

# CIRCULAR TOWER

As the essence of contemporary architecture has inevitably to integrate sustainability needs, the Circular Tower's building envelope intertwines with transparent volumes used as greenhouses.

The latter represent a **bioclimatic system**, able to provide pleasant natural light, and ensure high thermal comfort to the internal space. At the same time, thanks to the photovoltaic glass they are made of, and to their orientation, they are able to supply energy granting both self-consumption and self-sufficiency.

The Circular Tower is situated in a **green area** between the anthropic element and the river. A further conditioning element is the cycling path which allows to have a direct access to the building's ground floor, where the hall is located.

The upper floors, destined to research activities, present an **elevator** which enables to easily make the containers, hosting particular laboratories, interchangeable. An exhibition space and two events rooms locate right below the panoramic terrace.

The core idea behind the development of the Circular Tower is a particular attention towards the most compelling environmental and sustainability needs, in fact reflected in the choice of recycled and recyclable materials, and in the building system made of structural wood. The latter, differently from concrete and steel systems, presents a quantity of CO<sub>2</sub> able to **reduce the climatic impact** of the construction.

The use of stormwater storage systems in conjunction with the purification and potable of graywater, allows the Circular Tower to be self-sufficient in terms of **water**, thus reducing the consumption of natural resources.

## TERRITORIAL FRAMEWORK



## TERRITORIAL ELEMENTS

- ..... Administrative boundary
- Emme river
- ..... Railway
- Highway
- Ring road
- Fast road
- Urban area

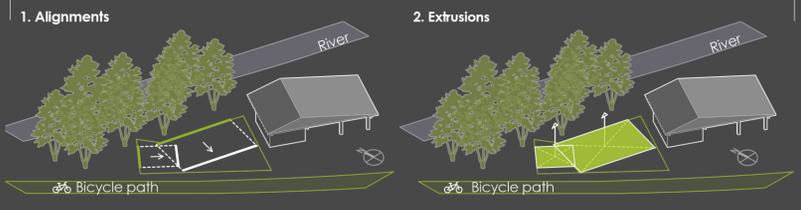
## PLANTS BUBBLE DIAGRAM



## REQUIREMENTS

- Quiet environment
- Heated compartment
- Filtered light
- Natural light
- Main access
- Service access

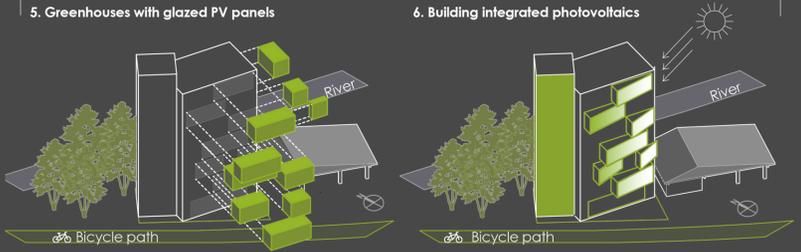
## VOLUMES



## FUNCTIONS



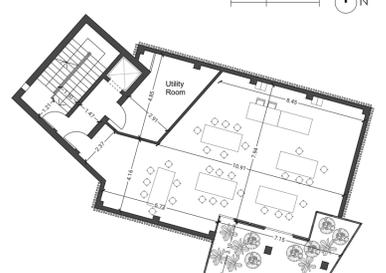
## ENERGY



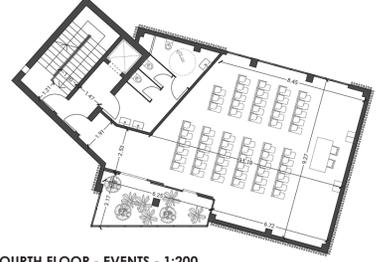
## ACCESSIBILITY



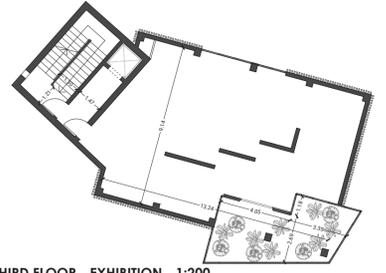
SIXTH FLOOR - EVENTS - 1:200



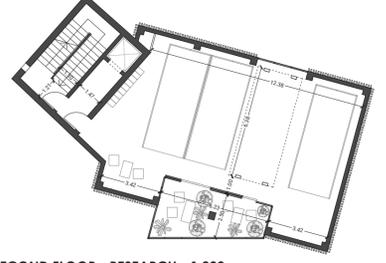
FIFTH FLOOR - EVENTS - 1:200



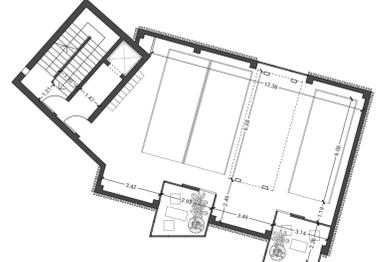
FOURTH FLOOR - EVENTS - 1:200



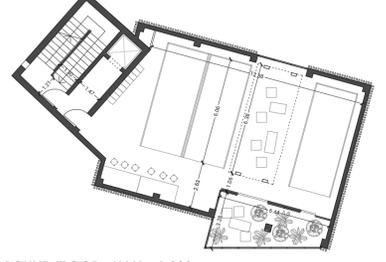
THIRD FLOOR - EXHIBITION - 1:200



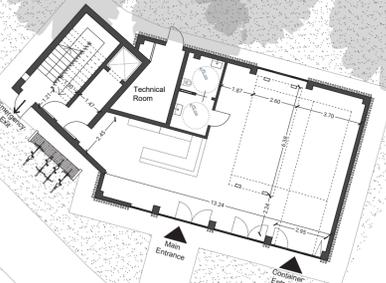
SECOND FLOOR - RESEARCH - 1:200



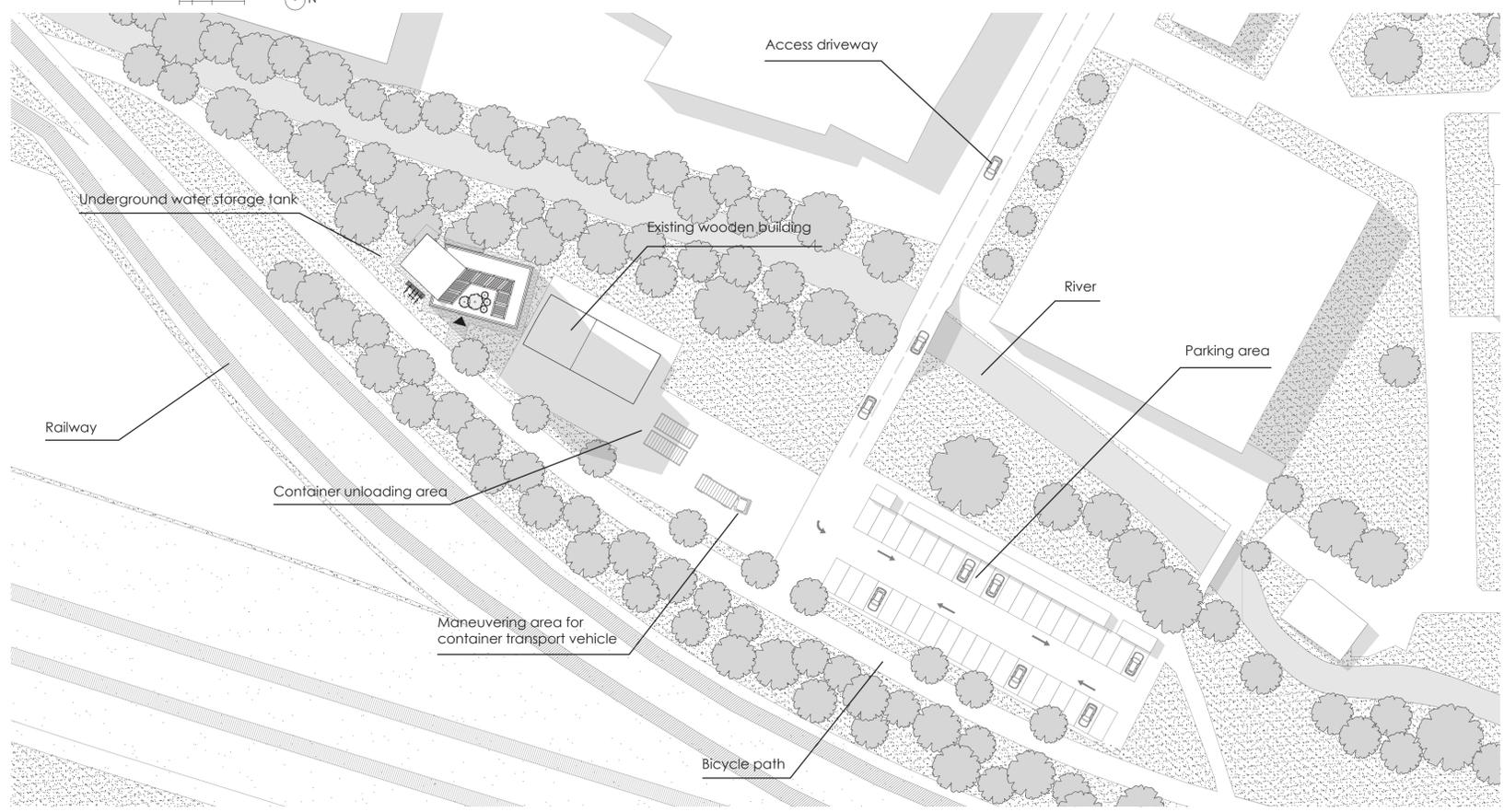
FIRST FLOOR - RESEARCH - 1:200



GROUND FLOOR - HALL - 1:200



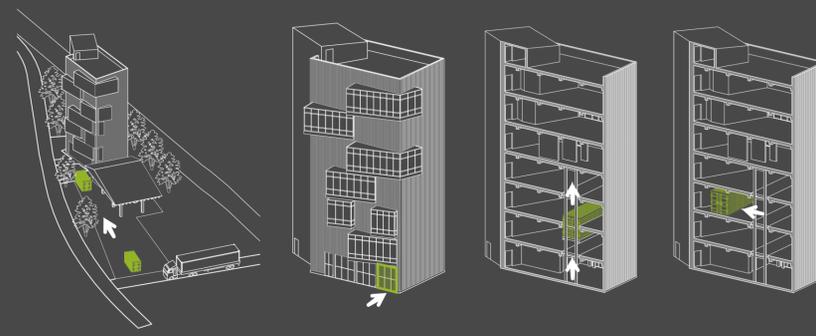
MASTERPLAN - 1:500



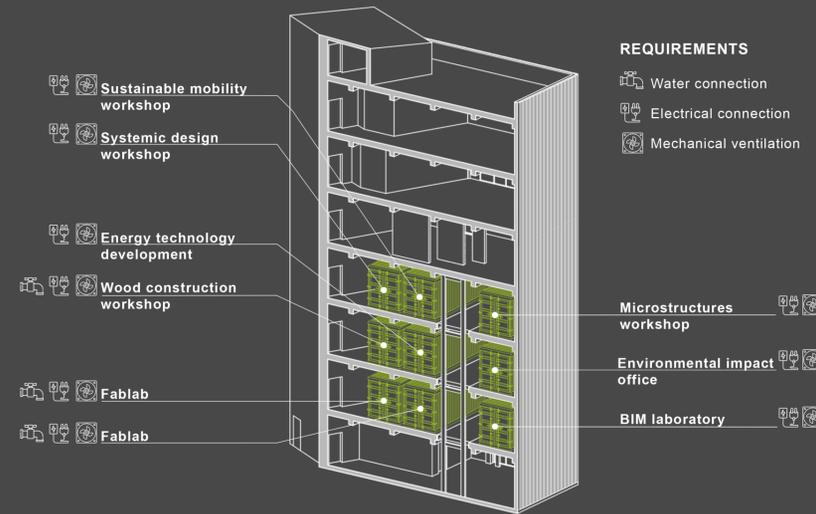
# FLEXIBILITY

## MOVEMENTS AND FUNCTIONS OF CONTAINERS

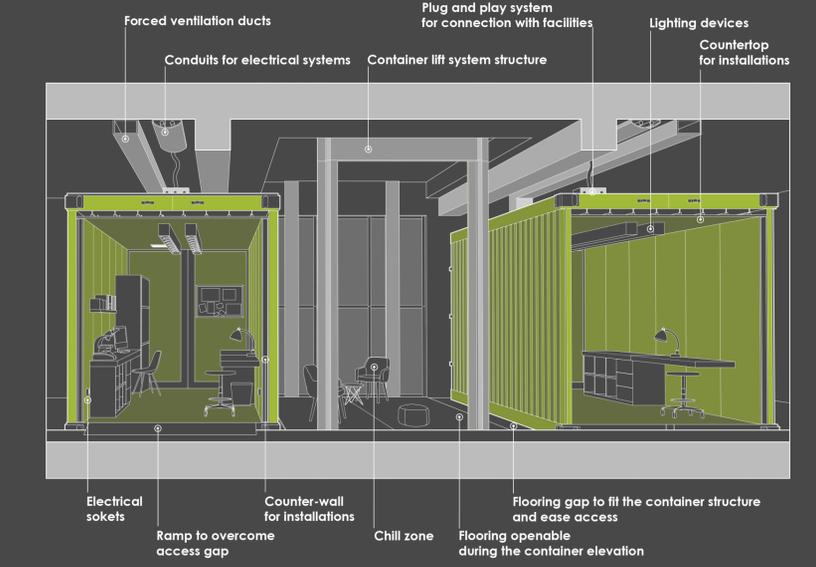
1. Transport of containers by track
2. Entry of containers into the structure
3. Ascent of containers by elevator
4. Transport of containers by means of floor rails



## CONFIGURATION LAYOUT AND HYPOTHESIZED FUNCTIONS OF THE CONTAINER



## CONTAINERS' INSTALLATION AND FUNCTIONING



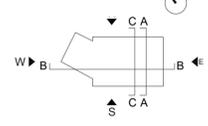
## INTERNAL VIEWS



## PERSPECTIVE SECTION AA



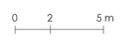
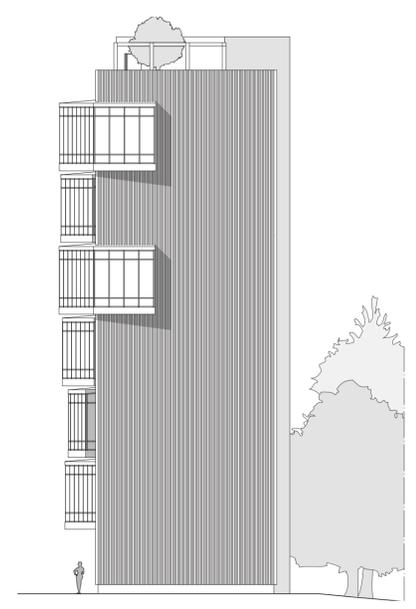
## KEY PLAN



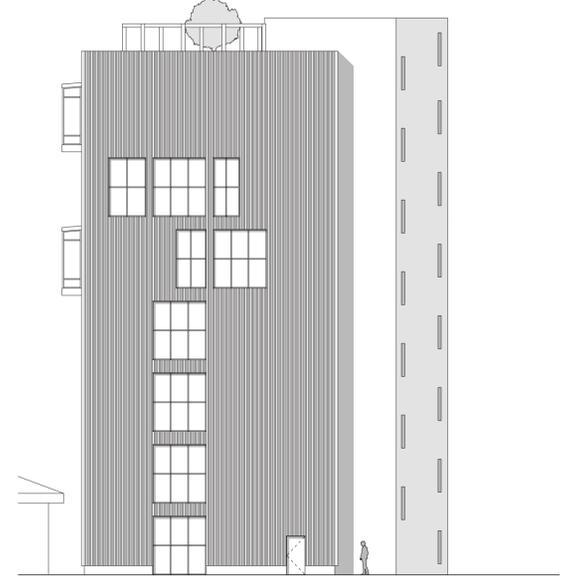
## SOUTH ELEVATION - 1:200



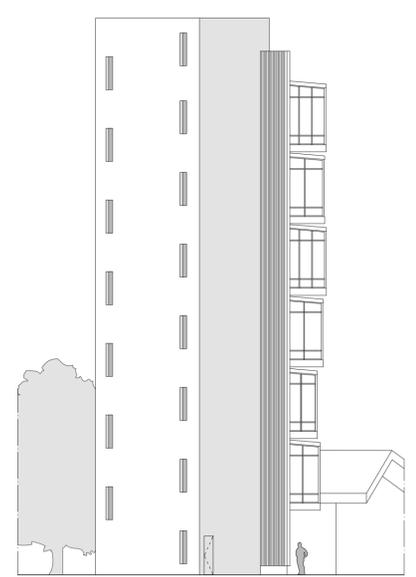
## EAST ELEVATION - 1:200



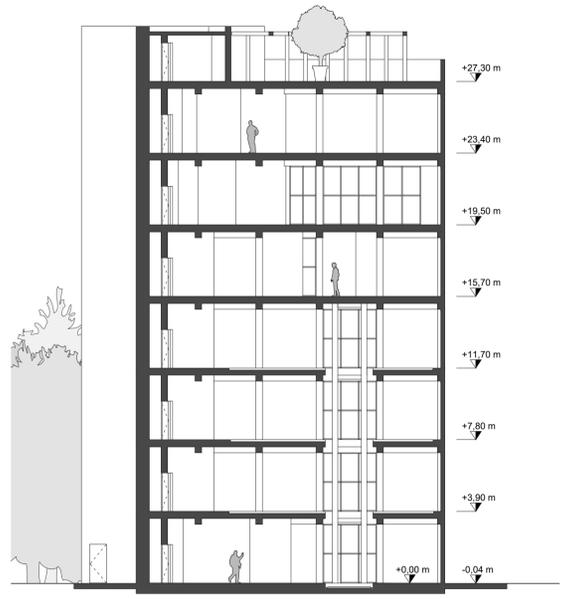
## NORTH ELEVATION - 1:200



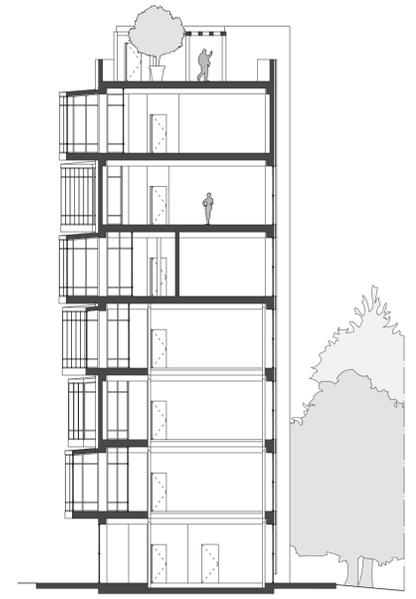
## WEST ELEVATION - 1:200



## SECTION BB - 1:200

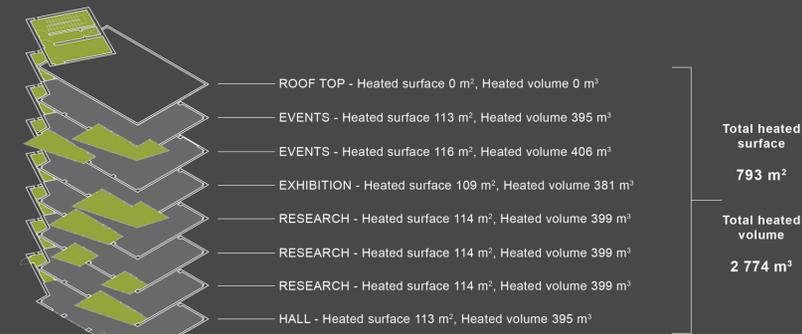


## SECTION CC - 1:200

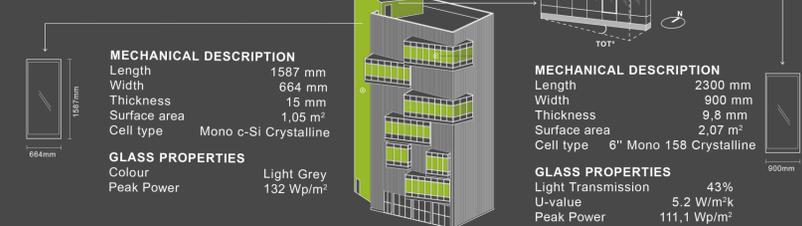


# ENERGY AND RESOURCES

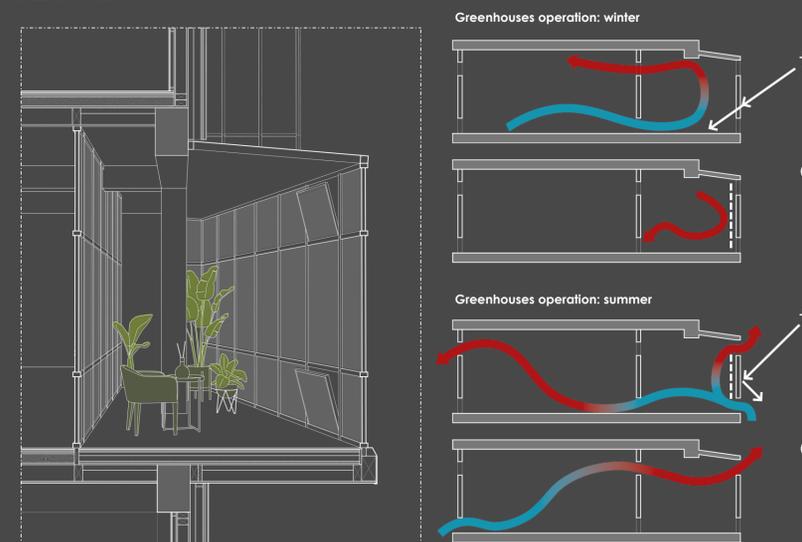
## THERMAL ZONES



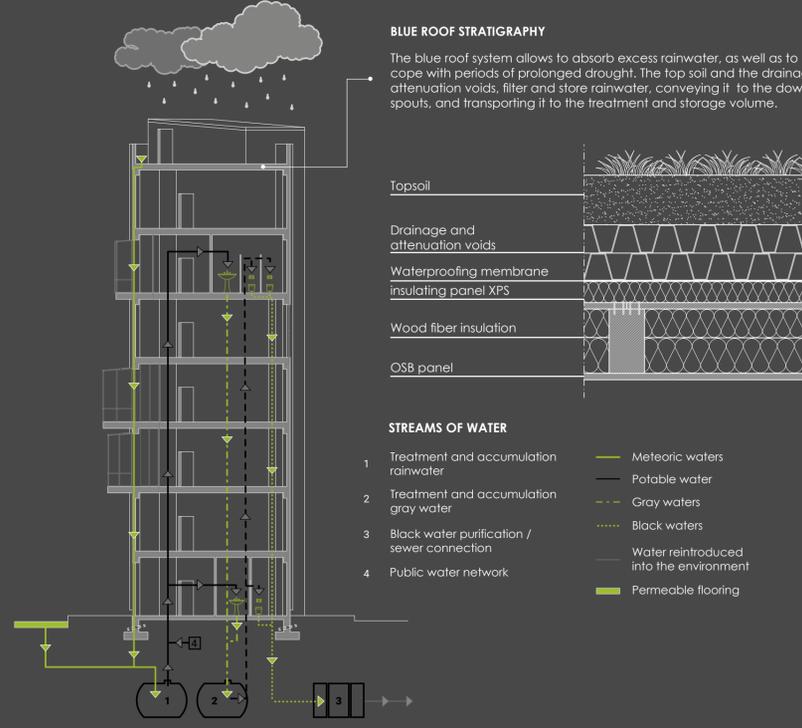
## PHOTOVOLTAIC ELEMENTS



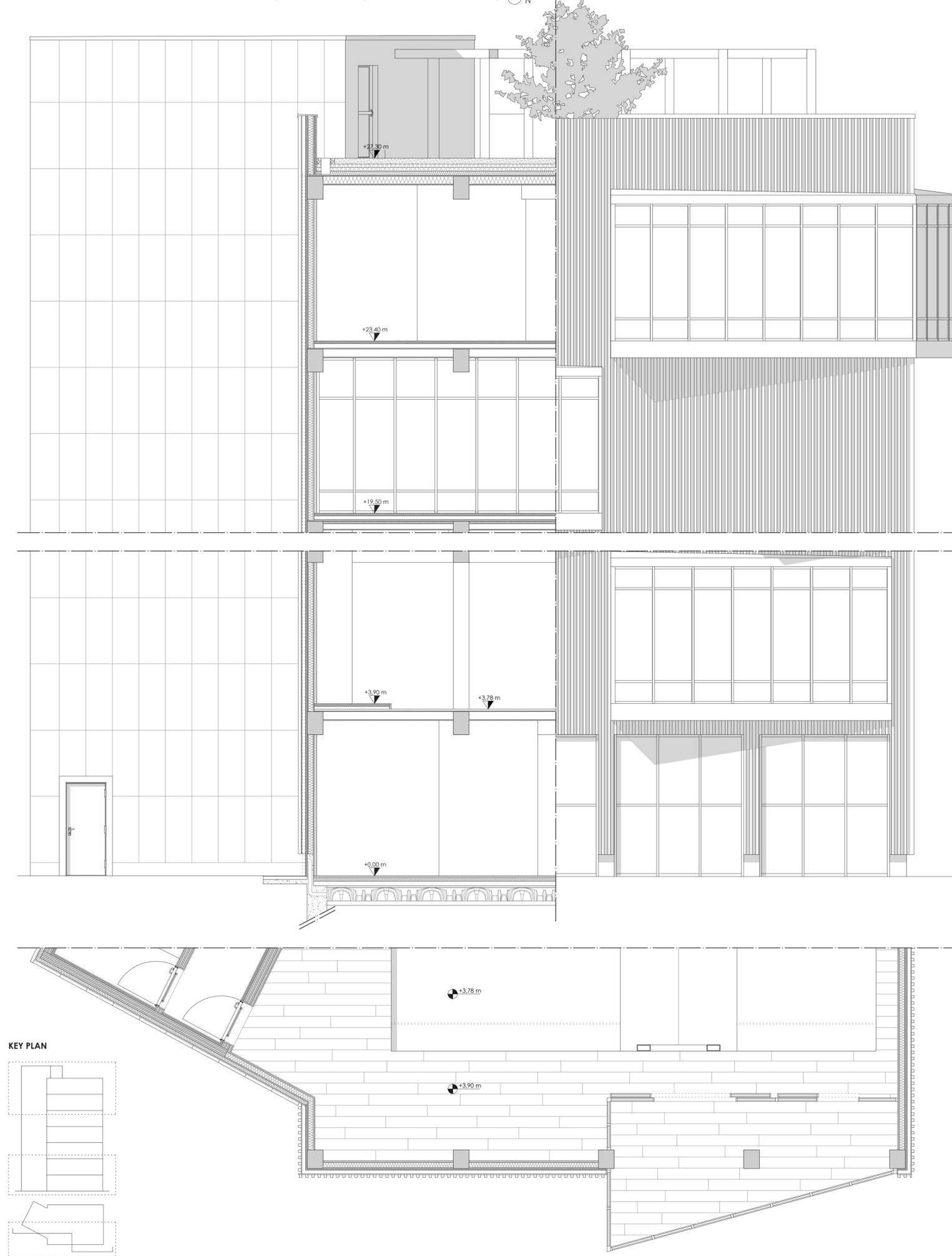
## GREENHOUSES



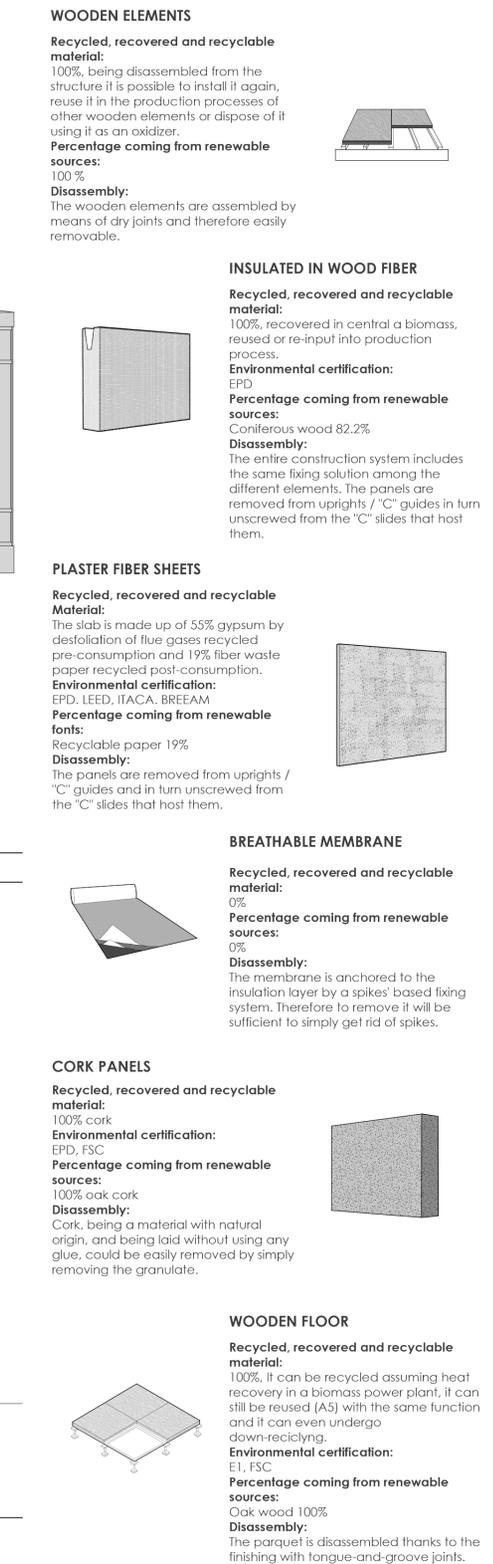
## WATER CYCLE



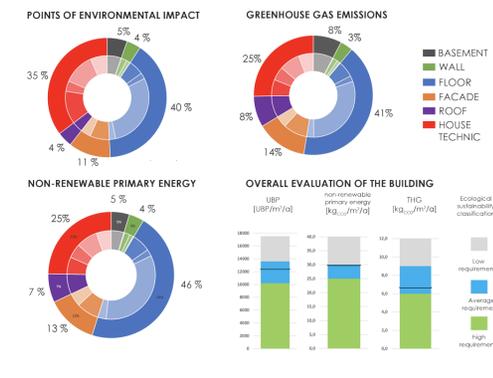
## SECTION, ELEVATION AND FIRST FLOOR PLAN - SCALE 1:50



## CHARACTERISTICS OF THE CHOSEN MATERIALS



## CALCULATION OF THE ENVIRONMENTAL IMPACT WITH ZPF



# ASSEMBLY

## CONSTRUCTION PHASES

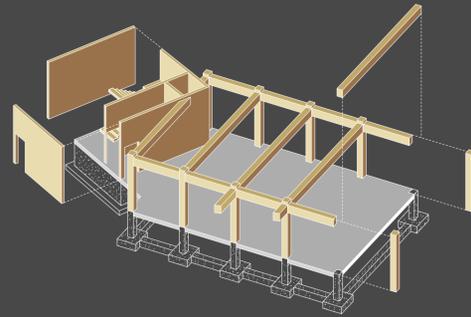
Following the construction of the reinforced concrete foundations, the primary structural elements are laid floor by floor, including beams, pillars for the main volume of the building and CLT walls and floors for the stairwell.

To create the building envelope and the inter-floor slabs, pre-assembled panels will be mounted, designed to be quickly laid on site, to reduce construction time, but also in anticipation of easy removal.

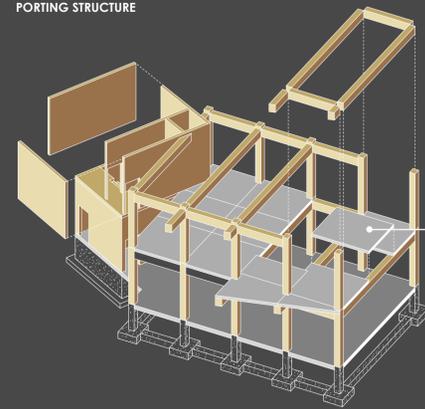
The materials that make up the panels have been chosen on the basis of their marketing in formats optimized for deconstruction, on the basis of their environmental impact and also for their thermal and acoustic performance.

In this way at the end of the useful life of the building there will be the possibility to separate the different components of the panels in order to reuse them and / or recycle them.

### 1. LAYING OF THE STRUCTURAL ELEMENTS ABOVE THE FOUNDATIONS



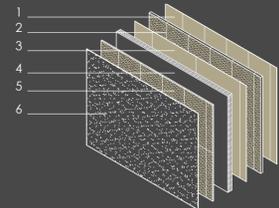
### 2. INSTALLATION OF THE PREFABRICATED FLOORS AND CONTINUATION OF THE CONSTRUCTION OF THE SUPPORTING STRUCTURE



#### FLOOR: INDOOR-INDOOR

1. 14mm Plank oak flooring
2. 5mm Decoupling layer for floating floor
3. 25mm Dry screed with gypsum fiber slabs
4. 20mm Wood fiber insulating panel
5. 100mm Substrate in mineralized wood panels
6. 5mm Separation layer
7. 18mm OSB panel
8. 18mm OSB panel

T = 385 mm



### 3. INSTALLATION OF THE PREFABRICATED WALLS AND COMPLETION OF THE CONSTRUCTION OF THE SUPPORTING STRUCTURE

#### WALL: STAIRWELL-OUTDOOR

1. 18mm OSB panel and 13mm external finish
2. 80mm Wood fiber insulation panel
3. 5mm Breathable airtight membrane
4. 180mm Cross laminated timber 5 layers
5. 40mm Wood fiber insulation
6. 13mm Plasterboard type F (GKF)

U = 0,212 W/m<sup>2</sup>k T = 333mm

### 4. INSTALLATION OF THE TRANSPARENT ENVELOPE

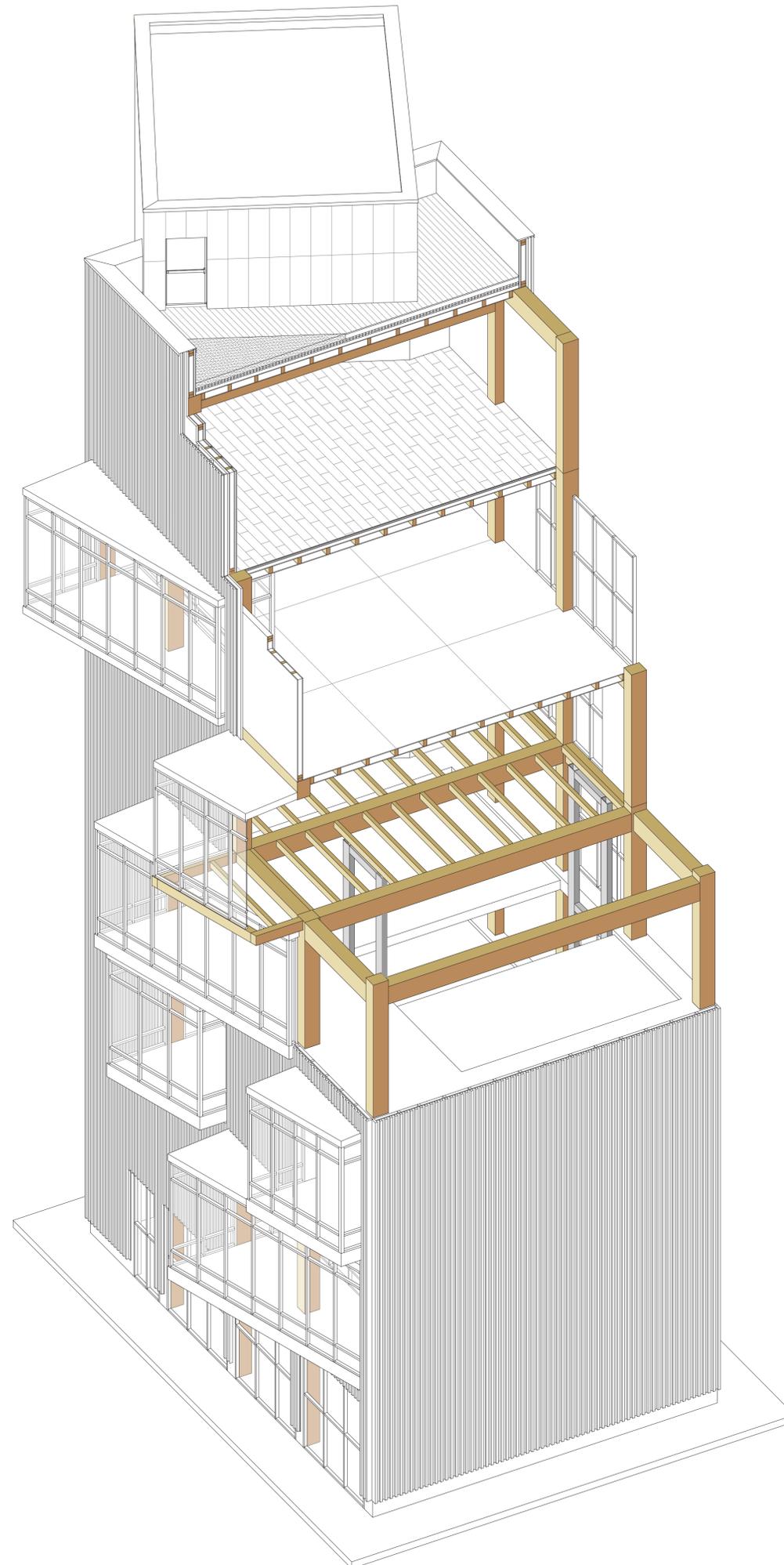


#### WALL: INDOOR-OUTDOOR

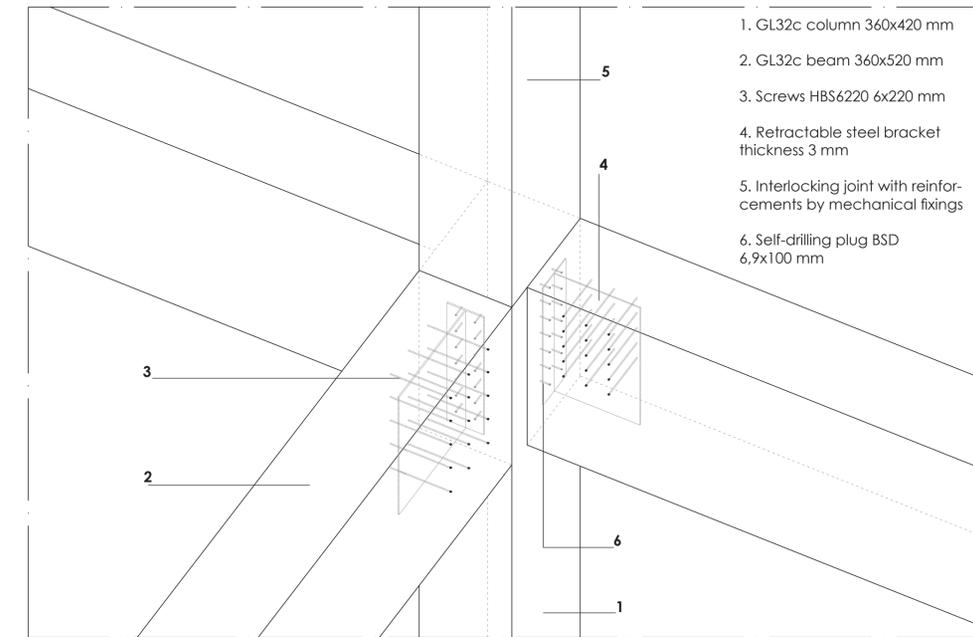
1. 40mm Fir wood strips
2. 18mm OSB panel
3. 60mm Wood fiber insulation panel
4. 18mm OSB panel
5. 120mm Wood fiber insulating panel
6. 18mm OSB panel
7. 5mm Breathable airtight membrane
8. 13mm Plasterboard type F (GKF)

U = 0,196 W/m<sup>2</sup>k T = 269mm

## CONSTRUCTIVE AXONOMETRY

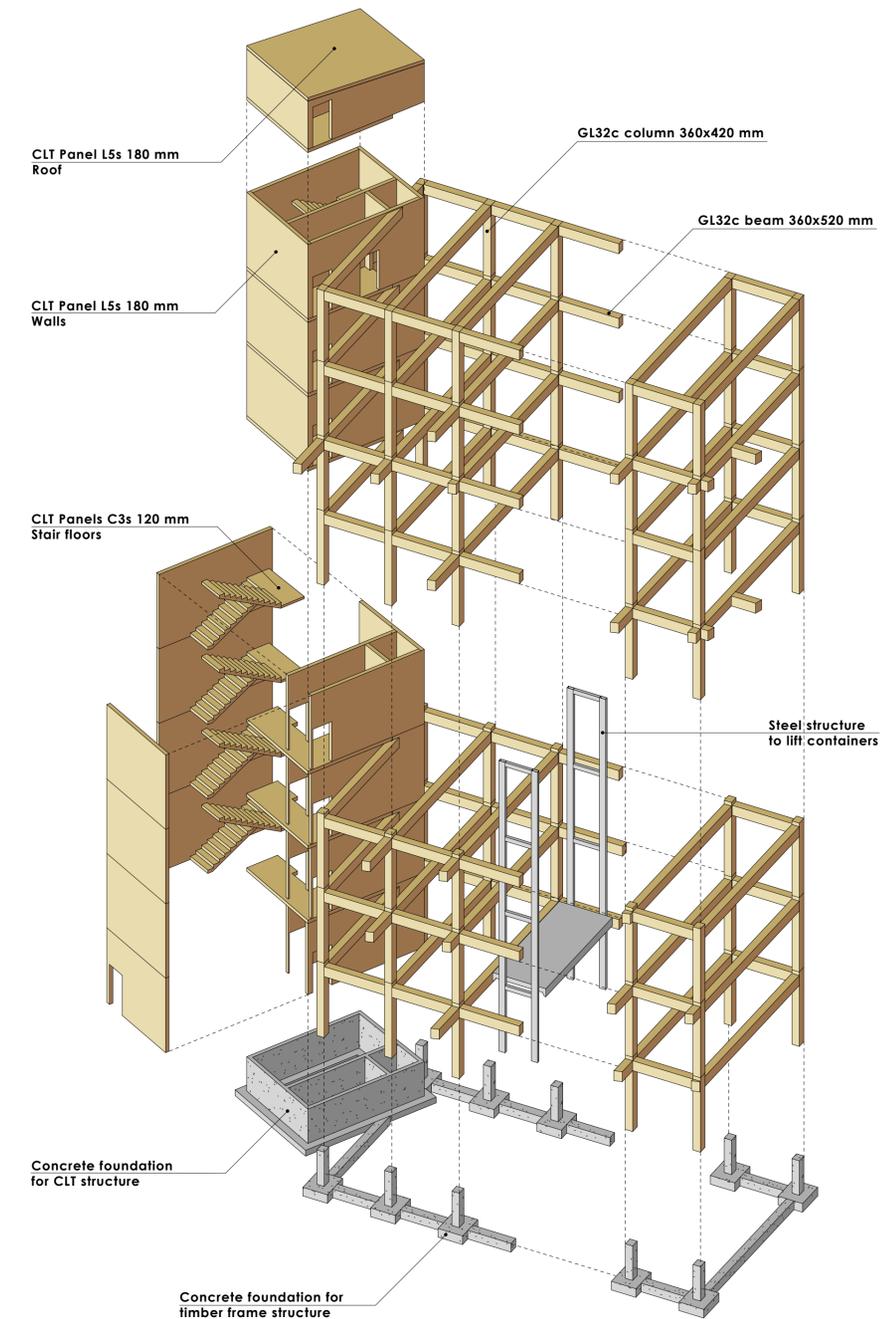


## AXONOMETRIC DETAIL OF THE BEAM-COLUMN JOINT



1. GL32c column 360x420 mm
2. GL32c beam 360x520 mm
3. Screws HBS6220 6x220 mm
4. Retractable steel bracket thickness 3 mm
5. Interlocking joint with reinforcements by mechanical fixings
6. Self-drilling plug BSD 6,9x100 mm

## STRUCTURAL AXONOMETRIC EXPLODED VIEW - PRIMARY ELEMENTS



CLT Panel L5s 180 mm  
Roof

GL32c column 360x420 mm

GL32c beam 360x520 mm

CLT Panel L5s 180 mm  
Walls

CLT Panels C3s 120 mm  
Stair floors

Steel structure  
to lift containers

Concrete foundation  
for CLT structure

Concrete foundation  
for timber frame structure