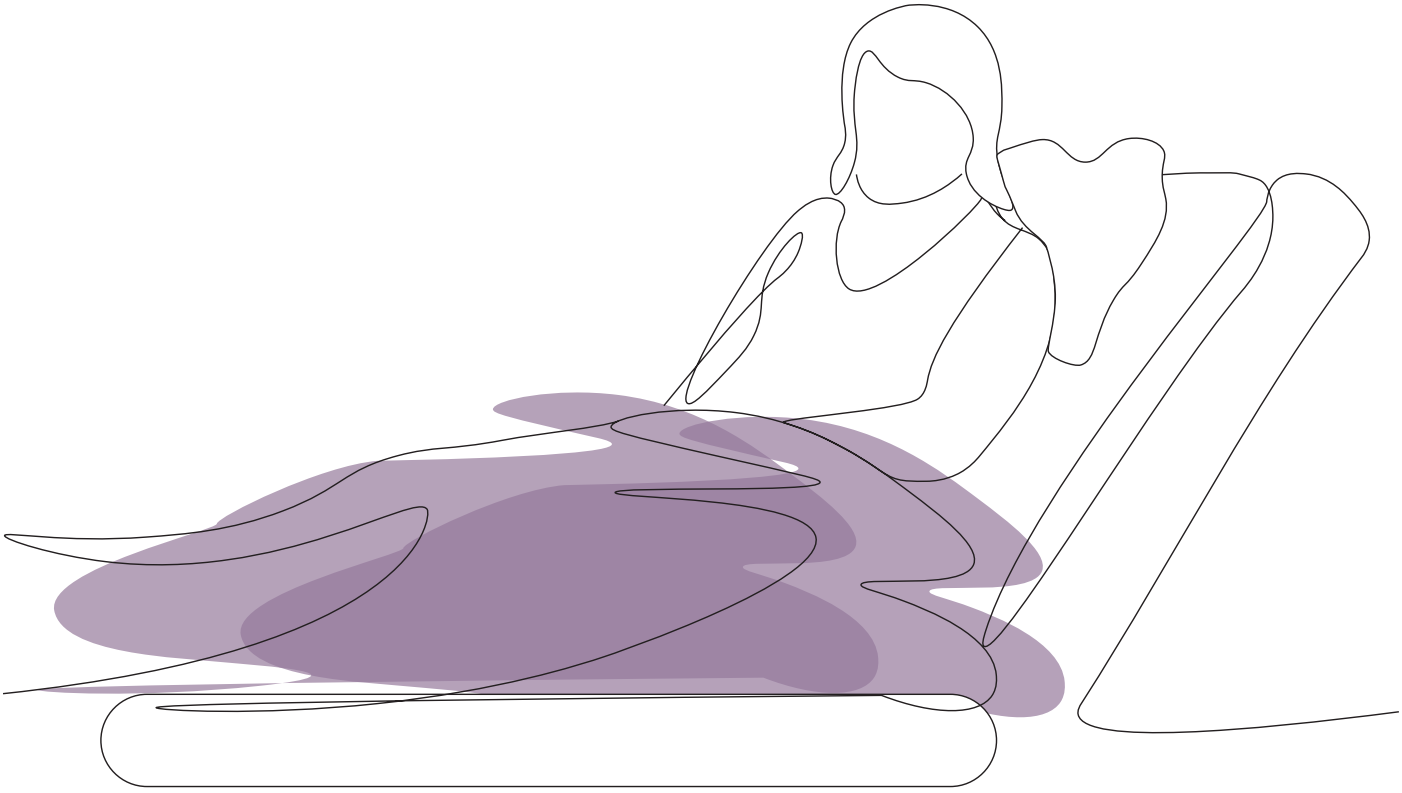
NIMA IN UPPSALA

A neurosurgery unit for postoperative- and intermediate care



Hanna Johansson

Chalmers School of Architecture

Department of Architecture and Civil Engineering

Year of publication and graduation: 2023

Examiner: Cristiana Caira

Tutor: Göran Lindahl

CHALMERS
UNIVERSITY OF TECHNOLOGY

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MPARC, Architecture and urban design

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ABSTRACT

How could the environment for staff, patients and visitors be improved by redesigning NIMA in Uppsala?

Akademiska sjukhuset in Uppsala serves all patients in the middle part of Sweden which includes almost 1,9 million people. Today, the hospital has challenges to develop the site which is tightly built with few possibilities for expansion and development. At the same time, the buildings are older and need to be updated according to today's standards of highly specialized healthcare facilities.

This master thesis will further investigate this challenge in a collaboration with a neurosurgery unit for patients who need intermediate or post-operative care (NIMA) at Akademiska sjukhuset. The unit has challenges with the facility where the care rooms are shared between three to six patients which cause both stress and challenges with privacy and recovery. NIMA also has challenges with hiring enough staff who wants to work there. Many employees attests that they suffer from stress and anxiety due to bad working environments, high workload, and many patients.

Additionally, the patients at the unit are especially vulnerable to their environment as they suffer from injuries, diseases or have been in surgery for reasons related to their brain, spinal cord, or peripheral nervous system. The patients are also in need of constant observation by staff which add extra requirements on the work conditions and environment. Research shows that through design and access to outdoor environment, it is possible to support the health and facilitate recovery for both staff and patients in hospitals.

By combining studies from research within the healthcare field, architectural knowledge and research, interviews with staff and observations at the unit, this thesis developed and present three scenarios with different scope. The scenarios are designed to facilitate staff's work, improve the environment for patients and better support visitors to patients treated within the unit. In a long term, this can contribute to an increase of recovery, health and wellbeing.

The main aim has been to develop an inspiring document with solutions the unit can use as a basis and starting point in a further discussion of an actual project to redesign the facility. This is also relevant in the ongoing discussion of how to develop Akademiska sjukhuset in the long-term perspective.

Keywords: Healthcare, Design, Architecture, Clinical environments, Hospital

STUDENT BACKGROUND

2017 - 2020

Chalmers university of technology// Bachelor of architecture

2020 - 2021

Chalmers university of technology// Master of architecture

AUT164 Future visions for healthcare, housing and work 1: Residential healthcare

ARK466 Sustainable architectural design

2021 – 2022

Architect intern// SWECO architects

Healthcare architecture

Residential/ Industrial projects in early stages

2022 - 2023

Chalmers university of technology// Master of architecture

ARK263 Future visions for healthcare, housing and work 3: Healthcare architecture

ACEX35 Master's thesis in Architecture spring 2023: Healthcare direction

TABLE OF CONTENT

INTRODUCTION

This chapter explains the purpose, background, delimitations, and method. It also contains reading instructions and a dictionary to support the understanding of terms used in the thesis.

THESIS QUESTION

How could the environment for staff, patients and visitors be improved by redesigning NIMA in Uppsala?

PURPOSE/ EXPLORATION

The objective of this master thesis is to investigate how an existing post-operative and intermediate care unit for neurosurgery patients (NIMA) can be redesigned to support a better environment. The purpose of this is to design environments that better support staff's work and patient's care and in a longer term, contribute to improve staff's and patient's wellbeing and recovery. The thesis also explores how a new design can support and create better physical environment for relatives and visitors to patients treated at the unit.

The work has been done through several meetings with staff working at the unit and two site visits containing observations and interviews with staff to understand, analyse and describe today's work, flows, environment, possibilities, and challenges. The proposed scenarios are divided in three parts with shorter and longer perspective. The first proposes only interior adjustments, the second a redesign on parts of the existing floor and the third a redesign on parts of the existing floor including extensions.

The main aim has been to create a supporting document (the thesis) including functional and inspiring scenarios for the unit to use as a basis and starting point in a further discussion about possible actual changes or project to redesign the facilities. Therefore, it has been important to design/ display different scenarios as a way to understand the similarities and differences between them.

Author's own illustration.

BACKGROUND/ DISCOURSE

This thesis investigates the premises of an existing healthcare unit at Akademiska sjukhuset in Uppsala. In August 2022, an analysis was done that analysed staff´s quality of life and perception of work at NIMA. The analyse showed several challenges with the working environment and patients care. After this, the unit started their work on how to change the facilities and improve the challenging environment for staff and patients.

The thesis addresses the existing challenge with crowded hospital rooms and difficulties to hire enough staff, as well as contribute with input to the discussion of single-patient rooms. Research recommends single-patient rooms, but the question is, when it comes to the staff working at the hospital, if it is the best solution for every unit.

The thesis is also relevant since there is an ongoing discussion of whether Akademiska sjukhuset should, in long term perspective, be redesigned in its current location or rebuilt outside the city. The reason is that they have challenges with cramped and older buildings that need to be updated according to today's standards. Earlier investigations have showed that it may not be possible to fulfil today's requirements with a renovation of existing buildings which is the reason behind a possible relocation of the hospital area (Kustmark E, Gozzi Svensson V 2022).

THEORY

During the process of this master thesis, several texts and literature have been studied. One of the main references in the literature chapter comes from research by Roger Ulrich who has written and studied the environment for staff and patients in hospital environments for many years. Another key reference comes from Anna Bengtsson who has written about outdoor environment connected to intensive care units.

The presented reference examples come from a report about single-patient rooms where different built examples were presented. Another example comes from a report about intensive care units (both published by CVA- centrum för vårdens arkitektur at Chalmers). The different projects showed in the master thesis have been important in the thesis work of understanding the needed measurements and layout for each patient.

DELIMITATIONS

The master thesis has been in collaboration with the unit of NIMA and all observations and interviews that have been done is from staff working in that unit. NIMA is on the same floor as NIVA and both share some common functions, but they also have different budgets and employees and therefore NIVA is not included in the scenarios.

Exceptions are the shared waiting areas which will be included in scenario 2 and 3 argued by both literature studies and staff's reflections. NIVA will also have a smaller change in one of their care rooms which is an agreed change to use space that is not used today (see the intended program in the process/ analysis chapter).

The master thesis does not include any calculations regarding the financial aspects of each scenario. Also, the work should be seen as a pre-study, inspiration, and basis to use in a further discussion about an actual project to redesign the facilities. A further project will need to include more studies on for example, a more exact program of rooms, detailed analysis of the building, additional knowledge from several disciplines including managers, calculations of cost and area, further investigation of room layout and more.

Additionally, the thesis only investigates today's premises, environment, location, flows, challenges, and possibilities etcetera. The investigation of redesigning or rebuilding the hospital, in a long-term perspective, has not been taken into consideration when designing the scenarios. Though, the subject is relevant in a bigger discussion and for a possible future change/ project.

READING INSTRUCTIONS

The first part of this thesis is the introduction that contains information and an explanation of the overall question and background. The following chapter about the background contains useful information and observations from site visits, meetings, and interviews at the unit. This chapter also includes general information about the site, patients, staff, and other neurosurgery departments in Sweden. The third chapter is the literature chapter that provides information and understanding about the designed environment and staff and patients' health.

After this, there are four reference projects presented that have served as inspiration and a knowledge base for the scenarios. The next chapter is the process and analysis part where the program of today and for the future is explained. The program is based on information received when interviewing and observing the staff at the unit. This chapter also contains analysis of the existing floor with support from the literature chapter. Furthermore, some examples from the investigation of different design options are presented as well as reflections from staff about earlier solutions. This chapter is important in the understanding of the master thesis process and how and why the scenarios got their final layout.

After this comes the three scenarios with the new programs, solutions, and proposed design. The following discussion and summary contain a pro- and cons diagram for the different scenarios and explains subjects that can be further discussed in the thesis or learnings that can be important to further investigate. The last chapter is a reference and bibliography list with reports, books, websites, and interviews that have been used to support the thesis.

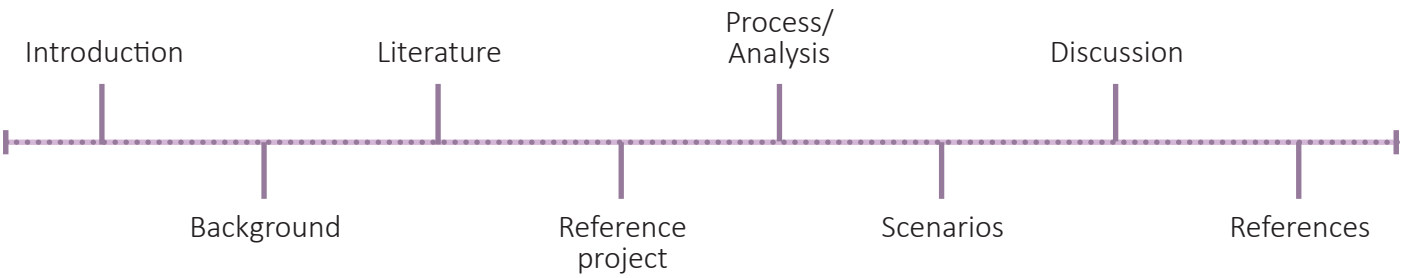


Illustration of thesis content connected to reading instructions. Author's own illustration.

METHOD

The method that has been used to develop the proposal is research by design. The research consists of literature studies, investigation of reference projects, several interviews/meetings with staff working at NIMA, observations and two study visits to Uppsala. The study visits at NIMA were three days each and included the possibility to walk around at the unit to understand how the staff work during the day, have conversations with them and observe patient flow. It has been important in the work to understand the unit, staff and patients and address possibilities and challenges of today's environment.

The literature is mainly related to topics that are important in the design to create environments that can support and facilitate staff and patients' recovery, health and wellbeing. An important topic is the outdoor environment which in this project can give an important value to both staff, patients, and relatives who visit, not only the unit, but the whole building 85. The literature chapter also includes how the hospital environment can affect and facilitate visits from relatives. This chapter has created a tool to evaluate the unit both before (existing) and after (scenarios) which has given the possibility to compare the designs with each other.

The research has also included an investigation of built examples and the reference projects that have been studied comes from the report about single-patient rooms and intensive care units, both published by the Centre for Healthcare Architecture at Chalmers. The projects have been chosen because they address different ways of designing, how much space each care room needs and how the rooms can be designed for patients that require around the clock care and observation. It has also been important to compare and see different solutions since NIMA is somewhere in between an intensive care unit that needs 30sqm/ patient (information from PTS) and an ordinary hospital ward that need 20sqm/ patient.

There has also been a design by research process where different alternatives have been tested and evaluated with the help of the literature chapter and in discussion together with staff at the unit. This testing has mainly been done in plan, elevation, and 3D both by hand and digitally and has been important for evaluating and understanding different scenarios. It also helped with understanding which solution is the best in relation to supporting staffs work, patients care and recovery- and the people who visit. An important tool has also been continuous counting of rooms and areas to compare different scenarios and understand the connection between area and certain values for the unit.

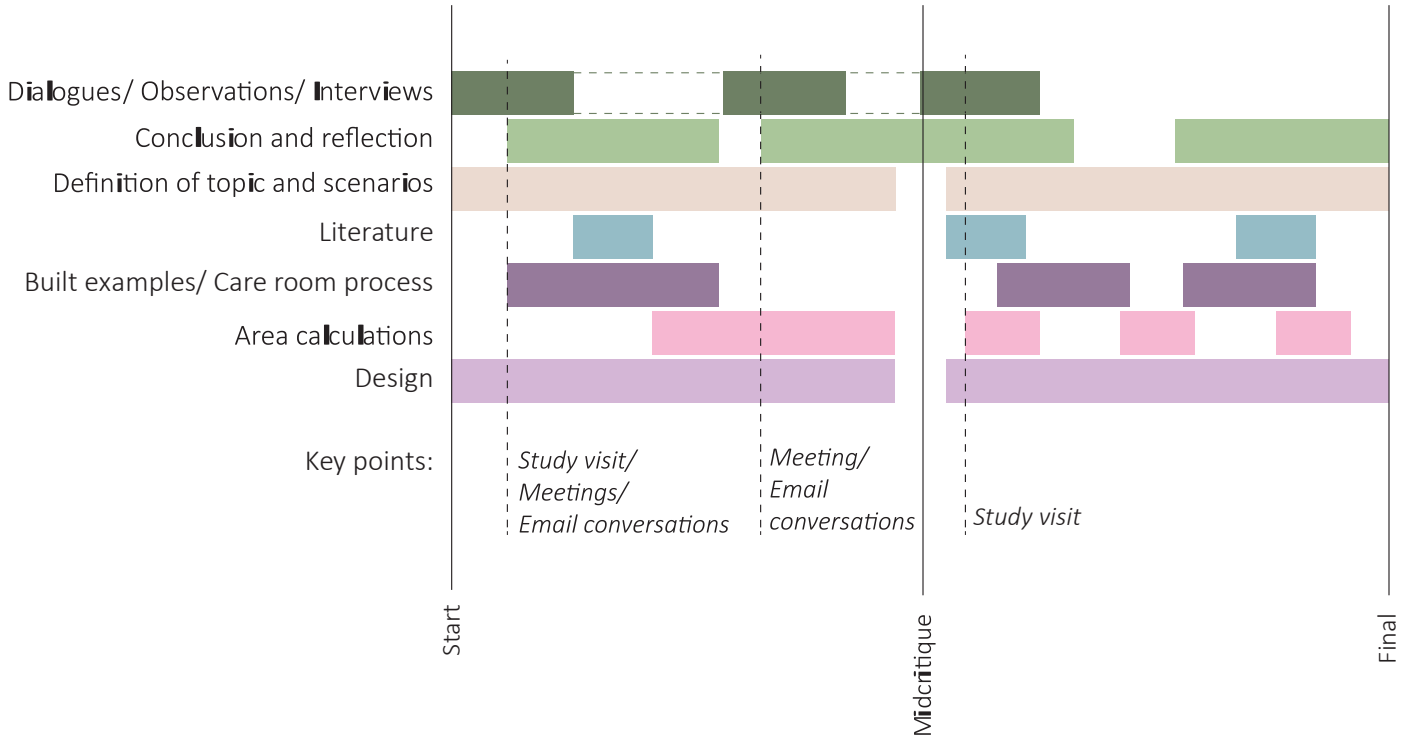


Illustration explaining the thesis process. Author's own illustration.

DICTIONARY

NIMA = Intermediate care unit for neurosurgery patients (Neurokirurgins intermediärvårds-avdelning)

NIVA = Intensive care unit for neurosurgery patients (Neurokirurgins intensivvårdsavdelning)

ICU = Intensive care unit (intensivvårdsavdelning)

Neurosurgery = The medical expertise concerning diagnoses and treatments for patients with injuries or diseases in the brain, spinal cord, or peripheral nervous system (Akademiska sjukhuset n.d. b)

Intermediate care = A form of care in between intensive care and an ordinary hospital ward where failing vital functions can be observed and nurtured (Kunskapsstyrning vård n.d.)

Noise = Refers to high sound levels that effect people in a negative way (Buller)

Single-patient room = A care room designed for one patient (En-patient rum)

Double-patient room = A care room designed for two patients (Två-patient rum)

Multi-patient room = A care room designed for several patients (Fler-patient rum)

Workplace = Workstation for one person that includes one desk and one chair

Health = *"...a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.*" (WHO n.d. a)

Wellbeing = *"... a positive state experienced by individuals and societies... Well-being encompasses quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose*." (WHO n.d. b)

BACKGROUND

This chapter contains background information about the location, the building, and the unit. It explains the work environment for staff and contains information about the patients treated in NIMA. This chapter has served as a base for the scenarios and has been important in the process of understanding the work and treatment done at the unit.

NEUROSURGERY DEPARTMENTS

There are 6 departments for neurosurgery patients in Sweden located in Uppsala, Göteborg, Linköping, Lund, Solna and Umeå (Swedish neurosurgical society, 2022). Each of these departments have different types of capacity and room for different number of patients and are therefore designed in different ways.

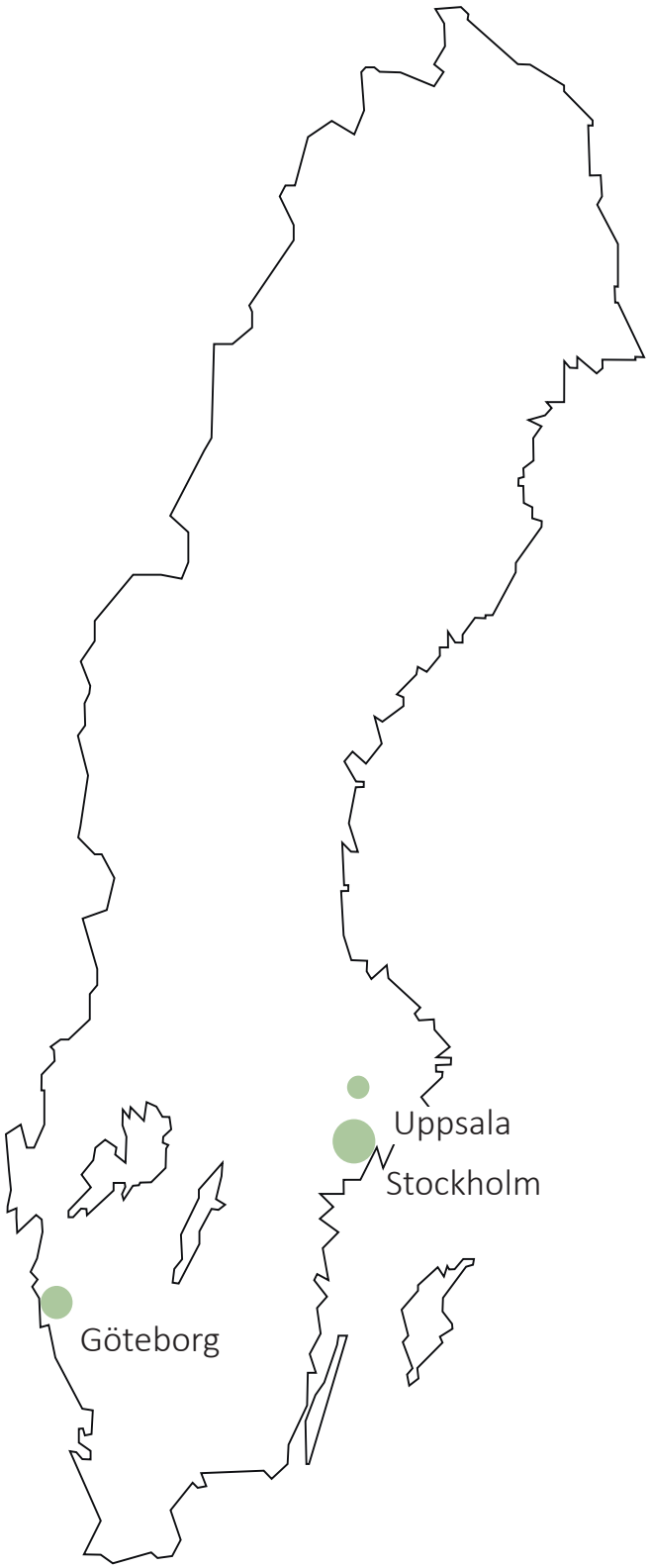
The departments are often divided into several units depending on the level of assistance needed by the patients. Examples are intensive care units, intermediate care units, standard wards, or day-care units. Day-care units are only for patients who have an appointment at the clinic and the other units take care of the patients for longer periods at the hospital (Doctor 1, personal communication, 23 January 2023).

This thesis will focus on the neurosurgery department in Uppsala. Uppsala is a city around 7 miles north of Stockholm and the department is located within the hospital area called Akademiska sjukhuset (Akademiska sjukhuset, n.d. b). This department serves all patients in the middle part of Sweden which includes almost 1,9 million people and is therefore one of the biggest in Sweden (Akademiska sjukhuset, n.d. b). The thesis will investigate floor 4 in building 85 with two units called NIMA and NIVA and the focus will be on NIMA.

BACKGROUND CHALLENGES - WHY?

NIMA today has a challenge to employ staff who wants to work there. This is not only a challenge at NIMA, but in many Swedish hospitals today (Doctor 1, personal communication, 4 November 2022). According to Doctor 1 (personal communication, 4 November 2022) a possible reason for this is the working environment. For example the light, sound, stress of taking care of complex patients and facilities that do not support the work performed at the unit or facilitate recovery for staff.

Many employees are suffering from stress and anxiety that effects their health. This has also been confirmed in an analysis done at the unit in August 2022 which analysed staff´s quality of life and perception of work. Another challenge is that the patients are sharing rooms with two to six other patients which cause both stress and challenges with privacy and recovery in the care rooms (Doctor 1, personal communication, 4 November 2022).

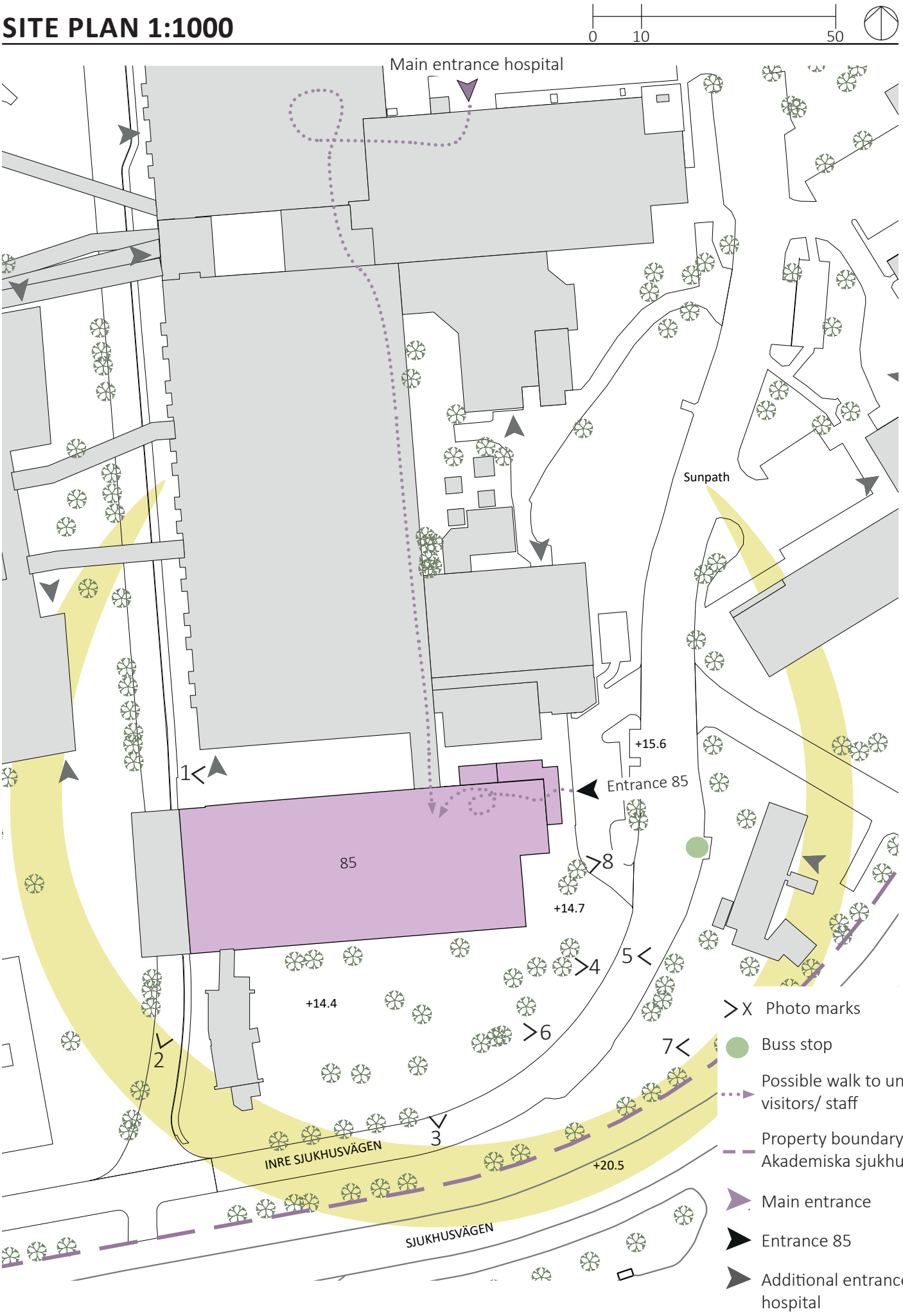


Map of Sweden. Author's own illustration

AKADEMISKA SJUKHUSET

(Google (n.d.) [Google maps 3d vy för akademiska sjukhuset Uppsala] n.d.)

SITE PLAN 1:1000



OUTDOOR ENVIRONMENT

Author's own photographs

Courtyard between buildings in the north

Road under house 85- NIMA & NIVA in ground level

Facade to south

Outdoor area south of building 85

Outside entrance 85

Outdoor area south of building 85

Green area across the road from building 85. Possible to see from unit

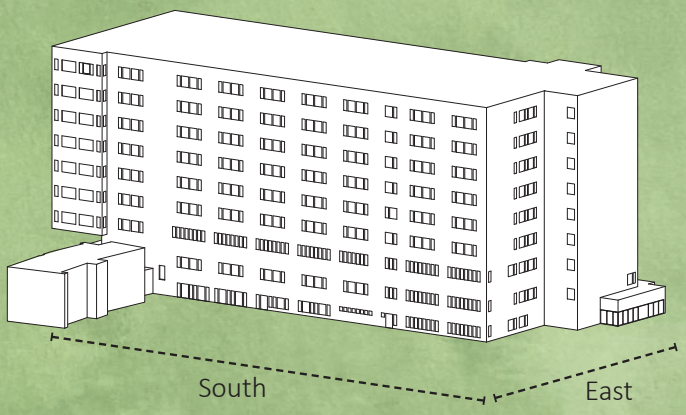
The corner of building 85

FACADES

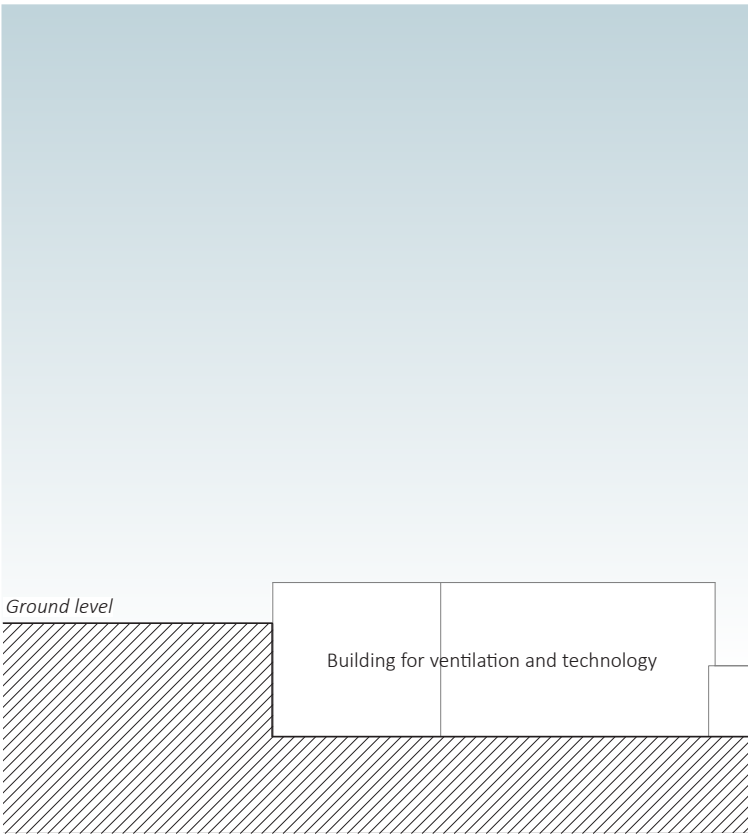
Note: The facades are only illustrations of building 85. The illustrations are estimated from received drawings and authors own photographs and should not be seen as the exact drawings of the existing building.

MATERIALS

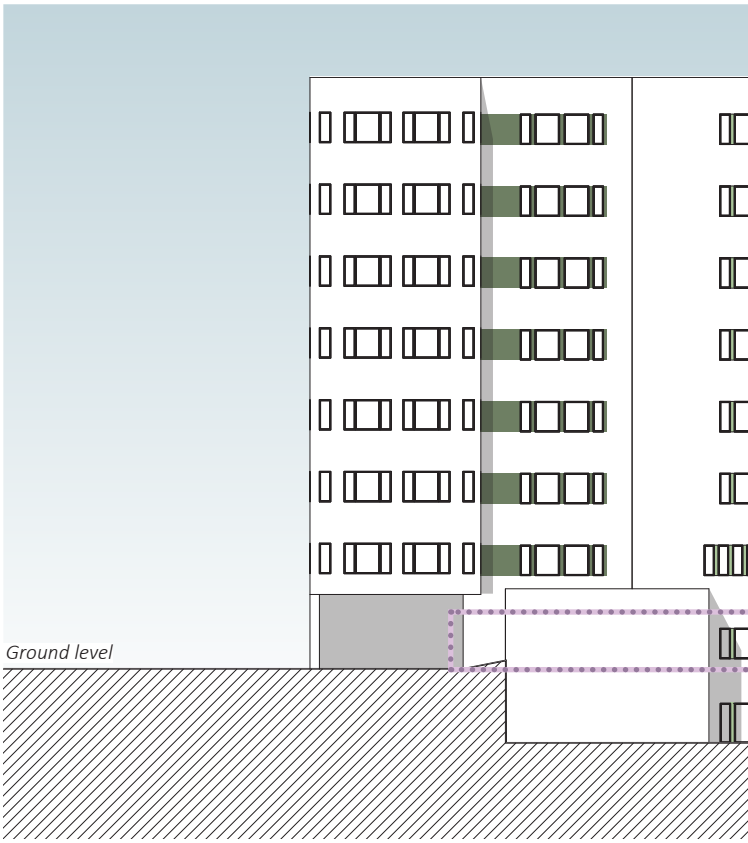
The façade is covered by beige plaster, but as new extensions have been built, also beige and grey panels have been added. The window frames are in a white colour and in between the windows is one or several green sheets.



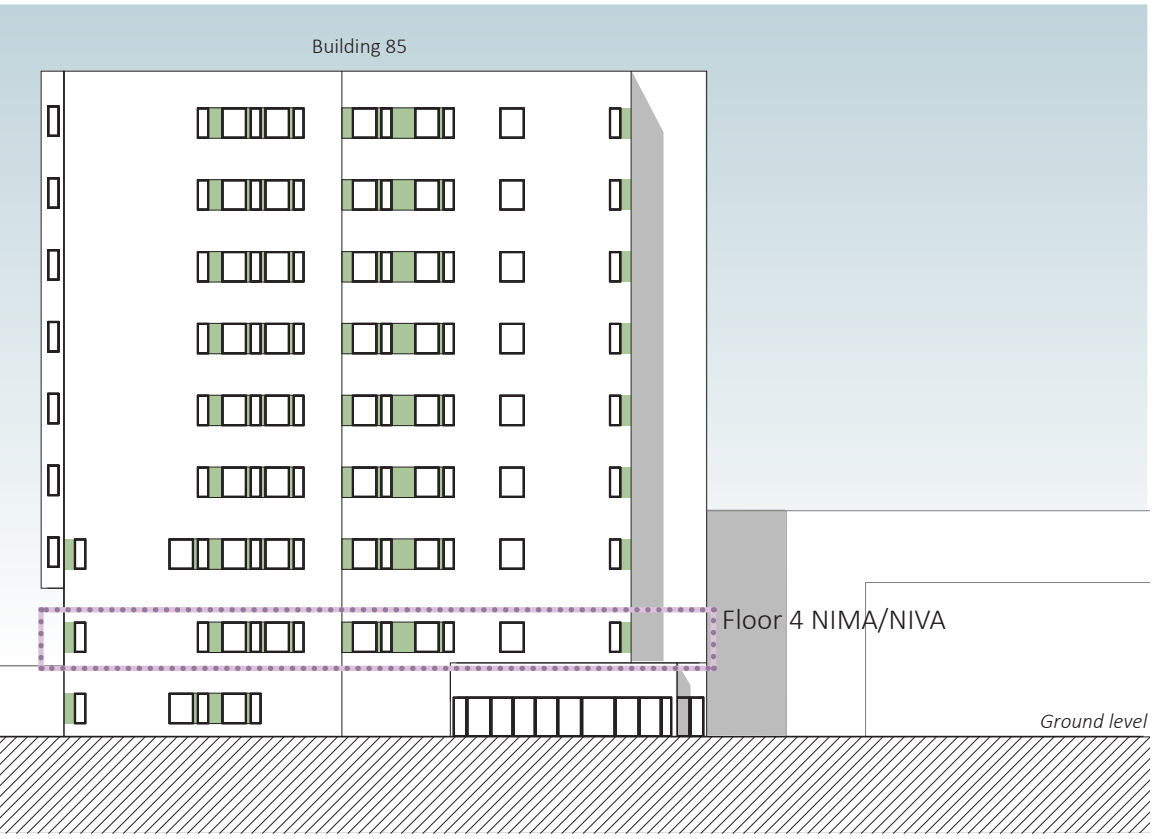
3D perspective of building 85

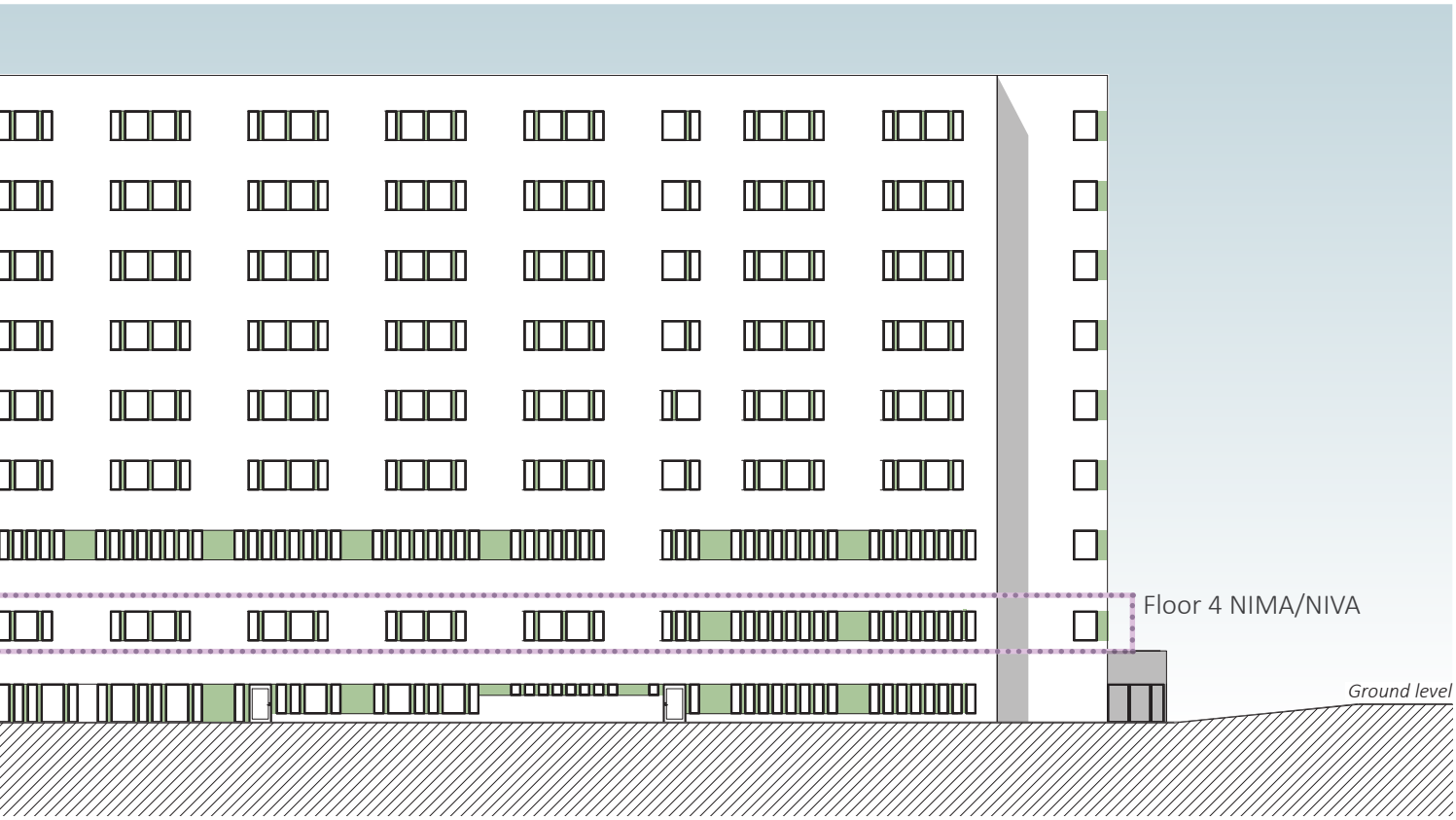


FACADE TO EAST 1:400



FACADE TO SOUTH 1:400


Building 85
Floor 4 NIMA/NIVA
Ground level


Floor 4 NIMA/NIVA
Ground level

ABOUT THE BUILDING

Note: The drawings are only illustrations of building 85. The illustrations are estimated from received drawings and authors own photographs and should not be seen as the exact drawings of the existing building.

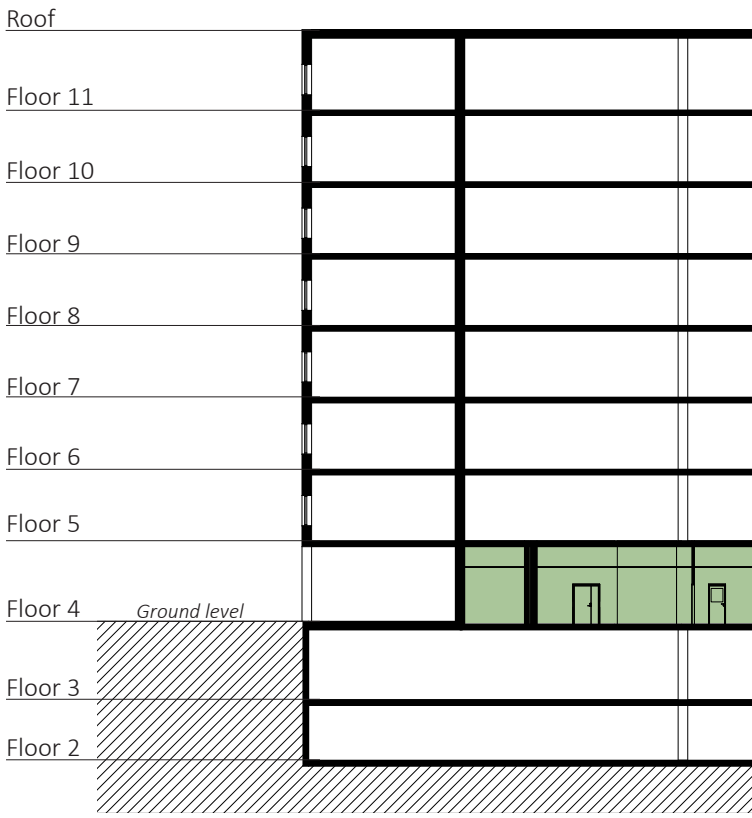
INFORMATION

The building was built somewhere around 1980 (exact year has not been able to be found). NIMA and NIVA was renovated 2005 with new finishes, floors, walls, and ceilings as well as a new kitchen and toilets. At this renovation, new medical equipment's attached to the ceiling was installed in the care rooms (Byggconstruct n.d.).

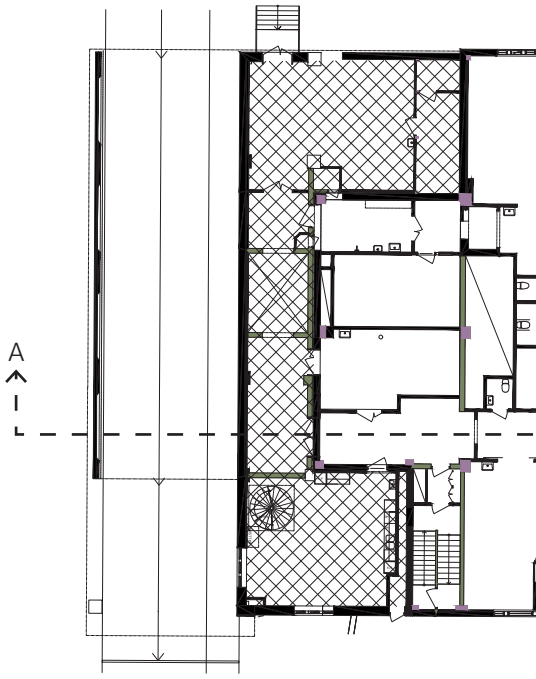
Between 2013-2016, an extension of the house was built. This extension included new technical space and a new staff kitchen (todays NIVA kitchen). It was also at this point, that the helipad on the roof was built. This extension is smaller on floor 4 due to the road in the west which means that the upper floors have more area than floor 4 (Byggconstruct n.d.).

CONSTRUCTION

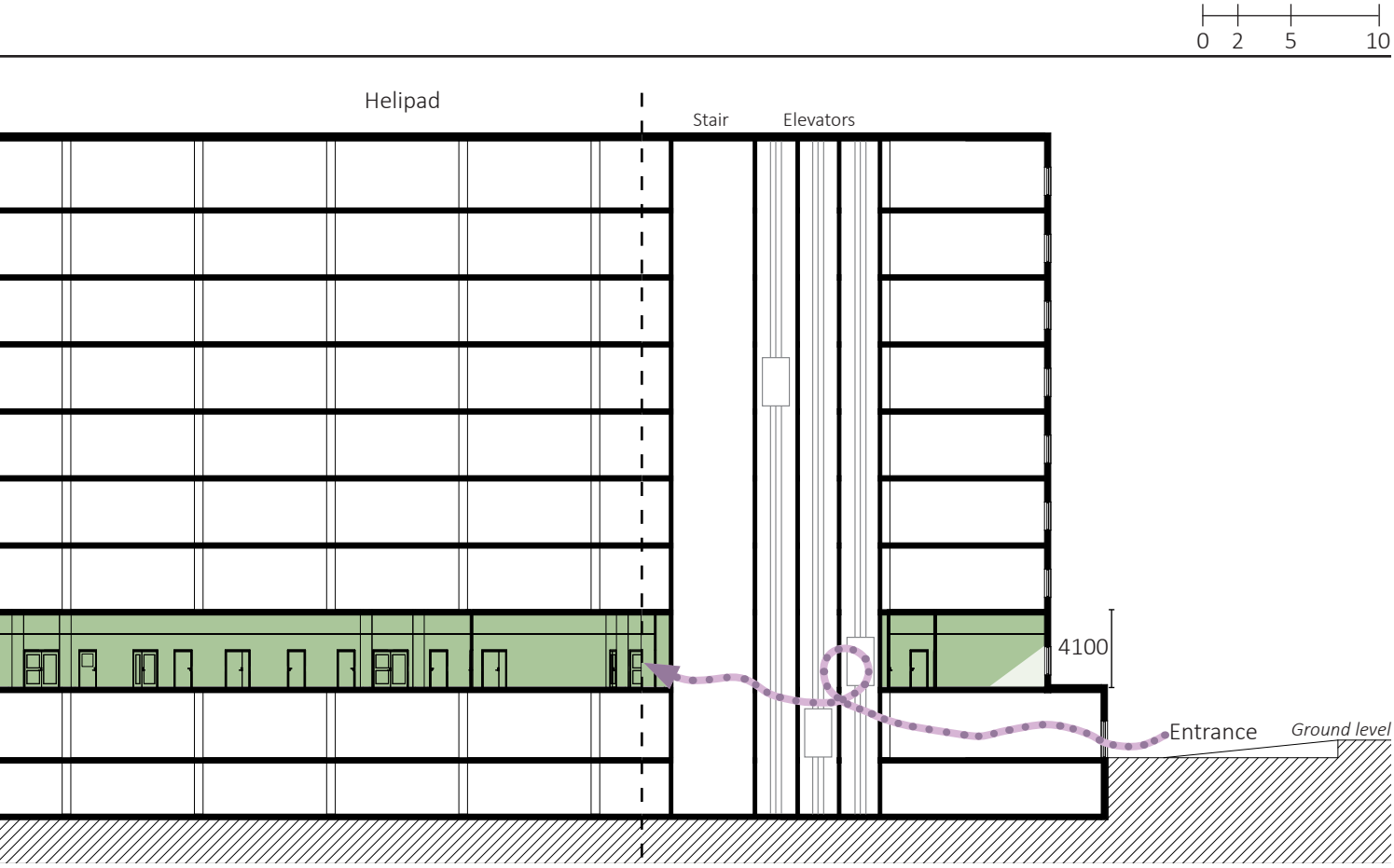
The building construction is a pilar and beam concrete structure with stabilizing walls (Byggconstruct n.d.).

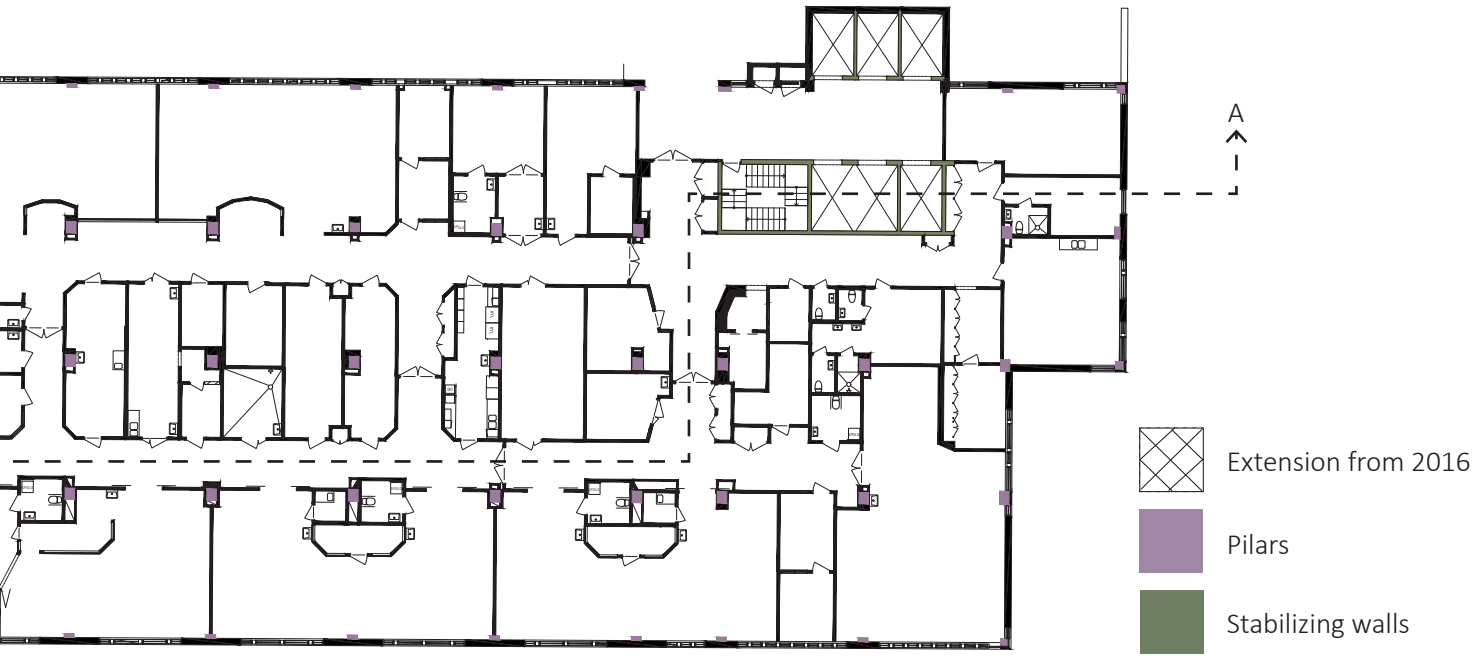


SECTION A-A 1:400



FLOOR 4 1:400


0 2 5 10
Helipad
Stair
Elevators
4100
Entrance
Ground level


A
Extension from 2016
Pilars
Stabilizing walls

NIMA AND NIVA

NIVA

NIVA is an intensive care unit for neurosurgery patients that suffers from trauma injuries or diseases in their brain, spinal cord, or the peripheral nervous system. Examples are patients who has had a stroke or have been in a car crash. The patients can be in all ages and are usually fully anesthetized (Akademiska sjukhuset n.d. c).

NIMA

Akademiska sjukhuset (n.d. a) states that NIMA is a highly specialized neurosurgery unit for intermediate- and postoperative care including emergency patients. The patients can be both children, adults and elderly that has, as NIVA, an acute phase of diseases or injuries in their brain, spinal cord, or the peripheral nervous system. Doctor 1 explains (personal communication, 23 January 2023) that the patients in NIMA need intensive observation and monitoring but do not need to be sedated or intubated. Therefore, they are too complex to be treated in a standard ward. In addition, many patients come from NIVA as part of the post-acute phase, after extubation. NIMA also has postoperative patients for example people who has been in surgery to remove a brain tumour or similar (doctor 1, personal communication, 4 November 2022).

PATIENTS

NIMA and NIVA patients are nurtured by nurses and nursing assistants 24 hours a day/ 7 days a week (Doctor 1, personal communication, 4 November 2022). The care includes continuous testing of neurological functions in the brain and spinal cord and supervision of virtual functions as breathing, circulation, nutrition, and elimination (Akademiska sjukhuset, n.d.). The patients are usually bedridden and/ or connected to medical equipment for observation and therefore rely on staff for help with necessary hygiene etcetera (Doctor 1, personal communication, 4 November 2022).

DOCTORS

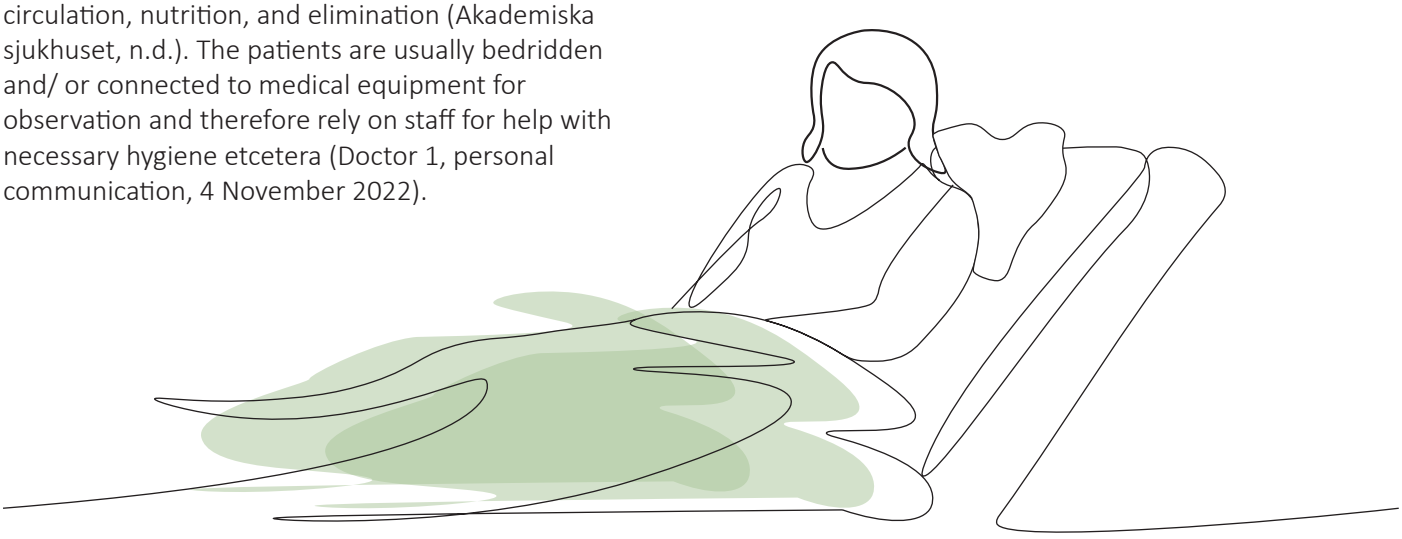
There are a total of 30 doctors working at the neurosurgical units in Uppsala, 18 people during day and 2 during night. 3-4 of the doctors' work at NIMA during daytime. The other units are two neurosurgery day-care units, and they also participate and execute surgeries within the field. The doctors' workhours are either 7.00-16.45 (day) or 16.00-7.00 (night) (Doctor 1, personal communication, 23 January 2023).

NURSES/ NURSING ASSISTANTS

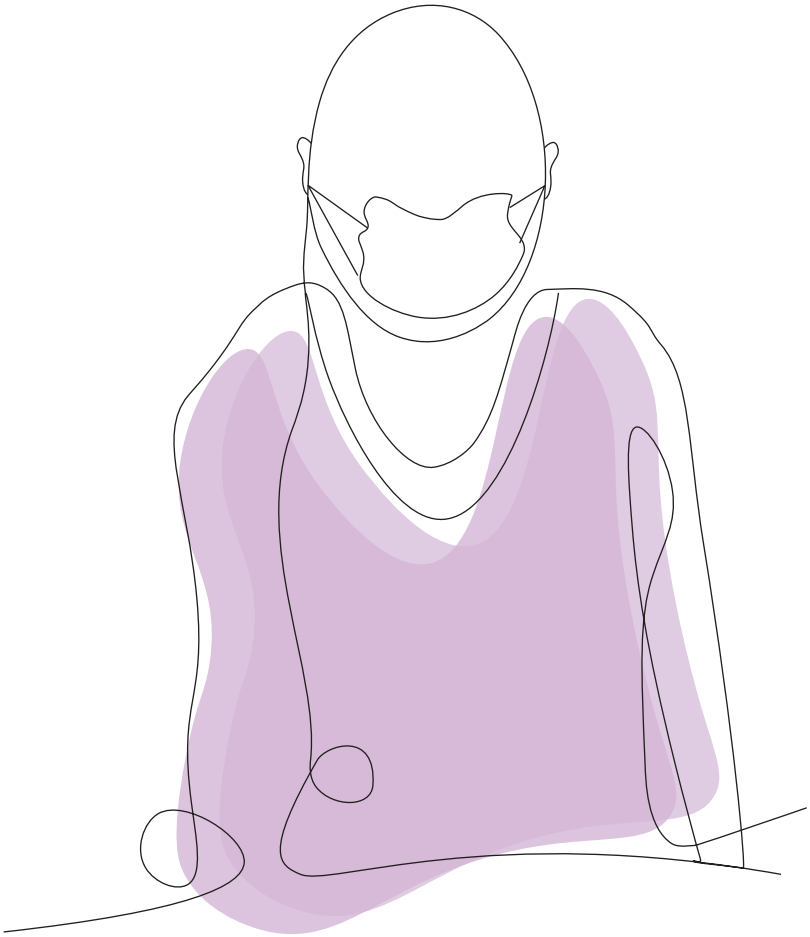
According to the head manager at NIMA (personal communication 24 January 2023) the nurses and nursing assistants only work in one of the units. In NIMA, there are currently 28 nurses (their actual need is 33) and 29 nursing assistants (their actual need is 35). Both have the same working hours which are 6.45 – 15.30 (day), 13.30-21.30 (evening) and 21.00-07.00 (night) (Nurse 1, personal communication, 24 January 2023). Some nurses also have other administrative obligations for example working as an assistant manager at the unit or is responsible for the premises (Nurse 1, personal communication, 24 January 2023).

ADMINISTRATIVE WORK

There are some staff who have administrative work obligations. Most of them have double tasks, working both with administrative duties and as a nurse/ nursing assistant. They use their administrative workplace 1-2 days a week. In addition, there are at least four people at the unit who only have administrative duties and they use their workplace 5 days a week (Nurse 1, personal communication, 24 January 2023).

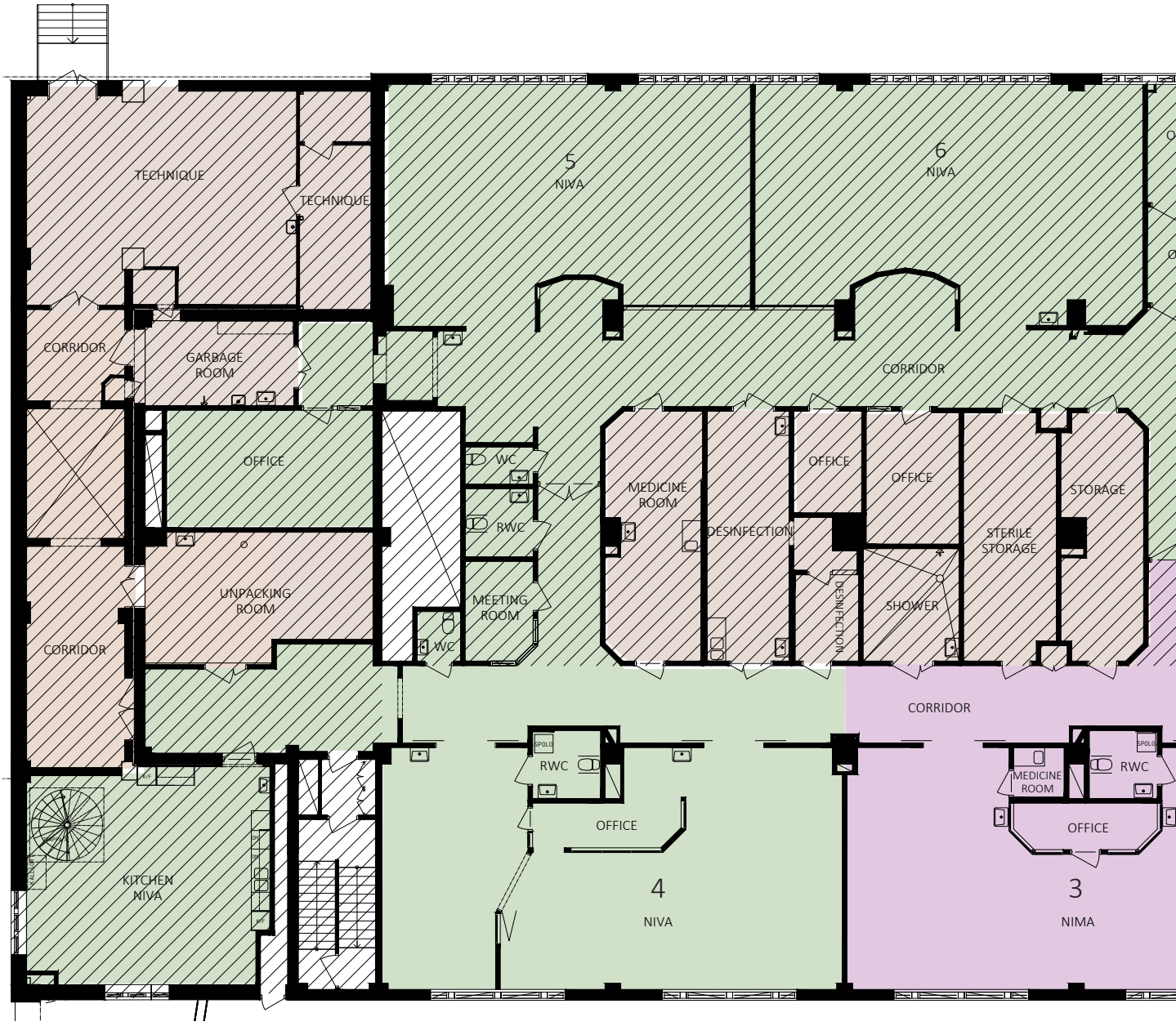


Illustrations of a patient. Author's own illustration.



Illustrations of staff. Author's own illustration.

FLOORPLAN 1:200



Shared functions

NIMA

NIVA

Area not included in MT


ISOLATION ROOM
LAB
AIR LOCK
RWC
LAB
RESEARCHERS 8ppl
DOCTORS ROOM
CORRIDOR
KITCHEN NIMA
WAITING ROOM
RECEPTION
OFFICE 2 ppl
WC
WC
CHANGING ROOM
OFFICE 3 ppl
KITCHEN
STORAGE MEDICAL EQUIPMENT
OFFICE
WC
SHOWER
MEETING ROOM/ RELATIVES ROOM
OFFICE 3 ppl
RWC
OFFICE 2 ppl
CORRIDOR
RWC
MEDICINE ROOM
OFFICE
1
POST-OP
OFFICE 3 ppl
2
NIMA
OFFICE 1ppl

FLOOR 4

1. Meeting room staff and relatives, NIMA

1. Meeting room staff and relatives, NIMA

2. Waiting room

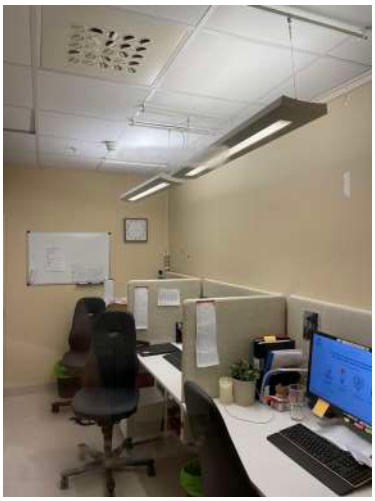
2. Waiting room

3. Office 3ppl

4. Staff kitchen, NIMA

4. Staff kitchen, NIMA

5. Care room 1, post-op



6. Office 3ppl

7. Corridor

7. Corridor

8. Care room 2, NIMA

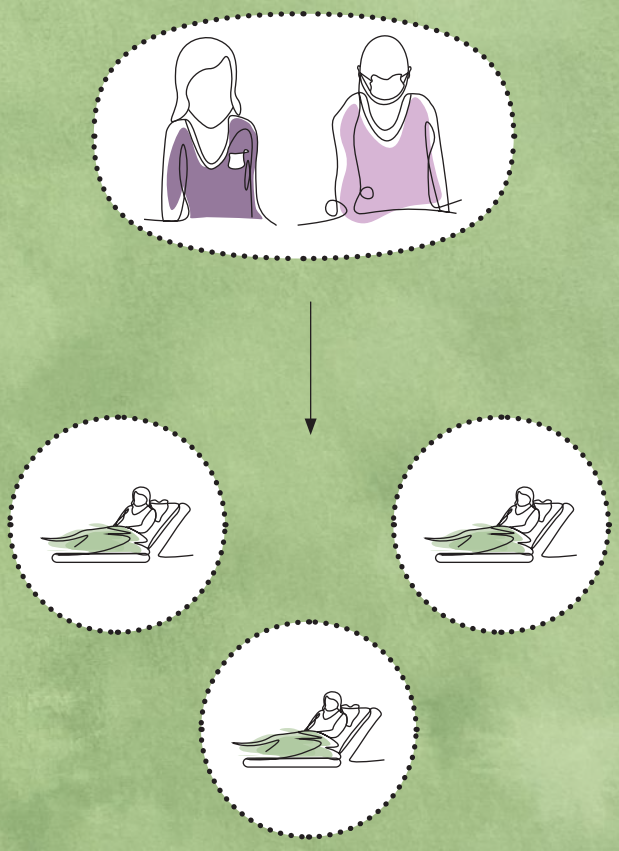
9. Care room 4, NIVA

THE HOSPITAL ROOMS AT NIMA

There are three care rooms at NIMA called 1 (post-op), 2 (NIMA) and 3 (NIMA). The nurses and nursing assistants are working in teams with one nurse and one assistant. These two forms one care team. Today, one care team is responsible for the care of either four post-operational patients in care room one or three NIMA patients in care room two or three (Nurse 3, personal communication 24 January 2023).

MEDICAL ROUNDS

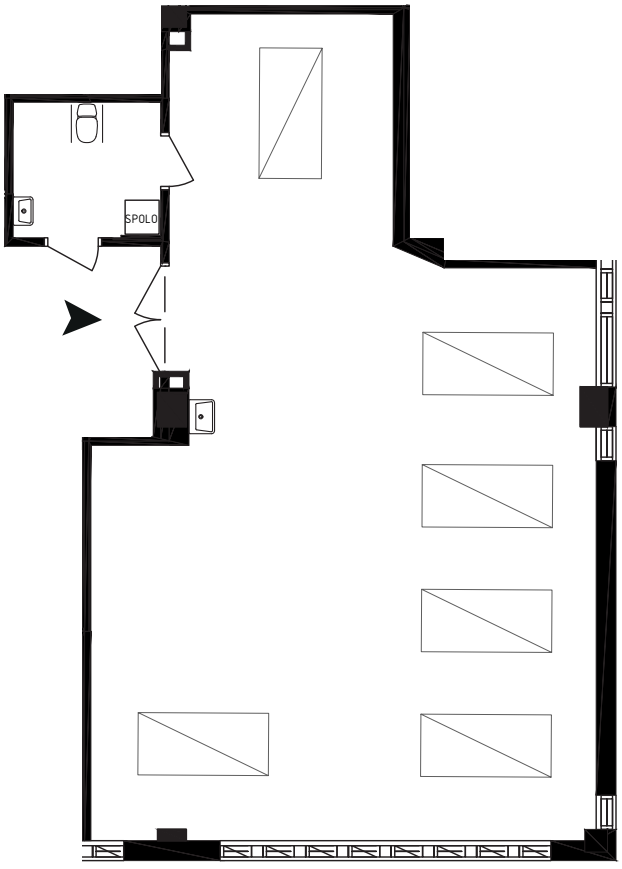
Medical rounds are done 3 times/ day at 9.00, 15.00 and 23.00. At that time, one or two doctors visit each care room and have conversations with the care team about their patients and atleast once a day, it includes conversations with the patients as well (Doctor 1, personal communication, 23 January 2023). In care room one, this is done either in the care room or in the corridor outside. If it is in the corridor, only the nurse communicates with the doctors. In care room two and three, one care team can do the medical round in the office within the care room, and the other care team usually do it by the beds (Nurse 3, personal communication, 24 January 2023).



One care team and three patients. Author's own illustrations.

CARE ROOM 1

Care room one has space for 4-6 beds and is primarily for post-operational neurosurgery patients (Doctor 1, personal communication, 23 January 2023). This room is usually active 24h/ day from Monday at 13.00 to Friday at 15.00 (Nurse 1, personal communication, 24 January 2023). Each patient is usually there between 2-48 hours after surgery and afterwards, they are either sent home or to another in- or outward unit. (Nurse 1, personal communication, 24 January 2023).



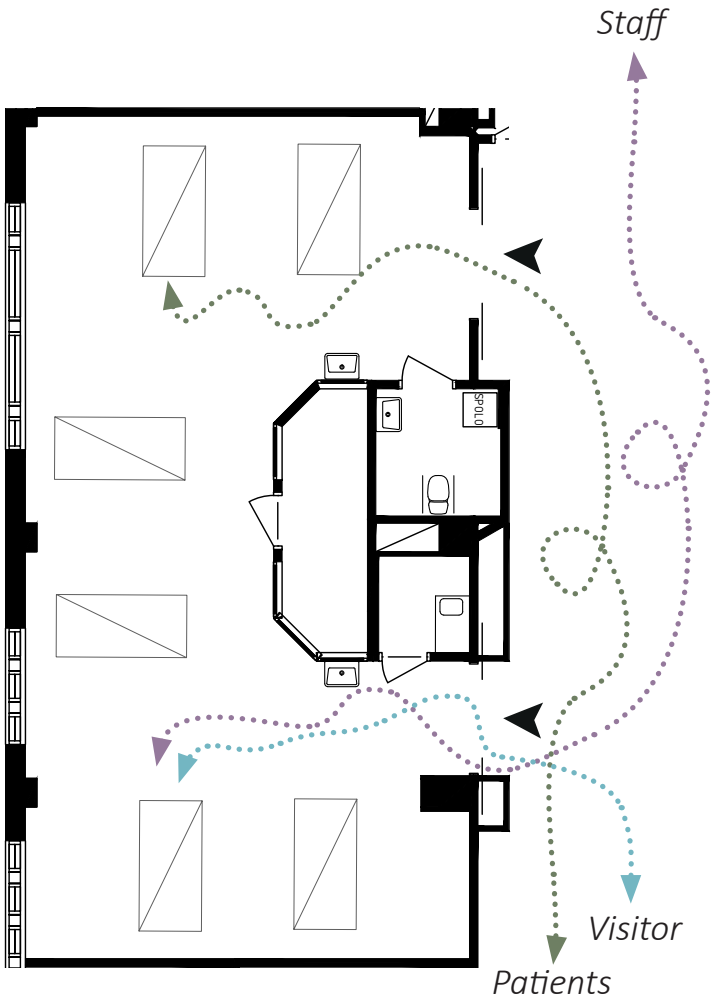
Drawing of care room 1

CARE ROOM 2

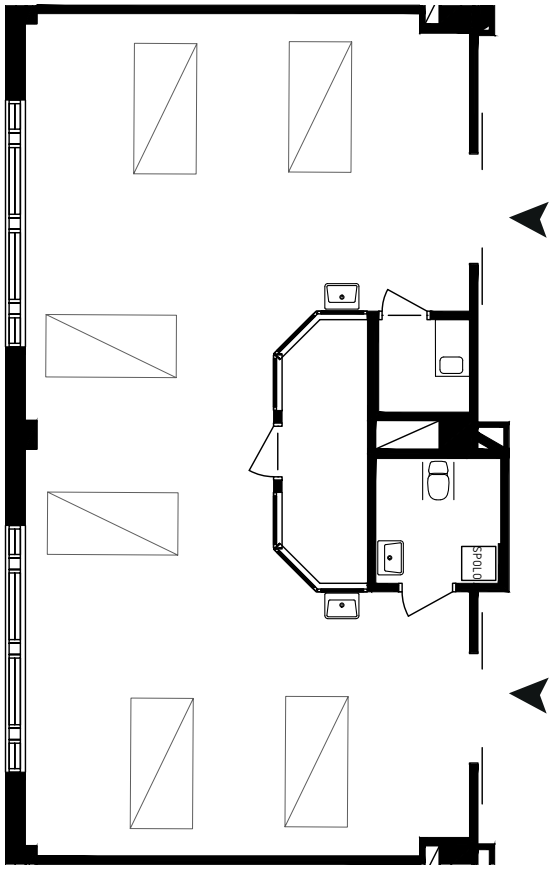
Care room two has space for six beds and is for patients that requires intermediate care. Patients who need extra care or observation by staff are usually treated in this care room (Nurse 1, personal communication 24 January 2023). It is open 24 hours/ day, every day in the week (Nurse 3, personal communication 24 January 2023).

CARE ROOM 3

Care room three has space for six beds but only 3 of them are usually used for patients that requires intermediate care. Therefore, Monday to Thursday every week, this rooms has post-operational patients who have done surgeries in their eyes or ears. For intermediate care, it is open 24 hours/ day, every day in the week (Nurse 3, personal communication 24 January 2023).

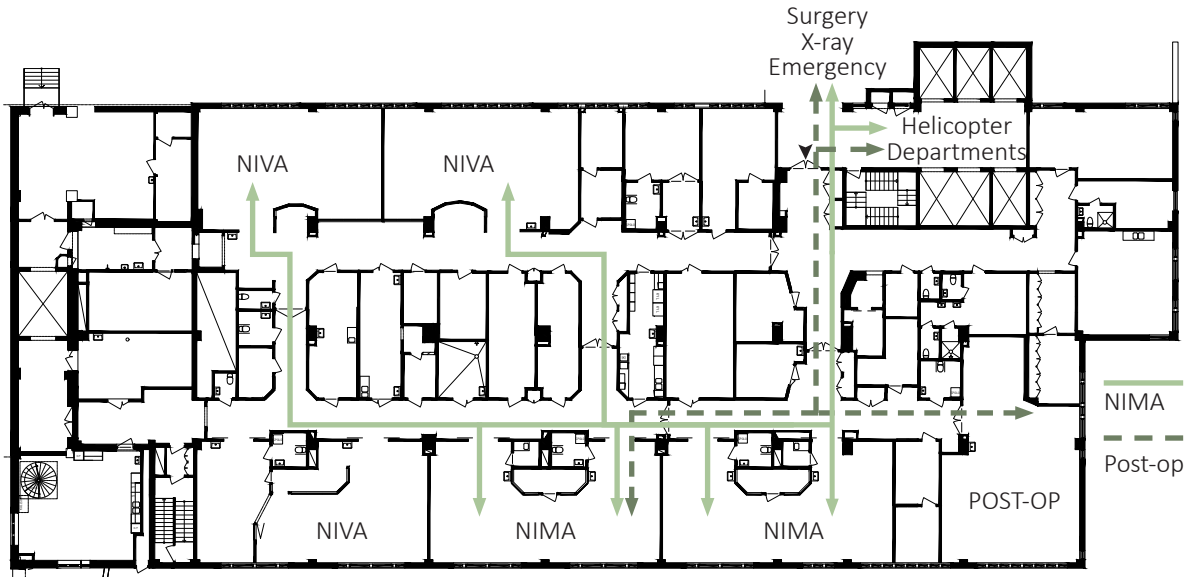


Drawing of care room 2 and example of flow

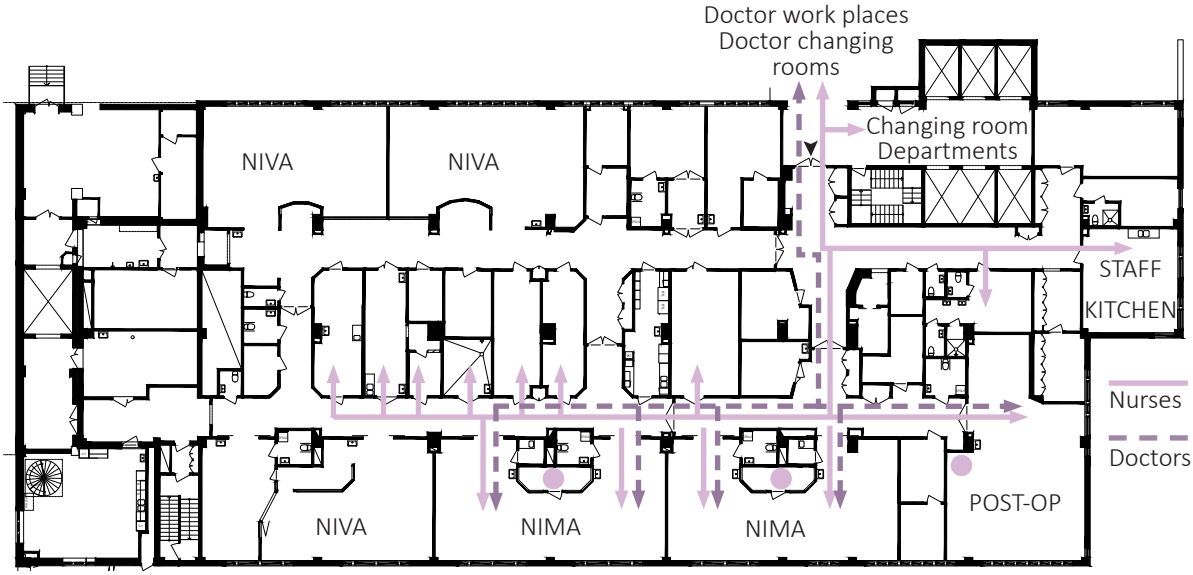


Drawing of care room 3

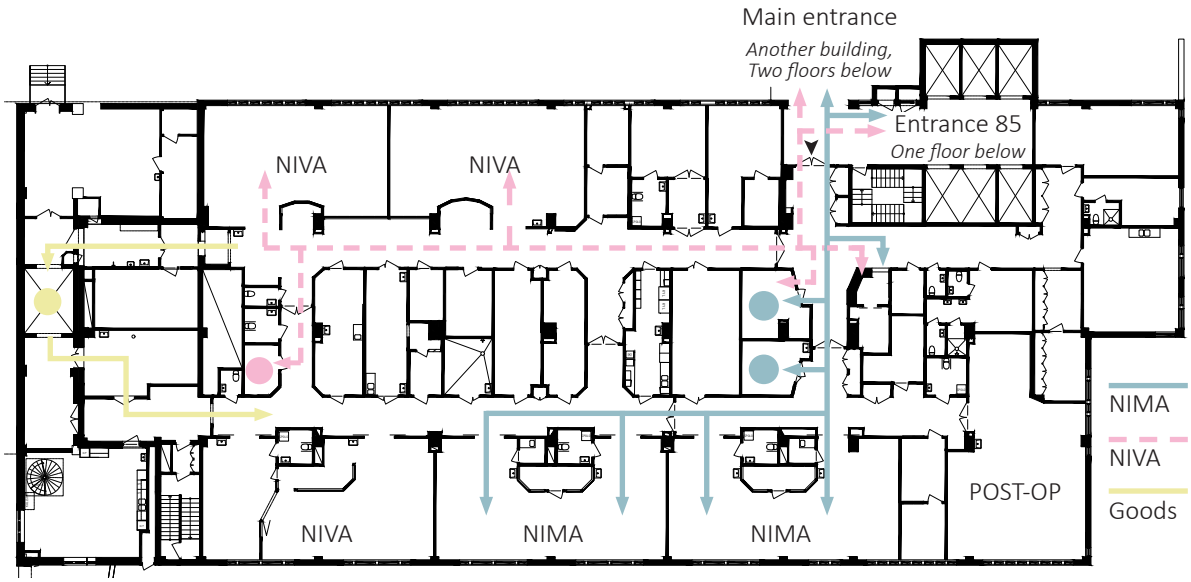
FLOWS



Patients



Nurses/ assistants



Visitors/ Goods

POST-OPERATIONAL PATIENTS

Post-operational patients are transported through the main entrance, directly in to NIMA and care room one or three depending on the type of surgery. This is normally a bed-transport directly from surgery, X-rays or other (Doctor 1, personal communication, 23 January 2023). The patients are nurtured and taken care of within the care room. Some will be further transported back and forth to X-rays, other examination, or units (Nurse 1, personal communication, 24 January 2023).

NIMA PATIENTS

NIMA patients can either come from NIVA (and vice versa) or directly from ambulances, helicopters, the emergency entrance, or other units. This is a bed-transport directly to hospital room two or three. The patients are nurtured and taken care of within the care room, and some will further be transported back and forth to NIVA, X-rays or other examinations during their stay (Doctor 1, personal communication, 23 January 2023).

NURSES/ ASSISTANTS

When the nurses start their shift, they collect their clothes on floor 2. Males have their changing room on floor 2 and females have it on floor 3. When arriving to floor 4, some leave their belongings in the changing room and their food in the staff kitchen (Nurse 1, personal communication, 24 January 2023). After this, they go to the hospital room where they are supposed to work and receive report from the nurses currently working in that room. The nurses and assistants are working in the room all day and are also collecting and leaving things in the common rooms (Nurse 3, personal communication, 24 January 2023). During lunch, staff switch with each other so that enough nurses and assistants, and at least one person from the care team remain in each hospital room (Nurse 1, personal communication, 24 January 2023).

DOCTORS

Doctors come to NIMA for medical rounds, emergencies or other circumstances regarding the patients care. They also have meetings with staff, patients, or visitors (Doctor 1, personal communication, 23 January 2023).

LOGISTICS

Goods are transported in and out of the floor through the elevator in the west directly to/ from one of the common rooms in the middle of the floor (Nurse 3, personal communication, 24 January 2023).

NIMA VISITORS

Visitors to patients at NIMA are allowed to visit the unit between 16.00-19.00 (only to patients in care room 2 and 3). Visitors enter through the main entrance where the receptionist let them in (Receptionist 1, interview 24th January 2023). The waiting room is placed next to the entrance and the relatives are allowed to wait there before entering the hospital rooms in the unit. If a doctor/ nurse need to have a conversation with a relative, or if a patient has passed away, there is a meeting room just inside the doors to NIMA and NIVA has a room longer down the corridor (Doctor 1, personal communication, 25 January 2023).

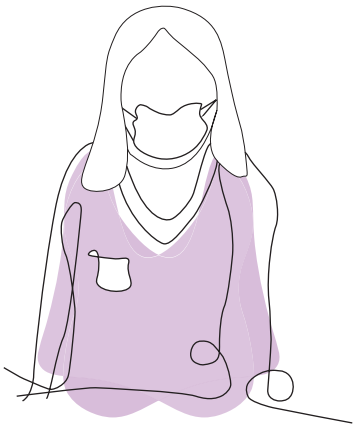


Illustration of a person. Author's own illustration.

REFLECTIONS FROM STAFF

Down below is a summary of reflections from staff at the unit about the existing floor. The reflections come from interviews and conversations during the study visits.

CROWDED HOSPITAL ROOMS

Since there are six patients in each care room and each patient have their own medical equipment and hospital bed, staff experience that it is crowded in the care rooms. Especially with a patient positioned near one of the doors to the care room two and three. In care room one, this is especially with a patient in the corner outside the door to the toilet. Staff also feel that it is sometimes difficult to work around a patient because of lack of space. This is also affected by visitors who need space to sit or stand near/around their relative when visiting room two or three. In addition, if the patient is a child, he/ she are allowed to have a parent there during their stay (Nurse 3, personal communication, 24 January 2023).

DOORS TO HOSPITAL ROOMS

The doors to care room two and three are placed behind the office meaning that the nurses and assistants are not able to see who is going in or out of the room. Some staff feel unsafe because of this, especially in the night (Nurse 2, personal communication, 24 January 2023).

OFFICE WITHIN HOSPITAL ROOMS

When sitting in the office, the view to patients located near the doors is blocked because of the location of the sinks in care room two and three (Nurse 3, personal communication, 24 January 2023). Some staff feel unsafe with only one door to the office because there is no other way out if that door is obstructed. In addition, the sound in the office is usually high even if the door is closed. The staff also asks for more storage in the office and many feel that it is too crowded when four people are working there at the same time (Nurse 2, personal communication, 24 January 2023).

EQUIPMENT IN THE CEILING

Some years ago, the hospital rooms were renovated, and equipment was installed in the ceiling in room two and three instead of mobile equipment's on the floor. This has been appreciated by the staff since it has created more space to work around the patients (Nurse 1, personal communication, 24 January 2023).

PRIVACY FOR PATIENTS

In the care rooms, the patients are separated by mobile screens which are moved and monitored by the staff so that they can work around each patient. The screens are approximately 1,5 metre high and made of plastic (or similar). The screens obstruct the view between patients but not conversations or sound from medical equipment's. Therefore, many experience lack of privacy for patients, both when having conversations with staff and/ or visitors (Nurse 3, personal communication, 24 January 2023).

SOUND

Each patient is connected to medical equipment that frequently sounds and more if a patient is not feeling well. With six patients in each room, this has led to high noise levels (Nurse 3, personal communication, 24 January 2023). A measurement of the sound in the care rooms showed that the average sound during a day was 42dB. The highest value measured during the same day was 64dB (Doctor 1, personal communication, 25 January 2023).

LIGHT

Some employees experience that it is dark in the hospital rooms. The light can be regulated manually by the staff, but is often forgotten about (Nurse 1, personal communication, 24 January 2023).

MEETING ROOMS FOR STAFF

Many employees experience shortage of meeting rooms where staff can have conversations, meetings, share knowledge and have lectures etcetera. There are also lack of rooms for medical rounds and reports between staff (Nurse 1, personal communication, 24 January 2023).

WAITING- AND MEETING ROOMS

The entrance to the floor is used by all patients, staff, and visitors. This means that everyone passes by the waiting room/ reception placed near the entrance. This has created an environment for visitors that can be experienced as stressful instead of calm and supporting. Also, challenges with privacy/integrity for patients. Staff also feel that the room for conversations with relatives in NIMA is too small and asks for additional paintings/ artwork in both meeting room and waiting area (Doctor 1, personal communication, 23 January 2023).

View from staff kitchen. Area with greenery across the road but parts of the view is interupted by temporary building blocks

Today's reception

View from care room with exterior sun shading

Medical equipments attached to the ceiling in care room two and three

LITERATURE

The literature chapter is divided in headlines based on the research and have been chosen because of their relevance to this project's challenges and possibilities.

DAYLIGHT

In a report from centrum för vårdens arkitektur (2020) about EBD it says that daylight has several positive effects on both staff and patients in healthcare environments.

IMPACT ON STAFF

Exposure to daylight increases staffs' wellbeing and can increase the feeling of satisfaction with their job. It can also help reduce stress for staff since people that experience more daylight tend to report better health and wellbeing (Centrum för vårdens arkitektur 2020).

IMPACT ON PATIENTS

Daylight has proven to reduce depression for patients and reduce the total time for care needed for depressed patients (Ulrich et.al, 2004). It is also proven that more exposure to daylight can reduce the pain and number of painkillers needed. Another is that it can help patients with their sleep since they can follow the normal circadian (Centrum för vårdens arkitektur 2020).

SOUND

It is proven that the sound in healthcare facilities have crucial effects on both patients and staff (Ulrich et.al, 2004, page 16). According to the world health organization (WHO) the recommended sound levels in bedrooms during night should be less than 30dB and less then 40dB outside the bedroom for people to get sleep of good quality (2010). During the day, the noise should not extend 35dB (Joseph et. al. 2007).

IMPACT ON STAFF

Joseph et. al. (2007) writes that noise has the following impact on staff: increase of tiredness, work pressure, stress and annoyance, communication problems which can lead to mistakes in care also emotional exhaustion and burnout. In a study done at a Swedish hospital inward, it showed that staff that experience better sound conditions felt less pressure/ strain and reduced demands (Blomkvist et al. 2005). Ulrich et-al (2008) also writes that a reduction of noise lead to less medical errors. Reasons are for example that it is easier to hear and have conversations with patients and other colleges, there are less interruptions in work and easier to concentrate.

IMPACT ON PATIENTS

There are several negative effects on patients caused by high noise levels. Some examples are worse sleep, higher respiration rate and an increased need for oxygen support. Other is the increase of stress among patients by higher heart rate and blood pressure (Ulrich et.al, 2004). Joseph et al., also writes that high noise levels can decrease the rate of wound healing and higher the risk of rehospitalization (2007).

EXAMPLES OF SOLUTIONS

In a study at Huddinge hospital, the noise reduction solution meant changing the ceiling from noise reflective to sounds absorbing (Blomkvist et al. 2005). Another is reduction of noise sources e.g. equipment (Joseph et. al. 2007).

Music in hospital environments have been proven to have positive impact on patients. Some effects are decrease of heart rate and respiratory rate also less feeling of anxiety and stress. There are also affects where patients have been more satisfied with their visit (Joseph et. al. 2007). Music can also have a positive impact on perceived pain and contribute to a smaller number of painkillers used during the visit (Centrum för vårdens arkitektur 2020). However, there are some factors important to consider. One is the individual selection for each patient based on personal preferences and the other are the music characteristics where the music tend to have a slow tempo and smooth melody and no accented beats or percussive characteristics (Joseph et. al. 2007).

Illustration of a person who listen to music. Author's own illustration.

SINGLE-PATIENT ROOMS

According to Schmitt et.al (2017), single-patient rooms in healthcare facilities have different effects on patients and staff´s safety and health. Studies have showed that the sound in single patient rooms compared to shared rooms are lower (Ulrich et.al, 2004). This seems to be because of most noise in shared rooms comes from the care of other patients e.g., staff talking and caring, sound of equipment, relatives/ visitors and other patient sounds as coughing, crying out and rattling bed rails etcetera (Johansson, 2016).

IMPACT ON STAFF

When designing single-patient rooms, there is often an increase of distance for staff to walk between patients. It can also have negative impact on the ability to overview several patients in the unit and the collaboration between different work teams (PTS and Centrum för vårdens arkitektur 2019).

IMPACT ON PATIENTS

Patients that are treated in single-patients rooms seems to be more satisfied with their care but there are also studies that the patients can feel lonelier and more isolated (Schmitt et.al 2017).

There are different types of research about single-patient rooms and infections that show different types of results. Some indicate that single-patient room can reduce the spread of infections while others are not able to prove that (Centrum för vårdens arkitektur 2020). Ulrich et.al (2004) writes that an effective way of reducing infections on hospitals is to increase handwashing among staff and that the amount of handwash seems to increase with single-patient rooms.

Singe-patient rooms has proven to increase the patients feeling of privacy which has a crucial effect on patients sharing personal information with doctors or nurses (Roger et al 2010). It also has an improved impact on the feeling of personal control where patients or family members can control light, temperature, and environment (e.g., personal belongings).

POSITIVE DISTRACTION

Positive distraction is described as different types of environments, circumstances or stimulation that has proven to improve wellbeing, reduce stress, keep distraction, and work as pain-relieving. This includes views of greenery, gardening, artwork, and music (Centrum för vårdens arkitektur 2020).

IMPACT ON STAFF

Nurses at hospitals that has windows that allow them to look at nature is less stressed and feel more alert (Centrum för vårdens arkitektur 2020).

IMPACT ON PATIENTS

Ulrich (Centrum för vårdens arkitektur 2020) writes in his report that research at intensive care units have showed that patients who is placed so that their only view is to a wall or to the ceiling have an increased feeling of stress and pain and that view of real and simulated nature has showed can reduce pain for patients. This has been tested in especially one study where post-operational patients were given different types of rooms with different views (Ulrich 1984). The ones who had outlooks over greenery/ trees suffered less and needed less painkillers compared to patients who saw a brick wall. The study also showed that views of nature could shorten the time the patients needed to be in the hospital (Ulrich 1984).

There have also been studies of simulated nature like prints and paintings on walls or ceiling. Also in these cases, patients felt less pain and, in some cases, also felt less stress and anxiety. Since stress can increase aggressive behaviour and anger, positive distraction can also have a positive impact on those patients. It also seems like more patients prefer artwork or prints of nature instead of abstract or emotionally provocative art within healthcare facilities (Centrum för vårdens arkitektur 2020).

Picture of a tree with flowers. Author's own photograph.

OUTDOOR ENVIRONMENT

Outdoor environments in forms of gardens can provide both patients, staff and visitors with restorative environment and views of nature. This has a positive impact on reducing stress and providing opportunities for positive escape from treatment or work (Ulrich et.al, 2004).

Bengtson et. al. (2018) describes that the outdoor environment in healthcare facilities can be divided into five different zones:

o Zone 0 – Indoor environment that lack contact with outdoor environment

This zone was added later in the report. The reason for it is to understand what lack of views can do to its users and how it can be transformed with artwork or paintings to create illusions of outdoors even if there´s no connection.

o Zone 1- Contact with outdoor environment from within the healthcare building

This includes views of greenery through windows. Positive distraction and daylight are also a part of this zone

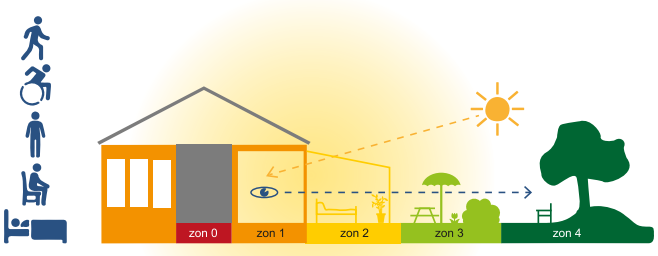
o Zone 2- Contact with outdoor environment within the transition between outdoor and indoor.

Examples are wintergardens or in glazed balconies. This zone does not have to be directly connected to the building

o Zone 3- Gardens and parks directly connected to the healthcare building

o Zone 4- Outside the healthcare facility and its direct local environment

This zone is important for people that approach and arrive to the healthcare building but also how patients or staff within the healthcare building can relate to surrounding public spaces.



The five zones. Illustration from Boverket (2022)

VISITORS/ RELATIVES

Relatives and visitors play an important role in social support and patient care where presence can contribute to reducing stress, feeling of pain and length of hospitalization also increase patients' satisfaction and clinical outcome. Examples of features that support family presence are quiet waiting rooms, extra beds for relatives within the patient room, internet access, workspaces, personal storages, and private bathrooms (Roger et al 2010). Singe-patients' rooms are another feature that makes it easier for patients to have visitors that also increase the feeling of privacy (Roger et-al 2008).

Fridh (2014) writes in the book Vårdmiljön betydelse that it is important to create environments that support the visitors and relatives in intensive care units. The need of privacy and rooms with less disturbance are important to support private conversations between the patient and his/her visitor. Many also feel uncomfortable if they can hear or see other patients suffer or taken care of in the same room.

Fridh (2014) continues to address the need of having smaller waiting rooms and meeting rooms outside the care rooms, especially if the patients are taken care of in multi-patient rooms. This is to separate relatives to different patients and provide rooms where staff can have conversations with relatives without being interrupted. Interior furnishing like comfortable chairs in the care-rooms, movable furnishing in the waiting room and artwork or outlooks are important features to support relatives while visiting the unit. There could also be children visiting which also addresses the need of a children's corner with furnish and toys that support their visit (Fridh 2014).

Ulrich (Centrum för vårdens arkitektur 2020) writes that gardens can function as meeting places for patients and their relatives which can contribute to higher satisfaction and wellbeing. One research also found that a garden with rich and varied vegetation close to an intensive care unit was effective in reducing stress for relatives and visitors to patients at the unit. The garden was also a little bit more effective than rooms or areas that was specially designed to offer a brake and relaxation for relatives within the hospital (Ulrich et al., 2019).

Picture of a forest which can function as positive distraction. Author's own photograph.

REFERENCE PROJECTS

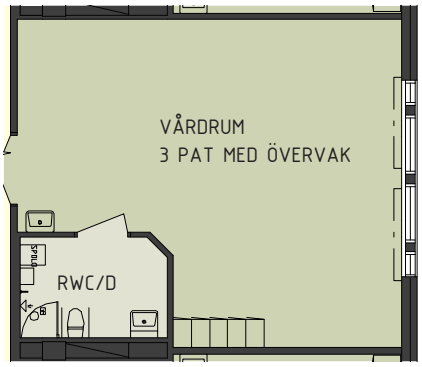
The first three reference projects are from a report about single patients' rooms and the fourth is from a report about intensive care units. The projects have been important in the process of measurements, areas, and layout where different solutions have been tested and evaluated.

AKADEMISKA, UPPSALA

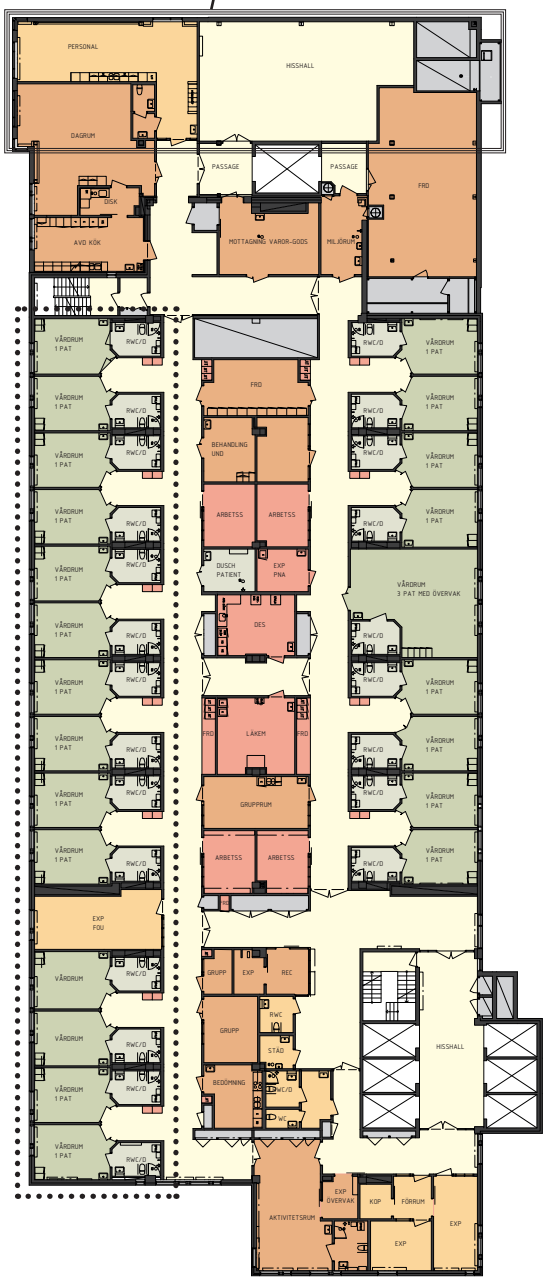
In the report about single-patient rooms (Schmitt 2017) there are one example from Akademiska sjukhuset in Uppsala. The example is from the same building as NIMA and NIVA but in another floor. The department has 22 single-patient rooms of 18 sqm and 1 three-patient room with supervision. The total area is 2010sqm.

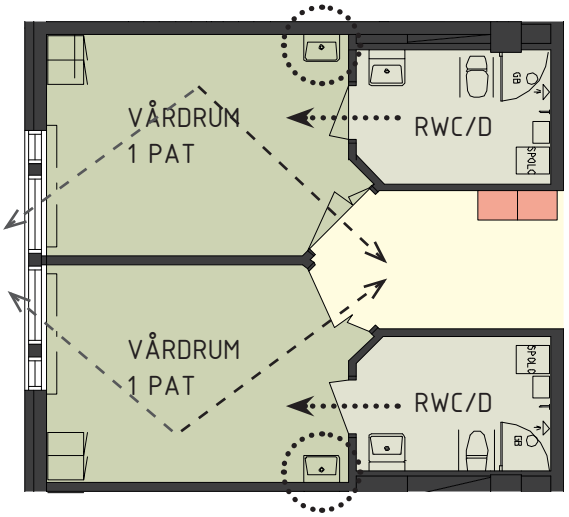
REFLECTION

There are 14 single-patient rooms at the south side which today at NIMA and NIVA have space for 13 patients, including 6 post-operational patients. The toilets are placed between the rooms and corridors which gives the care rooms all the façade area. The toilet doors are placed directly to the patient room and sinks for the staff is placed in the room. The layout makes it possible for the patient to have both view to the outdoor and view over the door to the room.



This area does not exist in floor 2





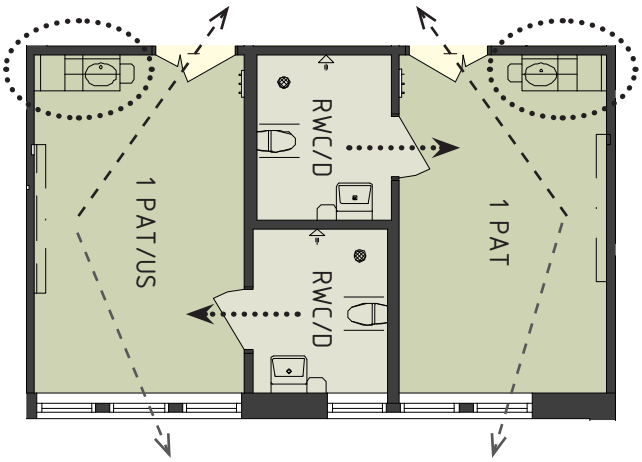
Floor plans from "Enpatientrum i sverige" (Schmitt 2017). Arrows and squares are done by author of the MT and are connected to the written reflection

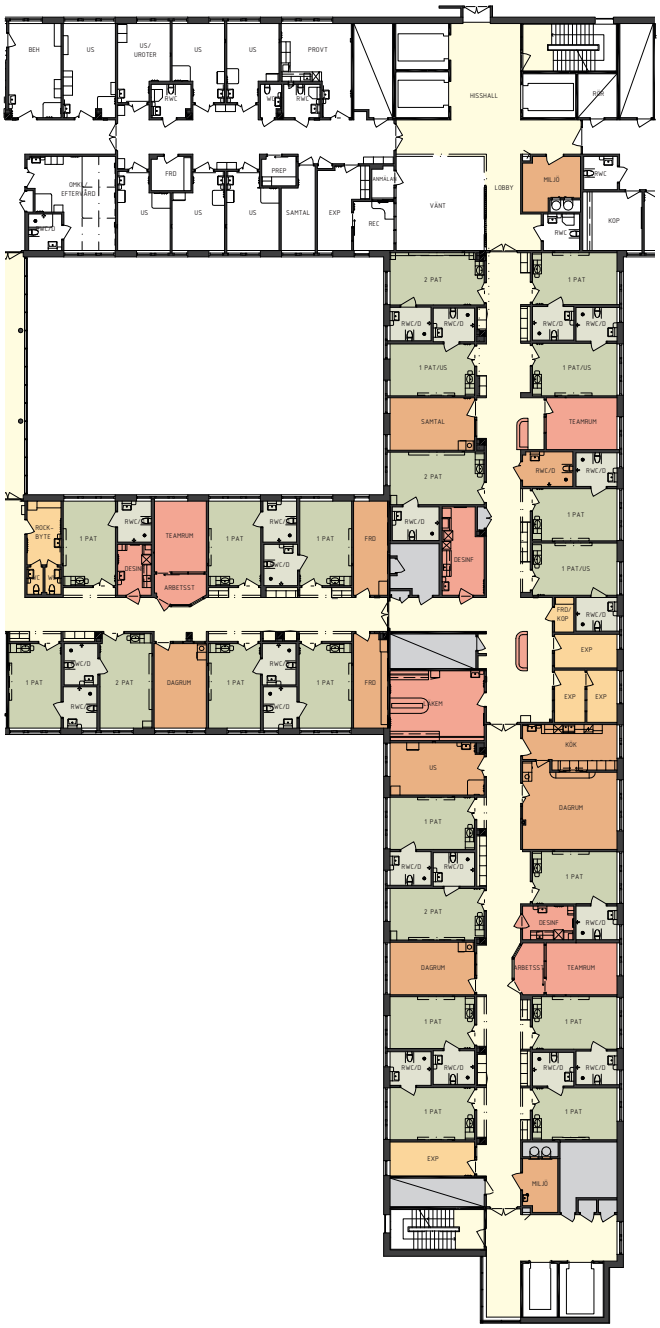
DAHLSKA HUSET, FALUN

The second example is from Dahlska huset in Falun where the care rooms have another type of layout. The department is 1490sqm and has 17 single-patient rooms of 19sqm each and 4 two-patient rooms of 20sqm.

REFLECTION

The department have another type of layout. In this department, the toilets are placed two and two between the rooms. This provides toilets with daylight, deeper care rooms and toilet doors directly connected to the care room. The layout makes it possible for the patient to have both view to outdoor and view of the door to the room. Through a window in the door, the patient have contact with the corridor and vice versa.





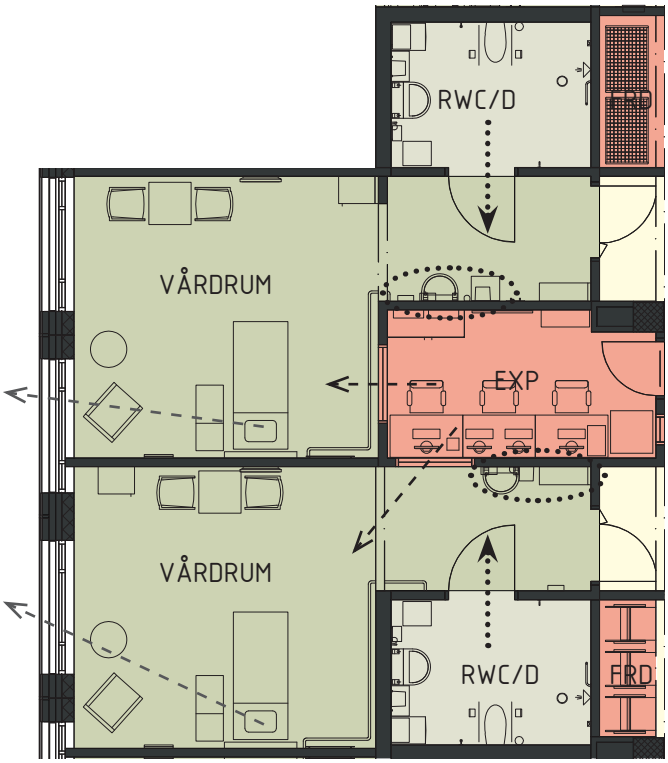
Floor plans from "Enpatientrum i sverige" (Schmitt 2017). Arrows and squares are done by author of the MT and are connected to the written reflection

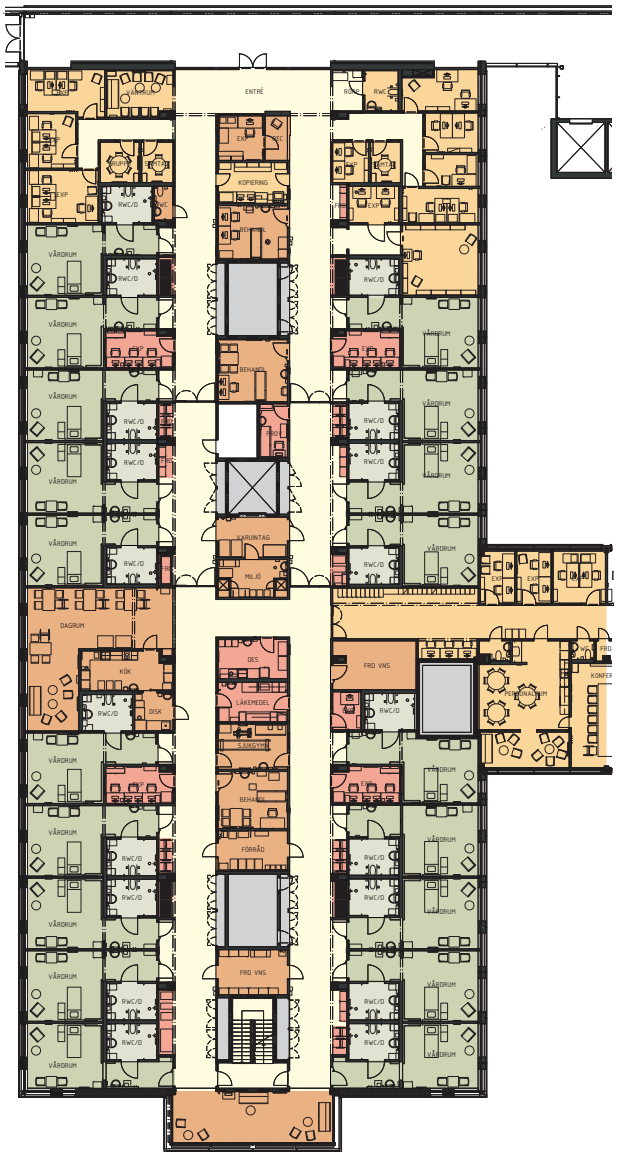
NEUROSURGERY, LINKÖPING

In the same report (Schmitt 2017) there is one example from a neurosurgery clinic located in Linköping where there are some rooms that have supervision offices for staff in between the care rooms. This floor has 19 single-patient rooms and 8 of them have opportunities for supervision. The department is 1950 sqm and each care room is 30sqm in total (Schmitt 2017).

REFLECTION

The toilets are placed between the corridor and care rooms and in some places, the toilets have been “replaced” with an office for supervision. These rooms also have an entrance area where the door to the toilet is placed. There are also sinks and place for hygiene items near the entrance to the rooms. The patients have view to the outdoor, but it is not possible to have view of the door to the room.





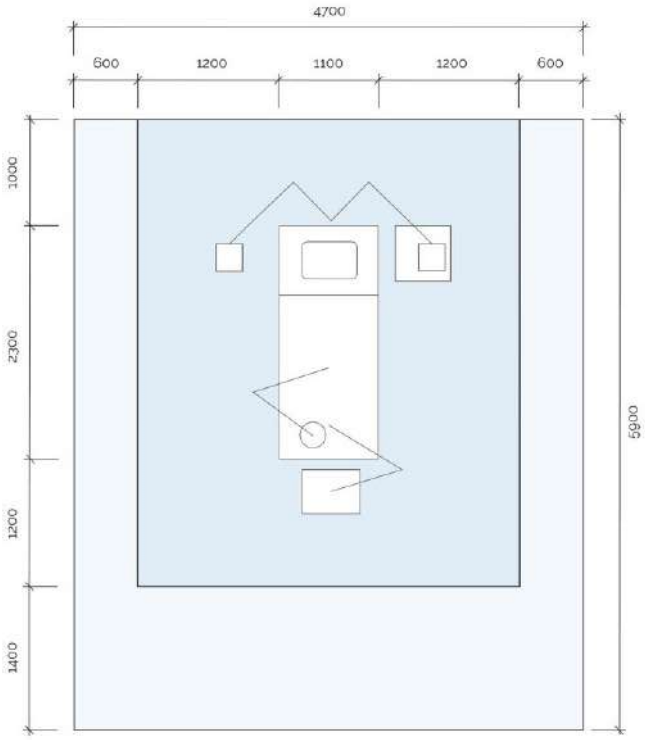
Floor plans from “Enpatientrum i sverige” (Schmitt 2017). Arrows and squares are done by author of the MT and are connected to the written reflection

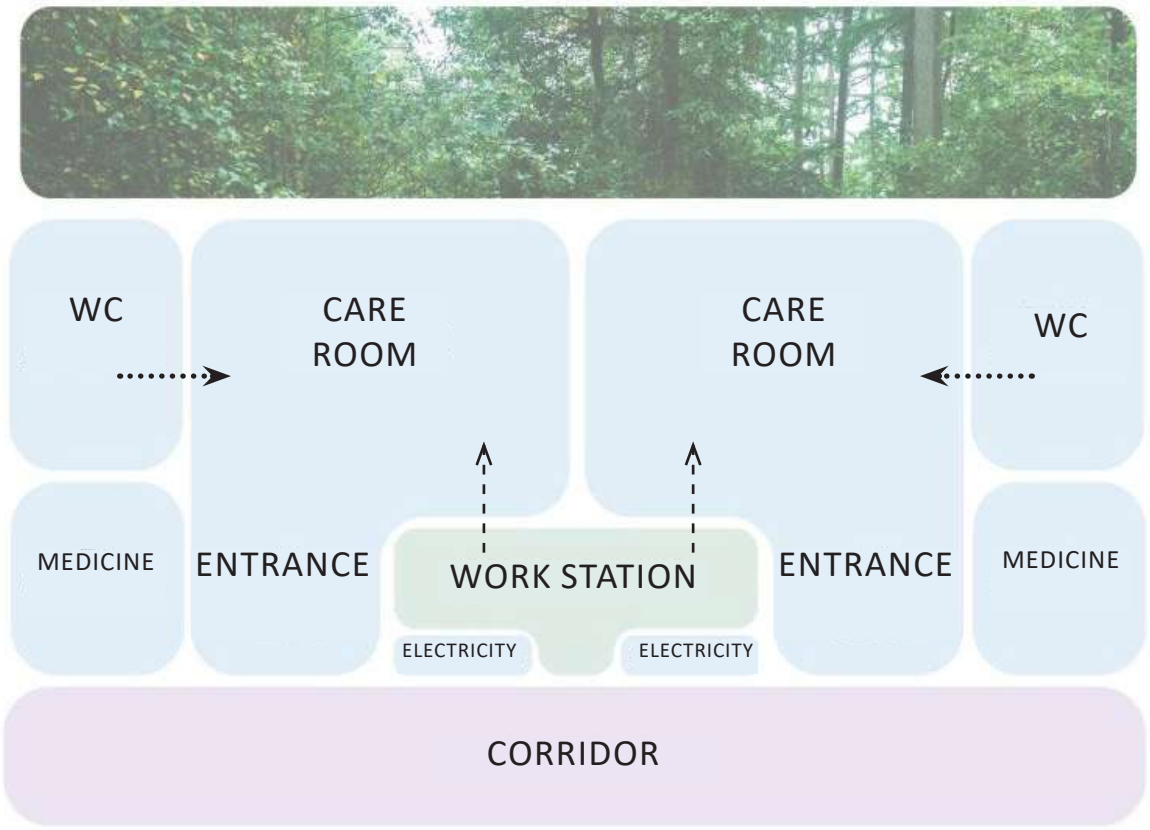
ICU, REPORT FROM CVA

In a report about intensive care units, published by CVA and formulated in a collaboration with PTS (2020), they have presented the example below. In this report, they describe that a patient who requires intensive care needs at least 3500 x 4500mm in a square around the bed, for the staff to work with the patient. It also describes the space required for medical equipment around the patient which gives the total area of 5900x4700mm (about 30sqm). In the report is also an example showing how single-patient rooms can be designed with support functions and space for supervision for staff.

REFLECTION

This example has been important in the choice of how big the care room at NIMA need to be to facilitate the care and work environment. Especially important was the measurement to work around the patient. Since the equipment at NIMA is assembled in the ceiling, it gives more space around the patient than if it was placed on the floor.





Illustrations from "INTENSIVVÅRD - Evidensbaserat konceptprogram" (PTS and Centrum för vårdens arkitektur 2020). Arrows and squares are done by author of the MT and are connected to the written reflection. The picture has been translated to english.

PROCESS/ ANALYSIS

This chapter explains the process and analysis that have been done to argument for the design and choices in the different scenarios.

PROGRAM COMPILATION

This page describes the future work division for staff and information about the program.

CARE ROOMS

To reduce the work pressure on staff, one care team will only care for two patients each instead of three. This is a solution coming from the unit and is today an ongoing process. To do this, NIMA will need to place two beds in care room 4 which today belongs to NIVA but is empty due to employee shortage. The result is:

- Care room 1 (post-op) will keep 6 patients
- Care room 2 (NIMA) will go from 6 to 4 patients
- Care room 3 (NIMA) will go from 6 to 4 patients
- Care room 4 (NIVA) will go from 4 patients to 2 NIVA and 2 NIMA patients

MEETING ROOMS/ CONFERENCE ROOM

In addition to the existing program, there is a wish from the unit to have more meeting rooms and a bigger conference room. Today, bigger meetings are held in the staff kitchen because there is no other space in the unit for several people. Also, the room for relatives is used by the staff to have conversations and for the manager to have meetings with employees.

CHANGING ROOM

There are several lockers for staff placed in the corridor outside the changing room because it is not possible to have all the lockers in the room today. Therefore, a bigger changing room is asked for and in addition a smaller rest room for staff.

DOCTORS ROOM

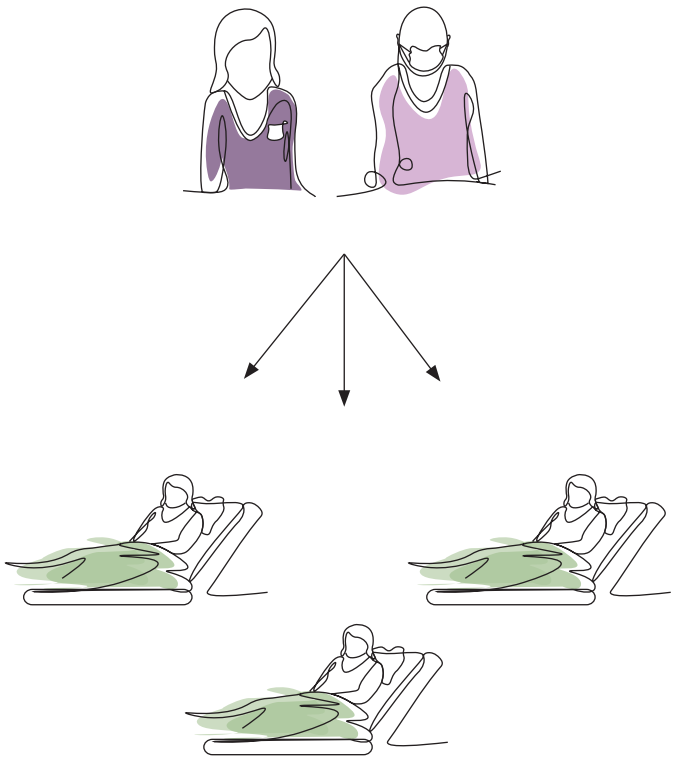
There has been a question asked from the unit whether it is necessary to have a doctor's room in the floor since there is one on the floor above. The scenarios will therefore show one example with and one example without.

RECEPTION

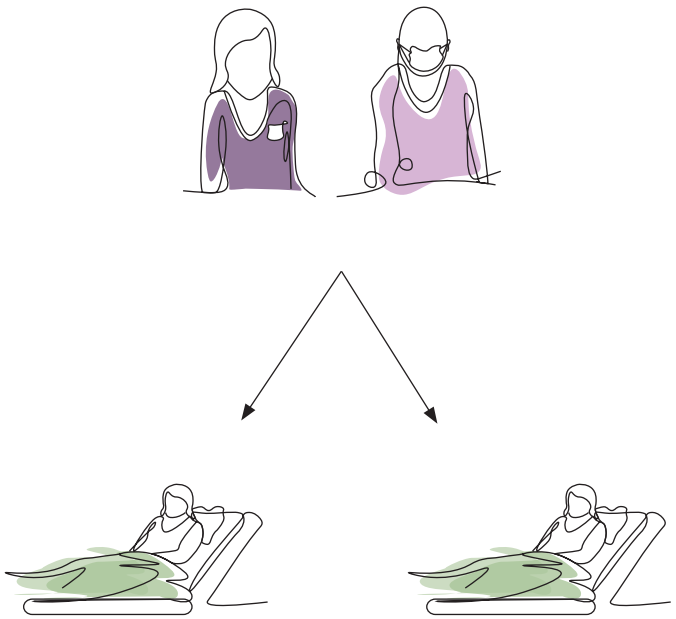
It is not possible to see the main entrance from the reception today and therefore staff have asked if it is possible to find a new position. The scenarios will show two different examples of this, also argued by reflections from staff about all groups using the same entrance and literature about spaces for visitors.

Author's own illustrations

Today



Future



ANALYSIS OF EXISTING BUILDING

	+	-
	DAYLIGHT	
Patients	Windows in every care room Pendelum light above every bed in care rooms (2 and 3)	Quite dark in the care rooms Sun shading on facade covers daylight in care rooms
Staff	Staff kitchen with daylight	Reception without daylight Several offices without daylight Dark corridors The light in the care rooms is regulated manually which means that staff often forget to turn it on
Visitors		Dark waiting room and meeting rooms
	SOUND	
Patients	Acoustic ceiling in care rooms	Noisy in the care rooms Low integrity meeting visitors/ talk to staff Many patients are not able to wear headphones because of surgeries or injuries on their head/ face
Staff	Possible to close the door to the office in care rooms 2 and 3 to have conversations, though still high noise levels	Noisy in the care rooms No office/ meeting room in post-op room
Visitors		Low integrity when meeting patients/ talk to staff – easy for others to hear the conversation
	SINGLE-PATIENT ROOM	
		There are only care rooms with 6 patients
	POSITIVE DISTRACTION	
Patients		Sun shading on the façade obstruct view to outdoor in care rooms No positive distraction within the care rooms
Staff	View of greenery from staff kitchen. But parts of it are interupted by temporary building blocks The staff are facing the windows in the care rooms- possible view outdoor	Sun shading on the façade obstruct view to outdoor in care rooms
Visitors	There are some artworks in the corridors	No positive distractions can be found in the waiting area or meeting room for relatives
	OUTDOOR ENVIRONMENT	
Patients	Green space in between the buildings to the north	Sun shading on the façade obstruct view to outdoor in care rooms Patients are usually bedridden and connected to medical equipment's and are not able to go out Several beds in the care rooms are not placed towards the windows
Staff	Easy access to outdoors through fire-stair	A possible outdoor area in the south is under construction and part of it is occupied by temporary building blocks No area nearby where they can have access to greenery
Visitors	Only one floor above ground – easy to go out	No direct contact to outdoors from unit No area nearby where they can have access to greenery

SINGLE-PATIENT ROOMS

From the beginning, an investigation with single-patient rooms was done. The reason was the arguments from literature describing the positive impact single-patient rooms can have on patients care and recovery. From the reference projects, there were two examples of a neurosurgery- and intensive care unit. The one from ICU with a 30sqm care room and the one from Linköping with a total of 30sqm including an entrance area.

These examples were chosen because of the relevance to the care performed at NIMA and requirements for around the clock observation by staff. An analysis of different qualities for example daylight and flow was done to understand which room could be the best solution for the unit and according to literature. The rooms were then placed in a row so that there were enough rooms for the needed number of patients.

There are several limitations in the existing building that affect the layout of the rooms. One example is the bearing structure (columns), and another is the limitation of only using the space that belongs to NIMA. A third limitation is the exterior walls of building. It was also important to create possibility for the patients to have access to daylight and view of the outdoor (daylight, positive distraction and outdoor environment).

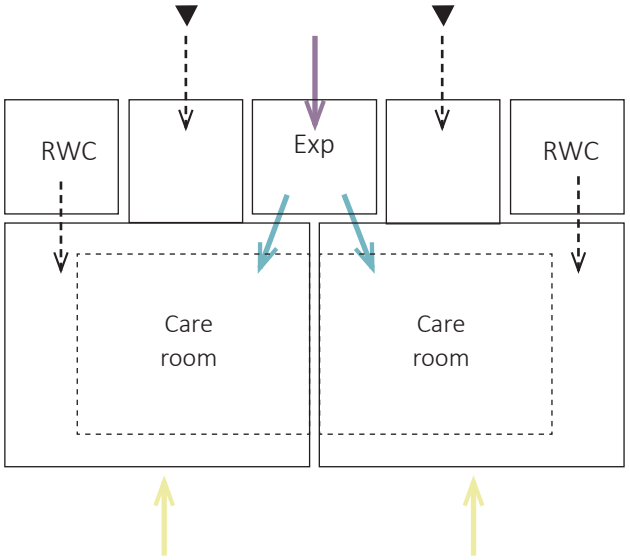
LEARNINGS:

o The chain of single-patient rooms became too long to fit in the existing structure on the south facade, therefore, to build this there need to be an extension

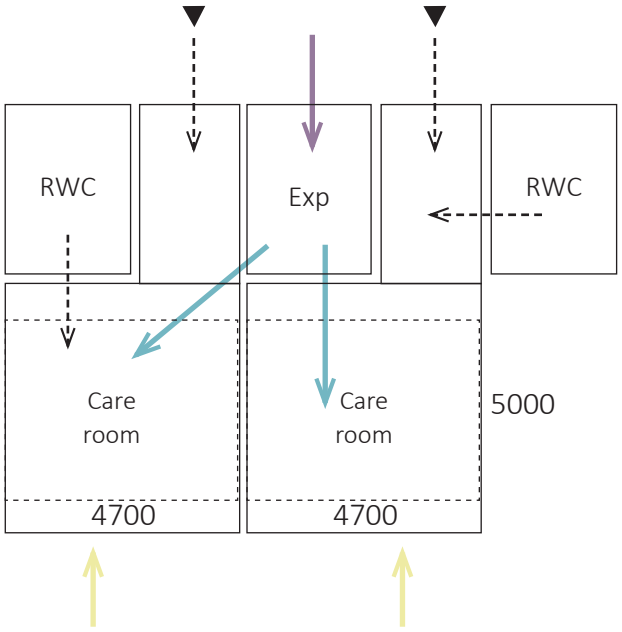
o Counting on the area for the single-patients room solution from Linköping compared to today, the single-patient room solution would need almost 125sqm extra

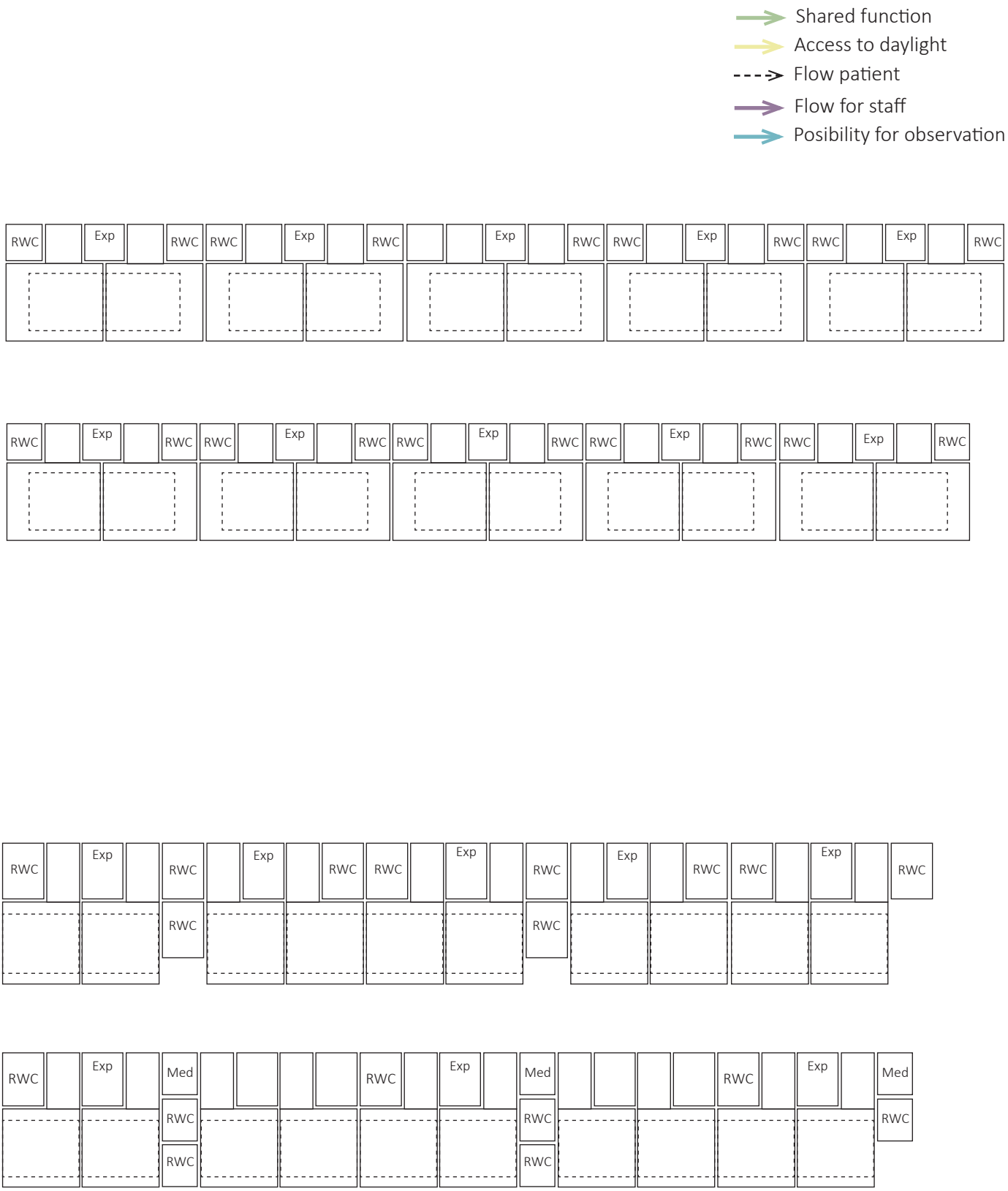
o Since intermediate care is not intensive care, NIMA do not need 30sqm for each patient. But a care room of 18 sqm will be too small considering the medical equipment needed and space to work around each patient.

ICU



Linköping




Shared function
Access to daylight
Flow patient
Flow for staff
Posibility for observation
RWC
Exp
Med

DOUBLE-PATIENT ROOM

Since single-patient rooms require more space than the existing building have. An investigation was done to see if it was possible to design care rooms with less patients than 4, but more than 1 in each room (to decrease noise and increase privacy). Since the care teams will have two patients each, the investigation focused on double-patient rooms. First, alternatives from the reference projects were investigated and compared to the experience from staff and the measurement for two patients today.

Today, staff experience that it is crowded with a bed positioned near the entrance to care room 2 and 3. The intention with the new layout was therefore to design rooms that are easy to access without interrupting the patient lying next to the door. This argued for designing a wider room than there is today (from 4500mm to 5900mm). When investigating how deep the rooms could be, there were several things to consider. First, the building construction. There are bearing columns placed with the same distance through the corridor. Second, the existing support functions in the middle of the floor which could not be moved and third the experience from staff who seem to think that the depth of the rooms today does work. Therefore, the chosen depth was the same as today (7900mm).

One double-patient room is connected to one assessable toilet, two workplaces and space for medicine. Several tests of the layout were done and evaluated. In addition it was important to create possibility for the patients to have access to daylight and view of the outdoor (daylight, positive distraction and outdoor environment). Also, different placement of support functions were tested.

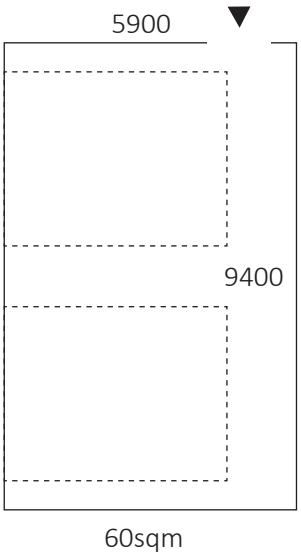
LEARNINGS:

o There need to be possibility for staff to observe both patients. Therefore, the workstations need to be placed in the middle of the care room

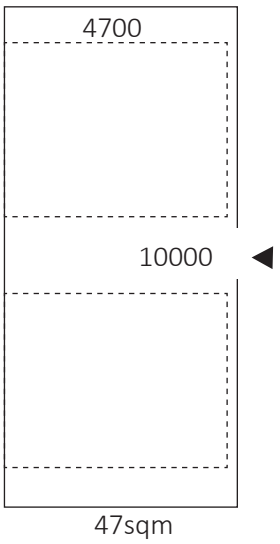
o There is a conflict with access to daylight in the staff office in relation to being directly connected to the corridor. This is a dilemma especially in the night to avoid unnecessary entrances into the care rooms when patients are sleeping.

o It is important to share support functions between the care rooms to save space, otherwise it is not possible to fit all the rooms within the existing structure.

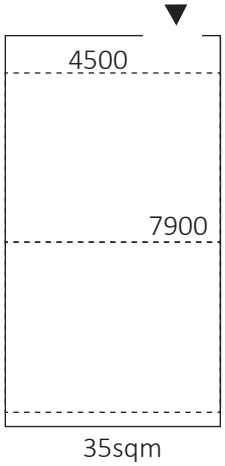
ICU



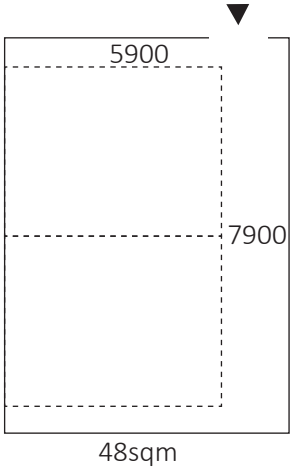
Linköping

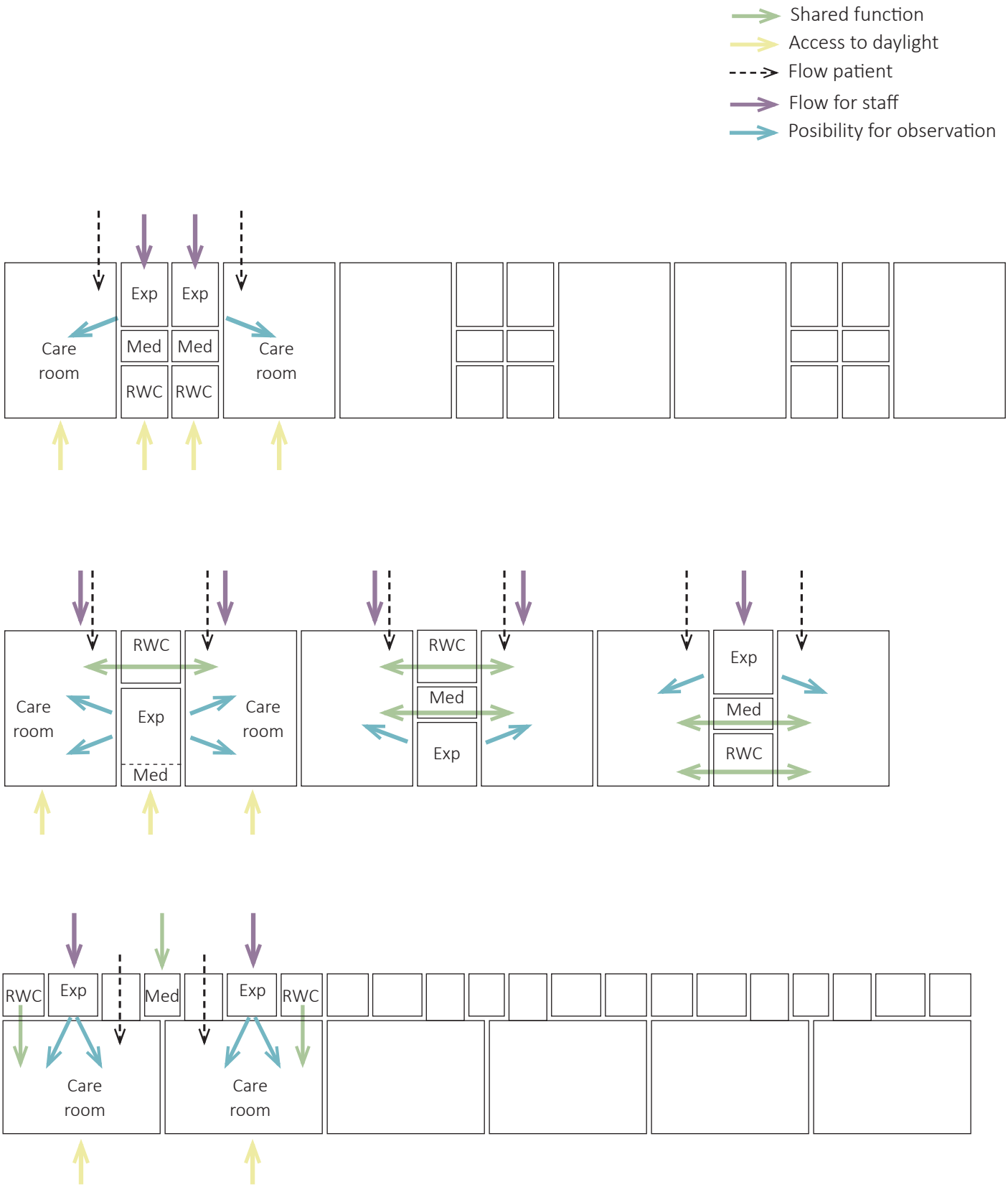


Today



Chosen




Shared function
Access to daylight
Flow patient
Flow for staff
Posibility for observation
Exp
Exp
Med
Med
RWC
RWC
Care room
Care room
RWC
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Med
Care room
Care room
RWC
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RWC
Exp
Med
Exp
RWC
Care room
Care room

EXTENSION & OUTDOOR AREA

Author's own photographs

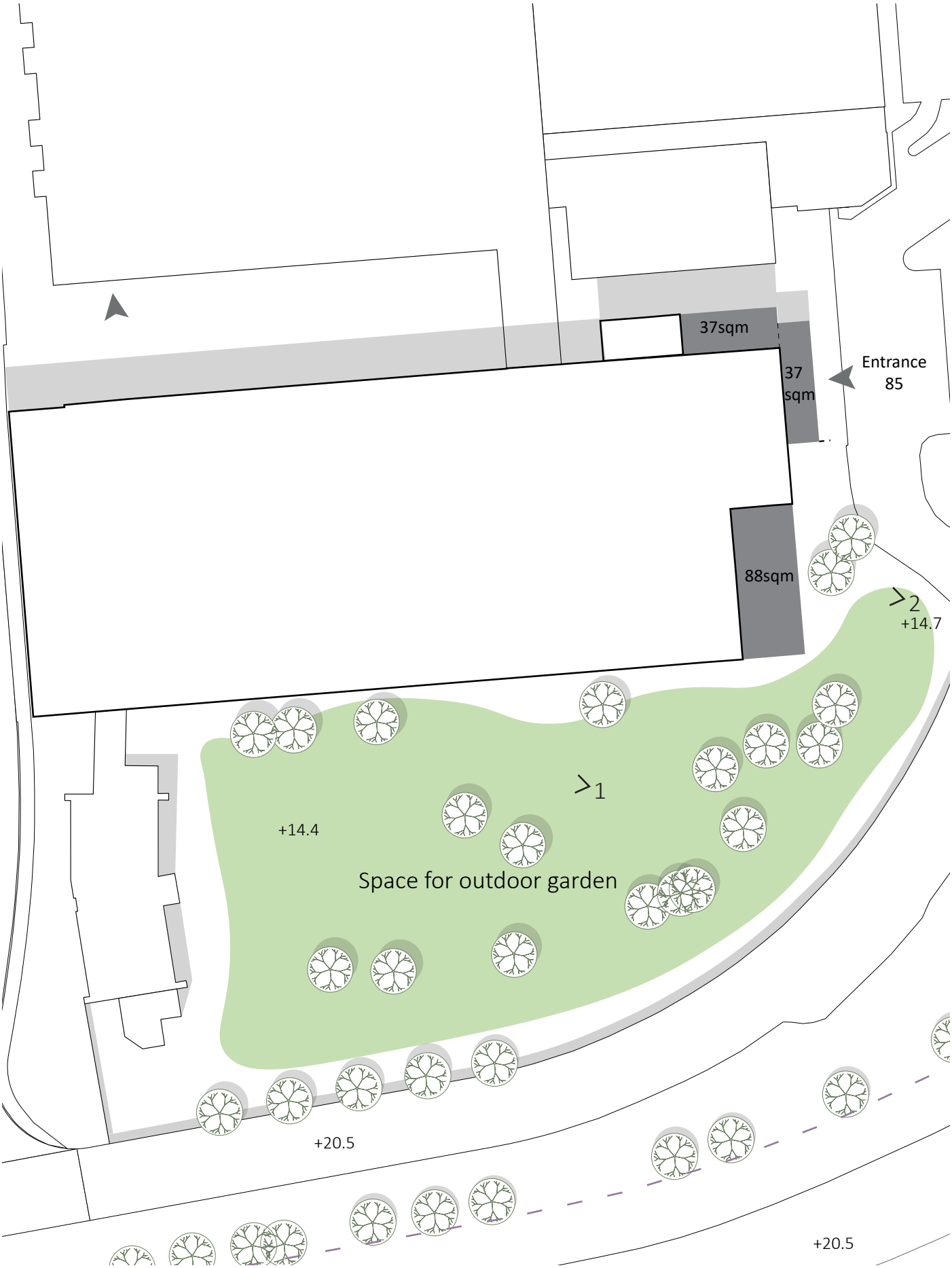
To meet the request of extra functions and to investigate a solution for single-patient rooms, scenario 3 will be designed with an extension. An extension could possibly be built in the corner to the east or above the waiting area and air locker on the ground floor.

OUTDOOR AREA

South of building 85 is an area that today consist of mud and temporary building blocks. This area is closely connected to NIMA and the entrance of building 85. This area has the potential to be transformed into an outdoor garden that can serve staff, patients, and visitors. This area is around 5 metres below ground (at its highest) which creates a calm environment (less traffic noise) and possibility for shading in the summer. However, the distance between the road and building is almost 40 metres which makes it possible for sunlight to reach almost the whole area, even in winter.

1. Picture of outdoor area today

2. Picture with illustration of possible extension


0
10
20
37sqm
37
sqm
Entrance
85
88sqm
2
+14.7
1
+14.4
Space for outdoor garden
+20.5
+20.5

REFLECTIONS FROM STAFF ABOUT EARLIER SCENARIOS

After the mid-term seminar, there was a meeting together with staff working at the unit where different solutions were discussed. This have had an impact on the outcome of the scenarios and some reflections from that meeting are therefore presented.

DOUBLE-PATIENT ROOMS

Would like to have the office in the care rooms closer to the corridor and a door between the room and corridor. Reasons:

- Easier to collaborate between different care teams when there is a direct access from the corridor
- Do not have to disturb the patients during night-time or when entering the office (they go directly to the office from the corridor)
- Easy and close access to the patients
- More like the work situation and flow they have today: easier to argue for

Need a separate office for each of these: 1 Head manager, 2 deputy managers, 2 secretaries, 1 admin, 4 flexible tables

Great with two doors to the toilet, it will be easier to work in there then

Staff feels that there is too little space for them in today's room – is it possible to have more space?

- Is it possible to create a separation between the patients at NIVA?

- May not need a toilet because the patients are in a bad condition and cannot be mobilized from the bed

- Possibility to have direct access between the NIVA and NIMA room?

Today there are four patients on the wall to the right. This makes is possible to fit five beds in this proposal

This solution will have a positive impact on the sound levels in the care rooms and create more privacy for patients than today

Would like to have sliding doors to the care rooms

Positive that it is easy to see all four patients at the same time

Want to keep the number of beds which they can have today. Not an option to move more functions that belongs to NIVA

Single-patients rooms are good for patients but doesn't fit the work at the unit, reasons are:

- Hard do collaborate with other care teams due to longer distance and offices that are not connected to each other
- Feels that it is a longer distance from the office to the patients
- Bigger change from today's work situation and flow

Toilet to this room is not placed in the best position. Can block the entrance door when used

CONCLUSION:

o Double-patient rooms are the solution for this unit. It will support their work better and will still improve the situation for patients (from six patients in the same room to two)

o The offices in the care rooms should be placed in contact with the corridor. Even though the staff does not get daylight in their rooms, the unit had important arguments for this. It will support their work and decrease the disturbance for the patients during night.

o Separated offices for staff with different administrative tasks is needed

SCENARIOS

This chapter include three scenarios which are: 1 Interior adjustment of existing facilities, 2 Redesign of existing facilities and 3 Redesign of existing facilities including extensions.

SCENARIO 1: ADJUSTMENT OF EXISTING FACILITIES

Scenario 1 is a suggestion on how to change the premises in NIMA in a short perspective. The scenario includes a variety of interior adjustments using the literature chapter as a framework.

DAYLIGHT

- Replace the exterior sun shading with exterior blinds that complies with daylight. The blinds should be as transparent as possible for view to the outdoors. This will contribute to lighter care rooms and views to nature (positive distraction).

- Replace lighting fixtures in the care rooms and corridors to light that follows daytime and daylight. This will improve the environment for both staff and patients since they will be able to follow the circadian. For patients, it can contribute to better sleep and in a longer perspective faster recovery. The pendant lamp above all patient beds can be used during night to obtain a lighter space if needed.

POSITIVE DISTRACTION

- Add paintings/ prints with nature in the ceiling above the beds in the care rooms. This can be done through changing one or several pieces of the ceiling and replace with painted plates or screens.

- Add paintings and prints with nature in the waiting areas, meeting rooms and corridors

SOUND

- Replace screens in care room with sound absorbing dividers. This will contribute to care rooms that are quieter and increase privacy for patients and visitors.

- Add sound-absorbers on the walls in care room to avoid that the sound is bouncing in the room

- Investigate the offices in the care room 2 and 3 for possibilities to decrease the noise coming from the care room when closing the door

SINGLE-PATIENT ROOM

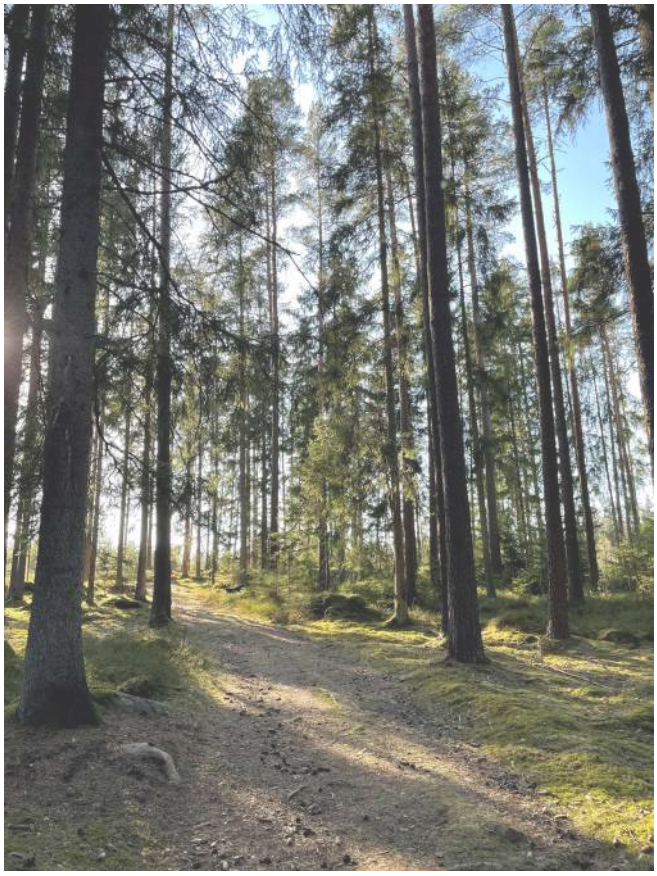
- Add one divider in care room 2 and 3 that are higher than the others. This will create an illusion of two-patient rooms instead of four. The divider should be placed in the middle of the room for possibility to observe all four patients from the office. Because of the placement of toilet and medicine room, it is not possible to completely divide the rooms.

OUTDOOR/ NATURE

- Scenario two and three include a proposal for an outdoor garden south of building 85. This garden can also be included in this scenario. The garden will function both as a garden and enable views of nature from the building. This will have positive affect on all user groups (patients, staff, and visitors).

VISITORS/ RELATIVES

- Four patients in care room 2 and 3 will enable more space for visits from relatives. Adding comfortable chairs in the care rooms will increase their experience.

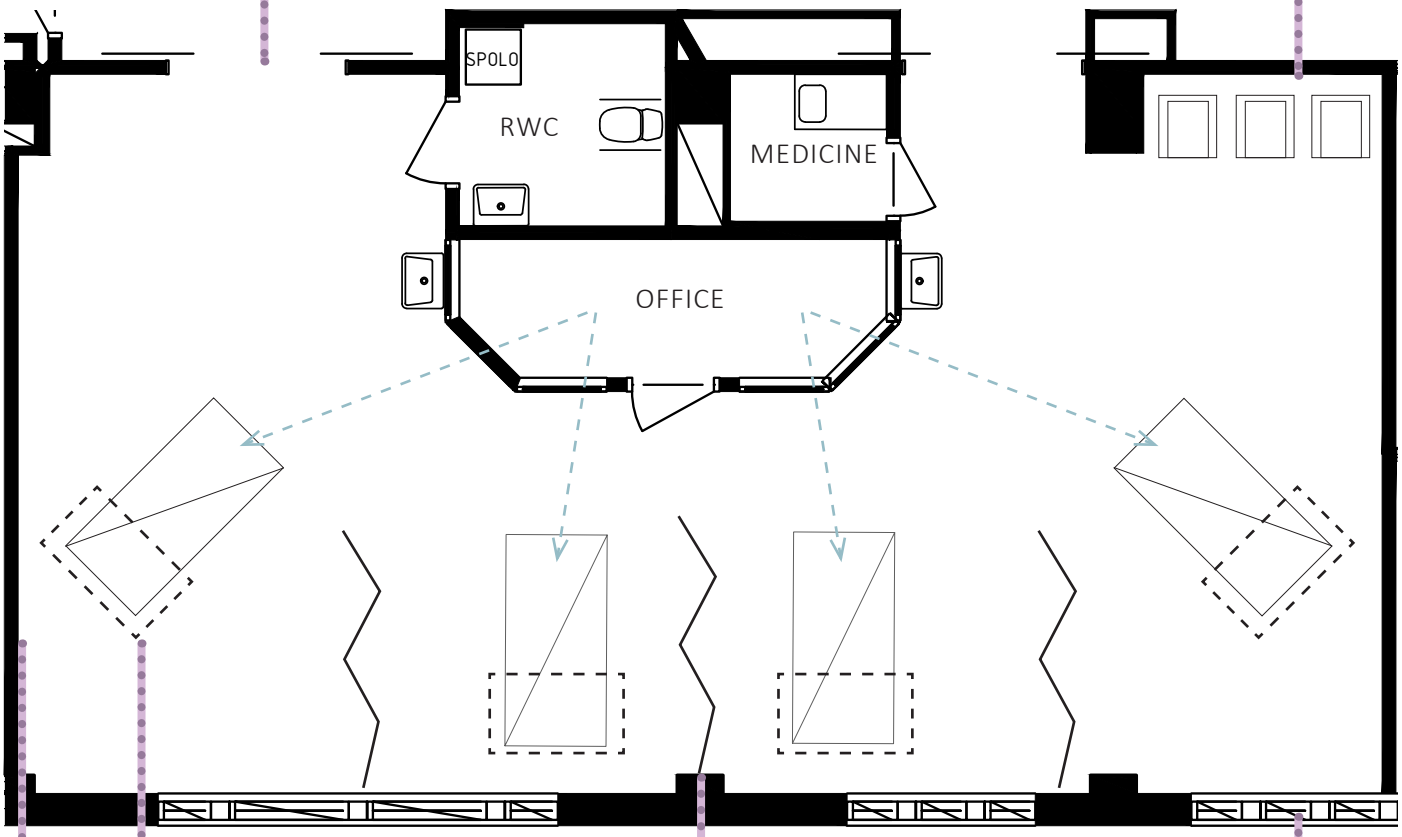


Inspiration picture for a wallpaper or poster that can serve as positive distraction. Author's own photograph.

Avoid having a patient near the entrance door to the room, reasons are:

- It will be easer to go in and out with patients
- There will be more space to work outside toilet and medicine room
- If a patient is placed near the door the view from staff office is interupted by the sinks

Less patients will open up for a few extra comfortable chairs in the care rooms for visitors. These should be easy to move and clean



Addition of patintings or screens for positive distraction can be added above the hospital beds

This can be a higher divider than the other. It will still be possible for the staff to see all screens and the four patients from their office

Patintings can also be added on the side walls along with new sound absorbers

An outdoor garden outside the building would create a necessary view of greenery both for patients, staff and visitors in the care rooms

SCENARIO 2: REDESIGN OF EXISTING FACILITIES

Scenario 2 is a redesign suggestion of the existing facilities. The scenario includes demolition of some existing walls and an addition of new walls including new finishes and interior design. All functions will be placed inside the existing building and the scenario also includes a proposal for an outdoor environment.

ABOUT THE AREA CALCULATION

The difference between the calculations is 26sqm. This is because some rooms (waiting area, meeting room, changing room and care room 1) have received some area from the existing corridor. The corridor and technical area are not included in the calculations which is why the new proposal seem bigger but is still inside existing building.

PROGRAM

Shared functions

NIMA

NIVA

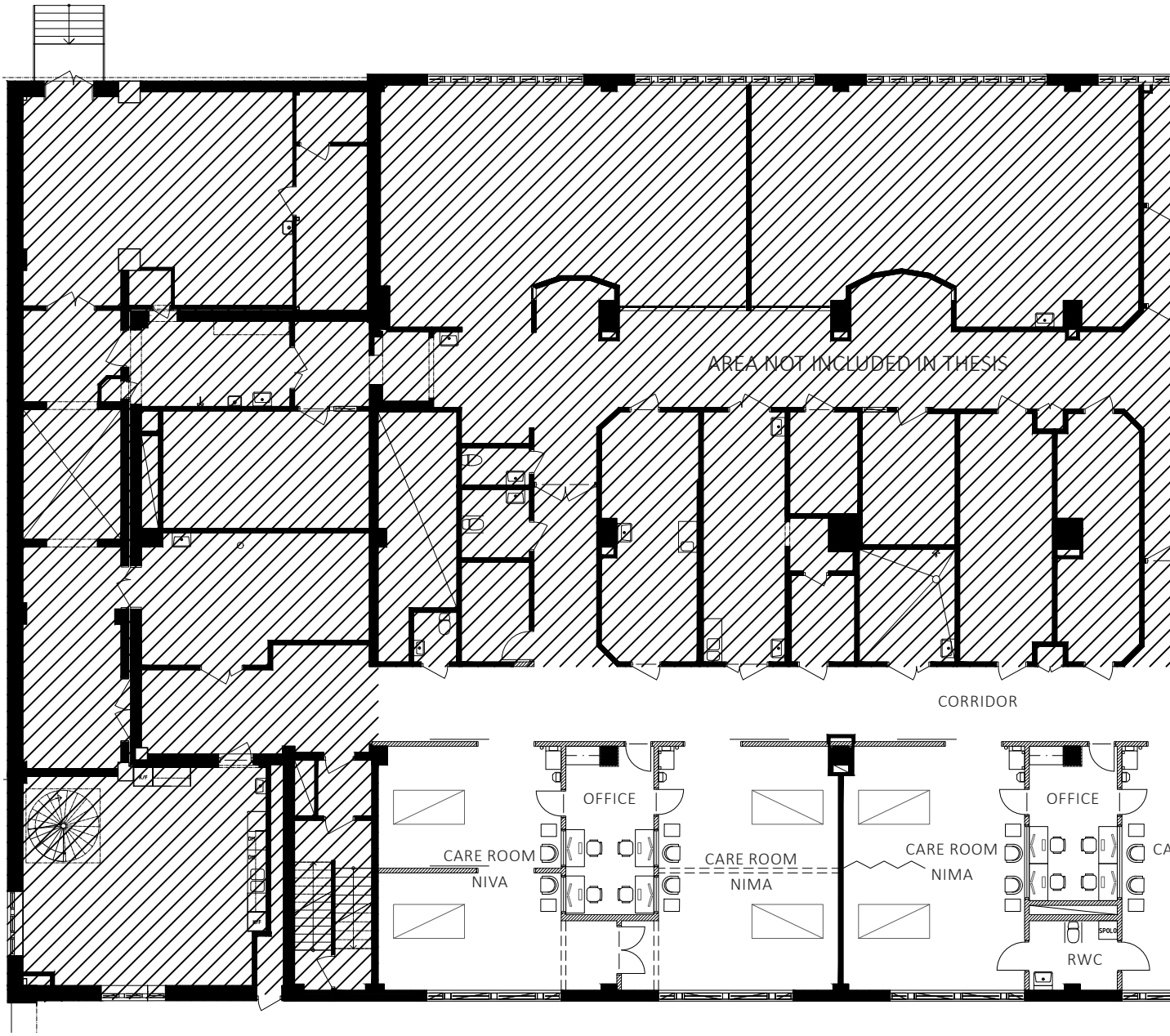
	EXCISTING FUNCTION	SQM	CHANGED FUNCTION	SQM
Care rooms	CARE ROOM 1 (6 patients)	102,7	1. CARE ROOM 1 (6 patients)	136,3
	TOILET	6,1	1A. TOILET	6,1
	TOTAL	*108,9*	*TOTAL*	*139,5*
	CARE ROOM 2 (4 patients)	98,7	2. CARE ROOM 2 (2 patients)	46,2
	OFFICE	6,6	3. CARE ROOM 3 (2 patients)	46,2
	TOILET	4,9	2A. OFFICE	14,3
	MEDICINE ROOM	2,7	2B. TOILET	6,4
	TOTAL	*112,9*	*TOTAL*	*113,1*
	CARE ROOM 3 (4 patients)	99	4. CARE ROOM 4 (2 patients)	46
	OFFICE	6,6	5. CARE ROOM 5 (2 patients)	46,4
	TOILET	4,8	4A. OFFICE	14,3
	MEDICINE ROOM	2,6	4B. TOILET	6,4
	TOTAL	*113*	*TOTAL*	*113,1*
	CARE ROOM 4 (2 NIMA, 2 NIVA)	98,6	6. CARE ROOM 6 (2 NIMA patients)	49
	OFFICE	10,1	7. CARE ROOM 7 (2 NIVA patients)	50
	TOILET	4,8	6A. OFFICE	14,3
	TOTAL	*113,5*	*TOTAL*	*113,3*
Staff NIMA	OFFICE (3 ppl)	11,6	8. OFFICE (3 ppl)	7,4
	OFFICE (1 per)	10,3	9. OFFICE (1 per)	14,5
	OFFICE (3 ppl)	12,1	10. OFFICE (5 ppl)	15,9
	OFFICE (3 ppl)	9,3	11. OFFICE (3 ppl)	9,4
	OFFICE (2 ppl)	11,7	12. OFFICE (2 ppl)	11,8
	OFFICE (2 ppl)	5,9	ADDED TO 5 ppl OFFICE	
	TOTAL	*60,9*	*TOTAL*	*59*
	STAFF KITCHEN	40,9	13. STAFF KITCHEN	40,9
	MEETING ROOM	13,2	14. MEETING ROOM	18,3
	TOTAL	*54,1*	*TOTAL*	*59,2*
Visitors	RECEPTION + BACK OFFICE	10,3	15. RECEPTION	13
	WAITING ROOM	16,6	16. WAITING ROOM	21,2
	TOILET	2,1	17. TOILET	5,3
	TOTAL	*28,9*	*TOTAL*	*39,5*
Staff NIMA & NIVA	CHANGING ROOM	20,1	18. CHANGING ROOM	25,1
	SHOWER	2,3	19. TOILET + SHOWER	2,6
	TOILET	2,4	REMOVED FROM PROGRAM	
	TOILET	2,1	REMOVED FROM PROGRAM	
	TOTAL	*26,9*	*TOTAL*	30,3
	DOCTORS ROOM	21,9	REMOVED FROM PROGRAM	
	RESEARCHERS	39,5	20. RESEARCHERS	39,5
	TOTAL	*54,2*	*TOTAL*	*39,5*

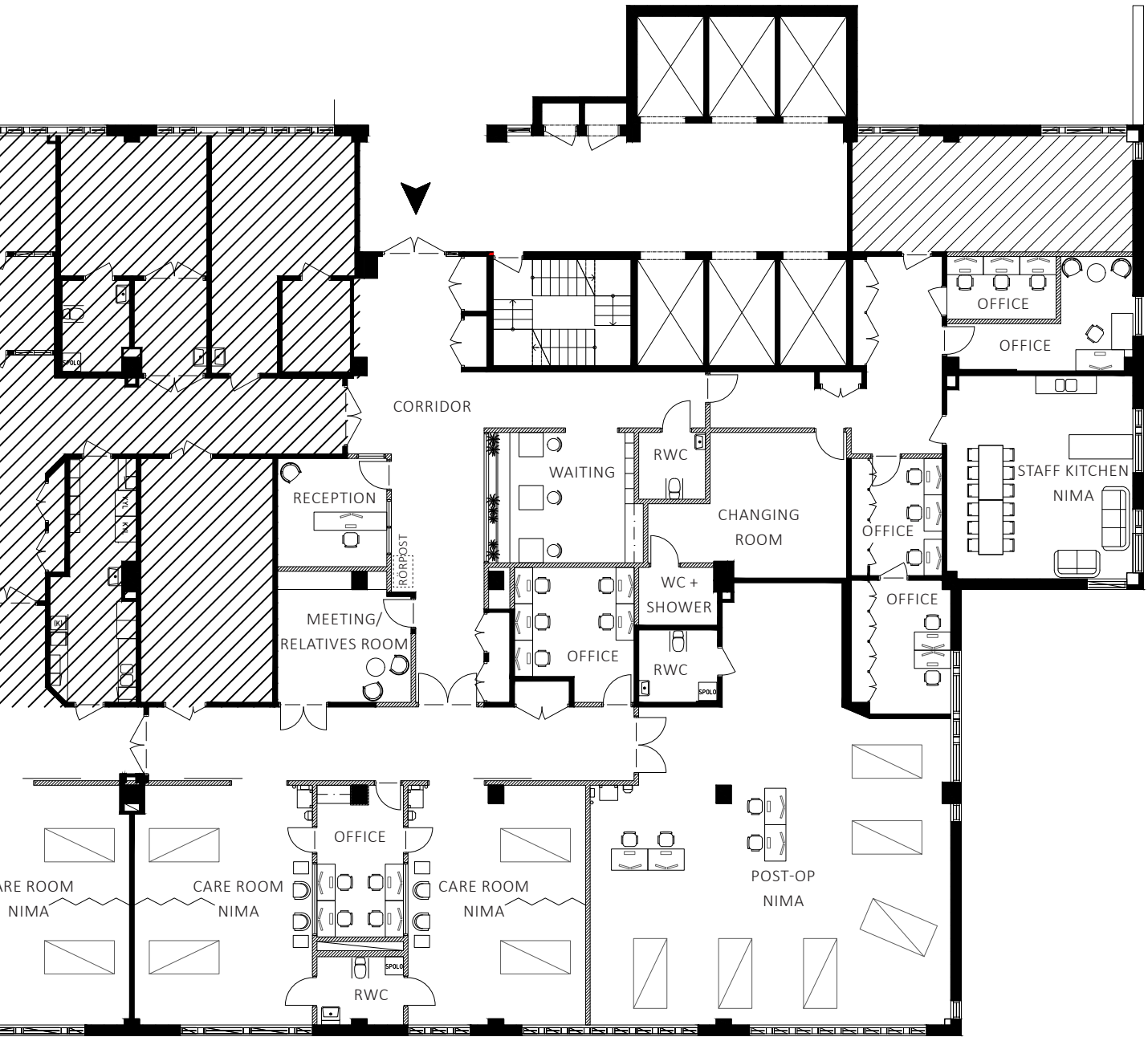
TOTAL AREA: 680,4

TOTAL AREA: 706,4

FLOORPLAN 1:200

Note: added equipments and furniture in scenarios are only estimated from site visits and should not be seen as the exact equipment needed or the exact size/ placement




OFFICE
OFFICE
CORRIDOR
WAITING
RWC
RECEPTION
CHANGING
ROOM
STAFF KITCHEN
NIMA
OFFICE
IRORPOST
WC +
SHOWER
OFFICE
MEETING/
RELATIVES ROOM
OFFICE
RWC
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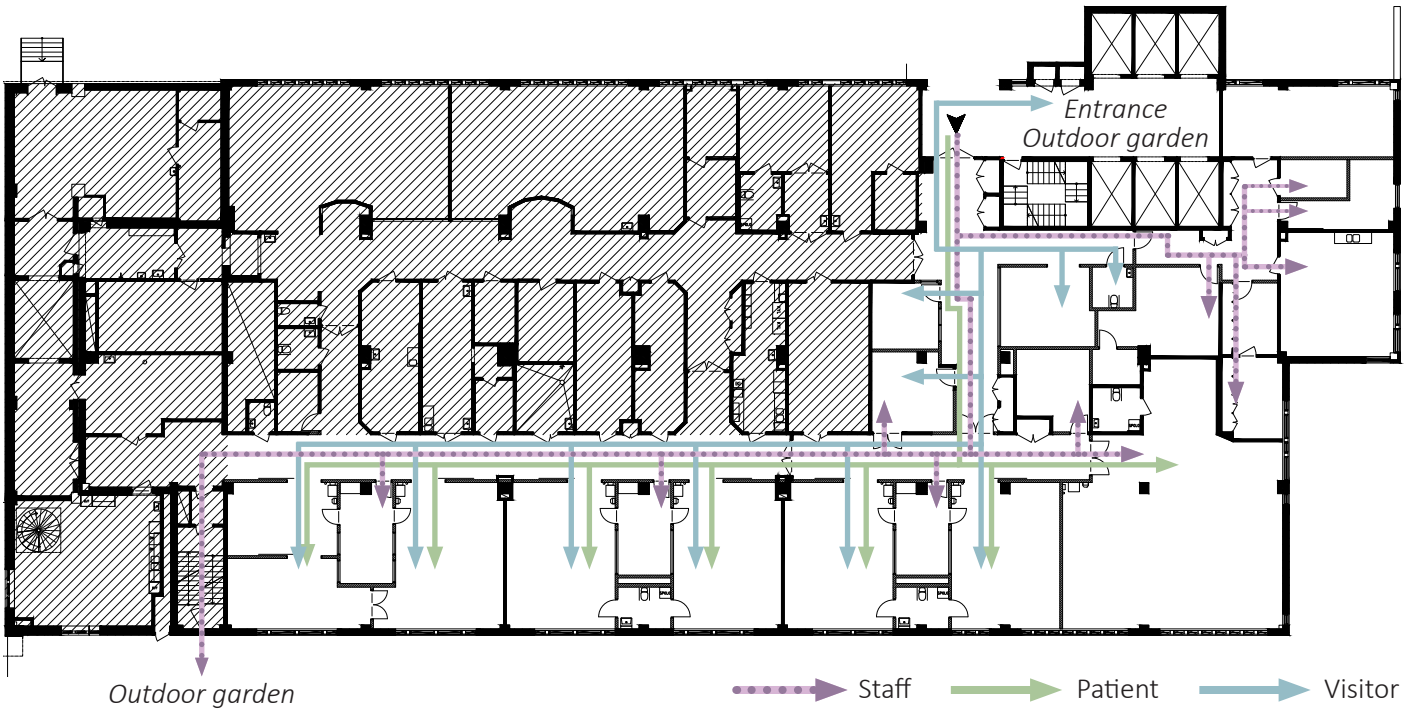
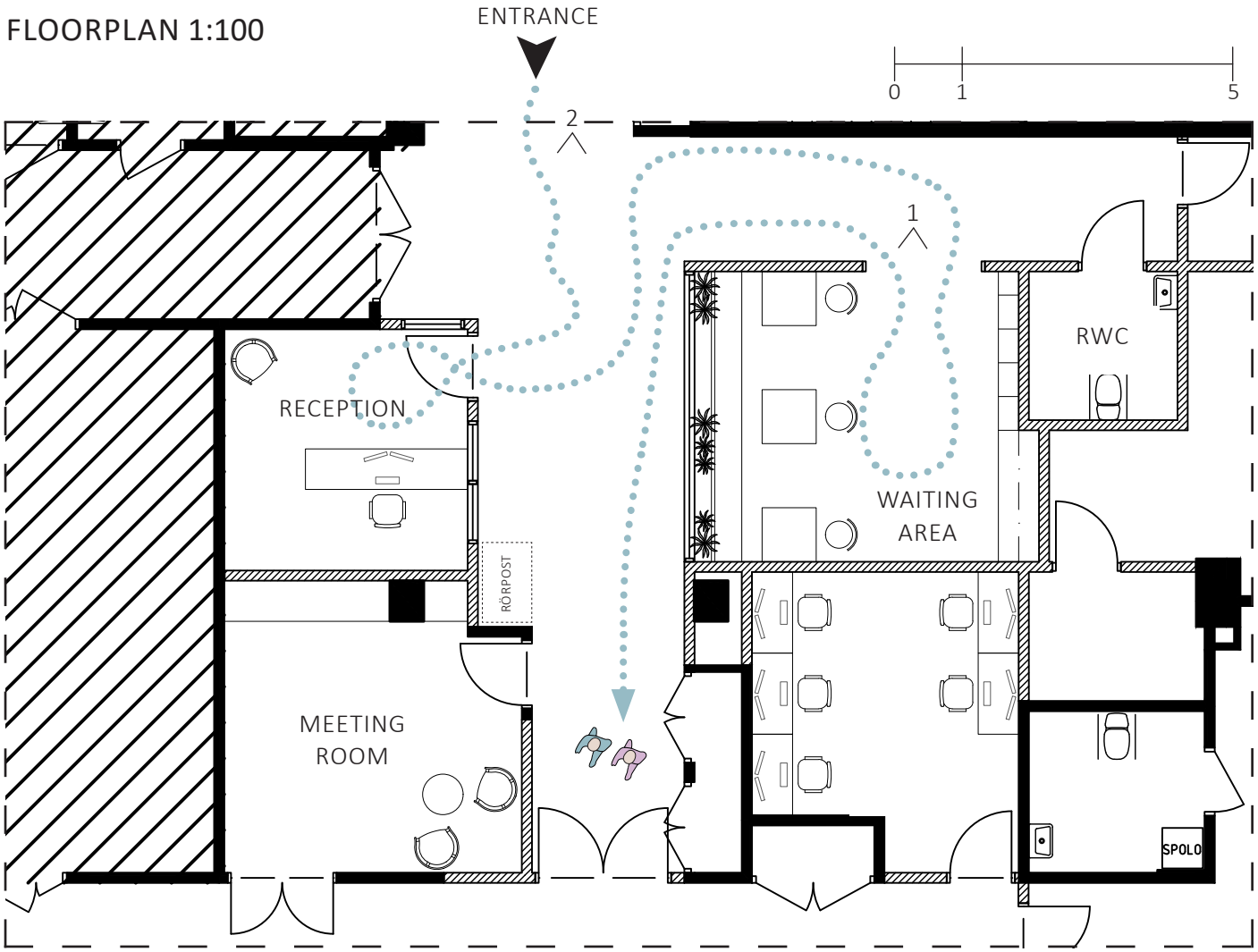
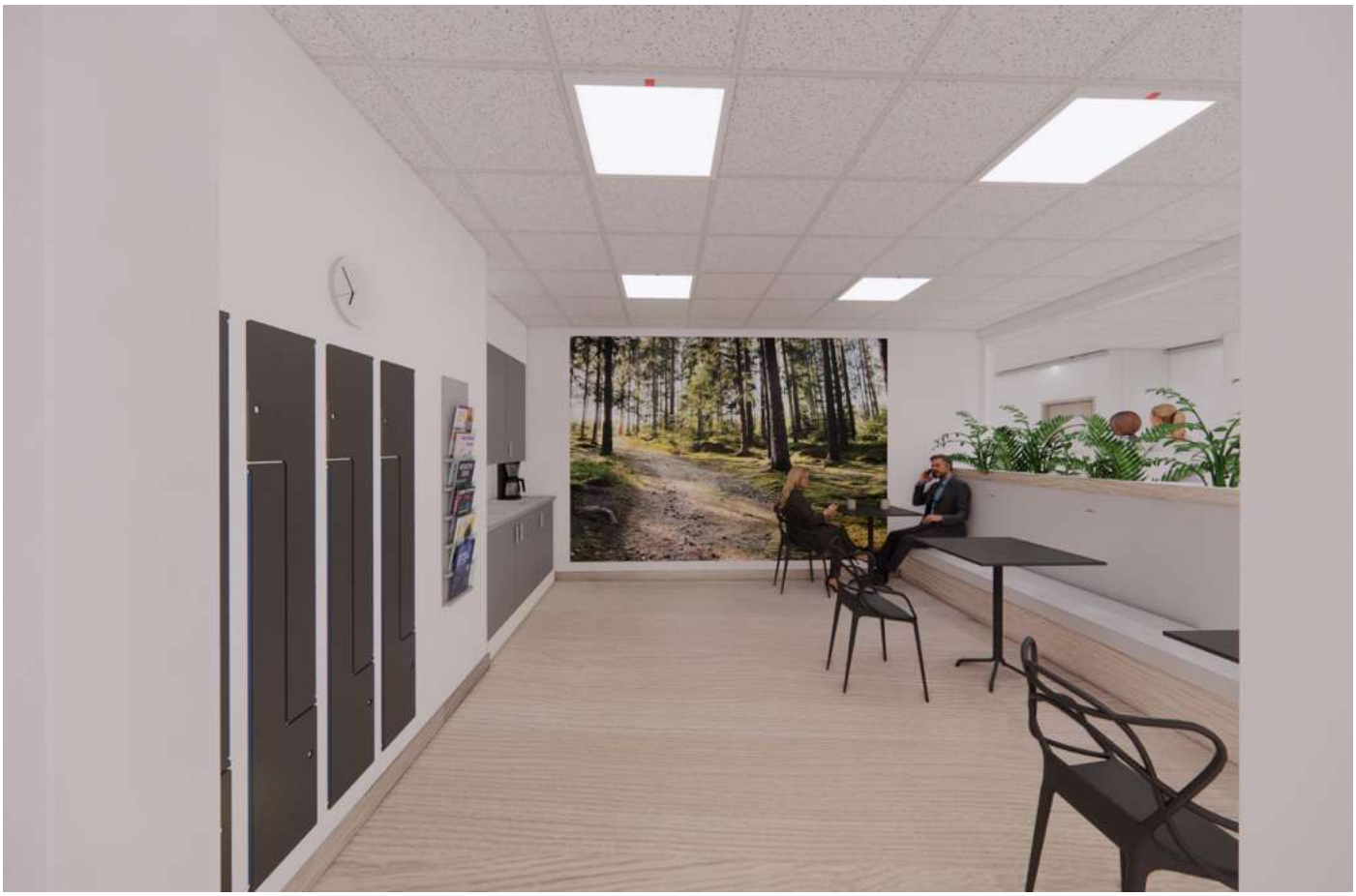
CARE ROOM
NIMA
CARE ROOM
NIMA
CARE ROOM
NIMA
POST-OP
NIMA
RWC



FLOORPLAN 1:100





1. View from the entrance to waiting area

2. View from entrance to the units

SCENARIO 3: REDESIGN AND EXTENSION

Scenario 3 is a redesign suggestion of the existing facilities including two extensions. The scenario includes demolition of some existing walls and an addition of new walls including new finishes, interior design, and new exterior walls. The argument for this scenario is to fulfil the wishes from the unit (in terms of extra functions and bigger care rooms) and investigate what the extra square meters can contribute to the unit in relation to the thesis question. This scenario also includes a proposal for the outdoor environment.

ABOUT THE AREA CALCULATION

The difference between the calculations is 104 sqm and the area of the new extension is 125sqm in total. The 21sqm difference between these two, belongs to the corridor to staff offices (the corridors and technical space are not included in the calculations). In the new scenario, some functions have been added to the program which are more meeting rooms for staff, offices for only one person, a restroom, and a conference room.

ABOUT THE EXTENSIONS

In this scenario, there are two extensions, one to the north above the waiting area on floor 2 and one in the southeast corner of the existing building. The extension in the corner includes both floor 3 and 4. In a further project, an investigation is necessary to exactly define how to use the extension on floor 3. According to received floorplans, it will be necessary to move two existing offices on floor 3 into the new extension. It will also be necessary to use some part of it for technical rooms.

PROGRAM

Shared functions NIMA NIVA

AREA CALCULATION

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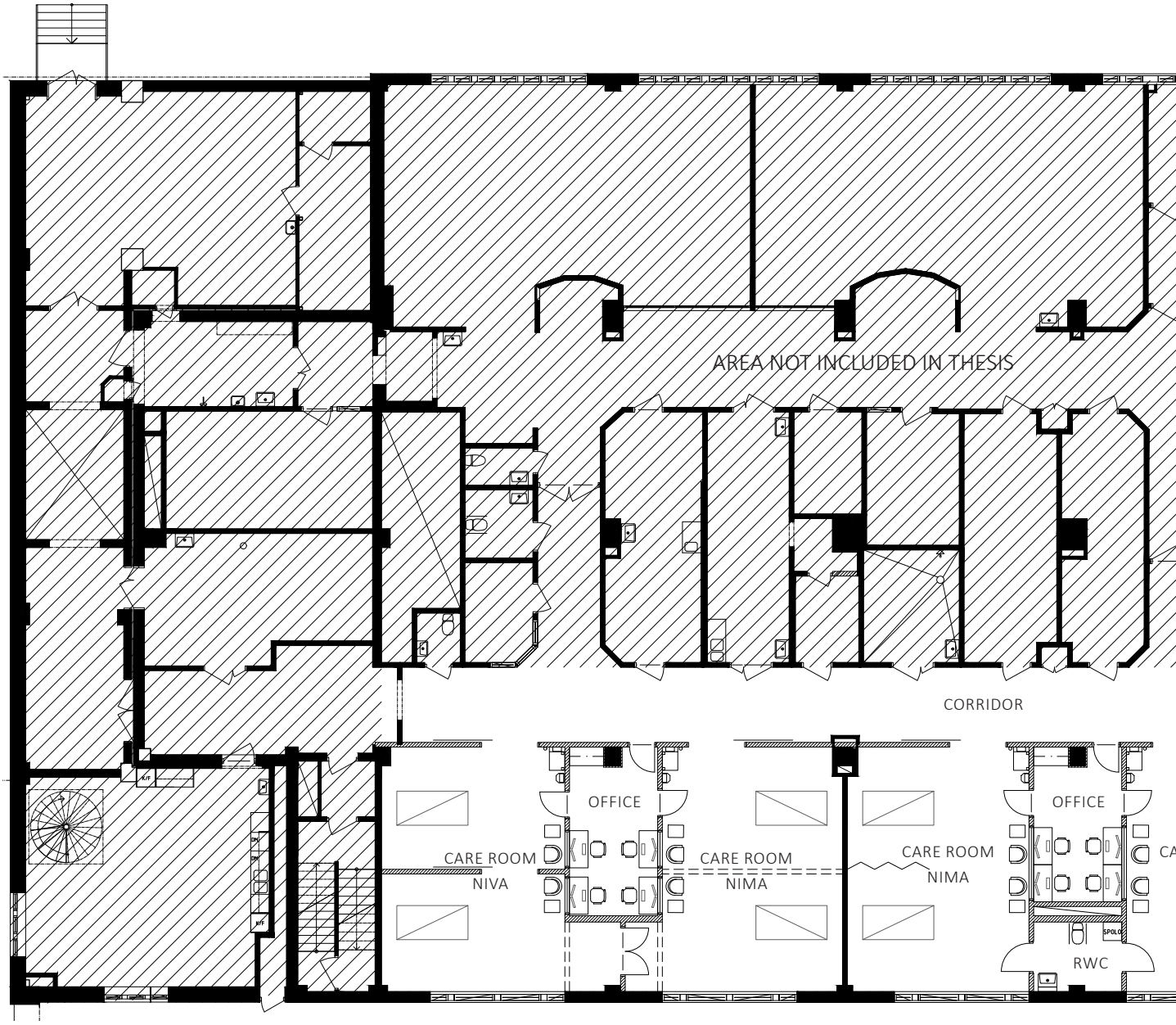
	OFFICE (3 ppl)	12,1	10. OFFICE (1 per)	4,3
	OFFICE (3 ppl)	9,3	11. OFFICE (1 per)	4,3
	OFFICE (2 ppl)	11,7	12. OFFICE (1 per)	4,3
	OFFICE (2 ppl)	5,9	13. OFFICE (1 per)	10
			14. OFFICE (5 ppl)	15,4
	TOTAL	*60,9*	*TOTAL*	*49,9*
	STAFF KITCHEN	40,9	15. STAFF KITCHEN	40,9
	MEETING ROOM	13,2	16. MEETING ROOM	11,4
			17. CONFERENCE ROOM	27,2
	TOTAL	*54,1*	*TOTAL*	*84,1*
Visitors/ staff	RECEPTION + BACK OFFICE	10,3	18. RECEPTION	16
	WAITING ROOM	16,6	19. WAITING ROOM	33,5
	TOILET	2,1	20. TOILET	5,1
			21. MEETING ROOM	16
			22. MEETING ROOM/ KIDS ROOM	13,6
			23. MEETING ROOM/ RELATIVES ROOM	18,6
	TOTAL	*28,9*	*TOTAL*	*98,2*
Staff NIMA & NIVA	CHANGING ROOM	20,1	24. CHANGING ROOM	22,7
	SHOWER	2,3	25. TOILET	5,3
	TOILET	2,4	26. TOILET + SHOWER	3,3
	TOILET	2,1	REMOVED FROM PROGRAM	
	TOTAL	*26,9*	*TOTAL*	*31,3*
	DOCTORS ROOM	14,7	27. DOCTORS ROOM/ RESTROOM	10,1
	RESEARCHERS	39,5	28. RESEARCHERS	24,6
		TOTAL AREA: 673,2		TOTAL AREA: 777,2

FLOORPLAN 1:200

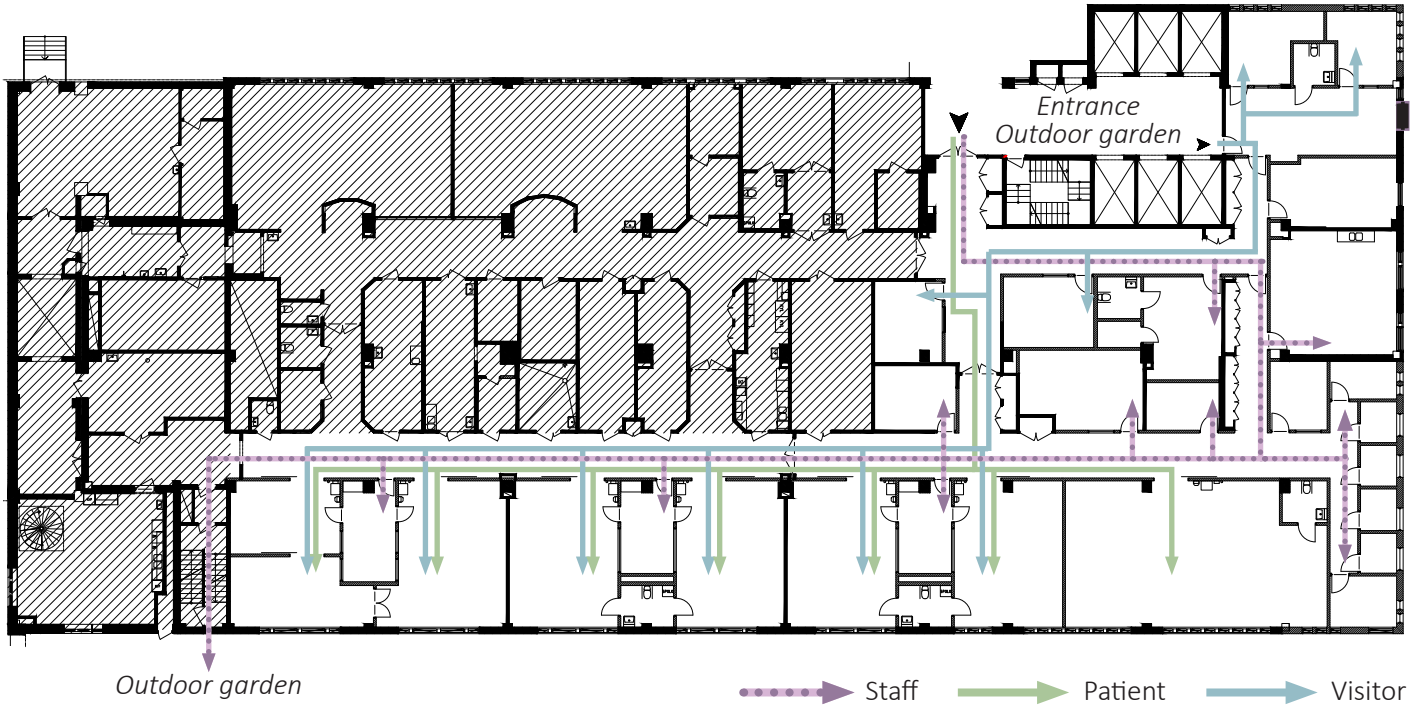
Note: added equipments and furniture in scenarios are only estimated from site visits and should not be seen as the exact equipment needed or the exact size/ placement



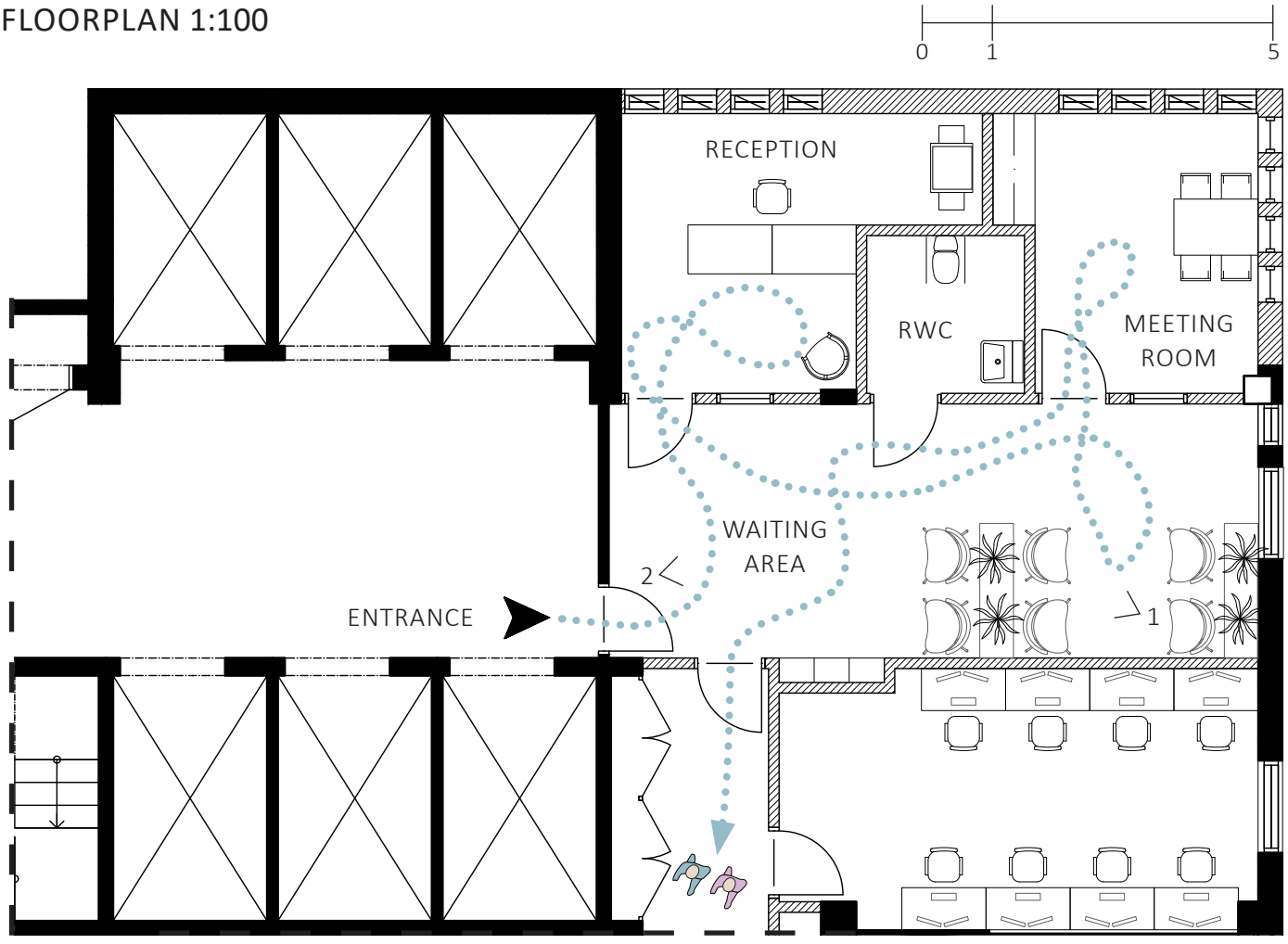
Existing wall

New wall


Extension
RECEPTION
RWC
MEETING/
KIDS
WAITING ROOM
RESEARCHERS
CORRIDOR
MEETING
RÖRPOST
OFFICE
MEETING/
RELATIVES ROOM
RWC
WC
SHOWER
CHANGING
ROOM
CONFERENCE
REST/
DOCTOR
STAFF KITCHEN
NIMA
OFFICE
MEETING
OFFICE
CORRIDOR
OFFICE
OFFICE
OFFICE
OFFICE
OFFICE
RWC
POST-OP
NIMA
CARE ROOM
NIMA
CARE ROOM
NIMA
CARE ROOM
NIMA
OFFICE
RWC
Extension



FLOORPLAN 1:100



1. View from waiting area

2. View from visitors´ entrance into waiting area

FACADES

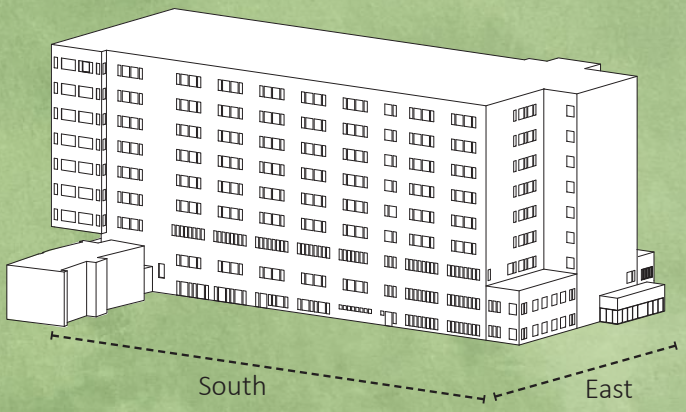
Note: The facades are only drawings for inspiration of a future facade extension and outdoor garden. The facades should not be seen as detailed drawings

Extension

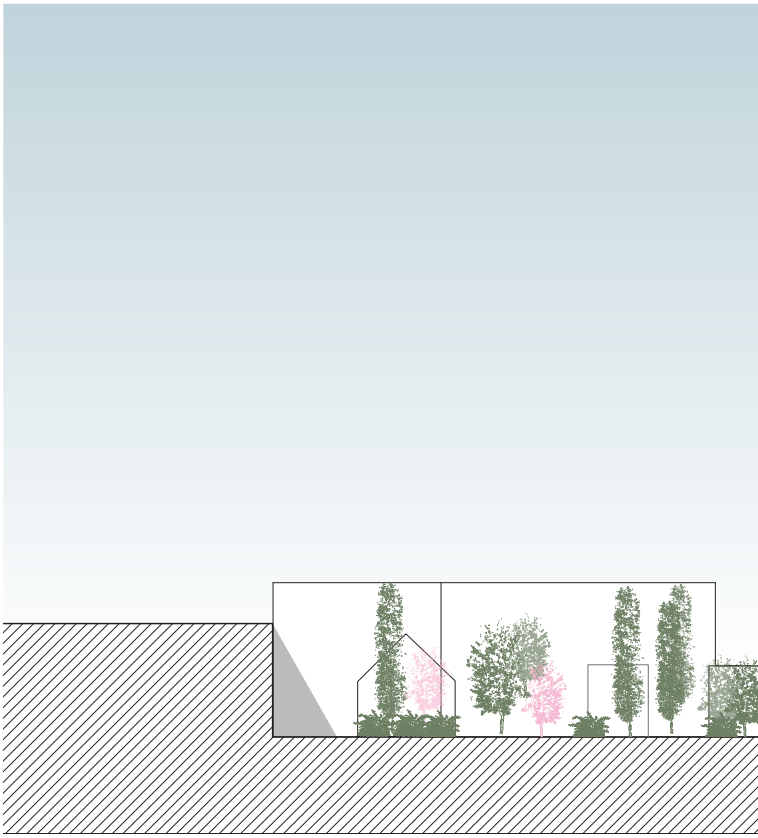
The new extensions have received a wooden panel façade painted in a green colour that connects to the green sheets today used between the windows.

Reuse

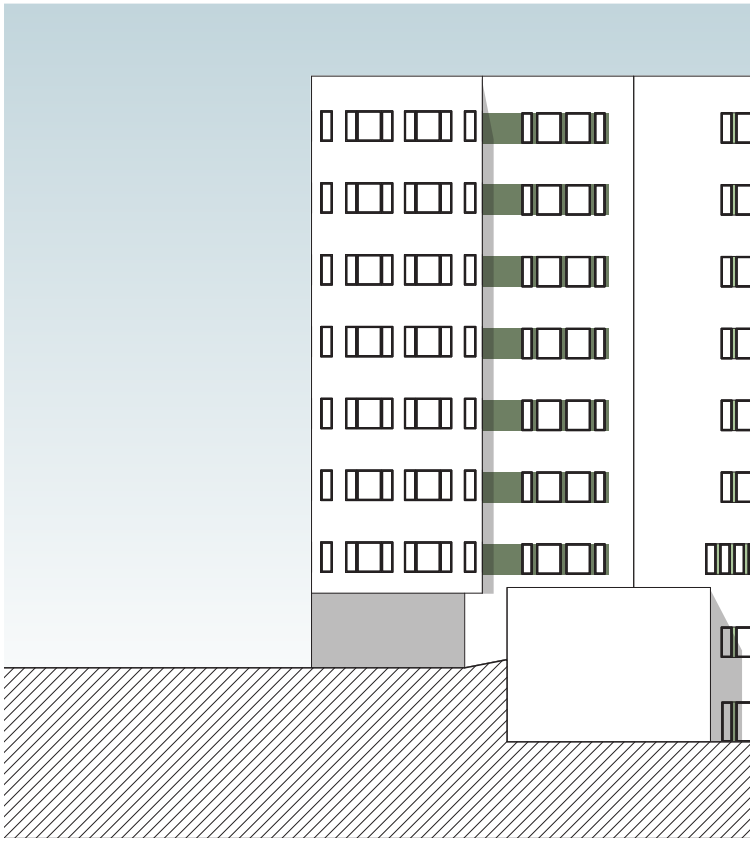
There are five big and seven small windows on the existing façade today that can be taken care of and replaced in the new façade.



3D perspective of building 85

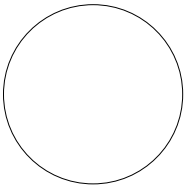


FACADE TO EAST 1:400



FACADE TO SOUTH 1:400

Facade material: Wooden panels painted green

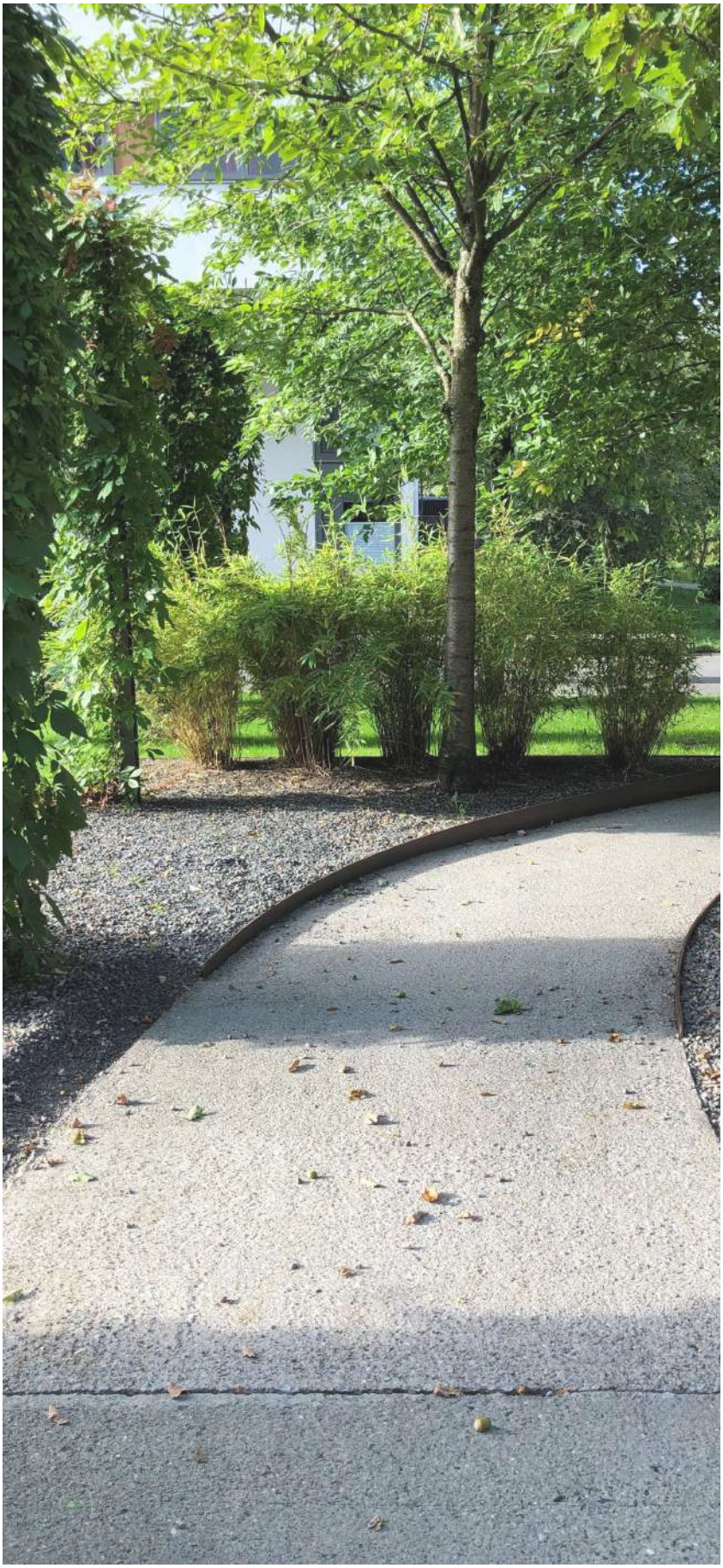


Window frame: Same as existing, white

OUTDOOR ENVIRONMENT

Author's own photographs

The following pages include both scenario 2 and 3



Inspiration for path surrounded with greenery

Inspiration for trees with different colours

0 10 20

1. Entrance/ exit for NIMA and NIVA staff. Start on the path for staff
2. Pergola
3. Greenhouse for both staff and visitors with different entrances and indoor space
4. Possibility for water collection
5. Start on path for visitors
6. Green roof on new extension
7. Sitting areas with different layouts
8. Entrance to ground floor

New tree

Existing tree

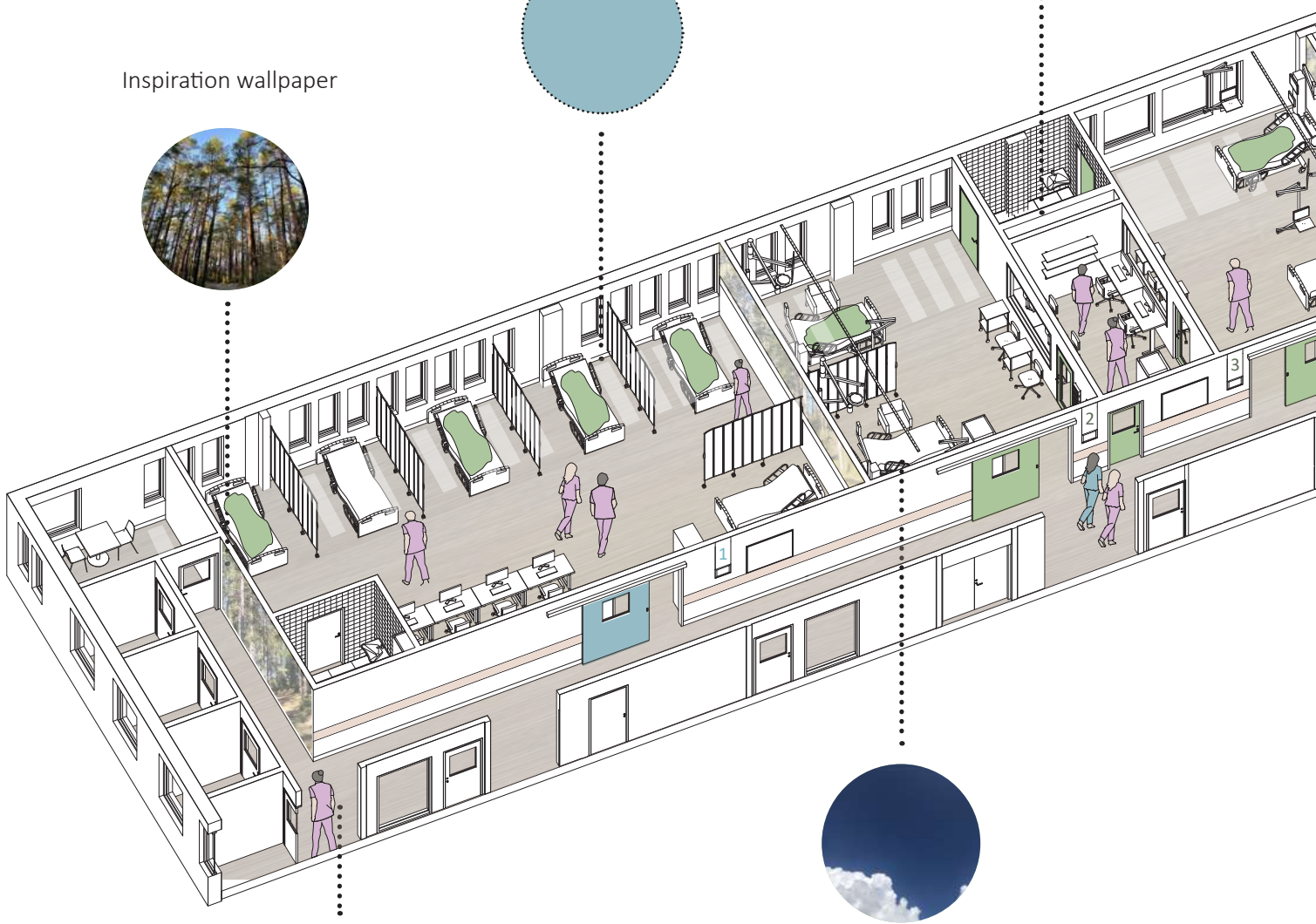
INTERIOR PALETTE

3D example from scenario 3

Care room 2 & 3- NIMA Green

Care room 1- Post-op Blue

Inspiration wallpaper



Inspiration print above hospital beds

New floors with oak-pattern

Existing doors of oak

Care room 4 & 5- NIMA

Purple

Inspiration wallpaper

Care room 6 & 7- NIMA & NIVA

Pink

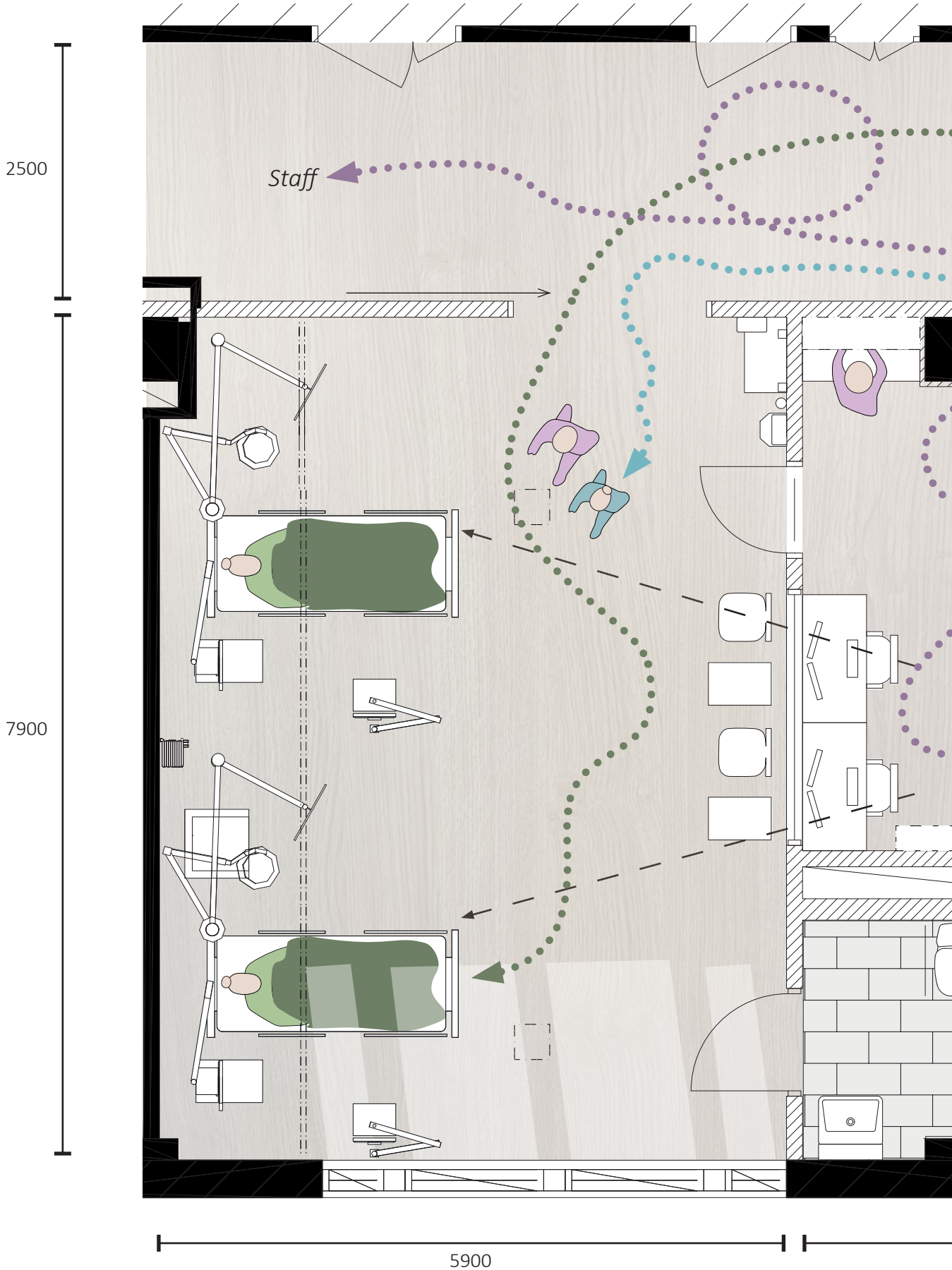
Inspiration print above hospital beds

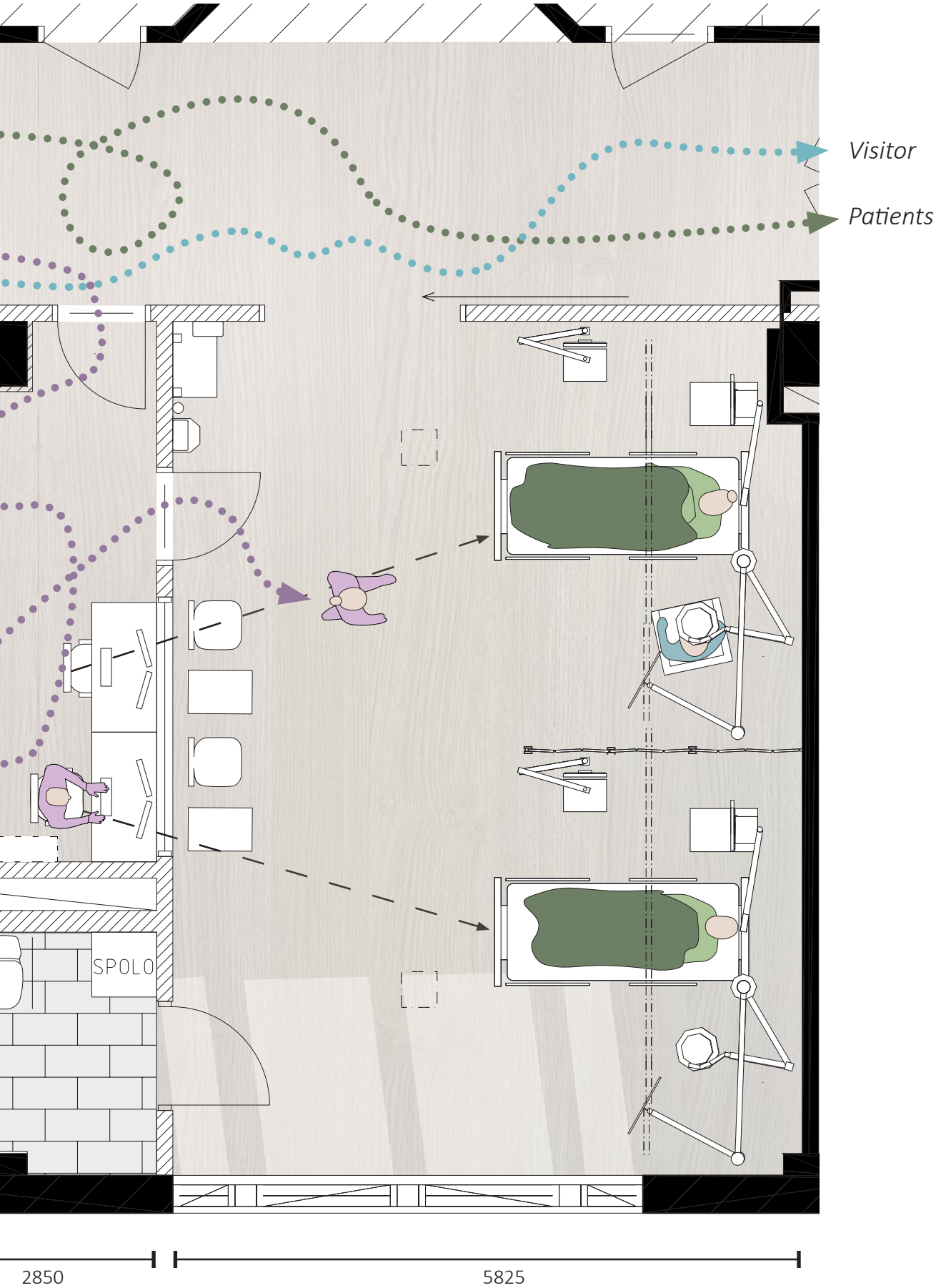
Additional walls

White

FLOORPLAN CARE ROOMS 1:50

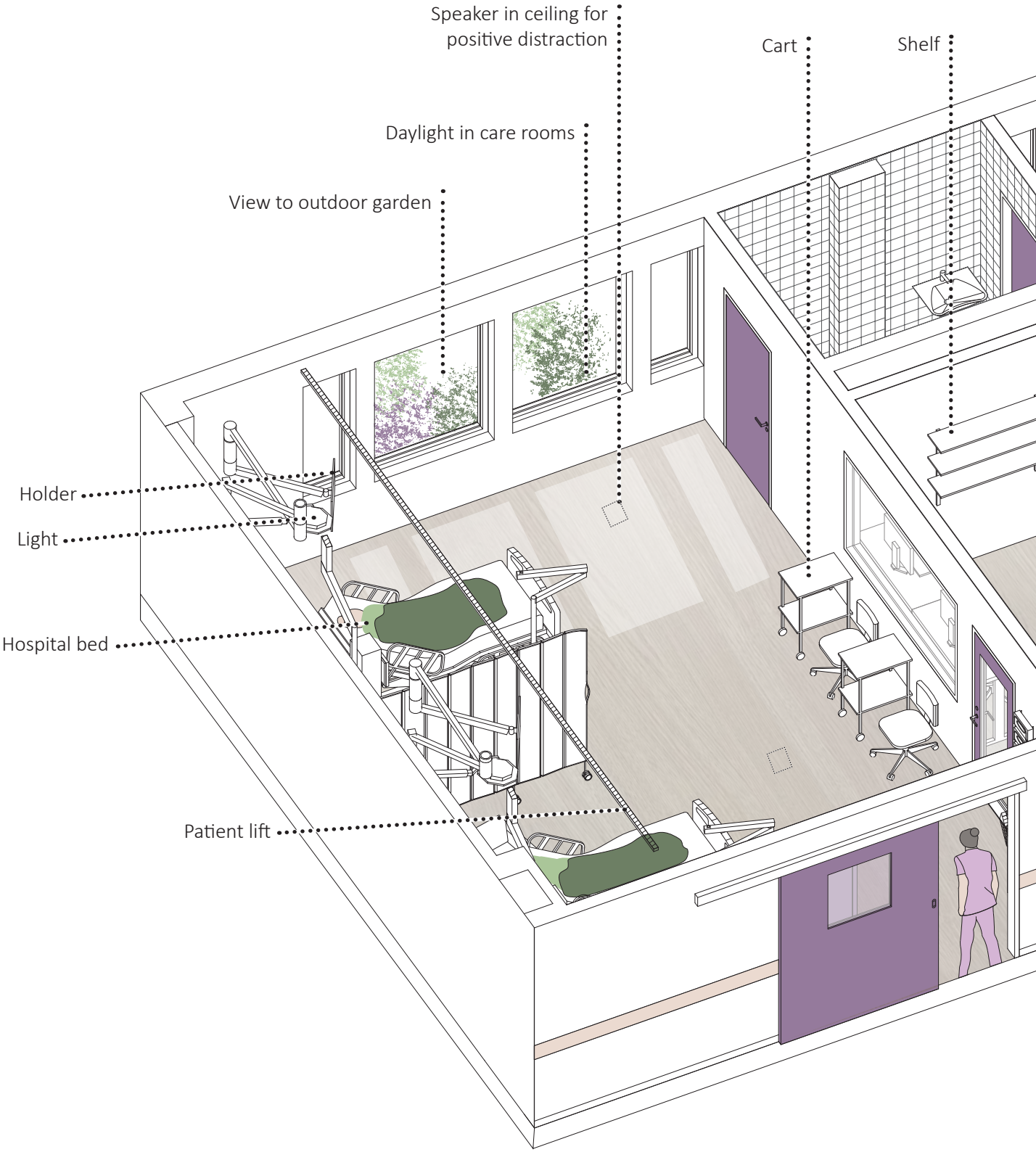
Care rooms for intermediate care

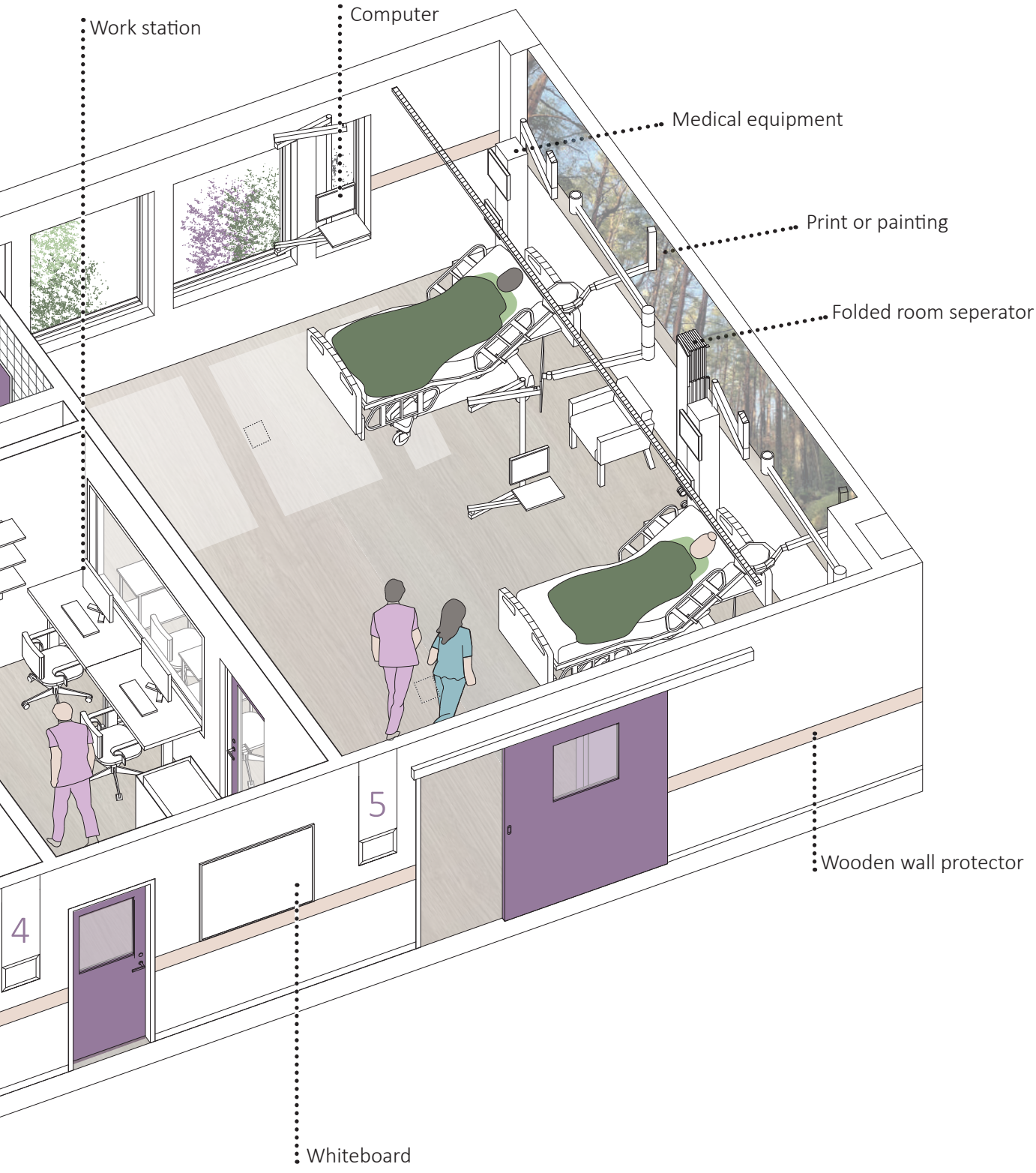



0
1
2
Visitor
Patients
SPOLO
2850
5825

3D PERSPECTIVE CARE ROOM

Care rooms for intermediate care




Work station
Computer
Medical equipment
Print or painting
Folded room seperator
Wooden wall protector
Whiteboard
4
5

PERSPECTIVES

View from corridor (scenario 3)

View from entrance door to care rooms

View from hospital bed in care room

View from staff office to care room

DISCUSSION

This chapter contains a reflection and discussion about the master thesis question in relation to findings, research and scenarios. It will also discuss other observations and thoughts about the project that can be useful in the future work for the unit.

SCENARIO 2, PROS AND CONS

Differences between scenarios

	+	-
	DAYLIGHT	
Patients	Care rooms with daylight	
Staff	Staff kitchen with daylight (same as before)	Office in care rooms 2-7 without daylight
		Dark corridors
Visitors		Waiting area, meeting room and reception without daylight
	SOUND	
Patients	Lower noise levels with two patient-rooms	
Staff	Lower noise levels with two patient-rooms	
Visitors	Reception with possibility to close the door	Waiting area near entrance everyone use- stressful
	Waiting area with door to a calmer corridor than today	
	POSITIVE DISTRACTION	
Patients	Patients are oriented for views outdoor in room 2-7	Not possible for view outdoor in Post-op
	Examples of paintings/ prints in the ceiling above beds	
Staff	Examples of paintings/ prints on walls in care rooms	
	Examples of paintings/ prints in the corridor	
Visitors	Examples of plants/ paintings/ prints in the waiting areas and meeting rooms	
	OUTDOOR ENVIRONMENT	
Patients	View to the outdoor garden from the hospital beds	
Staff	View to the outdoor garden from the care rooms	
	Easy access to the outdoor garden from unit (fire-stair)	
Visitors	View to the outdoor garden from the care rooms	No view outdoor from waiting area or meeting room
	Easy to reach outdoor garden through entrance 85	
	SINGLE-PATIENT ROOMS	
Patients	Two-patient rooms instead of 4/6	Six patients in post-op (argument in discussion)
Staff	Two patient rooms instead of 4/6	Six patients in post-op (argument in discussion)
Visitors	Two patient rooms instead of 4/6	
	ADDITIONAL COMMENTS	
Patients	Less disturbance during night because of staff walking in- and out of the care rooms (entrance through office instead)	Everyone has the same entrance to unit
Staff	Easy to collaborate between work teams	Some offices are crowded
	Easy overview of all four/ six patients	Office for manager and deputy managers further away from care rooms
	Easy for staff and patients to see who enter the care rooms	No meeting room for post-op room
	Three doors to office in care rooms 2-7: safety for staff	
	Reception with view of entrance door (no view today)	
Visitors	Easy access to meeting room/ relatives room from waiting area without going in to the units	Everyone has the same entrance to unit

SCENARIO 3, PROS AND CONS

Differences between scenarios

	+	-
	DAYLIGHT	
Patients	Care rooms with daylight	
Staff	Staff kitchen with daylight (same as before)	Office in care rooms 2-7 without daylight
	Majority of offices with daylight (needed)	
Visitors	Waiting area, meeting room and reception with daylight	
	SOUND	
Patients	Lower noise levels with two patient-rooms	
Staff	Lower noise levels with two patient-rooms	
Visitors	Reception with possibility to close the door	
	Waiting area with their own entrance	
	POSITIVE DISTRACTION	
Patients	Patients are oriented for views outdoor in room 2-7	Not possible for view outdoor in Post-op
	Examples of paintings/ prints in the ceiling above beds	
Staff	Examples of paintings/ prints on walls in care rooms	
	Examples of paintings/ prints in the corridor	
Visitors	Examples of plants/ paintings/ prints in the waiting areas	
	and meeting rooms + view outdoor	
	OUTDOOR ENVIRONMENT	
Patients	View to the outdoor garden from the hospital beds	
Staff	View to the outdoor garden from the care rooms	
	Easy access to the outdoor garden from unit (fire-stair)	
Visitors	View to the outdoor garden from the care rooms	
	Easy to reach outdoor garden through entrance 85	
	View to outdoor from waiting area and meeting room	
	SINGLE-PATIENT ROOMS	
Patients	Two-patient rooms instead of 4/6	Six patients in post-op (argument in discussion)
Staff	Two-patient rooms instead of 4/6	Six patients in post-op (argument in discussion)
Visitors	Two-patient rooms instead of 4/6	
	ADDITIONAL COMMENTS	
Patients	Less disturbance during night because of staff walking in- and out of the care rooms (entrance through office instead)	
Staff	Easy to collaborate between work teams	
	Easy overview of all four/ six patients	
	Additional conference room for lectures/ meetings etc	
	New meeting room near post-op room	
	Easy for staff and patients to see who enter the care rooms	
	Three doors to office in care rooms 2-7: safety for staff	
	Reception with view of entrance door (no view today)	
Visitors	Their own entrance and meeting room	
	Easy access to meeting and relatives rooms from waiting area without going in to the units	

DISCUSSION/ REFLECTION

This thesis has been a project in collaboration with an existing neurosurgery unit called NIMA located in Akademiska sjukhuset Uppsala. The thesis question focused on how the environment for staff, patients, and visitors can be improved by redesigning NIMA. This has been investigated in different ways, both by observations and conversations with staff working at the unit as well as reading literature and study reference projects. Also, continuous sketching and designing with a frequent dialogue with the unit to understand their needs in relation to what has been discovered during the thesis work and process has been applied.

SINGLE- OR DOUBLE-PATIENT ROOMS?

Research shows that single-patient rooms have a positive impact especially on patient's health and recovery. Therefore, in the beginning, single-patient rooms were designed as a scenario 3 in this thesis. When calculating the area single-patient rooms need in comparison to the asked number of patients at NIMA and the existing area of the floor, it was not possible to design that without an extension. Parallel to this, scenario 2 was developed to see if it was possible to design care rooms with less than four patients but within the existing building. The two options where then discussed together with staff at the unit where it became clear that the solution with two-patient rooms was more suitable for the unit and their working environment.

One of the reasons for this where the extra space single-patient rooms needed and that it effected the total number of rooms for NIVA. It was important for NIMA to be able to keep the same number of patients as they have today. Another discovery during the investigation of the single-patient room solution, was that it is more difficult to share support functions (toilets, offices etcetera) between single-rooms than rooms with more patients. Additionally, the patients at this unit need 24/7 observation/ presence by staff. When having offices for one care team (as single-patient rooms have), it is harder for staff to collaborate with each other if some nurse/ assistant needs to leave the room. Staff also felt that they have a longer way to reach the patients and to collect necessary equipment in emergency situations as well as an increase of distance walking during day. These reflections are also similar to what authors have discovered in the read literature.

The arguments came from staff at the unit and was important in the understanding of their work environment. Staff preferred easy access to the care rooms and easy collaboration between care teams. Staff preferred double-patient rooms, but the question is weather or not double-patient rooms are the best solution for the patients. Neurosurgery patients are especially vulnerable of their environment and the room layout is therefore extra important. According to literature, single-patient rooms have many advantages for example less noise and disturbance that otherwise can come from other patients, increase of privacy and improvement in self-control etcetera.

On the other hand, if the staff have easier and quicker access to the care rooms (especially in emergency situations) and have better opportunities to collaborate for 24/7 observation, this can contribute to a safer environment for the patients. Another aspect of this is the possibility to have four staff to observe each patient instead of two. In addition, research shows that single-patient rooms can lead to a feeling of loneliness for patients. Perhaps, having two patients in each room can counteract this. This reasoning became a part of the argument for the final scenarios where double-patient rooms were chosen.

In both scenarios, the post-operative care room has the same number of patients as today. The patients treated here stays for a few- up to 48 hours and do not need the same type of special care as intermediate patients. Therefore, the workload for staff is lower in this room. As the other care rooms, the possibility to observe all six patients at the same time is important. The only change of this room is the placement of beds (room layout) and area. Staff experiences are that the post-operative room is too small today and that it is too crowded to work outside the toilet when a patient is placed there. These arguments have been the main reason for the design and layout of this room in the scenarios.

Illustration of a patient. Author's own illustration.

SCENARIOS

Continuing with the thesis question, the scenarios show that it can be addressed by different answers/ designs and that it can be solved in different ways considering limitations. The answer to it, is in one way, visible in the previous pros- and cons diagram which describes how scenarios 2 and 3 can contribute to the discussion compared to what the literature says and in relation to each user group. Each scenario has different effects and can contribute to a shorter and longer perspective.

When it comes to scenario 1, it shows short-term solutions NIMA can apply today to increase the qualities in the environment. These changes will only have minor effects since they are limited by today's layout which has, during this thesis, been understood as challenging for both staff, patients, and visitors. The biggest effect in this scenario will be the change NIMA already is considering, having four patients in each room instead of six. On the other hand, there will still be challenges with space for patients when going in and out of the care rooms and both the toilets, medicine room and office will still feel too small.

Scenario 2 will increase the environment in and around the care rooms for every user group. However, it will be the almost the same situation for the administrative workers and the flow at the unit will not change (all users will have the same entrance). The visitors will almost have the same situation even if the scenario can contribute to a smaller change for privacy and sound.

Since scenario 3 has two extensions this scenario will be more expensive compared to the other alternatives and it will also need a further investigation in terms of the building. What becomes important in this scenario is to reflect on what the extension can add to the unit considering staff environment, patient care, visitors space and other spatial qualities that can support the work as well as support of increased health and wellbeing. To add this to the calculation of this scenario is important. This is something that is hard to calculate but is highly relevant.

More space and area in scenario 3 will create better space for more user groups and for more people at the unit and can therefore contribute, in a long term perspective, to a more sustainable and healthier environment. Better environment can have positive effect on lowering and shortening staff absence, increase wellbeing and health, increase the care for patients (higher satisfaction, faster recovery, less painkillers etcetera) and create a calmer and less stressful environment for visitors. It can also create a more attractive workplace which will lower the work pressure, support staff recruitment and retention. All of this will probably, in a longer term, contribute to less operating costs for the unit but how much is hard to calculate. However, the most important question in relation to this is weather the cost of developing the facilities, in any way, is more important than the health and wellbeing of the people who work at the unit, patients who recover from diseases or injuries, or visitors who meets a relative that may recently have been in a car crash.

OUTDOOR ENVIRONMENT

In both scenario 2 and 3 (it is possible to implemented in scenario 1 as well), there is a proposal for an outdoor garden just south of building 85. This is one of the most important features in the scenarios because it can contribute to a lot of positive effects at, not only floor 4, but the whole building. There are several arguments for an outdoor garden e.g., that it can serve as a space for rest and recover for staff, as part of the recover for patients and as a meeting place for relatives and patients. It also has the potential to decrease the feeling of stress and increase satisfaction for all groups.

In addition, it can serve as a green buffer and give several floors in the building a view to nature (positive distraction) which also have an important impact on staff, patients and visitors' health and wellbeing. Since it is placed near the entrance to building 85 it is easy to reach, and it has the potential to be divided in smaller zones if asked for. Therefore, the garden has a multi-purpose function, serving both as something to use and to look at. In addition, it is something that is important for the climate and ecological sustainability.

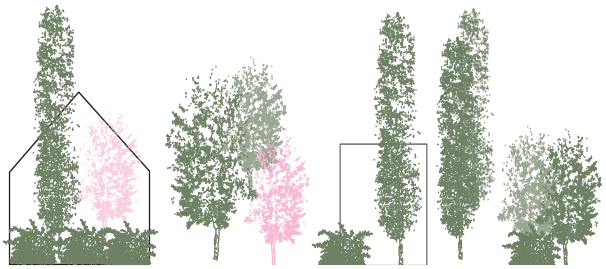


Illustration of an outdoor environment. Author's own illustration.

ADDITIONAL THOUGHTS

To continue the discussion, it will be done with the help of the important topic of sustainability. Today, there are no project that cannot take sustainability into consideration referring to economic, social, and ecological solutions. Since this project include redesign solutions, it will already save materials and money in comparison to building completely new. Each of the solutions have been designed to create an environment that work, support and facilitate more and in a longer term contribute to increase the health, wellbeing and recovery for staff, patients, and relatives. However, this has been done in relation to different limitations considering the existing building.

Each of the scenarios also has the intention to save as much of the existing walls and functions as possible. This means, that is it possible to rebuild parts of the scenarios, without effecting all the other functions at the unit. This will be especially important during the rebuilding process, where NIVA will be able to operate even if NIMA is under construction (and vice versa?) and makes it possible to rebuild some parts of the floor but keep the rest. Also, all the existing exterior windows that need to be removed with scenario 3 can be reused in the new proposal and there are several interior windows and doors in the existing unit that can be reused in the new scenarios.

In scenario 2 and 3, the total length and depth of all double-patient rooms 2-7 are the same as the total length and depth of the existing care rooms 2-4 with four-six patients each. The difference between them is that the new scenarios have bigger offices, each care room is wider, and the toilet is bigger but the space for medicine is smaller than before. This makes it possible to do changes at the unit today that only concerns the care rooms, without interrupting other functions.

However, an important addition to this discussion is the ongoing investigation at Akademiska sjukhuset concerning if it is possible to renovate/ redesign the whole hospital area where it is today or if it is better to build a new hospital outside Uppsala city. Building a new hospital takes time (maybe 10-20 years or more) and from the report, it seems like the building 85 is not part of the initial discussion about renovation.

With this thesis, the intention is to give a document that highlight the challenges and shows possibilities for the unit. But the reality is, that it is part of a bigger discussion. Should one refurbish one floor or wait for larger projects that give new conditions all together. The question of sustainability becomes even more important since there is a chance that the hospital is moved, even if it takes time. Therefore, there could be a solution where the unit can rebuild parts of the scenarios that today are considered least functional and has the most effect. One of these parts are the care rooms, but these are also probably the most expensive renovation compared to for example new offices.

FUTURE

Lastly, this thesis has been in a collaboration with NIMA who share the same floor with NIVA. During this process, the master thesis has focused on creating the best environment possible using mostly the space at NIMA and as little space as possible from NIVA. The two units have similar environment and there can be environments for both units that today are not utilized properly. Therefore, it will be important in a further project to investigate the environment for both units at the same time (even if only one is rebuilt in the end). This will open for more opportunities within the floor, and the ability to design for long-term solutions and collaborations as well as being more sustainable.

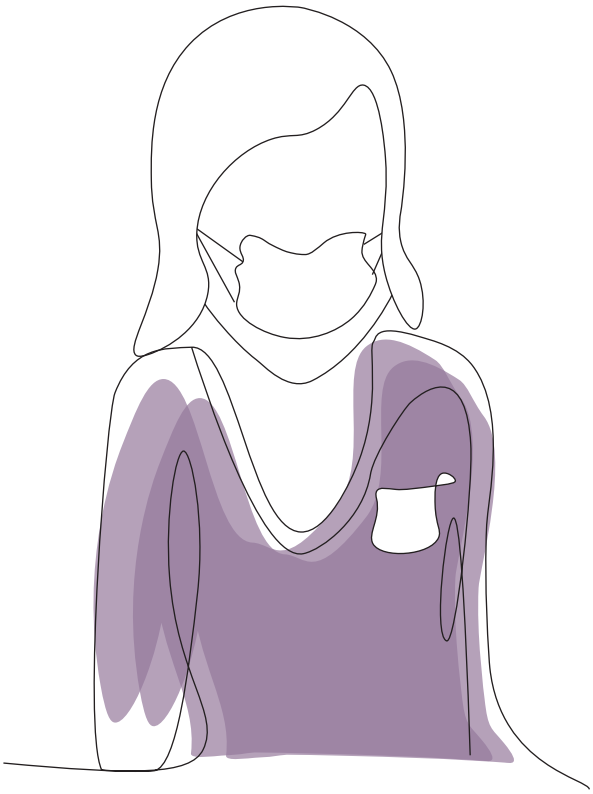
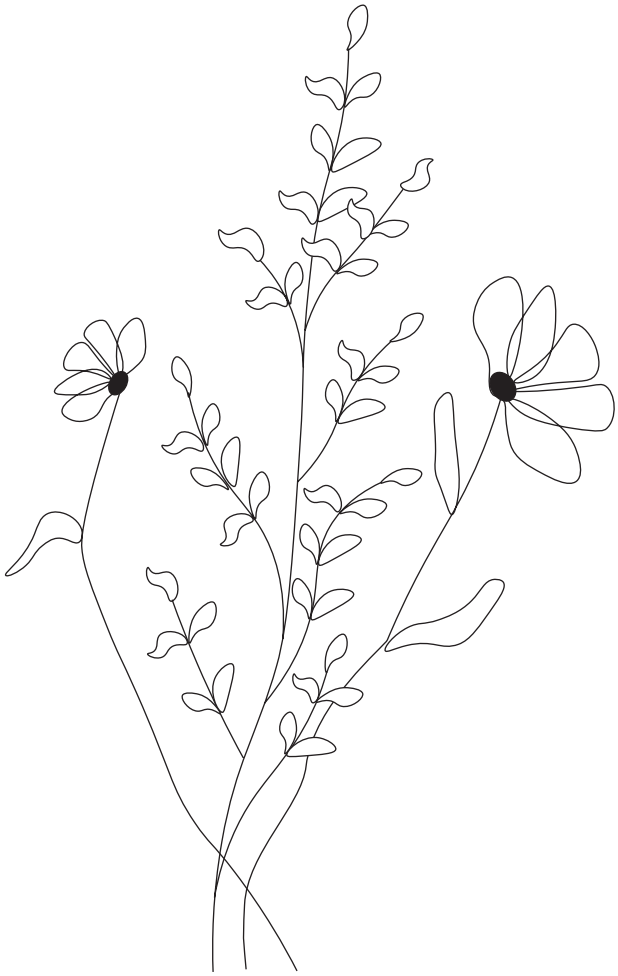


Illustration of a person. Author's own illustration.

ACKNOWLEDGEMENT



Thanks to all the people being involved in this thesis. Especially my tutor Göran, the staff at NIMA and Francesco who has given me the opportunity to do this project and continuing my journey of knowledge about architecture, specifically in the field of healthcare architecture.

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All additional pictures and illustrations is photographed and illustrated by the author and belong to the author. The purpose of them is only to be used in this master thesis.

INTERVIEWS

Doctor 1, interview, 4th November 2022

Doctor 1, interview, 23rd January 2023

Nurse 1, interview, 24th January, 2023

Nurse 2, interview 24th January, 2023

Nurse 3, interview 24th January, 2023

Head manager of department, interview 24th January, 2023

Receptionist 1, interview 24th January, 2023