

# IN MOTION

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ARK 263 Future visions for healthcare, housing and work 3: Healthcare Architecture





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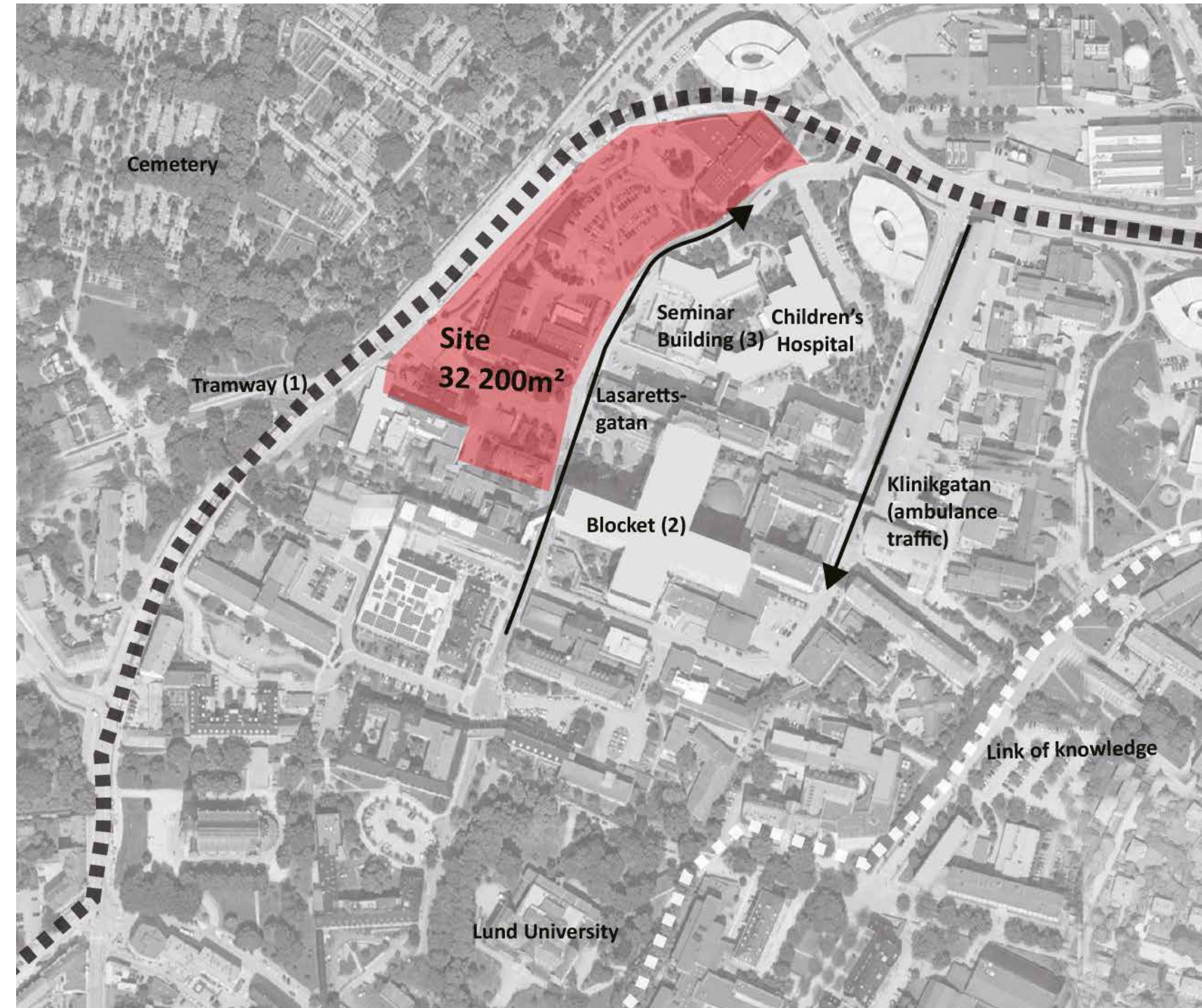
# INTRODUCTION & ANALYSIS

The task was to design a new high-tech healthcare complex in Lund, for Skåne University Hospital. The brief for this task involved 111 400 m<sup>2</sup> of healthcare facilities, including Emergency, ICU, Surgery and the Imaging & Diagnostics department, wards, and the Women and Neonatal clinic. The vision also included creating a better public flow and connection from the tramline to the new Science Village, called the "Link of Knowledge."

The site has its pros and cons. The new tramline is an important step for sustainable mobility and the placement of the tram station will define a new node in the hospital area. The planned connection between the tram and the Link of Knowledge can be an attractive part of the city and enhance public life. In particular, the form of the Seminar building would allow a smaller public square to be created. The site is also close to the Northern cemetery, which has an area of 25 000 m<sup>2</sup> and represent the largest green area in the centre as well as a green lounge in the city.

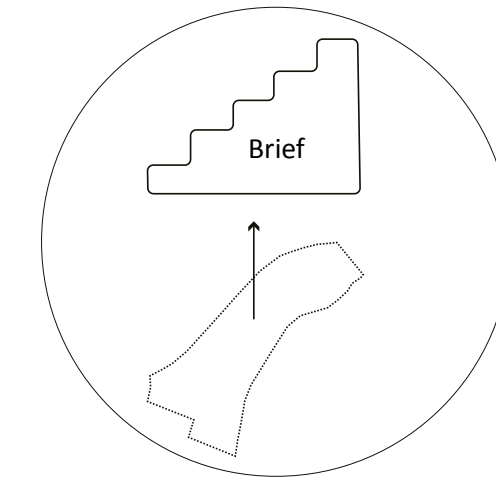
The footprint has a limited size in relation to the large program, though. The brief is 111 400 m<sup>2</sup> and the footprint of the site is 32 200 m<sup>2</sup>, which is further reduced by a 25 meter "tram zone" unsuitable for high-tech healthcare. This might lead to new high buildings that cast large shadows. Also, the shape of the footprint is quite irregular, making it difficult to fit the program. The current logistic situation is that car traffic has a clear priority in the area. Lasarettsgatan runs through the hospital area and the current ambulance traffic runs on Klinikgatan. Both streets will cross the future pedestrian flow from the new tram station to the new Science Village.

Many existing buildings are planned to be demolished, which isn't optimal from a sustainable point of view. However, it creates an opportunity to change the overall expression of the site. Three important elements that defines the site today are the new tramline (1), the existing Blocket building (2) and the existing Seminar building (3). These elements have helped to shape the project and influenced our design strategies.

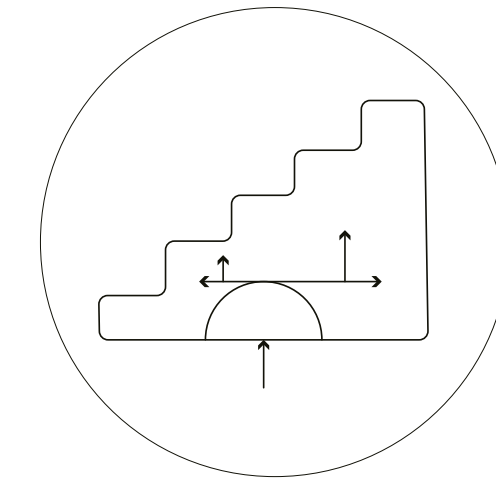


# DESIGN STRATEGIES

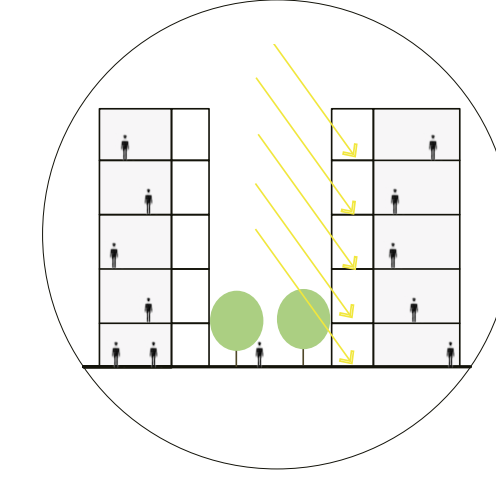
## Brief and Logistics



Turn the brief into a vertical structure

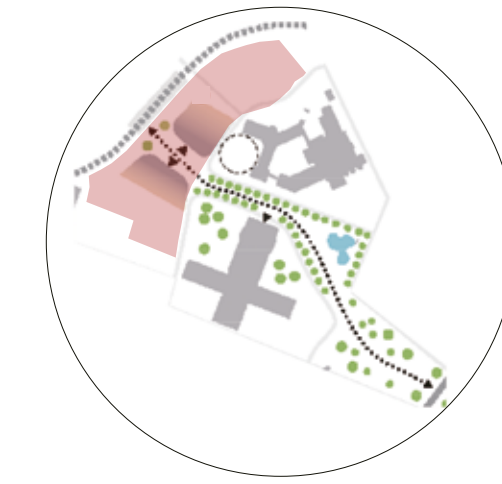


Wayfinding through shape

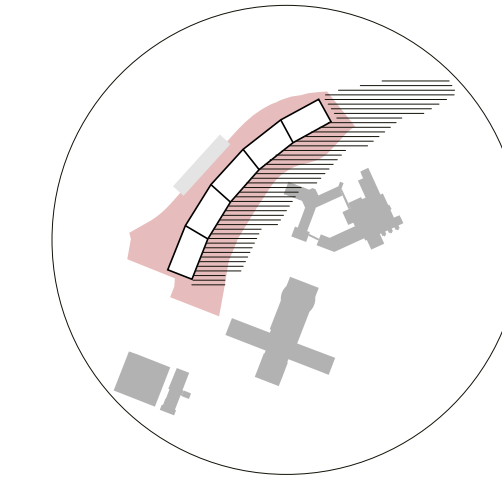


Daylight and greenery to logistic connections

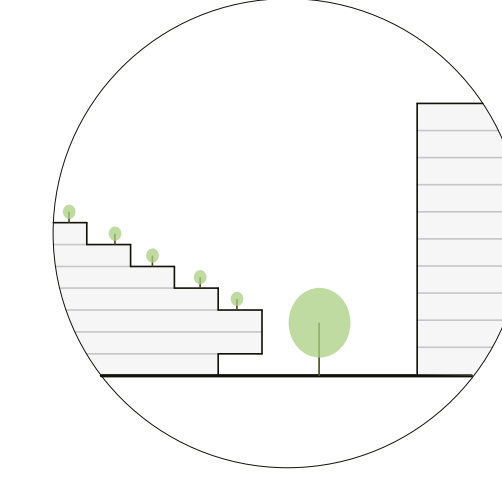
## Site and context



Walkable link

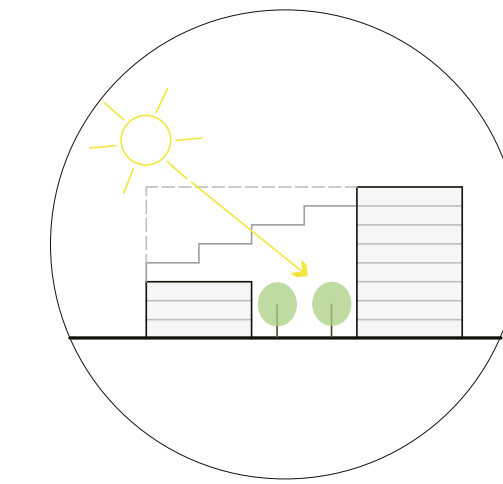


High-rise in the north

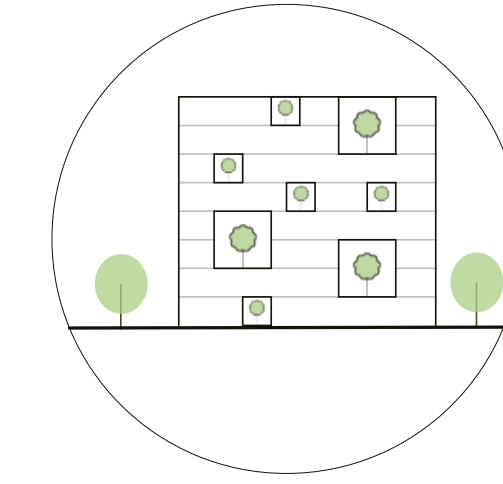


Implement human scale

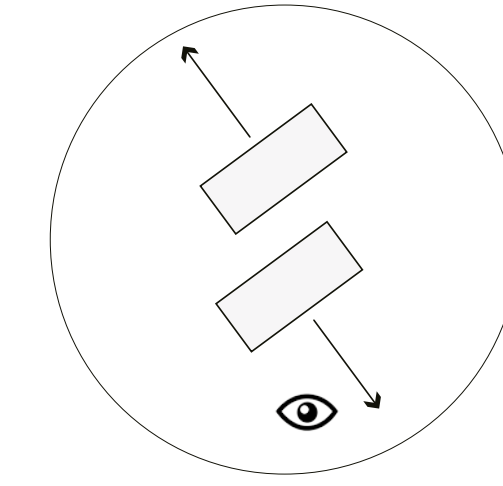
## Health-promotive architecture



Provide daylight through terracing and openings

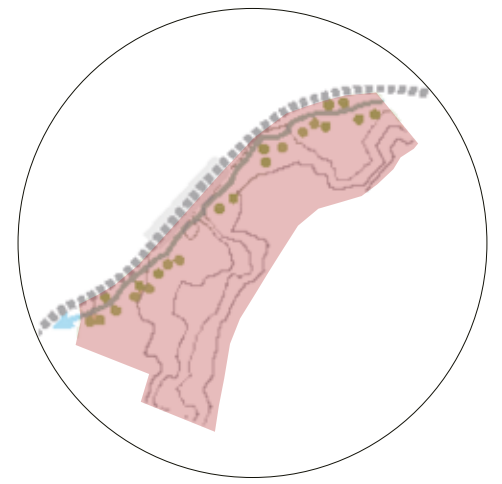


Greenery on the inside and outside

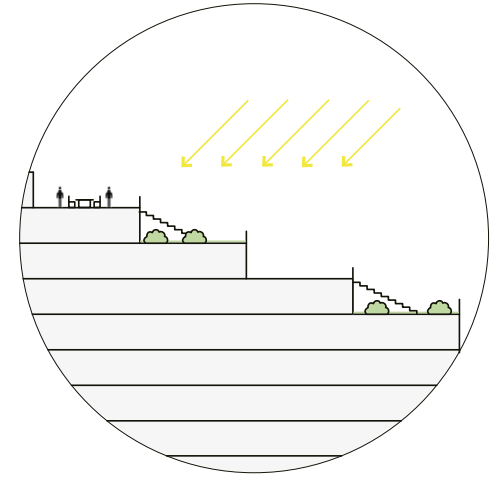


Privacy and orientation

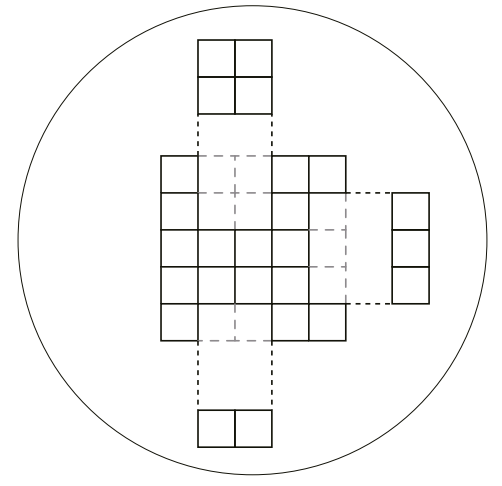
## Sustainability and future proofing



Collect rainwater



Sustainable roofs



Grid system for elasticity



## BUILDING CONCEPT

### Organic shape

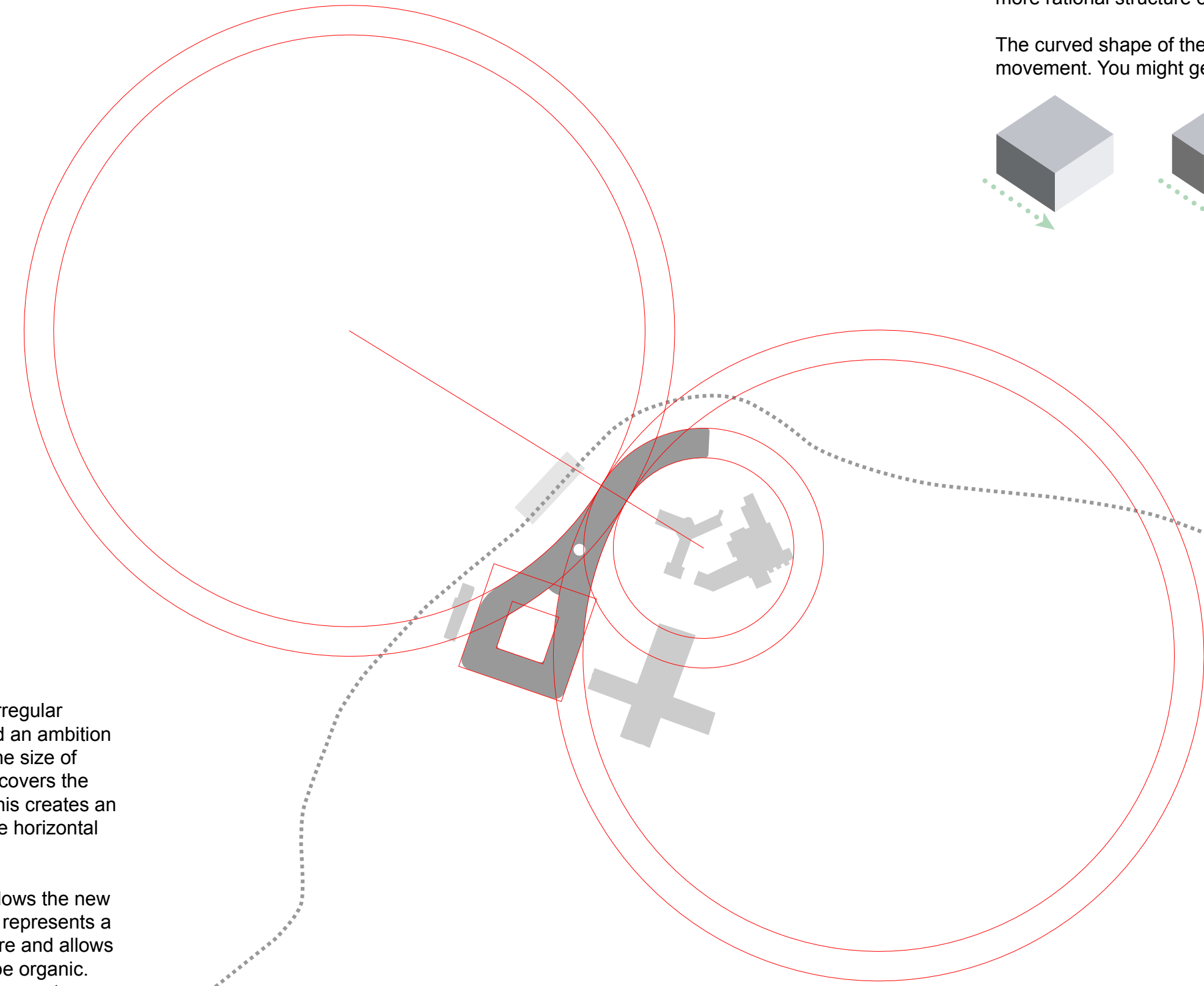
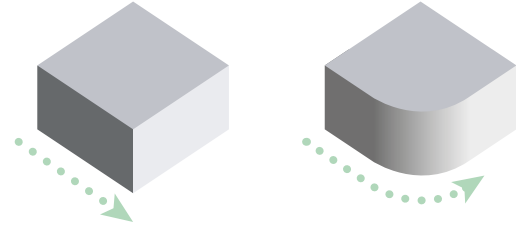
As a response to the irregular footprint of the site and an ambition not to build too high, the size of the proposed building covers the whole site in length. This creates an expression that is more horizontal than vertical.

The building shape follows the new tramline, as the tracks represents a permanent city structure and allows the building shape to be organic. Also, the organic shape creates a nice counterpoint to the surrounding buildings.

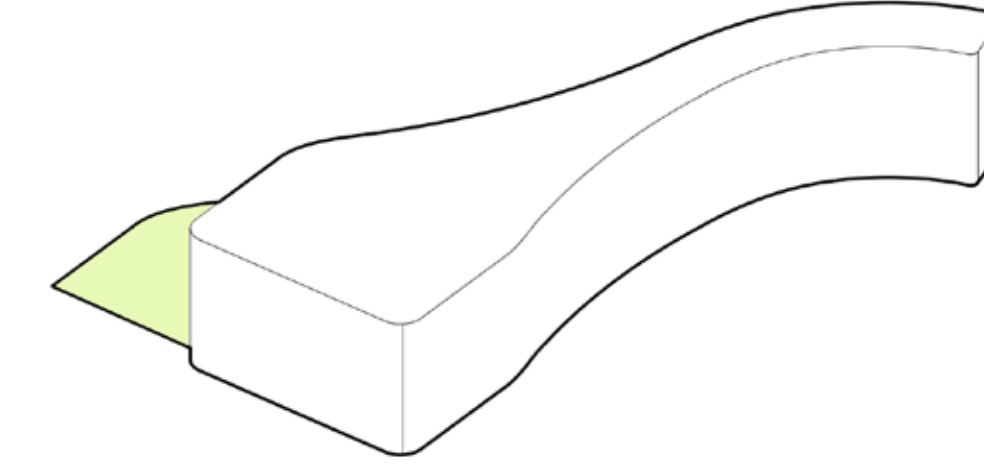
### Geometry

The underlying geometry of the building consists of two basic forms: the circle and the square. Three interlocking circles in two sizes adapt to the organic shape of the site while the square connects with the more rational structure of the existing "Blocket" building.

The curved shape of the building also enhances and promotes movement. You might get the feeling of being led by the form itself.

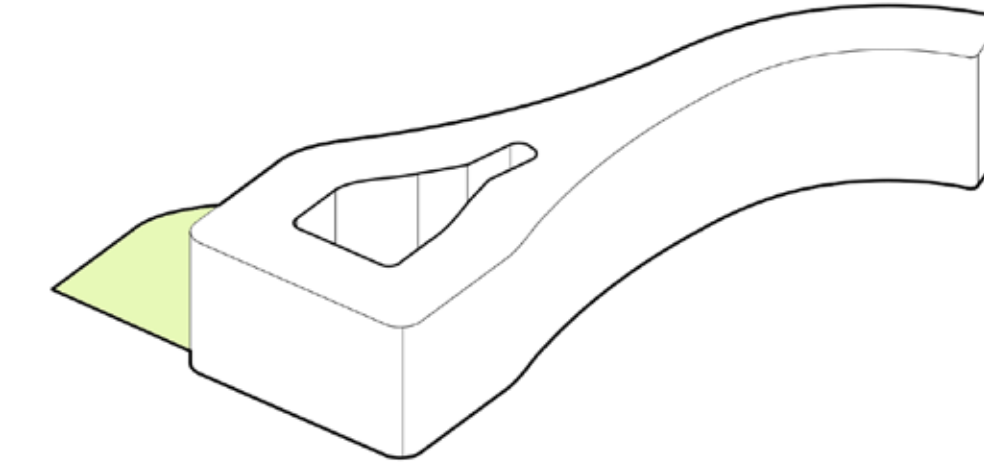


## BUILDING EVOLUTION



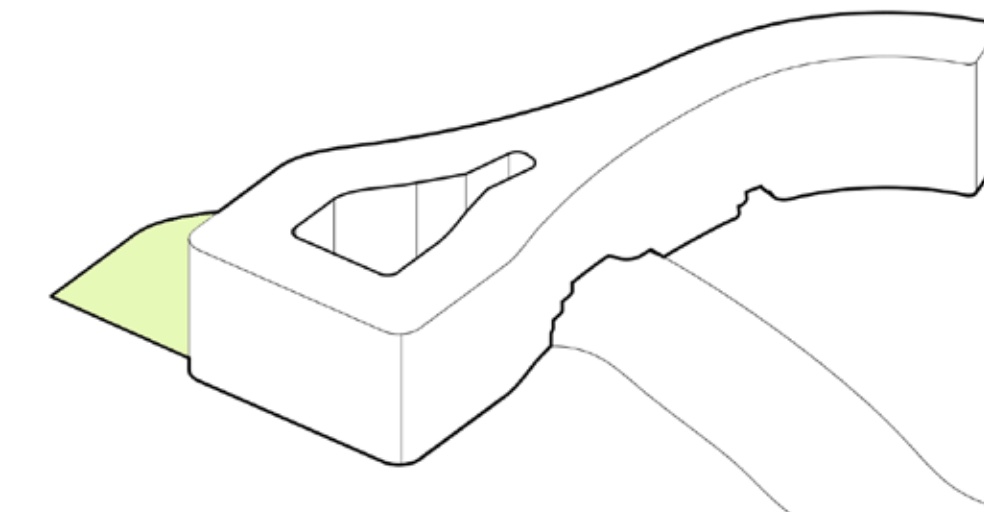
### 1. Megastructure to handle the brief

The new tramline on the west side of the site requires us to make a 25-meter retreat, so the buildable area of the site is reduced.



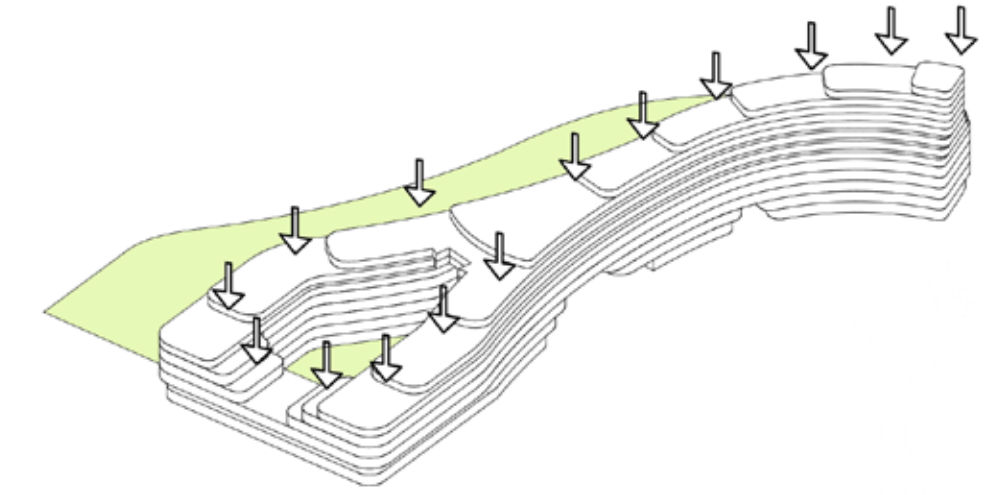
### 2. Courtyard

Connection with nature and provide good conditions for daylight and ventilation.



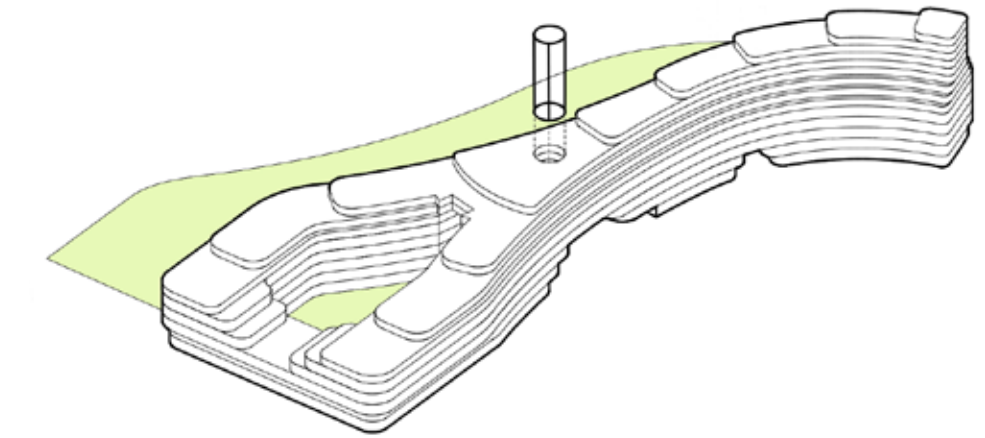
### 3. Links

Two openings are subtracted in the volume; a larger one from the tramline and a smaller one at the north.



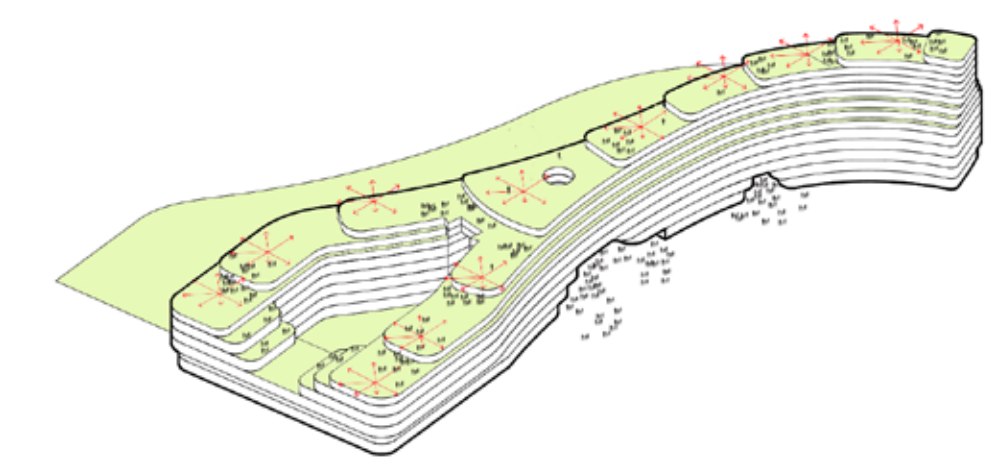
### 4. Terracing

Breaking down the large scale, provide outdoor spaces, and let more sunlight into the courtyard.



### 5. Circular lightwell

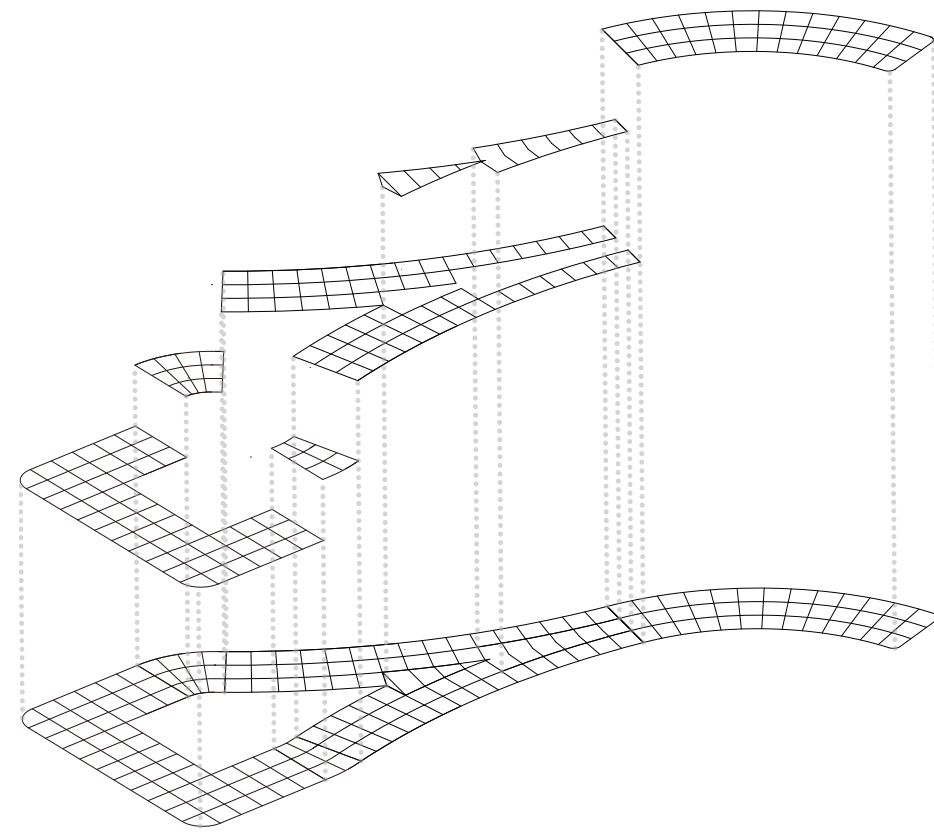
A circular lightwell is subtracted from the thickest part of the building to assure natural light and to create a natural meeting place indoors for both patients and staff around the lightwell.



### 6. Greenery

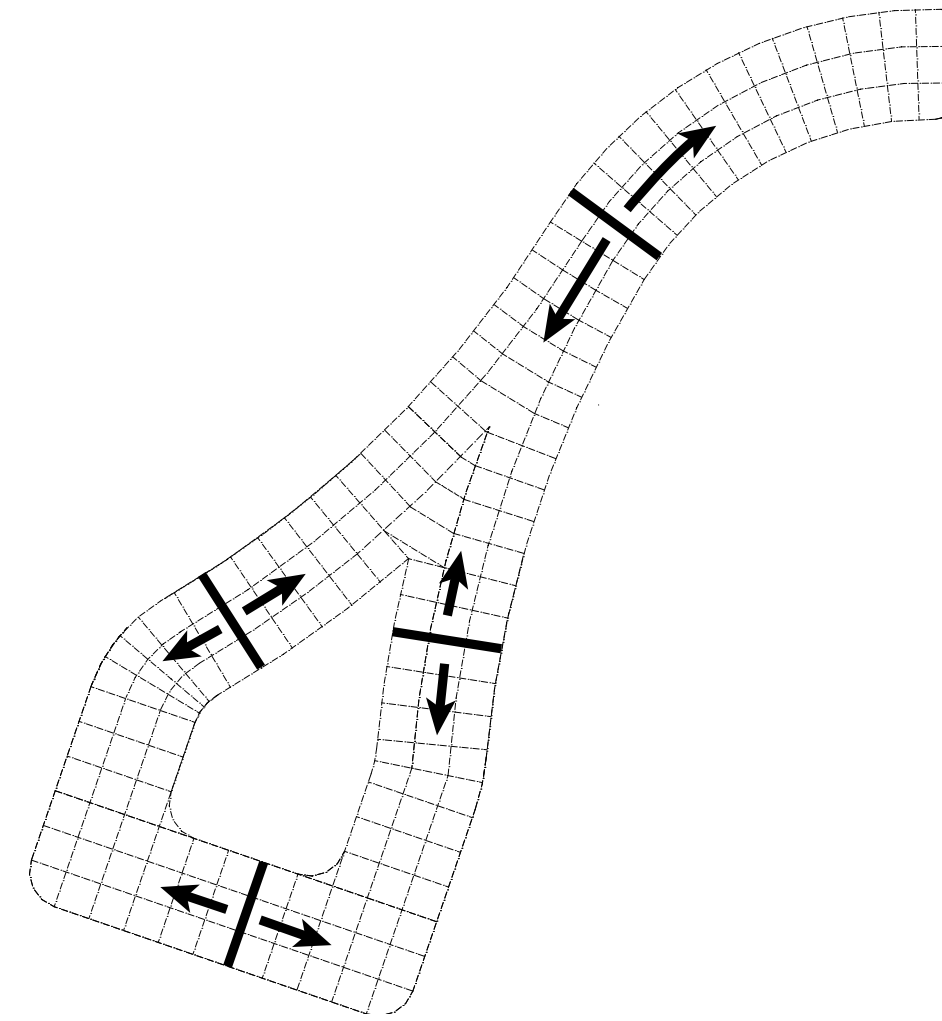
The ambition is that the people in the hospital should be able to enjoy the landscape on the terracing of the building, as well as the inner courtyard. Greenery and ponds are added on the terracing.

## SUSTAINABILITY AND FUTURE PROOFING



### Grid structure

Starting of from the square form, a 10x10 meter grid was extracted from the building shape. This gives a clear structure to all parts of the building and allow many of the rooms in the hospital to be modularized, for instance the ward rooms and the operation theaters. These modules can be prefabricated, which will save costs as well as building time.



### Elasticity

The grid system also allows for flexibility in the size of different units. The borders between departments can easily change size to meet possible new demands of the future. The structure of the building has elasticity.



### Daywater collection

The 25-meter area closest to the tram is unsuitable for high tech healthcare according to the brief. Instead, we have chosen to turn it into a green/blue buffer zone for rainwater collection, which will promote biodiversity and make the area less vulnerable to future cloudbursts.

Daywater is also collected in the inner courtyard, on the roofs of the building and on the low point of the hospital area.

## MASTERPLAN STRUCTURE

The proposed road structure involves a split of both Lasarettsgatan and Klinikgatan. These streets will instead bend themselves around Blocket and act as a drop-off zone for visitors. By splitting the roads, a walkable link from the tram to the university is created through the hospital area. Protection against traffic and accidents as well as opportunities to walk are two of 12 key criterias for a successful public life.\*

Emergency traffic does not interfere with the pedestrian flow and is kept to the extents of the site. Due to the site conditions, two separate emergency units are created: one larger for adults situated closer to Blocket and a smaller for women & children, situated closer to the children's hospital.

Goods logistics are smoothly handled underground which will further promote the public life and walkability of the site.

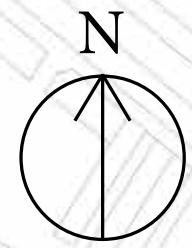
\*Source: Jan Gehl et al. (2006) "New city spaces".

- Emergency traffic
- Walkable link
- Underground culvert

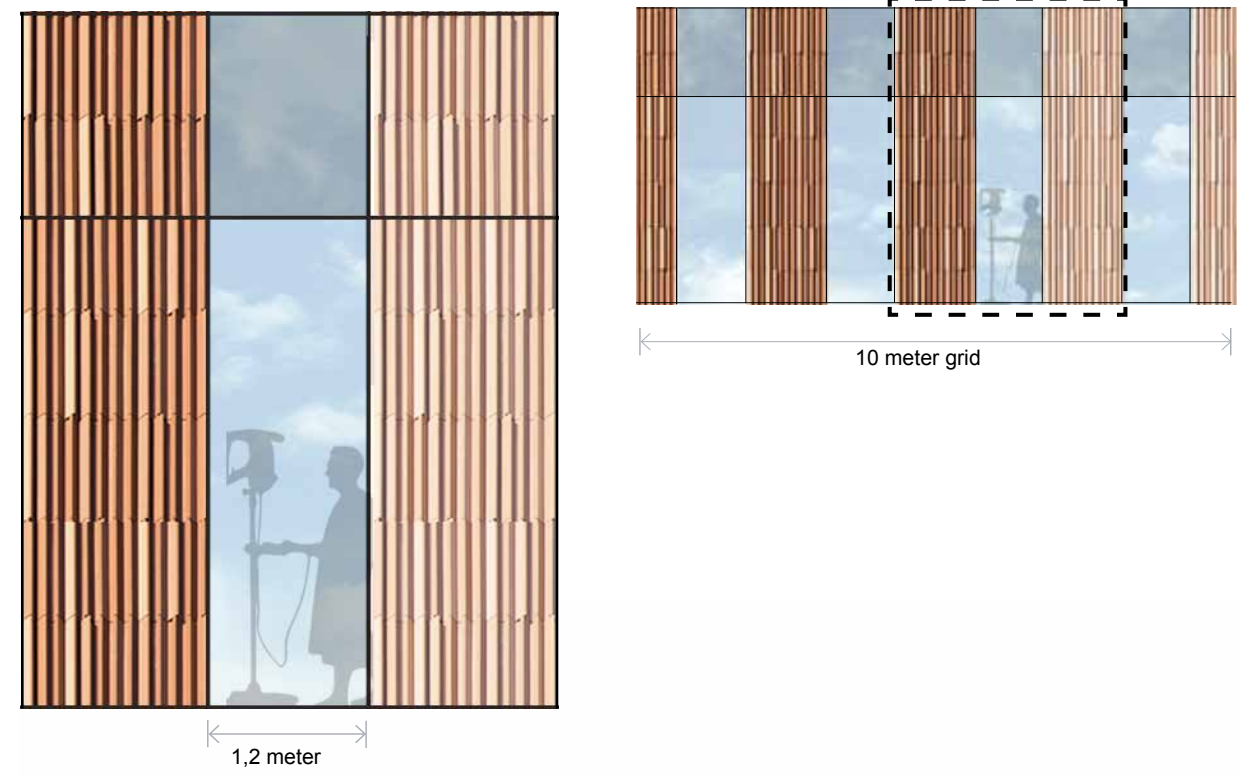




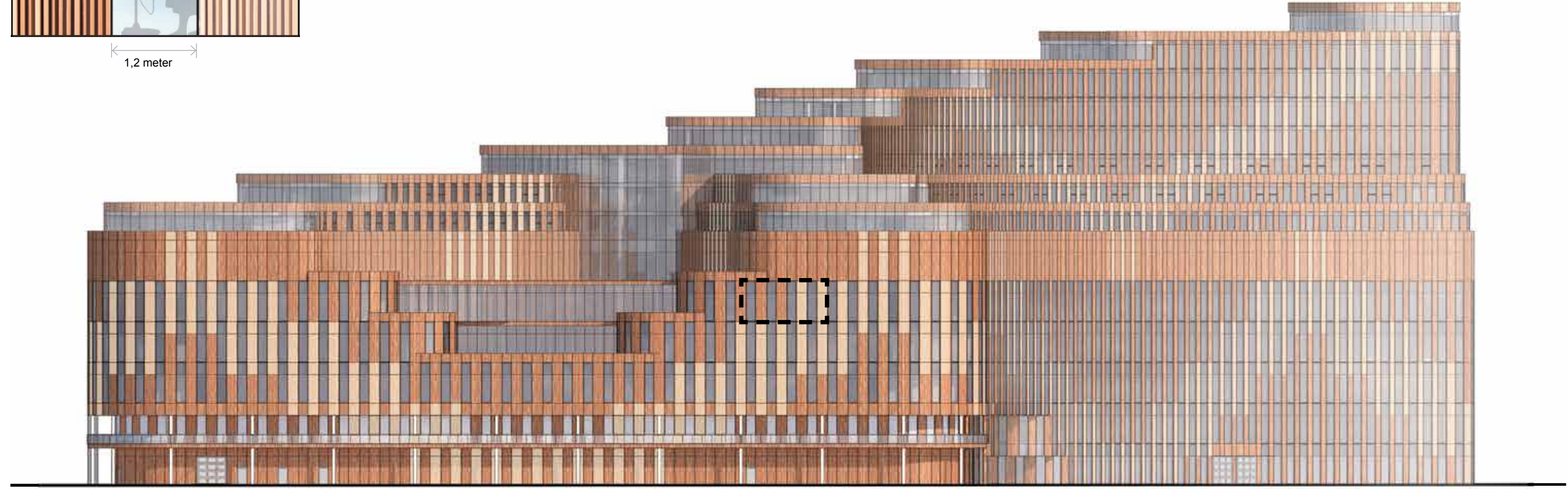
# MASTERPLAN



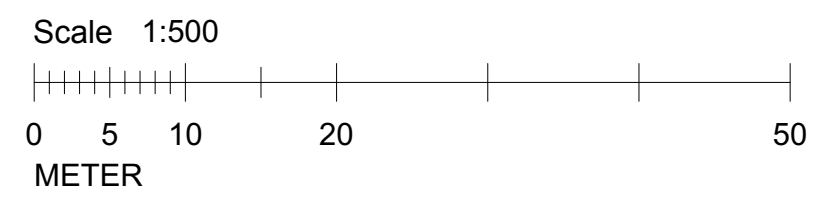
# FACADE



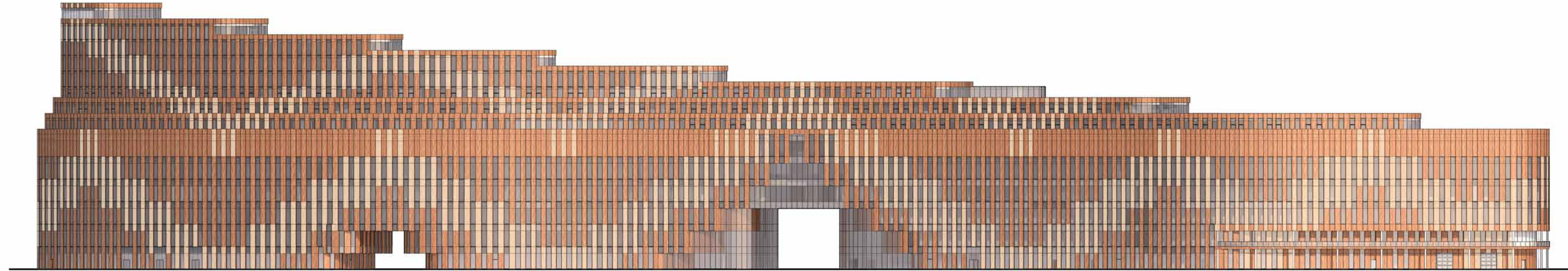
The facade is clad with ceramic terracotta tiles, which connects to the existing brick buildings while at the same time giving it a contemporary expression and an organic touch. The decks on the roof and courtyard are made of fireproof Thermowood. Some of the terracotta tiles are in a lighter colour, which creates a continuous pattern along the whole building and further enhance the sense of motion.



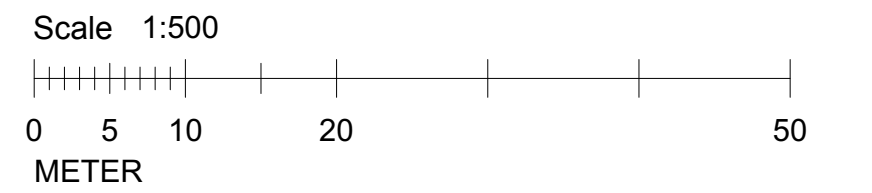
South facade





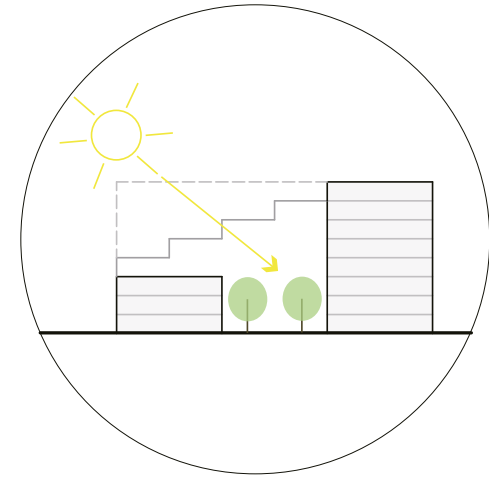


West facade

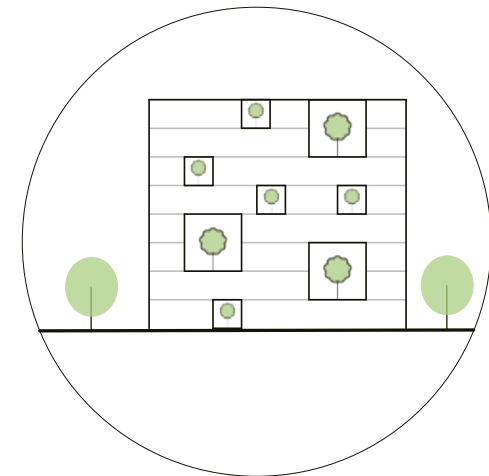




# HEALTH-PROMOTIVE ARCHITECTURE



Provide daylight through terracing and openings



Greenery on the inside and outside



Visualization from main elevator hall (floor 9).

## Biophilia

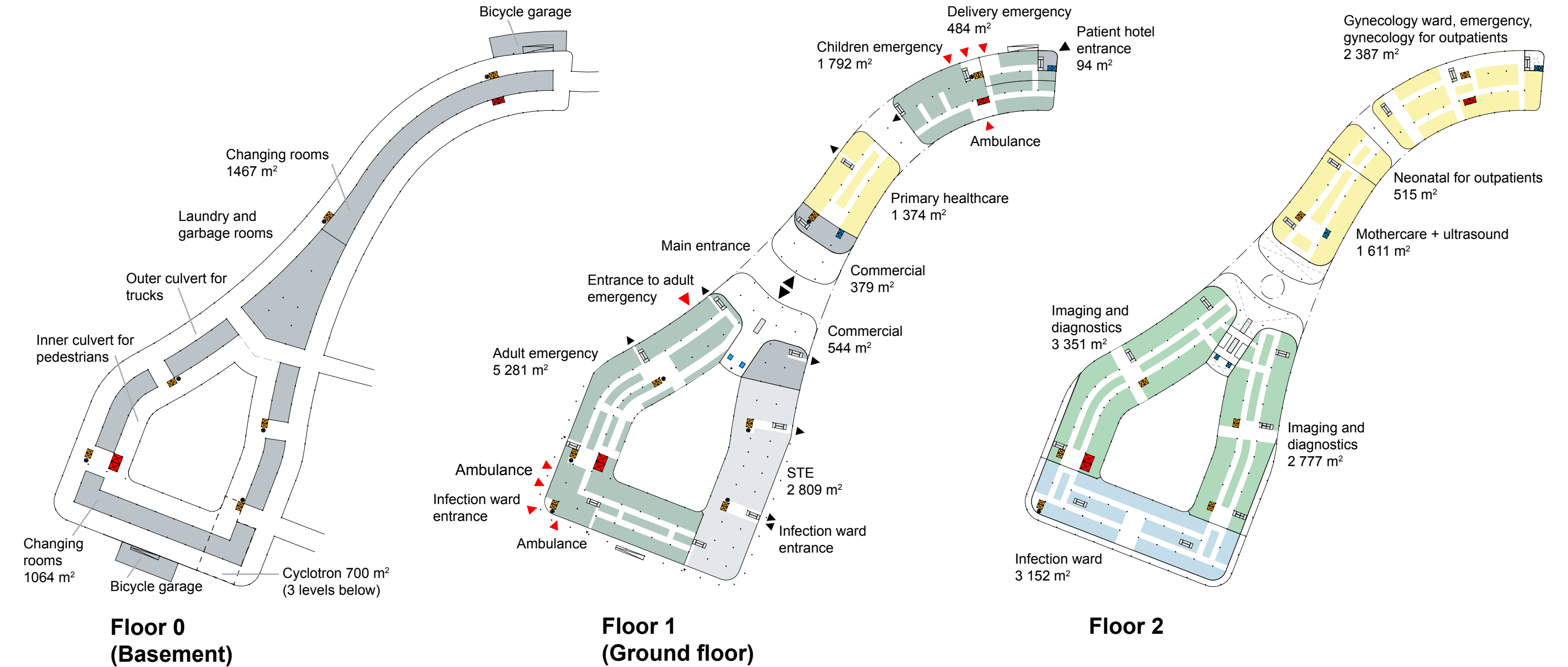
Two important design strategies, as well as the organic shape and facade expression of the building, can be related to the concept of *Biophilia*. As Bio means "life or living things" and philia means "love", Biophilia can be translated to "Love to life". Biophilic design typically includes environmental features (characteristics and features of the natural environment such as sunlight, fresh air, plants, animals, water, soil, landscape, natural colors and natural materials such as wood and stone), natural shapes and forms (simulation and mimicking of shapes and forms found in nature) as well as light & space (spatial and lighting features that evoke the sense of being in a natural setting, including natural lighting, a feeling of spaciousness and more subtle expressions such as sculptural qualities of light and space, and the integration of light, space, and mass).\*

The biophilic concept is interesting because it somehow connects sustainable architecture with healthcare architecture by means of incorporating nature in the design. It is also connected to the evidence-based design finding that views of nature from a window may influence the recovery from surgery in a positive way.\*\* To conclude: the biophilic design elements in our building can be seen as health-promoting architecture.

\* Duarte Dias, B. (2015). Beyond Sustainability – Biophilic and Regenerative Design in Architecture. European Scientific Journal, March 2015.

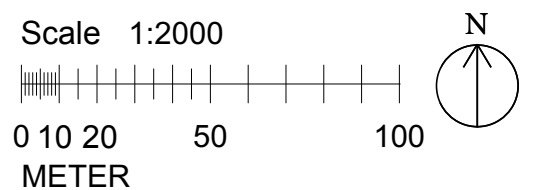
\*\* Ulrich, R. (1984). View through a window may influence recovery from surgery. Science, April 1984.

# SCHEMATIC FLOOR PLANS



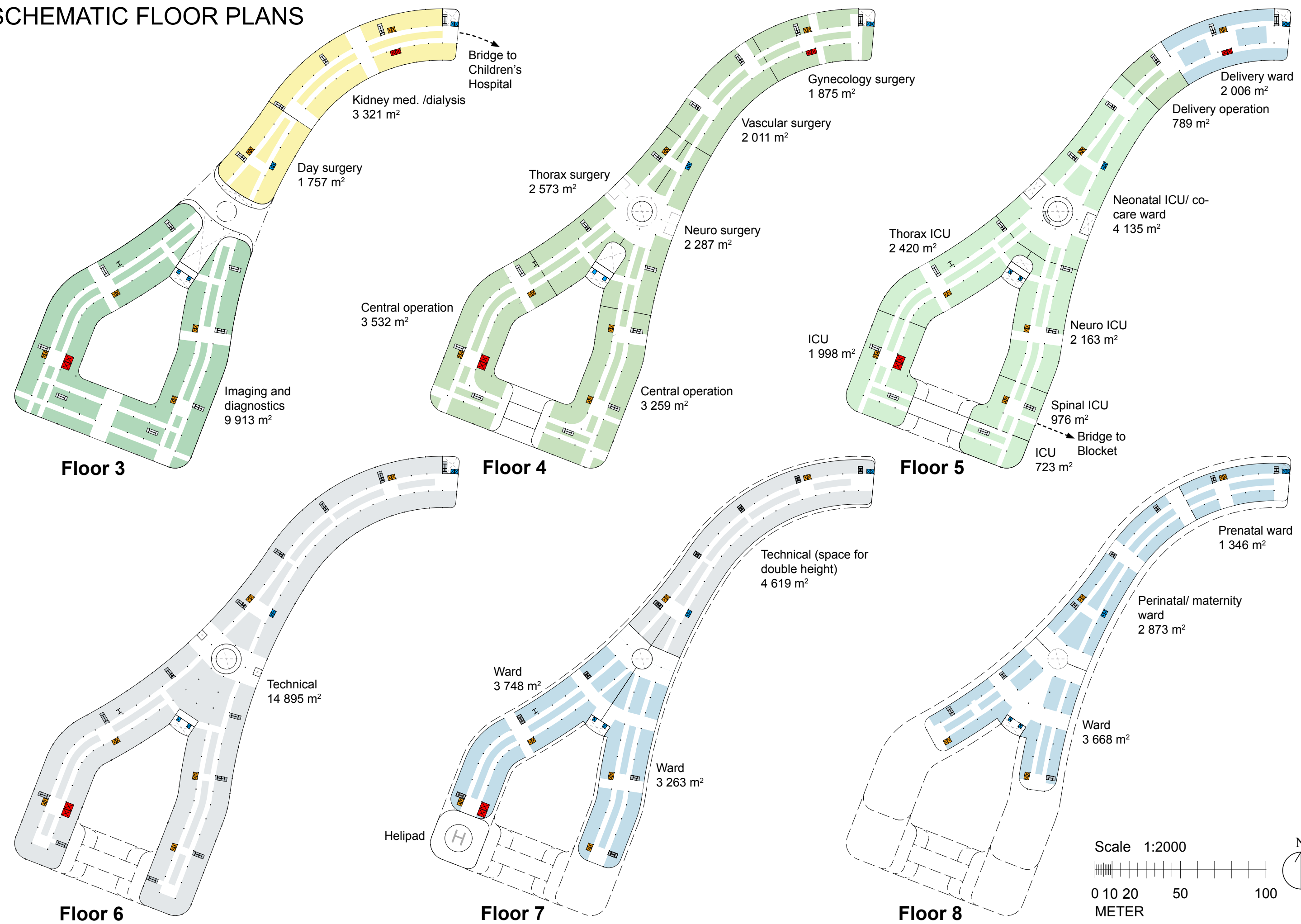
## Legend

	Hot floor - emergency		Inpatient - wards		Technical spaces & medical supply
	Hot floor - ICU/ Intensive care unit		Outpatients		Staff & public area
	Hot floor - Operation/ surgery				

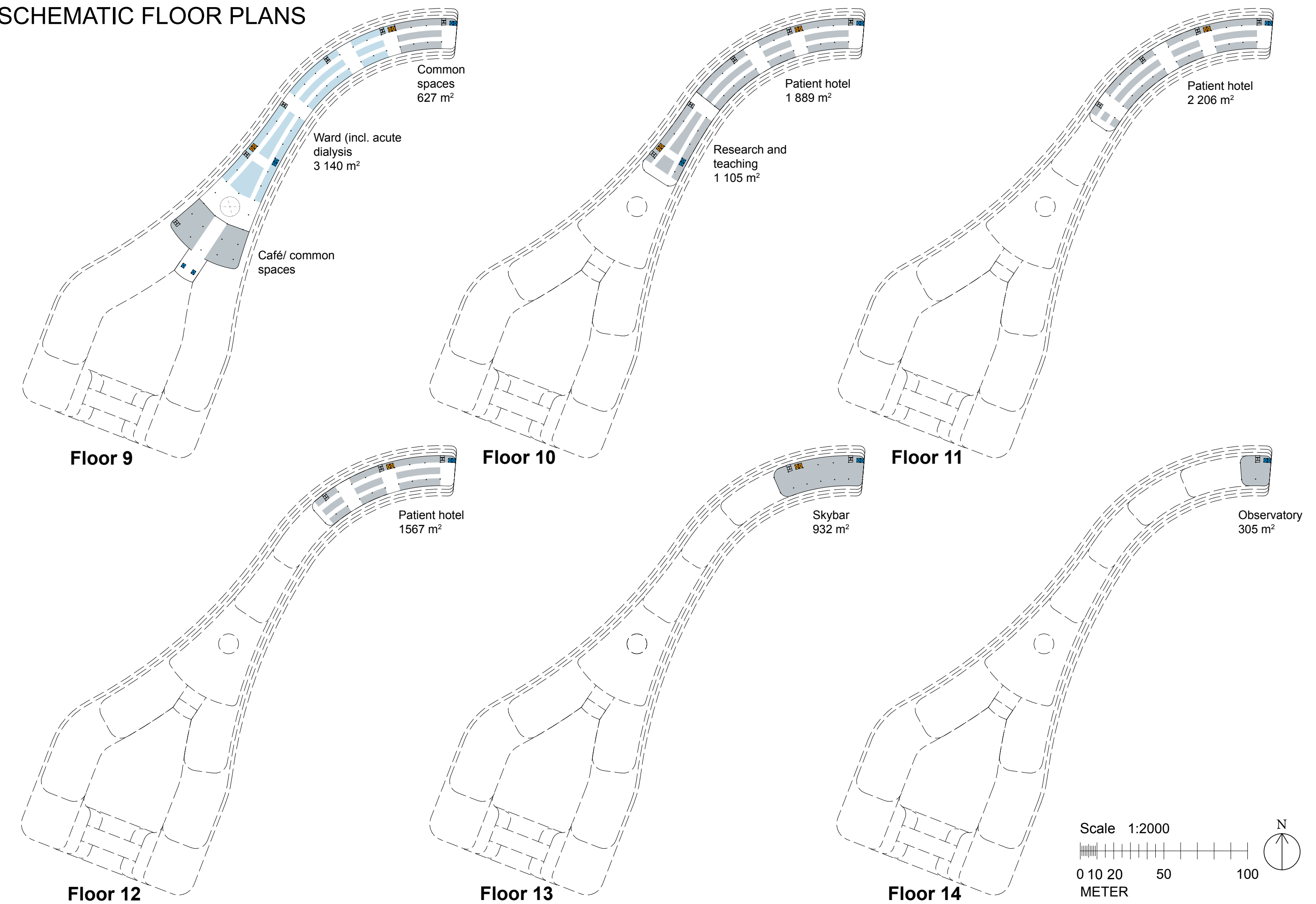




# SCHEMATIC FLOOR PLANS



# SCHEMATIC FLOOR PLANS





# FLOWS

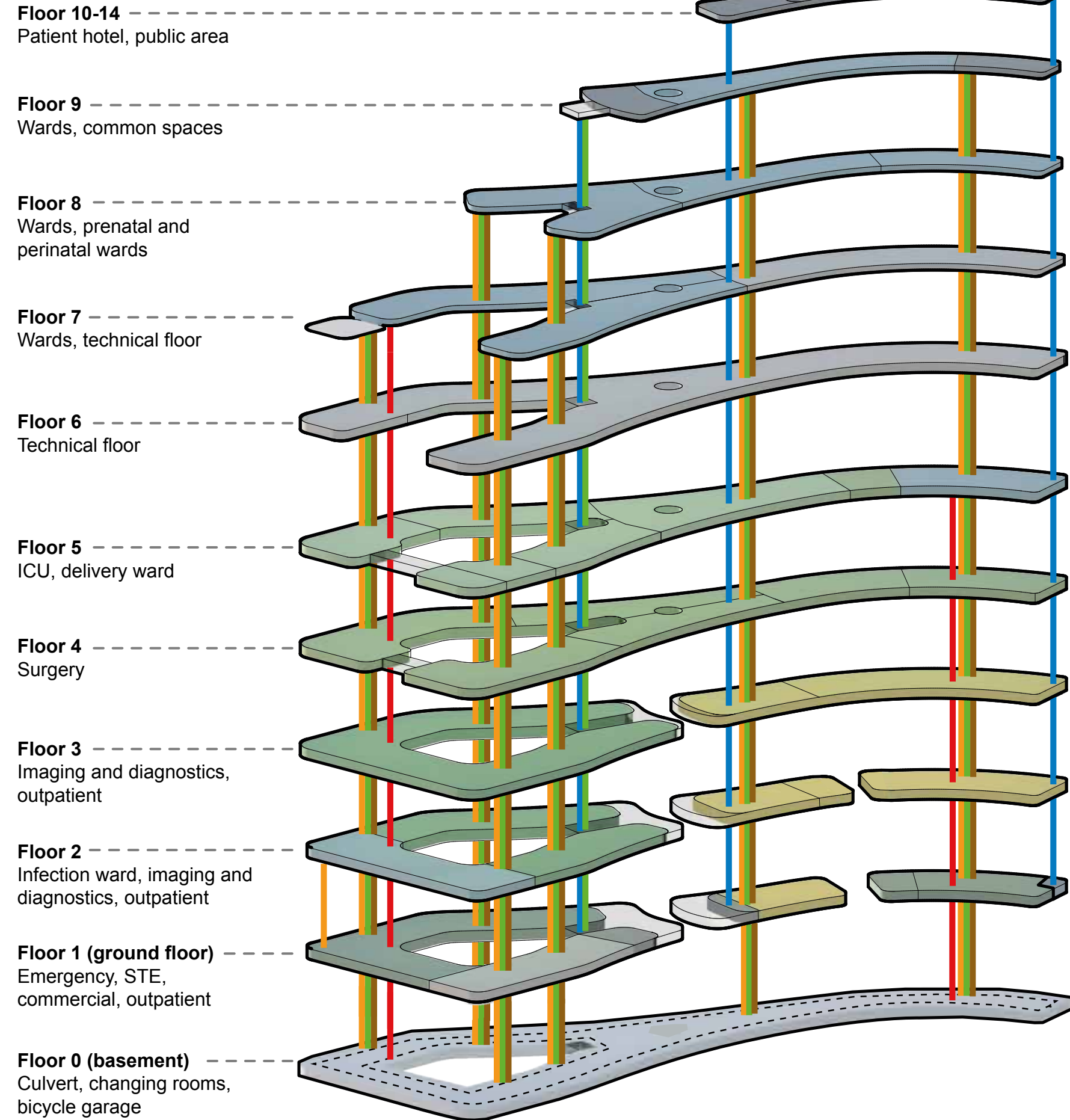
## Legend

- Emergency
- Inpatients in bed
- Staff
- Outpatients/ visitors
- Goods
  
- Hot floor - emergency
- Hot floor - Operation/ surgery
- Hot floor - ICU/ Intensive care unit
- Hot floor - imaging and diagnostics
- Inpatient - wards
- Outpatient
- Technical spaces & medical supply
- Staff & public area

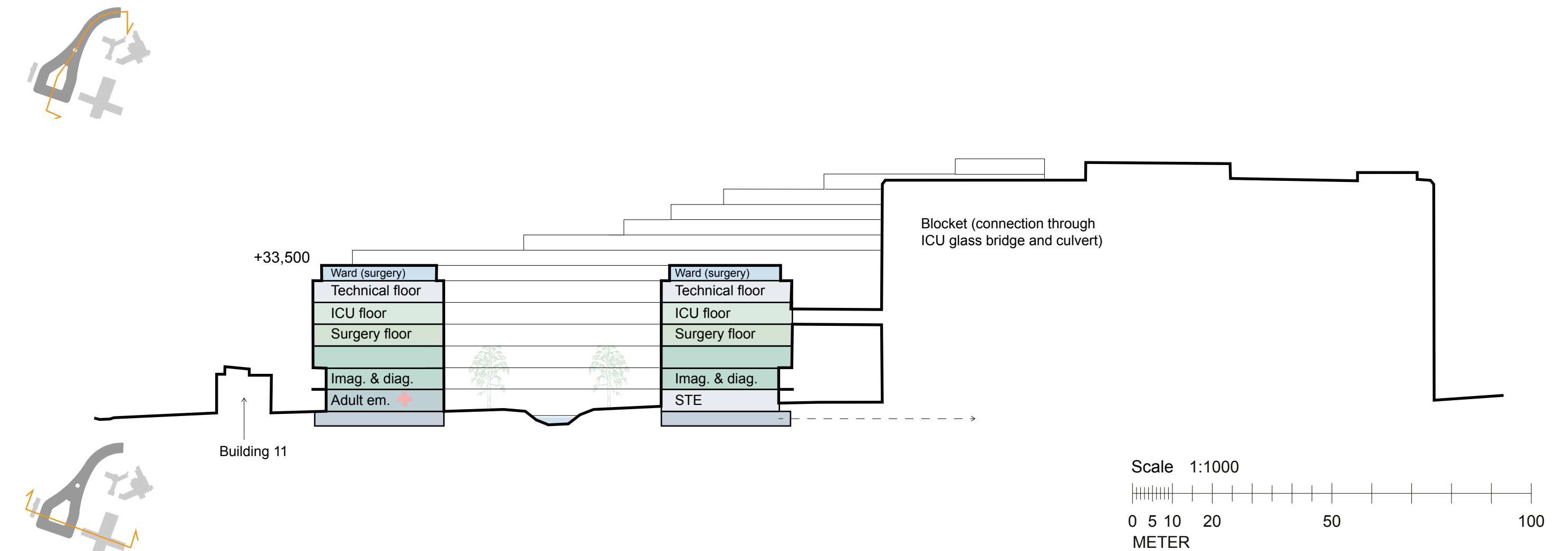
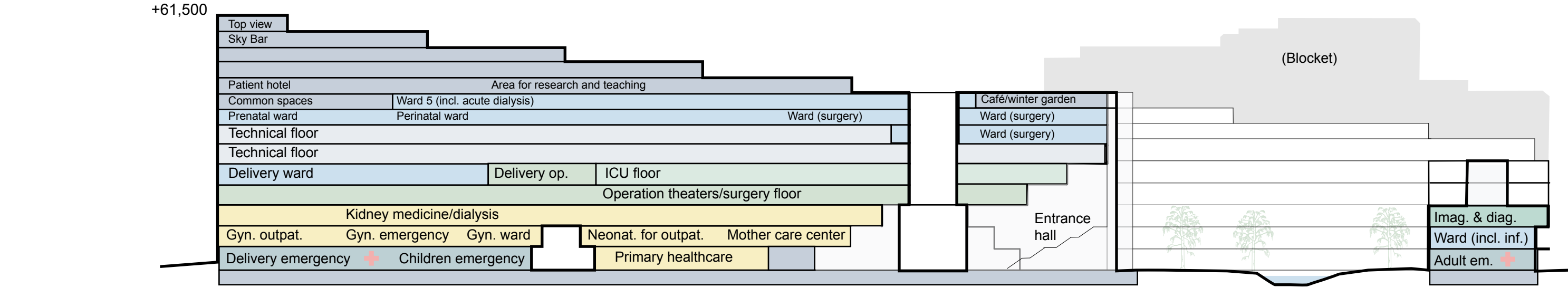
## AREAS

**Total BTA: 124 591 m<sup>2</sup>**

Hot floor total area: 46 931 m<sup>2</sup>  
 Surgery: 15 537 m<sup>2</sup>  
 ICU: 8 280 m<sup>2</sup>  
 Inpatient - wards: 16 971 m<sup>2</sup>  
 Outpatient: 8 893 m<sup>2</sup>  
 Women/neonatal: 14 386 m<sup>2</sup>  
 Staff and public area: 14 441 m<sup>2</sup>

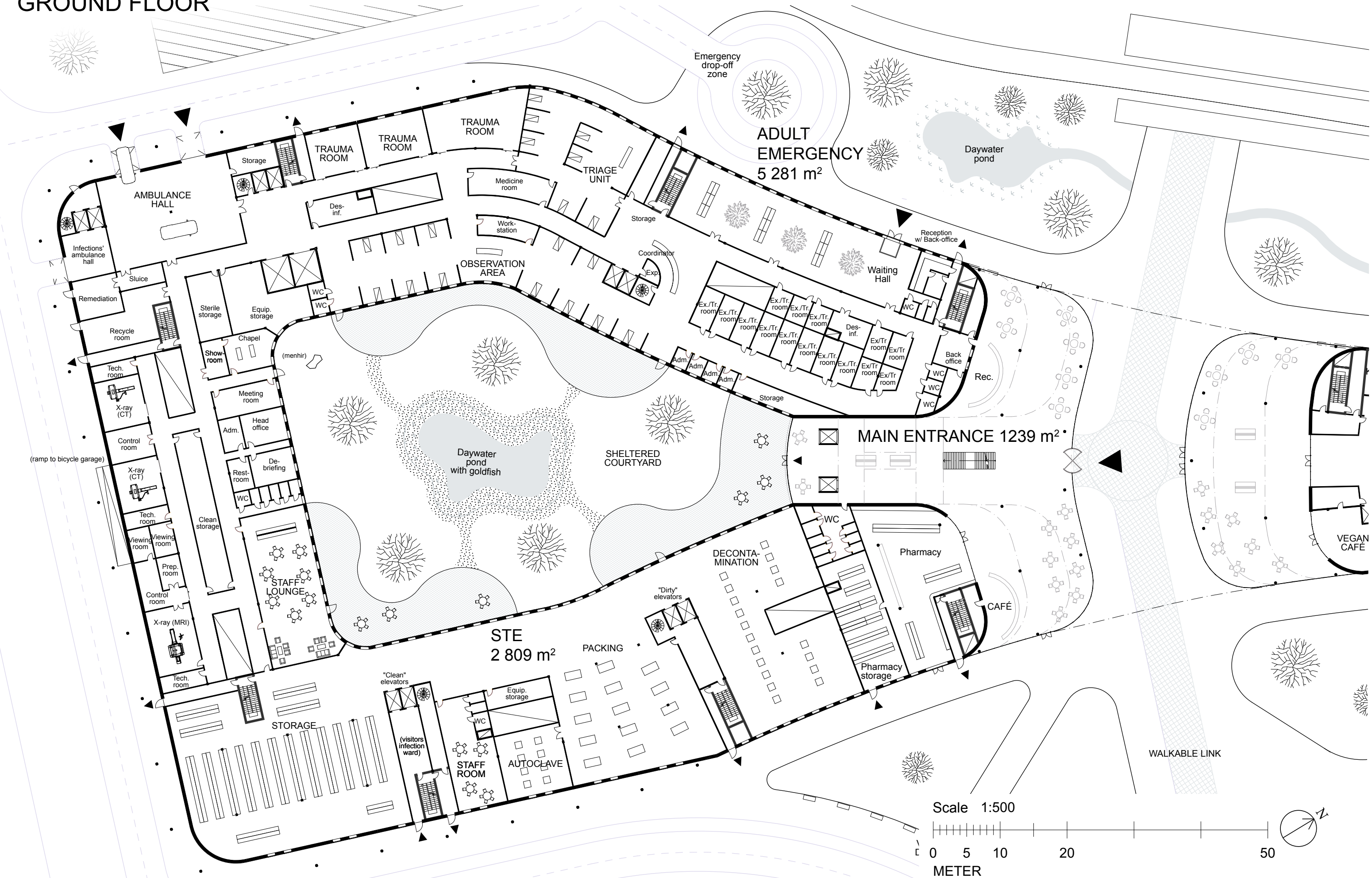


# SECTIONS

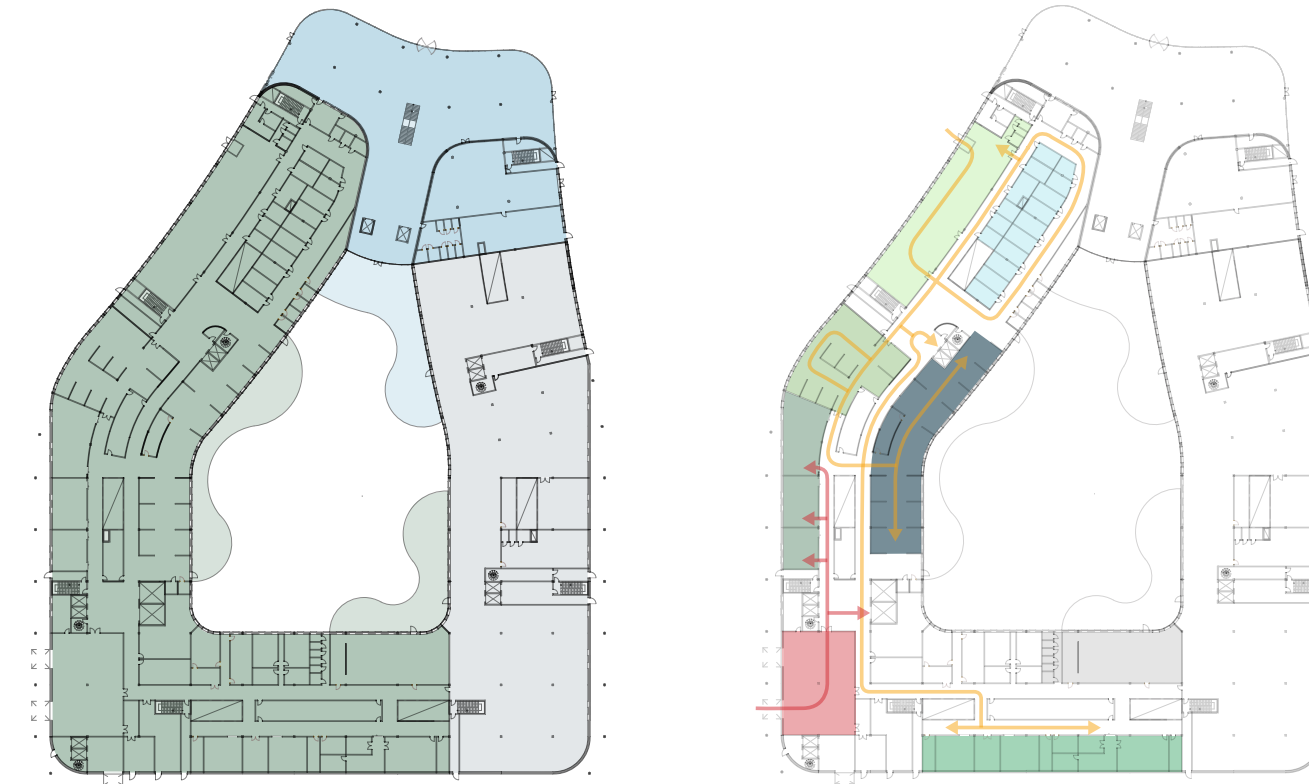




# GROUND FLOOR



# GROUND FLOOR



- Main entrance/commercial & public area
- Emergency unit
- STE

## Emergency Unit

The emergency unit is equipped with three trauma rooms, an ambulance hall with remediation room and a small x-ray unit for urgent examinations. A smaller ambulance hall is also offered for infectious patients, who will access their ward through a balcony one floor above. The emergency waiting hall has greenery on both the inside and outside in order to relieve stress and create a peaceful environment. Patients kept under observation are placed in connection with the inner courtyard, which creates a feeling of more seclusion and tranquility.

## STE Unit

The whole STE unit is placed on ground floor which will allow a better workflow as well as providing daylight for the staff working here.

- Waiting hall
- Triage
- Examination/treatment rooms
- Observation area
- Ambulance hall
- Trauma rooms
- Emergency X-ray
- Staff area

## Main entrance hall

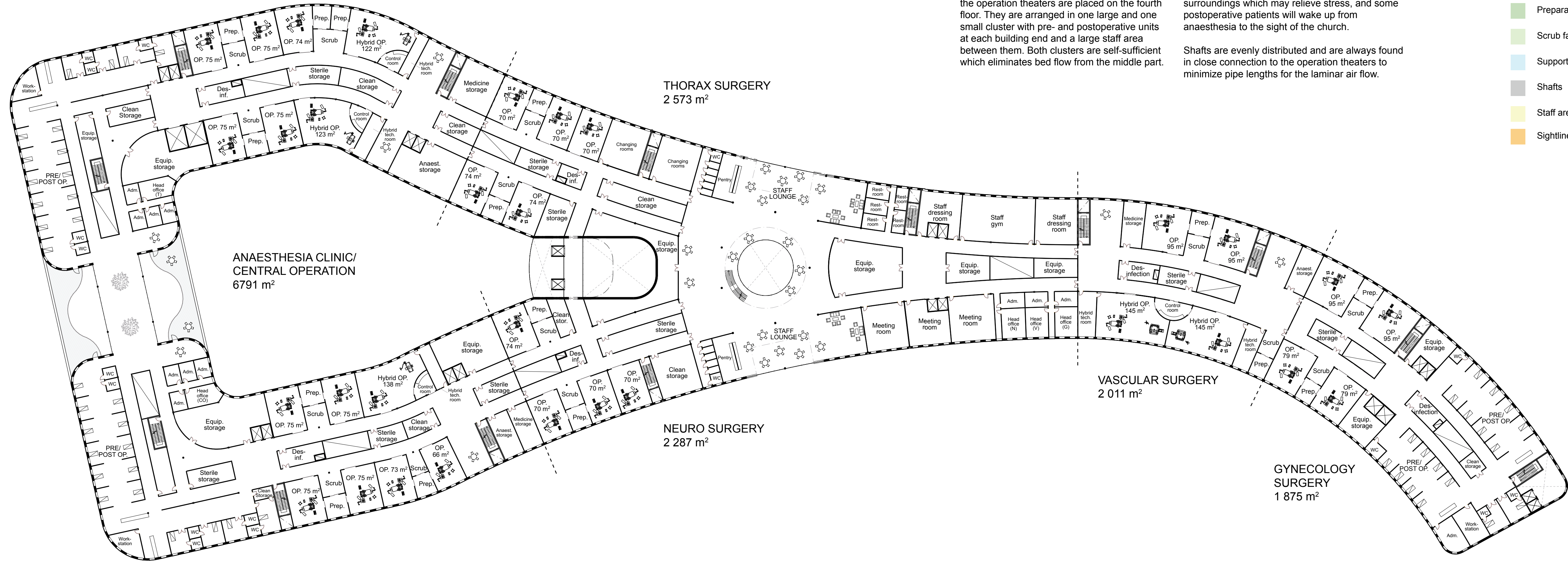
The main entrance hall includes a reception, visitors elevators and a large staircase which connects the ground floor with the Imaging & diagnostics unit. Public functions are placed along the walkable axis to the Link of Knowledge and include cafés and a pharmacy.



Visualization from the main entrance hall



# SURGERY FLOOR



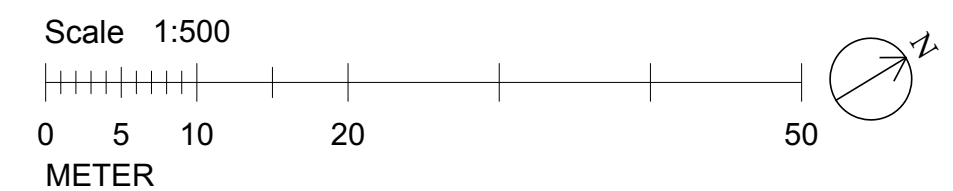
# SURGERY FLOOR

With the exception of the Delivery operation, all the operation theaters are placed on the fourth floor. They are arranged in one large and one small cluster with pre- and postoperative units at each building end and a large staff area between them. Both clusters are self-sufficient which eliminates bed flow from the middle part.

All preoperative patients have a view of the outdoor surroundings which may relieve stress, and some postoperative patients will wake up from anaesthesia to the sight of the church.

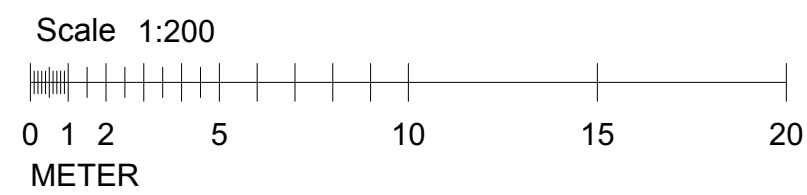
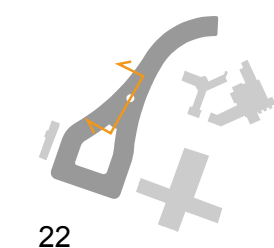
Shafts are evenly distributed and are always found in close connection to the operation theaters to minimize pipe lengths for the laminar air flow.

- Pre/post operation area
- Operation theaters
- Preparation rooms
- Scrub facility
- Support functions
- Shafts
- Staff areas
- Sightlines & wayfinding





PERSPECTIVE SECTION



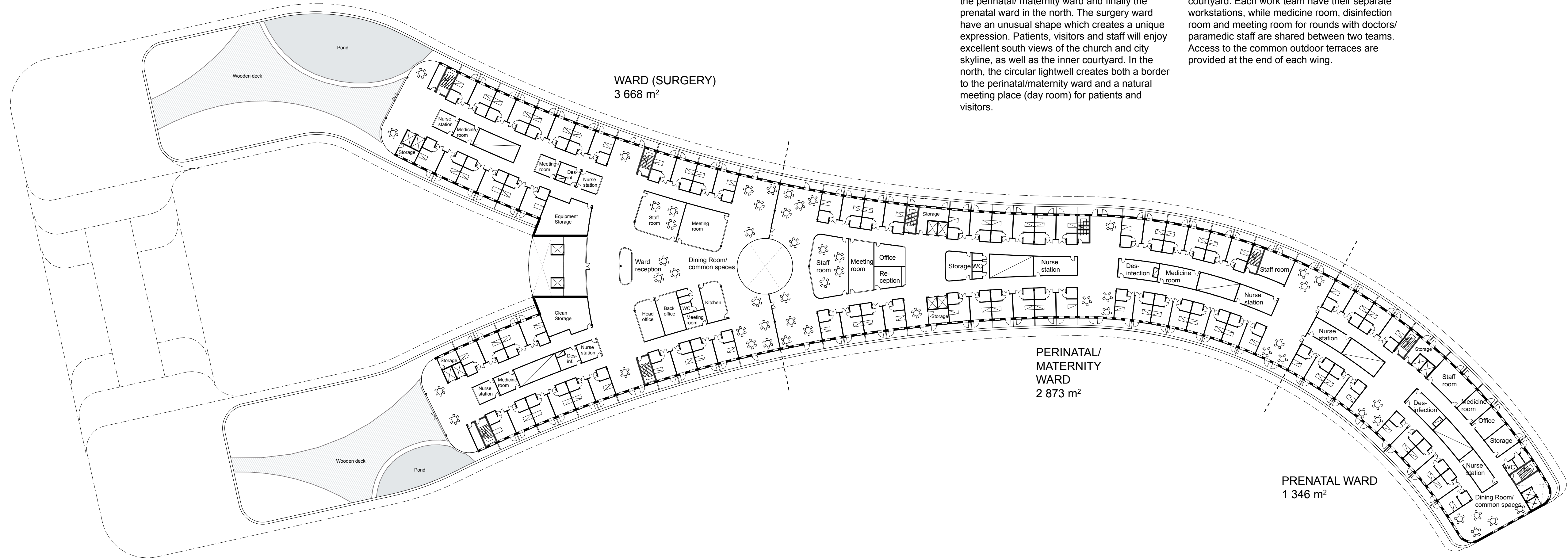
STAFF LOUNGE



The big staff lounge on the fourth floor is a common meeting place for the whole surgery and ICU clinic and offers a good connection with the outside through large curtain wall panels. The floors are connected with a meandering staircase around the round lightwell.



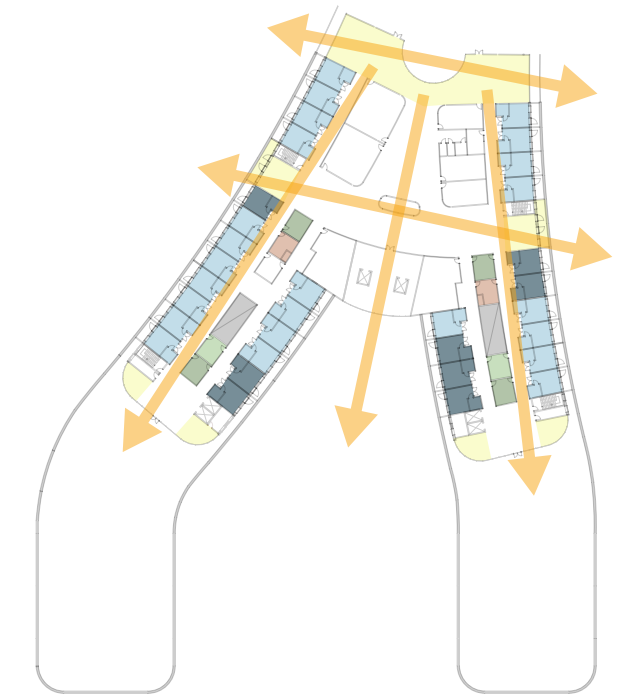
# WARD FLOOR



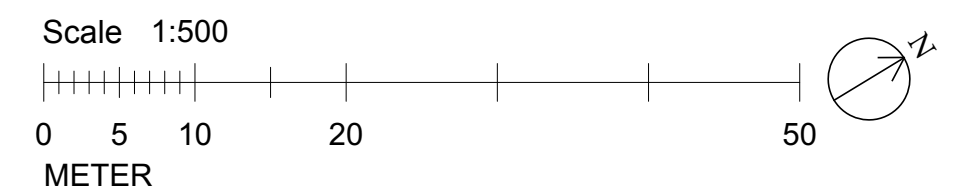
# WARD FLOOR

Due to the shape of the building, the configuration of wards differ on each floor. The eighth floor contains a surgery ward, the perinatal/ maternity ward and finally the prenatal ward in the north. The surgery ward have an unusual shape which creates a unique expression. Patients, visitors and staff will enjoy excellent south views of the church and city skyline, as well as the inner courtyard. In the north, the circular lightwell creates both a border to the perinatal/maternity ward and a natural meeting place (day room) for patients and visitors.

The patient rooms are situated along each wing of the ward, with many rooms facing the large cemetery park and some rooms facing the inner courtyard. Each work team have their separate workstations, while medicine room, disinfection room and meeting room for rounds with doctors/ paramedic staff are shared between two teams. Access to the common outdoor terraces are provided at the end of each wing.



- IMCU rooms
- Normal care rooms
- Nurse stations
- Medicine rooms
- Laundry & garbage shafts
- Shafts
- Common areas (pat. & visitors)
- Sightlines & wayfinding





# WARD UNIT



# WARD ROOM

