



UPON THE FIELD
OOSTAKKER - SPACE AND ADAPT

Climate design and sustainability

KU LEUVEN - Department Architecture
Gent 2021

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TEAM MEMBERS

We have not assigned specific roles.
Tasks have shifted from one to another in
order to keep a fresh look at the project



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TEAM SPACE AND ADAPT



KEYWORDS

ADAPTABILITY - MODULES - 15MIN VILLAGE

BASIC DATA

Functions

shop, restaurant, washbar, offices,
housing, rooftop

Numbers of:

workers: 70
customers/visitors: 150
inhabitants: 30
housing : 15

Footprint of the building: 660m2

Total floor area: 2300m2

GENERAL OVERVIEW

THE FUTURE OF OOSTAKKER



GOALS FOR OOSTAKKER

For Oostakker to be reimagined and propelled into the future, it is essential to **revitalise the village** so that it may become an attractive place to live once more. The focus lies on **densification**; bringing more people, as well as the spaces and services they require, closer together.

The goal is to bring everything within reach; within **a 15 minute distance**. This forces us to think differently; not only about transportation, but also about the way goods, services and buildings are used today and tomorrow.

A JOINT ENDEAVOUR

Different teams, each focused on a specific theme, list a number of requirements the village has to meet. These guidelines are followed in the design of every new building. As such, all the **teams collaborate** towards a sustainable and positive future for Oostakker.

MATERIALS

repurposed facade bricks
prefabricated, reusable structure

ENERGY

solar panels
using waste heat from factories

WATER

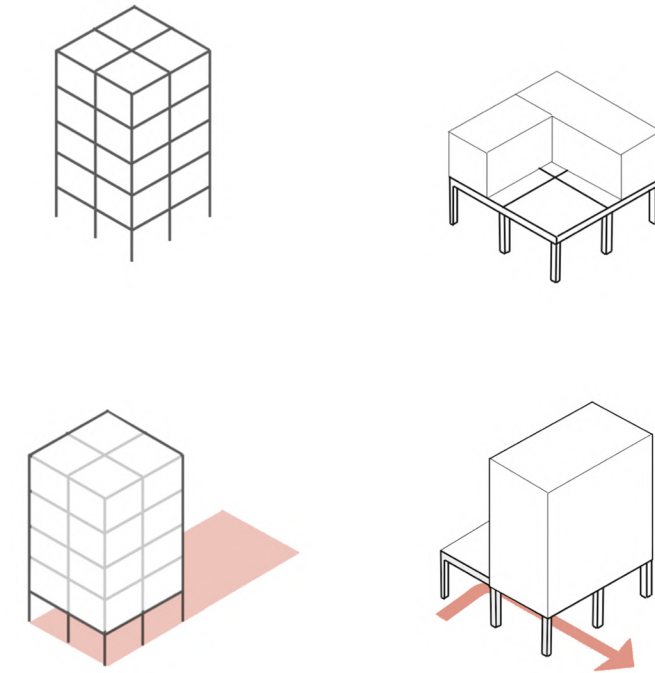
green roof
water infiltration bed

MOBILITY

bicycle and electric step parking
car free streets

FOOD

greenhouse
locally produced and sold



excerpt from the adaptability guidelines

GOALS FOR SPACE/ADAPTABILITY

Each team is given a set of guidelines which aim to ensure valuable spaces and adaptable structures which can continue to function way **beyond 2050**.

Existing cultural heritage is to **be preserved** and a **grid system** for new structures is to be implemented as to ensure their adaptability and thus longevity. The modular grid structure is realised with **prefabricated** and **reusable concrete** elements; a column and beam system that doesn't necessitate loadbearing walls. The new buildings that use this system are **adaptable** because changes to the layout don't compromise the larger whole. Each module is large enough to accommodate a variety of functions easily and has a length which is divisible by 60cm; a distance based on human scale.

A MULTIFUNCTIONAL BUILDING

To demonstrate how the **modular system** can contribute to densification and result in an **attractive environment** to live and work, a new multifunctional building is conceived in the center of the village.

THE CITY SCALE

GENT AND THE 15-MIN VILLAGE



Ghent, Belgium



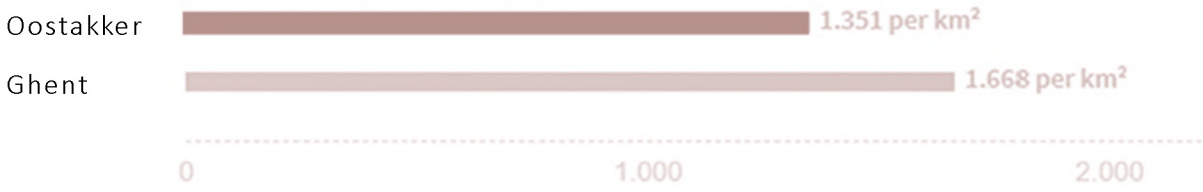
Project area, Oostakker

Oostakker, a former municipality of the city of Ghent is located only 3 kilometers away from the city and its potential is currently untapped. The new concept for the village aims to transform it into a **vibrant place** that would not only serve its residents but also attract citizens of Ghent. The concept of the **15 minute village** offers everything its inhabitants

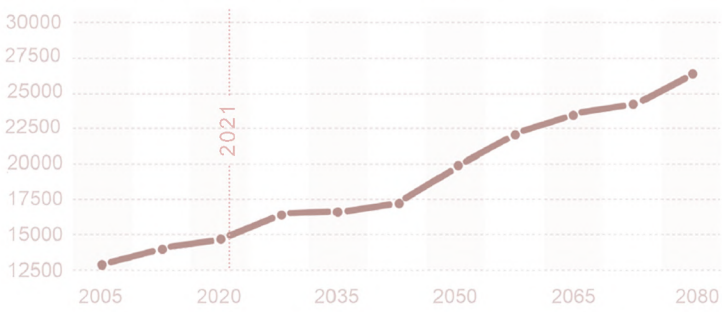
shop and recreate, all within a walking distance of 15 minutes. Thanks to this solution, the residents are saving time and money from commuting to the city but most importantly improving their health and well-being. The new vision for Oostakker puts people first and provides perfect conditions for a sustainable and healthy life at present and in the future.

VILLAGE SCALE
NEEDS OF OOSTAKKER

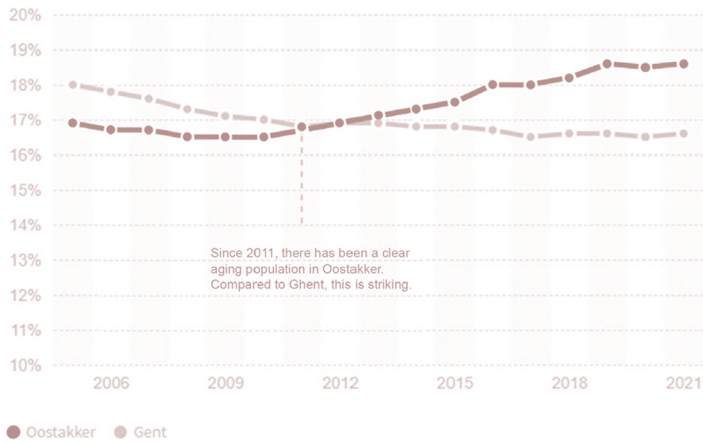
POPULATION DENSITY



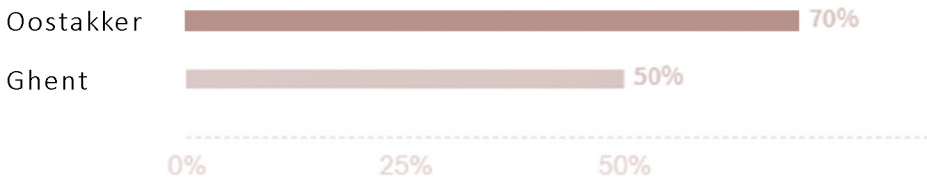
POPULATION GROWTH FORECAST



AGEING OF THE POPULATION (65+)



PERCENTAGE OF POPULATION OWNING A CAR



Need for attracting more people to settle down and providing more job opportunities



Need for urban densification to house more residents



Need for accessibility and inclusiveness



Need for the 15 minute village- eliminating the need for a car

TIMELINE

- Housing
- Shops
- Offices

2021

Nowadays, the centre of the village is predominantly a residential area composed of houses, shops and restaurants. Most inhabitants have to **commute to Gent** or its surroundings **to go to work**.

2040

The goal for 2040 is to **densify** the center of the village. Higher residential buildings will be built to welcome more inhabitants, while maintaining room for greenery and public spaces. The ground floor will host shops and restaurants, and in addition, offices will also be built to revitalize the village. These functions will help create a village where every necessity is found within **15-minutes**.

2060

In the future, the buildings' flexibility will allow the village to **change its functions** and meet its new needs. If the population continues to increase, we can imagine the need for more living places, while shops and offices might take less space due to **new technologies** and more **remote work from home**. We aim to design spaces that will accommodate any function in the future.

HISTORY



Old picture of the centre of Oostakker. Source unknown.

The center of Oostakker is a three-storey site whose history may have started in the early Middle Ages. At the beginning of the 17th century, a Sint-Lurentius chapel was replaced by the still existing, but now very renovated **Sint-Amandskerk**. The buildings around Oostakkerdorp,- a mixture of public buildings with the former municipal functions such as **the former town hall**, trade and residential functions, are predominantly built during the

The **kiosk** in the centre of Oostakker has served as a landmark and a meeting place for its residents. In 1896 the old trees on the square were replaced by young ones. Those trees were sold and the kiosk was put up with its profit in 1897. Oostakker is also known to have a long tradition of organizing big events every year, such as **festivals, fairs, markets, performances and carnivals**. With a new design, we aim to preserve this beautiful identity of Oostakker.

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sint-amandskerk



kiosk

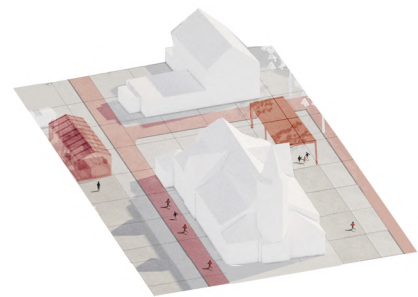


carnivals

8 RULES REGARDING SPACE AND ADAPTABILITY



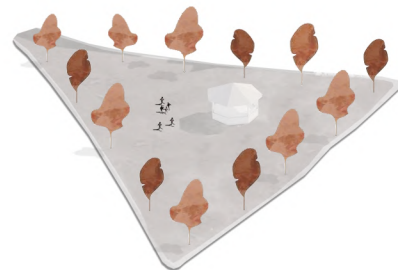
1. PRESERVATION OF EXISTING BUILDINGS
preserve the old and valuable buildings of Oostakker to keep the identity of the village



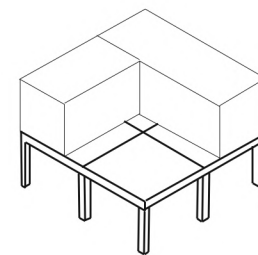
2. LANDSCAPE UNIFORMITY
apply modular landscape design to create a coherent landscape along the village



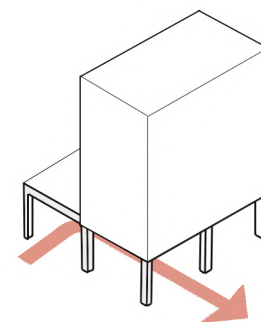
3. SITE-BUILDING CONNECTION
create a strong connection between the site and the building to enhance its purpose



4. PRESERVATION OF EXISTING TREES
when designing a new building, keep at least 80% of the existing trees on the site



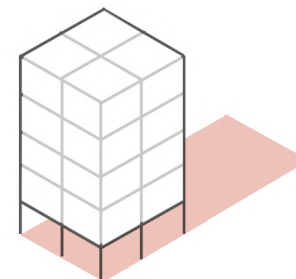
5. STRUCTURE MODULARITY
design with a module for flexible and adaptable structures in all new buildings



6. PASSAGES
create passages in the ground floors' modules in order to connect the plots in the centre



7. MODULAR FACADE
apply modularity in facades of buildings to create uniformity in the village

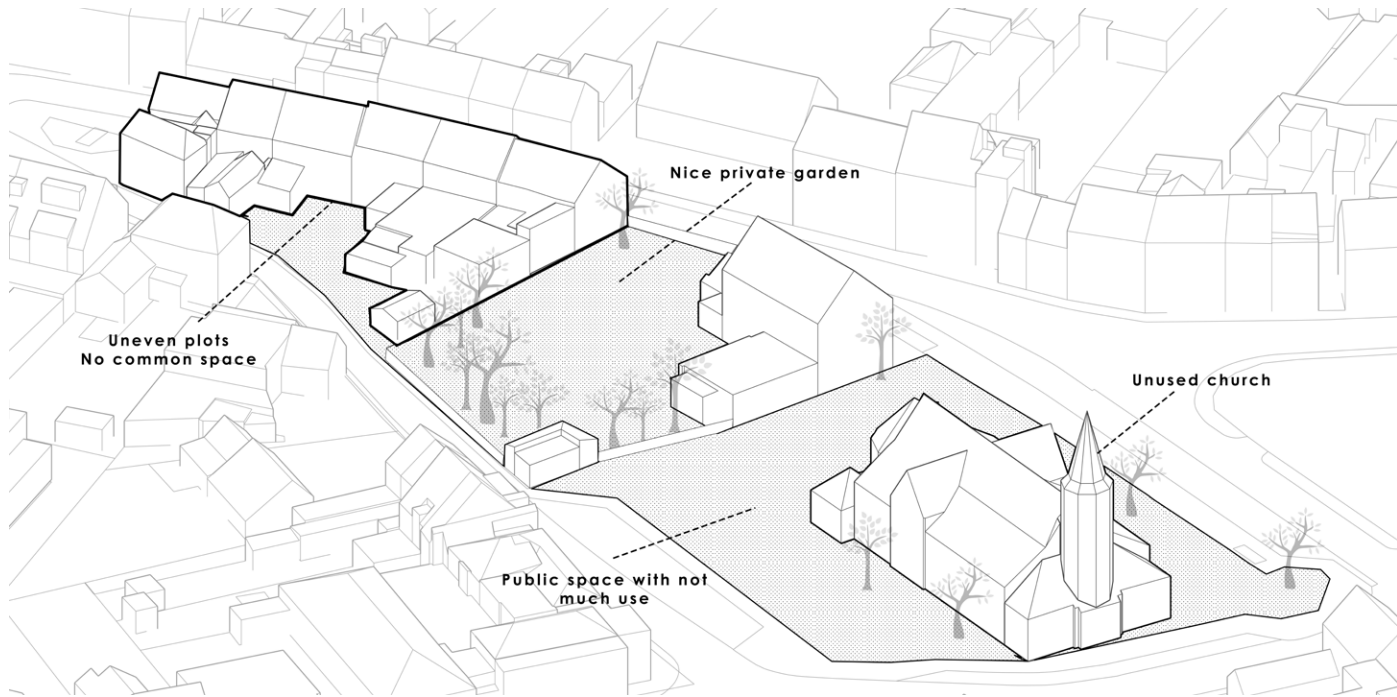


8. EXTENSION
a further step towards adaptability is ensuring space for future extension on site

PRESERVE AND DENSIFY

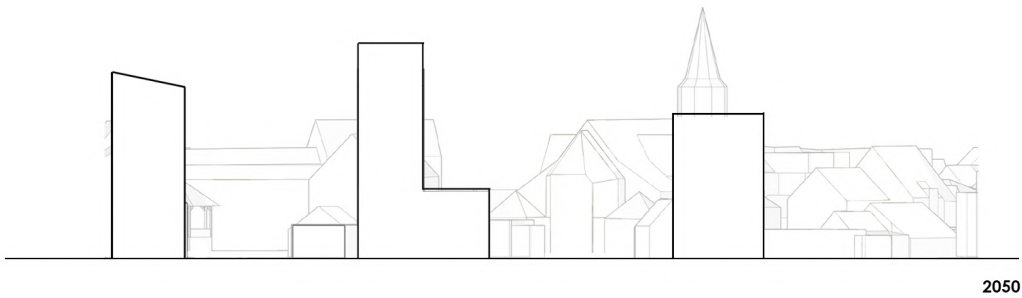


Our first study of the village determined which areas should be **preserved**, and which areas could be changed in order to **densify** the centre. The buildings which enhance the **identity** of the village will be kept, whereas other plots were chosen by different teams to design new projects that will improve and densify Oostakker.

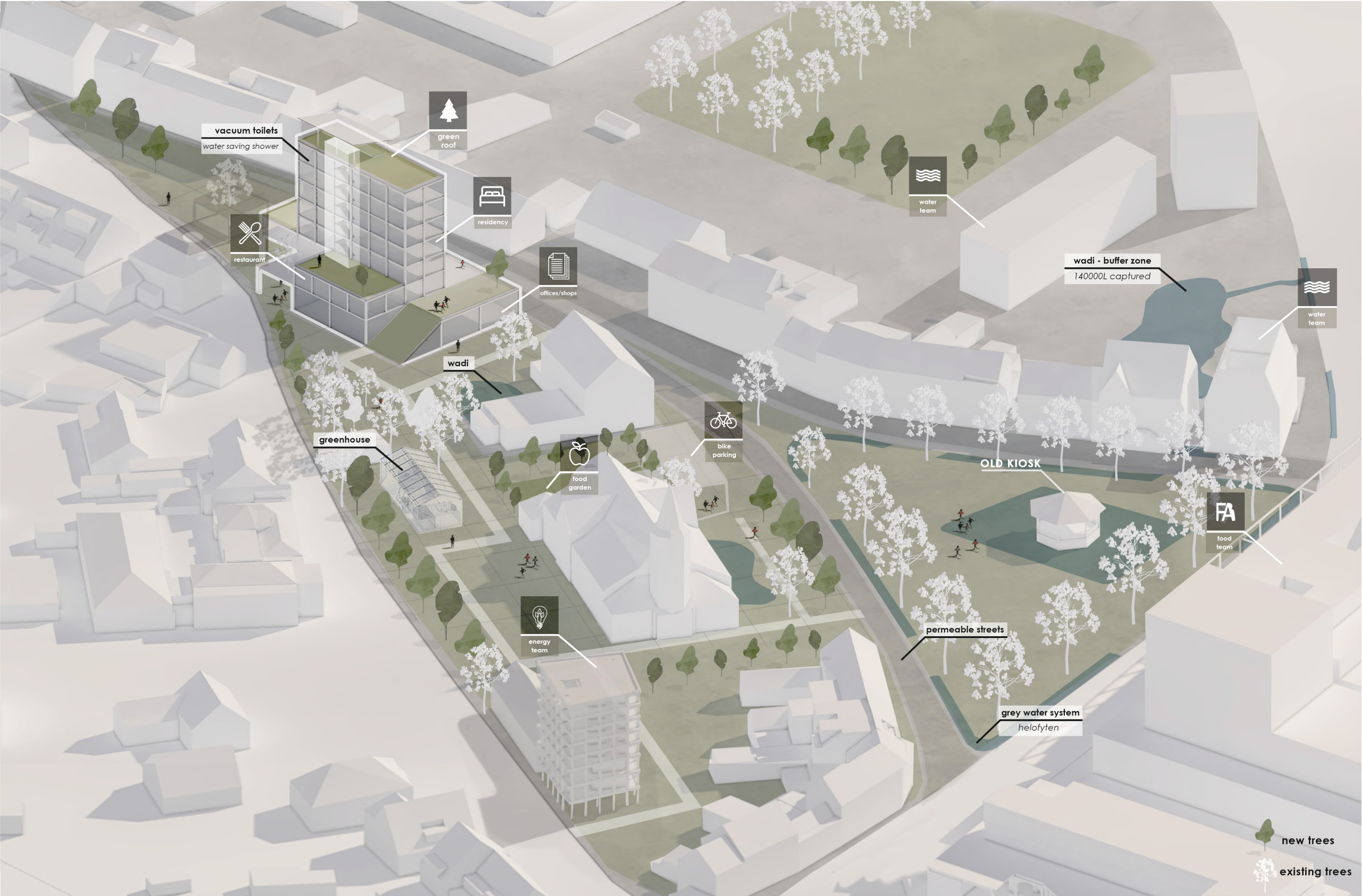


Our team decided to densify the site around the church. Its location in the **heart of Oostakker** has the potential to attract visitors and to function as a gathering space for citizens. It is currently composed of different elements: on one side, **the church** from the XVIIth century, which is not in use anymore and will be desacrilized. We want to preserve it and help it find a new public function in the future. On

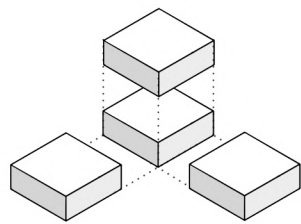
the other side are **row houses** of uneven materials and heights, which don't have a common space to meet. Between these two elements, there is what used to be the rectoral house. Now, it is a **private house** with a wide garden, composed with trees and a pond. We want to preserve the house, and open the garden to **create a whole park** and therefore give space for the inhabitants to appropriate.



SUSTAINABLE VILLAGE

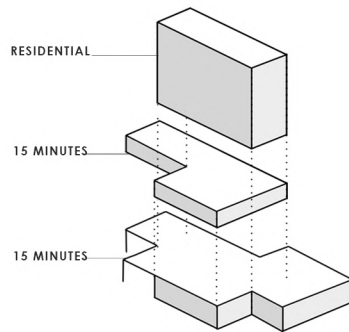


THE BUILDING SCALE
SUSTAINABLE CONCEPT



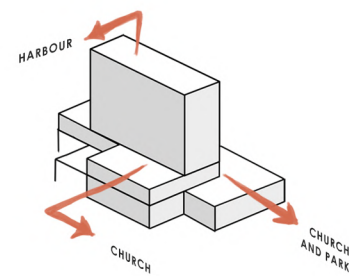
1. MODULARITY

We believe that **modular** structures and designs create long lasting buildings due to flexibility and **adaptability**. Our team uses a module or 7.80x7.80m, which accommodates many different functions. In this regard, the function of each floor can be changed easily within years.



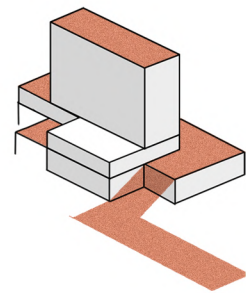
2. FUNCTION

Apart from **densification**, our building contributes to the **15-minute concept** of the village by offering offices and workplaces for people who live nearby. In this case, inhabitants of Oostakker won't have to travel far to go to work, and all needs will be met within 15 min. distance.



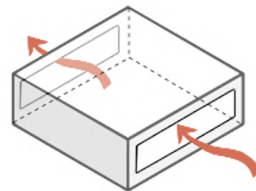
3. VIEWS

The shape of our design derives from the three main views we wanted to provide for the citizens of Oostakker. By playing with modules, we create terraces that will give views towards the Sint-Amanduskerk **church**, the **kiosk** in the centre, and towards the **harbor** from the rooftop.



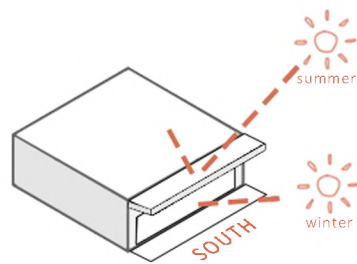
4. GREEN RIBBON

By transforming the roads of the centre into **car-free streets**, a large green park is formed in the middle of Oostakker. Since our building is located inside of it, we have aimed to create a **strong bond** by creating a **green ribbon** that connects the park with our terraces.



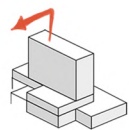
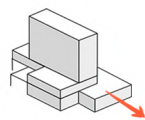
5. NATURAL VENTILATION

The building is **one module wide** so that the flats can benefit from a cross ventilation coming from two sides.



5. SUN SHADING

From the south, each apartment has its own **balcony**, which provides **protection from overheating** in summer.



view towards the church and the park



view towards the harbor

SUSTAINABLE CONCEPT

existing: 2020

church: 930 m²
clergy house: 614 m²
green areas: 3120 m²

new impact: 2050

wash bar: 120 m²
offices: 120 m²
stores: 180 m²
circulation: 560 m²
restaurant: 340 m²
residential: 750 m²
terraces: 180 m²
new green: 4700 m²

total area: ≈ 7200 m²

170 new customers:

restaurant
washbar
stores
terraces

50 new employees:

restaurant
washbar
stores
offices

30 new inhabitants:

10 apartments
5 studios

materials

- prefabricated concrete elements
- reclaimed bricks

food

- greenhouse
- food garden in 3 modules :
2-4kg/m² of food.
360-720kg veg./year

mobility

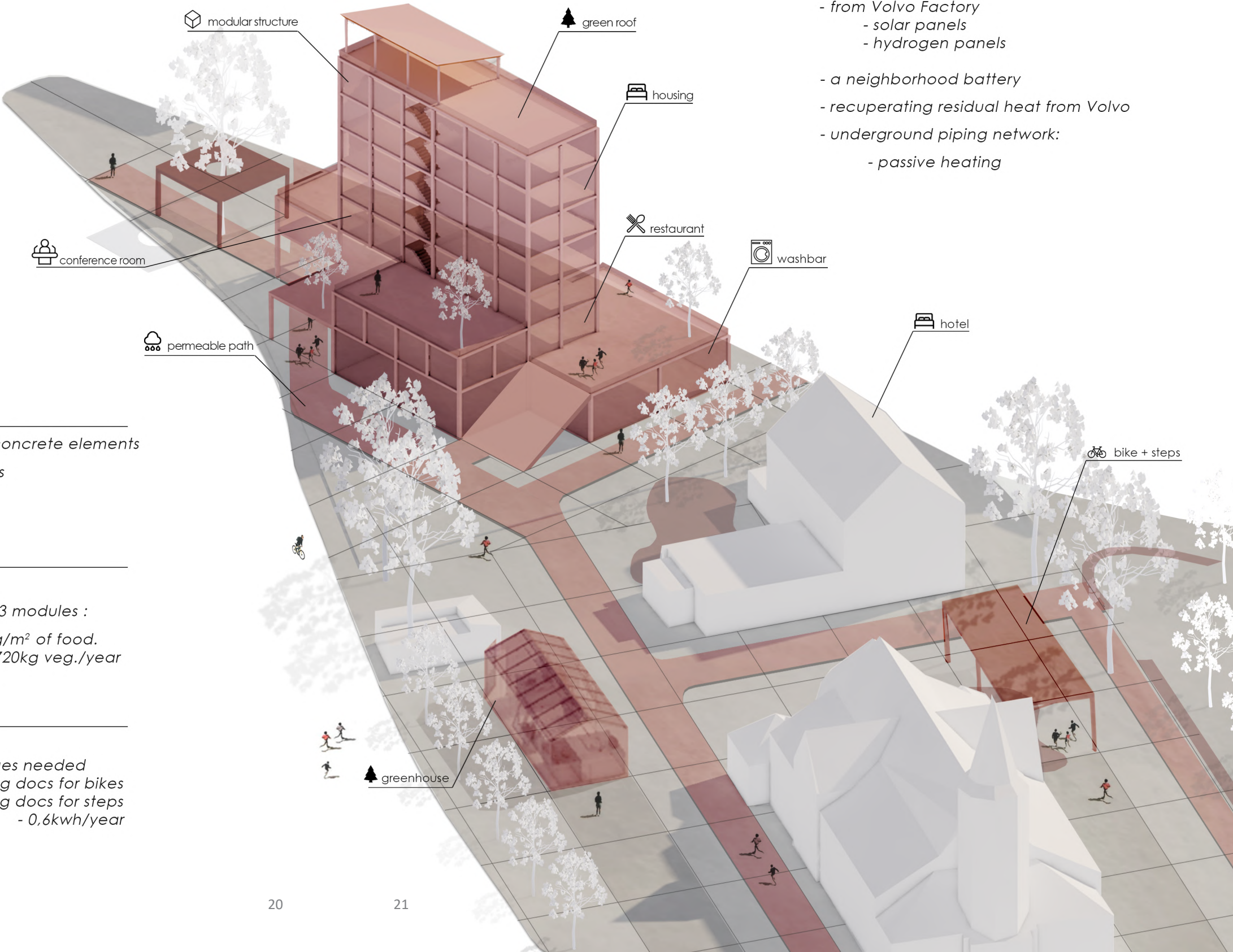
- car-free streets
 - no garages needed
 - 20 loading docs for bikes
 - 7 loading docs for steps
 - 0,6kwh/year

water

- sustainable shower head (6L/min)
- water pond in 2 modules 7.8 x 7.8m:
120m² x 2m depth
store 230000L for reuse

energy

- from Volvo Factory
 - solar panels
 - hydrogen panels
- a neighborhood battery
- recuperating residual heat from Volvo
- underground piping network:
 - passive heating

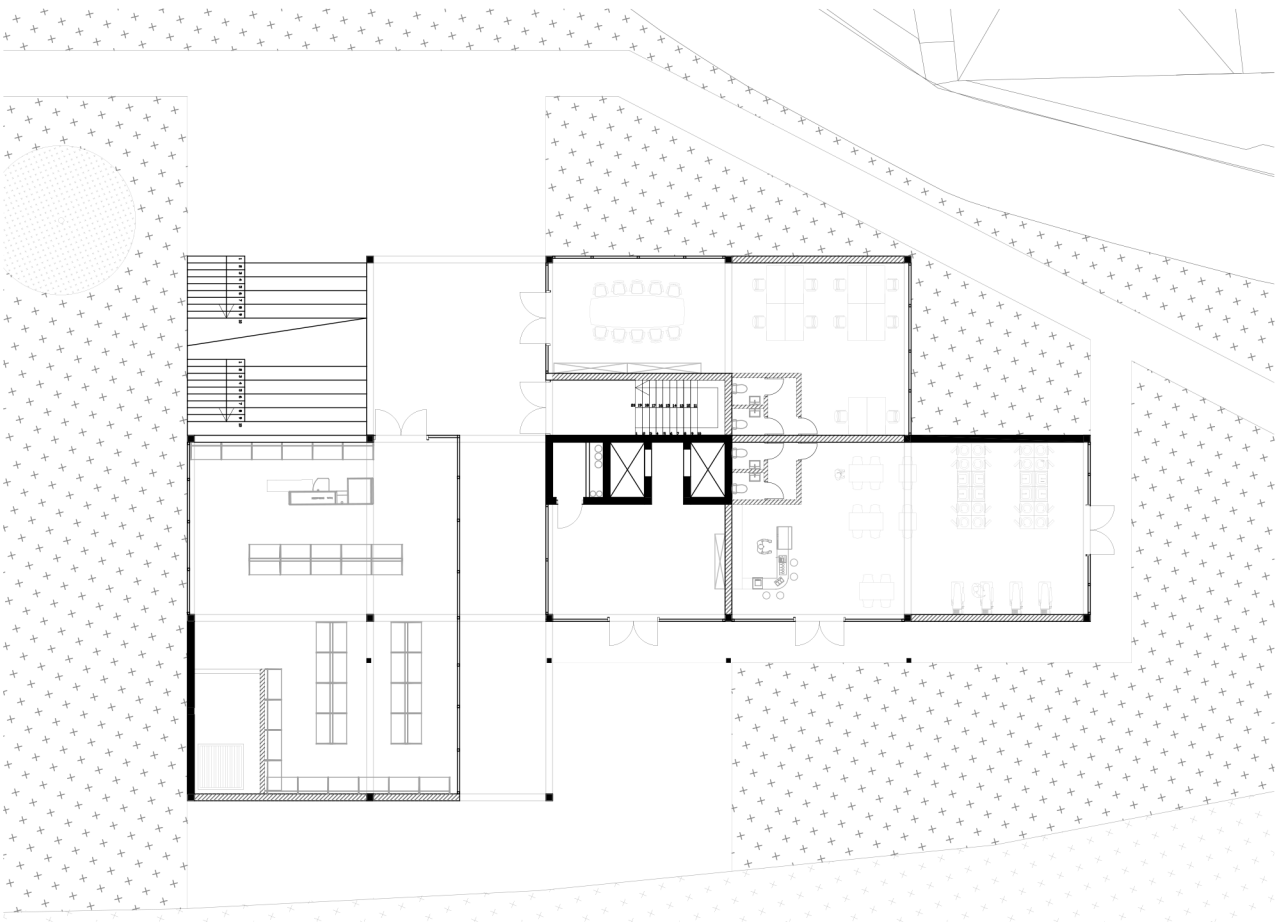


FLOOR PLANS

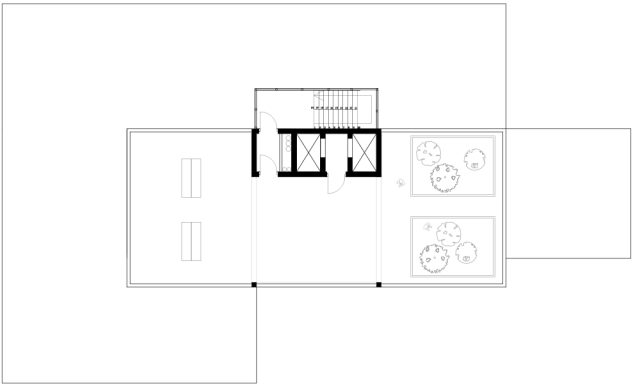
Densification is achieved by combining a multitude of programs in one building. The lower levels house public and commercial spaces and residential units in the tower section accommodate 15 families.

Each residential level can hold two apartments and a studio. The structural system also allows the layout to be changed in the future, allowing for two larger apartments for instance.

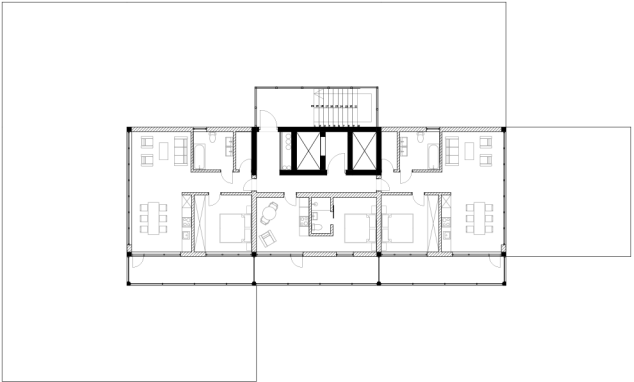
An office and a conference room aim to diminish the need to travel to work by placing the workspaces within reach of the citizens. The grocery store can sell the locally produced food, thus further reducing unnessecary transport. The café and restaurant can serve as meeting places; strengthening the sense of community.



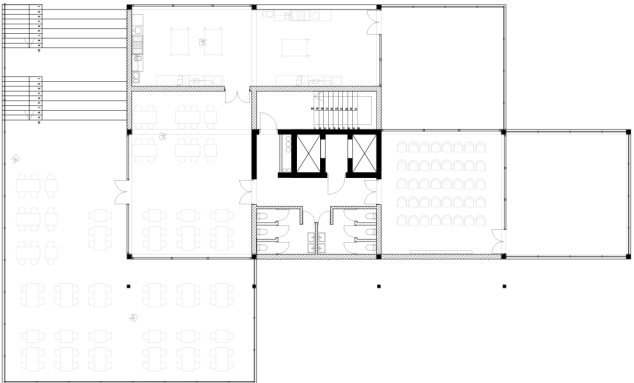
GROUND FLOOR
grocery store
office space
bar



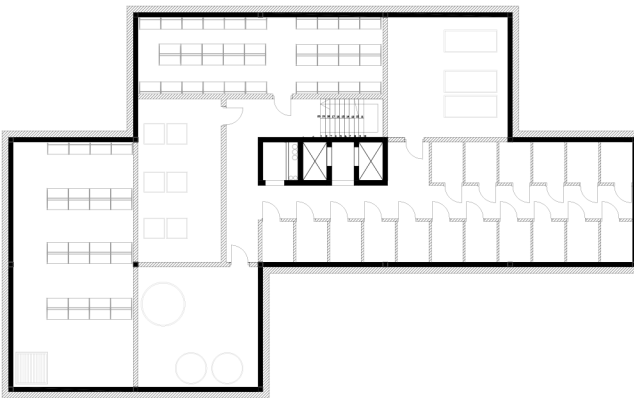
LEVEL 7
rooftop terrace
accessible to visitors



LEVEL 2-6
apartments
studio dwellings



LEVEL 1
restaurant
conference room
restrooms

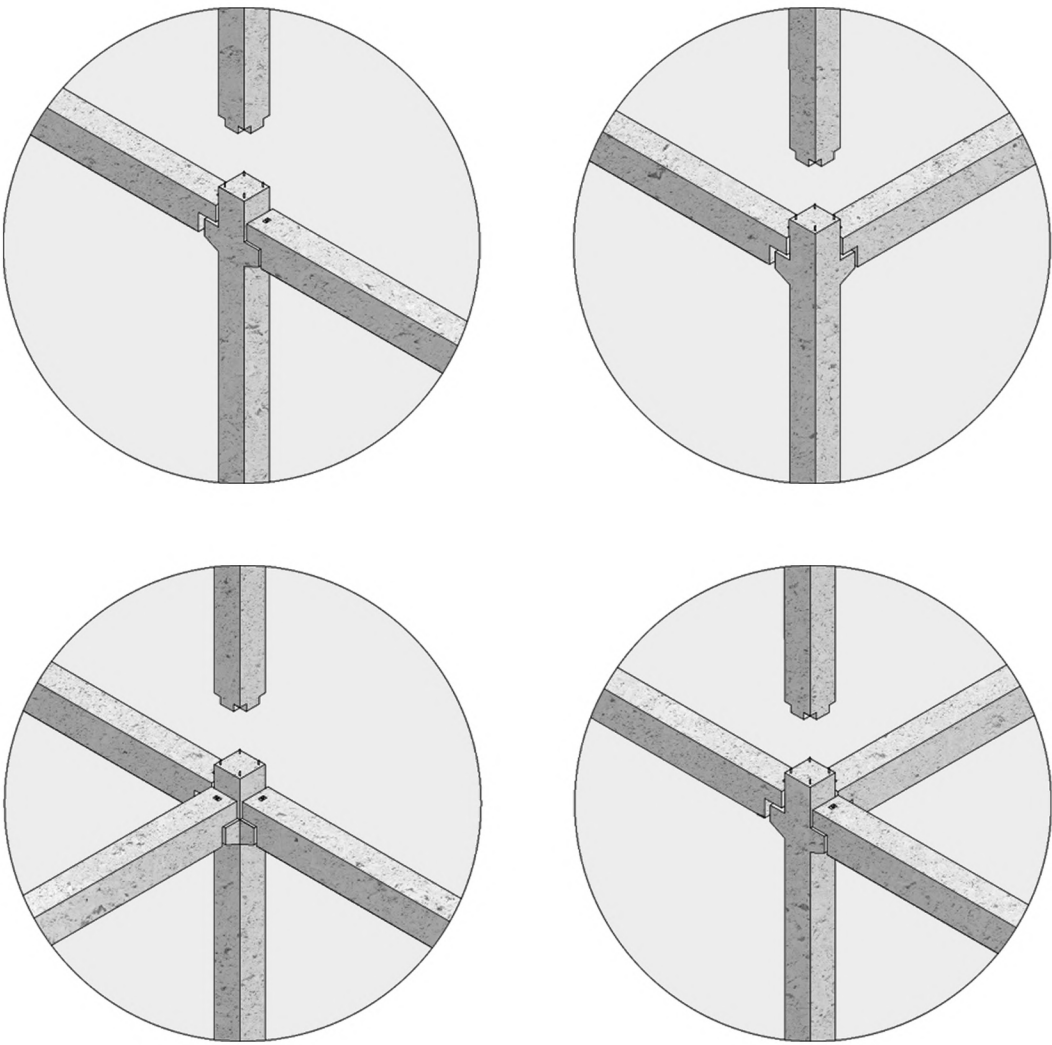
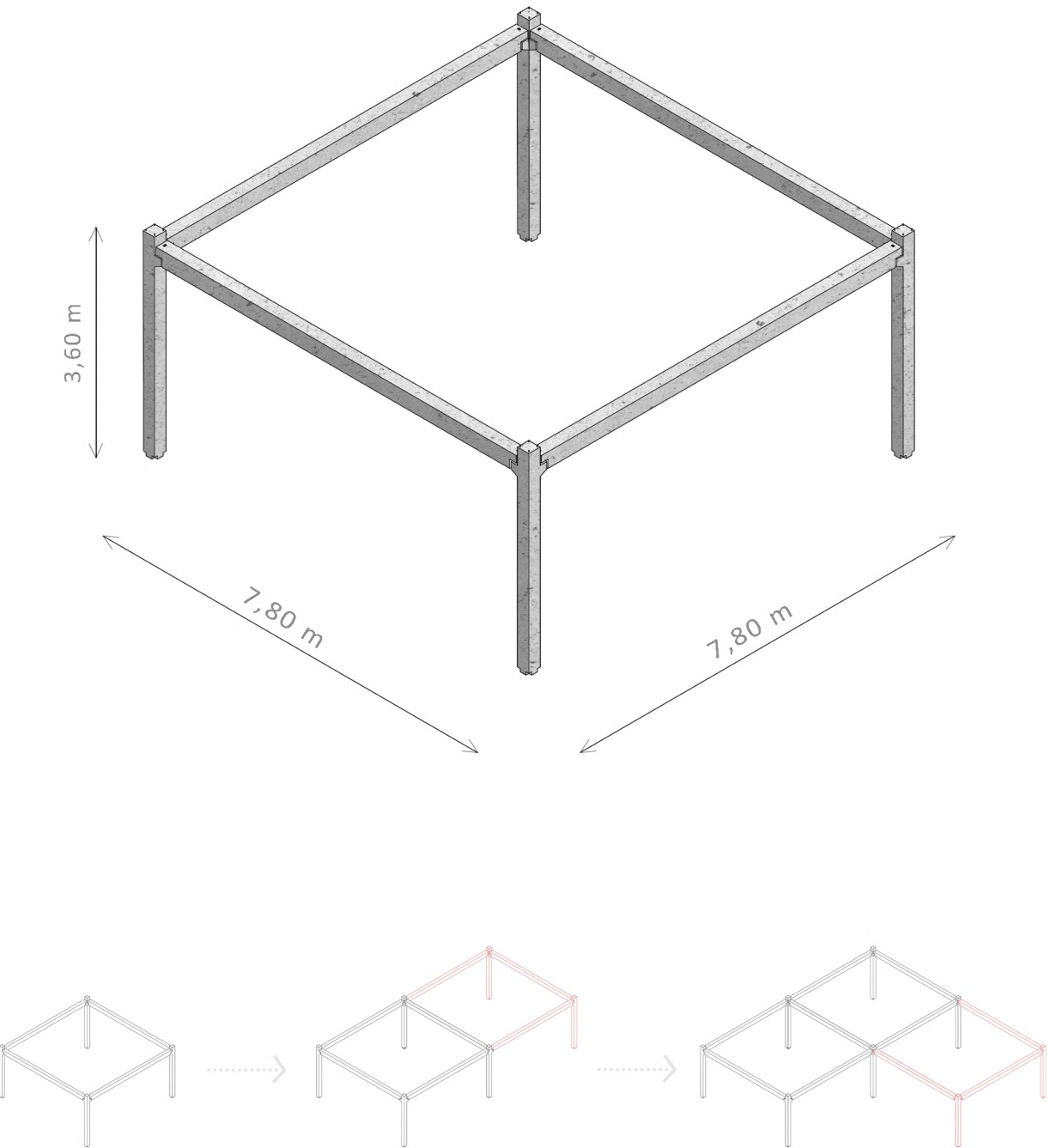


BASEMENT LEVEL
storage rooms
technical equipment

THE DETAIL SCALE

MODULES

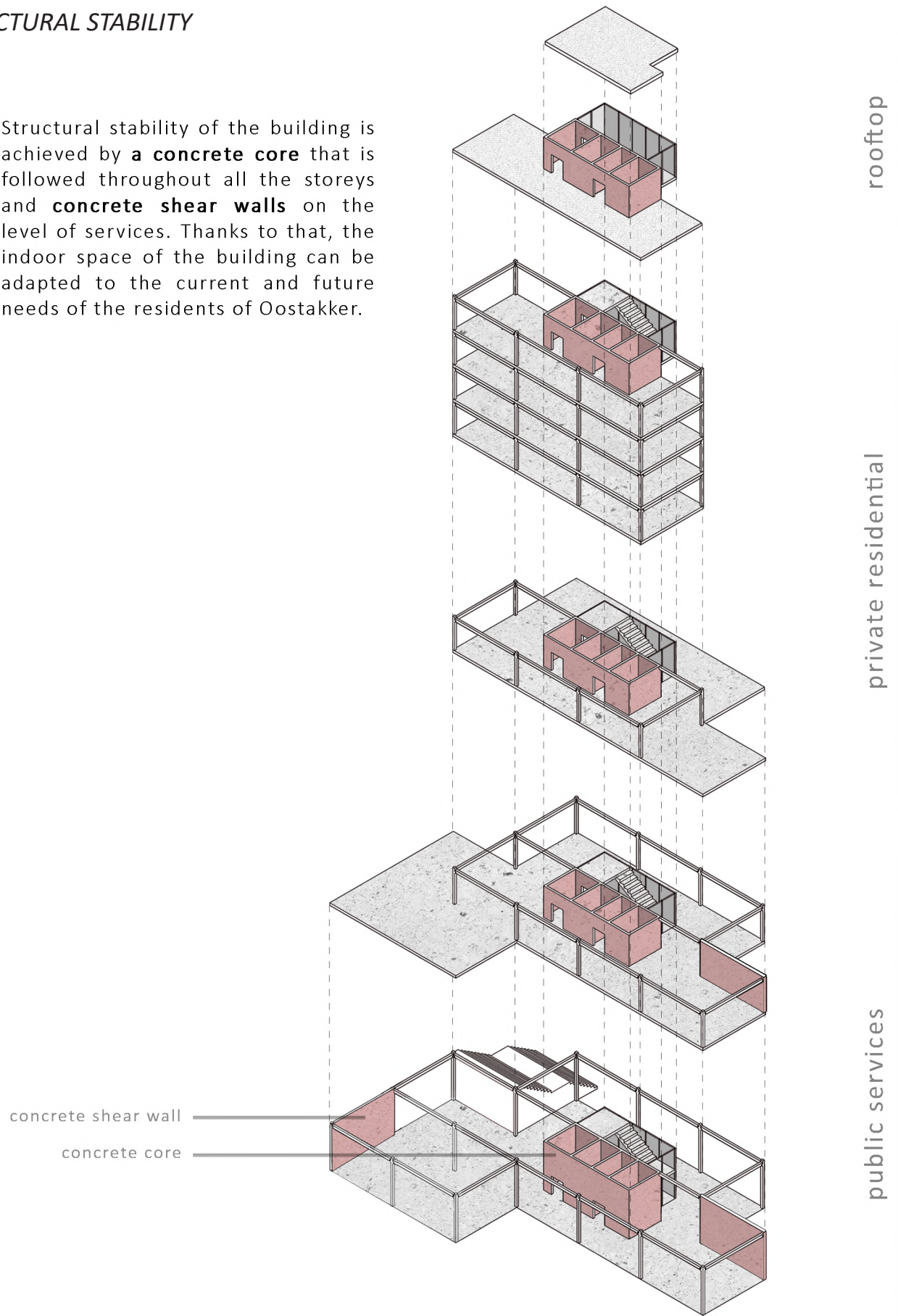
The module of **7,80 m x 7,80 m x 3,60 m** consists of precast concrete columns and precast concrete beams connected with dowels in steelbox tubes. The chosen module (with the surface of 60 m²) can fit multiple functions such as flats, offices, stores and parking spots that can be changed and expanded in the future, depending on the preferences of its users.



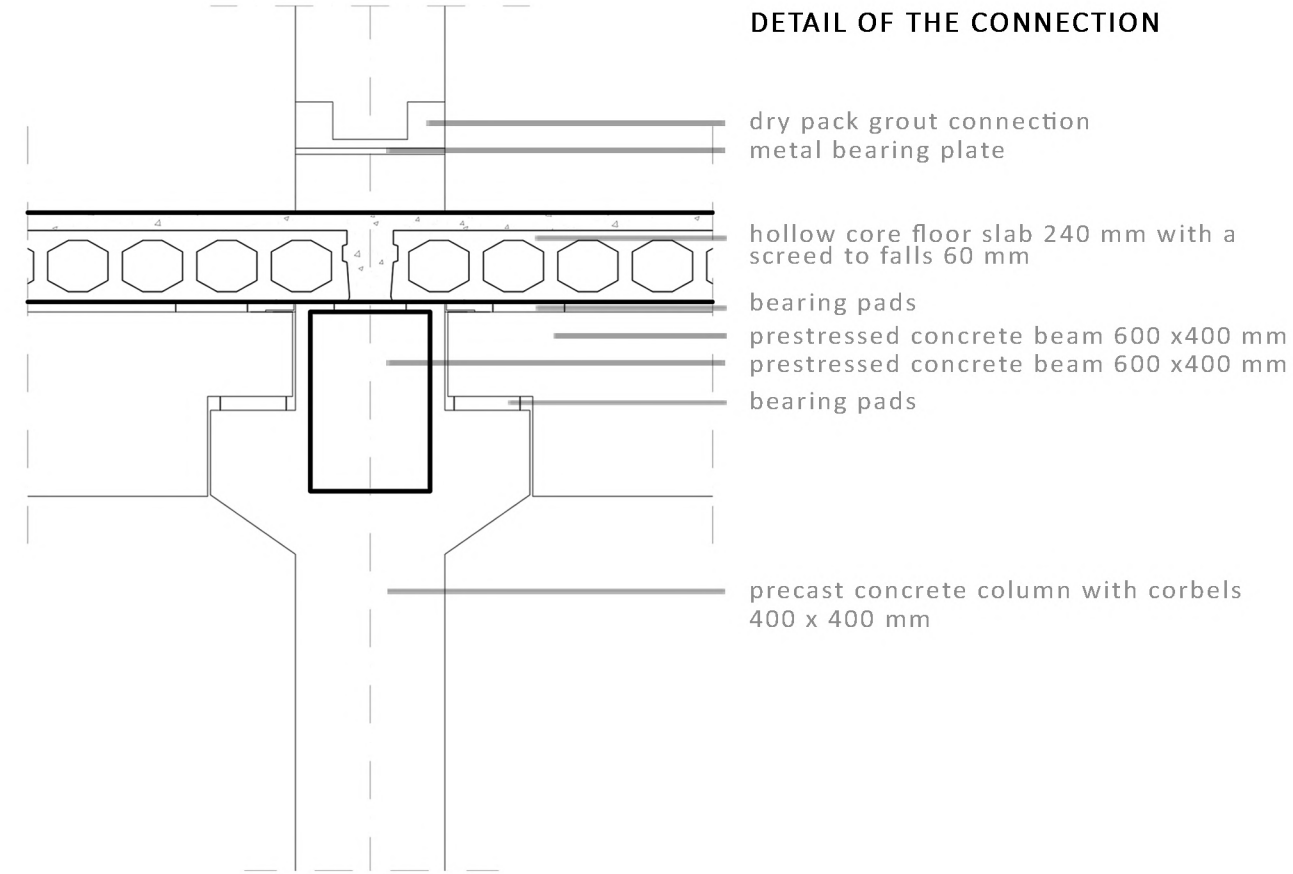
Column-to-beam connections

STRUCTURAL STABILITY

Structural stability of the building is achieved by a **concrete core** that is followed throughout all the storeys and **concrete shear walls** on the level of services. Thanks to that, the indoor space of the building can be adapted to the current and future needs of the residents of Oostakker.



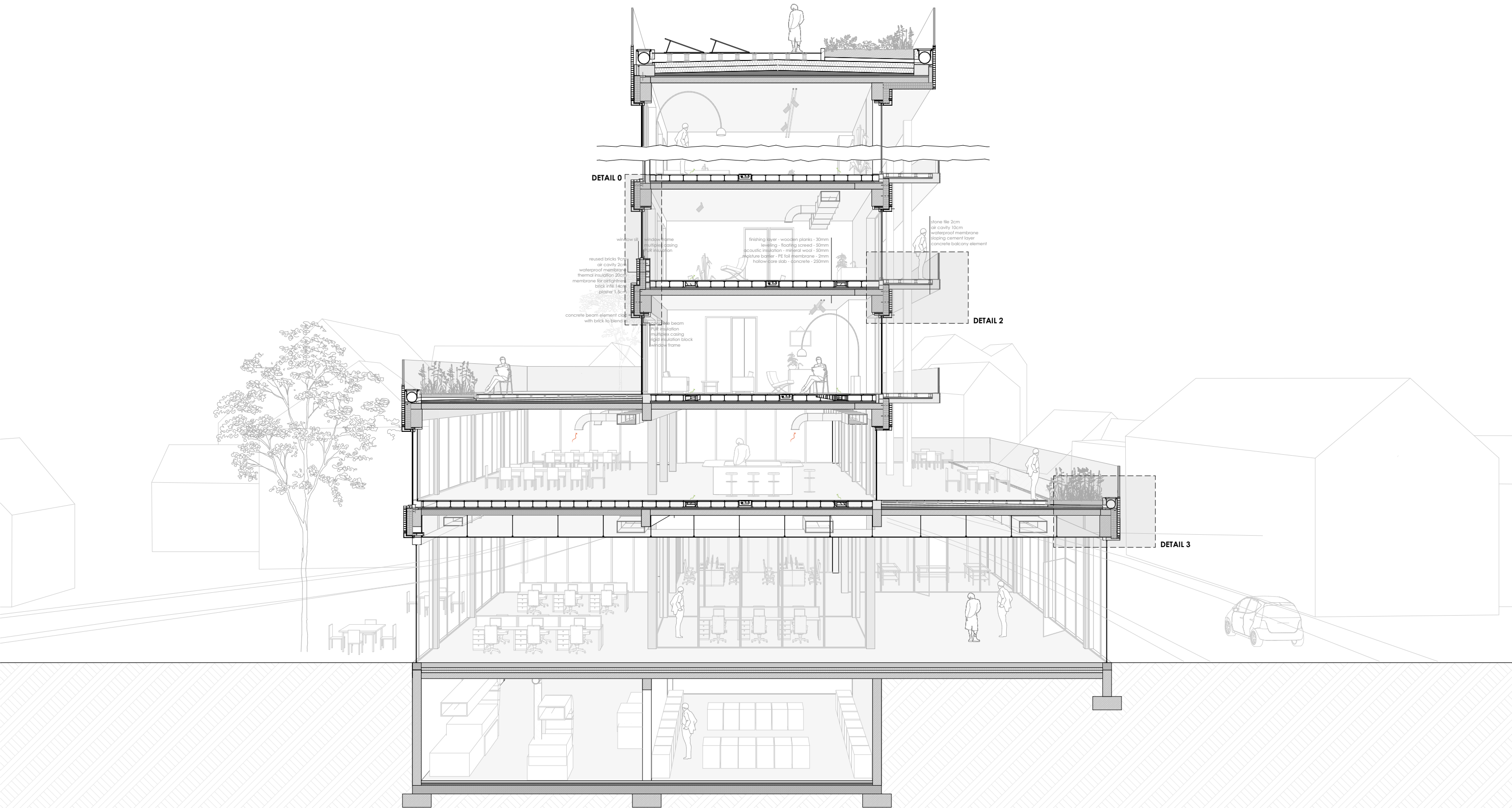
PREFAB STRUCTURE

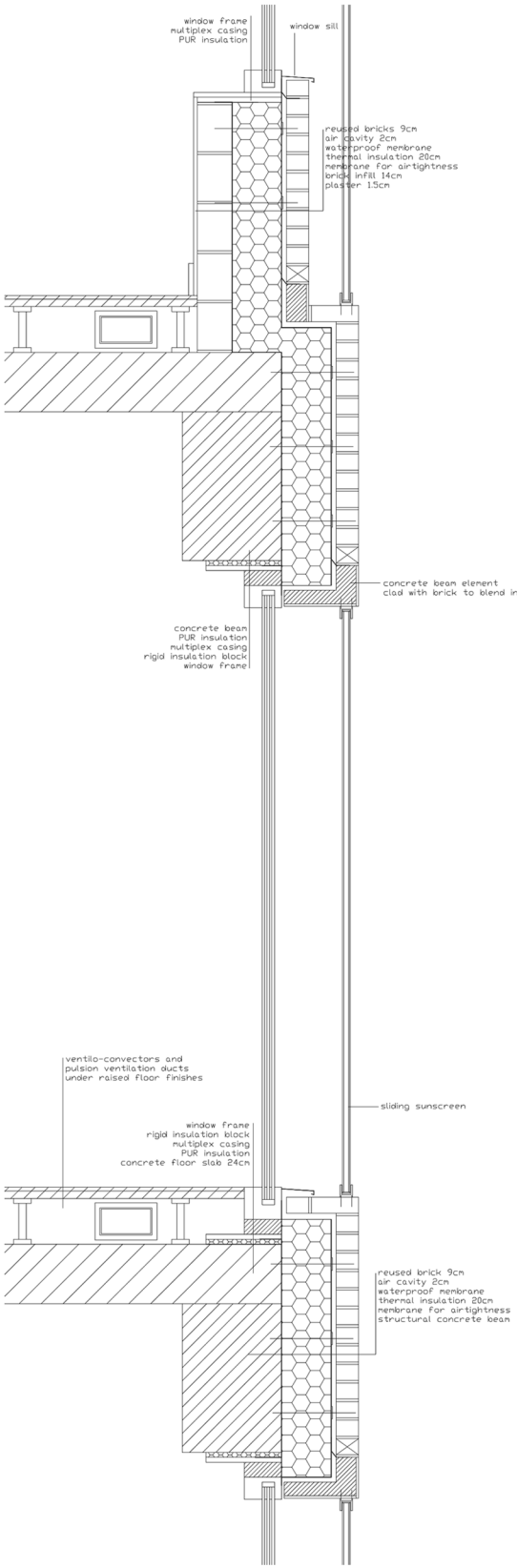


The structure of the building aims to be **durable and adaptable in the future**. To achieve that goal, we chose a modular concrete framework that would consist of only **prefabricated structural elements**. Following that concept, precast concrete beams are placed on precast concrete columns with corbels and covered by

a hollow core floor slab. Various joists are made with the use of dry pack grout, metal bearing plates, bearing pads, steelbox tubes and dowels. Because all the elements of the module are prefabricated, the building can be erected faster and easier than usual.

SECTION





DETAILS
representing a modular structure

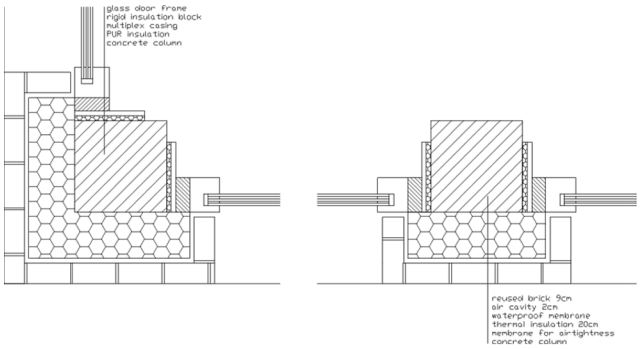
To express the modular structural system, a grid of horizontal and vertical bands is readable on the facade. The bricks roughly follow the concrete beam and slab elements, thus giving the facade a depth.

The eastern and western faces of the building are equipped with a sliding sunscreen to deal with harsh sunlight. Occupants can slide these screens to their liking.

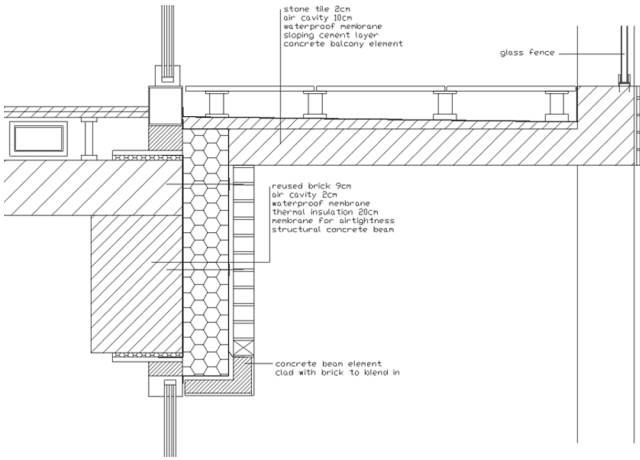
The bricks are repurposed from the demolished buildings that previously stood on site. The first residents are given the opportunity to choose the particular bricks that will make up ‘their’ part of the facade; a process which establishes an emotional connection to the building.

FACADE SECTION
facing east/west
with sunsreen

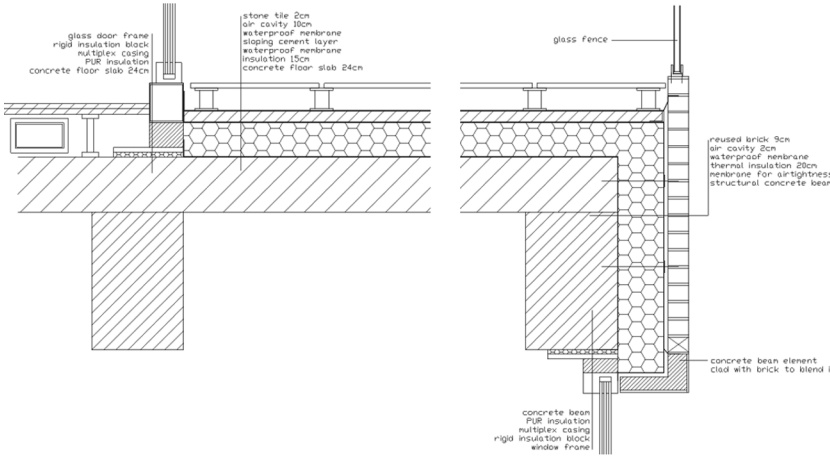
DETAIL 1
fully glazed facade
horizontal section



DETAIL 2
south facing balcony
vertical section

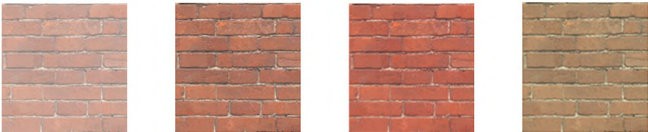
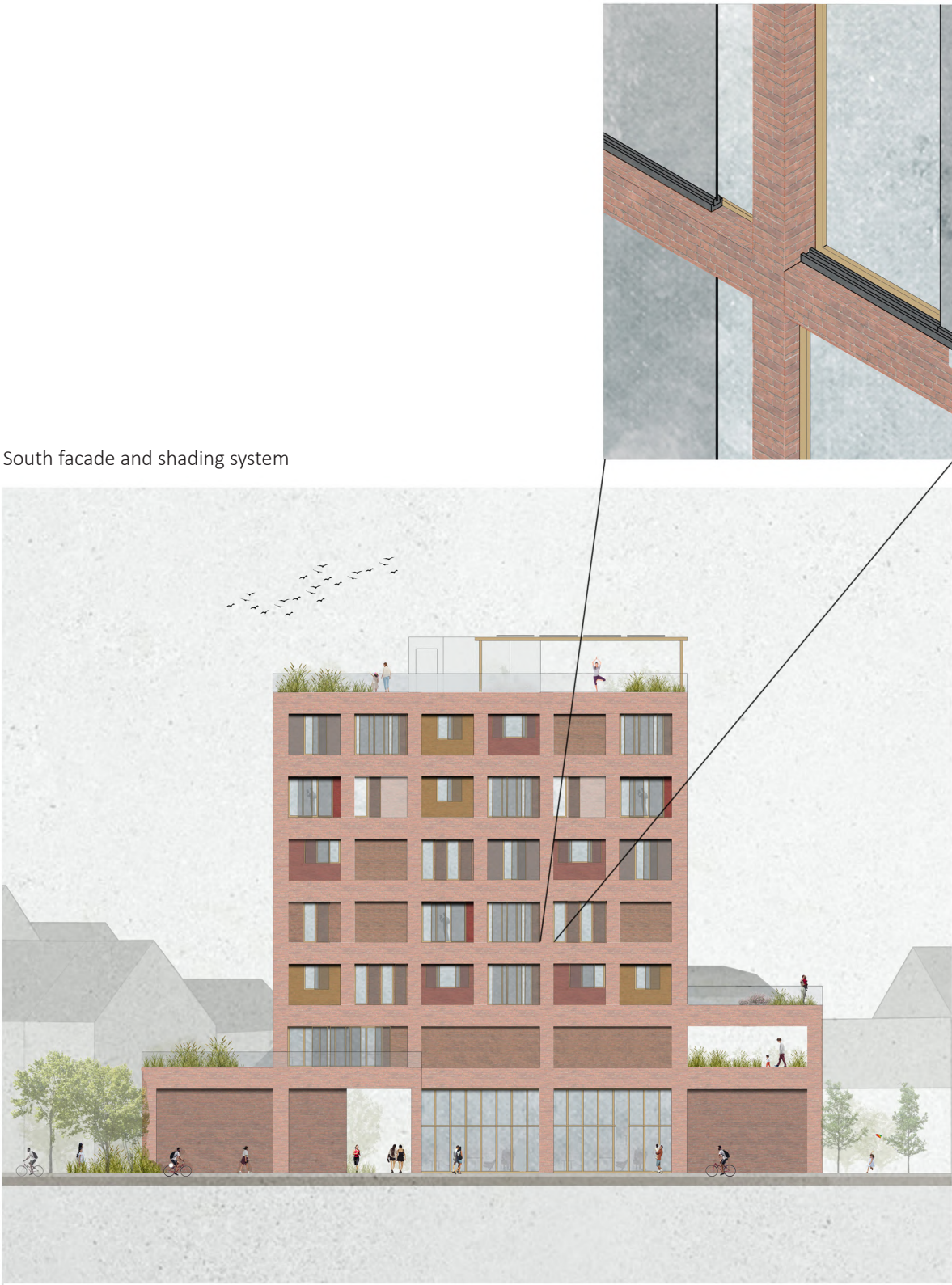


DETAIL 3
rooftop balcony
vertical section



ATMOSPHERE

FACADES



To keep the identity of Oostakker and make the facade of each module more personal, we decided to use **reclaime bricks** in different tones, depending on the **preferences of residents**.

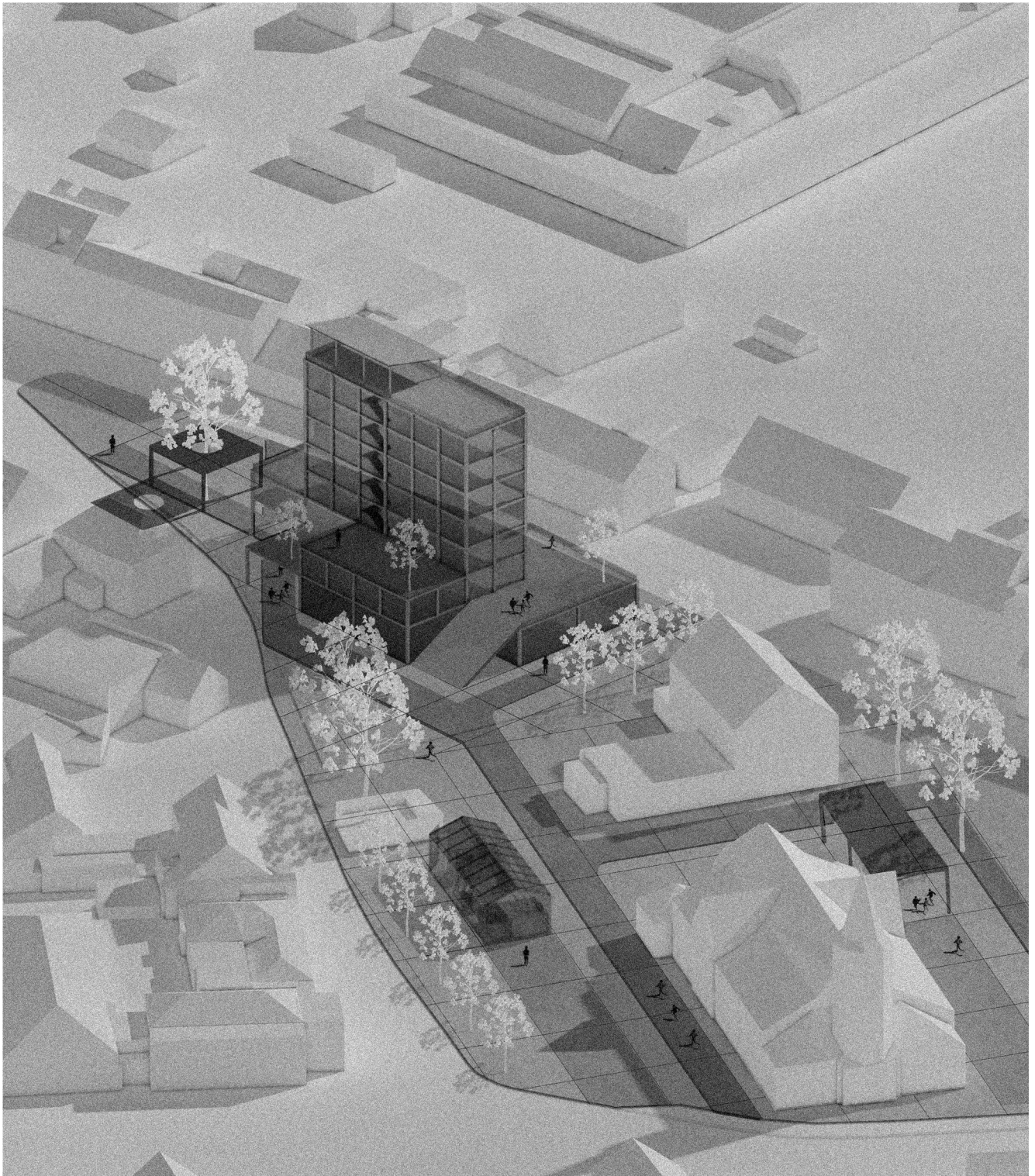
West facade



VIEWS







The new concept for Oostakker aims to bring it back to life and benefit both the local community and the citizens of Ghent. The main goal of **the 15 minute village** is to meet all the needs of the residents within the walking reach. In that way the village will not only become a lively environment keeping its inhabitants but also a landmark attracting new visitors. By appreciating the existing structures and readapting them to the needs of the public, the project keeps the most essential value of the village- **its identity**. At the same time the

vision involves creating a new multifunctional building hosting various services as well as flexible housing units. **Adaptability** of the spaces is achieved by working with **a modular framework** implemented on the building and its surroundings. Modules based on prefabricated concrete components provide a durable structure that can be easily assembled and reused. While the future means an inevitable change, the new Oostakker can have it in its own favour and keep improving the lives of its people at all times.