

# Collaboration Hub

*Enhancing the knowledge transfer in GoCo Health Innovation City*



**Author: Łukasz Gnatek**

**Supervisor: Lin Tan**

**Examiner: Cristiana Caira**

*Chalmers University of Technology*

*Department of Architecture and Civil Engineering*

*Faculty of Architecture and Urban Design*

*Year of Graduation 2024*

# Table of contents

## **1. Introduction**

*Abstract*

*Research questions*

*Delimitations*

## **2. Theory**

*Triple helix theory of innovation*

*Conditions for transfer of knowledge*

## **3. Context**

*Health Innovation Hubs in Swedish context*

*GoCo Health Innovation City*

## **4. Investigation**

*Process*

*Functional program*

## **5. Detailed program**

*Examples of primary care centres*

*Assessing the GoCo user base*

*Extrapolating primary care programs to fit the GoCo requirements*

## **6. Site analysis**

*Functional analysis*

*Choosing the project site*

*Preliminary design*

## **7. Design strategies**

## **8. Design**

*Isometric view*

*Functional layout*

*Structural system*

*Plans*

*Plan schematics*

*Sections*

*Visualisations*

## **9. References**

# 1. Introduction

## Abstract

This thesis explores the convergence of healthcare architecture, knowledge exchange, and participatory design within the innovative ecosystem of GoCo Health Innovation City in Mölndal, Sweden. It specifically addresses the necessity and potential form of a healthcare facility integrated with a collaborative hub for education and innovation on the GoCo site. The primary research question investigates the requirements for such a facility, focusing on its design, functionalities, and the role it plays in facilitating knowledge transfer among clinicians, academics, and industry professionals. Through the lens of knowledge creation and inter-organizational collaboration, alongside principles of participatory design in healthcare, this study examines how architecture can bridge gaps between different professional groups and enhance their engagement.

The research methodology incorporates spatial analysis of the GoCo and surrounding Gothenburg area, considering accessibility to existing medical facilities, transportation, and architectural functions, such as the neighbouring housing and home for elderly, offices, clinics and laboratories. This part also includes interviews with GoCo partners, healthcare workers, researchers, and students to assess current and anticipated needs, exploring ways to integrate academia and public healthcare into the industry-driven environment at GoCo. This approach ensures that the proposed facility not only meets industry preferences but also takes into the consideration entirety of the

triple helix environment. Conclusions from the interview with GoCo partners were that they need a place to test their medical products in cooperation with patients and public healthcare sector. The conversations with the researchers and students gave the idea for the space in which they could collaborate and get to know startups, current trends within the industry and see the medical products and devices.

The outcome of the design part is a primary health center - a basic function that is heavily related to the neighbouring housing area, elderly housing, and that answers GoCo founders needs for testing their medical products in dialogue with doctors and patients. Conclusions from the dialogue with researchers and students is conveyed into the form of a Collaboration Hub - knowledge-sharing facility adjacent to the primary health centre, host activities such as workshops and lectures between patients, industry, medical professionals and university students, which can result in an increase in exchange of knowledge and human potential.

# 1. Introduction

## Research question:

*- What kind of healthcare facility is needed on the site of GoCo?*

## Subquestion:

*- How to incite transfer of knowledge and cooperation between different groups of users at this facility?*

## Delimitations:

### Scope of Research

While this study explores the design, functionalities, and the role of such a facility in facilitating knowledge transfer among clinicians, academics, and industry professionals, it intentionally does not go into the economic aspects, such as cost analysis or market studies of constructing and operating the proposed facility. The research focuses on architectural and functional requirements, along participatory design principles, to imagine an innovative ecosystem that bridges gaps between different professional groups.

### Nature of the Project

This research is conducted as a student project in cooperation with GoCo Health Innovation City. It is an academic project, not a commissioned piece of work by GoCo. While the study aims to offer valuable insights and proposals that align with the needs of the GoCo community, it does not carry an official endorsement of GoCo or its partners and is done on the author's own initiative.

### Feedback and Implementation

The research methodology includes interviews with GoCo partners, healthcare workers, researchers, and students, to gather a broad spectrum of needs, expectations, and ideas. Although the feedback from these stakeholders is invaluable and shapes the foundation of the proposed design and functionality of the facility, not all suggestions and feedback can be fully implemented.

### Problems and solutions

The thesis puts and emphasis on the role of architecture in facilitating interdisciplinary collaboration and knowledge exchange in the healthcare sector. However, it recognizes the complexity and challenges in aligning the interests and operations of clinicians, academics, industry professionals, and other stakeholders. The proposed design solutions are conceptual and aim to incite dialogue and potential pathways for future implementation rather than offering definitive solutions to these challenges.

## 2. Theory

### Triple helix model of innovation

The Triple Helix Model of innovation is a conceptual framework that highlights the interconnected relationships among three key actors in the innovation process: academia, industry, and government. This model was developed by Henry Etzkowitz and Loet Leydesdorff in the 1990s as a way to understand and promote innovation in a knowledge-based society.

Each component of the triple helix creates the environment and influences the work of two others.

The idea is that universities play a crucial role in generating knowledge through research and education. They act as a source of new ideas, technologies, and skilled personnel. Industry is responsible for applying and commercializing the knowledge generated by academia. It's the sector that turns research and ideas into products, services, and economic value. The last helix represents the role of government and public policy in fostering and supporting innovation. Government agencies create policies, regulations, and funding mechanisms that can influence and shape the innovation ecosystem. They provide the necessary infrastructure and environment for academia and industry to thrive.

The interactions and collaborations between these three helices are essential for successful innovation. The Triple Helix Model emphasizes the idea that innovation is not solely the responsibility of one sector but rather a dynamic process that involves the active

engagement and collaboration of academia, industry, and government.

This collaborative approach is believed to enhance the overall innovation capacity of a region or a country by leveraging the strengths of each helix.

In the context of healthcare sector, the government helix represents regulatory bodies, policy makers and public funding institutions. Government sets standards for medical procedures and products, operates public hospitals and medical centres, funds academic research and implements innovation into public healthcare. Industry helix includes pharmaceutical, manufacturing, biotechnology companies, as well as medical device producers and private healthcare providers. It works by commercialising medical knowledge and technology and making it available for consumers. The academia helix symbolises universities and research centres that come up with new methodologies, treatments, and medical technologies.

## 2. Theory

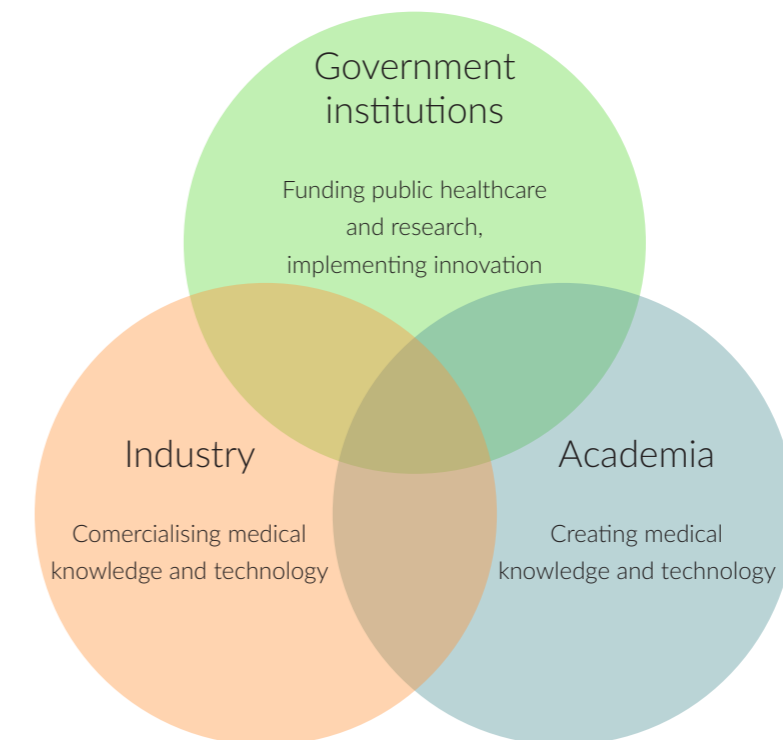


fig. 1 Diagram showing the interplay of Industry, Academia and Government institutions in healthcare environment according to the Triple Helix model of innovation. [Image], by autor, 2023

## 2. Theory

### A Case for Boundary Spanning

A study done in Finland (Knuttu, Huttu, Neuvo, 2018), took into the account case studies of three major technology companies, who invited doctoral students of Aalto University and Tampere University to take part in workshops, with the aim of solving current engineering problems with the help of tutors from the industry. The effect of the workshops was a wide exchange of people between Industry and Academia, with almost all doctoral students being hired by the companies, and many of the tutors later enrolling in doctoral degrees. These cases illustrate the benefits of university-industry collaboration in doctoral education and offer practical examples of how such collaboration can enhance the transfer of academic knowledge to industry, potentially leading to innovation and commercialization of new technologies.

The case of doctoral students and graduates acting as boundary spanners between academia and industry aligns well with the Triple Helix model of innovation theory. This model emphasizes the interaction between universities, industry, and government to create economic and social development through innovation. By facilitating knowledge transfer and bridging the gap between academic research and industrial application, this case represents the Triple Helix's principle of creating synergies and enhancing the innovation ecosystem.

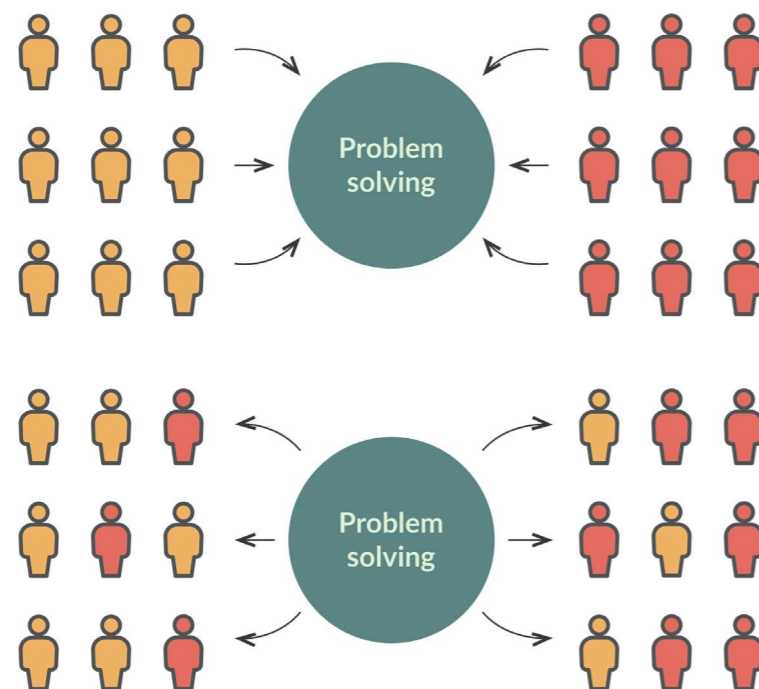


fig. 2 Diagram showing the result of the boundary spanning workshops in Tampere. [Image], by author, 2023

## 2. Theory

### Conditions for transfer of knowledge

For the transfer of knowledge to occur, an organization needs to create certain conditions, so that knowledge-sharing relationships will form (Baksa, M., Branyiczki, I, 2022). For that to happen, an organization needs to incite two-persons phenomena. They fall into two categories. State-like Phenomena (enduring), which consist of Similarities and Social Relations, and Event-like Phenomena (dynamic), which consist of Interactions and Flows. Below are some of the examples of both.

These „invisible” social structures are crucial for knowledge sharing and advice seeking, essential processes in boundary spanning activities. By understanding and leveraging these informal networks, organizations and institutions can more effectively collaborate, facilitating the transfer of knowledge and innovation between academia and industry.

#### Similarities and Social Relations:



Group membership



Shared workplace

#### Interactions and Flows:



Collaboration



Exchange of information

fig. 3 Diagram showing the steps necessary for the knowledge transfer to occur. [Image], by author, 2023

### 3. Context:

#### Health Innovation Hubs in Swedish context

A Health Innovation Hub is a collaborative platform or ecosystem designed to foster innovation in healthcare. These hubs bring together stakeholders from various sectors, including healthcare professionals, researchers, technologists, entrepreneurs, and policymakers, to facilitate the development, testing, and implementation of innovative solutions aimed at improving patient care, enhancing healthcare delivery, and reducing costs. The focus is often on leveraging cutting-edge technologies such as digital health, medical devices, biotechnology, and data analytics to address healthcare challenges. Health Innovation Hubs provide resources such as mentorship, funding, networking opportunities, and access to facilities and expertise, creating an environment that encourages experimentation and accelerates the translation of ideas into practical healthcare solutions.

The Forskaren Project in Stockholm

The Forskaren project in Stockholm is an ambitious initiative designed to create a vibrant ecosystem for life sciences and innovation. Located in Hagastaden, a district that bridges Stockholm and Solna, Forskaren aims to be a hub where academia, healthcare, and the private sector can collaborate closely. The project is part of a broader vision to establish Hagastaden as one of the world's leading areas for life sciences, taking advantage of its proximity to top institutions like the Karolinska Institute and Karolinska University Hospital. Forskaren's infrastructure is tailored to foster collaborations across disciplines, offering state-of-the-art laboratories, office spaces, and meeting venues.

The goal is to create an environment where startups, established companies, and researchers can coexist and innovate together, driving advancements in medicine, biotechnology, and healthcare services.

Similarly, the Sahlgrenska Life project in Gothenburg is another significant initiative aimed at enhancing health innovation. This project seeks to integrate healthcare, research, and education more closely by physically connecting Sahlgrenska University Hospital with surrounding universities and research institutions, including the University of Gothenburg. Sahlgrenska Life is designed to be a collaborative space where clinical, academic, and industry partners can work together on healthcare solutions. By fostering a seamless exchange between research and clinical practice, the project aims to accelerate the development of innovative treatments and technologies, improve patient care, and strengthen Gothenburg's position as a leading center for life sciences and healthcare innovation. The development includes plans for new facilities that will house laboratories, offices, and educational spaces, all designed to support interdisciplinary collaboration and the translation of research into clinical applications. At this moment, Sahlgrenska Life is also said to include Deintistry centre.

### 3. Context:



From Rendering of Sahlgrenska life spanning across Per Dubbsgatan, [Online image], by Sweco, 2023, <https://www.sweco.se/projekt/sahlgrenska-life-gote-borg/>



From Rendering of Sahlgrenska life spanning across Per Dubbsgatan, [Online image], by Sweco, 2023, <https://www.sweco.se/projekt/sahlgrenska-life-gote-borg/>

### 3. Context:

#### Sahlgrenska University Hospital

Hospital closely affiliated to research and education at the University of Gothenburg including odontology clinic.

#### Goteborg University

Library, Wallenberg conference centre as well as Biomedicine, NMR and research laboratory facilities of the Goteborg University.

#### Sahlgrenska Science Park

A hub for innovation and business acceleration in the life sciences sector.

#### Sahlgrenska Life

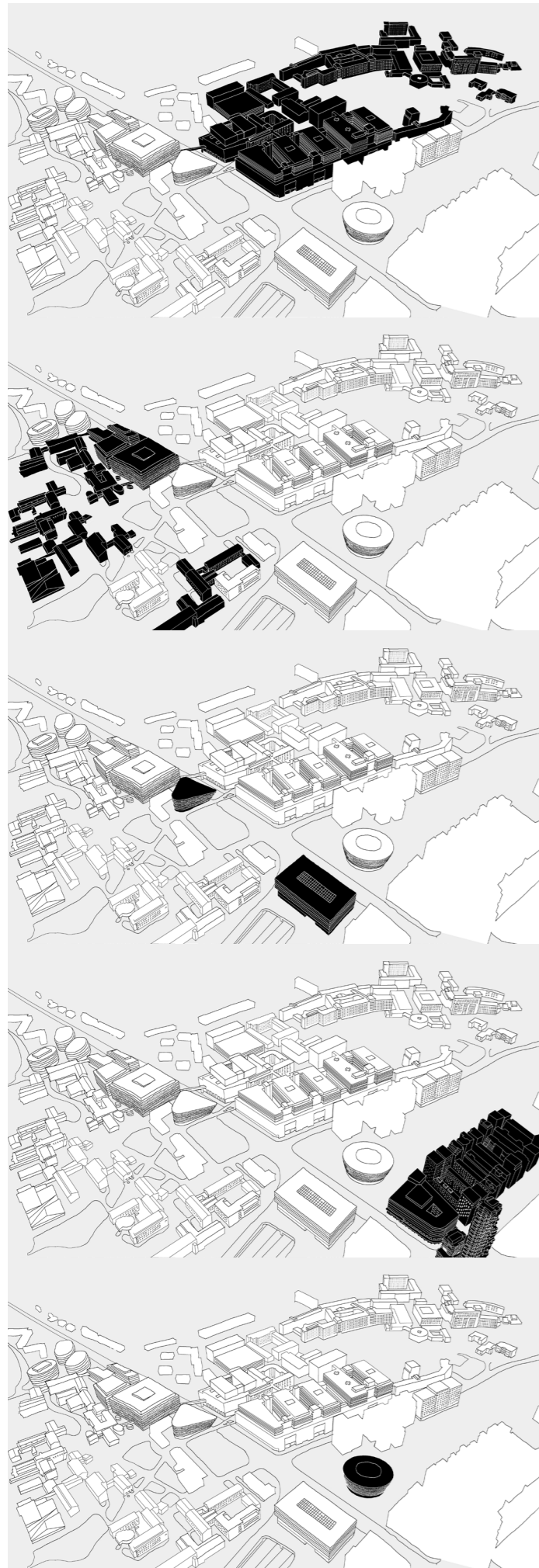
A health innovation hub including translational research centre, dentistry centre and laboratories as well as premises for simulations and training of dentists and other medical professionals.



From Architectural rendering of Forskaren [Online image], by Forskaren, 2023, <https://forskaren.se/>



From Architectural rendering of Forskaren [Online image], by Forskaren, 2023, <https://forskaren.se/>



### Karolinska University Hospital

Public hospital closely affiliated to research and education at Karolinska Institute.

### Karolinska Institute

Biomedicum, a research focused facility with laboratories, lecture halls and common areas, as well as several other research centres and institutes.

### Conference centres

Life City, offering conference rooms for 480 people, meeting rooms and restaurants.

Aula Medica, offering an amphitheater hall for 1000 people, meeting rooms, a restaurant and spaces for product exhibitions and fairs.

### Hagastaden

Apartments, offices and commerce developed as a part of the life science cluster.

### Forskaren

Forskaren building, bringing innovative industry to the site. It also hosts exhibition, workshop and lecture space for college students, and offers office space for startups to connect with industry and academia.

## 3. Context:

There are many examples of boundary bridging establishments in the context of Swedish Health Innovation Hubs. Two forementioned projects are characterised by their unique backgrounds and actors that they include. Forskaren takes advantage of its physical closeness to healthcare facilities and Karolinska Institute, and creates a vibrant space to host startups and companies who wish to benefit from establishing cooperation with them.

Science Park as well as potential rentable spaces in the new development. In conclusion, successful Life Science Hubs must take advantage of their location, taking into consideration its strengths and resources at hand. They have to bring the right function to the site in order to complete the triple helix of Public Healthcare facilities, Academia and Research, as well as to create the right environment for transfer of knowledge.

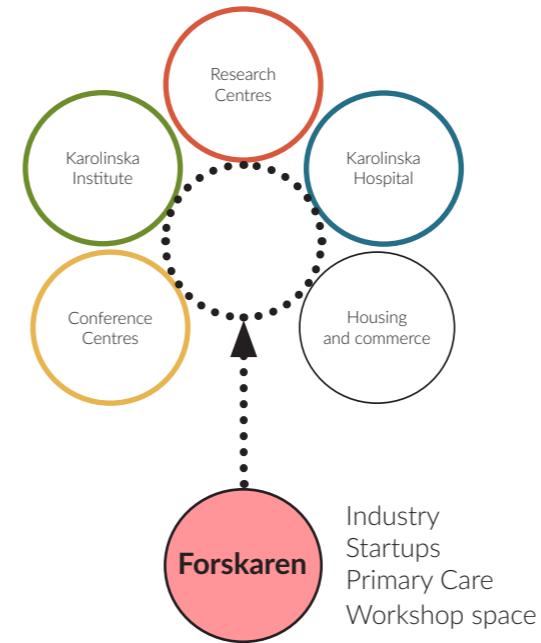


fig.4 Schematic diagram of a Health Innovation Hub Forskaren, established in the middle of academia, healthcare and housing context, that is completed with the addition of industry. [Image], by author, 2024

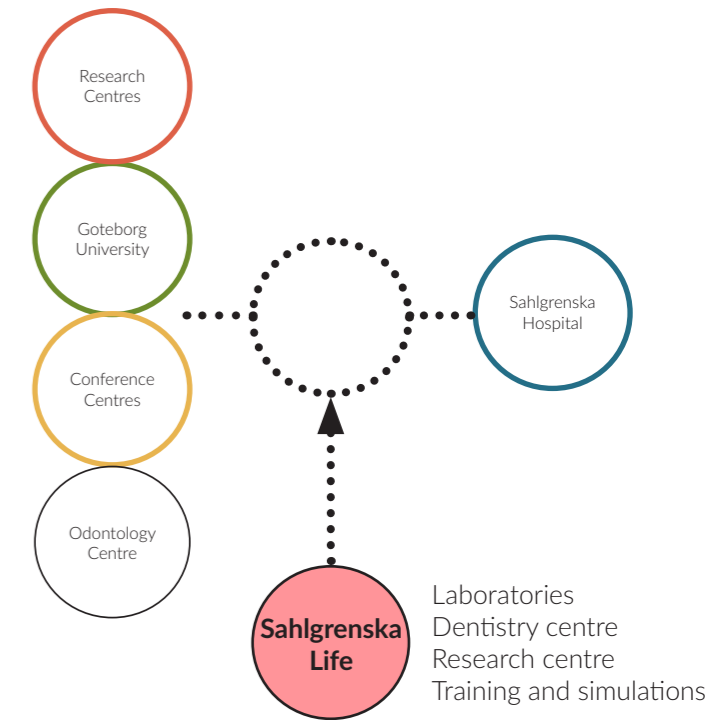


fig. 5 Schematic diagram of a Health Innovation Hub Sahlgrenska Life, established as a connector between academia, healthcare and specialised Odontology centre. [Image], by author, 2024

The building also hosts an educational venue to bring health science closer to its users. When analysing the Sahlgrenska Life project, it is also crucial to look at it through the lenses of its location. While it still works towards including all three helixes in the innovation process, Sahlgrenska Life focuses on providing closeness to academia and research, while still making space for interested companies to participate in the form of the Sahlgrenska

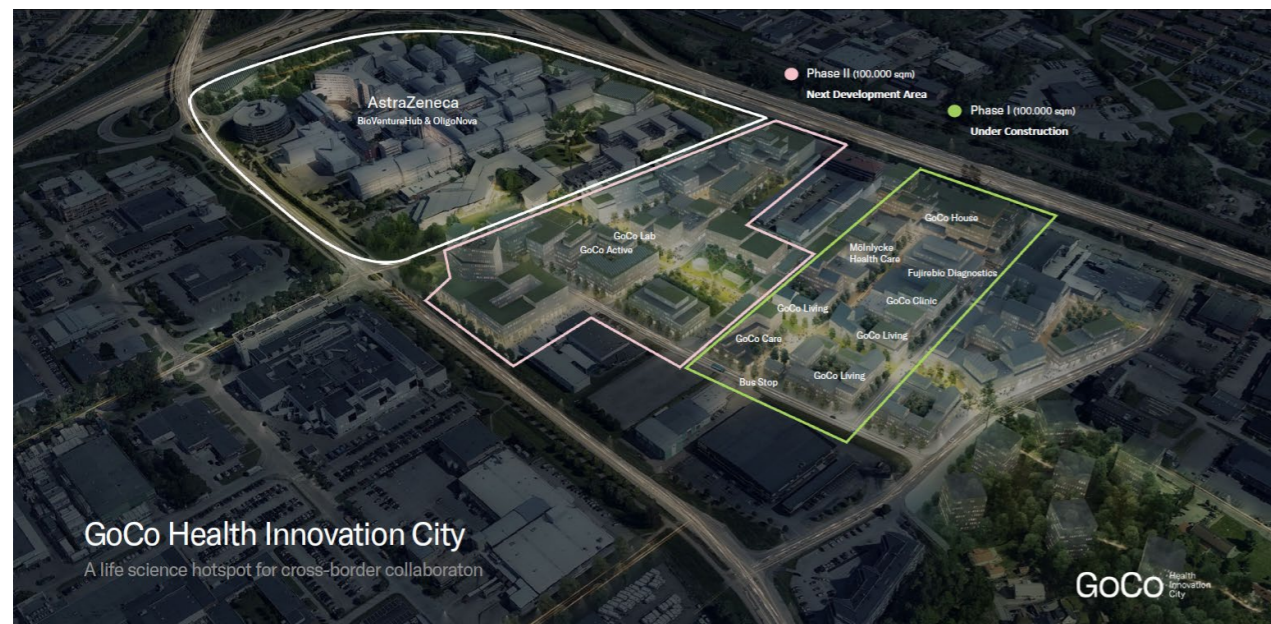
### 3. Context:

#### GoCo Health Innovation City

GoCo Health Innovation City is a new area in Gothenburg, located by the AstraZeneca Research and Development facility in Molndal, Sweden, near the intersection of Soderladen and Kungsbackaladen. It is designed to be a major centre for health and life science innovation and a place where different companies, startups and researchers can work in proximity to one another, resulting in collaborative and dynamic workplaces. By the end of its development, GoCo Health Innovation City will consist of offices and laboratories of, among others, medical, pharmaceutical, engineering and manufacturing companies. It will also

host multi-storey housing, restaurants, elderly care and sports facilities.

Development of GoCo is divided into two phases. Phase I, that nears the end of construction, consists of the offices, clinics and laboratories of GoCo partners, as well as the housing and the nursing home for the elderly. It takes form of a central avenue that starts with the elderly housing and leads to the GoCo House, a building hosting offices, conference rooms, laboratories, cafeteria and a restaurant. Phase II will consist of offices, sports and preventative health centres, a park and a laboratory for advanced medicine.



From Rendering of GoCo Health Innovation City from the bird eye view, [Online image], by GoCo, 2023, <https://goco.se/thecity>

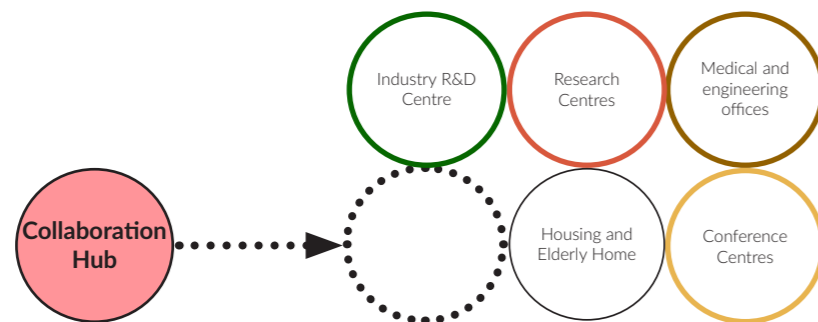


fig.5 Schematic diagram of a the Collaboration Hub, established in the middle of the environment focused on life science industry, housing and elderly home context - the project aims to complete it with additional functions. [Image], by author, 2024

### 3. Context:



fig.7 Location of GoCo Health Innovation City, Molndal. [Image], by author, 2024

-  GoCo Health Innovation City and AstraZeneca R&D
-  Goteborg city center
-  Molndal city center
-  Soderladen/Kungsbackaladen

### 3. Context:

#### GoCo founding partners



Biopharmaceutical company focused on developing, manufacturing, and marketing prescription medicines for serious health conditions, notably in oncology, cardiovascular, and respiratory fields.



A leading healthcare company specializing in diagnostic testing solutions, particularly for infectious diseases, oncology, and neurological disorders, serving professionals and laboratories worldwide.



Specializes in providing medical solutions for surgical and wound care, known for its innovative products designed to enhance healthcare performance and patient outcomes.



Offers innovative medical devices and solutions, especially in urology and continence care, aiming to improve the quality of life for individuals with specific healthcare needs.



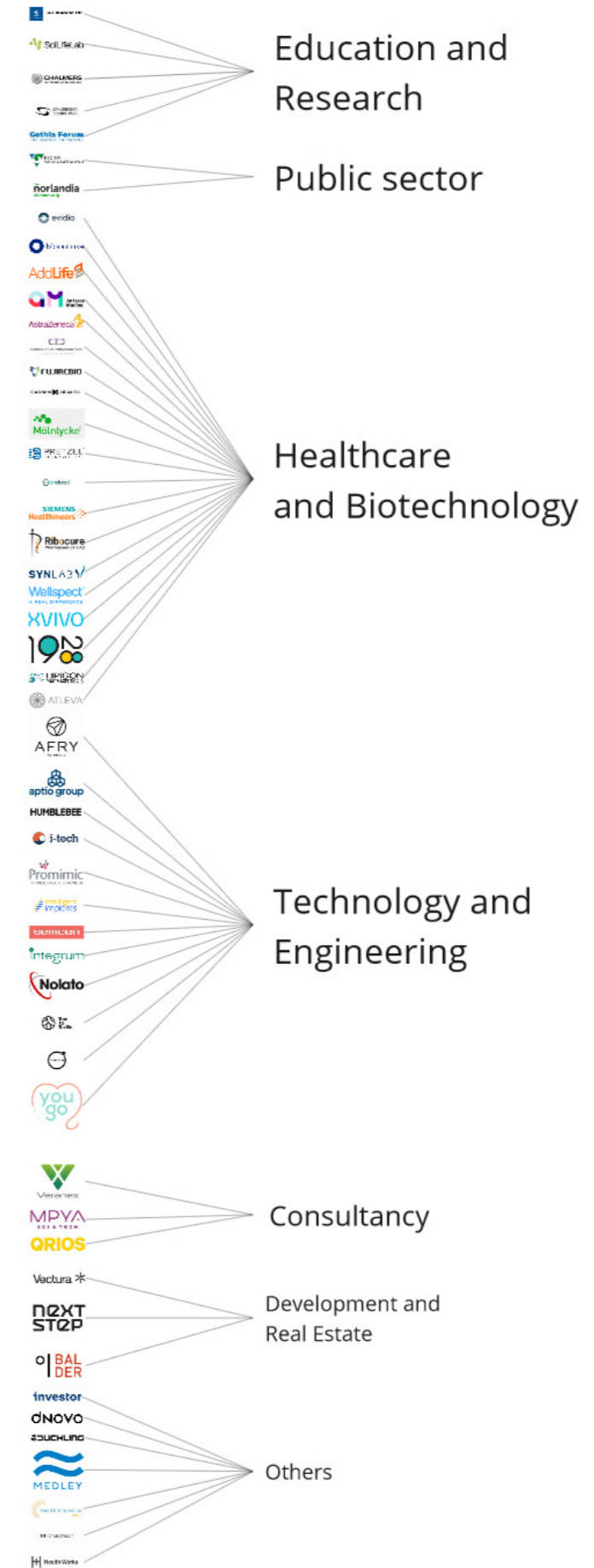
The medical faculty of the University of Gothenburg, Sweden, focusing on education and research in medicine, dentistry, and healthcare science.



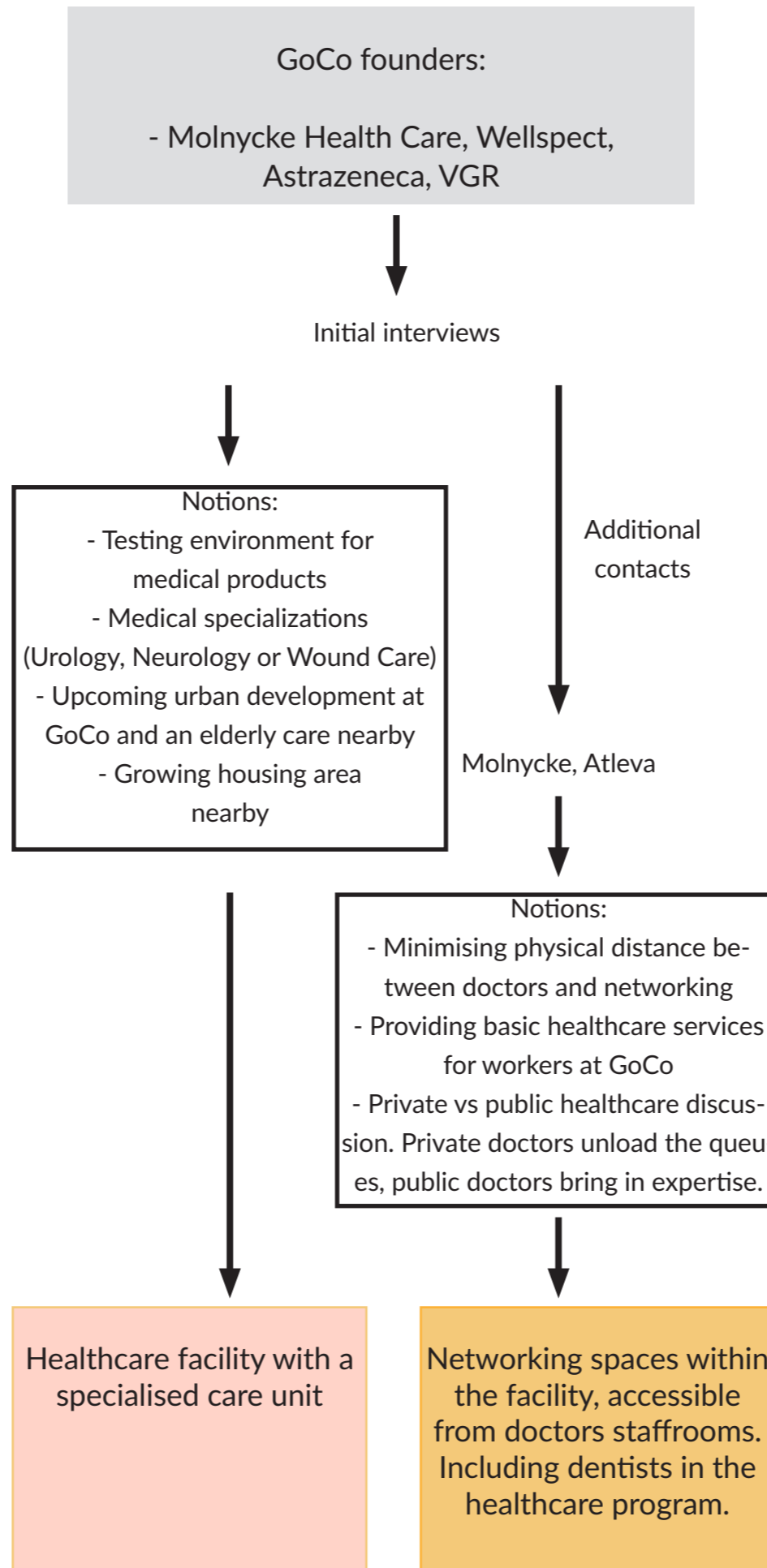
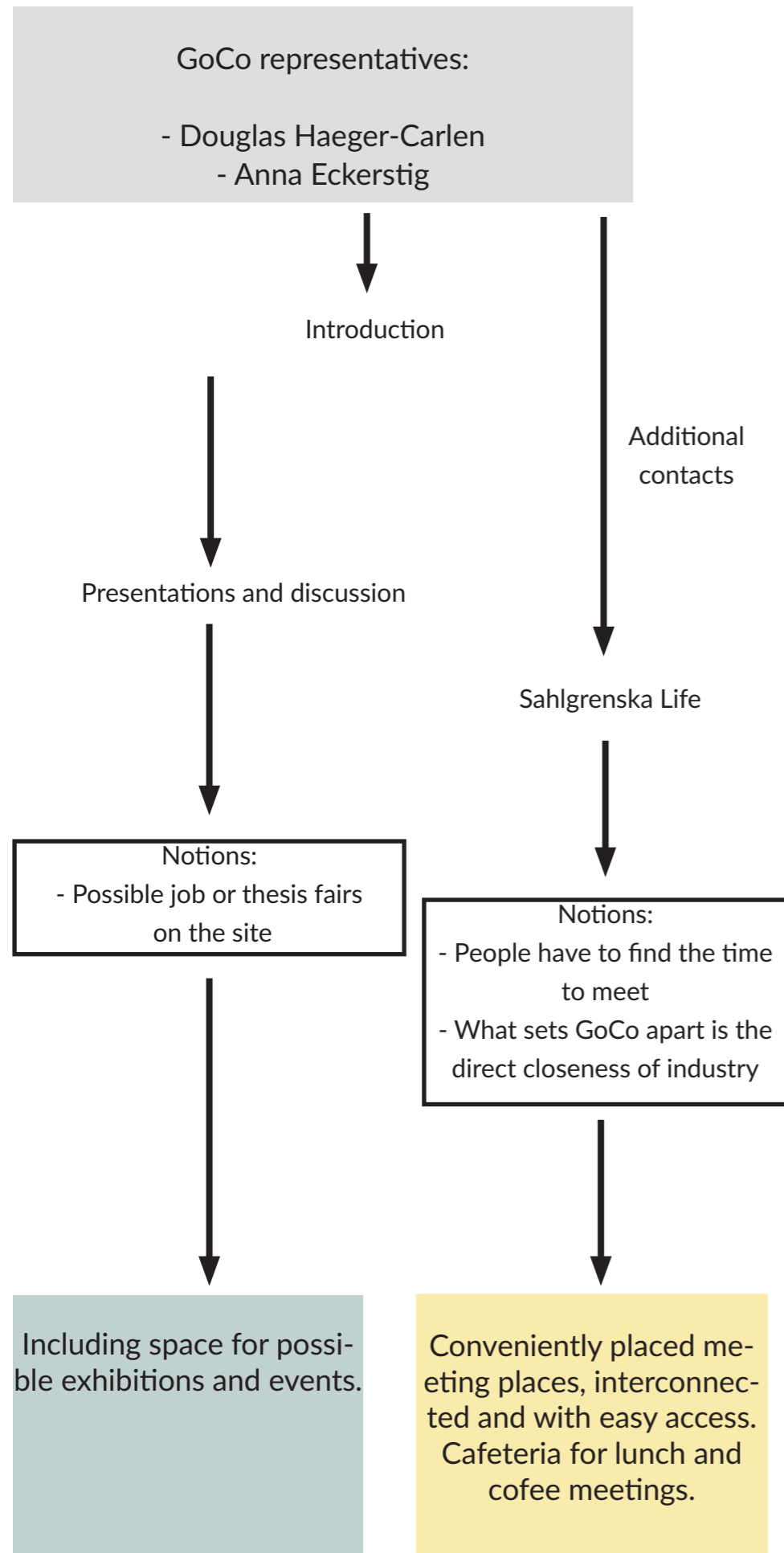
A Swedish institution for education and research in technology, natural science, and beyond, known for its innovative research environment and industry collaborations.

### 3. Context:

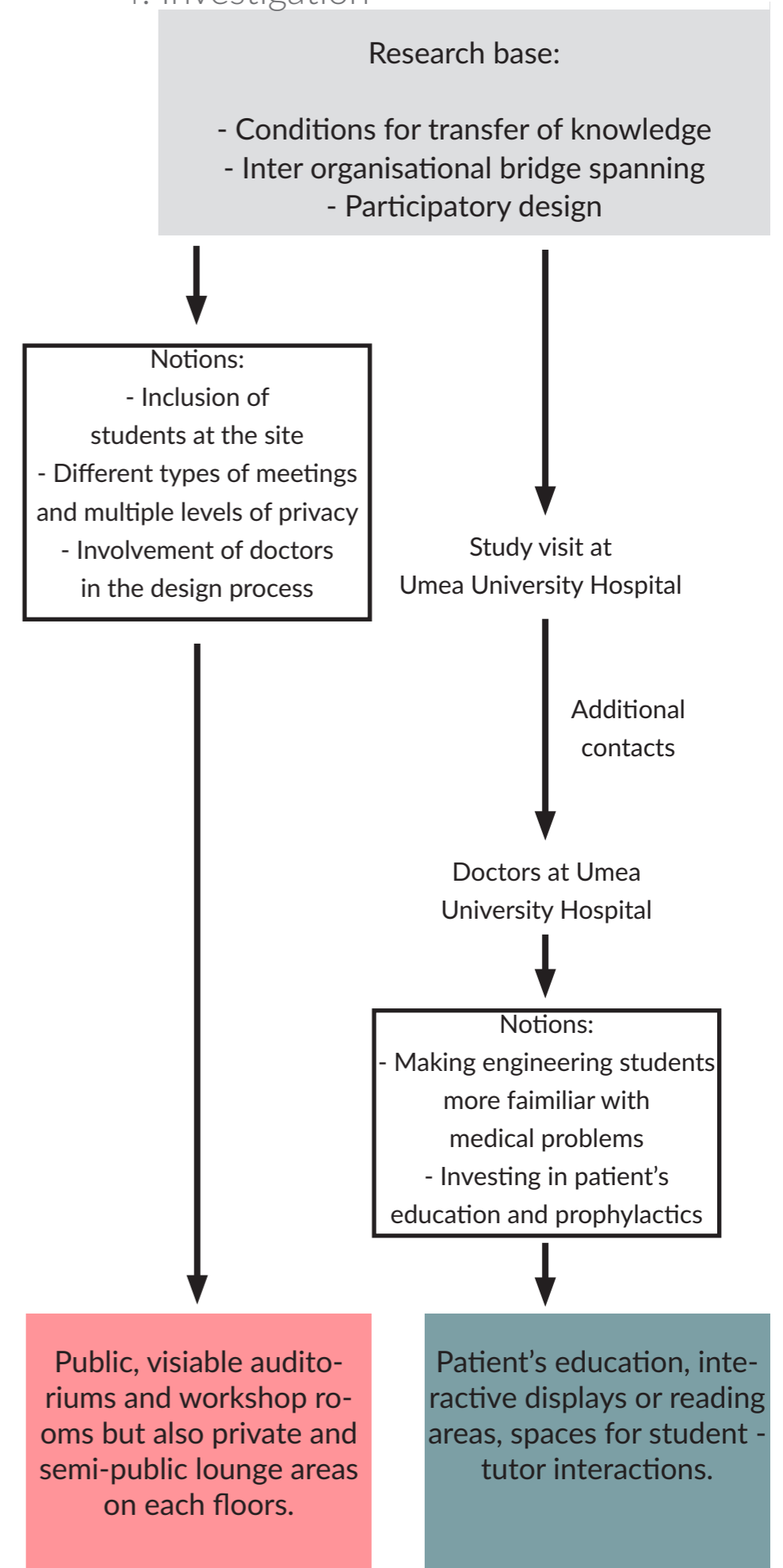
#### GoCo partners



#### 4. Investigation



#### 4. Investigation



#### 4. Investigation

Conveniently placed meeting places, interconnected and with easy access.  
Cafeteria for lunch and coffee meetings.

Including space for possible exhibitions and events.

Healthcare facility with a specialised care unit

Public, private and semi-public lounge areas, public terraces.

Patient's education, interactive displays, workshop rooms.

Networking spaces within the facility, accessible from doctors staff rooms.  
Including dentists in the healthcare program.



- Areas for networking:**
- Meeting rooms
  - Cafeteria
  - Break areas on each floor
  - Shared workspaces



- Areas for education:**
- Auditorium
  - Workshop rooms
  - Information desk
  - Cloakroom
  - Foyer with exhibition space
  - Conference lounge



- Healthcare facility:**

#### 4. Investigation

##### Function and program of the healthcare facility

After receiving input from the GoCo partners, doctors from study visits, and synthesising research papers, I had to make the decision for the functional program of the healthcare facility, but interviews and readings alone didn't give a clear indication.

#### 4. Investigation



fig.8 Locations of primary care centres near GoCo Health Innovation City, Molndal. [Image], by author, 2024

- GoCo Health Innovation City and AstraZeneca R&D
- ⬇ Hospitals in Goteborg and Molndal area
- ▾ Primary Health Centers in Molndal
- Urban highways

#### 4. Investigation

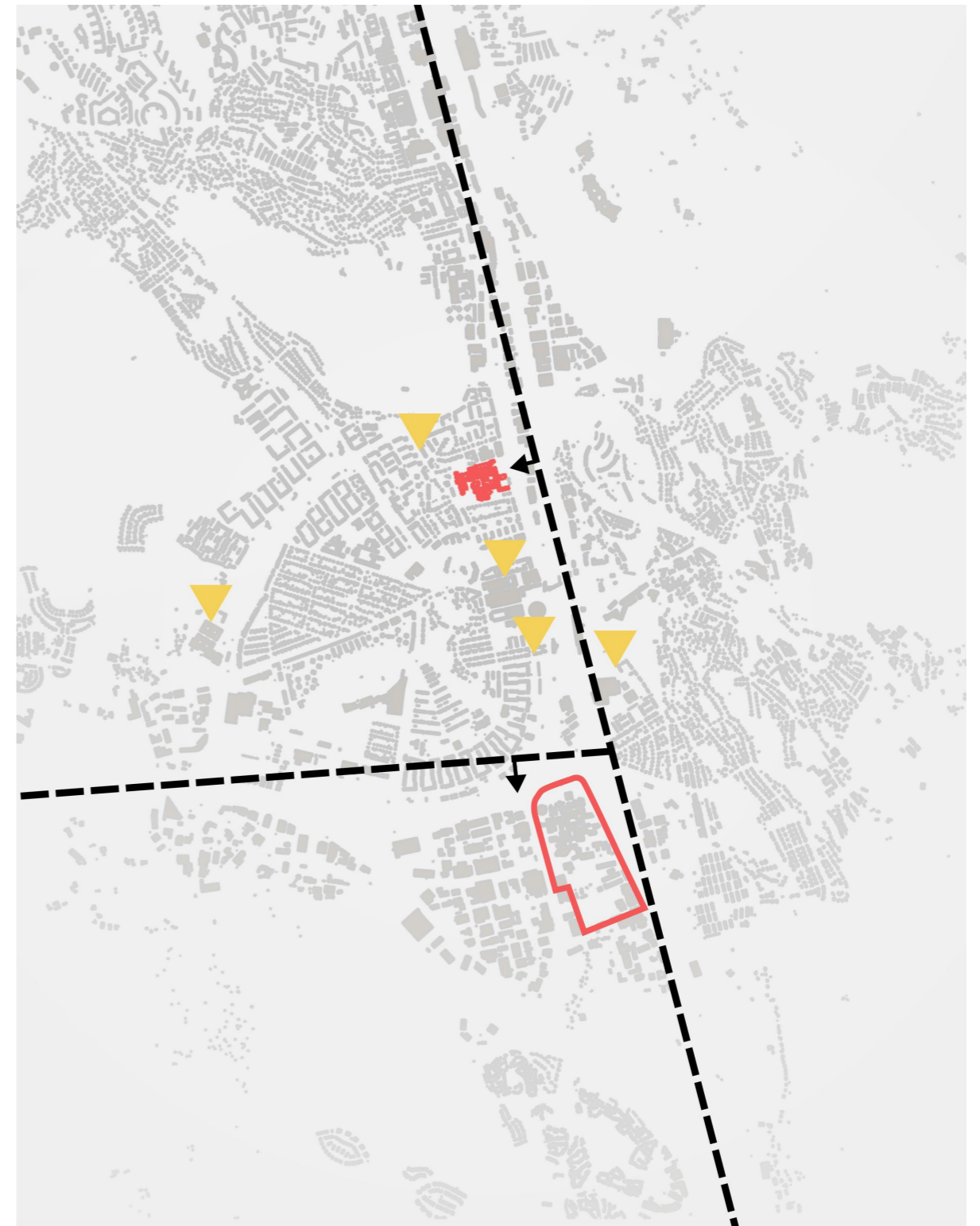


fig. 9 Locations of Hospitals in Molndal. [Image], by author, 2024

Highways mitigate site's connection to Molndal Hospital and the primary health centres by foot and by public transport. While Molndal hospital has a good parking infrastructure and hosts a central function, primary health centres, as more local functions should be accessible also by foot and public transport.

## 4. Investigation

### Function and program of the healthcare facility

Due to the proximity and accesibility of Molndal Hospital, and inaccesibility of sorrounding Primary Health Centers, in the light of upcoming housing development on the GoCo site, it's best to plan an additional Primary Health Centre.

## 4. Investigation

Conveniently placed meeting places, interconnected and with easy access.  
Cafeteria for lunch and cofee meetings.

Including space for possible exhibitions and events.

Healthcare facility with a specialised care unit

Public, visiable auditoriums and workshop rooms but also private and semi-public lounge areas on each floors.

Patient's education, interactive displays or reading areas

Networking spaces within the facility, accesible from doctors staff rooms.  
Including dentists in the healthcare program.

### Areas for networking:

- Meeting rooms
- Cafeteria
- Break areas on each floors
- Shared workspaces

### Areas for education:

- Auditorium
- Workshop rooms
- Information desk
- Cloakroom
- Foyer with exhibition space
- Conference lounge

### Primary health centre:

- Standard rooms such as gynecologist, diabetes nurse, ears and eyes examination, psychiatrist and occupational medicine.
- BVC
- Rehabilitation compartment and physical therapists

## 5. Site analysis

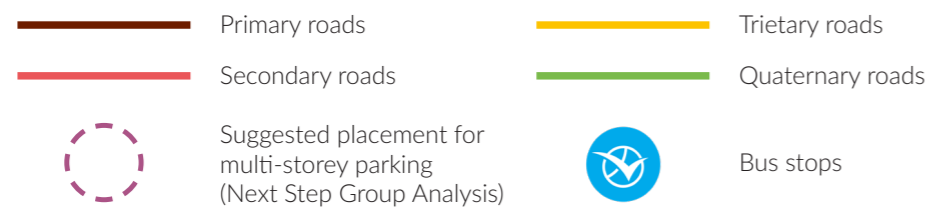
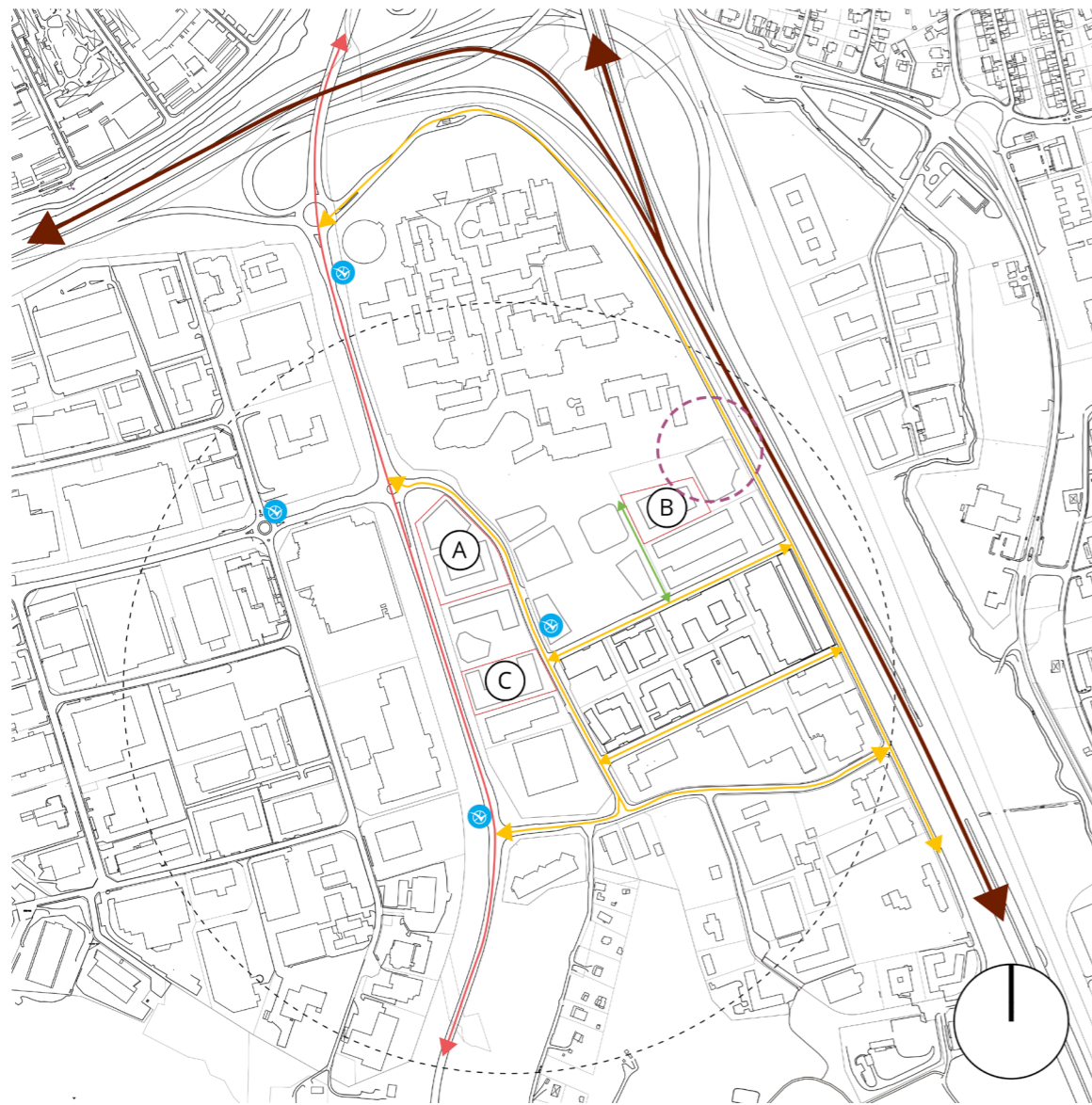


fig.10 Analysis of public transport and road network around the plots A, B and C in GoCo area. [Image], by author, 2024

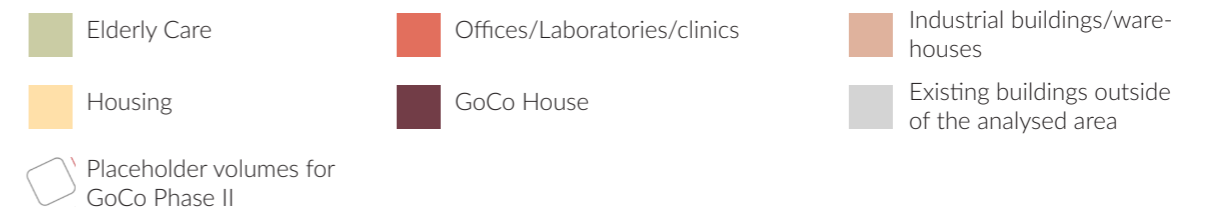


fig.11 Analysis of functions around the plots A, B and C in GoCo area. [Image], by author, 2024

## 5. Site analysis

### Analysis of the potential GoCo plots.

When evaluating the plots for the primary care project at GoCo Health Innovation City, both functionality and transport accessibility play a key role. Plot A offers good visibility and is easy to reach by car, but its distance from housing, elderly care, and the GoCo House reduces its practicality for a healthcare-focused facility. Plot B is located near the GoCo House and potential parking areas, but its limited visibility, poor car access, and distance from bus stops could make it less accessible for patients and staff. Plot C emerges as the most suitable option, as it provides strong connections to nearby housing and elderly care facilities, ensuring convenient access for the local community. Additionally, its good visibility, ease of access by car, and proximity to bus stops make it a highly practical choice. Although Plot C is farther from GoCo House, its advantages make it the best potential location for the primary care project.

## 5. Site analysis

### A

- High visibility ●
- Easy access by car ●
- Short distance from bus stops ●
- Far away from housing ●
- Far away from elderly care ●
- Long distance from GoCo House ●

### B

- Short distance from GoCo House ●
- Close to potential parking space ●
- Difficult to access by car ●
- Low visibility ●
- Long distance from bus stops ●

### C

- Good access to housing ●
- Good access to elderly care ●
- Easy to access by car ●
- Good visibility ●
- Short distance from bus stops ●
- Long distance from GoCo House ●

## 6. Detailed program.

Analysing the examples of existing programs of primary care centres

Sizing: making a comparison between existing programs and their prognosed user base.

Assessing the possible user base for GoCo area.

Extrapolating the existing programs to fit the GoCo user base.

## 6. Detailed program.

### Examples of program-to-density ratios.

Staffanstorp Halsocentrum  
- a 2023 studio project

Located in Staffanstorp, Skane, project included a vardcentral, BVC and BMM. Distinct features of the program were rehabilitation compartment and gymnasium for physical therapy, as well as an open preschool for local children and their parents.

Staffanstorp is a city of around 17.000 inhabitants. In the Staffanstorp Halsocentrum studio project the patient group from both the city and the commune of Staffanstorp is divided between two primary health centres - the one designed and one already existing within the city centre.

Vadstena, in region of East Gotland, is a home to around 5 600 people in total, and has only one primary health centre operating.

For the purpose of the project the scope of the population analysis is a circle with a radius of 500 meters from the primary health centres, as it appear to be a good basis for local urban analysis in many research papers (Berghauser Pont et el. 2019), (Tamir El-Khouly et el. 2023). A deviation from this rule can be made if the primary health centre is situated in a low-density environment or it's location is not specified. By using geodata from SLU University Library, the population density has been determined and matched with the size of the elements of the functional programs such as number of examination rooms or storage space. This determines the estimated program requirements for the new project plot.



From rendering of Staffanstorp Halsocentrum. [Image], by Simon Viklund, 2023

6. Detailed program.

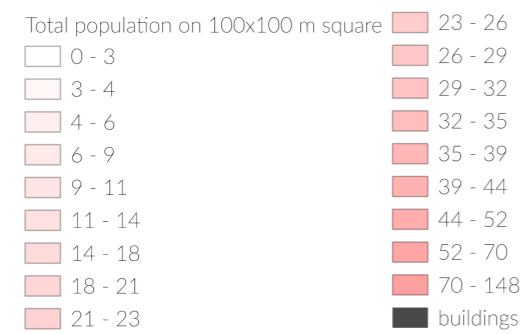
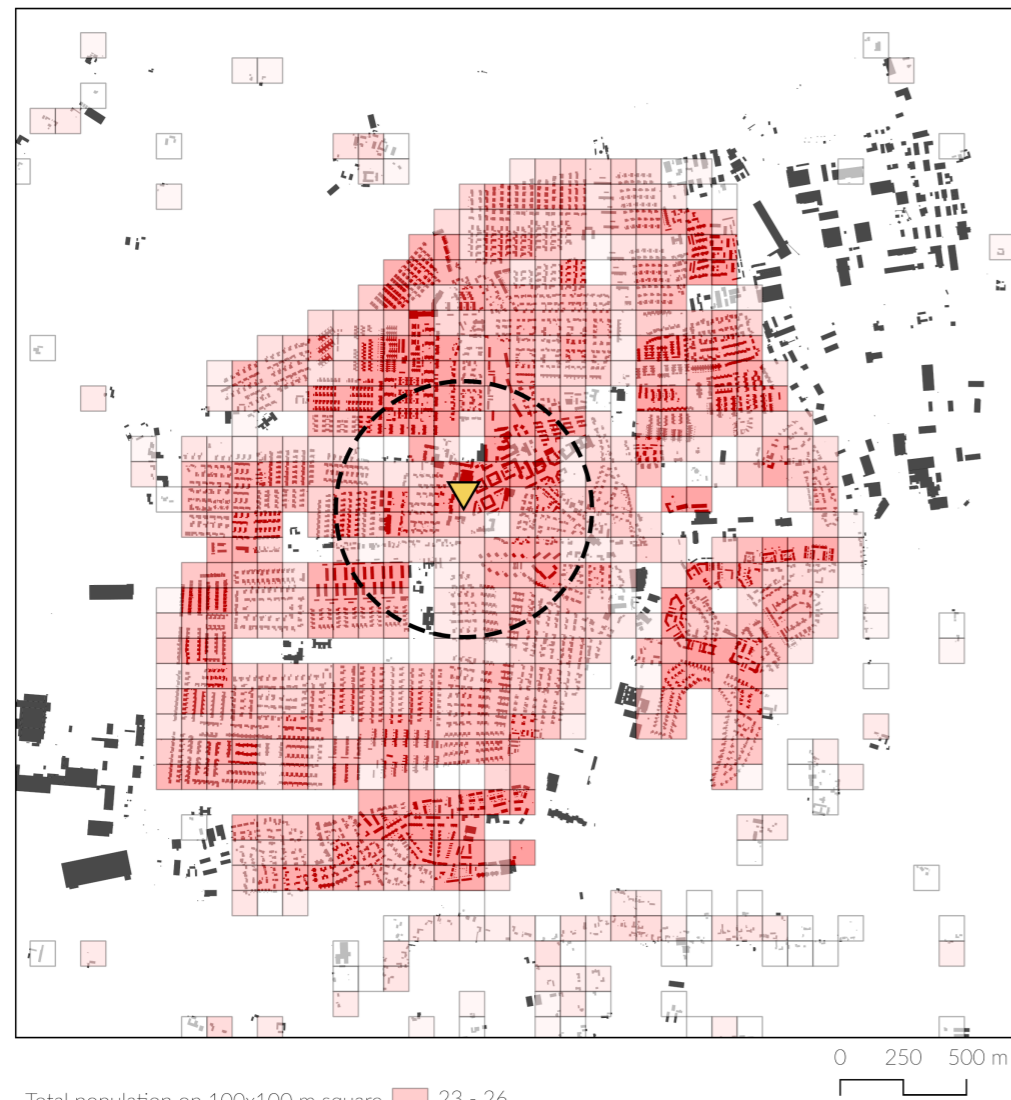


fig.12 Density of population in Staffanstorp around Halsocentrum (yellow). [Image], by author, 2024

Diagram showing GIS population density data from Staffanstorp area. Staffanstorp has a city centre with an urban character as well as a centrally located plot for a potential primary care centre.

6. Detailed program.

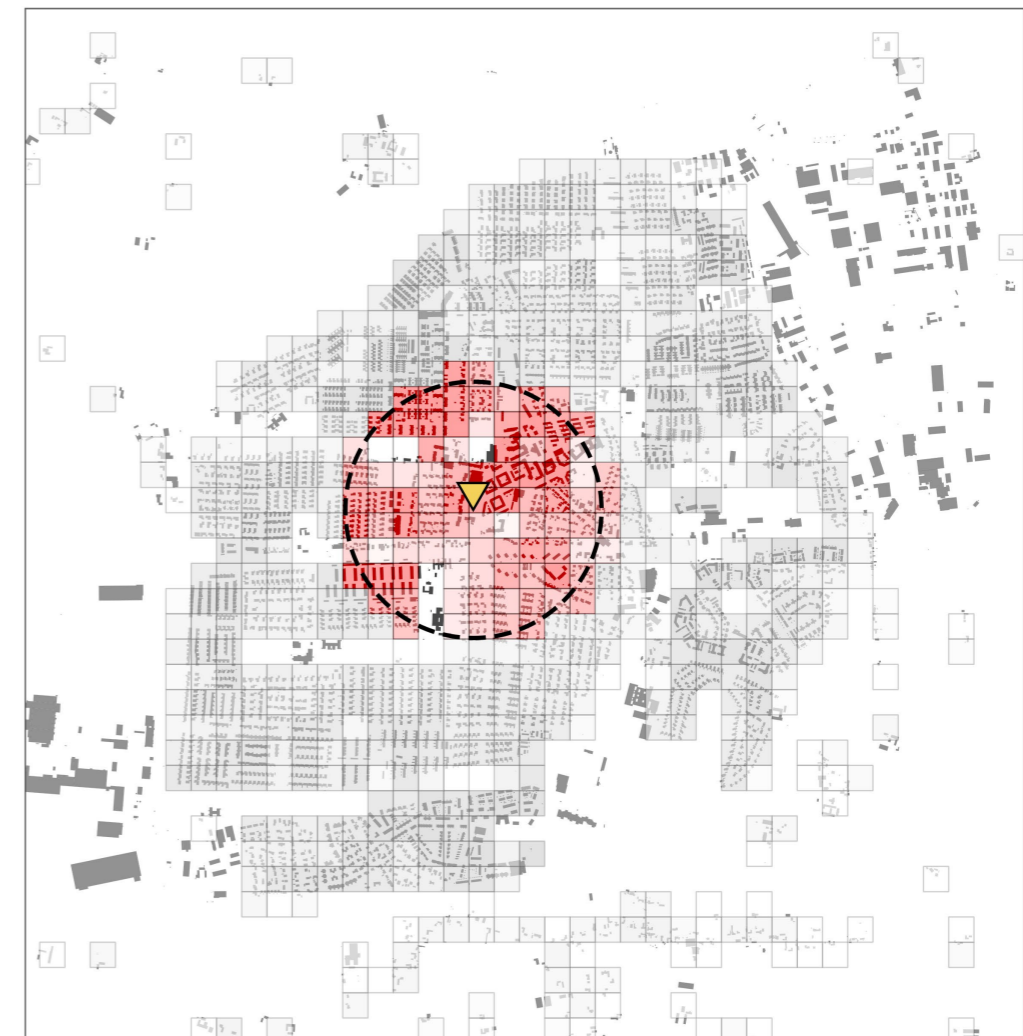


fig.13 Density of population in Staffanstorp city centre around Halsocentrum (yellow). [Image], by author, 2024

According to SLU University Library geodata, in the proximity of a 500 meters from the Staffanstorp Halsocentrum project plot, there are approximately 4 000 inhabitants.

6. Detailed program.

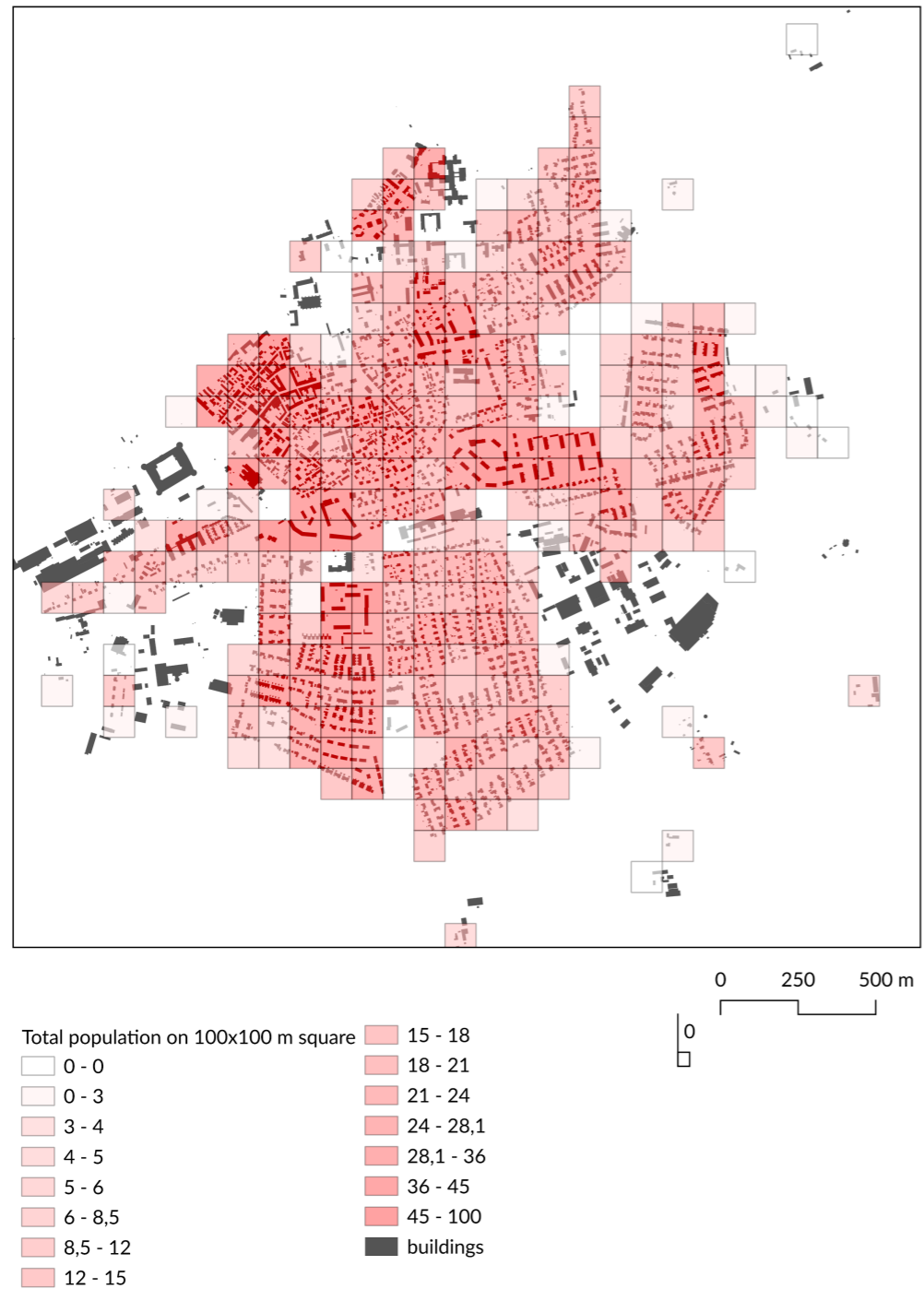


fig.14 Density of population in Vadstena. [Image], by author, 2024

Diagram showing GIS population density data of Vadstena. Vadstena has a low-rise city center (maximum of 3 stories) and vast majority of it's urban tissue is composed of low density single-family housing.

6. Detailed program.

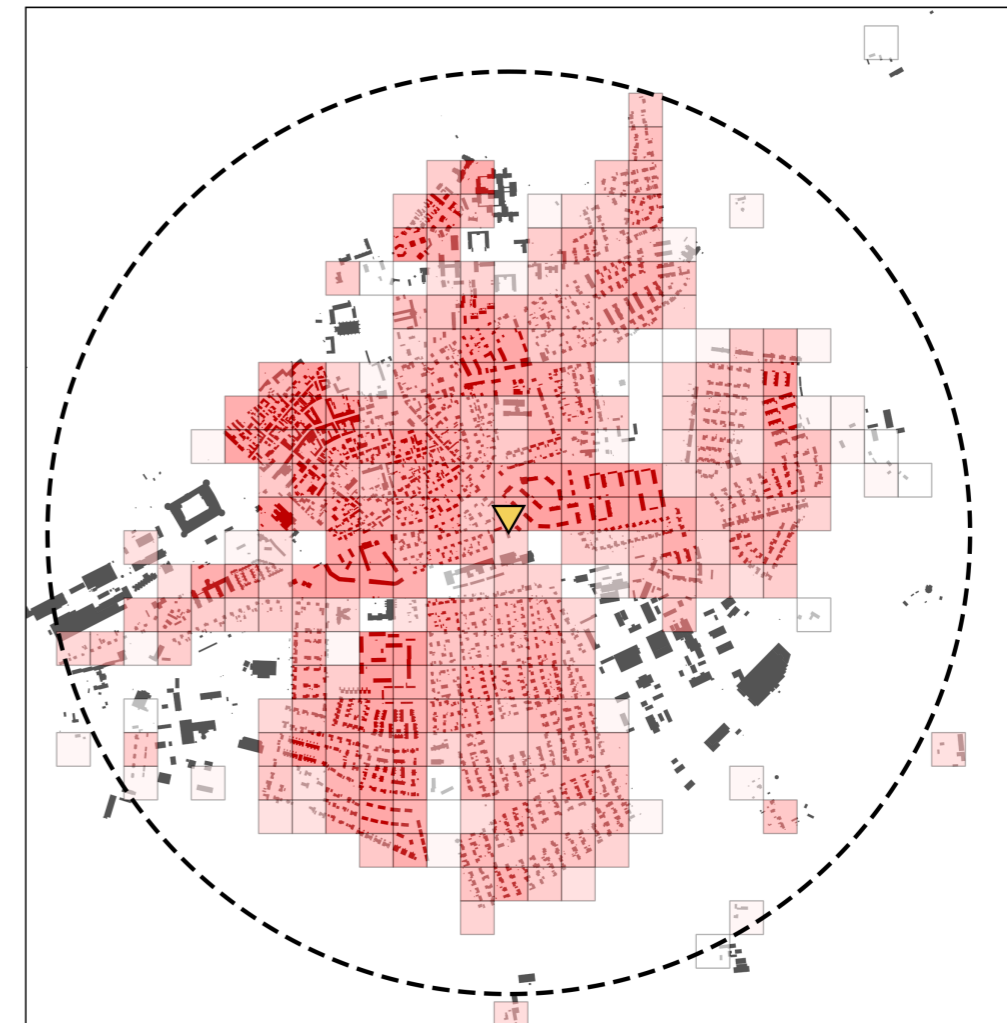


fig. 15 Density of population in Vadstena in proximity to local primary care centre (yellow). [Image], by author, 2024

Due to the location of the Vadstena primary health centre not being specified in the program data, and the density of the city being low, the scope of the analysis has been extended to cover the whole area of the city. According to SLU University Library geodata, in the proximity of a 1300 meters from the Vadstena city centre, there are approximately 5 600 inhabitants.

## 6. Detailed program.

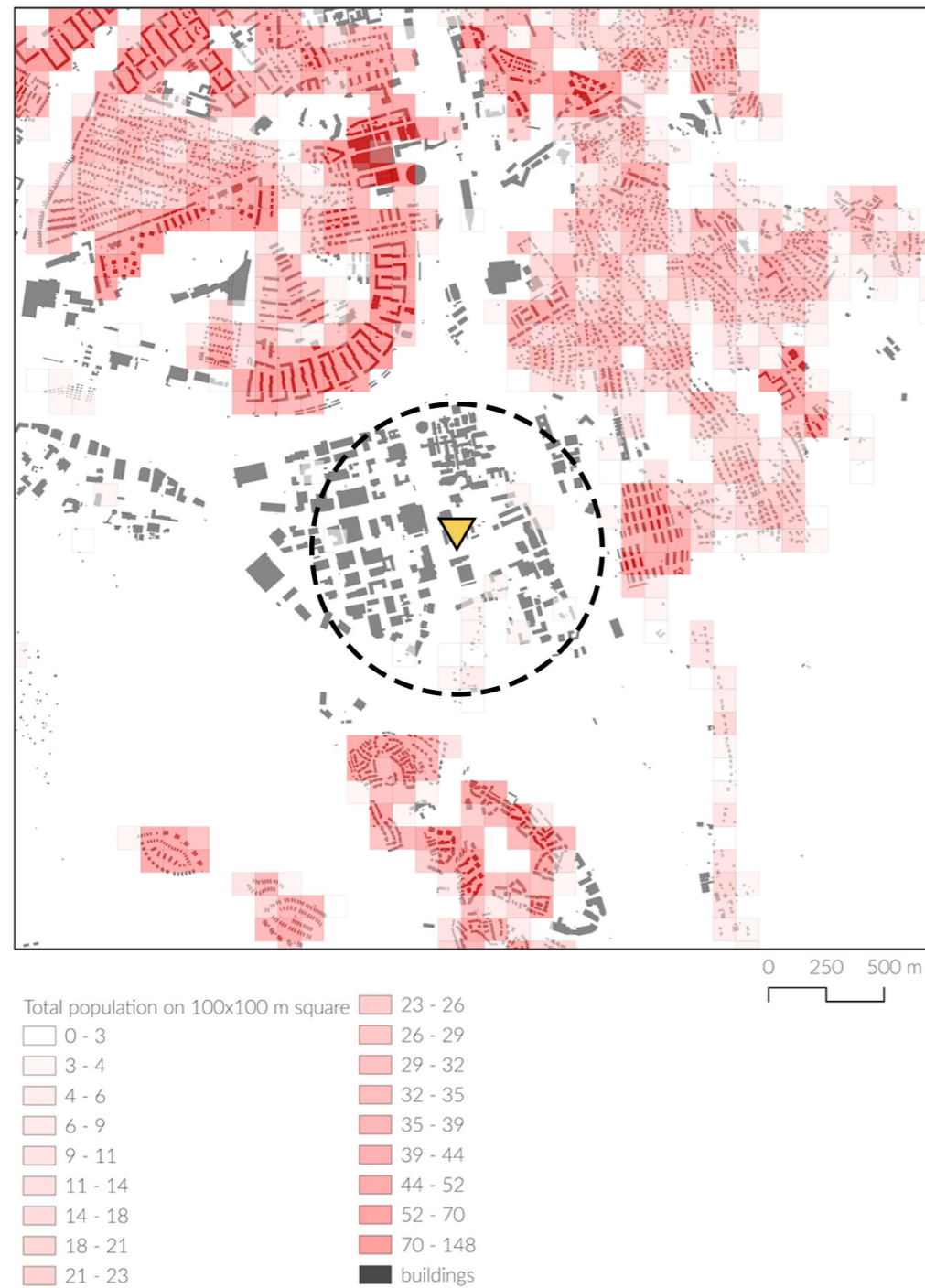


fig. 16 Density of population in Molndal in proximity to desined GoCo primary care centre (yellow). [Image], by author, 2024

Diagram showing GIS density population data in Molndal area. There is no data for the population density of GoCo area, and therefore it has to be assessed using other means - thanks to the developer's offer

## 6. Detailed program.

### Sizing of the new program.

For the purpose of the project, this thesis assumes that the workers and inhabitants of the GoCo area would preferentially use the Collaboration Hub's primary health centre. According to GoCo's website, the cluster will provide 7 000 workplaces, and three housing blocks provided by GoCo Living have been estimated to provide apartments to maximum of 349 inhabitants, giving a potential patient count of 7 350 patients, given that GoCo workers and residents would have the priority in using the facility. By comparing the programs of the Vadstena and Staffanstorp primary health centres with the population density of their environments, we can estimate program numbers for the new primary care centre at GoCo.



fig. 17 Description of new worplaces created by GoCo. [Online image], by GoCo, 2024, <https://goco.se/thecity>



Staffanstorp program sized for around 4 000 users



Vadstena program sized for around 5 600 users



GoCo program sized for around 7 350 users

For the estimated 4 000 users, Staffanstorp program uses 224 m<sup>2</sup> of examination rooms, coupled with 150 m<sup>2</sup> of office space (including telephone rooms, administration spaces for doctors as well as the health centre's adm-

inistration), 230 m<sup>2</sup> of staff area (including showers, dressing rooms and toilets) and 118 m<sup>2</sup> BVC. It also contains a 96 m<sup>2</sup> rehabilitation compartment.

## 6. Detailed program.

To create a functional program for a facility serving 7,350 people, two existing programs were scaled up—Staffanstorp, designed for 4,000 people and Vadstena, designed for 5,600 people by using proportional scaling factors based on the increased population size. To avoid scaling complex programs of each primary care centre, approximate room types and areas were determined to create simplified programs. Each room and area from these programs was adjusted to the new size by the proportionate scaling factor. After adjusting both programs, the larger value was selected from each corresponding area of the two scaled programs. This approach ensured that the final combined program could effectively accommodate the maximum needs anticipated for 7,350 people, providing a solution that uses the strengths of both initial plans.

The GoCo program sizes were rounded up and translated into a number of rooms that corresponds with the sizes of the respective zones. An example of that would be a 509 square meters of space for examination rooms, being rounded up to 32 rooms of 16 square meters, giving a total 512 square meters of examination rooms. After interpolation, certain room types, particularly staff areas, showed disproportionate growth, and needed a reassessment of their area relative to other rooms that require staff presence, such as examination rooms, sample analysis rooms, and cleaners' rooms. The Staffanstorp program has a larger ratio of staff areas, at 230 m<sup>2</sup> to 931 m<sup>2</sup>, accounting for approximately 25 percent of the total space. In contrast, the Vadstena program suggests a more balanced ratio of 130 m<sup>2</sup> to 883 m<sup>2</sup>, or about 15 percent. This ratio is

Etykiety wierszy	Suma z Staffanstorp program	Suma z Vadstena program	Suma z GoCo program
Administration	74	58	74
BVC	217	92	217
Cleaner's Room	18	13	18
Conference room	66	85	85
Delivery Room	22	18	22
Desinfection Room	22	24	24
District Nurse	22	71	71
Emergency Exam Room	22	24	24
Examination Room	412	509	509
Medicine Room	37	9	37
Office Room	276	76	276
Office Room Students	22	13	22
Psychologist Office	44	32	44
Reception	37	22	37
Recycling Room	22	20	22
Rehabilitation	176		176
RWC	55	39	55
Sample Analysis	22	37	37
Sample Room	40	30	40
Staff Area	423	171	423
Storage	70	116	116
Waiting Room	90	54	90
WC	18	10	18
<b>Suma końcowa</b>	<b>2207</b>	<b>1523</b>	<b>2437</b>

fig. 18 Linear interpolation table with prognosed GoCo primary care size. [Image], by author, 2024

## 6. Detailed program.

more optimal for the proportion of staff areas relative to rooms that require personnel presence. The final program of the primary care centre is estimated for 2067 square meters, and after adjustment for 20 percent of the area being communication and the 10 percent being taken by partition and exterior walls, it takes a total area of approximately 2728 square meters. (appendix 1.)

### Collaboration space

One of the main premises of the project is the inclusion of a representative space that hosts lectures, conferences, coworking offices for startups and the administrative space of the primary care centre, with an access to a cafeteria. The functional program of this area is much more flexible than this of a primary health centre and in its core, includes an auditorium for around 150 people, workshop rooms, conference rooms of various sizes and a cafeteria. The exact sizes will be determined in later stages of design work in the iterative process and consultations.

## 6. Detailed program.

Administration			
Head office	3	12	36
Copy room/storage	1	10	10
Office 2 people	5	10	50
Office room students	2	12	24
Toilet	2	2	4
<b>Total</b>			<b>124</b>

Conference room	1	85	85
-----------------	---	----	----

BVC			
Examination rooms	4	16	64
Stroller storage	1	12	12
Sample room/Lab	2	16	32
Office 2 people	2	16	32
Disinfection room	1	12	12
Medicine room	1	8	8
Airlock	1	10	10
Waiting room	1	20	20
Storage	1	12	12
Meeting room	1	30	30
Toilet accessible	1	6	6
<b>Total</b>			<b>238</b>

Rehab compartment			
Gym	1	60	60
Rehabilitation room	4	16	64
Rehab storage	1	12	12
Rehab office	1	16	16
<b>Total</b>			<b>152</b>

Supporting functions			
Main storage	1	40	40
Main medicine storage	1	24	24
Unpacking room	1	15	15
Recycling room	1	20	20
<b>Total</b>			<b>99</b>

Staff area			
Changing rooms	2	45	90
Showers	4	2	8
WC	4	2	8
Staff room	1	184	184
Storage	1	40	40
<b>Total</b>			<b>330</b>

Total area VC	2057
Adjusted partitions	2262,7
Adjusted for communication	2715,24

Entrance zone VC			
Waiting room	2	45	90
Reception	1	15	15
Back office	1	20	20
Disinfection room	1	16	16
<b>Total</b>			<b>141</b>

Lab			
Sample collection	2	13	26
Sample analysis	1	13	13
Urine sample analysis	1	7	7
lab storage	1	12	12
<b>Total</b>			<b>58</b>

VC			
Examination room	32	16	512
Laryngologist	1	16	16
Gynecologist	1	18	18
Infectious disease	1	18	18
Emergency examination	1	18	18
Offices	16	7	112
Local storage	2	10	20
Medicine room small	2	7	14
Cleaner's room	2	10	20
Toilet	4	2	8
Toilet accessible	2	5	10
Psychologist office	4	16	64
Stomatologist	4	16	64
<b>Total</b>			<b>830</b>

## 6. Detailed program.

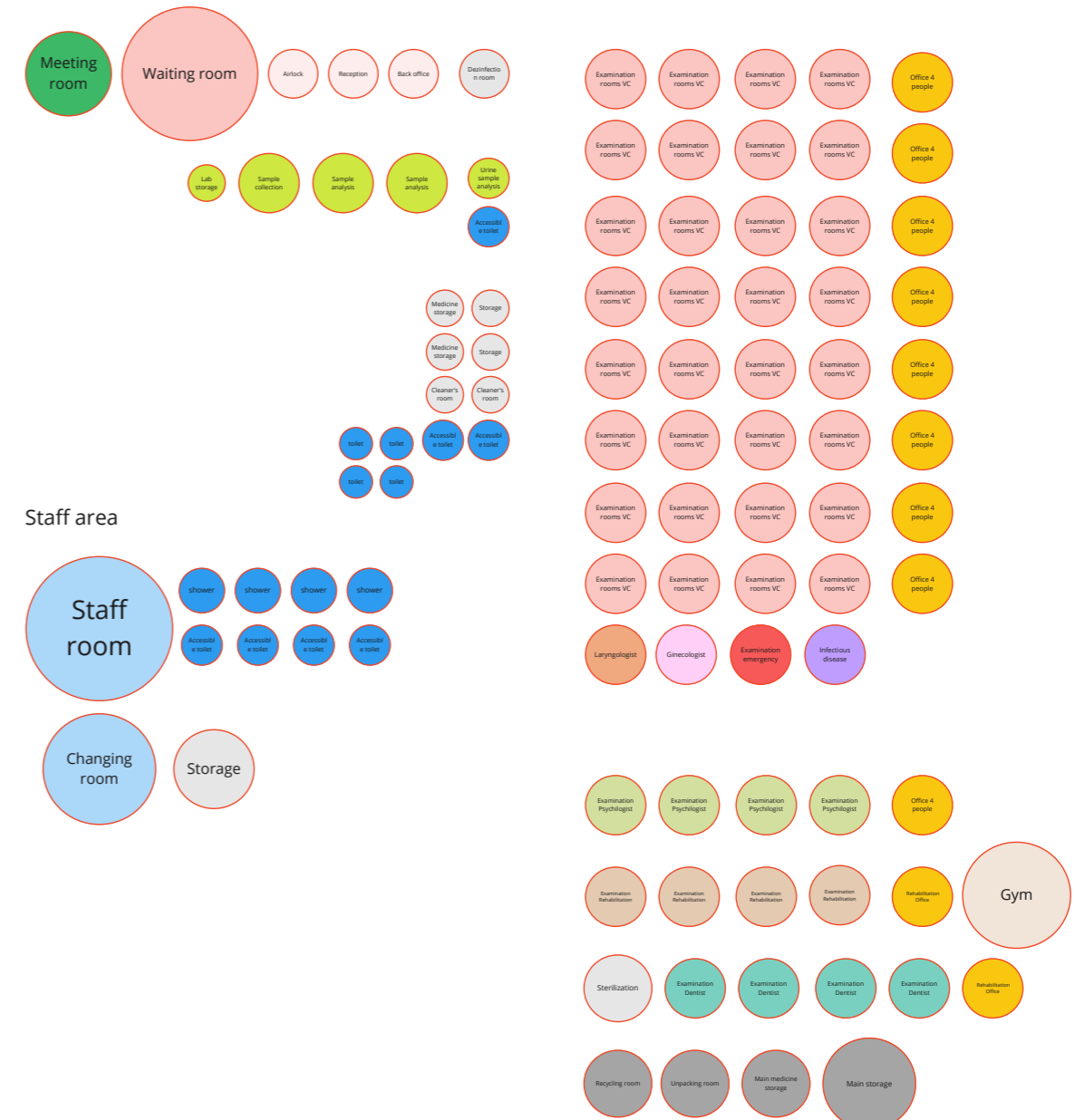
### Administration



### BVC



### Primary Care



### Staff area

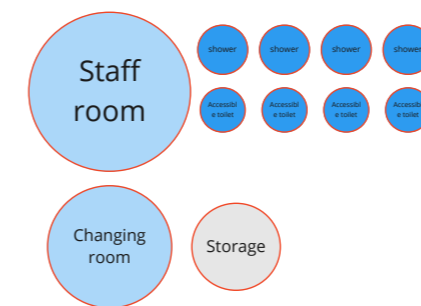


fig. 19 GoCo primary care size adjusted for communication and partitions. [Image], by author, 2024

fig. 20 GoCo primary care program as an illustration. [Image], by author, 2024

## 6. Detailed program.

### Functional layout

After breaking down the projected program size into functions, I laid out the crucial nodes, such as the examination rooms for primary care and BVC, both connected to a central waiting room. The main sample collection and analysis area is accessible from the waiting room and linked to the main storage and supply square, allowing for easy pickup by a sample transportation truck. The BVC has its own sample collection and analysis facilities, ensuring that parents with children do not need to travel through the entire floorplan. The entrance zone, accessed from the main square, connects to the waiting room as well as the cafeteria and central staircase. Both the main storage area and cafeteria are linked to the supply square, allowing for the pickup of supplies and garbage disposal. Additionally, functions such as those of the psychologist, dentist, and physical therapist can be separated from the main examination room grid, enabling them to operate during extended hours or to be rented to private practitioners.

In the next design phase, Examination rooms were joined into groups of four, each group complimented by a four-person office space, located along the outside parameter of the building for better lighting. An inside atrium was added to provide better lighting and view for examination rooms, functions such as examination rooms for gynecologist, laryngologist, emergency situations as well as the infectious disease patients were added.

## 6. Detailed program.

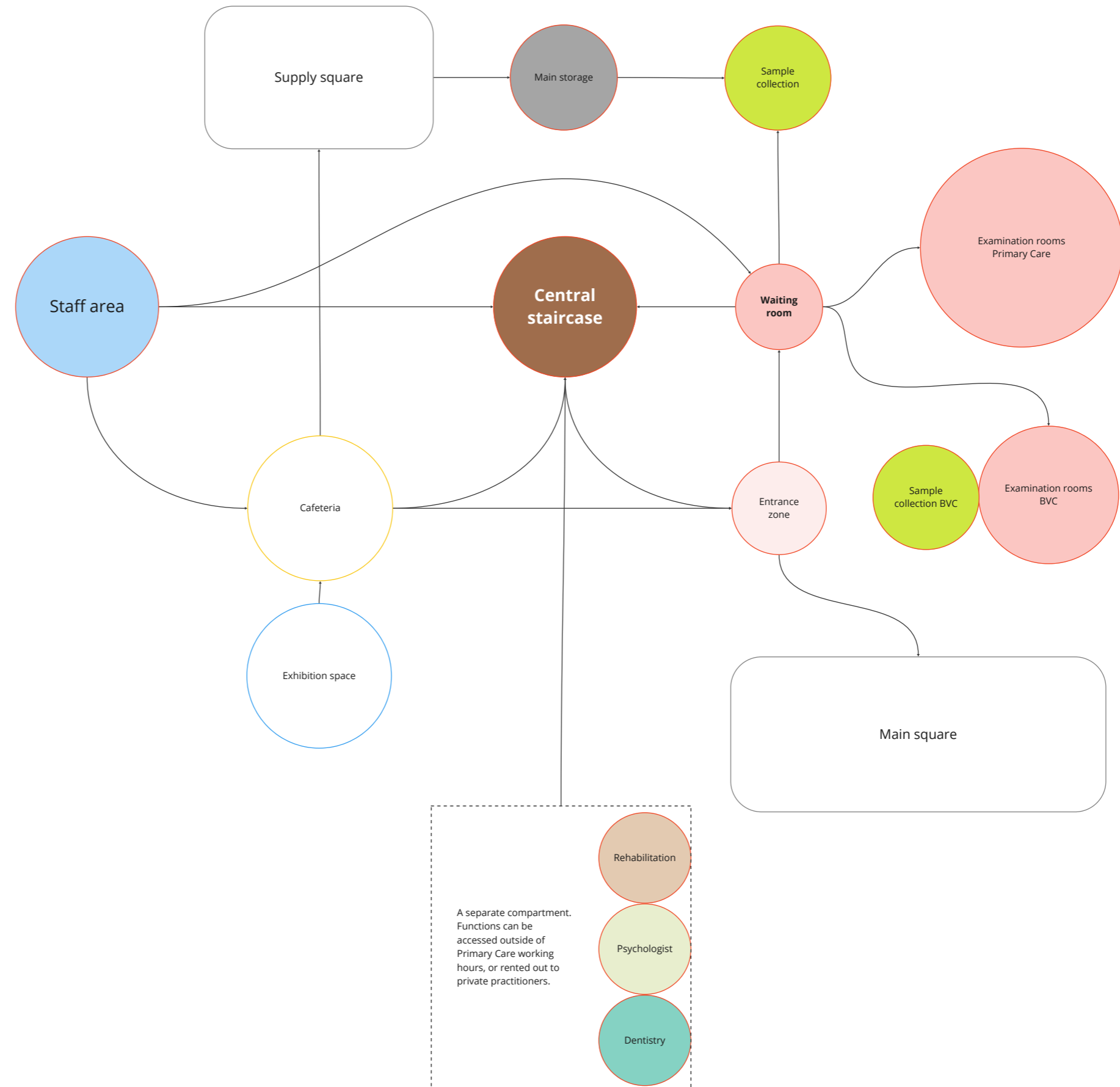


fig. 21 illustration of the draft functional layout for GoCo primary care program. [Image], by author, 2024

## 6. Detailed program.

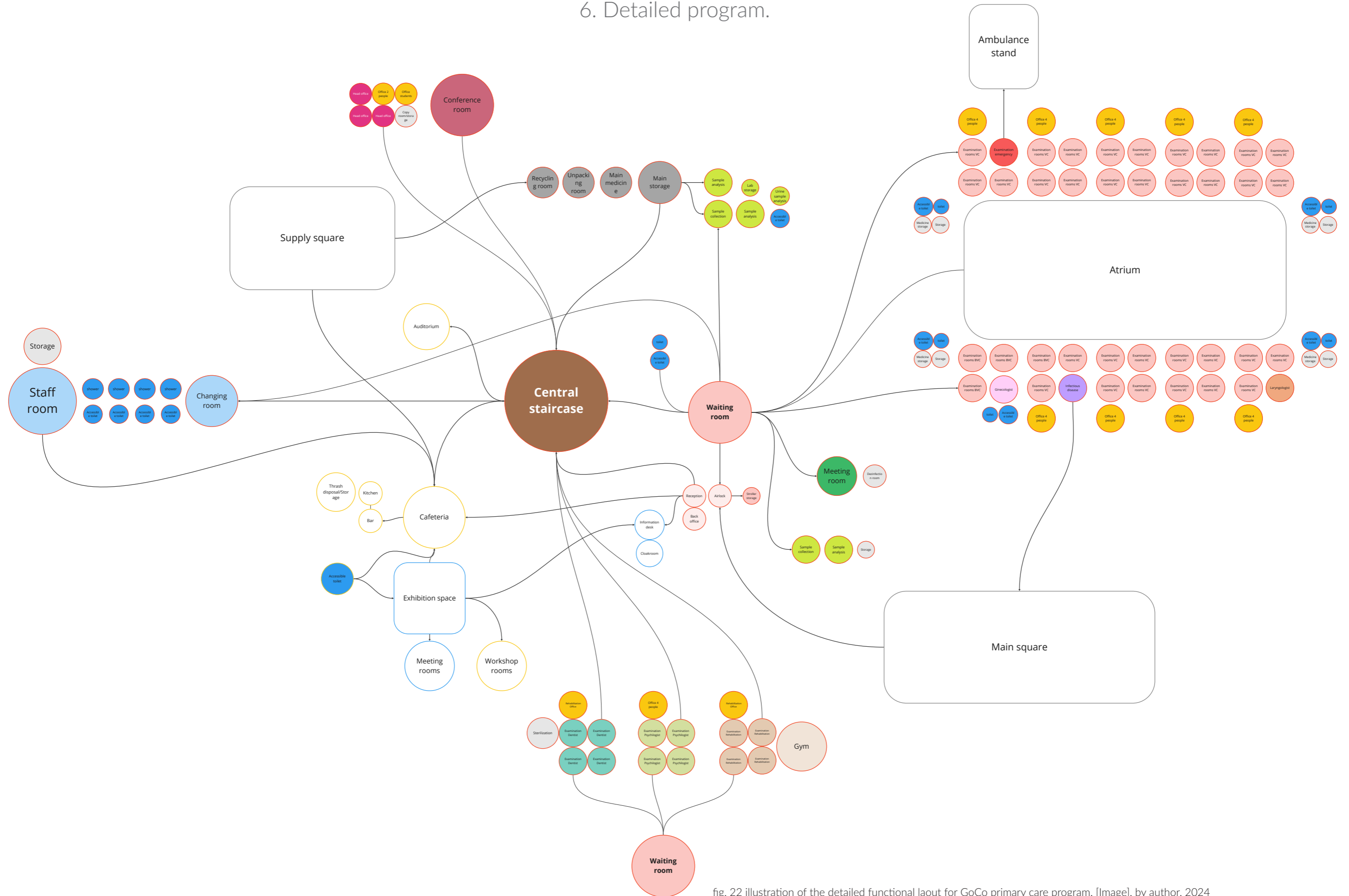


fig. 22 illustration of the detailed functional layout for GoCo primary care program. [Image], by author, 2024

## 7. Analysis of the plot



Western side of the plot is exposed to a road and a biking path. Eastern side is more active: it connects to housing, elderly care and pedestrian areas.

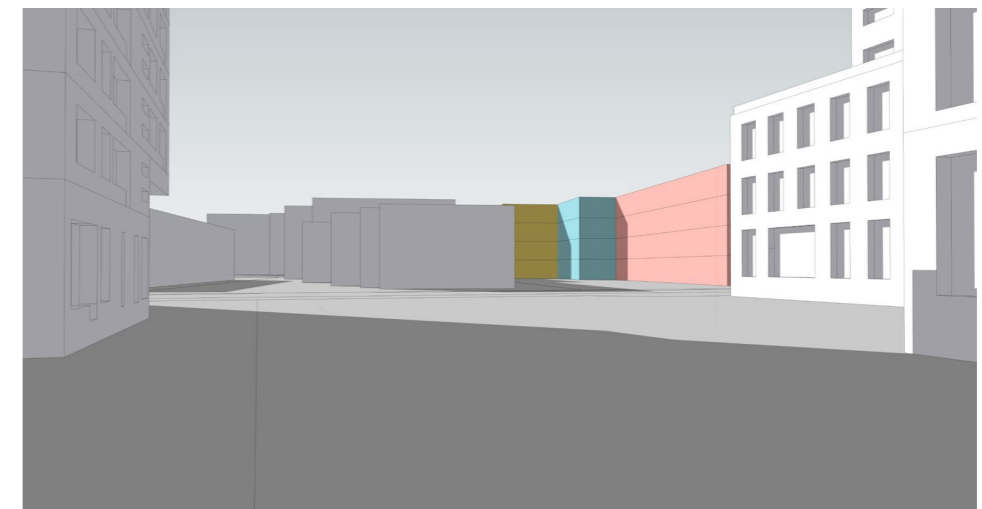


Potential for creating urban interiors and sightlines.  
- main avenue leading to GoCo House can be a starting point. Collaboration Hub's main square can be an extension of it.

## 7. Analysis of the plot

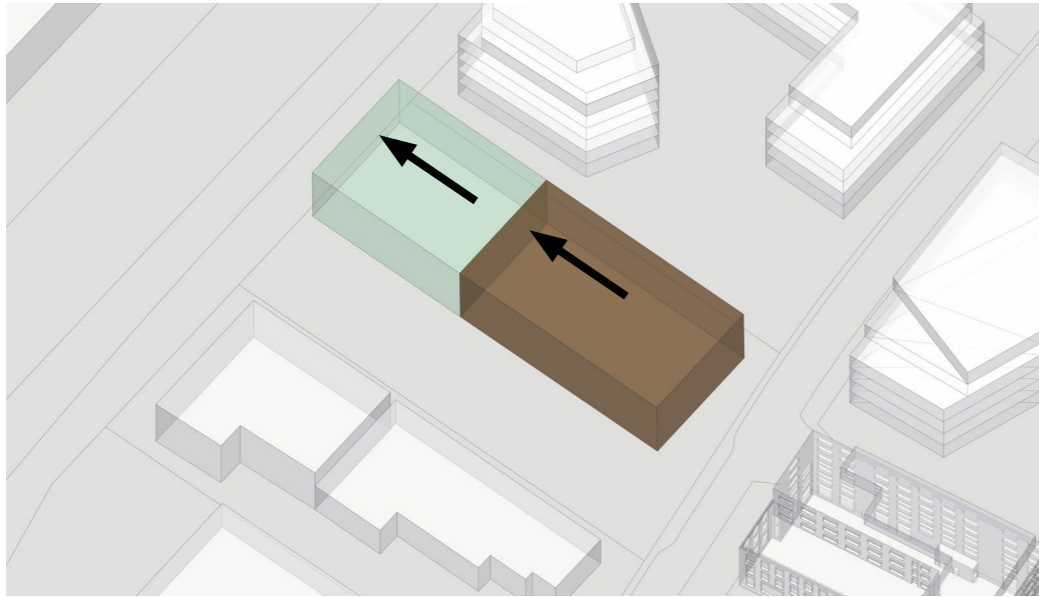


First draft of the volume.



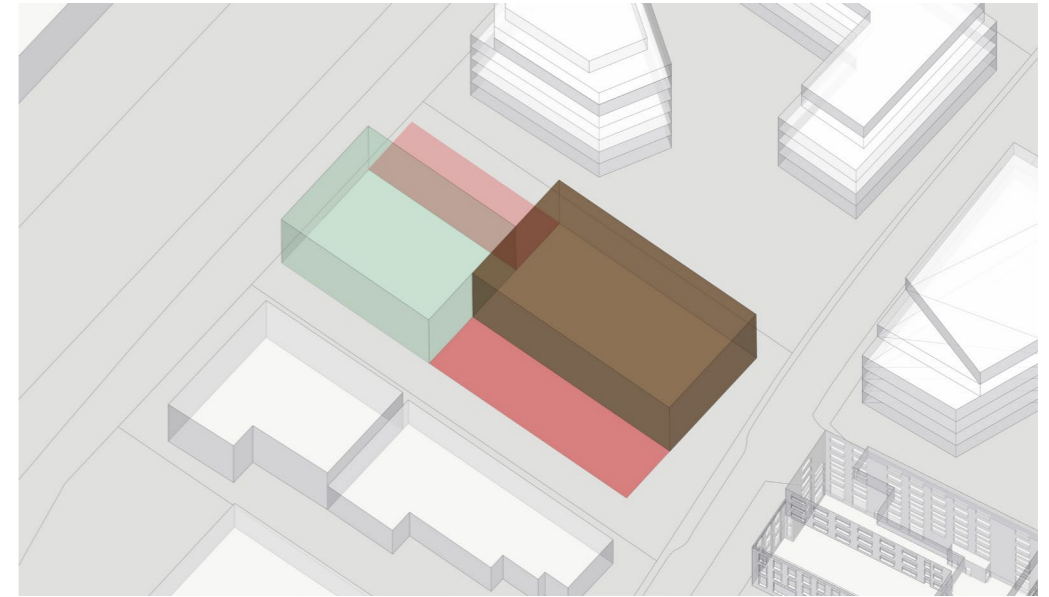
Possible visual grading of functions and potential points of interest.

## 7. Analysis of the plot

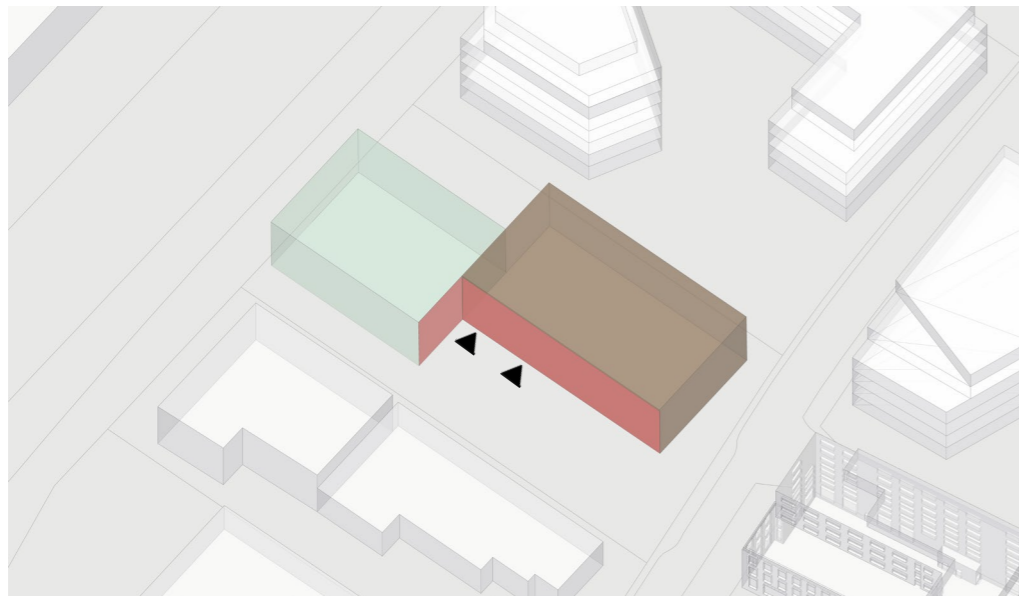


Functions graded from the most to least benefiting from public access - green, the office space and brown, the primary care center.

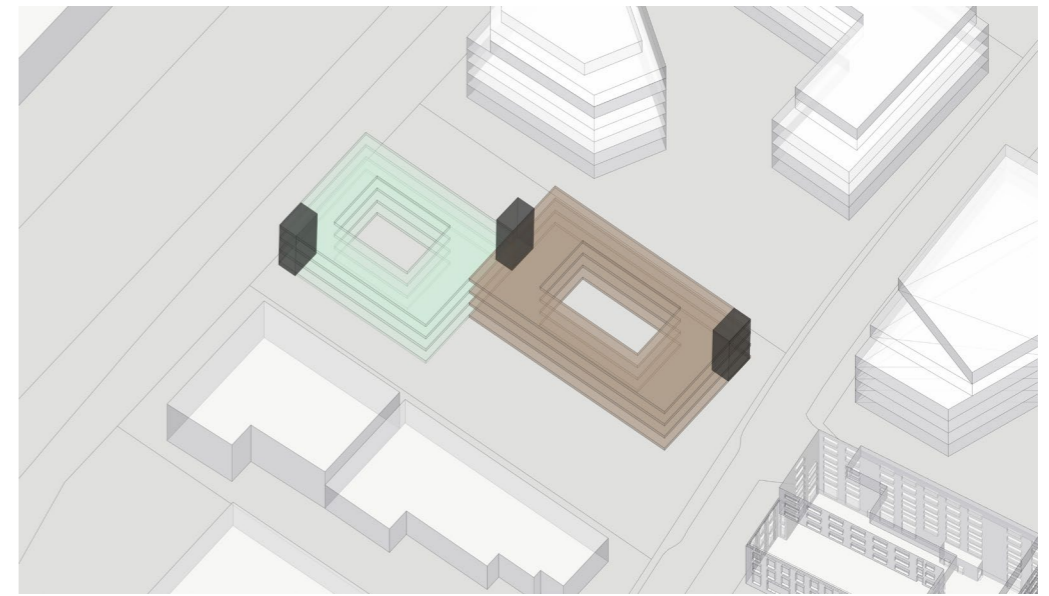
## 7. Analysis of the plot



Pushed volumes create urban interiors - the main square in the well-lit southern part of the plot and a supply square at the back.



Facades are activated for entrances and points of interest

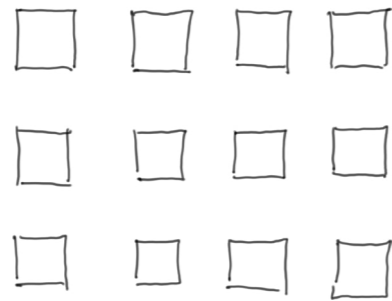


Meeting spaces connected with vertical communication, mixed with auditorium and staff areas.

## 8. Design strategies



Co-operation, not co-location - the project should bring all of the user groups together to prevent separation. To achieve this it has to create an incentive for people to use many different spaces within the building.

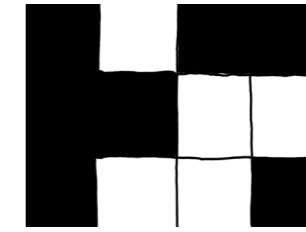


Generality - Molndal as well as the GoCo area are going through constant changes. Continuous use of the building relies on its adaptability to future needs. For this the project has to rely on simple and repetitive construction grid.

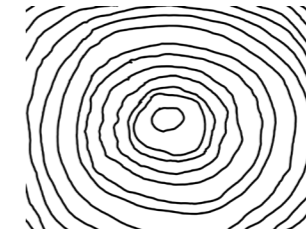


Collaboration and visibility of competence - central staircase, auditorium, workshop rooms or exhibition spaces should be in position to be visible by passers-by and accessible by other functions equally. Doctors should have access to shared offices.

## 8. Design strategies



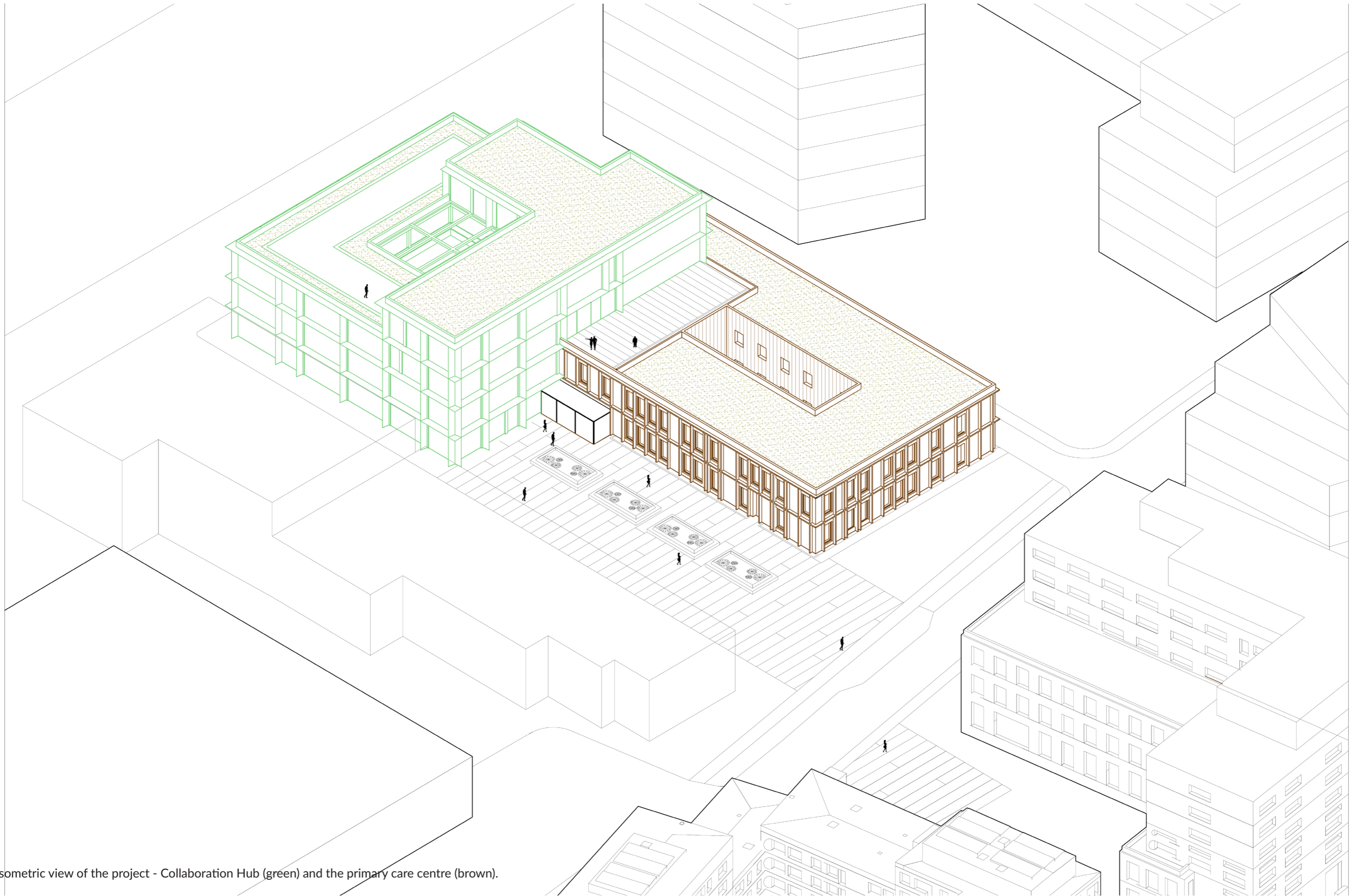
Flexibility - While hosting two functions - Conference and Office Hub and Primary Care Centre, Innovation Hub's spacial grid has to allow one to take over the other if needed.



Materials - Spans and dimensions should not exceed those met by the LVL and CLT structural elements. There should be a structural core in the centre and horizontal bracing in the far ends of the structure.



Wayfinding - fewer staircases, use of sightlines, frequent sitting areas and views to the outside helps to navigate the building.



Isometric view of the project - Collaboration Hub (green) and the primary care centre (brown).

## 8. Design

### Synergies

To create sense of cooperation between function within the building, I looked for potential synergies in two planes: vertical and horizontal. Vertical synergies are those between rooms and functions that are above and below one another, while

horizontal synergies are those between the rooms located on the same level. Synergy can be any kind of relationship between functions or rooms - it could be visibility of one space from the other, the fact that their users meet at a third point, or the when two spaces can be used interchangeably.

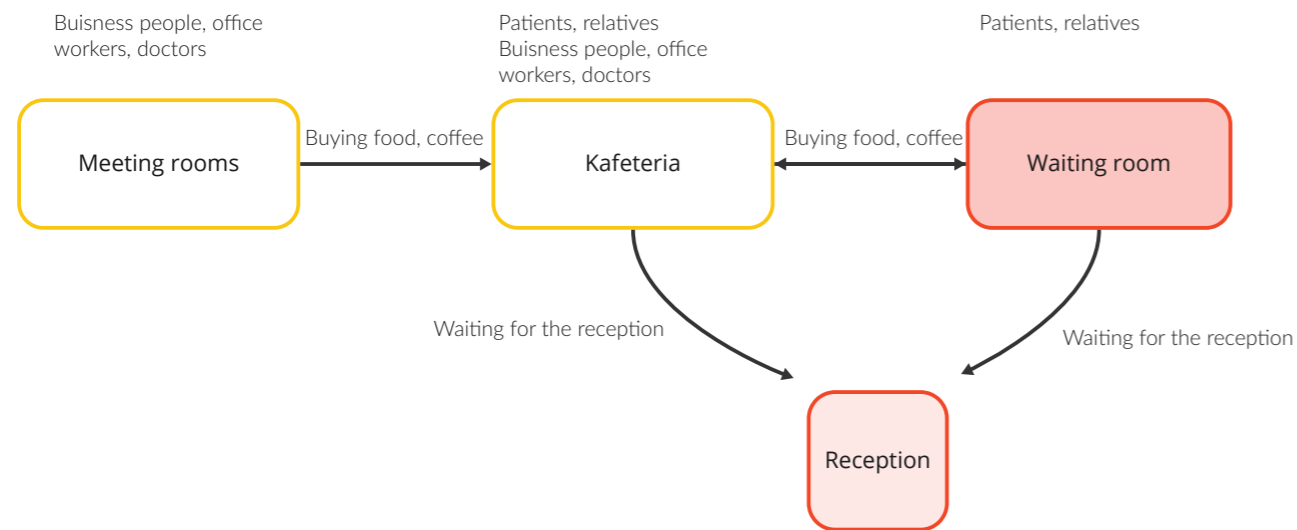


fig. 23 Diagram showing horizontal synergy. Kafeteria is a common ground between waiting room and meeting rooms. [Image], by author, 2024

Placing kafeteria next to the reception makes it possible for the patients to eat or have coffee while waiting their turn in the queue, placing them in the same environment as other users and workers within the building. Additionally, creating one central staircase and locating it in the proximity of the major functions within the building helps the users to explore the whole building and come in contact with one another.

It also increases the likelihood of the users showing up at common spaces due to having equal access to them. Another Horizontal synergy is between Workshop room, Auditorium and the main square as well as the GoCo main avenue. These spaces, when placed in a visible location, have the potential to advertise Collaboration Hub to the GoCo inhabitants and workers, as well as to mobilize the patients to participate in lectures and events.

## 8. Design

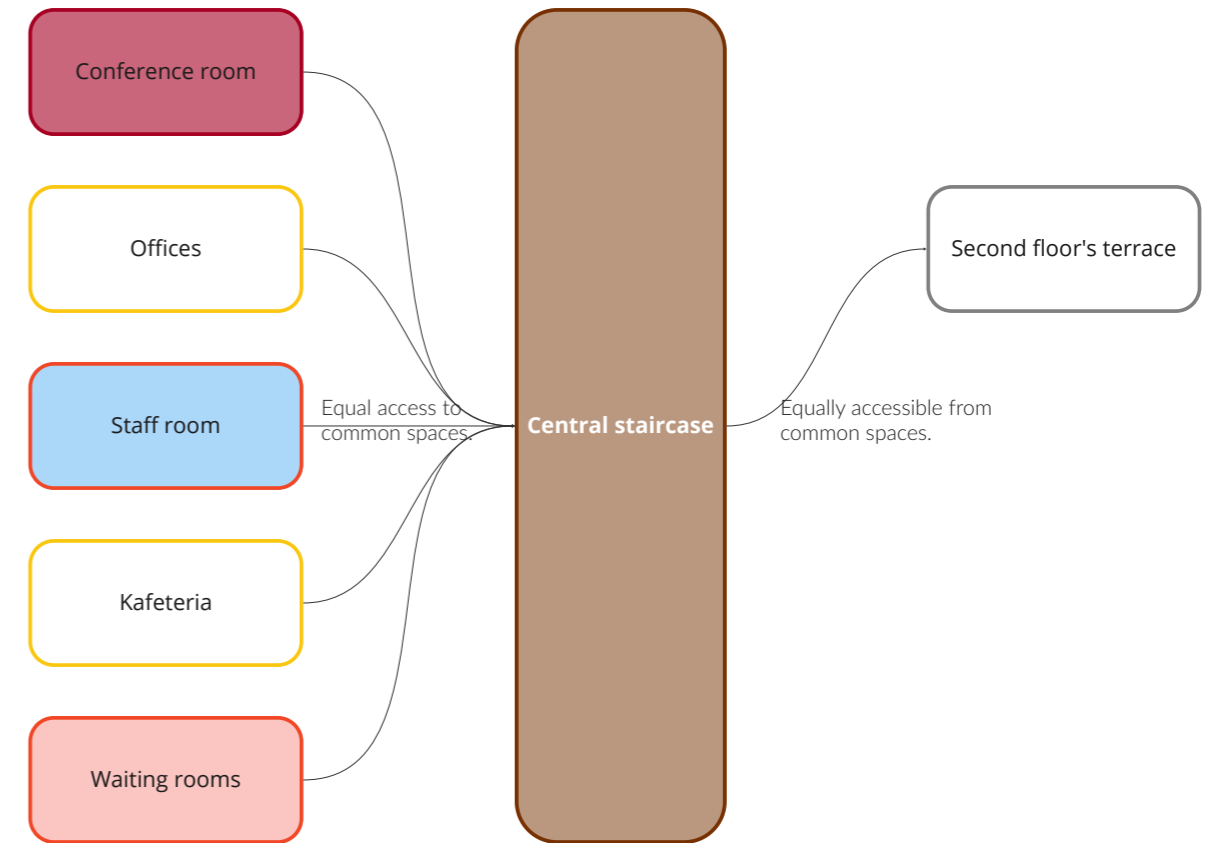


fig. 24 Diagram showing vertical synergy between the Auditorium, Offices, Staff room, Kafeteria and Waiting rooms [Image], by author, 2024

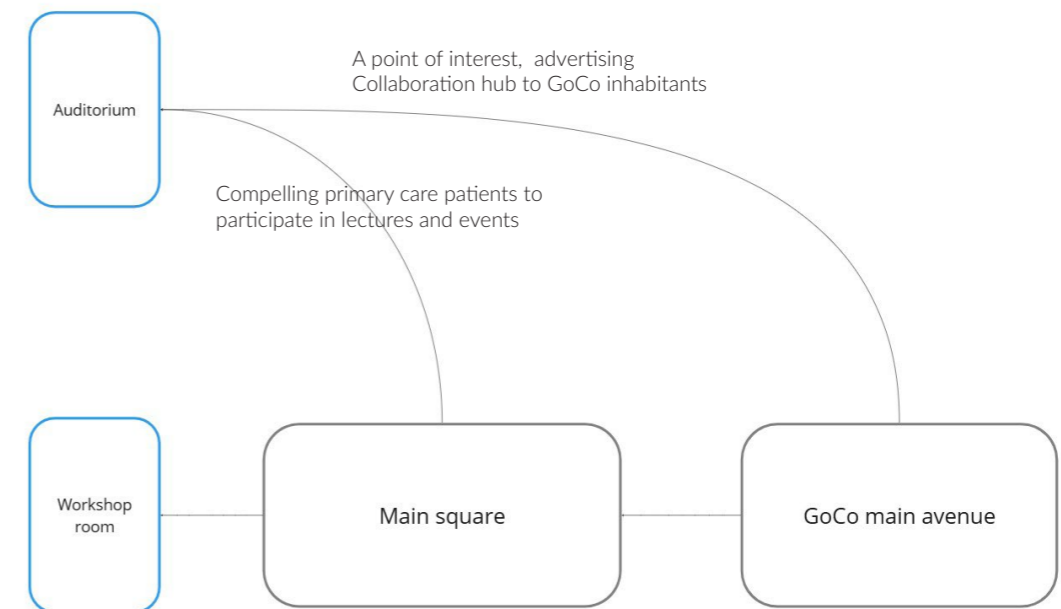
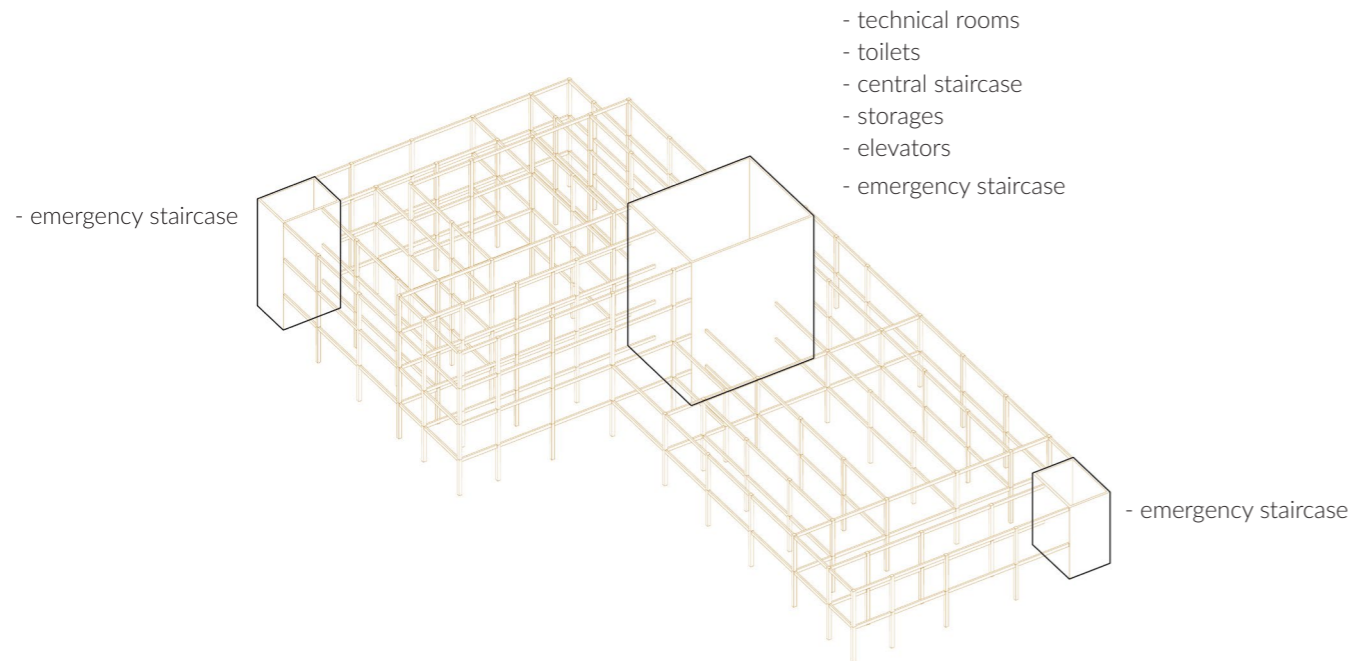
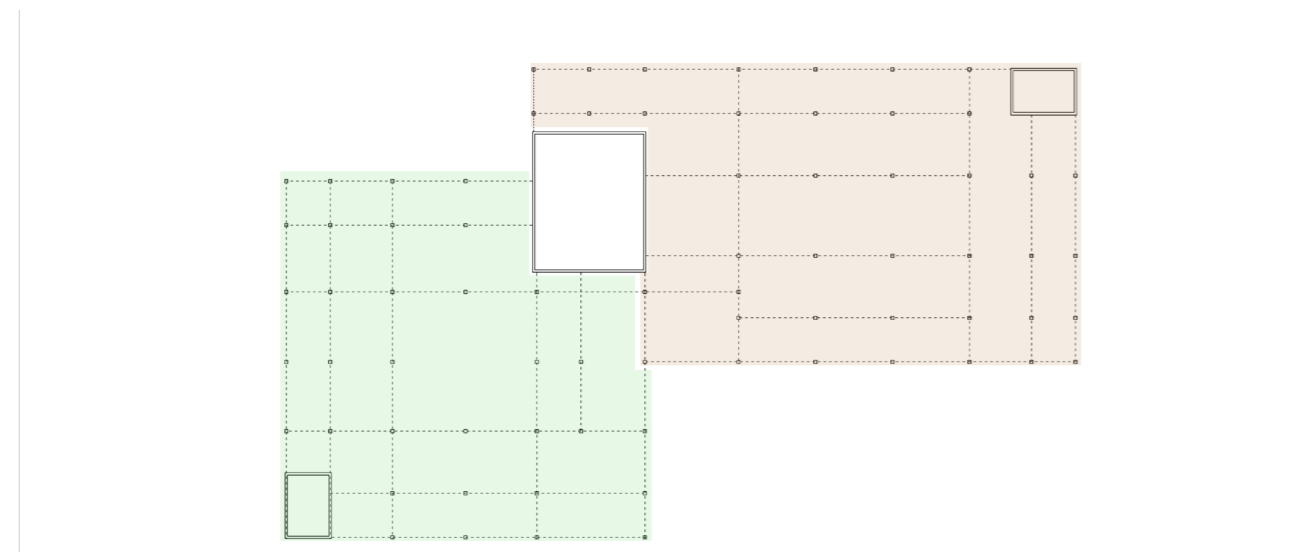


fig. 25 Diagram showing vertical synergy between the Auditorium, Offices, Staff room, Kafeteria and Waiting rooms [Image], by author, 2023

## 8. Design



Modular timber structure isometric view

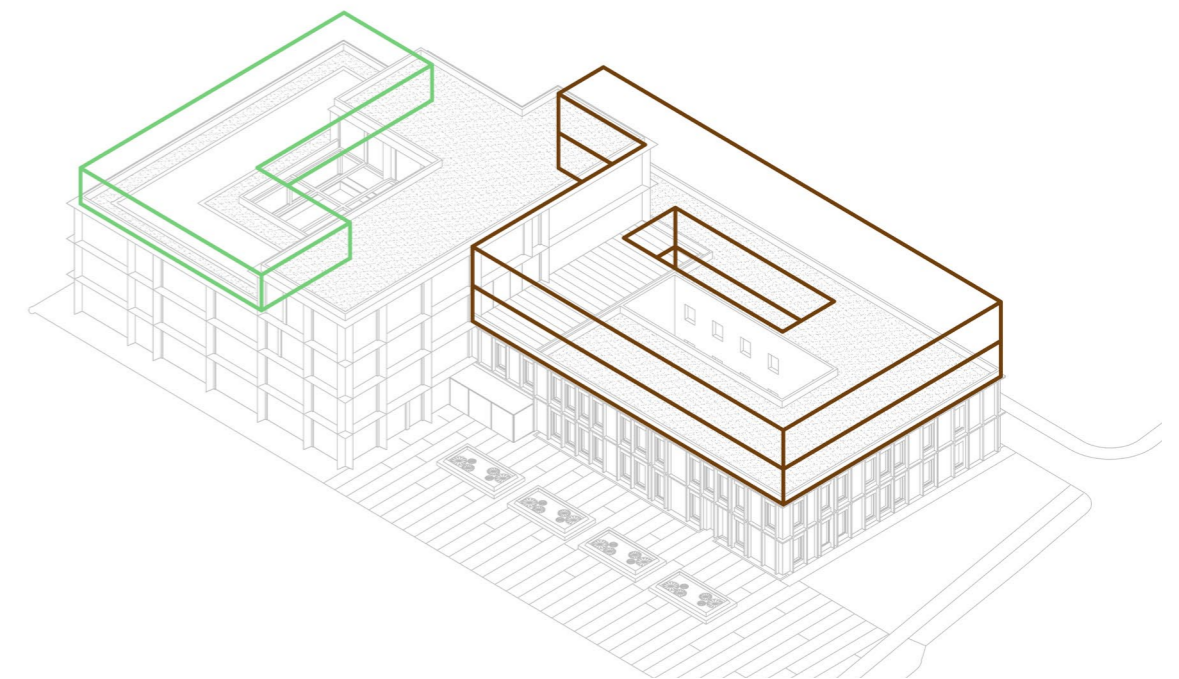
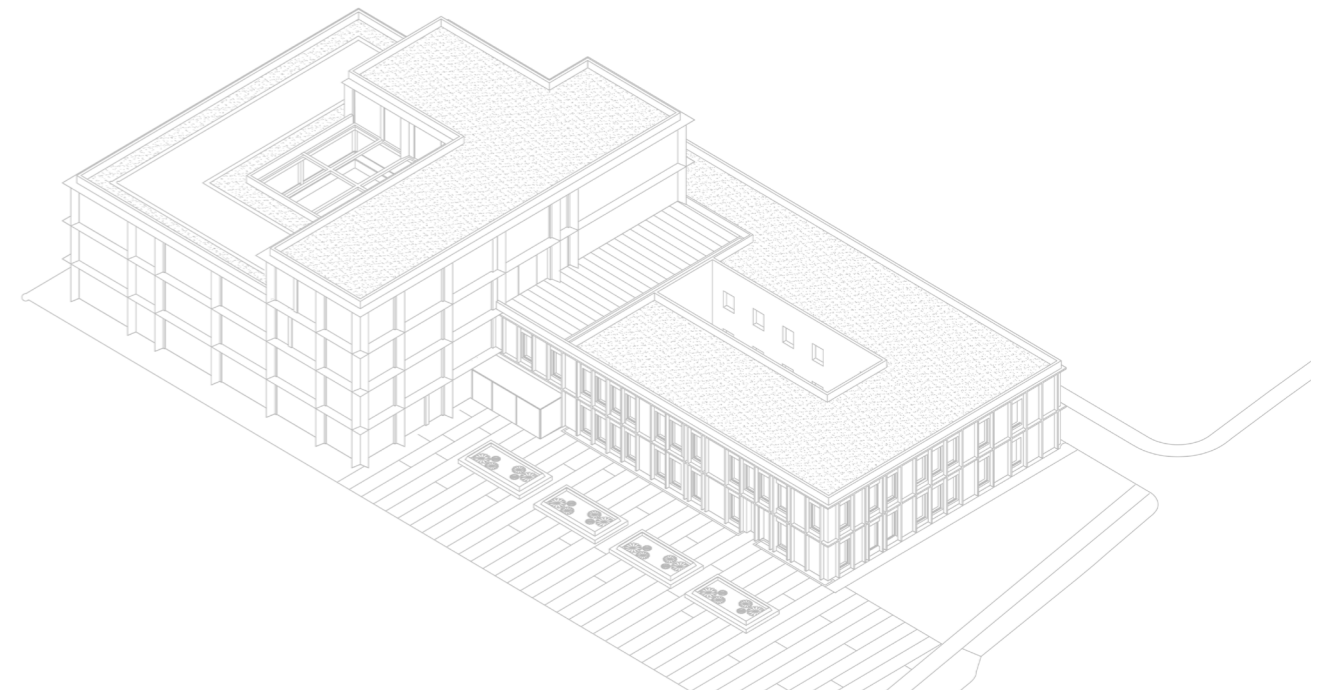


Modular timber structure plan with primary care centre (brown) and the office and conference part (green) shown.

Project is split into two volumes, joined together by the technical core made with CLT. It stabilises the structure, hosts technical spaces, stairs and toilets. Together with the post-and-beam modular structure, It allows to

increase the volume of the building in the future. By using different a different shape and material of the facade for each volume, it becomes apparent which from the user's standpoint, that they host different functions.

## 8. Design



CLT core of the structure allows increasing the volume of up to two floors for primary care centre and one floor for the administration part of the Collaboration Hub.

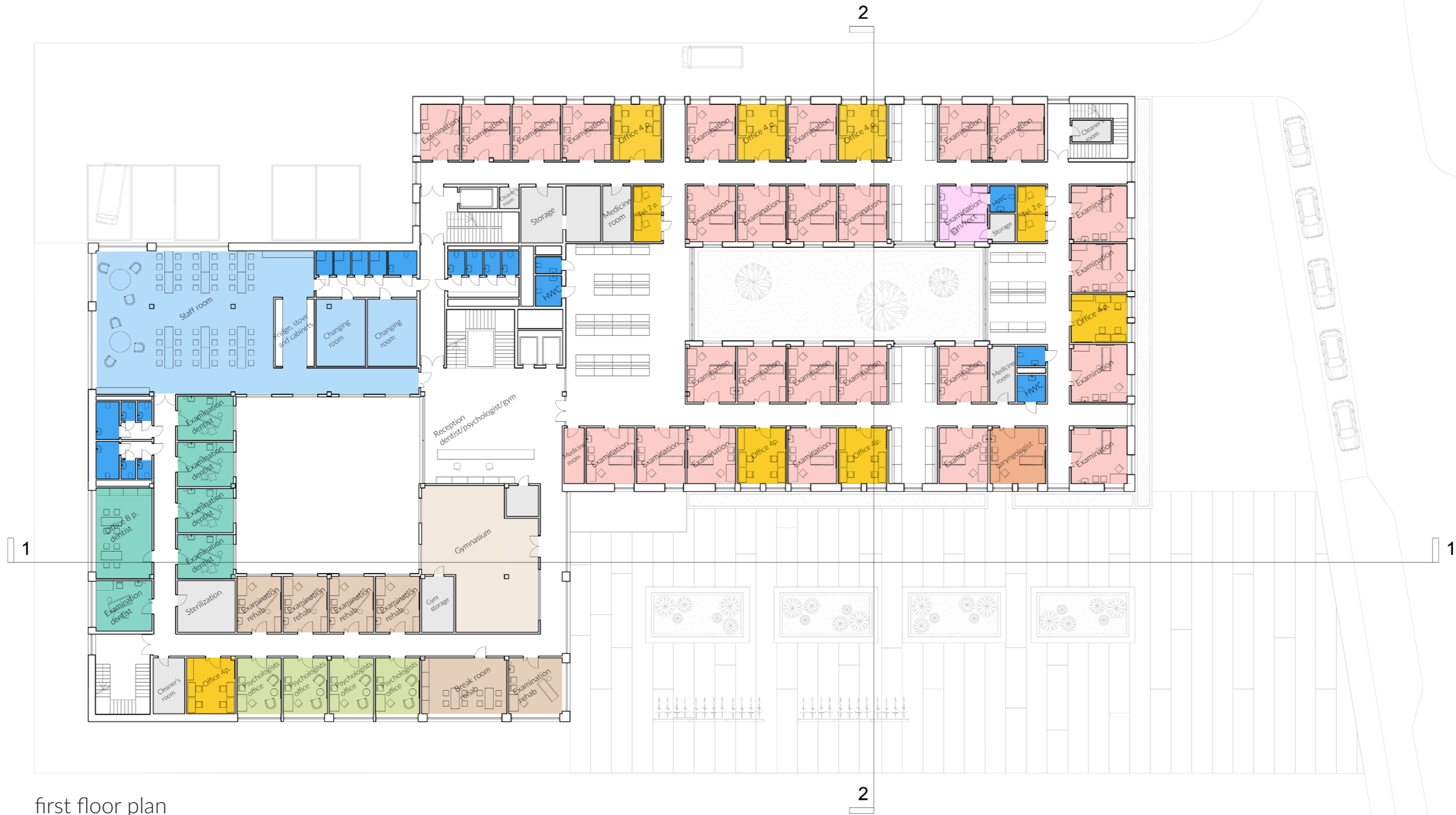
# 8. Design



Ground floor plan

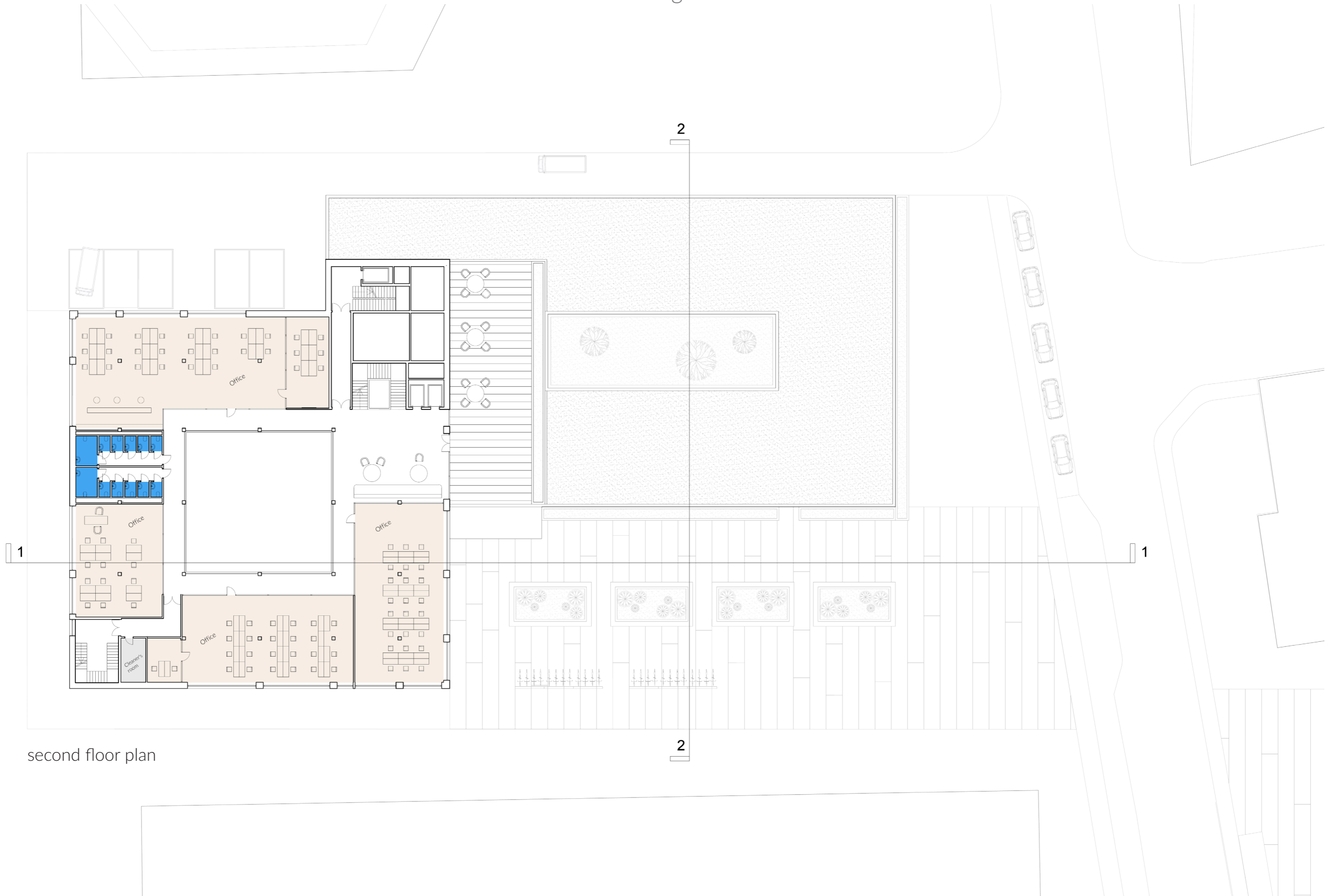
A - Supply square, entrance to cafeteria and recycling B - Bike stands C - Sitting benches D - Taxi stand E - Emergency entrance, ambulance stop

# 8. Design



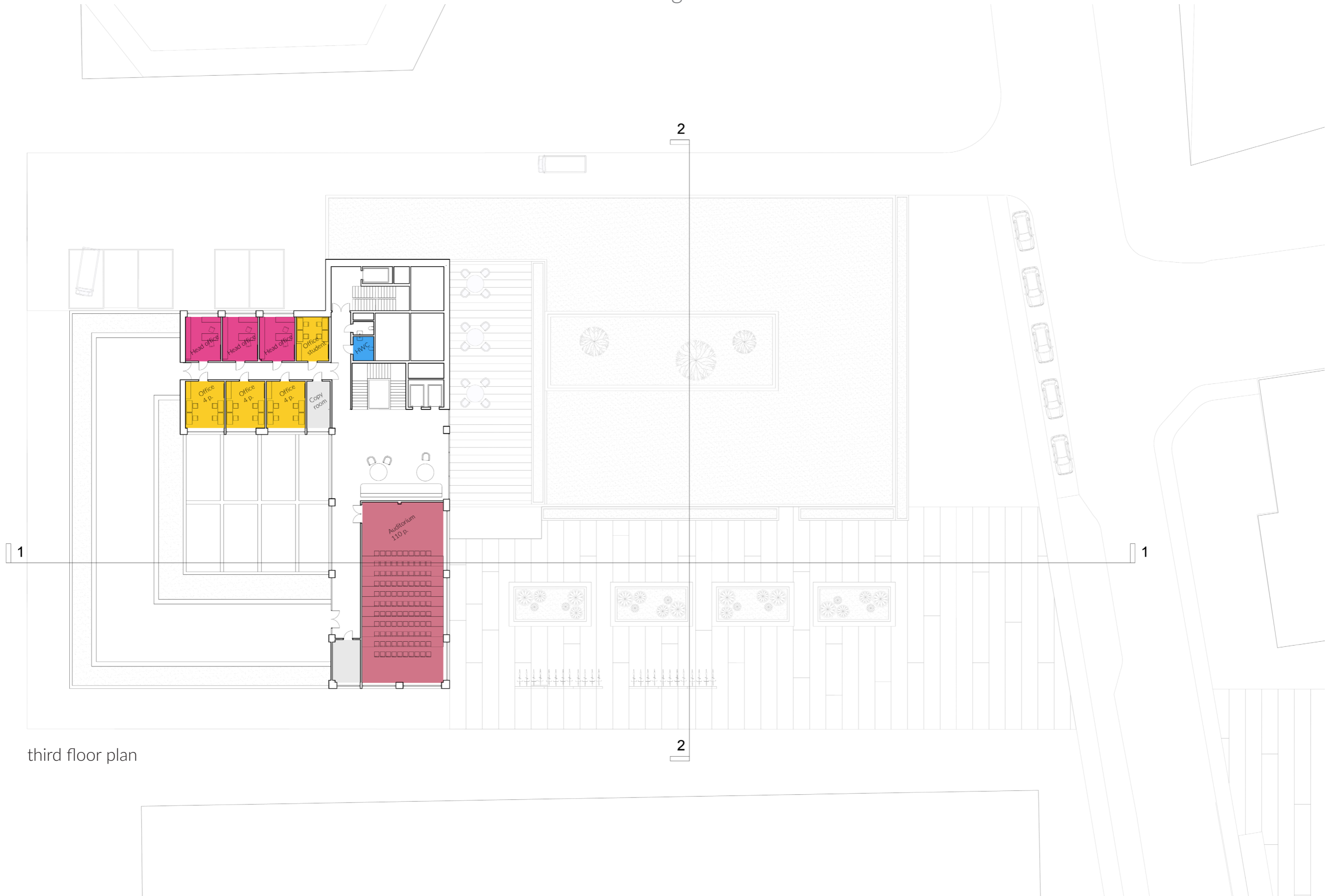
first floor plan

# 8. Design



second floor plan

# 8. Design

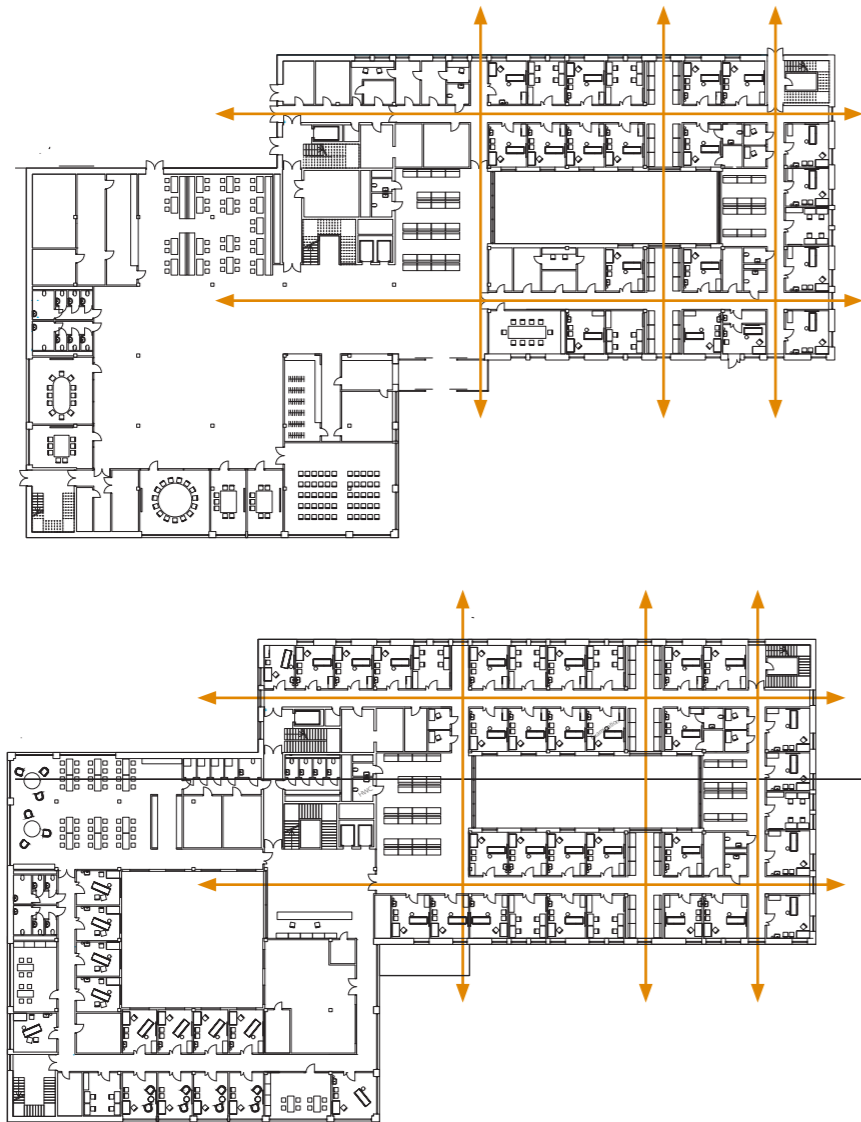


third floor plan

## 8. Design

All corridors in the primary care center have sightlines to the outdoors, making it easier to navigate the building, as well as creating a more friendly indoor atmosphere.

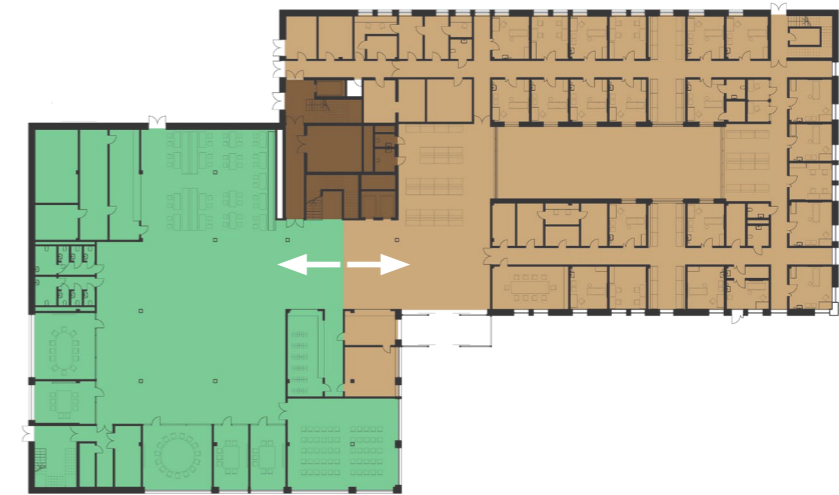
Collaboration Hub is divided into two functional blocks which can work independently from one another.



Diagrams showing the sightlines from primary care center towards the outside spaces.

On the bottom floor, workshop and meeting spaces can be used outside of the primary care working hours. On the first floor, functions like gym, psychologist office, rehabilitation or dentist office can be rented out to private health practitioners.

## 8. Design



Diagrams showing the division into two separate zones on the ground floor. Workshop, meeting rooms and cafeteria (green) can be opened outside of the primary care (brown) working hours.



On the upper floor, rooms like gym, psychologists office, rehabilitation or dentist's office (blue) can be rented out to private professionals, with a separate registration.

# 8. Design



Section 1-1

# 8. Design



Section 2-2

## 8. Design



Visualisation of the entrance zone, looking from the waiting room towards the registration and the cafeteria..

## 8. Design



Visualisation of the main square, looking towards the entrance.

## 9. References

- Sweco, (2024, November), Sahlgrenska Life. <https://www.sweco.se/projekt/sahlgrenska-life-gote-borg/>
- University of Gothenburg, (2024, November), Strategiska Lokalprojekt, <https://medarbetarportalen.gu.se/lokalforsorjning/strategiska-lokalprojekt/>
- Forskaren, (2024, November), Forskaren. <https://forskaren.se/>
- University of Gothenburg n.d., (2024, November), Sahlgrenska Academy. <https://stu-dentportal.gu.se/english/my-studies/sahlgrenska>
- GoCo, (2024, November), The City, <https://goco.se/thecity>
- United Nations, , (2024, November), Agenda 2030. <https://social.desa.un.org/2030agenda-sdgs>

## 9. References

- Baksa, M., Branyiczki, I. (2022). Invisible foundations of collaboration in the workplace: a multiplex network approach to advice seeking and knowledge sharing. *Central european business review*.
- Carthey J. (2020). Interdisciplinary User Groups and the Design of Healthcare Facilities. *SAGE Journals*.
- Nickl-Weller, C., Nickl, H., (2013), Hospital architecture. *Berlin, Braun*.
- Boosting advice and knowledge sharing among healthcare professionals. F. Colladon A., Grippa F., Broccatelli C., Mauren C., Mcinsay S., Kattan J., St John Sutton E., Satlin L., Bucuvalas J. (2022) *Journal of Knowledge Management*

