

REDEFINING FREDERIKSBERG *(HOSPITAL)*

abstract

This master thesis acts as a response and comment on today's urban development, being an effect of the prosperous city - the welfare city's success.

The thesis focuses on the transformation of Frederiksberg Hospital, seen as an opportunity to create a link between past and future, while turning towards a more social approach. As such the thesis seek to acknowledge architecture's effect on its surrounding, using an approach of sustainable-tectonics to catalyse social relations and a sharing of resources.

Presenting a new typology, a place of (ex)change house people with other resources than wealth, staying temporarily, while being able to exchange resources with other inhabitants and the city of Frederiksberg. Through this, along with compact communal housing adds to inhabitant's self-awareness, allowing these to be re-introduced to society and the city.

Title
Redefining Frederiksberg
(hospital)

Project
Master thesis

Group
MA4-ARK3

Semester
MSc04, Spring 2022

Institution
Aalborg University

Department
Architecture, Design and
Media Technology

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Project period
02.02.22 - 25.05.22

Pages
203

Appendix
7

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INTRODUCTION

towards a social approach

The city of Copenhagen has changed dramatically over the past three decades, and with a history dating back to the 11th century the city is a physical display of the years of historical, cultural, and societal development. With its combination of new and old residential areas, dense urban structure and well-integrated urban spaces, the city provides the opportunity for high quality of life. Despite often being recognized as one of the best cities to live in, praised for equality, transparency and accessibility, Copenhagen's diversity of life is challenged. These imbalances are often overlooked when developing the city, in favour of a manicured city based on the planning ideals of the prosperous welfare city, where the subset of people who can afford living in the city is shrinking (Weiss, 2019b).

Problem

The continued global population growth, the increasing rate of migration from rural areas to the cities and pressing global ecological crisis have increased the demands of the cities, presenting multiple challenges in terms of how we plan and develop our cities in the future.

The complex demands of the built environment and scarce resources have led to a building culture that is based on generic materials, high saleability, and efficiency, where the concern of the technical, economic, and measurable aspects of construction is favoured over the experienced, cultural, and social. This has resulted in disconnected places characterized by characterless volumes, that are poorly detailed and confined to narrow spatial variation, affordable for the few, thus fundamentally altering the city's socioeconomic fabric (Weiss, 2019a; Beim and Hvejsel, 2016; Beim and Hvejsel, 2019).

Evidently, the relation between the city, the buildings and the people who inhabit these is increasingly relevant.

Opportunity

An opportunity to address these problems has arisen, through the transformation of the current built environment, turning towards a more social approach. Slowly moving away from the 'take, make, use, dispose' consumer culture, focusing more on the social impact and longevity, redefining urban development as a social gesture rather than primarily a physical concern.

There is a potential in utilizing existing settings as they form a physical and metaphysical link between the past, present and future. A transformation and alteration of the built environment allows for the old to become part of the new memory of the place. It acknowledges the time and life the building has lived and continues its life into a new cultural, social, and physical relation that responds with the new tomorrow, creating new purpose. The physical interventions can alter the metaphysical perception of a building and place, and thereby architecture have the potential to influence the social fabric - mediating a social and cultural change.

Setting

The more than 100-year history of Frederiksberg having its own hospital, is soon coming to an end. With Frederiksberg Hospital moving out in 2025, the inhabitants of Frederiksberg are losing a very central part of their welfare and history (Frederiksberg Kommune and Grandville, 2021). Left is a big area, with great architectural, social, and cultural value, along with an opportunity to recontextualize the place. This presents the

task of understanding the big; 'city', medium; 'neighbourhood', and small; 'building' scale and how the place can become a part of the city and relevant in the everyday of the people of Frederiksberg.

Frederiksberg Municipality intends to transform the area into a new green residential neighbourhood, with the focus on the everyday life, diversity, and variation (Frederiksberg Kommune and Grandville, 2021). Frederiksberg strive to be a 'city for everybody', with diversity and opportunities for all inhabitants, yet the municipality is characterized by being an affluent and privileged area, where the difference between rich and poor is increasing, and the income inequality is greater than on national level (Danmarks Statistik, 2020).

The setting becomes a platform to study how everyday architecture can promote change socially and physically, without creating more social and economic imbalance. By transforming Frederiksberg Hospital an opportunity arises to create meaningful architecture that invites and offers gestures for everyday life. Redefining the area in the city and reimagining the future of Frederiksberg.

Intention

The following thesis explores how architecture can address the social issues related to the building culture, through the potentials of transforming existing structures at Frederiksberg Hospital. It investigates how a sustainable-tectonic approach can unite the big, medium, and small scale and form a physical and metaphysical link between the past, present, and future. Offering generous gestures and expressive qualities for everyday life, hereby catalysing change. A change from measurable concerns towards a social approach.

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The thesis is divided into six overall parts: *prologue*, *program*, *presentation*, *process*, *epilogue*, *appendix*, which is marked in the bottom left corner. The parts are subdivided into chapters highlighted by a **blue** page and concluded in the end on an **orange** page.

Throughout the thesis Harvard referencing is used to cite sources. Sources are collected in the bibliography and list of illustrations in the epilogue. All illustrations are referred to by a number in the bottom right corner and are developed by the group unless otherwise stated in the list of illustrations.

THEO- RETICAL FRAME- WORK

This chapter explains the theoretical and methodological basis of the thesis. Through an exploration of the topics of urban development, catalyst architecture, transformation architecture and tectonics, a notion and position in architecture is sought, developing the thesis' methodological approach, and the platform for the analytical and architectural exploration. References of built examples are studied to understand how the theoretical basis are implemented and expressed in practice.

“Modern life
demands and
is waiting for
a new kind of
plan, both for
the house and
for the city”

- Le Corbusier (Scott, 2008a)

WEALTHFARE CITY

a city for all?

Urbanization and globalization are still ongoing processes that influence the continued development of cities. However, the premise and ambition of which cities are planned and developed has changed, along with the economic development of cities and the country. The prosperous city, where the focus lies on profit and return of investment have resulted in a disconnect between human and city, excluding certain citizens, as a direct result of the welfare city's success (Weiss, 2019b). These imbalances and changes can be seen in both a historical, physical and social context.

Copenhagen has internationally been regarded as a welfare city, based on the ideologies of equality, fairness, accessibility and openness. Shared resources and a diverse demography spawned a city for all, a city of social welfare. This diversity was likewise expressed through architects and urban planners, who were allowed greater creative freedom, creating diverse and qualitative architecture, ensuring the city's unique character. However, in recent years the city has been driven by economic growth, privatization and satisfaction of investors, developing into a prosperous city. This precipitates outcomes that will and have proved to contradict the welfare profile of the city, creating a new era in Copenhagen's urban development (Madsen, 2019; Weiss, 2019b).

The prosperous city brought with it an accelerated development and construction of city districts, while saving time, energy and economics used on urban and architectural quality. As a result, urban space forsakes human scale, generating exaggerated volumes and uninviting atmospheres. The city evolved to a space for cars, facilitating the vast economic growth. In relation, this accelerated development facilitated a generic and prefabricated

approach to architecture, disregarding the importance of tectonics and qualities hereof. Definitively, the physical manifestation of prosperity has caused an unfavourable effect on the architecture experienced every day, calling for awareness of just that (Beim and Hvejsel, 2016; Weiss, 2019a; 2019b). How can everyday architecture, embrace tectonics and be part of the prosperous city, adding value to both inhabitant and city?

The social fabric of the city is likewise coerced to change, issued by the market driven city. High housing prices neglect the inclusion of low- and middle-class demographics, creating a more uniform city and what could be described as a 'ghetto for the upper middle-class'. Furthermore, this initiates a discussion of right to the quality and benefit of urban space, questioning the notion of 'a city for all'. Current development gives the upper middle-class this right. This benefit, for those who can afford it, creates further segregating of demographics causing distance between people (Madsen, 2019; Weiss, 2019b). Is the prosperous city capable of evolving, generating a true city for all and host social sustainable thinking?

The prosperous city has failed in creating meaningful everyday architecture, that connects the physical and social aspects. The planning, development and construction of cities needs to be reimagined. There is a need to prioritise resources, through an understanding and creating new value to what already exists; the people who live in the city and the buildings that make the city. The city needs architecture that matter, that becomes a contributor to creating positive synergies between people. A setting for the exchange of resources.



001. Superkilen by BIG in Copenhagen NV.
Praised as a multi-cultural urban space for all to use

ARCHITECTURE AS AN ACTOR

the role of architecture

The built environment is not only a physical manifestation in the city, but rather a two-dimensional concept. Physical constructs impact societal use and correlations, shaping human life surrounding it. Thus, architecture has the potential of impacting human interaction with both building and each other, promoting something larger than mere physical appearances.

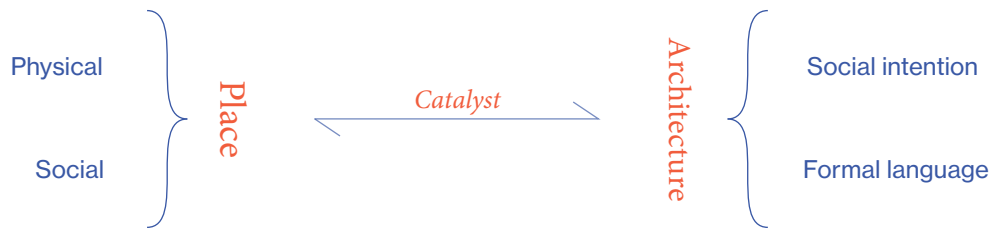
In the book '*Catalyst Architecture*', architecture is seen as "*a catalyst for urban development*" (Kiib, Marling and Mullins, 2015, p. 7) causing the creation of a democratic and learning city that is rich in experience. This is further explained through the three concepts of *Catalyst*, *Architecture* and *Place*, seen as a relation between architecture and awareness (Kiib, Marling and Mullins, 2015).

In chemistry the definition of catalyst describes an element that promotes or accelerates a chemical process, with no change to the element itself. In architectural thinking, the notion of catalyst architecture sees architecture as the element of promotion. Architecture effects both the physical dynamics and the experience of structure. Being the reason for change in user behaviour, social situation along with the spatial experience, resulting in development of an area. Kiib, Marling and Mullins describe how architecture through *internalized performance* and *external architecture-related performance* promote this process. Internalized performance relates to architecture's mixing of programs and users, while being able to accommodate these in both spatiality and aesthetic. External architecture-related performance concerns the

effect architecture has outside of its physical limitation and construct. This performance relates to the effects on human experience, behaviour and interaction, promoting a new narrative of building and urban space (Kiib, Marling and Mullins, 2015).

The physical representation of architecture should not be perceived as just physical. The unification of structure and aesthetic promote something larger, effecting the use of space and social understanding of elements, elevating them past their physical attributes. This is the result of human occupancy with the physical space. Through interaction the entirety of material composition and combinations, invoke an immaterial experience, its atmospheric qualities, and an understanding of the surrounding place (Böhme, 1995). This brings attention to the importance in understanding the effects of the architecture's formal language have. It implies that behind every physical choice there needs to be a social intention. The creation of meaningful architecture calls for a focus facilitating and enriching the everyday lives of the humans who occupy it.

In '*Cities for people*' architect Jan Gehl describes different methods of how to design for the human dimension (Gehl, 2010a; 2010b). Here he points out that working with the human dimensions is about designing for the human senses and creating invitations for the use of a space – such as to walk, sit, stay or bike. By inviting people to specific use, it cultivates new patterns of use. Furthermore, he describes a pattern in the diversity of activities that occurs in a city; the necessary ac-



002. Relation between place and architecture

tivities, the optional activities and the social activities. Necessary activities happen under all conditions, while optional activities occur under good conditions. These two types are important for the city life and are a prerequisite for the social activities. According to Gehl people seek the presence of other people, and new activities begin where others are already happening. Incorporating these notions in architecture opens the opportunity to create architecture that invites for necessary activities and optional activities that cultivating social bonds.

Architecture, no matter where located, is eminently dynamic, as it cannot be understood apart from its context and place. When developing architecture, it is therefore essential to analyse and understand the place. This understanding of place should not only be physical, but also social and cultural. By acknowledging both the existing physical and social fabric, the architecture can take on a position, creating an awareness and intent that needs to be implemented in the design. In addition, an understanding of the cultural, economic and political aspects of a place, all have a direct influence on perception of the architecture (Hvattum, 2009). The intentions should therefore not only be applied to the architecture itself but also onto the context it acts within. Architecture hereby becomes

an actor of development, by designing with social intentions that generate new understandings of the place (Hvattum, 2009; Kiib, Marling and Mullins, 2015).

In this thesis, architecture is likewise seen as a catalyst, promoting a change of the physical and social fabric of a city. This process cannot solely be seen as a one-way exchange, as architecture and place are inherently related. The experience of architecture and place is understood through the interaction between the individual and the whole, and like architecture catalyse a change of place, place catalyse a change in architecture. For the architecture to contribute to positive synergies between people, it requires a comprehensive understanding of place, how it is experienced and how it can change the gesture. Furthermore, the architecture needs a program that functionally and physically address necessary everyday activities of different users, to allow for new constellations of people. Finally, it should nurture the optional activities to push the social relations. Exploring the potential of architecture as a social actor.

“Places do not create architecture, at least not by itself. Often it is actually the opposite: architecture creates places...”

-Mari Hvattum (Hvattum, 2009)

AN ACT OF REDEFINITION

“The conservation of monuments is always facilitated by making use of them for some socially useful purpose”

(Gazzola et al., 1964, Article 6)

past, present and future

All built structures have three possible fates; to remain unchanged, to be altered or to be demolished. The result of remaining unchanged is the building's eventual loss of occupation and its demise, whilst the potential of demolition is a new building. The outcome of alteration is however less known (Scott, 2008a).

The idea of alteration, or the act of transformation, has been discussed since the nineteenth century. The debate started with French architect and theorist Eugène Viollet-le-Duc and English writer and art critic John Ruskin opposing point of views regarding restoration. Ruskin was a protector of old buildings arguing for preservation, calling restoration destruction under false description (Scott, 2008a). Viollet-le-Duc argued that the purpose of restoration was “(...) to recover a perfection that may have never existed at any given time.” (Scott, 2008a, p. 78). Therefore, he also advocated the importance of understanding the existing architecture. In comparison to Ruskin, Viollet-le-Duc was viewed as a despoiler, but his ideas pioneered the more contemporary views and approach

to transformation. Both theories, along with the Venice Charter from 1964 (Gazzola et al., 1964), had their shortcomings, as the value and quality of a restoration and preservation was defined by its adherence to the authentic – the truth that lies in the physical form (Viñas, 2002).

In ‘On Altering Architecture’ Fred Scott draws attention to the lack of the social dimensions in the discussions. He argues that alteration offers an alternative to preservation or demolition, as it allows extending the buildings beyond their time through change, enabling a shift in use and occupation.

“The work of alteration is paradoxically a function of the general impulse to conserve, perhaps to try to keep hold of something within an assumed universe of increasing entropy, a response to the general anxiety that not all will be lost by the passage of time, and the purpose is to work the existent and the ideal together through the processes of intervention, to keep the existing occupied and significant.” (Scott, 2008a, p. 19)

Alterations should according to Scott, aim for incomplete perfection, or perfect incompleteness – it should simultaneously allude to the authentic form and become an element of continuity. Therefore, the act of transformation is transition or translation not only of the physical form but also its intentions, from past into the present, allowing the building to live a new life (Scott, 2008b).

Salvador Muñoz Viñas likewise describes social value. He argues that transformation is

bound to change the way structures are perceived, understood, or valued by the observer. Therefore, the act is no longer regarded as natural activity, as every structure has a narrative value; personal, impersonal, scientific - and therefore different values for different people at different moments (Viñas, 2002).

A building's meaning is subjective, and with the acts of transformations it is important to understand the building's historic, social, cultural qualities and values, to ensure the translation from the past to the present. Buildings are dynamic, exist in time and have a narrative. Interventions should therefore not dwell and become solidified objects of the past. Transformation should create a new narrative and ensure the maximum meaning for the present and future users, continuing the building into the future.

Transformation has since moved away from viewing architecture as something that should not be altered, an object limited to its time and place, to be seen as a resource for sustainable development. The sustainable transformation of existing buildings is a relevant concern of the current times, yet the precise measure of sustainability has countless definitions across the architectural discipline (Peters, 2014). Aside from the use of less resources than a new building, many aspects of sustainability cannot be measured straightforwardly, like social and cultural values – the considerations that go beyond the building. Since there is no universal agreement of what equals sustainable architecture, it is important to define this thesis' sustainable notion.

Moving away from a take-make-waste culture, circular economy have gained momentum focusing on avoiding waste, transitioning towards the design concepts of reuse, recycle and upcycle of resources (Rønnow Arkitekter, 2018). As a respond to this agenda, different circular building concepts have emerged in the architectural practice. From design for disassembly principles, adaptive structural concepts and more (Beim and Hvejsel, 2019). However, the present discussion of sustainability tends to favour the economic and technical aspects based on measurable data, overlooking the core architectural aspects such as the spatial, social, and cultural dimensions (Beim and Hvejsel, 2019). Through transformation architecture there is a potential to make the non-measurable and soft values of architecture the driving force in respond to the ecological challenges.

“Architecture has a great influence on us in our everyday lives. It is not a measurable influence, but nonetheless extremely significant. Architecture has the potential to increase quality of life. Thus, one must not underestimate the importance of beauty and architectural quality in terms of sustainability. No matter the number of fulfilled environmental requirements, if the building does not speak to the users, it will not be sustainable in the long run - we simply take better care of architecture we like - architecture that has cultural value” (Rønnow Arkitekter, 2018, p. 41)

This thesis therefore regards the lifetime of building as the most important parameter of sustainability. Contrary to the notion of reversibility, that indicates the building has an

end of life. Designing for robustness allows for transformation and restoration to extend the buildings lifetime, hereby utilizing the resources already available. Resources viewed as both the tangible and the intangible. Rønnow Architects describe the core values of a building's longevity being the cultural values, materiality and patina, robustness, and maintenance (Rønnow Arkitekter, 2018).

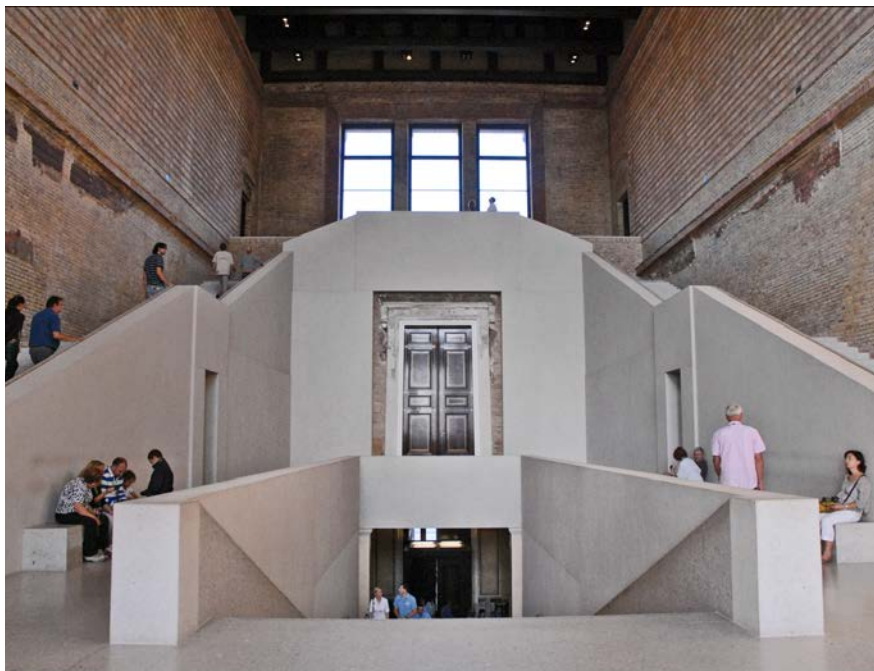
Thus, cultural and social aspects of transforming a structure, become significant factors of a structure's lifetime and sustainability. The questions remain what to restore and what to demolish? And how to alter the existing?

There exists a wide array of methods and approaches for transformation all attempting to create a framework for tackling transformative architecture. One of them is '*Arkitekturens Transformation – fem metoder*' (Andersen, 2015), here the methods attempt to understand the existing architecture in its context, by exploring its individual characteristics through its formal, technical, historical, and phenomenological qualities and intentions. The systematic use of divisions and scale makes the complexities tangible and by understanding architecture in its parts, creates awareness of how architecture is part of the whole. From this the physical and social value of the buildings and the potential for alterations are uncovered (Andersen, 2015). Every act of transformation is therefore different and should be a translation of both the existing built world and the potential one. It should be developed around the architecture's intention, expression and meaning, and

in close dialogue with the place.

Transformation is not only a concern of the way buildings are altered, but also the transformation of what goes beyond the building, built and unbuilt, tangible and intangible. Architecture is inevitably linked with societies and cultures, the neighbourhood and city, and one cannot be observed without acknowledging the other.

In this thesis transformation is the act of re-definition – not only of the physical form but also its intentions. It takes departure in the previously described method, to get an understanding of the physical, social, and cultural components that encompass the buildings and their place. It acknowledges the existence of time and the building's life and history. By letting the spatial, social, and cultural dimensions become the driving force of sustainability, the relation between the social and physical language must not only be understood, but also be interpreted into new narrative. By altering existing resources, building becomes an element of continuity, extending the lifetime of the buildings and creating new purpose.



003. The Neues Museum by David Chipperfield Architects, retells the story of the building, while adding new qualities

MEANINGFUL ARCHITECTURE

tectonic thinking

The current state of sustainable and ecological development of architecture, is associated with profound focus on quantitative measures, such as technical and economic conditions. Profit, while maintaining a low carbon footprint is of highest priority, focusing on the definitive numbers. This has resulted in a narrow definition of current architecture's value, consequently disregarding and devaluating how it is acting in societal and cultural dimensions (Beim and Hvejsel, 2019). Anders Lendager implies that in order to achieve a sustainable and circular approach “... we must accept that we cannot just build more and more in the way we have been used to without also increasing the negative footprint on our climate...” (Lendager and Vind, 2018, p. 65). In contradiction, we must not accept a decrease nor neglect of how architecture operates as an active cultural and social construct in further promoting the sustainable and ecological city.

This thesis is interested in how architecture address the human dimension, and the notion of tectonics hold a great potential in this manner. Tectonics provide a way to assess the intangible measures, and the formal languages that impact the human perception. It is seen as the interaction humans have with space, which as a result promotes and create an awareness of architecture and the role it plays in society. The interaction is understood through the space's *gesture* and *principle*. Architecture's resulting spaces are defined by certain envisioned atmospheres and qualities that address human senses and consciousness, referred to as gestures. This gesture is a result of and share a mutual con-

nection with technical principles, constituted of form, structure and function (Hvejsel, 2018). The implementation of tectonic thinking facilitates the creation of meaningful architecture, through an interaction between the principles and the intention. The result is a gesture that appeals to use and associated experiences (Beim and Hvejsel, 2016; Hvejsel, 2018).

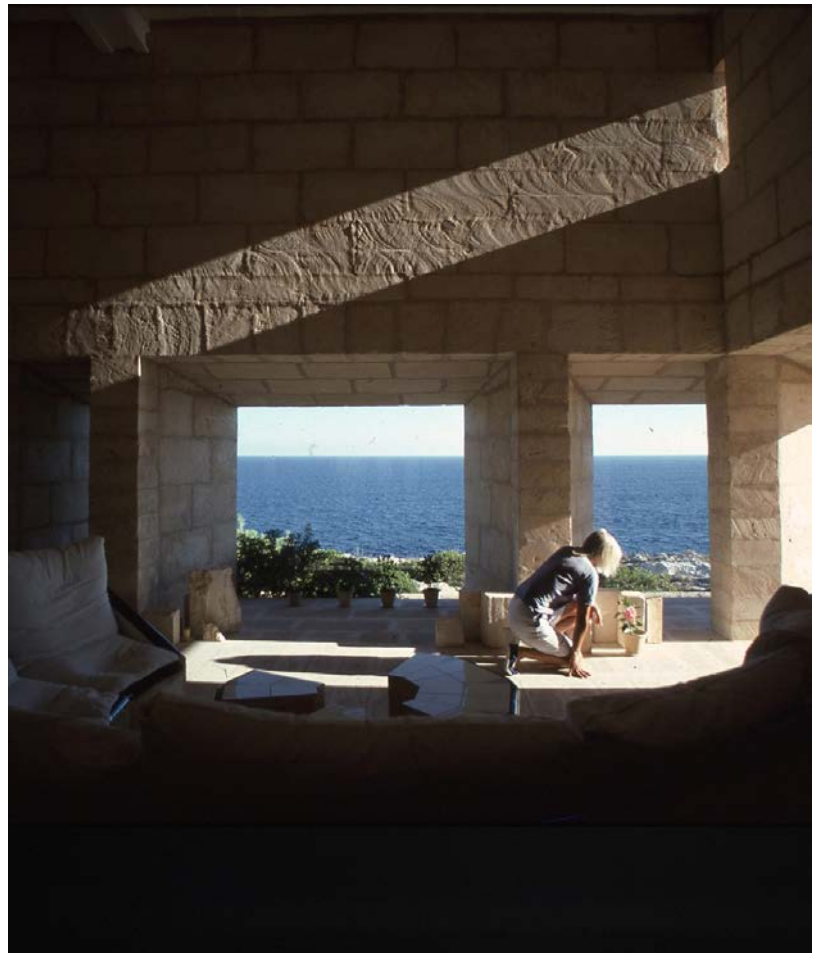
As previously acknowledged architecture is a part of a greater whole, in the constant interplay with its social, physical, cultural context. The urban environment is therefore a requisite to creating architecture and vice versa. Expanding on the tectonic approach, this thesis sees similar factors affect the urban scale development and definition of place. Life between buildings is framed by the physical manifestation of buildings, typologies, and structure which result in a development of space. This notion of gesture and principle is likewise akin concepts of describing urban space, deemed just as important, when developing an ecological city. This is done through deconstruction of urban space, creating a nuanced understanding of its assembly, factors and qualities. This critical perspective of the city acknowledges factors, such as culture, society, technology, space, and more, as *structuring forces* that affect building, urban space and districts. As a result, experiences, atmospheres and moods of the space is invoked, describing the *expressive qualities* (Christiansen, 2020).

“These buildings do not exist in a vacuum – they are built as part of people's lives and culture. These structures are shaped not only by

physical circumstances and available materials, but also by the beliefs, myths, customs, and traditions of the tribe, clan, or group that builds them” (2010, cited in Beim and Hvejsel, 2016).

Considering the environmental and economic challenges that conditions architecture of today, the means of tectonics are even more relevant. Tectonic approach enables to bridge the increasingly interdisciplinary field of architecture and has the potential of furthering the idea of sustainable architecture. Tectonics explores the spatial potential of the elements of construction. It is a method of understanding the experienced value of a space through its components and intentions. Consequently, the creation of meaningful relations between form, function and structure become an expression of the utilization of resources. The question becomes how high-quality spatial gestures can be achieved, through modest means making the use of spaces more ecological.

In the creation of meaningful architecture, it is important to understand the assembly components and factors and the resulting gesture of place, both on an architectural and urban level. Deconstructing the whole into its physical and social parts is an attempt to recognise the spatial potential and intention of the place, seeking out opportunities for new architectural intentions and ways of uniting the material and immaterial aspects. Furthermore, it locates the pivotal places to focus the value creation that enriches the totality. Thus, tectonics become a design tool in creating everyday architecture that invite for a specific use and experience.



004. Can Lis by Jørn Utzon uses its structure to create views and play of light, evoking a cave-like gesture

THEORETICAL CONCLUSION

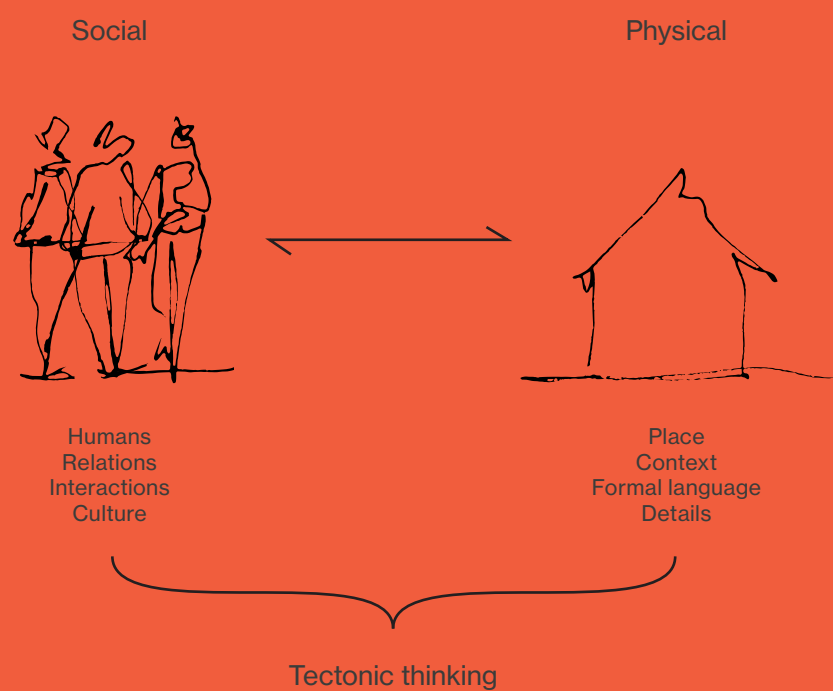
Through research and acquired knowledge, a fundamental understanding of the relation between city, neighbourhood and building is explored. It informs the design process of this thesis, creating a foundation for the analytical approach

The development of Copenhagen, from a city of welfare to a more prosperous city, has resulted in a change of building culture and the societal construct of the city. Focus on pleasing investors while generating vast profits, has devalued the architectural quality of new buildings, resulting in urban spaces neglect of the human scale and behaviour. The forgotten everyday life of the city has aided the growing issues with inequality and distance between people. In acknowledging and understanding these issues lies a potential to create an architectural method and typology that comment and address these issues.

Understanding the role of architecture as a catalyst and the notion that it impacts its surroundings both physically and socially, creates an awareness that architecture must address the social, cultural and physical context. It is both conditioned by its place yet also an actor in creating place – a mutual dynamic exchange. Architecture is therefore fundamentally both a physical endeavour as well as social. Catalyst architecture must therefore acknowledge its existing situation whilst also be able to promote change. This is done through a critical approach to architecture, ensuring a generous and sustainable development.

Transformation architecture, the act of altering the physical state of the existing built structures, is a significant endeavour. It requires a comprehensive knowledge and understanding of place, to be able to make an intervention. The intervention not only changes the physical state of a building but influence and alter the metaphysical perception of a building. By altering the existing, that acknowledges the life and history of the building, a new relevance for the building's present and future is created. Designing interventions with new intention, create a new narrative for the building and its place, and allowing the building to become an element of continuity extending its lifetime.

The global goal of sustainability has a significant impact on construction. However, with the large focus on quantitative measures, results in a reduction in the quality of everyday architecture. Understanding that architecture is an element in a larger system of societal-, technological-, and cultural context, presents the potential to critically rethink the approach by applying tectonic thinking. Tectonics understood as a spatial unification of aesthetics, structure, construction, materiality, details, and how it amplifies the spatial experience and its use. These notions serve as methods to critically assess and evaluate the experienced value of architecture. Informing the exploration and application of a constructive use of the resources inherent in each context, to enrich the everyday life hereby creating meaningful architecture.



METHOD- OLOGY

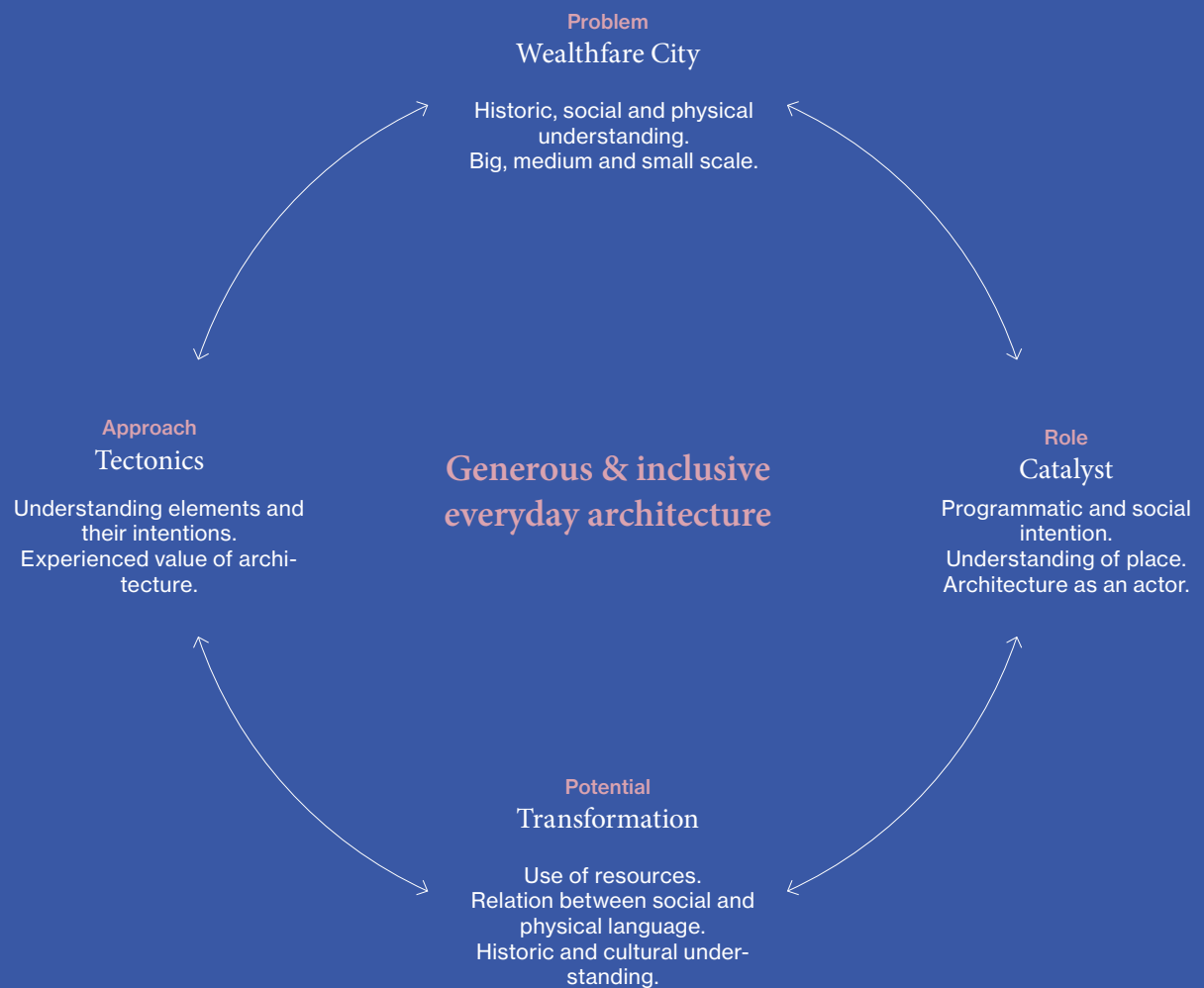
Trying to create architecture that highlight the issues of today and challenges the landscape of the field, calls for an interdisciplinary approach to the way of thinking architecture. This demands a variety of methods, and the ability to understand the implications of different methods and how to utilize them in new contexts.

The theoretical framework shapes a methodological approach of the thesis. Each subject inspires a new understanding, providing methods and approaches towards architecture, becoming pragmatic tools in the development of architecture. The understandings obtained through these theories, are to be explored through holistic investigations and discussions. As a result, design choices are made based on understanding of the effect across theoretical parameters, while benefiting the promotion of something new.

Creating a link between the urban development of the city, and architecture and the people using it, needs to consider the built environment's social and physical manifesta-

tion and effect. Furthermore, considerations regarding the architecture's future manifestation in the city must co-develop with present day conditions and the societal perception in mind, seeking to answer the issue of tomorrow. As such, the thesis sustainable-tectonic approach seeks a balance between the social and physical aspects of architecture, to create generous and inclusive everyday architecture.

The methodologies are integrated and activated through the holistic and iterative process, the integrated design process. This process aspires to blend the knowledge of the architectural and engineering fields, allowing for meaningful and high-quality architecture to emerge (Hansen and Knudstrup, 2005). This allows further incorporation of acquired knowledge and research in the thesis development. However, in this thesis, theory from literature outside the realms of architecture and engineering are likewise incorporated, allowing the thesis to acquire a broader quality and thereby a more societal relevant design.



REFERENCES

Architects

Lacaton &
Vassal

Location

Bordeaux,
France

Year

2016

transformation of 530 dwellings

Part of an overall renovation plan in Bordeaux, France, the project concerns transformation of 3 modernistic building blocks from the 1960s, consisting of 530 dwellings. Ruling out the option of demolition it presented an opportunity to revitalize the buildings. As a result, the transformation, finished in 2016, focused on utilizing building location and layout, to create quality and comfortable dwellings. Therefore, interior assessment of building aims to differentiate what should be preserved and what needs to be supplemented. This led to the addition of winter gardens, adding multiple benefits for the inhabitants, while changing the outside expression (Lacaton & Vassal Architectes, n.d.).

Lacaton & Vassal exemplifies in this project how the revitalization of existing structures, through an assessment of physical framework, can develop to something of greater quality than before. Due to the nature of the buildings, being blocks of a modernistic era, the functionality of buildings serves to elevate a new purpose, through an existing tectonic principle. Lacaton & Vassal utilized these principles in means of making new gestures, complimenting what was there and adding architectural value. Using a modu-

lar extension on the building façade, winter gardens increased apartment square meters, acting as addition to what was there. This approach allowed Lacaton & Vassal to reinvent the social notion of the building, both inside and outside, adding new meaning to what the building was and acted as. Neighbours inside now share winter gardens together, promoting community within. However, on the outside, the winter gardens not only changed the social narrative of the building, but cultural perception as well. The building act more as a contemporary construct than the often-criticized social housing from modernism.

The transformation of dwellings shows how well Lacaton & Vassal qualitatively assessed opportunities of an existing structure, revitalizing both its physical and social manifestation. By using what was there and already working, focus was able to be redirected to additions, ensuring the tectonic synthesis with the existing structure. Furthermore, this highlights the opportunity that can be found in already built architecture, and how, through development and tectonic thinking, transformation can elevate buildings' architectural quality.



007. Exterior and interior of the transformation by Lacaton and Vassal

Architects
Carlo Scarpa

Location
Verona, Italy

Year
1958-1974

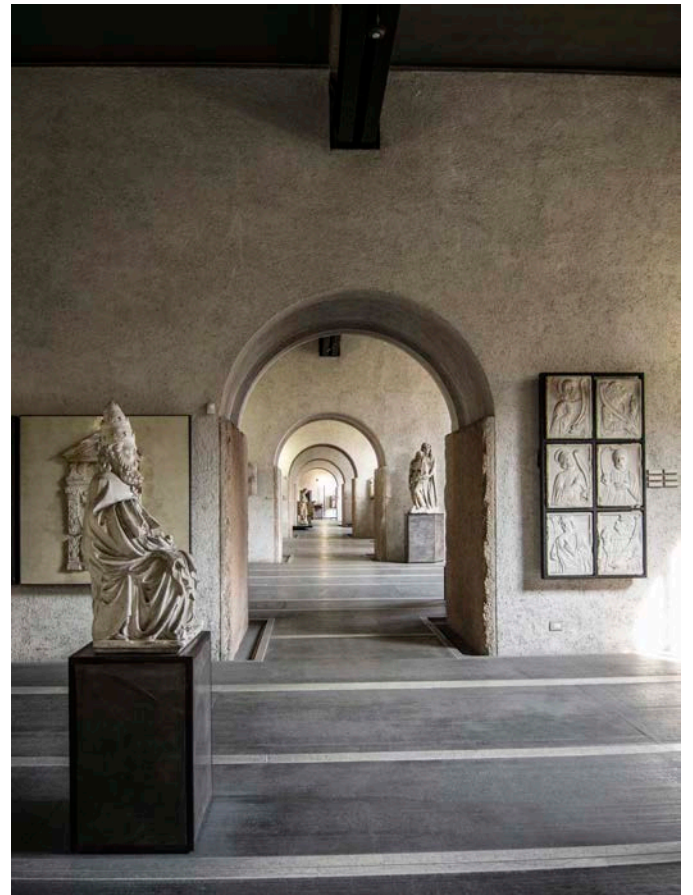
castelveccchio museum

In 1958, Carlo Scarpa was approached as architect of what is now museum Castelvecchio, located in Verona, Italy. The 14th century fortress had a rich history as both castle and hosting multiple military operation through centuries, before being turned into a museum in 1923 (Theodorakakis, 2017). As a result, Scarpa found it necessary to educate himself on the building's structure and historical layers, before assessing what to keep and disregard. This was done with the purpose of creating an authentic and educating space for visitors of the museum. The result was a transformation that sought to highlight tension between new and old, within Scarpa's critical selection of elements that belonged (Scott, 2008b).

Scarpa's assessment of Castelvecchio, acted as a filter sorting out meaningless or irrelevant elements in the telling of the museum's past. It becomes clear, he saw the building's cultural and historical value as its most important attribute, seeking to both preserve and highlight this in his design. Therefore, human perception and interpretation of spaces played a big role in the development of the museum. In addition, the flow through the

exhibition sought to elevate the experience of both sculptures and building, creating an elaborative narrative of what the building once was. Physically the tectonics of the building was heavily developed by Scarpa, removing parts that was seen as completed. Interventions added new structural principles, such as a seamlessly floating platform supported by a metal beam, which in their gesture, further highlight the existing structure. Likewise, choice of materials supported this further. Using, what could be deemed modernistic materials, steel and concrete complement the existing structure, while not taking ownership of the spatial narrative.

When analysing Scarpa's historical and cultural approach it becomes apparent how intertwined the physical elements and their narrative are. Scarpa managed to elaborate on Castelvecchio's story, while highlighting what already existing, using his knowledge of the building to further this and adding smaller interventions. Furthermore, his approach of deconstructing something complete, in the name of something bigger, highlight the importance of knowing a building's history and thereby opportunity.



008. Interior of Castelvecchio showing Scarpa's interventions

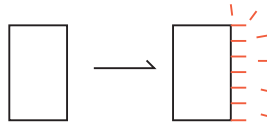
transformation spectrum?

The physical manifestation of architecture, has a mutual impact on how humans perceive it, determining its cultural and social value. Through these references it becomes clear, that transformation occurs in a spectrum of approaches, however, the common factor is the position on what to keep and what to disregard.

Lacaton & Vassal's project highlight the possibilities which can be found in existing architecture, no matter the structures' cultural and social heritage. Utilizing tectonics that already exist in a new way, new physical shapes can emerge, which likewise cause a new interpretation of the space. Similarly, Scarpa takes a position in his project's existing structures and how it can become a part of a bigger whole, focusing instead on a complete cultural narrative and social experience. Here, disassembling something which is already complete, makes room for something new. Each of these projects are seen as op-

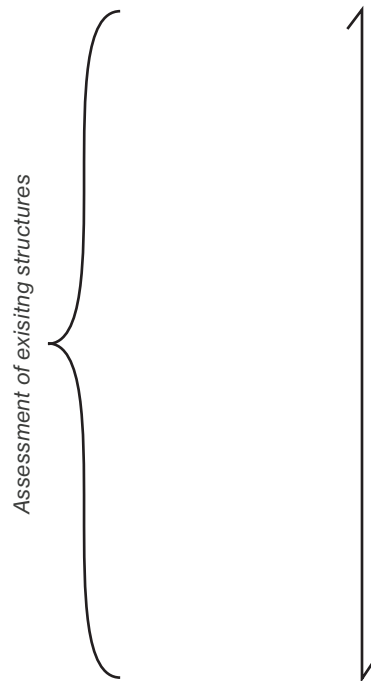
posite ends of the transformation spectrum, having different approaches and end goals. However, this comparison needs to take the difference of typology into account. Doing so makes it apparent that a consideration of what the building is, and what it wants to be should determine the approach of transformation. How much is needed to achieve the intended quality of the architecture? Are there any tectonic principles that can be utilized in creating new gestures? Is a new structure needed to elevate what already exist?

Through this thesis such considerations and spectrum of transformation acts as ways of assessing buildings on a physical, cultural and social level, along with the possibilities they might present, notably regarding sustainable-tectonics. Furthermore, it must be stressed that not one approach can or should be applied to multiple buildings, instead each should be carefully considered.



Lacaton & Vassal

Utilize physical structures to create new use and interpretation

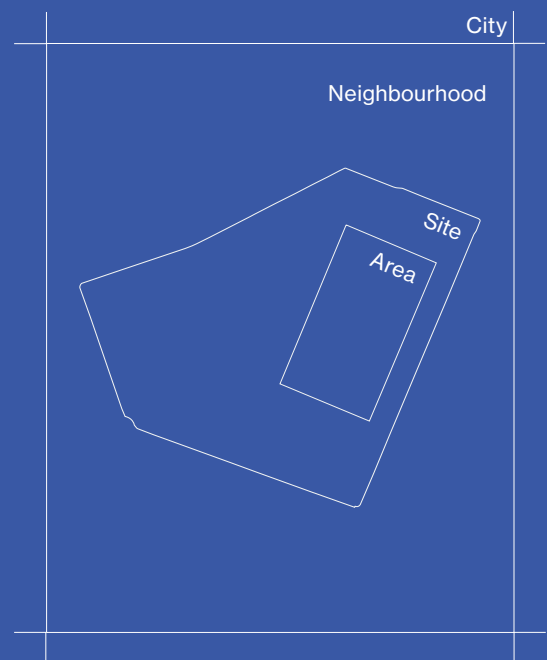


Stress the importance of social and cultural history

Carlo Scarpa



ANA- LYTICAL FRAME- WORK



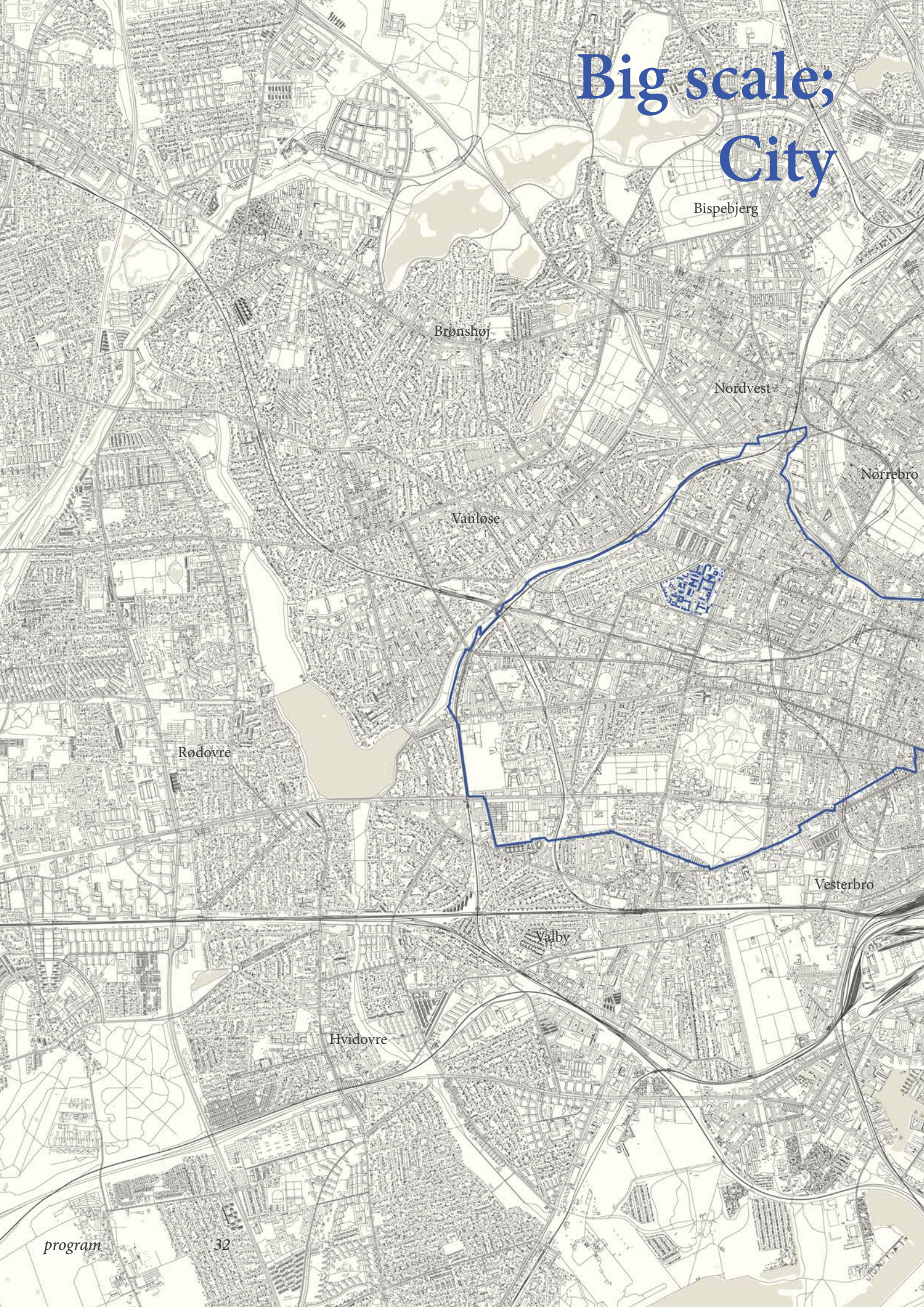
This chapter introduces the analysis of the place, Frederiksberg Hospital, divided into a big, medium and small scale. Through the understanding of place as both a physical and the social construction, the formal, technical, historical and phenomenological qualities and intentions of the place are explored. Resulting in an understanding of the site in relation to the city and its cultural and social value. Leading to problems, potentials, and principles of how to transform the area for the place to become a part of the city and create new relevance.

Big scale;
City

Medium scale;
Neighbourhood

Small scale;
Building

Big scale; City



Bispebjerg

Brønshøj

Nordvest

Nørrebro

Vanløse

Rødovre

Vesterbro

Valby

Hvidovre



Nordhavn

Østerbro

Copenhagen Center

Christianshavn

East Amager

West Amager

33



010, Frederiksberg and Copenhagen, 1:35,000

FREDERIKSBERG

Area
8,7 km²

Population
103.696 (2021)

Density
11.919/km² (2021)

the city in the city

Frederiksberg is a part of the Capital Region of Denmark and the city of Copenhagen. It is known for being an affluent and well-educated area with a rich history and architecture, large green spaces and various culture experiences (VisitCopenhagen, n.d.; Andersen, Askgaard and Klintø, 2018). Most notably, Frederiksberg is an independent municipality surrounded by Copenhagen municipality – A city within the city. The city of Frederiksberg is therefore a municipal island within the capital with its own identity which is the result of the historical development from village to city, together with the expansion of Copenhagen in the 19th century.

The land of Frederiksberg has, since the Stone Ages, been a place of settlement (Andersen, Askgaard and Klintø, 2018). From the early Middle Ages until the middle of the 19th century, Frederiksberg developed from a small farming community Solbjerg to the village known today as Frederiksberg, which was marked by King Frederik IV building a palace for royal summer residence on top of the hill Valby Bakke in 1699. During these years the land served the purpose to provide food and produce for the royal household and later as an area with country houses for the wealthy citizens of Copenhagen (Frederiksberg Kommune, 2021).

As result of the industrialization and urbanization from mid 19th century to the 20th century and the removal of the demarcation line in 1852 – which prohibited construction outside Copenhagen's city walls, Frederiksberg developed from a small village to an independent city and municipality. During this period both Frederiksberg and the Capital experienced rapid population growth and

numerous residential areas were constructed. Frederiksberg population increased from 2.800 inhabitants in 1850 to 96.000 in 1914 expanding from the eastern part near Copenhagen towards west. In 1950 the population had grown to almost 120.000 with Frederiksberg being largely developed and only few available building plots left – thus Frederiksberg became established as an enclave in Copenhagen municipality (Frederiksberg Kommune, 2021).

Today Frederiksberg is Denmark's most densely populated and smallest municipality, with 103.696 inhabitants in an area of 8,7 km² (Frederiksberg Kommune, n.d.). Despite its high land-use ratio of 96%, Frederiksberg has managed to maintain parts of the village character, with its smaller scale residential areas and significant green qualities such as boulevards and gardens like Søndermarken and Frederiksberg Gardens, that meets the city's larger scale dense blocks. An urban development where urban spaces, buildings and green spaces have developed in close relation to each other.

Due to the boundaries of the municipality and the limited possibility for expansion, development must focus on transforming existing structures. Frederiksberg is a city characterised by growth and privilege. Throughout history Frederiksberg has expanded by adding new. With the hospital functions coming to an end in 2025, leaving the large area of Frederiksberg Hospital empty, there is an opportunity to address the demographic landscape of the increasingly rich city. Utilizing existing resources, and renouncing space for a diverse user group - expanding the social gesture by doing less.



011. Entrance to Frederiksberg Gardens,
an excursion spot for wealthy citizens

the social fabric

Frederiksberg is commonly associated with a municipality for the rich. With an average income per person well above national average, this assumption is not without reason. Furthermore, a still increasing gap between rich and poor, emphasize the notion of the prosperous city's effect. The wealth of citizens is likewise reflected in housing square meters, being above the Copenhagen average despite the still rising residential prices. Frederiksberg is developing into what could be considered a 'ghetto' of the wealthy. Consequently, the city has become a victim of its own success, creating a city for the wealthy reflected in the social understanding of the city.

In relation, the rising housing prices have forced groups of people with fewer resources to move to the outskirts of the city or out of it, further segregating the demography of Frederiksberg. Even within the city itself, people are divided in enclaves of similar resources and lifestyles. This have resulted in a larger gap and distance between people, due to the lack of perspective on each other's lives. There is no reference or exchange of personal

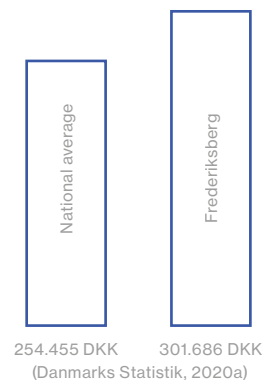
or cultural experiences. Despite being a city with many opportunities, it is only for a select few. Diversity and difference of people needs to be seen as a resource and a value. However, the concept of resources must be seen as more than just wealth. It is equally about knowledge, skills and experiences.

Addressing the value of these resources holds the potential to create a typology with the possibility to re-introduce people, that are defined by other resources, into the city, and vice versa. A place to exchange knowledge, skills, personal and cultural experiences through a common purpose. Combining this with the necessities of living have the possibility to create new opportunities and new social relations, effectively becoming a mean of transition and reestablishment into the city. A point of intersection where people form connections and gain greater understanding of each other by sharing the same city space. Turning towards a socially diverse city.

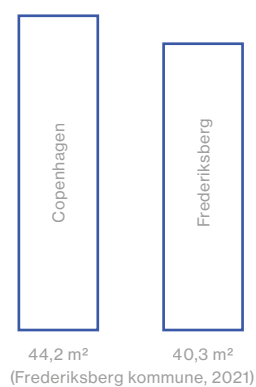
Income inequality (2020)



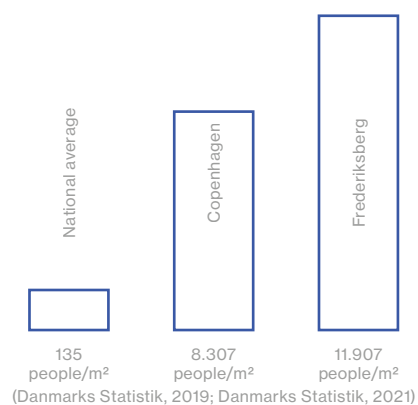
Average disposable income (2020)



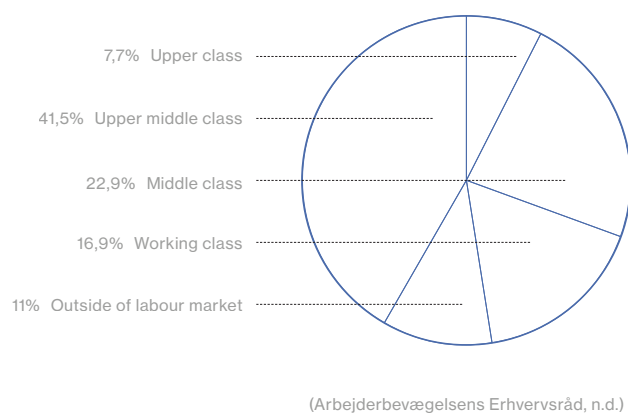
Housing area pr. person (2021)



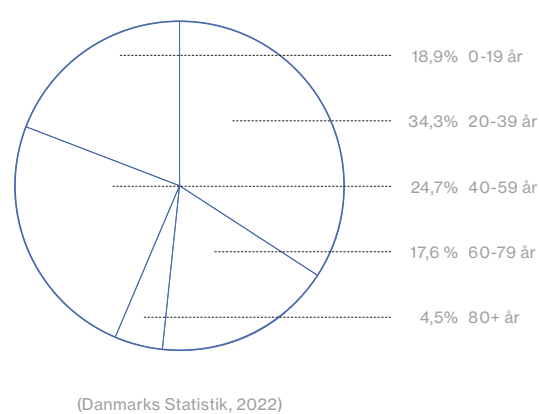
Density (2019)

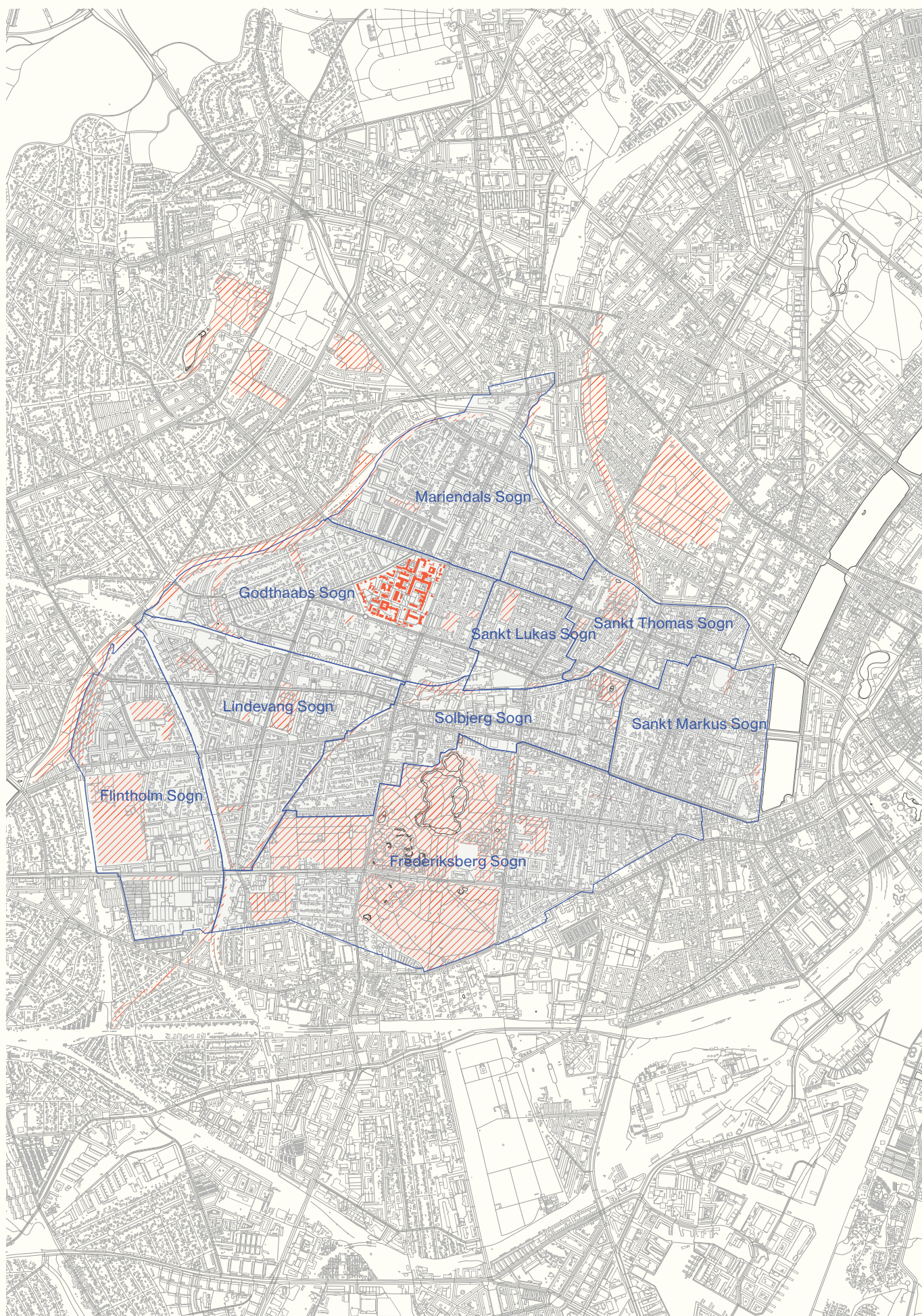


Frederiksberg
Distribution of social classes (2019)



Frederiksberg
Distribution of age groups (2022)





Frederiksberg's parishes mapped and listed in the order of wealth (average income pr. person). It is seen there is a correlation between the history of the development and the where the wealthiest people reside

Solbjerg Sogn

Avg. age: 39,5
Avg. income pr. person: 378.564 DKK
Citizen: 9.479
Immigrants incl. descendants: 1.448 (15,3%)

Sankt Thomas Sogn

Avg. age: 37,7
Avg. income pr. person: 305.451
Citizen: 9.159
Immigrants incl. descendants: 1.594 (17,4%)

Frederiksberg Sogn

Avg. age: 42,3
Avg. income pr. person: 375.502 DKK
Citizen: 16.462
Immigrants incl. descendants: 2.560 (15,6%)

Lindevang Sogn

Avg. age: 40
Avg. income pr. person: 289.181 DKK
Citizen: 13.985
Immigrants incl. descendants: 3.069 (21,9%)

Sankt Markus Sogn

Avg. age: 40,5
Avg. income pr. person: 370.225 DKK
Citizen: 11.307
Immigrants incl. descendants: 1.991 (17,6%)

Flintholm Sogn

Avg. age: 45,2
Avg. income pr. person: 285.497 DKK
Citizen: 9.975
Immigrants incl. descendants: 2.794 (28%)

Godthaabs Sogn

Avg. age: 41,7
Avg. income pr. person: 358.603 DKK
Citizen: 11.371
Immigrants incl. descendants: 1.810 (15,9 %)

Sankt Lukas Sogn

Avg. age: 37,2
Avg. income pr. person: 280.538 DKK
Citizen: 7.015
Immigrants incl. descendants: 1.385 (19,7%)

Mariendals Sogn

Avg. age: 38,1
Avg. income pr. person: 322.018 DKK
Citizen: 14.536
Immigrants incl. descendants: 3.174 (21,8%)

Avg. age: (Danmarks Statistik, 2022)
Avg. income pr. person: (Caspersen, 2021)
Citizen: (Danmarks Statistik, 2021)
Immigrants incl. descendants: (Danmarks Statistik, 2022)

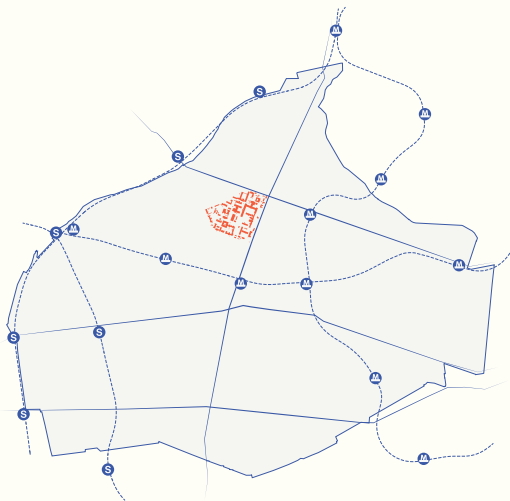
a city of opportunities

Frederiksberg's physical structuring has developed significantly since its village age, becoming a dense city with mix in functions, typologies and public transport. A mix of functions are scattered across the municipality, however, the frequency of culture and education is apparent. Each function serves specific purposes, having its own designated space. Furthermore, specificity of functions and their scattered location, impact social structuring and visitors, being uniform in demography. Opportunities in the municipality is present, however, not all are able to benefit from these.

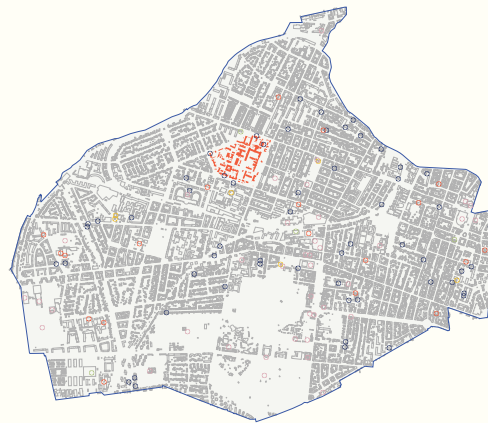
Surrounding these functions are a variety of buildings, however common typologies are low villas and denser apartment blocks. Villas open the urban space, allowing more green and smaller buildings, however, both houses and plots use more square meters on average, compared to the remaining municipality. These are especially apparent west of Frederiksberg Hospital. However, most commonly is the denser apartment blocks, all bigger in scale and low on square meter use. Especially the city centre, east and south of the hospital grounds is defined by this typology, making it apparent the hospital buildings must act in-between two typologies.

Despite the predominantly dense building blocks, Frederiksberg has large green spaces, occurring mostly in the south. Being spaces from Frederiksberg village era, these large-scale areas distinguish themselves from the remaining city, breaking up the otherwise dense structure. Preserving these large-scale spaces has added a quality of life to the citizens of Frederiksberg, becoming more than just open space. This emphasize the importance of such spaces and the value in using what is already there.

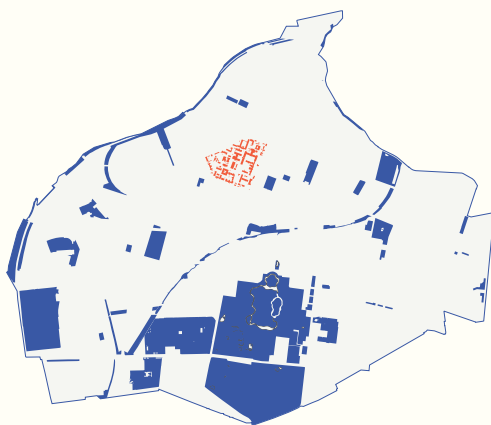
Development of Frederiksberg Hospital calls for an awareness of the city as it exists now and in the future. The hospital ground serves as an opportunity to preserve an existing structure and physical manifestation, rethinking what it can become. Similarly creating a relevance and new function within, holds the potential of bringing together citizens, not only for specific necessities or optional cultural activities, but a mix of both. The structure of Frederiksberg Hospital is in dialogue with its surroundings and can, through transformation, become something more, adding a new quality to citizen, neighbourhood and city.



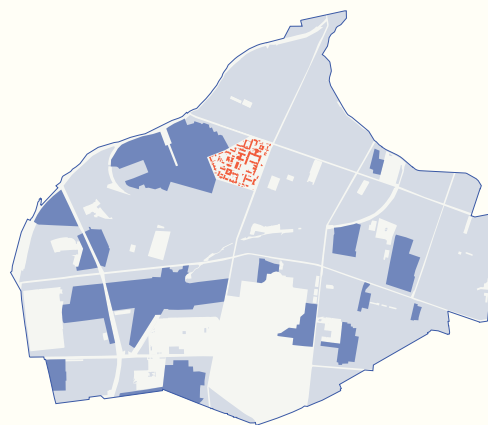
Connections



Functions



Green areas

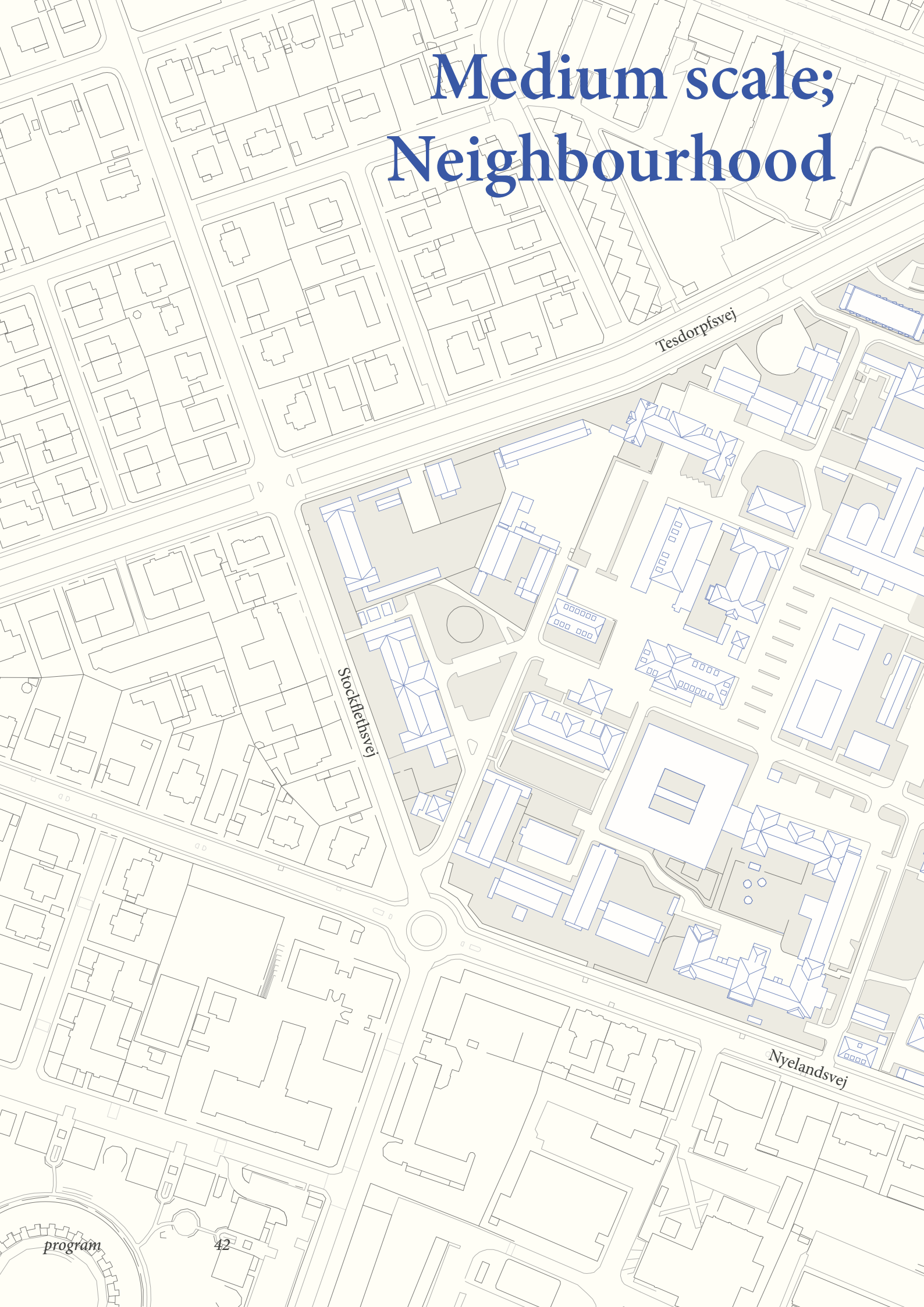


Typologies

- Education
- Culture
- Attractions
- Institutions
- Libraries

- Dense apartment blocks
- Open-low villas

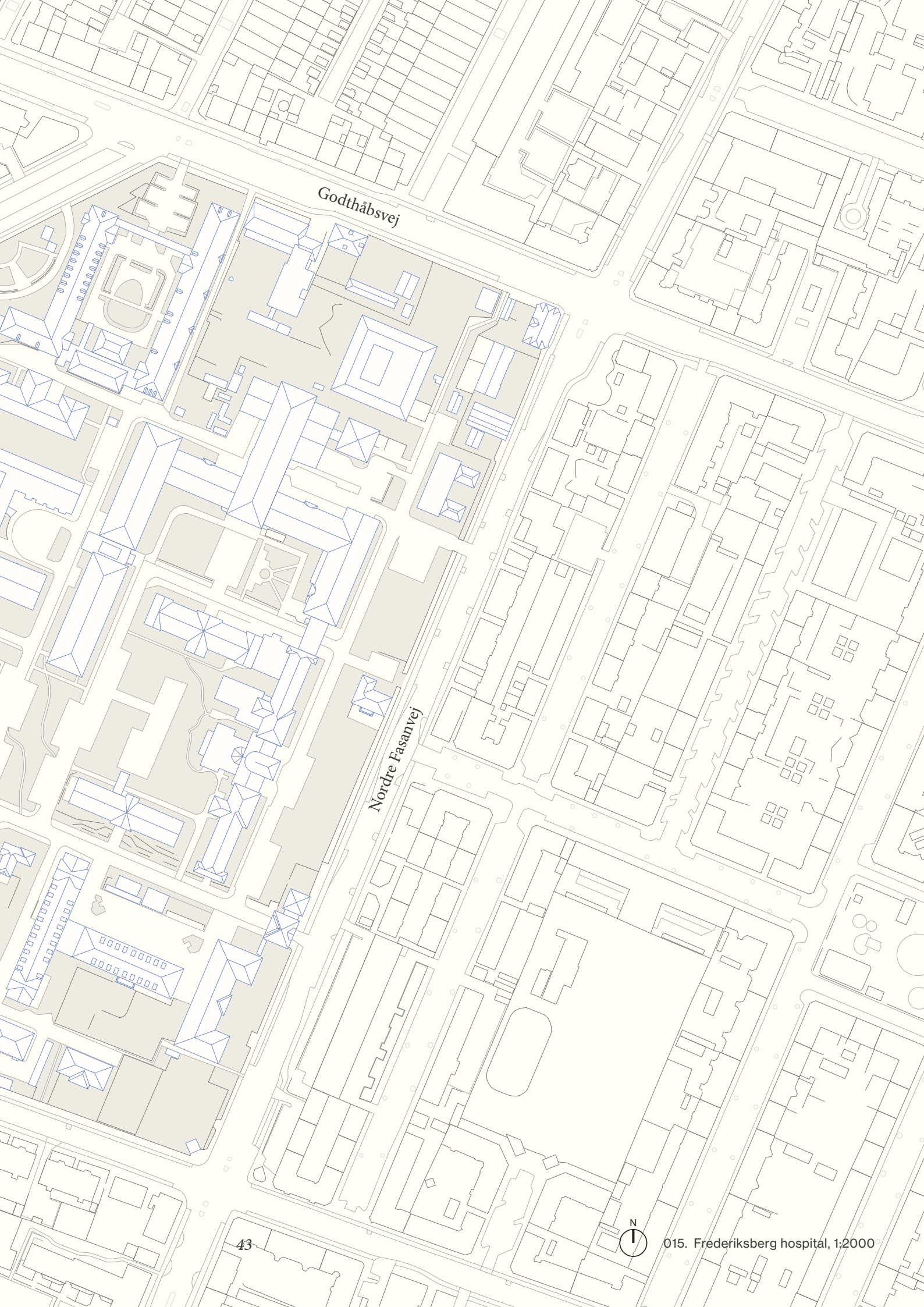
Medium scale; Neighbourhood



Tesdorpsvej

Stockbelsvej

Nyelandsvej



Godthåbsvej

Nordre Fasanvej



FREDERIKSBERG HOSPITAL

Area
149.340 m²

Building area
approx. 80.000 m²

Land-use ratio
55-60%

a history of welfare and independence

In the year 1903 a new hospital south of Godthåbsvej and west of Nordre Fasanvej in Frederiksberg was inaugurated, replacing the city's older hospital that had become too small, marking the early forms of welfare and the wish for modern institutions that could handle the city's health and welfare. Throughout more than 100 years the hospital have expanded and today it covers an area of almost 15 hectares.

Initially, the plan was to maintain the old hospital complex and only build a small hospital on the bought land, however with the separation from Copenhagen County, Frederiksberg achieved full municipality status and consequently the obligation to manage all hospital functions themselves. As a result, a complete hospital was built to handle Frederiksberg's hospital treatment. At this time the land was shared with the Copenhagen County hospital from 1893 (Bro and Schultz, 2019).

During the start of the 20th century light and fresh air was essential components of the treatments, and the hospitals architecture and surroundings was perceived as a key role for patient's health and well-being (Carlo Volf, 2015). Frederiksberg Hospital was built after the healing principles of access to nature, fresh air and natural light, with its scattered two-story pavilion typology, where each specific function was split into separate buildings, having large green parks between the buildings. With this building typology Frederiksberg broke with the norms of the hospital typology of the time, which was dominated by corridor layouts and the mixed

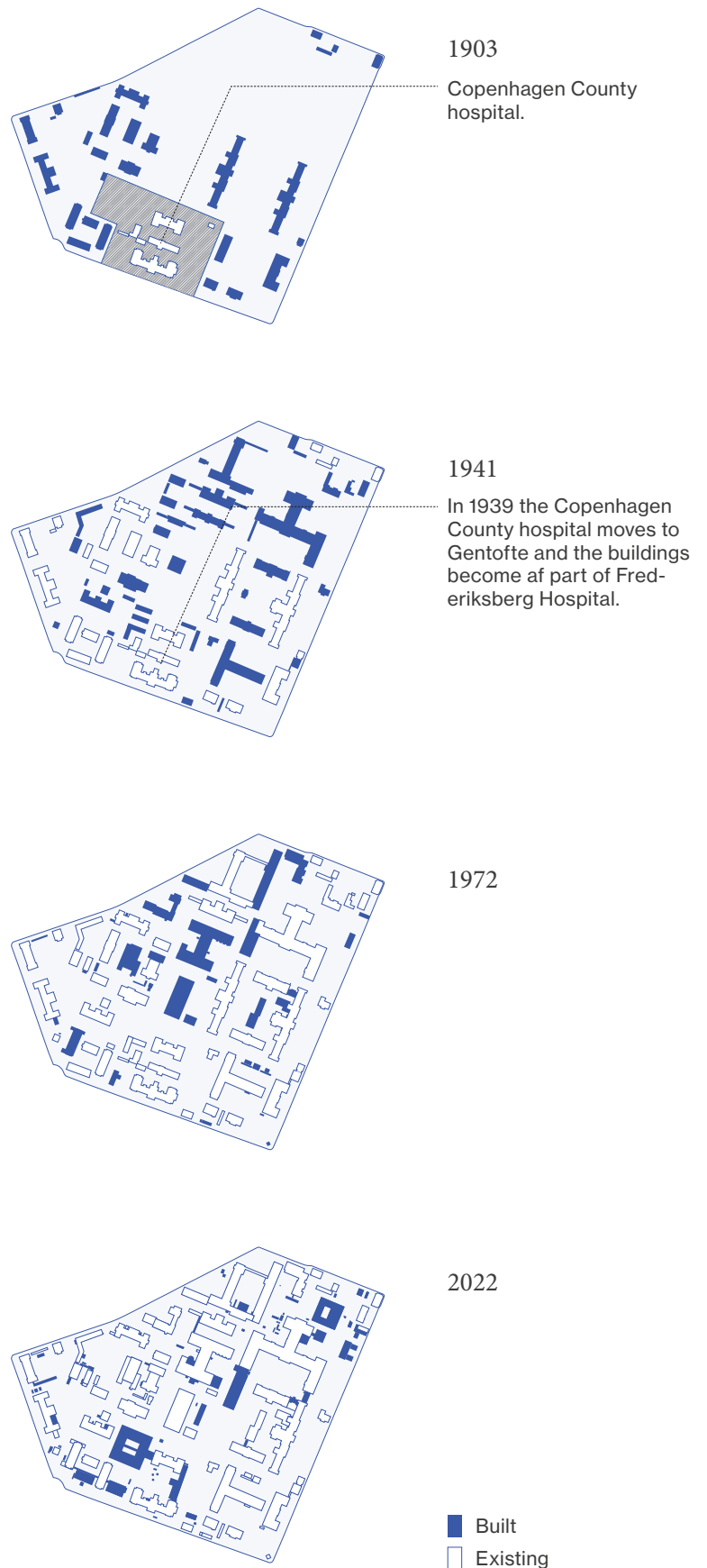
hospital form, where all diseases were treated under one roof (Bro and Schultz, 2019). With these new high technology buildings, the staff was worried about losing the intimate human connection with the patients – also referred to as guests. The worry was, however, unfounded and the old values continued (Pedersen, Christy and Hvidtfelt, 2003).

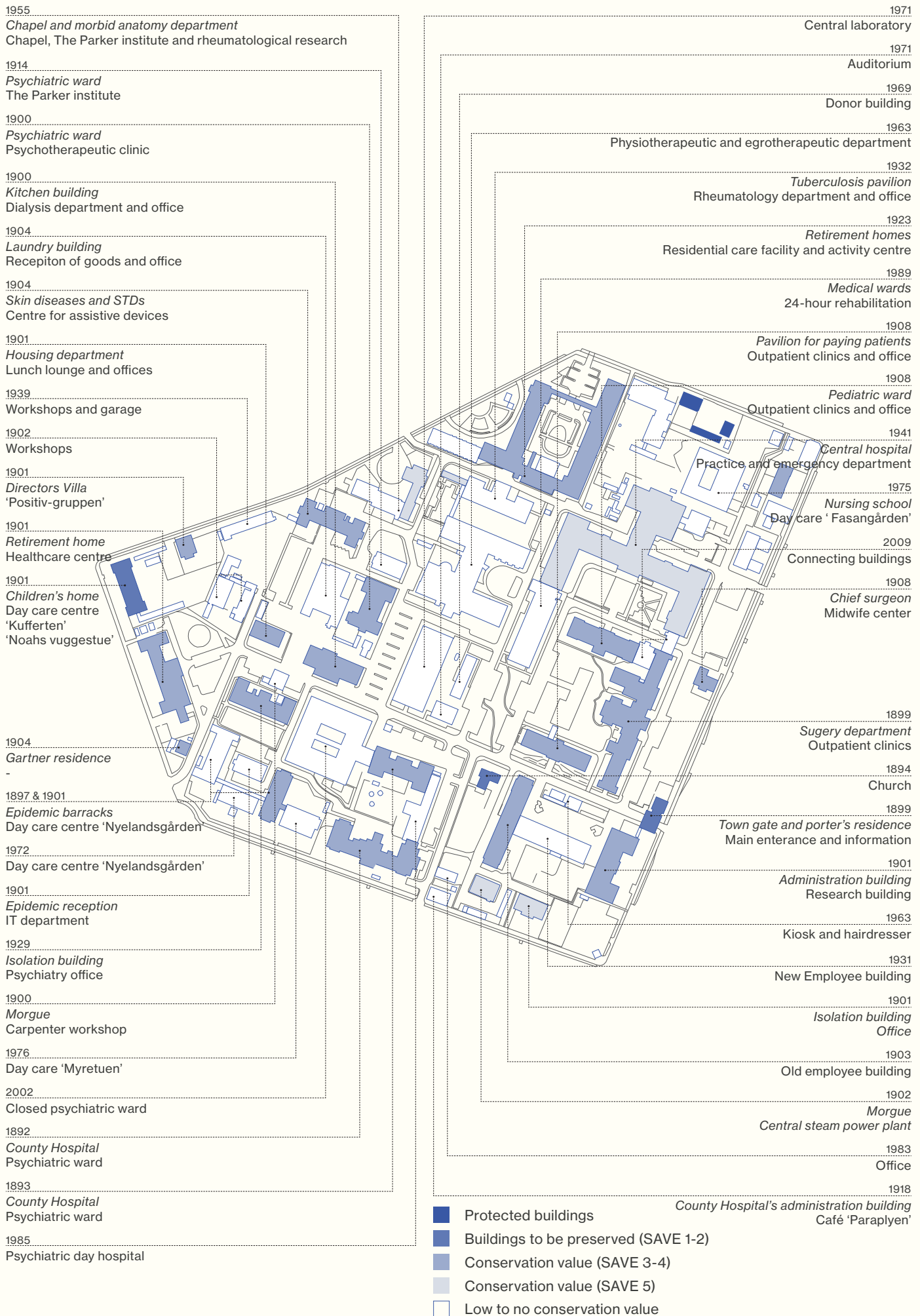
From the first world war until the middle of the 20th century the hospital complex expanded rapidly, as a result of the development of the social welfare system – where the goal of equal access to health care was an important part. In 1940's Frederiksberg hospital had a capacity of 1.100 beds. During this time some of the larger scale volumes were built, however the hospital typology was still mostly characterized by scattered pavilion buildings with many green areas.

In the 1960s the hospital complex was considered outdated, due to an increase of all the hospitals services and a further centralization and specialization of the hospital treatment. This emerged from the post-war universal welfare state in efforts to raise the living conditions and welfare of the entire population. The equal access to the best possible research-based treatment of all possible forms of diseases became an important element. This led to big plans of extensive modernization of Frederiksberg Hospital, where old pavilions were to be torn down and new big complexes were to be built. Only some of these plans came to fruition due to economy and a decrease in population (Bro and Schultz, 2019; Pedersen, Christy and Hvidtfelt, 2003).

Due to continued societal and structural changes of centralization and technological development, and the political reformation in 2007, that removed districts in favour of regions, many smaller and local hospitals were forced to close. Effectively merging Frederiksberg Hospital and Bispebjerg hospital in 2012 with the goal of Frederiksberg Hospital moving to the modernized Bispebjerg Hospital soon after.

Frederiksberg Hospital tells the narrative of the welfare state ideals gradual development. It marks Frederiksberg as an independent municipality and have since been the local anchor for the citizens and is important piece in the collective memory of the city. Herein lies the potential to redefine Frederiksberg and its social uniformity by translating this setting into something new. Altering the existing structures to give new value, the hospital can remain integral to the life of the city. From patient – staff relation to human – human relation.







018. Photo of beds in pediatric ward



019. Main pavilion seen from Nordre Fasanvej

a look inside

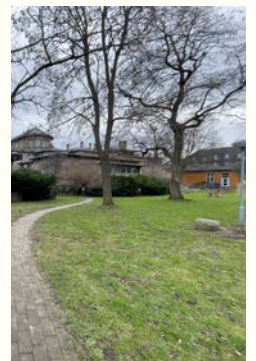
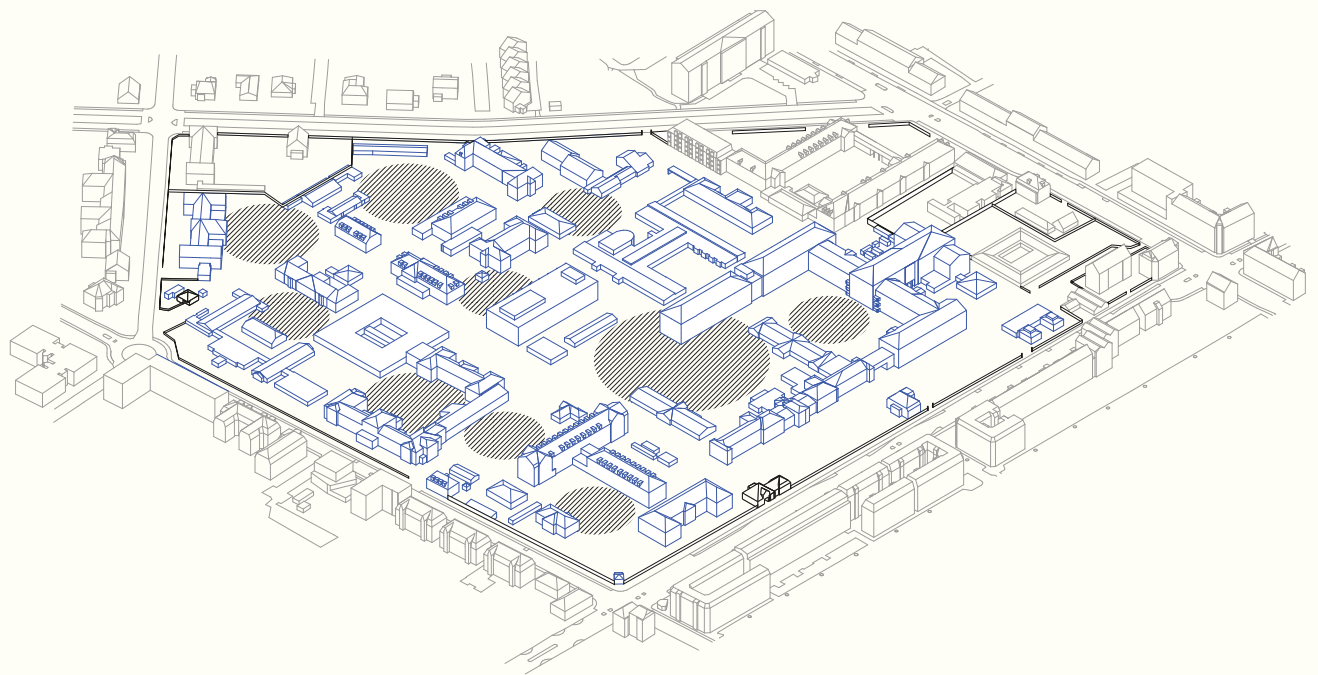
The hospital is characterised by great variation. It is comprised of detached buildings that ranges in scale from one to five stories and is composed of both scattered structures along with more defined squares, as a result of the 100-year development. Most of the buildings built around the turn of the 20th century are of historical style, while the buildings built around the 1950s are examples of Nordic functionalism. The historical buildings are ornamented with motifs and forms that are borrowed from other historical periods such as the arch and column giving them a certain status and grand gesture (Dansk Arkitektur Center, n.d.a - Historicismen). In opposition the functionalistic buildings have a more universal style designed based on function, stemming from the post-war need to build a new better world for the people (Dansk Arkitektur Center, n.d.b - Modernismen). As such a catalogue of principles is mapped for the site (appendix 1).

Common for the buildings are the symmetric composition that leave a sense of harmony and rhythm invoking experienced relation between them. However, with the addition of extensions over time, the symmetry has become blurred, underlining the diverse character of the site. The passing of time is also prevalent in the materials and construction techniques. The different bonding styles and patina offer a tactility and textuality that reveals the buildings past life, cultural norms and traditions. Throughout the site yellow brick is the primary material, which con-

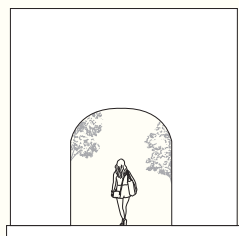
tributes to the buildings heavy, robust and grounded expression. This is broken down by the details and subdivision of base, body and roof acknowledging the human scale.

Generally, the buildings and the urban spaces are shaped by the health care functions. A clear orthogonality and axis structure the complex, not effected by the surrounding city. It is characterised by four distinct elements. First are the fences that enclose the area. Second are the controlled entry points defined by gates that mark the axis throughout. Third are the streets that invite one to stroll through the complex. Variation in the buildings give diverse spatial experiences from dense and narrow, to wide and open spaces. The squares, the fourth element, that appear in-between as both asphalted parking and big green areas, leaving a reminiscence of the large park areas that used to dominate the complex. The movement and discovery of the spaces through these elements are key to the experience of the place.

The hospital is experienced as an assembled whole, with diverse structures and unexpected urban spaces. As a separate entity from the dense city. This call for an expansion of the gesture potentials found in the existing structures and urban spaces. Giving the generous spaces back to the city, through openness and interventions that invite to use these spaces. Tying the experience of the hospital together with the experience of the city.



Fence



Gate

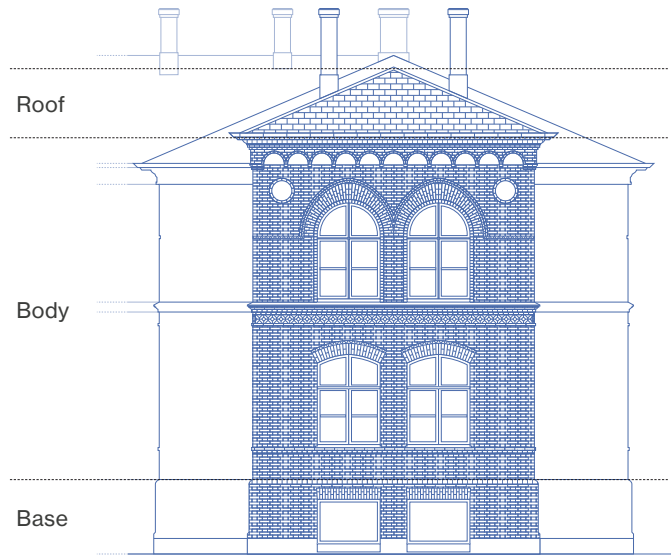
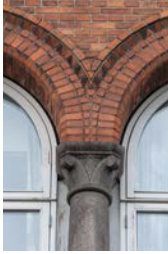


Street

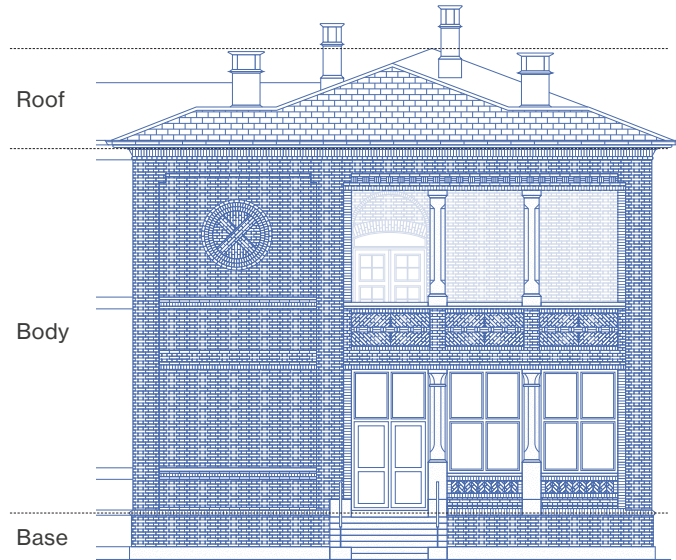


Square

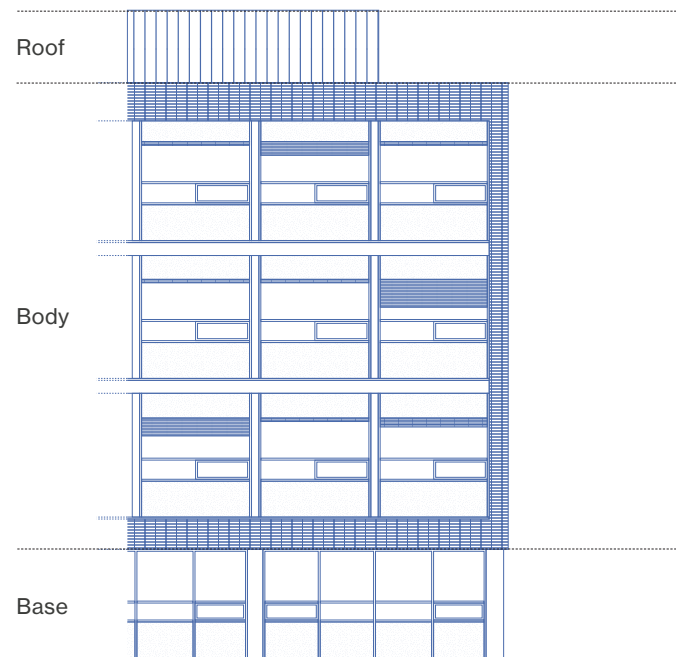
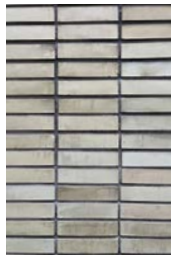
County Hospital, 1892

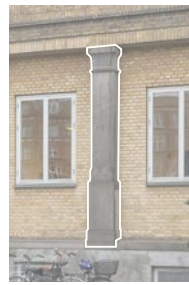
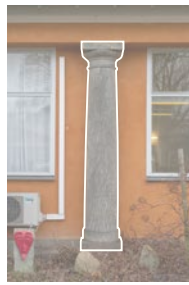
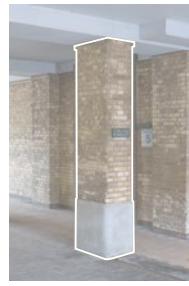
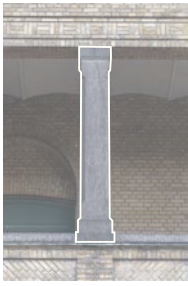


Surgery department, 1899



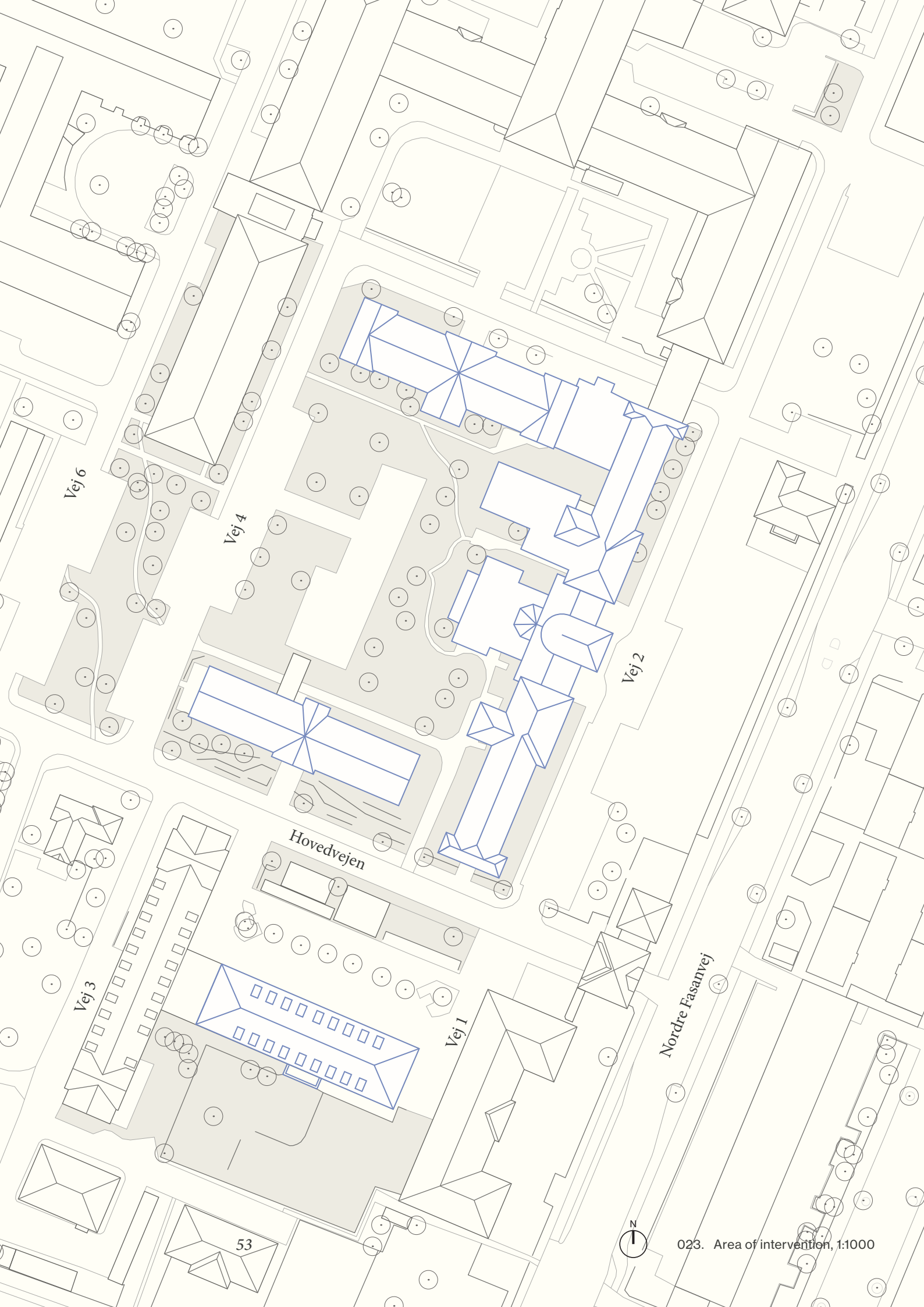
Central laboratory, 1977





Small scale; Building





Vej 6

Vej 4

Vej 2

Vej 3

Hovedvejen

Vej 1

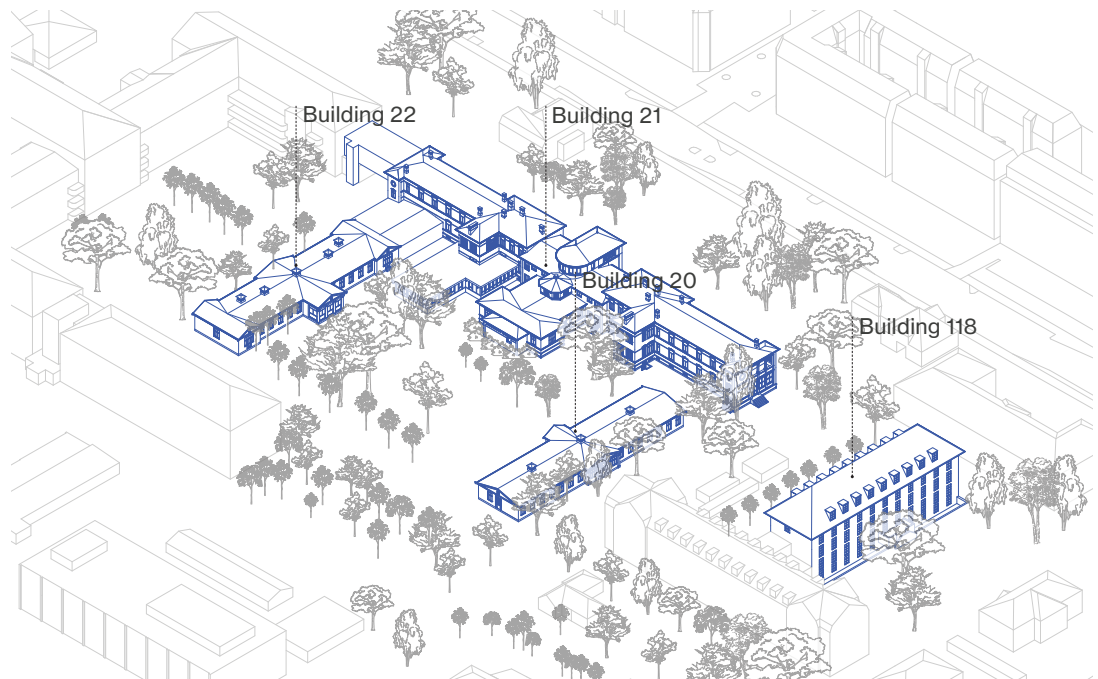
Nordre Fasanvej

53



023. Area of intervention, 1:1000

AREA OF INTERVENTION



024. Buildings in intervention area

Character and societal perception of the hospital is a uniform understanding of what the area has been and is, however depending on the building of focus, this narrative's distinctness varies significantly. Based on and synthesising past knowledge of city and neighbourhood, this thesis exploration is delimited to a few specific buildings, based on architectural, tectonic and cultural value.

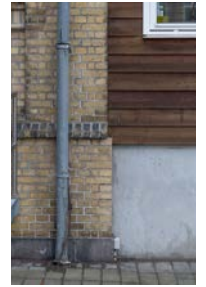
The south-east area of the site has a significant cultural and historical value that is reflected and emphasized by its architectural expression. Green open spaces and preserved large trees, emphasize the areas distinct character, it differs itself the rest of the site and in the proximate neighbourhood. Furthermore, its relation to the main entrance the City

gate and road Hovedvejen, acting as the first meeting between city and site. This area show potential in developing a new typology that can utilize its existing cultural perception and history to redefine the social narrative. Being the face towards the city, the buildings and urban space present an opportunity new functionalities and interventions that utilize their distinct character to change the gesture. Going from a structure that supports people to a place where people can participate.

Using past theory, the following analysis aims to understand the specific buildings intention and formal language, to approximate the direction and potentials of structures. Therefore, old drawings of building aid in this understanding (appendix 2).



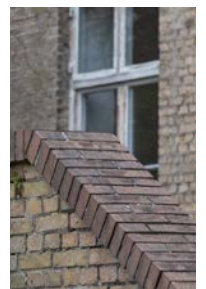
Building 20



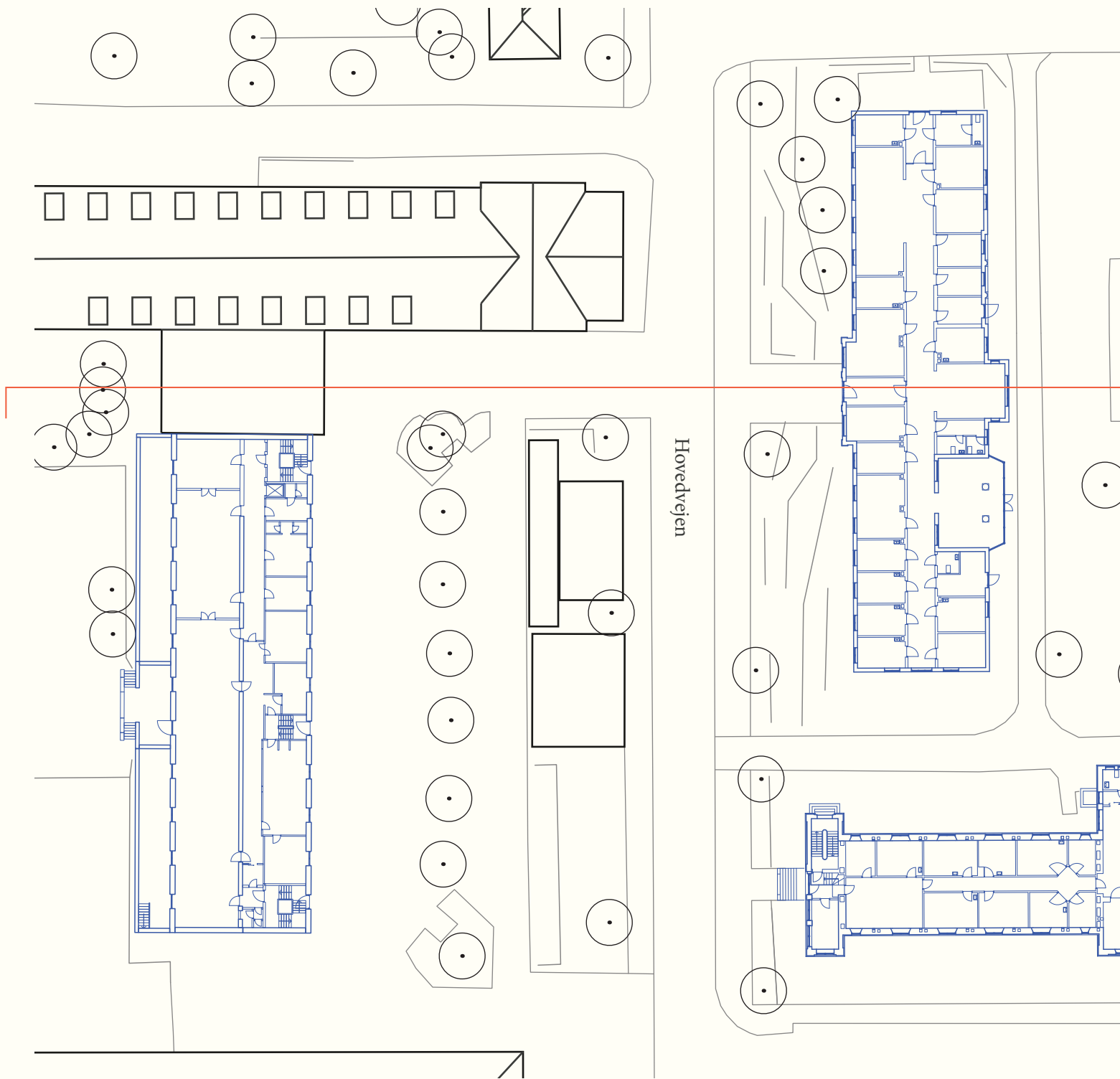
Building 21

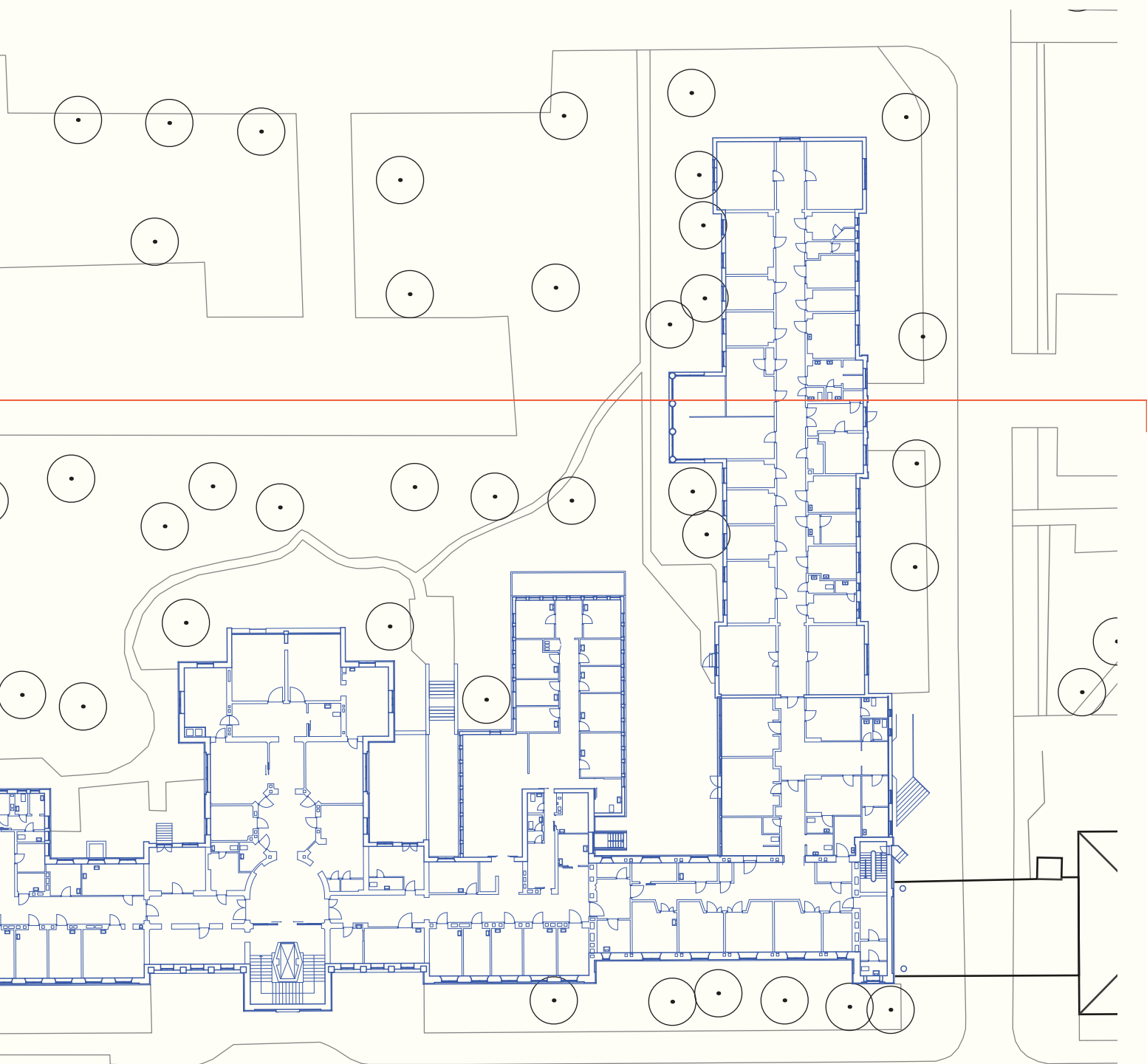


Building 22

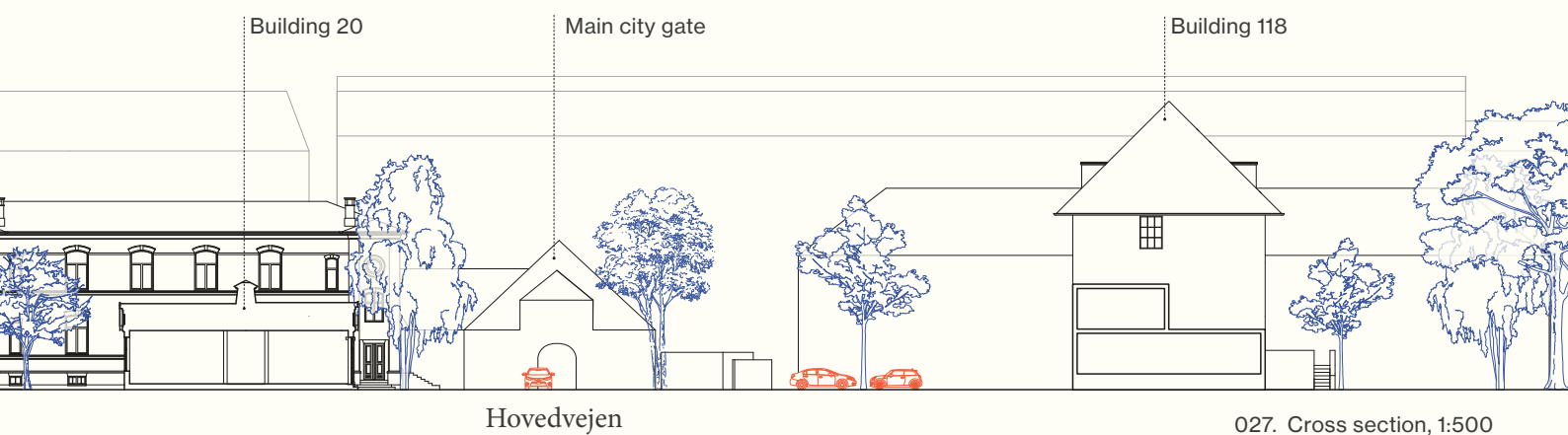


Building 118





026. Ground floor plan, 1:500



027. Cross section, 1:500

building 20

Year
1908

Building area (BBR)
677 m²

Architect
Gunnar Laage

Function
Heart outpatient department and
(Originally paying patients and children's department)

SAVE-value
3

Designed by Gunnar Laage and built in 1908, parallel to building 22 which is near identical in structure, building 20 acted as a department for paying patients, that wanted a more private stay at the hospital (Bro and Schultz, 2019; Frederiksberg Kommune, 2022). Today it concerns heart outpatient treatment. Due to its purpose, the building is of smaller scale, 677 m², in close relation to its exterior green area. The structure is rich in details and ornamentation, inspired by Greek architecture however still simple in its construction. From the main road, the building is prominent in both colour and dimensions, distinguishing itself from a taller context, highlighting the building's important and unique role along Hovedvejen's course. Its tectonic qualities

are most visible in the columns on its north façade, which in the past created a sheltered outdoor space. Inside the interior walls separate the necessary spaces, however these are not load-bearing, which presents the opportunity of opening the space.

The tectonic quality and decorative detailing of the façade is deemed important in the building's story and cultural narrative, while being able to convey a new purpose without large interventions. The non-loadbearing walls inside presents a potential in opening the building's interior creating new spaces and gestures inside. As such the transformation focuses on expanding the building's possibilities in its interior.





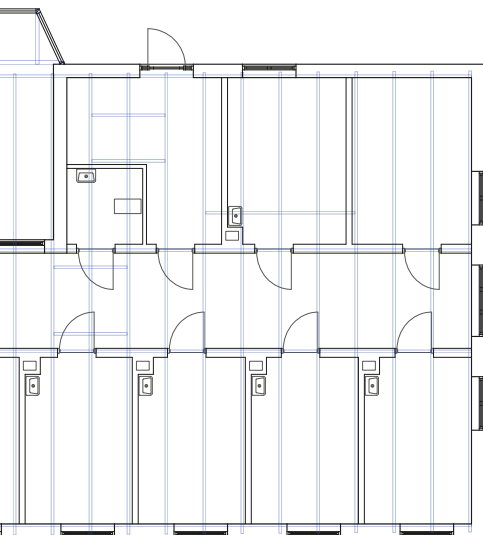
028. Historic photo of building 20
seen from park



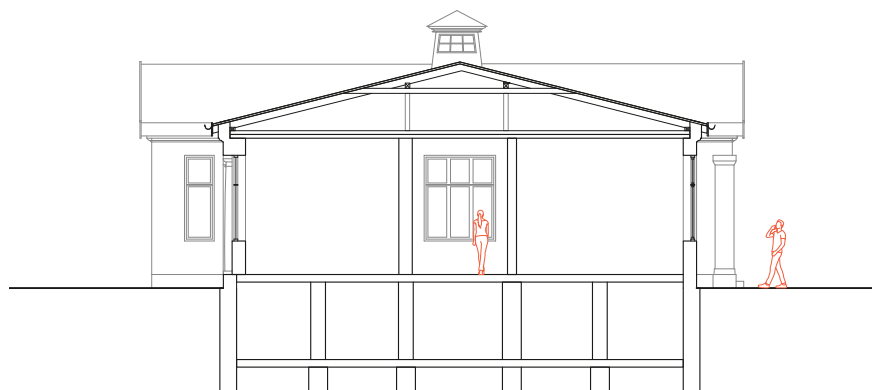
029. Historic photo of the transverse
hallway in building 22



030. South Elevation, 1:200



031. Ground floor, 1:200



032. Section, 1:200

building 21

Year
1899

Building area (BBR)
3153 m²

Architect
C.L. Thuren, Henry Meyer & Richard Blom

Function
Endocrinological outpatient department
(Originally surgical department)

SAVE-value
4

The double pavilion, designed by C.L. Thuren, Henry Meyer & Richard Blom, was built in 1899. It was a part of the original development plan, focused on building four double pavilions, whereof only two were built (Bro and Schultz, 2019; Frederiksberg Kommune, 2022). When built, the 4952 m² building housed the surgical department, which today is replaced with endocrinological outpatient department and have since been expanded with additions. It is perceived as an important building, being the place of one-on-one contact between patient and hospital staff. Architecturally the building was a unique addition to the hospital, becoming one of the first and today oldest of its kind in Denmark (Frederiksberg Kommune, 2022). Focusing on the use of natural elements and relation between inside and outside, the building was ahead of its time. As a result, the green areas are designed as a part of the building and has remained since, creating a unique atmosphere around the building. In extension, the detailed façade compliments the human perception of these spaces, creating an insepara-

ble relation in-between, while also becoming the face to the surrounding neighbourhood. The use of barrel vaults inside creates open and welcoming spaces that since has been blurred, due to the addition of interior walls.

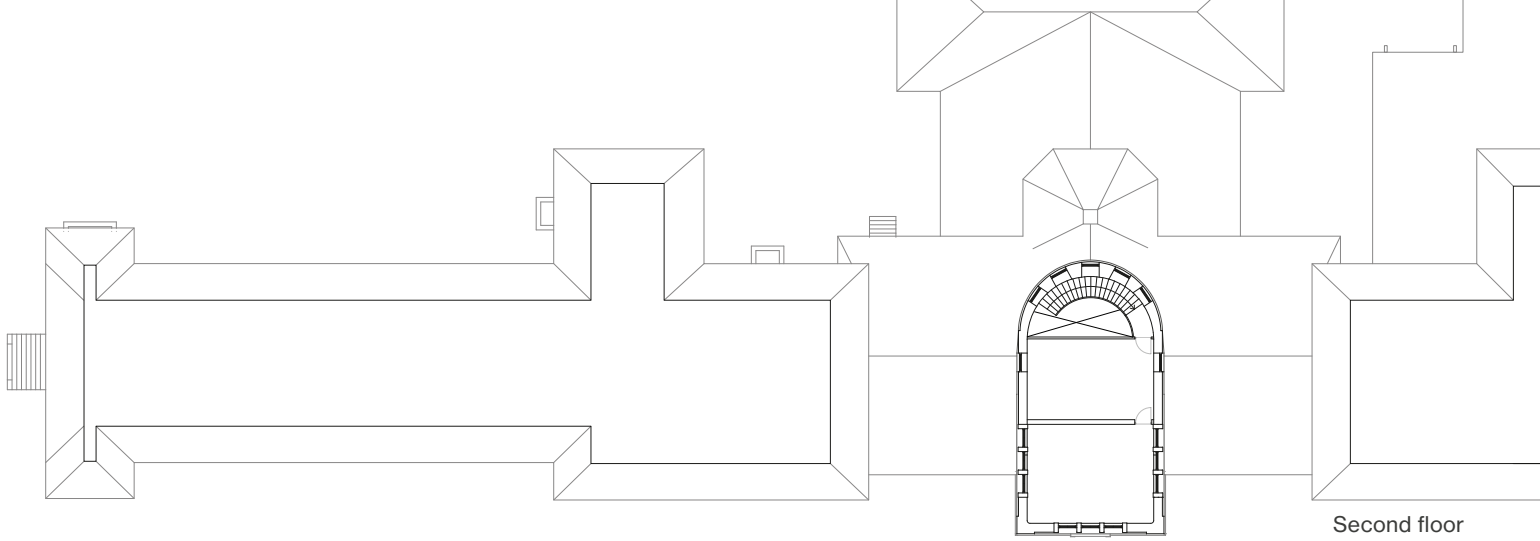
Building 21 acts as an important factor in the area's storytelling and societal relation. Its one-on-one relation between patient and staff calls for a continuation of such narrative, however, retold as a social interaction between users and typology alike. In relation, the building's exterior has a recognizable look, which is associated with the hospital's history and people's affiliation. The building's eastern façade, towards the city, is deemed very valuable that should not be reduced. Oppositely the west side of the building, show potential of embracing the green area further, transforming into a part of it. Inside, the vaulted ceilings should be embraced, due to the potential of creating gestures that acknowledge human interactions and use of building.



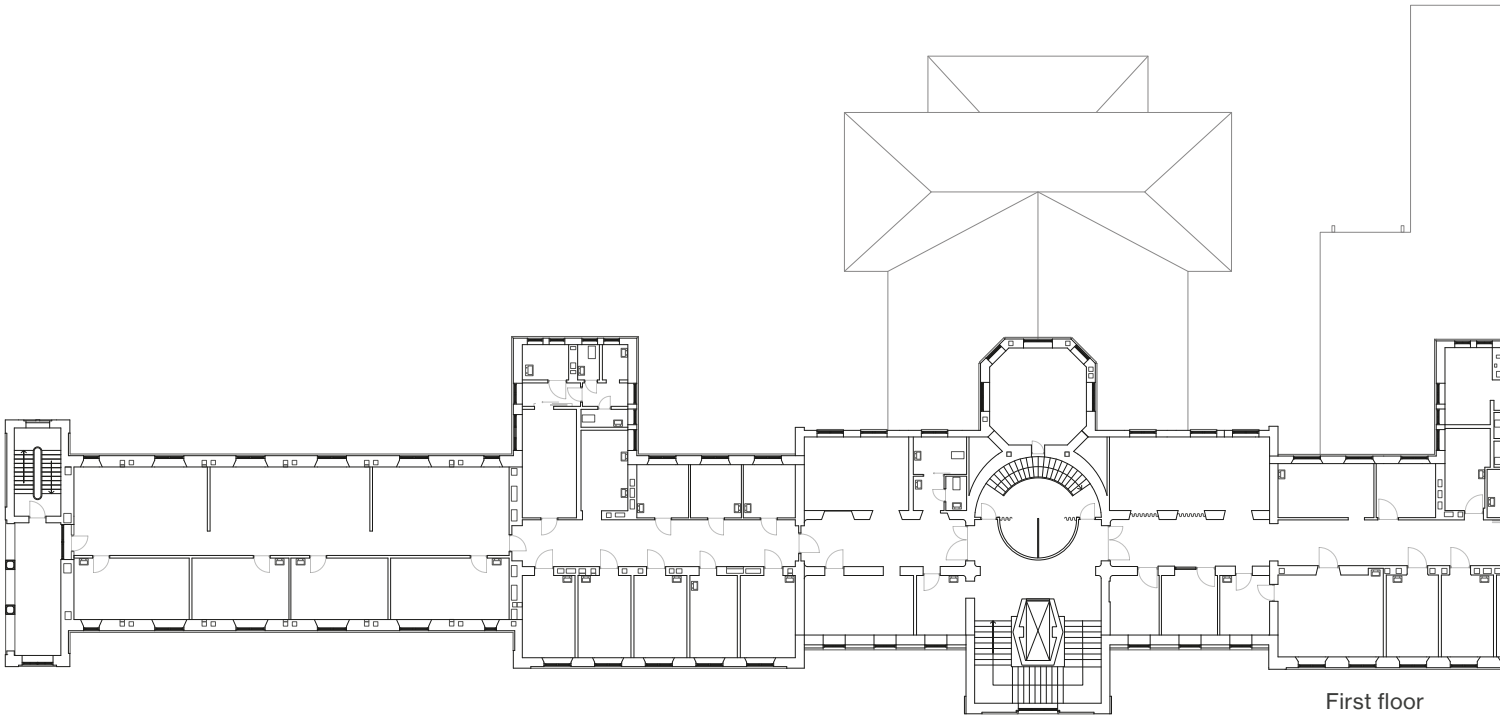
033. Historic photo of left or right wing, open flexible space for patients, 1909



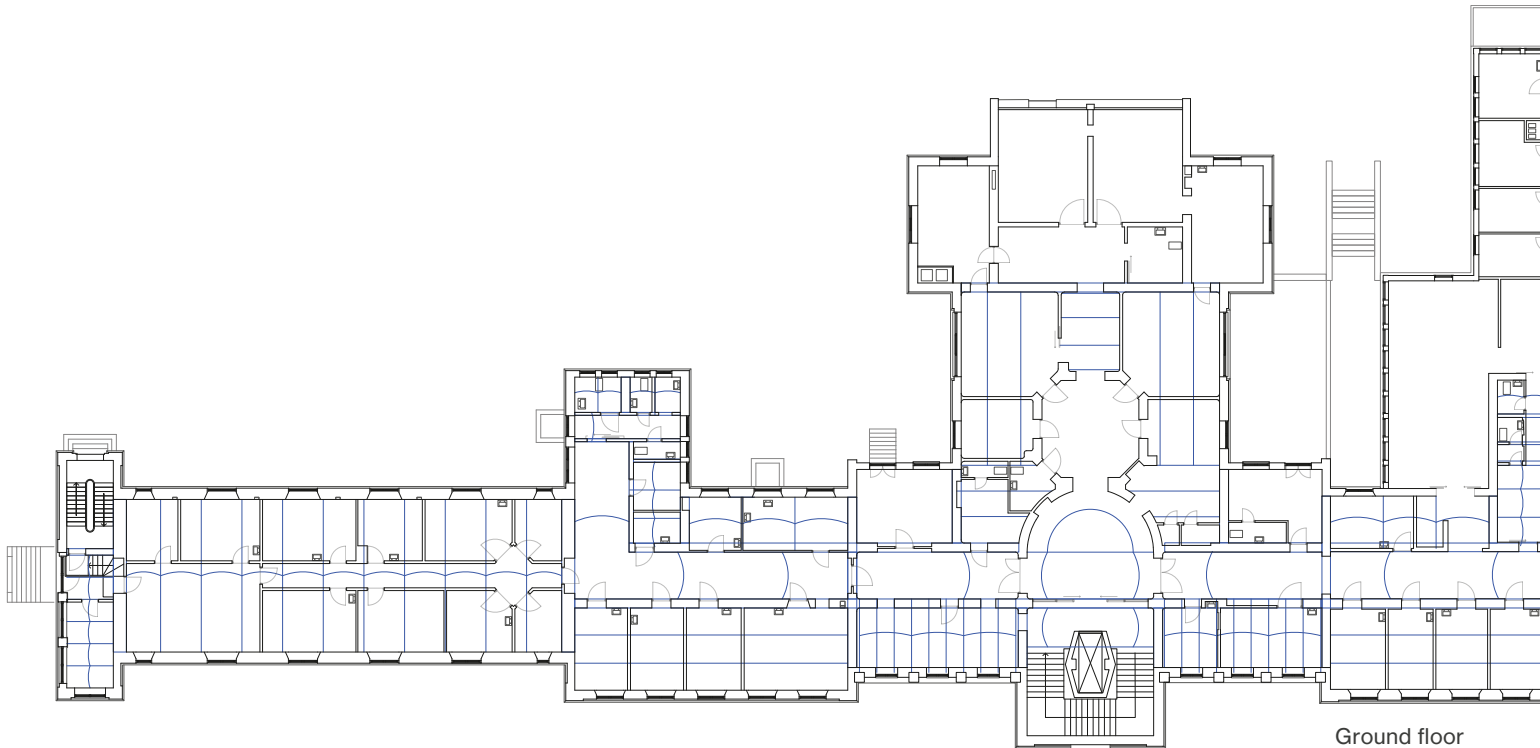
034. Historic photo of corridor with seating, 1909



Second floor



First floor



Ground floor



036. Historic photo of building 21 seen from Nordre
Fasanvej in 1909



037. North-west elevation, 1:400



038. South-east elevation, 1:400



039. Longitudinal section, 1:400

building 118

Year
1899

Building area (BBR)
2880 m²

Architect
A.S.K. Lauritzen

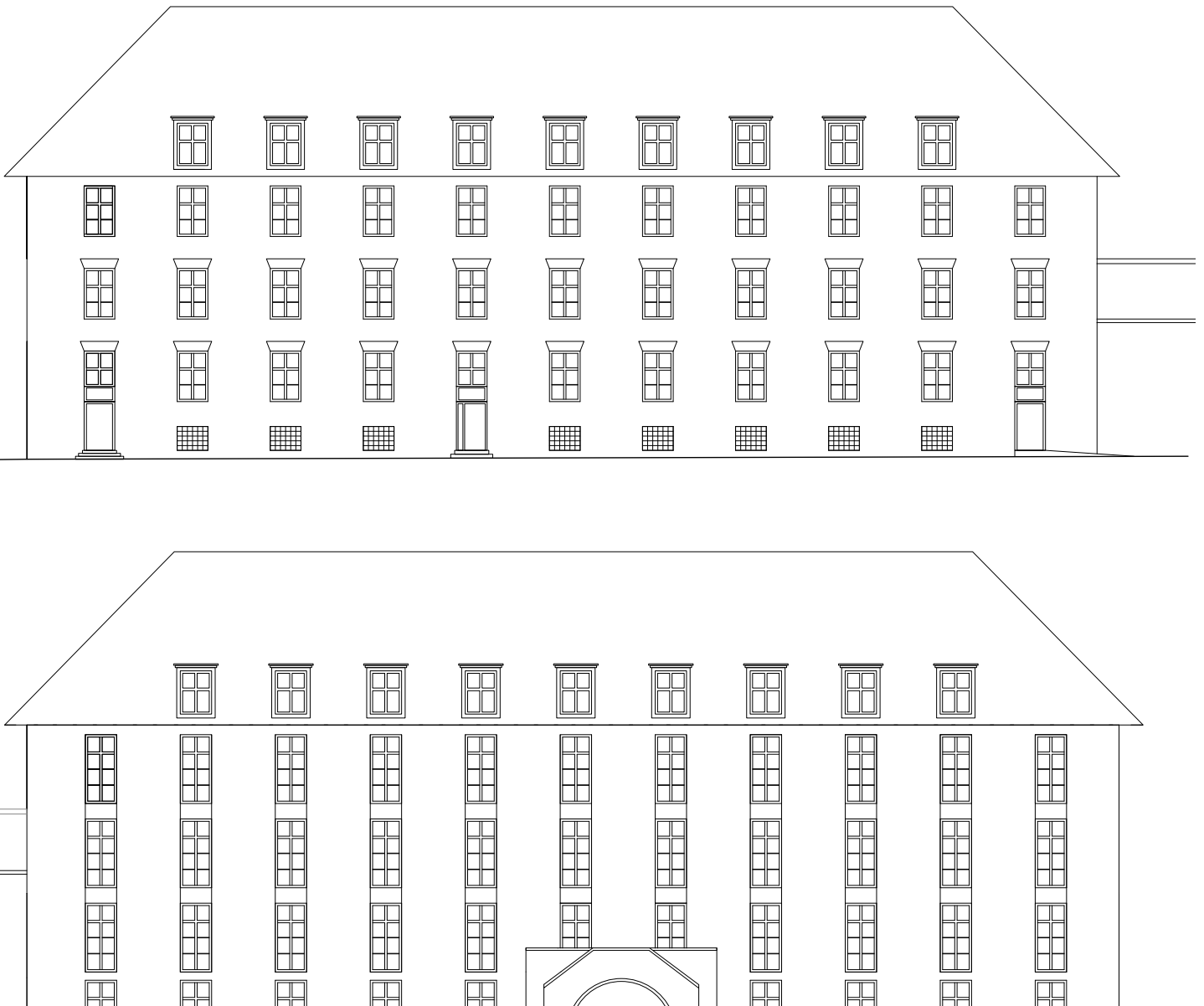
Function
Employee facilities
(Previously Employee
housing)

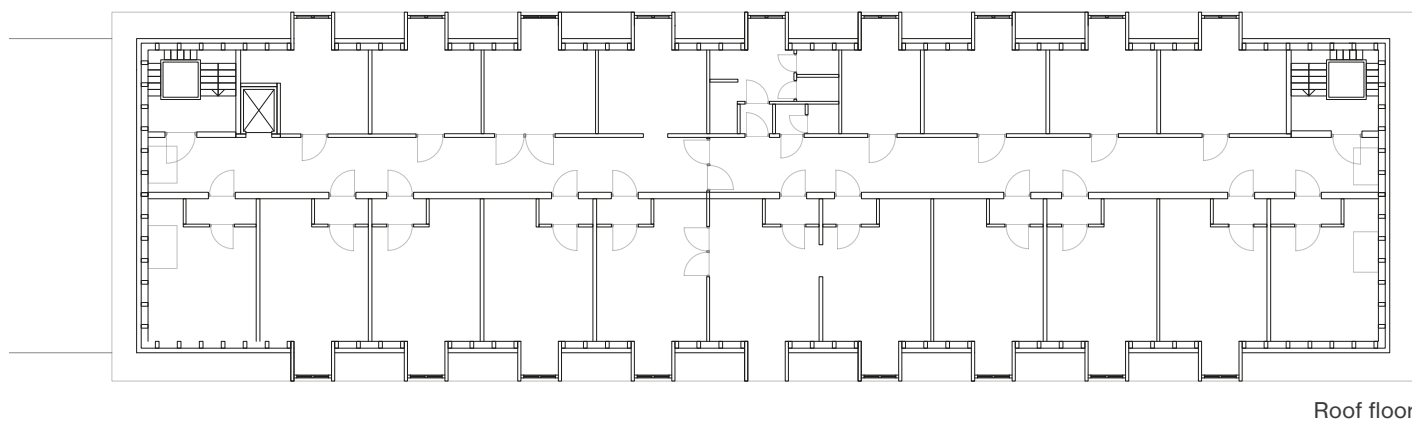
SAVE-value
-

Built in 1931, based on A.S.K. Lauritzen's drawings, the building solved an acute need for employee housing, due to nurses' obligation of staying on-site. In extension, the building was seen as an investment in the future, attracting more personal for the hospital. South of the building a green area was established, creating a private courtyard for the employees (Bro and Schultz, 2019; Frederiksborg Kommune, 2022). Today the 2880 m² building still hosts facilities for the employees, although without residence. The building is a result of its time, being of functionalistic character. Therefore, simple geometry and sparse detailing is found on the façade, however, smaller interventions of brick bonding above windows add to the expression. Structurally the building utilizes a load-bearing wall in the centre of the building, acting as a

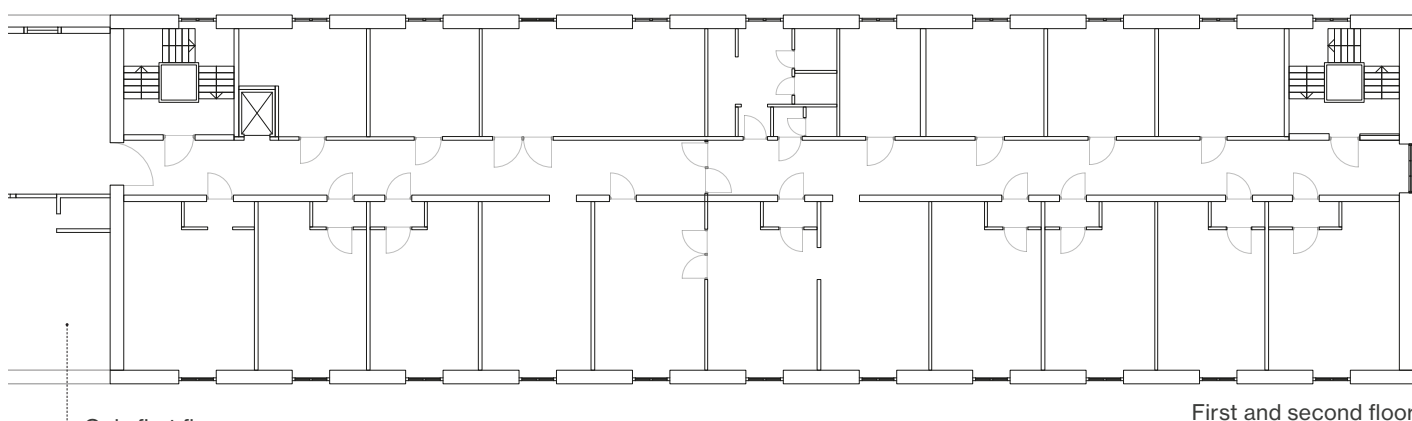
space-defining tectonic element.

As a building mostly focused on employee use, the had little value from the perspective of a patient but large value for the staff. The past function of the building creates an opportunity to utilize it in a similar manner, for living. The façade offers a private gesture which can be challenged, ensuring a transformative just approach that elevates the building. In relation the building should address its location close to the main road, becoming integral part of the experience. Structurally the building allows for a change of tectonic approach, presenting an opportunity of developing new principles and gestures. In relation this could support a narrative different from what is already there.



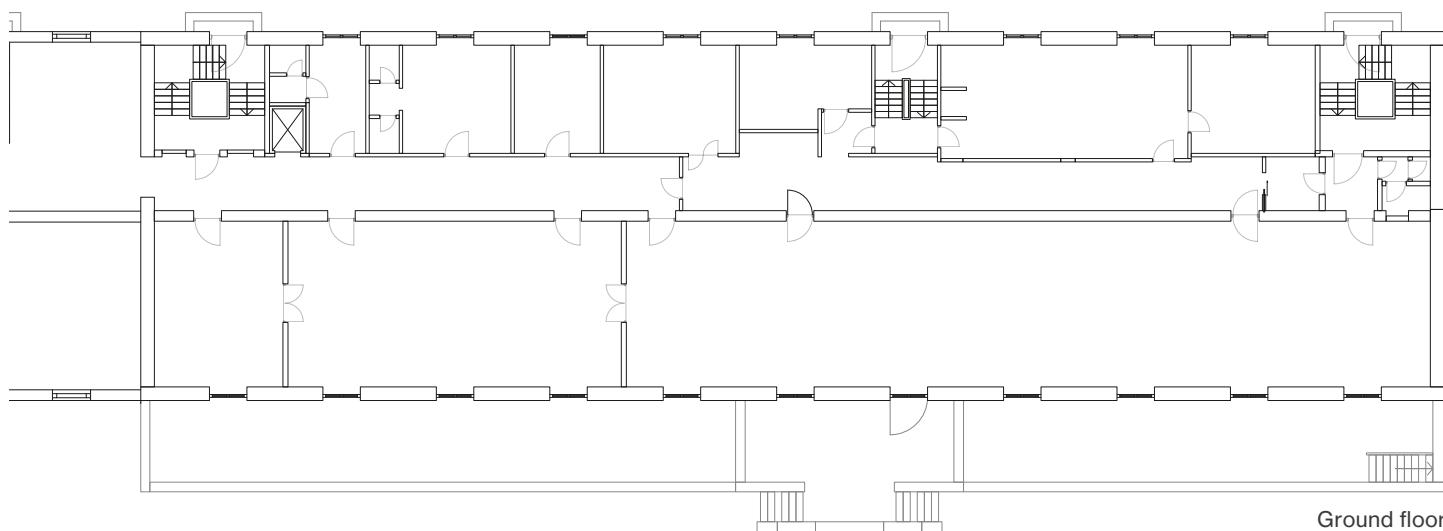


Roof floor



First and second floor

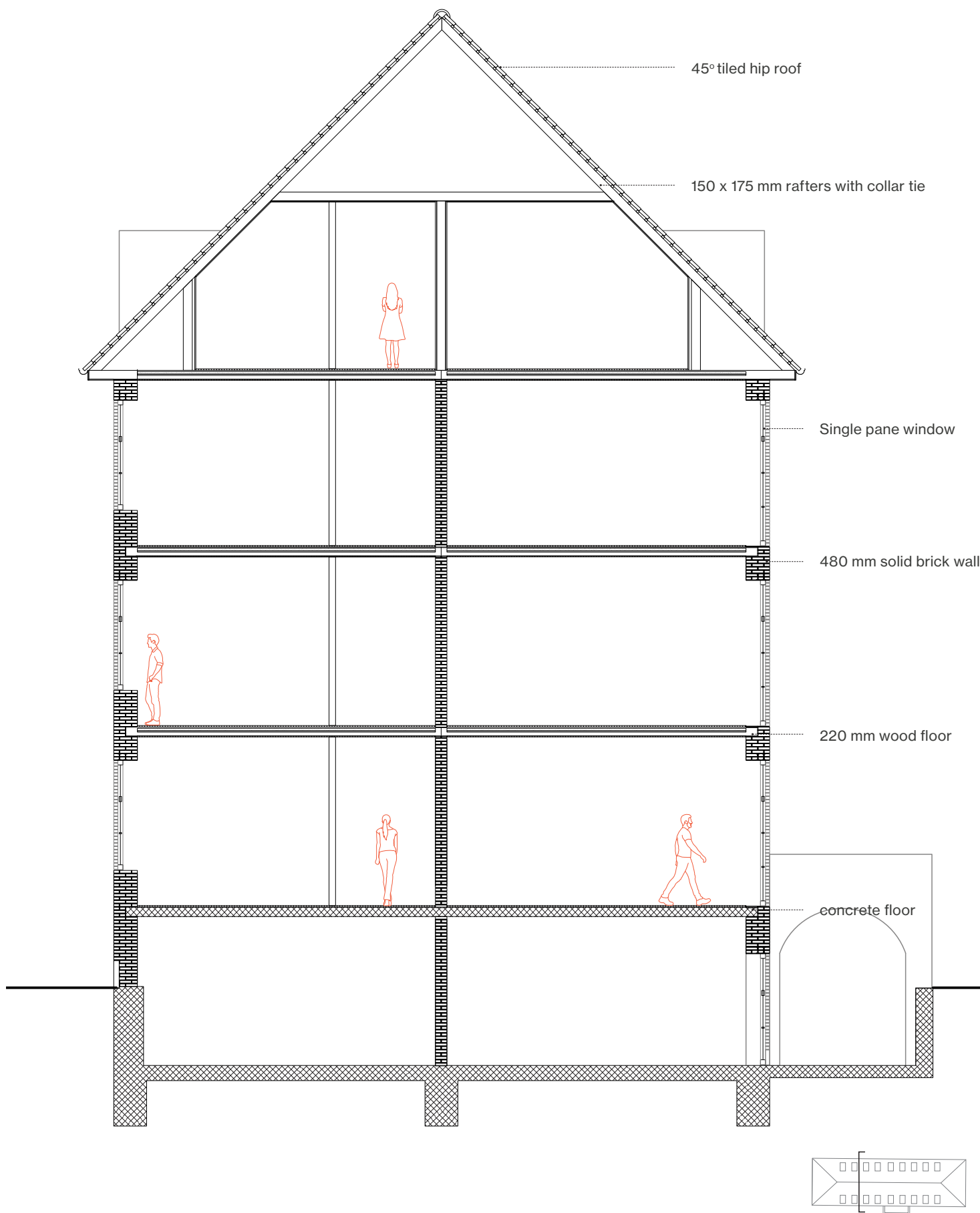
Only first floor



Ground floor



042. Historic photo of the nurses' common living room



ANALYTICAL CONCLUSION

Grounded in the theoretical exploration, the site has been analysed in the big, medium and small context, both as a physical structure and as a social structure.

The big scale informs that Frederiksberg's prosperous growth have made the city increasingly wealthy and segregated, hereof the importance of redefining it. With the large area of Frederiksberg hospital soon becoming available, there is a necessity to utilize this opportunity to address the social and cultural uniformity of the city.

By renouncing existing spaces for the purpose of exchanging knowledge, skills and experiences, together with providing the necessities of living, people with other resources, in terms of wealth, can be re-introduced to the city. The change of function presents a setting for people to find purpose and a sense of accomplishment. The merging of necessary and optional functions creates positive synergies and have the potential to bring different groups of people together and gain a deeper understanding of each other. Creating new value and benefiting not only the people but also the city.

Zooming in on the site of Frederiksberg Hospital it becomes apparent how essential the function is in the collective memory of the locals. Both as a symbol of welfare but also as a symbol as an independent city. Historic and cultural symbols that must be recognised but also redefined. With its large open spaces and diverse buildings that separate

themselves from the city, the place requires interventions that respond to the city, transforming this setting into something new. It becomes a task of changing the gesture of existing structures, utilizing the elements of fence, gate, road, squares, to invite new segments of people. This through the unification of the experience of the hospital with experience of the city, becomes and reclaims a space for people.

Despite the hospital having a social and physical value for the locals and the city, all the buildings have distinct narratives that varies based on their functional, architectural, cultural and historical context. It is therefore becoming relevant to narrow down the area of intervention for the thesis' architectural exploration. The area near the main gate and primary axis is chosen due to its relation to the city and apparent opportunity to interfere with the current narrative, from a structure that supports people to a place people can actively participate in. Building 20, 21 and 118 each unfolds different spatial experiences and opportunities that inspire specific use and types of alterations. By expanding the gesture and use they become an element of continuity. Pieces of catalyst architecture.

The theoretical and analytical framework show the potentials of how already existing resources – physical, social, functional, cultural and personal can inform a new typology that merges the small, medium and big scale.

a new typology



Temporary



Permanent



SCOPE

This chapter synthesizes theory and analysis, delimiting the approach of the thesis. Defining the problem to be solved, and furthermore what elements the solution must aspire, gives a sense of scope and vision. To delimitate these, users and their needs, functions of the project are defined, finally culminating in design principles.

PROBLEM

a new way on thinking?

How can the creation of a new typology give value and purpose to its inhabitants utilizing their resources, while creating awareness and opportunity to address the city's societal issues? A typology that is in dialogue with its surroundings, not only physically, but also understands the societal structuring of Frederiksberg and its citizens. By renouncing existing spaces create an awareness of the value of people's resources, while promoting interactions across demography, culture and status.

How does such a typology house people with different resources, promoting a sense of community while creating personal self-awareness and purpose. Housing that incorporates necessities of inhabitants in social flexible ways, while adding to the value of everyday life through the unfolding of different spatial experiences and tectonic qualities.

How can necessities of inhabitants, become a link between typology and city, being an optional activity for visitors? Becoming an element in a larger system of societal- and cultural context, rethinking the societal approach to city, people and the joint development.

Finally, how can redefining Frederiksberg Hospital, along with the collective memory of locals, become a catalyst of a city for all? Becoming a hub for resources, relations and exchange, that through a synthesis of all, create a new social prosperous development.

USERS

those who feel overlooked

A new typology, creating social relations and self-awareness, requires an understanding of the people using it and what is necessary for them to acquire this. Furthermore, based on theory, the necessary and optional activities of the user should be considered in this regard, allowing them to elevate in their potential and quality of life. This specification of the users does not limit the typology to the specific groups, it should cater to people of all cultures and social groups, but it helps ensure its ability to fulfil human needs and bring architecture of higher quality to fruition.

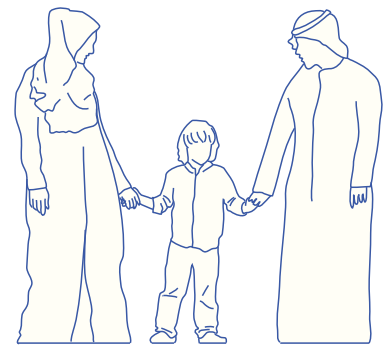
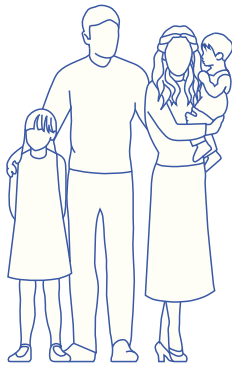
As cities become homes of the wealthy, groups with other resources are relocating outside the city. Such groups are the vocational workers, prioritizing their family and future possibilities, when being challenged economically. Moving out of the city, so too does their occupation, changing the demography of the citizens and jobs. Furthermore, a stigmatisation and skew social relation between these cause a social distress and neglect among the group. As such, vocational workers need a re-introduction and purpose in the city, acting as steppingstone to an elevated quality of life.

Students are today defined by a large group of people feeling lonely and depressed. And by being the biggest demography in Frederiksberg, the new typology could both utilize and solve the issues students have. A lack of

community, new relations and activities outside of their studies, students seek ways of socializing without having to compromise their studies. Creating an understanding of other people, cultures and occupations, the typology can socially strengthen students transition from young to adult.

Environmental and political calamities have resulted in vast numbers of people seeking refuge. Especially political situations of today, has made this group bigger in numbers and more relevant to address than ever. Being involuntarily displaced, refugees seek shelter while being able to participate in society, bringing new resources back to their home country when able to. However, due to stigmatization and neglect refugees cannot participate. Exchanging resources while becoming a part of society, show a potential in elevating the typology, along with the quality of life for refugees.

Bringing people such as vocational worker, students and refugees together recognizes their individual necessities, creating a place that embraces their occupation and resources, while accommodating their social needs. Utilizing this in functions that create community and societal relevance, develops into interactions, recognition and self-awareness. As such, the typology catalyses a change of societal perception of these groups of people, along with the way we socially construct our city.



Vocational worker

Student

Refugee

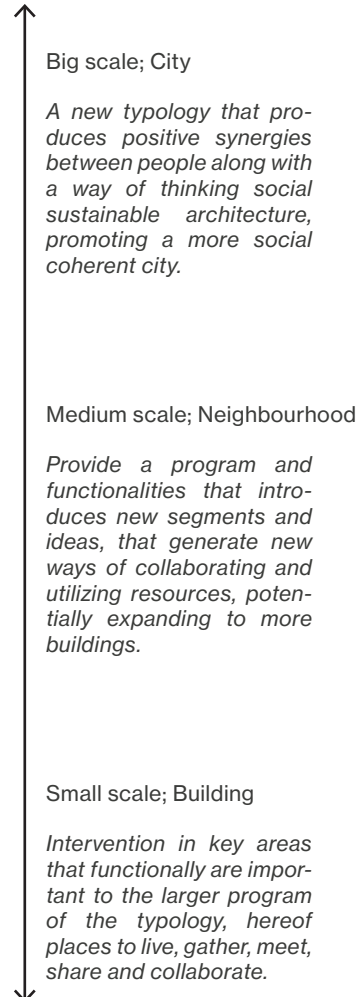
Feelings	Isolated, excluded, less valuable	Lonely, insecure, overwhelmed	Loss of familiarity, guilt, fear, vulnerable
Wants	Respect, sense of accomplishment, social acceptance	Part of community, confidence, acknowledgement, influence	Safety, freedom, security, contribute to society, inclusion
Necessity	Family-friendly environment, widen their social network, gain new resources	Social bonds and attachment, activities and occupation outside of studies	Participate in society, work or occupation, support, stability
Contribution	Share experience and talents, create jobs and opportunities	Enthusiastic participation in social events, volunteering,	Share experience and talents, sharing their culture

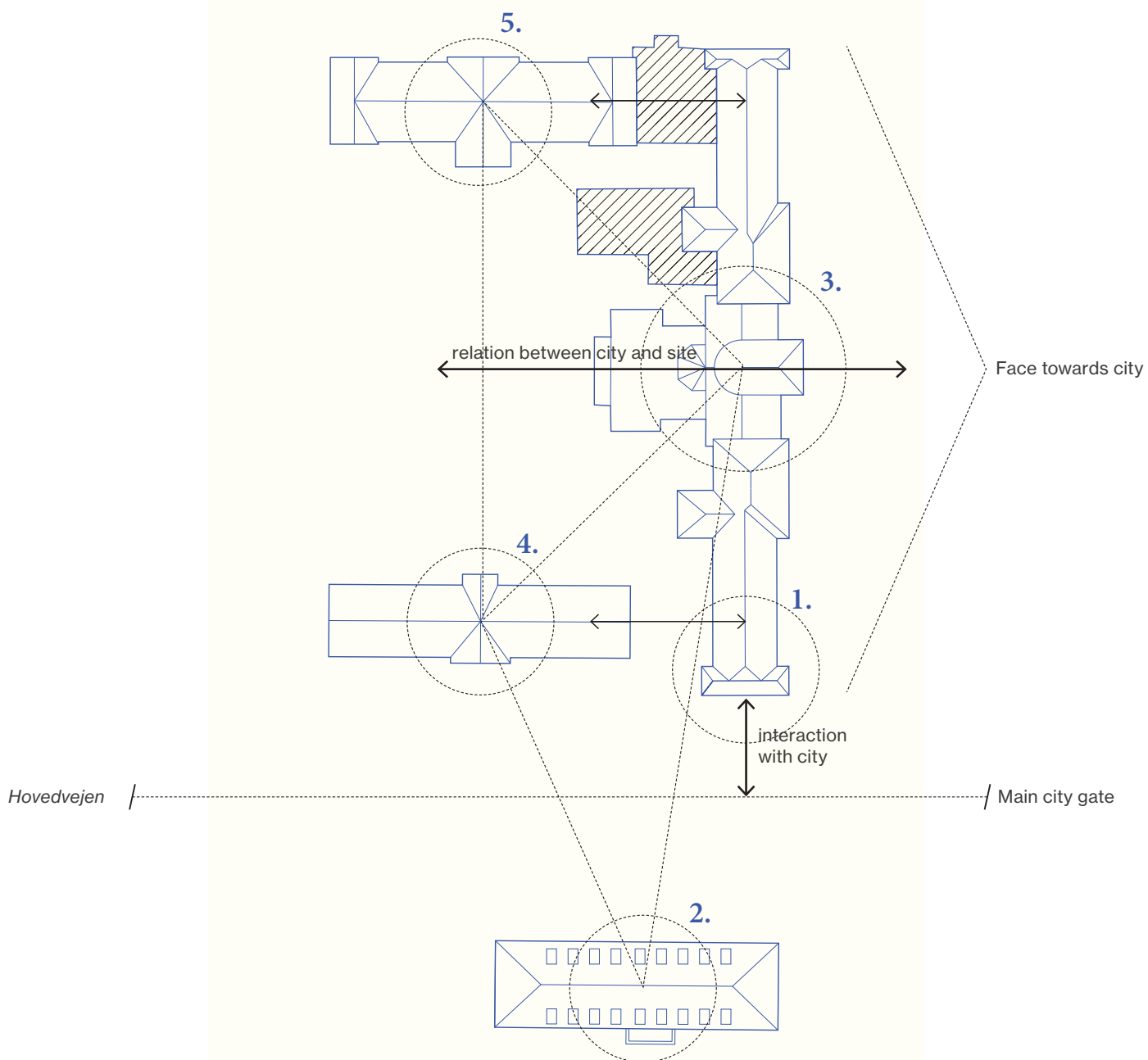
ARCHITECTURAL FOCUS

hierarchy

Architecture plays an important role in how humans perceive and use the city and each other. Therefore, the main architectural focus of the thesis will be changing the social fabric of Frederiksberg through the introduction of programs and functionalities in existing structures, that produce positive synergies between people. By focusing on a specific group of people there is an opportunity to re-introduce them to the city through these functions. The main architectural drivers therefore become the study of what components are necessary to live, together with the study of how mixing necessary and optional can produce situations that encourages new connections and narratives.

Having existing buildings that are part of the collective memory be the base setting of the project, allows the architecture to raise questions and take on the new narrative through interventions, effectively impacting both the big, medium and small scale. A hierarchal understanding of the importance and influence of each element are key in focusing the design study of the thesis.





FUNCTIONS

Synthesising theory, analysis and user, functions and activities of the typology are chosen based on the elaborate relation and intention that these will have together, being parts of bigger whole. Together creating a meaningful and impactful everyday life of the inhabitants, along with new avocations and possibilities for the city.

Forum

Acting as link between typology and city, the forum hosts events that unite these. Creating awareness of the typology's inhabitants, resources and co-operation with companies, open events seek to bring the city in, while promoting learning together. The forum is therefore a culmination of the typology's functions, acting as learning space, studio and thematic exhibition, being able to adapt to each.

Administration

Hosting the administering tasks of the typology, this smaller office extends the forum's relation to the city, handling communication to companies and scheduling workshops for the complex. Furthermore, visitors have easy access to the function, allowing for volunteers to apply and actively be a part of the typology.

Conservatory

Acting as a tranquil gathering space between other functions, the conservatory seeks to bring peace of mind to inhabitants and visitors alike. Extending the surrounding nature to the inside, personal time, casual talks or social gatherings take advantage of a different spatial experience, defined by natural elements. Furthermore, educational gardening and learning of plants can likewise take place in this space.

Design & art, Craftsmanship & production and Technical machinery

Combining theory and practical aspects of different occupations, these functions seek to act as inhabitant's spaces of exchange. Learning and sharing are key components, which is likewise reflected in the interior spaces,

allowing both group and individual learning, along with necessary equipment. Being focused on different occupations, changes of spatial gestures accommodate the types of learning and activities.

Knowledge

In this space, inhabitants can explore theory and knowledge themselves or with others through reading, talking or being taught these.

Youth education

The function provides a space for a more playful approach to learning, allowing for younger age groups to learn and have a base. Furthermore, the space reinforces inter-generational learning, becoming not only a space for the adults.

Food & service

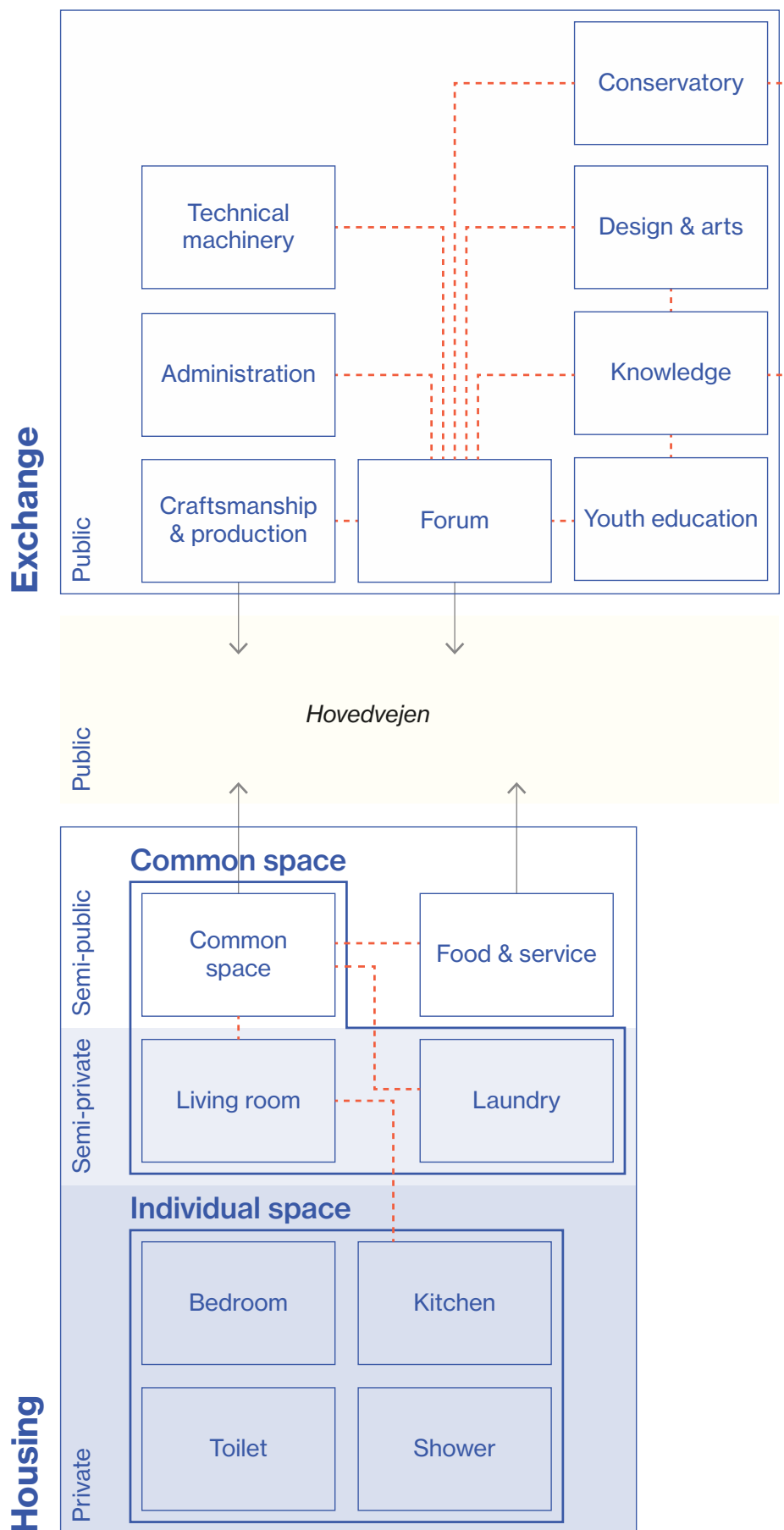
Inhabitants are taught how to prepare and cook food, furthermore, learning how to service in this industry. A flexible space and moveable appliances, allows the kitchen to simultaneously operate as the common kitchen for inhabitants in their housing building. The kitchen is connected to a larger dining area that function both as a cantina and a communal dining space.

Housing – Shared space

Seen as an extension of the inhabitants' personal space, the area is a collection of various spaces and functions, and therefore different kinds of use. Inhabitants are both able to operate these themselves or with the remaining community, becoming spaces of interaction.

Housing – Personal space

The inhabitants' personal space act as their base of everyday life, where they are in control. Space optimized apartments, allows for safety and relaxation, while promoting participation in the common activities. Through the housing the typology aims to provide a temporary stay, that give the residents safety and stability to promote social relations and a network.

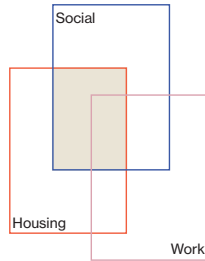


Space	Amount*	Size [m ²]	Intention	Use	Gesture
Exchange					
Forum		321	Link between inhabitants and city, show value of resources and typology.	Interactions, exhibitions, exchange of resources. Learning.	inviting, including, exploration, inviting, fluctuation between open and enclosed
Main forum		185			
Small forum		106			
Lounge		24			
Toilet		6			
Administration		33	Manage typology activities, communication with companies.	Start conversation with inhabitants and visitors, work	Including, informal
Office		18			
Meeting room		6			
Kitchenette		6			
Toilet		3			
Conservatory		355	Place of relaxation and contemplation, interact with gardening resources, gathering space, contemplation.	Gardening, place of conversation, events and gatherings, mindfulness sessions	Tranquil, inviting
Conservatory		325			
Toilet	3	5			
Showers	3	5			
Storage		5			
Design & art		284	Exchanging resource, create relations over common activity.	Use and exploration of topic, interactions, learning and sharing, creativity.	fluctuation between intimate and social, focused and collaborative, inspiring vibe
Workshop		185			
Group area		20			
Focus area		16			
Theoretical room		38			
Storage		15			
Toilets	2	5			
Kitchenette		2			
Craftsmanship & production		513	Exchanging resource, create relations over common activity, visible to visitors.	Use and exploration of topic, interactions, learning and sharing, machine operations, extend to outside.	fluctuation between intimate and social, focused and collaborative, energetic vibe
Workshop	2	126			
Material library		85			
Group area		50			
Focus area		22			
Kitchenette		2			
Showers	2	16			
Toilets	2	6			
Technical machinery		536	Exchanging resource, create relations over common activity, visible to visitors.	Use and exploration of topic, interactions, learning and sharing, machine operations, extend to outside.	fluctuation between intimate and social, focused and collaborative, energetic vibe
Workshop	2	150			
Material library		60			
Group areas		50			
Focus areas		22			
Kitchenette		2			
Showers		16			
Toilet	2	8			

Space	Amount*	Size [m ²]	Intention	Use	Gesture
Knowledge		323	Exchanging re-sources, a common space for learning on a theoretical level, learning together.	Reading and discussing, listening to presentations, private immersion.	Motivational, fluctuation between focused and sharing
Theoretical room		30			
Reading area		50			
Library area		80			
Group area		30			
Focus area		30			
Lounge		32			
Kitchenette		2			
Toilet	3	6			
Youth education		323	Exchanging resources through activities and play, a inter-generational space for learning.	Sessions of learning, fun and games, playing.	Fluctuation between playful and serious, energetic and motivational
Theoretical room	2	30			
Studio / Hall		185			
Play area		32			
Group area		26			
Focus area		10			
Toilet	2	5			
Housing					
Common space		1000	Inhabitants' place of interacting with eachother, everyday living.	Do daily tasks, engage in community activities. Share experiences and culture through conversation, cooking or a game.	Open and intimate spaces, pleasant, social, conversation, connection to outside, transition to public.
Food & service		110			
Common dining area	4	90			
Common living space	1	130			
Entrance		60			
Mail room		17			
Laundry		30			
Outdoor space		85			
TV Lounge	3	50			
Toilets	5	6			
Individual space, big	15	35-45	Everyday life, home, safe space of inhabitants.	Do daily tasks, living personal life, be yourself.	Intimacy and privacy, adjustable level of interactions, transition to common.
Kitchen		11			
Bedroom	2	4			
Social space		4			
Intimate space		2			
Bathroom		2,5	Big apartments: 2-4 persons, either friends, strangers or families		
Individual space, small	9	25-35			
Kitchen		11			
Bedroom		4			
Social space		4			
Intimate space		2			
Bathroom		2,5			

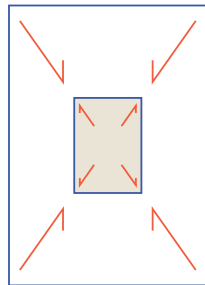
* if blank the amount is 1

DESIGN PRINCIPLES



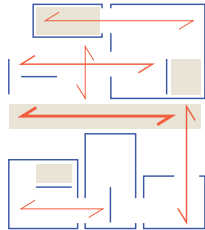
Mixing live, work and social functions

Promoting community and interactions by mixing optional and necessary activities.



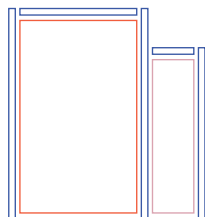
Expanding inwards

Utilizing existing structures, expanding the potential and gesture inside.



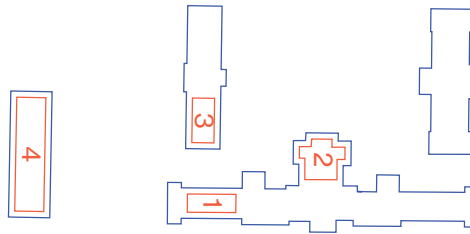
Clear hierarchy in private and public spaces

Identification of transition zones, insinuating use of space and interactions.



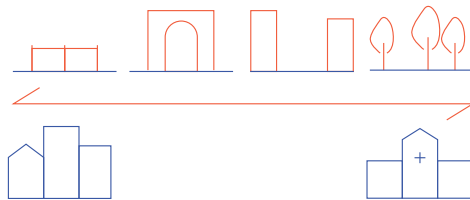
Physical elements invite specific use

Creating opportunities to develop new type of alteration.



Hierarchy of intervention

Different levels of intervention responding to the building's value and future function.



Unifying the experience of city and site

Using elements of fence, gate, road and squares to emphasize the experience of the hospital with the experience of the city, to invite new segments.



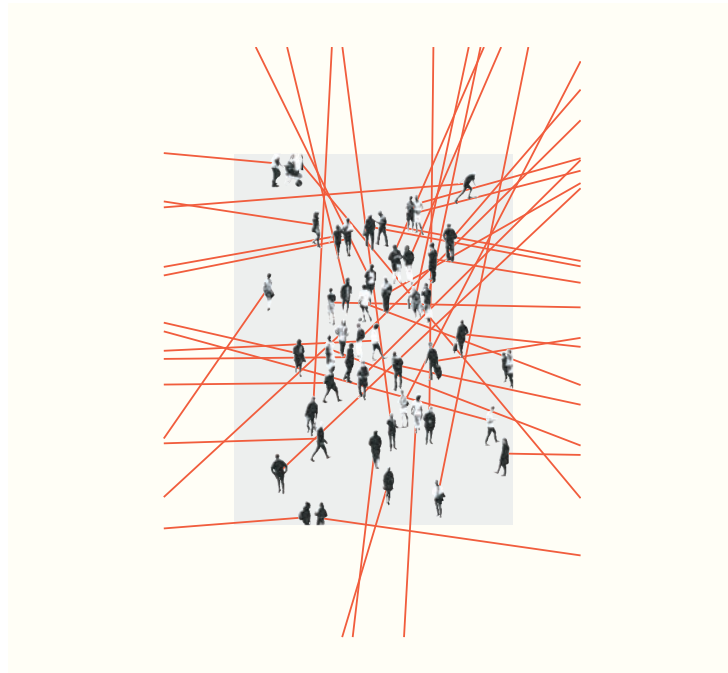
Break down the scale

Break down the large complex expression to a relatable human scale.

PRES- ENTA- TION

This chapter presents the result and solution synthesising theory, analysis and the defined scope. Presenting the concept of a new typology, its functions and relation between these are explained, along with how this together solve a social problem of today.

CONCEPT



050. Creating a place for different people to exchange, gather and meet

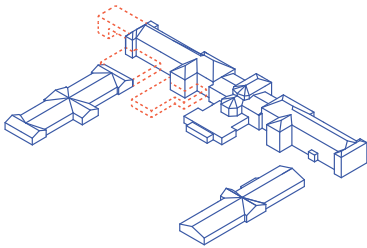
a transformation to a place of (ex)change

The exploration of theory, analysis and scope, in an iterative design process, has resulted in the new typology for Frederiksberg Hospital to house. A typology that seeks to promote a change of thought when developing Frederiksberg and cities like it, ensuring a social sustainability development. Through a promotion of self-awareness and social relations using existing cultural architecture, people with other resources than wealth can be re-introduced to the city, sharing their resources.

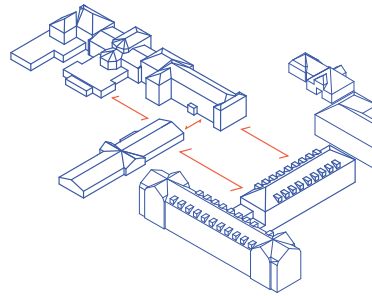
Elevating the quality of life of people, stigmatized by their differences, requires a place to learn, share, meet and communicate – a place of exchange. The typology seeks to bring a purpose to people, creating a sense of mutual dependence and respect through a programme that foster skills and knowledge and provides tasks that gives a sense of responsibility. Breaking away from feelings of needing help and being a burden, people elevate themselves through talents, interest and sharing their resources they have or learn, creating value for themselves and the community. Hereby gaining motivation and value

by contributing to society and becoming acknowledged in the city. Furthermore, in the process of doing this new social relation can occur both on-site and outside, further emphasizing the self-awareness of the inhabitants of Frederiksberg. Such a typology does not need new types of functions, but instead new programmatic synergies. Incorporating shelter for people creating a space of security, while promoting a sense of community, allows individuals to develop themselves and find their place in society. This in correlation with an exchange of resources develops to a common platform of meeting and personal development, becoming a steppingstone into society.

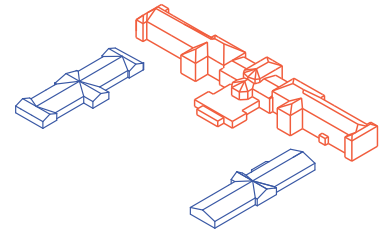
As such a place of exchange becomes a sustainable construct in the city, promoting a social consideration and awareness when developing the city of tomorrow. It becomes a place for people to get re-introduced to society, informing both them and the city surrounding them in the process, breaking away from current stigmatizations.



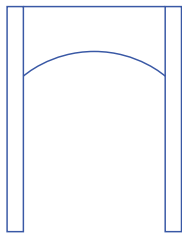
Removing extensions, clarifying historic building's expression.



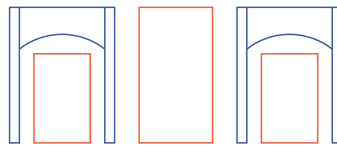
Connections between functions create a cohesive experience across social and physical.



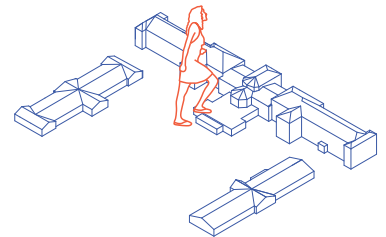
Use cultural history of buildings to promote a new social typology.



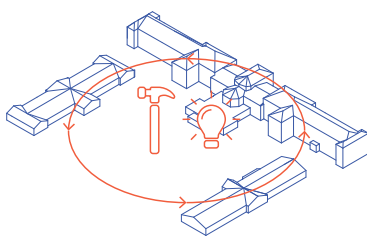
Structural principles draw inspiration from existing principles.



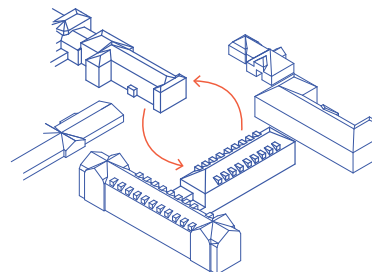
Structural principles define spatiality.



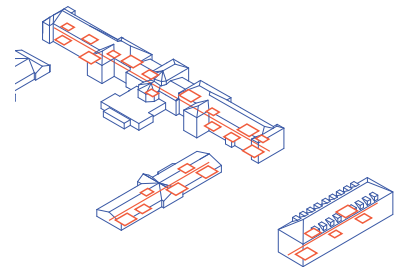
Elevate people with other resources, allowing them to be re-introduced to the city.



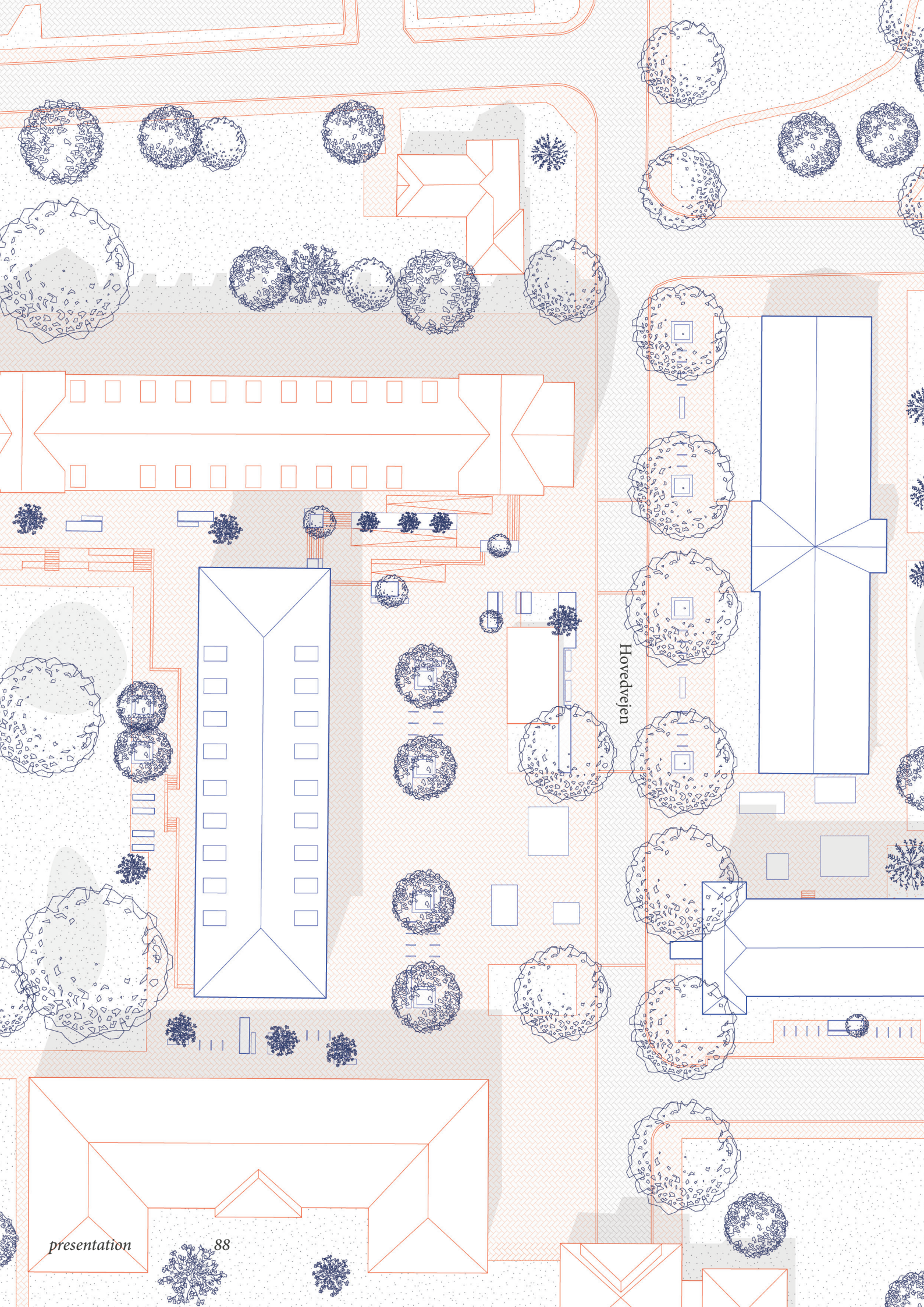
A program that combines practical and theoretical learning.



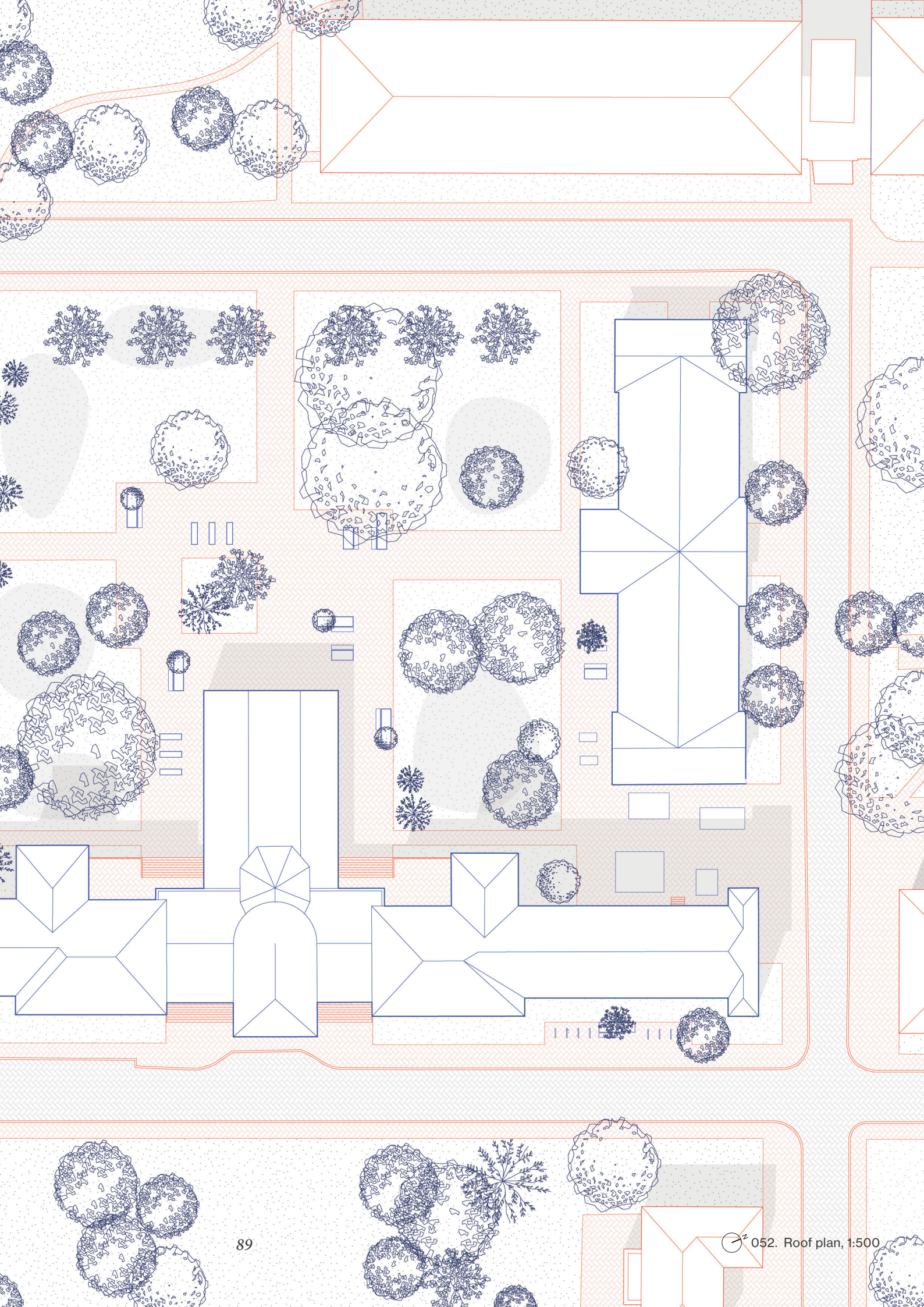
A place to work and live, creating new social synergies.



Hallways define movement through buildings, while creating smaller spaces and niches.



Hovedvejen



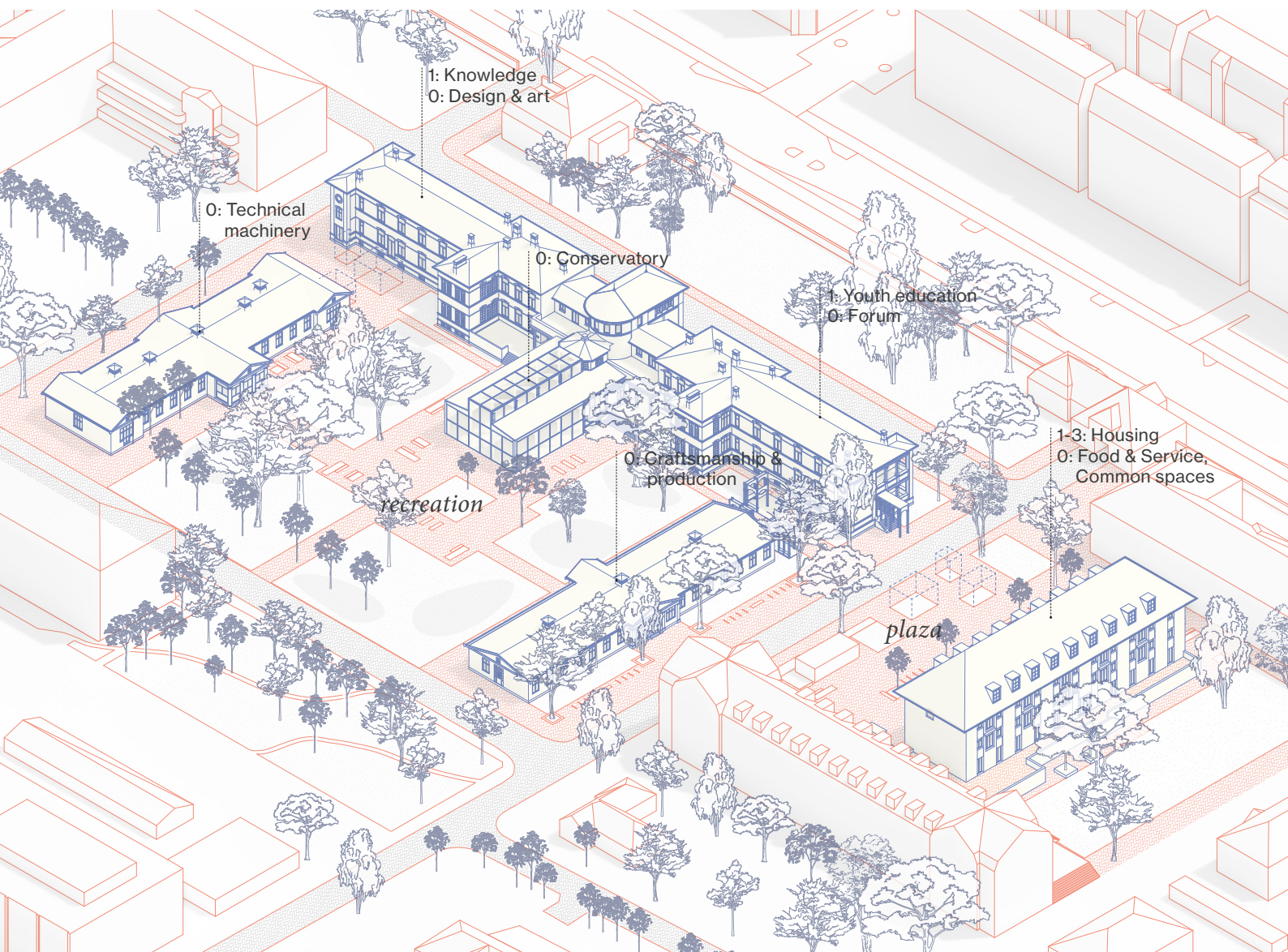




053. Visualisation of main entrance seen from Nordre Fasanvej

The centre of building 21 act as main entrance, opening and inviting people to discover the place.

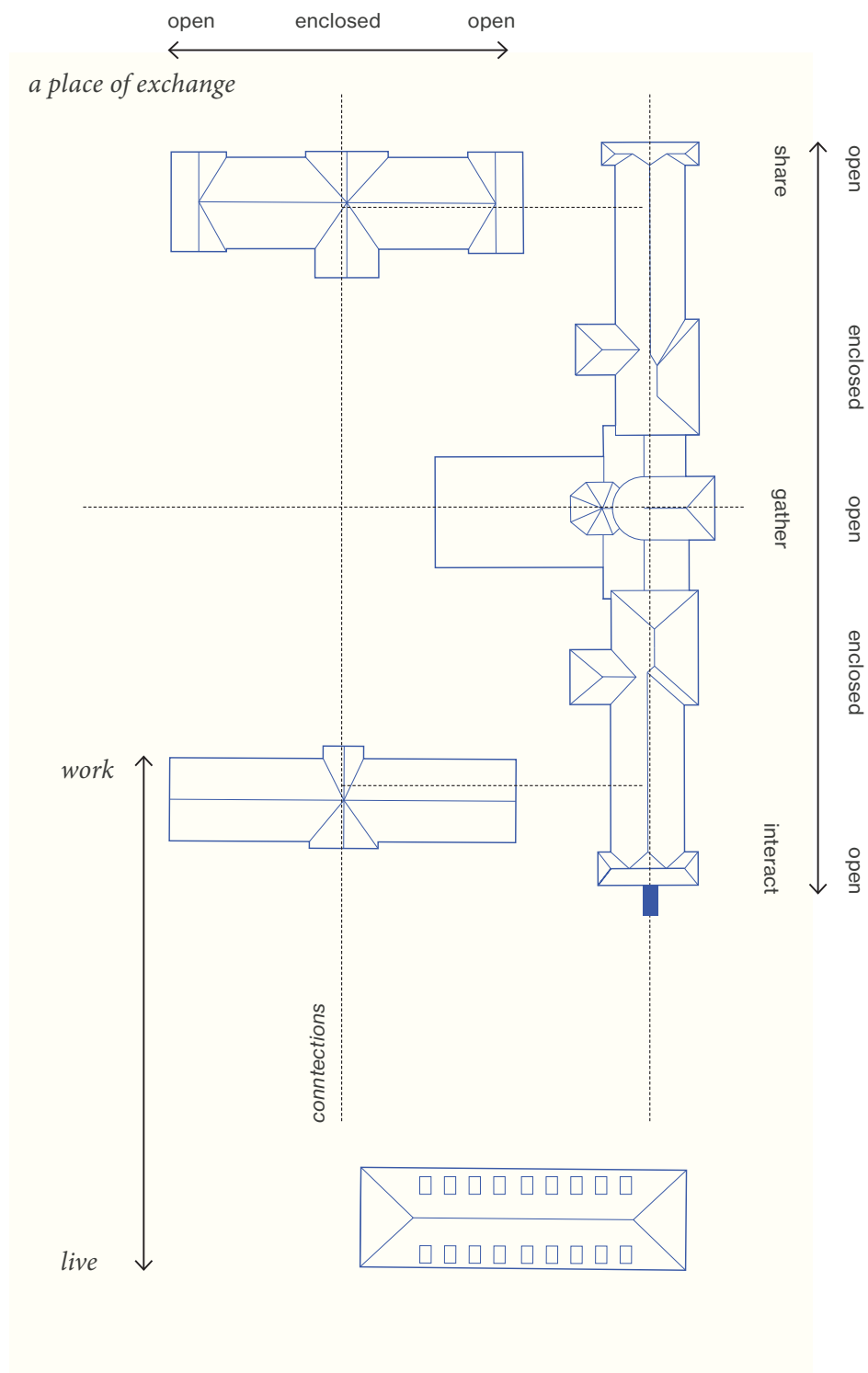
FUNCTIONS



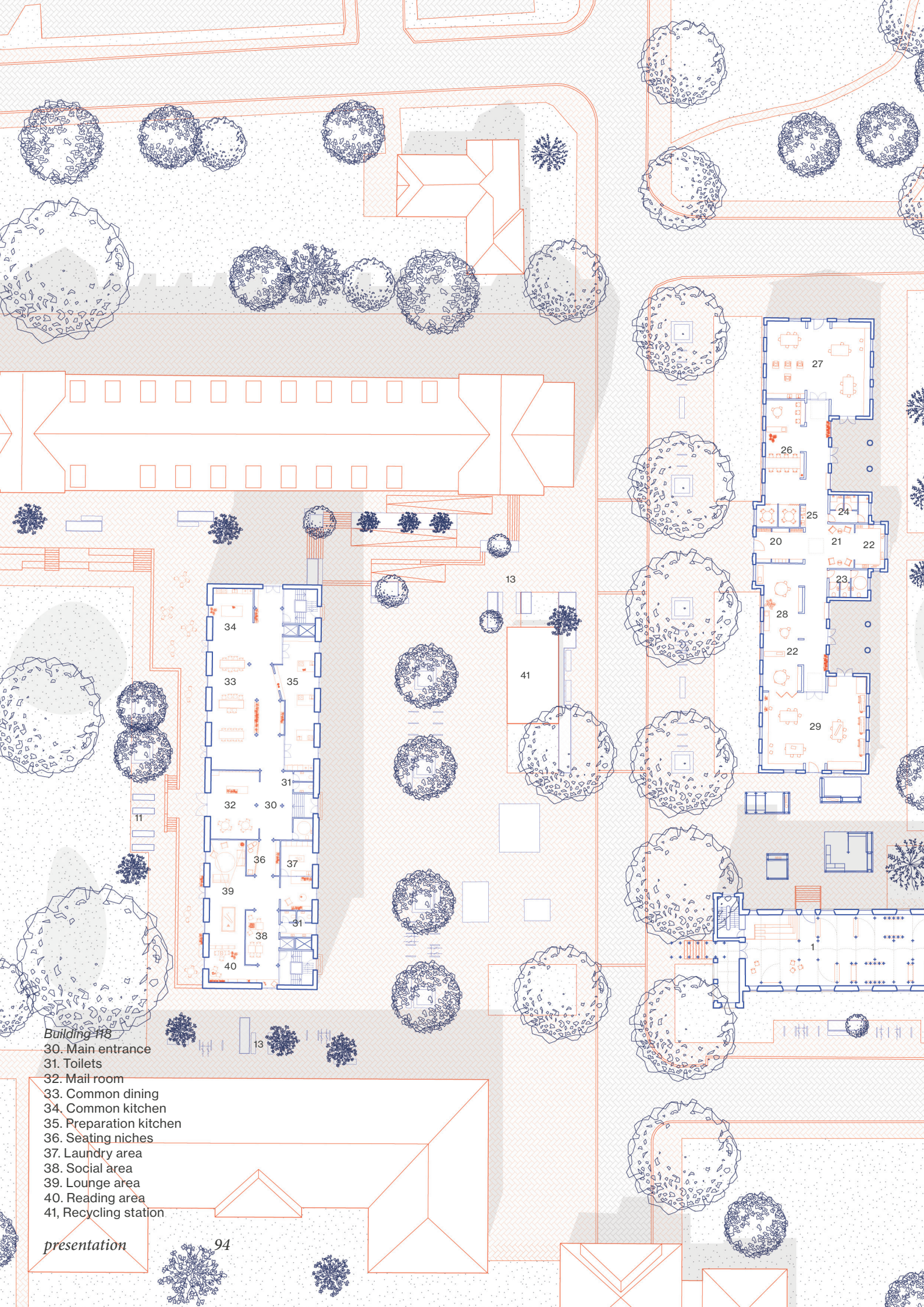
054. Placement of functions

Relation between functions and how users utilize them is represented in the programming of buildings. Buildings 20 and 22 act as practical workshops, having specific requirements in terms of machinery and security. In close relation, building 21 hosts a mix of open and closed spaces, providing learning workshops and gathering points. Towards Hovedvejen, the forum acts as a place of interaction between typology and city, linking

inhabitants with citizens of Frederiksberg. Proximity of Hovedvejen and remaining buildings, building 118 acts as a place for users to share experiences and culture through common facilities. While hosting a food and service workshop, the ground floor transitions private and public, being a place of interaction and community. On the remaining floors interior streets of temporary housing strengthen communal relations and create a safe space for inhabitants.



055. Functions concept



Building #18

30. Main entrance

31. Toilets

32. Mail room

33. Common dining

34. Common kitchen

35. Preparation kitchen

36. Seating niches

37. Laundry area

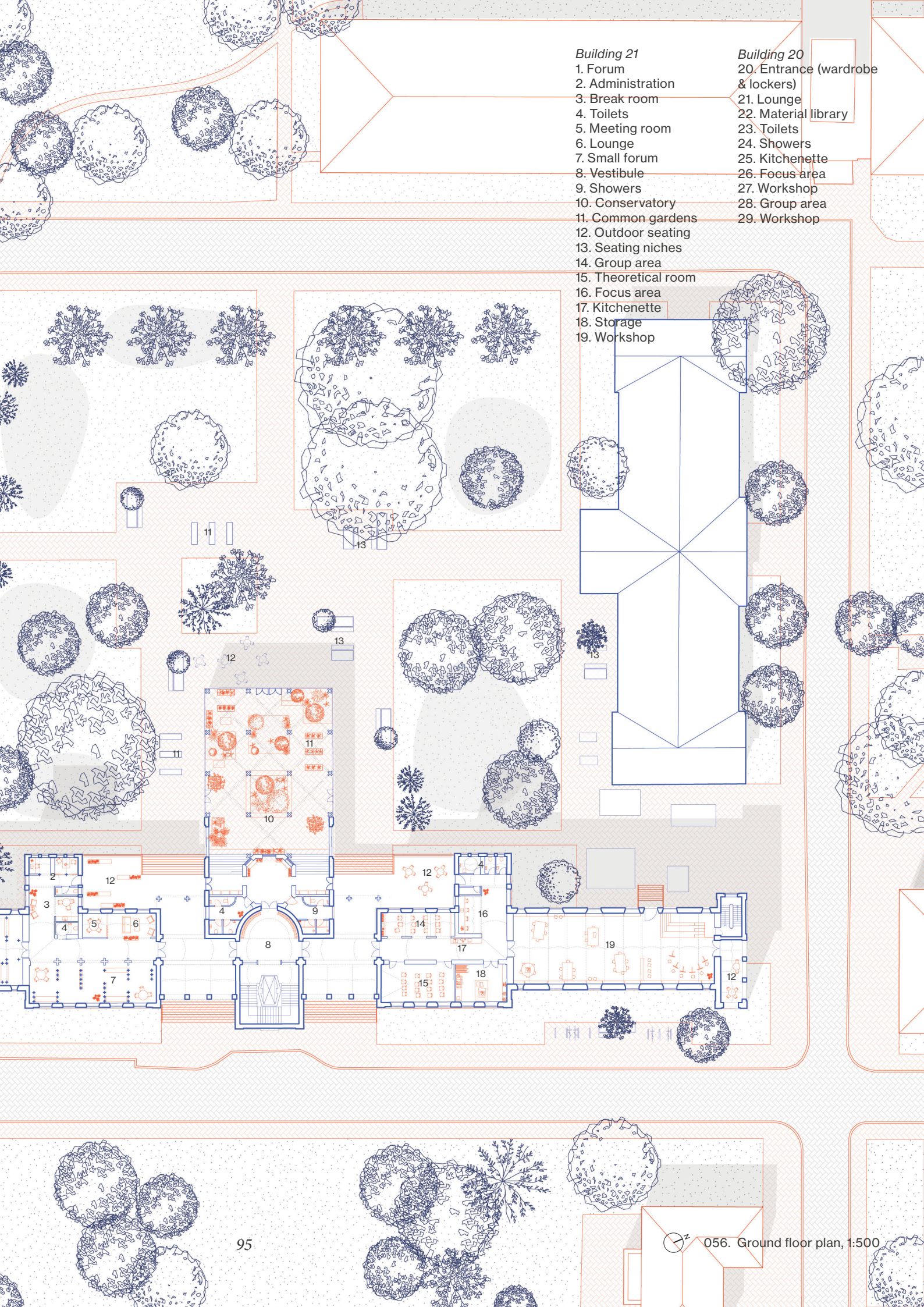
38. Social area

39. Lounge area

40. Reading area

41. Recycling station

presentation



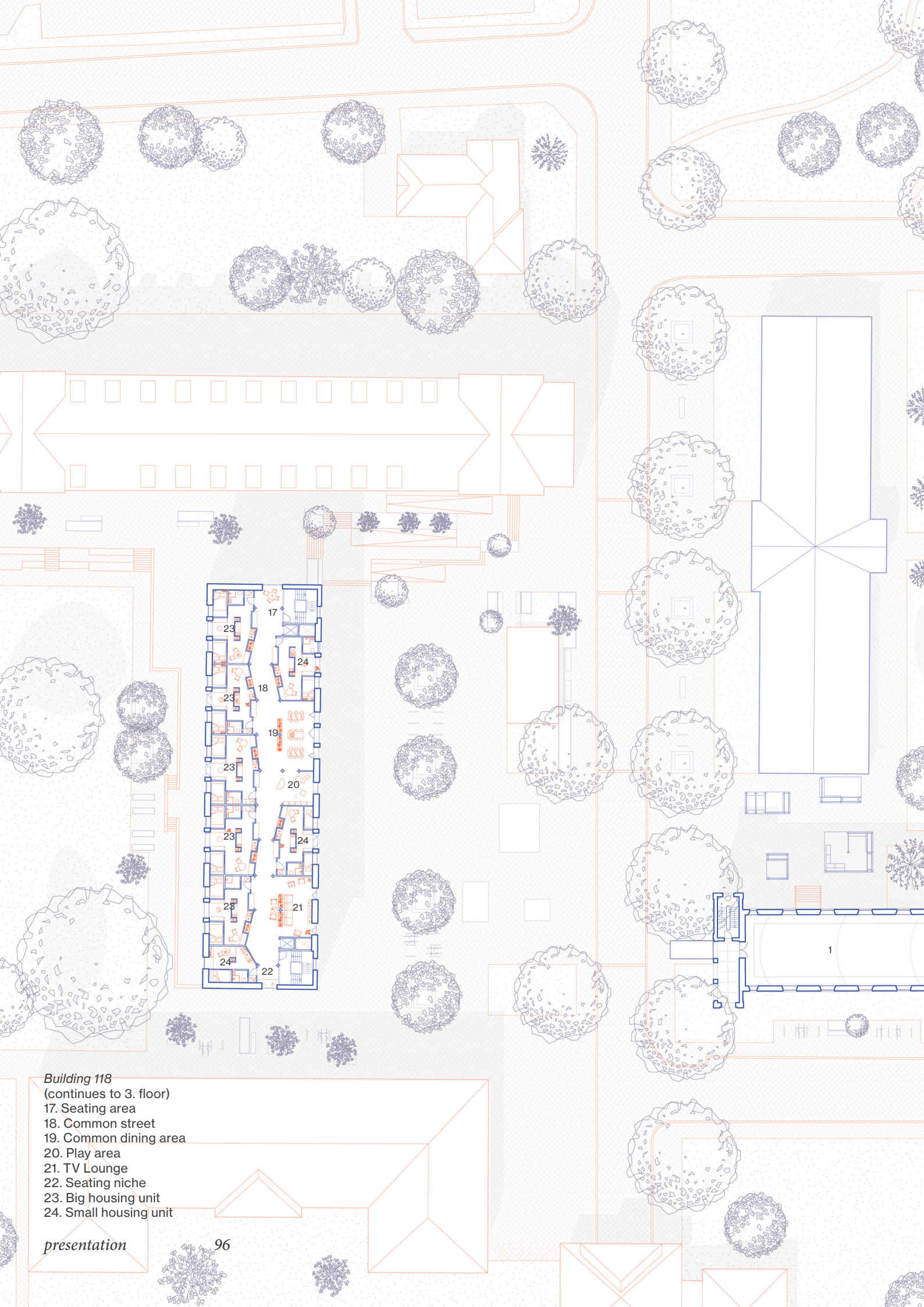
Building 21

1. Forum
2. Administration
3. Break room
4. Toilets
5. Meeting room
6. Lounge
7. Small forum
8. Vestibule
9. Showers
10. Conservatory
11. Common gardens
12. Outdoor seating
13. Seating niches
14. Group area
15. Theoretical room
16. Focus area
17. Kitchenette
18. Storage
19. Workshop

Building 20

20. Entrance (wardrobe & lockers)
21. Lounge
22. Material library
23. Toilets
24. Showers
25. Kitchenette
26. Focus area
27. Workshop
28. Group area
29. Workshop





Building 118

(continues to 3. floor)

17. Seating area

18. Common street

19. Common dining area

20. Play area

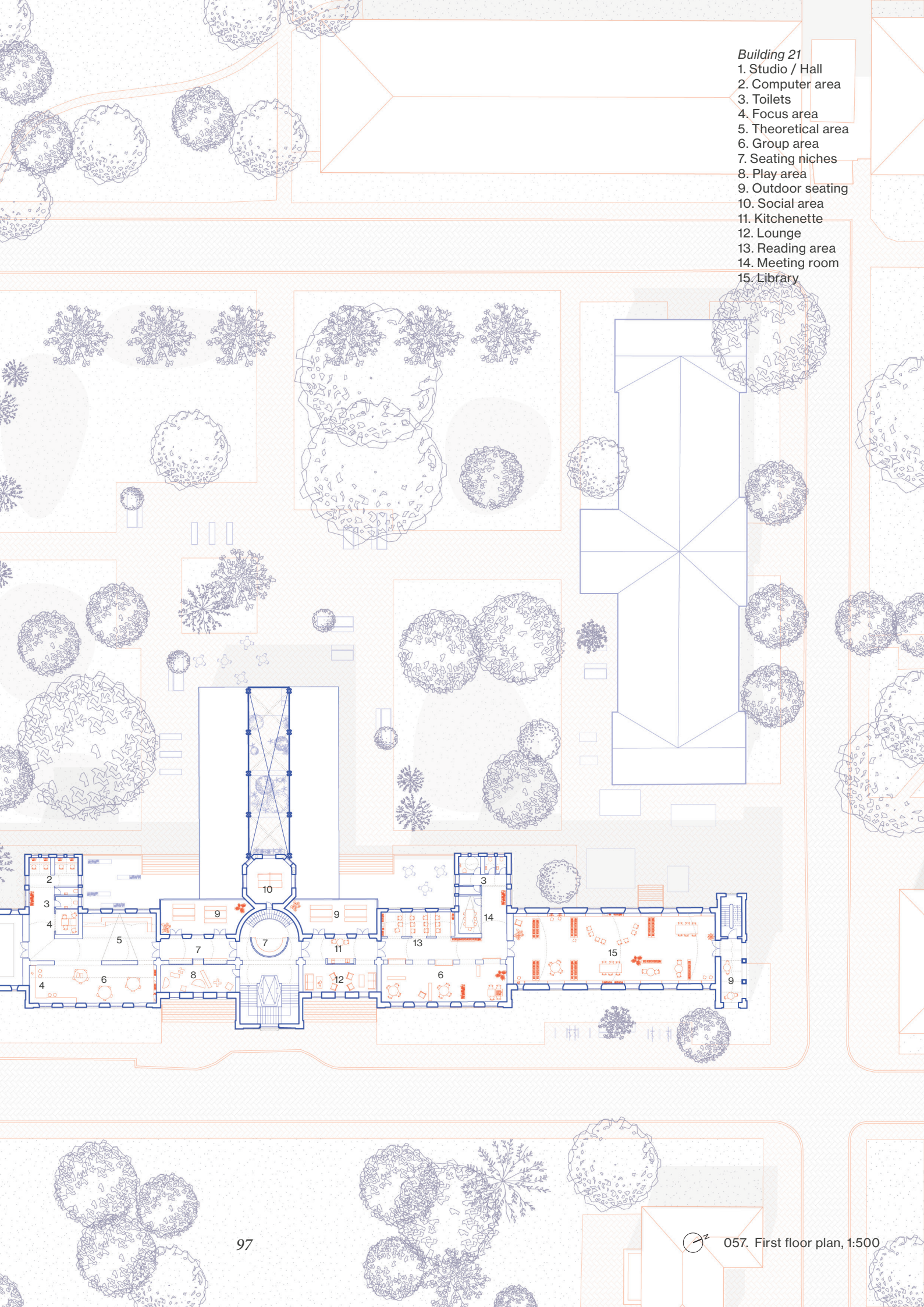
21. TV Lounge

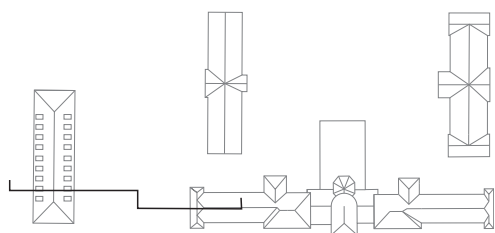
22. Seating niche

23. Big housing unit

24. Small housing unit

- Building 21**
- 1. Studio / Hall
 - 2. Computer area
 - 3. Toilets
 - 4. Focus area
 - 5. Theoretical area
 - 6. Group area
 - 7. Seating niches
 - 8. Play area
 - 9. Outdoor seating
 - 10. Social area
 - 11. Kitchenette
 - 12. Lounge
 - 13. Reading area
 - 14. Meeting room
 - 15. Library







Linking typology and city, the forum faces towards Hovedvejen creating awareness of citizen passing by. The space acts as the entrance to the typology and its program, while creating an entrance for inhabitants, being housed on opposite site of the road. The housing is defined by a communal ground floor, while the remaining floors host apartments, with common spaces directed towards Hovedvejen.

TYPOLOGY

Big; City

Through the functions and results produced from these, the typology catalyses a change of thinking city and how to incorporate the people who inhabit it. As a result, a more social approach to city development occurs.

Medium; Neighbourhood

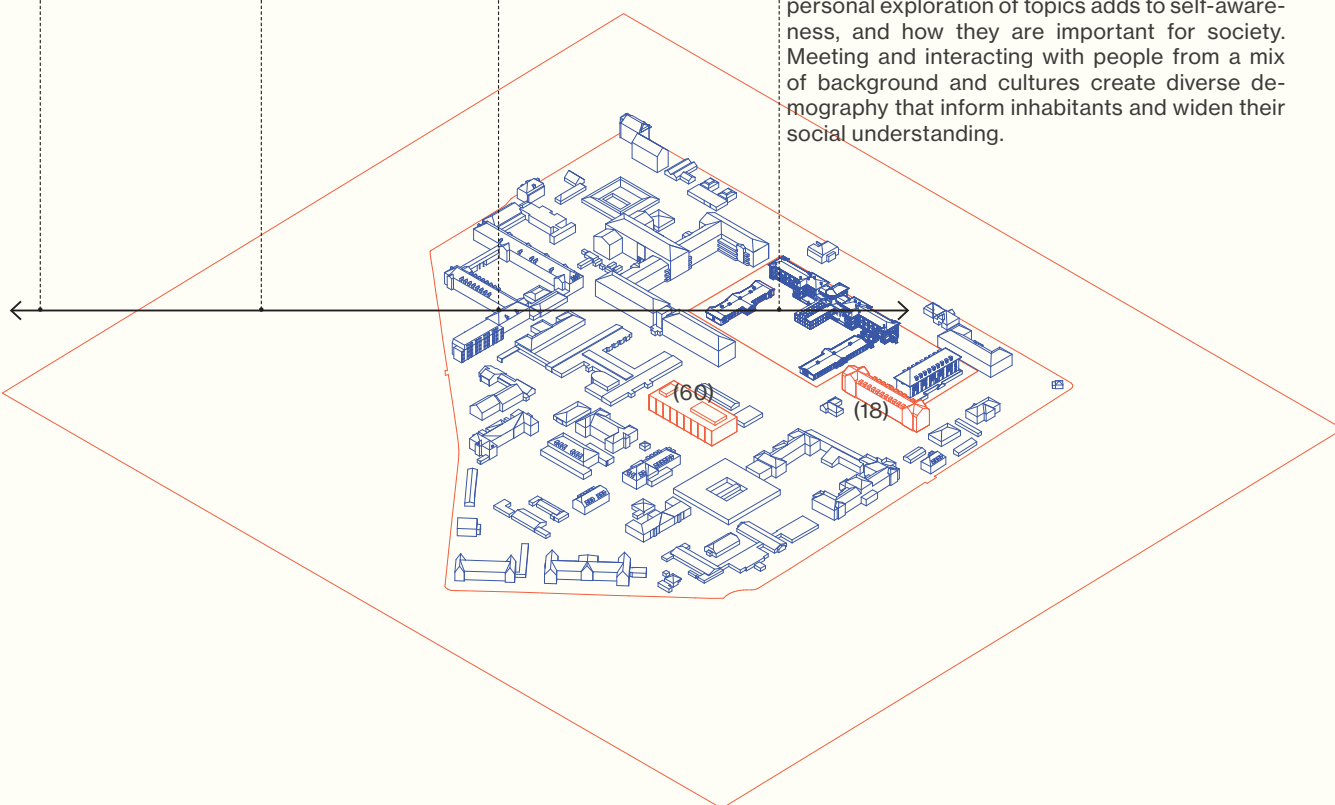
The typology becomes a new actor in the development of neighbourhood, offering new opportunities and exchanges between people, both socially, professionally and culturally. As such, creating an understanding of people's differences and how society can benefit from a mixed demography.

Site

Through an organic growth the typology expands to other buildings of the Hospital site, creating more or new functions, together with more housing expanding the capacity. Examples for further development are building 18 which is suitable for housing and building 60 which is suitable for a mix of functions and satellite offices of interested companies.

Small; Buildings

Buildings of the typology create a space for inhabitants to develop themselves through common tasks, promoting social interactions. Solving tasks for private companies, along with during personal exploration of topics adds to self-awareness, and how they are important for society. Meeting and interacting with people from a mix of background and cultures create diverse demography that inform inhabitants and widen their social understanding.



Temporary

A place to live

Building

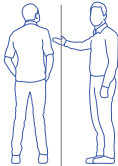
Individual

Community

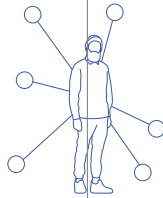
A place to exchange

Permanent

City



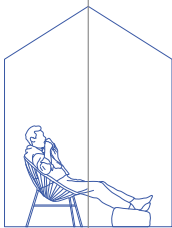
Inhabitants arrive to the site, being introduced to the typologies' structure and how the course of the stay works.



Receiving tasks outside of the site, responsibility and dependency becomes apparent.



Becoming part of a community, spanning beyond site, inhabitants develop their role in society and how they can contribute.



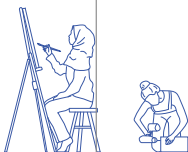
Private housing presents shelter and a safe space for occupants, serving as their personal base, while being presented to a new way of living together with others.



Interactions occur in workshops and common rooms, creating new social relations through common tasks and everyday life.



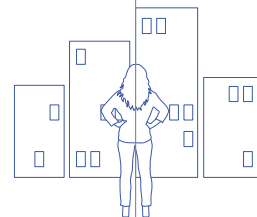
Exchanging their resources and culture through the forum and conservatory creates an understanding of other, while adding to inhabitant's self-awareness.



Through introductions to work and tasks, inhabitants achieve a sense of self value in for filling these, while seeing how the typology and building are depending on them.



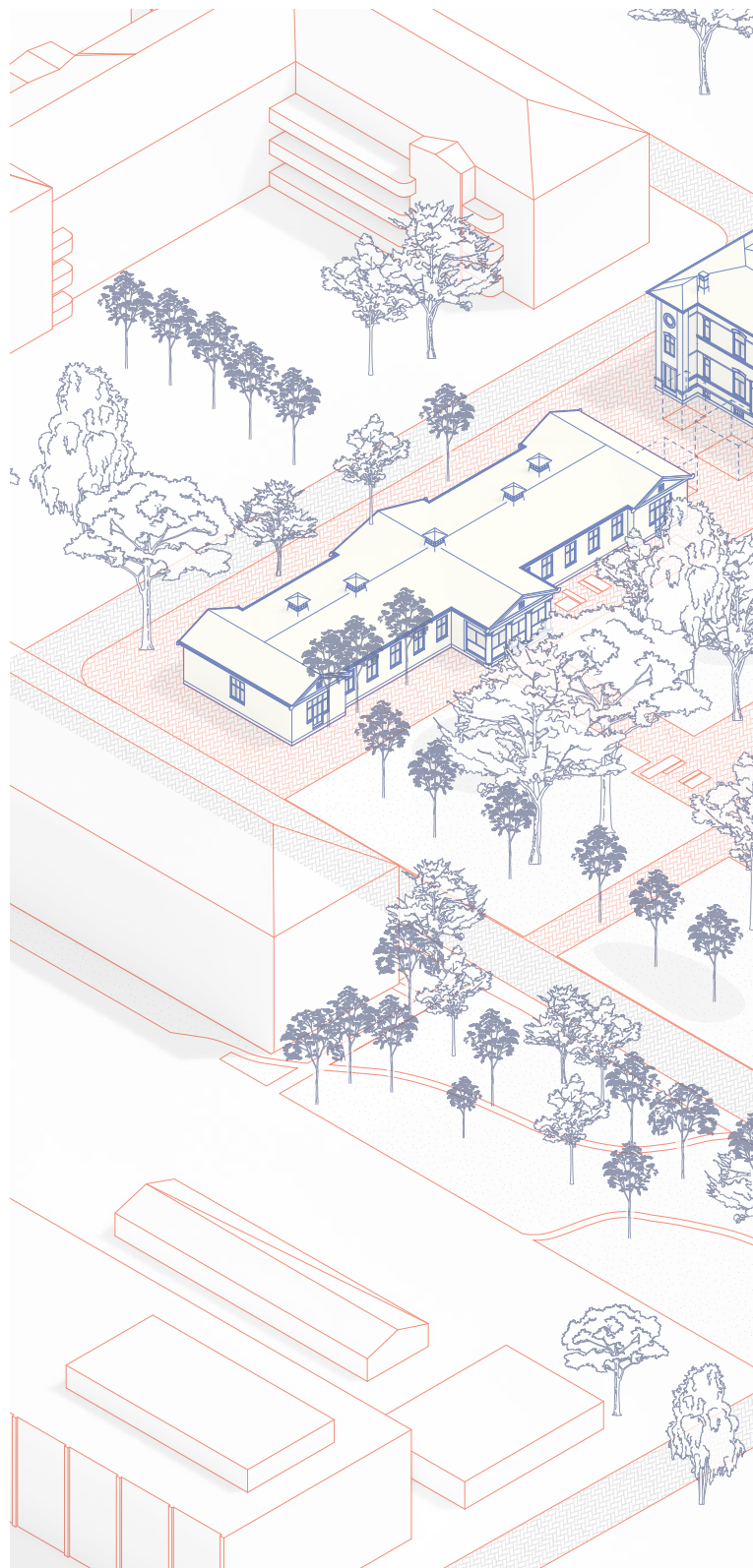
Inhabitants develop a social network having both social and professional bonds, giving them a social role in the community.

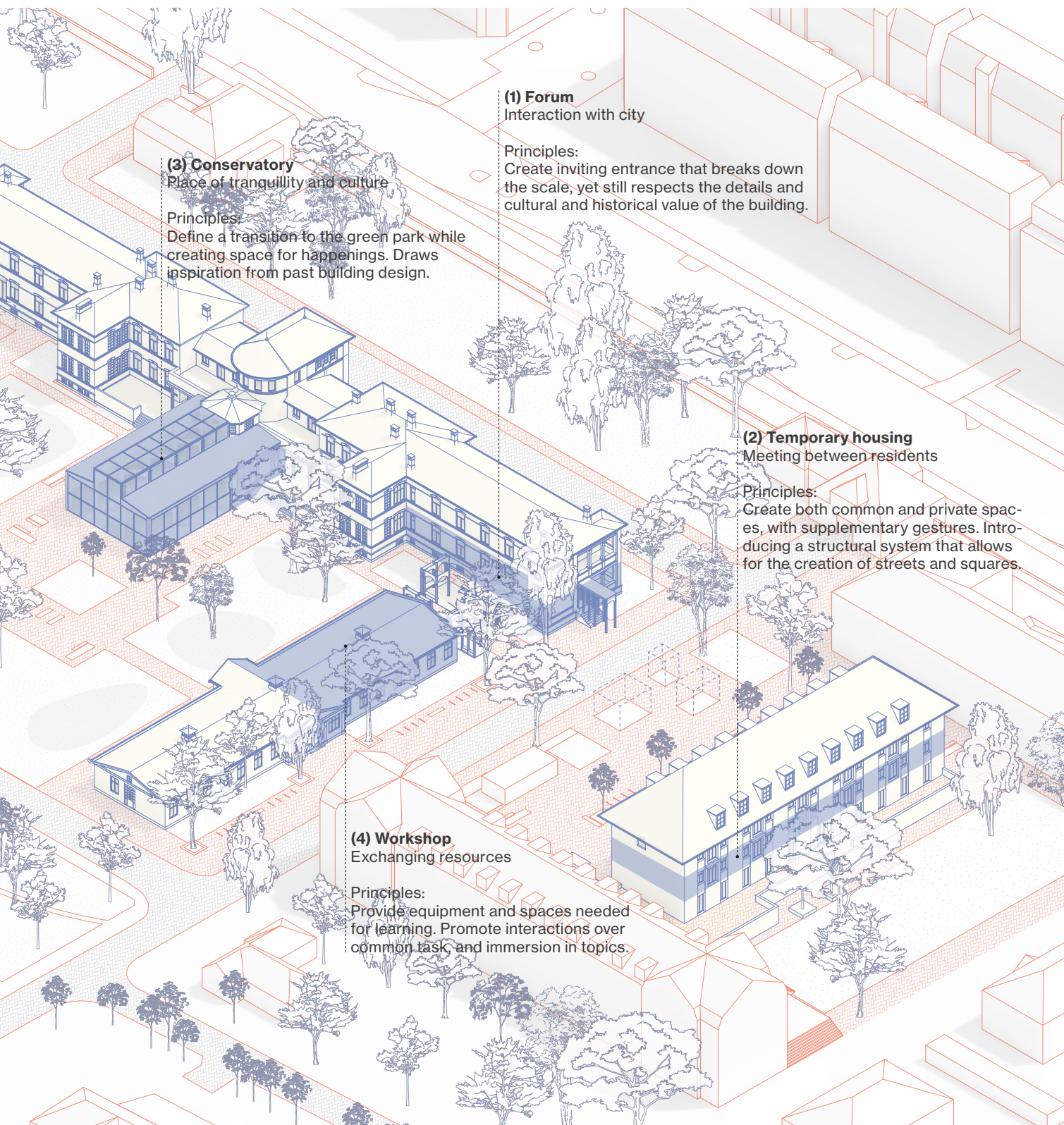


Achieving self-awareness and a sense of respect, inhabitants are re-introduced to society, using their newfound and developed resources to become a part of a social city.

POINTS OF INTEREST

A defining point of the typology is its relation between functions and how the different purposes create a synergy together. As such, points of interest explore the design of functions, and how these are indispensable for the typology's success, through their physical and social definition of space. Hereof, a hierarchy of intervention reflect the importance of the spaces, in relation to the typology. Furthermore, each function hosts different gestures through structural elements and principles, contributing to an enrichment of everyday life of inhabitants.





(1) Forum
Interaction with city

Principles:
Create inviting entrance that breaks down the scale, yet still respects the details and cultural and historical value of the building.

(3) Conservatory
Place of tranquillity and culture

Principles:
Define a transition to the green park while creating space for happenings. Draws inspiration from past building design.

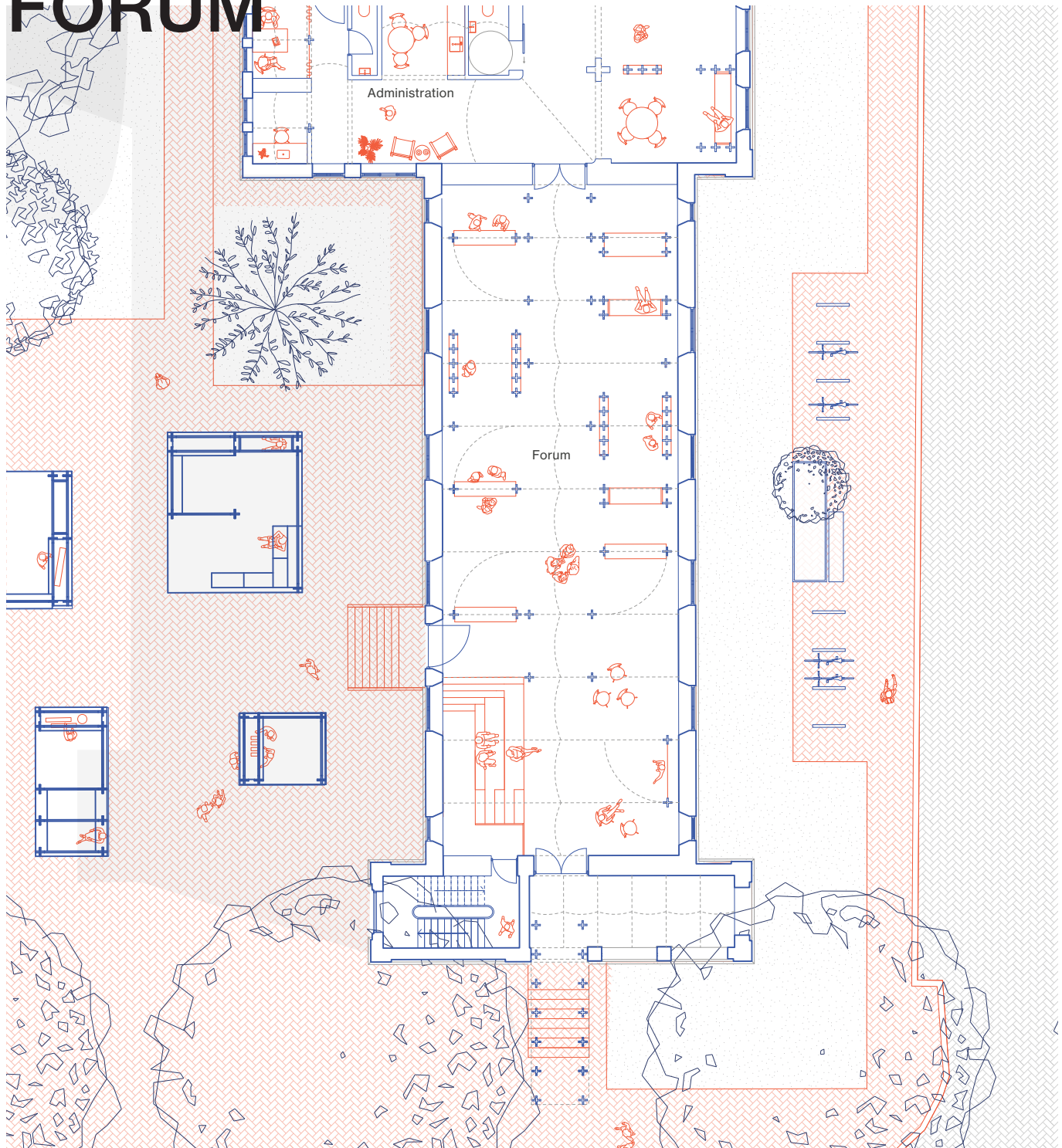
(2) Temporary housing
Meeting between residents

Principles:
Cr  ate both common and private spaces, with supplementary gestures. Introducing a structural system that allows for the creation of streets and squares.

(4) Workshop
Exchanging resources

Principles:
Provide equipment and spaces needed for learning. Promote interactions over common task and immersion in topics.

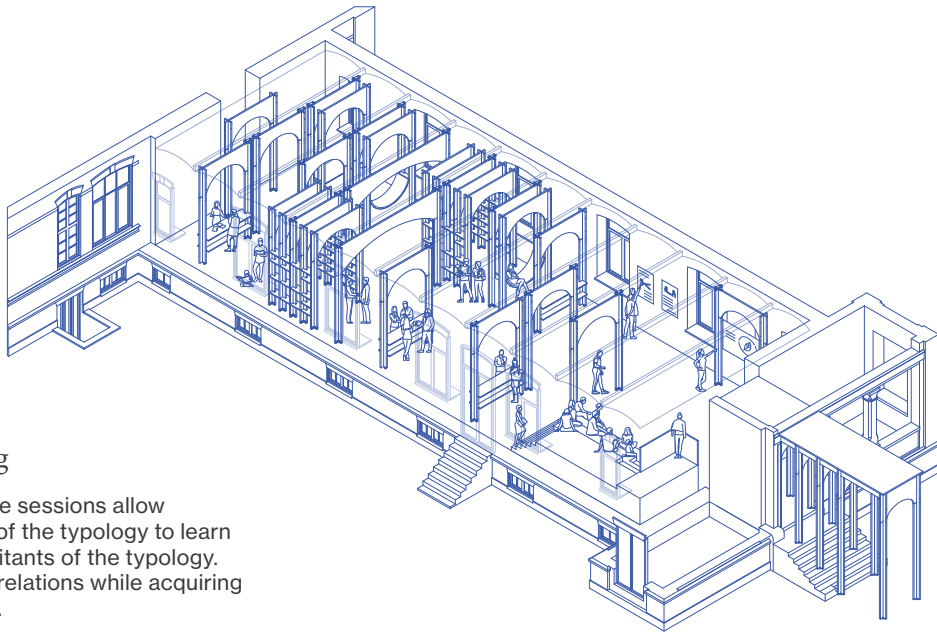
FORUM



062. Zoom plan of the forum 1:200

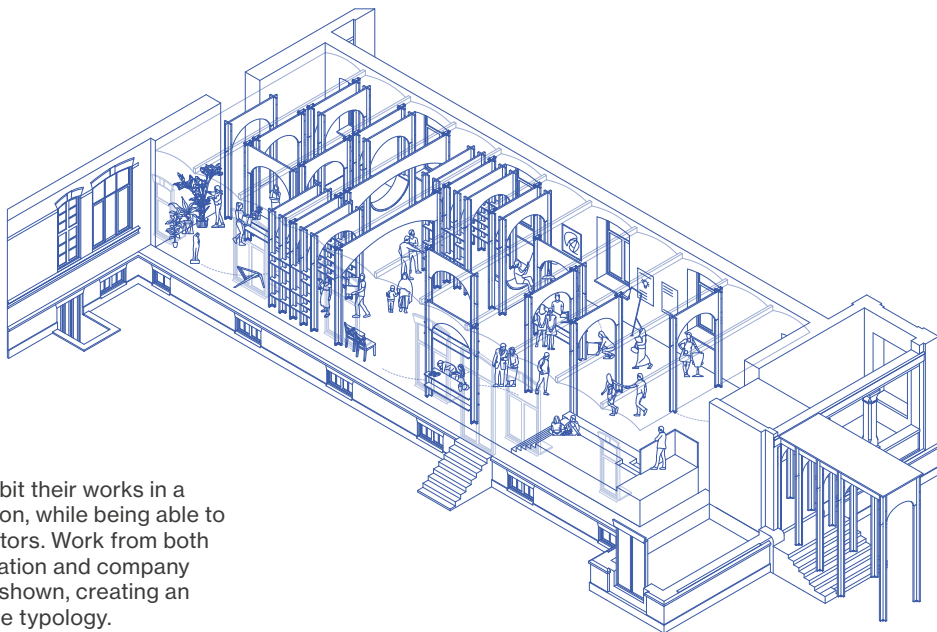
The forum creates a space for inhabitants of the typology and citizens of Frederiksberg to meet, host functions and events that can be utilized by both. Encouraging a sense of community and inspiring new collaborations to develop. As such, the space is designed to change according to its use, allowing its gesture to change, from learning, studio and casual conversations. Using structural ele-

ments, spatial courses and niches are defined within, while selected elements are rotatable, changing the course of the space. Occurrence of elements is defined by the vaulted ceiling of the space, emphasizing the history of the space. Elements create different affordances, complimenting use of space and its flexibility. This breaks down the building's scale, creating a new spatiality open for all.



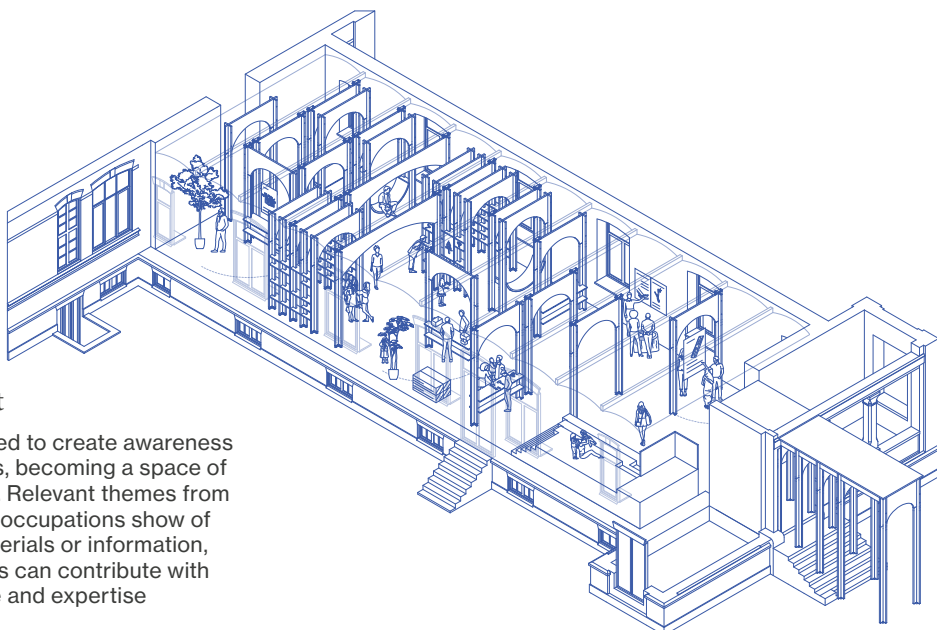
Open learning

Publicly available sessions allow people outside of the typology to learn alongside inhabitants of the typology. Promoting new relations while acquiring new knowledge.



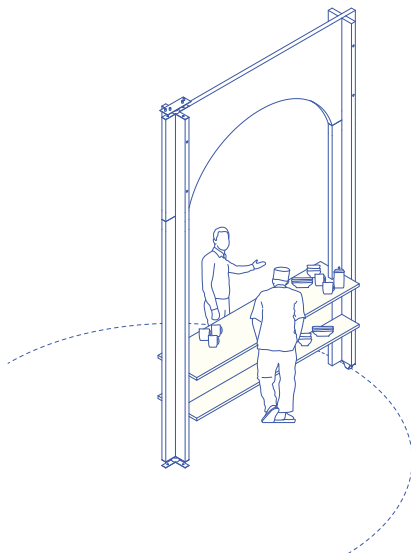
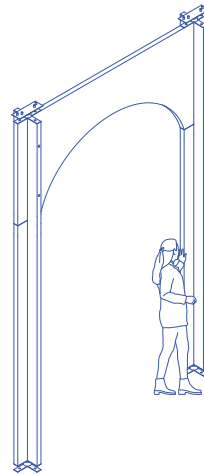
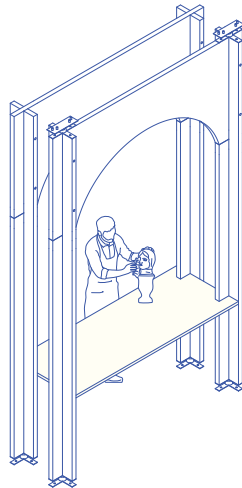
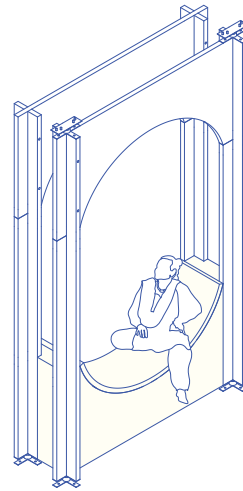
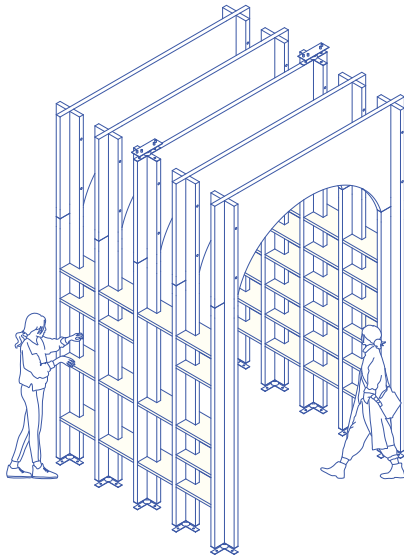
Market

Inhabitants exhibit their works in a studio-like fashion, while being able to sell these to visitors. Work from both personal exploration and company co-operation is shown, creating an awareness of the typology.



Themed event

The forum is used to create awareness of certain topics, becoming a space of exploring for all. Relevant themes from a wide range of occupations show of techniques, materials or information, while inhabitants can contribute with their knowledge and expertise

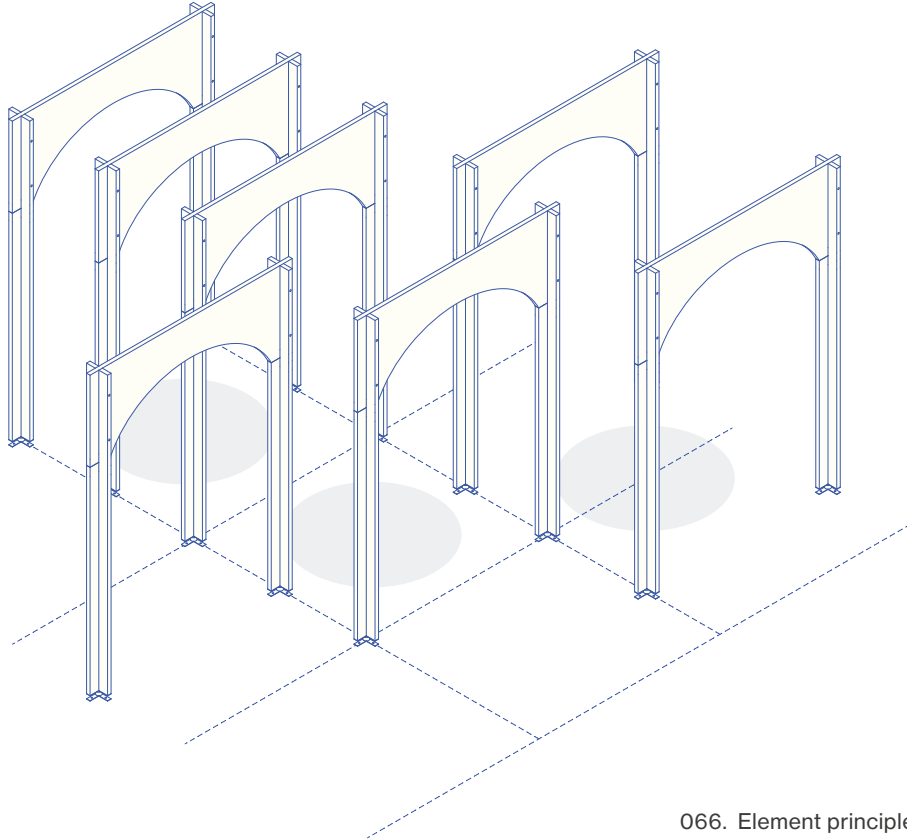




065. Visualisation of the forum

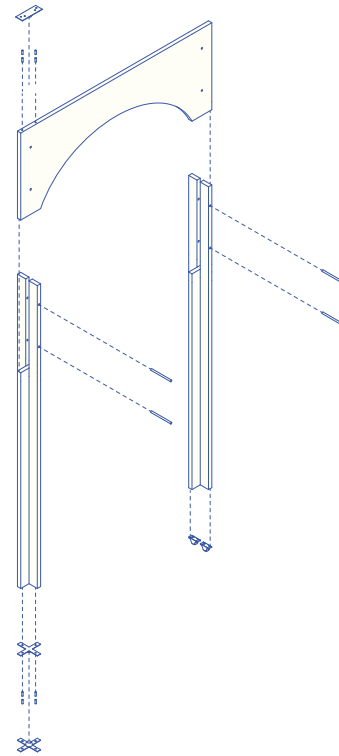
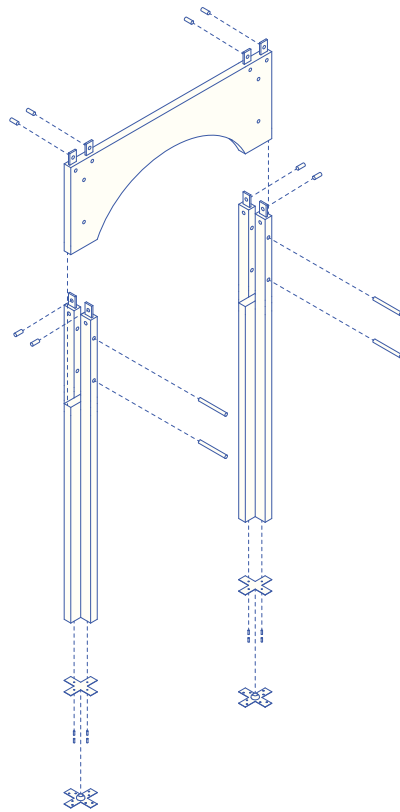
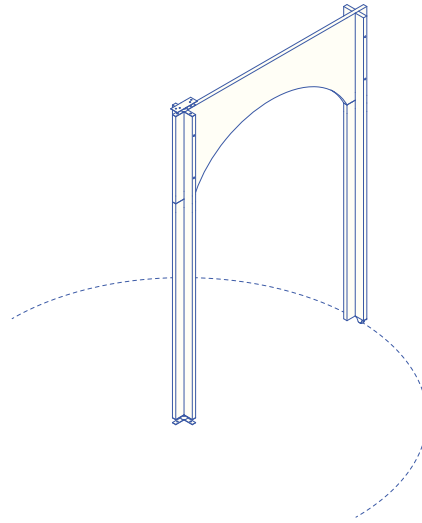
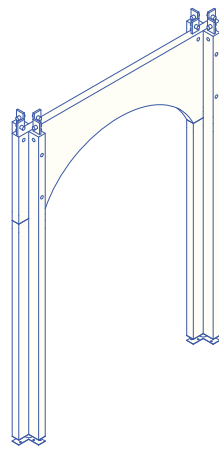
While continuing the hallway structure of building 21, elements break down the space creating niches and defined areas within. The space becomes a place of exploration, that through change of content, can be re-explored.

ELEMENT



066. Element principle

The definition and break down of the forum's space demands a tectonic principle, creating gestures and use within that embrace inhabitants and visitors, and promote interactions. As such, using principles found on the hospital grounds, a structural element is defined. These elements are, through a continuation, able to define areas in-between, while adding to the atmospheric experience of space. Furthermore, rotatable joints allow a change of space and custom composition. The element is comprised of a glulam beam, supported and fixed to wooden columns with a cross profile, which allows for load-bearing use. As such, the same element principle is used in the housing building, bringing along its spatial defining properties.



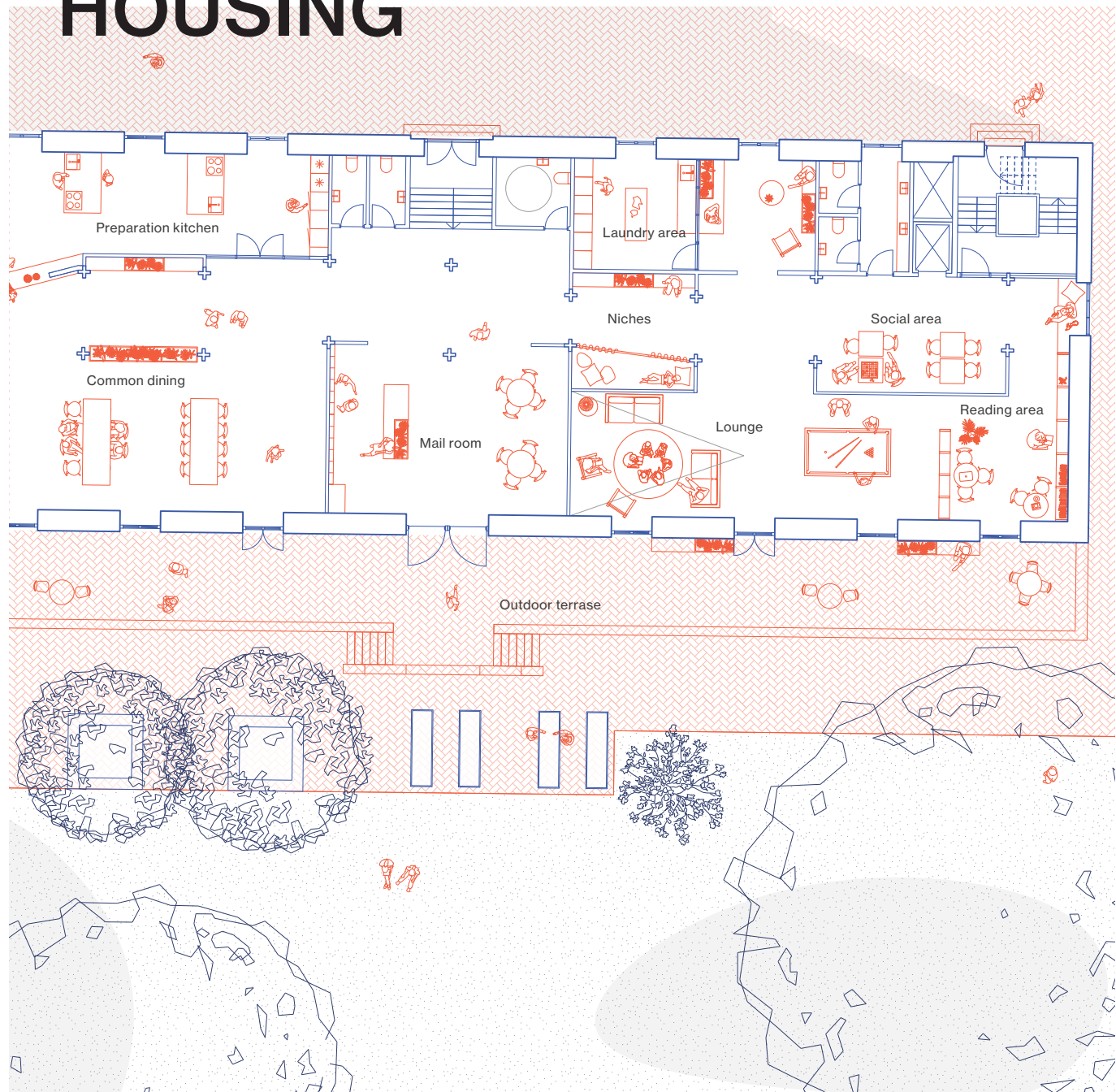
Housing

Columns of 400 x 400 mm construction wood support the 100 mm glulam beam, while metal brackets are cut into it, allowing for stacking of the elements. The dimensions allow load-bearing properties, while being stackable allows this to happen across floors.

Forum

Columns of 300 x 300 mm construction wood support the 50 mm glulam beam, while metal joints allow for rotation or fixation. Furthermore, dimensions and profile define spaces around the element while creating a tactile perception of the materials.

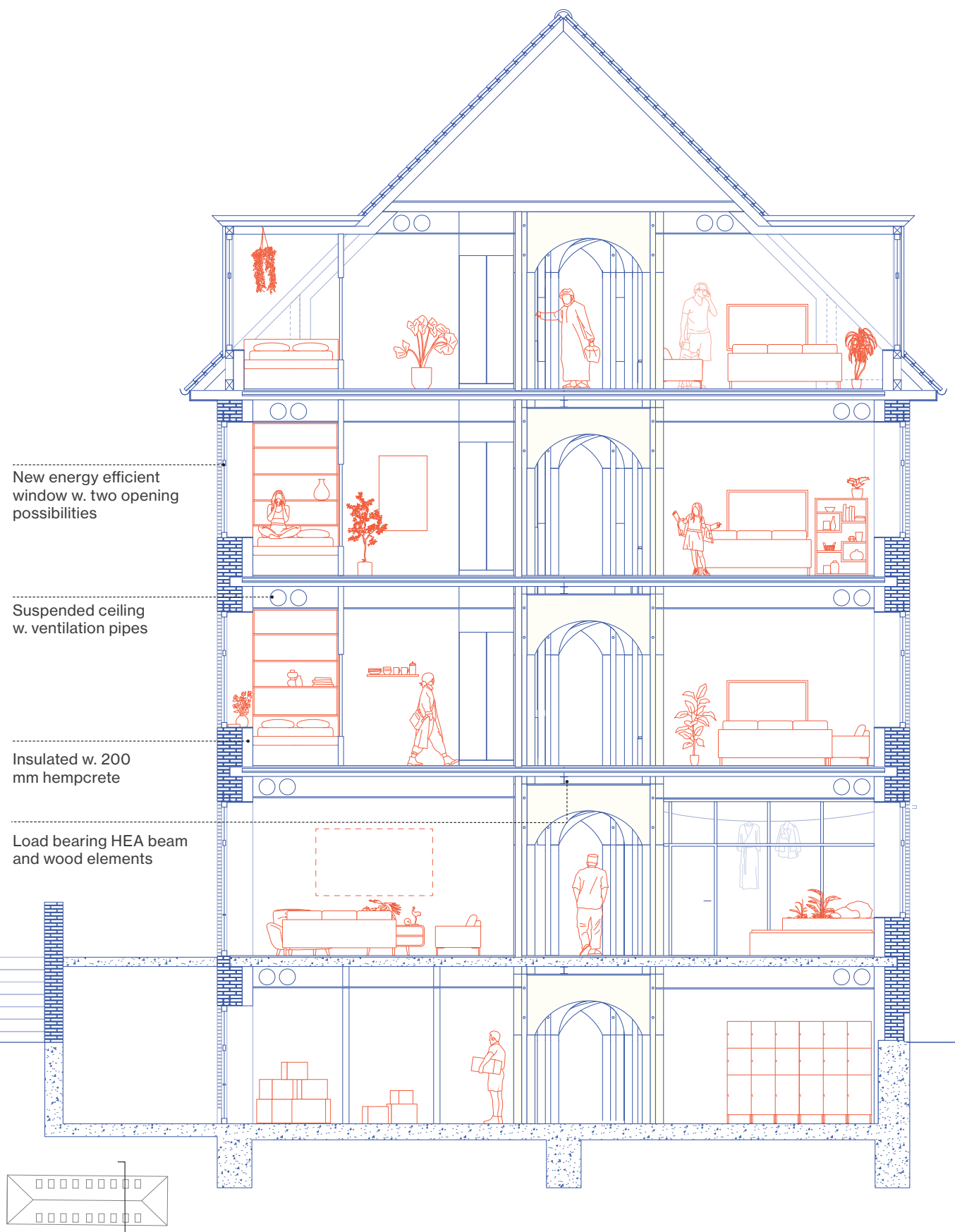
HOUSING

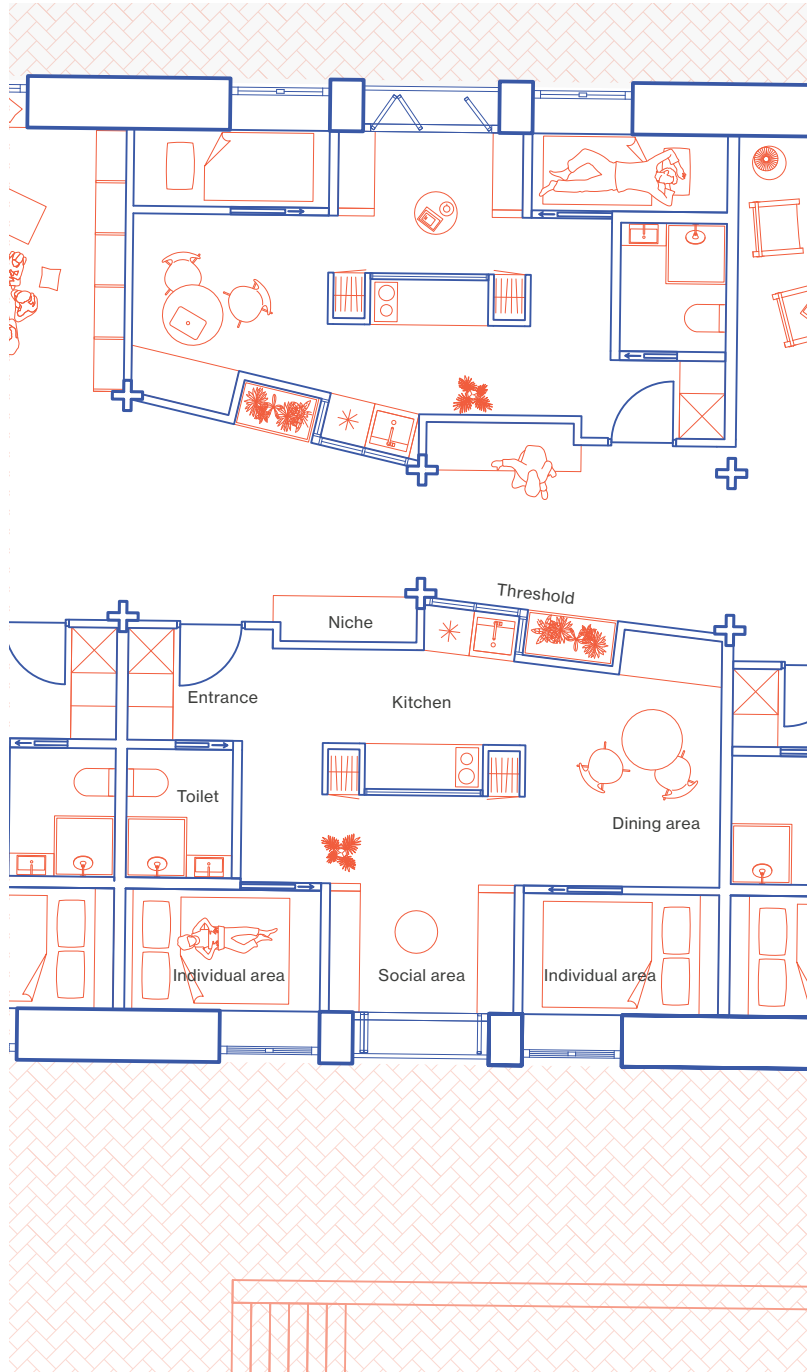


068. Zoom plan of common space, 1:200

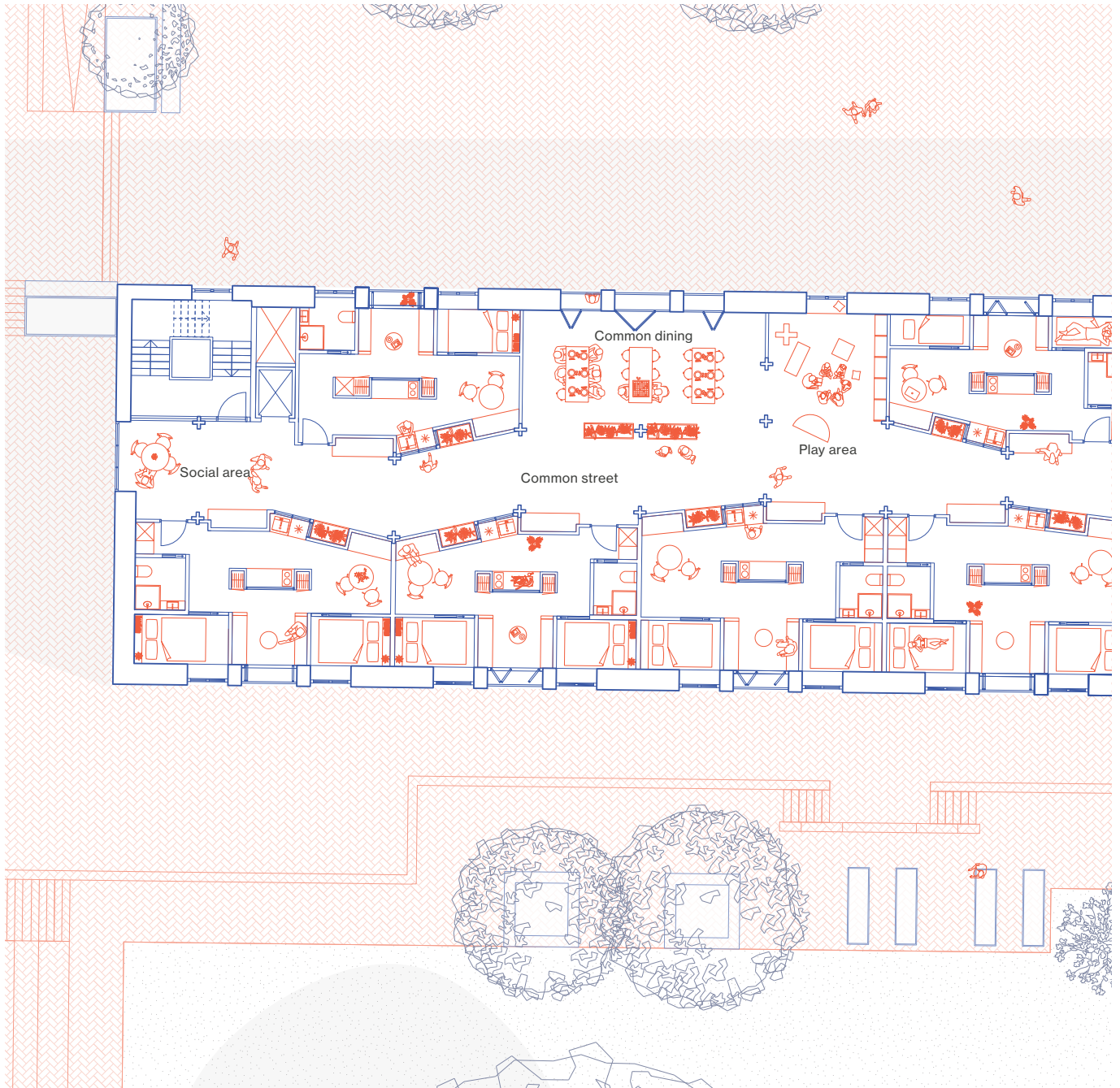
Housing inhabitants during their temporary stay, the typology's housing combines private, communal and exchanging resources. The ground floor act as transition from private to public, being a space of communal activities. Inhabitants share functions and af-

fordances, causing interactions and relation to develop, while being able to exchange their experiences and newfound knowledge from workshops. Food and service workshop is located here, simultaneously acting as common kitchen for inhabitants to use.





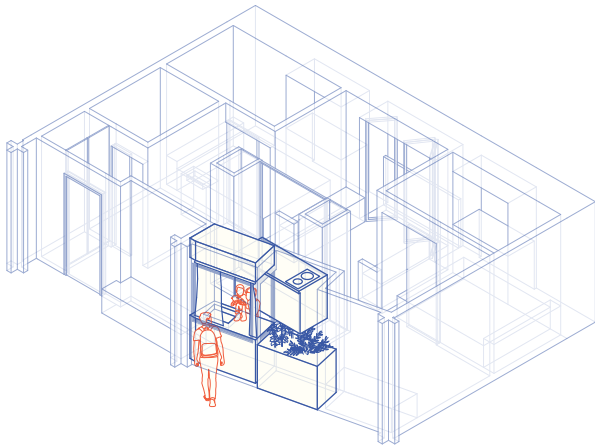
070. Zoom of housing units, 1:150



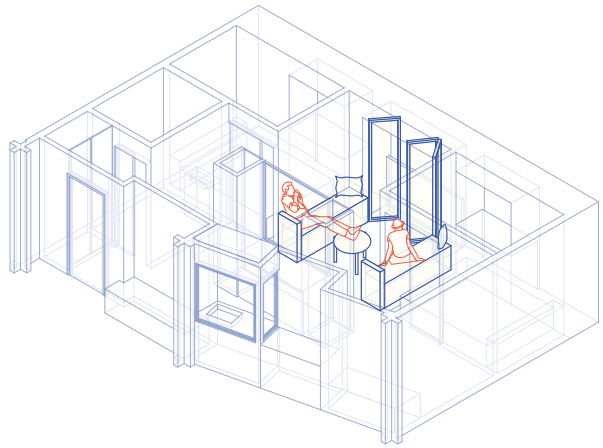
071. Zoom of 1.floor housing plans, 1:200

The remaining floors, first to third, focus on more intimate meetings and relations. The structural system defines a centred hallway of the building, using the same element principle of the forum. As such a street-like course is defined. Each floor houses 16-20 people, split into housing units designed for families of four, friends or strangers of two and couples. Each unit is designed with the necessities of everyday doings, while windows to the

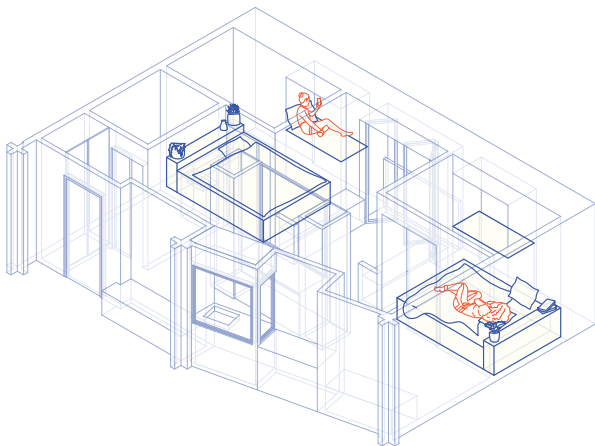
interior street are implemented. These act as a way of changing the degree of privacy, while allowing over-the-hedge-like interactions to occur. In extension, benches are implemented outside each apartment, creating affordances for interaction between neighbours. As an extension of housing units, common dining and living room create shared spaces for each floor to use together.



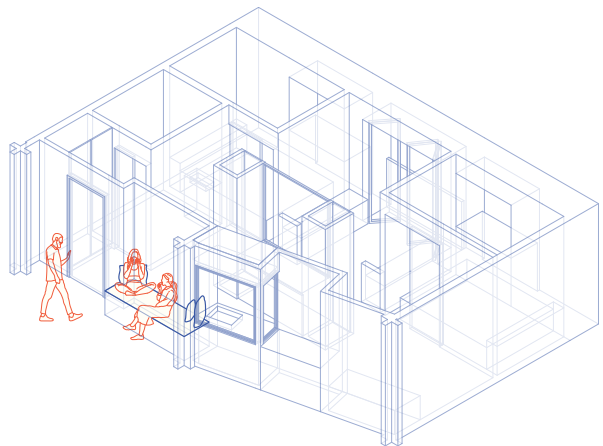
Meeting over the fence



Having a conversation



Being by yourself



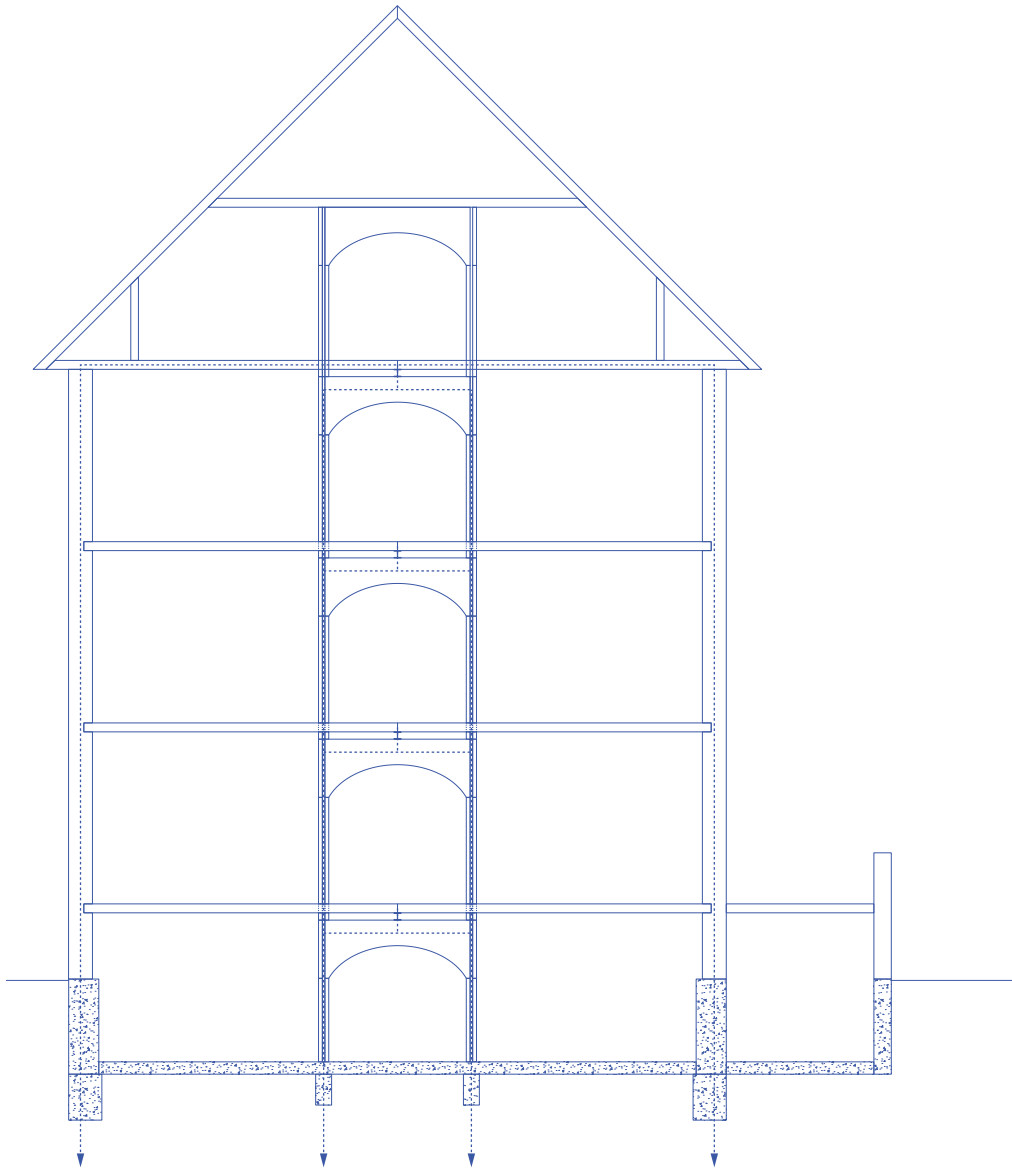
Saying hello



073. Visualisation of common street

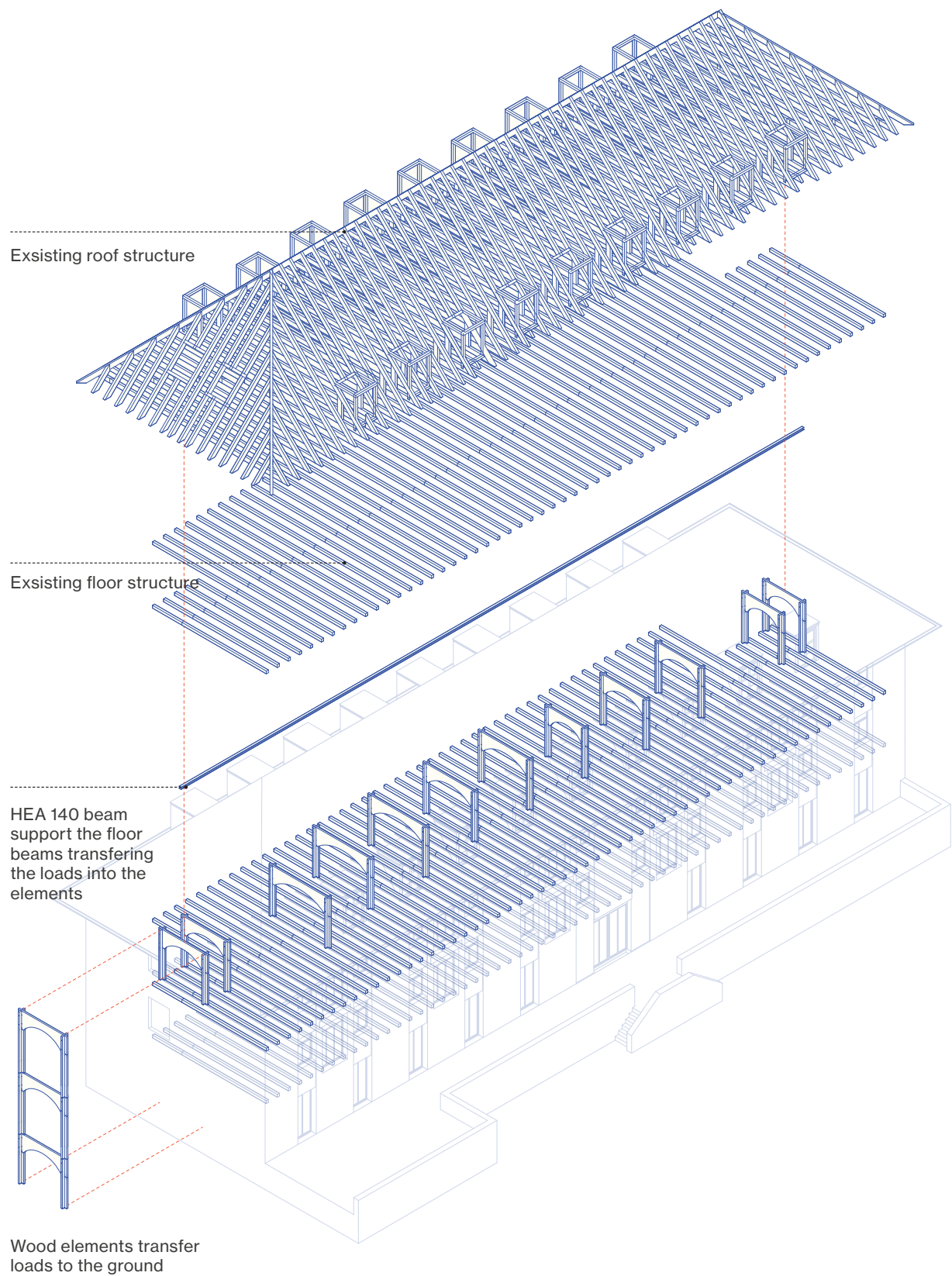
The hallway of each floor act as a street, with housing unit windows directed towards this. The hallway becomes a place of casual interactions and a place to occupy, becoming more than just a hallway.

STRUCTURAL PRINCIPLE

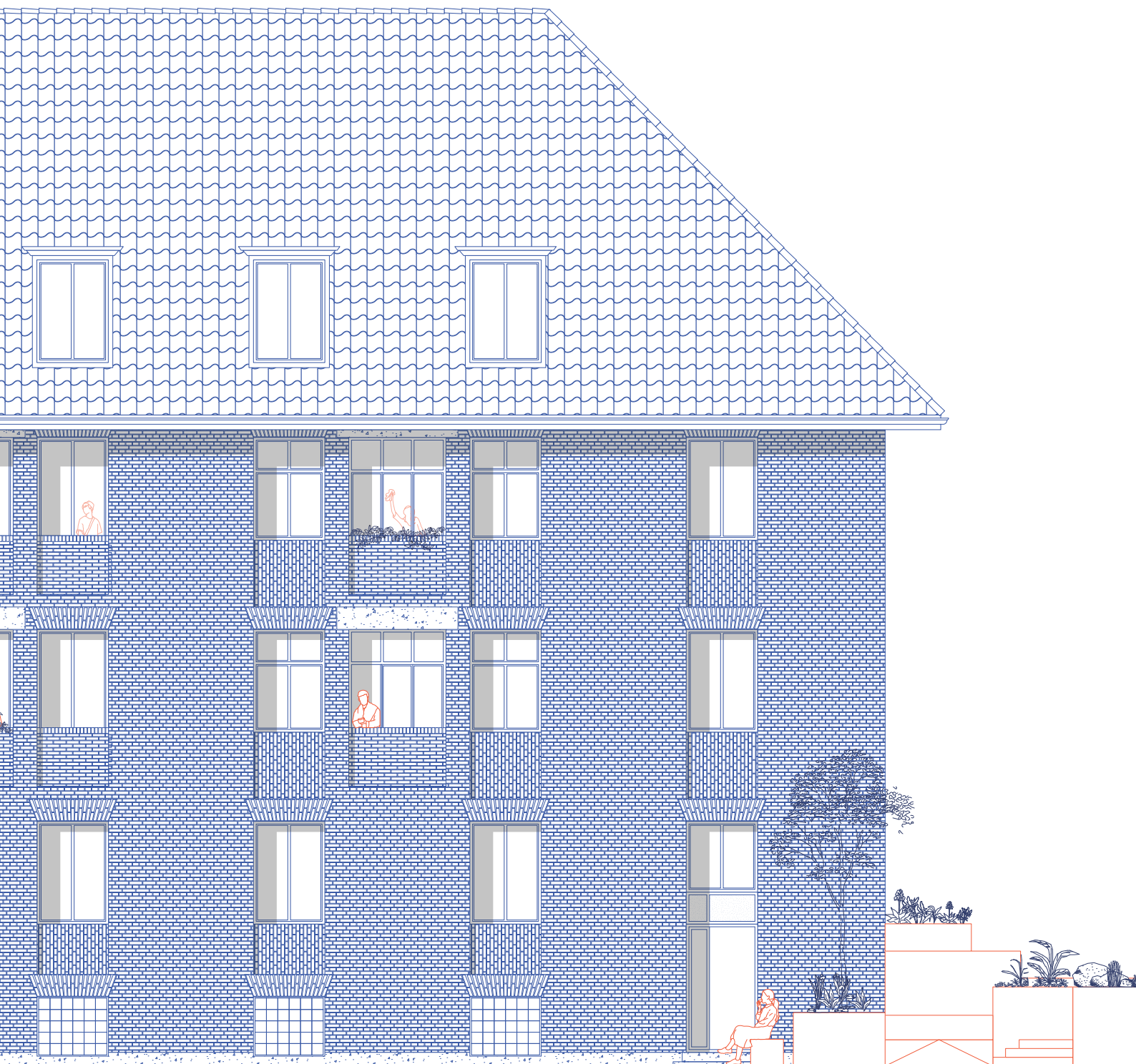


074. Structural principle

Using elements of beam and columns as load bearing structures the structural principle of building 118 is replaced. A previous load bearing interior wall is replaced by HEA 140 beams which are then supported by elements, creating a new interior spatiality. Stacking these elements allows a repetition of this spatiality, while transferring loads throughout the building. Interior walls aid in stabilising these elements, ensuring the integrity of the structure. As such, along with exterior walls, loads are transferred to the ground, adding a tectonic quality to the building.

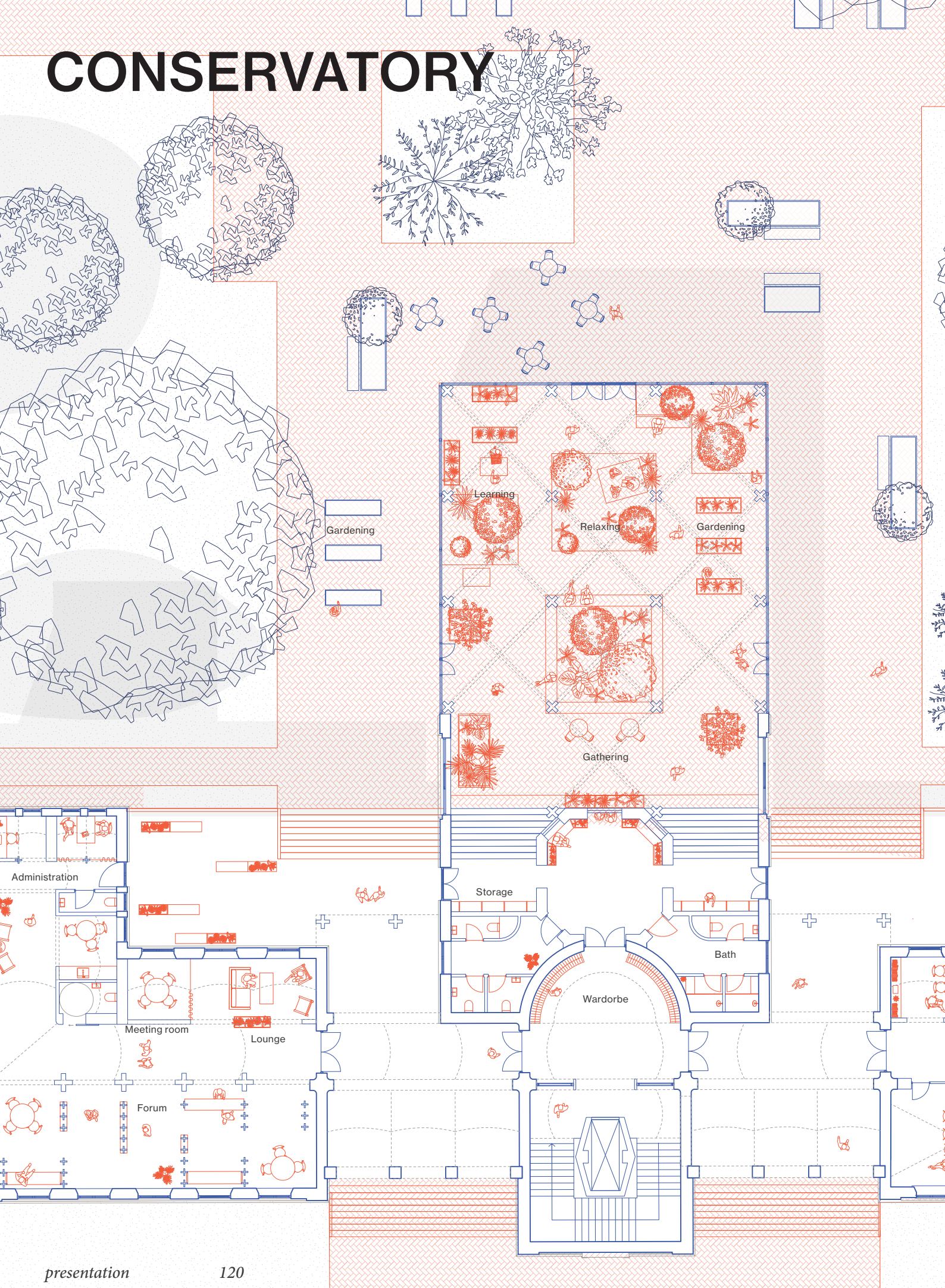


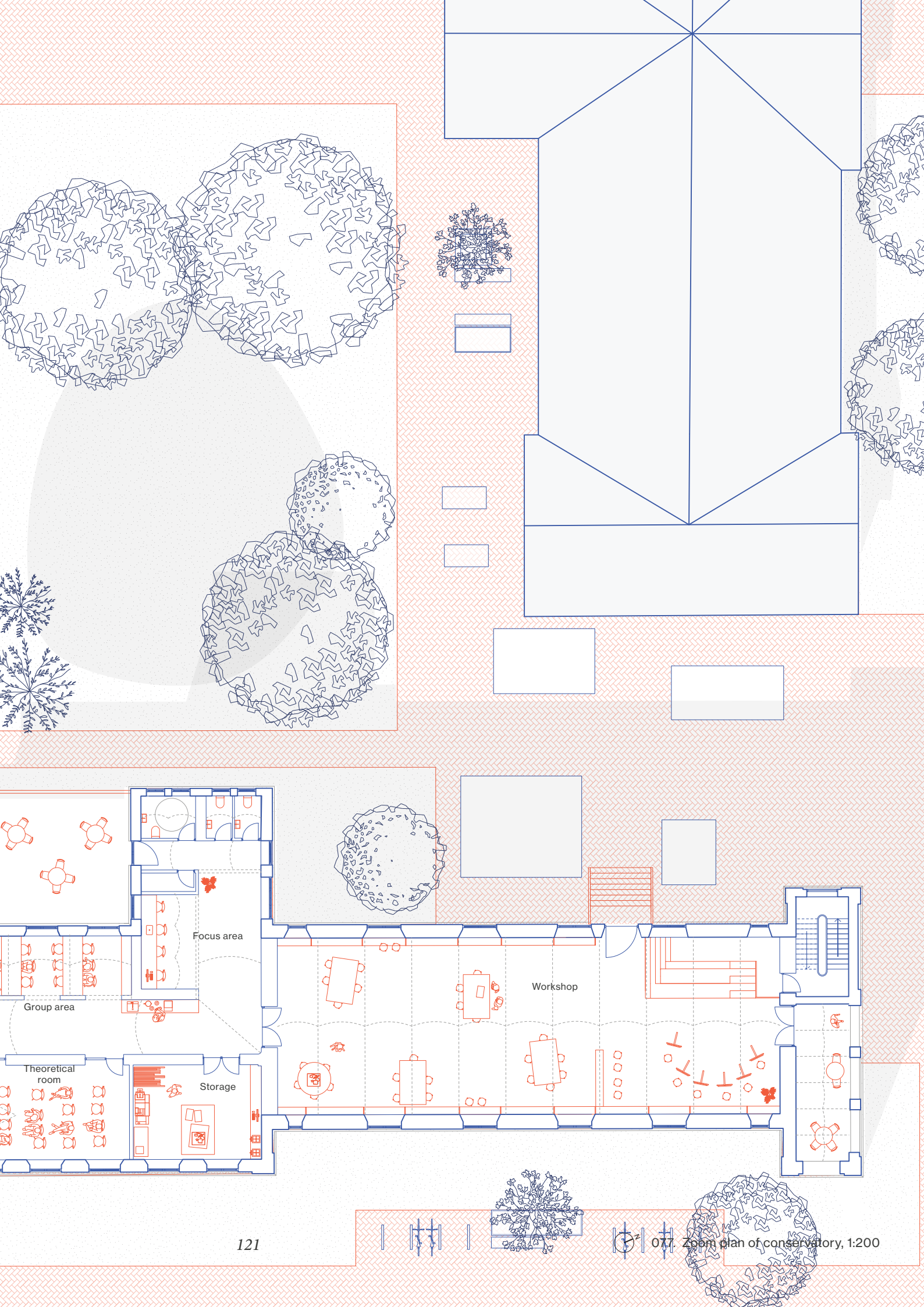




Façade of housing building utilize existing patina and materials to create a re-interpreted façade, creating and highlighting entrances.

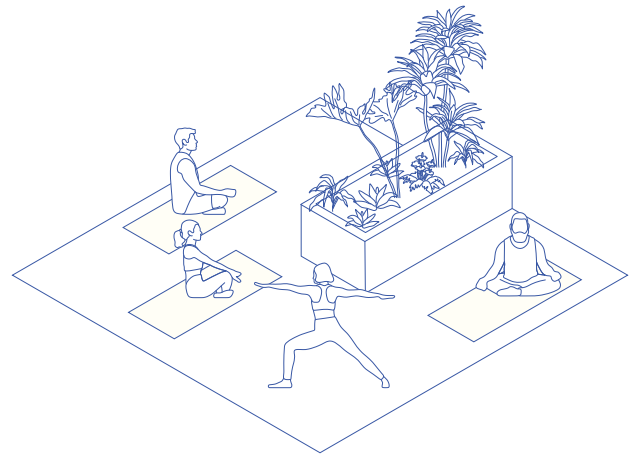
CONSERVATORY



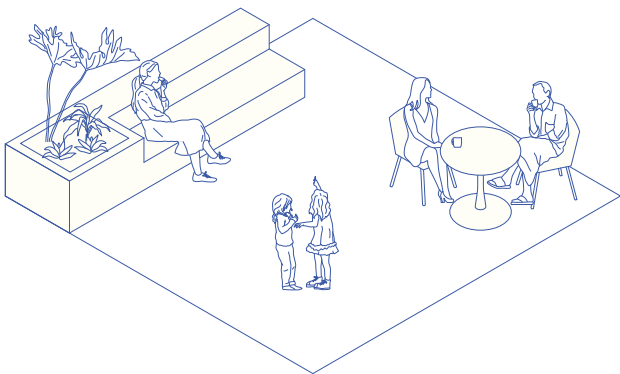




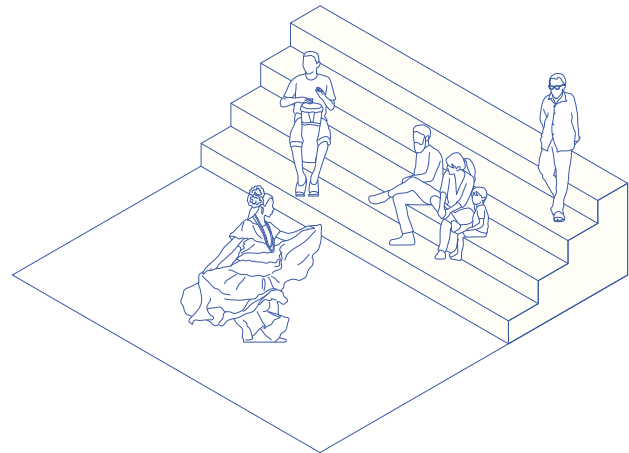
Gardening



Mindfulness



Socialize



Gathering

078. Scenarios for the conservatory

The conservatory differs both in function and physical appearance from the remaining typology. The space focuses on a more tranquil aspect, bringing the surrounding nature inside. As such, the space allows for casual occupation, while being a part of the typology's exchange of resources. Greenery is maintained through gardening, presenting

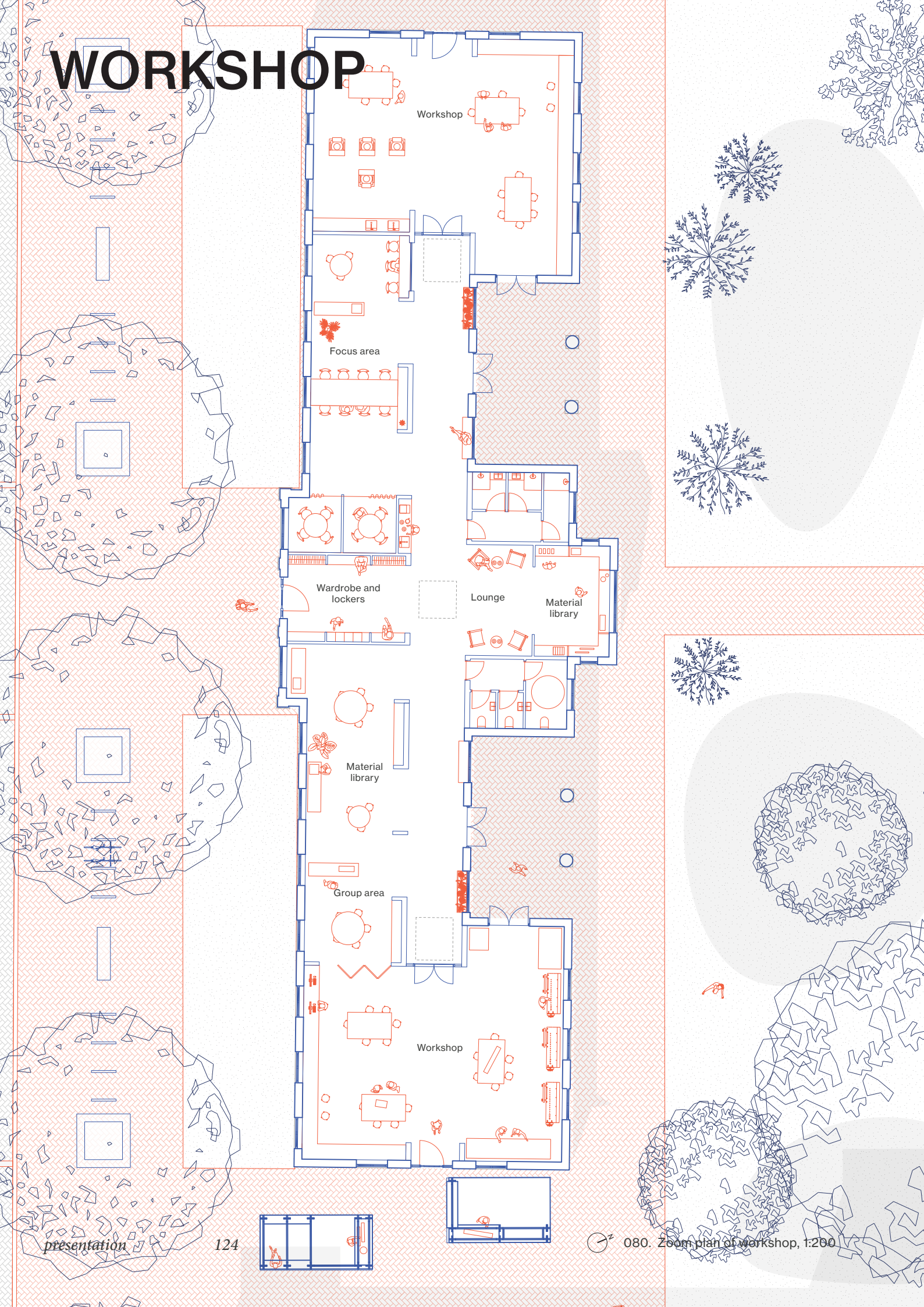
a learning of plants and biodiversity, while creating a natural atmosphere. Furthermore, the space allows for happenings and cultural events. This is defined by an upscaled version of structural elements, creating grand gestures promoting gatherings while adding a tectonic quality to the space.



079. Visualisation of the conservatory

The conservatory is defined by lush greenery and an open character, becoming a space to occupy and stroll through. Furthermore, mix of plants, herbs and smaller produce creates a space for learning and growing these.

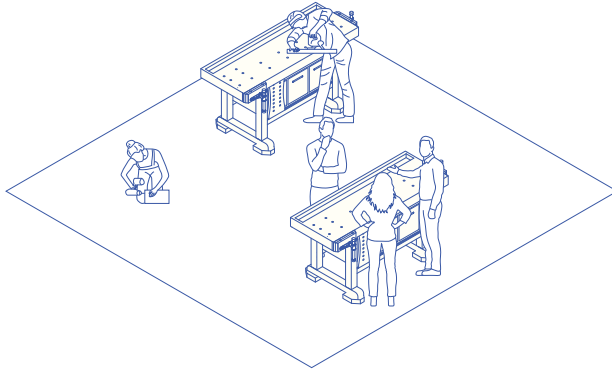
WORKSHOP



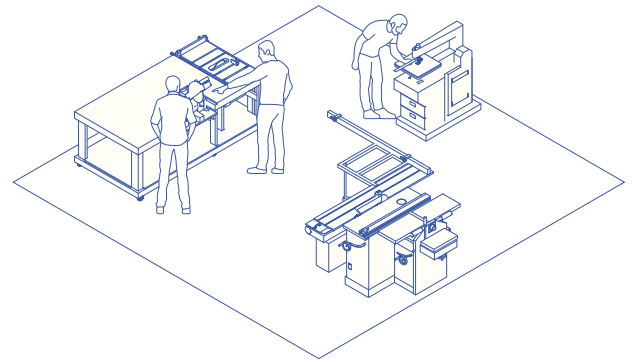
presentation

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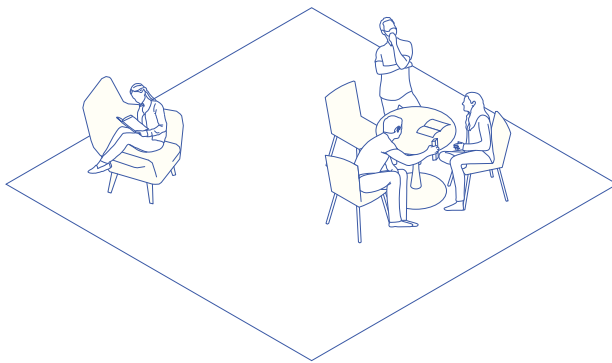
080. Zoom plan of workshop, 1:200



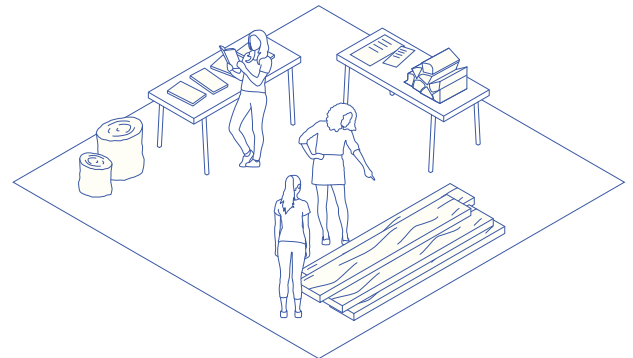
Collaborating



Practical learning



Theoretical learning



Material library

081. Scenarios for the workshop

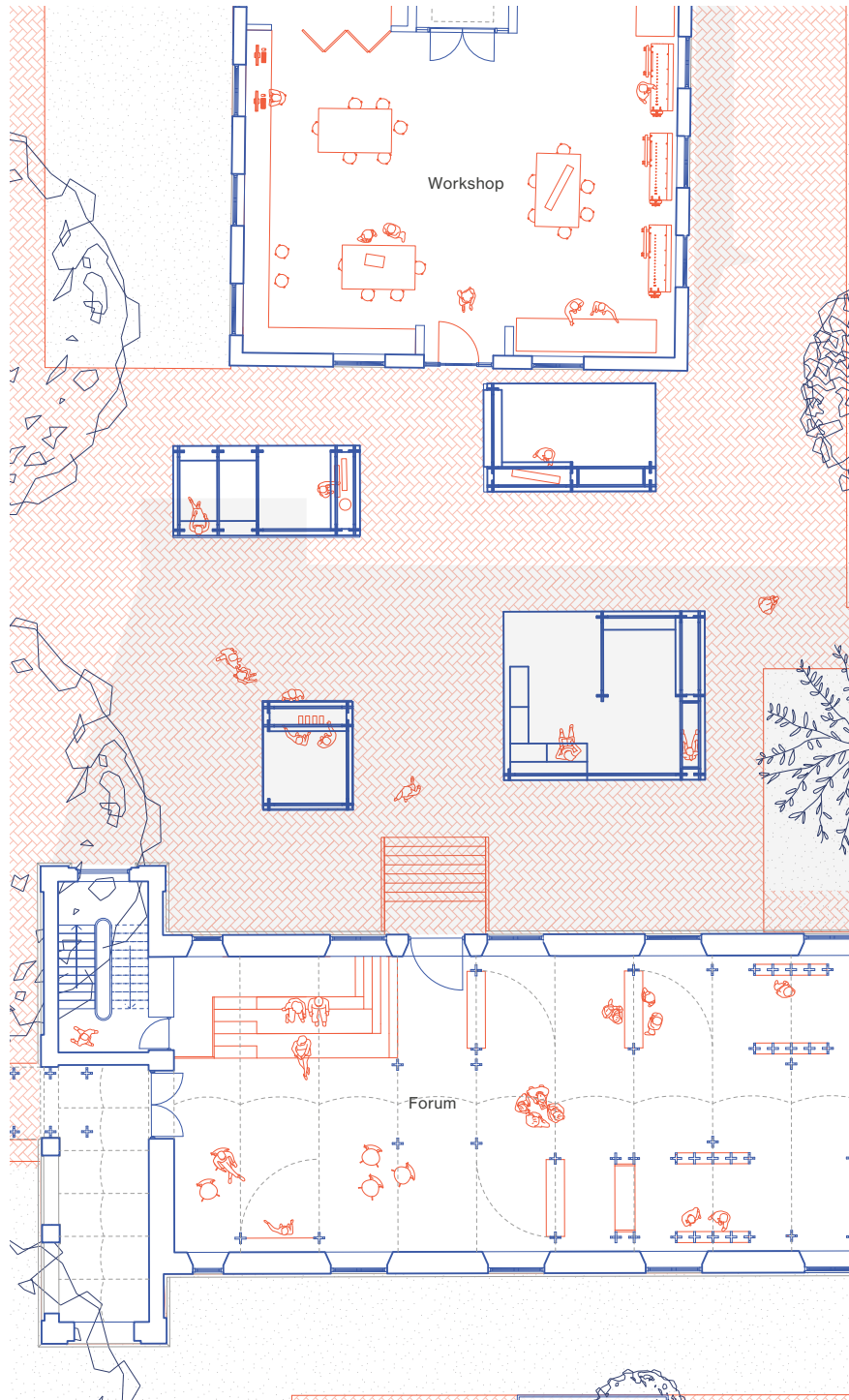
Focusing on physical resources, the space hosts a learning of craftsmanship and production. Spaces accommodate use of tools and machines, while in extension to these having theoretical spaces for both group and individual learning. Complimentary to these functions is a material library, that inhabitants can explore or use for their work in the building. Due to its location in a low-story building, all functions have easy access to

exterior areas, allowing for the extension of interior learning to the outside.

The building's construction allows for opening spaces inside. New interior walls not only define spaces for each function but are also stabilizing in the structural integrity of the building. Furthermore, past covered exterior spaces are re-opened, embracing and retelling the past expression of the building.



082. Visualisation of connection between the workshop and the forum

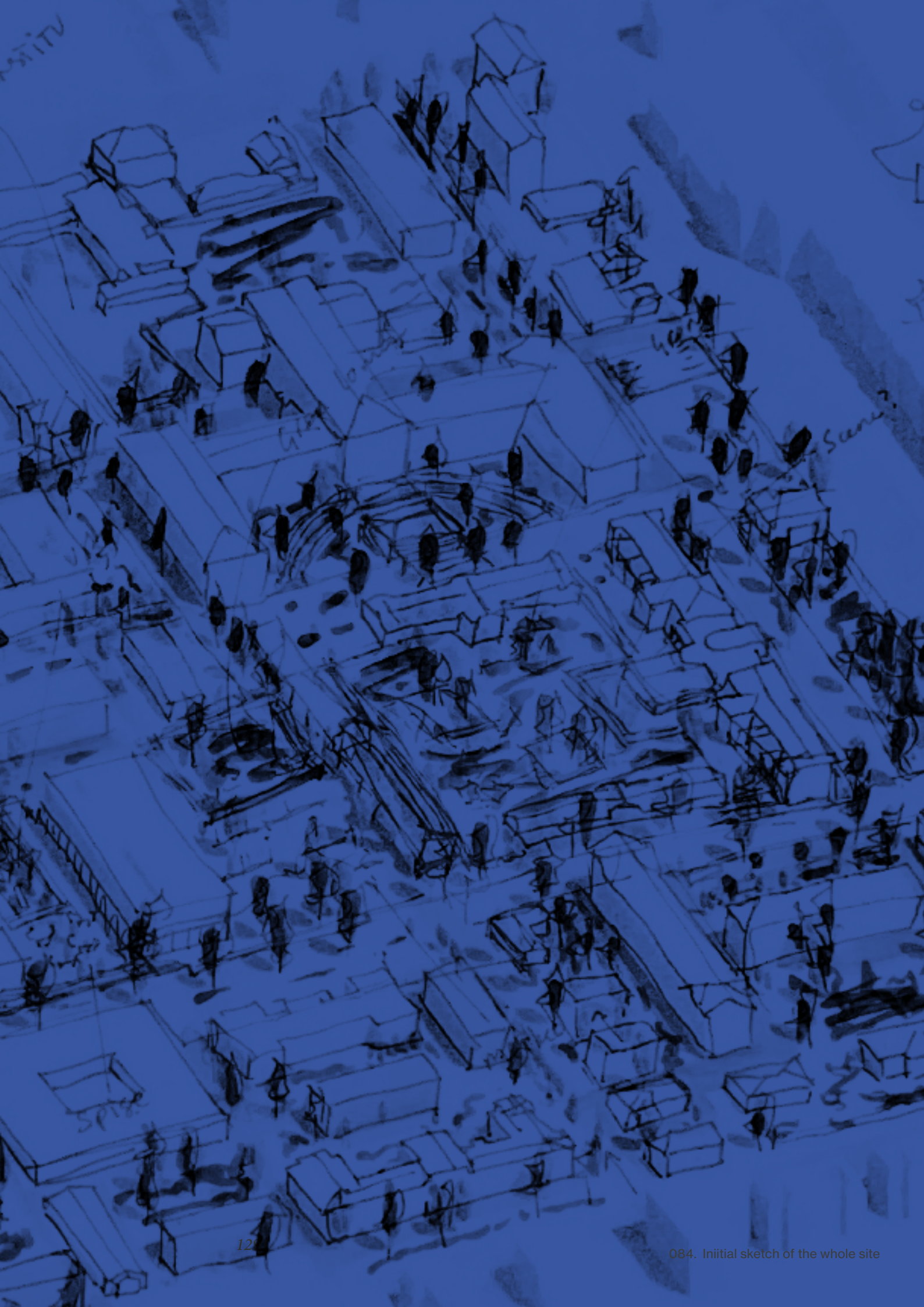


083. Zoom plan of urban space, 1:200

Linking workshop and the forum outside, elements define affordances in-between, allowing for interior functions to extend outside. This space becomes part of recreational areas outside, as a place to relax or stroll by, while creating awareness of functions inside.

PROCESS

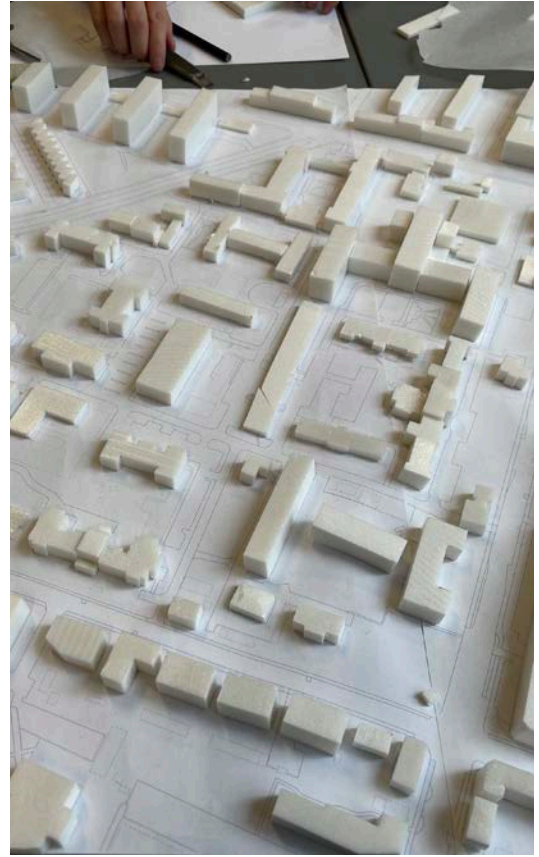
This part presents a simplified version of the design process of the thesis. The design is reached iteratively which underlines the non-linear structure of the process. Wherefore, a selection of key explorations related to the development of the project are summarised. The process evolved through a mixture of analogue and digital tools. Mediums of hand-sketching and physical models are supplemented by digital representations and simulations. In relation the classical architectural methods of plan, section, elevation, axonometric drawings and perspectives while simultaneously changing in scale, are used to study the qualities of the design.



INITIAL STUDIES



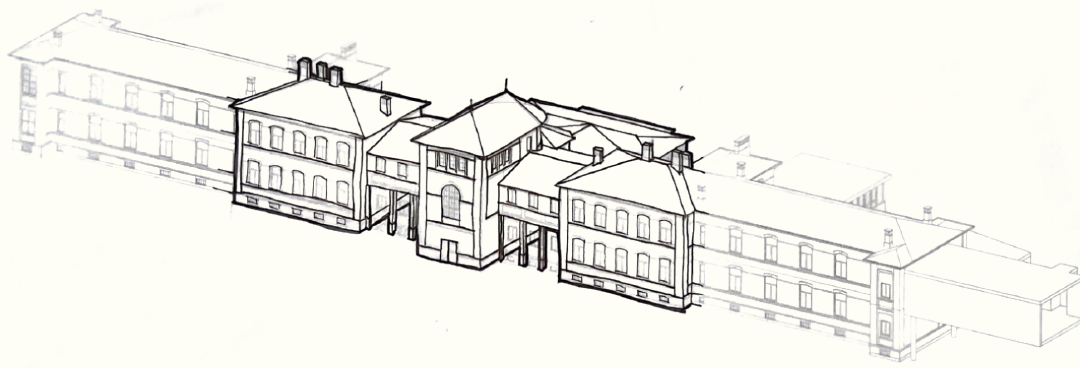
085. Site photo of building 21



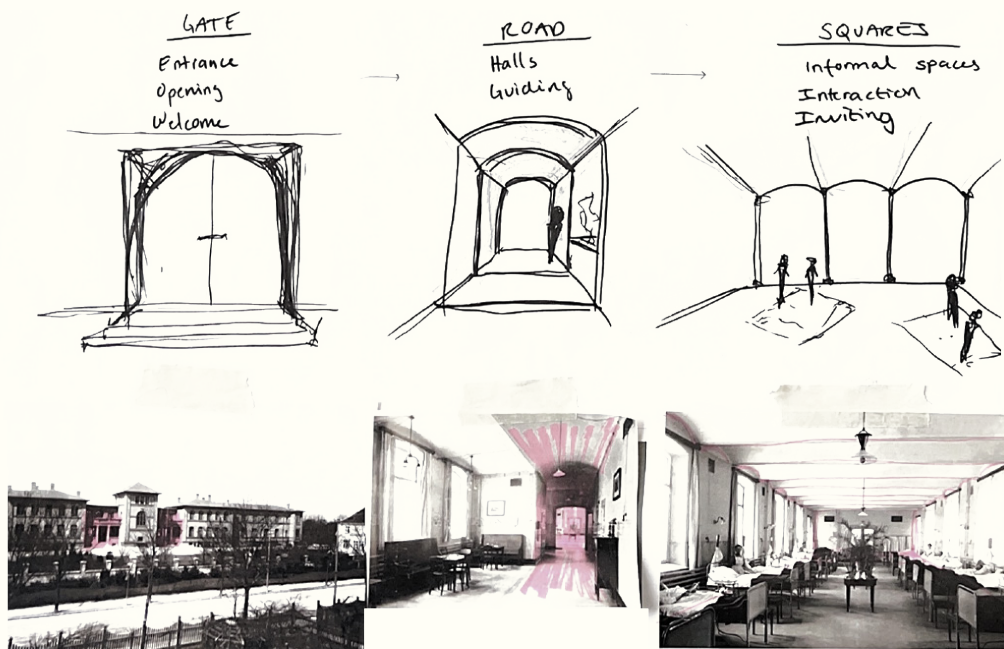
086. Model of the site and near context, 1:1000

The initial studies and explorations were focussed on grasping what possibilities existed within the large site of Frederiksberg hospital. Concepts of the social and physical intention helped define the projects position in relation to the municipality plans of the hospital grounds. Explorations of how to utilize existing features of the site, as the fence, gate, roads and squares, and the corridor spaces of the hospital buildings, were a focus in the early phases of the process. It was a process of reverse engineering to gain insight into how function, form and structure relates to the whole, in order to explore how past, present and future should relate.

A study trip to the site concluded the inherent relation between architecture. Being able to visit physically allowed an experience of the presence of the hospital complex with its current function, on site and in the city changed the prenotions and expectation of the place. The influence of the context, the surrounding city of Frederiksberg, was noticeable in the changing characteristics and atmosphere on the site. The study trip together with a physical model, helped in the development and delimitation of the project. It clarified the potential of a new function that could gather city, neighbourhood and site.

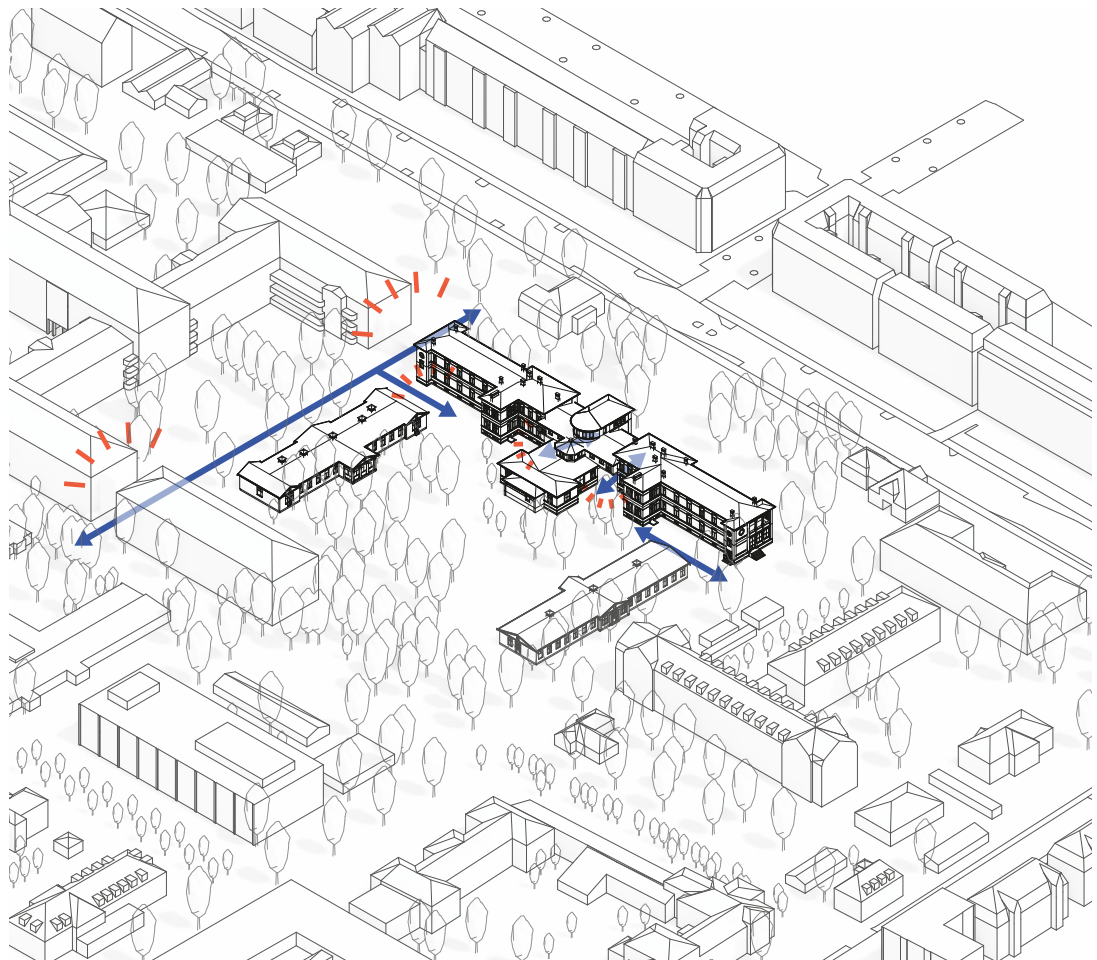


087. Initial concept of opening the large complex



088. Initial concept of how to work with the movement and sequence gate, road and squares

APPROPRIATE INTERVENTION(S)

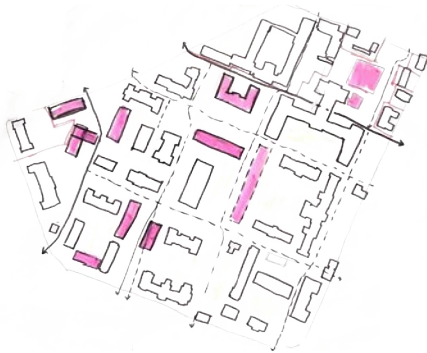


089. Isometric diagram, showing principles of interventions from midway critique.

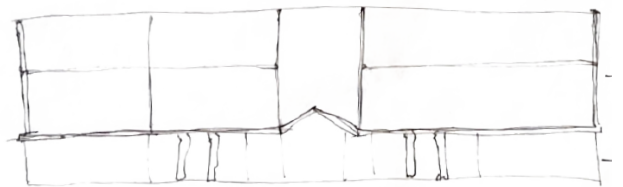
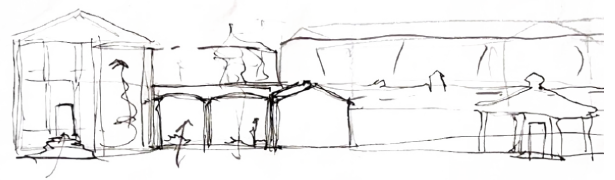
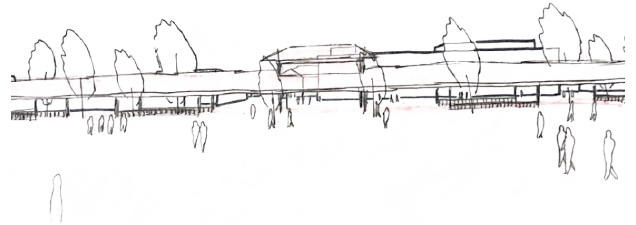
With the intention of creating a dialogue between the different scales together with emphasizing existing and uncovering previous features, concepts of how to develop the surroundings and buildings were explored.

With how large of an intervention should the project announce itself? How much should be preserved and how much should be demolished? What is needed to create the strongest effect on the complex physically and socially? Should it be part of a bigger plan or grow more organically?

The explorations led to a better understanding of what was appropriate and inappropriate for the site. It helped get a grasp of what the project was about and defined key concepts and ideas that became main motivators for the decision making. As such the vision to improve the existing through humble means of alterations developed, hereby deliberately reclaiming both physical and social space. The studies also clarified the need for a more defined idea of the functions and the use of the spaces, and how this use can be beneficial for the site and the city.



090. Iterations of masterplans



091. Different means of additions

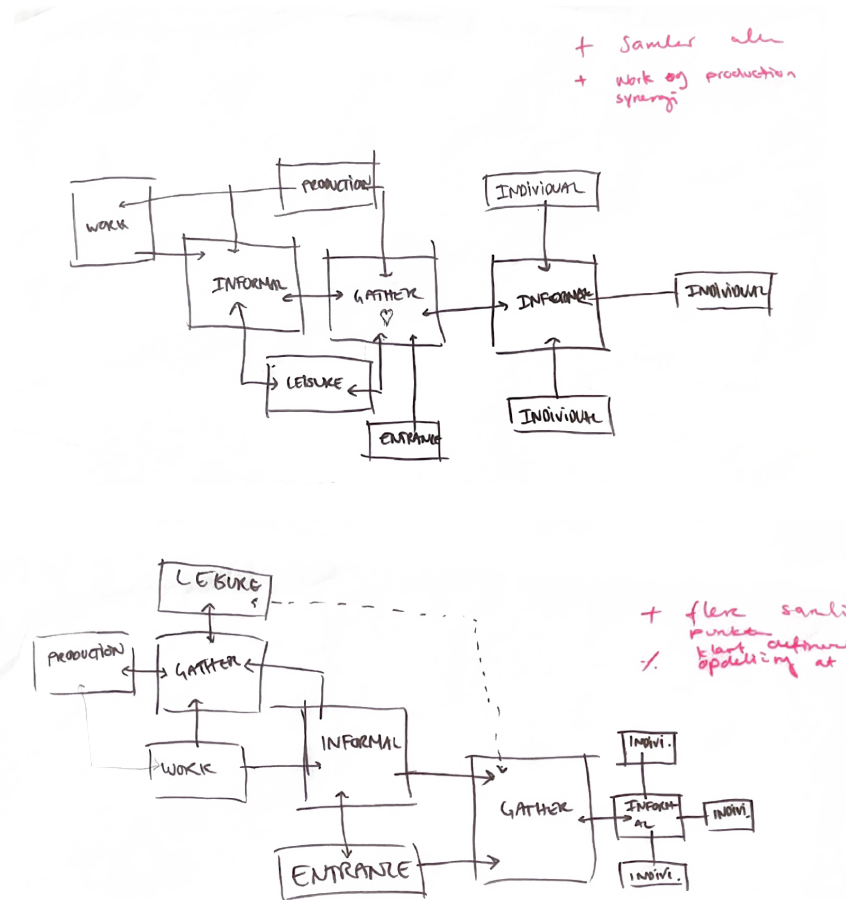
Grand gestures

With the exploration of the masterplan an overall cohesion between the journey from city to site and vice versa was sought. The masterplan approach gives a sense of position on the site, its advantage is the understanding and control of what is to become. The disadvantage is the uncertainty of the spaces, as they are a product of an expected need instead of specific social and physical intention.

Humble means

Different additions were to explore the dialogue between old and new through the creation of different connections and compositions. The potential lies in using minimal resources while getting the strongest effect and experience. It also allowed working in greater detail with a relatable and human scale.

FUNCTIONS



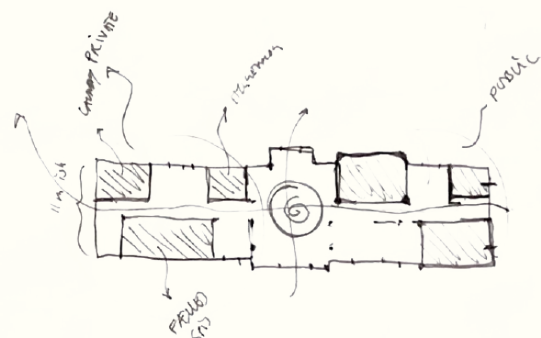
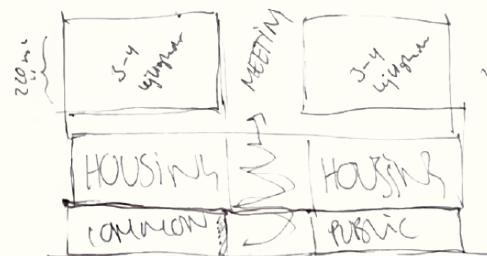
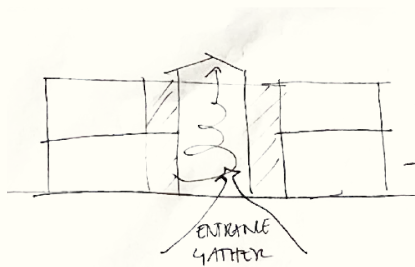
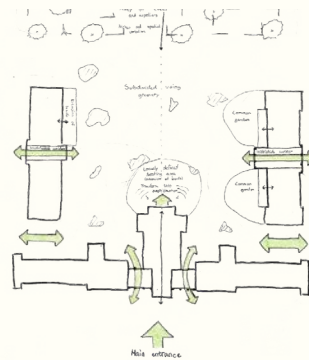
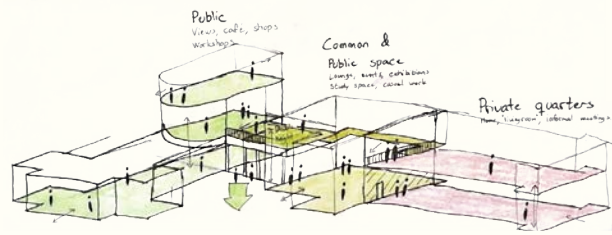
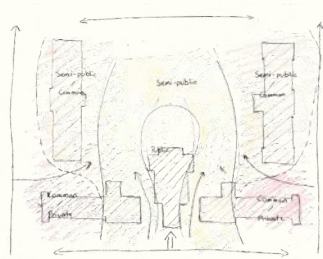
092. Diagrams of the relations between functions

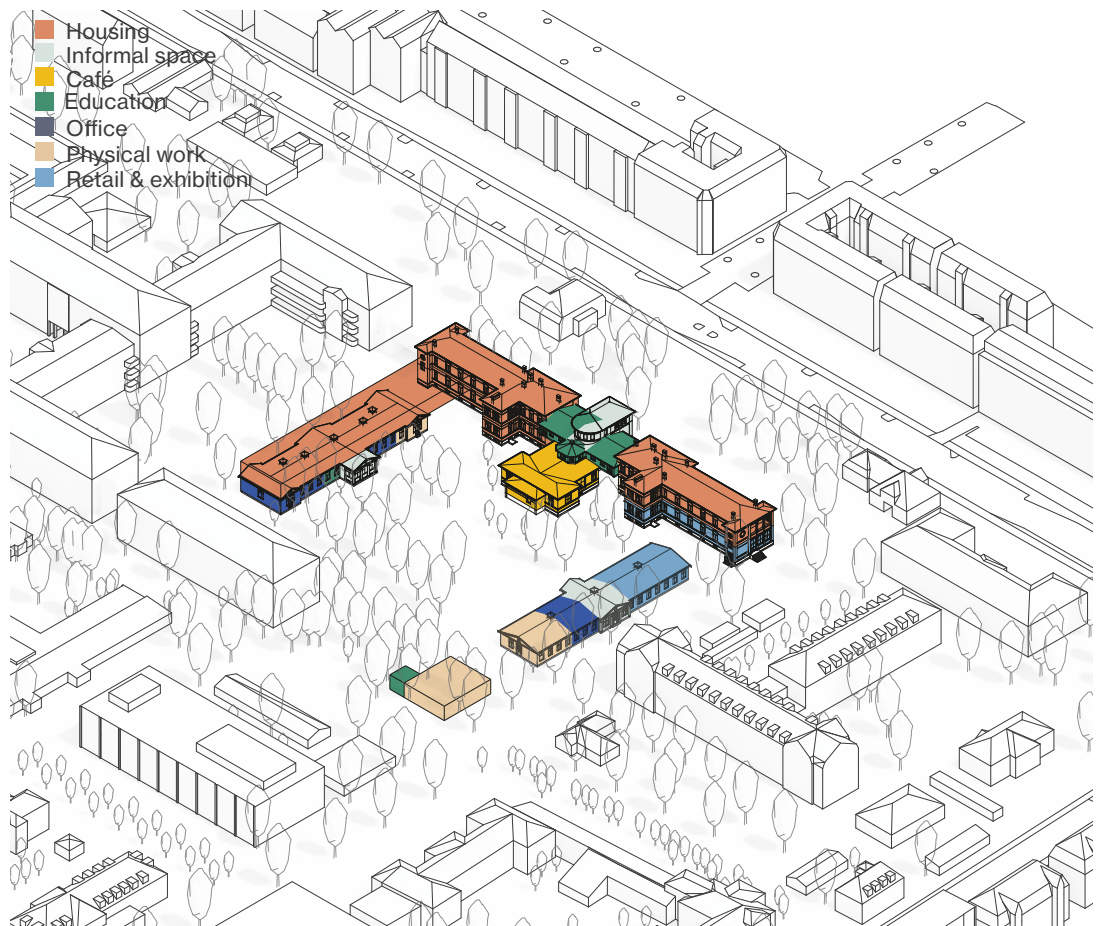
relation

From the intentions of people meeting and interacting across different cultures and social classes, initial ideas around the mixing of functions and possible connections emerged. Aspects such as the degree and relation of private and public spaces, the transition from individual to community, as well as the experiences of intimacy and openness were explored. The knowledge of different users' needs was applied, to create positive synergy between the people, functions and buildings.

The sketches illustrate a focus on intersection points where people can informally meet and

become acquaintances that leads to spaces for sharing and collaborating. The exploration highlighted the functional need for both practical and theoretical spaces to cater to a larger group of people, creating the possibility to use what is already known as well as learn something new. Likewise, it emphasized the need for spaces that are more focused and intimate inviting for exchange of ideas, knowledge and skills. Spatially this needs to be communicated in the creation of the individual rooms in sequences of exposures and enclosures.





094. Placement of functions for midway critique

placement

The specific placement of functions and sense of direction of existing buildings was explored. For this exploration the mediums of physical sketches and later CAD programs was used relating functions to specific sizes.

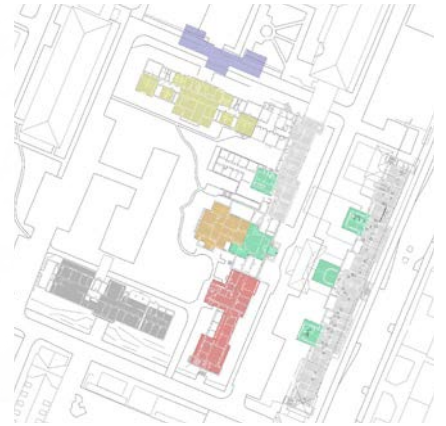
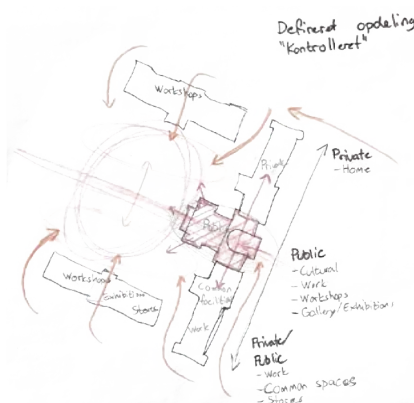
Considered potentials of the buildings, their relation to the intermediate context and use at different hours of the day, were applied during the development. This study concluded an advantage of placing optional spaces, such as informal meeting areas, near neces-

sary spaces, such as living and workspaces. As such, benefiting from each other and enforcing the possibility for activities and interactions to occur. Furthermore, a deliberate division of more public and more private functions give users the possibility to adapt to their needs of retreating and participating.

The sketches illustrate a lack of infrastructure regarding the functions and activities, which therefore became an area of focus for the further development.

Defined division

Important functions are placed in the centre of building 21, as a point of orientation and space of entering, a narrative of wanting to participate. The workshops are placed in the smaller buildings 20 and 22 as they are at ground level, which create an opportunity to use the outdoor spaces. A mediating function is placed in the wing towards Hovedvejen, to act as an intersection point for everyday users and people from the city.



Vertical division

Functions are structured in a similar composition, however with a clear vertical division of private and public functions. This utilises the spatiality of the buildings more efficiently, as zones of circulation and transition already exist and does not need to be replaced.

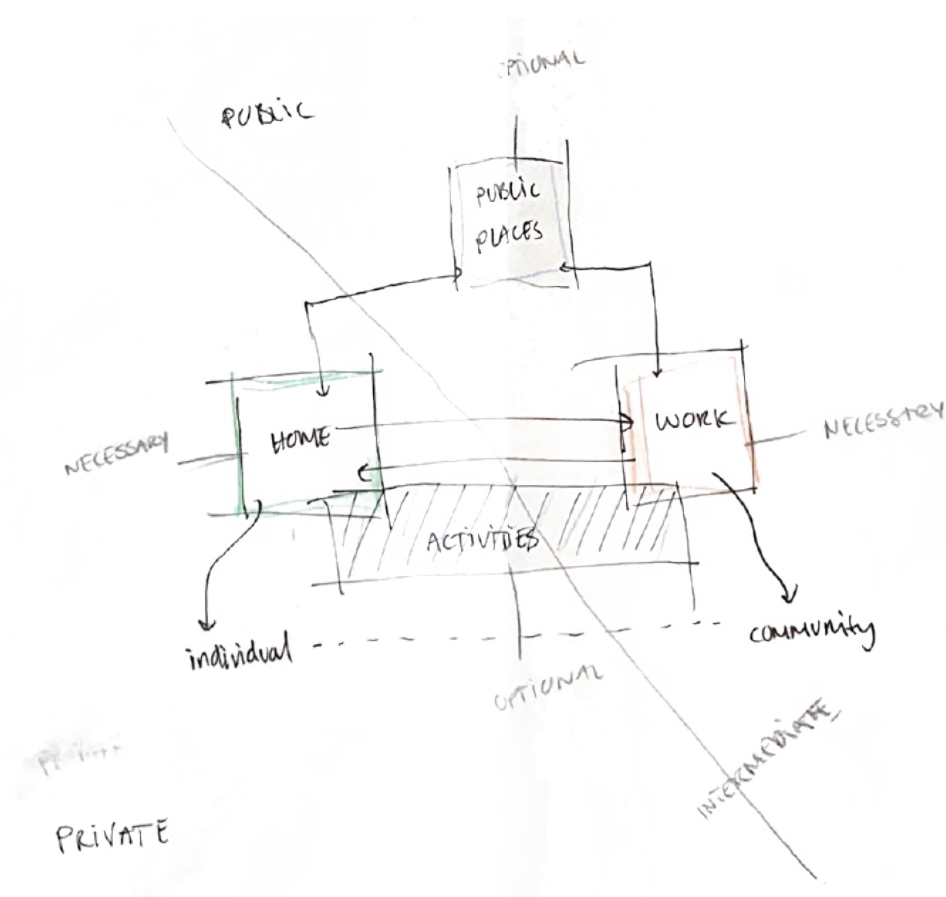


Mixed division

Mixing the functions create opportunities for interesting relations, while blurring the use of the spaces. This proof as both a potential and an obstacle. As such, in case of the building's structure and spaces, a clearer division is deemed suitable.



CONCEPT OF PARTICIPATION



096. Preliminary sketch of activities

With an intention of inviting new segments of people into the city and creating value for the inhabitants, by becoming participants of something larger, it became crucial to explore ways of which the project should contribute to change.

What can inhabitants participate in, how can they contribute? How can they join this place? How can the typology become profitable and relevant for both users, investors and the municipality, Questions such as these became starting points of the exploration.

Studies of existing references were conducted to understand the current typology landscape. As such a need to suggest new ways of thinking these relations became clear. As

such, life in buildings should emerge from a thought of mutual dependence – being dependent on others and vice versa. Therefore, architecture becomes an actor in activating the social landscape, inviting and providing spaces for this exchange of resources.

At this point, aspects of time and evolution were introduced to the concept, with the typology becoming both something temporary and permanent. In extension, an understanding of what aspects were needed, reflected through the architecture's interventions and details, was sought to be understood. The further process therefore became a study of where to create positive synergies between people, and what components were necessary for everyday life.

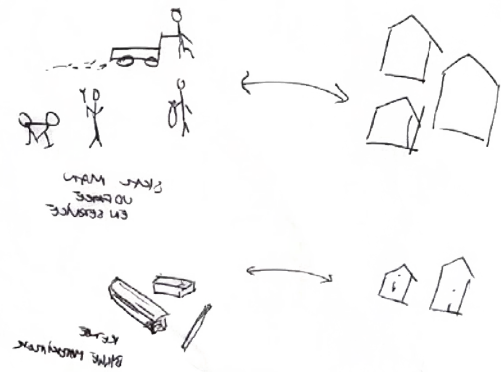
Start-ups

A box to live in and a box to start something in, a business, a hairdresser, an atelier etc. Based on previous knowledge and skills, inhabitants achieve acknowledgement and self-value, providing something to the community and others. Such concept demands a new way of utilizing existing structures, suggesting notable interventions and changes of expression.



Sharing work

A place to live and a place to get tasks. Tasks are acquired from a private company, creating a new form for collaboration between communal and private. Inhabitants establish themselves through collaboration and sharing of work, creating a sense of acknowledgment through participation in the community. Implementation of this concept, in the existing structures, would be achieved through minimal means.

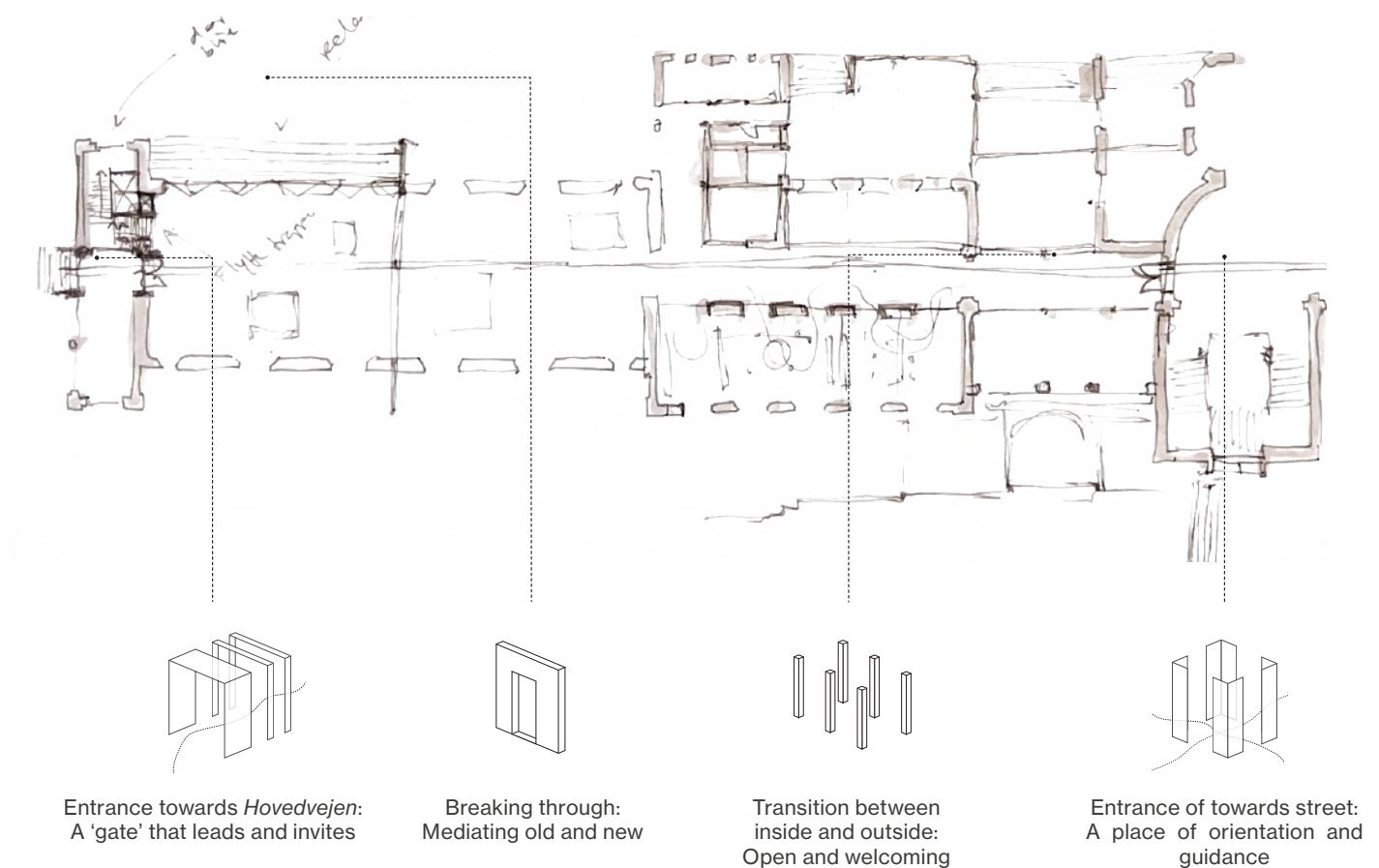


Job-hub

A place to live and a place where you can be trained. Inhabitants learn how to do a job while being offered workspaces, such as offices, to promote working alongside inhabitants of the city. This suggests larger flexible spaces that can provide different settings and jobs.



THRESHOLDS



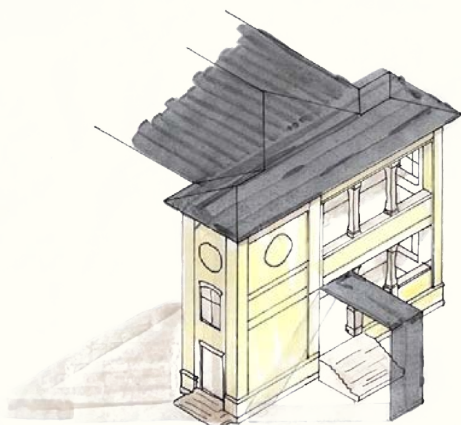
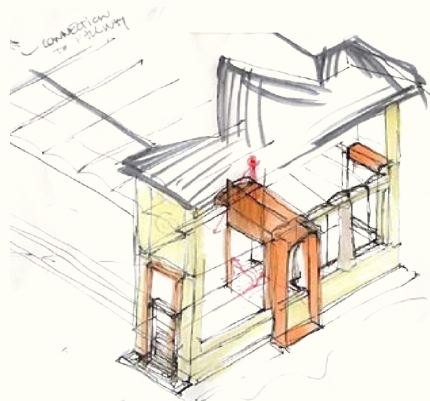
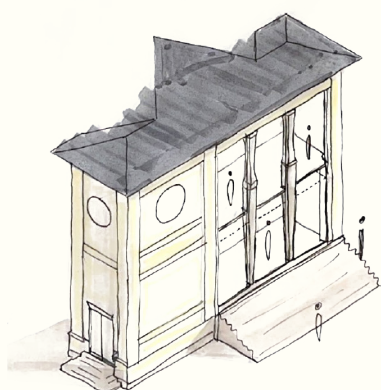
098. The different thresholds and their placement

inviting for exploration

The sequence of exposure and enclosure, moving from city to building, outside to inside, is a significant part of the spatial experience in the project. The entrances and the space in-between buildings become the thresholds that mediate the experience of what occurs inside and what takes place in the context. Wherefore investigations into the concept of opening and breaking down the facades are initiated. For this a clear hierarchy of the openings and difference of intention needs to be defined.

Much of the exploration centred around the

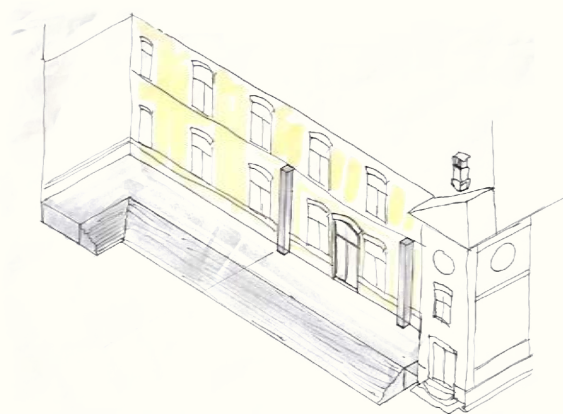
dialogue with the existing expression, spatial quality and gesture, where a multitude of aesthetic expressions, materiality, sequences and rhythms were investigated. As a result, the threshold serves as a function of use and experience. By emphasizing a sense of direction, while creating a moment of pause in the long views, along with breaking with the symmetry, the threshold spaces break down the grand scale of the site and buildings. The expression should emphasize the feeling of exploration, inviting people inside, while simultaneously being a continuation of the inside.



099. Entrance proposals towards Hovedvejen

Entrance towards Hovedvejen

The proposals emphasize a potential in creating an element that highlights the transition from old. This seeks to break down the scale, rather than becoming a grand gesture. It should interrupt by reaching out effectively inviting people inside.



100. Proposals of breaking through the façade

Breaking through the façade

The investigation shows the potential of creating a threshold in the façade, connecting buildings 20 and 21. The exploration focused on the expressive dialogue between old and new and the degree of openness. The opening however should not function as an entrance but rather as a connector, especially due to its position in relation to the entrance towards Hovedvejen. The opening should therefore not draw attention towards itself



101. The facade elements translated in different manners

experiential quality

Sketches were 3D modelled to understand the scale and materiality of the conceptual sketches. From this exploration it became apparent that threshold in the facades of building 20 and 21, primarily had aesthetic values – a visual connection. There was a neglect of intention and value of the relation between the two functions. This led to further development centred around activating the urban space in-between, creating a place of occupation instead of just transition, allowing functions to move outside. As such, the thresholds deliberately become an extension of the functions. The exploration led to a need to clarify the use of the spaces inside the buildings.

The 3D investigation highlighted the experi-

ential qualities of reaching out and interrupting the main axis of Hovedvejen. In addition, it visualised that the interrupting element should not be too slender, yet not too heavy either, to create enough visual impact and while still relating to the human scale. The roof cover defines the position, while also providing shelter in the urban space before entering the building. Furthermore, creating an opening in the end, emphasizing an off-axis direction, underlines the connection to building 118. Emerging from the investigation was the question of how these interventions were constructed as well as desire to create a common language, formal or material, to create a cohesive experience and make the user aware of the movement from one place to another.

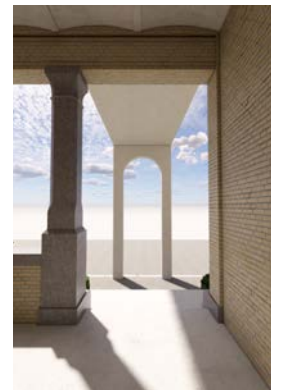
Frame

The intervention frames building 20 while visually guiding the user inside. The light frame accentuates the old and new.



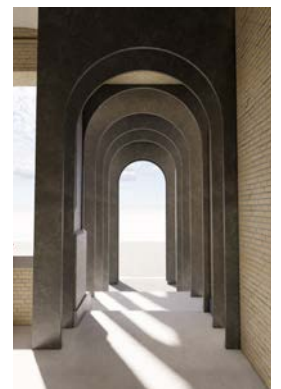
Arch

The intervention opens towards the end, inviting people inside while highlighting the connection to building 118, opposite the entrance. The expression of the arch and the heavy material tries to translate the existing features without success, insinuating a place of status instead of a place of generosity and inclusiveness.

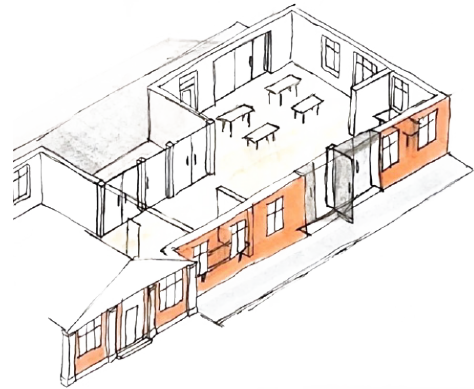
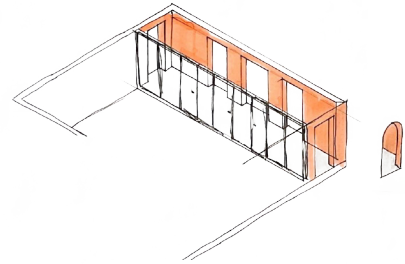
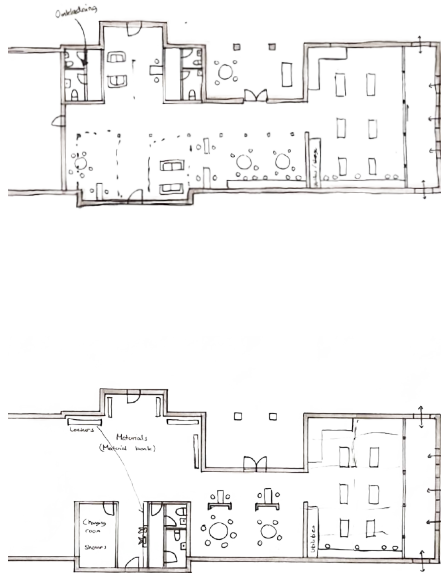


Sequence

The intervention underlines the direction towards 118 by introducing a sequence of elements. The gaps created by the elements allow for light to enter the structure, giving a sense of depth. However thin elements and lack of roof cover make the intervention disappear in the main axis. The repeating element provides an opportunity to utilize such concept in other contexts.



BUILDING 20

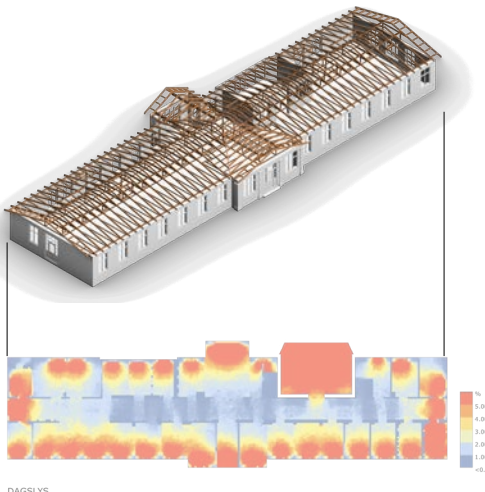


103. Concepts sketches of workshop

workshop

The intention of creating positive synergies between people through exchange, collaboration and sharing work, introduced the function of workshops. A space to do a specific task and through this actively share knowledge and skills. Building 20's high ceiling and relation to the surrounding urban spaces provided an opportunity to utilize and re-activate these spaces.

As such, a question of what the building allowed arose. As the building is quite expressive and atypical on the exterior and very noticeable from Hovedvejen, the exploration mainly focused on the interior. Analysis of the daylight and structural principle (appendix 3) concluded that the building could be utilized for working, as the rooms are well lit. The assessment also provided the opportunity to remove all the interior walls providing the opportunity to create spaces that complement the function. The qualities and implications of different options were explored through visualisations and sketches. It became apparent that some of the existing features should be preserved or accentuated, such as the skylights and the defined view of the corridor. On the contrary, the exploration showed a benefit of improving the rigid and uniform experience of the corridor, through opening the space. A shift between open and enclosed could compliment the use, giving a sense of movement and anticipation, as well as providing opportunities for different types of situations, from collaborations to focused work.



DAGSLYS

104. Structural system and daylight analysis

Existing

Visualisation of existing spaces. The light from the skylight and the window at the end of the corridor are emphasized by the continuous walls. The experience throughout the hall is rather monotone and removing walls could benefit the space.



Removal of ceiling

This attempt blurs the direction of the space as well as light from the skylights. The room height seems smaller as the roof structure becomes a heavy and busy feature resting on top of the walls.



Opening up

The proposal shows the potential of opening the space, creating an open and inviting atmosphere. The roof structure dominates the space and demands a design that embraces it as a feature or adds a new roof structure that becomes a continuation of the space. However, since the building has characteristic roof details and an architectural value of 3, whereof ornamented gables are a part of the reason (appendix 2), this is deemed an inappropriate intervention.

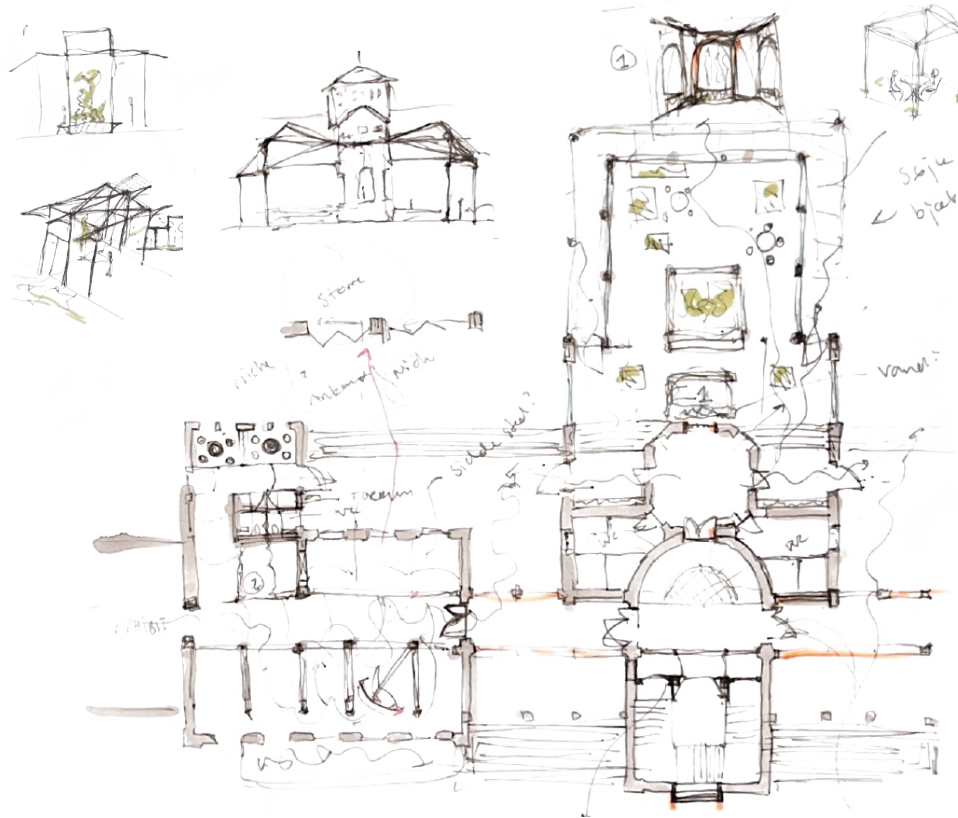


Removal of walls

The proposal shows the potential of removing walls, but still providing elements that divide the space shifting between enclosure and exposure, allowing for users to explore. It also conveys different zones of use.



BUILDING 21



106. Conceptual sketches of the conservatory

conservatory

A key component in the transformation was opening the façade of building 21, changing the gesture of the building from the street, from being closed and private to being an invitation of use. The exploration centred around accentuating the entrance and connecting the urban landscapes on both sides of the building. Hereby improving the arrival and experience of the building.

The approach emphasized the centre of the building which called for a function that could become a place of gathering, being a continuation of the main park area of the hospital complex. Different functions, such as library, eatery and conservatory, were assessed and discussed before further exploration based on their qualities and implications. The conservatory provided an opportunity to help

activate the park area becoming an urban plaza for recreation, events and gardening. It also provided a sheltered transition space that can be utilized both during summer and winter. The interaction between interior and exterior, together with the dialogue between old and new, were explored with an intention of creating a recognisable volume that gathers and becomes a midpoint for the typology.

Movement through the space and the gesture of the building, opening up towards the park, became important factors in the development to create a strong sense of discovery. Both in the sense of the architecture and discovering oneself through the presence and interaction with others of different cultures.



New volume

A new volume highlights the function and emphasizes the significance of the space. It creates an abrupt transition from old to new.



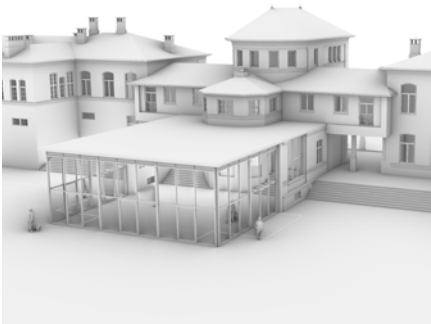
New roof

A new roof creates a voluminous structure and draws attention towards the space, while being seen from further distances. It underlines the feeling of openness whilst also allowing for larger greenery to be implemented in the space



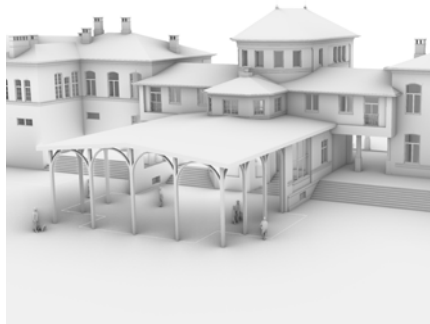
New windows

New windows open the façade towards the park, creating an opportunity to merge indoor and outdoor functions. The space has a more intimate feeling.



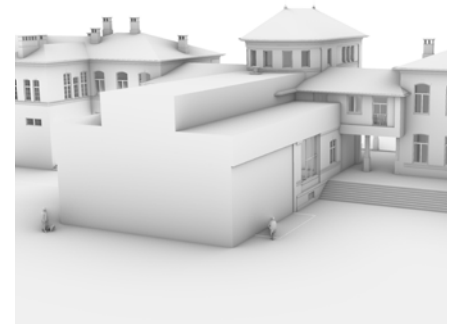
Flat roof

The proposal's formal language and composition fits with the existing building but becomes rather anonymous in its expression.



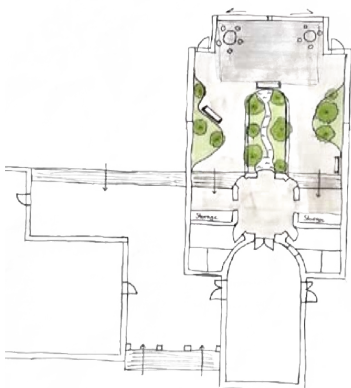
Angled roof

The proposal becomes a natural extension of the building continuing the inside to the outside.



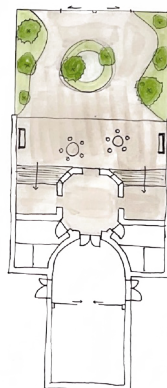
Steps

The proposal attempts to merge the idea of a more recognisable volume with the characteristic composition of the existing central building.



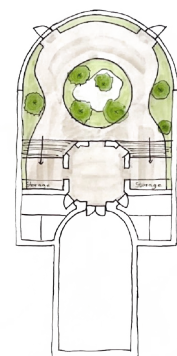
Gathering space towards park

The proposal gradually becomes more open towards the park, leading the user outside. The gathering space at the end create a potential to merge indoor and outdoor activities.



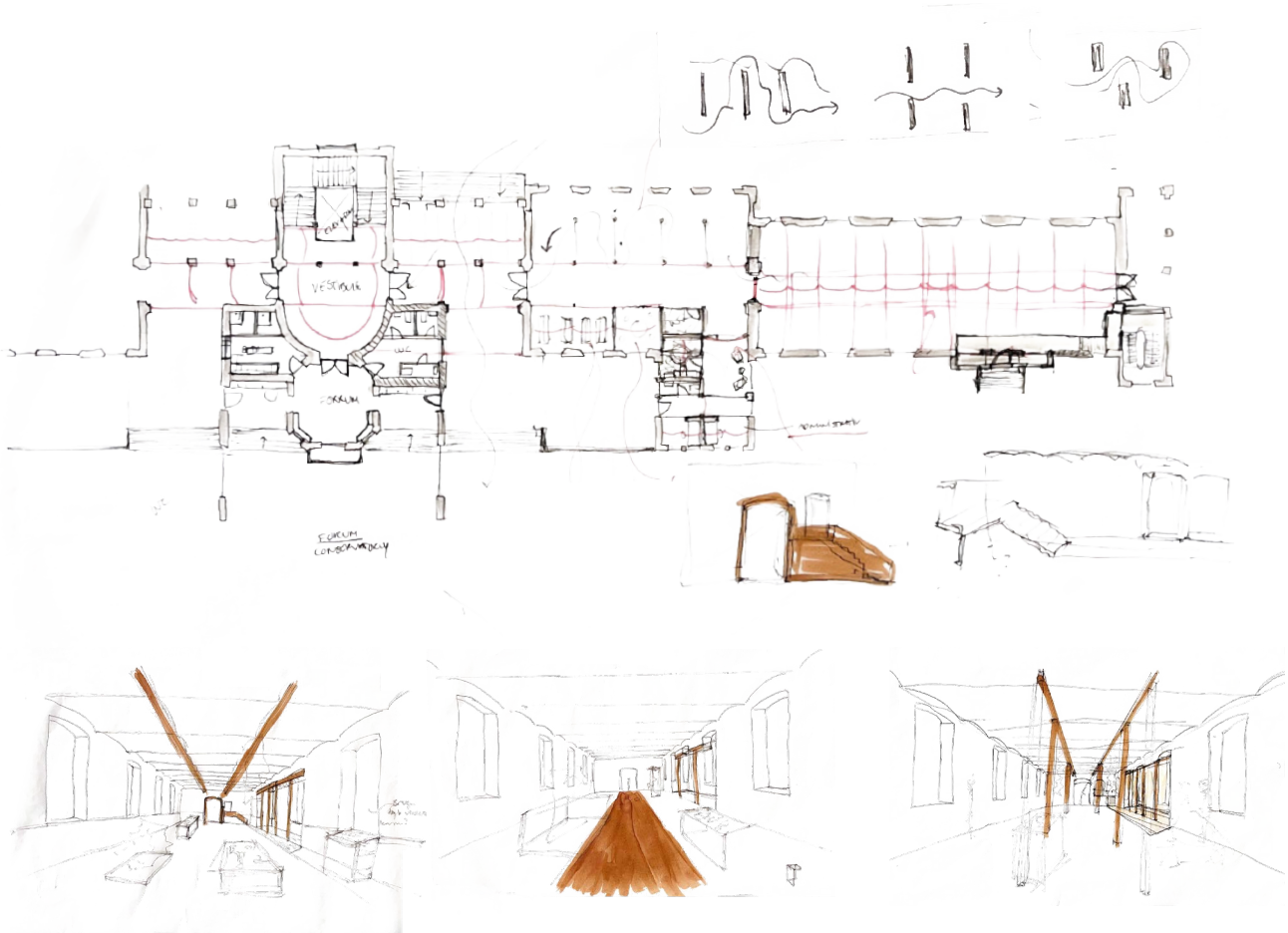
Gathering space towards park

A more unprogrammed space towards the existing building creates an invitation to host events that gathers people, wherefore the stairs become a space of occupation. Gradually the space becomes more intimate and greener towards the park, creates a strong relation to the outside.



Mixed

A mixed proposal creates the opportunity to have smaller pockets of spaces and a more intimate atmosphere where smaller groups meet.



108. Initial sketches of the forum

forum

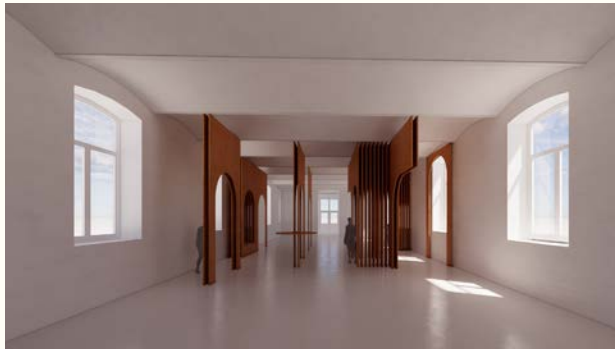
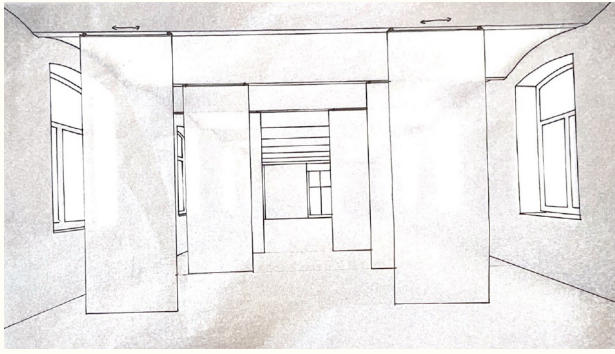
An important part of the project was the study of how to communicate the solutions and new constellation the typology provides. Simultaneously becoming a way to inform people of what happens here and how one can contribute. It became means of which to connect different resources and create value for the people, the local and the city.

The development focused on how to connect and create a relation between different functions, through the creation of a forum. It should be a place that intrigue the city, while presenting the work happening here. Together it should produce synergies that inspire new ideas and collaborations, to push a new way of thinking resources while furthering the social diversity of the city.

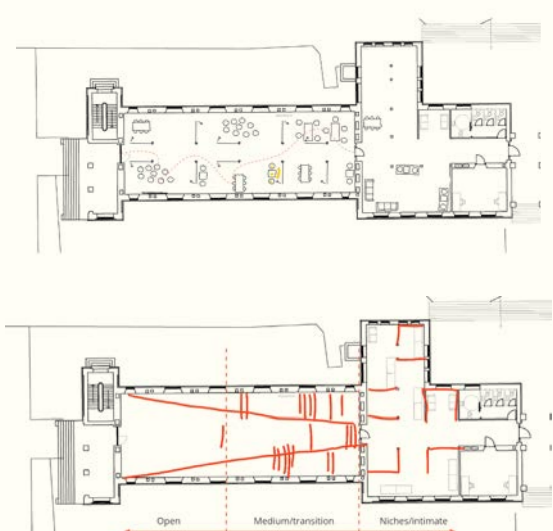
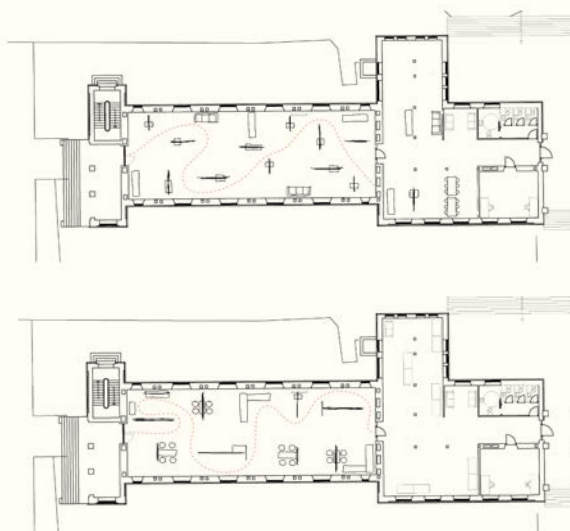
The open space of the hospital wing therefore needed to be activated as a place of interaction. From this an idea of how to create both

something universal and flexible, yet still specific enough to provide different zones, supplementing the narrative of discovery and interaction emerged. With a focus on underlining the existing features such as the axis of the building and the vaulted ceiling, concepts of how different elements could provide niches and invite for different movements were developed. The exploration was carried out across different mediums, resulting in elements that create visual pause and a non-linear movement, yet still highlights the axis, were chosen.

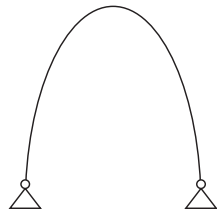
The investigation showed a need to clarify who the users were and what they did in the space. While, furthermore, investigating how the structure can become a part of the existing rather than working against it. The further process therefore became a study of how the elements should be constructed and meet with the existing structure, as well as how they could invite different uses of the space.



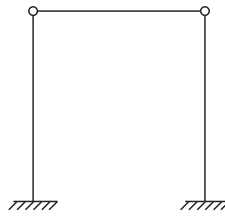
109. Exploration of formal expression, spatial qualities and use of elements



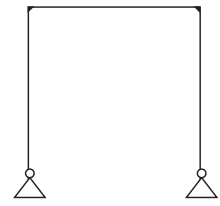
110. Different composition of the space in relation to scenarios



Arch
DoF: 3, R: 4



Beam and columns
DoF: 9, R: 10



Frame
DoF: 9, R: 10



111. Different structural principles and expressions

element

Being able to implement room defining elements would require an understanding of how these were assembled and connect with the existing structures of the forum. Creating an element that structurally supports itself, while adding a new expression and gesture to the space.

This investigation focused on the construction of such element, defining the joints and assembly. Being non-load bearing in the space, the element did not need dimensioning in this regard. However, during this investigation, a potential of becoming a structural principle emerged, creating an element that could be used elsewhere and assembled on-site. As such the development shifted to a more tectonic approach, becoming a structural element that added gestures. Structural principles in the art of construction enlightened the design development, however, the individual pieces needed consideration as well.

Becoming a structural principle, cross sections of elements should not only be room

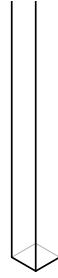
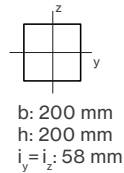
defining, but also create potential for a load bearing structure. Investigations of profiles sought to show the effect on spatiality, while a subconscious understanding of construction and their stiffness was considered in the assessment. To achieve a tectonic element, such synthesis was deemed necessary. In relation to the expression of elements, joints and meetings was found to be important in this regard.

Situated in the wing of building 21, how these elements interacted and connected with the room defining vaults and floor was an important question. The assembly of element, along with the level of intervention on the room surfaces, became defining factors, creating a joint that left minimal impact while being mounted in the space.

By defining the elements, a structural principle developed creating spatial gestures in the room. In extension to these gestures, potential of using elements as more than just room defining gestures was seen, developing into an investigation of furniture.

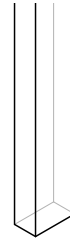
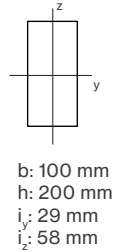
Square

Square profile of elements created a solid and simplified expression, appearing sturdy. As a basic geometry, such profile is well known and used as columns.



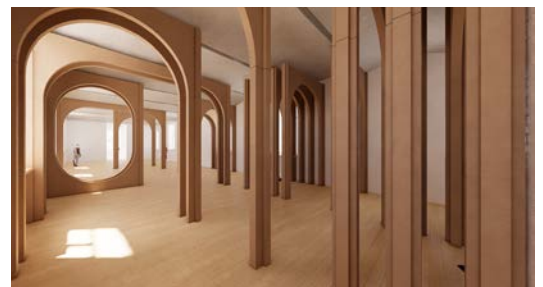
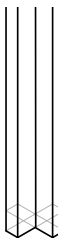
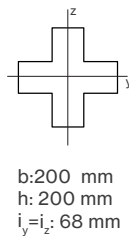
Rectangle

Using a rectangular profile, the elements changed in their appearance, when watched from the side, while maintaining a solid expression from other angles.



Cross

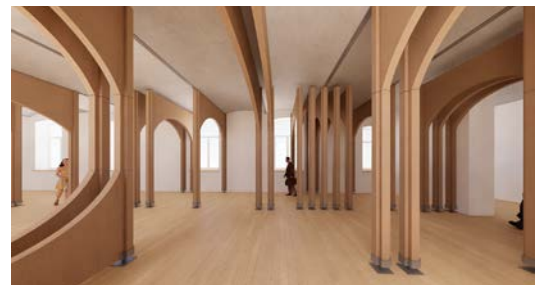
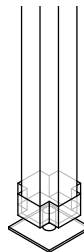
Creating a more intrigue expression, the profile allowed the profile to appear slimmer, while becoming defining in its axes. Furthermore, the cross-section had a greater stiffness allowing for a smaller profile, providing a lighter expression.



112. Investigation of cross-section

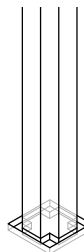
Elevated

Columns were raised above ground on metal joints, creating a lighter expression. The joint allowed only screws to penetrate the floor.



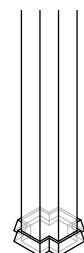
Sunken

The columns were placed within the floor, appearing to grow out of it. As such, the profile of the column needed to be cut into the floor.

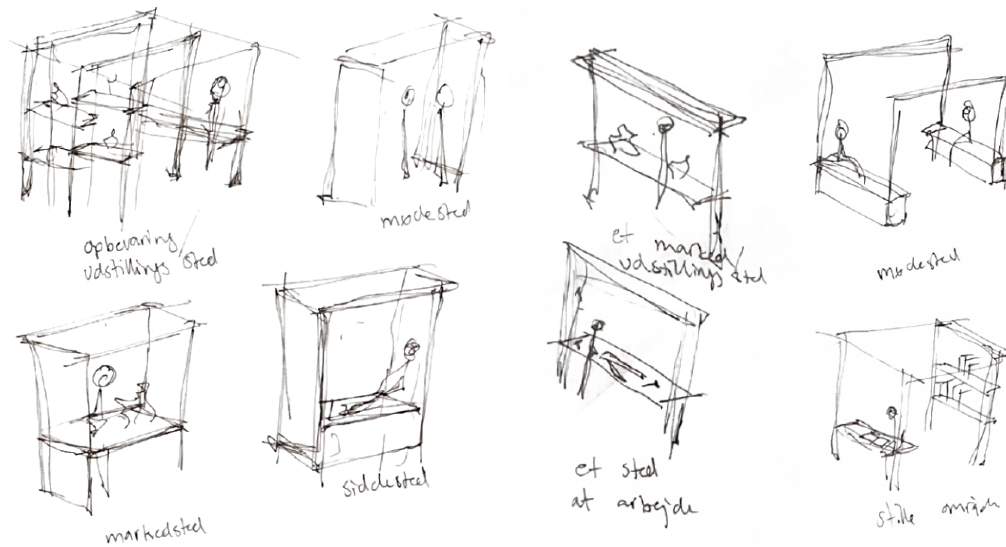


Defined

Mostly expressive, this joint defined the foot of columns, appearing sturdy in their connection to the floor.



113. Investigation of floor joint



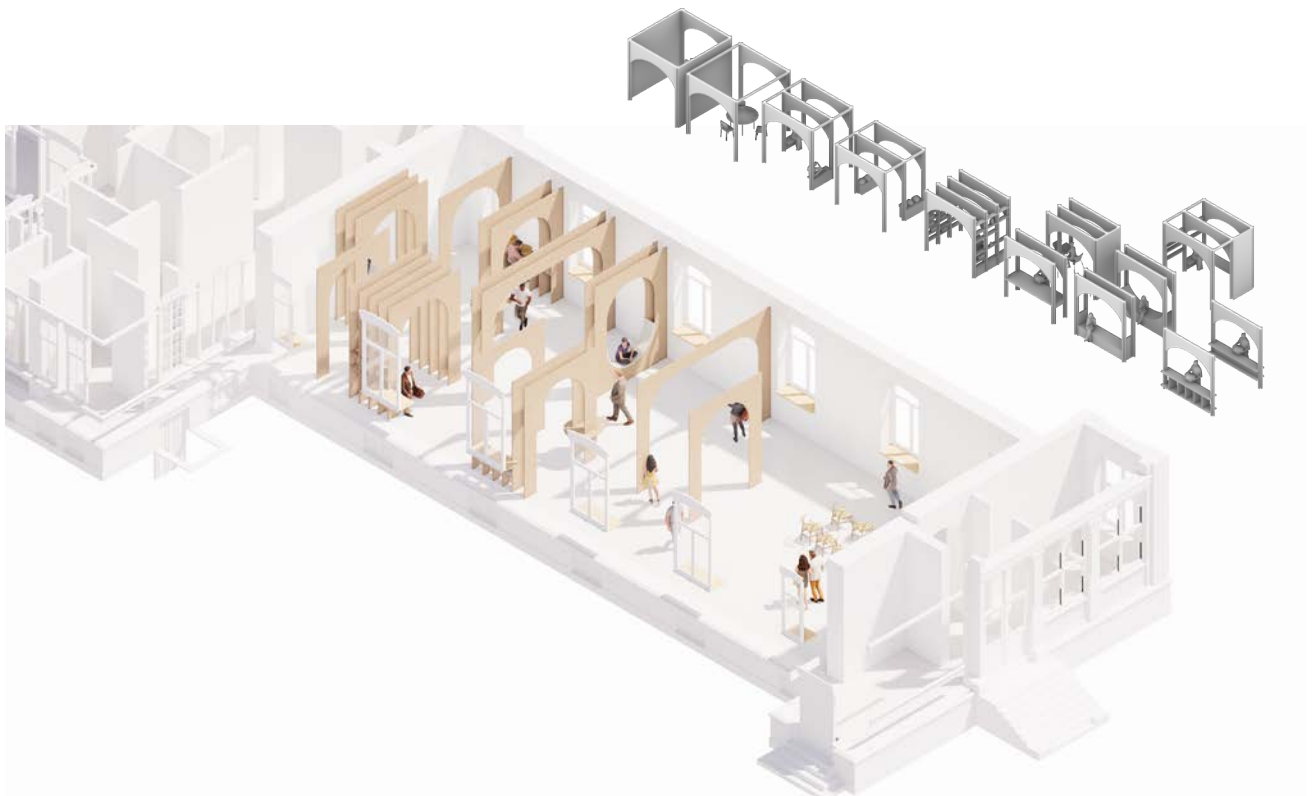
114. Concepts of different scenarios of use

furniture & materiality

With the intention of utilizing elements to create a spatial gesture, an exploration of implementing furniture was initiated. The concept of universal and specific solutions, that through the same element, but with different compositions and repetitions, create different scenarios.

This raised the question of what furniture was needed and what specific use it should accommodate. Concepts were developed for the different functions, creating affordances for interaction, relaxation, collaboration, socializing and more.

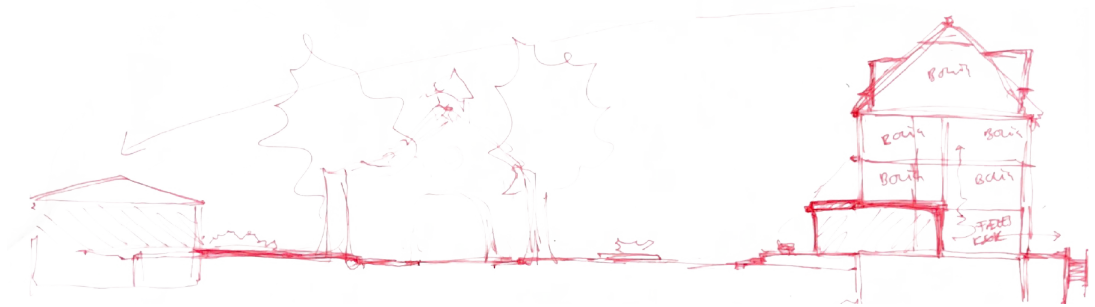
In relation the materiality of the elements was explored, and a decision of wood was made. This was due to the structural need and efficiency of the material, while having complimentary expressive, atmospheric and sustainable qualities. Visualisations helped ensure a balance between existing and new, in an attempt of avoiding the element becoming a foreign element in the room. As such, wooden floors compliment the elements, allowing them to act as deliberate addition that emerges from the floor, while accentuating the vaulted ceiling.



115. Concept of creating niches and movement through the interplay between elements and furniture



BUILDING 118



117. Early sketched section, showing principle of programming

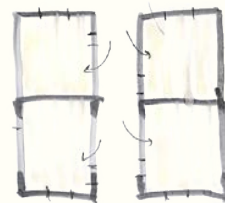
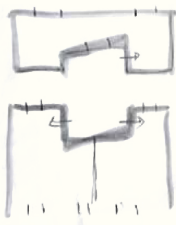
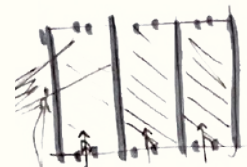
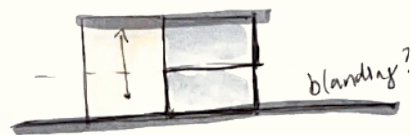
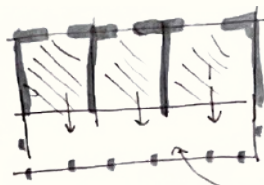
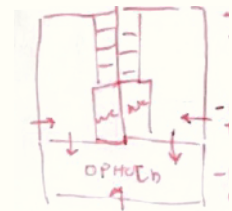
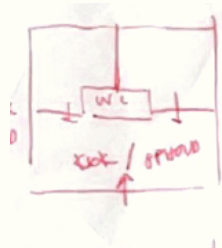
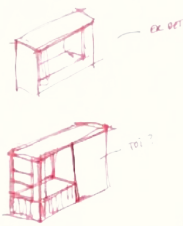
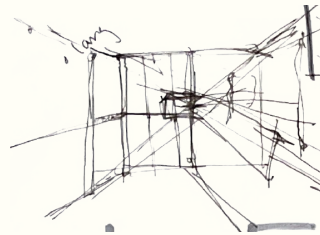
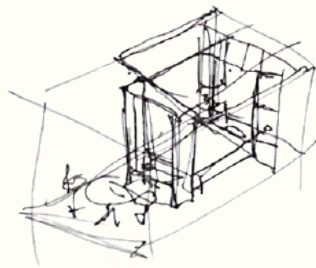
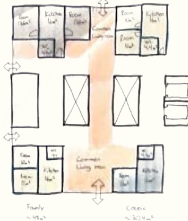
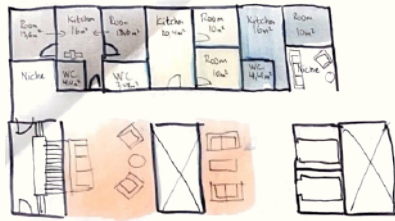
ideation

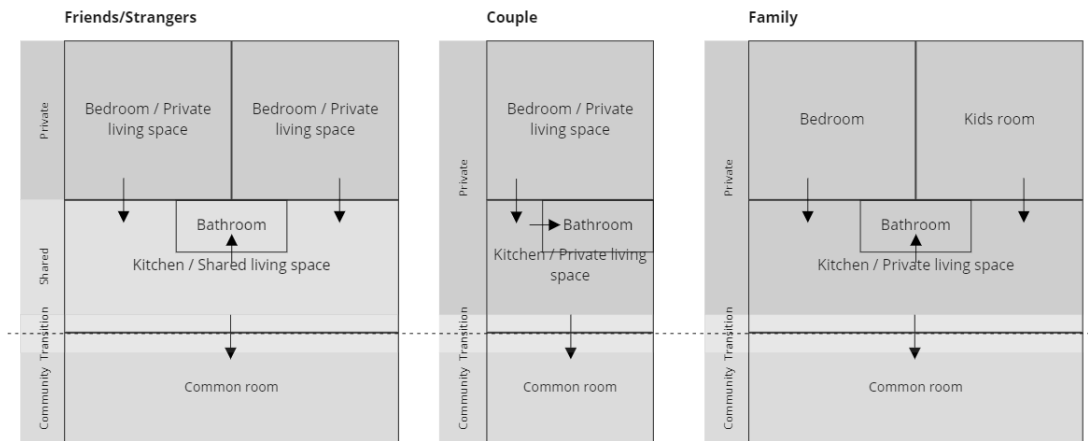
The idea of implementing a temporary housing solution within the typology demands a consideration of what is needed, in order to create community and a home. Considering the delimited area of the site, building 118, being a past building of employee housing, has a potential of developing into a new type of housing.

Using building 118, a concept for the type of living had to be explored, along with how community could develop within the same building. What is the time horizon for the housing, should it be something temporary or permanent? How does temporary housing allow a new way of living while promoting community? Exploring concepts of housing caused sketching of iterations and new ide-

as to emerge. As a result, this highlighted the project's need of a concept that prioritizes people and a sense of community, solved through compact solutions.

Initial sketches focused on quality compact housing that seeks to host necessary functions of everyday life, while assigning more space to communal and social areas. Sketches therefore reflect an investigation of how to compose spaces accordingly, while ensuring relations between spaces for inhabitants to meet and use functions together. Through these investigations, shared housing with a degree of privacy throughout the building shows potential, requiring further consideration regarding the relation of spaces.





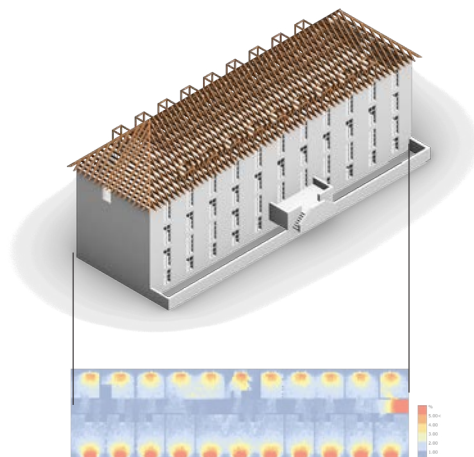
119. Early concepts showing delegation of functions within housing units

relation between spaces

While the composition of spaces needed to be considered, decisive factors that impact this had to be explored. For this, sketching the openness of spaces sought to investigate this.

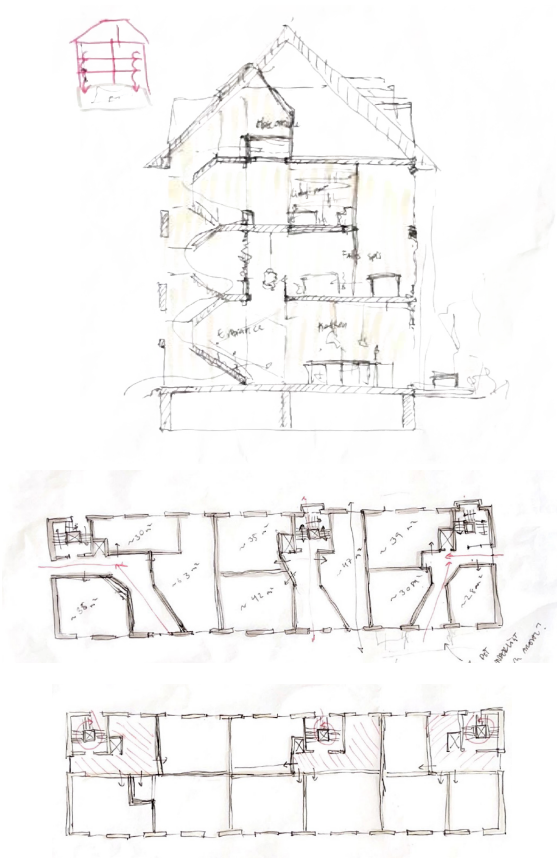
Utilizing simulations of daylight, an understanding of light inside the building informs the design, along with how this light can be maintained through a relation of spaces in-

side. Besides considering a relation between housing units, so too was the relation between housing and hallway. How can housing units support a new type of hallway, become something more? Furthermore, the composition of housing units in this regarded, being on one or both sides of the hallway, and in a straight or skew formation was investigated. The result was a benefit of spatial course as a result of housing unit composition, creating a street like experience. Common spaces were able to be defined in-between, creating possibilities for daylight to light these up.



120. Daylight simulation of building 118

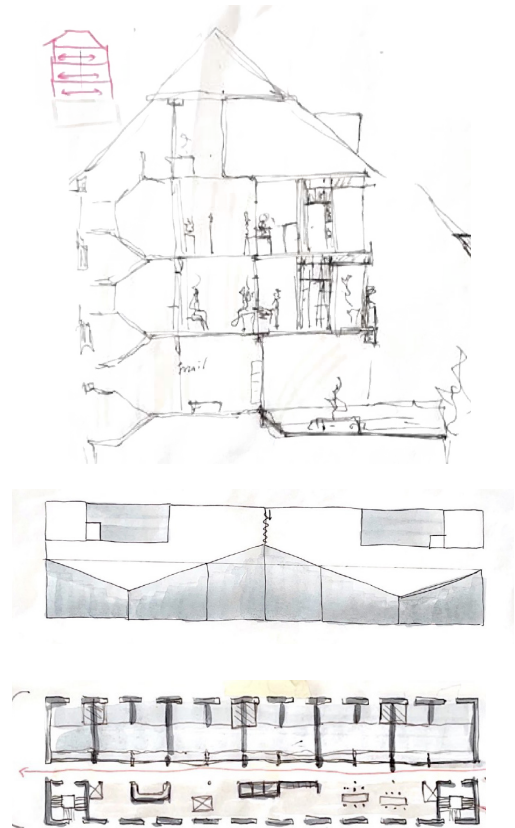
Creating a sense of community spanning across floors, was at this point deemed important, avoiding exclusion of people on each floor. Therefore, how this connection was implemented was investigated, while considering what functions could promote a communal effect for everyone in the building. As such a gradual degree of community from ground floor to housing floor developed, calling for connection across floors, that could help define the hallway and housing units.



121. Sketches and visualisations showing concept of vertical relation

Vertical relation

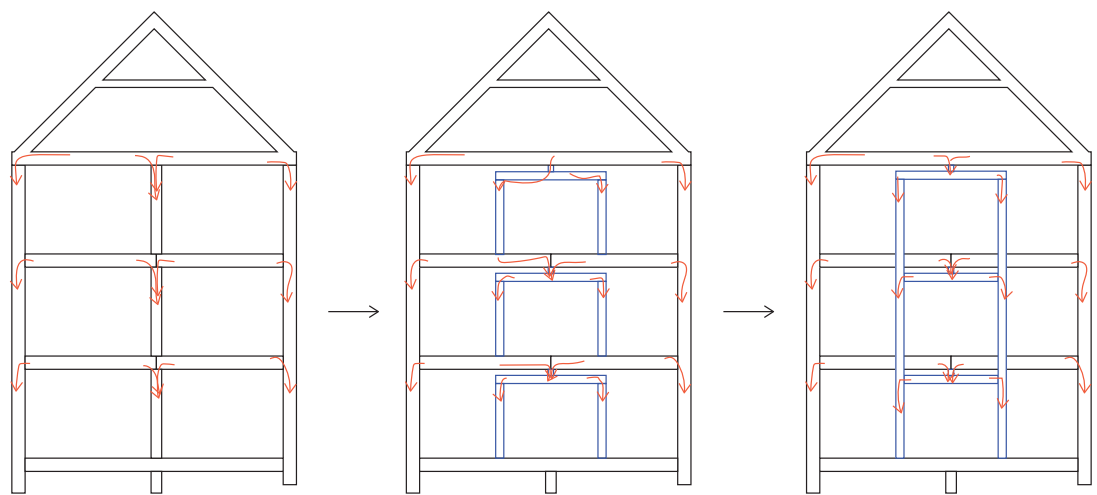
Using vertical relations between functions, each floor is defined by separate common spaces, housing only a few inhabitants. Course of space is shorter, focusing on lines of sight, while common areas is lit by daylight.



122. Sketches and visualisations showing concept of horizontal relation

Horizontal relation

Using vertical relations between functions, each floor is defined by separate common spaces, housing only a few inhabitants. Course of space is shorter, focusing on lines of sight, while common areas is lit by daylight.



123. Structural principles, showing the transferring of loads

structural system

With a new spatial course within the building, the existing structure needed to be considered. Through structural calculations (appendix 3), the need for a new structural system became clear.

The transferring of loads was sketched, while considering how structural elements can contribute to a tectonic quality of spaces inside. Furthermore, this highlighted an importance of supporting the existing beams of floors, avoiding replacement of these. The result was a post and beam system, transferring loads across floors while avoiding a need for reinforcing floor beams. Furthermore, these

elements were a potential to develop a spatial experience, that not only define a hallway, but create affordances inside.

The design and dimensioning of these elements required an engineering understanding synthesising aesthetics and construction. Through calculation and dimension, as well as visual representation of elements (appendix 4), the result was a principle of repetition, that in-between define spaces and affordances throughout the hallway. Furthermore, using interior walls to stabilize the structure, define both hallway and housing unit, calling for consideration of housing unit interior.



124. Design of elements and their effect on space

Element expression

Different designs of the element were considered, along with how they would affect the hallway space. The investigation showed that the element should not become too perforated and light.

125. Different kinds of repetition of elements

Repetition

Through calculation, the amount of load bearing elements were investigating, show how repetition could both impact the spatial experience of the hallway, while being able to transfer loads.



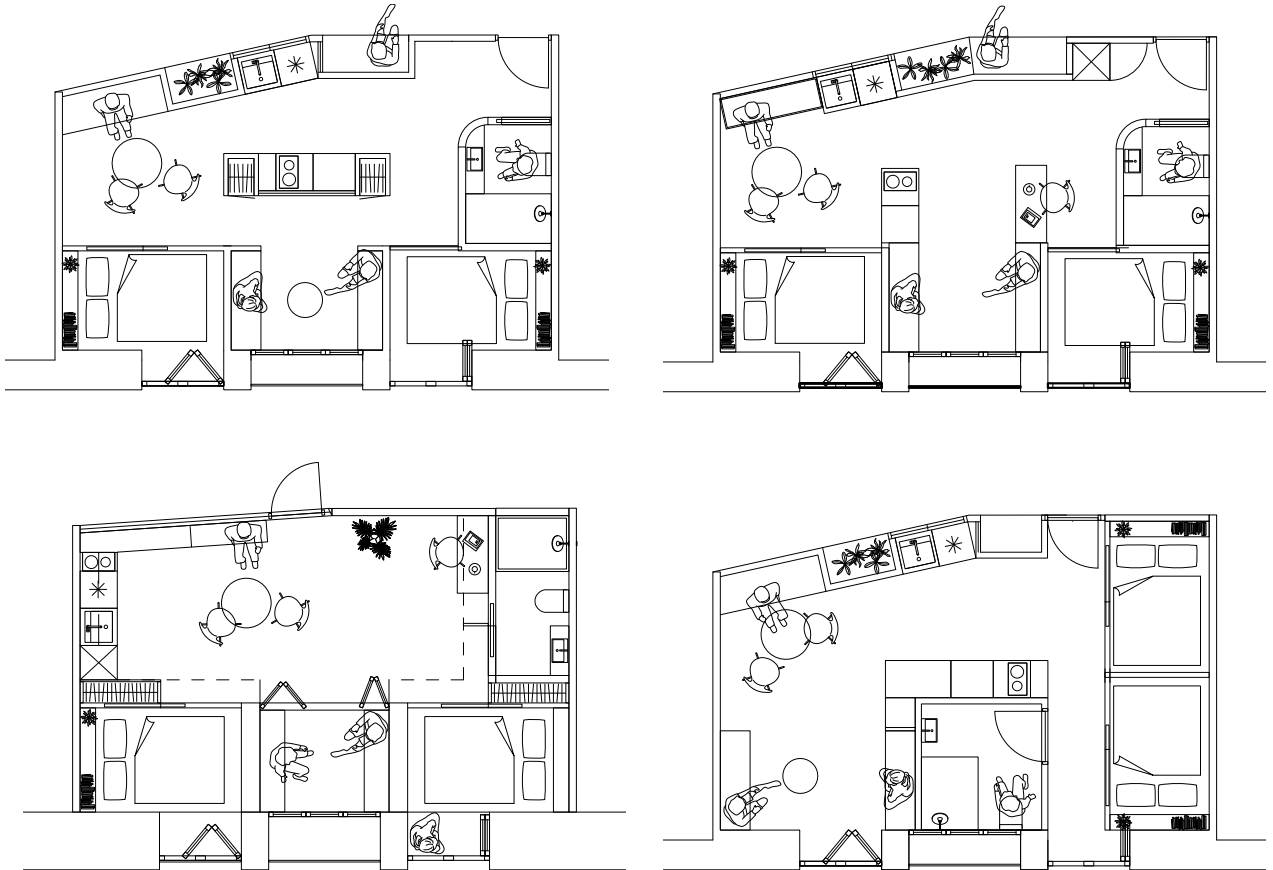
126. Types of housing unit concept, with simulated daylight

units

Developing the interior space of housing units, needed to consider the demands of being a temporary solution, that though compact in size, added a quality to inhabitant's everyday life. As such, how were these composed? Who and how many did they house?

Sought to answer such questions, iterations and principles of units were developed. With a common concept of access to the hallway, common spaces act as extensions of the unit. Furthermore, through these principles, a sharing of units showed potential in the social fabric of the building, with only bed-

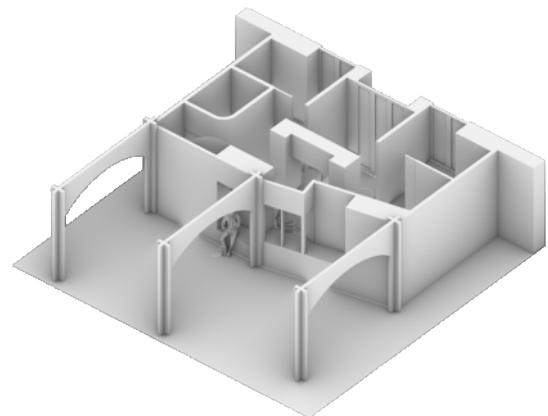
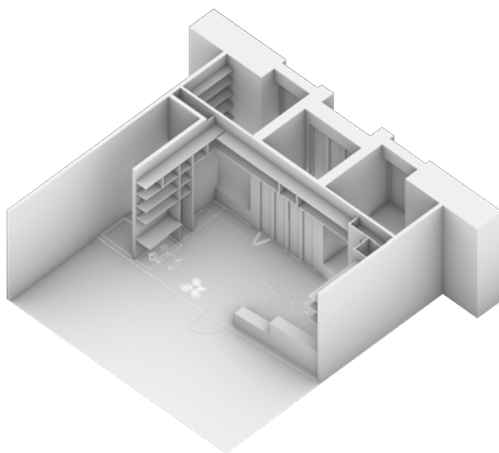
room as a truly individual space. However, this raised a question concerning human necessities, and what was needed in order to live here. Pinpointing necessities and sketching on the composition of these, privacy and avoiding waste space became main tasks when developing a compact plan, while still creating affordances inside. Furthermore, daylight was likewise considered, ensuring natural light in the space. Through these iterations the importance of windows become increasingly relevant, ensuring the light and atmosphere inside, while being part of the building's façade and outside expression.



127. Detailed iterations of housing unit's plan solution

Plan solution

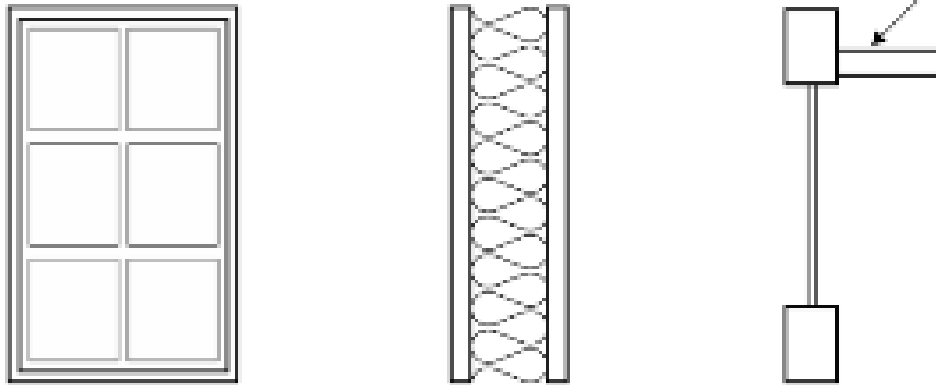
Creating a compact plan requires careful consideration of every square meter. As such, iterations sought to eliminate waste space creating use of often neglected spaces such as hallways. Furthermore, lines of sight and exposure in the unit was important in the definition of private spaces.



128. Principles of using walls and ceiling height

Affordances

Further utilizing space, is the implementation of furniture in walls and under the ceiling. Besides creating extra storage and new types of walls, shape and composition of affordances allow for interaction or certain situations to evolve. As such, these become part of the promotion of community, creating mores spaces for inhabitants to use.



129. Window, insulation and shading

New windows

Windows presented an opportunity of extending the building lifetime, as well as lowering its energy consumption. In extension, windows also affect the expression of façade.

Re-insulation

Insulation approach of building could affect its expression, while extending its lifetime. As a result of re-insulation, the interior climate should be considered.

Shadow

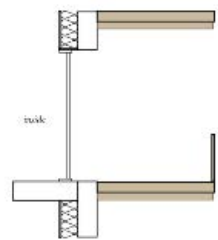
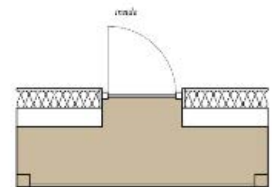
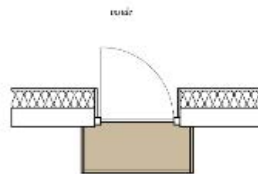
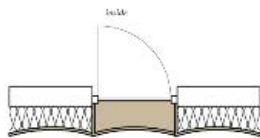
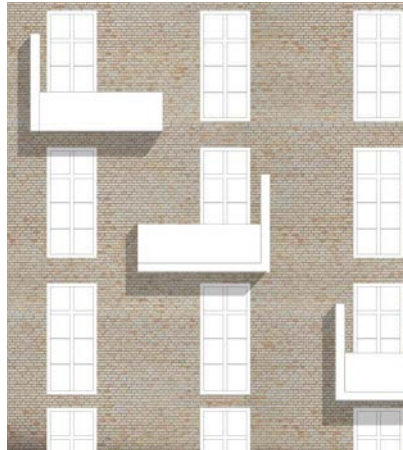
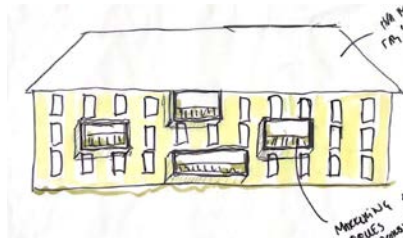
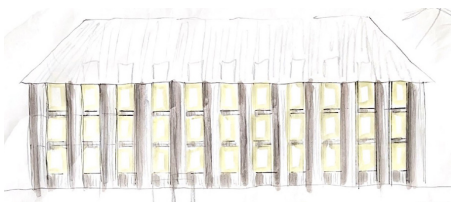
Passive shading strategies are investigated in relation to the re-insulation of the building. Shading can become part of the new façade expression.

façade

Utilizing building 118, for housing needed not only consideration of interior space, but of the exterior as well. Being a product of functionalism and a time of no use of insulation, re-insulation and façade expression was investigated, while synthesising investigations and results from the interior. Furthermore, re-insulation expands the building's lifetime, securing future use while lowering energy consumption.

Thorough investigation into approaches of re-insulating was made, juxtaposing pros and cons of these. In relation to this life cycle assessment calculations (appendix 5) sought to aid in the decision of this, however this

calculation instead created an awareness of materials used in doing so. Instead, external sources aided in the understanding of renovation and LCA (Serrano et al., 2022). The result of these investigations likewise called for awareness of indoor climate, and how the façade may aid in this regard (appendix 6). As such, key factors in the re-insulation of the building emerged, being windows, insulation and shading. Numerous façade iterations (appendix 7) synthesised this information into a solution, that would be deemed as respectful and sustainable as possible, while not compromising the human scale experience.



130. Sketches, visualisations and diagrams showing the re-insulation approaches

Exterior re-insulation

Exterior re-insulation presented an opportunity to change the façade while maintaining the number of square meters inside. Furthermore, this approach was more effective in terms of lowering energy consumption. However, adding a new façade hid the building's patina while hindering the telling of its history. In extension, more material was needed, covering more square meters than inside, while the extra layer of insulation created deeper walls, calling for attention of daylight.

Interior re-insulation

Allowing the existing façade to remain, interior re-insulation used less material, due to the area on inside walls. However, this approach did require a careful and comprehensive quality control of vapour barrier, due to the risk of higher moisture levels in the construction, while also decreasing useable square meters. Furthermore, the brick façade needed to be assessed in order to assure tightness regarding down-pour.

Extra facade element

While still re-insulating on the inside, this approach sought to change the façade, without compromising the building's patina. As such, modules of new façade elements would be added, creating a merge of old and new. Posing the same pros and cons as interior re-insulation, this approach did have other values as well. The façade element could block summer sun, while breaking up the old façade. However, even more considerations regarding daylight should be done.

EPILOGUE

This chapter concludes on the thesis' typology and design, while reflecting on aspects of the design process.

CONCLUSION

Addressing today's issues of the prosperous city, a place of exchange seeks to become a new typology, putting people and their resources at the front, promoting self-awareness. The typology achieves this through an understanding of theory, analysis and scope, synthesising physical and social parameters. This results in a typology and architecture that embraces a willingness to learn and share resources, that through this creates social bonds and a relation to other citizens. While increasing their confidence and giving them a role in society, inhabitants are prepared for a re-introduction to the city, with a social sustainable way of living. These, along with the companies and citizen that visit and participates in the typology, will change the urban development, to one of social proportions.

The sustainable approach of today, presents the opportunity to use transformation to solve issues such as the urban development. Using existing structures' physical and social

manifestation, shows a potential of furthering this narrative, while creating new architectural qualities. Understanding existing structures and its setting, the typology furthers a cultural perception of place and buildings, while through interventions adding layers to the story of Frederiksberg Hospital. The resulting typology embrace the city, as the hospital functions before it did, while housing people with other resources. As such, old architecture is given new relevance, and playing its part in the urban development.

Synthesising theory, analysis and scope, the typology creates an architectural intention of participation and exchange of resources, elevating quality of life for inhabitants, visitors and companies co-operating with them. Through tectonic quality of spaces, emphasizing use and interactions in its program, the typology catalyses a social change, allowing people to gain insight to each other's differences and themselves.

REFLECTION

Development of a place of exchange dependent on multiple theories and analysis, acting as defining factors for defining the scope of the project and how to solve it. Especially excursion and on-site analysis enlightened analytical perception of site and buildings. As such, a personal experience of these developed. However, this empirical impression was only done on an urban and exterior scale. Due to today's function of Frederiksberg Hospital and privacy concerning this, an interior visit and exploration of structures was not possible. As a result, quality of space in this thesis is based on assumptions, drawings and pictures. For future and further development of typology, such an excursion could unveil new qualities and potentials that could further the typology's narrative.

Seeking to bring social sustainability back into the urban development of cities, the thesis develops based on a mutual connection between physical and social. Physical shape and dimensions affect the social use and experience of architecture, while the social construct and context effect how architecture develops. In early stages of the design's development most focus was assigned the social fabric of the typology and how the course of inhabitant's stay would proceed. While proving a challenge to the design process, physical representations of these social fabrics were not considered or sketched, focusing instead on function diagrams. With the mutual focus on physical and social, sketching and generating ideas of physical constructs could have altered and even simplified the process of developing a social fabric.

A place of exchange is designed as a concept that organically grow within the hospital grounds. As such, the exact expansion of functions and housing isn't known. This type of growth proved a challenge when designing the delimited points of interest, not knowing what structure or composition the functions need to act in-between in the future. A defined plan could illustrate and ease this process. However, during early development and exploration of this kind of expansion proved too rigid for this thesis' typology. A social typology like this thesis' should be allowed a social growth, that qualitatively assess surrounding building's possibilities when expanding. Furthermore, the master-plan approach could develop into an investor driven solution, becoming what the typology sought to break with.

As a result of the theoretical framework and scene of Frederiksberg Hospital, transformation and how to utilize existing structures is a main concept in the development of a social typology. Furthering a cultural narrative while complimenting it through something new, is a discussion of what to keep and what to disregard. This topic was predominant during the design's development, utilizing analysis and empirical experience of place as decisive factors. As such, most of the existing structures remain, while expansion happens on the inside, initiating a discussion of; when does the number of interventions become too few? However, such a question does not have a decisive answer, instead being dependent on who, how, and what.

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Based of: Hauerslev, J. (1909) *Korridoren foran*

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135. – 141.

Frederiksberg Kommunes Tekniske Forvaltning (n.d.) *Historic drawings* [Drawings].

APPENDIX

1. Catalogue of elements
2. Historic drawings
3. Reverse engineering
4. Structural determination
5. Re-insulation and LCA
6. 24-hour analysis
7. Facades

CATALOGUE OF ELEMENTS

1

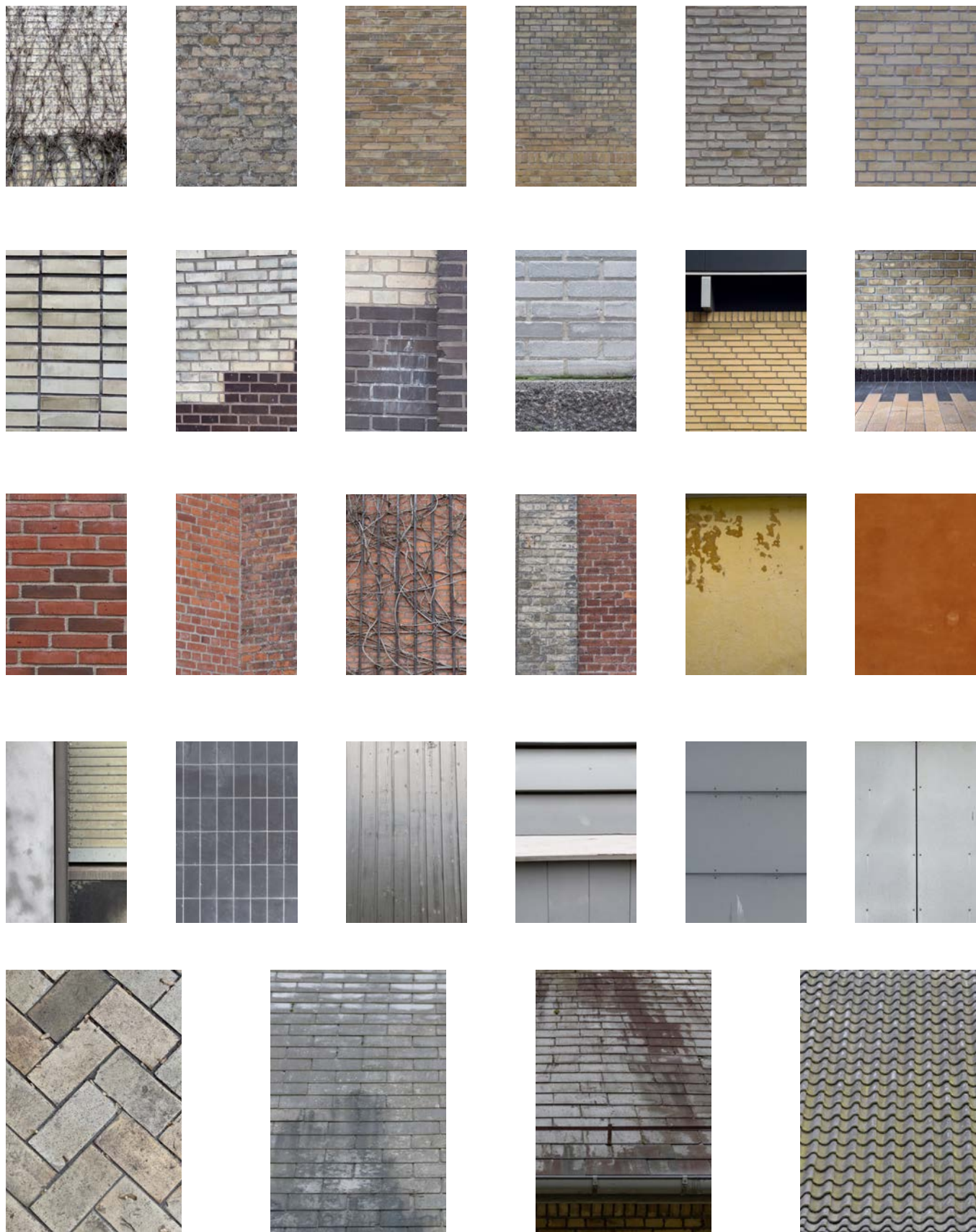
A systematic photographic registration of materials, windows, doors and details found on the site was carried out in the attempt to understand what elements influence experience and identity of the place. Through the reoccurring elements an understanding of principles and gestures was acquired.

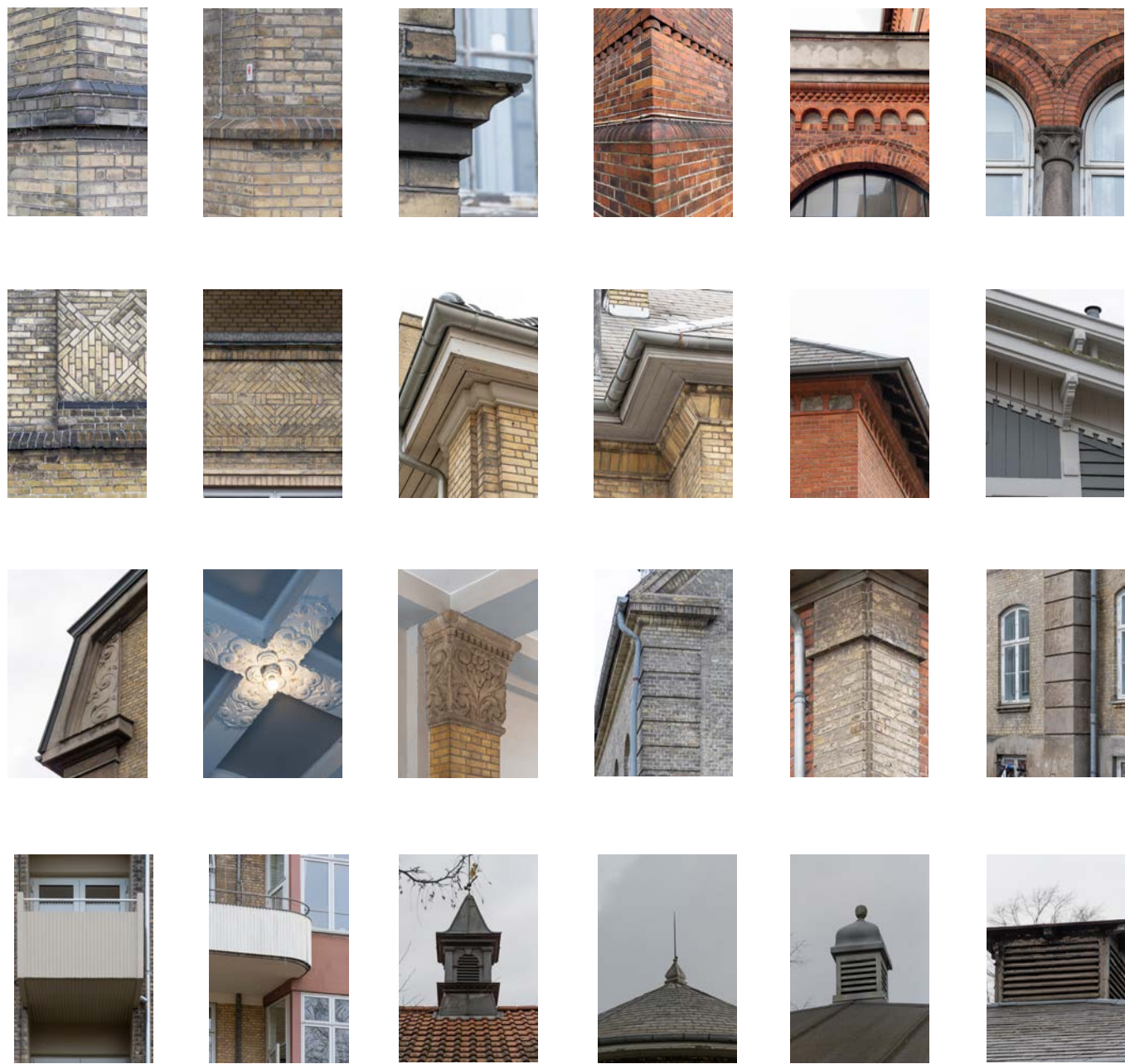
doors



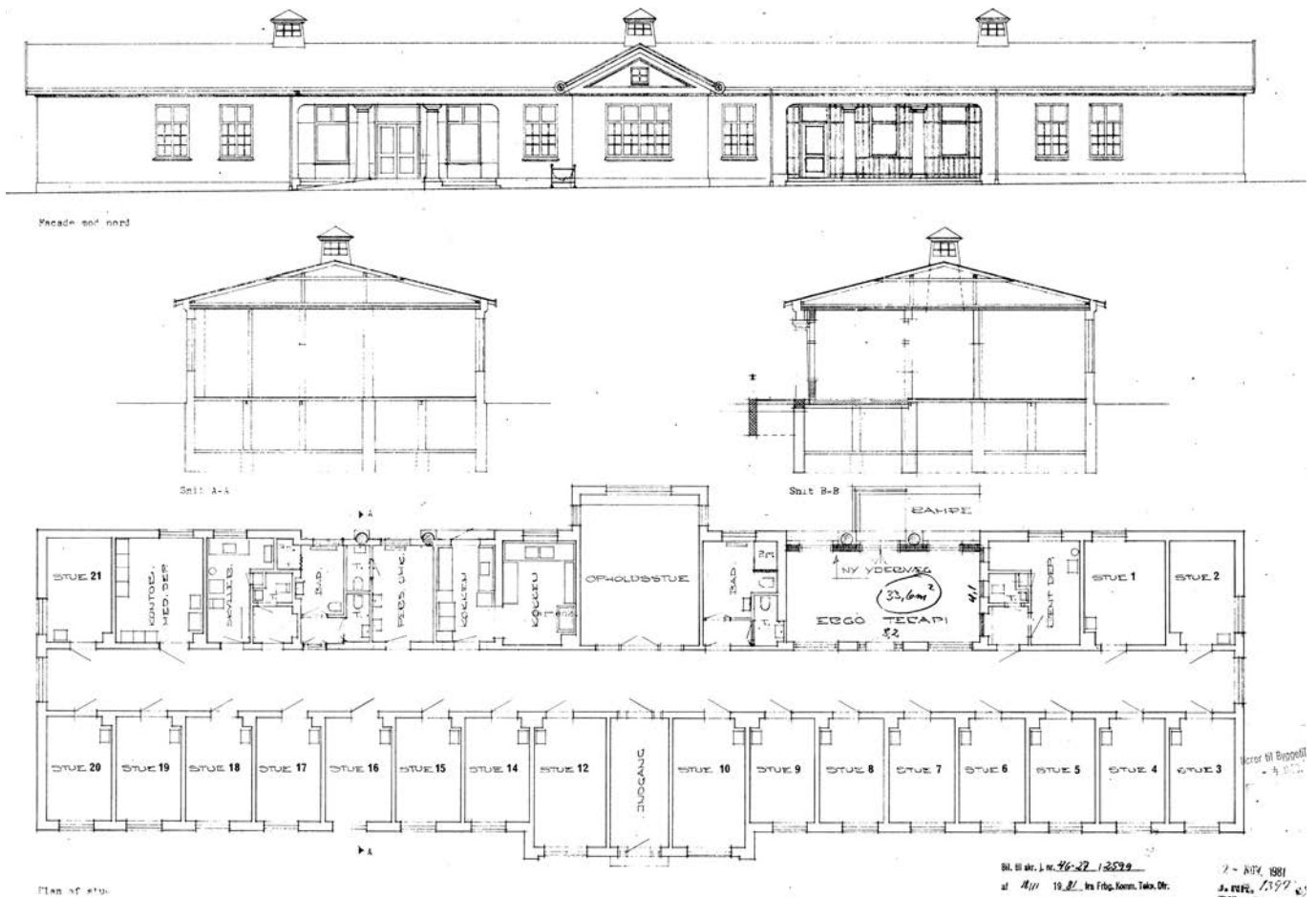
windows



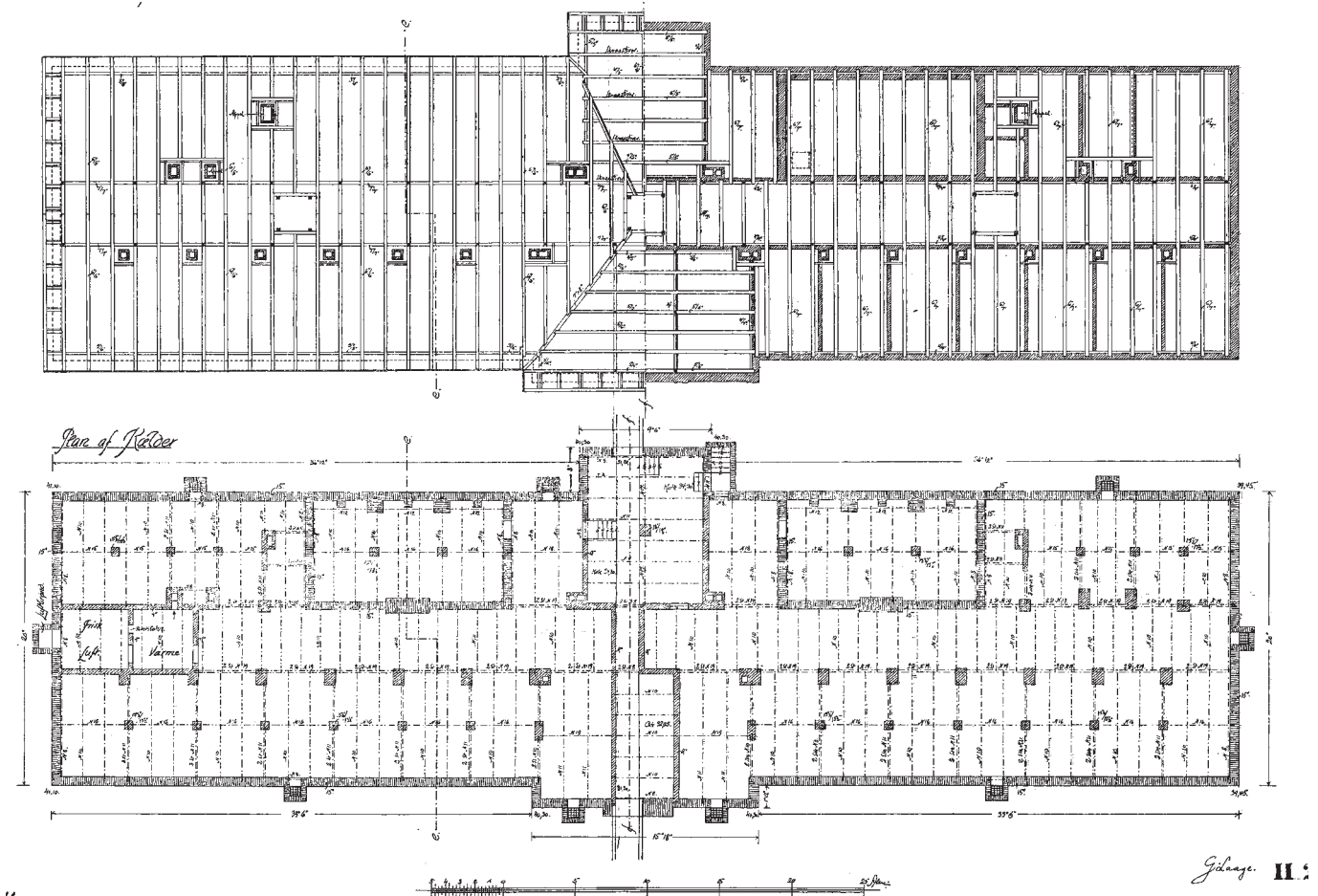




2



137. Facade, section and plan of building 20 from 1981



138. Roof and cellar plans of building 20, n.d.

Building 21

Year
1899

Building area (total)
5121 m²

Location
Vej 2, 1

Materials
Slate, yellow brick,
granite

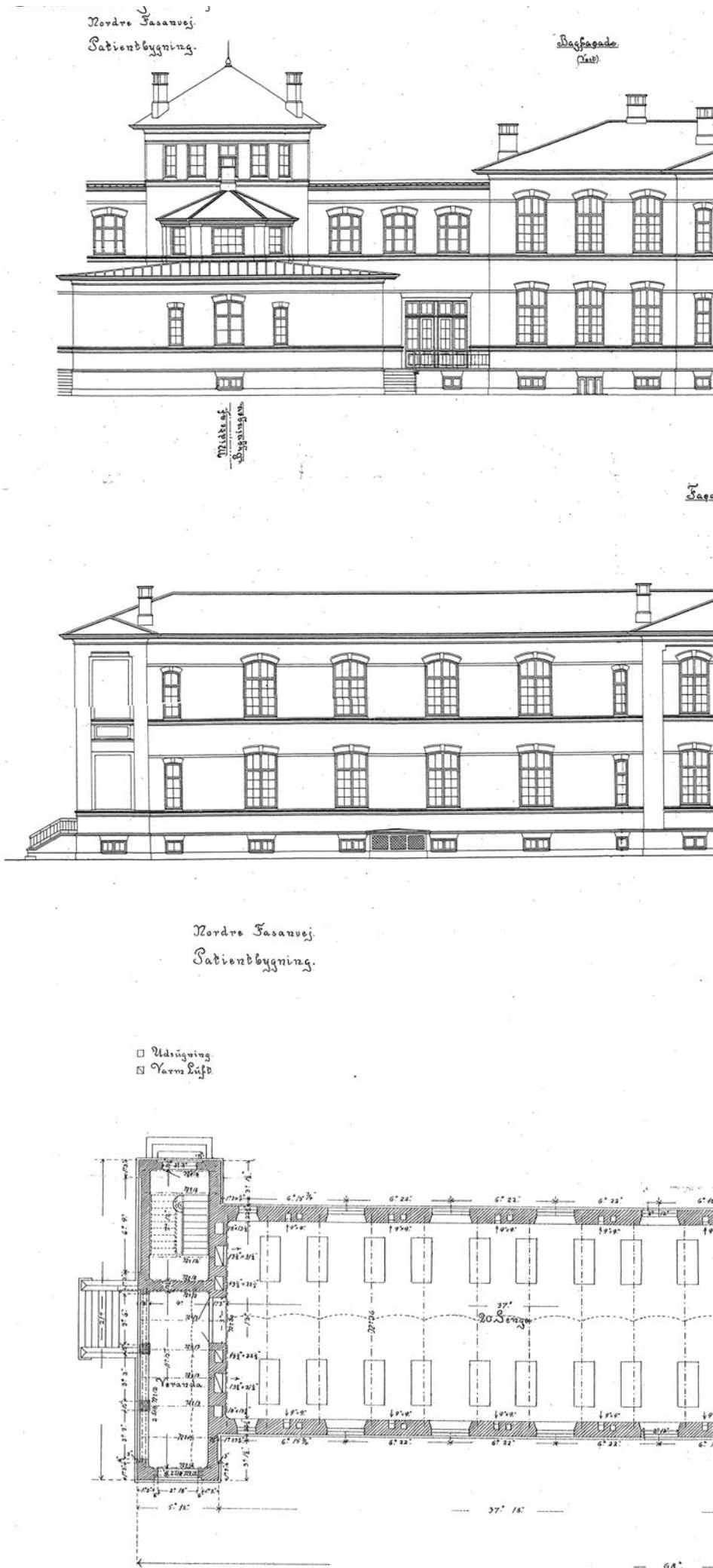
Architectural-value
3
Significant building,
symmetry

Environmental-value
3
Part of the complex

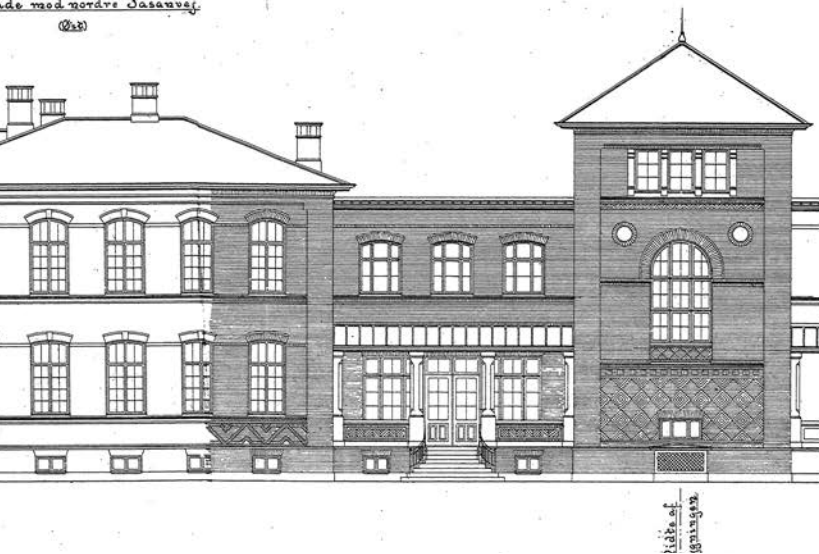
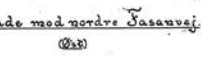
Original-value
4
Modifications, addi-
tions, new windows and
doors

Condition-value
4
Reasonable

Conservation-value
4
Due to modifications
and additions



10 AL



Gulf facade.
(Syd.)



Plan af Stueetage.

Architectural floor plan of the first floor (Stueetage) of a building. The plan shows a central corridor (Korridor) running horizontally. To the left of the corridor are several rooms: a 'Sovekammer' (Bedroom) at the top, a 'Bade' (Bath) below it, a 'Siddesplads' (Seating area) below the bath, and another 'Sovekammer' at the bottom. To the right of the corridor are more rooms: a 'Repose mod Vest.' (Rest area towards West) at the top, a 'Sovekammer' (Bedroom) below it, a 'Bade' (Bath) below that, and another 'Repose mod Vest.' at the bottom. The plan also includes a 'Vestibule' and a 'Stoedetrappes' (Staircase) on the right side. Dimensions are given in feet and inches throughout the plan.

139. Elevations, sections and ground floor plan of building 21, from 1899

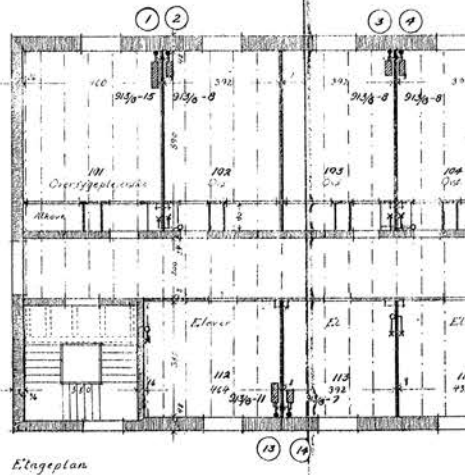
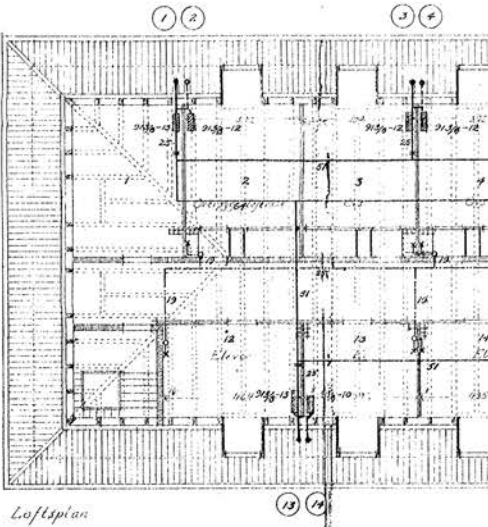
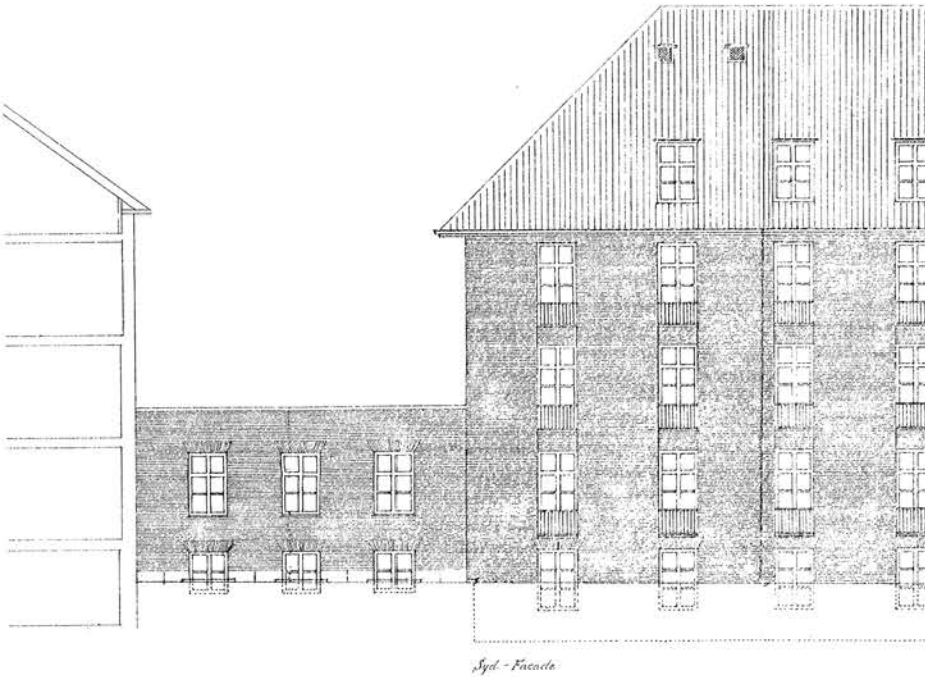
Building 118

Year
1931

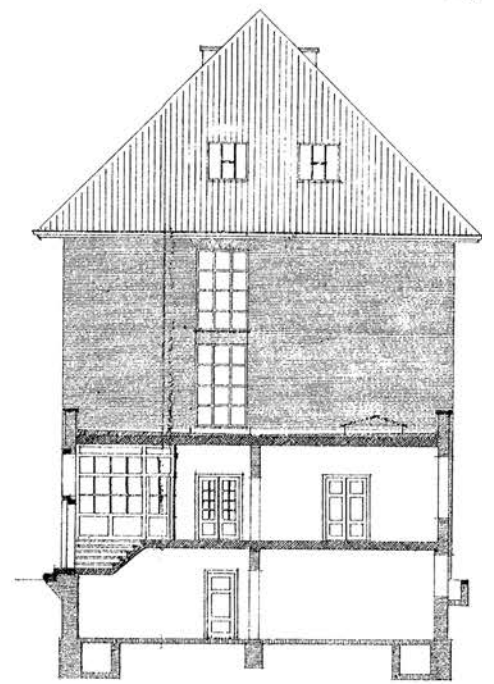
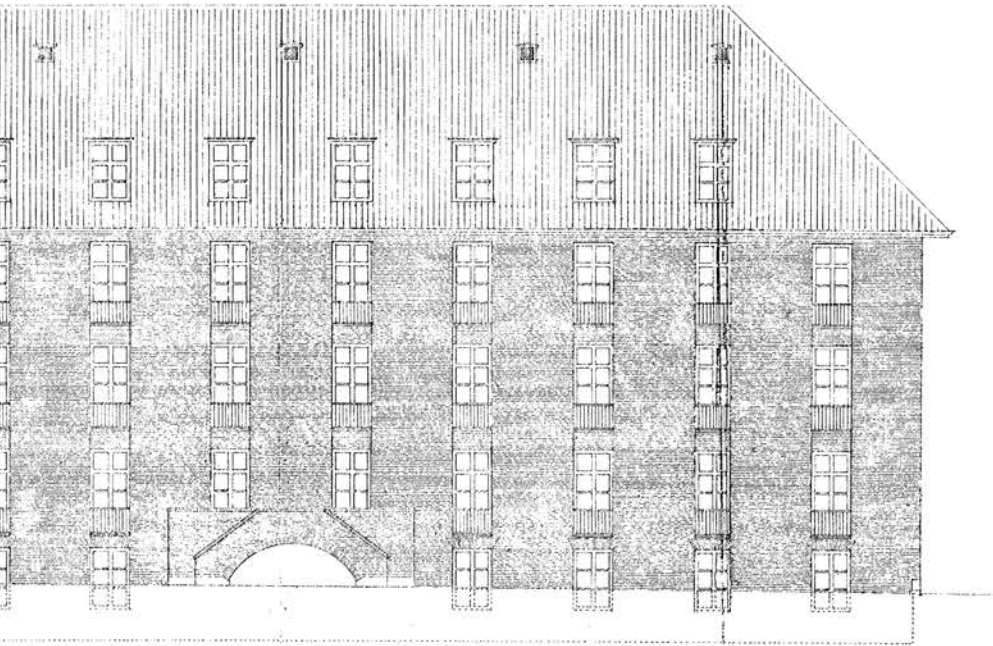
Building area (total)
4274 m²
(with building 18)

Location
Hovedvejen 7A

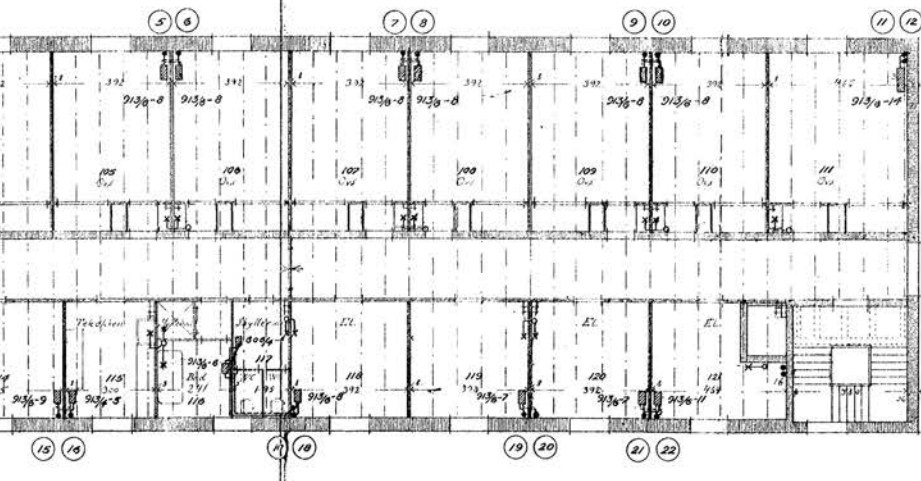
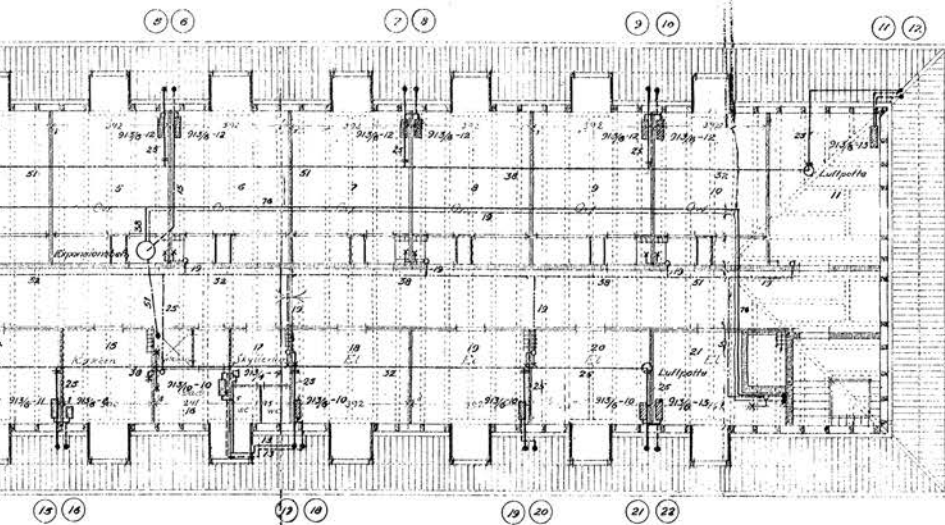
Materials
yellow brick, tile roof



h 12.1
A. A. P.



Sul i Mellembygning



Signaturer

- Fremledning for Varmeanlæg
- Returledning ---
- Fremledning — Varmtvandsforsyning
- Cirkulationsledn. —

185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000

Building 22

Year

1908

Addition from 1956

Building area (total)

1745 m²

Location

Vej 4, 16

Materials

Roofing felt, brick with lime plaster, granite

Architectural-value

3

Ornamented gables, granite columns

Environmental-value

3

Part of the complex, atypical size and facade treatment

Original-value

5

new windows and doors

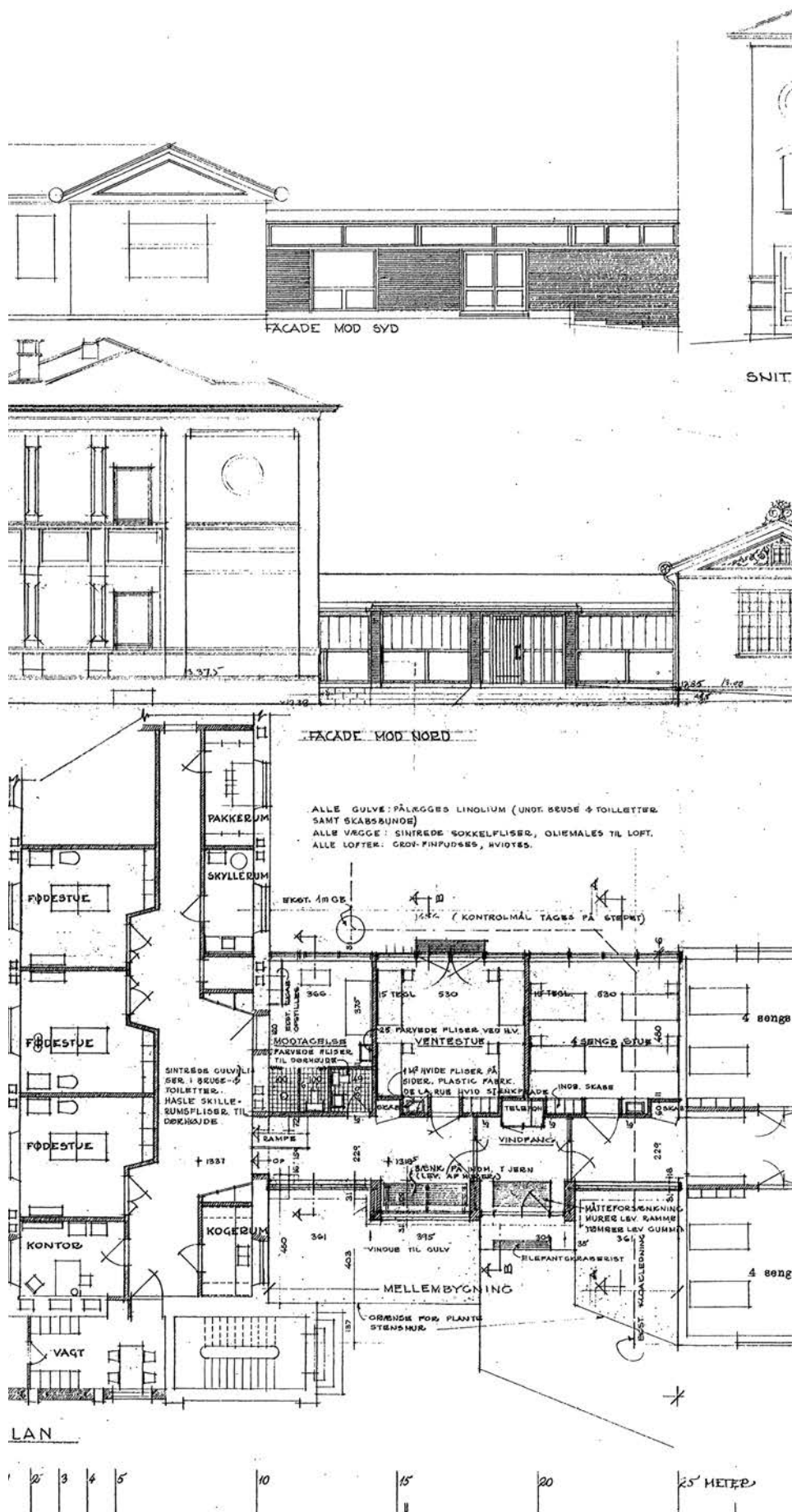
Condition-value

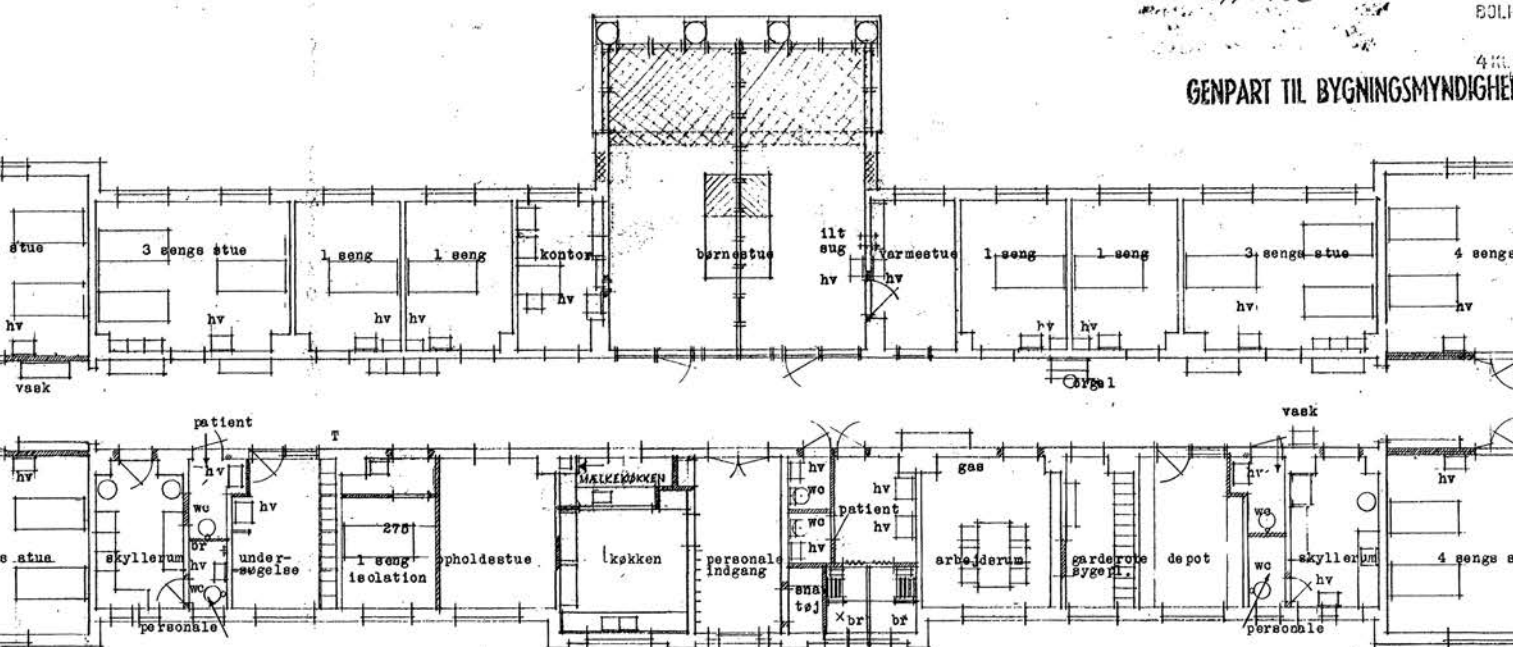
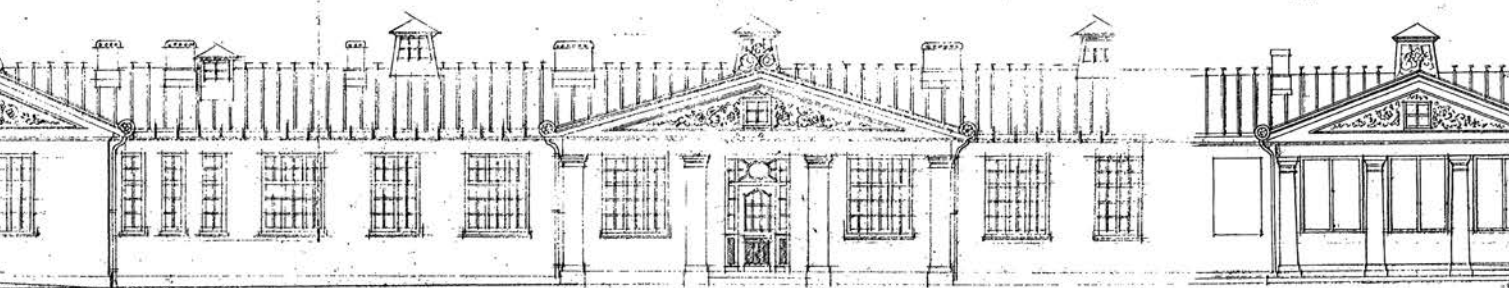
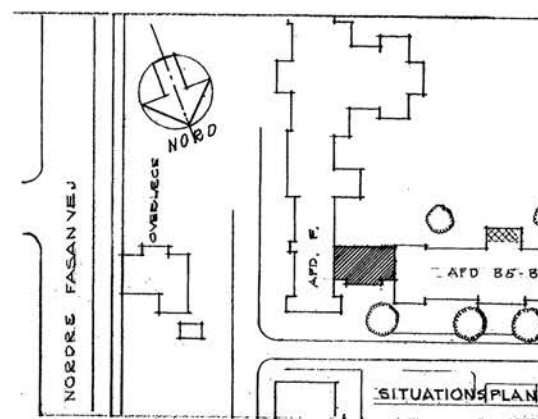
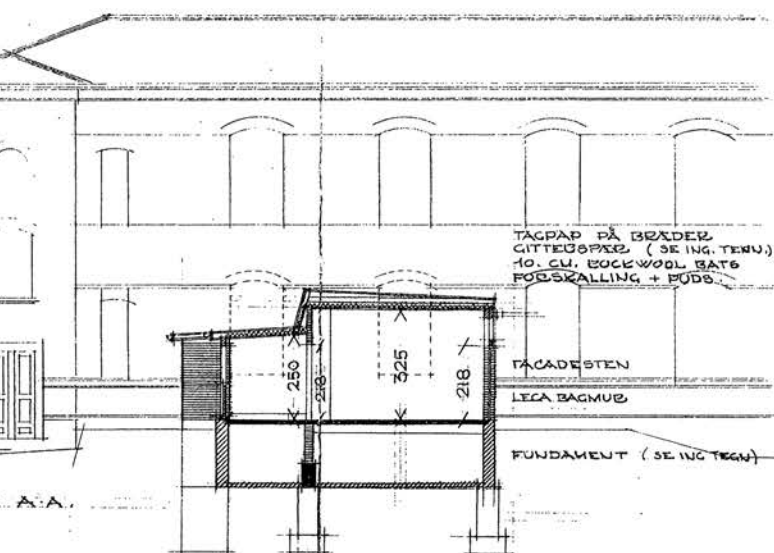
4

Reasonable

Conservation-value

4





Byggesagseksp. 17.10.1956

Frederiksberg Kommunes Tekniske Forvaltning
Sag i Frederiksberg Hospital
Godejdsdeafdeling og Barselgang
Tegnet
Mål 1:100 Dato: 17.10.1956

REVERSE ENGINEERING

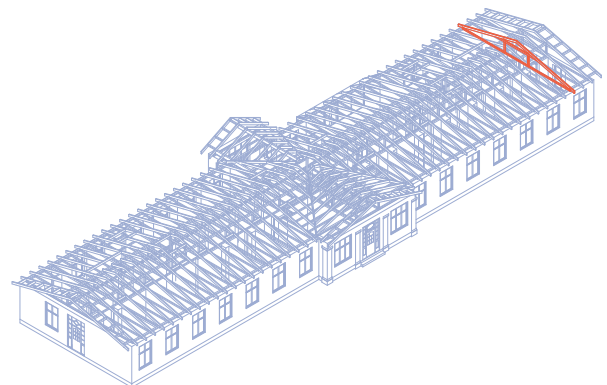
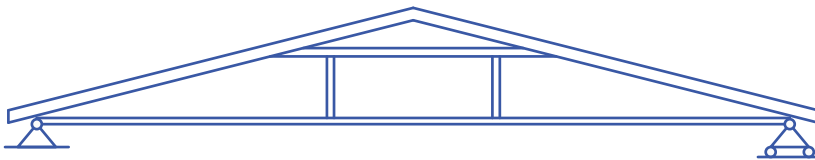
3

To better understand existing structures and their structural principles, an approach of reverse engineering was used, using construction calculations of today in Autodesk Robot. As such building 20 and 118 were both deconstructed, using research for understanding of past building codes.

Drawings of building 20 reveals that a structural system of collar beam trusses carries roof loads, transferring these to loadbearing external walls. However, inner walls are not specified as load bearing, calling for an analysis of these to determine their importance to the building's integrity. Results show that the structural system of building 20 does not need support inner walls, therefore presenting an opportunity of utilizing the space in a new way.

Collar beam trusses likewise define the structural principle of building 118, however on a bigger scale. Furthermore, in this building it is assumed, through drawings and past building codes that an interior wall is load bearing, calling for a verification of this. Results of calculations confirm this assumption, calling for awareness on how this transferring of loads is maintained.

Building 20



142. Selected truss for building 20's calculations

Loads are calculated based on characteristic values, assuming the kinds of materials used and amounts. For these calculations the construction is presumed having a cross section of 150x150 mm and being C24.

Dead weight: $G = \rho \cdot (l \cdot b \cdot h) \cdot g$ (Gammel, 2010)

Characteristic dead weight light roof construction: $G_{roof} = 0,5 \frac{kN}{m}$

$$G_{roof} = 0,422 \frac{kN}{m}$$

Snow load: (Gammel, 2010)

Characteristic gable roof load (15 degrees): $S_2 = 0,72 \frac{kn}{m^2}$

$$Q_{snow} = 0,72 \frac{kn}{m}$$

Wind load: (Dansk Standard, 2015)

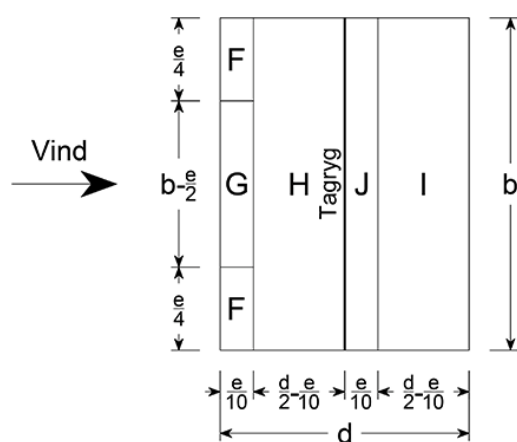
Terrain category: 4

Basic wind: $v_b = 24 \frac{m}{s}$

Mean wind speed: $v_m = 12,9 \frac{m}{s}$

Peak velocity pressure: $q_p = 0,423 \frac{kN}{m^2}$

Wind pressure on gable roof







143. Areas of wind pressure on a gable roof

Zone F: $C_{pe,F} = 0.08 \frac{kN}{m^2}$	$W_{e,F} = -0,38 \frac{kN}{m^2}$
Zone G: $C_{pe,G} = 0.08 \frac{kN}{m^2}$	$W_{e,G} = -0,34 \frac{kN}{m^2}$
Zone H: $C_{pe,H} = 0.08 \frac{kN}{m^2}$	$W_{e,H} = -0,13 \frac{kN}{m^2}$
Zone I: $C_{pe,I} = 0.00 \frac{kN}{m^2}$	$W_{e,I} = -0,17 \frac{kN}{m^2}$
Zone J: $C_{pe,J} = 0.00 \frac{kN}{m^2}$	$W_{e,J} = -0,42 \frac{kN}{m^2}$





Autodesk Robot results:

With supporting interior walls

Section	Material	Lay	Laz	Ratio
 SQR 150x150	C24	154.59	154.59	0.11
 SQR 150x150	C24	154.59	154.59	0.12
 SQR 150x150	C24	109.67	109.67	0.03
 SQR 150x150	C24	279.65	279.65	0.08

144. Results from Autodesk Robot

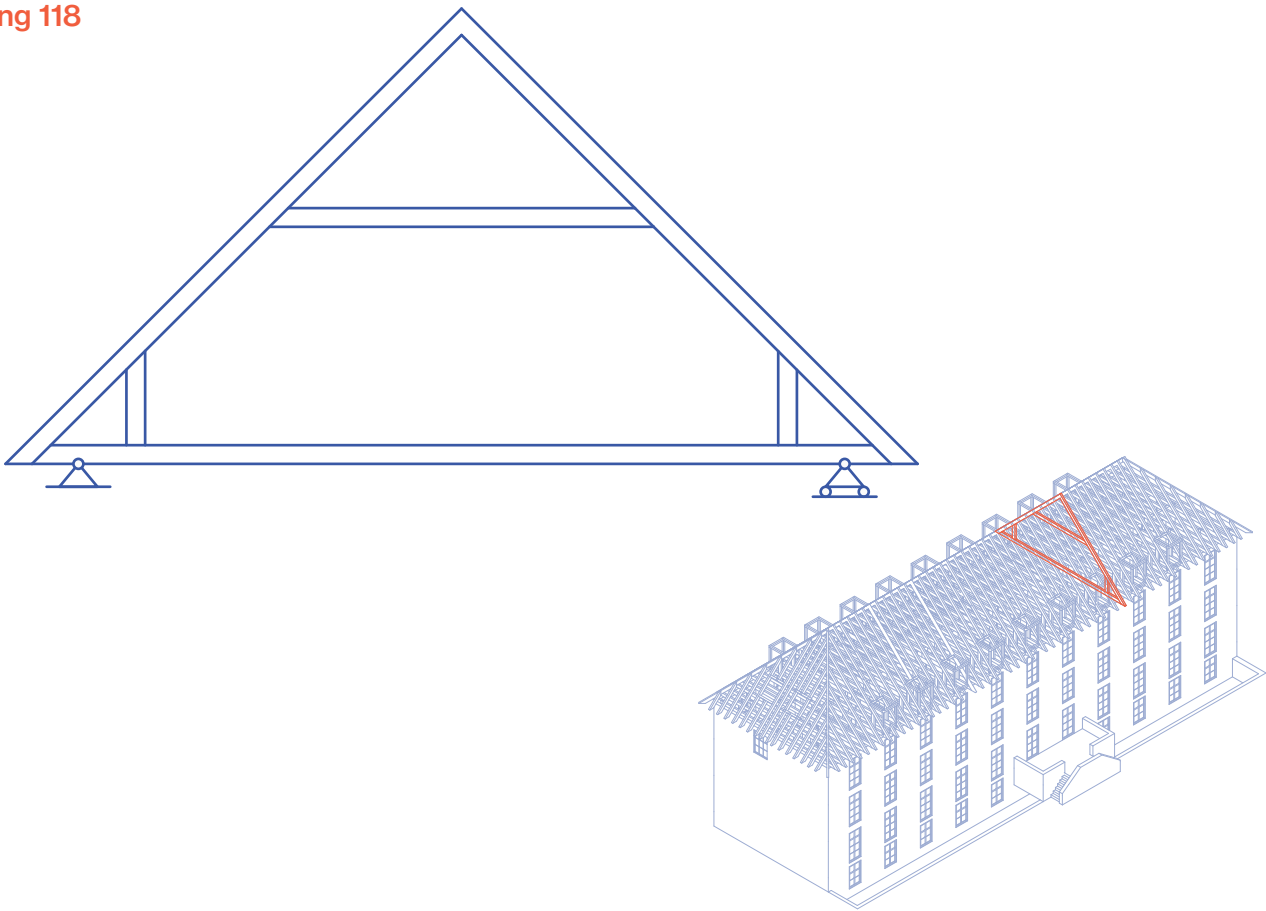
Without supporting interior walls

Section	Material	Lay	Laz	Ratio
 SQR 150x150	C24	154.59	154.59	0.12
 SQR 150x150	C24	154.59	154.59	0.14
 SQR 150x150	C24	109.67	109.67	0.04
 SQR 150x150	C24	279.65	279.65	0.04

145. Results from Autodesk Robot

Based on calculations, the interior walls are shown to **not be load bearing**, therefore presenting the opportunity of changing the interior space.

Building 118



146. Selected truss for building 118's calculations

Loads are calculated based on characteristic values, assuming the kinds of materials used and amounts. For these calculations the construction is presumed having a cross section of 150x200 mm and being C24.

Dead weight: $G = \rho \cdot (l \cdot b \cdot h) \cdot g$ (Gammel, 2010)

Characteristic dead weight light roof construction: $0,5 \frac{kN}{m^2}$

$$G_{roof} = 0,422 \frac{kN}{m}$$

Live load:

Characteristic live load residential: $2,0 \frac{kN}{m}$

$$Q_{residential} = 1,688 \frac{kN}{m}$$

Snow load: (Gammel, 2010)

Characteristic gable roof load (15 degrees): $S_2 = 0,5 \frac{kn}{m^2}$

$$Q_{snow} = 0,442 \frac{kn}{m}$$

Wind load: (Dansk Standard, 2015)

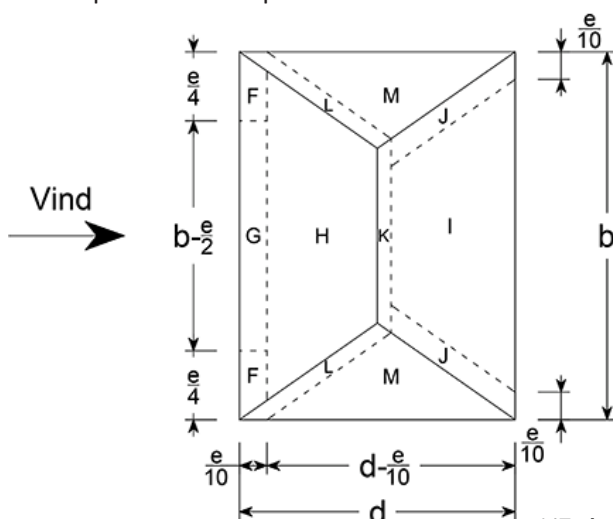
Terrain category: 4

Basic wind: $v_b = 24 \frac{m}{s}$

Mean wind speed: $v_m = 30,843 \frac{m}{s}$

Peak velocity pressure: $q_p = 1,144 \frac{kN}{m^2}$

Wind pressure on hip roof









147. Areas of wind pressure on a hip roof

$$\begin{array}{ll}
\text{Zone F: } C_{pe,F} = 0.8 \frac{kN}{m^2} & W_{e,F} = 0 \frac{kN}{m^2} \\
\text{Zone G: } C_{pe,G} = 0.8 \frac{kN}{m^2} & W_{e,G} = 0 \frac{kN}{m^2} \\
\text{Zone H: } C_{pe,H} = 0.69 \frac{kN}{m^2} & W_{e,H} = 0 \frac{kN}{m^2} \\
\text{Zone I:} & W_{e,I} = -0,34 \frac{kN}{m^2} \\
\text{Zone J:} & W_{e,J} = -0,69 \frac{kN}{m^2} \\
\text{Zone K:} & W_{e,K} = -0,34 \frac{kN}{m^2}
\end{array}$$







Autodesk Robot results:

With supporting interior walls

Section	Material	Lay	Laz	Ratio
 150x200	C24	169.04	225.38	0.22
 150x200	C24	169.04	225.38	0.35
 150x200	C24	129.11	172.14	0.23
 BALK 50x100	C24	62.41	124.80	0.21
 BALK 50x100	C24	62.41	124.80	0.47
 150x200	C24	242.83	323.78	0.53

148. Results from Autodesk Robot

Without supporting interior walls

Section	Material	Lay	Laz	Ratio
 150x200	C24	169.04	225.38	0.54
 150x200	C24	169.04	225.38	0.58
 150x200	C24	129.11	172.14	0.28
 BALK 50x100	C24	62.41	124.80	0.58
 BALK 50x100	C24	62.41	124.80	1.09
 150x200	C24	242.83	323.78	1.27

149. Results from Autodesk Robot

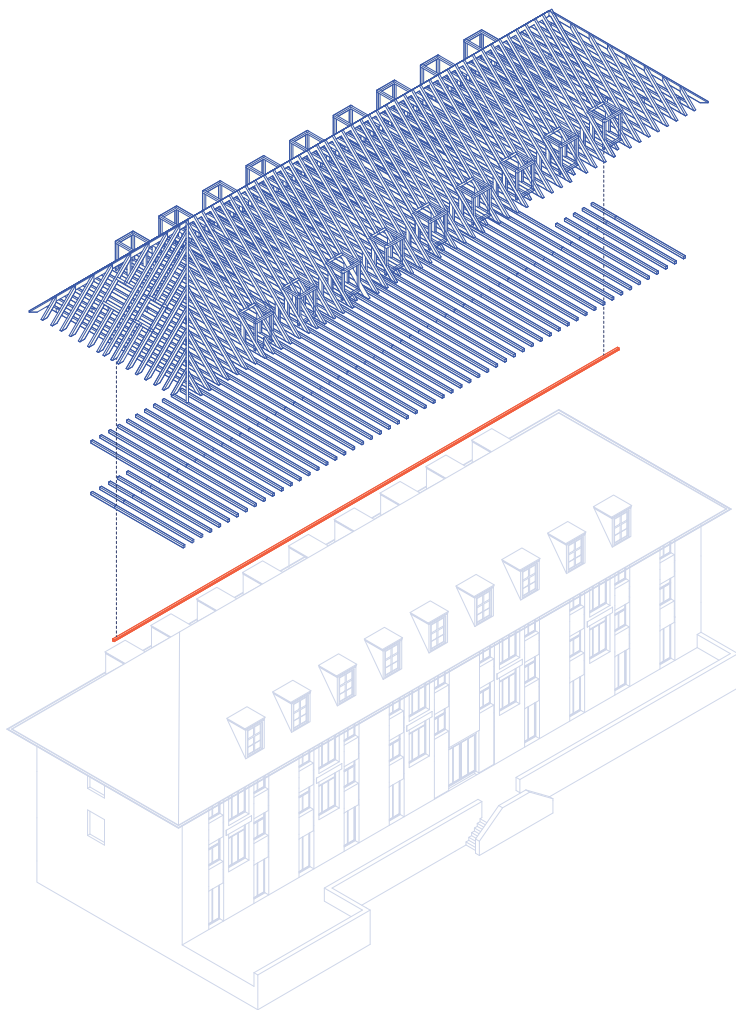
Based on calculations, the interior walls are shown to **be load bearing**. The interior wall therefore needs to be considered when developing designs in building 118

STRUCTURAL PRINCIPLE

4

Developing a new structural principle for building 118, requires an understanding of the existing structure, and how loads are transferred through each floor. Established already is the load bearing capacity of an interior wall, therefore, investigations seek to visualize how this wall can be replaced. Through Autodesk Robot calculations, an understanding of supports needed, and cross section of elements is acquired, while presenting an opportunity of developing structural and spatial elements

The calculations allowed synthesising of qualitative qualities and quantitative measures in the centre space of the building, creating a new structural system along with new spatial gestures.



150. The beam in question in calculations

Replacement of wall

Loads are calculated based on characteristic values, assuming the kinds of materials used and amounts.

Dead weight: $G = \rho \cdot (l \cdot b \cdot h) \cdot g$ (Gammel, 2010)

Characteristic dead weight light floor structure: $0,6 \frac{kN}{m^2}$

$$G_{roof} = 3,6 \frac{kN}{m}$$

Live load:

Characteristic live load residential: $2,0 \frac{kN}{m}$

$$Q_{residential} = 12 \frac{kN}{m}$$

Wind load: (Dansk Standard, 2015)

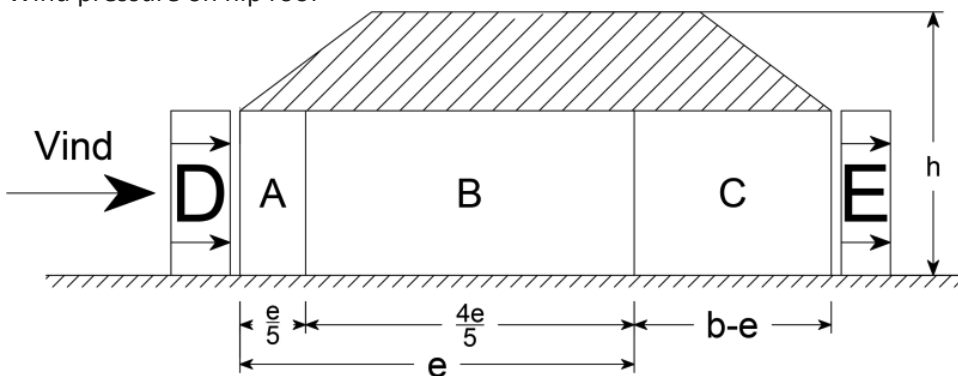
Terrain category: 4

Basic wind: $v_b = 24 \frac{m}{s}$

Mean wind speed: $v_m = 16,676 \frac{m}{s}$

Peak velocity pressure: $q_p = 0,584 \frac{kN}{m^2}$

Wind pressure on hip roof



Zone A: $C_{pe,A} = -0,7 \frac{kN}{m^2}$

Zone B: $C_{pe,B} = -0,47 \frac{kN}{m^2}$

Zone C: $C_{pe,C} = -0,29 \frac{kN}{m^2}$

Zone D: $C_{pe,D} = 0,42 \frac{kN}{m^2}$

Zone E: $C_{pe,E} = -0,2 \frac{kN}{m^2}$

151. Areas of wind pressure on a hip roof building

Autodesk Robot results:

Due to the size of loads, result show that timber elements would require extreme dimensions, affecting the interior spatiality overwhelmingly.

Section	Material	Lay	Laz	Ratio
✗ 100x500	C24	38.80	193.99	2.13
✗ 100x500	C24	38.80	193.99	2.13
✗ 100x500	C24	38.80	193.99	1.72
✗ 100x500	C24	38.80	193.99	1.72
✗ 100x500	C24	38.80	193.99	1.75
✗ 100x500	C24	38.80	193.99	1.75
✗ 100x500	C24	38.80	193.99	2.60
✗ 100x500	C24	44.34	221.70	2.80

152. Results from Autodesk Robot

Therefore, the use of steel was investigated, showing preferable dimensions and structural properties.

Section	Material	Lay	Laz	Ratio
☑ HEA 220	Steel	64.67	107.59	0.64
☑ HEA 220	Steel	61.07	101.60	0.62
☑ HEA 220	Steel	61.07	101.60	0.47
☑ HEA 220	Steel	61.07	101.60	0.47
☑ HEA 220	Steel	61.07	101.60	0.47
☑ HEA 220	Steel	61.07	101.60	0.47
☑ HEA 220	Steel	61.07	101.60	0.62
☑ HEA 220	Steel	64.67	107.59	0.64

153. Results from Autodesk Robot

As a structural element steel is preferred, however, length of the element and number of supports affects the spatiality of the building interior. Investigating this aspect is done through a joint comparison of Autodesk Robot calculations and 3D visualizations, allowing an informed decision to be made.

HEA 220 with 9 supporters, 2 of which are the exterior brick walls.

	Section	Material	Lay	Laz	Ratio
OK	HEA 220	Steel	61.07	101.60	0.58
OK	HEA 220	Steel	61.07	101.60	0.58
OK	HEA 220	Steel	61.07	101.60	0.46
OK	HEA 220	Steel	61.07	101.60	0.46
OK	HEA 220	Steel	61.07	101.60	0.47
OK	HEA 220	Steel	61.07	101.60	0.47
OK	HEA 220	Steel	61.07	101.60	0.70
OK	HEA 220	Steel	69.80	116.12	0.74

154. Results from Autodesk Robot



155. Visual representation the amount of supports

HEA 220 with 17 supporters, 2 of which are the exterior brick walls.

	Section	Material	Lay	Laz	Ratio
OK	HEA 220	Steel	64.67	107.59	0.17
OK	HEA 220	Steel	61.07	101.60	0.11
OK	HEA 220	Steel	61.07	101.60	0.11
OK	HEA 220	Steel	61.07	101.60	0.11
OK	HEA 220	Steel	61.07	101.60	0.11
OK	HEA 220	Steel	61.07	101.60	0.11
OK	HEA 220	Steel	61.07	101.60	0.11
OK	HEA 220	Steel	64.67	107.59	0.17

156. Results from Autodesk Robot



157. Visual representation the amount of supports

Due to properties of the steel beam, repetition of supports and elements, along with their effect on space, becomes a principle that should be investigated further creating the intended gesture.

RE-INSULATION AND LCA

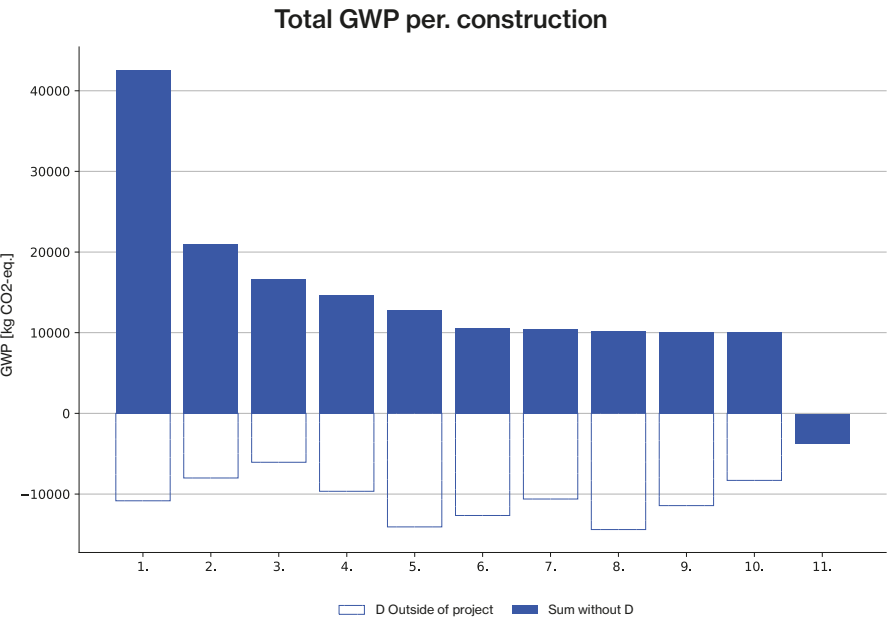
5

Assessing ways of re-insulating through life cycle assessments, LCA, adds a quantitative measure to the sustainability. Using LCAByg materials, external and internal insulation approaches are assessed informing the design regarding its impact on the environment. This investigation therefore focuses on stages concerning product A1-3, replacement B4, and disposal C4.

Based on the investigation emphasis on material type becomes clear ensuring an environmentally sustainable re-insulation, however, material types alone are not enough to decide the re-insulation approach. Thorough and elaborate LCA investigations of other stages may answer such questions.

LCAByg

Using LCAByg's material library, along with self-added data from other databases, a calculation of material's environmental impact is made. In extension, re-insulation approach is incorporated through square meter amounts of materials on one exterior wall. However, the difference between these is narrow, being 550 m² inside and 559 m² outside.



158. Graph showing results of calculation in LCAByg

Material type has a significant impact on the numbers. However, when isolating re-insulation approaches no clear principle is apparent.

Nr.	Re-insulation approach	Insulation type	Surface material
1	Exterior re-insulation	150 mm wood fiber	Brick
2	Exterior re-insulation	200 mm cellulose board	Re-used brick
3	Exterior re-insulation	150 mm cellulose board	Re-used brick
4	Interior re-insulation	100 mm cellulose board	Wood planks
5	Exterior re-insulation	200 mm wood fiber	Re-used brick
6	Interior re-insulation	100 mm wood fiber	Wood planks
7	Exterior re-insulation	150 mm wood fiber	Re-used brick
8	Exterior re-insulation	150 mm wood fiber	Wood planks
9	Interior re-insulation	100 mm wood fiber	Pinewood
10	Interior re-insulation	100 mm wood fiber	Plywood
11	Interior re-insulation	100 mm hempblock	Clay

24-HOUR ANALYSIS

6

When re-insulating older buildings, awareness of the effect on the inside should be considered, maintaining a comfortable indoor climate. As an already defined volume and geometry, the older building is not expected to achieve the same standards as new building. Nonetheless, seeking to use building 118 as housing should consider how to achieve a comfortable indoor climate.

Using 24-hour calculations, estimates give a sense of direction regarding solution and design choices, and how they affect the interior of buildings. Modelling existing rooms of building 118, solutions and interventions are accounted for, focusing solely on temperatures inside. Through these calculations it becomes apparent that re-insulation of the building requires an awareness of façade shaping, while presenting a potential of implementing solar shading.

Existing meeting room

Defining the existing building in these calculations is based on assumptions regarding envelope U-values from authoritative sources (Energistyrelsen, 2015a; 2015b), while dimensions and direction is defined on architectural drawings. As such a southern faced room is investigated.

Walls	Solid exterior wall, 48 cm brick (2 bricks), uninsulated	1,08 W/m ² K
Floor	Solid concrete deck towards cellar, wood floor on battens on concrete, uninsulated.	1,3 W/m ² K
Windows	Windows with mullions - 1 layer glass	4,1 W/m ² K
Air change		0,3 h ⁻¹

Chosen month:	July	tu =	21 °C
---------------	------	------	-------

If the ventilation air has same temperature as outdoor air

24-hour average	ti =	23,4 °C
Temperature variation	Δt_i =	4,1 °C
Max. Temperature	t _{imax} =	25,4 °C

Chosen month:	January	tu =	3,9 °C
---------------	---------	------	--------

If the ventilation air has same temperature as outdoor air

24-hour average	ti =	10,9 °C
Temperature variation	Δt_i =	3,3 °C
Max. Temperature	t _{imax} =	12,5 °C

159. Results of 24-hour calculations for summer and winter

Results show a building with comfortable indoor temperatures during summer. However, a large amount of heating is needed during winter, due to the low u-value of the envelope.

Re-insulated meeting room

Calculations of a re-insulated room, use standard U-values of today (Energistyrelsen, 2015a; 2015b).

Walls	Solid exterior wall, 48 cm brick (2 bricks), uninsulated	1,08 W/m ² K
Floor	Solid concrete deck towards cellar, wood floor on battens on concrete, uninsulated.	1,3 W/m ² K
Windows	Windows with mullions - 1 layer glass	4,1 W/m ² K
Air change		0,3 h ⁻¹

Chosen month:	July	tu =	21 °C
---------------	------	------	-------

If the ventilation air has same temperature as outdoor air

24-hour average	ti =	31,5 °C
Temperature variation	Δti =	4,1 °C
Max. Temperature	t _{imax} =	33,6 °C

Chosen month:	January	tu =	3,9 °C
---------------	---------	------	--------

If the ventilation air has same temperature as outdoor air

24-hour average	ti =	17,6 °C
Temperature variation	Δti =	3,3 °C
Max. Temperature	t _{imax} =	19,2 °C

160. Results of 24-hour calculations for summer and winter

The re-insulation has a bilateral effect, creating better temperatures during winter, while causing overheating during summer. As such small changes, like adding overhangs and shading highlight a need to block out the sun during summer is calculated.

No shading or shadow

Chosen month:	July	tu =	21 °C
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If the ventilation air has same temperature as outdoor air

24-hour average	ti =	31,5 °C
Temperature variation	Δti =	4,1 °C
Max. Temperature	t _{imax} =	33,6 °C

With shading and shadow

Chosen month:	July	tu =	21 °C
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If the ventilation air has same temperature as outdoor air

24-hour average	ti =	28,8 °C
Temperature variation	Δti =	3,1 °C
Max. Temperature	t _{imax} =	30,3 °C

161. Results of 24-hour calculations for summer

Calculations show a need to implement shadows and shading when re-insulating the building, calling for consideration of this when changing its facade.

FACADE INVESTIGATIONS

7

Using knowledge of how to re-insulate a building, such as building 118, caused an exploration of possibilities in revitalizing the building and its façade. Categorized by the re-insulation approach, factors such as materials and especially brick bonding is explored.

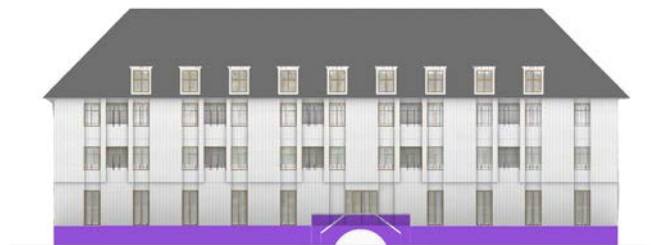
These investigations and iterations are made alongside other calculations such as LCA (appendix 5), and external sources on renovation and LCA (Serrano et al., 2022), informing the assessment of façade qualities and how the existing building can tell its story. The result of these iterations concludes in utilization of the existing façade, using its patina and modernistic design in the making of a housing building.



162. Exterior re-insulation using new bricks on the southern and northern facades.



163. Exterior re-insulation using wood on the southern and northern facades.



164. Exterior re-insulation using new bricks and wood on the southern and northern facades.

165. Exterior re-insulation using concrete on the southern and northern facades.



166. Visualization of wood patinate as a new facade material.



167. Facade interventions, allowing the original facade to remain.