Hybrid High

Master Studio

Winter semester 2020/21

Institutions _ MASTER STUDIO – GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY – UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & UBRAN PLANNING
Supervisors _ Prof Brian Cody, Prof Dragana Konstantinović, Christiane Wermke, Maja Momirov, Slobodan Jović, Sebastian Sautter, Aleksandar Tepavcević

IMPRESSUM

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Hybrid High is a joint study project of UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & UBRAN PLANNING, THE FACULTY OF TECHNICAL SCIENCES and GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY.

The subject of the study is the research of programmatic, design and energy characteristics of high-density buildings. A special focus of the work is the creation of a relationship between the concept of "design by energy" and the program structure of the building, which together create a space sensitive to the local context.

The location of the project is the corner of Bulevar Oslobodenja and Bulevar Kralja Petra I in Novi Sad, at the current location of the Lottery of Vojvodina.

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Projects

UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & UBRAN PLANNING

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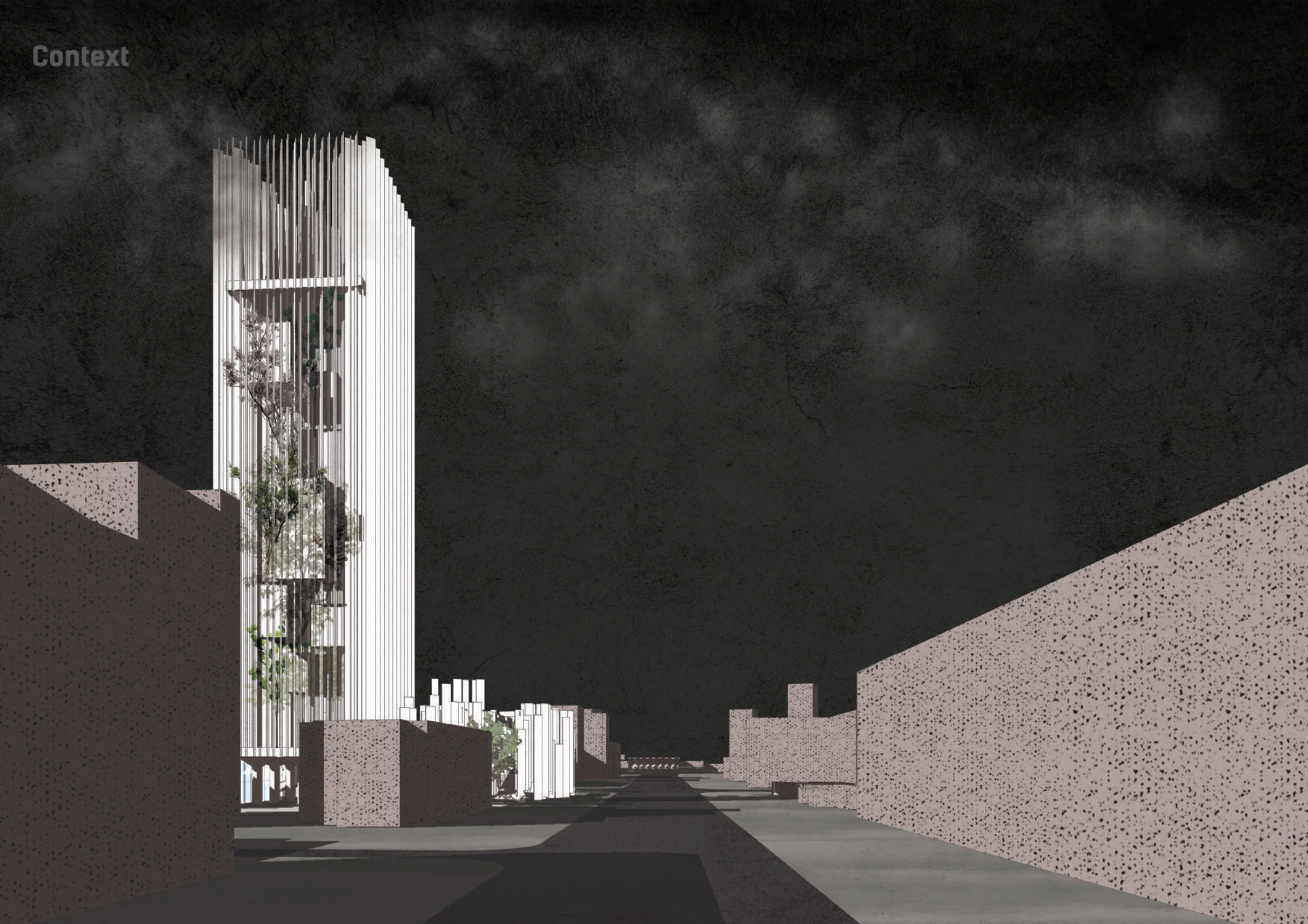
Off the grid / 2000 watt society

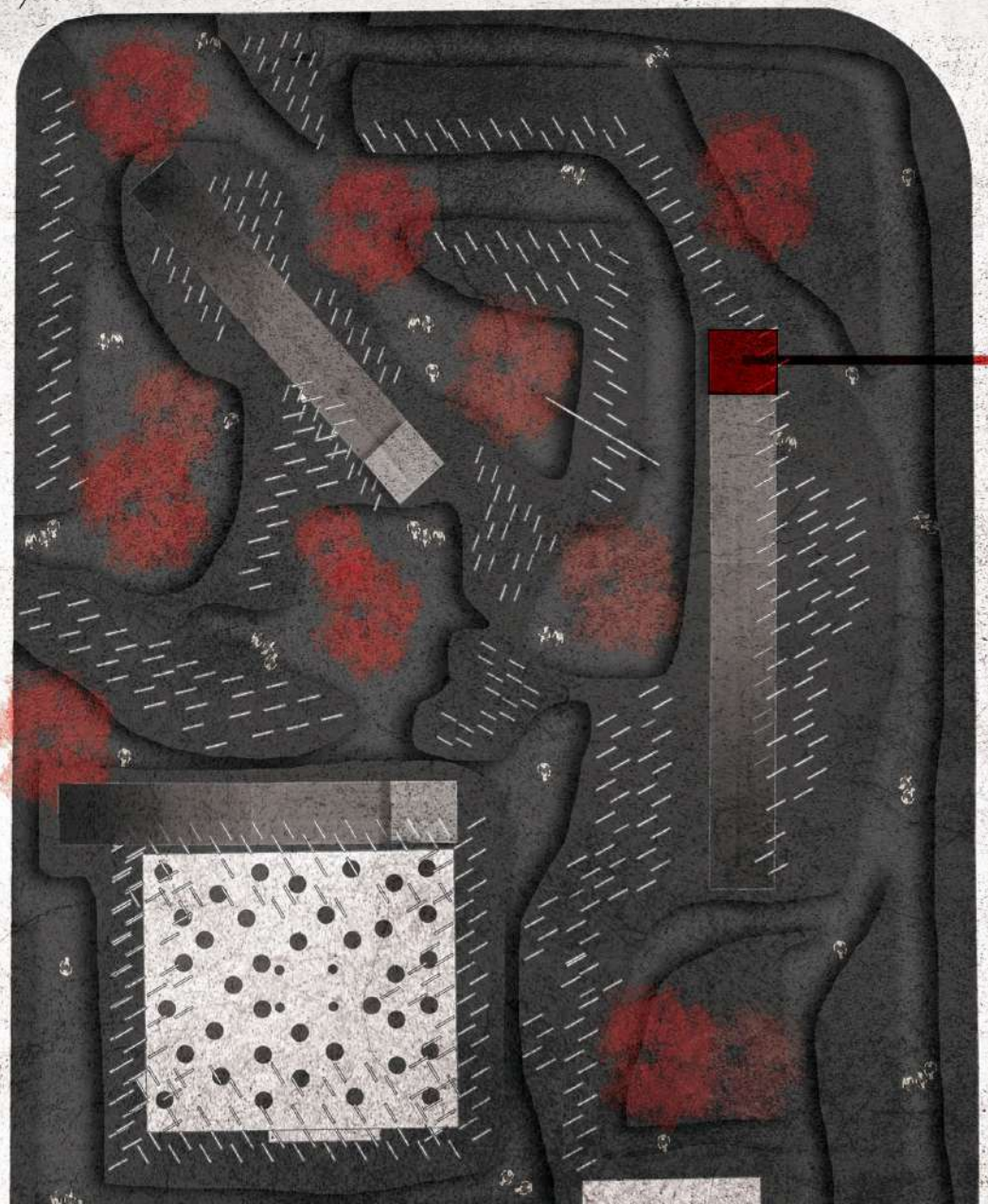
"***Off the grid / 2000 watt society***" is a project situated on Boulevard of liberation in Novi Sad. The concept revolves around the topic of **liberty** and **freedom** nowadays regarding internet, social media, fake news and companies tracking our movements, purchases, aspirations and personal relationships. *Off the grid* is an **enclave** contrasting its surroundings – a space free of internet, social media and external socio-political factors, therefore it is a safe space for inner self-reflection and finding freedom. By going vertically really high with the skyscraper, the unbuilt space (urban forest) is "a space given back to the city" – there is no strict borderline of the parcel since everyone is invited into this **extroverted extension of urban space**. Self-reflection and improvement is achieved through the greenery in the courtyard and peaceful atmosphere that consists of **meditation temples/chapels** (a ramp climbing up to each chapel meaning "rising to your peace and freedom"). This project is designed for everyone who is in need of "switch off and introspect" oasis, everyone who is struggling to find their freedom. Users of the space are voluntarily accepting change and are going through a "**cleansing cycle**" which starts in the urban forest and proceeds in the skyscraper functions (institutions of social work centre and regulatory centre for social media, independent NGO media/newspaper agencies, workshop/support joint space and finally, individual/isolation space accommodating users for possible longer periods of stay. Also, this project contains independent and **self-reliant 2000-watt energetic system**. This is achieved through distribution of the louvers (these solar panels are primary electricity resource and are also shielding the façade from radiation), panels in the urban forest which contain stone wool serving as noise reduction, heat/cold regulation chimney system, antennas that switch off any geotag or wifi connections (frequencies) and finally, the urban forest which reduces CO2.

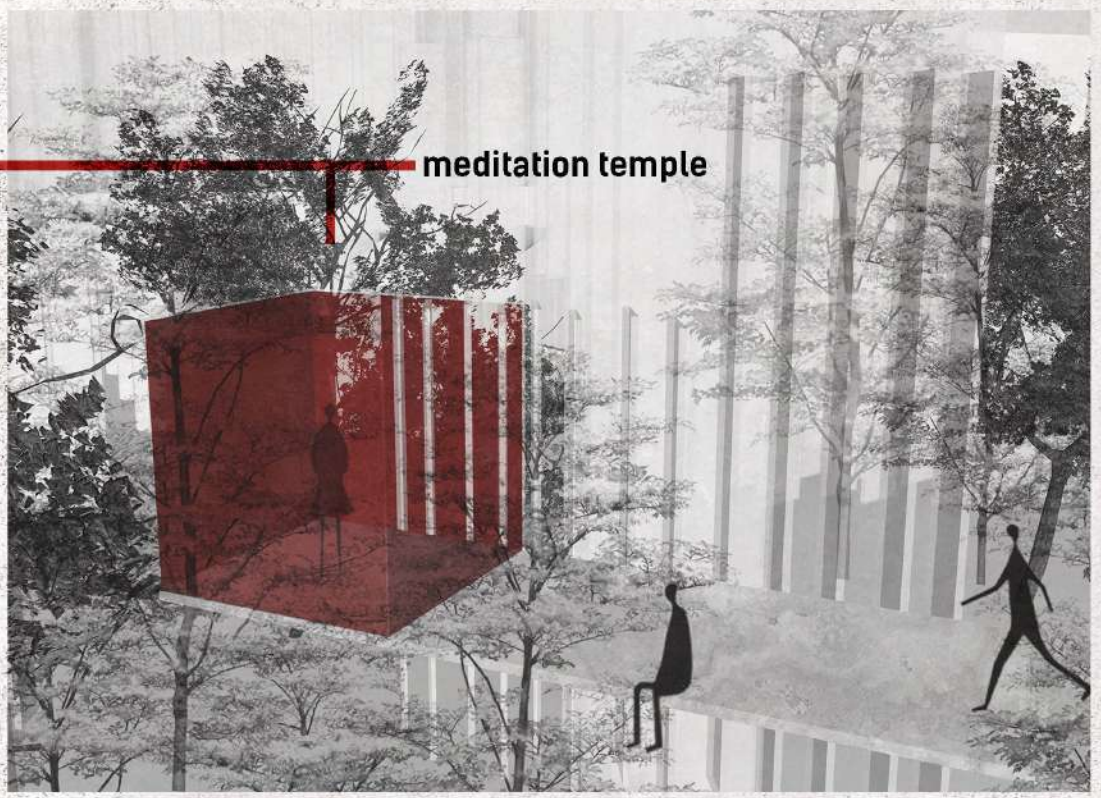
Situation plan



User pathways

User ambients






“Freedom is far more terrifying than slavery.”

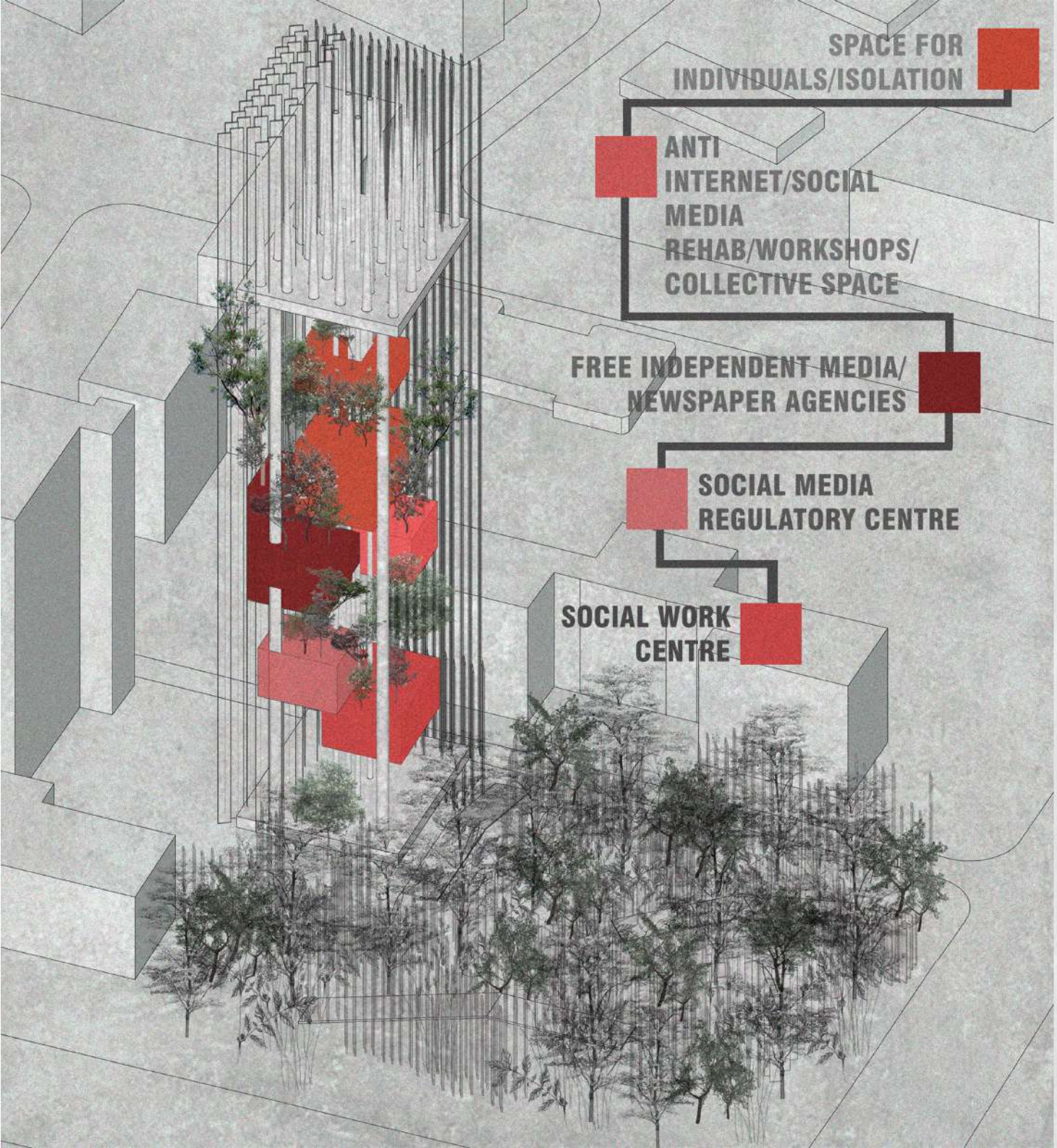
SPACE FOR INDIVIDUALS/ISOLATION

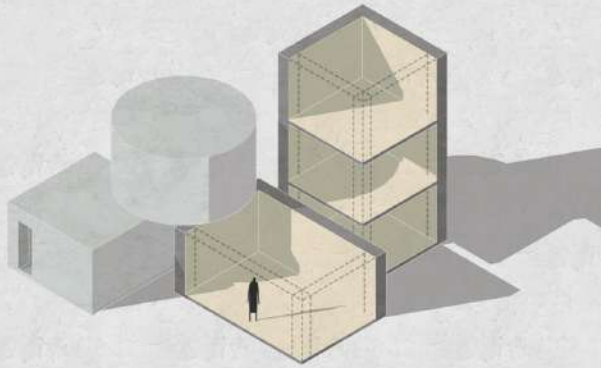
ANTI INTERNET/SOCIAL MEDIA REHAB/WORKSHOPS/ COLLECTIVE SPACE

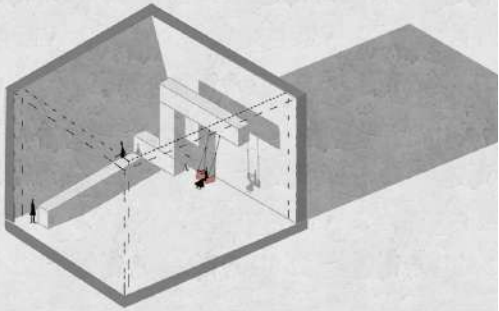
FREE INDEPENDENT MEDIA/ NEWSPAPER AGENCIES

SOCIAL MEDIA REGULATORY CENTRE

SOCIAL WORK CENTRE







Function distribution

The "cleansing cycle"

FREE INDEPENDENT MEDIA/
NEWSPAPER AGENCIES

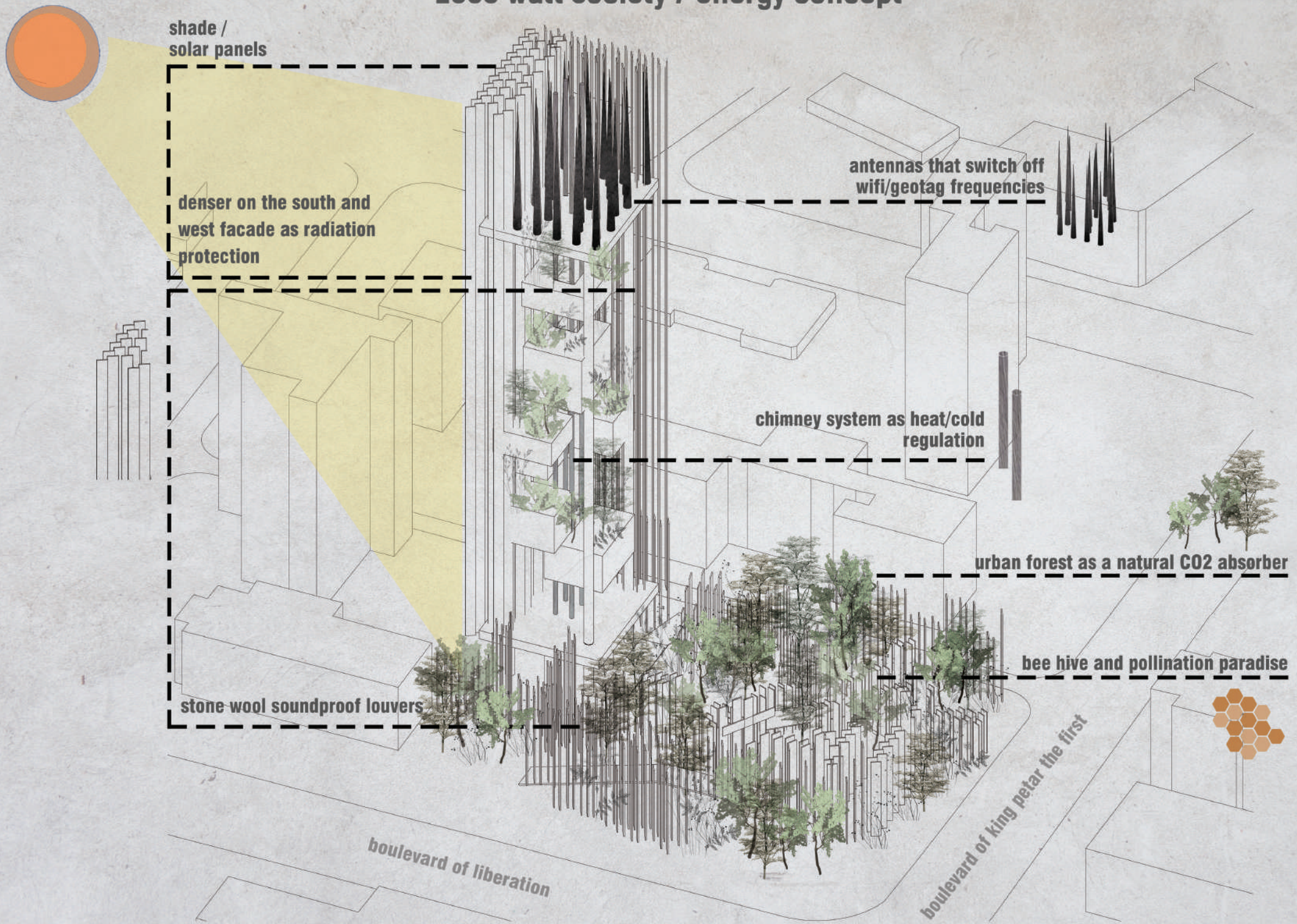
SOCIAL MEDIA REGULATORY CENTRE

SPACE FOR INDIVIDUALS/ISOLATION

ANTI INTERNET/SOCIAL MEDIA/REHAB/
WORKSHOPS/COLLECTIVE SPACE

SOCIAL WORK CENTRE

2000 watt society / energy concept



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Institutions For The Future – Re-thinking Worker's University

The project is located on one of the most frequent streets in Novi Sad, Boulevard of Liberation. Analyzing important institutional buildings and their history, we understood that common for all of these buildings is their white stone facade.

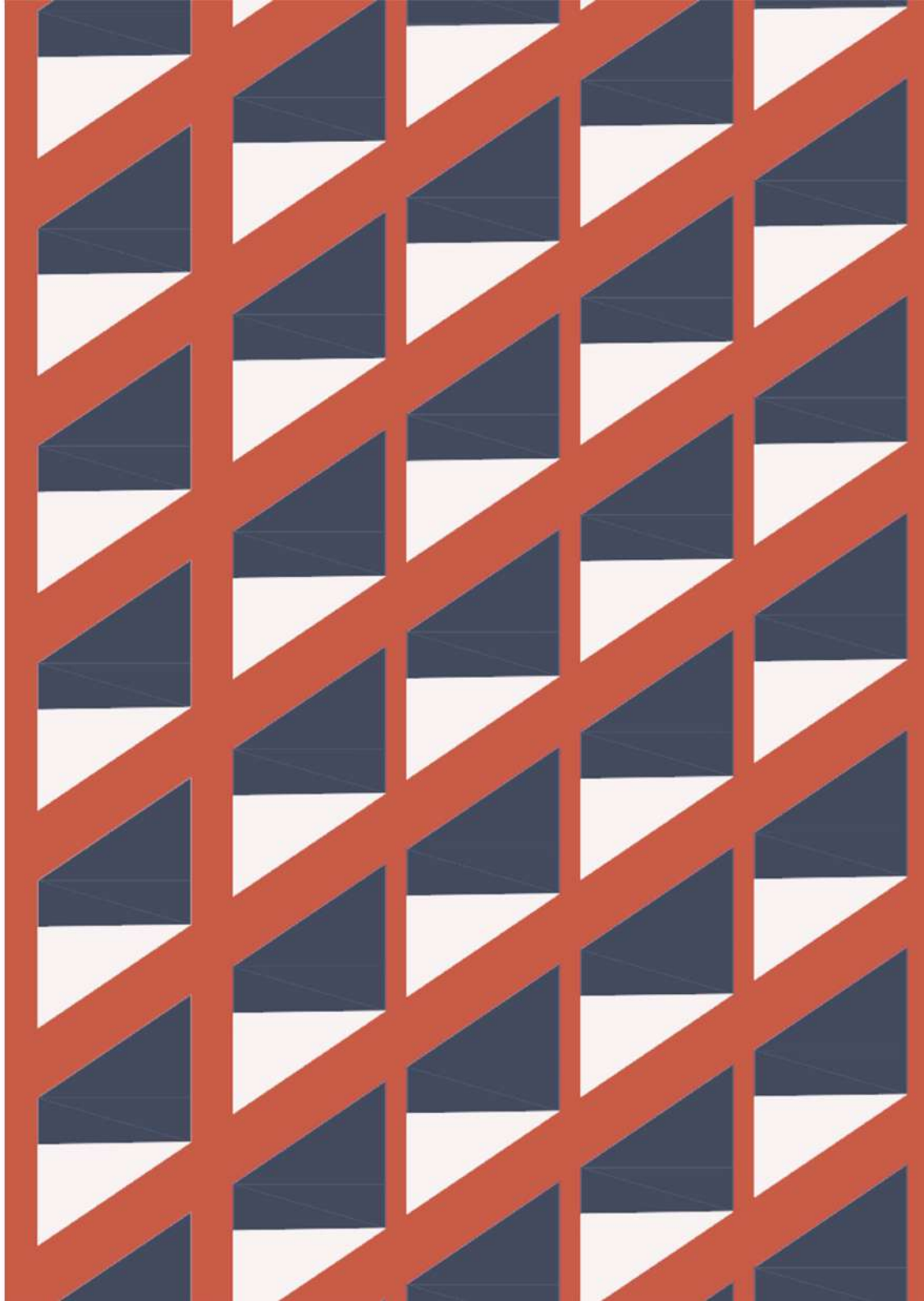
Considering this, but also chaotic atmosphere of our location, we decided to use a plain and uncomplicated facade that speaks to the past, but also set an example for possible architecture of the Boulevard in the future.

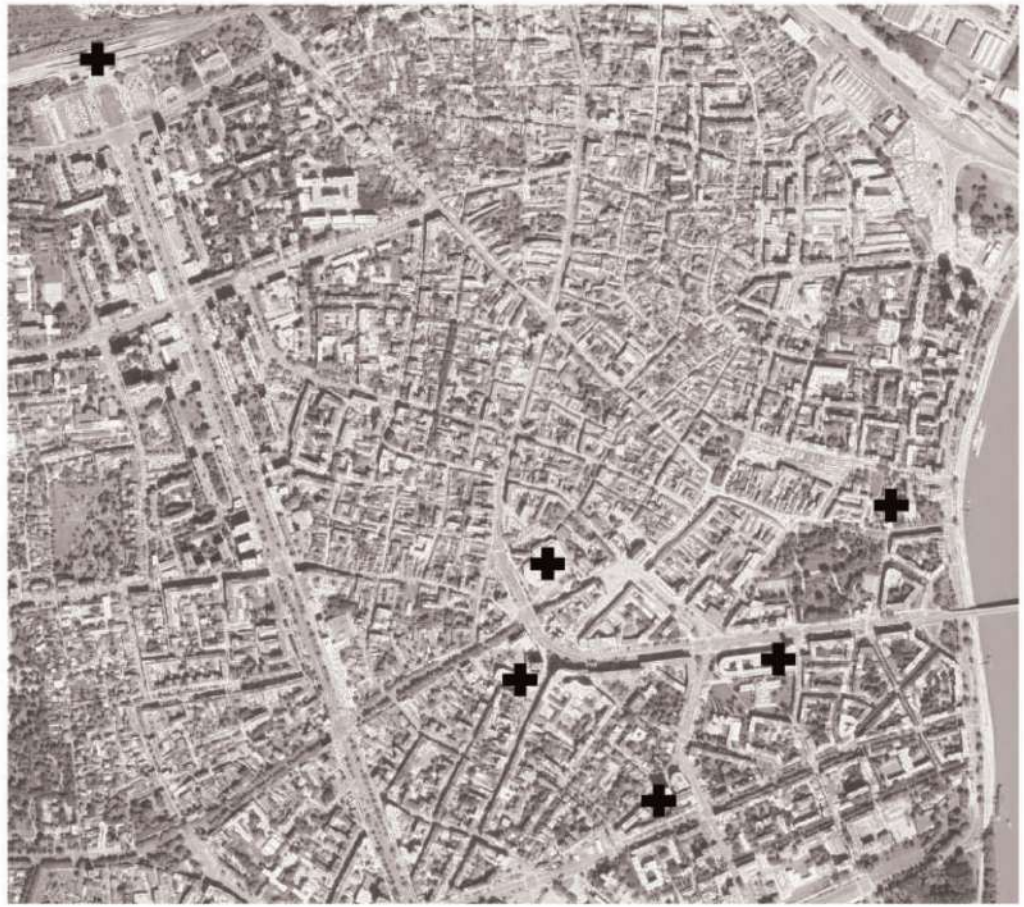
The Workers university as a program is allowing us to create space that has the main goal to offer education and improvement of qualification that will lead to a better job. Also, the quality of life of employees is considered, and we are creating a safe and suiting environment.

We can separate the building as Base and Tower, the base is imagined as chaotic, airy space, contrasting the institutional tower in program and aesthetics. Facade of the base is made of glass bricks, and it isnot fully transparent so the silhouette can be seen, which purpose is also to invite people inside the building.

The walls of the tower are angled and oriented in a way to provide enough daylight on all sides but to avoid direct sun and heat, in order to save as much energy as possible. The folded facade provides a free view, and creates plenty of diffused daylight by reflecting the direct sun between the interior panels.

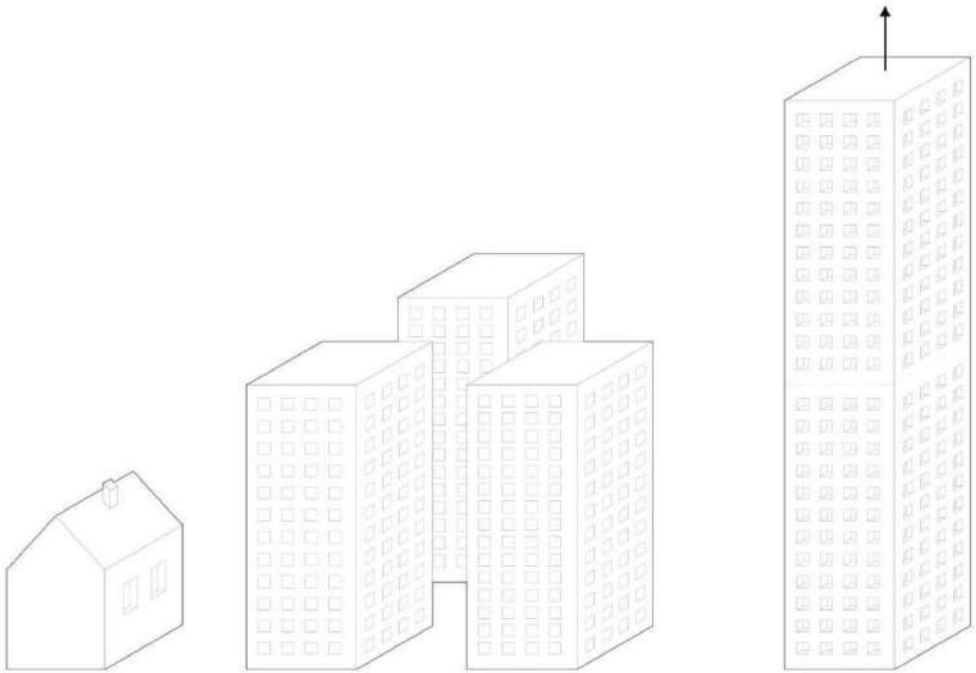
Considering the thickness of the walls, we decided to put all installations in, in order to have completely usable floor space. By representing more flexible ways of education, we decided to reflect that idea to the inside design of the building. System of curtains is used to partition the space and allow countless scenarios of operation and appearance.





new paradigm of education

old	new
• teach and move on	• circle of knowledge
• grading system with defined end	• continual lifelong learning
• memorizing	• relating
• strict already verified curriculum	• developing curriculum with students
• one discipline one teacher	• multi-discipline, more teachers
• classroom	• online learning, co-studying, co-classroom
• cultural uniformity	• diversity and commonality
• competitive	• cooperative
• impersonal relationship	• personal relationship

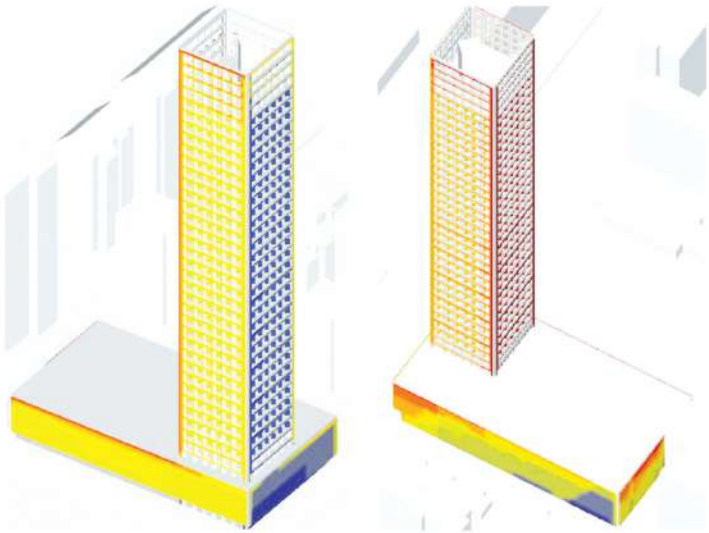


archetype

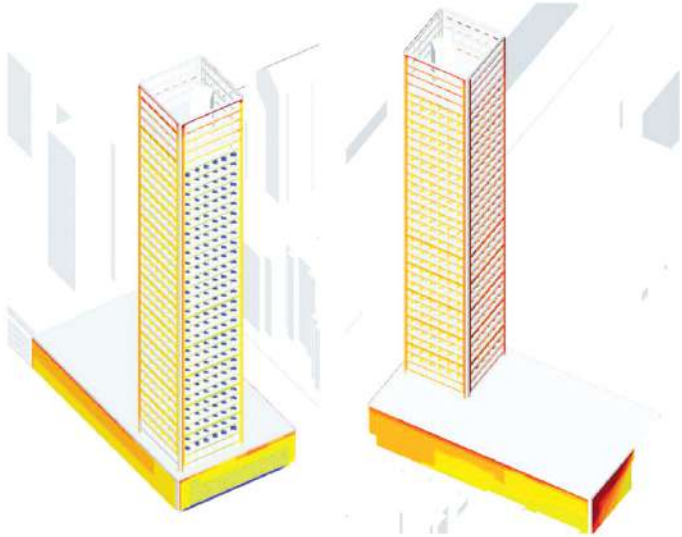
XX century towers

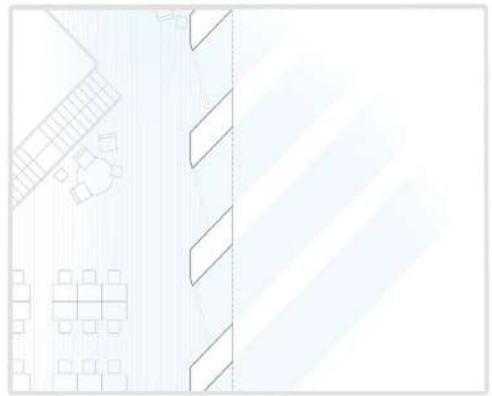
project

spring



summer

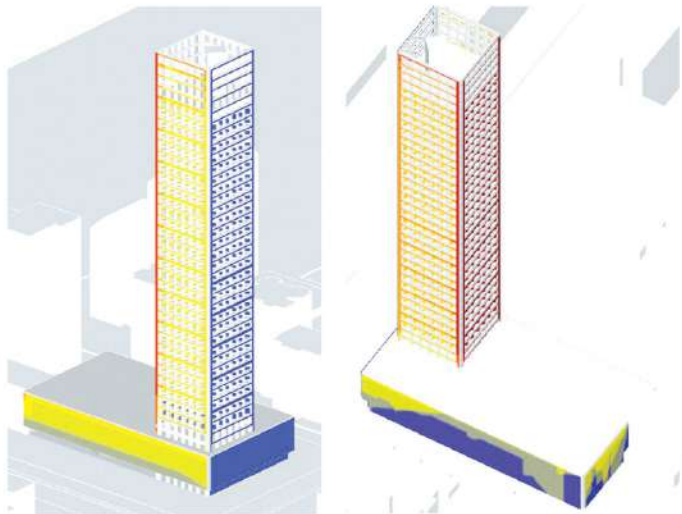


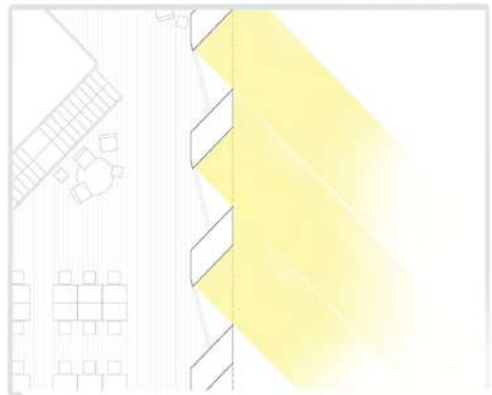


the folded facade provides a free view, and creates plenty of deffused daylight by reflecting the direct sun between the interior panels

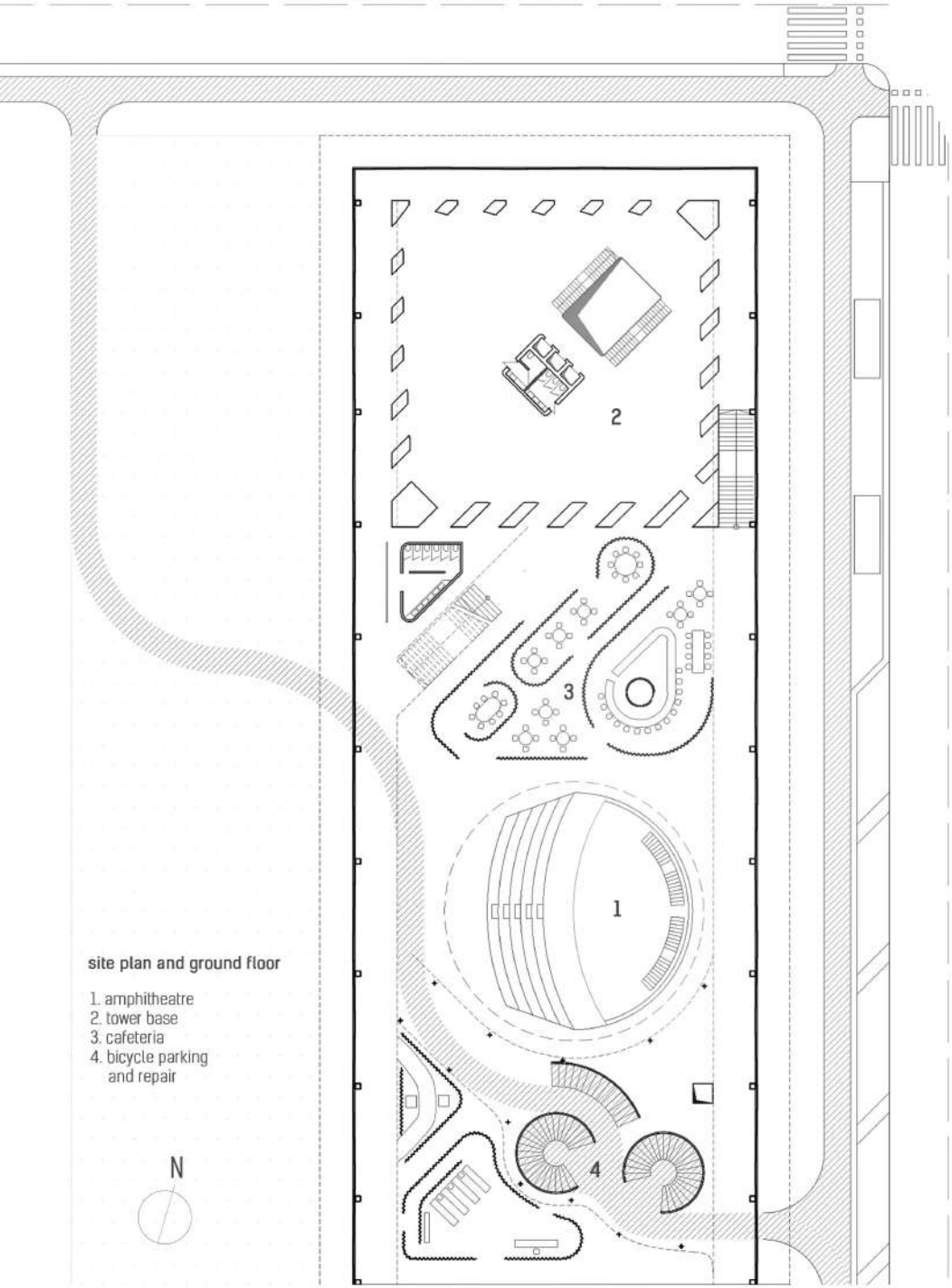
fall

winter



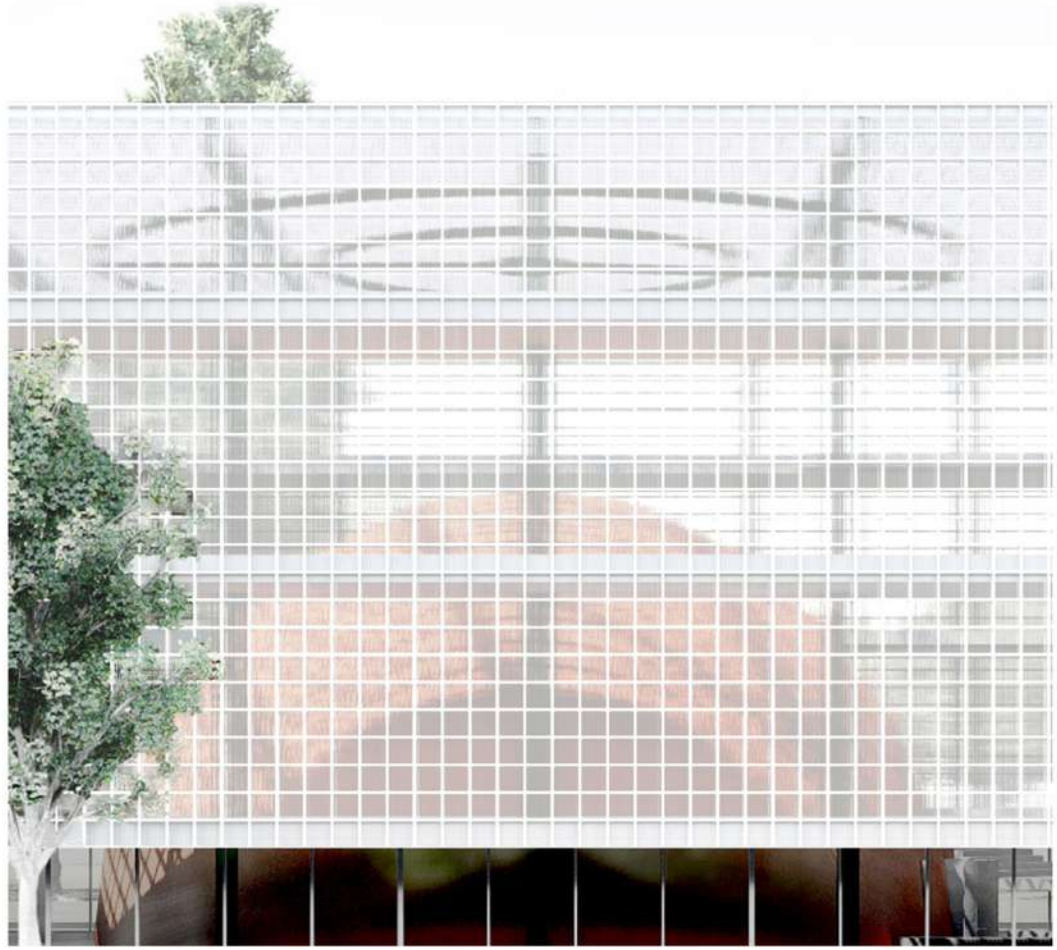


the folded wall reduce solar loads, by providing high insulation while blocking direct sunlight and allowing views outside

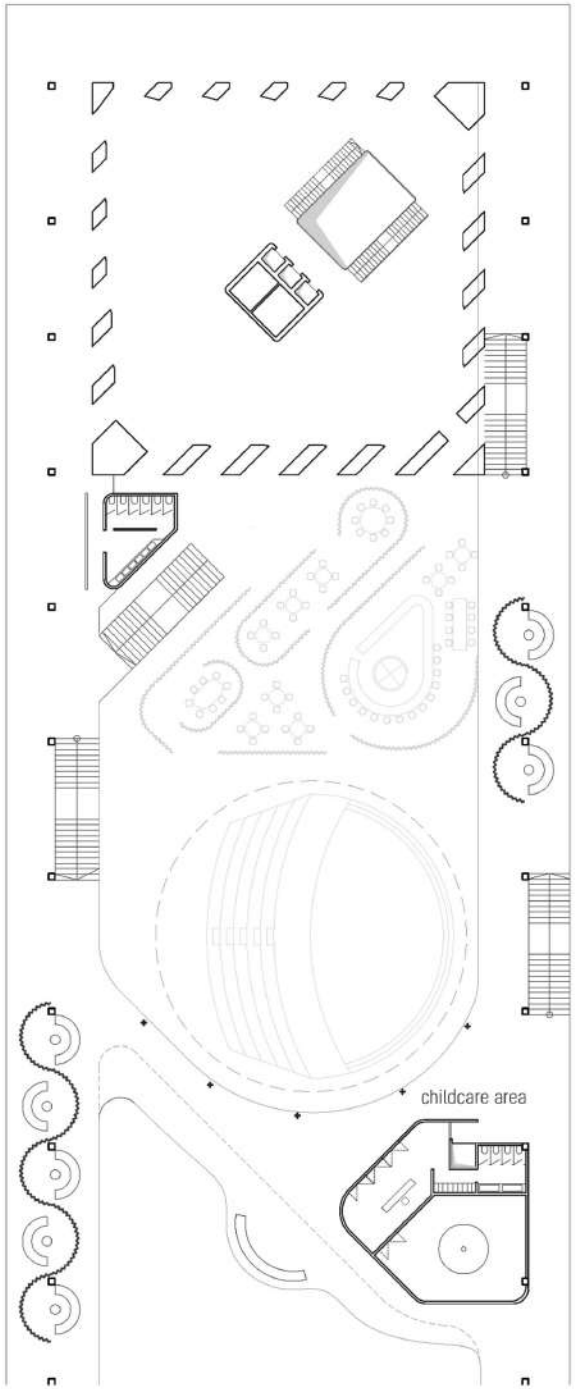


site plan and ground floor

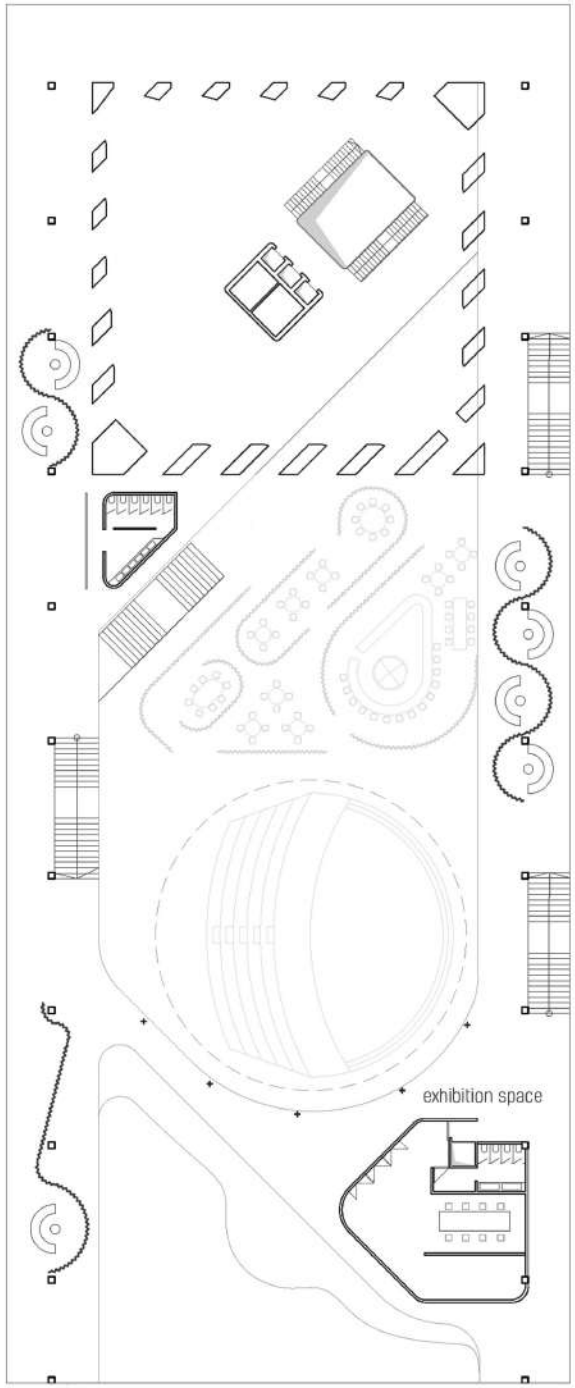
1. amphitheatre
2. tower base
3. cafeteria
4. bicycle parking and repair



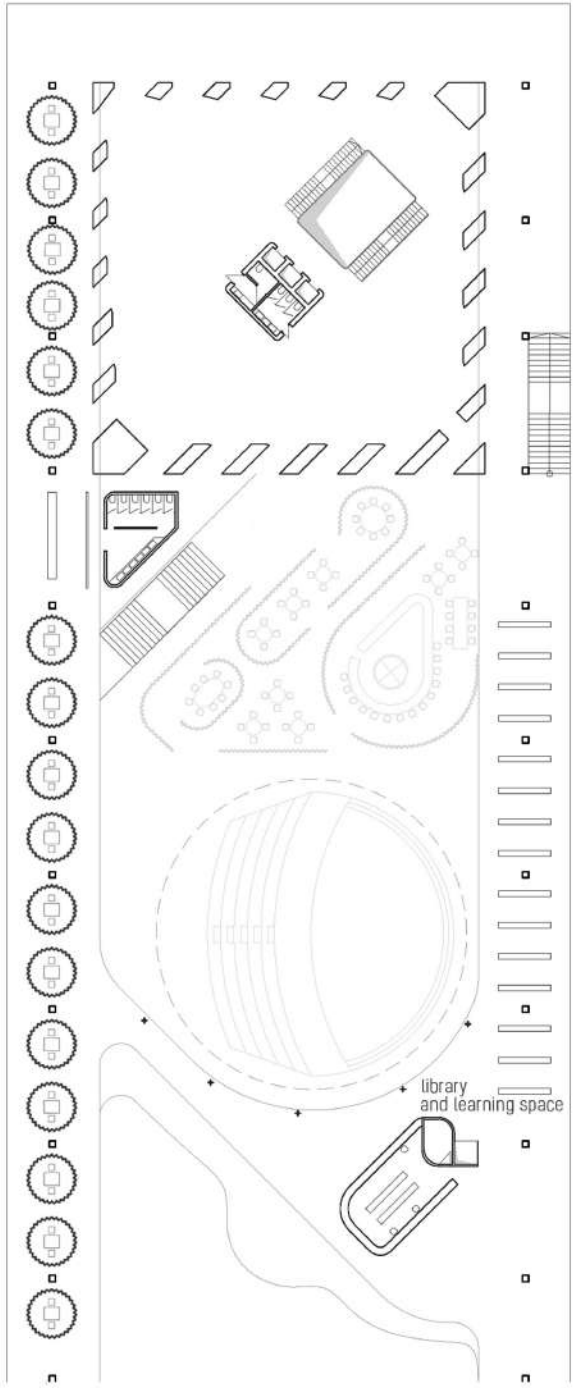
FIRST FLOOR (BASIS)

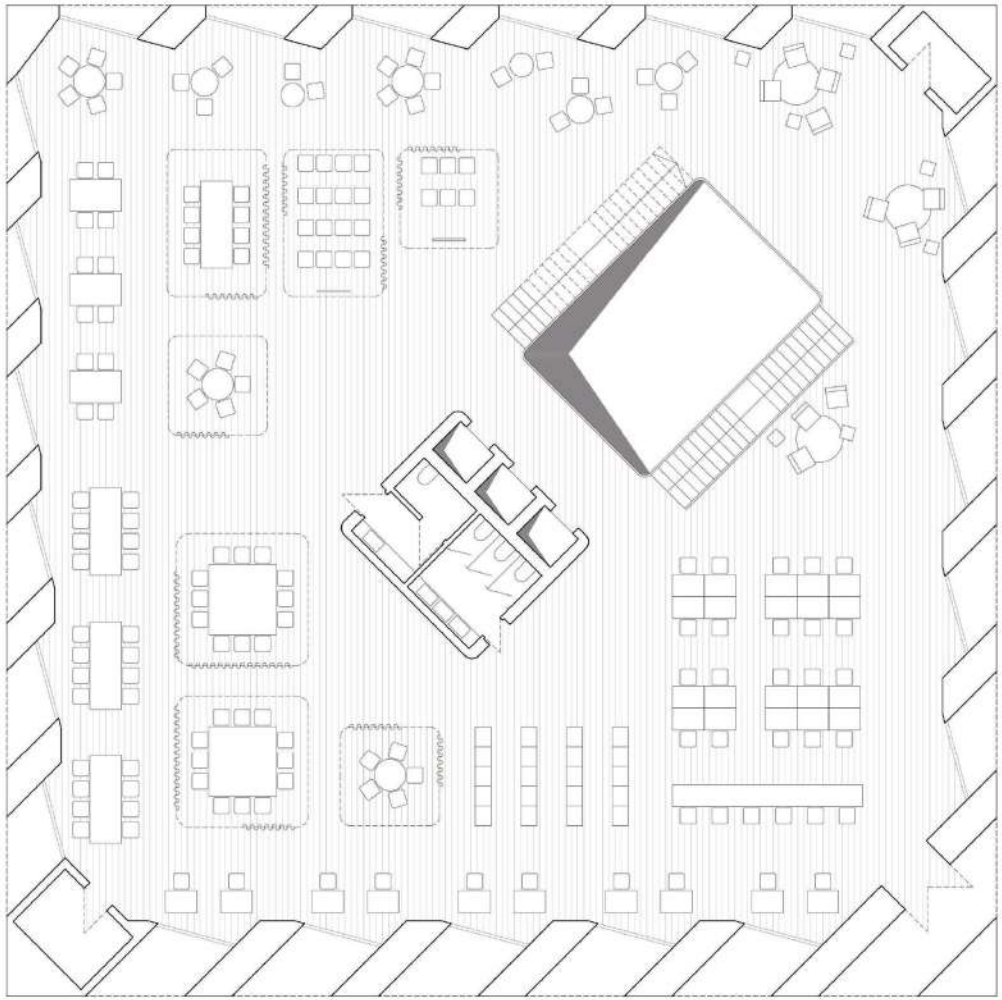


SECOND FLOOR (BASIS)

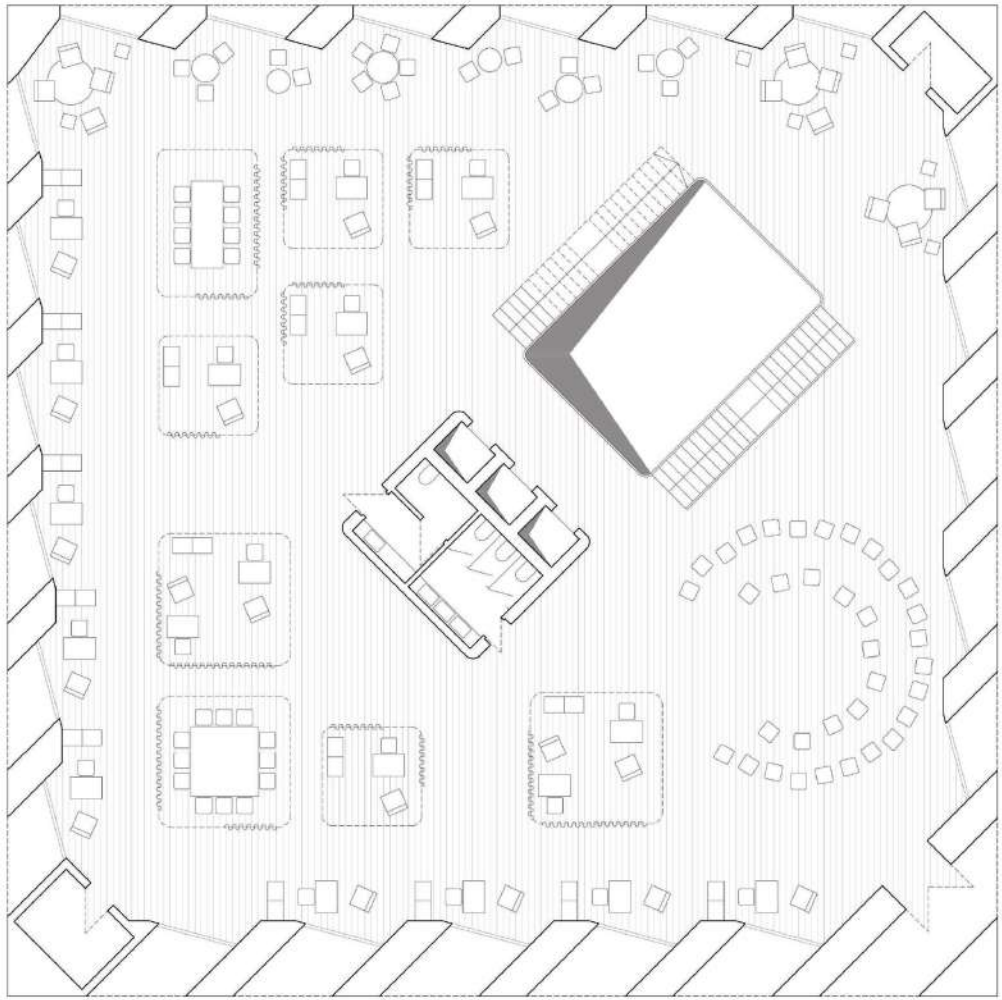


THIRD FLOOR (BASIS)

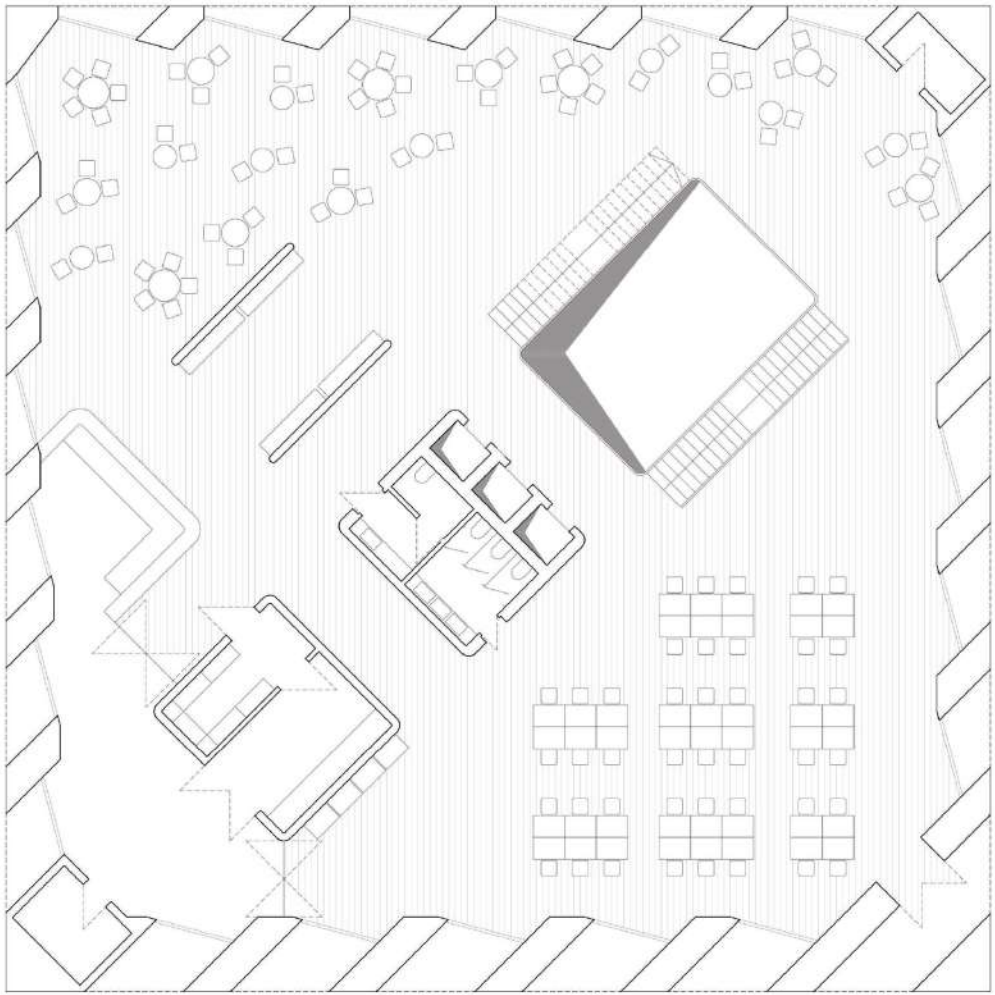




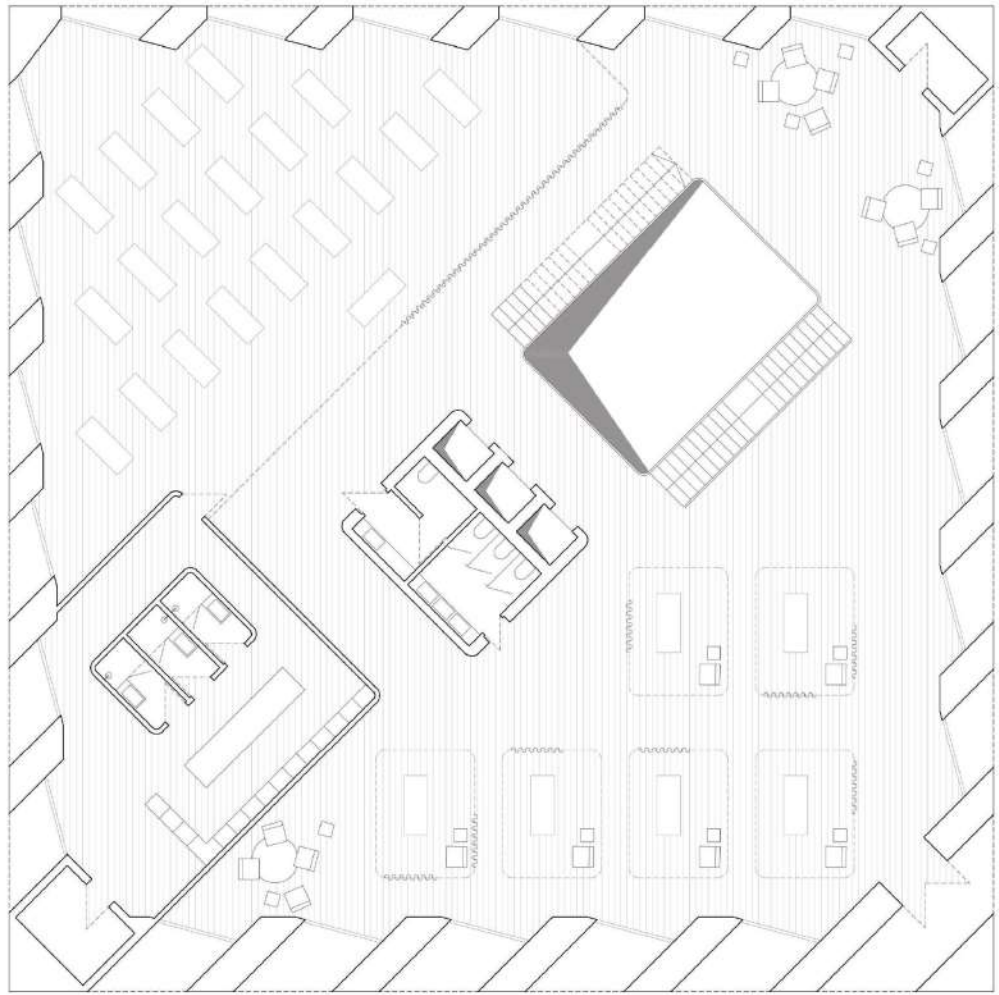
floorplan1: study space



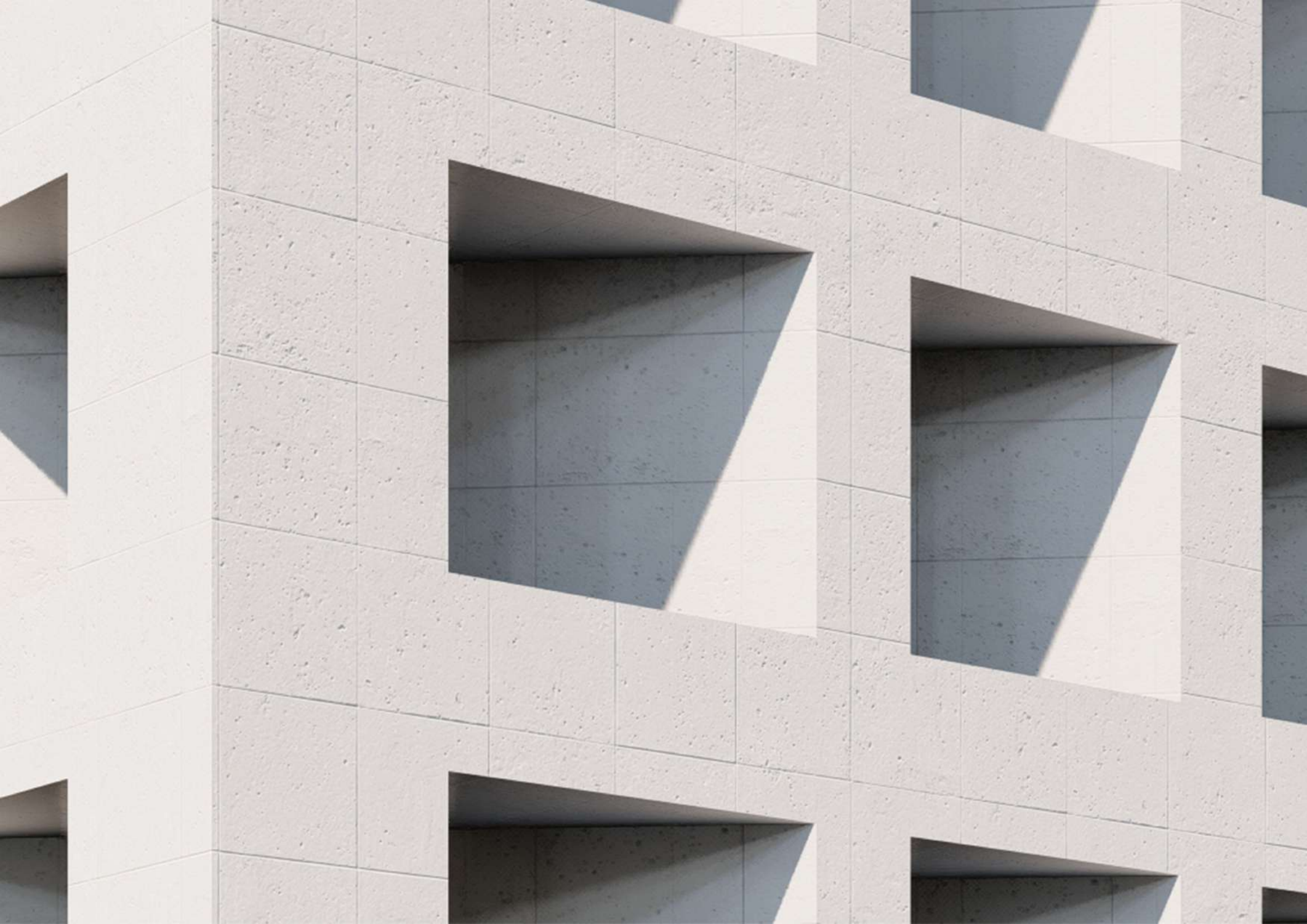
floorplan2: administration

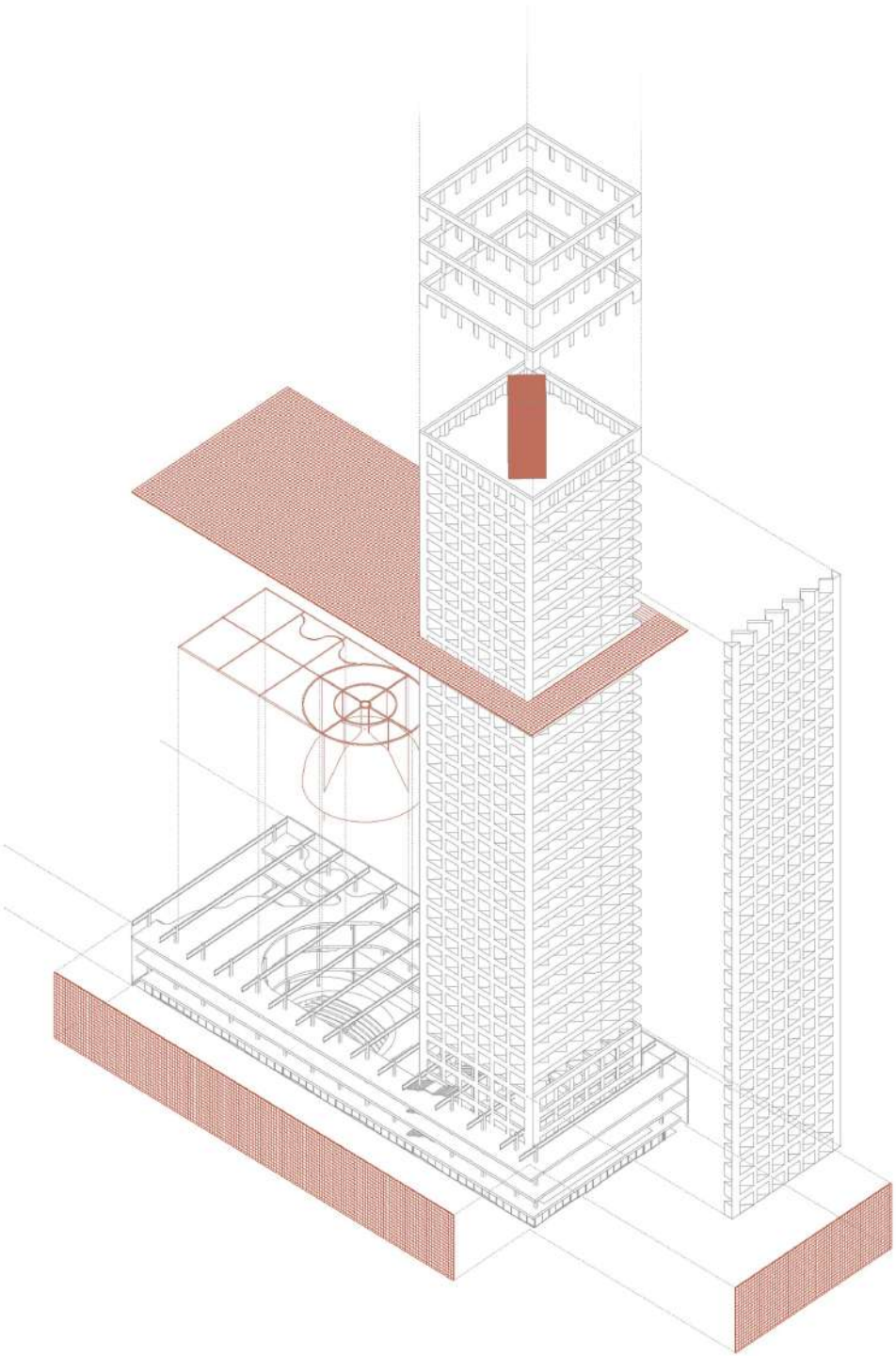


floorplan3: canteen/caffeteria



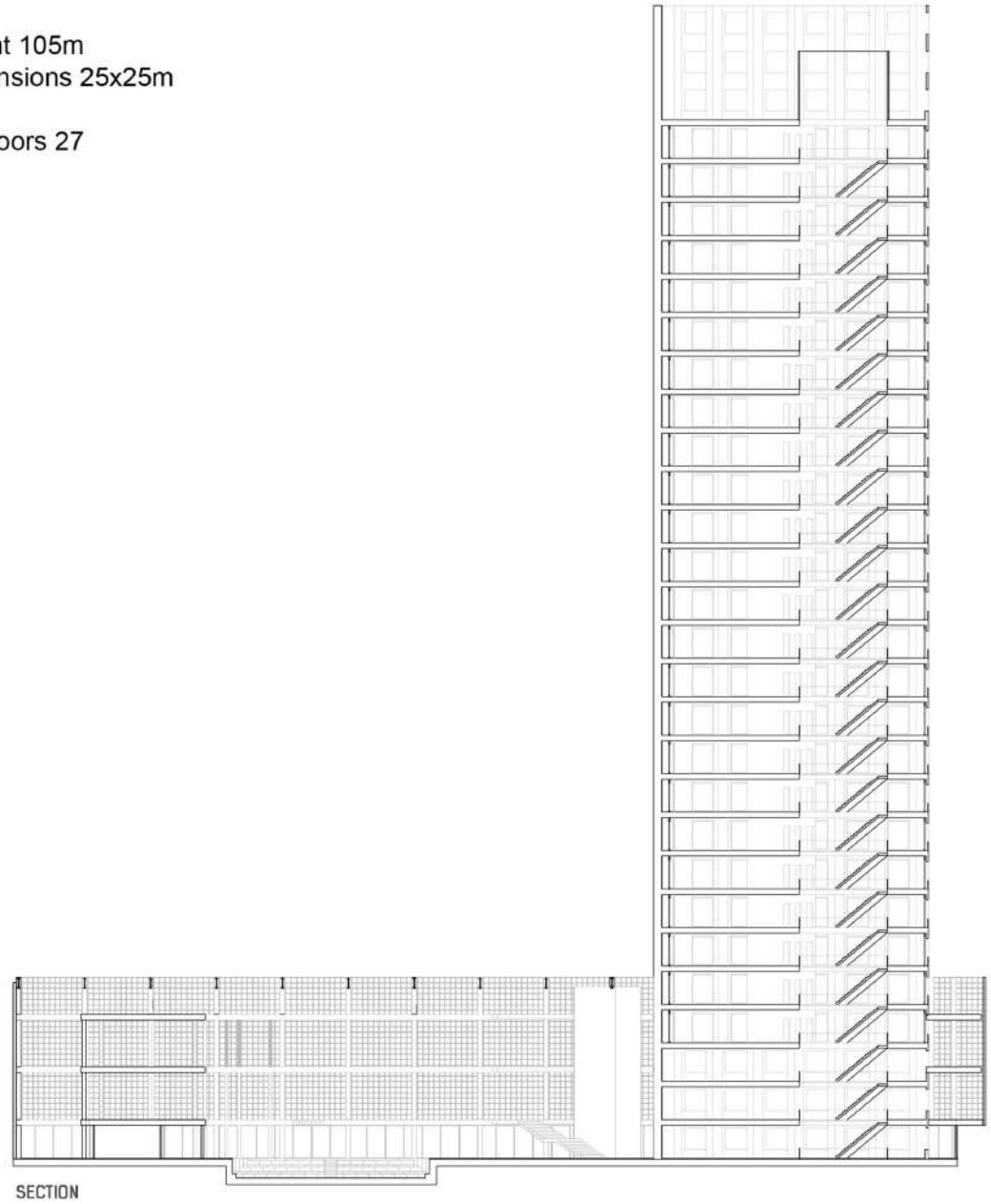
floorplan4: yoga/meditation space



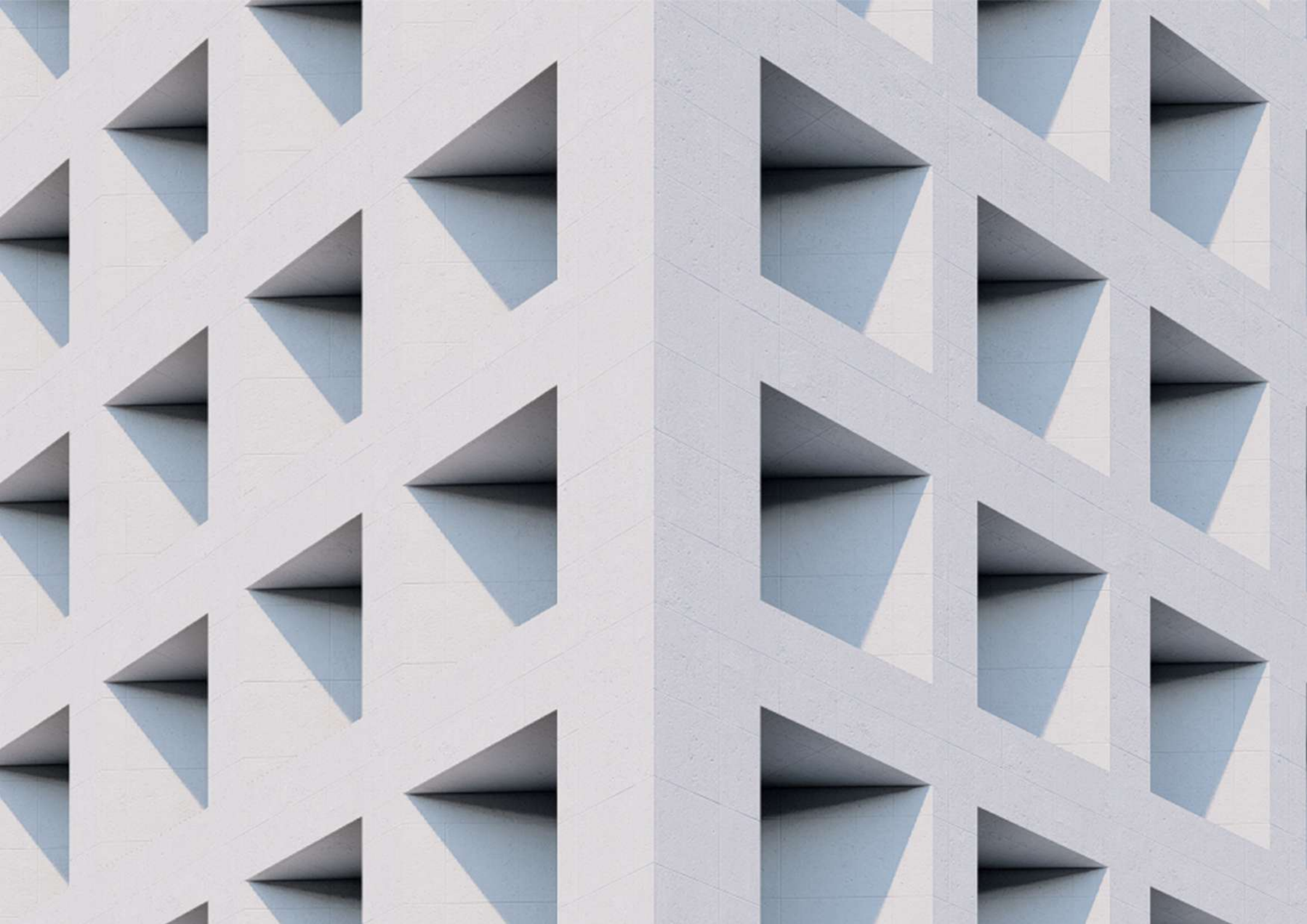


height 105m
dimensions 25x25m

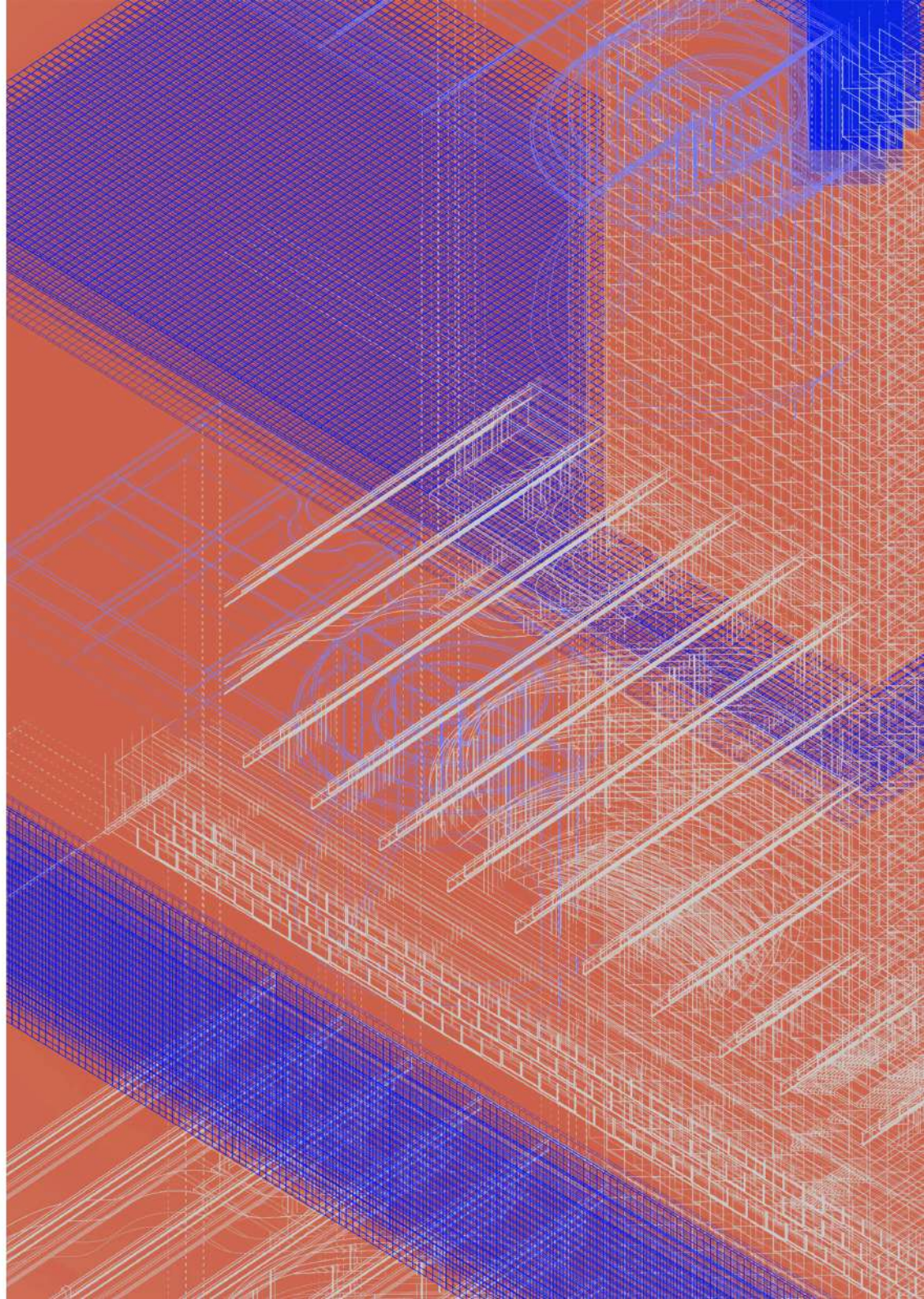
no. floors 27



SECTION



20/21



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AUTHORS _ MLADEN KESEGIĆ
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У Р Б А Н И
И Н К У Б А Т О Р
URBAN INCUBATOR

An incubator is a device used to grow and maintain life. The incubator maintains optimal temperature, humidity and other conditions such as the CO2 and oxygen content of the atmosphere inside.

Current studies show that Serbia is at the bottom of the list of European countries in terms of the amount of municipal waste recycled and composted per capita. The need for better waste management in Serbia was a starting point for the project ***Urban Incubator***.

The technology that our facility uses to achieve sustainability is the incineration of bio waste. The aim of the project was to offer a sustainable energy concept as a closed circle, where there are no by-products that pollute the environment.

All of the energy, generated from bio waste, is used to operate different parts of the building.

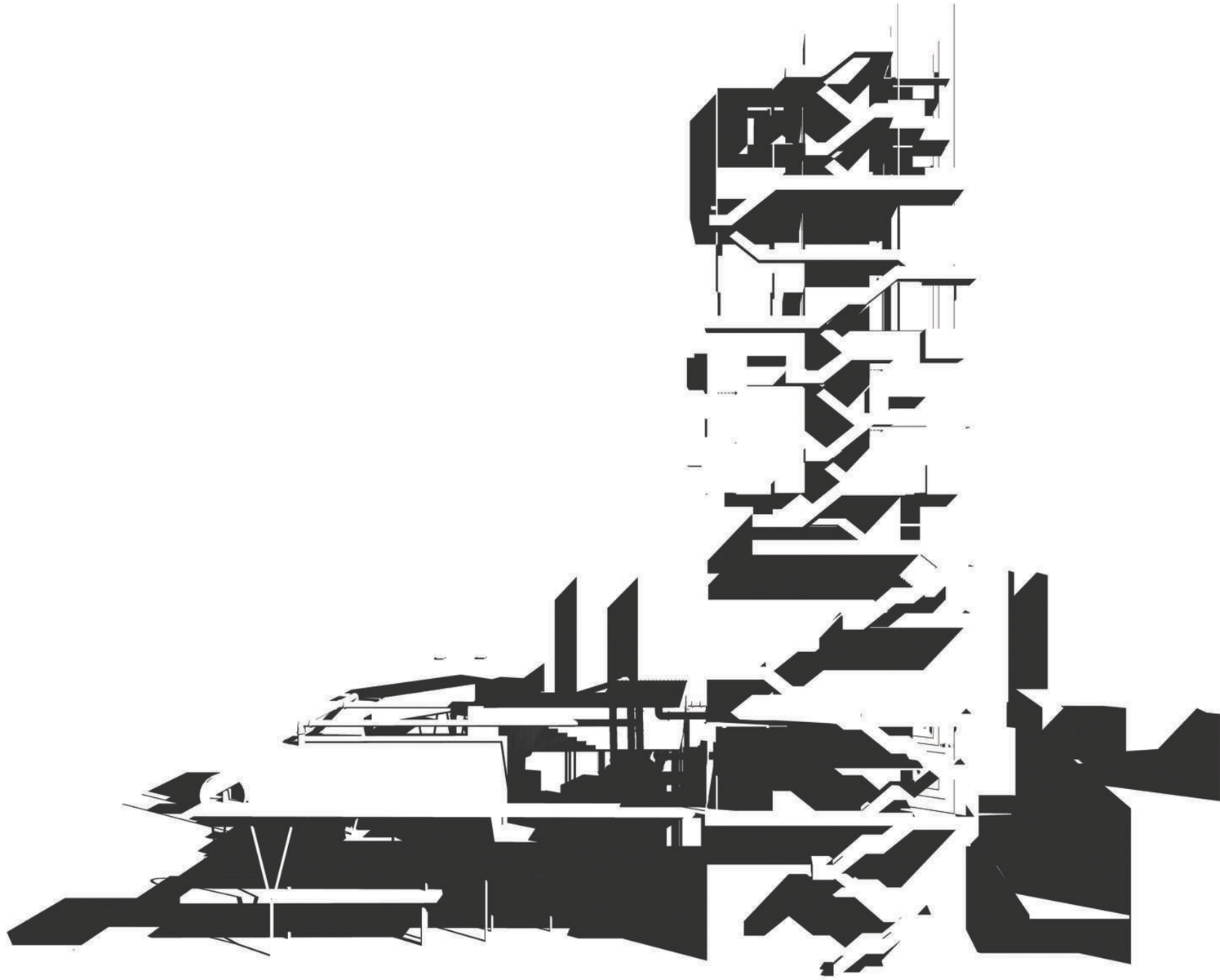
The second part of the research is based on a survey, where citizens of Novi Sad were asked, which institutions our city lacks. The answers we got showed that the Boulevard of Liberation deserves to be, as once promised, center of activities. Locals, stu dents, as well as passengers were included in the project.

The Urban Incubator is an educational, recreational and artistic platform for all of them. The concept of merging the factory part of the building with the mixed-use part creates a raw, genuine structure, revealing both characters of the building at the same time.

As the Boulevard becomes the center of activities, it appears necessary to put people in focus. By lowering the car traffic underground, a square is created at the intersection of the Boulevard of Liberation and King Peter, to which our building is connected via an amphitheater.

The tower comes as a clear reference to the proportions of context towers. It is enclosed and solid, for smaller groups or individuals.

The space is defined by human activity, the concept of the project is a space based on atmospheres, rather than formal typology. It allows connection and independence at the same time.

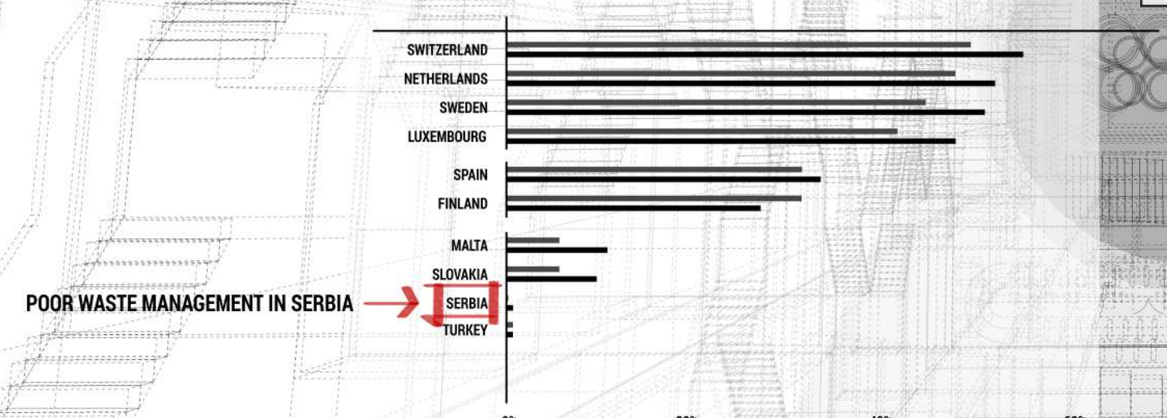


Students: Mladen Kesegić a7 27/2020 Anastasija Radovanović a7 50/2020 Iva Pejčić a7 52/2020

125 t/DAY ORGANIC WASTE (0.4kg/PERSON)

22 t/DAY FOR THE ELECTRICITY OF THE HYBRID
= 4 SMALL TRUCKS/DAY (5.5t/TRUCK)

COUNTRY COMPARISON - MUNICIPAL WASTE RECYCLED AND COMPOSTED IN EACH EUROPEAN COUNTRY

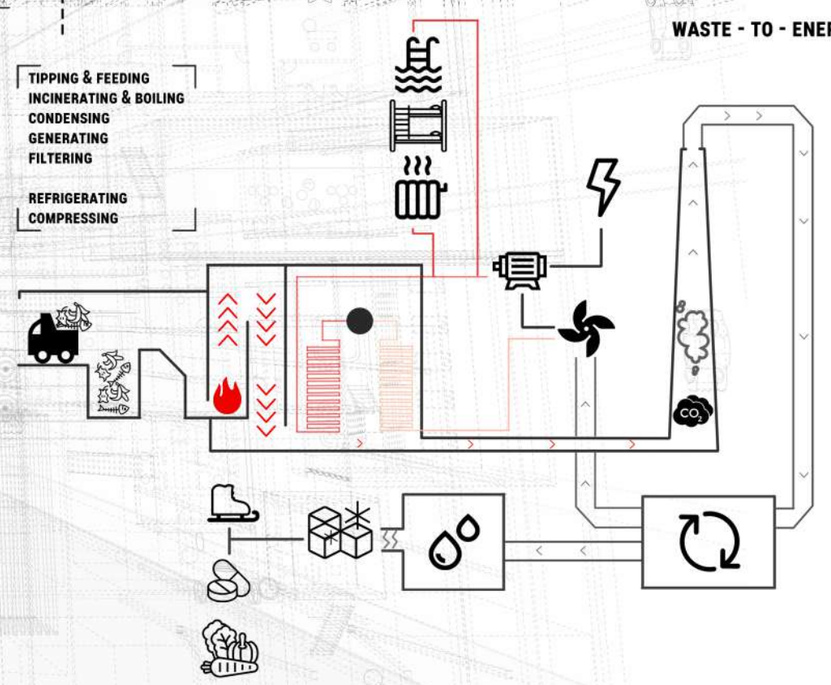


POOR WASTE MANAGEMENT IN SERBIA

WASTE - TO - ENERGY

TIPPING & FEEDING
INCINERATING & BOILING
CONDENSING
GENERATING
FILTERING

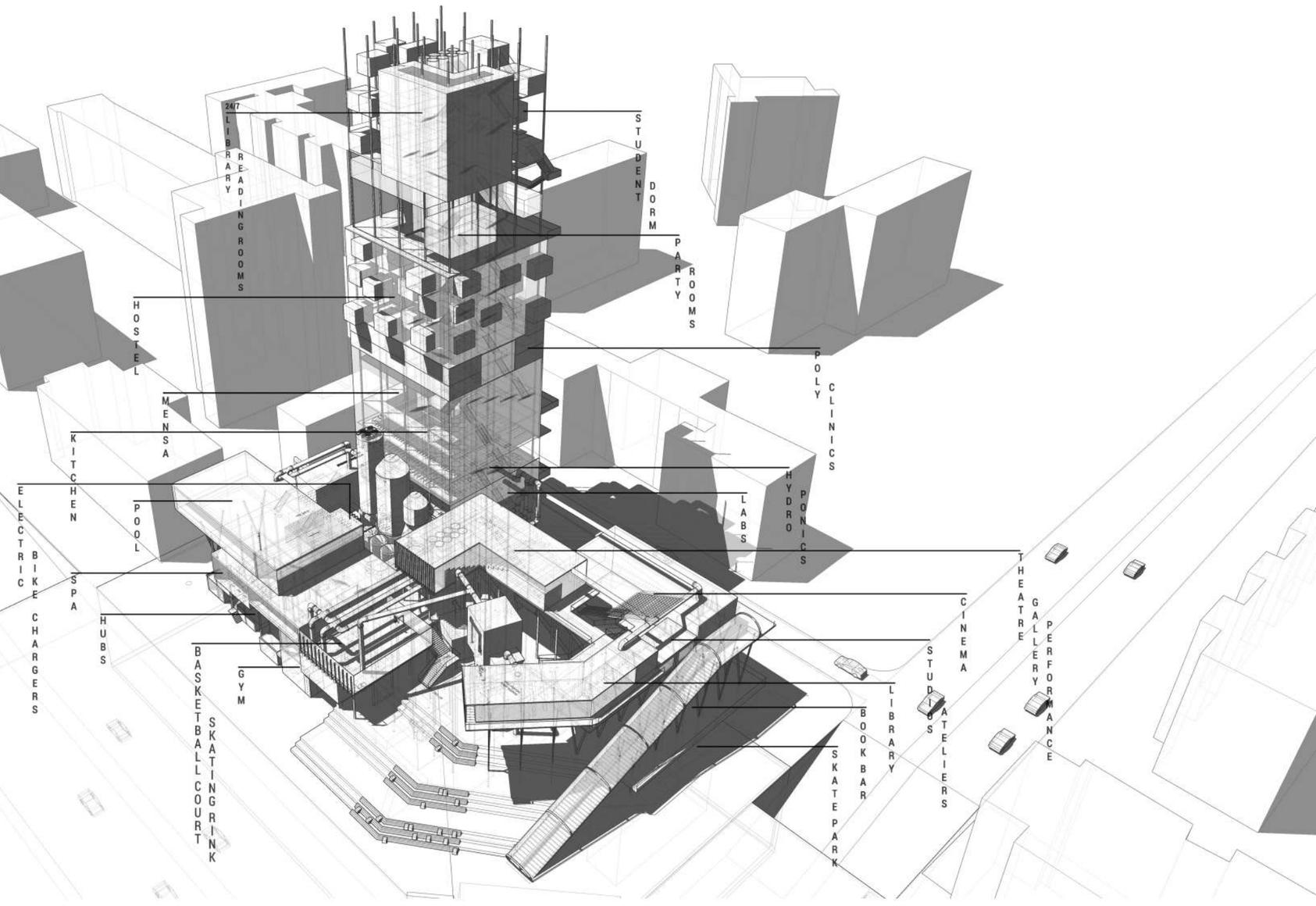
REFRIGERATING
COMPRESSING

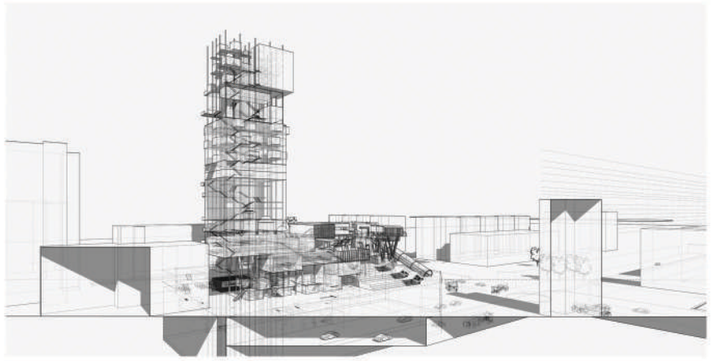


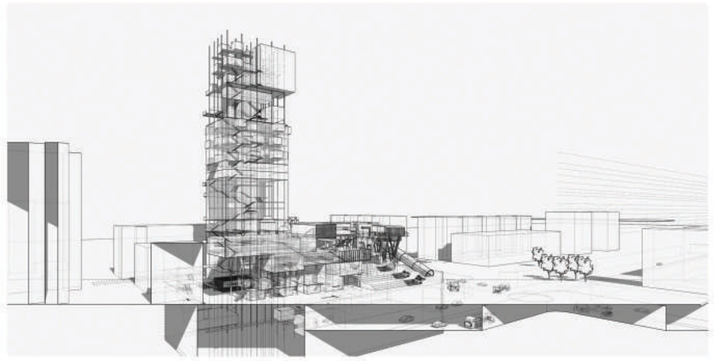
questionnaire

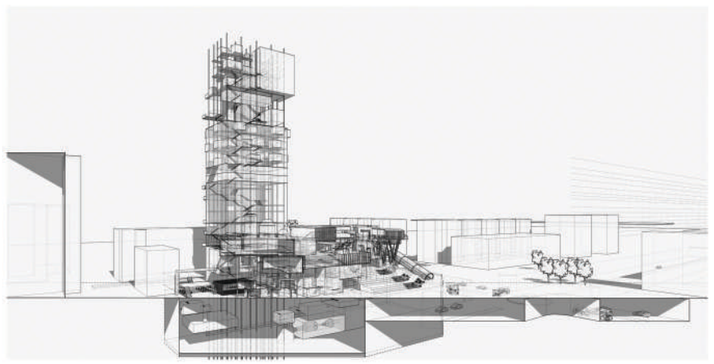
1. In your opinion, which institutions are missing on the territory of Novi Sad?
2. What do you think the city needs from the (a)typical facilities near the train station?
3. What contents from the past do you miss on the territory of Novi Sad?

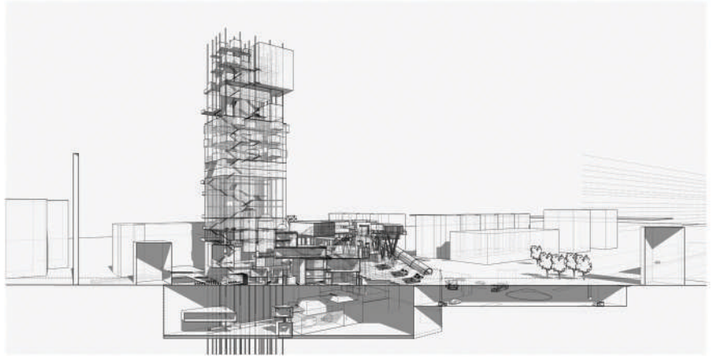
40.4% EDUCATION
52.9% ART
40.4% SPORT & RECREATION
32.7% MEDICINE
12.3% TEMPORARY ACCOMMODATION

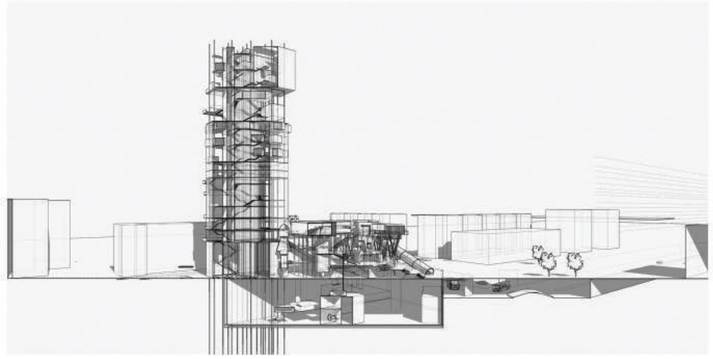


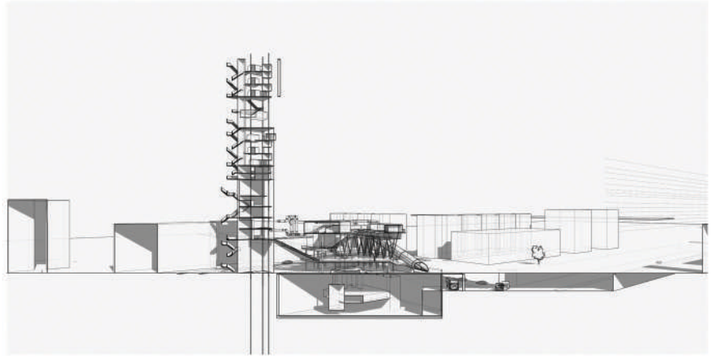


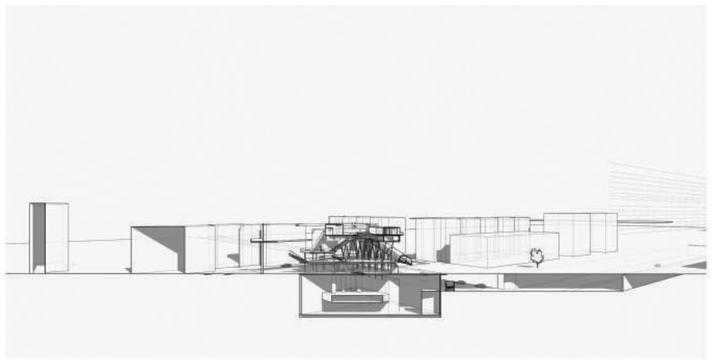


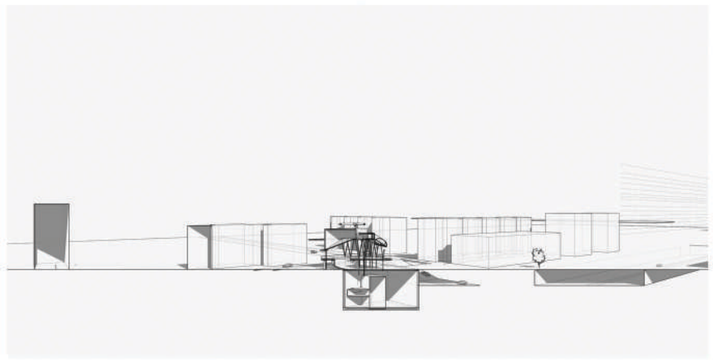






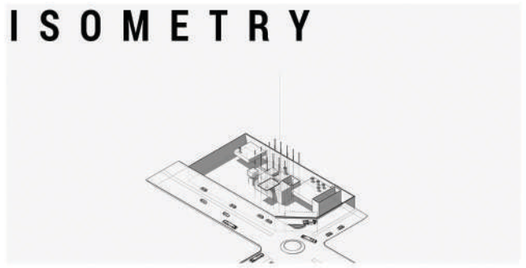


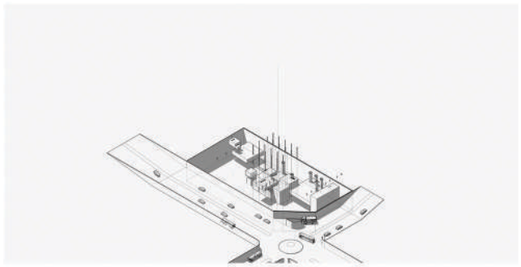


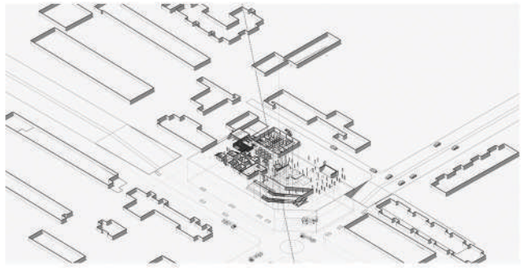


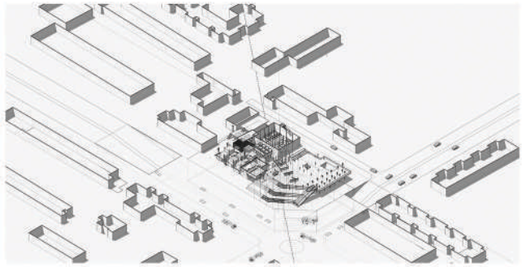
SECTIONS

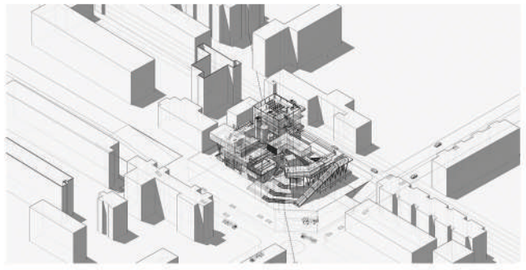
ISOMETRY

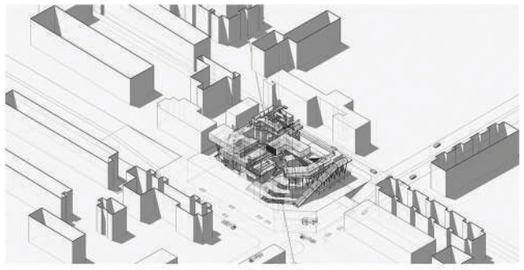


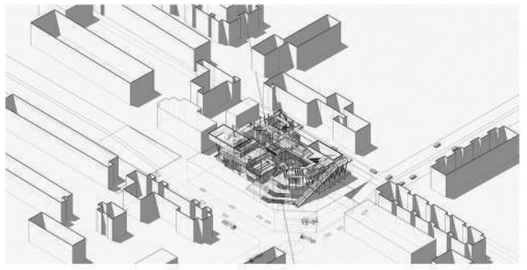


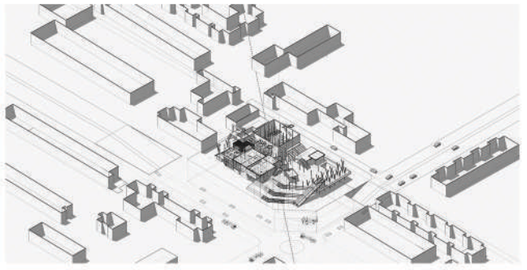


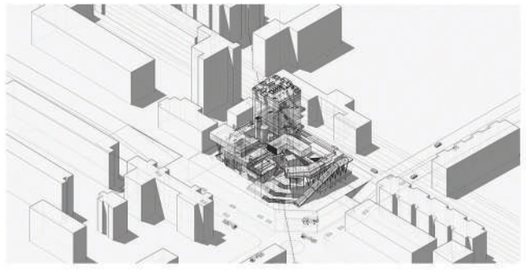


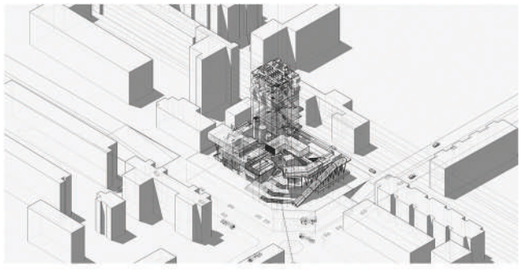


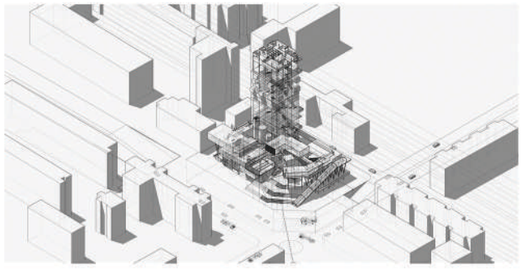


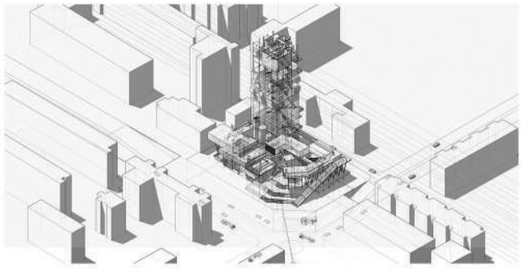


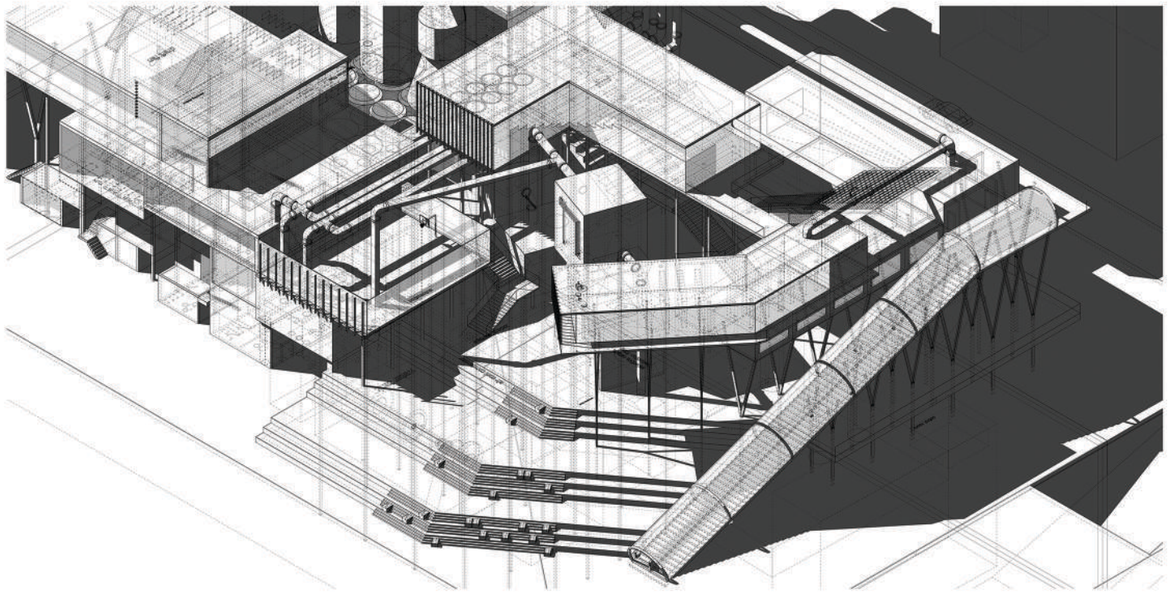


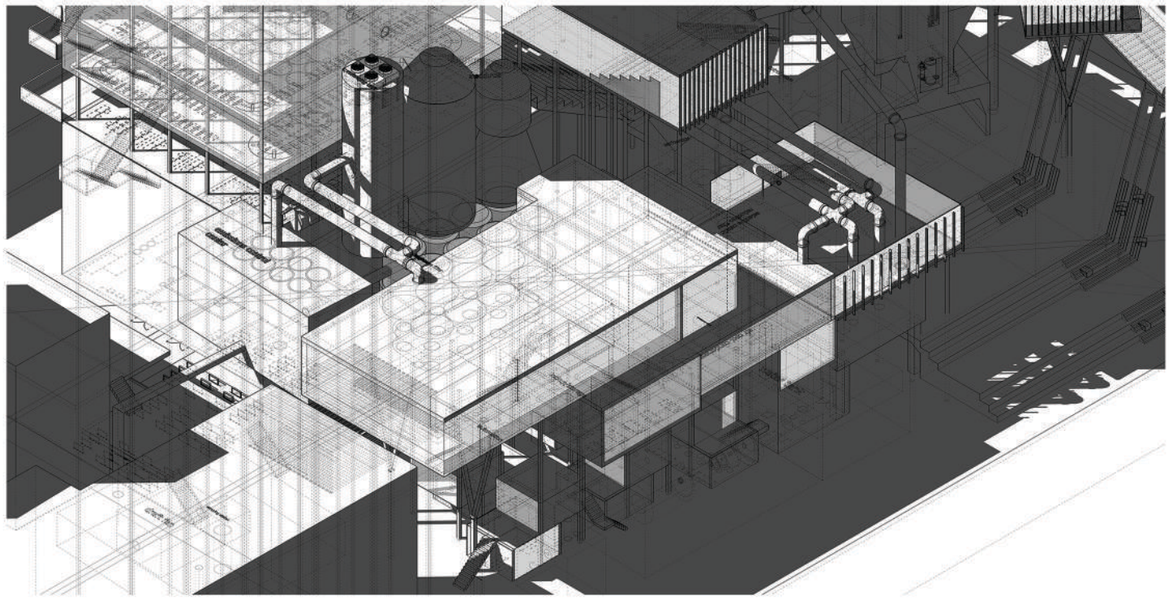


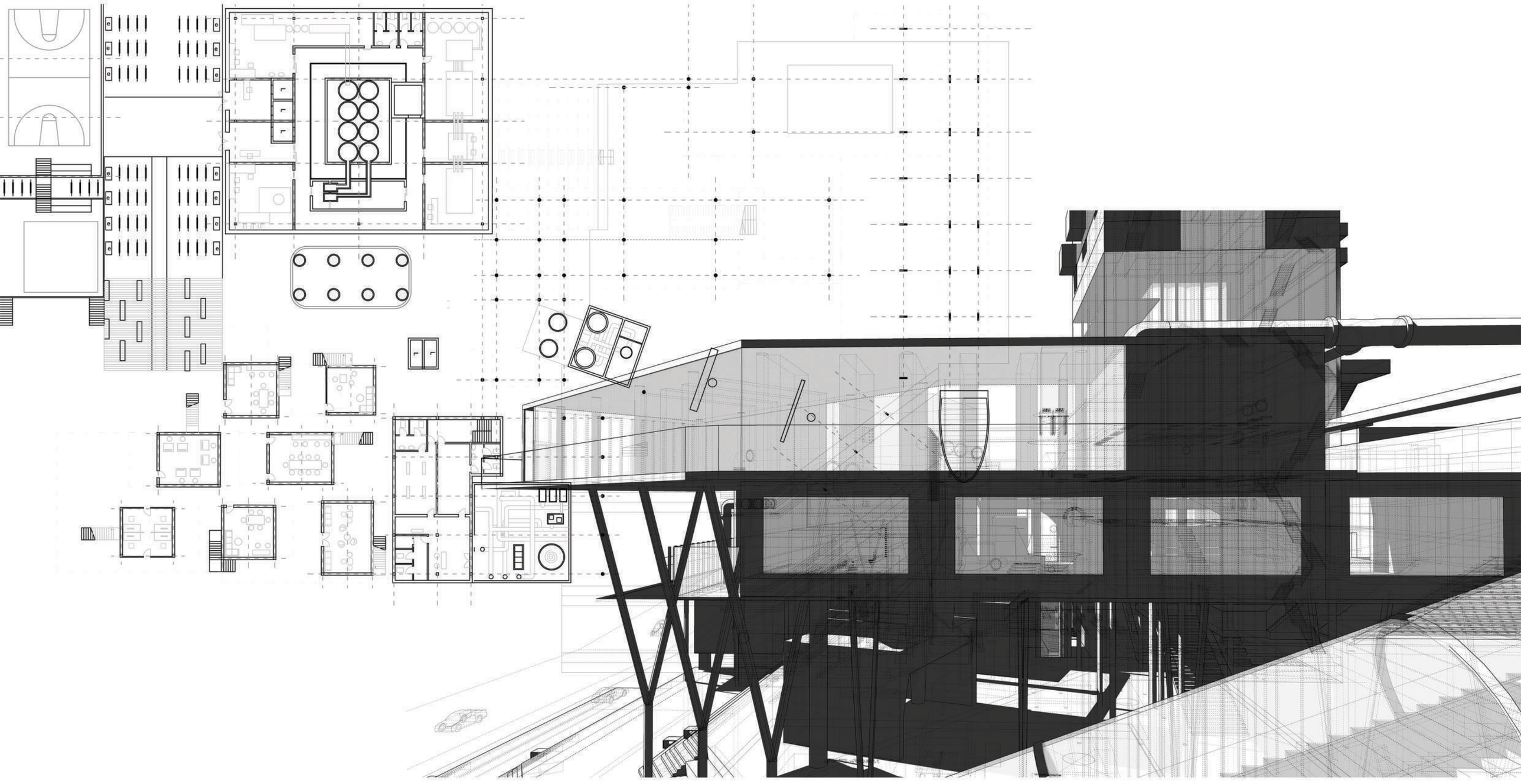












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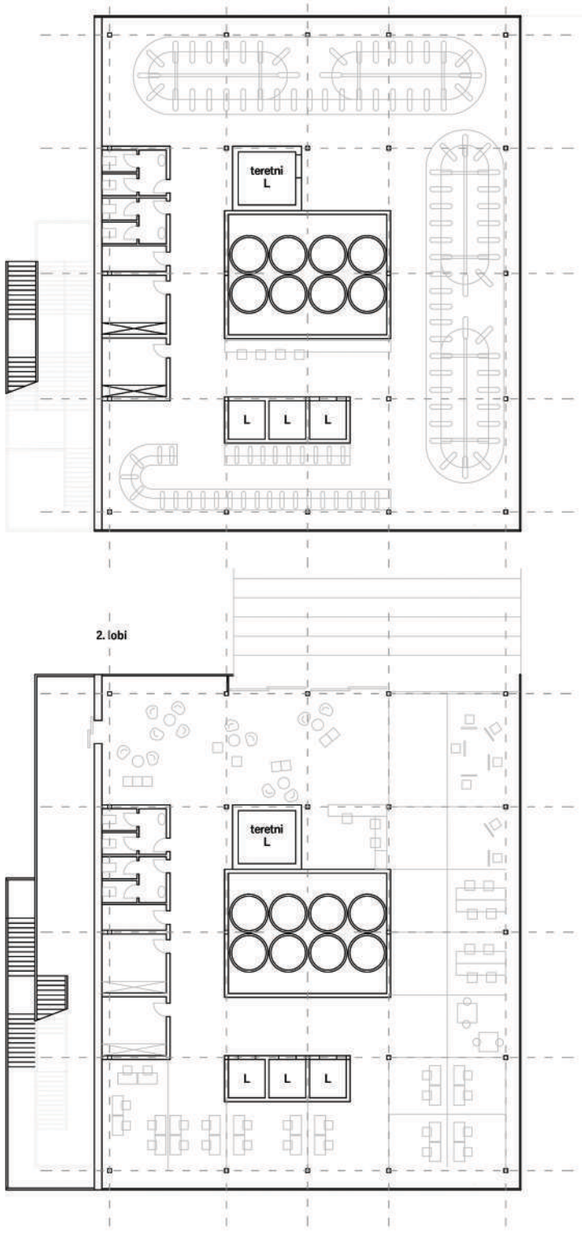

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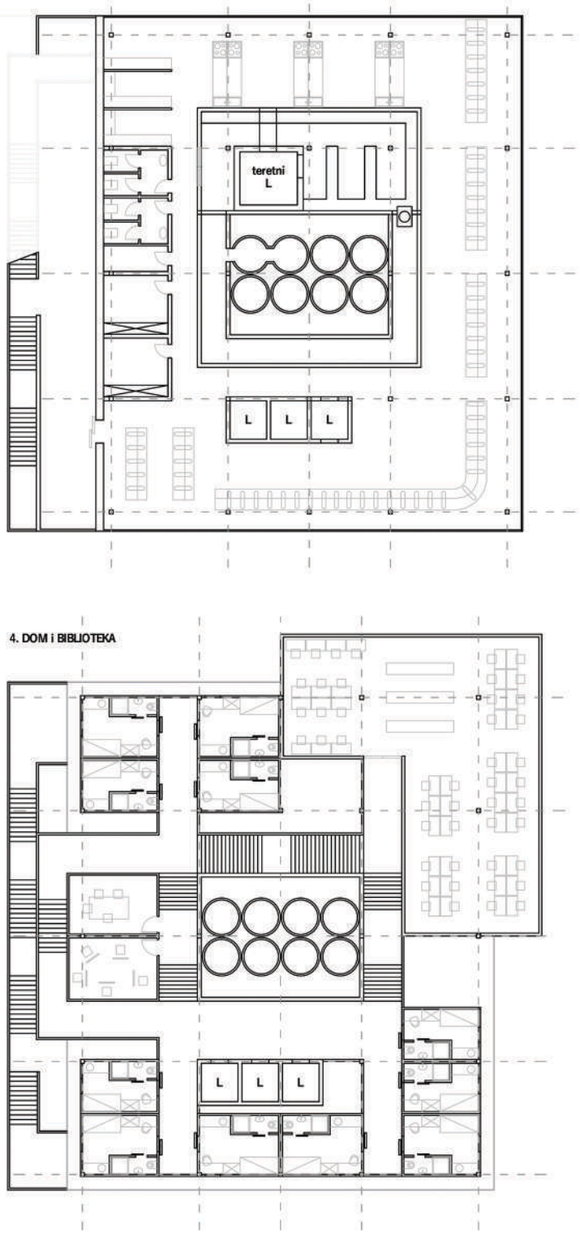

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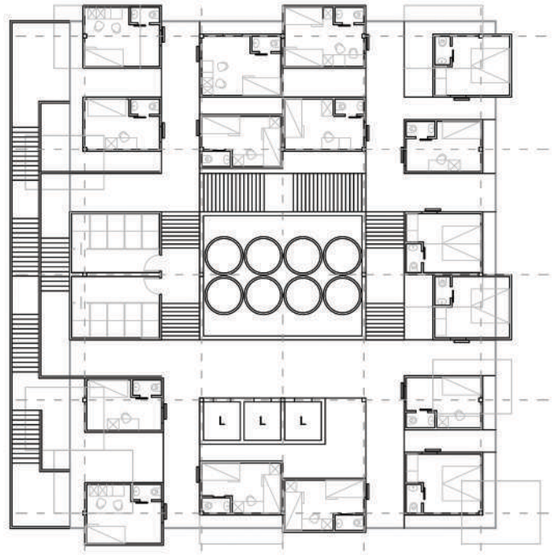

2. lobi

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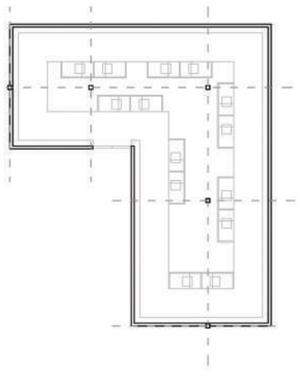
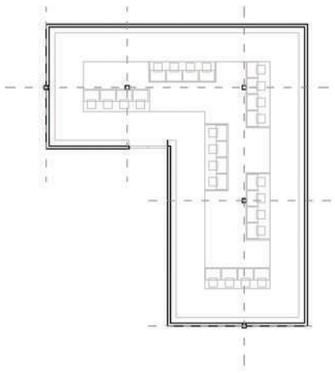
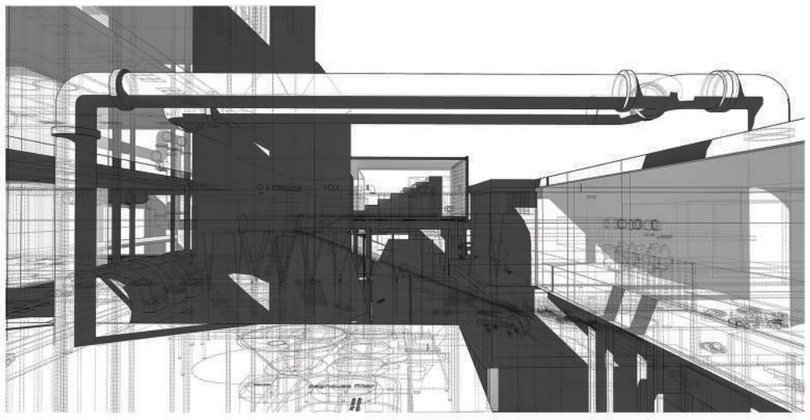
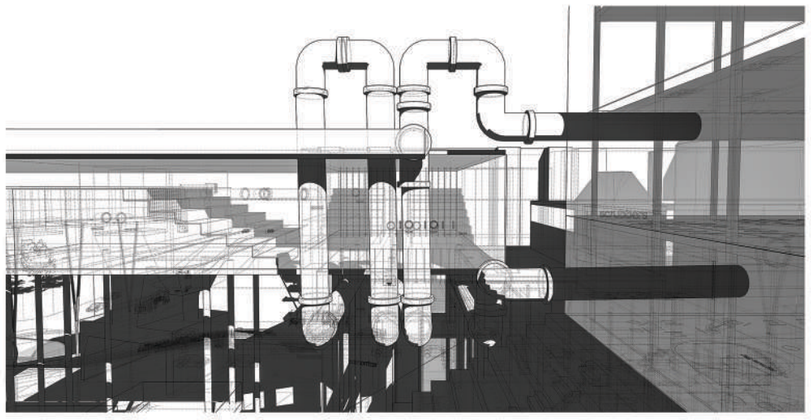
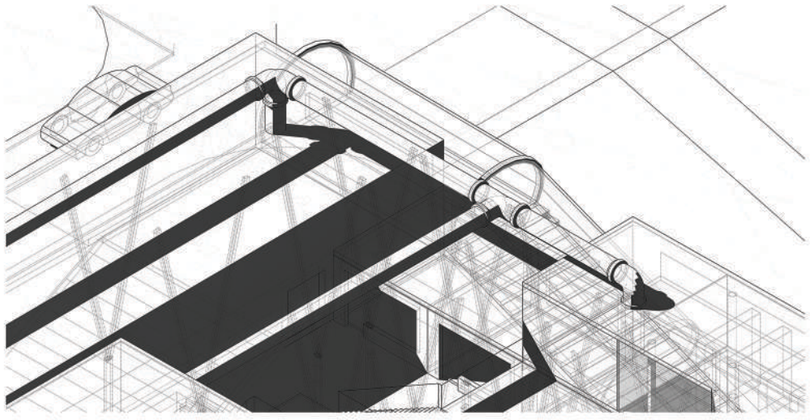
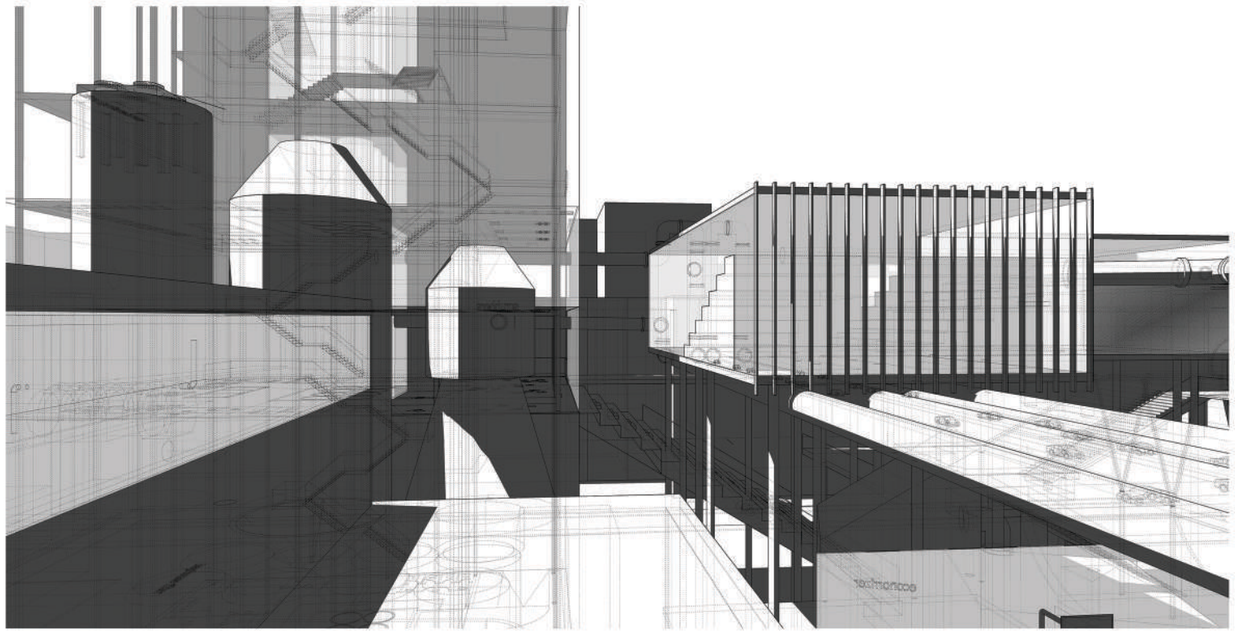


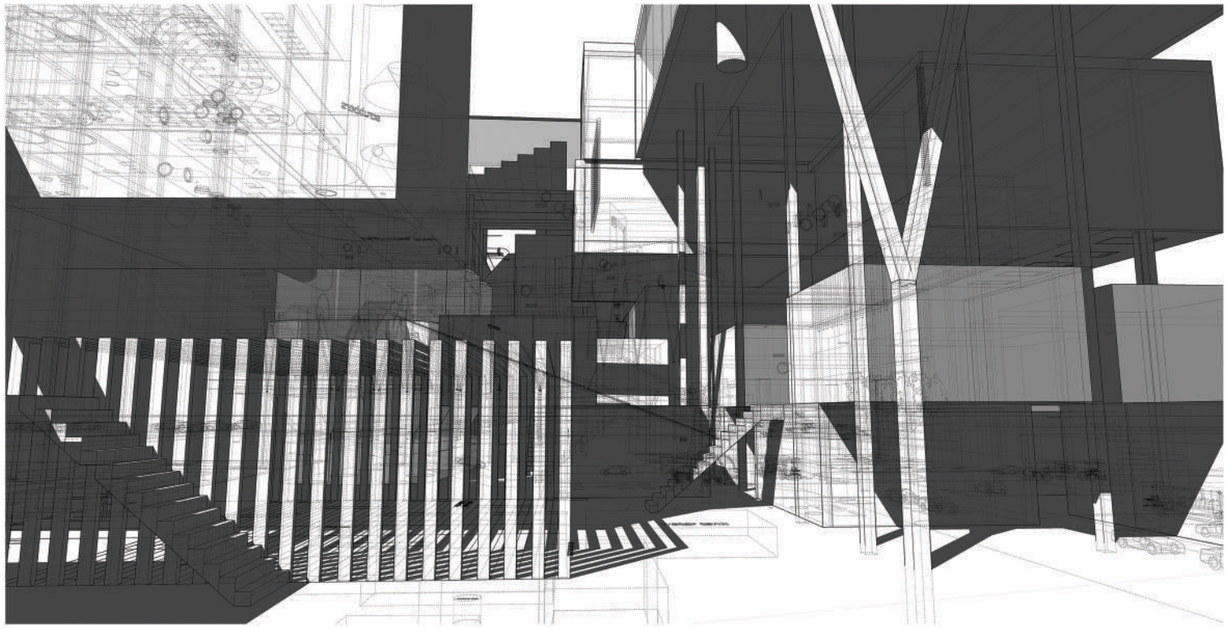


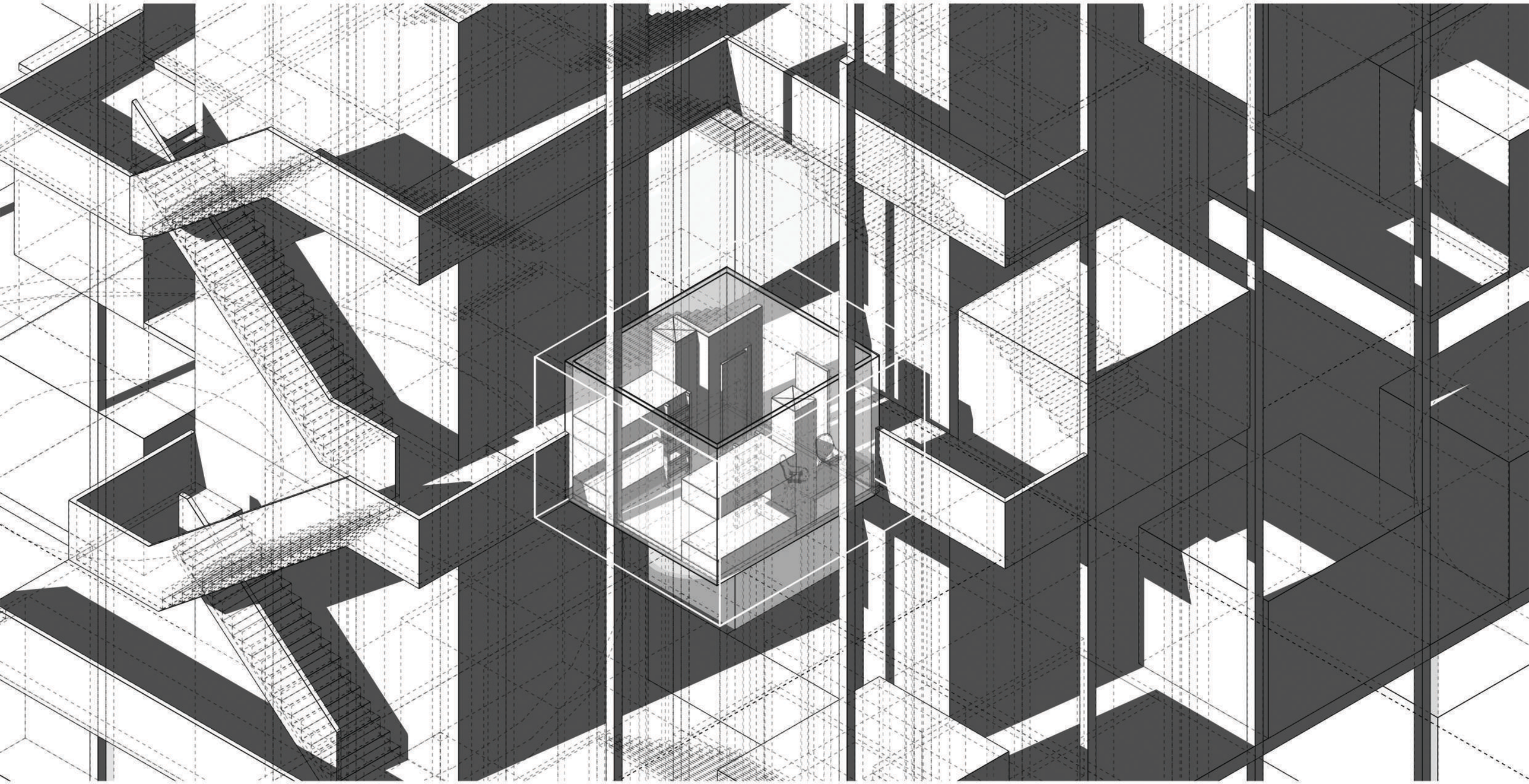


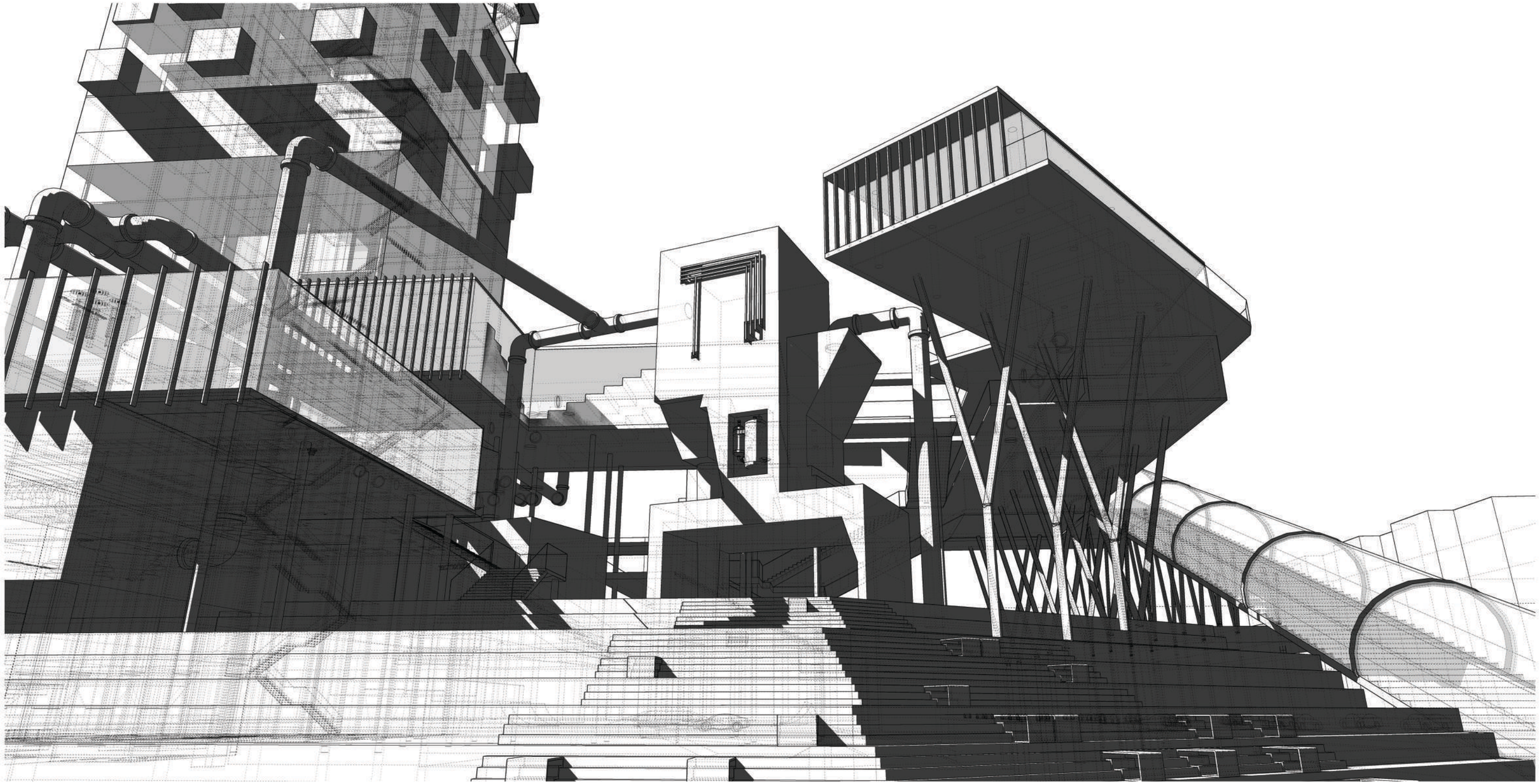












Hybrid High

Master Studio
Winter semester 2020/21

AUTHORS _ SOFIJA MUNJAS
VLADIMIR RAKIĆ

Institutions _ MASTER STUDIO – GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY – UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & UBRAN PLANNING
Supervisors _ Prof Brian Cody, Prof Dragana Konstantinović, Christiane Wermke, Maja Momirov, Slobodan Jović, Sebastian Sautter, Aleksandar Tepavcević

Through the analysis of the current situation, we become interested in a discussion about THE POST-PANDEMIC global position.
What would happen in a world of heightened aspiration toward individualistic society?
We noticed that there are two contexts of the situation: physical and psychological.

2 contexts:
The first context is derived directly from concrete analysis of virus spreading and their first line of defense, known as strong immunity.
So now the concept of "healthy house" ceases to have the role of concept and takes over the role of standard.
The second context represents sociological and psychological tendencies of modern society where an individual has the main role in social development.

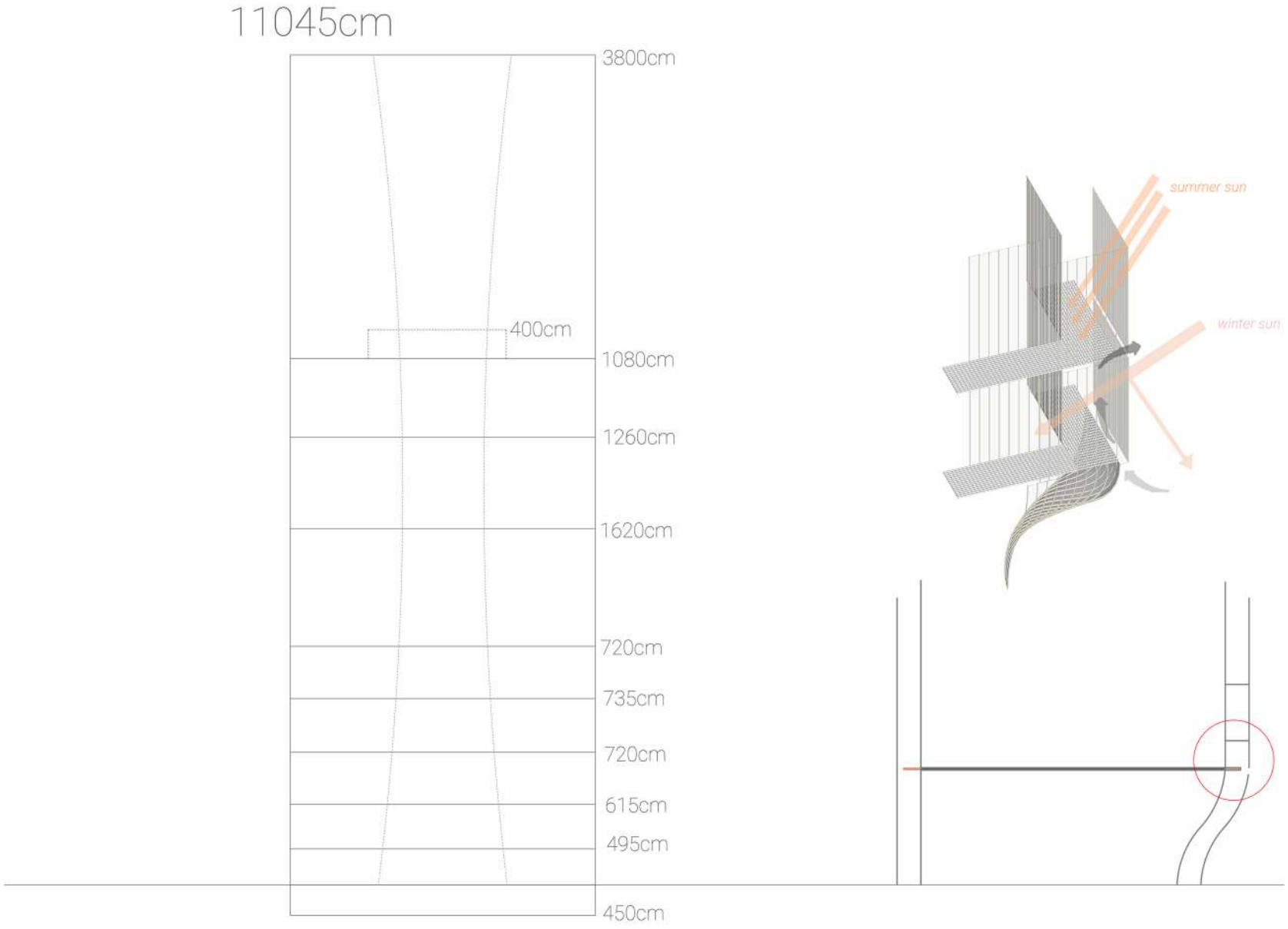
Healthy house concept
Our first concept developed around a solar chimney whose role is to form uniform temperature, continuous ventilation, humidity regulation, optimal brightness, and clean air. The main facade element is "facade pockets" which have a double role: first is a canopy over terraces, and second is the induction of airflow, where air circulation is incited to go in the facade and easily go out without stagnation.

Self-complexity model
Theory of self-complexity is a person's perceived knowledge of herself of himself, based upon the number of distinct cognitive structures, or self aspects, they believe themselves to possess. These self-aspects can include context-dependent social roles, relationships, activities, and goals of the individual, which combine to form the larger, associative network of their self-concept. Model for self-complexity suggests that elf-aspects are "activated" in the context of relevant experience. If an individual experiences a favorable event towards which they feel positively, self-aspects that have been activated by the experience will be associated with positive feelings. In contrast there are negative thoughts activated by unfavorable experiences.

For that, we used Cedric Price "Fun Palace" model for content forming, where we would define activities, rather than programs.

Idea was to provide free space in every meaning of that word - our task is only to provide flexible space. So in that manner, we didn't define programs, but actions - because actions are changeable.

Form concept



before/after

community opening, bringing an individual closer to a group, through the architecture;
multifunctional spaces, transformable spaces

**question of social complexity*
**question of program fluidity*

community checkpoints, separation of an individual from a group through architecture;
multifunctional spaces, transformable spaces

*question of self-comlexity and integrity
*question of new programs

content - context

from content potential
to self-forming program

multifunctional spaces///

///classrooms... /

/////workshops.../
../ //// library.....

reading...
working..
sitting.....

jumping...

climbing....

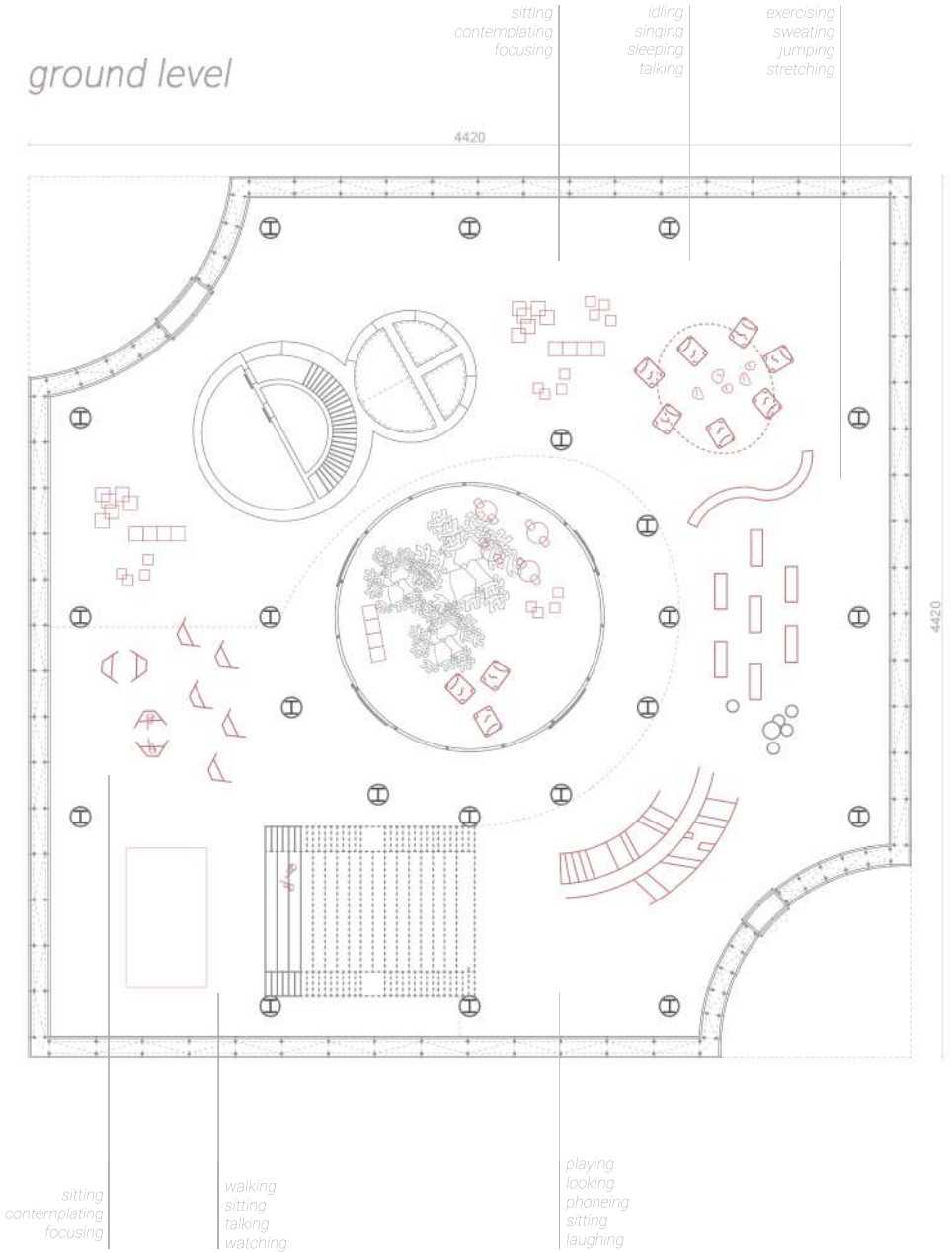
laughing//
thinking...

drinking, resting, dancing.....

jumping to conclusions....

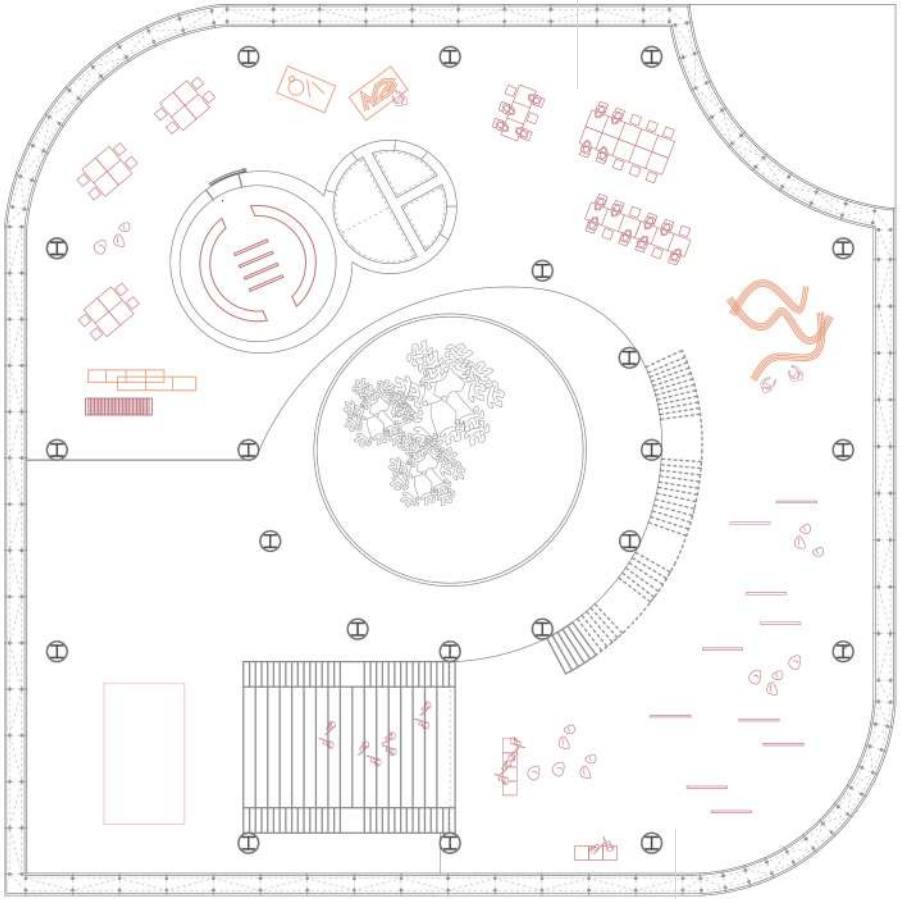
basement

ground level



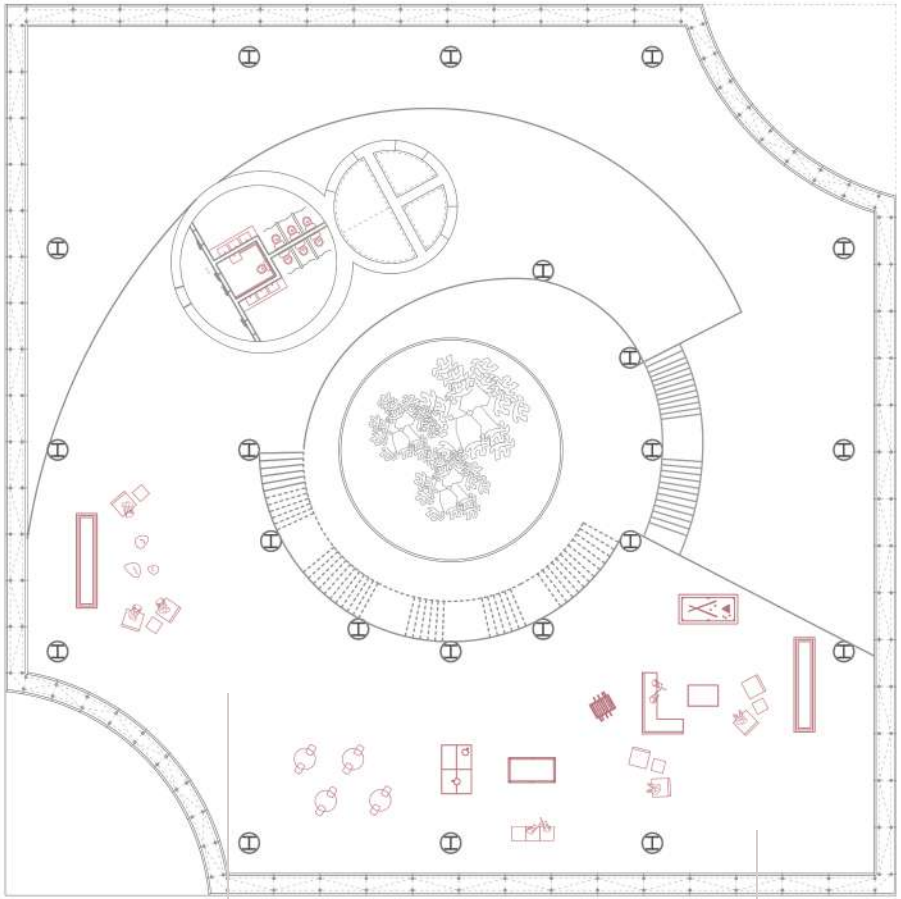
first level

painting
modeling
cutting
thinking
talking
...



walking
exhibiting
learnig
thinking
talking
drinking

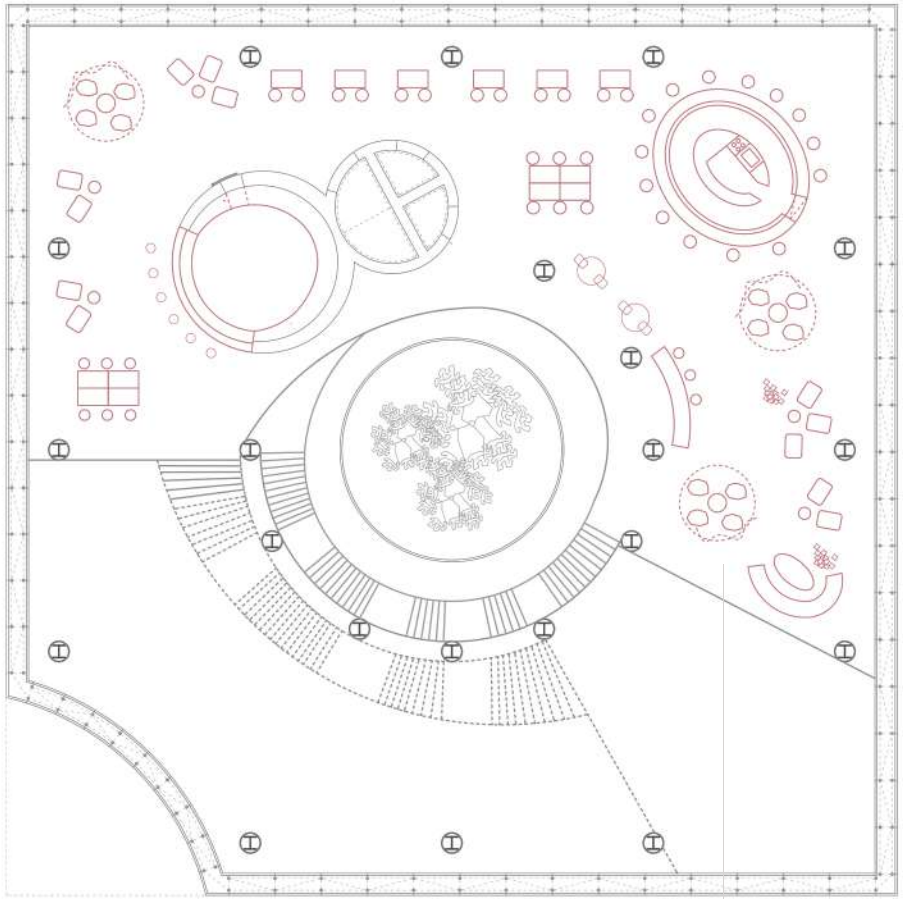
second level



reading
thinking
having fun
hanging out
talking

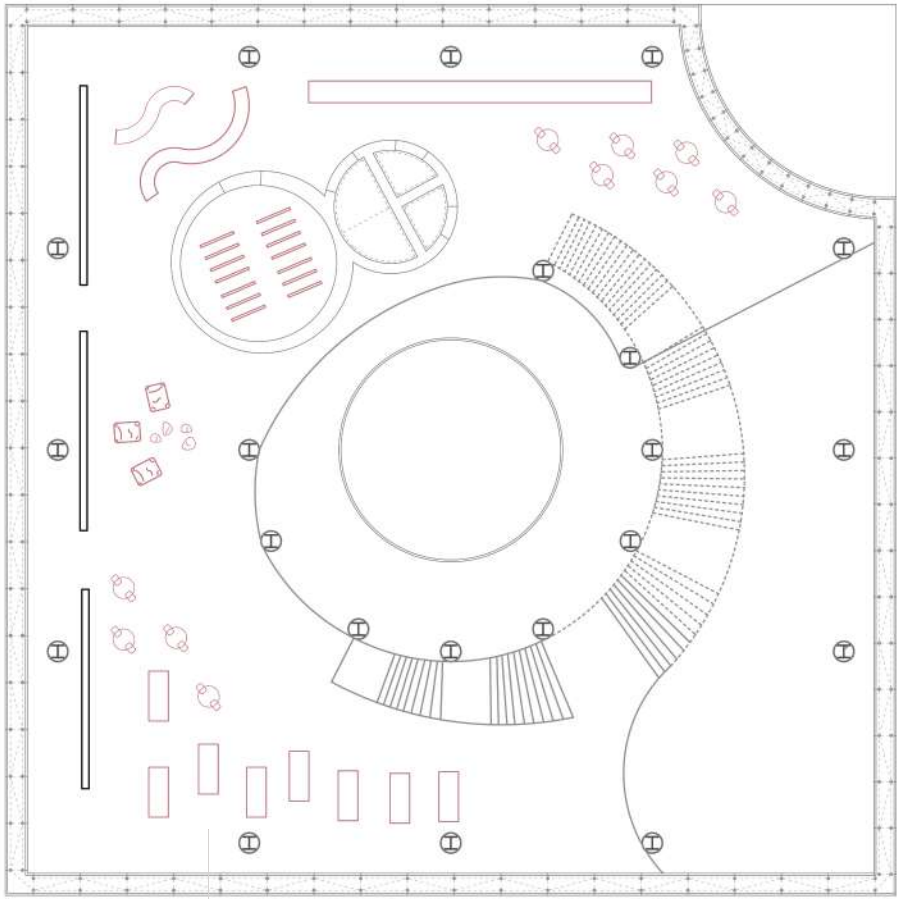
playing
laughing
drinking
eating
resting

third level



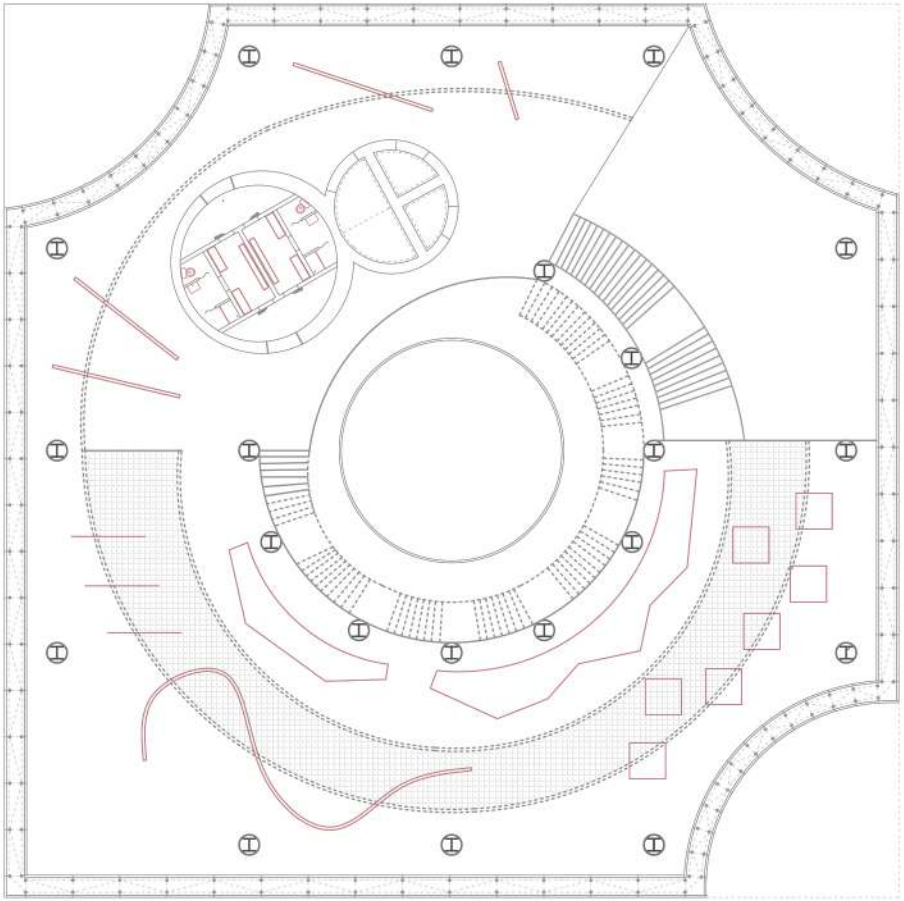
sitting
eating
drinking
talking
laughing
celebrating
socializing
...

fourth level



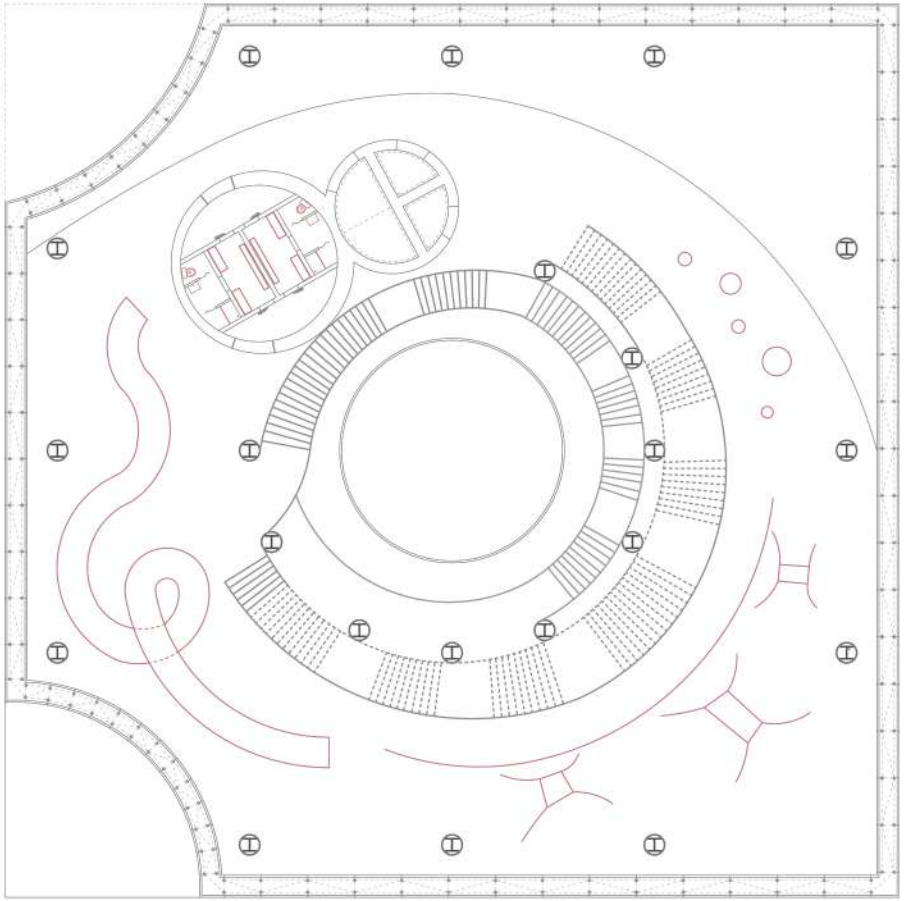
eating
drinking
planting
contemplating
talking
planing
...

fifth level



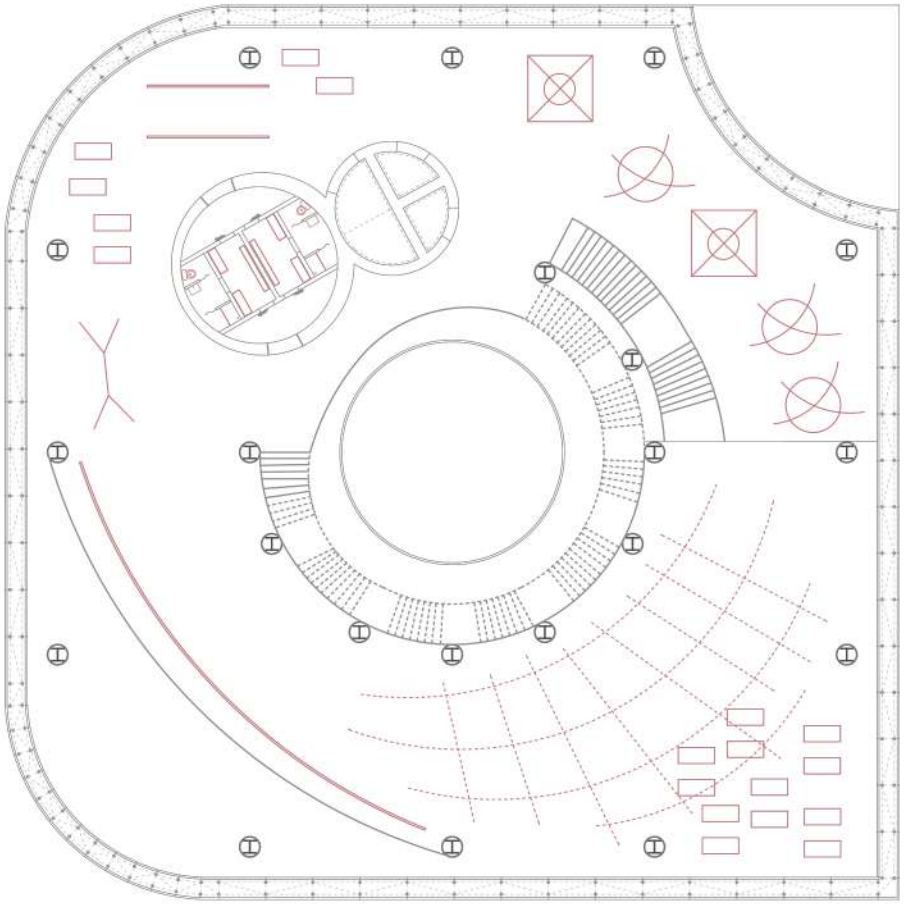
Fifth level is every form of climbing and free activity..

sixth level



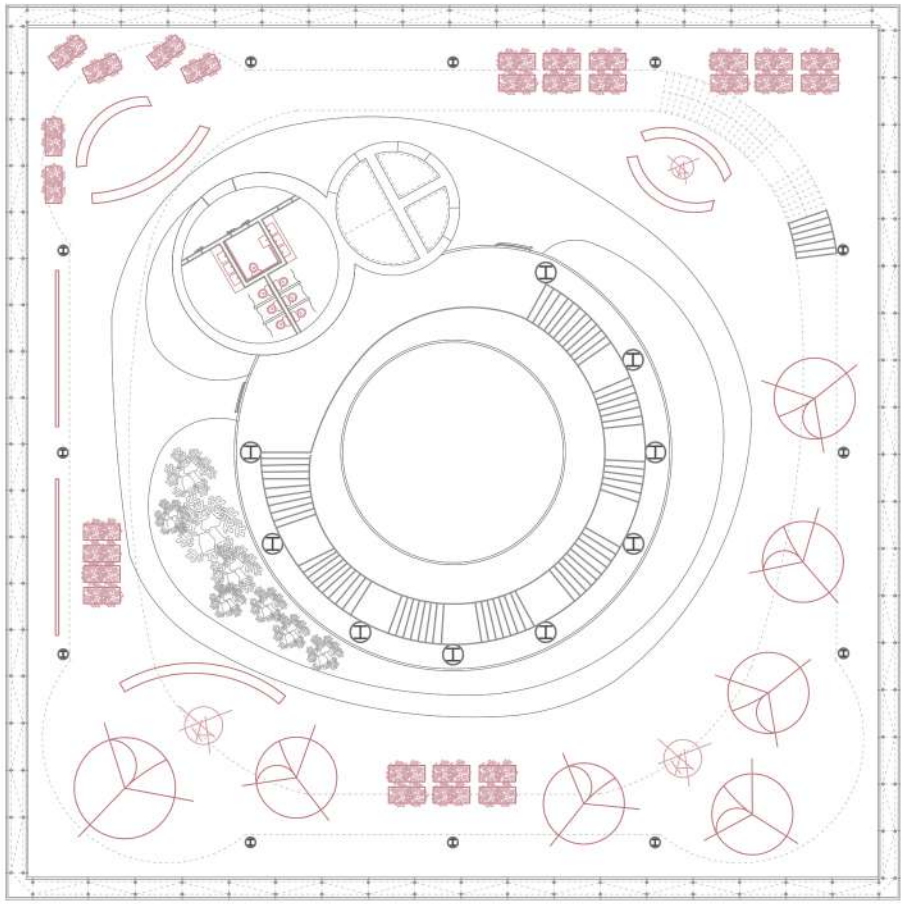
Sixth level is free scate activity..

seventh level



Seventh level is free dancing program.

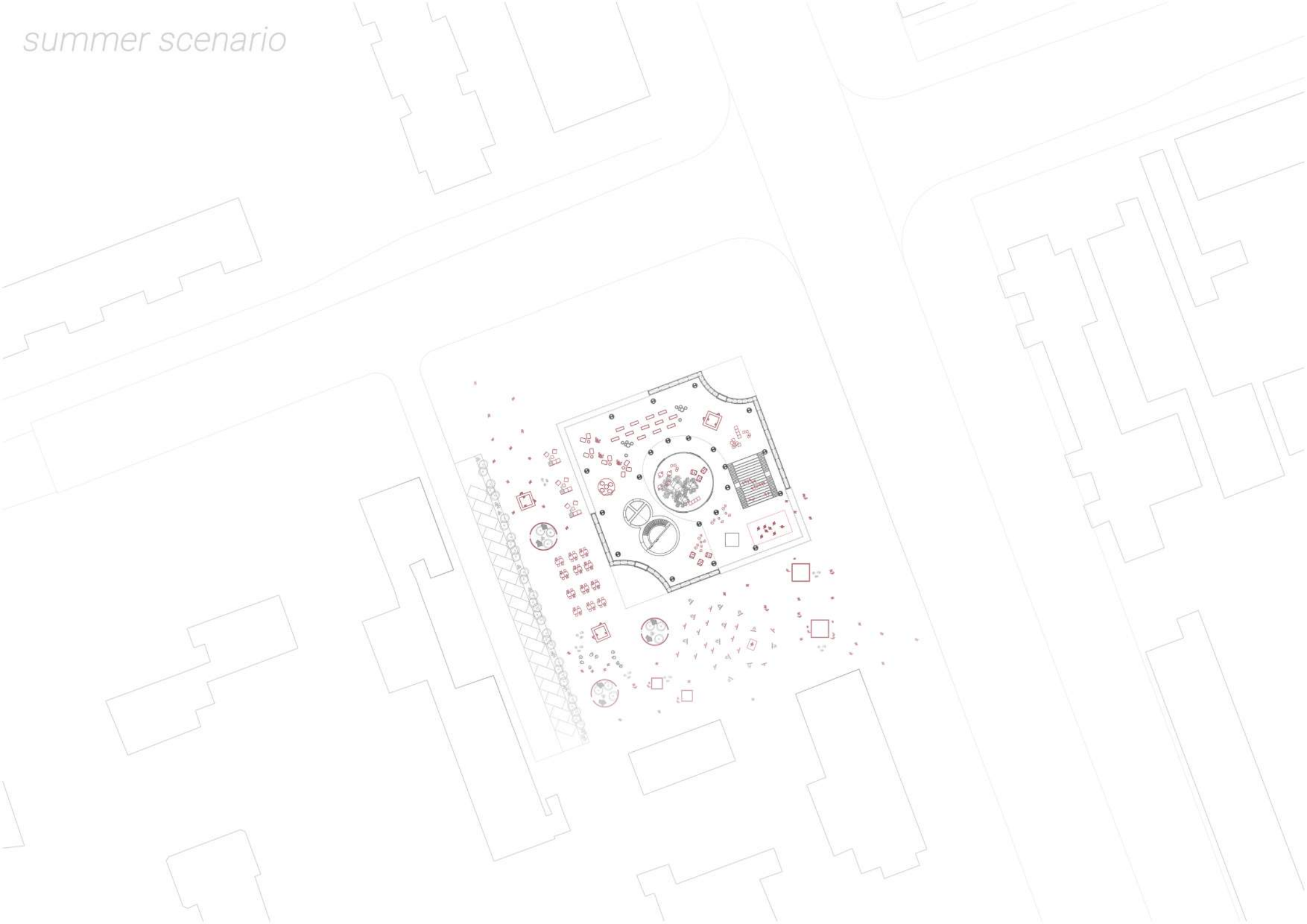
eighth level



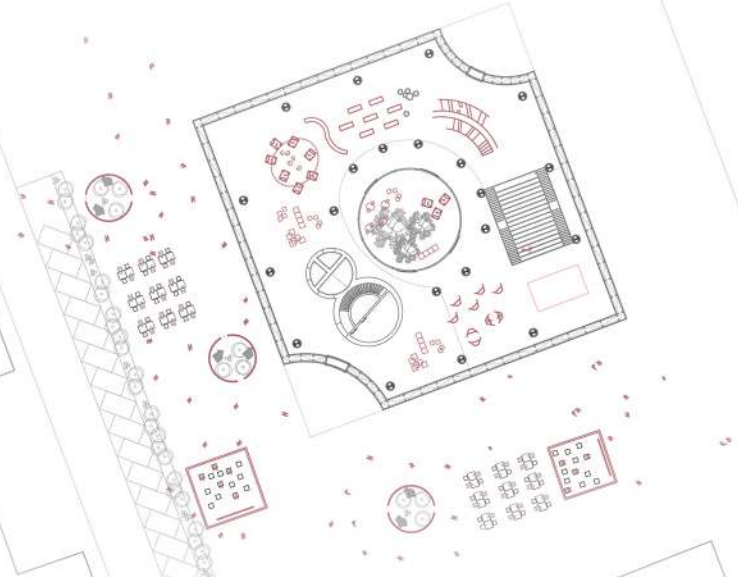
Eighth level is free camping space with posibility of engaging in actions of urban garden.

spring scenario

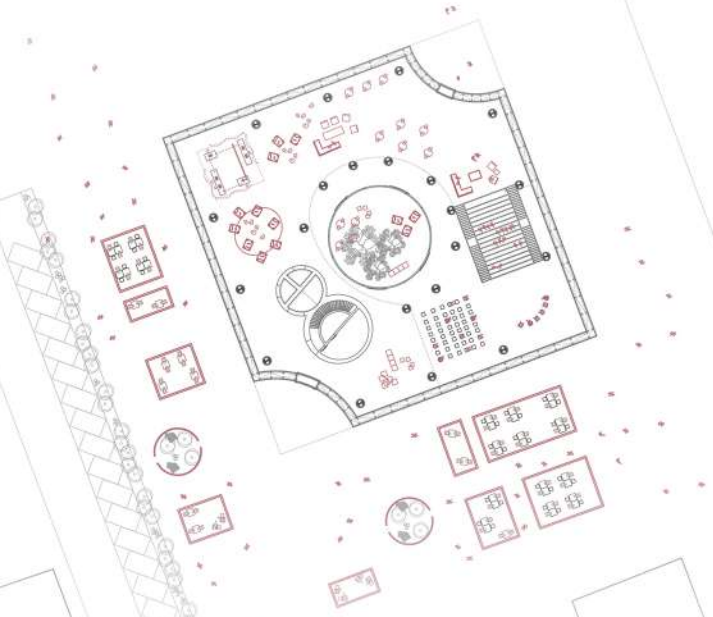
summer scenario



autumn scenario



winter scenario



Hybrid High

Master Studio

Winter semester 2020/21

Projects

GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY

MASTER STUDIO – GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY –
UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & UBRAN PLANNING –
WINTER SEMEMSTER 2020/21

HYBRID HIGH

Prof. Brian Cody, Prof. Dragana Konstantinović,
Sebastian Sautter, Aleksandar Tepavcevic,
Maja Momirov, Slobodan Jovic, Christiane Wermke

Ivan Dmitriev
ENERGY$_{plus}$+ building

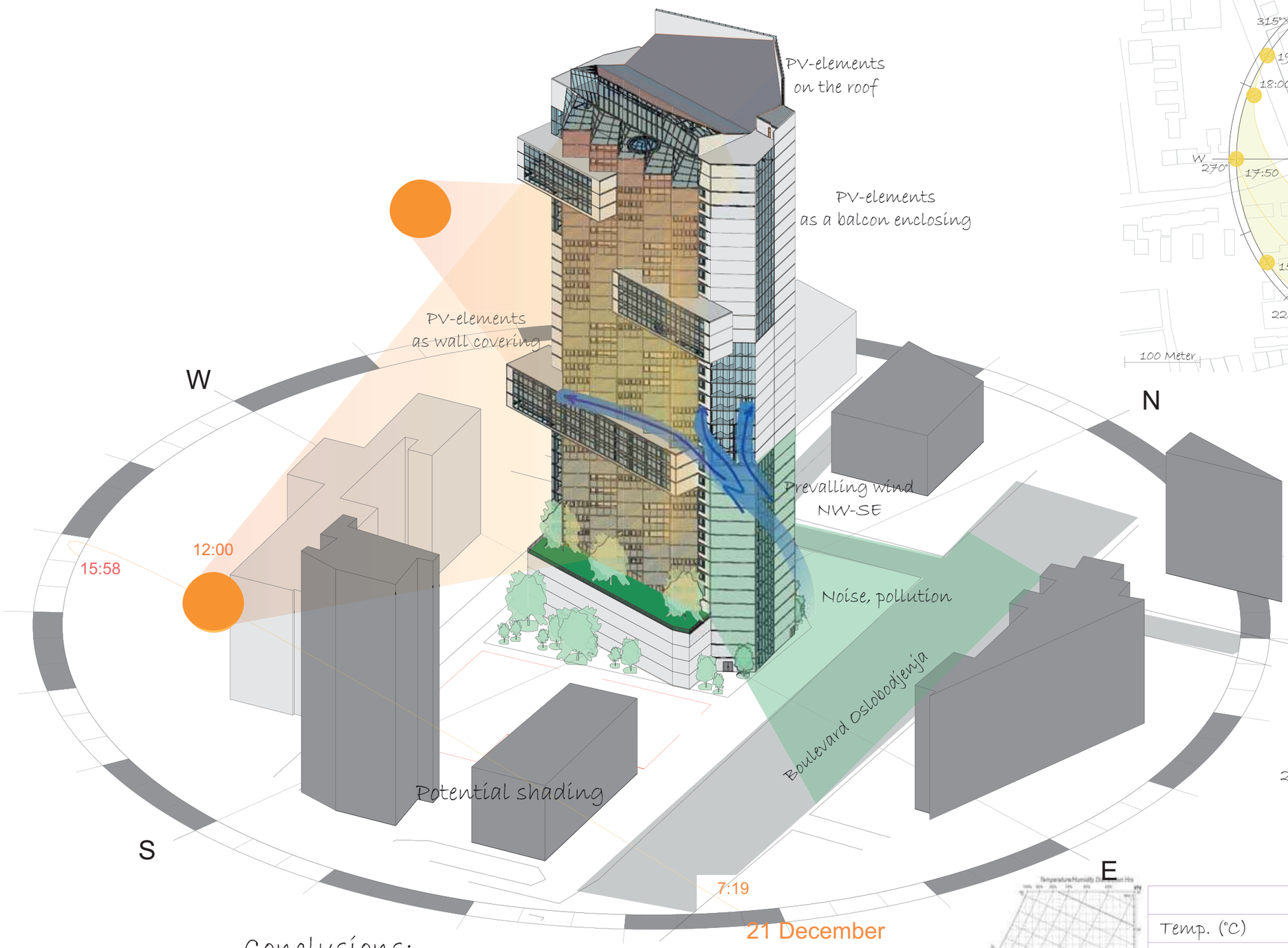
Project descriprion

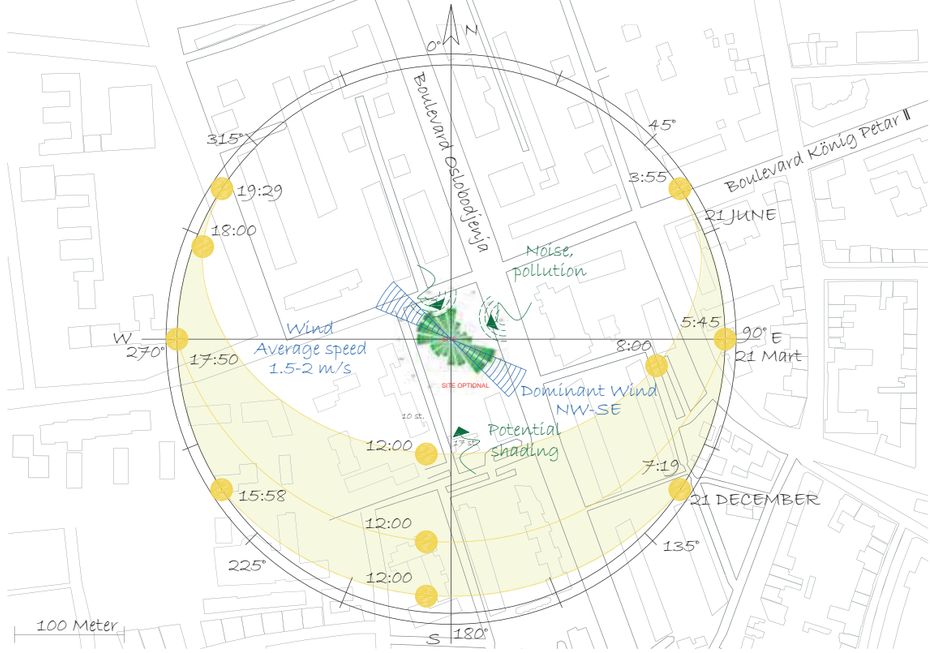
Nowadays, people begin to think about one simple fact that was known in antiquity: you do not need to fight with nature, you need to live in harmony with it. It is reflected in an art, worldview and, of course, in the Architecture. Previously, the building was perceived only as an impenetrable shield from the outside world, a shelter designed to protect its owner from changeable and often adverse behavior of the environment. Moreover, the more progressive humanity becomes, the more it divides itself from Nature. In the 21st century, we live in an extraordinary time when the spiral of history decided to make a reverse turn and return people to the Nature. The general ecological orientation and new way of thinking have created some new trends in the field of architecture. Now architects have a new challenge, in which they should not create barriers and shields, but include external forces in the work of the entire building as a whole.

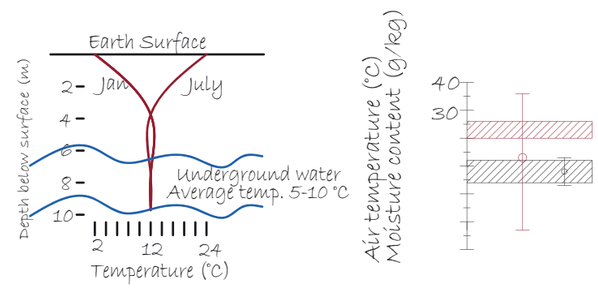
Until recently, mechanical ventilation was preferred to ensure natural air exchange and maintain the indoor climate, leaving out the possibility of creating natural convection as an outdated technology. Now this opinion begins to change again. People prefer to breathe natural rather than sterilized air, and even forgive small temperature irregularities associated with this. In addition, the elimination of mechanical air exchange systems allows to provide the significant financial and energy savings. The use of adjustable floors with a system of included special piping allows creating an inert system that produces heat in winter and cool in summer, regulates the internal climate. The coolant in the system circulates according to a three-circuit heat pump scheme, where the external circuit is the underground waters of the Danube River, a heat exchange circuit with a Freon cooler and an internal water circuit of the hot water supply system. In winter, water from the Domestic hot water system enters the second loop as a heating medium for the heating system (since the required water temperature in the "warm floor" system is significantly lower than the temperature for radiators). In the summer water from the ground sources turns to the system as "cold floor". The heat pump is powered by solar panels on the roof of the building. In addition, solar panels are included in the design as facade elements to generate energy for the needs of residents and save electricity costs up to 50% per year.

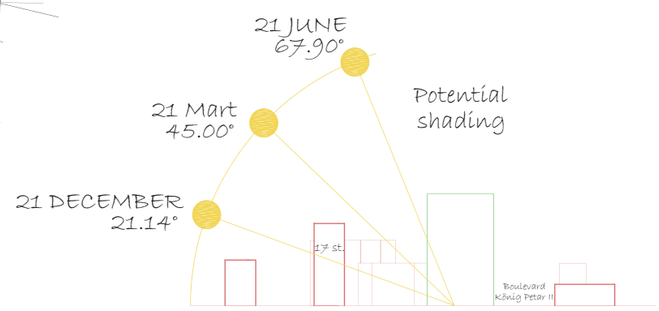
In terms of functional purpose, the building is designed to combine within itself two traditionally differentiated functions as work and home. Open-plan offices protected from external noise by a double façade are combined through the atrium space with and inserts of recreational areas with a living area. On the lower floors, there is a small shopping center with its own exit to the green terrace. Thus, the concept of flowing from public space to private space is realized, but without a clear separation of boundaries. In terms of urbanism, the building creates in the area close to the Boulevard of Liberation a new public space for young musicians and other caring people to meet, thereby becoming a new urban dominant, symbolizing the modern ecological future of Novi Sad as one of the fastest growing cities in Serbia.

Site analysis



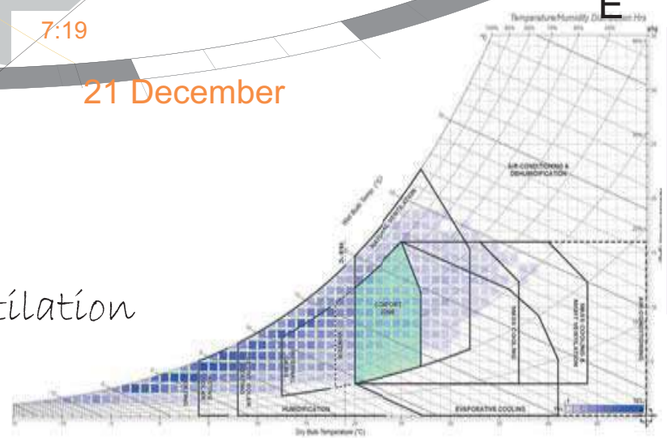






Conclusions:

1. Temperature climat:
   Winter - heating, Summer - cooling
2. Enough sunlight - PV
3. Dominant wind is week for 100% natural ventilation
4. Undergroound water - heat and cool pump
5. Noise and pollution from Boulevard

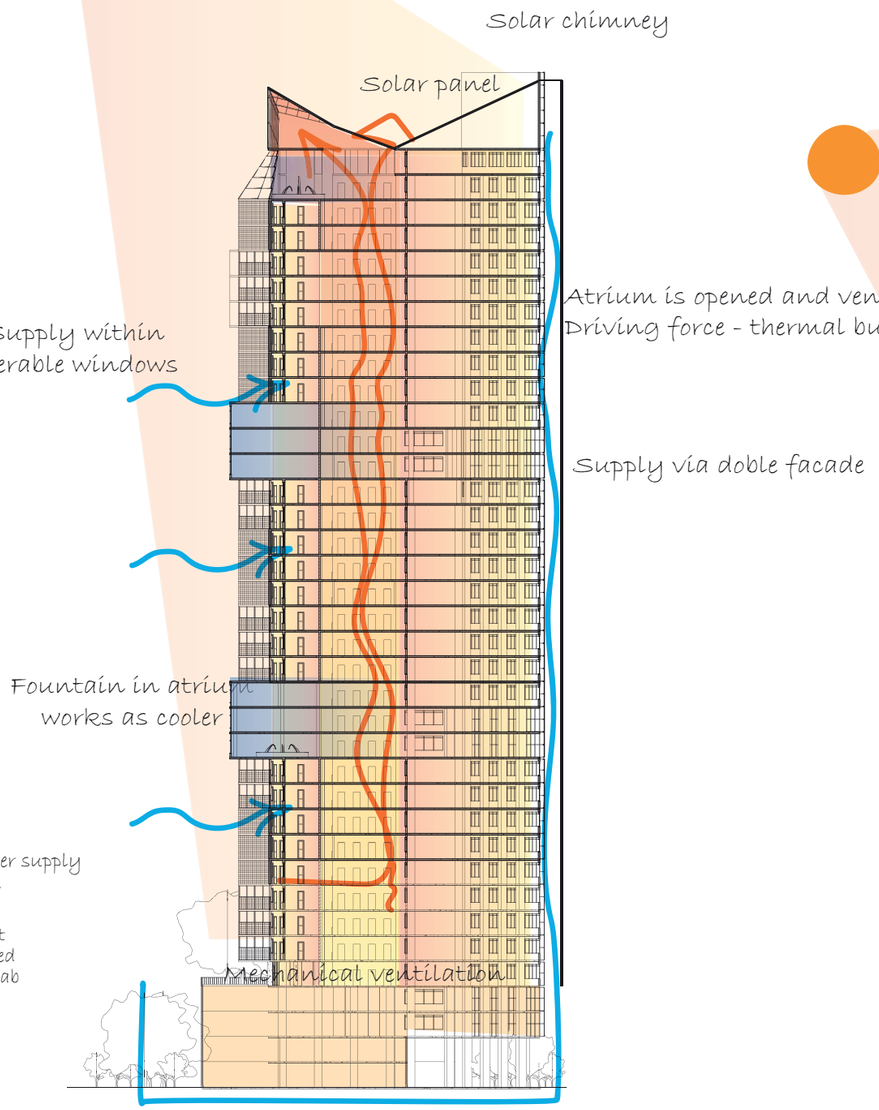


	Inside	Outside	Comment
Temp. (°C)	20-26 °C	-13-36 °C	Av. 1-24 °C
Rel. humidity	30-60 %	45-90 %	Av. moisture content is suitable
Air movement	0.1-0.2 m/s	0-20 m/s	Dominant average: NW-SE 2 m/s
Air quality	800 ppm CO_2	400 ppm CO_2	Europe
Light	300-500 Lux	0-100 000 Lux	Av. 0-45 000 Lux
Sound	35-40 dB(A)	40-85 dB(A)	Overcrowded Boulevard

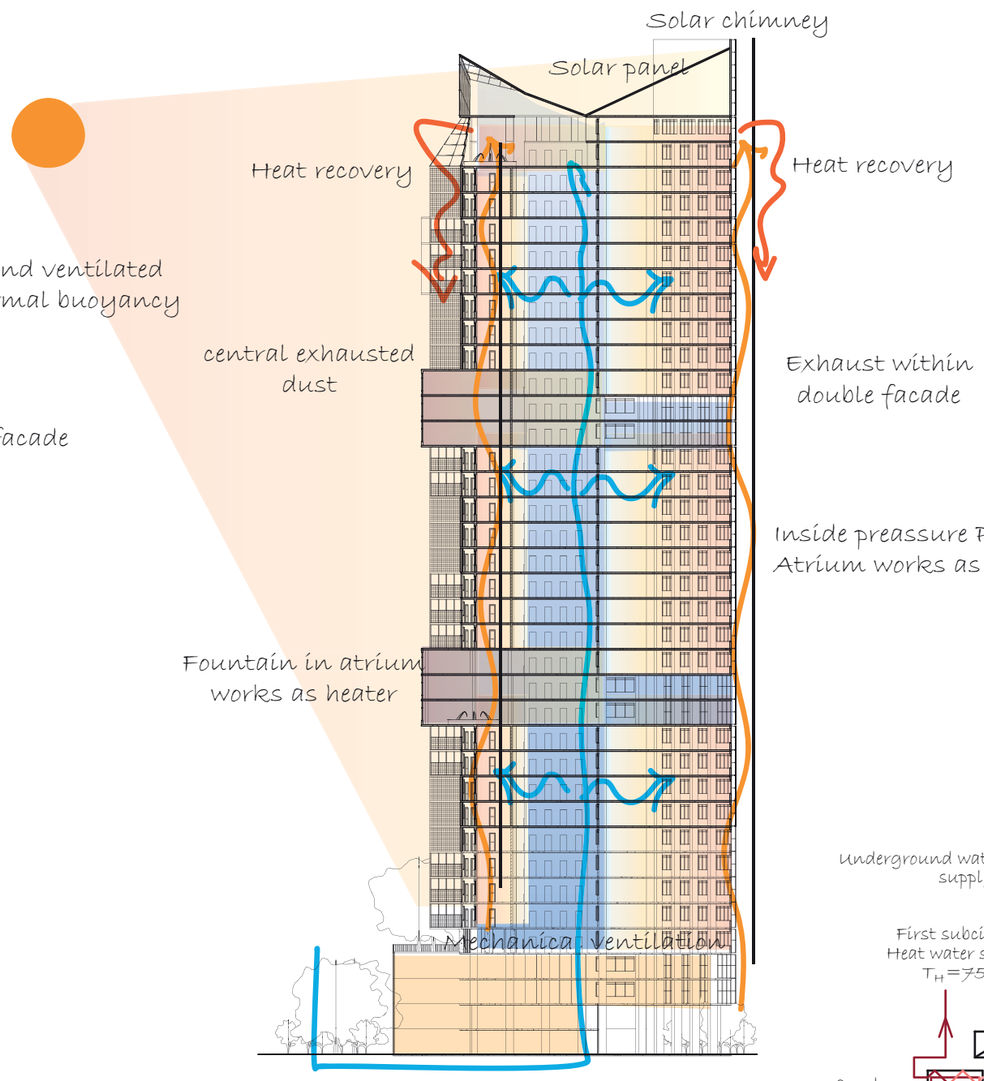
Data: Climate Consultant 6.0, www.meteoblue.com

Energy concept

Summer mode



Winter mode

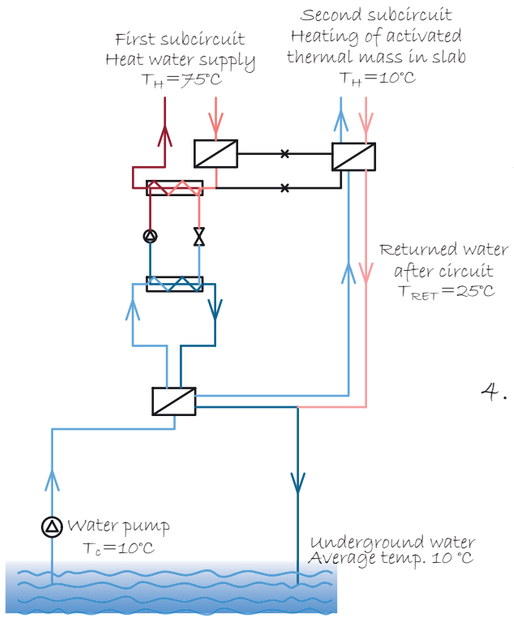


Heat pump

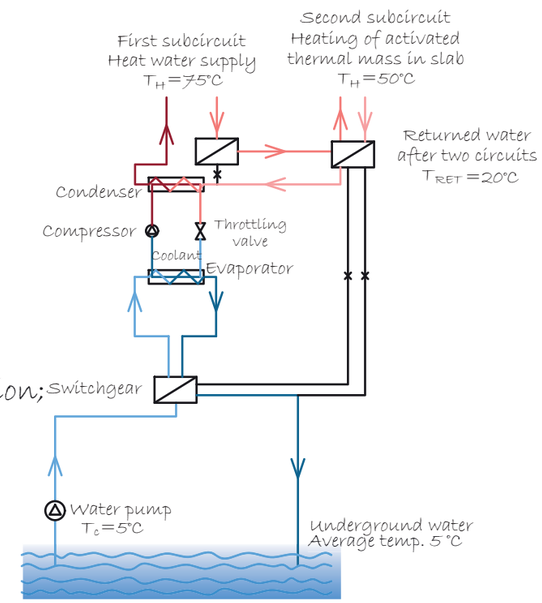
$$n = \frac{T_H}{T_H - T_C} = \frac{348}{348-278} = 5$$

Three closed circuits:
external, compression, internal

Summer mode:
Underground water as heat sourse for heat water supply
and sa heat sink for "cooling" system



Winter mode:
Underground water as heat sourse for both heat water
supply and "heating" system



The energy concept of a building can be described as follows:

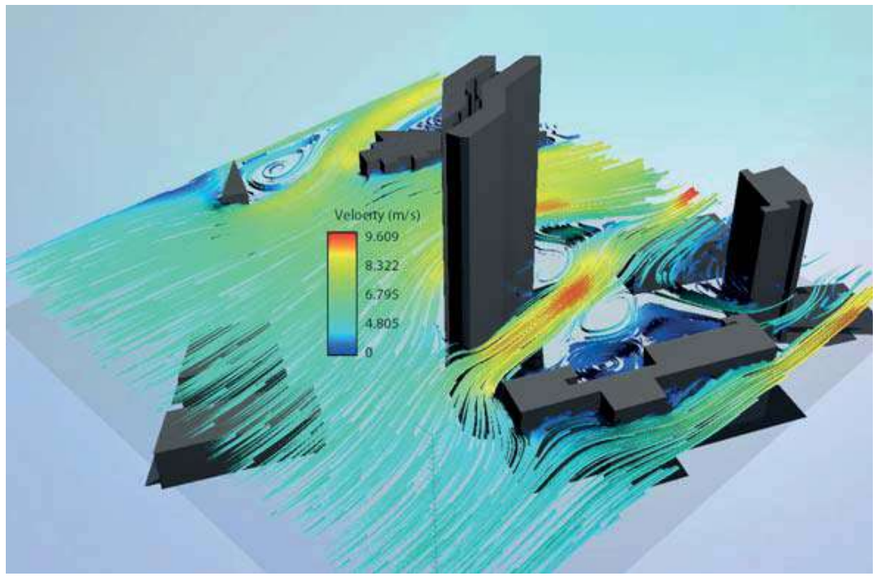
1. Solar panels on the roof generate electricity for heat pump and common needs (like elevators);
2. Heat pump increase temperature of ground water for a hot water supply and heating system;
3. Warm / cold activated floors maintain climate control and regulate the internal temperature;
4. Winter mode: automatically adjustable atrium glazing creates an excess of pressure and force natural ventilation;
   Summer mode: natural ventilation through operable windows in residential area
   and via double facade in office area;
5. Fountain complexes and plants in atrium act as a thermal regulation system
   for the atrium climate (thermal barrier for the penetrating air with heating or cooling functions).

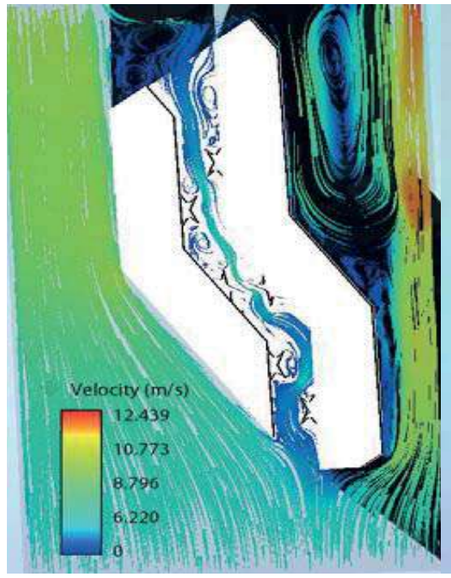
Wind analysis

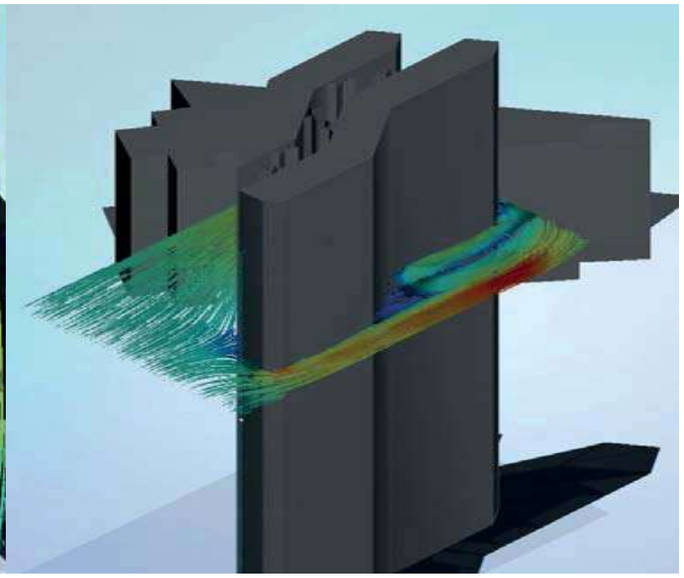
General wind analysis

Detailed wind analysis

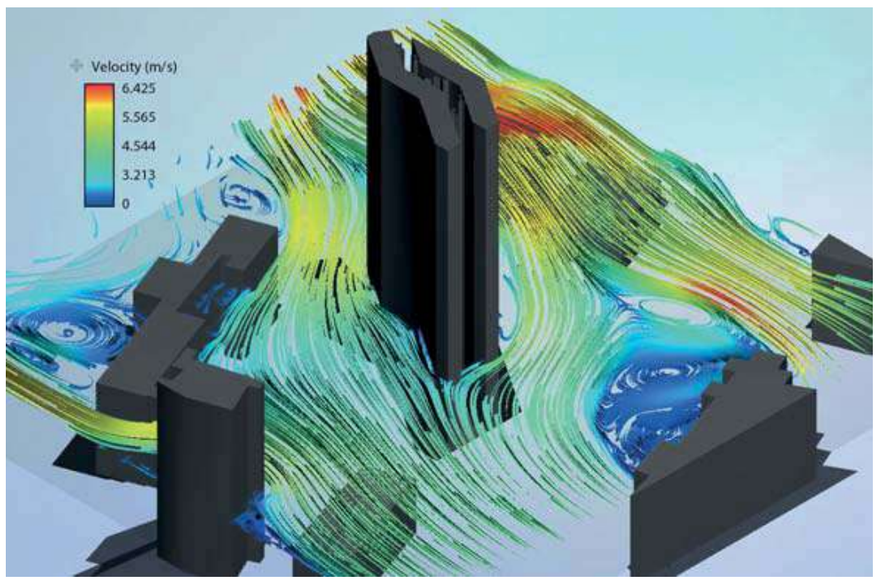
NW-wind direction

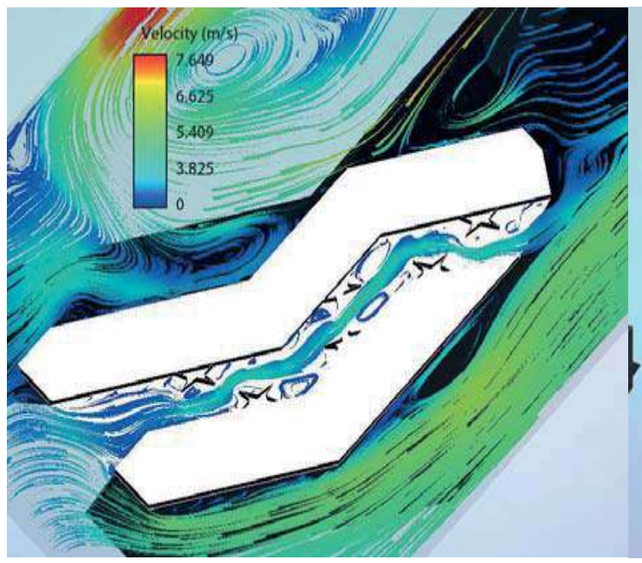


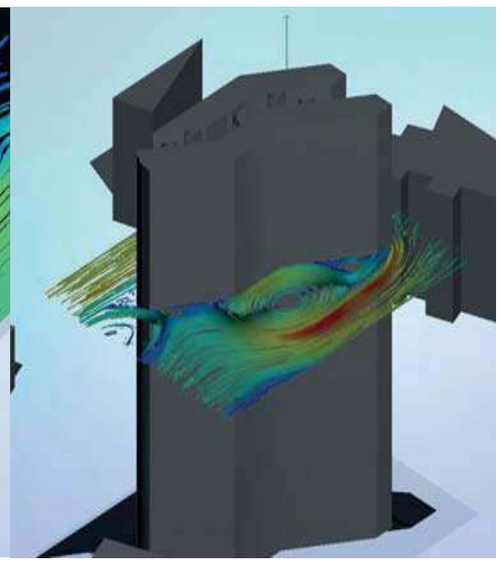




SE-wind direction

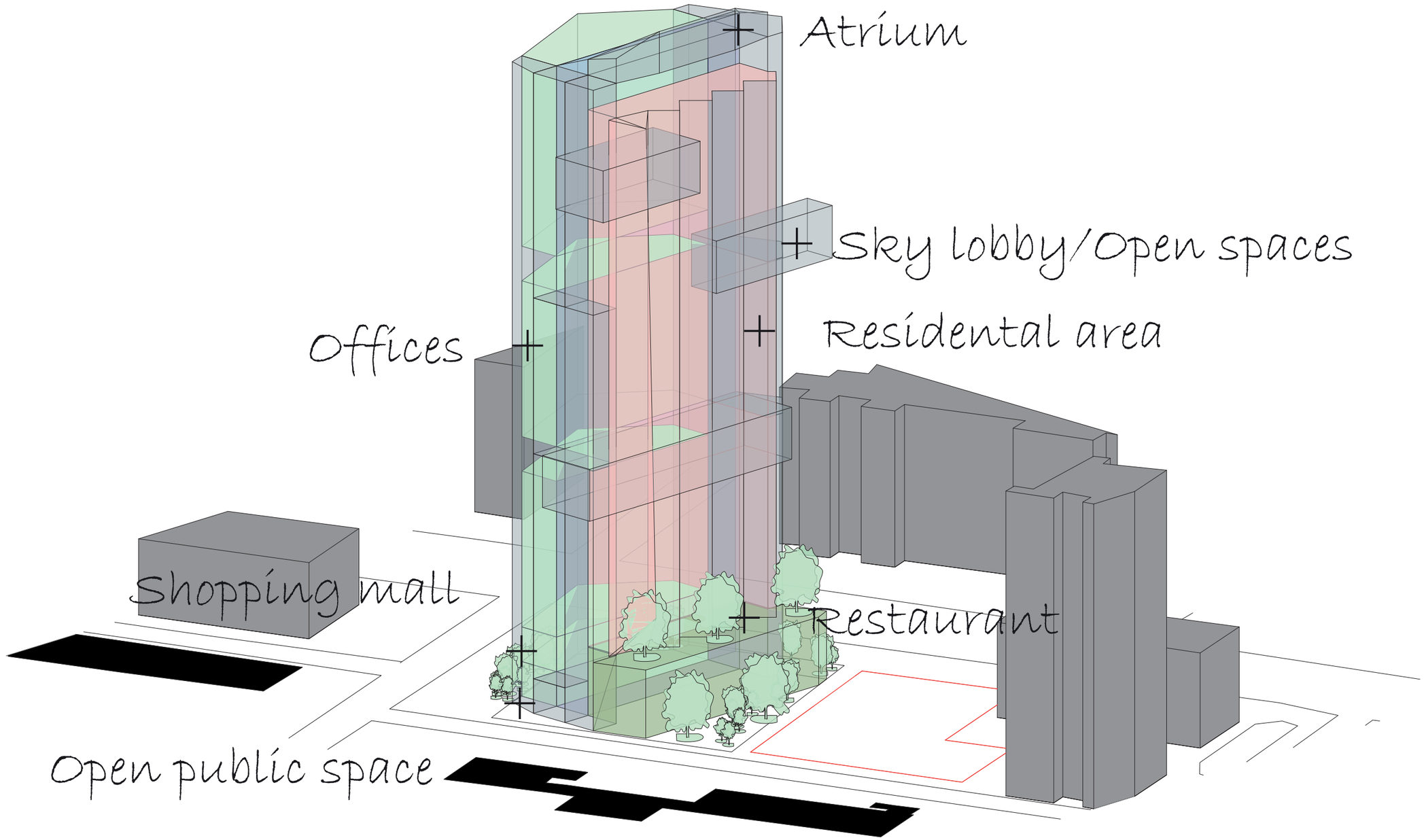






Absence of negative influence on surrounding buildings
Good internal ventilation in case of prevaling wind and avarage in other cases
Wind speed inside the corridor is lower than 5 m/s (in comfort zone)

Function concept



UP CY CLE

BOOKS & BEDS

RESSOURCE EFFICIENCY IN A COMMUNITY CENTER

HYBRID HIGH MASTER STUDIO

WINTER SEMESTER 2020/21

MASTER STUDIO – GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY
UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & UBRAN PLANNING

Supervisors: Prof. Brian Cody, Prof. Dragana Konstantinović, Christiane Wermke, Maja Momirov, Slobodan Jovic, Sebastian Sautter, Aleksandar Tepavcevic

AUTHOR: CHRISTINA FREESE

PROJECT TITLE: UPCYCLE BOOKS & BEDS

CONTENT

01

NOVI SAD

MAKROANALYSIS
CITY

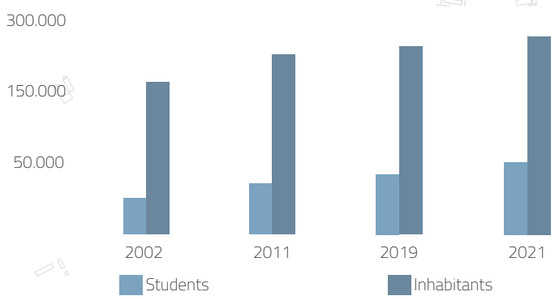
CITY	Novi Sad
AREA IN KM²	106.2
INHABITANTS	250,439
STUDENTS	50,234
PROVIDED STUDENT DORMS (NUMBER OF BEDS)	3,833

Development to a Student City

In the last decades, the city of Novi Sad developed to a more and more important educational center next to Belgrad. It is the second biggest City in Serbia and consists of educational roots from 1740 on.

The University of Novi Sad was established in the 1960s and grew from there on into one of the most important educational and research institutions in Serbia and South Eastern Europe. Through the establishment of the University considerably numbers of the young population came to this educational center and stayed. These circumstances helped the City to recover from its unbalanced populational distribution. Novi Sad grew in Population, especially in Students and accompanying that the knowledge, which was to deliver, found its place in one of the ten libraries established.

The books followed the growth of the educational center (although uneven placed), however, the beds are still behind in growth of number. On one Student comes 0,076 beds, which means not even 1 out of 10 is provided with a bed from the University dormitories.



Development of population - Novi Sad

M 1:15.000

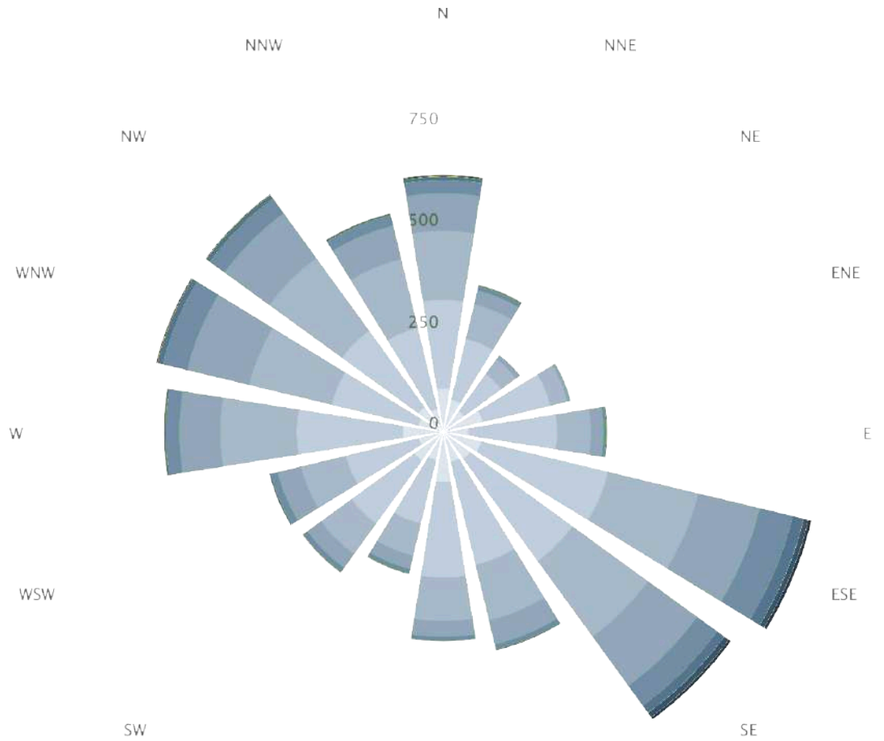
01

NOVI SAD

MAKROANALYSIS
CLIMATE

REGION	North-West Serbia
CLIMATE	Continental Climate
SEASONS	Spring/ Summer/ Autmn/ Winter

Climate Analysis
The Serbian climate in the North-West is continental, with cold dry winters, and warm, humid summers with well distributed rainfall patterns.



SEASON	Mar,Apr,May	Jun,July,Aug	Sep,Oct,Nov	Dec,Jan,Feb
	59 kWh/m²	66 kWh/m²	33,3 kWh/m²	22,3 kWh/m²
	5 mm	59 mm	41,3 mm	49,3 mm
	7-29 °C	14-37 °C	13-28 °C	-10-18 °C
	6 h	8,75 h	5,3 h	2,4 h

WIND:
-mostely from south-east to north-west
-narrow house, let wind through / ventilation
-about 1,0- 1,3 m/s; not enough to generate energy

SUN RADIATION :
-strongest in Summer
-Orientation to the south
-Big facade area to attach PV-/ Solar Panels
-Close building in summer / open in winter

RAIN WATER:
-big amount in Summer/ Winter
-collection of rain water

TEMPERATURE:
-high in Summer / low in winter
-Close building in summer/ open up in winter
-public functions need cooling/ heating

SUN HOURS:
-multiple in summer/ less in winter
-important for health
-get all in in winter/ close up in summer

01

NOVI SAD

MIKROANALYSIS
MATERIAL

BUILD MATERIALS

used nowadays in the area

				IN THE FUTURE?!
Glass	✓	✓	✓	✓
Concrete	✓	/	✗	✗
Steal	✓	/	✓	/
Plaster	✗	✗	✓	✗

Future Building Materials

The **Lifespan, Recycability and Availability** of materials are going to be more and more important for the building sector. For example, we already reached the edge of sand mining in Europe, therefore, we need to import it from China. Sand is needed for Concrete and Plaster (depends), although concrete can be recycled in gravel it is a material which will die out. So why build a future building with such a material?

FACADE STRUCTURES

used nowadays in the area

Balconies – are important for the well-being of inhabitants (outside space)

Shading Elements – free movable and inside for residents, mostly outside for office buildings

Cooling Systems – Cooling Systems are important, BUT not at the facade. Ventilation and heating should be as natural as possible or inside the building

Open Ground Floor – Open Ground Floors are mostly seen in public buildings, but sometimes they are used in private buildings as public areas. The ground floor is important room to arrive at a building and get settled.

01

NOVI SAD

MIKROANALYSIS
UTILIZATION/ COMMUNITY

The bulevar oslobodjenja offers many residential buildings, as well as workspace availability. Unfortunately, free spaces for the many inhabitants of this quarter are rare, because most of the green areas are private or restricted areas. Thus, the people encounter small spaces with markets and benches.
With a new building on this boulevard a space to encounter, which provides space for small businesses, should be build.

Residential

- More then half of the buildings on this section of the **bulevar oslobodjenja** are residential. The quarter between the city center and main station provides most of the housing as an inner belt, which is still remarkably close to the center. These apartments are more expensive than the ones on the outer belts and do not consist of much free/ gathering space.

Bank

- If Novi Sad has a bank quarter it is definitely here. All the city headquarters of banks align aside of the bulevar oslobodjenja which provides a variety of jobs.

Commercial

- There are many commercial buildings around the site area, which make this quarter an attractive place to live and work.

Restaurant

- The gastronomy of Novi Sad offers a great variety of food for every taste. From the small Kiosk to high class restaurants one can find everything needed on this boulevard.

Co-working

- Free spaces for working and learning are rarely in this quarter and the city in general. Especially in these times and also for start-ups or new businesses it would be beneficial to provide open space which can be rented and used freely.

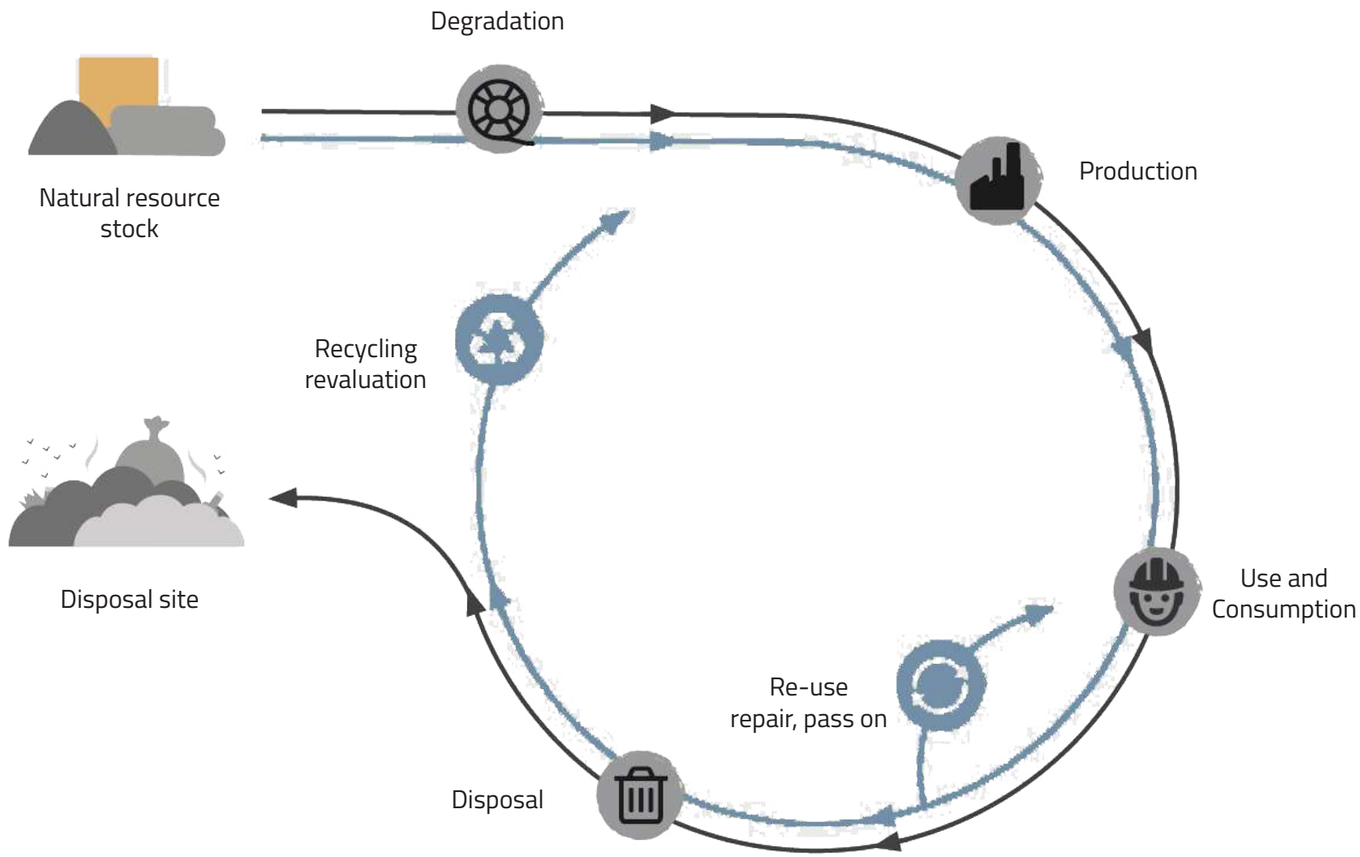
Green area

- There are rarely green areas on this boulevard and the ones provided are mainly private or restricted areas.
A free space meeting point to gather is needed in this quarter for the many inhabitants.

02
RESEARCH

RESOURCE EFFICIENCY

It means using the limited resources of the earth and not taking them for granted. Treating them in a sustainable way is underlined by the Urban Mining Concept, which means to take a resource and using it again.
The Process can undertake Re-Use or Recycling if possible, also Upcycling is an option in the Urban-Mining Concept. With Upcycling one produces another Product out of used materials with giving new energy/ resources into the Process Cycle.
Thus, resource efficiency allows us to create more with less and deliver greater value with less input.



02

RESEARCH

RESOURCE EFFICIENCY

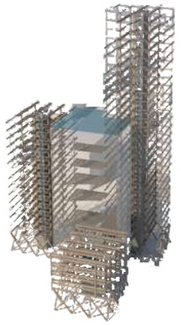
Book:

MANUAL OF RECYCLING Buildings as Sources of Materials

written by:
Anette Hillebrandt
Petra Riegler-Floors
Anja Rosen
Johanna-Katharina Seggewies

The design process started by implementing the main criterias into the final building, as shown here. These were the guidelines for the design process.

The research started with the book MANUAL OF RECYCLING.
Since Anja Rosen (one of the authors) was my former colleague, I heard about the book and the overall goal to create a manual of recycling, thus a building kit for houses to recycle materials.
When hearing about the topic of this Project assignment, to build a future building, it was clear to me that I had to get more into this topic.
The book does not just give information about materials, but also about sustainable building techniques and how to apply them.

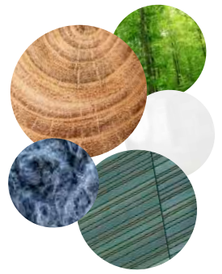


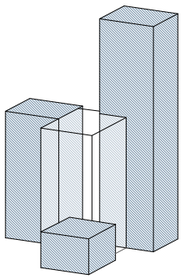
BUILDING STRUCTURE

„**Flexibility of usage** is the priority in future Re-use. Floor plans, free from primary building structure, will ensure new room organisations at all times."
(skeleton structure)

CONSTRUCTION & MATERIAL

„**Reconstruction friendly design and recycability of the materials** are important parameters for an Urban-mining concept thought for the future."



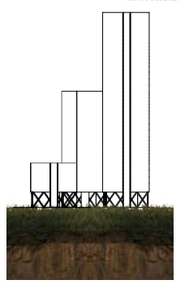


BUILDING FORM

„A compact building form results in a good **A/V- ratio.** Because of the minimized outer facade surface and through avoidance of thermal bridges, which e.g. occur at cantilevered components, energy is being saved."

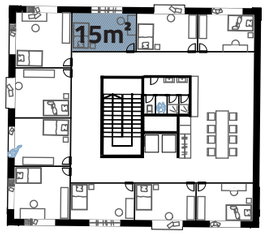
TERRAIN

„For the purpose of the Untouched-World-Idea one needs to **renounce basements** at new building property. That saves organisms in the ground, which are important pieces of the ecosystem- normally it takes 100 years to build one cm of topsoil."



FLEXIBILITY OF FACADE

„The expectations of the building surface rose in the last decade and it will continue to rise in the next years. Possible functions of the facade: the building surface as energy generator, as greenery possibility, [...] as information platform [...]. The evolutionary process of the facade is focused on **dismantling and exchange friendliness of the components**."



SUFFICIENCY & REBOUND EFFECT

Practicing sufficiency is the most direct type of resource protection and avoidance of waste. The most flexible and efficient building system is useless, if the tendency of **high area consumption per person** keeps rising.

ENERGY MANAGEMENT

„The basis of resource efficient energy strategies stays the minimized usage of energy through energy efficient technology, such as LED lights and **sufficient insulation.**

03

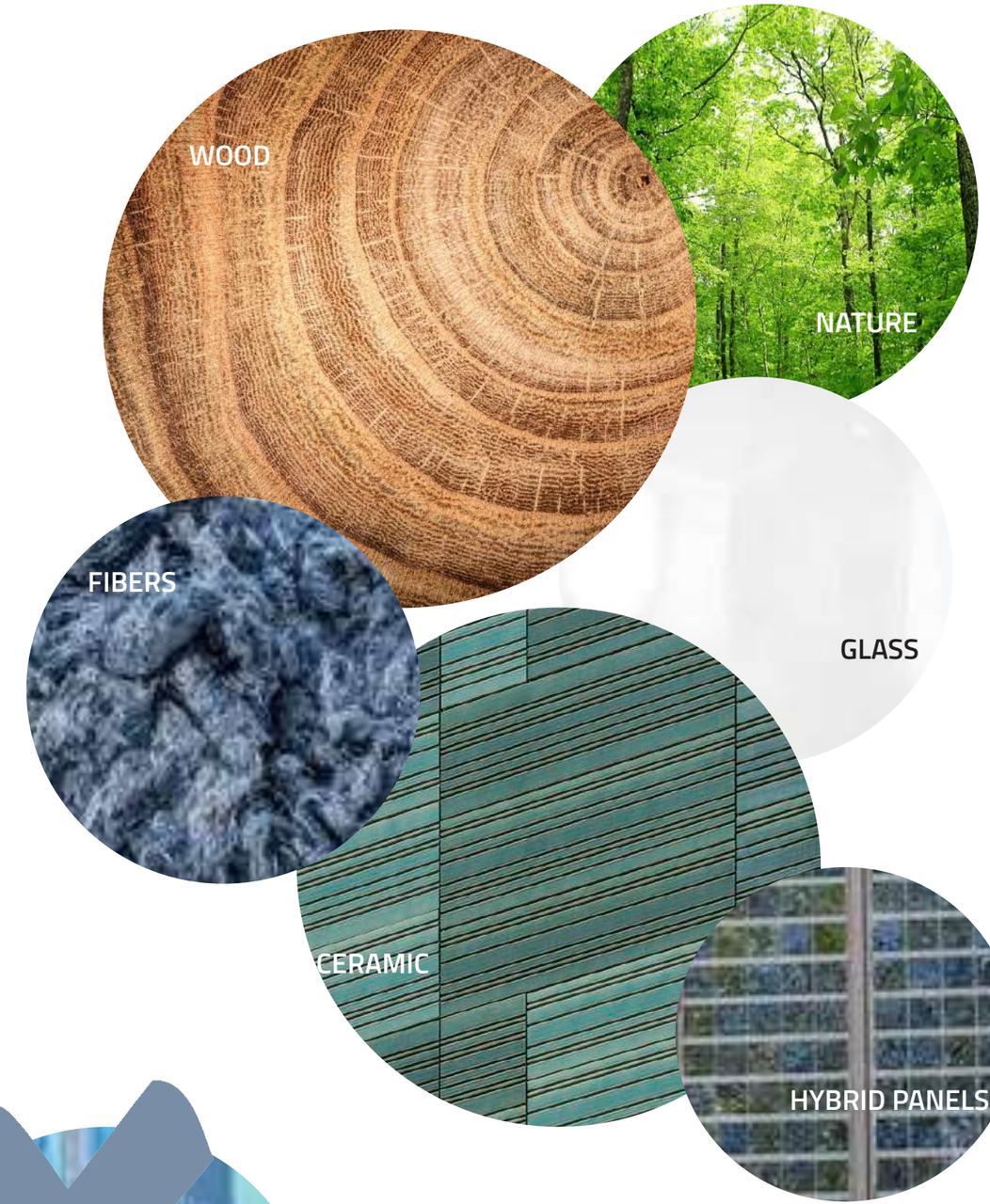
CONCEPT

BUILDING ENVIRONMENT

Facade	**CERAMIC**
Atrium	**GLASS**
Window frame	**BEECH WOOD**
Insulation	**JEANS FIBERS**

RESOURCEEFFICIENCY

Sustainable, natural materials are used to ensure a reduction of the embodied energy in the building complex.
Wood as a construction material for high-rise buildings is new land for engineers and architects to discover. Since Serbia has its own wood production industry it was clear to use this material for the construction. Although, the construction with wood has great benefits it needs to be covered and saved from the weather to reduce the use of pesticides.
Therefore, the facade is going to be covered with ceramics, the material is maintenance free, a natural material, individually shaping is possible and hybrid panels can be assembled on the tiles.
The construction of the building will be built in a system which can be extract, therefore, also in the wall construction no glue is used. The insulation consists of old jeans fibers and hanf insulation as well as different layers of wood.



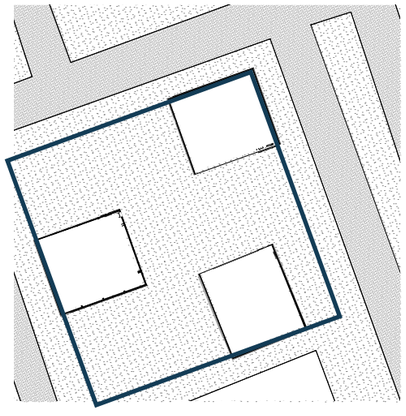
03

CONCEPT

BUILDING ENVIRONMENT

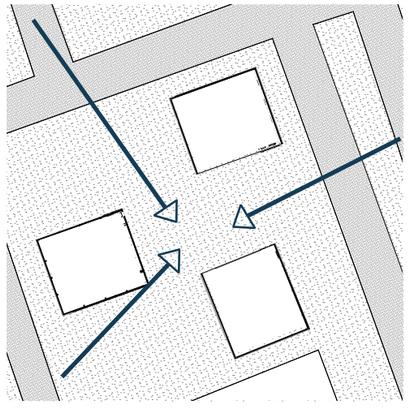
COMMUNITY SPACE

Public spaces are indispensable for healthy, working communities inside a city or village. Among city buildings, there is a network of spaces that create and strengthen connections at different levels of influence. In a book, they would be between the lines: the implicit meaning between concrete, or wood.
In my research I presented 10 for connecting people in public spaces, one of them is to generate a positive use of space and increase urban vitality. In addition to focusing on high-density and saving space, it is crucial to consider the free public, green areas one can encounter and spend time, not just in summer, but all year round.
Guaranteeing accessibility and visibility to the community space, connections between the ground level of the buildings, the sidewalk and the streets are made, through the open ground floor.



FRAME THE SPACE

SET UP CONNECTING ROUTES:
ACCESS ROUTES

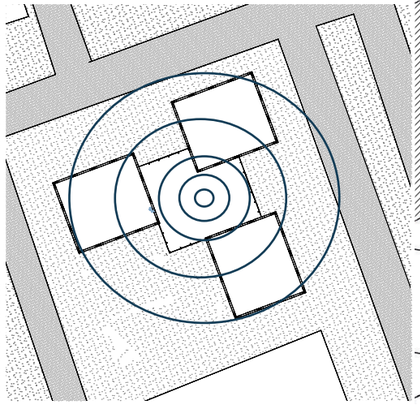


SHELTERED AREA

ROTATE/ CUT BUILDINGS:
ROTATE TO THE SUN

MINIMALIZE SHADE ON OTHER BUILDINGS

FORM ENTRANCES



MEETING POINT

FORM GREENHOUSE AREA:
USAGE ALL YEAR

PROTECTED FROM WEATHER

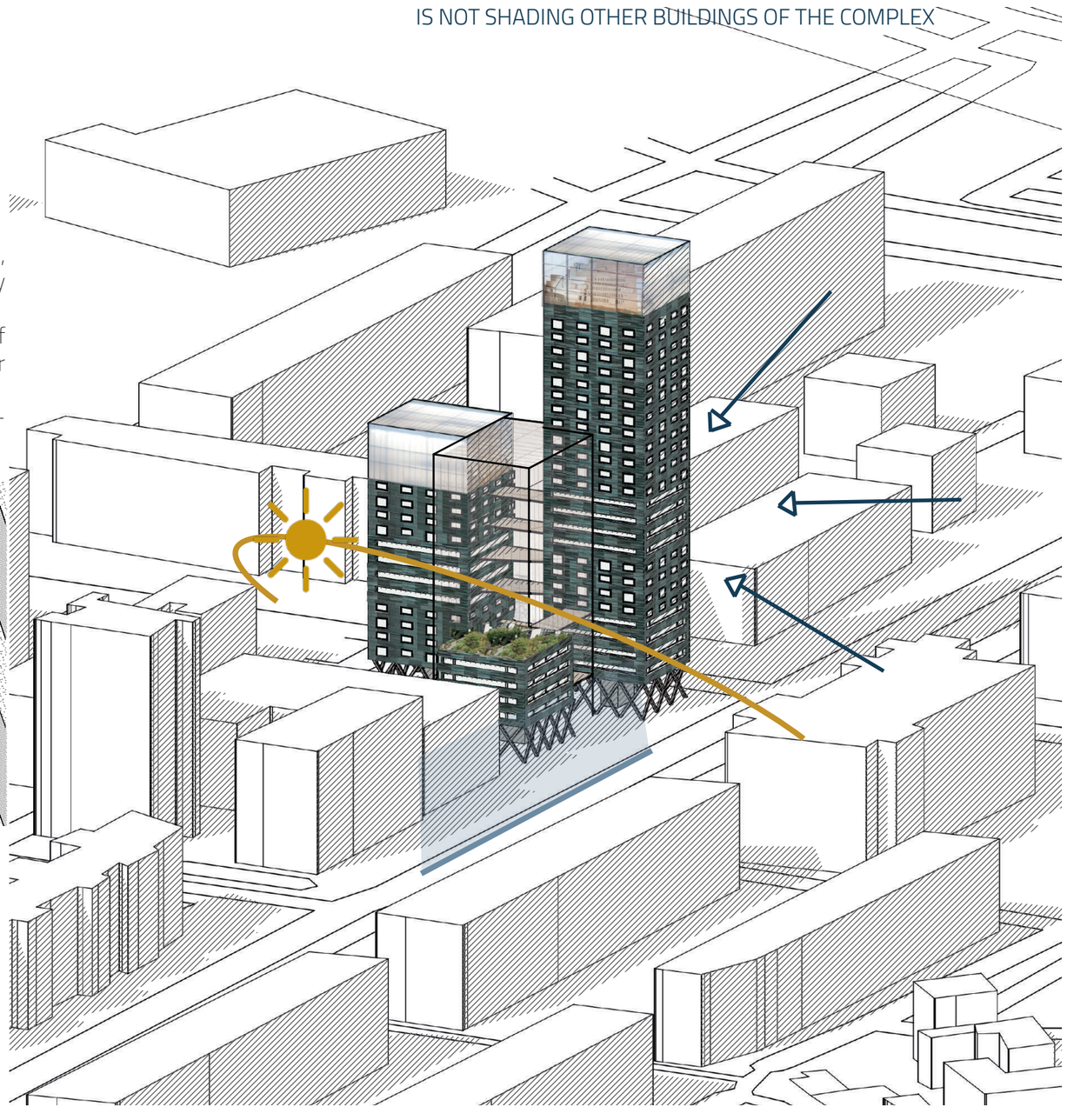
VENTILATION

URBAN SETTING

1. BUILDING KEEPS THE LINE OF THE BOULEVARD HOUSING,
30m THE SMALLEST BUILDING

2. BUILDING TO CIRCLE THE PLACE TO THE NORTH-WEST
50m TO NOT SHADE OTHER BUILDINGS
WORKS AS A WIND DEVIDER, VENTILATION

3. BUILDING THE HIGHEST TOWER IN THE NORTH
80m as ORIENTATION POINT
IS NOT SHADING OTHER BUILDINGS OF THE COMPLEX



BLACK DAPPLE SHEETS

CLAYTEC GREENTECH 700

MYCOFOAM
Thickness: 25,4mm

CARDBOARDWALL
Thickness: 30mm

ULTRA TOUCH DENIM ISULATION
Thickness:51mm / 89mm / 140mm

FLUMROC ROCK WOOL
Thickness:40mm / 50mm / 60mm

SILVER FIR
Thickness:15mm / 20mm

LIGHT BROWN ASH
Thickness:15mm / 20mm

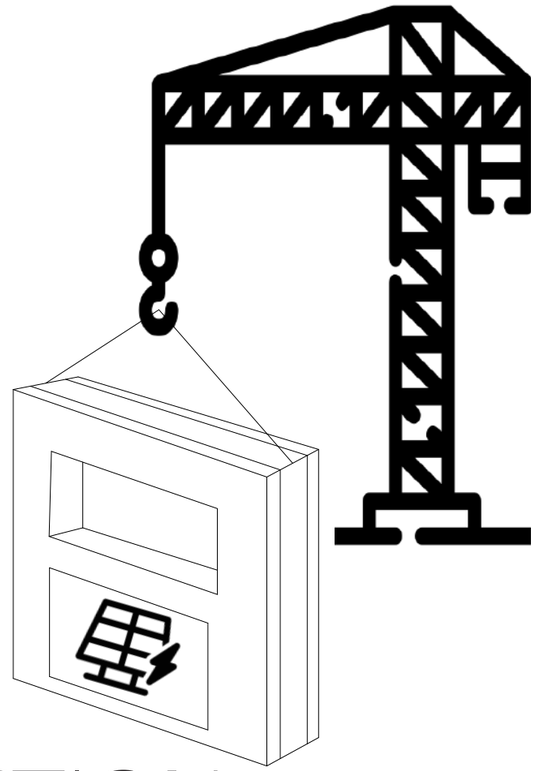
CAPATECT HANF FLEX ISULATION
Thickness:40mm / 50mm / 60mm

REAPOR
Thickness:24,5mm / 50mm

03

CONCEPT

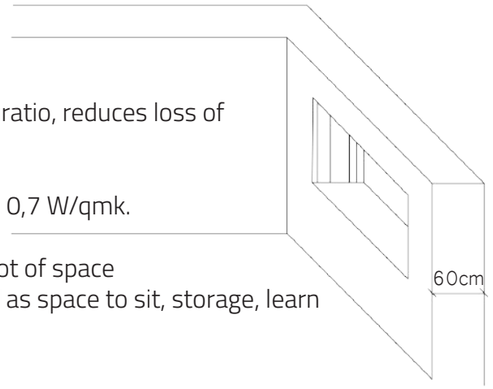
BUILDING SYSTEMS



Functional walls/ windows
60cm

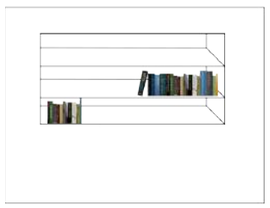
Enables a very good window to wall ratio, reduces loss of energy.
U-Value of the wall: 0,13 W/qmk.
U-Value of the tripple glaze window: 0,7 W/qmk.

Thickness of recycled walls takes a lot of space
Walls are used as space to sit, storage, learn

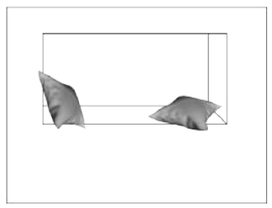


PLACE TO SIT

AS BOOK SHELF



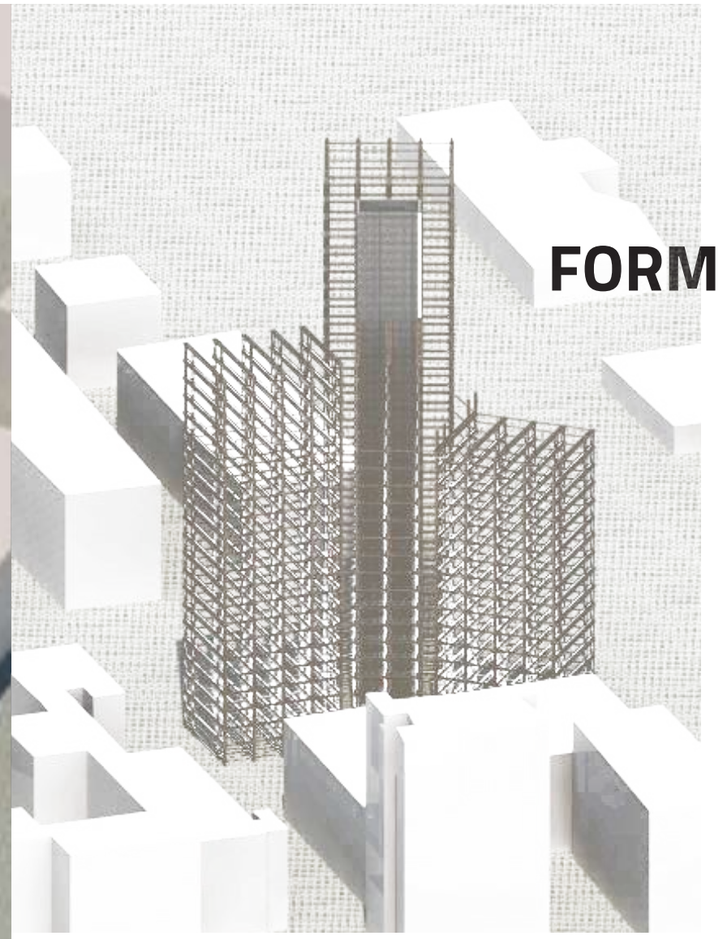
AS WORK PLACE



MODULAR CONSTRUCTION

According to Allison Arieff & Bryan Burkhart, the authors of the book “Prefab”, use of **wood in modular construction** is the most common practice since the seventeenth century. Using wood in modular construction is greatly beneficial due to its properties as a construction material. Wood is easy to manipulate by hand or with machinery, has low toxicity, is biodegradable, is easy to reuse and recycle, and is affordable.

Prefabrication in a factory allows the wood to stay dry and at a constant temperature while being precisely cut and fitted to exacting tolerances. Prefabrication minimizes waste, saves resources, and simplifies recycling of waste. Since this Projects focus is resource efficiency in the building industry, the walls insulation will be a composition of different layers with recycled materials. Therefore, the material with the best CO^2 footprint will eb the ULTRA TOUCH DENIM INSULATION, which consists of old textile fibers.

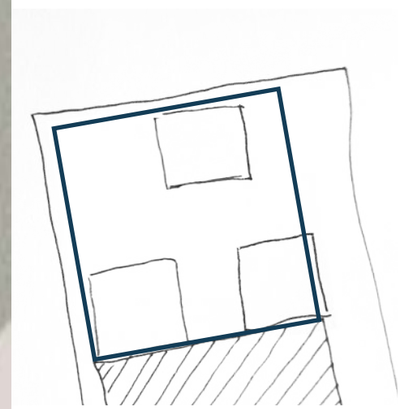


04

FORM DEVELOPMENT

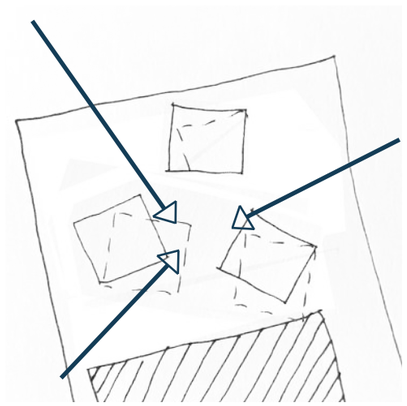
26.11.2020

After comments has been made the design evolved vertical-ly instead of having a line-up of function they were mixed through the buildings and piled up. Also, the Atrium works now 3-dimensional as buffer zone between outside and the towers. Furthermore, the hybrid-wood structure made progress in terms of static and placement. The three towers are erected, thus the sun light would touch all towers at all times of the day.



FRAME THE SPACE

SET UP CONNECTING ROUTES:
ACCESS ROUTES

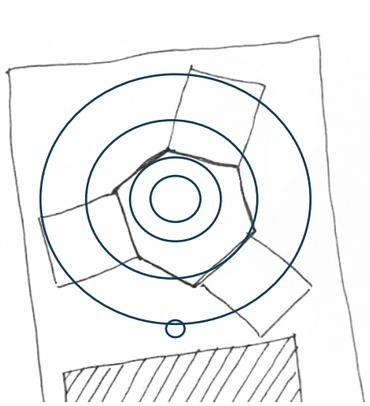


SHELTERED AREA

ROTATE/ CUT BUILDINGS:
ROTATE TO THE SUN

MINIMALIZE SHADE ON OTHER BUILDINGS

FORM ENTRANCES



MEETING POINT

FORM GREENHOUSE AREA:
USAGE ALL YEAR

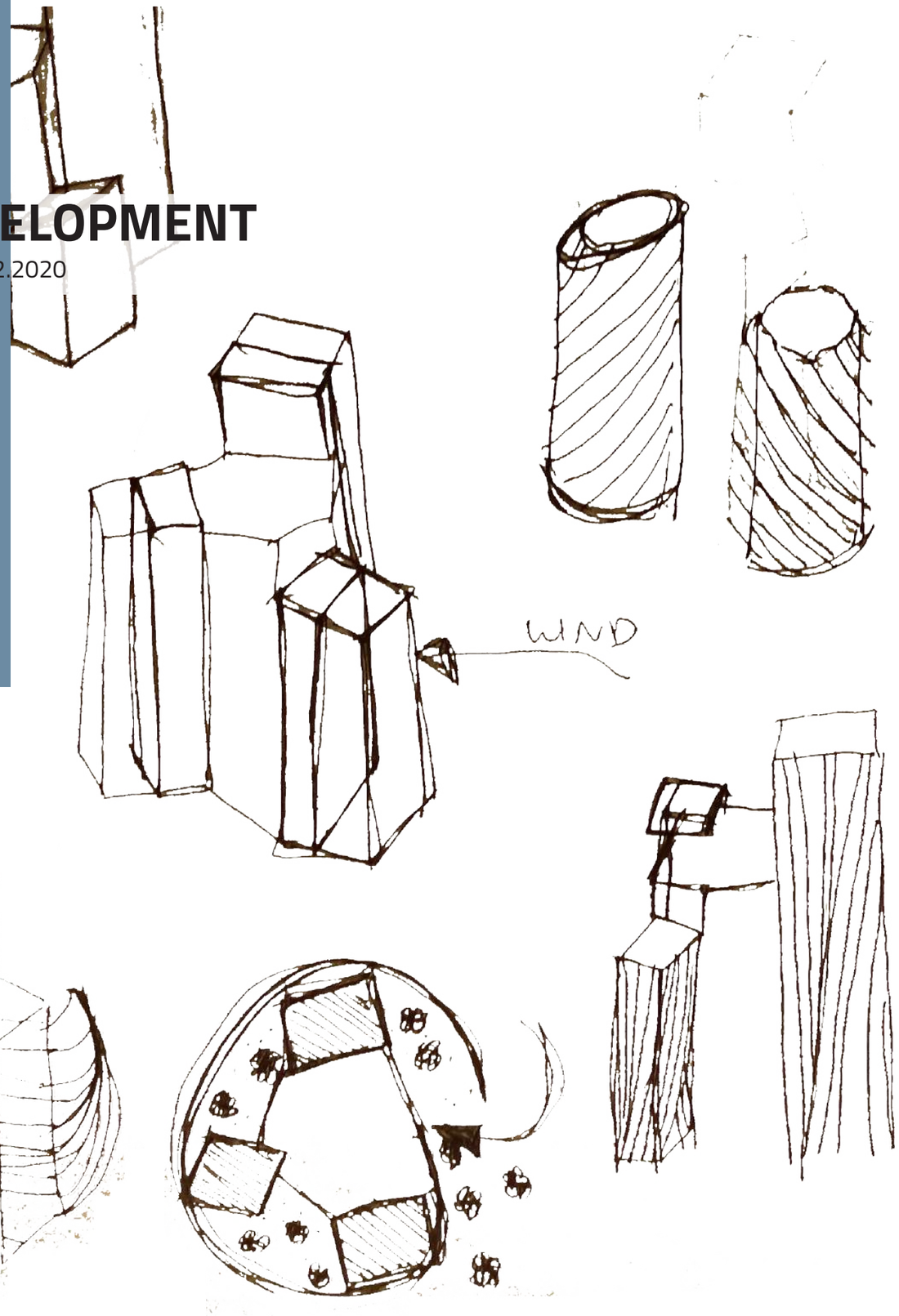
PROTECTED FROM WEATHER

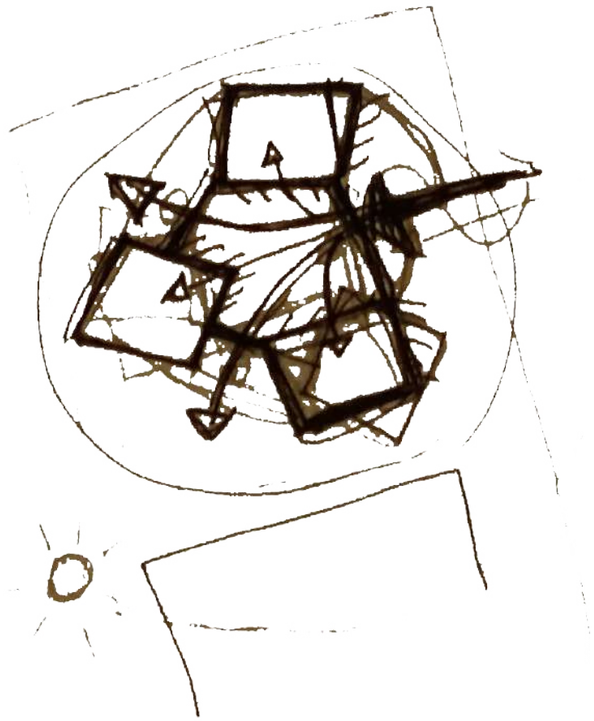
VENTILATION

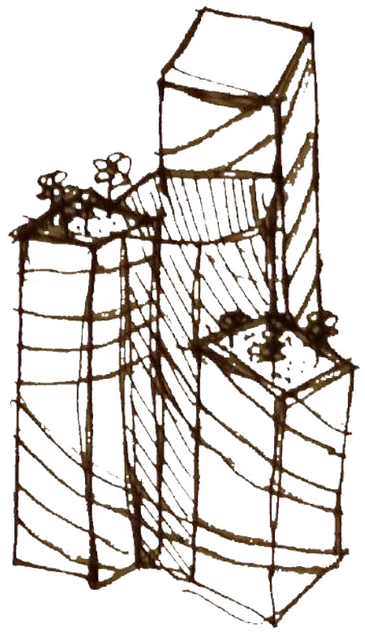
04
FORM DEVELOPMENT

10.12.2020

Before the last presentation in this year the design developed. The critique of the former building not respecting it's surroundings and the form being too symmetric, for an energy efficient building, made sense and thus the design process continued.
Further on, the building should look like one and not shade each other too much.







05

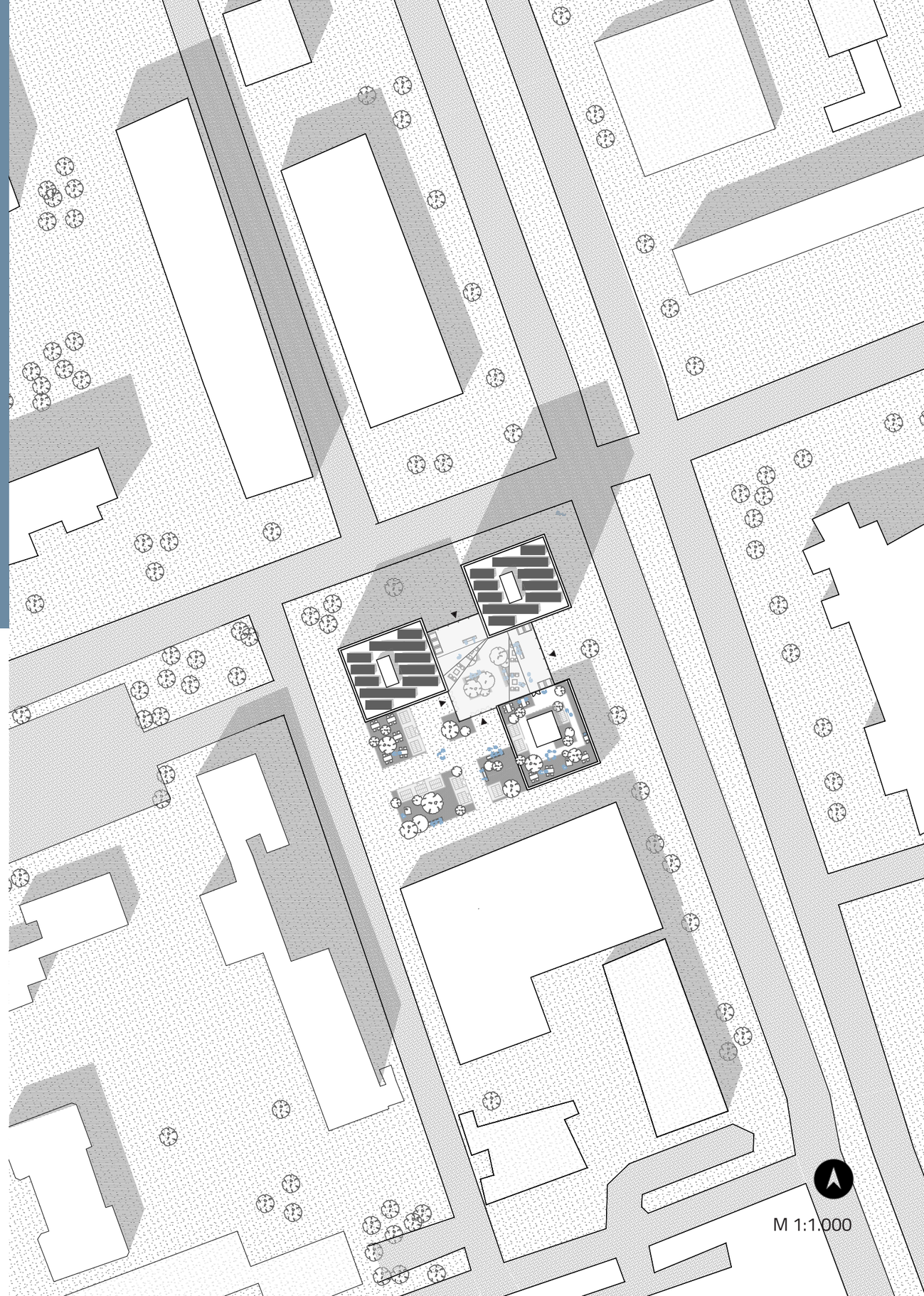
UPCYCLE BOOKS & BEDS

URBAN SETTING

The calculations are made without considering the atrium area, because it is not a warm zone. Since the atrium contains all the community functions it is the heart of the building complex.
Adding the atrium-space the new constructed building is slightly over the volume of the old building. Therefore, one need to consider the additional open space which is gained with the new building and contributes to the community life in Novi Sad.

FINAL DESIGN

Adress	Bulevar oslobođenja 30, Novi Sad 21000, Serbia
Site area	3.523 m²
Planned ground area	ca 1.875 m²
Dimensions of a tower	ca. 20m x 21m
Average TFA per floor	1.080 m²
Storeys	25+13+4= 42 + open ground floor
TFA	9.000+5.680+1.440= 17,120 m²
UFA	6.192+3.600+1.296= 11.088 m²
Space efficiency	0.73
Shape Factor A/V	0.23



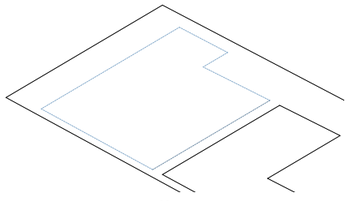
05

UPCYCLE BOOKS & BEDS

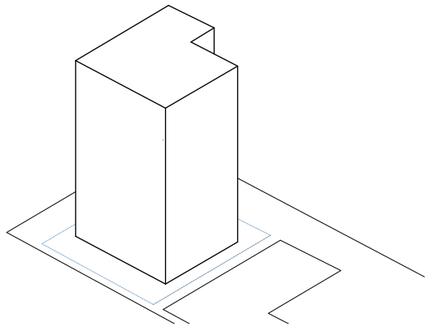
FORM DESIGN

Taking everything into account, the conception occurs because of many factors which were analysed previously.
First of all it was important to create a maximum volume to use, as cities get denser from year to year. After that the volume is divided and stretched throughout the site area to create room and enable the incidence of sunlight. Therefore, the high-rise with 80m is positioned on the north corner on the site, and a free space is placed to the south protected from the noise of the boulevard.
To keep a maximized volume, the fourth tower is placed in the middle of the arrangement as an atrium which does not shade the other buildings. The last step involved the structuring of the complex and opening it up to the public with an open ground floor.

CONCEPTION

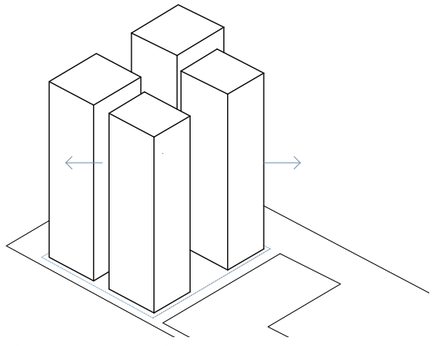


FLÄCHE

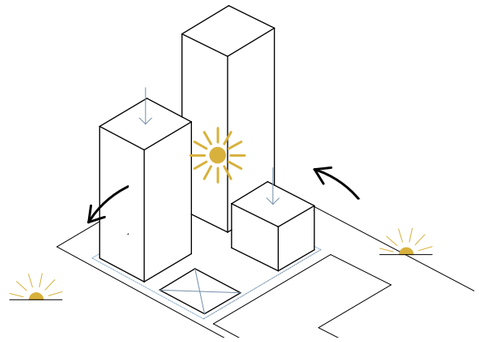


MAX VOLUME

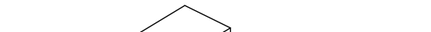
SEPERATE



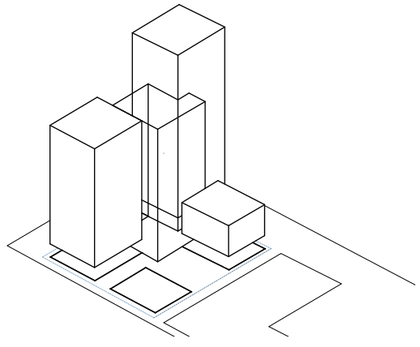
STRETCHING



OPTIMIZE



ADJUST



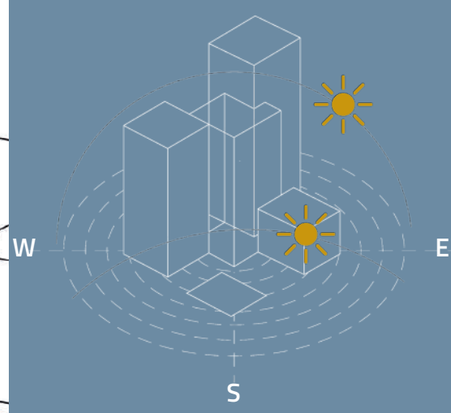
STRUCTURE

05

UPCYCLE BOOKS & BEDS

PERSPECTIVE

The building is oriented to the south to ensure as much lightning as possible in the buildings itself and the atrium.
All community functions and meeting areas are inside of the atrium, the garden area or inside of the library/ student hub on top of the buildings, which ensures sufficient lightning.
The building shape evolves, the towers are stacked up from the free ground area to the south to the 80m tower in the north. The atrium is located in the center to maximize the expose to sun irradiation in winter, which also supports the heat recovery system used.
The building has a timber structure to ensure the reduction of the embodied energy.



05

UPCYCLE BOOKS & BEDS

ENERGY OVERVIEW

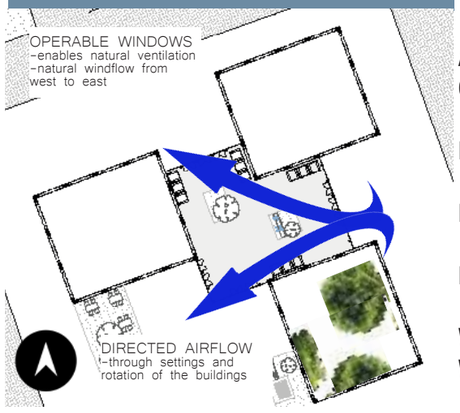
SUMMER SECTION

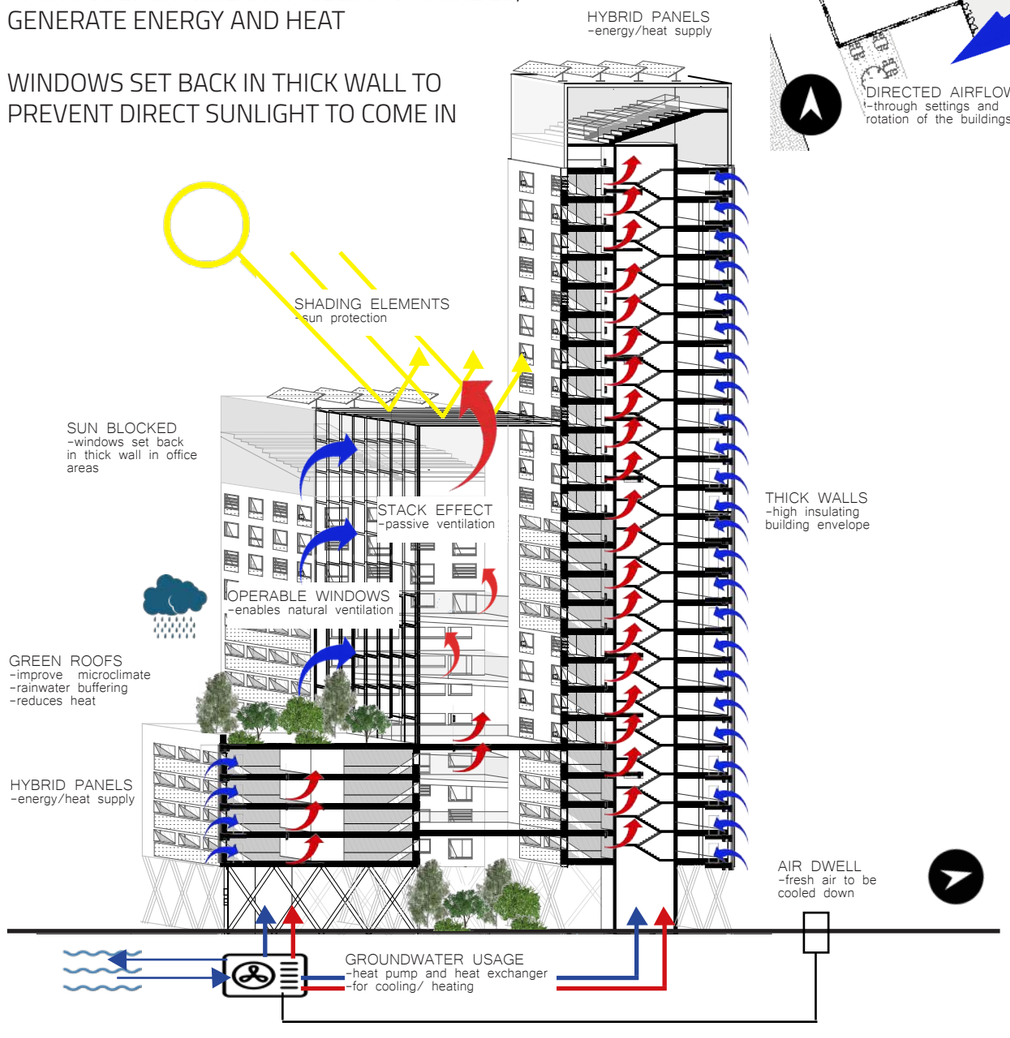
ATRIUM AS VENTILATION, OPENED UP IN SUMMER,LET WIND THROUGH

ROOF GARDENS,HELP TO BLOCK SUN IN SUMMER

PHOTOVOLTAIK/ SOLAR PANELS ON FACADES, GENERATE ENERGY AND HEAT

WINDOWS SET BACK IN THICK WALL TO PREVENT DIRECT SUNLIGHT TO COME IN





WINTER SECTION

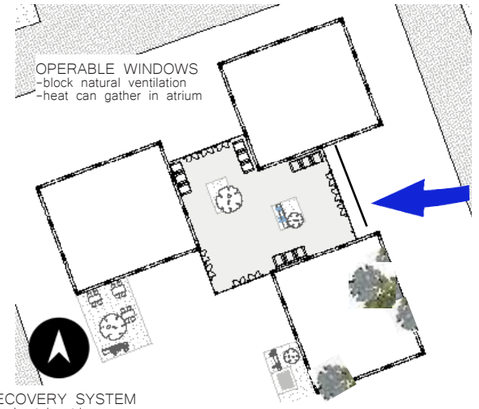
ATRIUM AS HEATER, CLOSED UP IN WINTER, GATHER HEAT UNTER ROOF

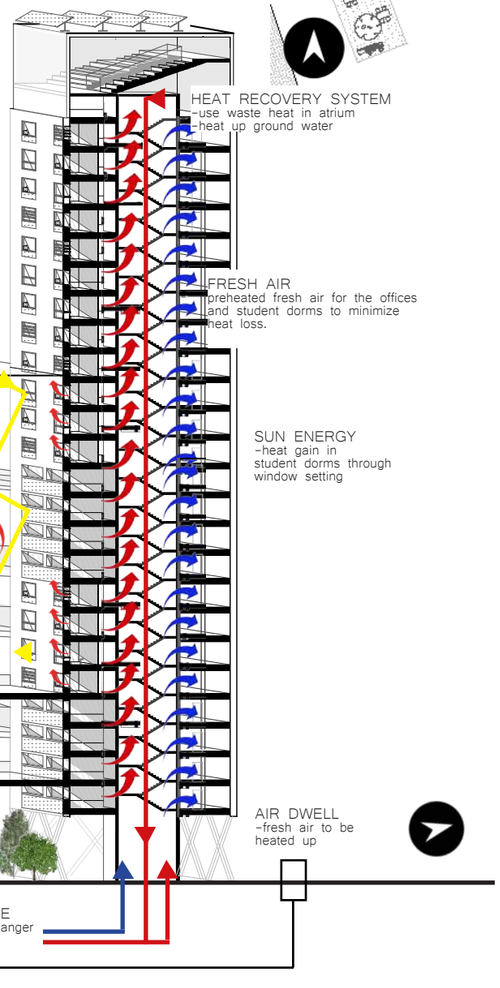
HEAT RECOVERY SYSTEM

ROOF GARDENS, LET SUN THROUGH IN WINTER

FRESH AIR THROUGH WINDOW OPENING

WINDOWS SET BACK IN THICK WALL, THE SUN IS COMING IN





LIBRARY/
STUDENT HUB

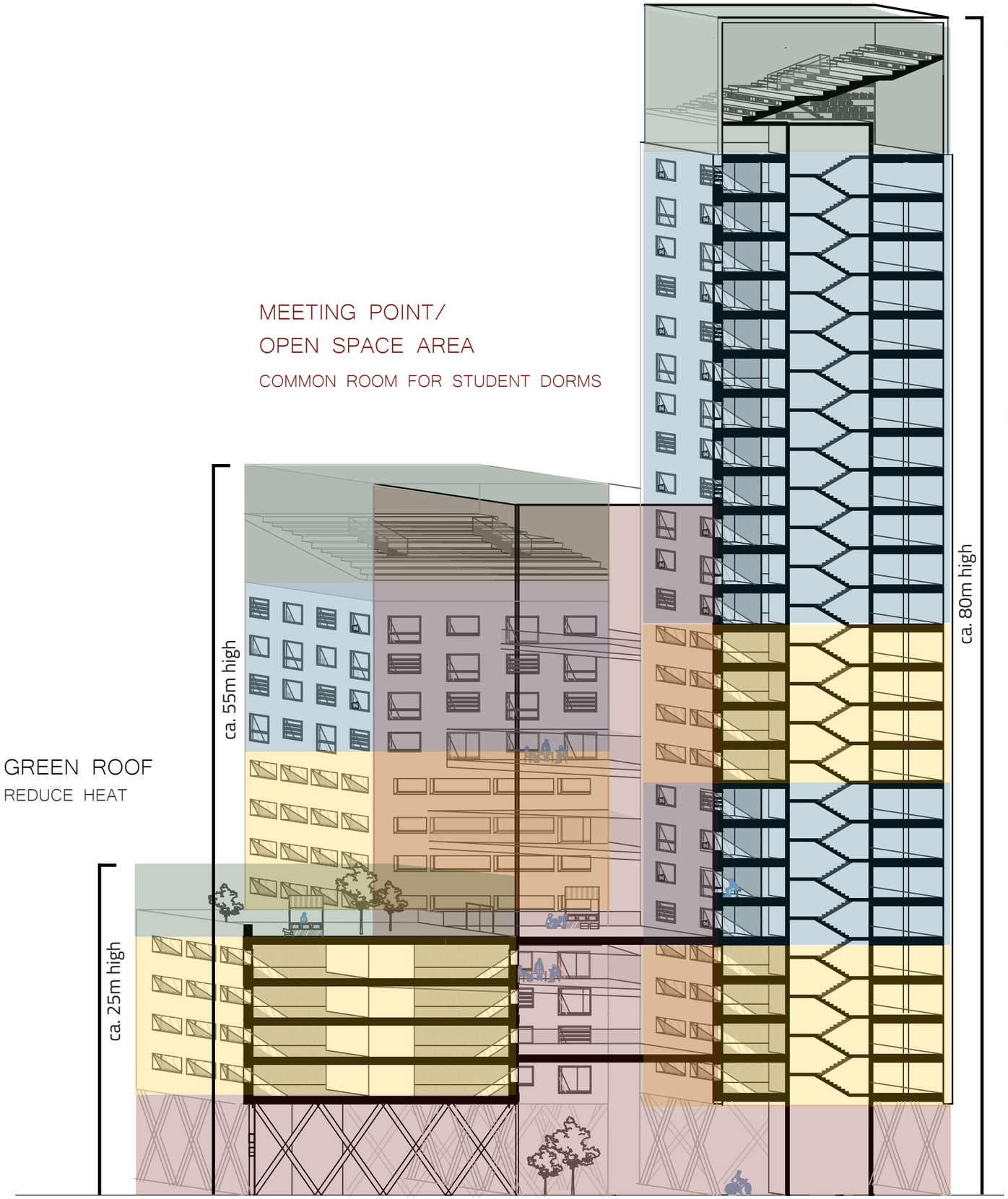
MEETING POINT/
OPEN SPACE AREA

COMMON ROOM FOR STUDENT DORMS

STUDENT
DORMS

GREEN ROOF
REDUCE HEAT

CO WORKING



05

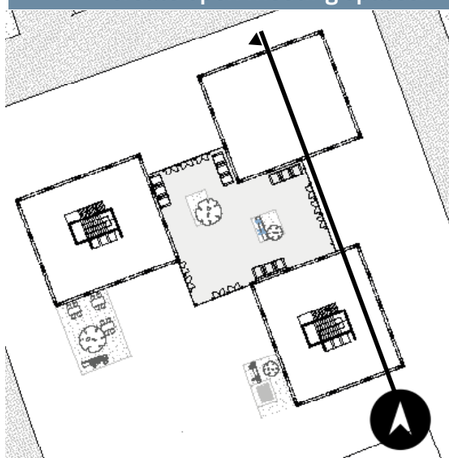
UPCYCLE BOOKS & BEDS

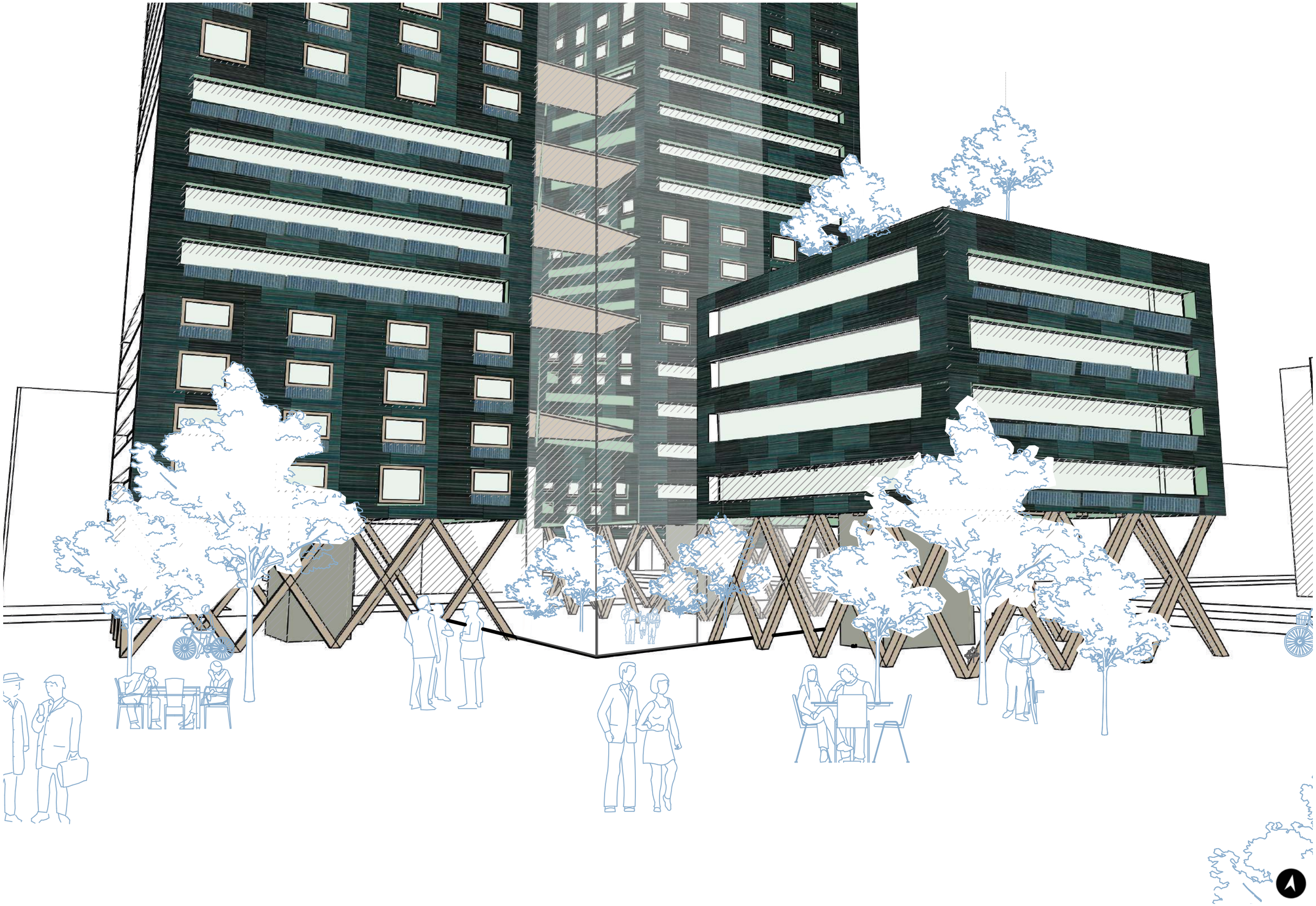
FUNCTIONS

The functions used in the building has been defined after the analysis of the region and city of Novi Sad. As Novi Sad became a student city, the knowledge from all over the world was delivered to the city. Unfortunately the rise was not followed by the provision of affortable student dorms. Nowadays, only 1 out of 10 students will get a student dorm offered by the University, therefore, the new building complex ‚UPcycle books & beds' will provide this function.

In the city of Novi Sad it is difficult to find open working spaces and rentable space for startups and freelancer. This will be covered from the new building by providing Co-working spaces and Student/ Library hubs.

An open meeting space, as well as, the community rooms of the student dorms are made available in the Atrium, which serves as a buffer zone between outside and inside. To strengthen the community of a city and unite the diverse cultures of Serbia it is important to create open meeting spaces.





Hybrid High Master Studio

WS 2020/21

MASTER STUDIO – GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY –
UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & UBRAN PLANNING

Highrise Gardens

Kenan Isakovic

Supervisors: Prof. Brian Cody, Prof. Dragana Konstantinovi , Christiane Wermke, Maja Momirov,
Slobodan Jovic, Sebastian Sautter, Aleksandar Tepavcevic

CONCEPT DEVELOPING - WHY ?

- The idea behind the project is bringing back something the city lacks and that's a meeting/assemlby areas and green spaces that are open for public use as well.

The goals of this project was to give people the opportunity to live in the middle of a city, in a high rise with green gardens available for use.

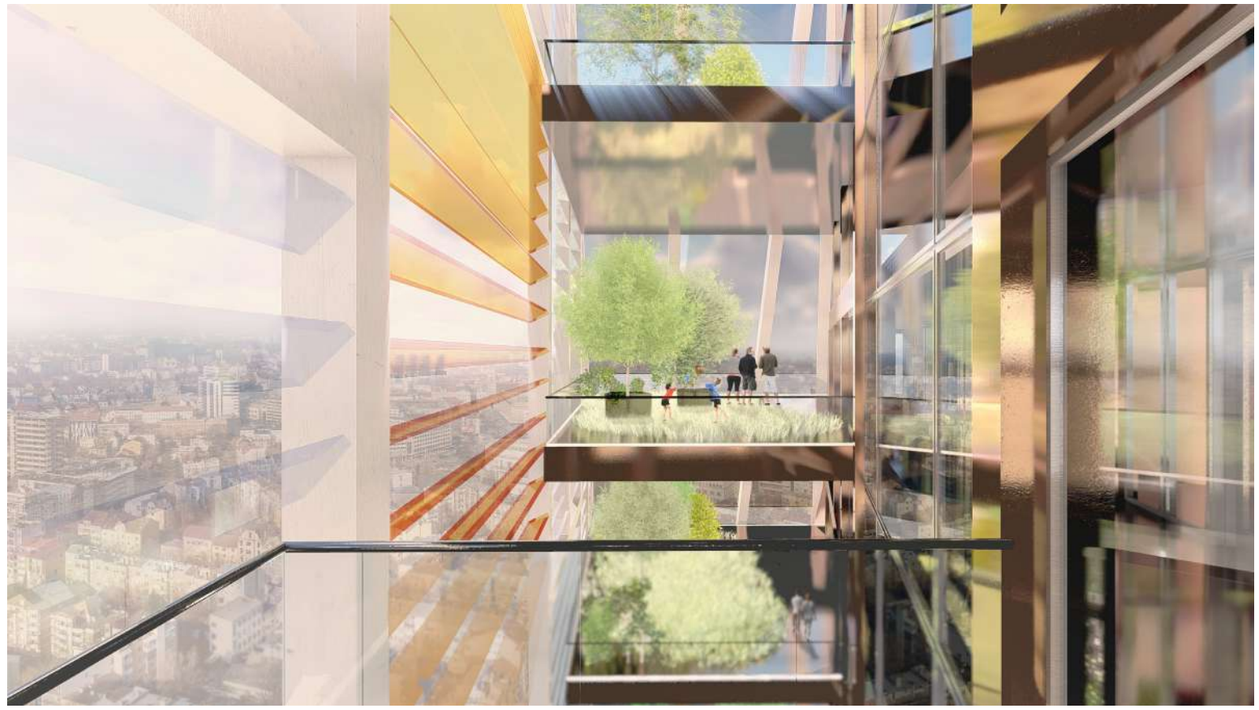
The form that the project took is a result of a base idea and implementing the results of the climate and situational analysis into it.

Almost 75% of the building is used as an energy source with implementing the energy design into the facade which would help to keep the energy waste from the city low.

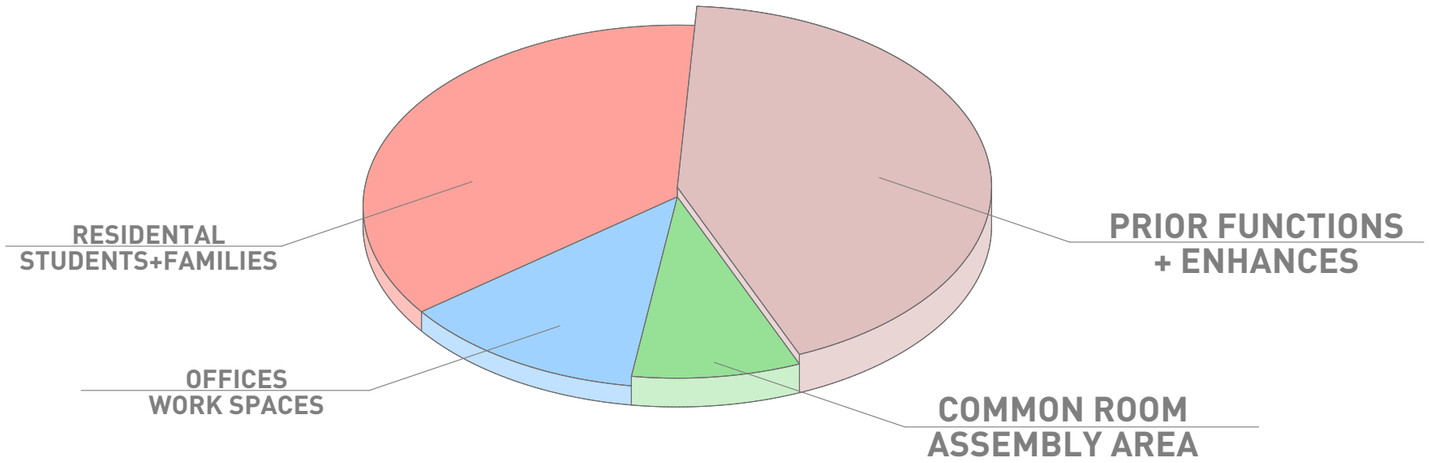
After finding out that Serbia and Novi Sad had a problem with unemployment I wanted to dedicate my project into something that that could offer more working places as well. (not only by the expanded Store levels, the office areas or the Gallery, but by people who'd take care of the building and also take care of the green spaces inside of the building and outside of it).
One of the most critical groups that got a big unemployment rate in Serbia are the elders (war veterans, old age groups) so flower grooming is something that would generally be good for that group.

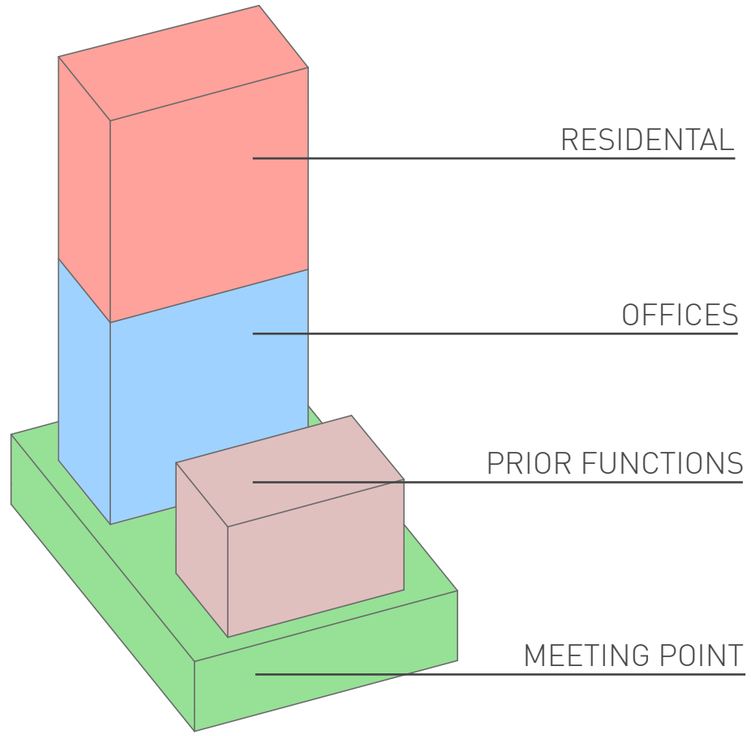
Sport activites are something that I had to include into the project as the sports culture is huge is these areas of Europe.

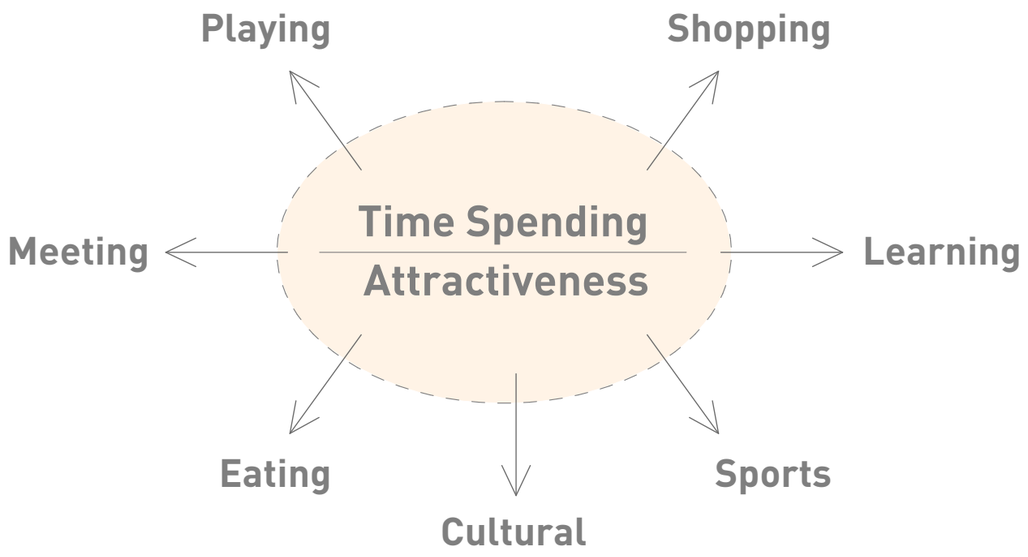
This project was made as a suggestion how would people be able to create green areas in parts of the world where it's lacking. By moving these green areas inside of the building and still allow people to use it.. That wuld help improve the quality of life within these types of populated and rushy areas.

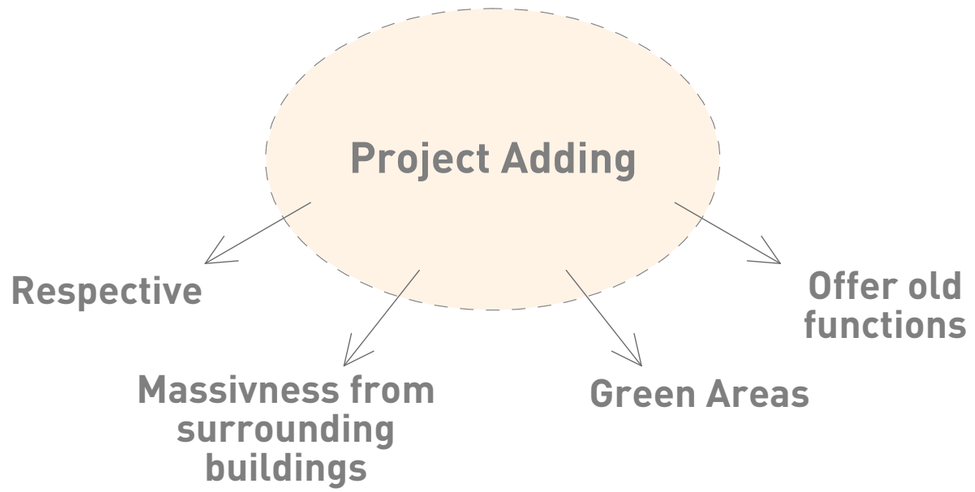


CONCEPT IDEA



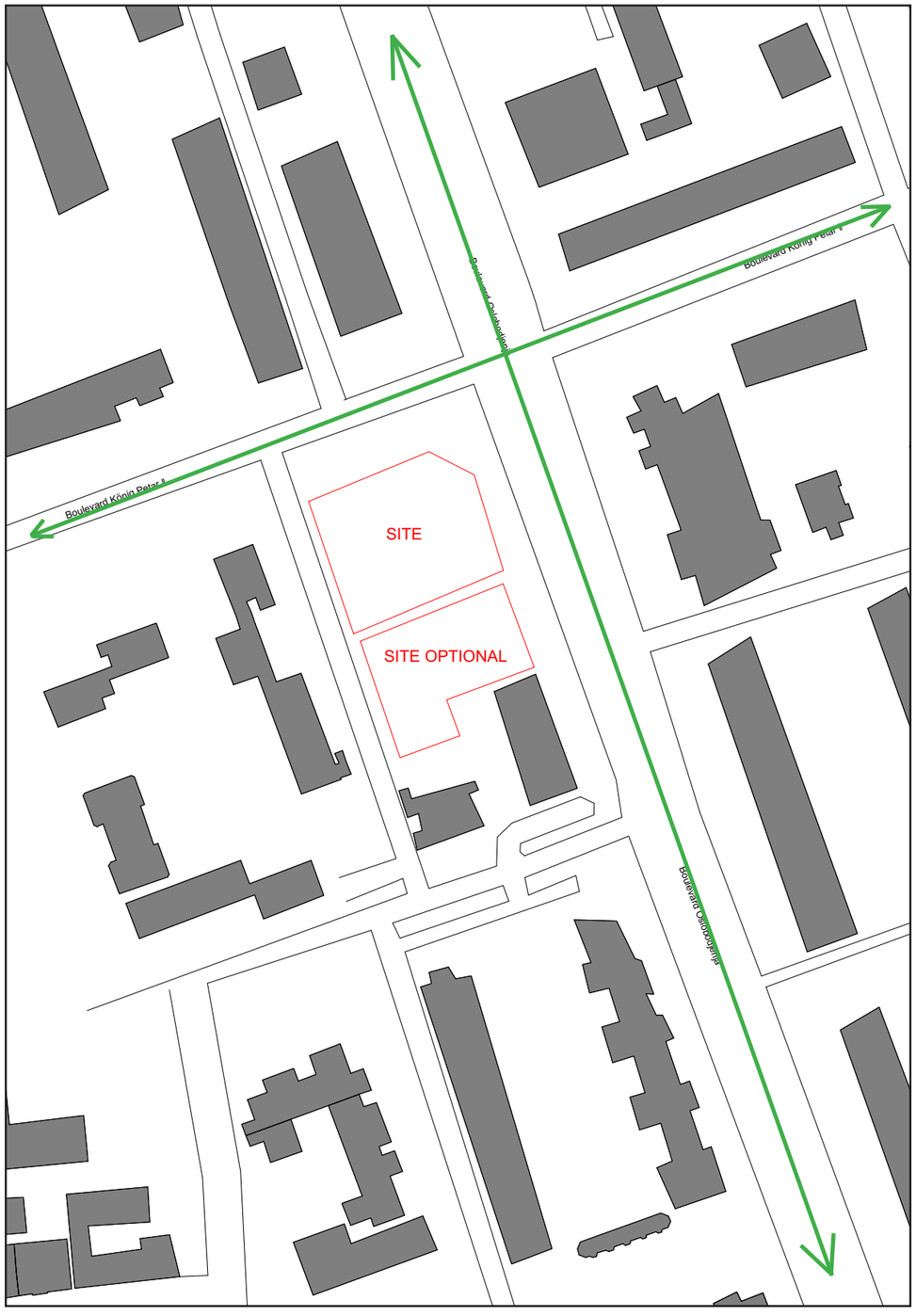




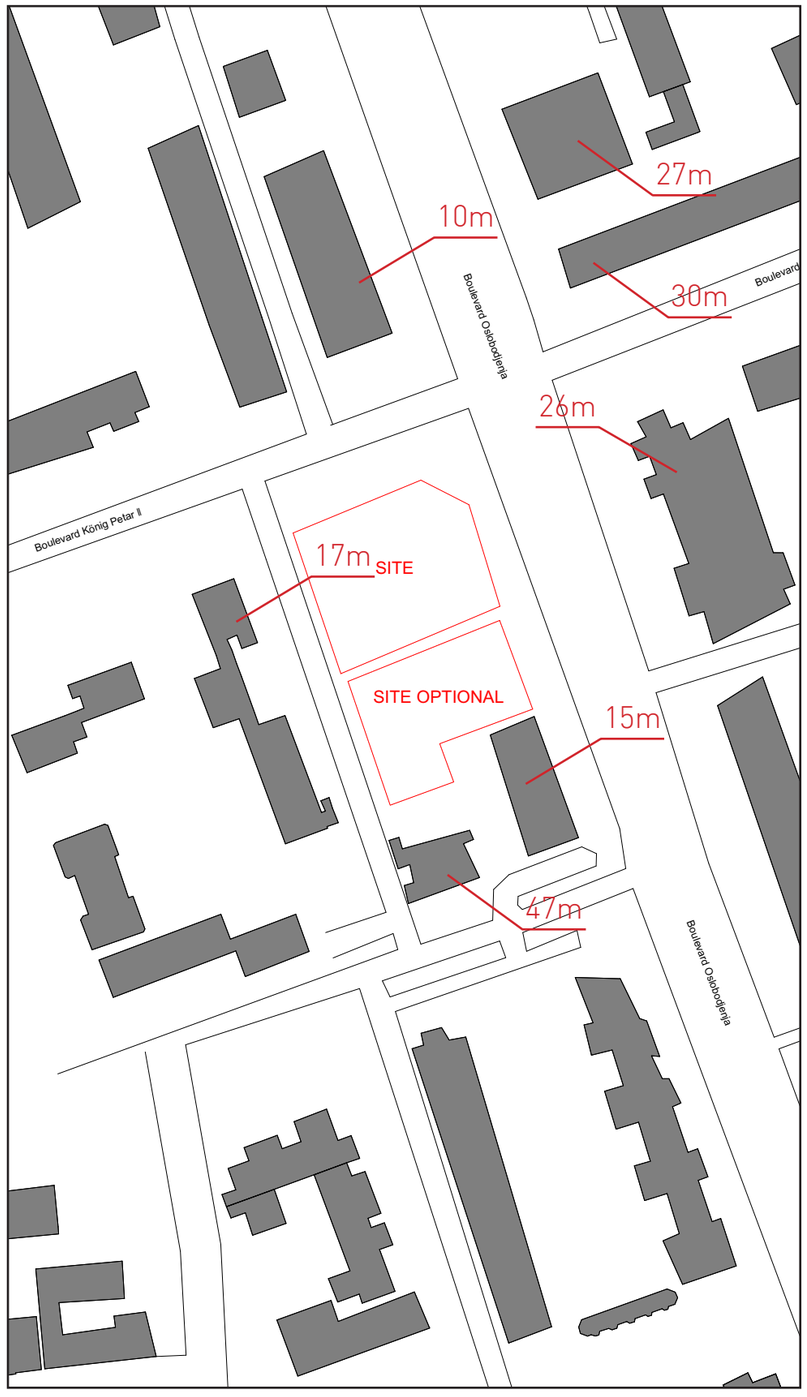


THE SITE 1:2000

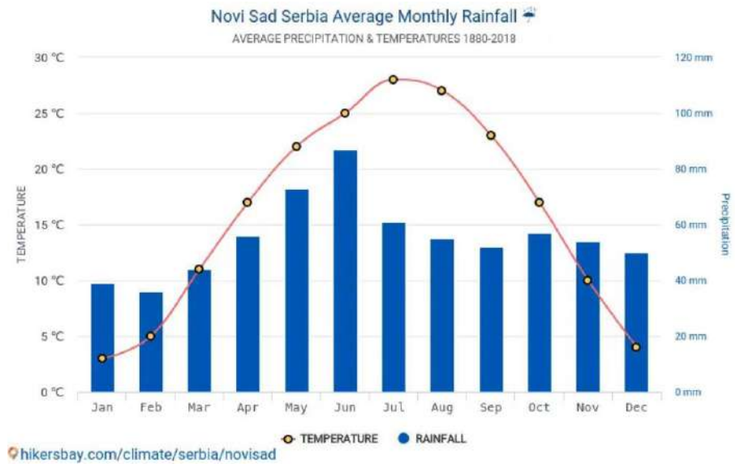
Main Transport Streets



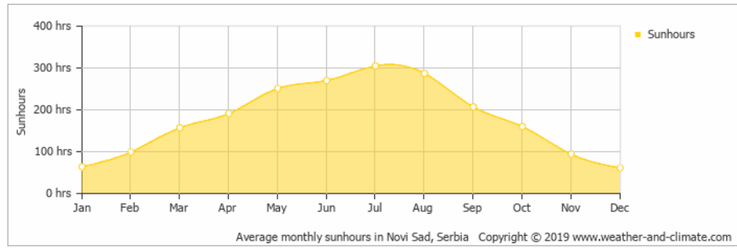
Building Height



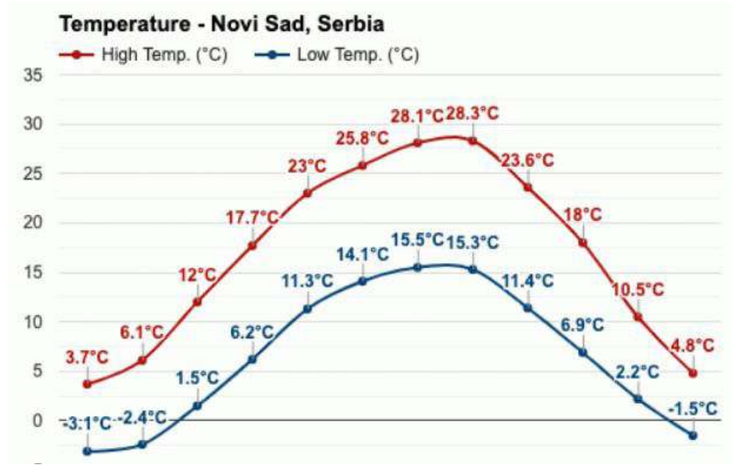
Monthly Rainwater in Novi Sad



Average monthly sunhours

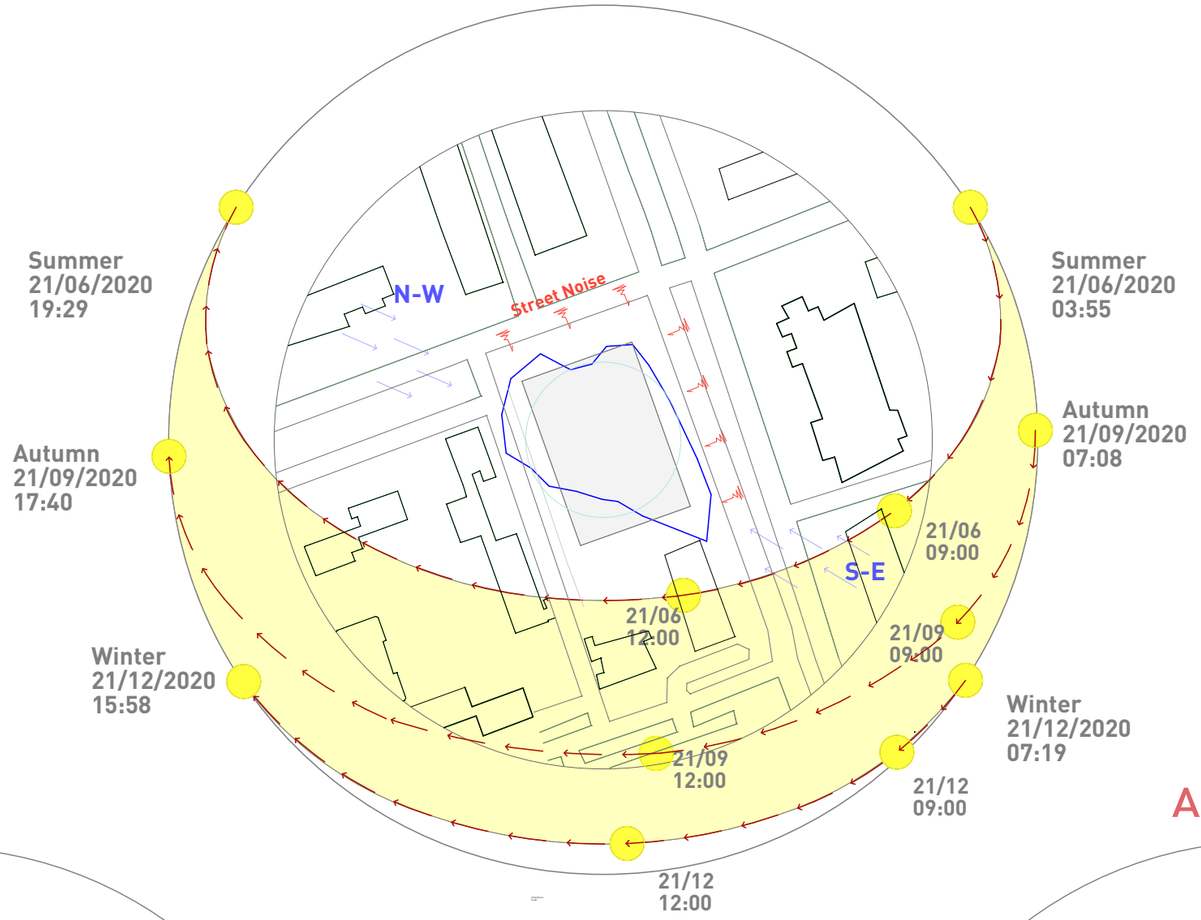


Temperature in Novi Sad

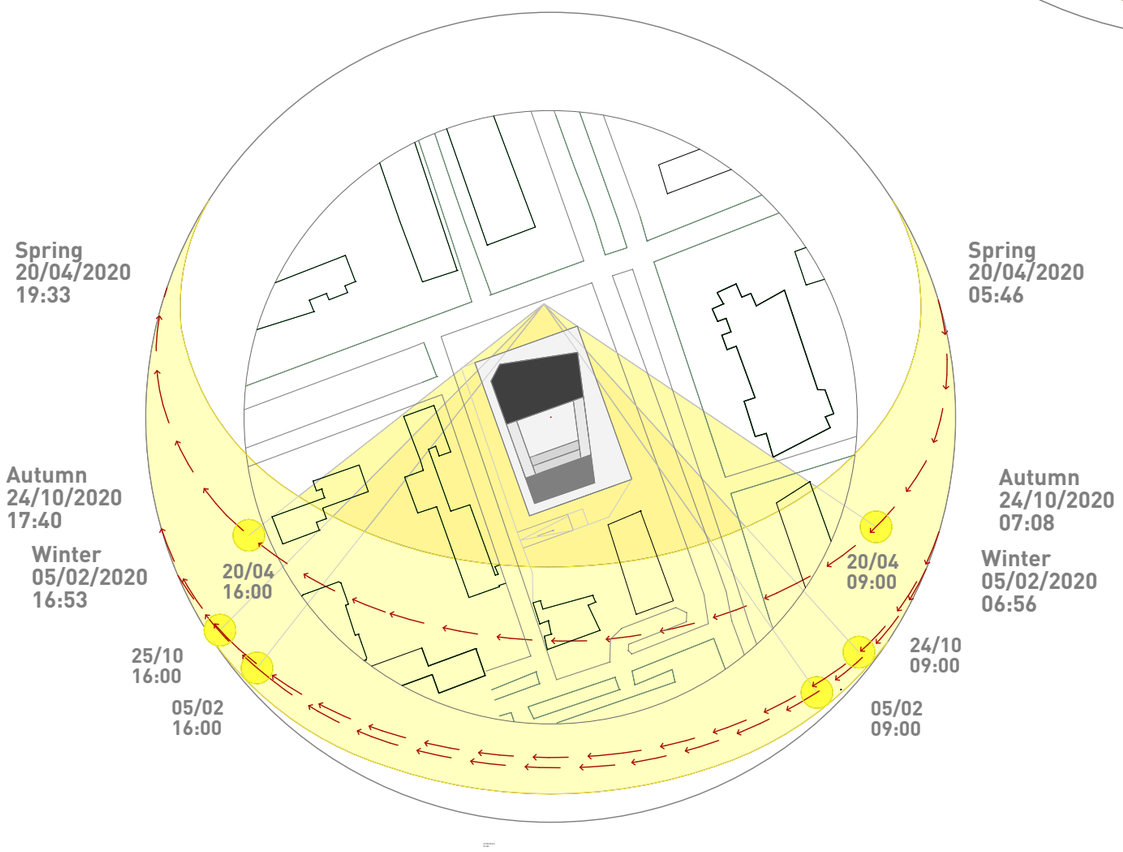


POTENTIAL: Underground water !!

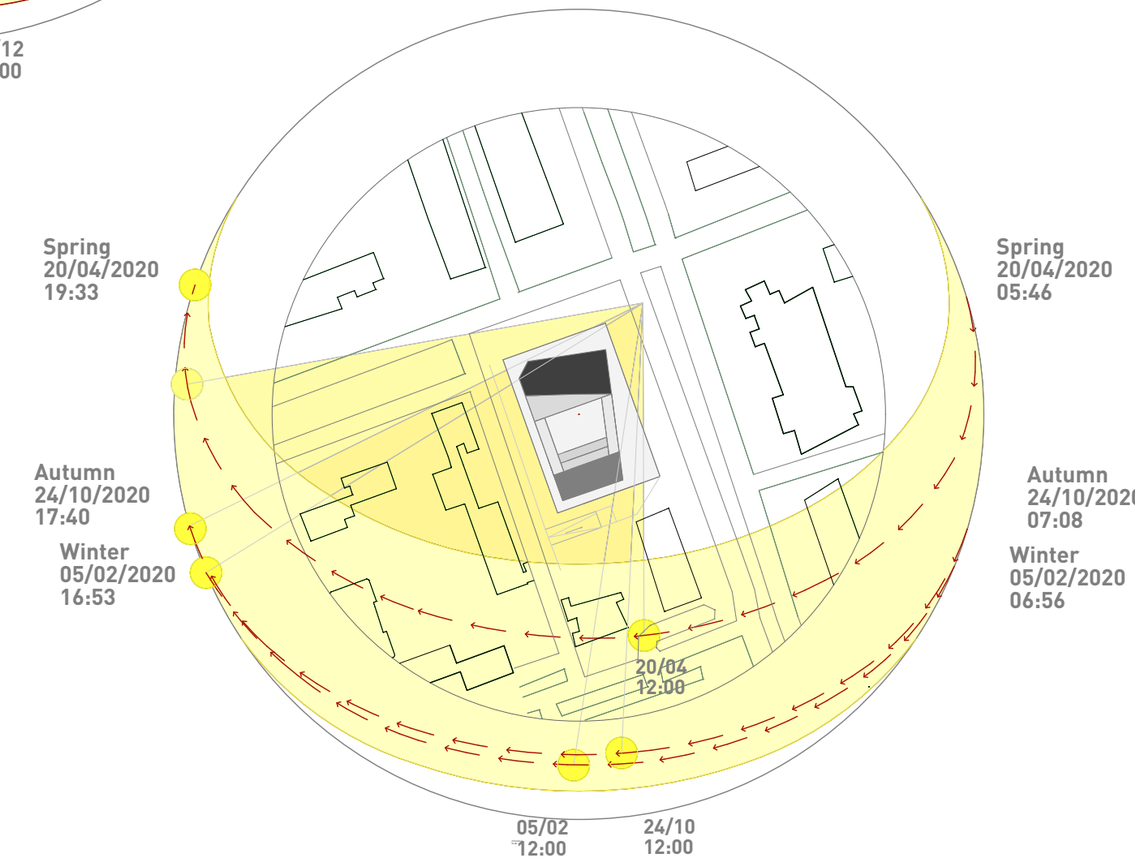
ANALYSIS AND ACTIVE HOURS



ACTIVE HOURS - OFFICES

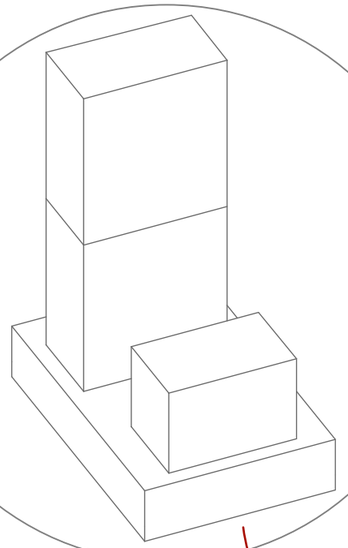


ACTIVE HOURS - RESIDENTAL



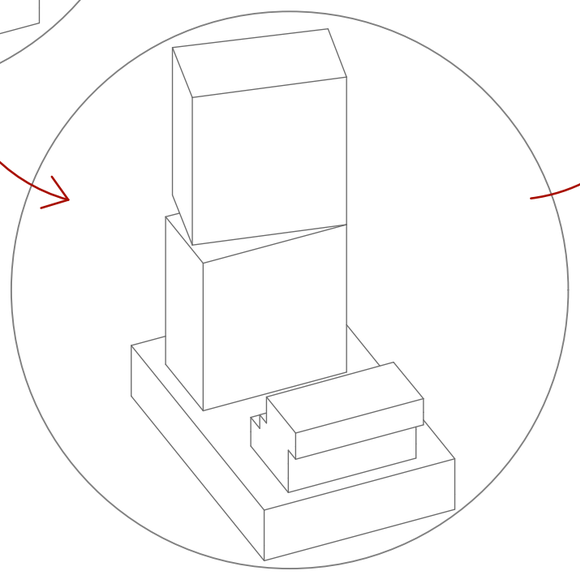
FORM-FINDING

1



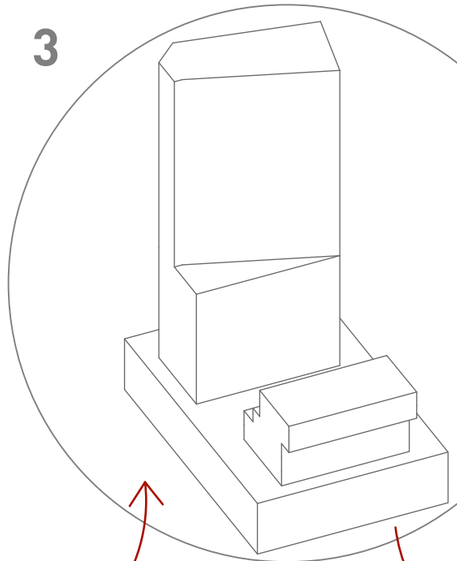
Basic Form

2



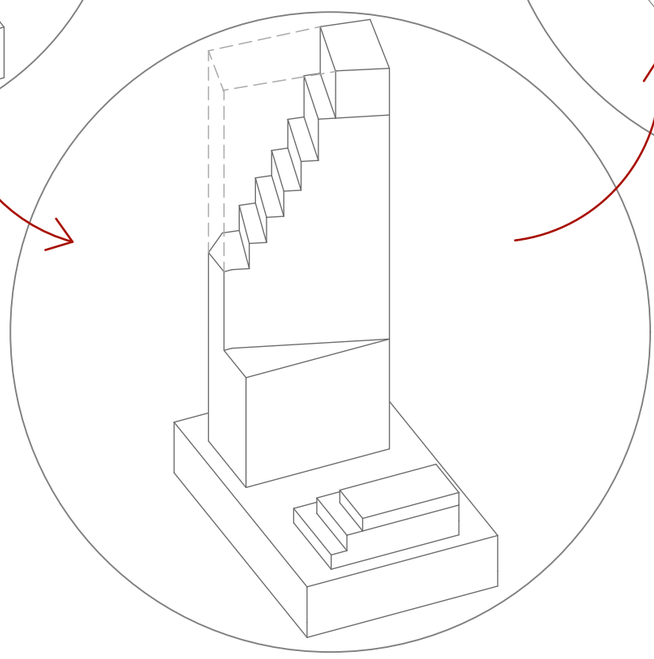
Rotating the areas to maximize solar performance and reduce energy demand during active hours

3



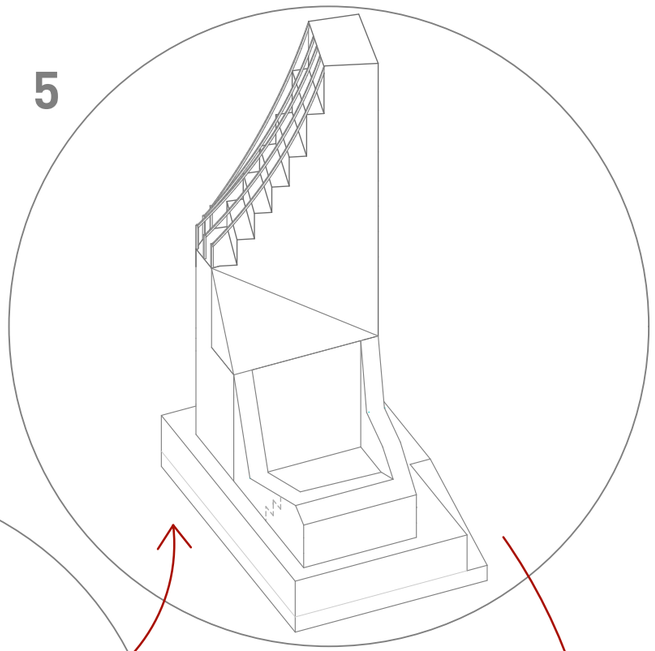
Adding Form

4



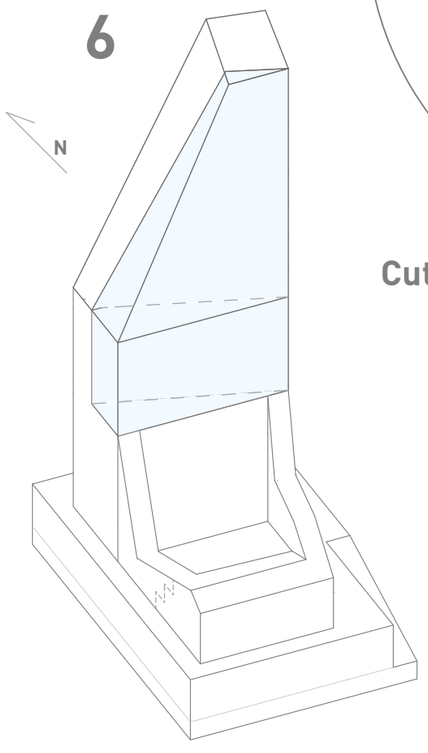
Cutting the Form to cast less shadow on the surrounding

5

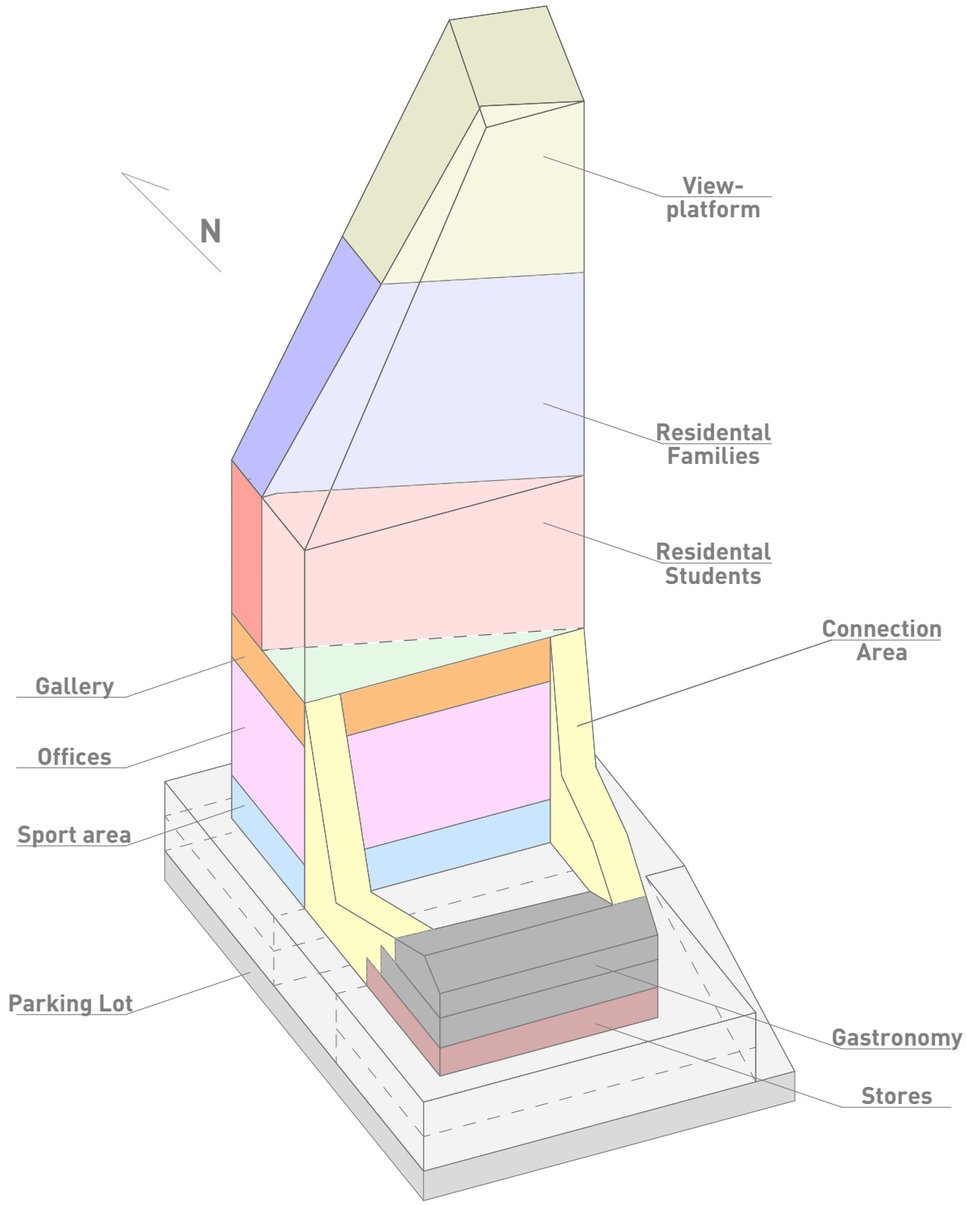


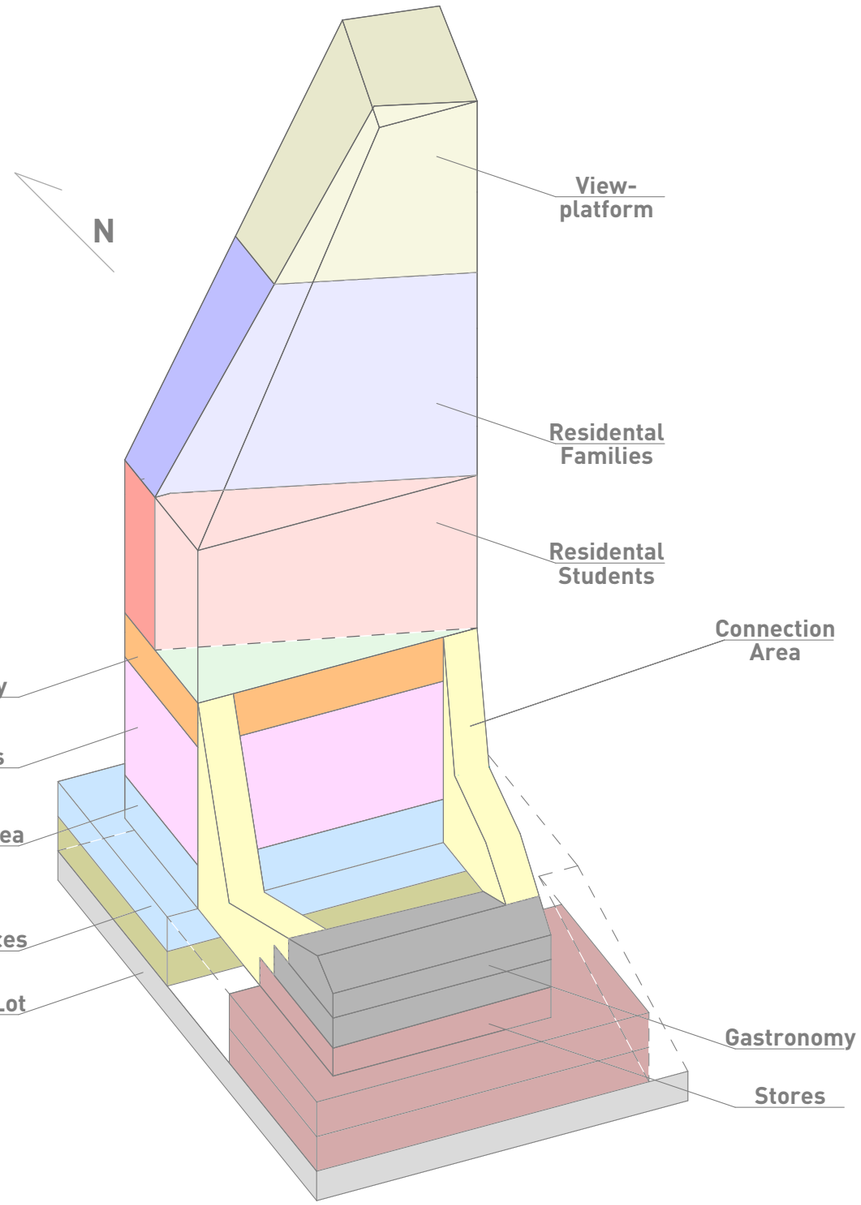
Adding horizontal connections

6

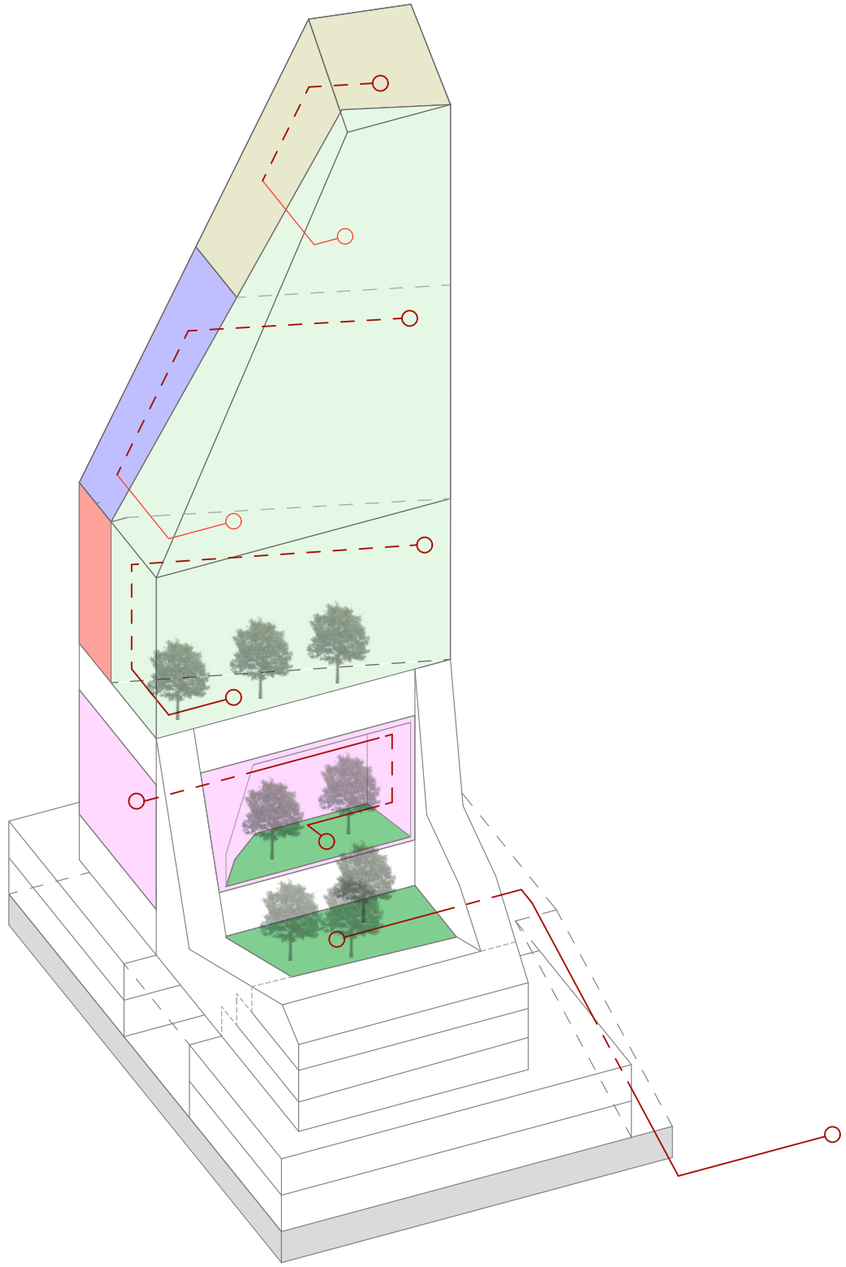


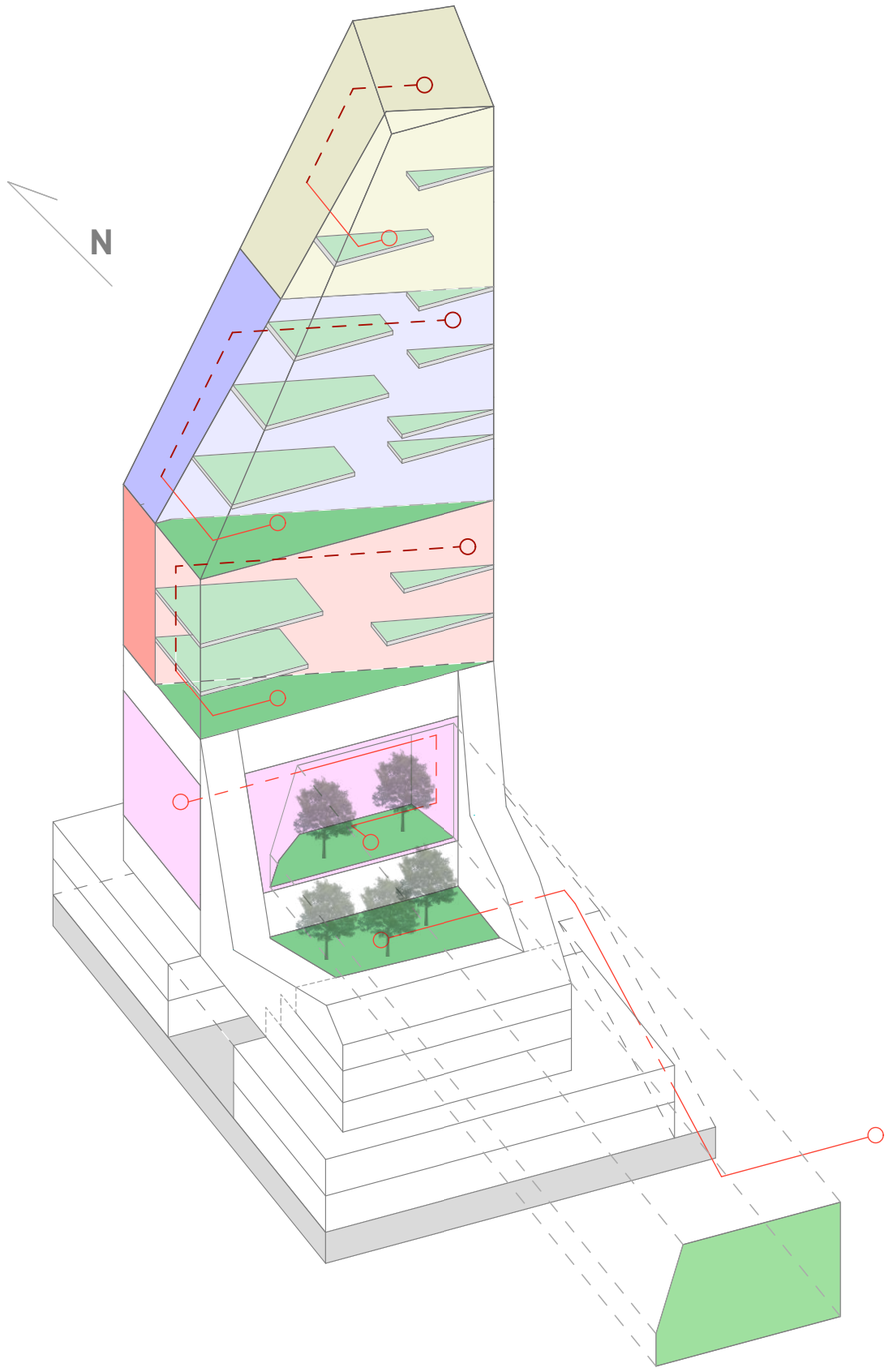
FUNCTIONS


N
View-
platform
Residental
Families
Residental
Students
Connection
Area
Gallery
Offices
Sport area
Parking Lot
Gastronomy
Stores


N
View-
platform
Residental
Families
Residental
Students
Connection
Area
Gallery
Offices
Sport area
STU-Offices
Parking Lot
Gastronomy
Stores

GREEN SPACES

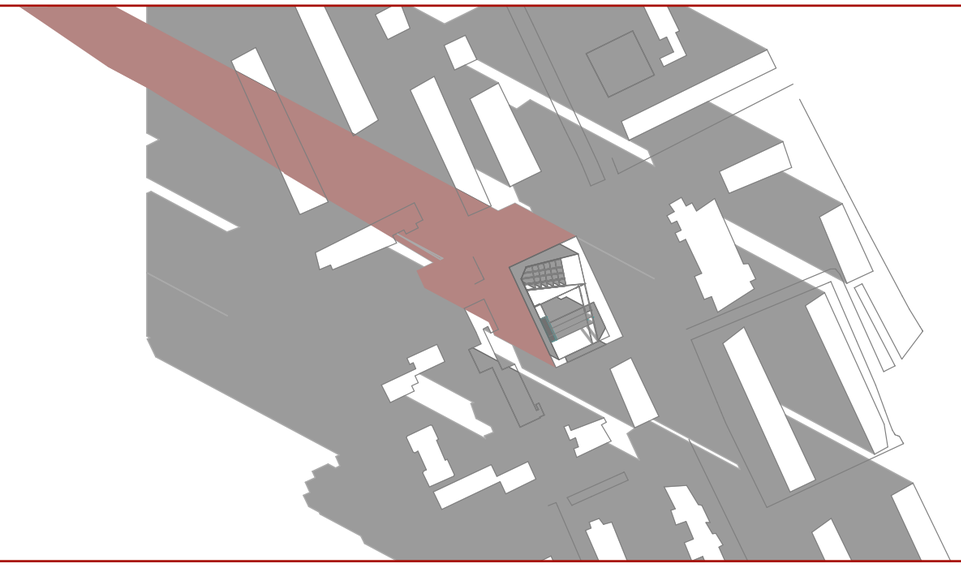




SHADOW ANALYSIS

21/12/2020

9:00

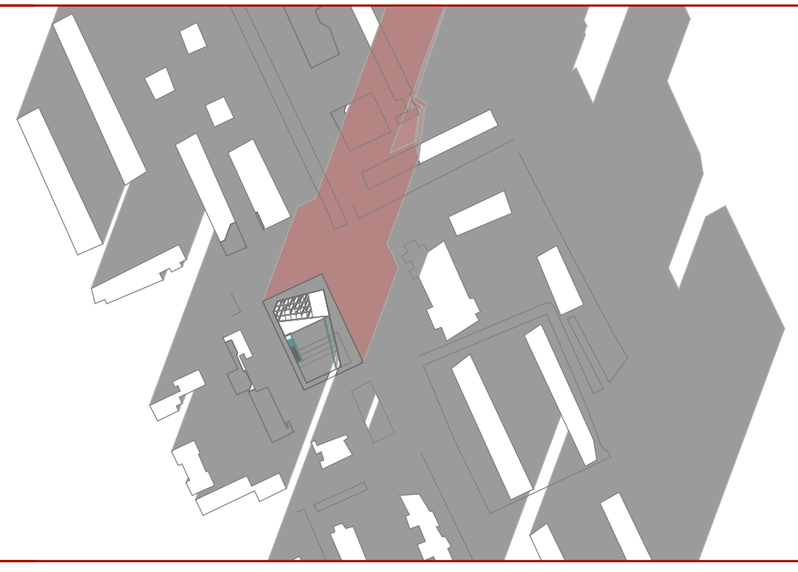


21/12/2020

12:00

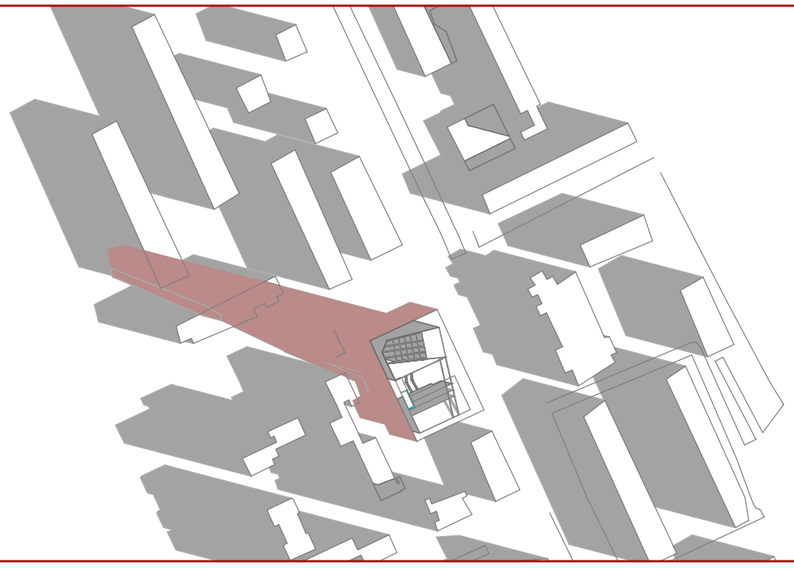
21/12/2020

15:00



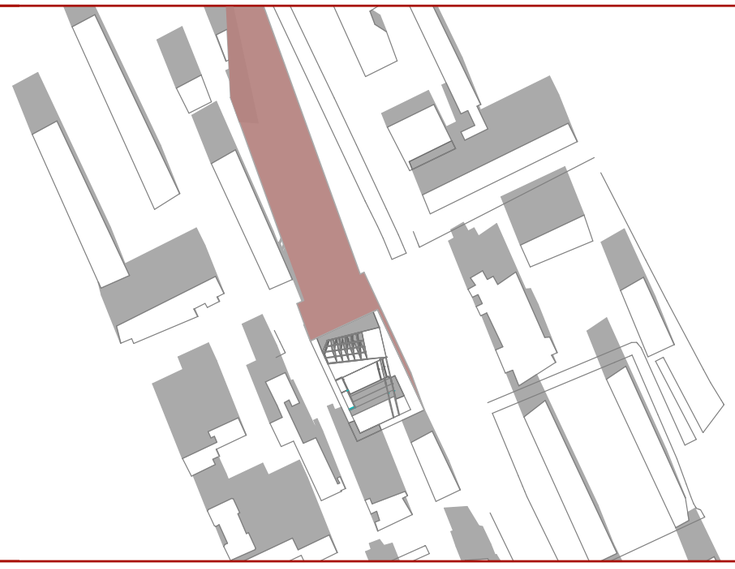
12/03/2020

9:00



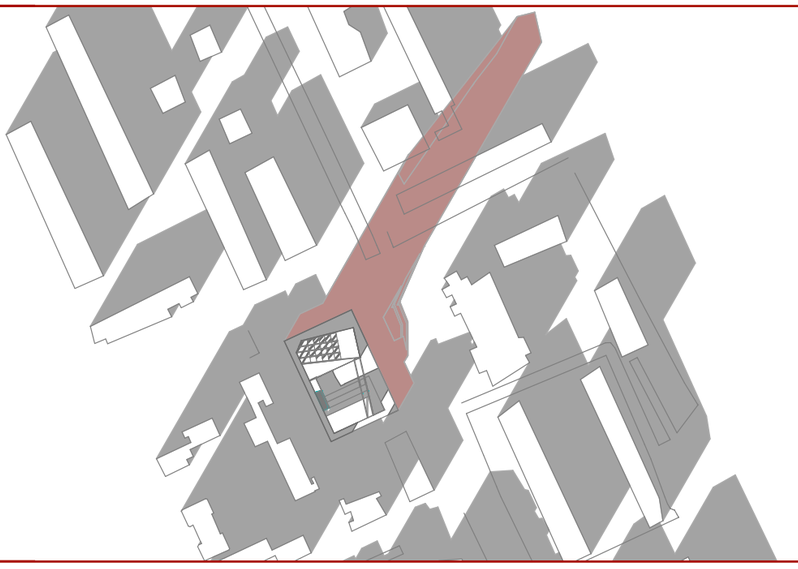
12/03/2020

12:00

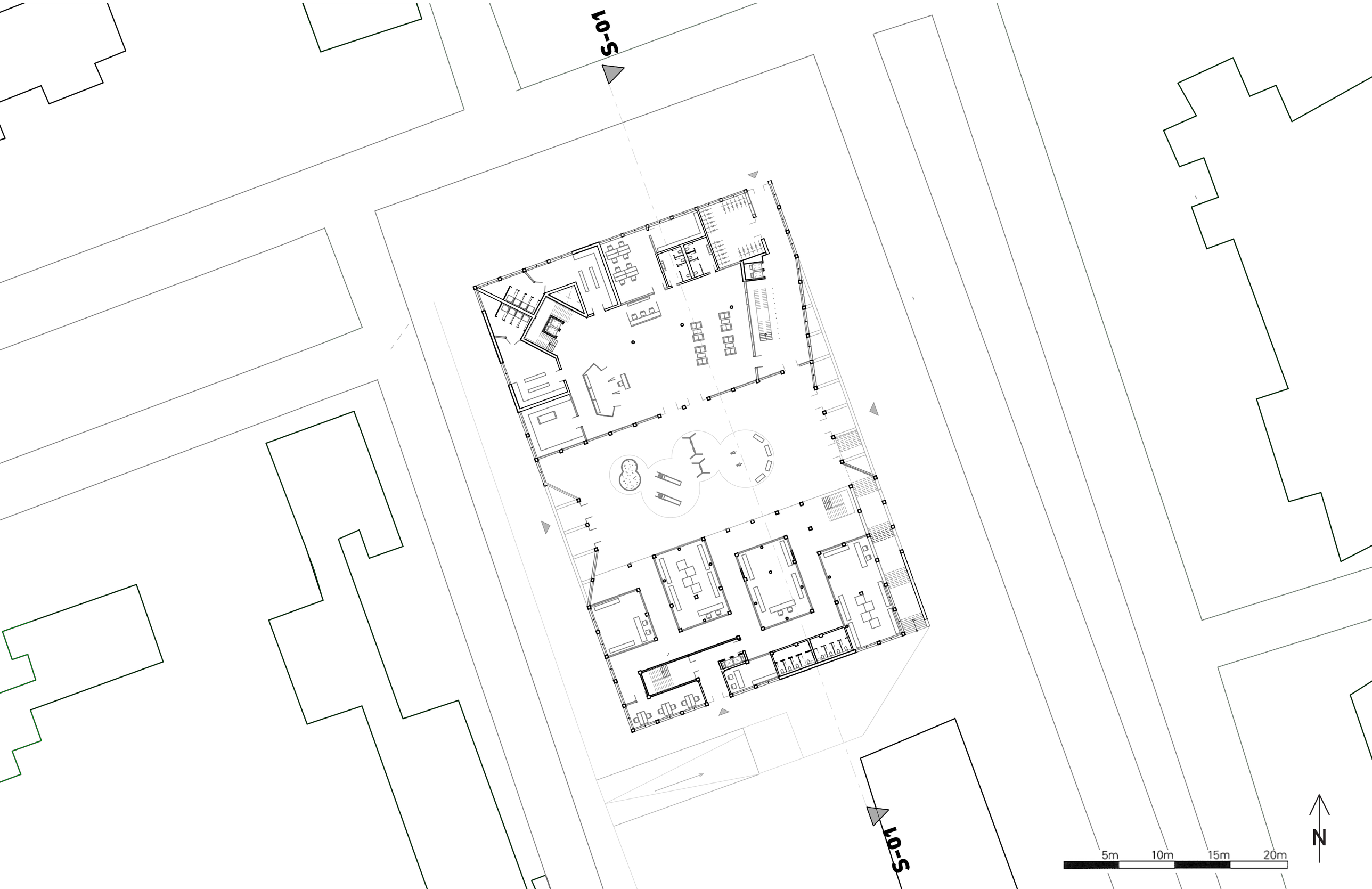


12/03/2020

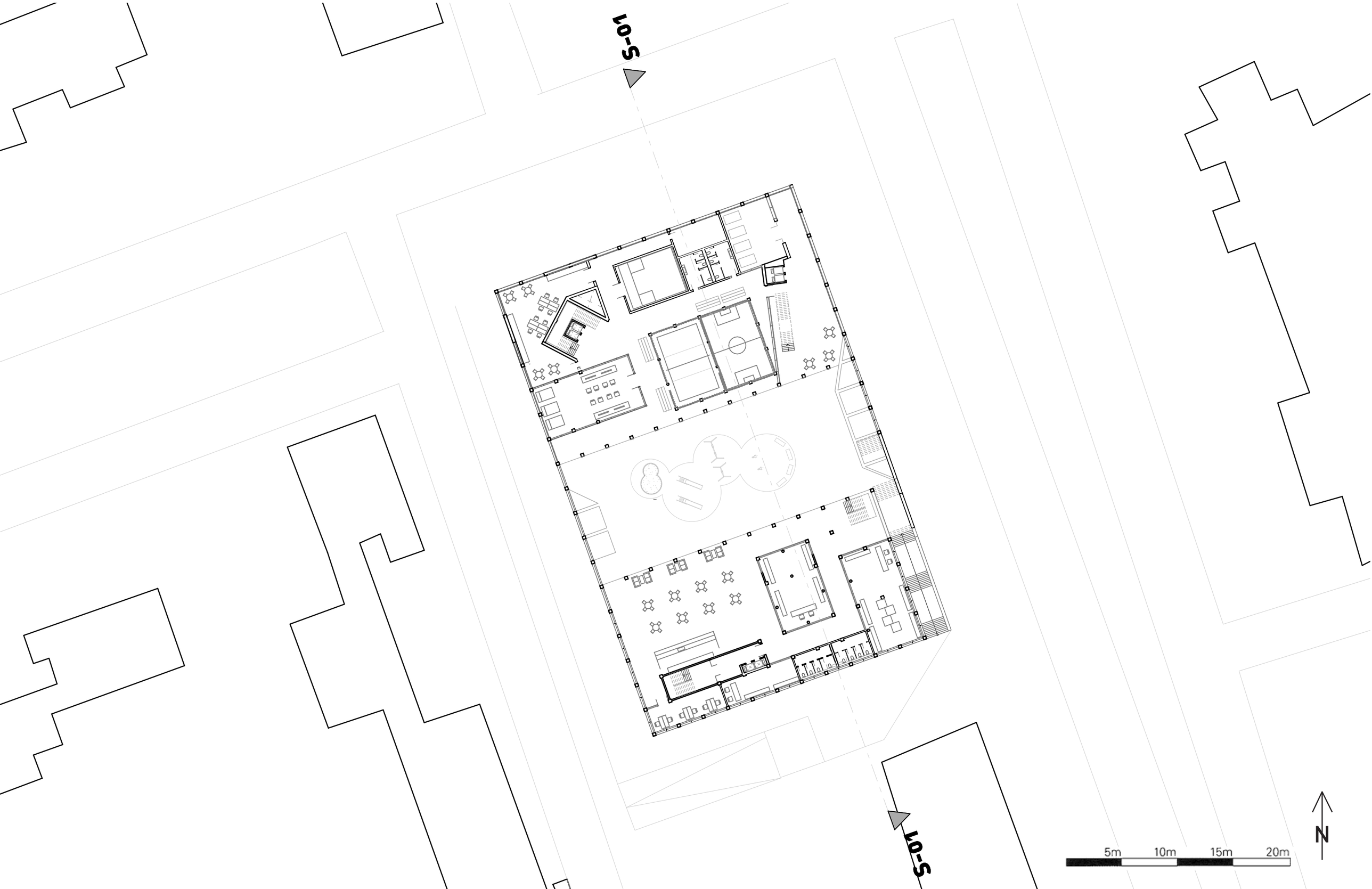
15:00



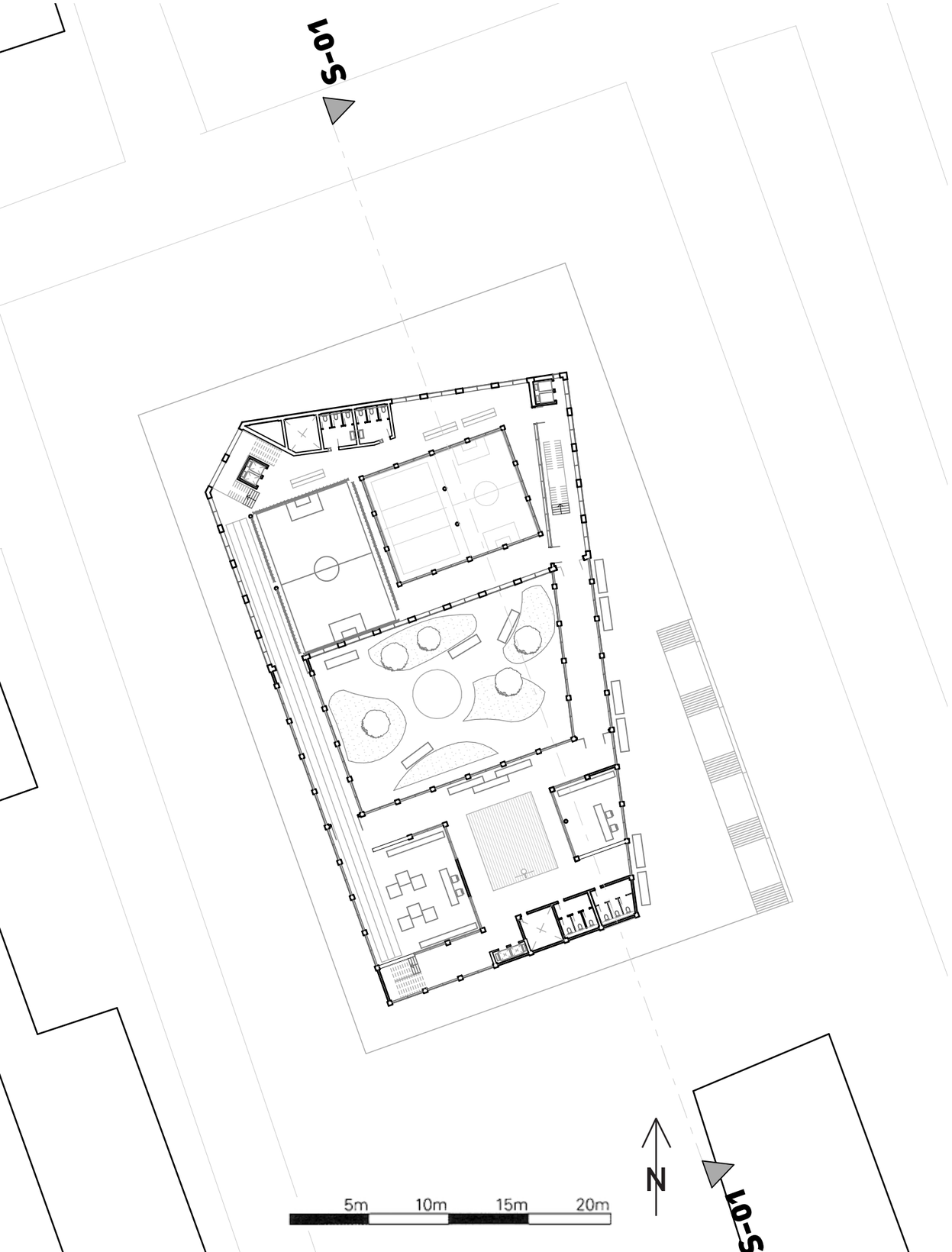
PLANS - GROUND FLOOR M 1:500

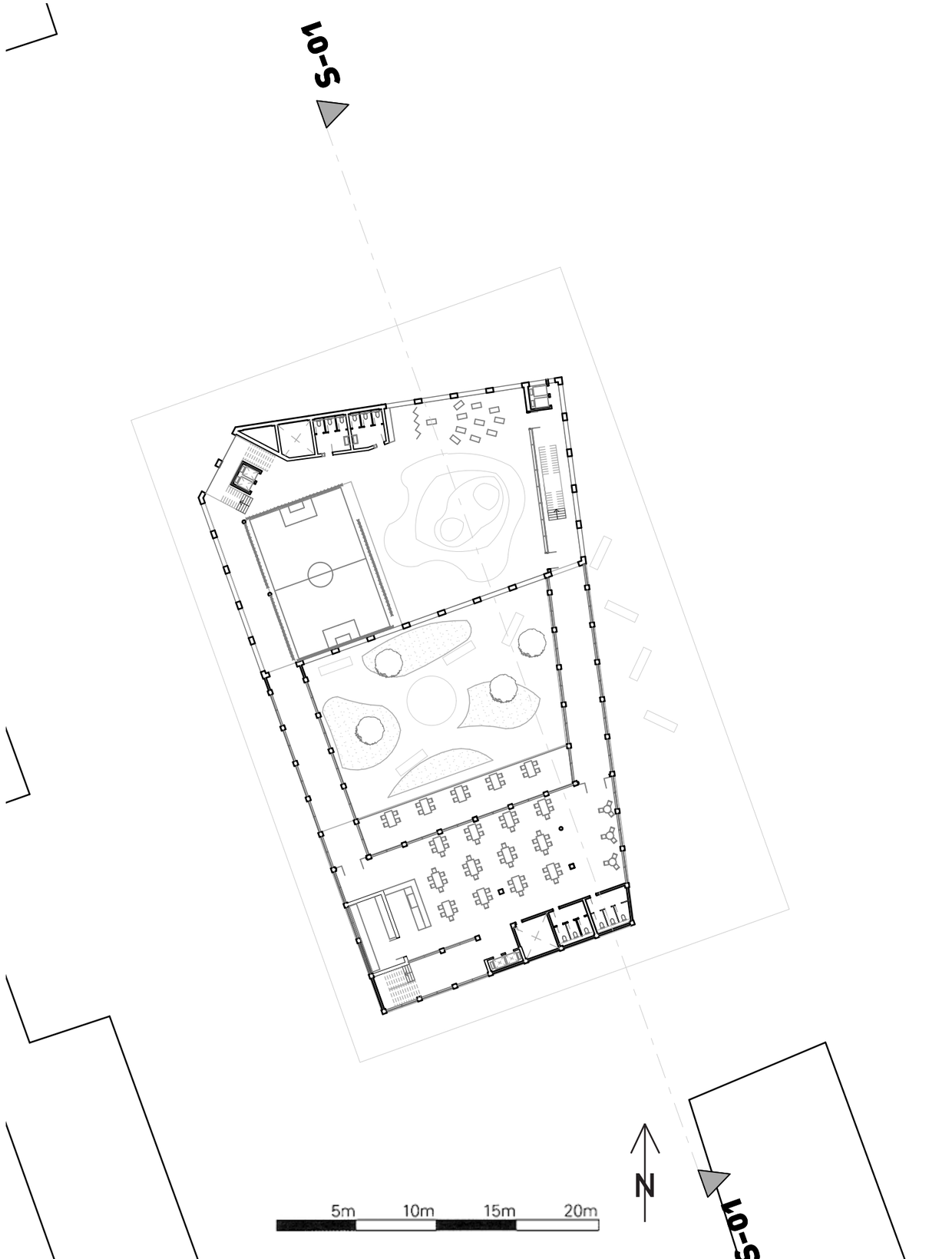


PLANS - 1st FLOOR M 1:500

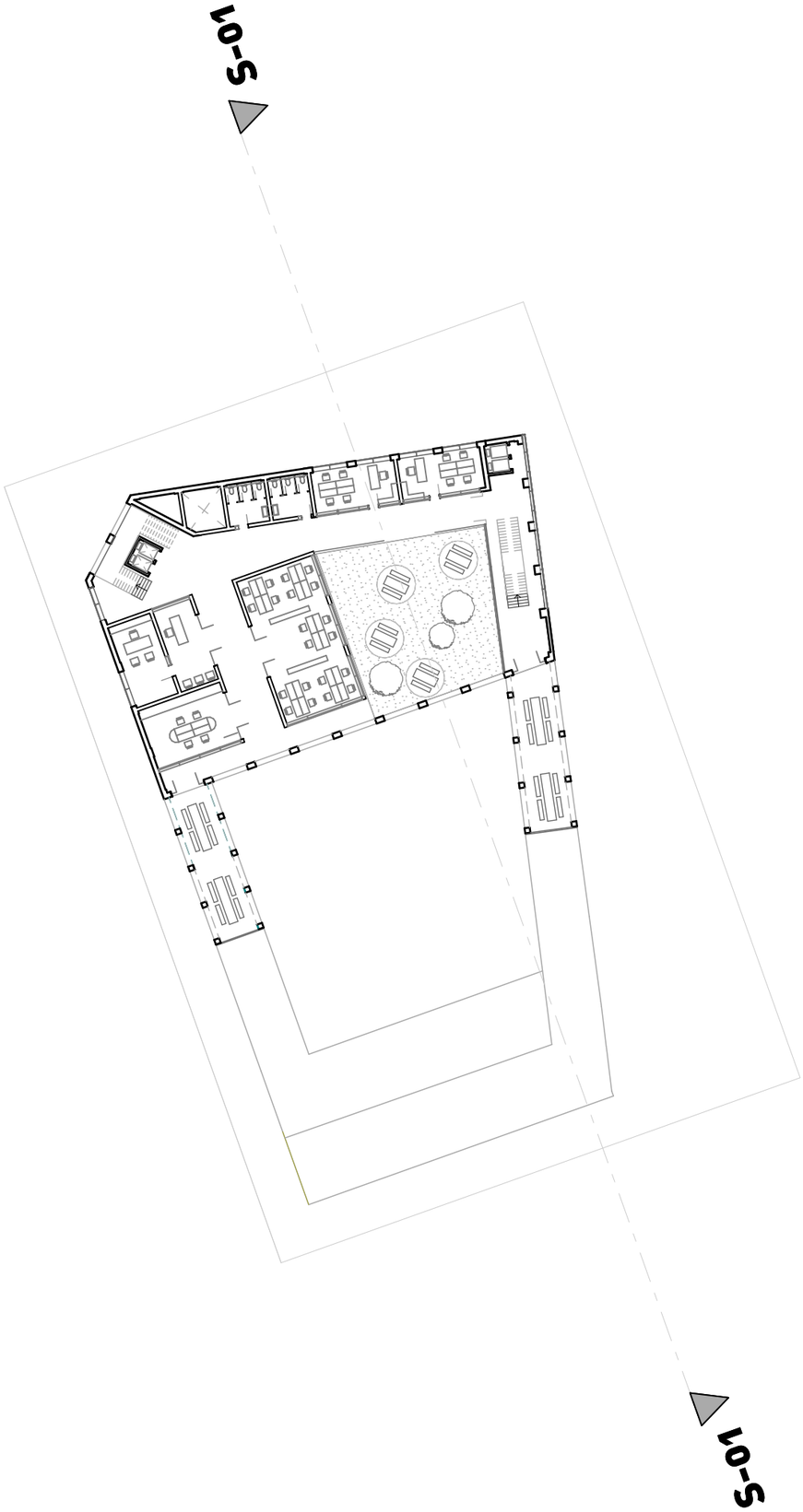


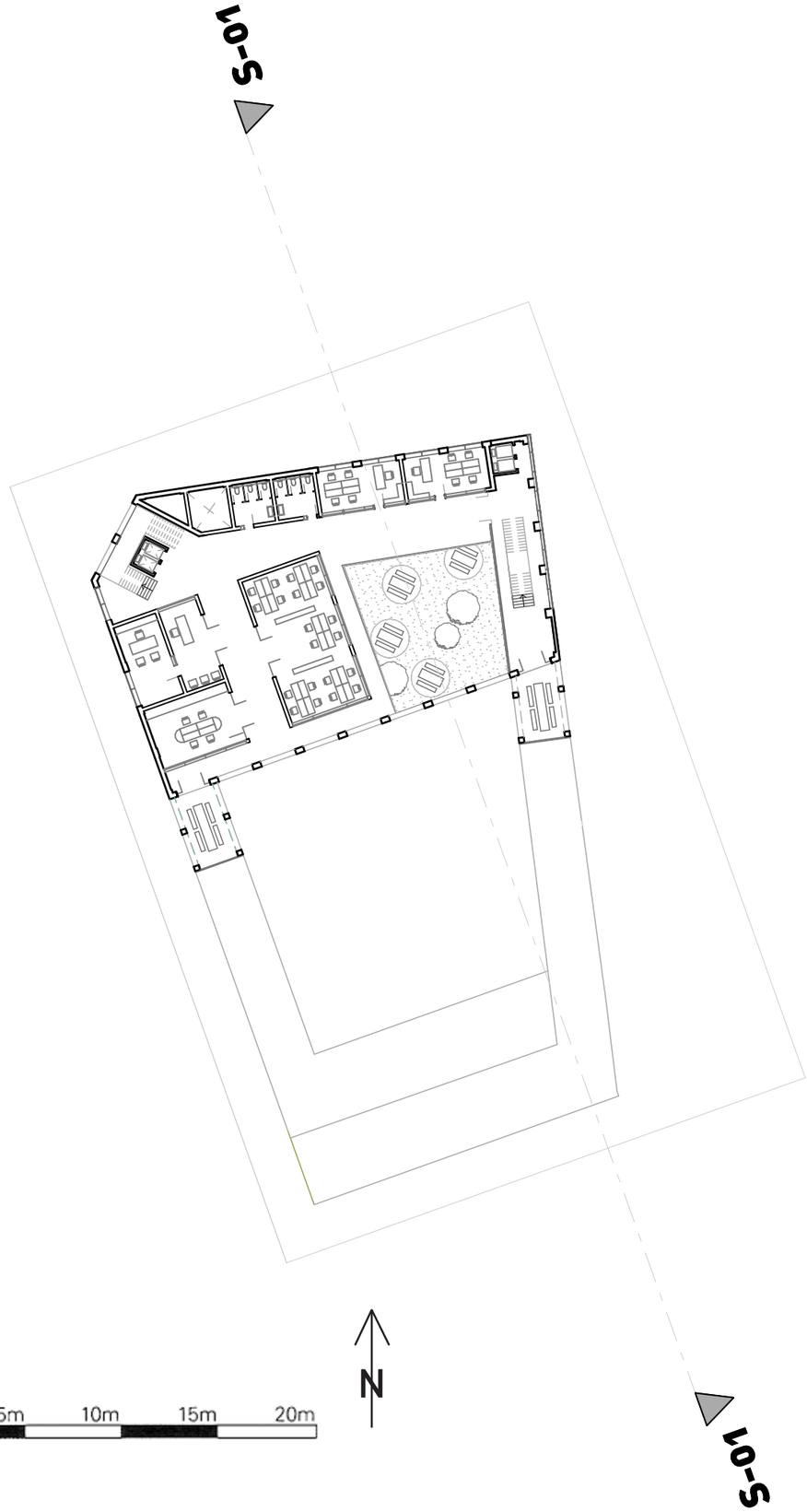
PLANS - 2nd and 3rd FLOOR M 1:500

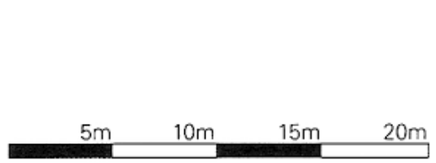




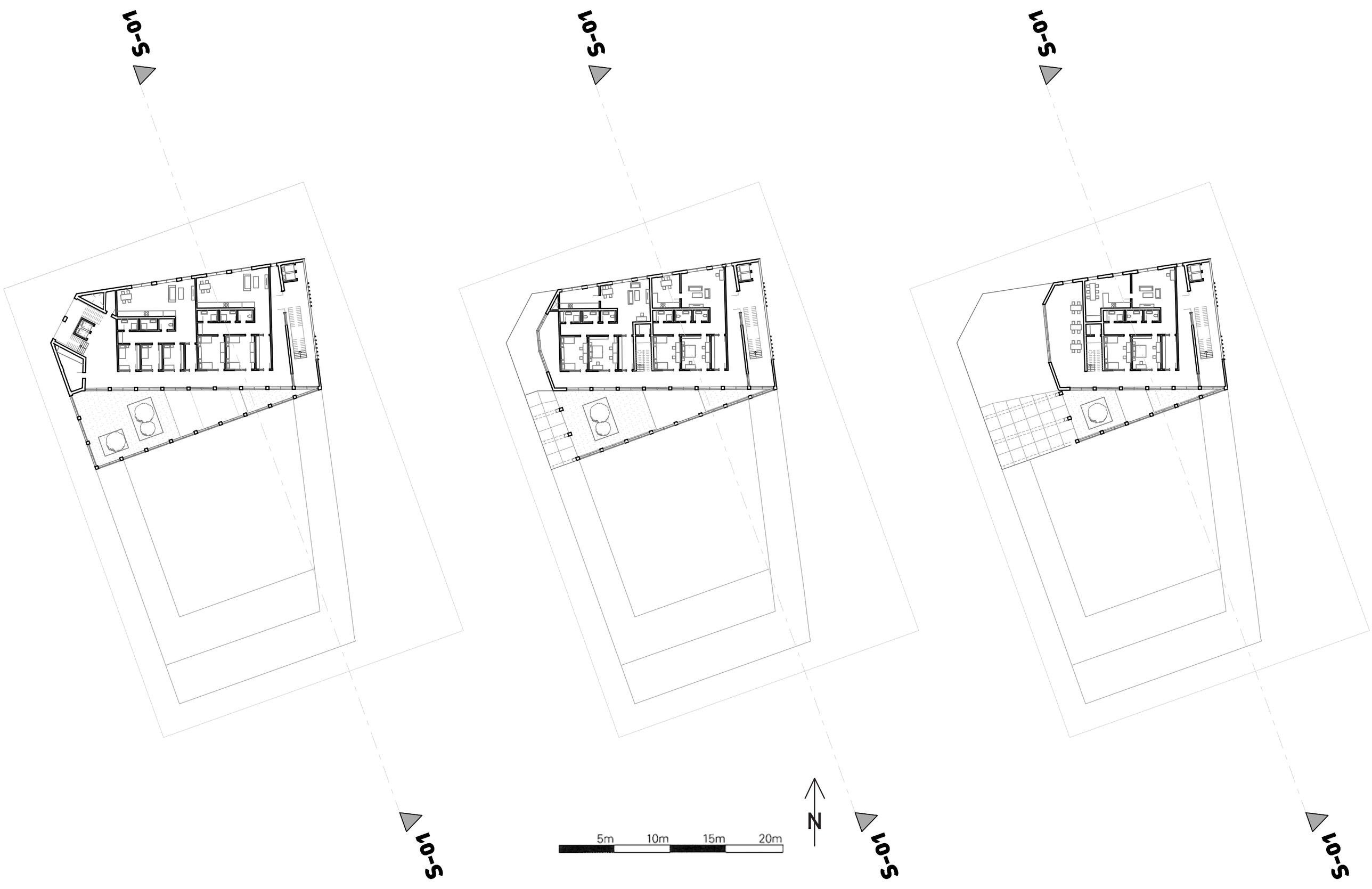
PLANS - OFFICE FLOORS M 1:500



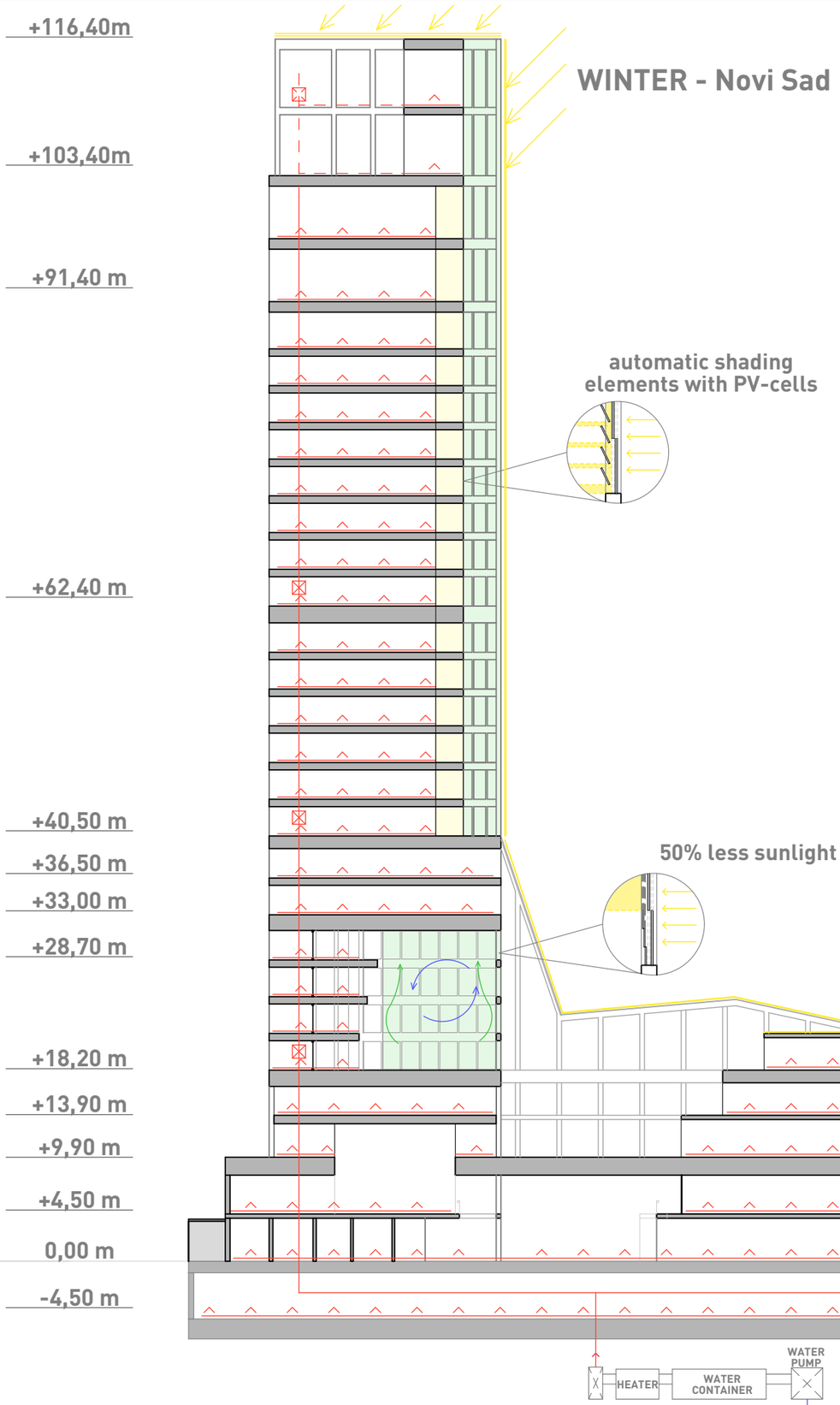




PLANS - RESIDENTAL FLOORS M 1:500



ENERGY SYSTEM - HEATING / COOLING



Heating/Cooling

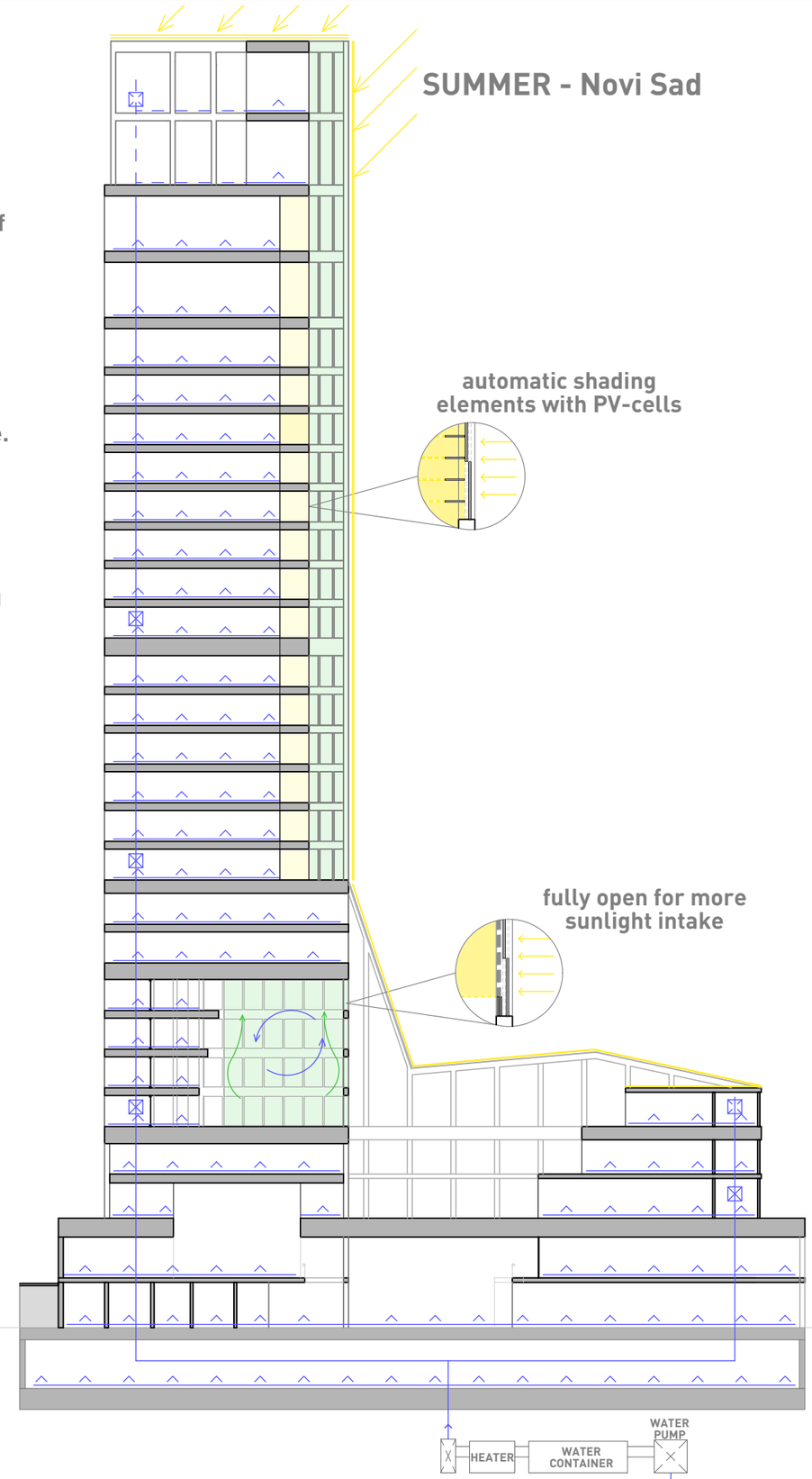
The Heating/Cooling system uses the underground water (river Danube). The water gets pumped and heated/cooled off underground before getting pumped into the building. It is used for a floor-heating system.

An important aspect for the heating and cooling are the automatic regulated panels behind the windows with integrated PV-cells which allow more (winter) or less (summer) sunlight intake.

Another important part for the energy concept is the winter garden that stretches out almost through out the whole south side of the building. It works as a buffer zone, keeping the heat in summer to go into the building by cooling it off and protecting the residental part from the cold winds in winter.

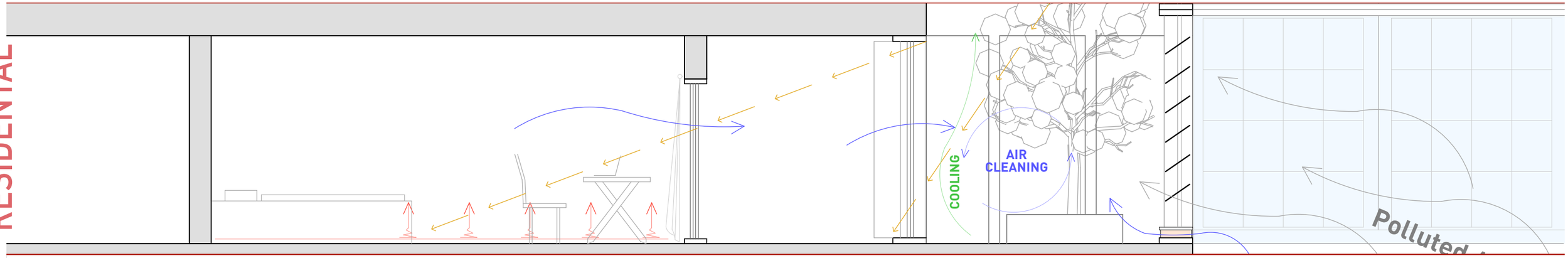
A heat recovery is provided so that the water doesn't get too hot/too cold while passing through the building.

— Heat recovery

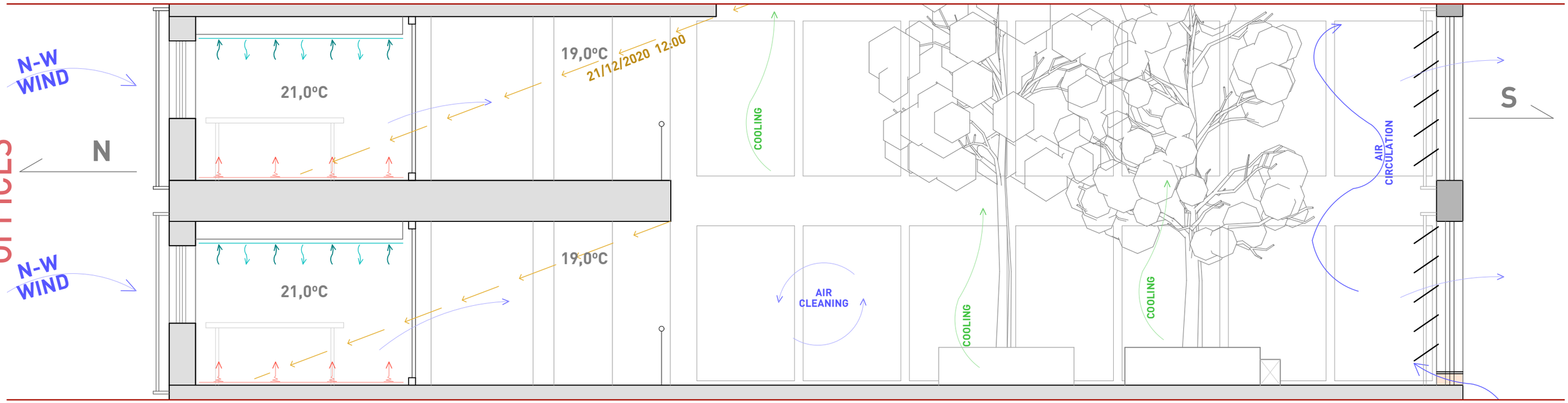


ENERGY CONCEPT

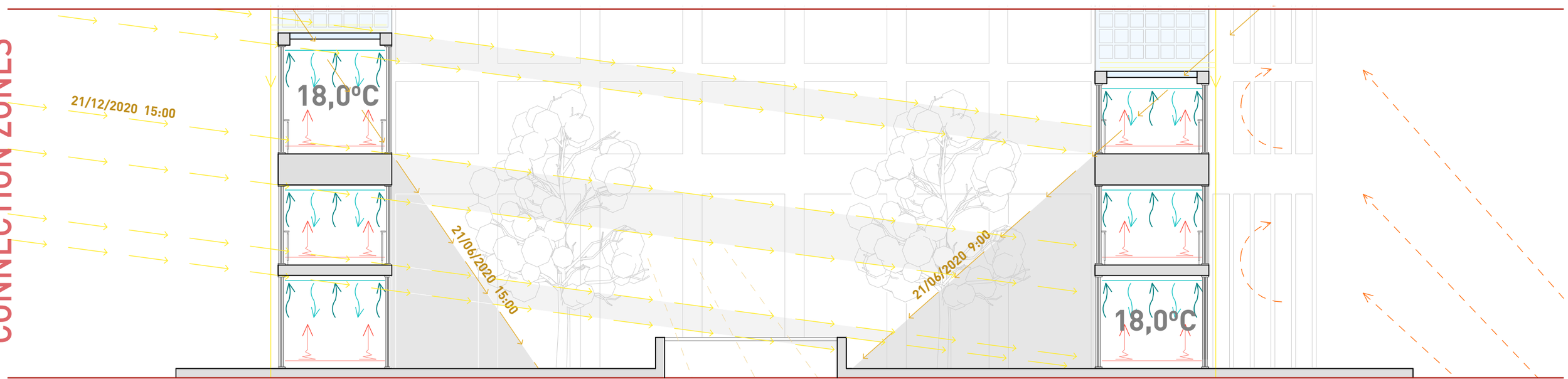
RESIDENTAL



OFFICES

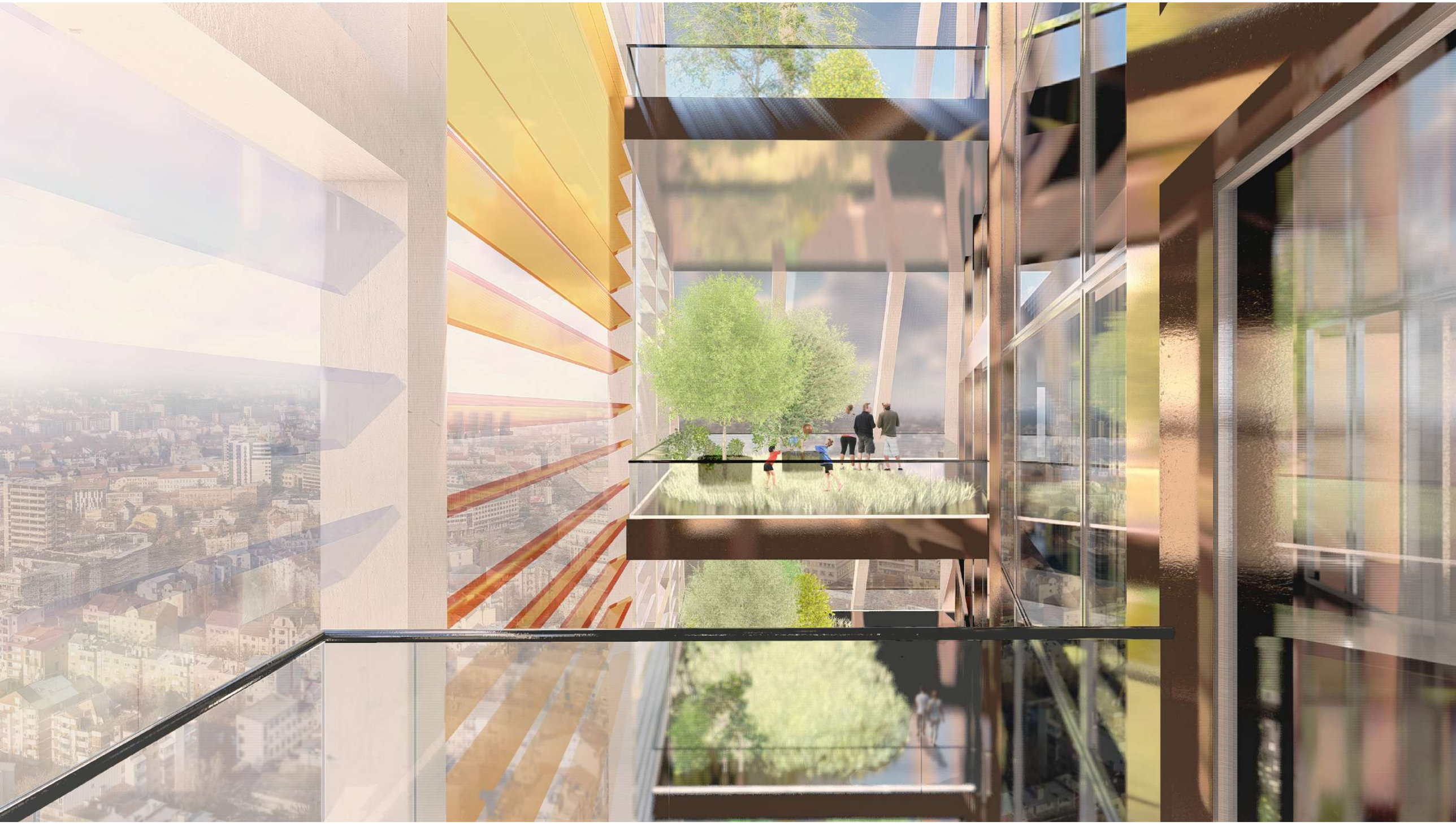


CONNECTION ZONES



3D VISUALISATION

3D VISUALISATION



Hybrid High Master Studio

Winter semester 2020/21

MASTER STUDIO – GRAZ UNIVERSITY OF TECHNOLOGY – INSTITUTE OF BUILDINGS & ENERGY – UNIVERSITY OF NOVI SAD – DEPARTMENT OF ARCHITECTURE & URBAN PLANNING

Supervisors: Prof. Brian Cody, Prof. Dragana Konstantinović, Christiane Wermke, Maja Momirov, Slobodan Jovic, Sebastian Sautter, Aleksandar Tepavcevic

Authors: Julia Diener

MAIN IDEA

The main idea of the design is to create a project which combines a selection of functions needed on a daily basis such as apartments, offices, common areas and a market, not exclusively for the residents but also for the people living close by to reduce unnecessary commuting around the city. To extend the idea of reducing traffic in the city a vertical farm is added to the design which helps with reducing the delivery routes of food. Furthermore, the vertical farm completes the project as it additionally connects to the other functions through providing them with fresh vegetables and creating an energetic interaction at the same time.

The design process itself started with experimenting in order to find a good initial form which interacts with the natural forces prevailing on the building site. The final product is a triangle form which enables an optimal amount of light to get into the building with rounded off edges in order to prevent big wind pressure on the building.

To maximise the density of the design the volume had to be increased. In order to prevent the volume from getting to deep multiple volumes were added to the design. The position and orientation of every volume is tailored to their functions and their requirements.

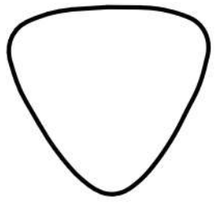
As multiple functions of the project interact with the vertical farm by exchanging used and cleaned air, they will be connected through a double skin facade to also visualize the connectivity of the functions with each other on the surface.

The major part of the building will be covered in 50% translucent ptfe fabric shading elements. These not only will prevent direct sun radiation from getting into the building but also reduce air and noise pollution from the boulevard. In connection with the apartments, the offices and the kindergarten the shading elements are individually rotatable and adjustable as needed which additionally allows a wide visual field. The ptfe fabric in front of the food market will be motionless and homogeneous.

The shading elements of the vertical farm will consist of 60% translucent amorphous solar glazing. As the color of the glass is adjusted to the white ptfe fabric it forms a homogenous overall picture. This gets even strengthened as these glass shading elements are also rotatable into an open position to let sun in. Furthermore, these amorphous solar glazing elements will be able to harvest solar energy.

Cut outs of the volumes are positioned between the functions to create attractive and green common spaces for residents, people working in the offices and the public. Some of them are inside the envelope, some are positioned on the outside. These areas will be connected through a ramp in the atrium which got formed by creating the facade envelope.

MAIN IDEA



+

+

+

FORM

VERTICAL FARM

DOUBLE SKIN FACADE

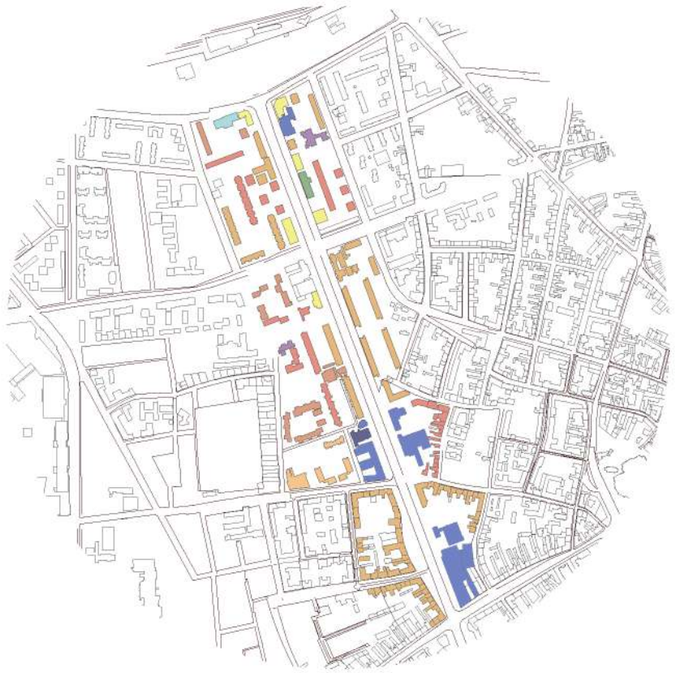
PTFE FABRIC / SOLAR GLAZING

The interaction of the design with energy starts with the basic form of the design as it tries to catch as much southern light as possible. Even though the form got extended afterwards it still aims to provide as much daylight as possible inside the building. The idea of the vertical farm wants to make the building more hybrid in a not so common way as it provides the residents with food, invites other people to get into the building to eat, spreads in the surrounding areas as the products of the vertical farm will be sold and it enables energetic interaction as air is getting exchanged inside the building which will provide the enlivened areas with cleaned air. Like this a connection between everyone using the building and every function inside the building occures. To show this connectivity a double skin facade is wrapped around all the functions which are part of the vertical farm air exchange. To complement the project the facade will be partly covered in ptfe fabric, which prevents direct sunlight as well as air and noise pollution from getting into the building. The facade of the vertical farm will be out of solar glazing which not only will provide the building with energy but also functions as shading elements.

SITE ANALYSIS

TRAFFIC

TYPOLOGIES



SHOPS ON GROUNDFLOOR, RESIDENTIAL ABOVE

BUILDING WITH MULTIPLE STORES

RESIDENTIAL EXCLUSIVE

INDIVIDUAL SHOPS

OFFICES

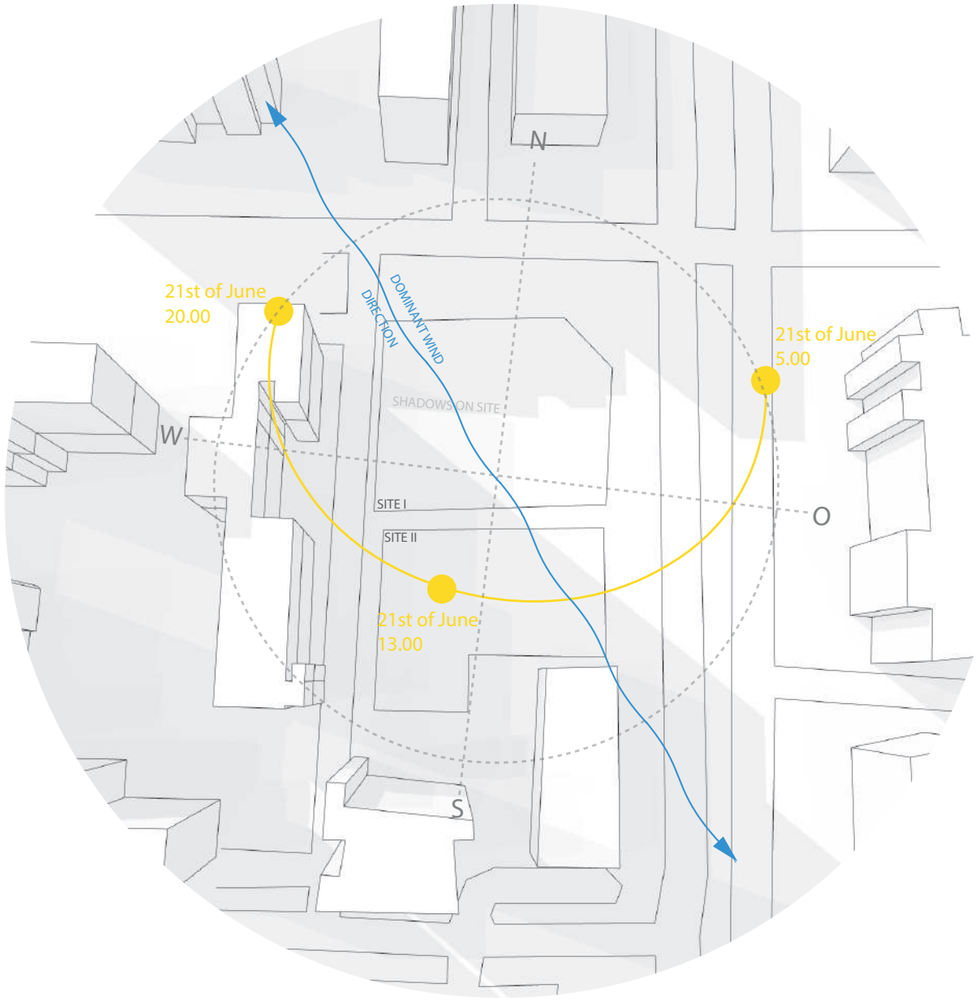
HOTEL

EDUCATION

GREEN AREAS

CLIMATE ANALYSIS

SUMMER



WINTER

SITE ANALYSIS & FACADE FUNCTION - SUMMER

21st of June
12.00

21st of June
15.00

21st of June
18.00

SUN DATA

9h average sunshine duration
79 kWh/m² diffuse radiation
190 kWh/m² global radiation

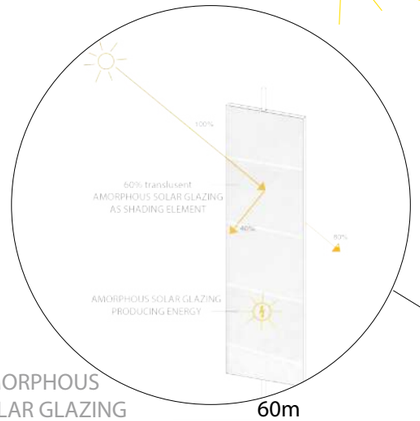
PRECIPITATION
June: 88mm
July: 57mm

SHDADING ON ADJAJACENT BUILDINGS

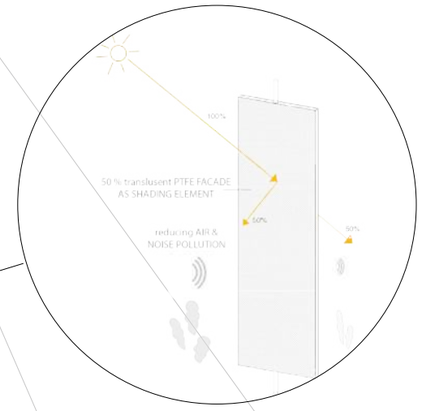
WIND INTENSITY

1,0 m/s

max. + 37 °C
min + 14 °C



AMORPHOUS
SOLAR GLAZING



PTFE FACADE

60m

SHDADING OF ADJACENT BUILDINGS

45m

35m

20m

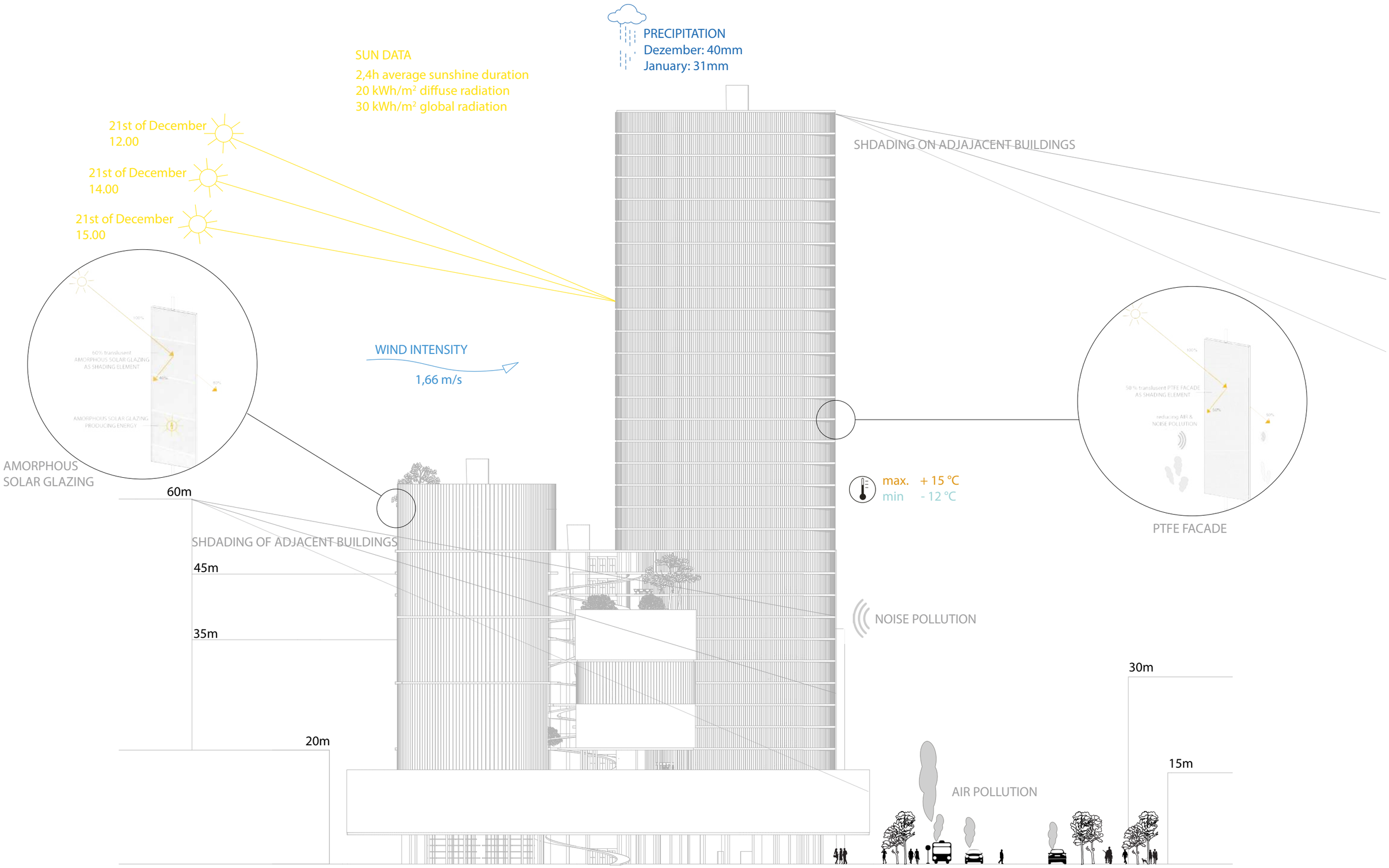
NOISE POLLUTION

AIR POLLUTION

30m

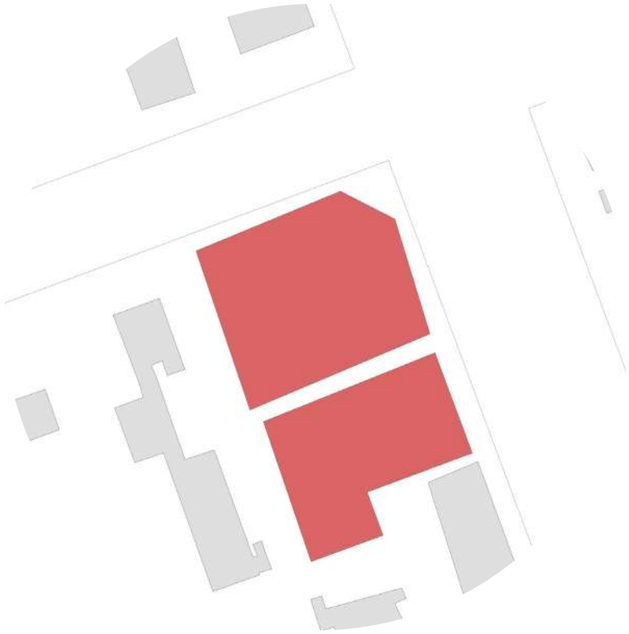
15m

SITE ANALYSIS & FACADE FUNCTION - WINTER



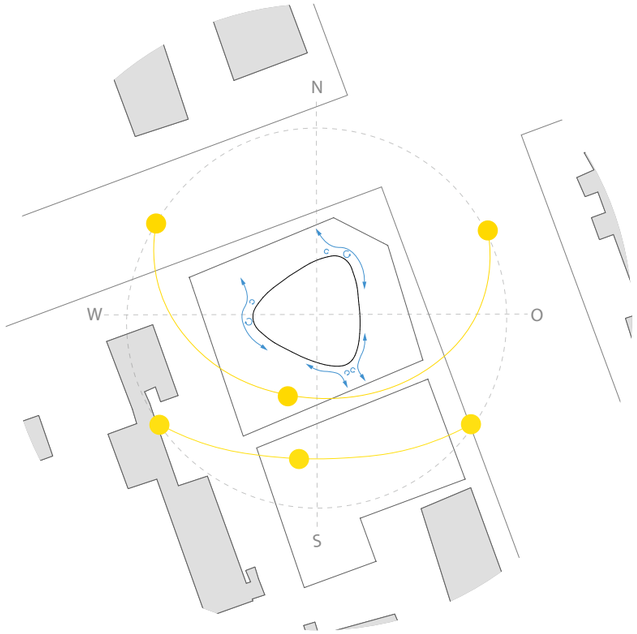
FORMFINDING

SITES



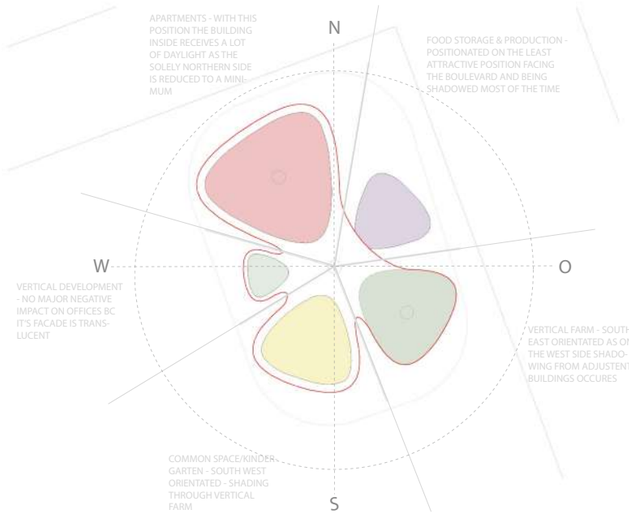
BOTH BUILDING SITES ARE USED

FORM



THE INITIAL FORM IS A TRIANGLE ORIENTED IN ORDER TO MINIMISE THE NORTHERN FACADE
THE EDGES ARE ROUNDED OFF TO REDUCE WIND PRESSURE ON THE FACADE

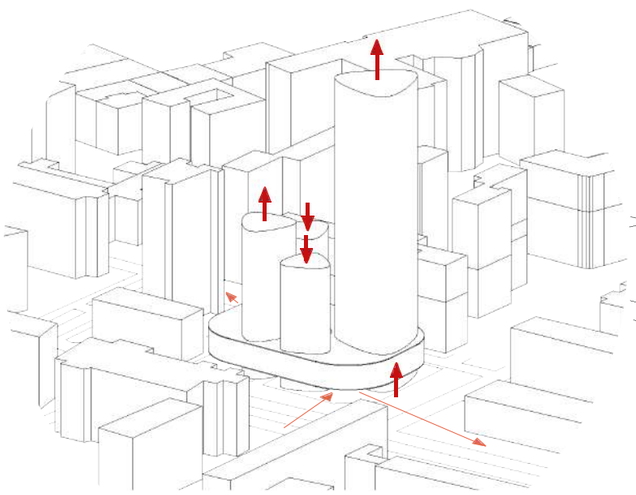
ORIENTATION I POSITIONING



TO GET A HIGH DENSITY WITHOUT CREATING A DEEP BUILDING MULTIPLE VOLUMES ARE ROTATED AROUND THE MIDDLE OF THE BUILDING SITE AND POSITIONED REGARDING THEIR FUNCTION

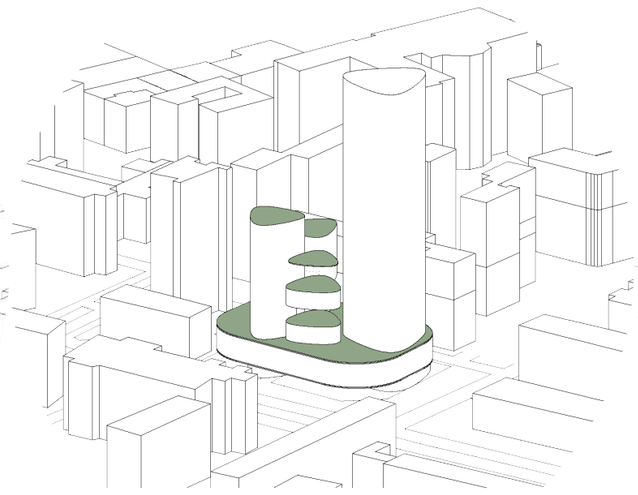
FORMFINDING

VARIATION



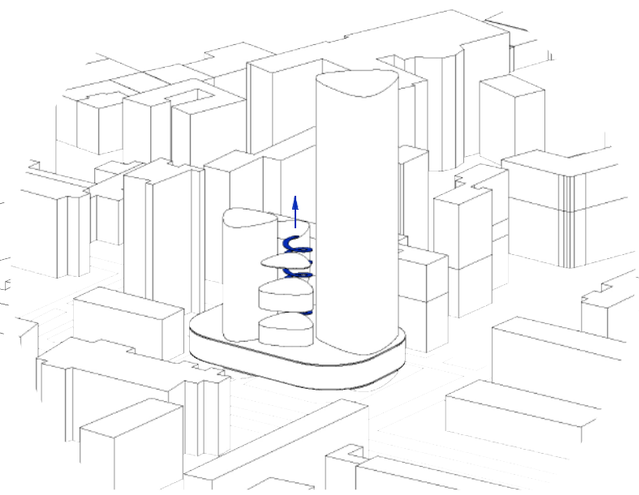
A LOW RISE BUILDING IS ADDED TO COMBINE THE VOLUMES ON THE BOTTOM
TO ALLOW PEDESTRIANS PASSING UNDERNEATH THE BUILDING THIS LOWRISE VOLUME WILL BE LIFTED
THE HEIGHTH OF THE VOLUMES VARIATES IN ORDER TO PREVENT OVERSHADOWING AND TO INTENSE VIEW CONNECTIONS BETWEEN THE TOWERS

CUTS



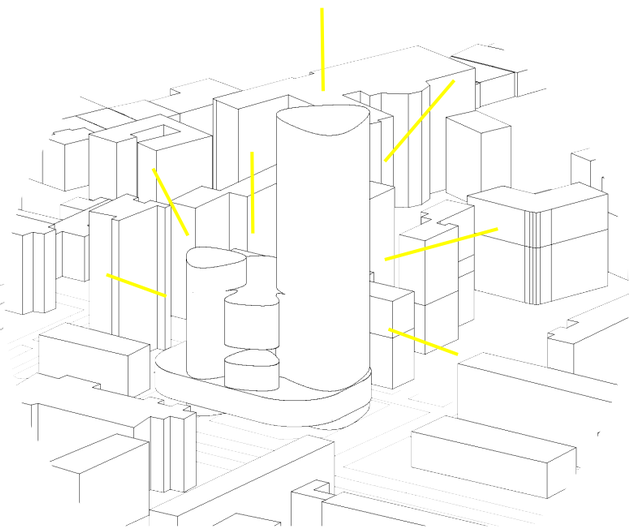
PARTS OF THE VOLUMES GET CUT OUT IN ORDER TO GET ATTRACTIVE COMMON SPACES BETWEEN THE FUNCTIONS

CONNECTION



THE PUBLIC FUNCTIONS OF THE BUILDINGS WILL BE CONNECTED THROUG A RAMP SYSTEM POSITIONED IN BETWEEN THE BUILDING VOLUMES

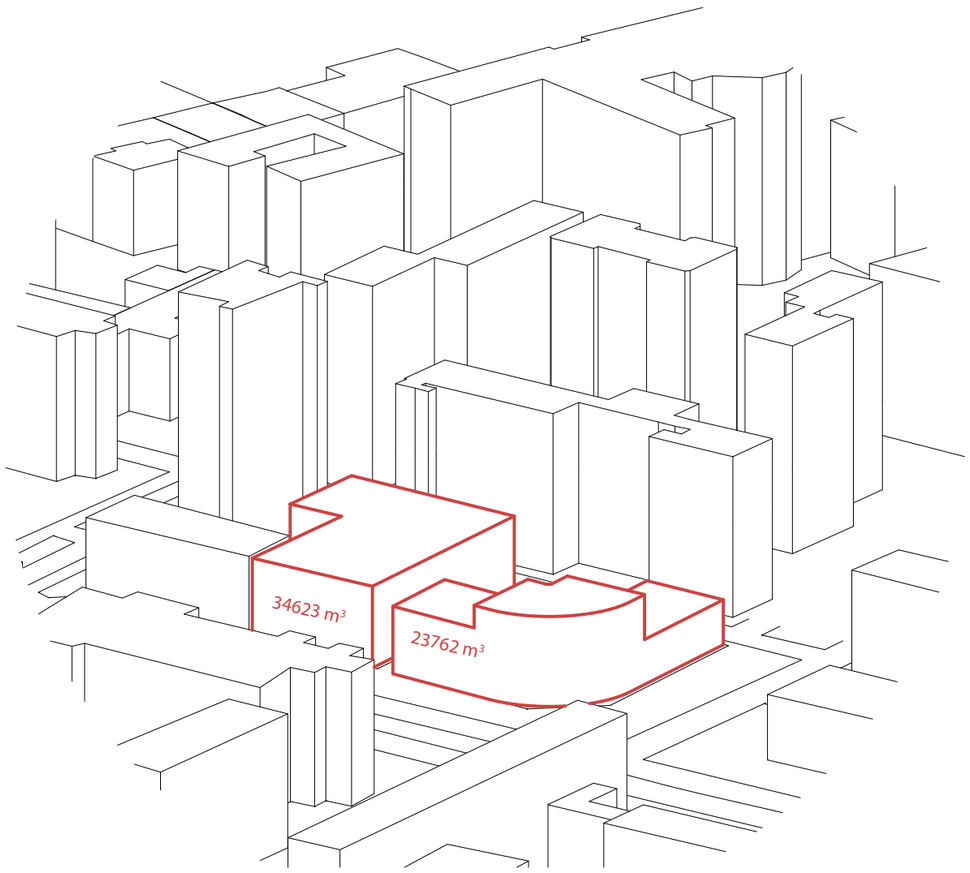
ENVELOPE



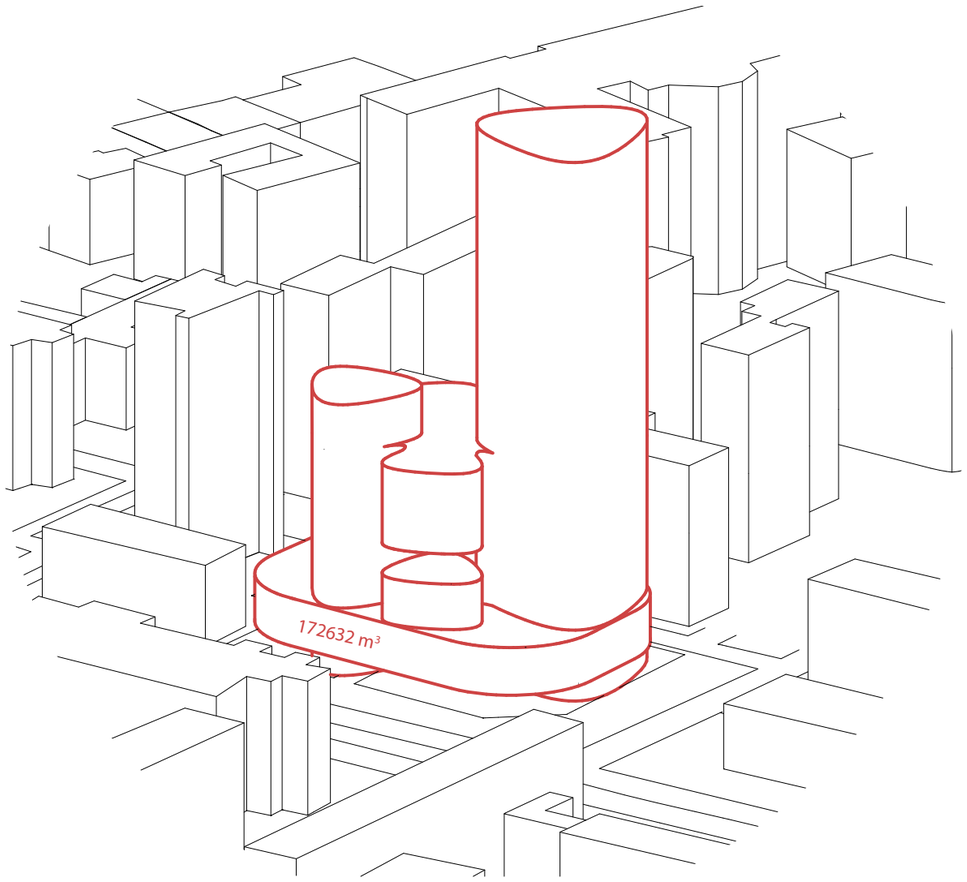
TO FINISH OFF THE DESIGN THE FUNCTIONS WHICH ARE EXCHANGING THEIR AIR WILL BE COMBINED THROUGH A DOUBLE SKIN FACADE

VOLUMES

EXISTING BUILDINGS

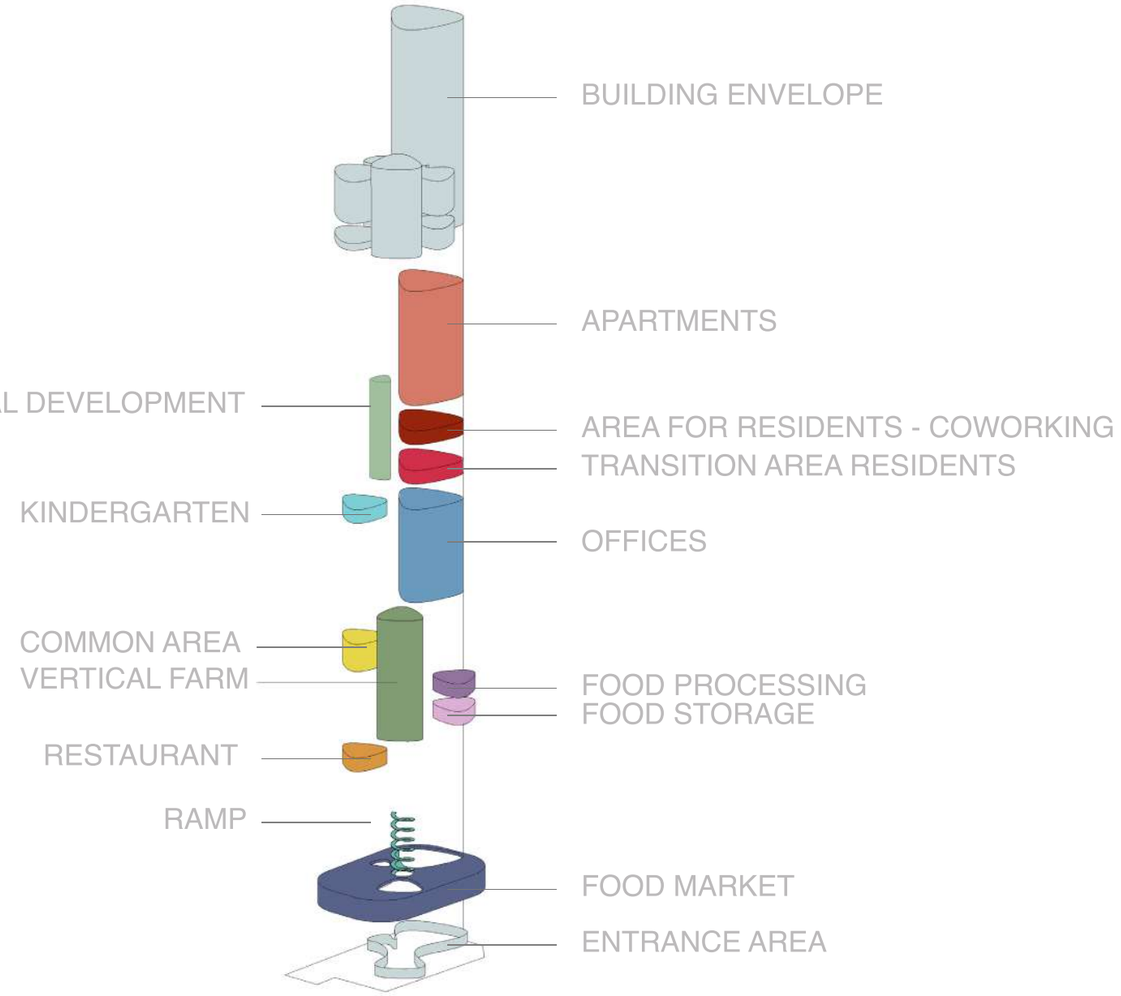


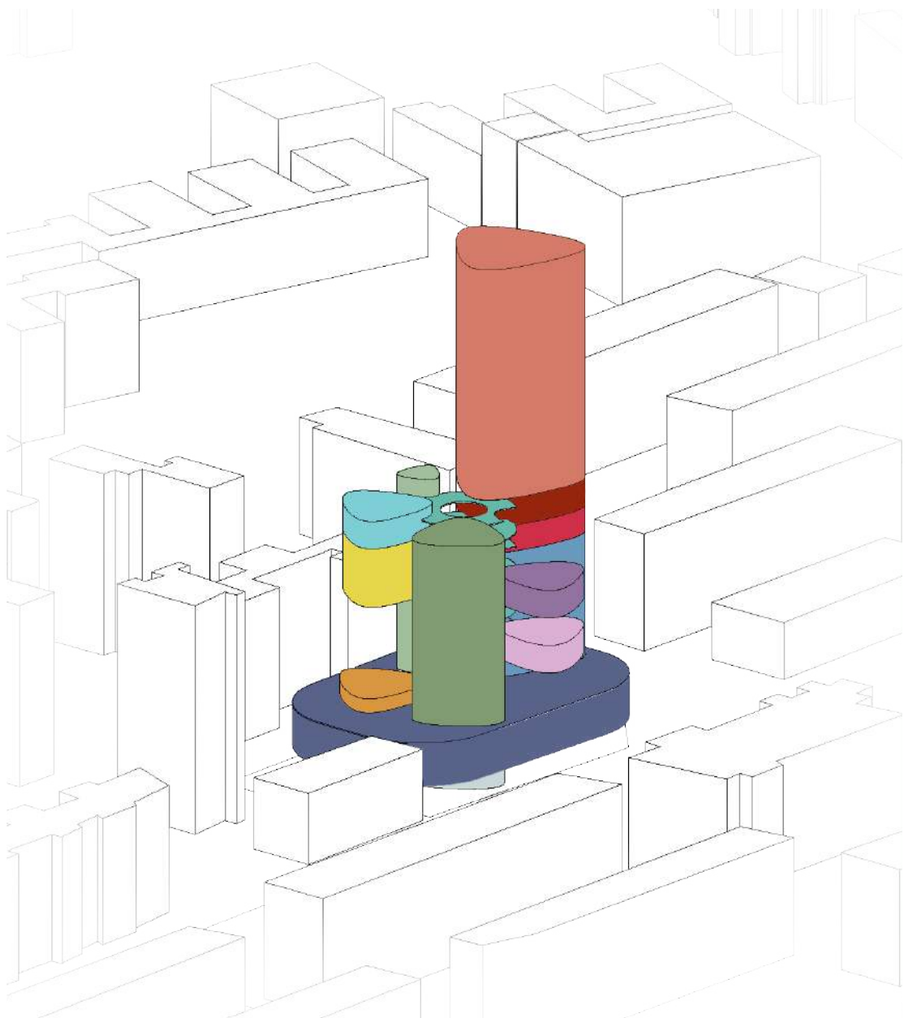
NEW PROPOSAL



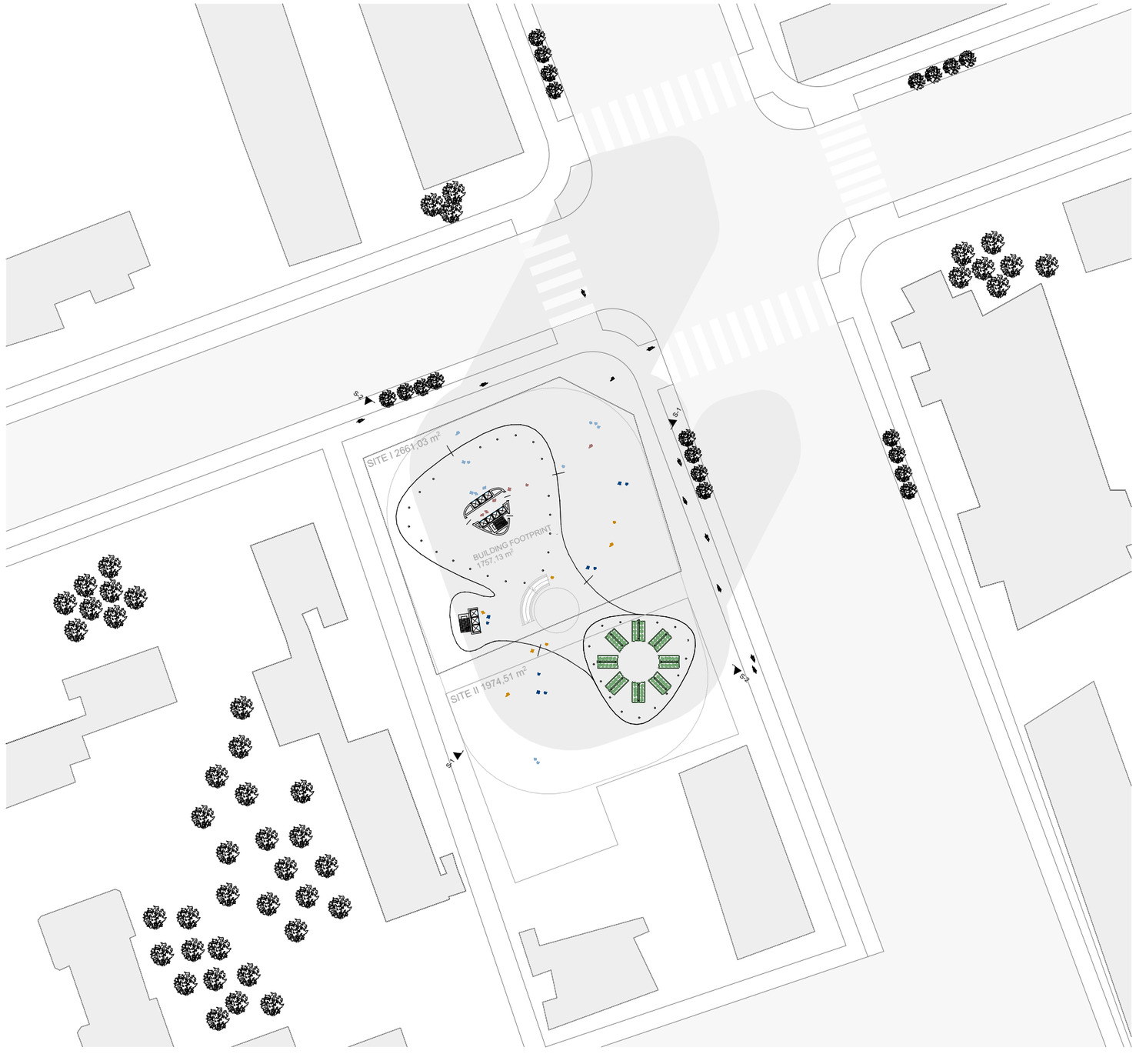
THE NEW PROPOSAL FOR THIS SITE NOT ONLY OFFERS A MUCH HIGHER DENSITY AND USEABLE AREA, IT ALSO HAS AN ADDED VALUE DUE TO IT‘S HYBRIDITY AND OPENNESS TO THE PUBLIC. THROUG THIS NOT ONLY RESIDENTS OF THE APARTMENTS WILL SPEND TIME IN THE PUBLIC COMMON AREAS, BUT ALSO PEOPLE FROM THE SURROUNDING CAN JOIN THEM WHICH WILL CREATE A BIGGER CONNECTION AND BOND BETWEEN THE RESIDENTS OF THIS NEIGHBOUR-HOOD FROM WHICH THE WHOLE AREA WILL BENEFIT.

FUNCTIONS


BUILDING ENVELOPE
APARTMENTS
HORIZONTAL DEVELOPMENT
AREA FOR RESIDENTS - COWORKING
TRANSITION AREA RESIDENTS
KINDERGARTEN
OFFICES
COMMON AREA
VERTICAL FARM
FOOD PROCESSING
FOOD STORAGE
RESTAURANT
RAMP
FOOD MARKET
ENTRANCE AREA

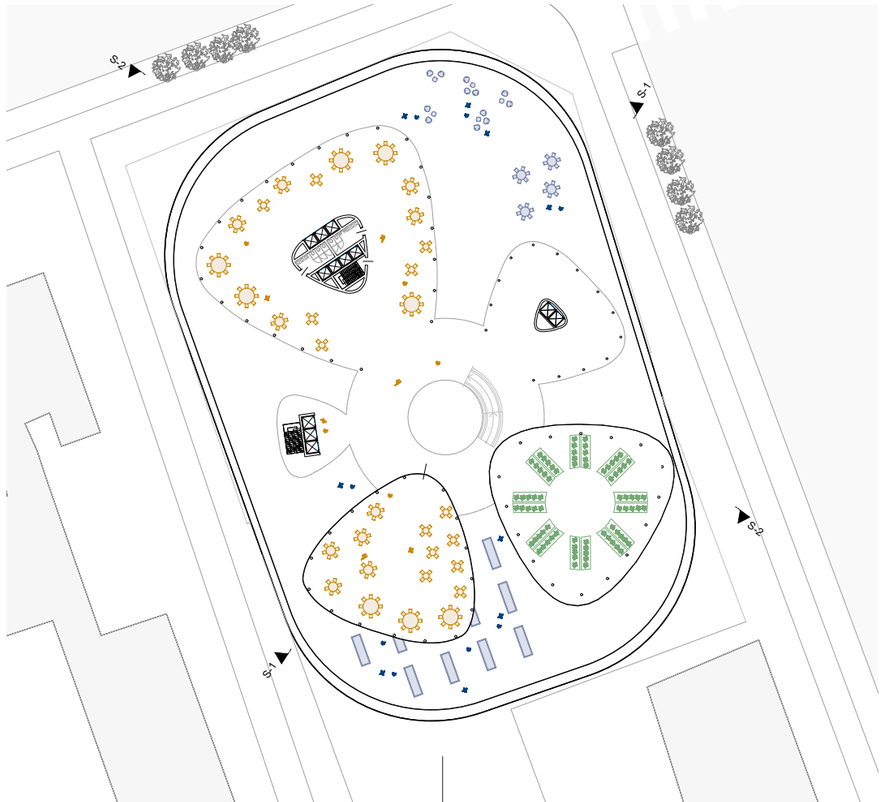


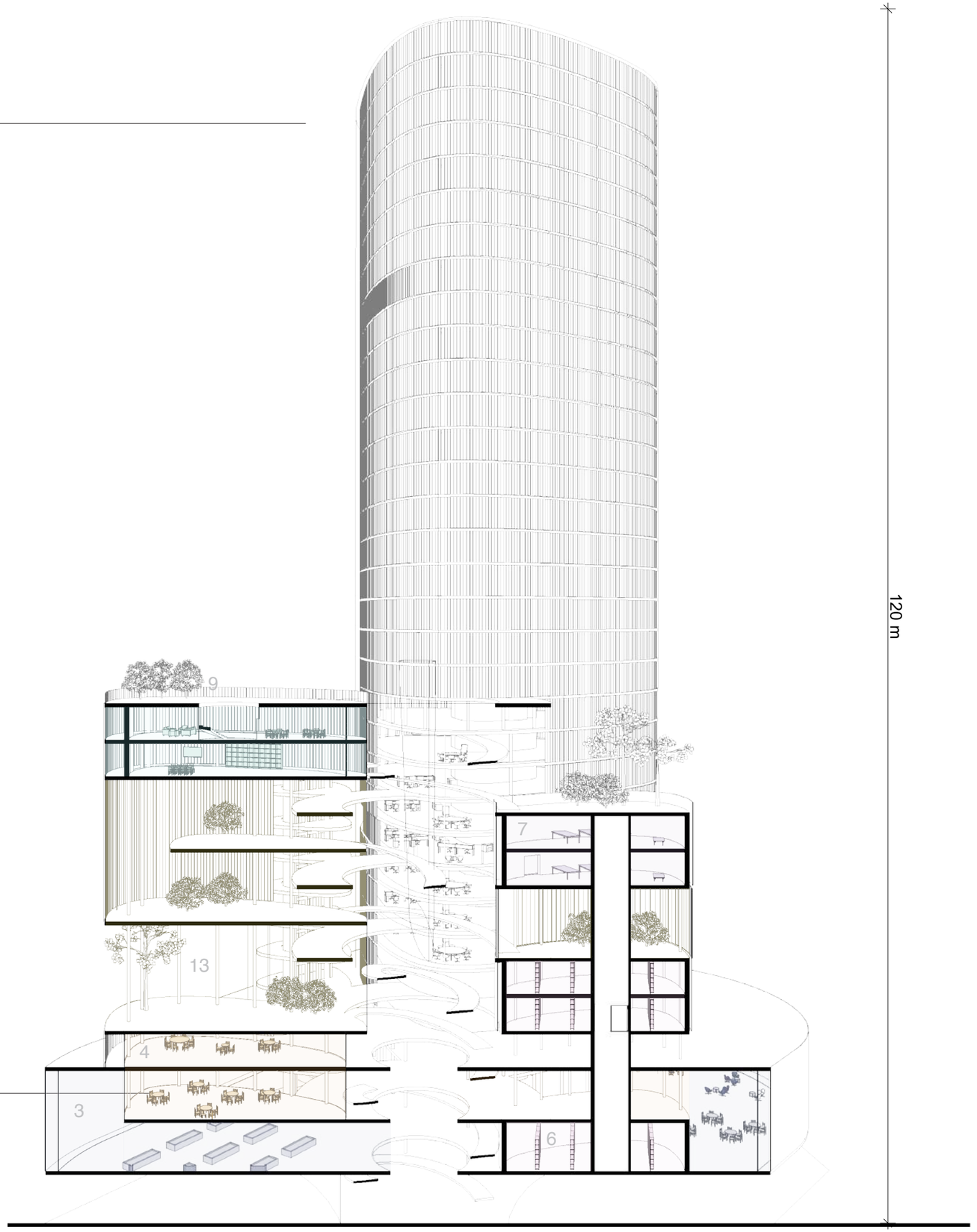
SITEPLAN 1:1000



PLANS 1:500

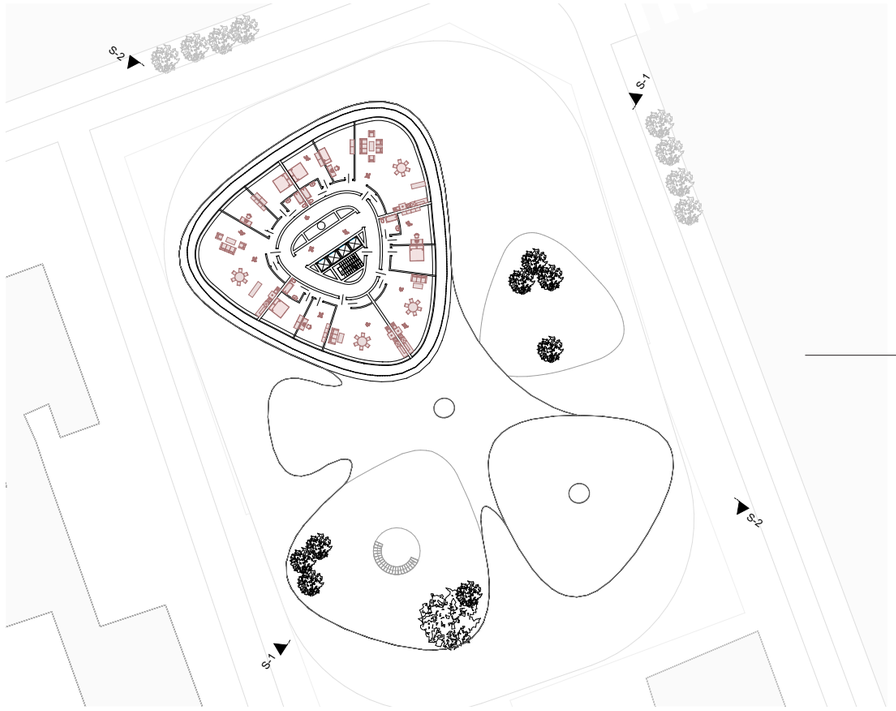
3RD FLOOR



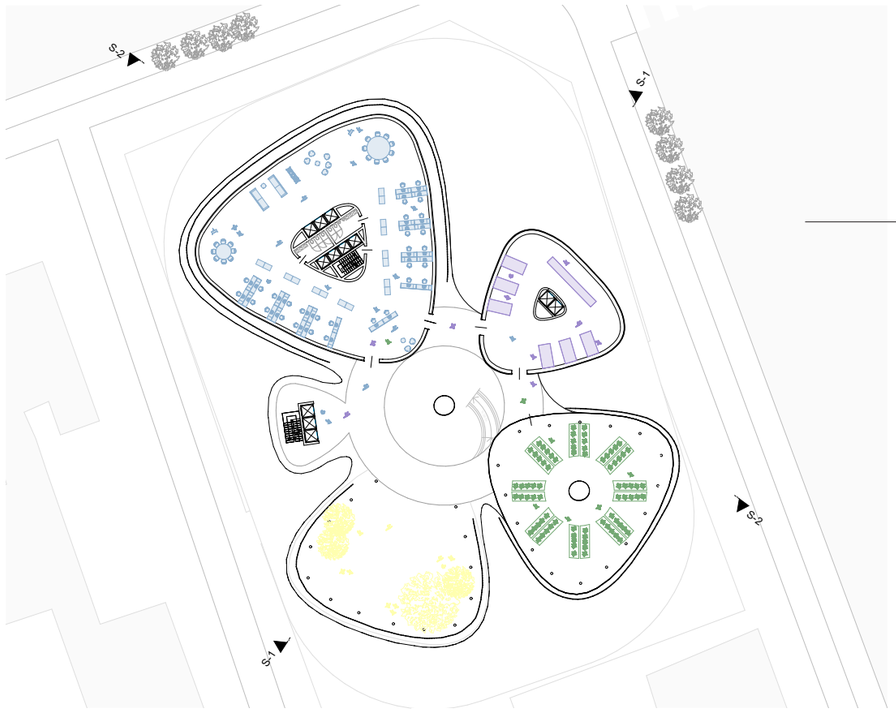


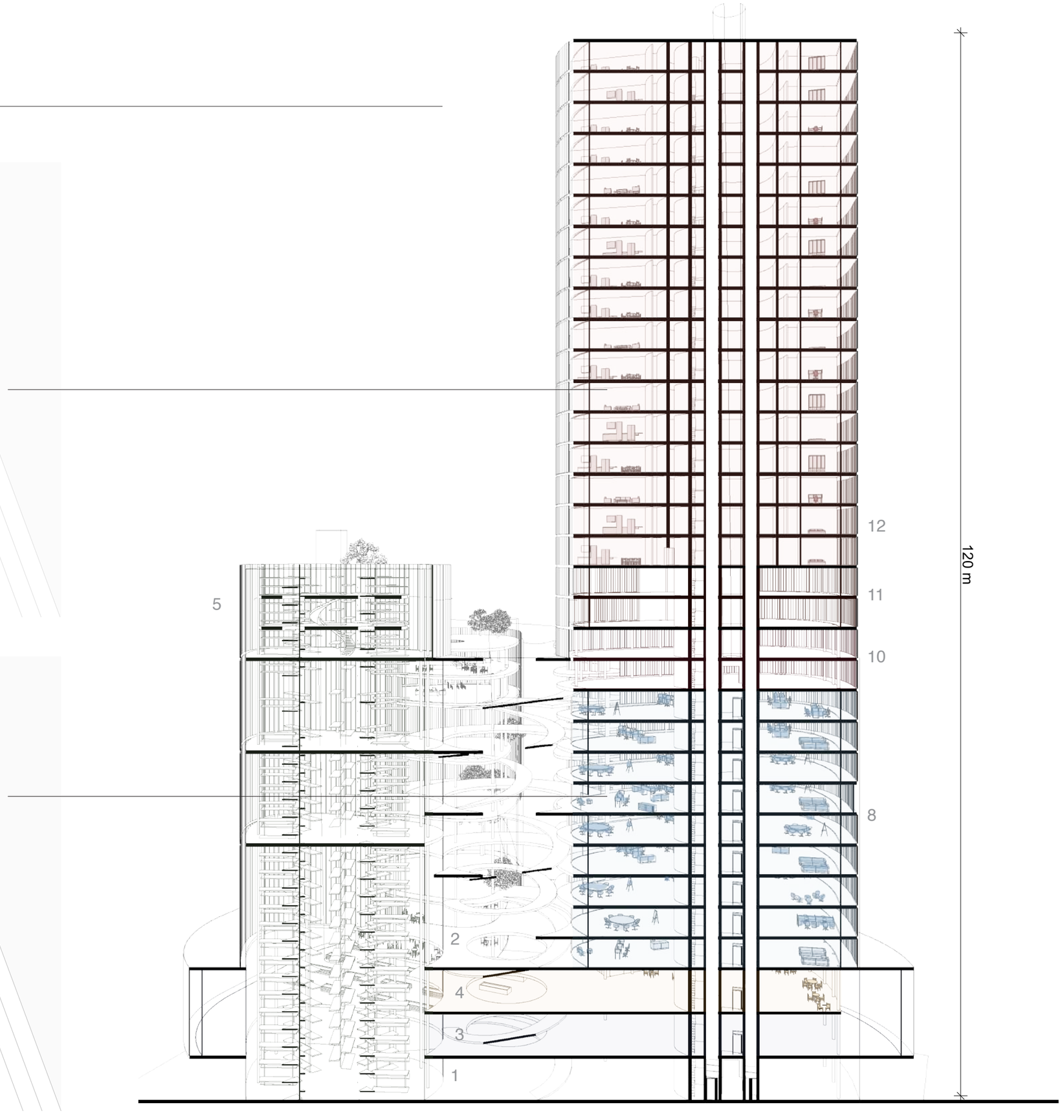
PLANS 1:500

16TH FLOOR

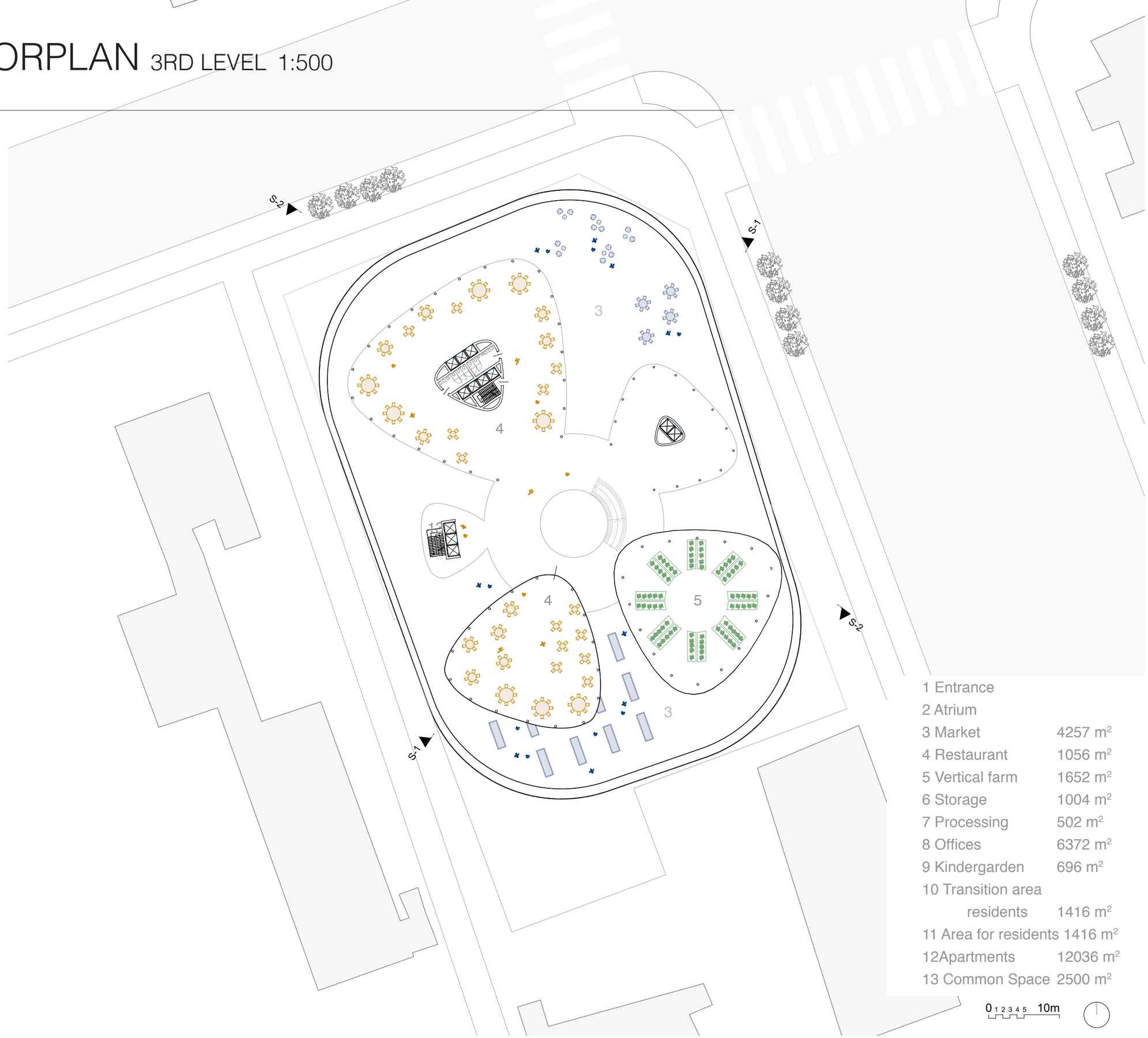


9TH FLOOR





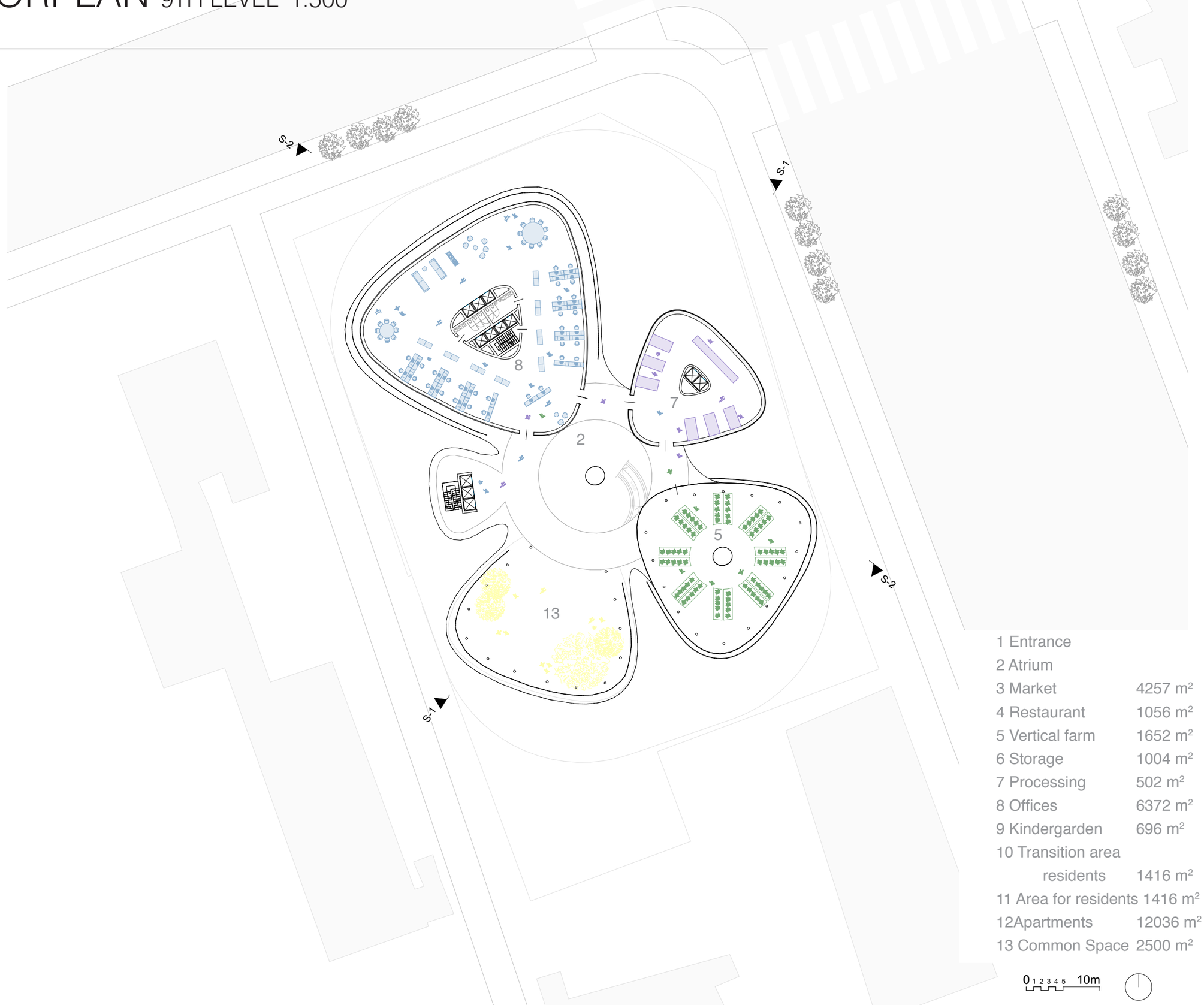
FLOORPLAN 3RD LEVEL 1:500



1 Entrance
2 Atrium
3 Market 4257 m²
4 Restaurant 1056 m²
5 Vertical farm 1652 m²
6 Storage 1004 m²
7 Processing 502 m²
8 Offices 6372 m²
9 Kindergarden 696 m²
10 Transition area residents 1416 m²
11 Area for residents 1416 m²
12Apartments 12036 m²
13 Common Space 2500 m²

0 1 2 3 4 5 10m

FLOORPLAN 9TH LEVEL 1:500



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11 Area for residents 1416 m²
12Apartments 12036 m²
13 Common Space 2500 m²

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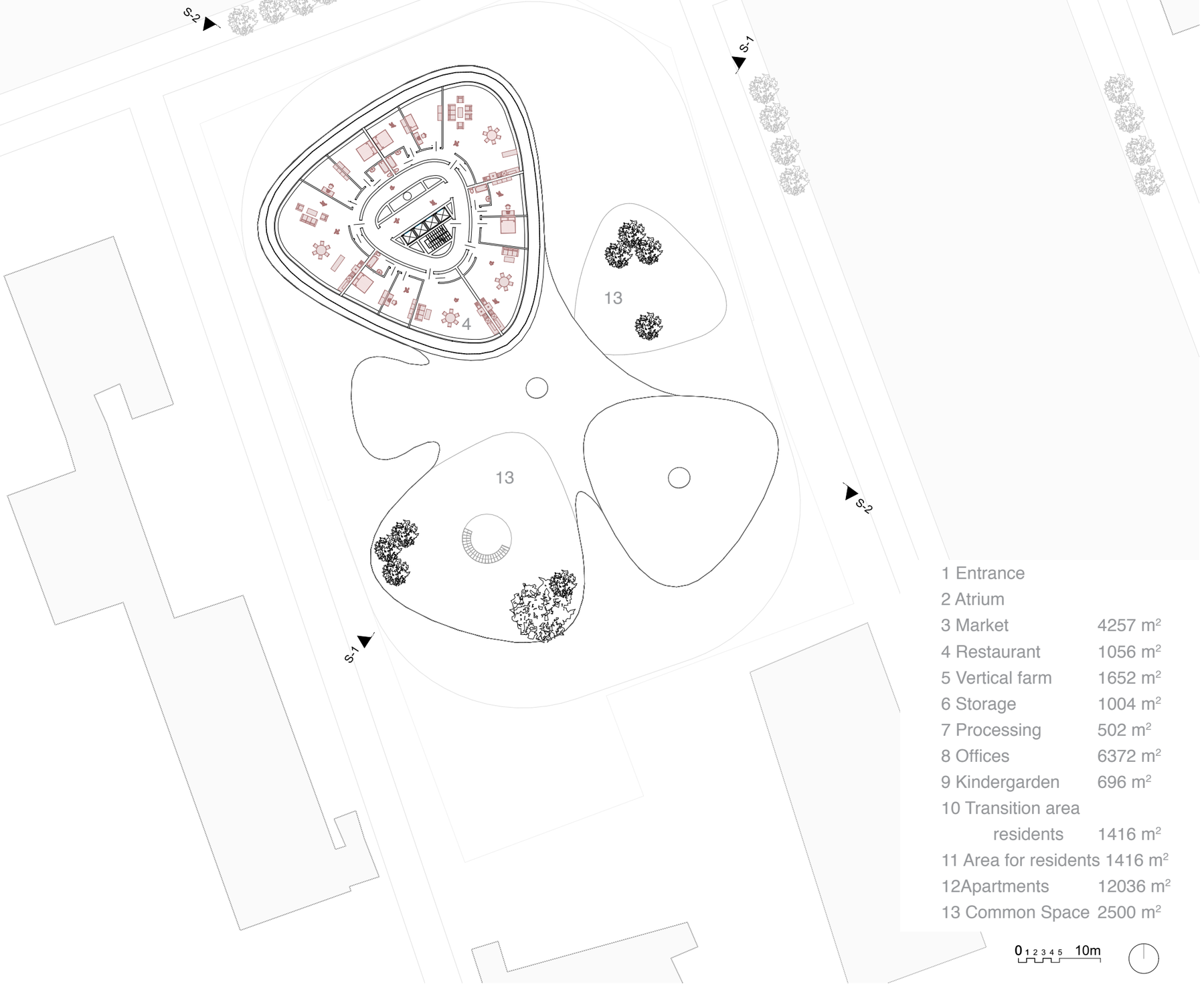
FLOORPLAN 16TH LEVEL 1:500



1 Entrance
2 Atrium
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4 Restaurant 1056 m²
5 Vertical farm 1652 m²
6 Storage 1004 m²
7 Processing 502 m²
8 Offices 6372 m²
9 Kindergarden 696 m²
10 Transition area residents 1416 m²
11 Area for residents 1416 m²
12Apartments 12036 m²
13 Common Space 2500 m²

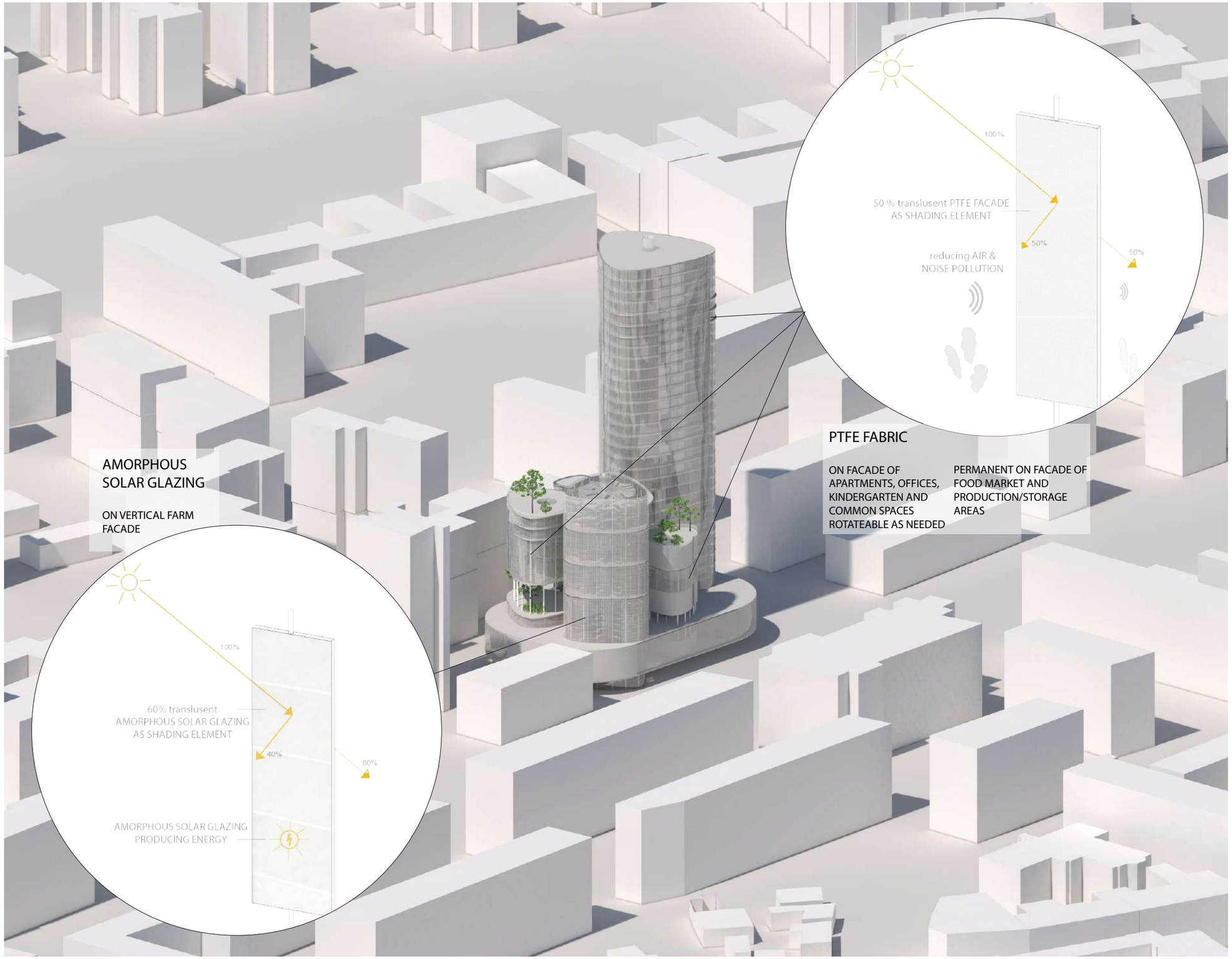
0 1 2 3 4 5 10m

BUILDING IN USE - HYBRIDITY

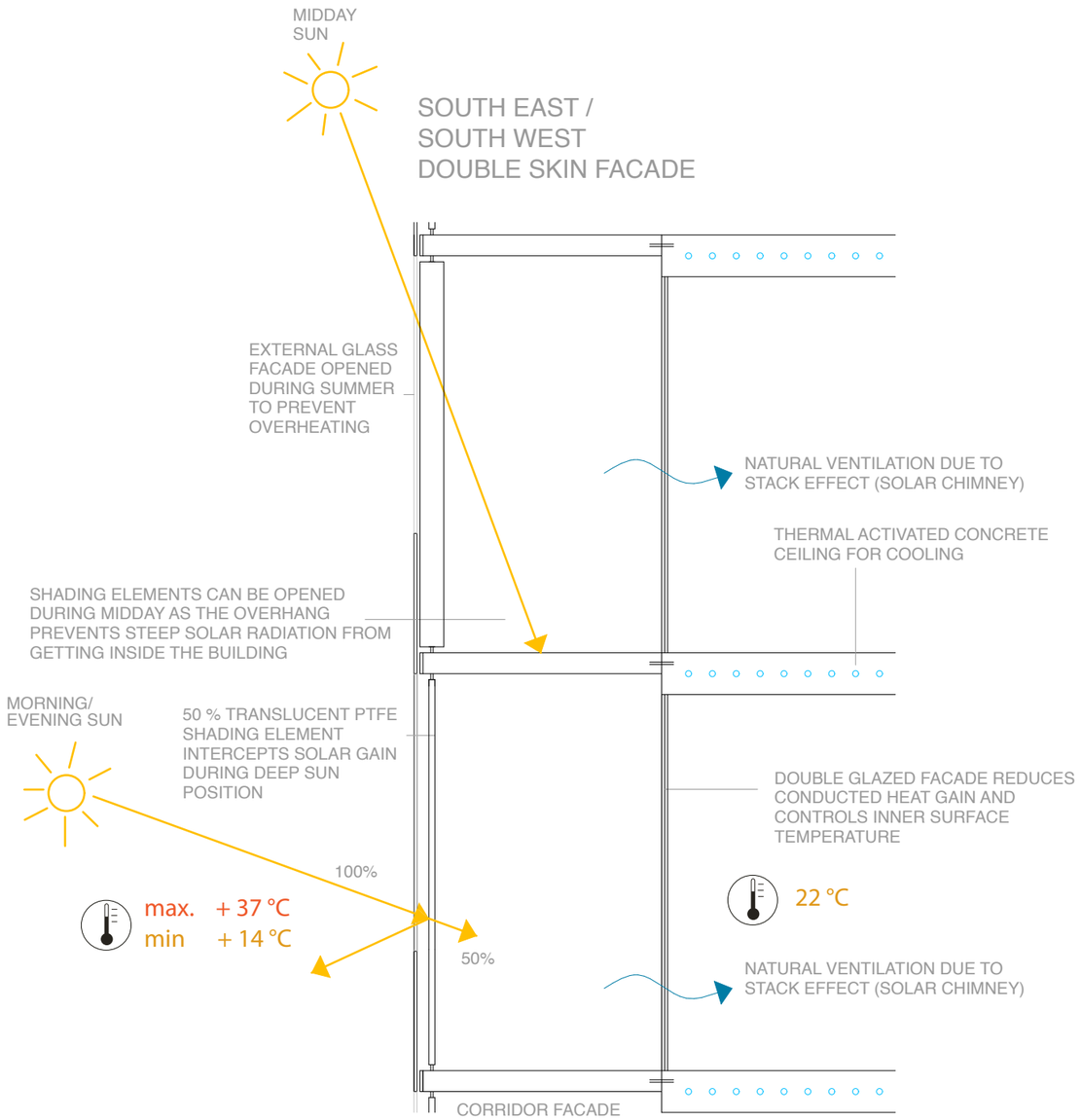
ELEVATION CLOSED - VIEW FROM BOULEVARD - SOUTH EAST SIDE 1:500

ELEVATION OPENED - VIEW FROM BOULEVARD - SOUTH EAST SIDE 1:500

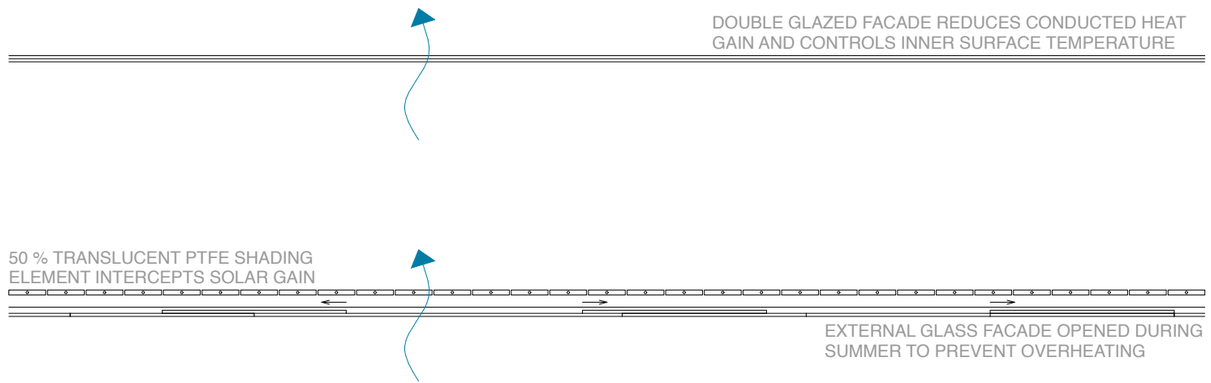
FACADE FUNCTION & PLACEMENT



FACADE - SUMMER - APARTMENTS, OFFICES, KINDERGARTEN 1:50

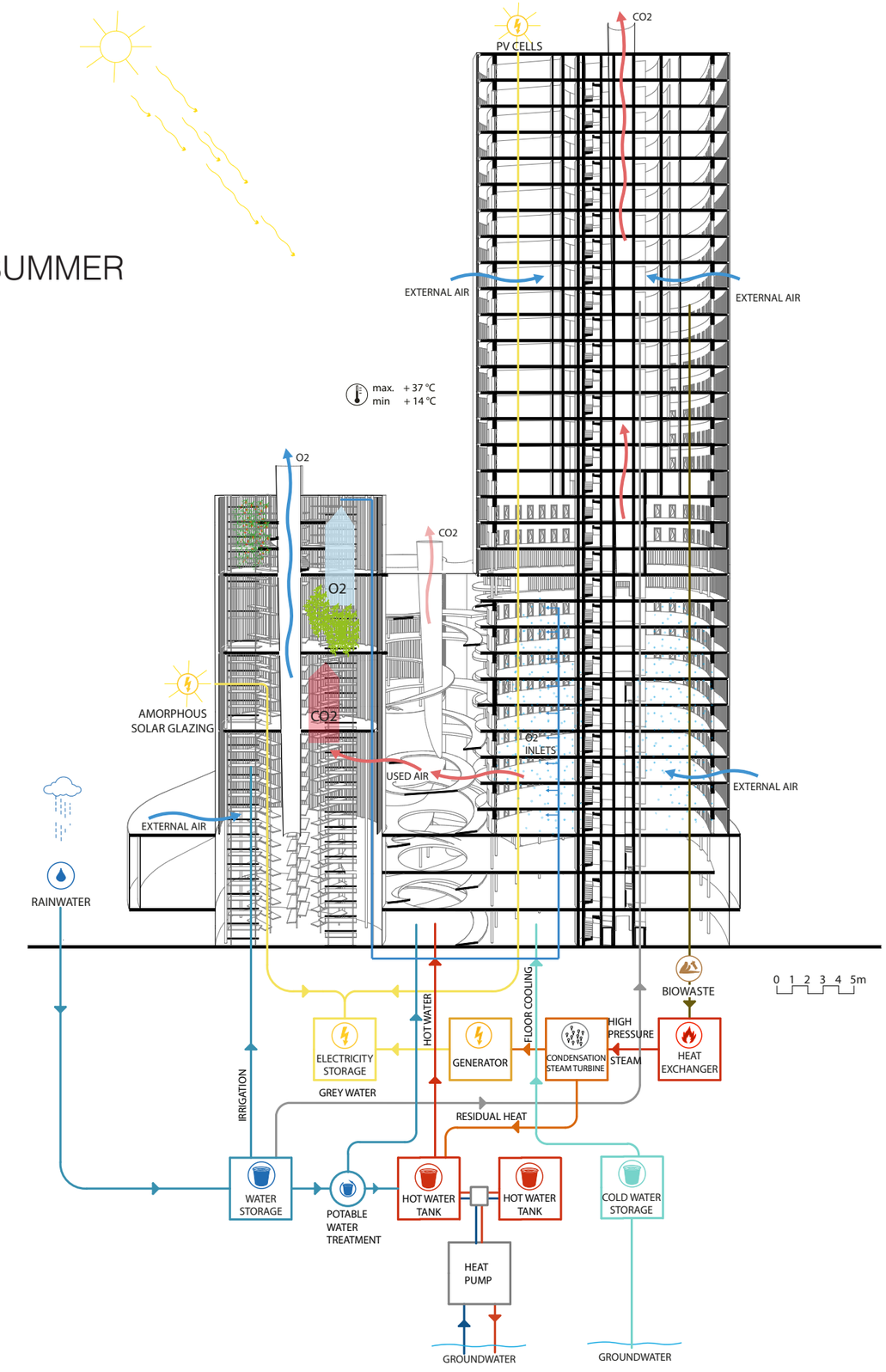


FACADE:	
DOUBLESKIN FACADE:	SINGLE GLAZING OUTSIDE DOUBLE GLAZING INSIDE
U - VALUE:	1,40 W/(m²K)
G - VALUE:	0,48
T - VALUE:	0,72

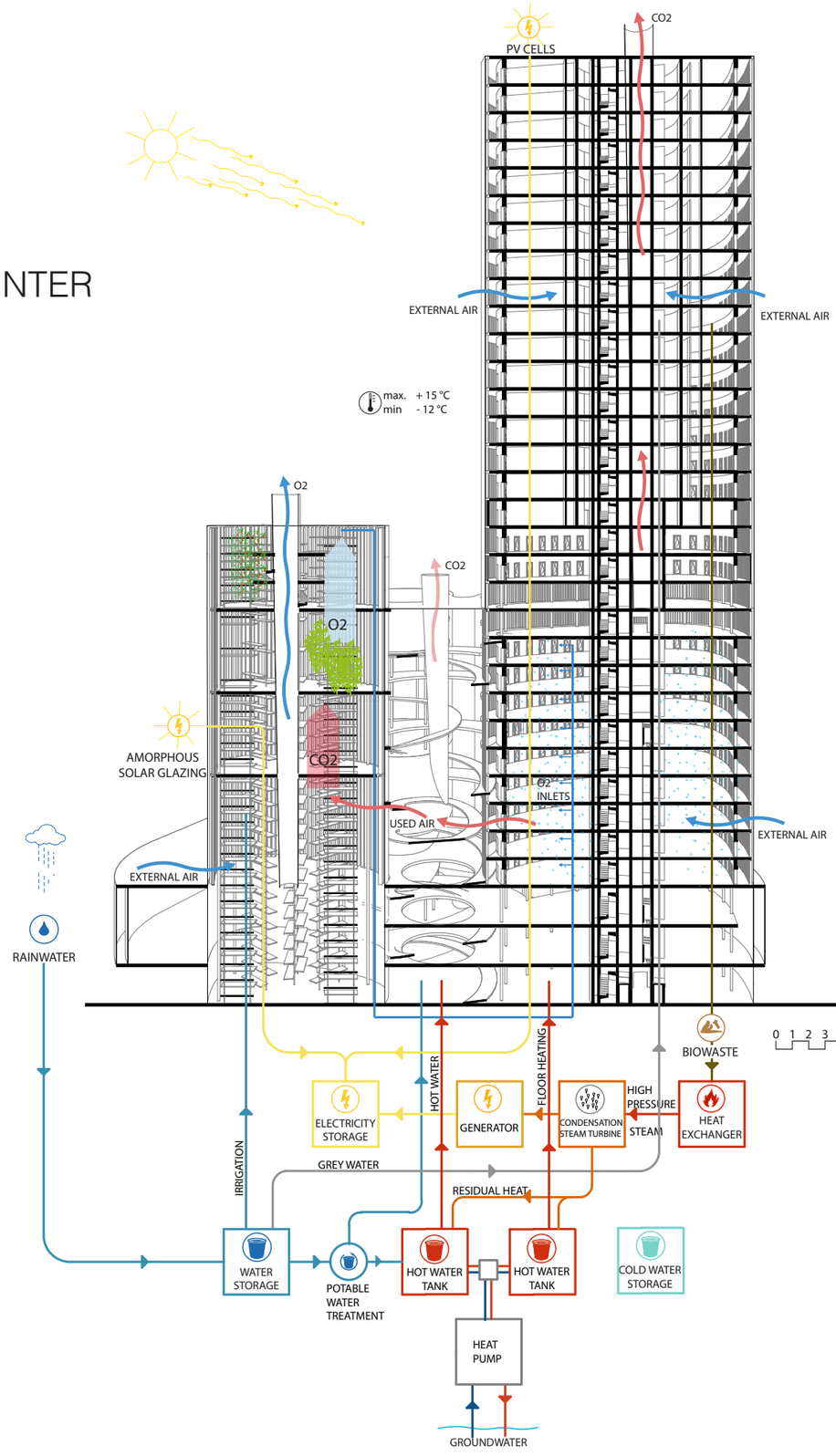


ENERGY CONCEPT

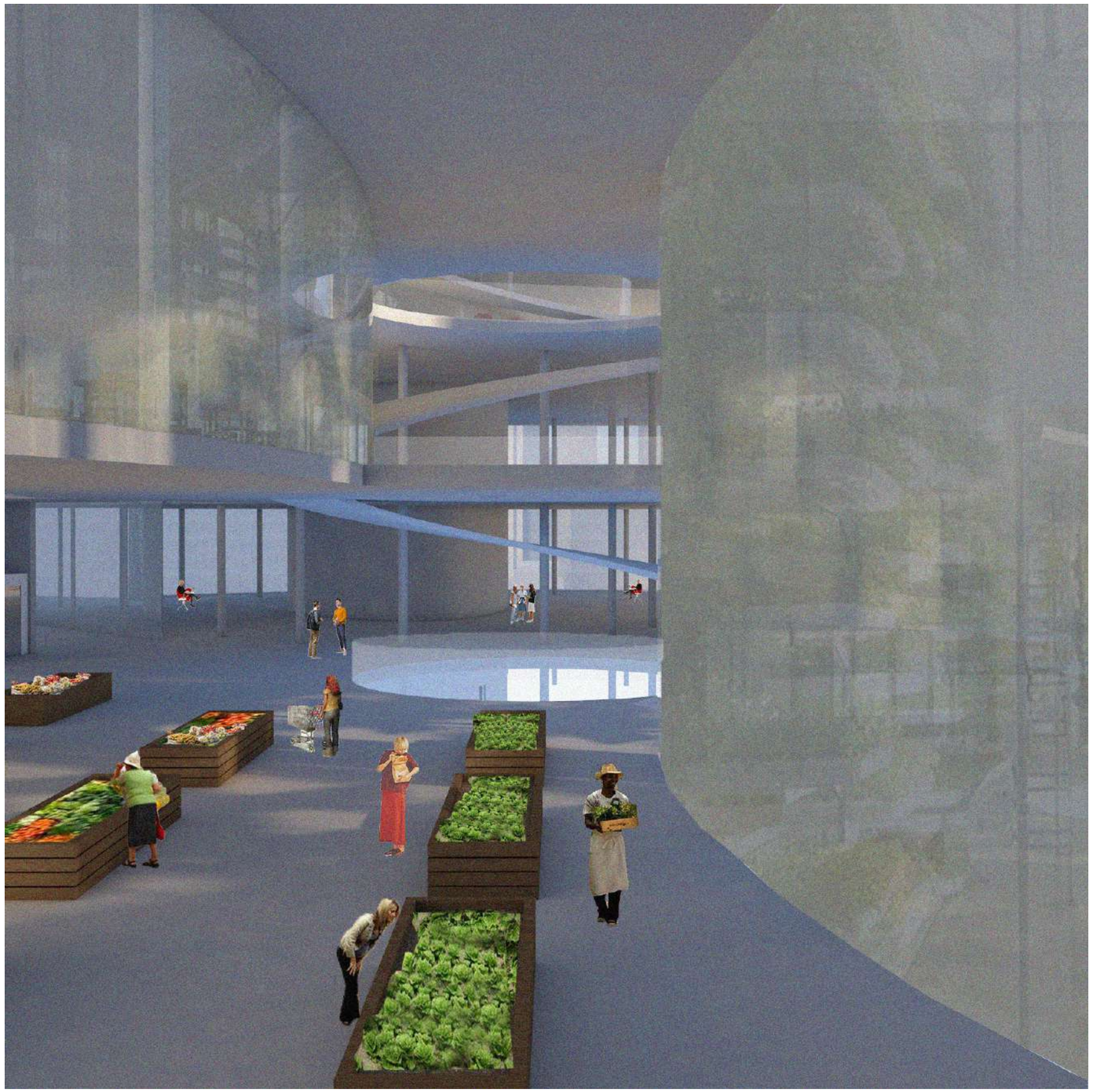
SUMMER



WINTER



VISUALISATIONS



REVIEW EXCERPTS_

"Projects from the Master Studio Hybrid High are a valuable contribution in connecting two aspects of architectural design – designing with an emphasis on program structure and designing in accordance with the energy principles of sustainability. It is especially valuable that through the joint work of students, from two schools, the transfer of complementary knowledge takes place and thus creates a new perspective on the design of mixed-use buildings."

dr Nebojša Čamrag, Technische Universitat Darmstadt

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