A PLACE TO GROW

Group accommodation for children with autism spectrum disorder

Johanna Edgren

Master's thesis 2025

Chalmers University of Technology

Department of Architecture & Civil Engineering

Examiner: Marie Strid

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ABSTRACT

Children with autism spectrum disorder (ASD) live in group accommodations for various reasons when it is deemed to be the best solution for them and their needs. The home environment is especially important for these children because of their tendency to be hyper- or hypo-sensitive to sensory impressions and the need for a safe and structured environment. Children living in these accommodations usually have complex needs, such as challenging behaviours, that can be exacerbated by an environment that is not suited for them (Socialstyrelsen, 2020).

This master's thesis aims to investigate how architecture can promote the well-being of children with ASD living in group accommodations. Furthermore, it investigates how these accommodations can be homelike and connect residents to nature. The thesis is in collaboration with Betaniahemmet, an organisation in Gothenburg municipality, and the aim is also to provide them with information and strategies that they can use in future projects.

The research was conducted using a literature study, study visits, and interviews with staff, parents, and experts on group accommodations for children and ASD. The gathered information was then analysed and formulated into design strategies, a spatial program and spatial organisation that were implemented in the design of a group accommodation.

The theory is based on literature about ASD, group accommodations for children and adults with disabilities, therapeutic spaces, homelike spaces, and connecting residents to nature.

The results suggest that well-being can be promoted by designing an accommodation that suits the residents' specific needs regarding hyper- or hypo-sensitivities, perception and navigation in the building, difficulties meeting others, safety, and privacy. A homelike feeling is created primarily by providing residents with a private space that they have control over and by choosing familiar materials to the extent that it is possible. To connect residents to nature, it is perhaps most important to provide a garden with various activities and create the possibility of having views and daylight in the building. It is, however, important that these forms of stimulation from the environment can be screened off.

Keywords: Autism spectrum disorder | well-being | homelike | connection to nature

AUTHOR BACKGROUND

My interest in healthcare architecture began when I worked at a group accommodation for adults during a summer. The staff said that housing for people with disabilities is never quite right for the residents or staff. I also realised how some design features that seem insignificant to an architect can have significant implications for the use of the building. The idea for this thesis started when I got in contact with the organisation Betaniahemmet in Askim, which said that they would like a thesis looking into group accommodations for children. I quickly saw that there was a gap in knowledge about these accommodations and wanted to investigate the subject with a focus on autism spectrum disorder, a common disability in this target group.

Education

Master's program in Architecture and Urban Design
Chalmers University of Technology
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Bachelor's degree in architecture
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2019–2022

Relevant Studios

Housing inventions 1
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Healthcare architecture 2

Work

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September 2022–July 2023

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1. INTRODUCTION

This chapter gives an introduction to the subject and the aim of this thesis. It contains information about the target group, the case that is investigated, and why it is important.

1.1 BACKGROUND

Support for children with disabilities
Children with disabilities and their families have the right to support from the municipality based on the Swedish Act of Support and Service to some disabled people (LSS) (SFS 1993:387). The type of support provided can vary depending on the child's needs. It can be support by a support assistant in the family home, short-term stays at a group accommodation, or a more permanent residence at a group accommodation. The latter is usually provided if the child goes to school in a town far away from the family home or has complex needs that cannot be sufficiently met in the family home (Socialstyrelsen, 2020).

Autism spectrum disorder
A common disability in children receiving extensive support and living in group accommodations is autism spectrum disorder (ASD) (Socialstyrelsen, 2020). According to the organisation Autism Sverige (n.d), it is a neuropsychiatric disability that affects the way that a person perceives and interacts with the world around them. ASD is usually described as a spectrum because it presents differently in each individual, particularly in terms of intellectual and language abilities. The diagnosis is characterised by differences in how a person functions socially, and having few and repetitive behavioural patterns and interests. The latter characteristic is also associated with a tendency to be "hyper- or hypo-sensitive to sensory impressions such as sound, light, smell, and touch" (Autism Sverige, n.d. Translated from Swedish).

Autistic people can often have other disabilities or diagnoses which affect how ASD is expressed. This can, for example, be an intellectual disability, verbal difficulty, or ADHD. The built environment can be a source of stress for autistic people due to their differences in sensory impressions and communication processing. Having an environment that is adapted to their difficulties and sensitivities can significantly impact their quality of life (Tola et al., 2021).

The difficulties that an autistic person can feel in demanding situations can cause them to experience strong emotions and reactions. Their way of coping with a situation that, for them, feels impossible can be to express challenging behaviours (Socialstyrelsen, 2020). Examples of challenging behaviours are aggression directed towards things or people, repetitive behaviours, and self-harm (Socialstyrelsen, 2015). To avoid situations when challenging behaviours can occur, it is important that the environment is easy to understand and designed to accommodate their sensory needs (Socialstyrelsen, 2020).

Group accommodations for children and young people in the Sweden
The Swedish government authority Socialstyrelsen (2020), which is responsible for creating rules and recommendations for healthcare and social services as well as providing statistics, has published the report "Stöd till barn och unga med funktionsnedsättning: Handbok för handläggning och utförande av LSS-insatser" that lists all types of care that need to be provided to a child in a group accommodation in accordance with LSS if necessary:

- "eat, drink and move around,
- handle personal hygiene and dress themselves,
- communicate,
- make daily life comprehensible and predictable,
- do homework, play and pursue interests,
- participate in daily tasks,
- be involved in social contexts,
- maintain contact with parents, other family and friends, and
- plan their future."

(Translated from Swedish, p.113)

All children have the right to a good upbringing that is safe and with adequate care. The group accommodation can make life comprehensible and predictable by providing structure and cognitive support, making the child more prepared for what is going to happen. The support should also reinforce the child's ability to live independently to the extent that they can, which prepares them for adulthood (Socialstyrelsen, 2020).

It is important to provide safety and security both inside and outside. The staff caring for a child should be able to supervise them, and there should be adequate safety precautions in and around the home. The child should, however, always have the amount of freedom that corresponds to their safety needs. There

is no age limit for children living in a group accommodation for children because some children may require qualified care and technical equipment at an early age. Children live in a group accommodation together with other children until they graduate from upper secondary school, with the possibility to extend to two years after. The group of children living in the accommodation should be small because children living there, especially children with an intellectual disability and ASD, can have difficulties having many relationships. The recommended number of children is two to four, according to Socialstyrelsen; this number can, however, be higher if the accommodation is used more as a boarding school (Socialstyrelsen, 2020).

The group accommodation should be used with the child's and the family's needs as a starting point. It should be a complementary support to the family home, and the child's relationship to both environments should be reinforced. The accommodation should also be able to adapt to the children living there and to their specific needs (Socialstyrelsen, 2020). Socialstyrelsen (2020) states that a group accommodation for children should be as homelike as possible in its design and function to avoid an institutional-like environment. Achieving a homelike environment in the interior can, however, be challenging because of some children's sensitivity to sensory impressions and a tendency to pull down or break things. Access to outdoor areas is also important for a child living in a group accommodation. A well-planned outdoor area can make it easier for the child to engage in spontaneous physical activity and other stimulating experiences. The outdoor environment should be safe and accessible regardless of disability (Socialstyrelsen, 2020).

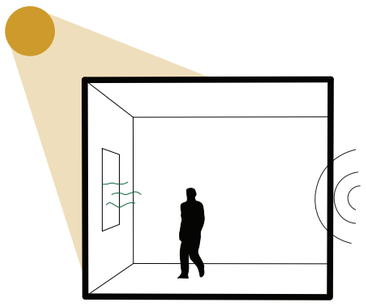


Figure 1. Illustration of a problematic environment

1.2 CASE DESCRIPTION

Betaniahemmet is a non-profit organisation located in Askim, in Gothenburg municipality, that manages group accommodations and daily work-life activities (daglig verksamhet) for adults with disabilities. They have seen a need for group accommodation for children and are, therefore, currently planning to renovate one of their buildings that is used for daily work-life activities into a group accommodation for children. The target group will mostly be 8 years old or older.

Group accommodations with care services are an important solution for some children and their families, and the design of these is arguably an important factor in creating the best possible living environments for them to grow up in. Not a lot of research on the design of group accommodations for children is found, which makes it a relevant subject to investigate. Lisa, a manager at a group accommodation and who will be presented later in the thesis, pointed out in a conversation that most of the group accommodations for children and young people are buildings that are not designed for that purpose in the first place. It is rather buildings that have been transformed to suit that purpose, which results in spaces that are often not ideal.

This thesis therefore strives to contribute to the research and practical knowledge about group accommodations for children with ASD to ensure that architects and other stakeholders can design well-functioning homes.

1.3 AIM & PURPOSE

The aim of this thesis is to investigate how the design of group accommodations for children with ASD can promote well-being by having positive effects on the physical and psychological health of the residents. Two qualities related to well-being and mentioned by Socialstyrelsen (2020) will be studied in more detail: how to create a homelike environment and connect residents to nature. The thesis will also provide the organisation Betaniahemmet in Askim with information and strategies that they can use in the renovation of one of their current facilities into a group accommodation for children.

1.4 RESEARCH QUESTIONS

- *How can architecture promote well-being in group accommodations for children with autism spectrum disorder?*
- *How can these accommodations be homelike?*
- *How can these accommodations connect residents to nature?*

1.5 DELIMITATIONS

There are several types of support for children and their families; however, this thesis focuses on children needing care in a long-term care facility outside of the family home. The building should accommodate residents with varying needs, complex or simple, and of different ages up to adulthood. This thesis also focuses on the Swedish context, specifically the Gothenburg municipality. The thesis presents suggestions for both the interior and garden designs, though it does not study the exact products and plants that can be utilised. Additionally, the economic aspects and construction details of the building are not examined thoroughly.

The design project is situated on the plot where Betaniahemmet currently plans a group accommodation for children. However, this master's thesis explores an alternative scenario wherein a new building would be constructed on the plot. This aims to create more opportunities to investigate various design solutions and identify potential site-specific solutions or issues that Betaniahemmet can address. The choice of site creates limits to what can be achieved. The specific solutions presented in the design proposal are therefore intended to serve as examples. The sample size of interview participants and study visits is also small, making it difficult to draw definitive conclusions from the results.

1.6 WORD DEFINITIONS

Group accommodation for children and young people: A facility for children and young people with disabilities in accordance with the Swedish act of support and service to some disabled people (LSS) (SFS 1993:387)

Homelike: Signifies, in this thesis, a sense of home and how an accommodation can create a home environment that is not institutional-like.

Connection to nature: A sense of closeness to nature due to exposure to natural elements both inside and outside the building.

There are different ways of referring to a person with autism spectrum disorder, saying "autistic person" and "person with autism". This thesis uses both.

1.7 METHODS

A combination of methods was used to research this subject: a literature study, study visits, and interviews.

Literature study
The literature chosen for the literature study was gathered from searches on the Scopus and Google Scholar databases. The phrases and keywords used in the searches were: "autism AND architecture OR built environment", "Group accommodations AND (disabilities OR autism)", "children AND autism AND (architecture OR built environment)", "homelike AND (architecture OR built environment)", "feeling of home", "biophilic

design", "autism AND ("connect with nature" OR "contact with nature" OR "biophilic design")", "snoezelen", and ""multisensory environment" AND autism" were used. Literature from earlier master's theses relevant to this subject was also selected.

The literature also gave insight into what questions to ask during the interviews and what to observe during the study visits.

Study visits
The choice of study visits was partly made together with people working in support of people with disabilities in Gothenburg municipality in email conversations. From these conversations, visits to Billdals Björkväg, started in 2017, and Långhagsgatan, started in 2023, were made.

When searching for reference projects, Tyringe barn- och ungdomsboende was found, which was a newly built facility that had not yet started. It is built by Emrahus, a company that specialises in group accommodations for people with disabilities and focuses on creating a homelike environment. During the search, Trädgårdarna assisted living facility was also found, which was built with a focus on creating contact with nature and creating a homelike interior. These buildings were therefore selected for study visits. The selection of group accommodations for children with disabilities is in different stages of the process, and that is to capture problems that can occur during these stages. During the visits, observations were written, photographs taken, and there were conversations with staff and, in the assisted living, also residents.

The buildings that were visited were then analysed and compared to the theoretical framework. The principal model, "Four zones of contact with the outdoors", by Bengtsson (2015), was used to evaluate the connection to nature.

Interviews
To get information about autism spectrum disorder, an interview with an expert in ASD was conducted. The interviewee was selected with help from Betaniahemmet, and one of their employees who is specialised in ASD was selected. To get information about how to design group accommodations for children, an interview was conducted with two experts in group accommodations for children. The interviewees were selected in conversation with the supervisor of this thesis, and two planners at Socialförvaltningen in Gothenburg municipality were chosen.

Interviews with parents were conducted to get their perspective on how to design group accommodations for children with ASD. This was to get as close to the user's perspective as possible. To contact parents, a post was made on social media, and staff in the visited group accommodations were contacted. Two parents responded and were interviewed.

All interviews in this thesis were semi-structured to allow for new, unplanned questions to be asked during the interview.

The combination of methods was used to gather knowledge from multiple points of view.

Results & Design proposal
The research was evaluated, summarised, and formulated into architectural design strategies, a spatial program and spatial organisation. These results, together with an analysis of the site, were then implemented in a design proposal. During the design process, Betaniahemmet was contacted to get feedback on the design.

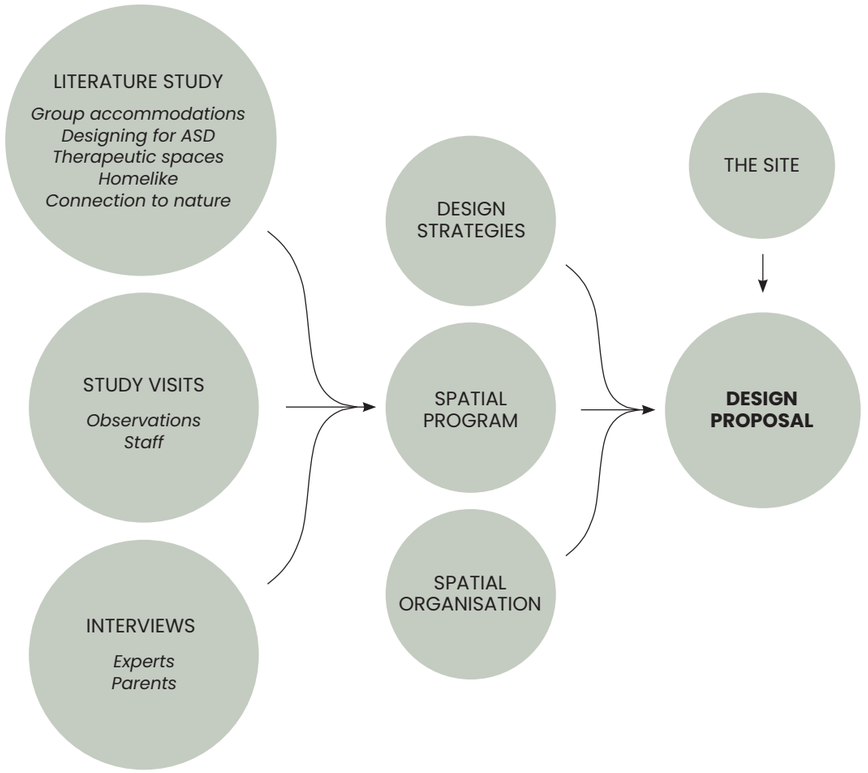


Figure 2. Method diagram

2. THEORETICAL FRAMEWORK

This chapter presents theories from research and literature regarding the design of group accommodations for children with ASD. It forms a foundation of knowledge that is discussed and analysed in the following chapters.

2.1 DESIGNING GROUP ACCOMMODATIONS FOR CHILDREN AND YOUNG PEOPLE

The location

According to Socialstyrelsen (2020), the location of the group accommodation should be in a residential area, and it should not be combined with other types of facilities or group accommodations if the children do not specifically need it. It is essential that the building is not close to areas with, for example, a lot of traffic, which can increase the risk of danger.

Homelike and access to staff

The building and the interior space should resemble a regular home as much as possible and be a permanent environment to grow up in. The children often have their own rooms, but can share the living room and kitchen. It is important that the children can contact staff easily and think about situations that can occur, such as a child needing consolation in the middle of the night or place where they can go to be by themselves. The building should also be adapted for someone in a wheelchair, and potential medicinal and medical care needs and equipment. Even in group accommodations where children pull down or break things, it is important to strive for a good home environment. Materials should be durable, and some things can be replaced over time (Socialstyrelsen, 2020).

Design for the residents' needs

It should be easy to navigate and understand the functions in each room to avoid challenging behaviour. The home environment should also be adapted to each individual and their hyper- or hypo-sensitivities. To create a good home environment, it is important to identify the residents' sensitivities and create a home environment according to those. It can be easier for a child to interact in common areas if there are several seating areas with movable furniture. Children can then decide where they want to sit and how close. It is important that they can sit by themselves in common rooms where there are others, in addition to their own room. Each resident should be able to have their personal space (Socialstyrelsen, 2020).

Staff areas

The building should also be practical for the staff to help the child, for example, with enough space in the bathroom. The building is also a workplace, and it is important that the spaces can be a good work environment. Ergonomic factors should be considered, and the staff spaces should be functional (Socialstyrelsen, 2020).

2.2 DESIGNING FOR AUTISM SPECTRUM DISORDER

Research shows that difficulties that autistic people face because of the built environment can be alleviated by certain design strategies. In a scoping review by Tola et al. (2021), guidelines based on several research papers on autism-friendly design are presented.

Limiting sensory impressions

Because of autistic people's hyper- or hypo-sensitivities to sensory impressions, limiting sensory impressions is one of the main requirements for an autism-friendly environment. Especially visual, acoustic and smell. Reducing visual stimulation can be done by, for example, providing adequate storage to reduce clutter, window blinds to limit daylight, choosing soft colours, and windows placed high up for less glare and distractions from the outside. Solutions for reducing acoustic stimulation can be choosing flooring, wall, and roof materials that reduce sound and avoiding high ceilings. Reducing stimulation from smell can be done by providing good air quality and avoiding having things in and around the home with strong smells (Tola et al., 2021).

Transition spaces

To help an autistic person process sensory impressions from the environment, the building can have transition spaces. This is so that the stimulation is introduced slowly to avoid it being overwhelming. This can be done by placing activities in a particular order and grouping common rooms with more sensory stimulation together. Multifunctional rooms should also be avoided, there should instead be clear distinctions between activities (Tola et al., 2021).

Small quiet spaces
Having spaces where an autistic person can go to avoid sensory impressions or handle overload can be beneficial. This can be small spaces where the sensory stimulation can be limited and customised to the person (Tola et al., 2021).

Understanding and navigating a space
A simple spatial layout can make it easier for autistic people to navigate inside the building. This can be accomplished by having a layout that is symmetrical with a defined centre. A visual relationship between spaces can also aid in navigation because it can provide an overview. Creating views between spaces inside and outside of the building can therefore be beneficial, also because it facilitates discrete supervision of the spaces. Visual supports such as pictures, pictograms, colours and simple text can also indicate the function of spaces and help an autistic person know the appropriate activity. Signs and other types of visual support can also make it easier for them to navigate inside the building independently (Tola et al., 2021).

Predictability
Predictability can be important for an autistic person, and it can be enhanced by having well-defined spaces and reducing unexpected situations. Placing activities in an order according to a routine, making space for a visual schedule, colour coding and naming spaces can create more predictability. Corners inside the building can also be curved so that residents can see past them earlier (Tola et al., 2021).

The right proportions
The spaces should also have the right proportions to aid in the perception of the personal space. The spaces should not be too small and with too low ceilings or too big and too high ceilings. Large spaces and long corridors should be avoided as large spaces can be where an autistic person orbits to control their bodies (Tola et al., 2021).

The possibility of choosing
Giving autistic people the opportunity to choose how social they want to be and the amount of sensory stimulation they want to receive can also be beneficial for them. This can be done by providing spaces for a small group of people that feel safe and intimate, and creating a hierarchy of spaces that they can choose from (Tola et al., 2021).

General guidelines
It is important to choose a neighbourhood that is right for the target group. The spaces outside the building should also be autism friendly regarding sensory impressions and social context, because it affects how much they can use the outdoor spaces. There should, for example, be low noise pollution as well as a good street network and mobility facilities. Because people with ASD have different needs, it is also important that spaces are flexible and can be used by many and in different situations. It is also crucial that the spaces are designed to reduce risks and keep autistic people safe, which is especially important for those who have difficulties recognising danger (Tola et al., 2021).

2.3 THERAPEUTIC SPACES

Hyper-sensitivity can be described as an adverse reaction to sensory stimulation. Hypo-sensitivity can make someone unaffected by sensory impressions or an unusual interest in sensory impressions. This can show as a lack of reaction from, for example, pain and temperatures, or an interest in touching and looking at certain things. Research shows that treatment in a multi-sensory environment affects neuroplasticity (the ability to reorganise the brain) and improves difficulties associated with ASD. This can be treatment in a multi-sensory environment such as a sensory room (Novakovic, et al., 2019).

Snoezelen rooms
One type of sensory room that is often used for ASD is Snoezelen. It is a room with equipment that stimulates multiple types of sensory impressions, such as visual, auditory, smell, touch, spatial orientation, and movement. Research has found improvements in, for example, repetitive behaviours. Sensory stimulation and relaxation in multi-sensory environment improve people's ability to regulate their nervous system. This, in return, makes a person with ASD better able to adapt to everyday situations (Novakovic et al., 2019).

2.4 HOMELIKE

Most research in creating a homelike environment has studied it in relation to elderly residents in nursing homes. Nursing homes have a similar type of issue, being both an institution where you receive 24-hour care from staff and a home. The sense of home is a multidimensional phenomenon that happens gradually and relates to, for example, a person's independence, source of one's own identity, security, choice and control, and memories (Eijkelenboom et al., 2017). A study by Eijkelenboom et al. (2017) identified guidelines for creating home environments that can increase the sense of home in nursing homes.

Both private and public space
One of the main factors in creating a sense of home for the elderly in nursing homes is having a private room where they can be on their own, be in control of, and have their personal belongings. Residents usually dislike sharing rooms with other residents. They also do not want their space to feel over-furnished, and more space can also make it easier to have visitors. It is, at the same time, important that residents can go outside of their private rooms to meet others. The common spaces should not feel ambiguous and there should be things that indicate that the space is, for example, a living room, such as family pictures, and table clothes. Having a favourite space in the public space can also create a familiar feeling (Eijkelenboom et al., 2017).

Personal belongings
Displaying personal belongings that are significant for the resident is essential for developing and maintaining a sense of home. It can be items that are attached to memories and can be a way to make a space their own (Eijkelenboom et al., 2017).

Appearance
The home should also look and feel like a home. Decor, colour and light can contribute to a more homelike environment. In the common areas, residents felt that homelike furniture can contribute to a homely feel, such as furniture with an old style and made of wood (Eijkelenboom et al., 2017).

The surroundings
The outdoor environment, both directly outside the facility and in the area at large, can impact the sense of home. Residents often did not consider facilities in large cities homely. The ability to go outside and activities that can stimulate the senses are greatly appreciated. A greenhouse can, for example, be a homelike thing for many and having a view or even a balcony from the apartment (Eijkelenboom et al., 2017).

2.5 CONNECTION TO NATURE

A connection to nature will in this thesis include both visual connections, such as daylight and views, and physical connections, such as gardens and parks where residents can experience being outdoors in nature.

Nature and health benefits
A growing body of research has found that a connection to nature is beneficial for mental and physical health. Studies in healthcare have seen improvements such as reduced stress, pain relief, and healing and recovery from illnesses (Kellert, 2018). Studies have also shown that children with more interactions with nature have improved in, for example, emotional well-being, self-esteem, stress, depression, and health-related quality of life (Tillmann, et al., 2018).

A term that is often used in architecture is "biophilic design", "biophilic" meaning the inherent human need for exposure to nature. The book "Nature by Design: The practice of Biophilic design" by Kellert (2018) categorises the different ways of having contact with nature into: direct experiences of nature, indirect experiences of nature, and experiences of space and place.

Direct experiences of nature
These are elements and design attributes that result in a direct experience of nature. This includes light, air, water, plants, animals, landscapes, weather, views, and fire. It can, for example, be accomplished by having windows that provide daylight and views, and can be opened so that fresh air can come in (Kellert, 2018).

Indirect experiences of nature
This group of elements and design attributes create an indirect experience of nature. It can be that things in the building are inspired by nature and thereby create a connection to nature. This includes images, materials, textures, colours, shapes and forms, information richness, visible changes in the environment over time, natural geometries, simulated natural light and air, and biomimicry (imitations of nature) (Kellert, 2018).

Experiences of space and place
This relates to the spatial conditions that we innately prefer as humans. This can be providing long vistas (views) inside and outside of the building, and creating a feeling of security. It can be spaces that are both complex and can be used for different activities, but also organised. Spaces that are efficient and easy to move around in, and transition spaces such as porches, balconies, and gardens (Kellert, 2018).

Four zones of contact with the outdoors
Where these types of contact with the outdoors can take place in the built environment can also be categorised by the principle model, "Four zones of contact with the outdoors" by Bengtsson (2015). Zone 1 is contact from inside the building, zone 2 is the transition space between inside and outside, zone 3 is the immediate surroundings, and zone 4 is the wider neighbourhood.

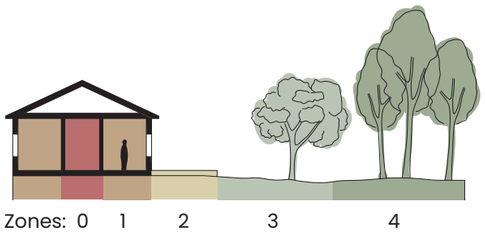


Figure 3. An illustration based on the four zones of contact with the outdoors by Bengtsson (2015) inspired by Jenny Lilja, Boverket (2022).

Garden design
The book "Therapeutic Landscapes" by Cooper Marcus and Sach (2013) focuses on the design of healing gardens. To create a garden that feels safe, it is good to provide both prospect and refuge. This can be accomplished by having plenty of spaces in the garden where people can have their backs covered and a clear view forward. A garden can support stress relief by creating a sense of control and access to privacy, social support, physical movement and exercise, and natural distractions.

Regarding a sense of control and access to privacy, a view and a door to the garden can be an opportunity to mentally or physically escape. Even if the person is unable to go out in the garden, the opportunity to view the garden can relieve stress. Social support, which also causes stress relief, can be supported by having different areas for different levels of social interactions. A view or access to a garden can encourage physical movement and exercise because it can motivate them to go outside or just get up and move indoors to see something different. Incentives to move in the garden can be walking loops, places where children can run around and exude energy, and places for games or more structured exercise. Natural distractions can be a form of positive distraction that can block stressful thoughts. The garden should therefore be a refuge that people can go to and experience something different (Cooper Marcus & Sach, 2013).

3. INTERVIEWS

This chapter presents information from interviews with people that are knowledgeable about this subject. Interviews with an expert in ASD, two experts in group accommodations for children, and parents are conducted to gain information from multiple perspectives.

3.1 INTERVIEW WITH AN EXPERT IN AUTISM SPECTRUM DISORDER

Philip has studied neuroscience and worked at different group accommodations for adults with disabilities. He works at Betaniahemmet in a daily work-life activity facility and as an educator in ASD. He also has the diagnosis ASD himself.

Philip explained that a person with ASD needs to have structure. Because they struggle to create structure in their day-to-day lives, they need external support. That is often a schedule they follow each day, intending to make each day as similar as possible. Based on their intellectual disability, these schedules can be written in text, with symbols and pictures, or communicated with objects that are handed to them. The goal is to achieve predictability in the day to relieve stress.

“The more sensitive to sensory impressions you are, the easier it is for your brain to be overwhelmed. And the more overwhelmed your brain is, the harder it is to manage your everyday life”

Group accommodations should be in calm areas. Noise from traffic can be disturbing, especially for those with sensitivity to noise. It would also be good if there was a green park nearby because walking is very good.

He could see some of the common problems in group accommodations, such as the lack of ability to escape from a room. If a person with ASD feels that a task is too difficult and that they cannot complete it, they may experience a fight-or-flight response. If the person cannot escape that situation, the only option is to fight, and that is when challenging behaviours can occur. The ratio between apartment space and space for the common areas can often feel disproportionate because the space in the common areas can be large, and the space in the apartment small. If the space in the apartment is small, it can feel crammed, and the ability to escape a situation where the person feels overwhelmed decreases. This can, in turn, lead to a higher risk of challenging behaviours. It can often happen in hygiene situations because it can be a difficult situation where they feel confined to a small room.

Something that can be beneficial to an autistic person who lives in a group accommodation is sound insulation. Two autistic people living wall-to-wall can have very different hyper- or hypo-sensitivities. One can have a hyper-sensitivity to sounds, and one can have a hypo-sensitivity and instead need to have sound stimulation and make sounds.

We often assume that a lot of daylight creates a good living environment, but autistic people can be sensitive to light. These people usually have the window blinds down, often to limit daylight, and might use hats and sunglasses outside.

“When you go home you want your brain to be able to recover. You should be able to adapt your sensory environment to the degree that enables your brain to do that recovery.”

It is important to consider the apartment as a refuge where they can recover after being exposed to stimulation during the day. The home environment should be a place that is adapted to suit the person’s specific sensory needs.

Being able to get a preview of the rooms that you are about to enter can be beneficial for someone with ASD because some can have significant difficulties entering rooms. It is connected to the ability to imagine what is behind the door, which results in stress and worrying. Because of this, problems with unplanned meetings between residents seem to be dependent on the individuals.

According to research, sensory rooms have led to increased well-being and decreased risk of challenging behaviour. Sensory rooms and equipment could be used more in group accommodations and daily work-life activities. Today, they are mostly used in daily work-life activity facilities in Betaniahemmet because they do not have room in the group accommodations. Previously, they thought that, because of the sensitivities to sensory impressions, autistic people would need a very plain indoor environment, but adding positive stimulation to an environment can be beneficial. Sensory rooms can, for example, have a lot of colour, coloured lights, LED light treads, ball pool, calming music and weighted blankets.

What increases the sense of home for someone with ASD is similar to what it is for everyone else. Feeling safe and having things that you like, for example. It is, however, important that there is a balance of personal items that create a feeling of home, but not too many so that the space becomes cluttered. This can differ from person to person, but the space must generally be organised.

It is good to have outdoor spaces, especially in the summer. How much they are used varies between residents. The garden could often be used more in group accommodations, it can depend on the staff. It can be good to have separate outdoor spaces because they do not choose their neighbours, and we should not expect them to like socialising with each other. It should be on their own terms.

“It is important that the building is designed for autism from the beginning, it is always an uphill battle when it is not.”

3.2 INTERVIEW WITH EXPERTS IN GROUP ACCOMMODATIONS FOR CHILDREN

Emma and Jessica are planning managers at Förvaltningen för funktionsstöd (the administration of functional support) in Gothenburg municipality and have been involved in planning group accommodations for both children and adults. They also have experience working in group accommodations for children.

A child receiving the support of living in a group accommodation is the last option because the child should be able to live at home with their family as long as possible. Children with NPF, ASD, or ADHD usually start living in group accommodations in the early teens and above. That is when the challenges usually become too great for them to live at home because they develop physically and go through puberty. A child can, however, live in a group accommodation at a very young age if they, for example, have multiple disabilities and a significant need for medical care from nurses.

There are usually four children living in a group accommodation, but there can be instances where a child cannot live together with others, and they must make temporary solutions. In those cases, the child might be unable to share a corridor with someone else. The municipality always plans group accommodation with space for four places, so that the children do not share a corridor and live more separated from each other. Living alone can, however, be the best option for a child because they will not be disturbed by others, but it is hard to form a staff group, and the municipality needs to think about the economy to some extent.

”We need to become better at predicting future needs”

The biggest challenge they face when planning new group accommodations for children is that the process is very long, and the operations can change quickly. It takes about five years from when they receive a plot that they want to build on to when the operations start. The children they build for are almost adults when the group accommodation opens. When other children move into the finished building, they might have to make adaptations immediately. The planners, therefore, need to become better at predicting future needs to avoid this issue.

Children with complex ASD and ADHD, which is the group that they see have increasing support decisions, often need to be able to be more separated, which makes the cost of the corridors larger. In the future, there might, however, be children living there that can meet and do activities together, and we should therefore also be able to accommodate that opportunity. They need to think about the most challenging scenario and build for many different options to adapt to future needs.

Having different entrances to the building is one of the most important things. They did not work with that before, but they see that it is a need that the operations have. A child would also just need a room, but they always build an individual bathroom, sometimes also a kitchen, and an entrance door directly from the outside, a common entrance and an entrance from the common corridor. They see the door to the

private outdoor area as an alternative entrance that can be used. In one of their current projects, they also plan to have a kitchen for the child because, if the need for housing for this target group decreases, they can use it for adults. Generally, children living in these accommodations have difficulties doing activities together. Therefore, they try to divide the common areas into individual rooms where the residents can go to do an activity. Common rooms should be able to close if residents cannot meet other children, but you should always be able to go outside of your room to do an activity. They also see a need for a common kitchen if the child cannot handle cooking situations, and the staff needs to cook somewhere else. It also gives the staff the opportunity to cook food for all the children at once.

They add escape routes (additional exits from a room) in the building, primarily so that the staff can exit a room and a difficult situation. These exits are in all rooms where the children are. If it is a small room, it can be a door to the outside, and if it is an open floor plan it is important that the staff cannot be trapped in a corner.

"If you are in affect (experiencing strong emotions) it is not you that should walk away from the situation, it is the staff... so that you can have your free space"

Building group accommodations for children is expensive. There is a need for more entrances, durable materials, extra-thick walls for sound insulation, and more. Even though it is a significant investment to build, has the committee chosen to make this investment because they have seen the need for these buildings. It is for the safety of the staff and the children. They should also try to execute support for the children in Gothenburg. The children should not have to move far away from their parents because we cannot execute it in the city. It is a lot more expensive than a group accommodation for adults counting per place and the space required for the staff.

The size and placement of windows are important design considerations. Large windows in places like the dining area can be distracting. They work a lot with high windows to bring in light but not cause a distraction. At the same time, they try to have some views of the outside, but it is important to think about what you see from the window. If you have a swing directly outside of someone else's outdoor area, it can be a distraction. Many with ASD also have a need for control, and if they have a view of the parking lot, they can quickly learn the staff's cars and their schedules. If the staff does not follow that schedule, it can lead to stress, and it is therefore better if they do not have that view. When having larger windows, it is important to think about sun shading, and having sunshades can be very difficult because it is something that you can pull on.

The buildings they have planned have activity rooms that can be used as sensory rooms. They can decide on colours in these rooms, but the operations themselves decide what is in them. It is important to prepare by having a room for this kind of activity, but not prepare too much, for example, with expensive equipment, because we do not know how much it will be used in the future.

"We never know who will live there later and what they want"

A homelike environment is a goal, and they usually choose fixed interior such as a porcelain-like toilet and kitchen with familiar materials and colours. It is usually the operation that furnishes the building to make it homelike, but we can prepare with colours and the opportunity to have a TV corner or have a large table, even if only one child is sitting there at a time. If there is a risk of windows being broken, they put a film on the glass to make it safe so it still looks like a regular window.

In the garden, there should be both private outdoor space and common space. It is important that children can choose whether they want to be alone or with others, and the garden is very important for these children. The garden can be the only place where staff do not have to be very close to them if it has a fence around it, and the child can run around freely. Outside of the garden, the staff must pay closer attention to the child. A garden can be especially good for these children because they can have a lot of energy and built up stress that they can release. It is important that there is a fence around the garden and a gate for the children's safety. They have difficulties recognising danger and can walk up to passing cars.

Limiting the view into and from the garden is also essential. Things happening on the other side of the road or in a neighbour's yard can be distracting for the children. Neighbours can start to ask questions and complain about the children's behaviour, and it can be difficult for the staff to try to make both the children and neighbours happy. Therefore, they will try to work more preventively in the future by placing group accommodations that are more separated from neighbours and by having high hedges, 1.5 to 2 meters high. Sometimes, however, they have a need to build a high wooden fence towards a neighbour.

If the group accommodations for children are planned to suit a lot of different residents and situations, they would not have to adapt them as much afterwards. A general design works in most cases, but unfortunately, they have not been able to achieve that in a lot of these buildings and have had to adapt them. It is usually because of a need to separate the residents, for example, by adding walls in the corridors or building wooden fences towards neighbours.

Examples of things that should be avoided in these group accommodations are hard materials in the bathroom and shower curtain rods that are suspended from the ceiling, they should instead be fixed to the ceiling. Instead of tiles in the bathroom, they have plastic carpets because they are softer and easier to clean. Gypsum walls are also unsuitable because they can easily break and need a more durable material. Handles on cabinets can residents open and close until they break, and it can be better to have cabinets that you push to open. They currently prepare for having locks on doors to cabinets, and then the staff can choose how they want to lock them.

3.3 INTERVIEWS WITH PARENTS

Two interviews with parents of children with autism spectrum disorder were conducted, one parent with a child living at home and two parents with a child living in a group accommodation.

What was important to the parent with a child living at home was limiting sensory stimulation, most importantly sounds from, for example, neighbours, ventilation, and appliances. Having a neighbour's staircase close to the bedroom can be disturbing, and sounds from appliances such as the freezer. It is important to be able to close rooms so that people in a home do not disturb each other; even a small opening between rooms can cause disturbances.

Visual stimulation must also be limited in their home, so they cannot have many decorations around the home, and the walls must be white. Repetitive behaviours that autistic people do to stimulate and calm themselves, such as running, can cause sounds which make it hard to have any neighbours below. Having any neighbours above would also be hard because of their sensitivity to sound.

The parent expressed that it is important to know the target group that the building is designed for because not all people with ASD are the same. The activities they want to do can therefore be very different. The age of the child also affects what is needed in the home environment. Older children might want to have more visitors, such as boyfriends or girlfriends, to the home, and younger children might need more attention and safety precautions. The parent would have liked softer walls and higher windows when the child was younger to ensure they would not hurt themselves.

What the parent thinks can contribute to a homelike environment for autistic children are soft toys and other soft furniture where they can sit, or maybe soft materials on the walls. Materials should preferably be both soft and durable, and it is better to have round edges. There should also not be strangers coming in and out of their own space.

Due to photosensitivity, the lights are never too bright in their home, and the window blinds are always down. They do not go outside to the garden much because too many things can be disturbing, such as sounds and smells from the neighbour's yards. When their child goes outside, they instead go to a nearby park. What the parent thinks would make a child use the garden more are things that they like and that attract them. A garden that is divided into small spaces

where one or two people can sit is good because open spaces can feel overwhelming. Swings are also good because they can feel calming.
The parents of a child living in a group accommodation explained that an apartment with multiple rooms that the child can move between is very valuable and that there is a door between them that you can close. It is important to be able to create an environment inside their apartment that minimises sensory impressions and can calm the child when needed, for example, lowering the lights and closing the door to create a safe space. Window blinds are important because they also help with sleep, especially during summer when it is light outside. The spaces inside the accommodation should be well-defined, and it is good if they communicate what kind of room it is, so that the children eventually learn the rooms' functions.

What the parents felt was missing was a place to have a hammock to swing in inside, something that the child likes very much, and there is no place for that in the apartment or anywhere else in the accommodation. The staff might not always be able to go outside with the child to swing or stimulate movement in other ways, so having it inside makes it easier. Trampolines are also well-liked, and it would be good to have space for one in an activity room so that it is not dependent on the weather. Something else that they noted was that the child can sometimes hear their neighbour, which can make them feel stressed.

What they believe can contribute to a homelike feeling is an environment that feels cosy, spaces that they can crawl into and feel safe, and that does not change much. The parents have decorated the apartment sparingly but have some stuffed animals and decor on the walls. How much it contributes to a homelike feeling for the child is, however, uncertain, but it could possibly create some familiarity.

The garden is very important because that is where they can run around and play. It is good if the children can run around the building freely, and swings and trampolines in a garden can be very appreciated. What they would like more of are bushes and smaller spaces in the garden where the children can hide.

4. STUDY VISITS

This chapter presents information from study visits that were done to get inspiration and knowledge about group accommodations for children, homelike environments, and creating a connection to nature. An assisted living facility, and three group accommodations for children and young people were visited. The chapter ends with a summary of the information gained from interviews and study visits.

4.1 TRÄDGÅRDARNA

Trädgårdarna is an assisted living facility in Örebro by Marge arkitekter. It was finished in 2018 and has focused on connecting residents to nature and creating familiarity in the interior design.

Observations
The building is in an area with forest and wetlands and good bus connections to the centre of Örebro. The large two-story building has a modern look with a facade in different colours of white, green and yellow, but has more traditional gable roofs. By the main entrance is a restaurant with a separate entrance that residents can visit with their families or guests.

In the main entrance is a chandelier and a fountain that creates a calming sound. It is spacious and has several seating areas, and you can see the stairs to the second floor directly. The building has two closed courtyards and one bigger semi-closed courtyard. The corridors continuously have views and entrances to the courtyards, making them light and giving them the opportunity to go outside to a protected garden. On the second floor is a winter garden with textiles hanging from the roof. There are large plants that the staff takes care of, seating areas, shelves with games and other activities, and there is also a plant room (were residents can care for their plants) and kitchen.

All units have a common kitchen and seating area with a view of a courtyard and a glazed balcony or outdoor space. The windows have decorations and books on them. The interior spaces all have the same colour palette and materials: light green, wood and beige. A negative aspect was that the building was difficult to navigate in because some doors to the units were past corners, and the similar colour scheme made them difficult to differentiate.

The semi-closed courtyard features planting boxes and a greenhouse available for residents' use. Additionally, there's an outdoor gym equipped for simple exercises. Asphalt pathways connect all areas for activities.

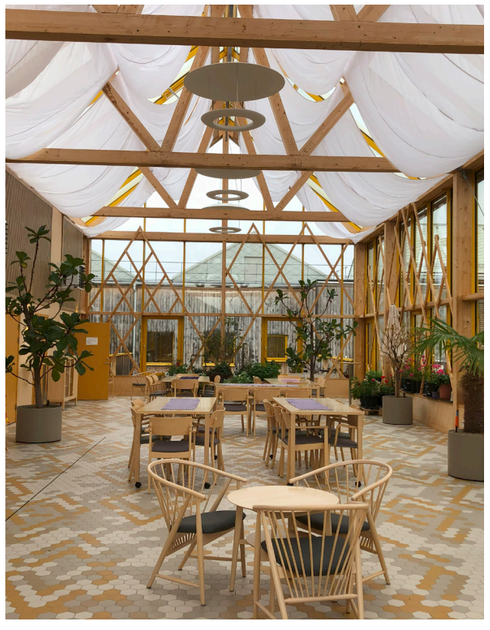


Figure 4. Winter garden

Figure 5. Corridor in a unit

Conversation with staff
The balconies and outdoor areas are not used much during the winter, but they are very appreciated and used in the summer. The residents have an activity in the spring to grow their own plants, and some residents interested in gardening utilise the gardens more. Many residents need help going outside because they are often unsure, and the staff can only do so when there is time. The winter garden is used mostly for daily work-life activities, some days a week, and during bigger events such as holidays, but can be booked by the residents, for example, birthdays. The semi-closed courtyard, balconies and winter garden get very hot during the summer, which is a negative.

Conversation with residents
A couple living in a couple's apartment agreed to a visit and conversation. They liked the building and appreciated the possibility of visiting the garden during the summer. They have a bigger apartment, which has a balcony, but they do not use much, even during the hotter months, because it was right by a busy road. They themselves did not use the garden for planting, but they knew people in the building who had an interest and used it for those activities more. Their apartment has windows in two directions, to a forest and to a wetland, which they appreciated because they could see some wildlife. The facility is also close to other green areas that they could visit, which they liked.

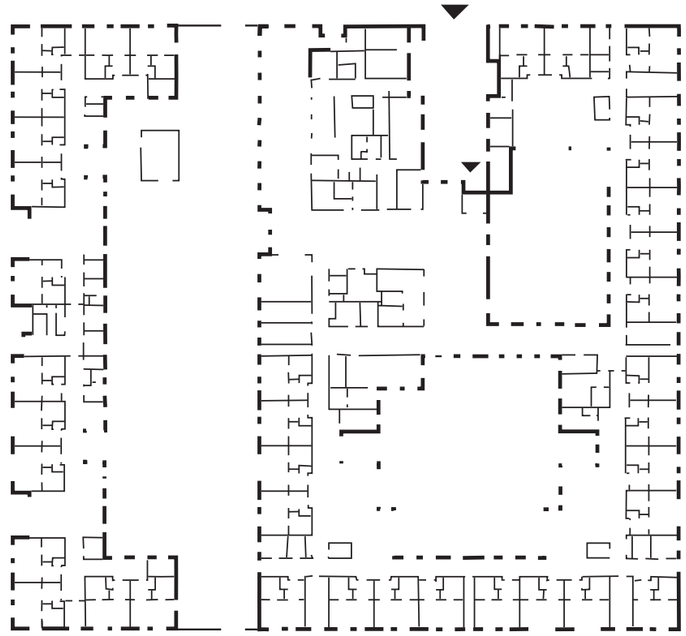


Figure 6. Floor plan sketch of ground floor

ANALYSIS

Homelike
The building has a muted colour palette, and most spaces have decorations to create a homelike interior. Wood material is heavily used inside and outside the building, lessening the institutional-like feeling. The corridors are light with a view of the courtyard, making it easier to orient yourself inside the building and making the long corridors more pleasant. The entrances to the private apartments are placed in niches, which defines the entrance more and increases the feeling of privacy. One potential downside is that the interior design is similar throughout the entire building, which can make it hard to navigate.

Connection to nature
Residents have visual contact with nature in most rooms, and the interior design seems to take inspiration from nature. There are also several transition spaces between inside and outside, such as the balconies and the winter garden. The courtyards are protected from wind and have space for quiet individual use and social interactions. The asphalt in the courtyard makes the garden accessible, and there are a variety of activities for residents. The negative aspects are that the garden and the transitional spaces are not used as much during the winter, and it can be a considerable distance for a resident to walk to get there.

Figure 7. Main entrance

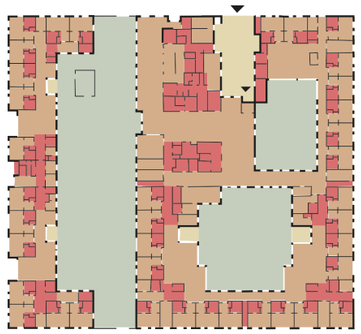


Figure 8. Zones of contact with the outdoors

Figure 9. Colour palette

4.2 BILLDALS BJÖRKVÄG

Billdals Björkväg is a group accommodation located south of Gothenburg city in Billdal and was designed for children and young people with autism spectrum disorder. The building was finished and moved in 2017, and four residents currently live there between 13 and 20 years old. The residents all have autism spectrum disorder, and some also have intellectual disabilities. The accommodation is in a residential area close to recreational areas and public transport.

A conversation with staff
The study visit started with a conversation with Lisa and Alice, who work at the group accommodation. Lisa is the manager and has many years of experience working in functional support (funktionsstöd) and has been involved in starting several group accommodations for children and young people. Alice is a support assistant (stödassistent) at Billdals Björkväg and has considerable experience working at the facility.

They think the building is a good example of a building designed for children with autism spectrum disorder. Not many buildings have been built for this purpose, and they are often old buildings repurposed for this use. The corridors are, for example, well designed because they are wide and light. However, the building is not perfect, and there is much room for improvement in how we design buildings for this target group. They have had to make changes, such as adding two walls with doors to create separate entrances for some residents. The best solution would have been to have separate entrances for all residents and a separate entrance for staff. For example, the residents can often get curious about the people entering the main entrance. They have also had to add acoustic panels on the walls in the main corridor to minimise echoing. Locks have also recently been installed on all doors, so the residents cannot enter rooms without staff. Fixtures on walls have been another issue, and they have had to relocate them so that residents cannot reach or focus on them as much.

The residents often have a schedule for the morning, and they strive to make every morning as similar as possible. Then they go to school in a taxi, and when they go home, they engage in activities such as walking, visiting a park nearby, or doing household chores with the staff. After dinner, they also often have a set schedule for the evening. On the weekends, they can do bigger activities like visiting amusement parks.

The children and young people live there permanently and sometimes visit their family home during shorter periods, such as weekends. The residents' families often come and visit and are then in the apartment. If they want to use a kitchen, they can use the shared kitchen. This has led to some difficulties because the residents need to be there one at a time during meals, and the use of the kitchen, therefore, requires planning.

Lisa and Alice noted that having kitchens in the apartments would be a good solution because it could also make it possible for children to participate more in the cooking and baking activities, which can be interesting for a resident because it stimulates taste and smell. However, this is more expensive to build and can result in other potential issues. Having a pantry and refrigerator in the apartment can, for example, be difficult for a resident because it can be very tempting.

Figure 10. Common living room area (Photograph by Lisa, the manager)

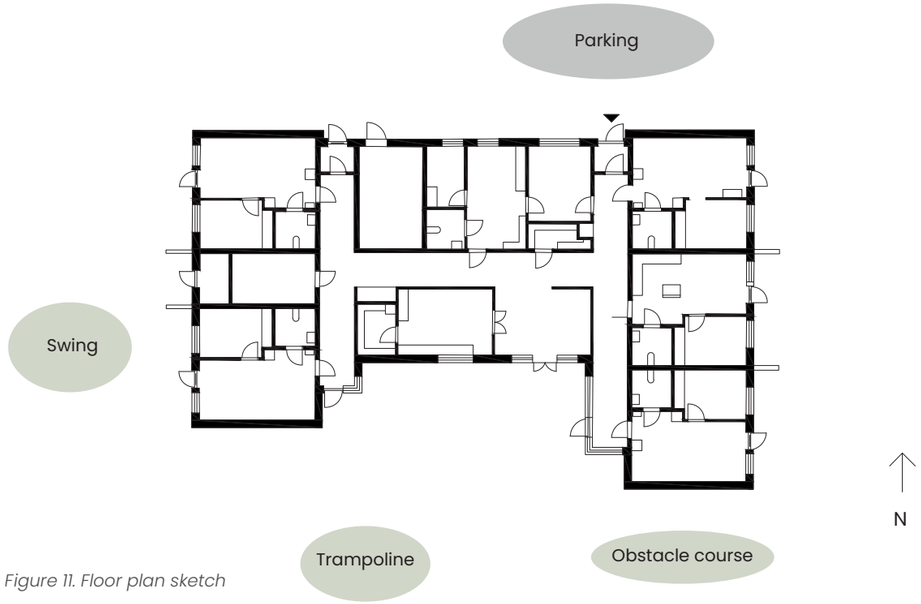


Figure 11. Floor plan sketch

One of their biggest challenges is separating the residents. Unplanned meetings between residents can result in the residents reacting with challenging behaviours. The shared kitchen is therefore the room where most challenging behaviours occur. Residents can sometimes eat together with staff during holidays and birthdays, but it is not common.

Each resident has their own outdoor space, but it would be better if these were fenced entirely because if someone has their door open, someone in the garden can enter their apartment. An open door can be fascinating for a resident. Spaces must be well-defined because the residents can have difficulties understanding, for example, what is my space and someone else's space.

There are six people on the staff when all four residents are at home in the accommodation, and 20 in the staff group in total. When they have meetings, they are at most 15 people, which can feel crammed in the main staff room. They have an on-call room (jourrum) for the staff working during the night. This room is also the changing room, which is not ideal because people cannot be there when someone needs to change. It would have been better to have a separate changing room and use the on-call room also for resting.

During meetings, staff often have the blinds down in the window because the residents can get curious about what they are doing. Overall, the blinds are usually down in the apartments partly because of privacy. They have been thinking of having reflective glass that people from the outside cannot see through to increase privacy.

The staff always work closely with the children and have few breaks. They are in the staff rooms mostly in the morning when they start their shift and at the end of their shift.

Tour of the building

It is a one-story building with a gable roof and a grey panel facade. The entrance to the facility is first through a gate that surrounds the building and the garden to ensure the safety of the residents. When entering the main entrance, you come to an airlock and then the main corridor connecting the different rooms in the building. Close to the main entrance is a door to the staff rooms where there is an office room, a staff room with a kitchenette, a large table and changing cabinets, an on-call room/changing room, and a staff toilet.

The main corridor, connecting the building, has light grey walls and acoustic panels. The lighting in the ceiling and the natural light coming in

create a bright corridor. A part of the corridor is a space with a seating area. This area would preferably be closed with a door and is used mostly as a waiting area currently. From this space, is the door to the common kitchen. There is a full kitchen with a pantry cabinet, refrigerator and freezer where they have some food items. Most food items and knives are in a large pantry behind a locked door. This door can be interesting to the residents, and they cannot go into the large pantry because it is too much for them to choose from. According to Lisa and Alice, a better solution would be to have lockable pantry cabinets in the kitchen with symbols on them. Then they would know what is in there and not be as curious. The kitchen is designed so that the residents can participate in cooking or baking.

The laundry room is used to wash the residents' and the staff's clothes and is also a space where the residents can participate. The staff would, however, prefer to have their own laundry room.

The staff could only show the extra apartment used as an activity and sensory room. This apartment is almost the same, but it has a kitchen with locked cabinets, which the other apartments do not have. Instead of a kitchen, the other apartments have more empty space.

According to the staff, the entrance area is not big or defined enough. Residents can often go straight into the apartment without taking off outdoor clothes or shoes, making the floors in that area dirty. From the entrance, you walk into the living room and, in the extra apartment, the kitchen. From there, you have a door out to the outdoor area with the possibility to have outdoor furniture, and you have flower beds where the residents can plant things.

The bathroom is close to the entrance, and it is common that residents use a bathtub; it is often easier, according to the staff. Above the bathtub is a shower curtain rod that could potentially be an issue, according to the staff, because it is easy to reach and can be continuously moved until it dislodges. A better solution would be to have the rod attached to the ceiling or not have it at all. Another issue that can occur is that the residents like to climb on things such as the basin which may need reinforcement. The interior generally needs to be durable. There is only a small cabinet for the necessary things, such as toothpaste and a toothbrush, and other items are in the storage

Figure 12. Exterior of the building

outside of the bathroom by the entrance. There are glass shelves in the small bathroom cabinet, which can be dangerous if they break, and it is important that the mirror is securely attached to the wall.

From the living room, you also enter the bedroom with a window to the garden. The staff is satisfied with the amount of storage in the apartments because they have one wall of cabinets in the bedroom and two close to the entrance.

The extra apartment currently has equipment for hobbies such as painting or crafts, and different furniture where residents can sit in the living room. The bedroom is used as a sensory room with a bed, furniture to sit in, and lights that create a sensory experience.

The garden has a higher fence around it because the residents like to climb. There are swings, a trampoline, and planting boxes where they have berries, such as blueberries, coming every year, that are greatly appreciated and require little maintenance. Having something in the garden that exercises the motor skills, such as an obstacle course, and that creates a sensory experience, such as things hanging from a tree, can be beneficial, according to the staff.

Privacy is an issue in the garden; they have planted a tall hedge against one street and plan on doing the same in other directions. They have a road next to the facility where people frequently pass, and it is easy to look into the garden and the apartments.

Figure 13. Extra apartment used as an activity room (Photograph by Lisa, the manager)

Figure 14. Main corridor (Photograph by Lisa, the manager)

ANALYSIS

Designing for ASD

The facility is well-liked by staff and is a good example of this type of building, according to them. The operation has solved many of the issues they first faced with distracting wall fixtures and a need for separate entrances. The spaces in the building are separated into different rooms, which the staff appreciates. They would, however, like the living room area to also be completely separated with a door.

Homelike

The residents spend most of their time in their own apartments, which, according to staff, have ample storage. The apartments are large with two rooms, which could also allow for more personal belongings and the ability to customise the space. The interior in the common areas has familiar materials such as textiles and wood, which can make it appear more homelike.

Connection to nature

There is a visual connection to the outdoors from the apartments' living rooms and bedrooms, and a private outdoor area for all residents. It is easy for residents to go outside into the garden, and it is equipped with different types of outdoor activities. The private outdoor areas could be used as more calm and relaxing spaces, and the common areas can be used for more active activities. The many different outdoor areas can create different levels of social engagement. Privacy is, however, important while designing the garden.

Figure 15. Zones of contact with the outdoors

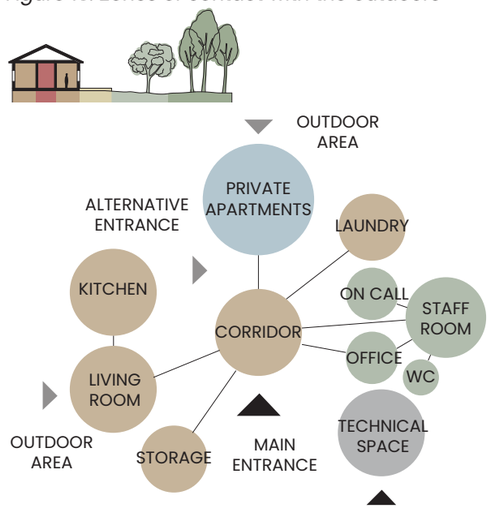


Figure 16. Spatial organisation

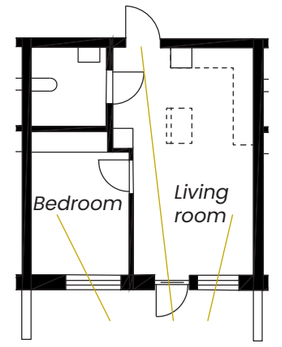


Figure 17. Sight-lines to the outdoors in apartment and it is room for a kitchen.

Figure 18. Colour palette

4.3 LÅNGHAGSGATAN

The group accommodation was started in 2023 and was built for four children, but there is currently only one child living there. It is in a calm residential area adjacent to a large forest. The building has a grey-green facade and gabled roof.

Tour of the building
The parking and storage are at the front of the building, and around the garden is a fence with privacy protection in the form of fabric and hedges. To increase the security, they also have a lockable gate.

The building has four entrances to the main corridor connecting all rooms, two from the front and two from the back. The staff have their own entrance to the staff area.

The main corridor is long and has grey-green colours on the walls with wooden details and doors. Two apartments are on each side of the building, and the staff area and common areas are in the middle.

The common areas have a room currently used as an art studio, a playroom, a dining room, and a kitchen. The playroom and dining room have a door that can be opened to connect them so they can be used simultaneously. The kitchen is generous and is where the meals are prepared together with the resident. The common rooms have large windows to the garden and an outdoor seating area with a pergola. The playroom and kitchen have doors to the outdoor seating area and serve as a escape route when needed. There is a storage space close to the kitchen used as a pantry with a refrigerator and freezer, so that they only have some food in the kitchen. The laundry room has room for two washing machines, a dryer and a drying cabinet, which the staff appreciates.

The staff entrance hall has changing lockers, and the staff then change in the bathroom. Next to the entrance hall is one room that was originally meant to be the on-call room but is now used as an office for two staff members. From the entrance hall, you also enter the staff room with a kitchenette and room for a large table with chairs. Then there is an office for the rest of the staff with windows to the corridor so they can see what is going on. One of the apartments is also used as a meeting room with a screen for the staff.

The individual rooms/apartments have an entrance with storage cabinets, which, in this case, need locks. The bathroom has two doors, one to the entrance and one to the living area. The bathroom has one lockable large cabinet, and the furniture is securely fixed so that it cannot move and thereby be damaged.

In this case, the shower was changed to a shower that the resident could push a button to turn on, so they could not leave it on. The main living area has room for a bed and some additional furniture, but only a bed in this case. The door to the private outdoor area is locked so that the resident uses the doors from the corridor instead, and the staff can see when they go outside.

Figure 19. Corridor with an entrance to an apartment

The garden is large and goes around the building, allowing the resident to move around it freely, and the hard surfaces are asphalt and pavement. There is a swing on the back side of the building, where the common outdoor seating area is.

A conversation with the manager and one staff member
During the visit, I got to talk to one staff member and the manager of the group accommodation. They noted that the resident has complex needs, which have proved to cause problems with the design. They currently only have one resident, but could possibly have more residents if they adjust the building. They are considering dividing the corridor with a door so the residents can be separated. They do not know if more than three people would work because the common rooms might feel small.

They think that the number of entrances is good; the problem they have is that the main entrance that the resident uses is open to the inside and closed from the outside, so the resident could easily get locked out.

They think the corridor is long, but cannot see how it could be solved better. There are windows on several doors in the corridor and on the entrances to the outside with glass that is not unbreakable, which is a hazard. On the inner doors, they think having peepholes that staff can look into before entering is better. The suspended ceiling is also a hazard because the plates can easily be moved, and residents can reach the electricity and the sprinkler system.

The staff is mainly satisfied with the staff areas, but they are a big group of staff, and they would have needed a separate changing room to change in and have lockers. They currently use the staff bathroom to change. The staff likes that they can use one of the apartments for meetings and do not have to have larger meetings far away.

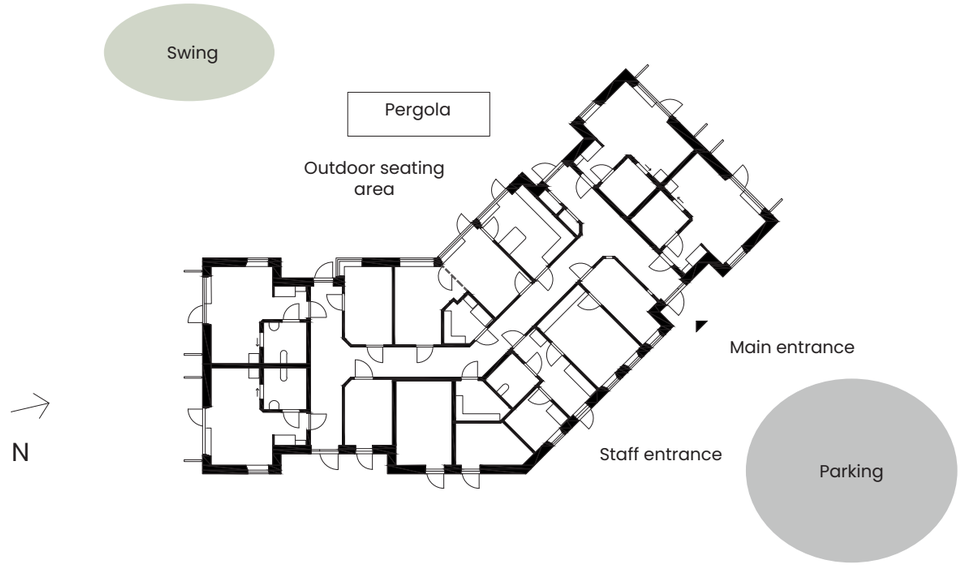


Figure 20. Floor plan sketch

Figure 21. Backyard with path and stair to a swing

The ability to regulate the daylight coming into the apartment is essential. They find that the sun shading that they have today does not darken the room enough sometimes, and they think it would be better to have blackout curtains or some other solution that residents cannot pull down. The staff would also like to be able to control the artificial light in the whole building from their office. Sometimes it can help to bring down the lighting to calm residents down, and going to a light switch near a resident is not always a good solution.

They said that having a kitchen or kitchenette in the apartment would be a good idea because residents sometimes eat in their apartments, but staff would have to be able to lock it.

In the art studio, they are thinking of adding a bathtub because it can be good to have the opportunity to bathe. They could possibly have a soft bathtub inside the apartment, but a resident could then want to bathe excessively.

They struggle with creating a homelike feeling in the building because they cannot have many textiles and furniture.

Figure 22. Common outdoor seating area

ANALYSIS

Designing for ASD

The corridor design makes it easy to adapt the building so that each resident has their separate entrance. The building is separated into different rooms, which makes them well-defined, but there is also a door between the dining and living room/playroom so that they can be used as one large room. The colour palette is muted with neutral colours, and corners in the building are cut, which can help residents see past corners earlier.

There are windows on the doors which could help some residents because it takes away the fear of the unknown, but according to the staff, some windows are not necessary, and it is important that the glass is unbreakable.

Homelike

The staff expressed that they have difficulties making the accommodation homelike. The colours and materials contribute to a more homelike appearance, but what can be negative is that the apartments are small and there is not much storage.

Connection to nature

There are plenty of windows to the private outdoor areas and the garden. Each apartment has a private outdoor area and easy access to the garden. The garden is large with space for residents to run around the building. There is, however, not a lot of variety in different activities.

Figure 23. Zones of contact with the outdoors

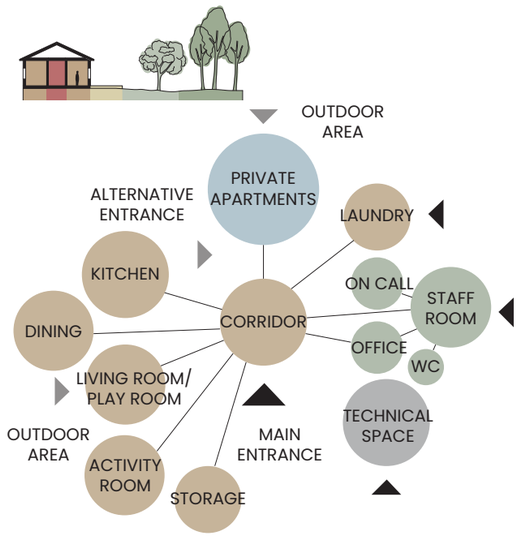


Figure 24. Spatial organisation

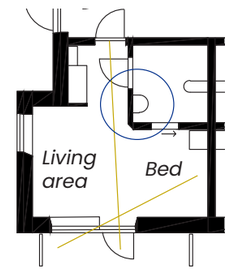


Figure 25. Sight-lines to the outdoors in apartment and an opportunity to circulate

Figure 26. Colour palette

4.5 TYRINGE BARN- OCH UNGDOMSBOENDE

The group accommodation has seven private rooms for children and young people with disabilities, ASD being one of the target groups. The building is new, and children have not moved in yet. The project started when they found a need for this building because there are specialised schools in the area. The group accommodation is meant to be used as housing for those who attend school in Tyringe but have their families living further away. The project was managed by Emrahus, who designed it with consultants, and the building will be rented by Humana, who will manage the operations. The building has a passive house standard and was built on a hilly site with special zoning requirements, which complicated its placement.

Tour of the building

They decided not to place the entrance to the building directly on the street so that the residents do not go directly towards the road. The building has an air lock and entrance room with storage that is light and spacious, so that residents can meet without it being crammed. From the entrance room, there is a door to the technical room. Close to the entrance is a door to the staff rooms and meeting room where staff or residents, family, and educators can meet.

The corridor is wide and light, with space for a seating area and a skylight that brings more daylight. The colours inside are muted green and beige, and the interior design is much like any other home.

The shared kitchen and living room are in the middle of the building. The kitchen has sliding doors so that it can be open to the corridor, the living room and the staff room. The kitchen is spacious and has two sets of stoves so that residents can participate in the cooking, and has large windows and a door towards a terrace by the dining area. The living room has two seating areas, one by a TV and one close to a large window to the terrace and garden. The living room is partially separated from the corridor where the residents' rooms are, with sparse wooden panels so they can see what goes on before entering.

The staff area has two offices and one larger staff room with an office area, a kitchenette and a table with chairs. The operation has decided to use a room that was originally for activities as an on-call room to be closer to the residents and use all the rooms in the staff area as offices.

Figure 27. Kitchen with two stoves

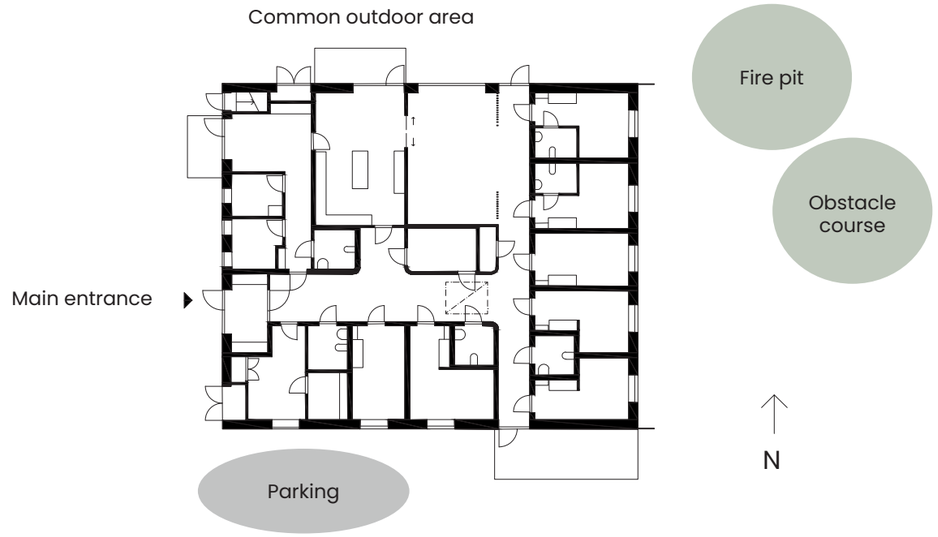


Figure 28. Floor plan sketch

The residents' rooms are quite small, and some have bathrooms, while others do not, to accommodate residents who have difficulties having a bathroom by themselves. When entering the room, there is an entrance hall where residents can take off their clothes and where they have their storage cabinets. From this space, you enter the bathroom, if the resident has one, with green and white colours and a small cabinet for bathroom items. Further into the room, you have room for a desk, a chair, and a bed. There is only one window to the garden in all private rooms, which has a window screen to regulate daylight.

The colours inside the building are nuances of grey, green, blue and beige to make the building more homelike. The floor plan is also supposed to resemble a villa, so the building would not have an institutional-like feeling.

The garden was designed by a landscape expert who specialises in ASD and outdoor environments for sensory stimulation. There is an obstacle course made of trees from the site, which is also suitable for insects and biodiversity, a swing, a fireplace, berry bushes, and fruit trees. The garden also needed to be low maintenance because you do not want to take care of it that much.

A conversation with two project developers working at Emrahus

I got the opportunity to talk to two employees at Emrahus who were knowledgeable about the process of starting the project. It is usually a municipality or private operation, in this case Humana, that has seen a need for these accommodations and contacts Emrahus, which then gives options for different plots in the area. It is often hard to find a suitable plot because of restrictions and other plans in the area. It is also hard because neighbours can appeal against the project because they do not want to live near a group accommodation for people with disabilities, likely because of a lack of knowledge. They then develop a proposal for the design based on the standard houses they have created and discuss it with the client. The client can then make adjustments. The process takes about three years to start the construction, and it usually takes less than a year to build, which was the case in this project.

They want to make the group accommodations for children and young people as general in the design as possible to suit a lot of different residents. They have worked with standard houses that they developed, but the clients often want to adjust the layout. Using a concept

they have developed from previous knowledge is quicker, and they do not have to involve consultants in that case, which also makes it cheaper. The economic aspects influence the projects a lot.

They have worked closely with Bo Hejlskov Elvén, a psychologist with a lot of knowledge about designing spaces for people with different disabilities. He has been involved in designing their standard houses for children with disabilities.

Emrahus is generally pleased with the result, and they are most satisfied with the homelike feeling that they were able to achieve, for example, with the colours and the villa-like floor plan. What they thought was negative about the project was that it had taken time to get it into use because of the Swedish Health and Social Care Inspectorate (Inspektionen för vård och omsorg). The reason is that the building has more rooms for residents than the standard four rooms. They would have also wanted the technical room to have its own entrance, now it is in the entrance room, which could be disturbing.

Figure 29. Seating area in living room

ANALYSIS

Designing for ASD

This building follows many of the design guidelines for ASD presented in the theoretical framework. Most notable are the common areas large and fit both social spaces where residents can gather and spaces where someone can sit by themselves. The curved walls and wooden panels create previews of the rooms and remove the element of uncertainty that can be difficult for some residents. The colour palette is muted with neutral colours.

What can be seen as limiting is the size of the bedrooms that only fit a small desk and a bed. If someone has a need for more separation from others, can this building be hard to adjust. The rooms that do not have their own bathroom could also be limiting for future uses if new residents want a bathroom in their room.

Figure 30. Corridor with skylight

Homelike

A strong quality with this building is its homelike appearance and spatial organisation, with the common rooms close to the centre of the building. The colours are soft, and the artificial light is warm. The large corridor with room for a seating area creates a space that is more welcoming and can be used for things other than communication. The emphasis on the common areas and not creating large apartments creates a more villa-like organisation. This could, however, create problems for those who do not want to be in the common areas and would rather be in their own private room.

Connection to nature

Plenty of natural light enters the building and the core because of the skylight. The common spaces have large windows with views of the garden, but can have privacy issues. The windows in the private rooms are more modest and easier to cover with blinds.

There are no individual doors out to the garden or private outdoor areas, which can be limiting for a resident. Privacy in the garden can be an issue because it does not have a fence and is close to neighbours. There are activities in the garden to encourage interactions with natural elements and physical activity, which is beneficial.

Figure 31. Zones of contact with the outdoors

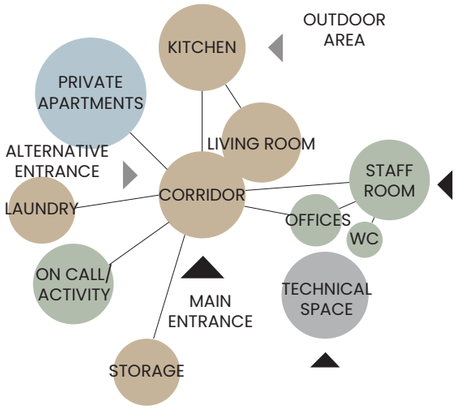


Figure 32. Spatial organisation

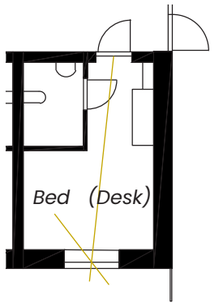


Figure 33. Sight-lines to the outdoors in apartment

Figure 34. Colour palette

4.6 SUMMARY OF INTERVIEWS & STUDY VISITS

Designing for ASD
Mentioned several times was the importance of having separate spaces inside the building and having separate corridors for different residents. The residents should be able to use the spaces inside the building without meeting each other. In the interviews with parents, one interviewee also mentioned that spaces that are too large can feel overwhelming. The interviewees emphasised that sounds from different rooms or equipment inside the apartment can be disturbing and must be considered. Also mentioned several times was the importance of being able to limit sensory impressions in a room by lowering the lights and closing the door to create a calm space. Windows can both be distracting in certain situations and cause too much daylight to come in. The residents can be curious about certain doors or fixtures, and it is therefore important to minimise these distractions, especially for safety reasons. Some safety precautions, such as having unbreakable windows, can be made from the beginning to eliminate certain risks. There should be escape routes so staff can walk away from a situation and give the child space. A separate entrance to the staff rooms can also be beneficial to avoid having to walk in the common corridor.

Having several rooms for the child with doors between them can be good because they can like being able to use different rooms and have a room that is more calming. Having room for a kitchen is beneficial because it makes the building easier to adapt to different residents. Muted colours or white are mostly used in the visited buildings and wood or wood imitation. The materials, colours, decor and furniture that can be used in the building depend on the residents, but they should overall be durable.

Homelike
What is homelike to a resident with ASD can be similar to what homelike is to anyone else, but they can have sensitivities to certain environmental stimuli. An environment that is free from colours and decor can be optimal for certain autistic people, and what is important is what creates a homelike feeling for that specific individual. The visited buildings all have private spaces for the residents that they have as their own, which, according to research, can be essential for creating a homelike feeling. There is, however, variation in the proportions of personal space and common space. Some of the accommodations have small apartments/ rooms, while others have larger; therefore, there are different amounts of space that residents can have control over and space for personal belongings.

Connection to nature
It is important to notice that autistic people can have a need to minimise sensory impressions from nature. The home can be a safe space for the residents because it is where they have control over the environment. It should be possible to cover windows to avoid daylight coming in when needed, and to think about the windows' view.

Access to a private and common outdoor area can be valuable. Some may want their own space, separated from other residents, but also have a common space for activities that need more space, such as swings. Being able to run around the building was also mentioned several times as something residents can appreciate. Parks and green areas near the accommodation are also beneficial if the residents want to do an activity elsewhere.

5. DESIGN STRATEGIES, SPATIAL PROGRAM & ORGANISATION

This chapter presents design strategies, a spatial program, and spatial organisation based on the gathered research. This information served as guidelines during the design process.

5.1 DESIGN STRATEGIES

The following design strategies were formulated to summarise the results from the previous chapters into guidelines for designing a group accommodation for children with autism spectrum disorder.

DESIGNING FOR ASD:

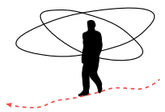
Easy perception & navigation
The space should have a simple and clear spatial floor plan, visual relationships between spaces, strengthen predictability and a routine, have the right proportions to aid in the perception of the environment, and use visual supports to help understand the function of the space and wayfinding.

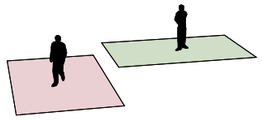
Control of environmental stimuli
The home should minimise environmental stimuli, have transition spaces, provide quiet spaces, and offer the possibility of choosing the level of environmental stimuli and social engagement the residents want.

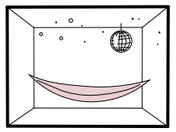
Separation of spaces
Spaces should be separated to create clear boundaries between them, either completely with walls or partially with, for example, furniture, or colours. In this way, residents who have difficulties meetings other can use parts of the building separately

Allow for therapeutic equipment
Providing environmental stimuli that are calming and relaxing can have positive effects on the residents' well-being.

Generality & flexibility
The residents living in the accommodation can change, and their needs can change over time. Therefore, the spaces must have a general design that can suit many and is adaptable for different situations during its use.







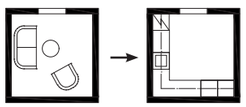
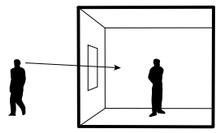


Figure 35-39. Design strategies

Safety
The accommodation should have escape routes and other appropriate safety precautions.

Privacy
The integrity of the residents should be prioritised, it is therefore important that the public cannot look into the windows or have a complete view of the garden.

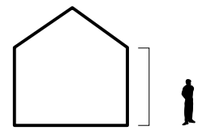


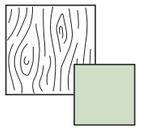
HOMELIKE:

Small building scale
The building should resemble a villa to avoid an institutional-like appearance and fit into the surrounding context.

Personalisation
Being able to make your room your own and display personal items can create a feeling of home. It is essential that the room can still be organised.

Familiar materials & colours
The home should have familiar materials and colours that create a homelike appearance, which can contribute to a sense of home. The interior should, however, be adapted to the residents and their specific needs.

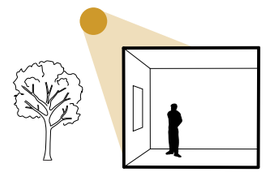




CONNECTION TO NATURE:

Daylight & views to nature, but mindful
Both daylight and views to the outdoors can be beneficial for the residents' well-being, but they can also create sensory stimulation. It is important to consider the placement of windows, and residents or staff should also be able to shade windows to limit sensory stimulation.

Variation of outdoor spaces
Their outdoor area should suit many different sensory needs. It is important to provide the residents with various activities, both active and restful, and for different levels of social interaction.



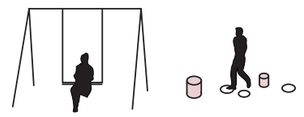


Figure 40-46. Design strategies

5.2 DESIGN IDEAS

These are ideas that can be used as a way of working with the strategies. Some of these might not be used in the design proposal for this thesis, but can be relevant ideas for future projects.

Including space for therapy
Additional spaces in the group accommodation can be included to allow for therapeutic equipment. These spaces should preferably be adaptable for different sensory needs.

Emphasising a view in some areas
Because of privacy issues, there may be a need to shield the group accommodation, which in turn could make it hard also to appreciate an attractive view. The view could be emphasised in some areas of the garden and in some rooms in the building where there is less need for privacy.

Combining safety precautions with greenery
The outdoor area should be safe to allow the children to play freely, which can be accomplished with a fence and gate. The fence can be combined with hedges to also include more greenery.

Daylight and views, but also privacy and limited visual stimuli
Having a tree in front of the window, a wall with climbing plants, or in other ways creating privacy and views that are more constant might decrease the need for using the window blinds in certain situations. Skylights can also be used to bring in daylight yet limit visual stimuli.

Allow for different social situations
In situations where the children want to socialise with each other, having doors that can stay open, such as sliding doors, can be useful. These doors could then be closed when needed.

Staff close to the residents
Placing the on-call room near the apartment can make them closer to the children during the night.

Soft corners
Rounded or cut corners could allow the children to see past corners earlier and make them less harsh.

Space for a kitchen
Having space for a kitchen in the apartment can open up more possibilities in the future, like not having to use the common kitchen and allowing adults to live there.

5.3 CREATING A SPATIAL PROGRAM

Based on the results from the previous chapters, the visited group accommodations, and information from Betaniahemmet, a spatial program for the design proposal is created. As a framework, the spatial program for group accommodations by the Gothenburg municipality was also used (Göteborgs stad, 2018).

Fire safety
A group accommodation for people with disabilities has the Swedish fire safety class 5B and should have an automatic fire extinguishing system. The building will therefore need a technical room for sprinklers. The size of the technical rooms is in this thesis estimated to be similar to the group accommodations Billdals Björkväg and Långshagsgatan, due to the size and number of apartments.

5.4 SPATIAL PROGRAM

COMMON AREAS:

Entrance (ca 8 sqm):
Storage, space to sit and wait, high ceiling and spacious.

Corridor:
Light, spacious, easy to navigate. As short and wide as possible but allow the residents to have separate entrances.

Laundry (ca 8 sqm):
Washing, drying, joined activity, away from kitchen and seating areas.

Kitchen (ca 15-20 sqm):
Spacious, safe, can cook together.

Dining, can also be apart of the kitchen (ca 5-10 sqm):
Room for everyone, close to kitchen, durable furniture, space for several seating areas.

Living room (ca 15-20 sqm):
Spacious, several seating areas both private and social, durable furniture, room for activities, several exits and places to circulate.

Activity room (ca 20 sqm):
For sensory play and relaxation, for hobbies, room for everyone, storage, room for larger equipment e.g. a swing or small trampoline.

TECHNICAL ROOMS:

General technical room (ca 15-20 sqm):
Heating, and sprinkler.

Electricity room (ca 5-9 sqm)

Data and Electricity for the apartments (ca 1 sqm each)

STAFF AREA (ca 30-40 sqm in total):
Overlook common spaces.

Staff room:
Kitchenette, room for larger meetings.

Office:
Room for several desks and storage for documents, medication etc.

On-call room:
Space for sleep and relaxation during breaks.

Staff WC/shower (ca 5 sqm):
WC and shower, place to change clothes, storage.

PRIVATE APARTMENTS (ca 20-40 sqm in total):

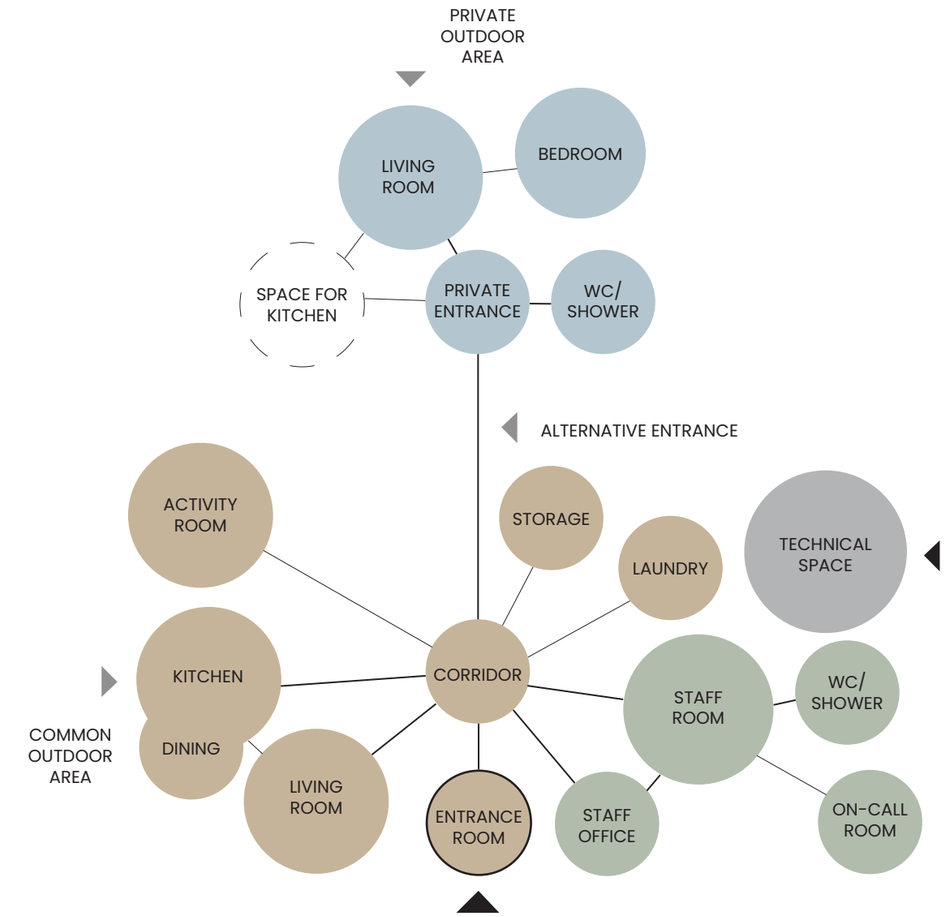
Entrance (ca 5 sqm):
Storage, well defined.

WC/shower (ca 5 sqm):
Easy access, storage, spacious.

Bedroom space:
Room for personal belongings, storage.

Living room space:
Room for personal belongings and equipment, seating area with room for visitors, room for play, access to the garden.

5.5 SPATIAL ORGANISATION



The spatial organisation is heavily based on the group accommodations that were visited and the diagram is inspired by "Space syntax" by Hillier et al. (1976). The diagram shows the connections between rooms in the building depending on how close they need to be to each other.

Figure 47. Spatial organisation

6. THE SITE

This chapter presents an analysis of the site for the design proposal. and were Betaniahemmet is currently planning to start a group accommodation. The analysis later influenced the decisions that were made in the design.

Plot
Betaniahemmet office
Group accommodations for adults
Forest
Grass area

Figure 48. Functions in the area and greenery

6.1 SITE CONDITIONS

Föreningen Betaniahemmet and the site for the design proposal is in Askim, a district in the south west part of Gothenburg municipality. It is an area by the sea Kattegatt and is rich in nature and recreational activities. Close to the site is the popular beach "Askimsbadet" (Göteborgs Stad, n.d.).

Figure 49. Noise pollution based on traffic data (adapted from Miljöförvaltningen Göteborg n.d.)

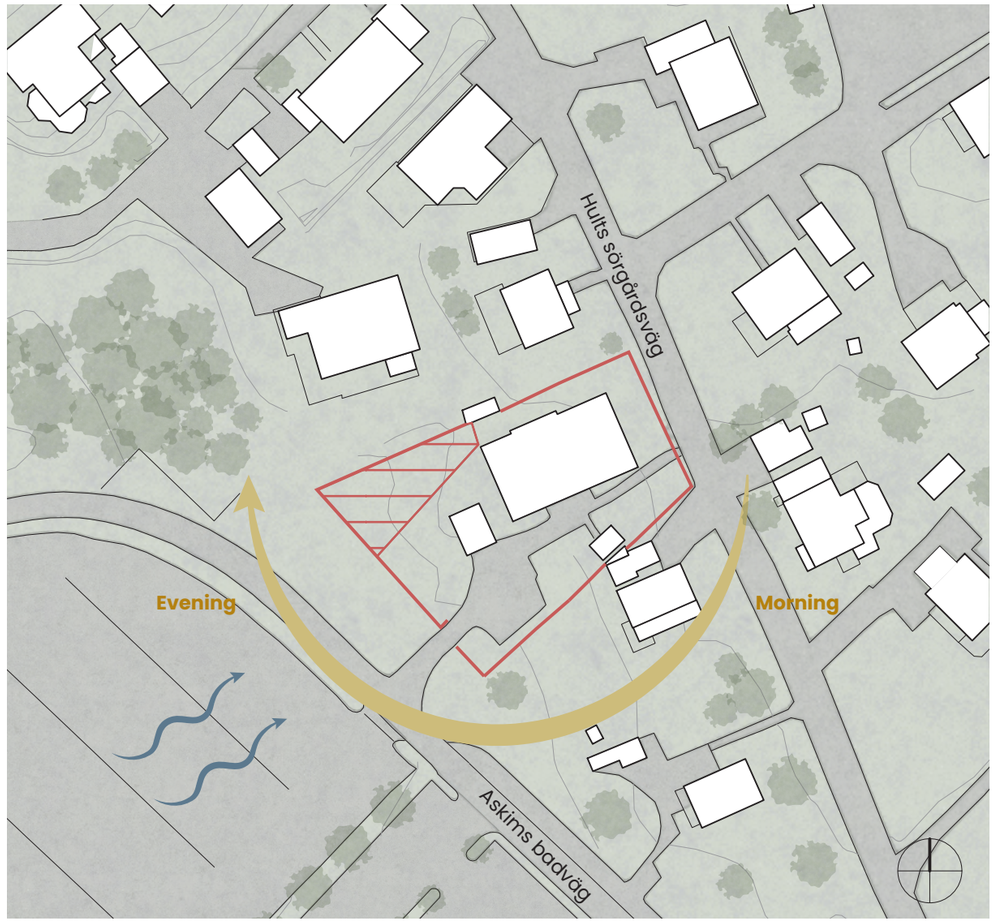


Figure 50. Project site with sun conditions and most prevalent winds, scale 1:1000

Notable about the site is that it is close to a parking lot that can be busy during the summer months and that the road Säröleden nearby causes some noise pollution, as can be seen in the noise pollution map figure 49, which is calculated from 2021 traffic data.

The site today
There is a driveway and parking lot on the south west side of the site and a path going through the plot. There is currently a fence around the building and a high wooden fence towards one neighbour.

Zoning plan
According to the zoning plan, the roof angle must not exceed 27 degrees. The highest allowed building height is 4 meters, measured from average level of the ground to the eave of the roof, and the facade should be in wood or facade boards in a light colour. The area with diagonal lines in figure 50 should not be built on.

6.2 SWOT-ANALYSIS

A SWOT-analysis of the site was done to identify its potential and the issues that might arise.

Strengths
A view of the sea.
In a calm neighbourhood.
Lots of green areas both open fields with grass and natural forest in the area.
There are many activities in the area such as the beach and playground.
The plot has not much elevation.

Weaknesses
View of the ocean is disturbed by a parking lot
The neighbours are close and on both sides of the building.
There is some noise pollution in the area.

Opportunities
Can highlight the view of the sea.
Because of little elevation, the garden can be easily accessible.
The children can go out and do activities in the area, for example, going out in the green areas and visit the playground.

Threats
Residents can be disturbed by traffic and people in the parking lot, especially during the summer.
The plot is small and the spaces both inside the building and outside in the garden need to be space efficient.
It can be hard to make the garden private and so that people are not able to look inside of the windows.

Figure 51. View of the site from the driveway

Figure 52. Hults sörgårdsväg

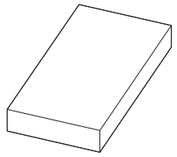
Figure 53. Askimsbadet

7. THE DESIGN PROPOSAL

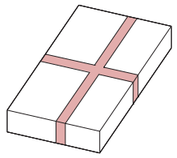
This chapter presents the design proposal of this thesis. It is an example of what a group accommodation for children can look like based on the results from the previous chapters and the analysis of the site.

7.1 CONCEPT

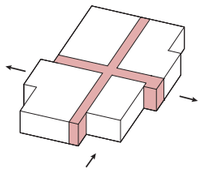
The concept for the building can be summarised into the following decisions:



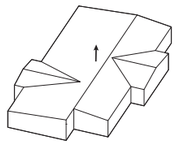
1. The design started with a simple volume.



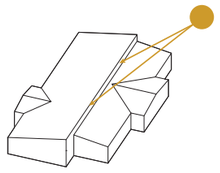
2. The volume was divided into parts: the apartments on one side of the building and the common, staff and technical rooms on the other. Two crossing corridors were created to allow for more entrances to the building.



3. Offsets to the volume were then made to adapt it to the spatial program.



4. A gable roof was added so that it blends in with the surroundings.



5. An offset in the roof was created to bring daylight into the corridors.

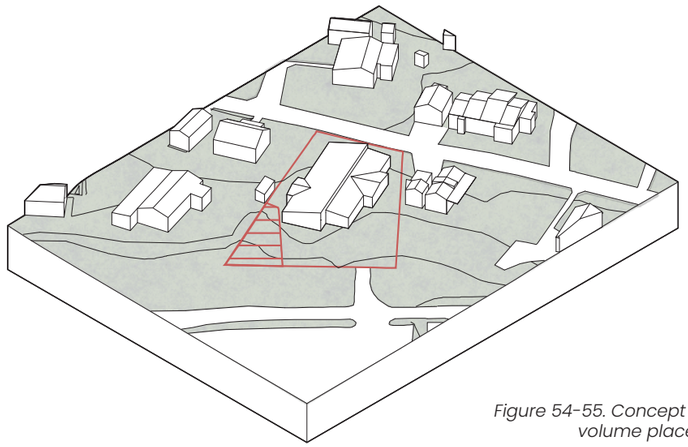


Figure 54-55. Concept sketches and volume placed on the site.

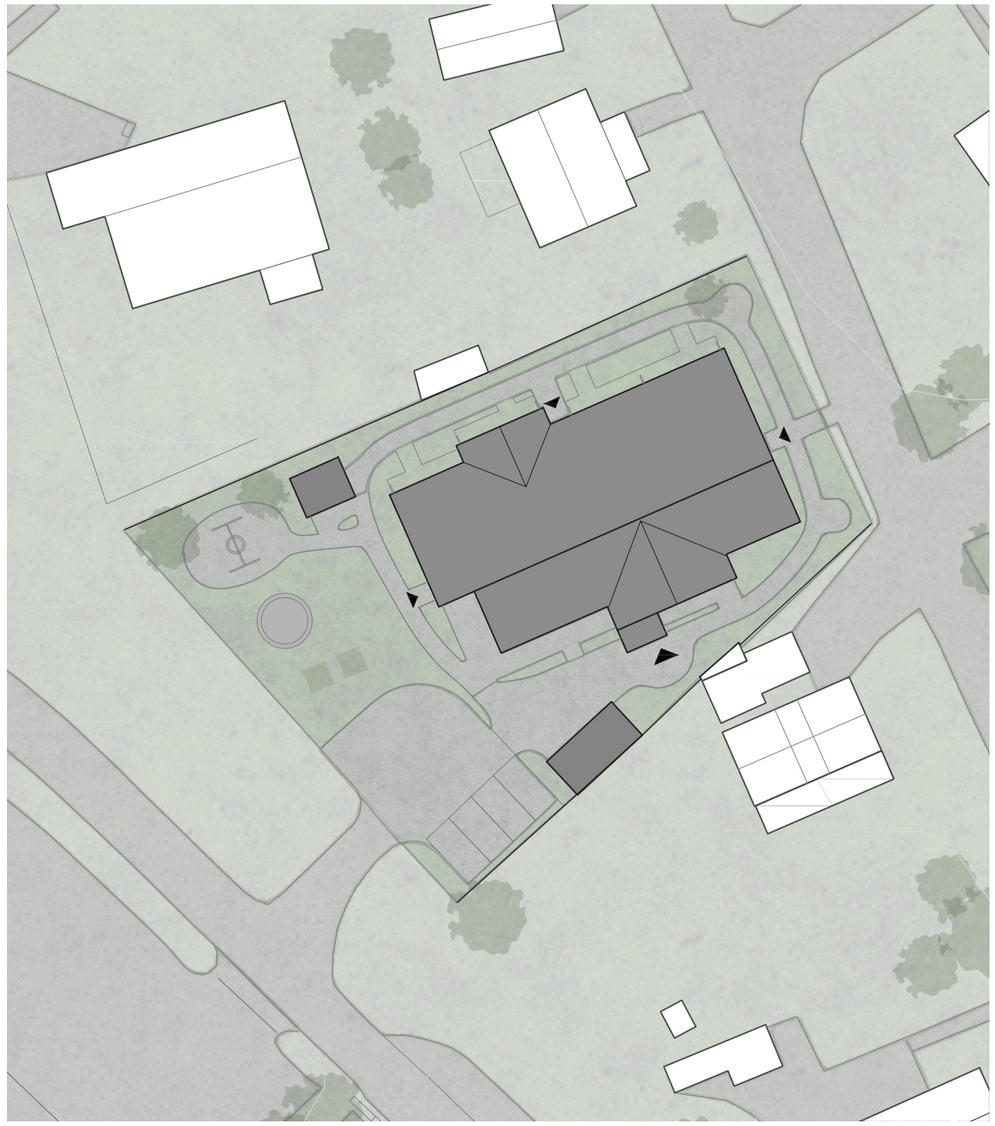


Figure 56. Site plan scale 1:500

7.2 SITE PLAN

The building's parking and drop-off are on the southwest side of the plot. Additional visitors are referred to the parking on the opposite side of the street. The garden has a fence and gate as well as 1.5-meter-high wooden fences with climbing plants towards both the neighbours' yards for privacy.

Figure 57. Exterior view with garden

7.3 FLOOR PLAN

The apartments are placed on the northwest side of the building, which gives them softer light and a view without traffic and pedestrians. The common areas and staff areas are on the opposite side of the building so that they do not disturb the apartments.

Due to the plot, a solution similar to Billdals Björkväg and Långhagsgatan was not suitable. Instead, another solution was made that still allows residents to have their own separate entrance. The corridor can also be divided with walls with door openings to separate residents further if desired. This is shown with dashed lines in the floor plan, figure 58.

The main entrance is close to the staff office and includes a place to sit and some storage. There is a small window between the staff office and the corridor to give staff a better overview and awareness of the people coming in and out of the building. This window can, however, be covered by a curtain if there is a need for more privacy.

Functions

A. Standard apartment, 40sqm
B. Apartment with high accessibility, 40sqm
1. Main entrance
2. Office
3. Staff room
4. On-call/break room
5. WC/shower/changing room
6. Living room
7. Kitchen and dining
8. Activity room
9. Laundry
10. Corridor
11. Kitchen storage
12. Staff storage
13. Electricity room
14. Technical room
15. Weather protected seating area
16. Garden beds
17. Trampoline
18. Swing
19. Apartment storage
20. Drop-off
21. Calm seating areas

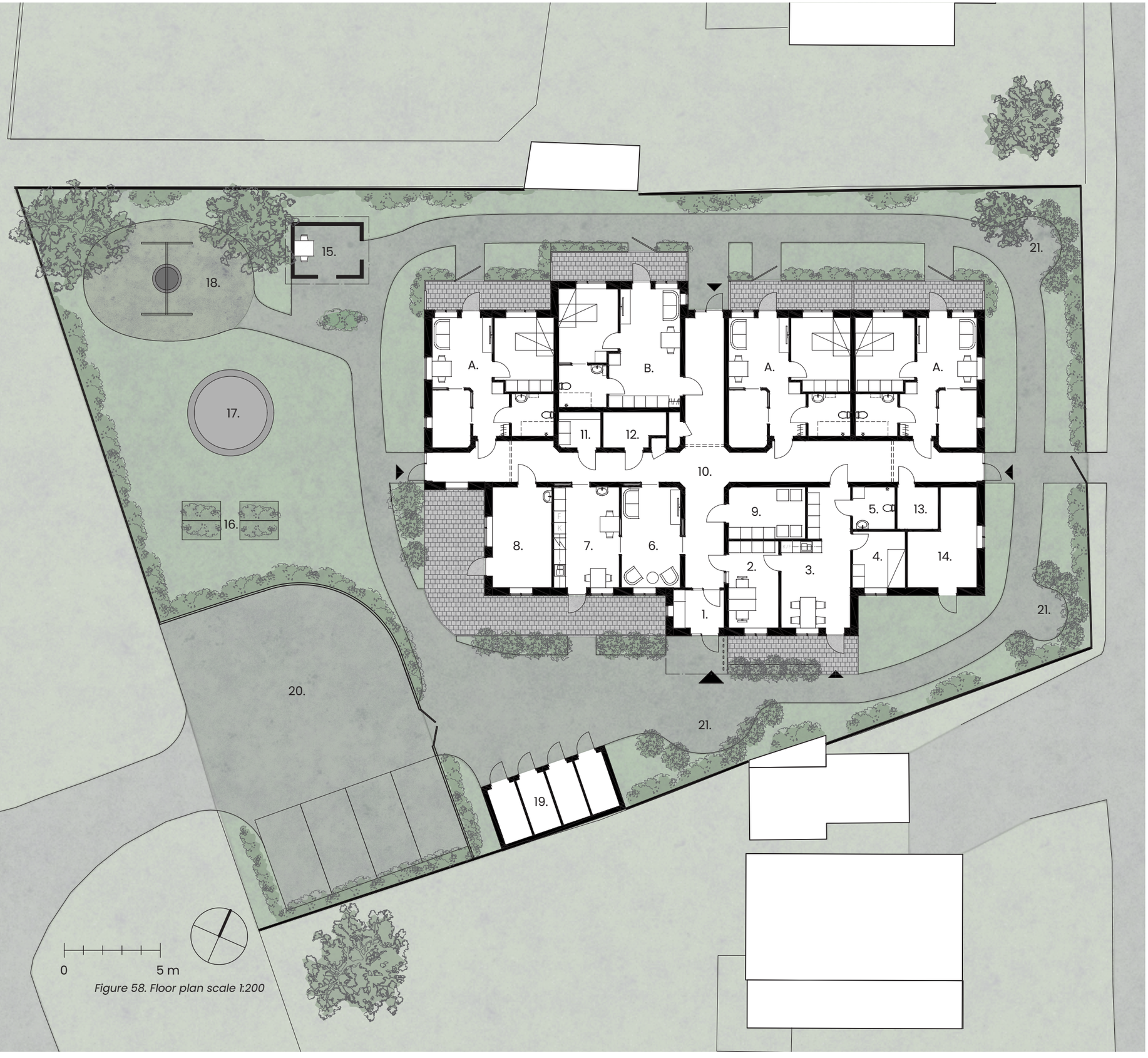


Figure 58. Floor plan scale 1:200

Figure 59. Functions

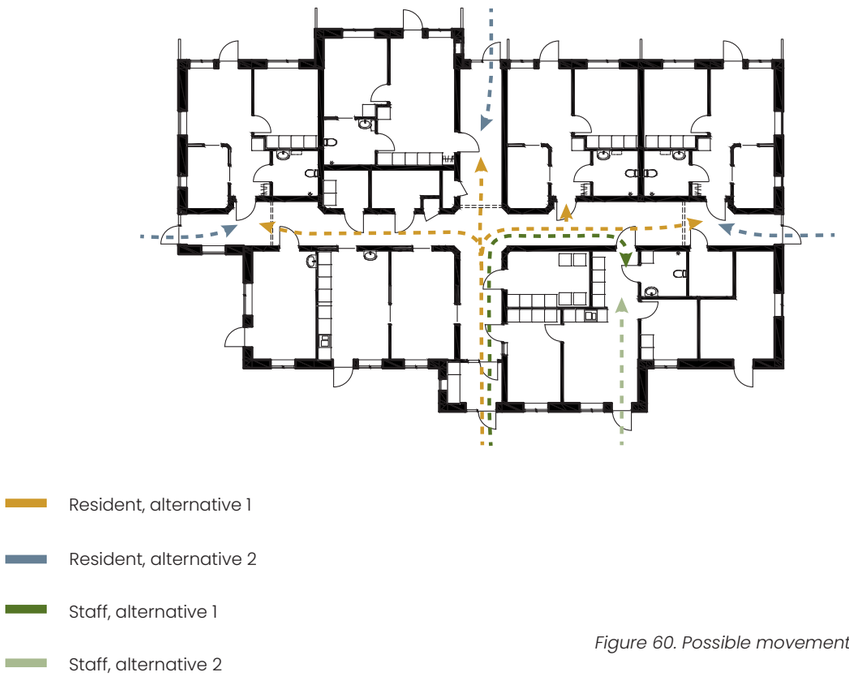


Figure 60. Possible movements in the building

Figure 61. Sensory impressions

Spatial organisation
The common rooms are grouped near the main entrance, where there is the most activity. The staff room has two doors to the corridor so that they can easily get to both the common areas and the apartments. Staff also have a door to the garden that they can use as a staff entrance. The larger technical spaces are placed in one corner of the building. Not all doors to the technical spaces are, however, to the outside, which would be preferred.

The alternative entrances make the building adaptable for different residents. Some residents can therefore avoid meeting others in the corridor as shown in figure 60. An alternative entrance for the staff area also creates flexibility and less risk of unexpected meetings in the corridor.

Sensory impressions
The building is divided into different sensory zones. The individual apartments are calm spaces that residents can customise to their own sensory needs. The common areas have more sensory impressions from, for example, daylight, views, smells, and sounds caused by the activities, and are therefore separated from the calm areas. The corridor can be seen as a transition space between the calm apartments and the common rooms.

All windows in the building have blinds to limit daylight and views. The common rooms can, therefore, also be customised to have fewer sensory impressions.

7.4 APARTMENTS

The two corner apartments have additional high windows in the living room and extra room.

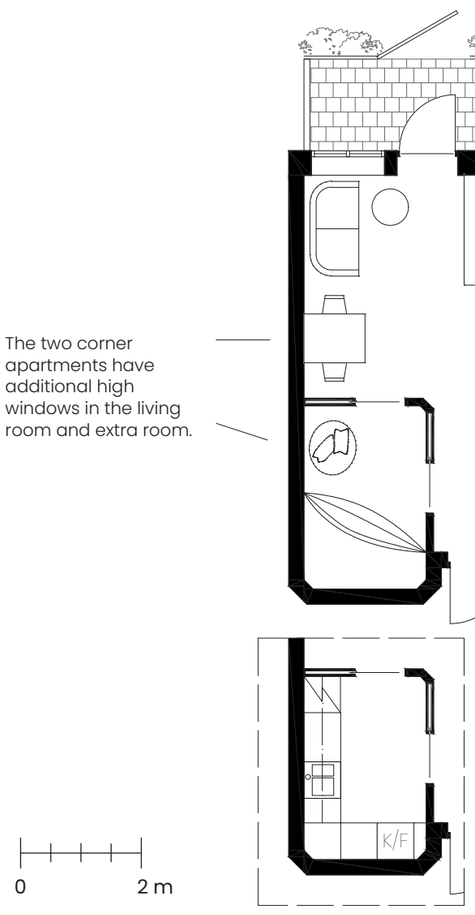


Figure 62. Apartment A with extra room scale 1:100

Apartment A
Three of the apartments have a floor plan with a living room, bedroom, bathroom, as well as an additional room. This room can be used, for example, as a sensory room, activity room and a kitchen. It can be a space for therapeutic equipment that is not ideal anywhere else in the apartment or solely as an additional relaxing area. The possibility of having a kitchen that can also be closed makes it adaptable for different residents, some of whom might benefit from an individual kitchen. The extra room is in figure 62 furnished with a hammock and a soft bean bag. The apartments have mostly views of their own outdoor space, so that the residents do not get distracted or disturbed by what is going on in the more active parts of the garden. Some of the windows are, therefore, placed high up. An example of this is the window above the dining area in figure 63. The size of the windows is meant to be enough to bring in daylight and create a good connection to the garden, but also easy to cover with window blinds.

The illustrations of the apartments show examples of what the interior design can look like. The interior will, however, depend on the individual.

Figure 63. Living room in apartment A.

Figure 64. Extra room furnished with soft furniture and limited sensory impressions.

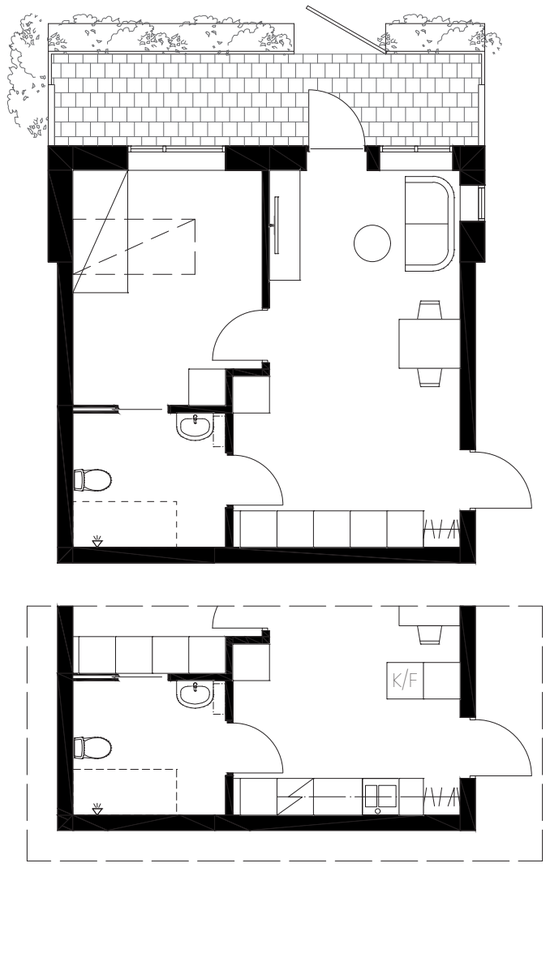


Figure 65. Apartment B with higher accessibility scale 1:100

Apartment B

One of the apartments has a different floor plan that is designed to have higher accessibility. This apartment also has space for a kitchen with some modifications but does not have an extra room. The higher accessibility is created by having more space in the living room, bedroom, and bathroom. The bathroom also has an additional entrance towards the bedroom, which makes it easier to access. This apartment does, however, have a less defined entrance space compared to apartment A.

This apartment also has a moderate amount of window area to ensure that it can be easily covered by window blinds if needed. The apartment has, however, an extra window placed high up on the wall in the living room area, which can be seen in figure 65.

Figure 66. Living room in apartment B

Figure 67. Bedroom in apartment B

Figure 68. Corridor with high windows

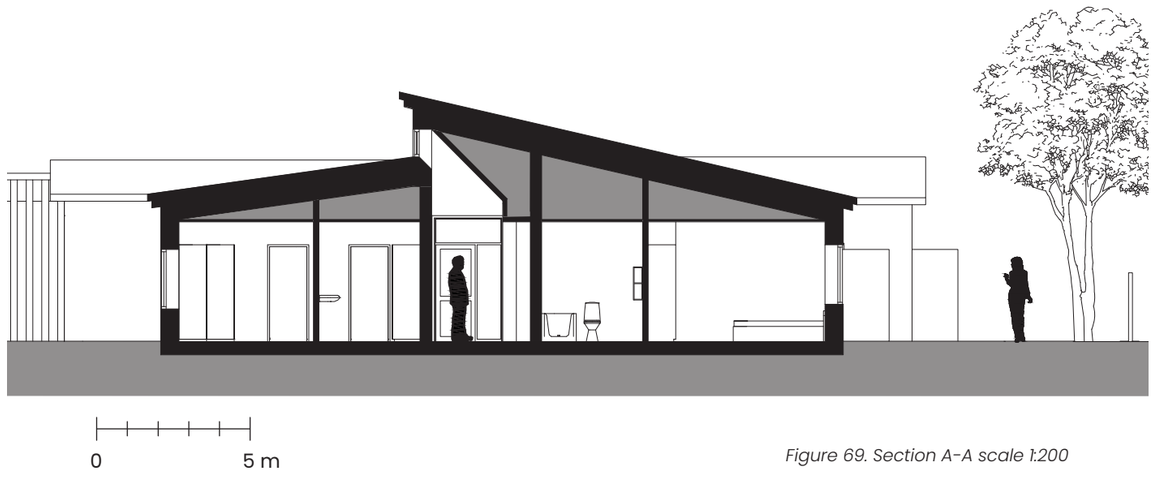


Figure 69. Section A-A scale 1:200

7.5 SECTIONS & ELEVATIONS

Figure 70. South west elevation scale 1:300

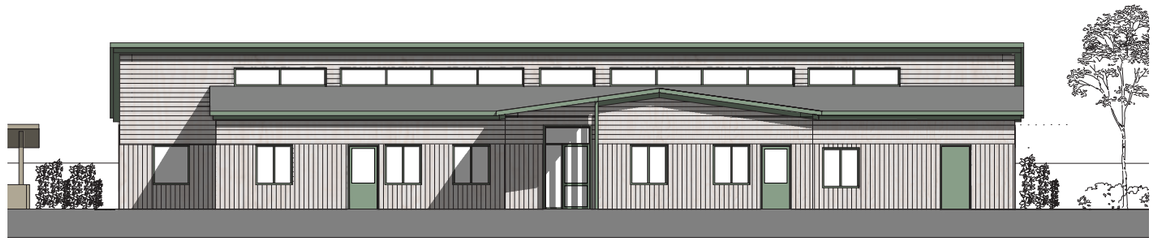


Figure 71. South east elevation scale 1:300

The corridors

The main corridor has high windows that bring daylight into the core of the building, decreasing the need for artificial light. The windows are frosted to diffuse the light so that it does not cause glare, in addition to blinds that limit the daylight if necessary. The ceiling height is higher in the corridor than in the rest of the building, where it is 2.6 meters. The choice of having a higher ceiling could, however, require more testing to ensure a good acoustic environment.

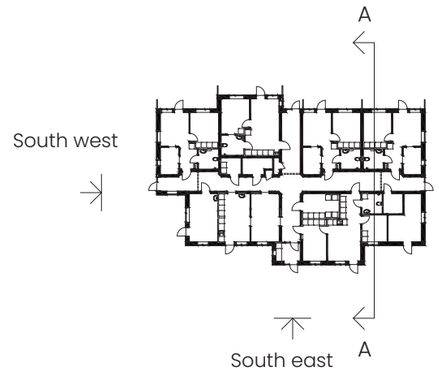


Figure 72. Common living room

Figure 73. Common activity room

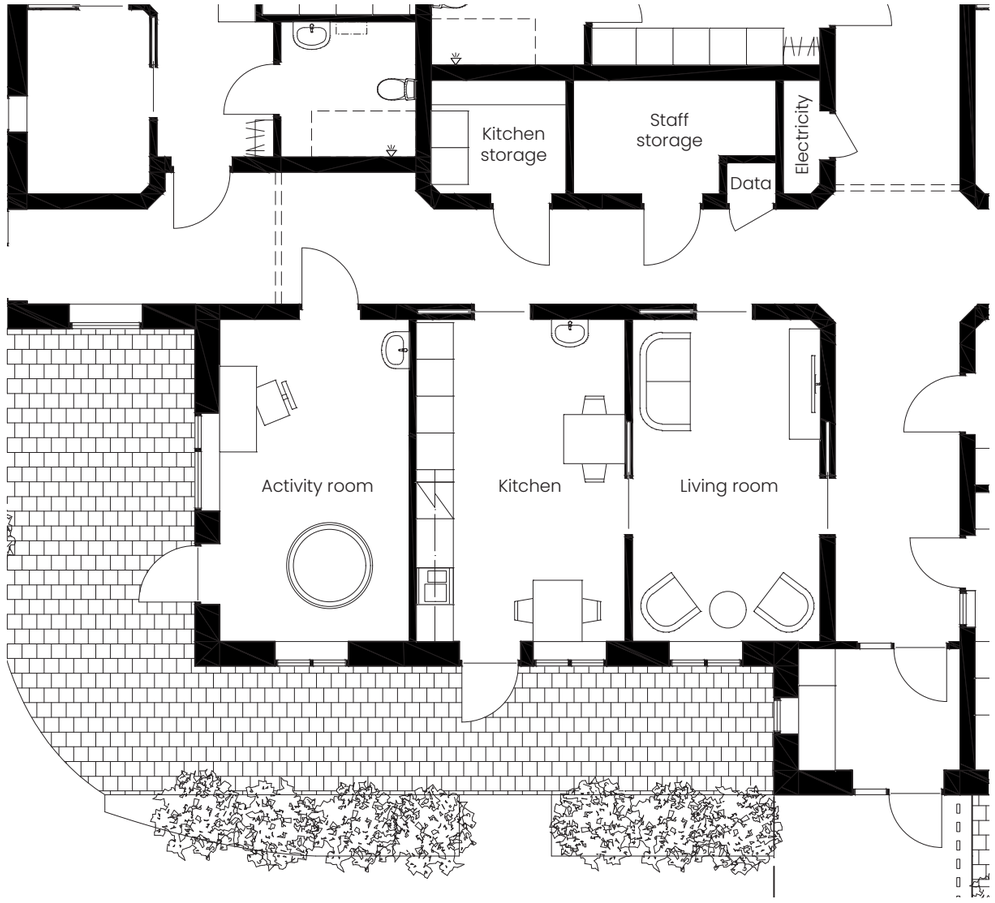


Figure 74. Common rooms, scale 1:100

7.6 COMMON ROOMS

The common rooms are designed to also be adaptable for different situations. They are similar in size so that the functions can change over time. There are two entrances to the common living room to create escape routes, and so that it can be easily accessed from different directions. There is also a door between the living room and kitchen so that these spaces can be used together. Sliding doors were chosen for these areas so that they can easily be kept open without disrupting the spaces. The kitchen has space for several seating areas and for big gatherings. It also has access to a large outdoor area so that residents can sit outside.

The activity room has a basic design so that it can be used for many different activities such as painting, playing music, using indoor swings or trampolines. This room could also possibly be used as a sensory room if the blinds are used to block visual stimulation from the outside. The colour on the walls is white, so that it can have limited sensory impressions if needed.

Figure 75. Corridor and entrance to an apartment

7.7 HOMELIKE

To create a homelike feeling in the accommodation, the apartments are large enough to have several rooms and a lot of private space. The floor plan of apartment A is based on the apartments in Billdals Björkväg, one of the visited accommodations, where staff noted that there was a good amount of storage. Each resident also has their own outdoor area, which, according to research, can affect the feeling of home.

The corridors in the building have the potential to create an institutional-like feeling. To avoid this, the corridors are light, spacious, and three entrances to the apartments are placed in niches which makes them more defined. Figure 75 shows one of these entrances. A green colour is added to the niche to differentiate it further.

The building is also designed to have a villa-like appearance and to fit in with the surrounding neighbourhood.

Materials & colours
The apartments are suggested to be white in this design proposal so that they are flexible for different sensory needs over time. This depends, however, on the residents who are going to live there. The common areas have natural green and beige colours on the walls, and the doors are wood or wood imitation.

The interior design is decided by the staff, residents, and their families, but this thesis suggests fabrics, colours, and other items inspired by nature.

Figure 76. Interior collage

7.8 CONNECTION TO NATURE

Most rooms in the building have direct exposure to natural elements such as daylight, views and operable windows for natural ventilation, which is shown in figure 77. The high windows in the corridor bring these experiences of nature to the core of the building.

There are both active and calm activities in the garden. There is a swing, trampoline, weather-protected seating area, garden beds, and smaller seating areas with bushes. These activities divide the garden into smaller areas. The weather-protected seating areas and seating areas with bushes are supposed to create the feeling of prospect and refuge. They should be safe spaces where the back is covered but with a long view of the garden.

To ensure privacy, there are wooden fences with climbing plants towards the neighbours. This was chosen instead of high bushes to save space in the garden and because there is currently a wooden fence towards one neighbour. These fences should have plenty of climbing plants on them so they can act as green elements in the garden.

Each resident has their own outdoor space in connection to their apartment where they can be alone. The private outdoor spaces have a short fence around them to ensure privacy from the other residents. These individual spaces are meant to be areas where the residents can enjoy being outside alone without having to meet others. It can be used as a complement to the shared garden that has more room for movement. To encourage movement in the garden, there is a path around the building. The path is of asphalt to ensure that it is wheelchair accessible.

Figure 77. Four zones of contact with the outdoors

Figures 78. Protected outdoor space in the garden.

Figures 79. Private outdoor space for an apartment.

8. DISCUSSION

This chapter discusses the results to find answers to the research questions and suggestions for future research. The chapter ends with concluding reflections about the thesis and possible improvements.

8.1 PROMOTE WELL-BEING

The results from this thesis suggest that architecture can promote well-being in group accommodations for children with ASD when they are designed to suit the residents' specific needs. The guidelines for autism-friendly design should be followed, and adaptability should be emphasised. What an ideal home environment is can be very different for children with ASD because of their different hyper- or hypo-sensitivities and difficulties meeting others. It is therefore essential to enable adaptations. As detailed in section 3.2, Emma and Jessica expressed that one of the main issues that they face as planners is creating a group accommodation that fulfils the current residents' needs and is also general in its design so that it can work for many in the future. An interesting topic for future research is looking at flexible floor plans that allow for as many situations as possible.

What was apparent when creating the design proposal in this thesis was that a lot of space is needed to create a floor plan following the suggestions from the gathered research. The increased amount of corridor space that allows residents to be more separated from each other is one of the significant factors. Therefore, finding the appropriate plot with a lot of space can be very important. Privacy is also a prominent issue, and it should be considered at the beginning of the project. Having neighbours close to the group accommodation can make creating privacy harder and lead to conflicts that the staff need to solve. It is, however, a balance of creating privacy and not shielding the group accommodation too much so that it cannot be seen and be a part of society.

8.2 HOMELIKE

What creates a homelike feeling is different for all residents, and what is generally considered a homelike environment might not be ideal in this type of group accommodation. This is because of, for example, the need to limit sensory impressions. The main factors that contribute to a homelike feeling are according to the results: their ability to have their own private space, shared spaces that they can feel comfortable in, being able to personalise the space so that it suits them, having a home with materials and colours that are familiar, and having an outdoor area. The topic of homelike environments is complex as it is subjective, yet it is an integral part of the residents' experience living there. For future research, it would be interesting to conduct more interviews with staff, parents, and children with the appropriate communication aid and on their terms so that they can voice what they would like their home environment to be.

8.3 CONNECTION TO NATURE

The residents can experience natural elements in different ways: direct experiences of nature, indirect experiences of nature and experiences of space and place. This can be used as a guideline for creating possibilities to connect to nature throughout the building. It is, however, important that the residents can choose when they want to have daylight, views, and other natural elements because they are also sensory impressions. The opportunity to experience natural elements, which can benefit their overall health and well-being, should be there, but the space should also enable residents to screen them off. Architects, including me, often think that bigger windows for more daylight and better views are better, and they are not aware of the issues that people can have because of this. At the same time, I believe this question should be investigated further to see what potential solutions could be made so that the residents can receive the positive effects from nature and the sensory environment they need. The garden is an important feature that should be emphasised when creating connections to nature for this target group, and there is potential for more research on how to design it.

8.4 CONCLUDING REFLECTIONS

Economy is a complex subject, as it is essential that the group accommodation is built to suit the residents and so that it can last for a long time. Design solutions that makes the building larger and more expensive can be necessary so that the home is safe and well-functioning for the

residents and staff. At the same time, it should not be over-dimensioned and have too many entrances, which can be costly, so it becomes unnecessarily expensive. According to Emma and Jessica, in section 3.2, designing a group accommodation that is general and flexible is a way of making it more economical in the long term. Being able to separate the residents in the building so that they do not have to meet can decrease the need for individual solutions.

Negative aspects about the thesis are that the study visits are not entirely representative of this type of building. One of the accommodations had only one child living there, and one had not been moved in yet. Therefore, a possible improvement to the study would have been to visit group accommodations with a similar target group and compare them. The number of interviews was small, making it hard to draw definitive conclusions about the results. Only three parents from two different families were interviewed, and it would be beneficial to have a larger sample size.

The design proposal in this thesis is meant to show an innovative example of what a group accommodation for children with ASD can look like. An extra room in the apartment that can be a quiet room with sensory equipment or a kitchen that can be closed off could potentially create an additional level of adaptability. I believe there is potential for more innovation in this area that could develop solutions to some of the problems that are present today. More research is needed for this specific target group so that we can design environments in which they can thrive.

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Figures:

3. An illustration based on the four zones of contact with the outdoors by Bengtsson (2015) inspired by Jenny Lilja, Boverket (2022). *Forskning från SLU, landskapsarkitektur och miljöpsykologi.* https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/vardens-miljoer/manniska-och-vardmiljo/evidens-och-kunskap/forskning-slu/

49. Photograph adapted from Miljöförvaltningen, Göteborgs stad, Trafikbuller beräknat på 2021 års trafikdata [Noise pollution calculated from 2021 traffic data]. https://karta.miljoforvaltningen.goteborg.se/

76. Interior collage containing pictures from Pexels. https://www.pexels.com/sv-se/

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CHALMERS
UNIVERSITY OF TECHNOLOGY

A PLACE TO GROW

Group accommodation for children with autism spectrum disorder

Johanna Edgren

Master's thesis 2025
Chalmers University of Technology
Department of Architecture & Civil Engineering