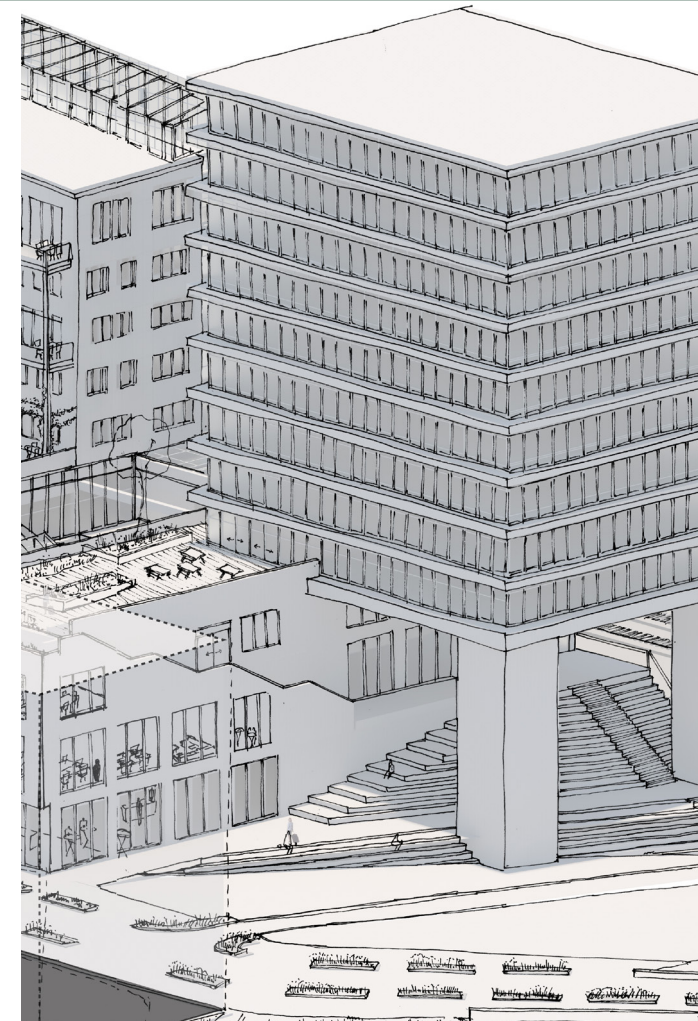


# INCLUSIVE STATION DEVELOPMENT

Achieving post-war neighbourhood renewal by creating station areas of the future



General & Technical drawings by Ilse Ivora de Jong

## **Colofon**

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## Table of Content

|                          |        |
|--------------------------|--------|
| Area map & Sections A& B | p. 4   |
| Summary of typologies    | p. 6   |
| Floor plans              | p. 8   |
| Elevations               | p. 18  |
| Section C & D            | p. 22  |
| Detail section A         | p. 24  |
| Impressions              | p. 26  |
| Construction material    | p. 32. |
| Construction floor plans | p. 34  |
| Facade material          | p. 44  |
| Climate design & Details | p. 46  |

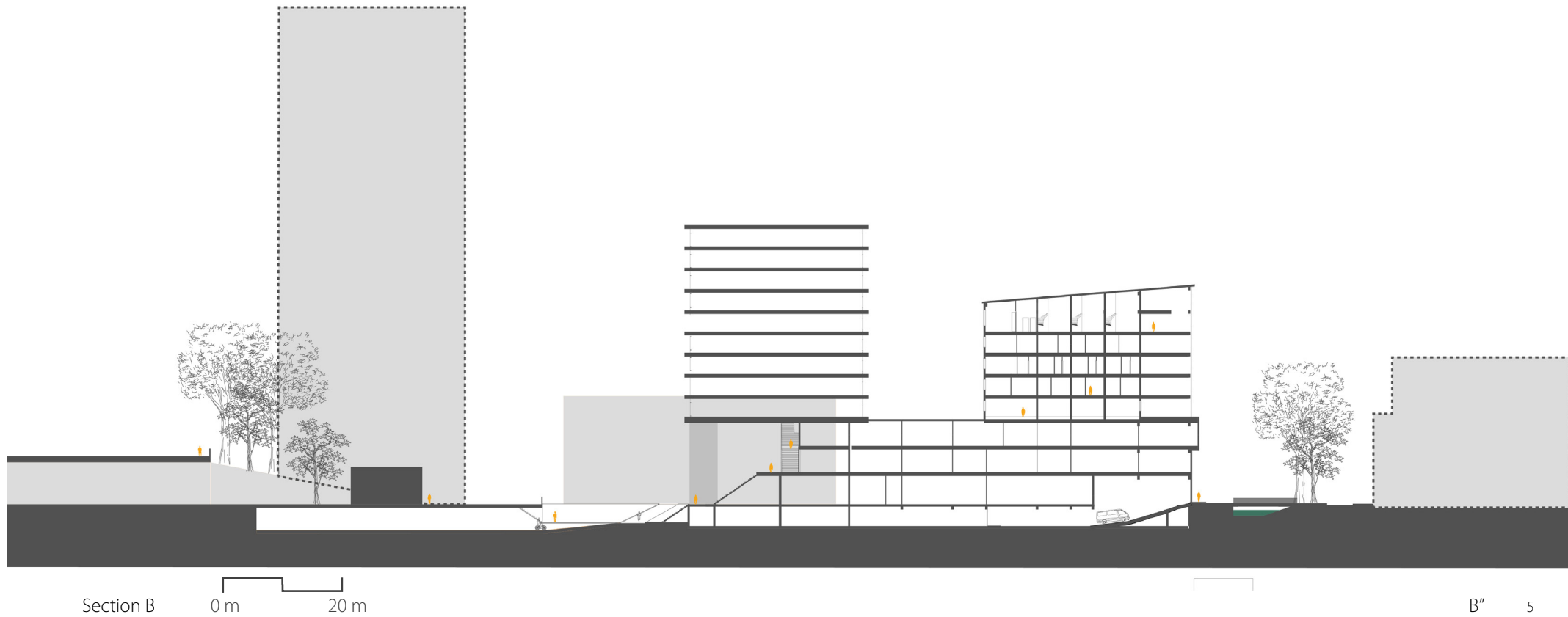
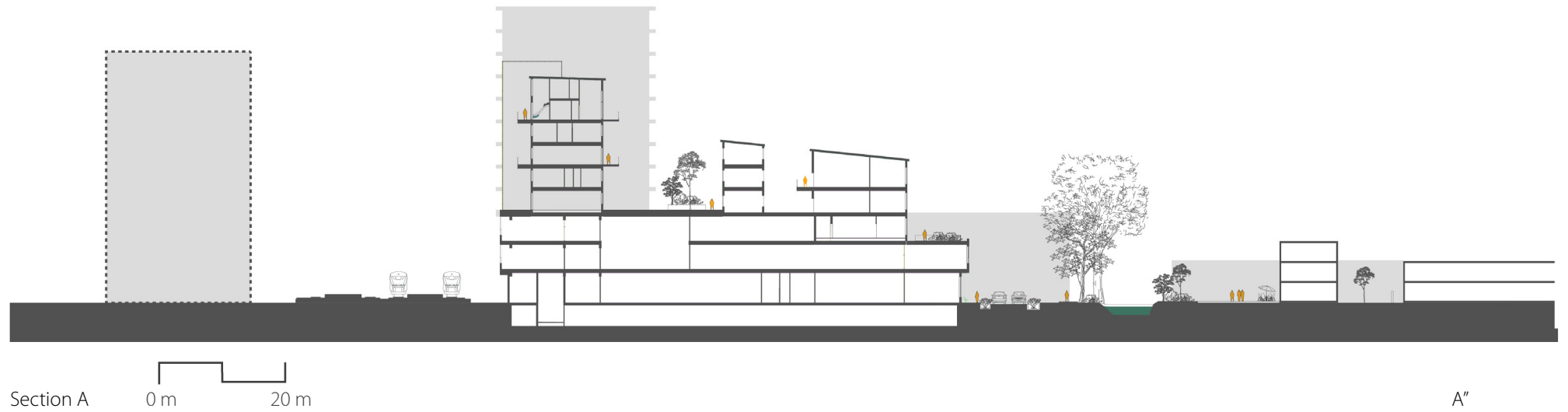
This architectural site plan illustrates a residential development layout. The central focus is a large rectangular building complex divided into numerous individual residential units, each accompanied by a designated parking space. To the left of this central block is a large, open parking area with several rows of parking spaces. The plan is bordered by a road on the right, which features a tram or light rail track. Landscaping is indicated by various tree and shrub symbols throughout the site. Section lines A-A' and B-B' are marked with dashed lines and arrows. A scale bar in the bottom right corner indicates a distance of 0m to 40m, and a north arrow is also present.



0m

40m

## Area sections

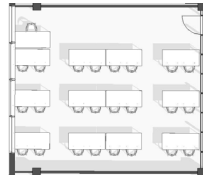




## School capacity

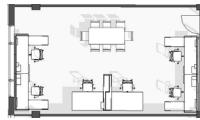
School has a total area of 9500 m<sup>2</sup>, based on reference projects student capacity is: 800

14 class rooms: +/- 80 m<sup>2</sup> +/- 24 students



class room capacity : 336 students

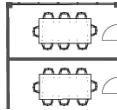
7 offices: +/- 50 m<sup>2</sup> +/- 6 staff members



Office capacity: 42 staff members

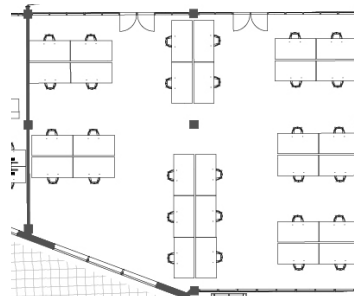
7 meeting rooms: 14 - 50 m<sup>2</sup> 8 - 20 people

meeting room capacity: 68 people



2 study areas: 315 m<sup>2</sup> 170 students

Study area capacity: 170 students



Workplaces: Robotica 180 m<sup>2</sup>

Building technology: 460 m<sup>2</sup>

Mechanical engineering: 360 m<sup>2</sup>

Automotive: 360 m<sup>2</sup>

Total workplaces: 1360 m<sup>2</sup> roughly equals 200 students

## Dwellings, size & typology

The building has multiple dwelling typologies. The aim was to create typologies that are missing in the post war neighbourhood, such as elderly and family housing. In combination with dwellings for starters, which are in high demand in the neighbourhood.

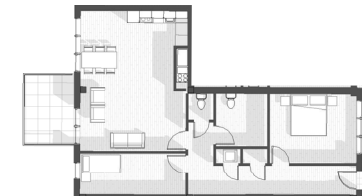
Starters: - Loft: 3x 75 m<sup>2</sup>



- Two bedroom: 11 x 75 m<sup>2</sup>



Elderly: - Two bedroom: 6 x 85 m<sup>2</sup>



Family: - Maisonette, three bedroom: 6 x 100 m<sup>2</sup>

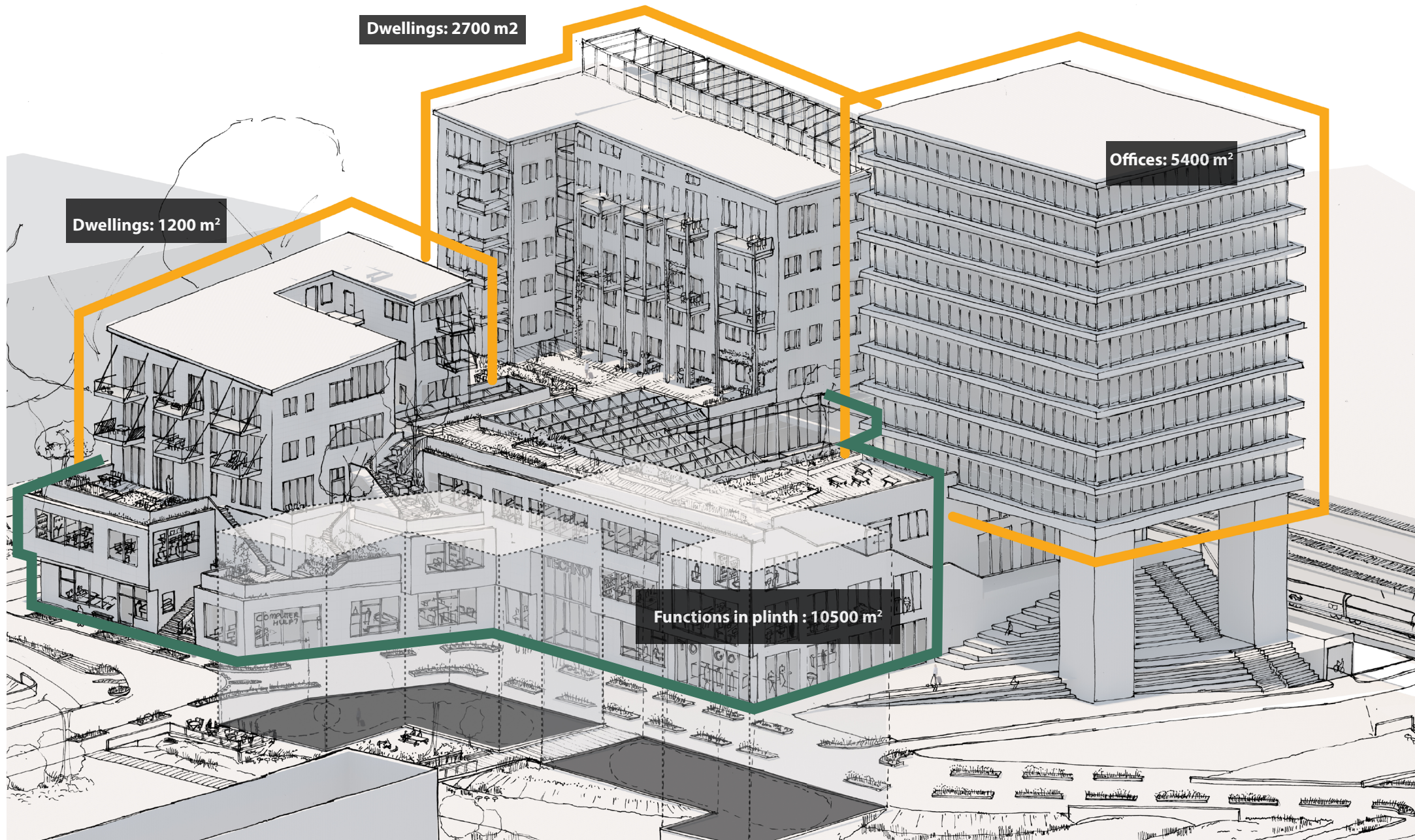


- Maisonette, three bedroom 2 x 140 m<sup>2</sup>

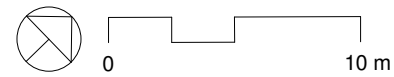
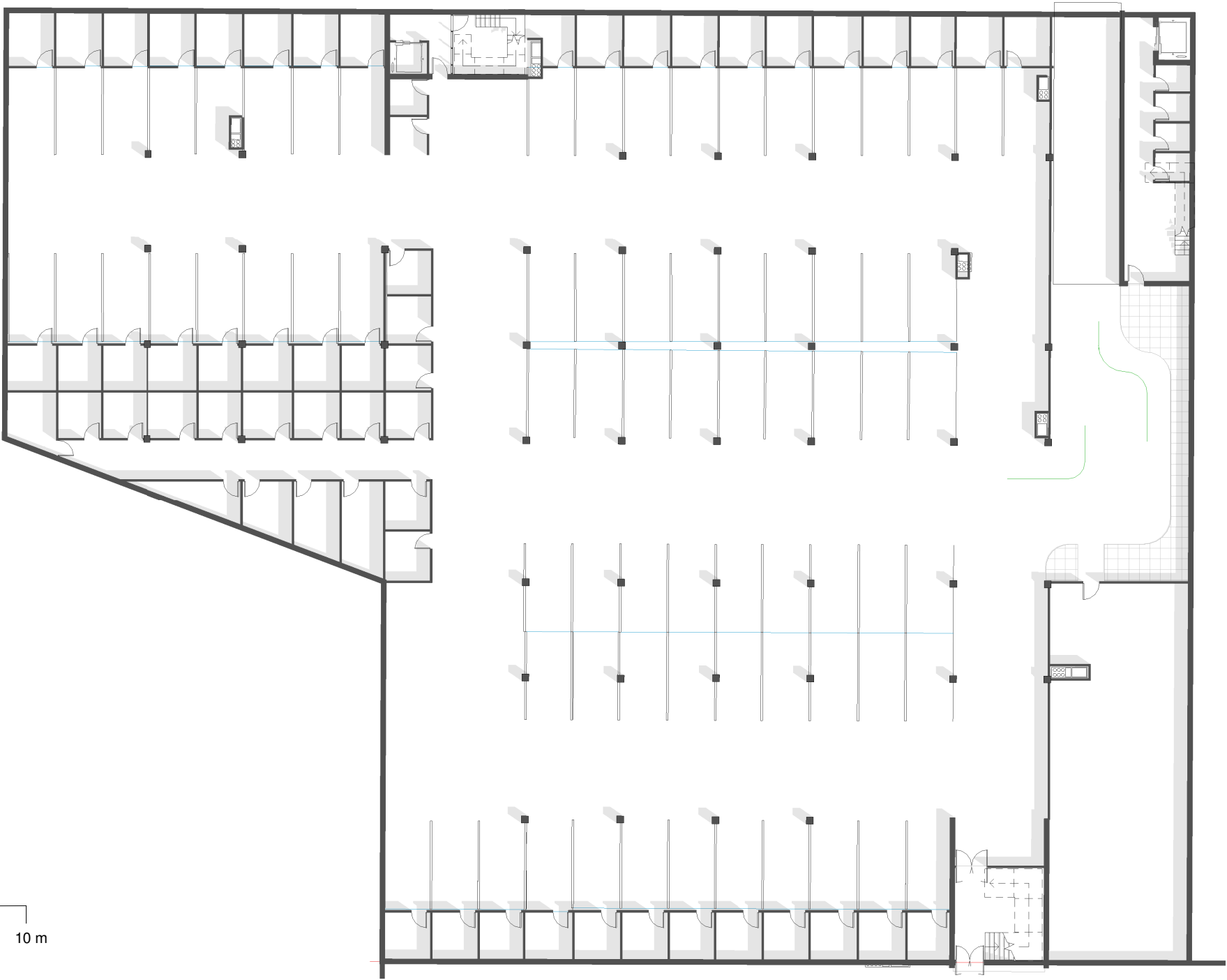
Total amount of rentable floorspace: 2440 m<sup>2</sup>

## Gross area

Gross area of the building is 19.800 m<sup>2</sup>

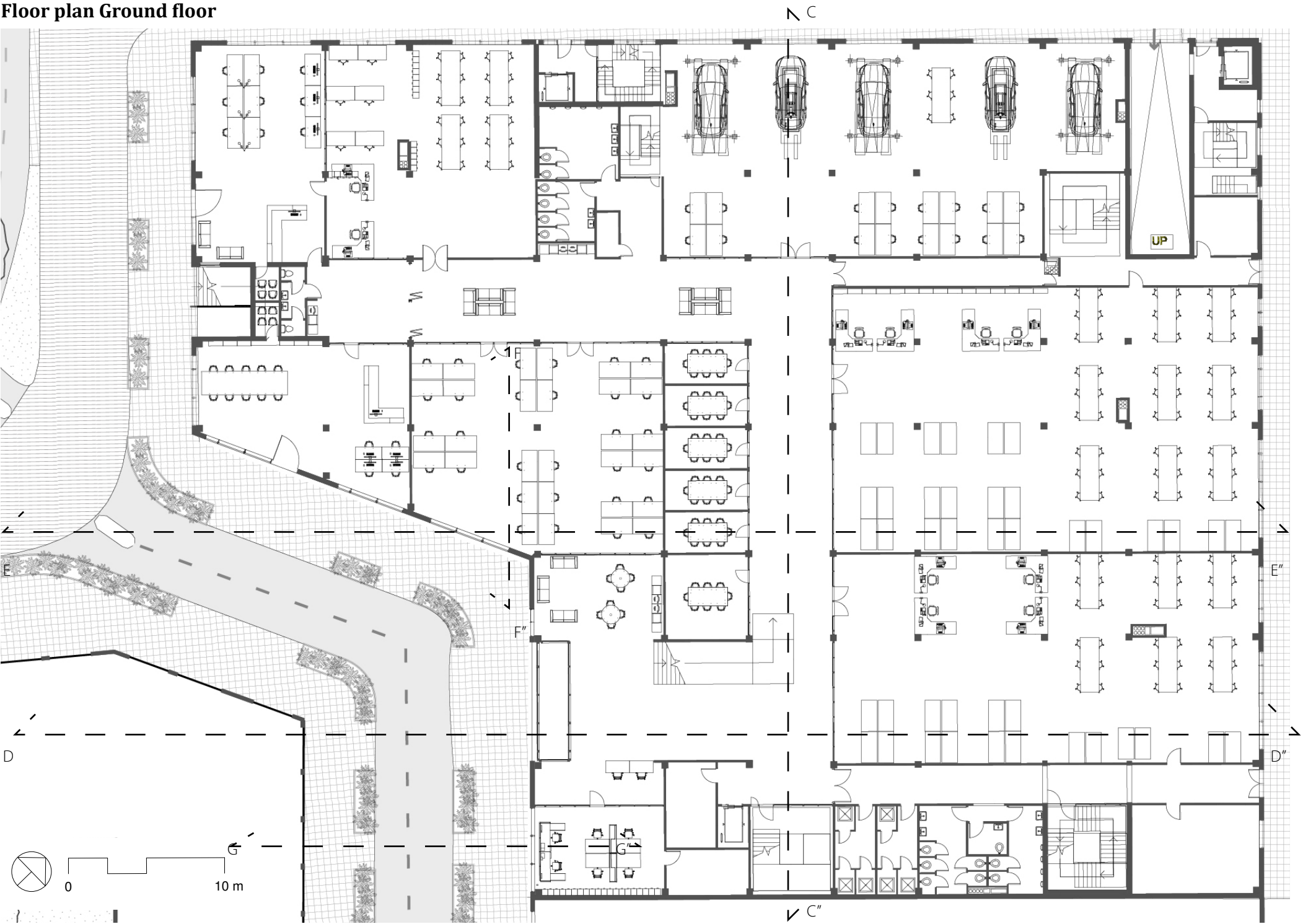


Floor plan level -1

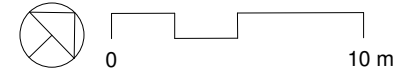
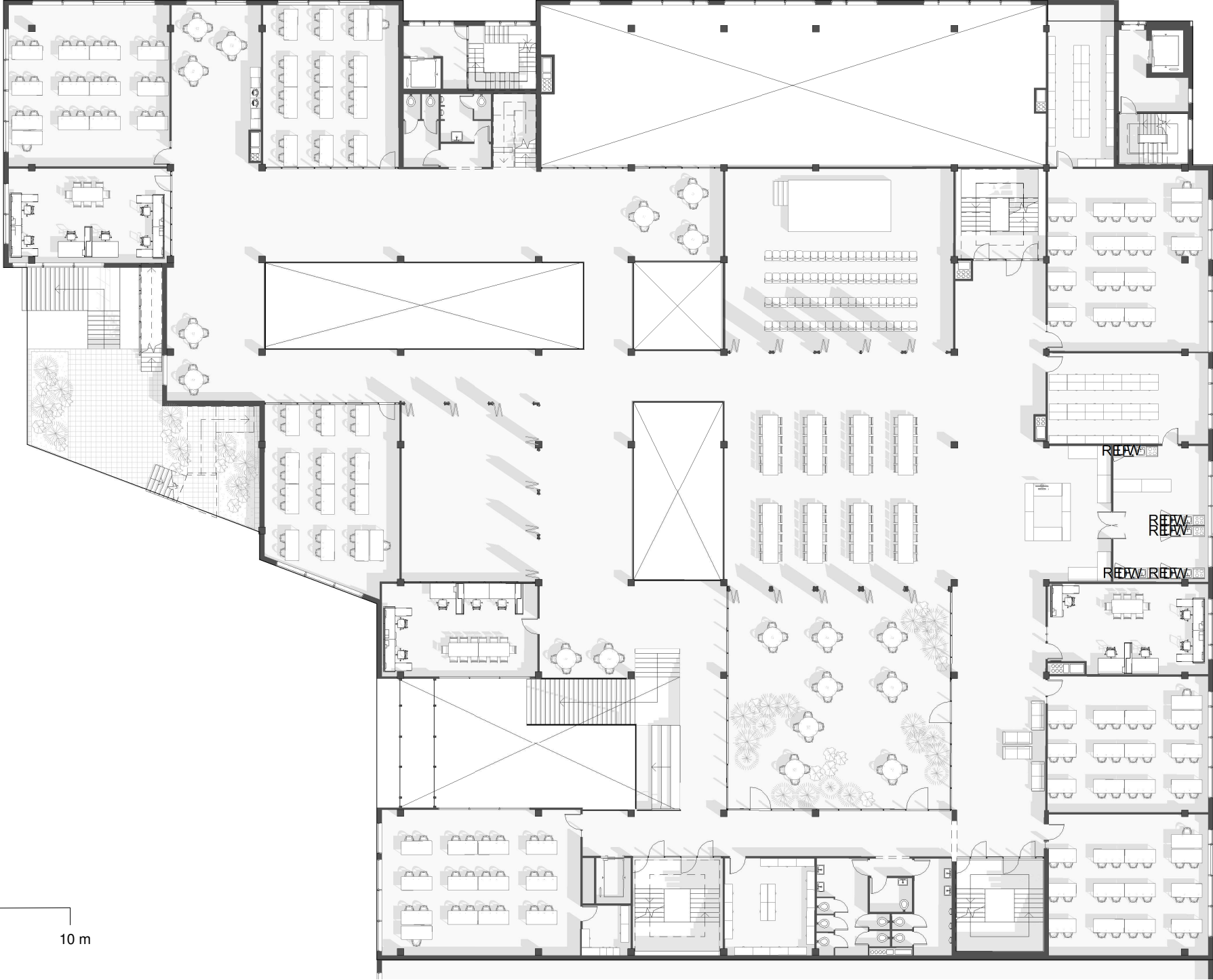




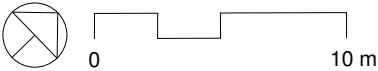
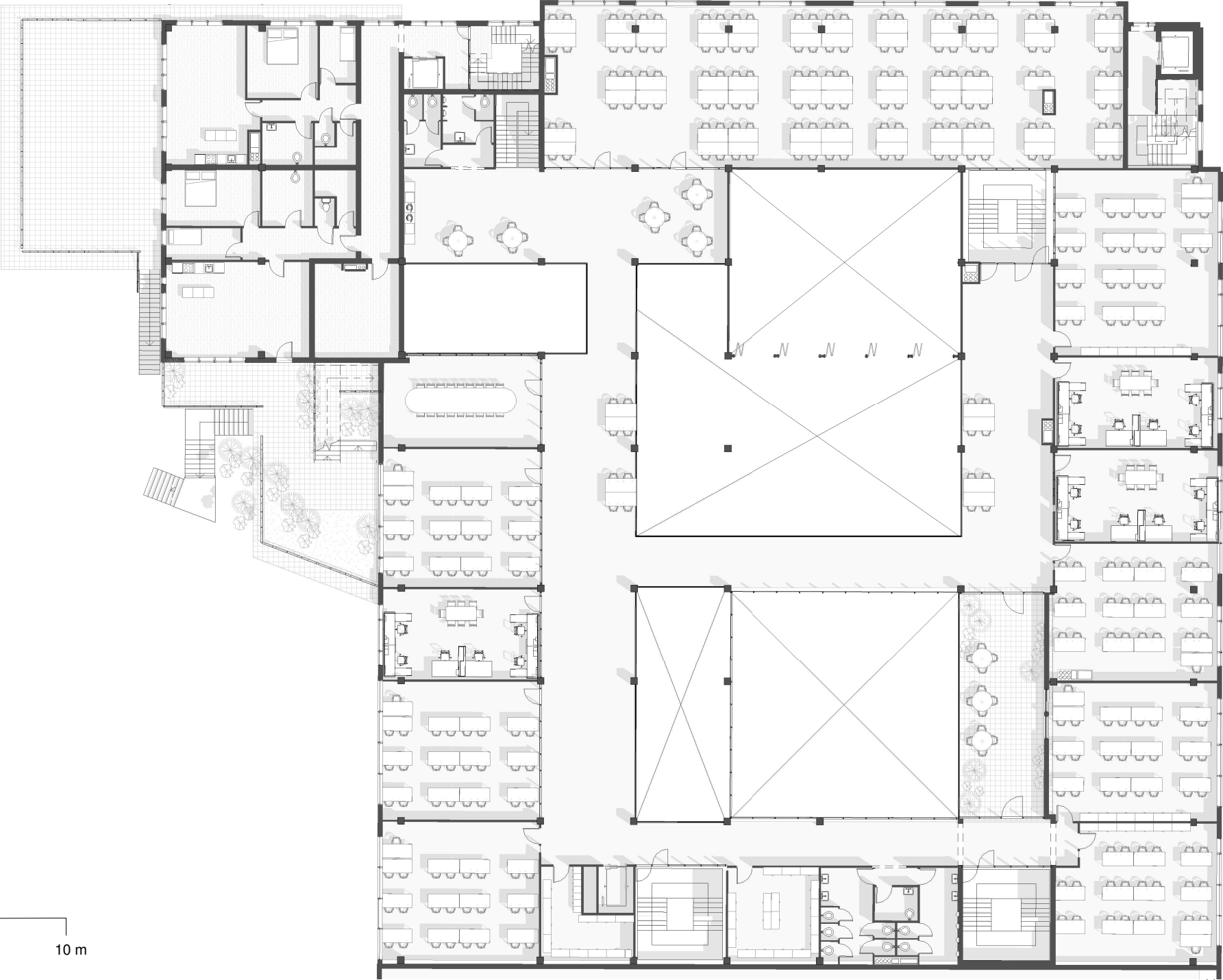
Floor plan Ground floor



Floor plan level 2

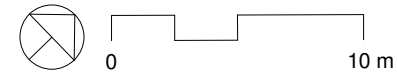


Floor plan level 3





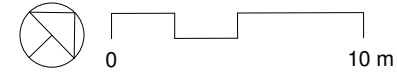
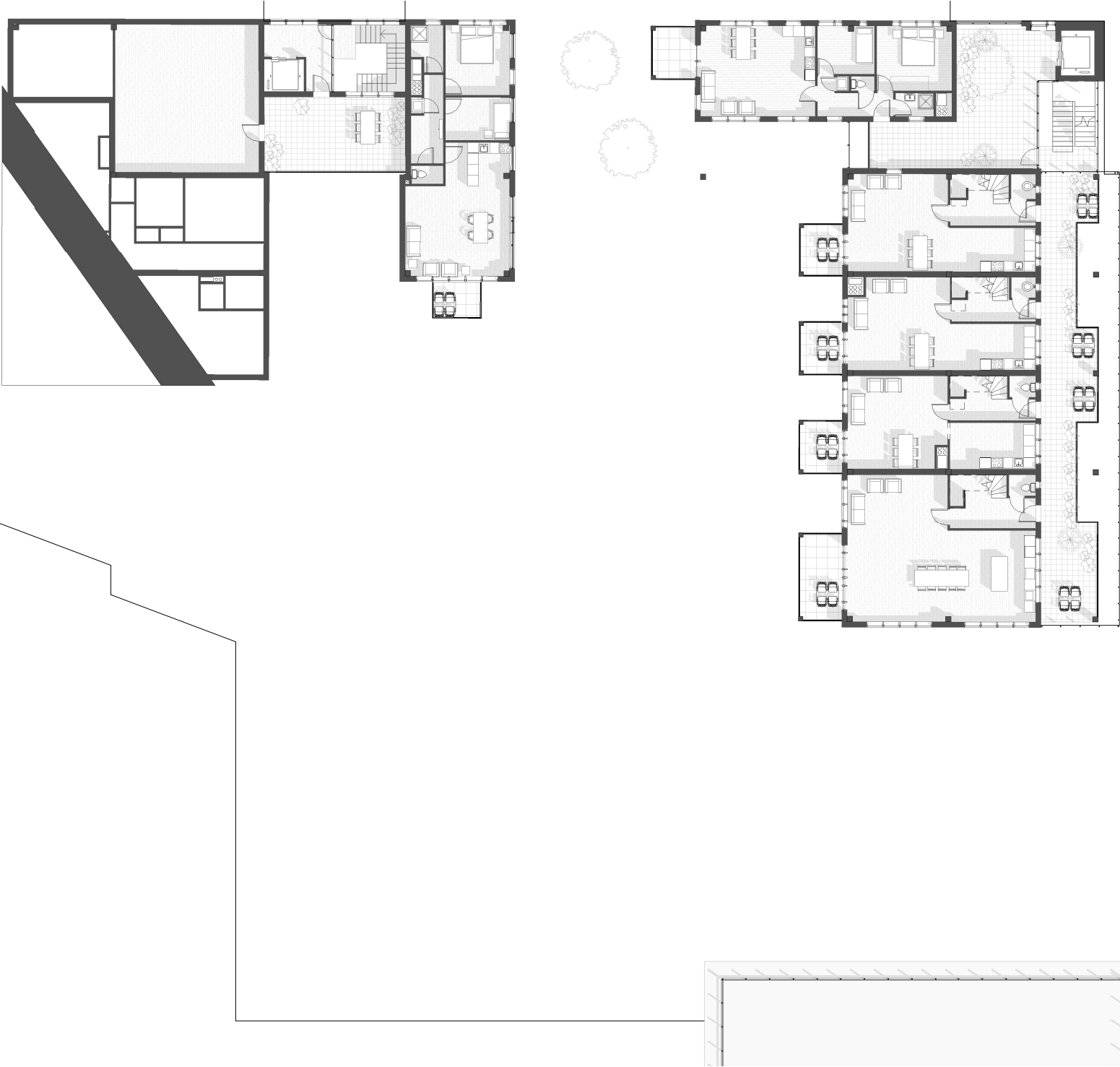
Floor plan level 4



Floor plan level 5



Floor plan level 6

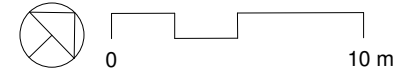




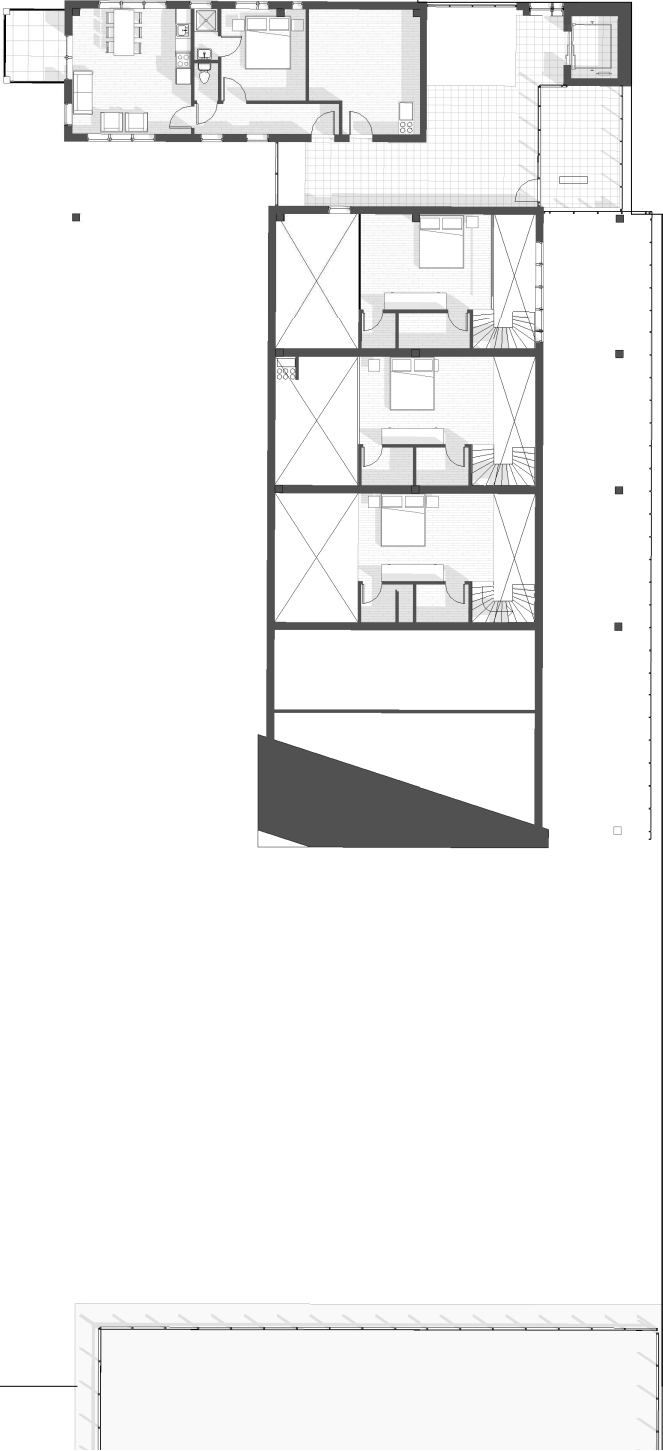
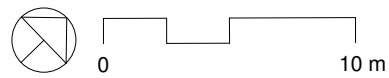
Floor plan level 7



Floor plan level 8

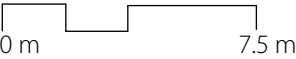


Floor plan level 9



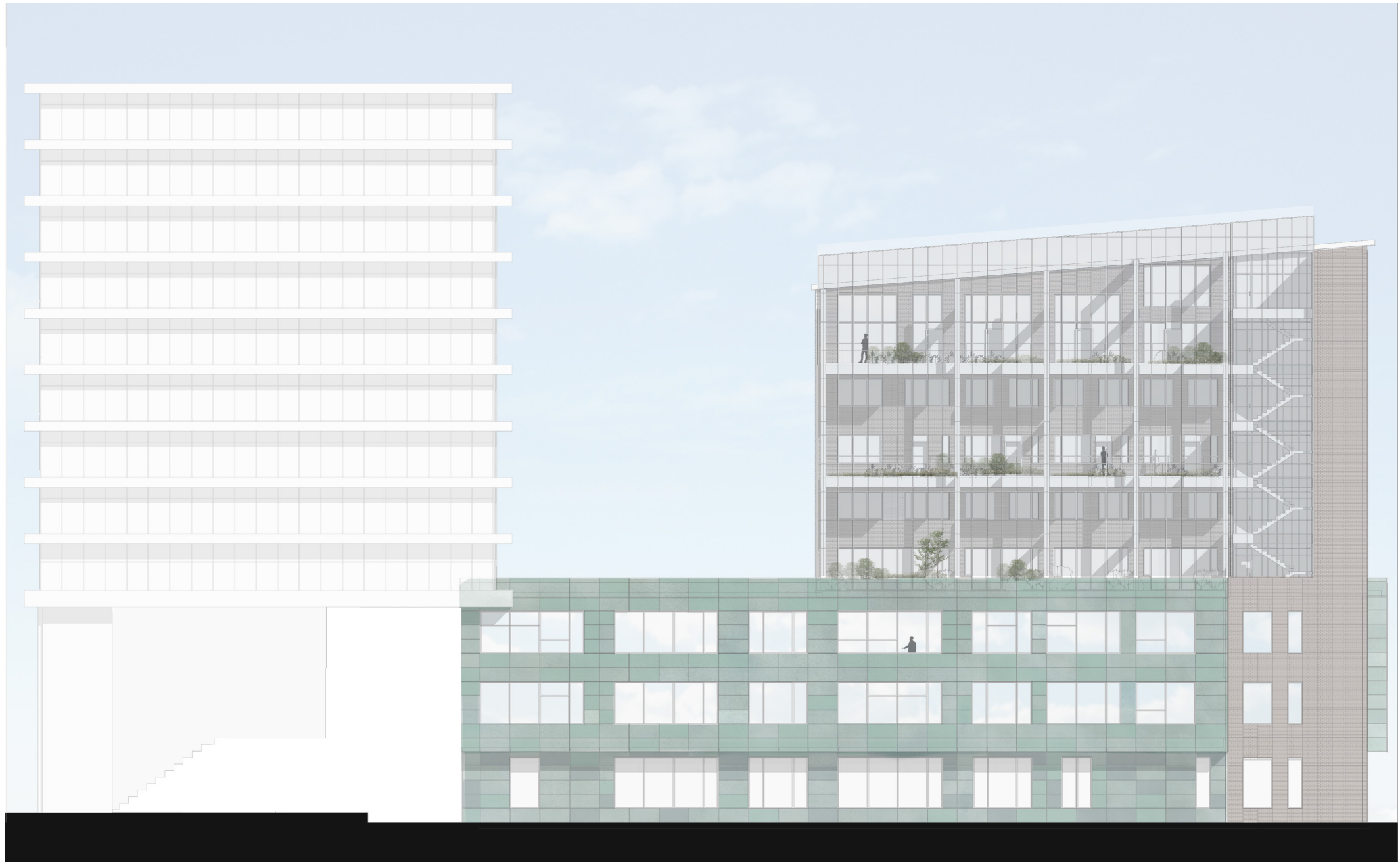


Elevation West

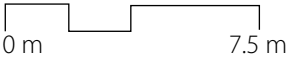


# Elevation East

0 m 7.5 m

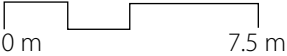


Elevation South



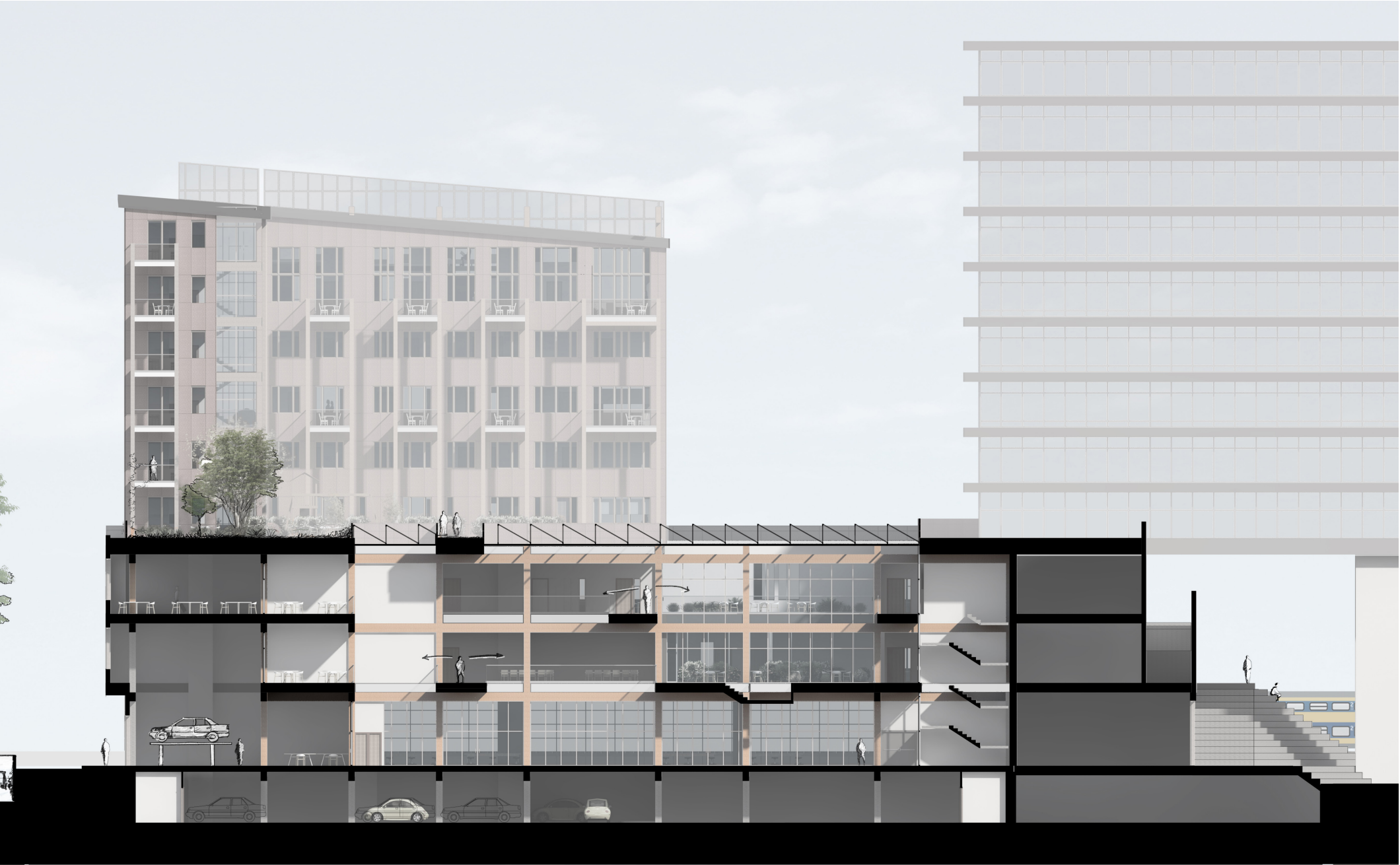
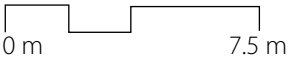


Elevation North



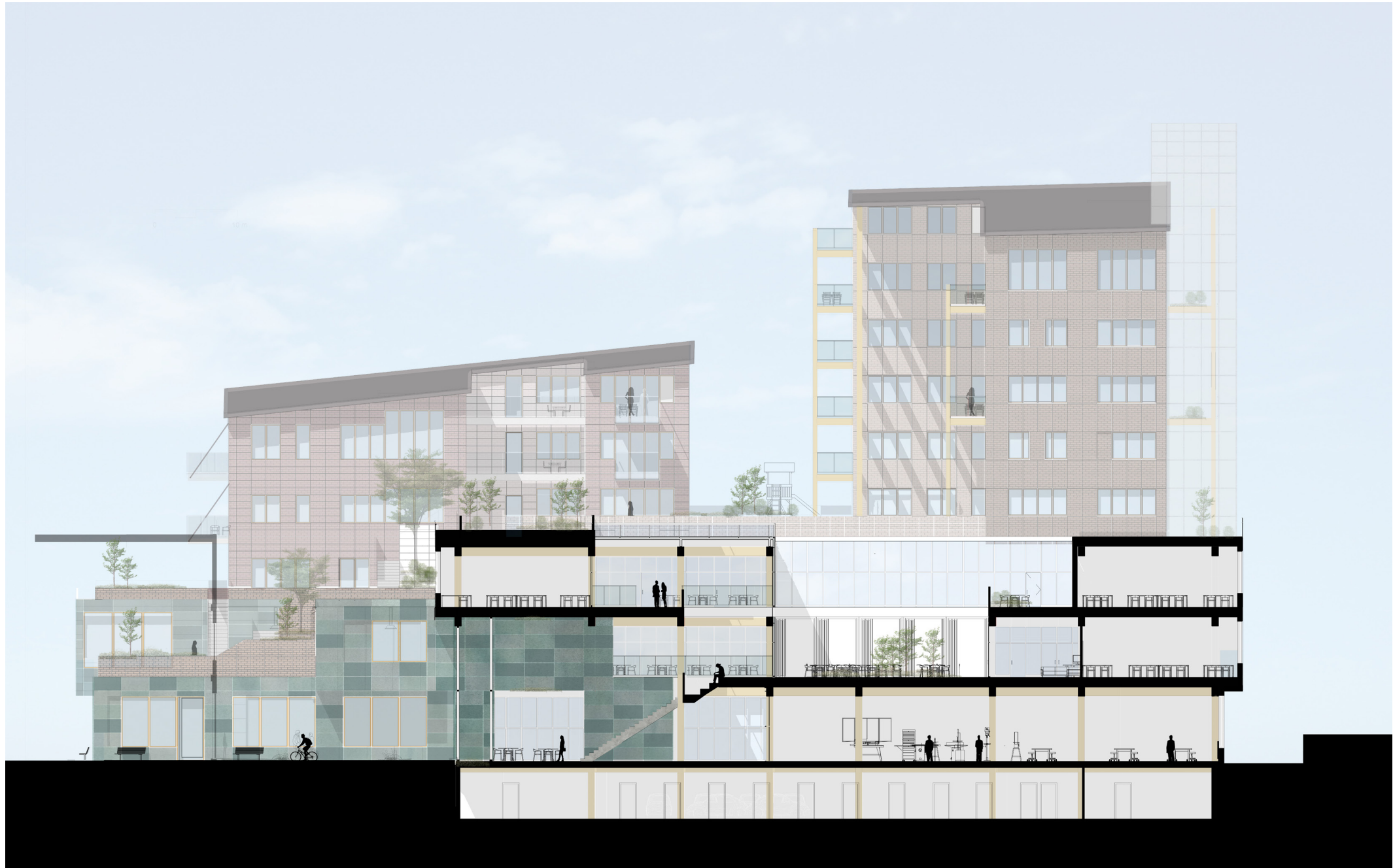


Section C



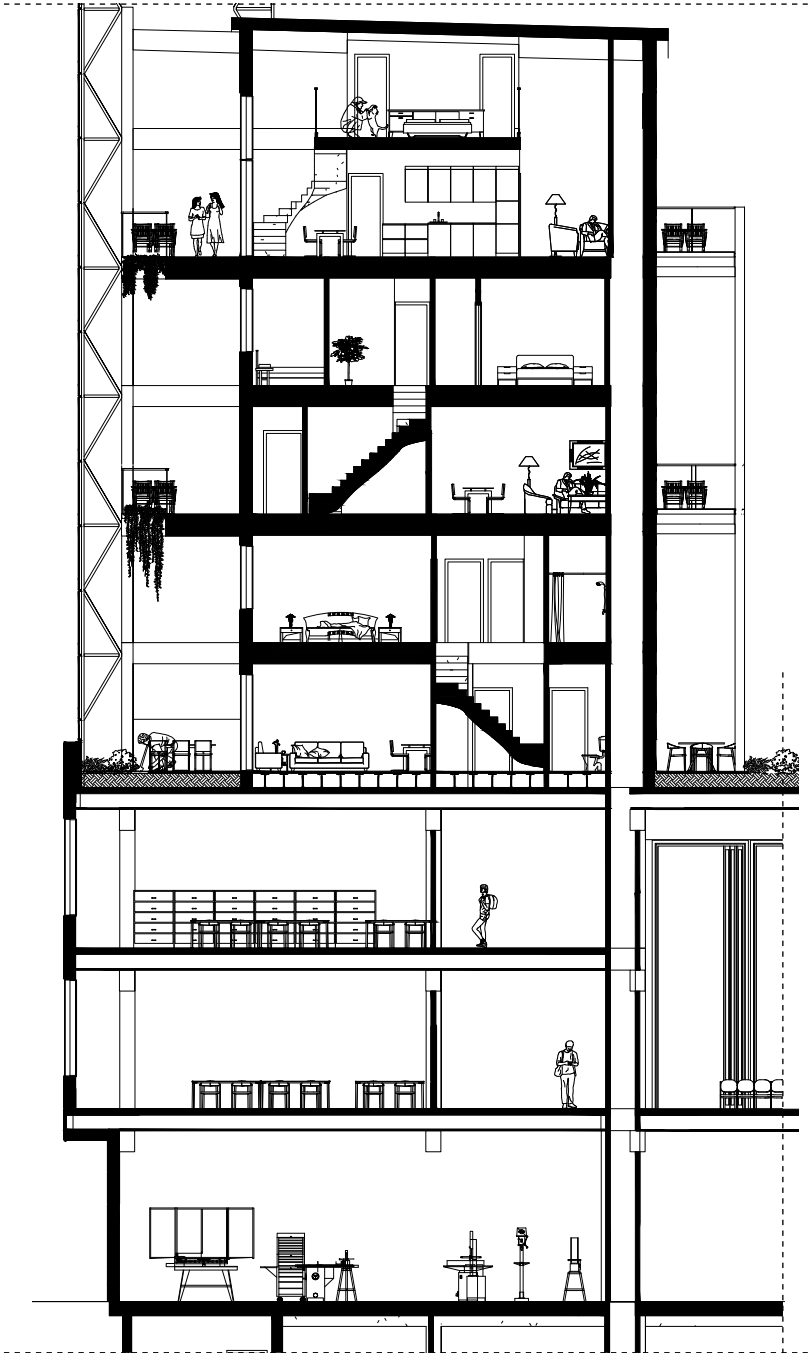
## Section D

0 m 7.5 m



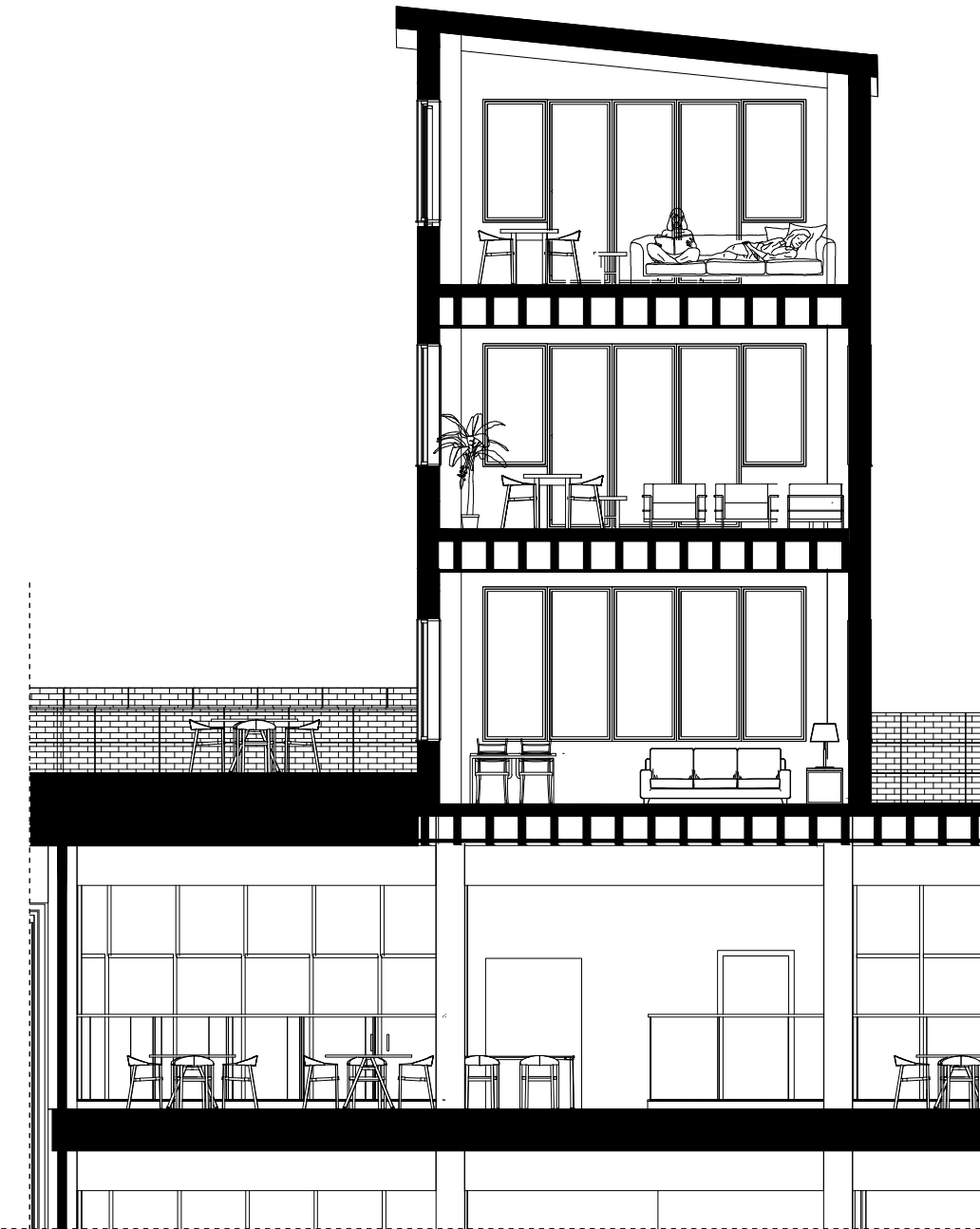
Detail of section A

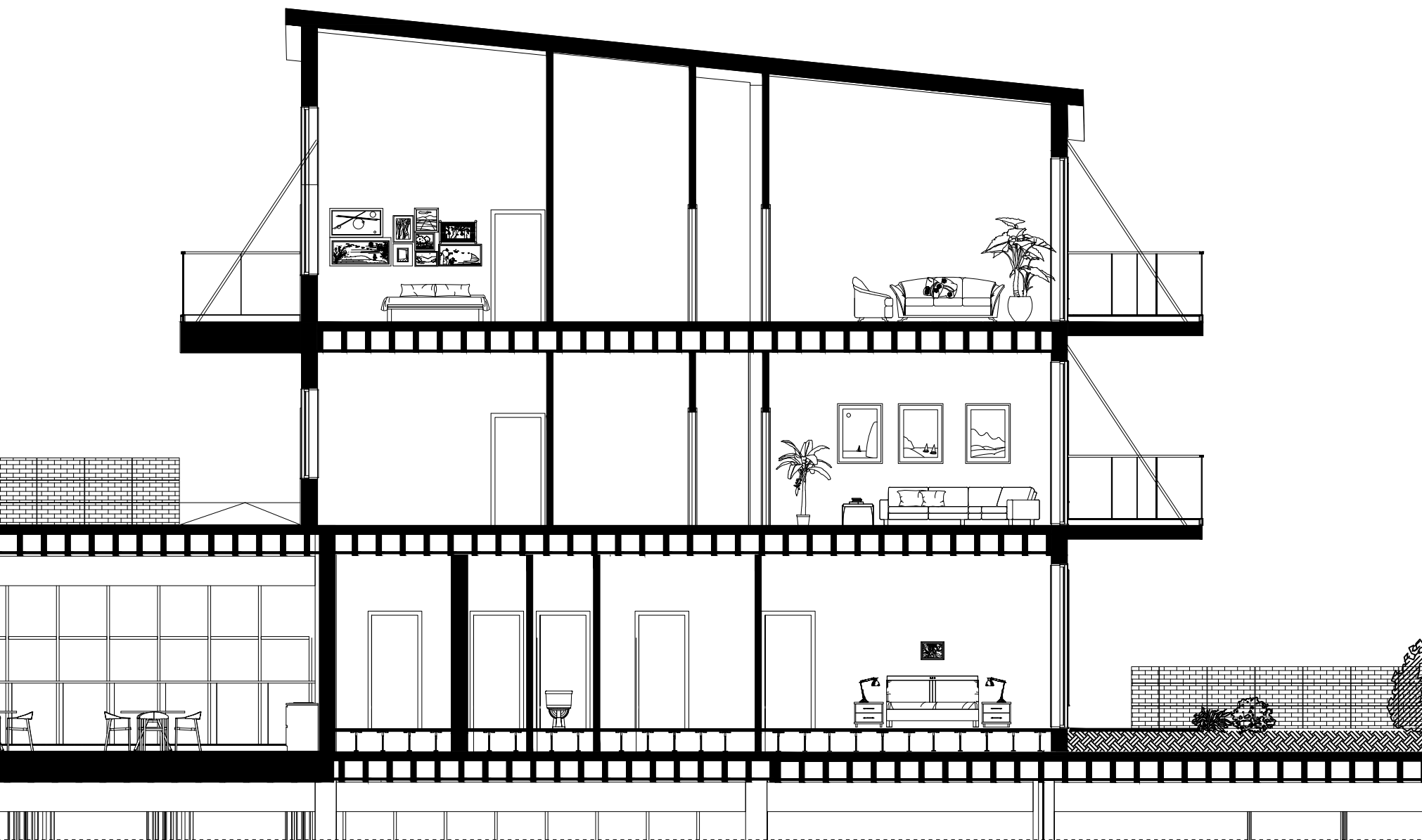
0 m 3 m



Detail of section A

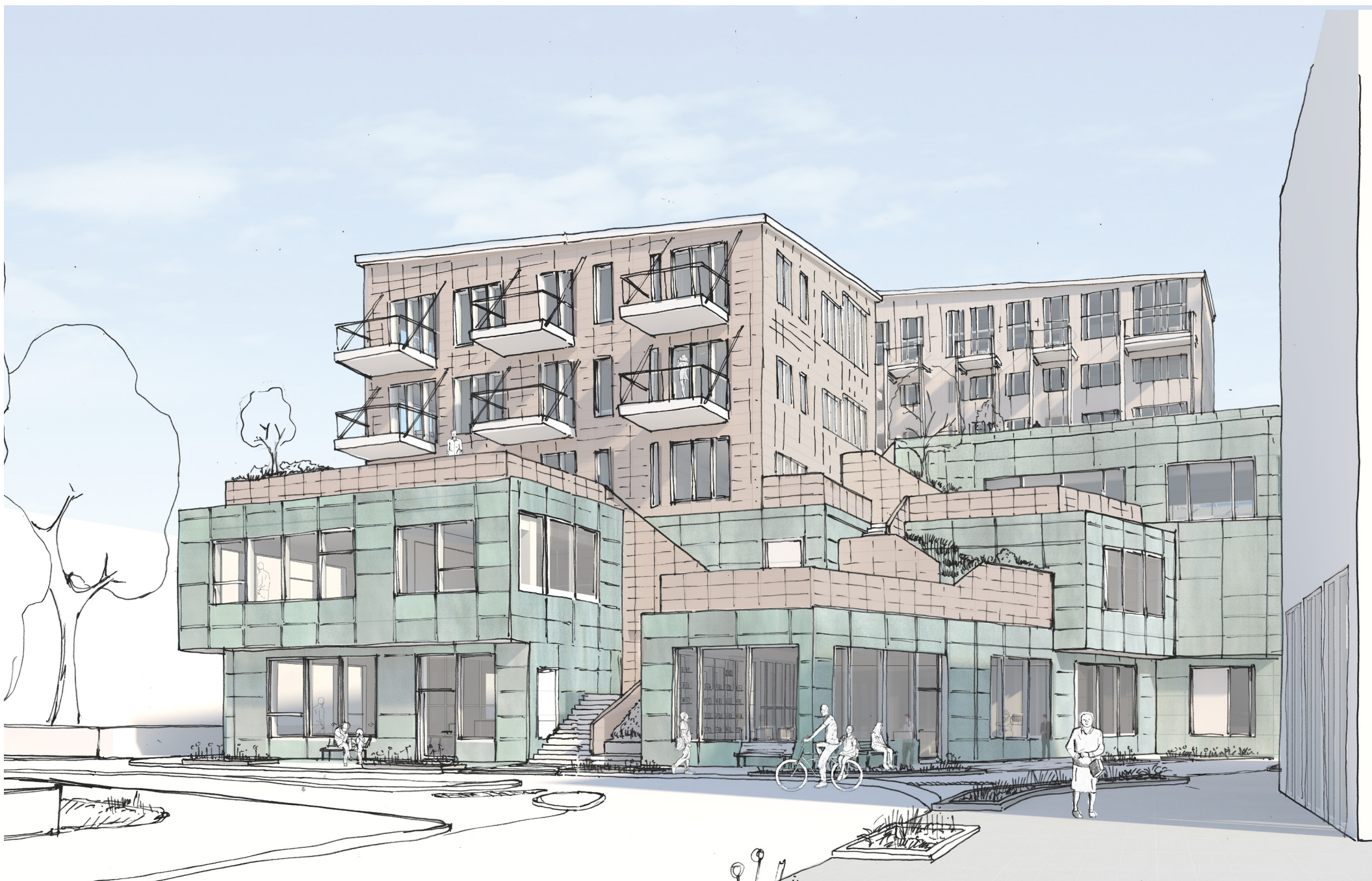
0 m 2 m





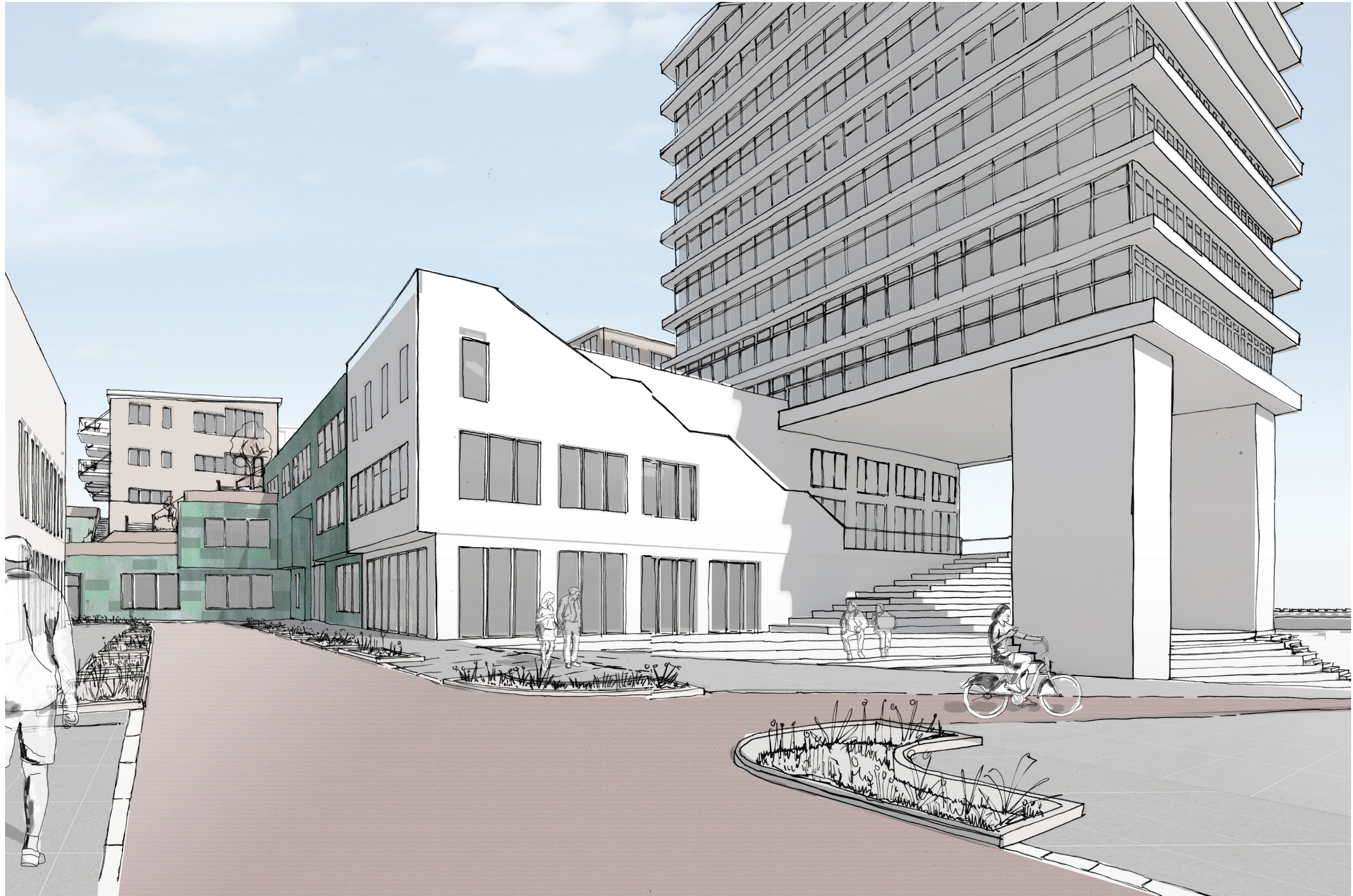


View from van Eedenlaan





View from Marcellus Emantspad





## Public square on higher level



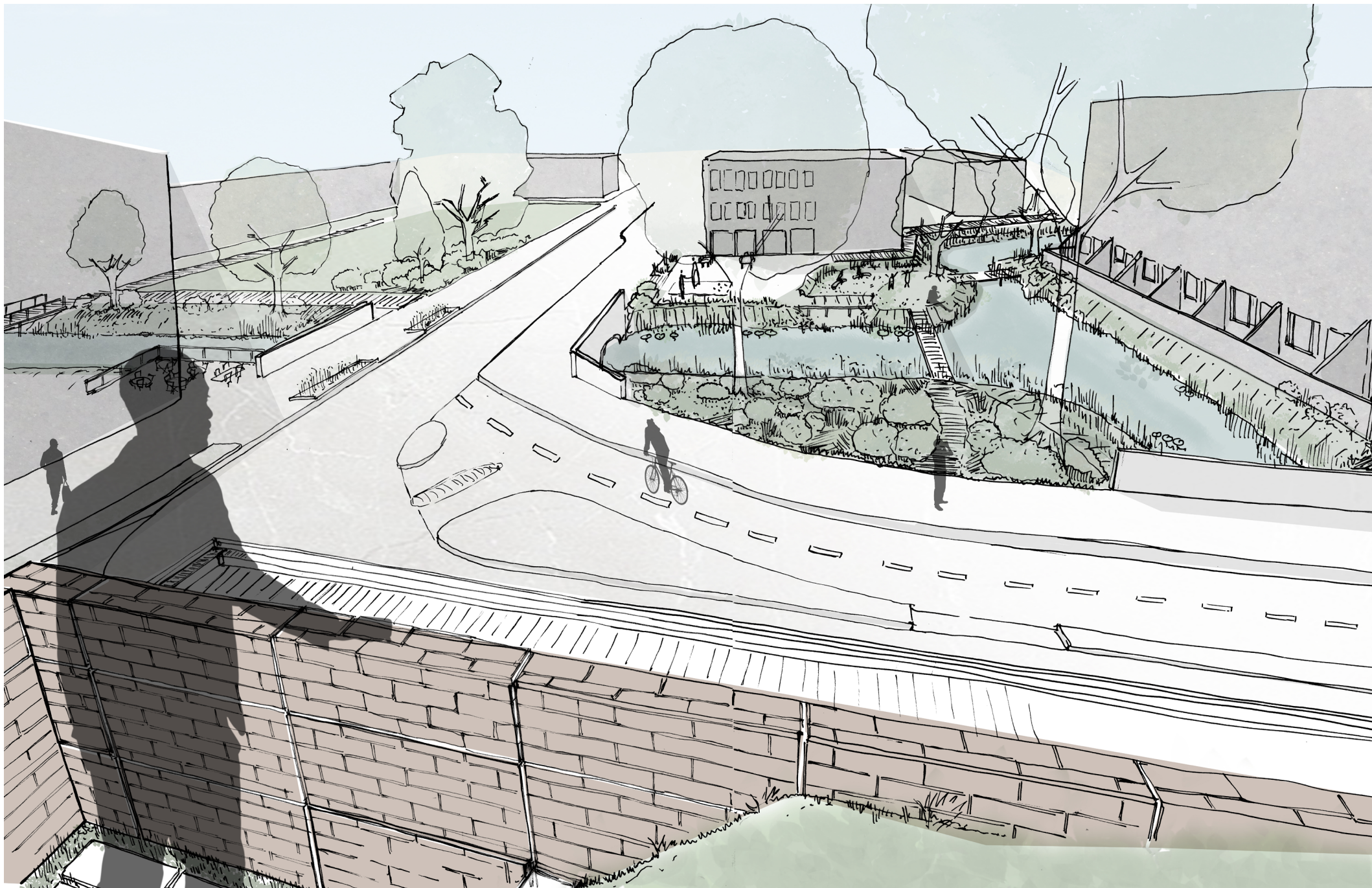


View from vulcanusweg





View on Vulcanusweg





## Interior of IT Helpdesk



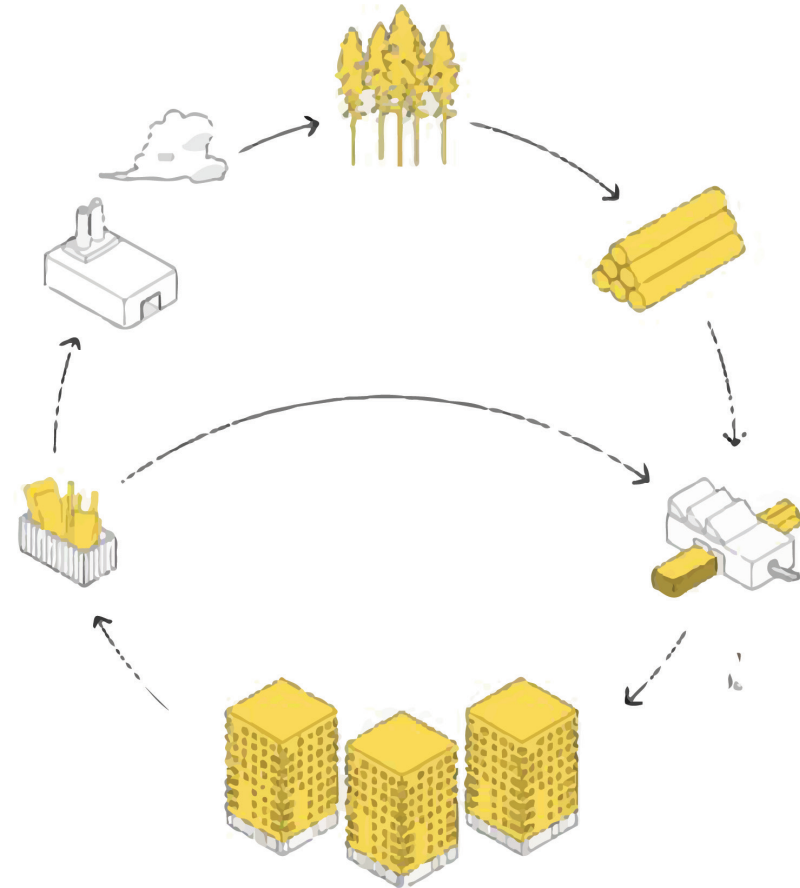
## Benefits of Cross Laminated Timber construction

**Sustainability.** Constructions using wood from sustainable managed forests, CLT provides a number of environmental benefits in addition to its excellent thermal performance. Wood is the only major building material that grows naturally and is renewable, and life cycle assessment studies consistently show that wood outperforms steel and concrete in terms of embodied energy, air pollution and water pollution. It also has a lighter carbon footprint—because wood products continue to store carbon absorbed by the trees while growing, and wood manufacturing requires less energy and results in less greenhouse gas emissions. In addition CLT panels are manufactured for specific end use applications, which results in little to no job site waste. Plus, manufacturers can reuse fabrication scraps for stairs and other architectural elements, or as biofuel.

**Innovation.** Manufacturers use CNC equipment to cut panels and openings to exact specifications, often to meet very tight tolerances (within millimeters)

**Installation speed.** Because panels are prefabricated, erection time is greatly reduced, which improves efficiency and results in lower capital costs and faster occupancy. Wall, floor and roof elements can be pre-cut, including openings for doors, windows, stairs, service channels and ducts. Insulation and finishes can also be applied prior to installation, reducing demand for skilled workers on site. The faster installation cuts cost in the building process, reducing cost .

**Design flexibility.** It is relatively easy to increase the thickness of a CLT panel to allow for longer spans requiring fewer interior support elements. . Plus, when field modifications are needed, they can be made with simple tools. By being adjustable the building has a longer life span.



## Prefab elements

Prefab elements, beams and columns, are connected on site by dry connection elements. This reduces construction time and costs.

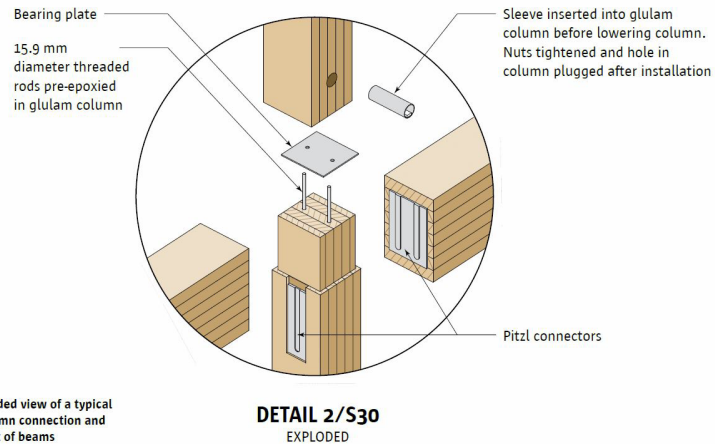
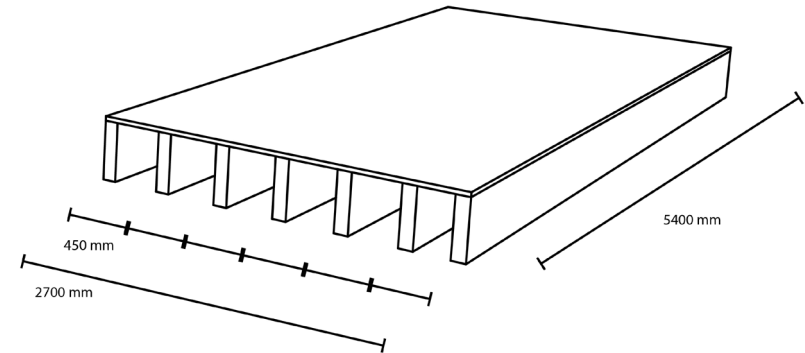


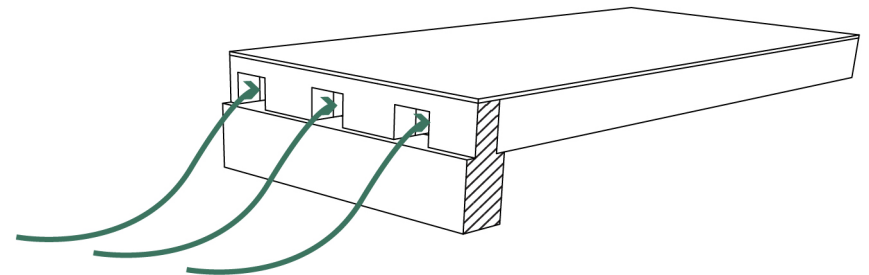
Figure 3: Exploded view of a typical column-to-column connection and the attachment of beams

## Floor construction

The floor construction is made by a secondary beam system, beam 100 x 400 mm. The space between the secondary beams is used as a plenum ventilation system.

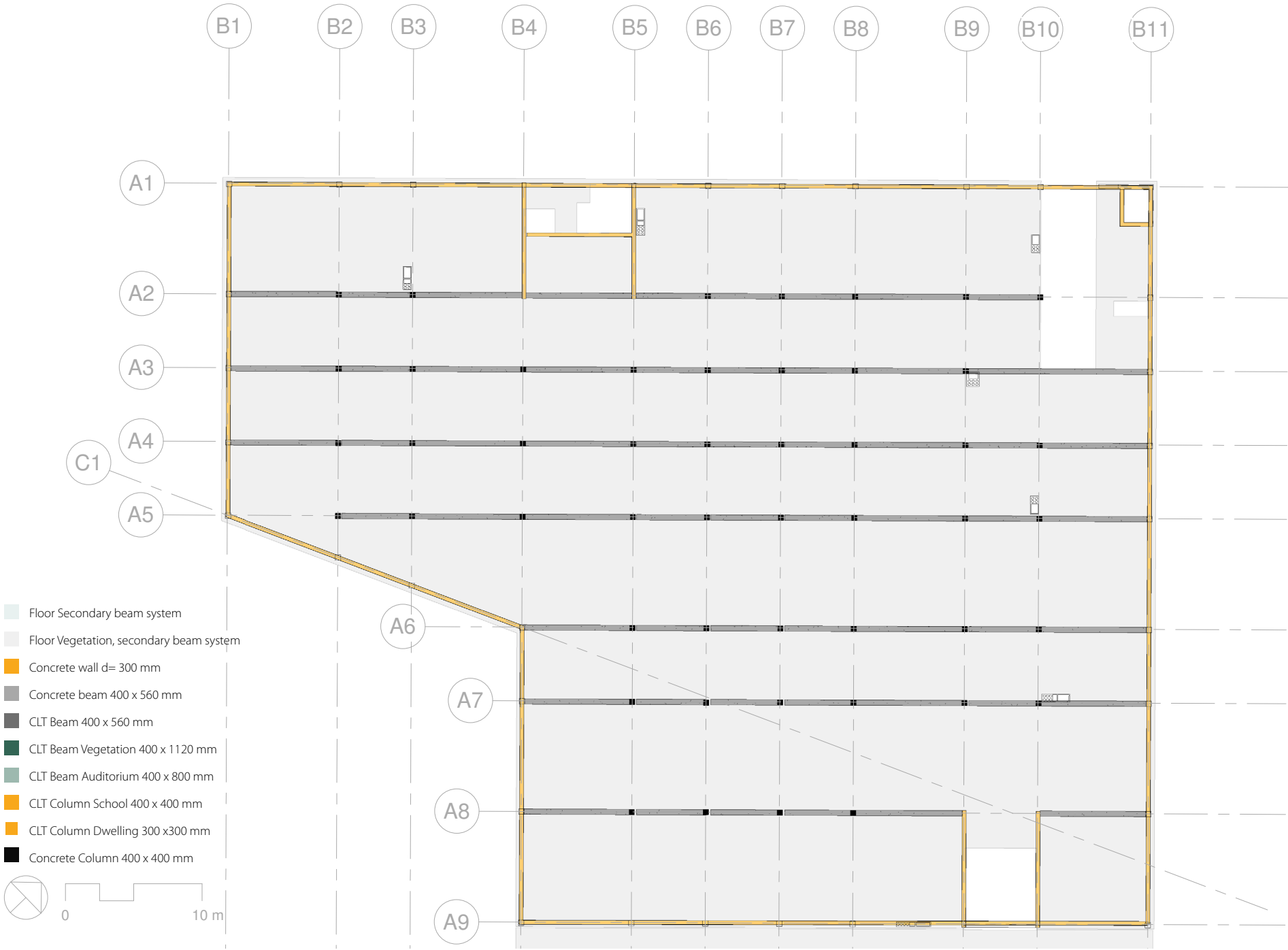


Enlarged beams, needed to carry the vegetation on the terraces, are perforated to create the airflow needed for the plenum ventilation system.

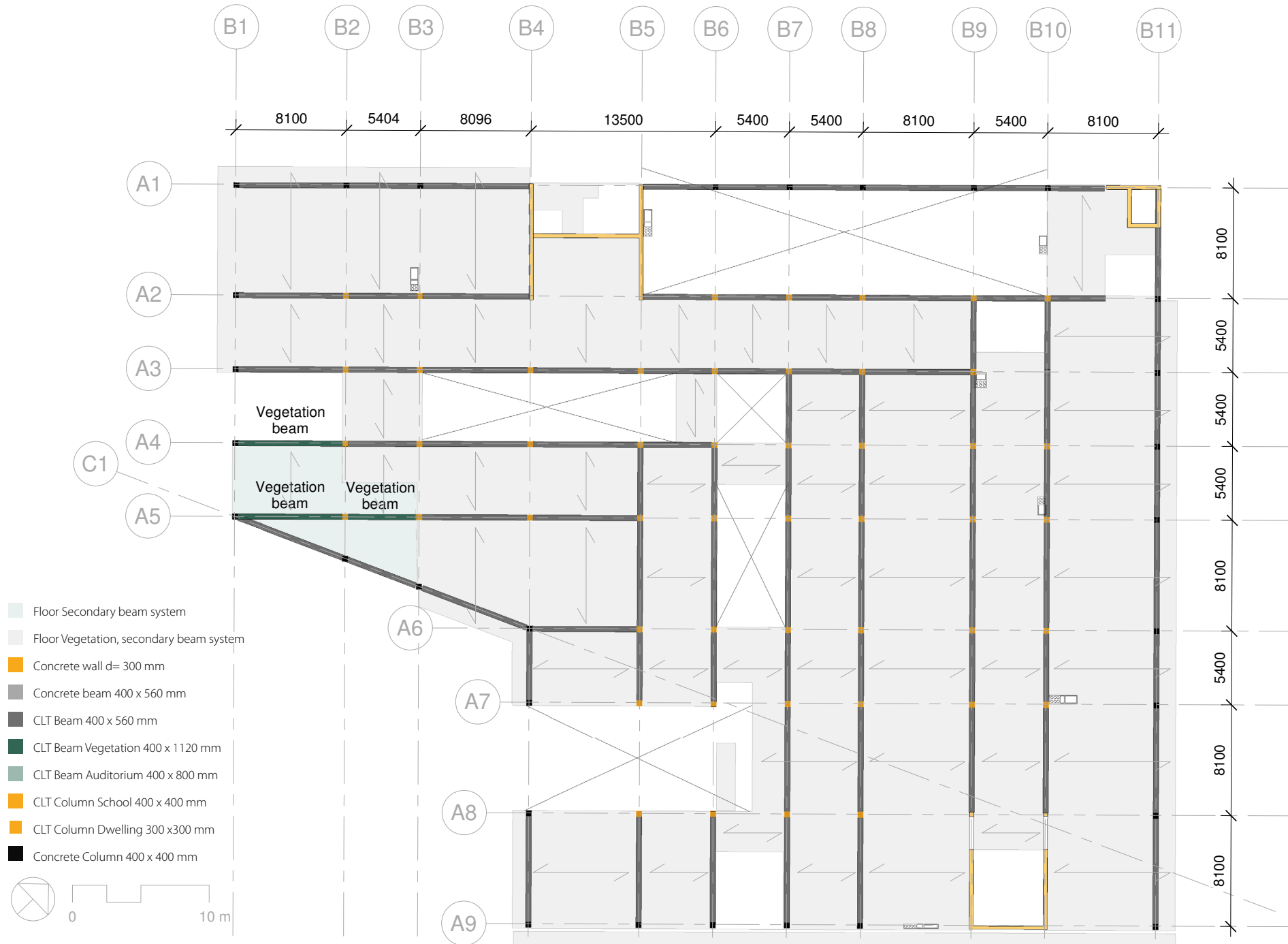




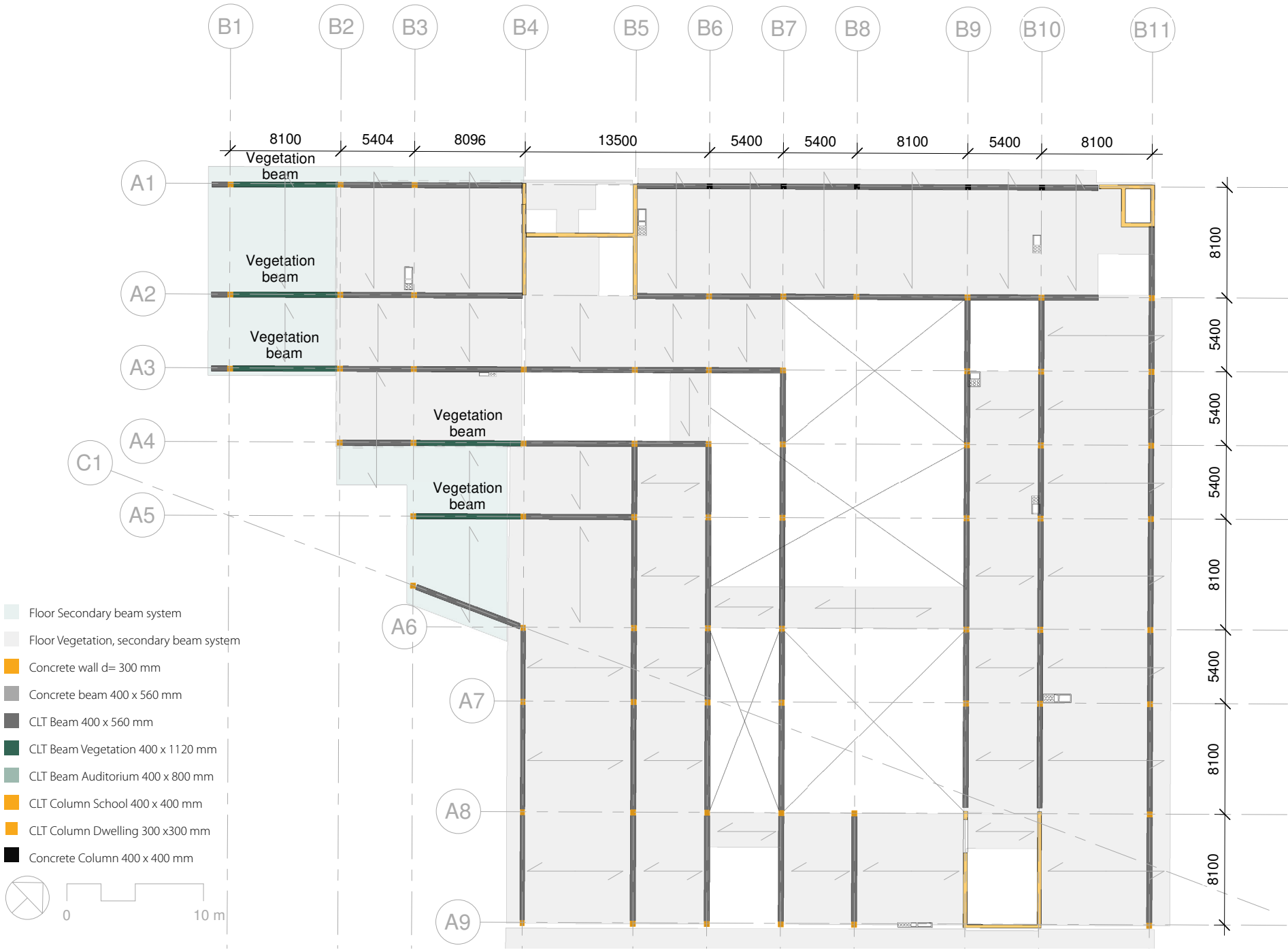
Construction floor plan level -1



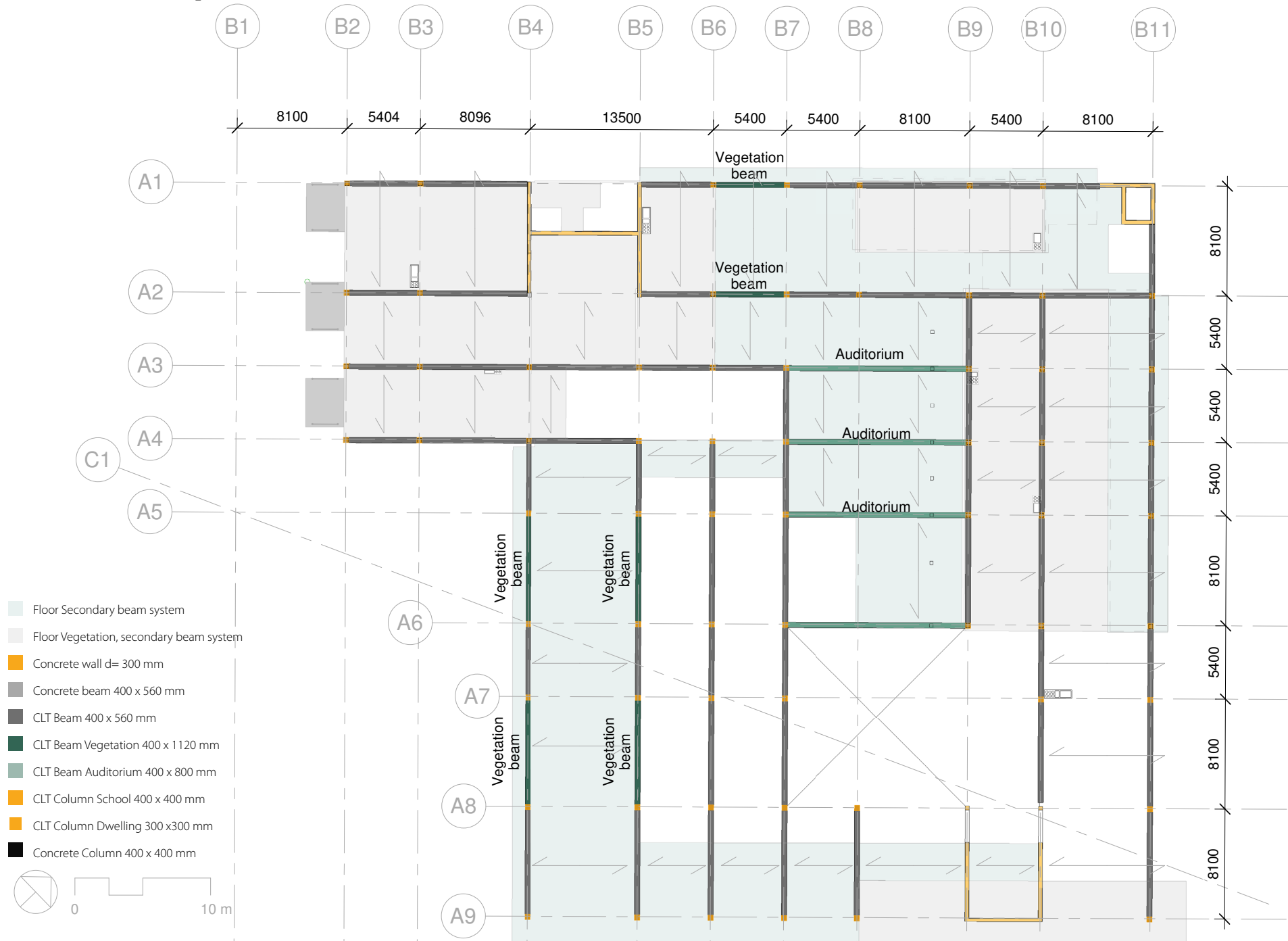
## Construction floor plan level 1 (GF)



Construction floor plan level 2

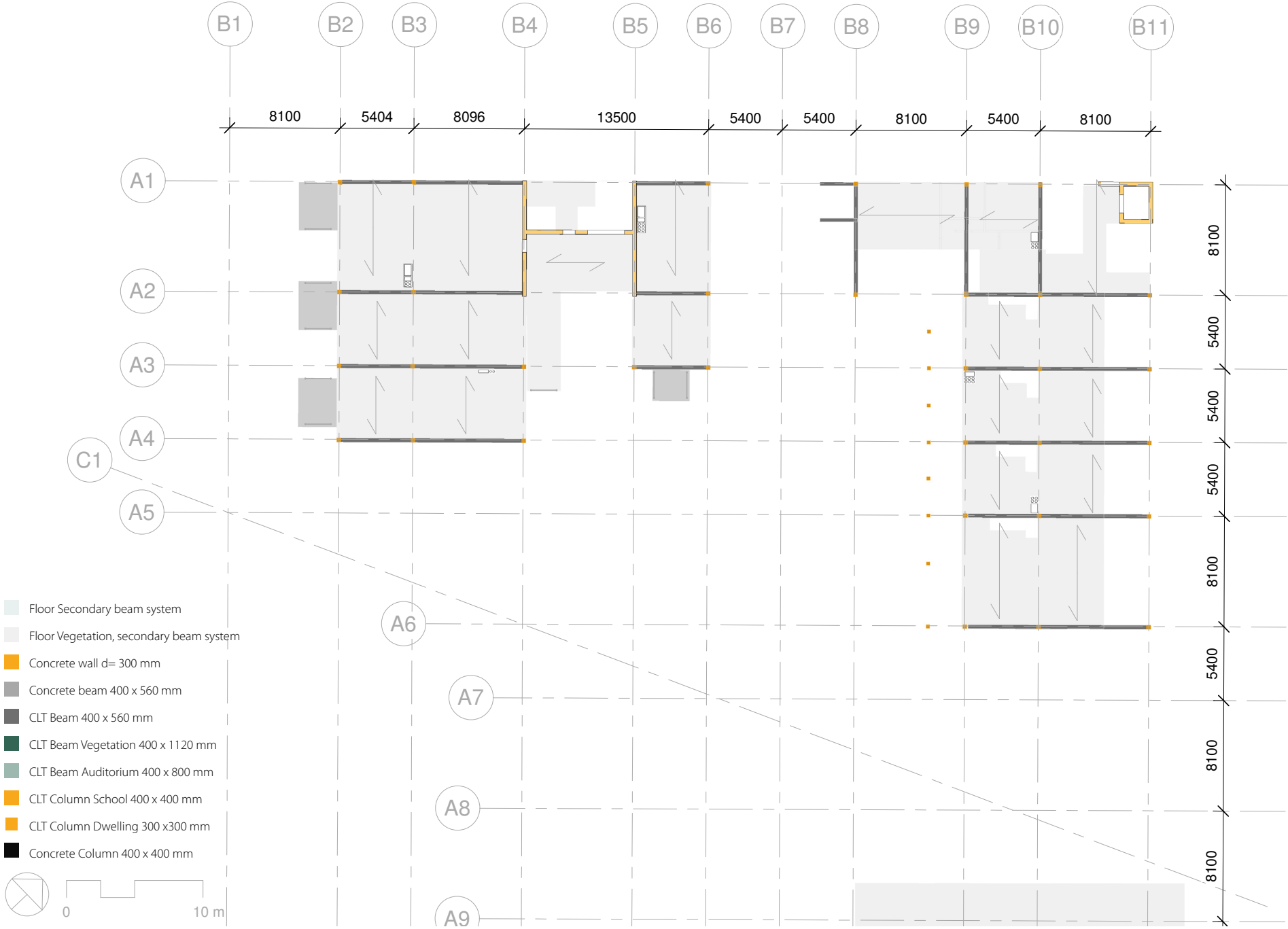


## Construction floor plan level 3

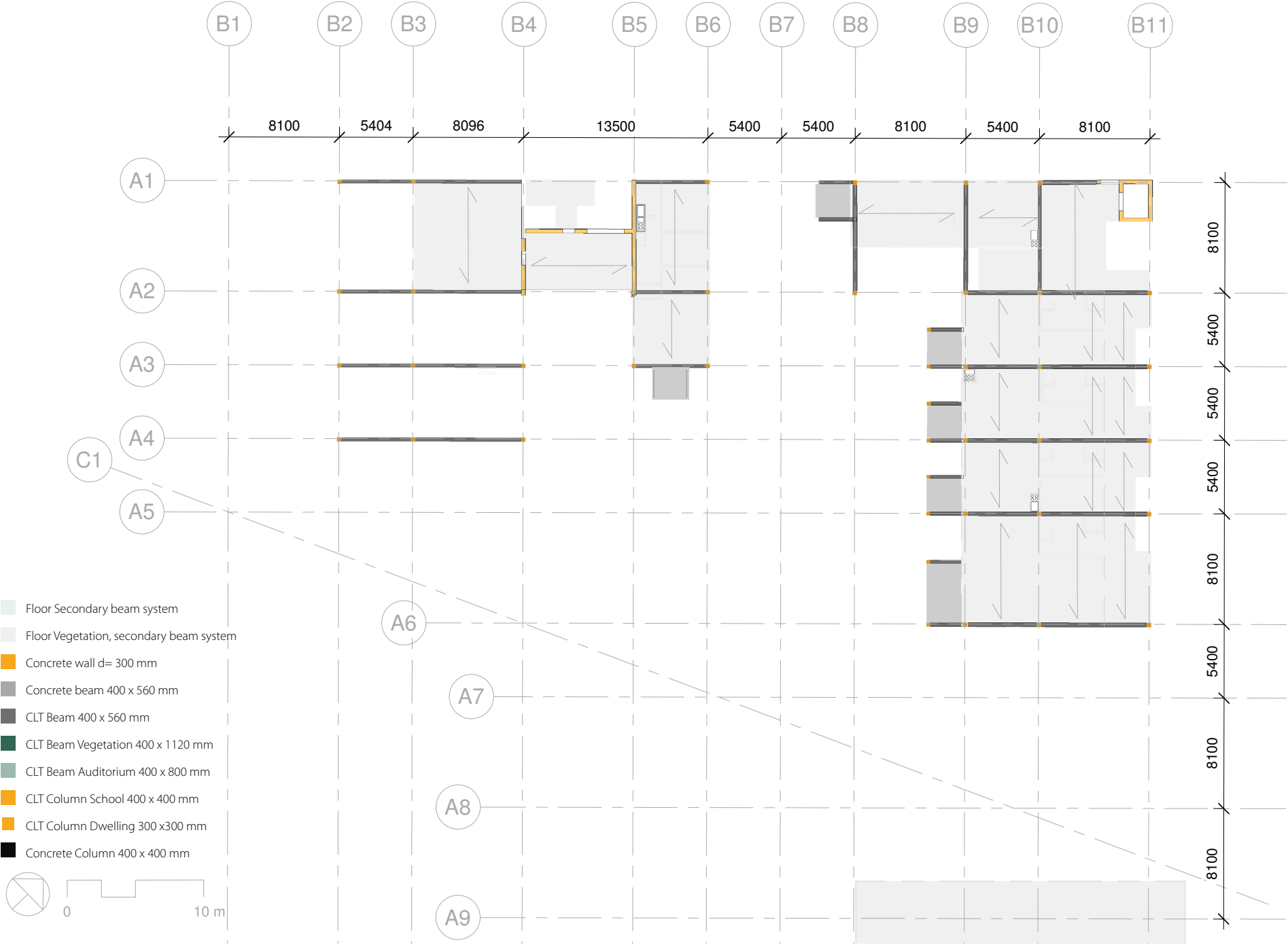




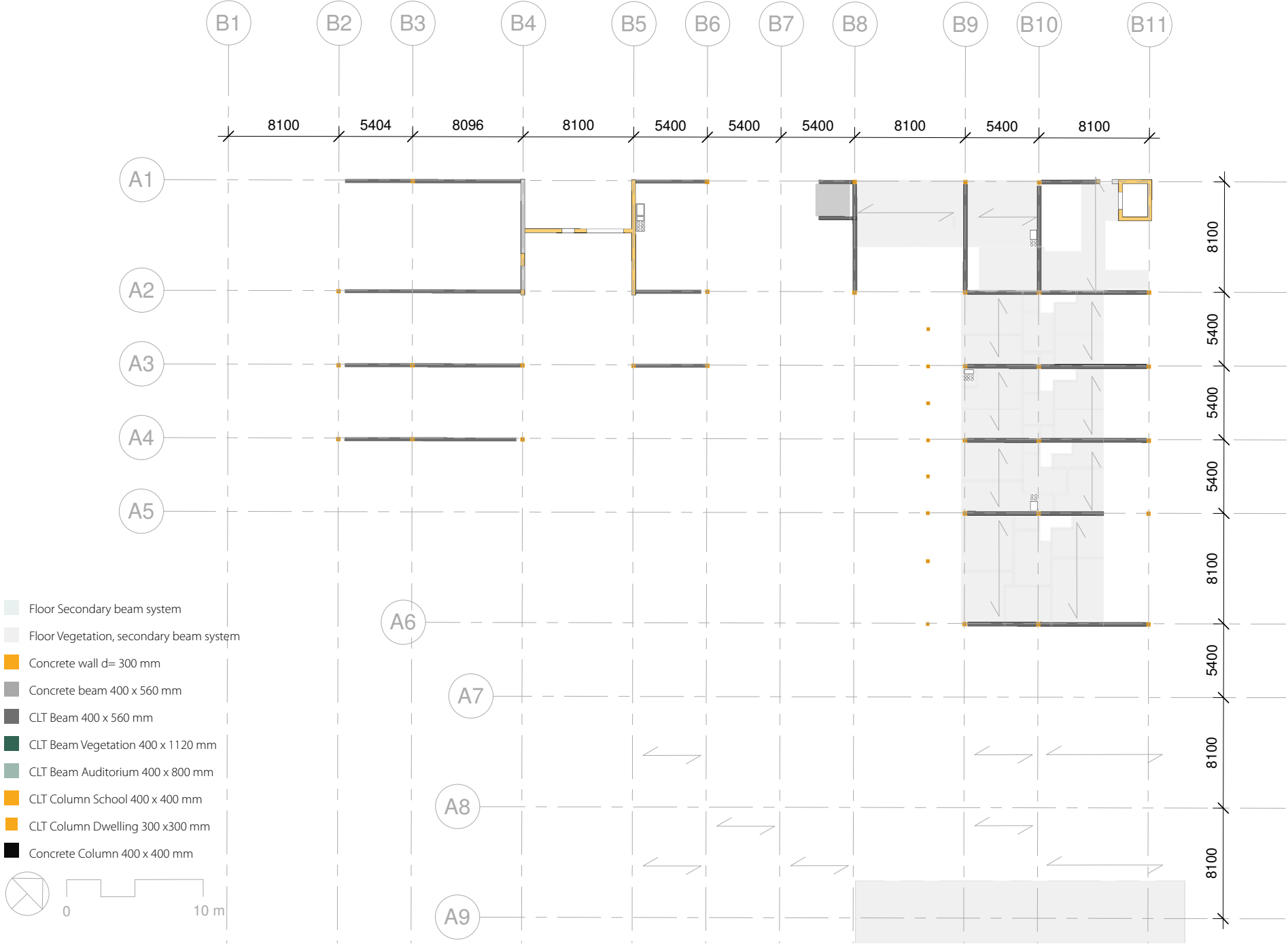
Construction floor plan level 4



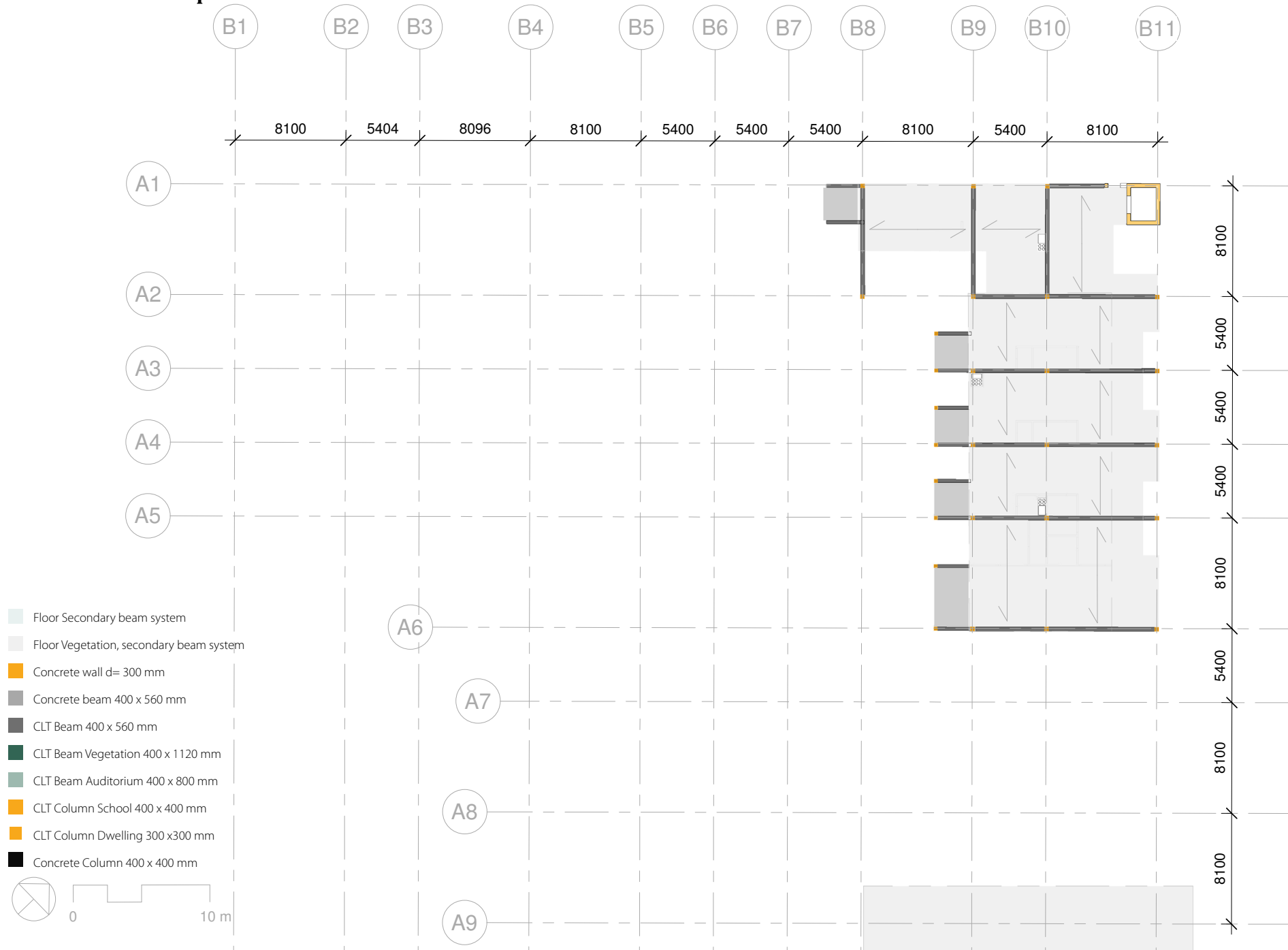
Construction floor plan level 5



Construction floor plan level 6

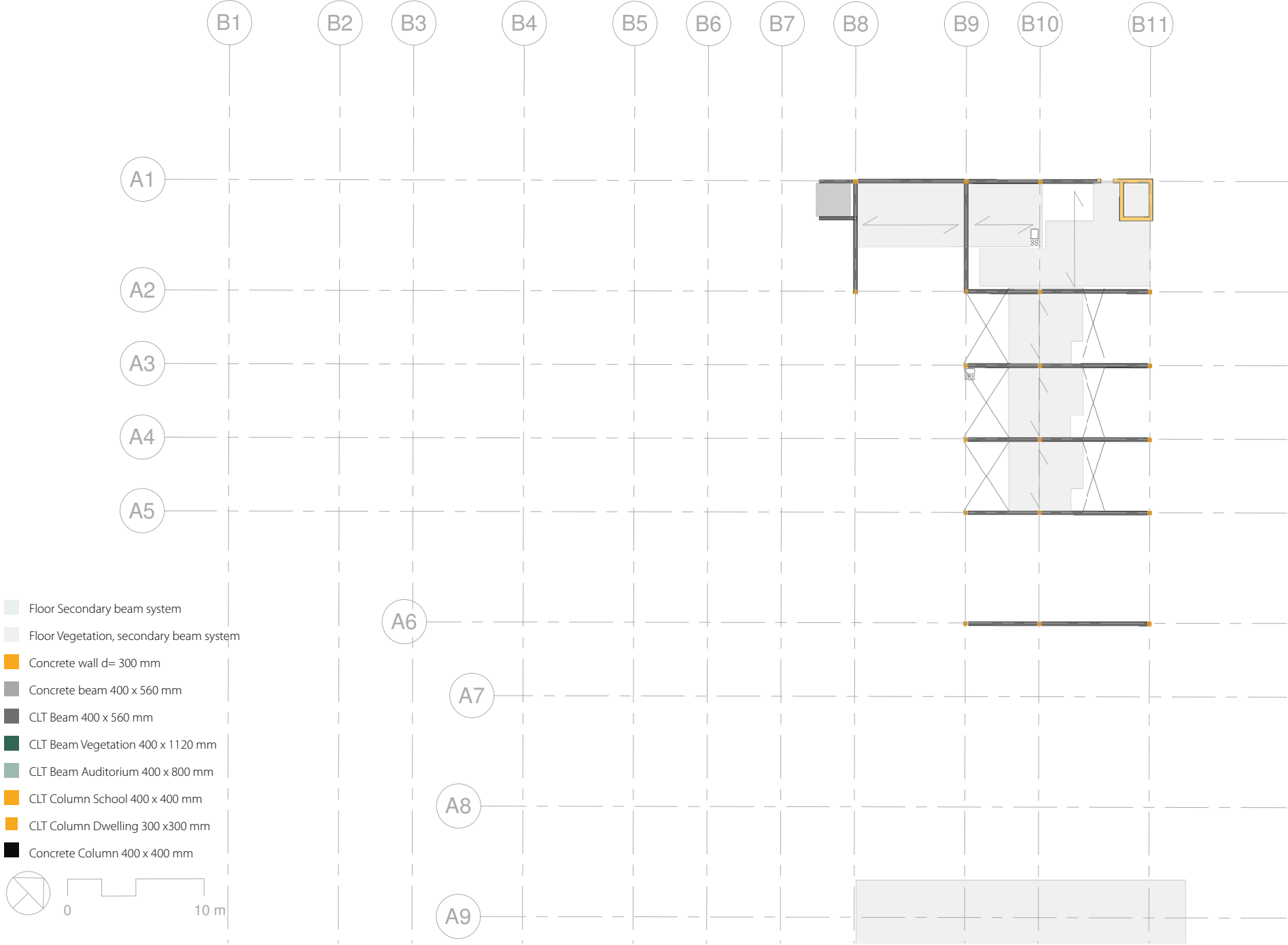


## Construction floor plan level 7

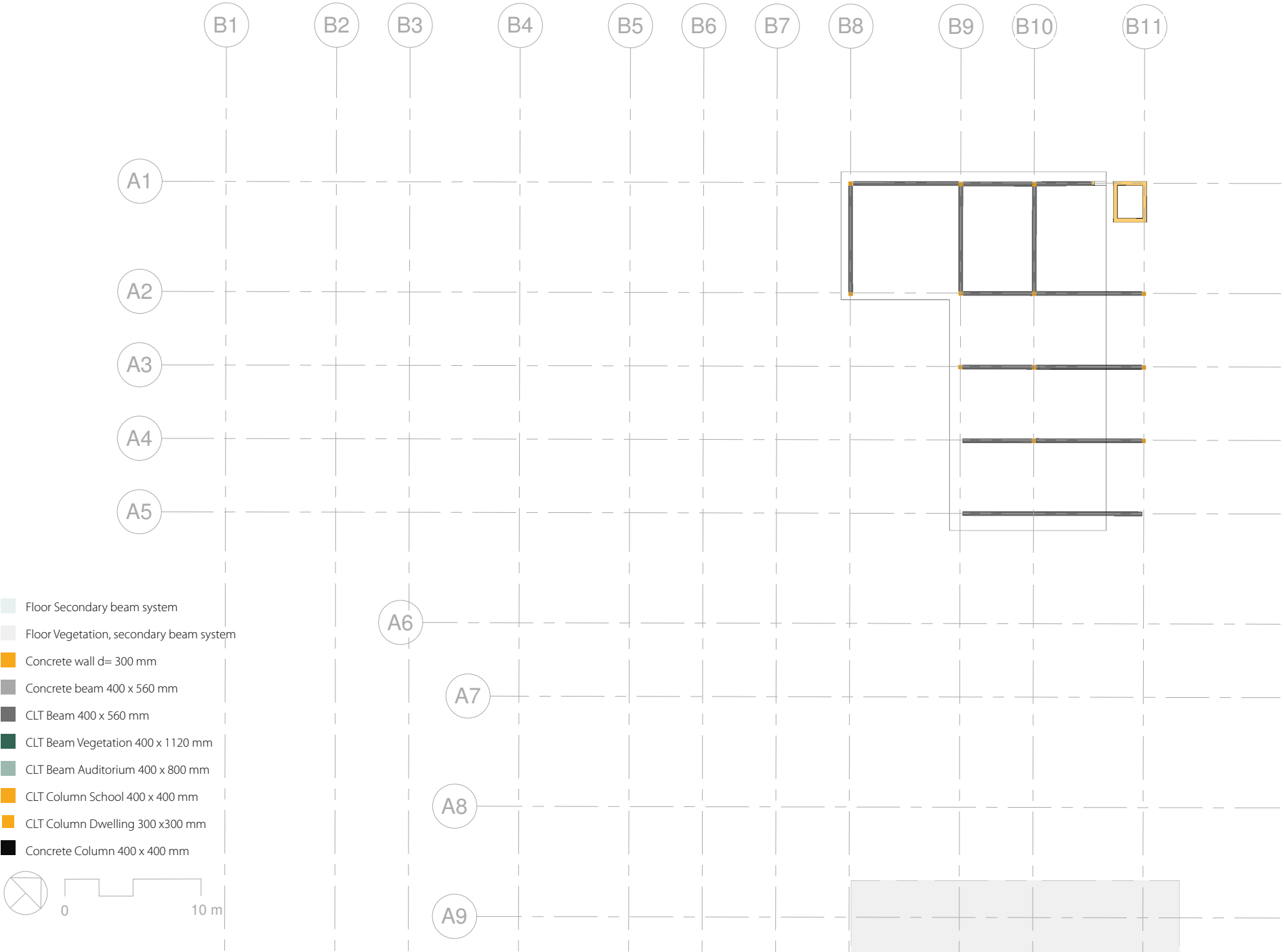




Construction floor plan level 8



Construction floor plan level 9

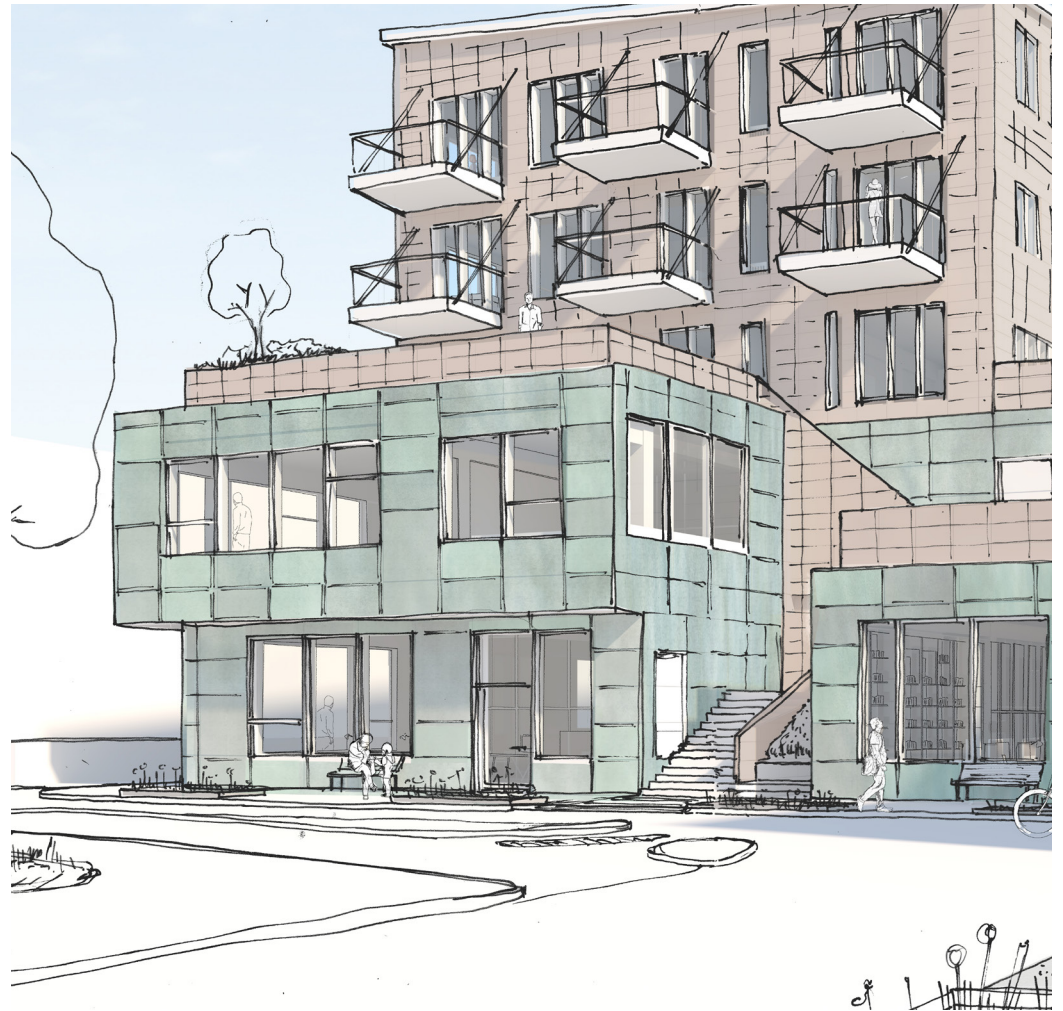
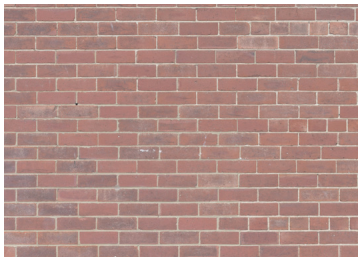


## Exterior facade

The exterior facade tries to be a transition from the existing neighbourhood to the new station development. The exiting high rise buildings are characterized by prefab panels. There are all kinds of panels; glass, ceramic, plastic, asbestos. The two stories row houses are characterized by their traditional brick facades. The design of the houses follows the traditional facade of the row houses and is constructed in brick prefab panels. There has been chosen for panels to reduce the weight of the facade, CLT constructions are not suitable for carrying heavy brick facades. The identity of the panels is clearly visible to show that they are not completely traditional.

The facade of the school is made of recycled glass panels. In current high rise the prefab panels are deteriorating which is not improving their aesthetic quality. Therefore recycled glass is chosen for the new development. Recycled glass has a clear texture ( is not completely smooth) which improves the deteriorating process (imperfections are accepted as the glass itself is imperfect/not smooth)

Magna recycled glass is made of 100% recycled glass, industrial and glass bottles, being the final piece itself fully recyclable. MAGNA Glaskeramik has developed a crystallization course, where parts of the production are hand-made; acquiring a unique translucent optic that allows a crystal-like brilliance effect when shone upon by light and thanks to which, each slab is different, but always maintaining a full recycled glass composition.





## Interior school

The construction consist of Cross laminated timber beams columns and floors. The wood used in this project is in Scandinavia produced “vuren hout” (Picea abies) . Which is a light type of wood with a clear texture. The construction is not visible in all the parts of the building. In the school the construction is a clearly visible. It is a vital element of the interior design of the school. The wood is complimented with white stucco and the rough texture of the concrete screed floor. In the school there are two types of walls; the ‘closed’ white stucco walls and the ‘open’ glass walls. The open walls are used to let natural sunlight penetrate the areas of the building that have less natural daylight from the roof. To provide the classrooms with privacy, and prevent distraction for the students the parts of the wall are filled with translucent recycled glass.



CLT construction material Vuren wood



White stucco on the 'closed' walls



concrete screed floor



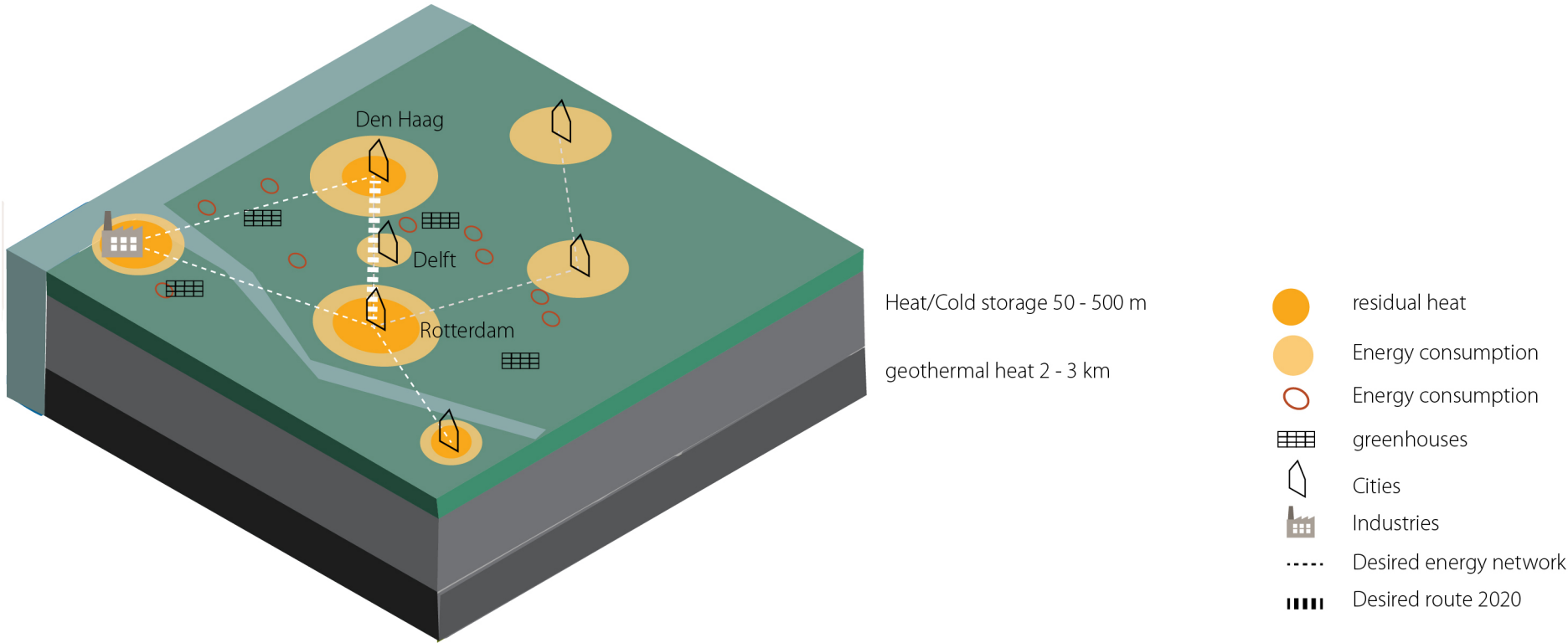
Recycled glass, translucent



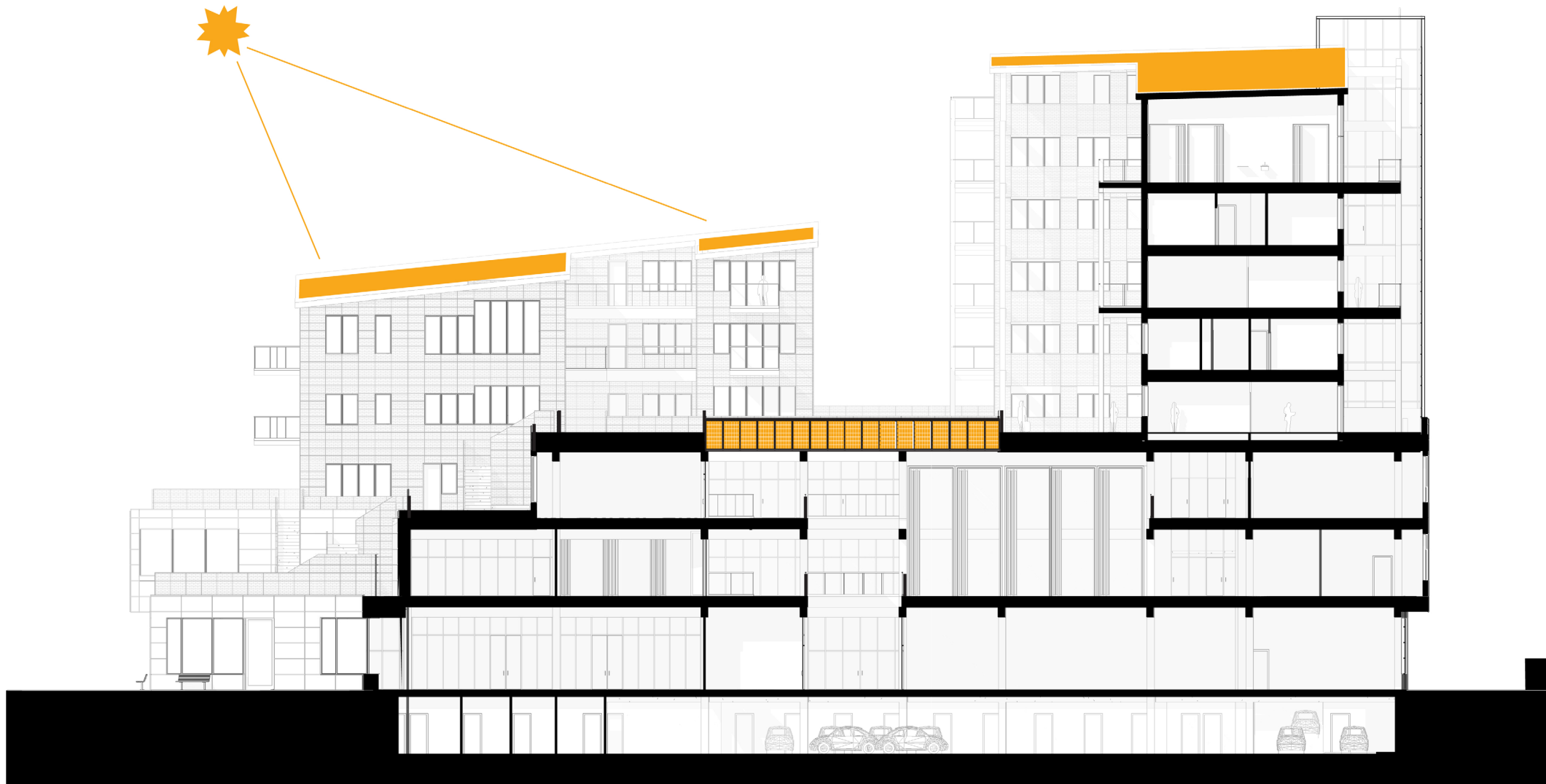
# Energy source

The metropolitan area Den Haag - Rotterdam is planning a large energy network which will combine geothermal heating, cold/heat storage and the use of residual heat. The first connection to be developed is the energy network between Den Haag and Rotterdam, luckily, the neighbourhood Voorhof is located right next to the line and will be able to participate. The production of heat is therefore no longer a problem., the network will provide it.

However, the energy network does not provide sufficient energy to support the energy demand for cooling, extra needed with the expected climate change. The energy will be obtained through solar panels. These are located on the roof of the dwellings and integrated in the glass of the glass roof.



## Solar Energy



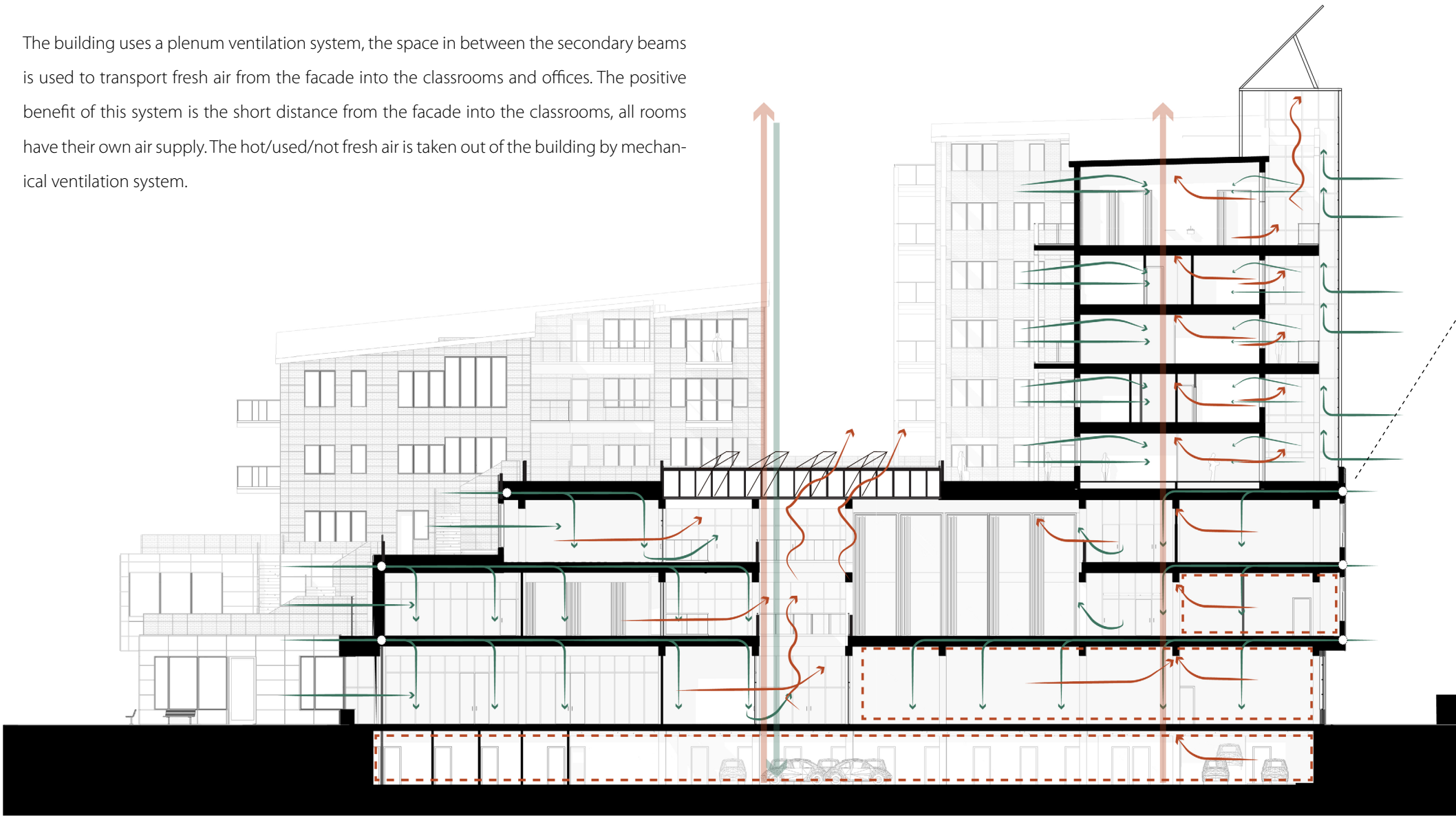
0 5 m



# Ventilation system

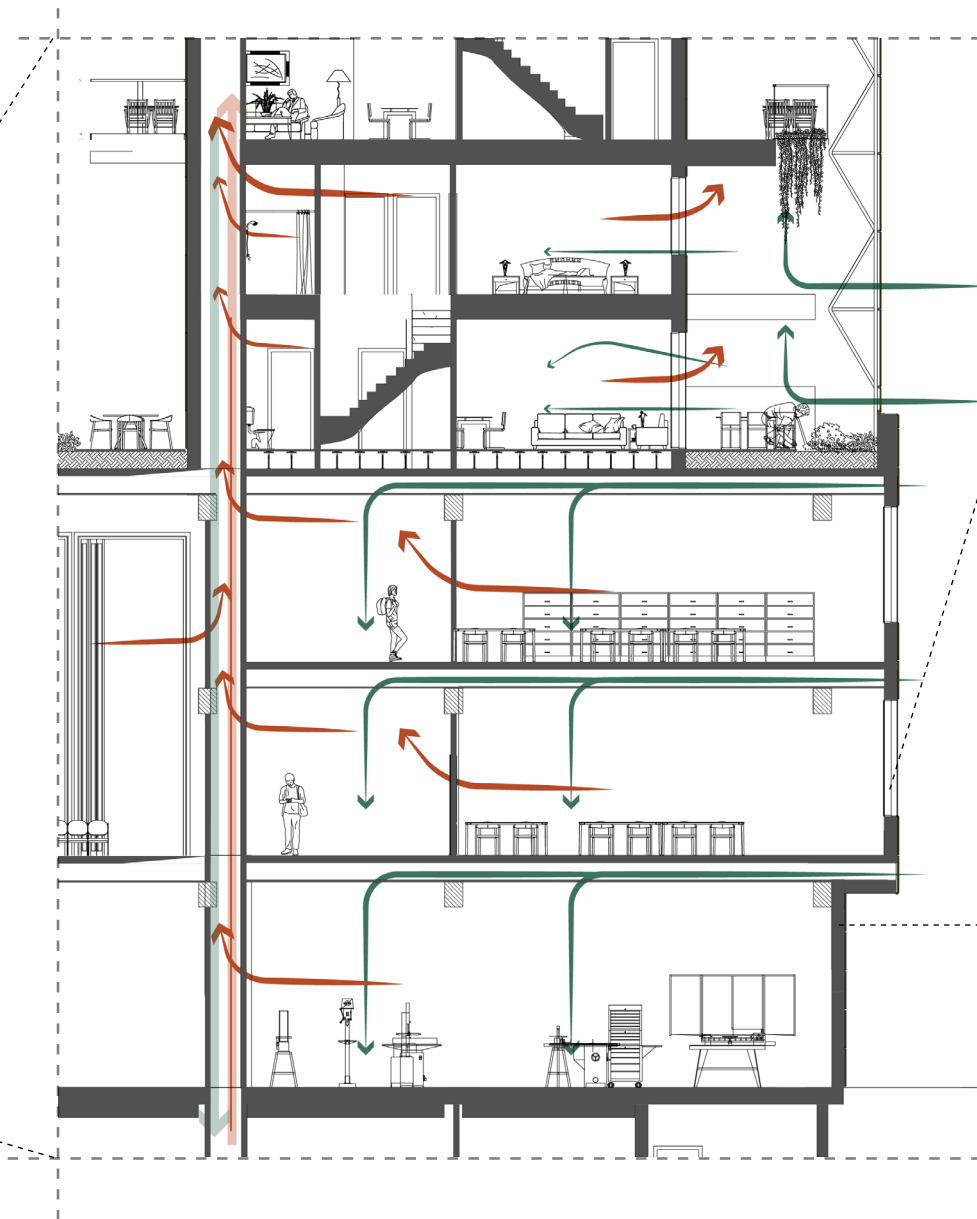
## Vertical section C, ventilation 1:250

The building uses a plenum ventilation system, the space in between the secondary beams is used to transport fresh air from the facade into the classrooms and offices. The positive benefit of this system is the short distance from the facade into the classrooms, all rooms have their own air supply. The hot/used/not fresh air is taken out of the building by mechanical ventilation system.



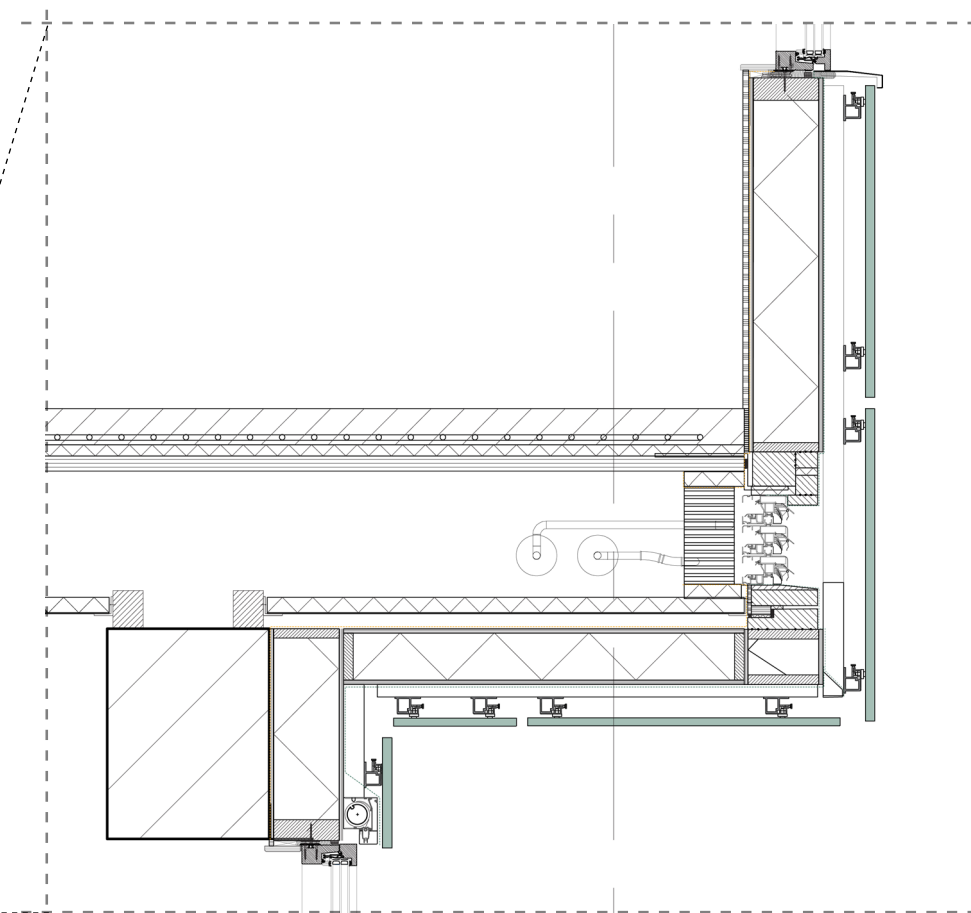
- Fresh air, Passive
- Cooling/heating of air
- passive ventilation out, through atrium
- Rooms with direct ventilation out, such as kitchen, workplaces and garage
- Fresh air, mechanical
- Mechanical ventilation out, through atrium

Vertical section, ventilation 1:100



0 m 4 m

Vertical section V1 1:20



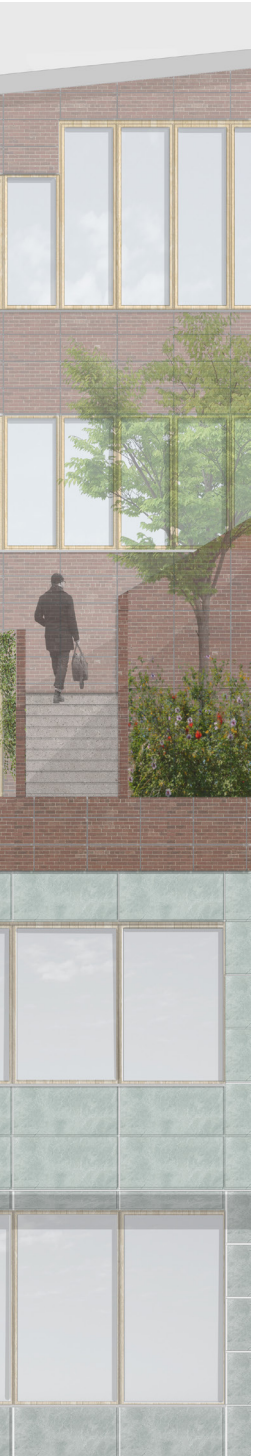
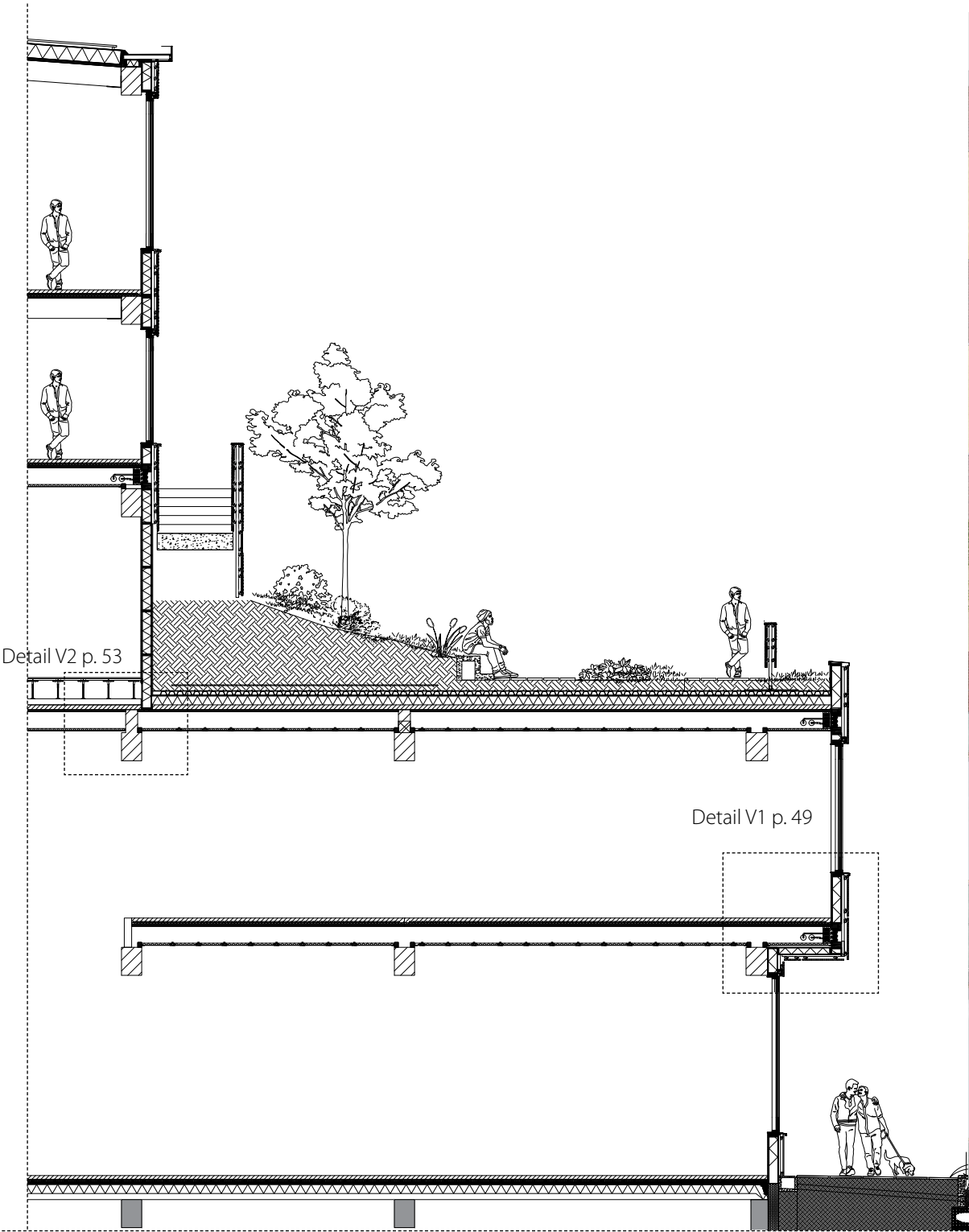
Floor:

- Primary timber beam: 400 x 560 mm laminated
- Secondary timber beam: 100 x 400 mm laminated
- Cross laminated timber board 30 mm
- Insulation: 30 mm
- Water repellent layer
- Dekvloer: concrete with heating 95 mm

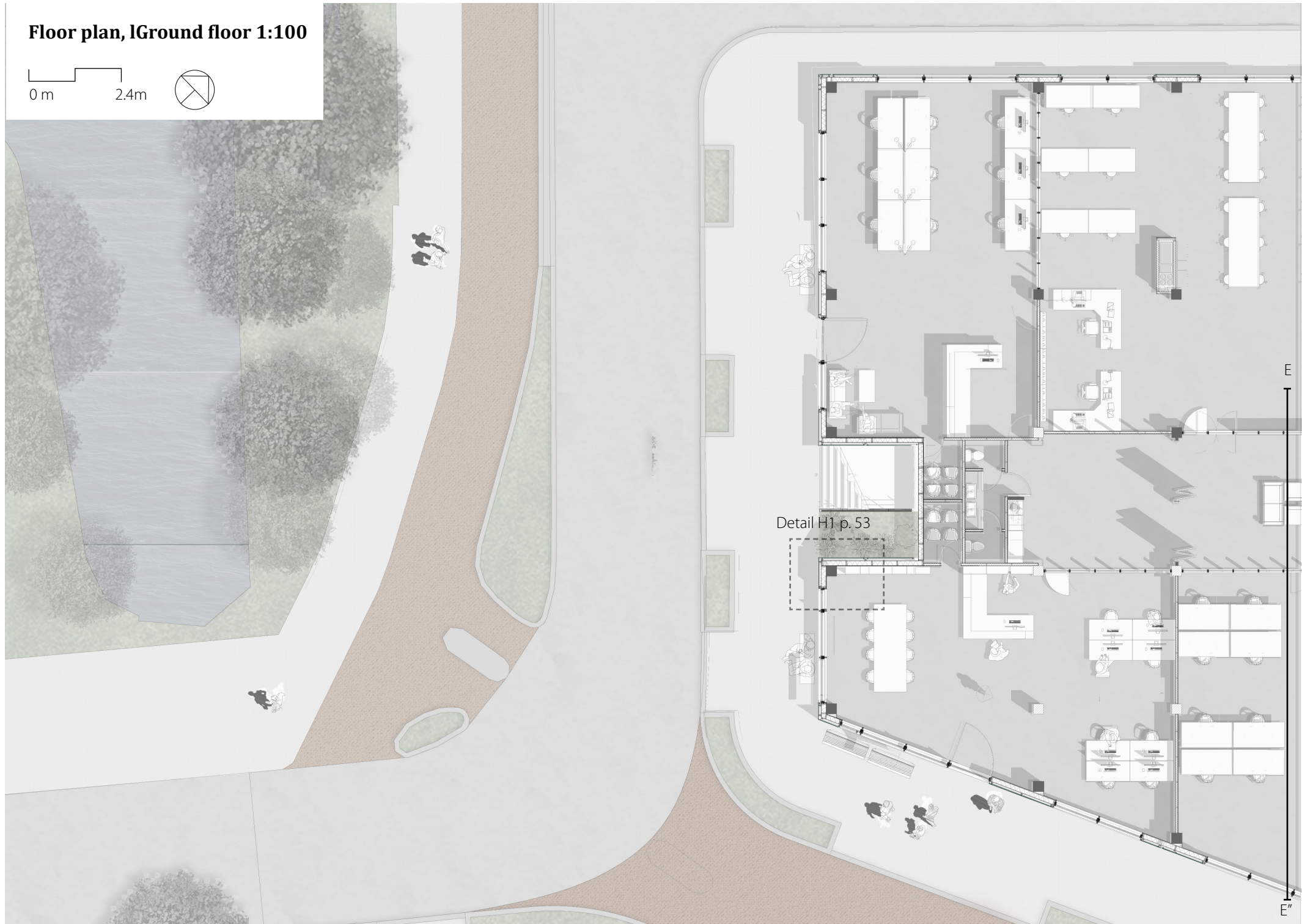
0 cm 80 cm

Section E 1:50

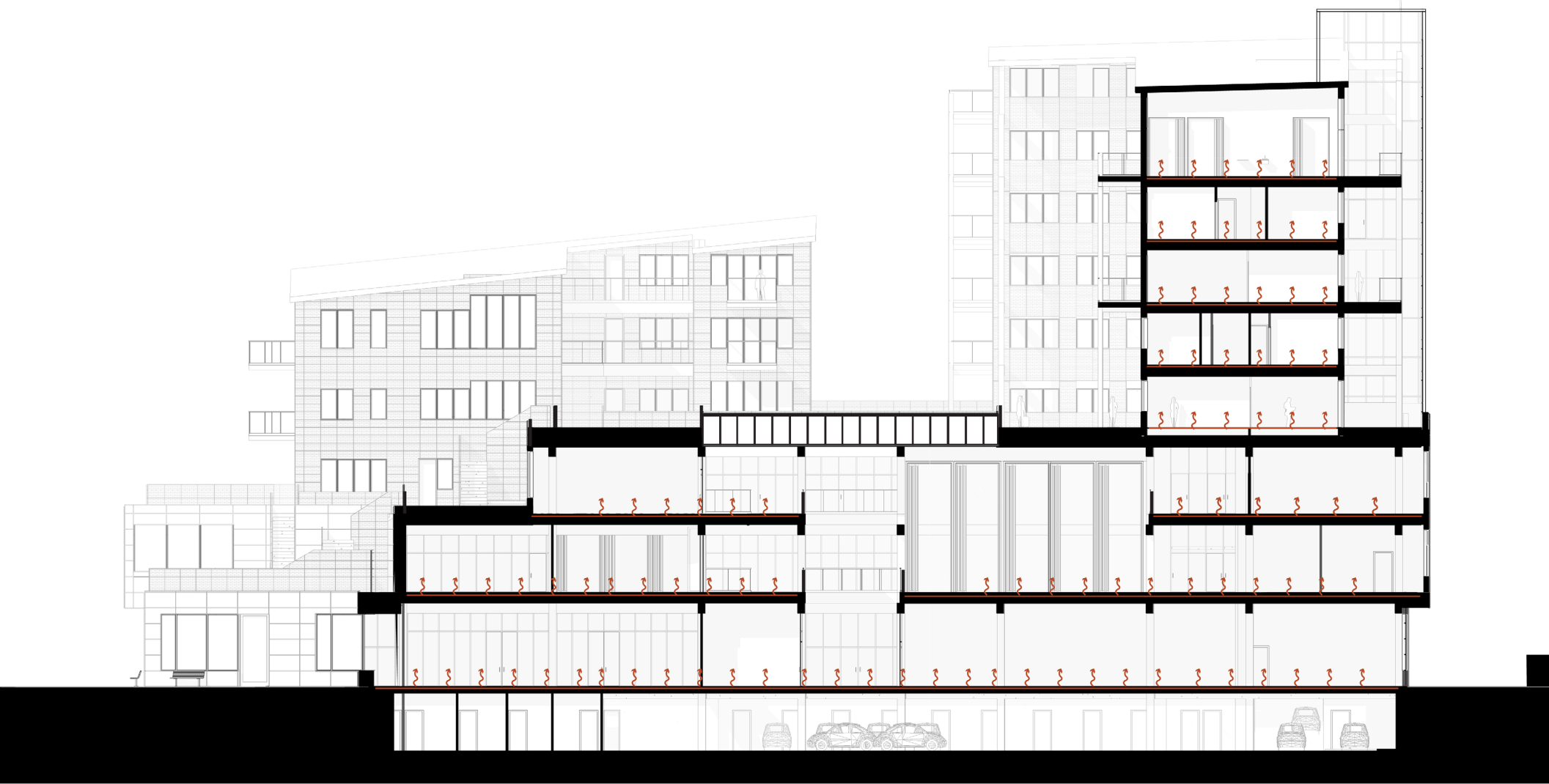
0 m 2.4m





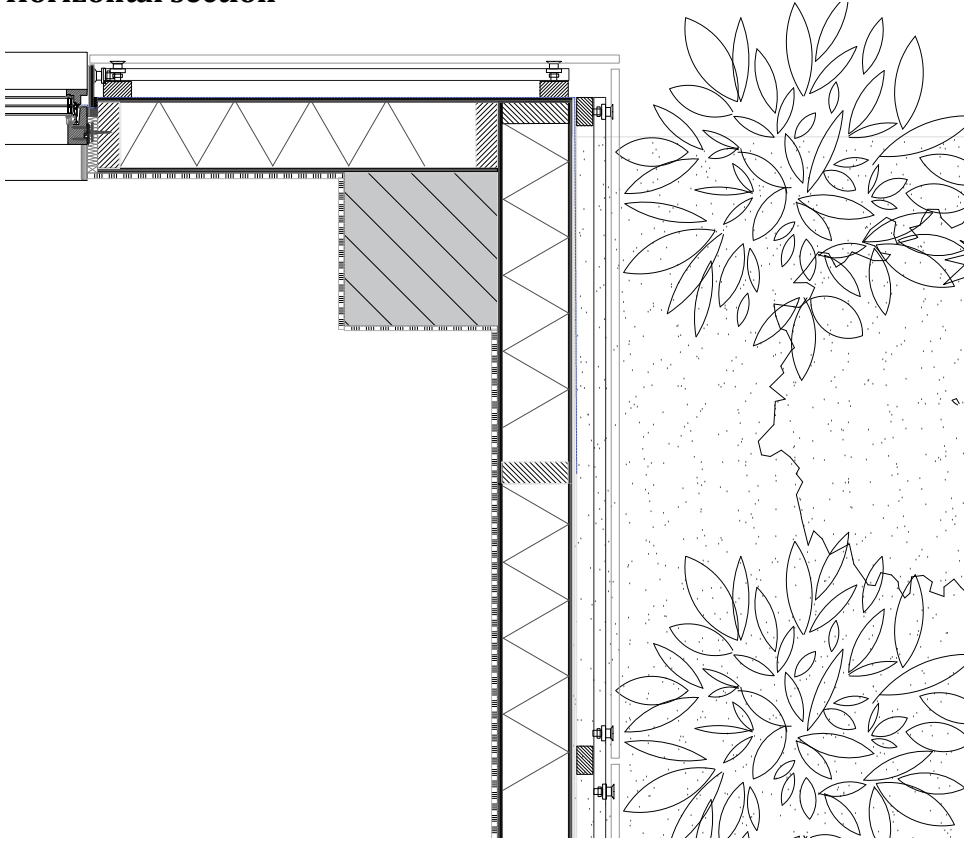


Heating



0 5 m

## Horizontal section



**Horizontal section H1 1:20**

Wall structure:

Interior wall: Plasterboard 12 mm, vapour retarder.

Sandwich panel: Spaanplaat 12 mm, Rock wool insulation  $\lambda = 0.035$  W/m-K between 50/170 mm

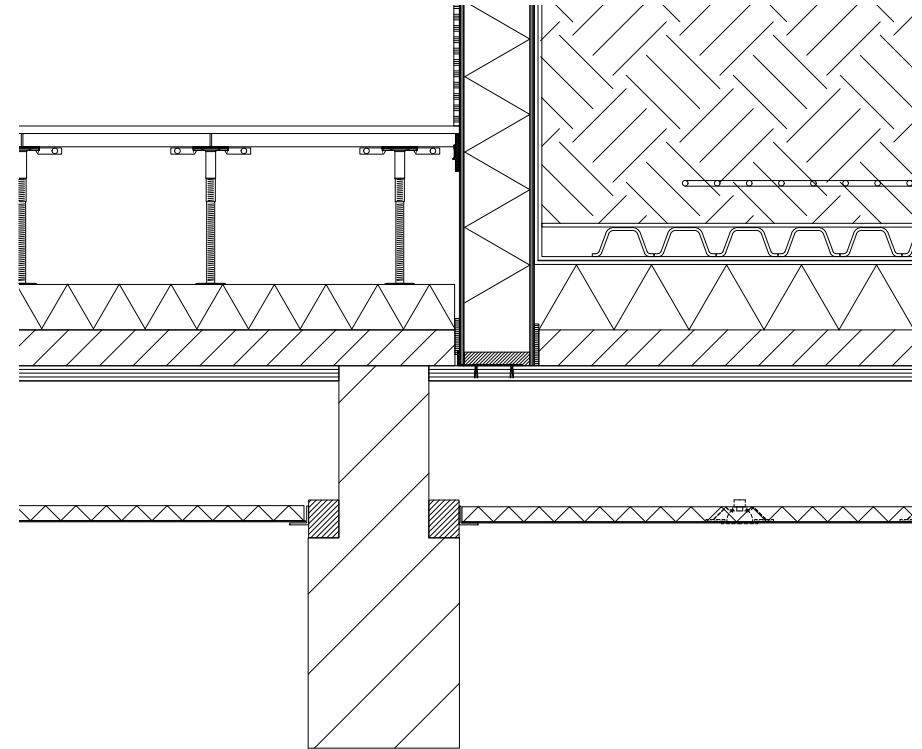
wood studs, spaanplaat 12 mm

Finish: House wrap (waterkerende laag)

Stijl en regel ophang systeem: 50/70 mm and 40/45 mm.

Recycled glass 21 mm

## Vertical section



**Vertical section V2 1:20**

Raised Floor

- Primary timber beam: 400 x 560/1120 mm laminated

- Secondary timber beam: 100 x 400 mm laminated

- Cross laminated timber board 30 mm

- Concrete screed 95 mm

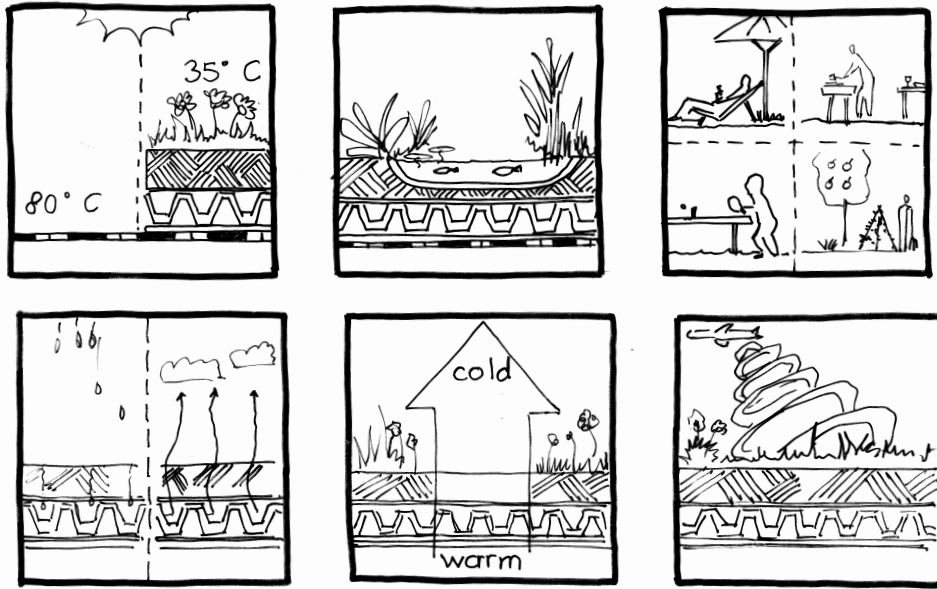
- Sound insulation 120 mm

- Steel understructure,

- Floor panels with integrated heating system.

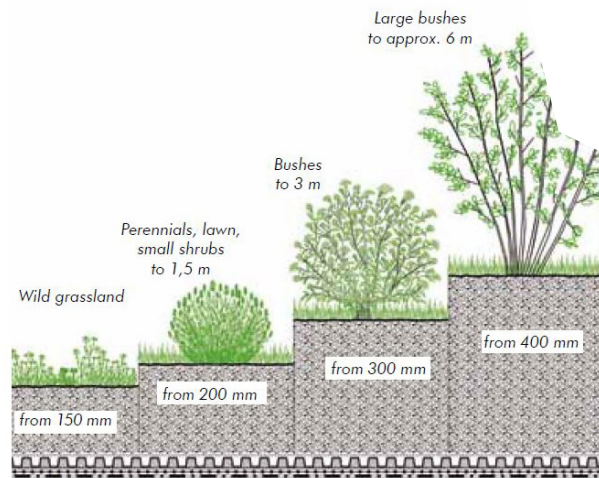
- Floor finishing

## Positive assets of green roofs



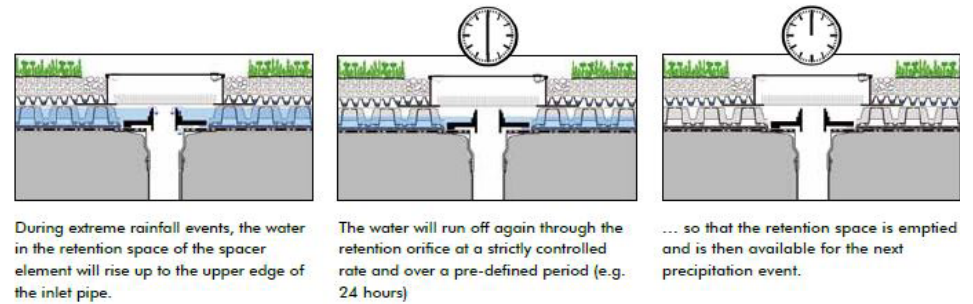
## The size of the vegetation

The construction has two types of beams the normal one, which can carry substrate to 200 mm. This beam carries most of the roof. At positions a larger beam is used to carry more and bigger plantes. This beam can carry up to 400 mm of substrate



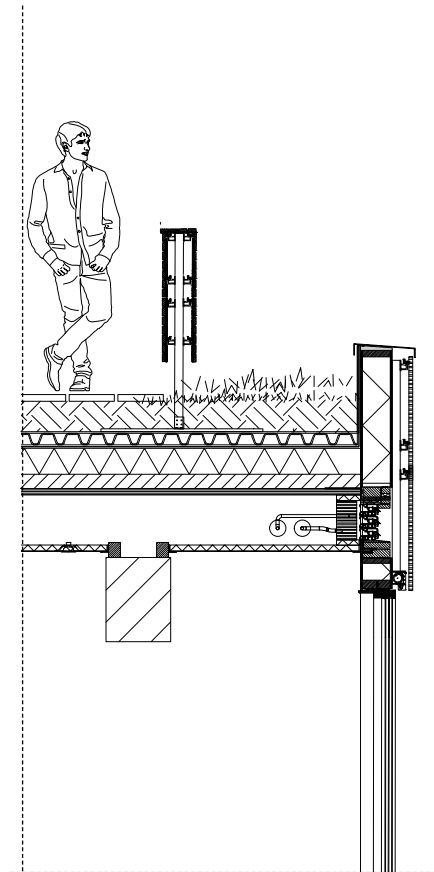
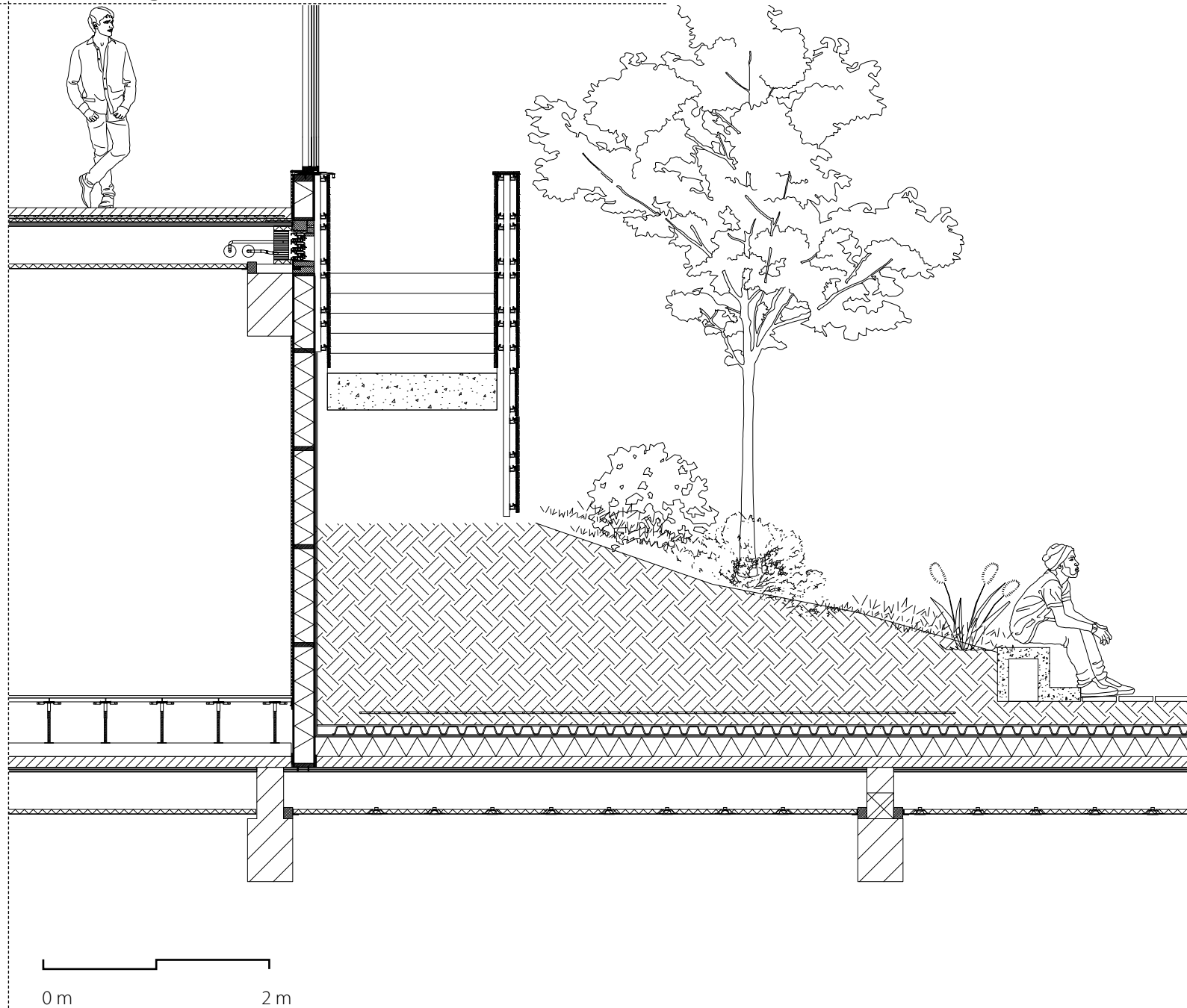
## Water storage

The vegetation roof uses a system called "Stormwater Management Roof" by Zinco. This roof has the capacity to store large amounts of water underneath the substrate. Benefit of this system is that the vegetation can not drown. And second it will prevent the sewage system from flooding.





Section vegetation roof, detail of section E 1:50



## Urban details

In the street to the station, now the Marcellus Emantspad a design by the Philadelphia water management team has been implemented. The design creates an open rainwater system that provides water storage and increase biodiversity. Additionally, During hot summers the open water provides cooling. The water basins are used to create barriers between the pedestrians and the cyclers.



## Section F, Street profile

