HEALTH CARING ARCHITECTURE
SPACES FOR SOCIAL SUPPORT

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SUMMARY

With *health caring architecture* as the main topic, this master thesis will take point of departure in the architectural challenges Denmark are facing in the coming years regarding the planning of new super hospitals.

Based on the political choice of hospitalising patients in future single-bedrooms, this project raises the overall question: “Where do future patients meet for social interaction and support?”
State-of-the-art research indicates an increased risk of experienced loneliness, isolation and insecurity for patients in single bedrooms, and research studies have already established a connection between the patients’ experienced level of social support and the actual time of hospitalisation.
Considering this as the foundation for future patients, the project will address justified focus on one of the neglected areas in current hospital projects – the spaces for social support.
Waiting areas, hallways and dayrooms are often designed with the same standard as bedrooms and treatment rooms, and appear clinical, institutional and are basically quite unattractive.

Through a theoretical approach including the history of healing architecture and the introduction of architectural and anthropological theories, the project defines three main parameters that should be included in the design of future spaces for social support: *Functions* that reflects the everyday life, *materials & textures* with a homely atmosphere, and *details* with interior design in the human scale.
In the design phase theses parameters are translated to a design proposal for a future social dayroom of 100 M2 in the context of DNU Skejby, where a new technical and innovative solution of new smart textiles are introduced, improving the tactile experience of the social dayroom and even improving the hygiene environment – together defining *health caring architecture.*

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PREFACE

When I started my education as architect at Aalborg University, nearly 6 years ago, it was with expectancy of an introduction to a new comprehensive field. A conceptual field, where architecture was not only physical objects, but rather an essential part of a deeper understanding of the world that surrounded us – a understanding of the correlation we as human counterparts in through the physical and social environment.
Since then, this understanding is tenderly broadened, and I have through my time as student experienced an architectural world that continuously has opened new doors for me. New architectural possibilities appears, but also new comprehensive fields and new perspectives that together guides me towards the understanding of emerging architectural tenets and those basic human values that is an essential part of our everyday life.
My time at the university, has also initiated the development of an architectural language that you as a young architect student still control falteringly. A language, where the grammatical rules and the creative exceptions should be fully disciplined before a final satisfactory and concluded project will be experienced.
And although the completion of the studies in many ways may be seen as the conclusion of a professional chapter, it is fortunately not the conclusion of my personal development, where I am looking forward to search for many new undiscovered areas and fields, in the process of becoming an architect.

In this master thesis that I starter a year ago, I have tried to gather some of those central aspects in the architectural field that have attracted my attention through the last couple of years. It is presented in this project as the overall concept of 'Healing Architecture', which has been in my interest since I encountered the emerging concept about three years ago. Introduced as a notion of design, the concept is enhancing the meaning of architectural boundaries, and is emphasising the potential of architectural values as more than just physical objects. It is also a concept that causes time for reflection, and questions if, 'architecture really can influence the human healing process?'.
This overall question has basically formed this master thesis, where I have worked with the aspects of Health Caring Architecture that I find most important to emphasize – the aspects of social support.

ACKNOWLEDGEMENTS

Through the past couple of months I have been privileged to participate in conferences, hospital construction meetings, courses and events with the topic of the new super hospitals in Denmark, and I have met and interviewed architects, designers, decision-makers and politicians working within this field. In all these occasions, I have received great response and endorsement regarding my preliminary work, and I am deeply grateful for the time and interest these people have put in my master thesis.

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Anna Marie Fisker and Poul Henning Kirkegaard

Ill. 1 - Textiles as tactile elements. Here it is the carpet Matches from Hay.

INTRODUCTION

In Denmark we are facing significant future challenges in regards to the national health care system, requiring innovation, redefinition and considerable structural changes. In a co-financial joint venture between the national government and the 5 individual regions of Denmark, the financial investment of these changes mount up to 40 billion (DKK), mainly used to construct new super hospitals. (Juhl et al 2008) An expert panel, established by the government, is together with politicians, doctors and architects visioning a historic possibility to ensure a future-proof health care organization with this significant investment and development. (Juhl et al 2008).
One of the main improvements is the gathering of individual medical specialities in future super hospitals, where the treatment will be compiled in fewer, but larger, hospital units, and where the patient course will be coordinated between specialties, enabling improved patient centered care. (Juhl et al 2008 and Gerteis 2003)
The combination of new hospitals, new specialized acute care units, new procedures, more ambulant treatments and a general better patient centered care, are believed to contribute to a future overall improvement in Danish hospitals and a decreased need for hospital beds. (Juhl et al 2008)
This fundamental reorganization of the general health care structure and an uncertainty regarding new improved treatments, innovative technologies and future diseases, complicates the estimation of required physical resources. The hospitals will not be completed within the next decade, and the prediction for architectural considerations and interior design for these buildings are impossible to define as future-proof. (Juhl et al 2008, Kehlet 2010 and Nissen 2010). Consequently, the main challenge - and success - for developers, architects and design teams are to build new hospitals that are still state-of-the-art by the time of occupancy. (Nissen 2010, Juhl et al 2008 and Klarlund Pedersen 2011).
Visionary ideas and concepts are in this preliminary stage of the development phase introduced from many professional fields, all calling on the importance of avoidance of dimensioning and designing the hospitals based on a linear continuation of former and current hospitals. Instead, innovative and new solutions should be incorporated in the early stage of the design process, used as the governing tools in the creation of a visionary health care system. (Phanereth 2010, Rau 2010)

One of common objectives in regards to the new super hospitals is to prolong the current reduction in the period of hospitalization, (Juhl et al 2008) requiring faster post-surgery mobilization. (Kehlet 2010 and Andersen et al 2008)
However, the problem in this regard remains the current lack of inclination and possibility to mobilize oneself from the patient bed, or as Kehlet (2010) is stating “we simply need spaces for the patient to go”. The experience of investigating the social spaces or common areas outside the bedroom in today’s hospitals, would probably leave the spectator with a sadden sense of carelessness. Consequently, the majority of all patients prolong their time in bed watching television or reading magazines, resulting in complicated wound healings, increased medical use and finally extension of the actual time of hospitalization. (Kehlet 2010) – and this current issue is only considered

Ill. 2 - A typical hallway in a current Danish Hospital

aggravated with the future choice of hospitalizing patients in single bedrooms.

Actually, the political choice of future single bedrooms, is believed to be a centrally - however missed - focal point in the discussion regarding future hospitals. Prevailing research results define this form of hospitalization as an improvement in regards to risk of infections, less fall accidents, reduced medical errors and generally increased patient satisfaction (mainly due to lower noise levels, better sleep, room for visitors and higher integrity). Even for the staff, the single bedrooms will involve greater flexibility, less transfers and the possibility to perform treatments in the bedroom itself. (C.F.Møller 2008, Rådgivergruppen DNU 2007, Chaudbury et al 2004, NHS Estates 2005 and Aagaard 2009a) Eventually, there seems to be a strong professional request for these single bedrooms, which is naturally utilized in the political choice, and the estimation states that 80 % of all hospital beds will be in single bedrooms within 2018. (Juhl et al 2008)

There is however still a significant number of patients still in request for the social company during hospitalisation, and supporting research even indicate an improved healing process for patients hospitalized with patients of equal status. (Kulik et al 1996) Consequently, there is a call for increased focus on the personal and social needs of hospitalized patients specifically in regards to social interaction and support, where several research publications even emphasize an increased risk of experience loneliness, isolation and insecurity when hospitalized in these single bedrooms. (Andersen et al 2008)

This project therefore takes point of departure in questioning where future patients should search for social interaction and support during hospitalization, and following the evidence-based design research claiming to proof improved patient outcomes when promoting potential social support to patients undergoing critical diseases (Koivula et al 2001, Ulrich et al 2008 and Kulik, Mahler & Moore 1996), the project seek to define new spaces where patients through social interaction and support may reduce their experience of loneliness and fear in the hospital environment. A challenge that calls for young architects and designteams to rethink the interior standards in the hospitals we see today, and a challenge I find personally interesting.

The project will not doubt the choice of single bedrooms, as the advantages seems both well-argumented and essential in regards to the definition of future patients' needs. Instead, the project will bring the hospital-related common areas and the neglected social spaces into justified focus, introducing a vision where innovative architectural solutions will counterpart in a future with designed spaces providing sensory and tactile qualities that encourage social interaction and support. This way, patients will be attracted from their individual bedrooms and the social spaces will contribute to faster mobilizations and eventually shorter periods of hospitalization – satisfying the dedicated intention of health caring architecture.

Ill. 3 - A perspective of 'forum' in the future DNU Skejby

PART ONE

THESIS INTRODUCTION

THE NEED FOR SOCIAL SUPPORT

HEALING ARCHITECTURE

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THE FUTURE CONTEXT

THE FUTURE USER GROUP

HEALING ARCHITECTURE
INTRODUCTION

As introduction, the project will describe and define some of those terms used when considering health care architecture, and according to the planning of future hospitals, the concept *healing architecture* is introduced, and is a seen commonly used by politicians, decision-makers, developers and design teams.

For detached spectators it seems obvious that, when building and planning hospitals, the architectural environment surrounding patients, families and staff, should support the medical treatment in friendly welcoming and accommodating environments. However, the majorities of our current hospitals are built on another foundation, and are often considered the direct cause to stress, anxiety, frustration and generally longer hospitalization due to the unsuited facilities and environments in today's health care system. (Ulrich et al 2008).

As a response to the current state of modern hospitals and as a weighty tool in the discussion of our future health care settings, the term *healing architecture* has gain ground. It is best described as a design concept, which represents the vision of encouraged human well-being and healing influenced by well-designed architectural surroundings. (Frandsen et al 2009).
The architecture itself is not considered the healing source, although factors like daylight, room atmosphere, sound, music, art and optional privacy, altogether are believed to assist in creating carefully designed environments that affects and supports the psychological and physical healing of the patients. (Dirckinck-Holmfeld et al 2007 and Frandsen et al 2009)

With acceptance of the architectural influence on human healing aspects, it is even more obvious that healing architecture should be incorporated in the planning of future hospitals.

Ill. 4 - Photo manipulation from Sansernes Hospital, discussing the influence of art on the human healing process

HEALING ARCHITECTURE
HISTORIC BACKGROUND

The intention behind the concept of *healing architecture* seems immediately obvious and straightforward, and it seems rather strange that not all hospitals are based on these concepts of integrating the architectural environment as support for the medical treatment. However, the idea of a beneficial effect on patient's healing process supported by well designed surroundings is not a new concept. In fact, these ideas may be traced back to thoughts and ideas evolved in the 18th century. At that time, leading doctors and nurses proposed changes in the layout and design of hospitals in order to reduce the danger of contamination by designing smaller wards and increasing ventilation. Later these theories are followed by Florence Nightingale, who in *Notes on Hospital* from 1859 published her philosophies and thoughts of the supporting effect of aesthetic environmental settings for the patient's physical and psychological condition. (Francis 2002 and Nightingale 1863)

In Denmark, the first public hospital is planned by request of king Frederik V in 1752. At that time, the medical knowledge was underdeveloped and the experience of building health care settings were naturally lacking. Decisions regarding the building complex were therefore made on the basis of the architect Nicolai Eigtved's concept, focusing on aesthetic considerations and compositions. The inputs from the medical profession were very few, and as result the first Danish hospital had issues regarding damp, infections and epidemics caused by lack of ventilation, etc. With ongoing changes and modifications, the hospital, however, was functioning in 153 years, and this record and success may be traced to the fine architectural accomplishment with aesthetic considerations and compositions based on the human scale and natural proportions. (Dirckinck-Holmfeld et al 2007)

In 1910 Rigshospitalet is initiated after the closure of Frederiks Hospital, and is built upon the beliefs of the hygienists as a pavilion hospital, where the danger of contamination is reduced by increasing air and light in the buildings. By spreading the buildings in a green surrounding, it was even possible to let in nature and to separate different groups of patients according to their disease. Compared to the planning of Frederiks Hospital, the architect's role in the new Rigshospitalet is considered more advisable and the project is now being developed in cooperation with medical staff and building advisors for the purpose of fulfilling the demands of the hygienic standards. (Dirckinck-Holmfeld et al 2007)
At the time of initiation, the hospital was considered very modern, but scientific progress in the following years started to question the need for isolation between the building sections as the doctors knowledge on bacteriology were enhanced. The technological movement was also significant, and in the first 25 years of operation the x-ray equipment was changed twice requiring new building facilities each time. (Dirckinck-Holmfeld et al 2007)

The ongoing development in the medical and technological field resulted in a competition in 1954 for planning an expansion and new building for the hospital. (Dirckinck-Holmfeld et al 2007).
In order to make the new Rigshospital capable of adapting ongoing changes, some of the governing tools in the process are resulting in flexible and standardized solutions, and the building process is furthermore influenced by the industrialization and the general thought of rationalization. Doctors see patients as an object, where only the documented and evidence-based issues are taken into consideration, and architects are even following these thoughts and ideas themselves.
When the new Risgshospital is finished in the late 1970s it is fulfilling the former ideals. However, after 20 years of planning and processing, the ideas behind the industrialized building are slowly being outpaced, leaving the buildings stand for critics. Still, nearly 40 years after the initiation, there are performed ongoing changes in order to improve the lack of sensory aspects in the building complex. (Dirckinck-Holmfeld et al 2007)

When the hospitals of the 60s and 70s were planned, they were based on the current state of medical and technological knowledge and the belief of the rational progress of treatment. This evidence-based scientific and medical approach had no room for thoughts and considerations regarding the healing effect of the environment, and we see this as result in today's unattractive and clinical hospitals.

RIGSHOSPITALET - 1757

Ill. 5

Ill. 6

Ill. 7

Ill. 8

RIGSHOSPITALET - 1910

RIGSHOSPITALET - 1970

Ill. 9

Ill. 10

Ill. 11

DNU SKEJBY - 2020

Ill. 12

HEALING ARCHITECTURE
PRESENT AND FUTURE

The ideas and the intention behind the design concept healing architecture is, as described, not a new way of thinking, but is rather a continuation of earlier assumptions that the surrounding environment, daylight, nature views and access, etc., had a healing effect on patients. It is believed, that the renaissance of the concept has several reasons originating as a backlash of the current state of hospitals around Europe and the U.S.. With the rapid development of technology and medical science in the 20th century, the postwar hospitals were often results of architect's attempt to create environments fulfilling functional and rational demands, without including patient humanity and spatial qualities in the plans of new hospitals. In today's planning of new modern hospitals, focus is shifting towards patient-centered care and the well-being of patients and their families, attempting to balance the design solution between functionality and aesthetic considerations. (Horsburgh 1995 and Laine & Davidoff 1996).

Politically, the term Healing Architecture and the diverted intentions is also used commonly in the debates regarding the major investment in the Danish health care system. Besides medical and structural changes, the designs of the current hospitals are also an important focal point in the political debate and discussion. Politicians, architects, engineers, designers, etc. are, in order to convince decision-makers, claiming that new hospitals will advance treatment and result in better patient outcomes, if based on ideas originating from the concept *healing architecture* and *evidence-based design*. (Francis 2002 and Stankos & Schwarz 2007)
It may seems strange, that it only takes 40 years to change the perception of Rigshospitalet from state-of-the-art, modern and effective to outdated, unfashionable and unfit for patient care (Dirkinck-Holmfeld 2007 and Nissen 2010). Especially compared to the description of the hospital as 'flexible' and 'general', used when planned and initiated. (Basically the same definition used by politicians and decision-makers today, in regards to the new hospitals.)
Today, the development of society has changed the way we vision the future patient care, and other parameters are now guiding. However, ever since the first build hospital in Denmark, decisions have been based on the current best evidence in regards to specific areas of subject. In Frederiks Hospital, only very little medical knowledge was incorporated in the decisions, and the hospital was primarily based on the architects aesthetic and compositional accomplishments. Later, hospitals of the 1960s were based on rational thinking and the fascination of medical and technological progress leaving them stand today is inanimate cold concrete shells. (Dirkinck-Holmfeld et al 2007).
Today we are building upon this rational thinking, however with a broader horizon. Evidence and science is no longer only related to the medical and technological field, but also discussed amongst architecture and design related concepts as *evidence-based design*. Developed as an extension of evidence-based medicine, research within the field of architecture and its effect on patient outcomes is still gaining ground, documenting the benefits of patients hospitalized in well-designed environmental settings. (Ulrich et al 2008 and Hamilton 2003).
The turning point for the acceptance of the environmental factor of patient's well-being is believed to have its origin in the still increasing field of evidence-based design, and former *ideas* and *thoughts* are now supported by *scientific documentation.*
Through EBD, various proofs has been found, that the sensory perception patients meet during hospitalization have an impact on their experienced level of stress, and if high, this will reduce the immune system causing higher level of infection disease and delayed wound healing. This way, undue noise, interrupted sleep, lack of daylight and generally dissatisfying environments, will all be factors that affect the level of stress negatively. (Frandsen et al 2009, Ulrich et al 2008, Francis 2002 and Horsburgh 1995).

Considering all the various demands and requirements involved in a complex hospital project, it would be naive to think that we have found the definitive solution regarding planning of future hospitals, and that we in 40 years not are facing critiques regarding these buildings. It is also important to remember that the concept of *healing architecture* is basically the recontinuation of ideas and visions from the past centuries. We have not redefined the way we build hospitals, but have just opened our minds towards the human and *healing* influence of the architectural environment - something architecture as profession has claimed through the last decades, but now with the right political words.

However, it is still believed that the, functionally or politically, involvement of healing architecture, basing design decisions on the human individual, the human scale and the human perception, will result in more consisting and promising results than when our hospitals in the 1960's where planned for machines and cynical medical care. The critical aspect remaining is therefore, *how* we can implement this *healing architecture* in our future hospitals and contemporary validate the effect of these healing environments.

The following chapter will describe the general method related to healing architecture, *evidence based design*, and then consider its specific relevance and effect in regards to the future need for social support.

Ill. 13. The arcade at Rikshospitalet Oslo

EVIDENCE-BASED DESIGN
INTRODUCTION

When consulting politicians or decision-makers regarding the new super hospitals and the issues about designing new buildings and physical spaces that will improve the human healing process through attractive and sensory appealing design solutions, the answer often is that "we should use *Evidence-based design*". But what is evidence-based design, and how may it be used in order to improve our future hospitals?

Evidence based design is often related to Healing Architecture as the method and process involved in order to scientifically document the environmental influence on the patient's healing process. Developed on the basis of evidence-based *practice* and evidence-based *medicine*, evidence-based *design* is linking the physical environment with better patient outcomes by using the best current research evidence to guide design decisions, thereby moving towards a new fundamental design process. (Hamilton 2003 and Ulrich et al 2004)
Evidence based design as a method may in general be used either as basis of documenting and qualifying design decisions or to document the decisions-making process in order to collect data to form basis for future decisions and design processes. (Frandsen et al 2009)

The extent of available research within the field of EBD is still increasing. In 2004, there were more than 600 studies linking design solutions to better patient outcomes (Ulrich et al 2004), and with the last years enhanced focus, research in the specific areas of EBD has improved and today more than 2.000 studies in rigorous science is available, resulting in a more advantageous research foundation for future projects. (Ulrich 2010) The amount of specific architectural EBD research, however, is still limited, and is usually concentrated around documentation and evidence using methods from other subject areas. (Frandsen et al 2009) Implementing EBD in specific building projects, is thereby, complicated by the fact that the research methods used within EBD research is originally developed for other purposes and is focusing on separate and specific subjects (lighting, acoustics, human stress, views, arts, etc.) and their effect on the general patient outcomes. In order to have the research results validated, the single subjects in the study are isolated in controllable systems, making it possible to measure and evaluate the outcomes, and subsequently results in very specific and definite subject related research. The application of this research in the actual building projects is consequently related to a great challenge for architects and design teams, as the design process is dealing with far more complex and holistic design issues, where the isolated and separate research evidence seems difficult to implement in these extended stages of the design process. (Shepley 1996, Ulrich 2007)
A basic requirement for the architect and design team is then to examine and interpret the research data critically in order to evaluate the relevance and use of the EBD results in a current context specific building project followed by a re-contextualization before implemented in a project (Hamilton 2003 and Hamilton 2004). Simultaneously some of the research results are in conflict and the design teams should take carefully considerations to decide which EBD results has the significance and contextual relevance that entitles the design concepts to be based on these.

Evidence based design is therefore not to be described as a product, as often done by politicians and decision-makers, and the results from single preceding research cannot be copied in new projects and thereby label the building and design as evidence based. (Hamilton 2003). On the contrary, EBD, is better described as a process or method, where the specific application in a building projects usually requires a hypothesis defining the intended effect of a proposed design improvement followed by an context related evaluation and measurement of the resulting outcome. (Hamilton 2004). EBD is this way not giving any answers in regards to hospital planning but is documenting that the architectural environment have great influence on our state of mind and physical healing process.

Basing design decisions on best current research evidence in complex design solutions may be compared to the traditional involvement of sociological studies and technical considerations in the integrated design process, which architects and design teams has practiced so far. (Hamilton 2003). Architects and designers have always applied science in the design process through engineering and sociological considerations, where integrated design juxtaposes aesthetic, functional and technical subjects in a united holistic design development. In regards to EBD, it is rather the amount of evidence and the specific use of it, which is contemporary. (Ulrich 2010)

Evidence based design in health care architecture is not solely capable of ensuring future well-designed hospitals, and the creativity of architects and designers is still an important part of development of new hospital environments. As a requirement and expectation of decision-makers and politicians, EBD is still to be a part of future hospitals, and it is an obvious task for design teams to evaluate and exploit the potentials of the available research in order to create future healing environments for patients, families and staff.

As it would be impossible to implement all aspects of EBD research in a fulfilling state in this limited project, the next chapter will focus on the available research within the specific topic of *needs for social support,* and consider the use of this research in the later following design phase.

Ill. 14 - The arcade at A-Hus, Oslo

EVIDENCE-BASED DESIGN
THE NEED FOR SOCIAL SUPPORT

The extent of available EBD research is quite significant within subjects like daylight, ventilation systems, acoustic environments, nature distractions, appropriate artificial lightning, better ergonomic design, etc. (Ulrich et al 2008, Frandsen et al 2009 and Dirckinck-Holmfeld 2007).
However, in order to define this project, the main focus will in the following be concentrated on the primary subject regarding the *need for social support*. Social support is associated with the social relations that derive from social activities and interaction between humans, and is in this project defined and applied for patients and their nearby families. In this regard, social support is described as the potential psychological effect of an actual social interaction between humans, and is in many ways comparable to the interaction we experience in the public space. Following the theories of professor and urban planner Jan Gehl (2003) a little further, this kind of social interaction may occur in many levels from passive contacts to profound conversations, and will in all matters be advantageous for patients and their families as they possess great quality and worthiness, as autonomous contact, or as the basis for more developed kinds of contact. (Gehl 2003)
The basic need for social contact and interaction in social activities, will be further discussed in the chapter "The public space" p. 34

When affected by an accident or a sudden critical disease our need for social support is increased in order to manage the stressful and unexpected event. This social support is ideally received from people in our close social network, however when hospitalized this network may be limited by geographical issues, visiting hours, etc., and we need to seek elsewhere for social contact and support. (Ulrich et al 2008) Usually, patients turn towards nurses and staff at the hospital, but also fellow patients, who often are in similar situations, are included in the extended social network temporarily while hospitalized, and are important sources of receiving social support. (Dirckinck-Holmfeld 2007)
Receiving social support during hospitalization has great impact on the patient outcomes and the experienced level of fear and anxiety, (Koivula et al 2001) hence generally results in faster recovery (Ulrich et al 2008).
The research project "Social comparison and affiliation under threat" (Kulik Mahler & Moore 1996) is taking this further, and study the affiliation tendencies of patients facing a novel, threatening situation, and is focusing on how patients interact with their roommates before a coronary-bypass surgery depending on the operation type and status of their roommates. The paper also discuss theories of social comparison processes when dealing with stressful and threatening situations, and argues that there are several reasons for people to engage in social comparison and contact with fellow patients for the purpose of self-evaluation, self-enhancement and self-improvement. Depending on the situation patients engage comparison either with patients being worse or better diagnosed than themselves, for the purpose of self-enhancement or self-improvement. Through questionnaires compared with nurses' observations and patients' medical use, the research team studied how patients interacted with their roommate and how they were dealing with their anxiety and concerns the day before surgery. The research showed that patients assigned to a roommate with the same diagnose, but post-operative rather than pre-operative, were generally less anxious and had a shorter following hospitalization. Patients assigned to no-roommate were comparable to those assigned to a non-cardiac roommate, however with slightly longer hospital stays (Kulik, Mahler & Moore 1996).
This study describe not only the reason and importance of social contact between patients during their hospitalization but also suggest better outcomes for patients assigned to a roommate of equal or excessed status.

Ill. 15 - A typical dayroom in many current Danish hospitals

Similar studies are focusing on the importance of social and emotional support from nurses to patients facing surgery, and finds that patients receiving a great amount of emotional support reports lower level of fear and anxiety. (Koivula et al 2001)
In studies discussing benefits of single-bed rooms rather than multi bedrooms, the need for social contact between patients are highlighted, and through interviews patients who advocates multi bedrooms all describe the aspect of social support and companionship with fellow patients as the main reason for this choice. (Andersen et al 2008, Chaudbury 2003, NHS Estates 2005). It is however difficult to describe the ideal bedroom type for patients in general, as the research indicates variation of choice depending on disease, personality and several other factors (NHS Estates 2005). Additionally, some studies actual describe roommates as the main reason for experiencing exhaust and stress due to lack of privacy, disturbance and interruption of sleep and generally undecided company. (Andersen et al 2008).
Single-bed rooms also make it easier for patients to have visits of family and friends and have intimate and serious conversations without disturbing other patients. (Ulrich et al 2008, Andersen et al 2008 and Chaudbury 2003). In this regard, social support to the families of hospitalized patients is often forgotten, but is still a very important factor to consider. The stressful situation striking patients with serious and threatening diseases are also transferred to the patients' near families who often also require social support in order to adapt to the new situation. (Rasmussen 2003 and Tarkka et al 2003). This support may derive from other family members and friends, but is also considerable advantageous through social interaction with families of other patients carrying similar experiences. (Rasmussen 2003).
The identified research regarding EBD and the need for social support seems only to define a need for social support for hospitalized patients and their families, without proposing ideas or concepts on how this is transferred to hospital layouts, design improvements or the physical environment in detail. In order to document the environmental effect scientifically, the research experiments is based on methods used in quantitative science, and is solely addressing the problem without developing solutions. (Kulik, Mahler & Moore 1996, Ulrich et al 2008 and Frandsen et al 2009)
On the basis of the EBD research it is consequently only possible to define and document a need for social support, hence social spaces, in future hospital environments. Specific design solutions and innovative concepts on how to facilitate this demand for social support is definitively left as a task for the architect and design team to solve, although the design solution and the sensory perception of the room has considerable influence on the possible social interaction. When the first sketches on these future spaces have been developed, EBD methods may then be used to evaluate the improved physical environment in regards to medical and mental health for specific hospitalized patients. EBD will then be used to scientifically prove and document that the environments, planned and build on the basis of the claimed hypothesis is actually beneficial and improves the mental and physical healing process as well as the patient outcomes.
Still, the first step is to develop new ideas and concepts for hospital planning, where these social interactions are rendered possible, and here the architect plays an important role in order to give these common spaces optimum condition for the essential social support. In order to fulfil these social needs of future patients, the following chapter will describe the future context of Danish hospitals in order to define the contextual challenges increasing the need for social support.

Ill. 16 - New spaces for residence in newer hospital environments. From Medicinerhuset, Aalborg

THE FUTURE CONTEXT

INCREASING THE NEED FOR SOCIAL SUPPORT

Despite the comprehensive research advocating social support for patients and their families, there is not identified any recent studies dealing with hospital design and layouts to facilitate social interaction outside patient bedrooms. Single research publications suggest that social support can be increased by providing day rooms, lounges, comfortable furniture in flexible groupings, without dealing with these issues in detail (Ulrich et al 2008 and Horsburgh 1995).

As mentioned in the introduction, the consequence of an overall political choice, is defining that hospitals in the future will consist mainly of single-bedrooms (Juhl et al 2008). This decision is widely supported by current EBD research stating that single-bed rooms in general increase patient outcomes, by adding privacy, patient safety, better sleep and quietness, more effective infection control, etc. (NHS Estates 2005, Chaudbury et al 2003 and Andersen et al 2008). This project will not doubt or dispute this choice but will focus on what other spaces and facilities are necessary in the future hospitals to create and offer new environmental settings for patients and their families to ensure social interaction and social support.
Although the decision regarding single bed rooms is made, research describing the result and negative outcome of patients being bored in the single-bed rooms (Aagaard 2009b), feeling lonely, anxious and uncomfortable (Andersen et al 2008), is still lacking. In order to deal with future situations, medical staffs on a few hospitals are already discussing the need for alternative common facilities, to provide patients with the possibilities of attending functions outside their single-bed room. Doctors and nurses are encouraging patients to take action for their own recovery and faster mobilisation, which requires facilities and spaces for the patients to go. Otherwise they will not get out of their beds, and by time their healing process will be prolonged. (Kehlet 2010 and Klarlund Pedersen 2011)
Furthermore, the potential of the existing common spaces surrounding the bedrooms is today not exploited, and are some places left unattractively empty most of the day (Kehlet 2010). Consequently, it seems essential that these common spaces should be redesigned and redefined in order to adjust to future conditions and to provide new settings for social support for hospitalized patients and their families. The architecture and physical environment in general is in this regard considered important in order to facilitate this social interaction and support between patients, where the common areas should create opportunities for social activities reflecting the everyday life from outside the hospital. Spaces where patients may observe other people, discuss course of illness, engage confidential conversations, informal meetings or even participate in social activities as dining, home-cooking, rehabilitation, exercise, entertainment, etc. All in a welcoming, homely atmosphere with a significant sensory experience - differentiated from the clinical characterized medical environment.

It is believed that these social spaces in general should support these optional activities, where patients feel invited to participate in common activities, and it is believed, that this basic social interaction is the first step towards forming relationships that will lead to social support between patients. Or in another simple way, if the patients are not meeting each other, they will not experience this important patient related social support; and in order to make them meet each other, the physical environment should not only support but even encourage these social meetings.

Ill. 17 - A typical hospital hallway

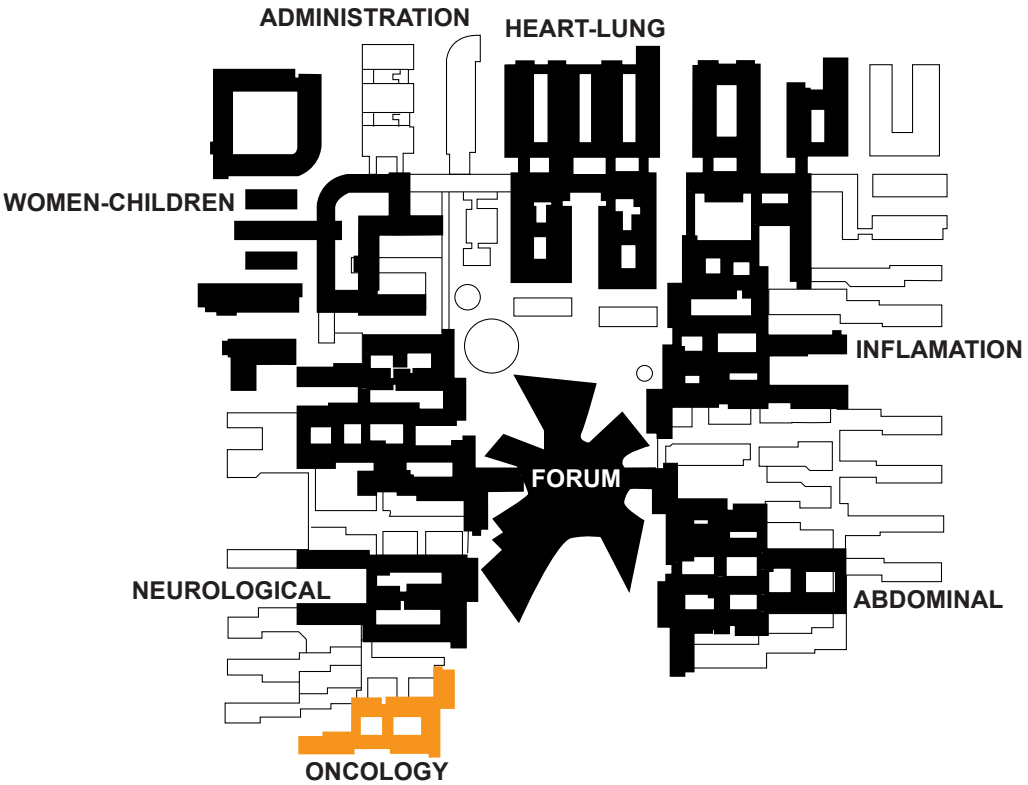
THE FUTURE CONTEXT

A SPECIFIC ONCOLOGY WARD - DNU SKEJBY

The need for social support during hospitalization is depending on the status and diagnoses of the various patient groups, and ideally all different patient wards and social spaces will be designed and dedicated to the individual patients and their specific needs.

Generally, it is believed that all patient wards would gain by having uniquely designed social settings, such as living rooms, patient kitchen, common areas, etc., where patients would interact with each other or just sit and watch the ongoing presence. However, for the further process and in order to define the project, the focus and development of these new spaces for social support will be designed on the basis of one specific patient group and take departure in a particular block in the future DNU Skejby.

Various considerations regarding patient groups has been made in order to finally select and base the project on the Oncology block of DNU Skejby. Oncology patients have, as well as other patients, needs of social support during hospitalization. In the particular case regarding oncology patients, this social support, is even more important, as the social support has influence on the stress level and have documented effect on patients' immune system. Cancer patients receiving chemotherapy experience reduced immune system, and basic trivial infections remain the single most important risk factor related to cause of death. As social support has a proven positive effect on the immune system, this is considered important in the recovery process, in order to stabilize and improve the patients healing conditions. (Lekander et al 1996).
The specific block and context will be further analyzed and described in the chapter "DNU Skejby" as introduction to the sketching phase. To follow the thesis introduction, the next chapter will define the users of the specific oncology ward in focus - people affected by cancer.



THE FUTURE USER GROUP

PEOPLE AFFECTED BY CANCER

When any patient is diagnosed with cancer, a range of arrangements and precautions are made, and the treatment is usually initiated immediately after being diagnosed, including ambulant visits and potential surgical procedure. These treatments are often performed, while the patients are either at home or hospitalized in the relevant surgical ward. If the patient is experiencing severe symptoms or other difficulties in their course of disease, a hospitalization on a oncology ward may be necessary. (Århus Sygehus 2011)

Through political debates, the patients in our future hospitals are described as being more sick and weak than today's patients - due to enhancement of ambulant treatments and a general more effective procedure, resulting in faster discharges. (Juhl et al 2008 and Kehlet 2010) According to the extrapolation of the expert panel, patients in future oncology wards, will this way only be hospitalized in 2-3 days in average – typical through their most critical period of illness. (Sundhedsstyrelsen 2010, Juhl et al 2008 and Danske Regioner 2008)

With this definition of future patients, and the relative short period of hospitalization, it may be argued, that the patient's experience and social interaction are not essential during their time in the hospital compared to the medical treatment. As such a logical conclusion that on the other hand would be a direct continuation of the mistaken arrangement of previous hospitals from the 1960's, with layout and design solutions completely off from the human scale, finally resulting in a strongly criticized hospital environment without sensory qualities.

Instead, I believe that it is crucial that we, when considering the actual design of our future hospitals, are focusing on other aspects than the simplified average statistics, as no patient will ever follow these. As general basis of evaluation, the statistics may help decision-makers to get a fundamental understanding of the future needs for hospitals, but in the planning procedure and design phase, it is crucial to think of patients as humans instead of numbers. Patients, who like everyone else, have social requirements and a basic need for engaging social interaction. Otherwise, we will simply build the same hospitals once again.

The fight against cancer, is not solely fought with advanced technology and fixed medical treatment, but is requiring a basic knowledge on what cancer does to the human and its physical and psychological condition. Especially through the severe courses of disease, it is essential to experience closeness with other people in order to feel safe and comfort in the social hospital environments. (Rasmussen 2003).

Social relations and the influence on cancer

Our relation to other people is proven to influence our health, and persons in a partnership have this way a generally better health than singles. This may result from the positive influence by our close relationships, or may in some cases be directly related to the social and emotional support.(Zachariae & Christensen 2004) The human is generally a social creature, and our relationship with other people – our social relations – is a central aspect of our life. The amount of social support that cancer patients is experiencing, and especially the possibilities to discuss ones disease and treatment with other cancer patients, is considered very helping in the stressful periods of the disease. (Zachariae & Christensen 2004)
The diagnose of cancer and the course of disease in general, is often causing reactions of stress, anxiety, anger, irritation and despair for the patients and their families, in a broad mix of emotional confusion. The risk of developing a profound depression is increased due to experienced social isolation and lack of control over the situation.
The patients are undergoing an overturned process of adaption in order to accept and understand the disease, changed prospects, various treatments, etc. Through this process, the social support is considered an essential aspect for the patients, as persons experiencing social support is less likely to develop stress and depressions. This social support is usually provided by families and close relatives, but also other persons, perhaps with similar experiences, is likely to offer helpful support at this stage. (Gram 2004)

Patients to patients

Cancer is a very difficult disease to handle alone, and it is important for cancer patients to have a social network to turn to for comfort and support. Other patients with cancer is in this regard a useful source for this social support, and especially for inculcating hope and belief. They may originate from various different places, however tied together in a destined community – all speaking the same language. (Rasmussen 2003).

The solidarity with other patients may range from intense conversations and social support to observations and inspiration of other patients activities and actions (Johnsen et al 2005). In all cases, the support and presence of other patients, are experienced as positive, and the patients are not feeling left alone with their disease. (Thomsen 2004).
Particularly when facing surgery or changed treatments, the social support from other patients is proven useful and beneficial.

Patients and their families

A serious disease as cancer is not solely affecting the patient, but typically the entire family. Partners, parents, children, close relatives are also implicated by the disease and long period of treatment. As it is important for patients to meet others with equal status, families of can-

cer patients also benefits from joining networks of other relatives to cancer patients. In these forums, the families may talk freely about problems and difficulties without influencing the patient. (Rasmussen 2003 and Kruse 2011) For the patient, the relatives and families is an enormous support. They are standing closest to the patient through the disease, and it is important they are prepared for this course. In many levels, the families are considered a great resource for patients, and may even be a helpful source for the health care personnel in order to assist in some aspects of care. (Johnsen et al 2005).

Families to cancer patients are experiencing a tough psychical stress, but their well-being is rarely in focus. Depression, confusion, anger, sadness and other negative feelings and emotions are often unavoidable consequences for the relatives to a cancer patient, which may be overcome or reduced with increased social support to the families themselves. (Hansen & Thastum 2005)

Social support in a future oncology ward

To summarize, it is believed, that cancer patients is requiring a high degree of social support to adapt to their new situation. This support is typically provided by their families, but may also derive from social interaction and knowledge sharing with other patients in similar situations.
The patients is of course sick, when hospitalized, but even for shorter periods of contact with the hospital environment, it is considered important for patients to experience social interaction in order to satisfy their mental condition. The outlined user group for this project, is on the basis of current research and analysis overall defined as people affected by cancer. This group includes both patients as well as their nearby families. The main focus point in the later following deisgn phase will be the patients themselves, and the needs of their families will be taken into consideration as well. This way, future hospitals should provide facilities for social support and include new common spaces for social interaction and knowledge sharing, where patients hospitalized in single-bed rooms have the possibility to meet each other, and their families do not feel in the way of the medical staff. With the current plans for new Danish hospitals, we will, through the next couple of years, experience an increased need for spaces where, social activities are reflecting the everyday life, and where patients engage in conversations or informal meetings, all set in a welcoming, homely atmosphere.

SUMMARY PART ONE

THE NEED FOR SOCIAL SUPPORT > THE SPACE FOR SOCIAL SUPPORT

When hospitalized, it is not only the patient's disease and the need for treatment that moves to the hospital. Human needs and the practical every day follows - although often in physical surroundings that limit the human unfolding and the essential psychological healing.

The patient is severely ill and already affected by stress and fear in order to cope with the medical treatment (Dirkinck-Holmfeld 2007), and additionally the physical surroundings are affecting the level of stress negatively. (Ulrich et al 2008) At once, basic everyday activities are involuntary suppose to take place with unknown people, and visits from family and friends are furthermore limited due to inflexible visiting hours and the families' feeling of being in the way in the confusing, clinical environment. The patients' reaction to this experienced physical chaos often leads to isolation in the bed with television and reading as the primary action. Although the patient are weakened and ill, the physical environment and the institutional interior are contemporary considered a contributing reason to the fact that patients actually prefer staying in bed – There are simply no places to go. (Kehlet 2010) The consequence of this is directly described as worse mobilisation, increased medical use and generally longer hospitalisation (Kehlet 2010, Klarlund Pedersen 2011 and Kulik, Mahler & Moore 1996), which is not improved by the future choice of single bedrooms. The risk of increased fear, isolation and insecurity in patient experiences are not considered in regards to this concept of hospitalization (Aagaard 2009b), and the opportunity for the essential social support and knowledge sharing between patients are consequently reduced. (Koivula et al 2001 and Kulik, Mahler & Moore 1996)

If the patient-centred care in this field should be improved, it is conluded that there are immediate call for new attractive social spaces, which by organisation and design are capable of mobilising the patients and encourage them to take part in the ward's social community - enabling social support.

Hence, the future hospitals require redefined social spaces that promote the social interaction between patients, and act as inviting and accommodating common areas, where patients and their families feel as a natural part of the social environment. The vision for these social spaces, are a design and layout so attractive that the patients, as their disease allow, are turning to these social spaces whenever awake. This may be in shorter or longer periods during their hospitalisation, which should ensure the important mobilisation and the potentially social contact with other people.

The need for social interaction and support in the hospital are today essentially important, and one of the tasks for the future health care architects are to redefine these social spaces that frames the social community. Hence, the following phase of the project will focus on some of the architectural effects that may be implemented in the design of these future social spaces in order to define how the physical environment may facilitate and promote this social interaction and support.

Ill. 18 - A current space for social support in Rikshospitalet, Oslo

PART TWO

ARCHITECTURAL EFFECTS

THE SPACE FOR SOCIAL SUPPORT

THE SPACE FOR SOCIAL SUPPORT

THE PUBLIC SPACE

THE HOMELY ATMOSPHERE

THE THEORETICAL APPROACH

THE CASE STUDIES

THE VISION

THE ROOM PROGRAMME

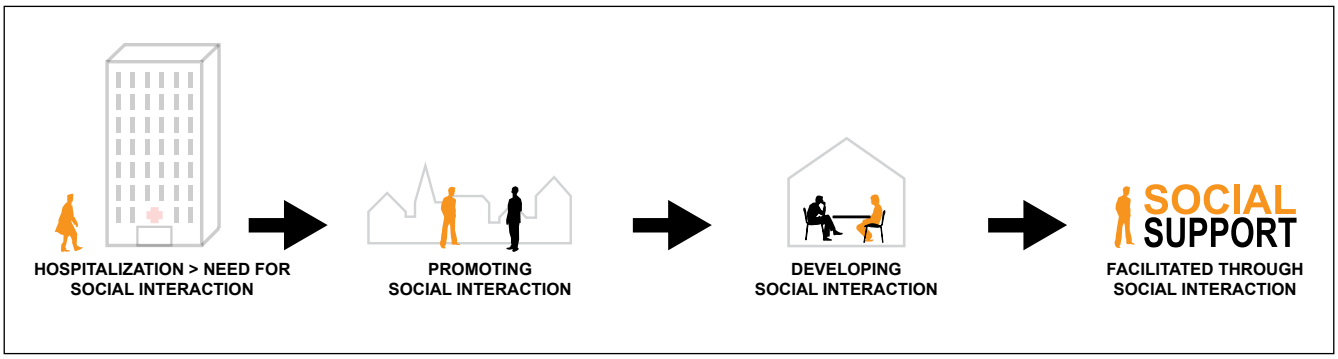
THE SPACE FOR SOCIAL SUPPORT

INTRODUCTION PART TWO

In PART ONE of this project, hospitalized patients' requirement for social interaction and social support has been identified. When hospitalized, the everyday is changed dramatically, and the patients' general level of stress is increasing – and not only because of a suddenly overturn in disease. (Dirkinck-Holmfeld 2007) Also struggles to perform simple every day activities combined with a low frequency of visits from family and friends may occur as factors of stress. (Ulrich 2010) The future planned single bedrooms is furthermore causing risk of increased experience of loneliness, depression and fear (Andersen et al 2008), and the need for social contact while hospitalized is maybe even more important in the future.

Future spaces for social support are consequently considered an essential aspect in order to promote general social interaction between hospitalized patients and secondly as physical facilitator for social support enabling knowledge-sharing and diverted inspiration between patients. If succeeded, the healing process of the single patient is believed improved by faster mobilization, less medical use and faster discharge as result. (Kehlet 2010, Koivala et al 2001 and Kulik, Mahler & Moore 1996).

Social support in future hospitals is considered facilitated through social interaction that may appear in various different levels and intensities. The social interaction experienced in the hospital is far ranging from the passive contacts, where the patient may observe others of equal status, through informal meetings as comparable to those we experience in trains, parks, city squares, etc. and to the deeper conversations and profound social relationships we recognize from our homes in safe and comfortable surroundings. (Gehl 2003) Through these human interactions, the opportunity for social support will arise, and knowledge sharing and inspiration with patients of equal status are potentially forthcoming. In order to facilitate this social support, the physical surroundings claim ideal settings where the common areas are framing both initial contact and developed social relationships. In this regard,



Social support during hospitalisation is experienced in various levels of intensity. The need, the promotion and finally the development of social interaction is the main essential steps towards the potential social support.

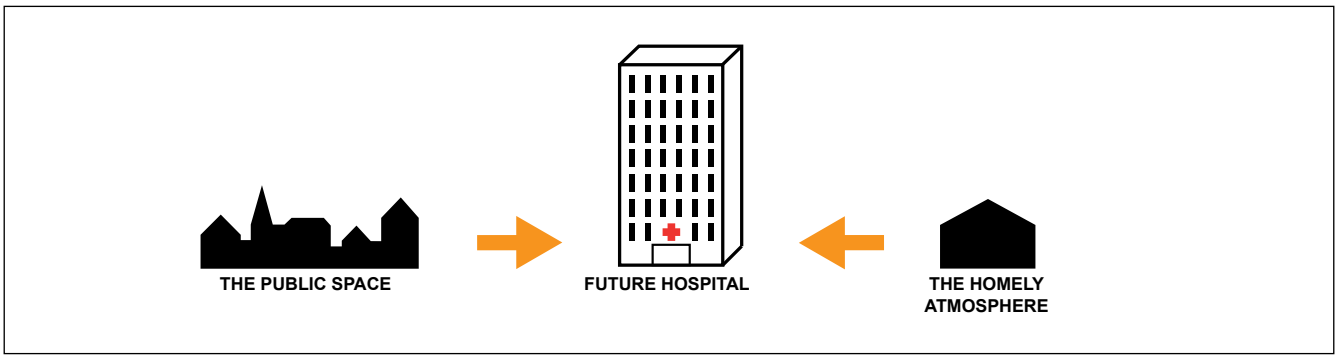
Ill. 19 - Social spaces at Medicinerhuset Aalborg

Ill. 20 - Hallway area at Sygehus Vendsyssel, Hjørring

the social space may be seen as an intersection between a public space and a homely environment. This even corresponds to the more practical functions, which the patients experience when being transferred to the hospital. Usually our everyday activities are performed with our family and friends, while in the hospital these simple familiar activities suddenly are occurring with unknown people in a semi-public space.

If improved, these future social spaces are believed to promote the psychological experience of space, and may even be considered as an influential element in regards to healing architecture. There are, however, not found any specific EBD research that define detailed aspects in regards to design and physical planning of these spaces. (Ulrich et al 2008) Instead, the project is stating the thesis that by introducing architectural and anthropological theories, a more thorough understanding of the human perception of space and even specific transferable architectural aspects may be defined and incorporated when designing social spaces with inviting, attractive and sensory aspects in future hospitals.
PART TWO of this project, will firstly present some overall architectural theories focusing on how people meet and interact in public spaces, and secondly describe how a environment characterized by a homely atmosphere may effect our comfort and well-being in various places outside home.

As closing compilation, the architectural and anthropological input of this part will be defined as a theoretical approach, including three main aspects, used in following case studies, where similar effects are used to create a desired experience for the patient/guest.
Altogether, this part should give renewed input to the understanding and following design of future spaces for social support.



Social spaces in future hospitals may be seen as an intersection between public spaces and homely environments.


Patient restaurant at Lund University Hospital


Elements in the social dayroom at Lund University Hospital

THE PUBLIC SPACE
HOW TO PROMOTE SOCIAL INTERACTION

As earlier described, the amount of research focusing on architectural effects in relation to design of new common facilities and spaces for social support in future hospitals is limited. Instead, this chapter will introduce some of the general theories regarding social interaction and human behavior in the public space that architects and designers has used until now when planning and designing urban scapes. Although the context is not directly the same in this project, there are still believed to be considerable similarities between the social interaction and support in the public city scape and the social spaces in future hospital scapes.
The chapter is consequently based on the writings by architect and professor Jan Gehl and anthropologist Edward T. Hall, in their theories described in *Livet Mellem Husene* (Gehl 2003), *Byer for Mennesker* (Gehl 2010), and *The Hidden Dimension* (Hall 1973), respectively.

Call for social contact

The call for social contact between individuals is a concept that covers many different variations, from simple unpretentious contacts to more complex and emotional conversations and intercourse. (Gehl 2003).

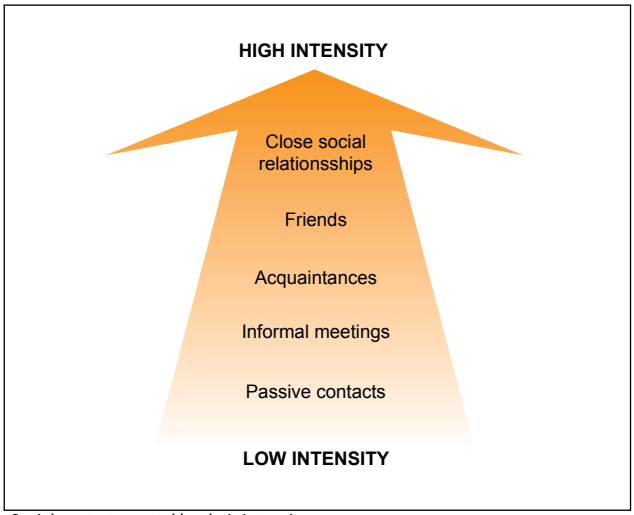
Jan Gehl defines in *Livet mellem Husene* (2003), the various contacts by their intensity, where close relationships have great intensity, and the passive and casual meetings have low intensity.
From this figure (below), the public space primarily represents the casual and passive kind of contacts, which compared to the more intense contacts are considered modest. However, they still possess great quality and worthiness, as autonomous contact, or as the basis for more developed kinds of contact. For instance, as maintenance of existing relationships, and especially as inspiration of acts and activities, that other people are performing. (Gehl 2003)
If this basic social contact is not obtainable, the boundaries between isolation and social contact are too pronounced, and you are either alone or in binding connection with others. The social contact on the low intensity scale is therefore an evident and important possibility for persons to interact with others on a casual level, and perform as transition between various kinds of contact. (Gehl 2003).

As the in hospital social support presupposes that the patients meet each other, these levels of social contact is still important, and considered the basis for any social support. The establishment of inviting and attractive common facilities and dayrooms in future hospitals is therefore seen as the fundamental requirement needed to provide facilities and spaces for social support.

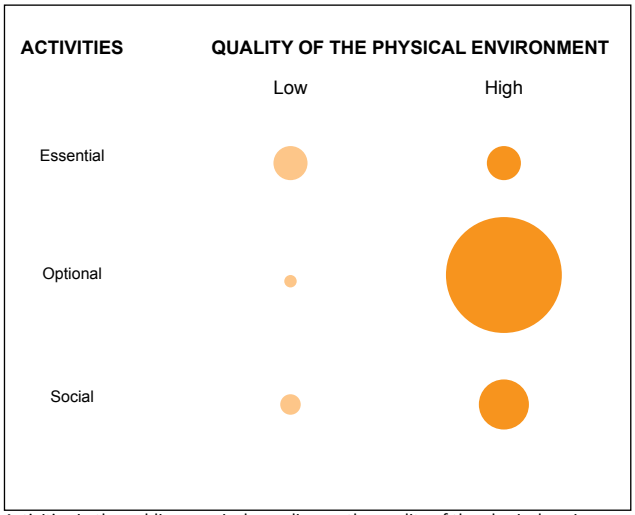
Activities in the public space

In regards to activities in the public space, Gehl (2003) defines three types; essential activities, optional activities and social activities – all with different demands to the physical environments.
The essential activities are conducted regardless the physical environments (Gehl 2003), and compared to hospitals this may be the medical treatment, which have no influence on the physical planning of the social environments at the hospital.

The optional activities however, are defined as activities only accomplished when desired, and these activities are only seen, when the physical environment is appropriately suitable. (Gehl 2003) In the perspective of this project, the



Social contacts sorted by their intensity.



Activities in the public space is depending on the quality of the physical environment.

optional activities may be the social interaction in common facilities, a relaxing walk, informal conversations, etc. These optional activities have great value regarding the social conditions, however if the public or social space is in unfulfilled state, the only activities present would be of essential character.
Social activities are often included in other activities with the presence of other people as condition. These activities may be described as resulting activities and appears usually instinctively, when people are interacting. (Gehl 2003)

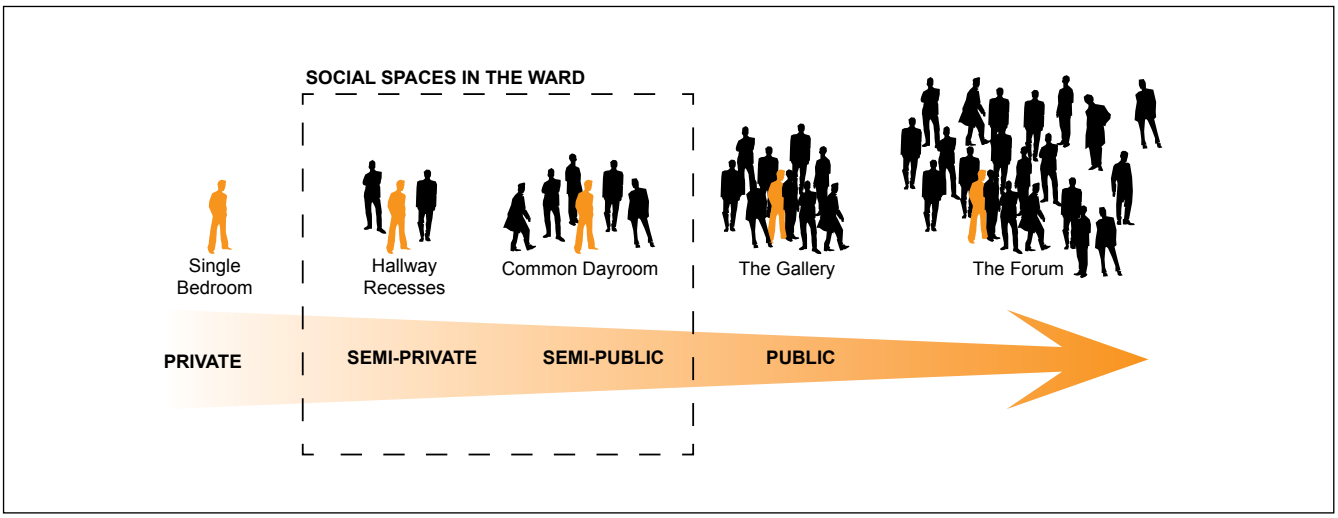
Social activities

Social activities have various different character depending on the situation in which they occur. Ranging from comprehensive greetings, conversations and discussions to less intense public occasions, where superficial passive contacts (see and hearing contacts) act independently as a significant form of contact. These initial social contacts may in all cases be further developed, if a common foundation is created, where people have background, interests or problems alike. (Gehl 2003)

The physical environment and the functional programming of the space is, in aspects of social contact, greatly responsible for the opportunity for expression, and room layouts, accessibility, common facilities, materials, textures and sensory aspects etc. has significant influence on the human behavioral patterns. (Gehl 2003)
The architect may, when designing common spaces, consider the intended social structure of the environment and correspond the physical environment with these objectives. In this case, a graduation between public and private spaces is advisable in order to facilitate flowing transitions between different social or private spaces, creating greater comfort and affiliation in public spaces, hence increasing the actual use. (Gehl 2003)
Programming of common and private spaces in the patient ward, may this way be organized in a hierarchic system from the private patient room, through gradual spaces of semi-private areas just outside the patient room, semi-public spaces in the ward and the public central forum.
Another aspect to consider regarding activities in public spaces is use of the invitational effect. If it is possible to see ongoing social activities, this will act as invitation for others to join. This may be even further enhanced by planning public destinations, where it is obvious to go for social interaction. This presupposes that the destinations have meaningful activities, which beside the activity itself provides subjects of conversation during and after the performance. (Gehl 2003)

Importance of space

The physical planning itself has no influence on the quality, content and intensity of social relationships and activities. However, the surroundings still provide the essential possibility for people to meet and interact and are especially important for creating passive contacts. (Gehl 2003)
It is this way possible to influence behavioral patterns through detailed planning, and this way give better conditions for social activities and interaction. In urban areas this is exemplified in districts with high-rise buildings, underground parking and lots of traffic, where only few people are walking or staying outside. Contrary to this, we see many people outside in those districts dominated by smaller buildings in human scale, where the indoor spaces are complimented by usable and active outdoor public spaces. (Gehl 2003).



The gradual transition of private and public spaces in DNU Skejby. The focal point in this project is the social spaces in the ward - the Hallway Recesses and the common dayroom.

In every aspect of human communication, the body language and distances between people are of immediate and unconscious importance. A person makes close approach, is leaning backwards, turning around, etc. All these body movements are used as a common set of rules in order to perform human interaction and are essential for comfortable and secure participation in the public social activities. Many of these rules call for the right physical surroundings if they have to work the intended way. Two persons meeting in a staircase, for instance, may find it difficult to commence conversation, as the space around them is not suitable for this. One of them is standing higher than another, and the distance between them is often too short. (Gehl 2010) This is just a basic example of the importance of space in regards to human communication or interaction, but there are similar considerations that are necessary to keep in mind, when designing spaces for people to meet.

Sociofugal and sociopetal spaces

That the physical environment often performs a very specific character in regards to social interaction also concerned anthropologist Edward T. Hall (1973). In the writing *The Hidden Dimension*, he refers to a research study performed by doctor Humphry Osmond, who ascertained that some types of spaces, for instance waiting rooms in train stations had the ability to keep people apart, while French cafes did the opposite and made people engage interaction. He defined the arrangements that discouraged social interaction as *sociofugal* spaces and the spaces that encourages and enforces the development of interpersonal relationships as *sociopetal*. Meanwhile Osmond had observed that the patients at his psychiatric ward apparently were talking less with each other the longer they were hospitalized, and that the hospital evidently were reflected by sociofugal spaces. Through extended studies in collaboration with a psychologist, Osmond discovered that with only minor changes in the ward and by adding more and smaller tables with a sociopetal seating arrangement, it was possible to improve the social aspects in the ward and encourage social interaction.

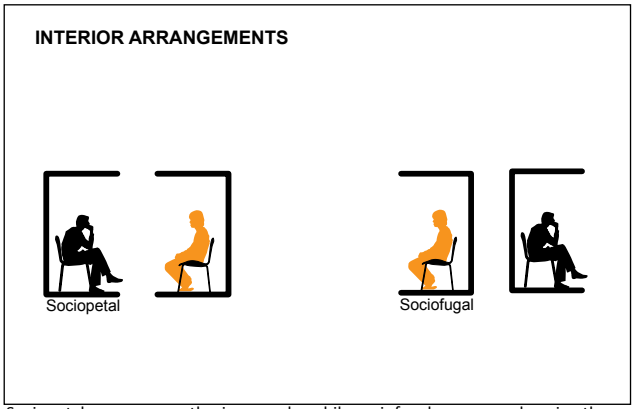
When designing future spaces for social support and interaction these aspects discussed by Hall (1973) are essential for the architect to consider, as it only takes minor adjustments to improve the settings and change the space from sociofugal to sociopetal. The room and the physical space is a prevailing factor but also the furniture layout is important in this aspect. By placing lounge chairs back to back, they will immediate create a sociofugal environment making it very difficult for these people to interact. However, if turned around and situated face to face, the chairs instantly becomes sociopetal. This of course, is a extreme example, although it shows the importance of focusing on the details when designing these spaces, and generally, there are no positive or negative connotations in the terms sociofugal and sociopetal. In some occasions the sociofugal setting would be preferable, for instance when studying or reading, and what is considered sociofugal in one context might even be sociopetal in another situation depending on the occurring activity and the people involved. General problems, however, may arise when sociopetal arrangements of furniture are placed in areas where privacy is sought or conversely, sociofugal settings are characterizing spaces for social interaction and support.

The challenge for the architect is consequently to design spaces with accordance between the physical space and intended function and to maintain diversity between the different spaces in order to give people the choice for social interaction or privacy depending on the circumstances and their own state of mind.

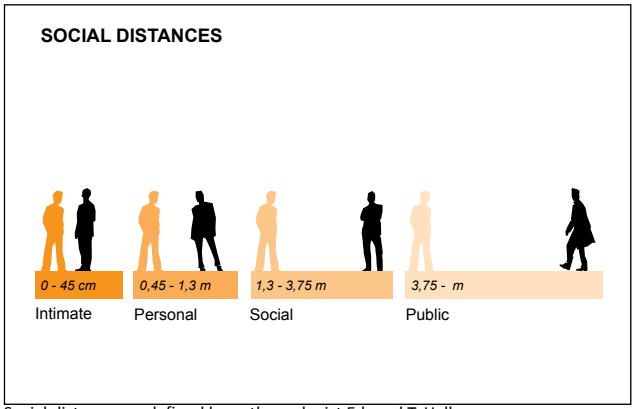
Designing in details

Small details may change our perception of any space rapidly, and if only prioritized by the architect, spaces for social support may be improved significantly in future hospitals.

In regards to the human interaction in public spaces, this is best unfolded on the horizontal level, where it has a rather large area of function. On this level, the social visual field is



Sociopetal spaces are gathering people, while sociofugal spaces are keeping them apart.



Social distances as defined by anthropologist Edward T. Hall

capable of intercepting other person's features and mood in distances up till 20 meters, and in shorter distances (1-3 meters), where we normally perform social conversations, our visual senses are supplemented with other senses in order to form a general impression of the person we are talking to. (Gehl 2003)

Hall (1973) defines very precise personal distances, where 0,45 – 1,30 meter describes the close social contact between family members, for instance around the dining table. Distances between 1,30 – 3,70 meter is defining the more public social distance between friends, colleagues, etc. and is usually seen in comfortable seating arrangements. These personal distances influence many details in the planning of social spaces, and for instance this affects the sizes of tables. If too small, two patients not knowing each other, would most likely not sit at the same table, as their intimate distance would be violated. Too large tables however, may make it difficult for patients to talk together across the table. Studies through the design phase are to consider these aspects in order to develop social spaces where patients find it natural to meet and engage contact.

Through other studies of human behavior in public spaces, Gehl (2003) argues, that the social activities in the public space has a self-perpetuating effect, where human actions attracts attention and thereby more people. These studies show for instance, that the use of benches in public spaces are depending on their orientation, where those situated towards human activities are used more than those placed in quiet green environments. (Gehl 2003) As well as the sizes of furniture the orientation and layout also have significant importance in regards to use and social interaction.

Finally, the placement of furniture in the room is noticeable, where seating environments along with the inner facades of common open spaces or in the transition zone between two areas usually are preferred. In these places ones individual exposure is limited, and it is easier to create an overview of the surroundings and to feel comfort in these situations. (Gehl 2003).

Summary

The physical environments have great influence on our social behavior and the possibilities for patients to engage social activities promoting social support. It is still important to keep in mind, that it is not the architectural surroundings that define the quality, content or intensity of social conversations, and great architecture alone does not guarantee social support.
However, Gehl (2003 & 2010) and Hall (1973) have defined some very specific effects and aspects regarding social contact and informal meetings in public space that may be incorporated in future health care design. The significance of a gradual transition between private and public spaces are believed to be directly transferable to future patient wards, along with the general understanding of the importance of social interaction between people in public spaces. Besides that, inviting social activities, as attractor and topic of conversation, and focus on details and planning in the human scale are primary aspects that may be transferred to social spaces in a future patient ward. These will along with the result of the chapter 'The homely atmosphere - how to develop social interaction' be compiled and translated to a hospital context, and used to describe and evaluate the chosen case studies in the later chapter 'The theoretical approach'.

The theories discussed in this chapter, may assist in letting patients in a hospital ward meet each other, but in order to develop these spontaneous connections, it is my thesis that the common spaces should provide more than just the possibility for patients to form this basic contact. The next chapter will therefore focus on how the social spaces may facilitate developed social connections in areas, where patients experience the homely atmosphere.

Social interaction in the public space. Picture from Yokohama International Port, Tokyo

THE HOMELY ATMOSPHERE

HOW TO DEVELOP SOCIAL INTERACTION

As concluded, my thesis in the project is that spaces for social support in future hospital environments is defined as an intersection between the public space and physical environments with a comfortable, homely atmosphere - a social place, where patients engage meetings and social interaction, thus enabling social support.
The first step towards social support is consequently for the patients to meet each other, which may include the theories of Gehl (2003 and 2010) and Hall (1973), described in the previous chapter 'The public space - how to promote social interaction'.

The next step is to develop this initial social interaction to intense level, and this process is believed to require specific demands of the physical environment. In our daily life these levels of profound conversations are usually performed with our families or close relatives in safe and familiar surroundings. (Rasmussen 2003) When hospitalized, the family contact may be reduced (Ulrich et al 2008) and the environment today is often characterized by institutional settings – far from familiar and well-known. (Kehlet 2010) Hence, the two aspects that form the basis of this social interaction and support in our everyday life are apparently not present today.

From an architectural point of view, it is very difficult to get the family to increase their visits and this is not the focal point in this project. Instead, other patients and the hospital staff may substitute the family as source of social interaction and may even be a better social support in some health related occasions. (Kulik, Mahler & Moore 1996, Andersen et al 2008, Chaudbury et al 2003)

When any patient is hospitalized, it is not only the disease that moves in. The daily routines and everyday life are forced into fixed boundaries, where the general freedom of choice, today is strictly limited. (Kehlet 2010)
Naturally, the main reason for hospitalization is the medical treatment, which of course is a break from the well-known every day. However, the things concerning the social interaction and the allocated social spaces do not necessarily have to be so different from the spaces we recognize from our daily life and our own homes.
The physical space defines the way we act in any room (Hall 1973 and Rasmussen 1966), and by changing the design, hence perception, of the hospital dayroom to an inviting, familiar and homely environment recognizable for the patients, it is believed that the conditions for social relationships between patients are improved, and social sup-

The Maggies Centers are all build upon the belief of architectural influence in the experience of the guests, and as the director of Maggies London says: "The buildings does half the work" (Quoted from Kræftens Bekæmpelse - Ny Kræftrådgivning i XXXX, 2011)

port in future social spaces are made possible.
The question remaining is how this home feeling and homely environment is defined outside home?

Feeling at home

Home is by the anthropologist Mark Vacher (2006) defined as a connection between a human being and a physical object. This object is usually a building, although more primitive units also perform as homes with the same psychological characteristics. A home is personal and intimate, and not something you can buy. When we talk about houses we are capable of describing them without mentioning the people living there but when we describe a home it always belong to someone. (Vacher 2006).
That our homes are personal is exemplified by Sjørslev (2007), who define a building as a house as soon as someone moves in, although this house is not a home until it is personalized and the resident have supplied his individual touch. Our home is therefore filled with personal objects, memories, heirlooms, etc., and even though our daily use of these objects may be of functional or aesthetic character, the sentimental value often exceeds the functional value by far. (Sjørslev 2007)

Home, as a concept, has in recent years been presented as a need and a cultural norm commonly used in many various occasions. In *Hjemlighed – kulturfænomenologiske studier,* anthropologist Ida Wentzel (2007) is in this regard describing four different categories defining home: *'Home as an idea'*, which describe the conception of home; *'the home'*, as the physical place; *'Feeling at home'*, describing the mood and atmosphere experienced when being in a homely place; and finally *'To home it'* (at hjemme den), being the individual tactics used in order to pretend and behave as if at home.
To home it, is further described as relaxed lounging in the couch, walking around barefooted, eating from the refrigerator, cooking, etc. The ability *to home it* does not necessarily require being at home, but may occur other places as well. It is not a mechanical act, and you need to feel inclination and will in order to achieve this behavior and thereby derive the feeling of being at home. Some of these tactics deal with the ability to capture the space and turn the strangeness familiar, and may occur when any person creates an individual homely atmosphere in the new unknown space. (Winther 2007)
As these tactics are strongly individual and personal, conflicts may occur, when different people separately attempt

Ill. 21 - Kitchen and dining area in a typical modern Danish home

to home it in the same space. Various moods, habits and tactics might be quite inconsistent, and maybe even uncomfortable. In the single bedroom, this personalizing is achievable in some degree, but as the common dayroom should service all patients, the tactics regarding *to home it,* should be handled with certain reservations and care. Consequently, the spaces for social support can not only be described as a homely environment, but needs to be combined with features from public spaces, as earlier defined.

Instead, the project defines *homely atmosphere* in regards to Winther's (2007) description of *feeling at home*, where this feeling is leveled at a certain space, other people or various combination creating the mood in general. The *homely atmosphere* is therefore not linked to one specific place and a hotel room or a restaurant (although far from every one) may even be a place where a feeling at home is experienced. There are certain aspects influencing this potential atmosphere, and the primary one is *recognizability*. The *feeling at home* is consequently often experienced in places where functions, activities or elements are memorable – without necessarily being exactly alike. (Winther 2006)

Home outside Home

Following the definition of *feeling at home* by Winther (2006), it is the thesis of this project that it is conceivable to define future social spaces with a familiar and homely atmosphere by implementing some fundamental characteristics derived from our homes and everyday life.
One of these characteristics is the activities and potential functions of the room. Today many of the daily activities and routines in the hospital are performed without involving the patient, where for instance meals are planned in advance, cooked in large industrial kitchens and served at certain times. Many functions are relieved from the patients in order to focus their energy to recover, although some of these activities are believed socially advantageous if performed by the patients or their families themselves. The social space would then instantly be a more recognizable hence homely place with increased possibilities for social support, and a place where the family or relatives would feel welcome or maybe even useful?
Another essential characteristic related to the homely atmosphere is believed to be the *materials and textures* of the dayrooms. Today these rooms are often marked as institutional and are often decorated and furnished as the bedrooms, hence the distinction between the dayroom and the rest of the hospital are often immaterial. The materials used in today's hospitals (wood, fabrics, textiles, colors, etc.) may be the same as we use in our own home but the way they are used have very different conceptions. Textiles are for instance a material that is used rather cursory, and does not derive the potential as we experience in our domestic environment. At home, textiles are applied for curtains, carpets, blankets, cushions, etc. all adding a tactile perception to the material, which imply comfort and cosiness to the space and experience. This tactile experience is according to Rasmussen (1966) appreciated in all physical environments, as it evoke our tactile memories and may be seen as one of the guiding parameters in order to evaluate the structure of a building. Rasmussen claims that only few architects are focusing on this tactile importance, while the majority is randomly applying textures to the inner and outer surfaces without consciousness or any other considerations. Today this critique may be noticed in many hospitals, as the high restriction in regards to hygienic and durability demands have excluded nearly all tactile materials, including textiles, from many applications. However, recent research and development in smart textiles is improving the potential use of textiles in new recognizable ways in future hospital environments, where the use of tactile and sensory materials, like textiles, would be possible to implement with great beneficial value. The potential of textiles in health care environments will be further discussed in the sketching phase.

Finally, the details and arrangement of furniture should reflect a homely environment. The size of the room, furniture orientation and the room accessories like artwork, greenery, light fittings, etc. are important aspects that should be incorporated and considered along with the design of the space, in order to design a holistic social space facilitating social interaction and support.

Summary

The homely atmosphere in future hospitals may be difficult to define, as our home is usually very personal and individual and therefore impossible to transfer directly to a health care environment.
However, it is the thesis of this project, that by implementing three fundamental characteristics of our home and everyday life, including *functions*; *materials and textures* and *details*, it is possible to create a more *homely atmosphere* in the social spaces, than we experience today. This atmosphere is considered beneficial for the more developed levels of social interaction and social support, as the conversations in safe, comfortable and homely environments are believed to be more outspoken and emotional than the acquaintances in the regular, standardized and clinical dayrooms we experience today.
To further underline this thesis, the later following case studies (page 46) will examine inspirational examples, where the homely atmosphere is brought outside the regular home-environment, in a space and room designed to give you a feeling of being at home outside home.
The next chapter will summarize the present research from PART TWO in a unifying theoretical approach, including the main architectural effects defined as three guiding subjects of *functions*; *materials and texture* and *details*.

A private space in the sun at Maggies London

THE THEORETICAL APPROACH

HOW TO ACHIEVE SOCIAL INTERACTION AND SUPPORT

The fact that appealing and attractive spaces for social interaction and support in future hospitals are depending on the surrounding architecture and the details of the physical design, seems commonly accepted by evidence-based designers, urban planners and even anthropologists. The alternative consequence of failed planning is even relative simple - if the environment is not providing possibilities for social activities, there will not be any interaction between patients - hence no social support.

The enhanced focus on the common areas is therefore decisive in order to design environments where patients choose to join the social intercourse instead of being abandoned to isolation in future single bed rooms.

Focal point in the previous chapters has been a theoretical view on social interaction in the public city space and the importance of a homely atmosphere as basis for social interaction and support, and this chapter will elaborate these aspects in the future hospital context.

The architectural effects described in the previous chapters, will in this chapter be compiled in three guiding subjects, including *functions (1); materials and textures (2)* and *details (3)*, and through a translating description, their aspects are defined in regards to the context of hospitals.

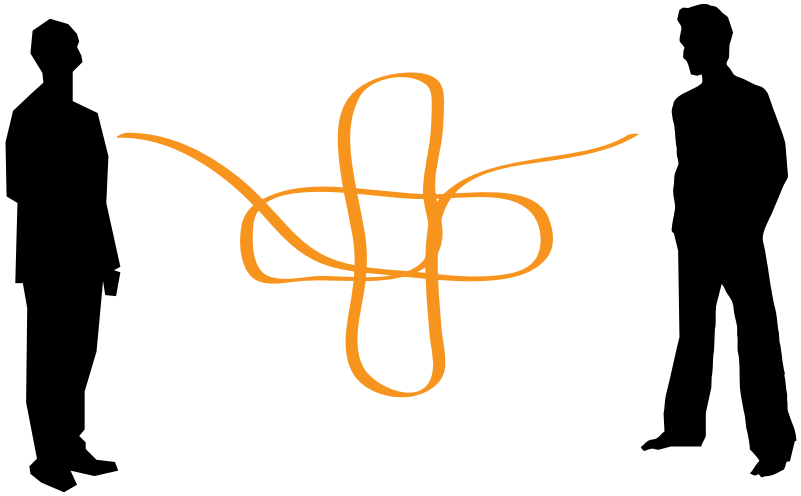
This theoretical approach will define the main visionary guidelines for the design phase of this project as well as form the basis of the evaluation model used in the later following case studies.

The aspects discussed in *functions* are derived from the theories described by Gehl (2003) and Hall (1973) stating the people attracts people, and that unattractive and unfulfilled physical environments will be left empty most of the day. When patients or their families have engaged social interaction, maybe through the attractive functions, they should develop these contacts, which call for spaces recognizable from their own home, partly achieved through a mix of functions – reflecting the everyday life.

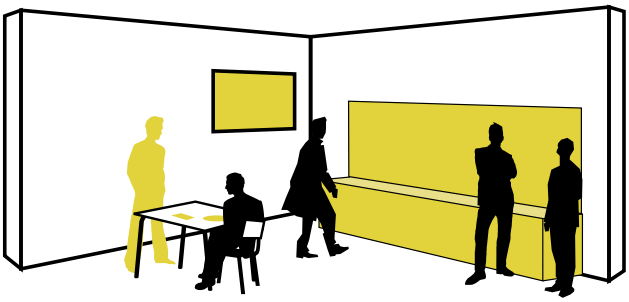
The aspect of *materials and textures*, are mainly concerning the implementation of deliberate chosen materials defining the intended perception of space, and the importance of using tactile elements as sensory aspects as discussed by Rasmussen (1966) in Om at opleve arkitektur. Following the ideas and theories of the described anthropologists, the materials and textures should overall assist in creating a familiar, sensory and homely atmosphere.

The final aspect considered as one of the main guidelines for future social spaces are the *details* and interior planning in human scale, concerning scale, personal distances and sociopetal spaces. Often small details change the way we experience a room, and some of the main physical elements in today's hospitals, like acoustic ceiling sheets, integrated artificial lightning, vinyl flooring, etc. are only supported by the details of for instance coffee serving, greenery, arts and furniture, all together defining the social space as institutional, inhuman and basically unfit for social interaction.

Following the definition of the three main aspects, the content of these will then be used as foundation for the evaluation of the chosen case studies.



FUNCTIONS
REFLECTING THE EVERYDAY LIFE



When looking at current social spaces in hospital environments, we often experience empty spaces not used by the patients due to unattractive and uninspiring common facilities. (Kehlet 2010) Above all, the patients should have a potential choice between private and social spaces, and ideally a gradual transition between these. Private spaces are ensured with hospitalization in single bedrooms, but a new concept is required if the common spaces and dayrooms in the future should appear social.

This social aspect may derive from inviting, attractive and socially obvious functions performed by patients and their families in the common areas of the patient ward.

Accordingly, the specific programming of the common spaces in future hospitals is essentially important to design very deliberate. Firstly, the patients should engage acquaintances, through a process that may be compared to the human interaction in public spaces or the small talks with our neighbor in the front yard. As in the public space, this step requires inviting conversational topics, which may derive from social activities or other common experiences. In a future patient ward these informal meetings may occur in the common dayroom or even in natural flow intersections and recesses along the hallway. Secondly, the patients should develop these initial relationships, through deeper conversations and social interaction, which may cause for more recognizable and familiar settings, reflected in the patients' everyday life.

When considering functions in the common spaces, these might actually be quite parallel to the activities performed in our daily life and the planning of a patient ward may even be compared to a regular single-family house having rooms for: conversations and drinking coffee in the living room, relaxing in the lounge area; dining around the kitchen table; simple cooking in the kitchen; entertaining around the television, etc.

By introducing these social activities in new-designed patient wards, and by making them optional and inviting for both patients and their families, spaces for social interaction and support are believed to have improved conditions in future hospitals.

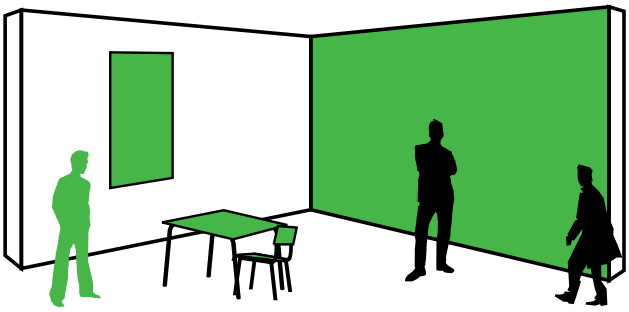
CASE 1 - Lund: The main activity in the dayroom is watching TV, which is placed visible for everyone in the room.

CASE 2 - Hejmdal: Social interaction in one lounge area.

CASE 3 - Geranium: View from lounge through the semi-transparent lamella to the dining room where the glass fireplace is one of those particular deliberate details that sets the homely atmosphere.

MATERIALS & TEXTURES

FAMILIAR AND HOMELY ATMOSPHERE



Besides reflecting the everyday life through planned activities and programming of the social spaces, materials and textures also have significant influence on the way we feel, act and interpret the room, and should reflect the familiar and homely environments we are accustomed to from our own house.

A deliberate choice of materials for any room, i.e. the visual surface and the tactile perception, are often under prioritized in many projects, and in health care architecture, the high demands for hygiene, cleaning and durability are usually decisive factors when considering materials in both bed rooms and common areas. Consequently, the spaces often appear clinical and institutional, with standard equipment and furniture, acoustic ceilings, white plaster walls, etc. As regards to social interaction, these spaces are predicted to limit the potential, as the patients will adapt their behavior to the institutional surroundings with no conclusive benefit for engaging social interaction and social support.

Instead, the future spaces for social support should ideally provide a homely and familiar atmosphere, with safe and comfortable surroundings, where the patients find it naturally to engage social interaction and personal conversations. New common spaces should apply materials and textures, in the way it is recognised from our everyday life, and this way design inviting, accommodating and familiar social spaces. Materials like textiles that today are banned from many hospital applications due to hygienic reasons, could easily be redefined with new specifications in order to adapt to the hygienic demands, hence the future hospitals are not limited to the use of clinical and institutional materials.

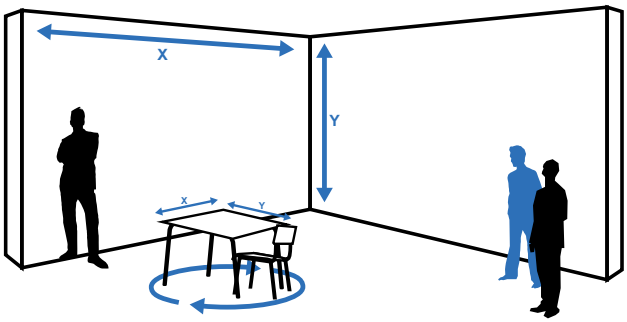
Today human qualities are competing against hygienic standards and general call for durability, and the predominant challenge for the health care architect is therefore to balance between the homely expression and the rational clinical demands, keeping in mind that the close compromise may determine the success or failure of the spaces for social interaction.

CASE 1 - Lund: The materials and textures in Lund and many danish hospitals is generally institutional and rather uninteresting.

CASE 2 - Hejmdal: In comparison with hospital environments, Hejmdal offers alternative seating arrangements in domestic scale and familiar materials.

CASE 3 - Geranium: The use of tactile materials and textiles are at Geranium defining the seating arrangement in a comfortable and homely atmosphere.

DETAILS
INTERIOR PLANNING IN HUMAN SCALE



Small details may change our use and perception of any space rapidly, and if only prioritized by the architect, spaces for social support may be improved significantly in future hospitals.

First of all, the overall scale of the room should be familiar in size and easy to overview if more personal conversations should take place, and even in regards to dimension of the furniture, Hall's (1973) theories regarding social distances may be implicated. Smaller tables will for instance force patients to sit within their intimate distances (0,45 – 1,30 meter), which may be advantageous for deeper conversations and social support. However, if the patients do not know each other yet, the small table and intimate distance may be an unconscious limitation for patients to join an occupied table, and the patients will then never engage important initial contact. The design of details and furniture should therefore contemplate the intended social concept in the common areas.

In this regard, Gehl (2003) is furthermore describing how the placement and orientation of furniture in public places influences the specific use. Seating environments along the perimeter of the room is usually preferred, where the individual exposure is limited, and it is possible to create a comfortable overview of the surroundings. Details in the orientation of the furniture may even define the social status of the room, where a face-to-face layout facilitates a sociopetal behavior and the back-to-back arrangement is creating a sociofugal, private space. Ideally the patient ward should provide both private spaces (sociofugal), passive observational spaces and social spaces (sociopetal) - although not necessarily in the same room. (Hall 1973)

Another aspect in regards to details and interior planning is the room accessories, which may assist in guiding the room towards a more homely atmosphere if chosen deliberately and inspiringly. Today, details like light fittings, acoustic regulations, blankets, cushions and other equipment are all details that by the first impression often expose the room as institutional. However, by bringing focus to these significant details as well, the future design for social spaces may become a holistic design solution creating a homely and inspiring atmosphere promoting social interaction and support.

CASE 1 - Lund: One of the striking first impressions when visiting Lund, and many other hospitals, is the ceiling details with acoustic sheets and 'integrated' lightning.

CASE 2 - Hejmdal: The level of details and the deliberate design solutions is a completely different story at Hejmdal compared to Lund.

CASE 3 - Geranium: The focus on details is well-defined, where the placement of chairs in the lounge is coordinated to make personal spaces around each table.

THE CASE STUDIES

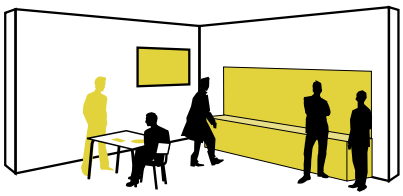
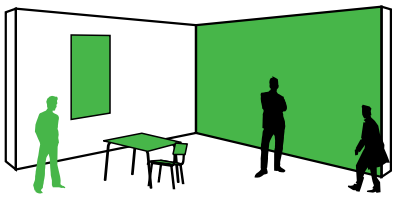
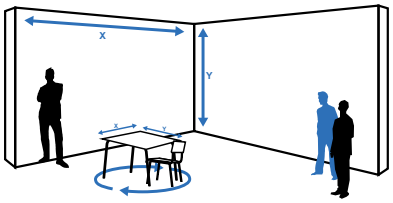
Future hospitals are requiring new types of social spaces than those seen today. The design inspiration to these rooms are not necessarily found in the health care environment it self, but may be found from other inspirational references identified from elsewhere.

In order to visualize the substance of the parameters *(functions, materials and textures, and details)*, defined in the previous chapter, three various case studies will in the following chapter be described and evaluated based on the analysis form stated below.
The overall thesis of this project defining the future spaces for social support as an intersection between the public space and the homely atmosphere is the overall basis for choosing three individual cases for analysis and comparison. Secondly, the cases are selected depending on the patient's/person's motivation for attendance, which follow the three guiding needs defined in Maslow's hierarchy pyramid (Poston 2009). The basic needs as exemplified in a hospital (case 1), the psychological needs is exemplified in a cancer caring centre (case 2), and finally the self-fulfilment needs which is exemplified in a high-end gourmet restaurant (case 3).

By maintaining the overall thesis (hospitals as an intersection between public spaces and a homely atmosphere) as primary criteria of choice, and then let the motivation vary from the physical basic needs to the pleasurable self-fulfilment needs, the architectural effects applied in the three case studies are expected to be diverse, however with comparable useful characteristics.
The person experiencing the room may in all cases be regarded as guest, who has no influence on the physical design of the environment. The perception of space is consequently controlled by the architect and designer along with the guest's subjective background experiences (Rasmussen 1966 and Hall 1973), making the three analysis parameters stand out as important aspects in order to give the guest the experience intended.

The specific choice of cases are based on my preliminary studies where I have attended conferences, meetings and seminars, and based on these experiences and network contacts these three cases are selected.
To summarize the chapter of the wide-ranging case studies, a concluding compilation will define the common relevant guidelines for the design phase.

EVALUATION MODEL

FUNCTIONS	MATERIALS AND TEXTURES	DETAILS
		
What are the options for residence? *(Room types: Private, passive, social)* **What are the optional functions?** *(Informal meetings, social interaction, dining, cooking, workout)* **Does the functions in the social space invite to participation?** *(Are there obvious places to go for social interaction? Does it seem easy to join occurring activities? Do you feel welcome in the room?)*	**List and short description of used materials, textures, furniture?** *(Furniture, painted colors, artwork)* **How is the room characterized by materials and textures?** *(Clinical, institutional or homely, and how is this achieved?)* **Are the use of materials and textures consistent and deliberate?** *(Where are which the materials used? Does it tell a story? Does the material and texture give a tactile experience? Do you know how to act by the use of materials?)*	**Scale and partition of the room?** *(Room scale, space partitions, smaller spaces, optional seating arrangements)* **Furniture and distances?** *(Size, orientation, sociofugal or sociopetal arrangements, options, moveable or fixed?)* **Other details?** *(Room accessories, artwork, decorations, lightning)*

CASE 1: LUND UNIVERSITY HOSPITAL

CASE 2: HEJMDAL

CASE 3: RESTAURANT GERANIUM

CASE 1: LUND UNIVERSITY HOSPITAL

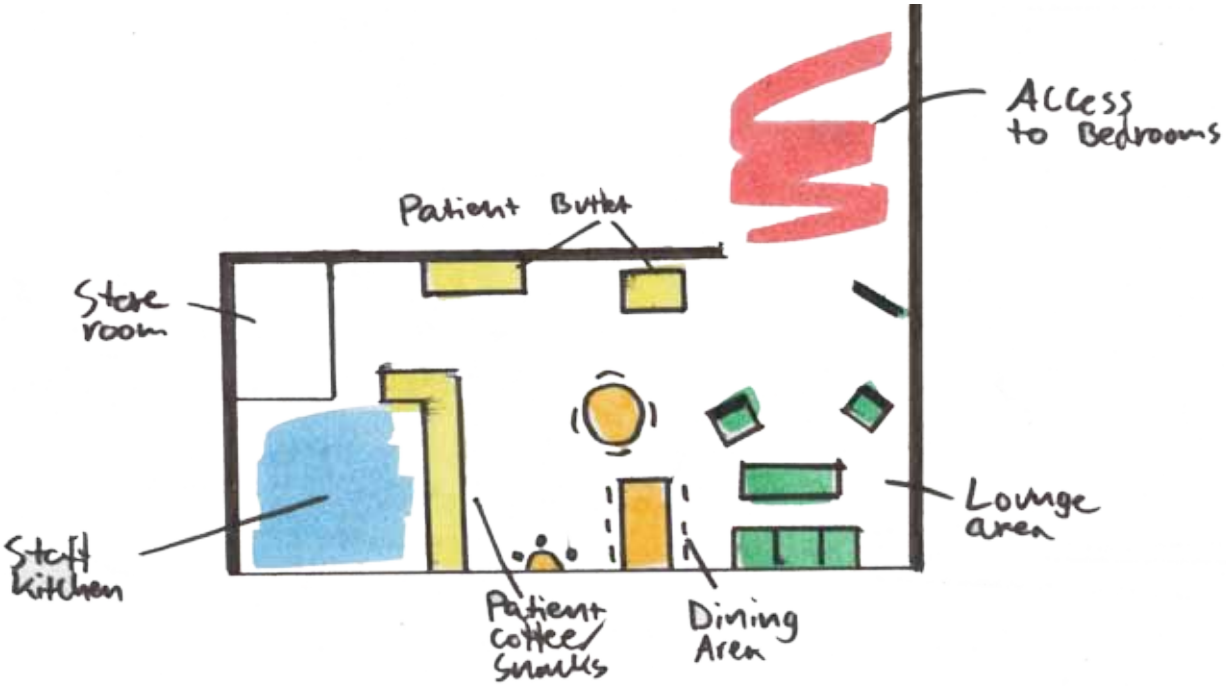
KAVA - SURGICAL EMERGENCY DEPARTMENT

Lund University Hospital is placed in Skåne, Sweden as one of the larger regional hospital with 980 beds. The basis for this case study is the surgical emergency department (*KAVA*) with 24 beds and 4-500 patients per year hospitalized for 48 hours in average. Patients in this ward may be compared to oncology patients in regards to medical/surgical treatment and their general physical condition and mobilization. The ward consists primarily of multi bedrooms, where the beds are separated with curtains. When this specific ward is chosen as hospital case, it is due to the recent modernization and remodeling performed a few years ago in connection with transferring the ward. Here one of the focal points, among others, was new arrangements of social spaces. The recent buildings are constructed in 1968 and is today causing problems with the physical surroundings in regards to patient treatment and human healing condition. When the ward was chosen to move to another floor, staff was given the possibility to rethink the interior layout and organization of the ward - without changing the main construction. Nurses and other members of staff initiated a process, where future requirements, visions and ideas were discussed and planned for the new settings. The intention of improving the social spaces was strong, and the fact that it was even a focal point in the nurse's vision for a future ward shows appreciated awareness of its importance.

The base in the new dayroom is the staff operated ward kitchen, where the meals to the entire ward are finalized (after being brought to the ward precooked from a central kitchen). Staff is consequently always present in the room performing a homely activity (in regards to cooking and not the method), and brings life and atmosphere to the space. Concurrently, the kitchen offers snacks and drinks directly from the kitchen counter, and mobilized patients can always get something to drink and eat directly from the kitchen – like in their own home.

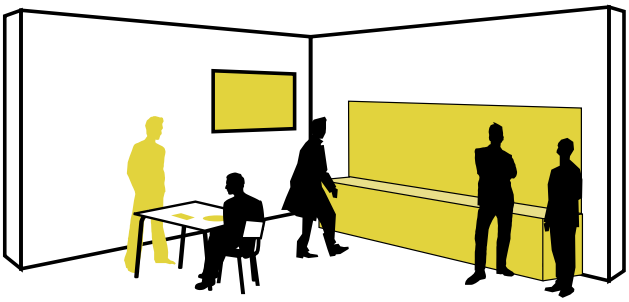
The general use of materials and textures indicates a clinical environment with institutional furniture, vinyl flooring and acoustic ceilings. Complimentary, there are single specific elements like a fruit basket, freshly brewed coffee, biscuits served in glass jar and blankets in the lounge area that attempt to drag the room towards a more homely atmosphere. Along with the kitchen function these small details actually do support the domestic feeling of the dayroom with added features that may revive memories from the patients' everyday life. However, the first impression and the overall experience of the dayroom as clinical and institutional is still predominantly. The intention of making the social space homely is noticeable although it lacks in completion of the commenced ideas, and a deliberate holistic approach towards creating social spaces in future health care environments are still needed for perfection.

References: Homepage of Lund University Hospital, meetings with: Head of department Birgitta Nilsson, and Executive Consultant: Per Bergenzaum, and own observations.



Dayroom in the KAVA ward (Surgical emergency department). The social space is placed at the end of the blind corridor leading to the patient bedrooms.

FUNCTIONS



What are the options for residence?

The dayroom is considered the primary place for residence outside the bedroom, although there are some smaller furniture arrangements in the hallway itself. These are not used during the observation, and they seem to be placed randomly in the busiest place of the hallway next to the elevator and with no seclusion from the semi-public corridor space.

What are the optional functions?

Besides reading and watching television as entertainment, the primary activity is relaxation in the lounge area and dining at the tables.
Secondly, the ward kitchen is an integrated part of the dayroom, and it offers self-provide able snacks at the ward buffet and the kitchen counter - patients have no access to the kitchen it self

Does the functions in the social space invite to participation?

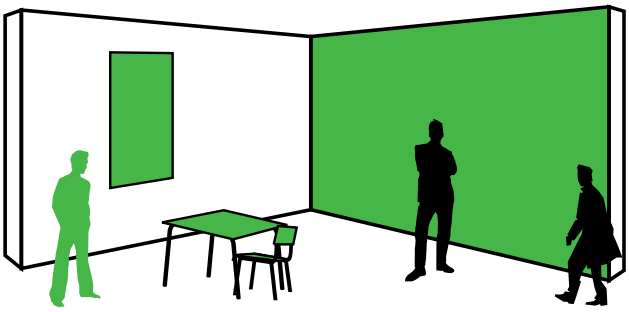
At the time of observation (between breakfast and lunch), there were only a few people in the room, however occupied for longer periods. There was consequently only little social interaction – maybe because of different activities (snacking at the dining table and TV entertainment in the lounge area).
As the functions are considerably simply there seems to be moderate possibilities to join in occurring activities, although it may not be inviting as such.

Seating arrangement in the hallway are left empty during the entire day. Placed in the middle of busiest place of the hallway.

The kitchen area provide a self-service counter that offers snacks and drinks to patients during the day.

Access from corridor to the dayroom with partly view of ongoing activities.

MATERIALS AND TEXTURES



List and short description of used materials, textures, furniture?

Walls are standard white walls, floors are greyish vinyl and the ceiling of white acoustic panels with integrated lightning – the same as the rest of the ward (although change of color in floor vinyl); The kitchen is closed off for patients due to hygienic demands and consists of steel and white laminated surfaces; Furniture in the dining area are wooden dining tables and chairs with steel frame and wooden seating; Furniture in lounge area of wooden tables and armchair and a couch with wooden frame and textile covered cushions.

How is the room characterized by materials and textures?

In regards to materials and textures, the room is considered quite institutional, as the vinyl floor and acoustic ceiling are predominant. The furniture in the lounge area have textile covered cushions although the dominant wooden frames and generel design of these are institutional recognisable.

Are the use of materials and textures consistent and deliberate?

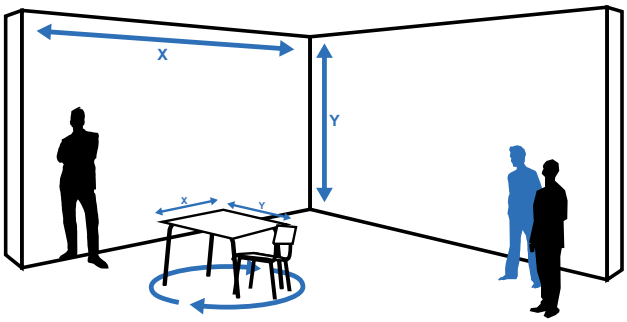
The furniture in the lounge area, kitchen area and dining area is varied, although it does not accentuate any stories or define a consistent use. The materials in the dayroom are not distinguished from the other areas of the hospital, and it may be different to tell the difference between various rooms. In general the materials and textures seem chosen and applied haphazardly, and there is a overall lack of homogeneity and deliberateness in the hospital in this regard.

Materials and textures are generally clinical and institutional. Small details however gives the room a reduced sense of homely atmosphere.

Institutional and clinical materials are predominant in the dayroom.

Textiles are used in the room, but very cursory and there are still a lack of sensory qualities to the room.

DETAILS



Scale and partition of the room?

The main dayroom is large in scale although with specifically defined partitions, and the room is consequently experienced domestic in scale. The kitchen area is by a counter closed off towards the patient zone and is physically separating the room in two. The patient area are sub organized in a lounge area and a dining area of two tables.

Furniture and distances?

The lounge area is furnished with a 3-person couch and two armchairs surrounding an oblong coffee table. In scale it is recognizable from private homes and the multiple seating options provide alternatively choice regarding social distances; The dining area consist of two tables with 4 and 6 chairs respectively. The 6 person table is placed in the perimeter of the room in front of the window. The table for 4 persons is placed in the middle of the room and is not used during observation.

Other details?

Specific details are worth mentioning as room accessories including a fruit basket and containers with biscuits in the kitchen area, as well as the blankets in the lounge. The intention of making a homely environment is remarkable, although not quite succeeded. The overall impression of the room is due to the general use of materials still significantly institutional and it takes more than just small details to define attractive and welcoming social spaces.

The room is divided in smaller areas that is perceived domestic in scale.

Tables are placed towards the window in the perimeter of the room, with light and potential views.

Small details is used with the intention of giving the dayroom a homely atmosphere, although not successfully enough.

CONCLUSIVE REMARKS

Lund University Hospital is a case illustrating the good intention of improving the social spaces in the existing hospital wards. It is a significant progress just to call attention to the problem of unfulfilled common areas, and with the enhanced focus from the staff, some hospitals are taking the lead – and in Lund with various success. The fact that a fair amount of square meters are dedicated to the dayroom is positive, and the room even has some small elements, where the intersection between the homely atmosphere and the public space is combined - although not convincingly enough. The room is still experienced quite institutional, especially expressed by the overall materials like vinyl flooring and acoustic ceiling sheets, and the lack of tactile and sensory elements.

The idea of letting the kitchen be a central part of the room is in general good and even recognizable from our own home, but the fact that it is closed off from the patients may instead work as an amplified reminder of hospitalization? The kitchen table towards the patient area, is however a self-service are, which share familiar elements, although the freshly brewed coffee, which is chosen for its homely character, instantly turn institutional when being served in 3 liter coffee pot with stacked industry cups. The small details could easily have been better thought through, and why should the patients not have access to a smaller part of the real kitchen them selves?

In general the dayroom in Lund meets many of these adversative examples, where the intention lacks completion due to small details that easily could have been improved if they were only in focus. The room is therefore experienced as institutional even though some positive elements do exist, and the future design of these spaces needs a more holistic approach towards material use and the general perception of space.

Compared to the other dayrooms experienced in Lund University Hospital, the KAVA ward is indeed a consolation. On the floor below the dayroom is a 15 m2 room in the middle of the building envelope with no windows and natural lightning, and consequently it seems to be empty most of the day.

The spaces for social support in future hospitals should, in regards to design and planning, be more holistic and well considered, than it is experienced in Lund. Therefore, the 2 following case studies will seek inspiration from outside the hospital environment and evaluate some examples, where the architect and designer have been involved in the process of creating social spaces, and the design and vision is contemplated and manifested in the final architectural solutions.

Lounge area: The furniture are recognisable from many other hospital environments. The detail with the blanket in the chair shows the intention of making the dayroom a comfortable, homely social space, but the specific choice of blanket makes it seem clinical after all.

CASE 2: HEJMDAL

CANCER CARING CENTER, KRÆFTENS BEKÆMPELSE ÅRHUS

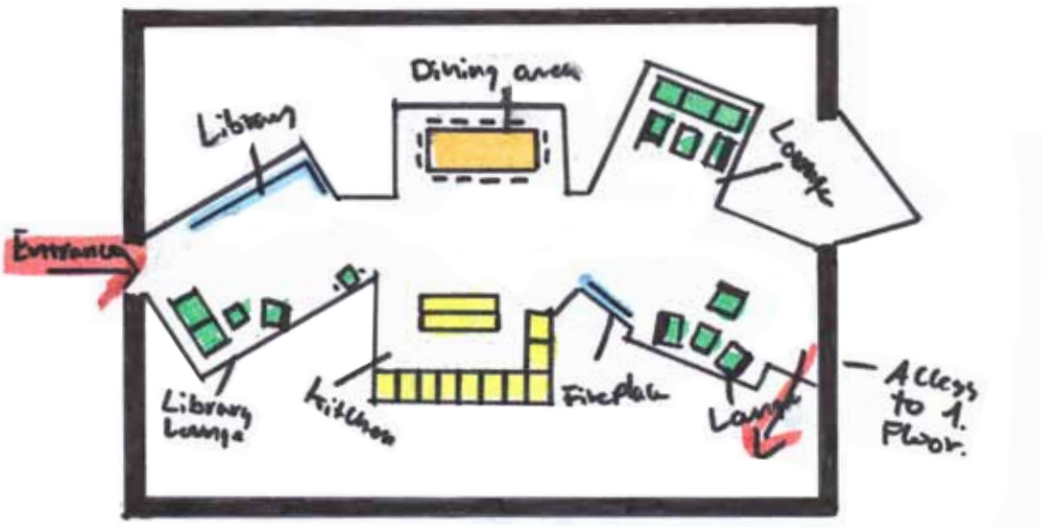
Hejmdal, the new cancer caring centre of Kræftens Bekæmpelse Århus, opened officially the 21st of September 2009. Similar to many of the international Maggies Centres, planned by world famous architects, Hejmdal is with no exception designed under direction of architect Frank Gehry.

In Hejmdal the users/guests are the same as in the hospital - people affected by cancer. As individuals these *guests* are quite different and the group is consequently wide-ranging. Some visit the center for activities, counseling or informal social company with people of equal status, while others are looking for private immersion. Some experience a negative development of their disease and are worried or frustrated, and some may be relieved because of some unexpected good news. In all cases, the guests have *one* particular similarity, and Hejmdal is considered a unique haven for these patients and their families to go.
Even though Hejmdal and the hospital itself may have different purposes, there are found many similarities that may be useful for this project, in particular when considering new spaces for social interaction and support in future hospitals.

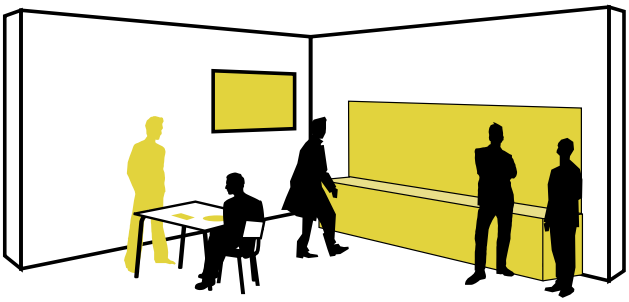
When asked to describe the overall vision for Hejmdal, manager Henrik Kruse refers to sociologist Ray Oldenburg (1989) and his theory regarding *third places.* Oldenburg defines these as informal meeting places, with an invaluable importance of the social quality of the society, as they stimulate the sense of community and counteract stress, loneliness and social inequality. (Oldenburg 1989) When affected by cancer many patients and their families suddenly find it difficult to recognize themselves in their usual network, and they often experience loss of their customary important informal network. In the future however, Hejmdal should be a new potential *third place* for some of theses people affected by cancer.
The activities in Hejmdal are manifold, and during observation, people with many different doings vivaciously occupied the house, still leaving the place with a certain calm relaxing and domestic atmosphere.
When you enter the house on the ground level, you are immediately in contact with the natural center of the house - the kitchen. The associated volunteers have an accommodating way of being present without being in the way, and as they welcomes you, kindly asking if they can be of any assistance, you feel instantly supported. The volunteer assists you the few steps from the entrance to the kitchen, and offers you a cup of coffee available in small porcelain cups. The friendly welcoming gesture is accompanied with a pleasant homely aromatic smell of freshly brewed coffee and homemade cake, which immediately makes the visit a remarkable sensory experience - especially compared to former visits of many Danish hospitals.

Reflecting the life and mental state of many cancer patients, one of the ideas behind the architectural concept has been to avoid seeking perfection, and instead leave the house and program with constant room for improvements.
Despite this ideal vision, Hejmdal is today experienced deliberately well defined, and the holistic perception of the house as well as the individual elements is cleverly adapted.
The vision of providing a *third place* for people affected with cancer and the intention of ensuring the social interaction in many levels is definitely succeeded. Here you find room for diversity and creativity; happiness and sadness. Hejmdal is the house of the users.

References: Homepage of Kræftens Bekæmpelse, Presentation by manager at Kræftens Bekæmpelse Henrik Kruse at the conference: "Superhospitaler – nu eller aldrig?", interview of Henrik Kruse and own observations at Hejmdal.



FUNCTIONS



What are the options for residence?

The house is generally divided in three stories, where the basement floor is reserved for common activities, the ground floor for social interaction and the upper floor for immersion and confidentially. The social spaces on the ground floor consist of a centrally placed dinning area (one table), and a lounge area divided into 3 sub areas with similar furniture. Combined with the basement and the upper floor, it is possible for the guest to be either social or private, or even passive and observing.

What are the optional functions?

Hejmdal offers a wide range of activities like art classes, rehabilitation, therapy groups, etc., and the house is experienced as lively and multifarious. The ground floor is the center for social interaction, where people arrange meetings or just engage on informal basis. The kitchen is the natural key area of this floor, where a volunteer always is present to welcome guests and offer freshly brewed coffee. On occasional basis the kitchen even perform as place for various cooking sessions.

Does the functions in the social space invite to participation?

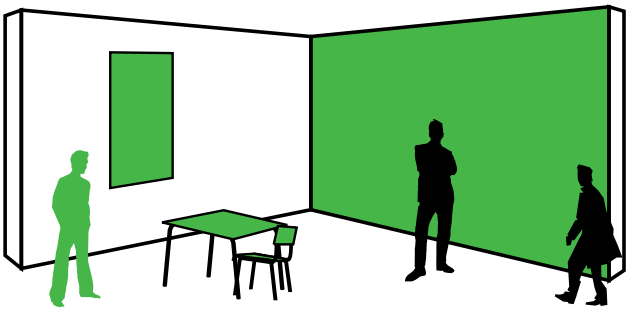
When you arrive in the center a volunteer is welcoming the guest, accommodatingly and friendly describing the various possibilities in the house. This feature is especially very giving, and you feel truly welcome in Hejmdal, being asked to act as if home.

The centrally placed kitchen is the natural meeting place for volunteers, guests and staff offering freshly brewed coffee served throughout the day.

The basement at Hejmdal has spaces for common activities and social gatherings.

The volunteers are a great aspect of Hejmdal, where you are welcomed with a warm friendly gesture.

MATERIALS AND TEXTURES



List and short description of used materials, textures, furniture?

The interior walls of the old porterhouse is kept in the original rough bricks, well complimented by Gehrys dynamic wooden structure. The floor and ceiling reflects the overall structure in an angular wooden pattern, with secluded white plaster fillings (ceiling) and wood chipped composite fillings (floor), respectively. Lounge furniture consists of couches and armchairs in white upholstery with colorful accessory cushions and small wooden tables aside. Dining area is one large wooden table with colorful chairs around.

How is the room charactarized by materials and textures?

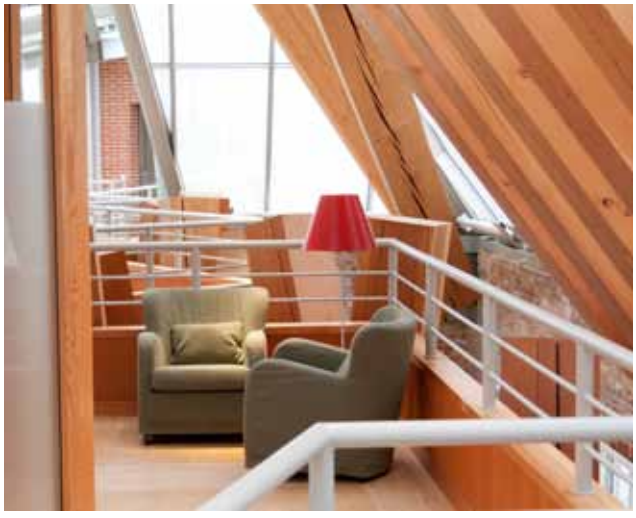
This case is rather difficult to characterize as either homely or institutional, as it possesses various specifications. In general the space is warm, friendly and accommodating and Hejmdal does have some specific homely characters. The daily use of the house, and the various functions may have a positive sense of activity center atmosphere or after-school center, which actually fits very well with the intention of making Hejmdal a third place for cancer patients.

Are the use of materials and textures consistent and deliberate?

The use of materials is very consistent, and especially the use of wood in various patterns and dynamic structures works very well. Additionally, the colorful dining chairs and cushions in the lounges tied these spaces together. This deliberate use of colors and materials calms the eye when you walk in the house, and it sets an appreciated easy atmosphere.

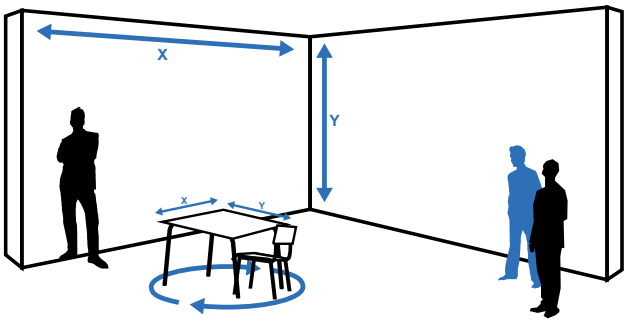
The generel impression of Hejmdal is dominated by Gehry's wooden structure.

The interplay between the porterhouse and the wooden structure seems natural and is well complimented by white IKEA furniture and colorful details.



The use of wood must be the consistent material, and the structure and unfinished treatment adds a sensory feeling to the experience.

DETAILS



Scale and partition of the room?

Besides the division in three stories, the social ground floor is by Gehrys wooden structured further divided into smaller subspaces: Kitchen/dining area, Information area, 2 lounges and a fireplace lounge. The division of the space into smaller areas gives the room a more domestic scale and allow smaller groups to meet without influencing other guests.

Furniture and distances?

In general all seating arrangements on the ground floor are considered potentially sociopetal. The guest however, may also to sit in the lounge area and read a book or a magazine and thereby indicate request for privacy or passive observation. A remarkable detail is the dining table, which is one large table with room for 10-12 persons. The fact that it is only one table adds a social unifying value, even though it is still possible for different groups to sit *privately* at the same table at one time.

Other details?

Gehry's wooden structure is of course the main element throughout the house, and it may take focus from some of other perceptual details. Coffee for instance, is unlike Lund, served from a regular coffee pot in white porcelain cups, to enjoy in the candlelit lounge area. Other details and elements are strongly defining the various divided lounge areas – especially the fireplace lounge and the library lounge.
Generally, Hejmdal is considered well proportioned and deliberate in regards to noticeable interior details.

The ground floor is divided in various zones, with the kitchen area as the central part on both sides of the longitudinal axis.

The large dining table provides optional space for different groups to occupy the area at the same time still being in social distance to eachother.

The fireplace is defining the ground floor with a warm and welcoming atmosphere.

CONCLUSIVE REMARKS

Today our hospitals are primarily providing the medical treatment of cancer patients, while places like Hejmdal are dedicated to the psychological and mental support, as well as the following rehabilitation. It could be argued that the purpose of the hospital and the cancer caring center are too different to compare, however focus on healing architecture in future hospitals, combined with the need for social support, call for an enhanced architectural responsibility in regards to design of new attractive and useful common areas in future hospital wards. In this context, the cancer caring centers, and Hejmdal especially, may provide both inspiration and directly transferable visions to the future spaces for social interaction and support.

The presence of volunteers in Hejmdal is in many ways an important aspect of the success of the caring centers, and the confident experience of a visit is strongly related to their charisma. The welcoming gesture makes the visitor feel like an invited guest – a well-defined role recognizable from our everyday that connotes the expected act. You are met with a familiar sense of homely atmosphere, where the volunteer undertake the role of the neutral coat less partner, which compared to the hospital environment is truly appreciated by all patients.

In general, the guest is far more active in Hejmdal compared to the hospital, and the many provided activities enhance the sense of community and contributes to the overall social interaction. In some specific aspects however Hejmdal may be associated with the atmosphere of an after-school center defining the house with an institutional character, which conversely does fit with the overall vision as the new third place. Many functions and activities in Hejmdal may be impossible to transfer to a hospital context, as the inpatients often will be physically unable to take action in these. Still, the informal social interaction and the activities occurring in for instance the kitchen area may be easily incorporated in the social spaces of future hospitals, where this unpretentious tone and homely characteristic defines the surrounding space with a vivid atmosphere - without forcing the guests to be involved. You are invited to participation, but may also choose a passive position in lounge and just observe the ongoing presence in case that is preferable

That Hejmdal is designed and build for its users is no secret and the easy calm atmosphere that defines the space makes the beautiful surrounding for both relief, sadness, immersion and confidentially - and especially, social interaction and support.

The lounge area provides space for both social interaction and passive observation. Guests may sit and read in one of the magazines and await social company or just continue passive presence in the vividly and comfortable environment in Hejmdal.

CASE 3: GERANIUM

HIGH-END RESTAURANT, COPENHAGEN

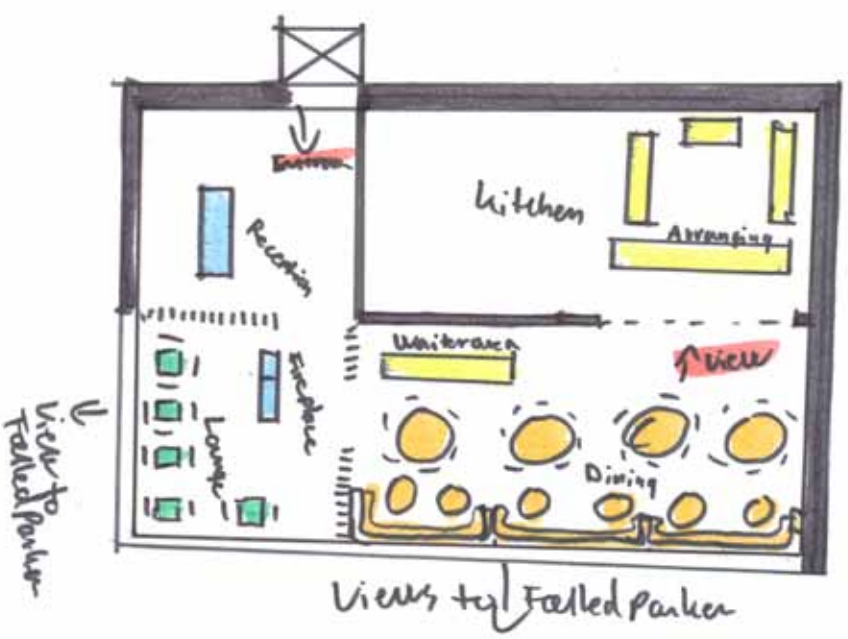
Restaurant Geranium is an exclusive restaurant led by Søren Ledet and Rasmus Kofoed. The restaurant was formerly situated in Kgs. Have, but the 22nd of September 2010 they reopened in a new redesigned location in the stadium complex of Parken.
When Geranium is chosen as the third case, it is first of all to get some more far-reaching and innovative inspirations for the design of future social spaces, and subsequently to put the other cases into perspective by comparing them with one of Denmark's newest and most outstanding references in regards to creating holistic experiences for the guests.
If the patient in a hospital was considered a welcome "guest" instead if a burden – as some patients experience today - it is believed that valuable inspiration may be found in some of those cases and establishments that are aware of their role as hosts and prioritize to provide the guest with a deliberate and contemplated experience.
Where the two earlier cases were focusing on the lowest levels of Maslow's pyramid of needs, the physical and psychological, respectively, the high-end restaurant like Geranium is primarily addressing the self-fulfillment needs of the visitors, and Geranium is accordingly providing a holistic experience, where food, wine, design and atmosphere is united in a multiple sensory expression.
The experience already starts when the potential guest is visiting Geranium's webpage, where an inviting front page and appealing mood generating pictures are welcoming you to the gastronomic sensory universe of Geranium. If you are making a reservation through the webpage, this is followed by a gentle telephone call of the concierge asking if there would be any special requests – the guest is already in focus.

The first physical meeting with the restaurant is an atypical deserted parking lot outside the stadium, but as soon as you enter the elevator and the lift of is initiated the promising adventure begins. When entering the restaurant itself the guests is immediate welcomed by a waiter in the special designed Geranium uniform, and the waiter is competently guiding the guests through the evening, firstly by introducing them to the lounge where the appetizers and a welcome drink is served.

The dinner itself is served in the main room of the restaurant with a great panoramic view of the treetops of Fælledparken and the even with view to the kitchen which is placed at the opposite long side behind glass walls.
As part of the exclusive menu the guest is even invited to enjoy a serving in the kitchen itself, and may at first hand witness the enormous effort and precision that is put into every single dish.

The physical context in the Parken complex are not providing any positive deflections to the restaurant, and it is through the gastronomic cruise and the special designed surroundings the experience is established. In a beautiful designed combination between the inventive Nordic cuisine and the interior decoration, the holistic experience make you forget where you really are.

References:
Homepage of Geranium, meeting with restaurant manager, Søren Ledet; meeting with interior designer from Space CPH (designer at the Geranium project) Jens Bo Fjeldsted, meeting with chairman of the organization of Danish Food Critics, Rene Langdahl Jørgensen.



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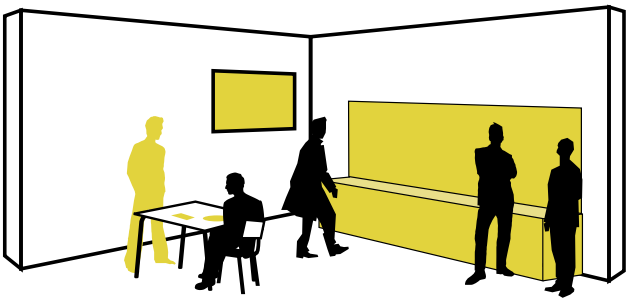


What are the options for residence?

At restaurant Geranium the guests' experience is designed and controlled through detailed design solutions, and the visit may be considered as a journey through various places of residence.
The guest is arriving in the reception and is afterwards introduced to the lounge, where the first appetizers are served. Subsequently the evening continues in the restaurant and in the kitchen, before returning to the lounge for coffee.

What are the optional functions?

As the case study is a restaurant it is difficult to talk about various optional functions in this regard, although the division of the restaurant in a lounge, dining room, kitchen, etc. gives various experiences throughout the dinner.

Does the functions in the social space invite to participation?

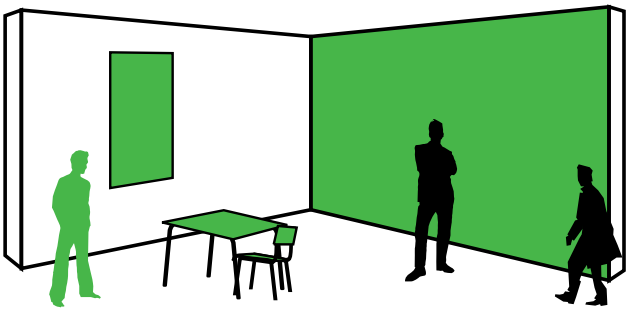
The restaurant is placed in the stadium complex of Parken, Copenhagen and consequently the context does not provide any potential positive approach to the expectation of a gastronomic experience. Instead, the interior design of Geranium should define the experience without help from the context and this result in a very exclusive and welcoming reception and lounge, where the guests are mentally influenced to forget where they are.

View from the dining room to the kitchen 'stage' where the guest may follow the work of the actors/chefs.

The main function at Geranium remains the dining experience.

When seated at the restaurant table, the views towards the treetops at Fælledparken is the only remaining aspect of the difficult context of Parken.

MATERIALS AND TEXTURES



List and short description of used materials, textures, furniture?

Lounge: Floor – dark grey natural stone, Fire place furniture – light grey natural stone, Lounge chairs – dark grey upholstery, Lounge tables – dark grey natural stone, Ceiling – white plaster ceilings. Dining room: Floor – greyish natural timber, Restaurant furniture – light grey natural stone, Dining chairs – dark grey upholstery, Dining tables – white tablecloths, Ceiling – white plaster with acoustic shaped installation. Kitchen: Floor – dark grey natural stone, Kitchen table – white surfaces.

How is the room charactarized by materials and textures?

The general material selection is of natural character chosen for its stylish patina – still processed to appear hard and strictly defined. This design approach is very consistent and deliberate, as it supports the gastronomic style of the restaurant where the plates and the dishes are precisely designed and coordinated to present the food in the intentional manner. In these aspects the room is enhancing the gastronomic experience and well defined through material and textural choice.

Are the use of materials and textures consistent and deliberate?

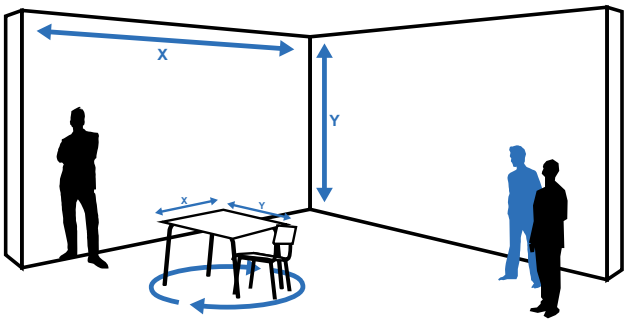
As the materials and textures are enhancing the focus on the gastronomic experience, the design solution is particularly consistent and deliberate. The general color tone is kept in general greyish shades, where the color white is reserved to present the dishes in white plates, white tablecloths and the white kitchen counter.

The colors of the restaurant room is in the scale of grey, where textiles is implemented as table cloths and upholstery and act as tactile elements in physical contact with the guest.

The materials and texture in the seating arrangement is dominated by tactile elements like woolen upholstery, table clothes, curtains and cushions. A warm, yet defined, atmosphere is experienced around the tables in contrast to the cold white materials on wall surfaces.

The materials on wall surfaces are considerable defined by light grey marble elements, providing a cold, but still tactile perception - here in the fireplace section.

DETAILS



Scale and partition of the room?

The restaurant is divided in a reception, a lounge, the dining room and the kitchen itself, with a semi-transparent/ transparent transition and partition – white wooden lamellas and glass walls, respectively.
The kitchen is this way a centrally part of the dining room, where the guests may follow the work of the chefs behind the glass walls.

Furniture and distances?

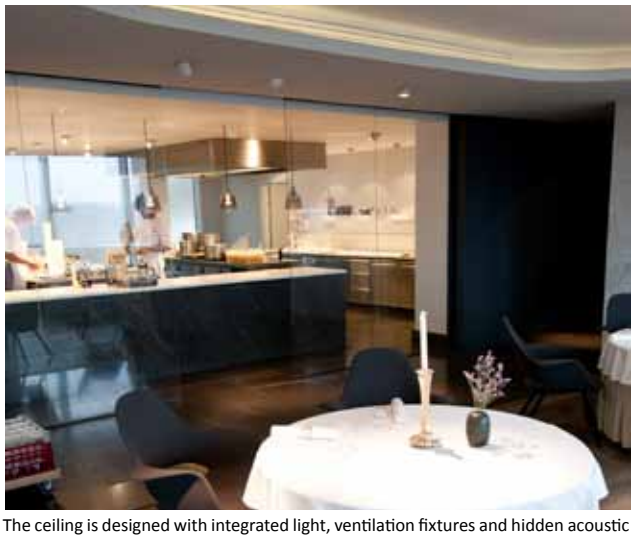
The distance between the tables in the dining area is quite spacious and facilitates various potential settings depending on occasion - the intimate dinner, the business meeting, the family dinner, etc. All is rendered possible around the round tables which immediate creates a concluded party.
The tables in the lounge were the evening starts are placed closer together, and it is consequently possible to engage conversations with other companies regarding the evening's expectations.

Other details?

In regards to other notable details is the tooling of acoustic and artificial light details, which has been an important focal point for the design team in order to create a safe and comfortable environment around each individual table. There are no obvious visible acoustic precautions in the dining room, but the generous use of textiles as well as the partition lamellas and the curved plaster ceiling, defines the acoustic milieu as calm and muted. The artificial light is used as spotlights to focus on the tables and the gastronomic experience.

View from reception to the lounge room through the semi-transparent lamellas that is improving the acoustic qualities of the room by filtering the general sound level.

The lounge area consist of smaller arrangement of 2-3 chairs around a table. The distance between the chairs allows intimate conversations.



The ceiling is designed with integrated light, ventilation fixtures and hidden acoustic absorbers, and is simultaneously defining zones in the dining area.

CONCLUSIVE REMARKS

The user group is in this third case immediate different from the previous cases, and the architectural effects may consequently not be compared directly. When Geranium nevertheless is chosen as case study it is firstly to put the other cases into inspirational perspective and secondly to study the strategic and conceptual effects an exclusive restaurant is applying when creating a focused holistic experience for the guests.

At Geranium, it is not the social interaction or the informal meetings between the guests that are prioritized, but rather the meeting between the guest and high-end gastronomy. A meeting that for the guest inexperienced with this type of restaurants sometimes may seem strange and unfamiliar – like the hospitalization do to the patient. At the restaurant it may be questions like; what cutlery to use, where to put the napkin, etc. - small behavioral challenges that many patients experience in larger scale when being forced to adapt to the confusing 'rules' of the hospital. The main difference between the hospital and Geranium in this regard, is that in the restaurant you find competent, professional waiters who elegantly are leading the guests through the night so that all the questions are answered or handled in a delicate and easy manner – something that many patients today are searching for in the hospital environment.
The waiters have a very important role in these exclusive restaurants, and at Geranium this is further underlined by their special designed uniforms, and in reviews their performance are characterized as the perfect balance between kindness and presence, and formality and professionalism. A difficult balancing act that may be compared to the future social spaces as an intersection between the public space (the formal behavior) and the homely atmosphere (the kind and attentive behavior), and as illustrated by the waiters at Geranium this balance should be well-coordinated down to the smallest details if the intended effect should be achieved.
Where the experience in many restaurants is limited to the enjoyment of great food and wine, the experience at Geranium is particular holistic – yet still focused. The guests are invited on a multi-sensory journey, where the gastronomy as central element reveal an eventful universe, exemplary supported by the special designed interior -including all details. To elevate and focus the holistic experience, there is still one single element centered at Geranium, and assisted by the deliberate design details, the gastronomy is distinguished and highlighted, physically underlined by the presence of head chef Rasmus Kofoed on the scenographic "glass stage".

The understandable focus in the holistic experience is partly guiding the guests through the visit and is even eliminating many behavioral challenges, greatly supported by the interior and design details. There is no doubt that the gastronomic adventure is extraordinary exclusive, but the interior and architecture should not be disregarded, and the awareness of this factor is perhaps what makes the experience at this particular restaurant truly exceptional.

Ill. 23

The restaurant area at Geranium just before dinner time

CASE STUDIES
SUMMARY

The intention of evaluating the tree case studies has been to visualize the substance of the parameters derived from the theoretical approach (p. 42), and to find inspirational examples on architectural effects and strategies in regards to the following design of future social spaces.
When considering people affected by cancer, our hospitals are today primarily providing the medical treatment of cancer patients, while places like Hejmdal are dedicated to the psychological and mental support, as well as the following rehabilitation. In this regard, the third case study at restaurant Geranium may be slightly off topic, but the architectural effects used to design a holistic experience for the invited guests are considered significant as perspective and inspiration for the following design phase. It could be discussed if the purposes of the various case studies are too different to compare, but the future focus on healing architecture and the need for social support, requires enhanced architectural responsibility when designing new social spaces. In this context, Hejmdal, and Geranium especially, does provide inspiration and some transferable visions that could define future spaces for social interaction and support.

Hierarchy of needs

As defined in the introduction to the case studies, the three various studies has been chosen to reflect the three main steps at Maslow's pyramid of needs in order to understand the character of the various effects depending on the guest's motivation of attendance. At the hospital the "guests" basic physical needs have been satisfied, while Hejmdal is also fulfilling the psychological needs of the patient or their families. The last case at Geranium has gone all the way in order to design a holistic experience for the guests, where even the self-fulfilment needs have been in focus.
Consequently, the incentive to "visit" the hospital is defined as a physical obligation, while the motivation at Hejmdal and Geranium instead may be characterized as pleasurable inclination. In the future, this inclination is believed to be a keyword in order to design new social spaces, where similar architectural effects may be used in the hospital context in order to attract patients from their bedrooms to engage the essential social interaction.
When comparing the architectural effects and the design strategy at these three cases, the hierarchy of needs is quite evident. When going from the hospital to the cancer caring centre, the improvements are already clear, and if only the hospitals were build like this today, it would be a major reformation. However, in order to raise the bar and to find state-of-the-art inspiration the case study at Geranium have furthermore shown some visionary inputs on how to design accommodating, friendly and relaxing environments, and if the case studies had only been concentrated around existing hospitals, the inspiration for the following design phase would considerably have been inconclusive.
It is however obvious that not all effects and details from the restaurant should be implemented in future hospitals, as the primary task of the social spaces here still should be the physical and psychological needs of the patients and not necessarily the self-fulfilment needs. Even though, the ambition of designing a holistic orientated and detail-focused environment and to improve the overall service and guidance of the patients is still to be desired even at the hospital.

A holistic design approach

That the holistic experience and even the single details have great impact on the human perception of space, may seem quite strange if considering our current hospitals, where we often see social spaces and dayrooms with no occupancy by the patients or their families.
The lack of a holistic approach and awareness of the importance of design are even further clarified if comparing the hospital case to the cancer caring centre and the restaurant, where the details and design concept is deliberate contemplated by the designer and architect. In this regard, the restaurant case is very relevant, when considering the enhanced focus on interior design, atmosphere, tactile elements, sensory experiences, etc., and the holistic experience at Geranium is particularly successful in the way the details are controlling and navigating the visit in order to define a understandable focus for the guest. The experience is indeed holistic but in a cleverfull way, where specific details are keeping the aspects from being mixed confusingly together. The main aspect (gastronomy) is promoted resulting in a experience which may be characterized as focused holistic, and this design approach may also be used as inspiration and basis for the design of spaces for social support in future hospitals.

Guidance and activation

Another centrally aspect that derives from the evaluated case studies is the importance of both guidance and activation of the guest.
The guidance is illustrated in both Hejmdal and especially at restaurant Geranium, where volunteers and waiters respectively are guiding the guests through their visit. This service minded approach is helpful in order to avoid many behavioural challenges were the guest may be in doubt of what to do - as seen in hospitals today were patients and their families often feel like a burden or as being in the way. If introducing volunteers as part of the social spaces at future hospitals, many of the immediate behavioral questions may be handled by these socially competent persons, who have the time and competence to deal with the mental care of the patients and their families.
One of the other important aspects that may be derived from the cases is the way the guest is activated during a visit. In Hejmdal the social and unifying activitites are an important part of the visit, and at Geranium the guest is even invited to the kitchen for a tasting. Both very giving concepts that besides the function and activation itself

also provide topics of conversation for the following social interaction. At the hospital however, the activation of the guests are often limited to the “self-service” food trolley at certain hours, and more specific activation and conversational functions are definitely desirable - for instance the possibility for the patients or their families to access a kitchen and prepare basic dishes for themselves and their relatives as discussed in the hospital case.

The use of textiles

One of the conspicuous differences between the three cases is exposed when considering the use of materials and especially textiles, as illustrated on the pictures at the right. First of all, it was quite difficult to find a right angle for photographing textiles at Lund University Hospital, where the implementation of textiles to a surprisingly degree are capable of appearing clinical, and compared to the consistent and deliberate use of the tactile textiles at Geranium the difference is distinct. At Geranium details like color tones, textures and story-telling are defining the textiles with a controlling role in the interior design solution, while the use of textiles at Lund seems coincidental and almost confusing in the clinical and institutional atmosphere.

Summary

The primary intention of the case studies has been to illustrate the three main aspects defined in the theoretical approach (*functions; materials and textures* and *details*), and to evaluate and understand the main differences between the three studies. One of the focus areas in this project is the use of tactile materials and the introduction of sensory aspects in hospital spaces, and the variation between the three case studies in this regard, is illustrated in the implementation of textiles, where the difference between Lund and Geranium is quite noticeable, ranging from a clinical perspective to a warm and inviting solution.
The specific output of the case studies is primarily of general character and provide valuable inspiration for the following design phase.
Additionally the cases have shown some more direct transferable parameters to consider and implement when designing new spaces for social support in future hospitals, and in this regard the use of design details in the focused holistic design approach should be highlighted. Furthermore the focus on the psychological and mentally needs of the guests are further defined through the case studies, and keywords like: care, warmth, humanity, texture, presence, tactile elements etc. are noticeable characteristics from especially Hejmdal and Geranium, which should be implemented in the hospital context.
With openness and inspiration from the three various cases, the future hospitals may be designed to attend to more than the physical needs of the patients and with the right architectural effects the patient ward will easily provide new improved spaces for social support.

TACTILE MATERIALS - THE USE OF TEXTILES


Lund University Hospital


Hejmdal


Geranium

Ill. 24

THE VISION

That people affected by a serious disease like cancer have an increased demand for social support seems to be commonly accepted (Koivula et al 2001, Kulik, Mahler & Moore 1996, Chaudbury 2003 and NHS Estates 2005) and the coherence to the physical environment has recently been supported by state-of-the-art EBD research (Ulrich et al 2008, Andersen et al 2008 and Frandsen et al 2009) indicating that social support, besides improved psychological condition, has significant influence on the length of hospitalisation, use of medicine, as well as the general ranking of the experience of hospitalization by both patients and their families.

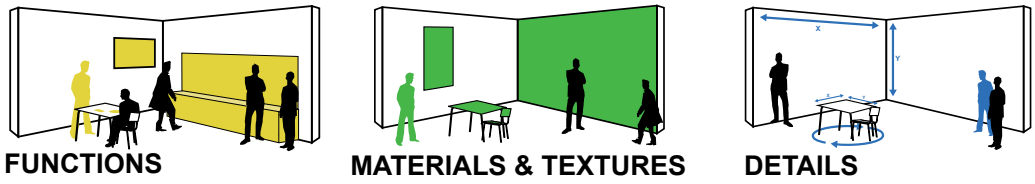
In our everyday life, the close social relationships and profound conversations occur with our nearby families and friends, mainly performed in safe and recognisable surroundings. However, during hospitalization, the social intercourse with our families is often limited and reduced and the physical environment is characterized as institutional, unattractive and deserted. The two main aspects that usually defines the foundation for social support is consequently lacking during hospitalization.

By reinventing and developing new social spaces in future hospitals, it is the overall vision for this project to design common areas and social zones where patients in the future may engage social intercourse in an inviting and accommodating environment that architecturally promotes social interaction between individual patients and their nearby families in attractive spaces for social interaction and support.

Architectural vision
Through specific development of new spaces for social interaction and support, the project seeks to define a new architectural typology and interior design strategy that in the future prioritize social spaces and promotes social interaction between patients.
The main visionary thesis is that recognisable and well-defined activities performed in a homely environment will establish a common frame between people affected by cancer, which besides the direct functional content, also will occasion equal social intercourse. Consequently, this gives both patients and their families an experience of being in the same boat with others of equal status, having significant importance of their psychological state of mind.

The social spaces should in terms of architecture and interior design define alternative solutions to the institutionalised and clinical environments characterizing current Danish hospitals. In these spaces, patients should be on home ground and feel they are master of their own life – something many patients seem to be lacking today.
Through holistic and deliberate architectural solutions the social spaces should indicate openness and accessibility and be spacious enough to accommodate different functions and various patient groups at the same time. Furthermore, the zones should reflect calmness and relaxedness in a warm homely and informal atmosphere characterized by tactile elements and sensory experiences, and be considered inspiring, challenging and resource mobilising amongst patients and their families. Textiles are in this regard seen as an optimal material to implement in hospitals as the case studies have shown remarkable and beneficial aspects by introducing textiles as tactile and sensory elements.

The essential homely atmosphere is achieved through familiar and accommodating surroundings, which involve the patients' memories in the design of social zones, where *functions*, *materials & textures* and *details* are defining specific recognisable and domestic icons; like the conversation across the dining table, the cosy social small talk in the lounge facing the fire place, the immersion in a good book in the library lounge, etc. And, by implementing textiles and other tactile materials the space will be defined with a sensory experience, where these well-defined architectural elements, is believed to strengthen future spaces for social interaction and support by promoting both informal engagement, and conversations between people affected by cancer.


FUNCTIONS
MATERIALS & TEXTURES
DETAILS


SOCIAL
SUPPORT

THE ROOM PROGRAMME
SOCIAL SPACES

The following programme is summarizing current conceptual ideas and considerations developed on the basis of the initial *analysis*, the *case studies*, the *vision*, the *brief* "Kræftrådgivninger i det 21. Århundrede – overordnet program for rådgivningen i Kræftens Bekæmpelse" (Arkitema and Kræftens Bekæmpelse 2008), and the *competition brief* "Kræftens bekæmpelse – ny kræftrådgivning i XXXX" (Kræftens Bekæmpelse og Real Dania 2011).
The spaces for social support will in the following phase be divided into smaller sub spaces with various characteristics and definitions. First these subspaces will be described individually and secondly they will be summarized in a common room programme and organisational principle diagram. As the programme stated below is solely is based on thesis and vision of this project, it only considers the new spaces for social interaction and support. In the following sketching phase, however it will be merged with the existing room programme for the oncology ward as developed by C.F.Møller and DNU Skejby.

Spaces for social interaction and support

The social spaces should in general provide possibilities for flexible use and consist of both semi-public and semi-private areas, which promote informal meetings between patients or facilitate undisturbed and profound conversations without being separated from the social community.
The social spaces in the patient ward are divided into smaller subspaces of 3-4 hallway recesses situated around the nearby single bedrooms, and one main common dayroom. These spaces, and especially the main dayroom, should frame the social interactions in a recognisable environment with distinct domestic references to familiar functionalities, hence characterising a safe homely atmosphere with comfort, calmness and tactile qualities.
Through the sketching and design phase, focus will be on the implementation of textiles in hospital environemnts and the design of the main social dayroom that should contain the following programmes.

Sub spaces in the main social dayroom

Entrance - library lounge:
The entrance to the social dayroom should be linked to the center of the patient ward, and provide easy access for all patients. In connection to the entrance, it would be ideal to place a library with appertaining lounge facilities.
For both patients and their families, the sudden disease or an immediate complication often occasion increased concern, causing many questions to arise. Today these answers may often be found in books, pamphlets or brochures situated in the patient information stands placed in all patient wards. In the future this information area is recommended extended to a smaller library with an increased amount of academic literature, Internet access and seating possibilities for adjusted studies. The library could easily be combined with fiction novels and magazines to read just for entertainment, and could then give the patient an appreciated and meaningful break from the bedroom.

The kitchen-dining area:
The kitchen and dining area should be the central meeting place for the patients to engage social interaction in a relaxing, informal and homely atmosphere. The kitchen is for most patients a recognizable zone with well-defined symbolic architectural elements, which will provide potential comfort and domestic safeness combined with well-known functional aspects like cooking, brewing coffee, etc.
Inspired from both Lund University Hospital and Hejmdal, the idea of having a volunteer person present from for instance Kræftens Bekæmpelse is implicated in this project, and the kitchen would ideally be the natural residence for volunteering counselors. During the day, the kitchen should serve smaller snacks and various drinks, but also be a potential space where patients and their families could prepare or cook smaller courses to be served for them selves in the social dining area. This way, the kitchen would become an activated zone with inviting functions forming topics of conversations between patients and visitors.

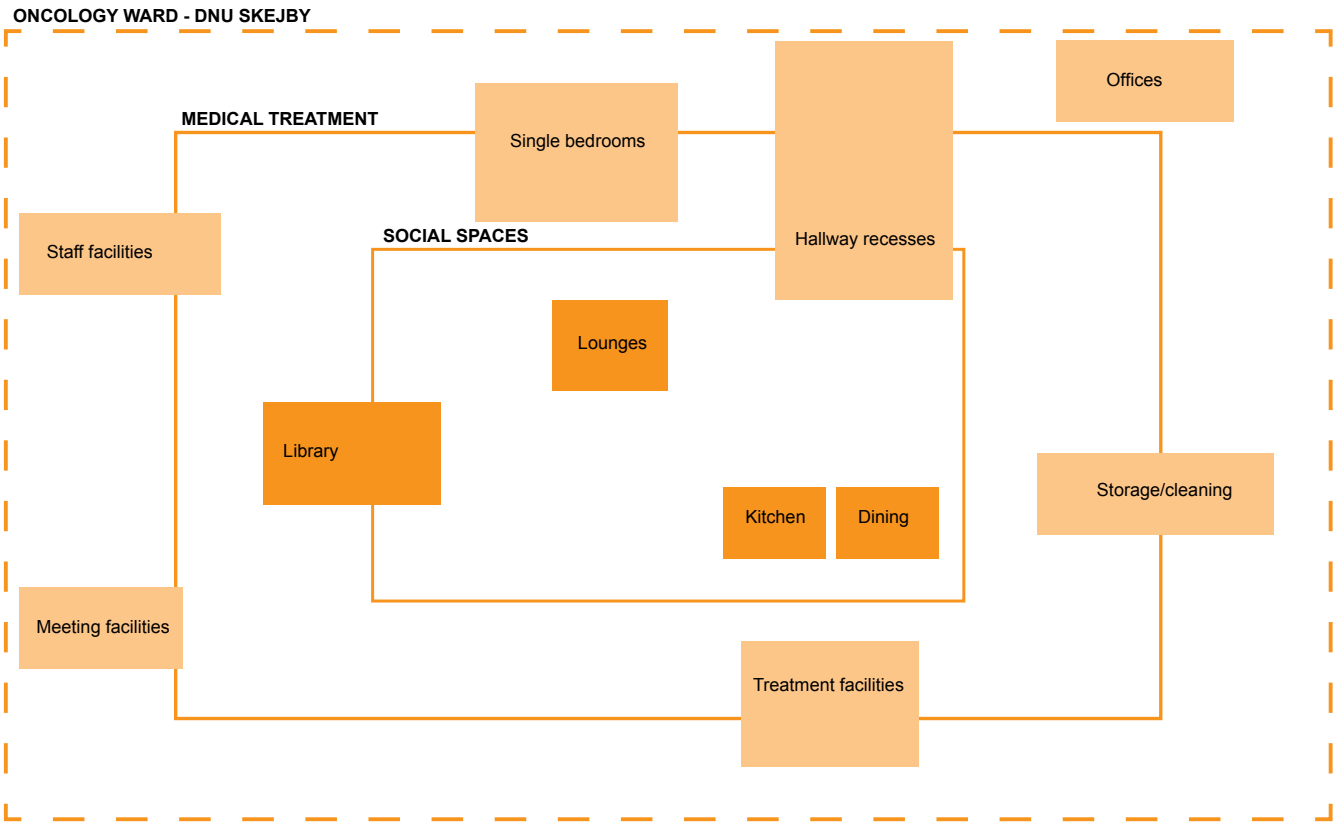
Lounges:
Besides the dining facilities the main dayroom should provide alternative seating arrangement in more comfortable surroundings, and the project suggest 2-3 sub spacious lounges with potential flexible use. The lounges should be a secluded area still in connection with the kitchen and dining area, where patients could perform reclusive passive observations or confidentially conversations in groups or tete-a-tete. Recognisability is also an important aspect of the lounge areas and these should be designed on the basis of archetypical elements including a fireplace lounge, the library lounge, a garden lounge, etc.
Besides the social lounges, the project also suggests a room or lounge reserved for immersion and quietness – a place where patients may go to find themselves and deal with their own deeper thoughts.

ROOM PROGRAMME - SOCIAL SPACES

ROOM	AREA	LIGHT	ACOUSTICS	INTERIOR DESCRIPTION
SOCIAL DAYROOM				
- Kitchen-dining area	40 M2	daylight + artificial lightning	Rev.: 0,6 sec	Seating arrangement for 8-10 persons. Kitchen space for two parallel groups sharing cooking equipment.
- Library incl. lounge	15 M2	daylight + artificial lightning	Rev.: 0,6 sec	Seating arrangement for 3-4 persons - individual spaces.
- Lounges	3 X 15 M2	daylight + artificial lightning	Rev.: 0,6 sec	3 lounges with each a different icon. Seating arrangement for 4-6 persons in each lounge.
TOTAL	100 M2			

The room programme for the suggested social spaces in a future oncology ward. The required **area** (M2) are defined by the project based on observations, the brief "Kræftrådgivninger i det 21. Århundrede – overordnet program for rådgivningen i Kræftens Bekæmpelse" (Arkitema and Kræftens Bekæmpelse 2008), and the competition brief "Kræftens bekæmpelse – ny kræftrådgivning i XXXX" (Kræftens Bekæmpelse og Real Dania 2011); Considerations regarding **daylight** are self defined based on analysis and observations; **acoustic** demands are based on BR10 and own conceptual vision for the social spaces.

ORGANISATIONAL DIAGRAM - THE ONCOLOGY WARD



The organisational diagram shows the combination and interplay of the room programme for the social spaces (orange cubes) merged with the standard rooms defined by C.F.Møller and DNU Skejby for a regular patient ward (light orange cubes)

PART THREE

SKETCHING PHASE

THE DESIGN OF SOCIAL SUPPORT

DNU SKEJBY

SKETCHING - 1:200

SKETCHING - 1:100

SKETCHING - 1:50


SKEJ BAR
Århus Universi

Ill. 25 - The arrival at DNU Skejby

DNU SKEJBY
INTRODUCING THE CONTEXT

The project is basing the following sketching phase on the context of DNU Skejby Aarhus by the project team 'Rådgivergruppen DNU' including C.F. Møller Architects, Cubo Architects, Rambøll Engineering, Alectia, etc.

The hospital as a city structure

Denmark's largest hospital complex, DNU Skejby is in scale and structure comparable to most Danish provincial towns, and the project team used the city of Ribe as basis for the concept and organization of the new hospital.
Traditional cities have a recognizable organization and scale, and provide an immediate functional flexibility. A spectra of various places, zones and areas that appeal to different personalities and moods, where the manifold characteristics improves the spatial variety and defines a multifarious milieu - in the city, and in the future DNU Skejby.

DNU Skejby is consequently described as a hospital city - a unique place with a special character that is defined by its wide range of programmes and activities.
When the hospital is completed, nearly 400.000 M2 will form the physical surrounding for more than 100.000 hospitalized patients pro year, and DNU Skejby will be the largest place of employment in the Central Region of Denmark.

In order to ensure location recognizability and an accessible environment, the project is designed with the city as reference and based on the human ideal and scale as requisite for the overall concept. *"In DNU Skejby it should not only be possible to find your way - but also find yourself."*, as quoted from the competition entry.
The organisation is clear, easy to understand and instant adaptable, and the spatial organisation is comparable to a recognisable city structure that gently leads patients and visitors through the large complex in an architectural approach chosen to mime the human scale.
When entering the complex either through the main entrance in 'Forum' or in any of the decentralized entrances in each specialty 'Block' the patient or visitor discover a hospital in an well-known organisation with districts, streets, squares, markets, etc. A conceptual distribution of space with terms that guides the visitor through an easy understandable hospital city.

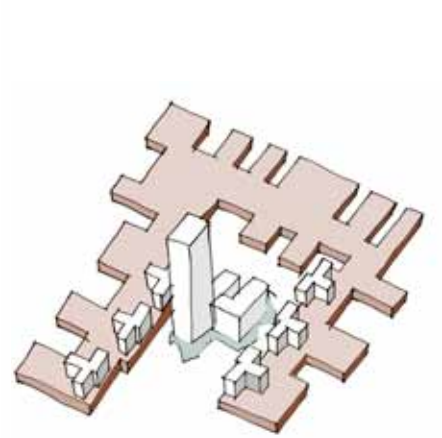
Forum:
Forum is the main central hospital square in the DNU Skejby complex. The natural arrival area, with shopping possibilities, cafés, banks, cinemas, conference facilities, library, hotel, etc.

The Arcades:
The arcades are main interior streets that connect the professional specialities and the *galleries* in the northern direction. The *arcades* are continuing the existing circulation of Aarhus University Hospital and will be a main allocating and organisational aspect of the new hospital. Besides handling the main flow, the *arcades* also function as part of the public space including waiting area, exhibition spaces, etc.

The Galleries:
The *galleries* are decentralised entrances and central squares of each different speciality block. They mark the individual professional domains in clear and recognisable districts and let each speciality block appear with a unique character.
The central *gallery* is a double high room with own reception, kiosks and cafes. From the *gallery* the primary vertical circulation is connecting the patient wards with the treatment base.

Ill. 26. View towards the main entrance where the forum is raising as centre of the new DNU Skejby. Illustration by Rådgivergruppen DNU Skejby.

Ill. 27. The connection of DNU Skejby to the city and the nature. Illustration by Rådgivergruppen DNU Skejby.



Ill. 28 Functional organisation with the main forum, the treatment base and the bedroom blocks. Illustration by Rådgivergruppen DNU Skejby.

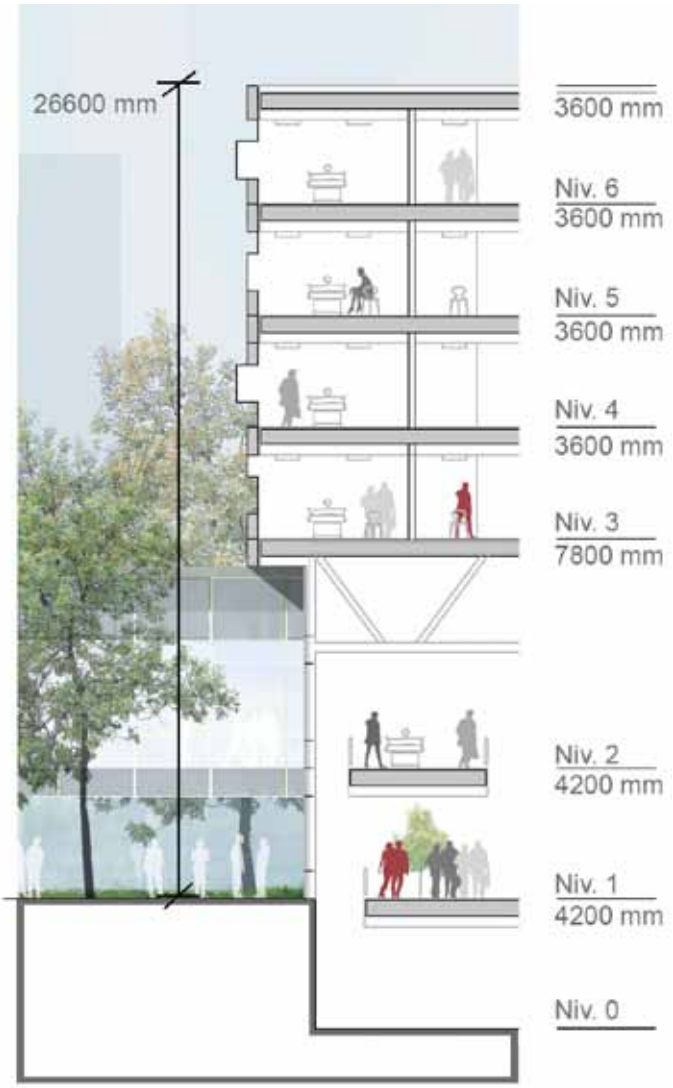
Ill. 29. The main flow and connections in the new DNU Skejby. Illustration by Rådgivergruppen DNU Skejby.

DNU SKEJBY
THE ONCOLOGY BLOCK

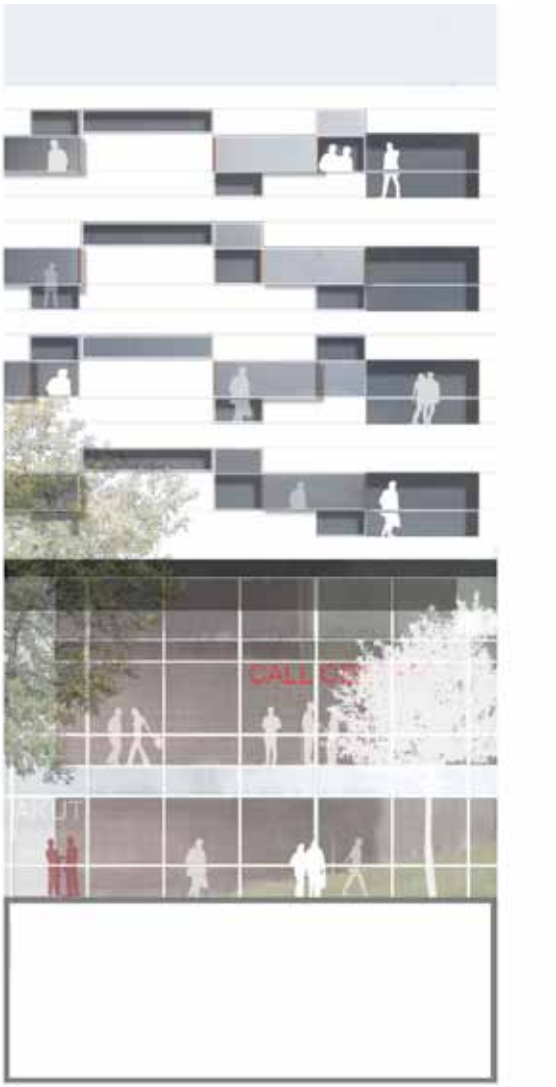
As introduced in the programme of this project, the user group are people affected by cancer, and in the following sketching phase, the point of departure will therefore be the professional speciality in regards to the oncology block. In this block, three stories of 24 single bedrooms and ward-specific functions are placed on top of a 2 storey treatment base, where a decentralise entrance, the main reception, and common and public programmes including ambulatories, cafés, restaurants, etc. are situated.
The bedroom storeys each have specific dayrooms for the patients hospitalized in the particular ward, and it will be this dayroom this project will have in focus through the following sketching phase.
In the ward, the common dayroom is placed centrally, where patients and their visiting families should have easy access to attractive and inviting social programmes within the ward itself. Here it is possible to engage informal social interaction and spend time away from the bedrooms, still being close to the medical staff and the ward facilities. Patients and especially outpatients and visitors are also encouraged to use the common and public facilities in the galleries at the ground floors of the oncology block, but the main social activities for patients and involved relatives are still believed to occur in the semi-public dayrooms of each single ward.

Ill. 30. Part of the facade, showing the 2 storey base with patient wards on top. Illustration by Rådgivergruppen DNU Skejby.

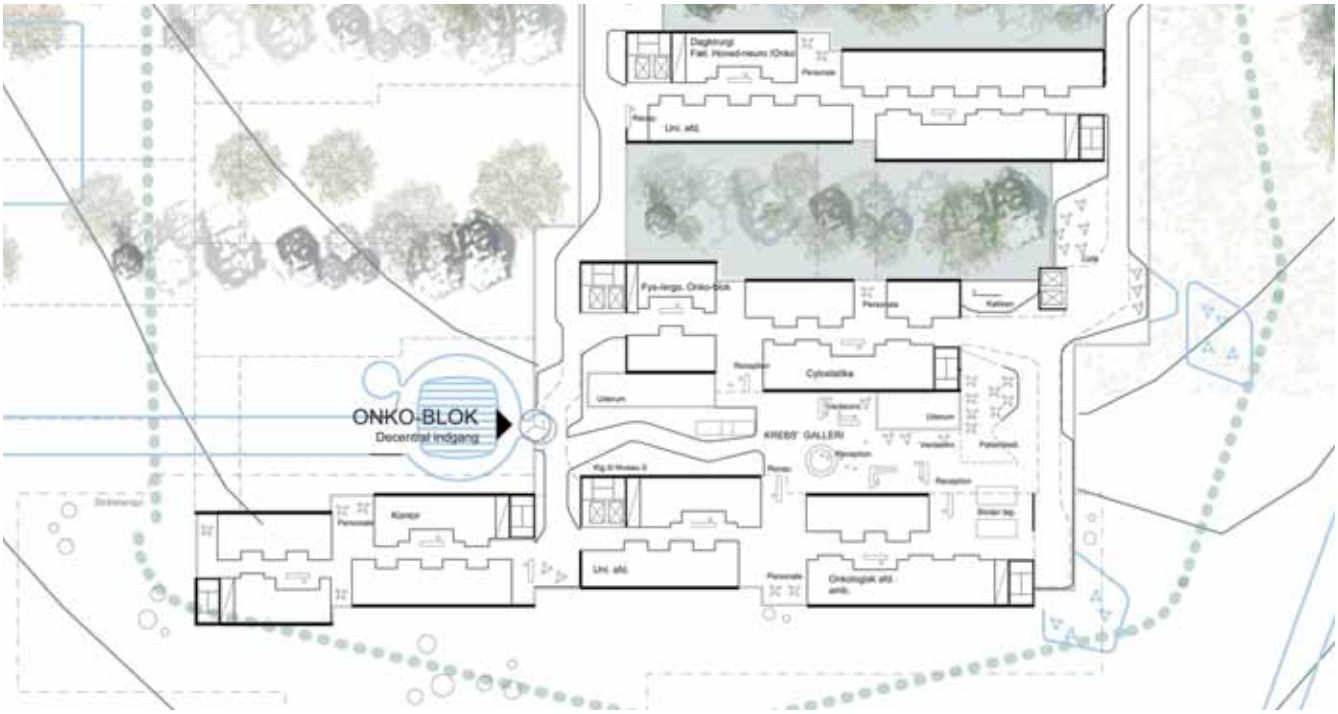
Ill. 31. The arrival at the decentral entrance of the specialist blocks. Illustration by Rådgivergruppen DNU Skejby.



Ill. 32. Section through the specialist block.
Illustration by Rådgivergruppen DNU Skejby.



ill. 33. Part of the facade showing the gallery and the placement of bedroom storeys on top. Illustration by Rådgivergruppen DNU Skejby.



ill. 34. Ground floor plan of the gallery at the oncology block. Illustration by Rådgivergruppen DNU Skejby.

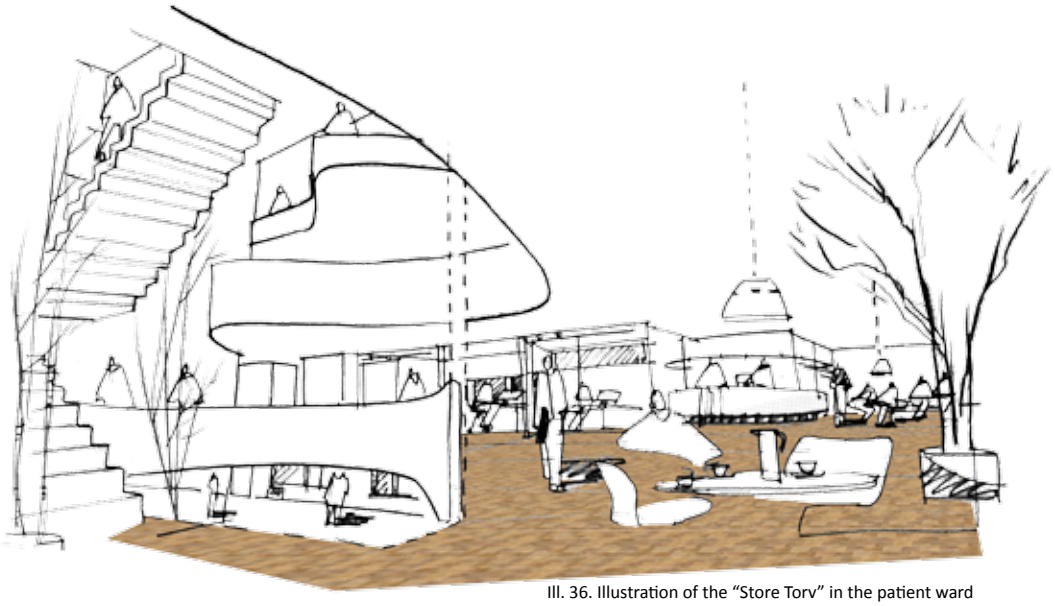
DNU SKEJBY

THE 4th FLOOR WARD

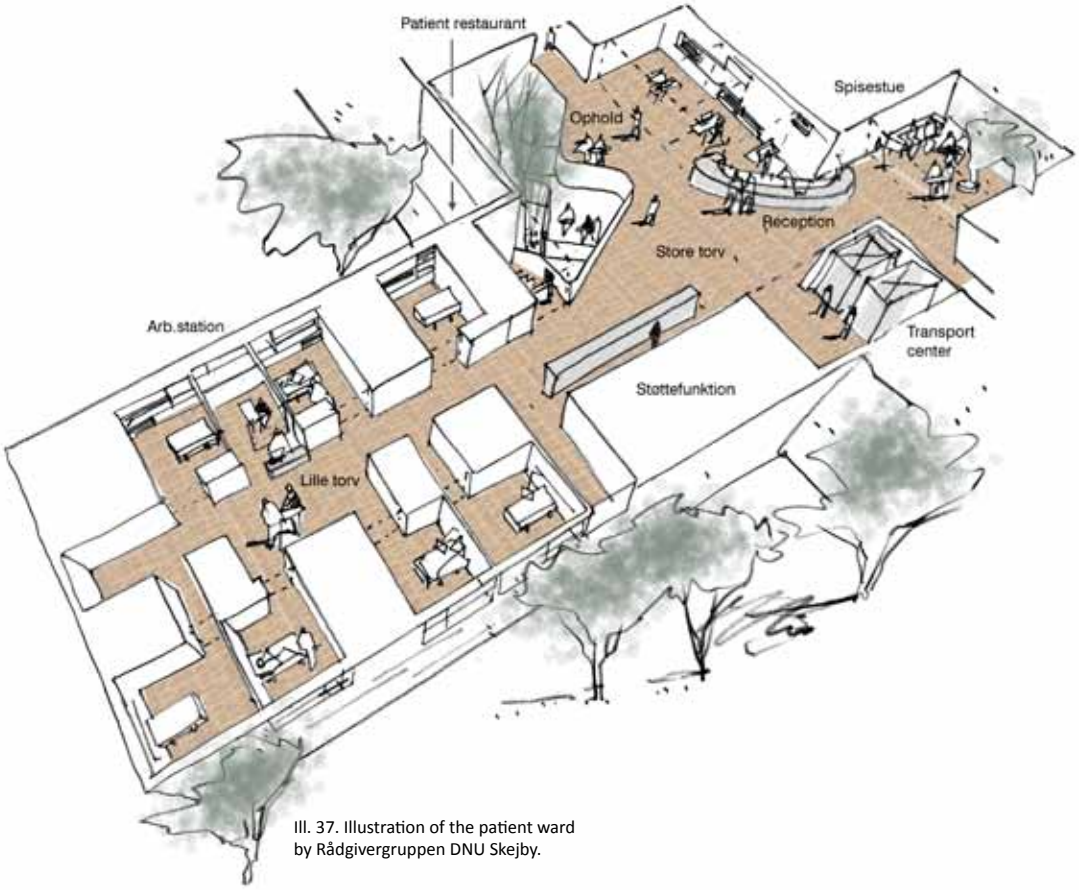
When entering the 4th floor patient ward, the visitor is welcomed by the main reception, where nurses may guide people in the right direction. Besides the reception, the common area contains the main social dayroom, access to a winter garden, offices, workstations, storage, cleaning facilities and treatment rooms. The centrally main area seems generally well lit, and is connected vertically through a large atrium.

This central atrium is not considered as contributor of any direct value in the ward itself, but is however believed to have a positive influence on the mental and psychological connection to the ground floor gallery - although it may be situated more than 20 meters below.
Still, this direct link to the public programmes downstairs, may act as motivation and invitation to hospitalized patients and especially their relatives, and the future use of these facilities may be improved compared to the current state, where hospitalised patients rarely leave their bed or the hospital ward. By visually connecting the stories vertically, the access to the gallery facilities may seem smaller, and by actively and mentally inviting patients to these areas, the variety during hospitalisation is increased, and patients' physical mobility may be improved.

Ill. 35. Existing plan solution by Rådgivergruppen DNU Skejby.
Scale 1:400



Ill. 36. Illustration of the “Store Torv” in the patient ward by Rådgivergruppen DNU Skejby.



Ill. 37. Illustration of the patient ward by Rådgivergruppen DNU Skejby.

DNU SKEJBY

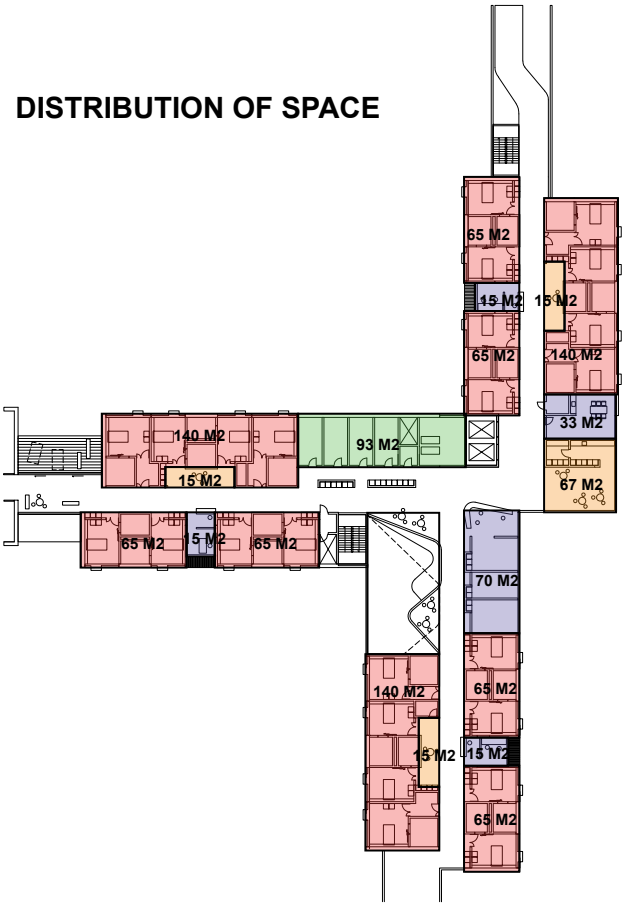
THE 4th FLOOR WARD

The patient ward is generally divided in three corresponding groups of each 8 beds situated around a hallway recess and a workstation.
This overall organisation is considered very useful and advantageous in regards to the general work flow as the nurses may perform alike in each of the three groups, where medicine, storages, equipment, etc. are arranged the same way.

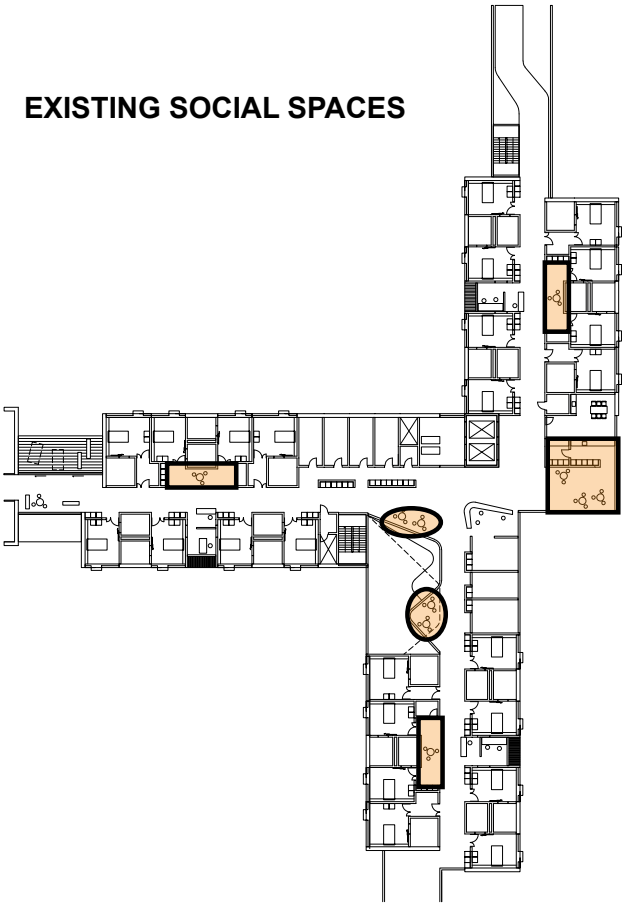
In the centre of each group of 8 bedrooms is a smaller hallway recess for shorter residence, passive observations and informal meetings. In these spaces, it is possible for the patients to engage social contact, within very short distance to their bedroom, and these recesses are considered very important as they function as the mental connection between the bedroom and the main social dayroom. If the hallway and the recesses do not feel inviting and safe, it is believed that many patients will be afraid or feel uncomfortable in these zones, and consequently not access the dayroom intended for social interaction and support.
The existing plan solution is not situating the hallway recesses with access to natural daylight or exterior views, and they may appear as basic hallways instead of actual places for residence. A reorganization of the plan solution is however believed possible (although not a part of this project), and a new design solution will give these spaces access to direct, natural daylight, and improve the quality of residence in these zones.

The common facilities are all placed in the central focal point of the ward, and this organizational concept seems well defined.
The overall focus in the following sketching phase will be the main social dayroom, which in the current plan solution is placed ideally - closed off from the hallway and still with natural daylight from 2 southern directions. As the solution is defined in the existing competition entry, the size of the dayroom, however, is not quite adequate compared to the programme.
The following sketching phase in the scale of 1:200, will consequently suggest some smaller overall changes to the existing plan in order to define 100 M2 for the main social dayroom that is needed according to the programme.

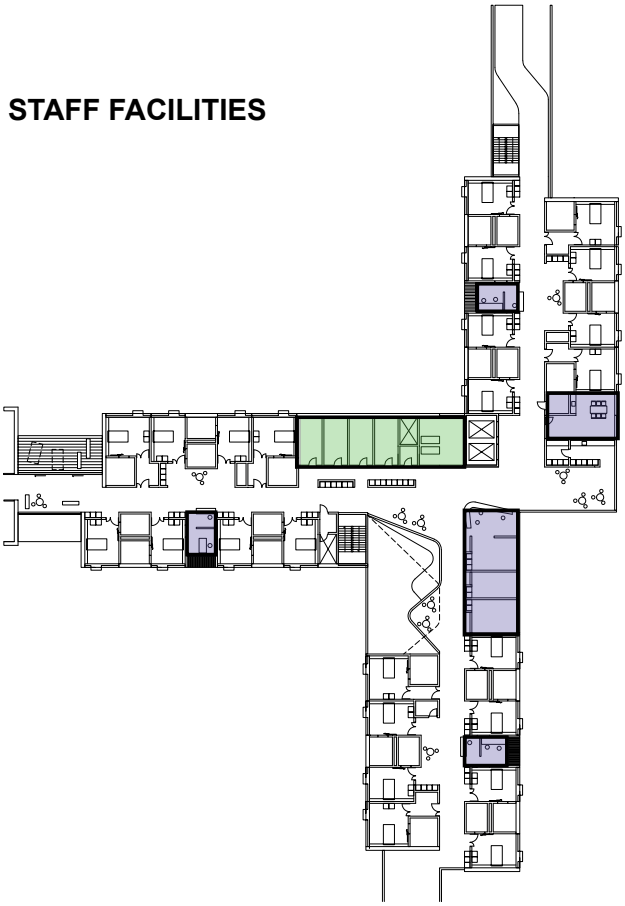
DISTRIBUTION OF SPACE



EXISTING SOCIAL SPACES

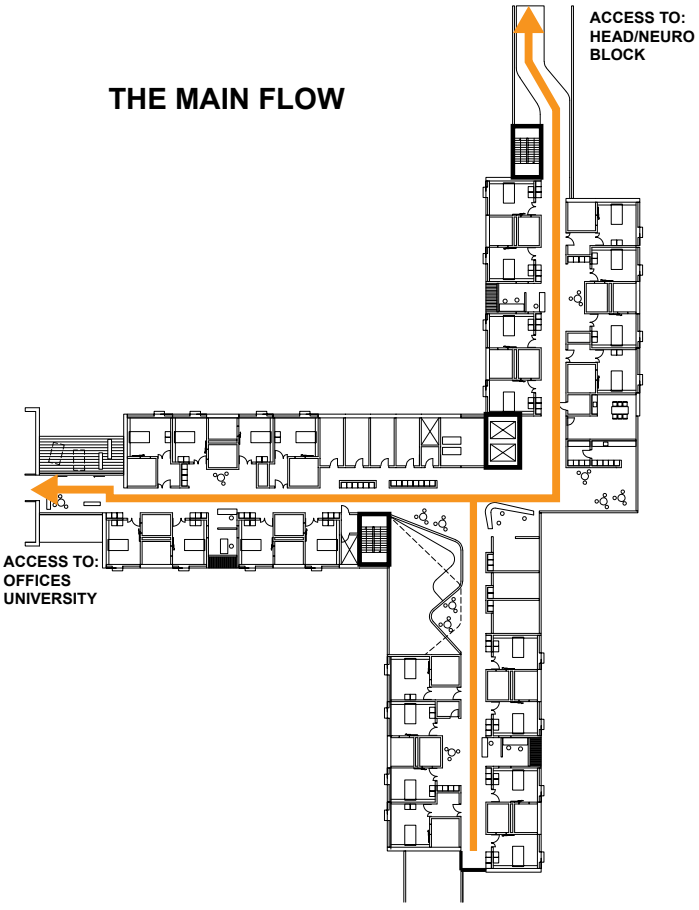


STAFF FACILITIES

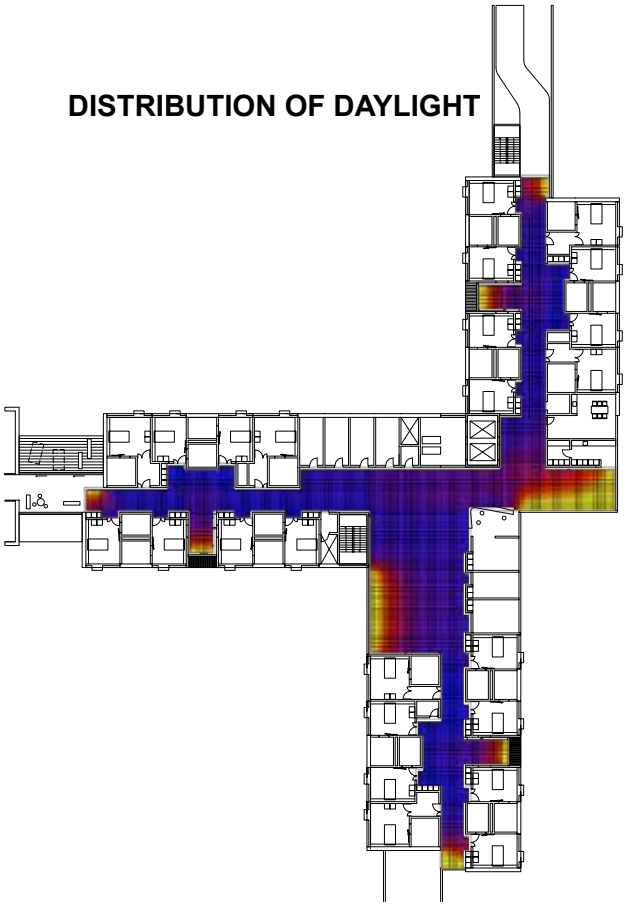


SINGLE BEDROOMS

THE MAIN FLOW



DISTRIBUTION OF DAYLIGHT




Reception

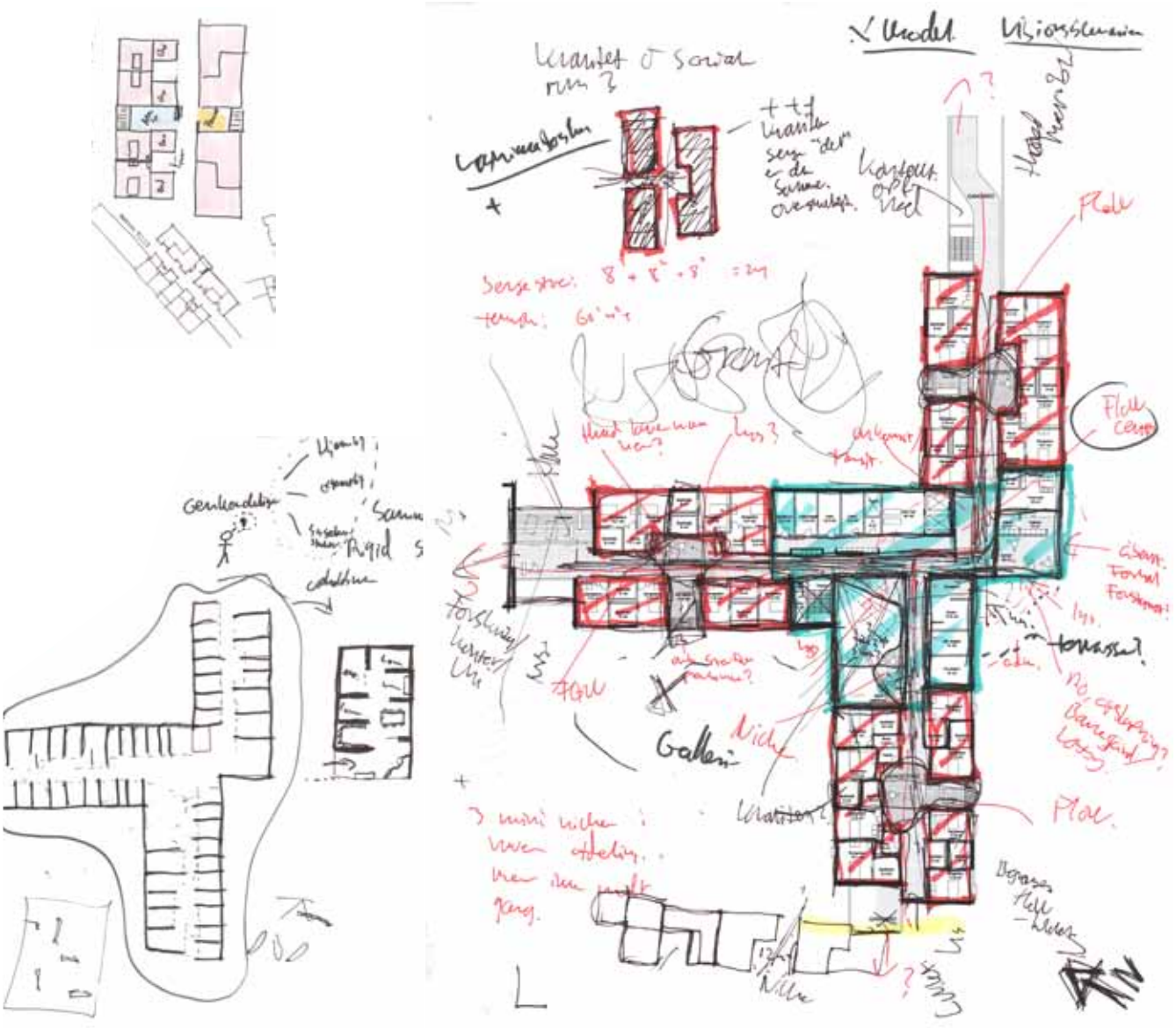

AGV rum
26 m2
Ophold

SKETCHING - 1:200

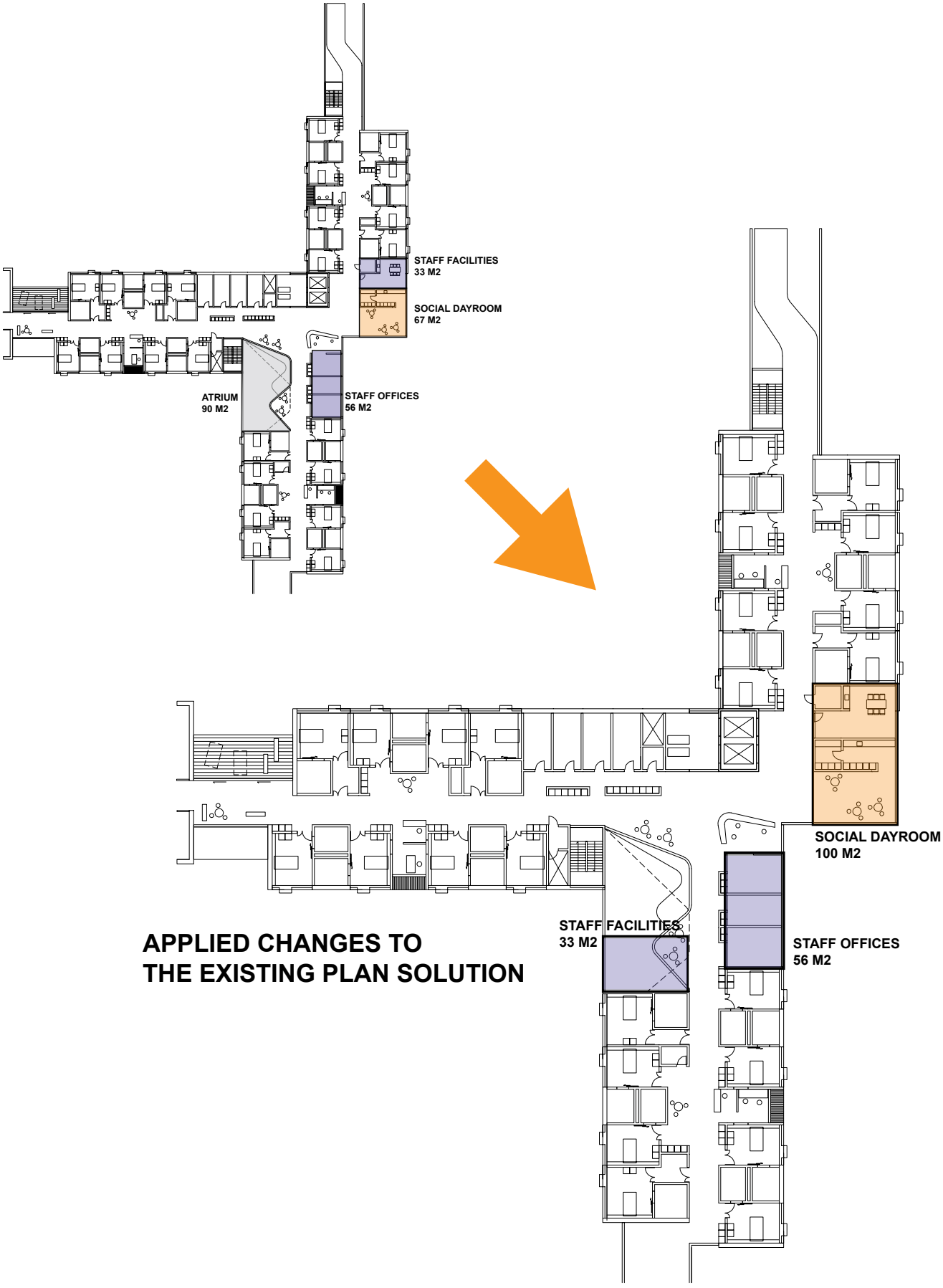
CHANGES TO THE EXISTING PLAN SOLUTION

The initial sketching phase in the scale of 1:200 has been concentrated around the close context within the patient ward, where the main focus has been the centrally social dayroom.
Based upon the room programme, the analysis states that app. 100 M2 is required for this dayroom in order to design a common social space, where patients and their relatives can meet and engage in essential social interaction.
The intention of this 1:200 sketching phase, has consequently been to make some overall changes to the existing plan solution, as presented by 'Rådgivergruppen DNU Skejby', in order to define a unifying centrally social environment, where the individual programmes and functions may contribute to each other, thus making the common social dayroom a living and multifarious environment throughout the day.

In this early stage of the sketching phase, various proposals has been made in order to define this united space of 100 M2, and the final solution has been to move the 33 M2 of staff facilities from the northern wing to the southern wing, where they now occupy a smaller part of the 'empty' atrium space. This placement of the staff facilities corresponds to the staff related offices and workstations across the hallway. By moving the staff facilities from its current position, the main social dayroom can be extended and is then able to fulfil the programme requirements. The social dayroom has with this overall placement still access to daylight from two sides, and is placed centrally within the patient ward with easy access from all three wings.



VARIOUS SKETCHES ON THE EXISTING PLAN SOLUTION



APPLIED CHANGES TO THE EXISTING PLAN SOLUTION

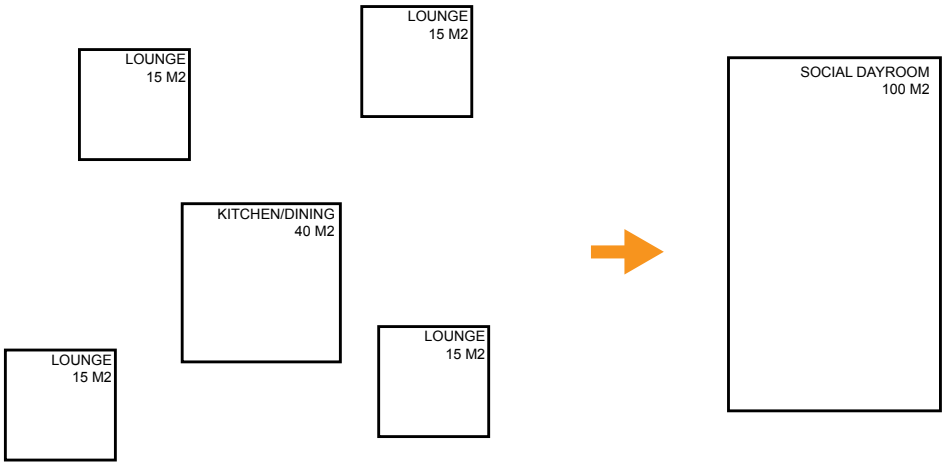
SKETCHING - 1:100

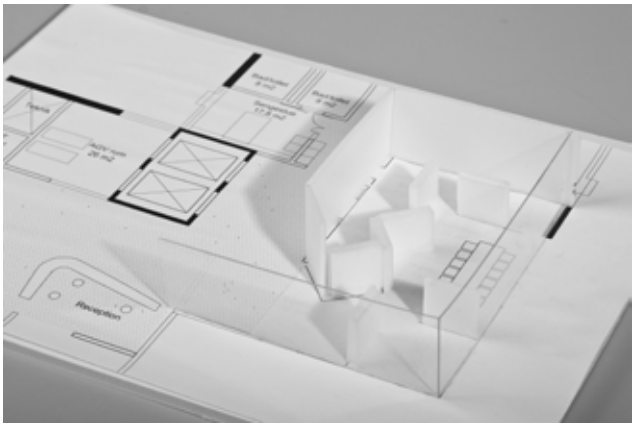
CONCEPTUAL SKETCHING

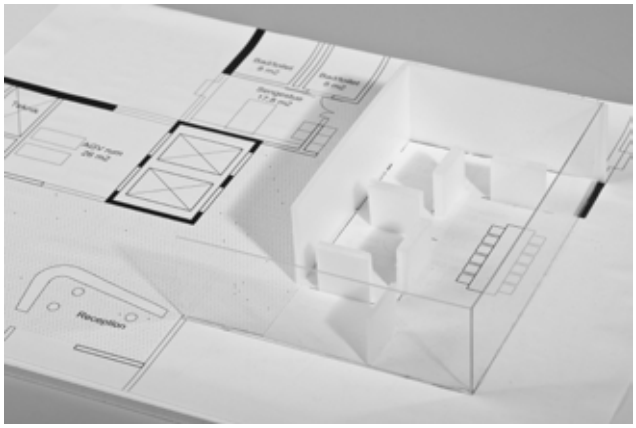
As the previous chapter has described, it is possible to ensure the required 100 M2 for the main social space by making some overall changes to the existing plan solution.

To introduce the conceptual sketching phase, and to understand the size and scale of the rather compact social dayroom, some preliminary volume studies have been performed.
From these registrations it is clear that the programming and organisation of the dayroom call for rational, flexible and well-defined solutions without unnecessary waste of square metres. The compact volume with comprehensive functions requires versatile design solutions, where each individual zone has significant influence on the holistic experience of the united space.
The introductory volume studies have addressed immediate answers to some preliminary ideas, and applied comprehensive insight regarding scale and spatial possibilities in the future social dayroom.
One of the main conceptual ideas for this project is deriving from the analysis and the three main parameters (*functions, materials & textures and details*), and defined as *Recognisability*.
Throughout the sketching phase this concept is defined as the emerging feeling experienced in well-known, easy understandable and familiar environmental settings. *Recog-*

PROGRAMMING







Preliminary volume studies

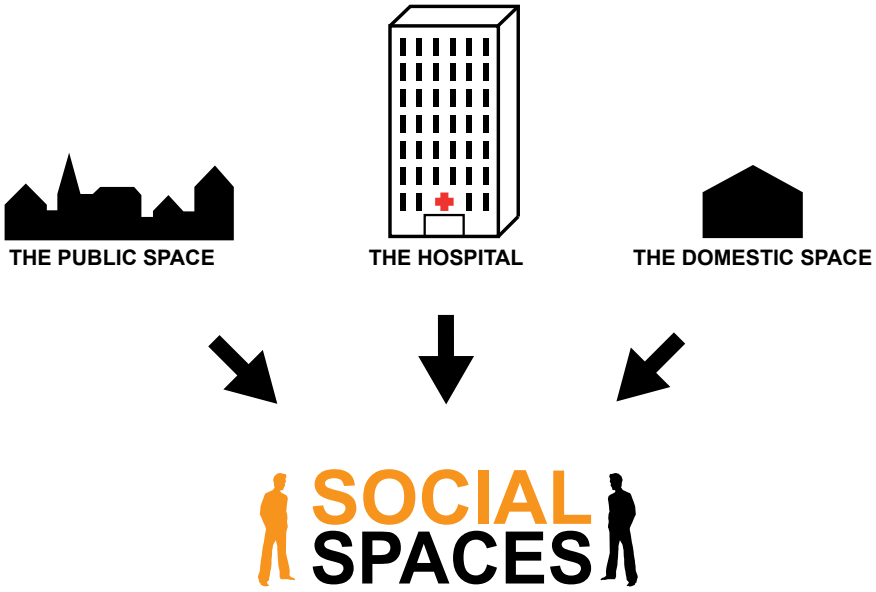
nisability as a concept is in this project deducing elements from three main areas that is considered as the basic foundation for future social spaces, including elements from *'the public space', 'the hospital space'* and *'the domestic space'*.
Recognisable aspects from each of these three areas should consequently be present in the design solution of the social dayroom in future hospitals.

'The public space' is considered represented from spaces that facilitate informal meetings, apply focus on details and define well-defined distances between people.

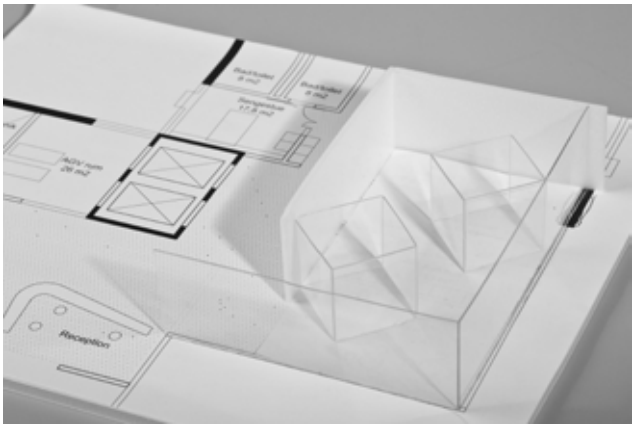
'The hospital space' is mainly represented by an overall, rational organisation of the floor layout, and by illustrating competency and radiate professionalism within the interior solutions.

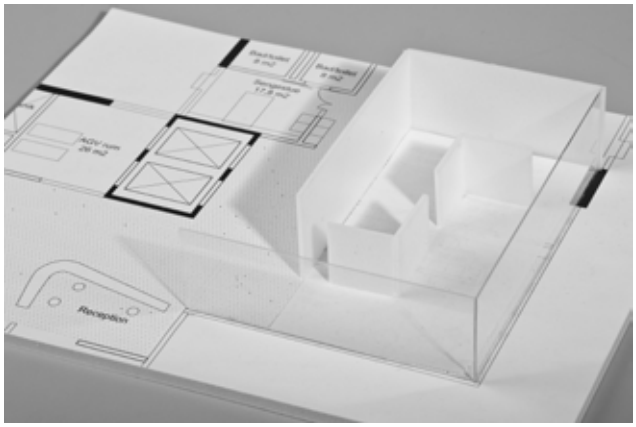
'The domestic space' is today far from the experience achieved when considering recognisability in hospital environments. However, it is an aspect that may be significantly improved by an enhanced focus on providing spaces with a homely atmosphere - instant achievable through the implementation of tactile materials and textures that will enhance a well-defined sensory experience.

RECOGNISABILITY



THE PUBLIC SPACE - Informal meetings, distances, sociopetal and sociofugal arrangements, etc.
THE HOSPITAL - Organisation of floor layout, radiate professionalism, illustrate competency , etc.
THE DOMESTIC SPACE - Homely atmosphere, tactile materials, room scale, accommodative etc.

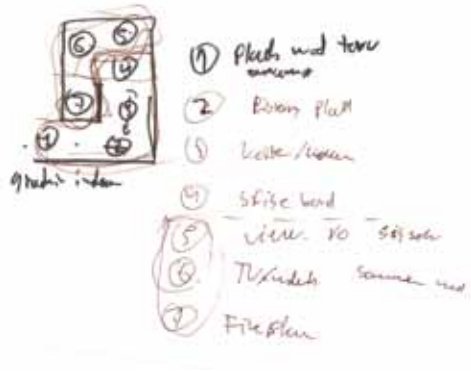


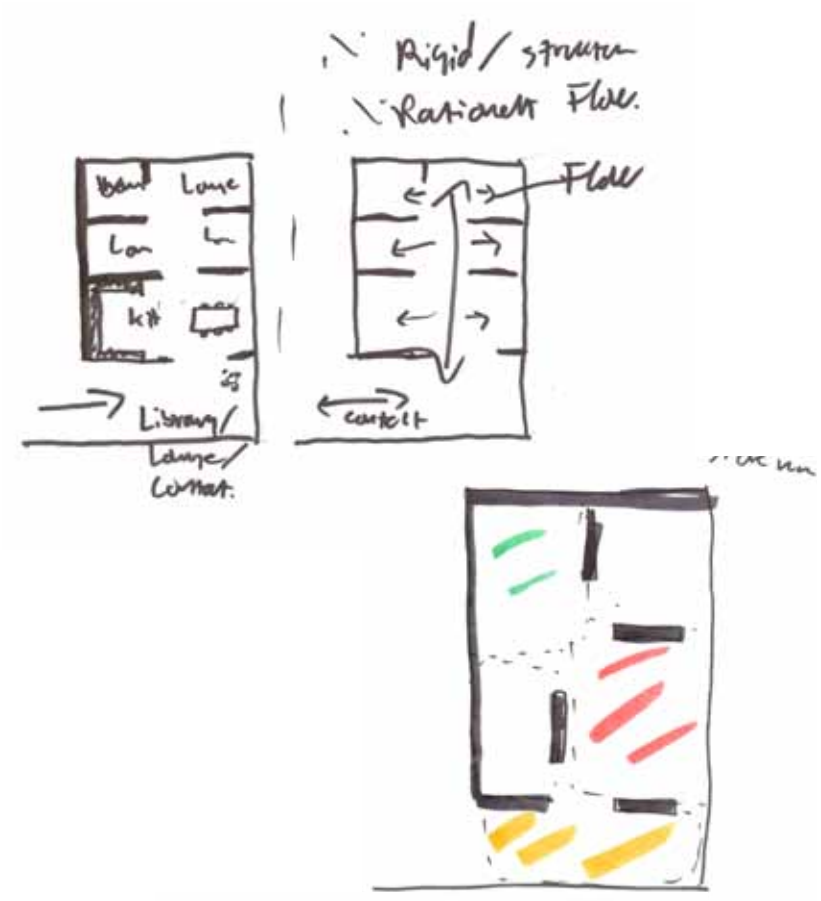


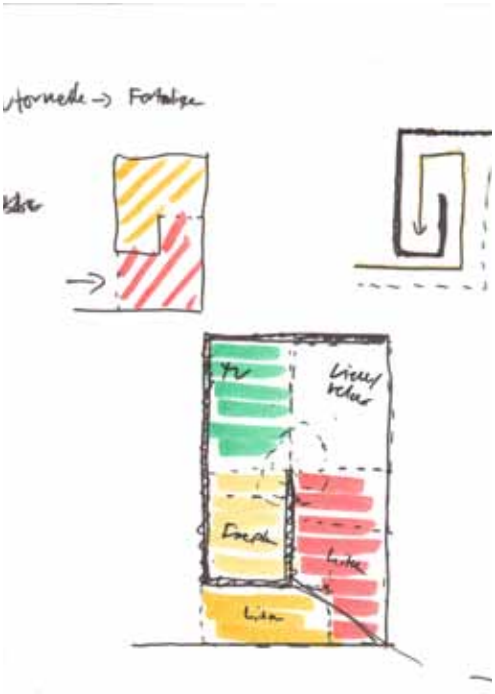
SKETCHING - 1:100

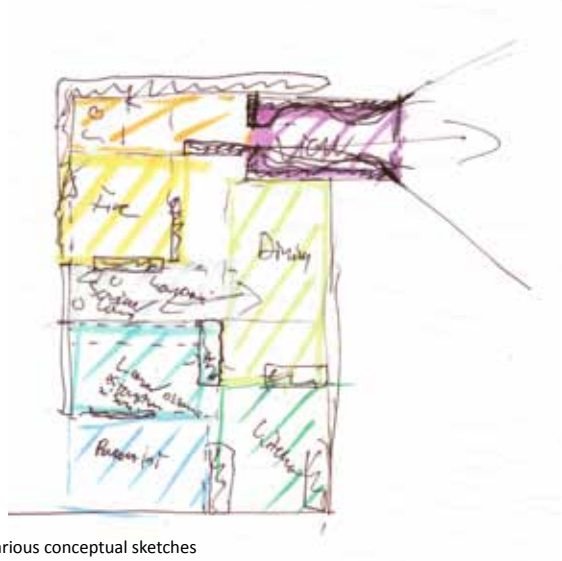
CONCEPTUAL SKETCHING

Based upon the overall concept of recognisability and the introduced volume studies, some initial conceptual sketches has been made. The various sketches below has together with physical models, 3d sketching, etc. partly defined the overall concepts presented. Basic considerations regarding the *'organisation'* and floor layout of the social dayroom, the *'intensity of social support'* and the main *'flow'* has been in focus in order to define the intended functionality and use of the main space for social support.









Various conceptual sketches

The initial conceptual sketching and the concepts presented, will form the basis of the further, more detailed sketching phase.

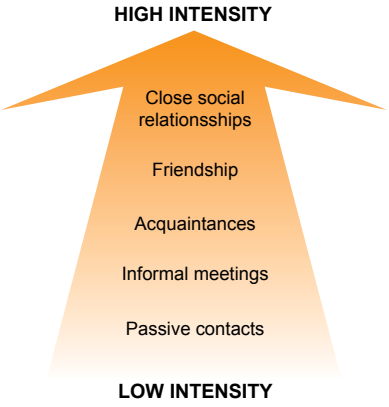
When considering the overall concept of recognisability, it has been possible to introduce elements from especially the public space and the hospital in the introduced concepts regarding *'organisation'*, *'intensity of social support'* and *'flow'*.

However, the domestic space and the homely atmosphere have not yet been introduced conceptually, and a main aspect that combines the various zones and implement sensory experiences and tactile elements is still missing. In this regard, textiles as a tactile and unifying material will be introduced in the following chapter in order to define the social space with a warm, attractive and recognisable, homely atmosphere.

CONCEPTS

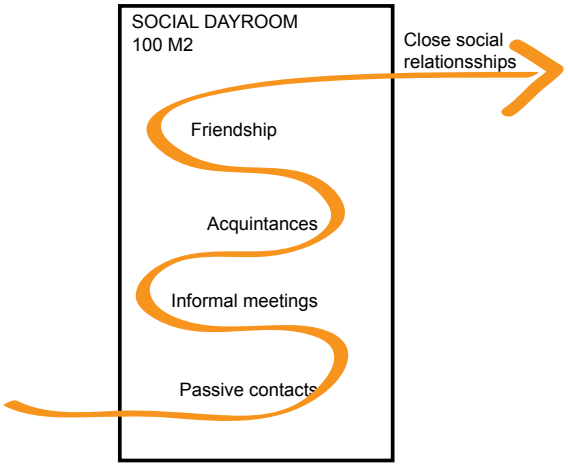
INTENSITY OF SOCIAL SUPPORT

The intensity of social contacts, as defined by Gehl (2003), is reflected in the social dayroom, where the visitor is progressively led into the dayroom through the low intensity, passive contacts to the high intensive, social relationships.



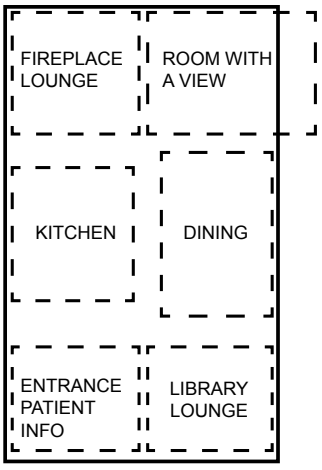
FLOW

The flow derived from the concept of 'intensity of social support' is used to programme and organise the social dayroom. This is believed to make it easier for new patients to enter the social environment where they are introduced to the less intensive passive forms of contact.



ORGANISATION

Recognisable organisational elements from the existing hospital layout are interpreted as a rational and orthogonal organisation of subspaces within the social dayroom, where the programmes and functions are following the overall flow of intensive interactions.



SKETCHING - 1:100

THE USE OF TEXTILES

In order to find a concept for connecting the homely atmosphere and hospital environment, while still keeping the overall recognisability, the project introduces the material seen as one of the main missing links between the clinical and institutionalised hospital (vinyl flooring, acoustic ceilings, hard wooden chairs, etc.) and the homely environment (warmth, comfort, safeness, etc.) – Textiles.

Through years, textiles have been abandoned from our industrialised hospitals due to increased hygienic demands, and is only slightly finding its way back, when browsing the European context. However, the clinical spaces characterizing our hospitals today are calling for new tactile materials, and new possibilities to design areas and zones with a more friendly and inviting atmosphere.
As a consequence of this ascertainment, the preliminary sketching phase is considering a concept for reintroducing textiles in hospitals in a far greater extent than seen today.

As standard material, textiles would be beneficial in a range of applications, including: *The tactile aspect* – texture, materiality, recognisability, relaxation, etc.; *The acoustic aspect* – absorbing, potential zone division. And *The flexibility aspect* – design potential, personalisation, multiple use and experiences.

When implementing textiles, a far range of requirements are immediate fulfilled, although the problem regarding hygiene is still evident, and may be a consequently barrier for implementation.
To deal with the hygienic challenge, the question *"Is it possible to design a textile that will improve the hygiene in hospitals?"* was raised, and the solution has been performed as a simultaneously project as part of the international student competition "Future Textiles", where the entry *"Health Caring Fabrics"* has been selected as one of four finalists.
Health Caring Fabrics generally introduces a textile series that actually improves the hygiene in hospital dayrooms by applying antibacterial fibres, and by detecting and communicating bacteria overgrowth to the hospital staff. This will allow them to take precautions before outbreaks and to avoid dangerous in hospital infections.
(A poster presentation of the competition entry is enclosed in the appendix)

By introducing this innovative textile series, the future implementation of textiles in health care environments will not be limited by hygienic demands, and this expert approved concept will throughout the design phase use the combination of the historic tactile qualities of textiles and the new hygiene approved aspects to influence the perception of the future spaces for social support.

Health caring fabrics - Illustration from the entry to the competition "Future Textiles"

SKETCHING - 1:100
TECHNICAL CONSIDERATIONS

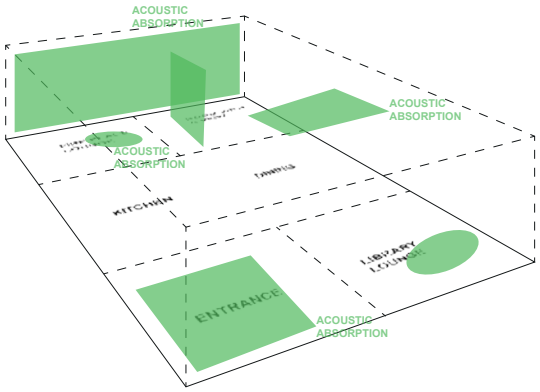
As introduced in the previous chapter, this project proposes an innovative implementation of a new technical textile series that will improve both the tactile perception of the hospital dayroom as well as improve the hygienic environment.
The installation of textiles within the interior will even have an acoustic function as absorber, and may provide a well-balanced and calm environment if implemented in proper proportions and distributed evenly throughout the room.

Besides the hygienic considerations and the acoustic advantages by using textiles, this project will also introduce some overall technical considerations in those aspects influencing the design solution and perception of the dayroom, including the *indoor environment* and the basic *lightning strategy.*

ACOUSTICS

One of the conspicuous characteristics you meet when visiting current hospitals are the consistent standardised ceilings where acoustic sheets and ”integrated” light fittings together mark the perception of the room as institutional and clinical.
In order to not make the same connotations in the future dayroom, the project seeks to process the design solutions of the ceiling on equal terms as the other surfaces of the room, and the design possibilities should therefore not be limited by acoustic necessities. Instead, the project will implement the textile solution, as discussed in the previous chapter, and will use the sound absorbing qualities of textiles to ensure a comfortable acoustic environment instead of using standardised ceiling sheets.
By distributing the textiles evenly in the interior sound field, the absorption will perform homogeneously, and this distribution will furthermore correspond to the hygienic concept of detecting bacteria overgrowth as earlier discussed.

DISTRIBUTION OF TEXTILES

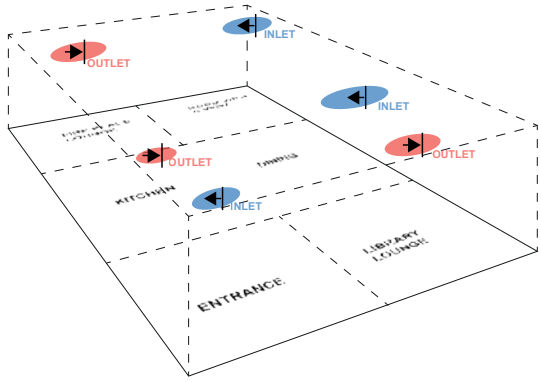


Acoustic absorbers are distributed evenly throughout the room and placed homogeneously on the surfaces to absorb the diffuse field of sound.

INDOOR ENVIRONMENT

Another important aspect to consider in the early design phase is demands for the indoor environment, and the ventilation strategy. Generally the hospital is using mechanical ventilation and it would be evident to link the dayroom with this system, where ventilation channels may be hidden in the floor structure.
When choosing mechanical ventilation, there are two main approaches to consider – displacement or mixed ventilation. In the dayroom, where the use is flexible and constantly changing the displacement ventilation would not be beneficial and the choice is therefore the less effective mixed ventilation strategy. Using this system require considerations regarding placement of inlets and outlets, and in order to dissociate this dayroom from the clinical atmosphere, the ventilation fixtures will be installed hidden or natural integrated in furniture, kitchen units, ceilings, etc. The inlets and outlets should be evenly distributed in the dayroom, keeping the air volume at each fixture limited, thus avoiding draught and allowing a well-functioning demand-controlled ventilation system.

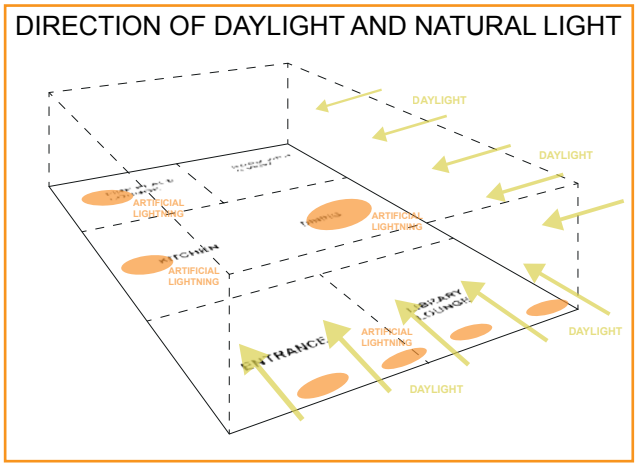
PLACEMENT OF VENTILATION FIXTURES



The mechanical ventilation fixtures are placed hidden and integrated in the dayroom. To allow the demand-controlled ventilation system to function effectively there are inlets and outlets distributed in each main zone of the room.

LIGHTNING STRATEGY

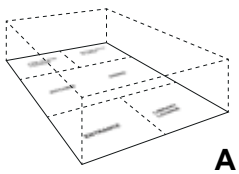
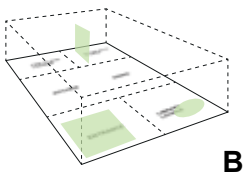
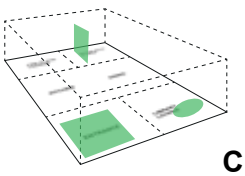
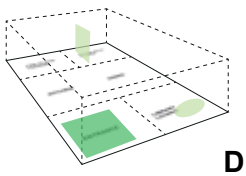
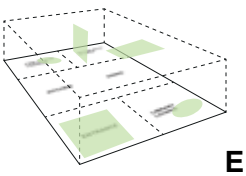
The general lightning should throughout the day be characterised by a high degree of natural daylight that allows the patients to follow the rhythm of the day and season, and hereby give them a feeling of connection to the on going life outside the hospital. The daylight should be used actively to create spatial zones, including some with a more dimmed lightning as a contrast to the light areas.
As sunscreens, traditional curtains are proposed, as they will work as a controllable unit, contributing with homely reflections and improving the self-controlled aspect of the dayroom.
The artificial lightning should, as the daylight, be used to create zones, and may support the daylight during daytime and then work individually during evening and night. Specific light fittings will be selected and implemented during the design phase in order to fulfil the atmosphere intended in the specific zones.

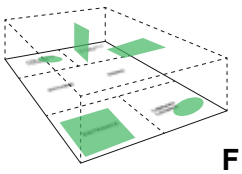
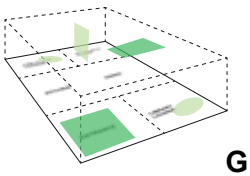
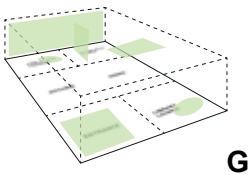
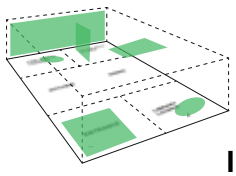
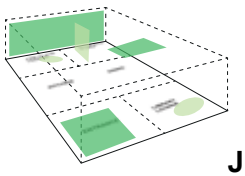


Daylight are obtainable from two sides (south-west and south-east), and should give the room a light and attractive character. Daylight as well as artificial lightning should be used to define spatial zones within the dayroom.

ACOUSTIC SCENARIOS

When using textiles as acoustic absorbers, it is essential to clarify the proportions in order to ensure a comfortable and quiet environment. Calculations on various scenarios, including different types of textiles have been made to define the adequate quantity. In all cases the textile material are placed homogeneously and distributed evenly throughout the room.
As the dayroom consists of six individual zones, the reverberation time is set to be below or equal to 0,6 seconds (based on recommendations in BR08). This rather low reverberation time will define a quiet environment and allow undisturbed conversations in each of the different zones. (Calculations to match the table below are to be found in the appendix).
As the table shows, a satisfactory arrangement are fulfilled by implementing 100 M2 of 'mixed' textiles in the dayroom, and this general estimation will be used during the sketching phase to ensure a correct proportion and implementation of textiles.

 A	 B	 C	 D	 E
NO TEXTILE	25 M2 - Textile 'hard'	25 M2 - Textile 'loose'	25 M2 - Textile 'mixed'	75 M2 - Textile 'hard'
Rev. > 2,6 sec	**Rev. > 1,7 sec**	**Rev. > 1,3 sec**	**Rev. > 1,4 sec**	**Rev. > 1,1 sec**

 F	 G	 G	 I	 J
75 M2 - Textile 'loose'	75 M2 - Textile 'mixed'	100 M2 - Textile 'hard'	100 M2 - Textile 'loose'	100 M2 - Textile 'mixed'
Rev. > 0,7 sec	**Rev. > 0,8 sec**	**Rev. > 0,9 sec**	**Rev. > 0,6 sec**	**Rev. > 0,6 sec**

Textile 'hard' - 476 g/m2 - flat textile against the wall or another flat surface

Textile 'loose' - 476 g/m2 - pleated textile in front of airspace or as upholstery

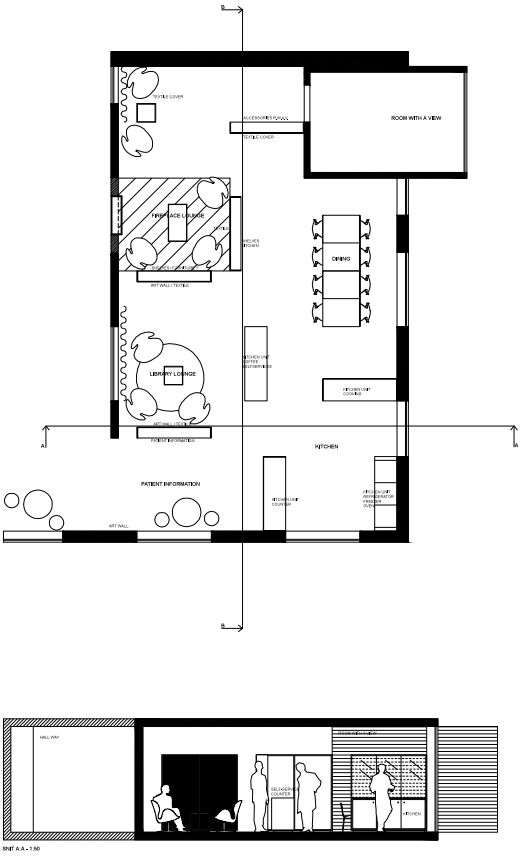
Textile 'mixed' - 476 g/m2 - a mix of 'hard' and 'loose' textiles. Mixed evenly (50-50 or 40-60)

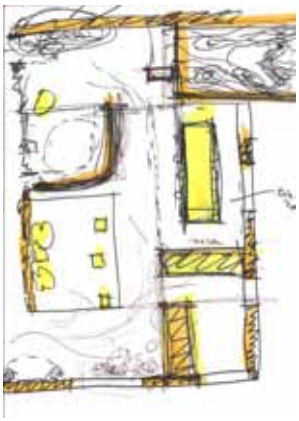
SKETCHING - 1:50

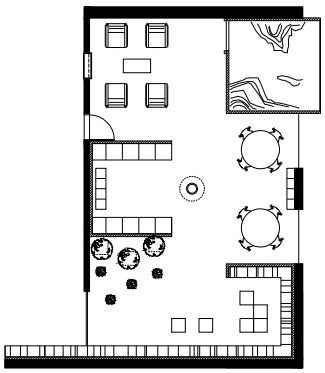
INITIAL SKETCHING

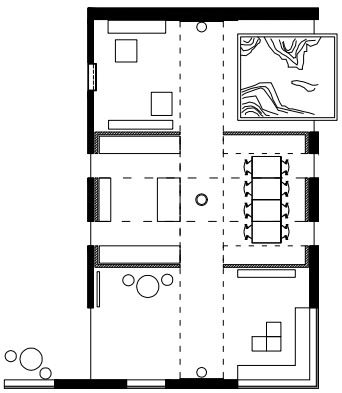
On the bass of the introduced concepts, *'Recognisability', 'Organisation'*, *'Intensity of Social Support'* and *'Flow'*, and the use of *textiles* as the main combining and tactile element, the initial sketching in the scale of 1:50 has its departure. Introductory in this phase, sketches on the organisation of the various zones (*the entrance, the library lounge, the kitchen-dining area, the fireplace lounge and the 'room with a view'*) are combined in various proposed plan solutions. The approach in this phase is to define the individual zones with a specific and distinctive character, and still maintaining an overall connection between the areas in the main social dayroom.

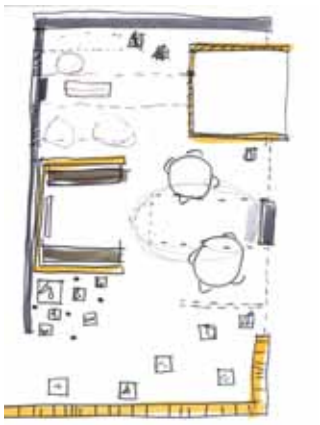
Simultaneously with these overall sketches on the plan solution, specific approaches to the design of the individual zones, including the implementation of the technical textiles are performed and presented in the following chapter.



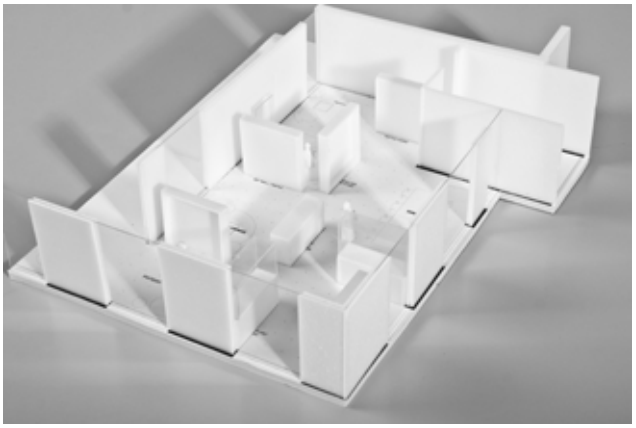




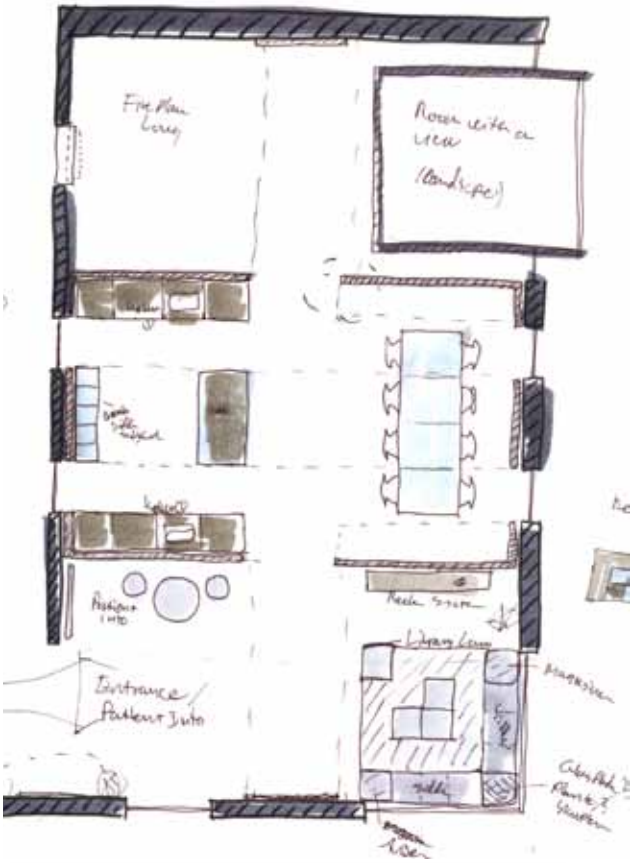


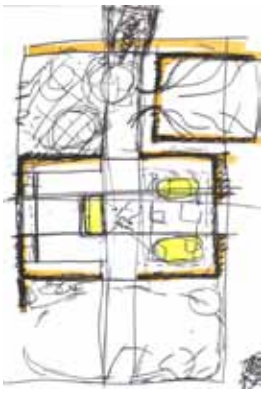


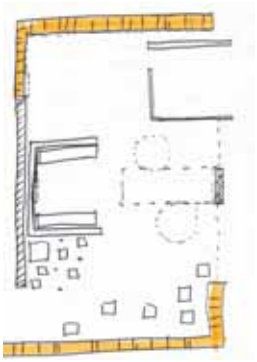
Various early sketches.

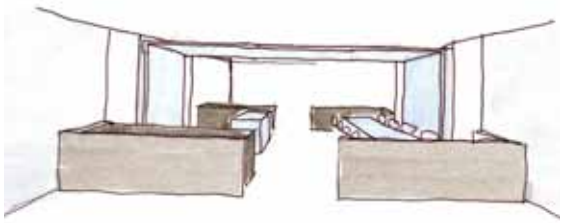


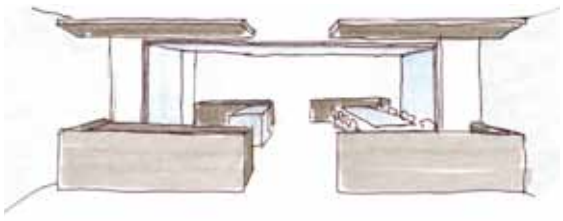
Models of initial sketching proposals.

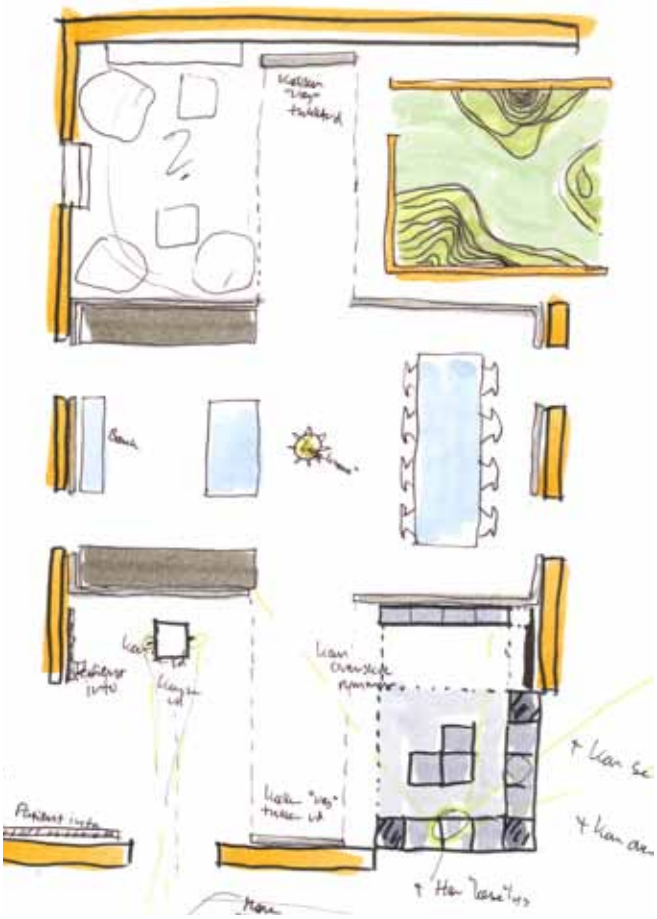




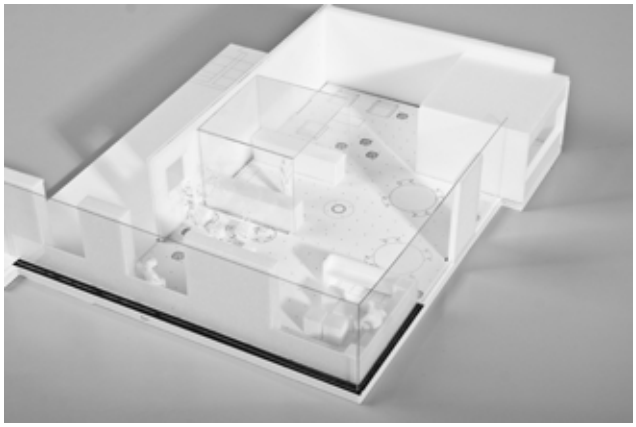








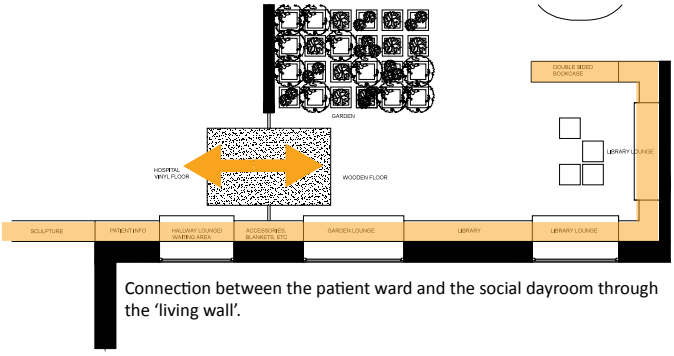
Various early sketches.



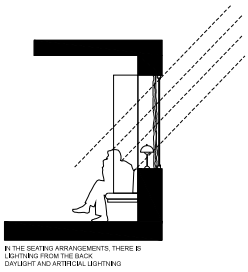
SKETCHING 1:50

THE ENTRANCE - LIBRARY LOUNGE

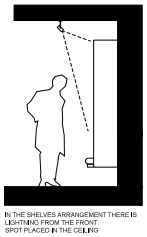
While sketching on the overall plan solutions, various concepts and approaches regarding the design of the individual zones are performed.
The entrance to the social dayroom is through an arrival area that contains a *'garden'* and the *'patient information'* area, and gradually the entrance is becoming the library lounge. The idea is to connect the social dayroom to the patient ward by using a *'living wall'* that contains seating arrangements, patient information, lounges and library in the dayroom section, and in a contiguous proceeding is becoming the reception desk in the patient ward just outside the dayroom. The social dayroom is consequently connected to the actual patient ward, and the 'living wall' is immediately and informal inviting patients to enter the social community.



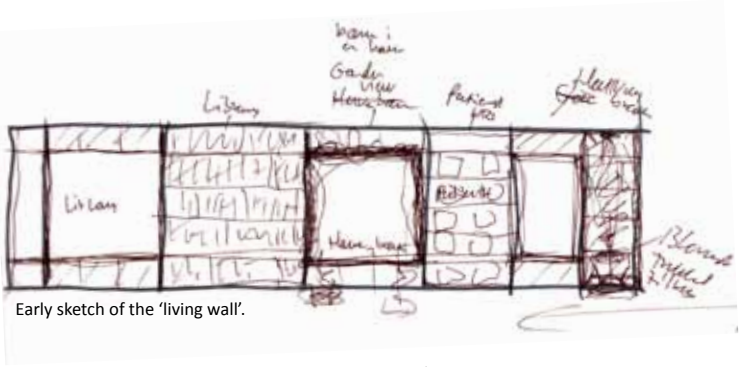
Connection between the patient ward and the social dayroom through the 'living wall'.



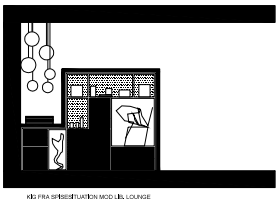
Inflow of natural light + artificial light.

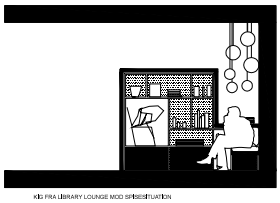


Concept for artificial light.

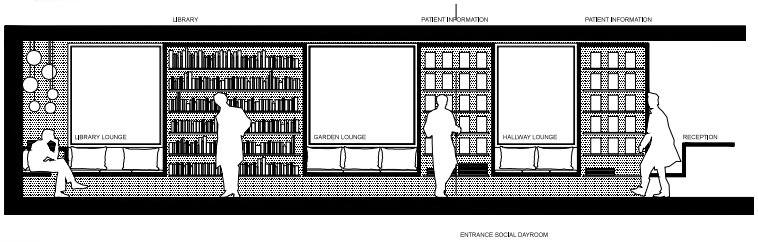


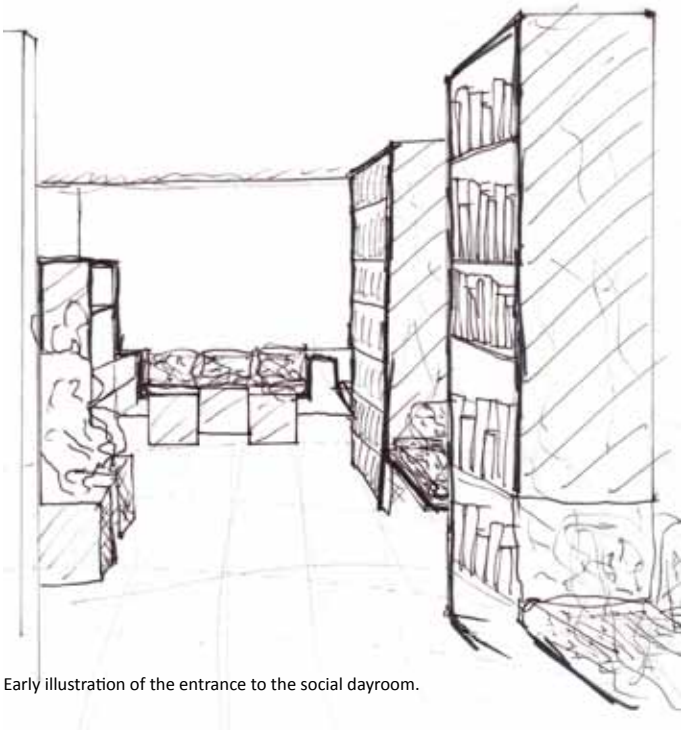
Early sketch of the 'living wall'.



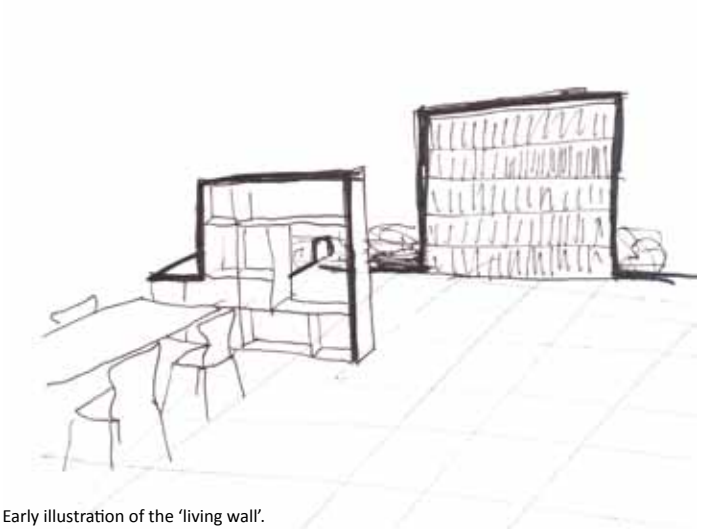


Early stage of 'living wall' with Library, lounges and patient information.





Early illustration of the entrance to the social dayroom.



Early illustration of the 'living wall'.

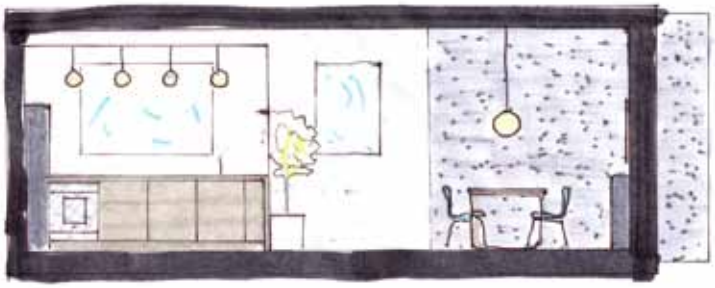
SKETCHING 1:50

THE KITCHEN-DINING AREA

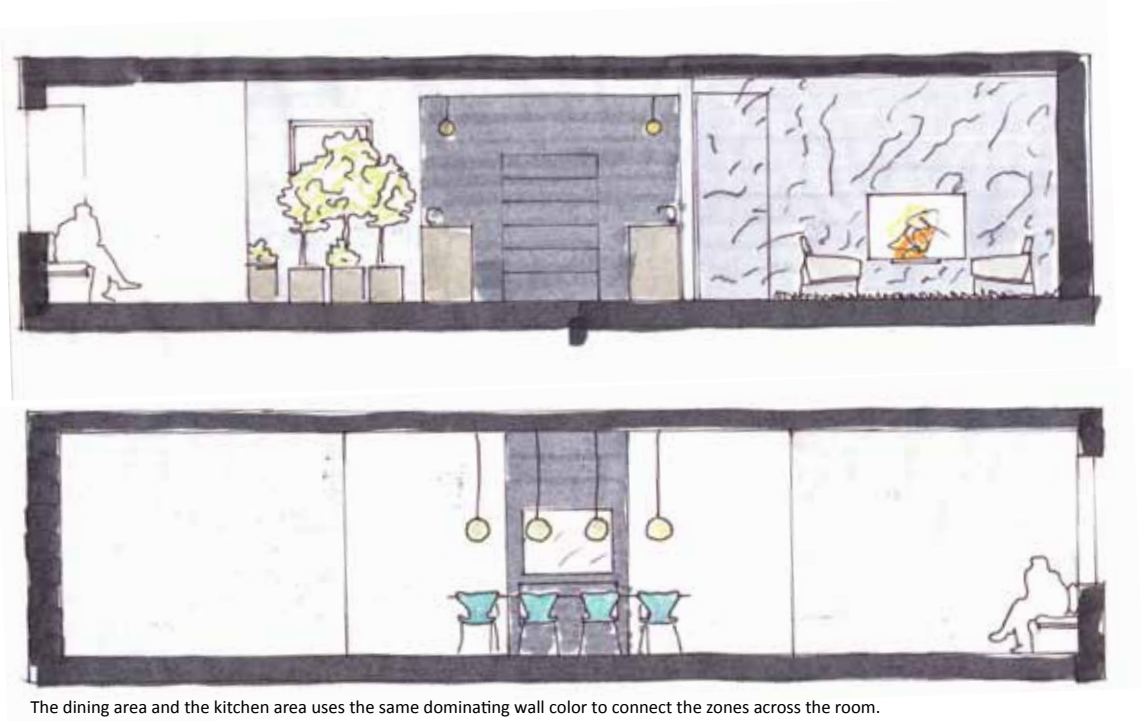
The kitchen and dining area are centrally situated in the centre of the social dayroom. This zone is defined as the natural centre of informal meetings - as the foundation of social interaction.
The kitchen and the dining area, is concurrently seen as a united zone crossing the longitudinal axis - a central area that naturally is opening towards the entrance and invites visitors towards the social community around the dining table.
Various approaches have been made in order to combine the kitchen and the dining areas across the room, while simultaneously define the spaces as two individual zones with independent specific functionalities. The consistent use of similar materials as well as the effect of colouring elements on opposite wall surfaces has been applied in this approach.

The kitchen zone and the dining area are seen as one united zone.

Early 3d sketches on the ceiling solution in the dining area.



The kitchen zone and the dining area are connected across the room.

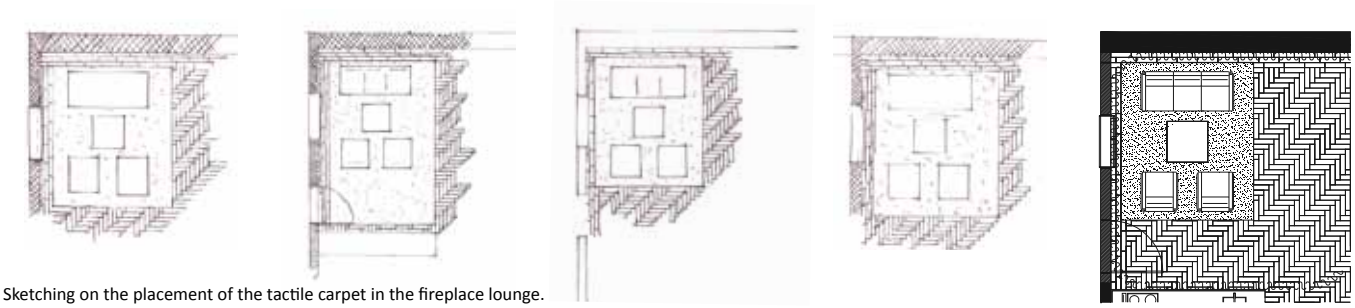


The dining area and the kitchen area uses the same dominating wall color to connect the zones across the room.

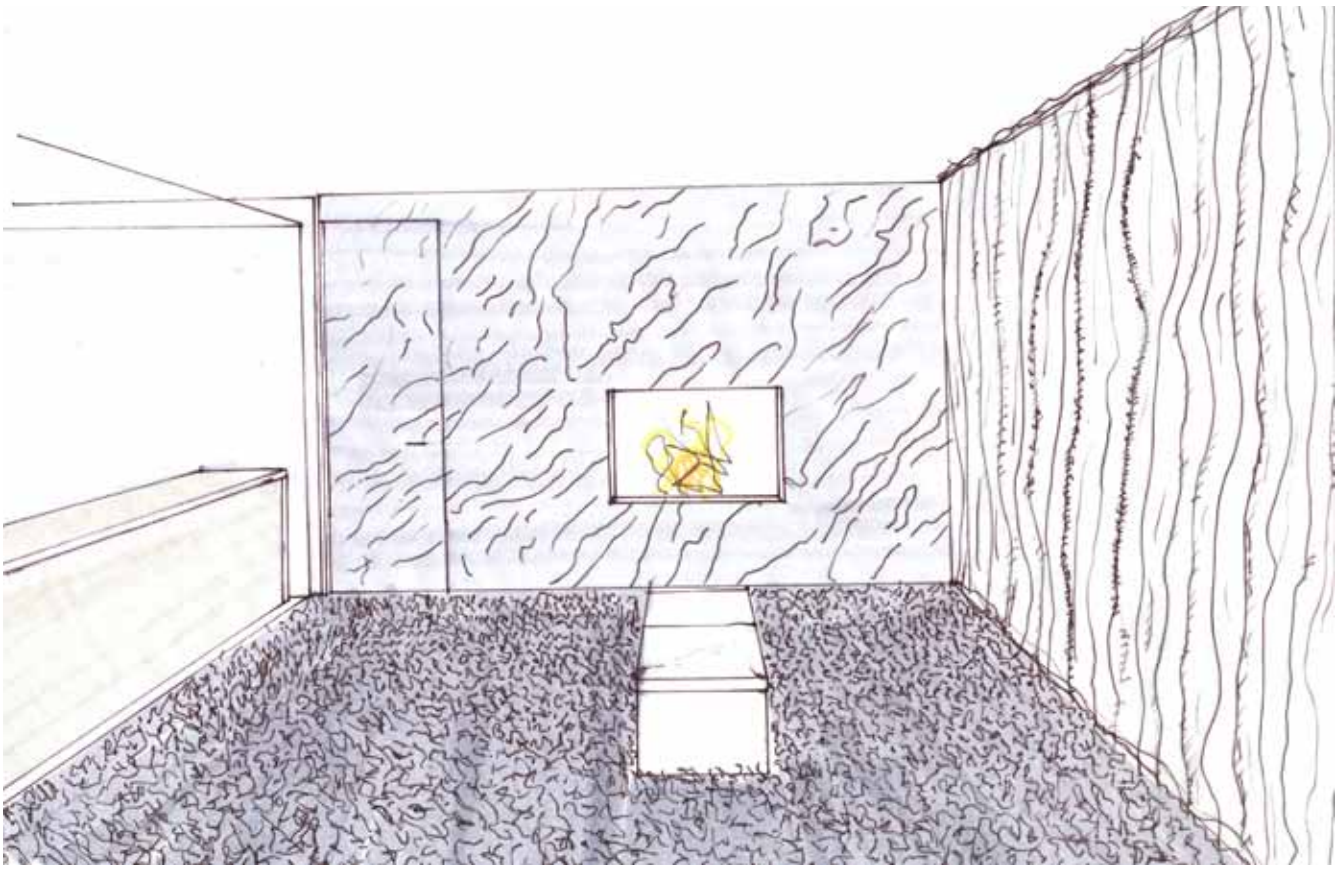
SKETCHING 1:50
THE FIREPLACE LOUNGE

The fireplace lounge should be the comfortable and relaxing lounge, where there is room for confidential and quiet conversations, while still connected to the remaining social environment in the dayroom.
The natural focal point in the lounge is the fireplace (bioethanol) itself, and this centrally focused aspect is enhanced by the selection of materials and colors of the surrounding elements. These are kept in the scale of grey in order to let the fire and smoldering gleam light up and define the surrounding surfaces. The seating arrangement however could divagate from these grey materials and perform as an inviting an eye-catching element.
Textiles are used for various applications as unifying aspect in the fireplace lounge. A tactile spun carpet to define the seating arrangement, an encircling curtain installation to provide flexible possibilities and accommodating furniture upholstery to define a warm and comfortable setting.

Early illustration of the fireplace lounge.



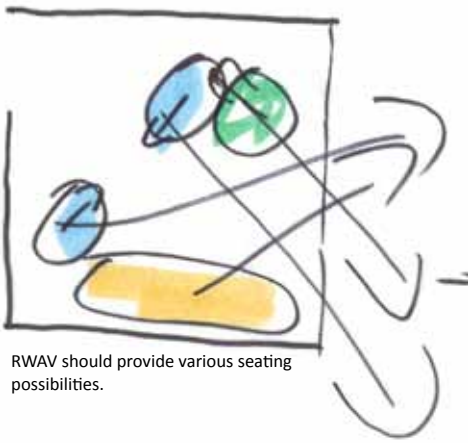
Sketching on the placement of the tactile carpet in the fireplace lounge.



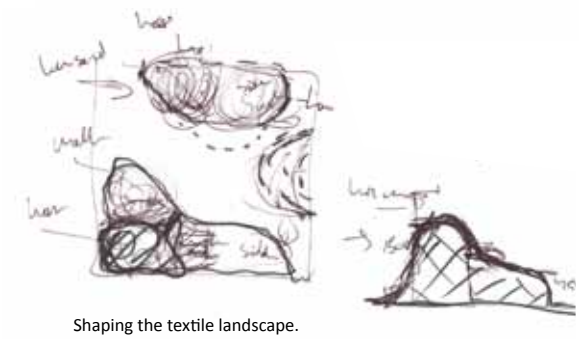
SKETCHING 1:50

‘ROOM WITH A VIEW’

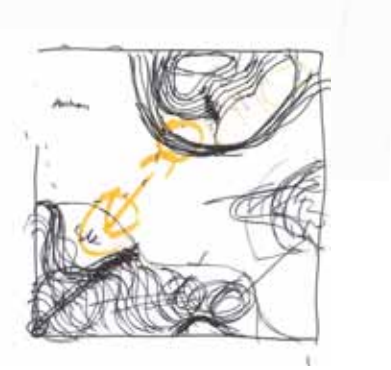
As the final room on the *‘intensity of social support’* scale, is a room reserved for immersion and quietness. A space where the patients may find room for their own thoughts - alone or in solidarity. It should be a room, where the individuals are centralized, and where feelings and deeper emotions can be meditatively processed. The sensory character of the room is limited to few impressions, and the concept is defined as a *‘room with a view’*, where the nature view and the inflow of light are the prevailing elements. Designing the entire room as a textile landscape further enhances this impression, and the patients entering this room should feel like lying in a grass field with the possibility to give vent to their thoughts and emotions. As a natural landscape, the textile shaped landscape should give various seating and laying possibilities with great views towards the nature, the light and the sky.



RWAV should provide various seating possibilities.



Shaping the textile landscape.



PART FOUR

PRESENTATION PHASE

THE FUTURE OF SOCIAL SUPPORT

PLAN

SECTION

WALK THROUGH

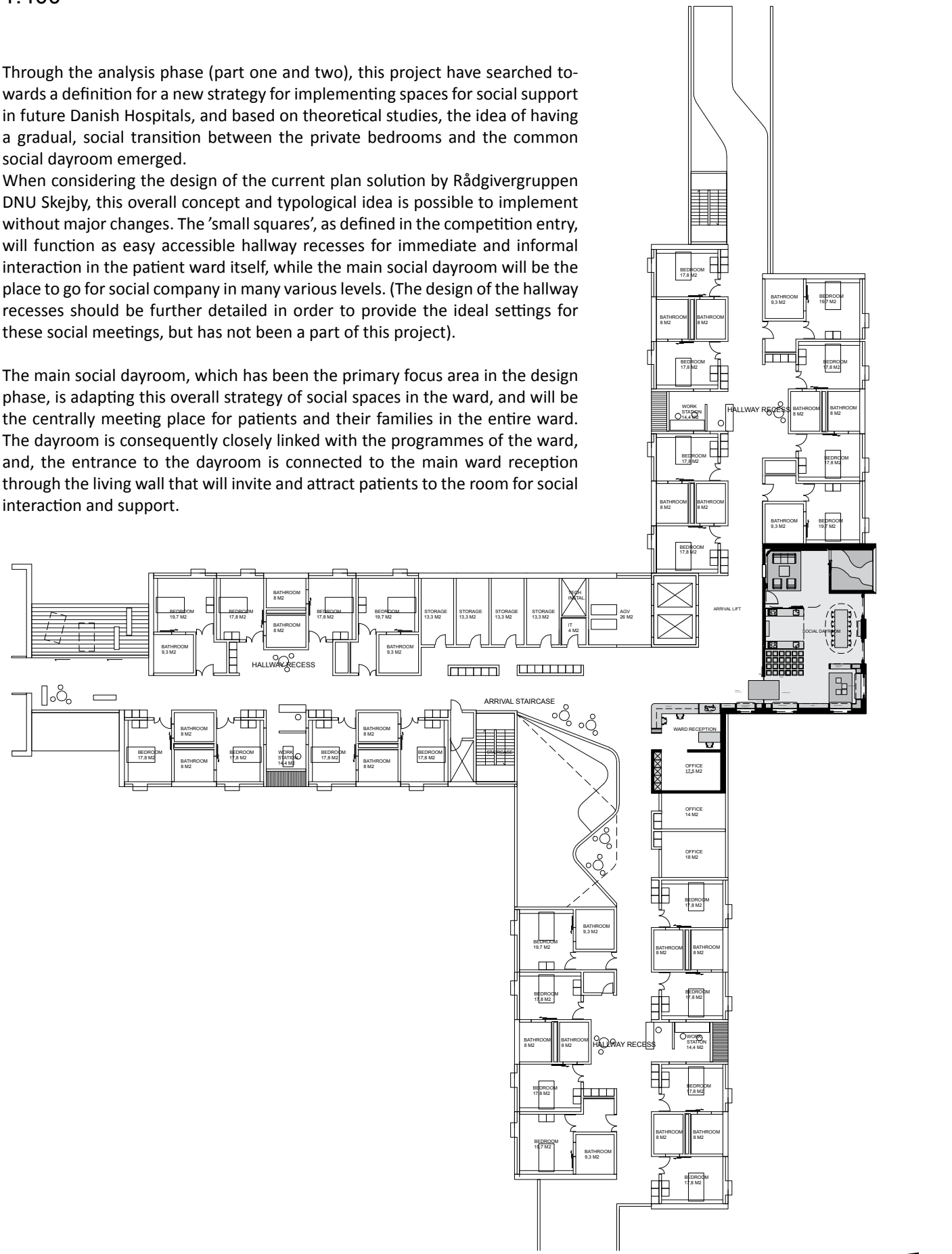
MATERIALS

PLAN

1:400

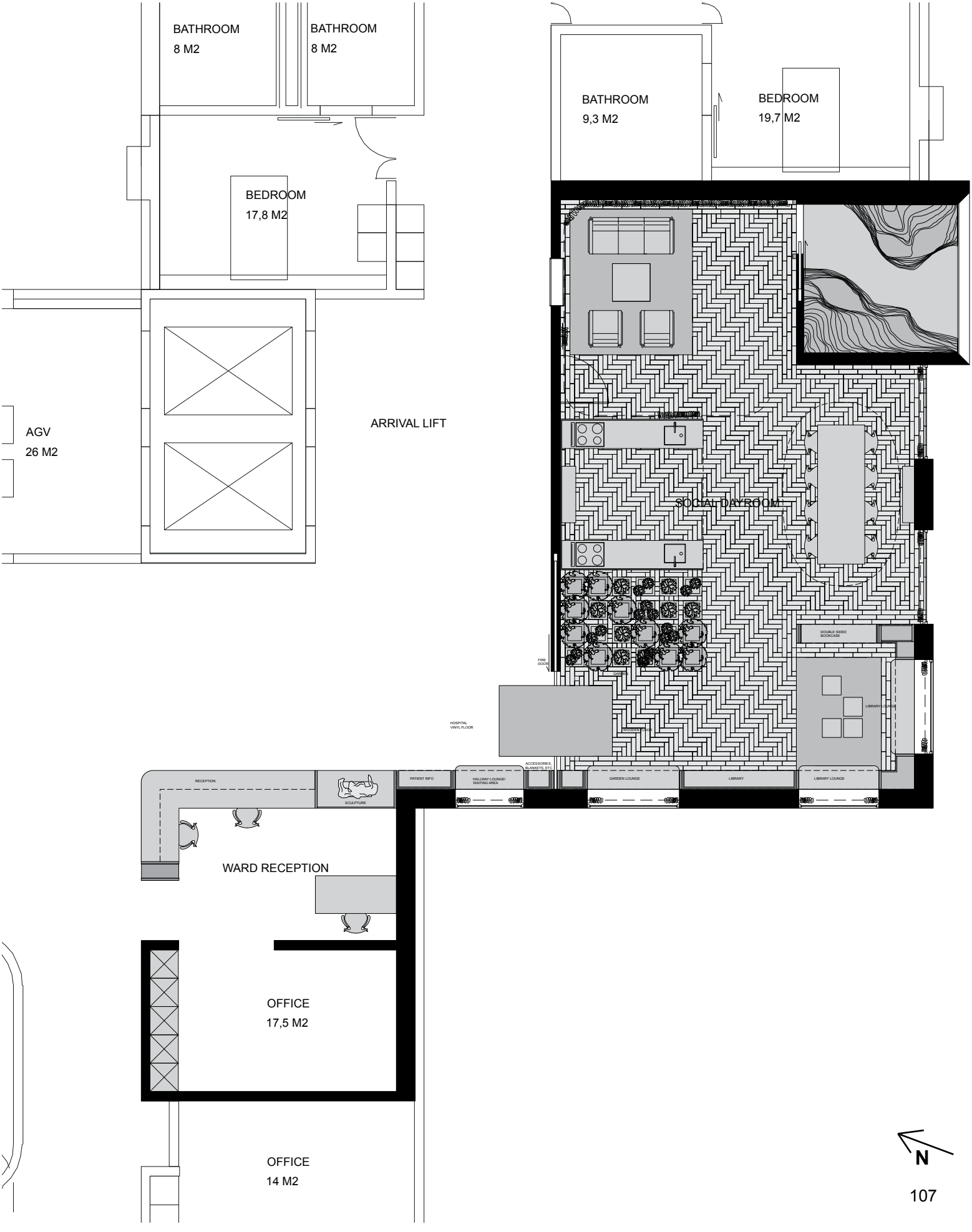
Through the analysis phase (part one and two), this project have searched towards a definition for a new strategy for implementing spaces for social support in future Danish Hospitals, and based on theoretical studies, the idea of having a gradual, social transition between the private bedrooms and the common social dayroom emerged.
When considering the design of the current plan solution by Rådgivergruppen DNU Skejby, this overall concept and typological idea is possible to implement without major changes. The 'small squares', as defined in the competition entry, will function as easy accessible hallway recesses for immediate and informal interaction in the patient ward itself, while the main social dayroom will be the place to go for social company in many various levels. (The design of the hallway recesses should be further detailed in order to provide the ideal settings for these social meetings, but has not been a part of this project).

The main social dayroom, which has been the primary focus area in the design phase, is adapting this overall strategy of social spaces in the ward, and will be the centrally meeting place for patients and their families in the entire ward. The dayroom is consequently closely linked with the programmes of the ward, and, the entrance to the dayroom is connected to the main ward reception through the living wall that will invite and attract patients to the room for social interaction and support.



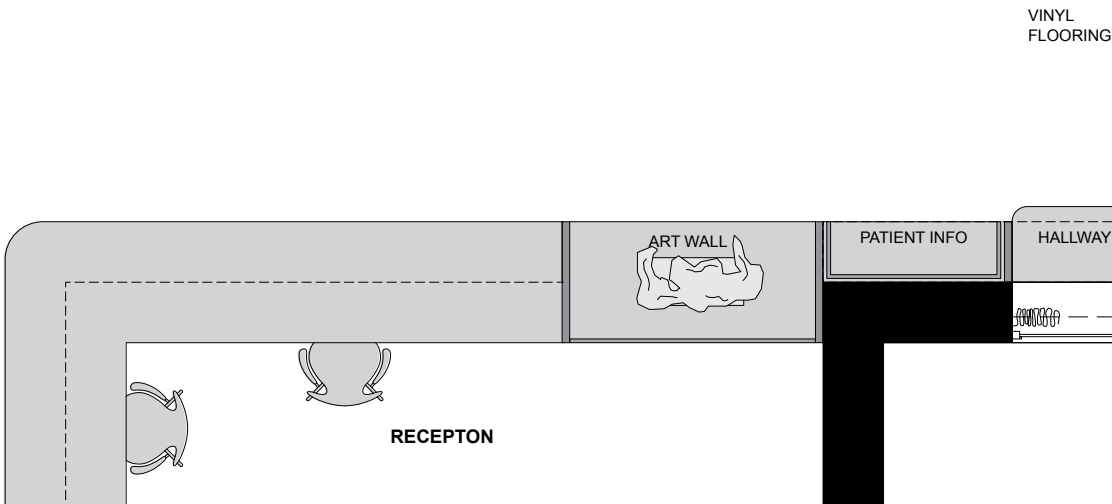
PLAN

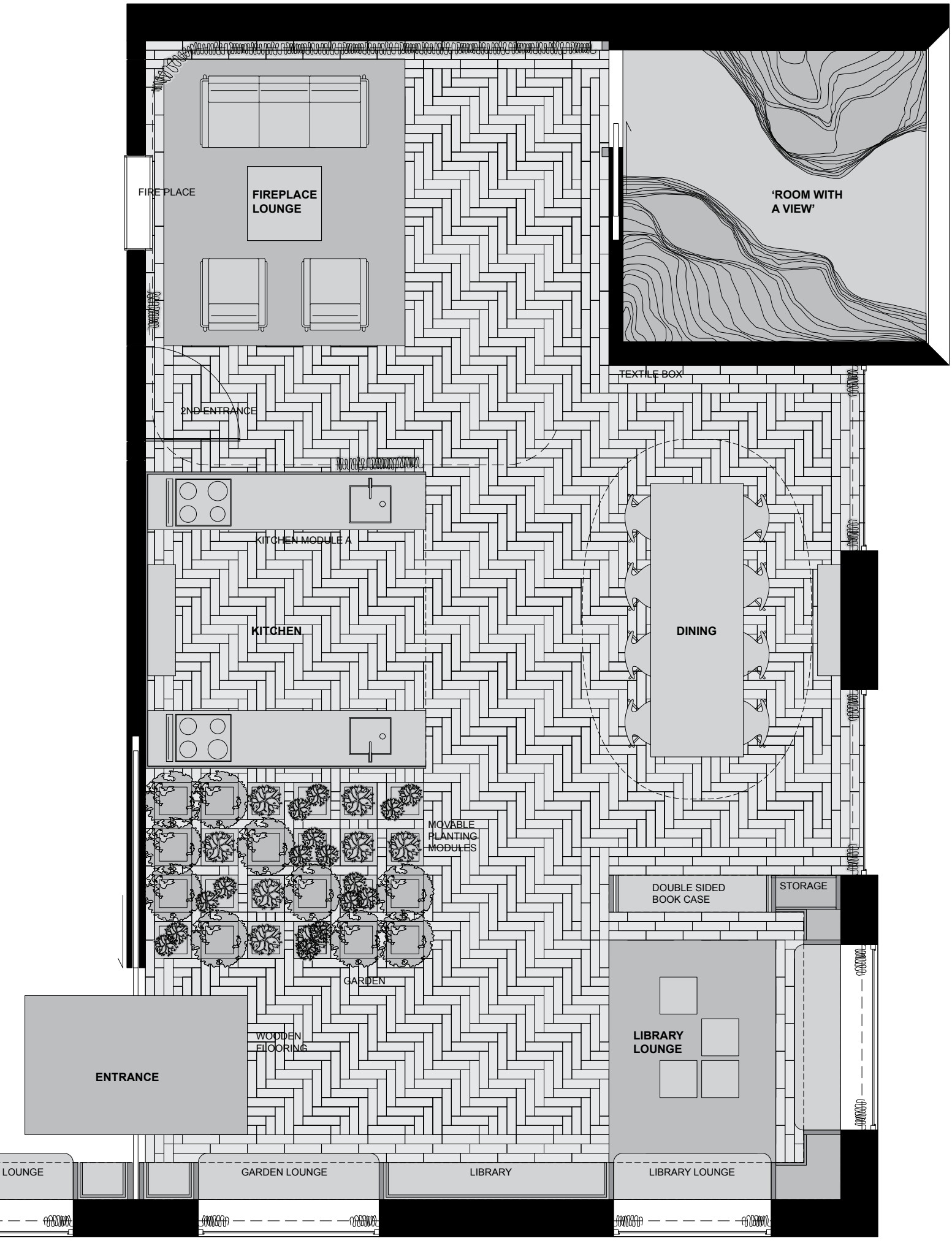
1:100


BATHROOM
8 M2
BATHROOM
8 M2
BEDROOM
17,8 M2
AGV
26 M2
ARRIVAL LIFT
BATHROOM
9,3 M2
BEDROOM
19,7 M2
SOCIAL DAYROOM
DOUBLE SIDED BOOKCASE
LIBRARY LOUNGE
FIRE DOOR
GATE
HOSPITAL VINYL FLOOR
WOODEN DECK
ACCESSORIES, BLANKETS, ETC
RECEPTION
SCULPTURE
PATIENT INFO
HALLWAY LOUNGE/ WAITING AREA
GARDEN LOUNGE
LIBRARY
LIBRARY LOUNGE
WARD RECEPTION
OFFICE
17,5 M2
OFFICE
14 M2
N

PLAN
1:50

When looking at the dayroom itself, the 100 M2 is divided in 4 overall zones: The 'entrance/library lounge', the 'kitchen/dining area', the 'fireplace lounge' and the 'room with a view'. These spaces is defined to be perceived as individual zones with each their own specific character, although combined and unified as one main social space. By designing the zones with recognisable characteristics, like the 'library', the 'kitchen', the 'fireplace' and the 'landscape', the spaces should be acknowledged for their homely and familiar aspects defined by immediate understandable architectural icons.
Besides the perception of the individual zones and typologies, the dayroom should also be experienced as one harmonious and unified space, and the applied materials are consequently consistent throughout the room. Based on a natural oak flooring in herringbone pattern, the materials mainly appears as natural with few well-defined contrasts and generally well complimented by textiles as carpets, curtains, upholstery, landscapes and accessories distributed throughout the dayroom. The implemented textiles are providing the required amount of acoustic absorbers as calculated during the technical considerations (see acoustic calculations in the appendix), and are simultaneously defining the dayroom with an inviting and welcoming homely atmosphere.

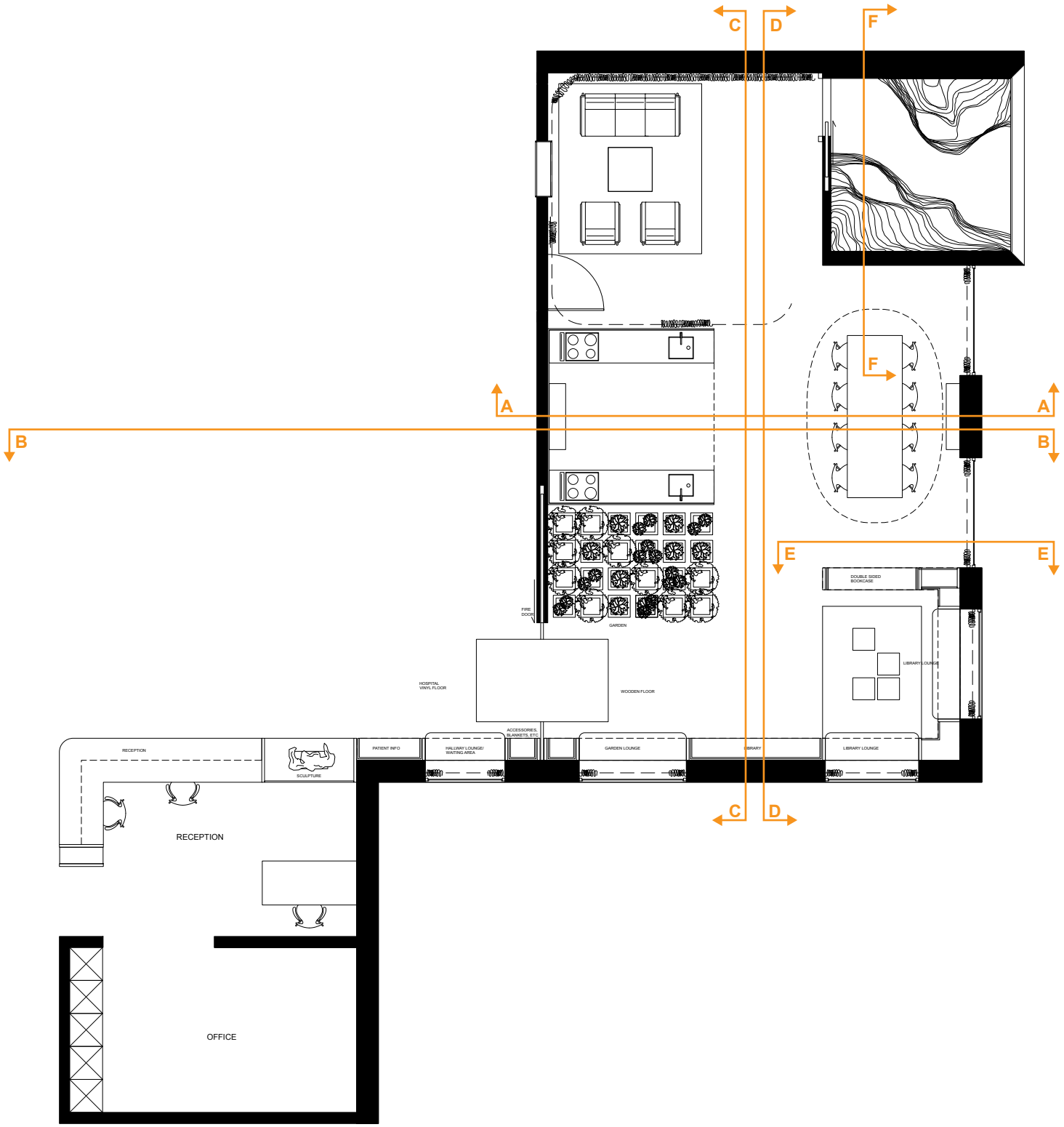




Plansolution 1:50

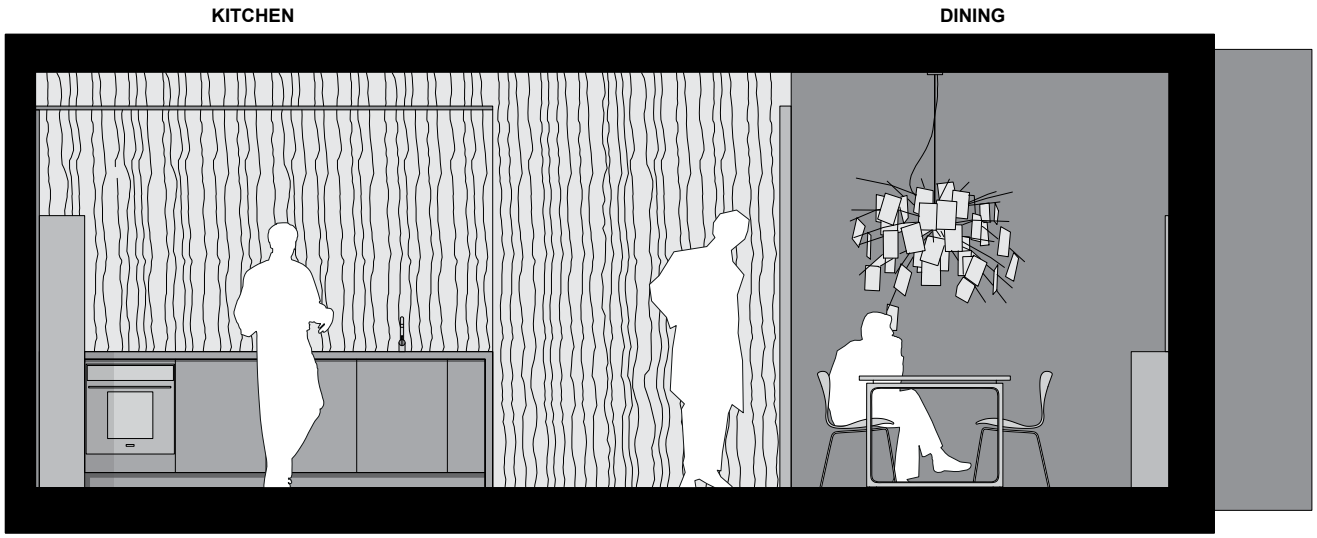
N

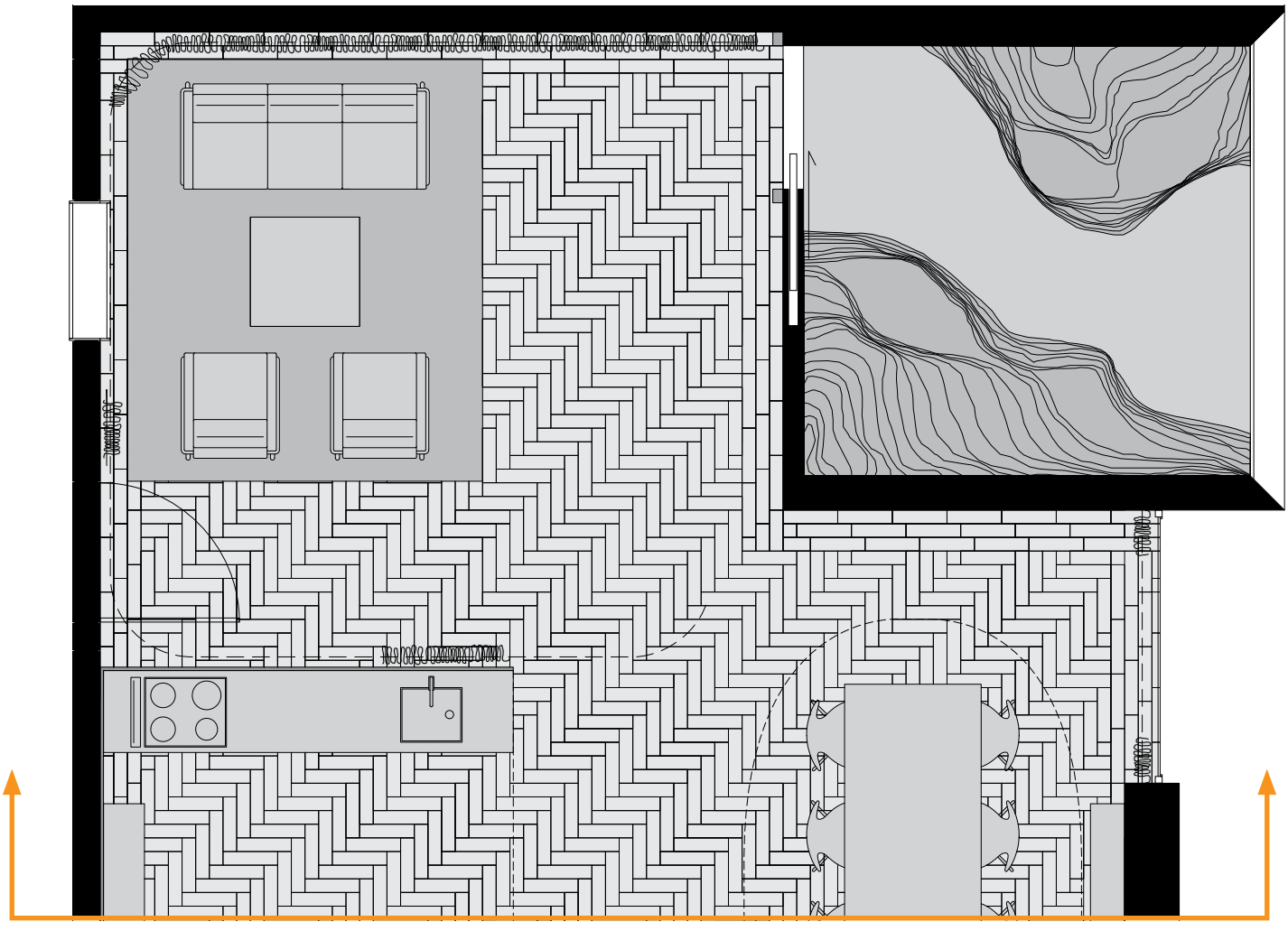
SECTIONS


C
D
F
A
B
E
RECEPTION
SCULPTURE
PATIENT INFO
HALLWAY LOUNGE/
WAITING AREA
ACCESSORIES,
BLANKETS, ETC
GARDEN LOUNGE
LIBRARY
LIBRARY LOUNGE
DOUBLE SIDED
BOOKCASE
LIBRARY LOUNGE
FIRE
DOOR
GARDEN
HOSPITAL
VINYL FLOOR
WOODEN FLOOR
RECEPTION
OFFICE
N

SECTION

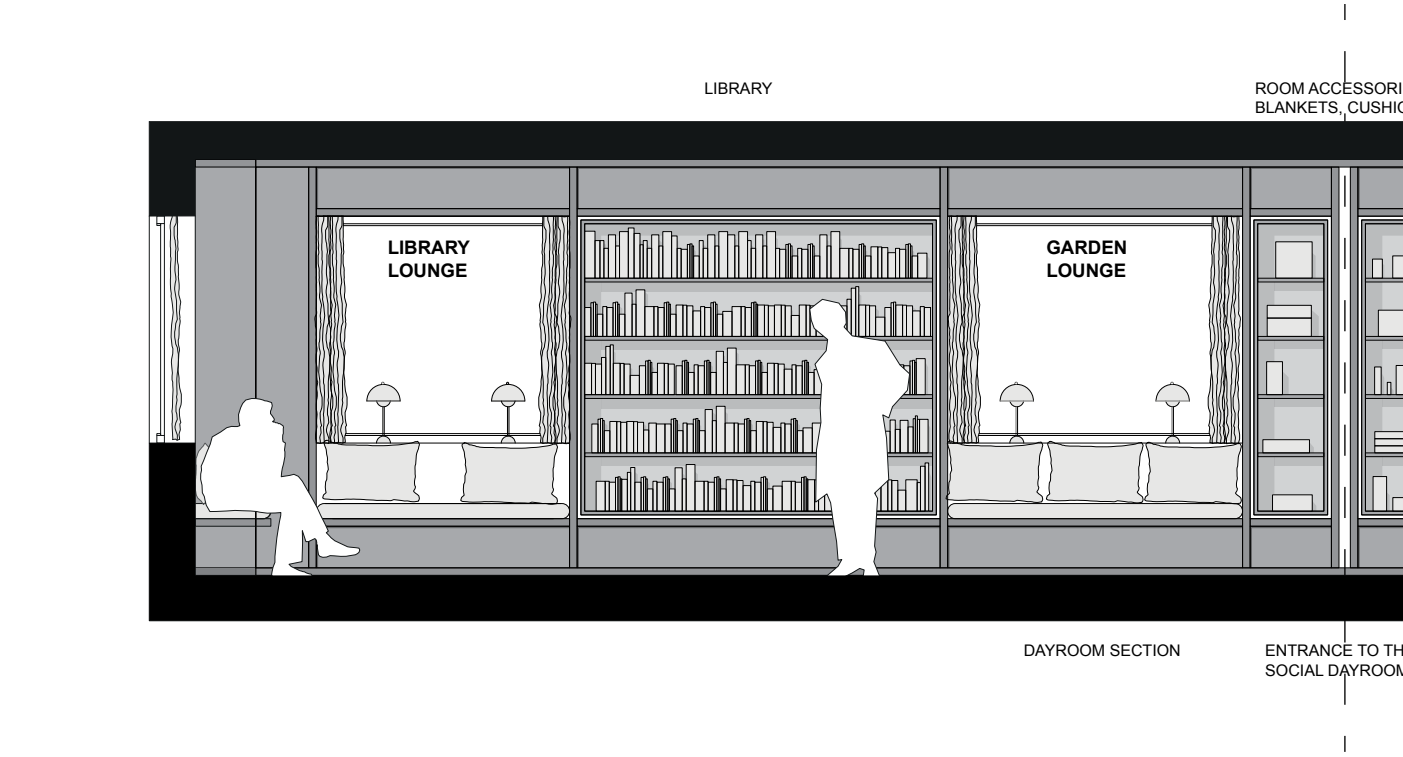
A:A - 1:50

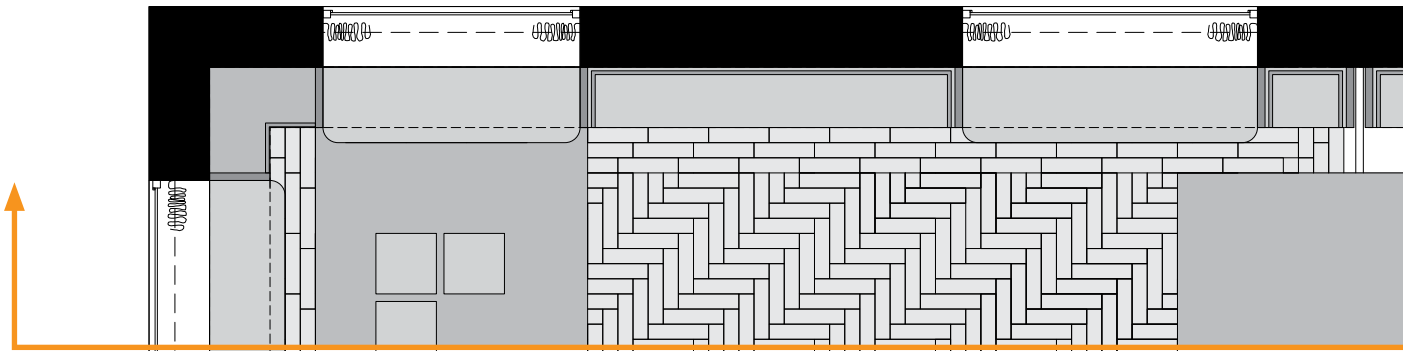




SECTION

B:B - 1:50





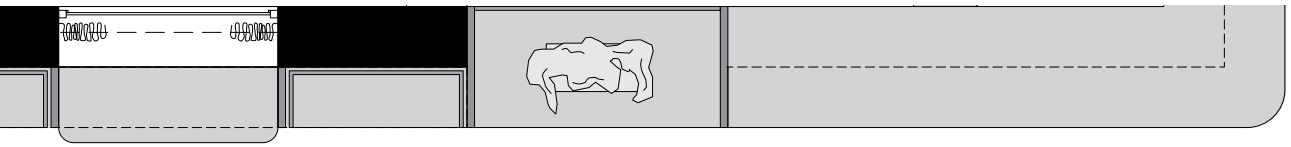
ES
ONS, ETC.

PATIENT INFORMATION

ART EXHIBITION

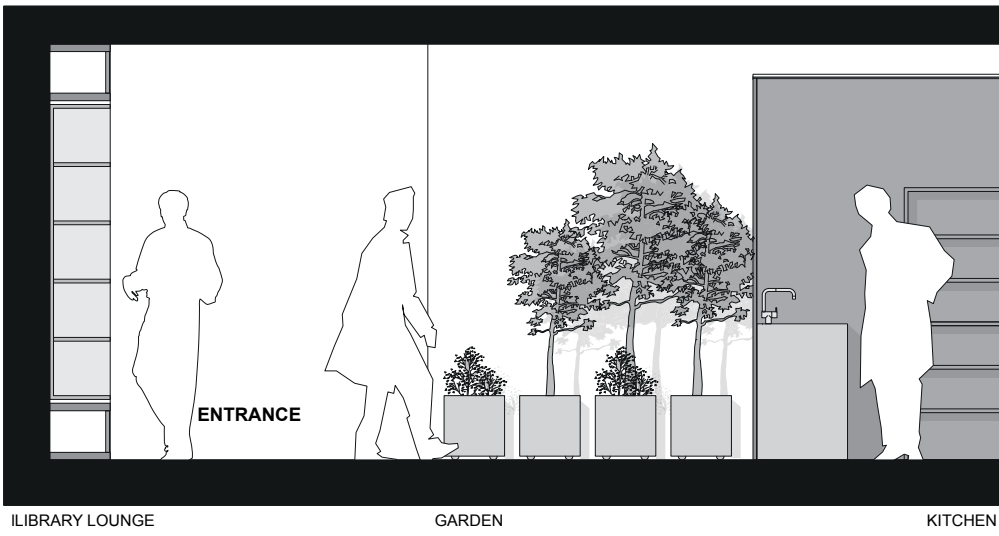
IE
M

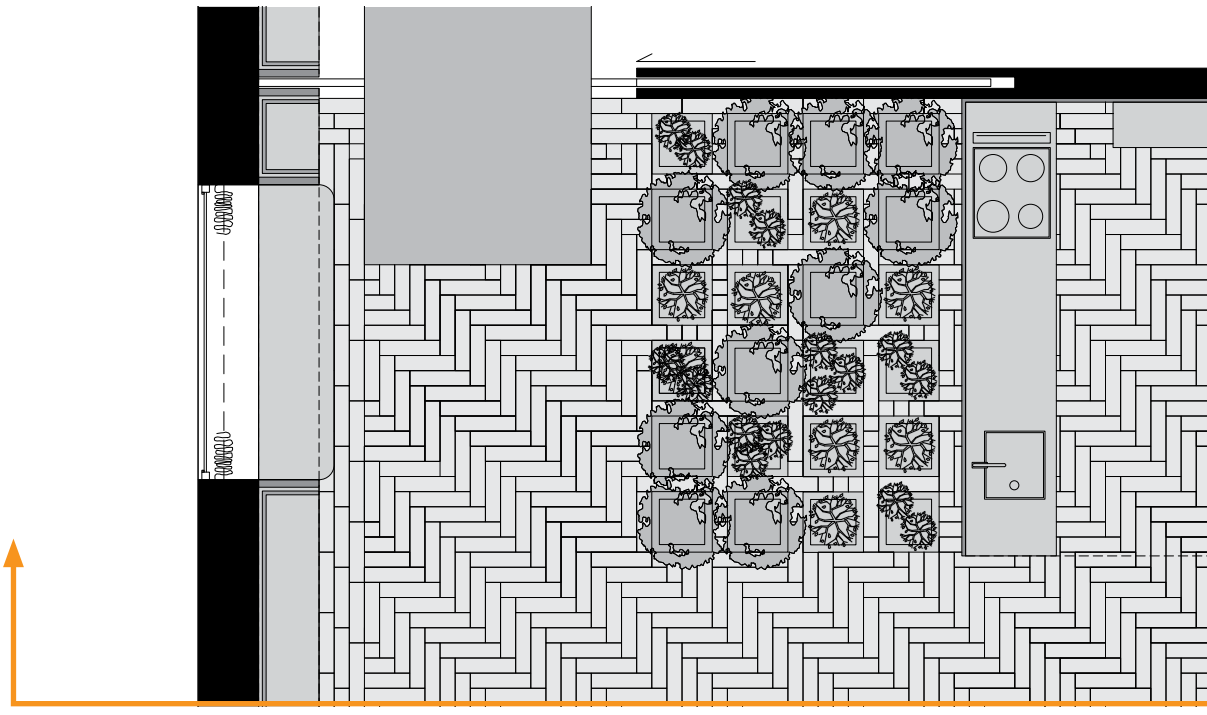
PATIENT WARD SECTION



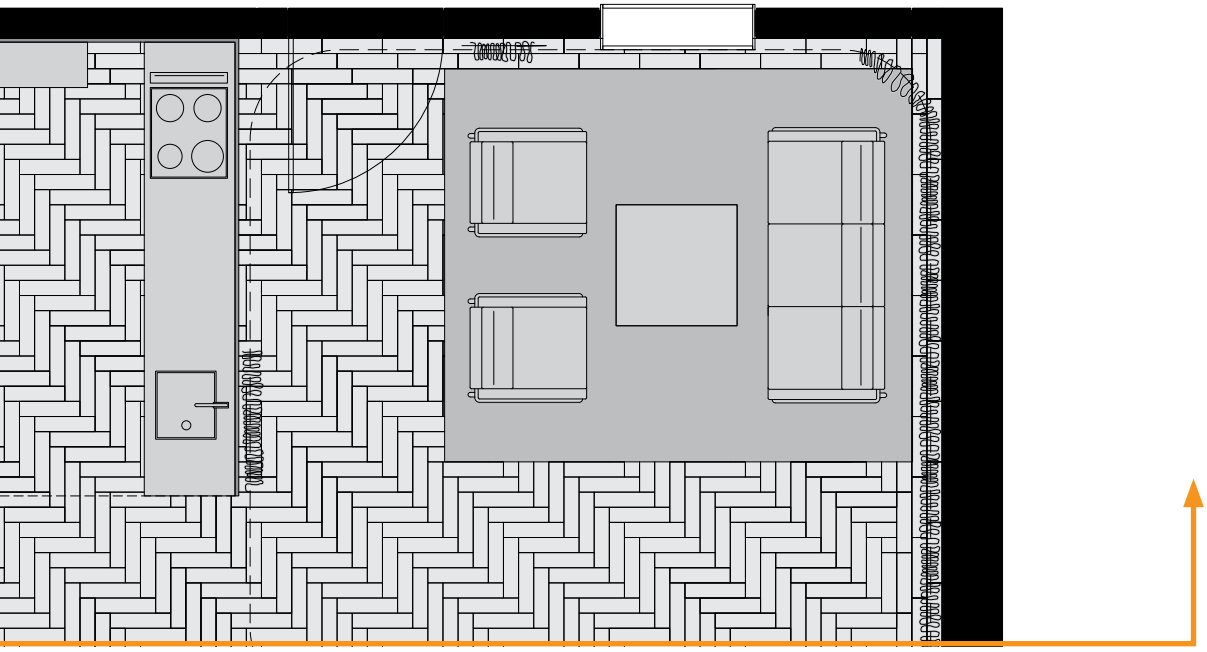
SECTION

C:C - 1:50



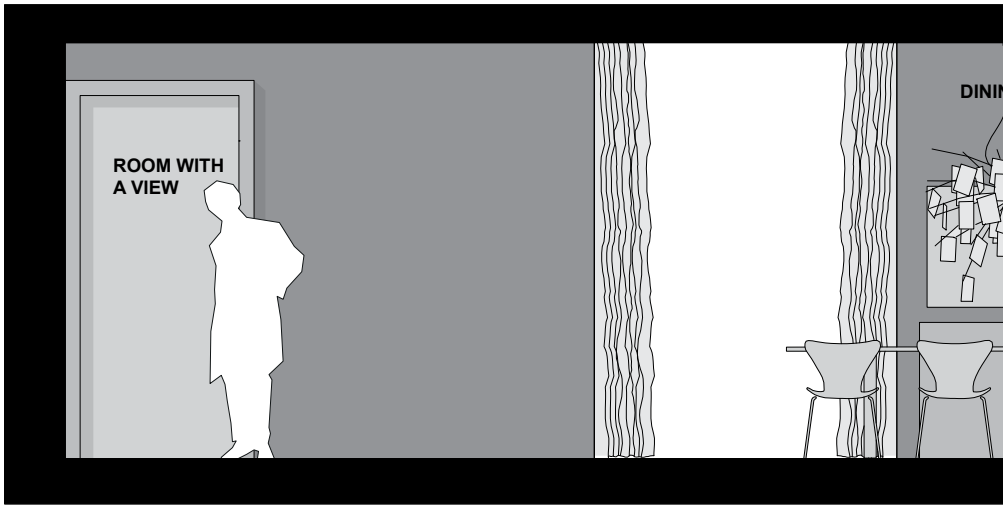


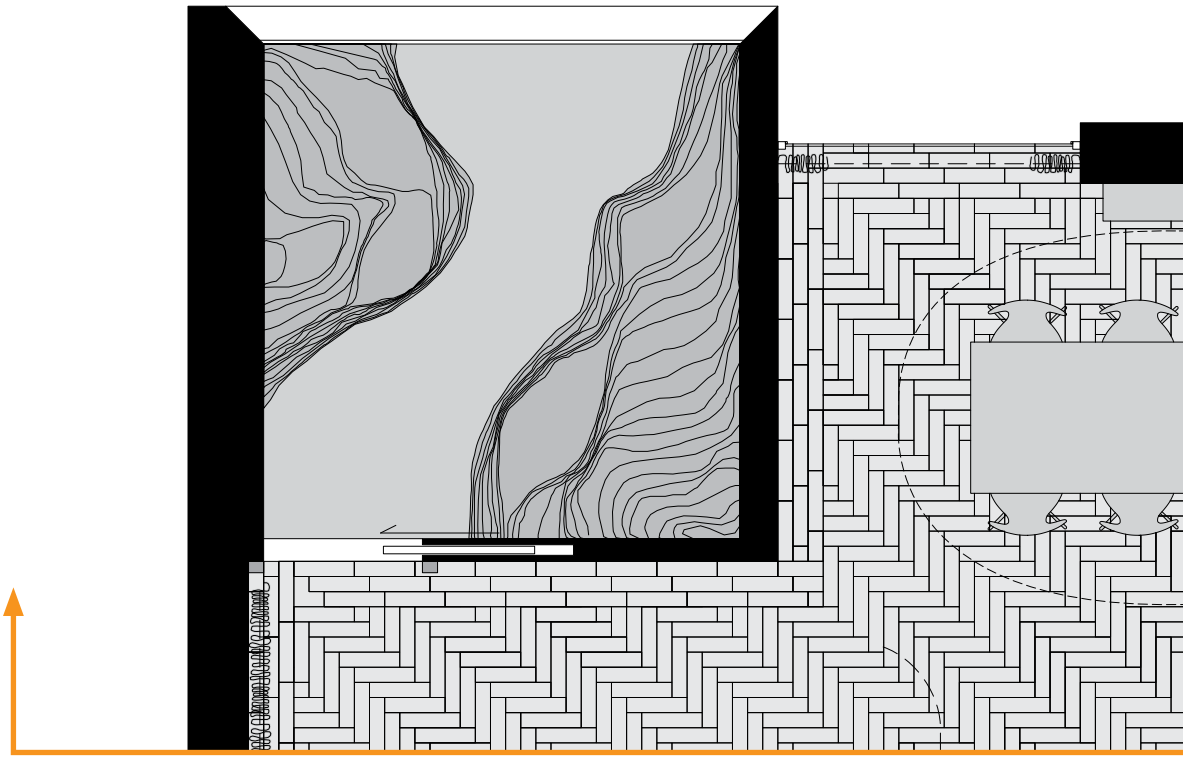
2nd ENTRANCE FIREPLACE LOUNGE



SECTION

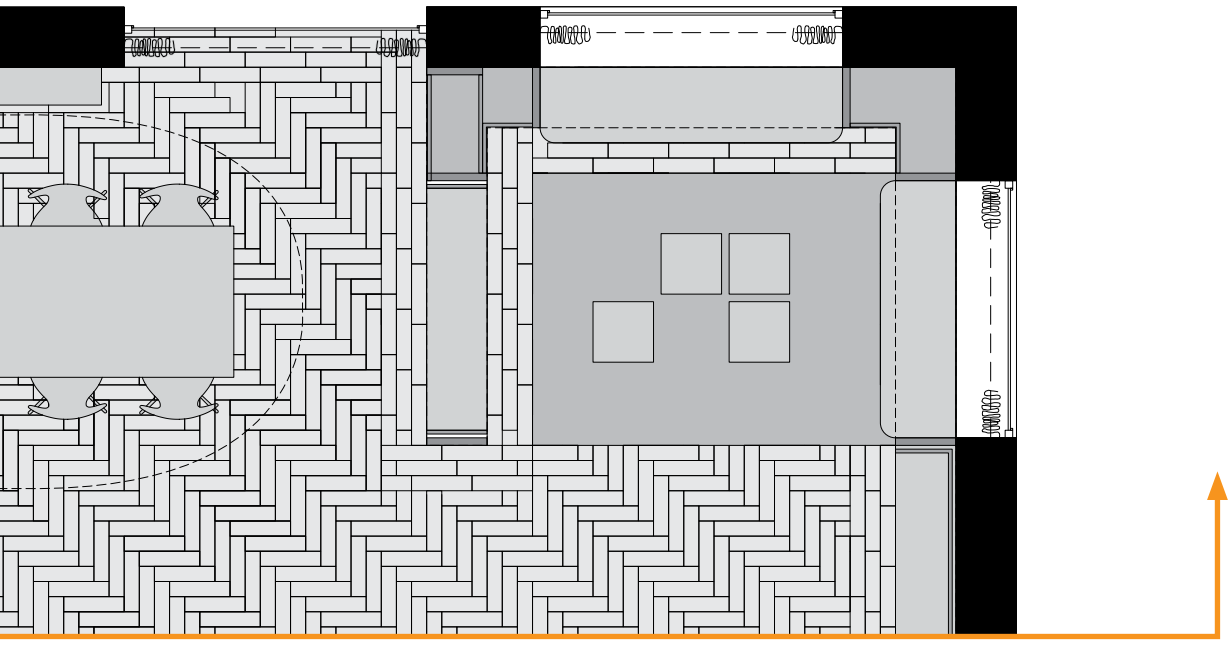
D:D - 1:50





DOUBLE SIDED
BOOKCASE

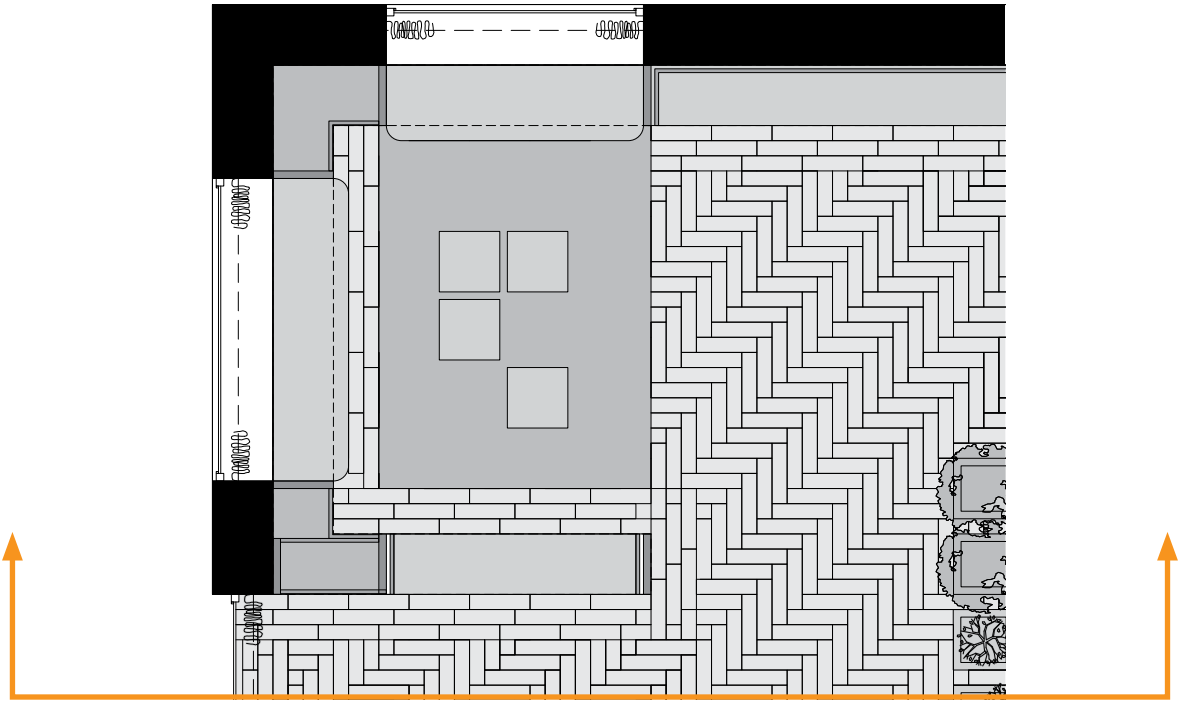
LIBRARY



SECTION

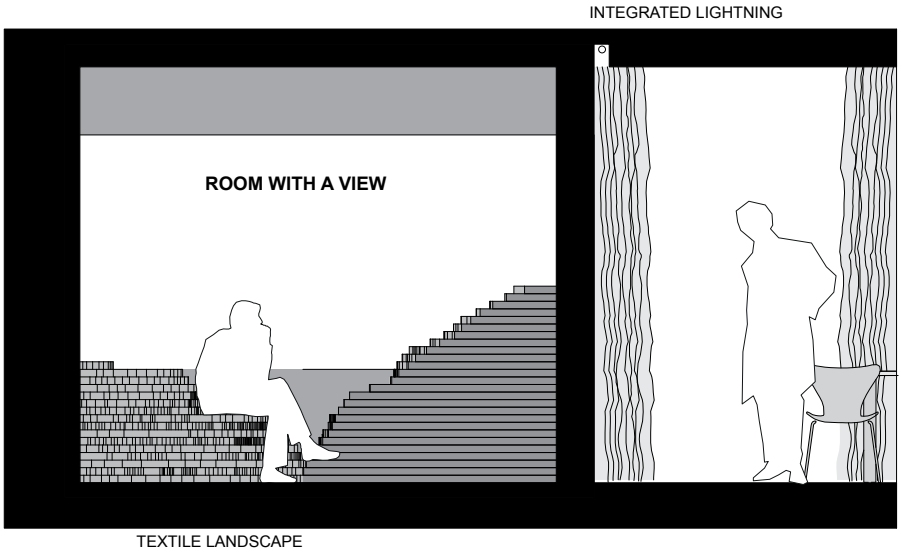
E:E - 1:50

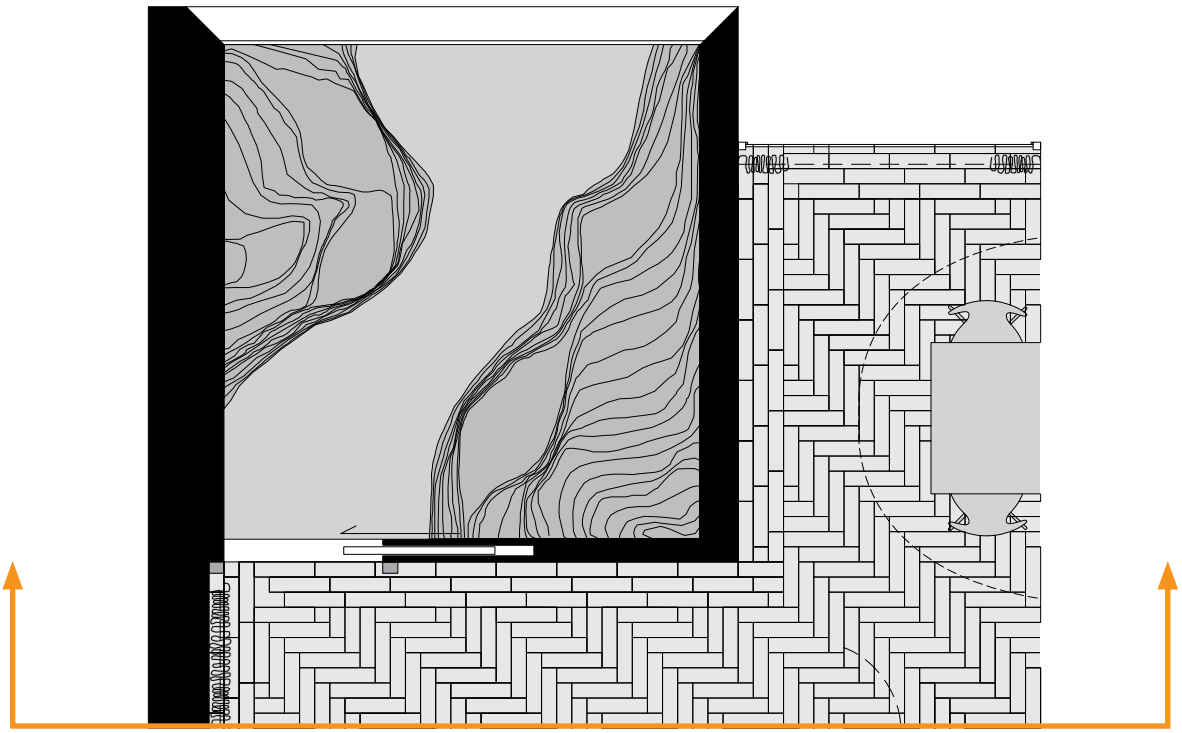
STORAGE DOUBLE SIDED BOOK CASE



SECTION

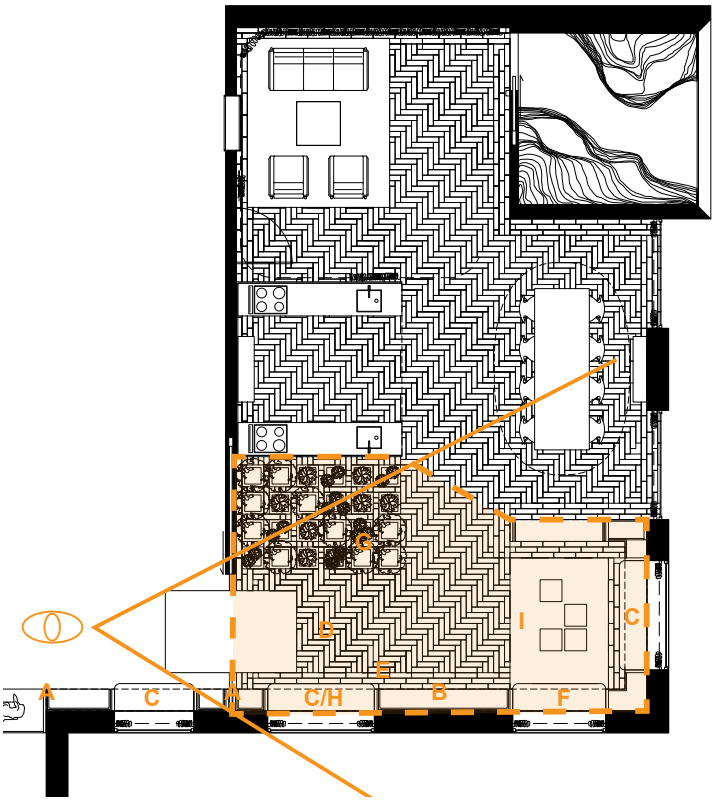
F:F - 1:50





WALK THROUGH
ENTRANCE - LIBRARY LOUNGE

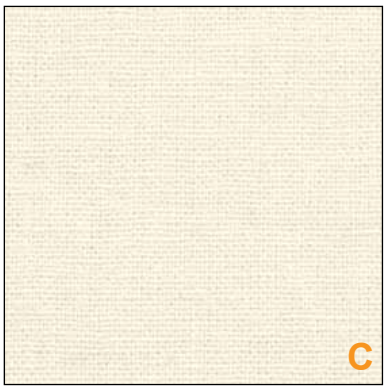
The entrance and the library lounge are situated and designed as the connection zone to the patient ward. The zone is primary characterized by the 'living wall', which stretches towards the patient ward and invites and guides patients and visitors inside the social dayroom.
This wall element contains various seating arrangements, like the 'hallway lounge', the 'garden lounge' and the 'library lounge', and even sections for patient information, storage for room accessories (cushions, lamb skin blankets, etc.) and a ward library. In the ward section, the 'living wall' elegantly becomes the reception and is competently connecting the dayroom to the rest of the patient ward.
The placement of seating arrangements in immediate contact to the dayroom entrance gives patients and visitors the possibility to take shorter residence in the different lounges, and the 'living wall' will then provide gradual transition between the public ward and the social dayroom.
In these lounges patients may establish their own personal space (a sociofugal zone), and partly observe the on going activities in the social environment. Based on these observations they subsequently have a better foundation for engaging social interaction.
When visiting the social dayroom as a new patient, the observation from the protected lounges in the 'living wall' will consequently provide possibilities to learn the unwritten rules of the social environment, and slowly encourage the patient to take part in the social meetings themselves.



MATERIALS AND REFERENCES

The ‘living wall’ is mainly made of white pigmented oak tree with visible grains. This material is used as a tactile element, but in another way than the textiles in the living wall.

The book cases in the ‘living wall’ is a contrast material to the white oak tree, and defines another function. The color is dark grey with blue tones - NCS: 7010-R80B



The seating arrangements in the ‘living wall’ section is upholstered with a natural white toned flax, which posses a tactile quality with invitational effects.

The flooring in the social dayroom is chosen as natural oak plank floor in herringbone pattern with the plank size 10 x 40 cm, and with a 30 cm wide boarder.

A reference to the ‘living wall’ idea, here presented as a white/blue solution designed by Montana.

A picture of the Hall in Hvitträsk, designed by the architect trio, Gesellius, Lindgreen and Saarinen. This reference is used in the library lounge, where the curtains, the upholstered seating and the spun carpet, is embracing the patients the same way as the carpet in Hvitträsk.

THE IMPLEMENTATION OF “TEXTILES”

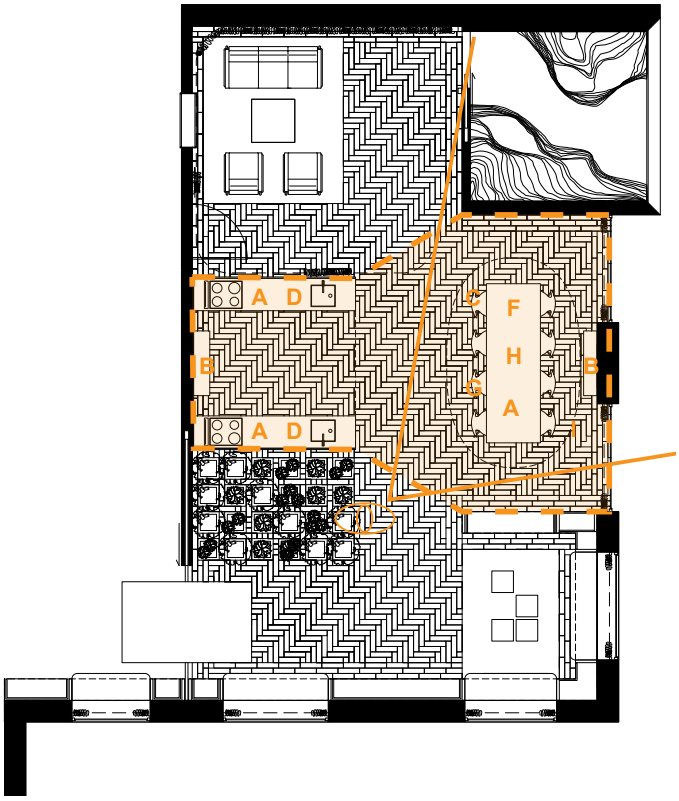
Textiles are in this project defined widely, and in the entrance zone, the herb garden is welcoming the guests to the dayroom as a small, recognisable front yard. The flowerpots in this project is in the same white pigmented oak tree as the living wall unit, and the boxes are designed as movable units, which allow them to be used for various flexible installations, screening of zones in the dayroom.

A reference photo from the Danish restaurant Noma, where lamb skin are used as a accommodating and inviting material in the lounge and in the restaurant. A soft and warm blanket that adds a comfortable aspect in the living wall lounges.

In the library lounge, the natural colored deep-piled carpet is arranged. With references to the Hvitträsk furniture, the carpet, the upholstery and the window curtain are in the same color tones and defines a 3-dimensional space in the lounge zone.

WALK THROUGH
KITCHEN - DINING AREA

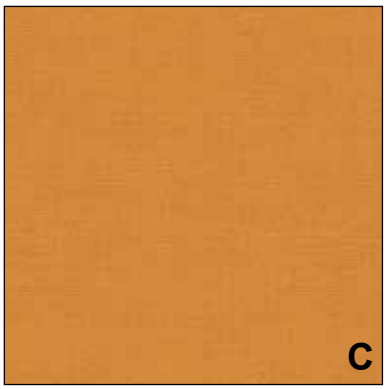
The kitchen and dining zone is believed to be the future natural gathering point and the centre of informal meetings, which is emphasised by the centrally placement in the social dayroom where patients and visitors inherently will be invited to join the social environment in the kitchen and around the dining table. An open glass box screens off the kitchen units, at the same time as it indicates openness and courtesy, and the kitchen consist of two modules that can facilitate two different cooking groups at a time.
In the dining area, the arrangement consist of one large table, that may gather up to 10 people at the same time, or provide space enough for two independent groups of 3-4 people to be situated around the socially unifying dining table.
Above the table is a centrally figurative light pendant, which will act as eye-catcher, when you enter the social dayroom – an installation by the artist Ingo Maurer, chosen for its contemplative yet humorous character.
In order to emphasize this art/light installation, the surrounding surfaces are defining a contrast in a slightly dark grey color tone.
In this zone, textiles are used in the dining area only, keeping the kitchen unit a productive, textile free zone.
The chairs in the dining area are upholstered in an orange woven fabric and the immersed ceiling surface is a stretched medium grey textile that defines the dining table as a zone, and could hide technical ceiling installations, like ventilation fixtures, etc.



REFERENCES AND MATERIALS

The white pigmented oak wood is used consistently, and is in the kitchen and dining area applied at the dining table and the kitchen elements.

Also the dark gray and blue toned color is applied throughout the room. In this zone, it is the opposite wall surfaces and the cupboards that is defined in this color. (NCS:7010-R80B)



As complimentary to the dark grey and blue colored wall elements in the zone, the dining chairs are upholstered with this orange colored wool/ viscose. (Fritz Hansen, Hallingdal Orange 547)

Ill. 44

A reference to the oak wood kitchen elements in the glass box. The visible grain structure supplies a conspicuous aspect and the module possess attractive and appropriate tactile qualities.

Ill. 45

The large common dining table is in the same material as the kitchen elements, and is designed by Cecilie Manz for Fritz Hansen.

THE IMPLEMENTATION OF “TEXTILES”

Ill. 46

Textiles in this zone is only applied in the dining area, where the main element is the orange colored woolen 7’er chairs.

Ill. 47

As a centrally figurative element, the pendant Zettelz 5 by Ingo Maurer is situated above the dining table. The lamp shade is made by pieces of Japanese paper, imprinted with various humorous and contemplative ‘messages’.

Ill. 48

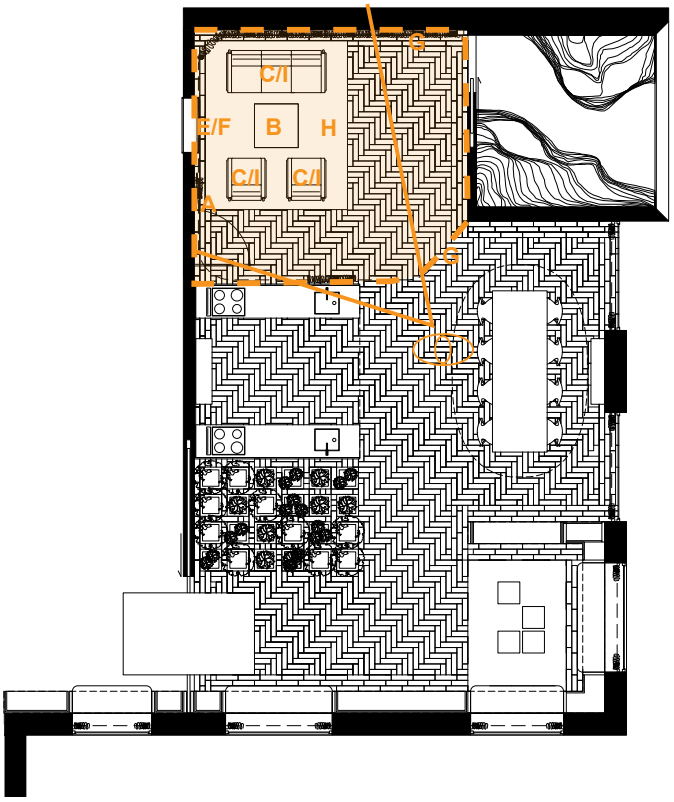
An oval shaped, light grey, textile cloth is stretched above the dining table in order to define the social zone, and to add an acoustic element.

WALK THROUGH
THE FIREPLACE LOUNGE

The fireplace lounge is the relaxing and comfortable zone of the social dayroom, where the patients may engage more quiet and profound conversations. To define the zone, and to add a flexible element, the fireplace lounge is surrounded by a floor to ceiling curtain, which allow patients to screen off the zone towards the dining area. Besides adding a tactile, acoustic and functional aspect, the curtain also provides the possibility for the patients to control the physical environment based on their personal preference.

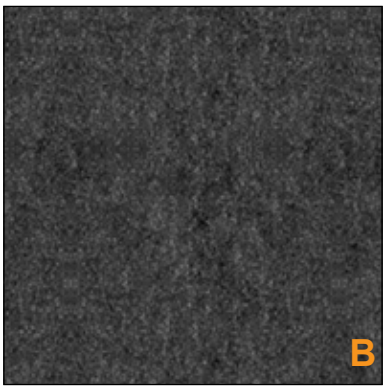
The main central element in the fireplace lounge is the bio-ethanol fireplace, which is integrated in the marble wall that defines the zone. In order to accentuate the fireplace itself, the materials (except the lounge chairs) are chosen for their grey natural colour tones, which will be influenced and affected by the fireplace's diffuse smoulder. As a contrast to the cold natural materials on wall surfaces, a colourful and accommodating textile fabric upholsters the classic Danish lounge furniture that should act as an inviting element facing the gleam of the fire.

Besides the curtain and the furniture upholstery, textiles are represented as a tactile element in the spun carpet that surrounds the lounge furniture – a deep-piled carpet that embraces the patient, and defines a protected zone on front of the fireplace, giving the ideal physical possibilities for social interaction and support.



REFERENCES AND MATERIALS

The wall element on the fireplace surface is covered with polished light grey marble. It defines a contrast to the fire itself, and appear with tactile qualities as a smooth and imposing material.



To compliment the light grey marble wall, the coffee table in the fireplace lounge is in the same greyish color scale, although the dark granite in this table contrast the light colored wall.

The lounge furniture is with this cheerful upholstery by Frank Josef a remarkable contrast to the greyish color tones of the zone. The colors will act conspicuously and will attract patients to take residence in the lounge area.

A reference to the fireplace, is a picture from the lounge at restaurant Geranium, where the bio-ethanol fireplace is situated in a clear glass box. When turned off, the surrounding grey materials appear clear and cold.

But when turned on, the surrounding materials absorb the glowing smoulder and the perception of the zone changes instantly and defines a warm, welcoming and homely atmosphere.

THE IMPLEMENTATION OF “TEXTILES”

White translucent curtains are surrounding the entire lounge as a flexible and controllable element. Besides giving the patients influence on the physical environment, the curtains act as acoustic absorbers.

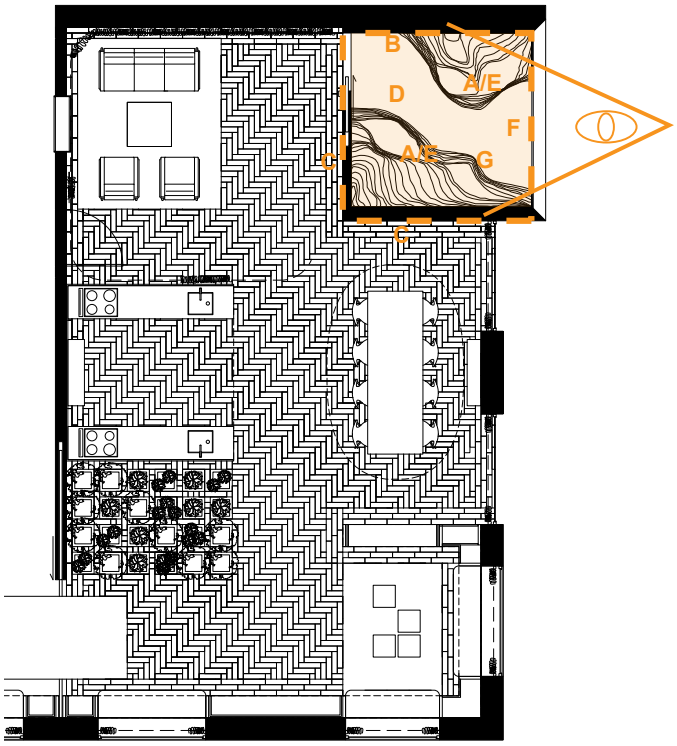
In the same grey color scale as the wall and table material is the spun floor carpet, defining a tactile and comfortable environment in the lounge.

An example of a traditional chair upholstered in the Frank Josef fabric. In the fireplace lounge of this project, it is the 3300-series by Arne Jacobsen, which receive a new and accommodating expression with this vividly and cheerful textile.

WALK THROUGH

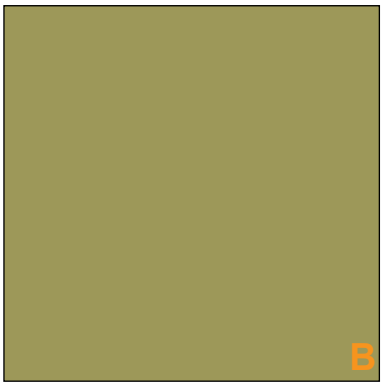
ROOM WITH A VIEW

The only closed-off zone in the dayroom, is the space for immersion – the 'Room with a View'. When you enter this zone, you should feel a distance to the hospital itself, and as a consequence of this idea the interior is a major contrast to the hospital environment. The main element in the room is the textile landscape and the large window that frames the nature and distributes a great inflow of light.
To minimize the perceived distance to the exterior nature, the room consist of a wall-to-wall, curved, textile landscape, where you can sit on a hilltop and ponder the situation.
The landscape is made of boiled wool in olive green/dark grass coloured tones, and is perceived as a warm tactile element that invites to residence.
From the exterior, the 'room with a view' zone appears as a solid textile box. The material is the same as the interior landscape, but in the dark grey colour as used in the rest of the room. The box is designed to break through the exterior wall of the dayroom, and even through the ceiling, as a symbol of the contact to the life outside the hospital, and as a metaphorical symbol on the strength of hope and belief that may triumph the physical rules and boundaries.



REFERENCES AND MATERIALS

The main material inside the 'room with a view' box is the textile covering the furniture landscape. In order to provide soft, warm and comfortable settings, where you feel invited to lay down, the material is chosen as boiled wool in a olive green colored tone.



The same color as the landscape textile is applied as semi glossy paint on the wall surfaces (NCS: S-4550-G70Y)

On the outside surface of the box the walls are coated with textiles in the same dark grey color as used on the wall surfaces in the kitchen and dining area.

The ceiling in the 'room with a view' box is designed as an abstracting metaphor of a cloudy sky, like this copperplate reference by Carlo Mollino.

A reference photo of the 'sitting in the landscape' idea. Here it is Christoph Seyferths Domestic Landscape.

The 'room with a view' idea is used commonly in health resorts and spas, like Zumthors Therme Vals. However, it is not yet seen in any hospital projects, although the concept is believed quite beneficial in these environments as well.

THE IMPLEMENTATION OF "TEXTILES"

In the 'room with a view' box the concept is 'the implementation of textiles', and the entire room is defined as one large textile landscape.

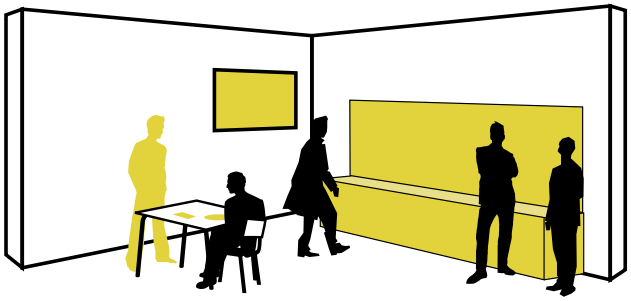
EVALUATION
THE THEORETICAL APPROACH

The design phase and the final design solution in this project is based on the *'Theoretical Approach'* defined in *PART TWO*, and is inspired by the case studies evaluated on the basis on three overall aspects including, '*Functions*' that should reflect the everyday life, '*Materials and Textures*' chosen for their familiar and homely atmosphere and finally '*Details*' that should introduce interior planning in a human scale.

In order to evaluate the design solution for the concluding remarks, a short general reflection of the implementation of these three main aspects will be performed.

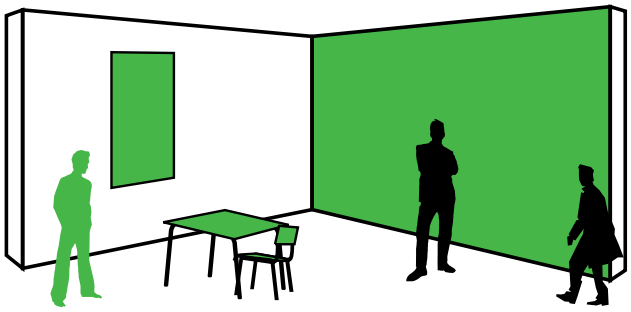
FUNCTIONS

The new design solution for the future spaces for social support is introducing functions that really do reflect the everyday life – based on recognisable architectural icons, like the fireplace, the kitchen and the library, etc.
The functions are believed to co-part in the process of giving the control back to the patients, where they can choose to engage in the activities and functions as desired and allowed according to their personality, mood and physical condition.
The functions in the dayroom are a main aspect in the facilitation of social interaction through all intensity levels, ranging from the informal meetings to the profound conversations.



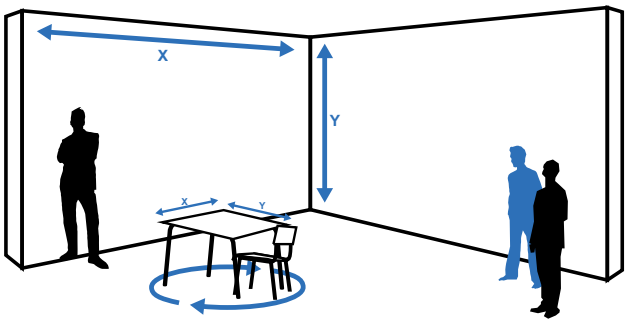
MATERIALS AND TEXTURES

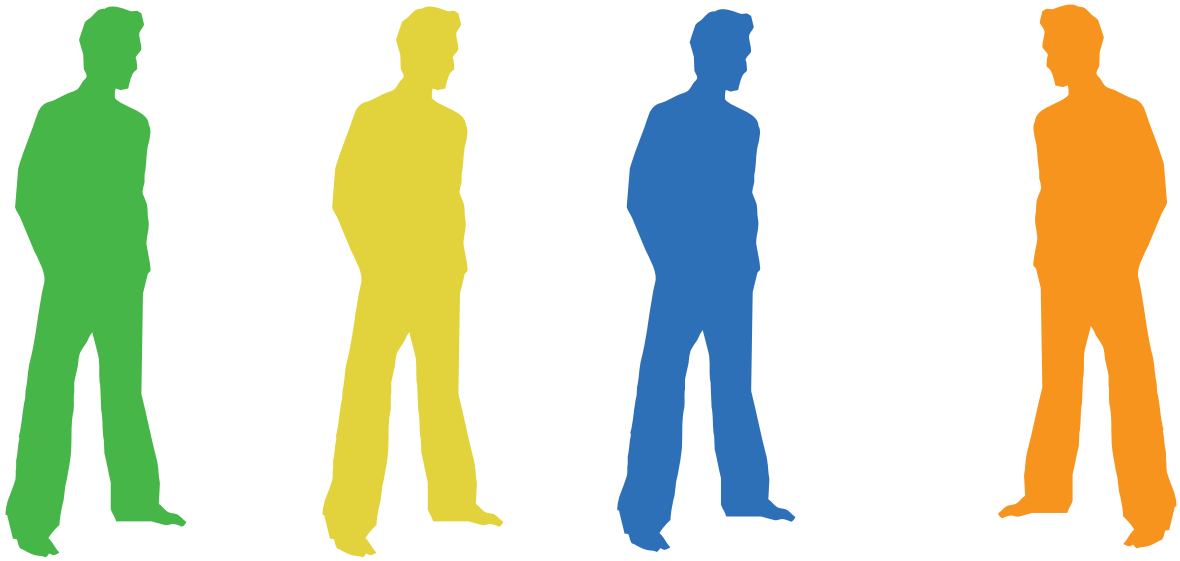
In the design of the social dayroom the consistent use of textiles are immediate conspicuous, where the tactile material is used for upholstery, carpets, curtains, wallpaper, plants and various room accessories. However, other materials are also chosen for their tactile quality, where the texture of the polished marble wall in the fireplace lounge is accompanying the fire as a textural contrast to the deep-piled carpet in the zone. Also the use of white-pigmented oak tree with visible grain structure is defined as a material with tactile and textural qualities, all together defining the dayroom with a homely atmosphere.



DETAILS

When considering the details of the social dayroom, the overall scale of the room is believed to be interpreted as human and applicable. The room is sub-divided in smaller zones, but still tied together and perceived as one common space, where the individual activities contribute to one another.
The distances in the seating arrangements are offering various choices for sociofugal or sociopetal settings, and the social atmosphere around the dining table, is consequently defined to support one large group or smaller groups situated around the same table, illustrating the social community of the dayroom.
Other room accessories like lamb skin blankets in the living wall lounge, the fireplace, the garden, etc. are all element that adds to the perception of the space as a tactile, recognisable, homely and socially environment.





REFLECTION
CONCLUDING REMARKS

The main goal for this master thesis has been to understand the future of Danish health care architecture and to address focus to the specific field of how coming patients, hospitalized in single bedrooms, can engage social interaction and support.
Through a preliminary analysis phase, the aspect of patient centered care and the basic human need for social support has been scientifically promoted by state of the art research, indicating a range of positive outcomes when including social interaction and support as part of a visit to the hospital.
However, this essential need has not been distinguished in the public debate regarding future super hospitals, and the project has consequently focused on this neglected subject and has searched for architectural solutions and improvements that could define the physical environment with the requested spaces for social support.
It has been clear that this architectural design solution would not benefit directly from the implementation of evidence-based design, as this method are not presenting any specific suggestions to the improvement of the physical environment. As overall inspiration, foundation and for following tests, the method do contain useable elements, which may be introduced in the actual design- and evaluation phase of coming architectural hospital projects – as long as the design team carefully considers the potential outcome and the validity of the research studies.
As theoretical foundation for the design phase, this project has instead presented some general theoretical concepts in the field of architecture, city planning and anthropology, and has used this phenomenological knowledge as basis for the theoretical approach. In this process, elements from three guiding parameters (Functions, Materials and Textures and Details) have been directing the actual design phase, and are consequently leading aspects in the final design solution.

One of the guiding parameters in this project has been the attempt to provide the future spaces for social support with an accommodating degree of homely atmosphere, which have derived the partial aim to implement tactile materials and elements that could provide a sensory experience. A challenging task considering the current state of Danish hospitals. However, the work with the competition entry "Health Caring Fabrics" for the competition "Future Textiles" and a general introduction to the emerging field of smart materials have provided new possibilities in regards to the implementation of textiles in hospital environment, still maintaining an even higher level of hygiene control.
The technical solution developed and presented in this project, still have a few years in the research stage before ready for introduction, but the technologies seems promising, and new ideas and technical concepts may also be developed within the nearest future in order to provide the fundament for introducing tactile materials like textiles.
As the technical solutions seems just ahead, the main challenge remains the mentally boundaries and the human accept of the new materials in the health care environments. Today we are already used to the clinical and institutional environment in hospitals, and it will probably take some time to accept and adapt to a textile solution in hospitals, as they most likely will be perceived as alien objects and even as hygienic snares. In this regard the communicating aspect is believed to be an important issue to remember, and the future of textiles and other tactile materials in our new super hospitals are hopefully within range.

The overall aim of the project has been to bring the hospital spaces for social interaction and support into justified focus, and to define new design solutions to the main social dayrooms, which could facilitate the informal and essential interaction between hospitalised patients and their families.
In many aspects, I believe this goal is achieved, and I am personally looking forward to my future work within this field, where I hope to gain the possibility to affect the coming Danish hospital projects and to ensure a future of Health Caring Architecture – a future, with spaces for social support.

APPENDIX

ACOUSTIC CALCULATIONS

HEALTH CARING FABRICS

DRAWING FOLDER

APPENDIX
ACOUSTIC CALCULATIONS

The following acoustic calculations are corresponding the results presented in the chapter ”Technical considerations” p. 96
They are based on the spreadsheet calculations presented below, which uses Sabine’s model of calculation, including the following assumptions, which all are considered fulfilled in the primary use of the dayroom. Diffuse field of sound, absorbing materials placed homogeneously on all surfaces, no big openings and no focusing.

Acoustic calculations

Reveberation time - Dayroom

Equation for reveberation time	*T=(0,16*V)/((Σα*s)+(Σn*A)+(4*m*V))*
Equivalent absorption area	(Σα*s)
where	
α = absorption coefficient	
and	
S = surface area	
Absorption from persons	(Σn*A)
where	
n = number of persons	
and	
A = absorption coefficient for person	
Absorption in air	(4*m*V))
where	
m = air absorption	
and	
V = volume of room	

Input for equation

Room size

Wall area	108 M2
Floor area	94 M2
Ceiling area	94 M2
Accessories *	50 M2
Room volume	253 M3

Absorption coefficients **
Wooden Floor: - 0,15 - 0,11 - 0,1 - 0,07 - 0,06 - 0,07
Walls and ceiling - 9mm plasterboard on battens: - 0,3 - 0,3 - 0,2 - 0,15 - 0,05 - 0,05
Textiles (476 g/m2) 'hard' - flat against surface: - 0,05 - 0,07 - 0,13 - 0,22 - 0,32 - 0,35
Textiles (476 g/m2) ' loose' - pleated in front of airspace: - 0,07 - 0,31 - 0,49 - 0,75 - 0,7 - 0,6

**) Accessories is defined as additional surfaces including furniture, room division/curtains, planting, etc.*
***) Absorption coefficient chart, PHK lecture: Building Technology and Architectural Design, 4.11.2009*

Scenaria

Scenario A - No Textiles
Scenario B - 25 M2 Textiles ' hard'
Scenario C - 25 M2 Textiles ' loose'
Scenario D - 25 M2 Textiles 'mixed'
Scenario E - 75 M2 Textiles 'hard'
Scenario F - 75 M2 Textiles 'loose'
Scenario G - 75 M2 Textiles 'mixed'
Scenario H - 100 M2 Textiles 'hard'
Scenario I - 100 M2 Textiles 'loose'
Scenario J - 100 M2 Textiles 'mixed - 40/60'

Scenario A < 2,6

Reveberation time

Equivalent absorption area	**Material**	**Areal** S(m^2)	**125 Hz** α	Sα	**250 Hz** α	Sα	**500Hz** α	Sα	**1000Hz** α	Sα	**2000Hz** α	Sα	**4000 Hz** α	Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		202	0,3	60,6	0,3	60,6	0,2	40,4	0,15	30,3	0,05	10,1	0,05	10,1
Textiles 'hard' (flat against surface)			0,05	0	0,07	0	0,13	0	0,22	0	0,32	0	0,35	0
Textiles 'loose' (pleated in front of airspace or as upholstery)			0,07	0	0,31	0	0,49	0	0,75	0	0,7	0	0,6	0

Absorption from persons	**Antal**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sa/stk**	**Sα**
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	**Volumen** [m3]	**125 Hz** m	mV	**250 Hz** m	mV	**500Hz** m	mV	**1000Hz** m	mV	**2000Hz** m	mV	**4000 Hz** m	mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433
Total absorption				74,7	0,8	70,9	0,9	49,8	1,2	36,9	1,1	15,7	1,1	16,7
Efterklangstid	T=(0,16*V)/((Σα*s)+(Σn*A)+(4*m*V))			0,5		0,6		0,8		1,1		2,6		2,4

No accessory surface added
- Low frequency values satisfied

Scenario B < 1,7

Reveberation time

Equivalent absorption area	**Material**	**Areal** S(m^2)	**125 Hz** α	Sα	**250 Hz** α	Sα	**500Hz** α	Sα	**1000Hz** α	Sα	**2000Hz** α	Sα	**4000 Hz** α	Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		202	0,3	60,6	0,3	60,6	0,2	40,4	0,15	30,3	0,05	10,1	0,05	10,1
Textiles 'hard' (flat against surface)		25	0,05	1,25	0,07	1,75	0,13	3,25	0,22	5,5	0,32	8	0,35	8,75
Textiles 'loose' (pleated in front of airspace or as upholstery)			0,07	0	0,31	0	0,49	0	0,75	0	0,7	0	0,6	0

Absorption from persons	**Antal**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sα/stk**	**Sα**	**Sa/stk**	**Sα**
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	**Volumen** [m3]	**125 Hz** m	mV	**250 Hz** m	mV	**500Hz** m	mV	**1000Hz** m	mV	**2000Hz** m	mV	**4000 Hz** m	mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433
Total absorption				76,0	0,8	72,7	0,9	53,1	1,2	42,4	1,1	23,7	1,1	25,4
Efterklangstid	T=(0,16*V)/((Σα*s)+(Σn*A)+(4*m*V))			0,5		0,6		0,8		1,0		1,7		1,6

25 M2 of textiles added as accessory surface

Scenario C < 1,3

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		202	0,3	60,6	0,3	60,6	0,2	40,4	0,15	30,3	0,05	10,1	0,05	10,1
Textiles 'hard' (flat against surface)			0,05	0	0,07	0	0,13	0	0,22	0	0,32	0	0,35	0
Textiles 'loose' (pleated in front of airspace or as upholstery)		25	0,07	1,75	0,31	7,75	0,49	12,25	0,75	18,75	0,7	17,5	0,6	15

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

Total absorption				76,5	0,8	78,7	0,9	62,1	1,2	55,6	1,1	33,2	1,1	31,7
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,5		0,5		0,7		0,7		1,2		1,3

25 M2 of textiles added as accessory surface

Scenario D < 1,4

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		202	0,3	60,6	0,3	60,6	0,2	40,4	0,15	30,3	0,05	10,1	0,05	10,1
Textiles 'hard' (flat against surface)		12,5	0,05	0,625	0,07	0,875	0,13	1,625	0,22	2,75	0,32	4	0,35	4,375
Textiles 'loose' (pleated in front of airspace or as upholstery)		12,5	0,07	0,875	0,31	3,875	0,49	6,125	0,75	9,375	0,7	8,75	0,6	7,5

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

Total absorption				76,2	0,8	75,7	0,9	57,6	1,2	49,0	1,1	28,5	1,1	28,6
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,5		0,5		0,7		0,8		1,4		1,4

25 M2 of textiles added as accessory surface

Scenario E < 1,1

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		177	0,3	53,1	0,3	53,1	0,2	35,4	0,15	26,55	0,05	8,85	0,05	8,85
Textiles 'hard' (flat against surface)		75	0,05	3,75	0,07	5,25	0,13	9,75	0,22	16,5	0,32	24	0,35	26,25
Textiles 'loose' (pleated in front of airspace or as upholstery)			0,07	0	0,31	0	0,49	0	0,75	0	0,7	0	0,6	0

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

Total absorption				71,0	0,8	68,7	0,9	54,6	1,2	49,6	1,1	38,5	1,1	41,7
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,6		0,6		0,7		0,8		1,1		1,0

50 M2 of textiles added as accessory surface - 25 M2 of surface is removed from walls

Scenario F < 0,7

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		177	0,3	53,1	0,3	53,1	0,2	35,4	0,15	26,55	0,05	8,85	0,05	8,85
Textiles 'hard' (flat against surface)			0,05	0	0,07	0	0,13	0	0,22	0	0,32	0	0,35	0
Textiles 'loose' (pleated in front of airspace or as upholstery)		75	0,07	5,25	0,31	23,25	0,49	36,75	0,75	56,25	0,7	52,5	0,6	45

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

Total absorption				72,5	0,8	86,7	0,9	81,6	1,2	89,4	1,1	67,0	1,1	60,4
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,6		0,5		0,5		0,5		0,6		0,7

50 M2 of textiles added as accessory surface - 25 M2 of surface is removed from walls

Scenario G < 0,8

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		177	0,3	53,1	0,3	53,1	0,2	35,4	0,15	26,55	0,05	8,85	0,05	8,85
Textiles 'hard' (flat against surface)		37,5	0,05	1,875	0,07	2,625	0,13	4,875	0,22	8,25	0,32	12	0,35	13,125
Textiles 'loose' (pleated in front of airspace or as upholstery)		37,5	0,07	2,625	0,31	11,625	0,49	18,375	0,75	28,125	0,7	26,25	0,6	22,5

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

Total absorption				71,7	0,8	77,7	0,9	68,1	1,2	69,5	1,1	52,7	1,1	51,1
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,6		0,5		0,6		0,6		0,8		0,8

50 M2 of textiles added as accessory surface - 25 M2 of surface is removed from walls

Scenario H < 0,9

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		152	0,3	45,6	0,3	45,6	0,2	30,4	0,15	22,8	0,05	7,6	0,05	7,6
Textiles 'hard' (flat against surface)		100	0,05	5	0,07	7	0,13	13	0,22	22	0,32	32	0,35	35
Textiles 'loose' (pleated in front of airspace or as upholstery)			0,07	0	0,31	0	0,49	0	0,75	0	0,7	0	0,6	0

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

Total absorption				64,7	0,8	62,9	0,9	52,8	1,2	51,4	1,1	45,2	1,1	49,2
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,6		0,6		0,8		0,8		0,9		0,8

50 M2 of textiles added as accessory surface - 50 M2 of surface is removed from walls

Scenario I < 0,6

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		152	0,3	45,6	0,3	45,6	0,2	30,4	0,15	22,8	0,05	7,6	0,05	7,6
Textiles 'hard' (flat against surface)			0,05	0	0,07	0	0,13	0	0,22	0	0,32	0	0,35	0
Textiles 'loose' (pleated in front of airspace or as upholstery)		100	0,07	7	0,31	31	0,49	49	0,75	75	0,7	70	0,6	60

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

Total absorption				66,7	0,8	86,9	0,9	88,8	1,2	104,4	1,1	83,2	1,1	74,2
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,6		0,5		0,5		0,4		0,5		0,5

50 M2 of textiles added as accessory surface - 50 M2 of surface is removed from walls

Scenario J < 0,6

Reveberation time

Equivalent absorption area	Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor		94	0,15	14,1	0,11	10,34	0,1	9,4	0,07	6,58	0,06	5,64	0,07	6,58
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)		152	0,3	45,6	0,3	45,6	0,2	30,4	0,15	22,8	0,05	7,6	0,05	7,6
Textiles 'hard' (flat against surface)		40	0,05	2	0,07	2,8	0,13	5,2	0,22	8,8	0,32	12,8	0,35	14
Textiles 'loose' (pleated in front of airspace or as upholstery)		60	0,07	4,2	0,31	18,6	0,49	29,4	0,75	45	0,7	42	0,6	36

Absorption from persons	Antal	125 Hz Sα/stk	125 Hz Sα	250 Hz Sα/stk	250 Hz Sα	500Hz Sα/stk	500Hz Sα	1000Hz Sα/stk	1000Hz Sα	2000Hz Sα/stk	2000Hz Sα	4000 Hz Sa/stk	4000 Hz Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	253					0,0004	0,1012	0,001	0,253	0,0024	0,6072	0,0061	1,5433

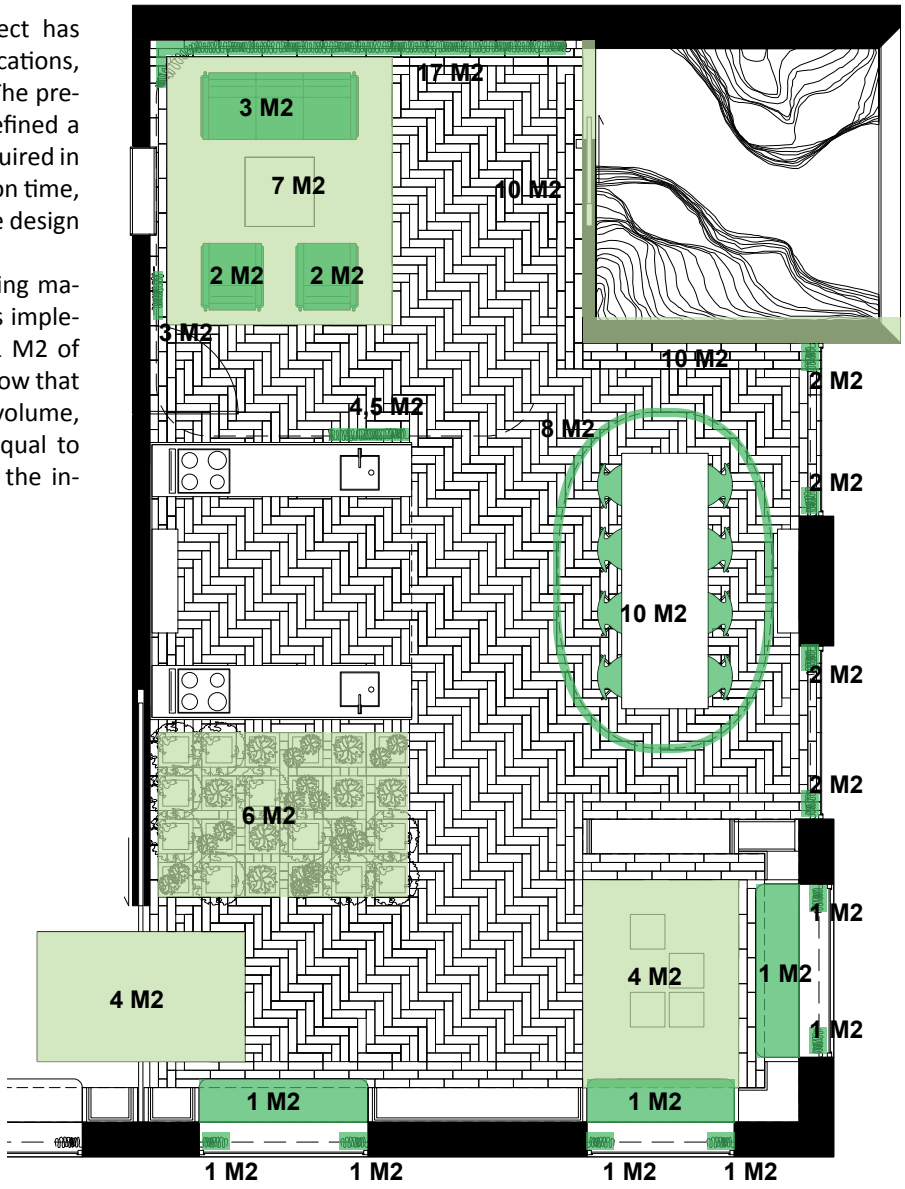
Total absorption				65,9	0,8	77,3	0,9	74,4	1,2	83,2	1,1	68,0	1,1	64,2
Efterklangstid	T=(0,16*V)/((Σα+s)+(Σn*A)+(4*m*V))			0,6		0,5		0,5		0,5		0,6		0,6

50 M2 of textiles added as accessory surface - 50 M2 of surface is removed from walls
Mixed 60 % Textile 'loose' . 40 % Textile 'hard'

FINAL SOLUTION

The final solution presented in this project has used textiles for various beneficial applications, and one of them is as acoustic absorbers. The preliminary considerations and estimations defined a use of app. 100 M2 of 'mixed textiles' as required in order to ensure a satisfying low reverberation time, and this has been used as guiding tool in the design phase.

The final result has distributed the absorbing material homogeneously in the room, and has implemented 66,5 M2 of 'loose textiles' and 41 M2 of 'hard textiles'. Based on the calculations below that have adjusted the floor area and the room volume, the estimated reverberation time is still equal to 0,6 sec, which is considered optimum for the intended functions in the dayroom.



Final solution <0,6

Reveberation time

Equivalent absorption area / Material	Areal S(m^2)	125 Hz α	125 Hz Sα	250 Hz α	250 Hz Sα	500Hz α	500Hz Sα	1000Hz α	1000Hz Sα	2000Hz α	2000Hz Sα	4000 Hz α	4000 Hz Sα
Wooden Floor	65	0,15	9,75	0,11	7,15	0,1	6,5	0,07	4,55	0,06	3,9	0,07	4,55
Walls and ceiling (9 mm plasterboard on battens at 0,5 m centers and 18 mm airspace)	152	0,3	45,6	0,3	45,6	0,2	30,4	0,15	22,8	0,05	7,6	0,05	7,6
Textiles 'hard' (flat against surface)	41	0,05	2,05	0,07	2,87	0,13	5,33	0,22	9,02	0,32	13,12	0,35	14,35
Textiles 'loose' (pleated in front of airspace or as upholstery)	66,5	0,07	4,655	0,31	20,615	0,49	32,585	0,75	49,875	0,7	46,55	0,6	39,9

Absorption from persons	Antal	Sα/stk	Sα	Sα/stk	Sα	Sα/stk	Sα	Sα/stk	Sα	Sα/stk	Sα	Sa/stk	Sα
Persons	0	0	0	0	0	0	0	0	0	0	0	0	0
chairs	0	0	0	0	0	0	0	0	0	0	0	0	0

Absorption in air v/ 50% RF	Volumen [m3]	125 Hz m	125 Hz mV	250 Hz m	250 Hz mV	500Hz m	500Hz mV	1000Hz m	1000Hz mV	2000Hz m	2000Hz mV	4000 Hz m	4000 Hz mV
	233					0,0004	0,0932	0,001	0,233	0,0024	0,5592	0,0061	1,4213

Total absorption			62,1	0,8	76,2	0,9	74,8	1,2	86,2	1,1	71,2	1,1	66,4
Efterklangstid	T=(0,16*V)/((Σα*s)+(Σn*A)+(4*m*V))		0,7		0,5		0,5		0,5		0,6		0,6

50 M2 of textiles added as accessory surface - 50 M2 of surface is removed from walls

APPENDIX
HEALTH CARING FABRICS

During the sketching phase of this project I participated in the international student competition “Future Textiles” (www.futuretextiles.dk) with the proposal ‘Health Caring Fabrics’ and was chosen as one of four finalists between more than 50 entries.

Summary
This project proposes a new series of Health Caring Fabrics to be implemented in our future hospitals in order to provide new social spaces with improved tactile and hygienic qualities.

One of the major lacks in the social spaces of today’s hospitals is seen as the absence of textiles and materials with a tactile quality. Vinyl flooring, acoustic ceilings, hard furniture, etc. is defining the space with an institutional character, and consequently discouraging people to engage in social interaction.

However, with the potentials of smart and technical textiles and a new innovative combination of existing and soon-to-be technologies this project has designed a series of Health Caring Fabrics.

When implemented in the social spaces, the Health Caring Fabrics provides the historic tactile qualities of textiles and fabrics, and even improve the hygienic environment where the antibacterial fabrics detects and communicate any bacterial overgrowth to the health care personnel in advance of epidemics.

Consequently the Health Caring Fabrics creates a physically and mentally healthier environment by introducing – FUTURE TEXTILES IN FUTURE HOSPITALS.

HEALTH CARING FABRICS
FUTURE TEXTILES IN FUTURE HOSPITALS

HEALTH CARING FABRICS

Introducing a new tactile and hygienic series of smart textiles for implementation in future hospital environments as furniture upholstery, carpets and curtains

FUTURE TEXTILES IN FUTURE HOSPITALS

HEALTH CARING FABRICS

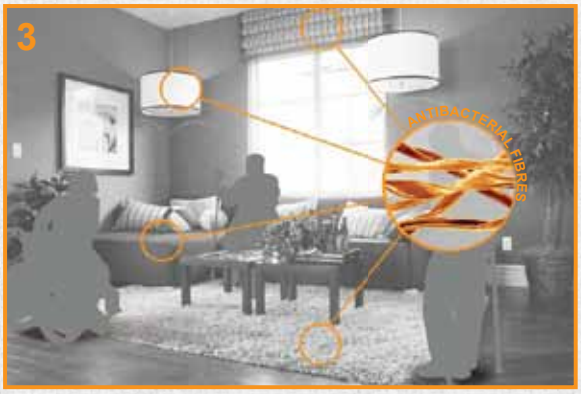
The Health Caring Fabrics is an innovative smart textile collection for hospitals - improving the tactile and sensory experience of social spaces and the physical environment

In order to improve the experience of our hospital environment we need to focus on the design of the physical surroundings. In this regard, one of the main missing links between the hospital (vinyl flooring, acoustic ceilings, hard wooden chairs, etc.) and the home (warm, comfort, safeness and cosiness) is believed to be the lack of tactile materials and textures – most importantly textiles!

HOW IT WORKS

The new series of HEALTH CARING FABRICS are introduced in hospitals as furniture upholstery, carpets, curtains, etc. - Immediately improving the tactile experience.

Contagious bacteria that earlier compiled in reservoirs and caused epidemics among patients, are now collected in the HEALTH CARING FABRICS - improving the hygienic safety and the physical environment.



When bacteria is contact with the HEALTH CARING FABRIC, an antibacterial catalytic process is initiated within the textile fibres, preventing bacterial cell division and survival.

Through an intelligent input/output system within the textile, the HEALTH CARING FABRIC even detects bacteria overgrowth and alert the hospital staff by illumination - allowing them to take immediate precaution and avoid dangerous outbreaks.

FUTURE TEXTILES IN FUTURE HOSPITALS

HEALTH CARING FABRICS

The Health Caring Fabrics even improves the hospital hygiene by detecting and communicating bacterial overgrowth to the staff in order to avoid dangerous outbreaks

Today nearly 10 % of all patients are infected during their hospitalization. Mainly due to lack of hygiene nurses and uncontrollable routes of infection. By giving nurses and staff new technical solutions, they will be able to discover bacteria outbreaks earlier than today and consequently avoid infections.

TECHNOLOGIES APPLIED

ANTIBACTERIAL FIBRES

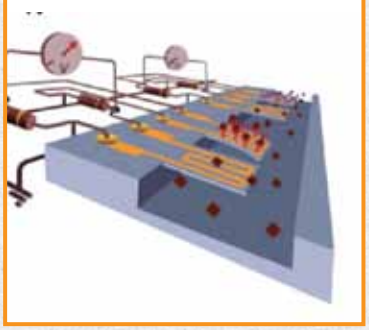
CATALYTIC PROCESS

Use of catalytic processes in nano coated fabrics, have been used in many years, and today especially silver ions are used as coating in many health care and everyday household products. The antibacterial fibres in this project could use similar catalytic processes in order to avoid bacterial reservoirs in the textile - still considering the potential problems with future bacteria resistance towards silver ions in the health care sector.

Further research to exploit the potential

The question regarding silver resistant bacteria should be fully defined before implementation in the health care sector. Other catalytic or electronic solutions may also be available in order to avoid bacteria reservoirs in the textile.

DETECTING BACTERIA



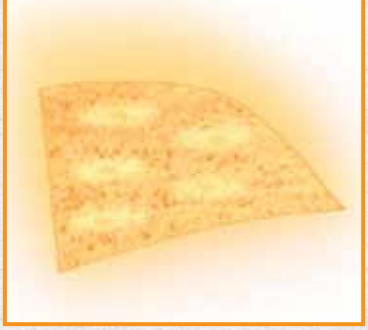
BIOSENSORS

State-of-the-art research within the field of biosensors including nano mass sensors, mechanical micro beams and whole-cell arrays is believed to enable future implementation of bacteria biosensors within the textile itself. Today these technologies are already used commonly in laboratories to detect, identified and analyse multiple bacteria and viruses within very short time.

Further research to exploit the potential

Implementation of the biosensors within the textiles would be ideal, and is believed possible with some further research. Other immediate solutions may however also be achievable, where the textile for instance could compile the biological material and let the bacteria detection be computed through a connected analytic installation. Questions regarding durability and washability with the technical textile should also be handled.

ALERTING HOSPITAL STAFF



ILLUMINATION

Illuminating textiles are today found in many varieties including led embedded textiles, glowing optic fibres, etc. When a bacterial overgrowth is detected by the biosensors in the health caring fabric, it should alert the hospital staff by direct illumination within the fabric. This instant communication will be a useful tool in monitoring and fulfilling a high hygienic standard in future hospitals.

Further research to exploit the potential

When implemented in the health care sector and used as assistance to the hygienic staff, the trustworthiness of the communication should be of very high standard, and detailed tests should be made in order to make this future solution reliable by both patients and the hospital staff.

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