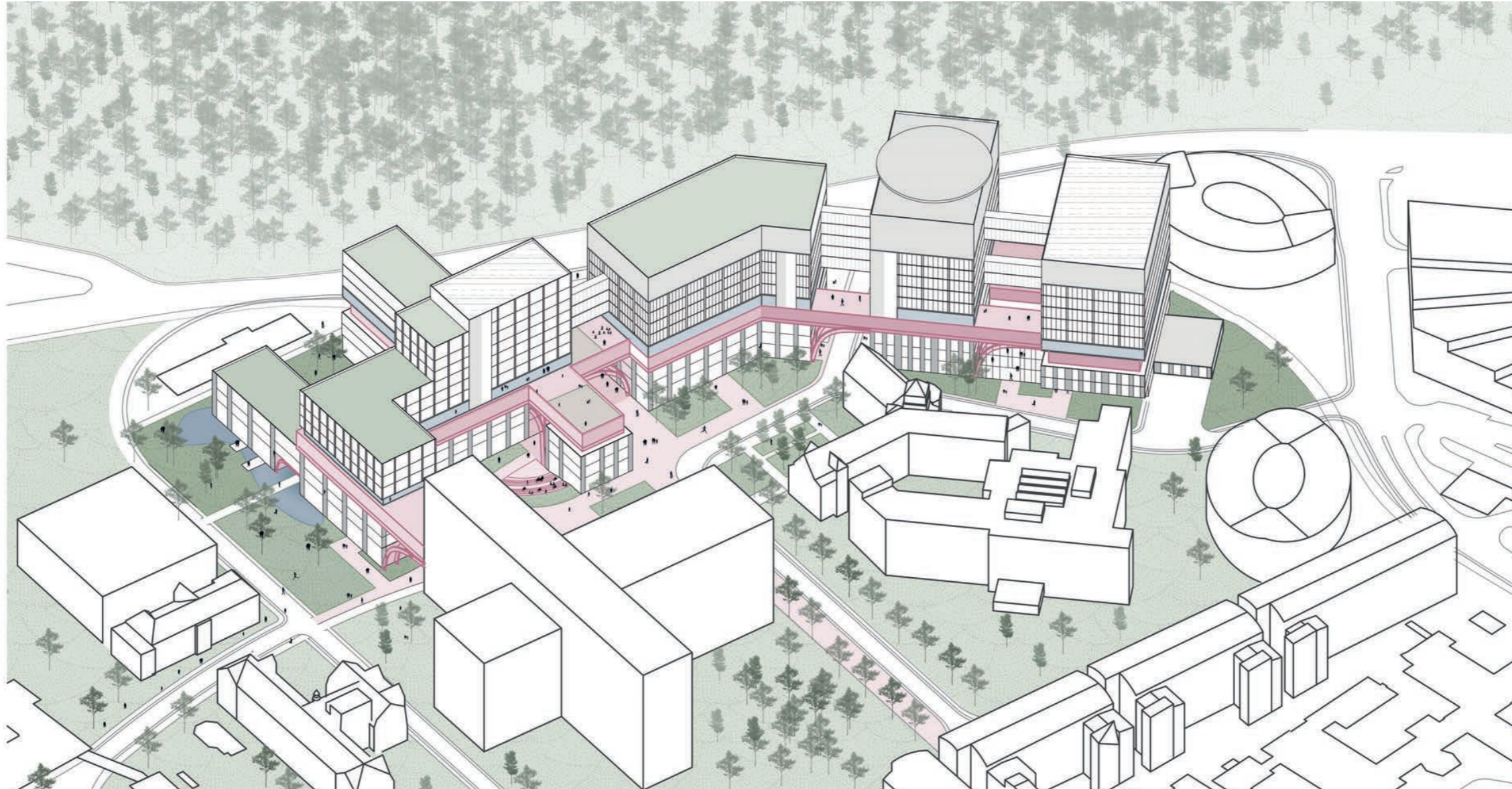


# LIVELY PIER

Lund University Hospital

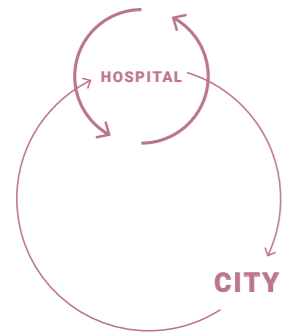


Regina Carlén, Bénédicte Chevalier, Louise Lafage

ARK263 \_ Future visions for healthcare, housing and work 3

Healthcare Architecture MPARC 2019\_20

# INTRODUCTION



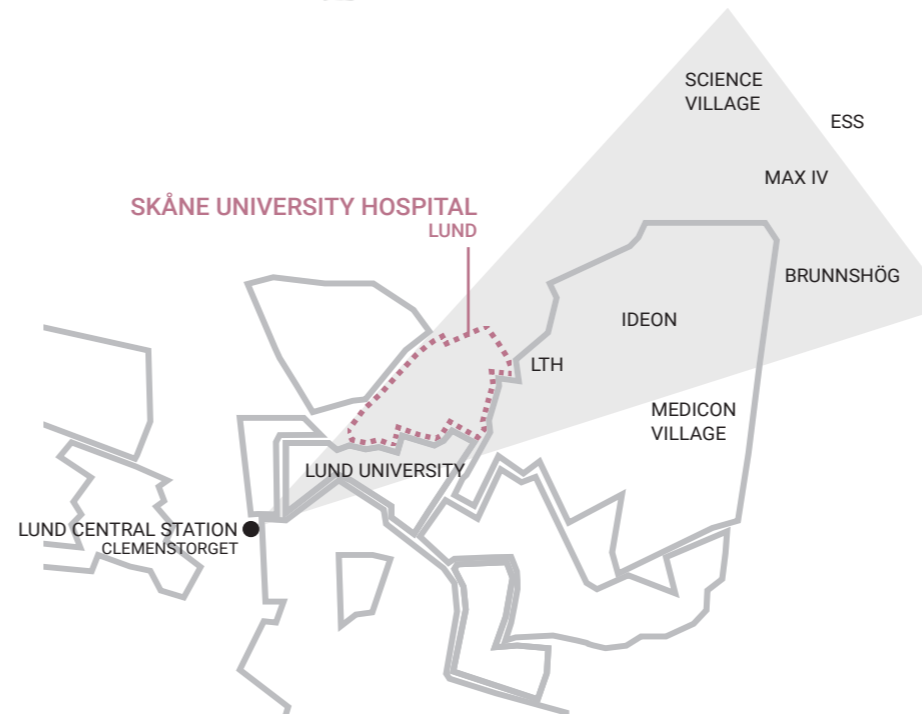
## A major expansion for Skåne University Hospital!

**AN INTEGRATED HOSPITAL IN LUND CITY**  
 Skåne University Hospital is currently planning for a forthcoming period of larger expansions. The goal is to meet future needs, while adapting to technical and medical development and becoming a well-integrated hospital in the future Lund city. Healthcare will be developed side by side with other professions in order to reach a multidisciplinary workplace where collaboration is key with education, science, business and city. Along with these developments there will also come huge investments in infrastructure, development of residential areas and working areas.

**HIGH-TECH SPECIALISED HEALTHCARE**  
 Region Skåne has a national mission to provide Sweden with national high-tech specialised healthcare within certain areas. Therefore, the task is to develop a rather complex program of 111 000 m<sup>2</sup> in a first phase. The hypothesis being that this will be added in the centre of the existing hospital area. Efficient flows and the possibility of close collaboration between the existing hospital as well as within the new hospital are essential.

**THE PATIENT AND THE PERSON**  
 The patient's safety is of utmost importance to Region Skåne as well as this project. This comes along with providing good spaces for everyone to live and thrive in. Everybody is equally important when thinking of safety: children, staff members, relatives, stakeholders or people passing by.

**MEETING UPCOMING MEGA TRENDS AND CLIMATE CRISIS**  
 To meet future challenges with a growing and aging population, a current increase of sedentary lifestyles, the post-antibiotic era that is to come and global warming, this project has put extra focus into sustainability and future-proofing.



**UNIVERSITY HOSPITALS IN SWEDEN**  
 Regional healthcare centres are located in seven different Swedish cities. National high-tech specialised care is then provided in five places, including Lund.

**LUND CITY IN REGION SKÅNE**  
 In 2018 there were around 122 000 inhabitants in Lund Municipality, which is today the twelfth largest city in Sweden.

**FUTURE DEVELOPMENT PLANS**  
 The municipality and Region Skåne, together with Lund University, are currently developing future plans for the area. The Link of Knowledge will link Lund city to the Science Village in the northern east side (see the grey triangle expansion zone). This link also works as a global and national link where scientists and businesses from all over the globe can come here quickly.

“Lund creates the future—with knowledge, innovation and openness.”  
 - City of Lund

Within the Hospital area a new Hospital Link will form a new major street and connect the university to the hospital.

**ISOLATED ISLANDS**  
 Lund is a rather dense city shaped like a circle, within which there are areas that are not so well linked. Developing the hospital area is an opportunity to connect these isolated islands.

CHALMERS TEKNISKA HÖGSKOLA  
 Date: Autumn 2019  
 Group 6: Regina Carlén, Bénédicte Chevalier, Louise Lafage  
 Master program in Architecture: MPARC  
 Course: Future visions for healthcare, housing and work 3: Healthcare architecture, ARK263, 2019  
 Examiner: Göran Lindahl  
 Head teacher: Cristiana Caira  
 Supervisors: Christine Hammarling, Lin Tan, Saga Karlsson

# SITE ANALYSIS

## SITE AND CONTEXT

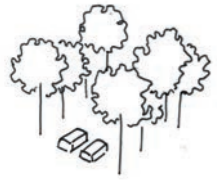
The plot is located in the central hospital area and observes clear boundaries to the tram, cemetery and large blocks within the hospital area. The central station and city centre are within a 13 minutes walking distance.

## IMPROVING LIFE BETWEEN BUILDINGS

Today there is a non-connected network of streets and paths in the area. The public ground is mainly paved surfaces and dedicated to cars, leading to an unsustainable lack of greenery on site.

## VARIOUS TYPOLOGIES

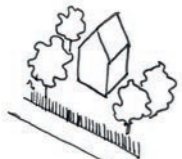
Lund city holds a broad variety of typologies and scales of spaces between buildings.



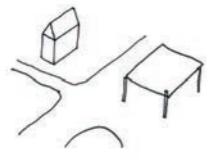
Northern Cemetery



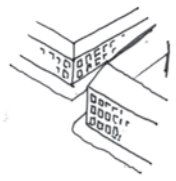
University, churches and cultural heritage



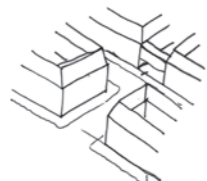
Housing in a garden city



Housing in a mixed area



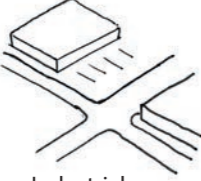
City blocks close to the train station



Lower old city blocks



Parks and Botanic garden



Industrial areas



# DESIGN STRATEGIES

## HEALTH PROMOTIVE ARCHITECTURE

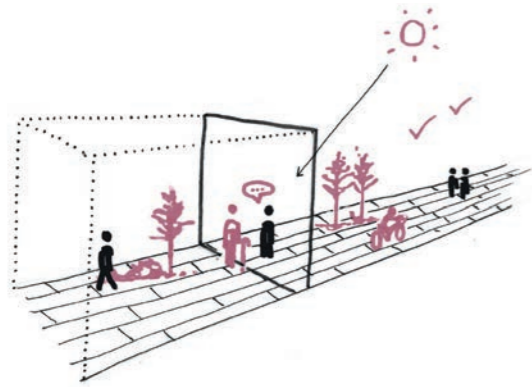
### PERSON CENTERED DESIGN

work flows, single rooms, involve patients, good work place (staff)



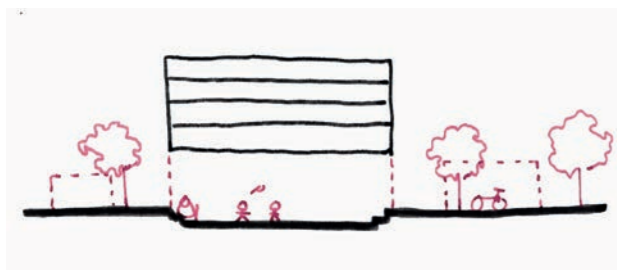
### HEALING ENVIRONMENT

interaction with greenery, social support, access to daylight, feeling of safety



### TO IMPLEMENT PREVENTION

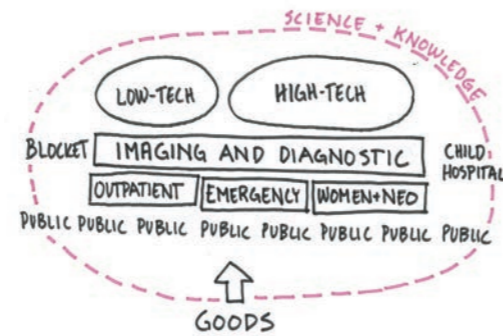
promote activities, education, teaching, interaction with researchers, improve development



## BRIEF AND LOGISTICS

### SMART EFFICIENCY

optimise and separated flows, vertical and horizontal efficiency, collaboration for staff efficiency



### TO ORIENTATE

logical, intuitive, stimulating, for first contact and everyday experience, sightlines



### INTEGRATION

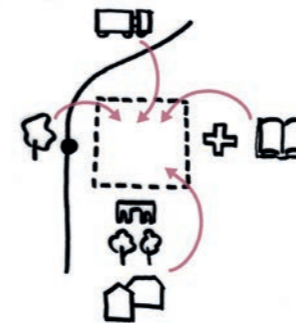
healthcare vs public ground floor, spread-out entrances vs gather public life



## SITE AND CONTEXT

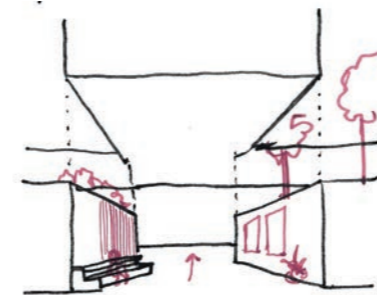
### CONNECTIONS

east-west connections, develop the new public entrance (with new tram), adapting to context



### URBAN WELLBEING

consider human scale, feeling of belonging (link to cultural heritage), accessibility, diversified



### TRANSITION

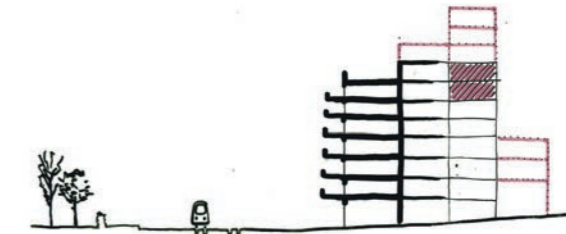
relation inside-outside, from greenery to cultural heritage, questioning front and backside



## SUSTAINABILITY AND FUTURE-PROOFING

### FLEXIBILITY

modularity, dismantled, adaptable, parallel systems, possible expansion in an uncertain future context



### POSITIVE DESIGN

local materials, minimise emission, local circular system, healthy microclimate, to give back to context



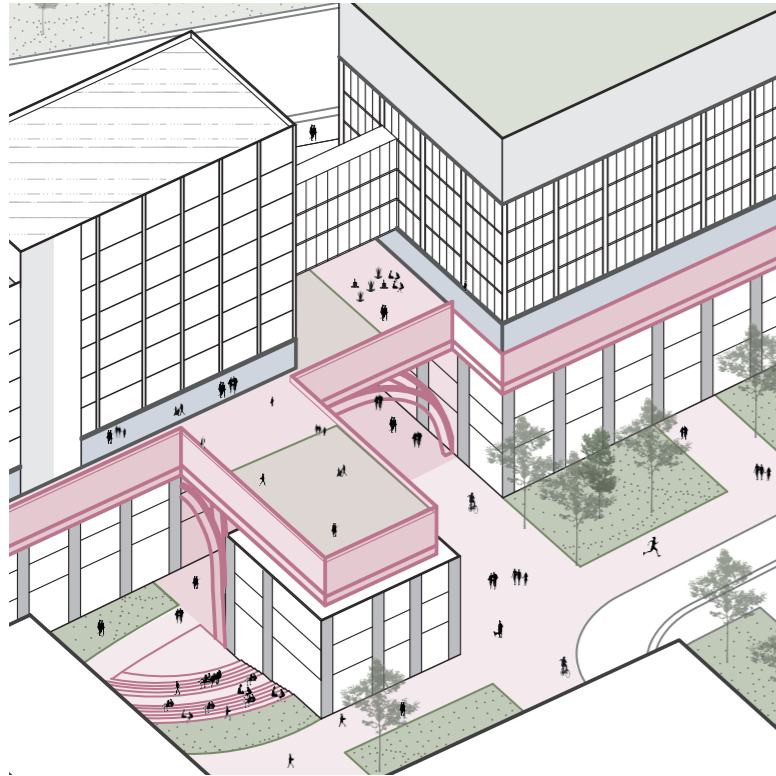
### INTERACTION

enjoyment, safety, involvement, stimulation, feeling of belonging



# SUSTAINABILITY AND FUTURE-PROOFING

## FUTURE POSSIBILITIES A SUMMARY OF THE PROJECT



### HEALTHY LIFESTYLE INSPIRATION

Prevention is a major key to deal with an uncertain future. Healthy lifestyles will be promoted within the hospital through added functions like education, conferences, exhibitions, close by recreation, gardens, gym and more. Everyday activity will also be encouraged with visible stairs, easily reached bicycles, and by planning for a diverse public space dedicated to pedestrians and adding free area, enabling children to play outside.

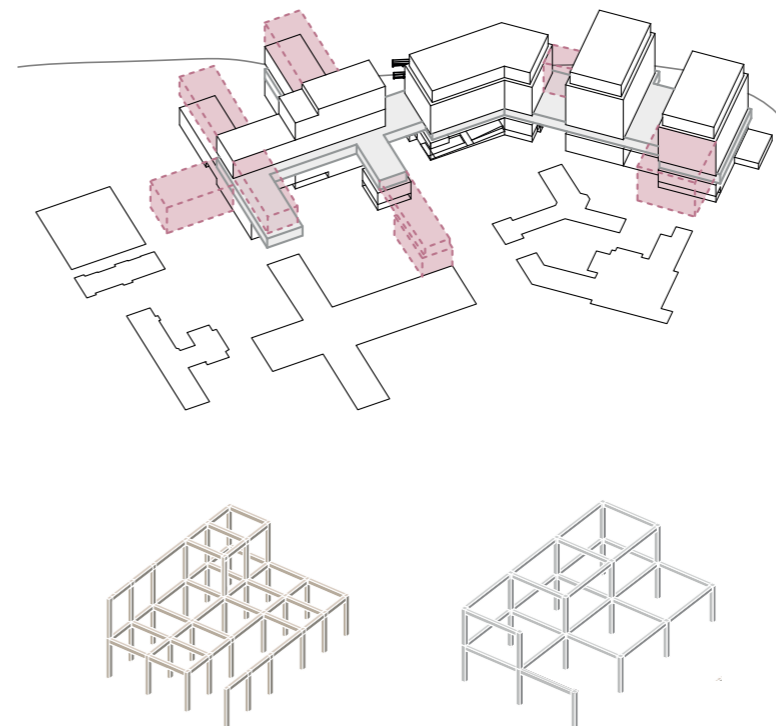
### BREAK UP THE LONELY BUBBLE

By working with interaction between layers and outside-inside, the feeling of being alone in a large structure is absent.

### POST ANTIBIOTIC ERA

To prepare for the future the project provides single rooms and several entrances.

P 13



P 6, 11

### PROMOTE FUTURE DEVELOPMENT

The patient hotel can expand into the levels of the patient wards. By building the most complex part of the structure first, the meeting of frames, future expansions towards the Radiology building, the Children hospital and Blocket is made easier. Accessing Imaging and Diagnostic being central, this function is placed as a spine.

### CHANGE OF USAGE

When the need of healthcare changes, the 22 meters wide buildings in the south can transform to hold other functions, like housing, hotels or education.

### POSSIBLE DISMANTLING

Modules, coming with a fast construction period and possible future dismantlement, work with a non hybrid construction assembling with screws and bolts.



### HOSPITAL INTEGRATED IN CITY

A public ground floor, an additional public terrace on the Pier, smaller urban volumes adapt to the city scale in the south.

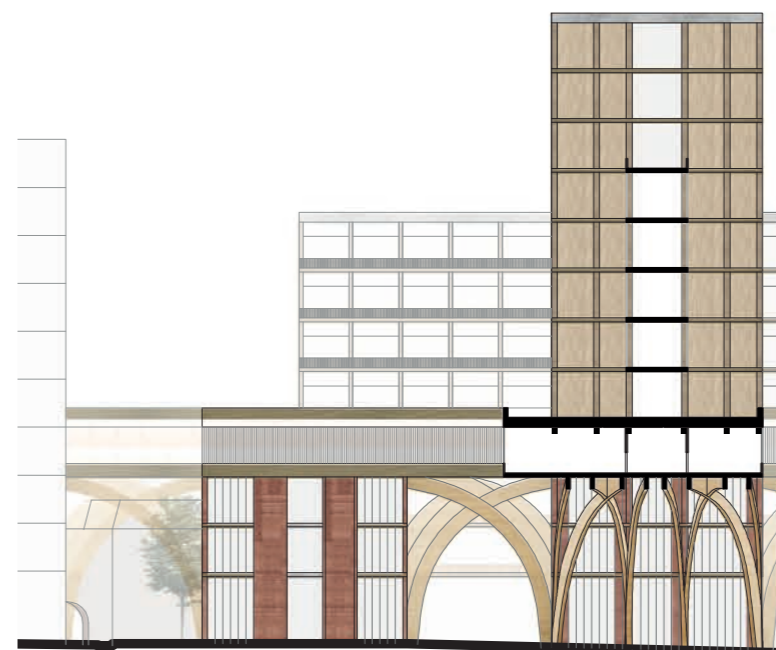
Lund now has the possibility to integrate the hospital in the city life, where it can contribute with even more positive outcomes for its closest surrounding.

### SMART WORK FLOW

The project is developed through the lens of the person. This can be noticed in the small scale, where safety for the patient is provided side by side with an area dedicated to staff where they can have a calm and efficient working flow.

Several cores provides redundancy.

P 28



P 9

### FEELING OF BELONGING

To reach a human scale, provide a feeling of belonging, connect to the cultural heritage, and maintain major sightlines due to a good orientation, there are multiple volumes. The entrances are placed under new timber arches lifting up the Pier.

### REUSED MATERIALS

By using reused materials as an orientation method, especially to show entrances within the arches and on the ground where people will move, the act of up-cycling is highlighted.

### BIODIVERSITY

Biodiversity is a central part of our ecosystems and therefore a natural element in healthcare. Closeness to wild greenery in this project will hopefully have the impact of providing stress recovery during breaks from healthcare (Evidence Based Design).

# GROWING FROM THE SITE



step 1 - public nodes & flows



step 2 - underlying frame & different scale



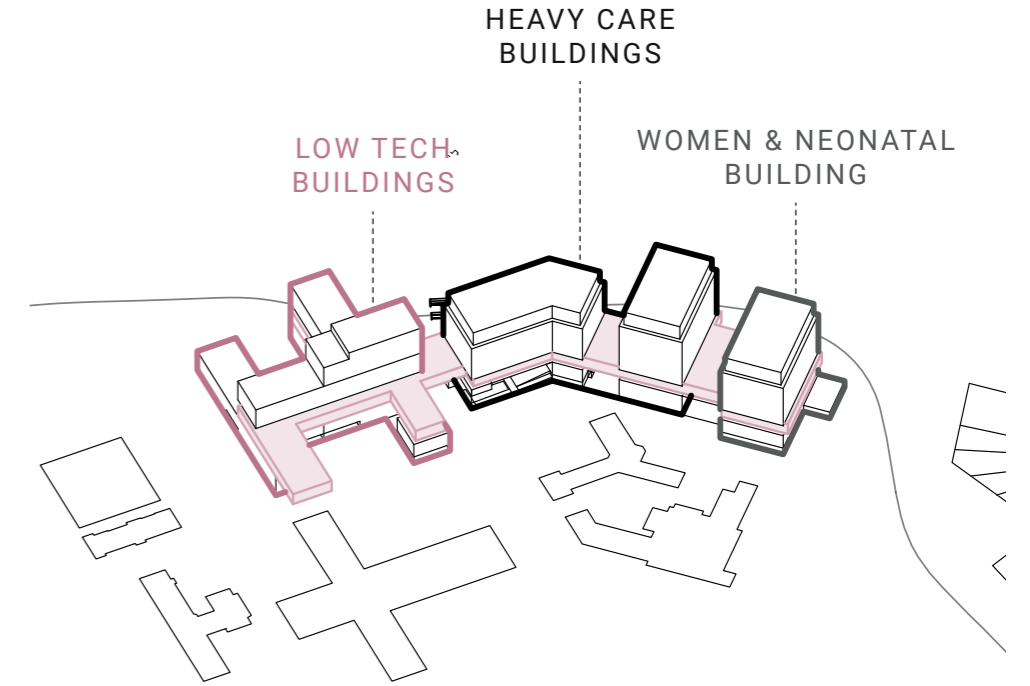
step 3 - expansion & connecting to culvert



step 4 - pedestrian & emergency flows

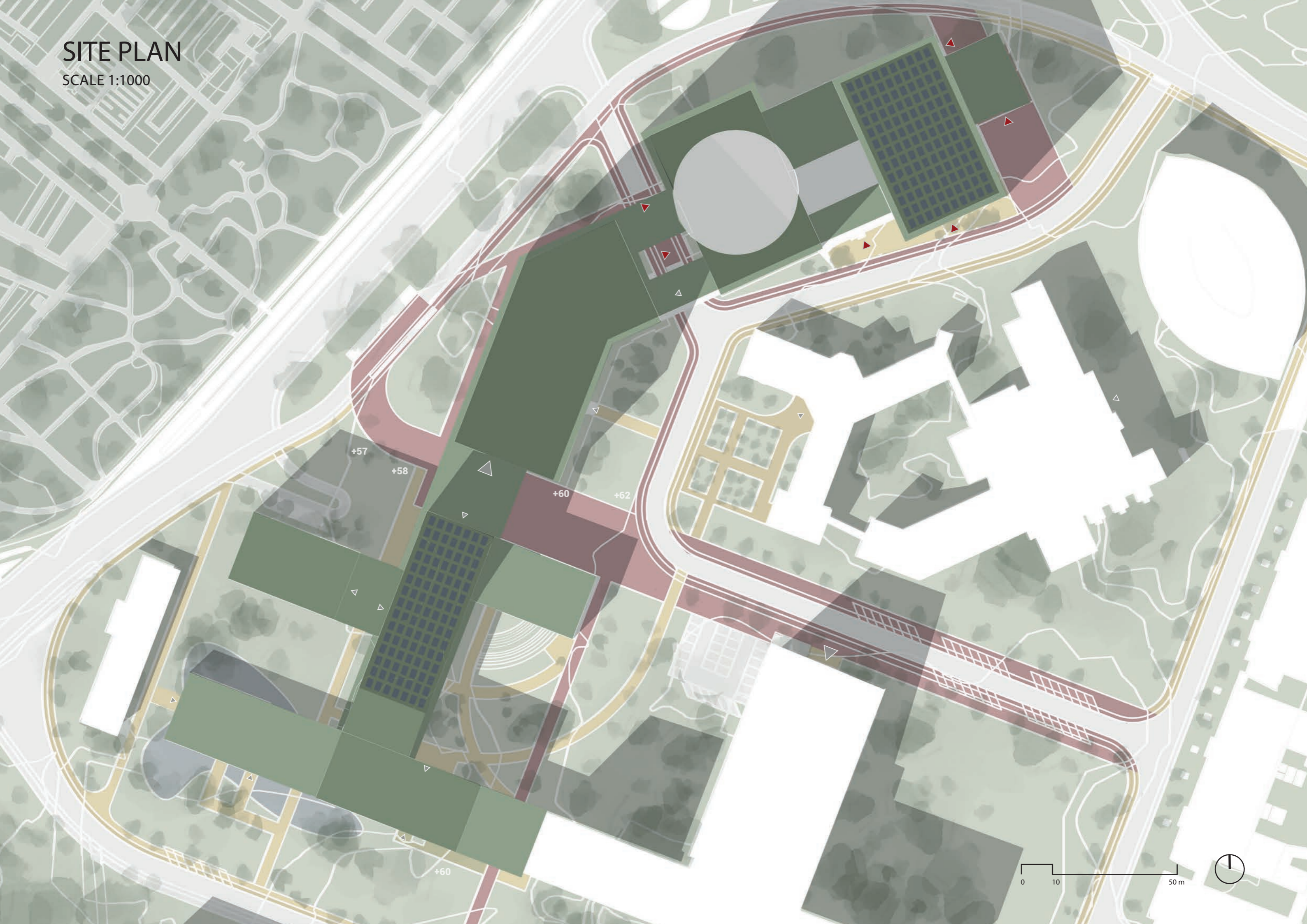


step 5 - linking greenery

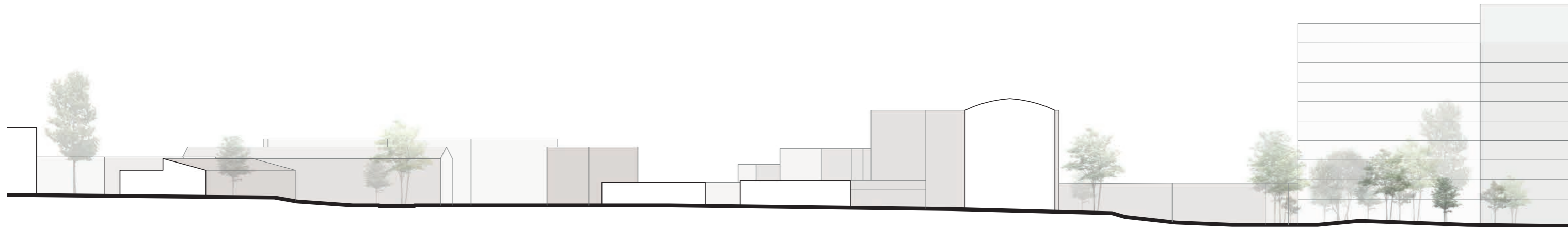


# SITE PLAN

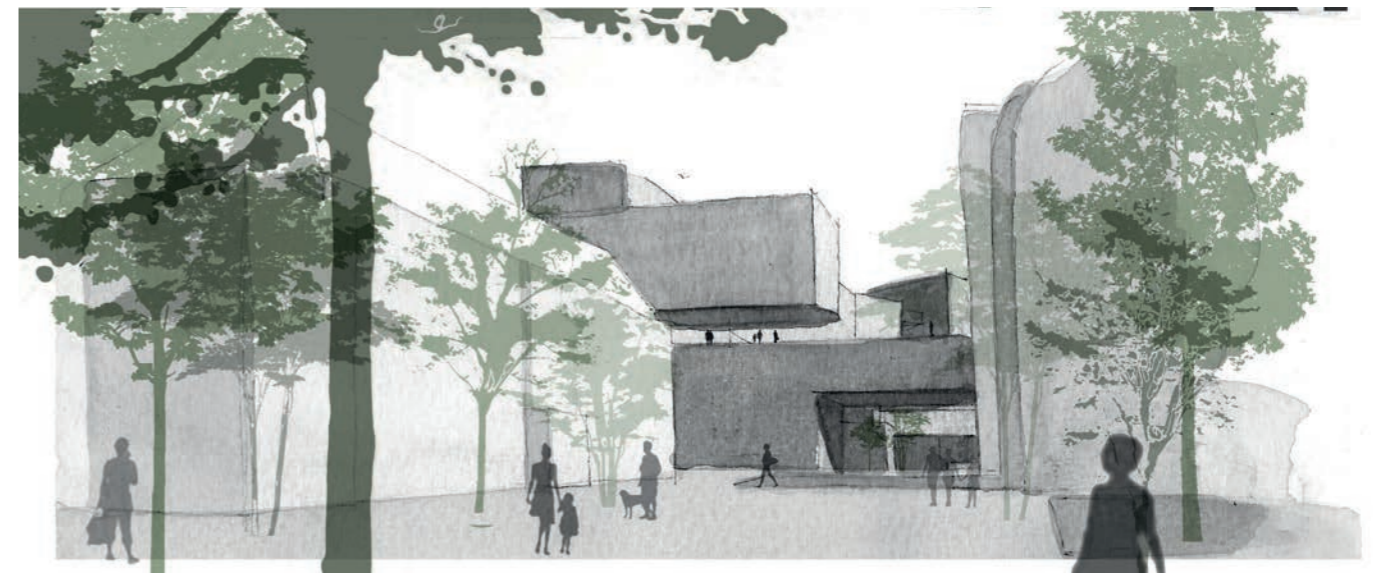
SCALE 1:1000



# FROM THE UNIVERSITY TO THE GREENERY



1. FROM THE CITY CENTRE

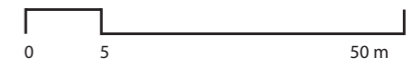


2. ENTERING THE HOSPITAL AREA





SECTION AA'  
1:1000



3. FROM THE TRAM



# LINKING THROUGH A LIVELY PIER

In order to provide the site with interaction, the different buildings are linked through a pier. This pink element connects the north of the plot to the south. The upper bridges are mostly for staff and patient in bed flow. But the pier composes the main horizontal connection for the others.

This fourth level is mainly composed from imaging and diagnostics, it welcomes above its roof free spaces for patients, relatives, staff or public. The aim is to bring life onto it. The public life could be seen from different levels and interacting through those. Then it's all about creating a second ground floor that is more safe and accessible for patients.

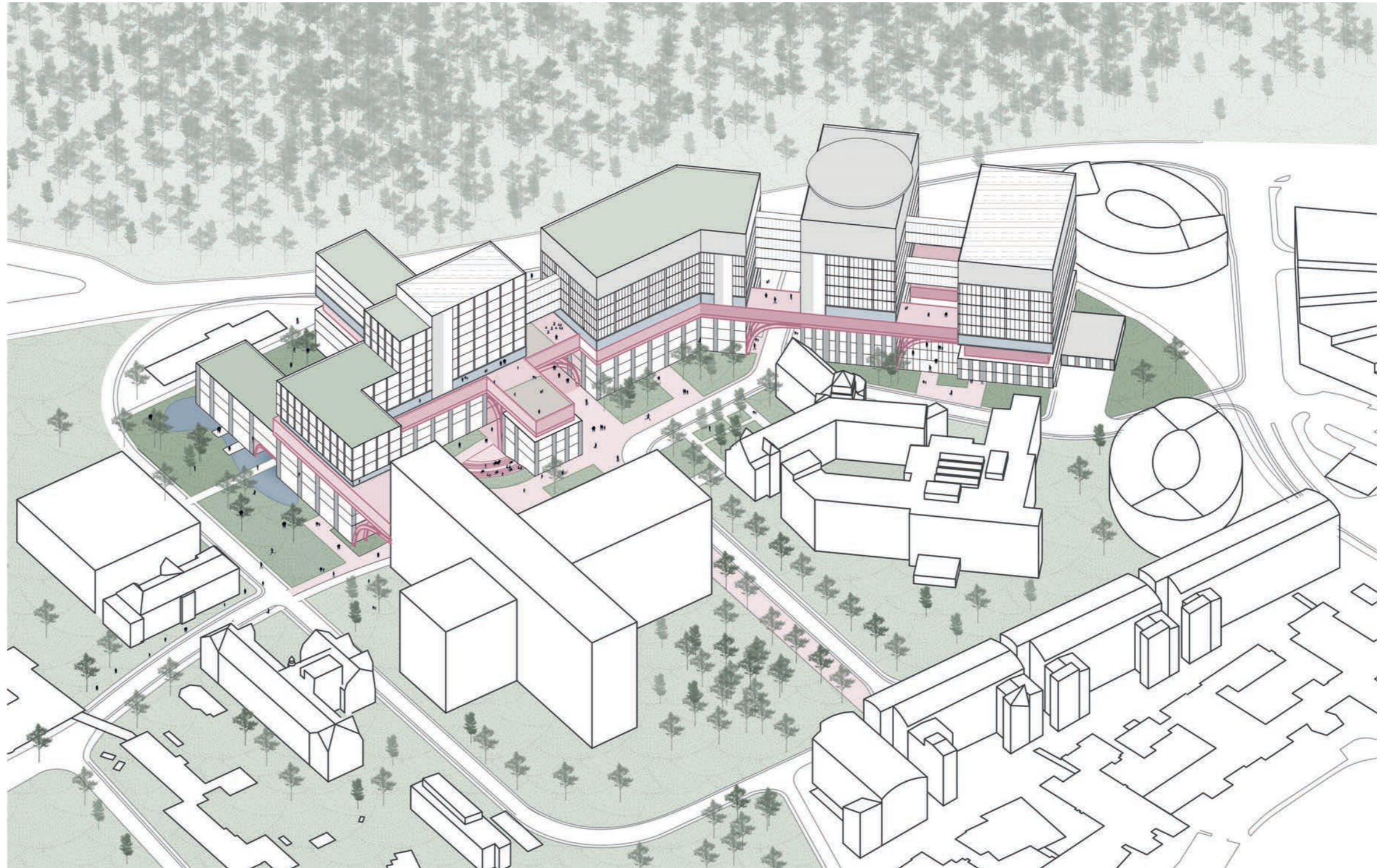
## GROUND FLOOR FOOTPRINT

12 063 m<sup>2</sup> built  
37% of the plot is built

## PIER

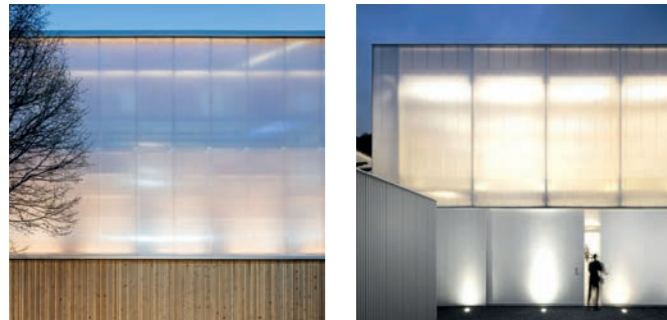
13 844 m<sup>2</sup> on floor 4 (Imaging and Diagnostic)

5 856m<sup>2</sup> of public spaces on floor 5

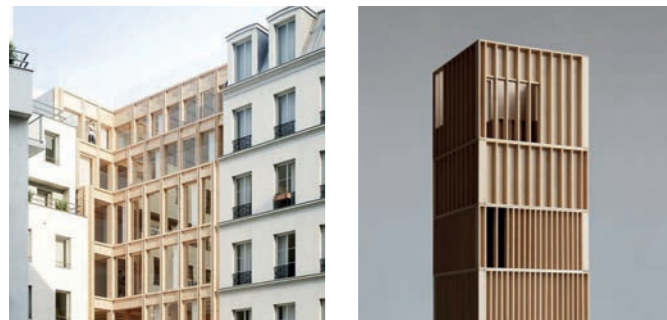


# DESIGN PRINCIPLES AND REFERENCES

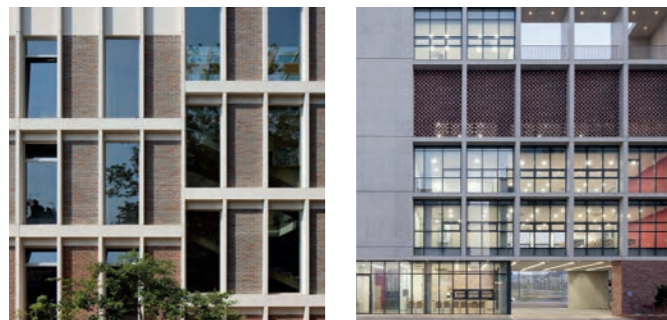
## EXTERIOR DESIGN



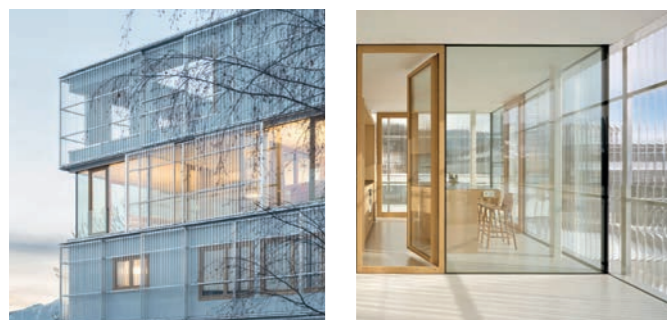
CROWN - Light and transparent polycarbonate.



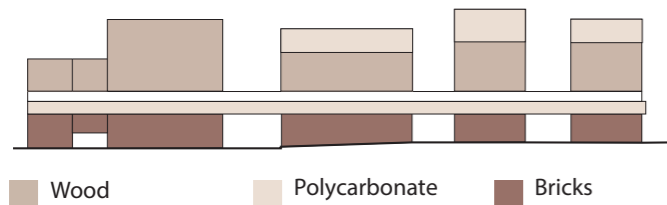
WOOD - Sustainable panels creates a warm feeling.



BRICKS - Robust red bricks in modules and different patterns.



PIER - A transparent second public floor holds a lot of daylight.



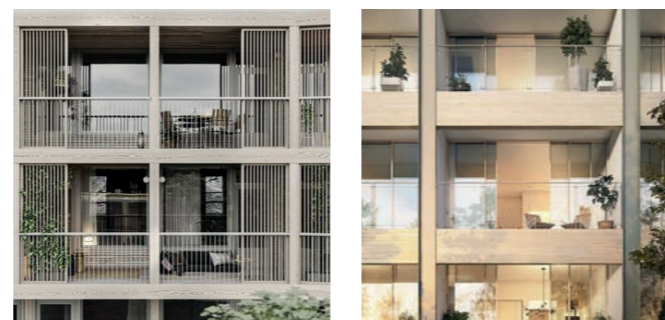
## CONSTRUCTION



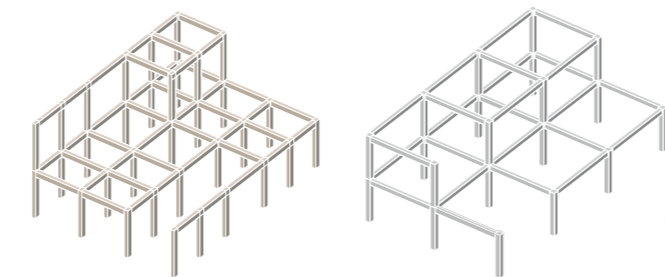
ARCHES - Laminated wood to highlight entrances.



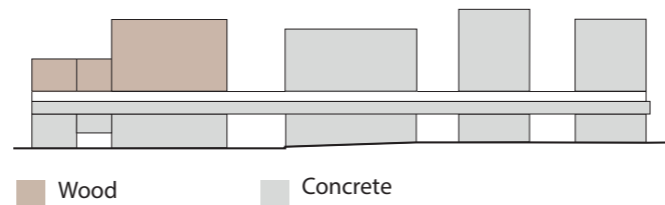
REUSED MATERIALS - From demolished buildings on site.



FLEXIBLE MODULES - Facade, loggias and windows.



POSTS - To give a flexible future-proof plan.



## ORIENTATION



### ARCHES

Where you will find entrances.

### TRANSPARENCY

Visible flows in the facade.

### PUBLIC GROUND MATERIAL

Reused bricks in patterns guide you.

### SEVERAL VOLUMES

Will give clear separated buildings.

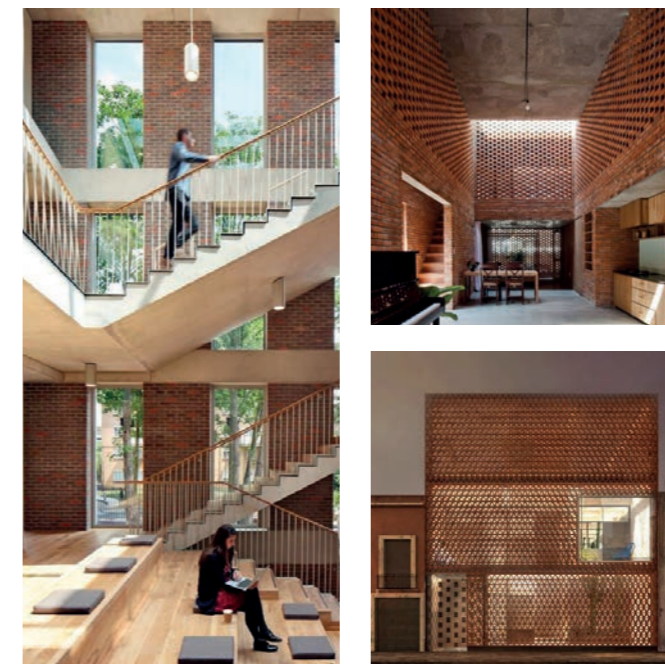
### "WARM" WOOD ENTRANCES

To highlight emergency entrances.

### SIGHTLINES

To gather around an atrium.

## HEALTH PROMOTION



### EDUCATION AND SOCIAL

Additional functions for health promotion, with the possibility to have conferences, hold lectures, exhibitions, workshops and more.

To use robust materials where sterile surfaces are not needed, enabling visitors to come closer to natural tactile materials.

A broad variation of spaces welcome diversity and interaction.



### ACTIVITY AND GREENERY

The Pier holds greenery and the possibility to grow vegetables as well as to move between buildings.

**MAIN ENTRANCE  
INTEGRATING HEALTHCARE IN LUND**

From the main entrance a wide stair leads the visitors up to a restaurant, a co-working space and a terrace with a nice view of the green park. This upper ground floor also holds the main entrance for outpatients to Imaging and Diagnostic and Day Surgery.

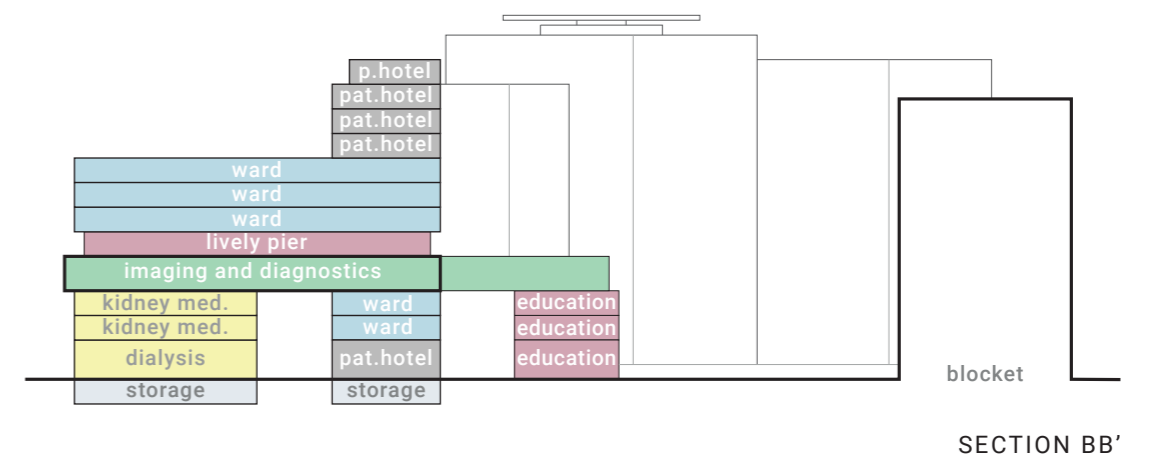
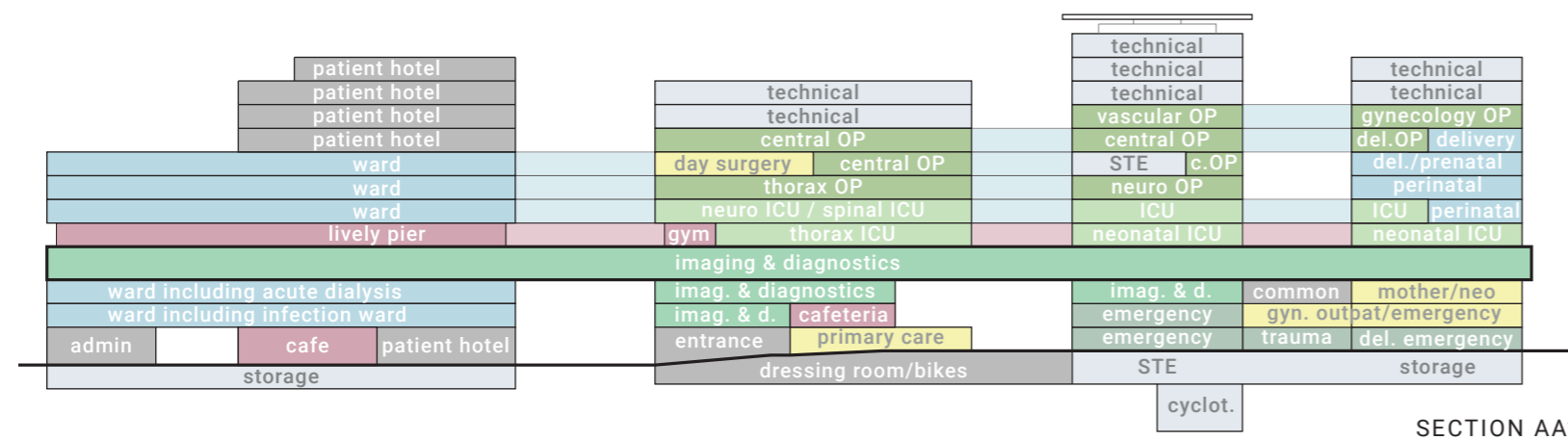


**FROM THE MATERNITY BUILDING**

Arches guide up until the city center. The entire new hospital, composed of several volumes, is linked thanks to the lightly pier. The volumes are lower on the south of the plot, they provide some roof gardens and a view of the Lunds Allhelgonakyrka.



# BRIEF AND FLOWS



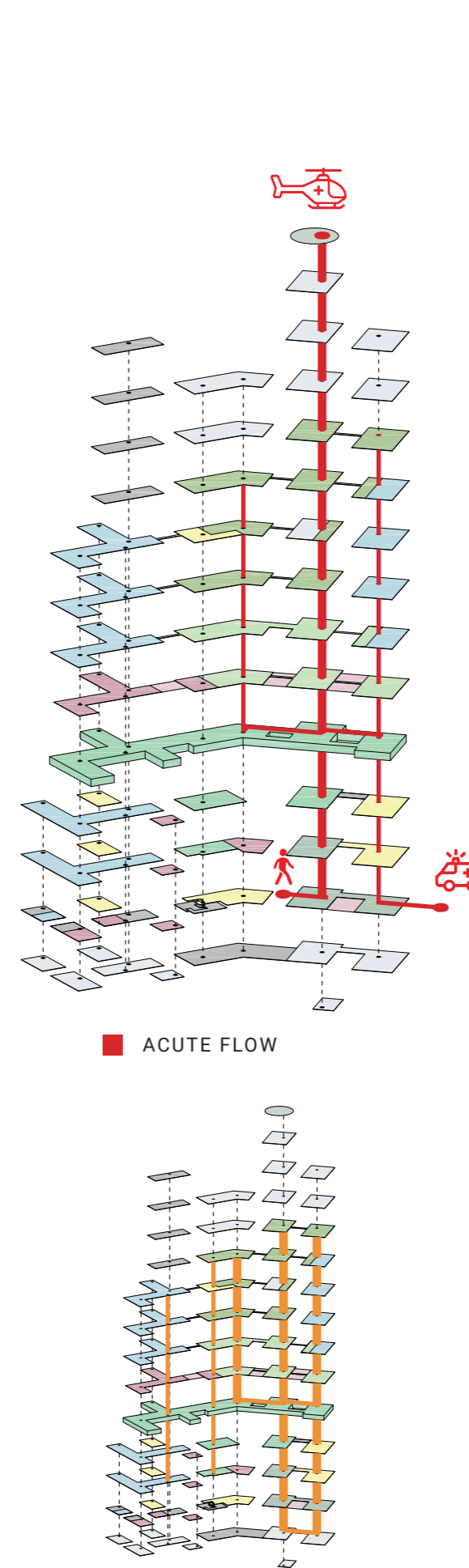
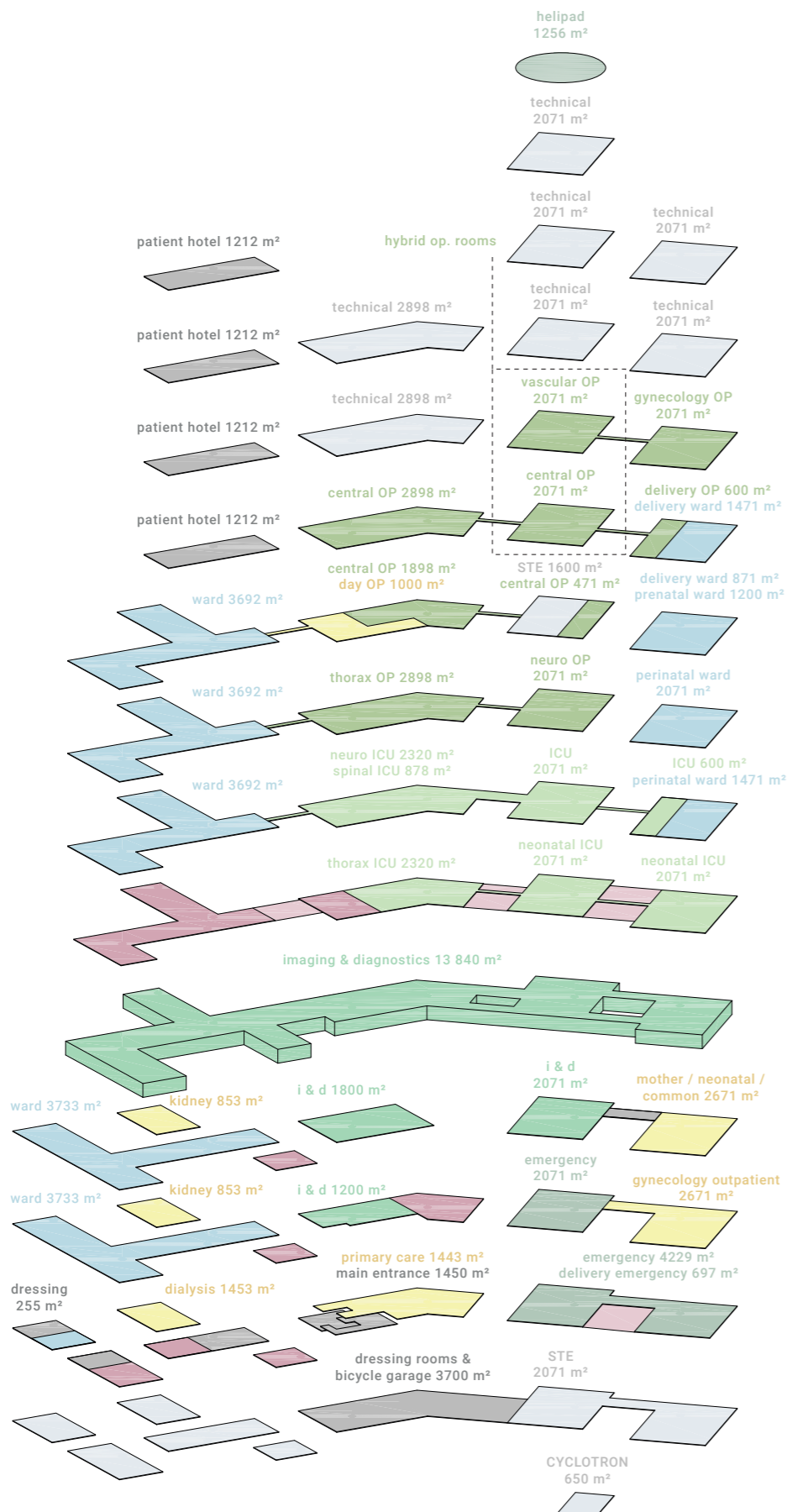
0 5 25 50 m

**BTA AREA**

- EMERGENCY - 6300 m<sup>2</sup>
- DELIVERY EMERGENCY - 697 m<sup>2</sup>
- IMAGING & DIAGNOSTICS - 18 911 m<sup>2</sup>
- CENTRAL OP - 7338 m<sup>2</sup>
- THORAX OP - 2898 m<sup>2</sup>
- NEURO OP - 2071 m<sup>2</sup>
- VASCULAR OP - 2071 m<sup>2</sup>
- GYNECOLOGY OP - 2071 m<sup>2</sup>
- DELIVERY OP - 600 m<sup>2</sup>
- ICU - 2671 m<sup>2</sup>
- THORAX ICU - 2320 m<sup>2</sup>
- NEURO ICU - 2320 m<sup>2</sup>
- SPINAL ICU - 878 m<sup>2</sup>
- NEONATAL ICU - 4142 m<sup>2</sup>
- PRIMARY CARE - 1443 m<sup>2</sup>
- DAY SURGERY - 1000 m<sup>2</sup>
- KIDNEY MED. / DIALYSIS - 3159 m<sup>2</sup>
- GYNECOLOGY OUTPATIENT - 2671 m<sup>2</sup>
- MOTHER/NEONATAL OUTPATIENT - 2071 m<sup>2</sup>
- WARD - 2 x 3733 m<sup>2</sup>
- WARD - 3 x 3692 m<sup>2</sup>
- DELIVERY WARD - 2342 m<sup>2</sup>
- PERINATAL WARD - 1200 m<sup>2</sup>
- PERINATAL WARD - 3542 m<sup>2</sup>
- PATIENT HOTEL - 4848 m<sup>2</sup>
- MAIN ENTRANCE - 1450 m<sup>2</sup>
- DRESSING ROOMS / BICYCLE GARAGE - 3700 m<sup>2</sup>
- COMMON SPACES WOMEN / NEONATAL - 600 m<sup>2</sup>
- STE - 1600 m<sup>2</sup> (above ground floor)
- STE - 2071 m<sup>2</sup> (below ground floor)
- TECHNICAL FLOOR - 16 151 m<sup>2</sup>
- CYCLOTRON - 650 m<sup>2</sup>

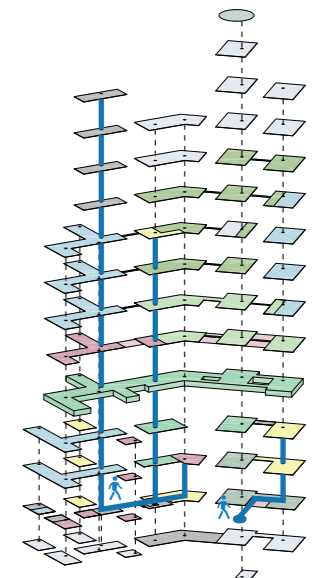
TOTAL BTA : 122 328 m<sup>2</sup> (healthcare only)

TOTAL BTA : 129 765 m<sup>2</sup> (including additional functions)

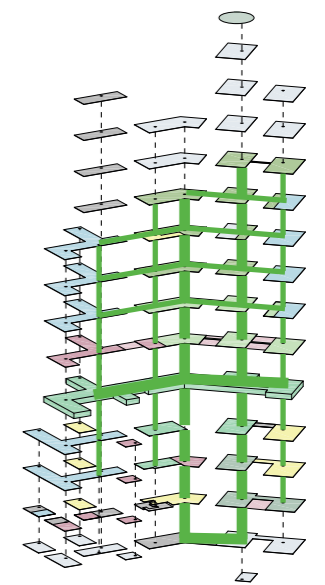


ACUTE FLOW

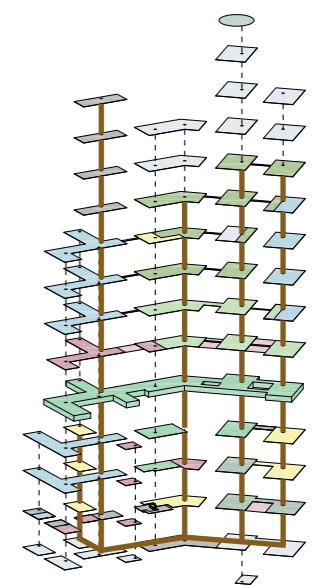
PATIENT IN BED FLOW



OUTPATIENT FLOW



STAFF FLOW



GOODS FLOW

# GROUND FLOOR PLAN

SCALE 1:500

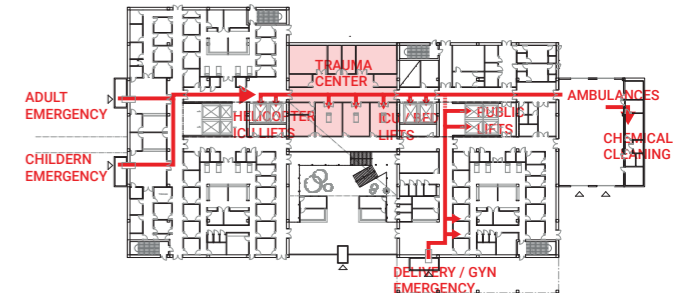




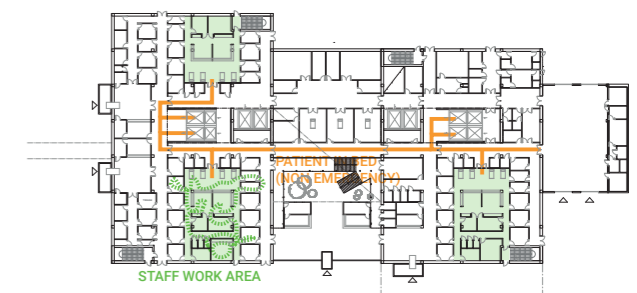
# EMERGENCY FLOWS

## EMERGENCY

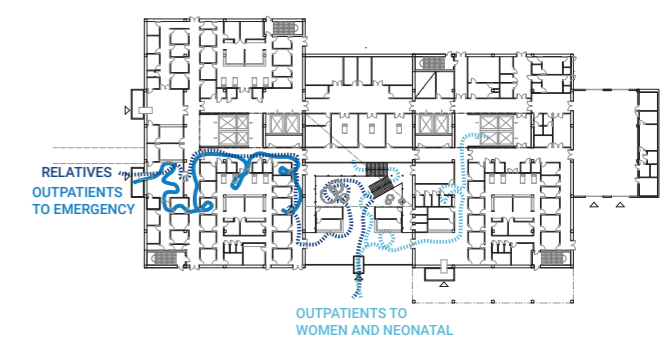
Separated flows, area for calm efficiency, a public green atrium for stress relief during breaks, nice view to greenery, good access to OP, Imaging and Diagnostic and ICU on upper floor levels.



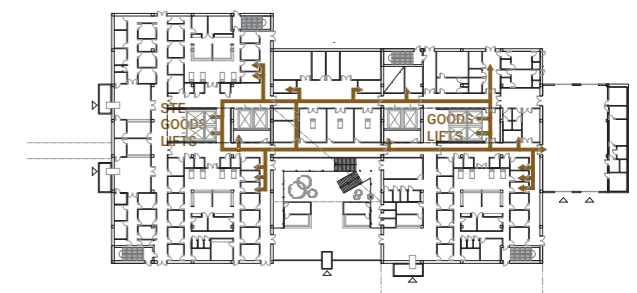
Acute flows to Trauma unit and Delivery



Patient in bed and centered staff area in three units



Outpatients and relatives coming quickly after



Simple flows for goods and STE goods from the culvert



LEGEND	
<span style="color: #0070C0;">■</span>	INFECTION
<span style="color: #4F81BD;">■</span>	EMERGENCY
<span style="color: #FFC000;">■</span>	PRIMARY CARE
<span style="color: #ADD8E6;">■</span>	WARD
<span style="color: #8B4513;">■</span>	STAFF
<span style="color: #D2691E;">■</span>	COMMON ROOMS / WAITING AREAS
<span style="color: #C8A2C8;">■</span>	PUBLIC FUNCTION
<span style="color: #F5DEB3;">■</span>	PUBLIC AREA
<span style="color: #A9A9A9;">■</span>	TOILETS
<span style="color: #FFFF00;">■</span>	OUTPATIENT - KIDNEY MEDICIN / DIALYSIS
<span style="color: #F080F0;">■</span>	ADDED EDUCATIONAL FUNTION

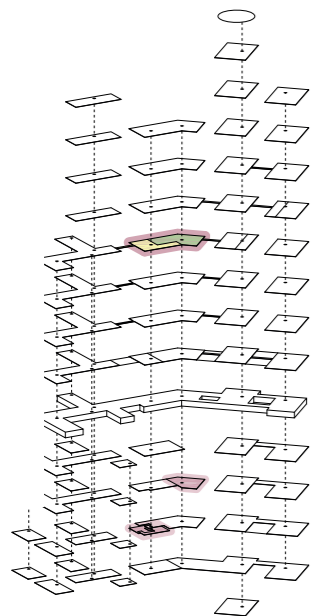
  

FLOWS	
<span style="color: #FF0000;">→</span>	EMERGENCY
<span style="color: #0000FF;">→</span>	OUTPATIENT
<span style="color: #00FF00;">→</span>	STAFF
<span style="color: #FFA500;">→</span>	PATIENT IN BED
<span style="color: #8B4513;">→</span>	GOODS



# ELBOW

SCALE 1:500



## FLOOR 8 – DAY SURGERY AND ADMISSION WARD

Day Surgery works in close collaboration to central OP and to the wards which are reached through two bridges. The green sterile zone is placed separated from the public flow.

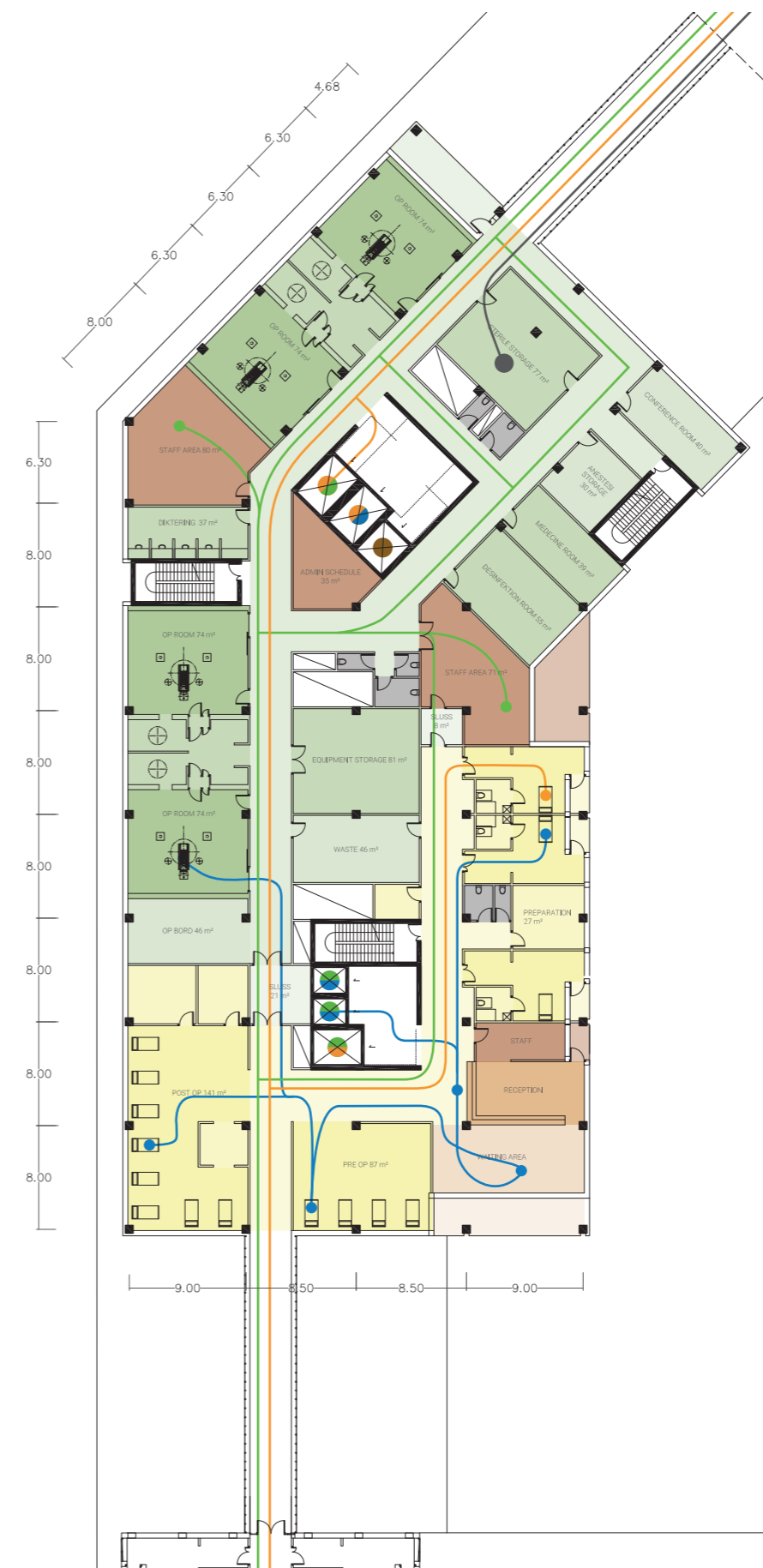
Most of the staff and waiting areas are placed in corners in order to have broader view.

### LEGEND

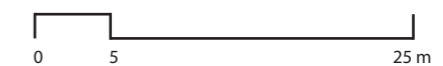
- SURGERY - CENTRAL OP
- OUTPATIENT - DAY SURGERY
- PRIMARY CARE
- STAFF
- COMMON ROOMS / WAITING AREAS
- PUBLIC FUNCTION
- PUBLIC AREA
- TOILETS

### FLows

- OUTPATIENT
- STAFF
- PATIENT IN BED
- GOODS
- STE GOODS

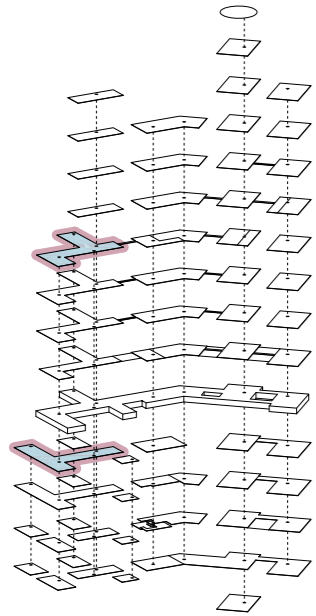


FLOOR 8  
Day surgery and Admission ward



# WARDS, IMCU, ACUTE DIALYSIS

SCALE 1:500



## LEGEND

- WARD
- IMCU
- STAFF
- COMMON ROOMS / WAITING AREAS
- PUBLIC FUNCTION
- PUBLIC AREA
- TOILETS

## FLOWS

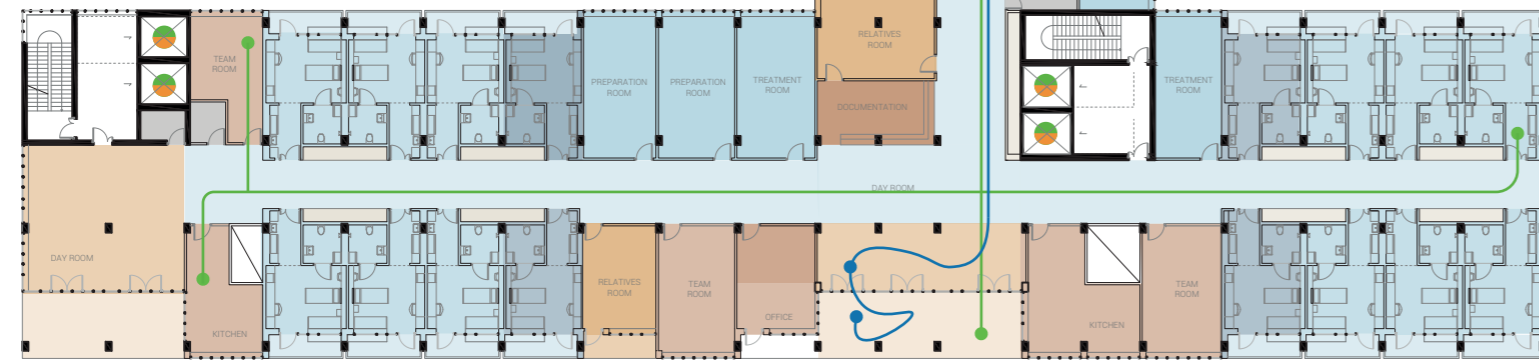
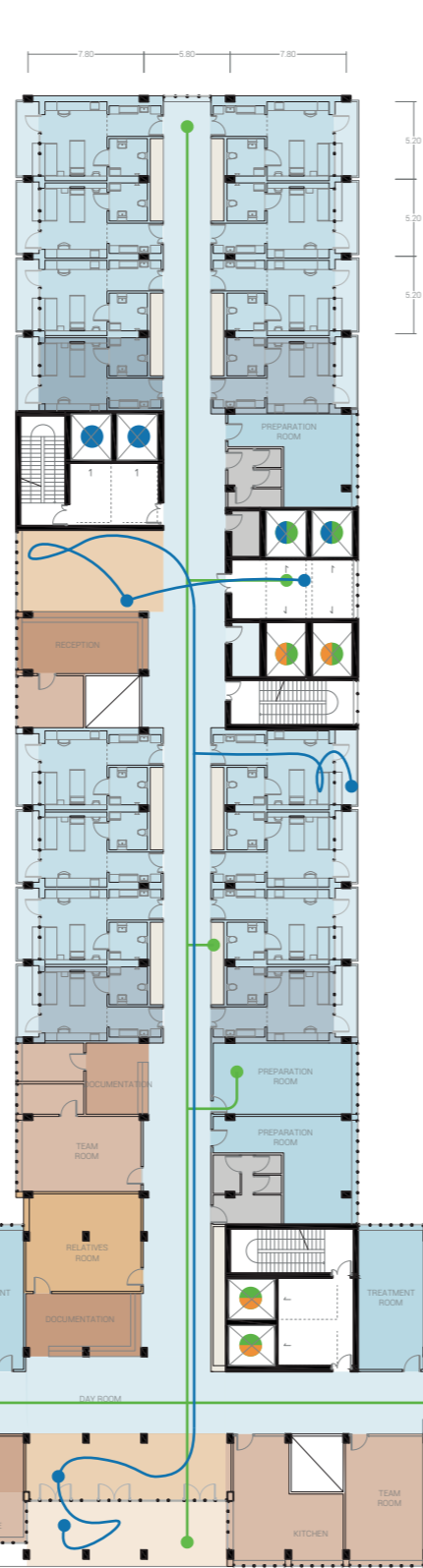
- OUTPATIENT
- STAFF
- PATIENT IN BED
- GOODS

## WARDS

The wards on the second and third floor host respectively the infection and the acute dialysis wards, held by a concrete structure under the pier. On the sixth, seventh and eighth floors, above the pier, light timber structure lifts the wards.

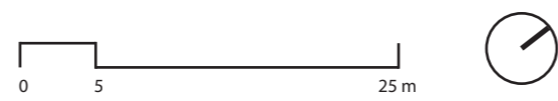
The 32 patient rooms are grouped by clusters of 8, including 2 IMCU rooms, thus

enhancing staff comfort. Flows are centralised with the 22 meters wide building, in a corridor animated by sequences of functions: reception, patient rooms, staff rooms, relatives spaces, outdoor loggias. The thickness of the posts is used to create storage spaces in the rooms; and seats in the corridors are enabled by the thickness of the volume.



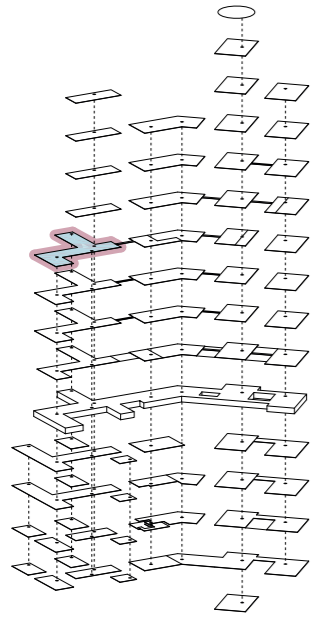
FLOOR 3  
Wards, including acute dialysis and IMCU

FLOOR 8  
Wards and IMCU



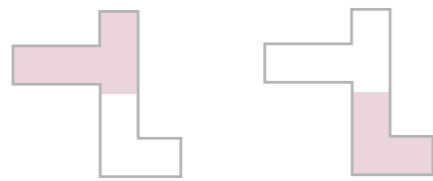
# WARDS

SCALE 1:200



## WARDS

To promote both patient and staff wellbeing, indoor and outdoor spaces are provided at diverse levels of publicity. It is made possible to spend time in the seats in the walls, day rooms, or private loggias. The reception is made clear for the visiting relatives, who can orientate instinctively with the daylight at the extremities. Bridges connect to the angled building as well as to Blocket, for transfers towards easier or heavier care.



## LEGEND

- WARD
- IMCU
- STAFF
- COMMON ROOMS / WAITING AREAS
- PUBLIC FUNCTION
- PUBLIC AREA
- TOILETS

## FLOWS

- OUTPATIENT
- STAFF
- PATIENT IN BED
- GOODS

3.90 | 3.90 | 5.80 | 3.90 | 3.90

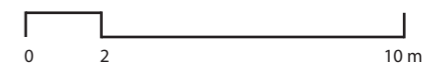
5.20  
5.20  
5.20



sectioned pan, look at the following page

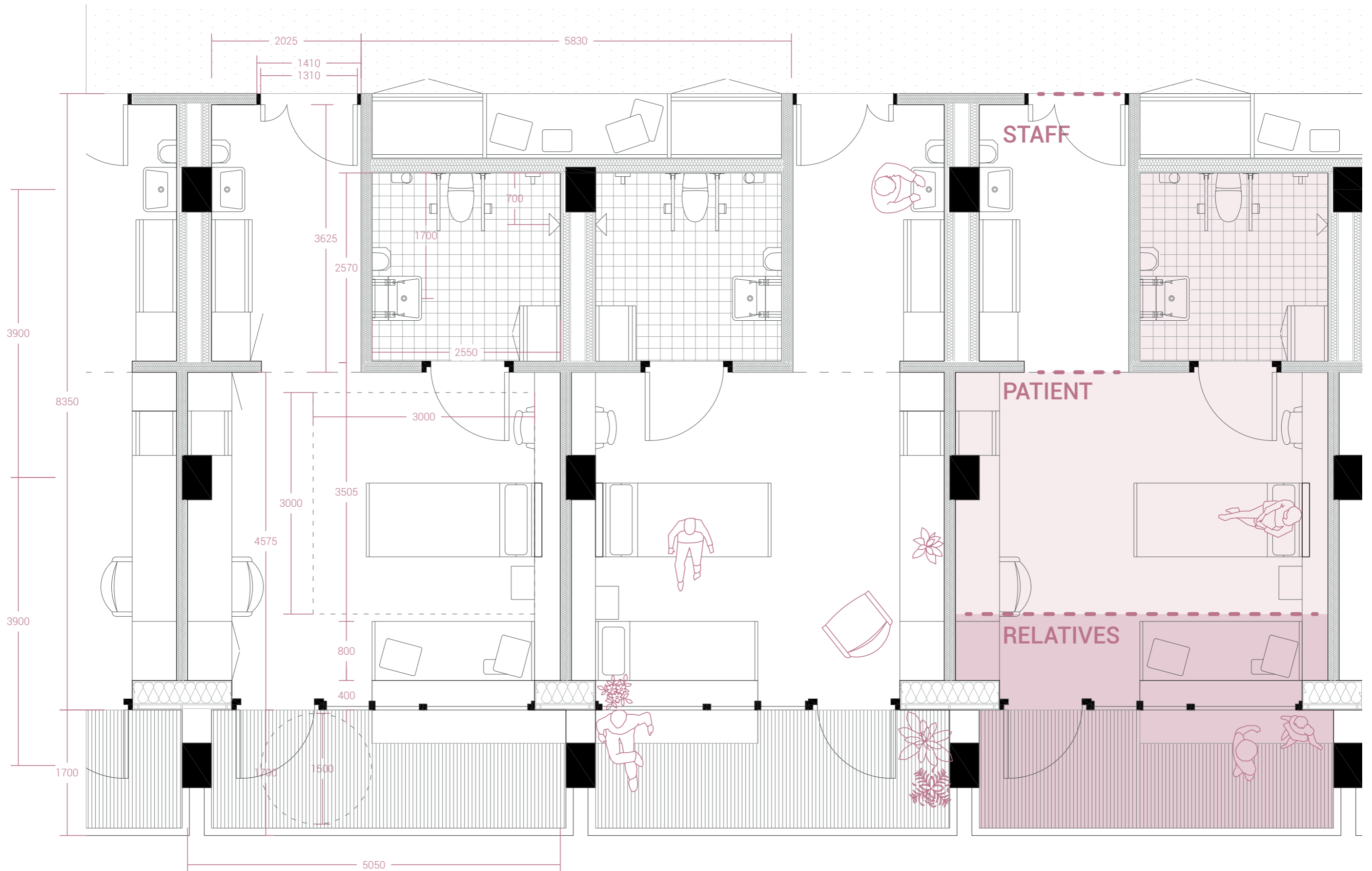


FLOOR 8  
Wards including IMCU



# PATIENT ROOM

SCALE 1:50



FLOOR 8  
Single patient room



#### SINGLE PATIENT ROOMS

Long-term thinking impacted the design into many dimensions.

Comfort for the patients, the relatives and the staff comes through healthy natural and tactile materials that are used as much as possible, providing a sense of awareness of the surroundings. Working along with daylight, view over greenery and access to private outdoor spaces, the created environment shall help a long-lasting recovery and wellbeing for all. Concerning the post-antibiotic era, every single room can develop a sluss within the entrance.

ENTERING A PATIENT ROOM  
16th October, 11:10 am



# SOUTH EAST ELEVATION

SCALE 1:500





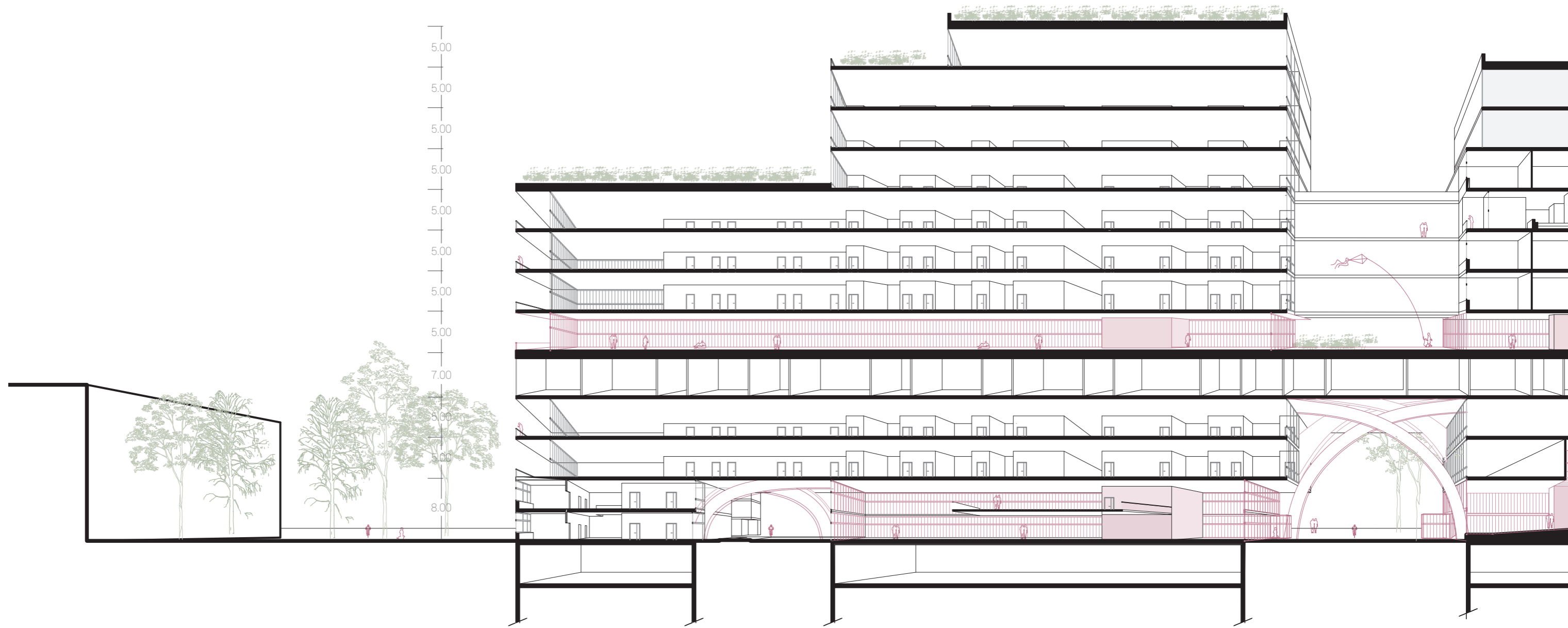


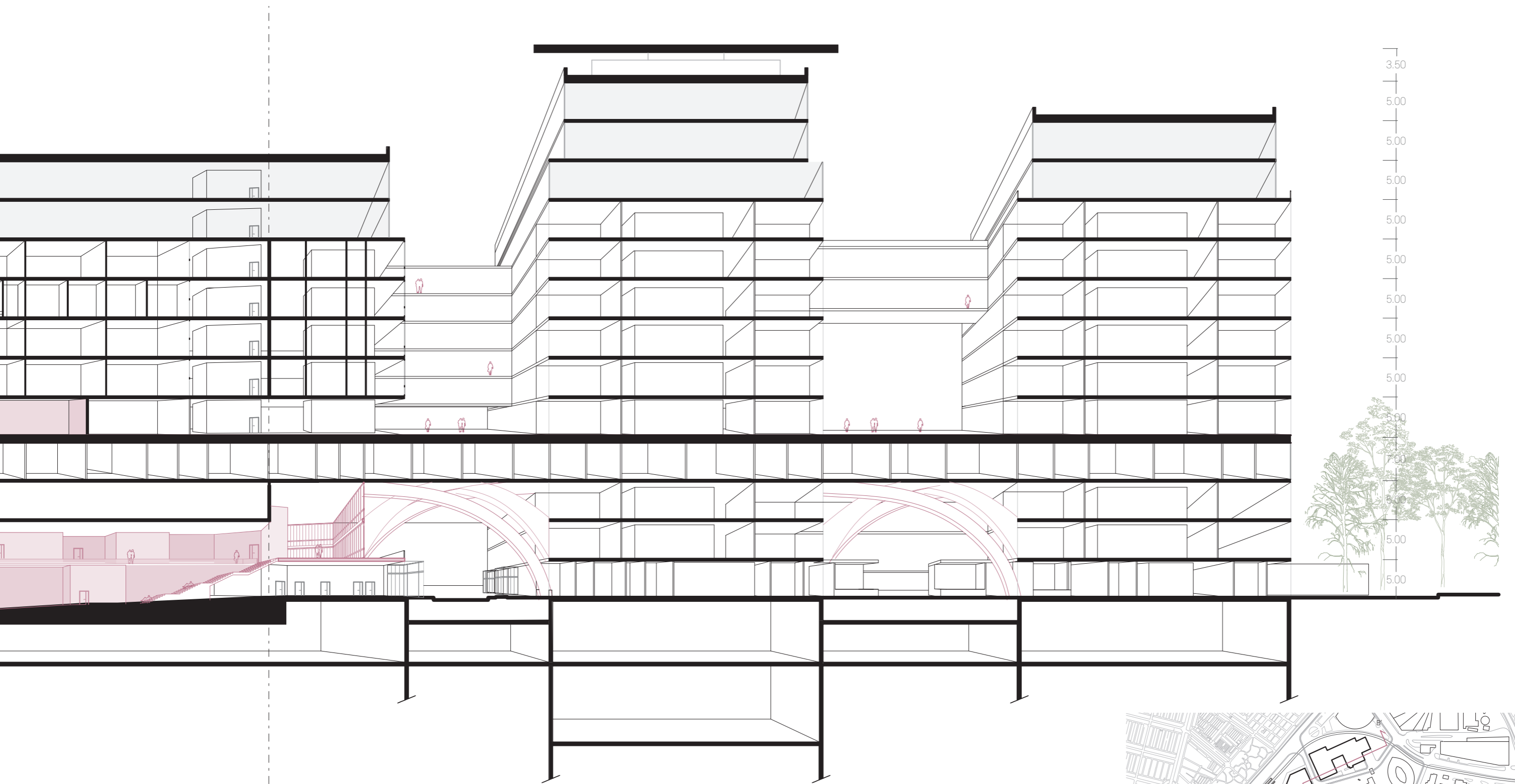
SOUTH EAST ELEVATION



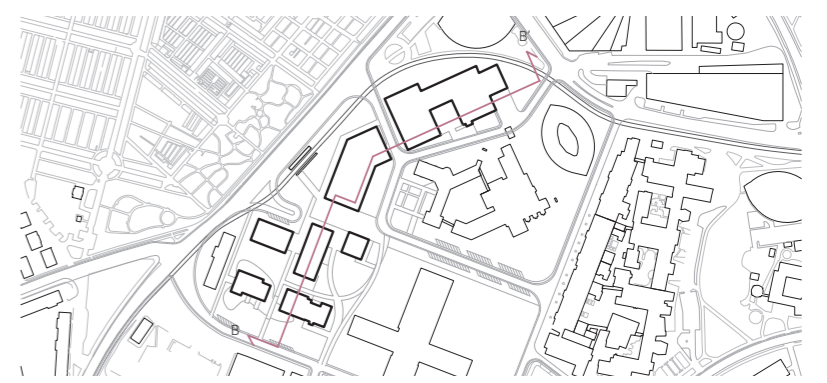
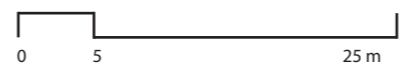
# PERSPECTIVE SECTION

SCALE 1:500



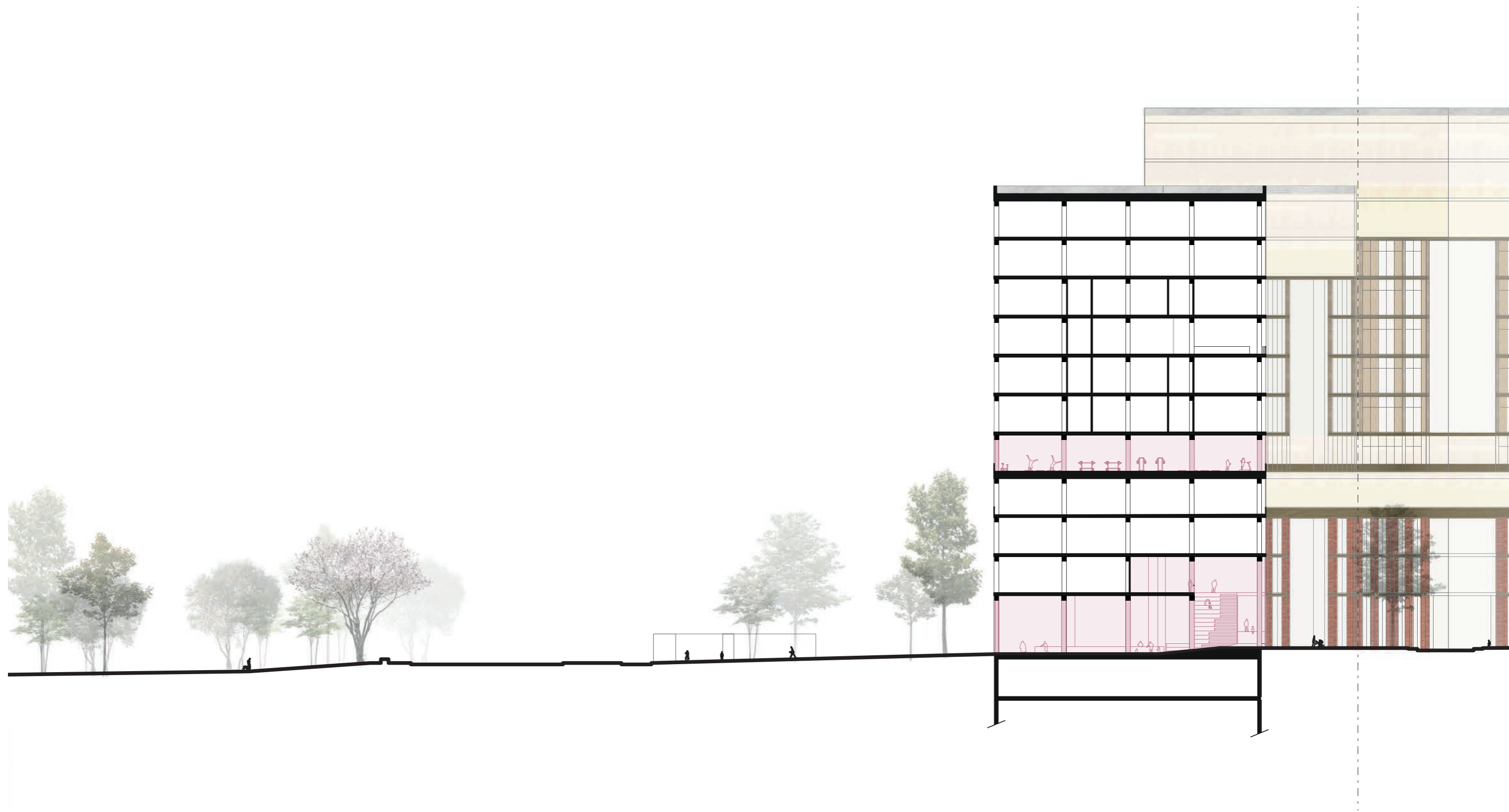


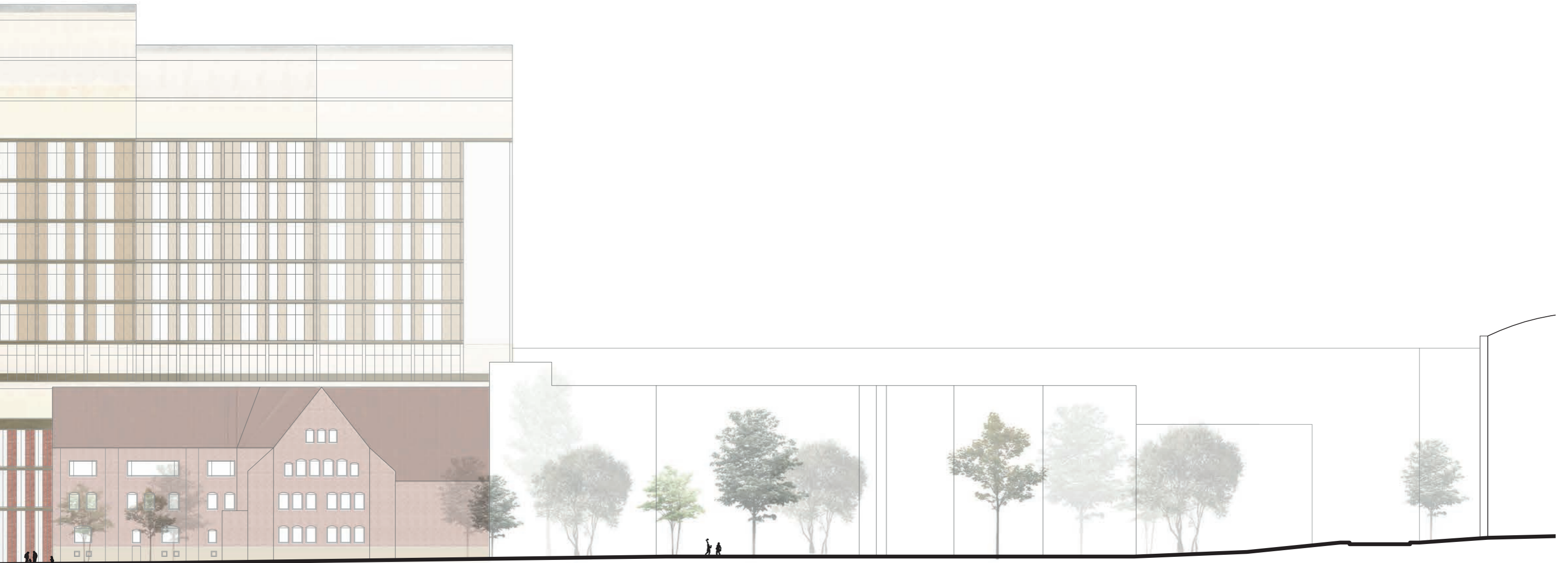
SECTION BB'



# SOUTH WEST ELEVATION

SCALE 1:500





SECTION CC'





Lund University Hospital now has the opportunity to adapt to the city, fulfill its purpose as a high tech hospital, and at the same time contribute with even more positive outcomes for its closes surrounding, while providing pleasant working conditions and a healthy recovery process. That is possible, while also becoming a well-integrated, a central part of the future in a sustainable Lund city.

