HOSPICE KOLDING

ma4-ark10 - May 2012
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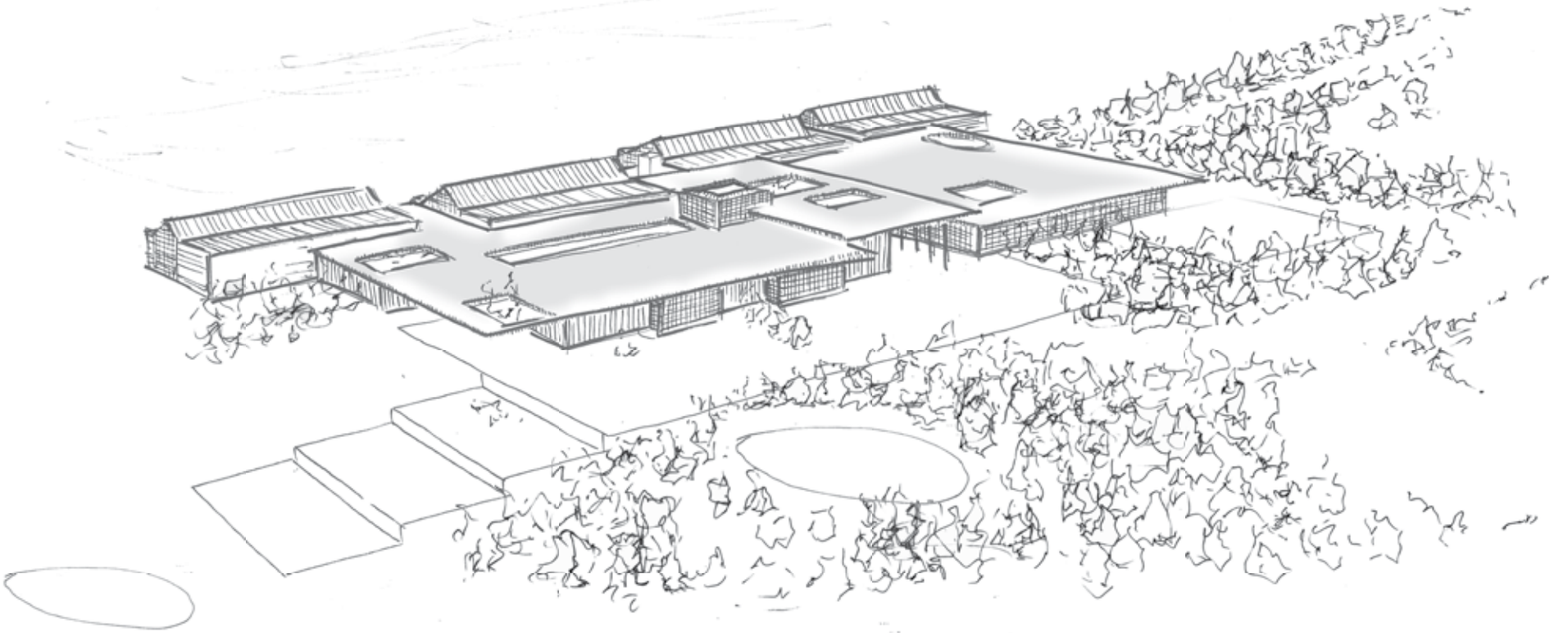
ABSTRACT

The present report represents the design of Hospice Kolding situated in the outskirt of Sønder Stenderup overlooking “Solkær Enge” and in close connection to “Fvos Å”. The functions of the building take its point of departure in “Program for Det Gode Hospice i Danmark” and different hospice visits. Hospice Kolding is designed to influence the comfort and well-being of the patients in order to create a house, were life can be lived and the perfect conditions are present in order to accomplish life. This is done by implementing characteristics from Nordic Architecture in terms of context relation, human scale architecture, light and materials. To enhance the patient’s well-being further an excellent indoor climate has been created additionally to energy optimization, where low energy class 2015 has been fulfilled by use of passive solutions.

The composition of the building reveals the hierarchy of the functions, consisting of two main elements, the dwellings and the staff facilities/daycare center. The dwellings are separated into two clusters each of 6 dwellings to increase the level of privacy. The dwellings are orientated south-east to provide a view overlooking “Solkær Enge” and to create the possibility to observe the sunrise. Each dwelling is 45.5 m2 and designed with a wall unit containing furniture’s to underline a homely atmosphere. Contrary to the private zones is a variety of common rooms, providing zones for activity and informal meeting, created. Of shared facilities can the reflection room, wellness room and the greenhouse be mentioned. Towards south-west is a ceremonial exit situated, with the aim to provide space for the relatives to say farewell to their dears. The staff facilities/daycare center is separated into three parts, staff area, entrance hall and daycare center. The daycare center is separated into smaller zones, a kitchen to welcome the visitors, therapy rooms, a quite/dialogue zone and a fitness/multi room.



Ill. 1 Hospice Kolding

PREFACE

The analysis for this project is founded in a substantial research, which only has been possible due to many people's willingness to help with information and to welcome us as visitors or collaborators. Above all we would like to thank "Støtteforeningen - Hospice Kolding" to be cooperative in terms of letting us draw a hospice project for them and to comply us in their thoughts about Hospice Kolding. Simultaneously we would like to thank "Hospice Forum Danmark" who established the contact and helped us gather information. We will also like to thank the project leader of "Program for Det Gode Hospice i Danmark", Marianne Kofoed from Realdania, the responsible for the program; "Arkitektur og Lindring", Karen Marie Kjeldsen from PAVI for providing informations and inspiring literature.

"Program for Det Gode Hospice i Danmark" is the strategic brief for this project. A desire to know more about the background for the program occured, why a contact to Esben Neander Kristinasen, SIGNAL Arkitekter was established, caused by his position as project leader in terms of composing the newest publication and he was helpful with knowledge about the foundation.

During the research of our cases, we got the opportunity to talk to the responsible architect of Hospice Djursland, Henrik Vestergaard, C.F. Møller, which we are very grateful for.

Last but not least we would like to thank the following institutions who has welcomed us, at our study trips; Ankerfjord Hospice, Hospice Djursland, Hospice Søndergård, Hejmdal – Kræftpatienternes Hus, Stabekk Hospice, Lovisenberg Livshjelpscenter in Oslo, Grove House in St. Albans, Maggie's London, St. Christopher's Hospice and St. Joseph's Hospice in London.

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Group	ma4-ark10
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Kristina Møller Hansen

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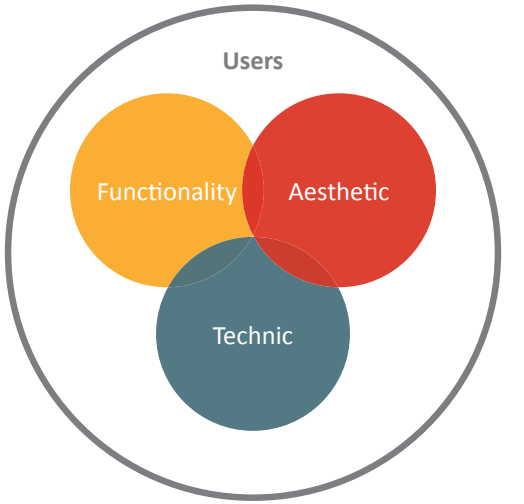


Ill. 2 A integrated approach

METHODS AND READING GUIDE

To create integrated building design the project is based upon an understanding of how functional, aesthetic and technical parameters (in this case indoor climate and energy optimization) should work together, and create a building that relates to all subjects. Another essential parameter, when designing a building, is the users, whose needs should be considered in order to create the most optimized design. See ill. 2. This strategy affects the entire project, and is seen as a very important foundation when designing.

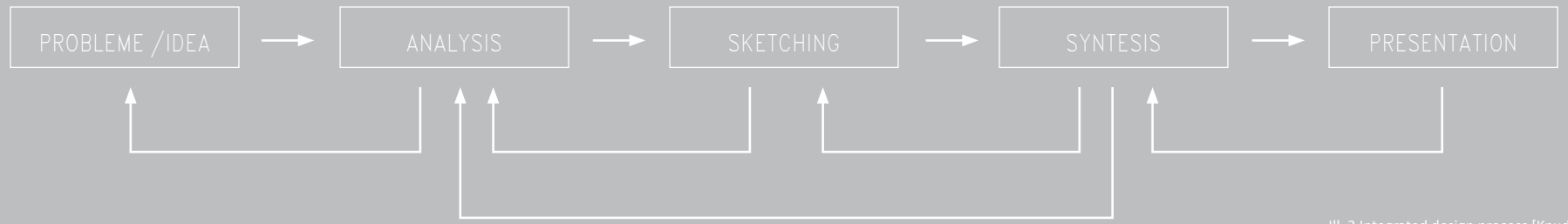
INTEGRATED DESIGN PROCESS

In this project the Integrated Design Process (IDP) is used as a tool to control the design process. This process is applied to the project in order to secure integrated building design, based on an iterative process. Ill. 3 shows the structure of this process, a structure, which also has been used, for organizing this report.

"The IDP method at A&D has the architectural design process as its starting point, where strategically chosen parameters from engineering are integrated from the very beginning of the architectural design process and throughout the process, and are integrated as interactive elements in an interactive workflow in the interdisciplinary design approach" [Knudstrup, 2004].

The process takes it starting point in the problem statement, which in this case is presented in the motivation. This is followed by analysis of the themes; history, in this case hospice history and philosophy, the users, the site, an aesthetic approach in this case Healing and Nordic Architecture and a technical approach, as mentioned concerning indoor climate and energy optimization. This part is followed by a design template, summarizing how the different subjects will affect the final design in a vision, design parameters and a room program.

This leads to the sketching phase, where ideas and the knowledge gathered in the analysis is converted into an architectural building concept. A concept based on architectural ideas, a



Ill. 3 Integrated design process [Knudstrup, 2004]

functional understanding and simulations of how the technical parameters work. The synthesis phase afterwards represents the part of the design process where every part of the concept is detailed and verified. The final design is furthermore discussed in relation to the initial idea and relating design process.

The final hospice design will be represented through visualizations, illustrations and drawing material in the very beginning of the report to capture the interest of the reader.

Drawings in a large scale are found in the drawing folder. A PDF of the report, drawings and original files of calculations and simulations and other appendixes can be found on the CD.

TOOLS

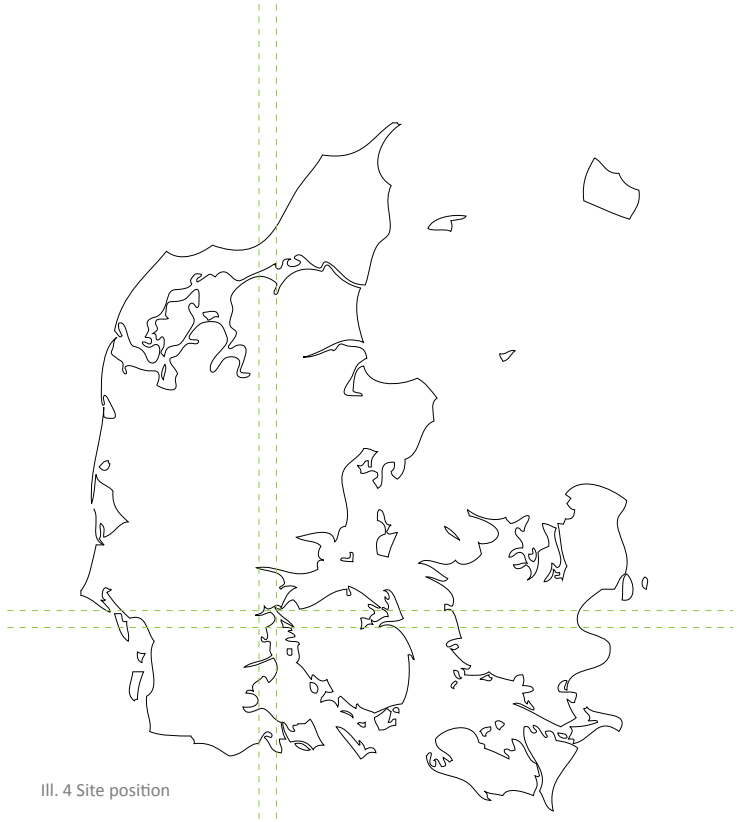
Through the project many other methods will be used, throughout the different design phases. Among these are case studies, interviews, mapping and phenomenological site analysis in the analysis phase. In the sketching phase and the synthesis phases sketching by physical models, sketches and 3D modeling are used in order to understand the form. The spreadsheet “daily average” are used for simulating the indoor climate in the process and BSim are used to simulate the final indoor climate, Be10 for estimating energy consumption including an calculation concerning solarcells, IES-VE for light simulations, spreadsheet for calculations of the CO2 level and reverberation time. For the final presentation Google sketch Up, Podium, Adobe and AutoCAD will be used.

References to literature are done according to the Harvard method, [Surname, year] and an index can be found in the back of the report. This also applies to the illustrations, which in the text are referred to as; (see ill. xx). Appendixes are to be found in the back of the report and are referred to as; (see app. xx).

INTRODUCTION

This report is a master thesis project in Architecture, at “Architecture, Design & Media Technology”, Aalborg University. The project deals with the design of a hospice based on a report called “Program for Det Gode Hospice i Danmark“ (translation: Program for The Good Hospice in Denmark), which was created on the initiative of Realdania in 2009. The purpose of this report was to create inspiration and a reference book for the planning of future hospices, which are required to meet today’s standards. In this project, the program will work as a imaginary strategic brief.

In addition to the strategic brief a cooperation with “Støtteforening - Hospice Kolding” (Friends of Hospice Kolding) has been established with the purpose of designing a proposal of a hospice in Sønder Stenderup in a nature landscape, with a view towards “Solkær Enge” (see ill. 4+5). The hospice will be designed based on the beliefs as an architect and inspired by ideas from the friend association.



Ill. 4 Site position

Ill. 5 The site

INITIATING PROBLEM STATEMENT

HOW CAN A HOSPICE BE DESIGNED TO EMBRACE THE PATIENTS NEED FOR COMFORT AND WELL–BEING, WITH AN ARCHITECTURE CREATED IN A HUMAN SCALE AND IN CLOSE RELATION TO THE CONTEXT?

" THE SPECIFIC DESIGN PROCESS IS BASED ON THE HUMAN AND END WITH THE BUILDING –NOT THE OTHER WAY AROUND"

[3XNIELSEN, 2010]

MOTIVATION

PERSONAL MOTIVATION

Through the studies a increasing interest for an architecture, which creates great potential for human well-being, has been built up. Architecture should generally not take its point of departure in the architects need for aesthetic unfolding, the specific design process should instead be based on the human and end with a building – not the other way around [3XNielsen, 2010].

Another focus, which through the studies, has been important is, the landscape, the spirit of the place and how to design context related buildings. Christian Norberg-Schulz stresses the importance of understanding the specific character of a place and designing buildings that "…gathers and represents the world to which it belongs" [Norberg-Schulz, 1996, preface]. In association to this the Nordic Architecture has captured an interest, which, besides context relation, is characterized by a functionalism combining light and refined materials [Lund, 2008].

Based on these philosophies and areas of interests, a motivation to find a building, which could hold all these design parameters occurred and what can handle that better than a hospice?

A hospice is a building, which in its architecture should be suitable for the palliative care focusing on both functionality and the senses affected by air, sound, light, colors and materials.

When focusing on integrated building design, where the needs of the users should be highly considered, a natural technical approach is indoor climate. Due to the profile as architectural Engineers, focusing on integrated design, energy optimized building design, reflected in the final building design is of great interest.

THE DISTRIBUTION OF HOSPICE BED SPACES IN DENMARK

The region of the capital:	44 bed spaces
The region of Sealand:	36 bed spaces
The region of south Denmark:	48 bed spaces
The region of the middle part of Jutland:	50 bed spaces
The region of the northern part of Jutland:	18 bed spaces

All in all 196 hospice bed spaces distributed on 17 hospices,
the need is on 275 bed spaces.
(50 spaces pr. 1 million inhabitants)
[Sundhedsministeriet, 2001]

Ill. 6 The Danish hospice capacity

THE INTEREST OF THE SOCIETY

In 1992 the first hospice was founded in Denmark and since then a rapid development has occurred. This development has caused the establishment of further 16 hospices, but Denmark is still lacking around 60 hospice beds to meet the demand (see ill. 6).

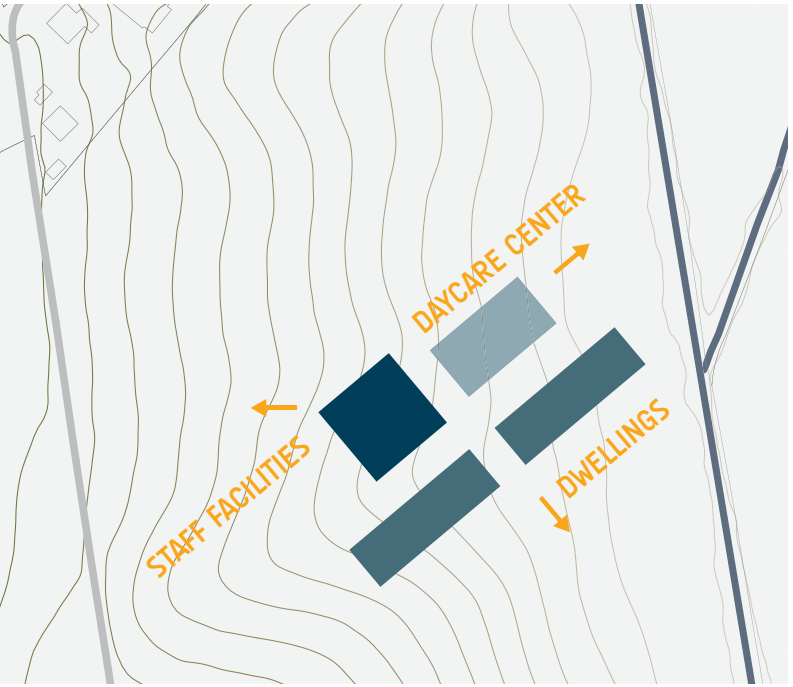
The increased focus on hospice design in the society has throughout the recent years created an interest and research within the so called healing architecture. This research shows that architecture can be used as a tool to create the best possible surroundings for people with life-threatening illnesses [Realdania Nyheder, 2011].

This knowledge has among other things occurred, through experience from the hospices; Hospice Djursland, Hospice Søndergård, Hospicegården Filadelfia and Hospice Svanevig, which are all developed, based on the report “Program for Det Gode Hospice i Danmark”. This new knowledge has caused further research within the field titled; “Arkitektur og Lindring” (translation: Architecture and Relief) performed by PAVI [Realdania Nyheder, 2011].

In the society and in the building industry the focus on energy optimization has increased through the past 30 years, which makes energy optimized building design very relevant to consider when designing a building today. The aim for this project is to reach the Low Energy Class of the 2015 standards. The large focus on energy optimization has however created problems concerning the indoor climate, why the future probably will cause a changed focus also considering parameter concerning the indoor climate. In terms of creating architecture influencing the patients well-being the indoor climate will as well be a integrated part of the design.

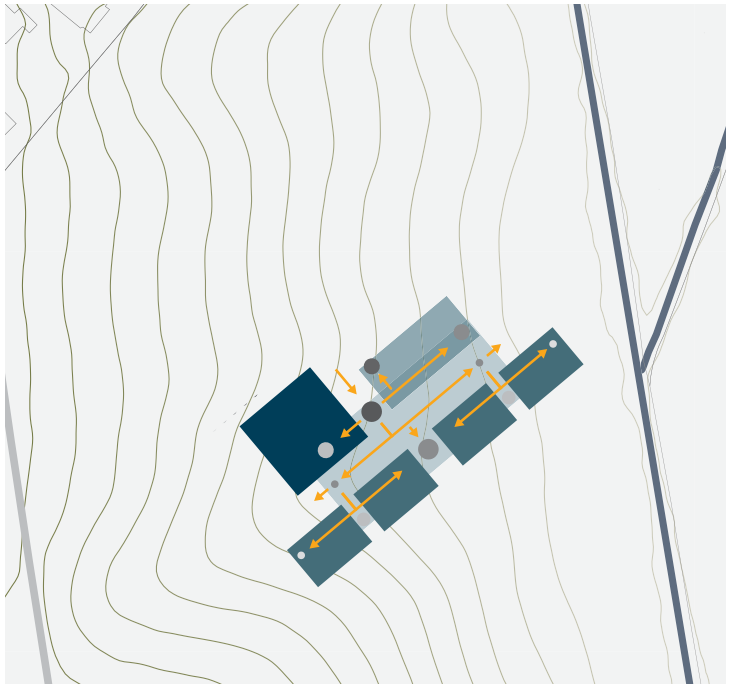
PRESENTATION

THE CONCEPT



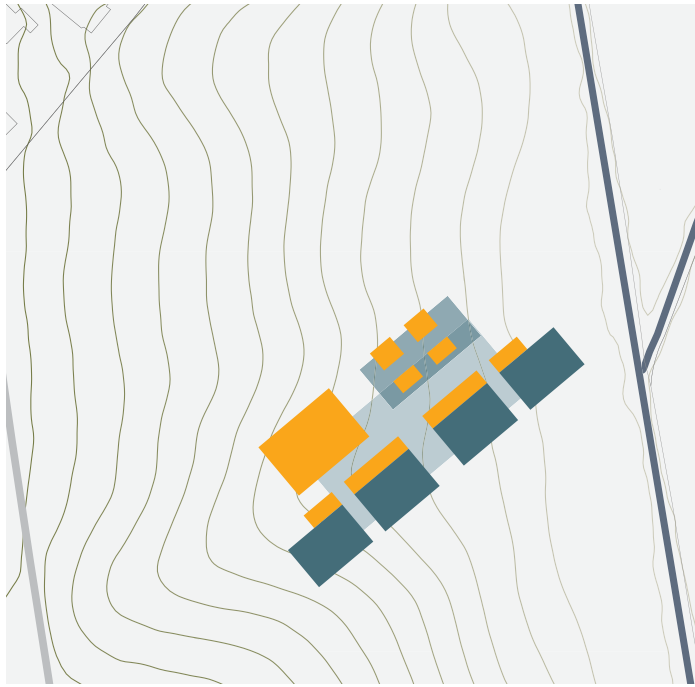
PLACING THE FUNCTIONS ON THE SITE

The facilities are placed on the ground, depending on which potentials of the site are of important value in the different elements.



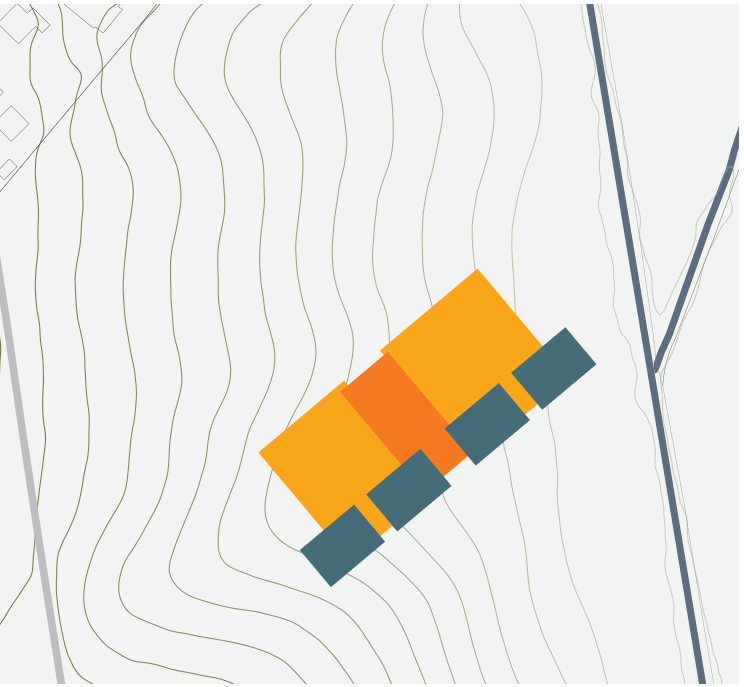
FLOW – PRIVACY AND COMMON ROOMS

The flow is controlled in order to create the wanted degree of privacy and commonness within the dwellings and in the common rooms.



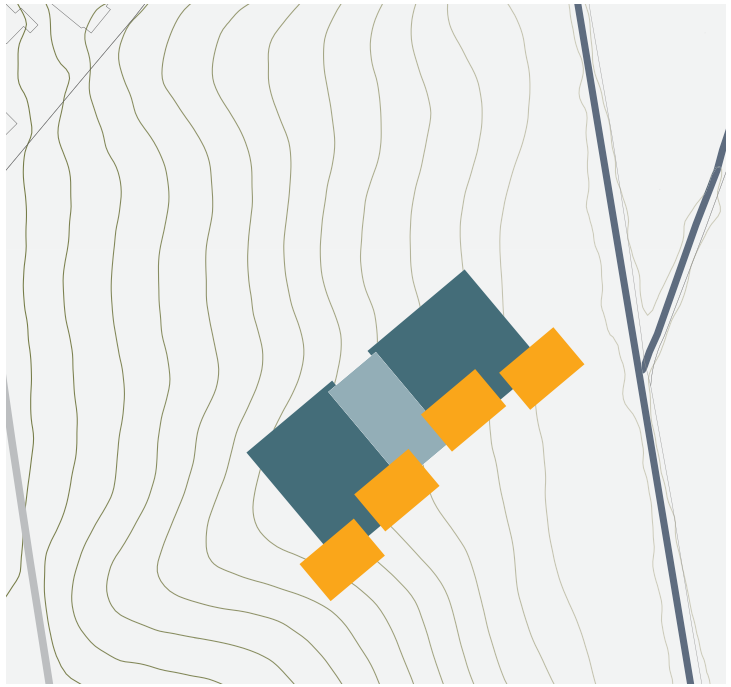
SERVICE FACILITIES

To ensure optimal flows for the staff the service facilities are distributed all over the hospice in relation to where they are needed.



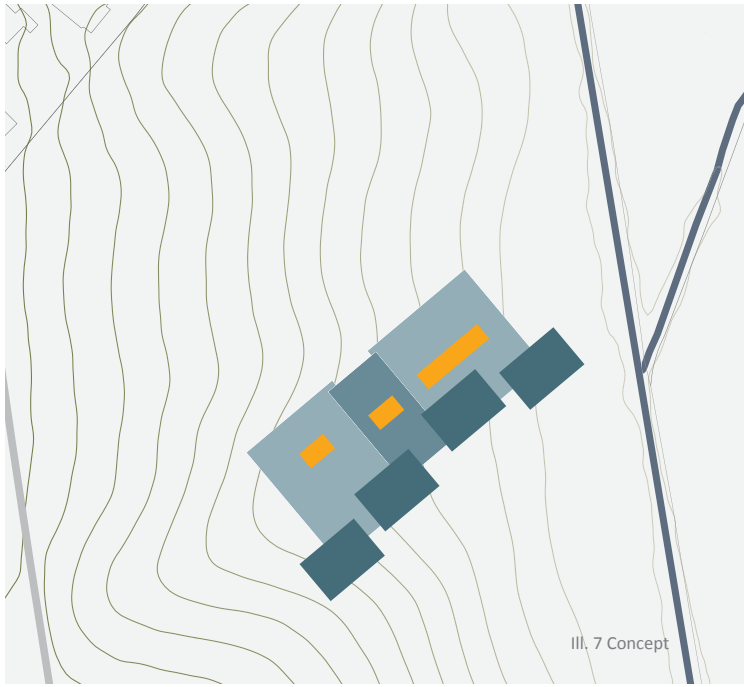
PLANE ROOFS

To create a focus on the dwellings the elements containing the dwellings are emphasized by covering the remaining facilities by the plan roofs. The plane roof is seperated in three elements to make them relate to the containing functions. The roof above the entrance area is lifted up to mark the entrance.



ADJUSTMENT TO THE LANDSCAPE

The elements containing the dwellings are adjusted to the levels of the landscape, to create the wanted composition and to make the building relate to the landscape.



Ill. 7 Concept

INCORPORATING NATURE AND LIGHT

Atriums and light inlets are incorporated in the plane roof to bring nature in to the inner part of the building and to create the most optimal indoor climate.

HOSPICE KOLDING

Upon arrival to Hospice Kolding, the visitors recognize a building firmly grounded in the landscape in close connection to “Fovs Å” and with a significant view overlooking “Solkær Enge”. The building is from Moshusevej clear to read, with a composition revealing the hierarchy of the dwellings and the staff area/ daycare center. These elements are separated further in terms of functions and the desired relation to the landscape.

Ill. 8 View towards “Solkær Enge”

SITEPLAN

The visitor's parking lot, surrounded by trees, is situated on the left hand site, when continuing down the arrival road. To ensure a calm and undisturbed entrance area the parking lot is situated a bit away from the main entrance, underlined by situating the staff parking, entrance and stock delivery in connection to the staff facilities. Along the north-west side of the building is a rectangular square created, containing a "kiss and ride" area and a sense garden continuing into the landscape towards north-east. From the sense garden and from Moshusevej goes a pathway continuing into the landscape along Fovs Å, with small zones designed to encourage halt and to enjoy the significant nature.

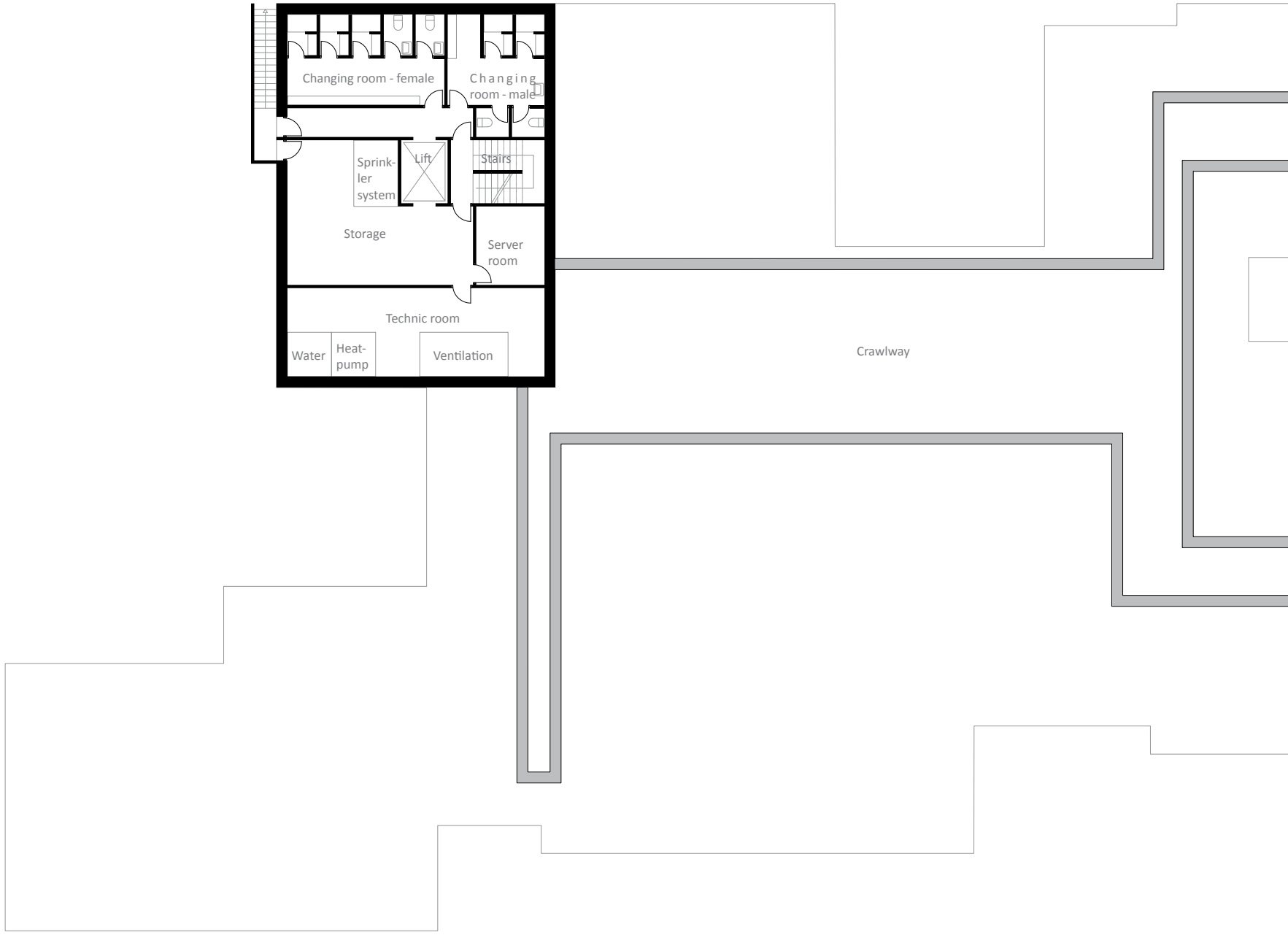
Ill. 9 Site plan - 1:1500

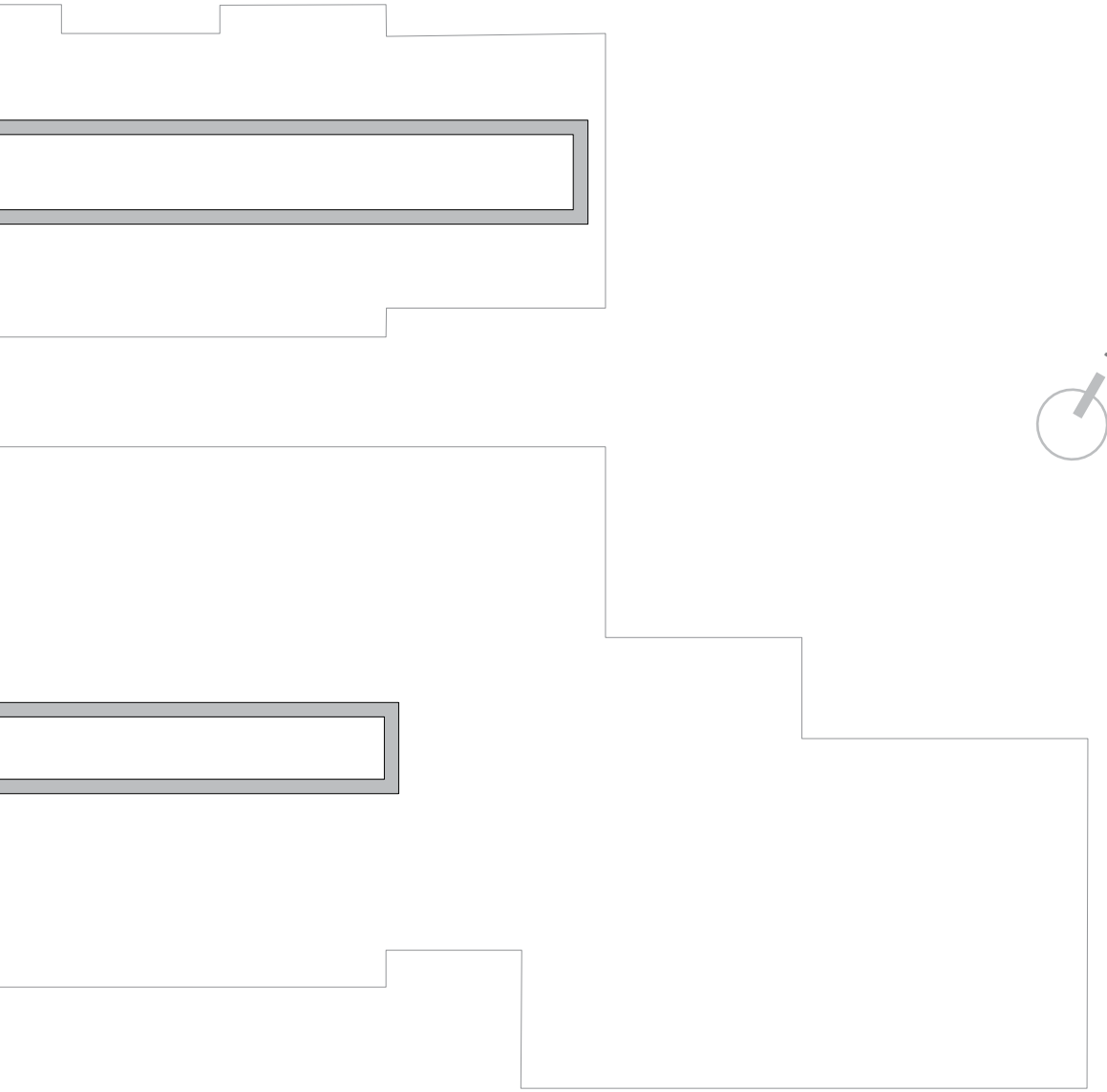

Waste room
Storage
Staff toilets
Porter office
Workshop
Break-/ conference room
Laundry room
Lift
Stairs
Atrium
Freezer
Fridge
Doctor office
Co. office
Manager office
Industry kitchen
Administration/Reception
Examination room
Kitchen
Handicap toilet
Weather porch
Reflection room
Atrium
Ceremonial exit
Linen storage
Sluice room
Medicin room
Nursing shift room
Wellness room
Guest room
Children niche
Common living room
Bath room
Living room
Kithenette

North

PLAN

Ill. 10 Plan - 1:250


Changing room - female
Changing room - male
Sprink-ler system
Lift
Stairs
Storage
Server room
Technic room
Water
Heat-pump
Ventilation
Crawlway



North

BASEMENT

Ill. 11 Basement - 1:250

Ill. 12 South-east façade - 1:250

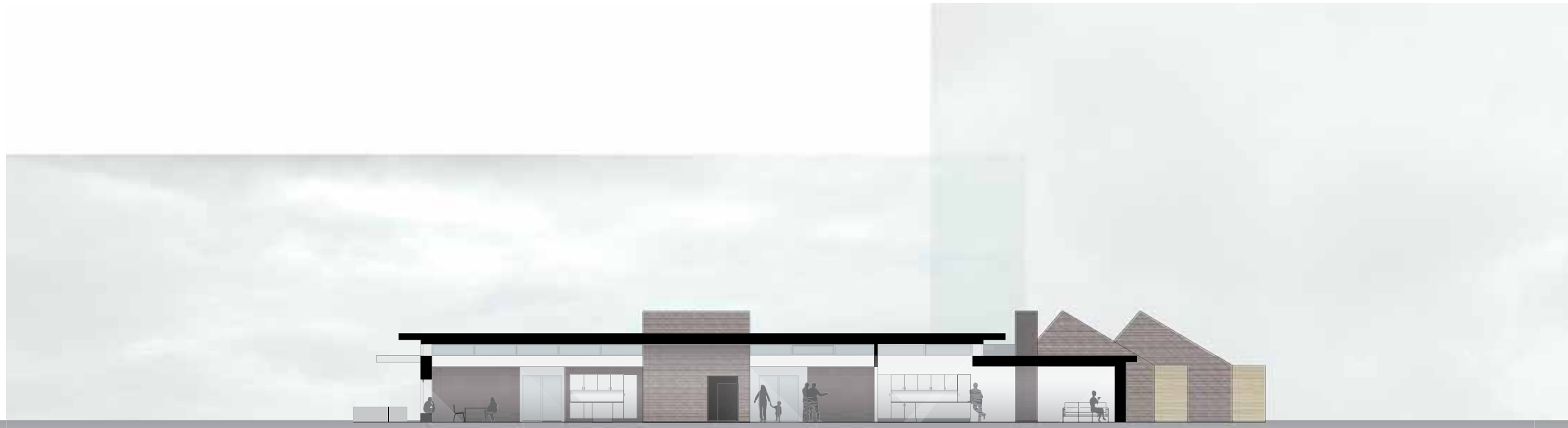
Ill. 13 North-west façade - 1:250

Ill. 14 North-east façade - 1:250

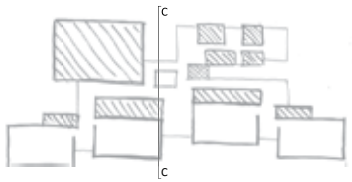
Ill. 15 South-west façade - 1:250

Ill. 16 Section A-A - 1:250

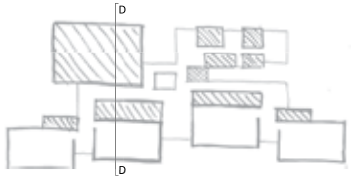
Ill. 17 Section B-B - 1:250



Ill. 18 Section C-C - 1:250



Ill. 19 Section C-C - 1:250

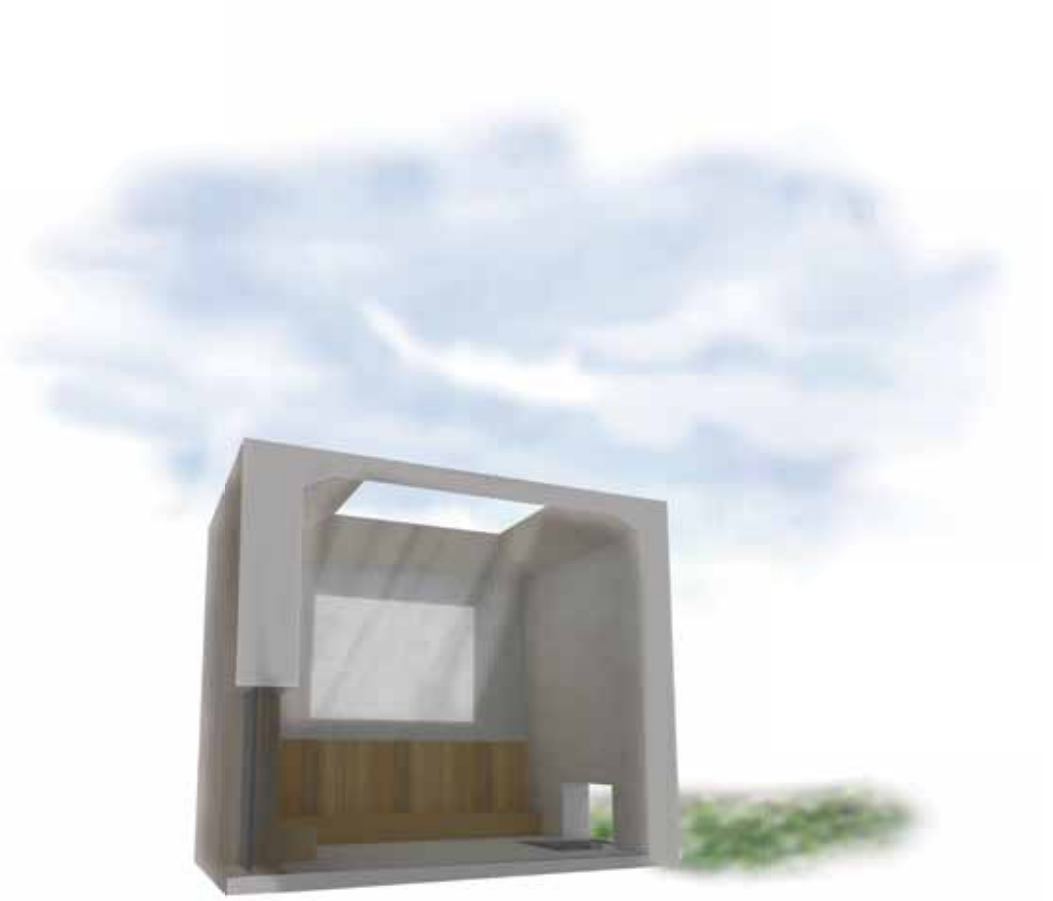


Ill. 20 Entrance

WALK TROUGH THE HOSPICE

The roof of the main entrance is raised to indicate for the users where to enter. Additionally the façade is secluded to create an enclosed and intimate space in front of the entrance with a view to the sky. Upon entering through the weather porch the first thing the visitors meet is a huge green atrium letting in a great amount of natural daylight, creating a warm welcome to the users. To the left the users find the daycare center and to the right the staff facilities, were they will be welcomed by the staff.

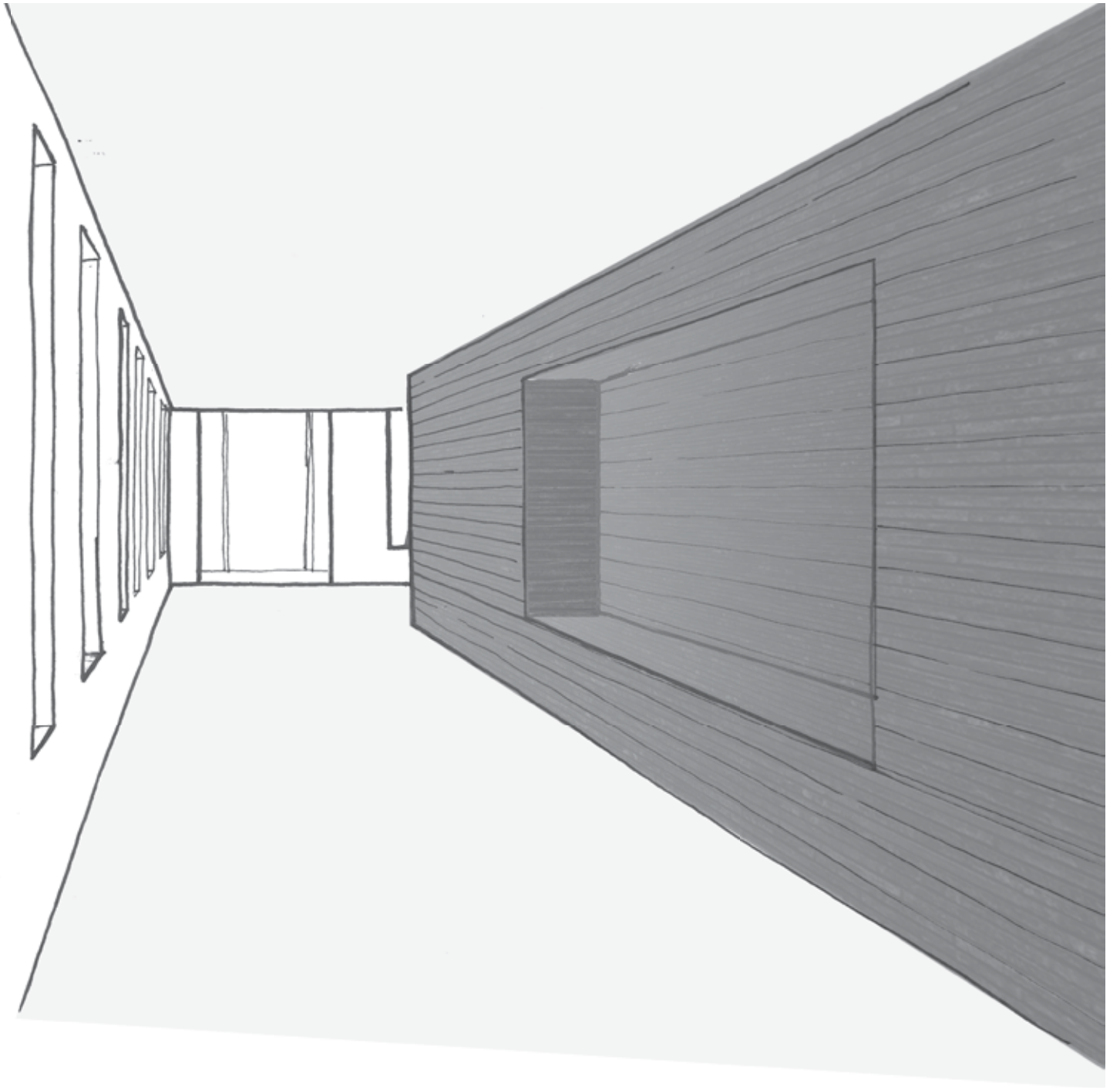
Ill. 21 Entrance hall



Ill. 22 Reflection room

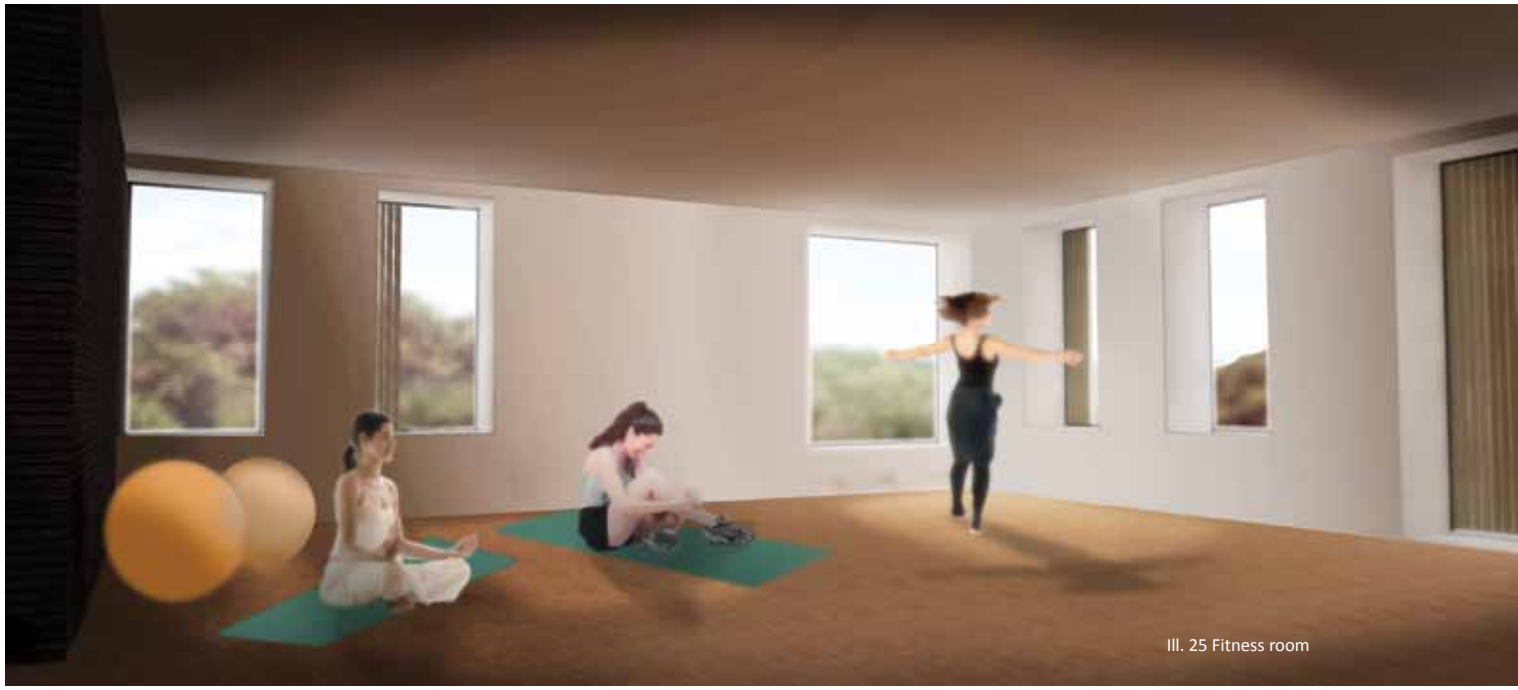
The reflection room is a very important element of the hospice, why it is emphasized in the layout of the building and situated with a very pivotal position upon the atrium. The exterior of shingles promote the room's importance and gives tactility to the surrounding rooms. The transition into the space is emphasized by a huge black door and an extremely thick wall. The room is made as a sound proof room for the users to reflect upon life in spiritual surroundings, with a view to the sky, the sound of purling water and glimpse and reflection of the green oasis outside (see ill. 22).

Continuing down the hallway the visitors will meet a light room, with a view to nature along the hallway, a view towards the greenhouse and the Library niche straight ahead. On the right hand side is a small seating niche integrated in the brick wall encouraging the users to take a break while observing the greenery upon the hallway (see ill. 23).



Ill. 23 Hallway

Ill. 24 Sense garden



Ill. 25 Fitness room

DAYCARE CENTER

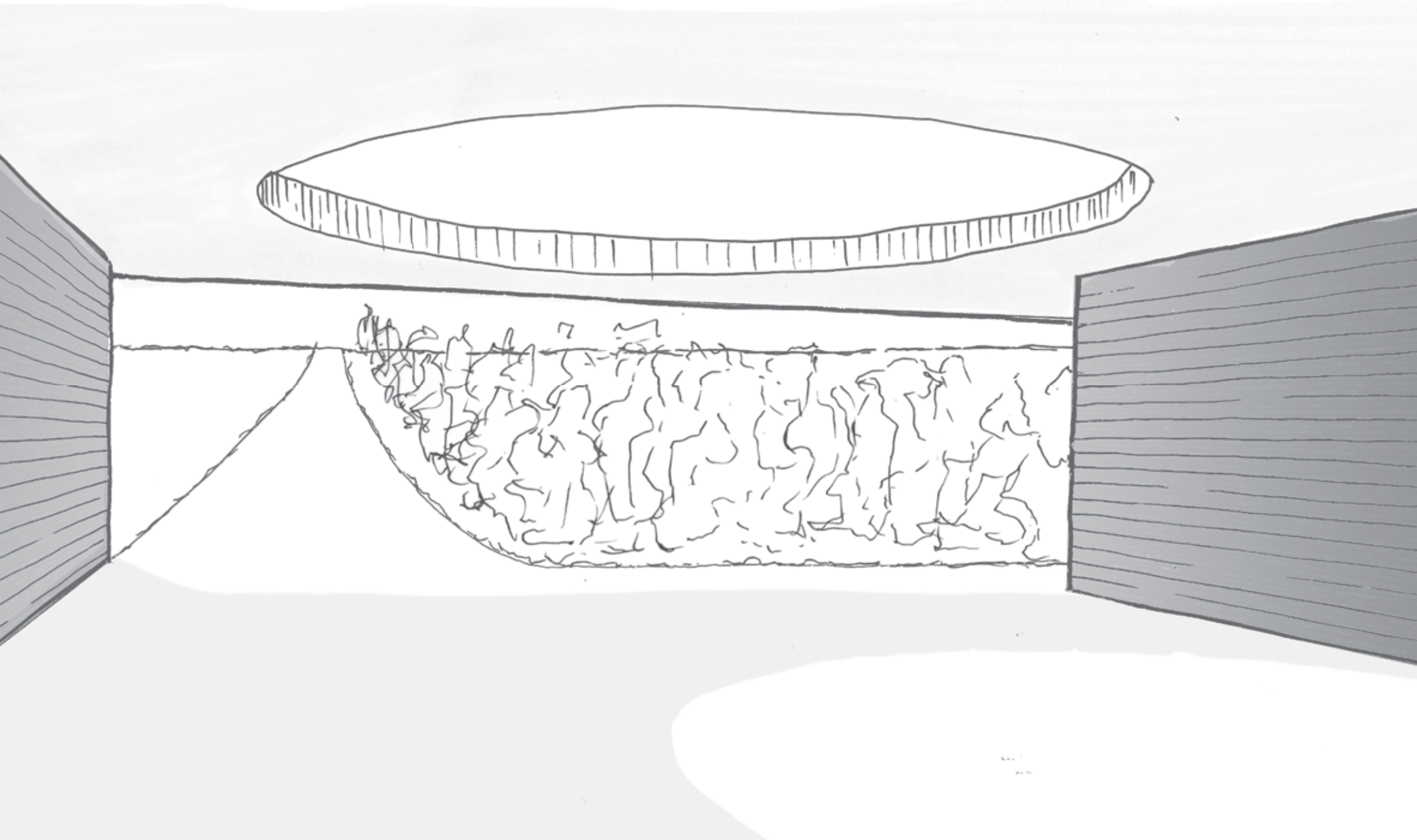
The daycare center is situated towards north in close connection to “Fovs Å” and in relation with the rectangular square containing the sense garden. The sense garden is intended for all users, why some of the beds are raised so the bed bounded patients can be lying, while looking at the plants and enjoying their smells. Some of the beds are created as wooden benches to encourage the users to take a halt and enjoy the garden. In the end of the daycare center is a roof covered terrace with a view to the sky and an access to the green house.

The daycare center is separated in tree zones; a kitchen to welcome the visitors to make them self a cup of coffee, while deeming the situation, if it is their first time visiting Hospice Kolding. A quite/dialogue zone in a more intimate area surrounded by therapy/nap rooms and in the end, by the terrace, a fitness/multi room for every kind of activities, such as yoga, painting or smaller concerts/ lectures.

CEREMONIAL EXIT

A ceremonial exit is situated towards south-west with the aim to create space for the relatives to say a dignified farewell to their dears in undisturbed surroundings. The space is a defined space with a huge circular hollow in the roof, with a view to heaven. Underneath the roof the hearse will be parked and will from there start it’s driving along the avenue surrounded by cherry trees.

Ill. 26 Ceremonial exit

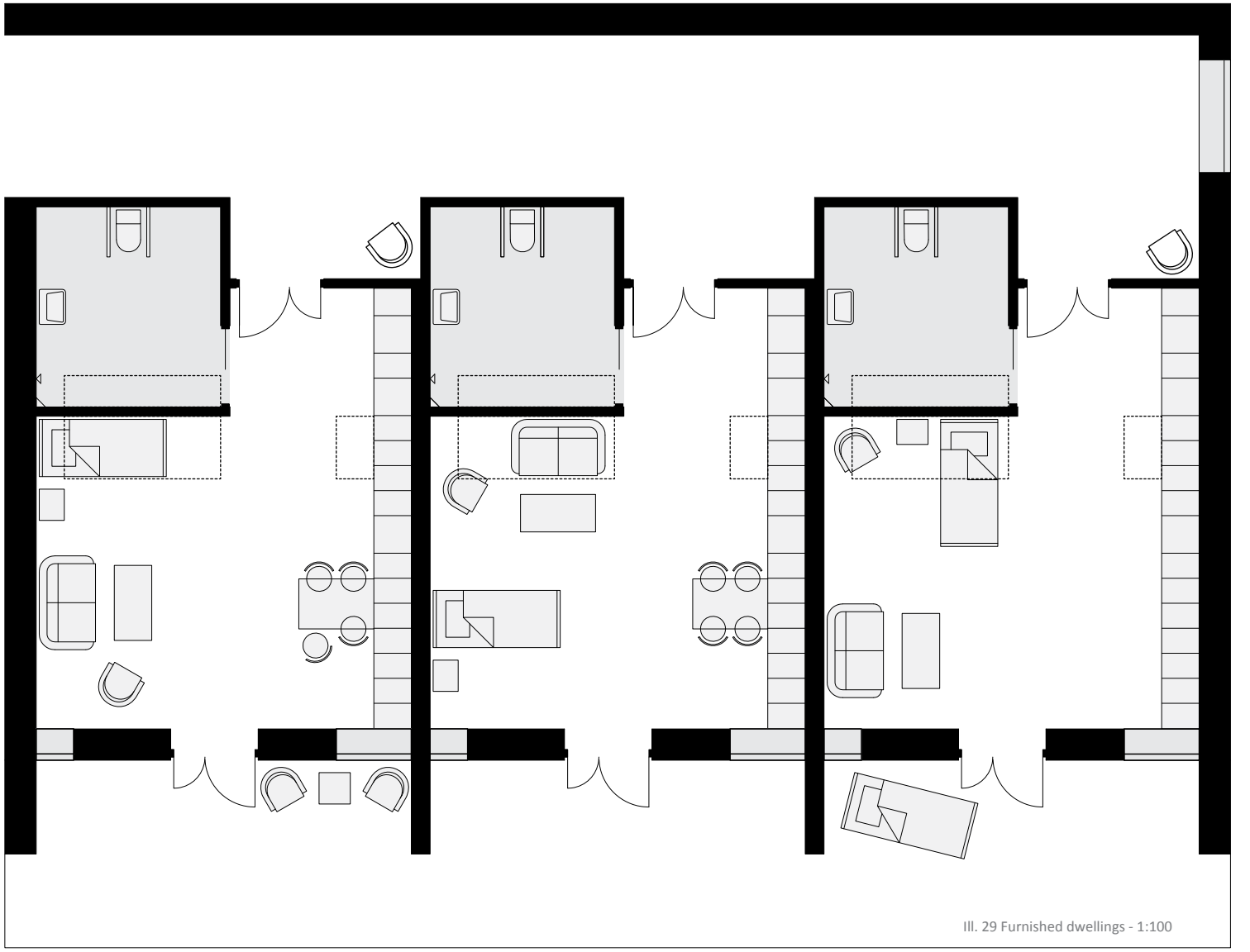


Ill. 27 The patient's living room

Ill. 28 View from the bed towards “Solkær Enge”

THE DWELLING

The dwellings are situated towards south east with a significant view overlooking “Solkær Enge”. The dwellings are separated into clusters of 6 dwellings further separated into two, to create as much privacy as possible. The dwellings themselves are 36 m^2 and the bathrooms 9.5 m^2, with enough space to fit in a bed. Within each dwelling a permanent wooden wall is integrated, creating a homely atmosphere and space for the patient’s to put up family photos and other personal belongings. The wall unit consists additionally to the shelves and wardrobe of a TV rack, a fridge a dining table and a bench continuing out in the seating window.



Ill. 29 Furnished dwellings - 1:100

THE DWELLING

Ill. 30 Dwelling section - 1:100

The rooms are created with doors and windows going all the way from the floor to the ceiling to let the daylight as deep into the rooms as possible. Additionally a skylight is integrated to give the patient's a view to the sky and to get daylight from opposing sides. Caused by the size of the rooms they can be furnished in different ways in terms of needs. A sofa bed is available in the rooms for the relatives, who prefer to sleep within the dwellings instead of in the guest rooms.

The temperature and atmospheric indoor climate is adjusted to the patients needs especially in this room and designed to make the users feel as comfortable as possible. Calm acoustic conditions are created by adding sound absorbing materials to the ceiling and the spaces in the shelf system, and the visual disturbances are minimized by placing the windows towards different directions.

USER SCENARIOS

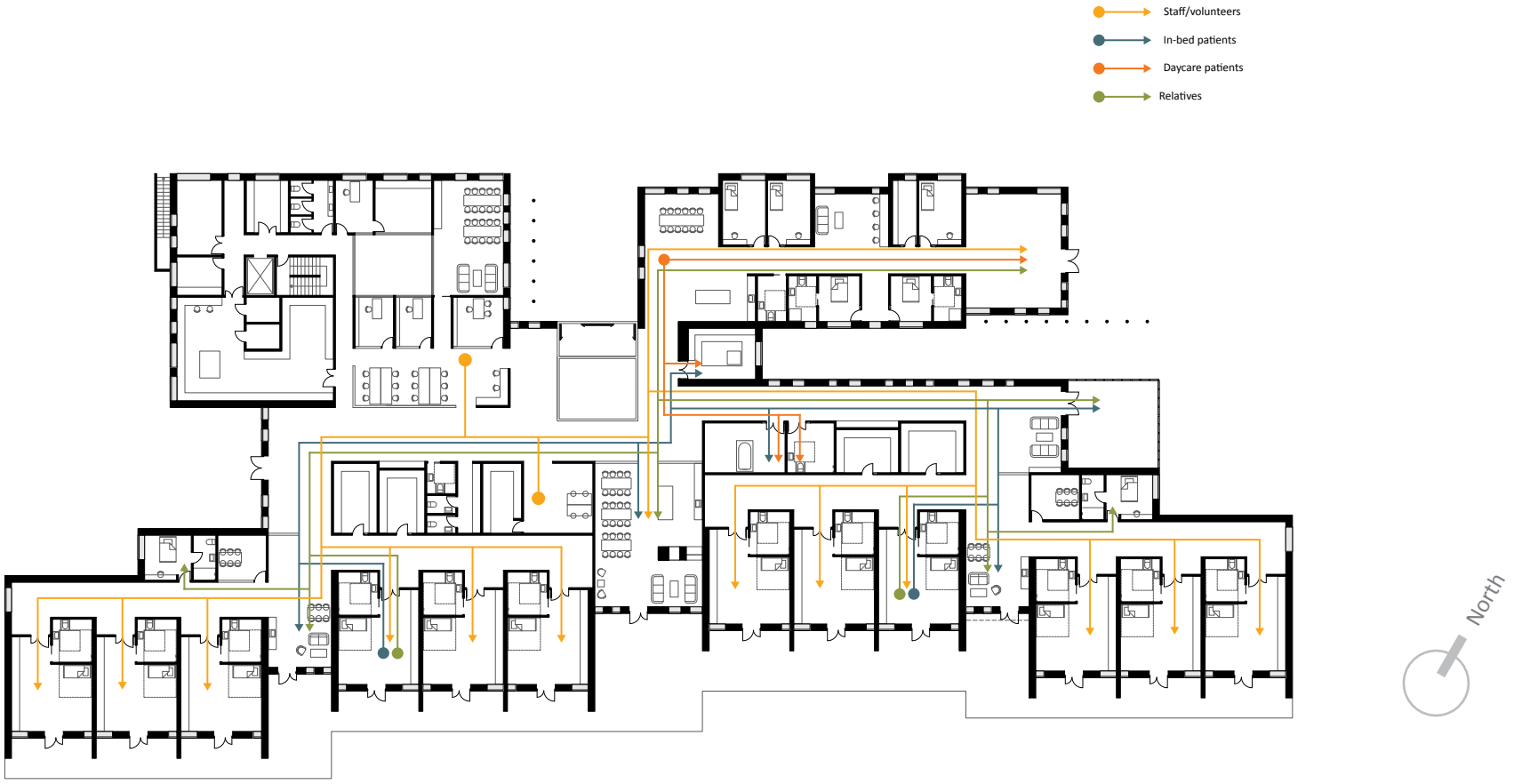
In terms of creating calmness and privacy for the patients and relatives, and simultaneously the best working conditions for the volunteers and the staff the flow in Hospice Kolding is highly considered. The diagram shows obvious scenarios of how the users use the building.

The base of the in-bed patient's is the dwellings, where they spend most of their day. They will likewise spend time in the common living rooms, especially during dining, if their illness let them. Additionally some patient's will make use of the reflection room, wellness room and greenhouse to relieve their illnesses.

The relatives are having their base together with the patient's, but once in a while they need some time for them self in the guest rooms or to socialize with other equals in the common areas or in the daycare center.

The base of the daycare patient's will mainly be within the daycare center and the connected outdoor facilities. In addition the daycare patient's, as well as the in-bed patient's, will make use of the reflection room, wellness room, bathroom and green house.

The staff is having their base in the staff area and in the nursing shift room, but will spend most of their time together with the patient's in their living rooms and in the common living room. The volunteers will spend most of their time in the common areas, in the daycare center and in the outdoor facilities.



Ill. 31 User scenarios

Ill. 32 View towards north

ANALYSIS

HISTORY AND PHILOSOPHY OF HOSPICE CARE

[hos'pice]

1. A shelter or lodging for travelers, pilgrims, foundlings, or the destitute, especially one maintained by a monastic order.

2. A program that provides palliative care and attends to the emotional and spiritual needs of terminally ill patients at an inpatient facility or at the patient's home. [Dictionary]

According to the dictionary, Hospice means; shelter. The term was already in the 12th century used for resting for pilgrims, at monasteries [Hospice Forum Danmark, 2011], [Diakonissehuset Sankt Lukas Stiftelsen].

Today a hospice is a term for a place, where treatment and care for terminally ill and dying people, are offered.

The hospice philosophy is based on a holistic mindset, a place where people who draw to the end of life and their relatives are offered professional help, for physical and mentally, social and spiritual/existential disorders [web 3]. The aim is not to cure, but to ensure dignity and a painless death for the patients in a comfortable physical and mental environment [Hospice Forum Danmark, 2011].

Around 1900 few hospices existed and the patients received excellent nursing and spiritual care, but there was minimal medical inupt, because it was generally believed that the doctor's role was to cure and these patients were, of course, incurable [Baines, 2011].

Cicely Saunders opened "St. Christopher's Hospice" in 1967, where she, for the first time in the world, brought together a large number of patients with terminal illnesses and a staff who were committed to discovering and learning the best ways of caring for the patients. These patients would earlier have been scattered in various hospital wards or at home. Cicely Saunders is besides being the founder of the first hospice in the world,

Ill. 33 Dame Cicely Saunders

also the founder of the palliative care movement.
Cicely Saunders motivation spawned, after losing her friend to cancer. After the loss she promised herself to improve the care of dying, why she, besides her education as a nurse and a social worker, started training in medicine. After 19 years of preparatory work, St. Christopher's Hospice was founded [Baines, 2011].

Since 1967 more than 200 hospices in England have been established and the hospice philosophy and the knowledge about palliation have been spread all over the world [St Christopher's Hospice, 2011].

HOMECARE

50 % dies at hospitals, 25 % at home and 25 % at care homes or institutions. A lot of people want to die at home, why most hospices are affiliated with a homecare hospice function, with a palliative team and doctors educated in palliation [web 2]. In 1969 the first homecare service was founded on the initiative of Dame Cicely Sanders [St Christopher's Hospice, 2011].

HOSPICE DAYCARE

In the beginning of the 1980's it became clear to a group of nurses and doctors that more was needed for those who were terminally ill. This fact gave rise to the Macmillan Runcie Day Hospice, which opened its doors for the first time in 1994. Today most hospices in the UK have an integrated daycare center. At first it was very difficult for Healthcare Professionals to convince patients that Hospices is not just for people, who have reached their terminal stage of their disease, but this have now changed [Groove house, 2011].

DENMARK

The first hospice in Denmark "Sankt Lukas Hospice" in Hellerup was founded in 1992 and is today under extension from 12 to 24 beds. Since 1992, 16 additional hospices have been established

and more are being developed, due to a large number of friends associations, who raise money in order to establish new hospices [Hospice Forum Danmark, 2011]. The existing hospices all together have a capacity of 196 beds, but according to the report “Hjælp til at leve til man dør” (transtation: “Help to live until you die”) from 2001 Denmark needs a capacity of 50 beds pr. 1 million inhabitants, which means that 61 hospice beds are still needed [Sundhedsministeriet, 2001].

The first hospice patients had to pay the hospice stay themselves, but since 2001 a hospice stay has been free of charge and included in the arrangement “free choice of hospital”.

PERFORMANCE

Experiences from England shows, that a hospice with 12 beds is an ideal capacity. This amount of beds requires minimum 5 nurses during daytime and 2 during nighttime with the opportunity to summon help. Daily house call is used to an extent of 1 ½ doctor pr. 12 hospice beds.

Both doctors and nurses have to be educated as specialists in palliation, which is a medical treatment, which currently is undergoing a perceptible development.

Volunteers play an important role in the performance of a hospice as well. They are not a part of the nursing team, but they help during the meals, read aloud, maintain the garden, the aquarium, talk with the relatives and many other tasks [Hospice Forum Danmark, 2011].

Ill. 34 Care

PATIENT PROFILE AND CONDITIONS

the statistical data shows, that the average age of hospice patients is about 65 years old, and differs from 19 to 90 years. The frequencies of men and woman are almost the same.

95 % of the patients die from cancer, because this illness gives the most predictable remaining lifetime. On an annual basis approximately 60.000 Danish people die, where 25 % is caused by cancer.

When a patient moves into a hospice it is often seen that they revitalize, because of the care and pain relief. Another reason is that the patient has been a strain for the relatives and now when the strain has disappeared is it a relief for the patient. The spiritual balance for the patient appears, when they are having the food they like, they are listening to the kind of music they like and so on [Hospice Forum Danmark, 2011].

PALLIATIVE CARE

Palliative care is defined as a treatment focusing on relieving and preventing the suffering for patients and to some extend for the relatives as well. This treatment is mainly used for patients suffering from life-threatening diseases, and can be applied both in the beginning of an illness and in the end were the patient maybe facing death. [WHO, 1998]

Palliative care is the essence of the hospice philosophy, and every Danish hospice is based upon the use of palliative care. The nurses and doctors focusing on this treatment work in "palliative teams", who both focus on the patients at the hospice but also people outside the hospice in day care centers, hospitals or in the home of each patient. [Realdania - Program, 2011]

The main focus of the treatment is to increase the life quality for the patient and to make the patient able to enjoy the last part of life, by relieving the patients from their symptoms with medication and not as normally were treatment is used as a tool for curing diseases. Almost every patient receiving this treatment, has no hope of being cured, it is however common, that the treatment has a healing effect on some patients. [Danske Regioner, 2009] In this treatment patients are not only treated with medication but also psychological, physical and other treatments can be applied, which means that the palliative care embraces the entire patient.

The knowledge concerning palliative treatment is quit new. The first Danish doctors focusing on this treatment were educated in 2003, and the treatment has been implemented at Hospices since 1997. This means that it is not quite determined how the palliative effort will work in the future, but at the moment it is planned that the teams should have their base on a hospice from which they can operate. [Sundhedsstyrelsen, 2005]

“To say goodbye to life requires the best conditions both for the dying and the relatives”

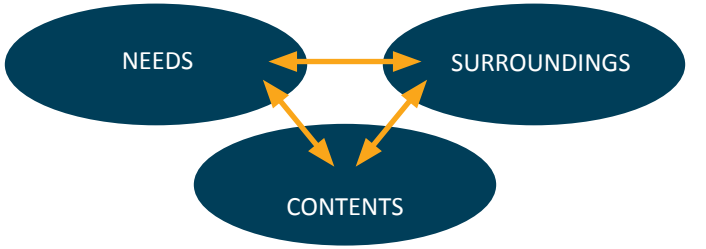
[Realdania - Program, 2011]

”PROGRAM FOR DET GODE HOSPICE I DANMARK”

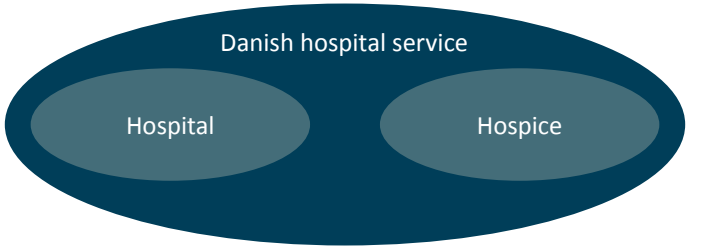
”Program for Det Gode Hospice i Danmark” (translation: “Handbook for the Good Hospice in Denmark”) was in 2006 launched, by the initiative of Realdania, to inspire and function as a checklist when planning new hospices or upgrading existing [Realdania - Program, 2011].

The handbook was created with the desire to innovate institutional buildings with the purpose of creating a fusion between physical surroundings, contents and needs, which both human, professional and architecturally will support the people using the hospice, i.e. the patients, relatives, volunteers and the staff (see ill. 35) [Realdania – Udvalgte projekter, 2011].

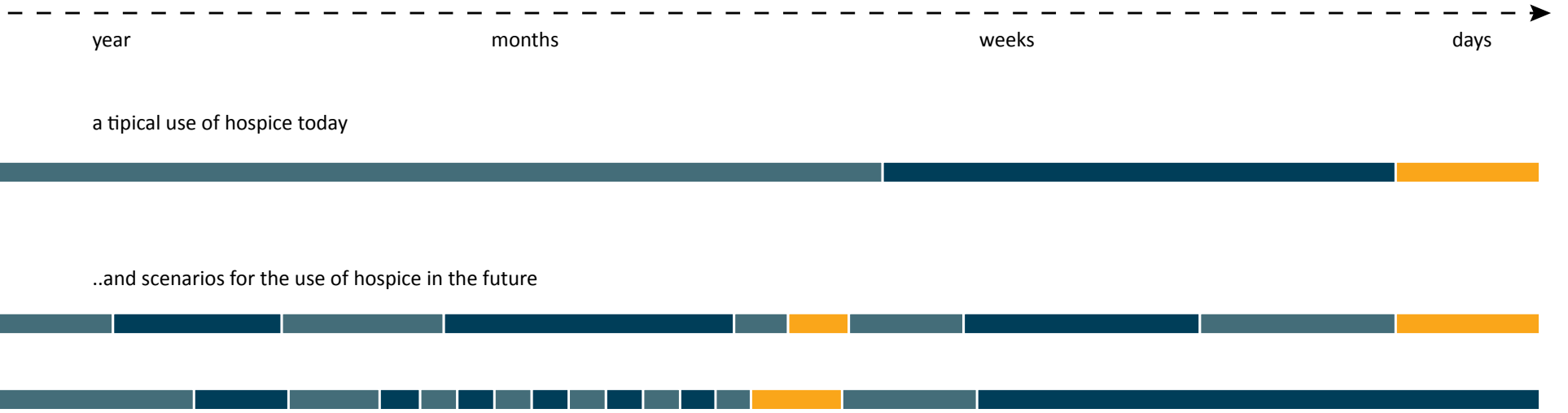
A hospice is an institution and a part of the Danish hospital service, but with a different focus on care, intimacy and pain relief (see ill. 36). As previously mentioned, this pain relief goes for both patients and relatives concerning physical and mental, social and spiritual/existential disorder. According to ”Program for Det Gode Hospice i Danmark” the relief has to be evidence based.



Ill. 35



Ill. 36 Danish hospital service



Ill. 37 Hospice user scenarios

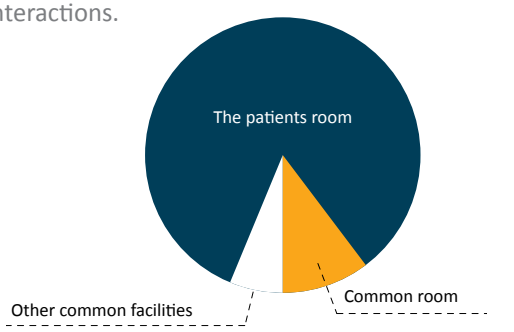
THE FUTURE

In the future it is expected, that new demands from patients and relatives will arise, due to changes in the demography, disease groups with palliative needs, treatment strategies and course of the diseases.

The development in England shows shorter admissions and more discharges, meaning that more and more hospice beds are used to alleviating the symptoms instead of ending a life. "Program for Det Gode Hospice i Danmark" is, on this basis, a natural take-off to develop new offers as daycare hospices, evening- and night stays in Denmark, which will entail more varied patient course (see ill. 37). These new offers will call for a palliative team operating both at hospices, at hospitals, other institutions and as home care, entailing continuity in knowledge, actions and personal contact.

PHYSICAL SURROUNDINGS

The physical surroundings are of great importance for the user group, in order for them to perceive the quality. The physical design, for instance the common room and the dining room, but also small niches in the corridors and in the garden, can create social interactions.

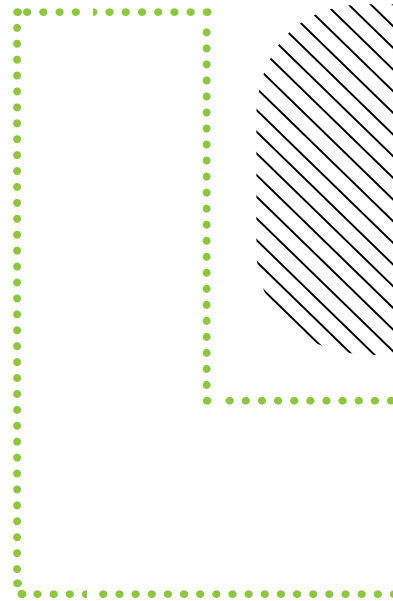


Ill. 38 Facility use

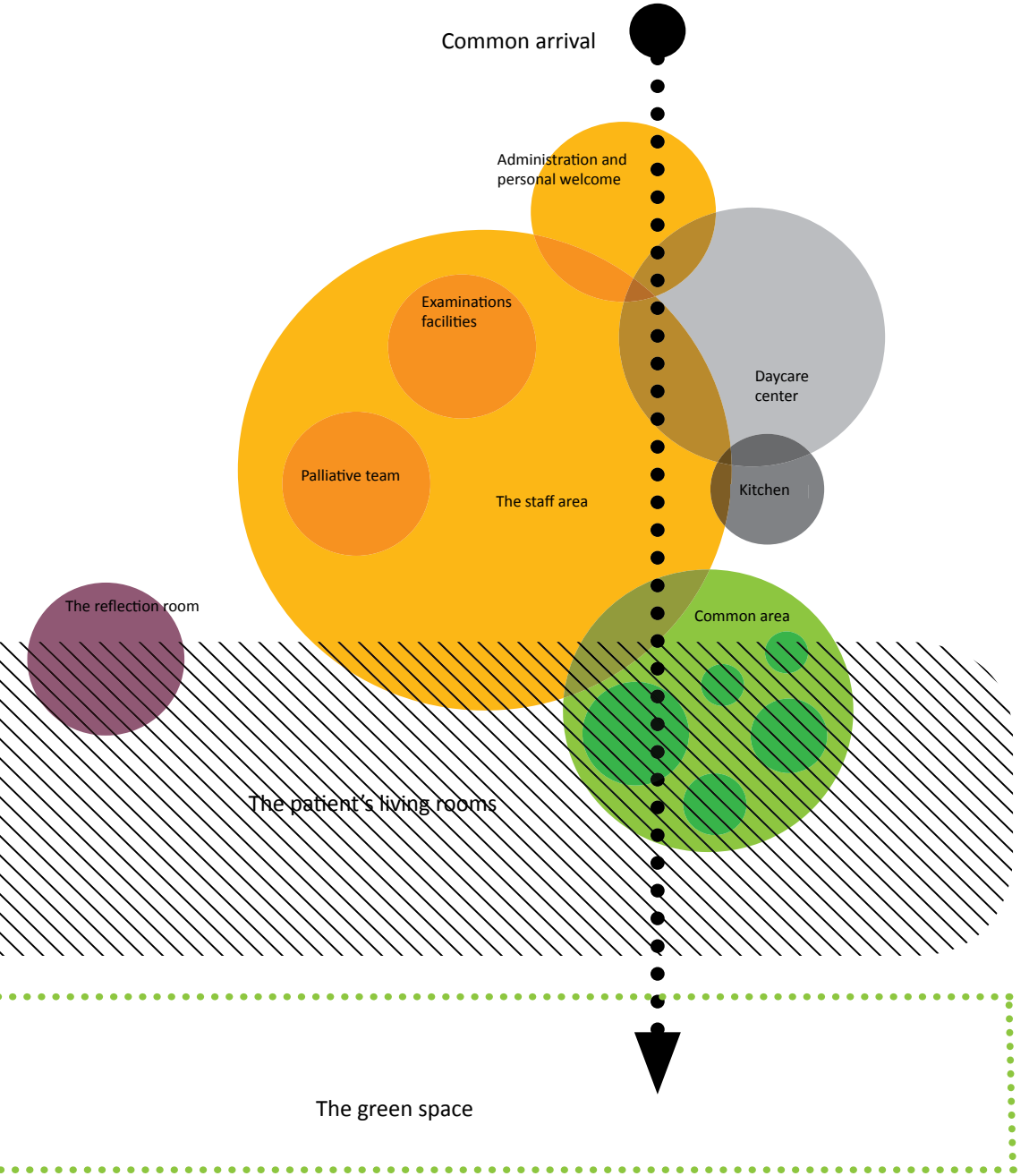
The sizing of the patient living room is very important, because big living rooms will limit the patient's home universe to the

living room itself, contrary to small living rooms, which will force the patients and the relatives to use the public space.
A study from Hospice Djursland concerning, how the patients use the facilities has shown, that they use their private living room 20 hours, the common living room 2,5 hours and other facilities 1,5 hours per 24 hours, which particularly brings the private living rooms into focus when designing for the patients (see ill. 38).

It is of great importance to remember functional aspects such as storage space, sluice room with window openings, easy accessibility to the garden and so on, but functional parameters cannot be favored in correlation to atmosphere and expression. A hospice is not a hospital, why it is important to design an institution associating as little as possible to a hospital. This entails that assistive technology, must be hid and the homely atmosphere must be strengthened through example materials and colors. Other factors which may affect a comfortable stay are the degree of privacy, the experienced size of the room, the light, the heat and the sounds.



Ill. 39 Function diagram - template



DESIGN PRINCIPLES

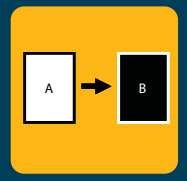
A hospice is not only a term for a ward, where the patients can live until the end of life, but a platform from where the palliative care can be handled.

The good hospice consists of the sub-components shown in illustration 39.

The building and the surroundings should with its mode of expression, choice of materials and architectonic elements promote life and relations between the building and its users.

The green spaces should indicate life, activities, openness and a homely atmosphere and be accessible for the surrounding society, with the purpose to create life and intimacy. These green spaces are important berating spaces for the users, why a direct access from the living rooms are important. A sense garden will create experiences for the senses through smelling, seeing, touching and tasting.

THE HOSPICE



Work with flexible areas, which can handle more functions. Avoid rooms, which would not be used for a period.

Provide proximity to or include green spaces. Incorporate access for patients.

Create rooms and outdoor spaces, so they are flexible and big enough for bed bounded and wheelchair users. Document the turning radius, at terraces and in living rooms.

Incorporate a natural gathering point, example a piano, a library, a fireplace, an area for playing, television, or an aquarium.

The entry to the hospice should give a kind, positive and accessible impression, where the entrance is clearly marked and the parking is situated nearby.

The ward should be in close connection to the staff area, to the green spaces and to the room for reflection. It should as indicates in the chapter “History of hospice care” consist of 12 beds as an ideal capacity. The intimate and homely atmosphere should be strengthened by separating the wards in groups of 4-6 beds.

The patient’s living rooms should promote a comfortable and homely atmosphere by means of private pictures, other personal belongings, material, colors/pattern (warm and pale colors), surfaces, furniture, lighting, textiles and plants. A huge window section with direct access to terraces or green spaces is needed, with the opportunity to screen gradually in terms of privacy or filtration of the sunlight. Technical assistive should be hid and permanent installations avoided. The decoration of the ceiling should be considered because it creates atmosphere and pastime for the patients. The floor should be made of wood. The furniture should be modern, comfortable and functional without an institutional touch. The possibility for the relatives to sleep in the room should be present.

The common living room must be placed centrally in the ward, - a place for casual gathering of patients, relatives, staff and volunteers, calling for activity and energy. The room should be separated in smaller zones with the purpose to create contact and interaction between the users, so they can share sorrow, happiness, worries and impressions. These zones could for an example consist of a sociable kitchen, a dining area or a couch area. A natural gathering point as a fireplace, a television, a piano, an aquarium or so, should be present. As in the patient’s living room windows towards and a direct access to the green spaces are important. Again it is important to consider the colors (cheerful, warm and pale colors), lighting, the decoration/ trinket, plants and useful and comfortable furniture’s. The room must be attractive for social activities such as dinning, ceremonies, exhibitions, community singing, concerts, reading

FACILITIES

The common areas and the public spaces should support social relations between users.

A room for reflection, with a spiritual atmosphere and without visual references to religion.

THE PATIENTS ROOMS

Consider if the assistive technology (lift, oxygen, suction etc.) should be mobile for the sake of aesthetic, homely atmosphere and the possibility for later upgrading.

It should be possible for relatives to sleep over in patient's living room, in a separate room or in a guest room as relief.

aloud and so on.

A separated playing area for kids and a common room for the young people should be present.

The reflection room should be a place for grief therapy and silent converse. It should be of spiritual character with candle lights, water or glass mosaics, but without specific religious symbols. The inflow of the light should be highly presented, but with the opportunity to screen the sunlight. The room should call for peace of mind and inner silence and have a visual contact to the nature.

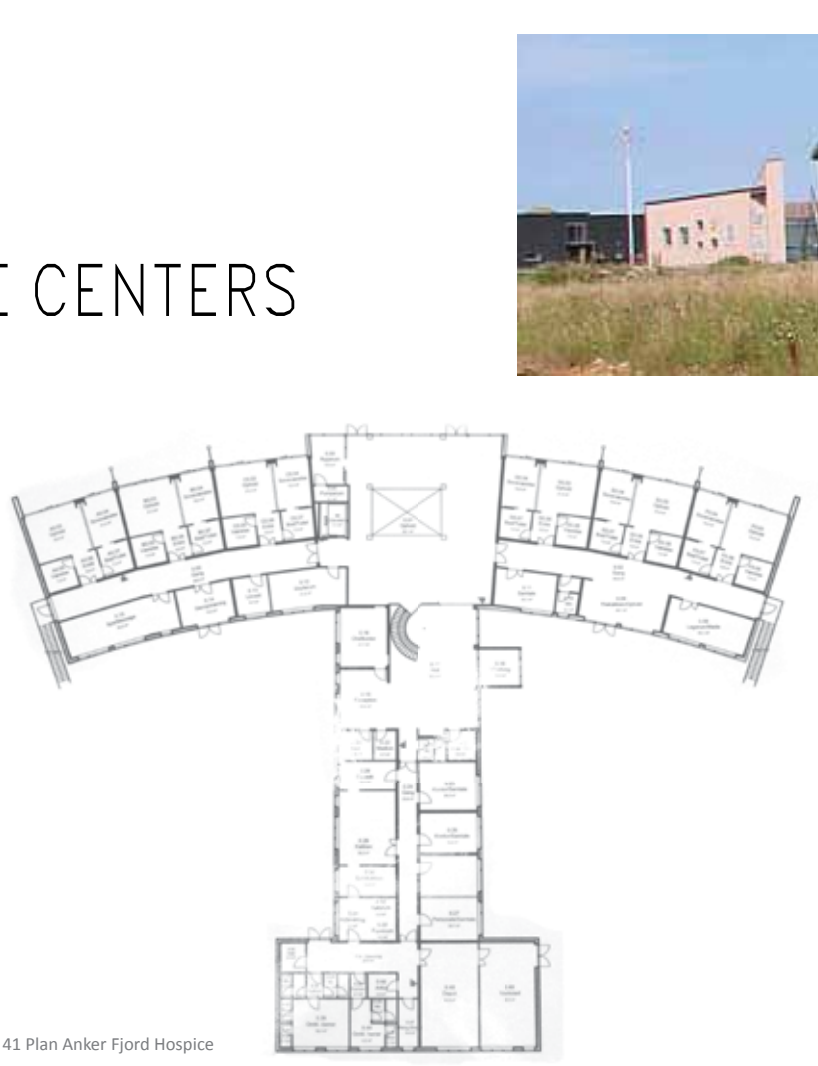
The staff area should include a team based area in a confidential zone close to the ward, the hospice daycare and the administration. The area should, be organized as an open landscape, requiring knowledge sharing and cross disciplinary cooperation. The palliative team should be placed in the periphery of the staff area to avoid disruptions. A number of meeting rooms/consultation rooms for internal/external use should be presented. The area should cope with both competence spaces for more employees in smaller groups and solitary spaces for individual work, which forces various work stations, which can cope with attendance, different kind of meetings and cooperative relations. The area should contain a conference room where the nurses can have their shift meetings. The furniture should be modern, functional, flexible and changeable. The colors should be energetic and dynamic and create a positive and cheerful atmosphere.

This chapter creates a basis for making a flexible hospice, a hospice focusing on the patients needs for care and comfort through the entire illness and not only in the end. Each room is described very detailed in "Program for det gode hospice", these descriptions will be used as inspiration for a possible solution, but the final design will be based on many other sources of inspiration, described in other parts of the analysis.

CASES – HOSPICE AND DAYCARE CENTERS

To get a deep understanding of how the flow is in a hospice, how everything is organized and what is important to the different users, hospices and daycare centers in both England and Denmark are described and analyzed. The flow of the Danish hospice case is furthermore analyzed in order to compare them with the descriptions in “Program for Det Gode Hospice I Danmark”, these analysis can be found in appendix XX. The floor plan of these hospices has been investigated closely as well, because these hospices are created with the same facilities and number of patients as in this hospice.

The description of each case is based on site observation and interviews with the different employees and/or architects. The Danish hospices are chosen because they deal with different ways of solving the architectural challenges and different ways of operating with a hospice. The three other cases are chosen because they represent different ways of creating a daycare center. Within them two represent the English version of a hospice daycare center and one a cancer center, with a similar focus.

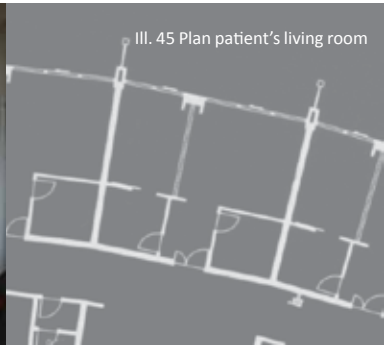


Ill. 41 Plan Anker Fjord Hospice


Ill. 43 Reflection room


Ill. 42 Anker Fjord Hospice


Ill. 44 Patient's living room


Ill. 45 Plan patient's living room

ANKER FJORD HOSPICE, 2006

nker Fjord Hospice located in Hvide Sande at the West coast of Denmark with a view towards Ringkøbing Fjord. This hospice differs from other hospices as it is financed by sponsors and operated by the organization; Danish Organization Against Cancer "Kræftens Bekæmpelse". This constellation made it possible to create an extraordinary well equipped hospice, with more space than other hospices, especially the patient rooms are very well equipped. Each patient has their own 60 m^2 "apartment" designed with an extra room for relatives, a small entre, bathroom, balcony or terrace and a living/bed room with a possible division by a sliding door. This seems very luxurious, but the fact that the relative's rooms are this close to the patient makes it hard for them to pull away and when the patient is resting and they easily get in the way. This solution does however create a very dark room as well, as the room for relatives is made only with a window towards the living room of the patient's apartment (see ill. 44+45).

The large influence of the sponsor has influenced the architectural expression as well, and created a very controlled form, were the plan creates an anchor. The curved part includes the patient rooms, shared facilities and a multi room in the middle. The facilities are distributed in two levels with the patient rooms and the multi room facing the view. The administrative facilities and the entrance are however situated in the middle part of the anchor. In 2008 a reflection space and a glass house were added to the building in each end of the curved part, but the very fixed form limits future changes of the building design. The atmosphere in especially the reflections room is however successful.

Ill. 46 Hospice Djursland

Ill. 47 Plan nursing shift room

Ill. 48 Nursing shrift room

Ill. 49 Plan Hospice Djursland

HOSPICE DJURSLAND, 2007

This hospice is situated in Rønde, with a view towards Kale Vig. The building is a result of a competition held by Realdania and Region Midtjylland and the hospice is today operated by Region Midtjylland. The hospice is designed by C.F. Møller and created as the basis for developing the report “Program for Det Gode Hospice I Danmark”.

The building is created as an arch, consisting of three layers which create three zones. The largest part of the arch includes the patient rooms and the shared facilities, and are all facing the view towards Kale Vig. The middle part contains practical and shared facilities and two attires. The smallest part of the arch includes the facilities used by the employees, the entrance and a multi room which originally was created to be a daycare center. This organization is made to create two different flows, one along the employee’s facilities and one along the patient rooms. This works to some extend but, in the center of the building the nurses shift room is placed in direct contact to the main living room, a constellation which affects the atmosphere in the living room quite a bit in terms of noise issues (see ill. 47+48).

As mentioned, the building was originally designed with a daycare center connected to the entrance area, but this constellation created a building where the economy was in focus from the beginning, why this part is cut away. A daycare center in combination whit the existing building would however have optimized the use of the shared facilities in the hospice.

Ill. 51 Patient's living room

Ill. 52 Entrance hall

Ill. 50 Hospice Søndergård

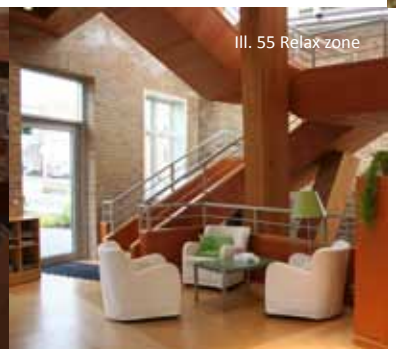
Ill. 53 Hospice Søndergård top view

HOSPICE SØNDERGÅRD, 2010

This hospice is situated in Måløv near Ballerup, and is the latest hospice built in Denmark and is today operated by Region Hovedstaden. The hospice is designed by Henning Larsen Architects and is of course based on "Program for Det Gode Hospice I Danmark". The hospice is built with a plan similar to Hospice Djursland, with the patient's room gathered in one line with a view towards a small lake. The facilities for the employees are concentrated along a walkway parallel to the patient's rooms and these two parts are separated by two inner courtyards - this makes a very well lightened building. The patient's living rooms are facing north, which ensures that direct light does not disturb, it does however also create rooms with a very cold light and no possibilities of using direct light at any time of the day (see ill. 51).

In general the organization of the hospice creates a plan, which seems to work very well, but when looking at how the smaller shared rooms are integrated in the building, most of them seem very exposed and institutional and not in any way cozy. The flows are all centered in the middle of the building to crossing the foyer, which makes it a very busy focal point.

Ill. 54 Atelier



Ill. 55 Relax zone

Ill. 56 Maggie's London

Ill. 57 Kitchen for "a cup of tea"

HEJMDAL, 2010

This cancer center is created by Frank Gehry in a renovated building next to the hospital of Århus. This center creates a frame around the mental treatment of cancer patients, it is a place where they are able to express their feelings through paintings, sports, receive psychological treatment and meet other patients.

The building is created with an extraordinary expression were natural daylight play a very important roll. The roof of the building is made entirely of glass, and the different floors are floating in an open space and letting light into every part of the building. The inner part of the building is constructed from large tree trunks, and the construction is made very visible. There are however many issues in the building concerning acoustic, overheating and energy consumption. And the open plan creates very public spaces with a very low degree of privacy.

MAGGIE'S LONDON, 2008

This center is a center created only for cancer patients and their relatives similar to Hejmdal. The users of this center differ from a normal daycare center because they can drop-in at any stage of their illness; from they get their diagnoses to the end. In this center the patients can receive information, help from a psychologist and physiotherapist, and many smaller conversation groups meet here as well. However the main focus is to create a place where the users can get to talk about their worries over a cup of tea. This is reflected very clearly in the plan, which is organized with many small rooms connected to one larger room all with a very cozy, homely atmosphere.

The philosophy behind the Maggie centers focus on the large influence architecture has on people, which means that this is nothing like a normal institution building. The center is designed by Richard Rogers and has very clear references to traditional Japanese architecture, with many inner gardens a floor plan organized as a traditional Japanese house in mind.

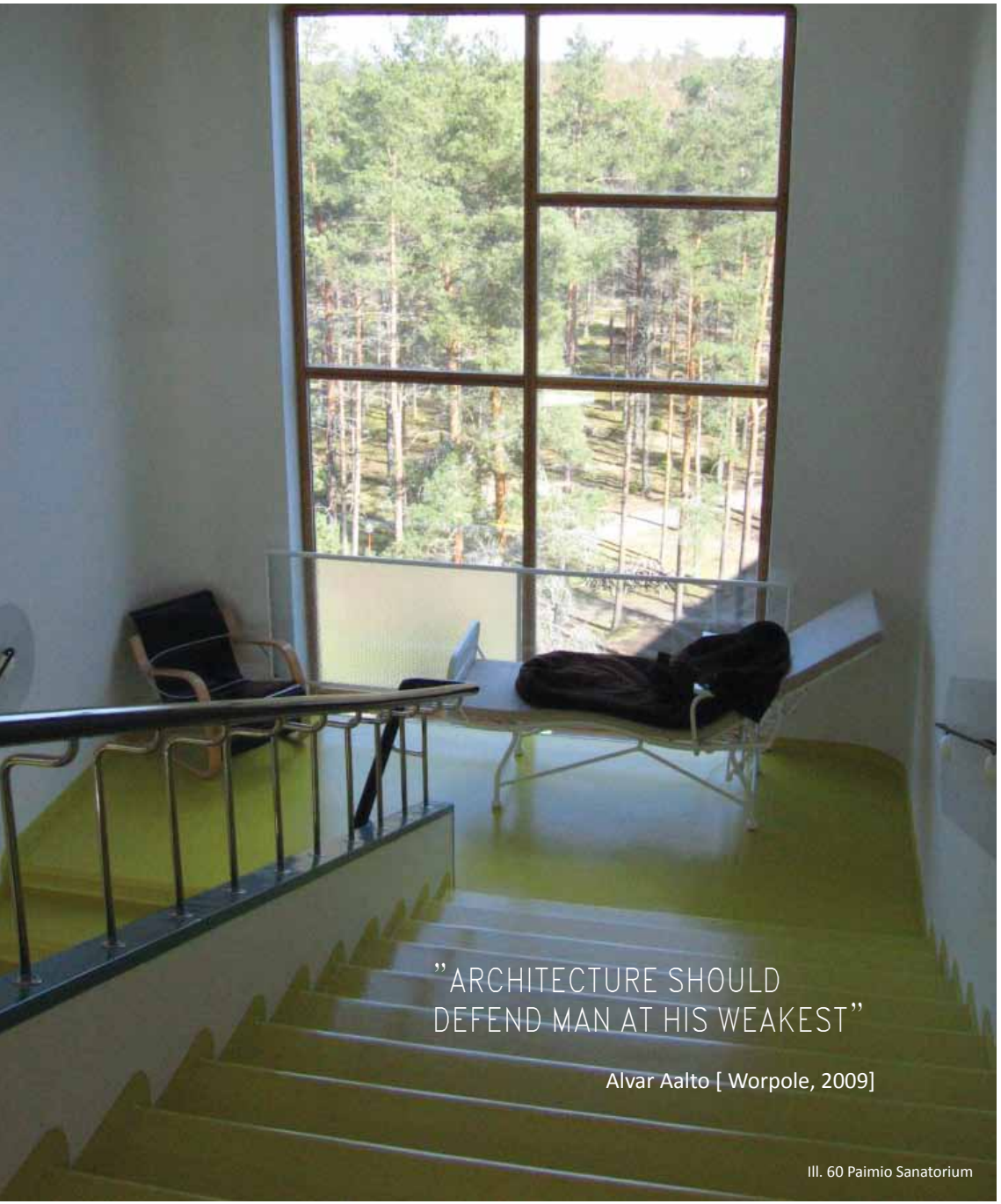
Ill. 58 Main room - daycare center

Ill. 59 St. Christopher's Hospice

ST CHRISTOPHER'S HOSPICE, 1967

This is the first hospice ever built, and since its beginning it has evolved in many ways. This means that the building has been going through comprehensive changes, and today it includes over 40 in-bed patients and almost 80 patients dropping by on a daily basis, so the way the hospice work is very different from the way we normally deal with it in Denmark.

Compared to the Danish hospices the physical surroundings of the bed areas is not in the same high standard as in Denmark, these areas seem more like hospital departments, in both organization, expression and size. But the way the daycare center is integrated in St. Christopher's is unique. The daycare center has all the typical facilities as conversation rooms and rehabilitations rooms but the central part of the center is a sort of a café or multi room where everyone are allowed to drop by at any time of the day, every day of the week. This area is the first thing welcoming you when you walk into the building and it creates a nice atmosphere with a different focus than what you would expect from a hospice. The café area works as a gathering point for everyone visiting the hospice whether they are there as relatives, in-bed patients, for treatment or simply because they dropped by, makes no difference this is a place for everyone to meet each other.



Ill. 60 Paimio Sanatorium

Ill. 61

HEALING ARCHITECTURE

Vision: to represent an architecture influencing both human well-being and strengthen a healing process for individuals.

The term "healing architecture" can appear, as a wrong term to use, when designing a hospice, where the patients have been diagnosed as terminal patients. In this case it is assumed that the knowledge about healing architecture can be directly applied to relieving architecture.

In the end of 2011 Realdania dedicated a sum of money to the project "Arkitektur og Lindring" (Architecture and Relief) managed by PAVI (Danish Knowledge Centre for Palliative Care), with the purpose to develop the "Program for Det Gode Hospice i Danmark" to embrace palliative care, which is performed at the hospitals, at elder centers and in private homes [Realdania Nyheder, 2011].

Healing architecture is about the physical environments influence on the patients healing as well as minimizing stress

Ill. 62

"HOW CAN ARCHITECTURE CONTRIBUTE TO HEALING?"

[Wagenaar, 2006]

Ill. 63

Ill. 64

Ill. 65

and optimizing the well-being for patients, relatives and the staff.

Factors as light, sight, noise reduction, colors and art have in recent years been considered as substantial when designing healthcare architecture in terms of supporting the healing process both physical and psychological. These factors influence the architectural design in terms of daylight quality, view to nature, atmospheres of rooms, room organization, colors, sounds and the possibility to be private and safe.

The effects of these spatial factors have in recent years through" Evidence Based Design" (EBD) been compared to qualify and develop design and architecture, with the purpose to increase the quality. The method can been seen as a step further than healing architecture in terms of being a design concept to include the buildings measureable effect. So EBD is the process of basing decisions about built environments on credible research to archive the best possible outcomes [EDAC, 2011].

The mission of EBD is not only to document measureable improvements in the results of the building, but also in the economy, consumption of resources and consumption investments as well as user satisfaction and productivity [Frandsen mfl., 2009].

The knowledge about Healing Architecture will be used in the design process to implement good daylight qualities, views to nature and colors and to consider the atmospheres of rooms, room organization, and noise reduction. These parameters have through EBD been categorized as factors influencing the patients healing process.

ACCOMPLISHING A LIFE

The purpose of this chapter is to enlighten, what the patient’s face, when the time has come to accomplish their life; - which considerations goes through their minds, when they have to take leave of their life.

The purpose of this chapter is to get an understanding of, how to design a hospice embracing all the layers of the dying gamut of emotions and wishes for the last part of life. The chapter is based on extracts from the documentary “Sømanden og Juristen” (The sailor & The Lawyer) by the journalist, Ander Agger [Agger,2011], articles written by relatives and nurses, which have death close to their life and our different hospice visits.

The most essential for the patients is to remain themselves and keep their dignity, even though the illness has deprived them full control over their own life. The patients also consider how to say goodbye to their partner, children, family and friends in a proper way, the most important is to let them know, that they will be loved forever. Another thing which a hospice stay often encourages the patients to, is to say sorry if they have something in their lives which is uncompleted. This often leads to reunion of earlier repelled family or friends, so they get memorable moments together, in the last days of the patient’s life.

The fact that time soon runs out entails, that things are not postponed until tomorrow, and the patients focus on living in the moment. They are served all their favorite dishes and are offered to do anything they like, no matter if it is a visit in the garden, music therapy, a talk with a priest, celebrating anniversary, even though that the partner died years ago [Andersen, 2012].

Religion often becomes crucial to the patients and their relatives in terms of dealing with fear and despair. Everybody have a strategy to deal with the crises of life, but the fact, that you soon will die and cannot do anything to change your destiny, often

Ill. 66 Mood board

entails many thoughts. Some start believing, already believers magnify their beliefs through prayers, contrary to others who stops believing;

"I have prayed to God all my life, but now I have dismissed him. He is not working anymore" [Nielsen, 2005].

A hospice is a home for everybody, no matter religious beliefs. A place where the nurses and volunteers are listening and observant on the patient needs, so they are ready to offer all the care and love the patients may need at anytime.

When the patient's wishes have been accomplished and they have said goodbye to their relatives, most of them are ready to let go of life.

For the relatives the most essential is to feel, that their dearest could not be in a better place in their last days of life and still maintain their dignity;

"I suddenly realized that the staff at a hospice conforms to the patient's need, contrary to a hospital, where the patients must conform to the conditions there. I was so glad, because I felt that Vera could not get any better place to be" [Lings, 2007].

Most people prefer to die at home, but when that is not possible, a hospice is a perfect alternative, because it represents a homely and relieving atmosphere.

"It turned out to be a epoch-making occurrence in my life to experience a hospice as another home, a place, where you in loving interaction live in the moment and maintain the dignity, until the heart stops beating" [Lings, 2007].


ill. 67

HOW TO ENSURE THAT BOTH PATIENTS AND RELATIVES CAN FEEL AT HOME, AT THE SAME TIME AS IT NEEDS TO BE A WELL –FUNCTIONING WORKPLACE?

[Realdania - Program, 2011]


ill. 68

USERS

As mentioned in the chapter “Program for Det Gode Hospice i Denmark” the program is carried by the desire to create revival within Danish institutional buildings, where surroundings, contents and needs will fuse together in a unit, which humanly, professionally and architectural supports the people, who will use the hospice (see ill. 35) [Realdania - Program, 2011].

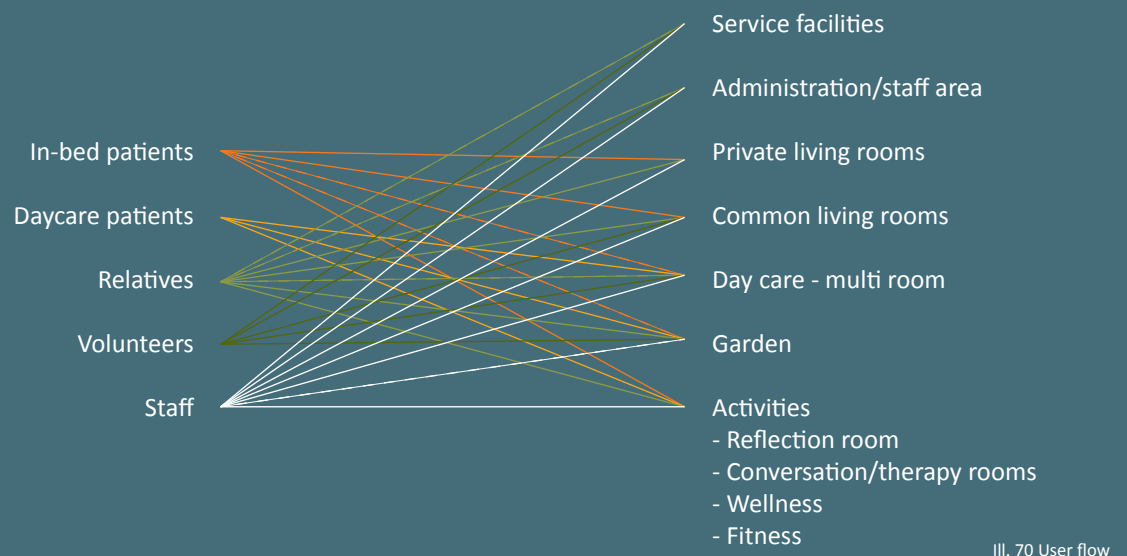
Based on a number of visits at different hospices and daycare centers in Denmark, Norway and England (see case studies) a substantial knowledge about the users has been established.

The users at a hospice can be categorized in four main groups the patients, the relatives, the volunteers and the staff including nurses, doctors, psychologists, music therapists, physiotherapists, priests and funeral directors, who all have a function the building.

The patients are the reason for the existence of the hospice and their needs are therefore the most essential. As written in the chapter “Program for the Good Hospice in Denmark” is the private living room the most essential space for the patients, why it needs to represent a comfortable and homely atmosphere [Realdania, 2009]. This also concerns the common living areas, where some patients will spend some time during the day. Beside these functions, facilities as the reflection room, wellness and the orangery will as well be used by the patients. Most of the patients prefer privacy in the last days of their lives, why it is important that the private living rooms represent the most private part of the hospice.

The relatives also appreciate the private and the common living rooms, but also smaller niches in the corridors and in the garden, where relatives can meet and share sorrows, happiness, worries and impressions [Realdania, 2009]. The relatives want to be close to the patients during the last days, why a bed in the private living room should be available, but if the relatives need to retire a guest room should be available as well. Like the patients the relatives also appreciate privacy, but they likewise

Ill. 69



Ill. 70 User flow

find the feeling of being a part of everyday life satisfying. This call for a hospice daycare center being a catalyst for the life outside and invite to stay.

Beside the inn bed patients, a day care hospice will represent patients, which have just got their diagnosis as terminal patients. This means that they are not as sick as the inn bed patients, why they need more activities available, like fitness room, workshop and rooms for therapy, where they can be taught about their illness regarding food, exercise, sorrow processing and so on. Beside the activity rooms a main room, as a kind of platform, is essential, where the patients and the relatives can meet each other and share knowledge.

Hospices could not be functioning without the volunteers, why they play a very important role. Most Danish hospices have at least 30 volunteers, which mean that they need a coordination room. The role of the volunteers is to host the dinning, create floral decorations, take a walk or drive with the patients, be responsible for the garden and things like these.

The last user group is the staff, whose task is to take care of the patients and their relatives. This means that the patient's private living room needs to be sized so the working conditions for the staff are acceptable. This is important because personal hygiene, physiotherapy and music therapy, will take place within the private living rooms. Another important need for the staff is a well-organized team based area, where both knowledge sharing and cross disciplinary cooperation's can take place, but still be able to retire to more quiet zones [Realdania, 2009]. To work in a hospice can be quite a tuff task, because it copes with the reality of death every day, so a recreational area for the staff, where they can retire to think, relax and enjoy calmness, is needed.

To create most calmness for the patients and the relatives and best working conditions for the volunteers and the staff is a buildings infrastructure/movement flow, which does not interrupt the different user groups, needed.

THE SITE

SØNDER STENDERUP

The site is situated on a field in the outskirt of the village Sønder Stenderup on Stenderup peninsula, 15 km Southeast of Kolding in the mid-east part of Jutland. Like most of the earth around Sønder Stenderup this is a site used as farmland, however the nature around the village also includes the protected meadow/ wetland area Solkær Enge in the south of the city. The site is in direct connection to the meadow, and the great nature life and the streams form different lakes during the season, this area adds a great quality to the site. The site is very close connected to the city as well and everything can easily be reached in walking distance, as shown on ill. 74.

Ill. 71 Section south - 1:2000

Ill. 72 Section west - 1:2000

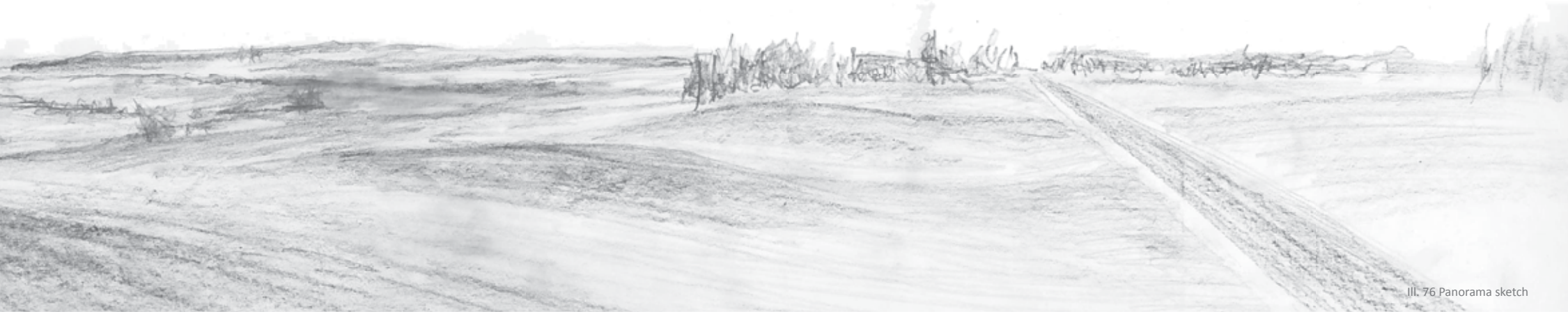
Ill. 73 Section north to south-east - 1:2000

Ill. 74 The site - 1:5000

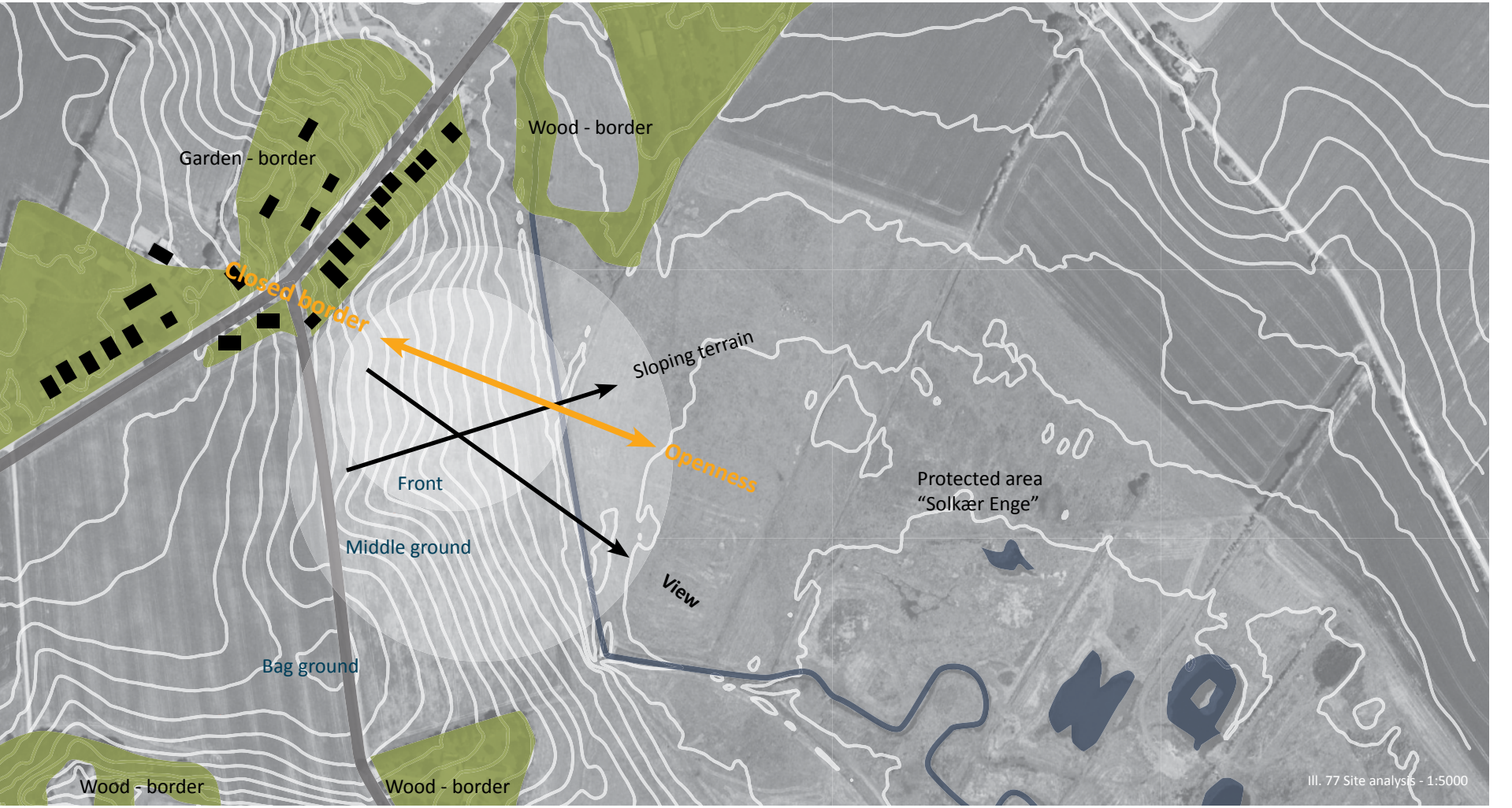
PHENOMENOLOGICAL SITE ANALYSIS

To understand the specific characteristics of the place an analysis based on a quality assessment and observations has been conducted. The site is enriched with spatial qualities as openness in the landscape, which creates a beautiful view overlooking Solkær Enge, - the preserved area, which has a significant bird life. The view is further refined caused by the

Ill. 75 Site pictures



Ill. 76 Panorama sketch



Ill. 77 Site analysis - 1:5000

sloping landscape toward Southeast, meaning that the sunrise can be seen. The sloping landscape will further more lee for the cold wind from west and together with the row of dwellings create closeness in the landscape towards north. The presence of the road towards west, the stream towards east and the row of dwellings towards north creates a clear definition of the site. The road is small, which means that it will give a limited noise effect, so silence and the noises of nature will be present at the site. The demarcation of the site will give a close contact to the nature, which will be supported by a great presence of the sky in all directions.

TYPOLOGIES

The typologies of the site can be separated in three categories, which correspond with the character of fore-, middle- and background. The foreground consists of a row of dwellings, the ploughed field and the road. The middle ground consists of the sloping field towards the meadow, the stream and a row of trees towards east. The background represents the preserved meadow/wetland and the horizon towards southeast, which gives an impression of infinity. The scale of the built up area is relatively small, because all the dwellings are maximum 2-3-storeys high and except for the church, which with its tower creates a focus point. Besides the buildings is it only a few clusters of trees, which gives a certain height in the landscape.





FLORA AND FAUNA

The flora at the specific site is quite limited, with the field, a few clusters of spruce and different kinds of shrubs contrary to “Solkær Enge”, which represent a significant flora. This also concerns the fauna, which is quite limited at the site, but again significant in “Solkær Enge”.

“Solkær Enge” consists of different kinds of nature. The northern part consists mostly of wetland and in the middle of the area is the old “Solkær Å” brought back to its natural twisting. Small waterholes have through time been created naturally, as a result of high tide, where bulrush is growing at the banks. In the eastern part a very varying nature, with small birch- and willow trees, thorn thicket and herbs, can be found. The area also has ford, where waders are to be found during migration. The western part consist of common, swamp and lakeshore. A part of a marsh is also to find, which ends in a waterhole in a field, where willow and thorn are growing. In the southern part is a cove, with a very marshy shore, where the poles are very used by cormorants, gulls, ruffs and sea eagles. The ground is a mix of swamp and clay.

By the lake and in the meadow area a number of different bird species are breeding as for example Pied Avocet, Common Shelduck, Wagtails, Reed Warbler and Western Marsh-harrier. During migration, pipets, wagtails, falcons, fish eagles and finches, among others pass by and ”Solkær Enge” hosts around 10.000 plovers on a good day, resting on their journey. Furthermore a sea eagle couple are hunting and resting in the meadow.

The small water holes in the meadow are unique in a Danish context and is in Solkær Enge host for a range of dragonflies and a massive population of green tree frogs, where the males in May can be heard croaking by the water holes . A population of foxes is living in the area and early in the morning roe dears are drinking water by the lake [Bygebjerg].

Ill. 78 Flora and founa pictures

CONCLUSION

The fact that the site itself does not hold a lot of qualities concerning nature, request a continuation of the landscape in the context such as widening and curving the stream and extending the meadow, so the field will be turned in to a part of the meadow. The assumed effect will, be a transformed flora and attract more bird life from the current meadow area.

The quality of the site demands an essential focus on the considerable view towards Southeast and the preserved meadow area, which will be enhanced in the architecture of the hospice. This will also be evidence in terms of “borrowing” views to the landscape and creating the impression of infinity towards Southeast.

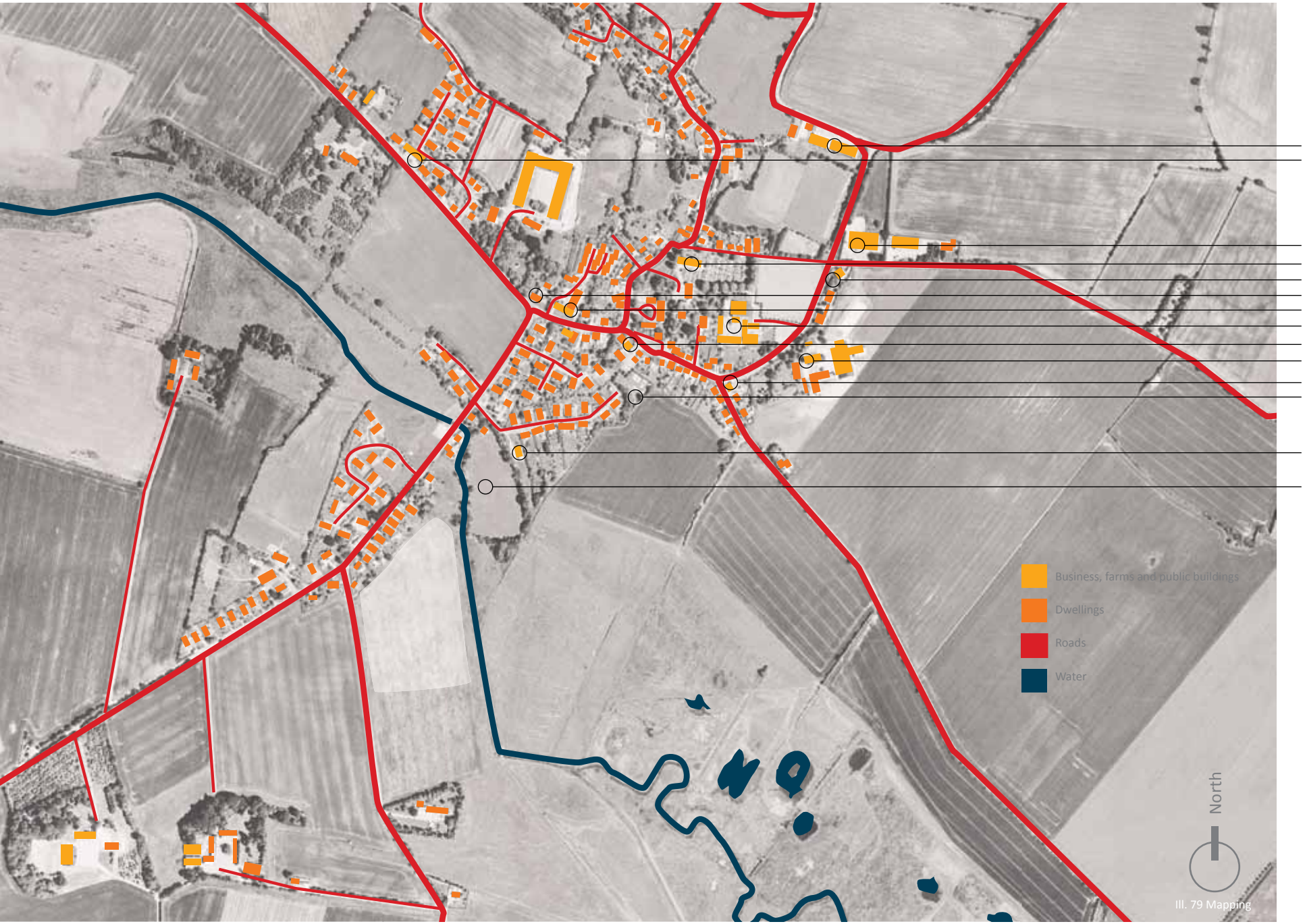
The small scale of the typologies in the area, as said, creates a great presence of the sky, which will be integrated in the building. The sloping landscape towards East encourages an architecture firmly integrated into the landscape. The fact that the site is situated in a very quiet area, will in relation to the presence of the sky and the sloping landscape, be used to design a breathtaking and silent space for the dying.

MAPPING

ACTIVITIES AND INFRASTRUCTURE

With the city of Sønder Stenderup being a village the activities are focused around the city center close to the school, the church and the local companies. The village primarily consists of dwellings.

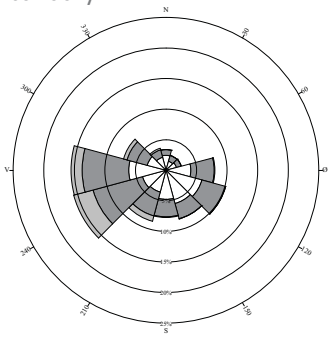
The main road going to Kolding causes that Sønder Stenderup is easy to reach. The site itself is not in direct connection to any of the big roads, but it can easily be accessed from Moshusevej.



Ill. 79 Mapping

Lillebælt

January



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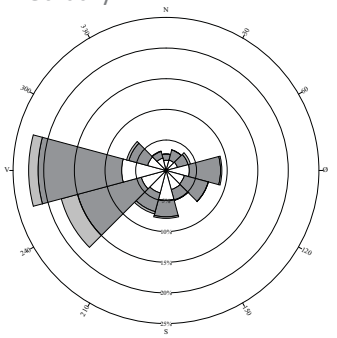
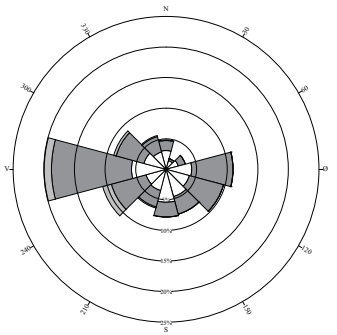


Marts



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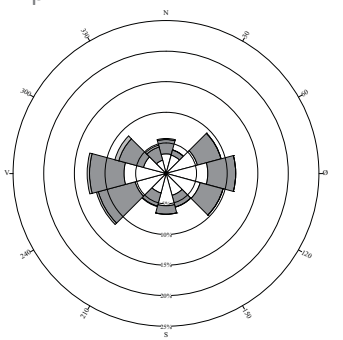

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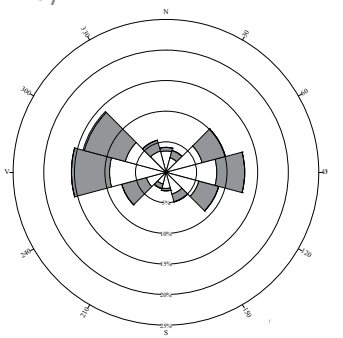

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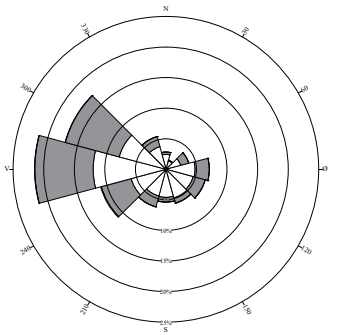
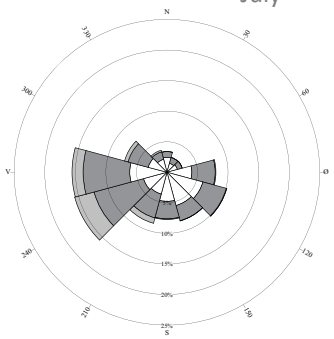


CLIMATE CONDITIONS

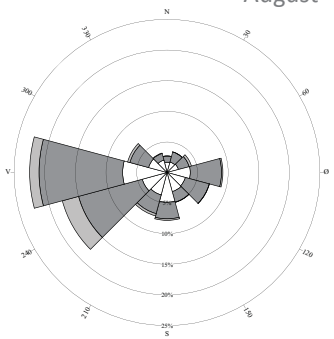
This site is situated in the East of Jutland were the difference between the day differs with more than 10 hours during the year. The site is open towards all sides and the sun can easily enlighten the site most of the day all year.

The wind is as in most parts of Denmark strongest from west most of the year, but winds from other directions are also affecting the site. The sloping terrain towards West and the dwellings towards North are sheltering the site a bit from the western wind, but to all other directions the wind hits the site without facing any obstacles.

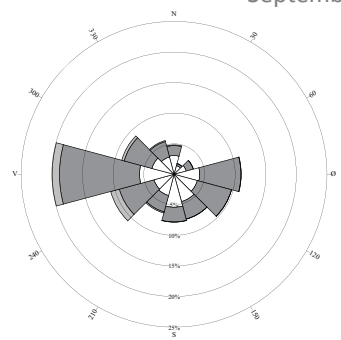
July



August



September



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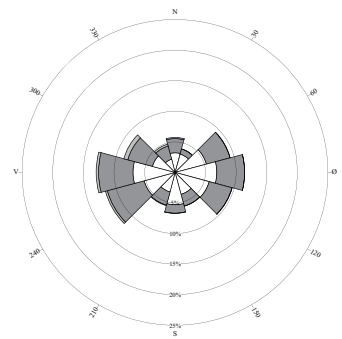

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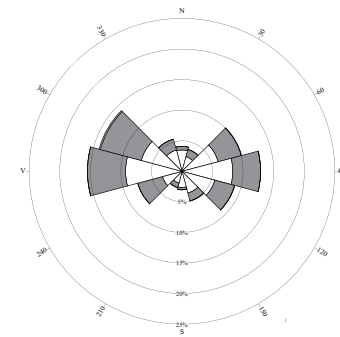
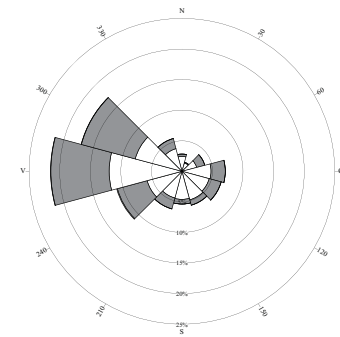
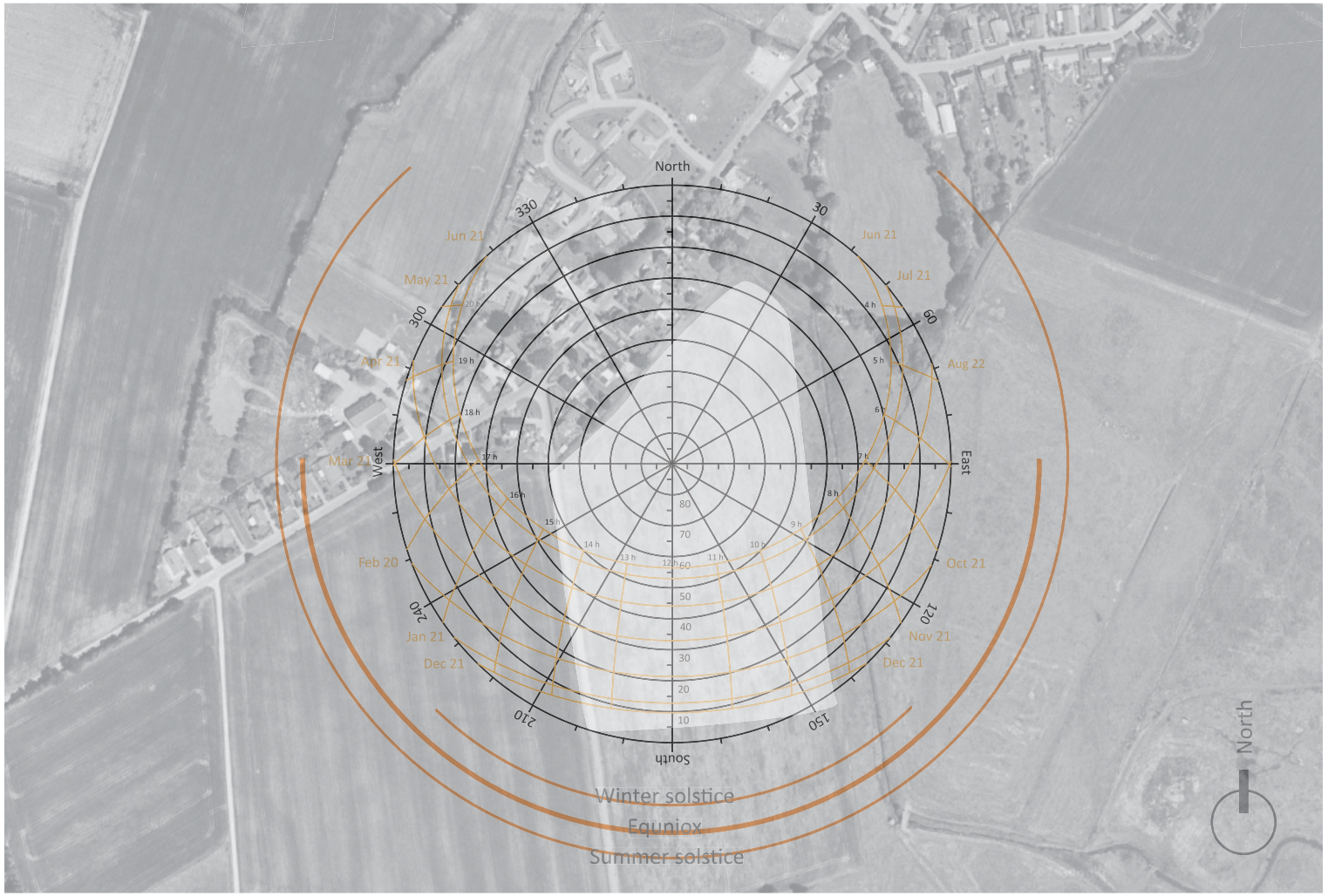


December



Ill. 80 Wind diagrams

Percent
> 11 m/s
5 - 11 m/s
0,2 - 0,5 m/s



NORDIC ARCHITECTURE

Nordic Architecture has, as written in our motivation, captured our interest and due to the specific site and the specific task of designing a hospice it is found very relevant, with its focus on context related buildings, the landscape, functionalism, light and materials, which this chapter will define further.

The Nordic Architecture becomes relevant for a hospice because the final building should express a homely atmosphere to minimize the impression of an institution. This homely atmosphere can be enhanced by using tactile materials, light and implementing the present nature, which, as written in the chapter “Healing Architecture”, will influence the relieving process of the patients. Functionality becomes relevant in terms of creating a building representing a good work environment for the staff and to avoid inconvenient connections between facilities, again to avoid that the patient feels like living in an institution.

An existence of a so called Nordic Architecture has since the beginning of 20th century been known as an architecture developing its own distinctive characteristics [Lund, 2008, p17]. The Nordic traditions reflect, contrary to build environment in other parts of Europe, more social and cultural character. This substantiate the fact that nowhere else in the world has common housing played such an important part in the architectural tradition [Lund, 2008, p12]. This goes well with Christian Norberg-Schulz’s conviction that the key to the Nordic is home. Contrary to the south is life not ensured on the piazza, but in the home, which entails intimacy and warmth [Norberg-Schulz, 1996, p22]. The political and cultural history has created a natural connection between form and content in Nordic Architecture [Lund, 2008, p12].

According to Christian Norberg-Schulz light defines the Nordic world and infuse all things with mood. The Nordic light creates spaces of moods with its shifting nuances even when the light is withdrawn and filtered through an overcast sky (see ill. 84). “Light gives all things their presence” said Louis Kahn and what he meant was not that light creates things, but that it defines their manner of appearance, which is exactly what distinguishes


Ill. 82 Aarhus University


Ill. 83 Villa Mairea


Ill. 84 Bagsværd Church


Ill. 86 Woodland Chapel


Ill. 85 St. Henry's Chapel

the Nordic light [Christian Norberg-Schulz, 1996, preface]. Juhani Pallasma instead argues that it is the shadows, which gives shapes and life to the object in light [Pallasma, 2005].

What characterizes the Nordic Architecture especially from the 1930s onwards is a translation of the strict and simplistic functionalism into a regional expression that combines light and refined architecture, with a more "soft" approach based on the use of regional materials and building construction [Lund, 2008, p18 and p20]. This is supported by Christian Norberg-Schulz: "These methods are not merely due to available building materials and technologies but also to the desire to accommodate building to a local context [...] Nordic regions have determined a sense of form that remains despite changes in the technology and despite the arrival of the imported" [Norberg-Schulz, 1996]. An obvious example of regional architecture in Denmark is Aarhus University from 1931 by Kay Fisker, C.F. Møller and Povl Stegmann, in which the use of brick in clearly defined volumes links the new functionalistic building to the Danish tradition of craftsmanship (see ill. 82), [Lund, 2008, p.

Ill. 87 Tietgen Kollegiet

Ill. 88 Villa Mairea - interior

Ill. 89 Lene Trandberg's summer cottage

70-73].

A debate about honesty has since the turn of the century concerned the connection between the architectural form and such diverse things as; popular heritage, the materials, the functions, the constructions and the industrial society [Lund, 2008, p129]. This project will treat honesty in terms of materials and function.

Through his work, Christian Norberg-Schulz became more and more interested in phenomenology, which he characterized as a method based on seeing. Another Nordic architect concerned with sensing place is Juhani Pallasma, who argues that a person experience the world with his entire body [Pallasma, 2005]. The appearance of a phenomenon is in this sense always an appearance of something for someone – and therefore introducing the international first person perspective as a basic precondition [Zahavi, 2003, p16]. Christian Norberg-Schulz´s interest in a phenomenological approach becomes evident in terms of rootedness and identity of place, which he in an article describe as genius loci, - the spirit of place [Lund, 2008, p288 and web 1]. In his book "Nightlands" he argues that contemporary architecture suffers from a "loss of place", why he stresses the importance of regaining a rootedness in architecture. The importance of understanding the specific character of place and designing buildings that "…gathers and represents the world to which it belongs" [Norberg-Schulz, 1996 p175].

A contemporary piece of architecture, which treats the above mentioned issues, is St. Henry's Ecumenical Art Chapel by Matti and Pirjo Sanaksenaho, due to the situation on the site and the choice of materials and construction (see ill. 85).

Some of the values characterizing Nordic Architecture can also be found in other architectural traditions around the world and in non-Nordic architect's believes.

An example could be the Swiss architects Peter Zumthor, who mostly design under conditions resembling those of the Nordic countries in terms of climate, cultural conditions and landscape

Ill. 90 Thermal Bath, Vals

Ill. 91 St. Ignatius Chapel

Ill. 92 Annex art Museum, Naoshima

Ill. 94 Traditional japanese architecture

context. His architecture can be characterized with words like atmosphere and mood and should according to himself be experienced by the senses. This does not only refer to his architecture, but architecture in general; “Architecture is not abstract, but concrete. To experience architecture in a concrete way, means to touch, see, hear and smell it” [Zumthor, 2010, p66].

Many of the same themes are seen in Japanese architecture in terms of simple expressions, use of raw materials and natural daylight. Those are special element which are handled with care in both architectural directions. Staging and framing elements of the landscape, is also very characteristic in the Japanese architecture, as seen in ill. 92 and 94.

Ill. 93 Bruder Klaus Chapel

HOMELY

”A home is where you feel at home”, - but what parameters affect whether you feel at home or not [Winther, 2006]? This question is the reason for this chapter, which will define what it means to feel at home and what a homely atmosphere is.

But why even talk about “feeling at home” and a homely atmosphere? As described in “Program for Det Gode Hospice i Danmark” a hospice, is an institution and a part of the Danish hospital service, but with a different focus on care, intimacy and pain relief. This creates a desire to innovate hospice design, so it associates as little as possible to a hospital by creating a homely atmosphere [Realdania - Program, 2011]. This gives rise to a vision for Hospice Kolding to create the experience of a home and a homely atmosphere and at the same time represent a healthy and well-functioning workplace.

Previously the human found meaning in resorting to God, family, the relations and the great ideals, which defined who they were and which role they played in the society [Mechlenborg, ?¬]. Today is it mainly the homes that defines this role, because they are a tool for people to create identity, personality and individuality.

The home is a place symbolizing a safe environment, where you feel secure and stable. The recent year’s globalization, with people traveling a lot, has created an even greater need for the safe environment, privacy, sheltering, intimacy, comfort and control, which the home symbolizes.

Zooming in on the smallest unit of the term “Living”, we have a homely atmosphere, which is a scale, where the architecture not only has to do with bricks, but with the human habits and everyday rituals [Holm, 2011].

“Our homes are organized as small worlds, which can be seen as a world map: people engaged in everyday activities, their odds and ends mess and order, - here is life about to be lived, marks and itinerary are made for the day-to day routines” [Holm, 2011]. (See Ill. 95)

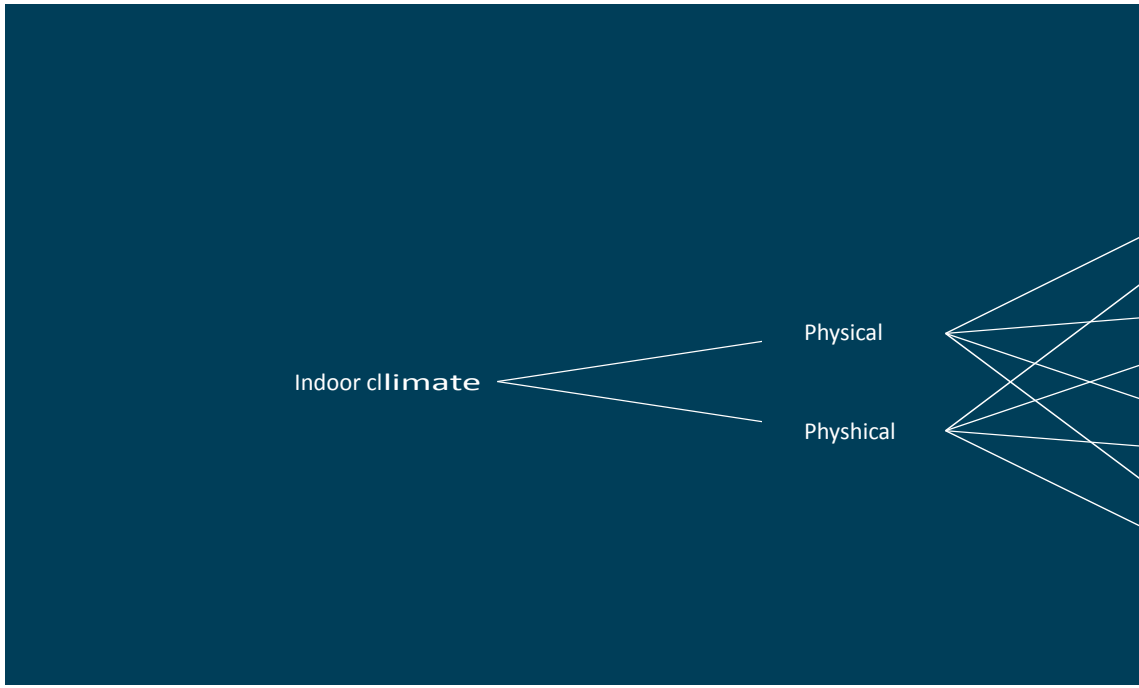
When patients move into a hospice they sacrifice their homes, but this does not necessarily concern the homely atmosphere. The homely atmosphere can be kept if the architecture accommodates space for “at hjemme den” and thereby build up personal experiences of a homely atmosphere [web1]. But what does “at hjemme den” mean? “At hjemme den” is a new Danish phrase describing a strategy about how to feel at home both at home and other places, by pretending that you are at home, do like at home, and act homely [Winther, 2006].

To feel at home can both be caused by a specific room, familiarity or people like for instance family. When you feel included in a familiar room or in a group of people the feeling of a homely atmosphere can occur. This feeling is not linked to a specific place, but does often occur a place. This means that the homely atmosphere can be brought elsewhere if the people, whom you feel at home with, are surrounded [Winther, 2006]. This creates a desire for an architecture embracing

social interaction between the patients and their relatives and expresses familiarity by for instance materiality in surface facing and textiles.

The home is as a base, from where we travel the world and turn back to. The home reflects, who we are, our roots and life story and the home is our private life frame, which we establish our self and develop all our life.

Ill. 95 “Plan” photographic art



INDOOR CLIMATE

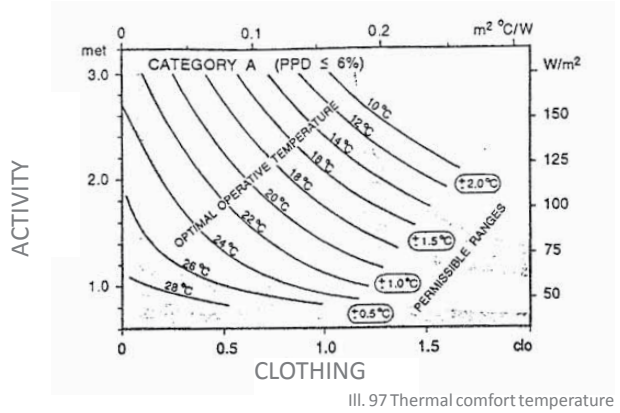
In a building where the main focus is, to make the last period of life as comfortable as possible, it is very important to focus on social sustainability and thus attend the patient's well-being. This makes indoor climate an important focus in the design process and due to the focus on energy efficient building design focusing on the indoor climate will be even more important.

Indoor climate is defined by thermal, atmospheric, acoustic and visual indoor climate (see ill. 96).

THERMAL INDOOR CLIMATE

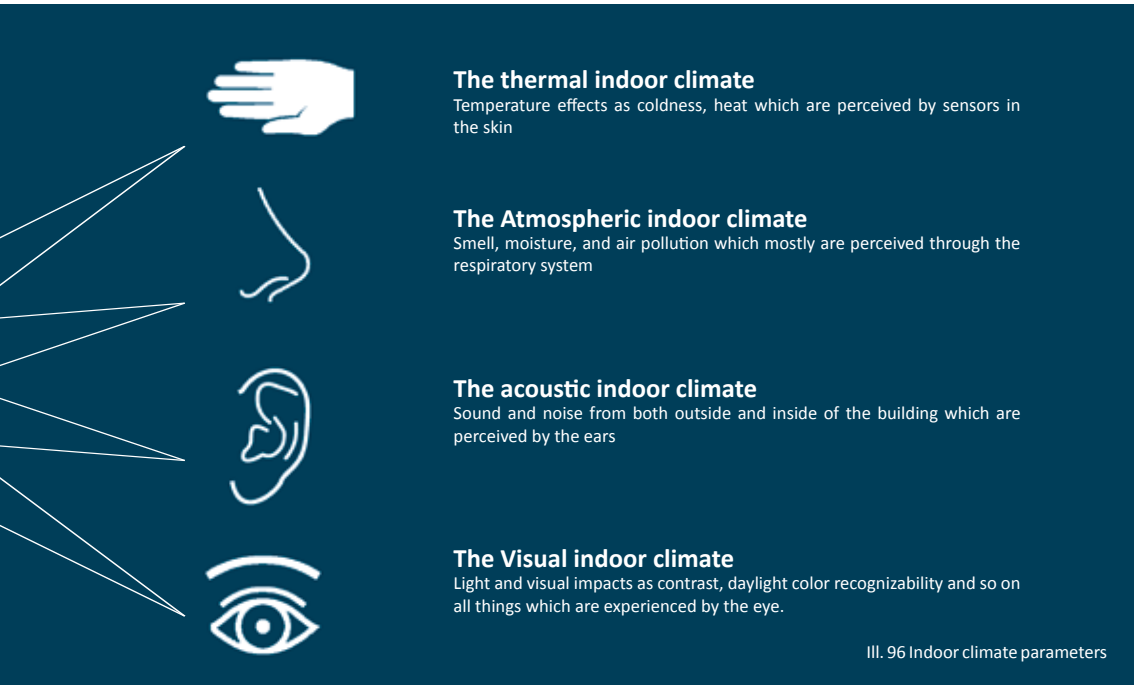
The thermal indoor climate concerns the temperature, air change and humidity. These parameters influence the human's heat balance and must all together be perceived acceptable to create thermal comfort for the users.

The thermal comfort depends on the use of the room, the user's level of activity and clothing. When designing a hospice the desire is to keep a temperature of 23-24 degrees, - a bit higher than usual for institutional buildings, because the patients level



Ill. 97 Thermal comfort temperature

of activity is very limited and their illnesses often makes them feel cold (see ill. 97) [DS 474].



Ill. 96 Indoor climate parameters

The thermal indoor climate is often the most challenging in buildings today, because of problems with overheating. Designing a building were overheating is taken into consideration from the beginning of the design process, means that the number of windows and their positions should be analyzed by using simulation the spreadsheet “daily average” to determine the temperature and need for ventilation to achieve thermal comfort and thereby optimize the design. “B-sim” will be used in the detailing of the design process to verify the indoor climate in the patients living room, because it is the most essential room in the hospice.

Furthermore it is important to create an opportunity of shading some parts of the windows in the most vulnerable time of the year, by using some kind of sun screening [Larsen, 2011].

To optimize the thermal indoor climate, the mechanical ventilation should work by the mixing principle, were the inlet and outlet air have the same temperature, this means that the ventilation system minimize the temperature zones in a room and optimize the comfort conditions for the users. [Heiselberg, 2007]

ATMOSPHERIC INDOOR CLIMATE

The atmospheric indoor climate covers the air quality concerning CO2 and sensory pollution produced by people and equipment. Ventilation is essential to create the best atmospheric indoor climate. The balanced ventilation system can help creating a building were fresh air is provided all year. This is especially important in a building where smells, which can be associated with a hospital, should be avoided [Realdania, 2009]. The air change rate will be calculated to find the needed ventilation to ensure a good air quality and health for the users. The desirable amount of ventilation is based on the choice of the wanted category of indoor climate, which for this building, based on the essential focus on indoor climate, will be category A in the rooms used by the patients.

”<THE SOUND OF A SPACE>. LISTEN! INTERIORS ARE LIKE LARGE INSTRUMENTS, COLLECTING SOUND, AMPLIFYING IT, TRANSMITTING IT ELSEWHERE. THAT HAS TO DO WITH THE SHAPE PECULIAR TO EACH ROOM AND WITH THE SURFACES OF THE MATERIALS THEY CONTAIN, AND THE WAY THOSE MATERIALS HAVE BEEN APPLIED” [Zumthor, 2010].


Ill. 98


Ill. 99

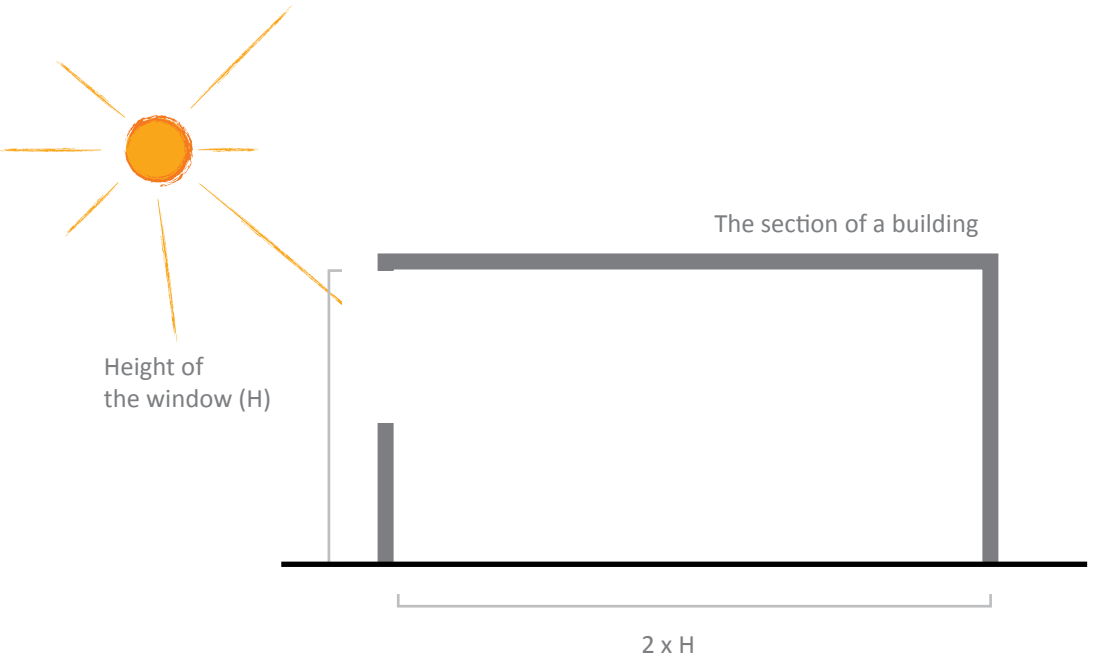

Ill. 100

ACOUSTIC INDOOR CLIMATE

The acoustic indoor climate is very important for the user as well. The reverberation time is very close connected to the acoustic conditions in a building, and is often used as guidance for the acoustic conditions. The reverberation time is the time it takes until the sound is reduced to 60 dB. This time is often wanted as small as possible to make is easy to understand speech. To create the optimal conditions there are different ways of creating the wanted acoustic, both the form of the room and the choice of materials are methods of creating the wanted acoustic solution. However the form of the room is not that important when dealing with smaller rooms like in a hospice, where the materials will be more important [Egan, 2007]. According to healings architecture is a deduction of the sounds desirable, because it is proved that this will influence the patients stress level [Frandsen mfl., 2009].


Ill. 101

Ill. 102



Ill. 103 Natural daylight

VISUAL INDOOR CLIMATE

The visual indoor climate is optimized by minimizing strong light contrasts, blind and flickering light. These elements should be considered and avoided in the design process especially around the facilities used by the patients as the visual indoor climate is even more important for them. Simultaneously is it very important to provide good daylight condition, which potentially can help the relieving process of the patients.

The good light conditions are also achieved by using the natural daylight to lighten the rooms. But to use the natural daylight most optimal it is important to consider, which functions prefer diffuse or direct light. When using the natural light for lighting, a general rule is shown in ill. 103. However a simulation of the light conditions should be done in order to document, that the light conditions are fulfilled.


Ill. 104


Ill. 105


Ill. 106


Ill. 107

ENERGY OPTIMIZED DESIGN

The aim for this project is to achieve low energy class 2015 from the Danish Building Regulations. This standard does not only consider energy used for heating, which earlier were the most important parameter in energy efficient building design, but also energy for heating water, cooling, technical installations and lightings should be considered, only energy used for mobile equipment like computers is not considered in the accounting according to the standards.

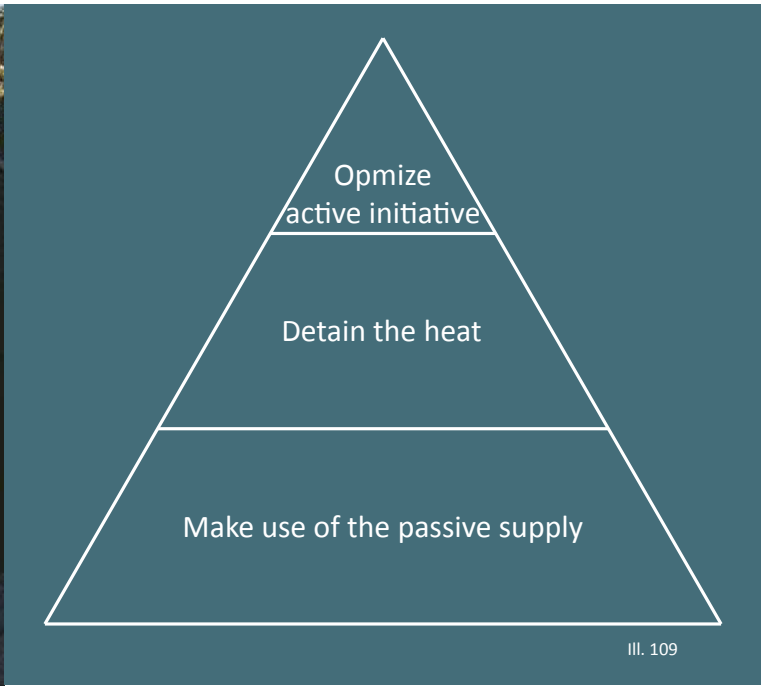
When focusing on a sustainable integrated design solution it is important, that the passive solutions work as an integrated part of the design concept, and the active solutions should only be applied in order to reach the final goal and not be the main method to reach the aim [Marsh, 2011]. This encourages making maximum use of the passive gains, minimizing the passive losses and trying to minimize the use of active initiatives, as shows in ill. 110.

The different design methods should all be considered in order to achieve the best design. But it is important to be aware of how the specific strategies should be applied in the building design. To clarify the passive and active methods, which is considered in this project, they are described in the following chapter.

SOLAR HEAT GAINING

One of the most efficient ways to gain heat is often through the sunlight. This makes it very important to consider where and how the windows especially facing south and west are placed in the building, because the solar heat gains are large from windows facing in these directions, especially in contrast to windows in constant shadow or windows facing north which only provides a heat loss. The solar heat gain is important in the winter time, but in the summer rooms with a large amount of windows facing south or west will often suffer from overheating issues. The only way to avoid it is to block the heat out in some periods of the year and to have it in mind doing the entire

Ill. 108



Ill. 109

design process, so not too many windows are facing the critical directions. To avoid problems the experience from earlier low energy buildings about how many of the windows are placed facing the different directions is considered.

NATURAL DAYLIGHT

The natural daylight should be used as much as possible in order to minimize the electricity consumption for light in the daytime. This should be possible even though some parts of the light may need to be blocked in order maintain the wanted temperature level.

INTERNAL HEAT GAIN

Because the buildings of today only let a very small amount of heat out, they gain heat from the electrical installations as well, this should be considered as well so rooms with many heat producing installations cannot be placed in a part of the building which gain large solar heat.

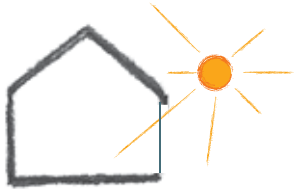
ORGANIZATION OF FUNCTIONS

With the heat gaining in mind it is important to note how the orientations of the windows influence the building and create different temperature zones. This is extremely relevant to consider when functions are placed especially the technical installations because the functions can either increase the zones or minimize the temperature zones. [Marsh, 2011]

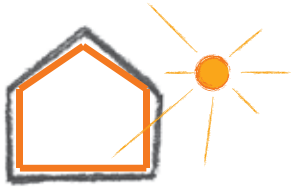
THERMAL MASS

Buildings with a concrete structure or brick walls have a large thermal mass, which means that these elements are able to maintain a certain temperature in a house. When earlier low energy buildings were designed, thermal mass were applied. The thermal mass was predicted to work as a heating element in wintertime, and by using night cooling in the summertime, it was predicted to work as a cooling element. The night cooling did however not cool the building down properly and instead the mass worked as heating element in summertime

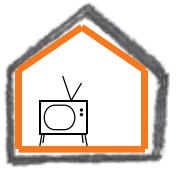
PASSIVE GAINS



Natural daylight



Solar heat gaining

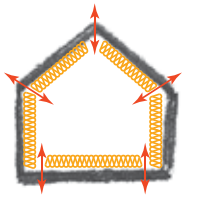


Internal heat gain

Thermal mass

PASSIVE LOSS

Heat loss through surface



Thermal bridges and insulation

and provide over heating issues. With this knowledge in mind thermal mass will be avoided. [Larsen, 2011]

OPTIMIZED VENTILATION

When a building is ventilated only by opening the windows, the loss of heat can be extreme in wintertime and a mechanical ventilation system, which includes a heat accumulating ventilation aggregate that preheat the inlet air, is a must. In the warm summer months it is however not necessary to use an aggregate to achieve the right temperature on the inlet air and fresh air can be achieved by using natural ventilation, this furthermore means that the aggregate can be turned off in the summertime to save energy. This solution is described as hybrid ventilation, because it consists of both mechanical and natural ventilation. [Albjerg,2008]

HEAT LOSS THROUGH SURFACE

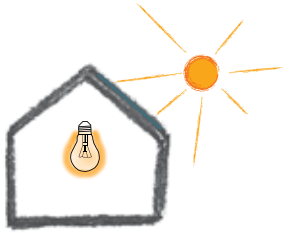
One of the most important challenges when designing an energy efficient building is to find the optimal relation between surface and floor area. If a very small building is considered the most efficient solution would be to make the building as compact as possible, if a building of a bigger scale is considered like in this task, the building can however get too compact. A too compact building can prevent the use of natural daylight, and solar heat gaining in large areas of the building.

THERMAL BRIDGES

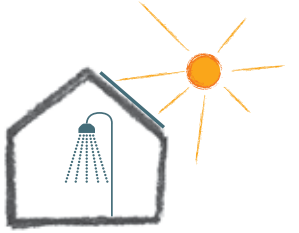
To minimize the heat loss, it is important to avoid a large number of thermal bridges. Thermal bridges appear in many different connections in a construction, around windows, in the window itself, in corners of the building. Many of them can be optimized or reduced by choosing products with a low U-value and by using construction methods were the thermal bridges are avoided as much as possible.

INSULATION

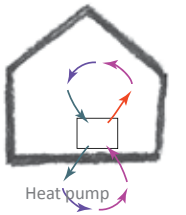
Choosing the right insulation and the right amount is also important. The amount of insulation in the walls is to some



Solar cells



Solar panels

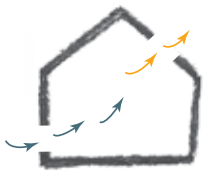


Heat pump

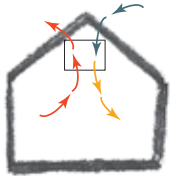
ACTIVE GAINS

Ill. 110 Passive and active gains and losses

ACTIVE LOSS



Natural ventilation



Mechanical ventilation

extended proportional with the amount of heat lost through a wall, but at some point when too much insulation is add the last part only provide a very small difference to the heat loss and the walls end up being extremely thick. If other design parameters are considered the amount of insulation in the walls should not create any problematic issues in terms of the architectural design.

SOLAR CELLS

If the goal is however not achieved by only by using these methods or if an even lower goal should be reached additional elements can be added. The most efficient on the marked today is solar cells. To optimize the effect of the solar cells, they should be placed facing south-east, south or southwest, most optimal the solar cells should be placed with an angle between 30 and 45 degrees. [elfrasolen,2007]

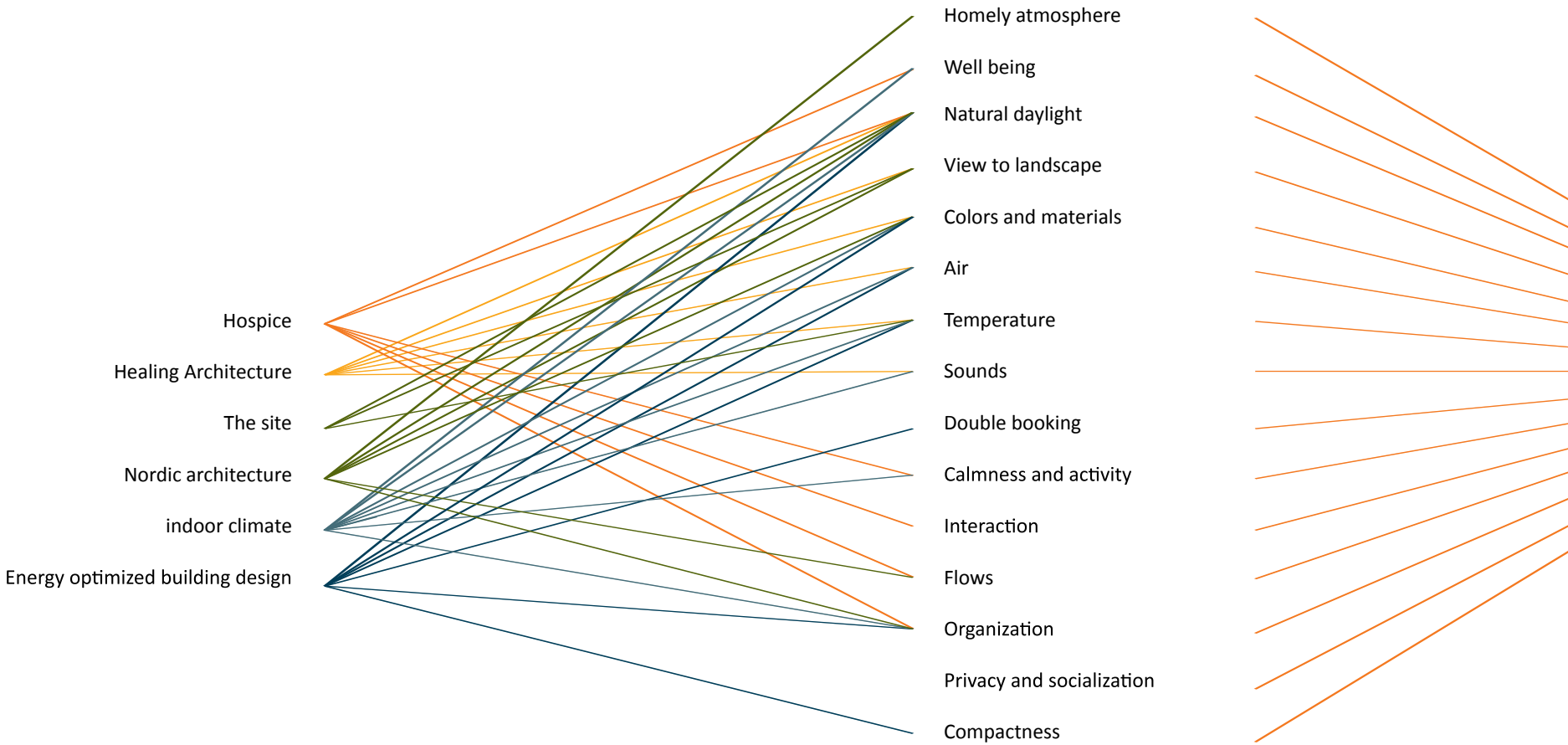
SOLAR PANELS

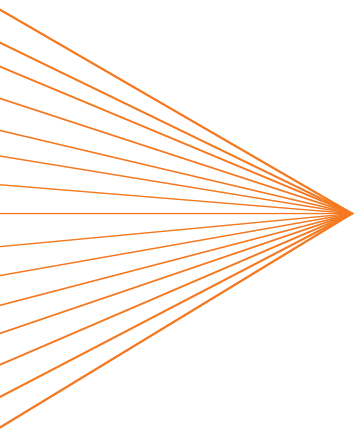
To generate heat solar panels can be a more sustainable solution. In the solar panels a liquid is heated up by the sun, the liquid is connected to a heat pump, which generate the heat. To optimize the effect of the solar panels, they should be placed facing southeast, south or southwest, to get the best effect the solar panels should be placed with an angle between 30 and 45 degrees towards these directions. [elfrasolen,2007] This solution should ever only be considered if the cost of this solution is less than the cost of using the normal heated water supply.

GEOTHERMAL HEAT PUMP

Is a similar system, but more efficient system in terms heat production, the system produces heat by circulating a cold liquid in the earth, the natural constant temperature level in the earth heats up the liquid and by using the temperature differences the heat then generated through a heat pump. [Dansk varmepumpe industri]


DESIGN TEMPLATE


Hospice
Healing Architecture
The site
Nordic architecture
indoor climate
Energy optimized building design
Homely atmosphere
Well being
Natural daylight
View to landscape
Colors and materials
Air
Temperature
Sounds
Double booking
Calmness and activity
Interaction
Flows
Organization
Privacy and socialization
Compactness



Hospice Kolding

VISION

The vision for this project is to design a hospice and a daycare center, also offer evening and night stays. A hospice where a fusion between place, physical surrounding, contents and the user's needs are created in an integrated design solution. This encourage for an architecture influencing the users well-being and contributing to the relieving process, with the aim to increase the patient's life quality and make them able to enjoy and accomplish the last part of life.

To increase the comfort level of the users the indoor climate will be in focus and the spaces should fulfill the standards of a Category A indoor climate. Concerning energy optimization the aim is to fulfill the standards of Low energy class, 2015, which only should be achieved by using passive energy solutions. These technical focuses should be reflected in integrated design solutions interacting with the aesthetic and functional design parameters.

Ill. 111 Keywords

DESIGN PARAMETERS

AESTHETIC

The design must reflect a homely atmosphere and associate as little as possible to a hospital.

The building shall relate to the landscape and implement the potentials of the site both in the fore-, middle and background and in all scales of the building.

The building must be created in a human scale were the different elements of the buildings are readable when approaching the building.

The building must represent a high level of natural daylight, comfortable temperatures and provide good air quality and acoustic conditions for the users, especially the in-bed patients. These elements must be implemented in an aesthetic expression and reflect an integrated design process.

The choice of materials should relate to expressions in Nordic architecture.

FUNCTIONALITY

The common rooms should reflect a variety of privacy and commonness, were the spaces close to the dwellings clusters are the most private, to embrace the user's need.

The hospice should be designed to fit the optimal flows of all users. This must however not be prioritized on behalf of the variation in the common areas and the atmosphere.

The common facilities of the hospice should encourage to interaction and socializing between the users.

The shared facilities should be organized so double booking is possible, so every user groups can make use of the facilities optimally.

TECHNICAL APPROACH

Indoor Climate should be optimized especially in rooms used by the patients, meaning that these rooms should be designed to;

- Avoid overheating by using simulation programs.
- Fulfill standards of Category A of air quality, based on the ventilation needs.
- Create good acoustic conditions by the choice of materials, and fulfill the Category A standards when considering reverberation time and the impact sound.
- Minimize strong light contrasts, blind and flickering light.
- Natural daylight should furthermore be used to create a daylight factor on min. 2% in the most used rooms.

The energy consumption should maximal end up being 30 kWh/m2/year, which is the aim for Low energy class 2015 [bygningsreglementet, 2010], this should be done by gaining energy through the use of;

- Solar heat gain
- Optimal natural daylight for lighting
- Internal heat gain
- Minimizing the thermal bridges and using enough insulation
- Choosing energy efficient installations
- integrating the possibility for using a hybrid ventilation system

ROOMS	UNITS	AREA	FUNCTIONAL CONNECTION	FUNCTIONAL DOUBLE BOOKING
PRIVATE FACILITIES				
Patient apartment - Living room with integrated celling lift. - Bathroom - Entrance with wardrobe, nursing equipment and a fridge - Terraces	12 units	30-40 m2	Close to the shift room, and the common facilities	No
COMMON FACILITIES				
Reflection room	1 unit	20 m2	Near by the patient apartments	Yes
Kitchenette/common living room	2 units	15-20 m2 pr unit	Close to the patient apartments	No
Common living - contact to kitchen - Dining area - Area with soft furniture's and fireplace	1 unit	40 m2	Close to the patient apartments, the shift room.	No
Entrance area/foyer - Visual view to nature - Reception/welcome area	1 unit	40 m2	the differnt main areas.	No
Guest room	2-4 units	15 m2 pr unit	Near by the patient apartments	Yes
Library	1 units	25 m2 pr unit	Close to the patient apartments	Yes
Dialogue room	1-2 units	10-15 m2 pr unit	Close to the patient apartments	Yes
Wellness	1 unit	20 m2 pr unit	Close to the patient apartments	Yes
Niches	2-4 units	24 m2	Close to the patient apartments	No
Children's room	1 unit	15 m2	Close to the patient apartments	No
Ceremonial exit	1 unit		Close to the patient apartments	No
PRACTICAL FACILITIES				
Hallway			Along the flows	Yes
Sluice room	2 units	10-15 m2 pr unit	Close to the patient apartments	No
Linen room/near storage	2 units	15-20 m2 in all	Close to the patient apartments	No
Medicine room	1 unit	15 m2	Close to the patient apartments	No
Changing room with lockers and showers/toilets				No
- Female	1 unit	30-40 m2	Staff area	
- Male	1 unit	20 m2	Staff area	
Remote storage	1 unit	70 m2		No

AESTHETIC VIEWS	AESTHETIC ATMOSPHERE	LIGHT The light needs will be fulfilled by the use of natural daylight when an N is applied	ACOUSTIC REVERBERATION TIME	 AIRBORNE SOUND INSULATION	OPE. TEMPERATURE Summer	 Winther	 	VENTILATION RATE Based on no smoking, though with available capacity
View towards east + skylight	Homely	500 lux - on tables - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	15 l/s pr unit
View to sky	Spiritual	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	15 l/s 25 l/s pr unit
	Homely	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	250 l/s
	Homely	500 lux - on tables - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	
View to nature	Homely - wellcoming	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	25 l/s
View to nature		200 lux - N	0,6s	Class A	24,5 +/- 1,5	22 +/- 2	Cat. B	15 l/s pr unit
View to nature	Homely - Silence	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	20 l/s
View to nature		200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	30 l/s pr unit
View to sky	calming	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	15 l/s
View to nature	Privacy – Public	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	15 l/s pr unit
View to the patient apartments	Children’s room	200 lux - N	0,6s	Class A	24,5 +/- 1,5	22 +/- 2	Cat. B	15 l/s
View to nature	Ceremonial	200 lux - N	0,9s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	100 l/s
View to nature	Homely	100 lux - N	0,9s	Class A	24,5 +/- 1	23 +/- 1	Cat. A	35 l/s
	Clinical	500 lux - on tables			23,5 +/- 2	20 +/- 2,5	Cat. B	10 l/s pr unit
	Practical	200 lux			23,5 +/- 2	20 +/- 2,5	Cat. B	10 l/s pr unit
	Clinical	500 lux - on tables	0,9s	Class B	23,5 +/- 2	20 +/- 2,5	Cat. B*	15 l/s
	Changing room	200 lux			23,5 +/- 2	20 +/- 2,5	Cat. B	
								60 l/s
								15 l/s
	Practical	100 lux			23,5 +/- 2	20 +/- 2,5	Cat. B	5 l/s

ROOMS	UNITS	AREA	FUNCTIONAL CONNECTION	FUNCTIONAL DOUBLE BOOKING
Workshop	1 unit	15 m2	Porter office	No
Porter office	1 unit	10 m2	Workshop	No
Waste room	1 unit	15 m2	Stock delivery	No
A space for technical facilities as ventilation and servers	1-2 units	10% of the building		No
Industrial kitchen - freezer, fridge, warm/cold kitchen, small office, toilet	1 unit	120 m2	Stock delivery, common roomS	No
Stock delivery in connection to kitchen	1 unit		Stock delivery	No
Laundry room	1 unit	8 m2	Stock delivery	No
STAFF AREA				
Administration with both open and closed offices	1 unit	17 m2	Staff area	No
Hospice manager office	1 unit	10 m2	Staff area visual con. to foyer	No
Doctor office	1 unit	10-15 m2	Staff and patient apartments	No
Volunteer's coordinating area	1 unit	10 m2	Staff area	No
Break room	1 unit	10 m2	Staff area	No
Conference room	1 unit	30 m2	Staff and foyer	Yes
Shift room for nurses	1 unit	20 m2	Patients and medicine room	No
Print/copy room and storage room	1 unit	5 m2	Staff area	No
Toilets for staff	2 units	7 m2	Staff area	No
DAY CARE CENTRE				
Multi room for social interaction, dining, concerts etc.	1 unit - floating space	120 m2	Foyer	Yes
Fitness room	1 unit	25 m2	Multi room	Yes
Examination room	1 unit	15 m2	Multi room	Yes
Therapy room	1 unit	15 m2	Multi room	Yes
Physic therapy	1 unit	15 m2	Multi room	Yes
Nape room	2 units	15-20 units	Multi room	Yes
OUTDOOR AREA				
Outdoor areas which tease the users senses	Different areas		All facilities except for	Yes
Parking spaces			practical facilities	No
- Cars	Drop of area and min. 25-30 spaces		Entrance	
- Bikes				
		Zum apporx 1550 m2		

AESTHETIC VIEWS	AESTHETIC ATMOSPHERE	LIGHT The light needs will be fulfilled by the use of natural daylight when an N is applied	ACOUSTIC REVERBERATION TIME	AIRBORNE SOUND INSULATION	OPE. TEMPERATURE Summer	Winther	VENTILATION RATE Based on no smoking, though with available capacity
	Practical	500 lux - on tables - N	0,6s	Class B	23,5 +/- 2	20 +/- 2,5 Cat. B	20 l/s
View to nature	Practical	500 lux - on tables - N	0,6s	Class B	24,5 +/- 1,5	22 +/- 2 Cat. B	10 l/s
	Practical	100 lux					
	Practical	100 lux				*	5 l/s pr unit
	Practical	500 lux - on tables	0,6s	Class A	23,5 +/- 2	20 +/- 2,5 Cat. B*	20 l/s
View to nature	Practical	200 lux					
	Practical	200 lux			23,5 +/- 2	20 +/- 2,5 Cat. B	5 l/s
	Official	500 lux - on tables - N	0,6s	Class B	24,5 +/- 1,5	22 +/- 2 Cat. B	45 l/s
View to nature	Official	500 lux - on tables - N	0,6s	Class B	24,5 +/- 1,5	22 +/- 2 Cat. B	12 l/s
View to nature	Clinical	500 lux - on tables - N	0,6s	Class A	24,5 +/- 1	23 +/- 1 Cat. A	15 l/s
View to nature	Official	500 lux - on tables - N	0,6s	Class B	24,5 +/- 1,5	22 +/- 2 Cat. B	15 l/s
View to nature	Homely	200 lux - N	0,6s	Class B	24,5 +/- 1,5	22 +/- 2 Cat. B	5 l/s
View to nature	Official	200 lux - N	0,6s	Class B	24,5 +/- 1,5	22 +/- 2 Cat. B	15 l/s
View to nature	Practical	500 lux - on tables - N	0,6s	Class A	24,5 +/- 1,5	22 +/- 2 Cat. B	40 l/s
View to the patients	Clinical	200 lux			24,5 +/- 1,5	22 +/- 2 Cat. B*	5 l/s
	Practical	200 lux			24,5 +/- 1,5	22 +/- 2 Cat. B	15 l/s
View to nature	Homely	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1 Cat. A	25 l/s
View to nature	Fun	200 lux - N	0,6s	Class A	23,5 +/- 1	21 +/- 1 Cat. A	15 l/s
View to nature	Homely	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1 Cat. A	20 l/s
View to nature	Homely	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1 Cat. A	15 l/s
View to nature	Homely	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1 Cat. A	20 l/s
View to nature	Homely	200 lux - N	0,6s	Class A	24,5 +/- 1	23 +/- 1 Cat. A	20 l/s pr unit

Relaxing

Level of the light decided with the knowledge the standards of DS700

Maximal reverberation time should full fill a category A standard and is decided with the knowledge of DS490

The walls facing other functions should fulfill the standards above. The airborne sound insulation will be decided with the knowledge of where the rooms are placed and the standards of DS490

'We will ignore the special conditions in this room.

The room temperature must only exceed these temperatures with 100 h above 26 degrees and 25 h above 27 degree on very hot summer days.

Ventilation rate is based on an estimation of the person load in each room and the standards are created as a category A for buildings without smokers is based on DS1752.

The ventilation rate pr year used in Be10 is

$$\frac{1372\ l/s}{2600m2} = 0{,}52\ l/s\ pr\ m2$$

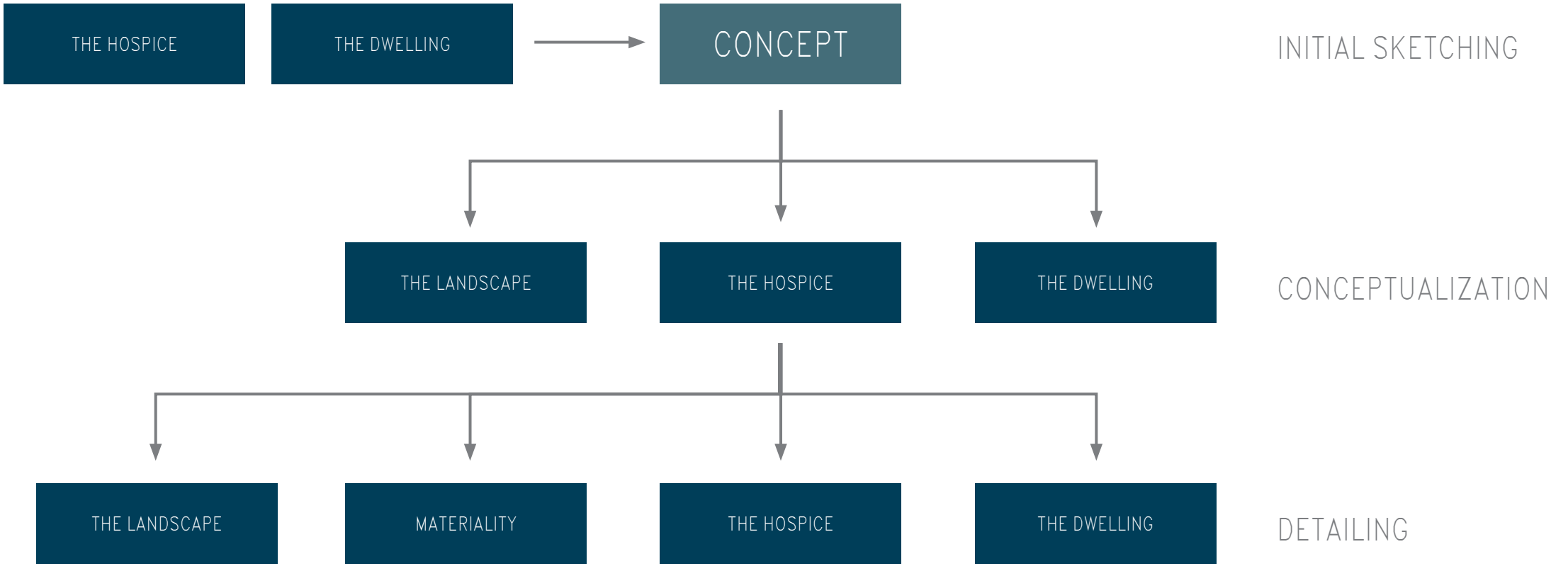
se calculation in appendix 2 on the CD

SKETCHING

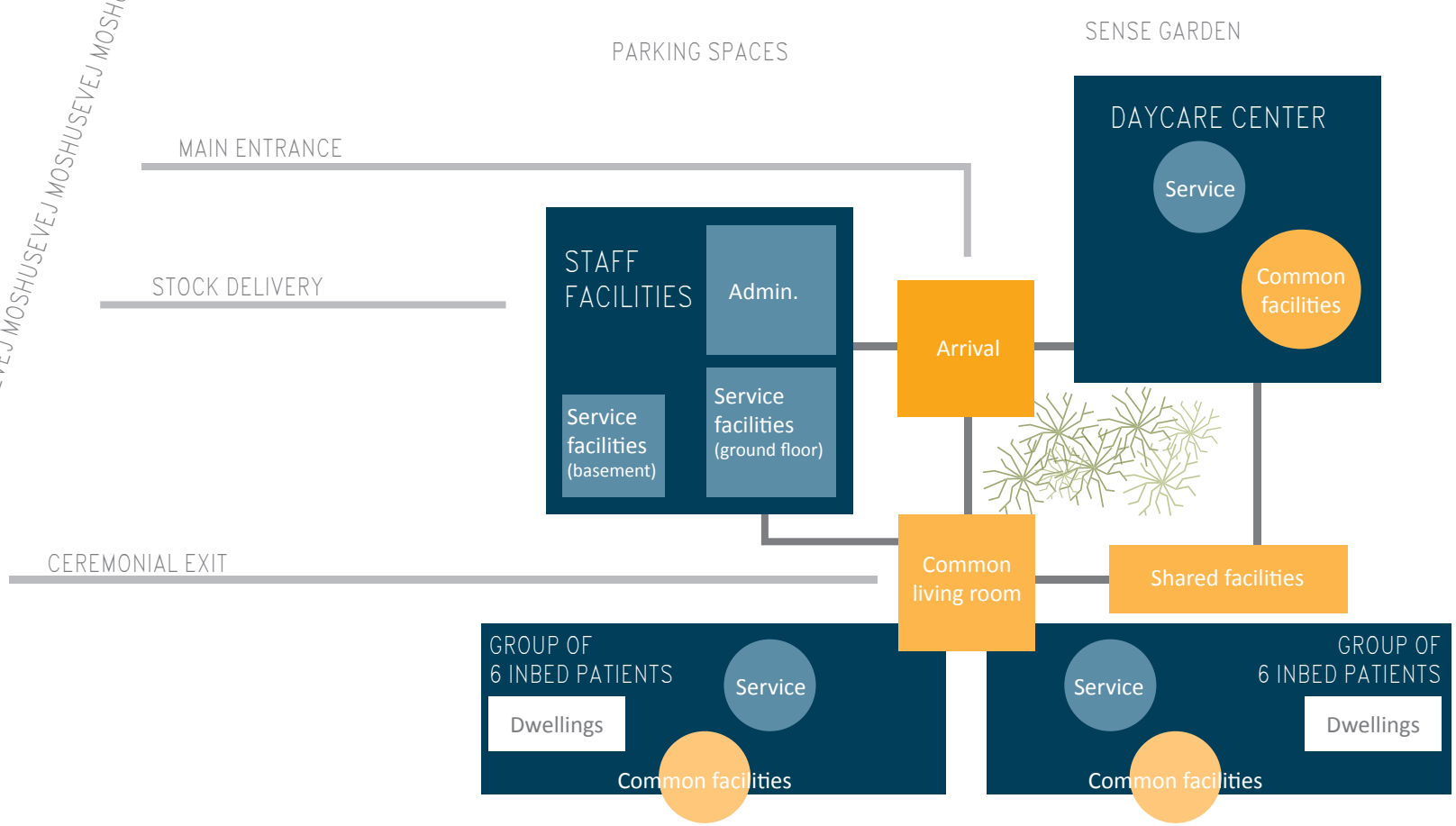
INTRODUCTION

The design process leading to the design of Hospice Kolding will be described in the following chapter. The description is created to show how, designing at different scales and the different design parameters leads to the final building design. The description only includes the part of the process, which has a clear relation to the final design, and only a selection of the sketches and models created in the process are described.

The process is divided in three chapters; the initial sketching, which leads to the creation of the concept, the conceptualization, were the different parts of the design are clarified even more and the detailing, were the specific parts of the design are clarified and the final simulations are verified. The process is described as one continually process to create the best understanding of the different parts of the process. The chronology does however not reflect the actual design process directly, as this has been divided into many iterations, were decisions made concerning the composition have affected the design of the dwellings and the other way around.



Ill. 113 Design process



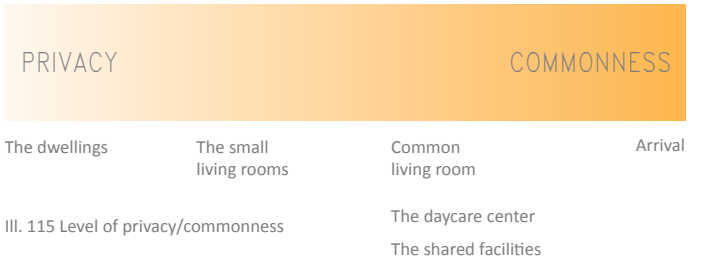
Ill. 114 Function diagram at the site

INITIAL SKETCHING

FUNCTIONS AND CONNECTIONS

In the room program, described in the design template, the different categories of rooms were divided into groups. The different groups of functions are organized in a function diagram (see ill. 114). This is done to create an overview and to understand how the functions should be placed, in order to secure different levels of privacy and community and to create optimal flow for the users between the different elements both inside and outside the building. The organization is as well done with the qualities of the site in mind.

The dwellings, with the in-bed patients, are situated orientated towards south-east with a view to the preserved meadow area and hidden away from the road. The daycare center is placed close to the entrance towards east facing the small stream running near the building. The main part of the staff facilities are placed towards the road close to the main entrance and with the possibility of creating a separate stock delivery. Smaller units of service facilities are placed in the dwelling clusters and in the daycare center to create the optimal workflows for the staff. The common facilities are evenly distributed throughout the whole building. The colors reflect the different degrees of privacy, were the white are the most private and the yellow are the most common facilities. The in-bed patient's dwellings are of course the most private part of the hospice (see ill. 115).



Ill. 115 Level of privacy/commonness

EAM STREAM STREAM STREAM

THE BUILDING IN THE LANDSCAPE

Based on the potentials on the site the position of the building is decided. The building is placed in the lower part of the site, were the dwellings can achieve the best view towards “Solkær Enge”. This position, near the stream, makes an integration of the stream in the near surrounding of the building possible, both by the daycare center and in front of the dwellings.

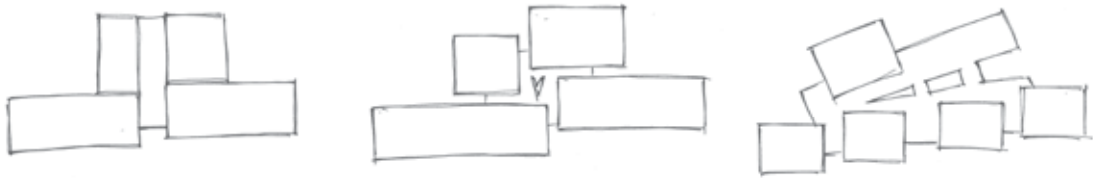
This position on the lower part of the site protects the building from the road, and placing the parking area in-between the road and the building seems natural, with this position of the building. By planting trees around the parking area is a transition from the road and to tne building created. Upon arrival to Hospice Kolding is a transition form the village, with its small houses surrounded by gardens, to the building created by use trees planted around the parking areas. When approaching the building firmly grounded in the landscape, it will appear between the trees, which creates a human arrival were the visitors are lead to the building.

On the north-west side of the building close to the daycare center, the sense garden and the playground is placed, with the intention of creating a relation between the facilities in the daycare center and the garden.

In relation to the functional requests the main road leads directly to the main entrance. The position of the administration and the staff facilities makes it easy to place the stock delivery as far from the entrance and the main arrival road. The road leading from the ceremonial exit is placed on the same site designed as a one-way road, were only the hearse is allowed. When the hearse arrives it will enter through the road leading to the stock delivery and leave through the road from the ceremonial exit, to make the flow as fluent as possible.

Ill. 116 The building in the landscape


Stock delivery
Main entrance
Ceremonial exit
Parking area
Staff facilities
Dwellings
Terrace
Daycare center
Dwellings
Terrace
Sense garden
Terrace
North



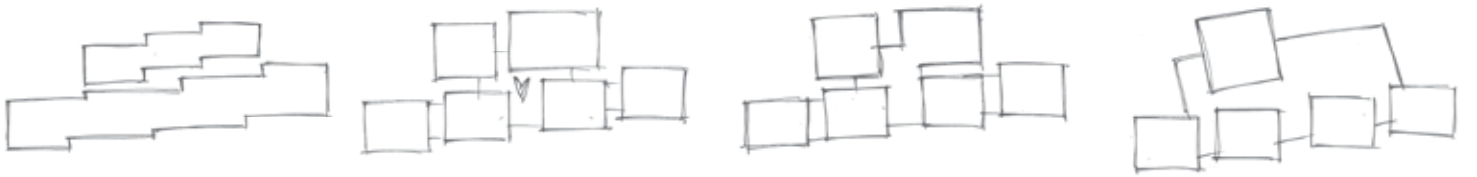
THE HOSPICE

The many different users of the hospice and the large focus on the patient's wellbeing caused a natural approach, were the building design was created from the inside and out. The relation between the different facilities, the different degree of privacy in the common facilities and floating zones between the rooms has been essential in all of the suggestions. The different suggestions represent different degrees of variation between the common facilities. Additionally to plan sketching a lot of models have been made both 3D models and physical models and many different suggestions have been created, before one was chosen. A number of them are seen in illustration 117.

The hospice was initially divided into very specific parts containing the staff facilities, the daycare center and the dwellings, to create a direct relationship between the functions and the expression, which is seen in the early sketches. But by dividing the functions into defined elements the natural flow between the common rooms did not seem as obvious as wanted. In all the sketches, the dwellings has been emphasized to create a focus as being an important part of the building. In the early suggestions many of the other function were standing out, which seemed a bit overwhelming and the dwellings seemed to disappear between the many elements.

In many of the concepts the dwellings are divided in groups, creating an division around the living rooms. "Program for Det Gode Hospice i Danmark" recommend groups of 6 dwellings sharing a smaller living room, further divided into groups of three, which is also the case in the chosen concept (see ill. 118).

In the chosen concept the dwellings are emphasized as the element standing out. To create an understanding of the other facilities as being more or less equal they are organized underneath one roof typology. To mark the different zones, the roof is however divided into three elements marking the staff facilities, the entrance area and the daycare center. The roof above the entrance is raised above the others to mark the entrance.



Ill. 117 Plan concepts

The service facilities are designed as defined elements standing out in the more floating spaces, which were the idea in some of the other sketches. These facilities are placed all over the hospice in the area covered by the plane roof, but with a clear relation to where they are needed. Their position creates the division between the different common facilities in the hospice. This is done to create a floating transition between the different common rooms, with many different spaces where the users have many opportunities to meet each other and interact on different levels. This plan solution with the floating spaces is inspired by the solution in Century Museum of Contemporary Art in Kanazawa in Japan, were the boxes create floating spaces in between them (see ill. 119).

In all the suggestions the service facilities are placed so they create a boundary between the common facilities and the dwellings. Like the service facilities the dwellings creates a boundary towards the common rooms especially the smaller living rooms, especially seen in the last suggestions. In the

Ill. 118 Architectural main idea

Ill. 119 Century Museum of Contemporary Art, Kanazawa

Ill. 120 Atrium - Century Museum of Contemporary Art, Kanazawa

chosen design the zones by the entrance of the dwellings are designed to be a zone were you never walk through, without having a purpose to visit one of the three apartments, to ensure that this part of the hospice can be as private as possible, creating a large degree of privacy, than in the earlier suggestions.

Many other design parameters have however affected the design in larger or smaller scale throughout the process. One of the more important parameters has been to create at relation to the surrounding landscape and integrate elements of it in the building. In the chosen solution the plane roof elements refer to the elongated movements of the landscape as well as the rhythmic expression of the dwellings created in relation to the levels of the ground on the actual site (See ill. 118).

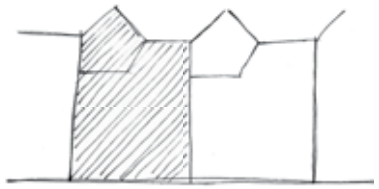
Specific elements of the nature are integrated in the building in all the suggestions. In the chosen solution, this is done by creating an outdoor atrium of pure nature in the middle of the hospice to mark the heart of the building. This is inspired by the atriums in Mortens Rud Church in Norway, were you meet an outdoor atrium just after entering the church (see ill. 121). Additionally a slip of the landscape is dragged into the center of the building towards north-east, in terms of creating a close connection to the landscape as well as letting in a great amount of natural light, to minimize the need of artificial light during daytime (see ill. 120). The many windows in the inner part of the building ensures, that the ventilation can work as a natural ventilation system, all over the hospice in summer time. These two parameters reflect two of the most important factors concerning the indoor climate.

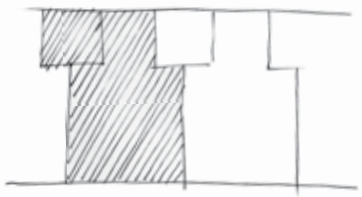
Creating a dense building where the different zones are placed in close connection to each other has been important as well, in order to create the possibility to drift between the different common rooms and to ensure a close contact between the staff and the patients. The dense building design is also a step in the right direction of creating a building design with a low energy demand for heating. The large atrium does however not

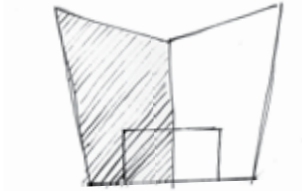
Ill. 121 Atrium - Mortens Rud Church

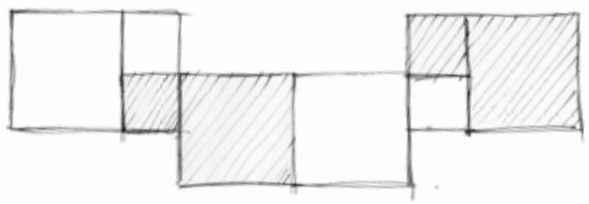
match the idea of a compact building, but they are considered to be very important in terms of the architectonic quality of the building.

The dwellings are as mentioned seen as the most important part of the hospice and the design process and the design is therefore taken to an extra level, and the description of the early design behind the dwellings are described in the following chapter.









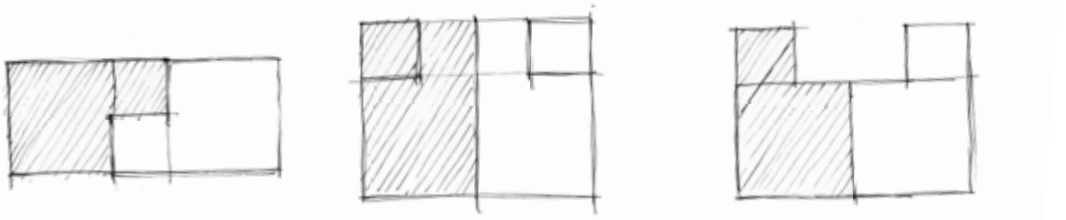
THE DWELLING

The design of the dwellings has from the beginning focused on creating a homely atmosphere in order to secure the wellbeing of the patients. This is done by creating views to the nature and the sky, with windows optimal for using natural daylight to lighten up the rooms. The windows have from the beginning been created in different directions to create the most optimal indoor climate. Because of the patient's physical condition the dwellings are created with the working flows of the staff in mind as well. As described earlier the dwellings are placed in groups, mean that it, through the design has been considered, how the dwellings are assembled (see ill. 122).

The size of the rooms are in all the suggestions much bigger than dwellings in regular nursing homes. This is caused by the fact that patients at hospices are much weaker than usual and demands more help from the staff, but also because the dwellings are made to improve the living of the relatives in the dwelling. The size of the living room does however also reflect the many possible positions of the bed. The bathroom is created in a large scale as well, making it possible for the patients to be bathed in their beds.

The section is done contrary to newly built hospices, where the dwellings often are designed with huge glass facades opening up the rooms, which causes that the patients often are blinded by the light and are very exposed to the surroundings. In cases where the windows faces south the dwellings suffer from overheating issues.

Instead the section of the dwelling is designed to create a sheltered space, which furthermore relates to the sections of many Danish dwellings and is therefore a way to bring a homely atmosphere into the dwelling (see ill. 123). The windows in the roof and the window in the façade allow the patients to follow the changes in the landscape and the sky (see ill. 124). The position of the windows does however also create very good light conditions, because the contrast from looking towards the windows in the facade is toned down by the light coming from the window in the ceiling. If the direct sunlight is too much for the patient, only one of the windows will need to be shaded



Ill. 122 Dwelling plan concepts

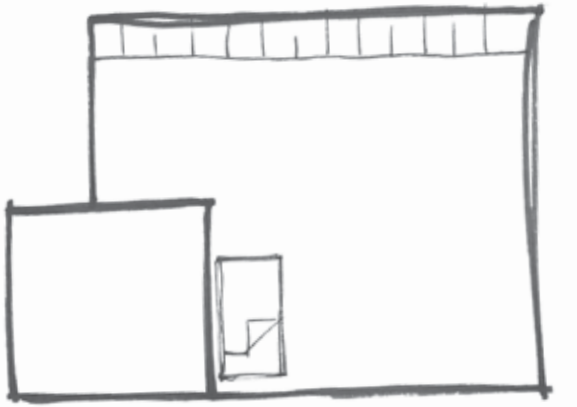
Ill. 123 Dwelling section concepts

because they are facing different directions. In summer when the windows need to be shaded, in order to minimize the risk of overheating, the fact that, the windows are placed towards different directions means that all of the windows do not need to be shaded at the same time. When ventilating the room by using natural ventilation two windows in different direction also helps creating a much better flow in the air. The windows do not cover the entire façade, so the patient is not exposed through the windows.

To amplify the homely atmosphere a shelf system is created as multifunctional furniture, integrating both the technical installations and specific furniture.

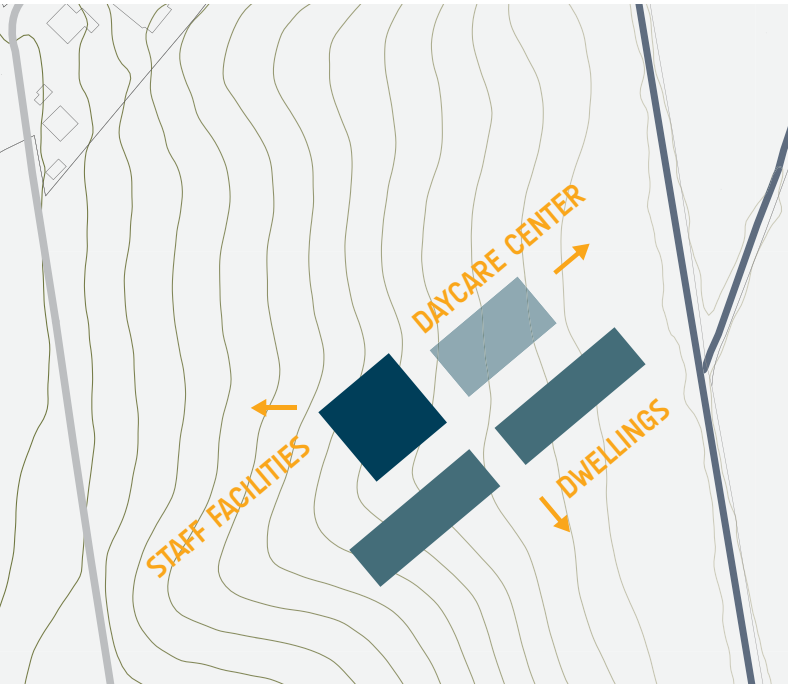
THERMAL INDOOR CLIMATE

During the development of the dwellings early calculations of the temperature variations in summertime has been investigated by using the spreadsheet “Daily average”, and the good intensions of making a dwelling without the risk of problematic overheating has been confirmed already in the initial part of the sketching. The calculations only show a average temperature of 24.4 degrees and a small variation in the temperatures of 2.8 degrees in July, which is the warmest month. The calculations are based on an air change rate of 2 h^{-1}. It is important, that the air change does not rise above 5 h^{-1} to avoid draught. To avoid a very high air change it is however clear, that shading elements need to be incorporated in some of the windows. (The calculation is seen in appendix 1 on the CD).



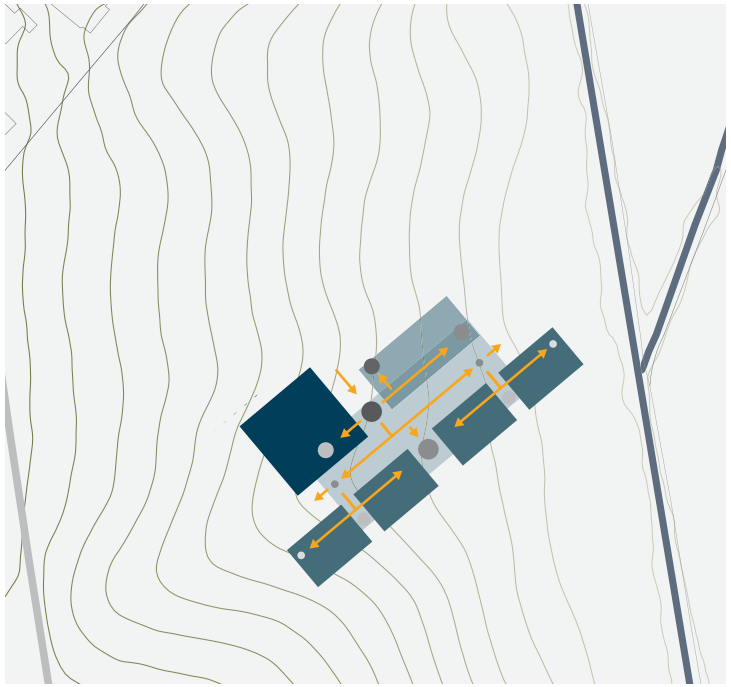
Ill. 124 Dwelling plan/section

THE CONCEPT



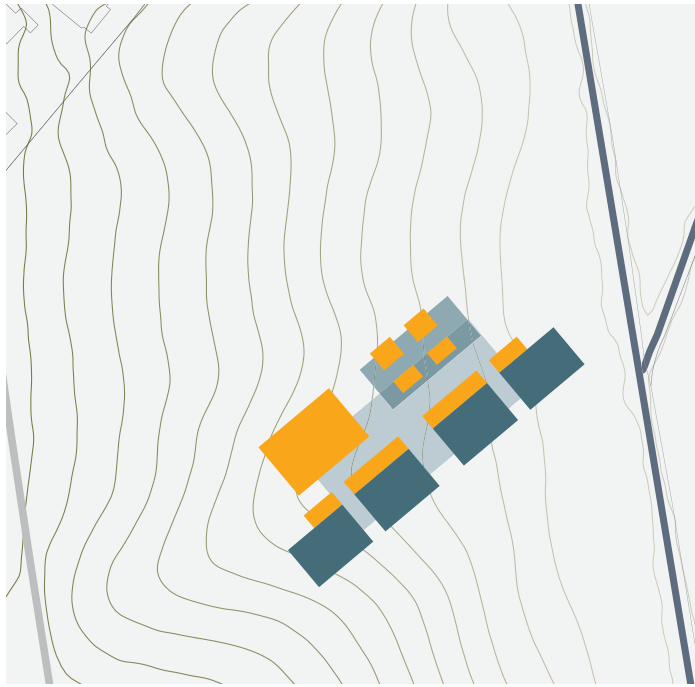
PLACING THE FUNCTIONS ON THE SITE

The facilities are placed on the ground, depending on which potentials of the site are of important value in the different elements.



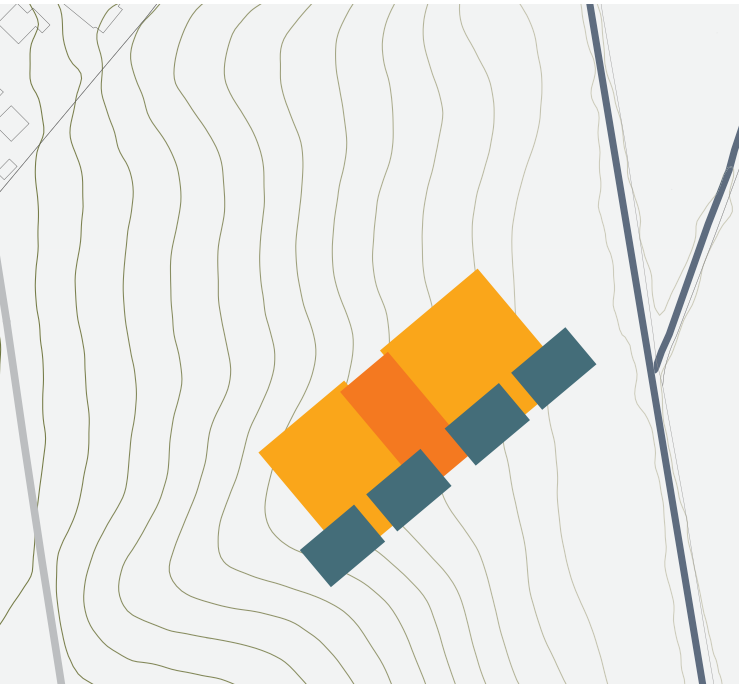
FLOW – PRIVACY AND COMMON ROOMS

The flow is controlled in order to create the wanted degree of privacy and commonness within the dwellings and in the common rooms.



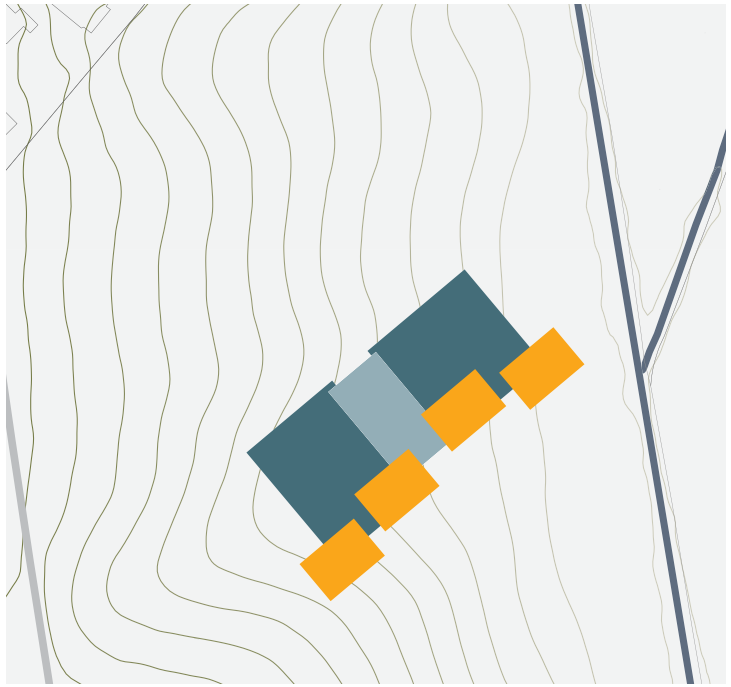
SERVICE FACILITIES

To ensure optimal flows for the staff the service facilities are distributed all over the hospice in relation to where they are needed.



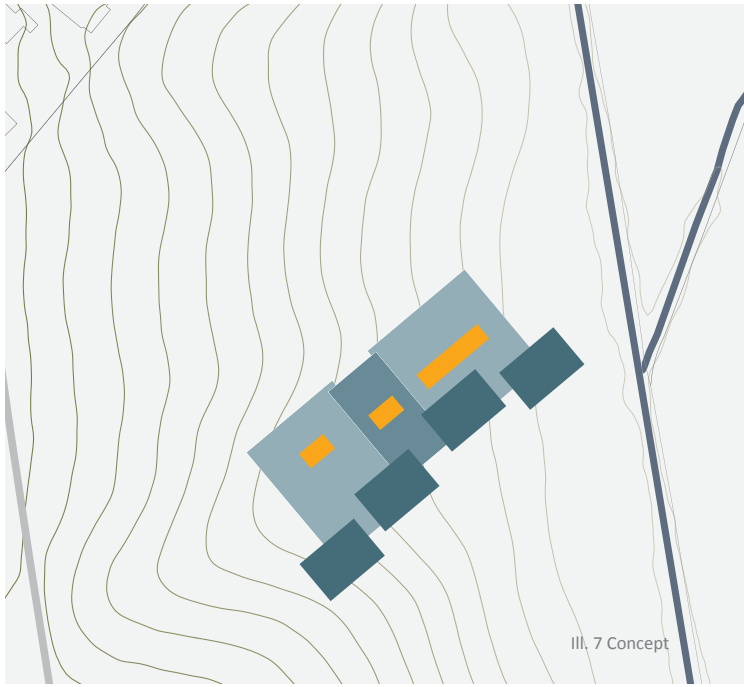
PLANE ROOFS

To create a focus on the dwellings the elements containing the dwellings are emphasized by covering the remaining facilities by the plan roofs. The plane roof is seperated in three elements to make them relate to the containing functions. The roof above the entrance area is lifted up to mark the entrance.



ADJUSTMENT TO THE LANDSCAPE

The elements containing the dwellings are adjusted to the levels of the landscape, to create the wanted composition and to make the building relate to the landscape.



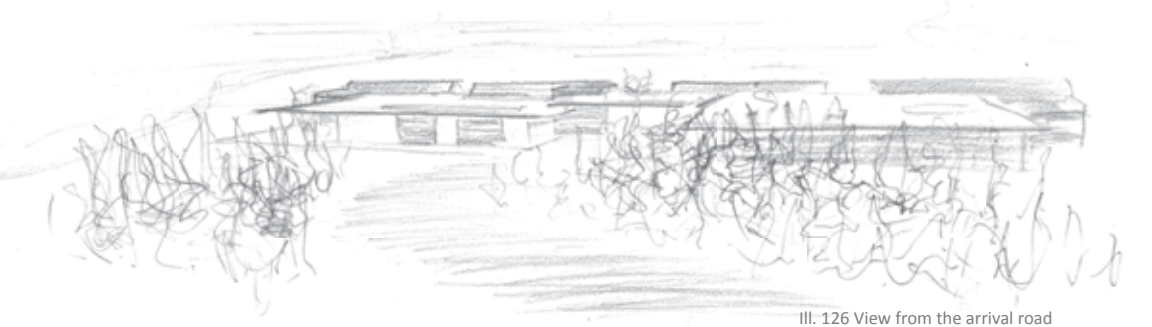
Ill. 7 Concept

INCORPORATING NATURE AND LIGHT

Atriums and light inlets are incorporated in the plane roof to bring nature in to the inner part of the building and to create the most optimal indoor climate.

CONCEPTUALIZATION

THE LANDSCAPE



Ill. 126 View from the arrival road

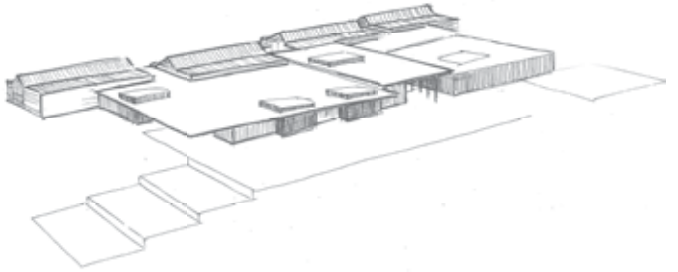
The design of the landscape focus on creating a translation from the village to the nature of “Solkær Enge” with the intension of let the users experience the diversity in the terrain.

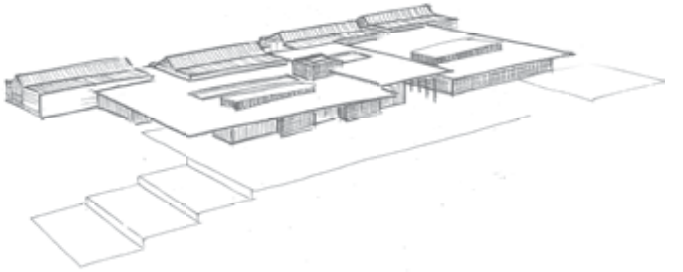
From Moshusevej a great view overlooking “Solkær Enge” will be present. When following the arrival road towards the entrance, the view to the horizon will disappear, but appear again, when the users reaches the dwellings and the common facilities. This development in the view is possible, because the building is incorporated into the landscape and does not rise above one floor (see ill. 126).

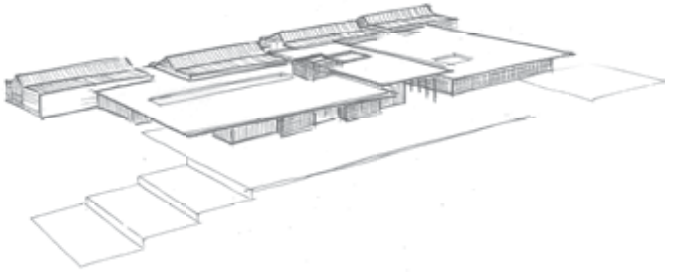
The arrival road leads directly to a plaza by the entrance were busses or ambulance can drop of the patients. The users capable of driving them self, can park their car in the parking lot on the northern side of the arrival road, were as the staff have their own parking lot on the right hand side in relation to the staff facilities.

Terraces in connection to the daycare center are created as plateaus following the natural decreasing landscape leading towards the stream and the meadow area. The different levels of the terrace create spaces in the otherwise open landscape. In the upper areas of the terrace a sense garden is integrated in the terrace, closely related to the daycare center, and with possible access for in-bed patients in both wheelchair and bed (see ill. 127).

Ill. 127 Site sketch







THE HOSPICE

The hospice is further developed as well. The exact plan of the common areas, service facilities and daycare center is developed, and the expression of the plane faces is investigated.

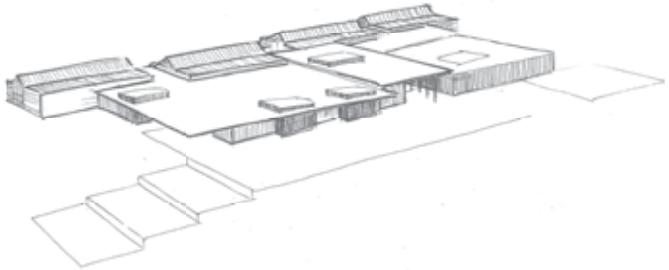
The plan of especially the entrance area and the daycare center has been through large development in the conceptualization phase.

From containing many different elements the entrance area in the final plan only contains the atrium and the reflection room. The entrance zone floats into parts of the different facilities, such as the administration, the daycare center and the common living room. In the final plan the atrium is not only placed in the center of the hospice, but the flow also appears all around it and connects the facilities surrounding.

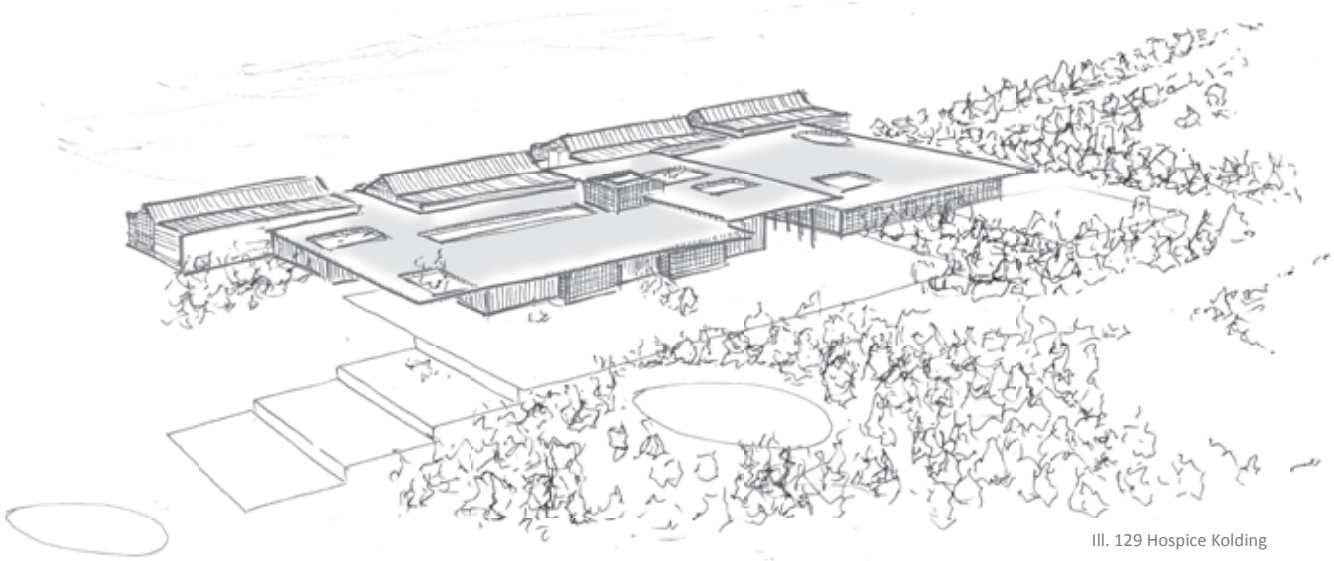
In the daycare center a lager variation is created in the common areas by the variation depths of the facade and the different mix of service facilities made as closed cores and the open spaces.

The staff facilities are in the final design visualized as a defined, closed box. Inside the building the staff facilities is however broken up as being more open. The plan of the administration is tightened up, to create very functional flow. The administrative functions are placed in the north-western part around the atrium with a close contact to the common living room, the entrance and the nursing shift room. The south-western part of the staff facilities includes the more introvert facilities such as the kitchen and storages in close connection to the stock delivery and with easy access to the basement.

The expression of the plane faces is investigated in models. Different ways of braking up the faces are tested, as seen in illustration 128. In the chosen design only holes letting light into the outdoor nature spaces and the reflection room breaks through the roofs to mark their importance of the hospice (see ill. 129). In general the holes in the roofs are rectangular, but in the ceremonial exit the hole is circular inspired from the space in the Naoshima Hotel by Tadao Ando (see ill. 132).



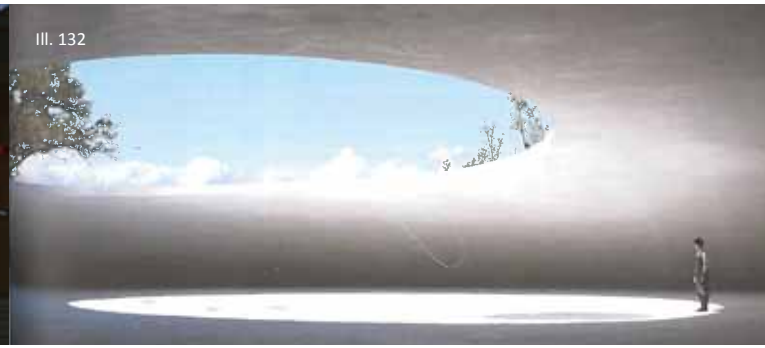
Ill. 128 Composition concept



Ill. 129 Hospice Kolding

Ill. 130

Ill. 131



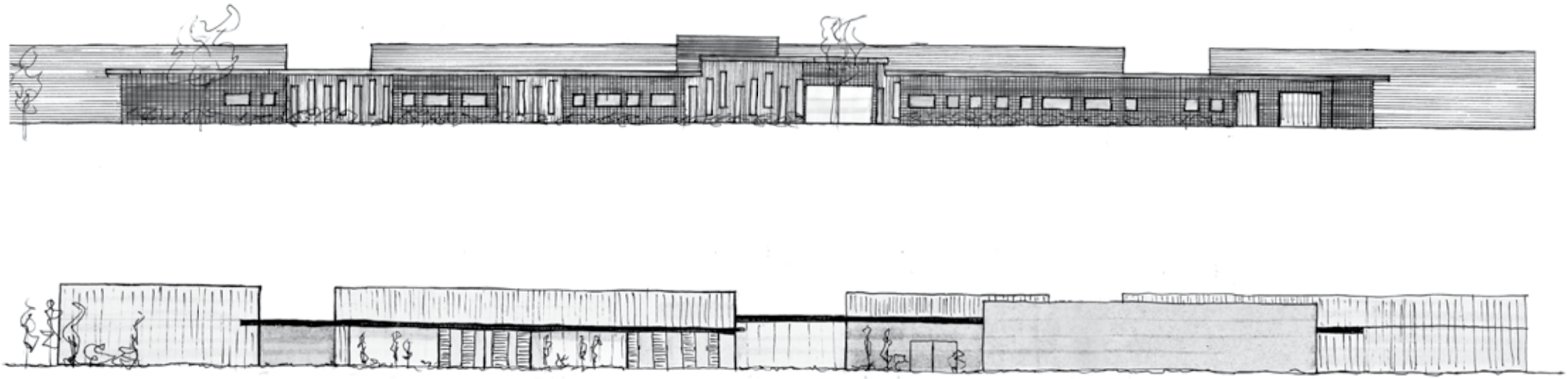
Ill. 132

The room height in the common areas is kept at 2.5m, to create a building in a human scale, relating to a homely atmosphere. This choice also helps lowering the energy consumption caused by an increades room volume.

The facades are detailed as well in this phase. The expression of the common areas is described in the concept as being semi transparent and consisting of different levels, whereas the staff and the service facilities are described as closed defined boxes. This leads to a facade design were the common areas is created in wood with a large variation in the window openings reaching from ground to the roof. The earlier suggestions expressed a much larger variation whereas the final suggestion is chosen, because it emphasizes the expression of the plain roofs floating over the spaces (see ill. 133). The service facilities are created with the opposite expression as defined rectangular boxes in bricks, with windows in the same size and level.

The meet between the dwellings and the plane faces is emphasized by a stripe of windows on the north-western part of the dwellings in the roof. Concerning the aims of the indoor climate, these windows makes it possible to light up the service facilities in the inner part of the building by using natural light during day time. The natural ventilation is also made possible with these windows.

To reach the goal of using natural light to lighten up every room in the hospice, made it relevant to use light from connecting rooms in some of the service facilities in the daycare center, were translucent windows are placed beside the doors.



Ill. 133 Facade investigations

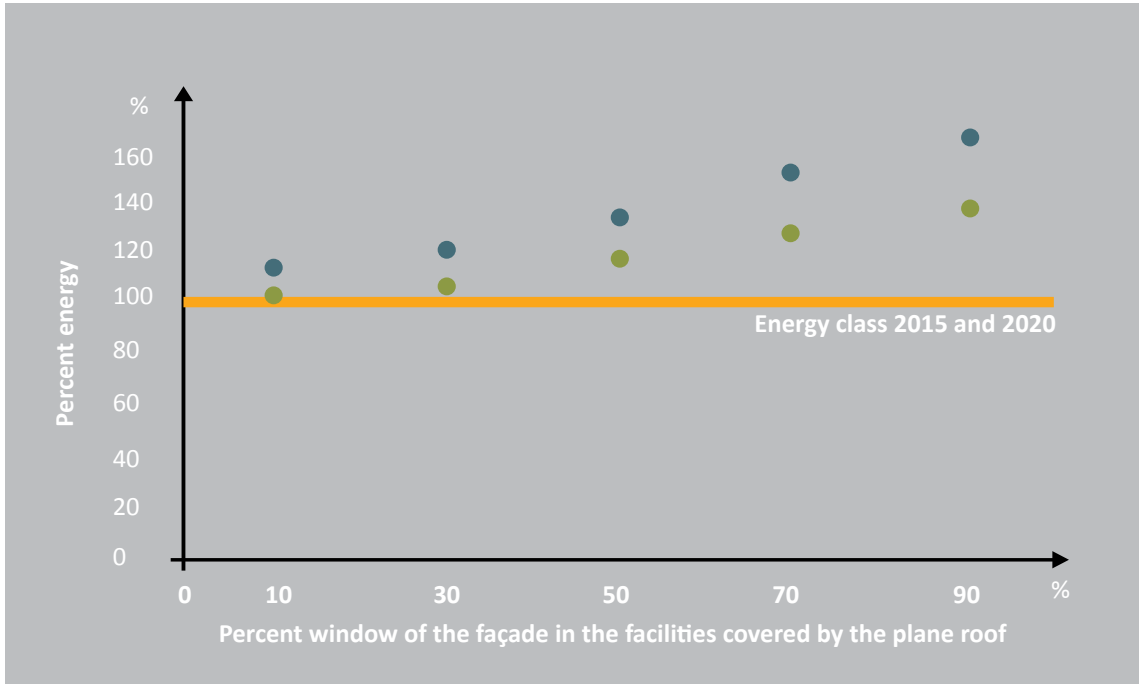
ENERGY CONSUMPTION

To fulfill the goal of reaching the low energy frame of 2015, especially the design principles of minimizing the energy loss by using enough insulation, keeping the internal volume rather small in relation to the floor area, and to optimize the heat gaining especially the solar heat gaining have been considered through the process. Using the natural daylight to lighten up the rooms have also been important in the initial phase, which will affect the energy consumption, but energy used for lighting is not a part of the calculations in Be10, why it is not taken into account in the energy frame.

In this phase the estimated energy demand of the building is calculated, to understand how different factors affect the energy demand the most.

To do the initial calculations some of the values has been estimated. Example of the most efficient installation were not chosen in the beginning and the estimated values were used instead. This causes initial calculations showing a much higher energy consumption than the final results.

When having the main design of the hospice, an initial calculation was made, the energy consumption, where the energy consumption were quite high, but the calculation showed that the building nearly only used energy for heating up the building and not for cooling. To optimize the energy consumption initial studies were made in Be10. From the analysis it is known that the heat loss through windows have a large influence on the energy consumption. This causes that, when having the initial investigations, the calculations were made to investigate, how different amounts of windows on the facades covered by the flat roof (except for the windows towards the atriums in the higher part and the staff area) affected the energy consumption (see ill. 134). In these calculations the other parameters were kept constant. (Initial calculation files are found in the appendix 2 on the CD) These specific windows were investigated because the windows in the dwellings already were optimized in terms of creating the best possible indoor climate within the dwellings.



Ill. 134 Window investigations

In the diagram different percentages of the window area in the facades covered by the flat roofs is seen on the x-axis and on the y-axis the percentage of energy used in the building in relation to the energy frame (100% = the maximal energy consumption for low energy class 2015 and 2020). The diagram shows that the less windows area placed on the façade the lower the energy consumption becomes, this is because most of the windows is shaded a lot and does not receive that much direct light. From this calculation it was decided that the window area should be around 30%. When looking at the results from the calculations it is seen that the differences in percentage from the calculated consumptions to the low energy class is different from 2015 and 2020. This is because the energy factors concerning both the electricity and the district heating used in the calculation of the consumption in Be10 is different from the energy frame of 2015 to the one in 2020. [Bygningsreglementet,2012]

In the final solution a large amount of bends are created, though this is not optimal in terms of energy consumption. This

Ill. 135 Seating window

is done to create the best architectural expression, and because the energy loss is optimized in the connections the u-value does not rise above 0,13 W/mK in the façade.

The walls are designed rather, thick with a u-value of 0,08 W/mK for the brick walls and 0,08 W/mK for the wooden walls. The detail drawings that are to be found in appendix 3, shows the construction. Instead of seeing the thick walls as a problem, the windows are created in a level and a size were many of them can be used for seating (see ill. 135).

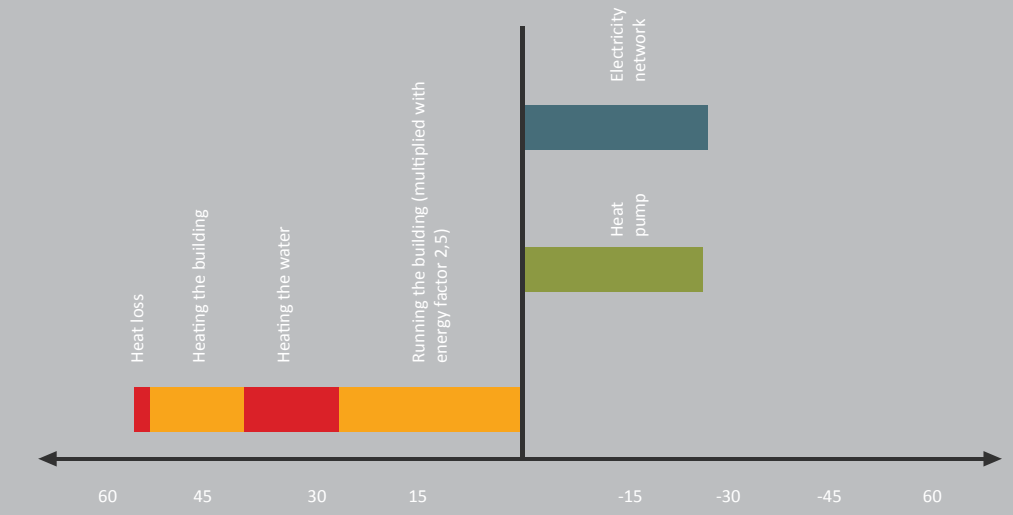
Throughout the process there have been uncertainties regarding the heating supply. It was initially understood, that the site received districted heating, which concerning the energy consumption would be an advantage, and the early investigations are therefore based on district heating, which is reflected in the early calculations.

The district heating system is however not connected to the city and the houses are heated by gas. This is however not seen as a very sustainable solution and instead of gas a heat pump is connected to a geothermal system incorporated on the site.

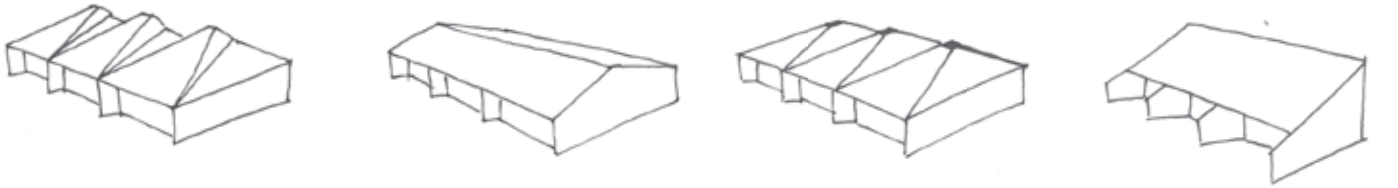
The choice of installations and the awareness of not using the mechanical ventilation all year have been important as well. The choice of installation is done by investigating, which installation fits the needs of the building and have low energy consumption. This has especially been important regarding the heat pump and the ventilation aggregate, because a large part of the entire consumption is used in these elements. In the calculation two pumps of Queen VV25 is used in the final calculations.

The energy consumption is calculated to be 30,2 kWh/m² pr year, for the low energy class of 2015, which is just above the border on 30 kWh/m² pr year for the low energy class 2015, which was the goal to reach. Ill. 136 Shows the factors affecting the consumption. In the detailing energy consumption is further investigated. The calculation is seen in appendix 2 on the CD.

PRIMARY ENERGY CONSUMPTION



Ill. 136 Primary energy comsumption

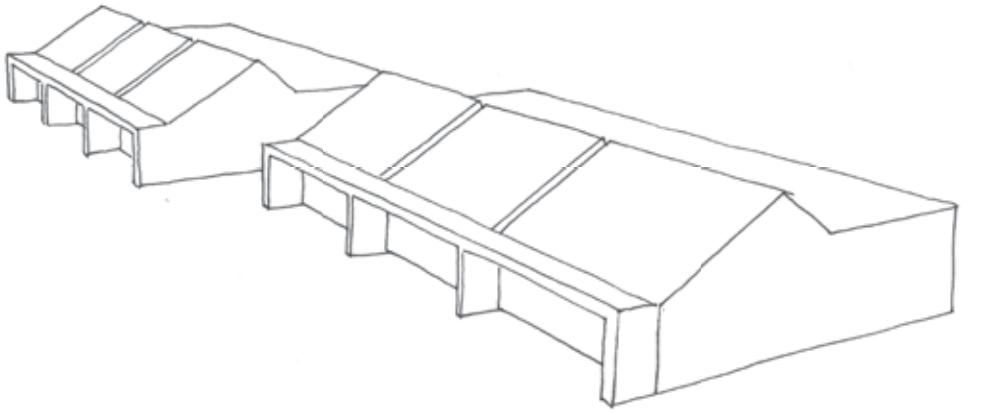


THE DWELLING

The design of the dwellings is further evolved in the conceptualization. The sketching especially revolves around the roof design. Through the process the goal has been to integrate a roof window or windows facing north-west, because of the many qualities related to it as described in the initial sketching phase.

The process has evolved around, how the three dwellings are visualized as single objects were the specific dwellings are realized and about how the expression stand out from the plane faces but still relates to the expression in the part of the building lying under one roof. A selection of the many suggestions is shown in illustration 137.

In the final expression the space encircling the living room is formed with a sloping roof, leading the light from a window above the bed beside the shelf system out into the space (see ill. 138). The walkway, the bathroom and the entrance area are formed as a squared element rising above the plain roof.



Ill. 138 Final dwelling concept

Ill. 137 3D dwelling concept

Ill. 139 Solar shading

The exterior forms are underlined by a change in the choice of materials. The single dwellings are marked by lowering a small part of the roof between the dwellings.

In the façade facing south-east the windows are placed so the users can enjoy views both while lying in the bed and standing in the room.

THERMAL INDOOR CLIMATE

While the expressions have been detailed according to the architectural expression the temperature variations in summer have been investigated again by using the spreadsheet “Daily average” to make sure, that the different designs does not have large temperature variation. Because of the condition of the patients it is decided, that the temperature should be around 24 degrees, and according to DS 474 not rise above 26 degrees in more than 100 hours a year and above 27 degrees in more than 25 hours per year. The exact number of hours is not calculated in the spreadsheet, but the calculation shows, that the average temperature is 23,7 and it does not vary more than 1,5 degree in July, in the final design, when shadings systems are integrated in the windows. Through the process a number of calculations have been made to ensure the temperature level in the dwellings. The calculations made through the process are seen in appendix 4.

In connection to the living room each patient has their own terrace, which can be accessed in their beds. The terrace is made with an overhang protecting the users from the weather, and create a more private outdoor space were the patients can enjoy nature. The overhang also minimizes the need of shading for the windows in order to avoid overheating.

DETAILING

THE LANDSCAPE

The area around the terrace and the sense garden are further detailed in the design of the landscape (see ill. 141).

The sense garden is not only placed in the upper part of the terrace, but in different levels including beds in different levels with a variety of plants with smells and strong colors. In the lower part is an outdoor fire place integrated, visible from the hospice and the village. A garden of fruit trees is further more placed on the southern side of the terraces, with a close relation to the greenhouse. In relation to the terrace a playground is created, which also makes the children visiting the hospice able to take a break from the sometimes sad atmosphere.

A path is created with its starting point in the sense garden, leading the user through the garden, the terraces, by the stream, towards a plateau were the view towards the meadow can be enjoyed, and ends by the old railway bridge were a final view towards the meadow can be made. The many experiences are created to make the weaker patients able to enjoy the nature even though they do not have the strength to walk through the entire area.

The path is further more connected to a path leading from the village to the hospice, which will attract the residents of the village to the path, creating life and a connection to the life outside the hospice. This path leads the user through the dense border of low trees between the hospice and the village.

The trees are chosen to relate as much as possible to the low dense trees in the meadow area to make the landscape around the hospice feel like a continuation of the meadow, but also to make the visitors able to enjoy the view when approaching the hospice. Along the ceremonial exit road a row of cherry trees creates a border between the parking area of the staff and the open landscape, which in spring time will show itself as a white row of threes.

Ill. 140

Ill. 141 Siteplan segment - 1:2000

MATERIALITY

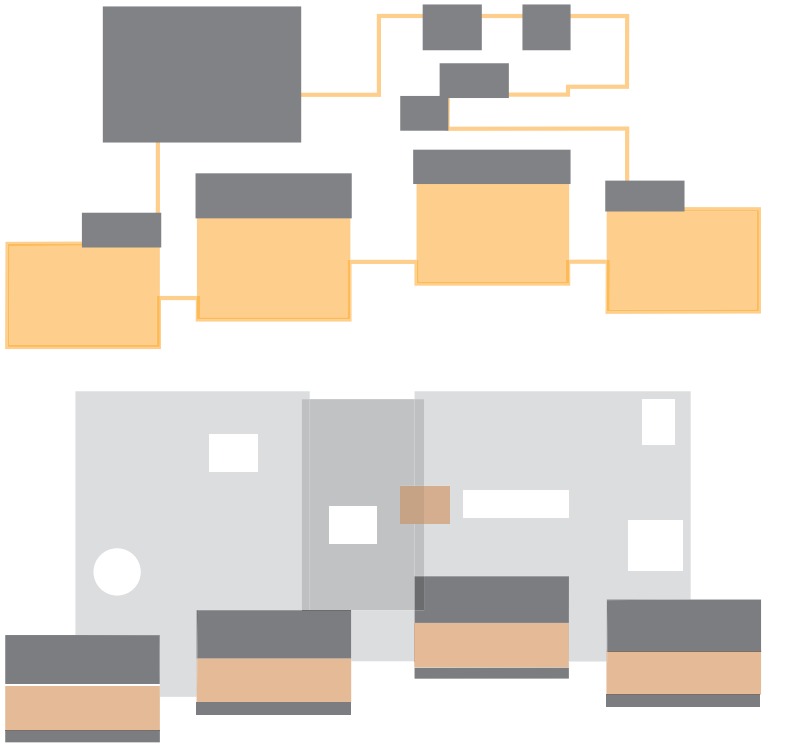
Materiality can, as mention in the analysis, by familiarity and tactility help to create a homely atmosphere, which is important for the patients in terms of feeling at home and of minimizing an impression of an institution and thereby influence the reviling process of the patients.

"I believe that they (the materials) can assume a poetic quality in this context of an architectural object, although only if the architect is able to generate a meaningful situation for them, since materials in themselves are not poetic." [Zumthor, 2010, p10].

This argumentation presented by Peter Zumthor has been a focus when choosing materials to the various parts of the building. It has been important to use materials having its own inherent sensuous qualities in terms of infusing a level of poetry within the materials. Another focus has been on the way the materials are generally used in terms of what to contain and to create a composition of materials contrasting each other, with the aim to create tension. The materials have been chosen in order to substantiate the building concept, the thoughts on Nordic Architecture, a homely atmosphere and sustainability of architecture.

EXTERIOR GROUND MATERIALS

The access road to the main entrance and the stock delivery of the hospice are made of asphalt. The parking areas are made of stamped sand, which also is applied to the pathway, the playground and the fire place. The sense garden and the terrace



Ill. 142 Materiality

Ill. 144 Grey concrete surface

Ill. 145 Grey concrete floor

Ill. 143 Plaza tiles

Ill. 146 K48

in connection with the daycare center are made of Plaza 40 x 40 tiles (se ill. 143).

THE ROOF OF THE STAFF AREA, SERVICE FACILITIES AND DAYCARE CENTER

The staff area, the entrance hall, the services cores, the daycare center and the common facilities are covered by one roof construction, separated in three parts; the staff area, the entrance hall and the daycare center. This roof consists of a flat light grey concrete surface, which, with its light expression, emphasizes the horizontal orientation of the building lying firmly in the landscape (se ill. 144).

ADMINISTRATION AND ADDITIONAL SERVICE FACILITIES

The staff area and the service facilities are built up as cores made of bricks; Kolumba48 from Petersen Tegl (see ill. 146), - both the courtyards facing outdoor as well as the cores facing indoor (see ill. 142). Kolumba bricks are handcrafted, horizontal building ceramics. The reason for using bricks is that it is a familiar material, which, as written in the chapter “Homely” will cause a feeling of a homely atmosphere for the users. The specific color 48 is a brown/violet brick with a yellow touch, which is chosen, because of its relatively dark but still warm color with a high level of depth. This will create a harmonious contrast to the light sheathing on the daycare center and the dwelling clusters. A strong feeling of human effort is inherent in the tactile handmade brick, which creates and intense textural expression.

The brick will, as mentioned, be visual in the interior, where the cores are open rooms, within the cores and in closed rooms the bricks will be plastered. The floor in the service facilities are made of a light grey concrete, with the aim to create light spaces and relate to the roof material (see ill. 145).

Ill. 147 European larch - oil treated

Ill. 148 European larch - untreated

Ill. 149 Mosaic wooden floor

Ill. 150 Shingles

DAYCARE CENTER

The daycare center consists, additionally to the service courtyards, of secluded facades covered with oiled European larch orientated vertically to relate to the vertical windows, which draw the light deep into the rooms. The reason for the oil treatment to maintain its warm look (see ill. 147).

To underline the vertical orientation of the daycare center is anthracite gray emalite glass added in the top and in the bottom of the windows to give the expression, that the windows goes from the ground to the ceiling.

In the interior the walls are, again except for the cores, made of plaster, which will help to reflect light.
The flooring, in the daycare center, the entrance hall and in the common facilities, is made of mosaic wooden floor of larch again to raise the homely atmosphere and implement a tactile floor material (see ill. 149).

REFLECTION ROOM

In the middle of the building the reflection room is situated. It is a very important element in the hospice, why it is emphasized in the layout of the building. The interior of the room has a different design than the exterior, to mark that it is a space, which stand out from the rest of the building, made for reflection in spiritual surroundings. To emphasize the transition to the space the walls by the entrance are made extremely thick. The walls are very well isolated to minimize sound disturbances from outside and to create the feeling of being in a different world. The design of the inner space is inspired by the space made by James Turrell in Scottsdale Museum of Contemporary Art (see ill. 151). The exterior is made of untreated wood shingles contrary to the interior, which on all surfaces are made of concrete. Along the wall is an organic shaped wooden bench, in the roof a skylight, in the floor a water surface and in the end wall a low situated window with a view to the green oasis.

DWELLING CLUSTERS

The outer part of dwellings are covered by horizontal orientated European larch, and the inner façade facing south-east is like the daycare center covered by vertically oiled European larch.

The horizontal sheathing is untreated, why it over years will paginate and become silver grey (see ill. 148). The ceiling containing the patients living rooms are covered with untreated wooden shingles again to let them paginate and get grey over years (see ill. 150). The contrast between the oiled and untreated wood, will enhance the warm expression of the dwellings. Like in the daycare center are anthracite grey emalite glass added in the top and in the bottom of the windows.

Beside the terrace frame which functions as solar screening, two moveable larch sun screens are added in each dwelling. The wood is orientated vertically, so they will blend in with the façade covering. The terrace in front of the dwelling façade is a wooden terrace of European Larch.

The floor, within the dwelling clusters, is like in the daycare

Ill. 153 Tietgen Kollegiet

Ill. 151 Scottsdale Museum of Art

center mosaic wooden floor, but of oak instead of larch to get a bit darker nuance, which will create a warmer atmosphere in the more private areas.

The interior walls in the dwelling clusters and in the patients living rooms are, made of plaster. The material contrast within the hall ways in the dwelling clusters, with the lively moving plaster wall towards the dwellings and the bricks towards the service courtyards, helps avoiding an institutional expression.

THE INTERIOR OF THE DWELLING

Except for the already mentioned materials, - mosaic wooden floor and plaster walls a wooden shelf system is integrated within the dwellings to amplify the homely atmosphere. This shelf system includes a table, a bench, cupboards, and shelves with books and other personal belongings, inspired by the shelf system integrated within the dormitory rooms of “Tietgenkollegiet” (see ill 153). The shelf is incorporated on the opposite wall of the beds to avoid the feeling of being in a hospital. The idea is that the patients do not need to bring a lot of stuff to create a homely atmosphere. When the patients are lying in their beds, they will be able to look at a wall containing a lot of different elements and not just a white wall. The shelf system includes cupboards for clothes and service equipment for the nurses and shelves were the patients can put their personal belongings. In addition the shelf system includes the ventilation fittings for the inlet air and materials which can optimize the acoustic conditions. Furthermore sound absorbing elements is applied to the angled ceiling, which is described in the “Acoustic indoor climate”.

Ill. 152

THE HOSPICE

ENERGY CONSUMPTION

The final energy consumption is as described in the conceptualization 30,2kWh/m² pr year for the low energy class 2015.

The consumption is 21,7 kWh/m² pr year for the energy class of 2020 which is just above the border on 20 kWh/m² pr year.
To optimize the energy consumption the low energy class of 2015 solar cells would be integrated on the flat roofs connected to the dwellings.

The most efficient solar cells is the mono crystalline solar cells, these would need an angle of 15 [solar.dk] to create acceptable amount of energy. By adding them in the Be10, the energy consumption of 19.9 kWh/m² pr year, for an area of 32m² solar cells is calculated. The solar cells (see ill. 154) however seems a bit disturbing towards the architectural design, and to integrate them in the design a crown should be build around them. They will however still be visible when entering the road toward the hospice.

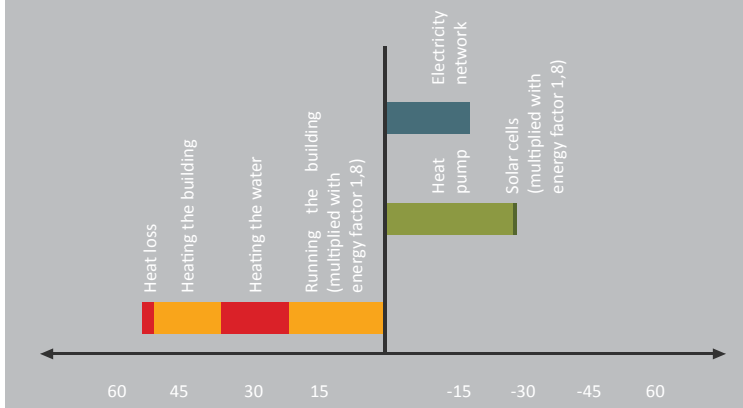
As a result to this another solar cell made by Icopal is investigated. These solar cells are not as efficient as the mono crystalline cells, they have a power peak on 0,07 kw/m² [Icopal] were the mono crystalline have an effect on 0,15 kw/m² [solar.dk]. The calculation shows that the solar cells need to cover a space of 70m² to lower the energy consumption to 20,0 kWh/m² pr year.

These cells can however be placed directly on the roofing felt with a minimal angle of 3 degrees, and it will not be necessary to integrate a crown around them. When entering trough the road they will only be visual as long rectangular forms, which could relate to the forms of the windows already created in the roof. The calculations are seen in appendix 5 on the CD.

The specific consumption of the solar system is visualized in ill. 155.

THE PERFORMANCE OF THE SOLAR CELLS CELLS	MONO CRYSTALLINE	ICOPAL SOLAR
The solar cells cover an area of	18 m2	40 m2
The average effect (covert area * peak power)	6 kWh	2,7 kWh
Assumed average production pr year (performance * square meters of the building)	1621,8 kWh/year	1351,5 kWh/year

Ill. 154 The preformance of solar cells



Ill. 155 Primary energy consumption

FIRE PLAN

CATEGORY OF APPLICATION

Hospice Kolding is categorized as category 6, which is defined as a building section for daily use as well as night stays, where the people staying in the building section, is unaided not capable to reach safety. This category include facilities as senior housing, treatment- and ward at hospitals, care homes, prisons, dwellings and institutions for physical or psychical disabled people and nursery [Bygningsreglementet, 2010, pp. 154-155].

ACTIVE FIRE PROTECTION/INSTALLATIONS

This category of application forces installations of [Bygningsreglementet, 2010, pp. 177];

- Hose hangers with a maximum distance of 25 m between.
- Automatic fire alarm system besides notifying the rescue service also notifies the staff
- Automatic sprinkler system, because the building is having a ward section and is bigger than 1000 m2. The system notifies, as the fire alarm system, the staff.
- Automatic fire door closing system on the doors within the fire escapes, so the fire sections and fire cells are safe.
- Fire escape and panic lighting because the building is bigger than 1000 m2.

PASSIVE FIRE PROTECTION AND FIRE AND SMOKE DIFFUSION

Caused by the category of application and the size of Hospice Kolding 2530 m^2, is the building seperated in two fire sections, one for the dwellings and one for the daycare center/staff facilities. Within the staff facilities are additionally two fire sections, one for the lift and one for the stair to the basement. The separated sections create the possibility for the users to escape to another fire section than the one, where the fire has started. These sections can be shut off from each other by fire doors of the category BD60, which can keep out the fire for 60 minutes. The fire sections are divided into fire cells, so that the users can stay in the cell, where they are, until they can be rescued by the rescue service via the fire escape or fire openings within the cells. The fire cells, which are rooms with substantial fire strain, are equipped with fire doors of the category of BD30, which can keep out the fire for 30 minutes.

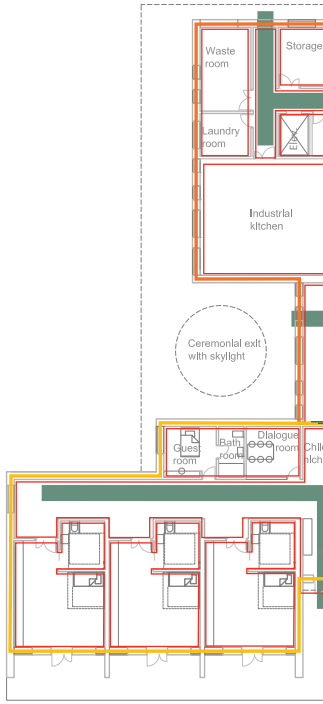
BUILDING MATERIALS

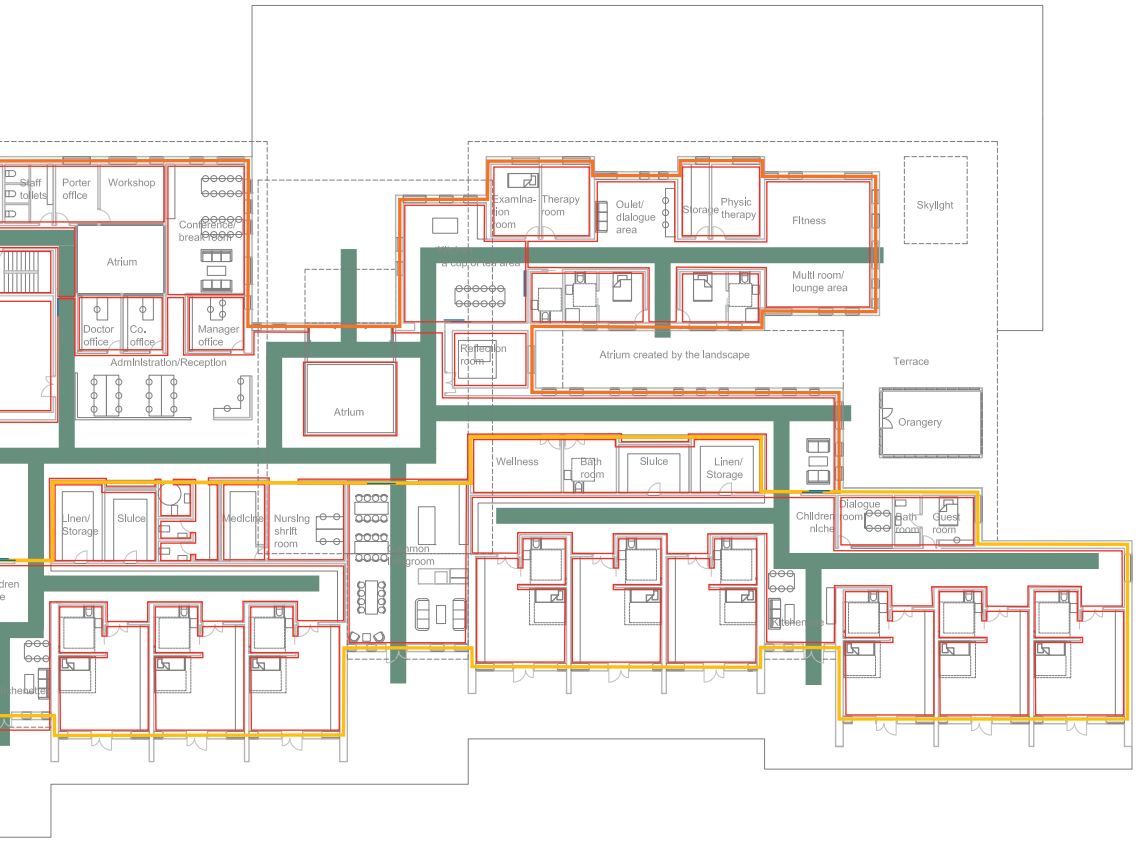
The building surfaces need to be made, so they would not contribute substantially to fire and smoke diffusion and will remain operable while the evacuation proceeds. The surfaces are classified as follows [Bygningsreglementet,, 2010, pp. 179];

- Wall facing: K1 10 B-s1, d0
- Ceiling facing: K1 10 B-s1, d0
- Flooring: K Dfl-s1

FIRE ESCAPES

Total evacuation of Hospice Kolding happens via the nine fire escapes evenly distributed over the whole plane (see ill. 156). One in each dwelling cluster, one in the common living room, one in each end of the main hallway, one in the administration,





Fire section – Administration and Daycare center

Fire section – The dwellings

Fire cell

Fire door

Escape roads

Ill. 156 Fire plan

two in the daycare center and one in the arrival zone, - all with the minimum width of 1.3 m. The fire escapes will lead the users directly out to the terrain through outward opening door, with dimensions from 0.9 – 1.3 meters. The building is planned, so that the distance from the access to the fire escape and to the nearest exit does not exceed 25 meters, which is recommended in order to keep the escape route clearly identifiable for the users. Two escape opening are added, one in each end of the dwelling clusters, to minimize high temperatures, smoke concentration and heat radiation, which can prevent the evacuation.

ACCESS– AND ENTRANCE POSSIBILITY

The rescue service needs an unobstructed entrance to the building and the fire engine must be able to park so the distance to the entrance never exceeds 40 m. The fire engines access should happen on a solidify road with a minimum width of 2.8 m and a rescue zone of min 4 m. The fire engine can drive all the way to the main entrance and to the staff entrance, from where the vehicle can continue on a grass reinforces area all the way to the front of the dwellings. With these access conditions can the rescue service easily rescue the users of Hospice Kolding.


Ill. 157

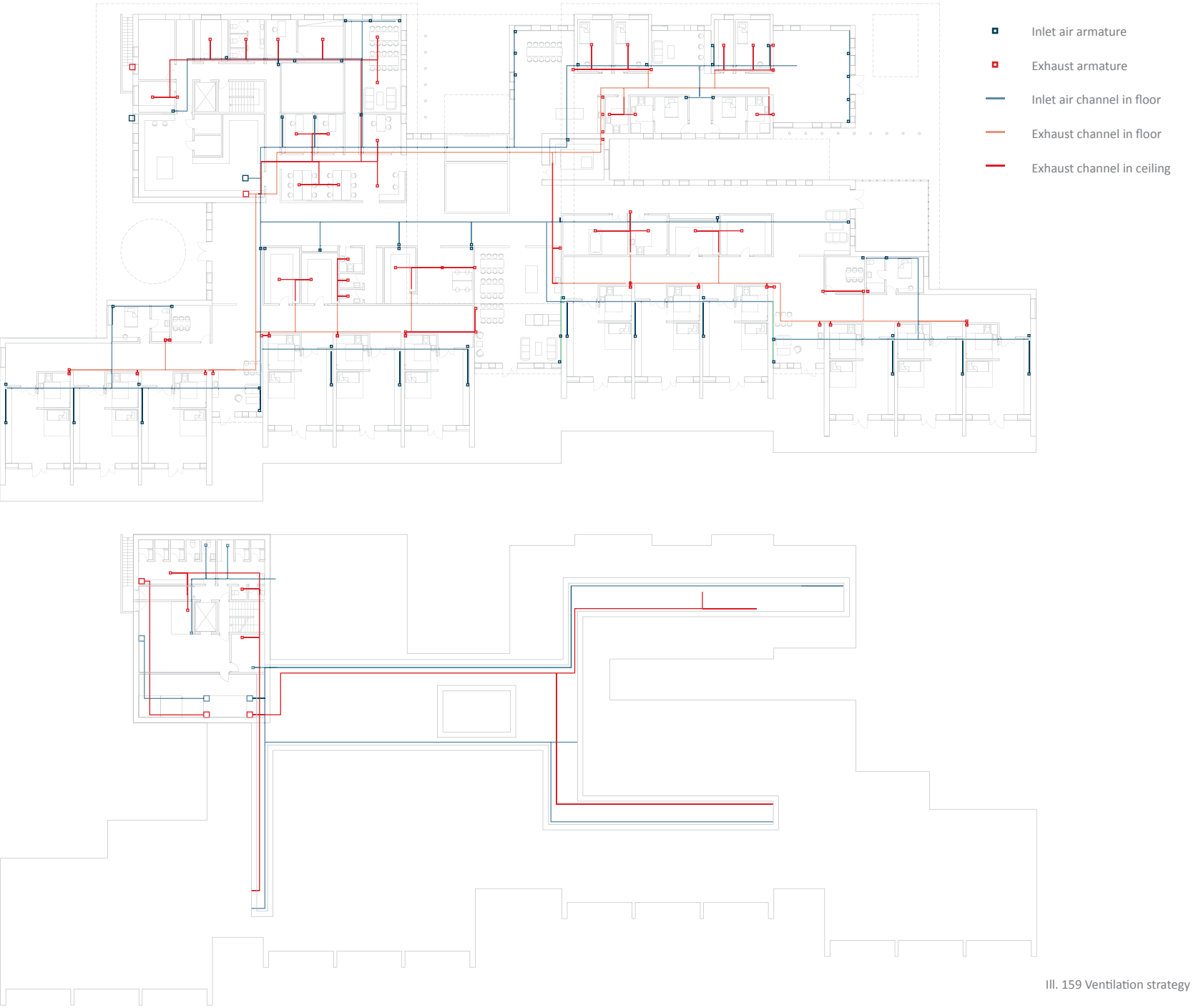

Ill. 158

THERMAL AND ATMOSPHERIC INDOOR CLIMATE

To create a good indoor climate all year around a hybrid ventilation system is installed, were natural ventilation is used in summer and mechanical ventilation in winter. This means that every room is made with a separate window, supplying the room with fresh air, and that the mechanical ventilation system shall cover the entire building as well. To create a homely atmosphere, the ceilings in the lower part of the common rooms, and to create a felling of the plain roof as being thin, it is not a wish to lower the height even more and let the ventilations run under the ceiling, instead the channels are incorporated in a basement were the channels are biggest and in the floor, were the channels are smaller. In the service rooms the mechanical ventilation is installed in the ceilings, but this should not be problematic because the channels do not need to be that big in these areas.

The fittings of the inlet air flows to the rooms through the floors can be created in a solution similar to the one seen in ill. 157. In the service areas the exhaust air is sucked out in the upper part of the walls and can be formed similar to the fitting seen in illustration 158 in the walls with brick walls.

The ventilation aggregate is placed in a technique room in the basement nearly in the center of the building. The ventilation room is placed as central as possible to minimize the size of the channels. Another separate aggregate is placed in the kitchen, only to change the air in the kitchen. This aggregate is left out of the calculation, but it should be incorporated in the final design. The large inlet devises from the aggregate in the basement and the aggregate from the kitchen aggregate are placed in the façade beside the space were the aggregate to the kitchen is placed, and the inlet exhaust is placed in the façade by the waste room. The plan of the ventilation principle is seen in ill. 159 and in the drawing folder in a larger scale.



Ill. 159 Ventilation strategy

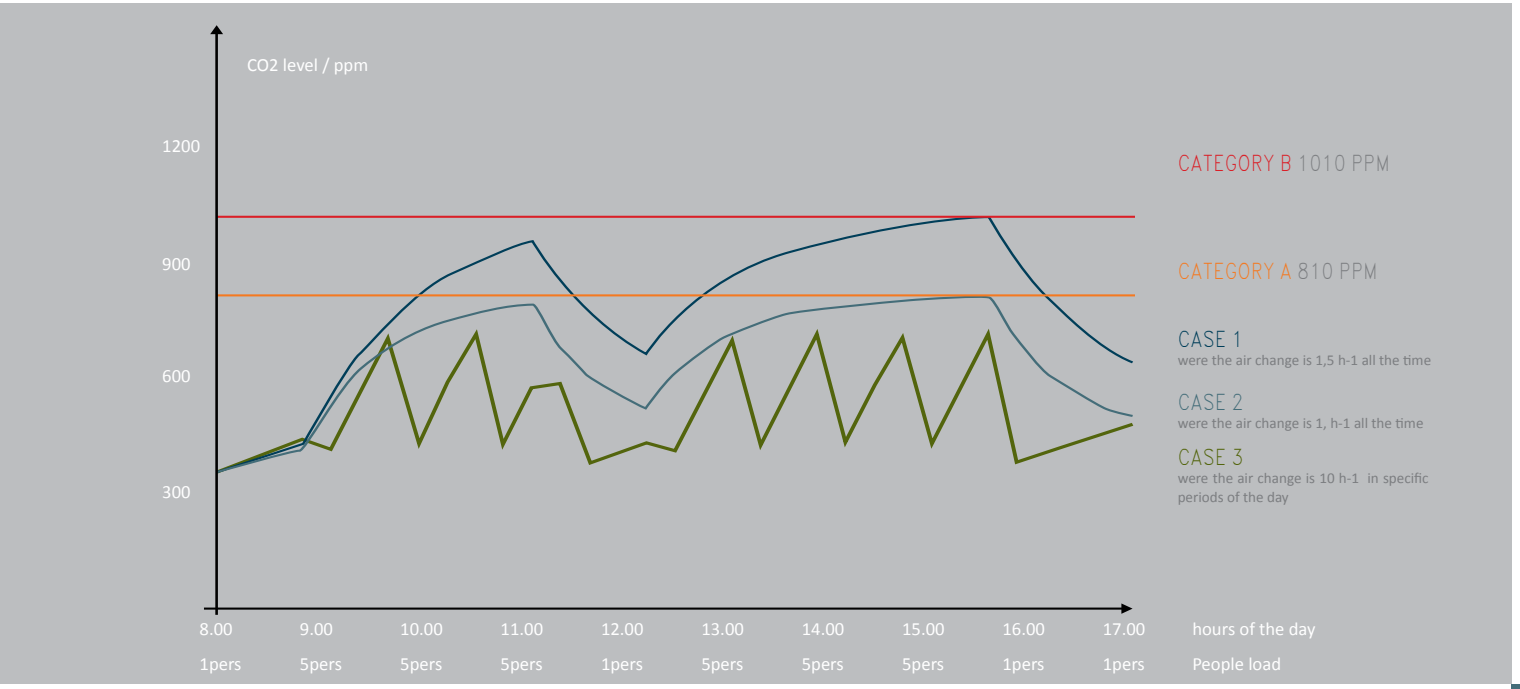
CO2 LEVEL IN THE DAYCARE CENTER

When people breath the CO^2 is created and when rooms are not ventilated well enough the CO^2 level will rise to a level where it is seen as a polluting gas in a space. The CO^2 level is further more an indicator of the oxygen level in a room.

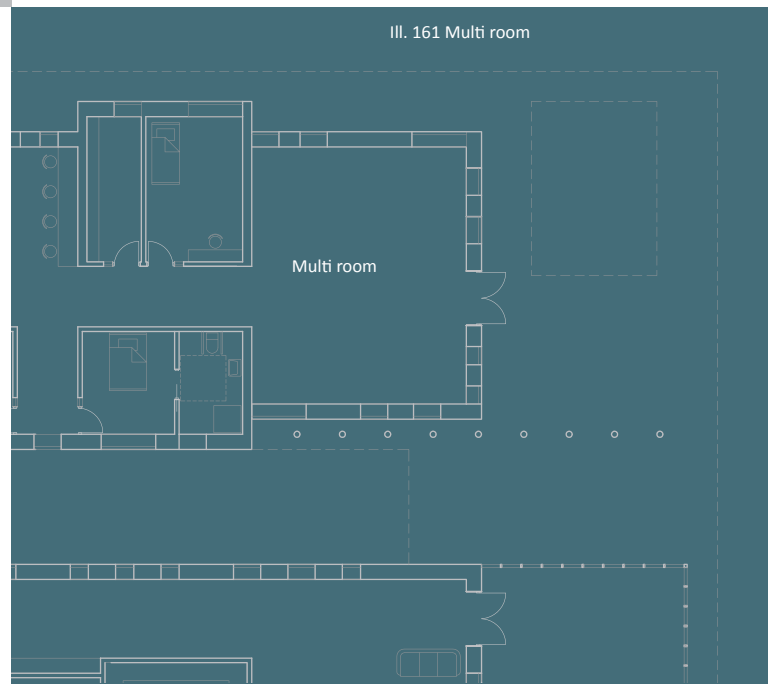
To investigate the CO^2 level in the building a simulation is made in the multi room in the daycare center (see ill. 161). This room is chosen because it has a large load of people all through the day. Compared to the other common rooms this room is very isolated, which means that the air does not have the same opportunity of floating into the other spaces, which is the case in the main living room.

The simulation is based on 8 hours on an average day in the daycare center from eight a clock to five a clock. Three ventilations scenarios are made; case 1 were the air change is 1,5 h^{-1} all the time, case 2 were the air change is 1 h^{-1} all the time and case 3 were the room is ventilated with an air change of 0,5 h^{-1} all through the day and with 10 h^{-1} in specific periods of the day. The CO^2 concentrations during the time period are shown in ill. 160. The calculations behind the diagram are seen in appendix 6. The number of people during the day varies and is visualized beside the x-axis.

The diagram shows, that the CO^2 level does not rise above 810 ppm in case 1 and 3, which mean that these ways of ventilating the room will fulfill the standards of a Category A indoor climate. When ventilation like in case 2 the CO^2 level rise above 1010 ppm meaning that the indoor climate in this case fulfill the standards of a Category B indoor climate. In the calculation the room is seen as a totally separate room which is not the case in reality, because the room is open towards the hallway, a room with a much lower people load.



Ill. 160 CO^2 level

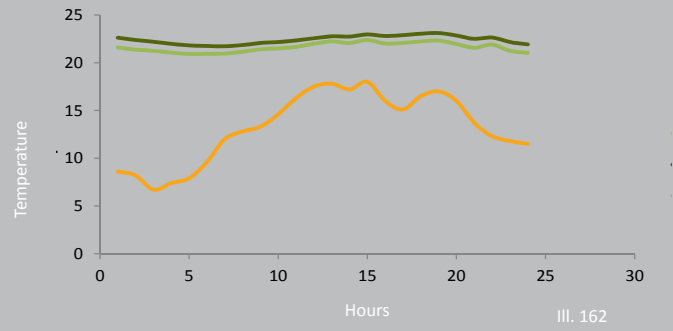


Ill. 161 Multi room

THE DWELLING

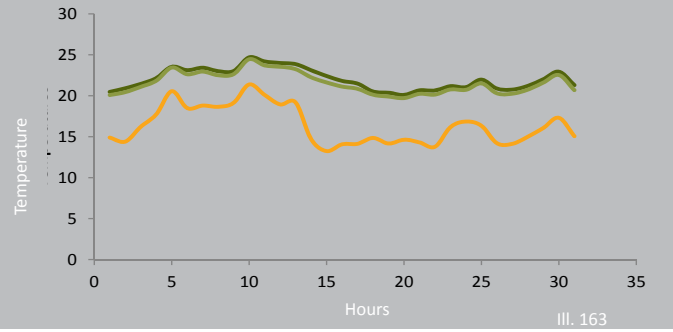
THERMAL AND ATMOSPHERIC INDOOR CLIMATE

Thermal indoor climate the 15 of July



Ill. 162

Thermal indoor climate of July



Ill. 163

To ensure the patients well-being has a great focus been on thermal comfort, in terms of overheating but likewise on keeping the patients warm, because their limited level of activity and their illness often makes them feel cold. The atmospheric indoor climate has likewise been in focus and the aim has been to fulfill category A, to ensure the best possible air quality for the patients and to avoid smells associating with a hospital.

Bsim has been used to verify the level of overheating and CO^2 from June to September, for the patient's living room, which, as written in the analysis, is the most important room of the hospice. The chosen living room is worst case scenario, - the one situated farthest south-west, with four surfaces facing outdoor. The model of the room is a simplified model of the reality (see ill. 166).

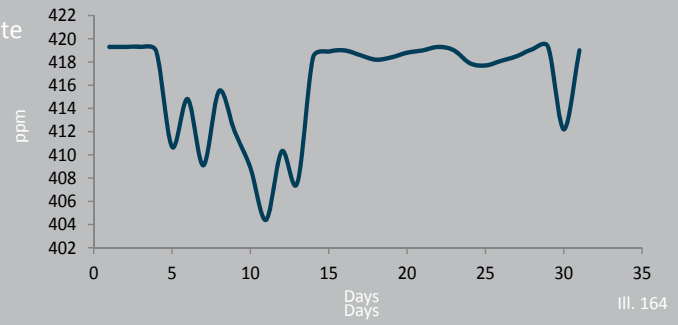
In the patient's living room the aim is for the operative temperature 24 °C ± 1.5 °C. The first step in Bsim after modeling the geometry is to build up the constructions (see. Appendix 3) and placing the windows after which the systems are added.

The systems added is People Load, which is defined as 1.5 persons, with a low level of activity, always present. The People Load has been dimensioned bearing in mind that the patient will be present almost all the time and relatives or staff will be present in some periods during the day.

The equipment consists of a fridge always running and a flat screen in use 5 % between the hours 10.00-21.00, - always. The room is designed to have a high level of natural daylight (See "Visual Indoor Climate"), so the desire for the artificial lighting has been to have it switch off as long as the natural daylight supplies the room with up to 250 lux.

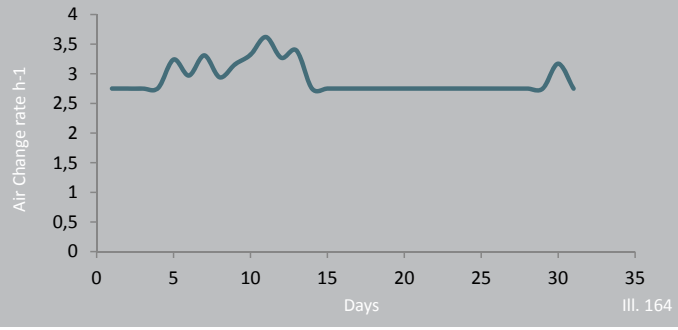
The ventilation is a hybrid system functioning all year with an inlet air temperature of 17 °C meaning that the use of energy to heat up the ventilated air, in the living room, would not be too high. The air supply is calculated to 0,067 m^3/s (see

Atmospheric indoor climate
July

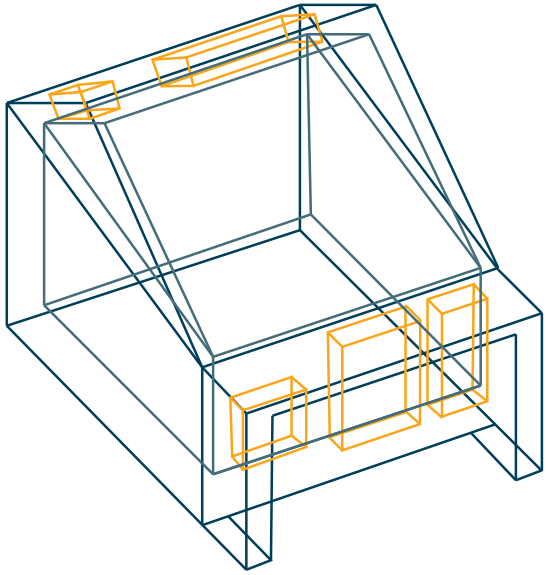


Ill. 164

Air change
July



Ill. 164



Ill. 166 Dwelling geometry

appendix 7), with the aim to reach an atmospheric indoor climate maintaining category A. Additionally to the mechanical ventilation will natural ventilation, be activated when the operative temperature exceeds 24 °C and the CO^2 level exceeds 810 ppm. To lower the overheating further an overhang is added to the building additionally to outdoor manually sunscreens, which can be regulated by the users. For further information's about the system details see appendix 7 for system table.

After supplying the above mentioned systems reasonable temperatures in the summer month are reached, which can be seen in ill. 162 for an average day in July and 163 for entire July. There are 49 hours exceeding 26 °C and 20 hours exceeding 27 °C, which is seen as a very acceptable thermal indoor climate (see ill. 167). Concerning the atmospheric indoor climate the CO^2 level never exceed 420 ppm, meaning that a high level of atmospheric indoor climate is reached (see ill. 164). The temperature and the level of CO^2 has caused an air change rate never below 2.75 h^{-1} and never above 4.25 h^{-1}, which is quite a limited interval and will cause a very low level of draught for the patients (see ill. 165).

	Hours > 26 °C	Hours > 27 °C
DS 474	100	25
Hospice Kolding	49	20

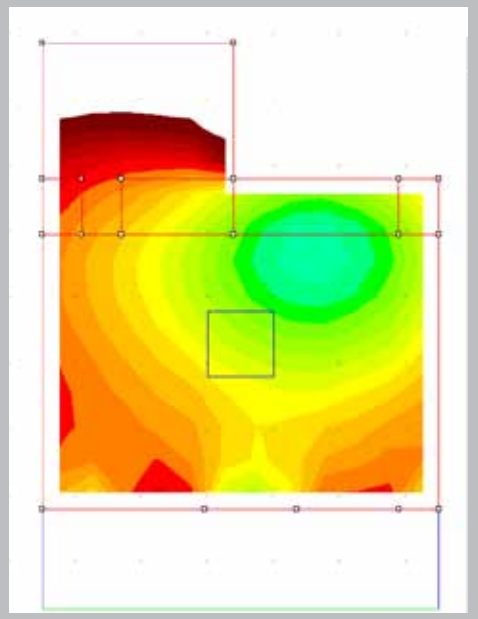
Ill. 167

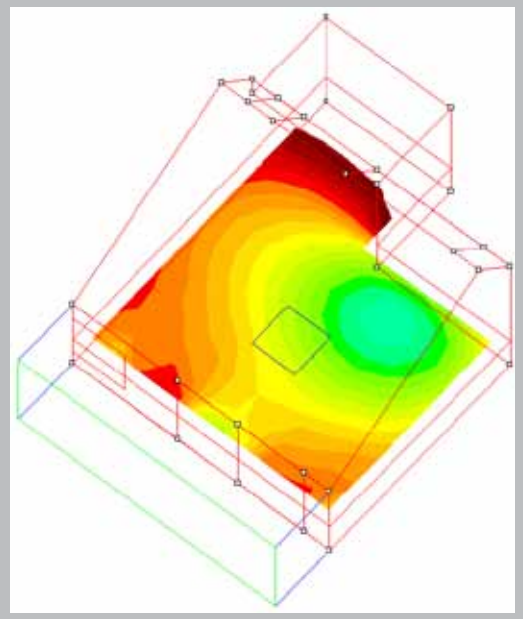
VISUAL INDOOR CLIMATE

As written in the analysis concerning “Visual indoor climate” page 95, it is important to minimize strong light contrast, blind and flickering light and at the same time provide good daylight conditions to ensure the patients well-being and to minimize the need for artificial light. This focus has had a significant influence on the design process especially concerning the patients living rooms, because it is here the patients spend most of their day.

A great focus has been on the facade facing south east, to avoid strong light contrast, minimize direct light and instead create good sight conditions. This has been done by angling the ceiling 30 degrees downwards to south east (see ill. 30/169) and by implementing an overhang and manually sunscreens, so only a comfortable direct light will be let into the rooms. The contrasting light has additionally been avoided by creating a skylight angled towards North West, to let in diffuse light and thus minimize glare from south east. The skylight will at the same time provide a view to the heaven, for the patient lying in their beds.

A simulation in IES-VE has been done do verify the natural light conditions within the patients living room. The result shows a daylight factor varying from 1.5 to 10 %, which means that the need for artificial light is limited (see ill. 168). The 1.5 % is present in the entrance area, where the patients would not stay. In front of the south east façade do the factors vary from 3.5 to 6.5 %, which means that the light would not blind the presents. Underneath the skylight is the daylight factor max 10 %, which means that a great amount of diffuse light will be let into the living room.





Ill. 168 Light simulations

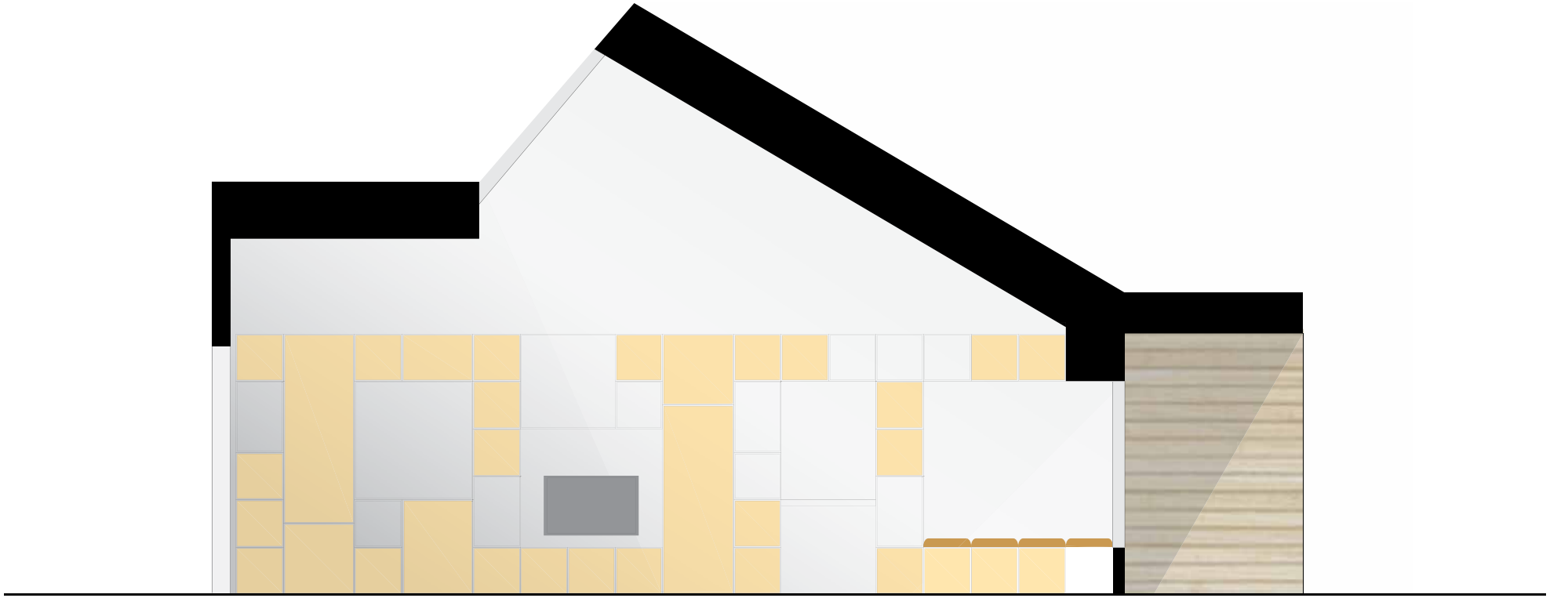
ACOUSTIC INDOOR CLIMATE

Good sound conditions are as written in the chapter “Indoor climate” page 94, a significant part of a good indoor climate. The aim for the acoustic indoor climate has been to secure very satisfactory sound conditions.

Normally dwellings should only fulfill the category C, but because it, as written in the chapter “Indoor Climate” is proved, that the sound conditions influence the patients stress level [Frandsen, 2009], the sound classification for the dwellings within the hospice will fulfill the requirements for category A.

Reverberation time is regulated in accordance with the use of the rooms. The dwellings of Hospice Kolding could be compared with a room at a hospital ward or an examination room, which reverberation time should not exceed 0.6-0.8 sec. Caused by a desire to create a hospice associating as little as possible to a hospital a reverberation time of 0.4 sec will be reached, which can be compared to a living room in a day care center [appendix 8]. This has been reached through both the form of the room and the choice of materials. The room has been created with few directly parallel surfaces, among these the angled ceiling, to minimize the amount of reflected sound. Likewise a focus has been on materials with a good sound absorption, among others; acoustic ceiling, curtains and acoustic plates functioning as pin up boards in the wall unit. The wall unit itself has had a good influence on the result as well, because it beside the acoustic plates will have books and other belongings on the shelves and because of the increased surface area (see ill. 169). The reverberation time will get even lower when the dwelling will be furnished.

Concerning the airborne sound insulation, the Decibel limit value is based on the standards for dwellings and similar buildings for overnight stay [Bygningsreglementet, 2010, pp. 223]. This means that the dB should not exceed 53 dB. The chosen partition is a double partition built up of two layers of plaster, insulation, an air gap and again insulation and two layers of plaster [appendix 3], which has an airborne sound insulation at 59 dB [Rockwool]. This level will increase even more caused by the wall unit, which means that the acoustic in the patients living room are very good and a high level of privacy is reached.



Ill. 169 Wall unit integrating acoustic solutions


REFLECTION

DISCUSSION

Through the design process of Hospice Kolding the problem statement and the many different design parameters have affected the design, and in the process different challenges have been recognized, some of them will be discussed in the following chapter, and the hospice design be compared to the investigated cases.

ARCHITECTURAL APPROACH

To make the patients feel as comfortable as possible one of the big issues in the design of Hospice Kolding has been to create hospices associating as little as possible to a hospital or an institution. This has created a desire to design hospices with a high impression of a homely atmosphere, which in some of the latest Danish Hospices has succeeded.

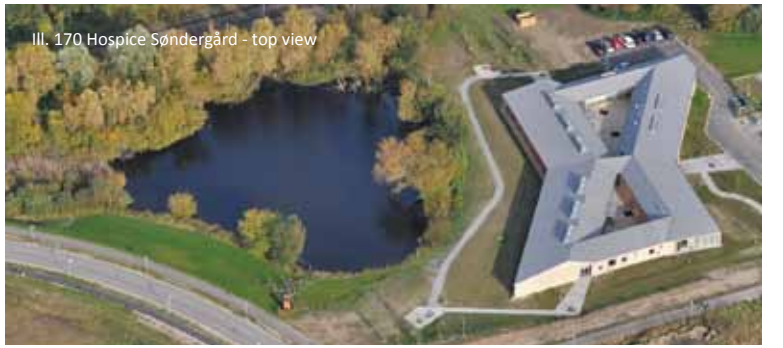
Hospices Søndergård, is seen as an example were the homely atmosphere is decreased on behalf of the functional requests. The architects have tried to create a homely atmosphere and affiliation within the patient's living rooms, by use of color combinations, which is a mistaken way of creating a homely atmosphere (see ill. xx), because what is associated is an institution, were the only thing separating one room from another is the color. Instead of adding colors or art in the end, the building should be able to create a homely atmosphere itself. This issue has influenced Hospice Kolding in all scales of the design.

The building composition has been designed with a desire to create a house expressing a hierarchy in terms of what to embrace. This has caused a building separated in smaller elements, with each of theirs function; entrance, staff facilities, daycare center and the dwellings further separated in smaller clusters. This separation helps to create an affiliation for the users and a human scale building. In contrast can again be referred to Hospice Søndergård, because this house is designed as one big volume containing all facilities underneath the same roof, which causes that the building and its facilities is difficult to read (see ill. xxx).

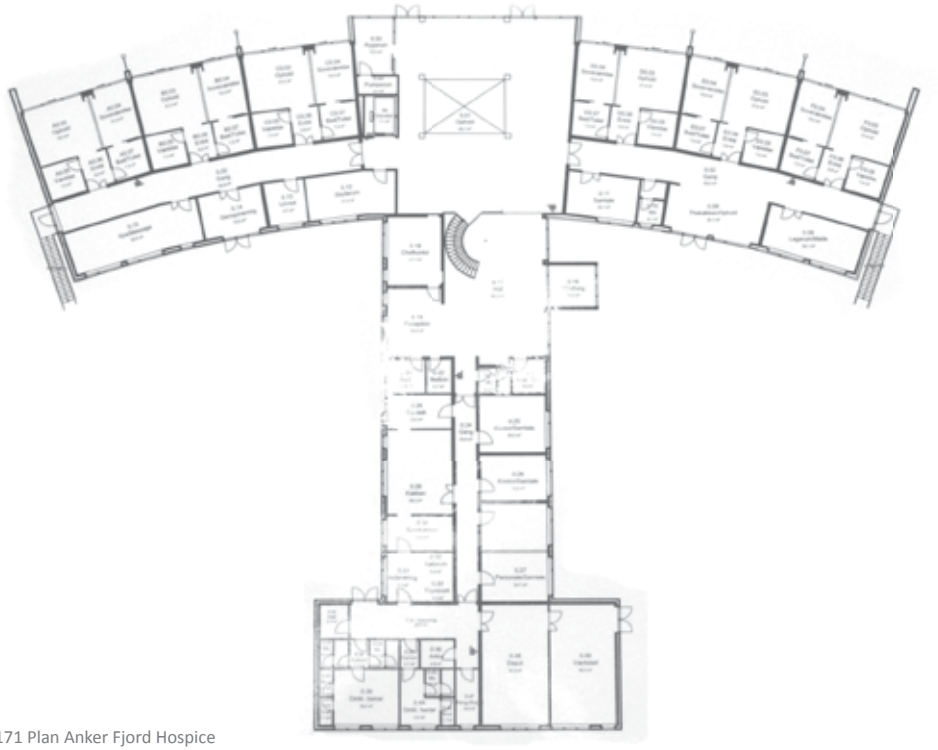
The architectural expression of Hospice Kolding has been inspired by Nordic references and the design parameters mentioned in the chapter "Nordic Architecture". Many different references have been used in the process as an example Villa Mairea by Alvar Alto has inspired the design in terms of creating a homely atmosphere by use of wooden materials infusing the room with a warm and enthusiasm atmosphere (see ill 173). To avoid too many impressions and to create a calm and relaxing atmosphere the amount of different materials has been limited, and the wood differing from larch and oak creates a warm atmosphere. To create a contrast to the warm wood surfaces brick walls has been integrated both within and in the exterior of the building, representing Danish building traditions and a high level of tactility.

FUNCTIONAL APPROACH

The flow and the different degree of privacy in the common zones has been a large issue as well. The flow is designed to fit the needs of all users groups but especially the patients need are prioritized.



Ill. 170 Hospice Søndergård - top view



Ill. 171 Plan Anker Fjord Hospice

Hospice Kolding is designed in one floor in terms of creating the most optimal flow and a high level of accessibility both for the staff as well as the users. Conversely the building could have been more integrated in the landscape and its curves by designing more varying in level. Anker Fjord Hospice is designed in two stories', which according to the staff is not seen as a problem, but when asking staff at other hospices they prefer one story. Contrary do Anker Fjord Hospice give rise to a great view towards Ringkøbing Fjord. In spite of the advantages by integrating the building more into the landscape, accessibility has been favored and a one story building has been designed.

To increase the opportunity for privacy the building has been designed with two parallel hallways, so a kind of transition will be made to reach the dwellings. This is also a result of a desire to create hallways, where the users will pass as less doors as possible and only have to pass maximum two other patient living rooms before reaching one's own. The hallways have additionally been design with displacements to avoid long straight corridors with views from one end to another, which can associate to hospital corridors. This has at the same time created many niches with a higher or lesser degree of privacy, where informal meeting can arise. This design has on the other hand caused a bit longer hallways, which are less optimal for the staff. Looking at Hospice Søndergård it is designed with the most optimized work flows for the staff.

According to the guidelines in "Program for Det Gode Hospice i Danmark" concerning separating the wards in groups of 4-6 are the wards of Hospice Kolding are separated into two clusters with 6 beds in each, to increase the level of intimacy. The

Ill. 173 Villa Mairea

Ill. 172 Maggie's London

clusters are both equipped with the needed service facilities in terms of optimizing the working procedures of the nurses, who during a day will be affiliated one cluster to minimize the walking distances.

As mentioned are the dwelling clusters designed with a high level of privacy, why a discussion could be if it is too private. The dwelling clusters are designed to represent a very calm area with a limited level of noise from the rest of the hospice, with the aim to create space to dwell and room for the patient's and their relatives to be together. At the same time does this level of privacy compromises the vicinity of the nurses, which for the patients can decrease the feeling of being safe, if the relatives are not present. The reason for this layout of the building is to give the patient's and their relatives the opportunity to choose between been in a calm and private area or in an active and more public area of the house.

Hospice Kolding has been designed with a daycare center to give the possibility to take care of the patient's terminally illness from an early stage. There are no actual hospice daycare centers in Denmark at the moment, only a few daycare cancer centers. "Program for Det Gode Hospice i Danmark" recommend implementing daycare centers when designing new hospices, because, as written in the analysis, it is expected that course of diseases will start to vary more in the future. This is already documented in England, where more and more hospice beds are used to alleviating the symptoms instead of ending a life. The reason why daycare centers are not implemented in a

Danish context yet is properly of economic reasons. Contrary to the hospice daycare centers in England mainly designed with one big main room, are Hospice Kolding designed with smaller zones like in Maggies London (see ill. Xxx), with the aim to create a more intimate feeling, where the patients can feel comfortable and less exposed. The daycare center is designed with a kitchen as a welcome zone inspired by Maggie's London, where the patients are invited to make them self a cup of tea, while they deem the situation, if it is the first time they visit the center.

An important issue when designing Hospice Kolding has been to implement a ceremonial exit, where the relatives, in a less disturbed area than the entrance, can say goodbye to their dears. Experiences from varies hospice visits shows that it is a theme with many different points of views. At Hospice Djursland and Anker Fjord Hospice are the opinion that a hospice is a house where the death are, why it is natural that the patients are carried out to the hearse through the entrance, opposite at Hospice Søndergård where their opinion is that the patients should be carried out from another destination that the entrance hall, so room for the relatives to say goodbye are present.

TECHINCAL APPROACH

Regarding the technical approach both indoor climate and energy optimized design has been highly prioritized in order to create a building influencing the patient's level of comfort and in all phases, kept in mind that the design should associate as little as possible to a hospital.

INDOOR CLIMATE

The last year's hospital design has been more and more focused on a high level of indoor air quality control in terms of avoiding airborne infections and smells [Wagenaar, 2006], which has caused a high air change rate, which for many patients can feel like draught and be too cold. This has been taken into consideration in the design of hospice Kolding, caused by the patient's limited activity level. The operative temperature has been set to24.5 +- 1 during summer and 23 +- during winter, - a bit higher than usual and a maximum air change rate of 5 h-1 enough to fulfill the max CO2 level of category A.

ENERGY OPTIMIZED DESIGN

Hospice Kolding has been designed to fulfill low energy class 2015 by use of passive and physical solutions (see ill. Xxx). The advantage of focusing on passive initiatives is that these solutions is present in all building, but by optimizing, the energy will be kept within the house and contribute positively to the energy consumption [Isover, 2007]. The optimization of the passive solutions allows greater focus on the building design and the architectural intentions instead of focusing of integrating active solution, which would not contribute to the aesthetic design of Hospice Kolding.

The design of Hospice Kolding is as described a result of many an aesthetic, functional and technical approach – result of an integrated process. The hospice is however particularly a result of the users needs especially the patients to provide them the perfect surroundings to enjoy and accomplish life.

CONCLUSION

The intention of Hospice Kolding has been to create a building where the users are in focus, especially the patients. A hospice, where the patients are looked upon as persons and not as patients and were the perfect conditions are present in order to make them able to accomplish life. A place embracing all user groups of a hospice, with particular attention to the patient, and where all levels of terminally illness can be handled. Both in the early stages by day/evening and overnight stays as well as the last days, where the patients are weakest. This intention has resulted in a building layout in which the balance between well-being, comfort and functionality is a key element.

The composition of the building expresses that it embraces different functionalities, e.g. the staff facilities are gathered in a separated zone, not disturbing the daycare center and dwelling clusters. Attention to a human scale is evident in different levels of privacy; providing a variety of common rooms and zones for activity and informal meetings where interaction and socialization between users can occur as well as more private zones within the dwellings clusters and the patient's living rooms representing calmness and a place to "feel at home". In this manner the spaces of Hospice Kolding invite to different kinds of interactions between the users, within rooms providing a variety of views to the nature, natural daylight and a feeling of intimacy.

Additionally the flow within the building strengthens the homely atmosphere by having shorter hallway distances and thereby shorter views. A sense of material familiarity is pursued in the hallways by implementing brick as the general material for the service cores, and furthermore there is a deliberate minimum amount of doors. The latter is obtained by having access to the service facilities distributed on both sides of the cores.

In order to create an architecture which positively influences the comfort and well-being of the patients, elements creating a homely atmosphere and an excellent indoor climate have been integrated. In the process of integrating such elements, examples from the Nordic Architectural tradition have served as a reference. In this regard the vision has been to create a house which is associated as little as possible with a hospital or other kinds of institutions and there through contributes to the relieving process of the patients, potentially increasing their life quality. The homely atmosphere is created by familiarity in terms of addressing a human scale in the architecture, the level of private vs. public zones and the choice of materials. An example is the fire place in the living room, which is integrated in the common living room, and emphasizes the room as a gathering point for the users.

In the dwellings the room height is raised above the bed to create the feeling of being in a spatial room contrasting the façade towards south-east, which is lowered in order to prevent a feeling of exposure. Framed views towards the meadow area of "Solkær Enge" are established and provide comfortable daylight conditions.

Besides adding to a homely atmosphere, the materials are chosen with an aim to substantiate an expression linking to the Nordic Architectural tradition by implementing Danish building

traditions and regional materials by making use of bricks, larch/oak and concrete - all with a high level of tactility. Within the dwellings a permanent wooden wall unit is implemented in order to enhance the homely atmosphere by the materiality as well as the possibility for the patients to put up personal belongings.

Healing architecture and indoor climate goes hand in hand, due to a concurrent focus on many of the same parameters in terms of creating comfort for the users. Indoor climate has been a highly prioritized theme in the design of Hospice Kolding, especially within the dwellings, becausethe patients spend most of their time here. This has caused a desire to fulfill category A, ensuring the best possible air and sound conditions for the patients. The placement of the windows furthermore creates extraordinary good light conditions. The good thermal indoor climate is also a result of both the directions of the windows and the integrated overhang and shading elements. The acoustic conditions are created by integrating sound absorbing materials in the ceiling and in the wall.

In addition to these themes healing architecture also embraces the implementation of good sight conditions and views to the nature. This element is also found to be crucial when examining examples of Nordic Architecture in terms of making use of the potentials of the surrounding site. This has influenced the position of the dwellings with a view overlooking “Solkær Enge” and the possibility to observe the sunrise symbolizing a new day. The daycare center and common facilities are as well provided with several views to nature especially in the entrance area and in the north-eastern part of the building where the landscape is seemingly ‘dragged’ deep into the building. This also provides good daylight conditions in the centre of the building. The sense garden is positioned in close connection to the daycare centre and the stream, again to provide interesting views to the nature.

The vision to fulfill the requirements of low energy class 2015 by using passive energy solutions has been achieved, except for an incorporated geothermal heat system, which is added due to the fact that Sønder Stenderup is not covered by the district heating system. A scenario where solar cells are added, is made to show that the requirements of low energy class 2020 can easily be reached, consolidating an initiative in Sønder Stenderup for green energy. Low energy 2015 class is reached by use of solar heat gain, a good level of natural daylight and thereby a low need for artificial light, having good constructions minimizing heat losses and using a hybrid ventilation system meaning that the energy consumption will decrease during the summer caused by natural ventilation.
The design of Hospice Kolding is intended as a house in which a symbiosis between the landscape, physical surroundings, contents, indoor climate and the users’ needs is created. A house in which every imaginable situation can be handled; from family reunions, a moment of reflection, wellness, room for celebrating a wedding anniversary even though the partner died years ago, to ceremonies held after the death of the patients.

RESUME

Dette er et specialeprojekt i arkitektur fra “Arkitektur, Design og Medieteknologi”, Aalborg Universitet. Projektet omhandler designet af Hospice Kolding med udgangspunkt i ”Program for Det Gode Hospice i Danmark” som fiktivt byggeprogram. Rapporten blev udarbejdet på initiativ af Realdania i 2009, med formålet at sætte fokus på hospice design og inspirerer til planlægning af fremtidige byggerier. Denne øgede fokus skyldes, at der siden 1992, hvor det første hospice i Danmark blev grundlagt, er blevet etableret 195 sengepladser fordelt over hele landet og at der for at opfylde behovet, stadig skal etableres yderligere 60 sengepladser.

Udover brugen af ”Program for det Gode Hospice i Danmark” er et samarbejde med ”Støtteforeningen – Hospice Kolding” indgået, med formålet at designe et forslag til et hospice i udkanten af Sønder Stenderup på Stenderup halvøen med udsigt over ”Solkær Enge”.

MOTIVATION

Motivation for at design et hospice bero på en betydelig interesse for arkitektur, som skaber potentialer for menneskets velbefindende samt en forkærlighed for nordisk arkitektur, som arbejder med landskabet og stedets ånd, kontekst relation, funktionalisme, lys og materialer.

VISION

Baseret på disse interesseområder har intentionen været at design et hospice, som med sin arkitektur tager hånd om brugernes velbefindende for at øge patientsenes livskvalitet og give dem mulighed for at nyde og gennemføre den sidste del af livet.

Det betydelige fokus på patienternes velbefindende har affødt et fokus på at skabe et godt indeklima, hvis parametre går hånd i hånd med helende arkitektur, og dermed igennem optimering vil påvirke den lindrende proces af patienterne. Udover

Ill. 174 Hospice Kolding

indeklimaet har målet været at designe et hus, som opfylder kravene til Lavenergi klasse 2015.

HOSPICE KOLDING

Hospice Kolding er placeret i udkanten af Sønder Stenderup med udsigt over "Solkær Enge" og i nær kontakt med Fvos Å (see ill. 174). Bygningen består af to hovedelementer; boligerne og personale/dagcenter faciliteterne. Boligerne er opdelt i to klynger af hver 6 boliger, yderligere afskilt i to dele for at skabe høj grad af privathed og få patienterne til at føle sig hjemme. Det andet element består af; personale faciliteter, dagcentret og ankomstområde indeholdende et stort grønt atrium, reception og arbejdsstation for sygeplejerskerne. I forbindelse med boligerne findes decentrale servicekerne for at optimere personalets arbejdsgange, et tekøkken, et børnehjørne, et dialogrum og et gæsteværelse tiltænke de pårørende. Boligerne er i alt 45,5 m^2 med et badeværelse med plads til en seng. I stuerne er integreret en reolvæg indeholdende hylder og garderobe til personlige ejendele, tv rack, spisebord og en bænk, som bliver til et siddevindue. Boligerne er orienteret med udsigt over "Solkær Enge" og med vinduer, som trækker lyset langt ind i rummet samt et ovenlys med udsigt til himlen. Hver bolig har en overdækket terrasse, hvor patienterne kan blive kørt ud i godt vejr.

Imellem de to boligklynger er spisestuen placeret med en central placeret pejs, fungerende som samlingspunkt. Imod nord øst findes en biblioteks niche og et drivhus og imod sydvest en ceremoniel exit, hvor de pårørende kan tage afsked med deres kære i uforstyrrede omgivelser. Af andre fællesfaciliteter kan nævnes refleksions- og wellness rum, som ved brug vil lindre patienternes symptomer. Dagcentret består af et køkken, hvor patienterne bliver inviteret til at lave en kop te/kaffe, imens de anser situationen, hvis det er første gang de besøger Hospice Kolding, forskellige terapi rum, en stille/samtale zone og et fitness/multirum.

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LISTE OF ILLUSTRATION

Ill. 1-2	Own illustration
Ill. 3	[Knudstrup, 2004]
Ill. 4-5	Own illustration
Ill. 6	[Sundhedsministeriet, 2001]
Ill. 7 -32	Own illustration
Ill. 33-35	www.StChristoporshospice.uk
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Ill. 41	angerfjord hospice
Ill. 42-48	Own illustration
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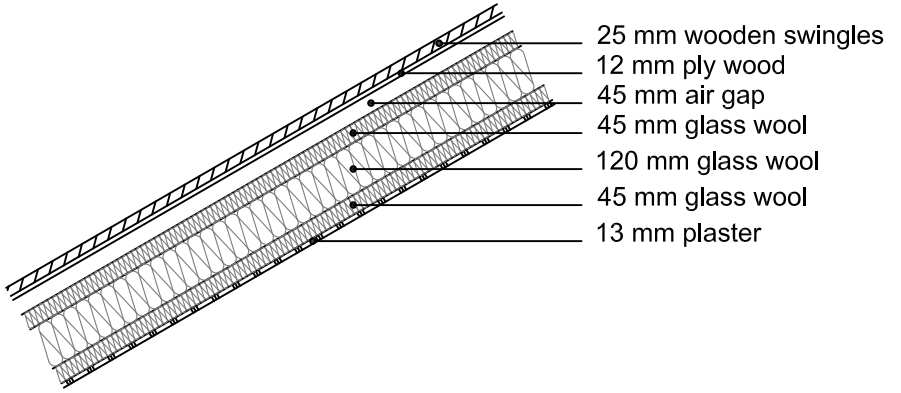
ill. 174	Own illustration

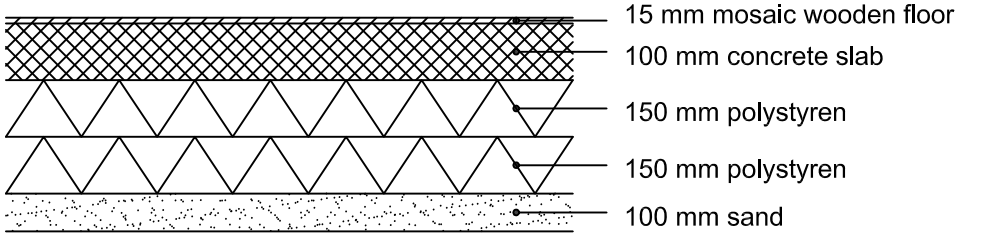
APPENDIX CONTENT

3 WALL CONSTRUCTIONS

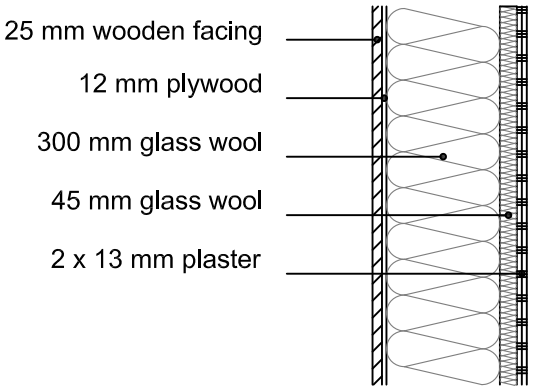
ROOF CONSTRUCTION



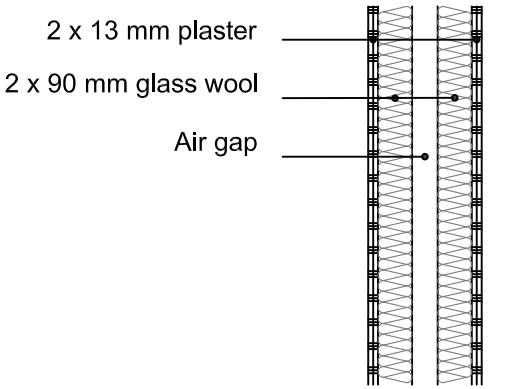
FLOOR CONSTRUCTION



OUTER WALL CONSTRUCTION



INNER WALL CONSTRUCTION



7 THERMAL AND ATMOSPHERIC INDOOR CLIMATE– BESIM

SYSTEME TABLE

Systems		Kontrol	Time
Equipment	Heat load: 0,092 kW Part to air: 0,7	Fladskærm 100 W, 5 % 10.00-21.00 Køleskab 92 W, 100 % 1-24	Always Always
Infiltration	Basic AirChange: 0,1/h	100% 1-24	Always
Lighting	General Lighting: 0,36 kW Gen. Lighting level: 200 lux Lighting type: Incandescent	Desired daylight level: 250 lux Control Form: On/Off	Alle dage fra kl. 8.00-21.00
People Load	1,5 number of people People Type: Normal Heat Gen. 0,072 kW Moist Gen. 0,044 kg/h	100 % 1-24	Always
Ventilation	Input: 0,085m3/s Pressure Rise: 900 Pa Total eff.: 0,7 Part to Air: 0,5 Return: 0,085 m3/s Pressure Rise: 600 Pa Total eff.: 0,7 Part to Air: 0,5 Max Heat Rec: 0,85 Max power: 0,5 kW Surf Temp: 5 C	InletCtrl Part of nom. Flow: 1 Point 1 Te1: -12 C Tinl1: 24 C Point 2 Te2: 8 C Tinl2: 17 C Air Hum: 0,07	Always

Venting	Basic AirChange: 1,5 /h Max AirChange: 3 /h	Set Point: 24 C SetP CO2: 810 ppm Factor: 1	Summer

Air supply

0,3 l/s
0,3 l/s x 36 m2 =10,8 l/s
10,8/126 m3 = 0,085 m3/s

The recommended in the Danish Building Regulations p. 116