YOUTH
HEALING
ARCHITECTURE
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TITLE PAGE

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THANKS

ill. 002. Youth Medicine Conference, Copenhagen

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Monica Hornborg, Akershus University Hospital, Oslo.

Dr Deborah Christie, University College London.

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PROGRAM *58*

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SYNOPSIS

Focusing on an often neglected group in the hospital environment - the young - this master's thesis reconsiders the hospital as an architectural typology in relation to the particular needs of the young. It has been the aim to study how the architectural layout of the hospital can help ease the healing process while being hospitalised in a difficult stage of life; to design spaces of high architectural quality that embrace the young body and spirit creating a sensory experience.

As a result of this study, this report presents our experiences, interviews, and analyses which have led to a design proposal for a Dedicated Youth Hospital, intended as a part of The New University Hospital in Skejby. The design proposes a novel spatial approach to hospital design where a curved space-dividing wall cuts through the otherwise rigid hospital layout creating a series of inviting, but also rational and functional wards including common leisure space. Throughout the project the project team has engaged actively in the current debate on future hospital developments. The work has been presented continuously on the public project webpage www.youthhealingarchitecture.dk.

ill. 004. Turned opside down.

PREFACE

This Master Thesis report has been prepared as a part of the project process on 4. MSc. In architecture at Department of Architecture, Design and Media Technology, Aalborg University. The project runs during the period of 1st February 2010 to 2nd June 2010. Through out our project a new typology within Health Care Architecture is defined with the aim of reflecting stage of life in future hospital environments. Our focus is on young patients and how the hospital environment should be designed to positively influence the healing process.
Although the process is iterative, the report is written so that the project phases are presented in a chronological order;

- Intro
- Experiences
- Program
- Proces
- Presention
- Outro

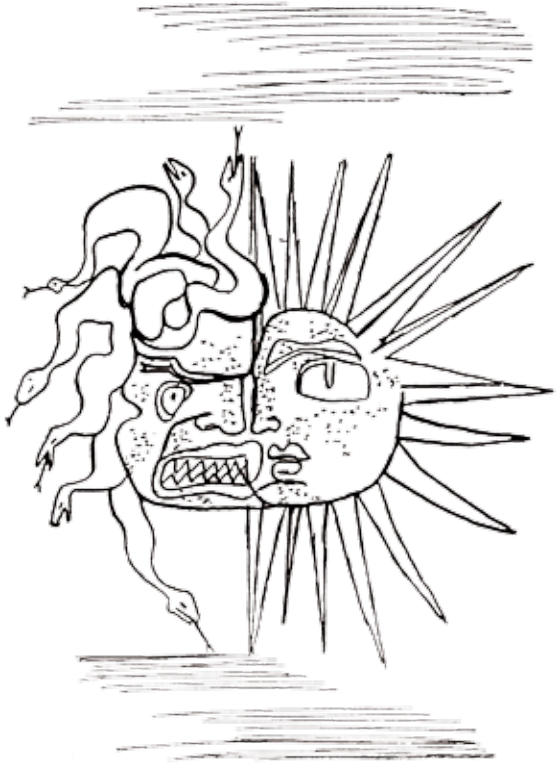
The report starts with the a our expereriences during the research phase, in continuation hereof the program explaining the basis of the project, followed by the desriction of the design process and ends with a presentation of the final design, a reflection of the project, and a conclusion.

READER`S GUIDE

References are used in accordance with the Harvard Method [author, year] for books and articles and [designated name] for Internet homepage, a full list of references is found at the end of the report.
As part of this project report an experience report [Experiences; Engel, Frier] has been developed, it contains personal experiences and research from the project period.
References for illustrations are indicated by continuous numbers throughout the report [ill. X] that refers to the illustration list to found at the end of the report. If nothing else is indicated the illustration is own production. References for appendixes are indicated [Appendix_1] etc. Note references have continous numbers.

ill. 005.

INTRODUCTION



ill. 006. Drawing by Le Corbusier.

>>The one who is limited to science has a hard time relating to a subjective term like the will to live. The will to live cannot be measured, consequently it doesn't exist<< [lægevidenskab].

The very life will is influenced when a young person gets seriously ill. The fast life with friends, parties and opportunities is on stand by and replaced by depressing institutional life as hospitalised. *>>The subjective factor of the personal contact between doctor and patient is in many cases of higher significance than the treatment he prescribes<<* [lægevidenskab]. Similarly it is the subjective factors in architecture that can make a certain space encouraging and appealing for a young person. Thus it is important to work with the subjective aspects of architecture and how a hospital is perceived by a young body and mind, as it is in this subjectivity that spaces have the potential to become magic, as illustrated by Le Corbusier in the illustration.

Hospitals worldwide are facing structural changes and the challenge of building new and improved healthcare environments. In the Danish context there is a present focus on Super Hospitals[1], as large city structures divided into neighbourhoods, based on patient groups with different diseases. Thus, there is a focus on improving treatment of patients by focussing on scientific research and hereby on all the measurable factors. The present risk in relation to Health Care Architecture is that there is a tendency to focus on developing quantitative models and sets of rules that designers follow. Acknowledging that subjective aesthetic and sensory aspects have proved to be of vital effect on the healing process. One of the challenges is how these aspects can be visualised and activated in the development of Health Care environments, and from here our project will take off.

When looking at hospitals in retrospect the young have been neglected as a group in Denmark, and hospitalised in either the child or adult section. Being at a turbulent stage of life the young patient faces a double pressure. Thus when working with future hospitals, there is an obvious potential in incorporating the needs of youth into a Dedicated Hospital Design. The problem is, however, how the hospital can be organised as an architectural frame focusing on age and the view of life, instead of the omnipresent focus on medical specialization and disease.[Holze, 2010] This is the issue we try to solve in this thesis.

The architect and the doctor´s worldviews resemble each other, both based on the encounter between the scientific and the artistic. The medical profession used to be defined as “medical art”; now it is strictly medical science. In the same way architecture, especially in a Danish context, builds on a long artistic tradition, but in recent decades it has moved towards the scientific aspects - highly influenced by economic rationalization. The risk is that doctors as well as architects can with basis in these scientific methods avoid abstracting and reflecting on the human individual and its mental needs.
With an approach based on perception this thesis questions the current social focus, on the “Specialized Hospital” where the scientific part of the medical system is more in focus than ever before. In this project focus is on how the hospital, as a frame of life, can be changed into something positive, for the young, as a specific group, within the frame of economy, a synergy between science and art could be the solution. The aim is with basis in the young patient to exemplify an approach that combines scientific research with subjective perception and needs of a young patient.

PREFACE

This first part of the thesis project Dedicated Youth hospital contains a compilation of personal experiences from our research phase carried out at the beginning of the project period to form a basis for the development of the Dedicated Youth Hospital.

READER´S GUIDE

The following part of the report is written in a diary form, thus experiences, impressions, immediate thoughts, opinions and statements is presented in informal writing and photos. We have chosen mark quotations in a graphical way to emphasize the punch lines, those of great importance to the development of the architecture of the Dedicated Youth Hospital. Personal photos from the various studies will support the written text in the cases where it has been possible to take photos. The specific dates of the described experiences will be mentioned in the introduction.

ill. 007. Sketching in the studio

INTRODUCTION

With this master thesis project we have chosen to challenge ourselves with the task, of designing a Dedicated Youth Hospital. Initially the question of where to look for inspiration and how to reach a clarification of how a future youth hospital could be designed was vital. This sparked consideration of how this project could become feasible in the perspective of present hospital expansion and the erection of new hospitals. We were aware that the knowledge we would be able to achieve through literature would not be sufficient. Consequenty we chose an untraditional approach within the architectural field. Our approach was to seek help from experts as well as patients and start out by listening and observing and furthermore to participate in conferences.

Our point of departure is a Youth Medicine Conference at Copenhagen University Hospital, where we had a chance to acquire knowledge and an understanding of the issue of youth in hospitals. In addition the conference helped to create a network of contacts that became vital for the project development. In the further process we observed and experienced life in various hospitals, especially focusing on young patients. With this method we had an idea that we would be able to get assistance through informal interviews with doctors, nurses, patients, relatives, and phychiatrists in hospitals in Denmark, Norway and England and utilise it in our analysis as a basis for our design solutions. Consequently, the following part of the report contains experiences, impressions, immediate thoughts, opinions, and statements presented in a diary form. The experiences enlisted below will be described;

- Participating at the Youth Medicine Conference in Copenhagen_02/02 2010.
- Youth in the news_02/02 2010.
- Visit at Herlev Hospital_03/02 2010.
- Visit at Rikshospitalet in Oslo_04/02 2010
- Visit at Radium Hospital in Oslo_04/02 2010.
- Visit at Akershus University Hospital in Oslo_05/02 2010.
- Visit at University College Hospital in London _10/02 2010.
- Participating in the conference “Creating Sustainable healthcare buildings” in London_11/02 2010
- Visit at Aarhus University Hospital_22/02 2010.
- Supervision and lecture by Roger Ulrich_20100310

All the above form the knowledge basis on which the master thesis project Dedicated Youth Hospital has been developed.

ill. 008. A day In the studio

YOUTH MEDICINE CONFERENCE

Our point of departure for the project was taken in a conference, “Ungdomsmedicinsk Konference” (Youth Medical Conference) at Copenhagen University Hospital. By a fortunate coincidence it was the first interdisciplinary conference about youth medicine in Denmark. The focus of the conference was on the young as an independent group within hospitals and therefore on how to handle the specific needs of young patients in future hospital environments

SPEAKERS

As almost 400 people took their seats in the big auditorium at Rigshospitalet I Copenhagen, the conference started out with a lecture by youth psychologist Ida Koch entitled “Sick youngsters are also teenagers”.
She started out by reflecting on the characteristics of a person – needs, tasks, dreams and interest are in focus and especially the wish to be normal is a goal in itself, as she put it.

>>Sick youngsters – the wish to be normal, or to be special in a cool way<<. Ida Koch

Thus, the feeling of a good self-esteem and being in control of one’s life is important even when in a hospital. From what we had read about Healing architecture Ida Koch`s statement clearly related to choice and the importance of patient influence.
>>It is important to look at the human being and not just at the disease<< she said and added:

>>The young patients need a secure base, with a sense of security and belonging. The surrounding architecture must reach out and frame the fact that life is hard when you are hospitalized. >> Architecture must have empathy for the sick youngster`s sense of hopelessness<<. Ida Koch

Throughout the other lectures the good young life was constantly in focus – characterised by having friends, girl/boy friend, sex, a future, freedom, self-determination, options, opportunities, career, a good body, sports, leisure, and parties. All these are usually set on stand by when a serious disease hits. A time of dislodgement where independence is the goal is suddenly replaced by dependence on family and relatives. It is important for the young to create their own social networks; develop emotionally and sexually to achieve a good self-esteem.

>>It is about putting yourself in the young person`s place and trying to compensate for what’s lost – where it is possible<< Ida Koch explains.

ill. 009. The Auditorium at Copenhagen University hospital during the Youth Medical Conference.

Bjørn Askholm who is 26 years old, a former cancer patient and now a student of architecture, continued with his lectureentitled >>Youth knows most about youth<< he described what it was like for him to be young and ill: a radical change where life is put on stand by.

>>You are forced to stop up while everyone else continues<<.

Questions of how to maintain development, education, relationships and your identity become predominant, in particular when there are no offers available – no café, no network. He continued by telling us how he made contact with other young patients during a stay at Dallund rehabilitation clinic in the "youth week" with the conclusion that a network is crucial and that new networks with other young patients are essential.

Then he told us about how, based on his experiences as a patient, he had been working in the group called "Drivkræften"(Cancerdrive) to establish networks and offers for young cancer patients.

ill. 010. Bjørn Askholm during his lecture.

During the conference we also had a casual talk with Nuka Hove from “Section of Youth Care” at Department of Oncology, Aarhus University Hospital. Because of our studies before the conference our immediate questions concerned the social aspect in relation to the discussion of whether to focus on design of single or multi wards.

Later on, social worker Jacob Højer Larsen and medical social worker Mette P. Gammelgaard, both affiliated with the youth medicine knowledge centre, gave an inspiring presentation back in the auditorium. The overall point of view was that it is important to

>>Turn waiting time into leisure time << quote Jacob Højer Larsen.

As a part of this the project Hr Berg Café at Rigshospitalet has been established as a place where young patients can participate in entertainment and funny activities that will give the break from a tough hospital stay. It is important for the quality of life to have something exciting and fun to focus on. It is important to reduce the feeling of exclusion through relations both social and professional.

>>Turn waiting time into leisure time<<

WORKSHOPS

As part of the conference we participated in one of the three planned workshops about the “youth orientated hospital” here we had a chance to listen to how the other participants commented on the physical environments of different hospitals and what suggestions they thought would improve the hospital environments to fit the young.

ill. 011. Our team during the workshop

Late that day we visited Hr. Berg Café, situated across from the main entrance in the hall of the hospital. Hr Berg is a café and activity lounge for young patients at Copenhagen University Hospital. The purpose of the café is to create some sort of refuge within the hospital. An attractive offer but somehow contradicting the described behaviour/picture of the young we had come to know through the lectures at the conference.

>>The young are impulsive and don't want be social on command<< Nuka Hove had said.

However, the café is open two hours a day in the afternoon and it can be hard for the young patient to actively search for this social spot. With our experiences from the conference an initiating direction for the project was inspired and we felt that we would have to talk to more people and see different hospitals in order to continue our task of defining and designing a youth hospital.

ill. 012. Presentation of the outcome at the workshop

YOUTH IN NEWS


NYHEDER

24 indland

Klummen

Lad børnene og de unge komme til orde

Unge kræftpatienter har kun én ungdomsafdeling

Ekspert: Unge føler sig mindre syge på en ungdomsafdeling

»Vi er forsigtige med at sprede lægernes ekspertise«

ill. 013. Article in the Danish newspaper 24 Timer, 02/02 2010

With this self-defined thesis project it was exciting to experience a sudden focus on the topic of youth in hospital. All we had been able to find about the topic ahead of the project period was an article from 1999 stating that the young were negclected in the Danish health care system and did not really fit neither in child nor adult sections.
Because of the Youth Medical Conference in Copenhagen the Danish press once again paid attention to the young in hospitals. Based on the project from Aarhus, where two wards has been redecorated to become youth wards, focus was on the cancer patients.

The articles stated that the young patients become lonely when they are hospitalised without patients their own age and that this can cause extra problems on top of the disease.

>>Young cancer patients are often hospitalized with much older patients - and that makes them feel even more ill<< it said in the Danish paper 24 Timer.

The articles reflected our initial research and were thus a motivation for our further process.

ill. 014. Article Newsweb dr.dk 02/02 2010

HERLEV HOSPITAL

To follow up the experiences from the Youth Medical Conference we visited Herlev Hospital, one of the largest hospitals in Denmark. A functional and flexible hospital characterized by a large high-rise building of 26 floors - a machine focusing on the medical treatment – and, in our opinion, not based on a design for healing space.
The immediate experience of the "tower of beds" is a standardized structure with spaces that have no access to natural air nor open air space. However, the spaces in the centre of the building have poor daylight conditions. On the bright side, the hospitals interior ornamentation of the hospital is very unique and inspiring. The interior is decorated in strong vivid colours and various details are enhanced making the standardised building seem tailored.

We had an appointment with Lise Nordqvist a Nurse of the Oncology Section, so from the large open lobby space we took the lift to the 24th floor of the building. The lift ride seemed like a journey in itself; luckily the lift was furnished with a small folding chair for the tired student or patient.

ill. 015. The open lobby area at Herlev Hopsital

Arriving at the Oncology Section everything was still defined by intense colours on the walls. We sat down in the waiting area next to a patient reading his newspaper. The waiting area was part of the characteristic corridor that turned into the ward areas.
Lise Nordqvist took us round the section where we met two old ladies sharing a ward. With our initiating interest in life stages in relation to hospitals we asked the two ladies about their experience of the ward and their hospital stay.

>>It is what it is<< one of the ladies answered perkily.

She had obviously grown accustomed to the fact that hospitals would not change to the better in her lifetime. Both ladies gave the expression that it was nice to share a ward -

>>not to lie there alone<< as one of them said.

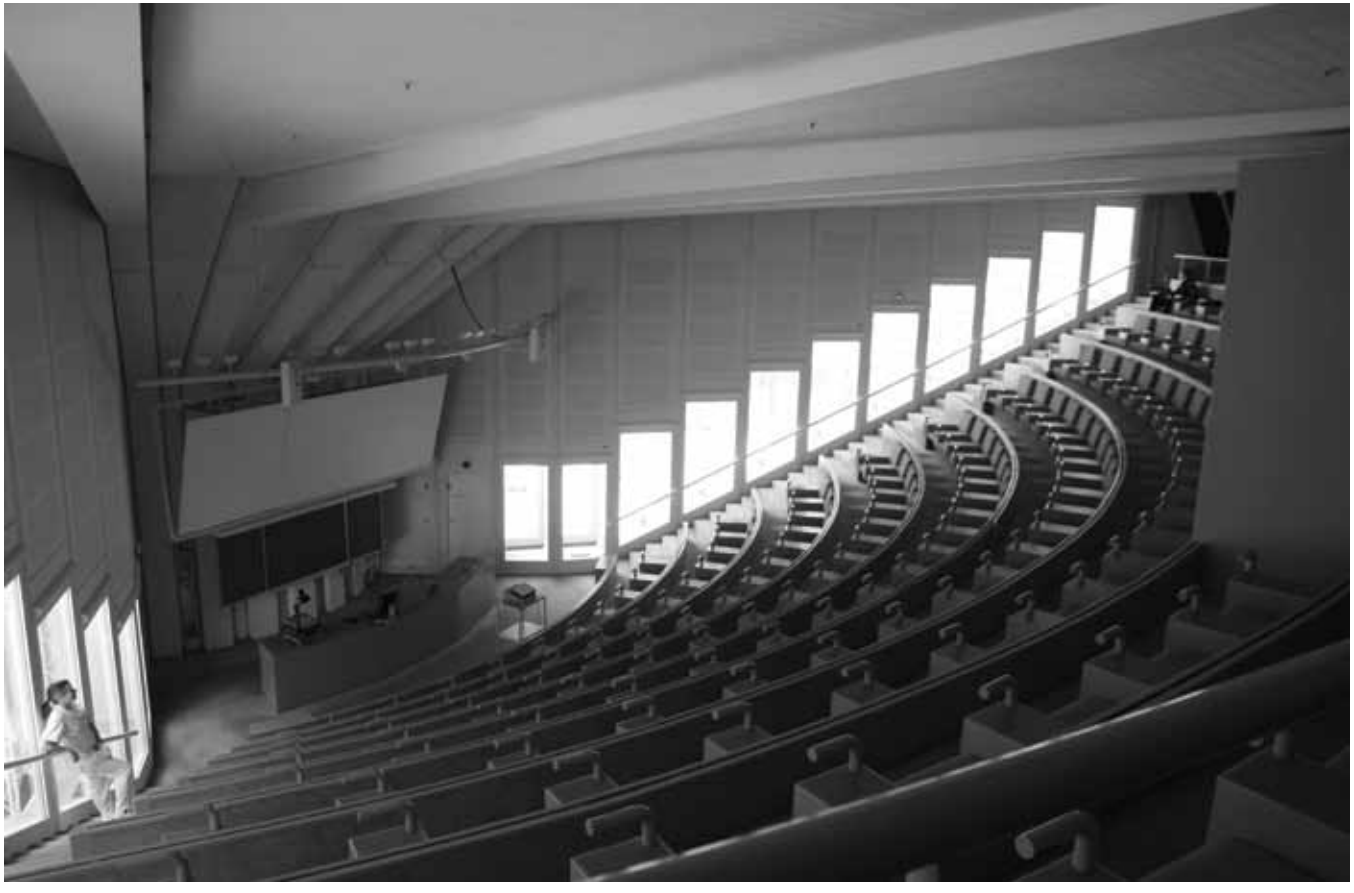
Continuing our stroll around the section we talked to Lise Nordqvist about her experience of the hospital from a staff point of view. We discussed the different problems of noise and light. The concern was that the corridors and office areas had the same amount of artificial light 24 hours a day and that it wasn't possible to know the difference between night and day. As for noise it was obvious that much of the noise was caused by call system in the wards and by people. Lise Nordqvist showed us the staff's office space and suddenly all the other nurses and doctors became interested in what we were working on. They were about eight in the office at the time and they told us that sometimes they would be fifteen working there at the same time. It was clear to us that the noise level was too high and with the open doors the noise could spread into patient areas. When we measured the level with a decibel measure we got the same noise level as when we tested the equipment in a bus surrounded by traffic noise, about 75 db.

ill. 016. Reception at Hemathology section at Herlev Hospital

ill. 017. A teenager making a phone call in the distant corner.

We went back down to the lobby to observe the life while waiting for our next appointment. On our way to the auditorium we observed a young blue haired girl sitting on the floor in corner talking on her cell phone. In the large reception area this was where she found a private space to make a call.

The auditorium was an architectural experience, entering it felt like leaving the hospital. With its deep red coloured seats and curved shape, the spaces had an uplifting atmosphere. Thus having experienced the wards, which in our opinion should be of highest priority when designing a hospital it seemed as if more energy had been spent on the design of this auditorium and the reception areas.
At the end of our stay, leaving the hospital we thought of ways to design the areas where the patients spend most of the time, so that they become just as welcoming and uplifting in atmosphere.



ill. 018. Spatial perception in the auditorium at Herlev Hospital

>>The auditorium was an architectural experience, entering the space felt like leaving the hospital. <<

RIKSHOSPITALET OSLO

ill. 019. Internal street at Rikshospitalet in Oslo.

After having visited Herlev Hospital our research trip continued in Oslo where we started out by visiting Rikshospitalet in Oslo. The main purpose of the trip to Oslo was to study more recently built hospitals. Our contact at the hospital Ragnhild Hals, whom we had met at the conference in Copenhagen invited us into the youth common space for a small talk about children and adolescents in the hospital.
Being in the youth common space we started out talking about the offers available for the young in the hospital. She told us about the initiative Youth café, a place for the young open every Monday for some hours. The problem was just that the young are not in the café, since communication between the different sections is poor, due to the fact that the young stay around the entire hospital.
Ragnhild Hals shared her perspective:

>>For the café to be a success a change of attitude toward the café offer is necessary. The staff of the different units, must understand what the café initiative can do for the young<< she said.

Then Ragnhild told us about their thoughts on having a youth unit for the whole hospital gathering different medical areas.
>>The doctors are against the idea<< she explained. It is a logistic problem for the doctors, who want the patients with the same illnesses gathered in one unit. Ragnhild Hals would like to gather the young in one unit for them to enjoy the company of each other.
Having discussed different aspects, of the hospital and youth with Ragnhild, she took us on a tour round the hospital.

ill. 020. The common youth space at Rikshospitalet in Oslo

ill. 021. Ward inhabit by a young patient.

She showed us the large auditorium and told us that it is used as a movie theatre and stage for stand up shows for the young. One of the big problems of the auditorium is that there is no space for beds and no lift for the weaker of the patients. Furthermore it would be great with a separated space for the infection-endangered patients.

The lack of a dynamic common room for children and adolescents, which is always open and is not used by any other patients, is really missing. The common room must encourage the informal meeting of the young. We continued talking about how a common space for young patients should be designed. One example is that it should be designed as a part of the flow, something the patient will experience naturally without searching for it.

>>The staff need a greater understanding of Youth Care, in the same way focus is on Child Care. Nowadays the young are accommondated according to their illness, thus making it difficult the create an adolescent platform<< Ragnhild Hals commented as we left the hospital.

ill. 022. Spatial perception of the auditorium at Rikshospitalet in Oslo

>>One of the big problems of the auditorium is that there is no space for beds and no elevator for the weaker of the patients.<<

RADIUM HOSPITAL OSLO

ill. 023. Spatial perception of treatment bath.

From Oslo University Hospital we went by “Helseexpressen” to Radium Hospitalet where Thora Kollenborg, the hospital`s social educator, met us.

We started out by telling Thora about our project while she showed us round the hospital. Radium Hospital is a compound hospital that has been developed over decades. Walking from building to building to building we experienced the history of the hospital.
We walked through the changing corridors of the hospital almost losing our way when Thora showed us the treatment bath, a pool for different kinds of therapy, with an open facade facing the arrival area of the hospital. The bath space was light and open and had a characteristic structure, which created a calm atmosphere.

Suddenly we ran into a man that we had met at the conference in Copenhagen, Hans Sverre Hansen-Gaard. It turned out that he was a former youth patient and that he would like to walk round with us and share his perspectives. Thora and Hans showed us the “Sensory space”, an intimate space with a massage chair, music rhythm chair[2], moving light and bright furniture.

>>Something that has to do with quality of life<<. Thora said and continued:

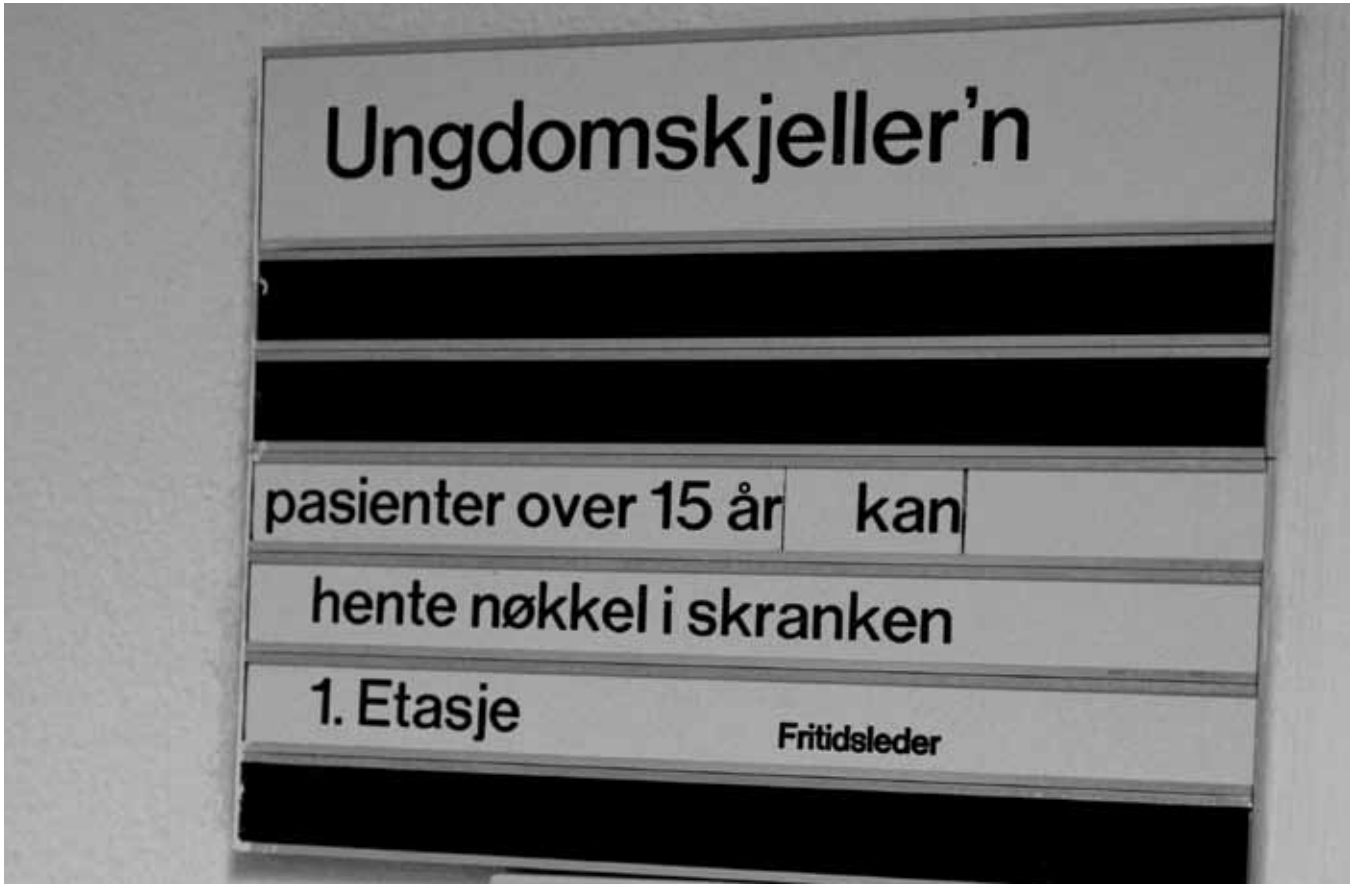
>>it is a space that can be used for many purposes and for conversation<<.

ill. 024. Testing the sensory space at Radium Hospital in Oslo.

>>Something that has to do with quality of life<<

YOUTH BASEMENT

Later they showed us the small demonstration kitchen and told us about how they used food as an approach to reach the young.
Hans Sverre Hansen-Gaard continued showing us the basement of the hospital where the youth common space is situated. “Ungdoms kjelleren” as it is called. The idea of the space is that the young patient from the age of 15. can pick up a key and use the space. But no one uses it yet, probably because it is hidden in the basement.



ill. 025. Sign by the entrance of the common space.

By the end of our tour Hans Sverre Hansen-Gaard tells us that he is interested in architecture and that he has some ideas that he would like to tell us about. We all sit down in Thora´s office and Hans starts sketching. Views from the wards are missing –or you only have a view of surroundings but not of the life in the building, the ward is completely blocked from the corridor so it's only possible to hear what is going on.

>>The idea of the space is that the young patient over 15 can pick up a key and use the space. But no one uses it yet probably because it's hidden in the basement<<.

ill. 026. Hans Sverre Hansen-Gaard, a former cancer patient sketching his ideas.

AKERHUS UNIVERSITY HOSPITAL, OSLO

ill. 027. Internal street in Akershus University Hospital

The next research point of our Oslo study trip was Akerhus University hospital also called Ahus, the most recently built hospital project (on our tour).

At Akershus University Hospital we had an appointment with Monica Hornborg, a Nurse of the Children and Youth Clinic.
Monica met us at the main entrance of the large hospital complex from where we walked down the internal street of the building to the opposite end of the building where the independent children and youth clinic is situated.

The internal street of the hospital was an inviting space with a warm atmosphere created by the materiality, niches and green elements. A large space, experienced as humane and pleasant with various places to sit down and rest. On arriving at the children and youth clinic we were met by a reception with a waiting area that opened up into an open air garden with a playground. On the opposite side of the desk was a independent entrance only for the clinic.

ill. 028. Children and youth clinic reception area.

ill. 029. Ward at Akerhus University Hospital

WARDS

Monica showed us round the clinic where we started out by looking into a ward. It was a two bed with displaced square windows that made the space feel bright and inviting The ward had wooden closets with a built in shared dining table that didn't seem very functional.
While we were in the ward with Monica one of the doctors asked us about our project and she started sharing her own perspective.

>>These built-in dining tables are already broken in most of the wards because people think they can sit on them so we must have them changed<< she said

She continued showing us the screen in the ward. Each patient has their own flexible screen which functions as both Internet browser and television.

ill. 031. Closet in the ward.

ill. 030. Testing multi screen in the ward.

TRANSPORT

We continued looking round the section and as we were on our way back to the entrance area we experienced one of the automatic transport wagons. We didn't expect this wagon to be on its own on its way to the lift. So we wanted to know more, and Monica told us about the system and took us down to the basement of the hospital where all these robots were. We tried to step in front of one of them, it stopped and said

>>automatic transport, please step aside<<.

The automatic transport system made us reflect on the future and how our own design could reflect the present but also be ready for the future.

ill. 032. Automatic transport wagon on its way to the elevator.

LONDON UNIVERSITY HOSPITAL

ill. 033. Meeting room without daylight at Unversity College Hospital London.

At the conference in Copenhagen we had made an appointment to visit Dr Deborah Christie and the Child and Adolescent Psychological Services at University College Hospital in London

We met Deborah in the reception area from where she took us around the facilities of the adolescents unit. Experiencing the differences between the hospitals in Oslo, Copenhagen and this section made a great impression on us. One of the most interesting experiences at University College Hospital was the 5-bed patients ward, where the young were hospitalised. These wards were not a separate space, but could be described as a bay of the internal corridor towards the facades of the building. Having experienced wards in Denmark and Norway this open ward seemed quite different and almost unreasonable to us. We almost missed a young guy lying next to the window in the large space and started taking photos. Peace and privacy was hard to find in the section, but on the other hand the arrangement allowed the patient to follow the “activities” of the internal street of the unit.

ill. 034. Collage made by a young patient.

All wards, common spaces and school facilities faced the façade and were thus greatly day lit but unfortunately all the office areas and conversation rooms had no daylight.
Because of the arrangement of the 5 bed wards it was clear that there was no space for relatives to stay close to the patient and maybe spend the night, so we asked Deborah about relatives staying in the ward. In Oslo we had been told that in Norway it is a patient´s right up until the age of 18 to have a relative staying with them. Deborah answered:

>>Well they can get accommondation on another floor but we recommend they go home.<<

On our way out of the section we passed a work of art on the wall of the corridor. It was a collage made by a young patient. It was clearly a reflection of what was going on in this young mind while being hospitalized. Centrally in the fragmented picture was a handwritten text >>where is the sun?<< and inside the collage were texts saying; like Mother like Daughter, fire, personal, man, gangster, love, lies, shops, cosmetics, surgery. The description of the collage said

>>I collaged my thoughts of today's issues and things that interest me. <<

The work of art made us reflect on how the environment of the Dedicated Youth Hospital could be designed so that it would be easier to see the sun litterally speaking.

ill. 035. Learning section at University College Hospital London.

CONFERENCE LONDON

CREATING SUSTAINABLE HEALTH CARE BUILDINGS

After the visit at University College Hospital we went to the conference Capital Health –Creating Sustainable Health Care Buildings at New London Architecture, the Centre for London's built environment.
The introduction at the conference was that "Health care buildings should be well-designed, sustainable, safe, healthy and productive whilst providing a quality internal environment to support health and well-being for users". Focus at the conference was on current trends and recently completed projects with the purpose to share the lessons of designing and building in the health care sector. NLA had invited key designers and manufacturers to share their knowledge about sustainability in Health Care Architecture.
Not all of the lectures were relevant for us but it was really interesting to hear some of the designers speak about their approach to health care architecture.
For example Ben Gibson the architect behind Kentish Tower Health Care Centre. He talked about how they used workshops in the process of getting inputs from different parties. He shared some of the focus points of the project being: informal seating, secret gardens, and graphics for way finding.
One of the special things about the project was that graphics, branding and identity had been a large part of developing the architecture.
The following lecture was a product presentation by David Sauders, about Nora Materials for health care. He presented a rubber flooring product for hospitals that had a dense surface, was resistant to chemicals, antistatic and in comparison with PVC and linoleum had far better material properties.
Nick Durham from Nightingale associates spoke about one of their health care projects and about their methods.

>>It is important to find the best design champions and let them feed the project in the process<< he said.

He also stated that it was vital to be experimenting in the process and test ideas.

>>If so, hospitals could be enjoyable places.<<

Some of the focus points in their projects were social spaces for rehabilitation and therapy and how works of art could promote a sense of belonging to a space. The conference gave us new input. Especially the focus upon some sort of user involvement in the process, as a method in architecture was appealing to us.

ill. 036. Auditorium during the conference at the building centre, New London Architecture

>>It is important to find the best design champi-ons -and let them feed the project in the process<<.

AARHUS UNIVERSITY HOSPITAL

SECTION OF YOUTH CARE

As earlier mentioned we met Nuka Hove and her colleagues from Aarhus University Hospital, at the conference in Copenhagen. Having read their book describing the project Youth Wards, we knew that it would be relevant for our research to visit their Section of Youth Care at the Department of Oncology, Aarhus University Hospital. The Section of Youth Care of the Department of Oncology, Aarhus University Hospital is a 5-day section for patients aged 15-21.

Arriving at the section on a Monday before the patients had arrived we were welcomed and asked to look around. Surprised by the openness we were met by. Having experienced different sections at various hospitals this was clearly different, in a positive way. It was clear to us that this part of the hospital was untraditional and managed in a different way.

>>It is important to focus on youth and not that they are sick, medically treated like grown ups but not handled like grown ups<< Nuka Hove commented.

The youth wards had been developed through the project "Youth with cancer" where the interior in two existing wards had been changed to accommodate the young according to a survey carried out in the section. Furthermore some of the common space was turned into a youth corner. The wards got changed to have warm colours, better furniture, and pictures on the walls, curtains and TV, video and games in the social corner. The question of single or multi bed wards popped up as we entered the ward. Nuka Hove and Else Mathissen shared their views with us through an informal discussion in one of the two youth wards.

>>The patients become lonely when lying here alone- three patients wards would be a distinct preference - thus the visual contact is crucial << Else Mathissen said.

>>The youth want the door to the ward open to have contact with activities in the youth section<< Nuka Hove said to clarify their shared point of view.

ill. 037. "Youth Wards" neon sign, a decoration in the youth section.

>>Important to take basis in the youth and not that they are sick, medically treated like grown ups but not handled like grown ups<<

>>Will he be in a ward with a patient his own age? – Because you know it means something for how he feels.<<

Nuka Hove continued talking about the organisation of the wards

>>Three bed wards is preferrable, two bed wards can be problematic, because one can feel obliged to make conversation whereas single bed wards can create a feeling of loneliness for the young patient. Different wards would be favourable; three bed wards, single bed wards and flexible spaces. Young patients will have had their children diseases and are therefore not isolated so often.<<

Another thing that we questioned was the definition of youth in the section. Nuka Hove and Else Mathissen told us that the age limit had been set at 22 because when older people move into other groups, getting children of their own and thereby reach another stage in their life.
While Nuka Hova was telling us a story about a former patient, the TV was on in the ward. Nik and Jays music video Boig Boing caught our attention "...the night is young and, the girl is beautiful – Got all my homies here, the beat is dope..."
The lyric reminded us of the young lifestyle. Moments later a young guy entered the ward. Again we experienced the openness as the two nurses welcomed the young patient, asking about his weekend and telling him about us and that we would like to have a chat with him later.
The young guy, Frederik, is 19 years old – turning 20 the next day – and he is a cancer patient in the Section of Oncology.
A few minutes later Frederiks mother entered the ward as well. She was concerned with the birthday planning. Frederik's girlfriend and friends from school were coming to the hospital to celebrate with him.
Frederik left the ward to go for blood tests and Nuka Hove continued with her story about a former patient with the quote;

>>Sorry! I can´t be in for treatment - I am in the middle of getting my driver´s licence<<.

The story shows that it is important for the young patient to stay normal and continue doing the things that are important besides the illness as far it its possible.
In the hall we overheard a talk between the father of a patient and a nurse.

>>Will he be in a ward with a patient of his own age? – Because you know it means something for how he feels<< he asked. The youth issue clearly concerns the young patients relatives as well as the youngsters

Chat with Frederik -19 years old.

Later that afternoon we had a talk with the 19-year-old Frederik.
We started out by asking Frederik about things he misses while staying in the hospital.

>>I brought my own PlayStation, It is to boring to lie there and look into a wall all week,<< he answered.

Then we asked Frederik to tell us what comes to his mind.

>>it is lonely here – because you rarely get out of the ward,<< he replied.

How do you feel about sharing the ward?
>>It is cool when you are two in a ward as long it's not five. It is lonely with your own room<<

>>My friends often come to visit,<< Frederik says and proposes to have a small kitchen that the patients in the ward can control themselves.

>>When I don't feel well I eat junk food because of the chemotherapy. It would be nice to have a microwave and a small fridge,<< he says.

Furthermore he suggests a calendar that makes it possible to find out who is in the section at what time as a social motivation.
Fredrik describes good and bad things; he mentions that noise can be a problem during the night. The different routines, someone has to go to the toilet, noise from medical equipment etc. as a problem but not during the day.

>>During the night it would be nice to have a single ward,<< he tells us.

ill. 038. Frederik telling us his story.

>>The conversation box is empty after an hour if you stay in a ward with someone who is fifty years old.<<

quote from Frederik

Chat with Nikolaj -19 years old.

We started out by asking Nikolaj about what he thinks of the youth section

>>It is nice with the warm colours in the ward<<

I have been in all sorts of wards all very sterile –but this is different and a bit more homely. He continues

>>it is important with room height also in bathrooms so that you can have your drop stand with you easily<<.

We asked him how the he feels about sharing the ward and he answered that two persons sharing a ward is nice.

>>It is important to share experiences and knowledge while hospitalised<<

Just to talk to someone who feels illness on her or his own body and therefore can relate is a good thing. Nikolaj mentioned an example of Ice tea which apparently can make you feel better when your mouth dries as a reaction to the medical treatment. Nikolaj proposed that it should be possible to have friend staying over night. He lives 4 hours from the hospital and therefore his friends have to travel to spend time with him.

Nikolaj gave the impression that he is very glad that he is sharing a ward with Frederik, at the moment and he commented

>>The conversation suitcase is emptied after an hour if you stay in a ward with someone who is fifty years!<<.

ill. 039. A humouristic moment during the chat with Nikolaj.

We asked Nikolaj how it works out when you have to share the ward with another young patient Nikolaj simply answered

>>You are concerned about others when you are a patient here.<<

We asked Nikolaj about leisure areas such as the youth corner and he answered that it would be nice with a greater extent of visual contact to common spaces.

>>A mini cinema and flat screens could be cool! But maybe that is luxury<<.

We asked Nikolaj about views and activities, he tells us that he is a former elitist swimmer and would therefore dislike to have a view of a park area where other young healthy people could hang out and do sports, it would be a mood killer and I would feel sad that I could not participate.

After the chat with two patients we sit down and talk with Pia Riis Olsen, clinical specialist nurse and PhD in network s of young patients.
Pia started the conversation by sharing her perspective on our thesis topic;

>>Activities and knowledge depend on a patient basis. One always talk about `children and youth` as a group but the young should have their own stage<<.

She continued, >>it is important to have a human approach to the patient, his relations and network as the centre of attention<<. Pia Riis Olsen used the term emerging adulthood and describes that you have to give the young person an independent space to make it possible to develop from child to adult. She clarifies by saying

>>Young patients are in lack of a solid platform – a social standpoint while hospitalised<<.

>>In fact the hospital could be split up according to stages of life and not medical specialities<<.

The thought of our youth hospital becoming a test for a new type of hospital organisation came to mind.

ill. 040. Frederik watching tv in the youth ward while Nikolaj is having blood tests taken.

Pia continued;

>>The fact that the young learn how to adjust does not mean that they are met in their needs<<

we discussed the logistics and the change of routines when organising the hospital differently and she says that many things will be different in the future with the development of new technologies >>some of the treatment will take placevia a interactive screen<<.
Furthermore Pia told us about her project >>the hospital is a frame for network, sick and relatives<<. In England they have a Youth Oncology education for nurses to train staff dedicated for handling the young.

>>It is crucial to think the young forward in life and not backwards<<

Pia explained that it is important to implement involvement of social network around the young patient.

>>The young reflect themselves in each other<<.

Pia tells us that there is evidence to the fact that persons between 15-40 years of age have some different types of cancer which are harder to treat right. The cancer cells are different with this age group and it is not evident that professional knowledge can be transferred to the young body. There are relatively few young patients so in fact there should be international investigations to create evidence in the area.

>>research and knowledge must be gathered in one place. One has to dedicate oneself to treating the young body – because evidence tells us that survival falls in the age group of 15-40<<.

Pia changed the topic and said, ***>>In relation to your project this also has to do with making qualitative studies of what the physical environment does to the patient<<*** The patients must be involved.
It was very interesting for us to experience the youth wards and talk to some of the young patients especially listening to their requests for a future hospital environment.

>>Young patients lacks a solid platform – a social standpoint while hospitalised. <<

VISIT FROM ROGER ULRICH

ill. 041. Roger Ulrich sharing his perspective.

SUPERVISION

Having finished our initiating program based on our studies we were privileged as to have professor Roger Ulrich from Texas University visit in the studio. Roger Ulrich is an acknowledged international expert in Evidence Based Health Care Design.
We had a personal supervision session with Dr Roger Ulrich, where we briefly introduced our project to him and had a chance to discuss the specific project but also more general issues concerning health care architecture.

Since our analysis had taken us in a direction where we no longer thought that single patient wards were the only right answer to the design of a hospital environment, and we knew that Roger S. Ulrich is a passionate advocate of exactly the single patient ward, we found it interesting to have a discussion about the future wards with him. The discussion went back and forth and Roger Ulrich mentioned some of the main advantages of choosing a single patient ward such as safety and family presence. He also mentioned examples of social analysis made on young university students to prove the point that you can't force a social behavior. Being aware of the above, we still believed in our studies mainly based on our own experience visiting the youth section in Aarhus, where a young patient described the course of his disease and told us that most of the time he wouldn't have the energy to get up and go to a common social space. Consequently the ward should facilitate a social solidarity for the patient not to feel lonely.

LECTURE

The day after we went to a lecture by Roger Ulrich on Evidence Based Health Care Design.
He started out by describing the method of using the current best evidence for making decisions in a project and make individual projects together with an informed client.

Roger Ulrich continued talking about the evidence base for health care that now holds more than 2000 studies, linking physical environment to outcomes that improves Patient safety, other patient outcomes (pain, length of stay etc), staff outcomes, overall health care quality and financial performance.

It is about making long-term considerations and by saying that he meant providing single patient rooms with the purpose to increase privacy and facilitate communication and family presence, avoid sleep fragmentation, avoid MRSA transmission mechanisms, infections and surface based contact spread.

Another important topic within health care architecture and planning that he focused on in his lecture was nurse travel.

>>The architectural task is to look upon the effects of floor layouts on nurse travel.<<

He mentioned a few important factors; to have decentralised supply storage, to localise nurse to decrease the travel distance and improve care time received by each patient, nurses should have good visual contact with patients.

In continuation he talked about safety and the importance of family presence; evidence shows that family presence equals safety. Also the organisation of spaces is important when considering safety, thus a short handrail-assisted walk to the toilet equal fewer falls as well as toilet placed near bed equals less falls.

Roger also described the large evidence base concerning light in relation to physical environment outcomes. Light reduces depression, improves emotional well being, can alleviate pain and thereby result in a shorter hospital stay.
The last thing that he chose to go into during his lecture was way finding in hospitals.
He introduced by stating

>>It´s not about signs. Way finding is 80% architecture<<

Way finding, where am I? How do you find your way from a to b. It is about giving directions through the architecture.
He had brought some graphics made from tests where they had tracked people's way finding in two buildings, a good and a bad example. In the bad example the persons in the test got lost trying to get from a to b whereas in the good example only a few persons took a small detour but reached the destination quickly.

EVALUATION

ill. 042. Initial sketching in the studio based on our experiences.

Seen in retrospect there is no doubt that these experiences from the first part of our thesis have been crucial for the outcome of our thesis.
We have searched with the aim to understand the life in the Hospital an architectural frame. Because the hospital is a complex size we have focussed upon becoming acquainted with the young patients and staff and based our approach on their needs and requests. We are sure that these needs are nowhere written and this booklet is hereby our documentation of tendencies within the hospital that maybe one day can become evidence.

PREFACE

This second part of the thesis project Dedicated Youth Hospital presents and documents our studies carried out based on the previous experiences, research, and analysis of specifically chosen themes. This being contextual studies, healing architecture, sociological review and more technical aspects such as, light, acoustics, and safety. Furthermore this part of the project report contains case studies of various projects related to tour specific challenge of designing a Dedicated Youth Hospital

All the above in order to form design criteria and a vision as a foundation for the further development of the Dedicated Youth Hospital.

MOTIVATION

>>Youth between two chairs<<

Being young the feeling of being between two chairs often occurs. In some situations you are very grown-up, but in others, you are back to being a child dependent on the help from parents and surroundings. On the one hand young people are in the middle of emancipation from their parents, and on their way to creating an identity of their own. On the other hand, as a patient with a serious illness, young people become extremely dependent on their surroundings and have to cope with a whole new life style.

Initially sparked by the planned erection of new super hospitals in Denmark, within the next twenty years, research has revealed that the young people are a neglected and disregarded patient group. The interest for change is evident in the field of medicine, were nurses and doctors are focussed on treating the young differently - but can architecture follow this development? Working with future hospitals, there is an obvious potential and challenge in incorporating the needs of youth in a dedicated hospital design.

So how can the contradiction between the spontaneous lifestyle of youth, and a period of lost identity, personality and control over your own life be eased? Creating space that reaches out and frame the fact that life is hard when hospitalized, and still have empathy for the sick youngster`s sense of hopelessness, architecture can become a healing aspect for the mental well being of the young patients.

Thus, in proposing a hospital design, that includes humanity and considers the sensory aspects of a healing process, it is our goal and motivation to initiate a discussion of how to plan and design the new super hospitals of Denmark within the next 20 years.

ill. 043. A feeling.

METHODS

>>When dealing with the complexity of Health Care design it is important to find the best "Design champions", doctors, nurses, patients etc. that can feed the project in the process<<

Quote Nick Dunham, Nightingale Associate Architects

INTEGRATED DESIGN PROCESS

The method utilized in this Master Thesis project, is The Integrated Design Process (IDP). It contains four project phases:

- Program phase
- Sketching phase
- Synthesis phase
- Presentation phase

The method utilized is focused on architectural strategies for developing form in correlation with technical principles and systems. This means working with architectural design, functional aspects, light, acoustics, and structural systems in unison, by mixing the two disciplines in an integrated design process through several iterations.

USER INVOLVEMENT
The basis of the program phase is created by user involvement, surveys, empiric compilation at conferences and research trips. The challenge of designing a Dedicated Youth Hospital environment has not been designed before, thus it is essential to seek appropriate information.

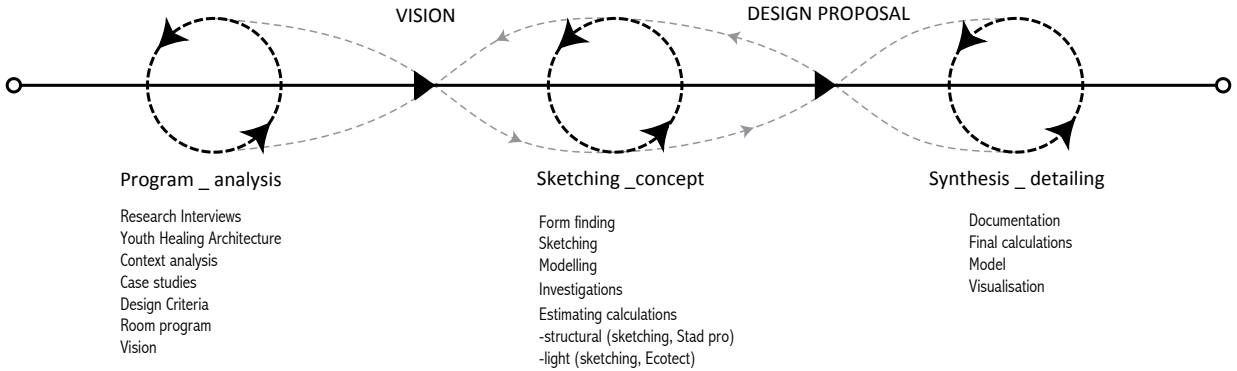
The aim is to have different parties of interest feeding the process, with relevant information and views on various issues related to Health Care Architecture and youth *>>When dealing with the complexity of Health Care design it is important to find the best "design champions", doctors, nurses, patients etc. that can feed the project in the process<<*
Quote Nick Dunham, Nightingale Associate Architects [Capital Health, Creating Sustainable Health Care buildings conference].
The method of having "public" involvement in the project period is expressed through the project webpage www.youthhealingarchitecture.dk that serves as a public process presentation which makes it possible for interested parties to follow the development of the project, comment on it in the process and express recommendations.

EVIDENCE/TENDENCY

The method of Evidence Based Health Care Design will applied to the degree it is found relevant to the specific task of designing a Dedicated Youth Hospital. Evidence Based Design is an approach to healthcare architecture and design that focuses on how the physical environment can impact the patient health, well-being, mood, and safety, as well as staff stress and safety. Evidence Based Design is the process of taking decisions about the built environment based on convincing research.
We look upon Evidence Based Design as a foundation that gives you a set of guidelines, not as an infinite design tool that will help you reach a healing architecture. This in correlation with the fact that there is little specific research based on youth in hospital environments available, the project cannot be evidence based only. Thus our focus in this project is on identifying tendencies present for the youth in hospital environments. These tendencies are ascribed a value from the optics that they may be evidence in the future.

SUB CONCLUSION

The idea is to combine the methods of Integrated Design, User Involvement, Evidence Based Health Care Design with our vision to set the young patient in focus.
Integrated design method will help us ensure that both technical and aesthetic parameters of the project are solved in unison. User involvement will create an understanding of the life that takes place around youth in hospitals. Evidence Based design will be applied to make sure that the safety level is high from the perspective of the young patient.



Integrated design method diagram.

ill. 044. Screenshots from our webpage.

CONTEXT

ill. 045. Skejby university hospital in relation to centre of Aarhus

INTRO

Our aim is for the project to contribute to the discussions on how future hospitals environments can be designed, thus we need to take into account the present direction within hospital architecture. Therefore we have chosen to take our point of departure in the first project in the row of five super hospitals that will be built in Denmark in the coming years. The New University Hospital in Skejby, situated outside Aarhus is going to be the first super hospital and thus is already being planned.
The idea is to take our approach in the project material for the proposed New University Hospital in Skejby and use it as a contextual frame for the design of the Dedicated Youth Hospital. In the following chapter the context is studied with the aim to set up a basis for working with the design of The Dedicated Youth Hospital.

CHARACTERISTICS

The project plot is a field outside Aarhus. The present context holds the existing Skejby University Hospital, designed by C. F. Møller architects built in 1994. The locality is characterized by industry and new buildings; mainly offices and dwellings arising everywhere. The future plan is that Aarhus University Hospital Skejby will be expanded to become one of the biggest hospitals in the Nordic countries, “The New University Hospital”
he project plan of the New University Hospital in Aarhus is the contextual frame of the Dedicated Youth Hospital. The New University Hospital is going to be the biggest hospital construction project in Danish history, and it will be built onto the existing building volumes of Aarhus University Hospital in Skejby, to form a large hospital complex. The aim is to incorporate The Dedicated Youth Hospital in this expansion.

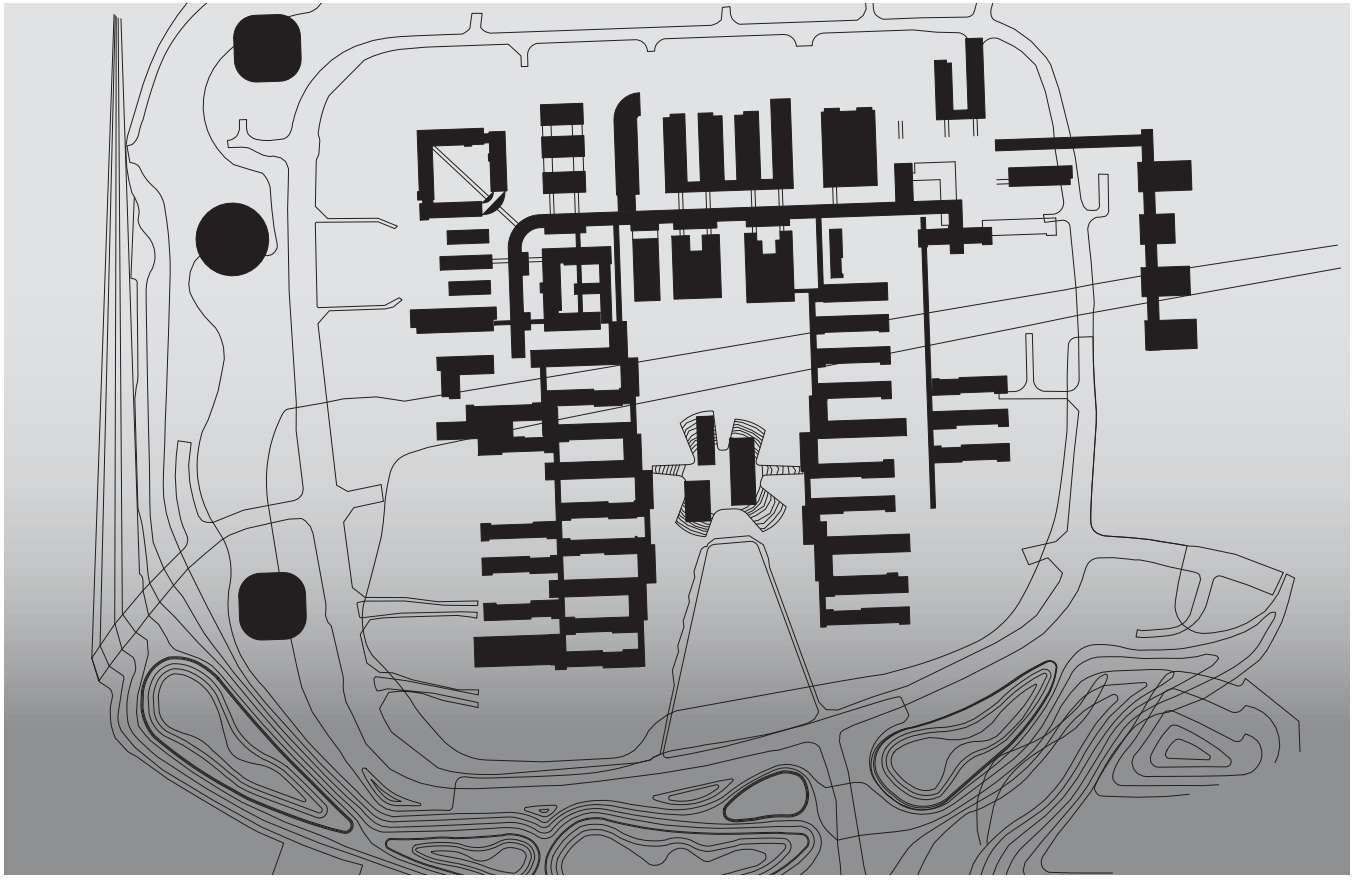
The area is situated on the periphery of the city centre of Aarhus and is surrounded by nature, woods and meadows. This may not be very attractive and appealing to the young who will be interested in commercial and cultural attractions in the city centre so there will be a challenge in reshaping a part of this area into an inspiring youth environment

ill. 046. Expansion frame for the future Skejby University Hospital

NEW UNIVERSITY HOSPITAL IN AARHUS

The future hospital will be the size of a Danish provincial town and this is reflected in the architectural idea behind the organisation and appearence. The hospital is organized like a town with a hierarchy of neighborhoods, streets, squares and green urban areas. [Tom Danielsen; C.F Moeller]

The New University Hospital is an example of the future super hospitals which are to evolve in Denmark over the coming years, to function as a university hospital, a regional centre and a basic hospital for citizens in the region. The complex of The New University Hopsital is furthermore able to expand both vertically and horisontally, however, the project team C. F. Møller among others mainly focus on horisontal expansion in order keep a harmonic human scale. [Project plan report]

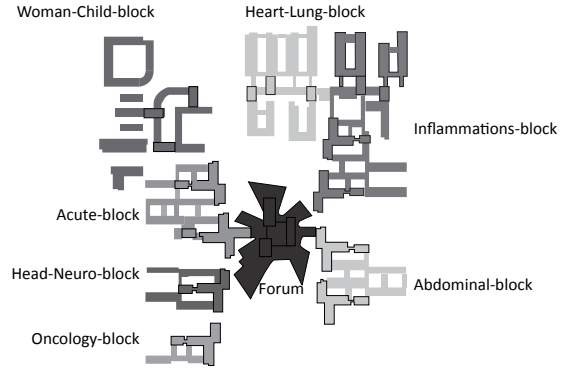


ill. 047. The New University Hospital in Skejby, Structure plan

The “town” is divided into 7 neighborhoods corresponding to 7 specialised fields with individual professional communities. The main entrance is in the centralized Forum that constitutes the town centre. From here arcades lead to the specialized sections that have decentralized entrances with a reception and lobby to meet the patients [Project plan report].

The project team behind the New University Hospital in Aarhus describes the hospital as being a place where the individual patient is in focus. [Project plan report] The aim of this thesis is to focus upon another kind of “Patient focus” based on the hospital being a living mechanism that reflects upon sociological tendencies.
Within the plan of The New University Hospital in Aarhus, a special house for Families with sick children has been designed. This family house is based on the fact that this specific user group has different needs than the other patients. The house will function as a temporary “home” for parents and family of the children hospitalised for long periods of time. The house will have communal spaces that will give families opportunity to meet and share their experiences and concerns. [Trygfonden]

With the Dedicated Youth Hospital the idea is to develop this initiative, where user groups are met in their special needs. The aim is to link the Dedicated Youth Hospital to the proposed structure of the New University Hospital in Aarhus, and at the same time let it be an example a new hospital typology.



ill. 048. Organisations diagram for New University Hospital, Skejby

ill. 049. Arcade in the New University Hospital, Skejby

ill. 050. Arrival area of existing Skejby University Hospital

ill. 051. Courtyard space in existing Skejby University Hospital

ACHITECTURAL EXPRESSION

The architectural expression of the New University Hospital is a homogeneous city structure shaped with basis in the scale and structure of the existing Skejby University Hospital. The buildings are designed as red brick buildings, as in the existing hospital, in the lower part of the complex containing treatment functions creating a foundation of the hospital city.
On top of the brick building base, white building volumes with characteristic green elements arise.
The building varies in floor numbers and bevels in the exterior expression. These building volumes contain the hospital ward sections and clinical office areas.

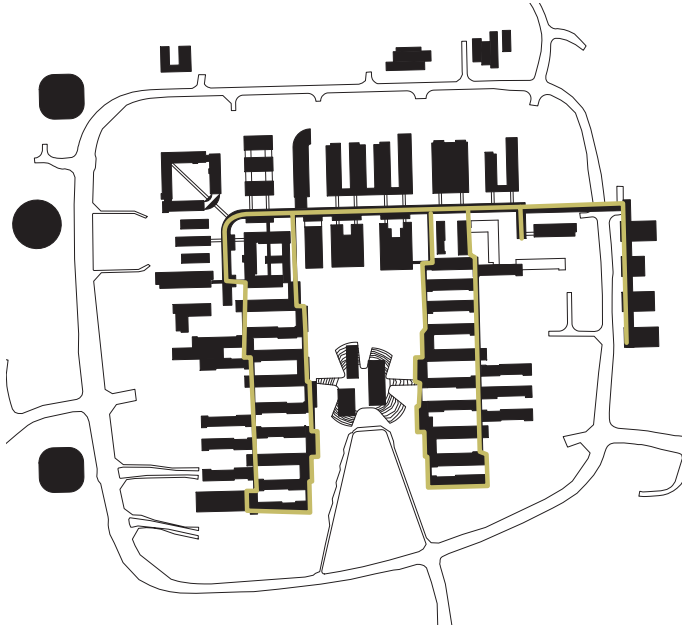
The centre of the city structure and park is Forum, which is characterized by white cubic shapes separated by green floors, creating a sculptural composition of the building. [Project plan report]

ill. 052. Visualisation of the New University Hospital Skejby by DNU project group.

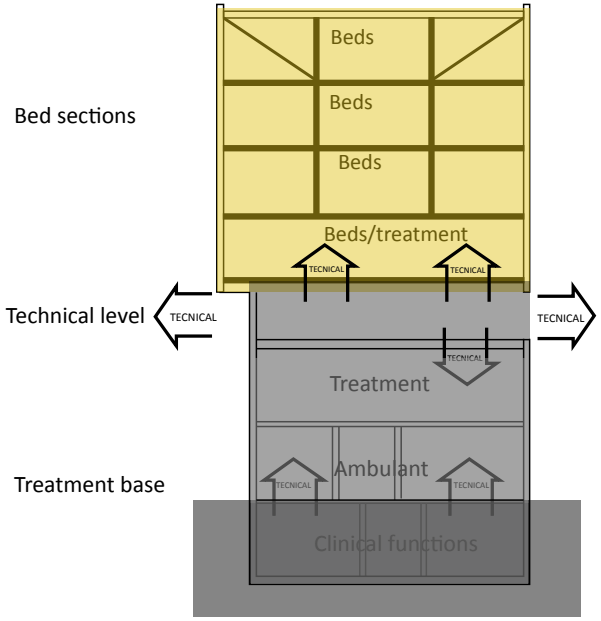
LOGISTICS

By choosing The New University Hospital as location for The Dedicated Youth Hospital it's not only about the characteristics of the site and the buildings. The idea is to design the Dedicated Youth Hospital so that it gets linked to the structure and logistics of the proposed hospital complex, as illustrated in the diagram.
Stock delivery and distribution happens via this network from the supply city situated outside the infrastructural ring around the hospital. The overall organization of the complex is that lower floors contain ambulant, treatment and clinical functions whereas bed sections are situated on the higher floors.

The main entrance of the hospital is, as earlier mentioned, located in the centralized Forum. From here internal arcades lead to specialized sections. [Project plan report] The aim is to integrate The Dedicated Youth Hospital in this system but design an independent expression, so that already on arrival the young patient feels accommodated.



ill. 053. Logistics diagram, based on the projekt material from C.F møller Arhitecs



ill. 054. Organisation diagram, based on the projekt material from C.F møller Arhitecs

CLIMATE

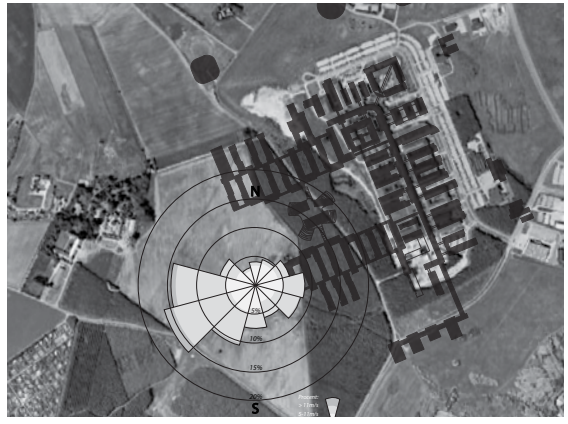
When designing the Dedicated Youth Hospital as part of The New University Hospital in Skejby it is important to consider the climate conditions of the site. These should influence the discussion of where to locate the Dedicated Youth Hospital in the form finding process.

WIND

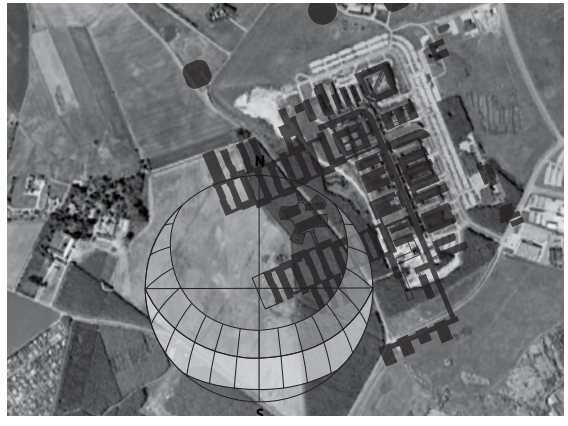
As seen on the wind rose applicable for the site, the dominant direction of the wind is west and southwest. The site is flat and open, with little wind slowing vegetation such as trees.
Since the Dedicated Youth Hospital is planned as an add-on to the east, the project site will be exposed to these western winds. The risk of turbulence on the lee side depends on the distance, and the connection, to the proposed hospital complex. This knowledge, of wind direction and turbulence possibility, must be integrated in the design: especially entrance areas, open air spaces, and natural ventilation.

SUN

When attaching the Dedicated Youth Hospital to the New University Hospital complex, the chosen location should also be considered according to the sun path and risk of shading. Placing the Dedicated Youth Hospital on the terrain as an independent building could result in shade from the taller hospital complex. If integrated into the hospital complex the possible shading from the new Dedicated Youth Hospital should be examined to reassure that daylight is intact or even improved.
Regarding sustainable solar initiatives shading from the west is to be preferred, as opposed to the east, to prevent afternoon overheating. During heating periods, the passive solar gain is most important before noon, thus towards east and south-eastern sunlight.



ill. 055. Dominating wind directions



ill. 056. Sun path diagram

LOCATION

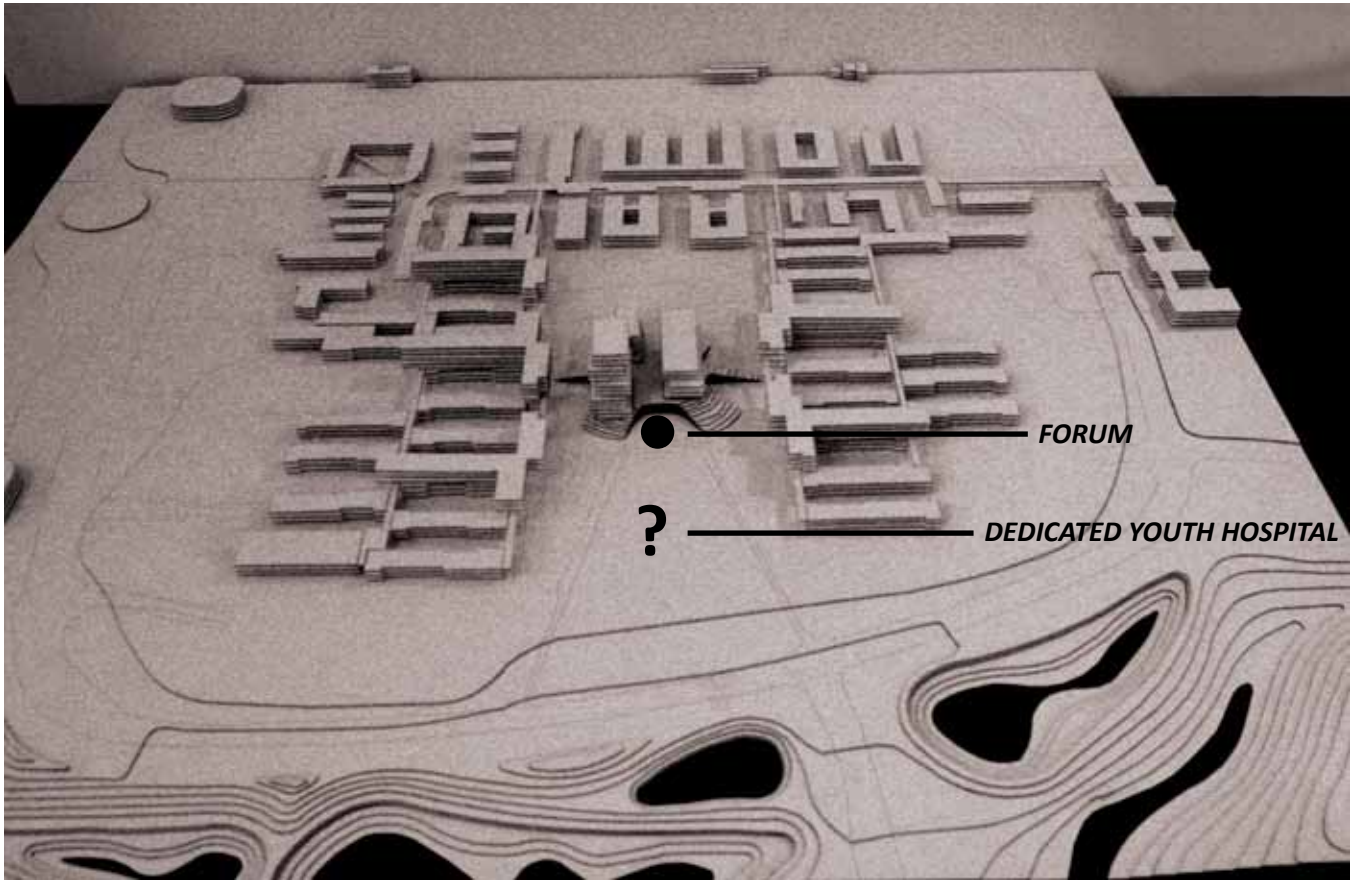
The location of the future Youth Hospital is chosen with basis in the proposed structure. The following factors are decisive for choosing the location of the Dedicated Youth Hospital.

• Accessibility, easy access to public transport, bus con nections etc.

• Visually, contact to university areas of the hospital, situ ated in forum.

• Attraction, the Dedicated Youth hospital may not be hidden away in the large complex but should be visually conspicuous in its location.

The Dedicated Youth Hospital will thus be situated near the main entrance, at the south west side of the large hospital city, in near connection to forum. Forum will become a place of activity, especially appealing to youth because young medicine students will have their daily routines here. The exact location of the youth hospital will be decided on the basis of the initial typology studies in the form finding process.



ill. 057. Model photo, contextual model based on the projekt material from C.F møller Arhitecs

SUB CONCLUSION

When choosing to design the Dedicated Youth Hospital as a part of the proposed super hospital project, The New University Hospital in Skejby, it is essential that the design is made based on the conditions, structure and logistics defined by The New University Hospital.
Furthermore it is important that the Dedicated Youth Hospital becomes conspicuous in the context of the large complex.

ill. 058. Project visualisation by C.F møller Arhitecs, arrival area.

ill. 059. Project visualisation by C.F møller Arhitecs.

ANALYSIS

ill. 060. Wall art by the artist Banksy.

INTRO

In order to create a basis for working with the challenge of designing the Dedicated Youth Hospital, various aspects related to youth in hospitals are studied.
The analysis will focus upon the situation around young people in hospital environments and more general aspects such as the sociological, sensory and phenomenological terms. These can contribute to an understanding of how the hospital could be designed to ease the healing process for the young patient. The outcome of the analysis will be a range of specific design criteria that will be decisive in the form finding process as a set of guidelines.

ill. 061.

YOUTH HEALING ARCHITECTURE

According to the research of healing architecture and the method of Evidence Based Design, evidence substantiates that architecture has the potential to contribute to a healing process. Since present healing environment based research is focused on patients in general; or only distinguished by disease, [Wagenaar a. m, 2006] this thesis sets out to investigate adolescents and the question if the hospital environment should be designed specifically to heal the young.
There is only one ”Section of Youth Care” nationwide, this section can have 15-20 patients in for treatment but only four at the same time [Ussing, 2010]. Various recent articles in Danish newspapers show that young patients tend to feel less ill when hospitalised with other young patients[Holze, 2010; Ussing, 2010; DR mangel på afdelinger]. Furthermore the need of new youth hospital sections is described. This is based on a new questionnaire survey carried out among 240 young patients at Copenhagen University Hospital. According to the survey´s preliminary results the majority of the young patients between 15-19 years have had no contact with other adolescents, and they would rather be hospitalised in a youth section if they had a choice. This is a problem, according to Doctor, PhD Kirsten Boisen from Youth Medicine Knowledge Center. “if you ask the young, their essential need is to be met as young people”[Holze, 2010].

According to Nuka Hove, Nurse at Department of Oncology, Section of Youth Care, young patients are different from patients in general because they do not socialise on command, they react spontaneously and differently from adults and children [Hove a. m, 2004]. The Section of Youth Care at Aarhus University Hospital has been converted into a youth environment based on a questionnaire survey and consists of youth wards and a social space. To emphasise familiarity and comfort, the organisation is based on an atmosphere like at home. [Hove a. m, 2004]
Focus on the young as a specific user group in relation to hospital environments can also be identified at Copenhagen University Hospital where a young dedicated social space, Café Hr. Berg, has been established. Café Hr. Berg is a refuge for hospitalized as well as ambulant young patients aged from 12-20 years. [Youth Medicine conference] It is a space that has the purpose of creating a place where the young patient can disconnect from illness and hospital. Furthermore a “Youth Medicine Knowledge Center” has been formed, to compile knowledge and to spread information about young patients and their specific needs. [Youth Medicine]

The challenge of designing a new physical environment that takes into consideration that young people are on their way to independence - suddenly life is put on stand-by and time gets characterised by despondency and few victories. The sudden dependence on the parents might be the reality, thus co-determination and independence is taken away. [Youth Medicine conference]
Furthermore architecture should facilitate the fact that the youth patient activity levels are highly variable and ranges in pattern of reaction from lying in a dark ward all day, to being physically able and wishing to actively unfold. [Experiences; Engel, Frier]

ill. 062. "Youth Wards" sign by the entrance area of the Youth Oncology section at Aarhus University Hospital.

SUB CONCLUSION

The previous examples indicate that youth is a significant group also in relation to hospitals and that there is a need for dedicated environments. The general health environment evidence is of course also valid when focusing on young patients. Besides to create a frame that will encourage social relations, and activity areas that will inspire movement and optimism. Our thesis will therefore incorporate both general evidence for health environments along with tendencies identified for young patients in particular.

HEALING BY ARCHITECTURE

INTRO

With regards to hospital architecture in general, the most essential question to pose is how can architecture contribute to a healing process. The question touches upon the essence of architecture, the fact that there are much more fundamental issues to be solved than the visual aesthetic appearance of the building. In relation to hospital architecture it has been proved that a deliberate work with space and shape can contribute to healing hospitalised patients. The aim is to put the human being in focus and implicate him in an architecture that stimulates the senses and constitute an important element in a healing process. [Frandsen a. m; 2009]. Throughout the last decades hospitals have primarily been looked upon as medical machines, industrial and rational public buildings, where architecture has more or less been identical with the building system, trying to make a more efficient hospital service [Heslet a.m. 2007]. The medical treatment of the patient is in focus, but the actual patient`s well-being and healing progress is left out. In the following chapter we explore the term “Architecture as medicine”. Focus in the following is on:

- Evidence based healthcare design
- Phenomenology
- Sensory aspects

to understand what should influence the design of the Dedicated Youth Hospital and try to define parameters of the architectural quality.

ill. 063.

EVIDENCE BASED DESIGN

Healing architecture inspired a new design approach, which is generally referred to as Evidence Based Health Care Design. The idea of the approach is to apply knowledge on the health impacts of specific physical characteristics of designed spaces on patients, staff and visitors, as guiding principles in the design. It looks at the building not only as a physical space, but includes the total sensory environment of sight, sound, touch and smell. [Wagenaar a. m, 2006] According to Roger Ulrich who, together with Graig Zimring, reviewed more than 2,000 studies identifying and documenting the effects of physical environments, the Evidence Based Healthcare Design "Should be informed by the best available evidence, with the goal of improving safety, medical staff and financial outcomes" [Ulrich, 2006 p 281; Wagenaar a. m, 2006] Evidence Based Design focuses on patient safety, reduction of stress and ecological health [Wagenaar a. m, 2006] The research on healing environments can be divided into the following categories:

- Connection to nature.
- Options and choices.
- Positive distractions.
- Access to social support.
- Environment stressors.

The physical setting has the potential to be therapeutic, based on [Wagenaar a. m, 2006 p.265]
- Eliminates environmental stressors such as noise, glare, lack of privacy, poor air quality.
- Connects patients to nature by views to the outdoors, interior gardens, aquariums, water elements.
- Offers options and choices to enhance the feeling of being in control; these may include privacy vs. socialization, lighting levels, type of music, seating options, quiet vs. active waiting areas.
- Provides opportunities for social support; seating arrangements that provide privacy for family groupings, accommodation for a family or friend in a treatment: sleepover accommodation in patient rooms.
- Provides positive distractions such as interactive art, fireplace, aquarium, internet connection, music, access to special video program with images of nature accompanied by music developed specifically for health care settings.
- Engenders the feeling of peace, hope, reflection, spiritual connection, and provides opportunities for relaxation, education and humor.

Recently it has become mainstream for hospitals and ambulatory centers to have lobbies with fountains, natural light, interesting art and comfortable seating. [Wagenaar a. m, 2006] These are often vibrant spaces in terms of design features. The challenge lies in the remaining part of the hospital building, which is where the patients spend most of their time, to become equally well designed. Thus there is a need for implementing the principles and qualities of evidence-based design in all aspects of future hospital design. In this thesis, evidence based research will not be neglected, though primary focus will be on finding a direction within health care architecture that focuses more on qualitative terms based on the perception of a young mind.

ill. 064.

ill. 065.

"The fact is, however, that every patient is unique and not just an evidence problem"

[Heslet a. m, 2007, p. 125]

PHENOMENOLOGY

The reason for people to experience hospitals is often a life-changing, sometimes shocking experience of great emotional significance, such as the birth of a child, the death of a parent, the trauma of a serious accident. For this reason hospital experiences will stay in our memory. It is therefore the architect's task to ascribe to spaces positive characteristics that go beyond the measurable, but are experienced emotionally. It concerns metaphysics and something that exceeds what can be immediately explained [Wagenaar a. m, 2006].

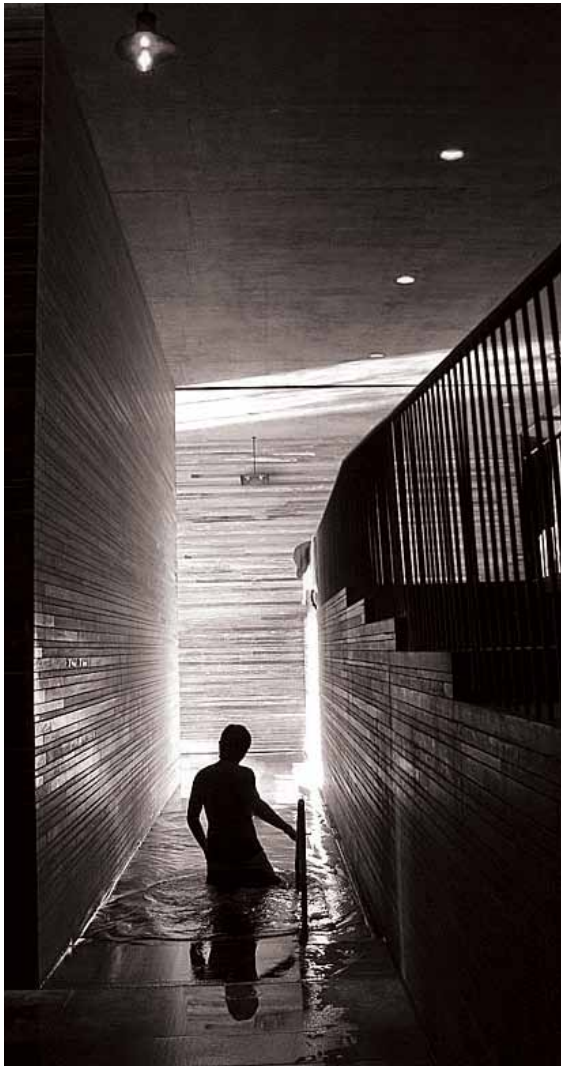
Humans have a subjective perception of space, this is defined and distinguished between a specific perception connected to a given culture and the individual perception of a certain space. Some cultures would consider one spatial organization a problem while another would find it appropriate [Heslet a.m. 2007]. We experienced an example of this during our research trip to the Youth Section at University College, London, [London study trip] where patients were hospitalized in 5-bed wards, not as a separate space, but as space that could be described as a bay to the internal corridor. From our point of view, this open ward seemed inhuman: peace and privacy being non-existent. When confronting Dr Christie with this issue she focused on the possibility to enhance socialization in the unit and that it was positive to avoid having parents, visitors etc. staying at the unit. A hospital is a temporary residence and it is therefore important to be aware of the patient experience of spaces in the hospital - these can differ from person to person.

>>Recognizing patients perspectives regarding the hospital as their temporary place of living will allow professionals to individualise patient care<<. Pia Riis, Aarhus University Hospital

In relation to the challenge of designing a Dedicated Youth Hospital it must be essential to recognize the perspective of the young patient. Thus, the aim is to design the physical environment of the Dedicated Youth Hospital so that the architecture is associated with positive experiences fot the young patient.

ill. 066.

ill. 067.



ill. 068. Perception of Therme Vals by Peter Zumpthor.

SENSORY PLACE

When working on the design of a future hospital environment, it is essential to focus upon the central criticism of modern hospitals, as sterile experience-poor environments, short of for sensory perception.

>>When human senses are stimulated, moods and feelings are generated – one notice that one is alive. Knowledge of sensory impact can hereby be utilized to create or enhance a desired impression.<<
[Karl Otto Schmidt]

Evidence shows that patients recover faster when stress levels are reduced. Focus is thus on how the intentional work with architectural effects can generate stimulating atmospheres which can create environment or situations where the disease can be forgotten for a period of time. At Radium Hospital in Oslo a "sensory space" is designed to create a frame for relaxation and informal conversation. The space has moving lights, music, soft furniture and a music rhythm chair. Recreation leader for children and young patients Thora Kollenborg describes the space as >>an example of something that has to do with the quality of life<< As we experienced in the different hospital visits during our research phase, the quality of life can be hard to find when hospitalised [Experiences; Engel, Frier].

Doctor and philosopher Drew Leder has criticized the philosopher Merleau Ponty´s theory that the body is the unreflective starting point for our impressions of the world, the body is in other words, origin of senses, an instrument we use without thinking about it. With the concept of "the recessive body" Drew Leder states that the body only attracts our attention when it is injured. This means that the body is clarified when we feel pain, or experience that the body does not follow our intention. This signifies that "the recessive body" changes our perception of the physical space that surrounds us. [Schmidt, 2007]. Because the instrument of senses is in a different tune, it is even more important to focus on sensory perception when working with the design of a Dedicated Youth Hopsital.

Peter Zumpthor`s thermal bath in Schweitzerland, Therme Vals is a fine example of an architecture based on the sensory. Materials, sounds and spatial contrasts determine the experience. Thus, the height in the bath is oversize to make the grown-up man or woman relate to their experiencse of the indoor swimming pool as children.
Colours, light and materials contribute to the atmosphere of a space, among these temperatures, structures and texture [Pallasmaa, 2005] The essence of the hospital is "healing", by which the sensuality is essential. According to the publication "Sansernes Hospital" a future hospital should inspire optimism, progress and joy also in the work environment for the staff and make the architecture a healing tool " [Heslet a.m. 2007]. When designing the architecture of the Dedicated Youth Hospital focus is on the experience not only as a visual and aesthetically but also with regard to smell, touch, and sound.

SUB CONCLUSION

Based on the previous analysis there is no infinite tool that can ensure the outcome “healing architecture” therefore the focus in this project must be on combining knowledge with the aim of designing a hospital environment that combines positive experiences for the young patients. Thus, we aim for a deliberate architectural piece of work with:

- a sensory atmosphere
- providing an opportunity for social support
- offering options and choices
- providing positive distractions
- connecting to nature.

all of the above taking their starting point in the young body and mind.

ill. 070. Sensory space, Radium Hospital, Oslo

ill. 069. Sensory space, Radium Hospital, Oslo

SOCIOLOGICAL REVIEW

INTRO

The following chapter concerns the acclimatisation of the young person in an unknown environment. When hospitalised, the young person is removed from the safe limits of home. Understanding what makes a home and how the different spaces in a home are defined, will create a picture of how to address a hospital design, that improves the feeling of home for the young patient.
The traditional hospital consists of zones with different degrees of privacy. The personal bed, with the possible drawn curtains around, defines the most private space, when in a multi-bed ward. Like at the home the bed is equivalent to the privacy when living at home or at a dormitory.

ill. 071.

ill. 072.

Thus, it is natural to ask how can the hospital and its material culture become a poetic space that reminds you of the treasures of home. The phenomenological approach to home is conceived as an extension of the body or as a shield of the body [Winther, 2006].
A study of eleven-year-old children reveals their understanding of home. Home is where they live, but at the same time they describe other homes where they feel at home [Winther, 2006]. The fact that the feeling of home can be present elsewhere, other than in the actual home, is interesting when trying to design a hospital environment, as a temporary substitute for home. The hospital environment must contain some of the same values as home. Especially the bed is pointed out as the ingredient that reflects home. The bed, in the ward, could be seen as a safe island in a shared space. The zoning is another essential factor. The entrance door and threshold is the portal of the safe home. When being at home the ability to follow life outside, without making a spectacle of oneself, is a quality that could allow the patient to feel a sense of community.

On the other hand the nomadic lifestyle is normal for the young until parenthood. The focus on change, movement, and spacious practices before settlement, has become a condition in a globalised world. Backpacking around the world and studying at different universities during the educational period, is a part of the way to reaching your goals and dreams. In that sense the capability to be in the world - to settle in the world, and not just anywhere, is essential for the modern young person [Winther, 2006]. Having this in mind, the young people stand out as a very adaptable group. However, *"the fact that youth adjusts to different settings is not the same as that they are met in their needs,"* quote from Pia Riis Olsen [Experiences; Engel, Frier]

In interviews with two young (19-20 years old) cancer patients at Aarhus University Hospital, the wish to rather share a ward than having their own was expressed. The advantages far eclipsed the drawbacks. Sharing knowledge about the illness and the comfort of company are two essential advantages [Experiences; Engel, Frier]
The agreement of a common set of rules for living together is what defines home. This is of course a more pragmatic understanding of home, but focusing on the creation of patient wards and common spaces, that facilitate individuality as well as social interaction, can possibly encourage these common rules.

>>The fact that youth adjusts to different settings is not the same as they are met in their needs<<

Quote Pia Riis Olsen [Experiences, Engel, Frier, 2010]

ill. 073. Hospital corridor

ill. 074. Prison corridor

TOTAL INSTITUTION

>>From an architectural perspective hospitals, hotels and prisons pose similar problems, and in fact they tend to look like one another<<
Quote from Abram de Swaan [Wagenaar a. m, 2006 p. 92]

All of the building typologies hold a transient population that must be cared for twenty-four hours a day, seven days a week and they accommodate a permanent population for care taking. Thus the purpose of hotels, prisons and hospitals is to provide a frame for all the physical needs of their guests, inmates and patients. Hotels are of course the most welcoming of these institutions and prisons the least attractive, but the fact that hospitals remind us more of prisons than hotels is terrifying. Both hospital and hotel derive their name from Latin `hospitium`, a guesthouse, and have a common origin in the dwellings that monks kept for passing travellers. [Wagenaar a. m, 2006]
The essential issue in present hospitals is the lack of co-determination. When hospitalised one loses the option of what/when to eat, how to dress and when to sleep, to fit into the hospital mechanism. Especially when considering a young patient who is developing towards independence this is problematic. >>To give the young patient a self-dependent position that makes it possible to development from child to adult is essential<< quote Pia Riis Olsen [Experiences; Engel, Frier] In this manner, spaces could be designed as frames of a wide and changing range of relations providing all sorts of opportunities for the young patient.

Thus, the physical environment of future hospitals should be designed with inspiration in hotels and “homes” where influence is present. This of course also depends on the various needs of different groups - the family mother, the senior, the child or the young patient which indicates that from a sociological view the hospital should be organised differently. ”The hospital could be organized in stages of life instead of medical specialties” quote from Pia Riis Olsen

SUB CONCLUSION

From an architectural point of view there is a potential in finding inspiration in sociological relations rather that medical treatment. It has advantages to unito young patients when looking at the social aspect in isolation. Of course this has to be held up against the security and the medical treatment. Could the architectural frame be shaped to enhance the feeling of belonging and participating for the young patient, to make space for development from child to adult. Since patients` influence is nowhere present in existing hospitals inspiration must be found in other architectural typologies.

ill. 075.

YOUTH WARDS

INTRO

With the problems of influence and belonging in hospitals in mind, the design of the wards is crucial for the young patient´s general experience of the hospital.

During the research and programming period, the discussion about single or multi bed wards, has arisen several times. At the Youth Medical Conference in Copenhagen, when interviewing staff and patients in hospitals in Denmark, Norway, and London and from the evidence based design results conducted by Dr. Roger Ulrich, we had a discussion about the different aspects of the ward. This is described more in detail in the experience report [Experiences; Engel, Frier].

According to the evidence published by Roger Ulrich the single-bed patient ward has several advantages as opposed to the multi bed ward. Minimizing the danger of infection between patients and incorrect medication, improved sleep and the possibility to adjust temperature and light level according to the patient's individual need and state of mind [Aagaard, 2009].
However, with the young patients as a specific group in mind it is natural to investigate these aspects further and consider the lack of social activities and solidarity in single patient wards, when designing wards for the Dedicated Youth Hospital.

The opposing factor to the single bed ward is the risk of loneliness. Interviews with two cancer patients, at 19 and 20 years of age, revealed that they would rather share a ward with one or two other patients with the same illness and age. Furthermore the nurse, Nuka Hove, who has worked with young patients for more than ten years, stated that the three-patient ward would be preferable, because it allowed the patient to participate more or less in the social life of the ward according to the mental state of the patient. Being together with equals also helped to share experiences of being hospitalized and how to cope with the illness [Experiences; Engel, Frier].In the Danish healthcare system the patients are released from the hospital at a very early stage [Roger Ulrich]. This makes sense from a social point of view, since the social network of the adolescent is very important for the mental well being [Experiences; Engel, Frier]. But this also means that many of the patients are very ill and bedbound while hospitalised. Thus the ward must also interact as a social space for the bedbound patient, so the risk of feeling isolated is avoided. In our research a young cancer patient commented on this issue:

>>it is lonely here – because you rarely get out of the ward,<< Frederik 19 years old.

At the same time the Danish health care system is being centralised with the regional "Super Hospitals", which potentially increases the distance to the social network of the adolescent. Therefore an alternative social network must be established when hospitalised.
The essence of the discussion seems to be narrowed down to choice between the single bed ward or the multiple bed ward in their traditional static and rational design. But what if the evidence based research can be combined with the social needs of the young?
At the Youth Medicine Conference in Copenhagen many of the speakers repeated that hospitalised youth must be seen, first and foremost, as young, secondly as patients. The social and cultural needs of the young person was a mayor issue at the conference [Experiences; Engel, Frier].

>>The architecture must have empathy for the sick youngsters` sense of hopelessness << Ida Koch, Youth psychologist

The overall discussion is centralised around the question whether single bed wards or multi bed wards is the right choice for future hospital environments but there seems to be a need for a more radical approach to wards. Could the evidence be implemented in a combination between single and multi that could answer to the regulations for safety and at the same time provided social support for the young patient.

ill. 076. Multi bed wards.

SUB CONCLUSION

The documented benefits of the single bed ward should, of course, be implemented in the design of the Dedicated Youth Hospital. The question is how many of the benefits can be implemented in a single bed ward? If each patient has an individual bathroom within the ward the hygienic conditions would be improved; if the ward is divided into different social zones, it would allow the patient to log on and off while bedbound. In the private zone the patient could be in control of light level and ward round and examinations could be carried out.

The single bed ward is the obvious answer to the evidence, but the mental well being of the young patient is affiliated with the social network and the feeling of belonging. Thus the single bed ward is not the answer for the young patient, but the evidence base must be respected and be focal points when designing the wards.

YOUTH HOSPITAL STRUCTURE

INTRO

In this project a new typology within the field of Hospital Architecture is proposed. This is of course not depend on an architectural solution only, but demands a new way of rethinking the organisation of the hospital. It demands a structural reorganisation that will change the daily routines of the staff and patients.

ill. 077.

Evidence shows that cancer among persons between 15-40 years of age is very difficult to treat. Cancer cells are biologically different and develop differently in the young body. [Pia Riis Olsen; Experiences; Engel, Frier] Thus existing medical evidence cannot be transferred directly to the young person, but since the young patient group is relatively small there is a lack of research in the field. By gathering the young patients it will become easier to develop both medical treatment and a youth network.

Today the education of the Danish nurses is a general, the nurses only specialise when working within a specialized medical field. In the Dedicated Youth Hospital nurses would have to specialise in adolescents. This means that nurses will develop the ability to handle different youth diseases, and will know how to deal with youth patients, thus improving their healing process. The structure will also change for doctors who will have to go to the patient for examination rather than the patient coming to the doctor, as it is proposed in the specialised hospital.

As we experienced during our research communication is very different in a youth section than in other departments of the hospitals [Experiences; Engel, Frier]. >>It is important to think the youth patient forward in their lives rather than back, as in the treatment the young patient usually gets in a child section<<. [Pia Riis Olsen; Experiences; Engel, Frier]

With basis in the already existing “woman and child” section at Skejby University Hospital it must be possible to reorganise to ease the process of being hospitalised at a difficult stage of life.

SUB CONCLUSION

For Dedicated Youth Hospital to become a realistic proposal, it is essential to rethink the hospital as a mechanism in relation to system organisation, and not only consider the spatial organisation of the architecture. The Dedicated Youth Hospital will obviously change the everyday life among staff as well as patient and relatives. Thus, it is important to consider the well being of the people who have their daily routines in the hospital. In the following chapters light, acoustics and safety will be studied in order to set up parameters for the architectural quality of the Dedicated Youth Hospital.

”The hospital could be organized based on stages of life instead of medical specialization”

Quote Pia Riis Olsen [Experiences, Engel, Frier, 2010]

LIGHT

ill. 078.

INTRO

The perception of space and feeling of well-being is highly dependent on light, thus light and the articulation of light is essential when designing health care architecture.

DAYLIGHT

The healing effect of exposure to natural daylight is essential to everybody – whether hospitalised or not.
It is documented that a low intensity of light during the waking hours can affect the human perception of day and night, and lead to disruptions of sleep and mood. Intense daylight, on the contrary, can enhance the stage of being awake during the day and thus improve the sleep quality during the night [Roger Ulrich].
Exposure to severe natural daylight for some hours during the day also causes a more constant sleep. Furthermore a disturbance of the normal circadian rhythm results in a lower mood and depression [Wagenaar a. m, 2006].
To optimize the natural daylight it is suggested to place the patient wards and common areas near the daylight – in a Danish context toward south or southwest [Heslet, 2007].

Inarguably this is correct, but the need for abundant daylight is as important for the staff. Research shows that there are direct links between light intensity and work related stress, burnout and medical mistakes. The placement of staff work space in plenty of daylight improves patient safety – in theory.

When we visited the Oncology Section at Herlev Hospital Nurse Lise Nordqvist expressed that it was a problem that the artificial light could not be dimmed during the night. This resulted in the same level of light 24 hours a day [Experiences; Engel, Frier]. This statement corresponds to surveys of light intensity during the night in a hospital unit. To improve the sleep for the patient in wards the light intensity level was drastically reduced during the night – from 128-1,400 lux down to 5-23 lux in the night hours [Heslet, 2007].

Three different nurses, of three different hospitals, have stated that young cancer patients need to enclose themselves in a dark private space in their most miserable periods [Experiences; Engel, Frier]. Though this is not scientifically proved, it brings up the idea that the light in a ward for young patients, must be controllable according to the senses and mood of the patient. Intense direct sunlight has an inhibitory effect on the immune system. So especially cancer patients should not be exposed to direct sunlight on their skin [Heslet, 2007].

PERCEPTION OF LIGHT

The sensory deviation of a sick person compared to a healthy person, is expressed in a sensory readiness that is highly affected by insecure and hostile environments [Heslet, 2007].
The realisation of this calls for an increased focus on the design of space for patients, which includes the light in the space. A high exposure to “life giving” daylight should still result in sensitivity and articulation of the penetrating light, which awakens a warm, soft and hospitable atmosphere.
If sunlight enters directly, the possible experience of glare is aggravating for the patient. And then again the lack of daylight can bring abouth low self-esteem or depression. [Roger Ulrich]
The perceived amount of sunlight, daylight and artificial light must be controllable for the individual patient. Especially for young people who can experience life as an emotional roller coaster, this is of key importance – the light must be able to support an optimistic atmosphere to improve the mood of the young patient.

Light is an essential component of architecture and it strongly influences the effect of materials and their surfaces. Daylight can divide rooms into different zones and illuminate areas according to specific requirements. The atmosphere in a room is defined by the degree of reflection, colour and smoothness of surface and daylight density [ALDC_ARK]. The light can articulate form and space, which must be essential in relation the design of hospital spaces for young patients. It is important that the light, together with materials and shape, will create a feeling well-being for the young patient.

SUB CONCLUSION

In general patient wards and staff work spaces should face natural daylight, but when designing dedicated youth wards, it is important that the light is easily controllable. Artificial and natural light must therefore be adjustable according to the different spaces and different needs during day and night. The intention is with basis in the above to design the Dedicated Youth Hospital so that the quality of light supports a positive atmosphere in all spaces.

ill. 080.

ill. 079.

ill. 081.

ACOUSTICS

INTRO

When focusing on acoustics the aim is to gather a basic understanding of the elements that can influence the acoustic properties in the hospital. Secondly to map how the youth cope with the acoustic impact from each other and from other (maybe unknown) sources.

>>If the acoustic regulation is implemented in the architectonic and spacious planning from the beginning, the need for behaviour regulating initiatives is minimised.<< [Frandsen, 2009, p. 75]

Unlike the faculty of seeing, the faculty of hearing cannot be turned off. Even when we sleep the capability to hear is our alarm system in case of danger.
Sound can both be a healing and a stressing factor. [Frandsen a. m, 2009] When sound is experienced as unpleasant it is referred to as noise. In hospitals noise comes mainly from equipment and people. Pleasant sound, such as music, can change our experience of the sound basis in a room, because the human ear has a unique capability to focus on the acceptable sound and distract from the sound basis present before the music [Heslet, 2007].
Sound levels in hospital environments are measured in decibel or reverberation time. World Health Organisation specifies 35 dB as maximum sound level at night and 45 dB during the day. The average normal bedroom sound level is 30 dB, and 45 dB is accepted in a living room [Heslet, 2007].

Health care environment based research has documented that the noise level has exceeded an average value of 50 dB for several periods within 24 hours. In periods the noise level reached an intensity of 70 to 80 dB. The original noise source was defined as the staff in the hospital. Another study revealed that sound absorbing ceilings and acoustic improving panels, led to a better sleep and a 30% decline in medication errors. The patients experienced that the caring from the nurses improved, with no initiatives implemented. Moreover a decentralisation of nurse activity had a positive influence on the medication errors [Heslet, 2007].
A tendency shows that noise levels will increase equivalent to the number of patients in the same ward. For young people of today the use of electronic equipment is an essential part of socialising. A notebook, used for movies, communication, gaming etc. is a noisy machine also when headphones are plugged in. This is of course an essential argument in the discussion of choosing single-bed wards vs. multi-bed wards in future hospitals and something that must be considered in the design process. When organising a hospital, optimisation of the sound environment is not an obvious task since many of the problems are related to noise from equipment and persons. Still, consideration to for example the distance from staff space to patient ward could minimise noise volume and the number of wards to disturbed.

ill. 082.

SUB CONCLUSION

When designing future hospital environments the aim must be integration of acoustics so that shape and size of the space is developed in coherence with the surface finish and furnishing. The use of the correct materials is an important factor in reducing the sound level and re-verberation time. The acoustic aim of this project is that space, size and surface will articulate the positive sound, and limit the stressing noise, to reach an acceptable level according to the sensory ideas of the different spaces. The WHO recommendations are not regarded as important since the static limits of 35 and 45 dB do not distinguish between positive sound and noise.

SAFETY

ill. 083. Akerhus University Hospital, Oslo

ill. 084. Akerhus University Hospital, Oslo

INTRO

Hospitals are generally seen as sterile environments in shape and materiality; part of the reason for this is the functional requirements linked to sanitation. It is crucial that the materials chosen in the architecture can be disinfected and that the materials are resistant to chemicals. It is also important to consider shapes that does not collect dust and bacteria but are easily cleaned.

One example of this was experienced in the central street atrium at Akershus University Hospital in Oslo [Experienced; Engel, Frier]. Wooden lamella had been utilized to give the space a certain warmth and materiality. Unfortunately some of the lamellas where mounted horizontally, with a small mutual distance, which resulted in a lot of small dust pockets – hard to clean because of the amount of them and the fact that the atrium is 4 storeys high.
With these demands and general regulatory requirements in mind it is natural to ask; how can a youth hospital be designed so that it expresses humanity in material but still fulfils the functional requirements?

Illness is often linked with a security risk because of transmission of diseases. The overall aim of Evidence Based Design is to create safety for patients [Frandsen, 2009] Thus safety is a keyword in the work with developing future hospitals, and it is a challenge to integrate all security aspects in relation to patient and staff. [Frandsen a. m, 2009] Infections are contagious mainly through contact, water and air. Thus, good hygiene is very important in hospital environments where patients with weak immune systems are extra susceptible to infection.

Material surfaces can act as disease carriers. A study from 2006 shows that bacteria have a varying survival time on various material surfaces and that some of the investigated materials are difficult to disinfect. [Frandsen a. m, 2009]. [Lankford, 2006] Materials chosen in health care architecture must therefore be durable and easy to clean, probably the reason why hard and repellent materials often are utilised in hospital environments.[Heslet, 2007] Materials are as earlier mentioned essential to spacious perception [Pallasmaa, 2005]. It is therefore important to set up an architectural vision for the materiality and hold it up against these technical issues in the process.

"Surveys indicate that single-bed wards minimise the risk of patients transmitting diseases to each other, and this is of cause important for the very unwell patients who have a low immune system or are infectious for other patients" quote Pernille Weiss Terkildsen [Lund, 2009, p.]. Airbourne infections are a risk in hospitals and should therefore be part of the discussion of whether a future hospital should be based on the idea of single-bed wards or several bed wards and considered in the spatial organisation.

ill. 085. Cafeteria at Thor heyerdahl comprehensive school, Larvik, Norway courtesy of smidt hammer lassen architecs.

SUB CONCLUSION

It is essential that the security of patients is a focal point and thus thoroughly considered through the process in all different aspects of the building design. Of course, architectural choices must be made in terms of sanitation, but the aim of this project is to create a sensory hospital environment, which must require deliberate work with architecture in relation to safety. Specific requirements related to security will be described in the chapter ROOM PROGRAM.

USER

INTRO

The medical hospital of today, like Copenhagen University Hospital, is an example of a place where science and technology is the focal point, which also is expressed in the buildings anatomy – a healing machine. Along with the medical breakthrough, at the beginning of the twentieth century, came a change in the interrelationship between the patient and the hospital building. Before the medical breakthrough the hospital building should promote light, air and nursing – an encouragement of the inner healing powers of the patient. In the modern healing machine primal focus is on the outer healing powers provided from the evidence-based medical treatment from the doctors [Heslet, 2004].
The facilities of a youth hospital are first and foremost for the sick young patient. But there are many other users such as doctors, nurses, psychologists, teachers, social workers, administration, hospital porters and relatives of the patients.

YOUTH PATIENT

Compared to adult patients the young have a far more spontaneous behaviour; their references are different and they have a widespread and individual span of interests. Adult courtesy is not present with very many young patients and they do not instinctively socialise when gathered in a common space [Hove, 2004].
A survey among young cancer patients about the interior of the youth section mapped the wish for warm colours, cosy objects and electronic equipment. The conclusion of the survey was that a youth environment in a hospital is all about recognisability and sense of security [Hove, 2004].

STAFF

The staff of the hospital is a myriad of different professions. Since the recovery of the patients is based on medical knowledge, naturally the doctors are in power. From a logistic point of view the segregation of the patients according to their illness is logic, which also seems to be the argument against the gathering of young patients in a youth healing environment.
The nurses, being in charge of the care and well- being of the patients, seem to have a larger focus on the environment and surrounding of the patients. And the ones the project team have talked to are in favour of the young healing unit [Ragnhild Hals, Nuka Hove, Hans-Sverre Hansen-Gaard; [Experiences, Engel, Frier]].

On the research trip to hospitals in Copenhagen, Århus, Oslo and London the feeling that arose was that the staff space is neglected compared to ward areas; often placed in small niches within the main unit corridor, with a high noise level and poor daylight conditions. Space for essential and serious conversations between patient, relatives, psychologists, and social workers about non-medical issues are placed in small artificially lit rooms, with no sensory consideration.

RELATIVES

Parents, siblings, and friends are important to consider in the youth hospital. Visits from friends are an important social issue, because the patient retains the feeling of belonging. Nuka Hove exemplified that a sixteen year old patient had a visit from two friends who stayed for a whole weekend, watching movies and sleeping on chairs next to the patient bed [Experience; Engel, Frier]. The possibility to provide extra space or beds will help to ease the social changes for the young patient.
Dependent on how attached the young patient is to his or her parents, they can be helpful communicators between the staff and patient. The parents are foreseeing and their knowledge and experiences about their child can help the staff in how to nurse the patient [Hove, 2004].Or as nurse Nuka Hove puts it: “Parents take a lot of the staffs time, but are also a considerable resource” [Hove, 2004 s.]

SUB CONCLUSION

The common goal of the youth healing environment must be to facilitate a professional medical treatment, which combines the scientific and sensory elements into one united program. Architecture could play an active and important role, if all spaces are considered according to the function and the sensory needs of the youth. Since many different users occupy the space alone or together, the flexibility of light, visibility, sensuousness and privacy are key issues in achieving this goal.

ill. 086. Young patient, at Youth Section, Aarhus University Hospital

THEME

ill. 087.

WHO

The aim of this project is to design a dedicated hospital for youth patients. The project will be based on young patients aged 15-21 as the primary user group. The reason for this is that within these years the youth goes through a dramatic development. Being aware that individuals develop differently, this group can be expanded to both younger and older patients.

WHAT

The aim of the Dedicated Youth Hospital is to become an environment based on the needs of the adolescent, a frame for caring of different diseases. Thus, not divided in medical specialties. The Dedicated Youth Hospital will accommodate young patients with all medically treated diseases.
The Youth Hospital will cover the following specialties:

- Oncology
- Haematology
- Diabetes
- Kidney Diseases
- Infections
- Neurology

WHY

The purpose of the project is to secure that young patients get the best conditions for healing during and after being hospitalised. The intention is that all design solutions are tailored to fulfil the needs of the young individual. Thus, the following chapters will zoom in on reference projects that can create the basis for and inspire the form finding process.

CASES

ill. 088.

Based on the project THEME the aim of the following case studies is to study physical environments, with the perspective of the youth.
With our challenge to design a Dedicated Youth Hospital as a new architectural typology, there are no obvious reference projects, so naturally this project seeks inspiration in significant hospital projects, but also in well-functioning youth environments. The studies are made from youth optics, trying to understand the physical frame in relation to a young body and mind. The following project is being studied;

- Paimio Sanatorium
- Herlev Hospital
- Tietgen Dormitory
- Ørestadens School
- Venice Hospital
- Akershus University Hospital
- Roskilde Festival

CASE PAIMIO SANATORIUM

ill. 089. Reception desk at Paimio Sanatorium.

That task of designing a hospital dedicated to youth will demand an architecture that reflects the youth. Paimio Hospital is an example of a hospital that reflects the needs of a specific user group, from masterplan to the smallest details.
Situated in the pinewood forest 30 km outside Turku, Finland, Paimio Hospital by, Alvar Alto, stands out as a piece of architecture that supports the healing process, as landscape, function and aesthetics are designed to encourage the recuperation of the patients.
Placed in the dark green fir wood forest the white clad finish of the building façade stands out as a contrast. Still building and forest compliment each other – the senses remember the purity and freshness that was much needed for the tuberculosis patient of the original sanatorium [Ehrström a.m. 2005].

The wellness – both physical and mental – is clearly enhanced by the architecture. From lightning to ventilation, acoustics, waste management to maintenance were thought through by Alvar Alto. It is said that he stated that "perfect peace is the prerequisite for the healing process" [Ehrström a.m. 2005 p. 16]. The wards were designed with the utmost consideration of a quiet and comfortable atmosphere. One wall had a soft surface and three hard surfaces to control the internal acoustics of the room. To minimize the noise from the wash-basin, the water from the taps hit the basin at an optimized angle. Patients sharing a ward could then wash them without disturbing each other and eac patient had his own wash-basin not to spread bacteria [Ehrström a.m. 2005].
One of the young patients at Aarhus University Hospital stated that he preferred to share the ward, for social reasons – just the presence of another person eased the feeling of loneliness. In the night time though, the noise from the "roommates", medical equipment or going to the bathroom was a disturbing factor when asleep [Experiences; Engel, Frier]. So if wards should be shared for social reasons, the architectural detailing must minimize the stresses from the interior.
To Alvar Alto the aesthetic element is a key factor in life, a combining element and a way of interpreting the life to be lived. The aesthetic dimension is found in the surrounding world, with a specific place for all the separate parts, just as inseparable as the versatile creations of nature.

Designing a door handle, the hand grib preoccupies Alvar Alto - the shape is an impression of the hand. His furniture design for the Hospital is created with the same organic shape readable from the human body. Thus all the scales of the design seem to grow out of the given circumstances; from master plan to the human details of a door handle [Lund, 2008].
Furnishing a space dedicated to the young will enhance a hospitable atmosphere directed towards the young patient. The young people lean more toward informal settings; Utilising the space in a nontraditional way, e. g. by occupying the window sill. The design must reflect the body of the young people, thus encouraging them to obtain the space in their own way.

ill. 090.

ill. 091.

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ill. 093.

ill. 094.

ill. 095.

ill. 096.

SUB CONCLUSION

Looking at hospitals today, increased rationalization has pushed humanism and sensualism away.
It is impossible to see the difference between a hospital and prison corridor. [p. 30] The choices of materials are controlled by the pragmatic issues such as hygiene, life and costs. Not irrelevant issues, but the lack of sensibility is evident. Standard solutions are used again and again in offices, homes, hospitals, schools, retirement homes and daycare centers, without considering the very different functions, physical and mental state of the inhabitants. Paimio Hospital stands out as an example of a “total” design that focuses on mental well-being of the patients and staff. For the youth hospital to succeed an understanding of being young must be present in the design – promoting that the norms and standards of the adult world is challenged, tested and questioned as a part of growing up.

ill. 097. Exterior, Herlev Hospital.

ill. 098. Arrival area, Herlev Hospital.

ill. 099. Corridor at Herlev Hospital.

CASE HERLEV HOSPITAL

Herlev Hospital is described as a mayor work of Danish architecture, from a time when Danish architecture was booming [Heslet a.m. 2007]. The choice of studying Herlev Hospital is however linked with an ambivalent felling. Experiencing Herlev hospital as part of a project study trip [experiences from a project] the first hand impression was the exterior of the large hospital complex; a piece of structuralism that did not summon the feeling of a place for healing. When entering the hospital a more humanistic world of colours, optimism and inspiration opens up. [Experiences; Engel, Frier] The idea is thus to take a look at the hospital in a young person's point of view to question the established architectural opinion of the project.

Erected between 1967-76, the architects Borenbusch, Brüel and Selchau, designed a hospital in the time of the industrialized building period, where rationalization was a demand. From a distance the exterior expresses an order and stands out as a technological development that has a clear reference to the medical capabilities of the hospital. Moving closer to the complex the futuristic fan shaped design of the auditorium buildings brings some balance to the experience of the hospital before entering the building – as an appetizer to what is to expect inside.
Exterior wise there is no doubt that the hospital can provide a medical recovery, but in the case of a longer hospitalization, the grey mass can awake some unpleasant feelings – will I be hid away from the world up there on the 20 floor? Will my friends be able to find me up there? Living in a parcel house or a typical four-storey city block apartment, the tall building does not exactly express hospitality that will appeal to a young person.

Inside the lobby the perception of the hospital changes, and what is missing outside of humanism, is present inside. The smooth surface, with the soft edges and corners, is decorated with the artwork of Poul Gernes. The warm colours create a gentle interplay with the conspicuous white cantilevered balconies. Everything is from clockwork, reception desk, light design to spinal stairs are designed with a hospitable atmosphere in mind. It is welcoming, optimistic and inspiring – the eye and mind is stimulated in the exploration of the space and does not grow tired from looking. The fresh combination of colours is a unique and thus appealing composition for the young mind [Experiences; Engel, Frier].

The access elevator to the ward tower is also designed specifically as part of the architecture, and although maybe not as long-lasting as the lobby design, it is still a part of the building and not some strange element in the core body of the hospital. The ascend to the ward is a positive experience, where the architects have made an effort out of the "trip" itself. Attention is focused on the ill and fatigued body, thus small foldable seats are incorporated in the elevator design [Experiences; Engel, Frier].

Placing the wards on top of each other in a tower accessed by elevators is clear in its organization and it is fairly easy to find your way around. A former cancer patient from the Radium Hospital in Oslo stated that the horizontal layout of the hospital was difficult to cope with when being young and ill [Experiences; Engel, Frier]. The wards are placed in the perimeter of each floor, with utility space in the core. Thus all wards are assured abundant daylight and a great view over suburban areas in Copenhagen. The colour program corresponds with the temperature colours of the daylight – warm colours towards south and cold colours toward north [Heslet a.m. 2007]. The idea is marvellous in its simplicity, but bedbound for a longer period the colours could affect the mood of the patient. Cold colours do not compel that well with the ambience of a warm summer day. The scent of the season is lost in the north facing wards and vice versa in the south facing wards during winter.
Still the architecture of the ward favours the patients and the fresh, cheerful and emotional colour scheme can be a stabilizing factor for young patients with hormones pumping in the body. Sadly the colours aren't as articulated in wards as in the access corridors. And if not for the colours the corridors would not be much different from other monotonous hospital corridors.

SUB CONCLUSION

From a young person's perspective on the hospital, the primal learning is the synergy between architecture and artwork. Having the opportunity to design a hospital for the youth; a more designated variant of this synergy could create an environment with homage to the youth. The clear organisation of the hospital layout is also worth acknowledging and appropriate when designing for the youth.
Furthermore the thorough detailing of installations, accommodation and fixtures brings humanity to the interior. Spiced with the coolness and curiosity of the youth this is one of the tasks for the project.

ill. 100. Reception, Herlev Hospital.

ill. 101. Dorm at Tietgen Dormitory.

ill. 102. Corridor at Tietgen Dormitory.

CASE TIETGEN DORMITORY

Introducing the youth as a specific group in the future healthcare system - with a new type of youth environments - it is essential to seek inspiration in architectural environments specifically designed to the youth. Looking at the hospital as a place for temporary living facilitation for the youth, it is naturally to look at dormitory living, as an architectural typology specific for the youth.
Tietgen dormitory by Lundgaard and Tranberg stands out as a masterpiece within dormitories - a modern interpretation of the body and mind of the youth, providing a balance between the individual private space and the collective common space. The geometric circle is the main concept, which allows an organization with the individual space towards the world outside, and the common facilities toward the central courtyard. This kind of zoning is very relevant to consider, also in relation to the design of a dedicated youth hospital. With inspiration in this, the aim must a spatial organization, based on the young individual and their needs for both privacy and social relations.
Cubic multi sized overhangs and cantilevers tone down the formality of the circle. Almost like a Mediterranean village, erected vertically, the facades speak an autonomic language that appeals to the youth. The use of Tombak and Oak as the exterior materials brings a natural unifying texture to the experience in the courtyard, as well as from the access outside the complex. Super graphics and varying colours are used to make it easy to identify ones personal cluster, and apartment in the large complex [Living study trip].
The interior texture is a mix of the raw, but smooth, concrete, the dark, warm and soft oak of the window frames and the birch accommodation of the private spaces. The combination of concrete and wood creates a transition from the raw urban space to the warmness of the dormitory. The birch plywood furniture wall is the nest around the inhabitant, which marks the security of private space [www.ltarkitekter.dk]. In the most private part of the dormitory, warm materials and a bodily shape accommodate the young student. The curved toilet and bath core is the characteristic element in the apartments that has differing depths in an alternating rhythm, which expresses the young individuals unique identity through its form.

ill. 103. Young persons `hanging` out in the central outdoor space.

SUB CONCLUSION

Tietgen Dormitory is a fine example of an architecture designated to the youth. The understanding of being young is translated into a beehive of live-quarters, common study spaces and kitchens, intimate and large outdoor spaces. This kind of programming could naturally inspire the room program for the youth hospital to include common spaces with various functions. This could encourage a social life but also give the opportunity to withdraw into the personal space, and to observe the world instead of taking part when needed.

CASE ØRESTADENS SCHOOL

ill. 104.

Ørestad`s High School from 2007 is the first in Denmark, with an architectural design that is built on the principles set out in the new high school reform. The school corresponds to the new visions on content, subject matter, organization, and learning systems. The result is a radically different school environment. Proposing a Dedicated Youth Hospital environment demands a radically different way of thinking hospital architecture. It is therefore natural to seek inspiration in Ørestads High School as an example of a present youth environment.
Ørestads High School sets a new standard for learning. Classrooms do not exist and most of the learning is web based – thus the nickname "the virtual school" [www.3xn.dk]. Studying the organization and architectural tools of the school, without the traditional corridors and cells for learning, could set an example for a new hospital typology for the youth. A typology that allows the youth to take charge of their own social interaction, but still facilitates the medical treatment carried out by the professional staff.
The school is based on the vision about knowledge sharing and interdisciplinary work. The architects created the school convinced that architecture is the frame of behavior, and that flexibility in space grants a larger degree of interaction for a learning environment. Flexibility and openness are key words for the building, which has open rooms divided into zones, niches for creativity and concentration, and free access everywhere to the virtual space [copenhagenx].
The four different study directions each have their own floor, which is open around a central atrium. The atrium defines the fifth social zone for the interdisciplinary socialization and a large stair winds its way from floor to floor, becoming a social platform – a furniture that facilitate observing and being observed. Circular islands, floating in the atrium sky, works as flexible and temporary space arrangements and study environments for varying group sizes [www.3xn.dk].

SUB CONCLUSION

Ørestads high school is an example of a school typology that is radically different than former school designs. Traditional spaces such as classrooms no longer exist in the high school of the future, and based on this, one could ask will wards exist in the future hospital? Just like the school, the youth hospital must set up a frame of opportunities for the young patient to choose between and settle in their own way. Only then the informal socialization and well-being can blossom.

ill. 105.

ill. 106.

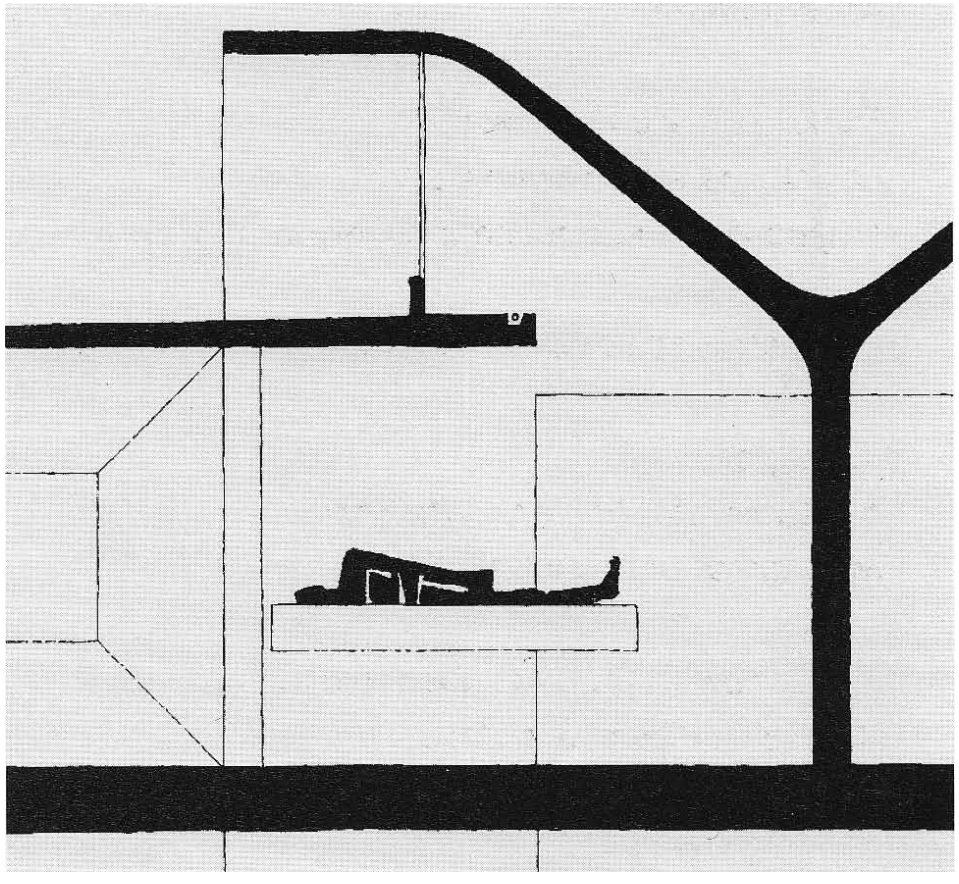
ill. 107.

CASE VENICE HOSPITAL

This case study explores an unbuilt yet iconic hospital project by Le Corbuiser; Ospedale SS Giovanni e Paolo, Venice Hospital [Sarkis, 2001] Late in his career; Le Corbusier was given the opportunity to design a new hospital for Venice. For this unique environment, situated at the edge of the city, this project called for innovative solutions. Le Corbusier designed a project focussed on the relationship between architecture and environment, and the relationship between space and human body. [architecture.com] In relation to the challenge of designing a future hospital environment dedicated to youth this case exemplifies an understanding of body and scale, of how a hospital can be organised so that it puts man in focus instead of the disease.

>>A hospital is a House for man, as habitation is the home for man. The key is always man.<< quote Le Corbusier [Sarkis, 2001]

With Venice Hospital project Le Corbusier emphasised the human scale and the body as the essential focal point. One of the most significant aspects of the hospital project is the patient cells that are planned as rooms for healing. Programming of the whole hospital emerged from this element like a series of small hospitals, clusters for creating visual groups relating to housing units.
Le Corbusier was aware that he had to focus on the subjective factors as well as the organisational system of the hospital. “Architects are to deal with the un-predictable, the un-measurable” quote Le Corbusier [Sarkis, 2001] Early in the process, that is why Le Corbusier started ex-



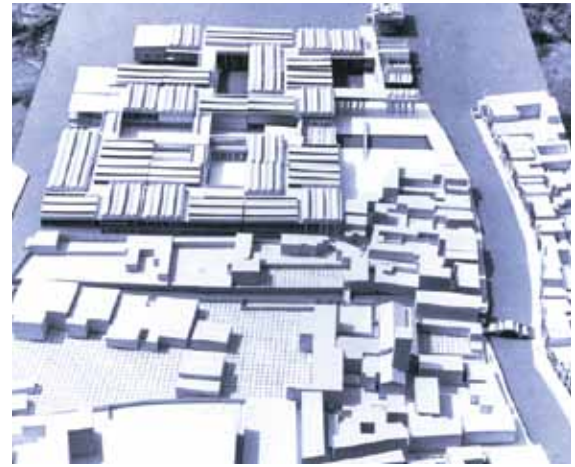
ill. 108. Section principle for skylight in ward at Venice Hospital by Le Corbusier.

changing information with the heads of the different hospital departments, customizing each section to their specific requirements and needs. The organisation of the hospital is built on the strategy to have all patient services and rooms situated on the third floor (top floor) and therefore in the most private part of the building, and have all other activities housed in the levels below. The second floor contained most of the medical technology, operating theatres, pharmacy, laboratories and physical therapy facilities as well as physicians offices. The ground floor concentrated all those services not directly related to medicine, such as administration, offices, kitchens, laundry as well as reception and specific entrances for emergency and ambulatory services. The ground level also housed complementary facilities such as shops, restaurants and a hospital chapel.

Planned in 1965 for the Arsenal area at the edge of Venice city, the hospital was designed to extend the city's roads and canal networks, while simultaneously turning in on itself to create a flexible form, with courtyards. [Harvard] Venice Hospital is hereby an example of the Mat building typology —a low sprawling structure developed in the late fifties that has been making a strong comeback in contemporary architecture, as seen in Yokohama Terminal in Japan. The "mat" is both city and building, both public and private, both structure and infra-structure. The building can act as a flexible framework rather than a rigid container. Venice hospital is a systematic created framework, both conceptual and spatial, for different possibilities of habitation based on streets, squares and hanging gardens. This has a clear reference to the plan and vision of the New University Hospital in Skejby, where the large city structure will be divided into neighbourhoods with streets and plazas.

SUB CONCLUSION

Venice hospital is an example of a vernacular hospital architecture that considers the human scale and the needs. Venice hospital gives inspiration to how a hospital can be based on a technical, organisational element that reflects on the scale of the human body.



ill. 109.

ill. 110.

ill. 111. Internal street in Akershus Sygehus, Oslo.

CASE AHUS

>>The New University hospital is not a traditional institution building; it is a friendly, informal place with open and comprehensible surroundings oriented towards the patients and their relatives<<.
[C.F. Møller]

The quotation above is C. F. Møller`s initial description of the new Akerhus University Hospital from 2008. Akerhus University Hospital was experienced during the project research trip, as the most recent hospital project in Scandinavia. The description of the hospital illustrates a very humane and patient orientated design. Based on the experience, at the research trip, it is found relevant to study this non-institutional, patient orientated design, which is opposite to more traditional hospital environment [Experiences]. Akerhus Sygehus is furthermore relevant to study because children and young patients have their own clinic in the hospital. Studying what initiatives that have, or have not, been implemented to enhance that it is a child / young clinic, is also carried out.
In order to break down the grand scale of the complex it has been divided up in departments, which vary in dimension, form and expression. The idea is to divers the visual experience and generate a clear organisation, which is easy for patient and guests to find their way around in [Paasche a.m., 2008].
The complex is designed around a central, glass covered, atrium street. The street offers various functions, such as kiosk, pharmacy, hairdresser, church, flower shop and café. The abundant daylight in the heated street also encourages the use of the street as an urban space – small niches with benches and greenery urge for the space to be occupied.
The choice of dividing the hospital up into smaller areas, creates a more tangible space for the patient to relate to during the stay. The short distance between treatment and ward create proximity for the patient and shorter work zones for the staff, thus being able to spend more time with patients. The entrance and large canteen are covered with glazed white tiles. The shiny material works as an attractor at the arrival; and draws attention toward the large cantilever above the entrance. The treatment buildings, on the right side, are covered with white plaster, to express order and purity. The patient wards, on the left side, are tiled with dark grey screen brick. The child and youth clinic is covered with vertical wooden boards in a warm glowing colour and has its own entrance; thus a part of the complex, but is still its own marked by the difference in material.
The central atrium street has a warm and light atmosphere from the wooden lists and the huge wooden columns that define the space from floor to ceiling. Internal bridges, hovering above the central street, marks the access to the treatment and ward wings, and divide the long central street up into tangible sections.

At the end of the street the child and youth clinic is situated. The large internal facade hosts a reception – a white box with softened corners and a smooth running desk. A welcoming installation because of the gentle texture and organic shape. The wards at the child and youth clinic are not as accomplished as the central street. A relatively small amount of daylight is conspicuous, and the space lacks visual stimuli. The storage closet is not integrated in the space and therefore become an alien installation. The positive features are the small differently

ill. 112. Exterior of Akershus University Hospital.

ill. 113. Common cafeteria at Akershus University Hospital.

ill. 114. Ward at Akershus University Hospital.

ill. 116. Class room.

ill. 115. Reception area at the children and youth clinic.

placed windows, and the asymmetric bore gives some life to the internal elevation. The fact that it is a child ward, the window placed just above the floor is a sympathetic gesture to the small human beings.
The child and youth clinic also includes a school service, which provides the young patients with the opportunity to study and complete assignments while hospitalised. This is standard in Norway, but not in Denmark at present, thus an issue to consider for future youth clinics. Furthermore the clinic is accommodated with a well equipped training gym for physical rehabilitation [Experience; Engel, Frier]

SUB CONCLUSION

The rational organisation and hospitable central street are the major strength of the hospital. The organisation is logic and the use of wooden list cladding adds warmness to the grand space.
Youth-wise there are some issues left to address. The lack of youth dedicated design and initiative leaves the young eye and mind without stimulant. The ward is too rational – easy to keep clean – but the young are not in any way reminded that they are young.
The school and gym facilities are great initiative, but still the dedication to the young is left out in the architecture. The greatest idea, when looking from the youngh perspective, is that the child and youth have a distinct building of their own. Next step is to separate children and young in two departments.

CASE ROSKILDE FESTIVAL

ill. 117.

ill. 118.

Appointed Nordic Cultural Festival 1994, by Nordic council of ministers:
>>The Roskilde Festival has a high artistic quality and a strong Nordic profile in its activities. Roskilde Festival has a broad presentation of rhythmic music an audience consisting of – predominantly – young, a group that has high priority in the Nordic cultural collaboration. Roskilde Festival unlikely needs further presentation. To the rock interested young audience the festival is almost a concept. Those, who have visited the festival, also know that apart from the internationally recognized concerts it has many other activities: theatre, visual art, courses and seminars. It is the broad and the variation in the offer that has qualified the festival to the appointment<<
[Roskilde festival]

The quotation documents the strong link between the festival and the young. Thus it is interesting to study how this social event interacts with the young.
Reading the core values of the festival certain values stands out, when trying to define young dedicated hospital. The focus on audience, quality, creativity and safety is important for a huge music festival, but could it also be values for a youth dedicated hospital? Focus on the young patients well-being; physical and mentally. Focus on quality of the surrounding spaces and medical treatment. Focus on a creative environment, where spacious stimuli, new initiative to mobilize the youth and interdisciplinarity cooperation strengthen the social atmosphere. And finally, focus on the safety of the patient concerning medical treatment, hygiene and the mental feeling of safety.
Another issue is that the Festival challenges the surrounding society and world, through its approaches to environment, humanism and cultural efforts [Roskilde festival]. The wish to challenge the established society is a part of being young so the youth, and the Roskilde Festival shares values and the festival becomes a visualization of the youth. Within the festival ground the youth sets the rules and social behaviour that is regarded as unacceptable in the society outside, is an essential part of the festival – ex. running around naked.
At the Roskilde Festival fences are broken down before the opening and when the gates are opened the crowed rushes into the festival ground. Imagine if the same could be experienced in front of a hospital! Neglecting that the festival is a free space for the youth and that socializing is a great part of the event is not fair. Thus one needs to distinguish between the festival and the youth hospital. Nevertheless understanding and implementing the social codex in the youth hospital environment should be possible.

ill. 119. Roskilde Festival from above.

SUB CONCLUSION

The four days of sleeping in a nomadic settlement, in an informal organization, is the architectural disorder, which is designed by the young – for the young. In that sense the youth hospital must create space that encourage the informal settlement, and allow the youth to imprint their personality on to the hospital.

The youth hospital design must learn from the spacious hierarchy that is present at the festival. A thin tent canvas is enough to distinguish between two separate social zones. The private space is only visually separated. This creates an intense social atmosphere where the festival visitors are forced into a pro-active approach to each other. Knowing that the young can sometimes find it hard to socialise on cue [sociological chapter], it is interesting that, under the right circumstances, it is not always correct.

ROOM DESCRIPTIONS

>>When planning a youth hospital environment it is essential to look upon the young human being as a whole and not just at the disease<< (Experiences; Engel, Frier].

A clear tendency within adolescents is a wish for “normality”. When hospitalized “The good youth life” is typically put on stand-by, and the normal disappears. There are many reasons for this, but one is that the present hospital doesn’t facilitate needs of young patients. “The good youth life” is characterised by; having a network of friends, girl or boy friends, freedom, self-determination, opportunities, future, career, a good body, sport, leisure and parties [Experiences; Engel, Frier] The aim of this thesis is to create a hospital environment that gives young patients more opportunities and self-determination by providing a physical environment that facilitates it.

The idea is to focus the room program of the building on the young and their specific needs, instead of the medical treatment of different diseases. Keeping in mind that the main purpose of the building is to heal young patients, the medical treatment cannot be neglected but the aim is to set up a frame for healing medically, physically, and mentally.

The Following Room Program is based on area standards for hospitals compiled by C. F Møller Architects and experiences from conferences and research trips to various hospitals. [area standards for hospitals; Experiences; Engel, Frier]

LIVING

Dorms - three-patients room
Baed on the young patient need`s, wards are turned into youth dorms. A dorm should accommodate 3 youth patients. Have shared or individual toilet and bath facilities and a kitchenette, zoning of social and private areas. The Dorms should provide the opportunity of personalization for the youth patients and have private storage space.

Single Dorms -individual patient rooms
For youth patients that needs isolation because of transmission risk or patients that because of religion or similar need privacy. Should have individual bath/toilet facilities and a kitchenette.

LEISURE

Activity Lounge
Social meeting place with activities, games, music, tv. etc. The room should be in connection with café and kitchen.

Immersion Lounge
Lounge for social and individual immersion, book reading etc. The room should be in contact with café and kitchen.

Café/Kitchen
Café and Kitchen in connection with social spaces. Could include demonstration facilities

Auditorium/Cinema
Stage for stand-up shows, movie showing etc. Accessibility for beds

Youth Park
Outdoor area dedicated young patients.

Secret space

THERAPY

Pool
Treatment bath/pool for rehabilitation

Music room
Space for music therapy. A sound insulated room

Gym
Rehabilitation gym, fitness, yoga etc.

TREATMENT

Examination rooms
Space for examination of patients with workstation for staff. The room should include washbasin and storage space.

Conversation rooms
Space for personal dialogue with the young patent.

LEARNING

Study Room
School room with desks and computers and facilities for studying.

Creativity room.
Room for art, painting, sculpturing etc.

Teacher room
Office" for the teacher.

Youth Mediatek
Library with books, magazines, dvd´s and games.

STAFF

Reception/lobby
Reception and waiting area by the entrance of the buidling.

Offices
Offices for staff. Could be designed a small units or as one big landscape office.

Meeting rooms
Small meeting rooms for staff and a larger less formal meeting room for network conversations.

Kitchen/lunchroom
Informal social staff room for breaks.

STORAGE

Depot for medicine and storage room.

ill. 120.

ROOM PROGRAM

Room	Area [m²]	Daylight level	Description	Total area
LIVING				
Dorms	65	2%	A space for three young patients, incl. bath/toilet facilities and evt. kitchenette.	600
Single-dorm	35	2%	For young patients that need isolation incl. bath/toilet facilities	125

Room	Area [m²]	Daylight level	Description	Total area
LEISURE				
Activity, social space	50	2%	Activity Lounge for social gathering around games, tv etc. in contact with Café/ kitchen	50
Immersion, social space	30	2%	Lounge for social and individual immersion, book reading etc. in contact with Café/ kitchen	30
Café/Kitchen	40	2%	evt. designed with a demonstration kitchen for education	40
Auditorium/Cinema	40	-	Small stage for stand-up shows, movie showing etc	

Room	Area [m²]	Daylight level	Description	Total area
THERAPY				
Music room	25	2%	Room for music therapy	25
Gym	80	2%	Rehabilitation gym fitness, yoga etc.	80
Pool	80	2%	Treatment bath/pool for rehabilitation	80
Sensory Youth Park	200	-		200

Room	Area [m²]	Daylight level	Description	Total area
TREATMENT				
Examination rooms	50	2%	Space for examination of patients should incl. washbasin.	150
Conversation rooms	30	2%	Space for personal dialogue with the young patient.	30

Room	Area [m²]	Daylight level	Description	Total area
LEARNING				
Study room	30	2%	Room with desks and computers.	30
Creativity room	15	2%	Room for art, painting, sculpturing etc.	15
Teacher room	15	2%	A “office” for the teacher	15
Youth Mediatek	20	2%	Library with books, magazines, dvd´s and games	20
Toilet	5	-		5

Room	Area [m²]	Daylight level	Description	Total area
STAFF				
Lobby/Reception	40	2%		40
Waiting area	30	2%	Informal seating area for patients and relative	30
Offices	15	2%	Could be designed a one big landscape office	45
Meeting Rooms	20	2%	For staff meetings.	60
Network Room	60	2%	For youth patient network meetings	60
Kitchen/lunchroom	45	2%	Room with a large table and a kitchen	45

Room	Area [m²]	Daylight level	Description	Total area
STORAGE				
Medicine depot	15	-	Depot for medicine should be situated in relation to office areas for staff	15
Storage	50	-	Storage should be seperated on localised areas	250

DESIGN CRITERIA

INTRO

In this thesis project it is found relevant to question the future design and planning of hospital environments originating in the design of a Dedicated Youth Hospital. In the following design criteria, based on previous analysis and case studies, are inlisted to set up a guiding principle for the form finding process.

GENERAL

Dedicated Youth Hospital should be linked to proposed architecture of the New University Hospital in Skejby.
Dedicated Youth Hospital should manifest the youth presence in the large complex.
The architecture of Dedicated Youth Hospital should provide a zoning from public to private.
The architecture should inspire social interaction, in indoor as well as outdoor spaces.
There should be a connection between exterior and interior in the architectural form.
Dedicated Youth Hospital should provide optimistic and inspiring spaces for the young.
Dedicated youth Hospital should be linked to flow and logistics of the proposed New University Hospital in Skejby.

PERCEPTION

When entering the Dedicated Youth Hospital the experience should not be associated with being in a hospital.
The perception of the spaces should be inspiring and optimistic.
Dedicated Youth Hospital should provide the opportunity for the individual patient to be part of a community but also create space for being immersed- this should be achieved by creating spaces with intimacy in different parts of the building.
Dedicated Youth Hospital should reflect the youth lifestyle and diversity.
Daylight should be utilized in as great an extent as possible and reflect the passing of the day.

EXTERIOR

The exterior of the Dedicated Youth Hospital should be conspicuous in its expression
The outdoor youth park space should be integrated in the architectural shape.

INTERIOR

Dedicated Youth Hospital should provide a clear organization and zoning between primary and secondary spaces.
Primary furniture, should be designed/ integrated as part of the design solution dedicated to the youth patients.
Social spaces should be part of the natural flow in the building
The interior should provide the opportunity to utilize the space in a nontraditional way, ex. Occupying the windowsill.

ill. 121.

SUB CONCLUSION

Design criteria will together with the following vision set the starting point for the development of the architecture for the Dedicated Youth Hospital.

VISION

>>The aim of this project is to design a Dedicated Youth Hospital as a frame for the healing of young patients medically, physically, and mentally. The hospital as an architectural typology will be reconsidered in relation to stages of life rather than specialization. The intention is that the design will contribute to a discussion of future hospitals.<<

ill. 122. Young patient, at the Youth Section of Oncology at Aarhus University Hospital.

FORM FINDING

INTRO

With our studies, design criteria and vision, we have created the preconditions for the work with the design of the Dedicated Youth Hospital. From here the form finding will take its departure. The following part of the report will describe the integrated design process of designing the Dedicated Youth Hospital through sketches, models, simulations, calculations and descriptions.

As described in the program the process of integrated design [Method] is iterative, thus consisting of loops and parallel developments. The design process based on our specific vision covers working with design in different scales; from furniture to architecture, and covers different
levels of detailing of aesthetic and technical aspects within the different scales from concept to detail.

Thus the following part of the report will describe the process in a chronological order with references to the program.

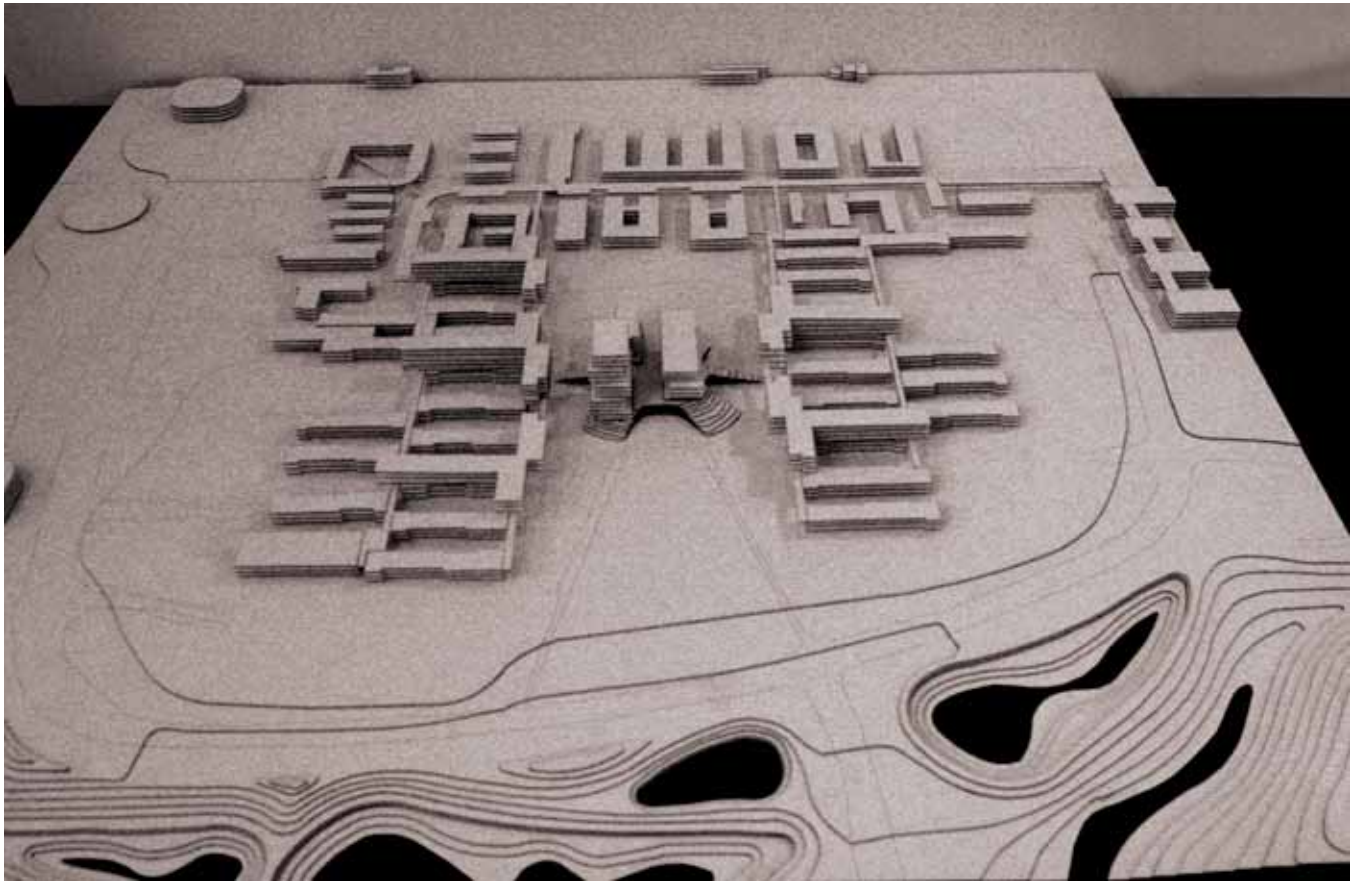
The development of the design of the Dedicated Youth Hospital process will be divided into four phases;

- Initial sketching
- Concept
- Concept development
- Synthesis

The form finding process will take its starting point in the context and the question of how to link the Dedicated Youth Hospital to the proposed Super Hospital - The New University Hospital in Aarhus - continuing from where the analysis [Program_Context] left of.

SUPER HOSPITAL

In order to understand the scale and organisation of the hospital complex a context model in scale 1:1000 sets of as point of departure for the process.



ill. 123. Contextual model of The New University Hospital in Skejby as designed by the project team among these C.F Møller architecs.

VOLUME TYPOLOGY STUDIES

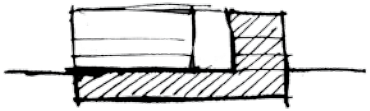
Based on the context model initial investigations concerning volumes and location of the Dedicated Youth Hospital is carried out.

The question is how to link the Dedicated Youth Hospital to the proposed hospital, which is the size of a provincial town. From the context analysis [Context] the initial idea is to situate the Dedicated Youth hospital as part of the southeast wing of the complex as the last sprout.

In relation to the design criteria it is important that the design of the Dedicated Youth Hospital becomes conspicuous
in its context. Thus, the initial typology studies concerns the expression and conceptual considerations for relating the Dedicated Youth Hospital architecturally to its context. Should the design of the Dedicated Youth Hospital contrast or could it somehow adapt to the frame of the proposed hospital so that it still expresses that it is a place dedicated to youth?

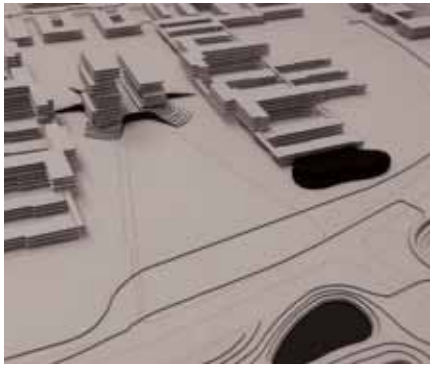
The New University Hospital is designed as a very significant
city structure of repeated geometric building typologies. The volume studies presented on the following pages seeks to explore how different architectural typologies can be linked to the large hospital complex and how the they will influence in relation to the climatic and physical conditions of the site.

Section principle, ***>>Youth Landscape<<***



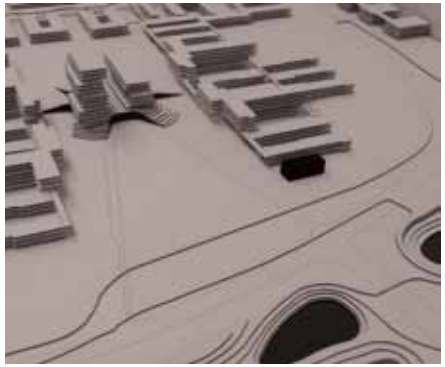
Section principle, ***>>Basement Jax<<***

Section principle, ***>>Youth Town<<***



ill. 124. ***>>Youth Landscape<<***

Is the idea of designing the Dedicated Youth Hospital as an abstraction of the landscape sloping towards the central Forum.

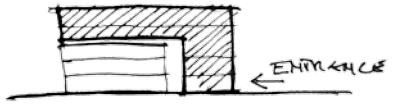


ill. 125. ***>>Basement Jax<<***

Illustrates the idea of designing the Dedicated Youth Hospital or parts of it as hidden under ground.

ill. 126. ***>>Youth Town<<***

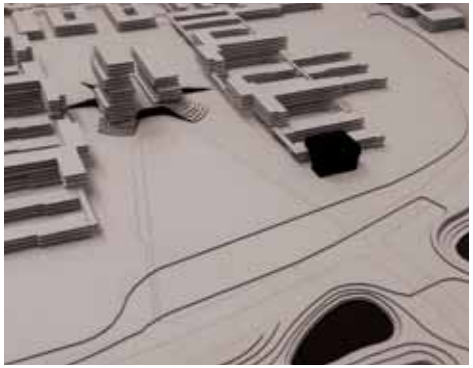
Caracterises the idea of a composite building mass as a reflection on the diversity of the youth shaped as an indepentent building.



Section principle, ***>>Framing the hospital<<***

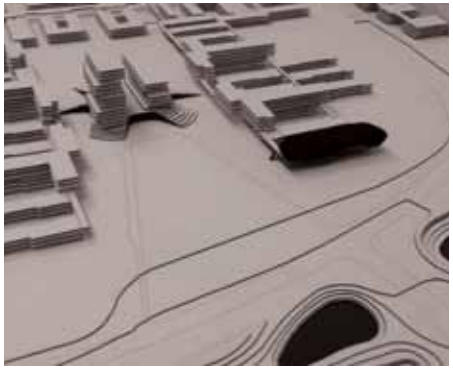
Section principle, ***>>Parasite<<***

Section principle, >>***Penthouse***<<



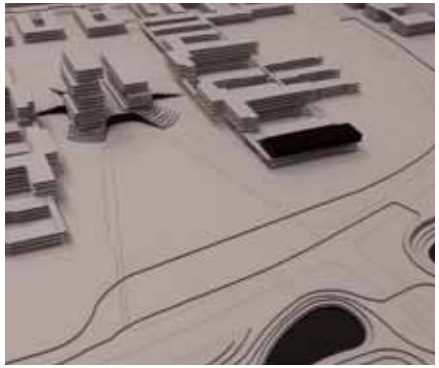
ill. 127. ***>>Framing the hospital<<***

Is the idea of designing the Dedicated Youth Hospital as a horisontal and a vertical element framing the structure complex.



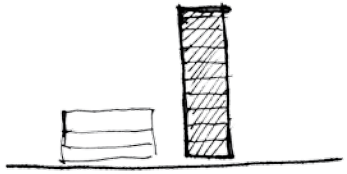
ill. 128. ***>>Parasite<<***

Illustrates the idea that the Dedicated Youth Hospital is an attached element that interferes with the proposed hospital structure.

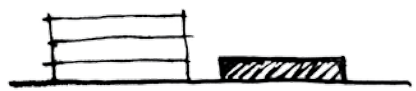


ill. 129. >>***Penthouse***<<

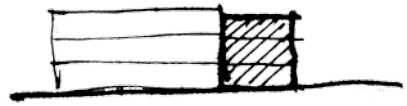
Is the idea of situating the Dedicated Youth Hospital on top of the hospital complex and developing its architecture within this frame.



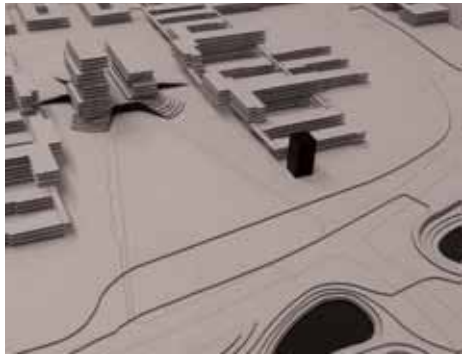
Section principle, ***>>Youth Tower<<***



Section principle, ***>>Repeated element<<***



Section principle, ***>>Horisontal expansion<<***

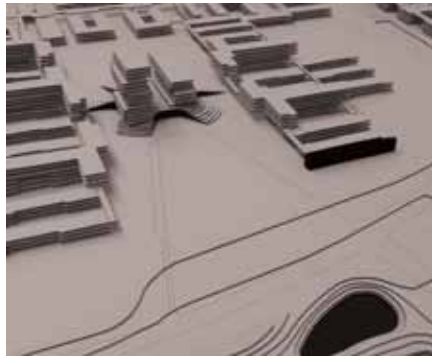


ill. 132. ***>>Youth Tower<<***

The idea of Youth Tower is that the Dedicated Youth Hospital becomes a visual landmark.

ill. 130. ***>>Repeated element<<***

Describes the idea of repeating the proposed structure of The New University Hospital horisontally.



ill. 131. ***>>Horisontal expansion<<***

Is the conceptual idea of expanding the proposed complex vertically thus a building covering a number of floors.

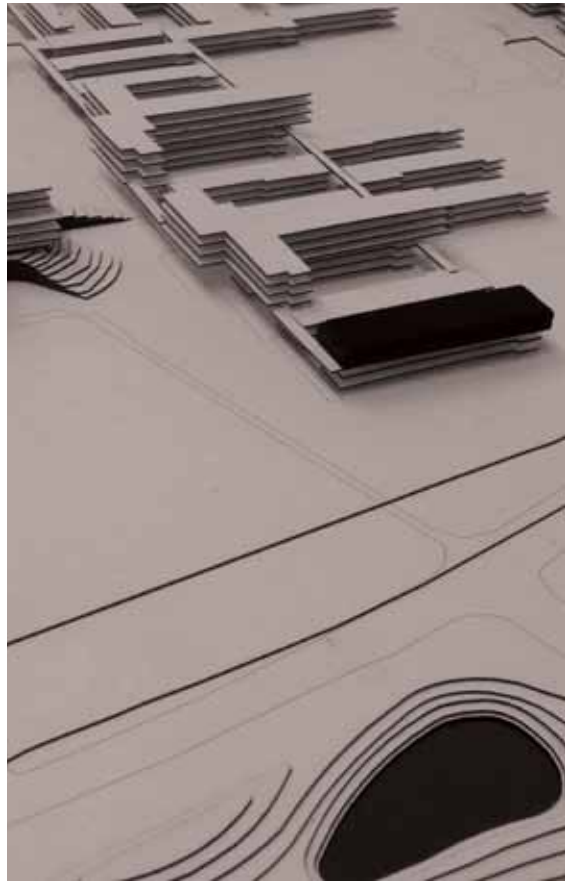
EVALUATION

The different typologies are evaluated individually with the design criteria as guidelines focusing on positive and negative relations. The following design criteria [Program_design criteria]are determining for choosing the specific location of the Dedicated Youth Hospital;

- ***The Dedicated Youth Hospital should be linked to proposed architecture of the New University Hospital in Skejby***
- ***The Dedicated Youth Hospital should manifest the youth presence in the large complex***
- ***The Dedicated youth Hospital should be linked to flow and logistics of the proposed New University Hospital in Skejby***

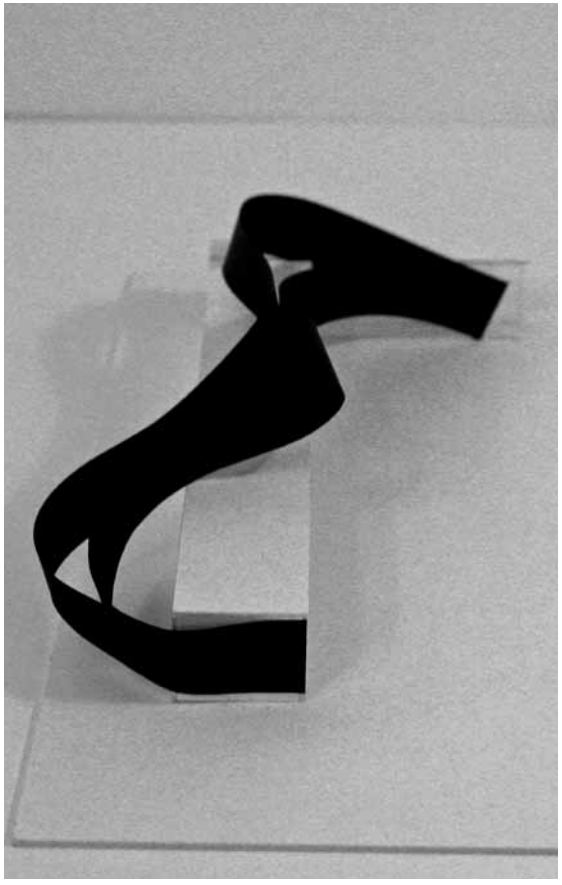
The overall conclusion of the investigation is that the Dedicated Youth Hospital should become part of the complex so that it adapts to its overall shape, otherwise it would become just another independent hospital.

By situating the hospital on top of the hospital as a typology that has to comply with the frame of the remaining parts of the large hospital complex we will be able to create a clear comparison basis and hereby work on how to turn things inside out within these very clear boundaries. The following initial sketching process will explore how a location on top of the hospital can be conspicuous even from the ground level.



ill. 133. A great potential is found in the idea of situating the Dedicated Youth Hospital on top of the hospital complex and develop its architecture within this frame of the complex.

INITIAL SKETCHING



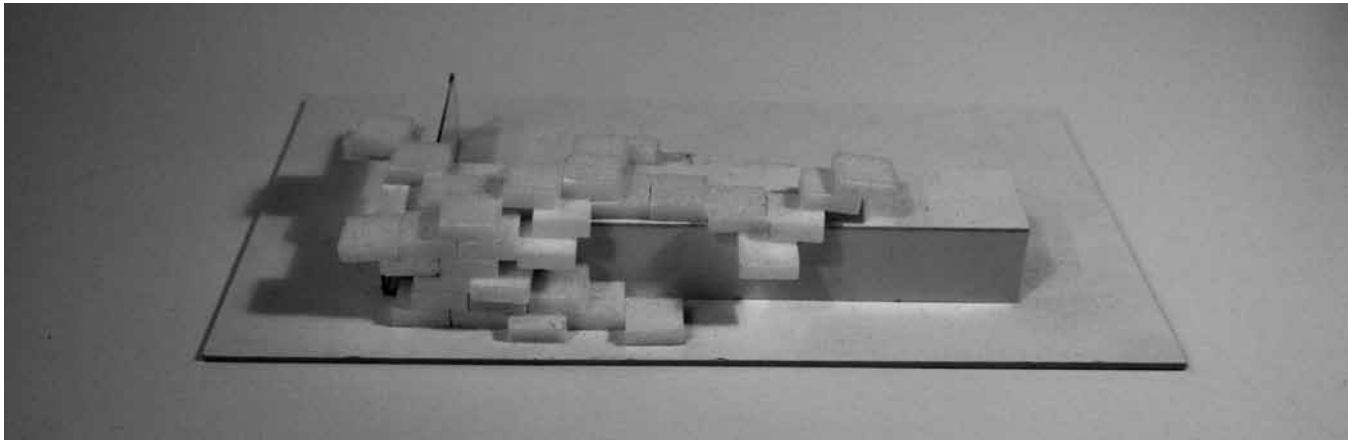
ill. 134. Conceptual model, curved around the hospital complex.

In continuation of the volume studies and the idea of the location of the Dedicated Youth Hospital being on top of the New University Hospital a process of sketching conceptual ideas started.

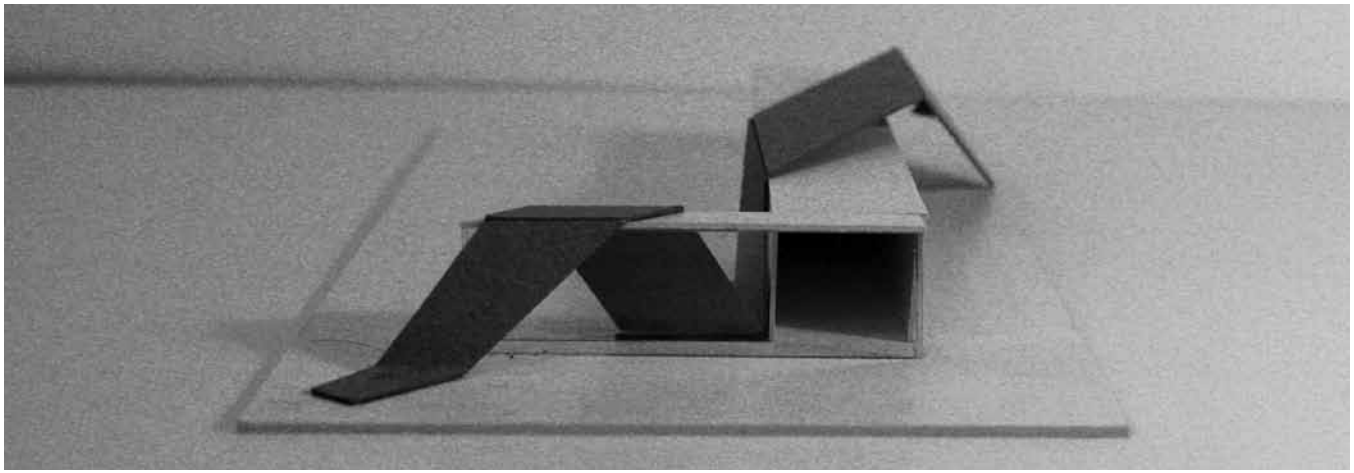
With the young patient in mind focus is on how the architectural shape can welcome the young patient in its shape.

The shapes seen in some of the initial foam models is developed into conceptual models in scale 1:500; Shapes cutting through the proposed hospital ending on the roof, tent like shapes with a reference to the case study of Roskilde Festival having in mind the adaptable life style of the young.

The aim of this phase is to sketch wild ideas to spark a direction of the form finding. The initial concepts represented many directions but common for all the ideas were the connection with the ground floor that symbolized a flow.

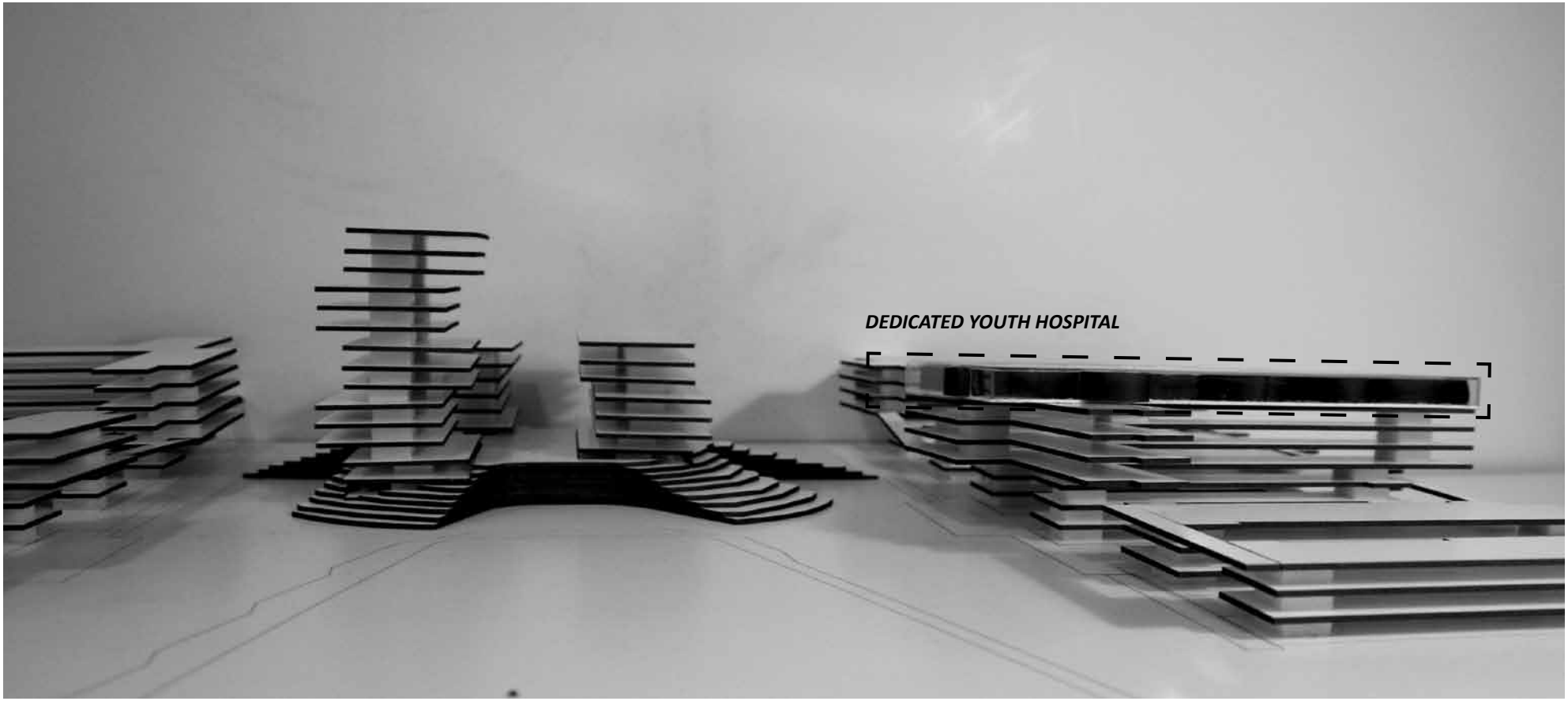


ill. 136. Conceptual model, fragmented youth city.



ill. 135. Conceptual model, shape folded around the rigid structure of the hospital complex.

CONCEPTUAL IDEA

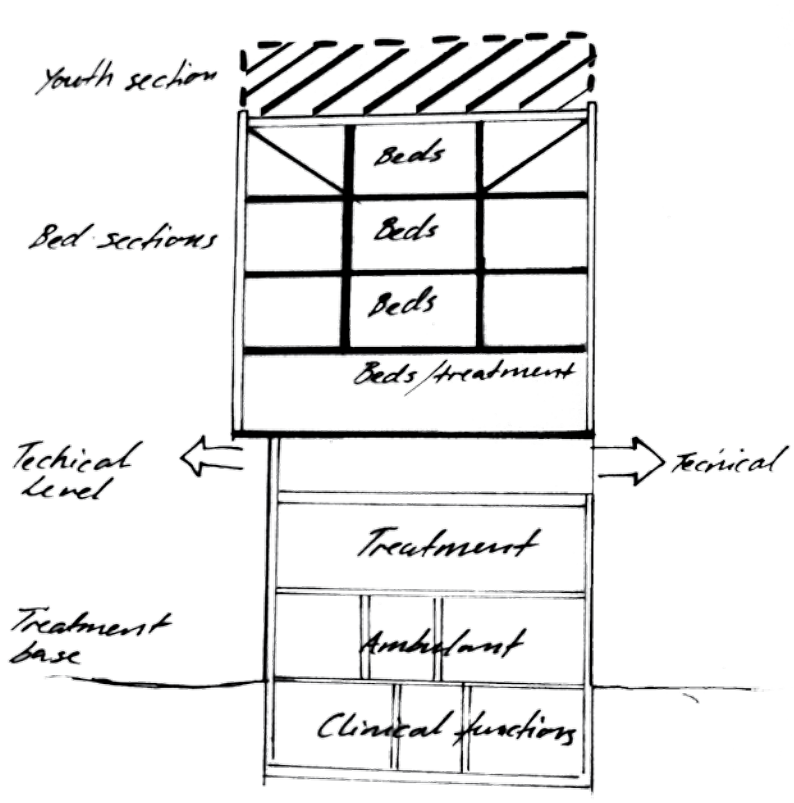


ill. 137. Dedicated Youth Hospital on top of The New University Hospital.

DEDICATED YOUTH HOSPITAL

After the initial sketching phase, zooming in on the organisation of the hospital caused a more clear direction of the form finding, focusing on the New University Hospital as a framework for the Dedicated Youth Hospital. This held together with the expansion plan illustrated by the project team in the main project description (from the project team behind the project), made us realise that the proposed horisontal expansion could make the relatively small youth section disappear in the large complex.

By taking an approach in designing a vertical extension of the bed section, as illustrated in the section principle, the idea is to design a space dedicated to the young as part of the hospital city. Hereby the Dedicated Youth Hospital would become part of the logistics and organisation but still have the potential of developing into an architectural independent section dedicated to the young.



ill. 138. Section principle sketch, design by C. F. Møller Architecs, with Dedicated Youth Hospital on top.

LOCATION

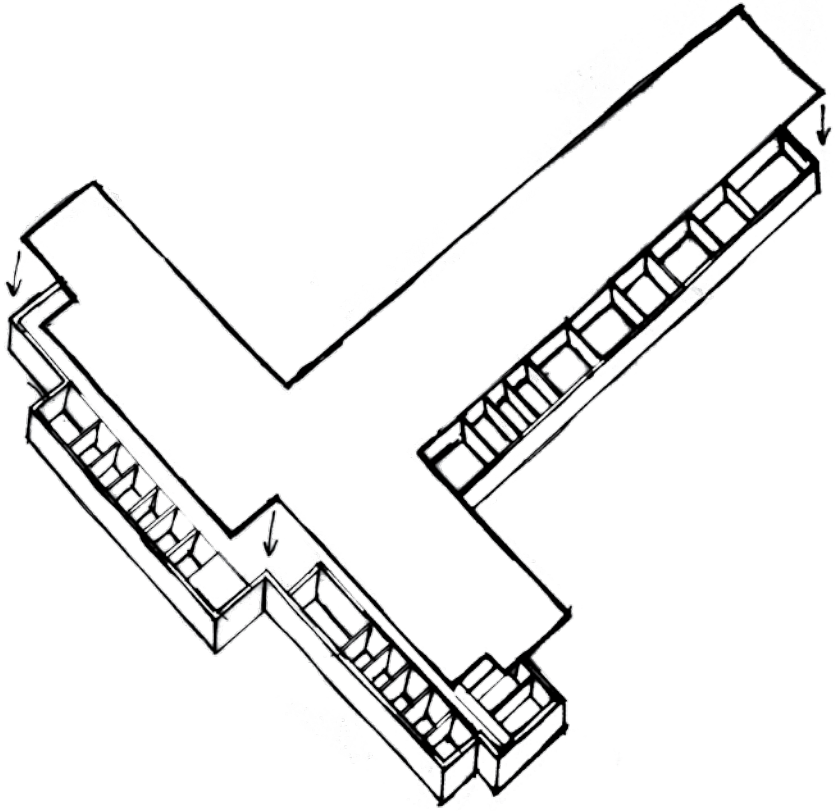
NEW PATTERN

When choosing the proposed hospital structure for the New University Hospital as a framework for the design of the Dedicated Youth Hospital it is natural to look closer into the standard plan solution designed for The New University Hospital in Skejby in order to focus on applying the access ways and structural system of the proposed organisation to create a new pattern tailored for the young.

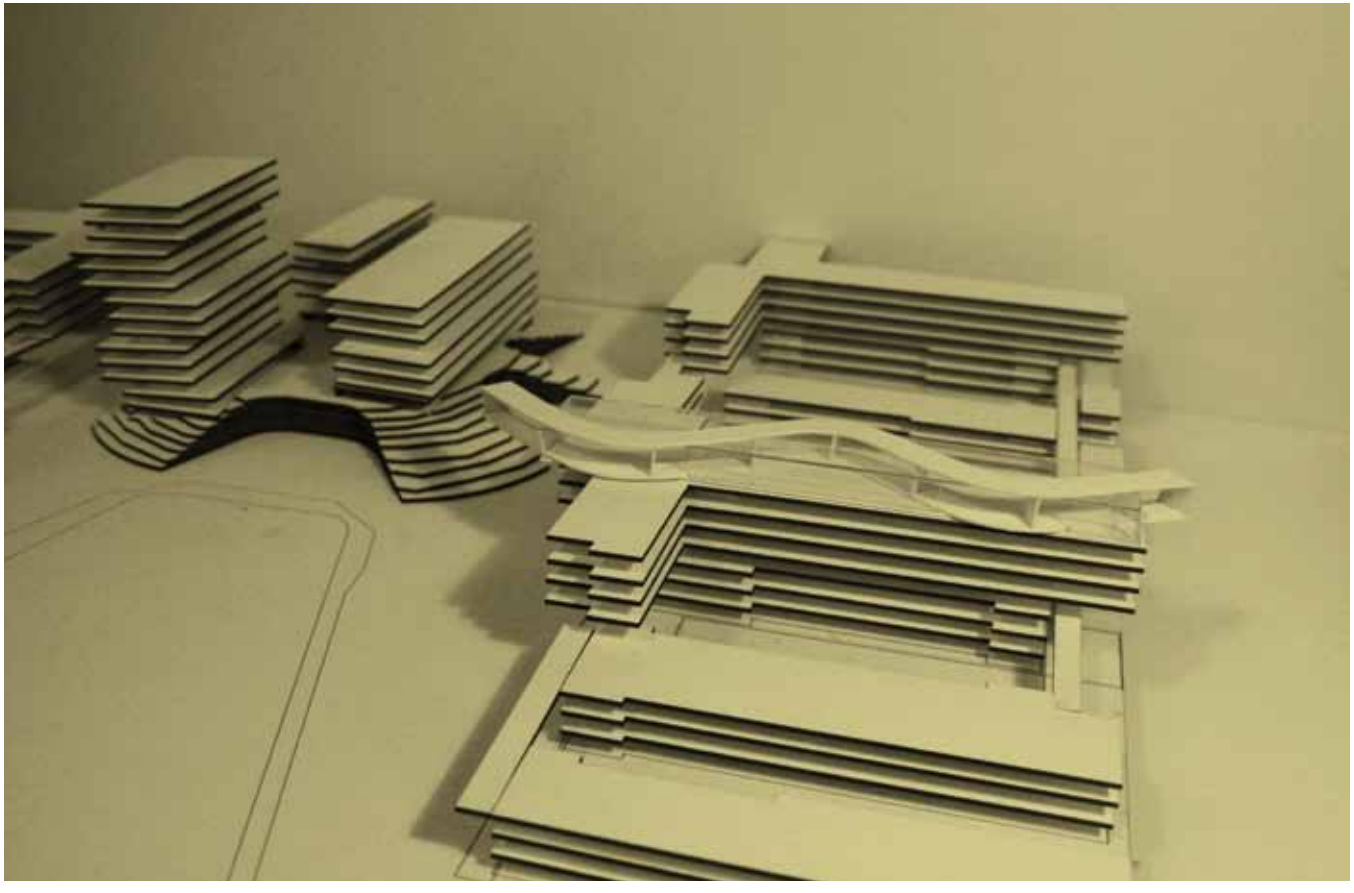
The new pattern should focus on living and leisure and thus on places to go to instead of a corridor that most clearly is associated with a prison, as discussed in our analysis [Program_Sociological]

The initial idea is to apply the planned vertical and horisontal logistics to connect the Dedicated Youth Hospital to the overall logistics of The New University Hospital complex. Furthermore the idea is to use the existing structural system of load bearing walls to keep the facade open and free.

Hereby the plan of a standard bed section in the New University Hospital in Skejby is intended as basis of the design of the Dedicated Youth Hospital and this motivates the following part of the process.



ill. 139. The plan of The New University Hospital in Skejby as a framework for the design of the Dedicated Youth Hospital.



ill. 140. Location on top of a bed section sketch model.

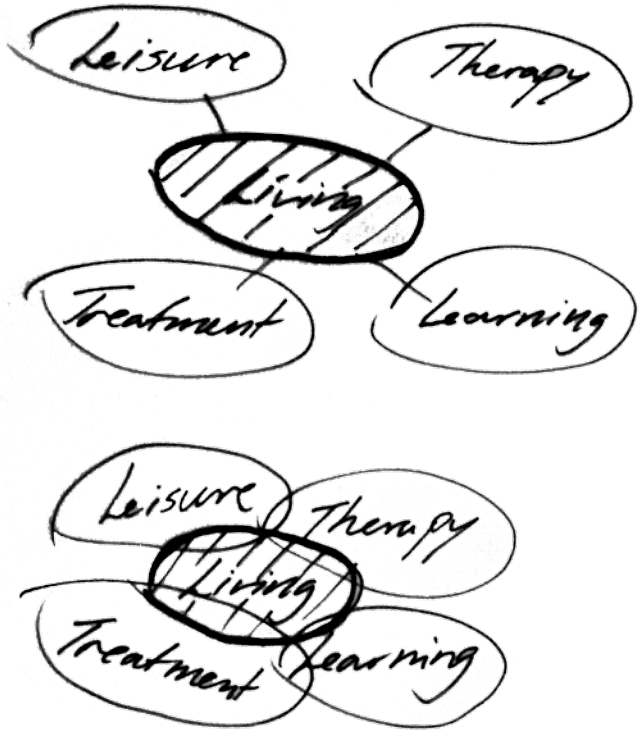
ORGANISATION

In order to create a new pattern for the Dedicated Youth Hospital within the frame of the New University Hospital in Skejby basis must be taken in the specific room program [Room Program] which we have developed based on our experiences, analysis and reference projects.

The room program can be divided into five areas.

- ***Living***
- ***Leisure***
- ***Therapy***
- ***Learning***
- ***Treatment***

As described in the design criteria the aim is that living becomes the centre of the arrangement, that is where the patient will spend most of the time while hospitalised. Furthermore nearness must be the keyword that connects the functions and creates relations between patients but also between patient and staff. Thus the overall aim is to find a way to organise the space so that they - literally speaking - float together.



ill. 141. Organisation diagram

ill. 142. ***"Pulsating"*** *shapes in a physical sketch model.*

PULSATING LIFE

With these general considerations concerning the room program as a point of departure, it has been the idea to develop a specific spatial concept for connecting the different functions of the program, what we call;
floating spaces

This in reference to our case study of Ørestadens School where corridors and classrooms have been replaced by open plans with zoning with different levels of privacy. [Program_Case Ørestadens School]

As the initial ideas took point in we envisioned living as a ***"pulsating"*** shape running through the rational structure of the proposed hospital. The aim was that this pulse could become the new structure that would create intimate as well as social zones and shape both architecture and furniture.

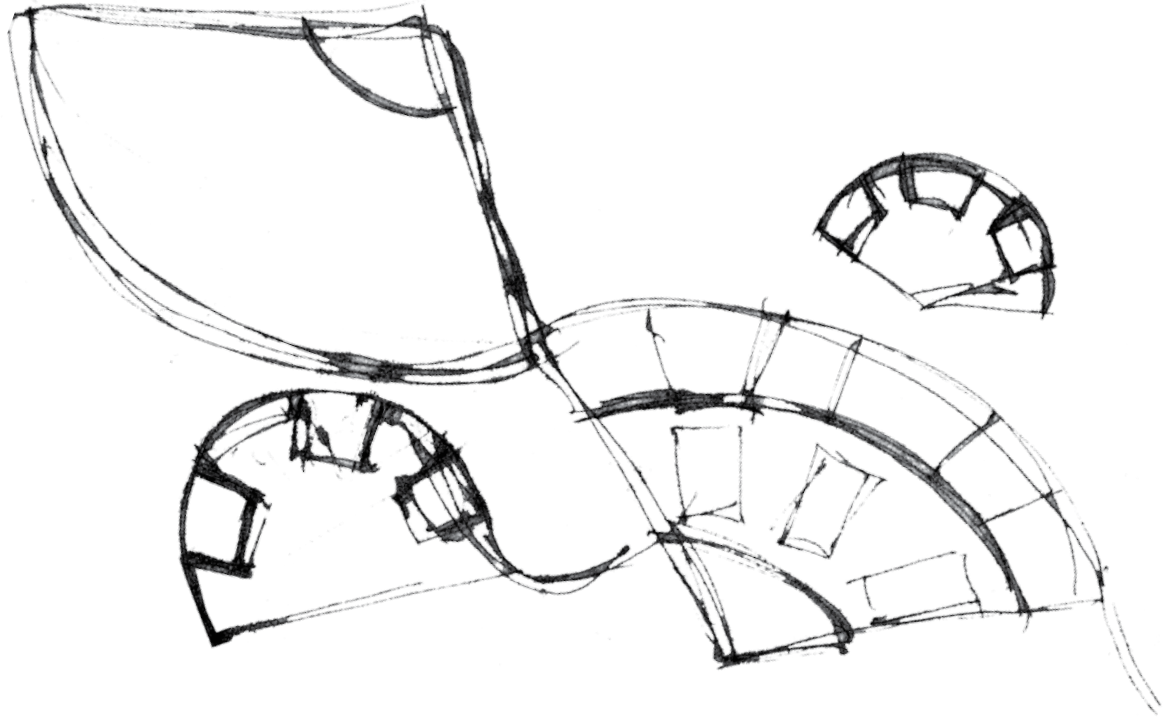
With ***living*** as the central of the arrangement it is crucial to zoom in on the how the patients can be accommodated. Thus, the following part of the sketching phase is focused on the organisation of the dorms.

INITIAL YOUTH DORMS

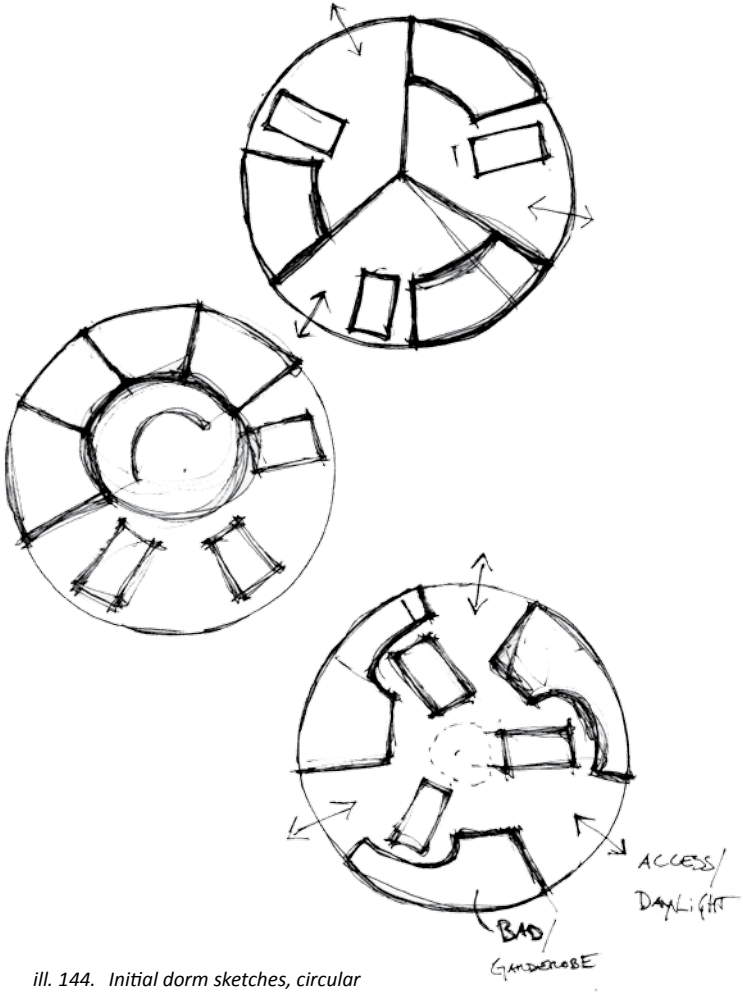
Considering the need of youngsters for a social platform while hospitalised, the ***pulsating*** life of youth is to be visualised through the ***floating*** spaces, with the dorms as a part of this.

We have chosen to focus on designing three patient dorms to accommodate the young patients. Thus, the initial focus is on how to enhance a feeling of solidarity within the dorm. The aim of this approach is that the young patient gets a feeling of belonging and that the dorm become an enjoyable place with an inviting atmosphere.

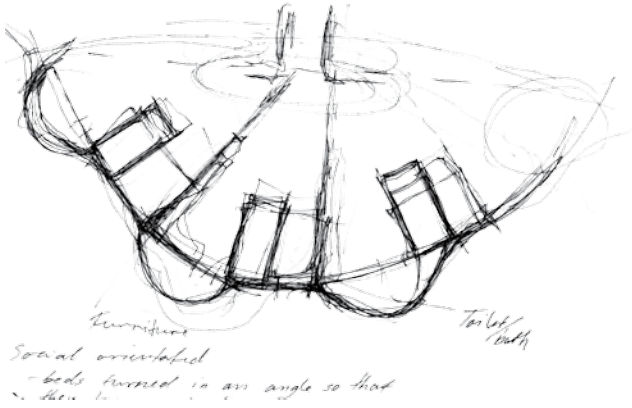
The initial sketches on plan ideas for the dorms are curved or circular shapes. This curved wall originates from the idea of turning the three beds a little bit towards each other, thus enhancing the feeling of solidarity. To develop the conceptual idea of ***living*** creating a new pattern the following part of the form finding process deals with developing the shape of the dorms in relation to the overall organisation of the Dedicated Youth Hospital.



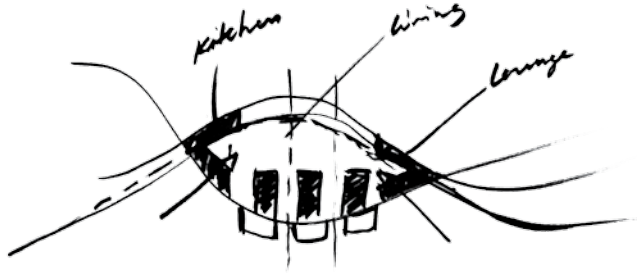
ill. 143. Initial dorm sketches, curved and triangualar



ill. 144. Initial dorm sketches, circular



ill. 145. Initial dorm sketches, curved in moon shape

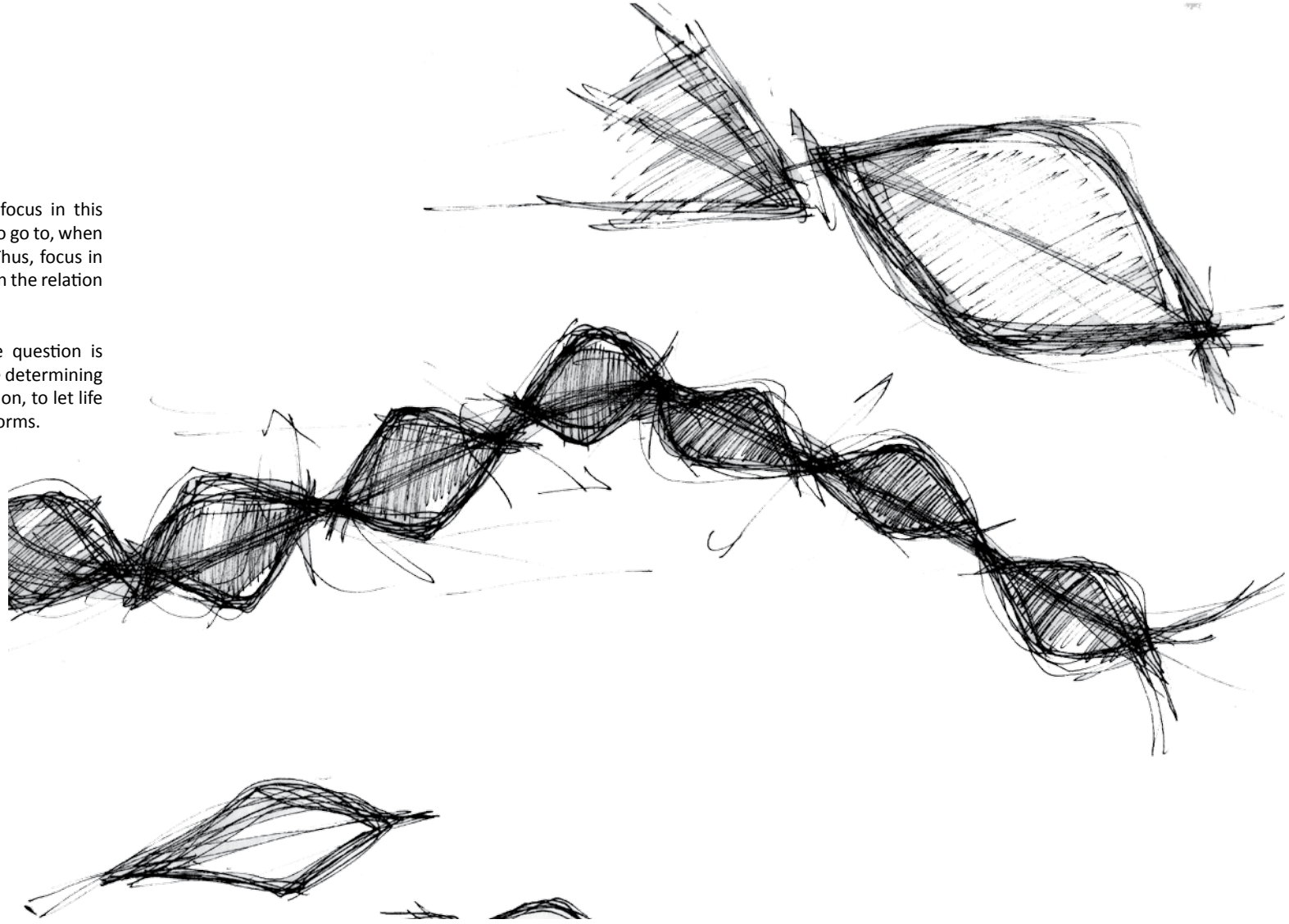


ill. 146. Initial dorm sketches, double curved

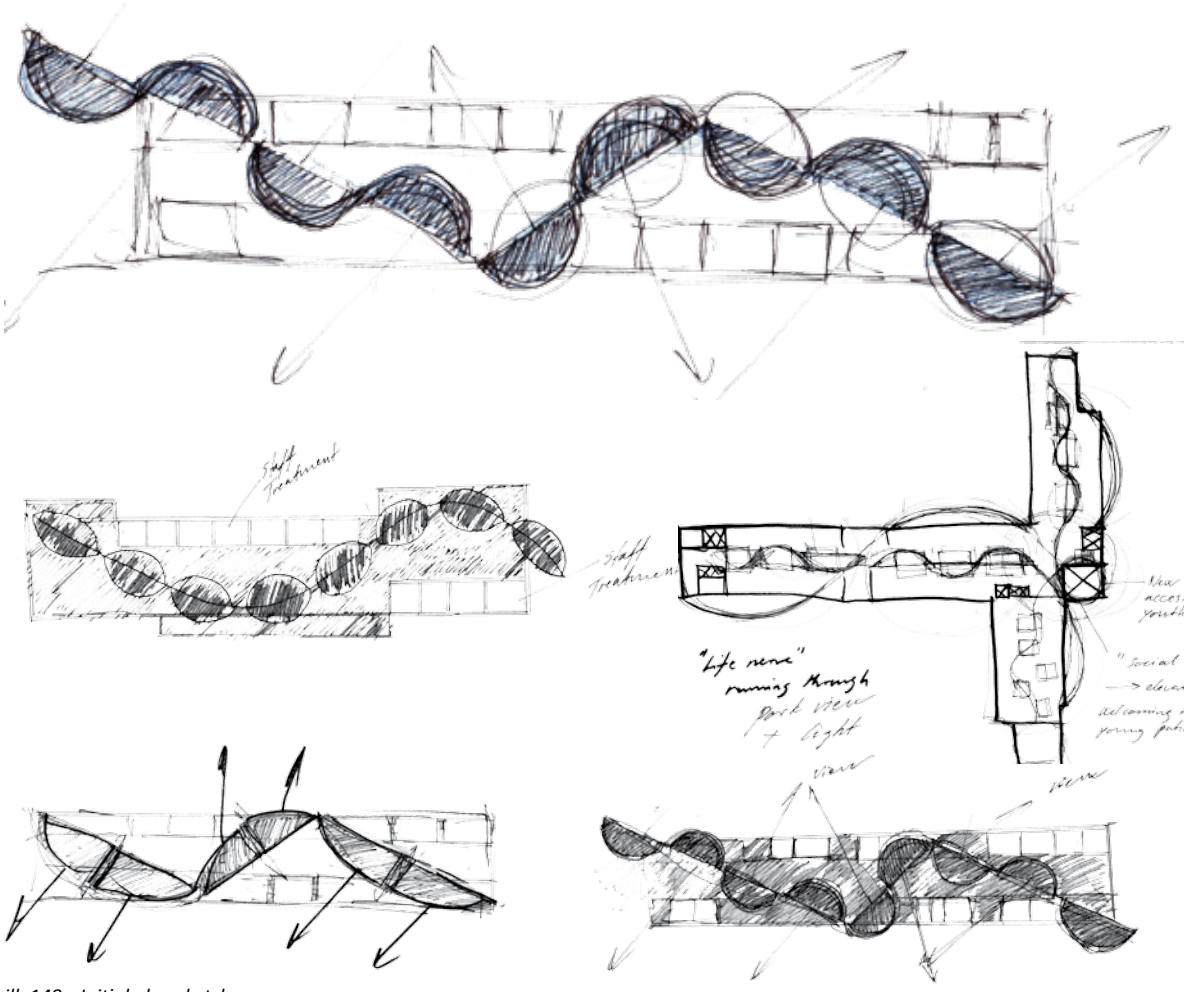
LIVING AND LEISURE

As mentioned in the analysis our specific focus in this project is on designing places for the young to go to, when they are physically able to get out of bed. Thus, focus in the following part of the sketching phase is on the relation between the dorms and the ***leisure*** spaces.

In continuation of the dorm sketching the question is whether the shape of the dorms can become determining for the organisation of the entire youth section, to let life and activities originate from the life in the dorms.



*ill. 147. Initial conceptual **living** and **leisure** sketch*



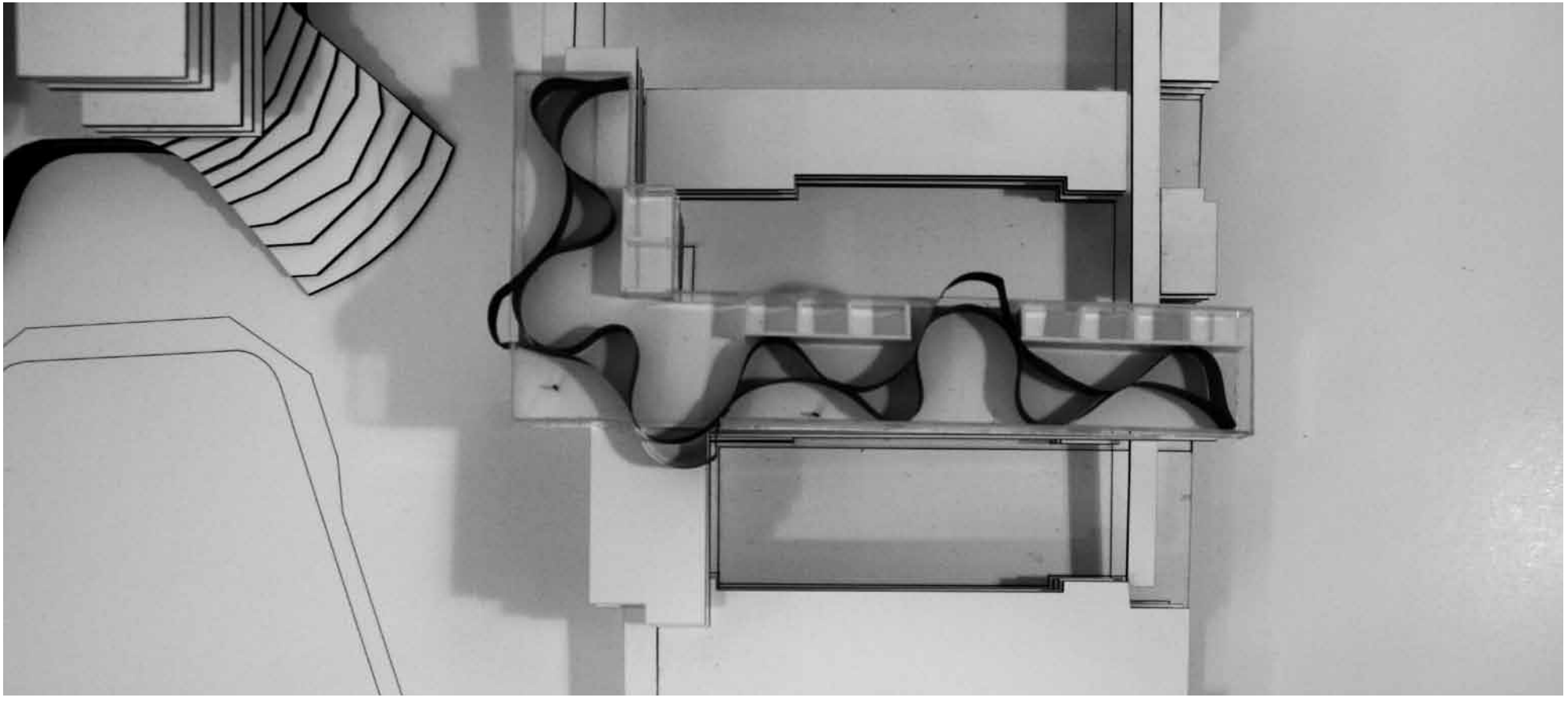
ill. 148. Initial plan sketches

INITIAL PLAN SKETCHING

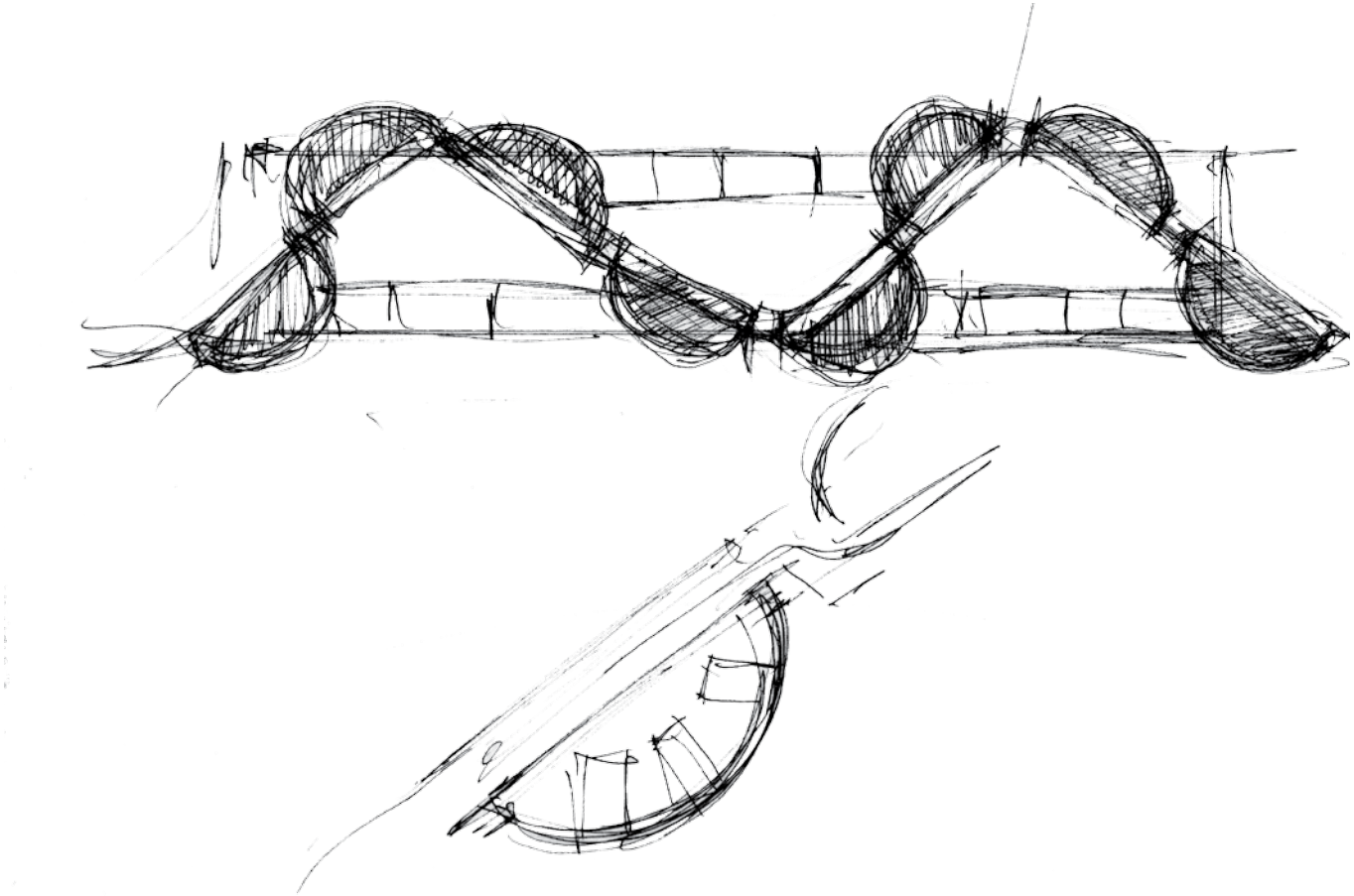
In a further development of the ***pulsating*** shape we find a potential in removing the corridor from the plan and letting the ***living*** represented by the dorms become the central part of the plan. Hereby the plan layout could be turned inside out to create an indoor park-like area for ***leisure*** and hereby views from the dorms towards activities the young patients can be part of.

The initial plan sketching is motivated by the idea mentioned above of "***floating***" relations between ***leisure*** areas and ***living*** and thus on how the ***pulsating*** shape can become spaces with hierarchy and different levels of privacy.

CONCEPT



ill. 149. Model photo of conceptual idea



*ill. 150. Conceptual plan sketches, relation between **pulsating** and rationality*

CONCEPT DESCRIPTION

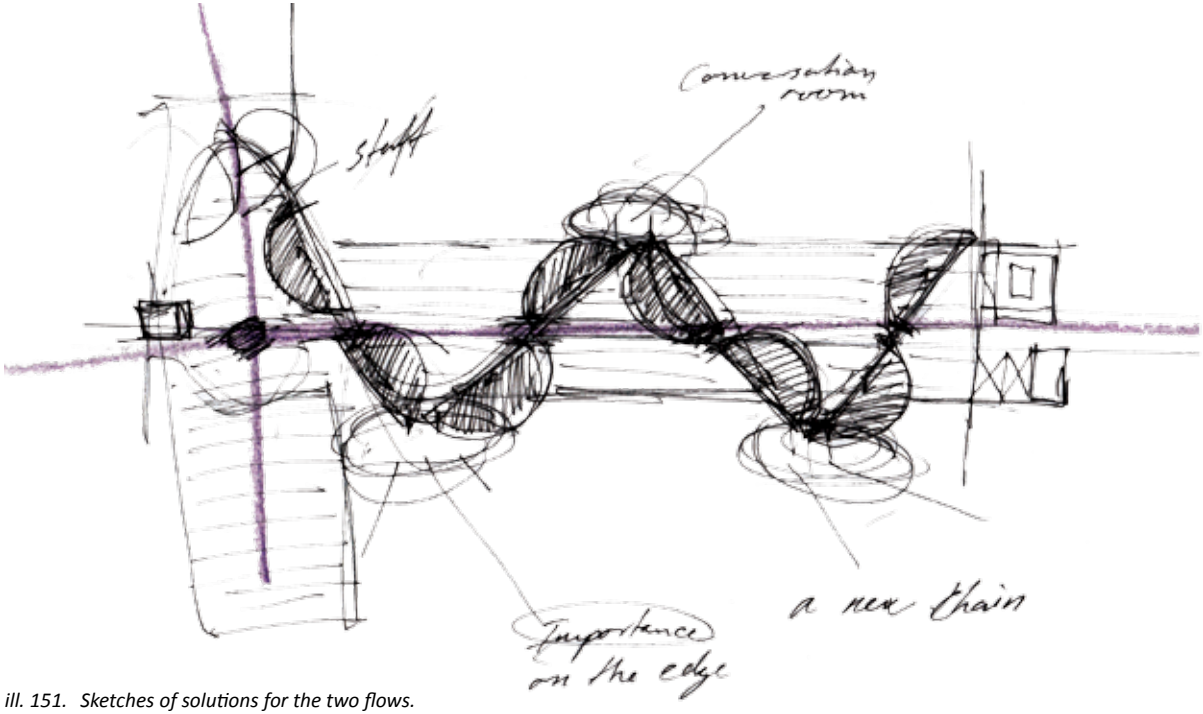
The architecture of the Dedicated Youth Hospital is beginning to take its form. The concept at this point is a ***"pulse"*** that runs through the floor plan on top of the proposed project for The New University Hospital in Skejby, creating spaces for ***living*** and ***leisure***. Each "pulse beat" contains a three-patient dorm and since these are away from the facade there will be a challenge in relation to daylight conditions in the dorms. This will be developed further in the process

The vital ***pulsating*** shape embraces the young patient throughout the hospital stay. In the following part of the process this concept will be developed by focussing on flow, access, zoning and light.

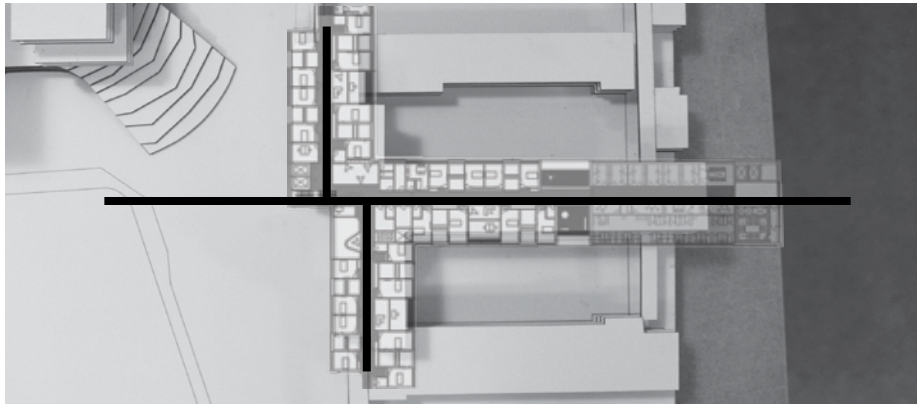
FLOW

In the work with the design of a new pattern created by ***pulsating*** shape, which makes spaces ***float*** together, there is still a need for rationality which will allow doctors and nurses to get from a to b as fast as possible.

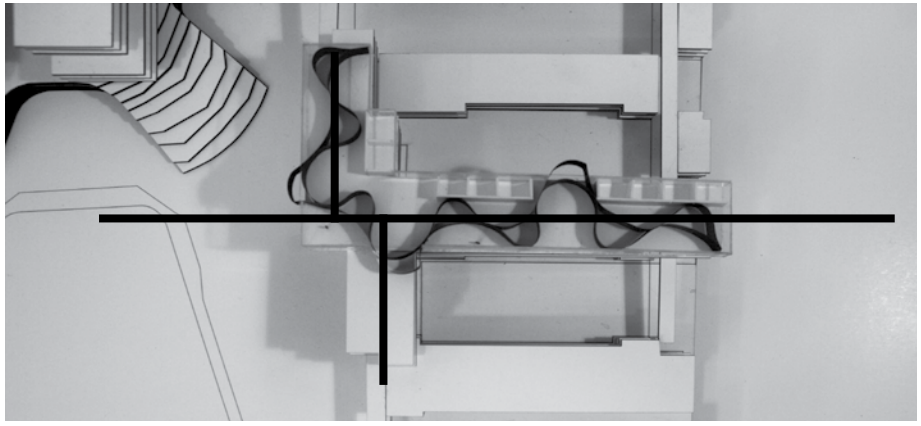
The central corridor equals a rational flow which links the youth floor to a subjacent floor, but since ***living*** is now the central element in the plan and the corridor in its usual nature is nowhere to be found, it is crucial to develop the concept so that nurse travel is limited. This, with reference to the lecture we had with Roger Ulrich where he described the importance of limiting nurse travel in planning in order for the staff to spend time care taking as described in the Experience part of the report [Experiences; Engel, Frier].



ill. 151. Sketches of solutions for the two flows.



ill. 153. The rational plan from the proposed project designed by DNU project team.



ill. 152. ***"Pulse"*** *with connecting lines to the rational flow.*

RATIONALITY

The necessity of rationality within the hospital brings up the idea of focusing on two flows; a free living flow that runs through the leisure areas and a rational flow that cuts through the plan at a width for beds to pass each other and function as an escape route.

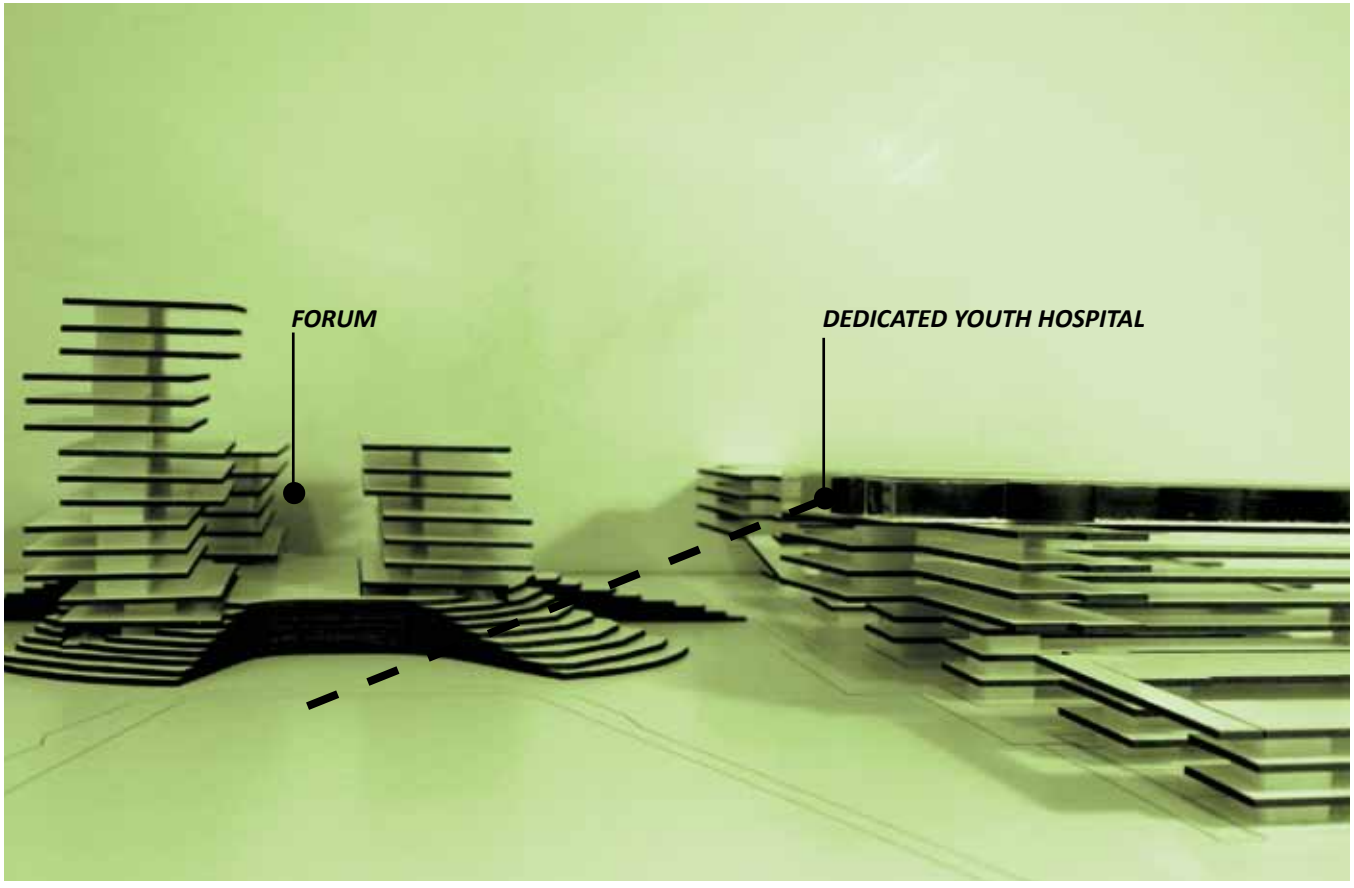
Hereby the idea is that the workflow is separated from the flow of patients and visitors so that there is a clear, obvious rational path for nurses, doctors, hospital porters, etc.

Based on this particular conceptual idea of having two flows defining the horisontal logistics of the Dedicated Youth Hospital the following part of the form finding will look into the access and thus the vertical logistics.

ACCESS

The decision to place the Dedicated Youth Hospital on top of the complex calls for a visual access characteristic -the youth structure as a contradiction to the basic structure of the New University Hospital.

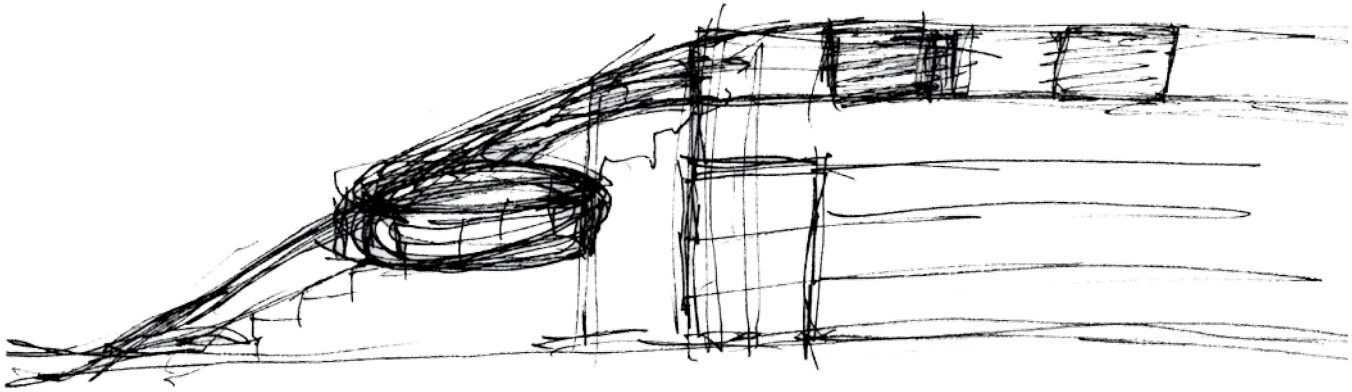
In continuation hereof the idea is to expand the existing vertical staircases, but more importantly, to design an independent vertical access, that clearly marks where the Dedicated Youth Hospital is situated - a landmark in the hospital town



ill. 154. Model photo, Dedicated Youth Hospital situated on top of The New University Hospital

The ***pulsating*** form that embraces the ***living*** and ***leisure*** must also be present when arriving at the hospital. Thus different solutions are initially sketched in a diagrammatic way to explore the possibilities.

We found that the external access that links the young to the central forum is most conspicuous and makes it visually strong, because the ***playfulness*** of the ***pulse*** contradicts and questions the rigid structure on the New University Hospital. In order to progress from the initial diagrams into an actual shaping of the access to the youth section, we need to develop the shape of the '***pulse***' more in detail. The following part of the sketching process will develop the architectural expression of the concept.



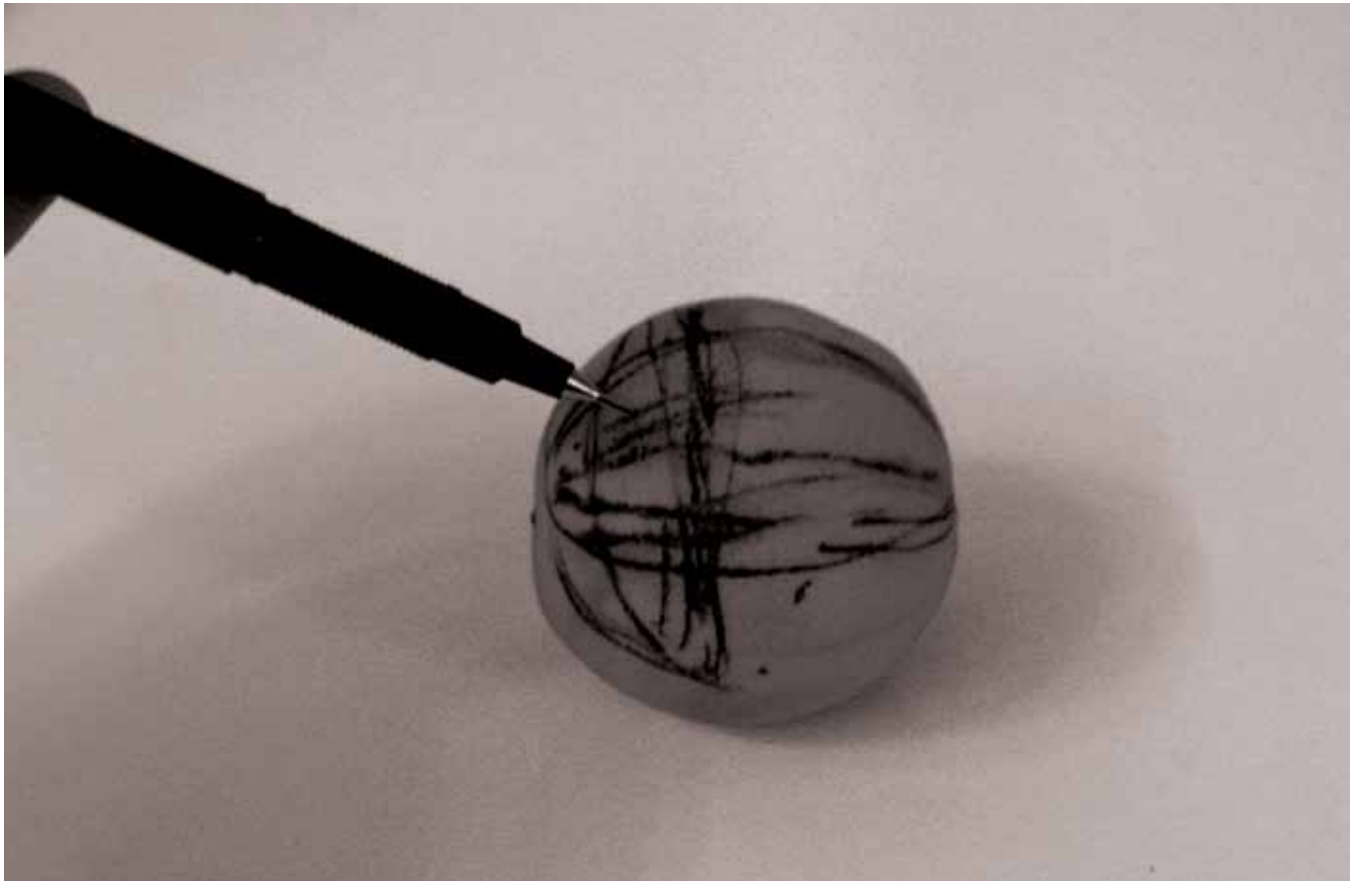
ill. 155. Sketch, access in looping shape.

FORM STUDIES

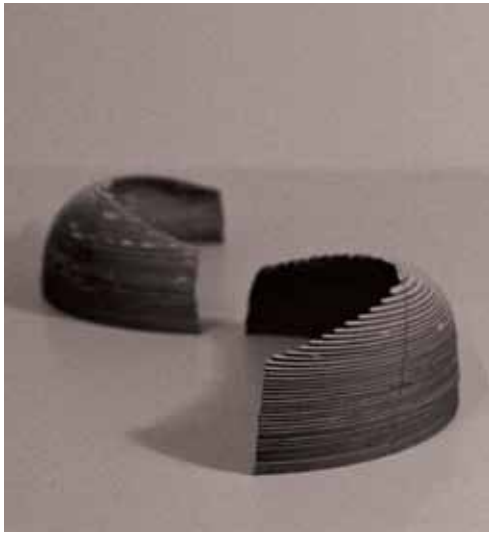
In order to progress from our initial sketches of the "***pulse***" as an organising principle into a more three dimensional development of the actual spaces we use hand sketching as the primary tool, but even though the shape is based on simple geometric curves we have become dependent on physical models as a means for understanding the spaces created by the double-curved surfaces of the organising ***"pulsing living"*** space. Therefore it was natural to work with models in a larger scale. Consequently, the following process is characterised by loops moving from hand sketching to 3D model made laser-cut models in order to develop the architectural shape.

The first physical model (Shape model 1) became too closed and heavy in its shape and thus not the playful light structure that could run easily through the floor plan to create a new ***living*** pattern in the hospital. So we began to work on a concept for how to let light into the dorm. The initial idea is that this shape could cut through the roof and pull daylight into the dorm. This will be explained further later in the process.

After a few try-outs the shape developed into a conceptual shape that we found had a potential that can be developed, with the aim of reach a characteristic architectural expression of the Dedicated Youth Hospital. In the following this shape will be developed for the plan solution of the dorms.



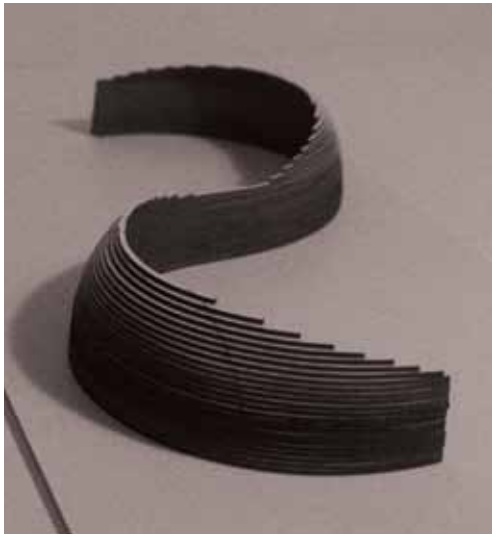
ill. 156. Skethcing on an orange to get an understanding of the shape.



ill. 157. ***Shape model_1****, too static and closed in it´s shape*

ill. 158. ***Shape model_2****, Too incoherent in it´s shape.*

ill. 159. ***Shape model_3*** *Not enough curvature*



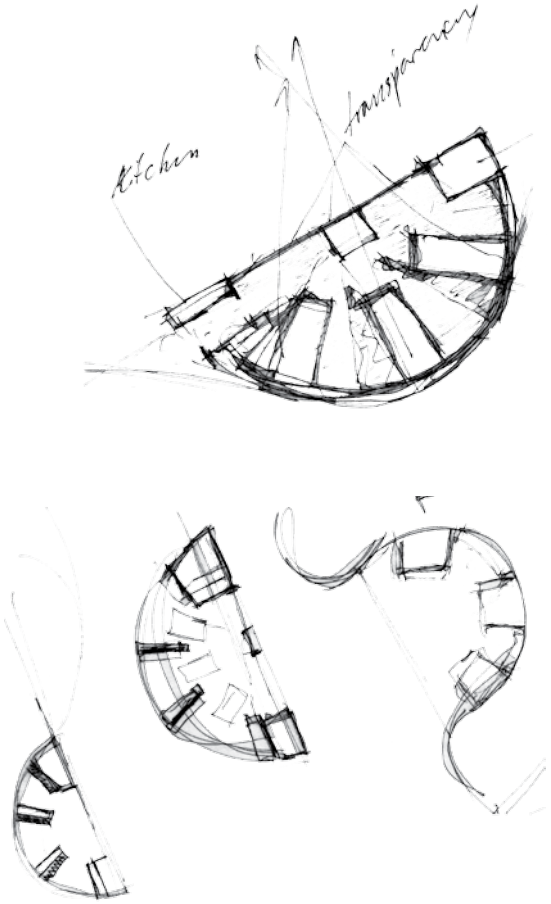
ill. 160. ***Shape model_4*** *vital and pulsating shape.*

YOUTH DORMS

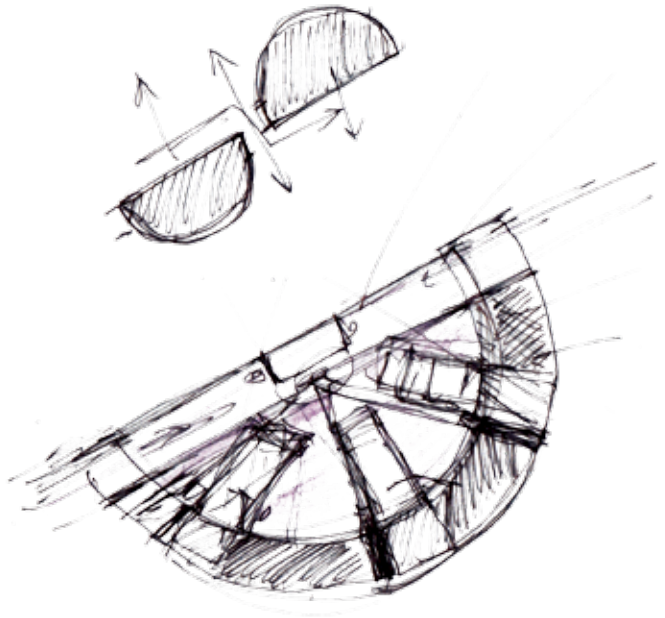
The following part of the form finding focuses on developing the specific organisation of the dorms focusing on the needs of the young patient: privacy and social platform. The overall focus is on enhancing a feeling of ***solidarity*** within the dorms. Furthermore on zoning the space of the dorm, to make it possible for the individual patient to create his own personal space. In the following focus is on developing different ideas on how to organise the dorm through plan sketching.

The potential of the idea of utilising the curved wall to create two zones is developed in the following progress. The conceptual idea is to have a private zone near the curved wall and the possibility of bringing the bed forward and thus be part of a more common zone.

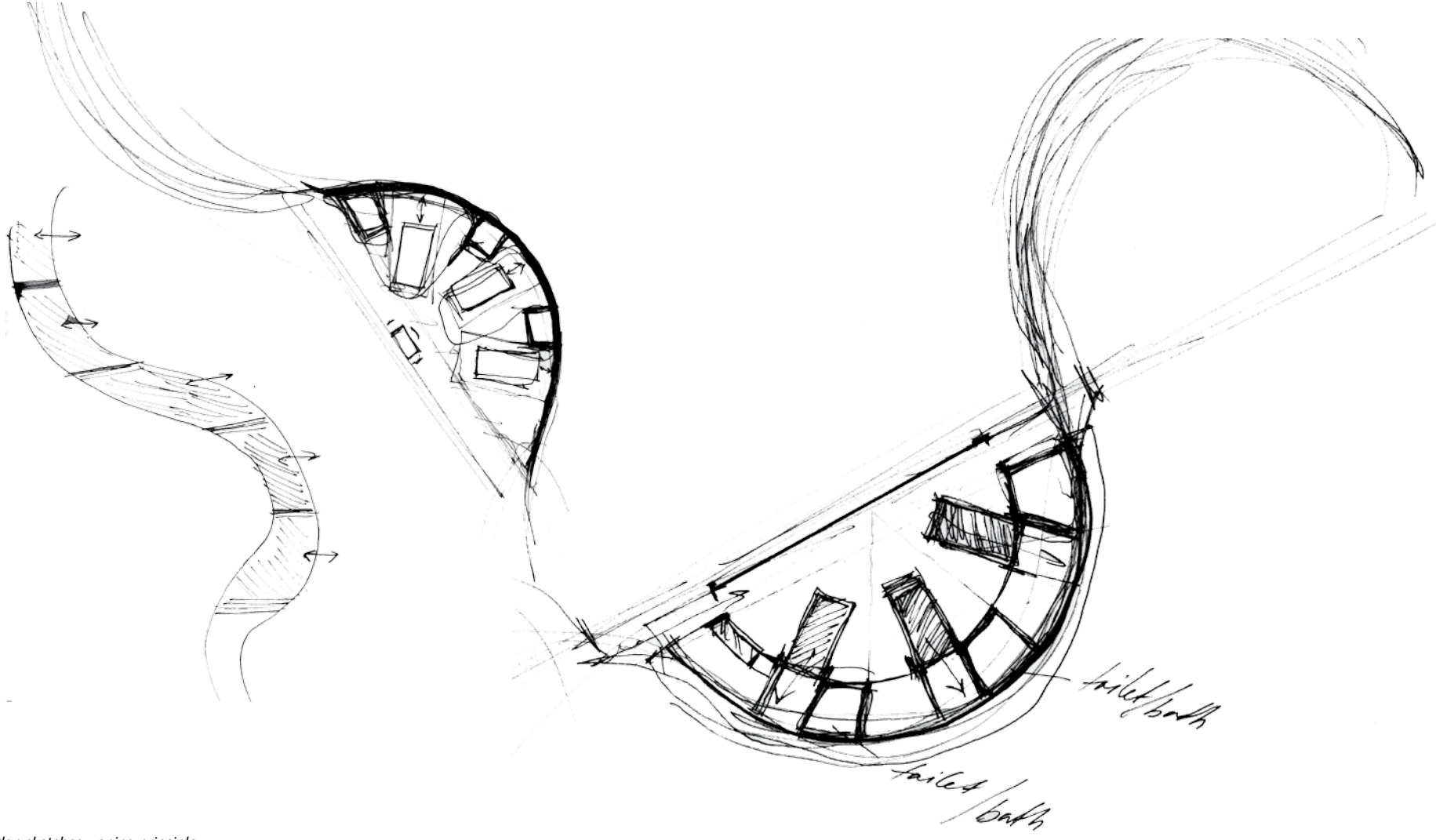
Motivated by our experiences [Experiences; Engel, Frier] during the visit at Aarhus University Hospital where young patients shared positive and negative perspectives on sharing a ward, ideas of having common facilities within the dorm such as kitchenettes, flatscreens, and furniture have been sketched.



ill. 161. Plan sketch of dorm shape



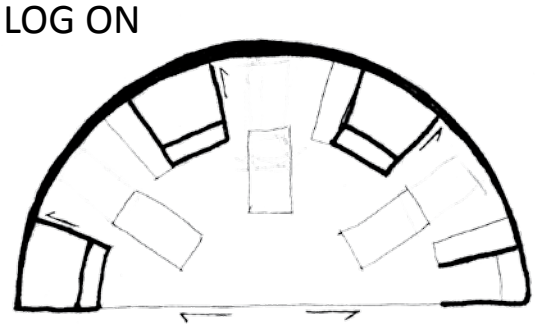
ill. 162. Plan sketch, zoning principle



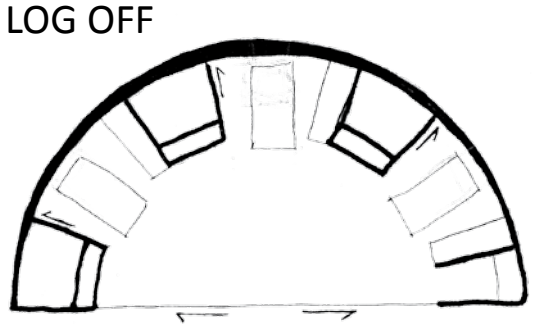
ill. 163. Plan sketches, zoning principle

REGULATIONS

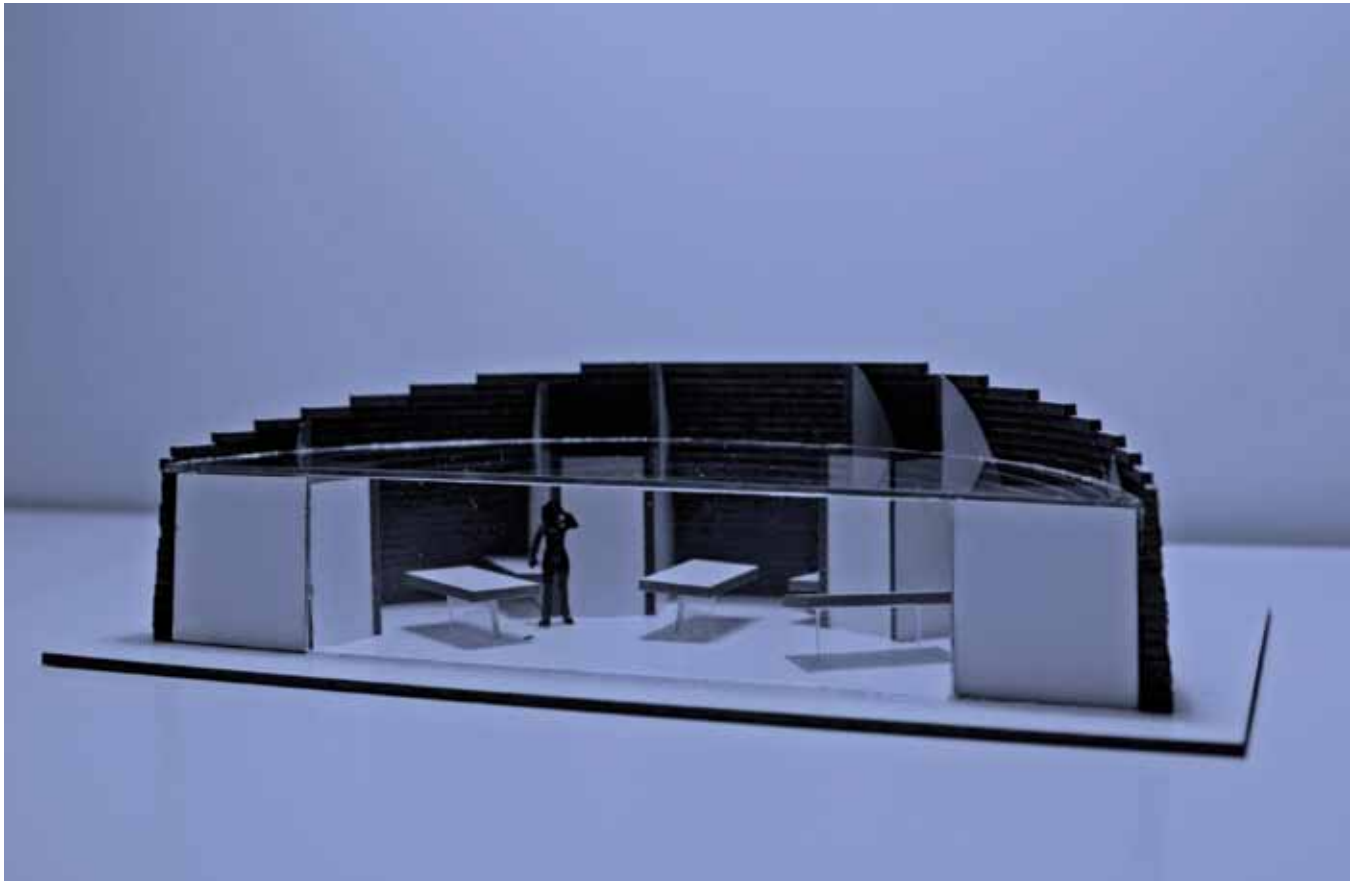
To concretise the conceptual idea of the dorms this part of the process zooms in on the dorm in order to refine the arrangement and shape in relation to the overall architectural expression of the Dedicated Youth Hospital. Thus, sketches of more precise dimensions are developed, based on the guidelines stated in "den gode sengestue (the good ward). [Nørgård,2003]. The publication describes the more measurable guidelines such as the size needed as reverse area for a wheelchair, space needed for storage etc. In order to get an idea of how the space is perceived the plan sketch is made into a physical model. Even though the space fully answers the regulations in the publication the space seems cramped when looking at it in the physical scale model (model photo on opposite side] thus this must be further developed in the process.



ill. 165. Plan sketch of dorm, logged on



ill. 164. Plan sketch of dorm, logged off.



ill. 166. Spatial sketch model of dorm.

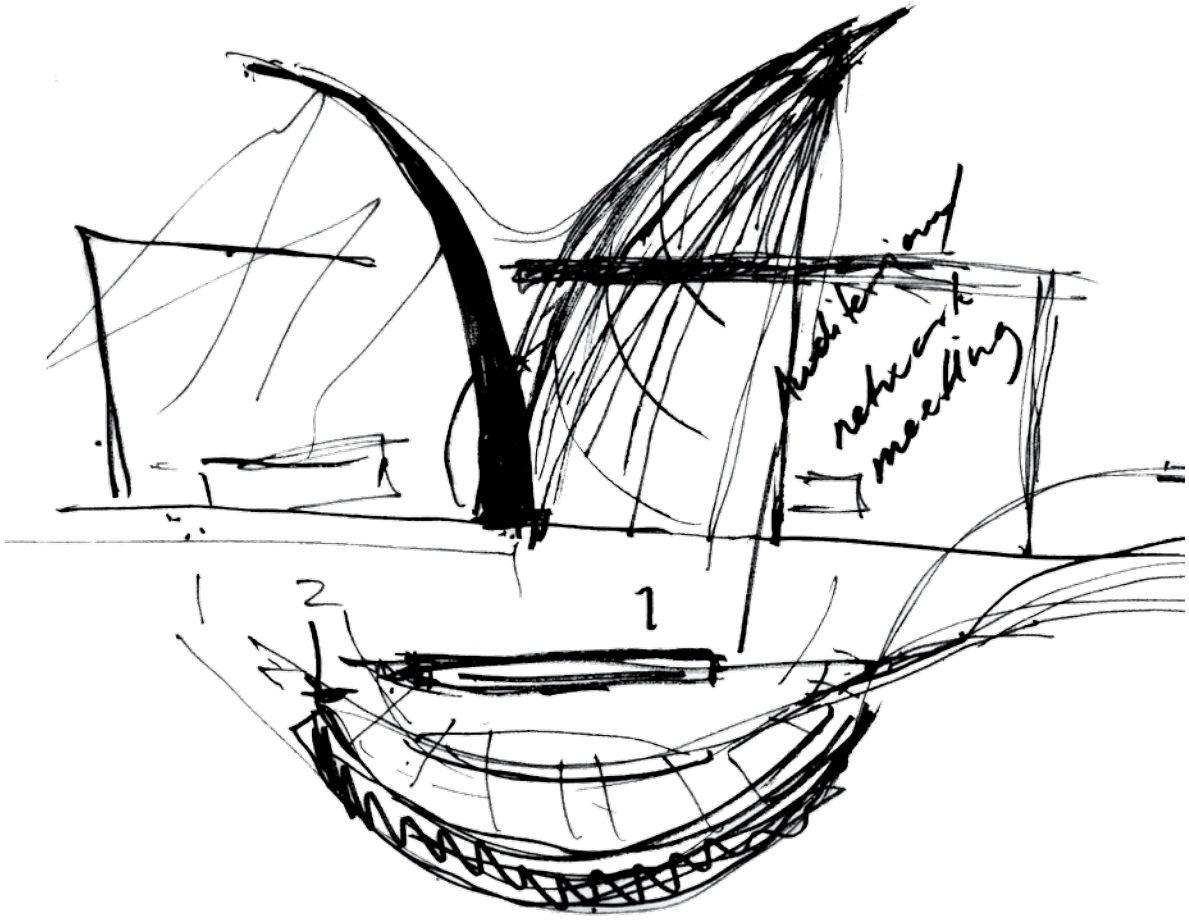
Looking into the regulations for sizes of baths and toilets in hospitals, according to the guidelines written in the publication `det godebadeværelse`[the well proportioned bathroom] it is obvious that they must be bigger in order to live up to the regulations. The zoning principle is developed into a concept where the patient can log on and off, that makes it the individual patient's choice to socialise and share knowledge with the other patients.

When hospitalised it is important to be able to sense the passing of the day not to become isolated, as stated in the analysis [light]. In the following part of the form finding the concept of the dorms will be developed with regard to daylight.

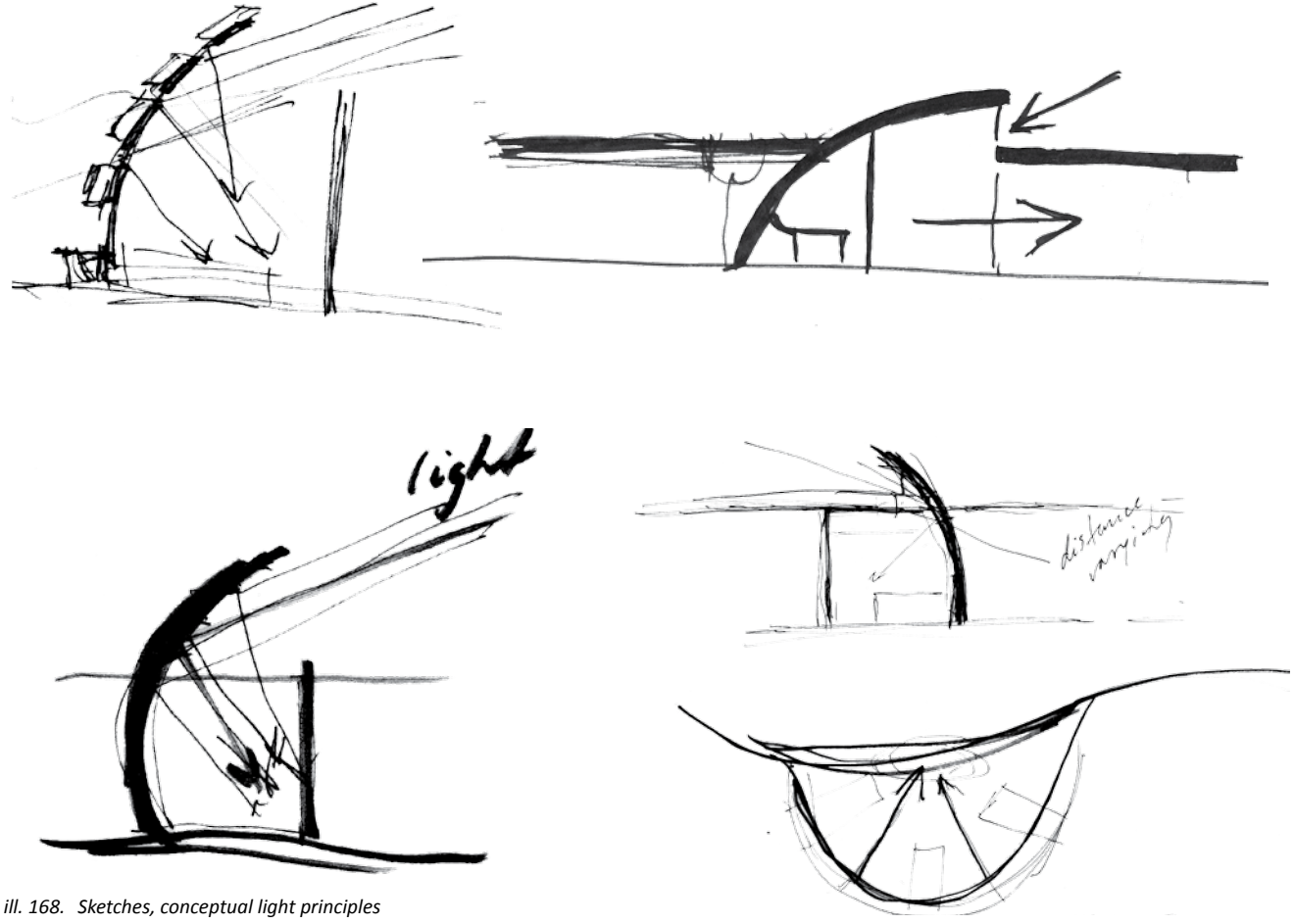
LIGHT

As stated above in the concept, the ***pulsating*** shape has caused a situation where the dorms in the plan will be situated with a distance to the facade. Consequently, pulling the dorms away from the facade and thereby the direct contact with daylight makes it essential to work with how a skylight can increase the amount of daylight in the dorms.

Motivated by the above mentioned, the initial idea is that the light from above can be used to enhance the ***pulsating*** shape of the curved wall. In the following part of the process focus will be on developing ideas of how the skylight principle can become vital for the architectural perception of space in the Dedicated Youth Hospital.



ill. 167. Sketch, conceptual light principle.



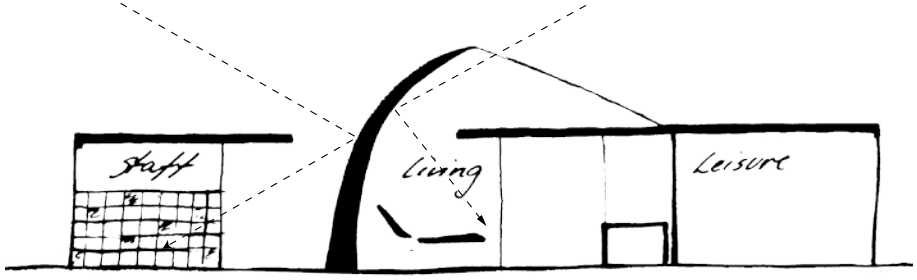
ill. 168. Sketches, conceptual light principles

LIGHT CONCEPT

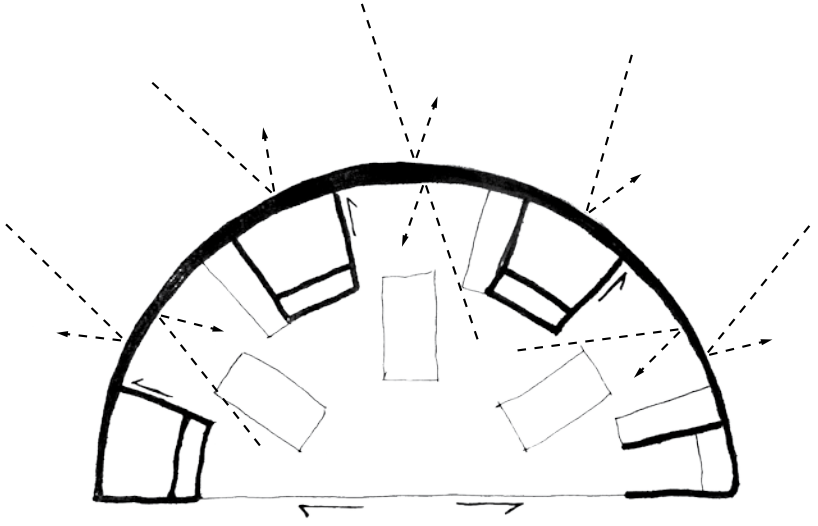
By extending the circle section of the ***pulsating*** shape through the roof, we find a unique potential for the design of a skylight. The conceptual idea for the skylight is to use the concave side of the curved wall to pull light into the ***dorm*** during the wintertime when the sun is low in the sky and, at the same time utilise the convex shape of the curved wall to spread the light into the ***leisure*** and staff areas.

Since the overall project idea is that dorms are situated in the beats of the ***pulsating*** shape, the curved wall will be orientated in different directions, some facing north and some south. The idea is that the skylight principle can be developed so that the distance between roof and the curved wall varies according to orientation.

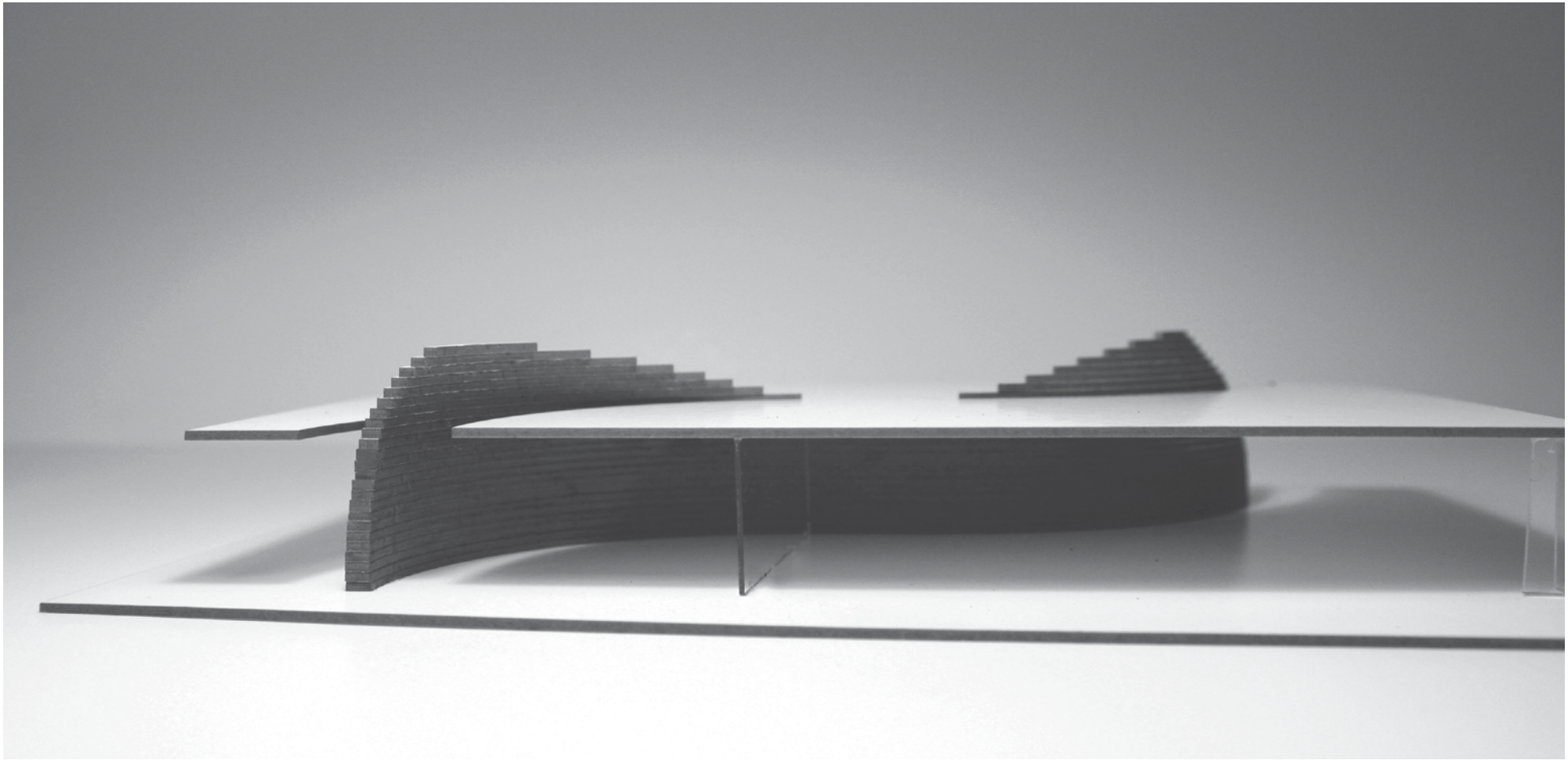
In order to develop this principle further, investigations are made in a physical model and in the simulation program Ecotect [note] in order to examine how much light the skylight will be able to bring down into the ***dorm***. In relation to our analysis [Light] the aim is to have 2,000 lux for at least some hours a day to reduce the risk of depression for the patients and staff. With basis in these quantitative goals the vision is to refine the principle so that it will enhance the intimacy in the dorms.



ill. 169. Section sketch of light principle.



ill. 170. Plan sketch of light principle.

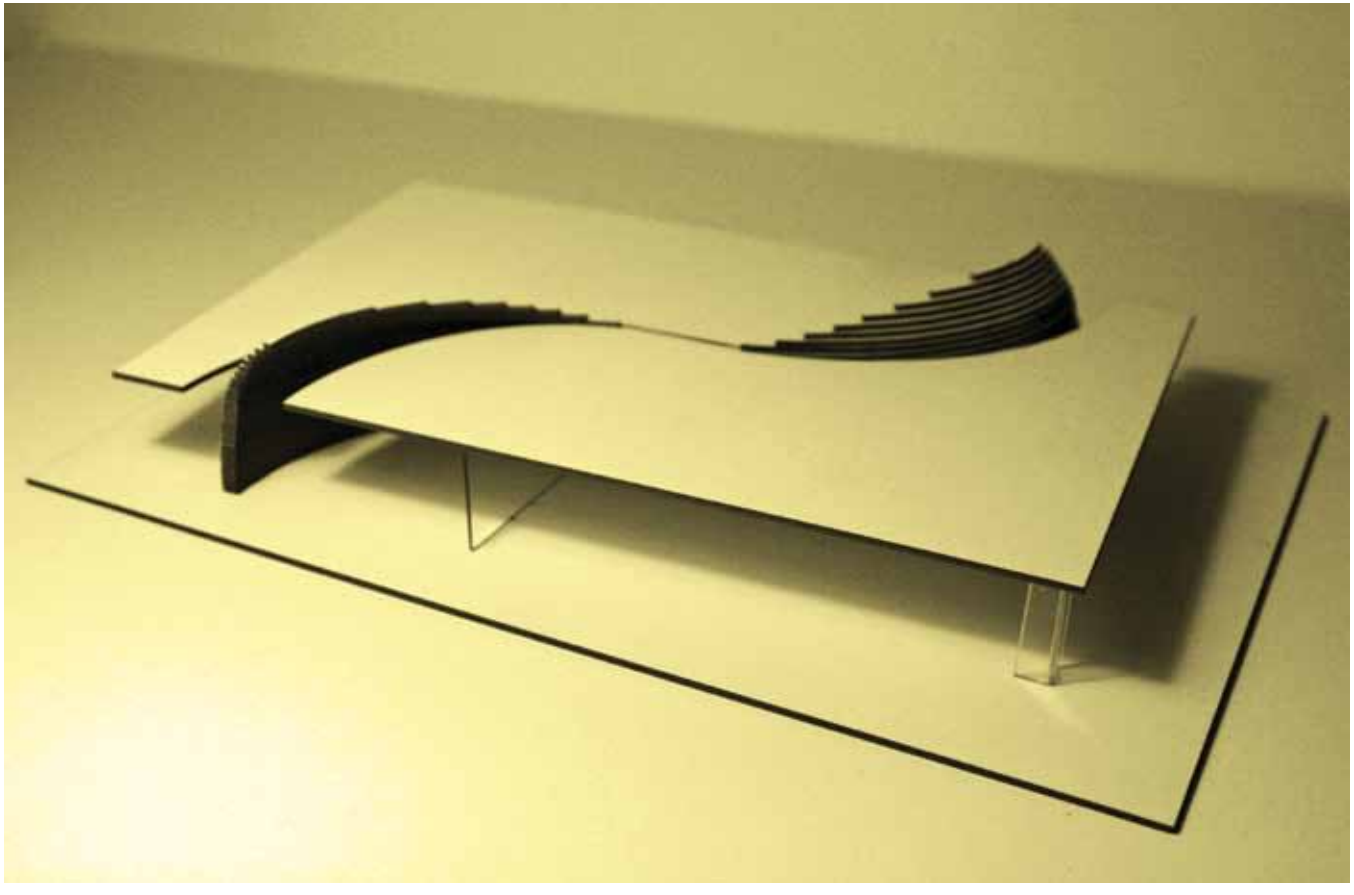


ill. 171. Section model of light principle, curved wall dragging light into the dorm.

LIGHT INVESTIGATIONS

In order to refine the lighting principle, the simulation program Ecotect[3] is utilised. The focus of the investigation is on how the light can support the atmosphere in the dorm, and on estimating how much daylight the skylight can bring into the dorm.

The investigation starts from the fact that the curved wall can be orientated in different directions to investigate the influence it will have on the daylight conditions in the dorms. The aim is to enhance a welcoming atmosphere and achieve a daylight level of about 2,000 lux during the Winter months for some hours, and at the same time to create a transparent relation between living and leisure areas in the plan by turning the main view form the dorms inwards.Sketch model of light principle, the curved wall cuts through the roof and pulls the light into ***living*** and ***leisure*** areas.

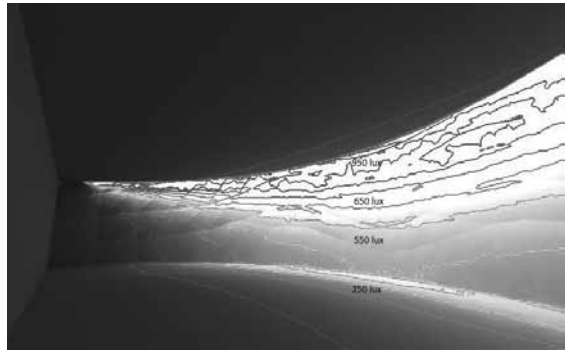


*ill. 172. Sketch model of light principle, the curved wall cuts through the roof and drags the light down to **living** and **leisure** areas.*

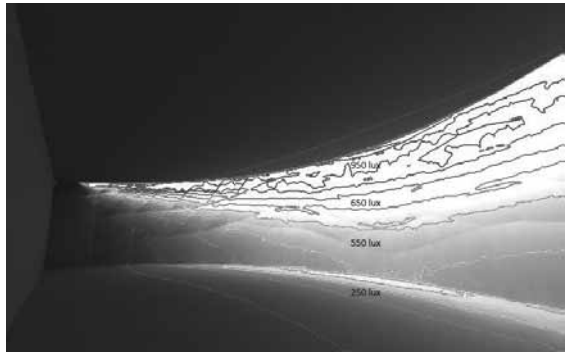
In this part of the process studies in physical model are supplemented with simulations in using digital tools. The lux levels from the skylight are tested to investigate the daylight levels in the dark winter months, as the worst-case scenario. According to the evidence described in the chapter light in the analysis [Light], exposure to high daylight about 2,000 lux for a few hours a day, can minimise the risk of depression and help ensure a stable circadian rhythm. Knowing that the Danish winter daylight is at an average around 3000 lux on a cloudy winter day [natural frequency], which means that the abundant daylight can be difficult to reach during winter. The analysis of the ***dorm*** visualises how a different orientation of the skylight affects the lux levels in the dorms. In the investigation we focus solely on the daylight from the skylight and not on the indirect light from the facade to get an understanding of the level of daylight the dorm will get from the skylight.

As seen in the illustrations to the right the daylight conditions in the dorm facing north will be the same as in the dorm facing south on a cloudy day since there will only be the daylight from a cloudy sky. When looking at the lux level, a maximum of about 950 lux is reached in the part of the space near the wall. Thus we need a larger gap between the roof and the curved wall to achieve the 2,000 lux, or focus should be on how much indirect daylight the dorm will get from facade. Consequently, we must expand our investigation to find a way to refine the design of the light principle.

In the following investigation focus is on a more detailed analysis of how daylight will spread in the dorm space, thus the model used in Ecotect is developed with toilet/bath cores and a larger gap between roof and the curved wall.



ill. 174. Simulation of daylight form skylight inside dorm.
21st Dec 12.00 cloudy day. Skylight towards north



ill. 173. Simulation of daylight from skylight inside dorm.
21st Dec 12.00 cloudy day. Skylight towards south

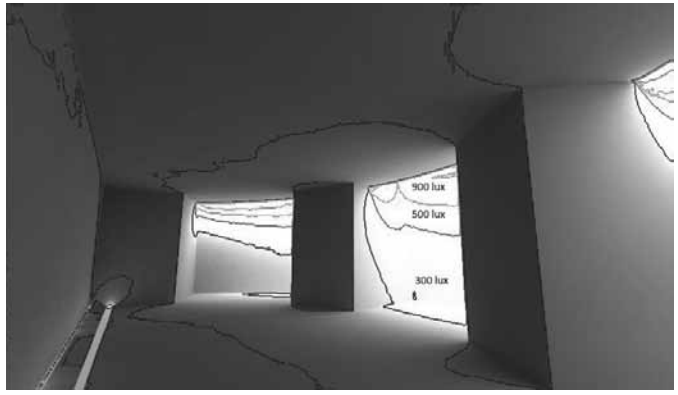
SKYLIGHT

In continuation of the initial conceptual simulations of the dorms described above, the aim of the following is to take the light investigation a step forward, thus focus on the daylight conditions in the dorm during winter in relation to the conditions during summer and include interior in the investigation. In order to do thisthe investigation focus on comparing a cloudy winter day with a sunny summer day.

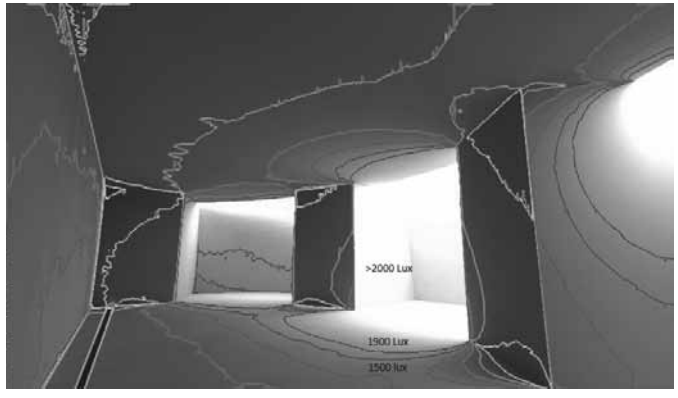
On the winter day the maximum daylight achieved from the skylight reaches 900 lux whereas the sunny day is above 2,000 lux.

When looking more closely at the daylight conditions for the sunny day it is obvious that there is a risk that the daylight can be blinding for the patient since the sun is high on the sky. Thus, solar screening must be considered in the final design. A system of sun shading in the summertime would furthermore give the young patient the choice of controlling the amount of daylight in his private niche and thus a direction for further detailing the design.

In this investigation focus is solely on daylight from the skylight, further on in the process our focus will be on the relations between ***dorms*** and ***leisure*** areas and thus on how much indirect daylight will be taken from the facade into the dorms.



ill. 175. Simulation of daylight from skylight inside dorm.
21st Dec. 12.00 Cloudy day. Skylight to the south.



ill. 176. Simulation of daylight from skylight inside dorm.
21st June 12.00 Sunny day. Skylight to the south.

*ill. 177. Model photo of dorm, the curved wall pulls the light into the **living** area, in this photo shown with glass roof to visualise the interior and zones.*

CONCEPT DEVELOPMENT

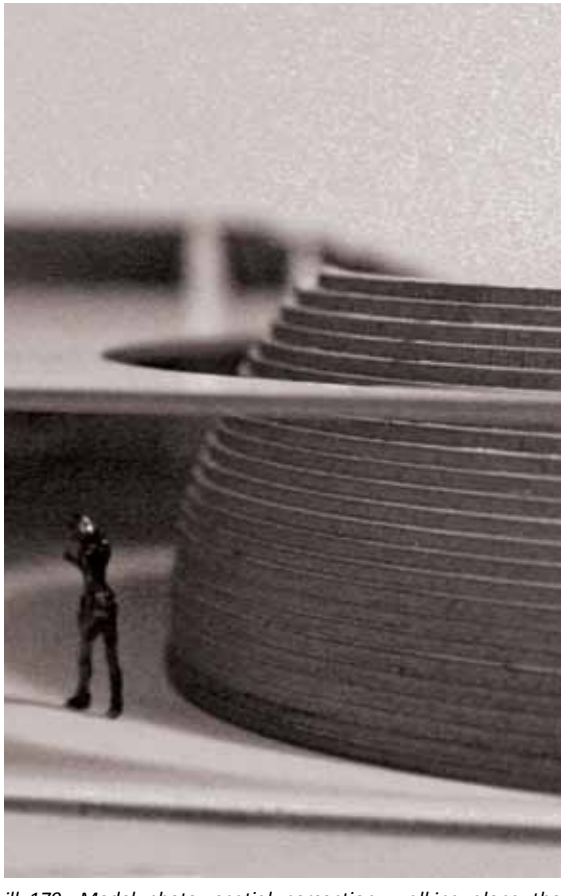
*ill. 178. Model photo, conceptual shape, showing how the **pulsating** curved shape run through the Dedicated Youth Hospital creating the organising principle and spatial concept of this novel hospital typology.*

Having finished the initial concept investigation and developed a spatial and organisational concept for the Dedicated Youth Hospital and we are now ready to enter more elaborate design part. Thus the following part of the form finding process is focused on developing the concept with regard to perception and organisation. The aim is that the ***pulsating*** shape in the form of the double curved wall can create spaces for privacy as well as for social activities for the young.

Based on the plan solution for a bed section in the New University Hospital in Skejby designed by C. F. Møller architects and the DNU project team, the vision is that the Dedicated Youth Hospital will have the same number of patients per square meter, but provide spaces for leisure during the hospital stay of the young.

As stated in the analysis [Program_Theme] the aim is design spaces where the young can develop while hospitalised. In the following we will go into the design development at a more detailed level in order to investigate if the vision is obtainable.

SPATIAL PERCEPTION



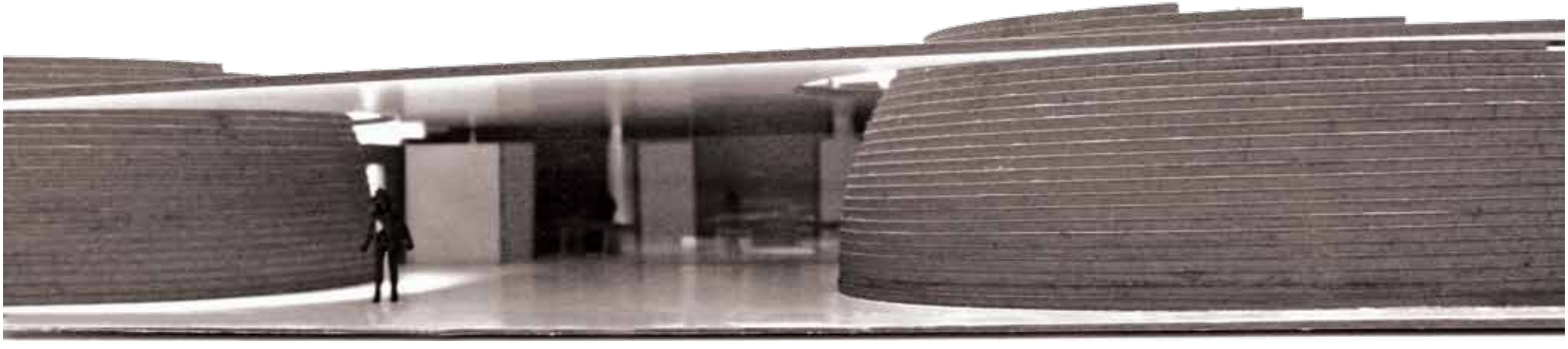
ill. 179. Model photo, spatial perception, walking along the curved wall.

The desired experience of being in the Dedicated Youth Hospital is characterised by the light and ***playful*** double curved wall. The idea is that this wall - metaphorically speaking - can take the young patient through an otherwise tough hospital stay. The shape of the skylights follows the shape of the vault of the curved wall, thus fetching natural daylight into the leisure areas creating an inviting atmosphere.

The leisure spaces hem in the dorms like front and backyards: these spaces open up and close to create different levels of privacy for the young patient. Thus, the views from the dorms are spaces of varying size and shape for different types of activities.
This conceptual idea for activities in the Dedicated Youth Hospital is now to be developed further and held together with the more measurable vision of having the same number of patients per square meter as in the designed plan for The New University Hospital in the following process.

The following part of the process will focus on developing the shape in relation to construction and thus focus will be on joints and detail.

ill. 180. Sketch section, shoving the dorms, and their relation to the leisure spaces.

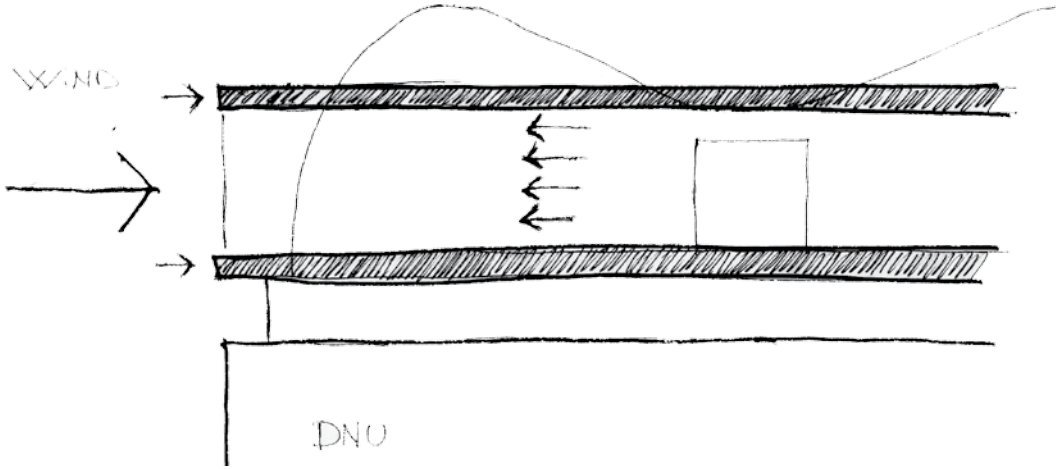


ill. 181. Model photo, perception of leisure space, walking along the curved wall experiencing the light from the skylight enhancing the curved shape.

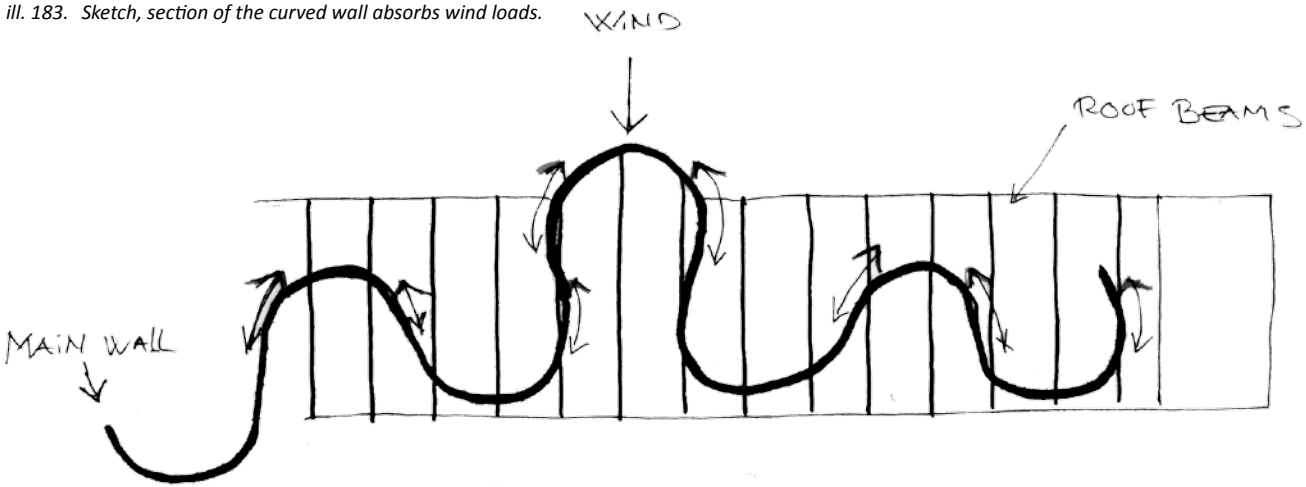
CONSTRUCTION

The overall concept in relation to the construction of the Dedicated Youth Hospital is that the pulsating shape created by the double curved wall becomes the load bearing structure. In the following part of the form finding process different technical solutions are sketched to develop the architectural expression of the Dedicated Youth Hospital. The structural system of the New University Hospital plan below is designed with load bearing inner walls. Since the Dedicated Youth Hospital has a different functional layout the challenge is to lead vertical and horizontal load from the designed plan down to the walls in the New University Hospital.

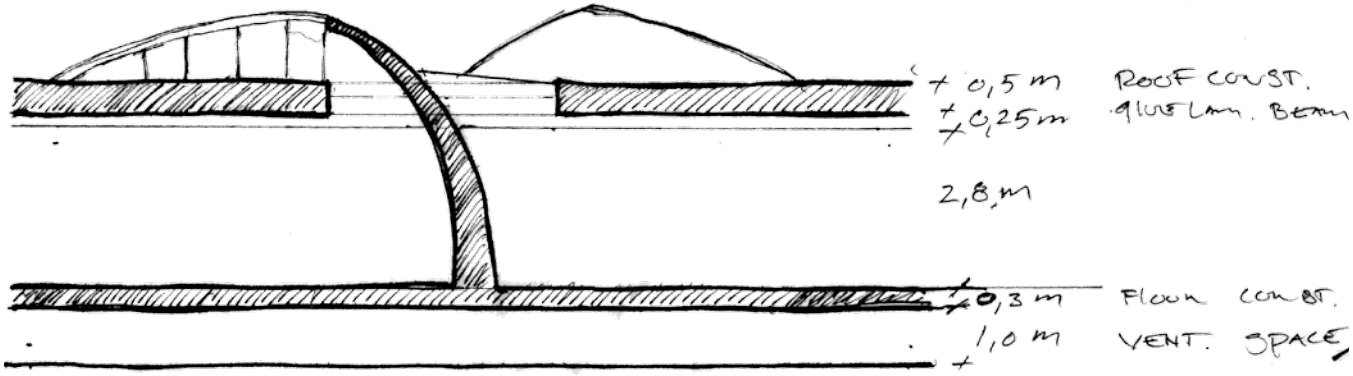
The curved wall is staged as the main element in the building functionally, socially, architecturally and structurally. Initially the idea is to use the curved wall as a concrete structure placed on top of a concrete slab which will distribute the loads from the curved wall to the inner walls below. The concrete should have a rough texture to articulate the skylight and to enhance the visual strength of the wall and thus its characteristics. On the other hand such a concrete construction could become too heavy in its architectural expression and construction wise it seems more reasonable to build a light structure at the top floor ñ just like in a traditional building. The Dedicated Youth Hospital comes to be the light roof top structure that protects the building below.



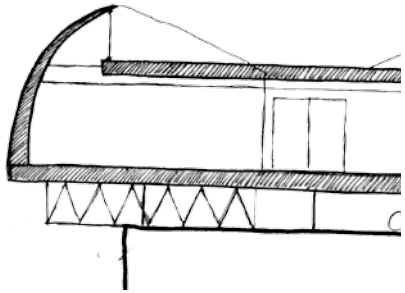
ill. 183. Sketch, section of the curved wall absorbs wind loads.



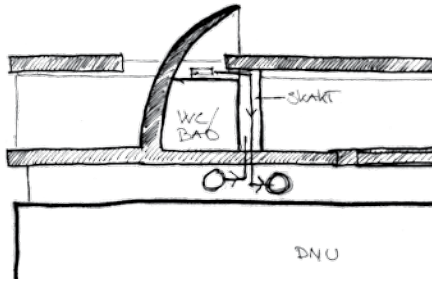
ill. 182. Sketch, plan of the the curved wall absorbs wind loads.



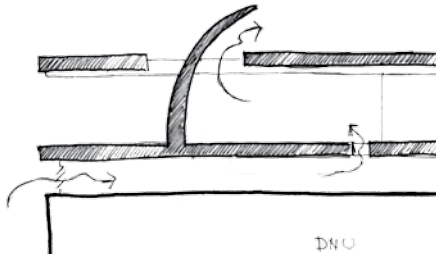
ill. 184. Sketch section, curved wall detail.



ill. 185. Sketch, structural principle for cantilever.



ill. 186. Sketch, mechanical ventilation principle.



ill. 187. Sketch, natural ventilation principle.

Another issue with the concrete structure is the need to insulate the curved wall when penetrating roof or facade, which will double the thickness of the curved wall. Consequently, a light steel structure with a wooden cladding is chosen. The double curved steel structure can absorb both tension and pressure, which makes it possible to cantilever the curved wall and distribute loads form the roof and wind loads on the facades. Furthermore insulation can be placed within the construction.

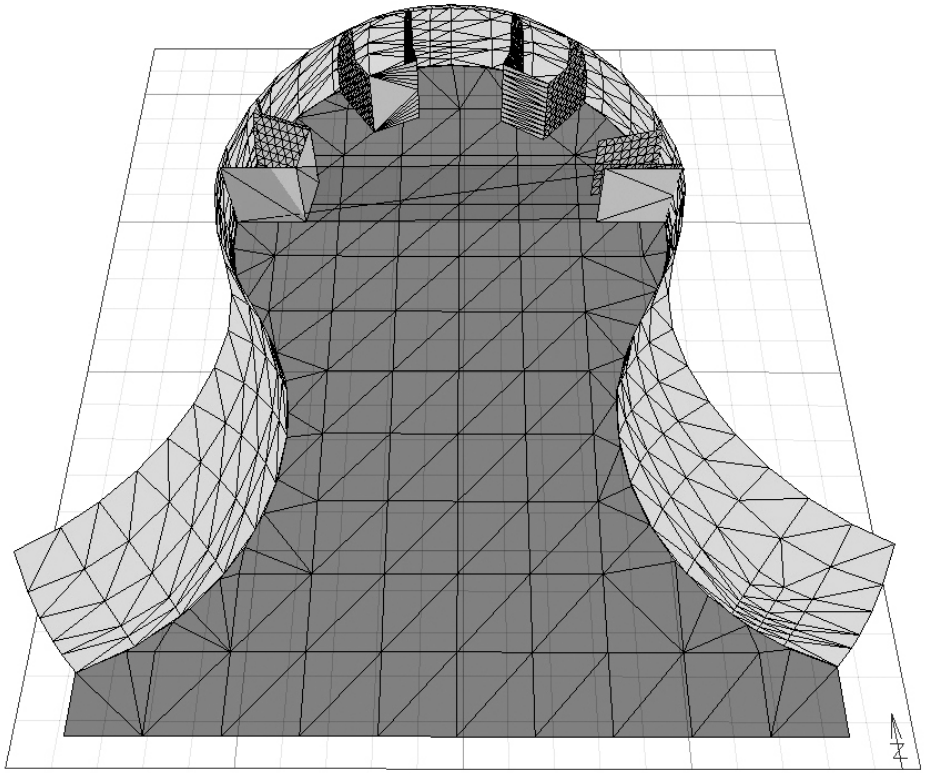
The need for large utility and ventilation shafts in a hospital requires a suspended ceiling. This does not compel with the desired lightness of the roof that becomes visible when the curved wall cuts through to fetch daylight into the building. To minimize the roof/ceiling construction the horizontal ventilation shafts are placed within the 1 meter high steel beams, below the floor, which distribute the loads from the floor of the Dedicated Youth Hospital to the load bearing inner wall below. Furthermore natural ventilation can be applied with air ducts from the facade below the floor and controlled by the patients' possibility to adjust the opening of the skylight window in the dorm.

In continuation hereof, ideas on how to design the meeting of roof, glass and the curved wall are sketched. Since the amount of daylight is important the skylight design has to be developed further. On the following pages the skylight opening is investigated.

LIVING LIGHT INVESTIGATION

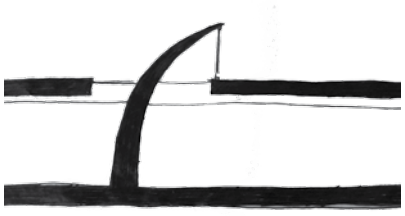
In continuation of the preceding considerations regarding construction of the skylights, this part of the process concerns the further development of the lighting principle. Thus, focus is here on developing and detailing the size and width of the skylights in relation to the perceived quality of light in the interior. Based on the previous light investigations, the following investigates will focus on whether it is possible to reach the daylight level needed in the dorms. As mentioned earlier research has shown that a daylight level of 2000 lux is needed a few hours a day in order to enhance a feeling of well being and to help a healing process [Program_Light].

However, in addition to this particular quantitative light-measure, which can be estimated through digital simulations as illustrated below, we are also interested in simultaneously evaluating the more qualitative aspects of the experienced atmosphere created by the skylights in the dorms. Therefore the digital simulations are continuously held together with physical models, which are crucial in achieving an understanding of the three dimensional and material qualities of space and light.

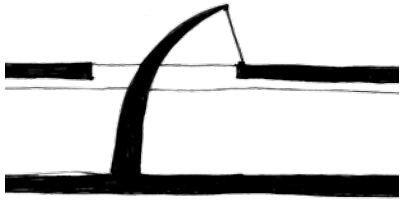


ill. 188. Spatial geometry in Ecotect, model of dorm and leisure, topview.

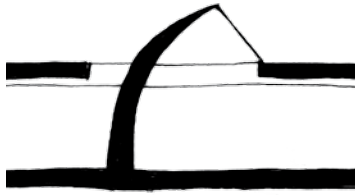
LIGHT SIMULATION FOR LIVING AND LEISURE



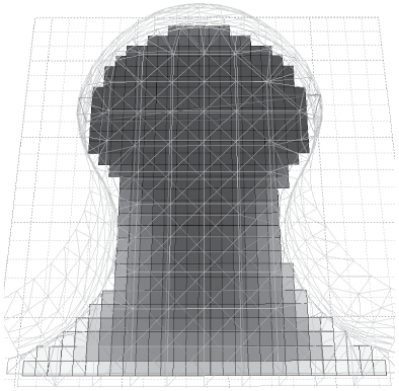
ill. 192. Section sketch, distance between roof and curved wall.



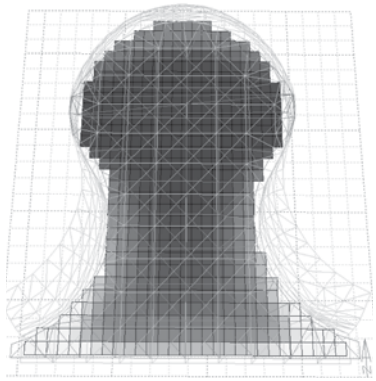
ill. 193. Section sketch, distance between roof and curved wall -0,5m.



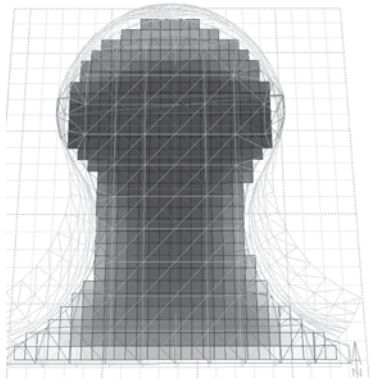
ill. 194. Section sketch, distance between roof and curved wall -1 m.



ill. 189. Ecotect simulation for Dec.



ill. 190. Ecotect simulation for Dec. roof -0,5 m.

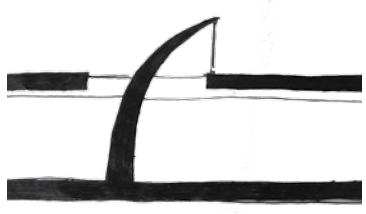


ill. 191. Ecotect simulation for Dec. roof -1 m.

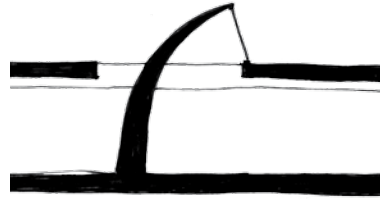
A simplified model of the dorm is modeled in the simulation program Ecotect in order to investigate the quantitative light conditions during the darkest months to focus on the worst-case scenario.

The investigation concerns the depth of the roof in relation to the curved wall thus different scenarios are examined, as illustrated on the sketches;

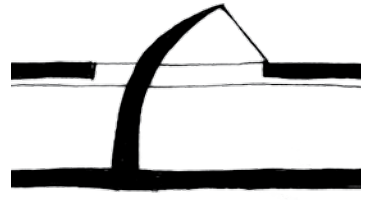
- Roof under curved wall's top
- Roof under curved wall's top -0,5m.
- Roof under curved wall's top -1,0m.



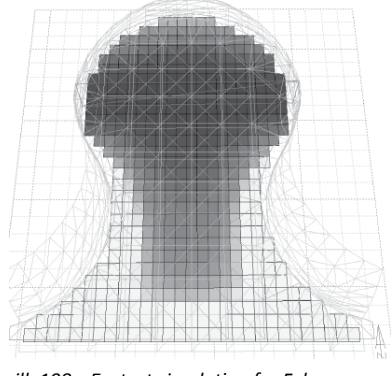
ill. 195. Section sketch, distance between roof and curved wall.



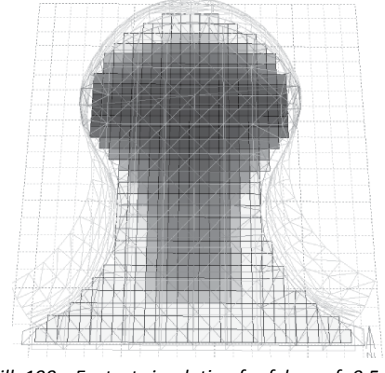
ill. 196. Section sketch, distance between roof and curved wall -0,5m.



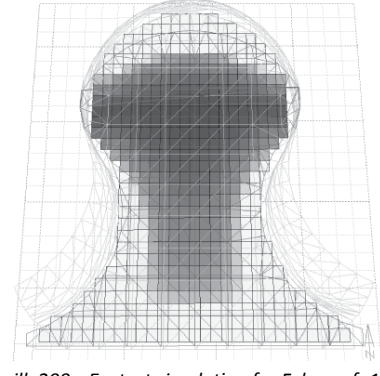
ill. 197. Section sketch, distance between roof and curved wall -1 m.



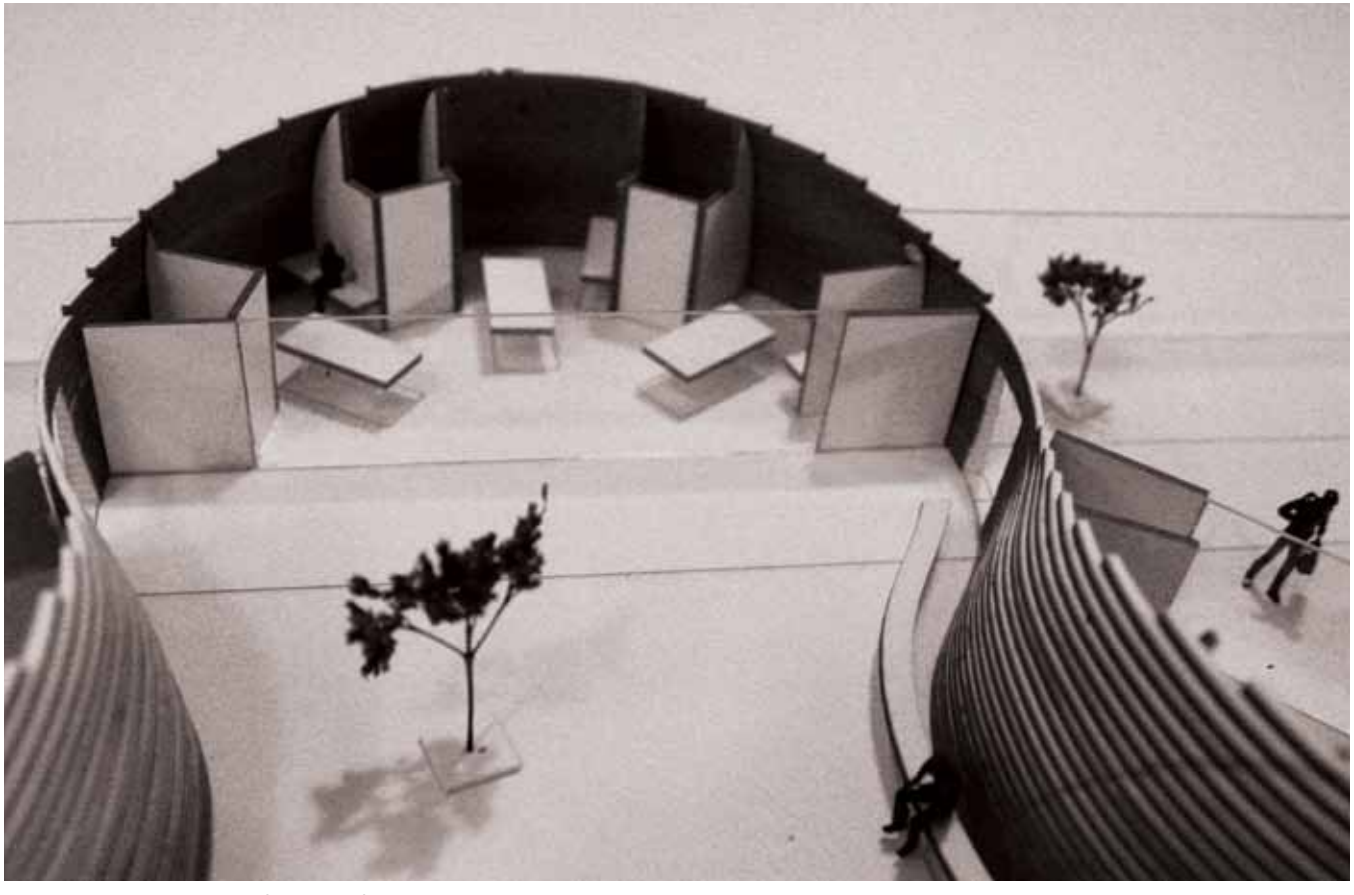
ill. 198. Ecotect simulation for Feb.



ill. 199. Ecotect simulation for feb. roof -0,5 m.



ill. 200. Ecotect simulation for Feb. roof -1 m.



*ill. 201. Spatial perception in **living** and **leisure** areas.*

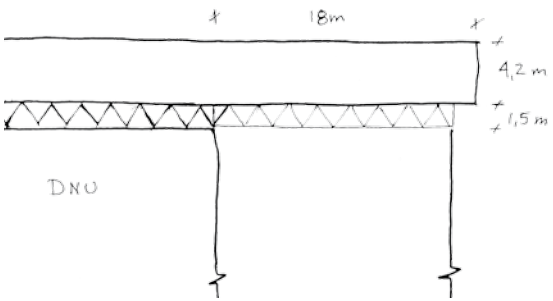
EVALUATION

As described the aim of these more detailed light simulations, has been to get an understanding of the possible lux levels during winter, which is the worst-case scenario in relation to fulfilling the required 2000 lux. As it can be seen from the simulations, the skylight has to be extended with one meter in order to gain more than 2000 lux on the shortest day of the year. However, seen in the perspective of how overexposed the dorm space will be during the sunny summer days, this solution of having a larger distance is not seen as a favourable design solution. Thus, in order to gain more daylight during the dark winter months there is a need to develop the lighting solutions further. One idea could be to use glass in the interior facade of the dorm to let indirect light in from the ***leisure*** spaces, an idea which could also enhance relations between patients as well as the perceived quality of light in the dorms, as they would hereby get light from two sides as shown on the physical model. That turns the view inwards and the dorm gets a 'window' to the ***leisure*** spaces, with a reference to our interview with a young patient at Aarhus University Hospital [Experiences; Engel, Frier], this could motivate taking part in social activities.

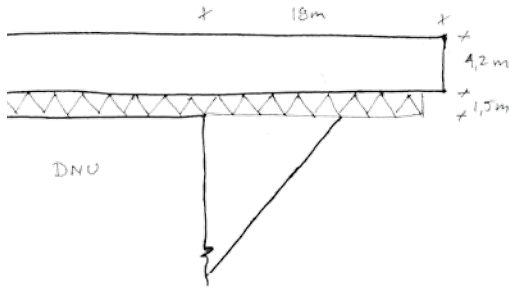
STRUCTURAL INVESTIGATION

With the development of the conceptual idea, the shape of the Dedicated Youth Hospital is extended towards Forum, away from the framework of the proposed bed section designed by the project team behind the New University Hospital in Skejby. This with basis in the idea of designing an independent arrival area with architectural identity for the Dedicated Youth Hospital. Below we will zoom in on this point where the shape extends the frame for The New University Hospital, in order to find a structural solution and thus develop the architectural expression of the Dedicated Youth Hospital.

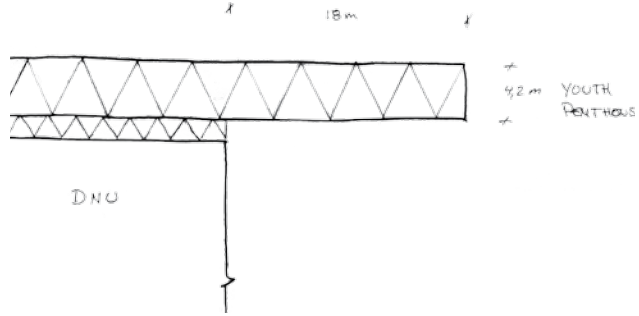
By cantilevering the plan of the Dedicated Youth Hospital from the structural system below, a considerable structural challenge unfolds. Consequently, we have to take a closer look at structural solutions in relation to the architectural expression. On some of the initial sketches for arrival areas this cantilever is about 18 m. In the following part of the process different structural solutions are sketched up with the aim to find an aesthetical solution for obtain the loads from the hanging deck. In relation to the architectural expression, the solution of the cantilevered truss beam is initially the best solution since it will enhance the conceptual idea of the light and pulsating shape. Thus a simplified construction model is built up in the finite element program, Staad Pro[4] in order to investigate the dimensions of the truss beam construction needed to obtain the loads [Appendix_1].
This knowledge is utilized in the further development of the arrival areas to be designed in coherence with the access to the 8th floor where the Dedicated Youth Hospital is situated. The figures below show different principles for supporting the cantilever.



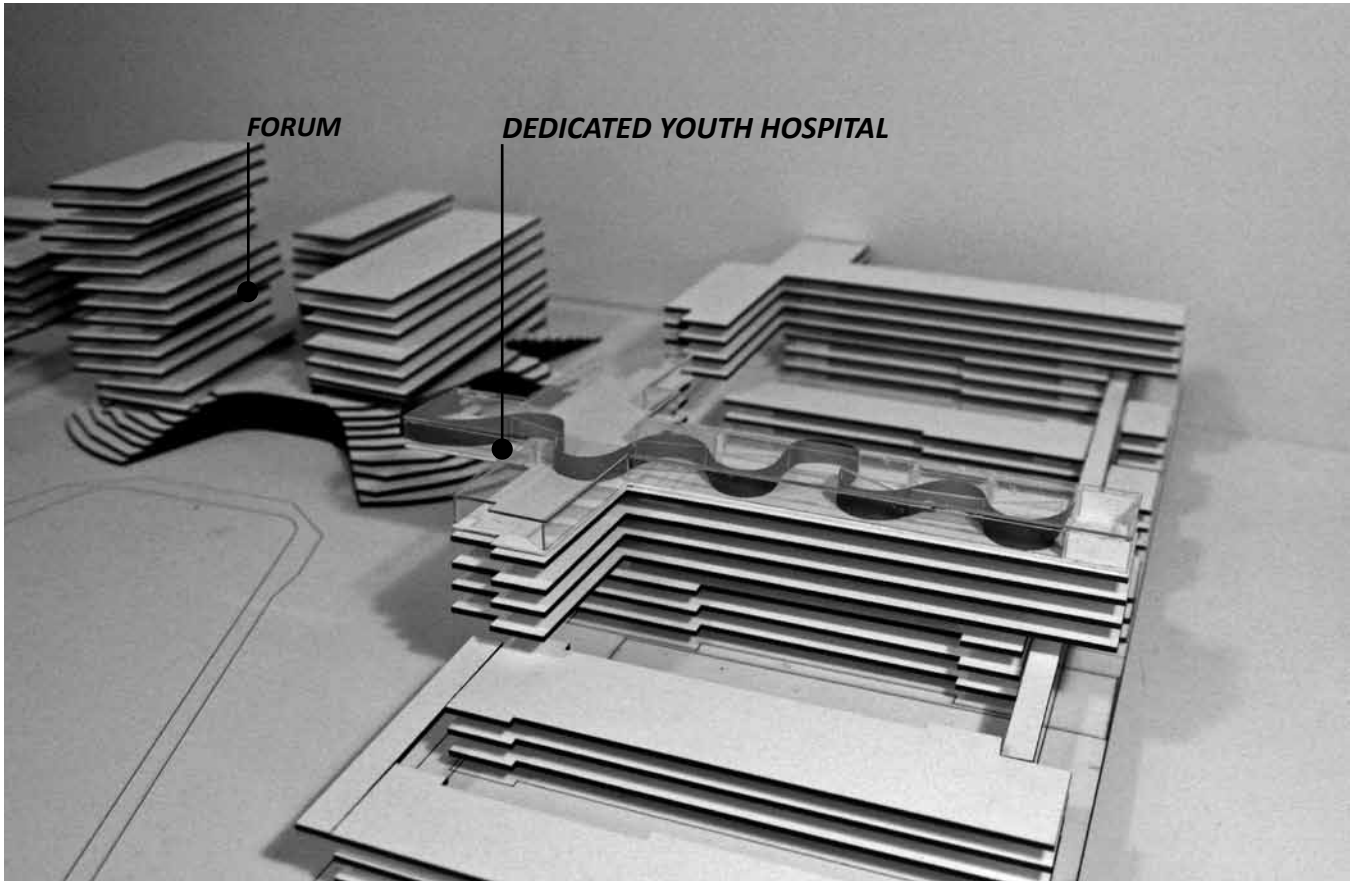
ill. 202. Structural sketch, truss/column.



ill. 204. Structural sketch, trussbeams



ill. 203. Structural sketch, cantilevered truss beam.

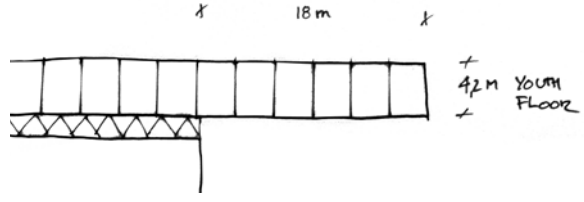


ill. 206. Sketch model showing the cantilever towards Forum.

EVALUATION

In relation to the architectural expression a light cantilevered free hanging shape would be the most elegant solution, but based on in our structural investigation in Staad Pro this must be developed further also in combination with the access. With basis in this the following part of the concept development focus is on developing the access area of the Dedicated Youth Hospital. To get technical and aesthetic aspects to act together is the key element for the project.

The Vireendel truss beam is chosen in order to compel with the vertical lines of the facades. According to the finite element analysis [Appendix_1] the designed steel construction is not able to obtain the forces from the assigned loads. The obvious solution is to introduce a traditional truss beam and hide the construction within a light non-transparent wall material. This would only be at the cantilevered part of the truss beam, where facade window in the end wall and skylight from the cantilevered part and dorm provide abundant daylight conditions. The visual connection to the Forum will still be present through the gable facade window.



ill. 205. Sketch diagram showing the cantilevered Vireendel system.

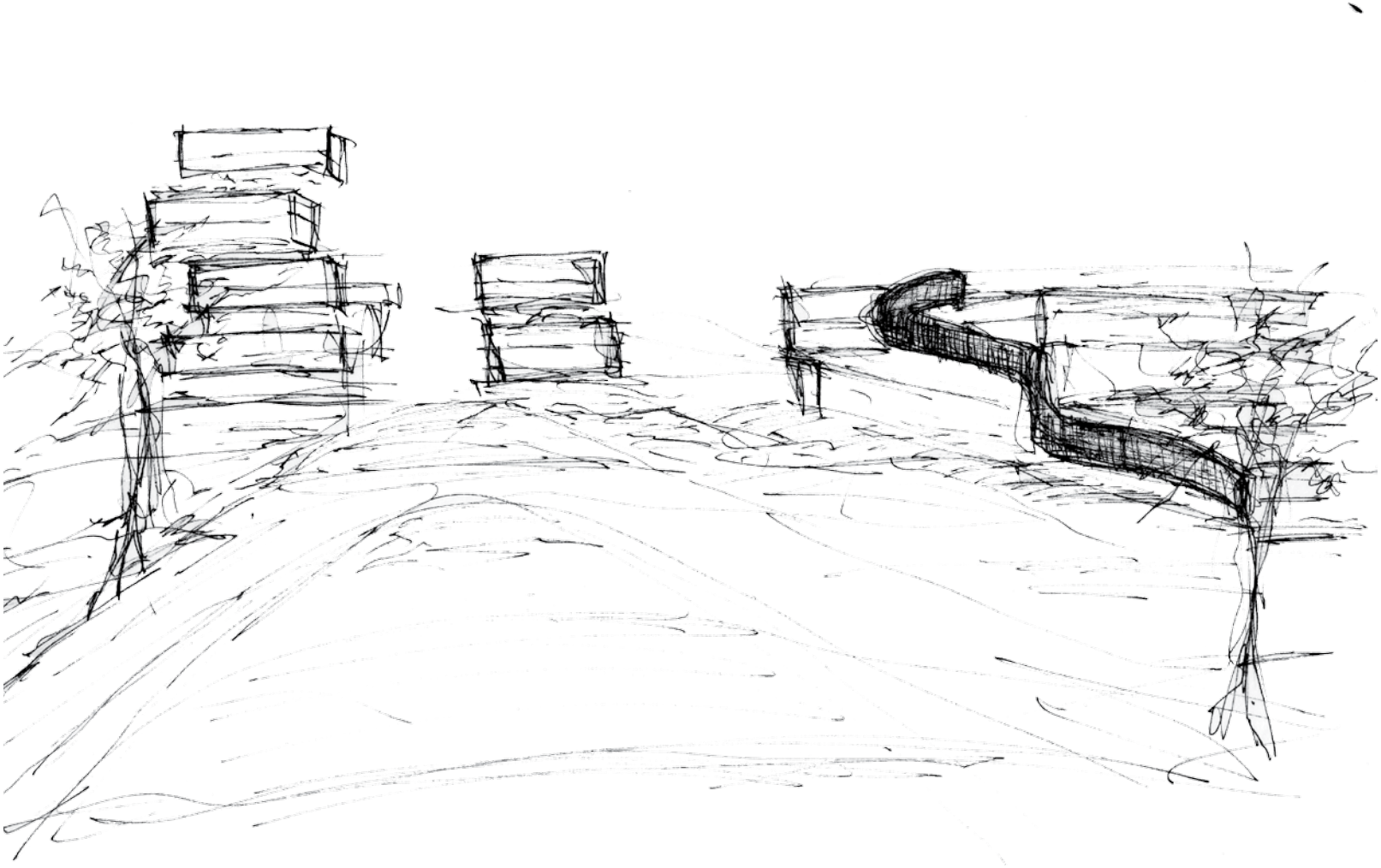
ARRIVAL

ACCESS

Situated on top of Scandinavia's largest hospital the Dedicated Youth Hospital is placed in a significant position. Since the initial sketching phase, focus has been on designing an independent arrival point for the Dedicated Youth Hospital to create an entrance for the young. This new entrance should welcome the young patient and lead to the Dedicated Youth Hospital, as described in the Design Criteria [Program_Design Criteria] the arrival should not be associated with the phenomenology of a hospital, as a rational medical machine, but should unfold a point of reference and interest for the arriving young patient.

Thus the following part of the process focus is on developing access of the Dedicated Youth Hospital. The initial idea is that the access becomes a sculptural element in the large public outdoor space, as a vital attractor that makes it clear to everyone where the Dedicated Youth Hospital is located.

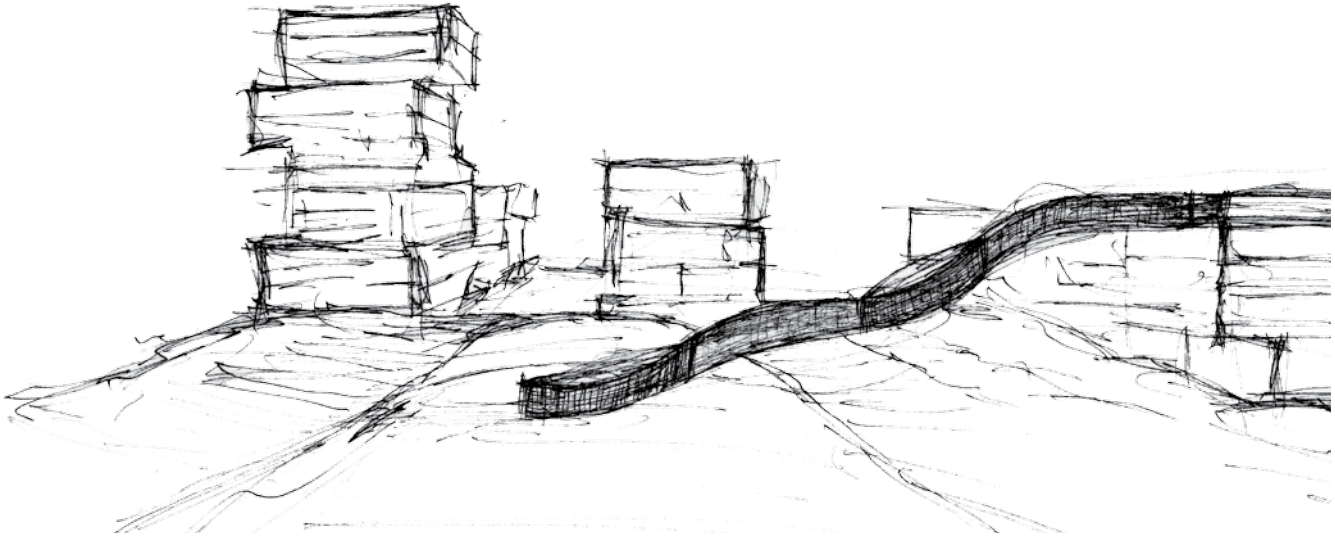
By sketching different solutions the idea of continuing the shape of the living structure of the curved wall into the landscape is found. The first idea is to continue the shape down and let it continue into the arcade but since most of the young patients would arrive from the large plaza in front of Forum it seems unnatural in relation to the flow. This will be developed in the following chapters.



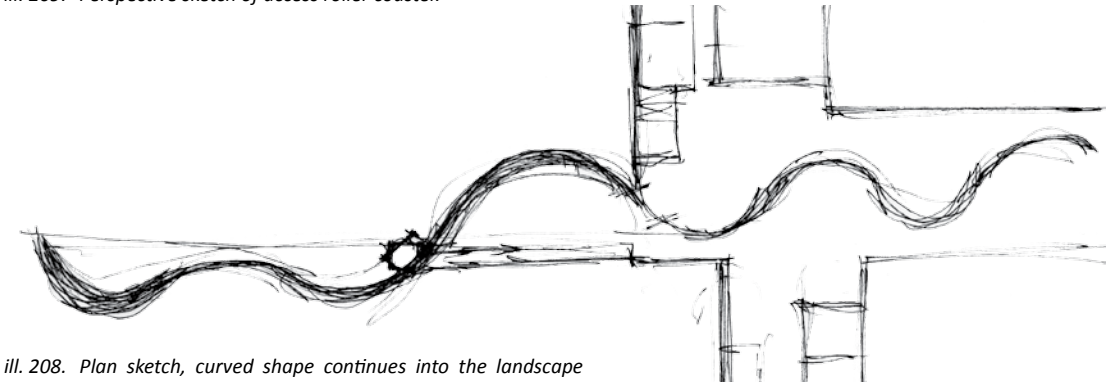
ill. 207. Sketch, acces to the Dedicated Youth Hospital through arcade.

A LIFT

Sketching on different ways of arriving at the Dedicated Youth Hospital an idea of developing the arrival as a playful sculpture, that continues into the landscape as a continuation of the architectural shape of the floor plan for the Dedicated Youth Hospital arose.
The idea is that a lift takes the patient from the open arrival areas in front of Forum up to 8th floor where the Dedicated Youth Hospital is. With the design of this characteristic access solution the aim is to try to associate the arrival with something enjoyable and thus take thoughts away from being ill. This, supplemented with the rational logistics and relations to the surrounding hospital complex, this response to both the need for mobility and way finding as well as the vision of designing the Dedicated Youth Hospital as a healing environment for the young patient.



ill. 209. Perspective sketch of access roller coaster.



ill. 208. Plan sketch, curved shape continues into the landscape

The inspiration for the arrival is found in two projects; the arrival designed by Tadao Ando, at the Art site in Naoshima where a small lift on tracks takes the visitor through the landscape and the diagonal lift in the WM Mountain by BIG. The lift on tracks in Naoshima takes you to a to a fantastic oval-shaped hotel on the mountain top whereas the diagonal lift in WM mountain led to the dwellings on top of the 'mountain'.

Based on these references the access becomes a sculpture in the landscape that takes the young patient directly to the Dedicated Youth Hospital and furthermore a characteristic element that marks youth presence in the hospital city. In the following part of the process this conceptual idea for the access will be developed in relation to statics.

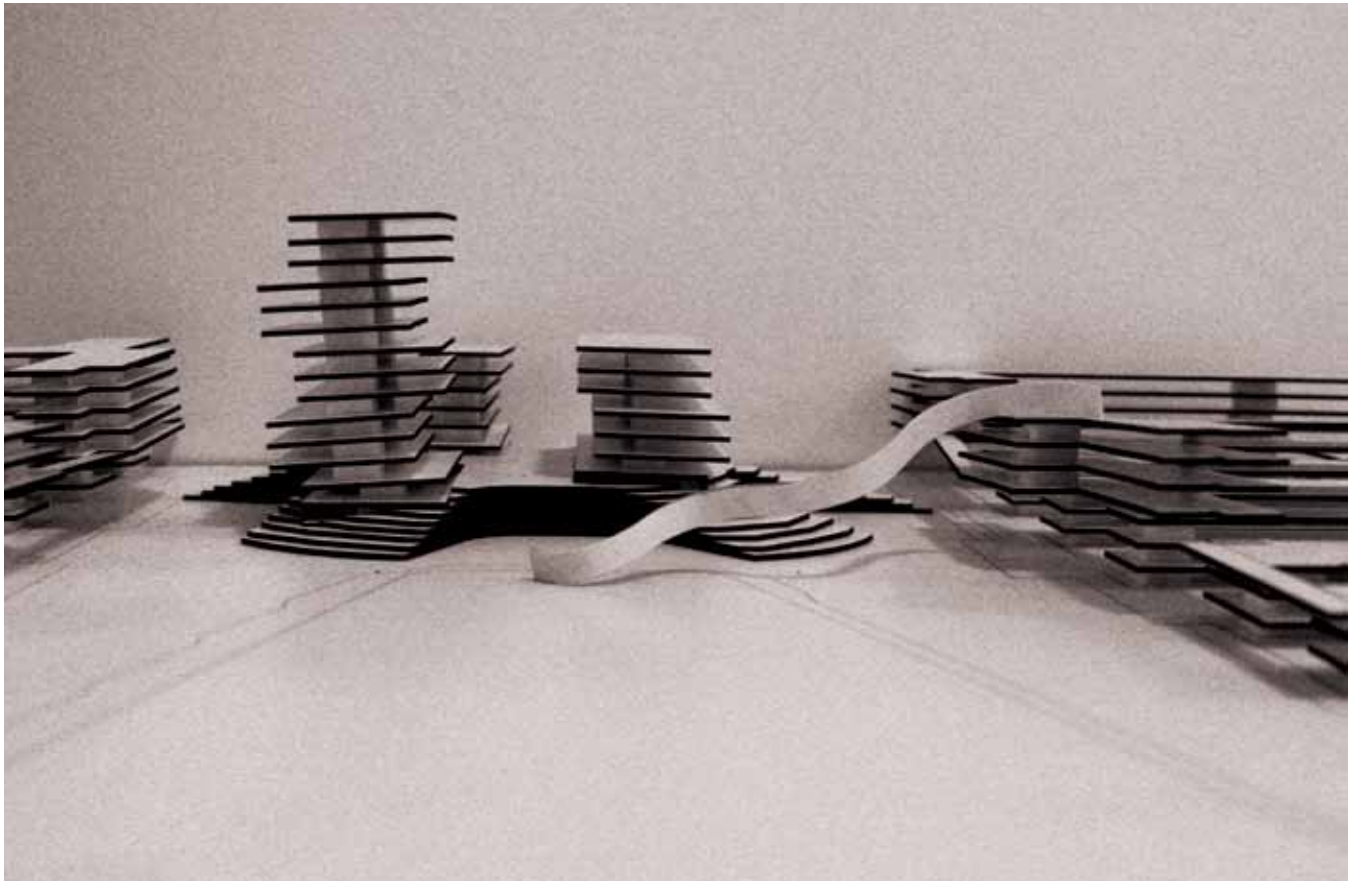
ill. 210. View of Art site, on the way to the hotel Naoshima, Japan Tadao Ando

ill. 211. Elevator in Wm Mountain by BIG.

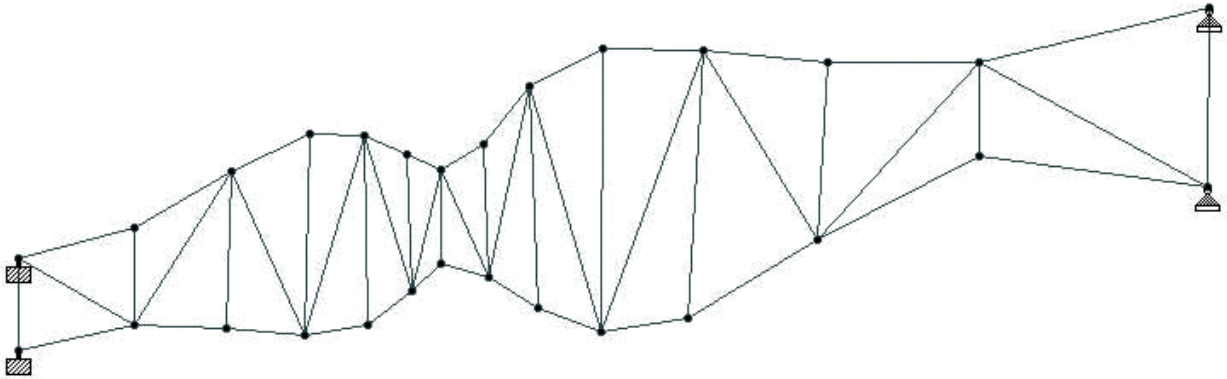
STATICS

Since the access is not a spatial construction, but a single ‘curved wall’ the main issue is how to obtain the wind load on the construction. Finite element analysis reveals problems with the self weight from the construction. Not knowing whether it is the user or the finite element program that is doing something wrong, it does not make sense that a truss beam construction with a minimum truss height of 3 meters and a span of 45 meters should have problems with self weight. Possibly the curved shape had an influence on the finite element analysis. The load from the lift does not seem to have any influence on the construction.

A solution to the wind loads problems could be to prestress the access construction and use steel cables, fixed at a diagonal angle to the ground.



ill. 212. Model photo, lift taking the young patient from the landscape to the Dedicated Youth Hospital.



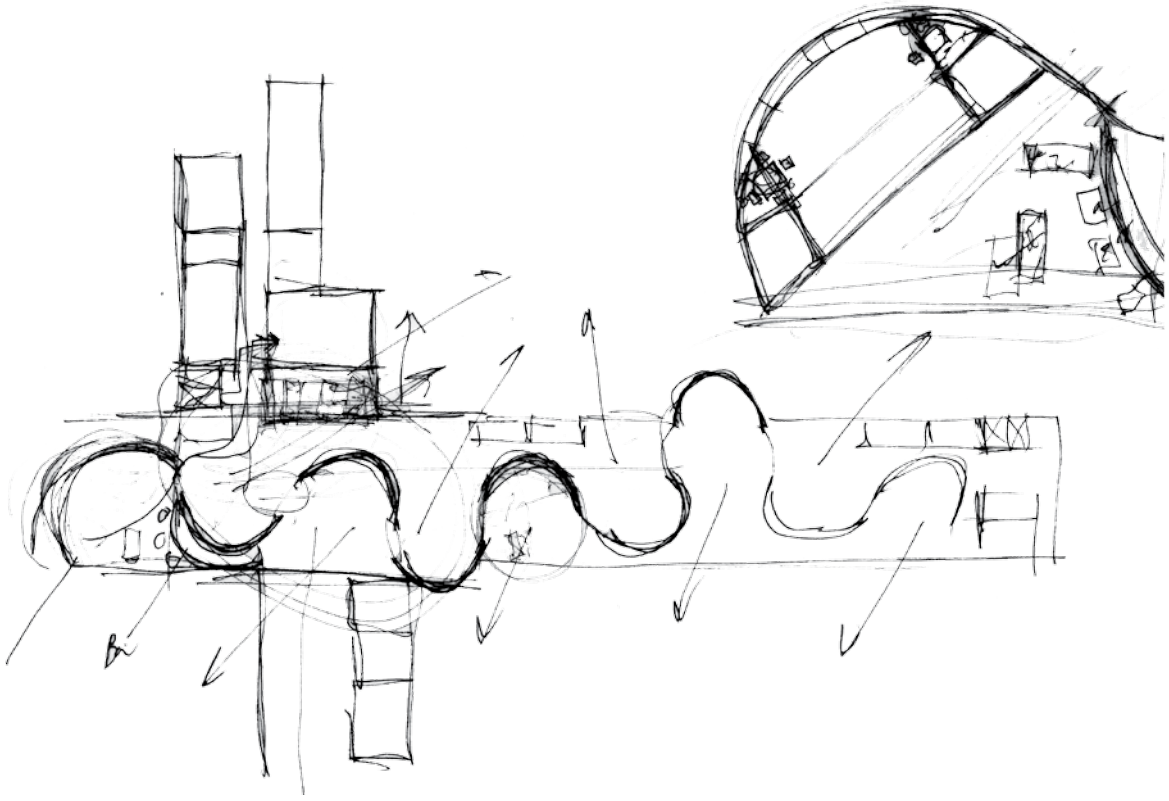
ill. 213. Diagram of simplified geometry for static investigation.

ill. 214.

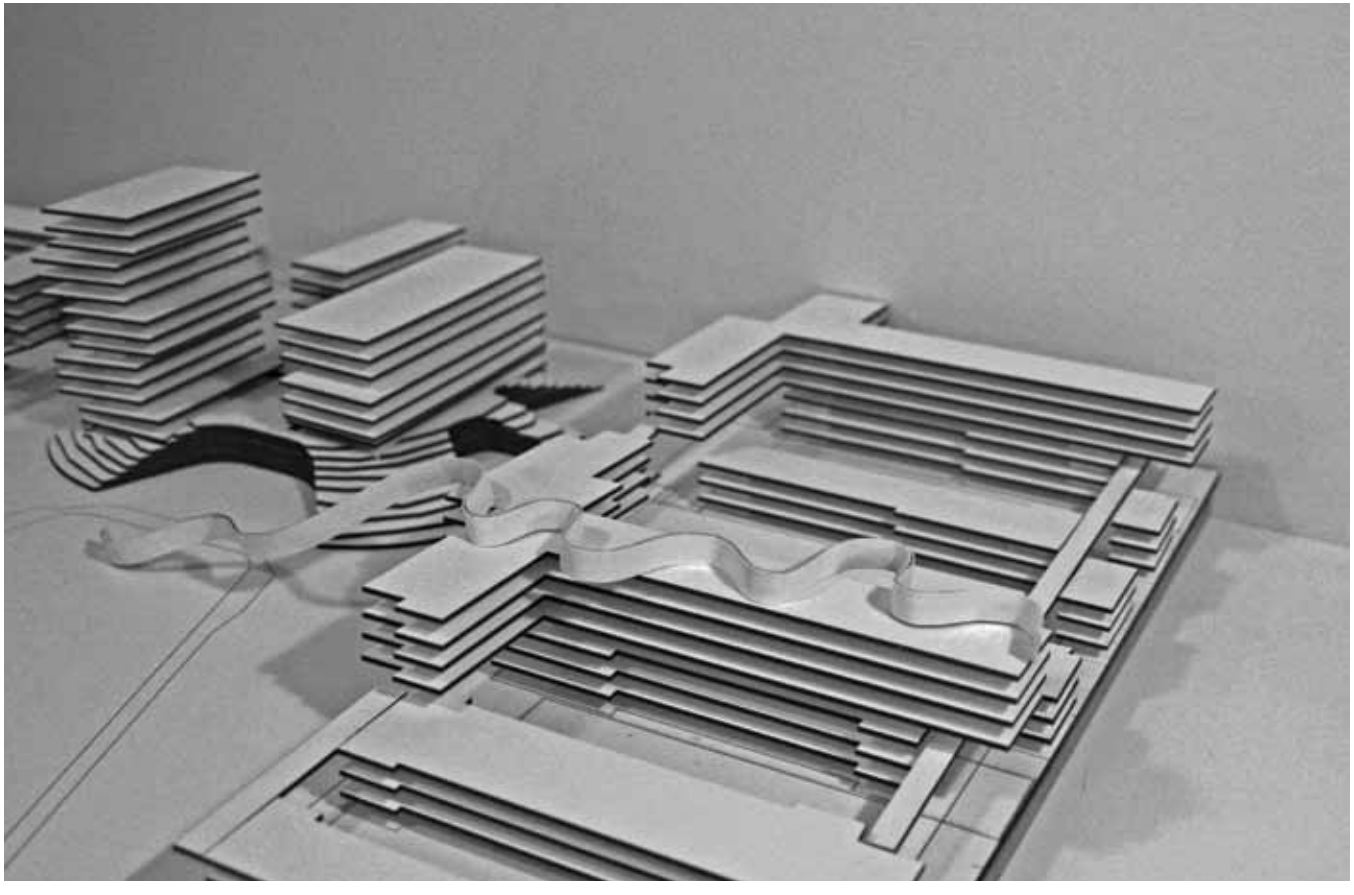
SYNTHESIS

In the concept development the following part of the process is focused on detailing. Thus on developing the perception of the Dedicated Youth Hospital in relation to spatial organisation, acoustics, materiality and light with the aim that everything comes together in an architectural whole to achieve our project vision;

>>...to design a Dedicated Youth Hospital as a frame for healing of young patients medically, physically, and mentally...<< [program_vision].



ill. 215. Sketch, conceptual plan.



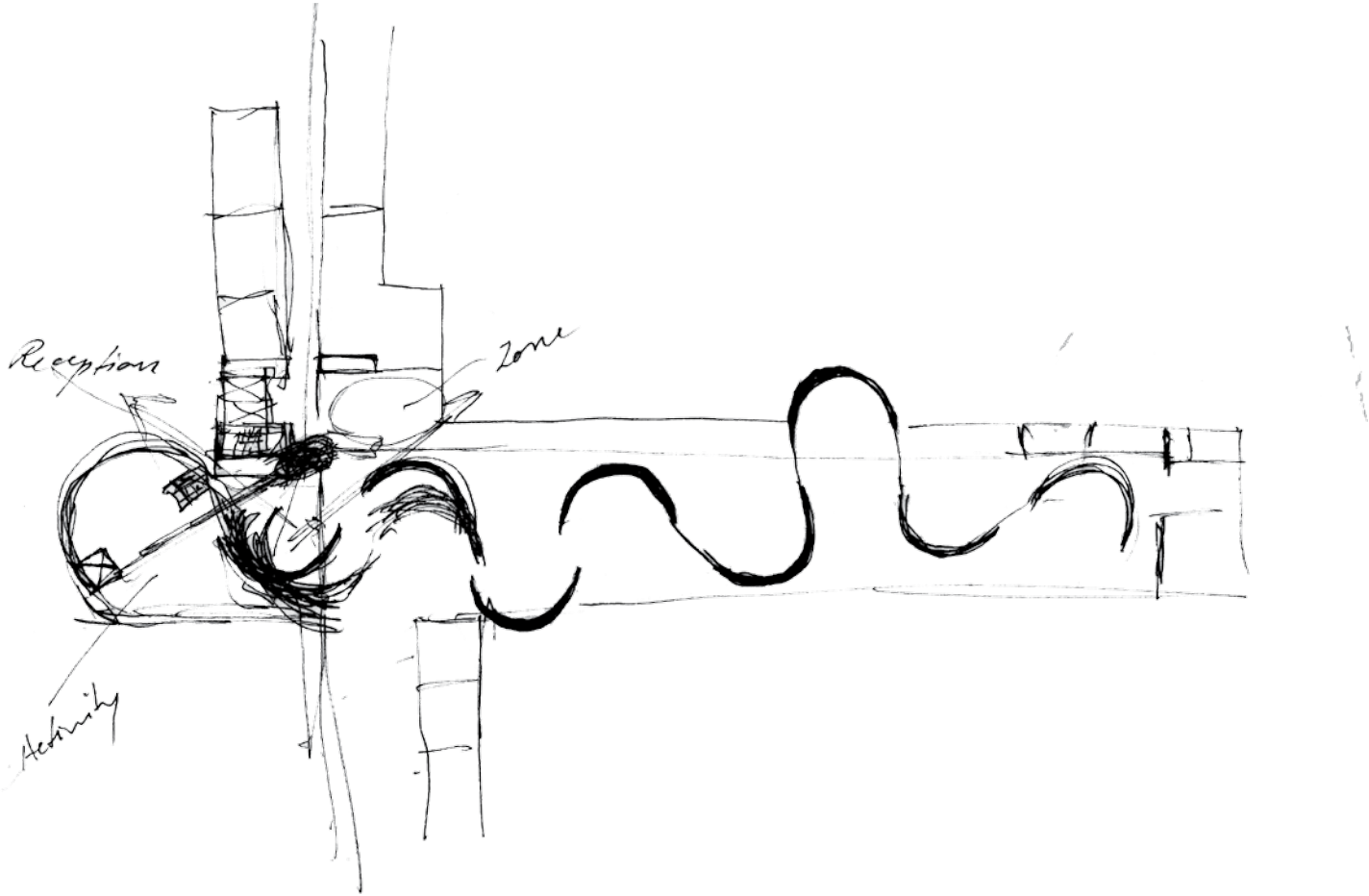
ill. 216. Sketch, conceptual shape.

ARRIVAL

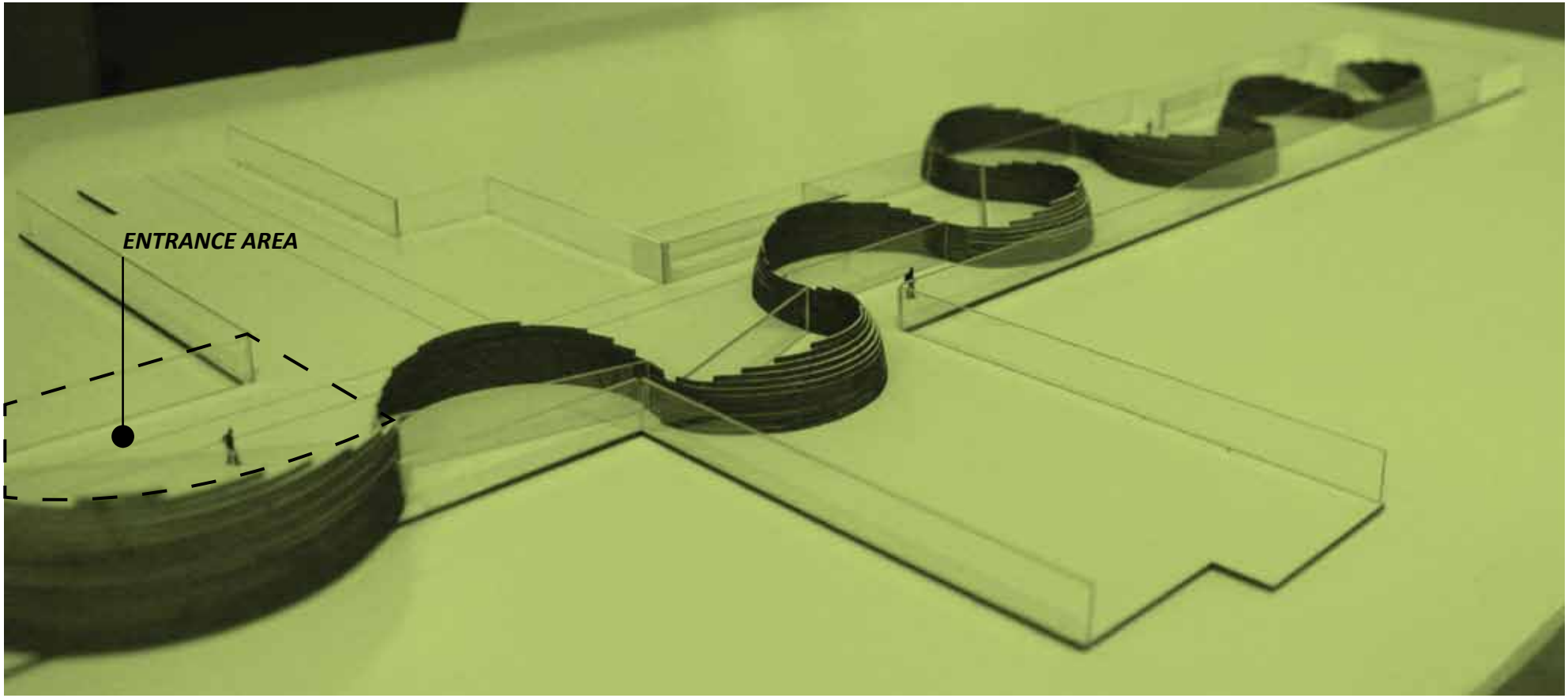
As mentioned earlier the arrival of the Dedicated Youth Hospital is of great importance to the perception of the hospital. In the following part of the process focus is on developing the entrance space inside the Dedicated Youth Hospital. The essential question is what is the first thing the young patient experiences and what is it associated with?

With basis in the previous development of the access, the young patient is taken from the open landscape in front of the hospital by a lift up to the 8th floor where the Youth Hospital is situated.

The idea is that a welcoming atmosphere of life and activity will meet the young patient - articulated through the light and the playfully curved wall. Similar to the life in a city plaza where the young can hang out, kiss, observe, and be observed.



ill. 217. Sketches, arrival area of the Dedicated Youth Hospital.



*ill. 218. Model photo, form study of the continuation of the **pulsating** shape into a entnrance area.*

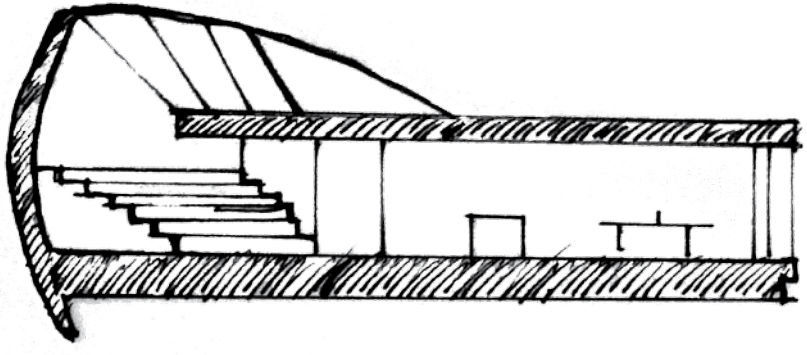
YOUTH PLAZA

ill. 219. The Greek theatre, Ostia in Rome.

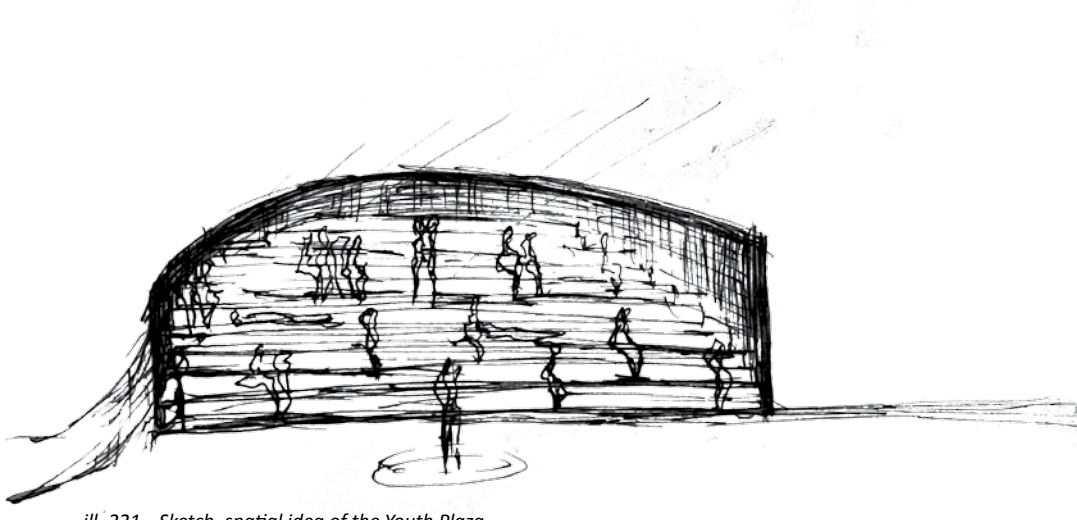
The idea of designing a space full of life and activity is developed along with the architectural shape. The aim is to form a space where the young can go and hang out, but at the same time a space that can be used as a waiting area for parents and other relatives. The entrance becomes a plaza functioning as an informal meeting space with different settings according to the user.

Using the Greek amphitheater as a reference to design an indoor arrival space, the idea is to design a space that can be used for different activities, stand-up shows, movie shows and so on, but also for the flow of young people coming and going.

In developing this arrival concept the first curve is fitted with large inbuilt furniture shaped as a staircase with steps of different heights. The center of the space is formed as a small stage that can be used for all sort of activities, plays, table football, tournaments etc. only the young imagination will put limits to possibilities. Youth Plaza hereby becomes a common gathering space where the young can be young - observe and be observed. In the following part of the process we will focus on detail in relation to materiality and acoustics



ill. 220. Sketch, section idea for stairs in the Youth Plaza.



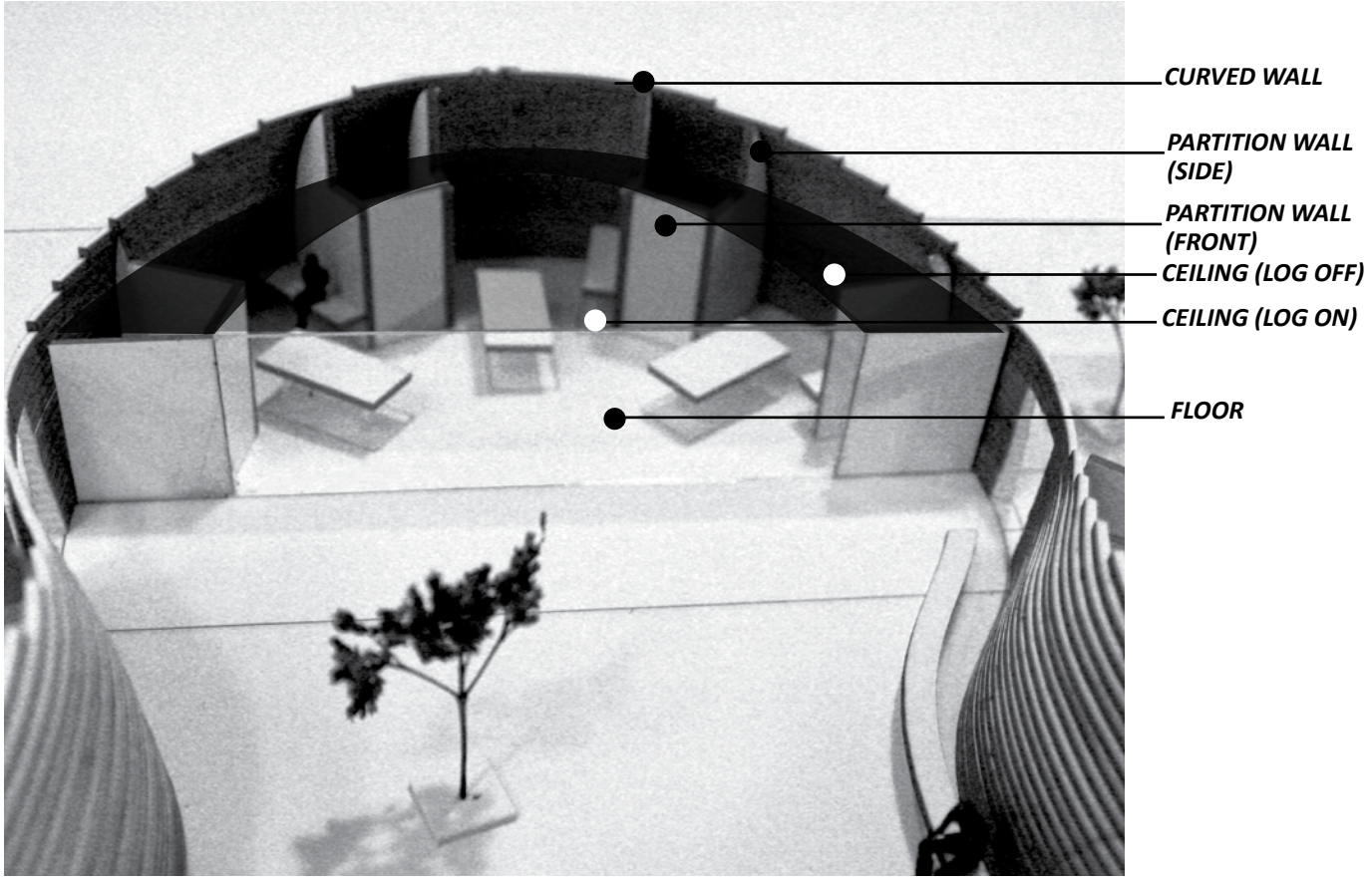
ill. 221. Sketch, spatial idea of the Youth Plaza.

ACOUSTIC INVESTIGATION

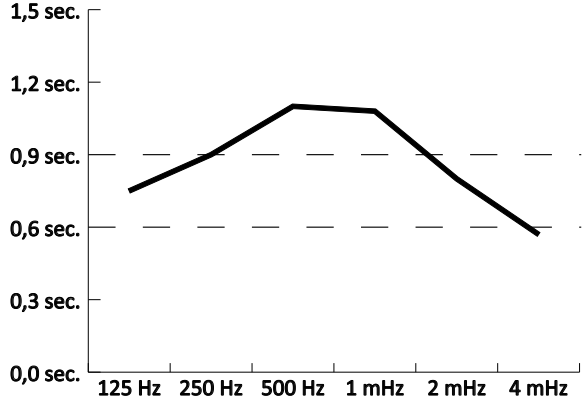
To develop the architectural perception of the dorms the following part of the process focuses on the materiality of the dorm in relation to the perception of sound in the space.

The aim of the acoustic investigation of the dorms is to document the possibility to reach a suitable reverberation time for speaking in the “log on” zone and a more “dead”, acoustic environment in the “log off” zone in order to minimize the distribution of sound from one “log off” zone to another. The initial idea of having a social and a private zone within the dorm should also be enhanced by a difference in the acoustic settings in the two zones. The reverberation time should be between 0,6 -0,9 seconds in the dorm [Egan, 2007], with the lower reverberation time in the “log off” zone.

In the following investigation different materials and textures are tested to understand what influence the choice of material has for the acoustic and spatial perception of the dorm.



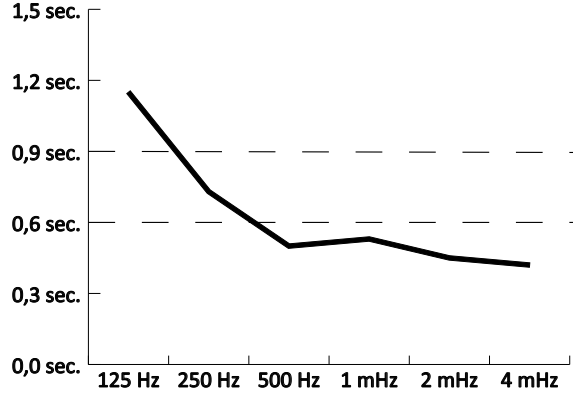
*ill. 222. Model photo of dorm for three patients in connection with **leisure** areas.*



MATERIAL INVESTIGATION_1

Curved wall	Timberboard
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Plasterboards on 50 mm insulation

ill. 223.

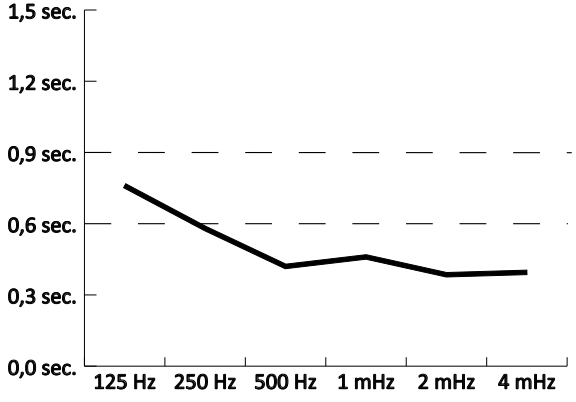


MATERIAL INVESTIGATION_2

Curved wall	Concrete, Painted
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Ecophon 50 mm acoustic insulation

ill. 224.

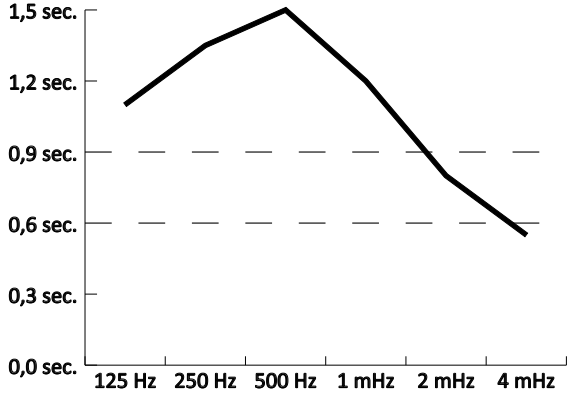
Furthermore the choice of materials is also influenced by the hygienic properties, an important aspect of a hospital design, cf. our analysis [Program_Safety] Thus the curved wall that guides the young patient from the dorms is the main material. The initial idea is as mentioned earlier that this wall should be a significant concrete element, but with basis in the curved wall being a warm, embracing element in the architecture this is changed into a steel structure with wooden paneling, to articulate a more sensible atmosphere in connection with the skylight.
To enhance the wooden texture of the curved wall the partition walls and ceiling would have a neutral appearance that will help to distribute the reflected light from the curved wooden wall.



MATERIAL INVESTIGATION_3

Curved wall	Timberboard
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Ecophon 50 mm acoustic insulation

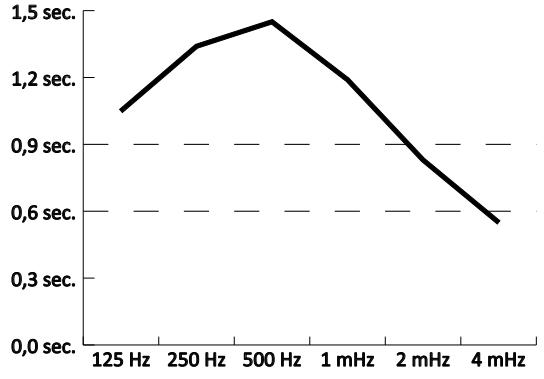
ill. 225.



MATERIAL INVESTIGATION_4

Curved wall	Concrete, Painted
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Plasterboards on 50 mm insulation

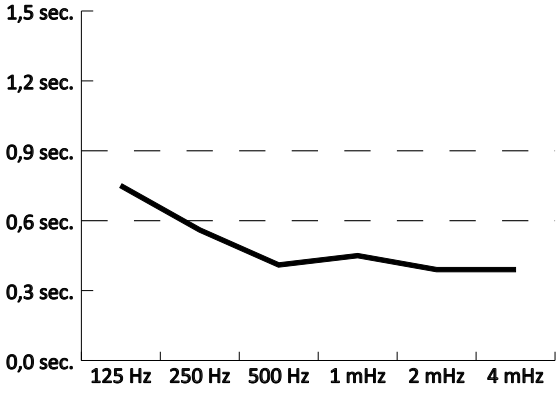
ill. 226.



MATERIAL INVESTIGATION_5

Curved wall	Concrete, Painted
Partionsides	Plasterboards on 50 mm insulation
Partion front	Wooden closet doors
Floor	Rubber on concrete
Ceiling	Plasterboards on 50 mm insulation

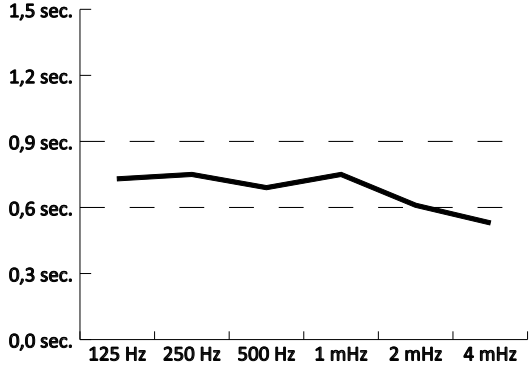
ill. 227.



MATERIAL INVESTIGATION_6

Curved wall	Timberboards
Partionsides	Plasterboards on 50 mm insulation
Partion front	Wooden closet doors
Floor	Rubber on concrete
Ceiling	Ecophon 50 mm acustic insulation

ill. 228.



MATERIAL INVESTIGATION_7

Curved wall	Timberboard
Partionsides	Plasterboards on 50 mm insulation
Partion front	Wooden closet doors
Floor	Rubber on concrete
Ceiling log on	Plasterboards on 50 mm insulation
Ceiling log off	Ecophon 50 mm acustic insulation

ill. 229.

EVALUATION

The result of the investigations reveals the reverberation time is optimal with the material composition seen in graph 7.
The curved wooden wall becomes the main material in the dorm while the additional materials underline the shape of the curved wall. The different ceiling material in the two zones will emphasise the private niches architecturally, socially and acoustically.

The choice of rubber for flooring optimises not only reverberation time, but also has hygienic properties and minimizes the injuries from falling accidents. Alternative flooring could be wood. A wooden floor has a more hospitable sense textually and has better sound absorbing properties, but the hygienic properties of wood are improper for a hospital.

DEDICATED YOUTH DORMS

With basis in the acoustic investigation, the two different zones;

- ***Private zone***
- ***Solidarity zone***

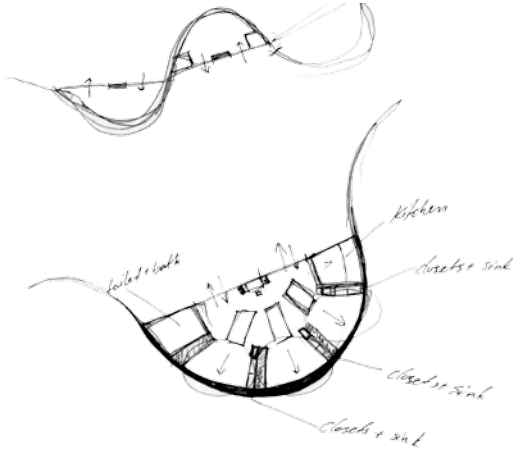
has become a very important aspect of the dorms.

In the following part of the process the idea of having two different versions of the dorm is developed. Initially sparked by the regulations in the publication "Det gode badeværelse" (the good bathroom, in hospitals) [Nørgård, 2001]. From an overall level the publication describes minimum distances that can help define the size of toilet and bath in a hospital. The regulations are based on knowledge from best available research. The regulations of course differ in relation to the mobility of the patients.

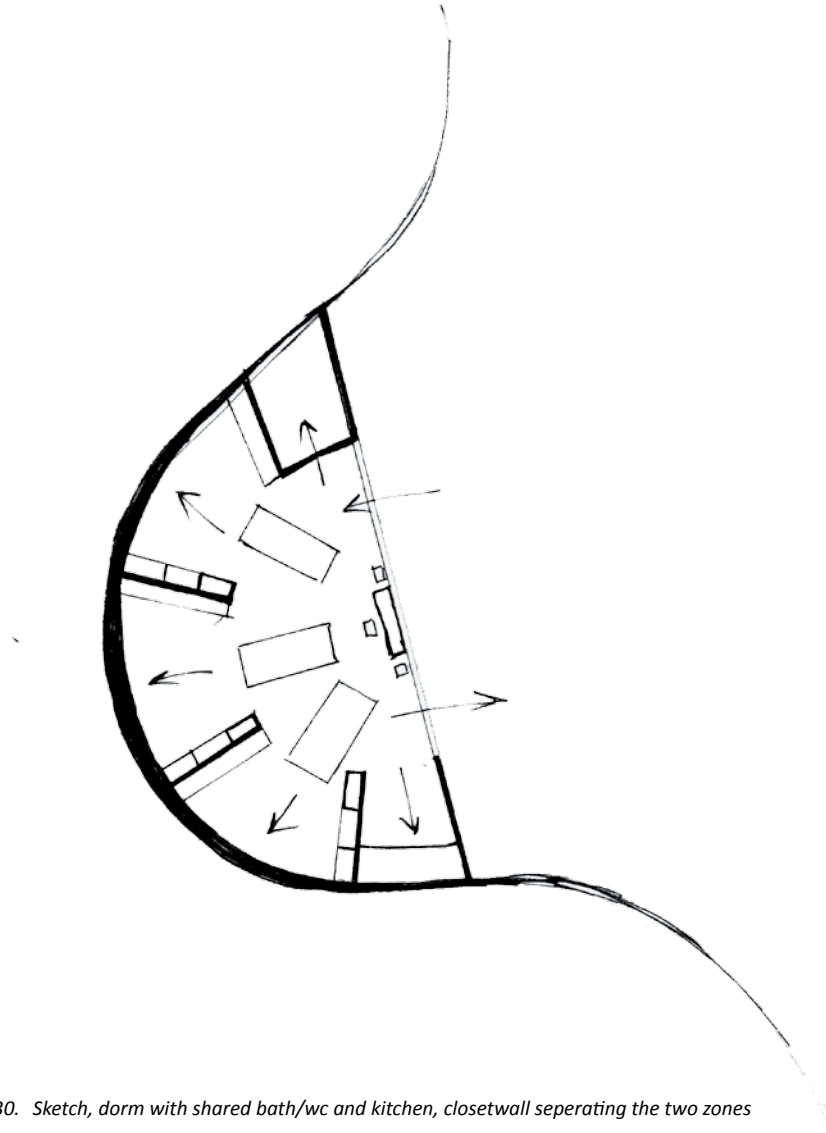
Thus the idea is to design two different dorms of the same size; One with a large shared toilet/bathroom and another one where each patient has his own toilet/ bathroom.

The idea of having a small kitchen inside the dorm is further explored in this phase, but with the risk of it creating obnoxious smells inside the dorm. The idea become that the kitchen should be apart of the ***leisure*** areas in front of the dorm.

In the following part of the process focus is on developing the relation between ***living*** and ***leisure*** areas.

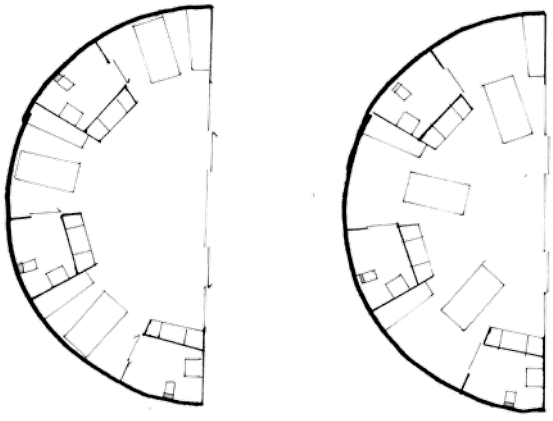


ill. 231. Sketch, dorm with shared bath/wc and kitchen

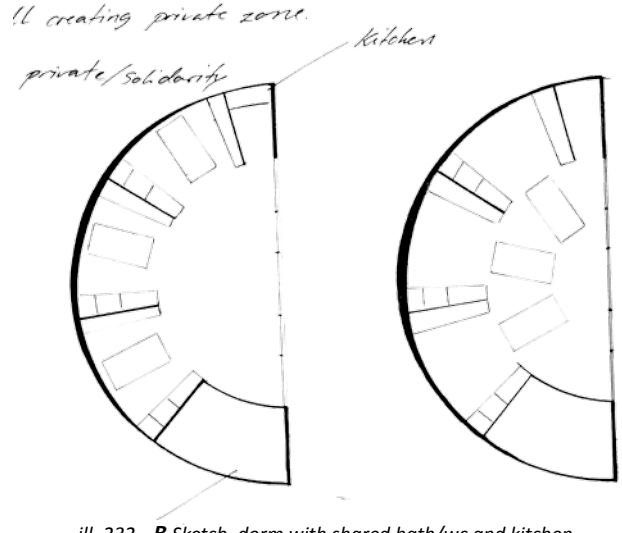


ill. 230. Sketch, dorm with shared bath/wc and kitchen, closetwall seperating the two zones

THE TWO DORM TYPOLOGIES



ill. 233. ***A*** *Sketch, dorm with individual bath/wc.*



ill. 232. ***B*** *Sketch, dorm with shared bath/wc and kitchen.*

MATERIALITY

As discussed in our analysis, hospitals are generally seen as sterile environments in shape and materiality. [Program_Safety]

The aim of this project is to design spaces with a materiality that embraces the young patient. It is crucial that the materials chosen for a hospital environment can be disinfected and that the materials are resistant to chemicals thus it is a challenge.

The curved pulsating shape that has become a conspicuous element defining the Dedicated Youth Hospital both in interior and exterior must be enhanced by its materiality.

ill. 234. Curved ceiling with wooden paneling.

The idea is to board the steel structure with wooden paneling to enhance the horisontal living shape of the double curved wall, but also to let the wood give warmth and texture to the perception of the spaces in the Dedicated Youth Hospital to let it contrast the general perception of hospital environments as sterile. The horisontal panels will support the natural flow and the human scale of the spaces in the Dedicated Youth Hospital.

As mentioned in the previous acoustic investigation the flooring in the Dedicated Youth Hospital is rubber flooring of a light colour, this because aesthetically together with the light ceilings it will form a background that will enhance the shape of the curved wall.

As seen in the example the materiality perceived is strongly influenced by the light. Light will enhance the shape and materiality of the spaces. In the following investigation focus is on the architectural perception in relation to light in the leisure areas.

ill. 235. Wood used in the design of Akershus University Hospital in Oslo *by C. F. Møller architects.*

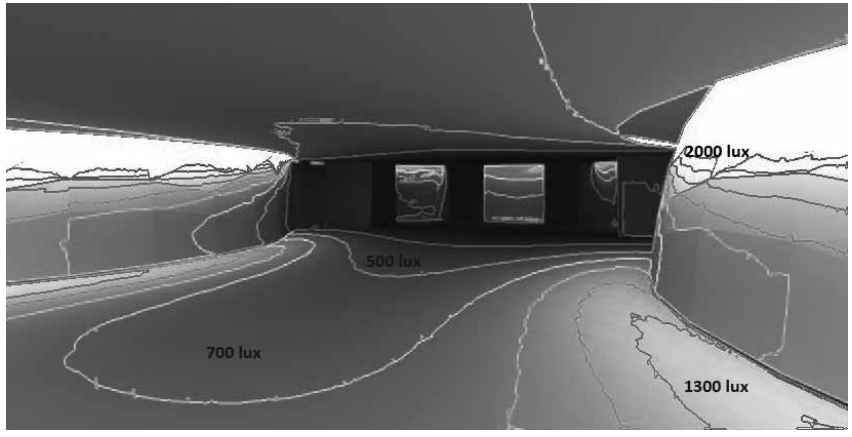
PERCEPTION OF LIGHT

The aim of the following part of the process is to develop the architectural perception of the leisure areas with regard to light. With the conceptual light principle described earlier as a basis the idea is to have a gap between the curved wall and the roof like in the dorm on the other side. The aim is that natural daylight will enhance the shape and the materiality of the curved wooden wall.

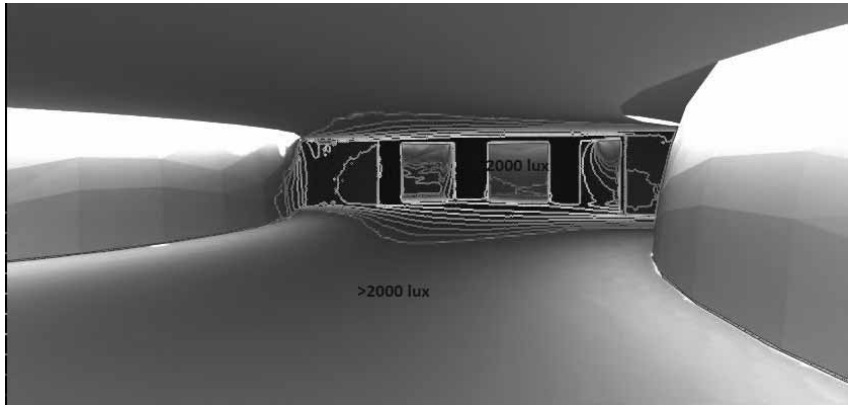
The aim of these particular investigations is to get an understanding of how the light from the skylight will spread into the leisure areas and what the level of daylight will be during summer and winter. Thus, the simulation in Ecotect will focus on a cloudy winter day and a cloudy summer day.

As seen on the simulations the light from the skylight spreads into the leisure areas enhancing the pleasant curvatures of the space and achieving a reasonable daylight level.

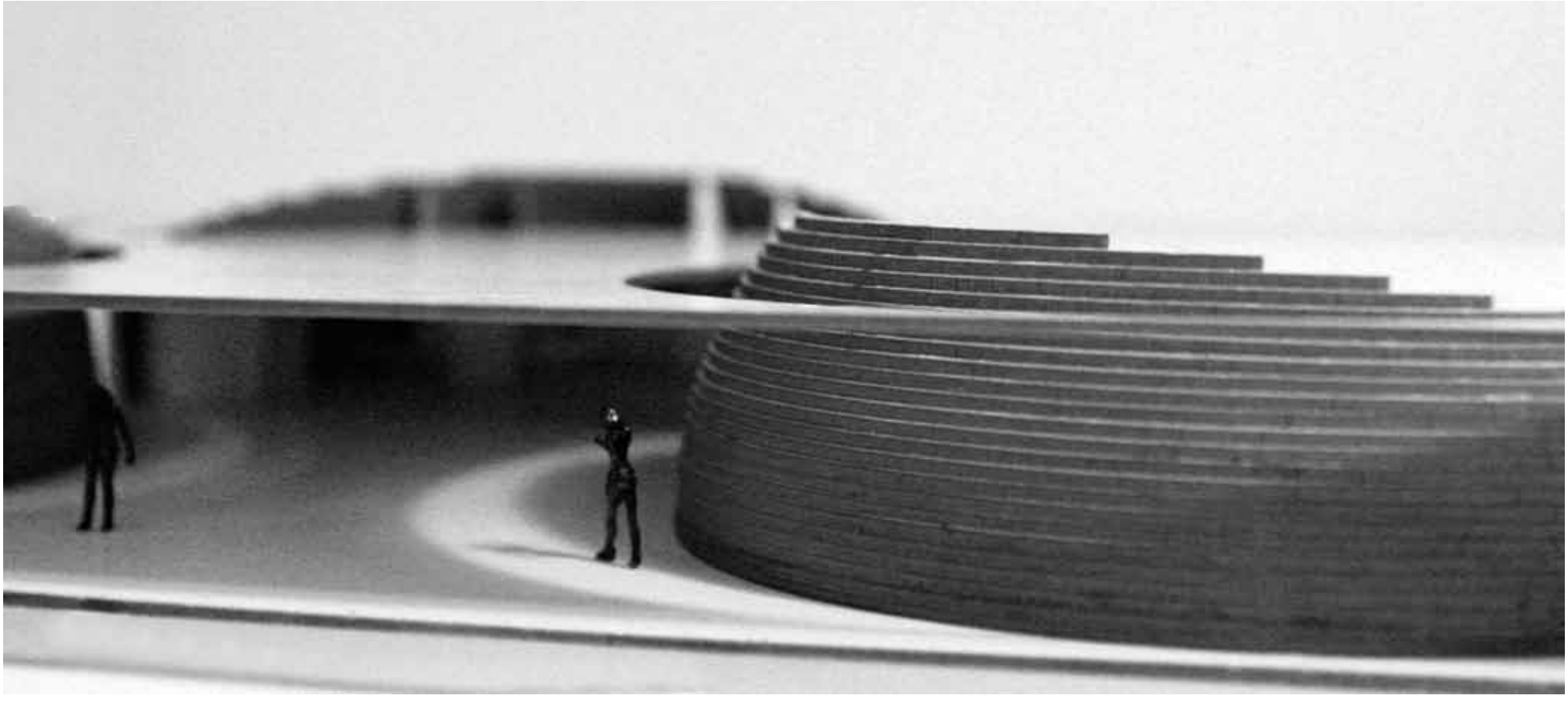
This held together with the model photo illustrating the perception of the space on a day with a more direct sunlight gives a good impression of how the light will contribute to an inviting atmosphere in the Dedicated Youth Hospital and contribute to a changing spatial experience through out the day and year.



*ill. 236. Simulation in Ecotect, dalight level in **leisure** area on a cloudy winter day*



*ill. 237. Simulation in Ecotect, dalight level in **leisure** area on a cloudy summer day.*



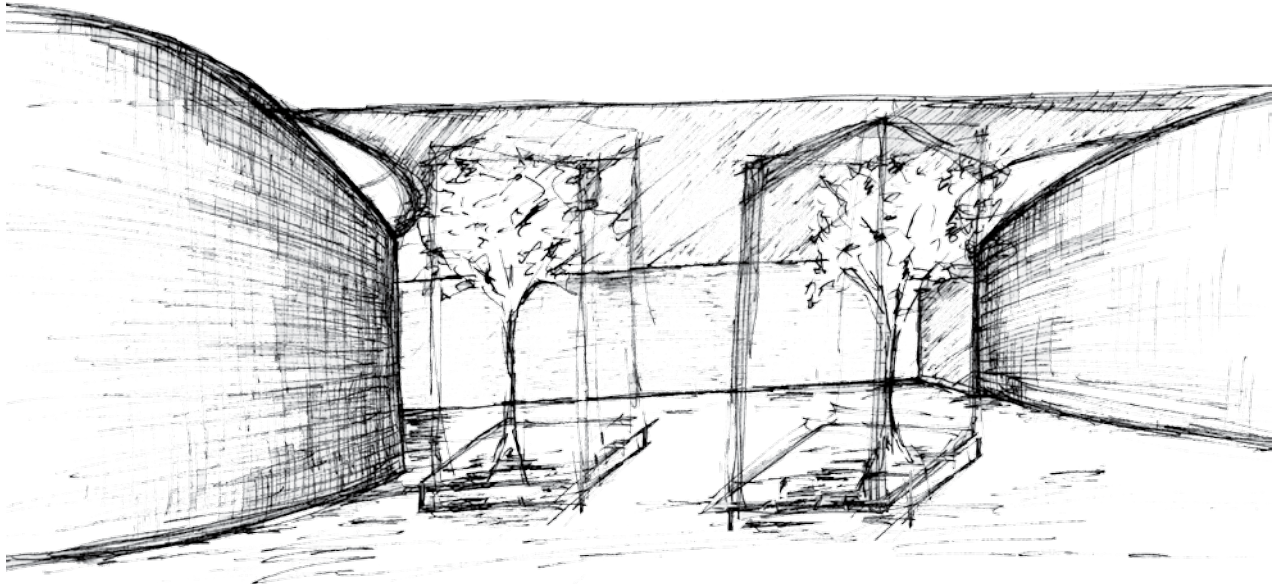
*ill. 238. Model photo, perception of light in a **leisure** area. A play between light and shadow enhancing the curvatures of the space.*

YOUTH LEISURE

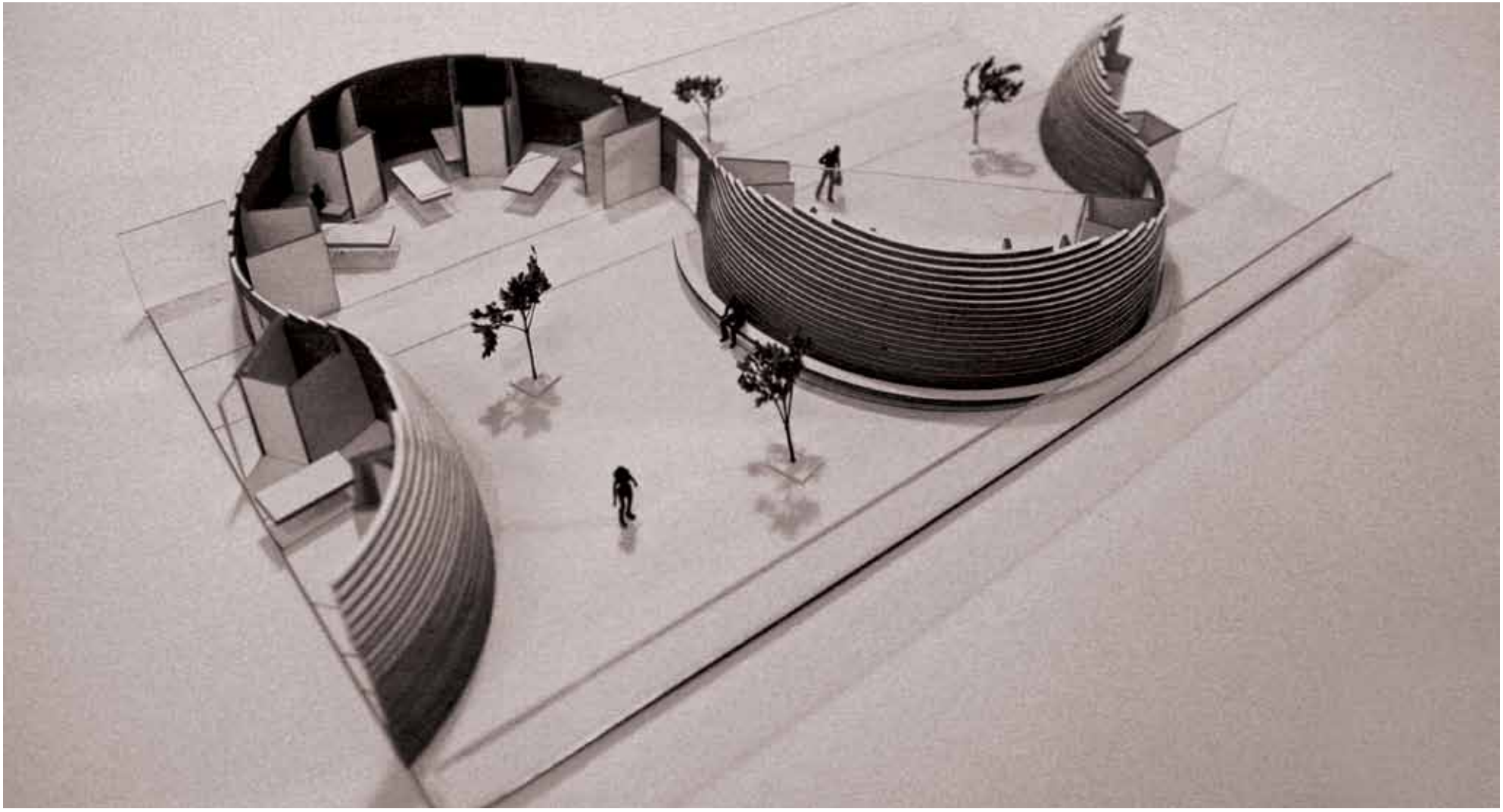
In the following part of the process focus is on the spatial connection between ***living*** and ***leisure***. Thus, on designing the ***leisure*** areas as spaces for different activities that the young would be in on ordinary weekdays, by turning the outside inwards in a way that creates spatial and human relations. This will be developed further in the following chapter.

The idea is that the ***leisure*** areas are organised as common spaces for the young with reference to the front garden of a family house.

To explore the potential of these spaces these ***leisure*** areas must be developed in relation to furnishing. With a reference to the observation of a young girl sitting in the far corner at Herlev Hospital, (Experiences; Engel, Frier] we must create niches and see to it that the furniture plays an important role in this spatial challenge. The idea is to work with a furnishing system that can reflect the diversity of the young of different interests [Program_Sociological]. Focus in the following is on developing the ***leisure*** areas according to the interests of the young.



ill. 239. Sketch, mobile trees in the leisure area.



ill. 240. Model photo, ***Living*** *and* ***Leisure*** *areas in connection.*

LEISURE FURNITURE SKETCHING

Sketching on design solutions for furnishing the leisure areas starts with the question what is ***leisure*** really for the young?
How do the young spend their ***leisure*** time and what is it that they miss when being hospitalised? The aim of this project is that there is room for being young and developing. Thus the aim must be to design furniture that turns waiting time into ***leisure*** time. Respecting the fact that we are focusing on patients, the objective is to relate to life as well, so that the house 'understands' the young.

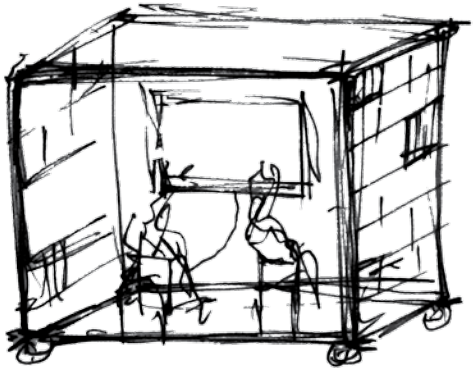
Could there be flexibility in the organisation that would make it possible to reflect the diversity of interests and activities?

ill. 241. Young guy playing Nintendo.

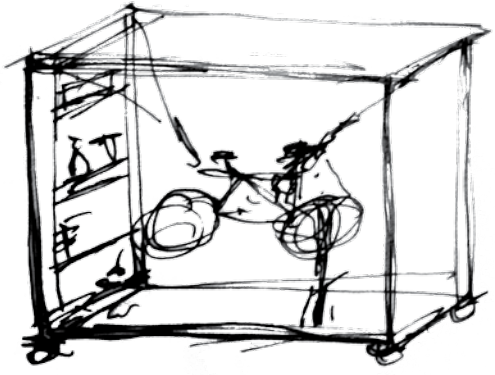
ill. 242. Young girls experimenting with new looks.

ill. 243. Young guys playing table football.

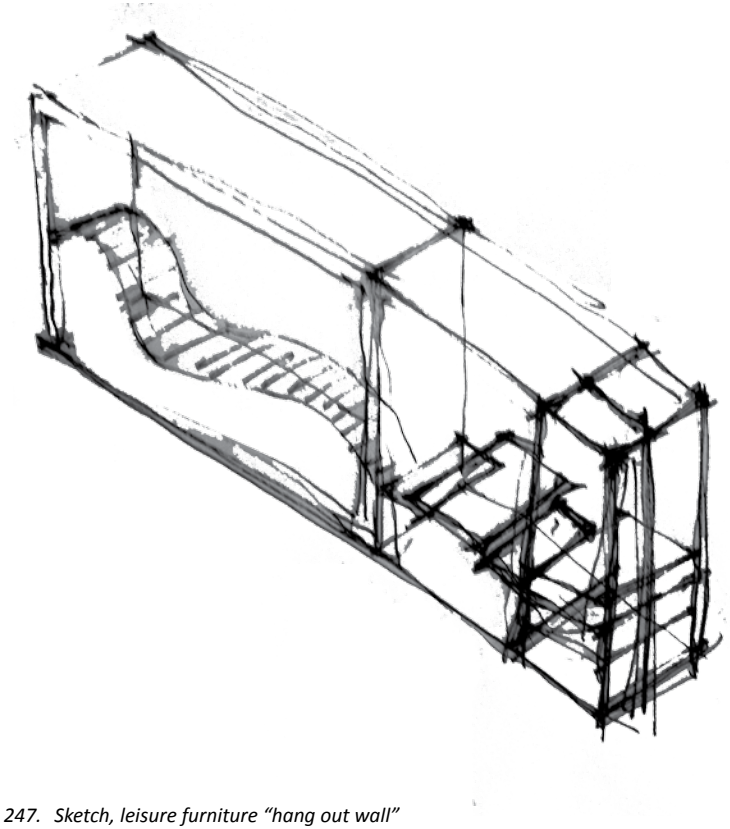
ill. 244. Young couple in a hammock.



ill. 245. Sketch, leisure furniture -game unit.



ill. 246. Sketch, leisure furniture -studio unit.



ill. 247. Sketch, leisure furniture "hang out wall"

LEISURE UNIT

Inspired by the rolling carriers used to transport everything from food and laundry to medicine in a hospital, this modular carrier system is transformed into a system of furniture, which can be moved around by the young and used according to their individual needs.

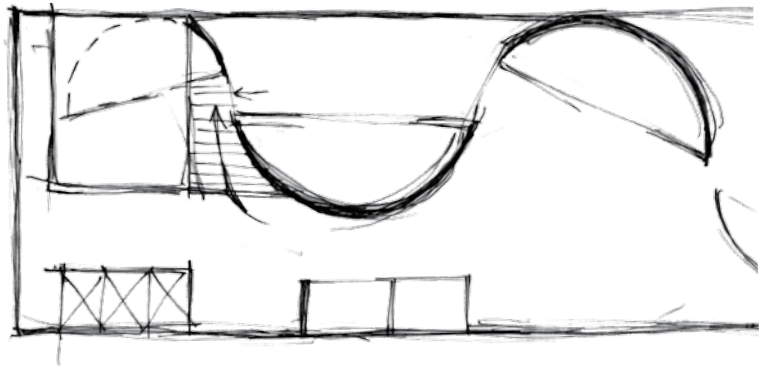
A simple rectangular construction, with or without closed sides, containing almost any imaginable activity. The mobility assures that the leisure units can have access to all parts of the youth hospital or even be pushed into the access lift and taken to the forum or outside.

- Make-up unit
- Movie unit
- Secret unit
- Music unit
- Game unit
- Workshop unit
- Kitchen unit
- Make out unit
- Lounge unit
- Mediatec unit
- Exercise unit

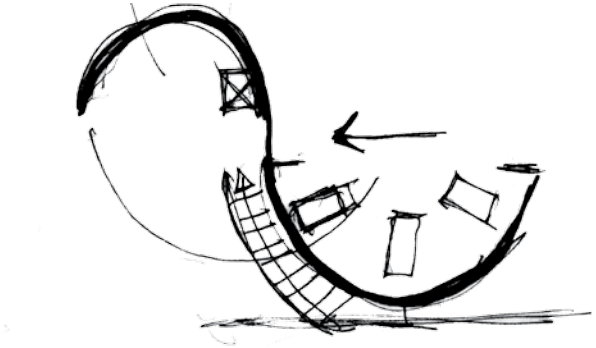
SECRET YOUTH SPACE

Throughout the process the ***pulsating*** shape has developed into an architectural instrument that embraces the young patient and takes him or her through the hospital stay as a journey that begins in the arrival areas. The question is, where does the curved wall end and in what?

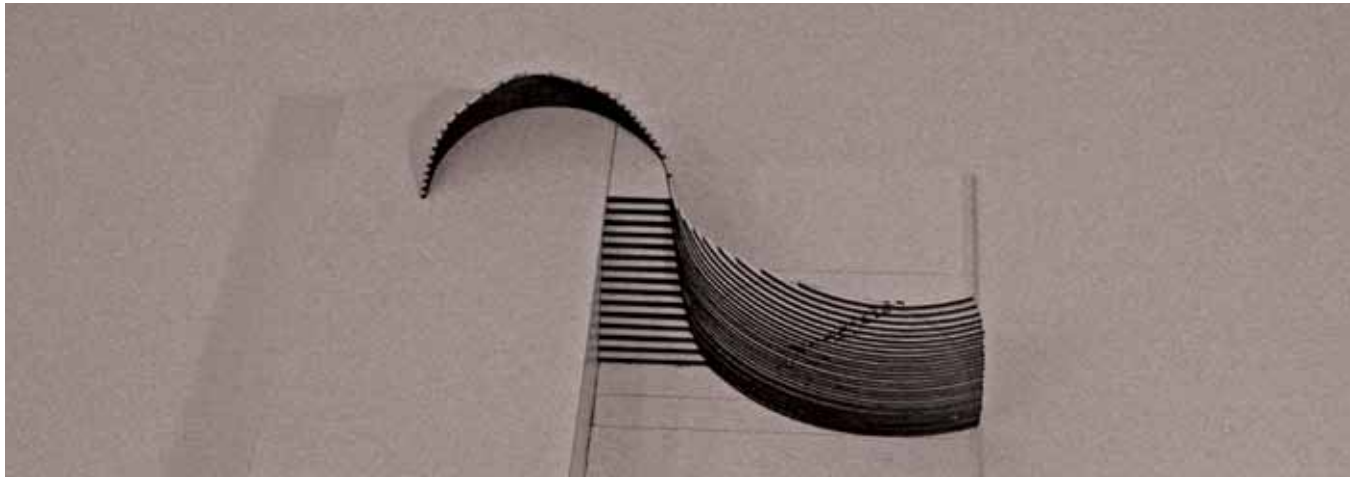
Our idea has been to complete the '***pulse***' with a secret youth place. A place on the roof, which only the young patients have access to; a place where the young patients decide what goes on. Being at the top of the large hospital complex this is a significant spot. The idea is that the curved ***pulsating*** shape ends in open air, outside in the shape of a shelter on the roof with a view of the hospital town.



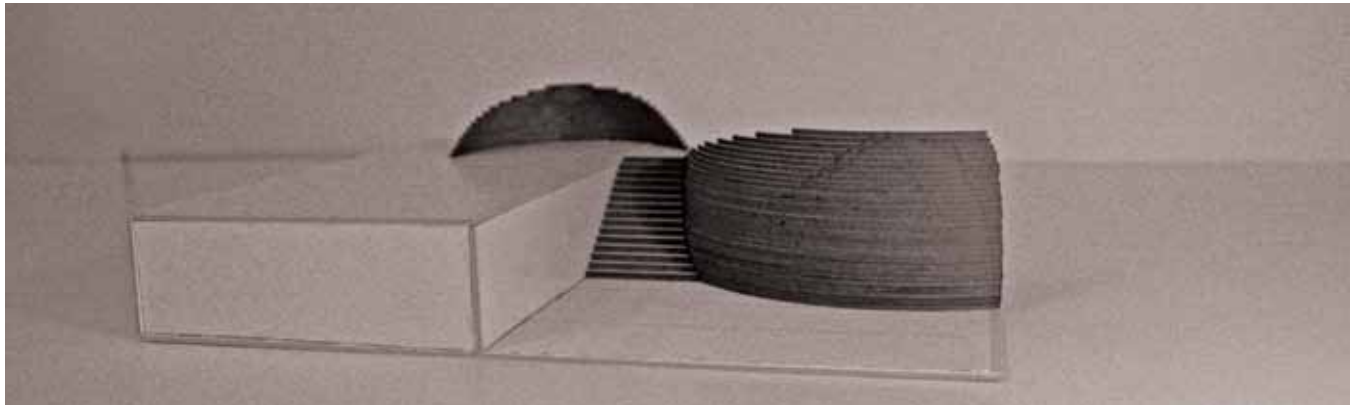
ill. 248. Plan sketch, access to secret youth space



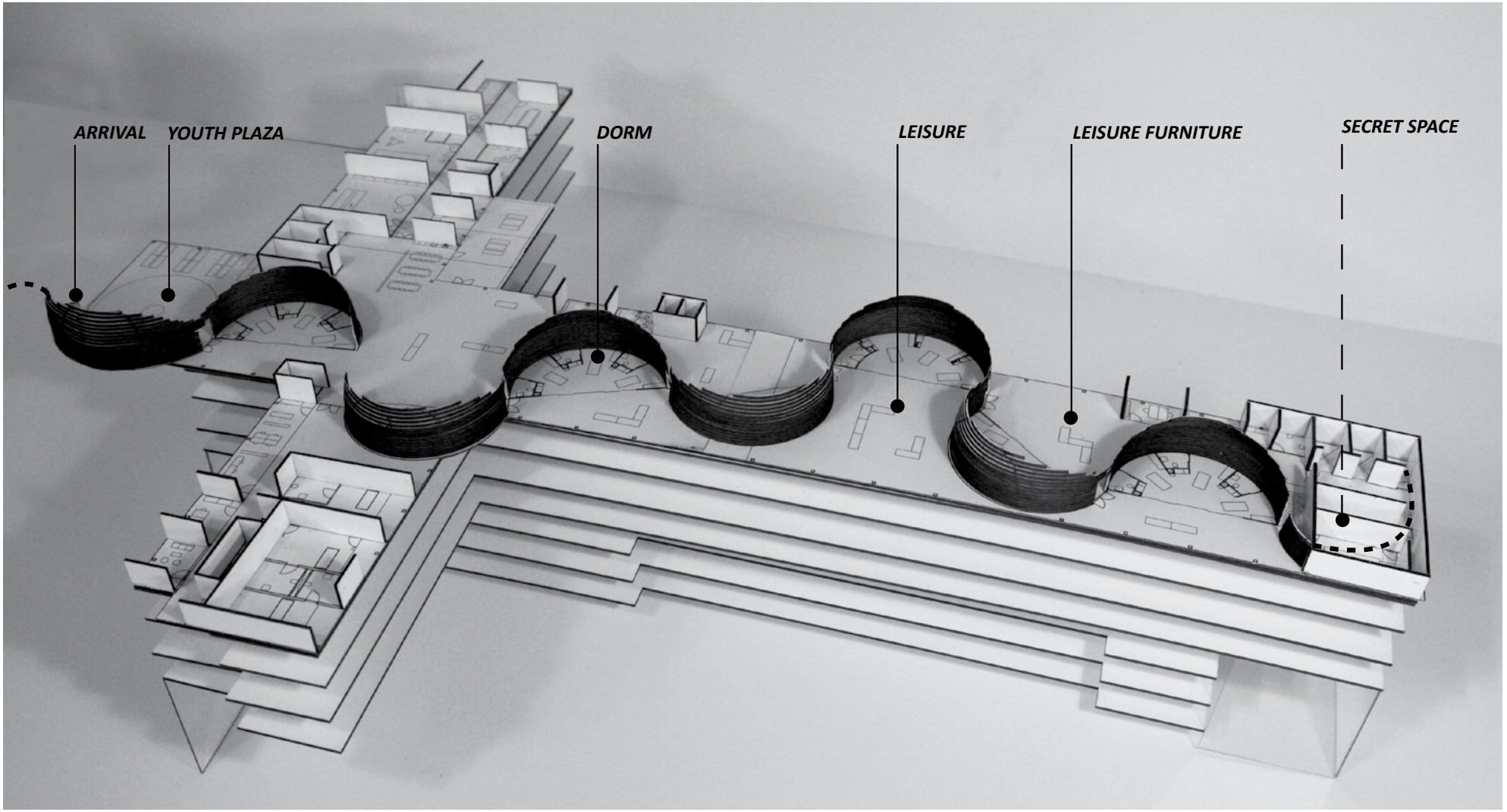
ill. 249. Secret space on the top of the Dedicated Youth Hospital.



ill. 250. Access to secret youth space



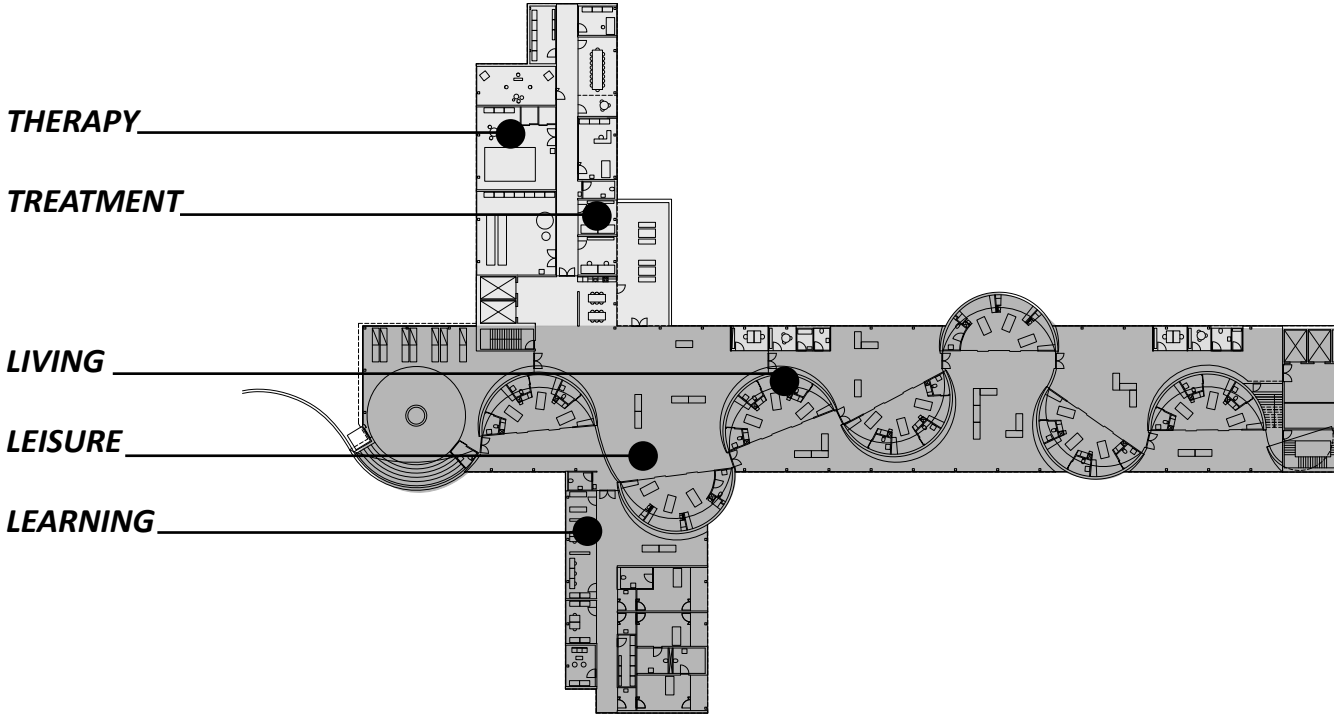
ill. 251. Secret youth space on the roof of the hospital



ill. 252. Model photo, process model for Dedicated Youth Hospital.

DOCUMENTATION

In this final part of the synthesis phase focus is on final documentation of organisation, flow, fire and the structural system before of the presentation.



ill. 253. Organisation diagram for Dedicated Youth Hospital.

ORGANISATION

The organisation of the Dedicated Youth Hospital is developed from the idea of introducing a living flow that crosses the essential rational flow of the Dedicated Youth Hospital.

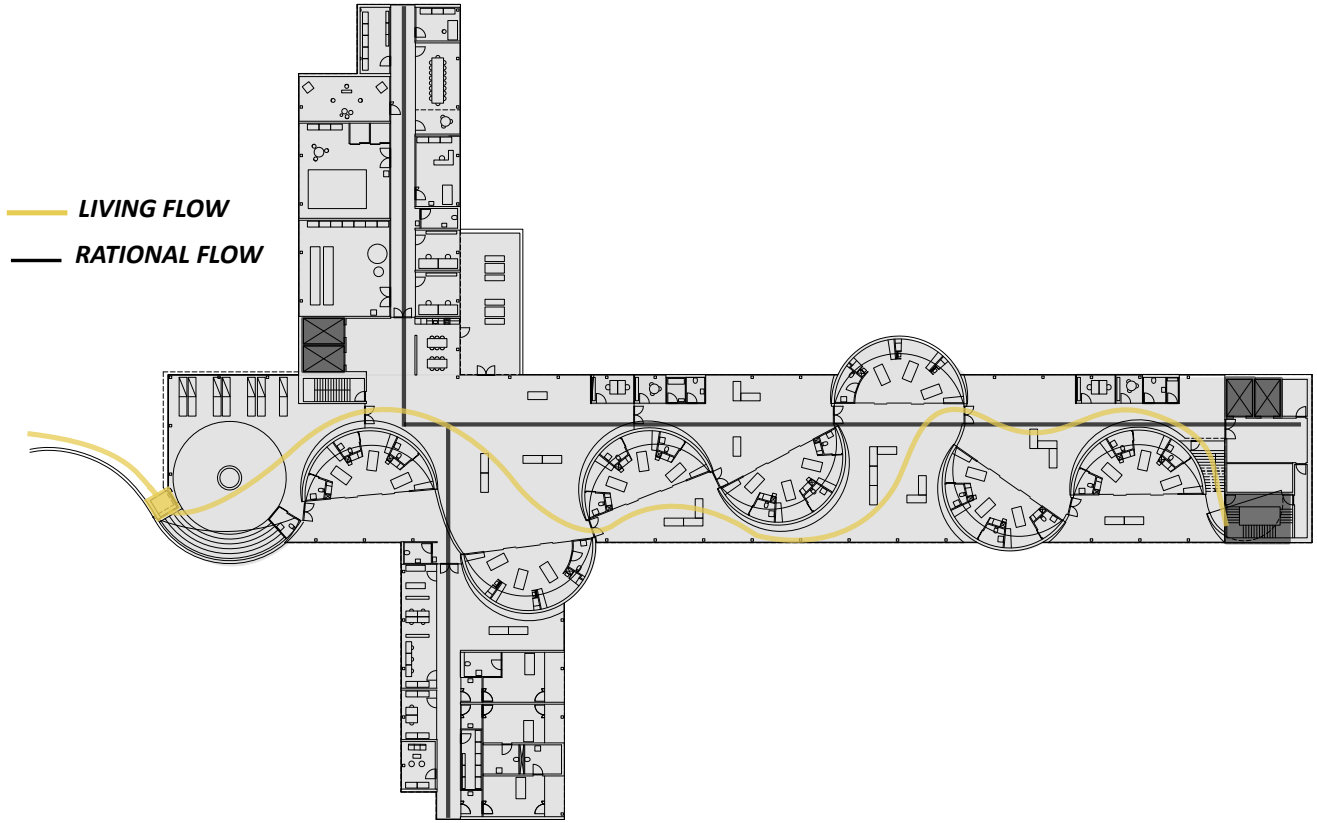
Consequently, the Dedicated Youth Hospital is organised with a clear zoning between the ***Living/Leisure/Learning*** part and the ***treatment/therapy*** part being the more rational functions as illustrated in the organisation diagram.

FLOW

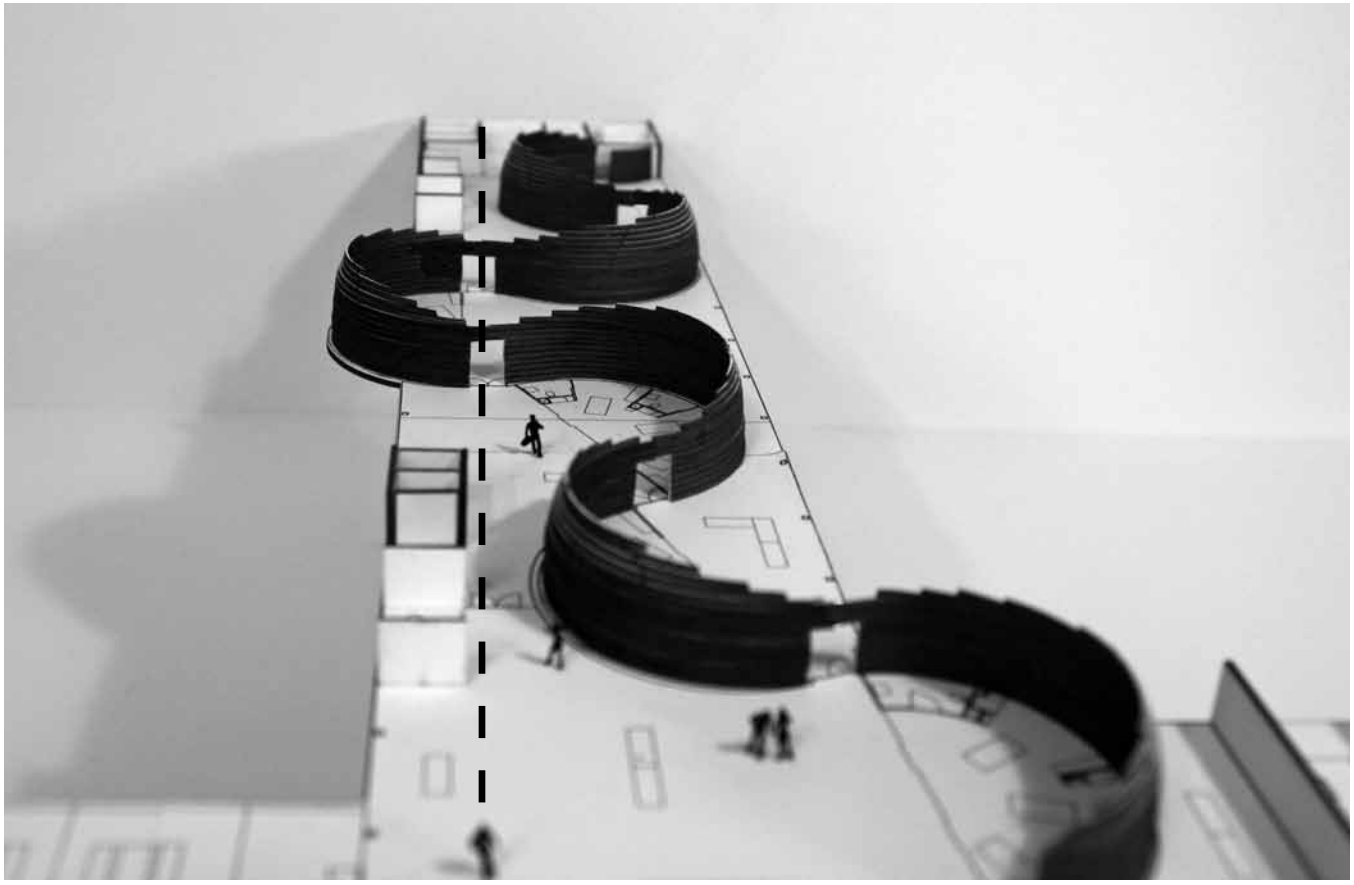
As described above the idea of the Flow in the Dedicated Youth hospital is to have two kinds of flow:

- ***A rational flow***
- ***A living flow***

The workflow of the staff is separated from the flow of the relatives and young patients. As stated in our analysis the rational flow in hospitals is usually characterised by the design of a corridor that is generally seen as unpleasant as the prison corridor. In the Dedicated Youth Hospital there will be no long corridors instead we have chosen a living flow characterised by the curvatures of the architectural shape. To live up to the functional needs of a rational flow the plan is cut through by a rational path. The rational path will also function as an escape route, which will be explained further in the following chapter.



ill. 254. Flow diagram for Dedicated Youth Hospital.

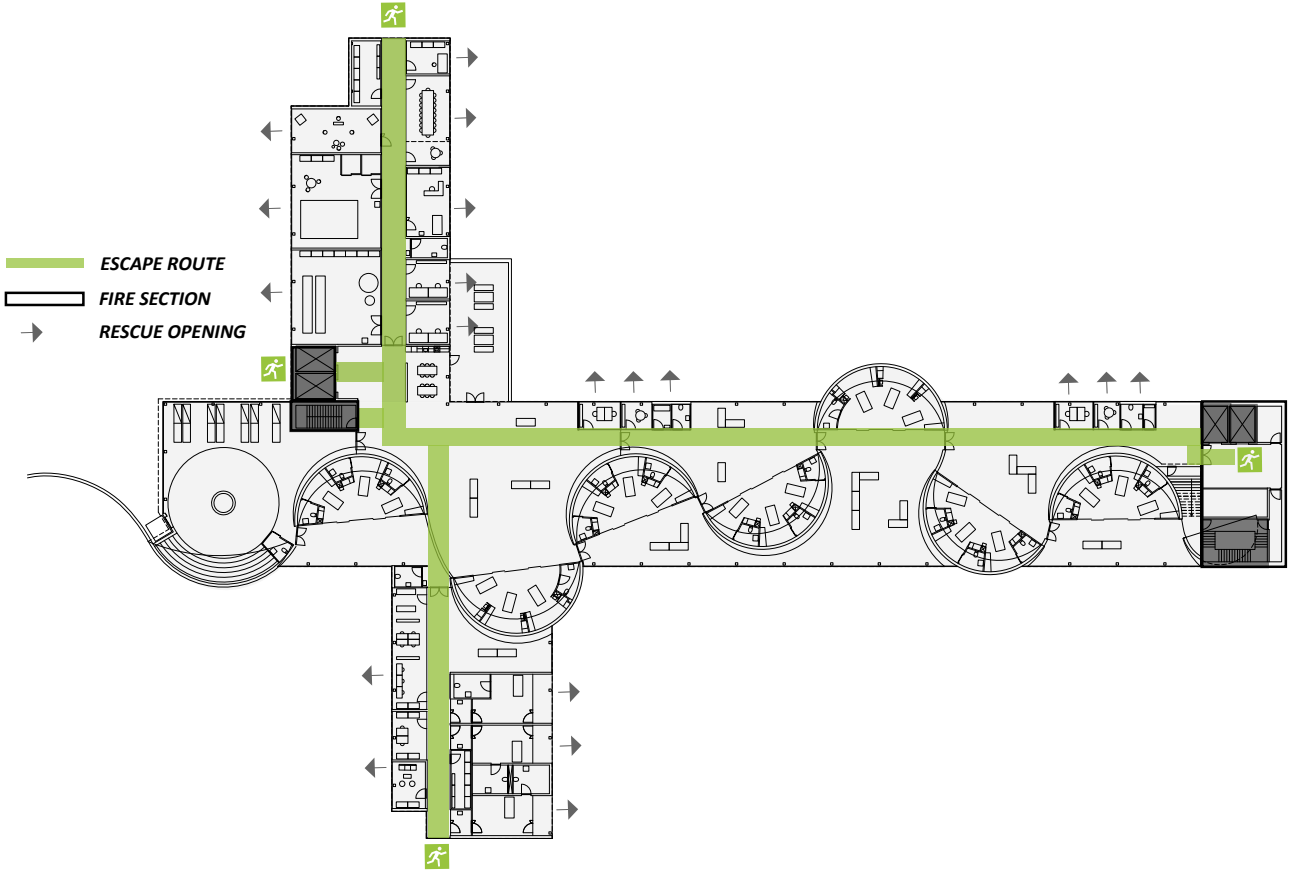


ill. 255. Model photo, rational flow and escape route.

FIRE

As stated above the rational path in the plan of the Dedicated Youth Hospital functions as an escape route. This path is connected to escape routes in the northeast and southeast wings of the plan. Spaces in the plan with access to only one escape route will be designed with rescue openings. Escape stairs and lifts are designed as fire sections, primarily to secure that the fire doesn't spread through these vertical elements to the other floors. In the following part of the report the structural system will be documented.

ill. 256. Emergency exit sign.



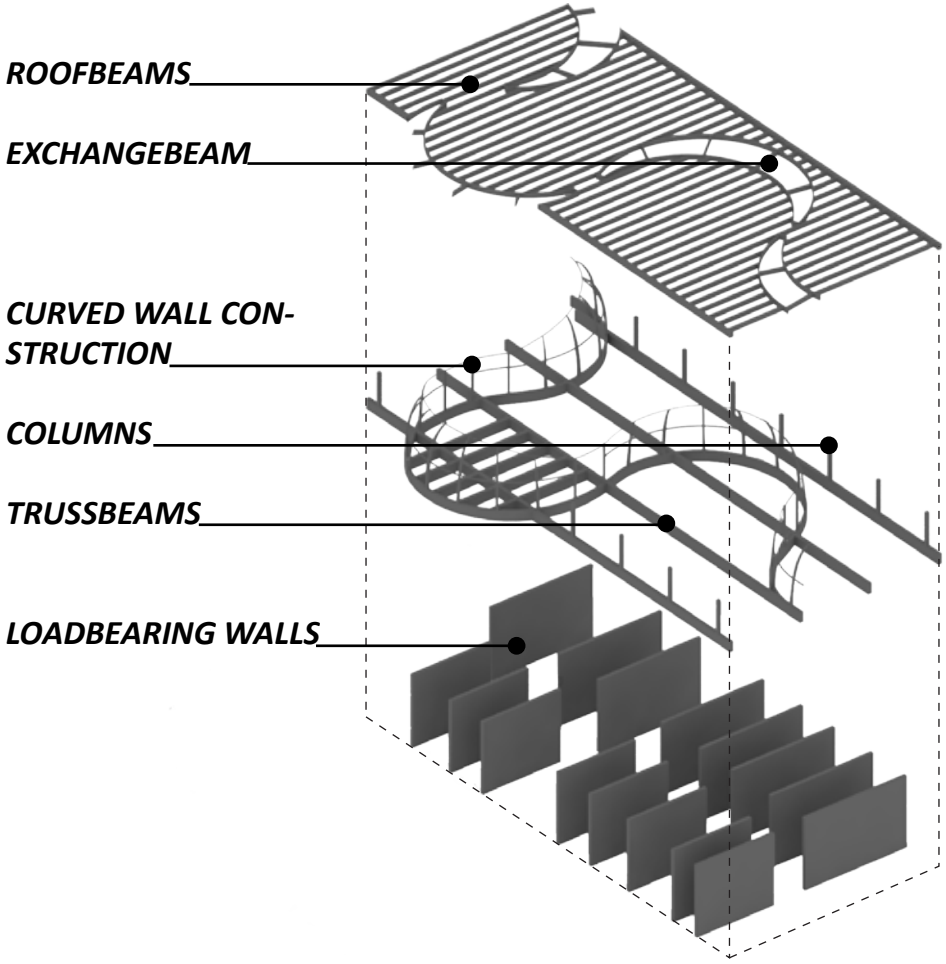
ill. 257. Plan diagran, escape route. fire sections and escape openings.

STRUCTURAL SYSTEM

As stated in the construction chapter [Process_construction] the different functional layout of the Dedicated Youth Hospital demand a structural solution that can distribute the loads from the youth floor to the load bearing inner walls of the floors below in The New University Hospital in Skejby.

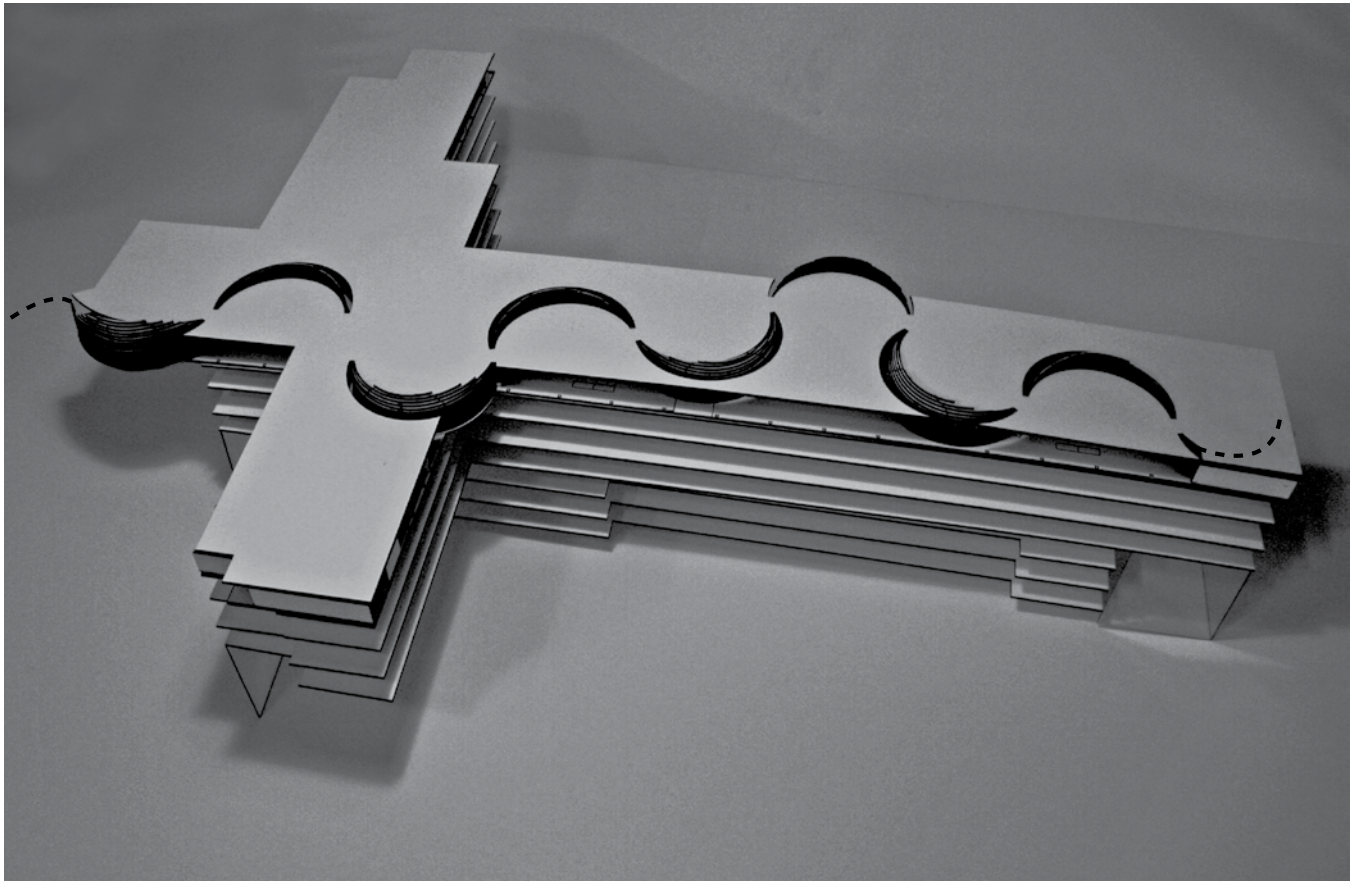
The choice of a light steel construction minimises the additional load to the DNU walls and allows the distribution of the loads to the inner wall below to be non linear in the vertical direction.

The foundation of the youth hospital floor is the truss beams, placed diagonally on the load bearing inner wall below. The steel construction of the curved wall is fixed to steel foundation along with the facade columns. The facade columns and curved wall construction carries the roof construction and the curved wall also absorb the windloads from the facades via the horisontal roof plate. Since the skylight cuts slices in the roof construction exchange beams transfer both vertical and horisontal loads to the curved wall construction.



ill. 258. Structural system diagram.

PROCES EVALUATION



ill. 259. Model photo, Dedicated Youth Hospital on top of section from The New University Hospital in Skejby, designed by C. F. Møller architects.

Throughout the form finding process the project is developed from initial ideas, based on the specific vision through conceptual investigations into a design proposal for The Dedicated Youth Hospital.

In the initial sketching different approaches on how to orchestrate the relatively small Dedicated Youth Hospital within the huge Hospital complex, The New University Hospital in Skejby is investigated. The understanding of the hospital organisation and flow became the decisive factor for the chosen concept. On the other hand the location on top of the complex called for a radical solution concerning the access of the Dedicated Youth Hospital, to reassure that the young would not feel hidden away, and an easy way finding is established. Furthermore the interaction between light and form has been investigated to design spaces that will embrace the young body and mind. Through the concept development the pulsating curved wall is articulated into a feasible design that fulfils both the sensible needs of the young patients and the rational needs of the staff. Technical investigations have been carried out to strengthen the assumed ideas about light, acoustics and construction from the concept stage.
Finally, in the synthesis phase, the organisation, flow, functional, technical aspects and materials have been documented. The final design proposal will be visualised in the presentation of the project.

DEDICATED YOUTH HOSPITAL

Arriving through the sloping terrain in front of The New University Hospital in Skejby, the eye is drawn by a playful sculptural shape contrasting the architectural expression of the surrounding hospital complex. This vital shape runs on top of the hospital complex marking the presence of our proposal for The Dedicated Youth Hospital within the composition of The New University Hospital in Skejby.

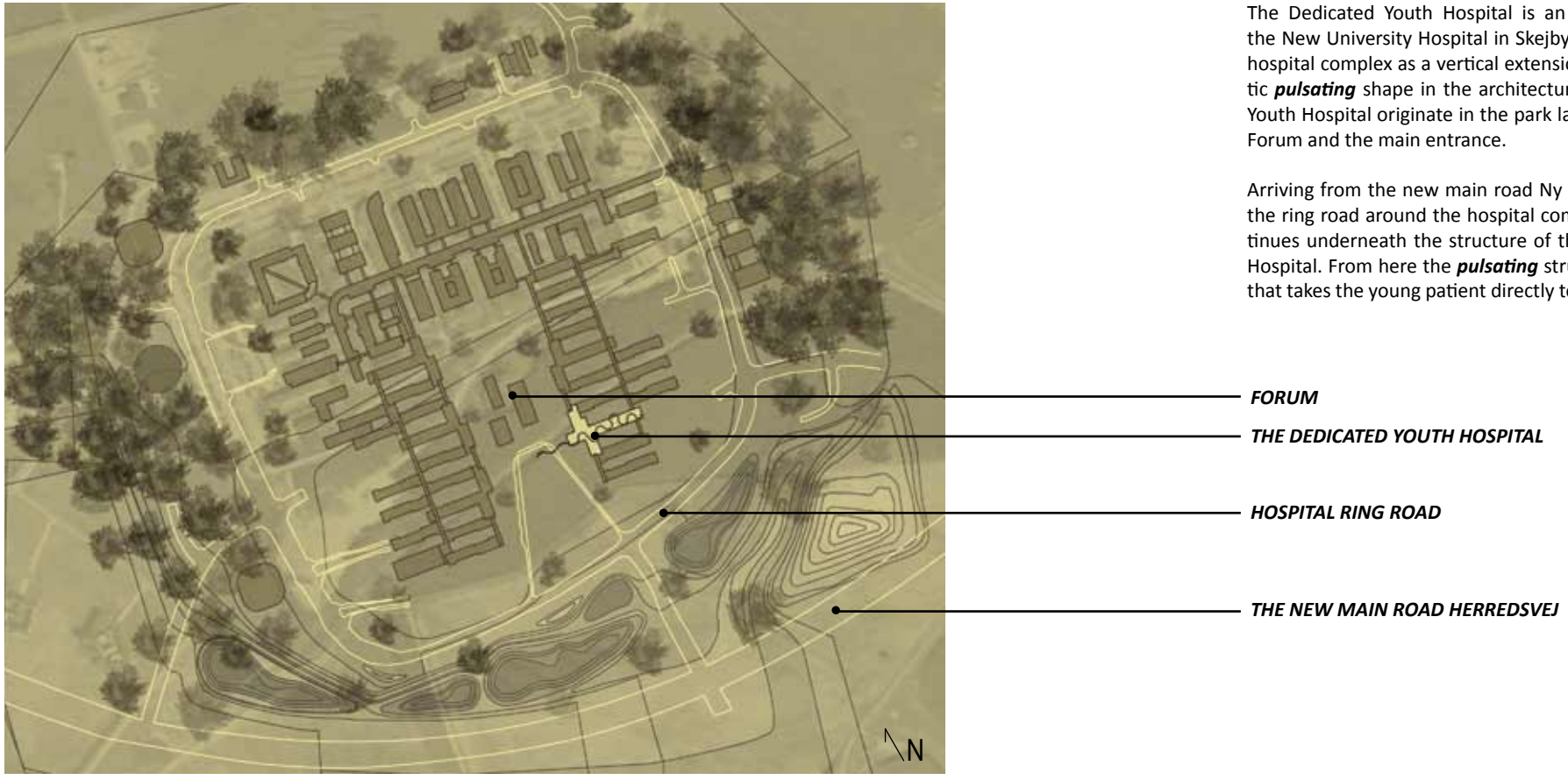
When approaching the main entrance and forum it becomes clear that the curved shape is more than a sculptural element in the park. The characteristic pulsating shape holds a lift that takes you from the landscape to the 8th floor where the Dedicated Youth Hospital is situated. Ridding with the lift memories appear - from skiing vacations, being on the way to the top of the mountain with the skies in your hands. The ride continues presenting a full view of the Hospital town from above and continues inside the Dedicated Youth Hospital.

ill. 260. Exterior expression of our proposal for The Dedicated Youth Hospital in the context of The New University Hospital in Skejby designed by C. F. Møller architecs..

NEW UNIVERSITY HOSPITAL

The Dedicated Youth Hospital is an integrated part of the New University Hospital in Skejby, situated on top of hospital complex as a vertical extension. The characteristic ***pulsating*** shape in the architecture of the Dedicated Youth Hospital originate in the park landscape in front of Forum and the main entrance.

Arriving from the new main road Ny Herredsvej through the ring road around the hospital complex the road continues underneath the structure of the Dedicated Youth Hospital. From here the ***pulsating*** structure holding a lift that takes the young patient directly to the youth section.



ill. 261. Landscape plan in 1:10000 of the Dedicated Youth Hospital in relation to The New University Hospital.

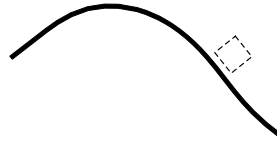
>>The characteristic curved pulsating shape of the Dedicated Youth Hospital originate in the landscape<<

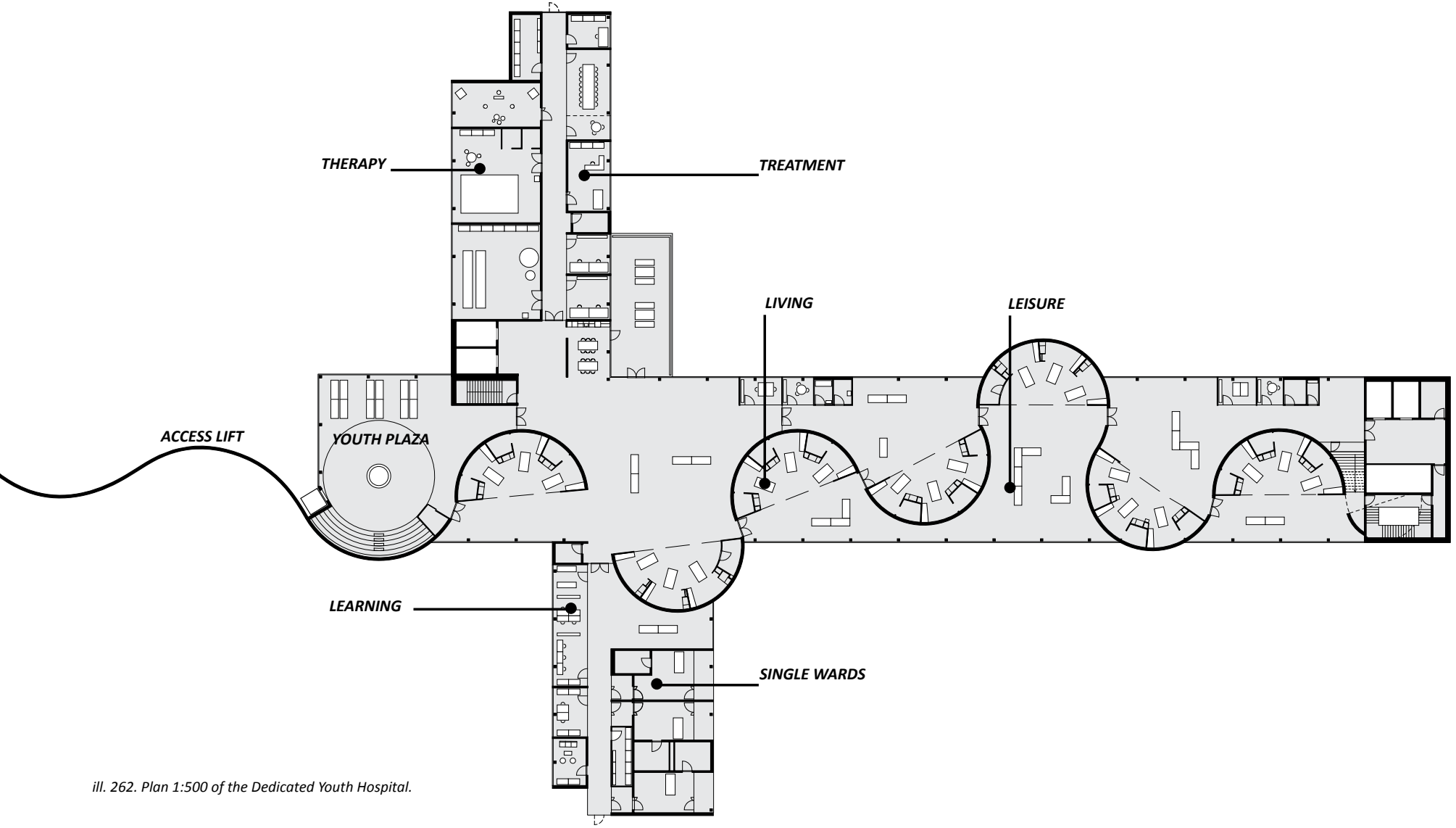
PULSATING LIVING

The ***Pulsating*** shape running through the landscape continues inside forming spaces for ***living***. The first “beat” of the pulse, where the young patients arrives, forms a Youth Plaza. Youth plaza is designed to be an informal meeting point and at the same time a activity area with ***leisure*** events such as, movie showing and performances for the young patients. The caracteristic double curved wall leads you further into the youth section. The continuing beats of the pulse form ***living*** spaces, as dorms for three patients. These dorms are surrounded by spaces for ***leisure*** i various sizes and shapes, spaces that the young patients and their visiting friends can occupy in different ways.

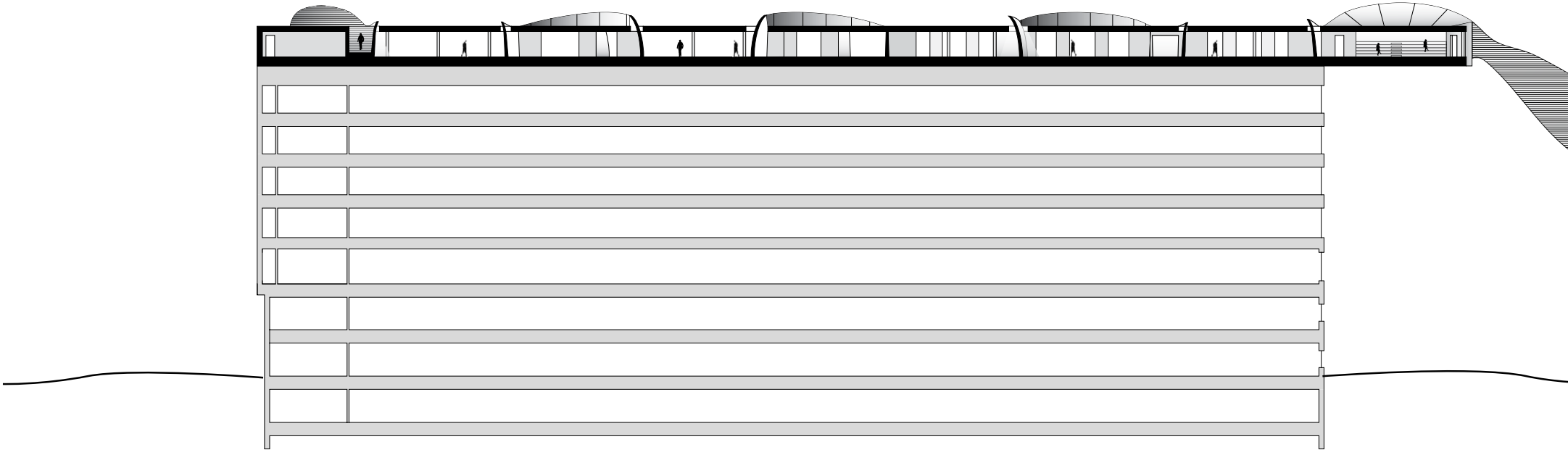
In the North wing of the plan there are spaces for treatment and therapy thus allowing the staff to have private consultations and work undisturbed. To limit nurse travel and create a nearness between the young patients and staff and the staff, there are staff offices located along with the ***living*** and ***leisure*** areas. The therapy part of the plan contains a pool, a gym and a music room. In the south facing wing there are ***living*** spaces for patients that needs isolation, these ***living*** spaces are designed with a small terrace that makes it possible for the isolated patient to enjoy light and fresh air. The learning and immersion spaces is also placed in this more quiet part of the youth section.

The Dedicated Youth Hospital is with this organisation characterised by informal and ***floating*** spaces that opens up to other spaces and thus to other opportunities for the young patients, rather than adding to the young patients feeling of isolation.



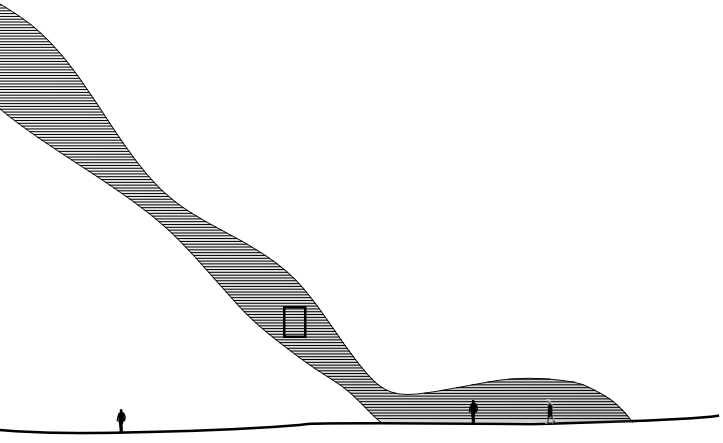


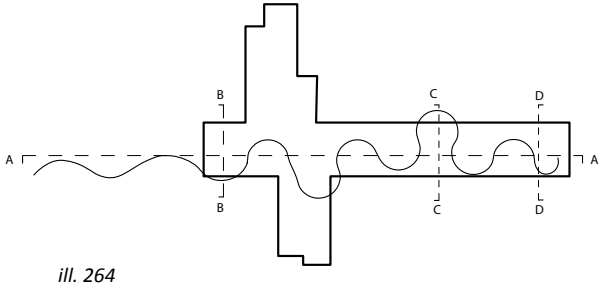
ill. 262. Plan 1:500 of the Dedicated Youth Hospital.



ill. 263. Section A-A 1:500 of the Dedicated Youth Hospital with The New University Hospital beneath.

The ***pulsating*** shape in the architectural expression of the Dedicated Youth Hopital is characteristic in interior as well as exterior, linking the spaces together and supporting a ***living*** flow. As illustrated in the section, The Dedicated Youth Hospital situated on the 8th floor of The New University Hospital in Skejby. Furthermore the characteristic element cuts through the roof, to let light into the ***living*** and ***leisure*** areas.





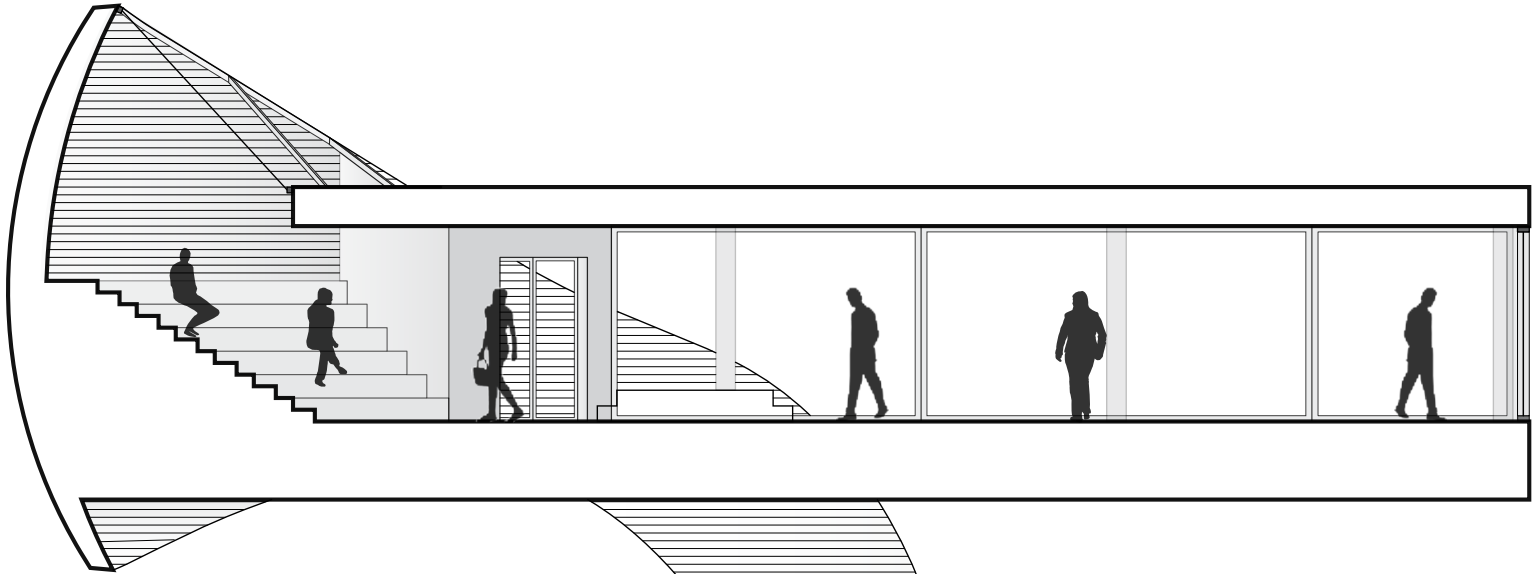
ill. 264

YOUTH PLAZA

ill. 265. Experiencing the atmosphere in the Youth Plaza.

ARRIVAL AREA

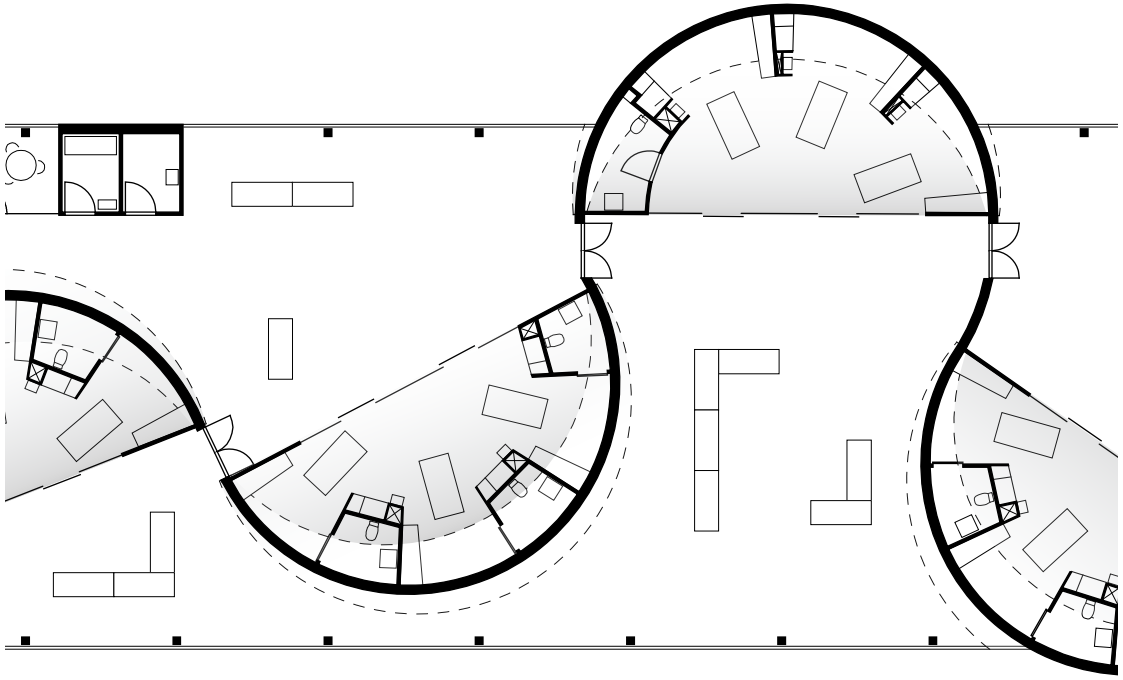
Once the lift stops on top of the hospital city and you enter the Dedicated Youth Hospital a young environment with life and activity and an informal welcoming atmosphere opens up. The grand stair in the entrance space is full of young people hanging out, making out and enjoying spending time together. The soft curved shape continues, leading you further into the youth section. Leaving this small plaza with the impression that you are not alone - exited about experiencing the remaining.



ill. 266. Section B-B 1:100, through the Youth Plaza.

LIVING AND LEISURE

Walking along the curved wooden wall further into the Dedicated Youth Hospital. The spaces almost ***float*** together creating an expectation of what is to be experienced next. The relation between ***living*** and ***leisure*** is transparent making it possible to take part in activities even when in bed but also to 'log off' completely and enjoy the privacy of the individual niches within the dorm.
In the dorms as well as in the ***leisure*** areas it is up to the individual patient to chose his level privacy.



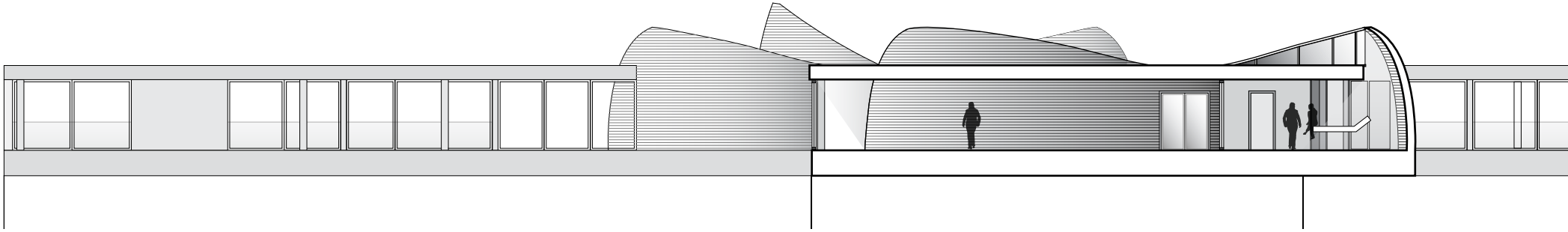
*ill. 266. Plan 1:100 of **leisure** and **living** areas.*

*ill. 267. Experiecing the informal atmosphere in one of the **leisure** areas inside the Dedicated Youth Hospital.*

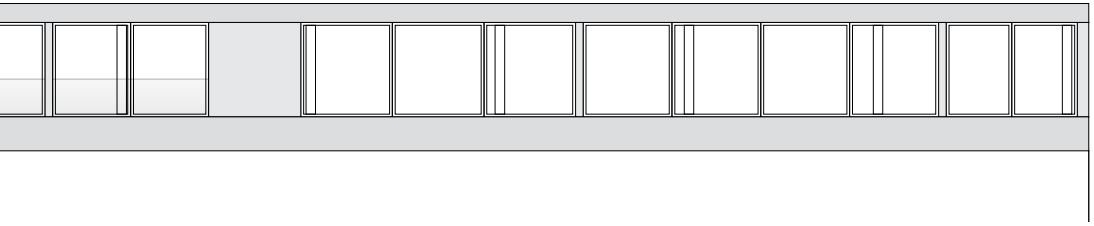
ill. 268. Walking along the cuved wall on my way to hang out in my dorm.

>>Experiencing the informal activities in one of the the leisure area<<

>>On the way to my dorm I feel the warmth of the daylight penetrate from the skylights above the curved wall.<<.



*ill. 269. Section C-C 1:200 through **living** and **leisure** areas.*



*ill. 270. Light penetrates from above in **leisure** and **living** areas.*

DEDICATED YOUTH DORMS

>>The light and warm atmosphere in the dorms makes me feel embraced, for a moment I forget my disease and feel relieved and alive.<<.

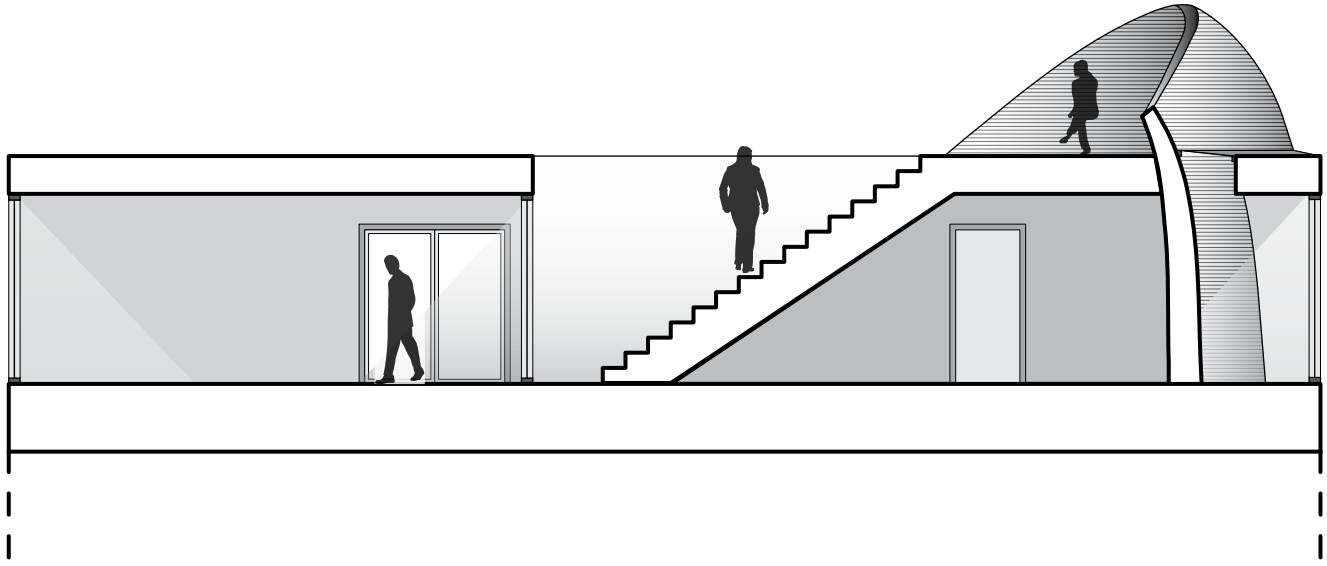
ill. 271. Experiencing the light and warm atmosphere of the dorm.

ill. 272. View from the dorm.

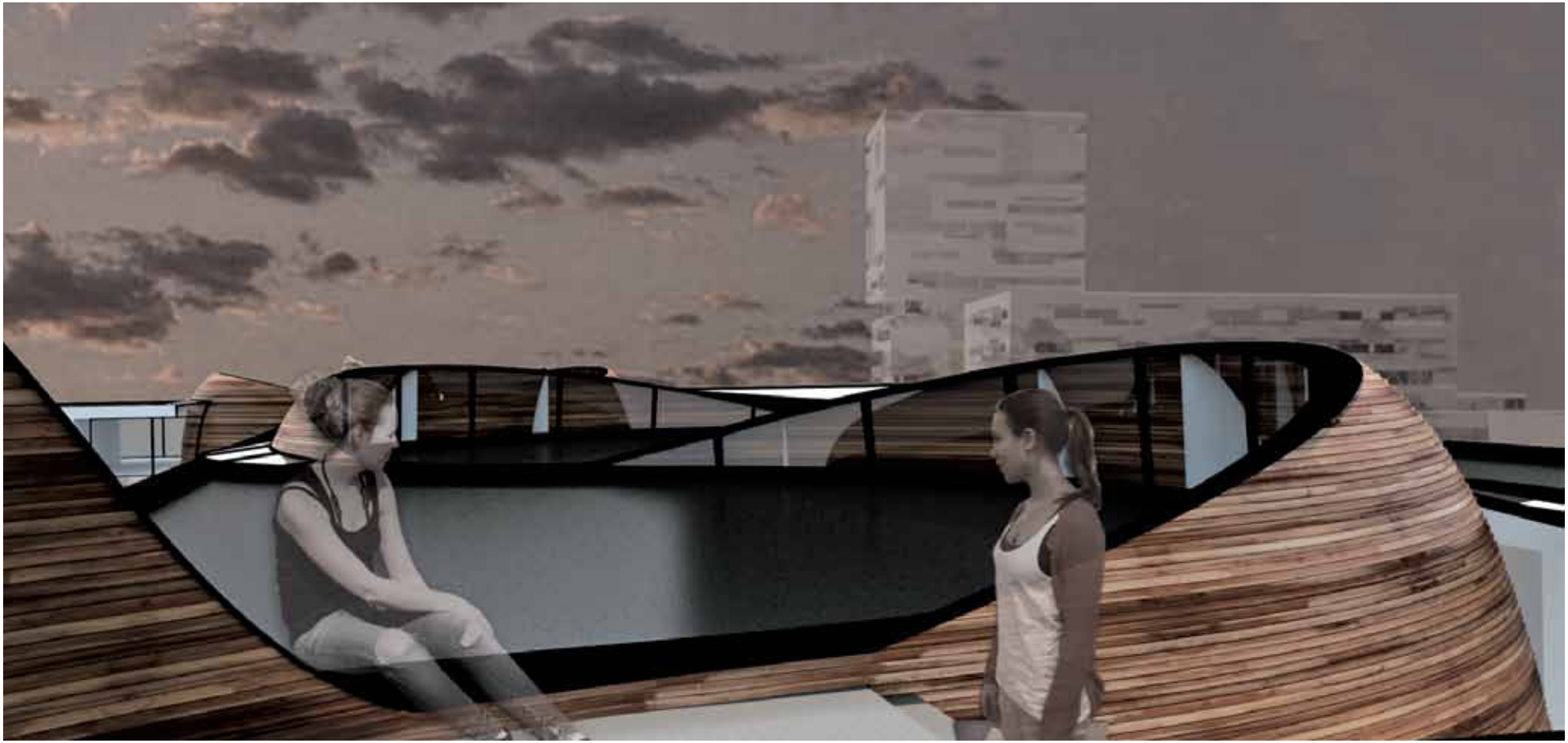
>>From the ward there is visual contact to leisure areas where other young patients hang out<<

SECRET YOUTH SPACE

The day at the Dedicated Youth Hospital ends at the secret youth space on the roof experiencing the sunset with a overview of the hospital town, while taking a relieving breath of fresh air.



ill. 273. Section D-D 1:100, Secret Youth Space.



ill. 274. View form the secret youth space on the roof of the Dedicated Youth Hospital.

CONCLUDING PERSPECTIVE

The intention with this thesis project is to utilise and activate our architectural background by questioning the current societal focus, on the "Specialised Hospital", where the scientific part of the medical system is more in focus than ever before. As stated in the program the aim of this master thesis project has been to focus on how architecture can create a positive atmosphere, which can promote the healing process - a frame for life. Focusing on the youth, who we found disregarded in the hospitals, as a specific group, our vision has been to exemplify an approach combining scientific research with our own compilation of subjective perceptions, in developing an understanding of the particular needs of a young patient and how architecture can fulfill these needs. Thus, with basis in this general issue, we took the challenge of working within the theme Healing Architecture, pursuing an understanding of the influence of the architectural environment on the health of the patient. In order to verify our more deliberated work with the young patients needs, the term Youth Healing Architecture came to existence. With the notion Youth Healing Architecture our intuitive idea was to study the particular situation around the youth in hospitals together with the intuitive behavior of youth in other environments, and to use these experiences in defining the particular needs of the young patient; something which, to our knowledge, previously has not been done.

These experiences have given us an understanding of the more subjective factors and how these can be related to well being through architecture. We found that there were something crucial present in the task of designing a hospital - namely having empathy for the patient and their stage of life, thus, on the things the youth lacks when hospitalized. We also found that as future architects, this is where our responsibility lies; in attempting to combine research and perception through architecture, and to be able to do this within a particular contextual and technical framework. In this relation it has been our intention to develop a relevant project for our thesis - a project as an input to the present debate – intentions, which led us to launch the webpage youthhealingarchitecture.dk. Likewise we chose a particular context for developing the design part of our project.

Here, The New University Hospital has been introduced as the contextual framework, or case under which, to endeavor the application of the developed concept and design for a Dedicated Youth Hospital within the hospital complex. Initially an analysis of the specific project and aims of the project group, with the intention to understand different aspects of the project, was carried out. This has been done in order to uncover the architectural, conceptual and technical potentials, to be explored in a future design of the Dedicated Youth Hospital. With basis in this our idea was to utilise The New University Hospital as a specific framework, consequently our focus was on designing a Dedicated Youth Hospital with basis in the design solutions of the future hospital complex, such as, number of patients pr. square meter, daylight conditions and rationality. In continuation hereof the scientific research in this project took basis in the method Evidence Based Health Care Design, focusing on taking decisions in the design process based on convincing research. We chose to look upon Evidence Based Design as a knowledge base, and hereby not as an infinite design tool that would help us achieve healing architecture.

In correlation with the fact that our studies showed, that there are little specific research based on youth in hospital environments available, our focus has been on identifying tendencies present for the youth in hospital environments. Within the design proposal for the Dedicated Youth Hospital all the research aspects of Evidence Based design has had influence [Program_Evidence Based Design].

Connection to nature.
Options and choices.
Positive distractions.
Access to social support.
Environment stressors (noise, glare, poor air quality etc)

Combining this research, with the earlier mentioned more qualitative experiences, we have managed to transform our specific youth related research, within these different areas, into a form. But even more important we have achieved to realize some of the specific, stage of life determined needs, into a design, thus relating them to the actual design of the architecture. Exemplified in the organization of the living areas as dorms, that provide a private space for the individual patient, and simultaneously gives the young patient an opportunity to create social relations with other young patients. With basis in the specific rational system of the New University hospital in Aarhus we have managed to design a living, pulsating and vital hospital environment for the youth. Dedicated Youth Hospital hereby provides spaces where the young patient is in focus, where it is possible to be young and to evolve.

When concluding, we might add, that probably the key learning from this thesis process is that architecture is based on experience and not on solutions - thus a method like Evidence Based Design is not a recipe for a good result in itself, but can be seen as valuable knowledge for the project. Acquiring an understanding of the fact that there is more to architecture than what can be measured, and that this exactly, must be the main focal point in the process when designing, can from our point of view lead to new specific answers like it has in the Dedicated youth Hospital. As future architects we find that it is our responsibility to explore the boundaries of architecture. On the opposite it is essential to understand the technical, economical and contextual framework, which are the pragmatic conditions of architecture, to ensure the relevance and feasibility of our work.

ill. 275. Sketching in the studio.

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ill. 138 Own sketch based on project material from C. F. Møller Architects.
ill. 153. Own graphics based on project material from C. F. Møller Architects.
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ill. 242. http://img.dailymail.co.uk_i_pix_2007_11_04_makeupgirlsL2511_468x345.jpg
ill. 244. http://feelgizmos.com_wp-content_uploads_2007_12_leaf_hammock1.jpg
ill. 256. http://www.ithinkitsnice.com/wp-content/uploads/foundtype_emergency_exit_1-460x307.jpg

NOTES

1. [Super hospitals] is the definition of the future hospitals in Denmark; to function as a university hospital, a regional centre and a basic hospital for citizens in the region. Five super hospitals has been planned on national basis

2.[] a soft that can contains a bass. When you play music you feel the rhythm through your body.

3. [Ecotect] Ecotect is a digital tool utilsed in this project to simulate both quantitative and qualitative aspects of the daylight inside the spaces of the Deidcated Youth Hospital. Furthermore the program is utilized to simulate acoustic conditiona in relation to materials.

4. [Staad pro] Staad pro is a finite element program utilized to simulate,, forces and reactions in a simplified digital version of the structural system.

APPENDIX 1 STRUCTURAL INVESTIGATION

Loadcalculation tested in Staad.pro.

Tests results show large deflections in Y-axis.
Vertical columns in the Vireendel truss could be enlarged from 0,25 m to 0,5 m and the construction could be pre-stressed to en some extend.

In a further investigation a standard truss beam should be tested to compare results.
Subsequently the cantilever has been minimised from 18 to 14 meter for functional reasons, which also will ease the deflection on the cantilevered truss beam.

Load calculation – Youth dedicated Hospital – cantilevered structure

Location: Skejby, Århus
Geometry (cantilevered part)
Facade length = 18 m
Height = 4,5 m
Depth = 17,4 m
The roof is flat

Constructions
Vierendeel truss
Bottom horizontal beam: 0,5 x 1 m square tube
Top horizontal beam: 0,5 x 0,5 m square tube
Vertical beams: 0,25 x 0,25 m square tubes

Loads

Permanent Load: Glazed façade	= 1.0 kN/m2
Floor	= 1.5 kN/m2
Lightweight walls	= 0.5 kN/m2
Installations	= 1.0 kN/m2
Total	= 3.0 kN/m2
Roof (remember payload, safety factor δ = 0.5)	= 1 kN/m2

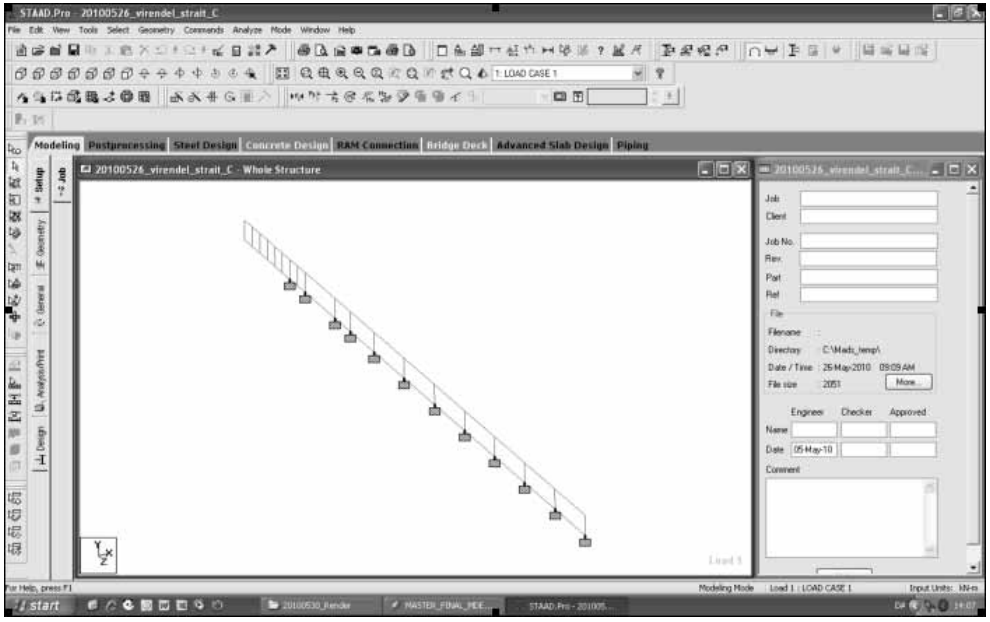
Payload:

Living space (DS 410 p. 7)	= 2.0 kN/m2

Snow load on roof:
(Look-up in DS410 p. 57)
The characteristic snowload on a roof is determined by s = ci CeCt sk
Here is,

-ci form factor for snowload = C1 at flat roof	= 0.8
-Ce location factor	= 1

-Ct thermal factor	= 1
-sk snow characteristic terrain value	= 0.9 kN/m2
-S	= 0.72 kN/m2
Design load (permanent, payload, snowload)	=7.72 kN/m2
Load area (Lastopland)	=8.5 m
Load pr. meter to cantilevered Virendel truss	=65.62 kN/m



ill. 276. Screen shot of simplified geometry from Staad pro.

APPENDIX2
STATICS

The Staad.pro tests shows that the loads from the cable car is not the problem, but the self weight from the construction results in a large deflection.
Recognizing that the steel construction has to be optimize and that windloads on the facade is a considerable issue to address, the investigation is ended without a final end result.

Load calculation – Youth dedicated Hospital – Cable car construction

Location: Skejby, Århus
Geometry
Length = 45 m
Height = 3m

Constructions
Truss beam construction
Bottom horizontal beam: 0,2 x 1 m square tube
Top horizontal beam: 0,2 x 0,5 m square tube
Vertical beams: 0,25 x 0,25 m square tubes

Loads
Permanent Load

Design load Cable car [accessauto] = 6.0 kN

Payload
Living space (DS 410 p. 7) = 2.0 kN/m2
Cable car floor m2 = 1,4 x 1,8 = 2,52 X 2 kN/m2 = 5.0 kN

Snow load on roof of cable car
(Look-up in DS410 p. 57)
The characteristic snowload on a roof is determined by s = ci CeCt sk
Here is,
-ci form factor for snowload = C1 at flat roof = 0.8
-Ce location factor = 1
-Ct thermal factor = 1
-sk snow characteristic terrain value = 0.9 kN/m2
-S = 0.72 kN/m2

Wind load on the facade

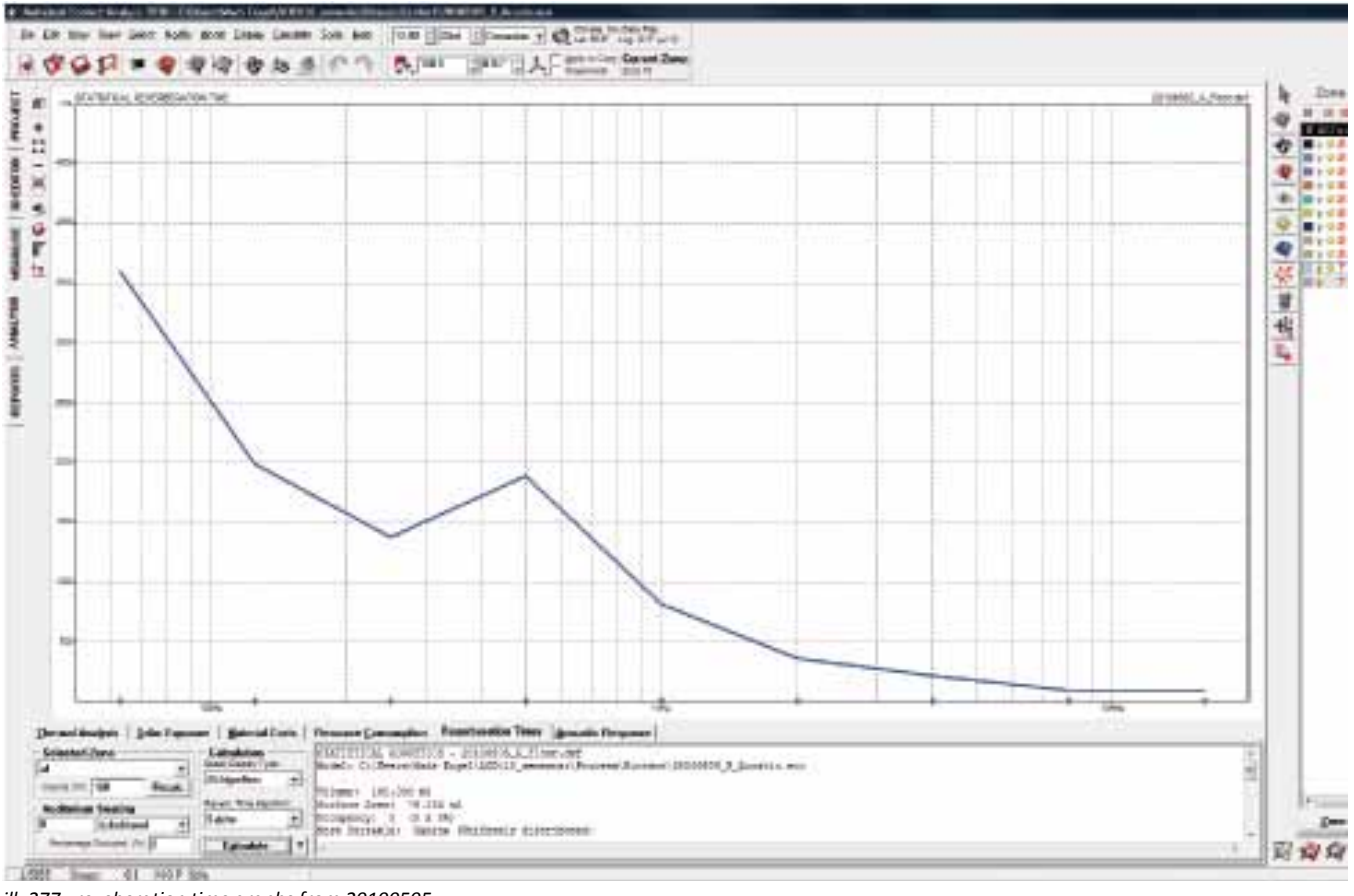
Prerequisites:
- Wind loads counted as fixed loads, operating throughout the construction.
- Geometrics of the lift construction is calculated as a vertical façade.
- It is assumed that the structure is so stiff that the wind load can be regarded as static acting load = Quasistatic response. This even though the design height is greater than 15 meters.
- The wind loads run perpendicular to the construction surface.

The typical value of evenly distributed wind load:
W [kN/m2] = c * qmax [kN/m2]
c is the form factor
qmax is speed pressure relative to the altitude z in terrain category 2 “Open country”.
Basic Wind speed is set at 24 m / s [DS 410 p.27]. As the lift construction run from terrain to approc. 25 meters above terrain the construction is divided into wind pressure zones:

Zones	qmax [kN/m2]	Form factor c (pressure + suction)	Wind load on façade [kN/m2]
0-5 meters above ground	0,7	1 (0,7 + 0,3)	0,7
5-10 meters above ground	0,85	1 (0,7 + 0,3)	0,85
10-15 meters above ground	0,95	1 (0,7 + 0,3)	0,95
15-20 meters above ground	1,02	1 (0,7 + 0,3)	1,02
20-25 meters above ground	1,07	1 (0,7 + 0,3)	1,07

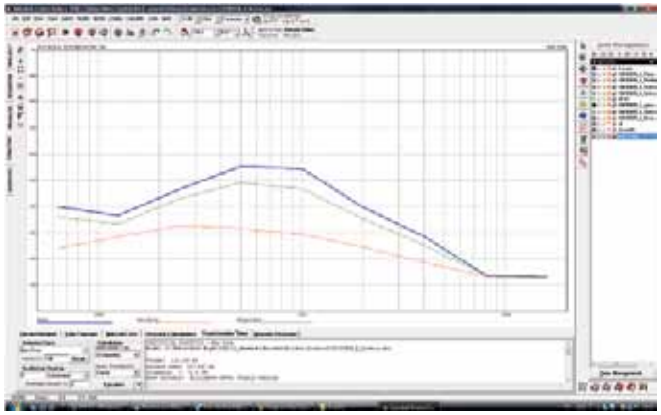
APPENDIX 3
ACOUSTICS

Screenshot from the simulation program Ecotect showing the reverberation time graphs for dorms investigated with different materials.



ill. 277. reveberation time graphs from 20100505

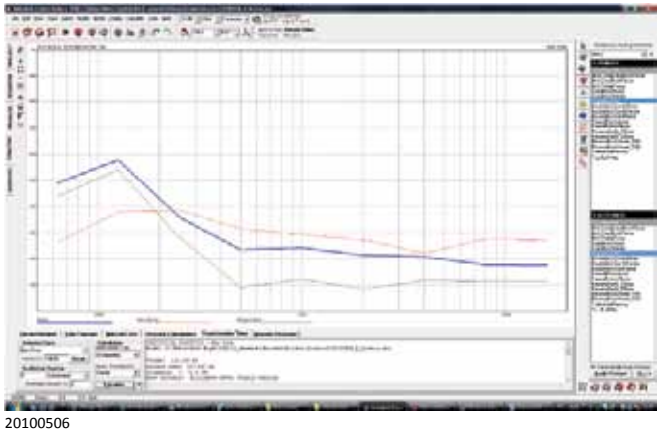
Imported geomertry	
Wall	Timberboard
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Plasterboards on 50 mm insulation



20100506

Material investigation_1

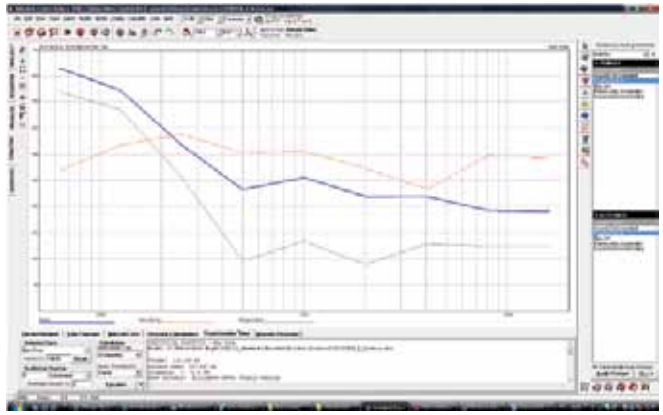
Wall	Timberboard
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Plasterboards on 50 mm insulation



20100506

Material investigation_2

Wall	Concrete, Painted
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Ecophon 50 mm acustic insulation



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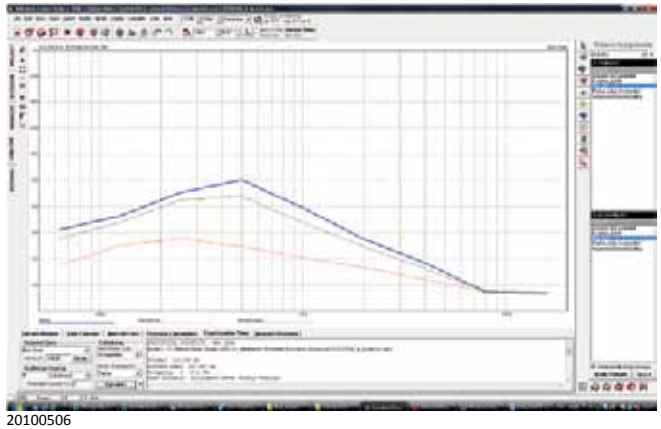
Material investigation_3

Wall	Timberboard
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Ecophon 50 mm acustic insulation



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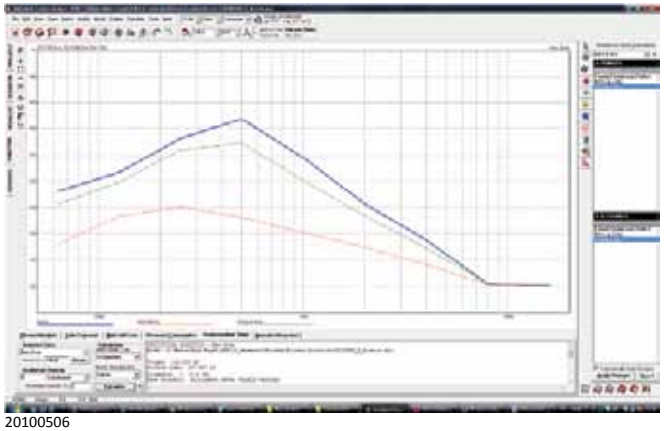
Material investigation_4

Wall	Concrete, Painted
Partion	Plasterboards on 50 mm insulation
Floor	Rubber on concrete
Ceiling	Plasterboards on 50 mm insulation



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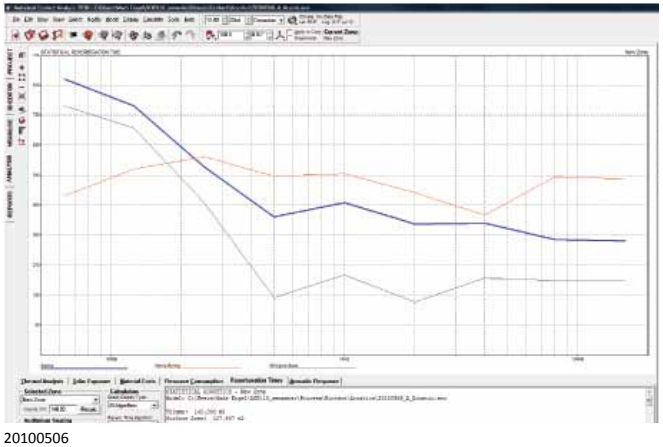
Material investigation_5

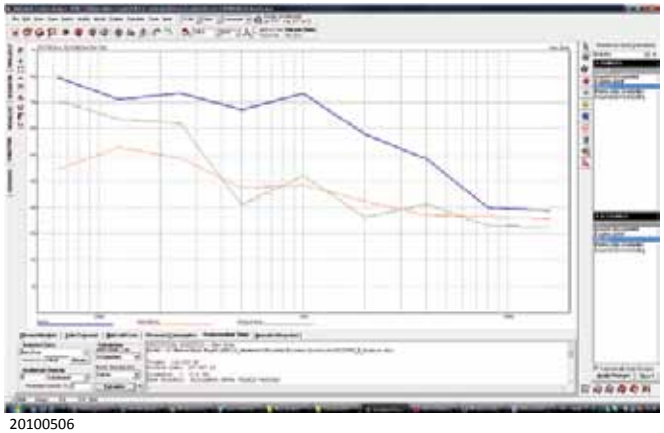
Wall	Concrete, Painted
Partio sides	Plasterboards on 50 mm insulation
Partion front	Wooden closet doors
Floor	Rubber on concrete
Ceiling	Plasterboards on 50 mm insulation



20100506

Material investigation_6

Wall	Timberboards
Partion sides	Plasterboards on 50 mm insulation
Partion front	Wooden closet doors
Floor	Rubber on concrete
Ceiling	Ecophon 50 mm acustic insulation



20100506

Material investigation_7

Wall	Timberboard
Partion sides	Plasterboards on 50 mm insulation
Partion front	Wooden closet doors
Floor	Rubber on concrete
Ceiling log on	Plasterboards on 50 mm insulation
Ceiling log off	Ecophon 50 mm acustic insulation