andrum

Exploring the use of biophilic architectural design in the context of a Gothenburg cancer support center

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Andrum

A Master's Thesis in Healthcare Architecture

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Architecture and Planning Beyond Sustainability

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ABSTRACT

How can a biophilic architectural design support the users and functions within a cancer support center?

Every day 137 people are diagnosed with cancer in Sweden. The illness not only impacts the patient itself, but also family, friends, colleagues, and society. Tackling cancer is usually difficult, both physically and mentally, and those affected often feel lonely and misunderstood. Many of them consider the psychological care aspects missing or insufficient, especially after finishing treatment. A more holistic view on cancer care is needed, where the mind and body are treated as equally important. Therefore, this thesis work will propose a new cancer support center in Gothenburg: a place where people affected by cancer can meet others in their situation, get support, information, and rehabilitation. There are many successful examples of cancer support centers, but none currently exist in Gothenburg.

Research has shown how contact with nature can improve health, with a wide range of positive effects such as stress reduction, faster physical recovery, an immune system boost and a happiness increase, all aspects that could benefit people dealing with cancer. Biophilic design is a method where the human connection to nature is incorporated in the design, with the purpose of increasing wellbeing. The method is explored through research, site analysis and sketching, with the aim to propose an environment suitable for physical and mental healing, in close connection to its natural surroundings.

The proposal also aims for ecological sustainability, through the 're-greening' of a city plot void of vegetation, as well as with high material standards. Merging the aspects of human healing and health with planetary healing and health is a strong combination, as they go hand in hand.

The project is based upon a Research Informed Design approach, including literature studies, interviews with patients, relatives and staff (n=6), surveys with patients and relatives (n=53), and reference studies focused on the relation between nature, cancer support and the built environment.

The result may contribute to a raised discussion about the spatial and psychological needs of people affected by cancer, as well as to the importance of including biophilic design in the development of health-promotive environments.

Keywords: Andrum, architecture, cancer support, community, rehabilitation, biophilic design, nature, healing, sustainability

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My relation to the topic

Most people have, or will have, experiences of cancer, with either it being themselves or someone close to them that is affected. Several people around me have died or been severely affected by the illness, making it an important topic for me to address. I am very interested in studying the ways architecture can affect people, and in this case how it can support the healing process. The choice of working with biophilic design stems from the large, and growing, body of evidence showing the positive health effects nature has on human well-being, making it a suitable design strategy for a cancer support center. It also corresponds well with my own love of nature, and my conviction that incorporating nature and sustainable solutions is especially important in urban architectural development.

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01.

introduction

Explains the aim, purpose, methods and delimitations. Also presents the research question

RESEARCH QUESTION

Purpose

The purpose of this thesis project is to explore the needs of people affected by cancer, resulting in a design proposal aiming at catering to those needs. The intention is to raise awareness about the perceived lack of a holistic view on health within the cancer care context today, where many people affected by cancer feel like the psychological care aspects are missing or insufficient, especially after finishing treatment.

As the number of people who will be affected by cancer is estimated to rise within the near future, de-stigmatizing the disease is important. By proposing a cancer support center where the design itself is allowed to make a statement (much like the Maggie's centers in the UK or Livsrum in Denmark), the hope is to contribute to this discussion within a Swedish context.

Delimitations

In order for this thesis project to be manageable within its timeframe, some delimitations had to be made. The facility will contain types of therapy and activities which are scientifically or anecdotally proven to have a positive impact on people affected by cancer, but it will not contain facilities for any medical cancer treatment. This would necessitate a completely different kind of building, and will be left to the hospital itself to take care of. The focus here lies instead on the positive effects natural elements and the built environment can have on health and well-being, in combination with the therapies mentioned.

The project will also focus on adults (from teenagers to elderly), as incorporating children with cancer would entail a larger scope of research and types of facilities.

Another delimitation is the technical approach to sustainability: emissions and energy-use will here not be measured, but the methods and materials used will be of the kind that have been proven to have a positive impact on climate change and the environment.

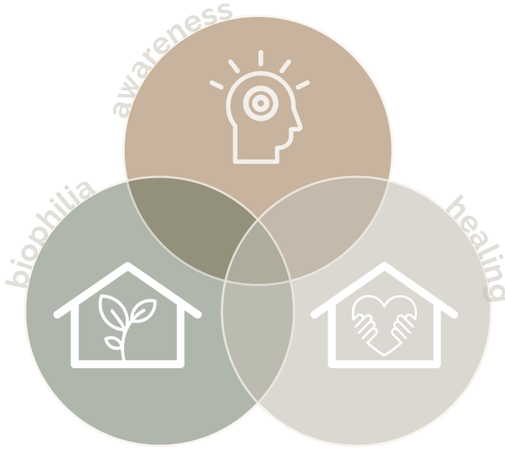
To be able to keep an explorative and experience-centered approach, economic factors will not overly restrict the design.

How can a biophilic architectural design support the users and functions within a cancer support center?

Aim

To create an architecture of healing

The aim is to propose spaces with the intent to aid in the healing process, psychologically and physically, with the help of biophilic design. By proposing such spaces, the hope is to make visible the needs and possibilities within the Gothenburg cancer care context today, possibly helping to de-stigmatize and prioritize the illness.

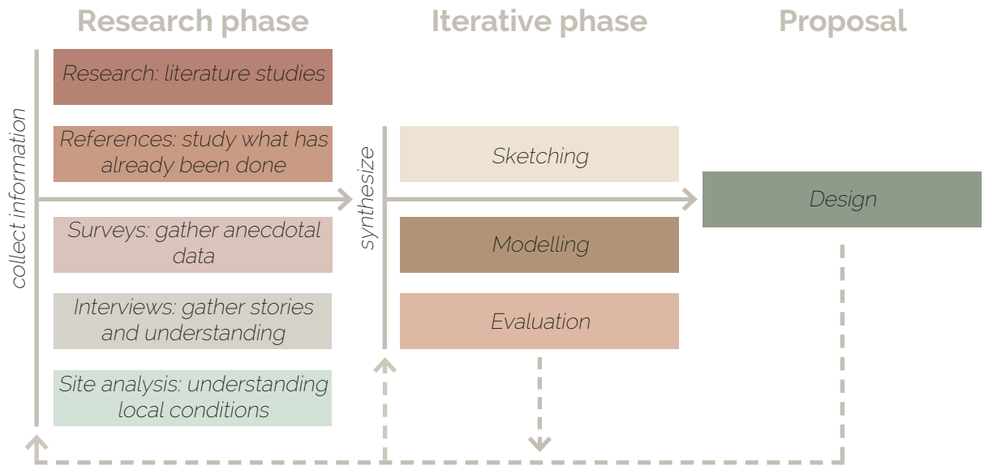


METHOD

The project is based upon a Research Informed Design approach, focused on the relation between nature, cancer support and the built environment. Literature studies, site analysis, reference studies, interviews (n=6) and surveys (n=53) with people with different experiences of cancer were conducted. Sketching and modelling were then used as a means to synthesize and develop the information found in the research into a final building proposal.

The research focused on the different needs and rehabilitation strategies for people affected by cancer, health-promotive strategies in architecture, and how nature and biophilic design can affect our wellbeing. The work included case studies and a site visit at Kraftens Hus in Borås, to anchor the project and its program in reality.

An important part of the research process was gathering understanding and information about the cancer experience from the potential users. To understand the needs and requirements within a cancer support center, surveys were sent out in different groups for people affected by cancer. 53 people replied. Six semi-structured interviews were also conducted. The interviewees were people with different experiences of cancer: Louise and Emelie are cancer survivors, Elke's mother had a cancer diagnosis, Jan has a long work experience within oncology, Pleuntje did her PhD within the field of cancer care in connection to the built environment, and Ulrika is a brain health expert.
Interviews, site visits and discussions were conducted in collaboration with Agnes Ståhl, whose master's thesis is also a cancer support center proposal.



method process - author's own image

02.
background

Introduces the problem

What is cancer?

Cancer is an umbrella term referring to around 200 different types of illnesses, which in turn can be subdivided into a range of categories. The most common cancer types are breast cancer, colon cancer, prostate cancer, lung cancer and skin cancer.
Cancer occurs when the balance of the cell division goes wrong, and the cell starts to multiply in an uncontrolled manner, which eventually creates a tumor. Tumors can be both benign and malignant, but only the malignant ones are called cancer. These are the harmful ones that can start growing through other body tissues and spread throughout the body (Cancerfonden, 2019).

69%

of those who get cancer in Sweden survive today

60.000

people get a cancer diagnosis each year in Sweden

100.000

people are estimated to get a cancer diagnosis each year in 20 years in Sweden

(Cancerfonden, 2018)

"As a cancer patient you are deprived of your integrity, control and identity. The medical care dehumanizes you – making the social support incredibly important."

- Louise

(personal communication, 2021)

How is cancer experienced?

How a person experiences a cancer diagnosis, either their own or of a loved one, is of course very individual. Physically there are many symptoms to the illness and its treatments, as there are so many different types of cancer, but some of them are pain, fatigue, loss of appetite, fever, nausea, coughing, bleeding, constipation, diarrhea, and a lower sexual drive (Cancerfonden, 2017).

There are also numerous psychological effects of cancer. Many experience a crisis as they, or their loved one, get the diagnosis. The uncertainty of what is to come can be stressful and frightening, and thoughts about death, life choices and anxiety can occur. (1177, 17–04-20) Struggling with the loss of independence and self-confidence, feelings of shame or anger, and depression is common,

The physical effects of cancer also affect the mind. Not having the energy to live life in a normal manner, due to the fatigue that cancer patients often experience, can be a difficult change for many people. Aspects like living with pain, having to surgically remove body parts, lose the ability to have children, losing hair, living with the knowledge that the cancer might never disappear, just to name a few things, naturally also has a great impact on the mental wellbeing.

For some people, however, the cancer diagnosis can also come as a sort of relief, knowing that there is help to get with symptoms that might have been present for a long time (Cancerfonden, 2018). Or, like in the case of Fabian Bolin, from the War on Cancer podcast, it can provide a moment of clarity to reprioritize life choices, and go from a stressful and unhappy life to a more meaningful one.

For the family or friends that help take care of a loved one with cancer, one of the toughest parts is to lose control over one's own life. Nursing someone can take up a large part of the daily life, and together with the worries about the loved one's health this can take over their entire life, interview participant Elke explains. Close family and friends also have a 25% higher risk of getting ill from e.g. cardiovascular disease and mental illness due to the stress they live under (Cancerkompisar, 2021).

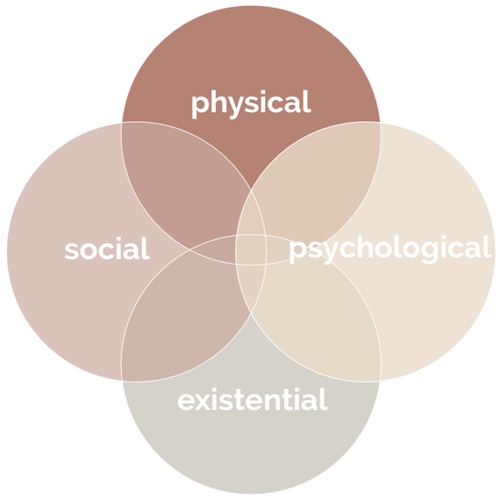
On top of the direct physical and psychological effects cancer has, there are also other parameters that affect the life of people affected by cancer. Interviewee Emelie explains that issues around work, economy, independence, relationships, taking care of children and so on often arise.

WHAT HELPS?

Cancer rehabilitation

Just like the cancer experience can differ greatly between different people, the methods that help can also differ between individuals. The definition of cancer rehabilitation according to the Nordic Cancer Union is that it aims towards the prevention and reduction of the physical, psychological, social, and existential effects of cancer illness and its treatment. The rehabilitation should give the patient and the close ones support and conditions to live a life as good as possible (Regionalt cancercentrum Syd, 2014, p. 21).

The four dimensions of rehabilitation often overlap, where an issue in one of them often can lead to increased need for help in one of the other fields. There may be large needs for rehabilitation in one of the fields, while none in some of the others. The rehabilitation activities hence depend on in which dimension the rehabilitation is needed, and some activities can prove helpful in several of the dimensions.
Some activities that can aid in the cancer rehabilitation are physical exercise in different forms, meditation and mindfulness, group discussions, information meetings, massage, nature experiences, gardening, hydrotherapy, art therapy, sessions with e.g. a psychiatrist/physiotherapist/dietitian/ sexologist and so on.



Based on the four dimensions of cancer rehabilitation (Regionalt cancercentrum Syd, 2014, p. 23)

03.
framework

Explains the theoretical framework and set of strategies used within the project.

HEALTH

a salutogenic approach

"health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"

(WHO, n.d.).

The WHO definition of health has been discussed by many, and it is argued within the salutogenic approach that health is rather defined by a "sense of coherence": manageability, comprehensibility and meaningfulness. (Mittelmark et al., 2016) It allows for larger variations and individual interpretations than the rather rigid WHO definition. In this context, the salutogenic approach has been preferred over the pathogenic. The pathogenesis approach is aimed at avoiding and preventing disease and infirmity, while salutogenesis is a health promotive approach. It focuses on the origins of health rather than the origins of illness, and aims at actively promoting health through different strategies.
Some salutogenic principles are extra relevant for a cancer support center, and will be integrated into the design:

Social support

having a strong sense of support and community has been proven to increase health and happiness. Here the cancer support center has an important role to fill by providing spaces encouraging interaction at the person's own terms.

Connection with nature

nature has many positive health benefits, such as lowering stress, increasing overall mood, boosts the immune system and can speed up the recovery rate from illness (Beatley, 2016). Here the biophilic design plays a large role in incorporating nature into the design.

Promoting movement

physical exercise has a great impact on health and wellbeing for cancer patients. Here rooms for movement will be an important part of the design, and movement through the building will be promoted through incorporating many places to sit down for those suffering from fatigue. The circulation through the building also invites visitors to stroll around. Walking, instead of driving, will also be promoted by the choice of site, as it is close to public transport and beautiful natural settings that encourage walking.

Manageability

regards the user's ability to live life normally, and provides a sense of control over the immediate environment. Here it is integrated in the sense that the center should be fully accessible and provide a sense of control: one should feel free to use the spaces according to their own choice. When having cancer, it is easy to feel like all control is lost (Maggie's, n.d., p. 4). Therefore it is extra important to provide a space that induces a sense of control and choice. It can be things like having freedom to choose where to sit, moving furniture around to one's own liking, regulating the temperature or opening a window.

A stimulating environment

Interview participant Ulrika explains how an activation of several different senses is healthy for the brain, which in turn has been proven to improve overall wellbeing and health. The brain is activated in a varied environment, which in turn creates new connections in the brain. Some tools to create a stimulating environment are using varied colors, shapes and sensory activators. It is beneficial to stimulate several of the senses simultaneously, not only the vision.

BIOPHILIC DESIGN

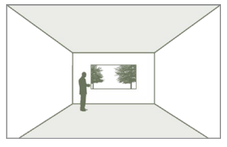
what is biophilic design?

"Biophilic design can reduce stress, enhance creativity and clarity of thought, improve our well-being and expedite healing; as the world population continues to urbanize these qualities are ever more important."

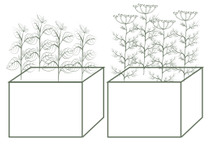
(Terrapin Bright Green, 2014, p. 3)

Research has shown that humans have an inherent need to connect with nature, as our minds and bodies evolved in sync with our natural environment. Biophilic design is a design tool helping humans reconnect with nature in the built environment, something which becomes extra important in the modern cities as many are suffering from a large disconnection from nature today. Biophilia is not specifically about making buildings greener, but about humanity's place in nature. Biophilia is designing for people as a biological organism, using the mind and body as indicators of health and well-being. Connection with nature leads to e.g. muscular relaxation and a lowering of blood pressure and stress hormones in the bloodstream, making biophilic design a good tool for a health-promotive design approach. (Terrapin Bright Green, 2014, p. 11)

In relation to cancer, biophilic design could help counter some of the side effects such as stress, depression and loneliness, which are common reactions when cancer turns life upside down.
Environmental consultant organization Terrapin Bright Green explains the relationship between the built environment, human biology, and nature in their report "14 Patterns of Biophilic Design". These patterns serve as a design tool when creating health-promotive environments. Some of these play an important role in the design of Andrum.

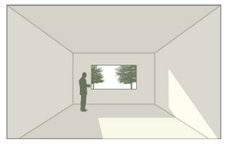


1. Visual Connection with Nature
A view to elements of nature, living systems and natural processes.



2. Non-Visual Connection with Nature
Auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems or natural processes

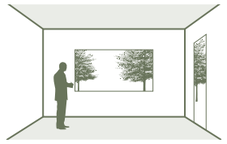
3. Non-Rhythmic Sensory Stimuli
Stochastic, ephemeral connections with nature that may be analyzed statistically but may not be predicted precisely



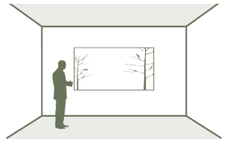
4. Thermal & Airflow Variability
Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments.

the 14 patterns

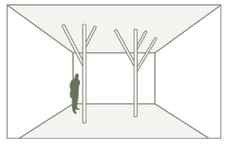
5. Presence of Water
A condition that enhances the experience of a place through seeing, hearing or touching water



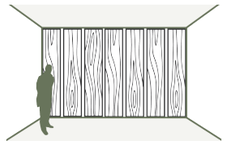
6. Dynamic & Diffuse Light
Leverages varying intensities of light and shadow that change over time to create conditions that occur in nature.



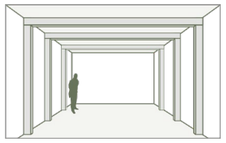
7. Connection with Natural Systems
Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.



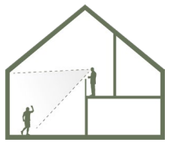
8. Biomorphic Forms & Patterns
Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature.



9. Material Connection with Nature
Materials and elements from nature that, through minimal processing, reflect the local ecology or geology and create a distinct sense of place.

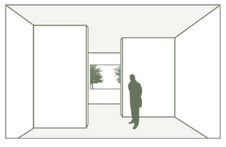


10. Complexity & Order
Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature



11. Prospect
An unimpeded view over a distance, for surveillance and planning

12. Refuge
A place for withdrawal from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead



13. Mystery
The promise of more information, achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment.

14. Risk/Peril
An identifiable threat coupled with a reliable safeguard.

SUSTAINABILITY

definitions and strategies

The UN definition of a sustainable development is the *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* (UNESCO, 2015)

There three dimensions to sustainable development are ecological, social and economic sustainability, which are all closely intertwined and dependent on each other. The aspects handled within this thesis are as follows:

Social

To propose a health-promotive and salutogenic environment. Aiming for meeting the needs of cancer patients who feel like the current healthcare system is not supportive enough. Providing rehabilitation physically and mentally. Providing a new alternative to patient hotel rooms: more accessible, homelike and safe. Proposing a place to get social support and build a contact network.

Ecological

An under-used parking lot is used more purposefully. Hard surfaces go soft and new greenery is introduced to the plot, tying together the surrounding natural areas and creating additional habitats for non-human life. Sustainable materials will be used, such as unburnt and local clay with low climatic impact, wood and straw which store CO_2. Natural ventilation will also be used.

Economic

People might more quickly get the help and rehab they need, which speeds up the process of getting back to normal life. Mental and physical health is beneficial to the economy of society. The patient hotel rooms can free some beds in the hospital premises. The partly volunteer-based staffing brings down the staff costs.

The topic also connects to some of the UN 17 Sustainable Development Goals:

3. Good health and well-being
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate change
15. Life on land
17. Partnerships

(United Nations, n.d.)

PERSONAL STORIES

interview and survey results

The surveys and interviews revealed a variety of wishes from the participants. Many of the younger participants had never heard of cancer support centers, but were interested in visiting one. Most of the people who had visited one expressed their satisfaction with the support and warmth they felt when visiting. The social aspects were of greatest importance: being able to talk freely about even the most difficult topics, crying and laughing together with people who share similar experiences – it all seems to have a great therapeutic effect.

Questions were asked about the desired activities in the center, with lectures, fika, yoga, group counselling and rehabilitation being some of the most popular. However, several expressed the importance of providing a range of different options, since the needs vary greatly between individuals. The atmosphere was generally desired to be calm, social, close to nature and joyful. It was important to not feel like it was a part of the hospital, although many expressed it being an advantage if being located close to the hospital. Accessibility was also an important aspect, as having a central and easy-to-reach location would make it easier to visit.

The interviews gave a deeper understanding of the cancer experience, where it became clear that the holistic view on rehabilitation was perceived to be missing in the current cancer care, as Louise expressed it:

"the cancer care lacks the connection between mind and body"

FILLING THE GAP

– in cancer care today

"The healthcare system is top notch when it comes to cancer and treatment. But when this is done it is goodbye immediately. What happens now?" **-Emelie**

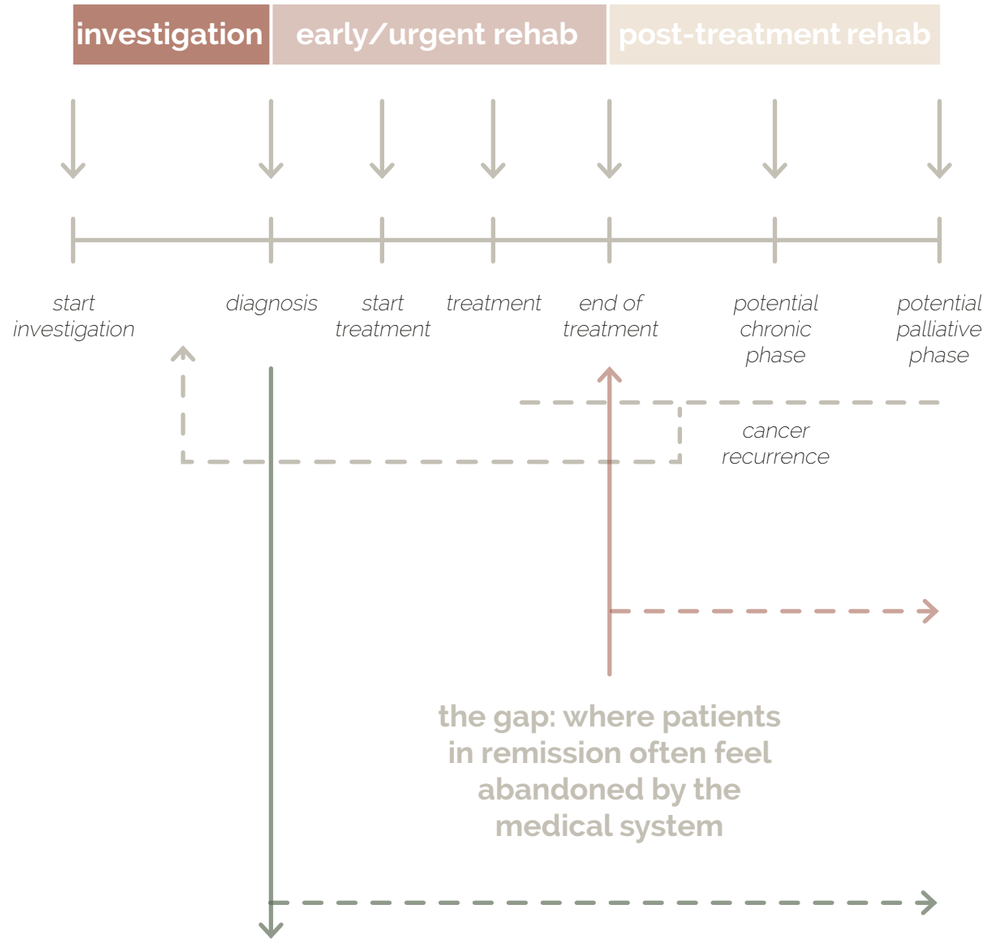
The gap

Based upon the interviews and surveys that were conducted, most people were very satisfied with their medical cancer care. However, when treatment was over, and the mental focus shifted from getting through the often tough treatments to the "what happens now?", there seemed to be a gap between the received care and the care needed. Several people witness of feeling abandoned, without any information or resources on how to move on, going into depression and an existential crisis. This is where cancer support centers are important, as they can take over most of the following needs. It is important for patients, family and friends to get information from the hospital about the help there is to get, since the psychological effects of cancer can follow the affected throughout the rest of life. Even after becoming cancer free, the so-called "cancer hangover" that often follows means that many still struggle with fear of cancer recurrence, anxiety, not daring to show one's body and so on (Ung Cancer, 2020).

The stigma

Some also experience that there is a stigma around cancer, and describe feelings of shame and guilt related to their illness. Some cancer types are also more linked to stigma than others, such as lung cancer. This is due to its links to tobacco use, where feelings of guilt for getting cancer are common. This stigma just further increases the suffering of the affected, and in some cases even leads to an underreporting of symptoms to the healthcare staff (Moyer, 2017).
By making cancer more visible and prioritized in society, the stigmas could be reduced, making at least one aspect of the cancer experience less difficult.

"In 2030, half of the population will get cancer at some point in their life, so we have to break the stigma around cancer. It's not you today, but it might be tomorrow." **-Louise**



based upon the cancer rehabilitation scheme during the different phases of cancer (Regionalt cancercentrum Syd, 2014, p. 24)

REHABILITATION

different strategies

Physical exercise

Physical exercise can be beneficial both during treatment as well as afterwards, and also helps in preventing the cancer from coming back. It lowers the amount of stress hormones, which can help improve sleep (Regionalt cancercentrum Syd, 2014, p. 152). Stress hormones have also been proven to speed up the spread of cancer cells throughout body (Kirkebæk, 2016), making the importance of lowering stress levels great. Exercise also lowers the levels of insulin and estrogen, which have been proven to stimulate the growth of cancer cells. Regular exercise also reduces cancer-related fatigue symptoms and helps people come back to normal life faster and can help in lowering pain and anxiety levels. Being overweight is also known to be a risk factor for getting certain types of cancers, also pointing towards the importance of physical activity (Cancerfonden, 2019).

Counseling

Different types of counseling can be of good help when dealing with issues regarding stress, money, work, relationships, living situation, juridical questions, insurance, existential questions, crisis handling, appetite problems, loneliness, anxiety, depression and suicidal thoughts.

Social support

Joining support groups can be a good way to be able to express difficult emotions and thoughts in a safe space. Often it can feel better to share those thoughts with others who are in the same situation, rather than with family and friends. Getting social support can be done in a structured way, including a psychologist and specific groups of patients or relatives (Maggie's, n.d.), but also in an informal way in e.g. a cancer support center where people can just enter and socialize freely.

Nature experiences

It has been proven that by spending time in nature, the wellbeing of people increases (Terrapin Bright Green, 2014, p. 3). It can help in handling a crisis, provide a sense of identity and safety. Cancer specialist Peter Strang explains that in a secular society as ours, nature has in a way replaced the religious search for something bigger.

Massage

Massage can help in lowering stress and pain levels, as well as anxiety and sleeping problems. It can also provide a moment of relaxation and positive distraction. The type of massage must be adapted to the individual, but methods such as tactile massage is generally considered safe (Regionalt cancercentrum Syd, 2014, p. 77).

Mind-body therapies

Can be used to control emotional stress and lower pain, anxiety, sleep problems, treatment-related nausea, hot flushes. It can also improve the overall mood. Some of the therapies used are relaxation exercises, yoga, art therapies, music therapy, tai chi and qi gong (Regionalt cancercentrum Syd, 2014, p. 193). These all focus on the interaction between the brain, mind, body and behavior, with the purpose of improving the overall health.

Mindfulness and meditation

Focusing on the "here and now" (Regionalt cancercentrum Syd, 2014, p. 144) and practicing a conscious presence can help in handling pain, stress and psychological issues.

Hydrotherapy

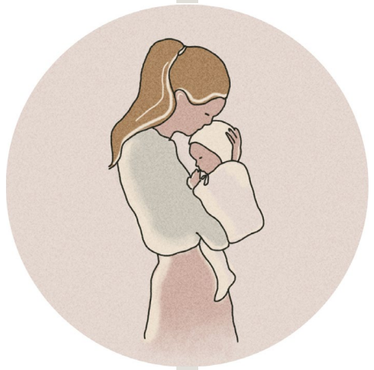
Physical movement in water is a mild type of exercise, where sometimes even gravely ill people are able to explore their mobility. It is also perceived as comfortable and calming (Regionalt cancercentrum Syd, 2014, p. 135).

Breathing exercises

Can be beneficial for people with lymphoedema or difficulties breathing. It helps activating the lymphatic vessels and has a relaxing effect on the body and mind (CancerCare, 2021), (Svenska Ödemförbundet, 2019).

Acupuncture

Acupuncture can help with nausea, fatigue, pain, a dry mouth and hot flushes (Regionalt cancercentrum Syd, 2014, p. 100).



Cancer patients
- adults in all stages of cancer

The largest user group, which includes people in their teenage years up to old age. Single parents, students, people who are in the middle of their career, retired, active people and elderly are all welcome. It includes both people with ongoing or chronic cancer, as well as people in remission.

Support needs: due to being a large and varied user group, this varies greatly. Examples are social support, physical rehabilitation and exercise, stress and pain management, lectures, economic counseling, psychological counseling, tactile massage, positive distractions, and creativity therapy.

Spatial needs: spaces for both calm and activity. A sense of protection from the outside, to be able to dare to open up, maybe take the wig off and to relax. Spaces to withdraw from activity. Social spaces where interaction with others is promoted, but also spaces for specific activities and counseling sessions.

Partners, family members and friends

The people close to a cancer patient, both children and adults. This is a group that often also greatly suffers the consequences of cancer, as nursing or worrying about a loved one can cause great stress, anxiety and suffering.

USERS

visitors and staff using the center

Support needs: some examples are group therapy or information sessions, lectures, grief counselling, juridical counselling and stress management.

Spatial needs: spaces for both calm and activity. Spaces for withdrawal as well as spaces for interaction with others. Rooms of different size that could fit both large and small groups.

Volunteers, staff and counsellors

The staff working in the facility, composed of volunteers (who often have experiences of cancer themselves), paid staff and visiting counselors/experts.

Support needs: support functions might be needed for the volunteers who themselves have been affected by cancer. They also benefit from social activities, therapy sessions and exercise, but might have come further in their cancer process than the visitors.

Spatial needs: adequate spaces to host the different activities within the center. An administration area with good overview of the center, with space for computers, books, binders, and a copy machine. A small staff room is also good to be able to withdraw, however the staff is mostly expected to eat their meals or do their work close to the visitors. The visiting counselors or experts need space to conduct their sessions, such as economic counseling, massage, rehabilitation exercises, art therapies, cooking classes, lectures and so on.

OCCUPANCY

Patient journey

There is no specific time that one is expected to visit the center when dealing with cancer; people are welcome as soon as they or their loved one gets their diagnosis, and from then onwards. The ideal situation would be that the hospital staff inform the people affected as soon as they get the diagnosis, and then help them book a time or have somebody follow them to the center for an introduction to the premises. Once comfortable and familiar in the settings, going back for a visit becomes less intimidating. Based on the interviews conducted, many people never receive information about the help there is to get both when undergoing treatment or afterwards. To enable a more holistic view on cancer care and health, this communication needs to improve.

Use

As previously mentioned, there are three groups of main users in the center: cancer patients (current or in remission), family/relatives/friends and staff. The patients and their loved ones are welcome to drop in unannounced during the center's opening hours, but they can also book appointments or attend specific events. The building is staffed from morning to evening to be able to cater to the needs of the patients staying in the hotel rooms, as well as the visitors. The staff, which is partly volunteer-based, is expected to keep an eye on the activities going on within the building, to be able to welcome hesitant first-time visitors and to enable a safe environment. They are expected to use the spaces like any visitor. An effect of including patient hotel rooms within the program of the building is that the site, which today is considered a bit unsafe, is activated throughout the day and the year, even when no scheduled activities are going on. The guests can freely move around, prepare meals, make coffee and relax in the different spaces. To control the flows and access to the different spaces, an electronic access system is used.

04.

context/site

The site criteria, information about the location, site analysis and site strategies are presented

CITY CONTEXT

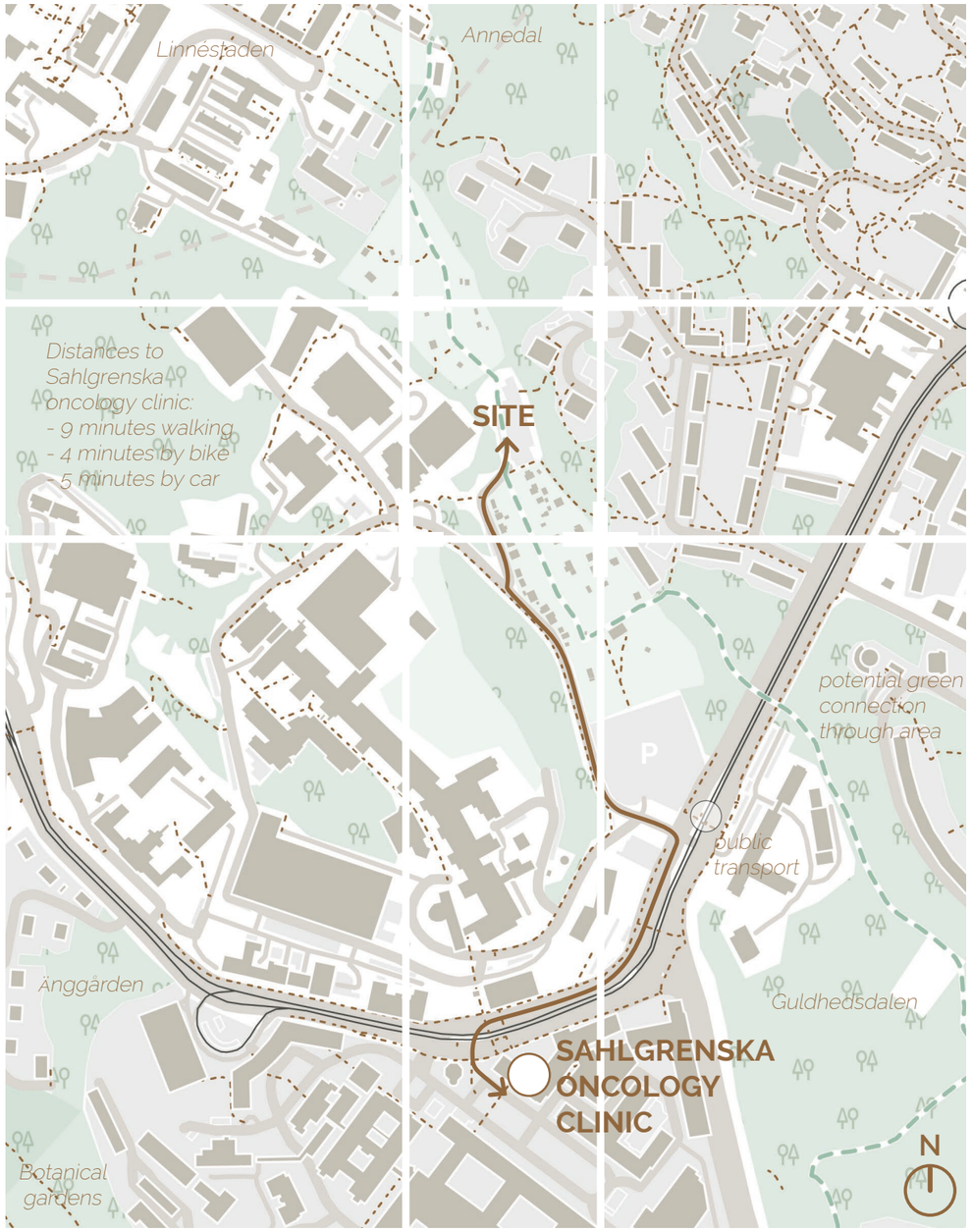
site criteria

The site was chosen based on a few important criteria:

- to be located close to the oncology clinic at Sahlgrenska hospital, but still feel distant from it. This was wished for in surveys and interviews.
- to have green surroundings, enhancing the biophilic experience.
- to be a plot with potential for re-greening, so no vegetation would be lost, but instead added. This is based on the concept of healing and sustainability.

LOCAL CONTEXT

scale 1:5000



SITE ANALYSIS

site photos

approaching from the southwest

allotment garden

approaching from the north

approaching from the southeast

site seen from the south

rocky terrain towards the west

local context

access points

functions

natural values

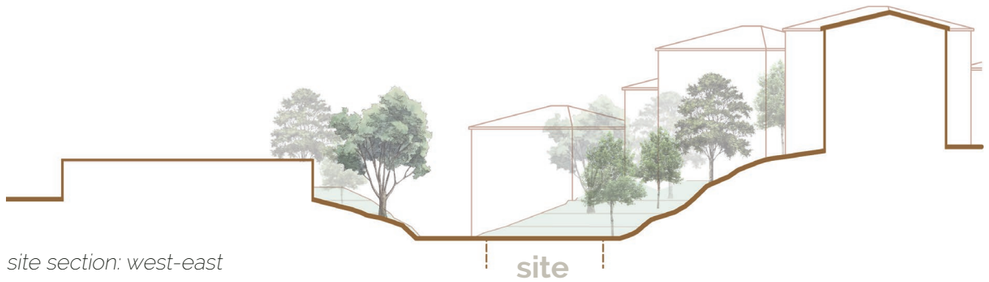
- site

access points
- entrance
- parking
- loading bay
- public transport station
- walking/pedestrian path
- car road
- public transport

functions
- housing
- student housing
- offices
- hospital
- education/research
- allotment gardens
- restaurant/café
- IV amount of floors
- entrance

natural values
- tree with woodpecker hole
- tree with potential future value
- high local natural value
- local natural value
- natural area with no specific value

site conditions



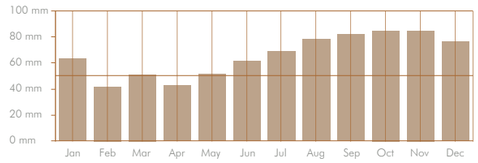
site section: west-east

site section: north-south

Site conditions

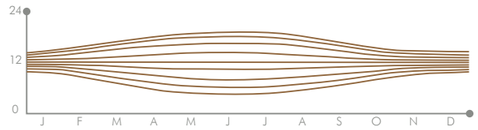
- The site is located between two hills in the west-eastern direction
- The ground gently slopes downwards from the site towards the north and the south
- The plot itself is long, slim and flat
- The site is currently used for parking
- The eastern side is covered by a large amount of trees
- Large buildings are located on the western and eastern sides, while to the south and the north there are allotment gardens with very small buildings
- The eastern buildings contain housing, while the western ones are of an institutional character
- There are many important green areas in the vicinity, such as Guldhedsdalen, Änggårdsbergen, the Botanical Gardens and Slottsskogen.
- The surrounding green space is home to two red-listed species: the lesser spotted woodpecker and the insect ctenophora flaveolata, making the importance of respecting the surrounding nature great.

climate data



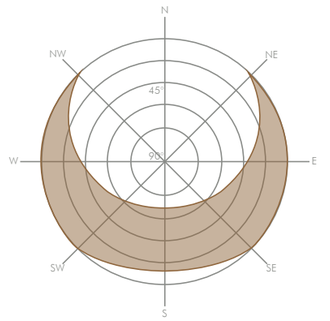
precipitation

Gothenburg is quite rainy all year round



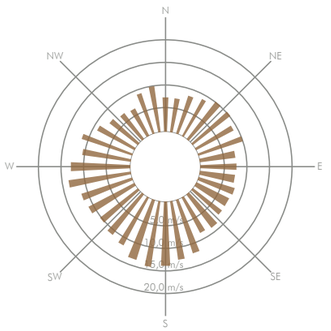
solar radiation

large variations throughout the year



sun path

large daylight variations throughout the year necessitate a well-planned daylighting strategy



wind velocity and direction

south-western winds are the most prevalent, making the placement on site important

SITE ANALYSIS

swot analysis of the site

strengths

- Close to, but not located at, the Sahlgrenska hospital
- "Empty" plot
- Surrounded by greenery: enhances biophilic experience
- Accessible (by car, walking, public transport, bike...)
- Central location within the city
- Secluded but visible location
- Allotment gardens provide biodiversity and a peaceful backdrop

weaknesses

- Long, narrow site
- The eastern side is shaded
- Dead-end of car road necessitates a wide turning zone for large vehicles
- Today considered unsafe during parts of the day
- Site only used for passing by or parking – no value in itself
- Hard surfaces

S W

O T

opportunities

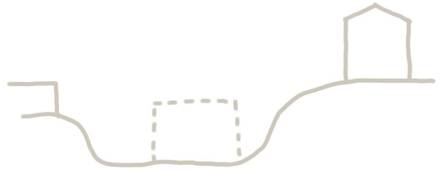
- The plot is already considered for development
- Tying together the allotment gardens through a green design
- Activating an unsafe and underused plot
- Hard surfaces have potential for re-greening
- A large variety of expressions on surrounding architecture makes a unique expression on site feasible
- Close to Västlänken excavations: clay could be used as resource
- Possible to make a green walk towards Guldhedsdalen and Änggårdsbergen for green exercise within the city

threats

- Development on the site could separate, rather than link, the allotment gardens
- Development on site might not take scale and functions of allotment gardens into consideration
- Rainwater runoff from hills might gather on the site

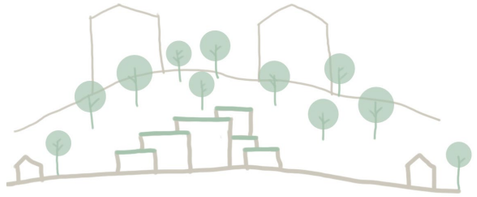
SITE STRATEGIES

conceptual sketches

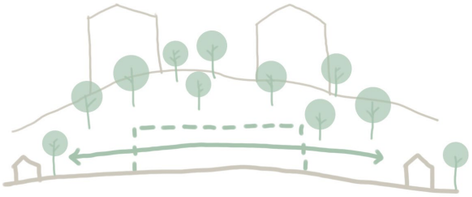


fill the void of the plot to activate the site throughout the day and the year

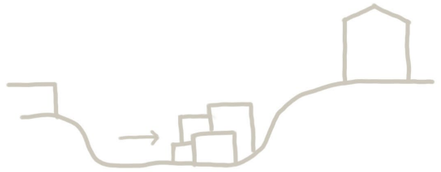
break up the volume for an organic shape, human scale and contrast to the institutional hospital



create a green roof landscape to blend the building with the surroundings



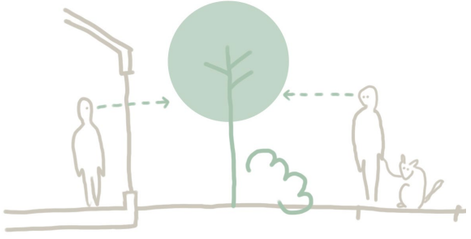
connect the allotment gardens and surrounding natural areas with a green design



push the building towards the north-east, to increase the privacy within and give space for parking and people passing by

create a visible and welcoming entrance from the main access point in the south-west

create an eye-catching design to draw attention to the cause



use vegetation and distance to the facade, to increase privacy within the building

05.

program/ design strategies

The program, references and case studies are presented along with the chosen design strategies, built from the research findings

THE SENSES

sensory stimulation

A visit in a natural setting activates most of our senses. This can be achieved also within a building design, to improve wellbeing and provide positive distractions:

Vision
Visual stimulation and variation is important. The different textures, directions and shapes of the natural materials provide variation, while still maintaining a calm atmosphere. Views of natural elements are abundant both inside and outside, such as the plants in the garden and the water and vegetation in the courtyards.

Hearing
The comforting sound of voices can be heard throughout the more open, social spaces. In the garden, trees and flowers are planted that will attract birds and insects, giving off a low buzzing sound. The wind rustling through the leaves of the vegetation, and the sound of the water in the courtyard can also be heard. The acoustics in the building are improved by high curtains and soft seats scattered throughout the spaces.

Touch
The texture of the rammed earth and wood details invite the hands to touch the surfaces. Soft fabrics cover the furniture, and the heated earth floors give off a warmth underneath the feet.

Smell
The grounding smell of rammed earth can be sensed throughout the building, and the open kitchen provides chances for the smell of coffee or freshly baked bread to spread throughout the social spaces. In the garden, the smell of flowers and herbs is strong during the warmer seasons.

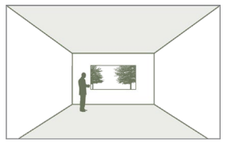
Taste
Fresh vegetables, fruits and herbs can be sampled from the garden, and the kitchen has regular cooking and baking events.

BIOPHILIC DESIGN

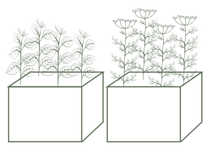
relevant patterns

When working with biophilic design in the context of a cancer support center, some of the 14 patterns of biophilic design were chosen as more relevant and feasible.

Visual connection to nature
an effective and easy-to-achieve pattern. Large and small openings are used to frame and direct the view towards the surrounding natural elements. The garden, trees and flowers, as well as the sky, hillside and animal life can all be seen from different areas within the building. Natural elements that attract birds, squirrels and insects are used.



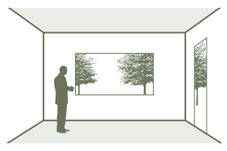
Non-visual connection to nature
a pattern using the non-visual senses, which can have a large sensory impact. The smell of the natural materials, flowers and herbs in the garden; the sound of a crackling fireplace, the wind and birds; the touch of tactile natural materials, the floor heating helping to warm the feet from below, and the sensation of the wind, sun and temperatures on the skin; the taste of garden fruits and herbs – these are all examples of the sensory stimulation the proposal can provide.



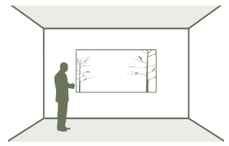
Thermal & airflow variability: By using natural ventilation and placing windows to allow solar heat gains, the building allows for thermal variation inside.

Presence of water
by placing a pond in the northern courtyard, which also connects to a water collection system, a close connection to water is achieved from many parts of the building.

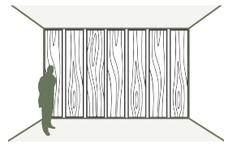
Dynamic and diffuse light
by providing most rooms with openings in at least two directions, the spaces are filled with light. The high, slim windows also allow for the light and shadows to play along the walls during the course of the day, to give a sense of time and change. There is also light coming from the fireplace when the sun starts to set.



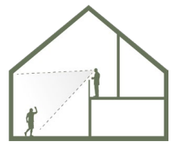
Connection with natural systems
the importance of being able to experience the seasonal changes is stated in Maggie's architectural brief (n.d.-a, p. 5): "Sheltered inside, it helps to be reminded by a seasonal and changing scene outside, that you are still part of a living world". This is achieved by the use of vegetation that changes appearance throughout the year, providing space for insect and animal life to use, and using shadows and light to experience light changes over the course of the day and year.



Material connection with nature
a pattern which can give a great impact on the overall experience of the building. Materials with tactile and visually stimulating qualities are used, such as locally sourced rammed earth and wood. These materials enhance the connection to nature and anchor the building in its local context.



Prospect
By having a good overview of what is going on in the vicinity, a sense of control and safety can be enhanced. The plan layout in the building allows for a good overview by adding glazed courtyards, while still enabling a degree of privacy.



Refuge
A sense of control and safety can also be promoted by adding private niches and nooks. Being able to sit down in a secluded manner while still taking in what is happening around can be important for those who prefer to not partake in social activities, but still want to hear what is going on.

REFERENCES

design and program inspiration

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Maggie's Leeds
- Heatherwick Studio

A wooden building immersed in greenery, playing with the balance of openness and privacy both in plan and facade design. The wooden units contain the private areas while the glazed in-between spaces open up outwards. The Maggie's centers are cancer support centers balancing unique design with homelike atmospheres, aimed at creating healing architecture, often using biophilic principles.

Reiach and Hall Architects, n.d.

Maggie's Lanarkshire
- Reiach and Hall Architects

A low-lying building that aims at blending in with the surrounding trees. The enclosing brick walls provides with privacy while still feeling light and open. Several small courtyards bring light to the interior.

Oki, 2019

House for Trees
- Vo Trong Nghia Architects

A residential project located in Vietnam. It consists of a cluster of introverted buildings, closed towards the periphery, but open towards the central courtyard. The aim is to bring greenery back into a densely built urban area through the use of green roofs and permeable pavers. The bottom floor contains social spaces while the upper houses the bedrooms.

Author's own pictures

Kraftens Hus
- Borås

Kraftens Hus in Borås is the cancer support center closest to Gothenburg. It was an initiative by the Regional Cancer Center in collaboration with e.g. the healthcare system, companies, organizations and Chalmers Center for Healthcare Improvement. A site visit at the center was conducted to get inspiration and information about their experiences of cancer support. The spaces were light and colorful, with the kitchen serving as the main hub. The glazed creative space and the yoga room were also appreciated.

Bühler, n.d.

Haus Rauch
- Roger Boltshauser, Martin Rauch

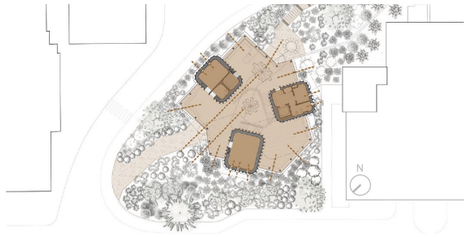
Haus Rauch is a pioneer project in rammed earth, where Martin Rauch attempted to adapt rammed earth construction to the style of modern architecture. The house, as well as the research behind the construction, has served as a structural and aesthetic inspiration. It is using rammed earth without a roof overhang, and instead uses bricks as erosion checks in a horizontal pattern across the facade.

EFFEKT, n.d.

Livsrum Naestved
- EFFEKT

The cancer counselling center Livsrum in Denmark har served as inspiration in terms of plan layout and the varied roof landscape. The plan is centered around two courtyards, bringing light and vegetation into the interior. This enables a quite introvert building that still has a connection to nature.

maggie's center - leeds



Privacy gradient and views

Movement and daylight

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The Maggie's center in Leeds, by Heatherwick studio, was used as a case study. It was chosen due to its cancer care program and obvious biophilic qualities (which will be listed below). It is located in a densely built hospital area, with few green spaces in the immediate surroundings. The entrance is welcoming, reached from a path surrounded by greenery. The plot itself is covered in plants, enabling privacy within, even if the site is small and surrounded by roads. The interior can be divided into two types: the three private units and the open spaces in between. The private areas are spaces for counseling and other activities of a more private nature. The space in between houses the more social spaces, such as the kitchen and an exercise room. It is completely glazed, letting natural light in from multiple directions. The vertical circulation is also located here, circling the central space.

Many biophilic qualities can be found in the building, with some of the most important being views towards natural elements, natural materials, a shape inspired by natural forms, extensive use of vegetation and materials stimulating the senses, prospect/refuge conditions inside and great natural light.

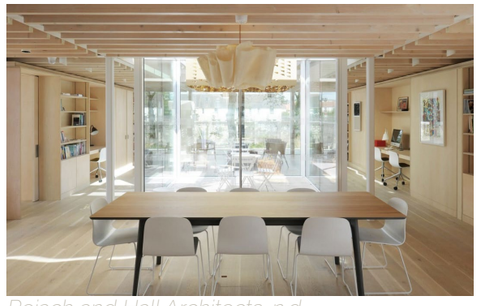
Maggie's Leeds has served as a large inspiration, especially in terms of using vegetation for privacy reasons as well as the choice to divide the building into more private units and the glazed and open in-between space.

maggie's center - lanarkshire

Privacy gradient

Movement

Daylight and views



Reiach and Hall Architects, n.d.

Reiach and Hall Architects, n.d.

The Maggie's center in Lanarkshire is designed by Reiach and Hall Architects, located close to the Monklands General Hospital. It is a building which also has many biophilic qualities, but in a very different way than in Maggie's Leeds. The shape is rectangular, with a perforated brick wall shielding the two gardens from outside views. The interior is open towards the two gardens, and there are courtyards bringing light and nature close to the inside as well. These courtyards also serve as spatial dividers. The building has zones of different privacy levels, with the more social spaces located around the central courtyards, and the more private spaces along the facades. The private rooms have views towards the courtyards if the doors are kept open. The material of the interior is mainly light wood, creating a soft and warm impression. The circulation within the building is quite free, with the central room serving as circulation space instead of having typical corridors.

Some of the most important biophilic qualities that can be found in the building is great natural light, natural materials, prospect/refuge situations and an extensive use of vegetation that brings nature close to the interior.

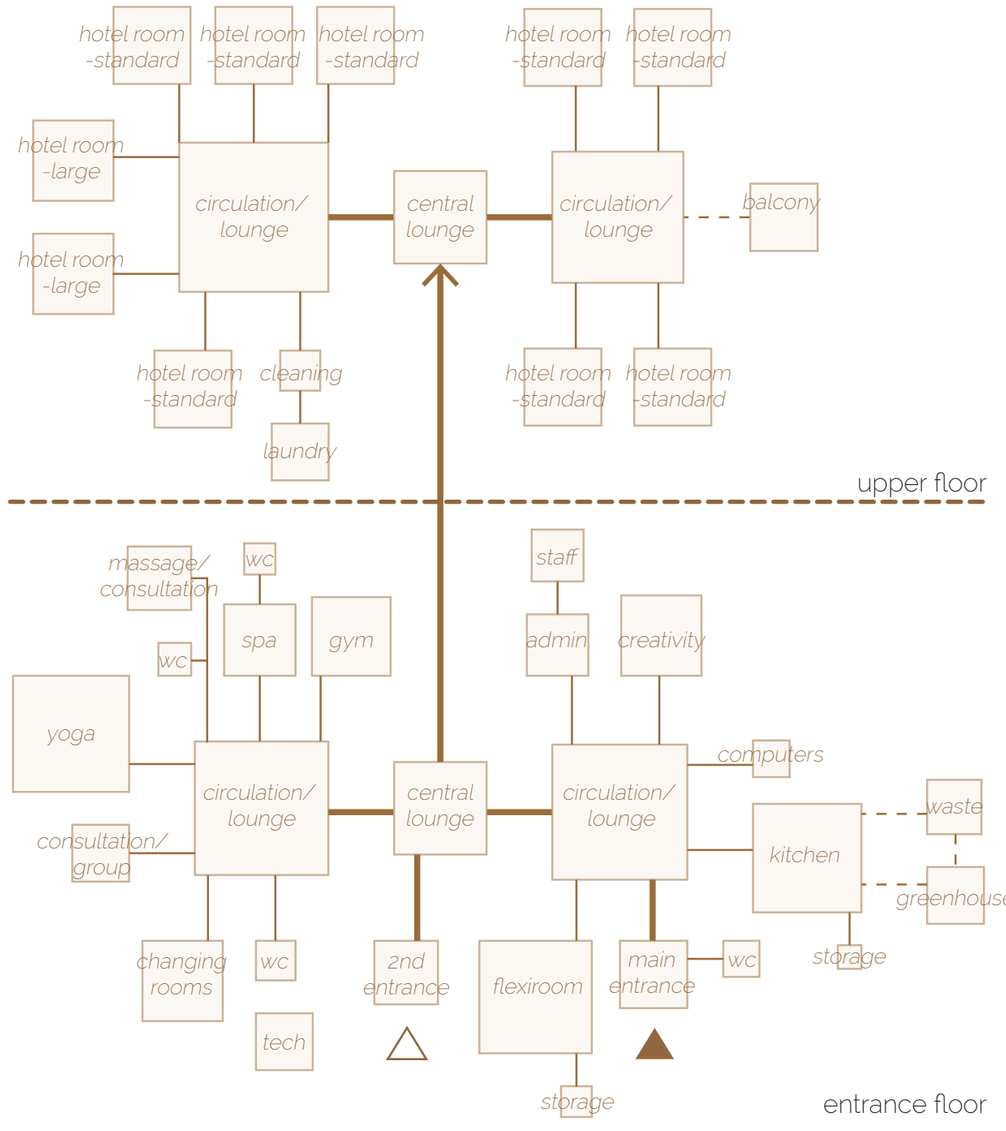
Maggie's Lanarkshire has served as inspiration mainly in terms of using courtyards for bringing light and nature to the inside. This enables a more private and introvert building, while still having great daylight levels.

PROGRAM

functions and areas

Space	area, m²
Social zone	**entrance floor**
Entrance/library	17
Kitchen	44
Computer corner	5
Creative space	24
Flexiroom	47
Intimate zone	
Secondary entrance hall	15
Changing rooms	24
Consultation/group room	12
Yoga/meditation space	50
Massage/therapy/consultation room	15
Space for solitude/consultation	4
Spa	19
Gym	23
Additional spaces	
WC x 3	14
Administration	14
Staff room	10
Storage space x 2	6
Technical room	12
Waste	11
Greenhouse	12
Circulation/lounge areas	166
Residential zone	**upper floor**
Patient hotel room, standard, x 8	176
Patient hotel room, large, x2	48
Additional spaces	
Cleaning	6
Laundry	12
Circulation/lounge areas	178
Total (incl. circulation, waste, greenhouse)	**964 m²**

layout and connections



SOUTHERN VIEW

bird's perspective

06.

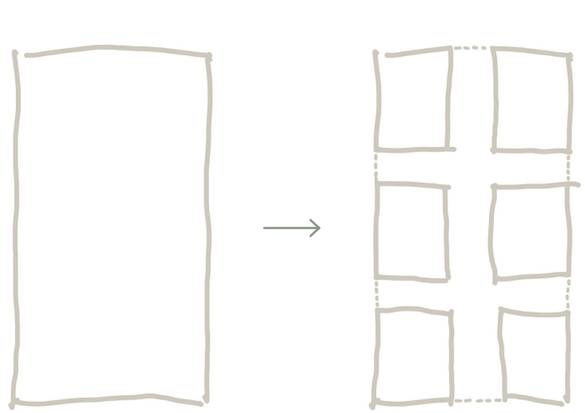
design proposal

Explains the design proposal in detail. Drawings, perspectives and explanations are presented

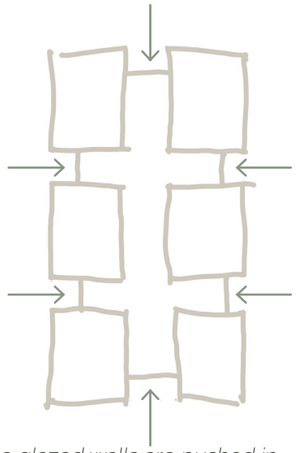
SITE PLAN

scale 1:500

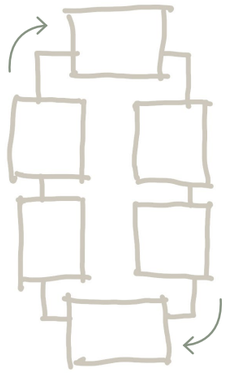
FORM DEVELOPMENT



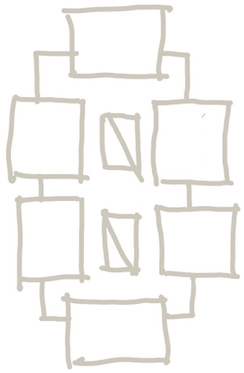
the volume is separated into the introverted "cave"-units and the glazed "forest" to break down the scale of the building and provide a gradient of privacy



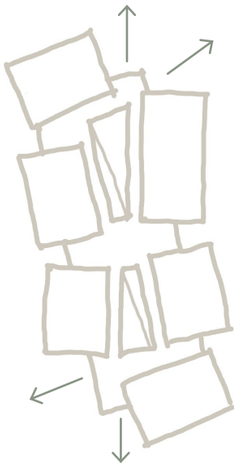
the glazed walls are pushed in for increased privacy



the units are moved to enclose the interior further



courtyards are added to bring more light and nature inside



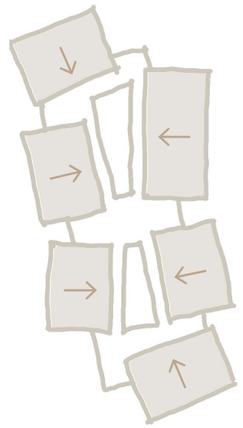
the unit placement is adapted to the site, as well as opening up towards the entrance

a roof landscape is created by pulling the roofs of the units into different heights. this helps break up the scale as well as blend the building with the sloping topography towards the east

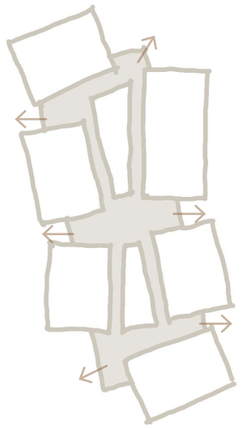
ENTRANCE FLOOR

scale 1:200

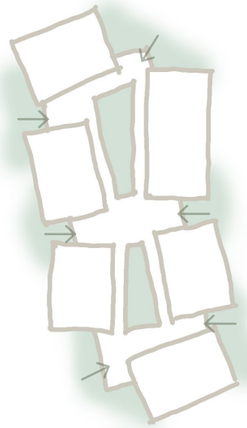
design concepts



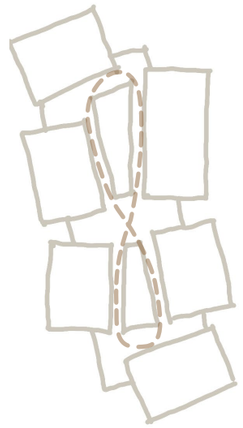
The building is divided into the private cave-like units...



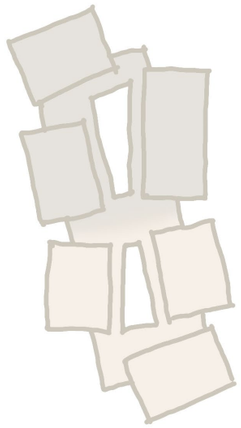
...and the open forest-like space in between



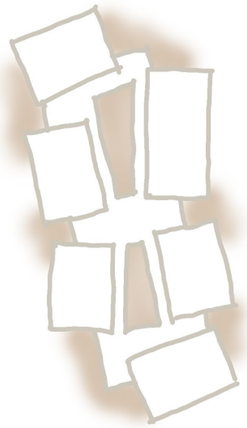
The shape invites nature into the building



The circulation allows a continuous stroll through the building



Two zones are created around the courtyards - the social and the intimate



The courtyards and in-between spaces bring in large amounts of daylight

1. Entrance/library
2. WC
3. Coats/shoes
4. Kitchen
5. Storage
6. Creative space
7. Administration
8. Staff room
9. Flexihall
10. Lounge
11. Gym
12. Spa/sauna
13. Massage
14. Solitude
15. Waiting space
16. Yoga
17. Group/counsel
18. Changing
19. Technical
20. Greenhouse
21. Waste

PROGRAM

explanation

"The most important thing is the coffee room, that you can come and just be" -Emelie

The functions within the building are inspired by the brief from the Maggie's centers, the site visit at Kraftens Hus, as well as by the interviews and surveys. Derived from the interviews, some of the most popular activities were fika and free social time, lectures and different forms of exercise (see survey results in appendix). The functions are also based on research on health-promotive activities and cancer rehabilitation (Regionalt cancercentrum Syd, 2014).

The functions on the entrance floor can be split into two parts, the social and the intimate. The spaces are located around an eight-shaped corridor, lit up by two large courtyards in the center. The courtyards house small landscaped gardens with vegetation and water features. They are accessible and possible to furnish with a few seats for sunny days, but have the main purpose to bring natural elements and light into the interior of the quite introvert building.

The eight-shaped communication allows for varied strolls around the courtyards. Some people might find it easier to open up the conversation when moving their bodies and not having to look straight into the eyes of their conversation partner or therapist.
The social zone houses spaces for social activities, such as cooking classes, having coffee, lectures, movie screenings, table tennis, group sessions and creative activities such as art or clay therapy. In the intimate zone, the activities are more personal, where physical rehabilitation, exercise, massage, counselling, sauna and hydrotherapy is held.

The entrance is placed towards the main access in the southwest, and is shaped to create a small buffer zone for the people hesitant about entering. For those who wish to sit down and get a glimpse of the activities going on inside before entering the center, there is a small library with information pamphlets and books, and some comfortable seats. In the Maggie's centers and Kraftens Hus, the kitchen is considered the heart of the building. It is the main social space, where informal conversations often are held over a cup of coffee. Therefore, the kitchen also has a central position within Andrum, with a close connection to the entrance and administration, as well as to the garden and greenhouse outside. It also has a visible position from most parts of the ground floor.

"If you have these deep conversations it can be nice if you don't have to look at each other all the time" -Elke

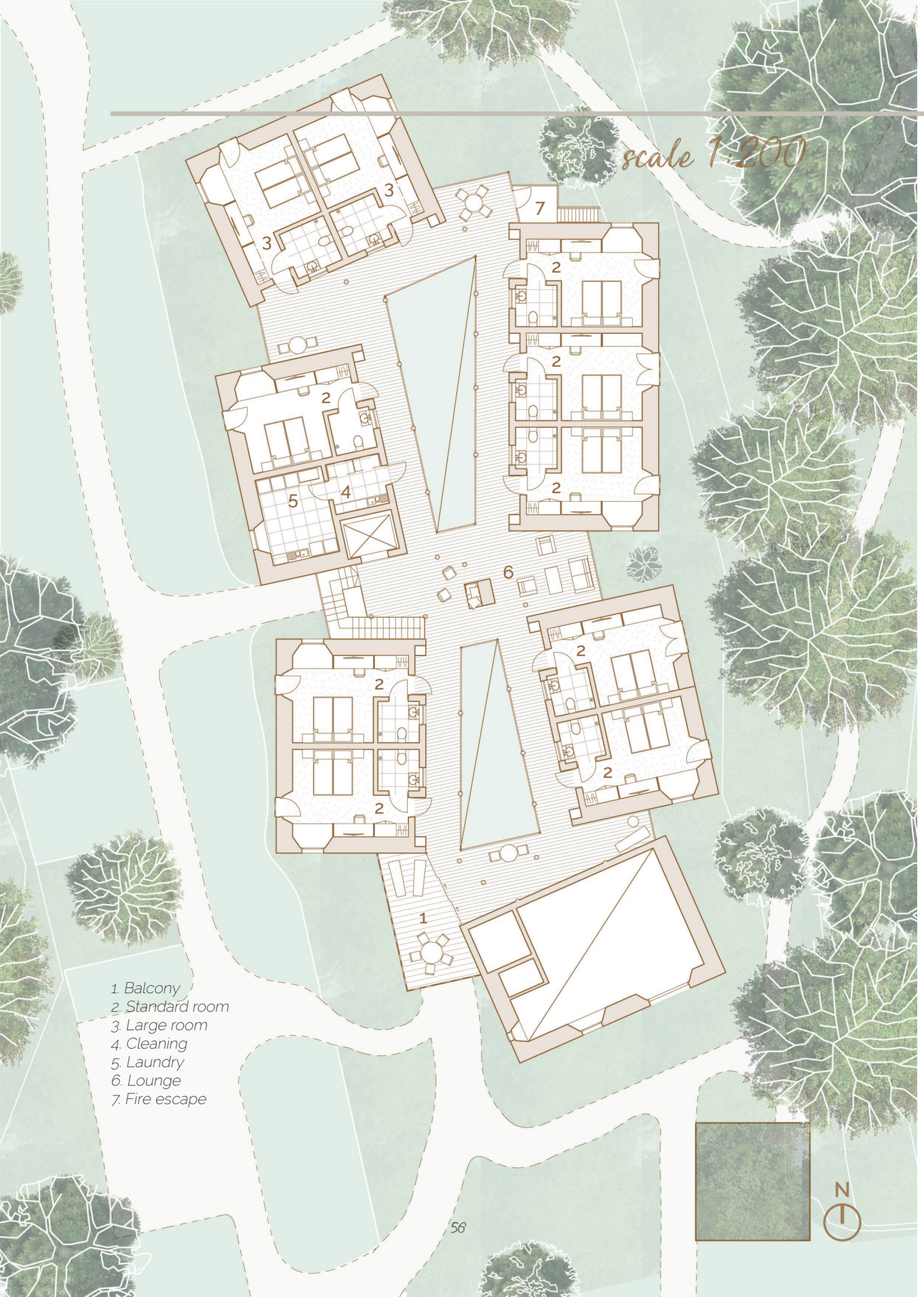
"It is a symbolic gesture to visit a cancer center - it makes it true" - Elke

The administration is placed in a central location, to have a good overview over the ground floor, and especially the entrances. The creative space is a flexible room which can also be used for group sessions or meetings when no creative activities are taking place there. The flexihall is a large space for lectures and movie screenings, but the chairs can also be stored to give space for a ping-pong table and some more comfortable seats. It could also be rented by different cancer associations, for events or meetings.

In the middle of the building, the two zones meet. Here the vertical communication is located, as well as some cozy seats by a large fireplace. There is also a secondary entrance, for people with access to the electronic door lock system, where visitors who want to be more discreet can enter.

In the intimate zone, the therapeutic activities take place. Here the rooms are more closed off from the corridor, and the glazed nooks offer a sense of privacy and refuge from the interior activities. A space for solitude is provided in the northeast, where one can go to have a rest, or cry, in private while watching the trees outside. The curtains allow the visitor to choose their level of privacy from the outside.

The upper floor houses the ten patient hotel rooms, which are meant mainly for people who are undergoing treatments and need to stay somewhere close to the hospital. Some treatments require many visits in a short amount of time, and it can be tiring to travel for a cancer patient who often already suffers from fatigue and other symptoms. The oncology clinic gets many patients from outside the city, and based on the interview with Jan, ten new hotel rooms would be beneficial to the hospital.



FIRST FLOOR

corridor perspective

The entrance niche of the patient hotel room creates a semi-private space, where the guests can sit down in close connection to the outside. The niche also creates variation in the circulation space.

MATERIALITY

building materials

"The envelope that surrounds us should be able to breathe and diffuse in the same way as our bodies" - Martin Rauch

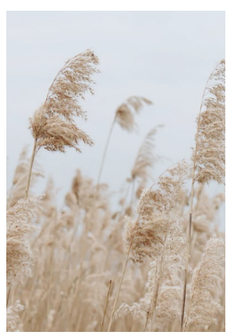
(Sauer & Kapfinger, 2015)

The main materials in the building are rammed earth and wood: healthy, natural materials with low climatic impact. Wood stores CO2 and rammed earth has low embodied energy. Reed is used as insulation material, also due to its carbon-storing capacity. All three materials can be harvested locally, minimizing transport distances.
The rammed earth and wood are tactile materials rich in visual variation, complementing each other to create a stimulating and varied environment. As the earth is rammed, the horizontal pattern is naturally created, showcasing the work process in its surface. The pattern also represents the layers of the earth rising up from below. The horizontality is additionally enhanced on the exterior facades where bricks are protruding in parallel lines. These are erosion checks, protecting the walls through preventing rainwater from flowing down the walls. The units have rammed earth as both façades, interior walls and floors. The ceilings are clad in clay boards covered with a layer of clay plaster. By keeping a unified materiality, the aim is for the spaces to induce a feeling of safety and enclosure, as if being in a cave. The rammed earth floors are heated to make it warm and comfortable to take off one's shoes. Rammed earth also helps in creating a good indoor climate as it regulates the humidity levels. It also has good sound insulation capacity – important for the private conversations that would take place - and is resistant to fire.

The wood is used for furniture, details, beams and pillars. The round interior pillars are placed in an irregular patten, like trees in a forest. In combination with the visible ceiling beams and glazed connection to the outside, these aim at evoking a sense of walking below the treetops.

(Snelling, n.d.)

(Unsplash)



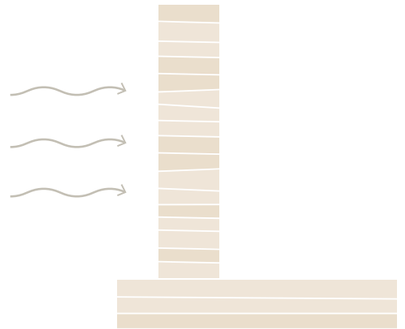
(Unsplash)

(Unsplash)

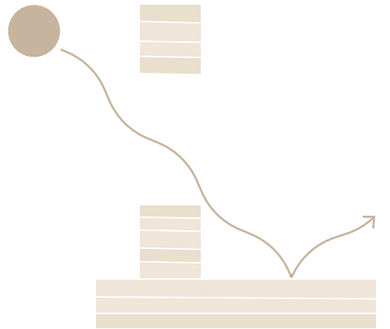
the qualities of rammed earth

the sculptural qualities of rammed earth enable monolithically slanted window reveals...

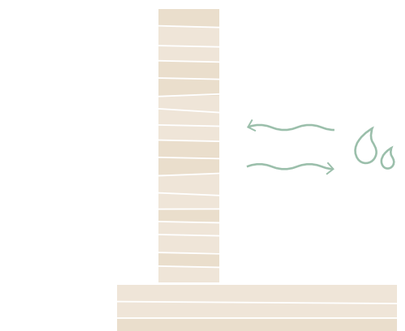
...and walls that become furniture



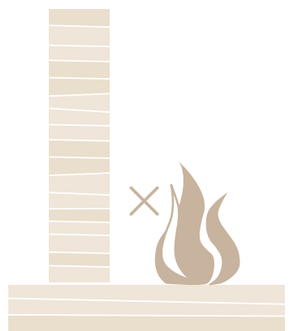
rammed earth combined with clay plaster is airtight



rammed earth has high thermal mass



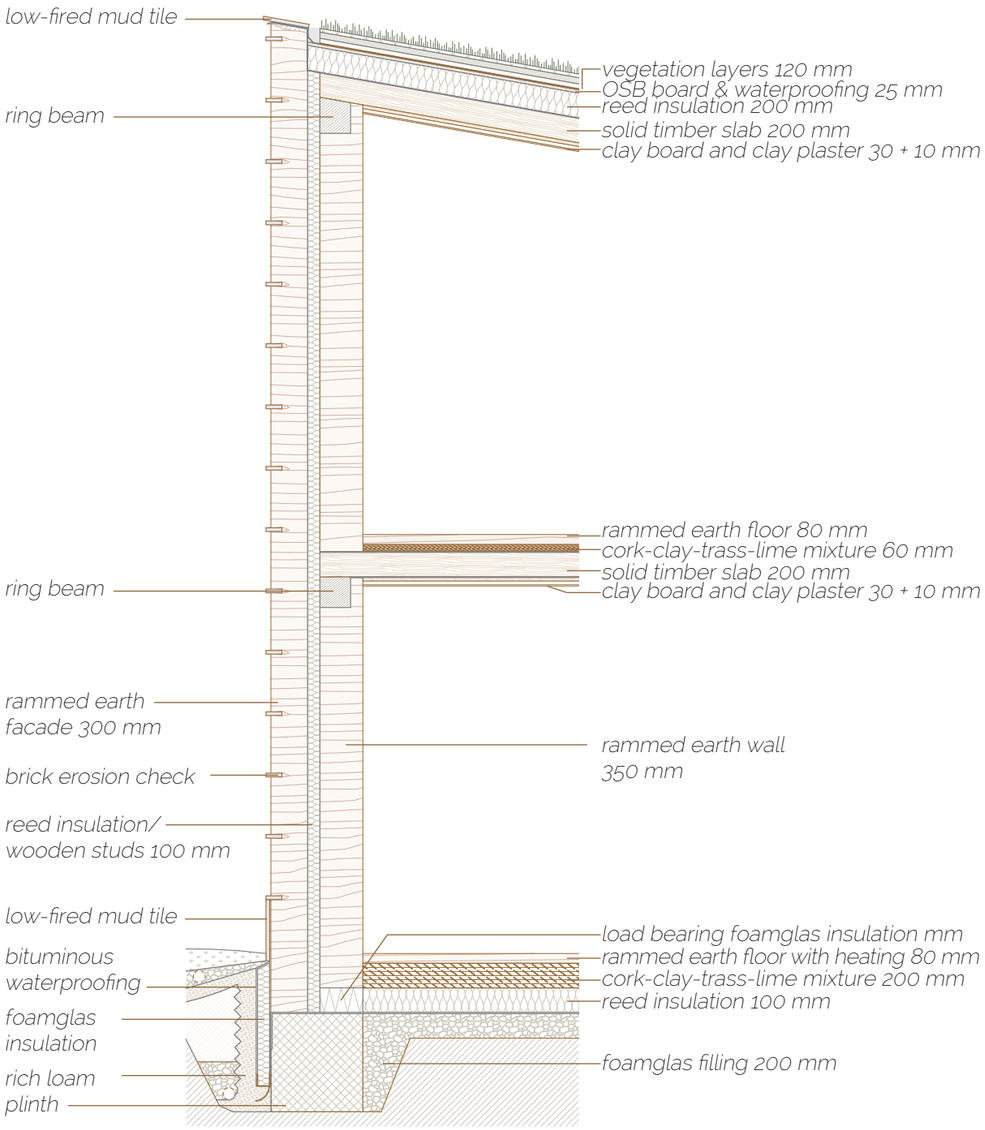
earth regulates the humidity levels inside



rammed earth is fireproof

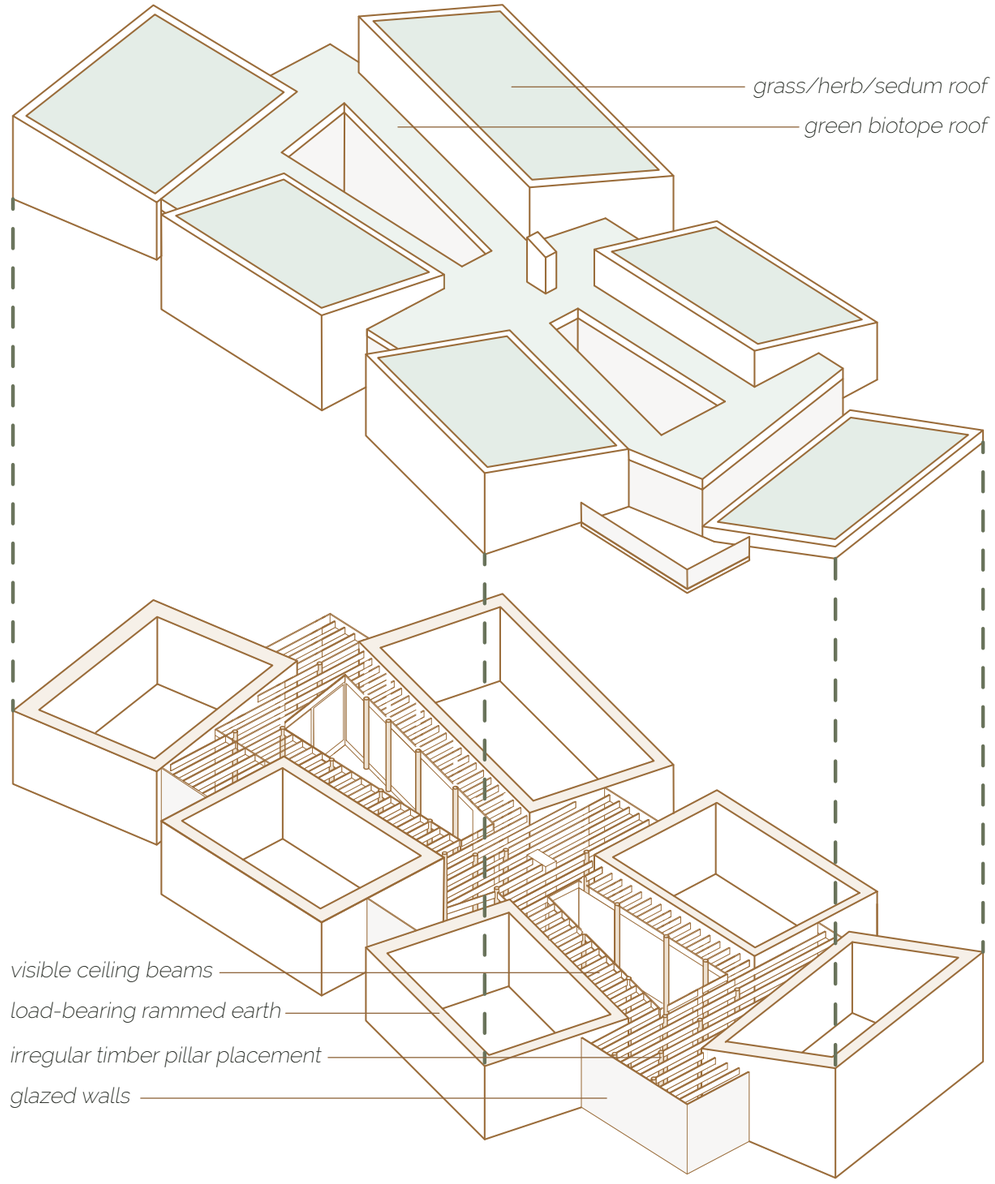
STRUCTURE

technical details, scale 1:50



Based upon details from Sauer and Kapfinger (2015)

axonometry



THE KITCHEN

scale 1:100

The bright, open kitchen is the heart of the building. Here visitors can have a coffee while meeting others who share similar experiences. The kitchen is also used for cooking classes, common meals as well as by the guests staying in the patient hotel rooms.

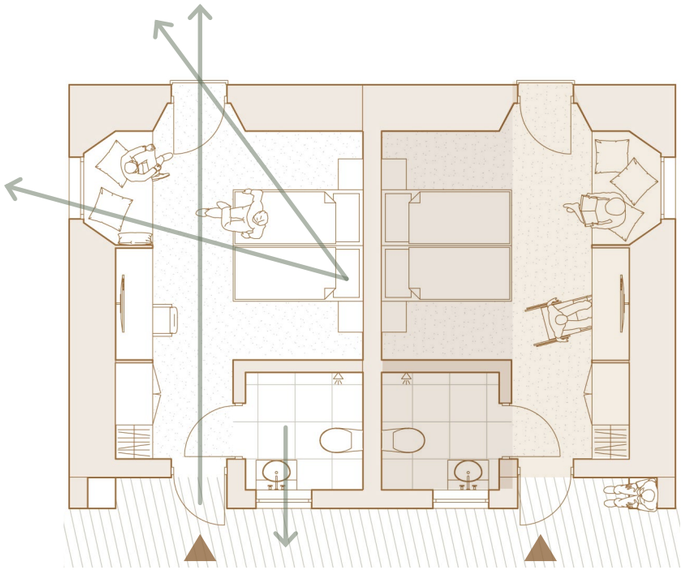
THE LOUNGE

scale 1:100

The central lounge offers a cozy space in close connection to the outside. Here visitors can enjoy a moment by the fire, or watch the water glimmering in the northern courtyard. The vertical communication is located by the lounge due to its central location and proximity to the secondary entrance. The four natural elements are represented here with a fireplace, a small pond, vegetation, rammed earth elements, and possibilities to open up the courtyard doors to bring fresh air inside.

PATIENT HOTEL ROOM

scale 1:100



views towards greenery *private* *semi-private*

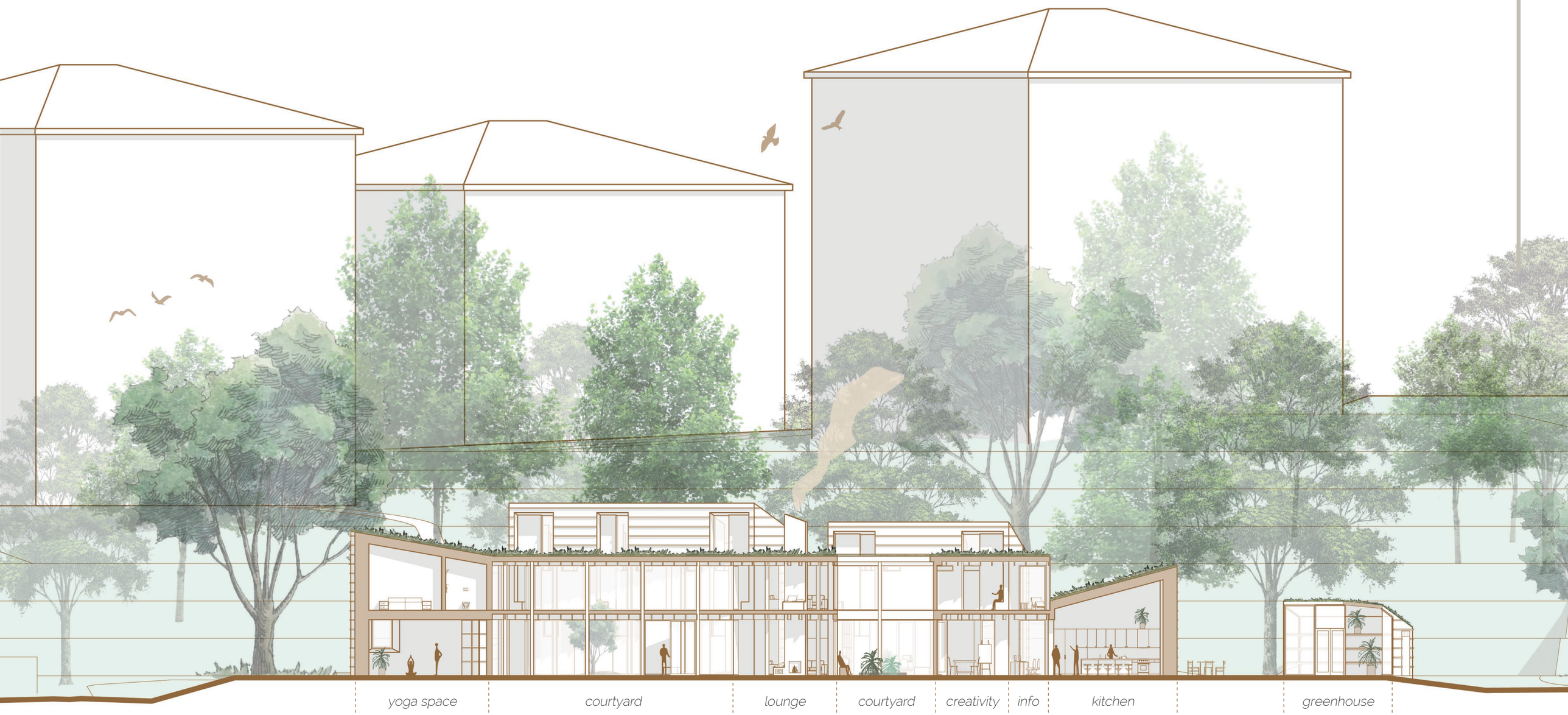
All patient hotel rooms are wheelchair accessible and have the same layout, except for the two northern ones which are slightly bigger with a high level accessibility. They all have their own bathroom, storage, space for two beds, as well as space for an extra bed if needed. The idea is that it should be easy to bring family or friends as support when undergoing treatments. The bed is protected from sight from the entrance door, where the entrance niche also provides a sense of welcoming and privacy. The sculptural rammed earth walls create a small semi-private seat outside each entrance. This sculptural quality is also shown by the windows, where the slanted reveals help let more light in through the thick walls. The high windows and french balconies provide the rooms with daylight and views in two directions. Each bathroom also has a small window towards the corridor, and there is also a transom window above the entrance door. This brings more life to the corridor space, as the glimpse of light from within the hotel rooms may make the corridor feel less anonymous. The wall opposite from the bed has an integrated desk and a comfortable space for sitting or laying down while watching the nature outside.

perspective

The patient hotel room provides a calm space for rest and withdrawal, in close connection to the outside

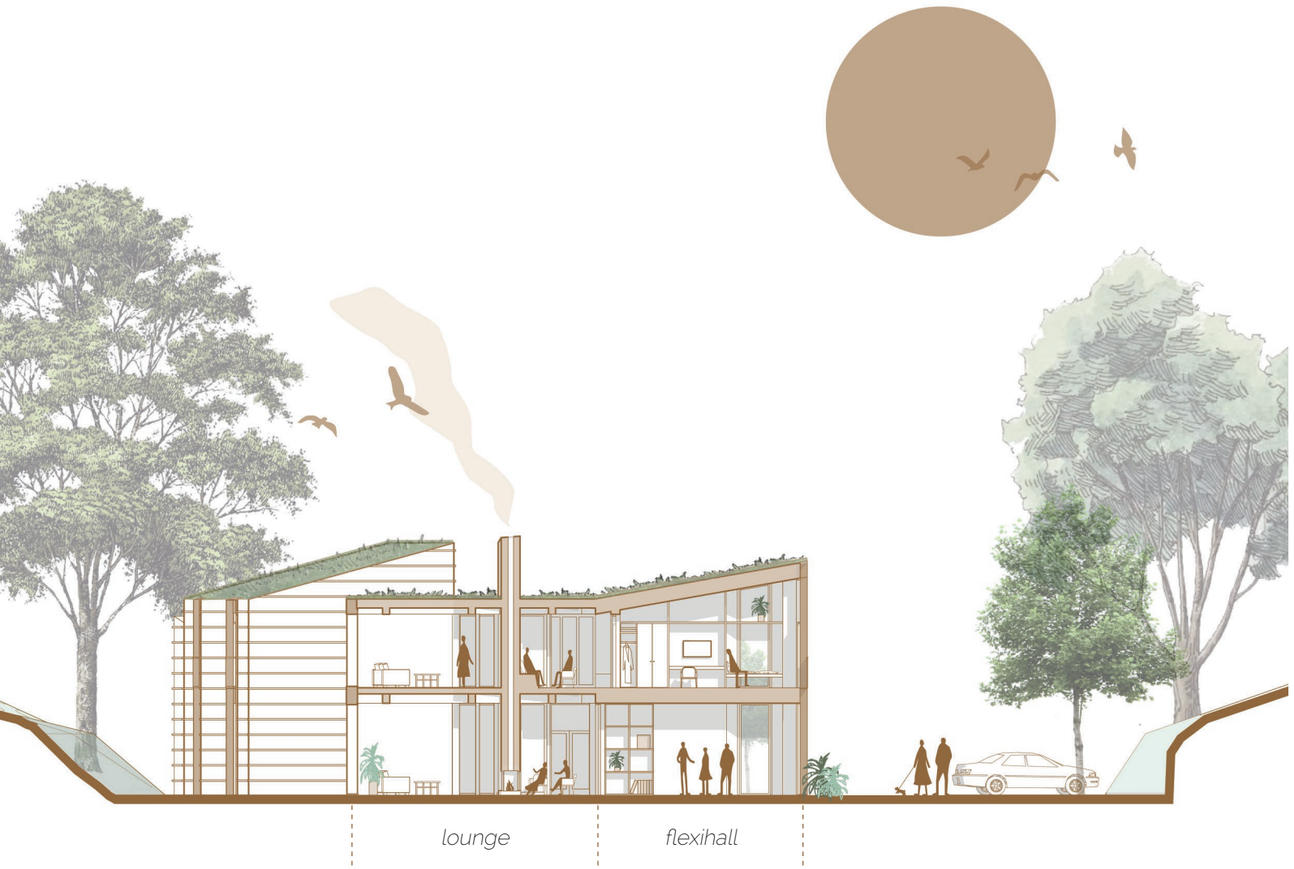
SECTION

scale 1:200



SECTION

scale 1:200



The main entrance houses a small library, which gives hesitant first-time visitors a chance to sit down, get information and scan their surroundings before joining the activities.

ELEVATION SOUTH

scale 1:50

scale 1:200

main entrance

kitchen entrance

ELEVATION WEST

scale 1:200

THE GARDEN

three zones

Moss garden

The moss garden surrounds the building towards the north and the east. It is shaded during most parts of the day and is characterized by a calm, meditative atmosphere. The ground is covered in moss, with a few stones and well-groomed coniferous trees.

Perennial garden

The western and south-western side of the building is surrounded by the perennial garden, which helps increasing the privacy within the building through an extensive use of vegetation. This is a green space with a large variety of bushes and flowers, bringing life, color and variation to the garden during different times of the year. It also increases the biodiversity on the site.

Cultivation garden

The cultivation garden is a space where the visitors can plant and harvest herbs, spices, vegetables and fruit as a part of their therapy, or to just get a moment of positive distraction. The smells and tastes of the produce help stimulating the senses, and watching it grow can enhance the feeling that life is still going on.

07.

conclusion

Discusses the outcome of the master's thesis: the process, results and reflections. What can be learned from this project? Also contains a list of references

Discussion

The aim of this thesis project was to create an architecture of healing, suitable for those affected by cancer, with the help of biophilic design. It synthesizes the findings of interviews, surveys, literature and article studies, into physical form. The theory that was built upon came from many different perspectives: from medical research studies, personal stories, case studies and biophilic design. Addressing this type of topic is always a bit sensitive, as it deals with existential questions regarding life and death. It was of greatest importance to first try to understand the users, as I myself did not have much first-hand information before. The interviews, surveys and design guidelines from Maggie's therefore had a large impact on the design and program. The activities were based on the wishes of interviewees and survey respondents, as well as the program of a typical Maggie's center and Kraftens Hus. The participants also wished for a social, joyful and calm atmosphere, something which guided the program zoning and material choices. Trying to balance spaces for solitude, social activities, sorrow and laughter is a delicate task, necessitating different options and gradients throughout.

The biophilic design also largely impacted the final result, both in terms of materials, functions and atmospheres. Reading about the great benefits nature has on wellbeing was very inspirational, and gives me hope that future development will take the natural aspects more into account.
The purpose was fulfilled in the sense that the building proposal is carefully adapted to the desired needs of those affected by cancer: a warm and welcoming building that enables both privacy and socialization. It also brings value back to the site, as new greenery is introduced on a site today covered in asphalt.

With more time, several aspects could have been developed further. One challenge throughout the project was to clearly show the biophilic connection, something which I think could be developed even further with more time. The next step could also be to develop the technical details, both in terms of construction and energy systems to achieve a truly sustainable building.
As healthcare architecture is often limited by tight budgets, the economic aspects would also be relevant to investigate – to see how such a function could be financed in Gothenburg in a reasonable manner. This also accounts for the construction: as rammed earth is a time-consuming building material looking into prefabrication methods would have been valuable.

Conclusion

This thesis work focused on filling the gap in the Gothenburg cancer care context, by proposing a support center for those who are affected by cancer. The early research phase consisted of gathering data from multiple sources, where the interviews and surveys provided valuable insight into what it can be like to live with cancer. As there are currently plans for starting up a cancer support center in Gothenburg, this data, as well as aspects from the project itself, could be beneficial as a basis for future decisions. The chosen site is currently being investigated for development, and by proposing a cancer support center here, perhaps this is what it could be used for in the future. Its close connection to the oncology clinic, as well as calm, natural surroundings makes it an ideal location for such a function.
The design focus was to find a balance between the public and the private, on how to create a building that protects the people within while still letting nature come close to the inside. Setting the program was another important aspect, where research on rehabilitation strategies played a large role. The final result is a synthesis of cancer care research, personal stories and biophilic design.

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Images

If nothing else is stated images and figures are made by author or in collaboration with Agnes Ståhl

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Gothenburg, Sweden, 2021

CHALMERS
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08.

appendix

Contains the full interviews and their summaries, as well as the survey results