ELEVATE

HIGHTECH HEALTHCARE CENTER
LUND UNIVERSITY HOSPITAL

GROUP TWO
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HEALTHCARE ARCHITECTURE
ARK 263
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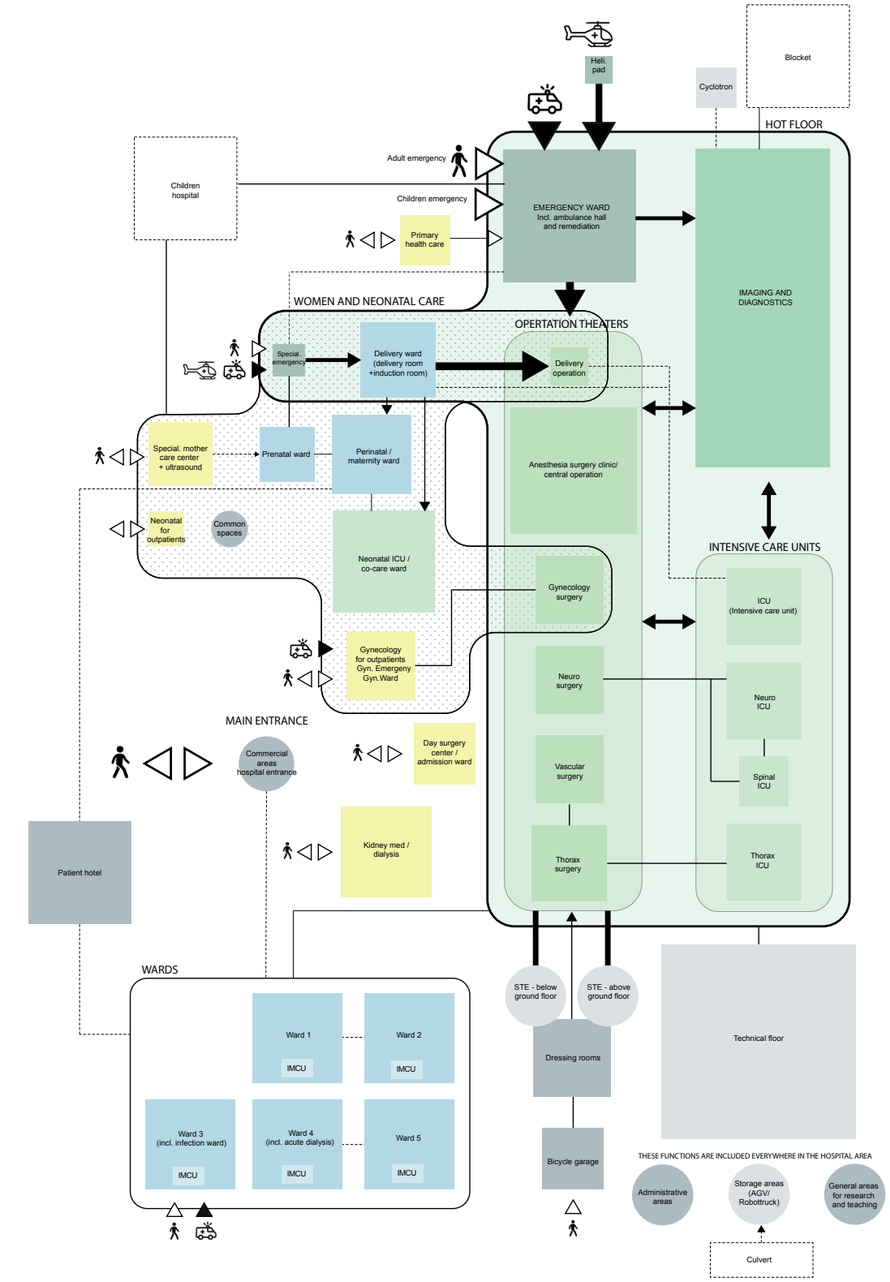
Task

To design a new high-tech healthcare complex for Skåne University Hospital in Lund. The brief contains the most complex and intense forms of care, such as Emergency, ICU, Surgery and the Imaging & Diagnostics department. Most of the departments are now located in other buildings spread around the hospital area, mainly “Blocket”, which are becoming too small for the new high-tech care that the Hospital wants to offer.

Region Skåne and Lund

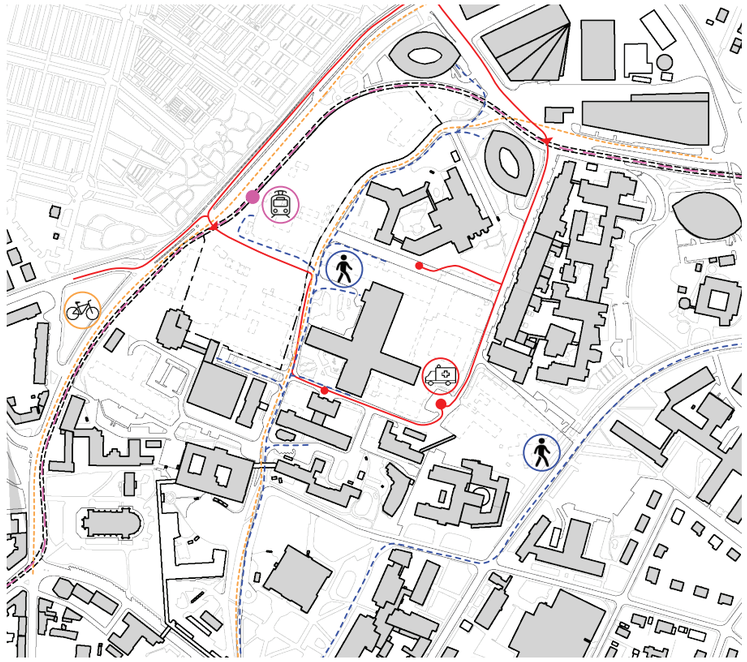
The main stakeholders are the Region of Skåne and Skåne University Hospital. Their vision for the new hopital area includes a better connection with the University of Lund and the new Science Village to the Northeast of the City, called the “Link of Knowledge”, through the new tram line. It also included opening up the hospital area itself to allow for a public flow (consisting of hospital staff, patients, visitors, medicine students etc.) starting from the new tram station and moving southeast.



Brief and Logistics

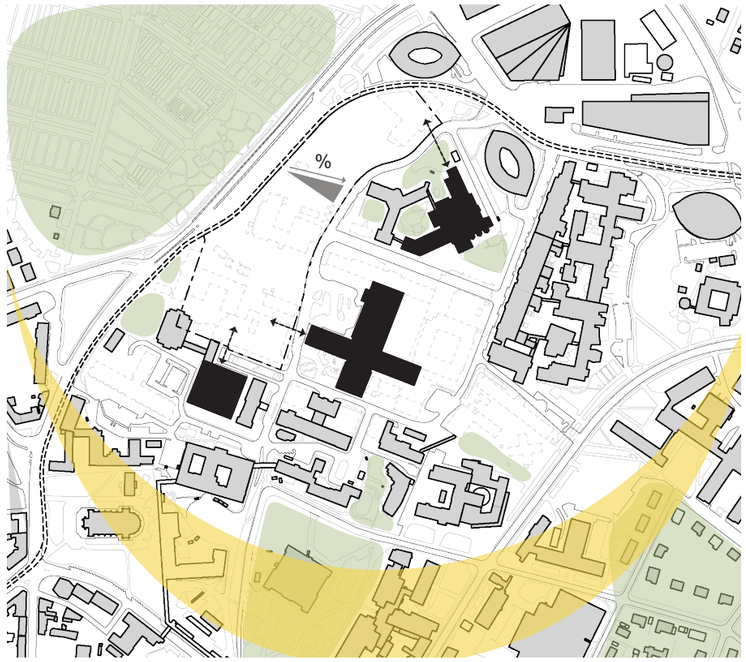
The brief diagram includes all the desired departments that should be included in the new hospital complex, including approximate sizes. It also shows the connections between different departments (where a thicker line means a shorter and faster connection) and the different flows of staff, outpatients, inpatients, emergency patients and goods.

SITE ANALYSIS



Flows

The flows that are marked out are (Red) the current emergency flow (mainly entering from the Northwest part of the Hospital area), (Blue) the necessary future connections to the "Blocket" and the Children's Hospital to the east of our assigned Site, and (Orange) the future desired public flow through the Hospital area and our Site.



Site and Context

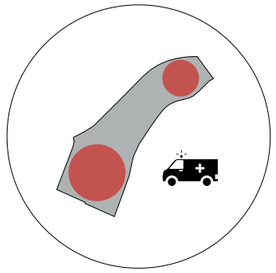
On our site we have identified mainly: the location of green areas (the cemetery to the northwest); the location of the future tram line and the radius of the magnetic field (25 meters) generated by it; the inclination of the Site; the movement of the Sun; and the need for the new building to be the highest in the Hospital area due to the relocation of the helicopter pad to the new Site.

Visions

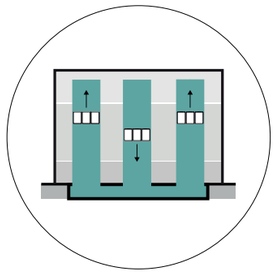
The main vision for the area is the connection to the University and new science centers to the northeast, through "the Link of Knowledge", and allowing for a flow of people through the area. A movement towards a nearly car-free inner part of the area is also desired.

STRATEGIES

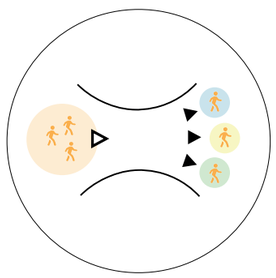
BRIEF AND LOGISTICS



Splitting emergency
Creating a beating heart of the hospital area with close and easy access from the city centre. Children's Emergency in the north, allowing a future concentrated women's and child care area.

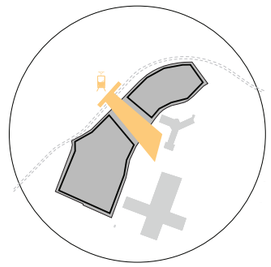


Concentrated vertical flows
Communication between high tech departments is mainly vertical. By using concentrated cores flows can be combined, making for an efficient use of space and simpler logistics.

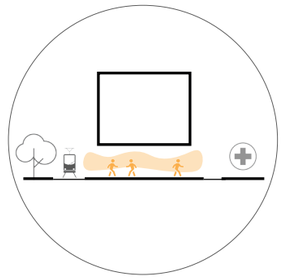


Intuitive wayfinding
By simplifying the wayfinding for patients and visitors throughout the hospital the flows will move faster and more efficiently, as well as putting users at ease.

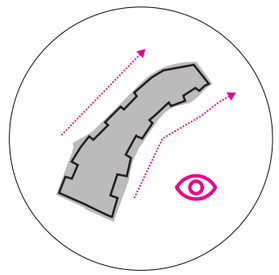
SITE AND CONTEXT



Framing public space
Create a natural and open entrance from the tram station into the Hospital area, where a public space can take shape.

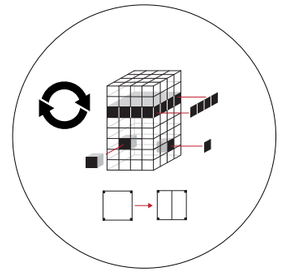


Open and transparent groundfloor
Transparency in the ground floor hints at the interior functions and provides a welcoming atmosphere, as well as a sense of connection from the inside to the outside.

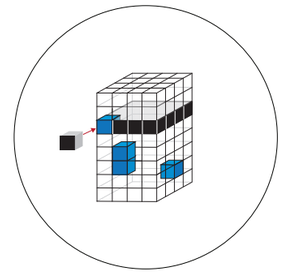


Breaking the facade
By pushing masses in, the appearance of a continuous endless wall can be prevented, improving the human scale of the building.

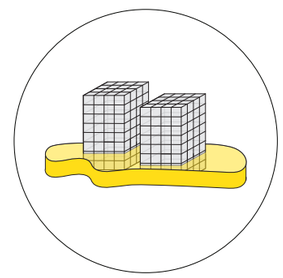
SUSTAINABILITY AND FUTURE PROOFING



General skeleton structure
A general grid structure allows for future adaptability.

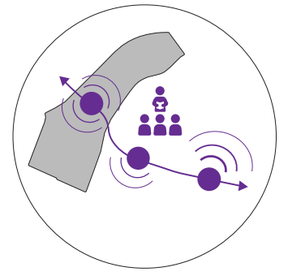


Design for growth
Modules within departments are designed with certain overcapacity to allow for more functions in the future.

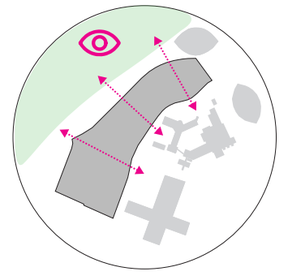


Use of different structure
Use of a more temporary structure improve possibilities for longer lifespan of big structures.

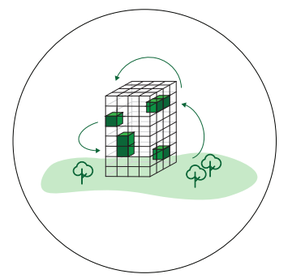
HEALTHPROMOTIVE ARCHITECTURE



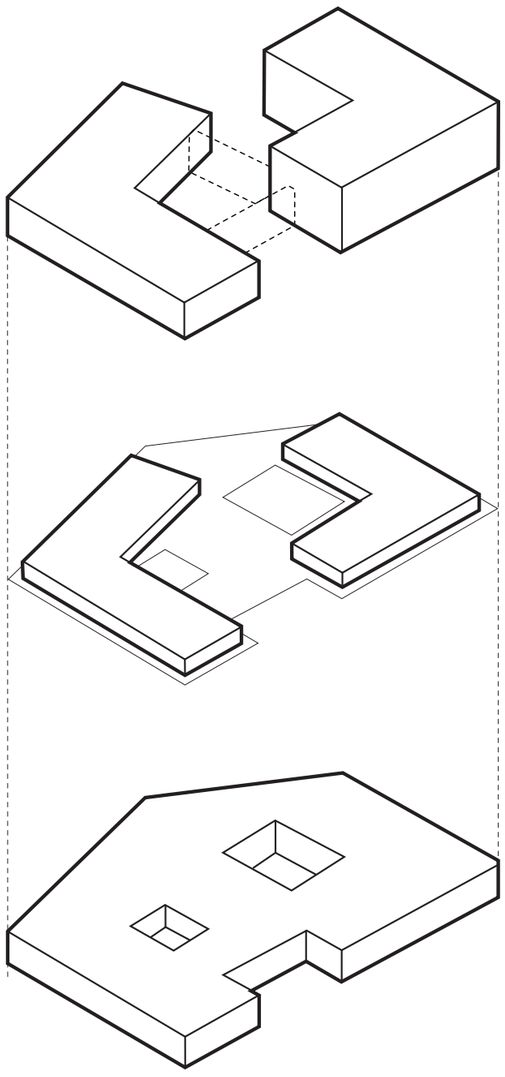
Expose research and progress
Medical research and health promotive knowledge could reach a more general public by designing open spaces for exhibitions and lectures in a public area.



Orientation through sightlines
Uninterrupted sightlines can create a clear sense of orientation by referring oneself to the outside.



Implementing biotopes
By creating stepping stones for green, the building is part of a green flow instead of becoming a barrier, increasing biodiversity and the long term health of the citizens of Lund.



L-Shape

Contains the departments where most rooms are in need of daylight and a facade connection, such as Wards, ICU and Surgery.

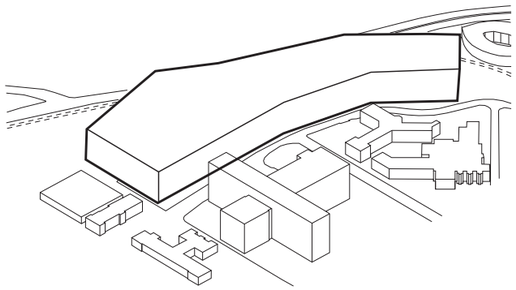
Split + Terrace

Contains staff and conference spaces where it's possible to access the green roof terraces on the same level.

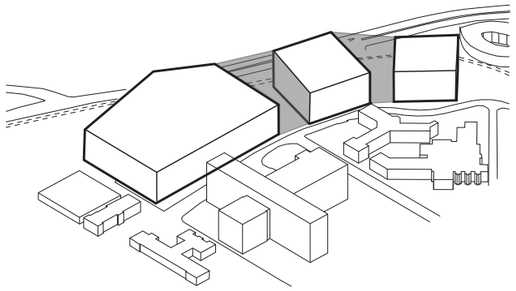
Plint

Contains the departments where the rooms requi-rea lot of space and many connections, creating a deep functional core, such as Imaging & Diag-nostics. Daylight is brought in through enclosed atriums in the center of the plint.

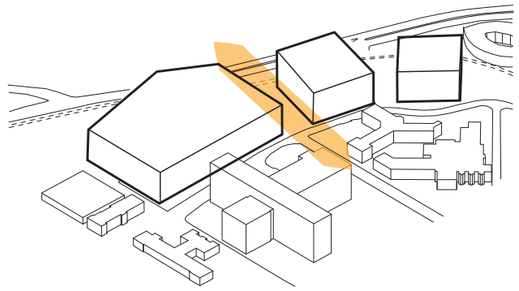
MASTERPLAN MASSING



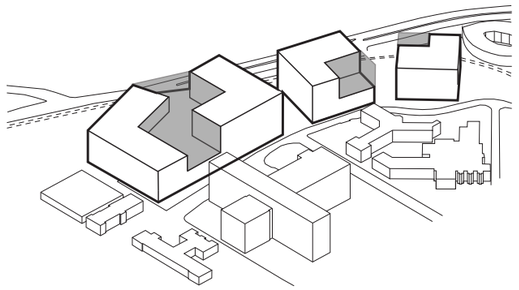
Volume covering the whole site



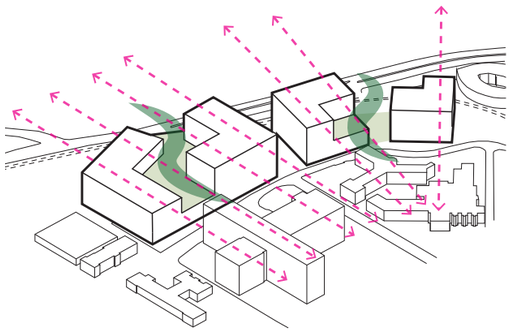
Opening up to allow for flows through the site



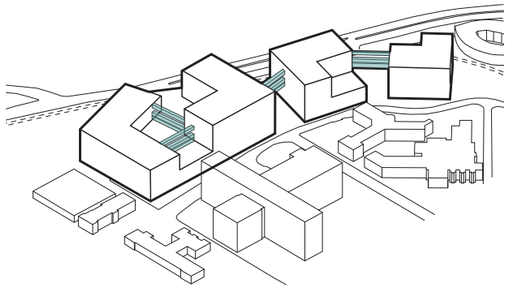
Main public flow



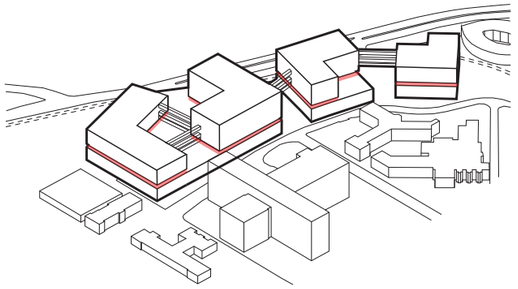
Opening up the upper part of the buildings further, creating L-shapes



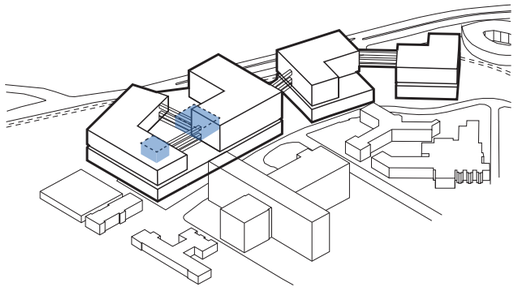
Green biotopes are placed on the created roof terraces, creating a green flow over the building Sightlines are also created



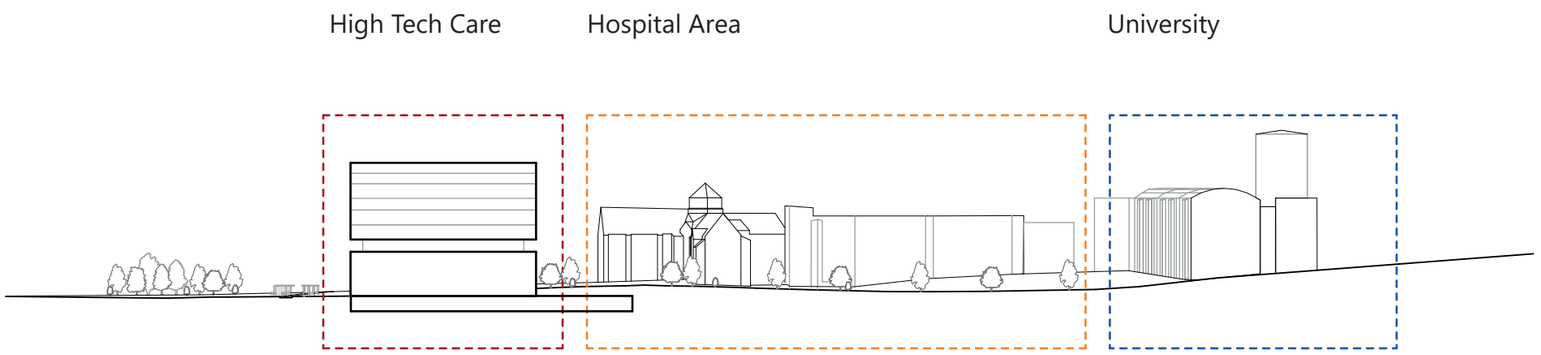
Adding connections between the buildings th-rough light bridges

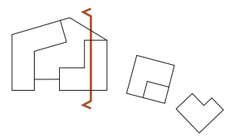


Dividing the lower and upper part of the buildings, creating an open and accessible floor from which staff, patients and visitors can reach the green terraces



Creating atriums that let daylight reach the core of the bottom part of the main building





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City section

Site space

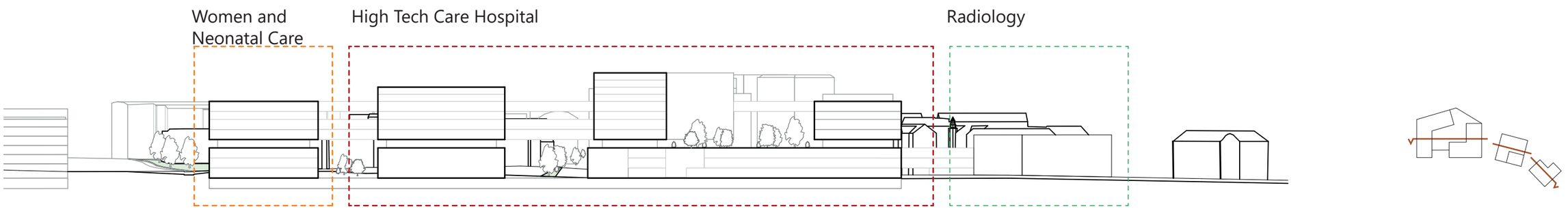
Car parking is mainly located in the outskirts of the area, keeping it as car-free as possible, whereas bike parking is located closer to the entrances. Greenery is implemented around the buildings, with different styles depending on the surrounding functions.

- Ambulance
- Parking Bikes
- Parking Cars

Site flows

The emergency flow is divided in two due to the split of the Main emergency and Children's/Special emergency. Both with main access from the street "Getingevägen" to the northwest, keeping it outside the central hospital area.

- Hot Flow
- Patient in Bed
- Staff
- Pedestrian



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City section

SITE PLAN

Getingevägen

Lasarettsgatan

Akutgatan

Emergency Women and Neonatal

+59.00

+58.00

+61.00

Car Park

Entrance Women and Neonatal

+61.00

Seminar building

Children hospital

Entrance Public

+58.00

+59.00

+60.00

Second Entrance

Primary Health Care

Main Entrance SUS

+60.00

+61.00

H

Staff

Entrance Emergehy

+59.00

+60.00

Ambulance Emergeny

Infection

Palm house

Imaging and Diagnostic

Entrance Blocket

Blocket

M 1:1000

0 10 25

SITE AND FUNCTIONS

Helipad
connectet to the main hight tec care

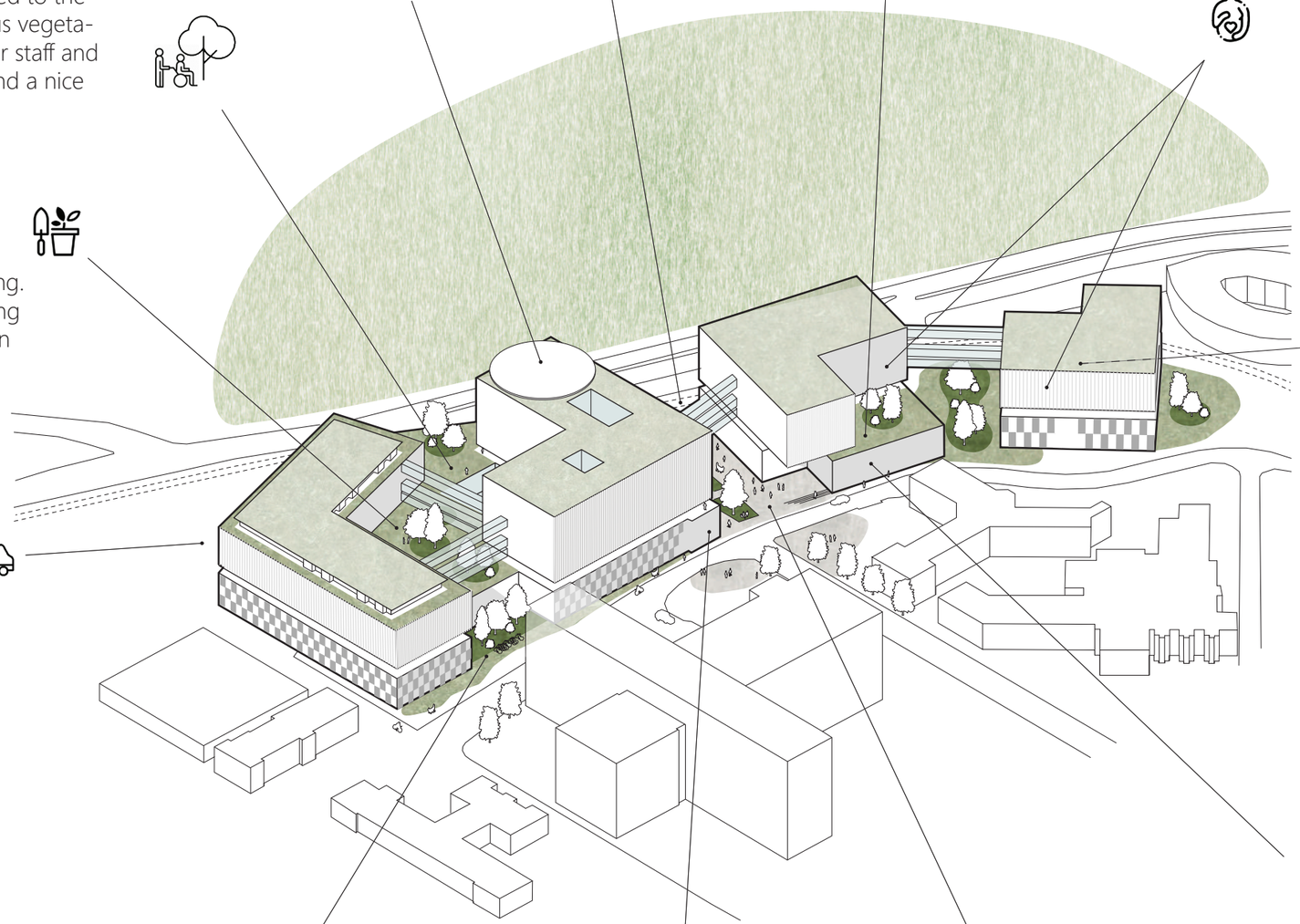
Tram stop
new pedestrian flow

Roof garden
A beautiful garden accessible from a the split level. Creating a nice view for the “women and neonatal” departments

Green roof
Relaxing green area connected to the staff restaurant, with generous vegetation to create a nice space for staff and inpatients to stroll through and a nice view to look at from indoors

Women and neonatal departments
spread out over two buildings with the patient/visitor entrance in the northernmost (right) building

Roof garwden
With possibilities for gardening. Mainly for staff to offer relaxing distraction from work, but can also be used by inpatients



Children’s and gynecology emergency
with close access to the Children’s hospital

Main emergency
Fast connection to high-tech departments

Open public space
Open groundfloor provides education and exhibition to include the public on the hospital life

Bike parking
All arround the plot there will be space for bike parking

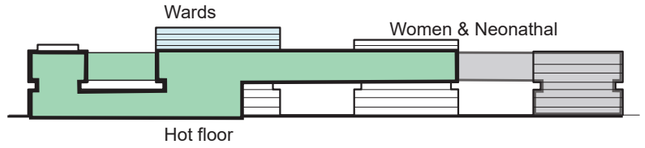
Flow
An opening from the tram station to the hospital area frames a public space for a pedestrian flow

Main entrance

BRIEF AND LOGISTICS

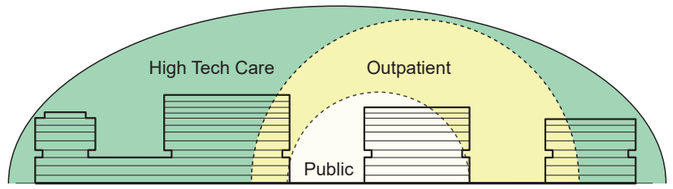
Clustering of functions

Considering given brief, functions are clustered in its main categories (Hotfloor, Women's and Neonatal care and wards).



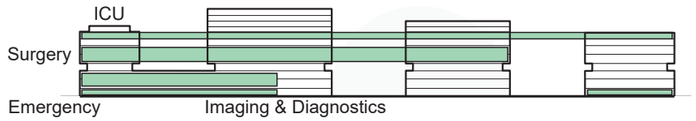
Intuitive wayfinding

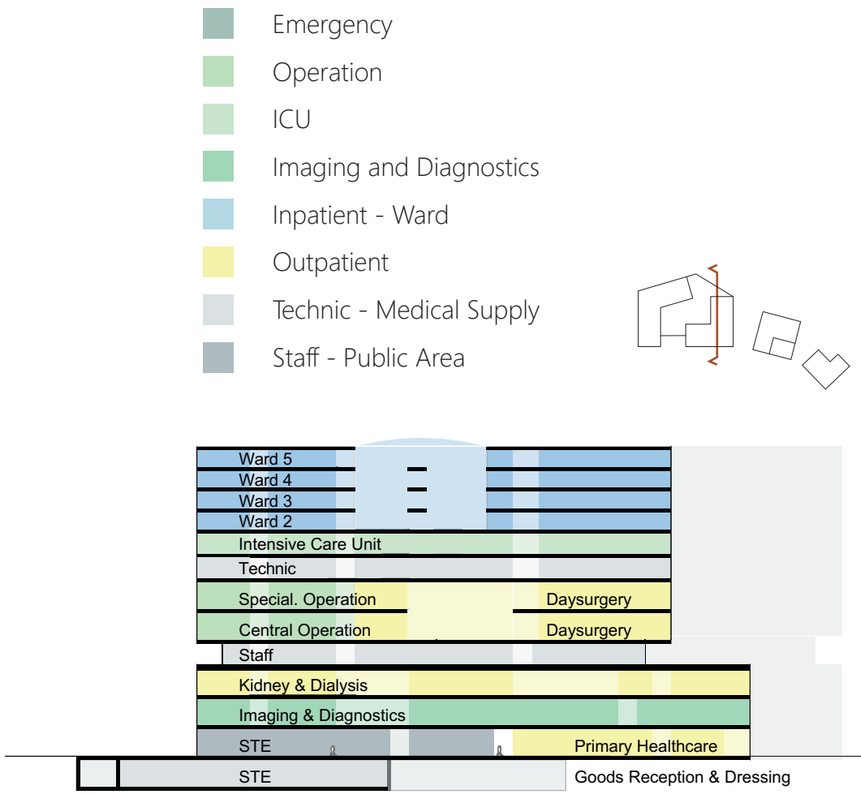
The hospital program is divided into public-, outpatient and high tech/inpatient functions. From the public environment, centered around the main public flow through the site, all outpatient departments are easily reached, and adjacent to them are the related high-tech departments.

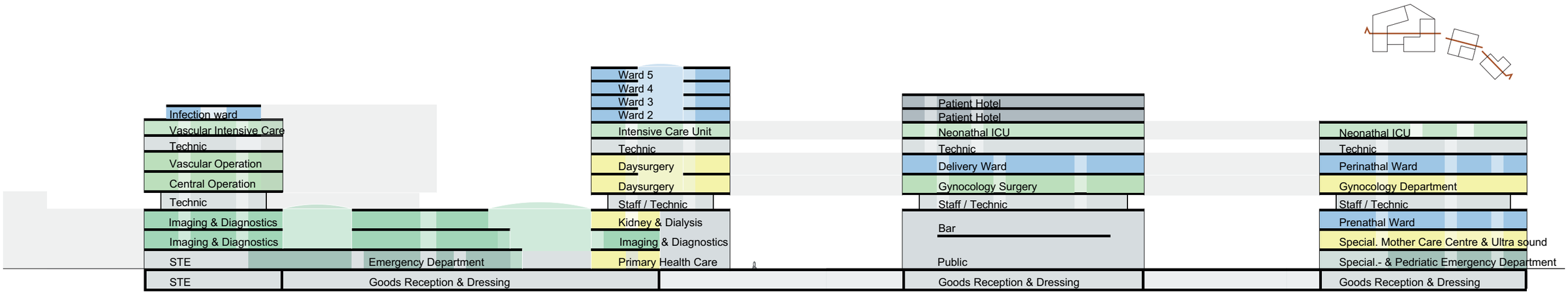


Horizontal layering

Departments such as surgery and ICU are spread out horizontally, with a close vertical connection between the corresponding units, such as neuro and thorax, of each department.







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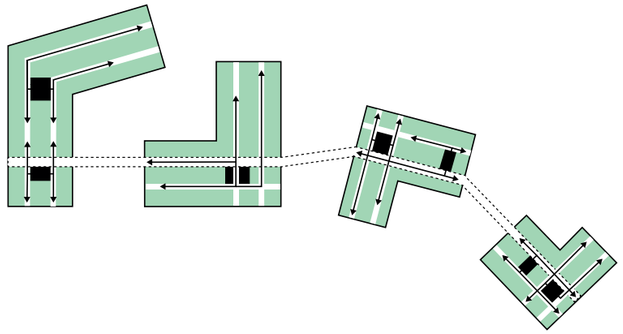
Section

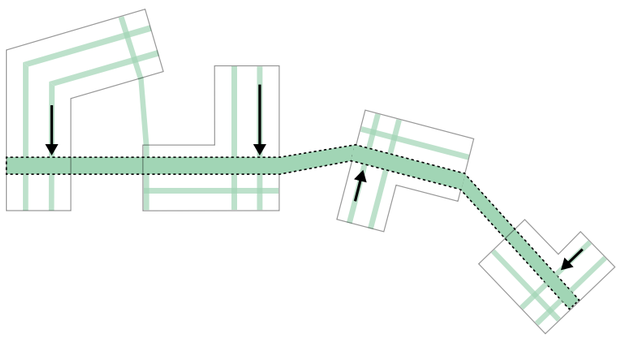
Concentrated vertical flows

Vertical communication is clusterted and centrally placed within the upper L-shaped floors, creating fewer vertical flows while still maintaining efficient horizontal connections

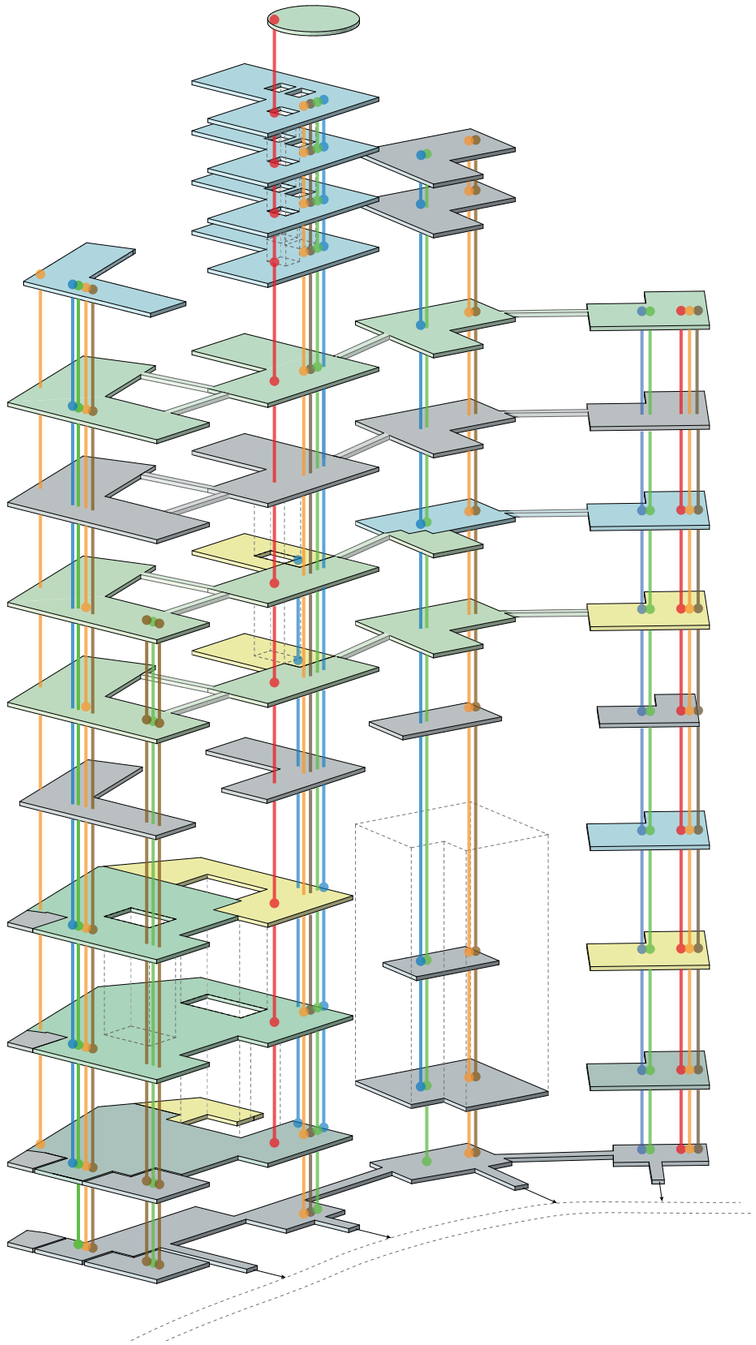


Horizontal staff movement

A horizontal backbone utilizing the bridges between the three buildings connect the units within each department (surgery and ICU) to enable an efficient workflow for specialized staff.



Brief Axometrie



- Hot Flow
- Staff
- Patient in Bed
- Goods
- Outpatient

- Emergency
- Operation
- ICU

- Imaging and Diagnostics
- Inpatient - Ward
- Outpatient

- Technic - Supply
- Staff - Public

13. Helipad + 53 600

12. Ward 5 + 46 200

11. Ward 4 + 42 800
Patient Hotel

10. Ward 3 + 39 400
Patient Hotel

9. Ward 1 (Infection Ward) + 36 000
Ward 2

8. Intensive Care Unit | Thorax-, Spinal-, Neuro ICU + 32 000
Neonathal ICU

7. Technical floor + 28 000

6. Thorax-, Vascular-, Neuro Surgery | Daysurgery + 23 200
Delivery surgery | Delivery ward | Perinathal ward

5. Central operation | Daysurgery + 18 400
Gynocology surgery | Gynocology department

4. Staff's floor | Techncial floor + 14 400

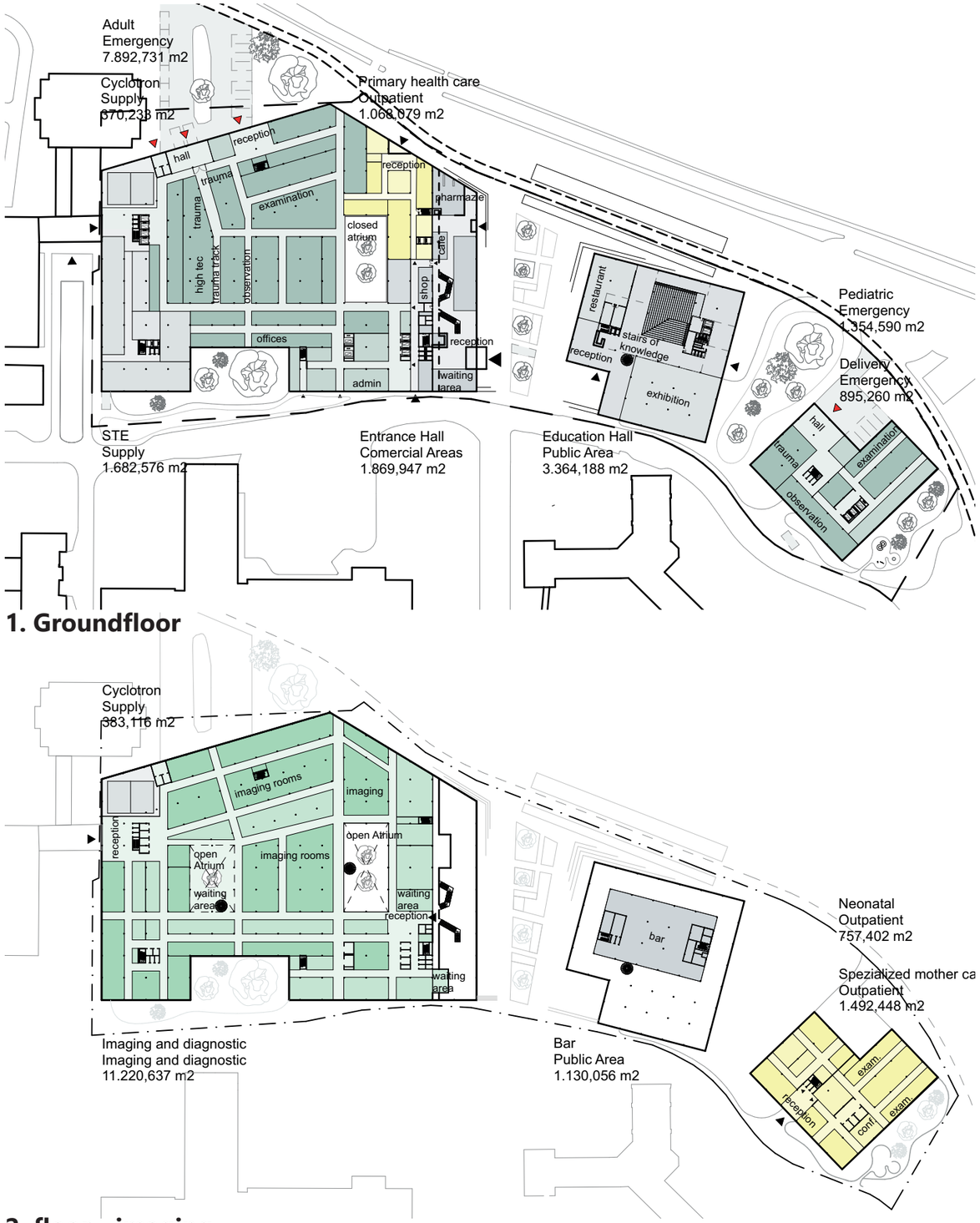
3. Imaging & Diagnostics | Kidney med/Dialysis + 9 600
Prenathal ward

2. Imaging & Diagnostics | Cyclotron supply + 4 800
Special. mother care centre | Ultra sound

1. Emergency department | Entrance | Pimary Healthcare Centre 0
Public facility | Pedriatic Emergency | Special. Emergency | STE

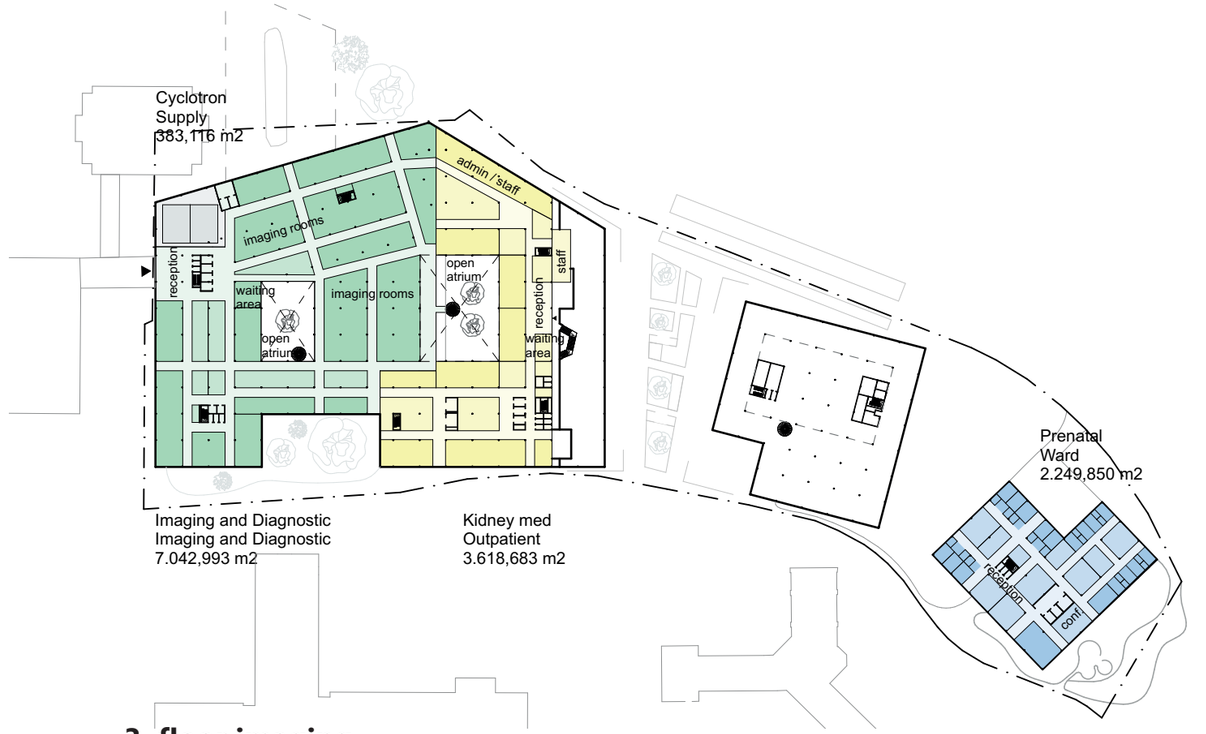
0. STE | Goods reception | AGV Storage - 4 000
Dressing rooms | Bicycle Garage

PLANS PLINT



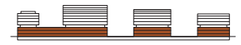
1. Groundfloor

2. floor - imaging



3. floor imaging

- Emergency
- Operation
- ICU
- Imaging and Diagnostics
- Inpatient - Ward
- Outpatient
- Technic - Medical Supply
- Staff - Public Area



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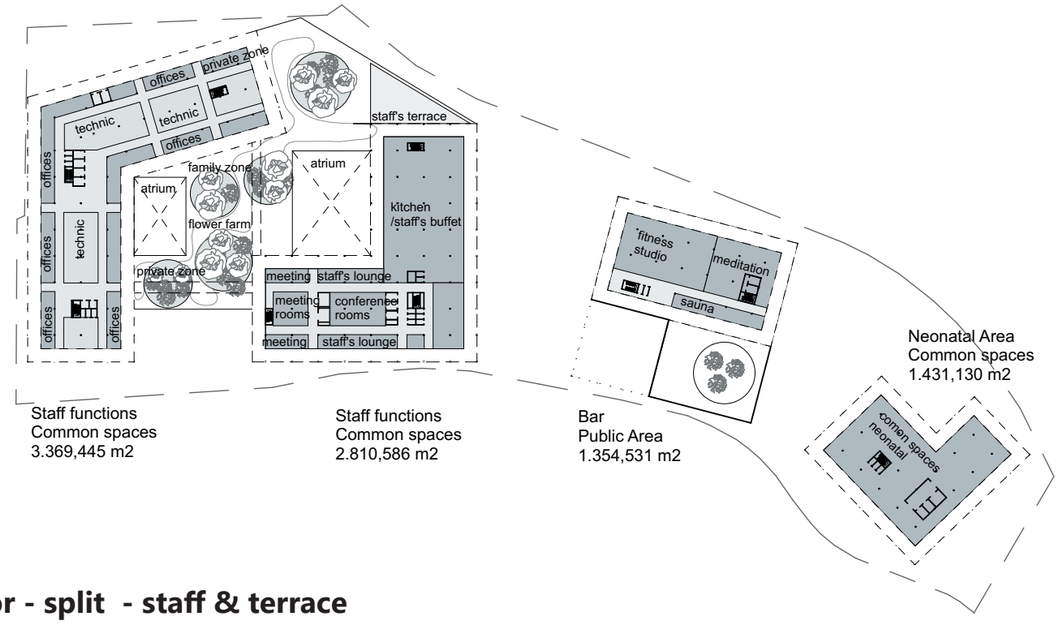
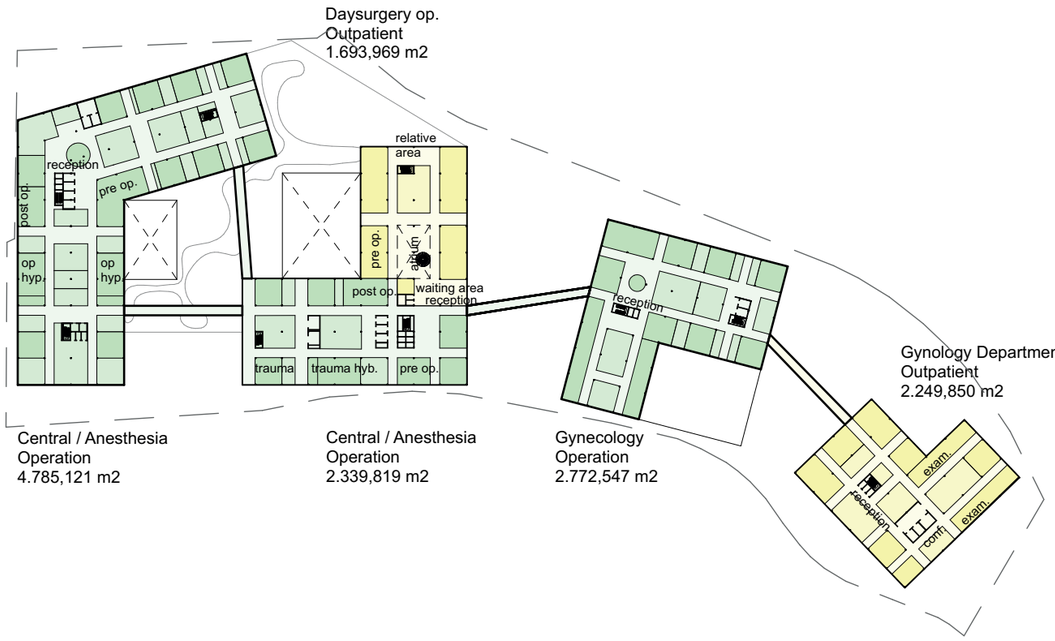
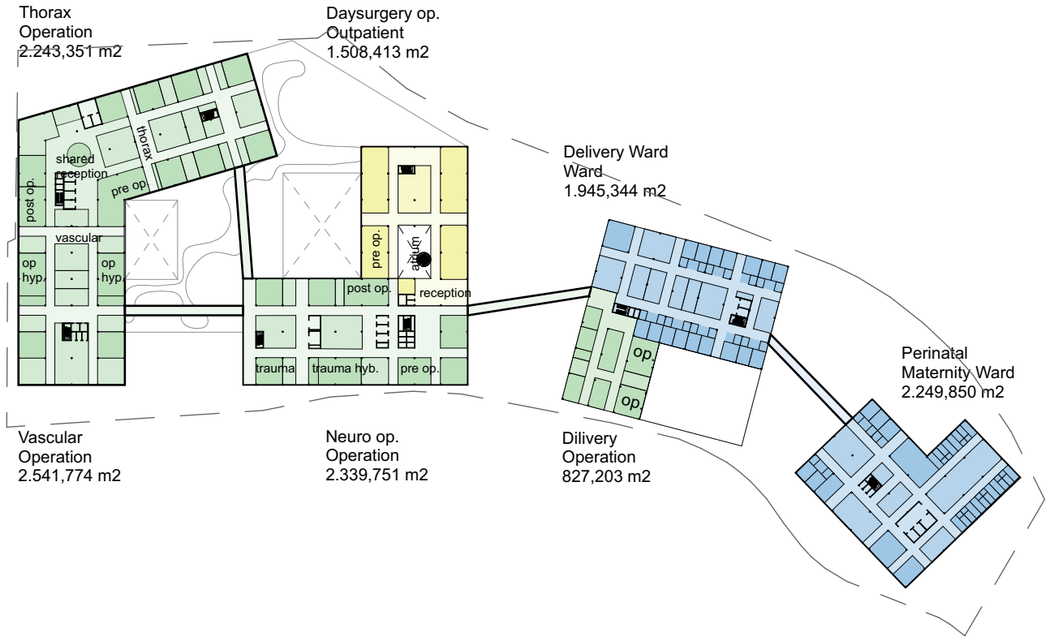
PLANS STAFF FLOOR & OPERATION



4. floor - split - staff & terrace



5. floor - operation



6. floor - operation

- Emergency
- Operation
- ICU
- Imaging and Diagnostics
- Inpatient - Ward
- Outpatient
- Technic - Medical Supply
- Staff - Public Area

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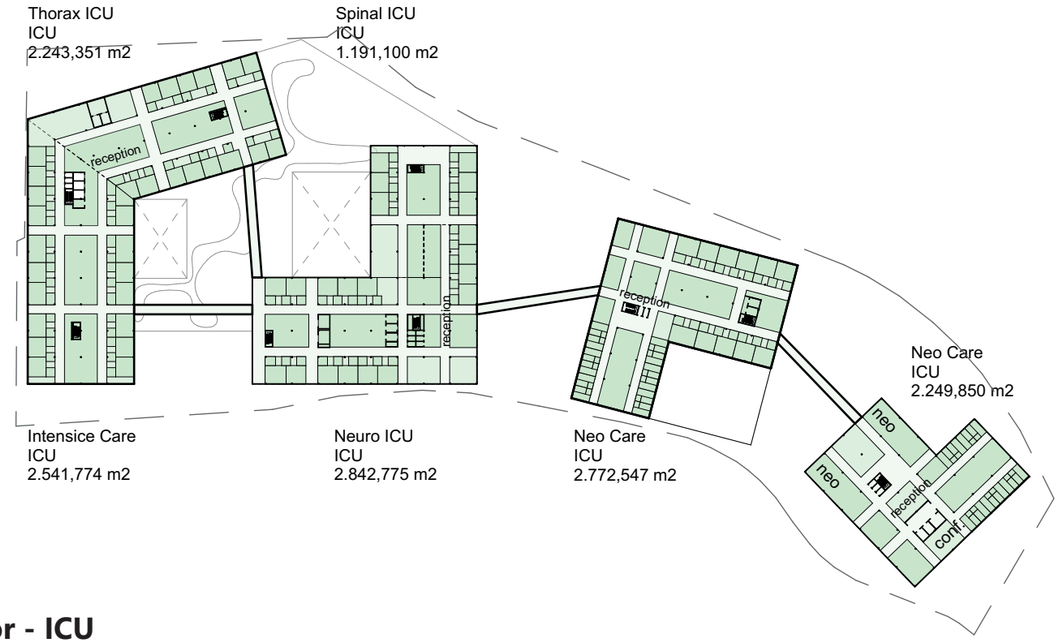
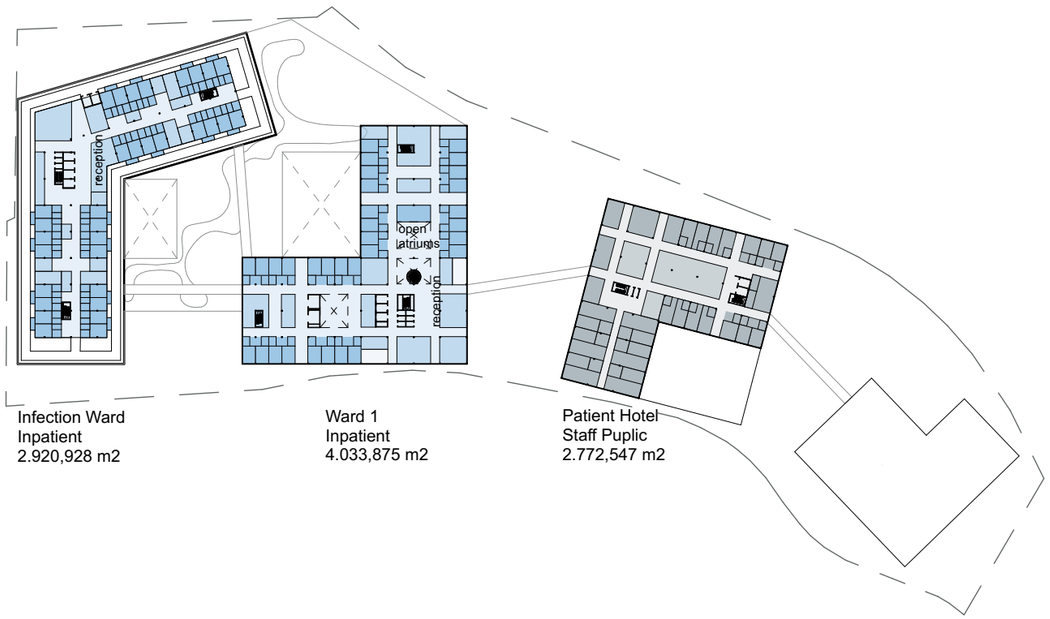
PLANS ICU & WARDS



8. floor - ICU



9. floor - wards

12. floor - ward

- Emergency
- Operation
- ICU
- Imaging and Diagnostics
- Inpatient - Ward
- Outpatient
- Technic - Medical Supply
- Staff - Public Area

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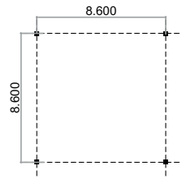
FUTURE PROOFING

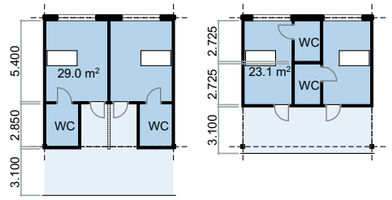
Grid flexibility

By using a general grid system, measuring 8.6 x 8.6 meters, it's easy to rearrange the space and change the function as need arises. This adds to the future proofing of the hospital, enabling it to answer to future demands.



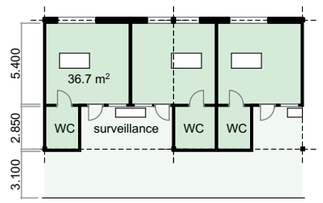
Ward rooms

Each ward rooms takes up ½ a grid unit along the facade. Including toilets and the possibility for a sluice one full grid is covered in connection to the corridor.



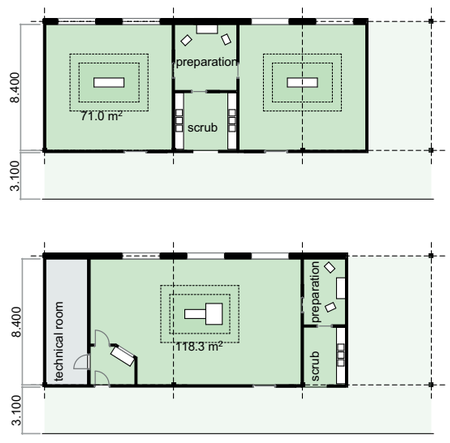
ICU rooms

One ICU room cover ⅔ of a grid unit along the facade, allowing 3 rooms to fit within 2 grids units.



Operation Theaters

General operating theaters cover 1 grid unit. The scrub and preparation room are placed next to it, differing slightly in size depending on if shared by another theater or not.
Hybrid operating theaters with imaging possibilities (including an adjacent technical support room) cover 2 grid units.



Floor heights

Horizontal layering of the brief allows the use of 3 different floor heights of 4.80, 4 and 3.4 meters, adapted to the specific needs of each department. Giving Imaging and diagnostics, requiring much more space due to large imaging machines, more space than e.g. the wards which require less.

Within these categories use is exchangeable.
The double corridor plans are flexible and able to adapt/ satisfy new requirements.

Facade use

Sets of vertical lamellas cover the facade modules of each grid unit. This facade system enhances the flexibility of each facade module, concealing visual imbalances such as window placement, and keeping the appearance of the building intact despite future changes in room placements and functions. The lamellas also provide sun shading according to personal preference by letting each set of lamellas be controlled independently.

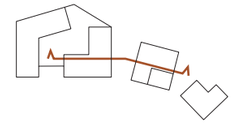
Installation capacity

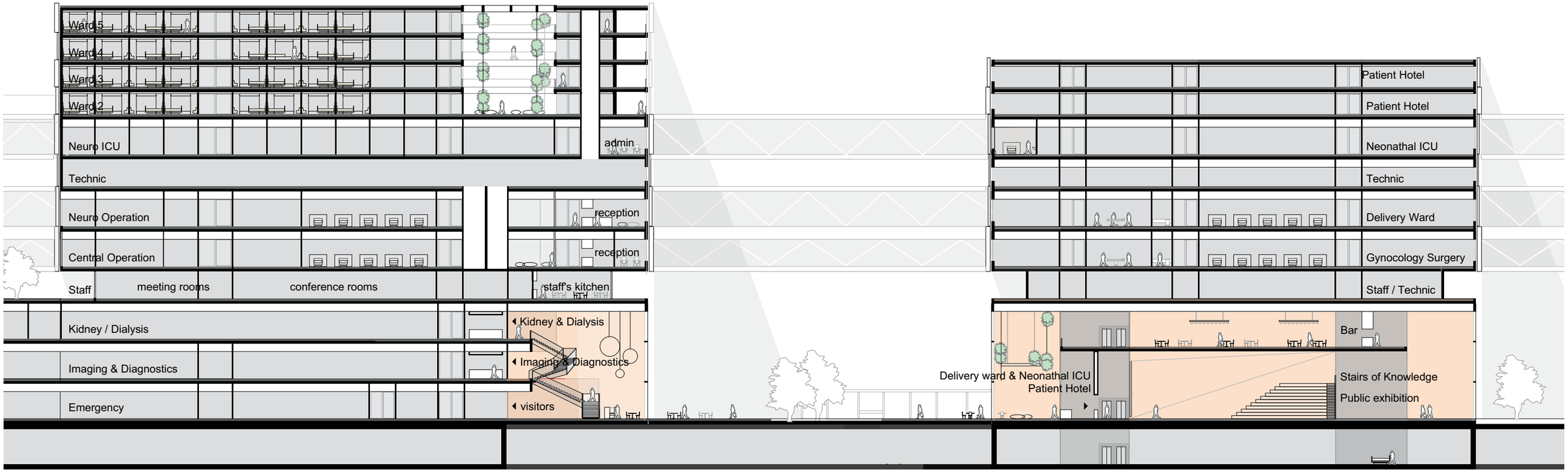
High Tech floors' general installation capacity allow occupation by different care activities and future system expansion, both within care floor installation as well as reserved technical floors. Care functions are focussed on the facade; by using double corridor system allowing future technical insallations to expand in the service areas 11 x 8,6 m per grid.

CONCEPT GROUNDFLOOR

Hospital Entrance Hall

Moving through the site as part of the main public flow you are presented with two entrances to two open and transparent interior spaces, one of which is the main entrance (left) to the main reception area and a café, where one can reach general outpatient functions such as day surgery and the imaging & diagnostics department. The other entrance (right) leads to a more general public interior space, with a restaurant and bar, as well as an exhibition hall and lecture stairs. The latter two are spaces for spreading general knowledge about healthy lifestyles, more specific information on certain diseases, and also new findings and research results that are otherwise only found in medical journals.





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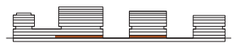
Section groundfloor

GROUNDFLOOR

- Hot Flow
- Patient in Bed
- Outpatient
- Staff
- Goods

- Emergency
- Primary Care
- Staff rooms
- Common rooms
- Storage
- Toilets
- Public Functions



waiting area
wc
reception
support functions
storage
lab
admin
admin
exp.
exp.
diag.
staff
storage
pharmazie
lab
consultation
consultation
consultation
closed atrium
storage
wc
cafe
goods bar
logistic
shop kiosk
wc
entrance day surgery
wash
main reception
entance outpatient visitor
waiting area
building FM
second entrance
main entrance
cafe
tram stop
restaurant
storage
kitchen
wc
entance visitor
reception
stairs of knowledge
storage
storage
wc
underground parking
main entrance public
flexible exhibition hall

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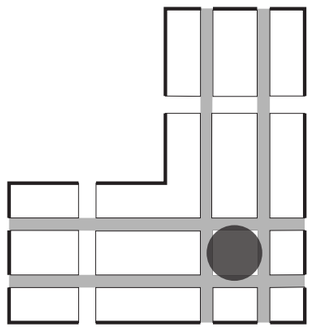
Plan groundfloor

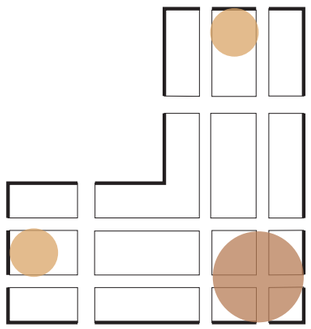
Open Double corridor system and central organisation

A double corridor system allows for a separation of different logistical flows, which reaches each floor through a centrally located vertical core..



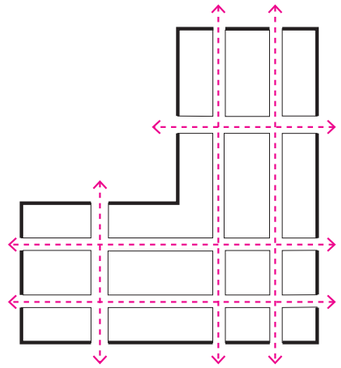
Organisation

L-shapes allow units to share functions in the junction and for rooms that should have less traffic and disturbance around them, such as common areas and meeting rooms, to be placed out of the way on the ends.



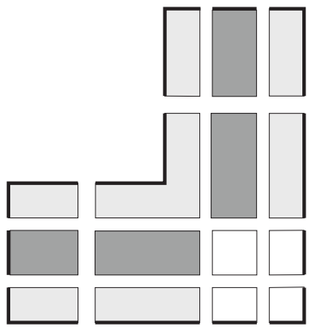
Sightlines

Open ended corridors help both patient and staff to orientate in the building and on the site by being able to refer to the outside/ view.



Functions regarding daylight

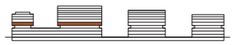
Rooms with high daylight requirements are placed along the facade, whereas functions such as storage rooms are generally placed between the two corridors.



CENTRAL OPERATION

- Hot Flow
- Patient in Bed
- Outpatient
- Staff
- Goods

- Daysurgery - Outpatient
- Operation
- Staff rooms
- Common rooms
- Storage
- Toilets
- Technic - Medical Supply



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Plan surgery 5. floor

INPATIENT WARD

- Hot Flow
- Patient in Bed
- Outpatient
- Staff
- Goods

- Infection rooms
- IMCU
- Ward rooms
- Staff rooms
- Common rooms
- Storage
- Toilets

M 1:500 0 5 10 Plan ward 9. floor

INPATIENT WARD

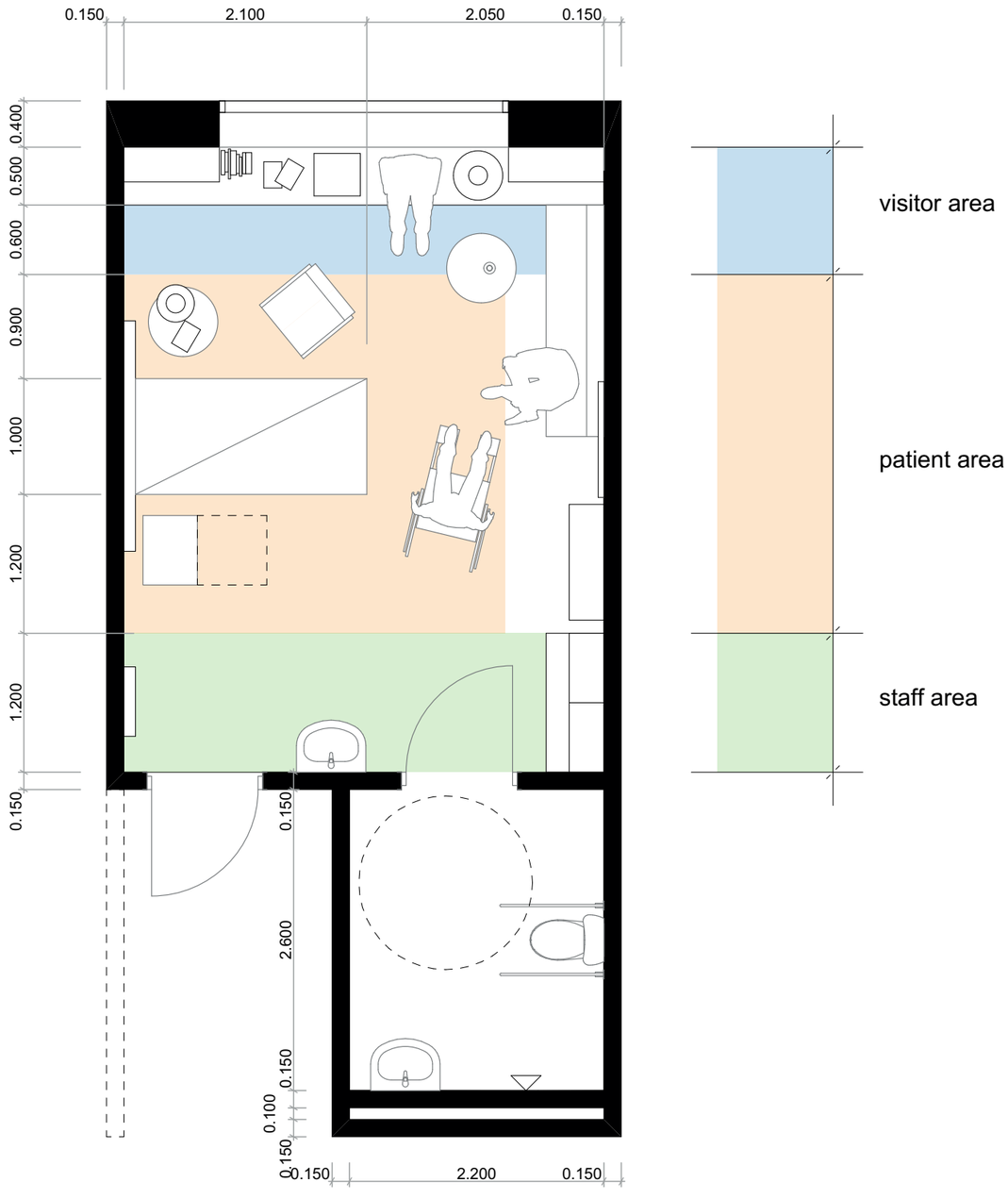
- Infection rooms
- IMCU
- Ward rooms
- Staff rooms
- Common rooms
- Storage
- Toilets

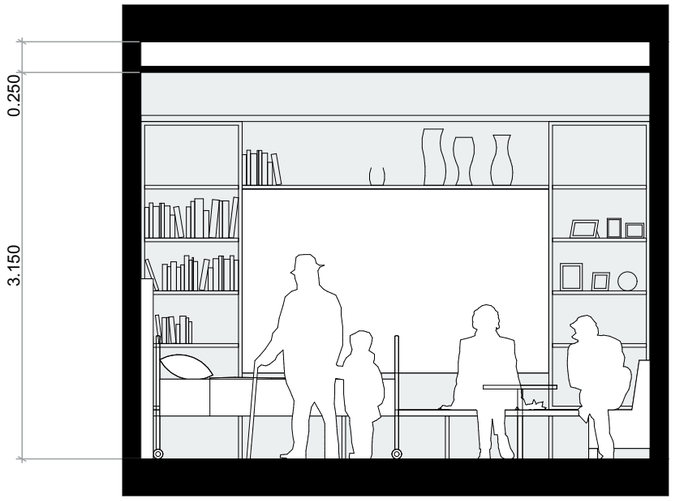
- Hot Flow
- Patient in Bed
- Outpatient
- Staff
- Goods

M 1:200

Plan ward 9. floor

INPATIENT WARD ROOM





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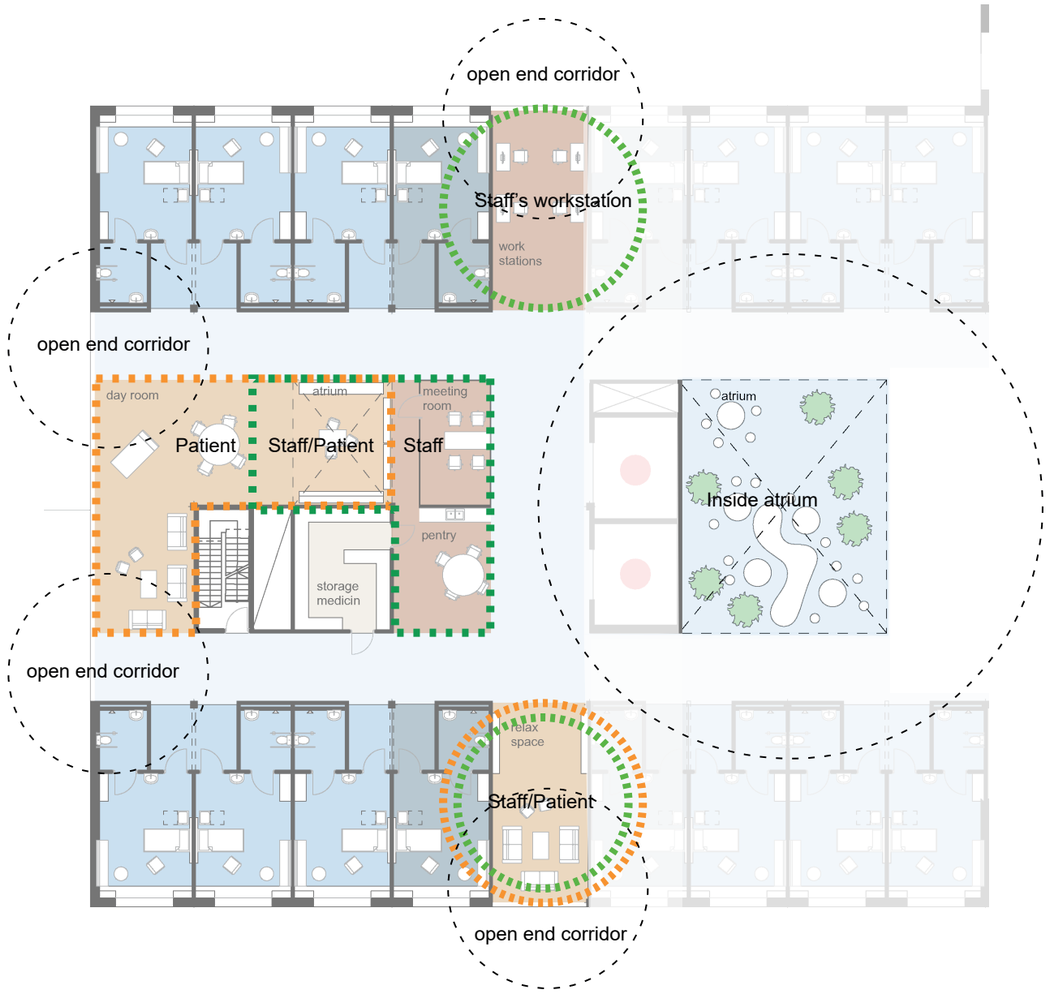
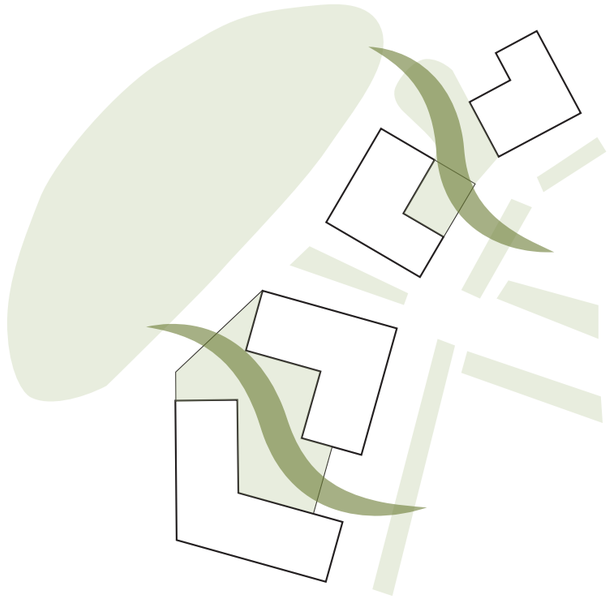


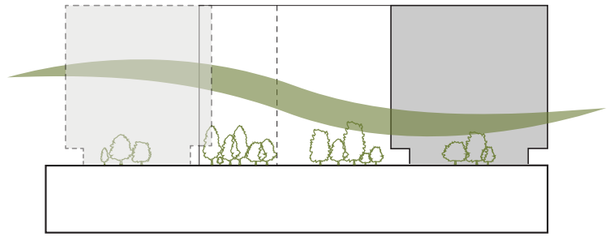
Ward organization

EBD (Evidence Based Design) is implemented by only using single patient rooms, due to the proven positive effects on healing and recovery,. Wards are designed with space for relatives, allowing them to stay beyond visitor hours in the patient's room or an overnight stay visitor's room, and participate in nursing. Day rooms are located in the end of each L to be used by patients and visitors. Workstations are shared between compact nursing units of eight ward rooms.
This leads to more frequent contact between colleagues, improving sharing of knowledge, and enables the wards to function well in situations of a lack of staff and night shifts. Both workstations and the relax room is placed to receive natural daylight.

Implementation of green atriums

Interior atriums reaching vertically through all the ward floors lets in extra daylight and adds a touch of green by suspending greenery from the skylight. But most importantly it enhances the connection between the wards and the wellbeing of people working and living there.





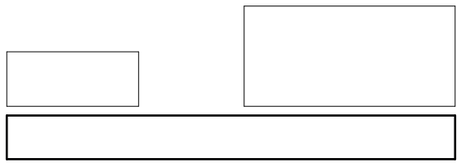
Implementation of biotopes

Allowing for a green flow through the site by adding "stepping stones" in the form of biotopes on different levels of the site and buildings. The biotopes and green flow will be a part in the greening process of the City of Lund, contributing to improved health through exposure to nature.

FACADE

Express volume

The facade of the buildings are built up using three different kinds of expressions. The lower part consisting of the first three floors, “the plint”, is designed to relate to the human scale, by using an interesting facade structure in brick. “The split”, the floor above, is pushed back to further accentuate the difference between the plint and the upper L-shaped structures, grounding the lower part and elevating the upper part to make it seem lighter.



Plint expression

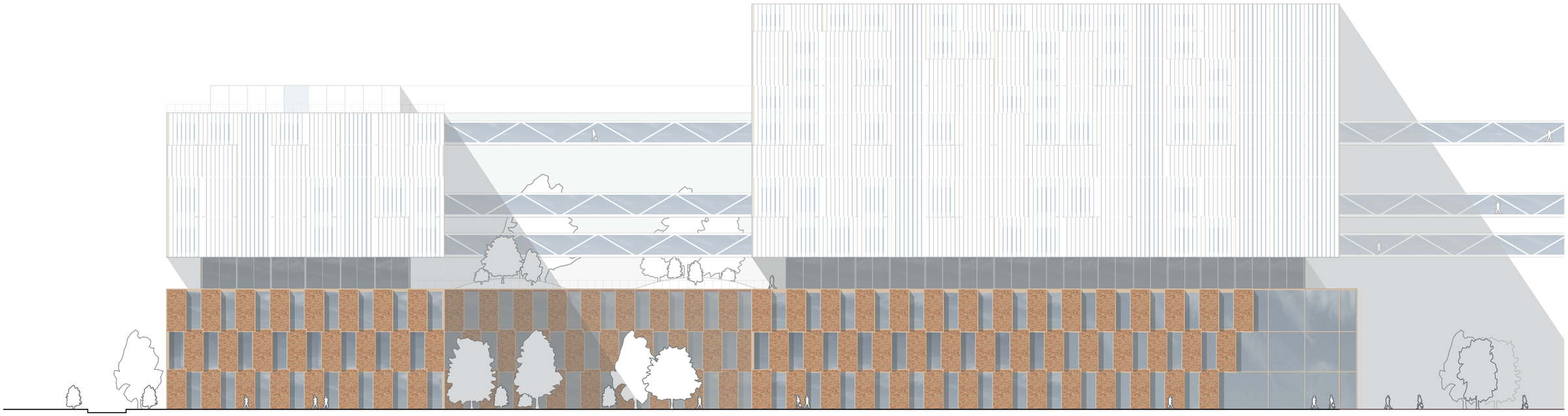
Plint expresses itself in the reused bricks of the demolished buildings. In order to reach a human scale, the 3 stories behind it are shown in their printout.
The facade expression of the plint is an alternation of bricks (possibly used bricks from existing buildings on the site) and glass highlighting entrances and interior spaces open to the public.

Split expression

To achieve a common area for all staff that includes places to eat, relax, exercise and meet investors/visiting researchers etc. a whole floor is set aside for this purpose. It is expressed with a glass facade and provides access to to the roof terraces that can be used by both staff and inpatients

L expression

A curtain of lammelas covers the whole top part of the building. It express one volume and aims at creating an illusion of lightness. The lamellas are flexible and can be adjusted to the situation and users needs.



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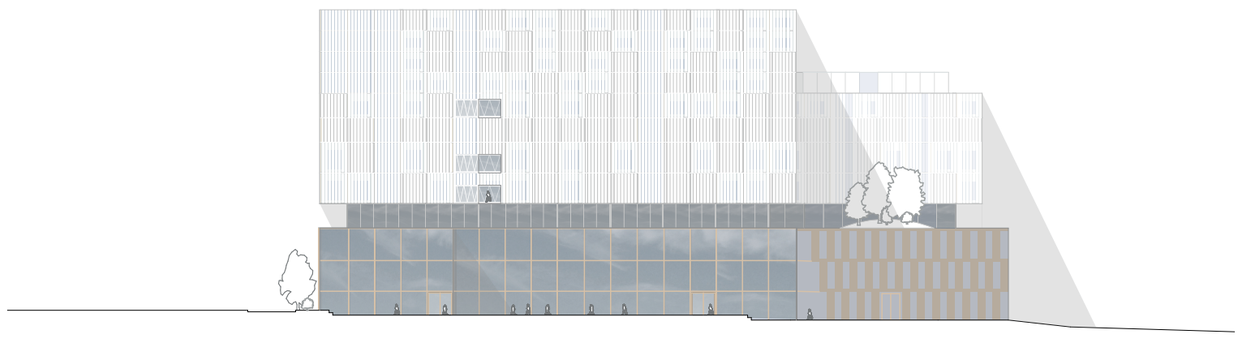
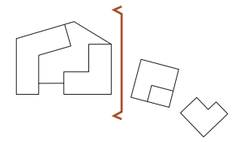
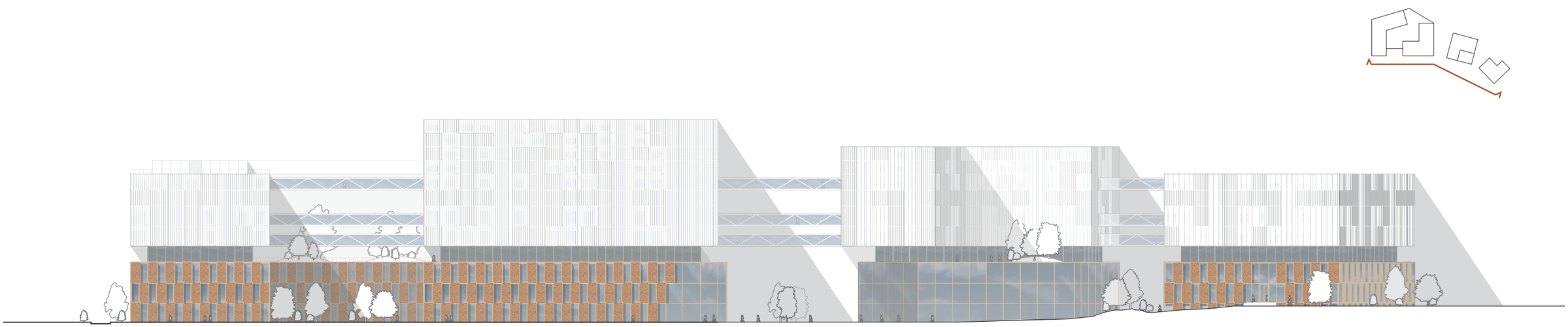
Elevation

FACADE





Elevation north



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Elevation east

HIGHTECH HEALTHCARE CENTER
LUND UNIVERSITY HOSPITAL

GROUP TWO
ANNIKA GOEDKOOP,
VANESSA RIEF,
ALEXANDRA BÄCKSTRÖM