






In Sickness and Health

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





 Site area
  Flood risk
  Vehicular circulation
  Cycling paths
  Parking lots

Introduction

The task is to propose a design for the new Närsjukhus/ Community Hospital of Wieselgrensplatsen in Hisingen, Gothenburg. This kind of outpatient hospital is different than what we knew about healthcare architecture in the last decades. The hospital is envisioned by its stakeholders as an open and welcoming facility, promoting safety and contributing quality to its urban environment. Moreover, it has to be adaptive to technological advancements and unpredictable future challenges (e.g. pandemics).

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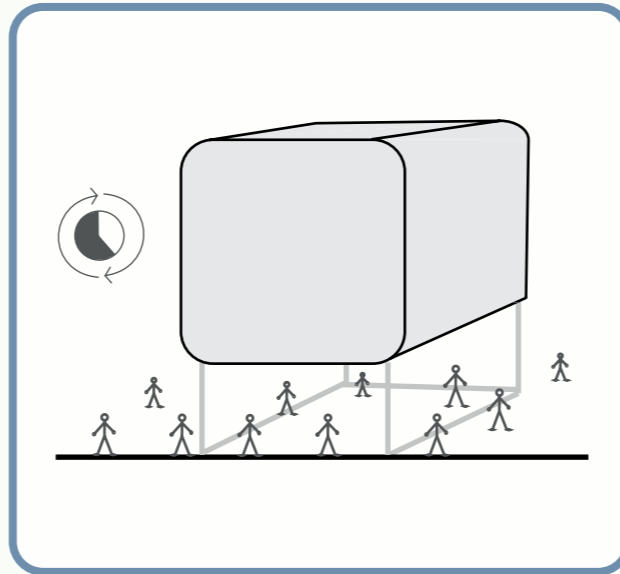
Since the beginning of the project we had one main slogan in mind "Heal the patient, not the disease". In other words, the specialist hospital would offer a holistic approach of healing that goes beyond the removal of symptoms and extends to the overall wellness of the individual. The hospital itself is a part of the community and not apart, so that the borders between health and sickness become blurred. We use a non-alienating architectural language, and respect neighboring heights. We want to provide functions for the neighborhood and activities around the clock that don't end when the hospital hours end. We plan to design an active plinth that doesn't create a division between the hospital and the rest of the community, and brings human scale to the area. We also want to promote active choices within and outside the hospital through designing wide and appealing staircases and high quality outdoor spaces.

In terms of sustainability and future proofing, first we plan to implement a passive design by optimizing the buildings height, shape and orientation according to the wind direction and sun path analysis, and to install solar panels and rain water collection systems.

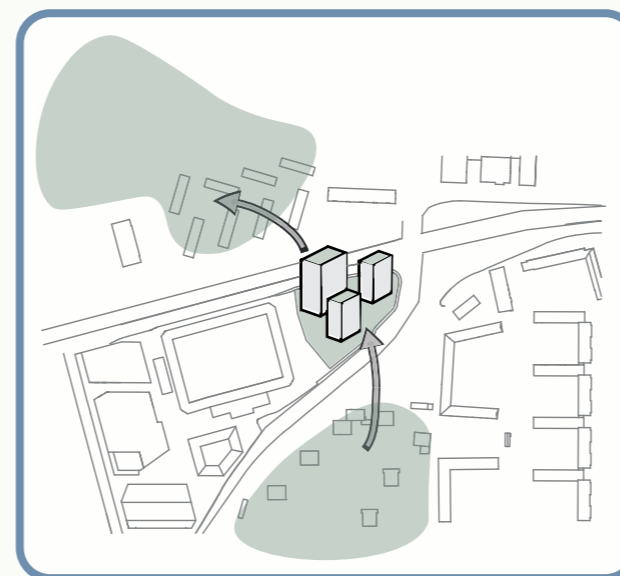
Second, we imagine a structure that could be dry mounted for the mobility hub. This could then also help in case the hospital's needs change and they wish to expand into the mobility hub. Our strategy is to have an efficient overall design through partially separate yet optimal flows and plans sharing resources and spaces between departments.

Site & Context

Hospital as a stakeholder



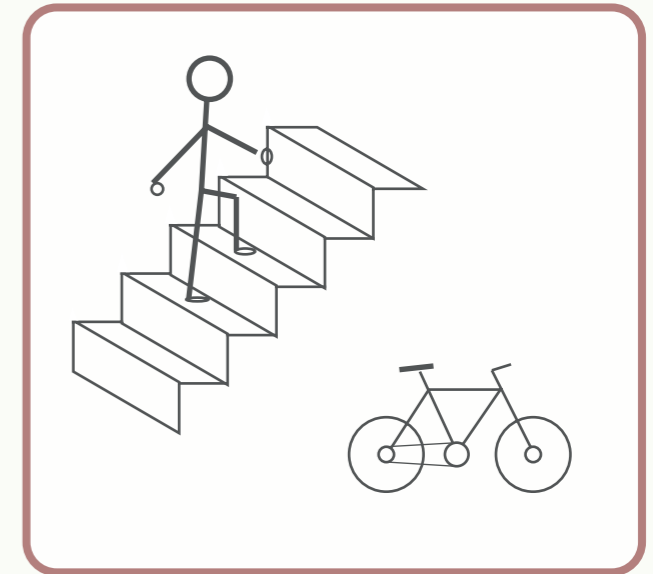
- Include the hospital as part of the city structure
- Add functions for the neighbourhood
- Provide an active plinth
- Provide activities around the clock
- Bring human scale to the area



- Pave the way for a green corridor
- Create high quality outdoor spaces
- Provide green roofs and terraces

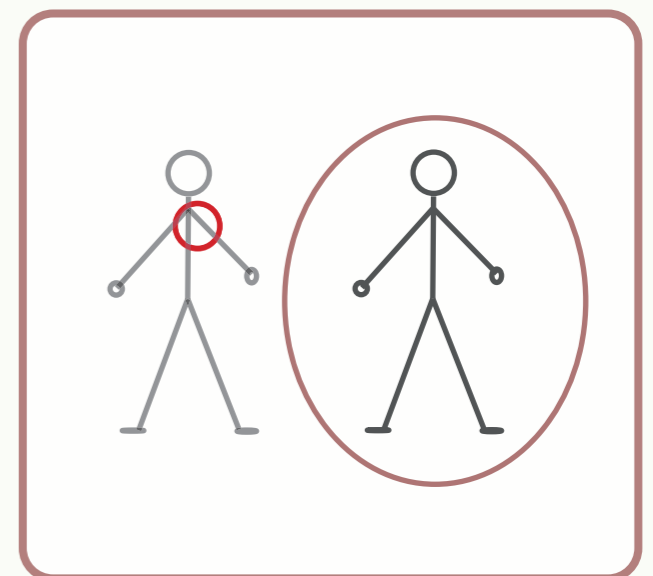
Health promotion

Active Design



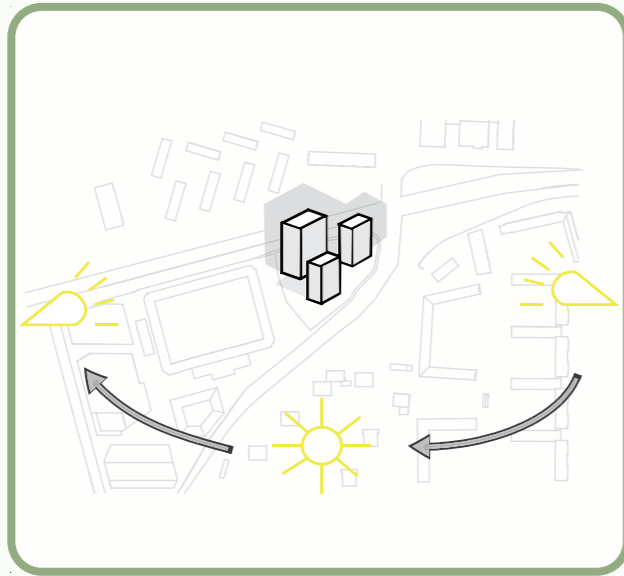
- Promote active choices within the hospital
- Encourage eco-mobility
- Provide outdoor public spaces

Wellness



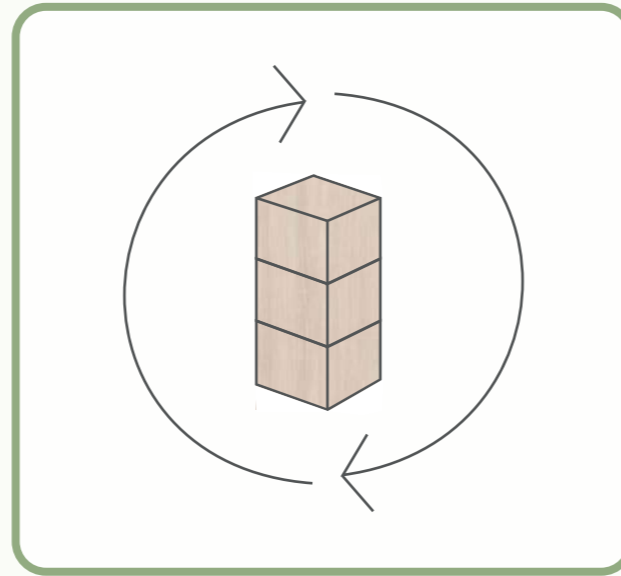
- Blur the physical and mental lines between sickness and health
- Maximize natural light and views

Passive design



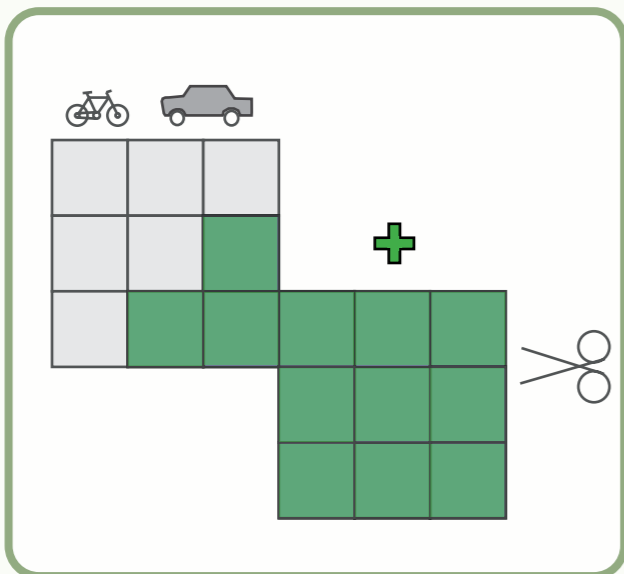
- Optimize buildings' height, shape, and orientation
- Install solar panels

Sustainable Materials



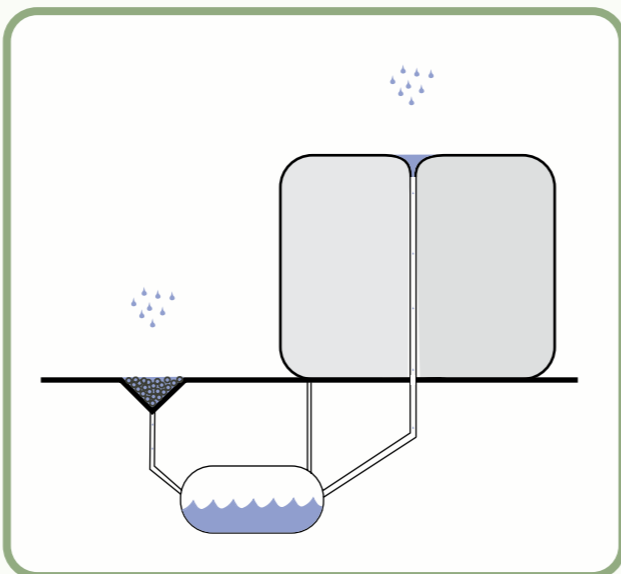
- Design for disassembly in mobility hub
- Use wood in medium tech areas and mobility hub in between floors

Adaptive floor plans



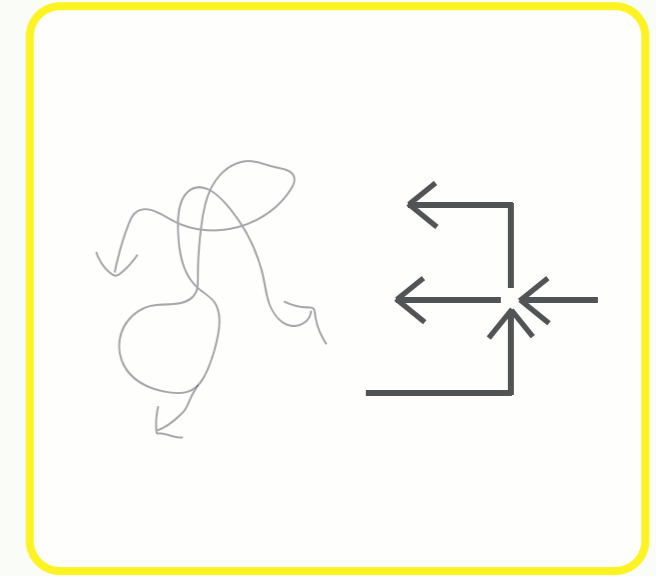
- Work within grids 2 + 1
- Expansion potential into the mobility hub

Water management

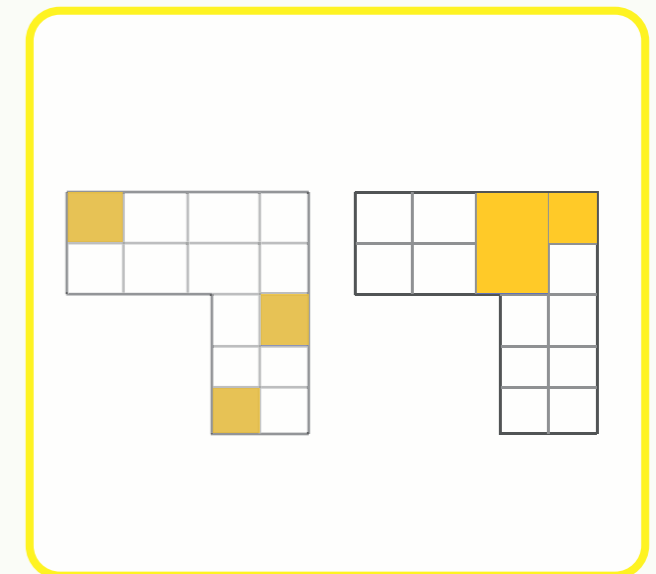


- Rain collection units on roofs, terraces, and ground floor

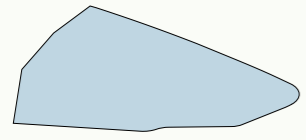
Efficient Design



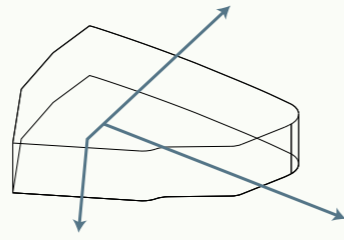
- Partially separate and fully optimize different flows



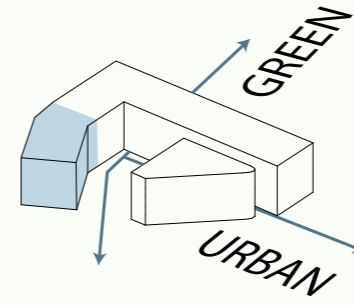
- Share resources and spaces
- Optimize floor plans
- Design flexible & lockable partitions



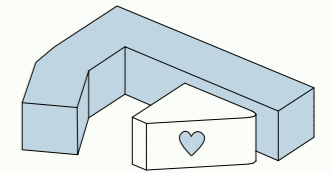
Embrace the plot shape



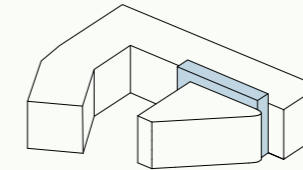
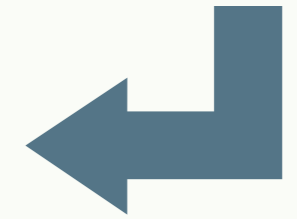
Identify three main directions



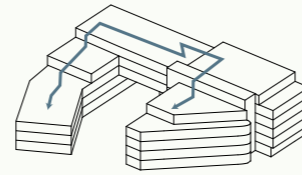
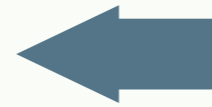
Create 2 main axis: one is green and the other urban creating a courtyard



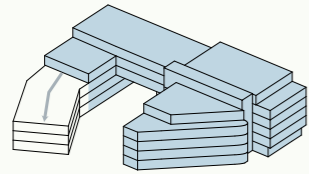
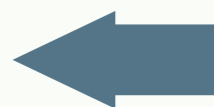
Split volume into a soft grid part and a hard grid part



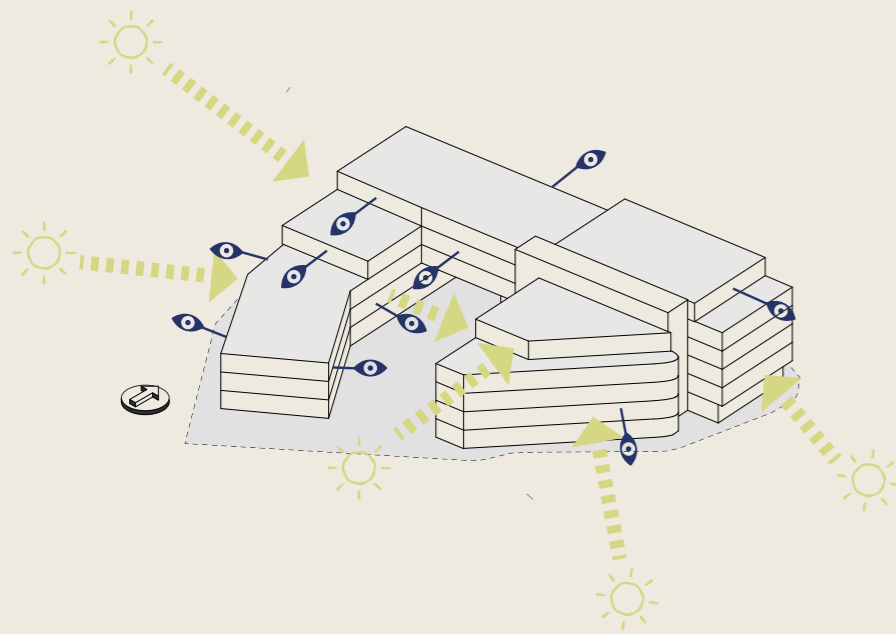
Connect the 2 volumes by an atrium



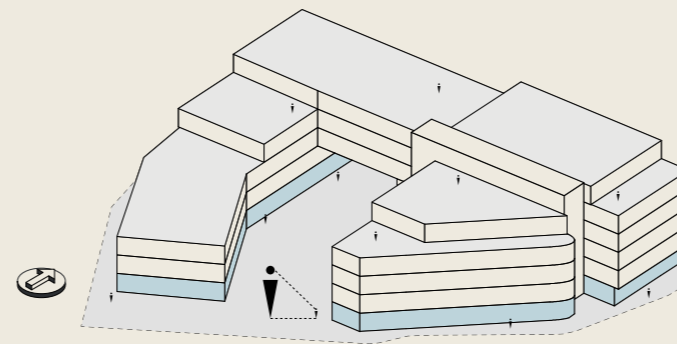
Create terraces to maximize sunlight and create green spaces



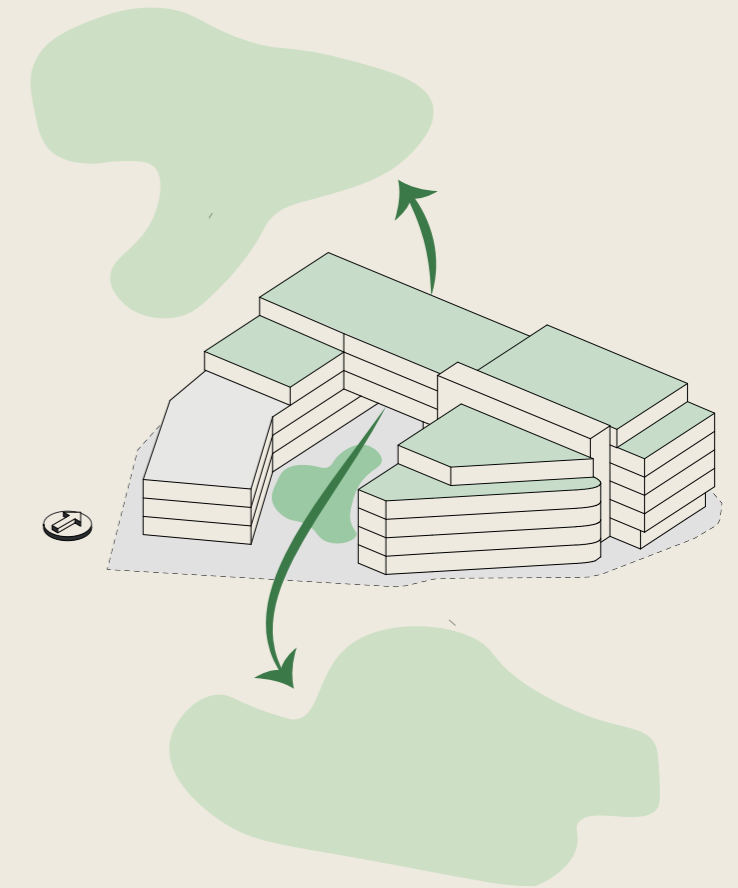
Consider future expansion possibilities into the mobility hub



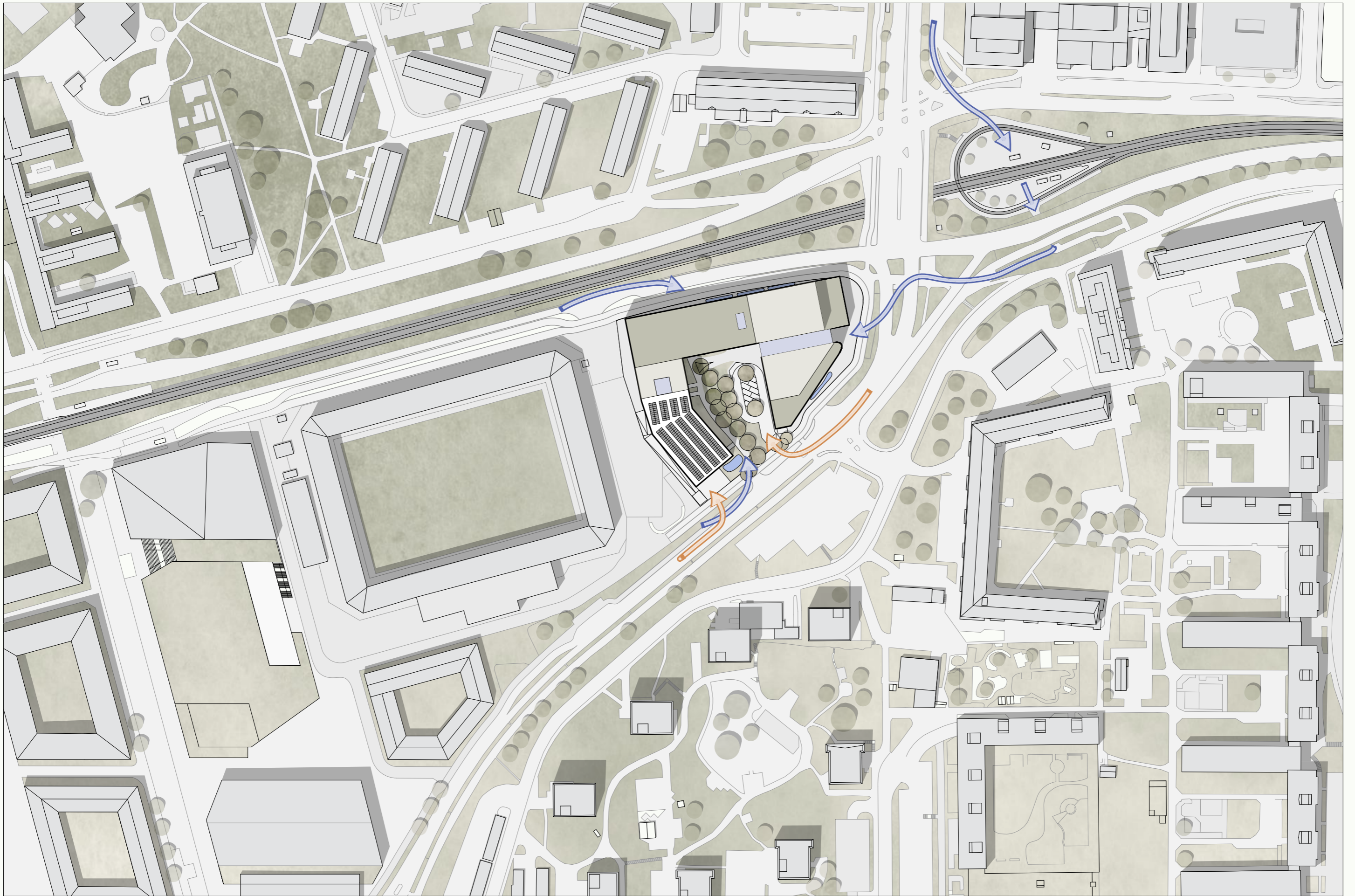
Visual & auditory comfort



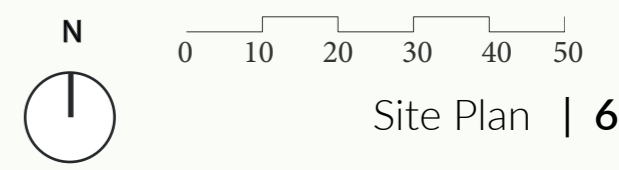
Active plinth & Human scale

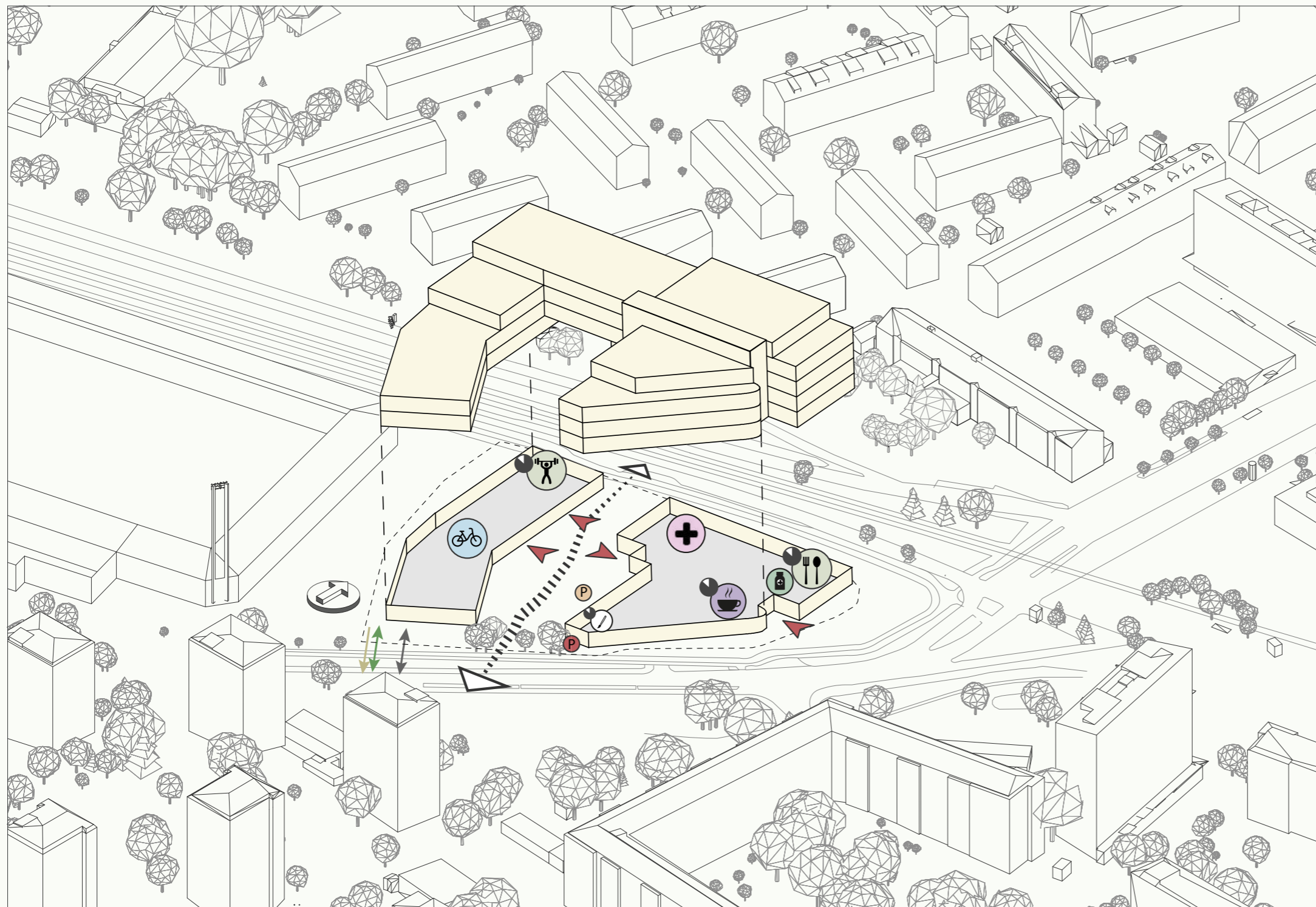


Green belt & Terraces


















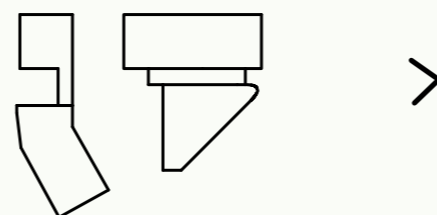
 Vehicular flows  Pedestrian and bike flows

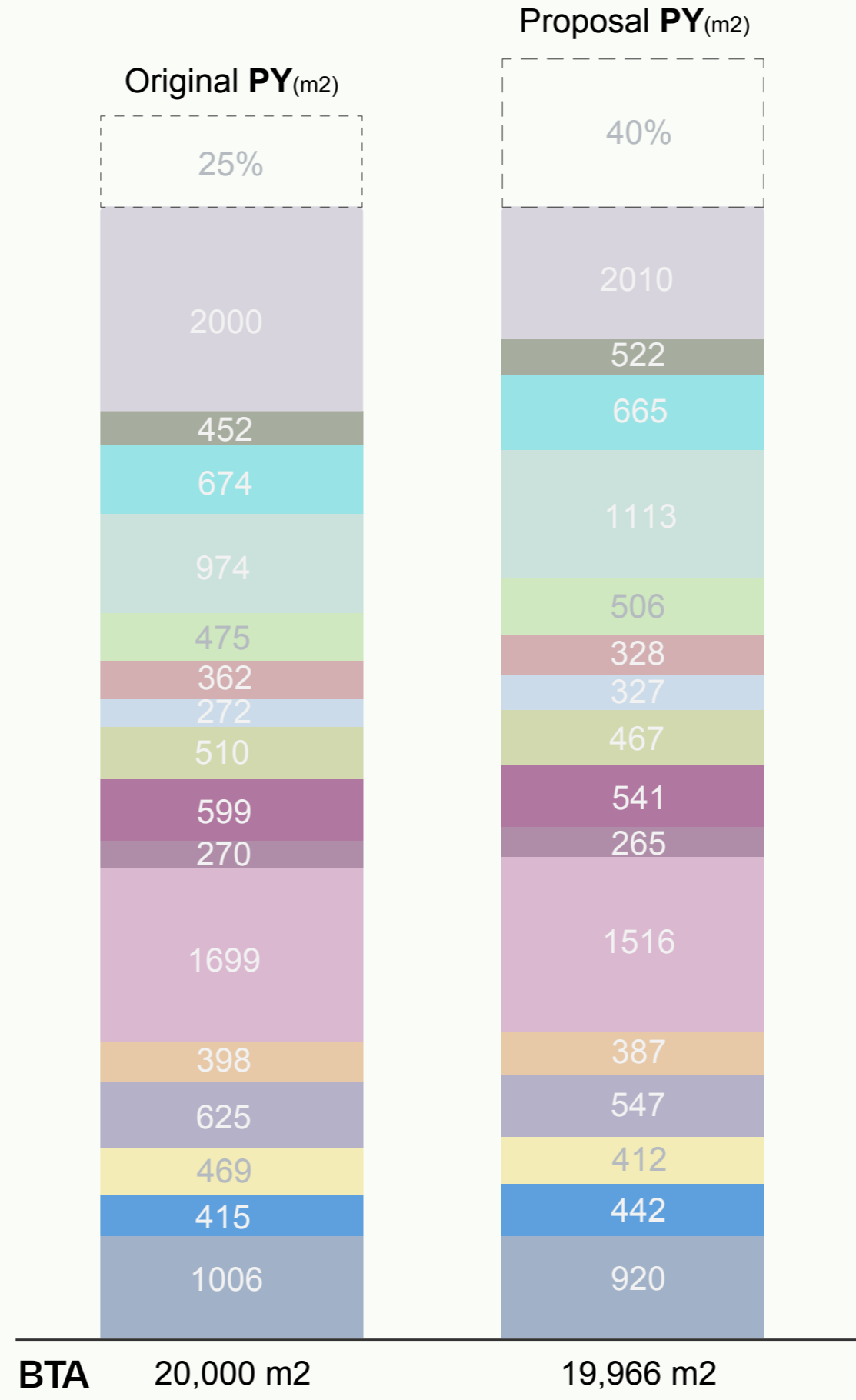
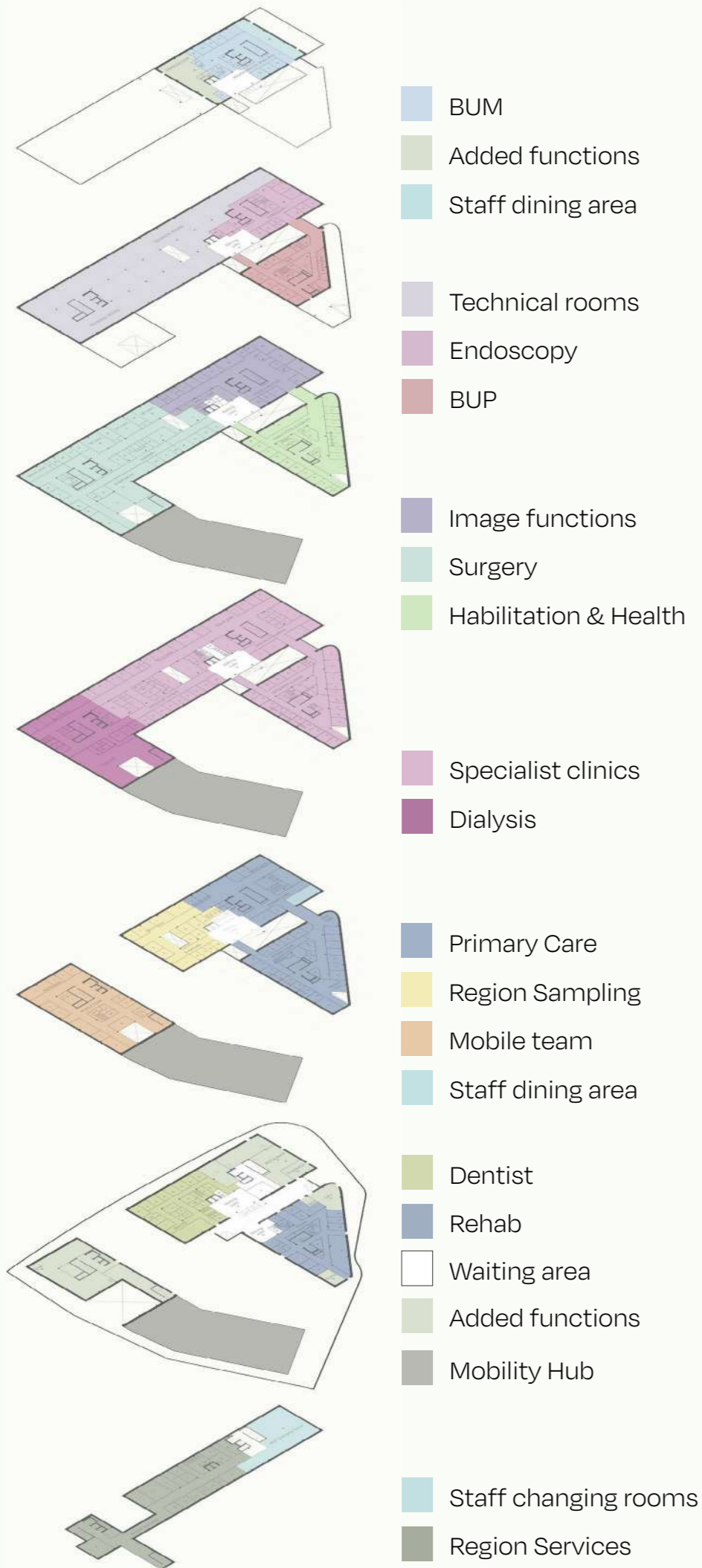




The different flows around the site decided the positioning of the entrances and the various public functions. All vehicular traffic coming in and out of our hospital happen from and to Inlandsgatan. The site acts as a safe and pleasant pedestrian and cycling path between Hjalmar Brantingsgatan and Inlandsgatan through a portal. Our main entrances are on both sides of the atrium on the east. This is where patients and staff access the hospital during normal working hours, and by the public in extended working hours to access the rooftop garden. We have provided another entrance on the west that would be mainly used by dialysis patients who need the proximity to the entrance and can also visit on Saturdays and outside typical working hours. We placed 2 hospital functions on the groundfloor: dentist and rehab. As for public functions, we have placed a gym on the West wing, and a restaurant, cafe, and studios on the East. We have dedicated parking spots for pick-up and dropoff, parkings for those with limited mobility, in addition to a separate parking spot for the ambulance in case of emergencies.

- | | | | | |
|---|--|--|--|--|
|  Pharmacy |  Cafe |  Cars flow |  Drop-off, pick-up parkings |  Longer opening hours |
|  Studio |  Restaurant |  Goods flow |  Ambulance parking |  Bike storage |
|  Hospital function |  Gym |  Waste/Returns flow |  Pedestrian axis |  Hospital entrances |





The brief is extensive and the area required for each department differs as well as their required tech levels. This led to our decision to separate all high tech functions from medium and low tech by concentrating them in the bigger building. Most of the medium and low tech functions are now located in the triangle-like building. The 2 buildings are connected through 2 bridges covered by an atrium. The covered space by the atrium on the ground floor then becomes the entrance and main flow area. This level contains the dentist and rehab functions, in addition to a gym, cafe, studio, and a restaurant. The latter can be used by staff, patients, and the public.

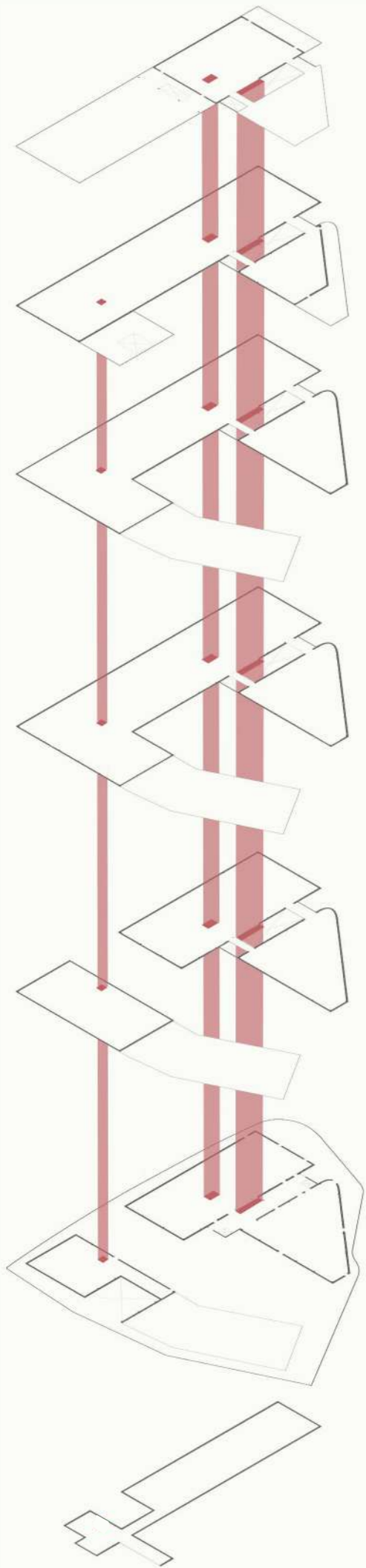
On the top floor which is L1 on the axonometry, there is a staff dining area for those wishing to eat their food in peace. We also have the primary care department extending on both buildings, in addition to the mobile team in the west wing of the building. The mobile team has direct access into the mobility hub and their cars.

Another big department that extends to both buildings is the specialist clinics that takes over the whole second level. Dialysis section is located on the left and it has its own reception and dedicated entrance and opens for longer hours and on Saturdays.

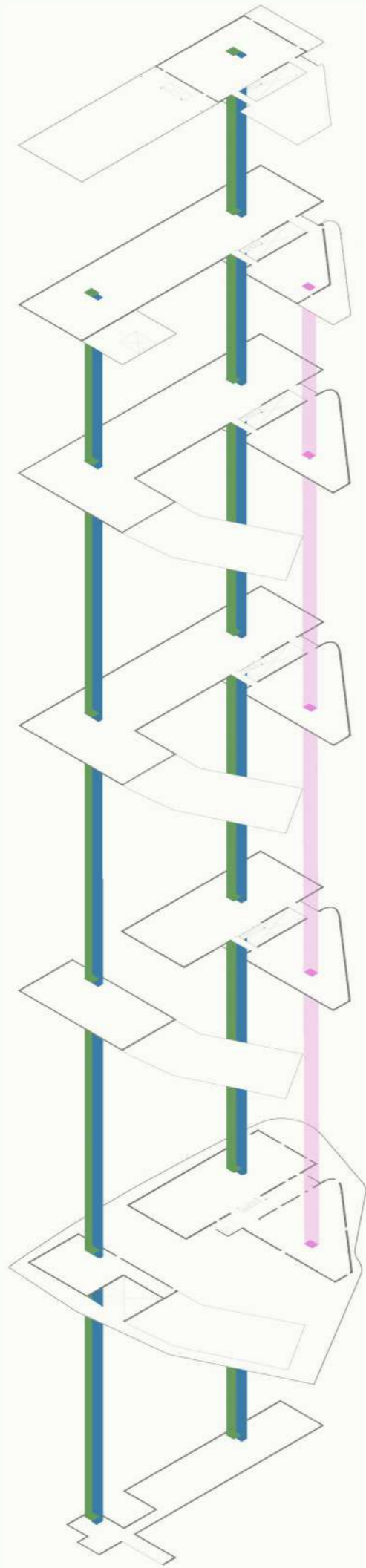
We placed Surgery and Image function together on the 3rd level for needed proximity in the high tech grid and habilitation and health in the soft grid. We then placed endoscopy and technical rooms right above surgery on the 4th level. BUP is also located on the 4th in the medium tech building and it has its own outdoor space to promote mental health.

On the last floor, we placed region health department (BUM), in addition to more staff dining areas with their own outdoor dining space, and an espresso bar. This rooftop also has a public garden accessible to the public through the atrium.

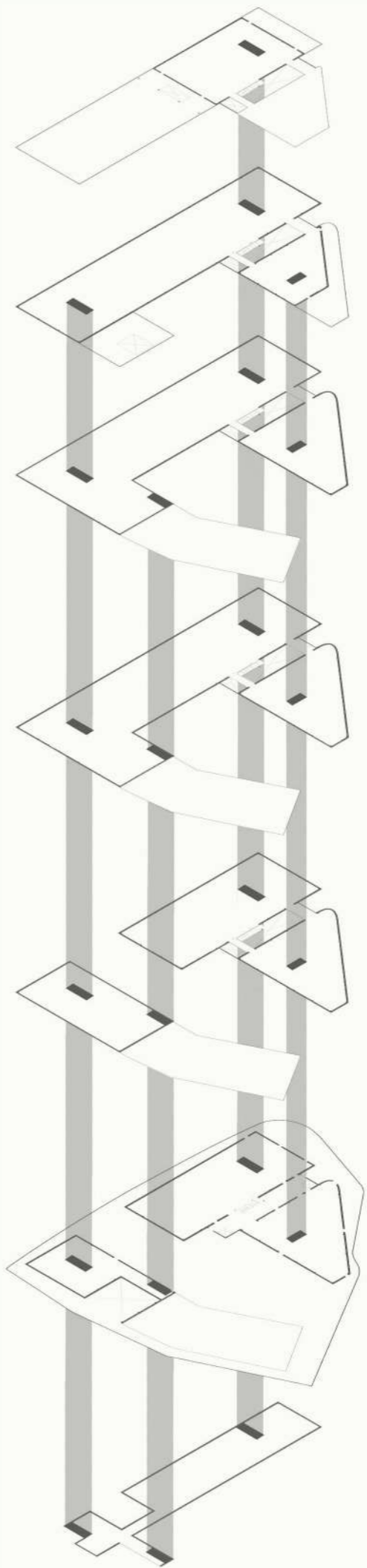
Departments share a common patient lobby and waiting area on each floor, in addition to some administrative areas and other complimentary functions like toilets, cleaning rooms, and environmental rooms.



■ Patient Flows



■ Goods elevator
 ■ Staff elevator
 ■ Ambulance elevator



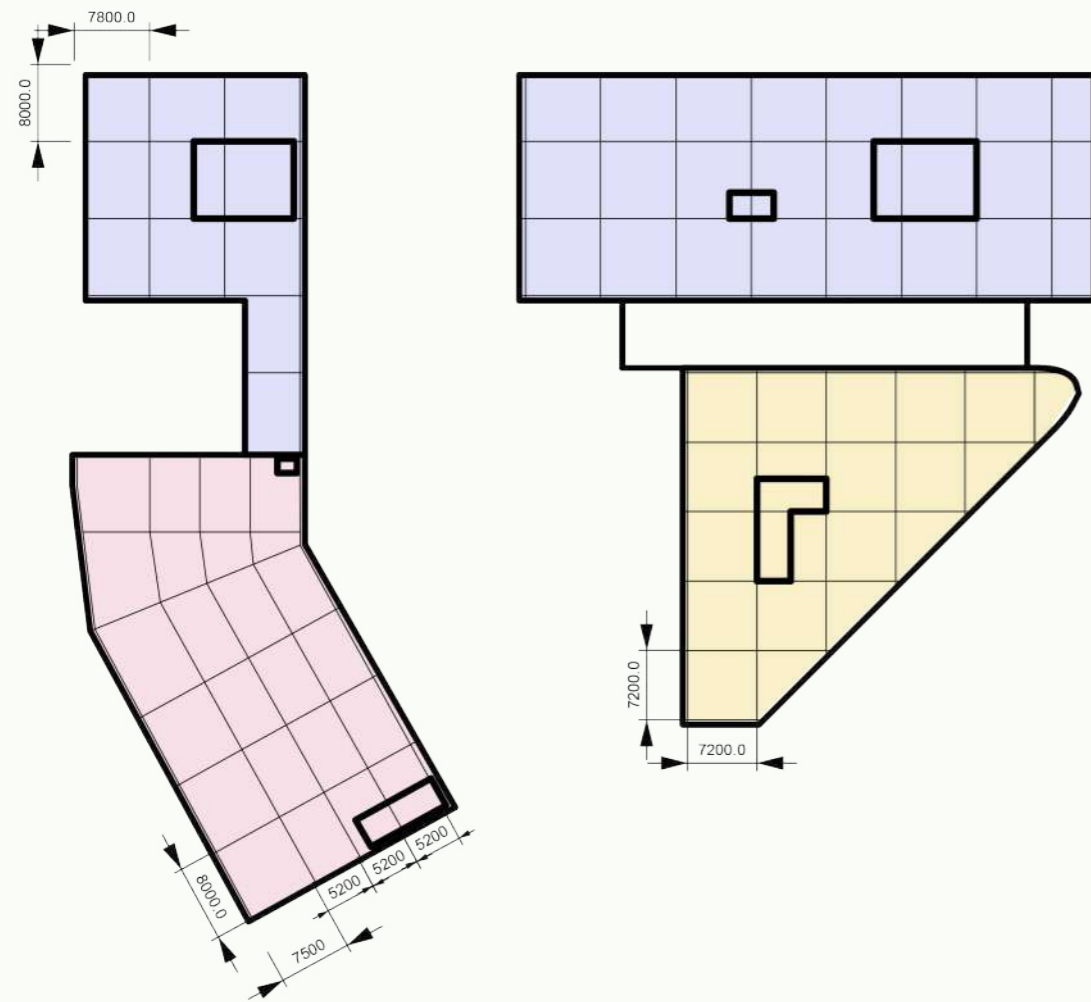
■ Fire Escapes

We have placed 2 cores for patients, staff, and goods, and another core in the medium tech building for ambulance.

There are 3 fire escape staircases as well, 3 of which are in the same 3 cores, and an additional one North of the mobility hub.

Goods and staff flows go all the way from the basement to the 5th level, where patients have no access to the basement. In the basement we have region services where the hospital receives deliveries, and sends waste, in addition to staff changing rooms.

Most flows are separated at least from the patients, so we placed 2 patient elevators and a staircase in the atrium area. The stairs aim to promote active health and go all the way up to the 5th floor where they land in the lobby. On each floor there is a common patient lobby and waiting area. We have placed another patient vertical connection in the left core for dialysis patients who needed a closer route to their treatment area.

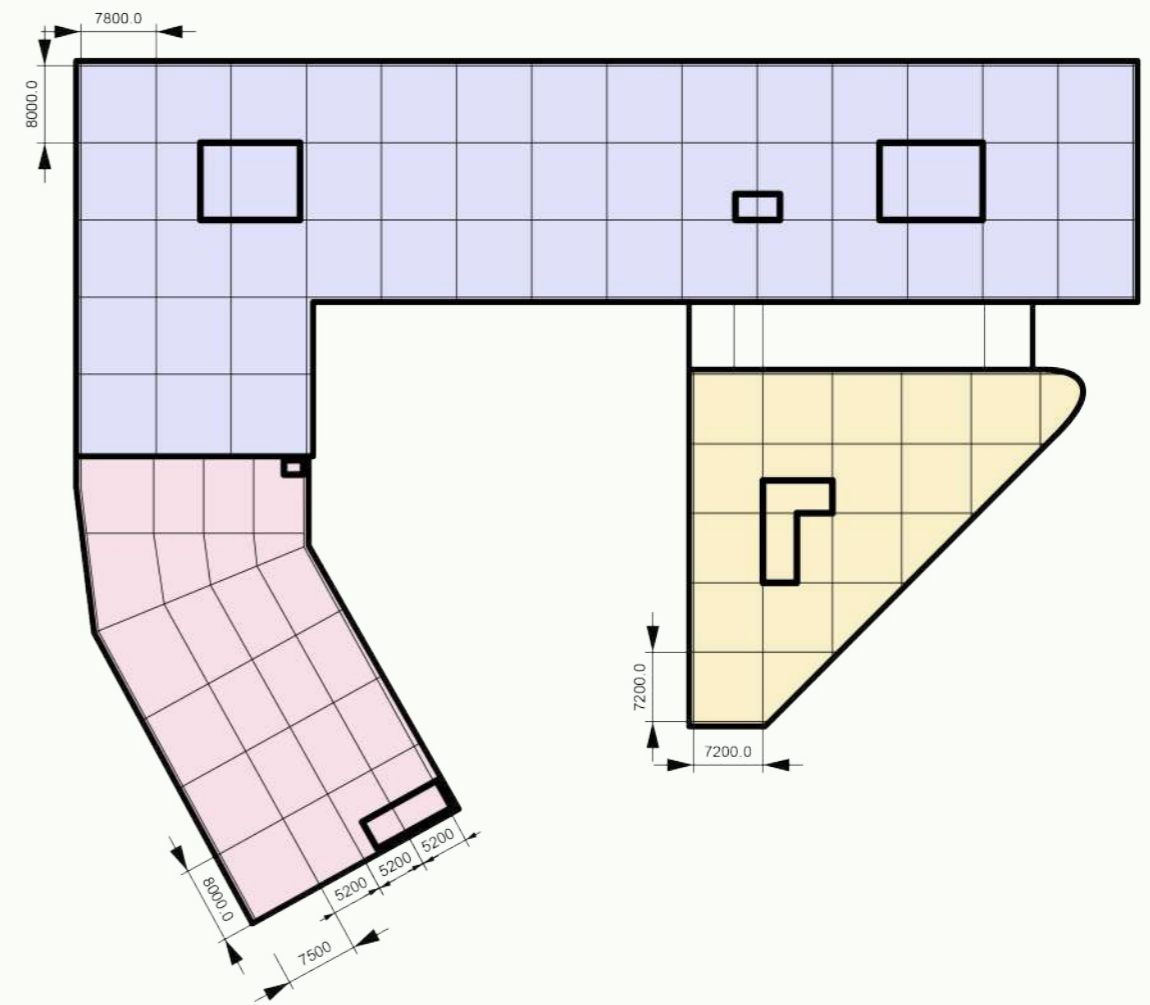


We have adopted 3 different yet complementary grids, each catering to the different function it holds.

The grid in purple is that of the high tech hospital functions such as surgery, endoscopy etc and it is a 7.8 by 8 meter grid.

The yellow grid corresponds to what we like to call the soft part of the hospital, and that is the part holding the medium and low tech functions of the hospital such as primary care and rehabilitation and health etc. It follows a 7.2 meter grid.

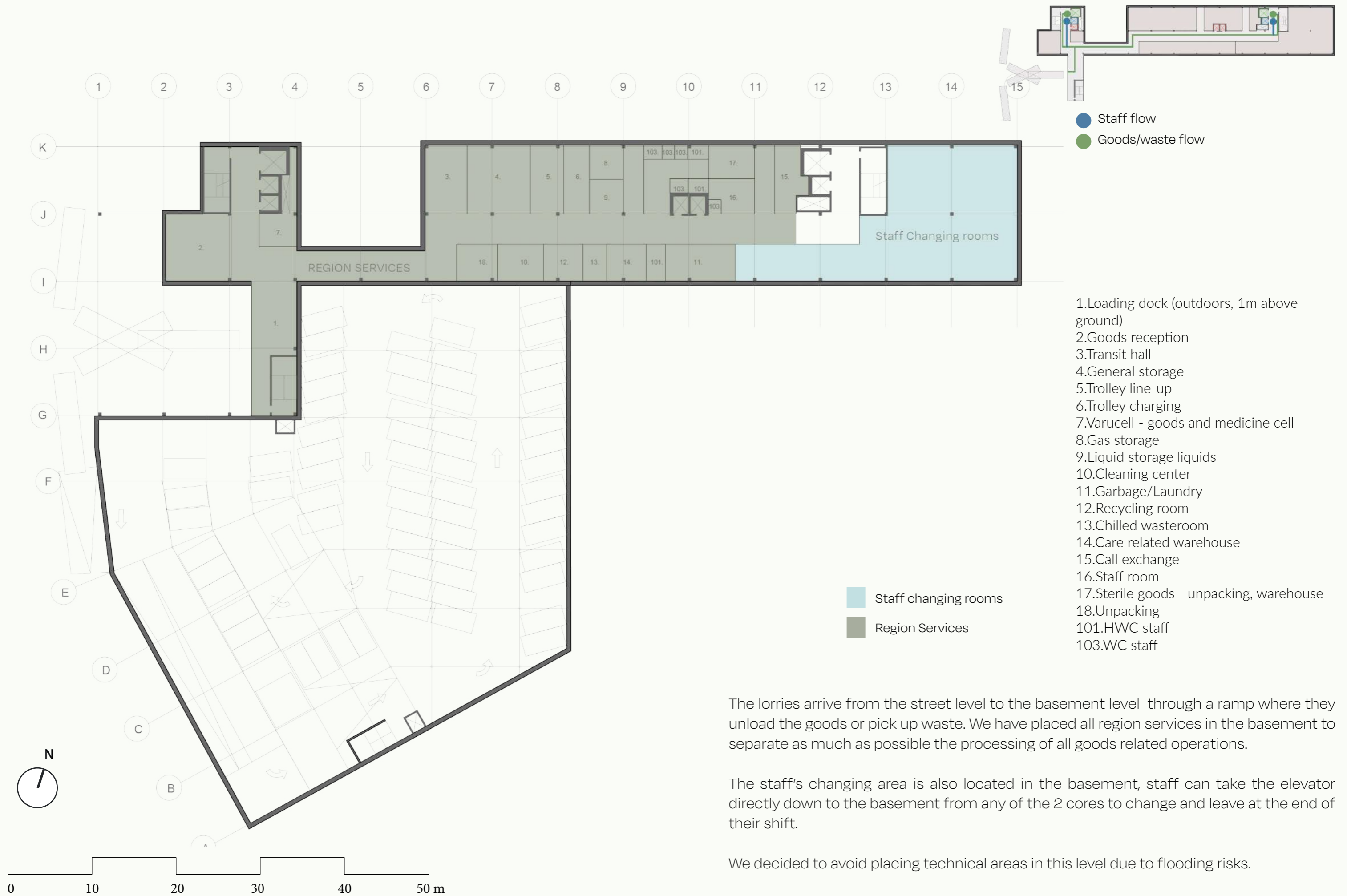
We envision this building to have a less technical and a more warm and inviting



character, especially that it is adjacent to the atrium and contains most of the non-hospital related public functions.

Finally the pink grid is that of the mobility hub, it is a 7.2, then 5.2 by 8 meter grid. The grid of the mobility hub aligns with that of the hospital at multiple points allowing for future expansions if necessary.

The mobility hub however is made from half floors so 2.5 meter high with in between CLT floors that could be disassembled in said case of expansion to match the heights of the hospital floors that go up to 5 meters.





- Staff flow
- Goods/waste flow
- Patient flow

1. Business-related administration, corresponding
2. Quiet rooms for example telephone calls
3. Integrated administration (team station)
5. Group room / Meeting room
6. Copy space
7. Staff resting area
8. Archive room
10. Patient meeting room
11. Patient meeting room, Large
12. Disk - Disinfection - Cleaning
13. Storage
16. Medicine room
20. Reception
100. RWC-patient
101. RWC-Staff
102. WC-patient
103. WC-Staff
104. Environmental room/trash
105. Cleaning room

- Dentist
- Rehab
- Waiting area
- Added functions

Starting from the vehicular flow, the car entrance to the site and the mobility hub is positioned in the south. On this level of the mobility hub we have the parking spots dedicated to electric cars and also to bikes. There is a clear separation between the 2 flows for safety reasons. We have a double ramp system, one going down to the basement and another going up to higher levels. Worth noting that on the left side of the mobility hub we see the ramp used by lorries to go down to the basement of the hospital for deliveries. This floor of the hospital has the dentist and rehab functions. Moreover, we have a gym, restaurant, pharmacy, cafe, and a studio for rent. The atrium is the primarily pedestrian way into the hospital. The courtyard acts as a small hidden oasis between all different buildings. Parkings for drop-off and pick-up, and the disabled are placed near the atrium's west entrance.

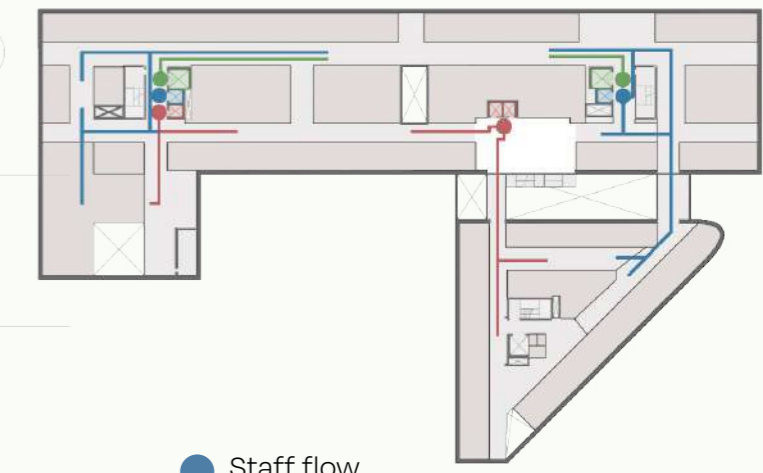


- Staff flow
- Goods/waste flow
- Patient flow

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- Primary Care
- Region Sampling
- Mobile team

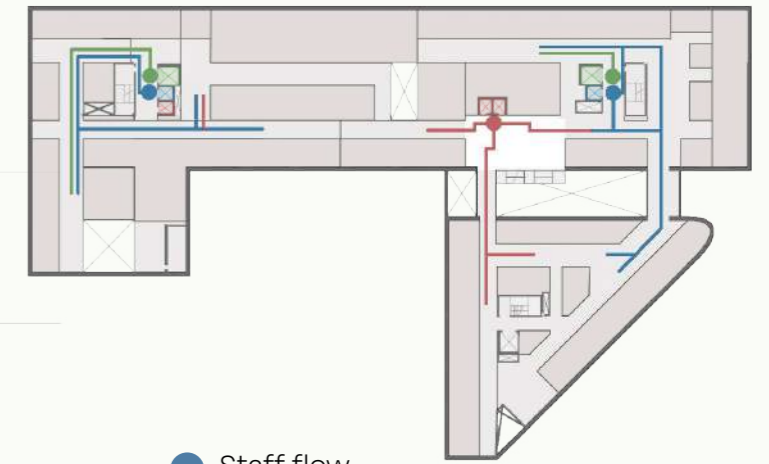
On this level we chose to place primary care that extends to both heavy and medium tech buildings, in addition to regions sampling, and mobile team in the west wing. In this plan and upper plans we tried adopting a series of corridors that on the one hand allow for smooth flows, and on the other provide natural light as much as possible. Additionally we added several atriums that serve the same purpose. One of our main goals was to have patient rooms with maximum natural light and that's why we placed them along the South or West facades. The atriums and corridors help us in achieving the same visual and psychological comfort from natural daylight for staff areas as well. Functions such as storage, toilets, cleaning room, or environmental rooms, and other infrequently resided rooms are placed in the middle of the floor plan with the least lights. Staff areas are ideally located in the North, West, and East of the heavy tech and North and East of the medium tech buildings. Where patients rooms are concentrated in the other directions.



- Staff flow
 - Goods/waste flow
 - Patient flow
1. Business-related administration, corresponding
 2. Quiet rooms for example telephone call
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 7. Staff resting area
 8. Archive room
 10. Patient meeting room
 11. Patient meeting room, Large
 12. Disk - Disinfection - Cleaning
 13. Storage
 15. Laboratory (Patient-centered analysis)
 16. Medicine room
 20. Reception
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 100. RWC-patient
 101. RWC-Staff
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 103. WC-Staff
 104. Environmental room/trash
 105. Cleaning room

Specialist clinics
 Dialysis

On this level we chose to place specialist clinics, and dialysis. The same series of corridors and atriums are adopted. Patient rooms are concentrated close to the lobby area near receptions (n20) on the left or down to the medium tech building for easy way finding. The patients on this floor can also access it from the west and that to reach the dialysis department quickly and also on weekends and outside normal working hours.



- Staff flow
- Goods/waste flow
- Patient flow

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5. Group room / Meeting room
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7. Staff resting area
8. Archive room
10. Patient meeting room
12. Disk - Disinfection - Cleaning
13. Storage
15. Laboratory (Patient-centered analysis)
16. Medicine room
20. Reception
22. Ultrasound
23. X-ray
24. CT
25. MR
26. Control room

30. Surgery room
33. Pre-Post-OP
34. Lab
36. Changing room, staff
37. Changing room, Patient
41. OP handwash
42. Expedition
43. Lock rooms
44. Sedation rooms

100. RWC-patient
100. RWC-patient
101. RWC-Staff
102. WC-patient
103. WC-Staff
104. Environmental room/trash
105. Cleaning room

- Image functions
- Surgery
- Habilitation & Health

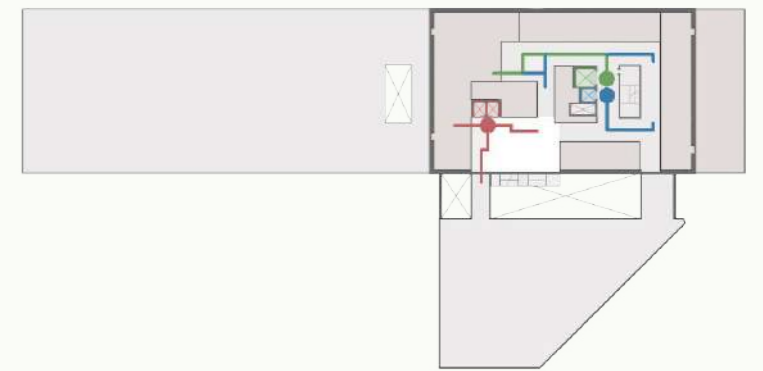
On this level we chose to place Surgery, Image function, and Habilitation and health. The same series of corridors can't be adopted on this floor due to the area requirements of the Imaging department, and the hygienic requirements of the surgery department. Patients on the high tech floors are always accompanied by staff so the flows on this floor are more mixed than other floors.



On this level we chose to place endoscopy, BUP, and technical rooms.

According to the brief, the technical room - at least partially - had to be placed directly above surgery wards. We have placed most of our technical space on level 4.

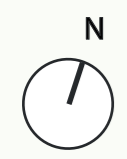
BUP is located in the medium tech building. We have provided it with its own outdoor space due to the nature of their work with mental health.



- Staff flow
- Goods/waste flow
- Patient flow

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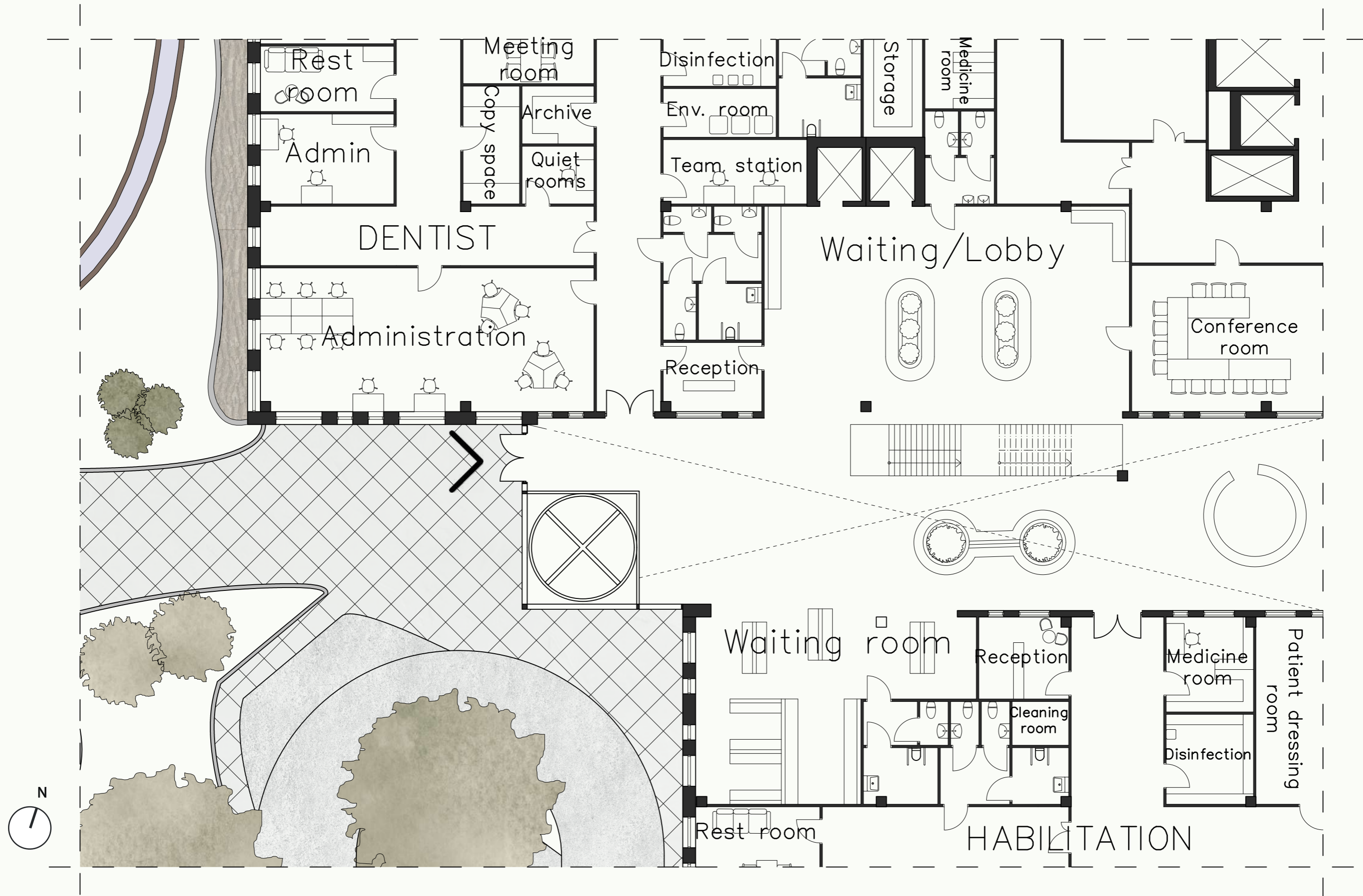
- BUM
- Added functions
- Staff dining area



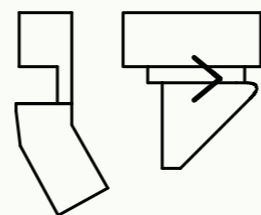
On the final level L5, we placed BUM in addition to staff dining area and an espresso bar.

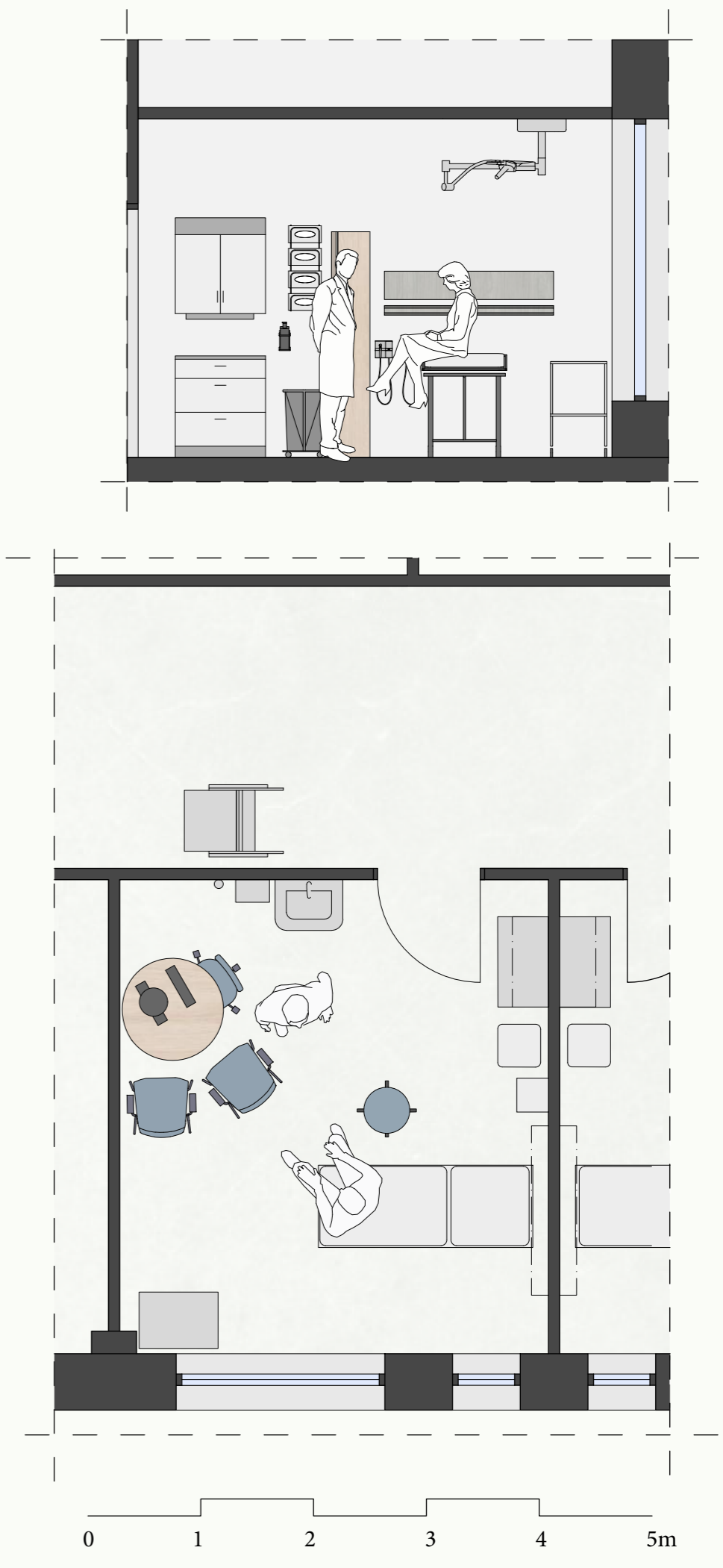
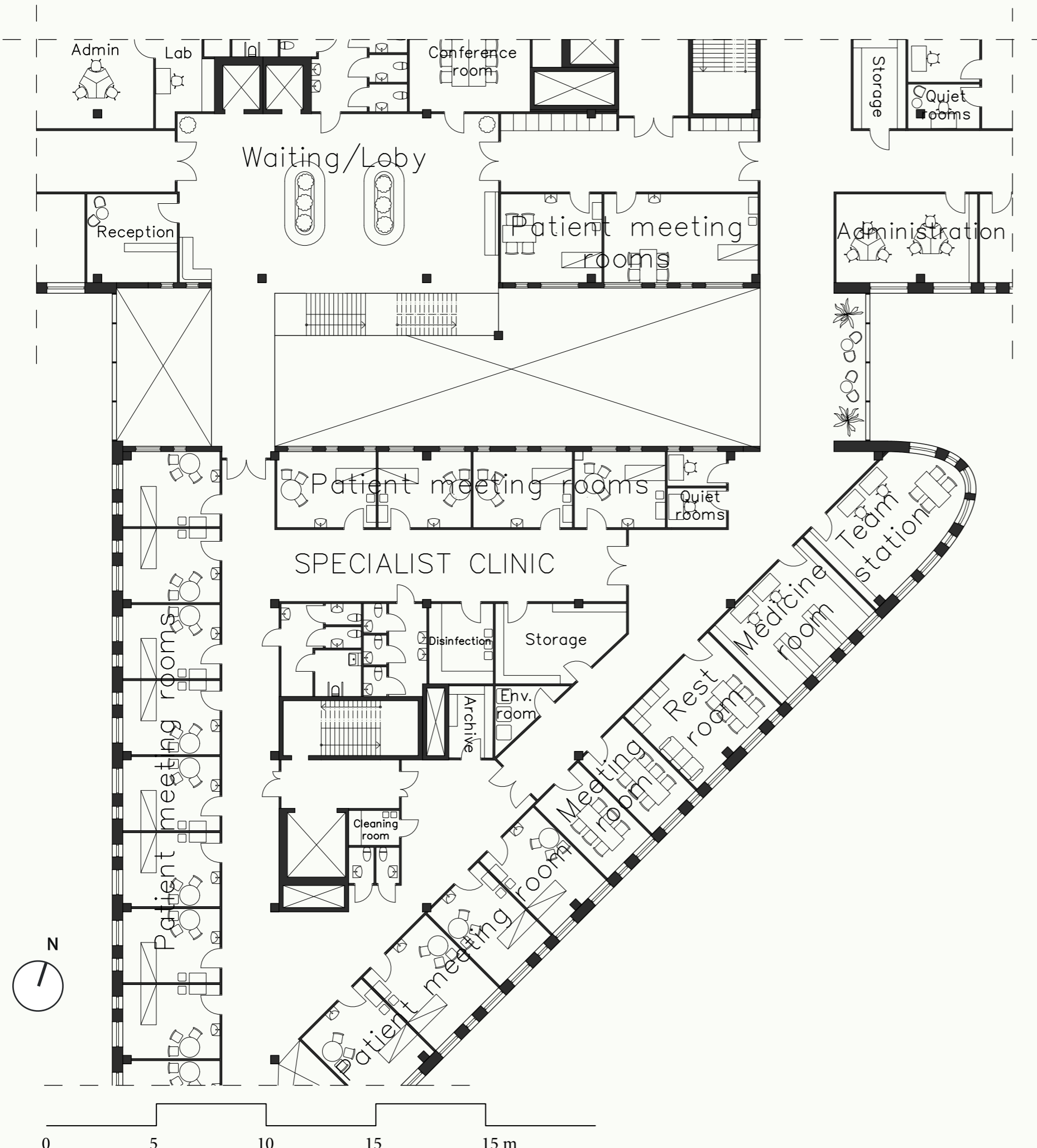
The staff dining area has its own outdoor dining space as well for the warmer weather.

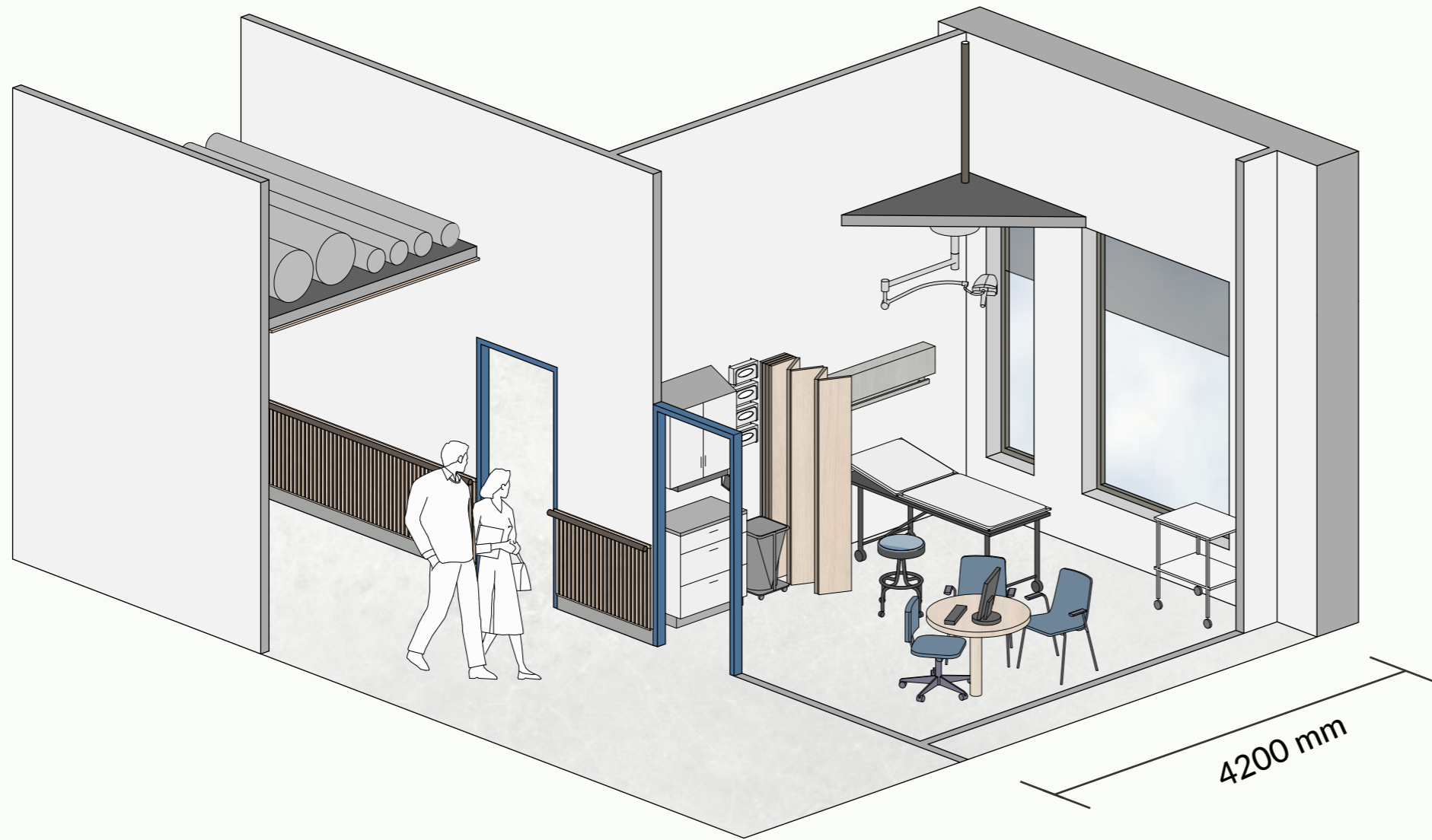
on the uncovered rooftop of the 4th floor, we have placed a public garden that can be accessed through the atrium and lobby. It can also be accessed through the espresso bar.



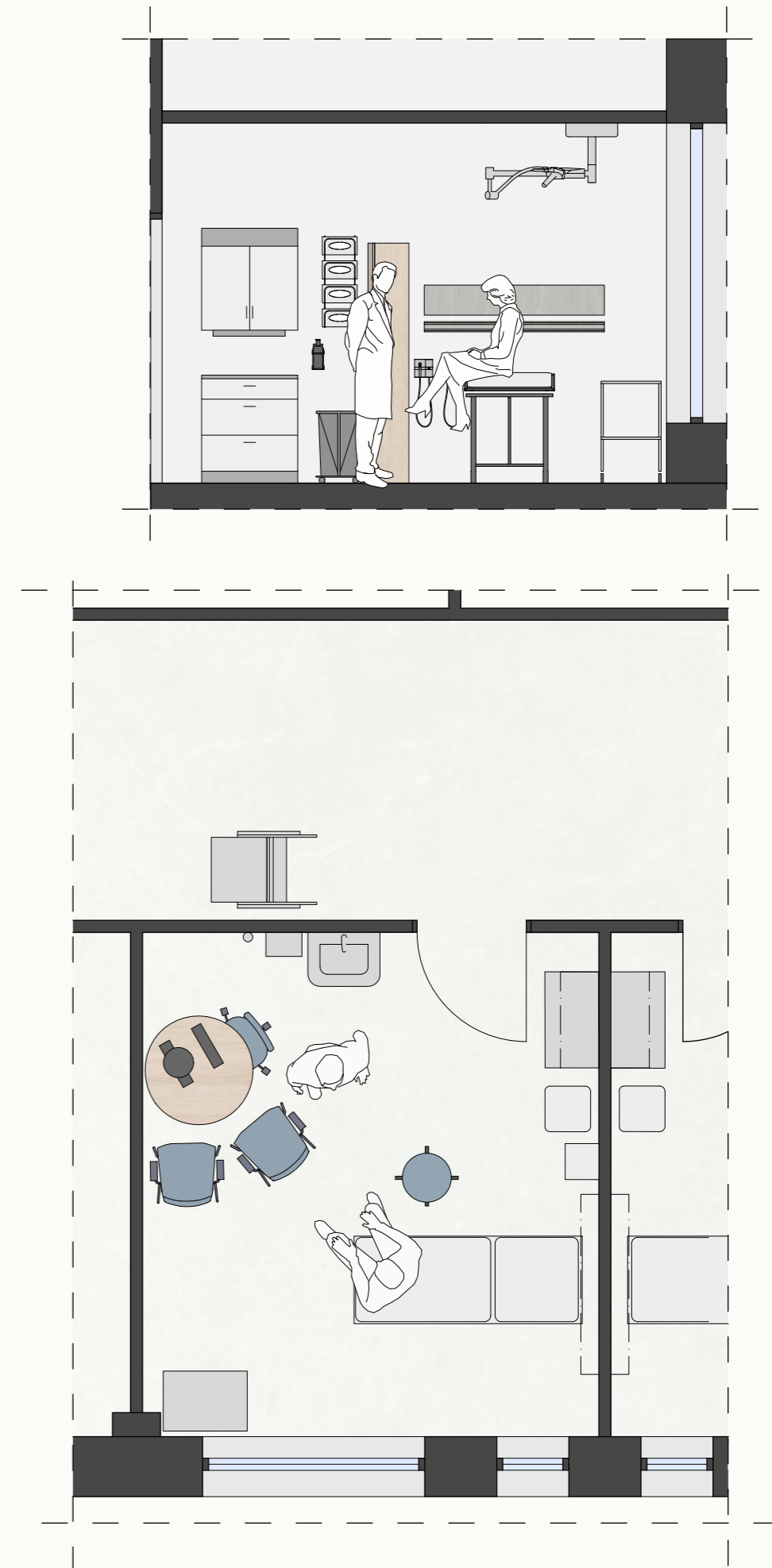
> Entrance

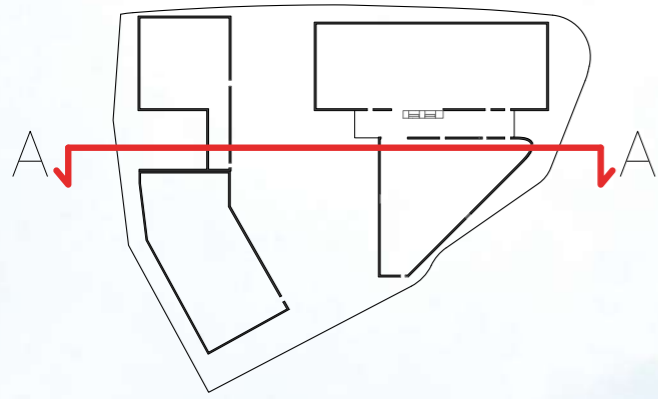


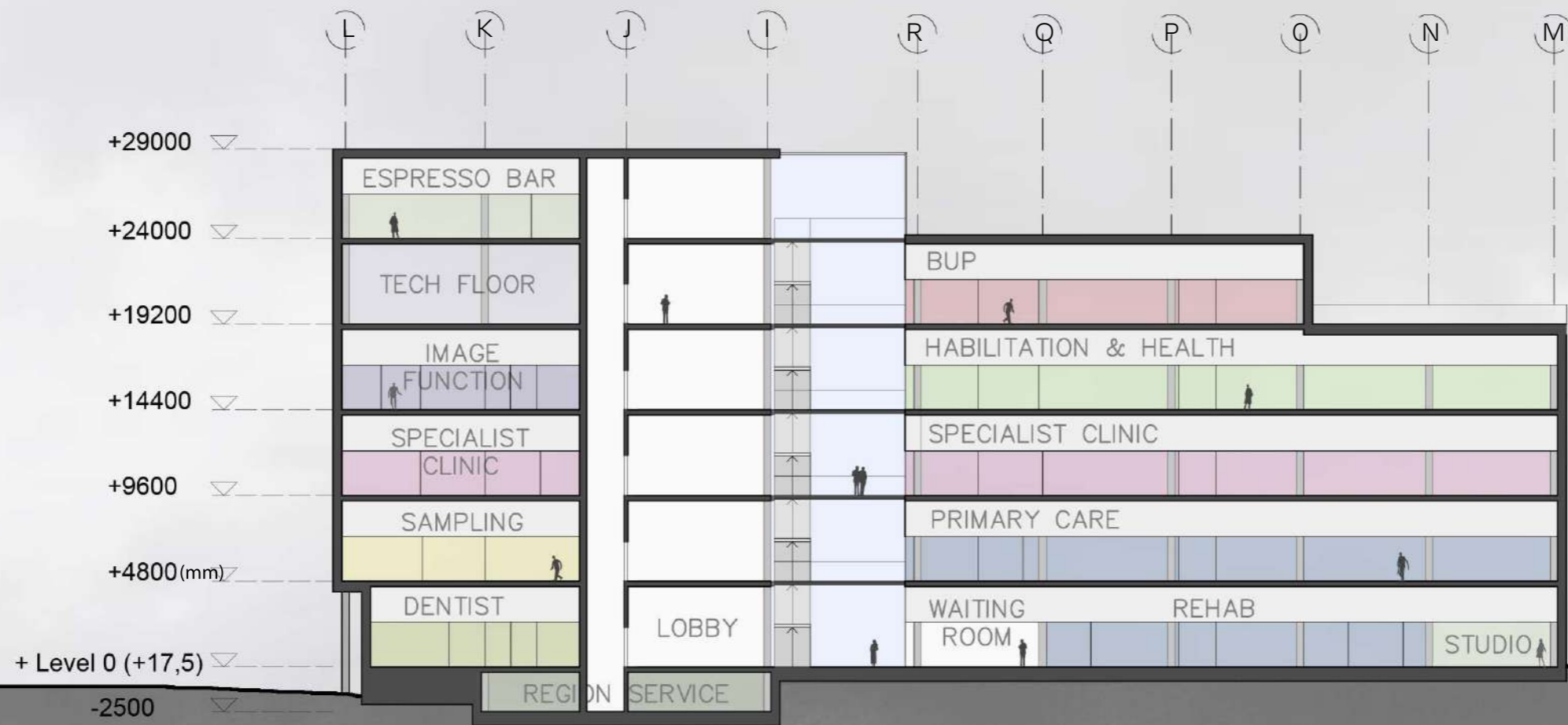
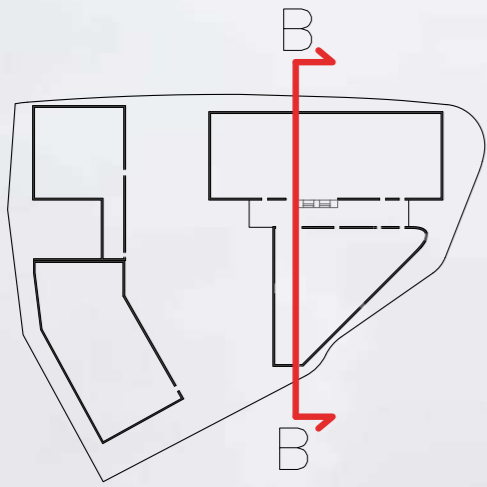


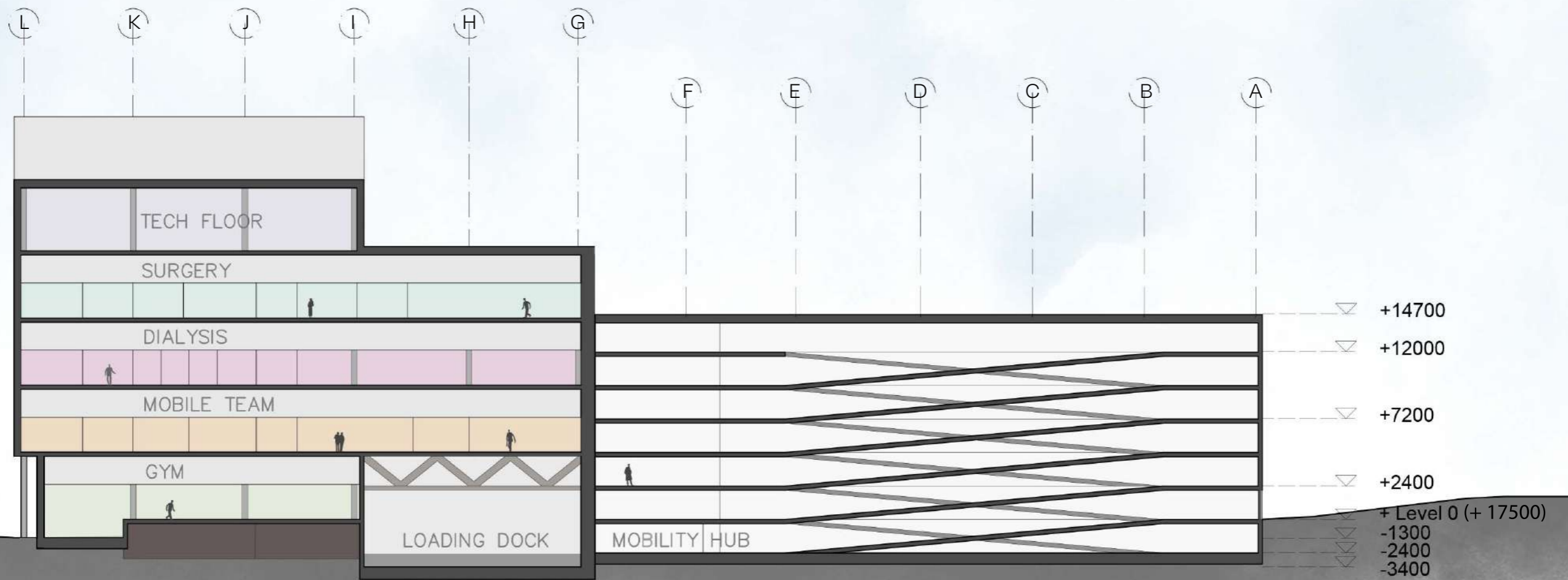
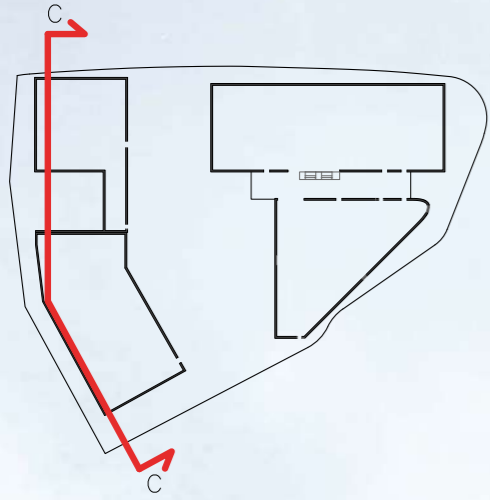


The patient consultation room is one of the most common rooms in the hospital and it is present on every floor. The door is surrounded by a blue or purple color as a way to help patients know that they are in the right area, and we used these dark colors for patients with impaired vision. The health care provider and the patient or/and their family meet in these rooms. There is a flexible internal partition for providing privacy. After the check-up, the health care provider uses the computer to input the information and talk to the patient. The exit door is located behind the doctor for safety reasons.







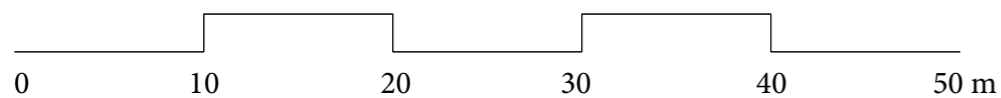




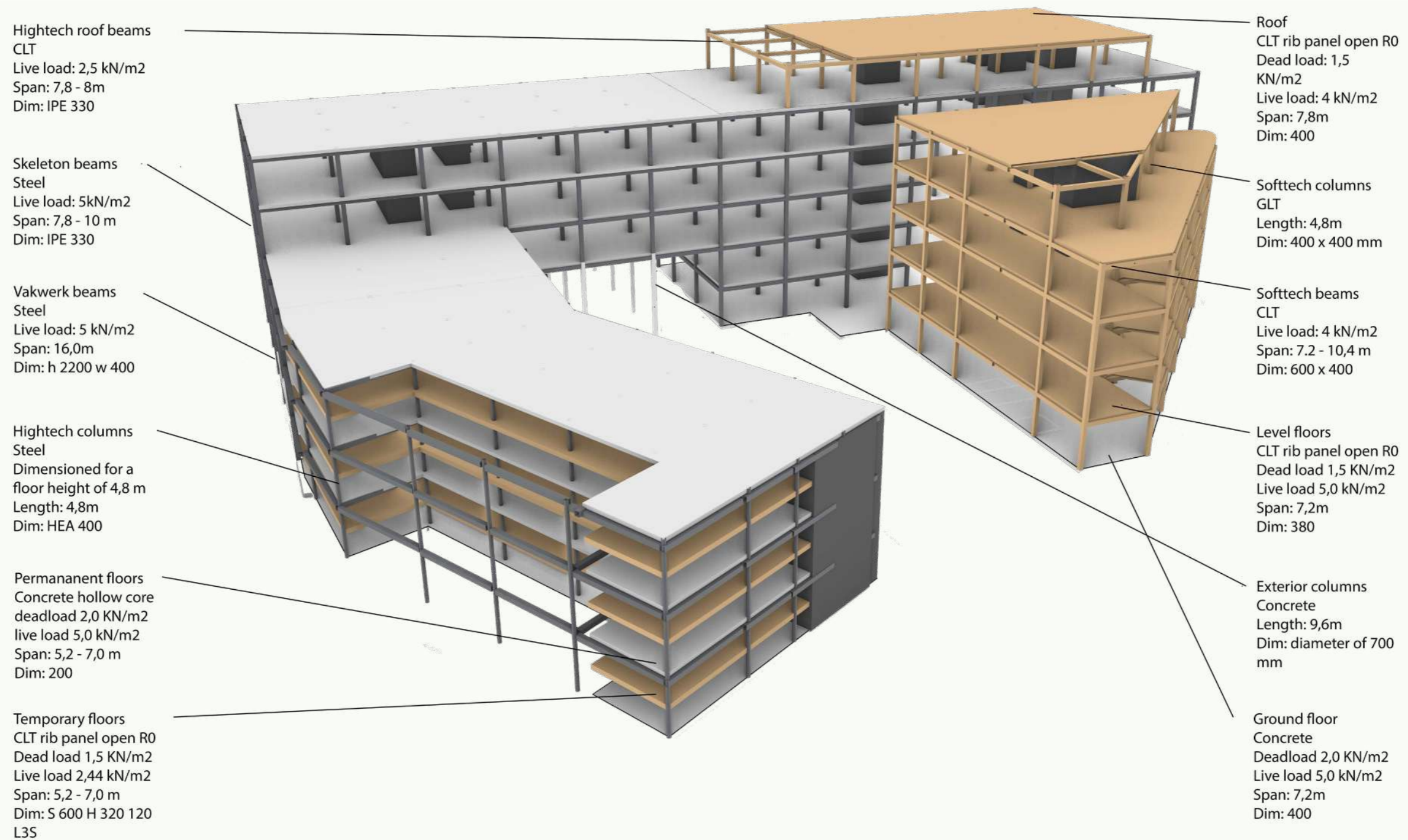
We have 3 different types of facades for the building representing the different functions within the hospital and the mobility hub. The biggest part of the hospital that also is the high-tech part we chose a natural stone façade with colours matching the urban environment.

In contrast to the high-tech part, the middle and low-tech part has a more welcoming wooden façade, also representing the wood construction within. This 'soft' part has a vertical pine wood cladding with wooden fins on the outside in different angles according to the path of the sun. In that way the windows get passive shading and the rooms inside get more privacy, while still getting enough natural day light. From the ground to the highest floor the fins get more dense to illustrate the public and active plinth. The rhythm of the fins is also used in the pattern of the high-tech stone façade.

The atrium divides the high-tech and the low tech with its own internal facade of plaster and wooden horizontal cladding in front of the windows. These are placed with an upward angle to ensure privacy, but still getting the light from above. The mobility hub has a non-insulated façade made up off perforated Corten steel mesh to allow natural ventilation and add to an urban look. The mobility hub will later adopt the high-tech façade when the mobility hub transforms as part of the hospital.







We have **2 different kinds of constructions** for the different tech needs in the buildings.

A. The high tech part of the hospital in addition to the mobility hub are built using steel skeleton with IPE 330 beams and HEA 400 columns for the interior. For the floors, we use concrete hollow core slabs.

For the exterior columns where we have a portal the size of 3 grids, we use instead concrete columns with 700 mm diameter.

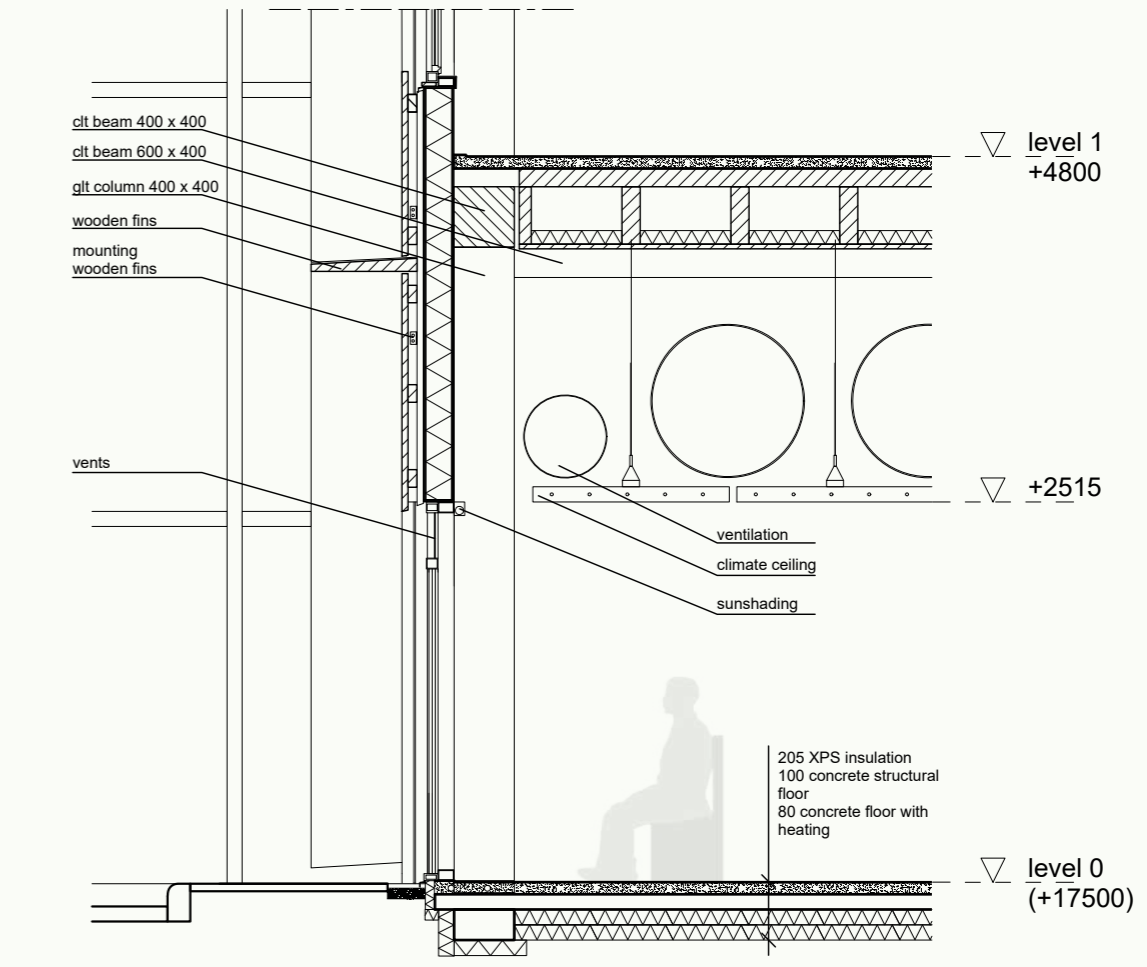
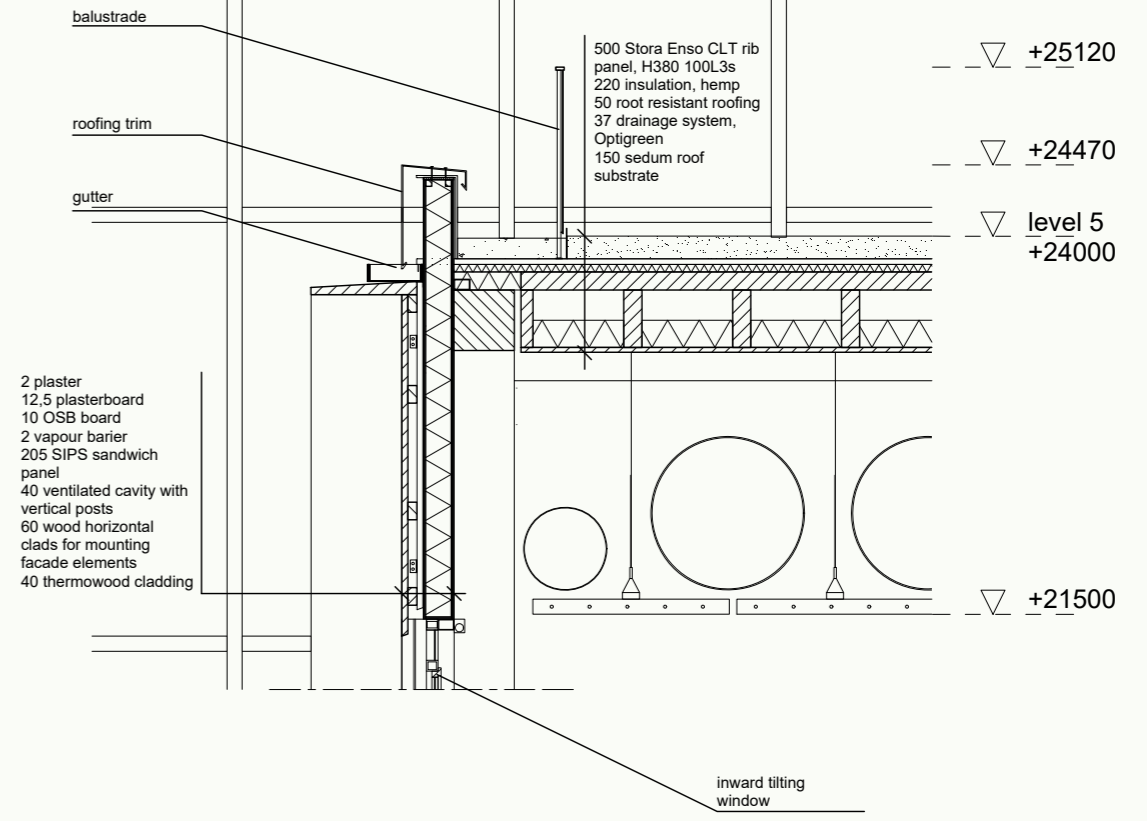
There are 3 construction interventions:

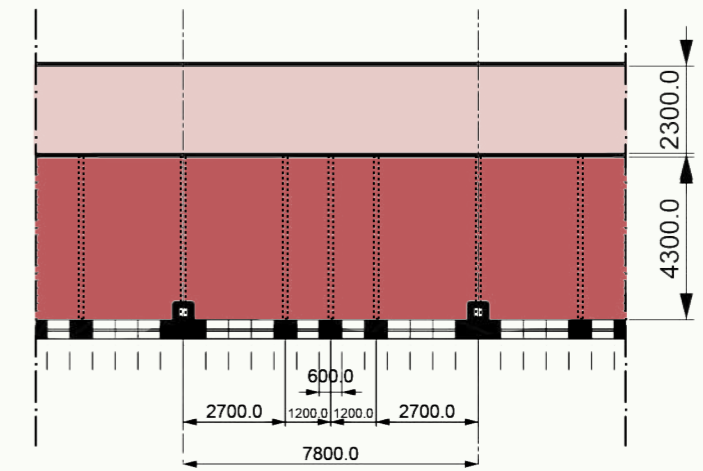
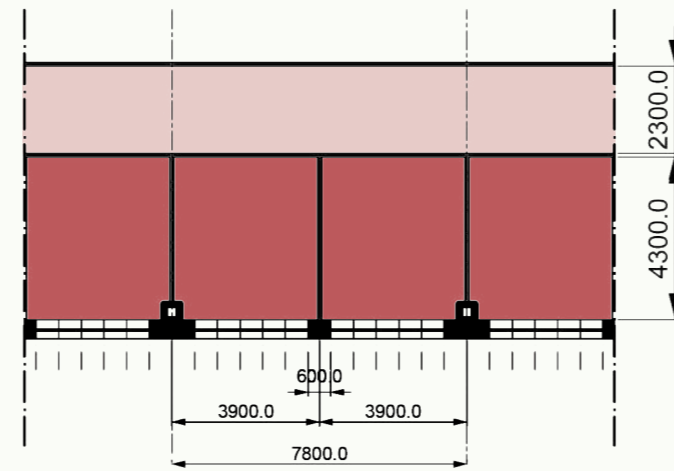
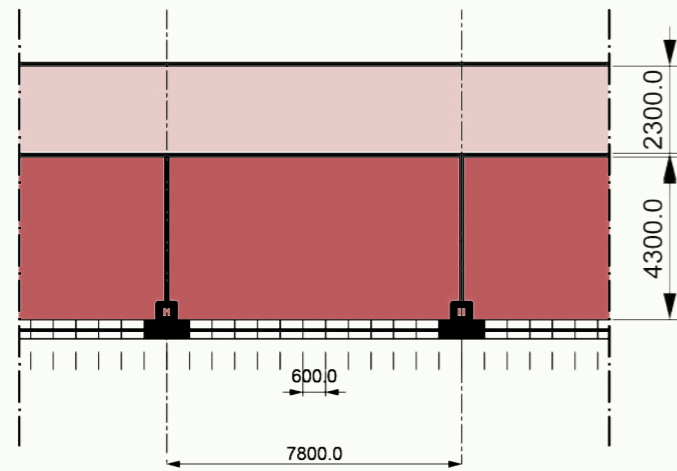
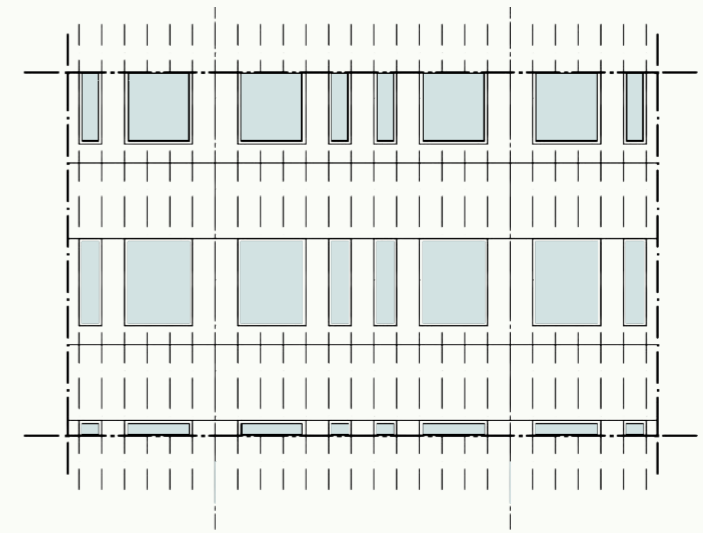
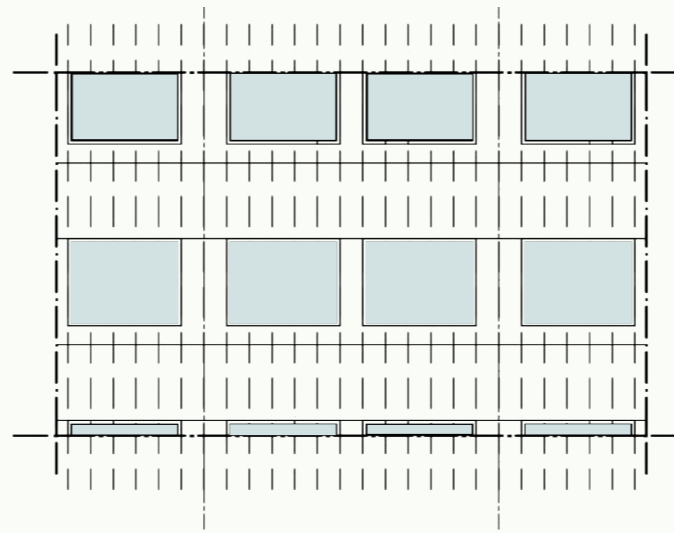
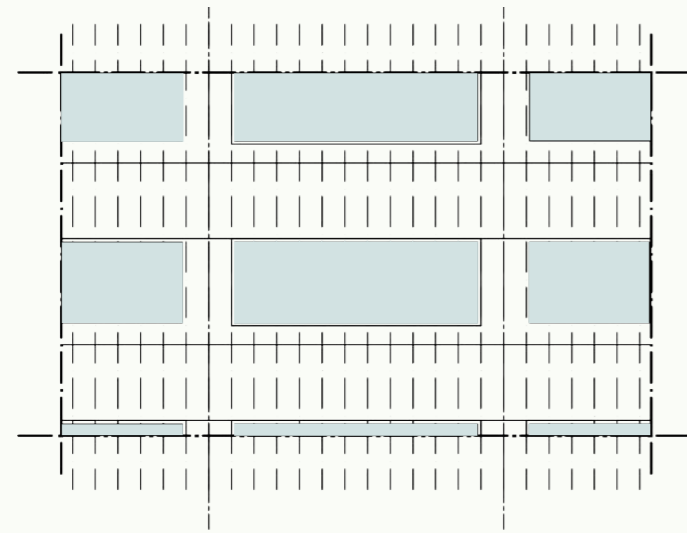
1. we use truss structure where we have the lorry drop off and that to take out the columns there.

2. Another intervention is in the mobility hub, where the inbetween temporary floors at 2.5 meters from the concrete slab are CLT rib panels that are dry mounted into the main structure and act as additional weight.

3. The third intervention is on the roof of the high tech building on the east where the 5th level's roof is made from CLT beams (IPE 330) and rib panels (400).

B. The medium-low tech part of the hospital or what we like to call as the soft part of the building is made from CLT beams (600x400), GLT columns (400x400), CLT rib panels (380), and finally concrete slab for the ground floor (400mm).



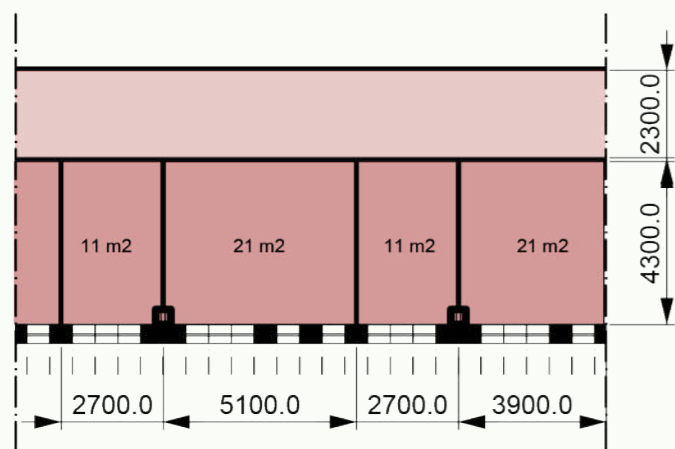


1. We started with allocating closed facades where columns are 7.8 meters apart. So we place walls to match the construction grid

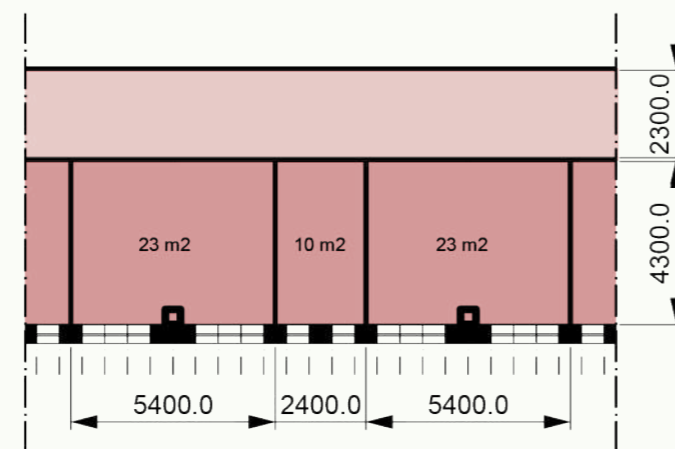
2. We split the open facades in half and place in patient rooms

3. We add closed facade segments to enable flexibility of the rooms for different functions or room sizes

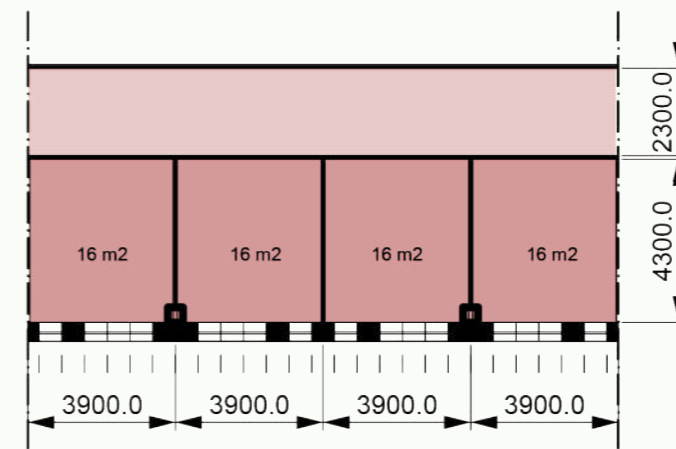
Corridor Patient room



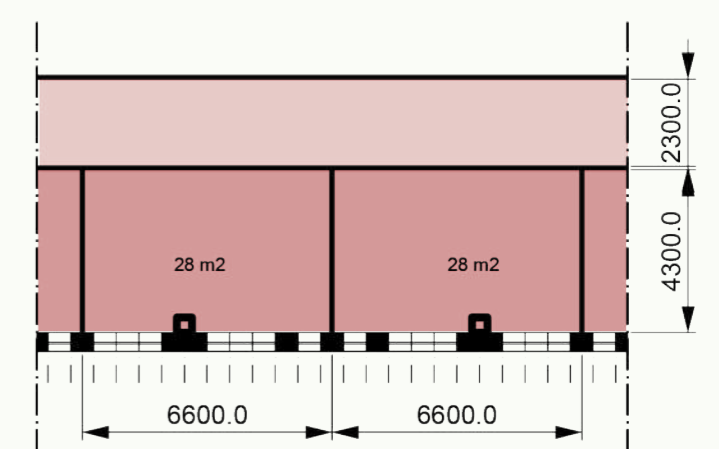
First facade variation



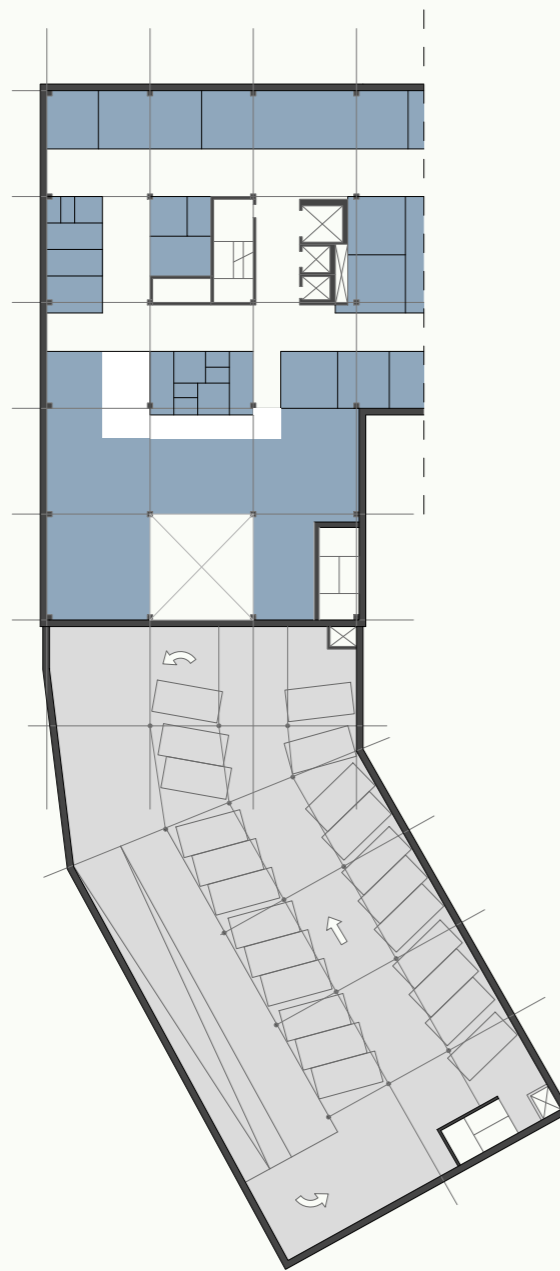
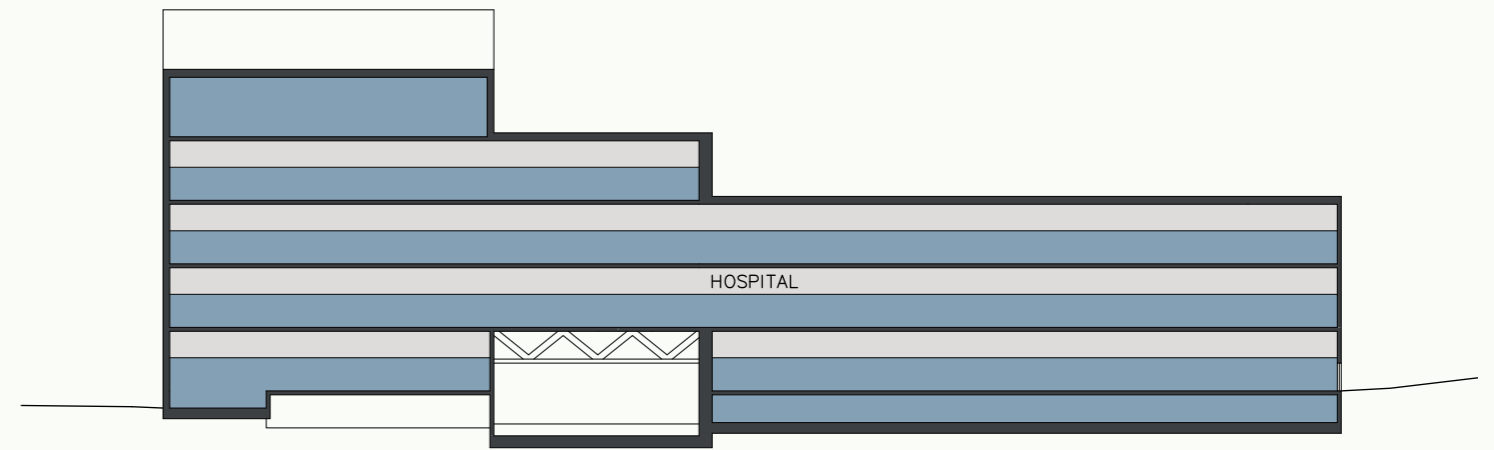
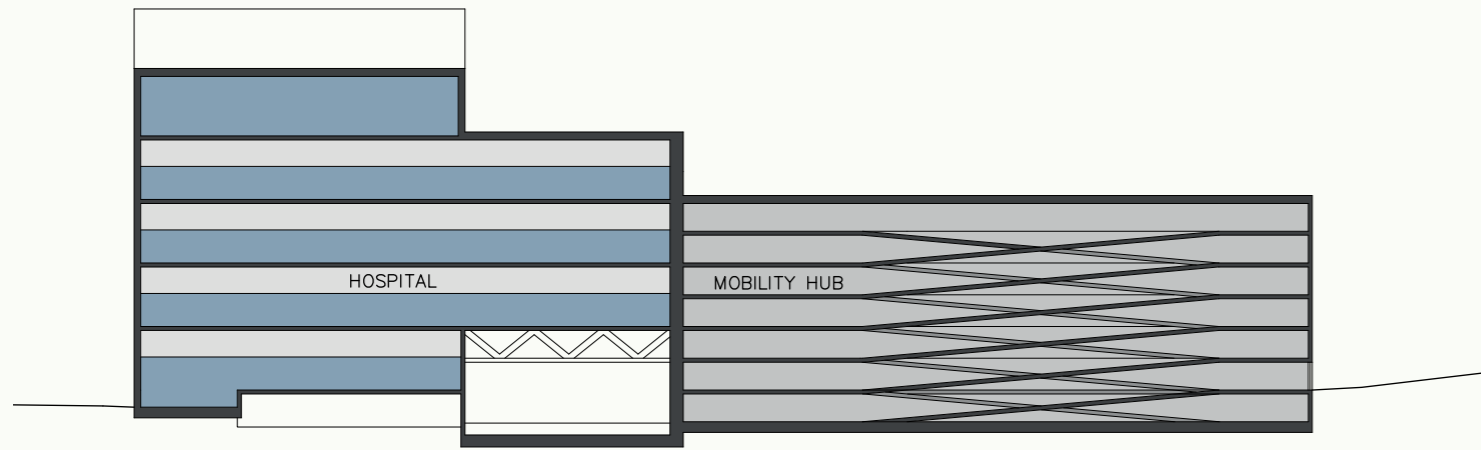
Second facade variation



Third facade variation



Fourth facade variation



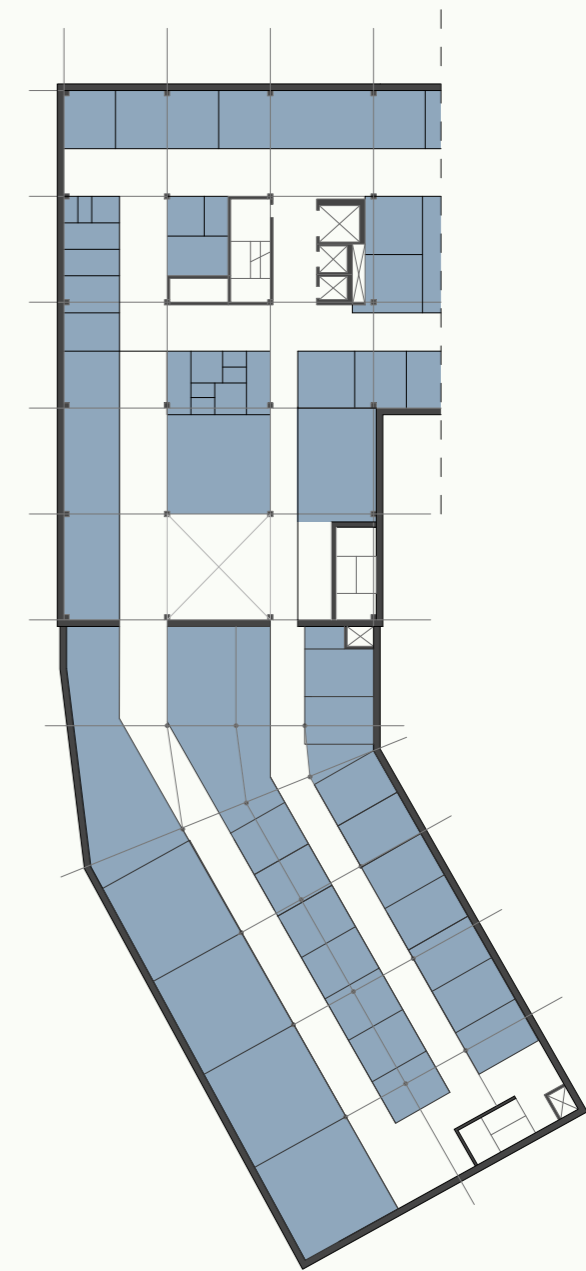
BEFORE

We were required to design a 12000 sqm mobility hub that caters to 200+ cars and simultaneously keep future proofing in mind through our design process.

We imagine that in the future, we will use less personal vehicles and switch to faster and more efficient public transport and other green means of transport. On the other hand we imagine that since technology is taking over some medical functions and making it possible from home, the guaranteed function that will still need to take place in a designated hospital space is surgery. Since our mobility hub grid follows that of the high tech then it seems reasonable that the hospital could expand into it in the future as their needs for surgical wards increase.

We started experimenting with how this can be possible taking into consideration the MH required BTA today and came up with a solution.

Instead of using 5 meters high levels only to match the hospital's floors, we introduced inbetween floors. The trick is to use CLT rib panels as those inbetween floors that from the one hand can carry the weight of the cars, but on the other also act as weight themselves that the main structure of the mobility hub can carry without cracking. These panels will be dry mounted for easy disassembly after the end life of the inbetween floors. The expansion can be to include more operations theatres but it could also be used for adding more consultation room.



AFTER