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ARCHITECTURE, MOBILITY AND BIOPHLIC APPROACH

Design of new access paths of San Luigi Gonzaga University Hospital using an Automated People Mover(APM) by active involvement of parking spaces and green areas

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Dedicated to my parents and my true love Ali

Contents

Abstract

Today, while hospitals are healthcare centres that are used to serve and heal patients, they also are considered as a part of urban design. Such a design, needs to contain different aspects of urban settings such as, accessibility and aesthetic point of view.
By accessibility, we mean not only to make the hospital accessible to every citizen but, to make such access in a more efficient way too. Similarly, the aesthetic aspect of the plan can provide a pleasant sense to a place that may produce an opposite feeling by its essence.
This thesis is a set of designs focused on the San Luigi Gonzaga University Hospital ,and surrounding areas, located in the municipality of Orbassano in the Metropolitan City of Turin in the Italian region of Piedmont (regione Piemonte).
The research was done due to current issues raised by directory board of the hospital reg-

arding growing needs of accessibility and transit from outside and inside the hospital. This is done by reorganizing parking spaces and also implementing an Automated People Mover (APM) inside the hospital by considering the railway station that terminates to that area.

Furthermore, the current status of area including surrounding greenery of the hospital together with the park and the river of Sangone is used to design new settings of green network to make continues interconnections between different areas. These settings are including the green pathways for both walking pedestrians and bicycles.

Introduction

This dissertation is a study focused on a university hospital and the area around it. The project contains different design's ideas including, people mover, greeneries and parkings constructions. Chapters organisation of this thesis is as follows:

Generally, the first two chapters deal with the main topics of this thesis, greenery and mobility inside hospitals. Here, in addition to some observations, examples and researches around these topics will be provided.

In a more specific way, the key aspect discussed in the first chapter is the the concept of mobility. To elaborate this, we will classify different types of mobility from outside, and similarly, inside the hospital, which allows us to investigate the importance of efficient mobility and way finding in a hospital.

Another essential point, which is discussed in chapter 2, is the importance of greenery in hospital design. This chapter explores the history of greenery in healthcare systems, and moreover, by providing some observations and academic researches around this topic, demonstrates potential impacts of such implementations on patients' wellbeing status in different terms.

Chapter 3 is a focus on the case study, San Luigi Gonzaga University Hospital. In this part, current situation of the hospital and its functionalities are examined. Moreover, the area in which the hospital is located is investigated and, together with the hospital, a perspective for future needs of the case study is considered. Subsequently, the discussion in this part concerns different elements around the hospital such as, the current furnitures in the area, the role of the Sangone park in the greenery design of the plan, and equally important, the contribution of each area in the overall planning of the design. These areas are included in parking spots, railway station, greeneries and current connectivities among each part.

Finally, chapter 4 consists designs for mentioned areas. In this part, plans and details for parking areas, paths and Automated People Mover of the hospital is provided.

Chapter 1

Mobility And Hospital Design

In this chapter the concept of mobility in a health care complex is discussed. Although the topic of mobility is to move from a point to another, the meaning of this term can be extended to different parts such as mobility inside and outside the hospital, terminals and the transit lounge (TL), and finally, the tools that can facilitate these mobilities such as, automated people moveovers. In a more general view, this topic can be developed from a wider view of urban design into a more detailed scheme, which is, among the buildings inside a hospital.

When we talk about the mobility related with hospitals, we need to consider that there are different groups (patients, staff and visitors), by different purposes and timing requirements that are faced with this matter. A good mobility design is the one who respects each group's urgency in a way that, they can easily access the proper service in a reasonable time. More importantly, the physical and spiritual status of visitors are so critical in the design. In fact, for patients with physical problems is very principal to make the movement as easy as possible, and for a person who is worry or scared about what will happen soon, it is important to design and think a route that does not create anxieties and insecurities.

By mobility we mean well-known behaviour that occurs for a user to get into a hospital, or similarly, to move inside the hospital. This is in contrast to the other types of mobility like, when a user is moving from a telecommunication coverage cell to neighboring cells that needs special prediction methods [Kallio, 2011].

In general, it can be inferred that, there are two main types(concerning our case) of mobility and transportation groups: individual and public, where the first type implies the usage of personal tools (car, bike, etc.), and the other exposes the meaning of using public transport system such as bus and train.

1.1 Reaching The Hospital

Sometimes hospitals are not located inside the city but they are outside or in the suburbs so is not always easy to get there. Because of the big flow of people that characterises this kind of activity, it is important to think about the best and more efficient ways to reach it.
By the previous classification, users can get to the hospitals by different ways, such as, using

their personal vehicle, like car or, if a proper infrastructure(path) exists, by a bike, or they can take the advantage of available public transport system like bus and train.

Additionally, some of these public transportation systems are hospital-specified tools. Namely, there have been stablished for the sake of hospital service to citizens and taking them directly to the hospital. They can be in the form of Hospital Shuttle Buses, or, the undergrounds with stations in the hospitals.

For example, Figure 1.1 shows the Taipei MRT NTU Hospital Station which is held in order to provide an immediate access to the hospital. According to this station information[1], "the station is a two-level, underground station with an island platform. It is named for the nearby National Taiwan University Hospital."

Another good example of public transport direct access to the hospitals is free shuttle bus service of Warrington and Halton Teaching Hospitals[2] in United Kingdom. The accessibility information found on the public web site of this group hospitals indicates the propose and specifications of such service as bellow:

[1] *Wikipedia*

[2] *https://whh.nhs.uk/patients-and-visitors/getting-here-maps- and-transport/hospital-shuttle-bus*

Figure 1.1: Taipei MRT NTU Hospital Station Exit 1 (Wikipedia)

”The popular service helps over 500 people a week get to their appointments free of charge as well as providing transport for staff between the sites. People visiting relatives in hospital can also use the bus. Our bus has full wheelchair and disabled access. The journey takes around 25 minutes between sites, but this can be delayed due to traffic and Mersey Gateway road works.” As can be noticed by the passage, the service is intended to help “people with appointments” and “relatives of patients” who need to come for a visit.

Another possible way to reach the hospital is using the bike. However, this kind of transporta tion needs specific infrastructures and routes otherwise, the risk of trip safety can be affected by external factors such as other cars, buses, etc. As a good example for this case, we can name the Utrecht city in Netherlands. This city has a good bike path plan for citizens and more specifically, in our case, it is possible to ride to the main city hospital (UMC Utrecht) by bike via multiple bike paths. Figure 1.2 shows a top view of the access to the hospital from city centre and, as it shows, there are different paths to ride by bike to the hospital. Instead, Figure 1.3 shows the infrastructures for the bike riders such as, traffic

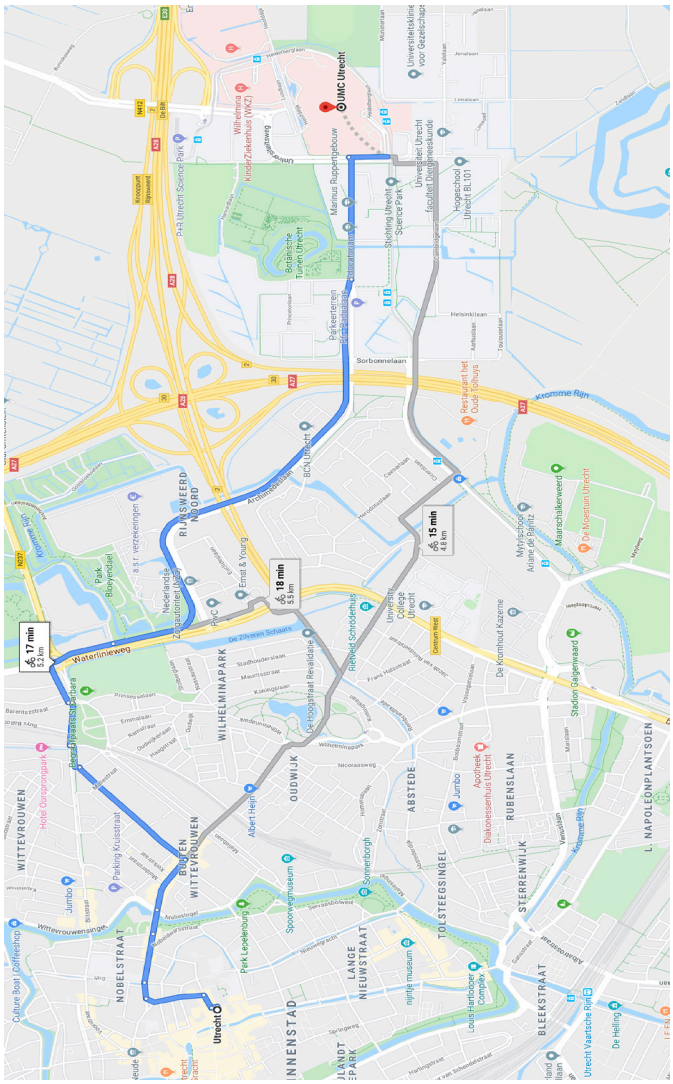


Figure 1.2: Bike paths to the UMC Utrecht Hospital from city center (Google Maps)

semaphores, road signs and identifiers and also the two-line path for the bikes. As the city puts lots of attentions to the bike's paths and furnitures, by this, we can conclude that they are considering this way of transportation in an important position for their urban planning.

To conclude, the popularity of each transportation way depends on various factors that can be considered as the efficiency involved factors of mobility, or in other word, how much a method can effectively facilitate the access to the hospital. Equally important, the inter-hospital mobility is very critical for investigating the movement behaviour of people. By "behaviour", we mean the path that users are taking for the mobility after the choice of tool is easy to recognise. This im plicitly

conveys that, by a smart design of paths or providing proper mobility tools, the user flow can be under control and eventually, the traffic in both inside and outside terminals of hospital can be improved causing a better service to patients with emergency status.

Figure 1.3: Bike path infructucture of the UMC Utrecht Hospital from city center (Google Maps)

1.2 Move Inside The Hospital

After we discussed about different ways to reach the hospital, now another aspect of transportation—concerning the hospital—is expressed here. In fact, in this section we are going to go more in details about how you can move inside the hospi tal between different wards or pavilions.

Today, most of the hospitals are big and fragmented, and the goal of users is to arrive at their destinations in the shortest time. With respect to this aim, the design of spaces can help people who are going in to have no confusion or disorientation. This aim, to be true, requires a good organisation inside the hospital too, that is why we need to talk about the concept of wayfunding in a hospital.

1.2.1 Wayfinding in Hospitals

The healthcare buildings' layout is mostly very complex, with lots of reference points and paths. This complexity may cause a big confusion for visitors to find the correct way from their entrance to the hospital. Furthermore, the waiting rooms are usually very crowded

and the comfortability of visitors is sometimes ignored.

In a research done by Morag et al. [2016], the way finding is defined as being in the correct start point and getting to the right destination by a minimum effort. Based on this research, wayfinding has direct effects on healthcare of patients and must not ignore the visitors and patients when new building are added to a hospital and routes are changed. With this regard, the concept of “wayfinding relies on a succession of communication clues that include visual, audible, tactile, and olfactory elements.” The interesting point of this study is in the way that it classifies different wayfinding-related issues by “people’s experience” instead of “their behaviours”. This was done by a questionary-based investigation in different hospitals and the results helped to locate different wayfinding problems in hospital for various type of users: “The difficulties at the hospital’s main entrance received emphasis in the questionnaire, including the information displayed on the directional signs (e.g. How easy was it to locate the required destination using the presented information?) and the assistance of the hospital staff (e.g. How easy was it to communicate with them?).”

Equally important is how to recognise this issue in old hospitals with numerous pavilions and wards that did not yet consider this problem. In [Rooke, 2012], the study deals with this matter by encountering how to implement an efficient wayfinding system in old and complex hospital environments relying on: “knowledge management, design (architectural and industrial), and production and operations management”. The results of study is classified in three different categories: “problem identification and definition; design and development and evaluation” and therefore, a full road map from starting point to the futuristic needs is suggested.

Short et al. [2017] instead, focuses on the “communication design” to address wayfinding for ”health seeking” subject by probing on a “Children’s Outpatient Department”. The experiment showed the importance of the “cohesive and staggered information” for the wayfinding “journey” in the examined unit. The outcomes of this research specifies the broader area of consideration to face wayfinding issue even if the focus is on a single department. In other word, the study explains how solving this problem inside a department

has external links to other units and places, i.e. ”finding a car park”, and therefore, it concludes the root of such design into “the organisation”.

In an article called ”Wayfinding in Hospitals: Solving the Maze”[Carpman, 1984], the way finding is argued as ”one of the greatest sources of stress” for visitors. This research is investigating the improvement factors of such issue over a period of 5 years at the University of Michigan Medical Center, and suggests the following design needs concerning patients and visitors in hospitals: “1. Wayfinding, which includes everything from finding the hospital, parking, and entrance, to finding laboratories and restrooms; 2. Physical comfort, which includes aspects of a hospital stay such as noise levels, lighting levels, and comfort of furnishings; 3. Social contact, which includes the level of privacy offered and the ability of the patient to control it; and 4.Symbolic meaning, which refers to the messages that hospital design sends to patients and visitors about their importance to the facility.” From above, the importance of way finding is concerning “everything” from visitor’s first entry, to reaching the desired destination. Similarly, Rooke et al. [2009] indicates the wayfinding as it ”is

about prioritising the needs of the users of a setting. The challenge for designers therefore is in finding the best way of establishing or assessing the needs of the users of a setting."

One of the important parts of hospital waydinding system is the transit Lounge. This place is a lightful and very relaxing part of the hospital where both patients or visitors can stay in a very comfortable area to have their appointments or waiting for the transportation facility to take them home. Furthermore, while the applications of TL can be various in healthcare places, most of the hospitals have similar definition for this place. For instance, The Royal Melbourne Hospital[Hospital, 2020] has the following variation of applications for the TL:

"The Transit Lounge is an area where:

- Outpatients can comfortably wait prior to attending their Outpatient Clinic appointment;
- Inpatientscanwaitpriortobeingdischarged from the hospital;
- Patients from Emergency and Outpatient Clinics who have been admitted by a medical team can wait for a ward bed to become available. These patients can have therapies started by our dedicated team

of skilled nurses and support staff;

- Family or carers picking up patients from the Transit Lounge can use the 20 minute parking bays at the front of the hospital on Grattan Street, between the Main Entrance and Emergency Department. These are also used by Non-Emergency Patient Transport vehicles and are subject to availability;"

In this definition, the importance of TL in mobility is very interesting. For example, as expressed by the guide, the TL can be used for patients' "picking up " by their family by a temporary parking space which is close to the entry. By this, we mean that the TL is like an interconnection area between inside and outside life of the hospital.

1.2.2 The Automated People Mover (APM)

Another essential point is the size of hospitals. Usually, healthcare complexes are very huge in dimensions and is not easy for users to move from a point to another in a short time. Therefore, the need for having a transportation, or a link from one point to another, both

from outside to inside, as well as, between different parts of the hospital, is one of the requirements of a good design. The Automated People Mover (APM) is a promising answer for such requirements.

The APM is a small-size model of rail train that is used to facilitate the transit in the short distances. Usually this type of service is used in areas such as, airports, parks and hospitals. The components of this system include the small cabin, monorail(usually), and stations. Today, these transit systems are used vastly. For example, in Italy, there are good examples of APMs that are due to different positions, like Automated MiniMetro in Perugia(see Figure 1.4). The existence of this APM not only helps football fans easily park their cars near the stadium which eventually prevents traffic jams inside the city streets, but also, by going to the heights, provides the chance to visitors to see the ancient city centre too. As you may notice, this smart transit service can solve the problem of traffic by providing public transport system but still allowing users to use their individual cars. The San Raffaele Hospital Light Railway of Milan (see Figure 1.5) is another example of this minimal transit systems. According to the

ATM Milano Official Website [ATM, 2020]:

”This is a light railway service connecting line 2 of the Milan Underground with the San Raffaele Hospital. This transport link, created specially for patients, staff and students travelling between the city of Milan and the hospital, is an automated railway with no onboard staff, covering a distance of 682 metres on an elevated track. On reaching Cascina Gobba on the M2 underground line, passengers transfer to the light railway without leaving the station, thus reaching the hospital entrance rapidly. The train carriages have reserved spaces equipped with safety devices for wheelchairs.” Figure 1.6 shows another example of this family which is the Huntsville Hospital Tram System. Based on information of this system[1], it “is an automated people mover system located as part of the Huntsville Hospital System complex in Huntsville, Alabama, United States.

[1]*Wikipedia*

Figure 1.4: Automated
Italy(W

l MiniMetro in Perugia, Vikipedia)

Operating on a 1,890-foot (580 m) concrete guideway, the trams serve to connect the Huntsville Hospital with the Huntsville Hospital for Women and Children. At the time of completion, this was the second hospital people mover system in the United States after the Duke University Medical Center Patient Rapid Transit." Another case of APM was the Cabinlift[1] at the Schwalmstadt-Ziegenhain hospital in Germany (see Figure 1.7). Although this setting was down by 2010 due to "functionality change in both connected by hospitals, but the explanation of the system shows it had very successful application during its age: "The Cabinlift is made up of fieldproven Cabintaxi components. Its functionality can be described as a "connector" technology-linking groups of buildings with each other on a horizontal plane. The experience gained during the testing of the Cabintaxi urban transport system has been used in the creation of an economically

[1] *https://faculty.washington.edu/jbs/itrans/cablift.htm*

Figure 1.5: San Raffaele Hospital Light Railway in Milan, Italy
Image from ATM Milano-allrights reserved for the image owner

attractive alternative to previous transport and handling techniques. The Cabinlift's linear motor drive units and rubber-tired wheels guarantee smooth and quiet travel. A clean form of energy: no problems with exhaust fumes, odors or noise. It has constant travel characteristics in all types of weather,

Figure 1.6: Huntsville Hospital Tram System (Wikipedia)

operates without a driver (by automatic or semi-automatic control), is guided by a track, can negotiate gradients and is pollution-free. Being designed to carry passengers, it incorporates extensive safety features. Its high operational reliability is retained by means of regular maintenance, and by check-out procedures for certain components."

Figure 1.7: The installation at the Schwalmstadt- Ziegenhain hospital in Germany
Image from https://faculty.washington.edu/jbs/itrans/cablift.htm

Chapter 2

Biophilic Approach In Hospital Design

It is thought that [Newman, 2014] the term Biophilia was expressed for first time by Edward Wilson [Wilson, 1984] in a book titled Biophilia where its meaning refers ”love of life or living systems.” Moreover, the concept of biophilic in architecture is based on the “connection” between human and the nature: “Biophilic architecture is based on the assertion that humans have an innate connection with nature that should be expressed in their daily lives, especially in cities” [Soderlund and Newman, 2015].

Newman [2014] believes biophlic has multiple advantages on urban settings such as “cooling”, decreasing the “stormwater surges”, reduction of buildings consumed energy; and improving health status. In general, we assert the application of biophlic as embedding the nature in our living ecosystem in a way that our emotional level improves.

2.1 History

The history of embedding and considering greenery parts inside the health care centres or using them as healing elements, are going back to thousand years ago as it appeared in Asian and Western cultures. There are studies such as El Barmelgy [2013] that believe the earliest hospitals in Western culture were independent of garden elements and the importance and effectiveness of greeneries in hospitals were ignored. Alternatively, Egypt's great gardens are evidence for early ages implementation of healing environment for escaping from daily pressures [El Barmelgy, 2013].

Later, in the middle ages in Europe, the elaborative gardens were a good sample of the existence of this idea in the human's life. Furthermore, in the 1800s the modern samples of hospitals are evidence for the importance and (still) effectiveness of the garden hospitals in the modern world of Europe and America. However, by the 1900s, the importance of the greenery in the hospital design were declined since the main focus was on how to improve illness curing by improving the functionality of new settings provided by new technologies.

This generated a very unpleasant mental face for the people who were engaged by the hospital, from staff to patient's family for many years [Ulrich, 2002].
However, this ignored need started to be reconsidered in the recent ages. As an example, many researches were done recently that proves the effectiveness of the healing gardens in the health care design [Paraskevopoulou and Kamperi, 2018]. The healing garden concept will be discussed in detail later in section 2.3.

2.2 Greenery in Hospitals

In the design of any building, despite all known issues that need to be addressed, there are some added values that can improve the quality and the functionality of the complex. For example, although the main functionality of a hospital is to focus on the cure techniques and healthcare technologies, by adding the greenery and taking the advantages of such spaces, the curing process can be improved ([Kellezi et al., 2017], [Alcock et al., 2014], Huisman et al. [2012]). This can be done by

considering the effect of such spaces on patients and staff, that in overall will result the improvement in the hospital functionalities.

If we consider the definition of greenery in the Cambridge's dictionary[1] is provided as green plants or branches, especially when cut and used as decoration, we will note that the first aspect of greenery is the visual or aesthetic part of it.

In general, greenery deploys not only the green elements such as trees, plants, grasses, flowers etc., but the way they are used and employed to transform a concept. Namely, the way that green entities are used in every space is important. This, by itself, is an explanation of the mental and emotional impacts that green decorations can implement in their places of use.

However, the advantages of green spaces or elements in outdoor or indoor, and more specifically in hospitals are proven to be more than the only visual aspect of them, that may even improve the cure time of patients [Heerwagen, 2009]. Furthermore, the central premise in the following discussions will be about how and in which regards is the greenery effective in healthcare centres, by naming different aspects who are dealing with it.

[1] *https://dictionary.cambridge.org/dictionary/english/greenery*

In other terms, we will be talking about the advantages of embedding greeneries in healthcare buildings.

a) Climate Mitigation

Greenery inside buildings can be characterised by the climate effects. There are several studies [Wong et al., 2010], [Coma et al., 2017], [Sˇuklje et al., 2016] ,[Yang et al., 2015] around this impact by evaluating different measurements. Wong et al. [2010] observes that there is a reduction in temperature of buildings where “vertical greenery” was installed on the ”wall and substrate surfaces”. Coma et al. [2017], instead, deals with seasonal periods and implies the “higher heating and cooling performance” of “green walls”.
Also, the fact that green elements and plants reduce air pollution, by absorbing CO2 and other dangerous particles in the air, is scientifically proved [Currie and Bass, 2008] , [Pugh et al., 2012]. However, the study around the effectiveness and share of each method into this freshness is still intresting for the researchers. ”Results of the study indicate that grass on roofs (extensive green roofs) could augment the effect of trees and shrubs in air pollution mitigation, placing shrubs on a

roof (intensive green roofs) would have a more significant impact. By extension, a 10–20% increase in the surface area for green roofs on downtown buildings would contribute significantly to the social, financial and environmental health of all citizens" [Currie and Bass, 2008].

This can be a motivation for improving the use of greenery in designing new buildings or generating sustainable designs from existing structures. Some good examples of the implementation of greenery in buildings' design are green roofs and walls. Green walls can be implemented both inside and outside the building but in hospital design can be considered also as interior project elements.

b) Impact on Level of Stress

Before to start how the greeneries can improve the level of stress in health care buildings, we discuss shortly about the environmental stress. The term "environmental stress" in general implies on every unpleasant status that can be pushed by the environment to a user or more specifically, "the environmental demands that require major adaptive responses from the individual" [Lazarus and Cohen, 1977].

Moreover, Biolchini [2019], in her study classifies the ”characteristics” of building-related stresses in different groups: ”1. The stimulation, the amount of information that is received from an environment, can greatly influence human health as the overload of stimuli can induce a state of strong stress. Intensity, variety, complexity, the novelty of the stimuli affects the levels of stimulation and are therefore to be kept under control so that the user receives the right amount of information that does not create an uncomfortable situation. 2. The coherence, clarity and comprehensibility of the elements of an environment is also fundamental as difficult to read, ambiguous and disorganised environments can lead to important problems such as those of disorientation, the cause of very significant stress. 3. The affordances, the functions of the objects, the utilitarian aspects of the environment make it possible not to experience sensations of annoyance and frustration due to the difficulty in understanding how certain elements present in the experienced space are used. 4. The control consists in the ability and possibility to manipulate the physical environment so that it responds to one’s specific needs and does not cause stress due to the fact of not having power over one’s own exp-

erience of that space." As it can be inferred, the rule of "information" is very critical on this issue. Biolchini [2019] believes that: "as far as the mental workload is concerned, stress can usually be caused by the way in which information is managed which cannot always be transcribed."

Healing gardens are capable to decrease the level of stress and by this, to increase the medical outcomes. This can be found in consideration of the psychological aspect of the cure process and in a wider view, definition of the health care services. By this consideration, in the recent years the greenery and garden concept have been added in the design of lots of hospitals and yet, there is a high trend in implementation of greenery and concept of healing gardens in the hospitals [Paraskevopoulou and Kamperi, 2018].

In a research done by [Marcus, 2007], the results declared a majority of interviewees felt better mood after facing with natural elements:" "Do you feel any different after spending time in the garden?" ninety-five percent of respondents reported a positive change of mood. One can reasonably assume that change to a more relaxed and calmer frame

of mind is likely to enhance the immune system and thus the body has a better chance of healing itself [Marcus, 2007]".

Ulrich [Ulrich, 2002] in a survey called "Health benefits of gardens in hospitals" under section "STRESS REDUCING EFFECTS OF VIEWING PLANTS AND NATURE" is dealing with the stress deduction impacts of gardens in hospitals. He believes such environments are highly effective and even a few minutes of being in such places can be relieving: "There is considerable evidence that restorative effects of nature scenes are manifested within only three to five minutes as a combination of psychological/emotional and physiological changes. Certain nature scenes effectively sustain interest and attention, and accordingly can serve as pleasant distractions that may diminish stressful thoughts"

c) Revovery Improvment

This fact is accepted that not only the medicines used for curing patients is affecting on their recovery process, other factors are also important. Here, by other factors we mean the rule of family members, friends and everything that can improve mental status of the

the patient. The importance of psychological state has been proved by various studies ([Kellezi et al., 2017], [Alcock et al., 2014]) as a relative factor that can ease and even accelerate patient's recovery process. However, the argument here addresses the impact of greenery on recovery time by providing emotional improvements on patients. To do this, hospital buildings need to be redesigned to deal with greenery patterns and elements, or, should be sustainably redefined to adapt new requirements of this improvement.

Another essential point is that the format of such building has been sustainably redefined to adapt new requirements of this improvement. For example, in the study done by Huisman et al. [2012], the affect of physical environment on the curing period of the patient has been deeply investigated. The goal of this research is to not only provide empirical results but be more focused on evidence-based[1] outcomes. They conclude this idea that there is a direct relationship between the healing environments and recovery of patients and even more, this is kind of smart investments for healthcare centres: "Evidence-based design has become the theoretical concept for what are called *healing environments* and recovery of patients and even more, this is kind

[1] *A conclusion based on a study of 65 articles by focus on the "influence of environmental factors"*

kind of *smart investments* for healthcare centres: ”Evidence-based design has become the theoretical concept for what are called healing environments because they save money, increase staff efficiency, and reduce the hospital stay of the patient by making the stay less stress-
ful . Based on the definitions of several academic researchers a healing environment can be defined as a place where the interaction between patient and staff produces positive health outcomes within the physical environment.”[Huisman et al., 2012]

To elaborate more about this relation, we need to investigate the definition of healing and recovery as the centric concept. According to Cambridge’s dictionary the term *healing*[1] is defined as the process of becoming well again, especially after a cut or other injury, or of making someone well again or the process in which a bad situation or painful emotion ends or improves. Similarly, the definition of *recovery*[2] is considered as the process of becoming well again after an illness or injury. These definitions imply that the definitions of Healing and recovery have inspired by multiple aspects. By this, we can assume the more rigid aspects of the well-being process including the medicines and, equally impor-

[1] *https://dictionary.cambridge.org/dictionary/english/healing*

[2] *https://dictionary.cambridge.org/dictionary/english/recovery*

tant, the emotional aspect that can be tied to the recovery of the patient.

Research done in Sweden clarifies that in addition of overall well-being promoted by healing definition, also personality of individuals who are experiencing the recovery is equally important [Stigsdotter and Grahn, 2002]. Furthermore, there are imperial based evidences about how the greenery can improve patients' recovery. For example, Heerwagen [2009] is mentioning an important scientific research done in 1984 by Roger Ulrich, in a way that two group of patients with same-types of surgeries and similar genders and ages were put in two different room types. One group was held in rooms with view of solid brick-decorated walls, while the other group was maintained in rooms with greenery sight including trees. The result however is astonishing: Ulrich found that patients with the tree view used less narcotic and milder analgesics, indicating lower pain experience. They also stayed in the hospital for a shorter time period and had a more positive post-surgical recovery overall than did patients who had the view of the brick wall [Heerwagen, 2009].

d) Long-term impacts

As mentioned before, greeneries have direct impacts on mental aspect of well-being process. Moreover, the effect mechanism of these impacts, including reduction of stress and pain, is a function of accessibility of these areas such as parks. It has been proven that the effects of living or being in touch in greenery areas not only has short term outcomes but, this mental impacts are remaining in long-term periods too [Alcock et al., 2014].

In the mentioned research, two groups of residence for a period of five years were under study. The study was focused on mental changes of each group after the period of the study. In this investigation, one group had migrated from less greenery zone to a greenery dense area while the other had gone from a very green area to a less green zone.

The result of this study was examined after processing the questionaries filled by volunteers in this research who answers questions at the end of each year. The calculation was very sensitive to any external factors that might affect on mental situation of each volunteer, such as, happiness factors, if they

were single or married, the salary rate etc.

The result of this study for those who moved from high to low green dense areas was not so variable during the whole period however, for those who came to more green areas was different. For them, in the first two years the average of mental measures was not so different than their historical situation but, by the third year, the outcomes showed a steady increase in their mental status.

In conclusion, this obviously implies that by easing the access of citizens to the green areas like parks people can benefit from the long term effects on their lives.

2.3 Healing gardens

It is thought that gardens have many positive impacts on healthcare buildings and this value is added by taking inhabitants from their “built environment” into natural light and spaces[Rawlings, 2017]. However, the idea of healing garden is the spaces for “promoting and improving health and well-being for people suffering from illness” [Erbino et al., 2015]. This is while Abas et al. [2015] suggests a separation among the concept of healing and

cure since they are not the same: “A nature or a garden may not be able to cure cancer or broken part of human bodies but it may facilitate stress reduction.”

A therapeutic garden or healing garden is a place where people can feel peace, getting away from spiritual tensions and in overall, feel the sense of heal. The functionality and implementation of these gardens can be set on different formats, from hospitals and nursing homes to assisted living residences, each focused on the improvement of mental status of the inhabitants by assisting the greenery and planets as curing and pleasant elements that can provide a mental satisfaction to the viewers.

Today, there are successful examples of implementing green elements in hospitals. For instance, the Khoo Teck Puat Hospital in Singapore (see Figure 2.1). According to information of this hospital[1], this complex is maintained to be a ”healing environment”: ”Khoo Teck Puat Hospital (KTPH), a 761-bed general and acute care hospital, opened in June 2010. Serving more than 550,000 people living in the northern sector of Singapore, KTPH combines medical expertise with high stand-

[1] *https://www.ktph.com.sg/overview*

Figure 2.1: Khoo Teck Puat Hospital By KTPH Own work, CC BY-SA 4.0 (Wikipedia)

ards of personalised care, set within a healing environment, to provide care that is good enough for our own loved ones."

Moreover, the application of these gardens is more promising than what can be found by what we assumed till now. For instance, there are evidences related to the effectiveness of these therapeutic gardens on improvements of eldery people's lives. As a case, a study done by Detweiler et al. [2012] is investigating the effectiveness and pros of healing gardens for this group of people in various dimensions. The case studies of this research were the Republic of Korea and the United States by considering Korea as one of the most populated eldry citizens countries among the world.

The brilliant point about this study is where it expresses the current situation of academic studies around the topic of healing gardens as they are "utilized views of nature or indoor plants", and then provides a better investigation on "benefits" of garden settings on eldery people. In this study, the reduction of pain has been mentioned as a key advantage for these gardens. This factor is important since by reducing the pain perception among el-

derlies the quality of life of them can improved so much. Also, the increase in attention is another key advantage that can be counted. This study specifically encounters the advantages of attention increasing on functional improvement following brain injury. Furthermore, this article mentions “the brain’s physiological response to stress” which can appear as brain damage and as a positive point of action, the healing gardens are able to reduce the level of stress which will result in good outcomes in this regard. Another interesting fact that is discussed by the authors of this article is the remedial effects of therapeutic gardens on citizens with dementia disease. According to this research, the big number of people with dementia is among eldery citizens and then by the application of these gardens the status of these people can hugely improved. Figure 2.2 shows a sample of Korean garden called *Buryeongsa*. This park includes the known korean elements[1] such as naturality, simplicity, and being unforced, providing pleasant view and calm area for visitors. Figure 2.3 and Figure 2.4 are sample of healing garden and hospital with greenery consequently. The designer of the *New Parkland Hospital* expresses this work as a healing environment that brings both

[1] *https://en.wikipedia.org/wiki/Korean_garden*

”confort” and ”accessibility” to the visitors: ”landscape and architecture create an immersive healing environment that extends outdoors, prioritizing comfort, accessibility, wayfinding, and environmental stewardship.” [1]. The same designer for the *Scottsdale Healthcare Healing Garden* is promising to offer ”restorative sensory experience” via this healing garden: ”The new Healing Garden courtyard and renovated lobby offers a restorative sensory experience that is symbolic of the natural cycles of life.” [2]

[1] *https://www.teneyckla.com/projects/healthcare/the-new-parkland-hospital*

[2] *https://www.teneyckla.com/projects/healthcare/scottsdale-healthcare-healing-garden*

Figure 2.2: Buryeongsa Healing Park (Wikipedia)

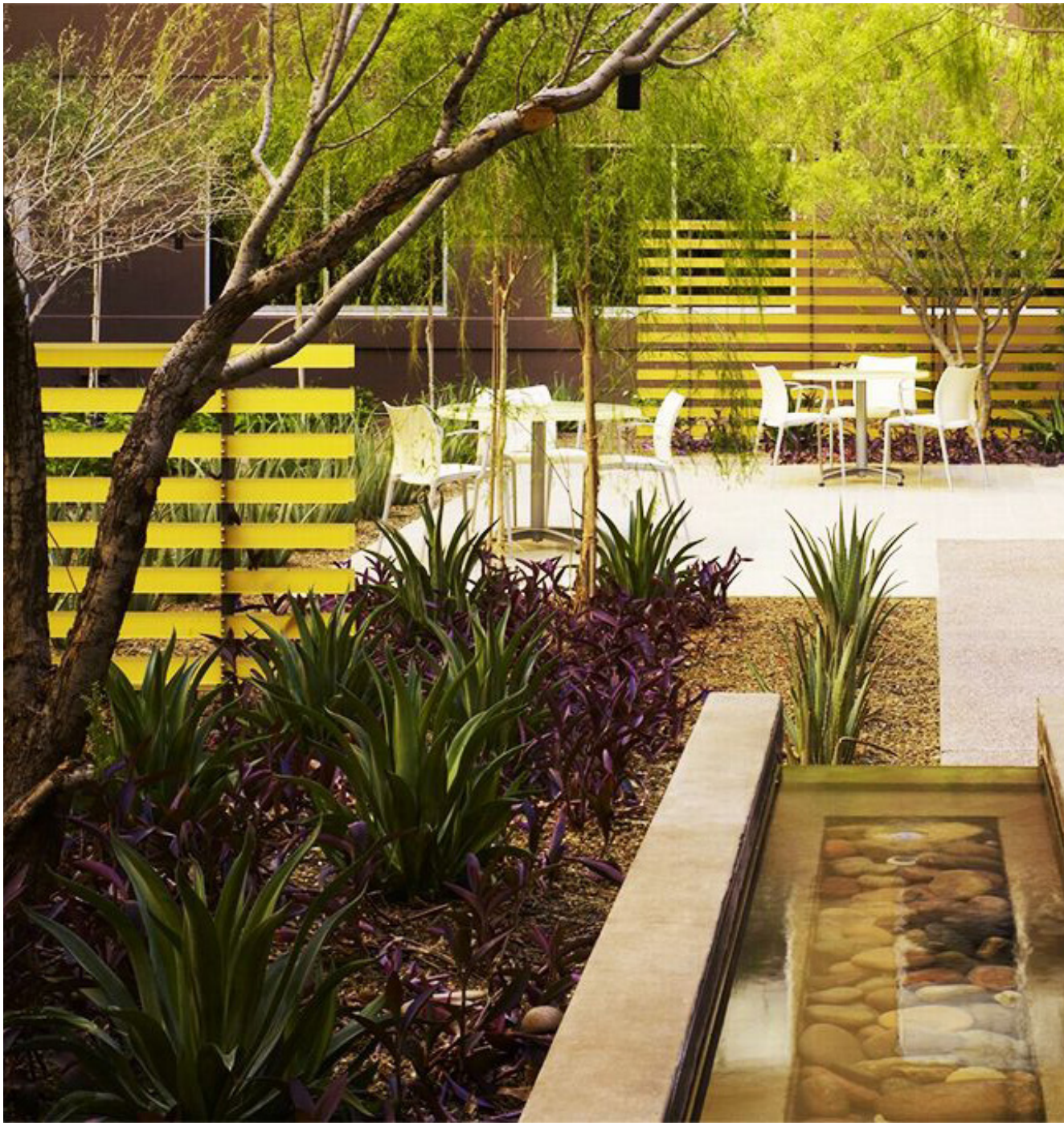


Figure 2.3: Scottsdale Healthcare Healing Garden Image from Ten Eyck Landscape Architects (TELA)- all rights reserved for the image owner

Figure 2.4: The New Parkland Hospital Image from Ten Eyck Landscape Architects (TELA)- all rights reserved for the image owner

Similarly, the other key advantage that is mentioned in the study is about “reduction in falls and antipsychotic medications” and how this reduction share increases among “the high garden users”. Overally, in this study the advantages, as well as, barriers and limitations of ”the horticultural therapy and garden settings” is encountered and ”the quantitative analysis of the benefits” of these gardens for the eldery citizens is investigated in deep and will predict in the near future the emergence of such settings is unavoidable.

Moreover, in Uwajeh et al. [2018] a review of different methods in which therapeutic gardens can be used to improve the clinical outcomes of patients with dementia and Alzheimer’s is discussed and then an extension to these methods is examined. The research argues that using therapeutic gardens may potentially improve the patients’ health level and authors of this paper believe “therapeutic gardens should be extended for speedier recovery of other patient populations”.

Equally important is the rule of natural elements which characterises an environment that whether it is natural or constructed.

Numerous searches with stop that natural environments, with the presence of vegetation or water, are preferred to urban ones or built however, it would be wrong to say that everyone natural environments are refreshing for attention or that every urban space is stressful and non-refreshing [Biolchini, 2019].

Chapter 3

Case Study:

The San Luigi Gonzaga University Hospital

3.1 History and Functionalities[1]

The beginning of the history of "San Luigi Gonzaga" has a precise date: March 26, 1818 . That day, in the presence of the King and the authorities of the Municipality , work began on the hospital "specialized" in the treatment of lung patients , at the time, for the most part, suffering from tuberculosis. The need for a specialized hospital was acknowledged by the Opera Pia San Luigi Gonzaga.

The hospital was built in 1826, in a location that was not the current one. In fact, it was originally located in Turin, in the Valdocco area, in the current headquarters of the State Archives.

The project was entrusted to Giuseppe Maria Talucchi, among the few exponents of Piedmontese Neoclassicism, who created, among other things, the facade and the rotunda of the courtyard of the Albertina Academy , the completion of the Guarini College of Nobles , later headquarters of the Academy of Sciences , as well as the entrance portal of theUniversity of Via Verdi.

In 1903 the hospital reached the maximum capacity of 243 beds ; however the continuous progress of science in the treatment of

[1] *resource available at: http:// www.sanluigi.piemonte.it/azienda/ impegni prog.shtml*

lung diseases led the administration not to carry out further extensions, but to build a new hospital intended solely for the treatment of patients suffering from tuberculosis.
The foundation stone of the new hospital was laid in 1904 , while the transfer from the Valdocco region to the ultra-modern 1000-bed suburban sanatorium in Corso Orbassano area in Turin, the current headquarters of the FIAT Mirafiori factory , takes place in 1909 .
The new San Luigi Gonzaga hospital was born in the Tre Tetti area , an agglomeration of three single-storey houses that interrupted the desert road that led to Orbassano.
In 1970 , finally, the San Luigi Gonzaga Hospital was moved again, going to occupy its current location. The original value of the sanatorium can be seen, in fact, from the pavilion structure, with large sunny terraces and long connecting corridors, as well as from the vast park surrounding the hospital.
At the beginning of the 90s , the installation of the University of Turin, through the acquisition of high professionalism, has produced a significant expansion of skills and specialties giving a strong boost to the life of the hospital. Consequently, from purely pneumological, the San Luigi has been transformed into a modern multi specialist complex.

In the following years, the institution of the II Degree Course in Medicine and Surgery, the Degree Course in Nursing (CLI) and some Postgraduate Specialization Schools further expanded the collaboration between University and Hospital allowing to reach high levels of development through the integration between scientific research, assistance and professional training, characterizing the Hospital, which in the meantime has become ”with national relevance , as a real ” teaching hospital ”.

With DPGR No. 99 of 17 December 2007, the San Luigi Gonzaga Hospital Company, has taken on the title of ” University Hospital Company ” since 1 January 2008 .

The San Luigi Gonzaga Hospital-University is characterized by medical-surgical activities that place it in a prominent position in the Piedmontese healthcare landscape.

Over the years, the initial vocation for the treatment of lung diseases has undergone profound evolutionary transformations that have led ”San Luigi” to a present and a future strongly characterized by an offer of high-quality multispecialist health interventions .

The ”Alessandro Bertinaria” Anti-Doping Regional Center is also highlighted within the

hospital, created on the occasion of the ”Torino 2006” Winter Olympics and intended to represent a center of excellence and training in the field of Toxicology and the Neuroscience Research Center of the Cavalieri Ottolenghi Foundation , recently inaugurated.
Since 1 October 2008, the health facility has been the seat of the San Luigi Gonzaga Faculty of Medicine and Surgery . This is the result of the strong collaboration between the Health Authority and the University, which has led to the achievement of high-level scientific results and, in particular, to the development and integration of scientific research, healthcare and training, all aimed at achieving a only primary objective: patient care.

[1] *Resource availible at Wikipedia(Public Domain) at https://it.wikipedia.org/wiki/Ospedale_San_Luigi_Gonzaga*

3.2 Structure and Departments[1]

The hospital has a structure consisting three pavilions, each of four floors, connected by long corridors. A fourth pavilion is instead intended for services. This is a conformation permitted by the territory in which the hospital is located, an area almost devoid of other constructions and about a kilometer away from the nearest urban center. The hospital has in fact a considerable horizontal extension and

the distance between the two ends is about five hundred meters. In addition to the aforementioned pavilions, there is one dedicated to the outpatient clinics and also a first aid pavilion , the anti-doping center building, a three-storey building housing the biological center and a circular building housing the university center. There is also a biomedical library. The hospital includes the following departments located in the various pavilions:

- Developmental and non-respiratory age allergology
- Hospital anatomy and pathological histology
- Universityanatomyandpathologicalhistology
- Anemias and coagulopathies
- Hospital anesthesia and resuscitation
- University anesthesia and resuscitation
- Cardiology
- Microcythemia center
- Sleep center
- SQUID center

- Emergency Medicine
- Internal medicine I with endocrinological address
- Internal medicine II with hematological address
- Internal medicine III with metabolic focus (diabetes and dysmetabolic diseases)
- Nuclear medicine
- Neurology
- Ophthalmology
- Dentistry
- Medical oncology
- Pulmonary oncology
- Orthopedics and traumatology
- Otolaryngology
- Pediatrics
- Pulmonology I
- Pulmonology II - Respiratory pathophysiology
- Pulmonology III - Bronchology

- Pulmonology IV
- Psychiatry
- Radiology
- Radiotherapy
- Functional recovery and rehabilitation
- Multiple sclerosis and clinical neurobiology
- CR and MS
- Analgesic therapy and palliative care
- Urology

3.3 The area[1]

The hospital is located beyond the south-western outskirts of Turin, in the municipality of Orbassano and the nearest inhabited center is the municipality of Beinasco . Two important roads leading to the city of Turin allow to reach the structure and place it indirectly in connection with the Piedmontese capital : Corso Allamano , to the north, and Corso Orbassano, to the southeast. Another important route from which you can reach the hospital is the south ring road of Turin via the SITO exit.

[1] *Resource availible at Wikipedia(Public Domain) at https://it.wikipedia.org/wiki/Ospedale_San_Luigi_Gonzaga*

Figure 3.1: The surrounding area of the hospital

As for public transport, the hospital is reached by two suburban bus lines (43 and 48) that connect it with the same capital and by an urban line in the municipality of Orbassano.

3.3.1 Furnitures and planning

The main characteristic of the area that the hospital is in is greeneries around it. As you may see in Figure 3.1, the hospital building is surrounded by tree coverage and, from the outside, the area is full of farm-like lands. Furthermore, from the southern face, the hospital is connected to the Sangone river. This river together with its greenstrip, will make a very good potential for making a green network by connecting the greenery inside the hospital area into the park.

From the accessibility point of view, despite the public transport and railway terminal that ends closby the location, also from the north the hospital has access to the highway *Tangenziale Sud* that provides connectivity to the main metropolitan of Turin, as well as, other cities nearby the hospital. In all, considering the scheme of area and status of accessibility, it seems that the area has a good potential for establishing an “accessible green netw-

ork" in a way that citizens are encouraged to spend time in it.However, this to be feasible needs a set of steps such as reorganising parking spots, designing bike/walk paths, etc.

3.3.2 The Sangone Park[1]

[1] *resource available at : http://www.comune.torino.it/verdepubblico/patrimonioverde/curaverde/parcosangone.shtml*

A disqualified area over 120,000 square meters located on the left bank of the Sangone stream, in District 10, today becomes a large public park thanks to the recovery project of the Large Public Green Works Sector. Today the area, from which it is possible to admire both the Turin hill and the Monviso, and the newly restored Savoy mausoleum of the Bela Rosin and the neighboring large Bosco dell'Accampamento, has taken on significant landscape relevance, thanks to the inclusion of 350 trees natives gathered in natural groups, shading the approximately 1500 meters of new cycle-pedestrian paths, and the realization of targeted naturalistic engineering interventions. Particular attention was also paid to the creation of 102 regulated vegetable gardens, each equipped with a wooden shed and fence, whose availability of water is ensured by two underground tanks of 26,000 liters fed by the overflow of the toretti.

The lighting of the main paths, the wooden fences delimiting the entire area, the preparation of a service parking lot and the refurbishment of the pedestrian square in front of the Bela Rosin Mausoleum, are the interventions that complete a redevelopment which, combined with the neighboring and newly redeveloped (June 2006) Colonnetti park, they deliver 500,000 square meters of fully usable and equipped greenery to the city.

Furthermore, this area can be correlated by the meaning of *green network* to the hospital. Figure 3.2 represents this correlation which is the park and its position due to the hospital. As it can be investigated from this view, the two greenaris can be connected by implementing new paths or redesigning the current ones.

Figure 3.2: The Sangone P
from the ho

3.4 The future needs of the hospital

In this section, we will briefly discuss about the future needs of the hospital which designs in this thesis are done according to them.

Chapter 4 deals with these design parts where we will explain the ideas and methodologies in detail.

As we interviewed by technical manager and directory of the hospital, we recognised issues related with the current status of the hospitals.

Park and its position
ospital

These issues mostly where included in infrastructural parts of the hospital. Moreover, the status of area and existing greeneries in the site was motivation for producing new ideas that could be implemented at the same time with the new design. In overall, we classified the issues that need to be considered as following parts:

First, *parking spots*. The current status of parking lots are not coherent with demands of both visitors and staff. We need to reorganise these areas and also implementing new multi-store parking.

Secondly, *Accessibility in hospital*. We need to facilitate the access inside the hospital from the parking areas. This will be done by establishing an Automated People Mover (APM) monorail system with different stops in area

of hospital. Finally, *greeneries*. The idea is how to connect different elements of this area including the Sangone park, hospital green area, parking and APM to make an added value to the region in a way that citizens can take more advantages of it and be motivated to come to the area for a walk, bike riding etc. This can be done by implementing proper paths and connectivities in the design.

Chapter 4

The Project

Site Analysis

In this part, the current status of the site is presented. As it can be seen, there is a large green area around the hospital which is abandoned. Later, in the planning, we will use this capacity to design a healing area for patients and also an area for the university. Furthermore, these areas are connecting by green paths to the Sangone Park.

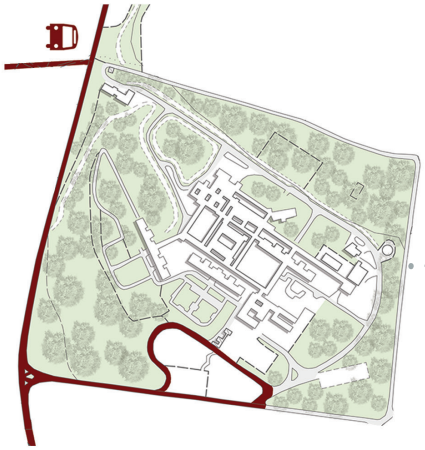
Another important point to consider is the entry points of hospital. At the moment, the access to the hospital is mostly limited to one major entry, causes a high density of cars and users around this area. This by considering the hospital's directory board demand, allowed us to design more parking spaces for different groups of users such as, patients and staff, in different locations. Also, using the APM which makes a better accessibility inside the hospital areas, people are more. Motivated to use other parking areas rather than the main entry point.

Landscape around the hospital

Hospital's Building

Streets around the hospital

Accessibility routes to the complex by personal car



Public transport access routes

Current status of parking spaces

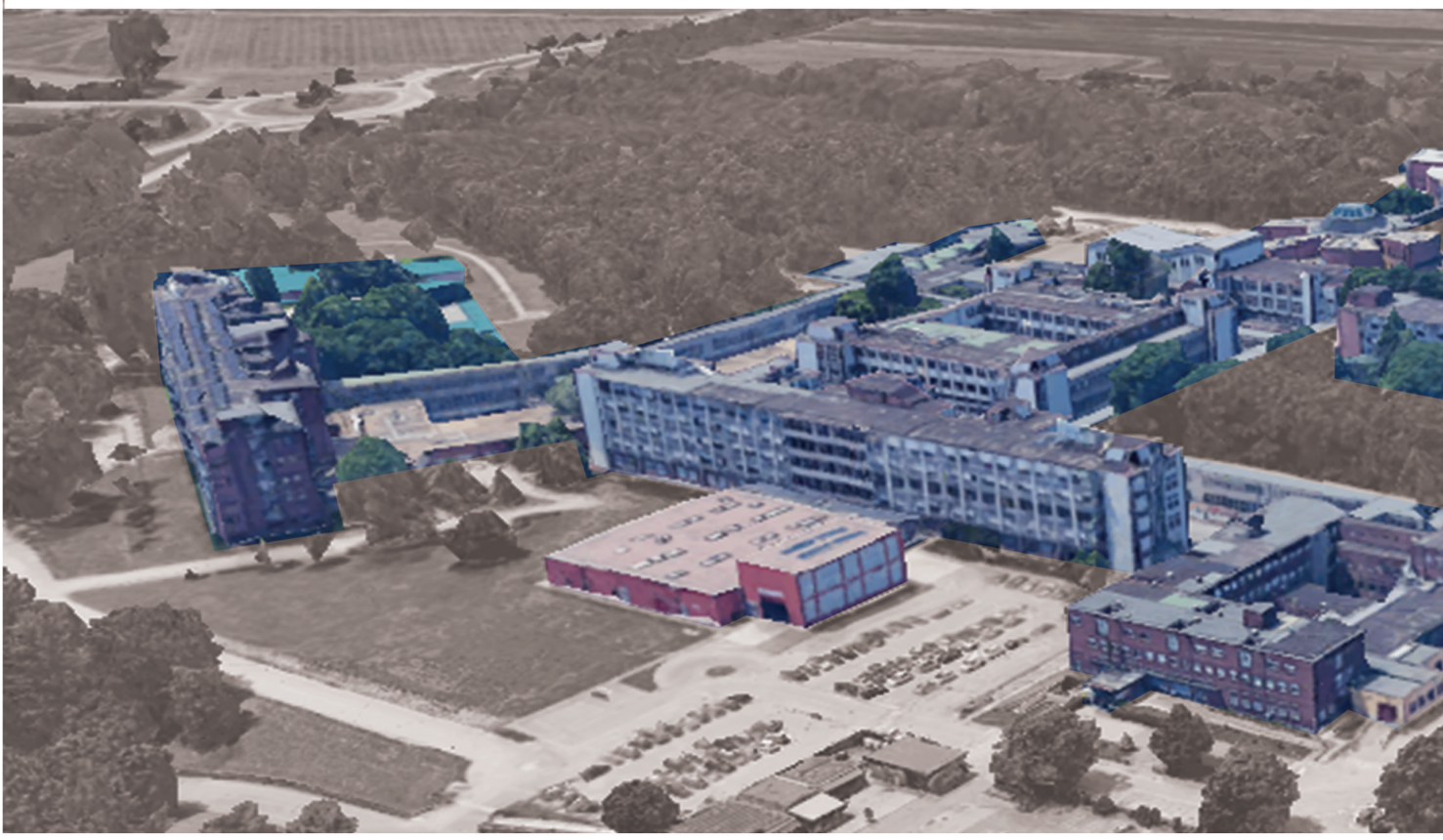
Landscape around the hospital

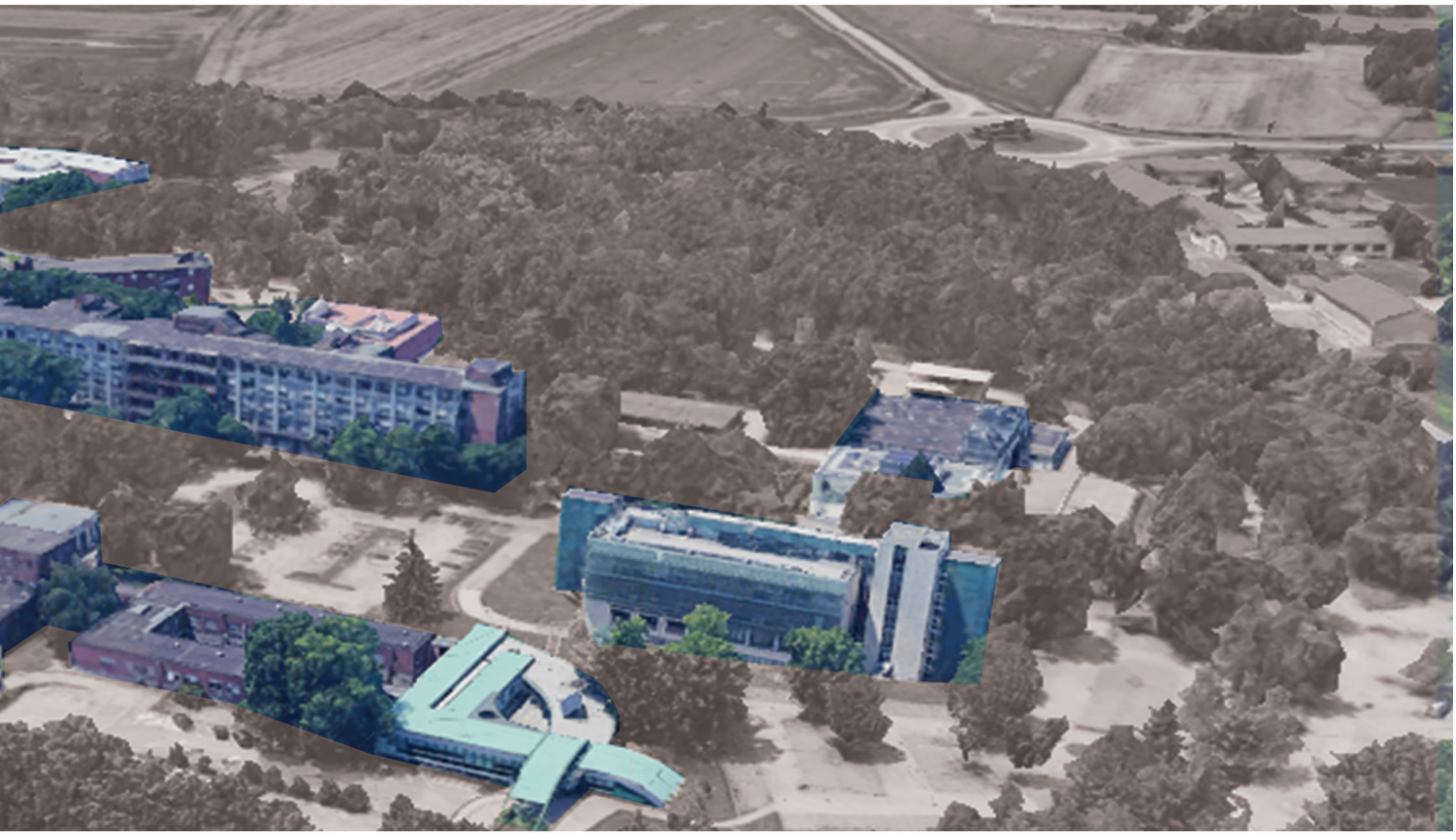

Google


40
Google


Google

Hospital's Building





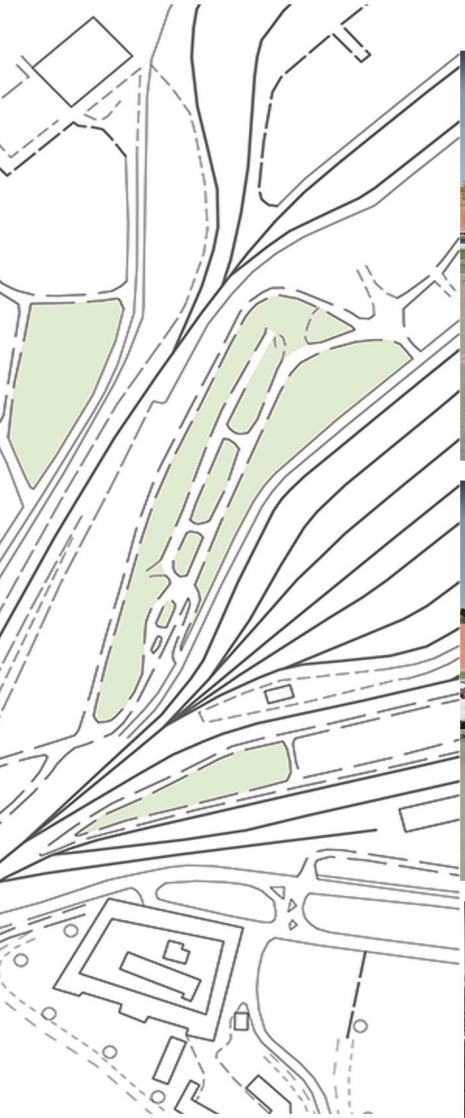

Birra Moretti
Birra Moretti

Streets around the hospital

Accessibility routes to the complex by personal car

Public transport access routes

Current status of parking spaces



PAVILION 1

P-1 TECHNICAL ROOMS
PT PSYCHIATRY/AMBULATORY OCULISTICS/PHSYCHIATRY AMBULATORY
P1 NEUROLOGY AMBULATORS/C.R.E.S.M./INTERNAL MEDICINE 1
P2 NEUROLOGIA GERIATRICS/EMERGENCY MEDICINE
P3 IMMUNOHEMATOLOGY MICROCYTHEMIA/MEDICAL LABORATORIES INTernal 2
P4 D.H. INTERNAL MEDICINE 2

PAVILION 2

P-1 TECHNICAL ROOMS
PT ANESTHESIA REANIMATION
P1 DIALYSIS / NEFROLOGY/D.H. UROLOGY/SURGERY
P2 THORACIC SURGERY/M.A.R. 5/D.H. M.A.R. 5
P3 IGENERAL SURGERY 2 / INTERMEDIATE TREATMENTS / GASTROENTEROLOGYUROLOGIA/CHIRURGIA GENERALE 1
P4 ORTHOPEDICS D.H. ONCOLOGY

PAVILION 3

P-1 TECHNICAL ROOMS
PT HEMODYNAMIC CARDIOLOGY/UTIC/ANTALGIC THERAPY
P1 SLEEPING AMBULATORS/D.H.M.A.R.1/CARDIOLOGY AMBULATORS/ AMBULATORS AND D.H/INTERNAL MEDICINE 3
P2 INTERNAL MEDICINE 3/D. H. MULTIDISCIPLINARY
P3 M.A.R. 2/PHYSICAL AND REHABILITATION MEDICINE/ D.H.PHYSICAL AND REHABILITATION MEDICINE
P4 M.A.R.1 / M.A.R. 5/CYSTIC FIBROSIS/ALLERGOLOGY/D.H. M.A.R. 1-2-5

CENTRAL AMBULERS

PT ODONTOSTOMATOLOGY AMBULERS/SURGERY

PAVILION CURE

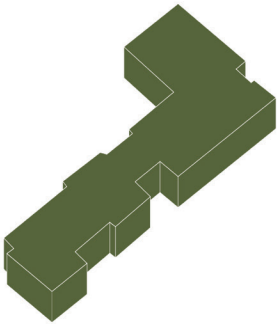
P-1 TECHNICAL ROOMS
PT DIAGNOSTIC RADIOLOGY/OPERATIVE CENTER/STERILIZATION CENTRAL
P1 NEUROLOGY AMBULATORS/C.R.E.S.M./INTERNAL MEDICINE 1
P2 ENDOSCOPIC CENTER/PHARMACY
P3 ILABORATORY ANALYSIS / PATHOLOGICAL ANATOMY

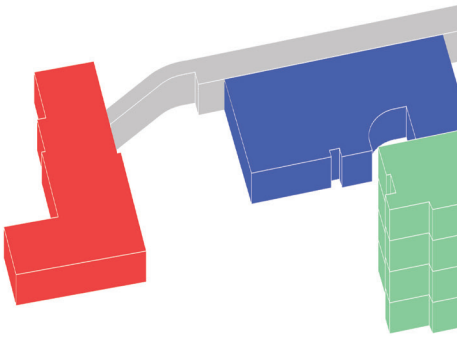
CUCINA

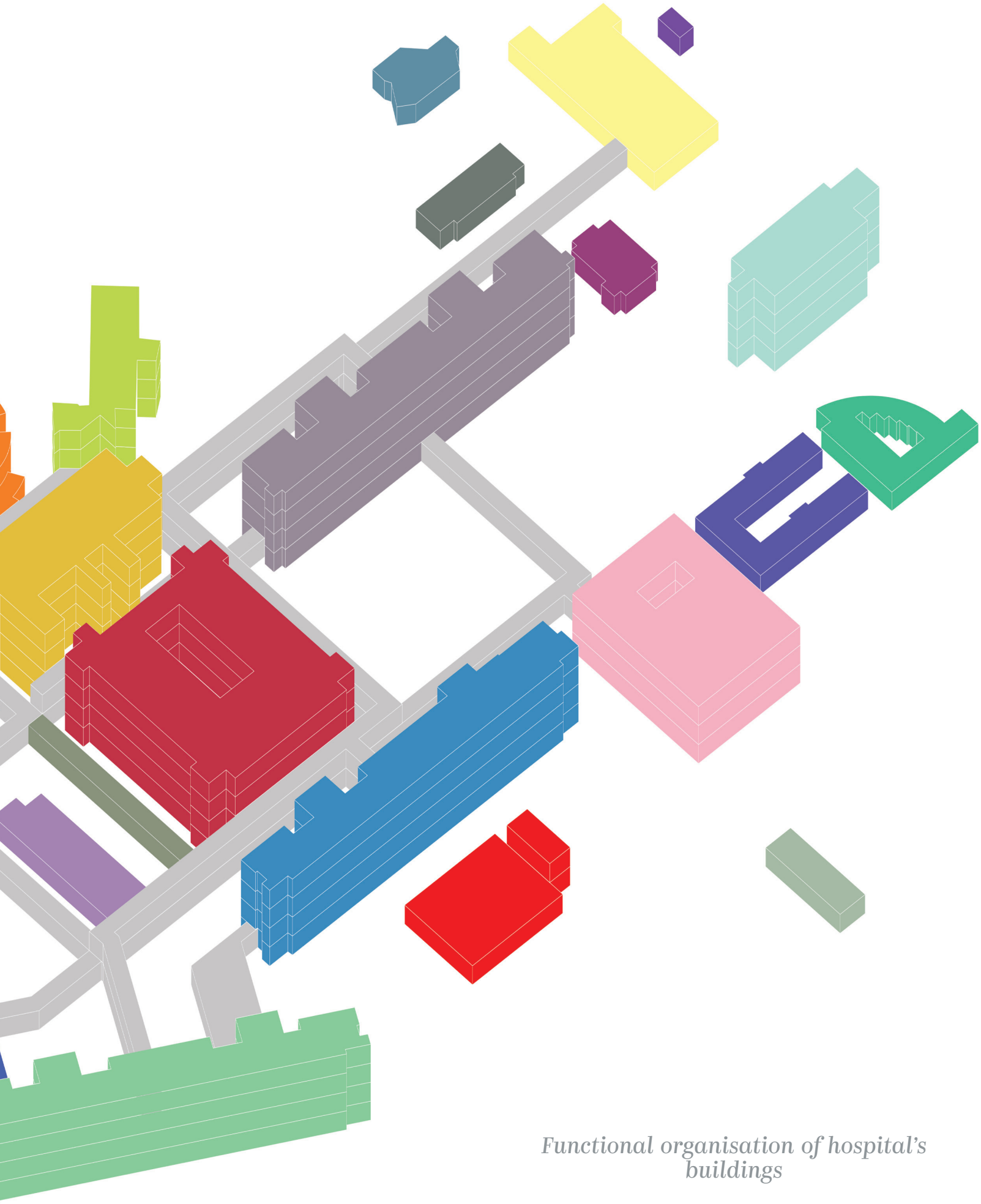
PT CUCINA
P1 CUCINA

OFFICE BUILDING

P-2 TECHNICAL ROOMS
P-1 ARCHIVES / WITHDRAWAL CENTER
PT CONTACT CENTER/C.U.P./D.E.A./RECEPTION
P1 OFFICES
P2 OFFICES







Functional organisation of hospital's buildings

THERMAL CENTER

CHURCH / CONFERENCE ROOM

PT CHURCH / CONFERENCE ROOM
MIXED FLOOR UNIVERSITY SECRETARY
P1 BUSINESS TRAINING CENTER
P2 UNIVERSITY CHAIRMAN

PREVENTIVE MEDICINE / LIBRARY

P-1 PATHOLOGICAL ANATOMY DEPOSIT
PT LIBRARY

PHARMACY STORAGE

P-1 PHARMACY STORAGE/
TECHNOLOGICAL CENTERS

RADIOTHERAPY

HOSPICE

EMERGENCY BUILDING

MORGUE PAVILION

ANTIDOPING REGIONAL CENTER

GARAGE

ANIMAL HOUSE

INTRAMOENIA

NEWSSTAND/FLOWER SHOP/CAF

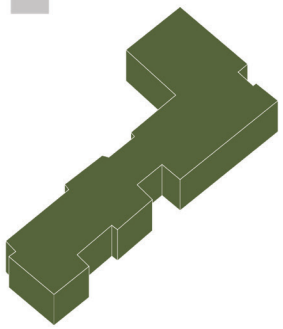
FIRE-FIGHTING CENTRAL

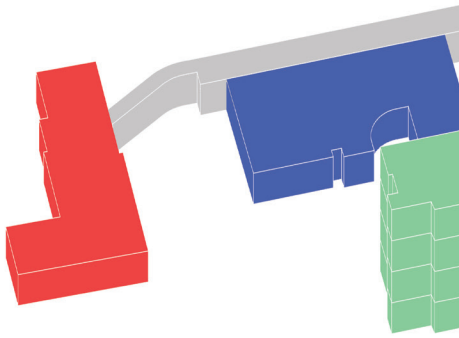
UNIVERSITY CLINICAL BIOLOGY

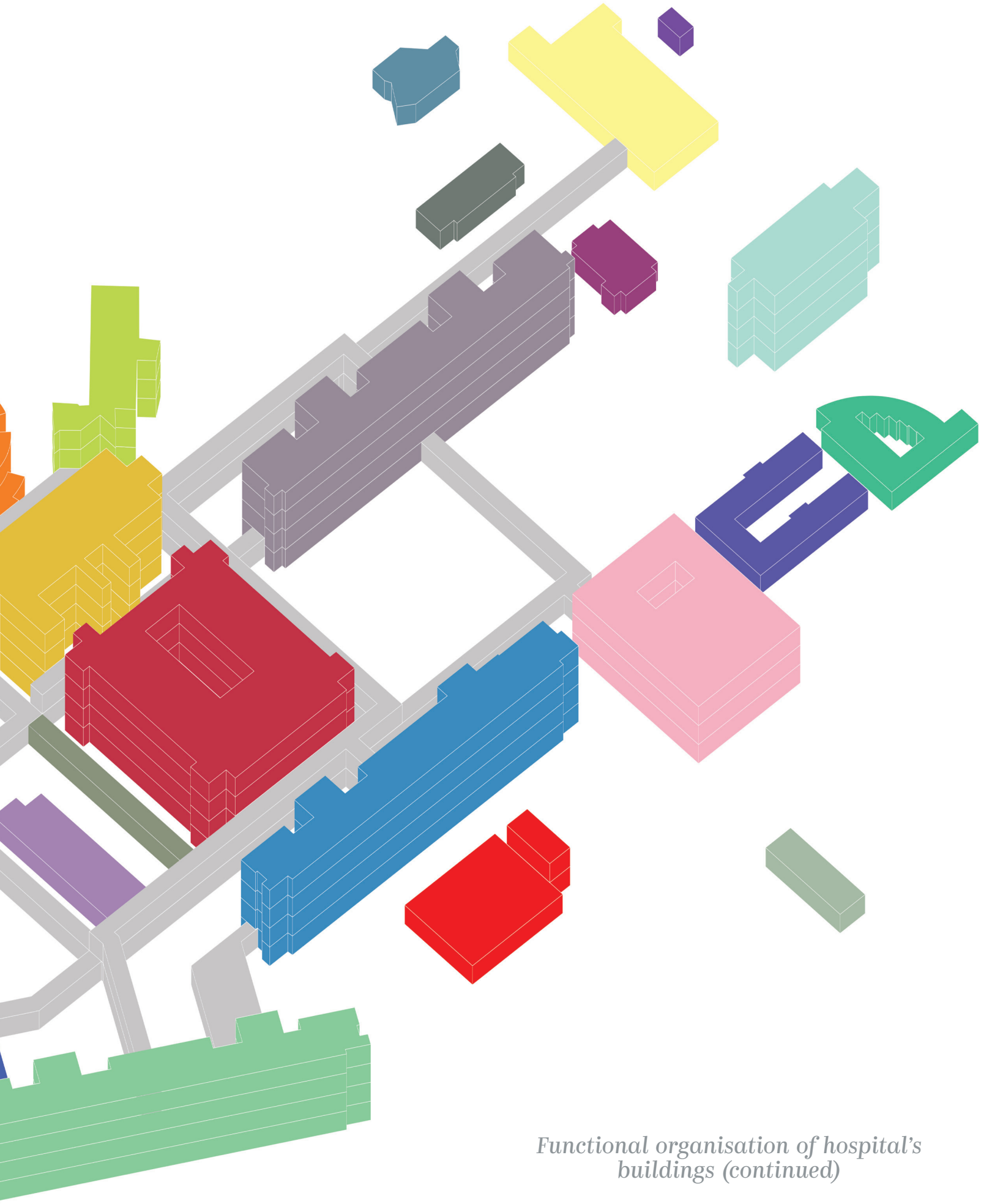
UNIVERSITY CLASSROOMS

NICO,NEUROSIENCE INSTITUTE CAVALERI OTTOLENGHI

CORRIDORS







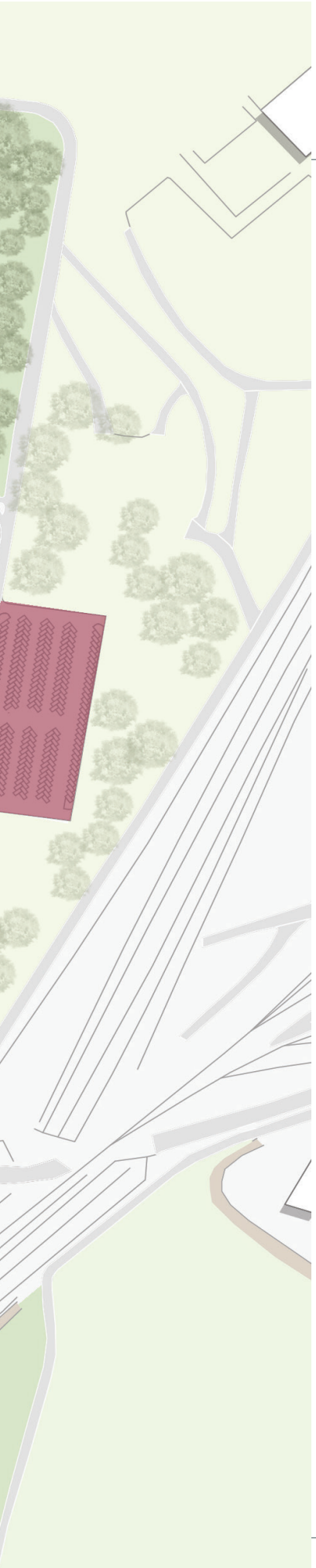
Functional organisation of hospital's buildings (continued)

Parking Areas


N.

We considered new spaces close to the entry of hospital for parking areas associated to visitors and patients. These areas include a vertical parking and an extension to the current parking space. There is also a monorail station with direct access to the inside area of hospital between two areas.

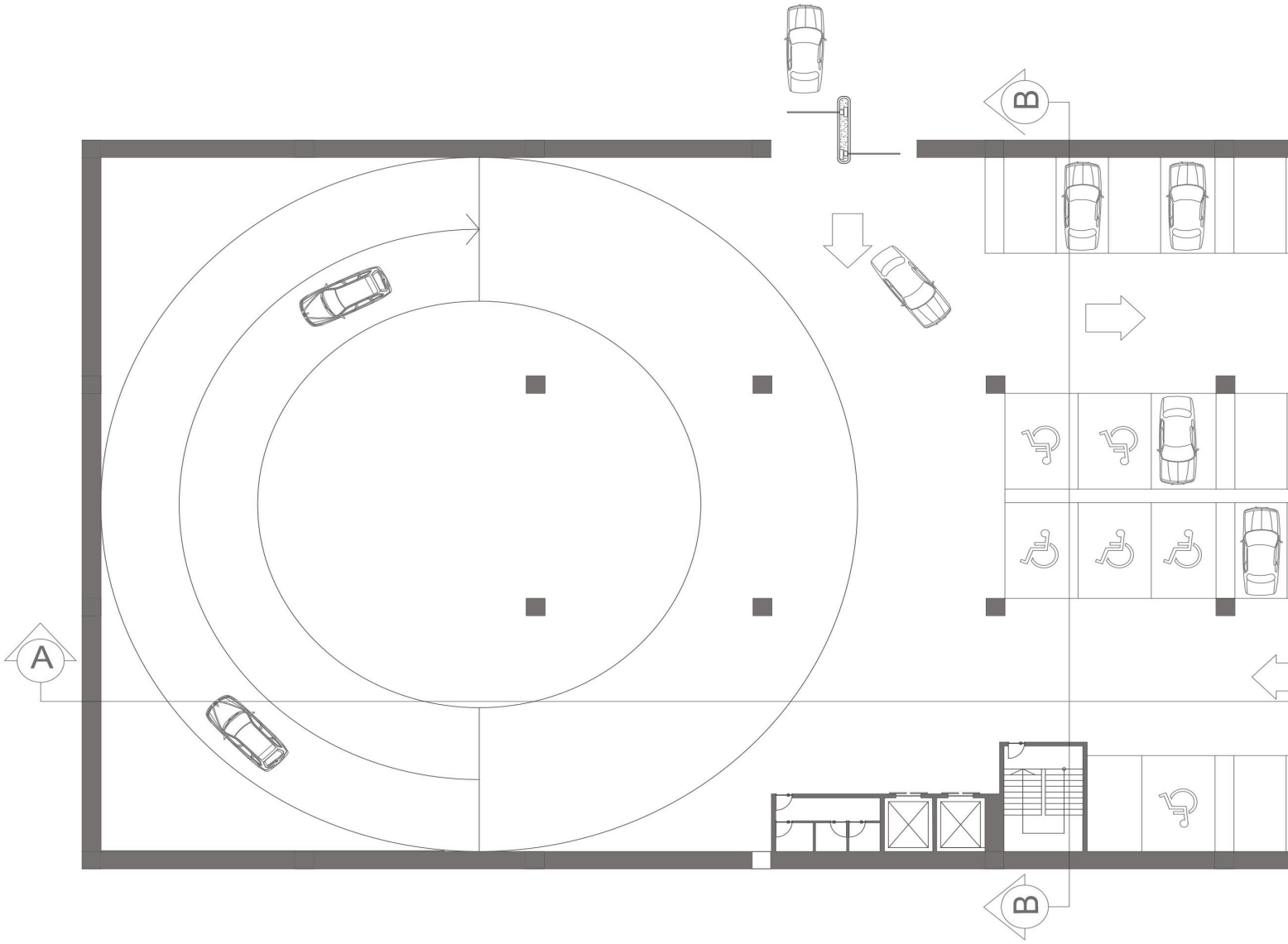

N.



Current parking spaces are 550 spots for patients and visitors while, after design, this situation improved to 1416 spots for patients and around 478for the staffs.

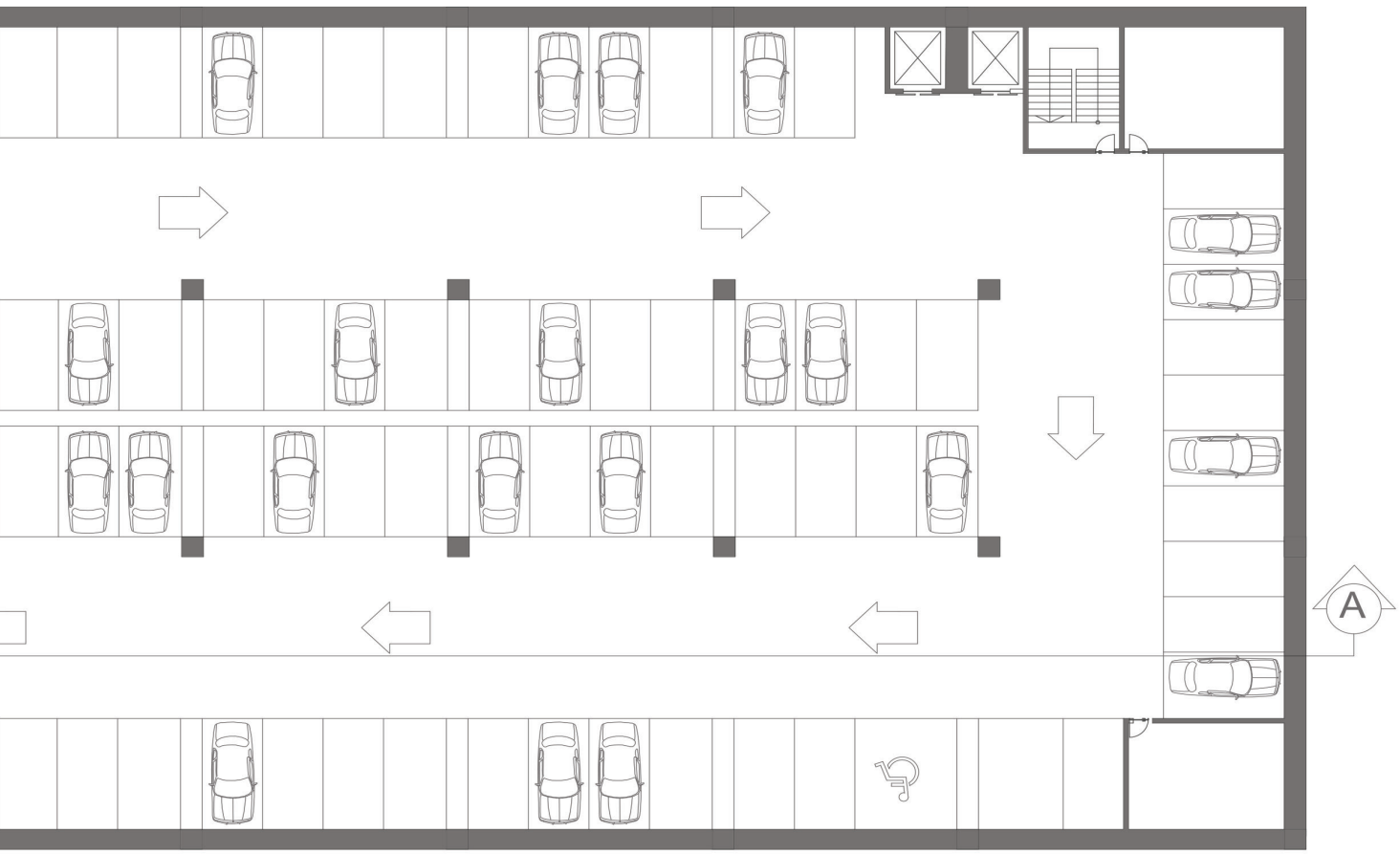
Public Parking Spaces

Staff Parking Spaces



Vartical parking scale: 1:200

The vertical parking has a total capacity of 340 spots which provides 85 lots on per floor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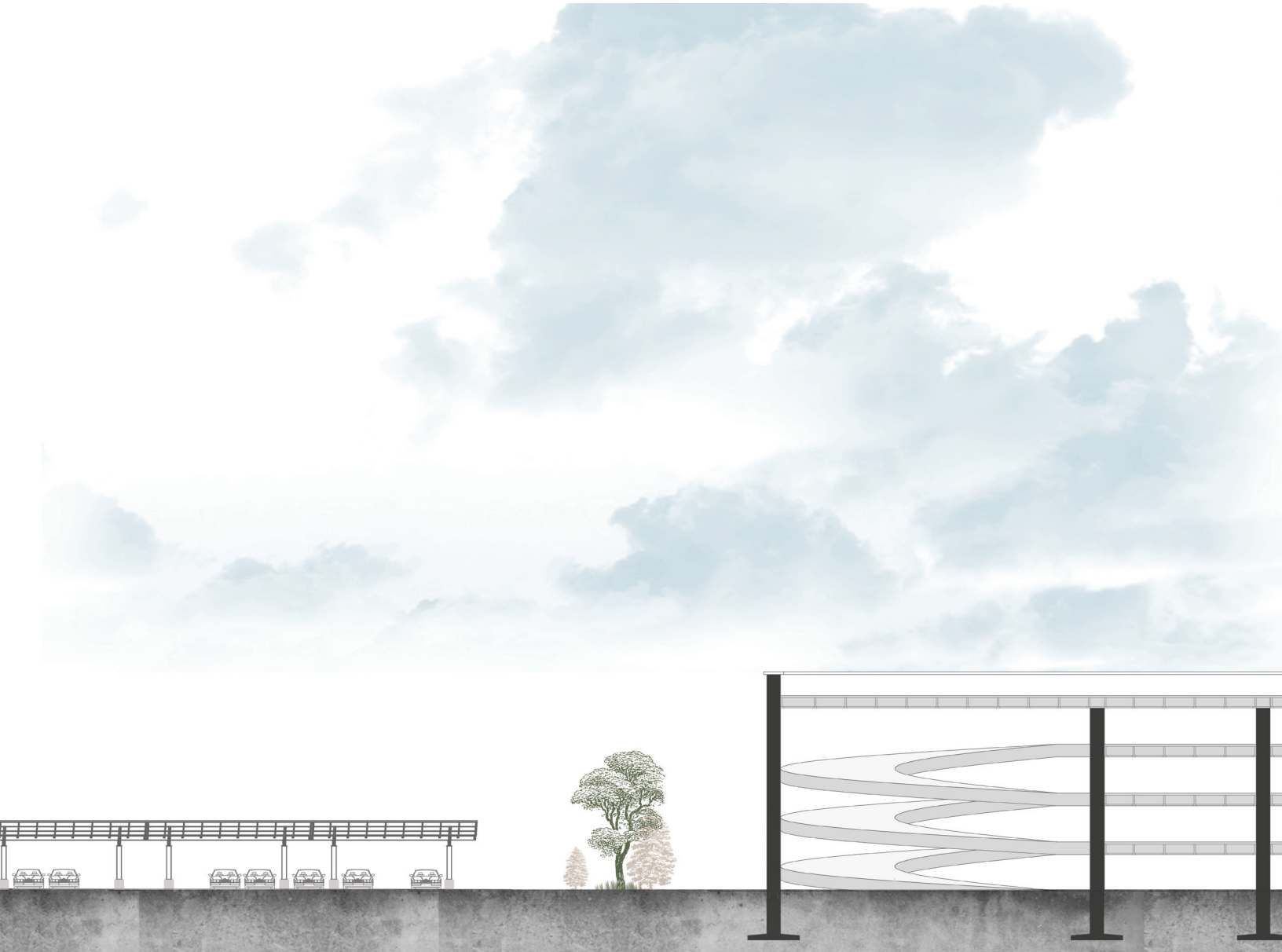
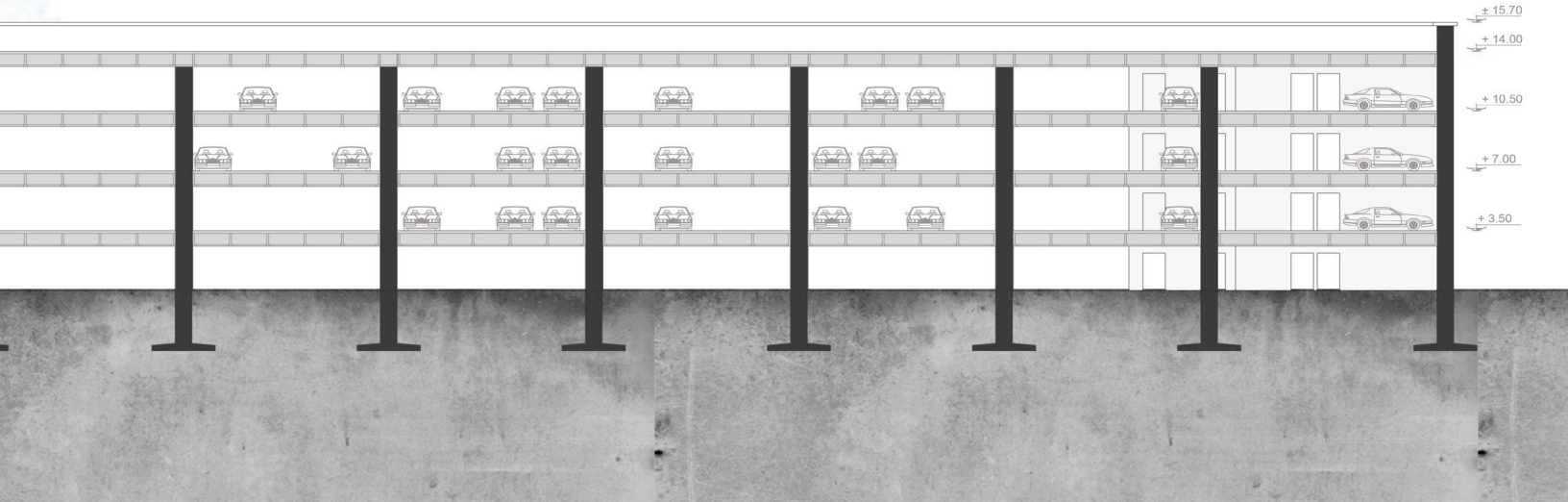
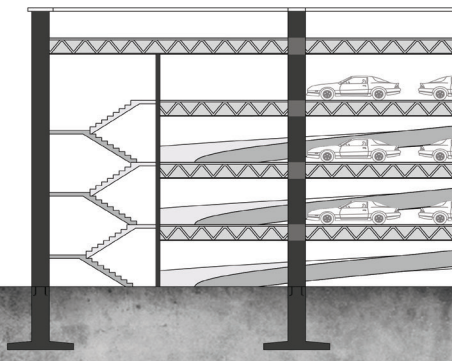


Section A-A Scale: 1:200

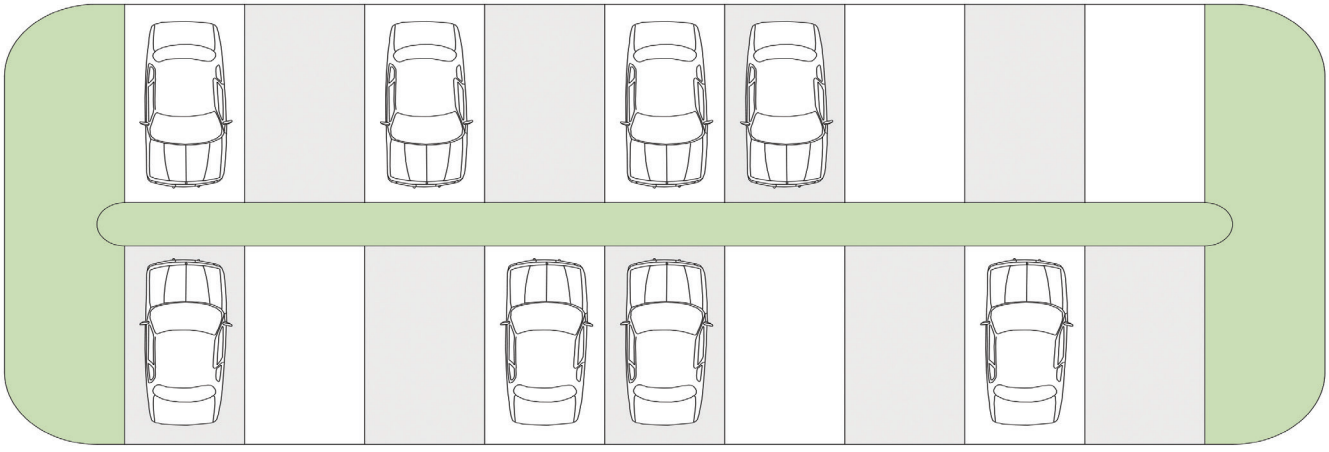

± 15.70
+ 14.00
+ 10.50
+ 7.00
+ 3.50



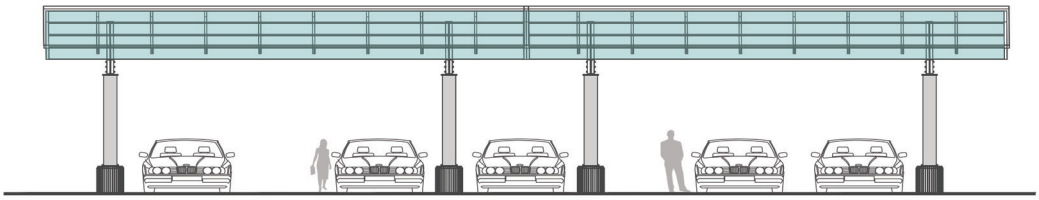
Section B-B Scale: 1:200


± 15.70
+ 14.00
+ 10.50
+ 7.00
+ 3.50

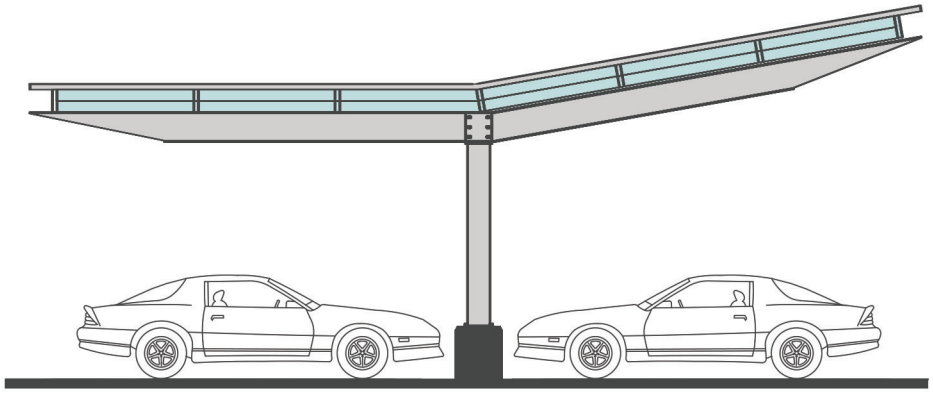
We considered the sustainability as a part of our design. To do this, we have foreseen the application of solar panels in the roofed parking lots. The energy produced by this setting can be reused for internal consumptions of the associated areas.



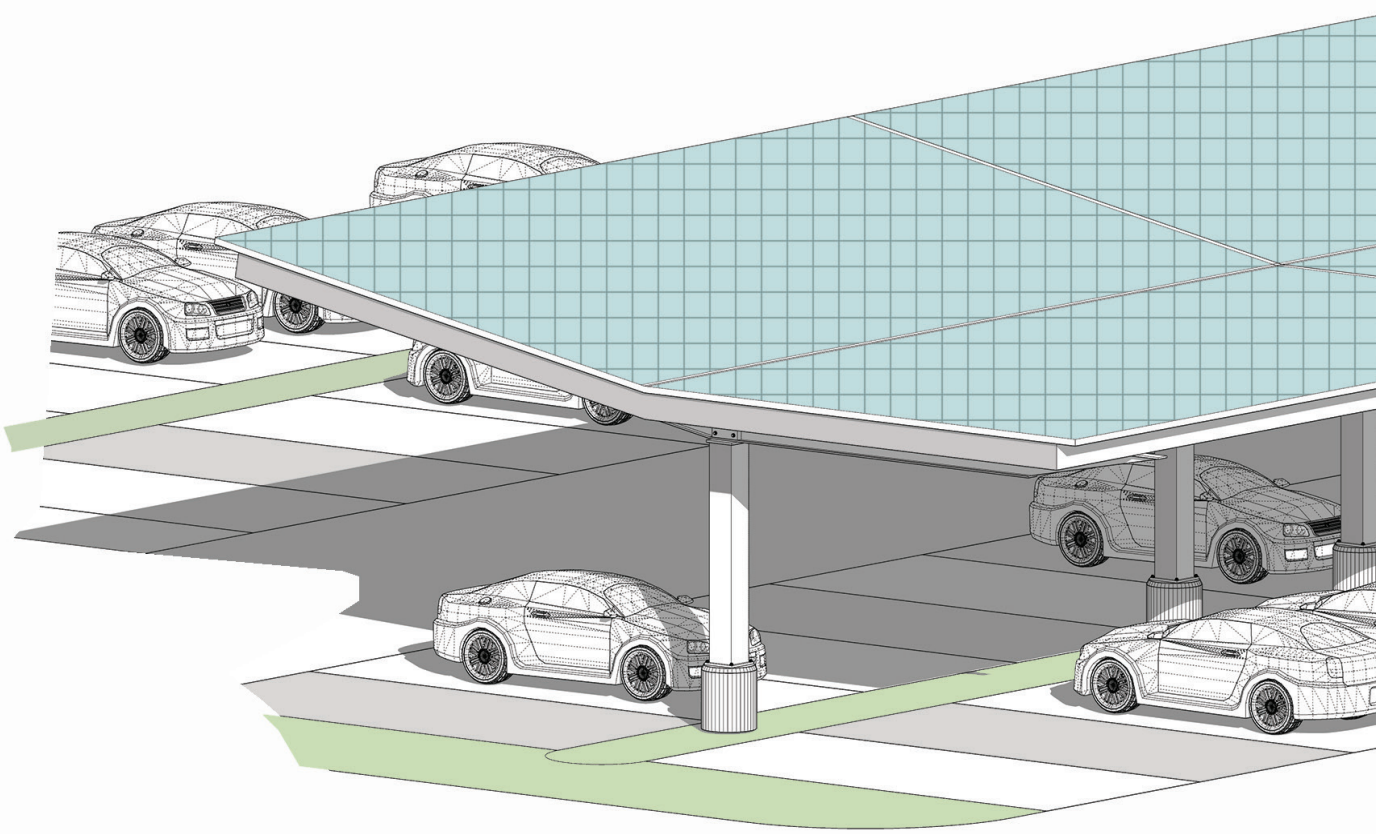
Parking space plan scale: 1:100

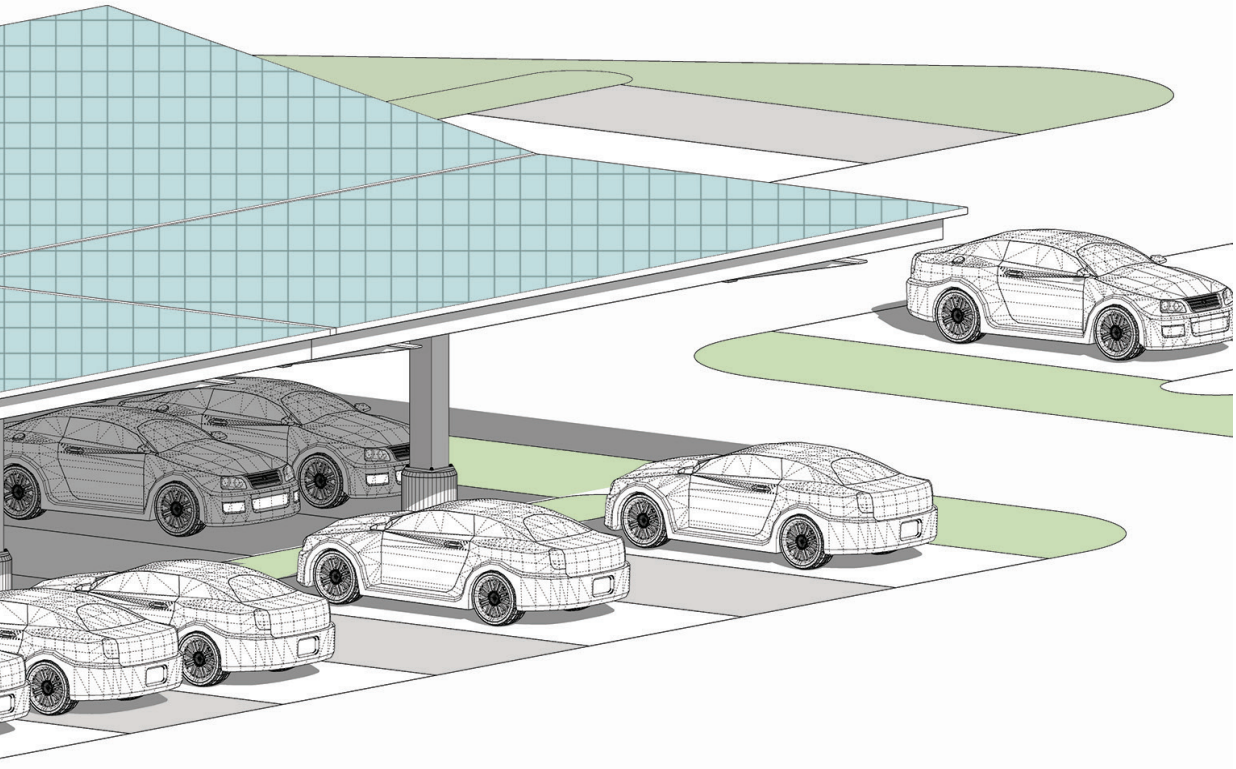


Longitudinal section scale: 1:100



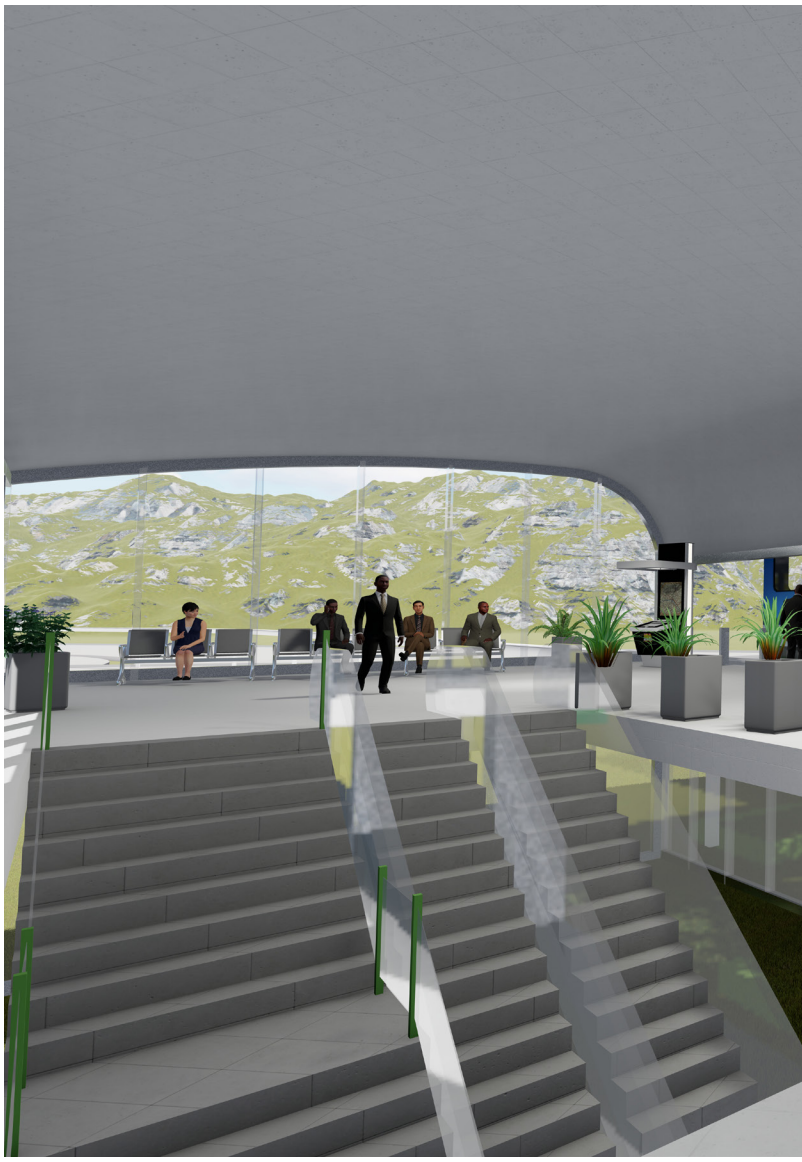
Transverse section scale: 1:100





Parking Space with Solar Pannels

Automated People Mover (APM)



In this part, the design of an Automated People Mover (APM) and its stations is discussed. The purpose of this device is to facilitate the access and mobility inside the hospital. In addition, the potential generated by the APM can motivate visitors to use other parking spaces, lowering the load of hospital's main entrance.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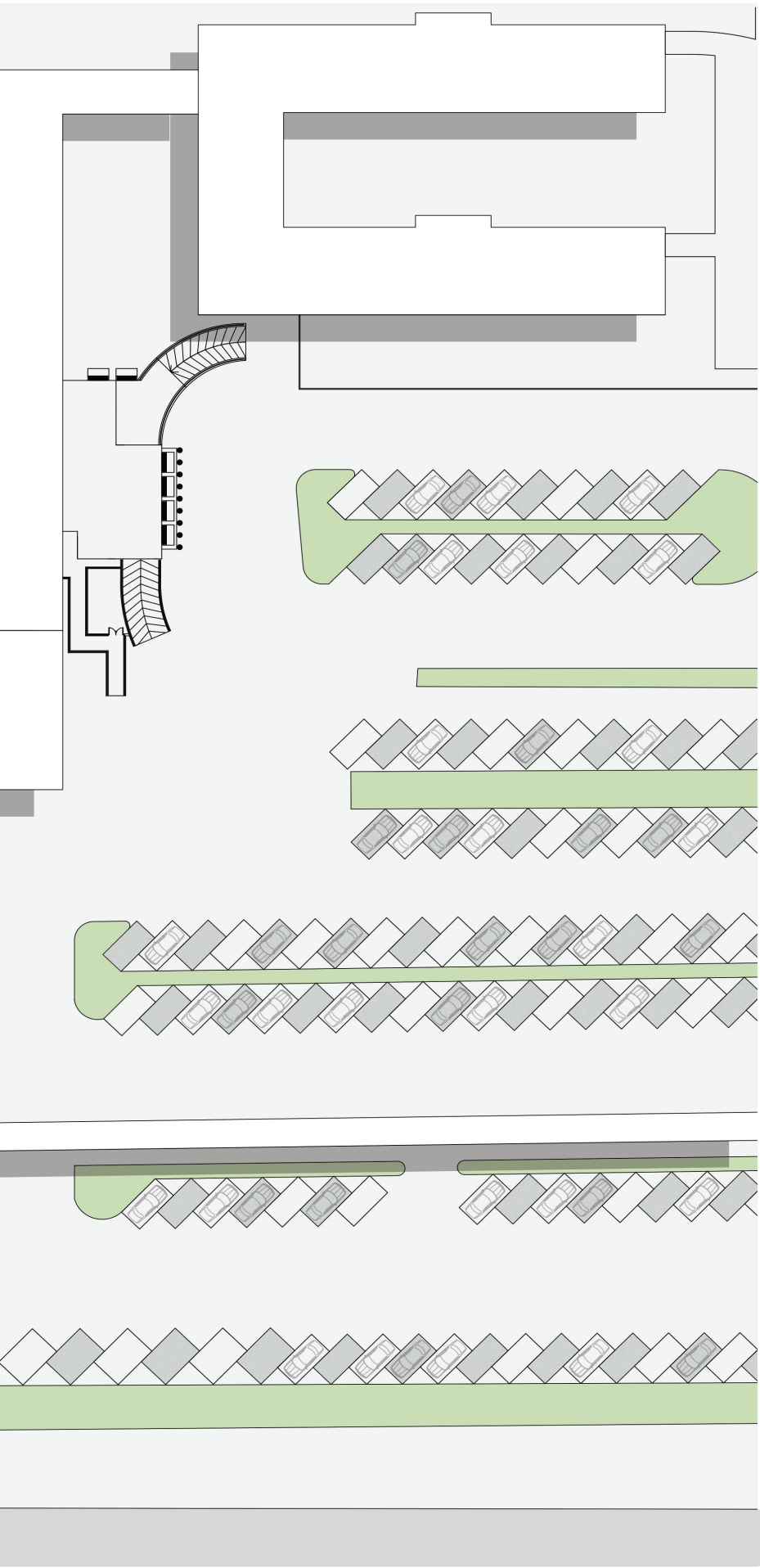


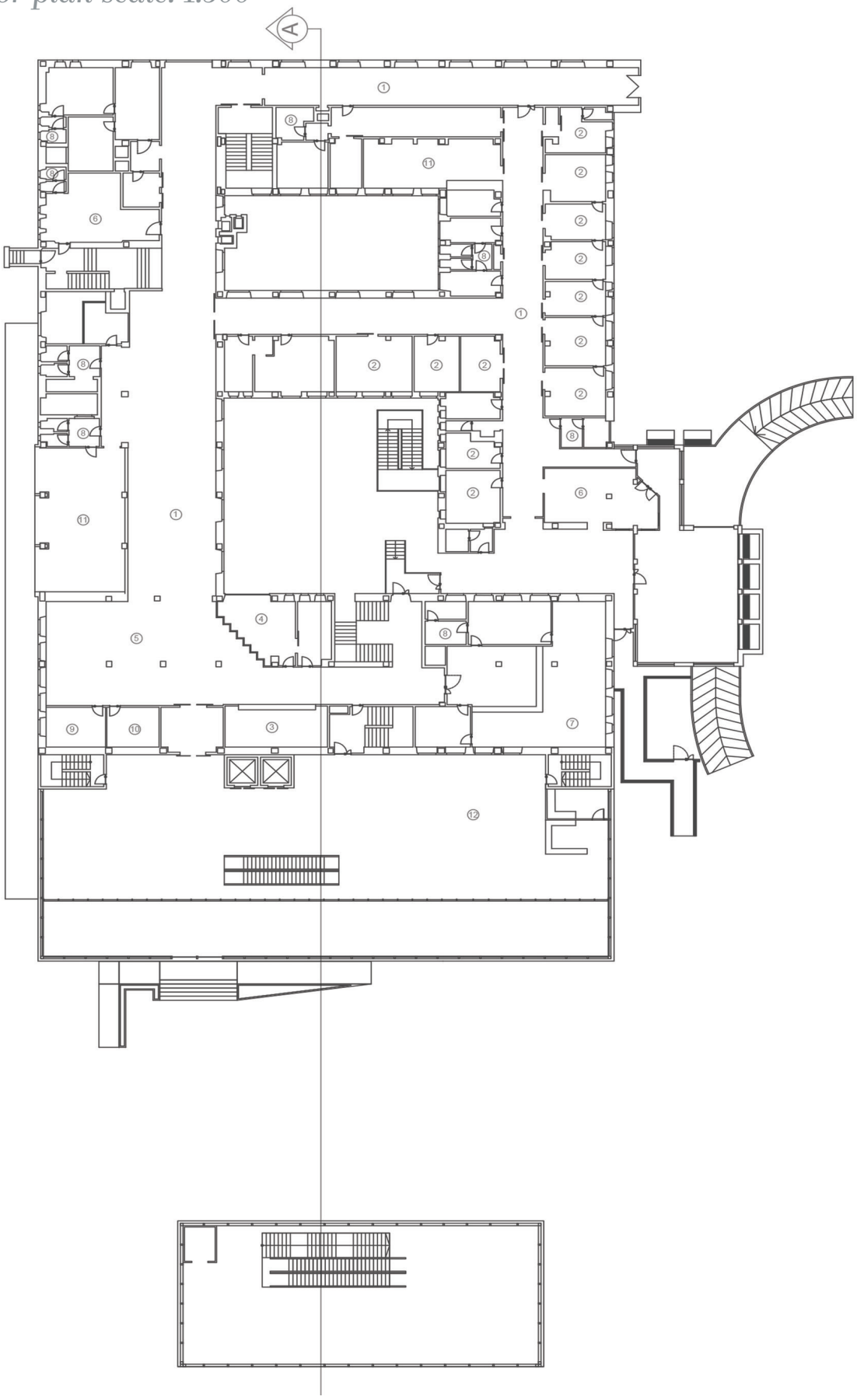
In the plan, one of the APM stations has a direct access to the first floor of Hospital's building. The interconnected point at the hospital is a new (extended) section which is added to the main office building.

This section is a light full building with these settings: ground floor, containing an entry point and also a coffeeshop; first floor includes waiting area for patients and visitors; and the second floor is intended for the staff by implementing meeting rooms and areas for relaxation and rest. As the lowering of level of stress in the hospital complexes was an objective of this project, by allocating such places for the staff we can imply this goal for them too.

Finally, we changed the functionality of the office building into an ambulatory unit to provide a better service to the patients. This is more effective if the facilitated access to this part by monorail is also considered.

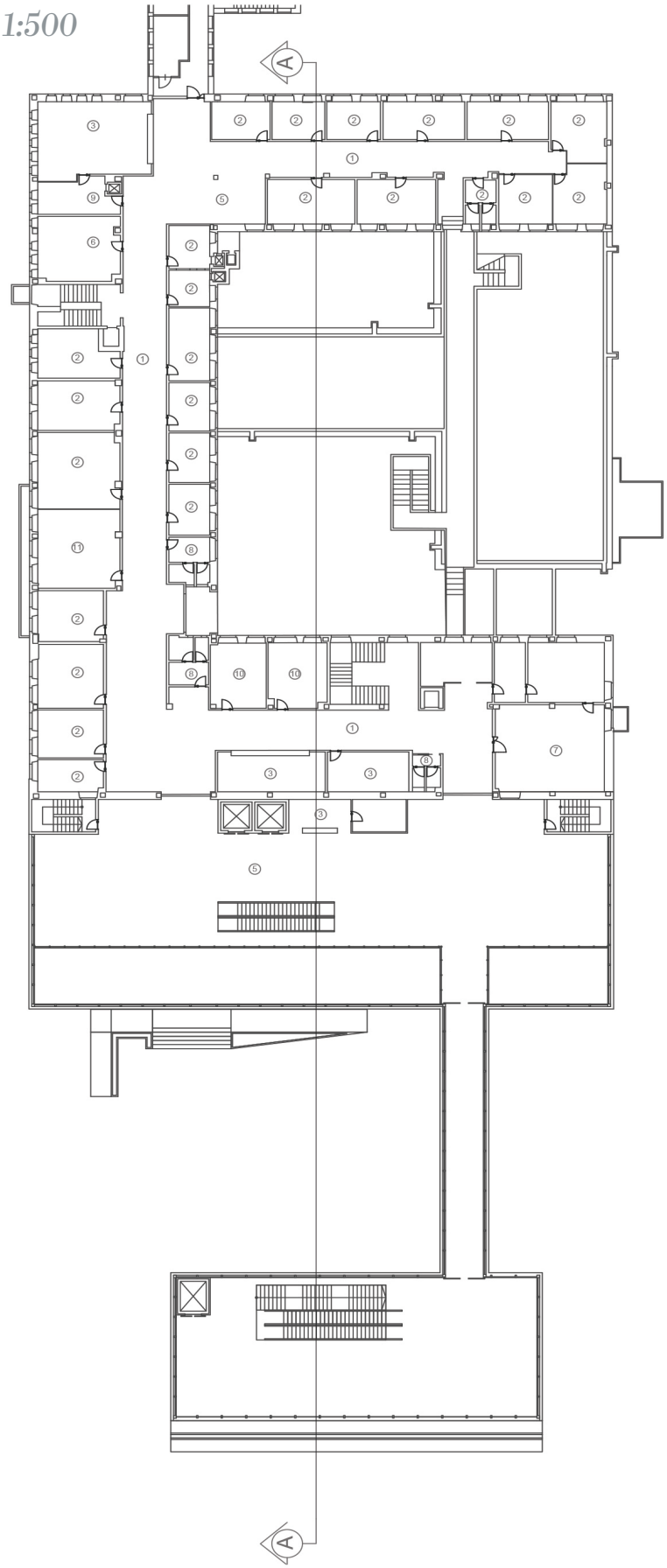
Site plan of the APM: 1:500

Ground floor plan scale: 1:500



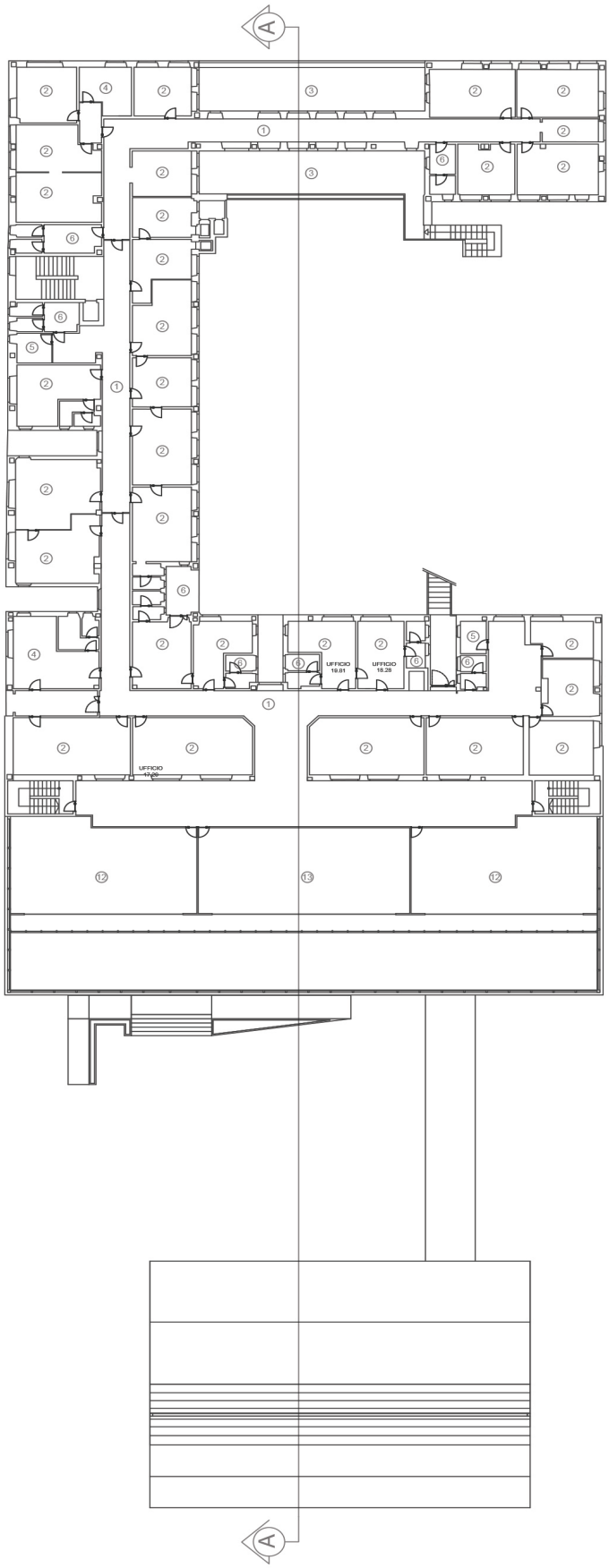
① COORIDOR
② PATIENT ROOM
③ NURSE STATION
④ RECEPTION DESK
⑤ WAITING AREA
⑥ OFFICE
⑦ PHARMACY
⑧ TOILET
⑨ ASSISTANCE
⑩ DATA CENTER
⑪ INJECTION
⑫ COFFEE SHOP

First floor plan scale: 1:500

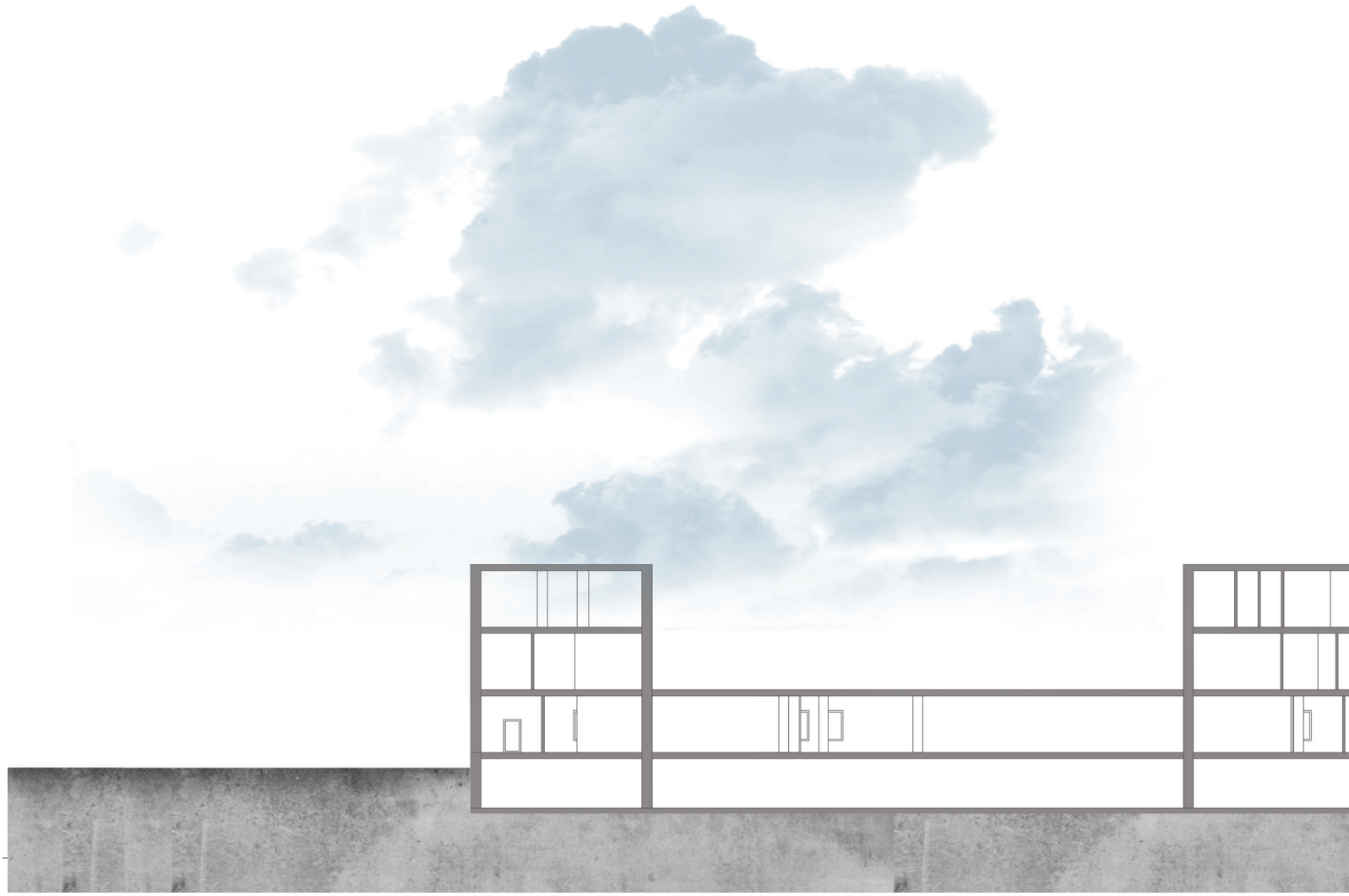


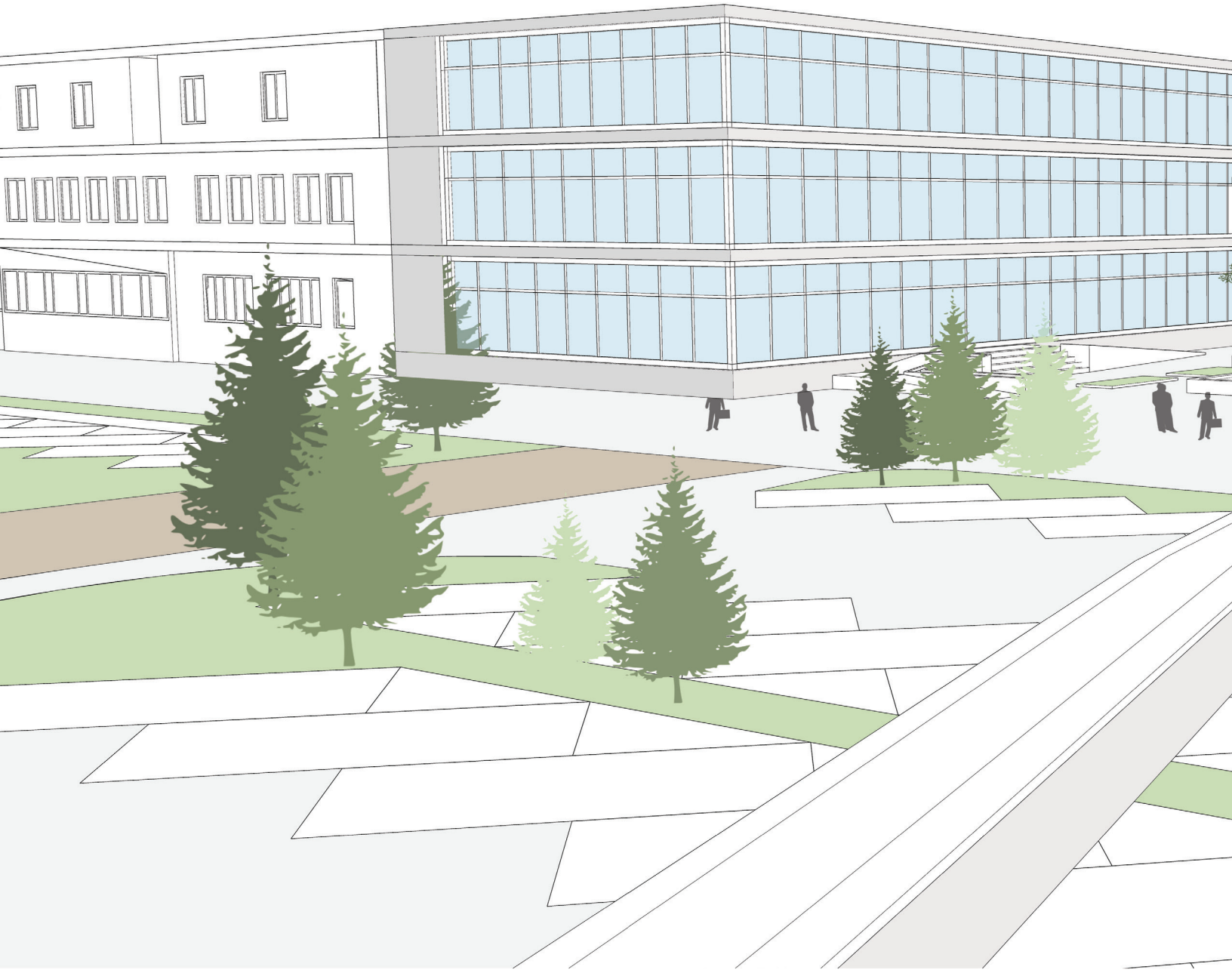
① COORIDOR
② PATIENT ROOM
③ NURSE STATION
④ RECEPTION DESK
⑤ WAITING AREA
⑥ OFFICE
⑦ PHARMACY
⑧ TOILET
⑨ ASSISTANCE
⑩ DATA CENTER
⑪ INJECTION
⑫ COFFEE SHOP

Second floor plan scale: 1:500

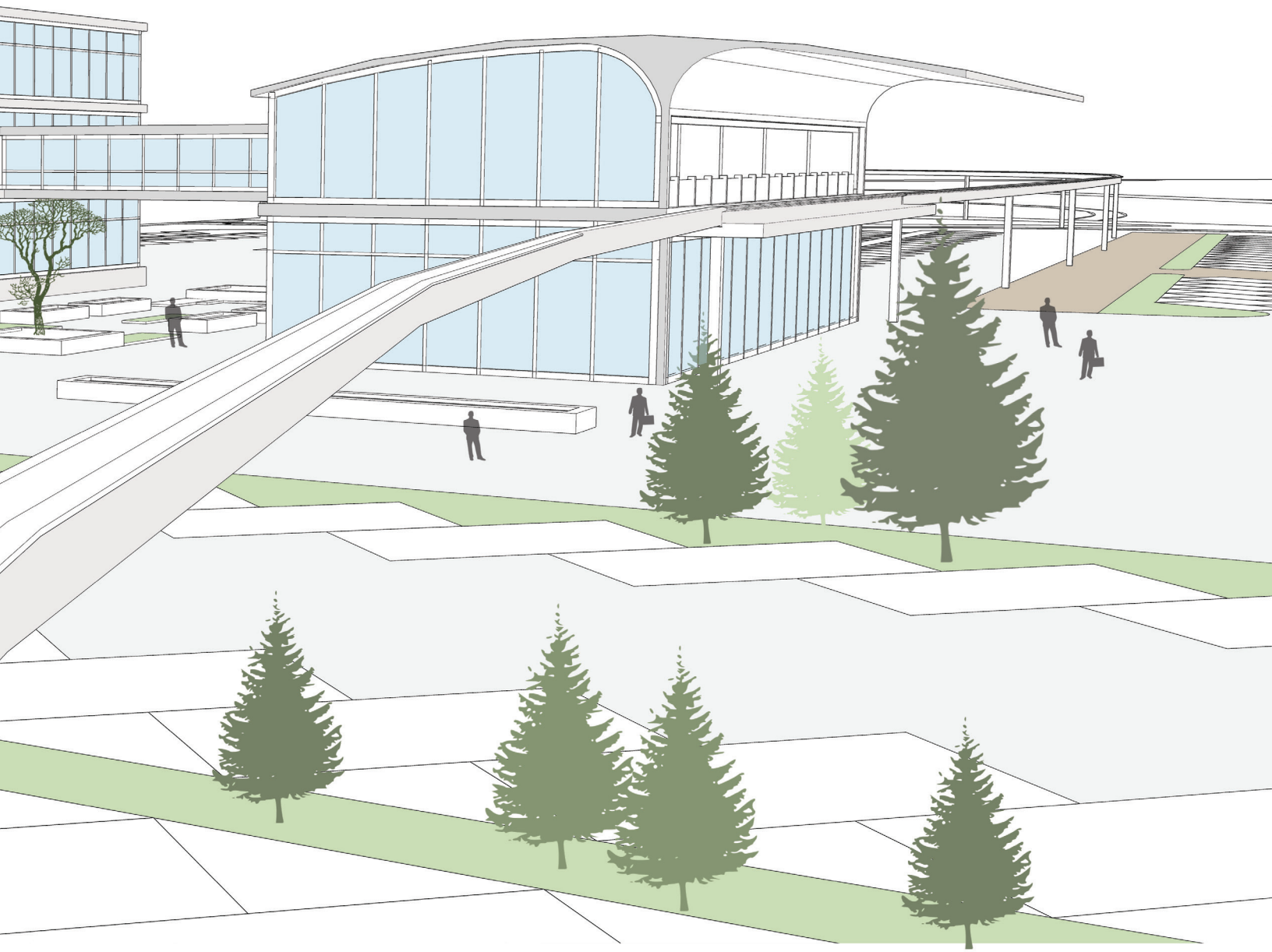


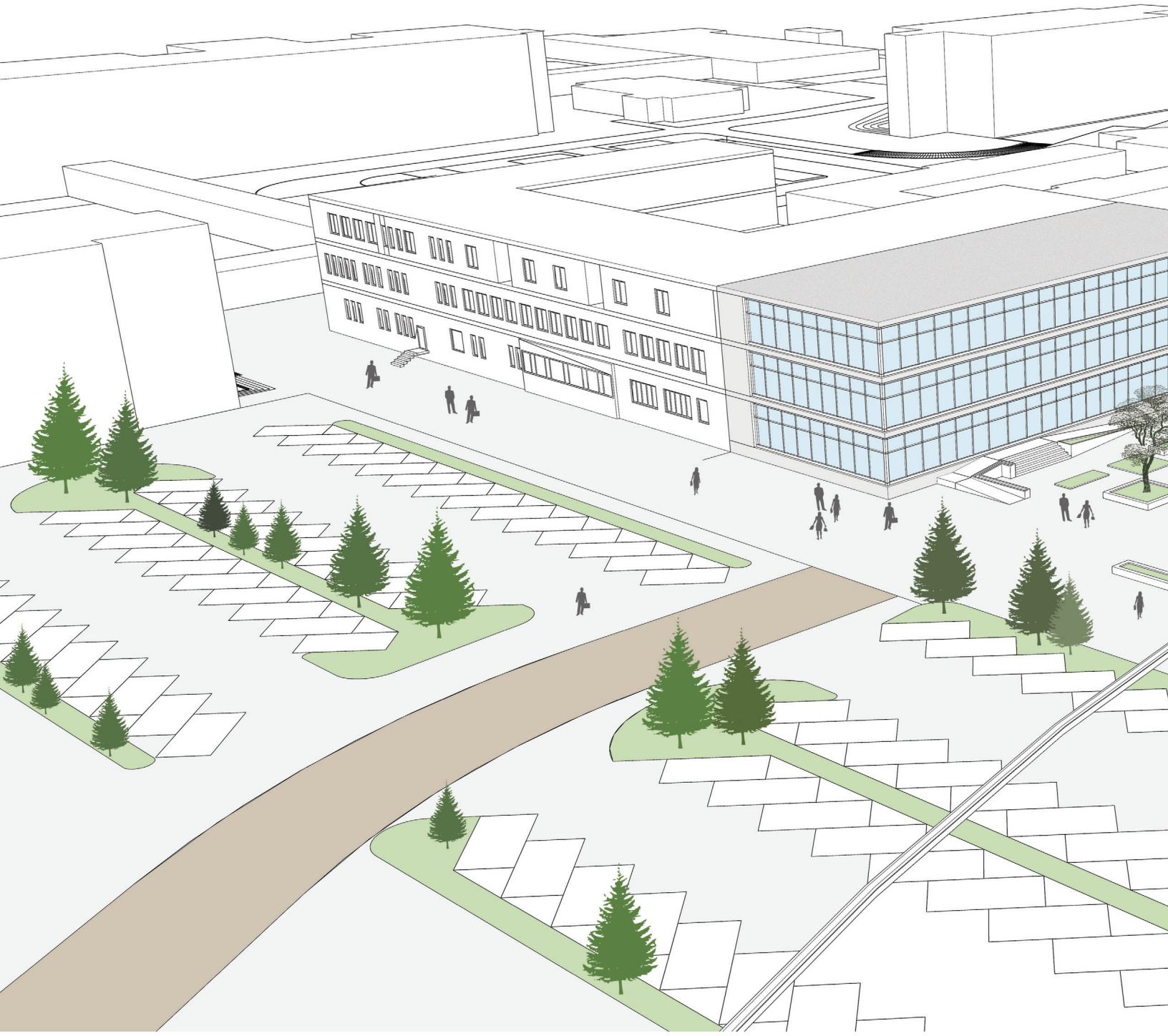
① COORIDOR
② OFFICE
③ TERRACE
④ SECRETERIATE
⑤ ARCHIVE
⑥ TOILET
⑦ PHARMACY
⑧ TOILET
⑨ ASSISTANCE
⑩ DATA CENTER
⑪ INJECTION



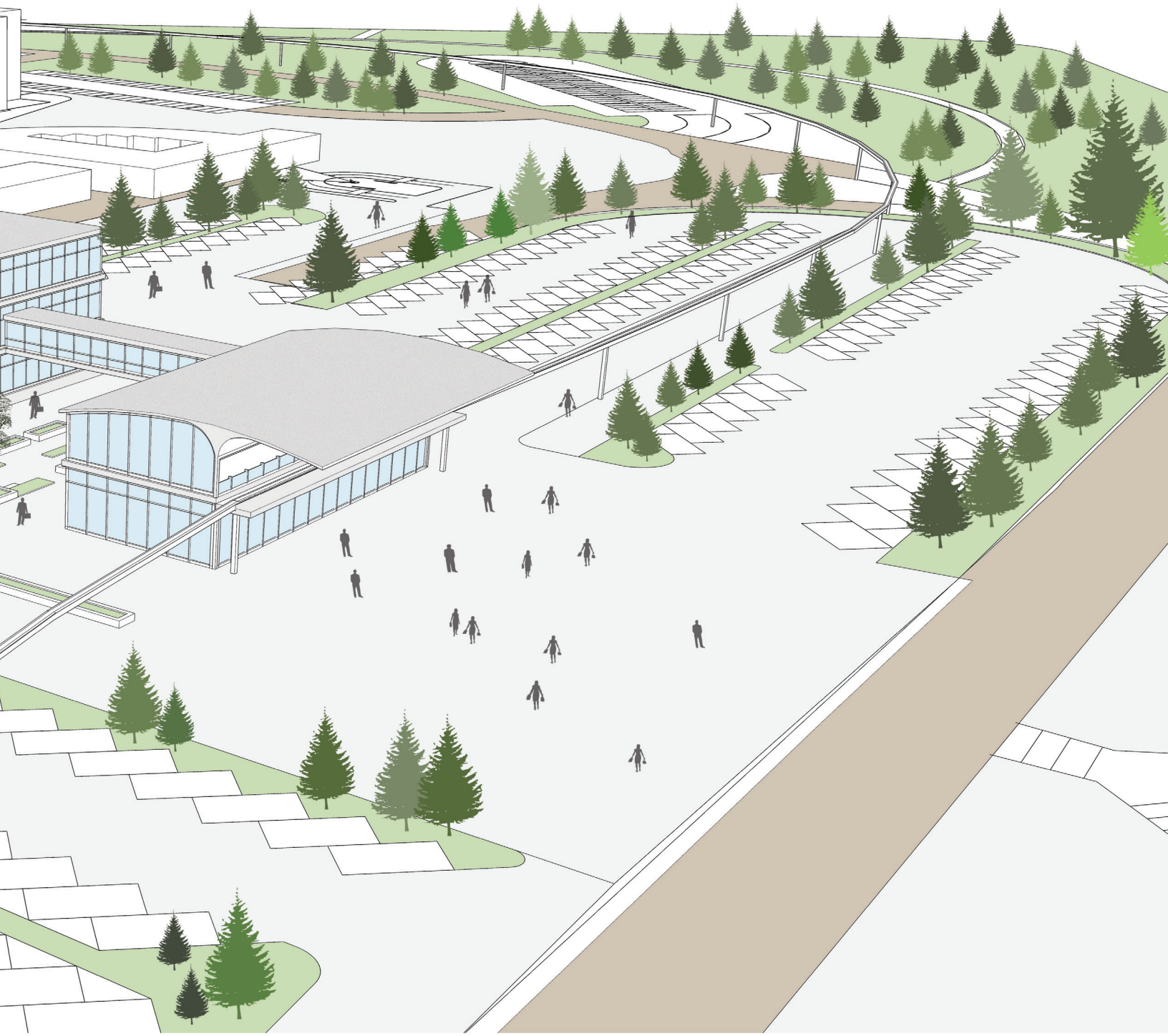


3D view of monorail station

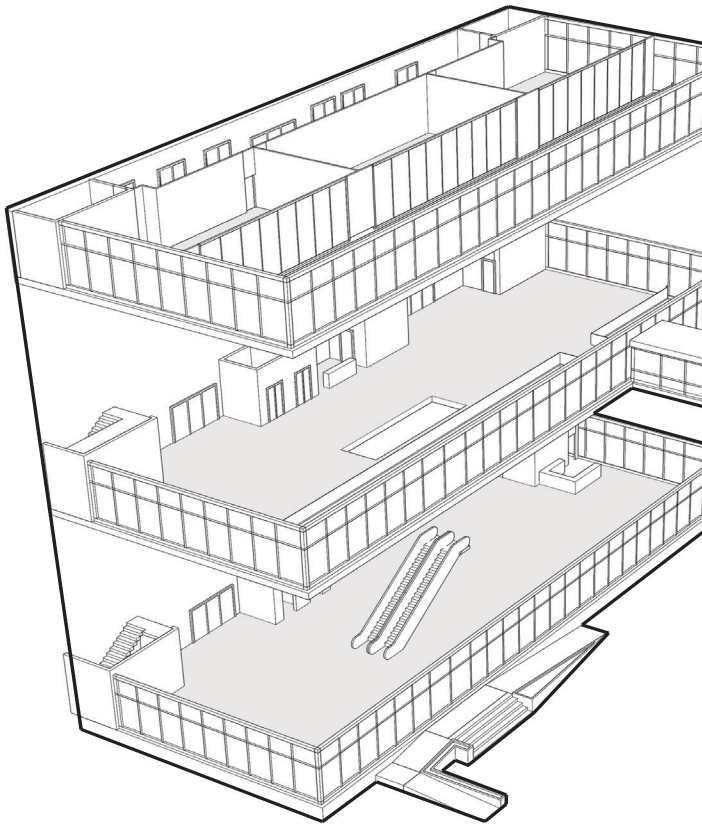




3D view of monorail station and new building connection



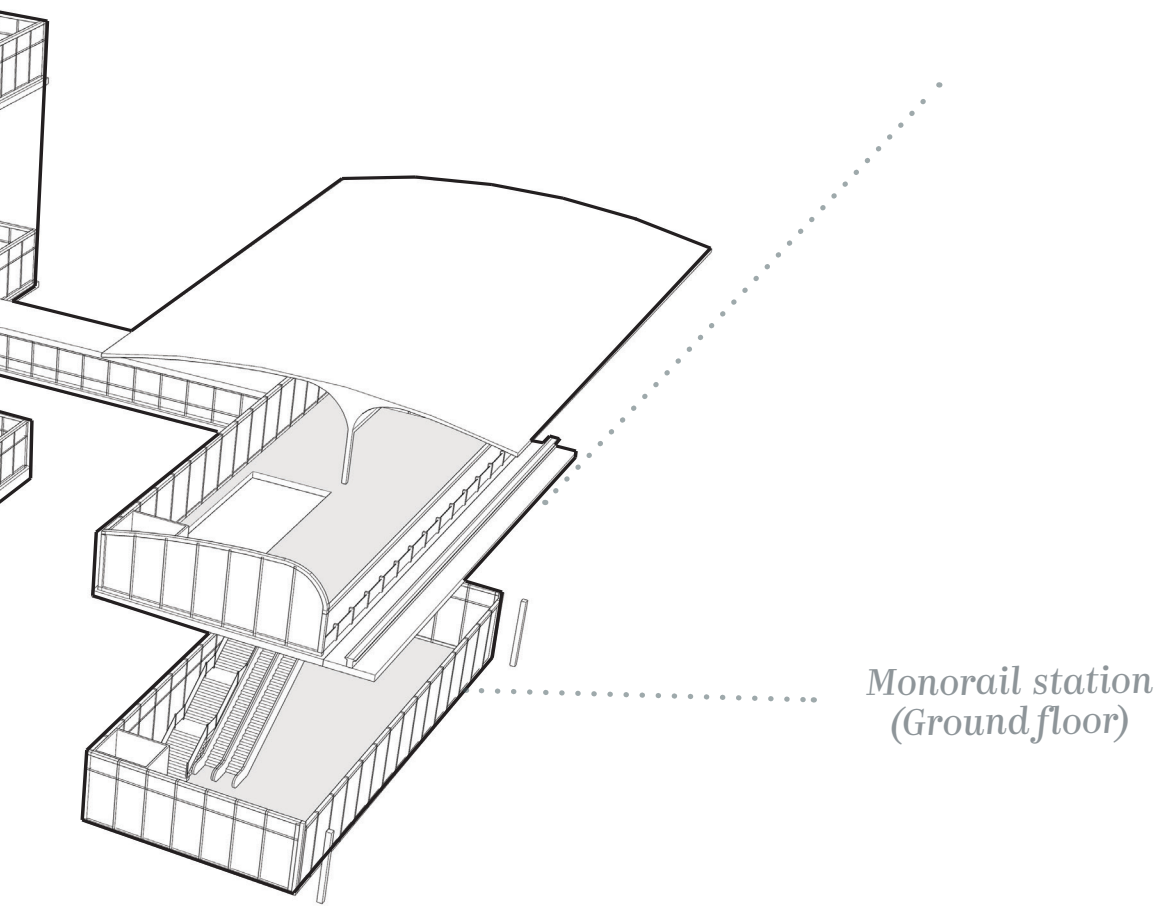
Staff's meeting room and relaxation



Waiting Area

Coffeeshop

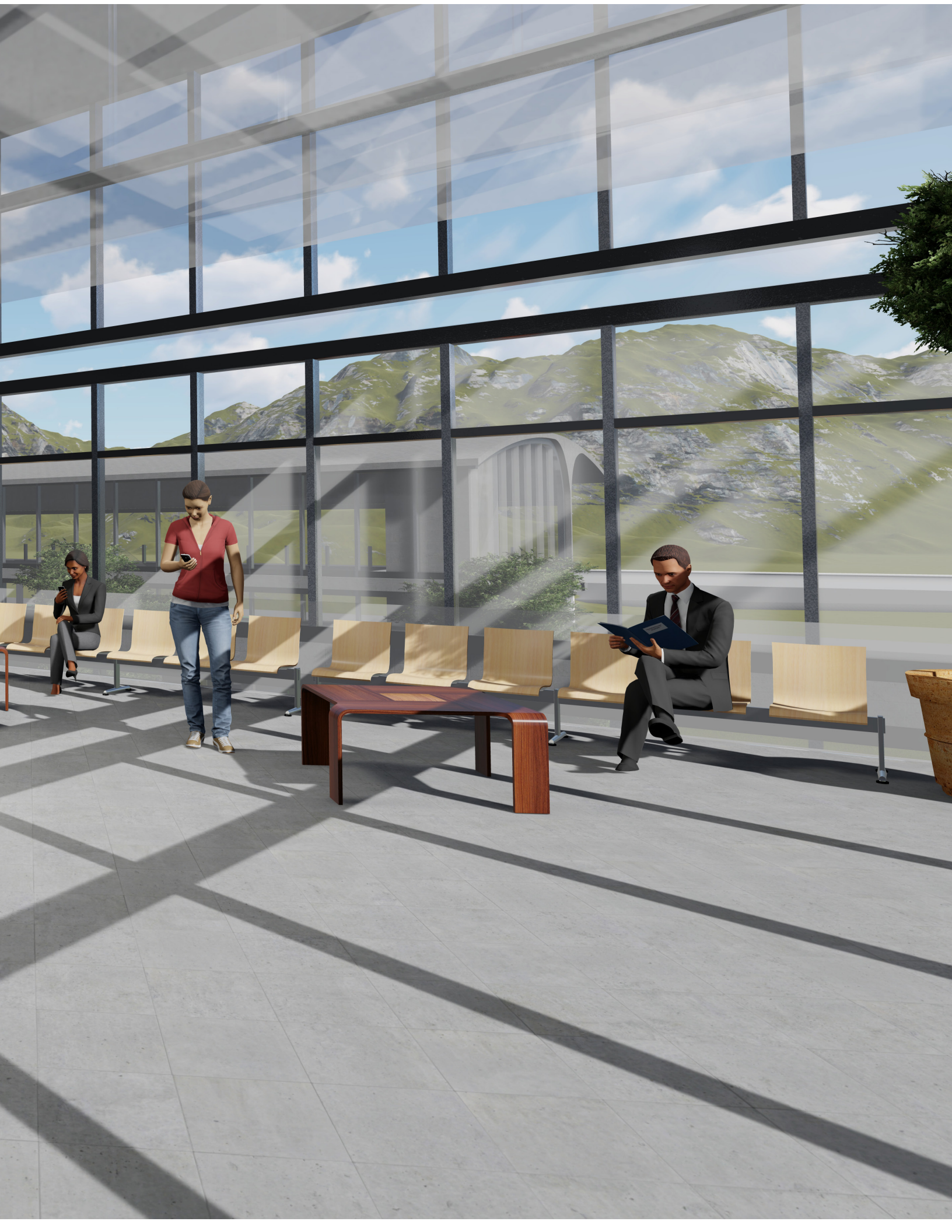
New building ext



tension - 3D view

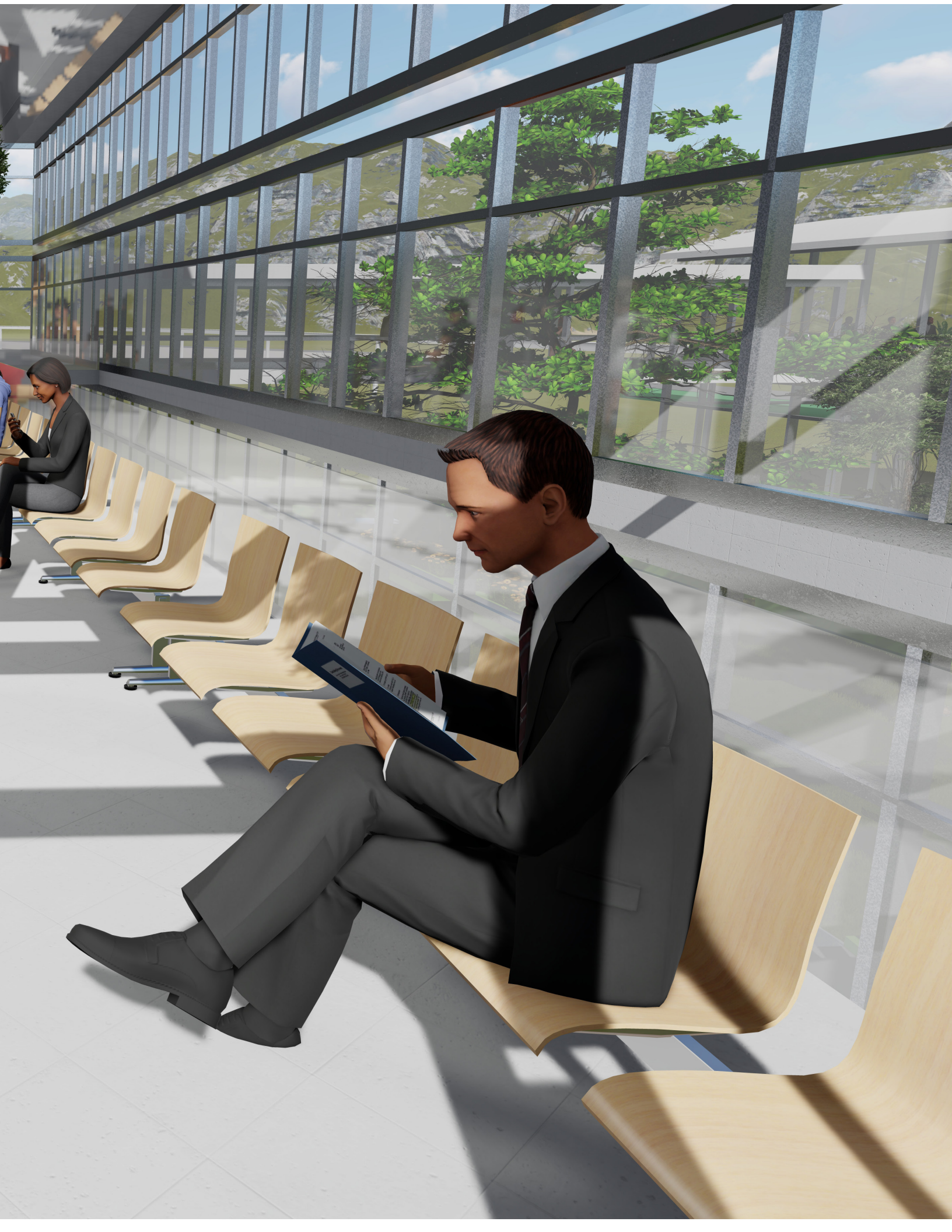
3D view of monorail station and new building connection

3D view of monorail station (inside)



3D view of monorail station (inside)

3D view of monorail station (inside)



Healing Garden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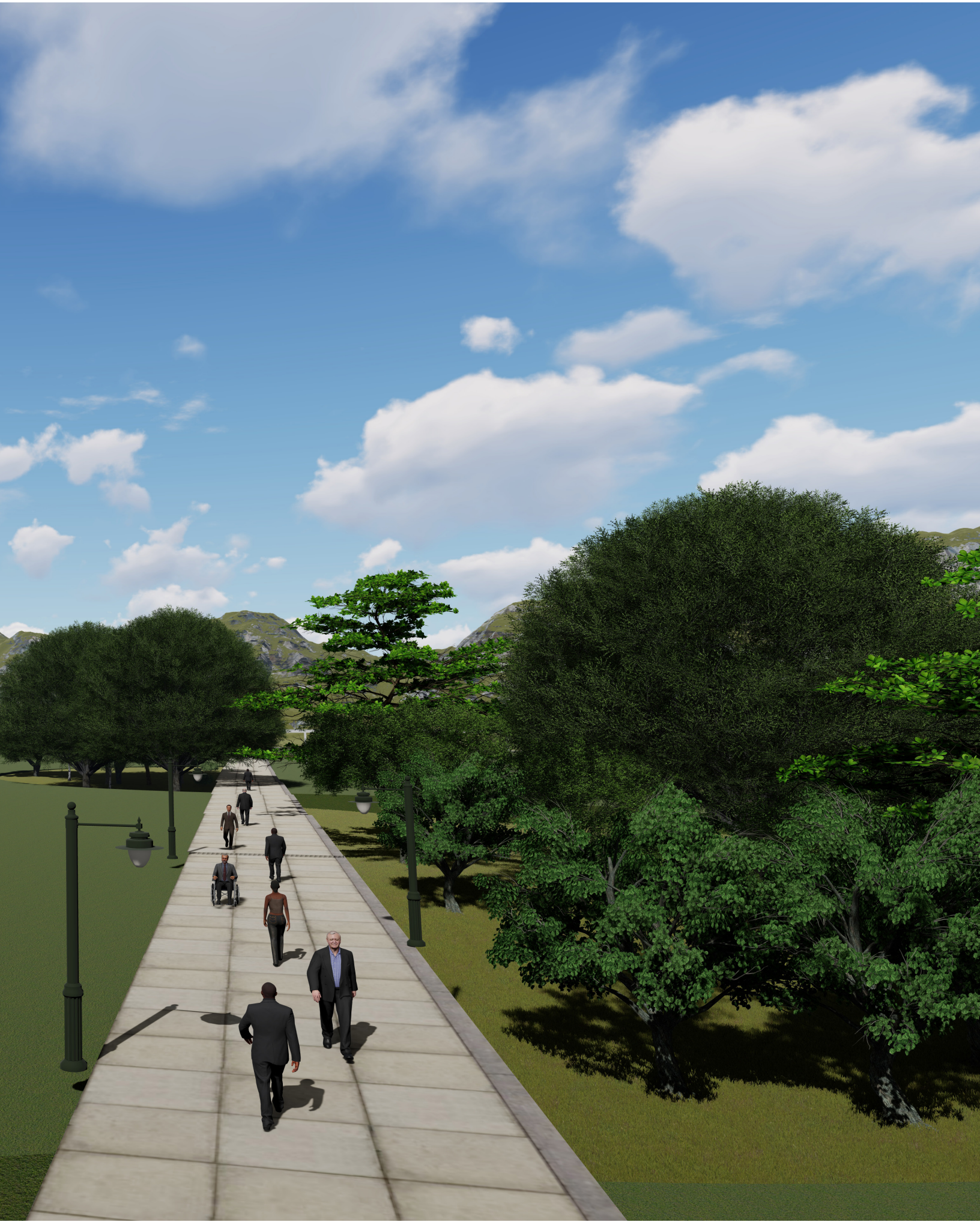
the general plan of the healing garden design
scale: 1:5000



The green area inside the hospital allowed us to design a healing garden. This garden includes multiple green paths and setting places that provide a joyful and mind relieving space for the visitors.

The interconnection between these paths and the Sangone Park allowed us to think about a bigger view of these healing garden.

A path in healing garden

A path in healing garden

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