TITLE SHEET

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Authors:
Mathias Palle - Stud. Msc. Eng. Architecture
Jonas Snedevind Nielsen - Stud. MSc. Eng. Architecture

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Main supervisor: Peter Mandal
Supervisor: Johan Clausen

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Mathias Palle

Jonas Snedevind Nielsen

PREPHASE

This project report is made by Mathias Palle (stud. M. Sc. eng. Arc) and Jonas Snedevind Nielsen (Stud. M. Sc. eng. Arc) at the 4th semester (short master thesis) of the M.sc. program in Architecture at Aalborg Univerisity. The main theme is tectonic architecture comprising welfare architecture, structural engineering and embodiment. The project report is a part of the product of their master thesis project.

ABSTRACT

This project report contains respectively the Framework, ideation, site analysis, building analysis, conceptdevelopment, design presentation, design process and epilogue of a preliminary design of an asylum center in Denmark.

This project deals with an investigation of the architectural potential in the design of Danish asylum centers. These architecutural potentials fosterd new values for the design of asylum centers The project herby aim to examine these values by designing a new asylum center in the city with focus upon embodiment in architecture and a tectonic way of thinking.

The vision of the asylum center is to enable new forms of interaction between the Danish society and the asylum center. A space of hospitality, which create a safe and caring environment for asylum centers as a building, which contribute to the city life around.

With a site chosen to be an old warehouse in Nordhavn, the project seeks to use the asylum center as an urban catalyst of the area, while it develops.

The architectural concept is 6 stacked volumes placed as metaphorical continuation of warehouse. The stacked volumes becomes a small three-dimensional image of a city creating a fluent transition to the context and with a variety of spaces, privacies and activates it becomes and urban catalyst of Nordhavn, activating the whole area.

The asylum center provides a place for the asylum seeker, where they feel they belong and understand their place as progress from refugee to citizen in Denmark or in another country. The asylum center will activate the new Nordhavn area and when it has been developed, the asylum center will move to another location leaving accommodation spaces for elderly, student or cheap housing maintaining diversity as a social sustainable strategy.

TABLE OF CONTENTS

INTRODUCTION
Motivation 6
Introduction 6
Methodology 7

FRAMEWORK
Tectonics 10
Welfare and Asylum 12
Embodiment 14
Location 16
Authorities 16
Registration 18
Neighbouring Countries 20
Visiting Asylum Centers 21
Accommodation Center 22
Program 24
Transformation 26
Home / Institution 28

IDEATION
Vision 34
New Concept 35

SITE ANALYSIS
Welcome to Nordhavn 38
Mappings 40
Section 41
Atmosphere 42
Materiality 44
Environmental Condition 46
Building Transformation 47

BUILDING ANALYSIS
Pakhus 54 50
Axxometric 52
Structural Investigations 53
Materiality 54
The Grid 55

CONCEPT DEVELOPMENT
The Idea 59
The program 62
Materiality 64
Polycarbonate 65
Foyer 66
Asylum Center 67
Apartments 68

DESIGN PRESENTATION
The Concept 72
Asylum and the Harbour 74
Siteplan 76
Functionality 78
Plans and Sections 79
Interdependence 90
Materialising 91
Foyer 92
Conversations Rooms 94
Apartments 96
Intersections of boxes 100
Facades 102
Meeting of materials 103
Facades 104
The Roof 106
Mechanical Ventilation 107

PROCESS
Initial process 110

EPILOGUE
Conclusion 117
Reflection 118
References 120

APPENDIX 125

Ill. 1 - Collage from Nordhavn

MOTIVATION

Our motivation for exploring the architectural potential in asylum centres spring from the media focus upon asylum in Denmark.

We experienced an intense contemporary political and public debate about asylum in Denmark in late 2014 and spring 2015. A discussion that seems to interest everyone from down the street to the hallways of Christiansborg. It is a subject everybody seems to have an opinion about. While this debate going on everywhere it was naturally to stop up and ask ourselves what do we actually know about asylum, the seekers and the asylum centres?

We had to realise, that we actually did not know that much about the asylum application and the seekers as we thought. We therefore started to search the internet and written articles for more information on the subject.

In our search we found articles criticizing both the spatial conditions and food of the centres, the instant need and constantly closing and opening of centres. The problems connected with establishing and finding accommodation. A general antipathy from the Danish society, though all stories about the often traumatised and frustrated asylum seekers living in these conditions.

It was naturally to question, how we organise and built asylum centres in Denmark and we asked ourselves:

How can architecture and engineering contribute to improve the asylum process?

INTRODUCTION

"I am the space, where I am" - Poet Noel Arnaud

In 2013, 51.2 million people were forced to relocate as a consequence of conflict, generalized violence, persecution, and human rights violations. This was an increase of 6 million people in 2013 alone and the highest amount on record. 435,385 persons sought asylum in EU and 7557 persons in Denmark. In the end of 2014, 14.815 people sought asylum in Denmark, which constitutes more than double the amount as the year before and the highest amount ever. (asylumeuneurope.org, 2015) (dr.dk, 2015) (nyidanmark.dk)

The increasing number of refugees seeking asylum in Denmark creates an instant need for buildings to accommodate the persons exiled from war and terror. In addition the asylum seekers have often left everything behind, when they come to Denmark and they need a place from where they can understand and change their often-frustrating situation. Disused hospitals, nursing homes, kindergartens, hotels and barracks are used as temporary solutions, but do to their often poor conditions, they need to undergo major renovations before they are able to be used as asylum centers. (b.dk, 2015) (information.dk, 2015)

The increased amount of refugees and the lack of spaces results in inhuman and appalling conditions, where often more than four people are stacked into a small room, limiting privacy and general comfort. The applicants live under these circumstances and conditions and have their home in the centers in an average of three years, before their case is resolved.

The objective of this project is to face these contemporary issues and rethink the design of asylum centers in Denmark, creating a place for asylum seekers. The project should initially raise the question:

How should we accommodate Asylum seekers in Denmark?

This frames the assignment as an investigation of architectural potentials in the design of asylum centers.
In rethinking an asylum center in Denmark two general aspects of architecture is interesting to explore: How spatial atmospheres impact the human wellbeing and how architecture interferes with social issues in the society?

In order to grasp this multifaceted objective the project will rely on a interdisciplinary and critical analytic methodology based on the method of "the integrated design process in PBL",(Knudstrup, 2004). The project will examine a tectonic method of thinking architecture as the key to develop atmospheres and social structures with focus upon structure, construction and materialisation of spaces.

METHODOLOGY

An asylum center is a complex mixed-used building. A Program with significant affect on both its inhabitants as the context.

The project should therefore rely on a critical and iterative process, emphasising a methodological triangulation as implementations of both architectural and engineering methods. This will potentially validate and improve the reliability of the process and the preliminary design.

Essentially creating a project balancing between vision and realism. The project is therefore structurally based around the design method of "The intergrated design process in PBL" formulated by Mary-Ann Knudstrup. (Knudstrup, 2004)

In order to deal with the integration of engineering and architecture in a preliminary design phase. However, in using tectonics as a method of thinking, phenomenology takes the leading position emphasising human experience as the main driver for the project.
"The integrated design process in PBL" is divided in 5 phases, the design process works iterative between the phases:

Problem phase
Critical theoretical analysis is made upon creating a position within tectonics and to discuss the aspects of welfare architecture and embodiment. This is done mainly through hermeneutic document analysis.

An overview of the asylum center is made through cartographic analysis mapping their locations in relation to infrastructure and urban area. Conversations with different users, visiting centers, operators, casestudies and references is carried out in order to understand needs and potentials. On basis of these investigations a project site is chosen and a spatial program is made.

Analysis phase
The focus in this phase is upon site analysis comprising the investigation of the architectural, contextual and the socio-cultural setting of the project. This is done in order to generate architectural potentials and needs for the purpose of creating an asylum center.

Phenomenology is used to define the atmosphere of the site through immediate perception. The perception will afterwards be described and expressed in pictures and text.

Hermaneutic document analysis will be used to collect and gather background information of the site, such as different maps, its history and future.

Engineering analyzes and empiric methods will be applied to visualize climatic condition, building codes and potentially analyzing conditions of old buildings.

Architectural analysis will focus on analysis in model, plan, section and perspective as analysis in different scales. In general architectural analysis work with both cartographic, observational and perceptual exercises and can therefore be argued by a mix of empiric observations and phenemoenological refletions.

Sketch phase
In general the project will strive to work iteratively between scale (detail, space, building and context) and media (model, plan, section, perspective, calculation and writing) in order to reach an integrated preliminary design. In this phase different studies is arranged dealing and exploring different aspects of the design. As typology, façade, spatial organisation, materiality and detail.
The project will also enable an artistic approach to architecture by working and defining and grasping atmospheres through abstract models and drawings due to atmospheres complex constitution.

In addition different performance-based empiric investigation is applied to study the performance of the building in relation to mainly structure and construction and secondly on indoor climate and energy consumption. Utilizing new digital tools its impact is visualised through form and mainly validated by its perceptual value.

In general this phase is highly productive and iterative as it merges, divides, discards and judge all ideas until a small general concept emerge. All material from the studies are valuated critically from their resonance to analysis and aesthetical, functional and technical qualities.

Synthesis phase
In synthesis phase the general concept unfolds through a tectonic approach. The almost circular manner and constant change in media and scale continues. The focus is still on the embodiment, articulating of atmospheres and human experience in relation the integration of aesthetical, functional and technical aspects of the design. In this phase more specific visualisations, calculations, plans, sections and detail are developed.

Presentation phase
This is the final phase of the design process, it focus simply upon the presentation of the final material, comprising the project rapport, drawings, posters and physical models.

Ill 2 - Girl in Center Sandholm

FRAMEWORK

EXPLORING AN ARCHITECTURAL POTENTIAL

TECTONICS

A way of thinking architecture and engineering

The aim of this paragraph is through selected tectonic theorists, thinkers and theory introduces at MSc01 in 2013 to discuss, how tectonics can be used as a way of thinking and connecting architecture and engineering in the contemporary architectural scene.

Etymology

In the book "Studies in tectonic culture" historian and theorist Kenneth Frampton seeks to derive the meaning of tectonics from its etymology. He explores several cognitions tied to the term. Tectonic derives from the greek word "tekton" meaning carpenter or builder, but later in Sappho's writings the word "tekton" is understood as the "poet", which starts to tie a poetic connotation to the term. Finally "tectonics" appears in Homer´s writings as a verb where it turns towards a more aesthetic understanding as the art of construction.

If we examine this sentence "The art of construction" closer, the word "art" could in this contents be defined as "something that is created with imagination and skill and that is beautiful or that expresses important ideas or feelings" and "construction" as "the way something is built or made" (Merriam-webster.com). If we use that as definitions, we can rewrite "The art of construction" to "the act to express important ideas or feelings through the way something is made."

It is like a poet putting meaning into the words and sentences of a poem or in architecture putting meaning into the constructive technique of the building underlying both artistic and constructive knowledge.

Place-making, Meaning and construction

This definition is a quite significant for tectonics, Kenneth Frampton also argues in a similar way, that tectonics is the articulation of the constructive technique in relation to embodiment and expression of an idea. He hereby argues that the tectonic has the potential to address human experience by communicating it's meaning or underlying idea through its tactile and visual qualities (Frampton, 1996).
The Danish architect Jørn Utzon is especially interesting to highlight for his work and ability to create tectonic metaphors. As Kenneth Frampton explains in the chapter "Transcultural form and tectonic metaphors" (Frampton, 1996). For instance in his architectural masterpiece "the Sydney Opera house", he express an image of white sails as the white sails of all the boats in the Sydney Harbour. In creating these sails, Jørn Utzon and the engineering team developed and additive structural system, where pieces of cast concrete moulded as section from a sphere created the structure and the sculptural form as a uniting tectonic concept. Sydney Opera house, 2002)

From own experiences the building awakes imaged of stair entrances to old Aztec temples or Chinese temples with a floating uniting roofs and the sail structure as an organic backbone referring to the animal world. All these images enhance the human experience, when visiting the Sydney Opera house, it becomes a multi-layered experience. Jørn Utzons ability to relate to the site and create metaphors, which on an artistic level creates a dialogue with the site, is especially notable. It also becomes important in creating a place for asylum seekers from where they can belong too and understand their situation.

A way of place making adding value to a site and designing buildings, which belong in its context. A way of place making, which have nothing to do with vernacular architecture, but everything to do with architecture, which enhance human experience and add value to the context within it is placed.

The human experience as a measure

By putting forward human experience as a measure for architectural quality, we draw on purpose parallels to a Heideggerian phenomology.

The philosopher Martin Heidegger is in architecture famous for his texts "the thing", "the nearness" and "building dwelling thinking", in which he discuss the importance of human experience and nearness. He especially argue the importance of human imagination as a measure of space rather the scientific and mathematics measures, which in his opinion is limitating acknowledging, locating and understanding ourselves in the world around us. Something fundamental for human well being and identity. (Sharr, 2007) An especially fundamental in establishing a place for asylum seekers.

Integration of architecture and engineering

Returning to the starting definition of tectonic as expressing something through the way it is built. It naturally implies knowledge in how to build. It is as the poet, who needs to know grammar and how to spell in order to create words and sentences, the architect need to know how to construct and join in order to create architecture. Comprising knowledge about natural forces, material properties, detailing and structure. This constitutes tectonics as an approach, which implies an integration of engineering and constructing in architecture with the focus upon the human experience.

In "Tectonic visions in architecture" Anne Beim address the importance of a tectonic way of thinking architecture. She express a critical issue in designing and building architecture today. The issue lies in designing and building process. The roles between architects and engineers have become to seperated. This means engineers often are left out from sketch phasing and architects simply hand over the responsibility of construction to the engineers after the sketch proposal.

According to Anne Beim, this tendency creates a gap between design process and building process potentially having consquences for the architectural quality in the end. This missing link could potentially risk the architectural ideas and intentions to be missing in the realized projects.

Anne Beim seeks a contemporary tectonic approach or discussion in architecture. Following that this tendency could

have something to do with the way we educate architects in Denmark with limited knowledge of basic construction, structure and production making it difficult for future architects to argue against the engineers calculation. (Beim, 2004)

In addition technology and civil engineering is constantly advancing and is a highly expanding field. The built environment surely needs experts as engineers dealing with advanced building projects in order to develop an efficient building phase and in the validation of structural, climatic and energy demands.

The architectural theorist Fredrik Nilsson introduces in his paper "New technology, new tectonics? On architectural and structural expressions with digital tools" how new digital technologies can foster new relations between engineers and architects. Fredrik Nilsson explains that new digital tools have the potential to enable structural, climatic and energy demands directly in the preliminary design phase. (Nilsson, 2007)

This is seen in digital tools as Karamba or Ecotec, where instant feedback loops is created between aesthetic, form and performance. This possibility makes engineering and the empiric methods potentially more than just a measurable result and reaching a technical demand. If the engineers are taught these new digital tools or if the architects are taught fundamentals in structural engineering and indoor climate, these new form of performance-aided design tools can be incorporated in the early sketch phase.

The mathematics can then be transformed to form and space instantly and the designer can use engineering as a design tool of articulating architecture and maintain a focus upon perception of space and human experience. (Nielsen, 2013)

Complex hierarchy

This also opens up for new relations between aesthetic, form, performance and engineering. A new complex hierarchy merging aesthetics, form and performance. In "Atlas of Novel tectonics" Jesse Reiser and Nanako Umemoto explore this new relationship, which they refer to as the whole-whole relationship. Instead of a traditionally top-down modernist relationship, where the whole of the building can be divided into its parts, this new methodology will involve both top-down and bottom-up logics operating in feedback loop. They argue that this potentially would create new organizations and new architectural effects out of wholes not reducible to its parts. In general they state "a sum greater than the parts". (Reiser, 2006)

The result is not necessarily more complex structures and architectural spaces, but a contemporary understanding of tectonics, where spaces and construction are multilayered with both technical and poetic cognitions in its design.

Introducing these tools and this new understanding of tectonics could potentially foster a bridge between design phase and the building phase. In addition it is interesting to explore how this understanding of tectonics can be used as an approach to unfold architectural ideas and intentions.
(Nielsen, 2013)

WELFARE AND ASYLUM

On the change of an architectural discourse

The aim of this paper is to position and explore the potential of Asylum centres as a part of the welfare institutions of Denmark. Furthermore, how a change in the architectural discourse could foster a new architectural potential, which would generate new relations between asylum seekers and the Danish society.

Welfare:
"The good fortune, health, happiness, prosperity, etc., of a person, group, or organization; well-being:"

"A governmental agency that provides funds and aid to people in need, especially those unable to work"
(Dictionary.com, 2015)

Welfare Architecture
The period from 1940's to 1970's is often referred to as the golden age of Danish architecture and design. Doing this period the frame of Danish welfare was formalised through design of new institutions and homes for the Danish people. (Information.dk, 2013)

Architecture had an essential role in the embodiment of the Danish welfare visions. Schools, hospitals, sport facilities, communal houses, libraries, elderly homes should forever change its form and in reverse take part in forming the Danish culture and the welfare state. (Information.dk, 2013)

40 years after, Denmark is today reorganising itself upon the economic crisis. What we are realising is not only a political change, but also a cultural change that also interferes with the way we built and design. (Information.dk, 2013) Sports facilities as almost social cathedrals have been built all over Denmark in seek for the social focus upon individual health.

New politic agendas fostering reforms in the public health and school system with focus upon more efficiency have resulted in shut downs of smaller schools and pupils moving into bigger renovated schools in urban areas. Moreover prestigious architectural competitions of super hospitals are progressed at the moment.

Architects and engineers should not only embody the new visions of tomorrow's world, but also examine them. Maybe its time to look back at the architects of golden age and ask essential questions as: where are we going? And what is welfare to us? (Information, 2013)

This project is interested in this essential question raised by Kjeld Vindum in the article "Architecture creates welfare" and wants to continue the discussing into the range and ethics of welfare architecture, by focussing on a specific case, asking the question: Should Danish asylum centres be considered as welfare architecture?

Asylum centres and a new architectural discourse
The dictionary explains welfare as the well-being of a group or the providing of funds and aid to people in need. In general the Danish model is referred to as the universal welfare model, where all citizen have the right to welfare – it is the citizens' basic right. In consequence Asylum seekers living in Denmark do not have the same rights, because they are not citizens, controversially they live under the Danish authorities and the laws of foreigners.

This architectural discourse has the same tone as the political. Asylum centres are merely descripted as the "place", where asylum seekers should be accommodated while waiting for their case to be resolved (faktalink, 2014). It is by this definition a space of limbo between being on flee and being a citizen. In addition the asylum centres is also referred to as camps as the "Sandholmlejr", referring to something temporarily. This might have something to do with the early history of asylum centres in Denmark, which where establish in the 1984 because of the instant need for accommodation due to rise in asylum seekers. Before that, they were accommodated in hotels or hostels. (Rødekors.dk, 2015) The fact is, that the asylum seeker is located and living in Denmark, but is legally not a part of Denmark. There exist today 50 centres across Denmark.

Asylum centres as welfare architecture
A research of people with schizophrenia shows that the social stress of being an immigrant in a new country is a critical factor for developing different mental diseases as in worst cases schizophrenia. (Eagleman, 2012) On top, refugees are often people fleeing from traumatising environments, such as war, terror, injustice and more. They are coming to Denmark with nothing at all, hoping for a better existence. Many of them can in different ways be categorised as people in need, even though if it is just a need for a bed.

By understanding the asylum centres as welfare institutions in Denmark, we can establish a new framework of thinking and designing these centres in the future. As welfare institutions, the centres will be providing the ability, or more specific, the right to aid and take care of asylum seekers, but on the same time it should also contribute to the Danish welfare society.
More specific shifting the discourse of an asylum centre from something isolated, where The Danish Red Cross and the Danish state need to establish accommodation and care, to something, which is an active part of the society. Spaces those also are useful for the Danish society.

The new framework of thinking
This new definition opens up for new area of contact between the asylum centre and the society, where new social relations can arise. By establishing this relation the asylum centres can work as pre-integration into the Danish society giving the refugees a better start and a more fluent transition to a life in Demark. This could be more beneficial for Denmark in the long term; maybe the refugee will find a job faster, decrease social stress or in general avoid trouble and misunderstandings with any Danish authorities. On the other hand research indicates that if the host countries express hospitality towards refugees

they are also more likely to understand their often-frustrated situation and cooperate with the authorities in the case of denial and demobilisation. In addition this centre could also provide them with resources to establish a life in their home country. (EB.dk, 2011)

Especially the term hospitality is worth exploring. The philosopher Jacques Derrida investigate in his chapter "On Cosmopolitanism" in "Drifting: Architecture and Migrancy" hospitality in relation to immigration. In here he reveal the experience of hospitality in relation to social interaction, not the architecture of the familiar place to dwell. (Derrida, J, 2004)

This interesting notice streamlines the idea of an asylum centre as something, which needs to be a part of the society. In addition the existing asylum centres contain a wide range of programs from cafés, shops, educational, sport facilities, housing and more that together with a new form of social interaction it is interesting to explore how that can effect urban areas and the interaction with the existing society.

UNIVERSITIES
SCHOOLS
HOSPITALS
ELDERLY HOMES
KINDERGARDENS
HOSPICES
COURTHOUSES
SPORT CenterS
CITY HALLS
LIBRARIES

ASYLUM CENTERS ?

EMBODIMENT

Atmosphere and architecture as a cultural medium

In the text "tectonic – a method of thinking architecture and engineering" we argue tectonics potential to express ideas and visions by generating atmospheres through the articulating of construction. In relation the text, "welfare and asylum" delineates a new architectural discourse for asylum centres providing them with new meaning and values. It is therefore essential to explore "embodiment" and "atmosphere" in architecture, as critical and key aspects in order to transform these values into architectural form.

Atmosphere

Architect Peter Zumthor explains atmosphere as the immediate form of physical perception. Spaces are sensed by the entire body and emotionally memorized as the atmosphere of a place. An atmosphere is determined by both visual and tactile qualities as smells and sounds and it's valued from its ability to stimulate those senses. (Zumthor, 2006).
In his book "The eyes of the skin"Juhanni Pallasmaa explains the importance of atmospheres in architecture:

"We behold, touch, listen and measure the world with our entire body, memory and identity. We are in constant dialogue and interaction with the environment, to the degree that it is impossible to detach the Self from its spatial and situational existence" (p. 64, Pallasmaa, 2005)

He argues that, immediate perception of a place have a crucial impact on the general wellbeing of people who inhabit the space. In addition to asylum seekers, it is important to address the atmosphere of the centre in order to create a space, which can take care of these people, who have left everything else behind. They will therefore feel a naturally or forced (by the authorities) belonging to the asylum centre, which will shape their identity in relation to the world around them. It is as the poet Noel Arnaud express *"I am the space, where I am"*.

These views on atmosphere referrers the ideas of putting forward human experience formulated by the philosopher and phenomenologist Martin Heidegger as we introduce in our reflections on Tectonics. To Heidegger an atmosphere is a person's imaginative boundary of a place. A place is by Heidegger determined by human use and experience. This is an interesting and complex idea to work with, which liberate atmospherically spaces from measurable room boundaries, making it an abstract and fluent form. (Sharr, 2007)

Peter Zumthor works directly with defining atmospheres and as he says, "construct" spaces around them, this project should on similar way try define atmospheres, which through a tectonic approach can be unfolded. (Sharr, 2007)

Place-making

Introducing a phenomenological "place" defined not by a physical boundary, but as imaginative boundary, a discussion on making places and defining places become an important factor. Heidegger puts forward that places are made of reasoning based on a dialogue between human use and the local site. (Sharr, 2007) Peter Zumthor make the same notions, when he talk about a critical dialogue between site and building in his project. He explains

"... Ultimately, if you have a good result it's a nice metaphor to say that the building looks as if it has always been there because then, maybe then, you have reached some kind of rapport between the place and the building". (Sharr, 2007)

Kenneth Frampton introduces the same ideas in his "Critical regionalism". In here he undertakes Heidegger's argument in "Building dwelling thinking" about loss of nearness and he addresses the need of architects to create places and sense of meaning, by embracing locality. (Sharr, 2007, p105.)

It is relevant to address place-making according to creating a sense of nearness and creating structures, materials and spaces in relation to human experience and sensitivity.

Furthermore adapting to topographic and climatic specification can potentially integrate technical solutions as creating a local identity.

However it is also important to examine what is a cultural context and how does it affect architecture. Cultural context has previous been rooted to the geographical location, but in a globalising modern society architects as Barbara L. Allen introduces a new regionalism. In this regionalism people and cultures identity is shaped as much from what they "do" rather from only what they see. In her book "On Performative Regionalism" she criticize this Habermasian- Heideggerian hybrid approach to regionalism shaped by Tzonis, Lefaivre and Frampton. She claims it to be too narrow-minded in their focus on static and material qualities in architecture. By prioritizing the individual as an active part of the experience of the site, she wants to discuss culture, context and identity from a performative angle. Hereby she follows the line of new cultural research, where culture is what we do (New Nordic, 2012).

This new performative angle extends our definition of what constitutes an environment and its atmosphere. In the book "Institution and Home" architecture's ability to communicate a culture is discussed. The author Julia Williams Robinson argue, "Places set the stage for daily life", (p. 15, Robinson, 2008) that within our culture we quickly recognise different kinds of institution and are not normally in doubt if we enter a hospital, school, theatre, elderly home or so on, even though we haven't been there before. We expect certain thing to happened and behave in a certain way in these spaces. We know how the staffs look like in a theatre and we instantly look for the front desk in order to get tickets. We maybe drink a glass of wine and small talk in the foyer, before a show and we kindly show the tickets before entering the stage. People change their behaviour being in a cathedral or in a public school, even kids are taught from very early how to behave and recognise these social institutions. (Robinson, 2006) Architecture and

Ill. 3 - Entrance at Center Sandholm

physical elements influence people in many ways, through many different stimuli, that it is impossible to identify the source easily. She continues arguing, "A society is responsible for its culture and for the buildings that express and reproduce it". (p, 31, Robinson, 2008) Society should therefore be aware of the messages communicated through buildings and as architects being aware of these messages provides the possibility to change and affect the culture of the society.

These positions delineate a more complex understanding of the constitution of atmospheres. On one hand sensitivity for articulation the construction towards human experience and the creation of "nearness". The need for a "critical dialogue" between site and project in order to create a "place", where the inhabitants can locate themselves according to the community around, creating a sense of belonging.

On the other hand an extended understanding of belonging through a performative discussion of culture and identity. Here the spaces made from these structures articulate certain ways to behave and the messages embodied in the building changes the perception of the institution. Its inhabitant become a part of the society, culture or community within it is placed. Hereby are these positions of regionalism not seen as oppositions as they where meant, but their differences and crossovers can reinforce the embodiment from the detail to the space, the building and the city.

From this new understanding of atmosphere, we can discuss embodiment, which from this position also must be discussed from the overall communication of the building, the behaviours embedded in the spaces and articulating of the constructive technique.

Embodiment

As described in the text "welfare and asylum" The deconstructionist philosopher Jacques Derrida write about hospitality. Derrida is especially famous for his works on cosmopolitanism (a countermovement to the Heideggerian provincialism). Cosmopolitanism is discussed in different moderations. In general it is the belief that *"all human ethnic groups belong to a single community based on a shared morality"* (Cosmopolitanism, Baylis, 2013).

In relation Levina(and Kant) argues that exactly hospitality *"hold out the possibility of an acceptance of the Other as different but of equal standing"*. (p. 105, Rovisco, 2014).

In relation to Derridas explorations of the potential of the city to create social interaction and the experience of hospitality. It is interesting to discuss in the design of an asylum centre the embodiment of hospitality. Not meant as the cosmopolitan "universal hospitality", but in relation to our different ways of creating atmospheres. The expression of hospitality articualted in the construction can create a nearness between the asylum seekers and the centre, essentially create a temporarily home for them. As a welfare institution, hospitality can create a caring environment supporting the asylum seekers in need and for instance help them treat traumatising experiences.

Furthermore a mutual experience of hospitality fostered by a relation to the city could create new social relations, contributing to a mutual understanding of each other as enriching the experience and diversity of communities within the city.

As a result, an asylum centre should balance between being an institution dealing with asylum applications, a home for the asylum seekers and a public building for the surrounding community. Ideally creating a feeling of Hospitality. A Hospitality created through interaction herby becomes a multifaceted theme in the project. Where interaction can be the creation of social interaction, how people meet the building materials and jointing of materials expressing underlying ideas.

LOCATION

Asylum centers in Denmark

The Danish Immigration Service has 50 asylum centers scattered throughout Denmark. The centers includes 4 centers for reception/departure all at Sjælland, 11 children accommodation centers and 2 special care centers, which includes separate accommodation for women. Some of the centers have more types of accommodation. Furthermore, asylum seekers can get permission to be accommodated outside the asylum centers, if they meet certain conditions.

The reception centers are for newly arrived asylum seekers, accommodation centers for asylum seekers whose cases are being processed, and departure centers for persons who have received a final rejection of their asylum application and therefore must leave. Special centers are taking care of unaccompanied children and asylum seekers with special needs for care, for example, seriously ill people.

None of the centers are located in relation to any larger city in Denmark, but instead are scattered out into smaller local communities in the remote parts of Denmark, where the amount of applicants in the centers compose a greater part of the urban environment in the small communities. (Nyidanmark.dk – Hvor ligger centerne?, 2015)

The asylum centers in the smaller communities act as a "catalyst" in the remote villages, when the centers besides bringing asylum seekers, brings jobs and life to villages with a degradation of population, why many smaller municipalities are extremely interested to have asylum centers.

Despite the interest for municipalities to accommodating an asylum center and the great courtesy and kindness from the locals, the amount of applicants represents a large group in the community and stand out from the locals. Whereas being situated in larger cities, the division in the society between asylum seekers and locals disbands.

The Immigration Service's policy of placing asylum centers temporarily in small communities for short periods only, from a few months up to a year, can be seen as a short-term catalyst for work and life in the urban environment. When the centers closes down after a short period, the city will again lose the jobs and the life, which the center brought and the effect as a catalyst in urban society, will be limited whether or not it is the intention of the Danish Immigration Service. Ill. 4 (Nyidanmark.dk –Asylcenter, 2015)

AUTHORITIES

The Danish Immigration Service and operators

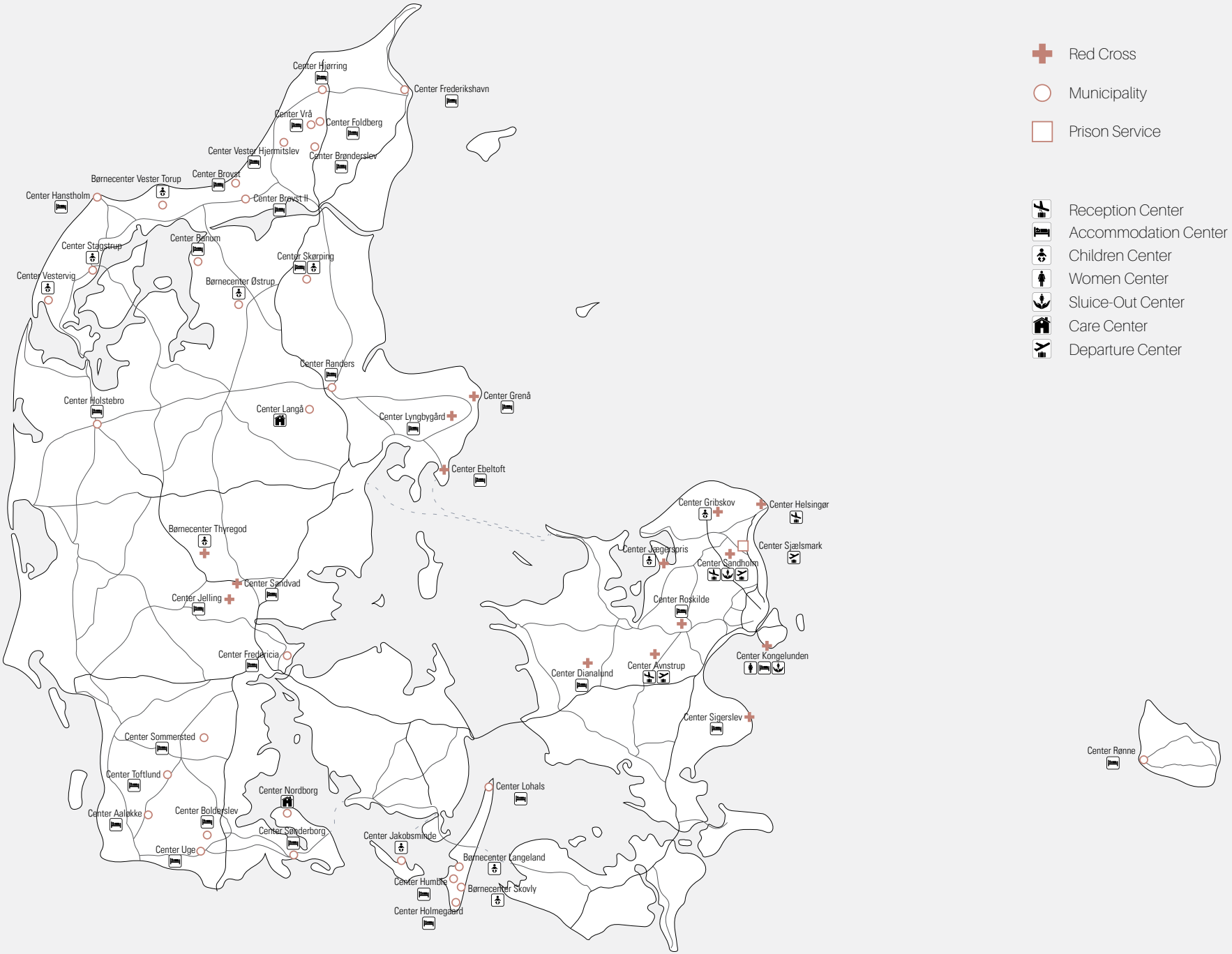
The Danish Immigration Service is responsible for providing accommodation for all asylum seekers at the asylum centers. In co-operation with several partners/operators who are responsible for the day-to-day operation of the asylum centers.

The operators are the Danish Red Cross, Jammerbugt municipality, Thisted municipality, Vesthimmerlands municipality, Langeland municipality and Bornholm regional municipality. The Danish Red Cross in collaboration with the Bornholm regional municipality runs the asylum center at Bornholm.

The Danish Immigrations Service sign separate agreements with the mentioned operators for each asylum center. The length of the agreements or contracts of each center vary from short-term agreements to more permanent contracts (vary from few weeks to several years), depending on the current situation of applicants, locations and capacity of centers.

The Danish Red Cross have signed contracts with The Danish Immigration Service, for the responsibility of the day-to-day operation of 16 of the 50 asylum centers in Denmark. Agreements of the remaining 2/3 of the asylum centers are signed between the Danish Immigration Service and the respective local municipalities.

REGSTRATIONS



Ill. 4 - Asylum Centers in Denmark

REGISTRATIONS

The Asylum Procedure in Denmark

The diagram shows the complexity of the Danish Asylum procedure, most of the asylum seekers are going through. This diagram is a possible progress for an asylum seeker, created on the background of information and conversations with the Danish Immigration Service, Danish Red Cross and three Syrian asylum seekers.

The progress begins when an asylum seeker arrives to Denmark, either by being stopped at the border control or in other ways gets in contact with the police or the Danish authorities, the applicants are being transferred by the police to the reception center at Center Sandholm, 35 km. north of Copenhagen.

At Center Sandholm the police and the Danish Immigration Service interrogates the applicants to determine their nationality and identity, before the Danish Red Cross introduce the procedure of the Danish asylum politic, their rights and progress to the applicant. The police takes fingerprints and photographs of the applicant, and interrogates the asylum seeker on how he/she traveled to Denmark.

During the course of the interview, the asylum seeker has the opportunity to further clarify why he/she is applying for asylum in Denmark.

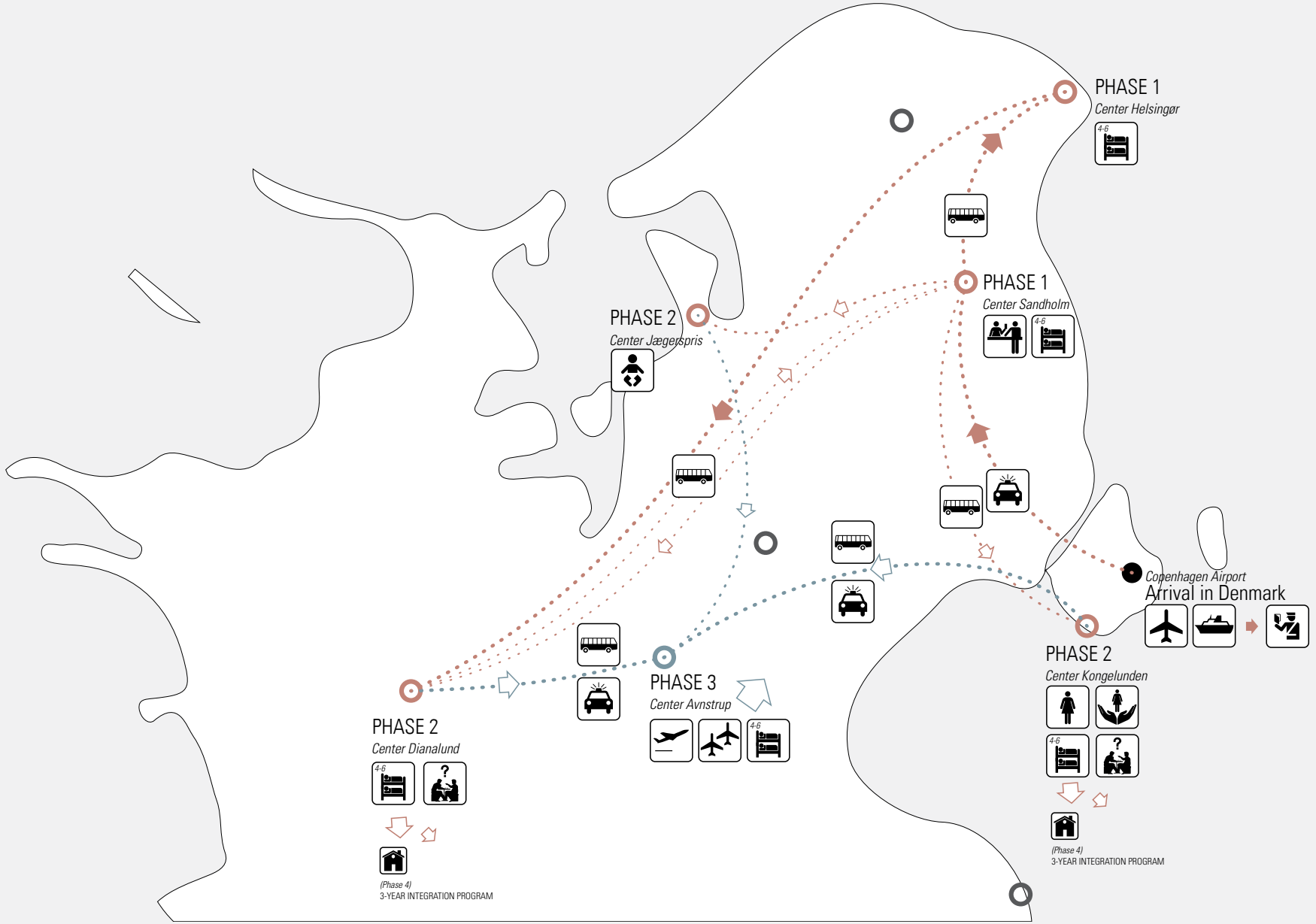
Following the interview, the Immigration Service will rule in the case, based on a factual and individual assessment of all relevant information pertaining to the case. The Immigration Service will consider the statement provided by the asylum seeker, as well as general information about conditions in the asylum seeker's country of origin. In most cases, this will be sufficient to make a ruling in the case. However, there may be instances where the Immigration Service requires additional information, e.g. if there is doubt regarding conditions in a specific country.

After the interrogation and interviews at Center Sandholm, the applicants are transferred and accommodate shortly to Center Helsingør, a temporary reception center, while the Integration Service determine in which accommodation center the applicant will be accommodate during the asylum progress. During the progress, the applicants might be transferred to other centers and have to travel back and forth to attend for interviews at Center Sandholm with the authorities.

Special Women Centers accommodate women exposed to trafficking, sexual abuse and other traumatization, likewise are applicants with special needs or diseases are accommodated at Care Centers and unaccompanied children youths under 18 are accommodated at Children Centers.

The applicant live at these centers during the progress of their case until the Immigration Service have decided whether they will achieve residence permit or are expelled from Denmark. Despite of rejection asylum, does not want to leave the country voluntarily. In these situations, the police have to ensure, that asylum applicant is traveling out of the country. (Refugee Welcome,2015) Ill. 5

REGSTRATIONS



Ill. 5 - Transportation flow for asylum seekers

Ill. 6 - Accommodation barracks at Center Sandholm

NEIGHBOURING COUNTRIES

Accommodation Procedure

Asylum process and how to accommodate the refugees are different all over Europe, this paragraph will try to delineate, some of the differences in the countries close to Denmark, in order to reveal architectural potentials in the accommodation process.

A couple of our neighbouring countries have a similar process as in Denmark. Both Holland and Norway have the same process of accommodate people first in Reception centers and then in accommodation centers, while their applications are processed. In Norway they also have the opportunity to stay with family or friends, but loose their right to get financial support from Norway, if they choose to. (Coa.nl, 2015) (Udi.no, 2015)

Germany has a slightly different system than Denmark. Refugees are in a short time accommodated at an initial reception center, where their application is set up. The center is often an old army barrack as in Denmark. After that set-up period of up til 3 month, they are then sent out to collective accommodation center run by the municipality in that location. This is quite similar to Denmark, however since 1990 the municipalities have started to close down these collective accommodation centers and started to accommodate people in normal apartments around the country. In some municipalities almost 95% is accommodated in normal apartments, instead of collective accommodation. This is a flexible system, where the municipality can chose between different kinds of housing for the asylum seekers depending on the needs. This seems like a system, suitable for a country as Germany, which in some period has a lot of applicants, compared to the rest of the European countries. (asylumineurope.org, 2015)

This way of accommodate refugees is well known in Sweden, which similar to Germany also have a lot of applicants in periods. In Sweden, the refugees is also registered in a reception centers, but then they are accommodated in special shared apartments through out the country. (Modalleodds.dk, 2015)
The asylum seeker is therefore accommodated in almost normal apartment from the start of the process.

Psychological effects and architectural potentials.
Following this different ways of accommodate refugees, Signe Smith Jervelund from department of public health at Copenhagen University explains about her research in the article "773 personer har skiftet asylcenter ud med egen bolig". Her research indicates that refugee families improve their life quality by living in normal houses, than at the center. She continues, that this normalisation of the asylum seekers every day life has a positive psychological effect. However she also describe the importance of the centers, when first coming to Denmark. She argues that the center could serves as safe base, when the refugees come to Denmark. This could potentially give them a place from where they can rehabilitate upon their travel and traumatic experiences. However the institutional living can have a negative effect in longer periods, creating a feeling of frustration not being in control of yourself. (EB.dk, 2015)

It is therefore interesting to look into the architectural potential of spreading out the asylum center, maybe as shared apartments in Sweden or normal apartments in Germany in order to create a greater balance between home and institution, which would have a positive effect on the refugee and a more flexible system.

VISTING ASYLUM CENTERS

Summary of conversations with involved persons and authorities

This chapter is the summarization of excerpts from conversations with different people involved in the Danish asylum system, - applicants, operators, police and authorities, which gave us a better understanding of the Danish asylum system. We have been in contact with people involved in the system at different positions of the progress.

The full summaries of the individual conversations can be found in the Appendix 4.

The Danish Immigration Service are responsible to accommodate asylum seekers applying for permit residence in Denmark. The Danish Immigration Service have entered agreements with different operators, to manage the accommodation and activation of the applicant during the progress of their cases. In the contracts between the Immigration Service and the operators, the operators agreed to activate and educate the asylum seekers, which according to Thomas vom Braucke are done in several ways, depending on the operator.

For many years, the Danish Red Cross has been the only operator to accommodate the asylum seekers, but in recent years, more operators are accommodating asylum seekers as well. Besides the Danish Red Cross, the main operators now includes Jammerbugt Municipality, Vesthimmerland Municipality and Langeland Municipality, which all has centers in other municipalities and most recent the Danish Prison Service who are managing the deportation at Center Sjælsmark near the Center Sandholm.

Many remote municipalities are interested to accommodate asylum seekers, often because of the economic aspects and reasons. To have an asylum center in a smaller remote municipality creates places for employments - teachers, nurses, doctors etc. and are often bringing some life to the local community.

Jannik Bisp pointed out that it worked well with having a reception center (Sandholm) where the respective authorities were gathered, and have close connection to the applicants at the beginning of the process.

A common problem that both the Police and several of the operators mentioned was the lack of an integrated card for the key-system, ID and pocket money, an issue not having one card the asylum seekers was dependent to, which contain information about their identity, key accessibility for the entrance and separate rooms.

Additionally, would a simple way to inform the applicants whether they got mail, having an interview or general information about the processing of their case. In this digitalized world, with WIFI, Internet, Skype etc. could easily be fixed by having an information screen in every room to inform the applicants, and at the same time could be used for private contact with families or the international media.

An issues all of the operators are dealing with, is the diversity of cultures, backgrounds and living standards the applicants are coming from, where simple problems as turning of the heat pumps, running water and electrical appliance. At Center Jelling a simple introduction to the western facilities, toilets, kitchen etc. to help applicants coming from lower living standards, had prevented the majority of the problems, other centers are struggling with.

A general problem all the operators mentioned was the conditions and circumstances the applicants are facing, up to 12 people at a room, sharing kitchen and bathroom facilities with many others. This has an apparent consequence for the poor condition and cleanliness of the facilities, where the applicants does not feel a sense of ownership.

It is problematic for the operators, inconvenient and inhuman for the applicants, that many single men often are relocated to other rooms of a center or being transferred to other centers due to logistic and economic reasons. This constant fear of the possibility of being transferred obstruct the opportunity to feel at home.

The operators supports location of centers in urban environments close to larger cities, advantageous for the integration into the community and helps the applicants to establish relations to locals. Furthermore, easy access to infrastructure, healthcare facilities and activities essential for the integration. Furthermore, the quantity of vandalism problems has fallen drastic, where applicants have lived in smaller units or as families, and not have to share facilities with many other applicants.

According to the three asylum seekers, Hani, Lutfi and Muhammad, the system seems to be randomly organized, like hoping to winning in the lottery. The same with the arrangement and distribution of beds/rooms, varying from sleeping 2-12 people in a room. Especially the lack of activities at Center Fredericia and prospect for a job interview may not happen for a long time to come, even though they have asked for any jobs, tried to arrange work groups for themselves.

They were all frustrated about their ignorance and lack of information about the system and the progress of it, especially the randomly prioritizations of different cases.

The asylum seekers does not have any rights, but rather many obligations, - meeting up for compulsory attendance to interviews with the Immigration Service, weekly or daily attendance etc.

ACCOMMODATION CENTER

Choosing a center and user group

Having analyzed and mapped the different centers located throughout Denmark, various types of asylum center and their relation to nearby towns, as well experienced the conditions and arrangement of the various centers, a closer look at selected centers, to choose the type asylum centers and user group.

Analyses and mappings showed that the majority of the center are accommodation centers, which primarily are located in smaller local communities in the remote areas of Denmark. The majority of asylum seekers are accommodated at one of the 34 accommodation centers where they spend most of the time, including language lessons and activities while awaiting a decision on their case for asylum.

The accommodation centers accommodate often both single men and women, couples and families with children, in which the major part, about 60-70% are single men while families represent about 25-30% of the total asylum seekers in Denmark.

In addition to the analyzes and mappings of the different types and locations of centers in Denmark, several centers were visited and further studied in relation to the typology and spacious programming.

The former military barracks, Center Sandholm has since 1989 served as a reception center and function today primarily as a reception center, a center where all new asylum seekers arrives after there arrival in Denmark, but also served as the departure and care center. The center is located in the former military wings along later established pavilions and is secluded located outside the town of Blackburn. The center's separation to the city is yet practical, considering the radical change and experience asylum seekers experience of coming to a new country, in calm surroundings.

Conversely, Center Sandholm remote location from the city, the accommodation Center Jelling is centrally located in the small town of Jelling and integrated with the city's programs and structure.

The center's scattered typology is a mixture of low terraced houses, former nursing homes, where families are accommodated and low temporary wings of townhouses accommodating single men and women in small rooms and sharing kitchen and toilet/shower facilities. The scattered buildings with different functions distributed around the center, mixed with municipal functions in between, emerge the center as a city within the city.

The institution and place still make a mental distinction between the center and the town, so somehow the asylum seekers still know they are not a part of the society. Still does typology, the buildings and different small activities create an image of a small quite town, which take care of inhabitants and makes them feel safe.

Like Center Jelling, does the temporary accommodation Center Fredericia have a prominent and central location in the city at the old military barracks next to the beach. Despite the central location next to low private houses, schools and shops, the 3-storey typology of Center Fredericia stands out from the remaining city of smaller family houses. Organized as a block around a larger courtyard, the center has 2-12 dorm rooms placed along the long corridors, sharing kitchens and toilet/bath facilities.

Located remote and isolate at Langeland, at another former military barrack is the accommodation Center Holmegaard, 2,5 km outside of the small city of Bagenkop. The center accommodates both single men and women, married couples and families with children.

Visits at Center Jelling, Center Fredericia, Center Sandholm along with typology studies of Center Holmegaard at Langeland together with the analyzes and mappings, have had influence of the type and spatial program of the center.

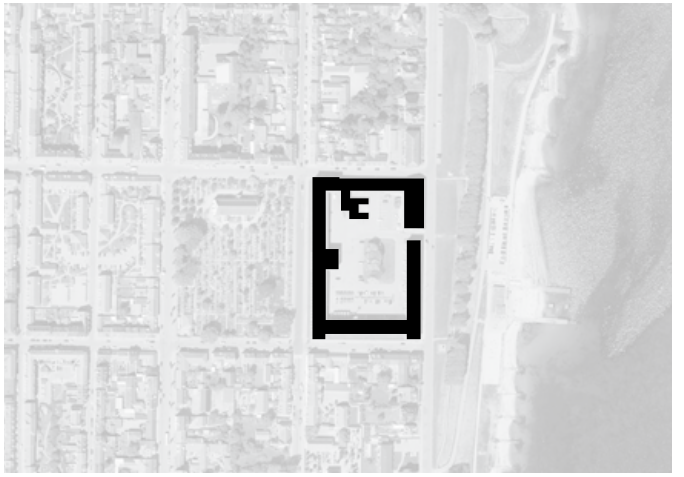
With this basis, it will be most relevant to designing an accommodation center, which will be a home for both single men and women, couples and families with children. The center will accommodate a total capacity of 300 asylum seekers, Of these, 200 single men and women, 50 married couples (25 couples) and 50 for families with children (10 families).

COUPLES
50

SINGLES
200

FAMILIES
50

Ill. 7 - Center Jelling



Ill. 8 - Center Fredericia

Ill. 9 - Center Sandholm

Ill. 10 - Center Holmegaard

PROGRAM

Private / Public

The initial spatial program is based on the casestudies of especially the asylum center in Jelling and Fredericia.
It should be looked upon as an overview of the spaces, which could be placed inside an asylum center. The project does not intent to detail every spaces in the program, but to set focus upon the most interesting spaces and develop an architectural concept in which the other spaces can be unfolded.
This project spatial program will later be developed according to its specific site and context.

In addition the exact room areas will also be establish according to building codes and standards from Red Cross.

In the "functional diagram" on the right we investigate how the different spaces should be connected to each other and how the spaces can be categorised as public or private space. The dashed line means it should be in close but not necesarrily in direct connection.

Accommodation	m^2	Number	Total
Single rooms	7	250	1750
Double rooms	14	25	350
Family units	40	20	800
Kitchens	40	10	400
Toilets/bathroom	10	50	500
Total			3800

Common room	m^2	Number	Total
Living rooms	150	6	900
IT-rooms	150	2	300
TV-room	100	4	400
Childrens room	50	1	50
Total			1650

School	m^2	Number	Total
Classrooms	75	4	300
Kindergarten	100	2	200
Youth Center	300	1	300
Total			800

Service	m^2	Number	Total
Cafe	200	1	200
Shops	30	3	90
Laundry	30	4	120
Total			410

Staff	m^2	Number	Total
Kitchen	30	1	30
Office	15	12	180
Meetingroom	25	3	75
Staff room	150	1	150
Toilets	15	5	75
Total			510

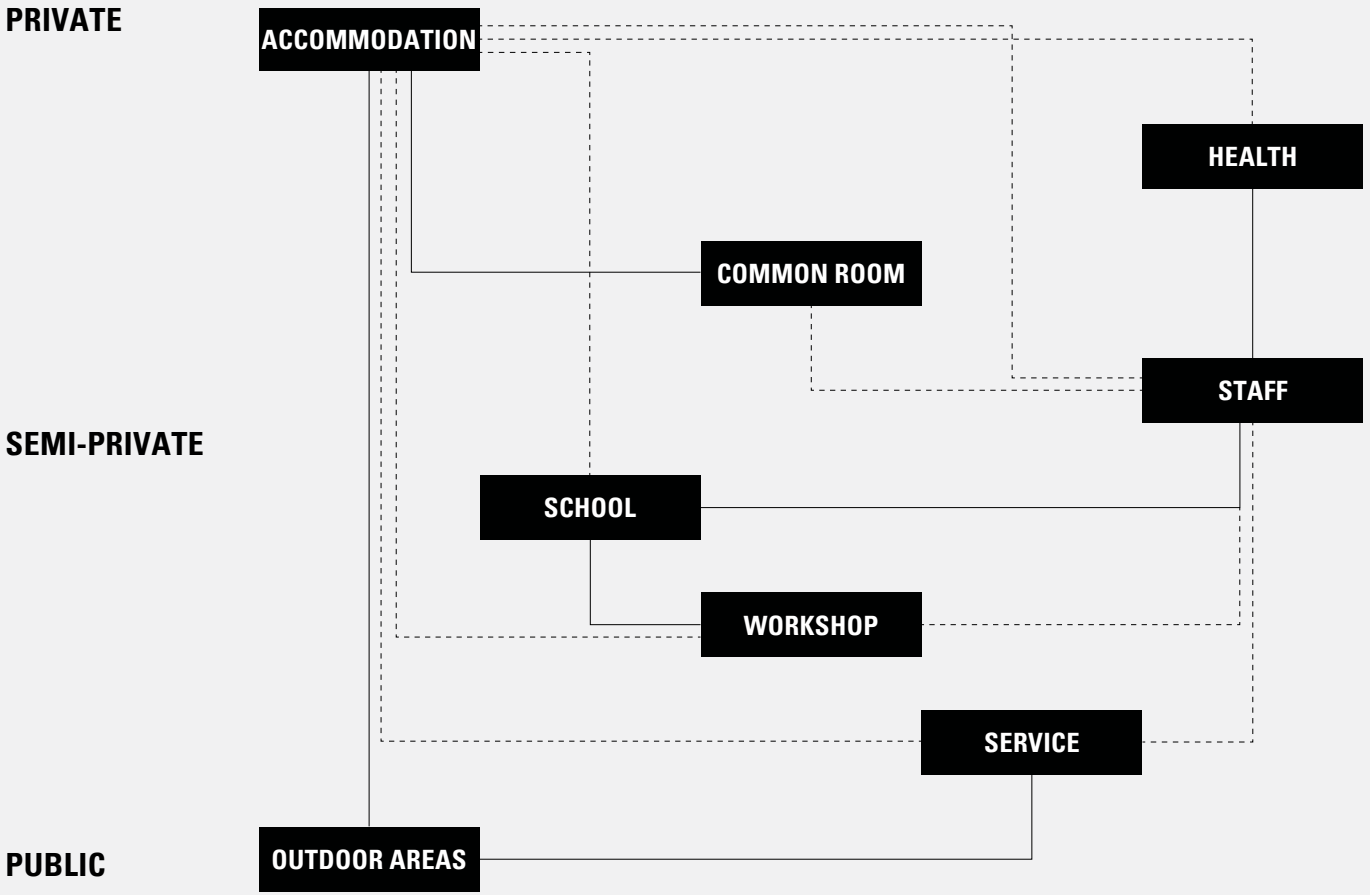
Workshops	m^2	Number	Total
Creative	50	4	200
workshop	50	1	50
Bike mechanics	20	1	20
Storage	30	1	30
Total			300

Health	m^2	Number	Total
Fitness	200	1	200
Sportfacilities	600	1	600
Clinics	15	10	150
Total			950

Outdoor area	m^2	Number	Total
Gardens	5	10	50
Green areas	600	1	600
Playground	150	2	300
Total			950

Total	m^2
Accommodation	3800
Staff	510
Common room	1650
Workshops	300
School	800
Health	950
Service	410
Outdoor area	950
Total	9370

FLOWS AND PRIVATE / PUBLIC SPACES



TRANSFORMATION

Finding a place in the city

The aims of these two case studies are to discuss the potential of transformation as driver for urban reveal and how this potential can be combined with an asylum center.

The Library in Nordvest by Cobe and Transform Architects

The Library designed by Cobe and Transform Architects is an extension of an existing culture house in Nordvest, a Neighbourhood on the fringe of Copenhagen with a diverse group of inhabitants. The architects asked themselves "How do you design a contemporary library in a run-down neighbourhood with an extremely diverse group of inhabitants?" (Cobe.dk, 2015)

Their answer was a concept of "stacked books", all "books" or golden boxes contain its own "universe" creating extinctive atmospheres and varied spaces suitable for its different use. Here among libraries for adults, young and children.

The interior of the different boxes was designed by both the community and the architects, which created the possibility of different spaces for the diverse groups in the community and still gathered them under one roof. The spaces between the boxes were utilised as multi-purposed community spaces, in order to unite the whole neighbourhood.

For instance, the ground floor drags the city inside and continues as a covered street with a small café and "outdoor" serving. It hereby creates a direct link between outside and inside, as a welcoming gesture for the whole community, not only the book readers. On the same time the stacked golden boxes become an urban beacon, which provide the whole area with an aesthetic lift. The whole architectural experience expresses an understanding and respect of both the need for change and the importance of the existing community.

The Library extension hereby embraces the surrounding community and provides it with new value and dynamic.

Nordkraft by Cubo Arkitekter

Nordkraft is a transformation of an old industrial power plant to a culture house in Aalborg in Denmark. The city is situated close to the Danish fjord "Limfjorden", where it was built and developed around the harbour and the industry. Nordkraft delivered most of the power to this industry and hereby to the growth of the city. In recent years the city has changed, the old industry is slowly closing down and schools, service and cultural buildings is becoming a more important part of the city. The transformation of Nordkraft has become an image of the change from industrial city to knowledge and culture city.

After its close down, the industrial spaces and spectacular concrete constructions been reprogrammed with cultural function. The big volume contains everything from theatres, exhibition halls, restaurants, cinemas, sport and fitness to lecture rooms and educational spaces.

The new use of the spaces combined with industrial history embodied in the construction create a balance between past and present. As an architectural image of change in time, it metaphorically withholds to provide power to the city and its growth. Following the thoughts of Pallasmaa in "Embodied Image",this image holds the potential to provide the inhabitants of Aalborg with an intuitively understanding of the city. Furthermore the image also contributes to the inhabitants' own understanding of themselves in relation, as their sense of belonging to the place. (Pallasmaa, 2011)

Reflection upon Asylum Center and urban transformation

An asylum center contains around 300-500 people, they need everything from hair saloons and cafés to bike repair and shops. By placing them strategically in the city, it can instantly boost an area with new functions and life. This can be used in "dead" areas in the city as the "run-down" area in Nordvest or in upcoming new areas in the city. New city areas as Ørestad in Copenhagen have suffered from being to mono-functional doing its establishment. Creating a slow building process and a "sleepy" unattractive city area for many years. (Poliken.dk, 2015)

By focussing on transformation the asylum center could more likely create a naturally belonging to the place with respect to the existing as the new culture house in Nordkraft. Furthermore it could potentially help establish foundation for a diverse and mixed-used development, enriching city life.

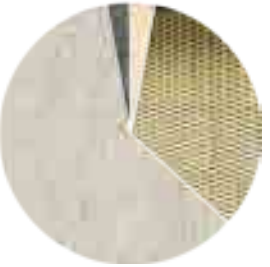
Ill. 13 - Nordkraft by Cubo Arkitekter

Ill. 14 - Abstraction of composition of Kulturhus Nordvest

Ill. 12 - Nordvest Kulturhus by COBE and TRANSFORM

Ill. 15 - Foyer in Kulturhus Nordvest

Ill. 16 - Reading room in Kulturhus Nordvest



Ill. 17 - Materials in foyer of Kulturhus Nordvest

Ill. 18 - Materials in reading room of Kulturhus Nordvest

Ill. 19 - Entrance Livsrum Herning by Claus Pryds

Ill. 20 - Tietgen Kollegiet by Lundgaard & Tranberg

HOME / INSTITUTION

On the sense of belonging

Healthcare center Herning – Designed by Claus Pryds Architects

The new healthcare centers in Denmark (Livsrum). All aim to create a better atmosphere for cancer patients after there time at the hospital. The healthcare center in Herning by Claus Pryds Architects strives to create a clear distinction of a hospital by an architectural reinterpretation of a "wing" house (længehuset), which many Danes combines with a home.

They use materiality, scale and measures, which relates to the human body. For instance the ability to touch the roof from the ground or the soft and touchable wooden interior, all in order to create and sense of home.

On the same time the height and variety of spaces with light coming down from the top gives a more institutional feeling.

The staff doesn't have a counter, but walk naturally around the common kitchen. The house is created around the green park and with a strong back to outside road, which create an easy orientation and have positive psychological effect. (ClausPryds.dk)

This effect and homely feeling combined with the informal and welcoming staff establishes the patients with the understanding of the difference between rehabilitation and being sick at a hospital and essentially creates the feeling of safety.

Tiegen Dormitory – Lundgaard & Tranberg

Another typology that balances between institution and home is a student dormitory. In relation to asylum center they also have small and often limited private spaces as bigger common spaces, often trying to establish a sense of community.

The Tiegen Dormitory designed by Lundgaard & Tranberg is made on aim to design "the future dormitory". It's recognised by its circular shape, which according to the architects create a common equality in the dormitory. Programmatically are all the common functions, as the big kitchens and living rooms places on the inside of the circle. This enables visual connections to all the common functions creating a greater sense of community in the whole dormitory with the enclosed courtyard in the middle.

The private spaces are turned towards the outside, so the other residents don't look directly into each other. The private rooms are shaped with one piece of wooden furniture from one end to another.

This furniture integrates bed, storage and tea kitchen into a compact space. In general wood is used in relation to human interaction as kitchen tables and furniture, while the overall spaces in dormitory is made in robust concrete, made to be used. This creates robust and useful architecture, which highlight and contrast the elements, which people should take more care of. (Archdaily.com, 2015)

The program balance between creating good sense of community, which could foster a feeling of home and belonging to the place for the students. On the same time privacy is insured on limited space.

Reflection on asylum center and the balance between home and institution

These examples exhibit ways to create a sense of home and the safety of a caring institution. The Healthcare center uses tactility and scale to create intimacy and relate to the human body, but also variation in space and light to balance feeling of private home. On the same way the staff is not staged as authorities but meets the patient in eye level, which also could be important in the design of asylum center in order to create trust between the asylum seeker and the operators.

Tietgen Dormitory exhibits how to balance private and public,

Ill. 21 - Abstraction of composition of Kulturhus Nordvest

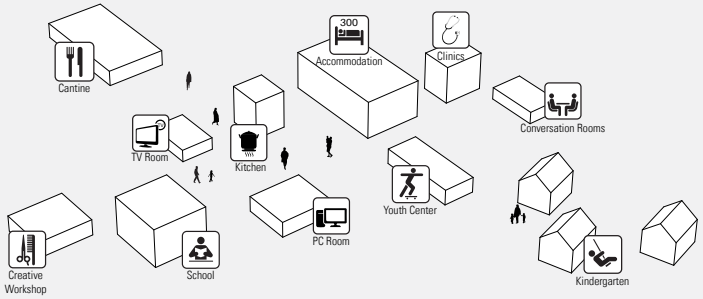
through a programmatic orientation, which on the same time generates a greater community feeling. This is also important in an asylum center, which the lack of privacy can be frustrating for asylum seekers and maybe a greater community feeling would generate more care of the center in general. Creating a sense of belonging.

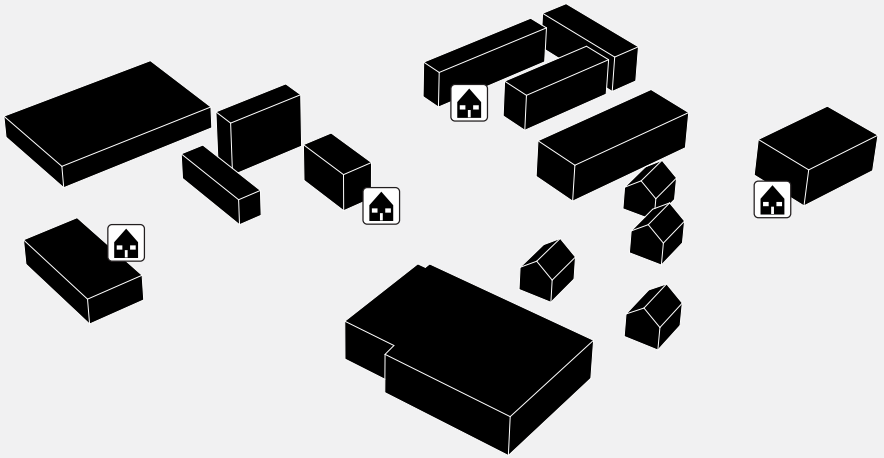
Ill. 22 - Community room in Livsrum Herning

Ill. 23 - Lounge in Livsrum Herning

Ill. 24 - Materials in community room, Livsrum Herning

Ill. 25 - Materials in lounge in Livsrum Herning



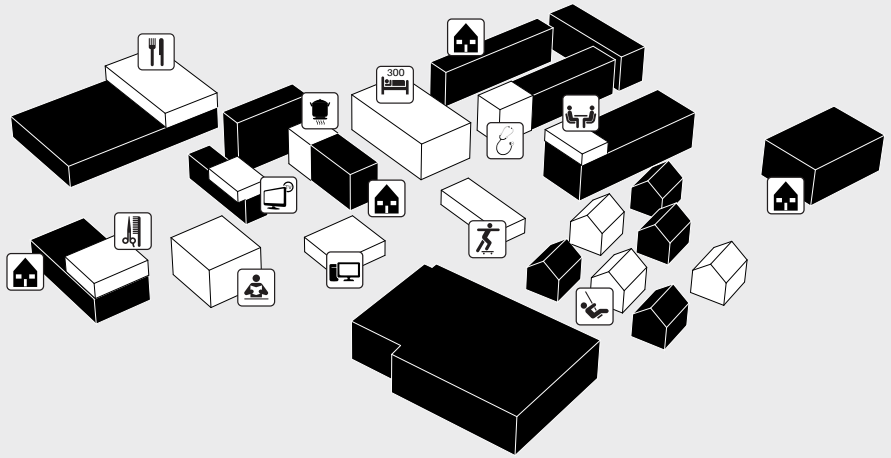


What if we connected asylum centers with new areas in the city?

Ill. 26 - Connecting asylum centers with new urban areas

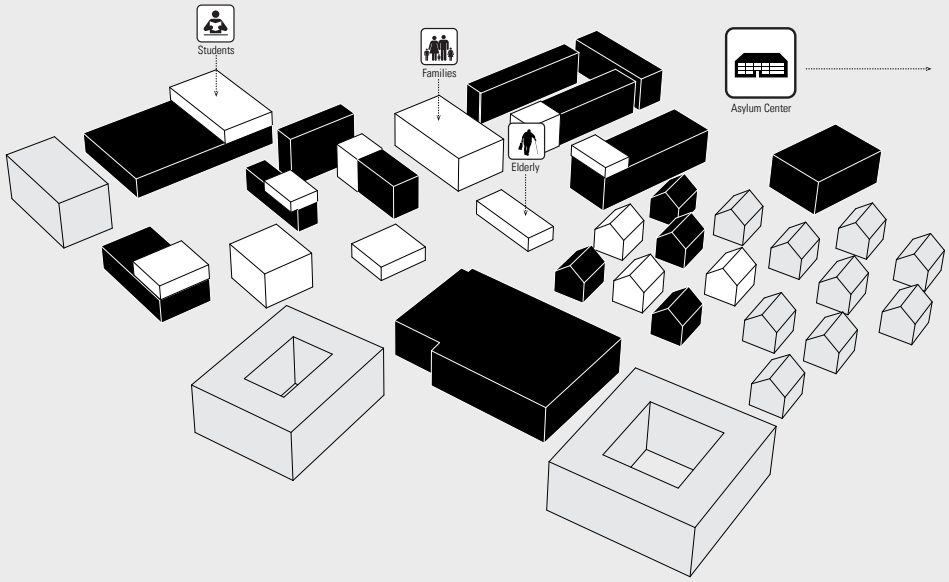
IDEATION

RETHINKING THE ROLE OF ASYLUM CENTERS



Can we then imagine new forms of interactions, where asylum centers contributed to city life and the city providing a safe and caring place for the asylum seekers?

Ill. 27 - A vibrant city



... And when the city develops around the asylum center, it can be moved out to another developing area. Hereby leaving spaces for affordable apartments, student accommodation or elderly homes as a sustainable strategy ensuring social diversity and vibrant city life.

Ill. 28 - Sustainable strategy

VISION

We aim to achieve new forms of interactions between the society and asylum seekers.
By balancing between home, institution and public, we strive to create a sense of hospitality both as a safe and caring place for the asylum seekers and as a place in the city, contributing to city life.

We will emphasize a tectonic way of thinking architecture, where the new values for an asylum center is articulated through the constructive technique.

A NEW CONCEPT

Finding a place in the city

In the case study of transformation, we discuss the potential of placing the asylum center in "dead" areas, as "run-down" neighbourhoods or in new city developments. The idea discussed, is to articulate the asylum center as an instant urban boost. 300-500 extra inhabitants as a range of new programs containing everything from library, hair saloon, shops, cafés and sport facilities will instantly create new activities and life in these areas.

Looking at the city areas in Denmark, the main tendency is people moving into the city. There is in general a need for affordable apartments and student accommodation for the new inhabitants in the city. This could potentially mean, that old "run-down" areas close to the center as Nord-vest and Sydhavn in Copenhagen would develop into new vibrant areas as it has been seen in the neighbourhoods as Nørrebro and Vesterbro, in the recent years. In addition to this tendency new city transformation is made in almost every Danish city turning old industry areas close to the center into new city neigbourhoods.

This is for instance seen in "Eternitgrunden" in Aalborg, the harbour area of Århus, Thomas B. Thrigesgade in Odense and Nordhavn area in Copenhagen. Copenhagen has especially a few interesting city developments as Carlsberg, Sydhavn, Ørestad, Holmen and Nordhavn.

The question is still, how can we argue the need for asylum centers in the city, which potentially would occupy needed student and affordable housing?

It is worth discussing these new areas more in depth. In general these new areas are so attractive for the real estate market, that the price for the building plots rise. (Politiken.dk, 2015). This makes it almost impossible to built affordable housing and apartments in these areas, which in the future would risk a lack of social diversity.

A lacking diversity there could have a negative effect on city life and it is a major concern for especially the Copenhagen municipality. They argue that this social segregation would create lack of diversity and decrease vibrant and lively cities as also create a greater societal segregation in general. The municipality has therefore demanded at least 20% affordable apartment types in new city areas and have changed the masterplan law, in order to make it easier for affordable housing associations to build on the building plots. For instance by providing interest free loan for a couple of years. (politiken.dk, 2014)

However these new initiatives haven't had an effect yet. In Nordhavn the first phase of "Århusgade kvarteret" has almost run out of building plots and only 3,5 % is now occupied for cheap housing. (politiken.dk, 2014)

These new areas also lack functional diversity, as service and leisure activities is not economical beneficial before a great amount of inhabitants have moved in. This is for instance seen in Ørestad, which have been a "sleepy" city area for many years, before different activities slowly started to rise.

This monofunctionality could potentially slow down the development. Then the last plots can not be sold because the city area is unattractive and new activities cannot arise because the lack of sufficient inhabitants. (politiken.dk, 2014)

Returning to our initial question of where to place asylum centers in the city. Asylum centers is often a temporary construction, where immigration service uses resourches on renovating old building in order to accommodate refugees for a period of time. Can we then instead imagine using asylum centers, as small urban accelerators helping these areas to develop by embracing both programmatic and social diversity? Hereby using the temporality of asylum center as and instant boost to the city. When the city is develop around it, the asylum center could be transformed into student accommodations, elderly apartments or affordable housing, if there was no more need for it or if the need of other kinds of accommodation was greater in that area.

This project want to investigate that idea in a preliminary design of an asylum center in one of these new areas. Especially Nordhavn in Copenhagen has many of these factors. The area is already in progress and could risk this monofunctional development. There are many old industrial buildings and the area is close to both the sea and the city, creating a unique area in the city.

Ill. 29 - Atmosphere in future Nordhavn by COBE

SITE ANALYSIS

NORDHAVN

WELCOME TO NORDHAVN

Nordhavn Masterplan by COBE, Polyform and SLETH

Introduction

Nordhavn is one of the new developments in Copenhagen, the masterplan started as open competition in 2008, where COBE, SLETH and Rambøll won the first prize. Since then COBE, Polyform and SLETH has formed a architectural team detailing the masterplan, where the first phase "Indre Nordhavn" is already in the middle of realisation. (Nordhavn, 2012)

Vision and Concept of future Nordhavn

Nordhavn is a visionary development, which aims to be "the sustainable city of the future". A holistic sustainable city comprising environmental responsibility, social diversity and the addition of value.

The concept works with six key aspects to reach the vision of Nordhavn. Continuing the addition of value the masterplan works with embracing Identity and history(1) of the site by enhancing the old characteristic harbour buildings and the urbanity of the harbour, it will articulate a unique character and atmosphere of the place, unlike the other neighbourhoods in Copenhagen. The old piers are transformed into Islets and canals(2), embracing the water as an important part of this city. The islets have there own identity and "centers", which ease the development of the city into phases. The building process focuses upon environmental responsibility creating a CO2 friendly city(3), as creating a sustainable mobility only having five-minutes walk between the small city centers(4).

The canals and islets create a new kind of blue and green city with a lot of different activities and recreative pocket parks and water canals. The aim is to create an active and vibrant city(5) through different recreative areas, high dense volumes and varied scales. Introducing a smart grid(6) will ensure mixed-used typologies providing a rich mix of cultural buildings, shops and cafés as space for big and small commercials. It should be a city for everyone with a range of different kinds of housing, aiming for social diversity and a lively city life. (Nordhavn, 2012)

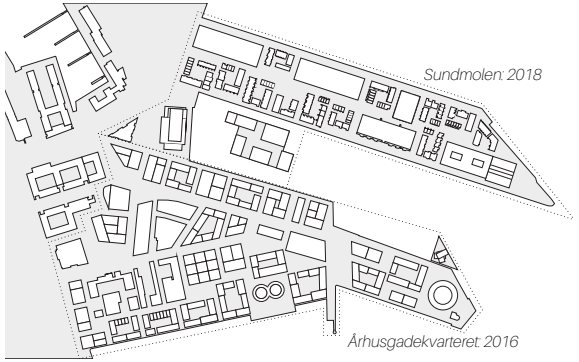
Ill. 30 - Masterplan of the future Nordhavn by COBE

Ill. 31 - Contemporary Nordhavn and Copenhagen

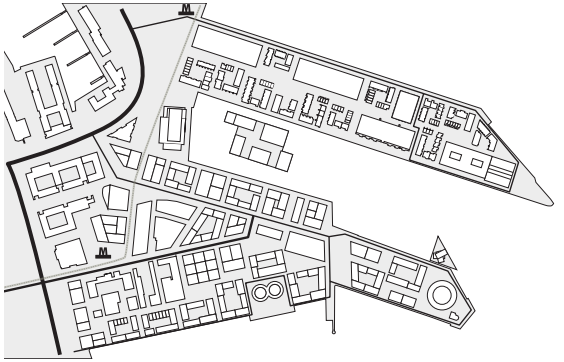
Ill. 32 - Future Nordhavn and Copenhagen

MAPPINGS

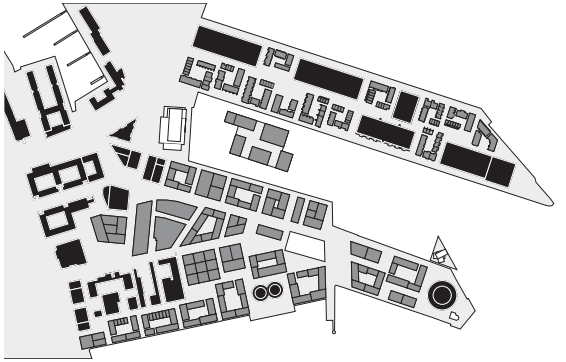
Inner Nordhavn



Ill. 33 - Development for Nordhavn



Ill. 34 - Infrastructure at Nordhavn



Ill. 35 - Functions in Nordhavn

Building development

In 2015, the first people will start to move to "Århusgadekvarteret" and most building plots expect to be started or fully build at the end of 2016. Due to the interest of Nordhavn, the plans for "Sundmolen" has been moved forward and can expect to be almost build around 2018.

In 2020 they planned to start outer Nordhavn continuing the same movement building from the city to the water in phases. Nordhavn is developing fast in the moment and "Sundmolen" is particular interesting according to its placement between "Århusgadekvarteret" and outer Nordhavn. There is still sites left at "Sundmolen" and many inhabitants have already moved into Nordhavn, when they start developing it. (Byoghavn, 2015)

Infrastructure

In general the new Nordhavn favor soft and public transport. This means that these groups have direct and convenient route to their destination, as the super bike path or the new metro stations which are placed in front of "Århusgade" and "Sundmolen".

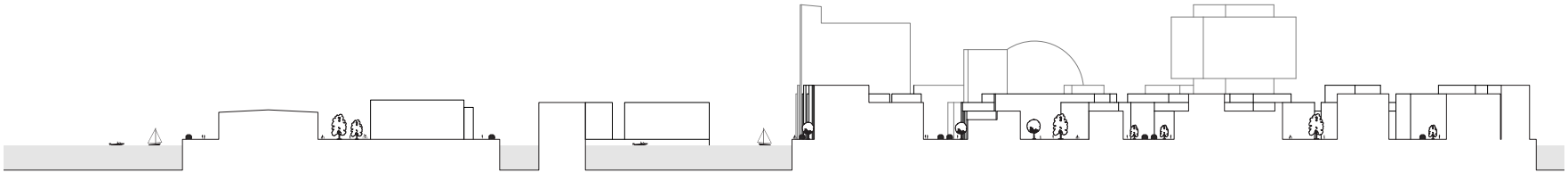
A small urban plaza is formed in front of the metro stations, which become arrival spaces when coming to Nordhavn.
Pakhus 54 is connected to arrival plaza at "sundmolen", the super bike path goes right through and the car street is going close by. Pakhus 54 is naturally going to be a building the new inhabitants is going to pass in their way around Nordhavn, but also a building everybody can reach both from "Århusgade" and outer Nordhavn.

Functions

Nordhavn strives to be a multifunctional city. Right now all the dwellings (grey) are starting to be developed. Some of them facing "Århusgade" also contain service functions, making that street into the main street. The commercial plots have still not been sold, but commercial functions (black) is still present in the existing warehouses and the "red town". There is no plan for any of cultural of leisure functions of Nordhavn, besides some kayaks in the water (Byoghavn, 2015). Only "By og havn" have a small exhibition space in one of the siloes and a gallery has their gallery space in one of the warehouses

SECTION

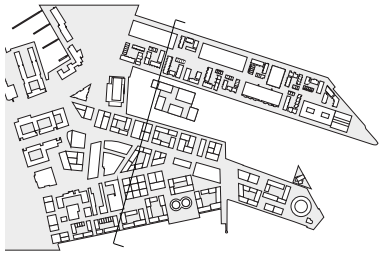
Hights of the city



Ill. 36 - Section through Nordhavn

Section

The section exhibit Nordhavns great variation. From big scales volumens to blocks with courtyard and townhouses. The outer spaces span from semi private courtyards to public pocket parks and the great sea. The buildings are both wide, low and slim, tall. The plan reach to the sky and to the bottom of the sea. It is a city of variation



Ill. 37 - Section overview

ATMOSPHERE

A sense of the future and present

This analysis will through a phenomenological walk capture the immediate experience and the atmosphere of the place with acknowledge of the future developments.

We entered Inner Nordhavn from the first time through Århusgade. The future main street. The activity was high, people working, machines going. Nordhavn is rising fast. The big old siloes is the first thing you notice, when you enter the site, they stand in the ground as big grey historical landmarks.

New houses are almost jumping out the ground, but the siloes will still be here, echoing the old harbour, which used to be here. The "red town" is the first place, which took our awareness away from the siloes. Their scale is much smaller and denser. The old buildings is made in red brick – therefor its name. They stand among a collage of different smaller buildings; shaped by the different times they were built. The spaces in between drag you away from Århusgade and makes you want to go explore. The red town is full of small alleys and different buildings with varied detailing. You can sense all the workshops inside the buildings and watch the people walking in and out of buildings. The life in Nordhavn is already started.

When you come out on the other side you meet from the first time the harbour edge and the water. Nordhavn is definitely going to be the neighbourhood between the city and the water.

Following the harbour edge up, you can imagine the promenade, which is going to be here but is still a building plot. Going up the edge you meet two round siloes, where the new add-on offices have grown them together. The small urban plaza in front is still waiting for the inhabitants to move in and climb its bulgy shaped concrete stones. Behind the silos you meet the first new housing block, the scale is bigger than "the red town", providing as many views to the harbour as possible.

Nordhavn is still rough with strong wind, almost no greens, noise and building areas is all over, but the new buildings will rise fast. Approaching the silo, which we saw in beginning, you start to imagine the varied scale of Nordhavn, going from 2 stories to 5 stories to 15 stories. Inside the silo, By&havn have their exhibition. Its open, but no one besides us is visiting the exhibition. Walking back towards the city, you can experience the skyline of the Copenhagen rooftops, cut by the railway.

Walking towards outer Nordhavn we meet "Sundmolen", the next pier to be transformed into city. On this pier the big red warehouses is still standing, however many of them has been transformed into design offices and art galleries, however many of the spaces inside is empty. Especially the first one "Pakhus 54". "Pakhus 54" is placed to the north and start of the pier, which gives it a fewer views to the sea than the others.

The other warehoses is occupied by design firms as GUBI and Montana. The warehouses doesn't stand out as much as the grey siloes, which reach to the sky. The warehouses with the wide and relative low volume feel more tied to the ground. T

hey are cladded with red bricks and the façade have different and varied kinds of openings. They are more sense able than the concrete and closed siloes. However their big volumes and harbour look, give them a special character, which makes them a special part of the harbour, also in the future. The first warehouse "Pakhus 54" might not have the best views to the water or the city, but it lies in the crossway. The crossway between Sundmolen, inner Nordhavn and outer Nordhavn, which makes it a quite interesting building.

Ill. 38 - Atmosphere in Nordhavn

MATERIALITY

The tactile Nordhavn

In the text "atmosphere", we experienced a form of roughness tied to Nordhavn, but also nearness in the meeting with the buildings.

This analysis zooms in on details and materials to examine these atmospheres. On the next page we have exhibited different kinds of materials, which we found representative for Nordhavn.

It is especially "cold" and "rough" materials as concrete, plaster, glass and metal. Especially stone materials as concrete, bricks and plaster are used in the existing building, while the new developments introduce metal and glass.

Water is also an important "material" in Nordhavnl. In some places you can find fine brick details, carving in the concrete and wood planks.

Reflection
The materials tell the story of the rough nature of the harbour. The cold deep water, the hard wind from the sea. The materials are properly chosen to consist in these conditions, creating projective and long lasting buildings.

It is like Nordhavn has a rough big scale with concrete, steel and glass and a softer small scale with bricks details, folded perforated panels and concrete details. In our opinion the materials not only tell the story of the old harbour.

The different materials, scales and volume express the need for projection from the harsh climate, but also an understanding and sensibility starting, when you meet the buildings. This is especially noticed in the "red town", which used to contain offices and in the new developments, which awaits the new inhabitants to move in.

Ill. 39 - Materials in Nordhavn

Perforated metal

Plaster finish

Concrete

Plywood

Red bricks

Polished aluminium

Rusted steal

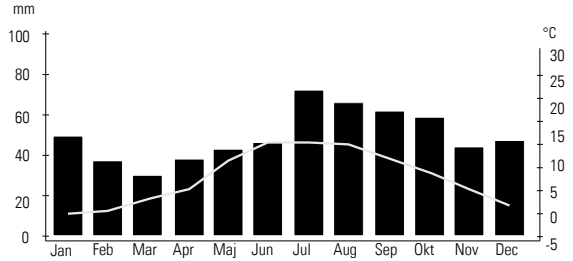
The water

Glass

Ill. 40 - Catalogue of Materials in Nordhavn

ENVIRONMENTAL CONDITION

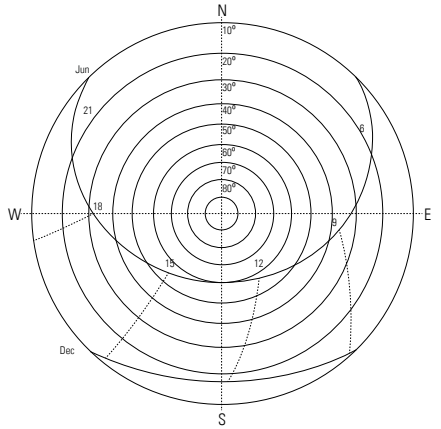
Macro climate



Ill. 41 - Temperature and rainfall

Average Temperature and Rainfall in Copenhagen

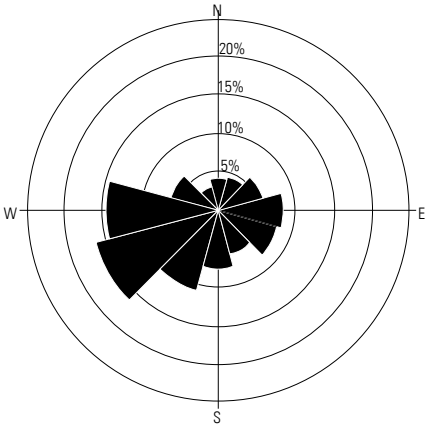
Denmark does not experience extreme hot or cold seasons. The seasons are varied going from freezing degrees to +26 degrees in summer. This means, that buildings should both be able to cool and maintain heat according to the season. Autumn is the most rainy period in Copenhagen, which in general experience rain the whole year. This means rain water can be utilites in the design. As grey water in buildings and for outdoor greenery. (Weather-and-climate.com, 2015)



Ill. 42 - Sun diagram

Sun diagram

Denmarks shortest day is in winter solstice, with only 7 hours of sun. Compared to summer soltice the longest day is up for 17,5 hours (DMI), it gives Denmark a quite varied days of sun light. In addition the diagram show that the sun angle is down to 12 degrees in winter and up to 58 degrees in summer. In general Denmark has a large seasonal change in sun light, which is important to notice in the design of building due to daylights impact on human mental and physical well being, as sunlights impact on energy use for heating and cooling. (Claaw.Wordpress.com, 2015)



Ill. 43 - Wind rose

Wind Rose

Almost 50% of wind comes from the south-west in Denmark, but the Nordhavn area is exposted from the sea to the east. From the sea there is no obstacles and wind breakers, so Nordhavn will experience strong and windy periods. Wind can be used to utilise natural ventilation but also create unpleasant environment for humans, which the project need to address. (DMI, 2015)

BUILDING TRANSFORMATION

Choosing a building and site

Looking at the existing siteplan for Nordhavn and its strategy for development, it is important to choose a site, which can be an urban catalyst for inner Nordhavn, but also to some extend the outer Nordhavn, which will be developed in the next phase. This will make the Asylum center usefull over more years and over a broader area.

The project has chosen to work with an old warehouse on Sundkajen named "Pakhus 54". The warehouse is semi occupied today by smaller offices, but informed by the owner of the building, ByogHavn, they have difficulties renting all the spaces out. Pakhus 54 is placed on the beginning of the pier, providing it with less attractive commercial spaces than the warehouses placed in the other end of the pier, overlooking the sea and the city.

Therefor the project will deal with a transformation of an existing building. It is important to outline the dfference between transformation and renovation.

The project defines renovation in relation to improve or restore, often worn out structures or buildings, but keeping its essential values, program or characteristics. (Dictionary.com, 2015)

In difference a building transformation deals with a more significant change in the building. A transition, where the existing building is added a new value, charatetistic or program, but still keeps a link to its past.

By using this opportunity we have the potential to give Nordhavn a building, which can express the change from old industrial area to new vibrant city area.

Ill. 44 - Pakhus 54

Ill. 45 - Pakhus 54

BUILDING ANALYSIS

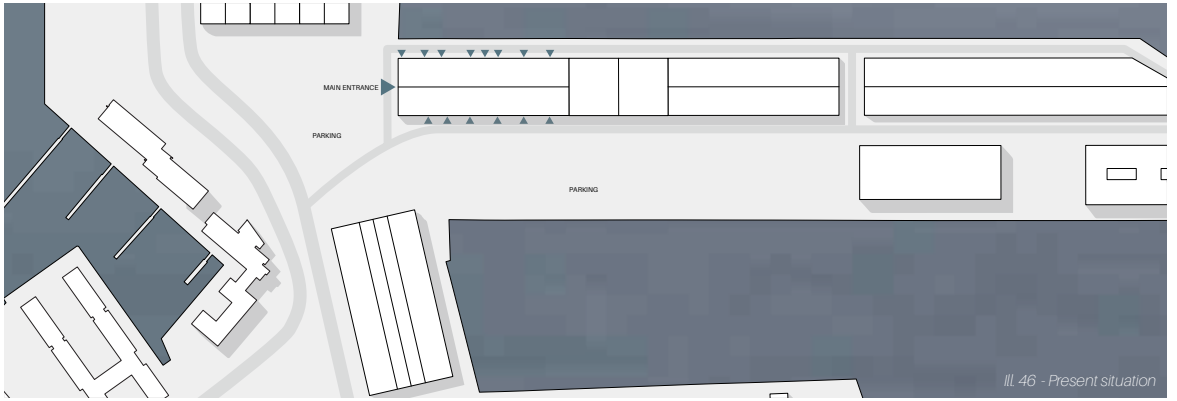
THE OLD WAREHOUSE

PAKHUS 54

The future of Nordhavn

The present situation at Nordhavn

The Copenhagen Nordhvan has for many years accommodated the harbour industries, reflected in the many warehouses located on the piers, together with the heavy traffic of trucks transporting goods and containers back and forth to the ships and warehouses. In addition to wide roads large paved areas are used for parking of trailers and containers. On the north- and southfacing facades of Pakhus 54, a number of large doors allow access for trucks into the warehouse. The large industrial facilities and surroundings in the old warehouses at Sundmolen, has evoked interest from desgn companies, which in recent years have moved into the warehouses to use the industrial warehose for showroom, offices and storage.



Ill. 46 - Present situation

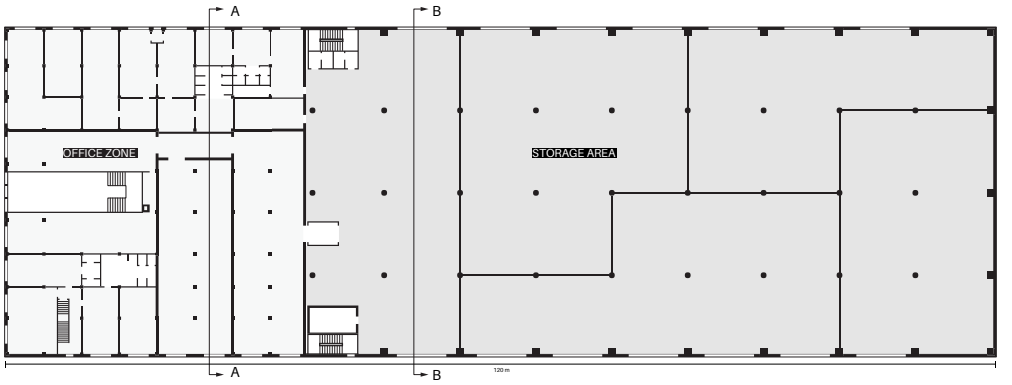
The future masterplan of Nordhavn

Inner Nordhavn will be a densely built, compact district. The density will provide a good setting for varied, vibrant urban life with a multitude of facilities and short distances. The density is supplemented with green spaces and open water, which will allow the dense district to breathe. The density will be conducive to creating a sustainable city district. The masterplan utilises the unique opportunities offered by the waterfront location: new canals, islets, bridges and green promenades offers recreational spaces for rest and activities. Different types of urban spaces and green areas provide space for social interaction and recreativity, New residential blocks along a green promenade will create a new neighborhood in between and next to the existing warehouses.

Ill. 47 - Future situation

Groundfloor plan in existing Pakhus 54

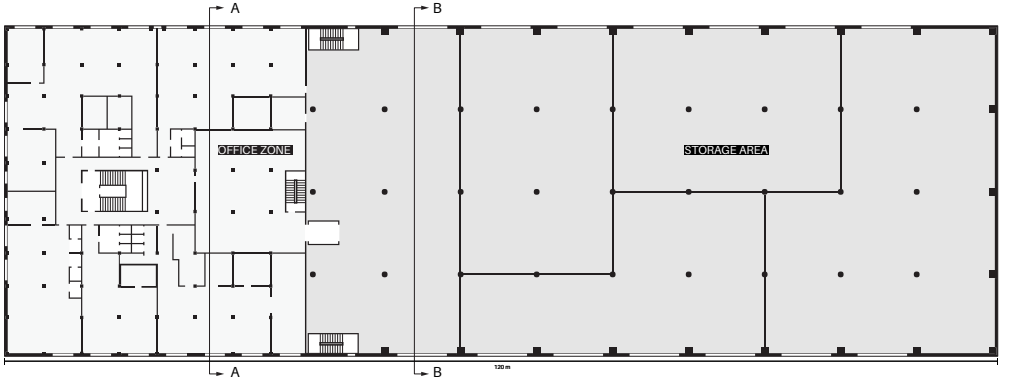
Pakhus 54 is divided into a office wing to the west and a double size storagewing to the east.
The office wing have a seperate main entrance to the west, while the storage area have several large doors, for trucks to enter.
The floor plan of the office wing is divided into different sizes of offices following the structural grid of columns. The columns is displaced in a rigid grid with 4 meters in all directions.
In the storage area a larger structural grid together with partition walls divides the large storage area into smaller storage areas for different companies. The columns in the storage area is displaced in a rigid grid with 10 meters in between the columns to all directions.



Ill. 48 - Ground floor

First floor plan in existing Pakhus 54

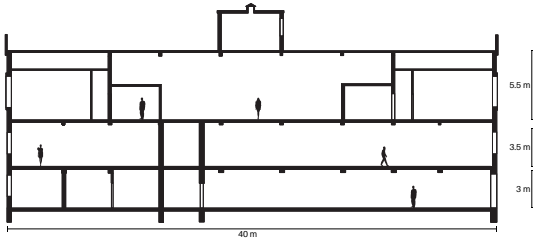
The officewing accommodate 10 - 12 small and medium size companies, spread out at three levels, having the second floor as a double high mezzanine floor.
The office wing have windows to the south, west and north, but due to the depth of 40 meter of the building, daylight in the center of the building can be limited, why secondary functions as print facilieties, smaller storage rooms and toilets is located in the center.
Daylight in the storage area is extremely limited, but is not a problem due to the function of storage.



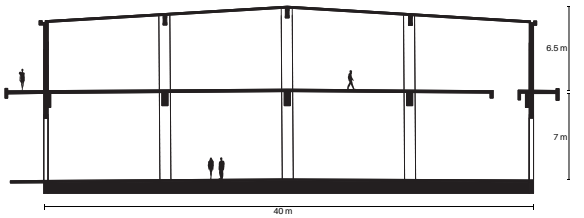
Ill. 49 - First floor

Section of officewing and storage area

The sections of each part of Pakhus 54, the officewing and the storage area is clearly showing the differen scale and proportions in the two zones.
In the officewing the hight of the floors is 3 meters at the groundfloor, 3,5 meter at the first floor while the 2. floor (mezzanine floor) is 5,5 meter in som parts.
The storage area have only two floors, both with a hight between 6,5 and 7 meter, suitable for storage of goods.



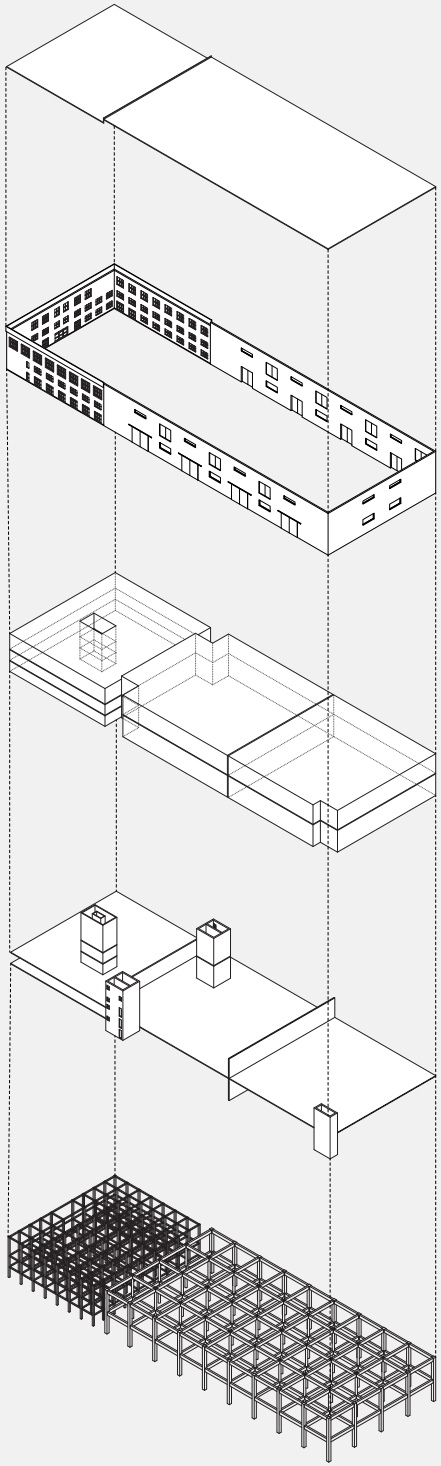
Ill. 50 - Section AA



Ill. 51 - Section BB

AXOMETRIC

The elements



Roof construction
(Thermal envelope)

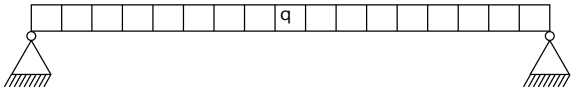
Outer walls
(Thermal envelope)

Spaces

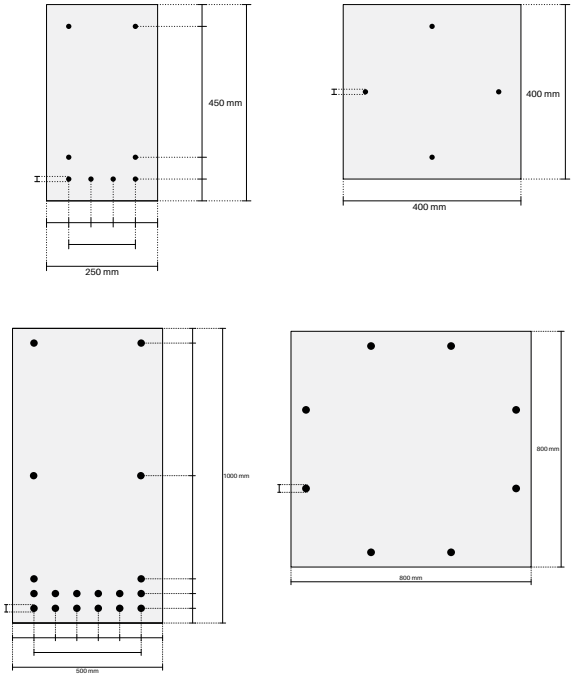
Stabilising structure
(Cores, innerwalls, floors)

Bearing structure
(Columns, beams)

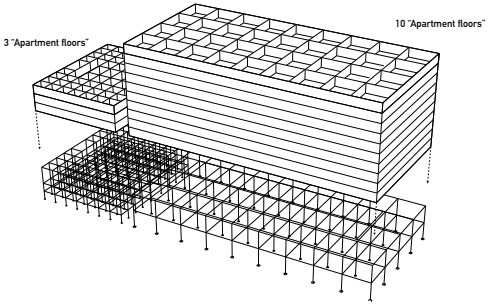
Ill. 52 - Explodet Structure



Ill. 53 - Static scheme



Ill. 54 - Dimensions on structural elements



Ill. 55 - Load capacity

STRUCTURAL INVESTIGATIONS

The construction of Pakhus 54

Two rigid grid structures, serve as the supporting structure of Pakhus 54, a smaller and denser column-beam grid system in the office wing, while massive columns and beams in the storage unit can withstand large loads of cargo. The two supporting column-beam systems are stabilized by some stair cores and floor slabs and interior walls. The outerwall together with the roof, work as an thermal envelopeof the building which also helps to stabilize the building.

Dimensions of the structural system

Through studies of technical drawings of the two supporting column-beam structures, found at the technical administration, an average column and beam for each structure is selected. The technical drawings have given information on the dimensions of the various concrete elements and how they are reinforced.

Dimensions of the elements and the reinforcement are used to find the ultimate limit moment for the two beam members as well as the maximum load capacity of the two columns. Calculations can be found in Appendix 1 & 2. The calculations of the beams is based on a static scheme for beam structures, fixed in both ends with a linear load seen at Ill. 53.

The dimensions of the columns in the structural system in the office wing is 400 mm by 400 mm while the beams are 450 mm by 250 mm. In the storage area the columns are 800 mm by 800 mm and the bemas are 1000 mm by 500 mm. Ill. 54

Maximum load capacity on existing structure

To get a sense of the load capacity of the two existing structures in Pakhus 54, the estimated number of fully utilized residential floors each individual structure can support from the information found at the technical administration.

The Characteristics loads for the constructions of residential dwellings, walls, roof, facade, etc., are found in the Teknisk Ståbi, p. 172.

By using the structural program Karamba, calculations informed that the structure of the office wing can carry 3 fully utilized residential floors while the structure of the storage area can carry up to 10 fully utilized residential floors, illustrated in Ill. 55.

MATERIALITY

The tactile Pakhus 54

Red brick

Steel doors

Concrete column

Rendered brick

Wooden gate

Concrete wall

Wooden floors

Yellow brick

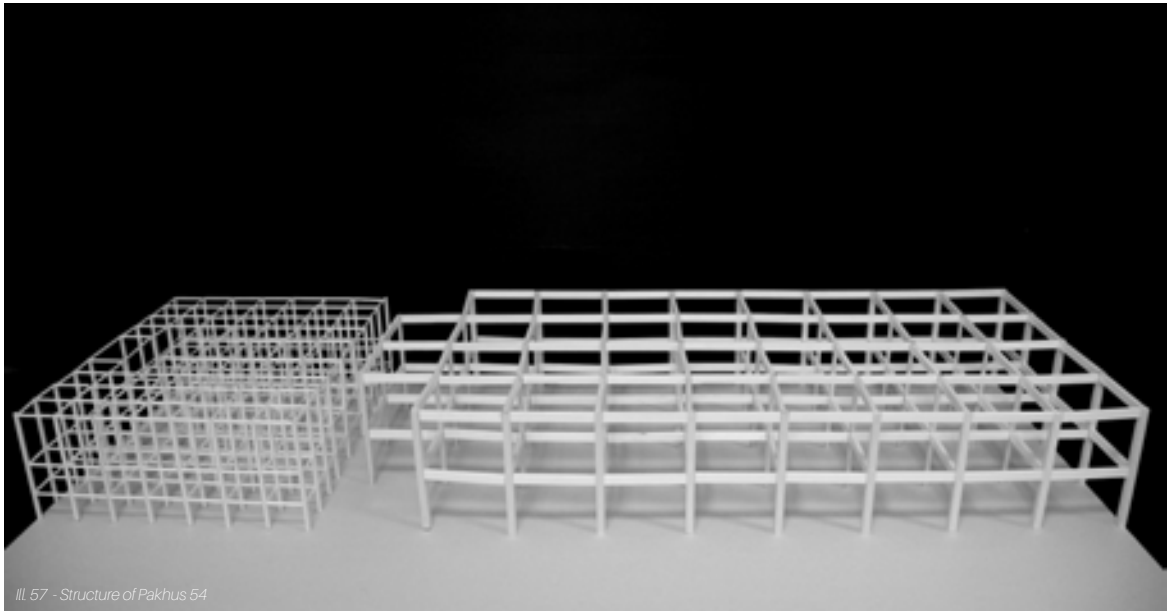
Plywood sheathing

Ill. 56 - Catalogue of materials at Pakhus 54

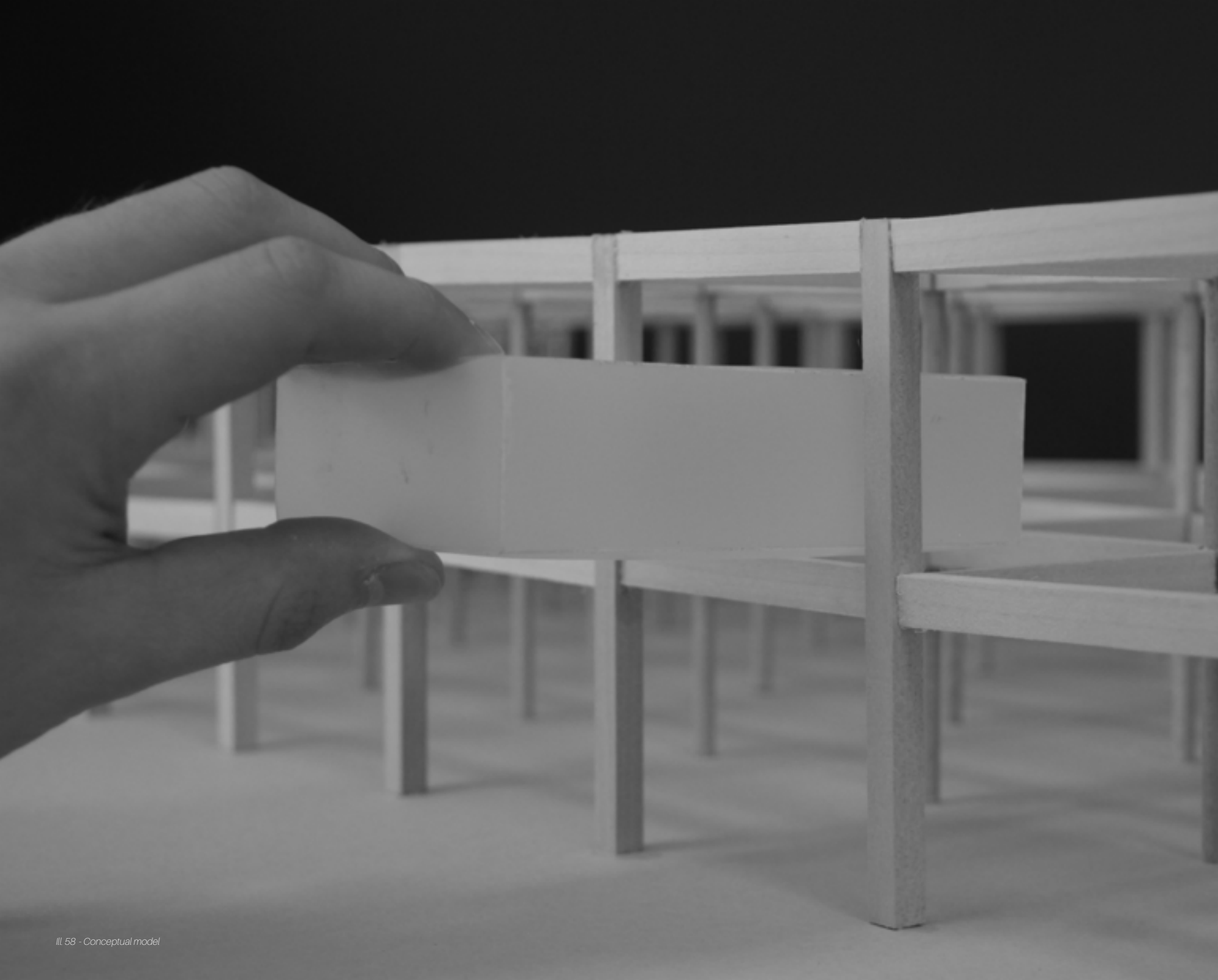
THE GRID

EXAMING THE SPACE

The project focus upon a transformation of the warehouse, it is therefor important to get a sense of the warehouse, the elements that make the warehouse. Examine the elements of the warehouse, it can quickly be determined, that the loadbearing structure becomes the symbol of warehouse; it is core elements, which makes the warehouse. It provides the warehouse with its characteristic form and it enables it to carry loads. Essentially providing it with the function as a warehouse. The project need to pay attention to this structure, both maintain it as a reference to past, but instead of an old ruin, the project should strive to utilise it in the design of the asylum center.



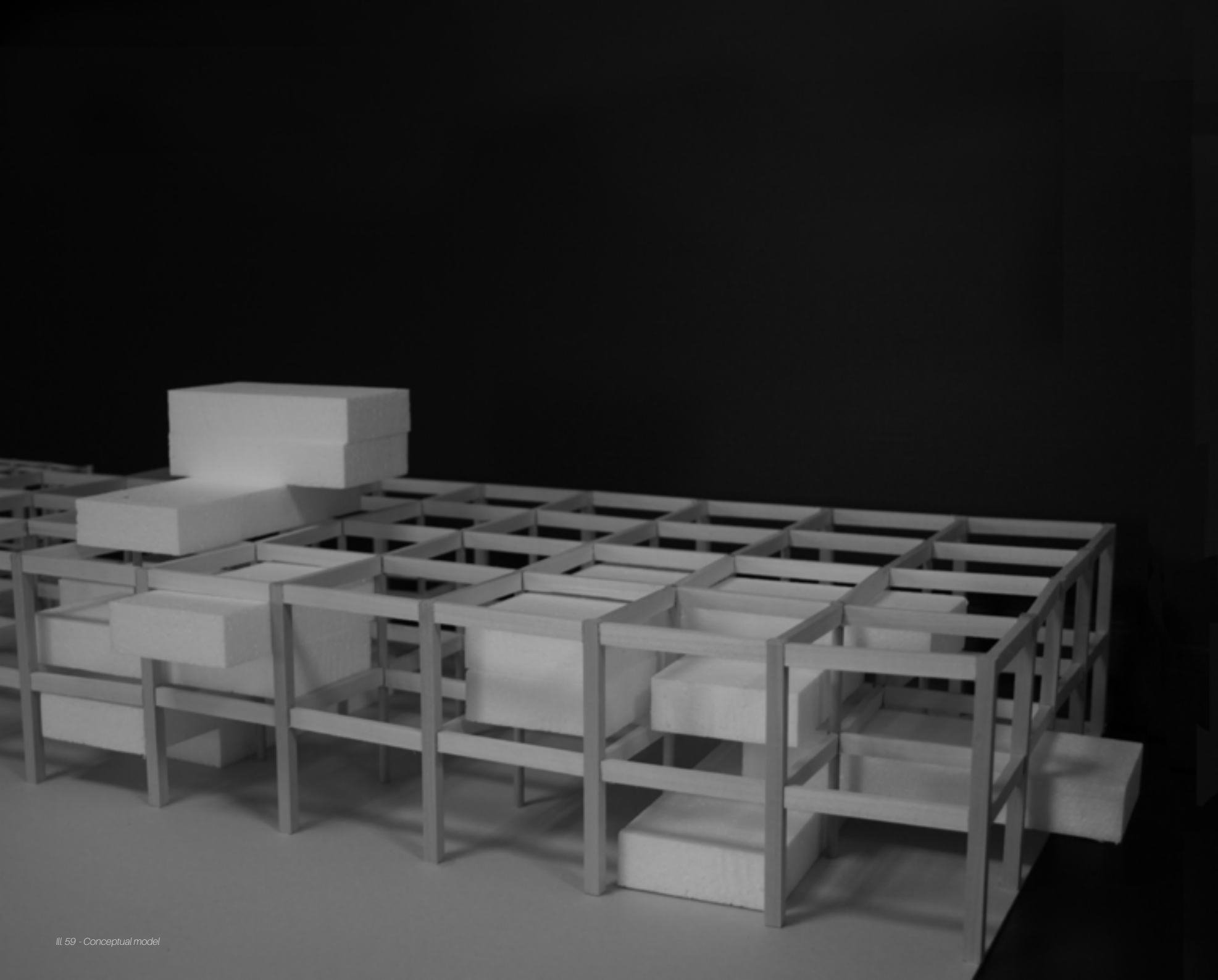
Ill. 57 - Structure of Pakhus 54



Ill. 58 - Conceptual model

CONCEPT DEVELOPMENT

UNFOLDING THE POTENTIAL



Ill. 59 - Conceptual model

THE IDEA

Concept as a tectonic metaphor

In this chapter, the project outlines a foundation for an architectural concept, rather than determining certain "design parameters" from the analysis, which the project needs to check of. The project aims to establish a framework of reflections addresing both aesthetics, functional and structural aspects of the design, as setting up spatial atmospheres in which an uniting architectural concept can emerge. Hereby determing a spatial process from the analysis to the design.

The Warehouse
Expressing change and movement through a tectonic metaphor of the warehouse.

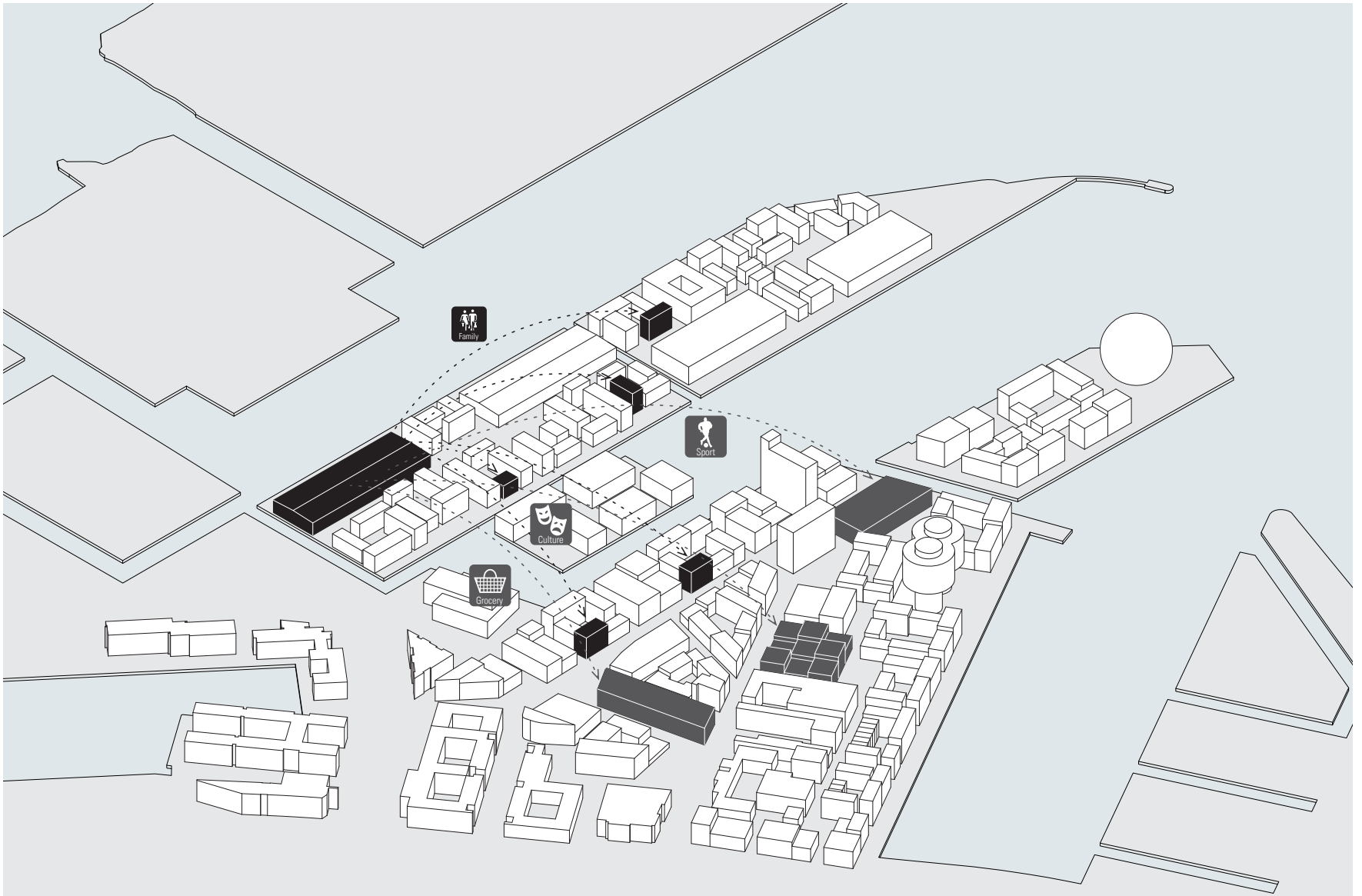
The atmosphere of asylum centers today is often described by the asylum seekers as being in a state of limbo, a feeling often connected to not knowing when or where, they will go after the asylum center or the constant waiting being in suspense.

In constrast, Pakhus 54 essentially express a story about the old harbour. Its a story about movement, activity and an industri, which fuelled Copenhagen. It was a dynamic and exchange of goods moving in and out of the harbour. Today the industry has left more or less this part of inner Nordhavn and the warehouses are semi occupided by small offices.
The warehouses stands as hollow echoes of the activity, they used to be a part of.

This project aim to establish a tectonic metaphor of a warehouse. Essentially working with an aesthetics of movement and change, turning the temporarily of asylum centers from the feeling of being in limbo to a progressive feeling of being in change or movement, from refugee to citizen either in Denmark or another country.

In an artistic ambiguous twist, the project hereby aim to point both as the temporary connected to the city development between new and old, the asylum center itself and the accomodation of asylum seekers. Hereby tying the asylum center to the city development of Nordhavn and the asylum seeker to this place in the city.

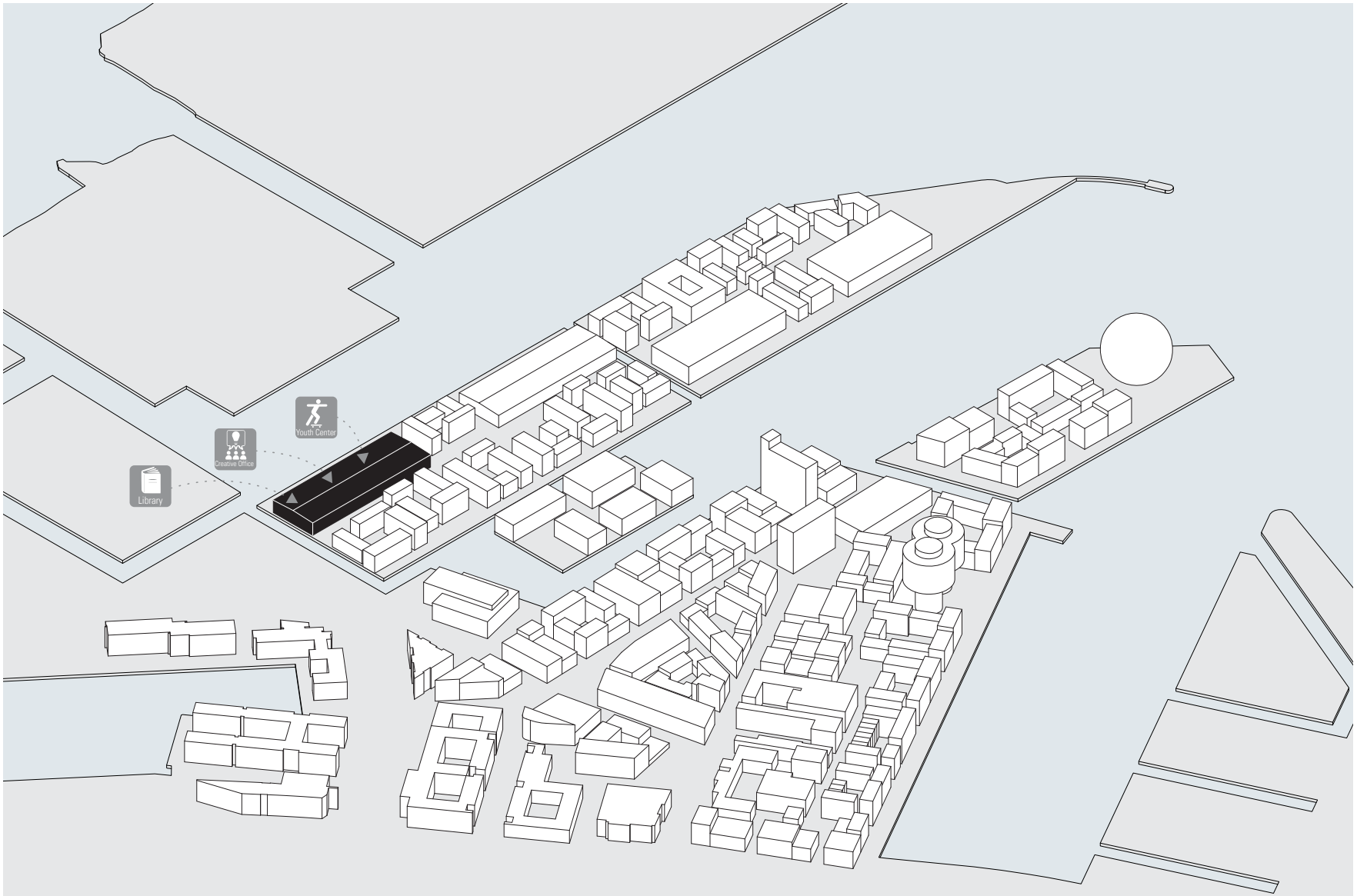
Consequently the project works with boxes or volumens, which inhabit the old warehouse creating a variety of spaces. An architectural idea, which utilise the strengh of the existing grid. When caring the volume the grid utilise its loadbearing properties in which is charateristic for this grid.



The program of the asylum center is chosen according to how it should connect with the context.
Nordhavn will contain of lots of green and blue recreative areas. Århusgade will have supermarkets, fitness, clinics and so on...
The city area of Nordhavn or nearby areas could provide small accomodations for especially well established families.

The asylum center should provide accomodation for 300 people in the warehouse, most of them singles and couples.

Ill. 60 - Combining Functions



Essentially the asylum center should provide the area with more daycare opportunities both for chidlren and for young people to gather and play after school. It should provide the area with a small library and study areas for students and adults as classroom for evening school and lectures.

Today the warehouse is partly occupied by small offices especially creative offices is in great focus. The asylum center should still accommodate the creative offices and provide and facilitate workshop facilities for the offices as well for the center

Ill. 61 - Providing new functions to the context

THE PROGRAM

Asylum center Nordhavn - Program

Looking at the program, we can organise them in different ways in order to create a hierarchy or logic in their arrangement.

Ill. 62, shows how the program can be organised according to privacy. Home is the private areas of the asylum center. It is, where the asylum seekers live. These programs should both ensure privacy, which is normally limited within asylum centers, but it should also open up for creating a community feeling between the asylum seekers. Institution is the semi private and semi public areas of the center. It contains everything from classrooms, staff spaces, working spaces and offices. These programs to different extends are used by both asylum seekers and the public.

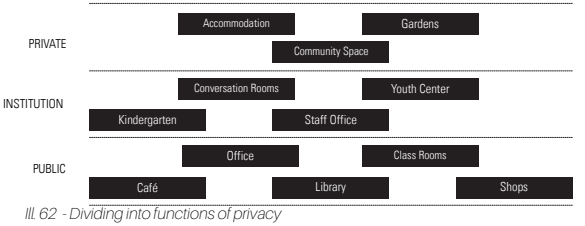
These programs should be carefully organised so the public don't create uneasserary disruption around spaces, where for instance the staff talk with the asylum seekers about their situation of their application.

Public is all the public spaces as cafés, shops and library, which should directly interact with the Nordhavn community.

Ill. 63 shows how the program can be organised according to enclosed and open spaces. That some programs as forinstance the meeting spaces needs privacy and enclosed spaces, while for instance café areas do not. These open spaces can be used to expose the centers different activities making the people passing by aware or curious of the buildings use and contribution to the area.

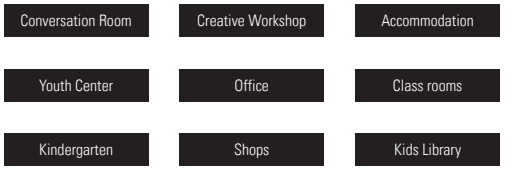
Ill. 64, shows the program can be organised according to types. It is the idea, that some programs can be grouped inside the same family. For instance library, class rooms and study areas, these has all learning as underlying theme. By grouping the program, we can establish a logic in how they are connected and ease wayfinding around the building.

If we merge all diagrams into one, Ill. 65, we start to establish a logic in which these programs should be placed. Both according to privacy, exposing activity and wayfinding in the building. The apartment type, which are all private can naturally be scattered on top of the other programs, this divides the asylum seekers over the entire building.

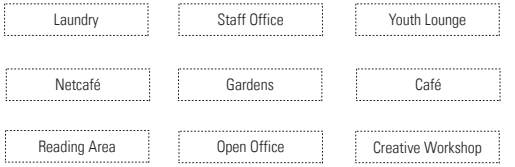


Ill. 62 - Dividing into functions of privacy

PRIVATE / INSTITUTION / PUBLIC

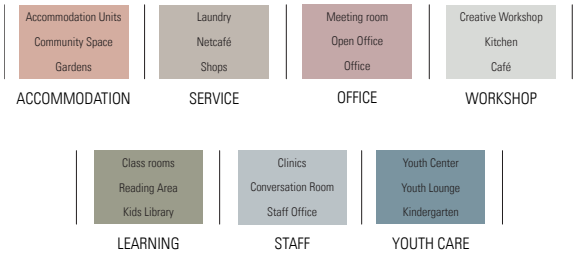


ENCLOSED SPACES



Ill. 63 - Open, Enclosed spaces

OPEN SPACES



Ill. 64 - Conceptual Development

Ill. 65 - Combining Conceptual Development

Workshop	m²
Creative workshop	1050
Kitchen	200
Toilets	80
Total	1330

Service	m²
Shop	500
Netcafé	390
Laundry	110
Total	1000

Office	m²
Office	1200
Open office	375
Meeting / kitchens	425
Total	2000

Staff	m²
Office	195
Conversation rooms	155
Clinics	200
Lounge	140
Total	690

Learning	m²
Library	935
Kids Library	380
Reading area	165
Class rooms	720
Total	2200

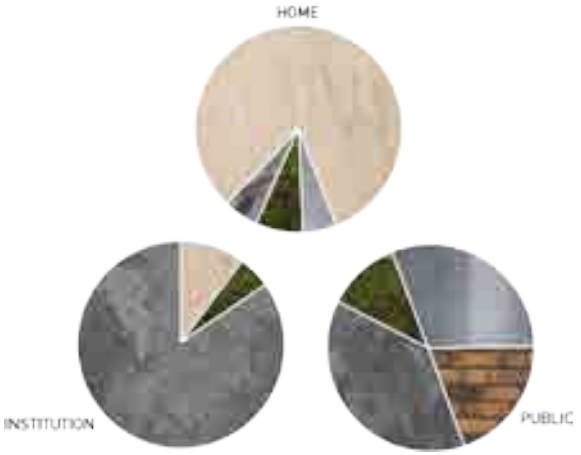
Youth Care	m²
Kindergarten	475
Youth lounge	160
Youth Center	500
Playground	345
Total	1480

Total	m²
Accommodation (300 beds)	6750
Workshop	1330
Service	1000
Office	2000
Staff	690
Learning	2200
Youth Care	1480
Open Space	1350
Total	16800

Open Space	m²
Café	530
Foyer	535
Showroom	285
Total	1350

Accommodation (338 beds)	m²
Accommodation units	4700
- incl. kitchens and toilets	
Community spaces	1150
Front yards	900
Total	6750

Ill. 66 - Spacial Program



Ill. 67 - Material Catalogue - Separate

Ill. 68 - Material Catalogue - Shared

Ill. 69 - Material Catalogue - Mix

MATERIALITY

TACTILITY AND SPACES

Based on the casestudies and site visits in Nordhavn and Pakhus 54 , we establish three circular diagrams, which we roughly have provided with the amount of material which we think suitable in relation to our studies, Ill. 67.

Home contains mostly warm materials as wood, fabric and so on, to create more homely and warmt private space as a contrast to the rough harbour.

Institution featers also wood material, but as in relation to creating a warm and welcoming environment for the asylum seekers, concrete is also utlities in order keep the more instituitional feeling in contrast to home.

Public: in the public areas more contextural materials are introdced as the red brick, greenery , steel and so on, in order to tye the spaces with the outdoor areas creating a direct link between them.

As shown in the public/private diagram, Ill. 68, the programs graduate betweein privacy, so in order deal with this graduation on forcing the program into a certain category, the circular diagrams are transformed into one circel diagram which graduates between home public and institution.

We can now from this diagram extract the new material amounts from the different programs, creating a natural graduation, which intuitively will create an understanding of privacy. Ill. 69

It is important to understand that the extracted amounts not should be taking to literally, but is providing a sense of materiality in the spaces, they should naturally be adopted and integrated into the design.

POLYCARBONATE

Boxes of life

The new asylum center should be full of life and varied activities for both the public community of Nordhavn and the asylum seekers. It is important to set focus upon enabling these through the spaces and organisation of the asylum, but also expressing these activities through the construction of the asylum center, establishing an atmosphere, which support these many activities. Instead of symbolising activity through for instance decorative patterns, the project seeks a more direct and literary expression.

By using polycarbonate, a semi transparent material the activities will be expressed as moving and changing silhouettes and interior contours on the walls of the boxes. Hereby ensuring enough privacy in the semi private / public spaces, but still visually articulate their inner activity. It creates an aesthetic, which almost unites a contradiction creating an honest "staging" of the activities.

Polycarbonate is a plastic material, which often has been used in relation to industrial buildings. This create a contextual relation to the old Nordhavn harbour but the tactility and appearance as a light, white shiny materials, also contrast the old heavy stone materials telling a story of the new harbour, hereby creates a link between the two, which talk about a transformation of the harbour.
The polycarbonate material, hereby enrolls itself in the harbour context as articulating the new harbour, creating an aesthetics meant for this particular place.

Ill. 70 - Polycarbonate and structure

Ill. 71 - Gusswerk Extension by LP Architektur

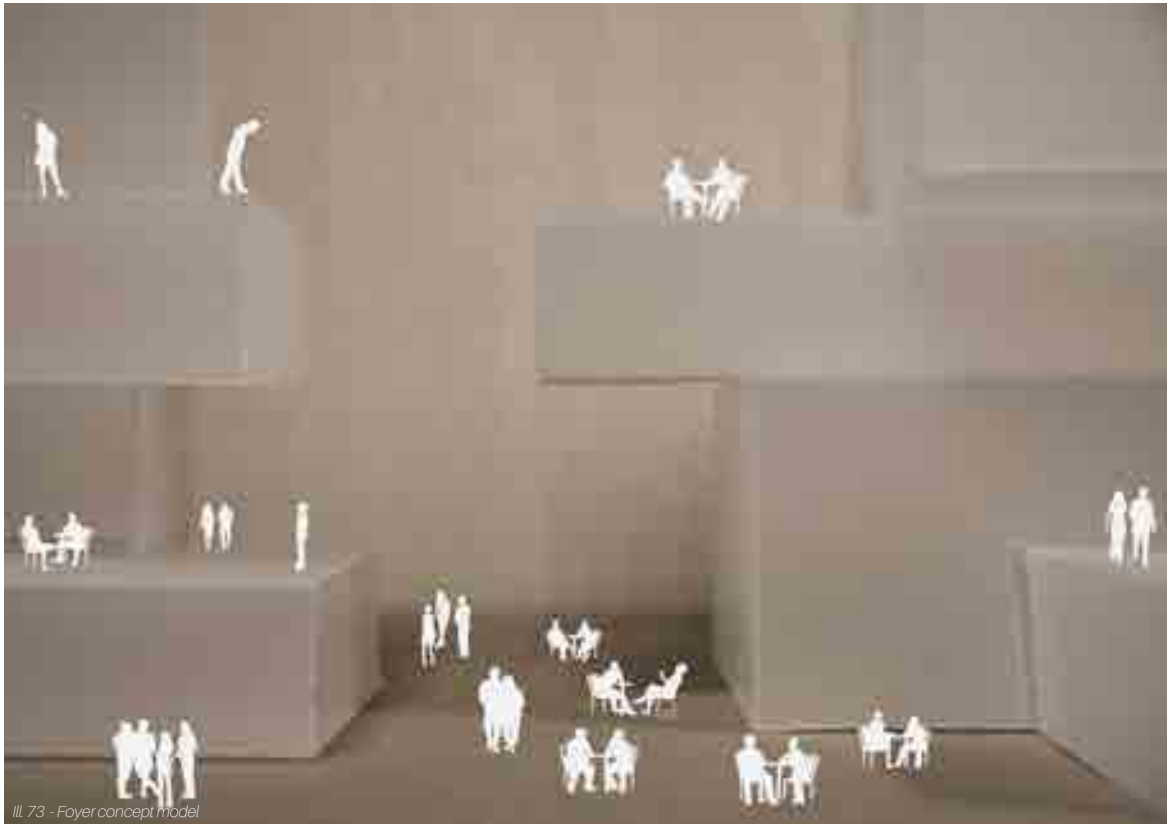
FOYER

PUBLIC / SEMI PUBLIC

The next following pages, contain atmospherical intentions of the spaces layout, in order to grasp the atmosphere of the new asylum center.

The entrance of the building should create a direct link between the exterior and interior, as a welcoming gesture, which signals openness of the warehouse and the accessibility for the surrounding community.
This should be present in scale, activities and materiality. The large scale of the outside should continue inside as space in between the boxes. The hard materials as stones and red bricks should continue inside, expression a space which are attended to be used by the public. The polycarbonate and wood elements will provide the space with some warmth, creating a distinction from the outside, which naturally also will be felt in the change of climate going from outside to inside. It should be a vibrant place which express the life of the building as having activities as cafées, play areas and so on which the community instantly can use.

Ill. 72 - Materials Foyer



Ill. 73 - Foyer concept model

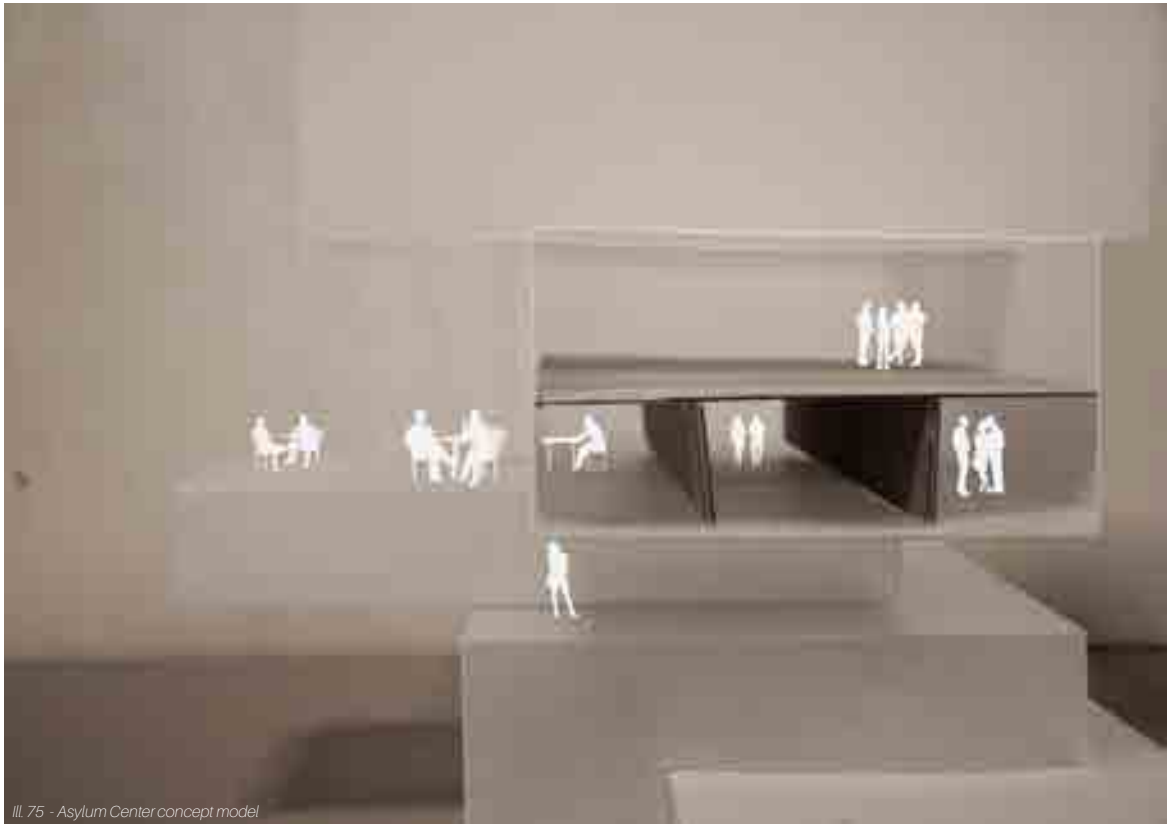
ASYLUM CENTER

SEMI PUBLIC / SEMI PRIVATE

The instituional function of the asylum center, as the staff area and meeting spaces, should be places inbetween the private apartmetns and the public, not as a wall between the two, but be able to serve both. It should have open offices to public, where the community can get in touch with the staff, as well as more important enclosed spaces where private conversation with asylum seeker can be made. Informel spaces are made around the public and community areas and the staff will walk natural around the whole building.

These spaces should still be made of hard materials to signal its institutional purpose, however wooden interior walls, and building furnitures should works as small gestures making the meeting more welcoming and warm.

Ill. 74 - Materials Asylum Center



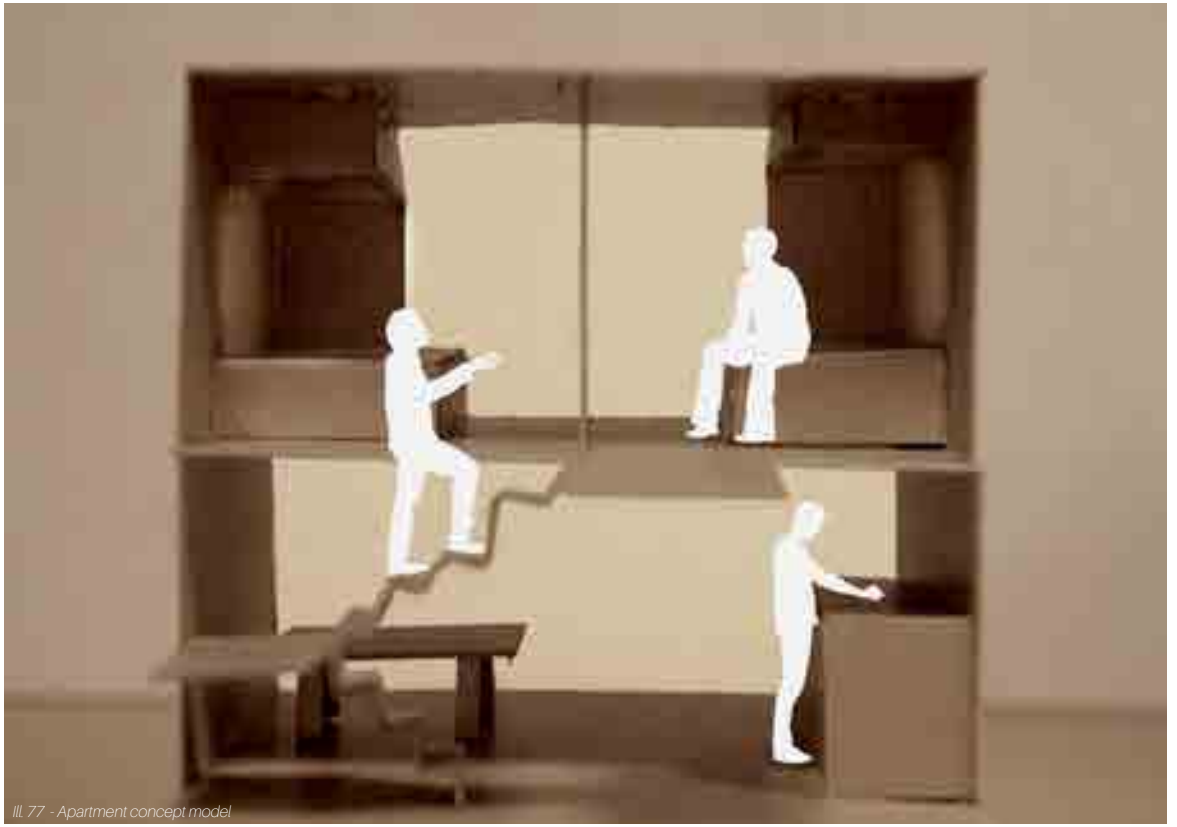
Ill. 75 - Asylum Center concept model

APARTMENTS

SEMI PRIVATE / PRIVATE

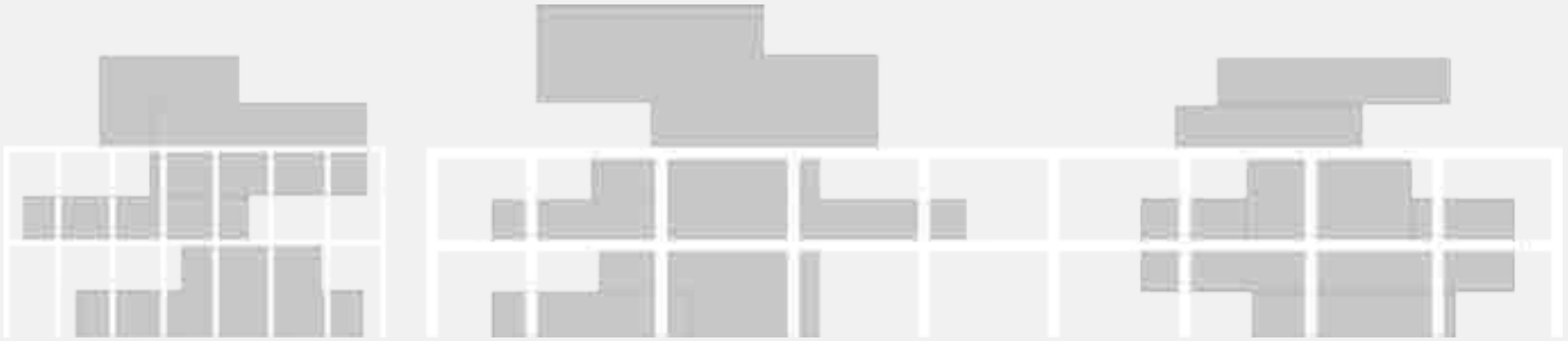
The apartments should be warm private spaces. The wood materials should shape the apartments as almost one big furniture, utilizing most available spaces. The apartments should creates spaces and niches, where the asylum seeker can be alone, but also where the asylum seekers meet each other, living in small apartments instead of bunck bedroom, creates small communities. It is the intension to create units, where the asylum seekers have the opportunity for privacy, and at the same time interact with the other asylum seekers in the open shared spaces, sharing kitchen and bathroom facilities in smaller communities.

Ill. 76 - Materials Apartments



Ill. 77 - Apartment concept model

Ill. 78 - Structure model



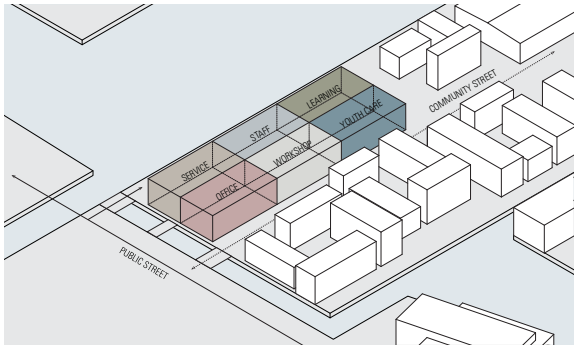
Ill. 79 - Design Concept

DESIGN PRESENTATION

ASYLUM CENTER NORDHAVN

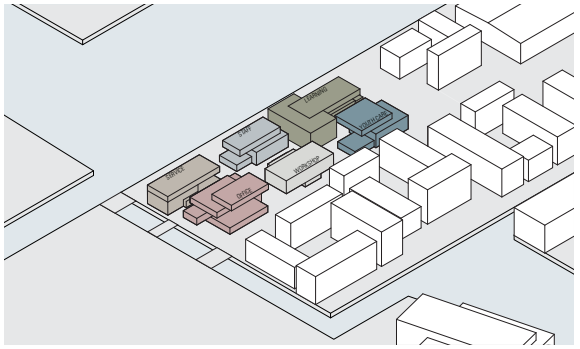
THE CONCEPT

The concept is stacked boxes which inhabit the old warehouse. As a metapohor of the old functions of the building but with new programming it links the past and the present. The boxes are light an contrats the heavy grid structure, which carries them. The life of the building is expressed through moving silhuettes on semitransparent material. The stacked boxes creates inbetween spaces between them, which is utilised with open and multipurposed programs, which unites the whole asylum center and create spaces for interactions.



Ill. 80 - Organising programs

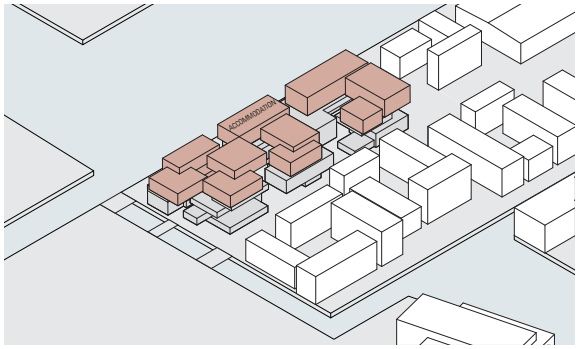
Organising Programs
In "Concept development", we outline 6 groups of programs. These groups are organised in the building in relation to how they should interact internally and with the context around the building. For example are the shops and library located to the public street, while play areas and youth center are located to the community street. Ill. 80



Ill. 81 - Shaping the functions

Shaping the functions

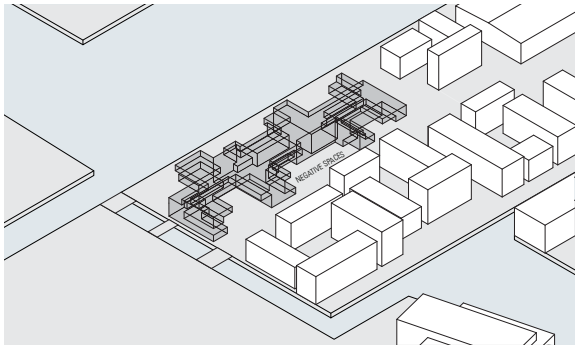
The enclosed spaces are shaped after there functional use and "stacked" upon each other. This create a natural hierarchy and organisation of the programs, which will easy wayfinding and flow streams in the building. By shaping the spaces, two entrances and atriums naturally emerged, one towards the public street to the north, the other towards the green recreative community street to the south.



Ill. 82 - The dwellings

The dwellings

The apartments are shaped as small towns houses which are put on the top of the building creating both privacy and possiblity of creating community feeling between the asylum seekers



Ill. 83 - The space in between

The space in between

The stacked boxes shapes a negative space in between them. The negative space is filled with open and multipurposed programs as cafés, play areas, foyers, showcase, community spaces and so on. This space creates a visual and programmatic connection between all the stacked groups of functions, which unites the asylum center.

ASYLUM AND THE HARBOUR

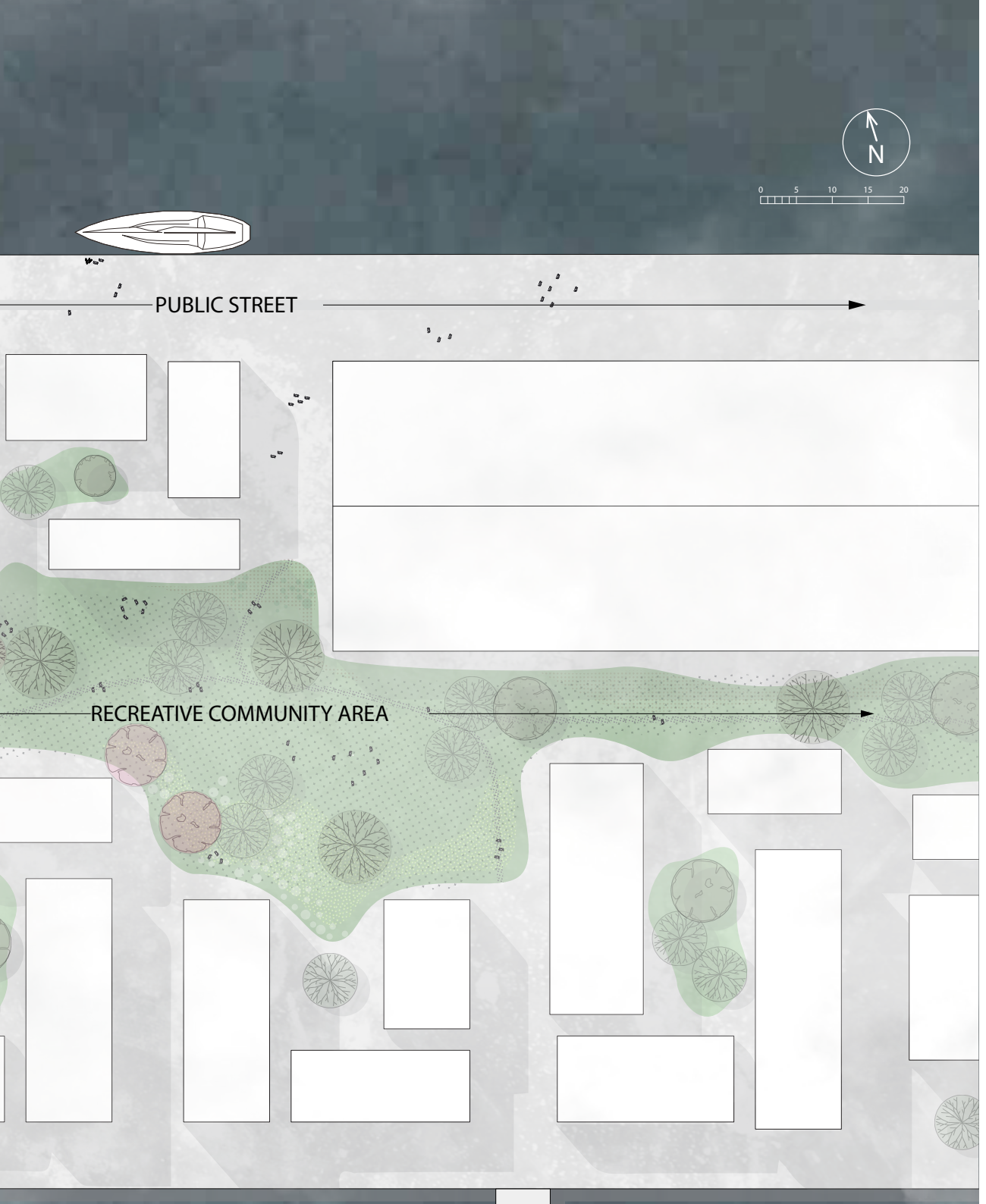
The ambassador

Arriving at the new Metro station in Nordhavn, the asylum center will be the first building you see. The building express a change from industrial harbour area to new vibrant city development. Through the contrast between the voluminous red brick building of the old warehouse and the light white boxes, which inhabit the volume, it express the development and movement from industry district to a community area. The activity and life of the building is expressed as moving silhouettes behind the polycarbonate creating a vibrant ever-changing facade. An indentation into the building becomes a main entrance to the building, as a welcoming gesture, which signals its openness to its community.

It stands as an ambassador for the change, diversity and vibrancy of Nordhavn and its future.

Ill. 84 - Arrival - Exterior

Ill. 85 Design Presentation

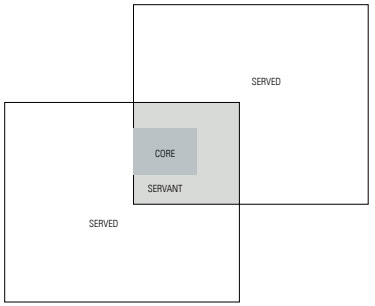


SITEPLAN

Creating a relation to the context

This siteplan features the future development around the asylum center in order to grasp Its future relation to the context. The siteplan shows how the indentations becomes entries into the building, as the paths leading into the surround courtyard buildings. The volume of the building express its programmatic difference from the other developments. However the apartments on top of the asylum center breaks down the scale starting to imitate the surrounding scales as a natural part of the context.

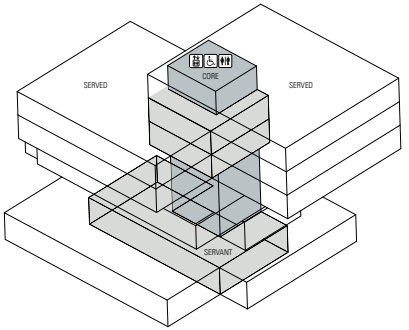
THE FUNCTIONALITY OF STACKED BOXES



Ill. 86 - Served and servant

The Served and the servant

Inspired by Louis Kahn's served and servant spaces, the boxes are arranged so they overlap each other. This creates a shared space, which is utilised as servant spaces comprising everything from kitchens, meeting spaces, toilets, storage and so on. Programs which can be shared and serve the programs in the boxes.

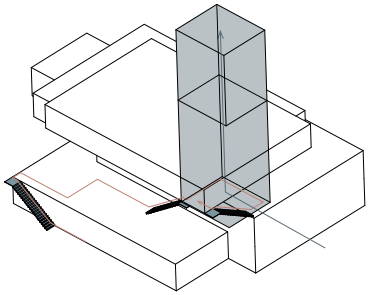


Ill. 87 - Served and servant around the core

The Servant space

The Servant space

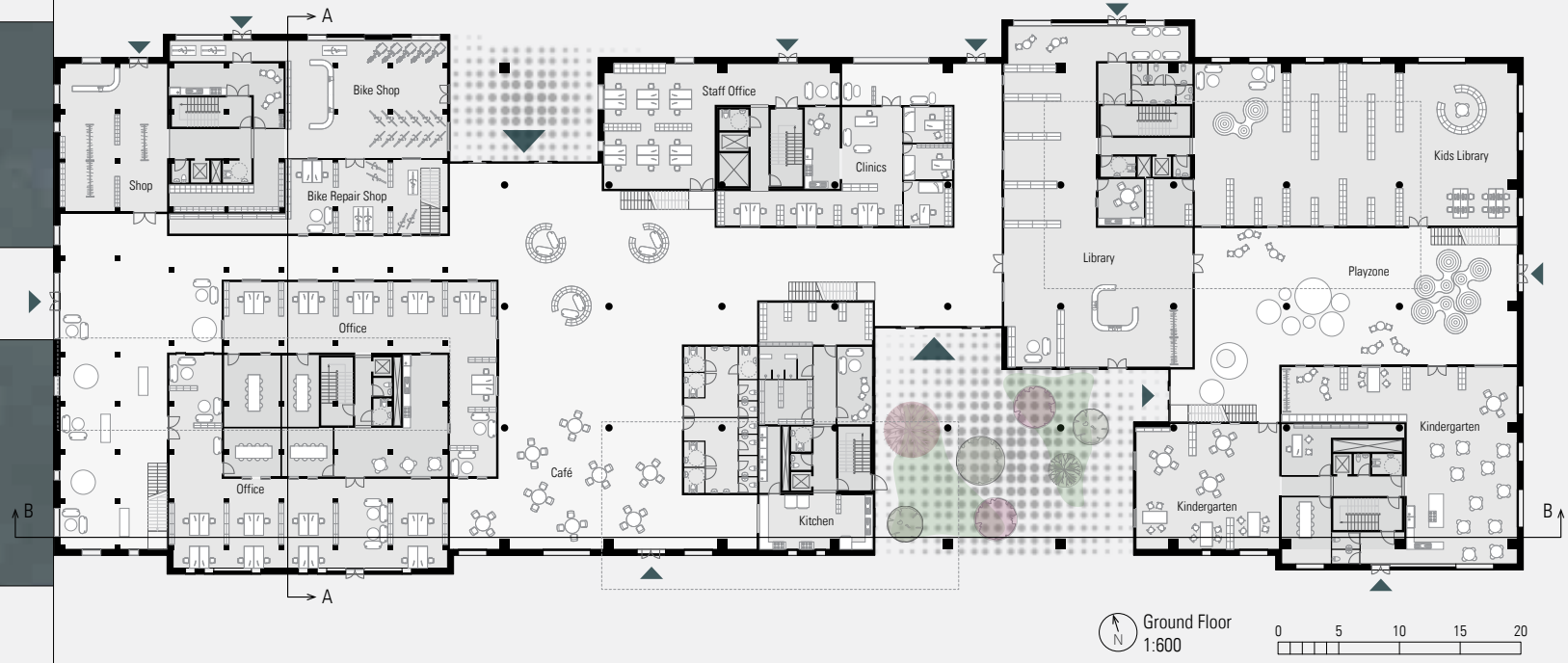
The servant space will change size in relation to needed servant spaces for the different programs. Equal to them all is the core, contains elevator, internal staircase combined with fire escape, technical utility spaces and toilets.



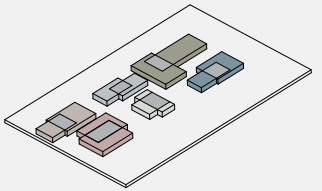
Ill. 88 - Internal and external flow

Public and Private flows

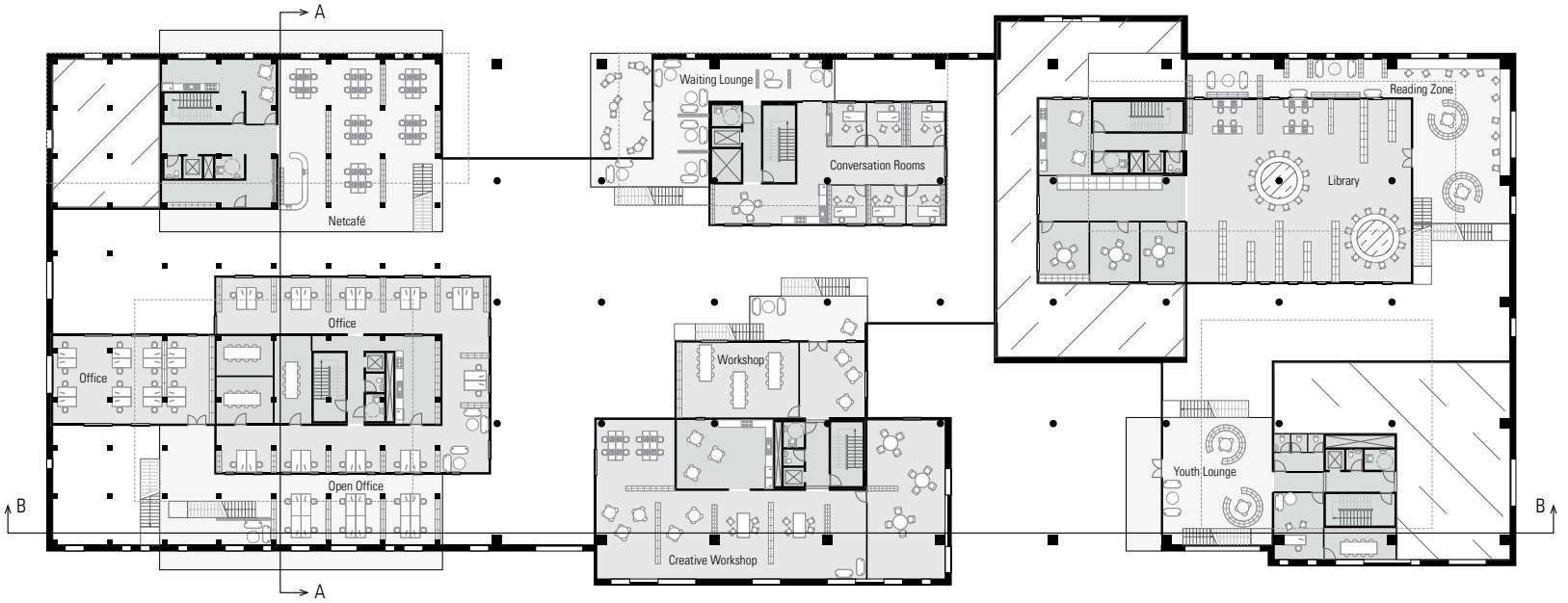
Light straight running stairs is attached in the bottom of the stacked boxes to connect the more public programs vertically. On the same time exposing this flow eases way finding for people as creating visual connections, activity and informal meetings in the space between the boxes. An internal staircase can be used by the staff and residence for more discreet and private access to the apartments and private functions. The stacked boxes are also connected by small bridges creating a horizontal connection.



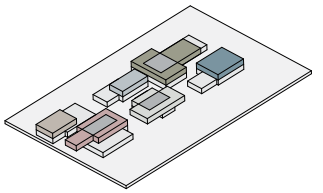
Ill. 89 - Plan of ground floor - 1:600



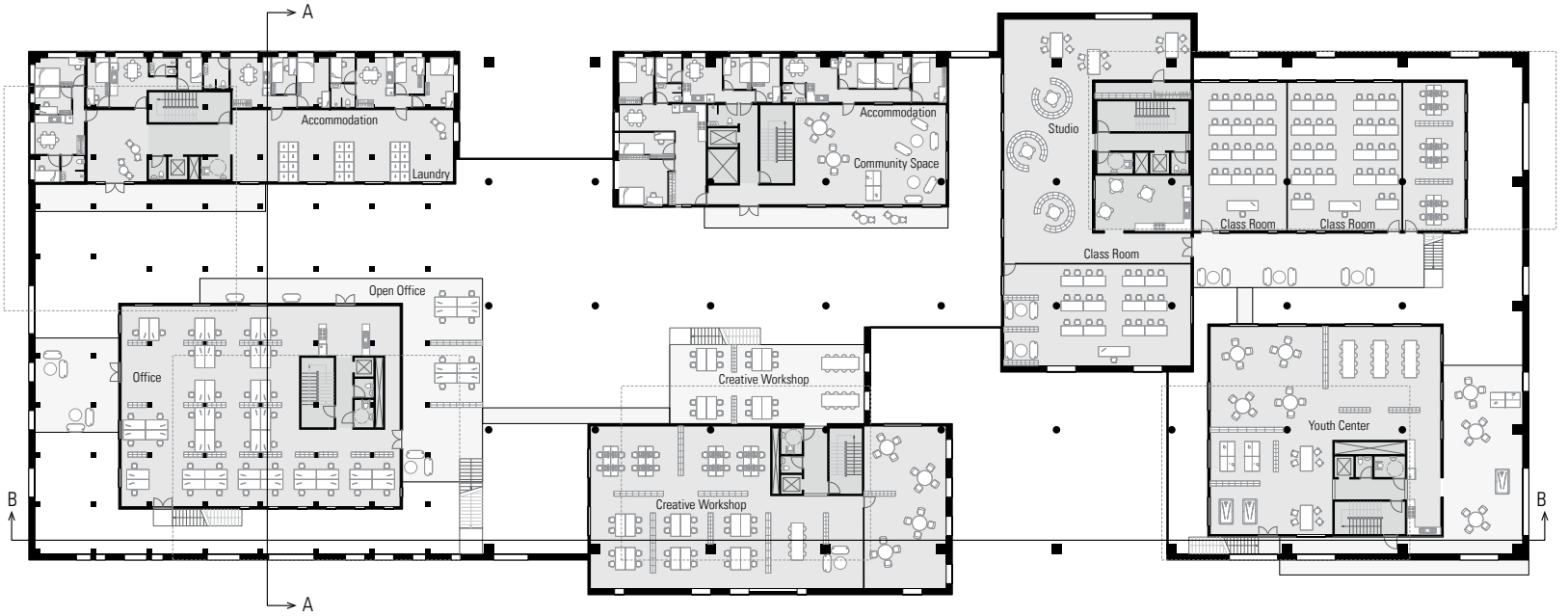
Ill. 90 - Functions diagram ground floor



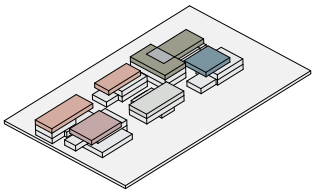
Ill. 91 - Plan of first floor - 1:600



Ill. 92 - Functions diagram first floor



Ill. 93 - Plan of second floor - 1:600

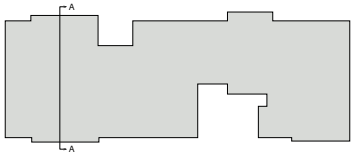


Ill. 94 - Functions diagram second floor

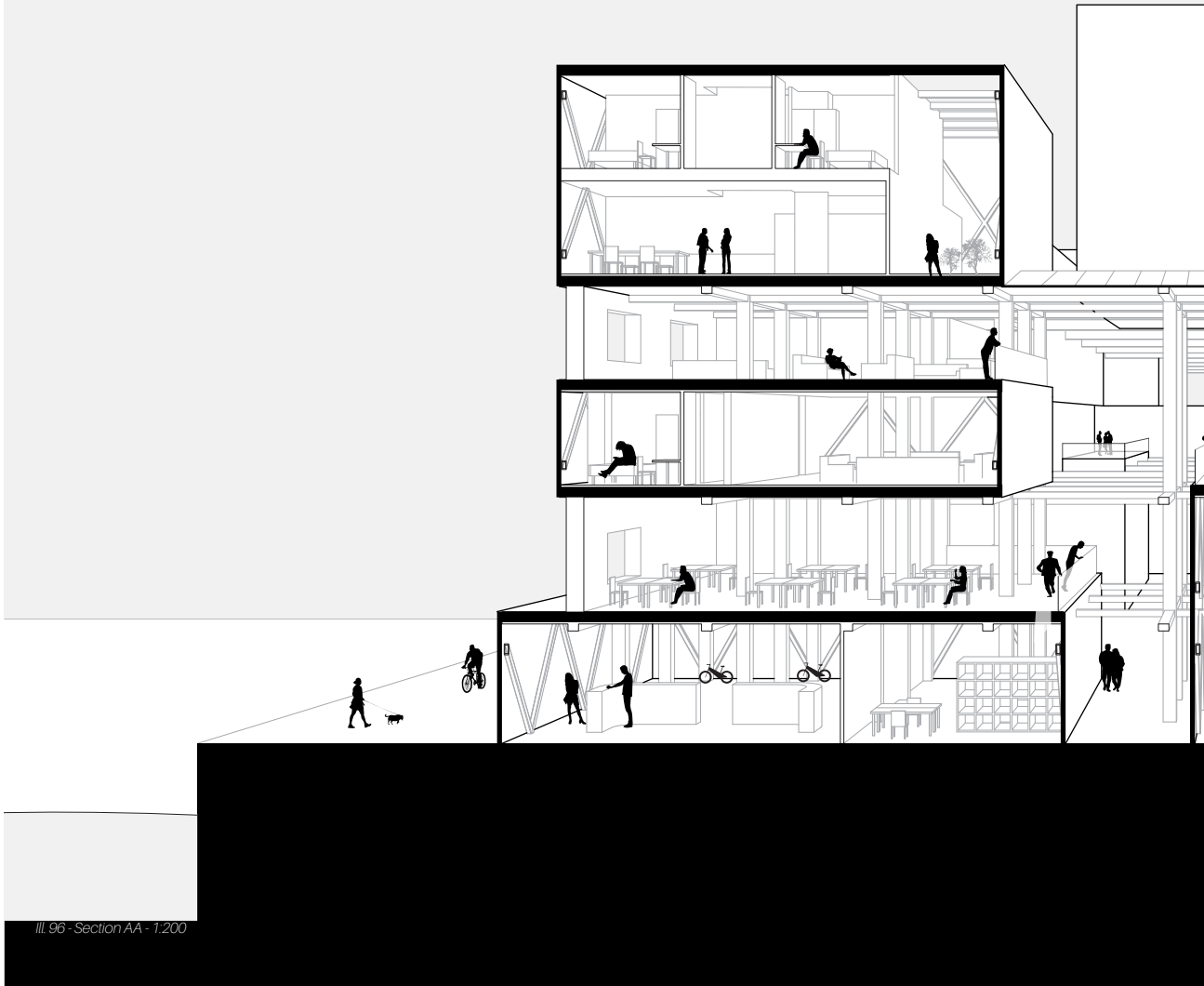
Cross section

The volumes are creating a great variety of different enclosed and open spaces. This is suitable for the many different programs of the asylum center.

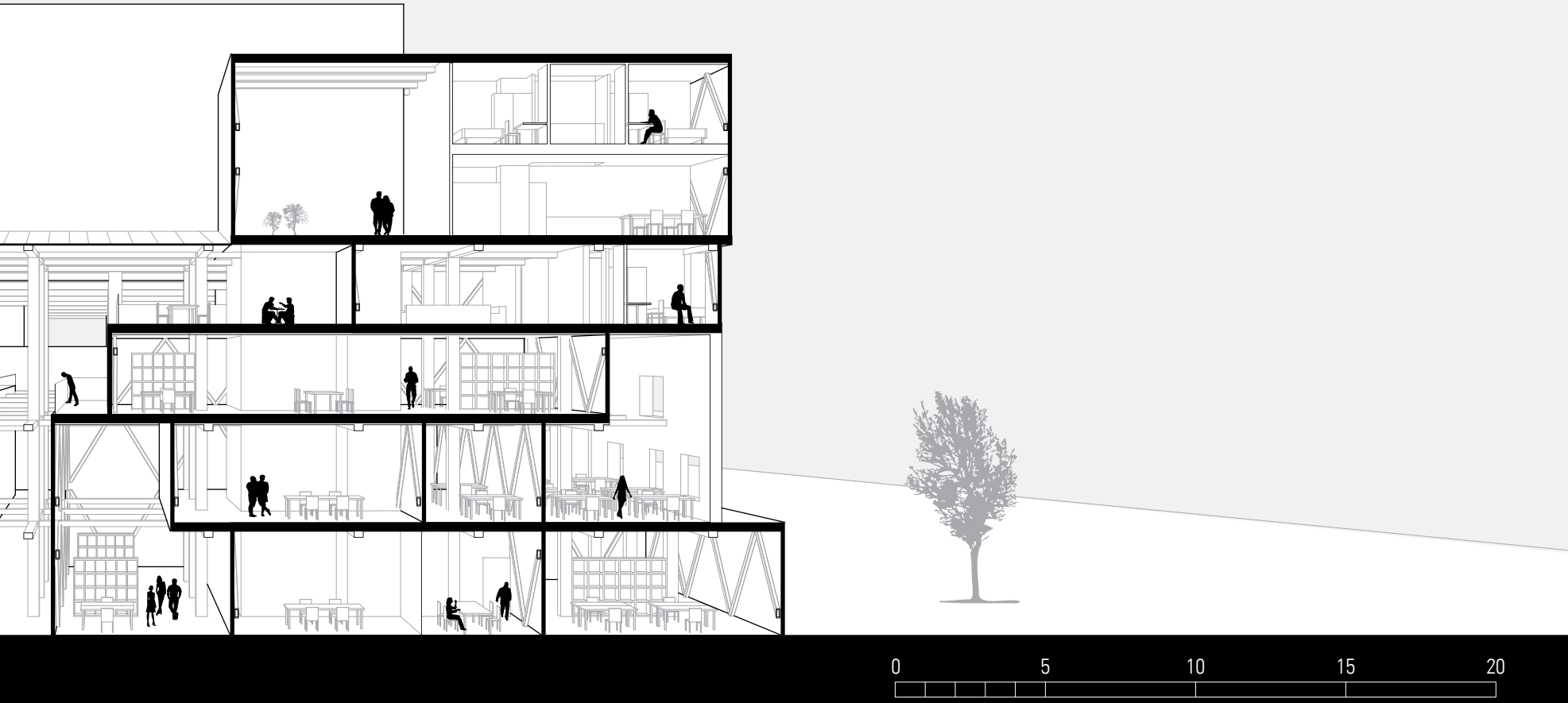
The volumes shape the open spaces and natural moves around all the stacked volumes tying them together into one building.



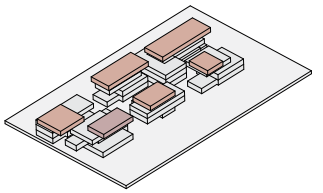
Ill. 95 - Section AA Overview



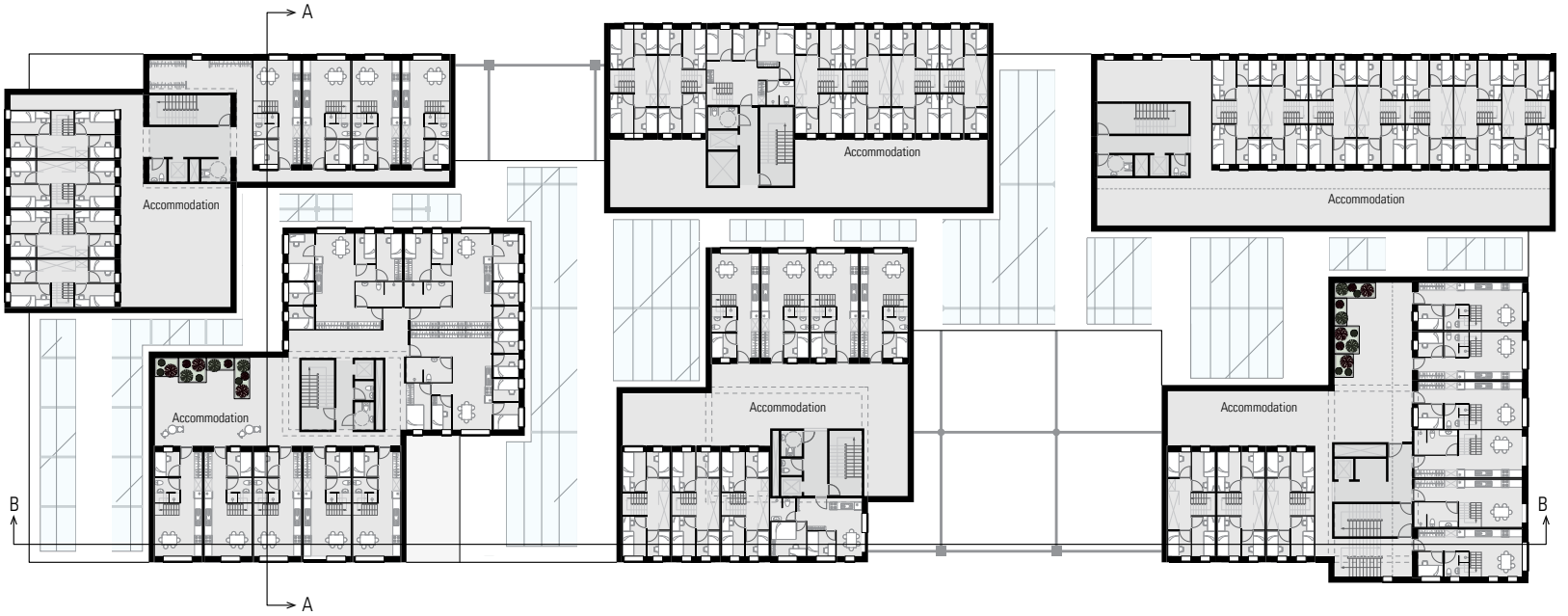
Ill. 96 - Section AA - 1:200


0
5
10
15
20

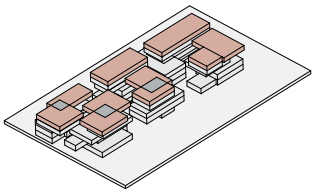
Ill. 97 - Plan of third floor - 1:600



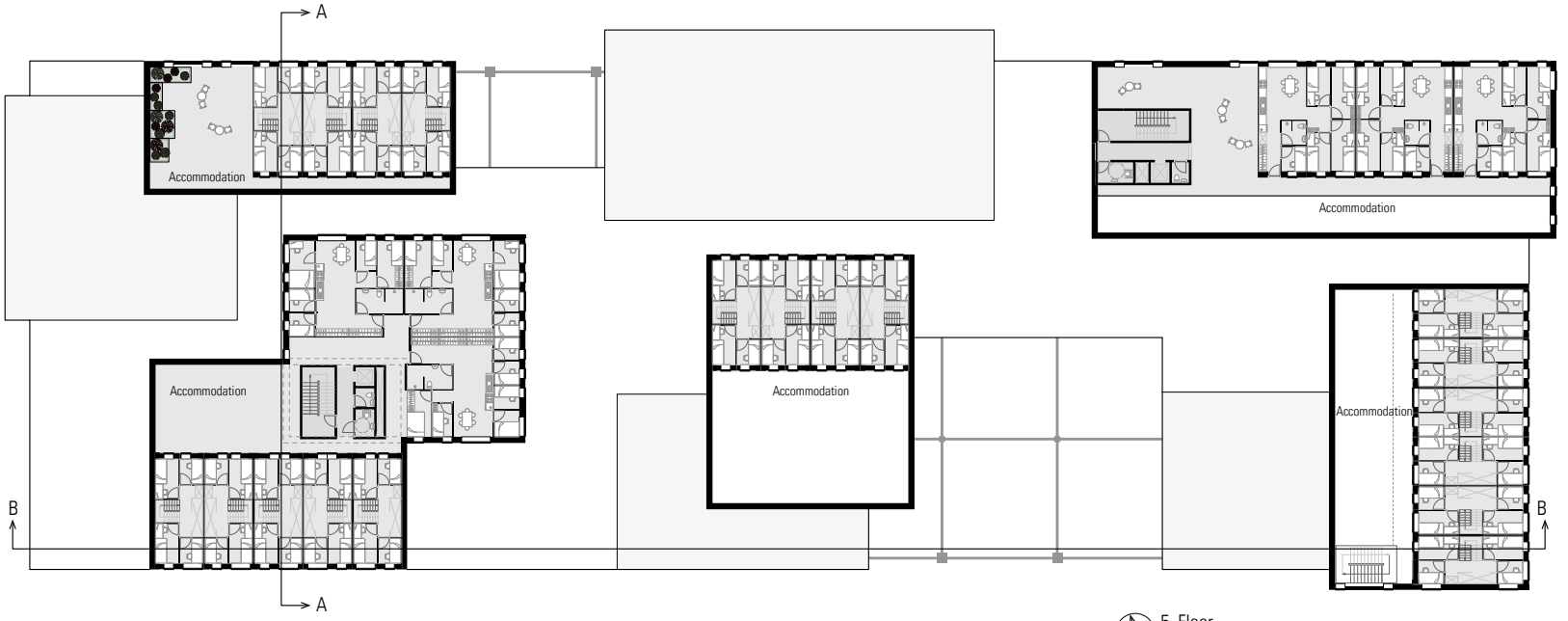
Ill. 98 - Functions diagram third floor



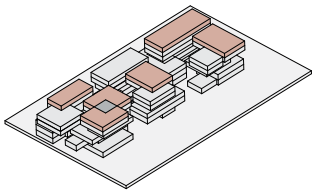
Ill. 99 - Plan of fourth floor - 1:600



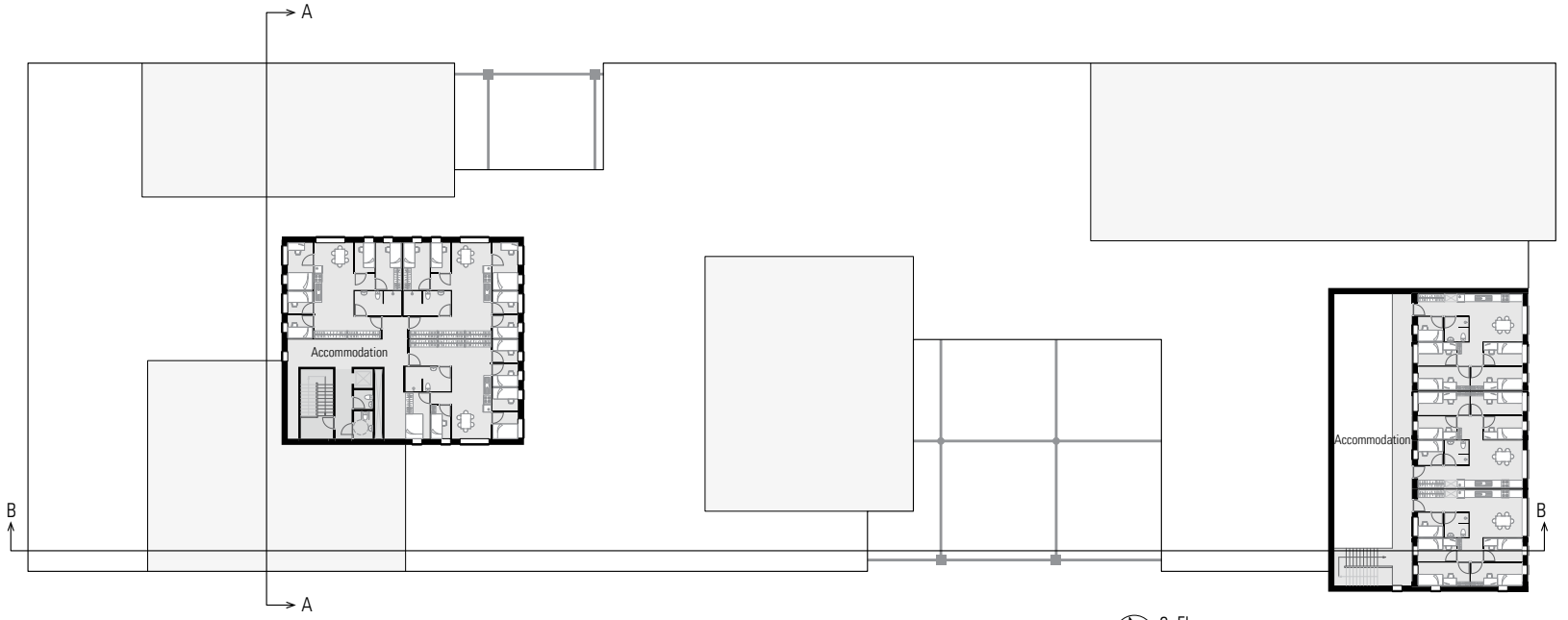
Ill. 100 - Functions diagram fourth floor



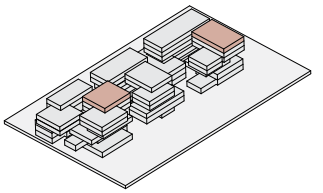
Ill. 101 - Plan of fifth floor - 1:600



Ill. 102 - Functions diagram fifth floor



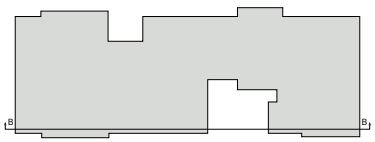
Ill. 103 - Plan of sixth floor - 1:600



Ill. 104 - Functions diagram sixth floor

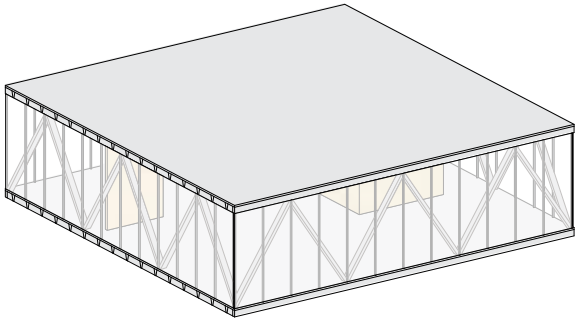
Long Section

The asylum center is full of different kinds of activities when they are arranged in these stacked volumes the building take an image of an almost three-dimensional city with horizontal and vertical pathways. By exposing this activity and life in the building, the asylum center becomes a welcoming, vibrant and uniting house.

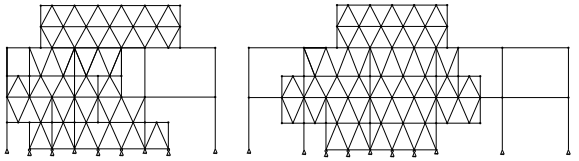


Ill. 106 - Section BB - 1:400

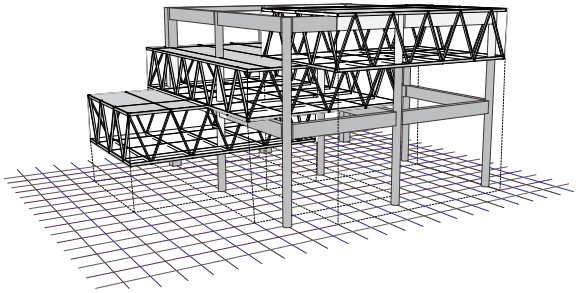

0
5
10
15
20



Ill. 107 - The box as an element



Ill. 108 - Static schemes of the symbiotic structures



Ill. 109 - Symbiotic structures

INTERDEPENDENCE

A relationship created from contrasting elements.

As the existing grid structure express the pragmatic use of the warehouse by its heavy loadbearing concrete beams and columns, which frames and outlines the space of the warehouse. The boxes create the contrasting image of light volumes in and shaping an inhabitable space.

The light volumes need to be carried by the existing grid in order to maintain its lightness and transparency. Transparency is also ensured by constructing the volumes with steel beams and diagonals columns. This structural system also strengthens and expresses the boxes ability to cantilever outside the grid, enabling the possibility of varied spaces suitable for the mixed-used program.
On the same time this steel structure helps stabilizing the existing grid for horizontal loads, creating a natural structural dialogue between the two systems, where loads are transferred between each other.

This creates a form of complex hierarchy, where the function, spaces and structures depend on each other. Ill. 109 shows this independence expressed by a simple 2D grid. The 2D grid relates to the existing structure and the diagonal steel columns, which informs how the boxes can be shaped according to transferring loads and creating cantilevers, making varied spaces. On the same time the diagonals are shaped according to their structural strength as to practicalities as being able to put in doors and windows in volumes, which again inform the size of the 2D grid. The 2D grid is furthermore informing placement of windows in the facade.

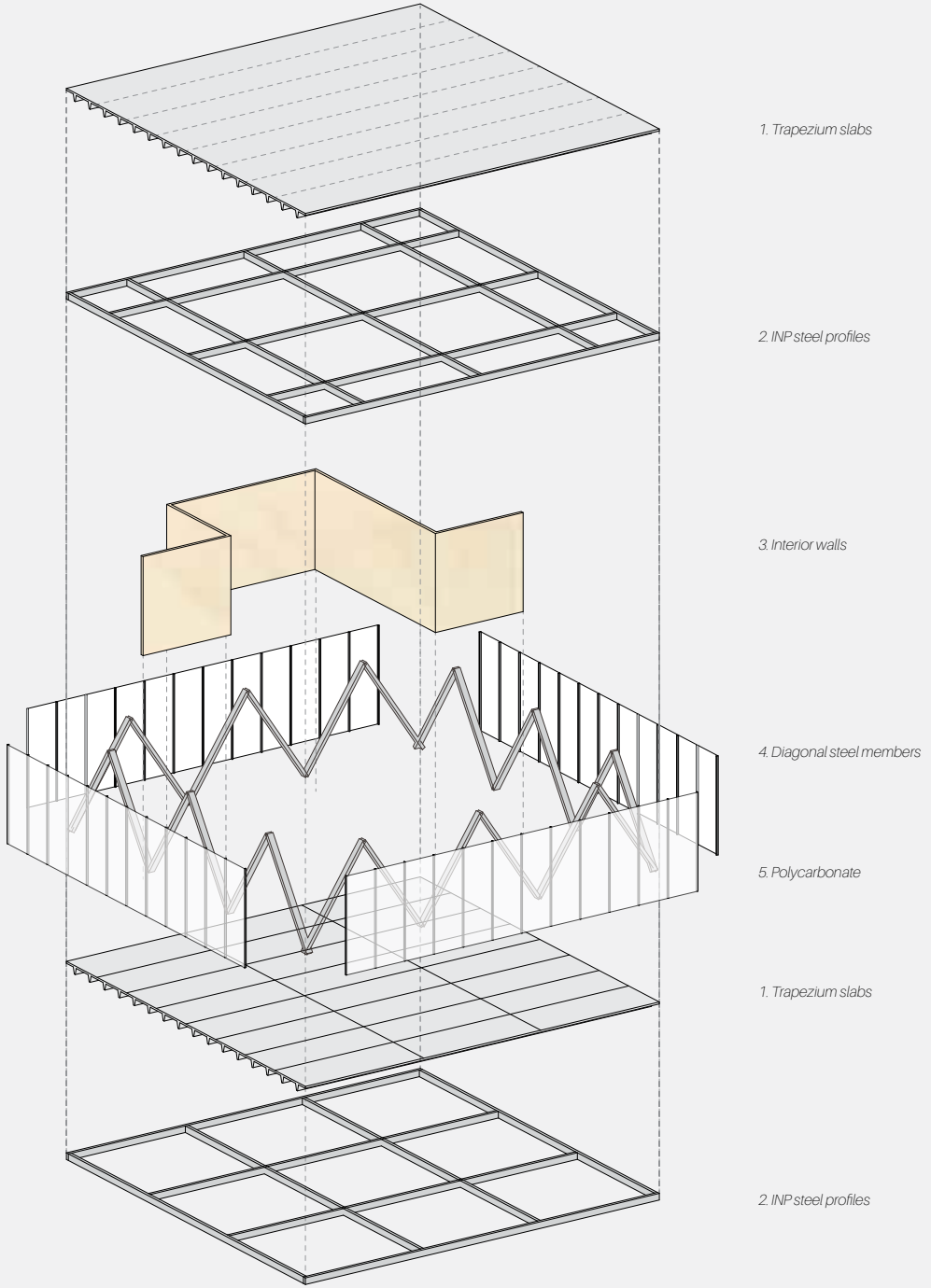
The hierarchy between the two systems are aesthetically expressed from their structural interdependence. Where the loadbearing and heavy concrete grid is the most dominate, but the light volumes still gives something back to the existing structure and especially to shaping the entire space together with stabilising the structure.

Essentially the structures express a meeting between two different elements, which points back at the theoretical discussion about the embodiment of interaction and hospitality in the architecture.

Structural System

The structural system has been optimised using the parametric FEM tool Karamba.
The structural system excels in transfer loads hereby enabling slender profiles of the boxes.
A structural vertification in ultimate limit state has been made using finite element method in Robot structural analysis and a critical member has been verified by a hand calculation, no members exceed a ratio above 0,80. In addition the structural system has been checked for deformation in Service limit state and found that it does not exceed the recommended allowable maximum deformation. All calculations can be found in appendix together with a small reflection on the results.

The static scheme ill 108. Shows the jointing of the system. In general are all the members fixed in order be able to transfer moment forces, besides the supports of the steel members at ground level, which are pinned. A small reflection can be found in appendix.



Ill. 110 - The material elements of the boxes

MATERIALISNG THE VOLUMES

Lightness and transparancy

1. Trapezium slabs:
80 cm thick concrete floor with 207 cm trapezium profiles, these kinds of slabs ensures that the slabs looks thins at the edge around the volumes. The trapezium slabs also have an aesthetic relation to industrial buildings, than standard residential slabs, which relates to context of the harbour and warehouse building.

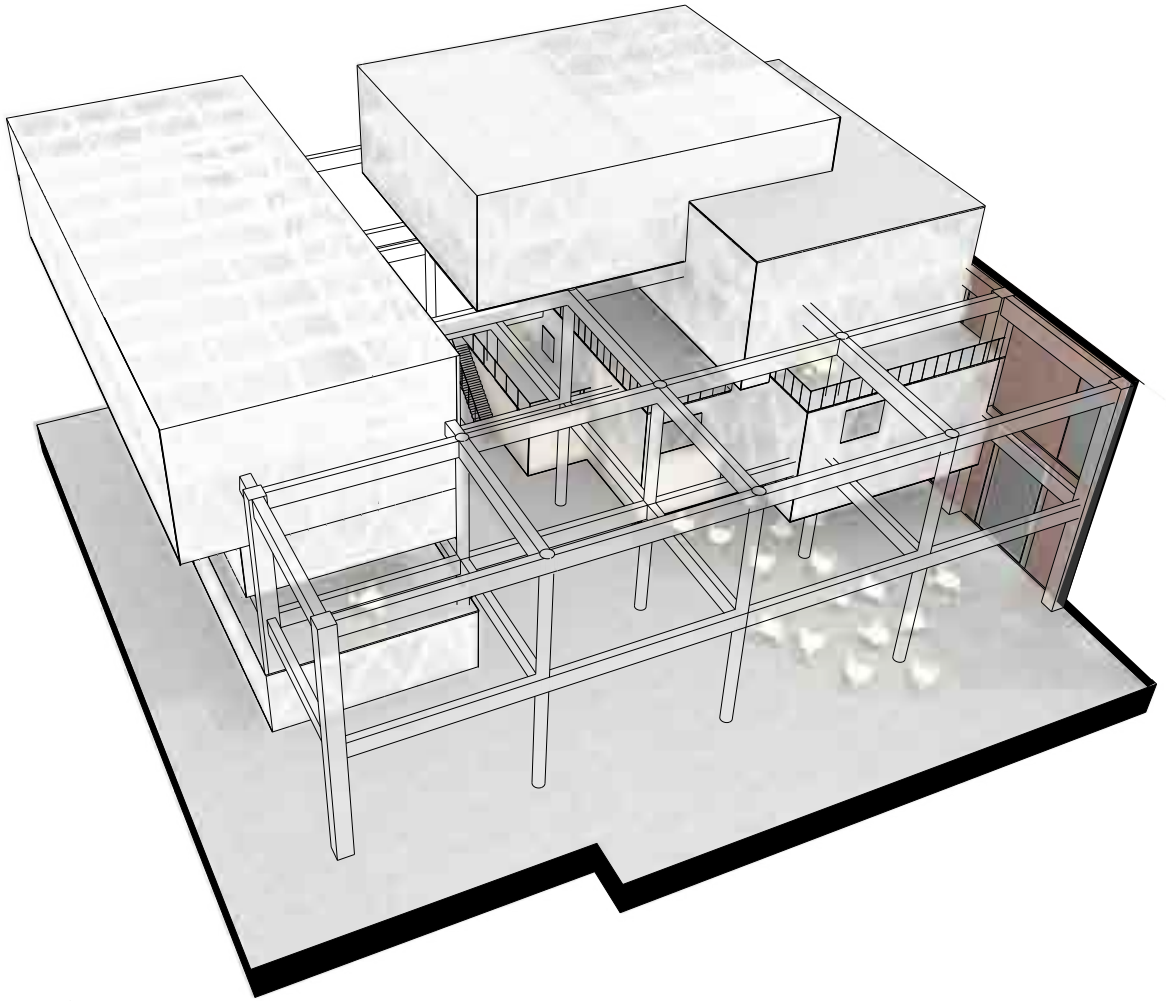
2. INP steel profiles:
Standard 30 mm height INP steel (p. 233, Jensen, 2011) profiles is used as beams, which continue the light structural appearance while keeping a reference to the industrial look.

3. Interior walls:
Light interior walls made out of gypsum or wooden plates are used to provide warmth to the spaces, the interior walls are folded to create small niches or in the apartments almost used as one big furniture as a gesture and relation to human scale and use. The light interior walls also create flexibility in constructing the spaces, which easily can be changed over time and fit different needs.

4. Diagonals steel members:
14x14 cm squared steel pipes profiles. The members strengthen the volumes ability to cantilever, while keeping the transparent and light appearance of the volumes. Furthermore they are also a clear distinction from the heavy concrete beams and columns.

5. Polycarbonate:
6 mm thick polycarbonate, the material keeps a reference to the industry, while providing semi transparency. This create changing activity on the facade in form of moving silhouettes on the same time providing good daylight conditions for the spaces inside the warehouse.

Ill. 111 - Café and foyer area - Interior



Ill. 112 - Café area - axometric

THE FOYER

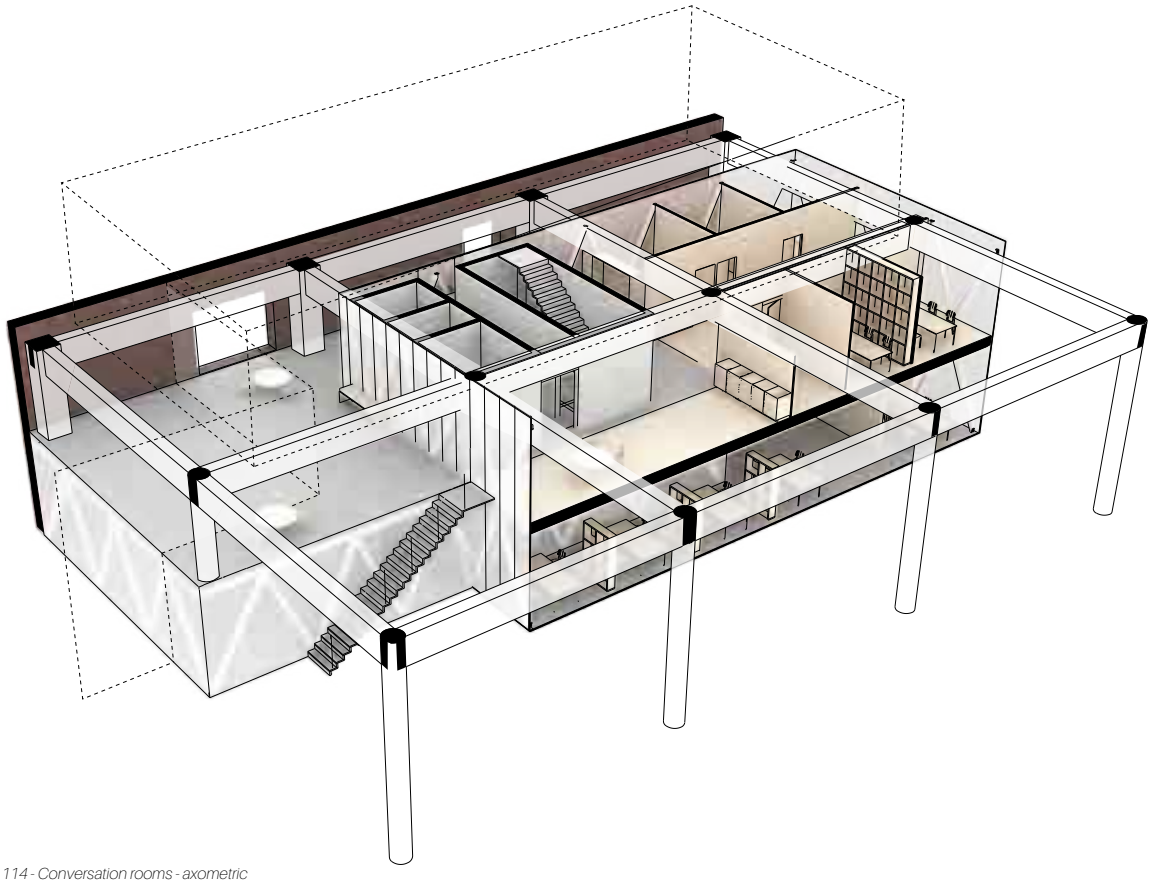
Public zone

Entering the asylum center, you arrive in a space between the polycarbonate volumes. It is a spatial transition, which works with a fluent graduation from exterior to interior both evident in activities, scale and materiality. As a in between space it create image of walking in a small city, which is supported by the scale between inside and outside, framed by the big warehouse volume creating this covered public street. A public street with small plaza with open spaces as café areas, play zones and show case spaces supporting this image of walking down a small city street. The polycarbonate exhibits the inner activities on the facade of the boxes as the windows on a building at night-time. At the small plaza as the café areas, small elements of wood, as chairs and tables are used to enhance and invite to human use with elements of warm and soft materials.

Ill. 113 - Lounge at Conversation room - Interior

THE CONVERSATION ROOM

Institution



Ill. 114 - Conversation rooms - axometric

The polycarbonate volumes are "stuffed" with wooden interior walls and slaps. This addrees directly to human use and scale. Creating a warm and inviting environment. The interior walls can be created to create more or less enclosed spaces inside the volumes, creating spaces with room for privacy.

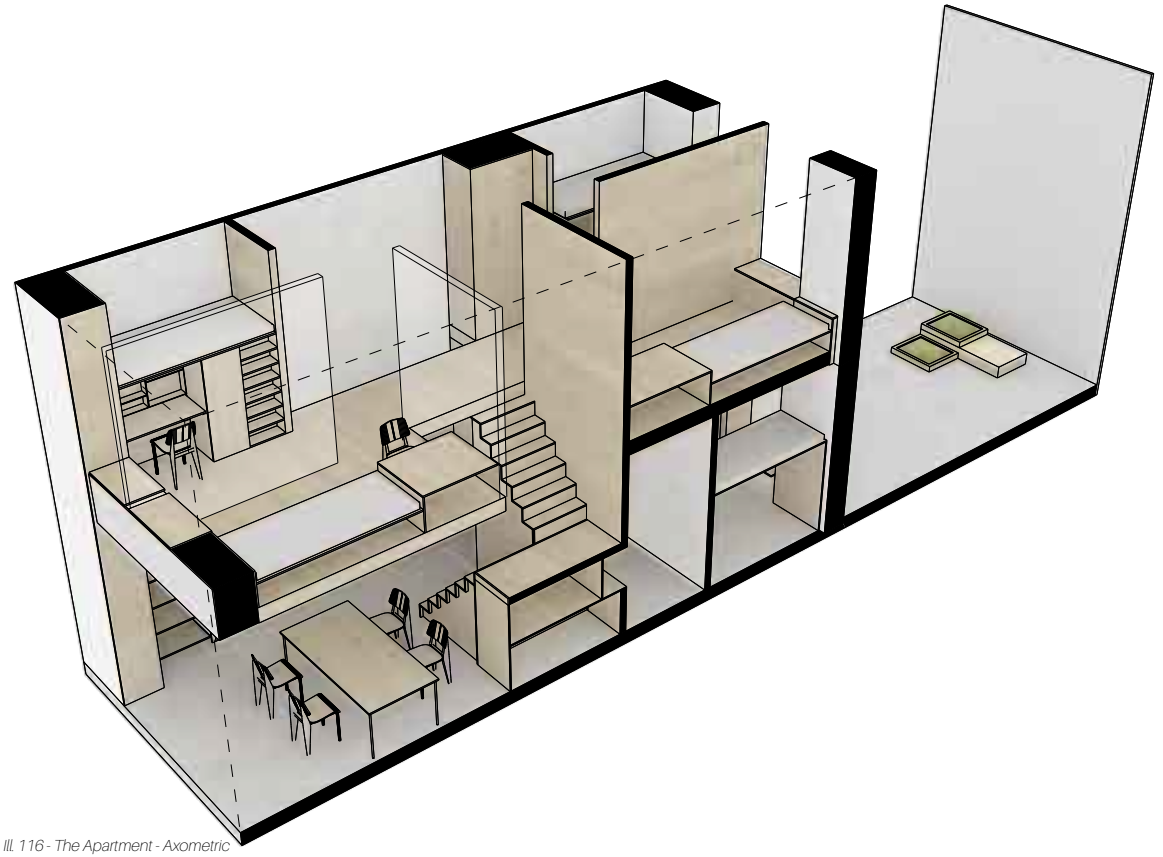
The interior walls are folded with small spatial "gestures", in order to enhance hospitality and inhabit the spaces. As the image of the waiting are in meeting spaces, the folded bench interact with the existing concrete beam, so it becomes a natural part of this little niche. A spatial gesture, which melts together the existing structure with the new in a smaller scale.

Privacy is in the meeting spaces enabled through graduation in scale and materiality. The most of the public staff offices are placed in the bottom, with more concrete and polycarbonate in a bigger space. The meeting spaces are placed on top, shaped into small spaces by wooden walls, creating intimate, warm and welcoming meeting spaces, expressing hospitality, where the staff and asylum seekers can have private conversations about their application process.

As a spatial detail the concrete flooring of the box extending inside the other are maintained to express this meeting and delineate the servant and service space. As supporting the image of these overlapping boxes stuffed with wood.

This concept of boxes with wooden elements and small spatial gestures are to be utilised in the entire asylum center.

Ill. 115 - The Apartment - Interior



Ill. 116 - The Apartment - Axometric

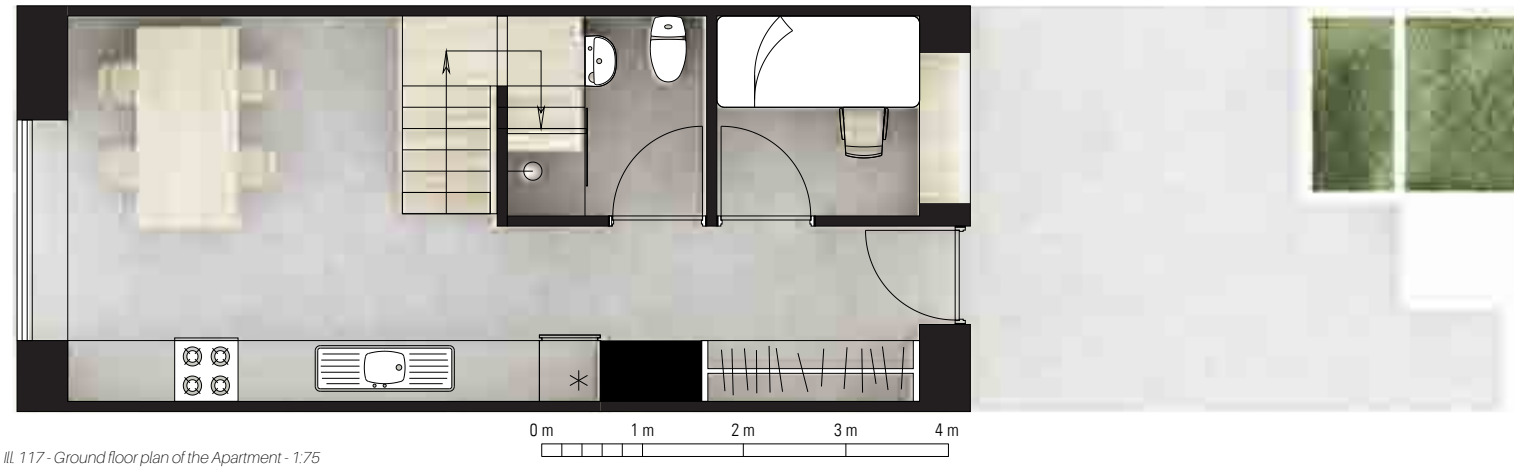
APARTMENTS

Asylum seekers meeting asylum seekers

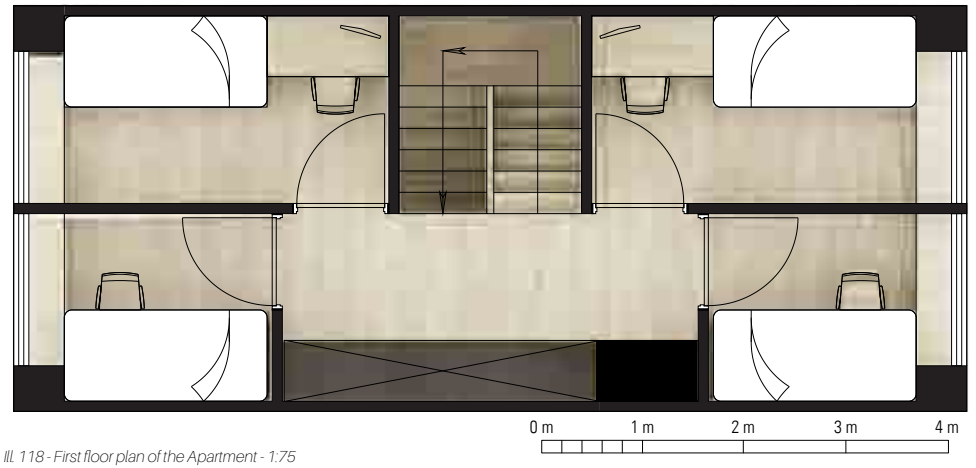
While the typical apartments for asylum centers are small rooms on hallways connected to a shared kitchen and bathroom, this asylum center creates an image of small town houses. These small apartments offer both privacy in small single or couple rooms and community feeling in shared kitchen/living space. Instead of walking out on an ordinary gallery, the space is used for small front gardens, providing a little green semi private community space, where the asylum seekers can meet their neighbours.
The apartments are cladded with wood, which provides it with a warm character and soft tactility, which create an inviting experience and feeling of safety and projection. In addition the wood materials is folded to create shelf, stairs and furniture, which relates to the human scale and the apartments becomes a natural base for the asylum seeker.

The flexible light weight interior walls and slaps, as image of town house typologies also makes it easy to image how the spaces can be transformed into affordable apartments and student accommodation in the future.

Few of the apartments units can accommodate families instead of singles and couple, having their own kitchen and bathroom. The majority of the apartments accommodate 5 singles, sharing one kitchen and a bathroom.



Ill. 117 - Ground floor plan of the Apartment - 1:75



Ill. 118 - First floor plan of the Apartment - 1:75

Plans

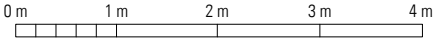
The small spaces of the apartments are used to the maximum, with integrated kitchen wall to the small sitting niches in the private rooms. The wooden furniture continous into the private rooms and becomes to element merging bed, desk, storage and window niches.

The final design of the asylum center can accommodate 338 asylum seekers

Section

The small spaces vary according to privacy. Becoming more open and large moving from private rooms to shared living space to community front gardens. The small gap over the kitchen table creates a discreet spatial experience with light coming down in the middle of the apartment and a visual connection, which emphasis the feeling of being inside this one big furniture.

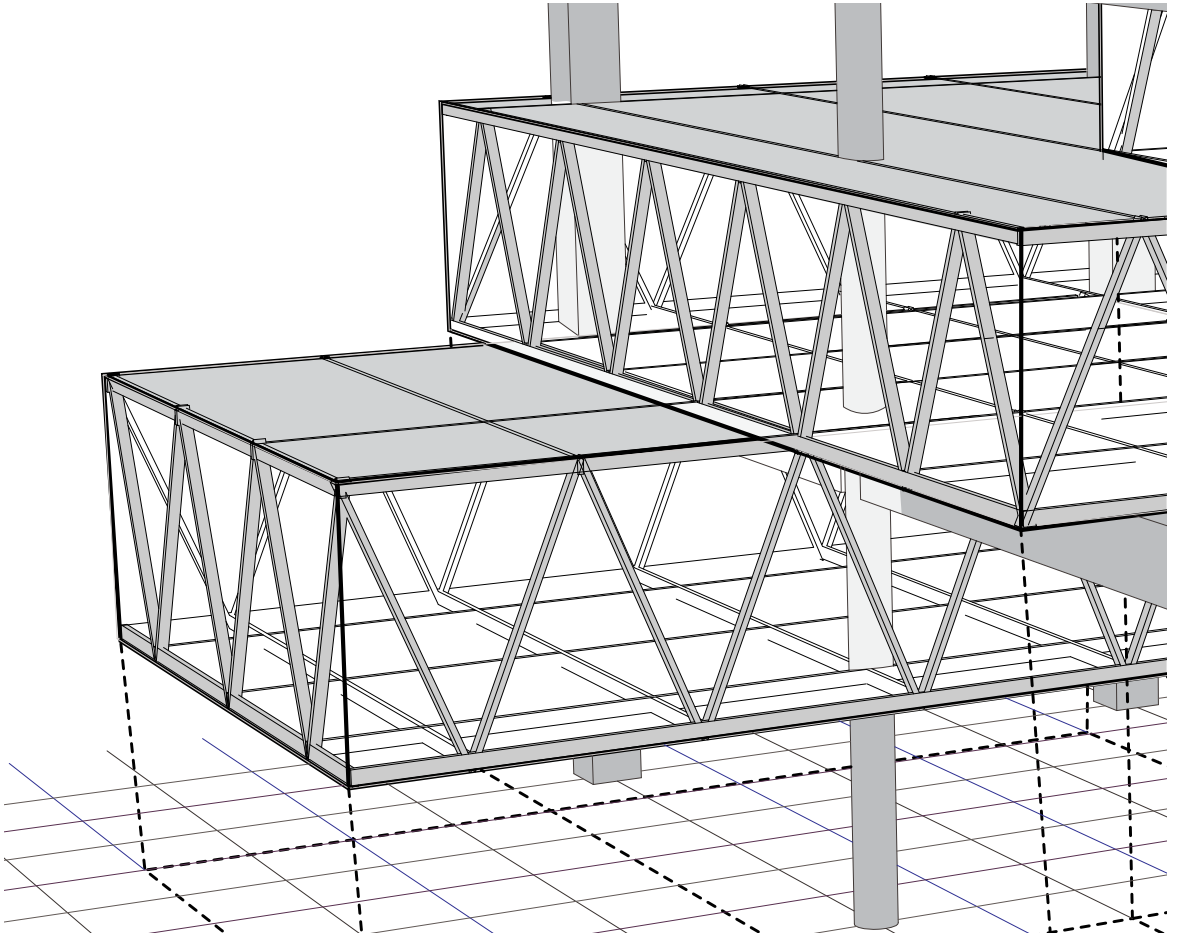
Ill. 119 - Section of the Apartment - 1:200



THE INTERSECTIONS OF BOXES

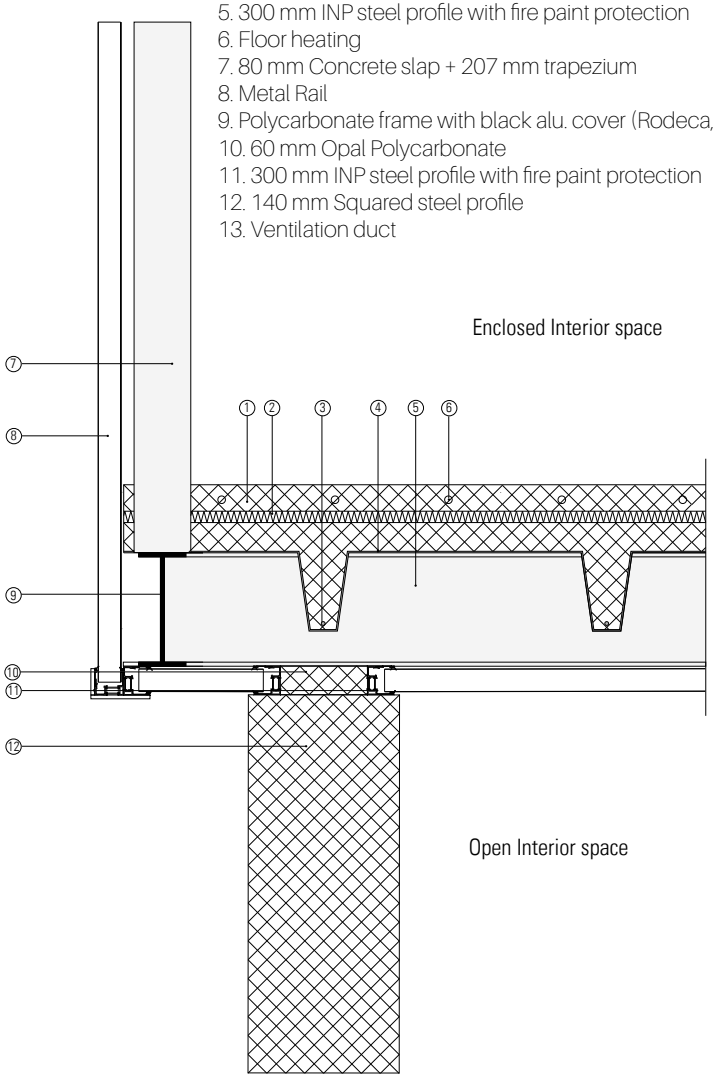
Construction of the polycarbonate boxes.

The construction details show the principal for constructing the boxes. The main architectural focus has been on establish the appearance of light boxes carried by the existing grid. This is for instance enhanced by casting a concrete top on the existing structure Ill. 121, this makes a place where the INP profil can rest and on the same time it hides the frames of the polycarbonate, giving it the expression of the box resting directly on the existing structure. The polycarbonate frames are placed on the edge of the box in top and bottom enhancing the edge and the box volume. Ill122.
In addition the spaces are to be heated by floor heating, which is placed in the top of the slap, insulation is placed underneath to ensure limit energy to warming up the whole slap and heat to move upwards. The insulation also prevents step sound between the levels. Ventilation ducts are to be exposed in the top of the ceiling. Technical installations will be placed under the slap parallel with the INP profiles between the trapezium and polycarbonate on the bottom detail. Acoustic absorbing materials are to be placed integrated with the wooden interior walls or slaps. In general it is a rough, usable and honest building, where technical installations and ventilations ducts can be exposed to enhance this atmosphere.



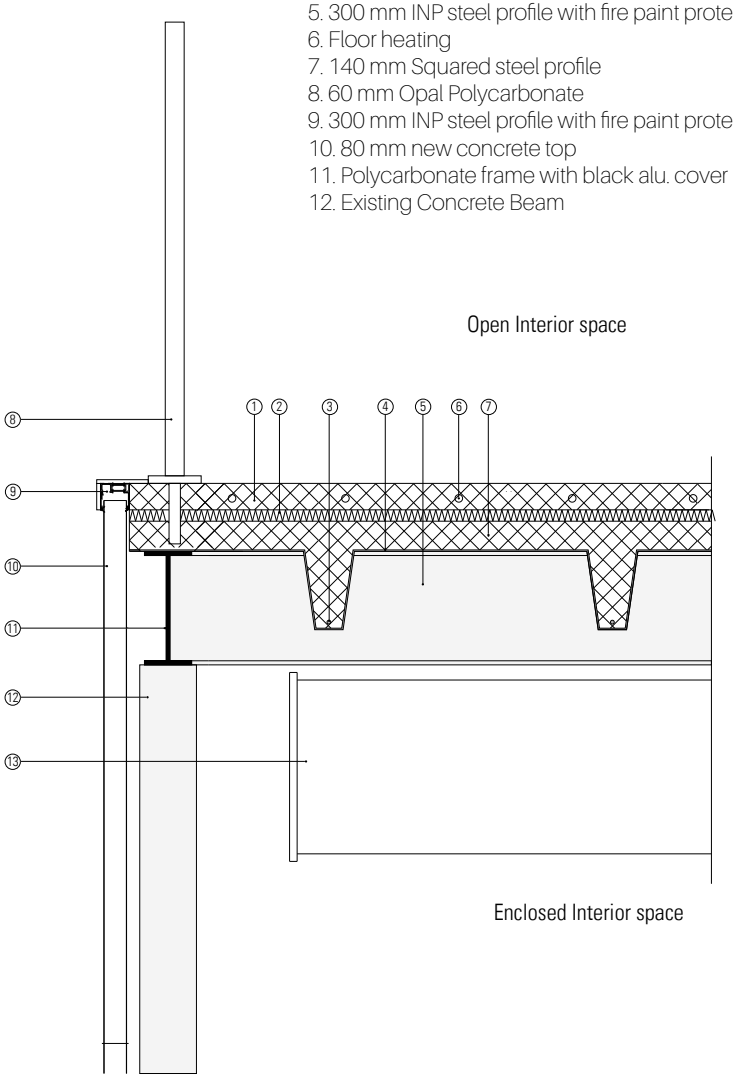
Ill. 120 - Overview of Construction details for boxes

TOP OF A BOX
1. 70 mm Concrete flooring
2. 30 mm Hard insulation
3. wire reinforcememt
4. Trapezium metal-sheat
5. 300 mm INP steel profile with fire paint protection
6. Floor heating
7. 80 mm Concrete slap + 207 mm trapezium
8. Metal Rail
9. Polycarbonate frame with black alu. cover (Rodeca, 2015)
10. 60 mm Opal Polycarbonate
11. 300 mm INP steel profile with fire paint protection
12. 140 mm Squared steel profile
13. Ventilation duct



Ill. 121 - Construction detail of floor in boxes - 1:20

BOTTOM OF A BOX
1. 70 mm Concrete flooring
2. 30 mm Hard insulation
3. Wire reinforcememt
4. Trapezium metal-sheat
5. 300 mm INP steel profile with fire paint protection
6. Floor heating
7. 140 mm Squared steel profile
8. 60 mm Opal Polycarbonate
9. 300 mm INP steel profile with fire paint protection
10. 80 mm new concrete top
11. Polycarbonate frame with black alu. cover (Rodeca, 2015)
12. Existing Concrete Beam



Ill. 122 - Construction detail of ceiling in boxes - 1:20

FACADES

Tactilty, Patina and Scale

When transforming the warehouse into modern standards, the existing climate screen needs to be critically improved which lack efficient insulation and contain insufficient cold bridges around openings. The project has chosen to partly remove the old façade and built up a new façade, which can be properly insulated and constructed for many years to come. The project aims to use a new methods developed by Danakon (ingeniøren, 2015). The back wall of the brick facade will then only be removed in parts where new windows are being designed and filled out where the old windows were placed. Then it will be insulated with sufficient insulation and a new front wall is put up. The front wall will be made partly by reused brick from the old façade and new bricks (or reused brick from another building), this methods creates a new resistance facade, which withholds its patina. The new brick façade hereby still keeps its natural tactility and characteristic red bricks. However it's changed to fits its new use. The facade breaks down its scale with parts pushed into the facade. These parts create a focus on the existing concrete grid inside and outline the concept of carried boxes. The pushed in façade parts is made in a decorative brick relief, which provides a level of detailing relating to the other red brick details in Nordhavn, as to create a facade, which relate to the human scale. The facade is made in a flexible system where 4 types of windows are repeated around the facade. Chosen according to interior needs.
The new facade express the meeting between new and old and literally shows how the light volumes have inhabited the warehouse. As the temporality in the asylum center it also talks about change and how old an new can meet eachother.

Ill. 123 - West Elevation - 1:600

Ill. 124 - East Elevation - 1:600

THE MEETING OF MATERIALS

Construction of the cantilever and façade.

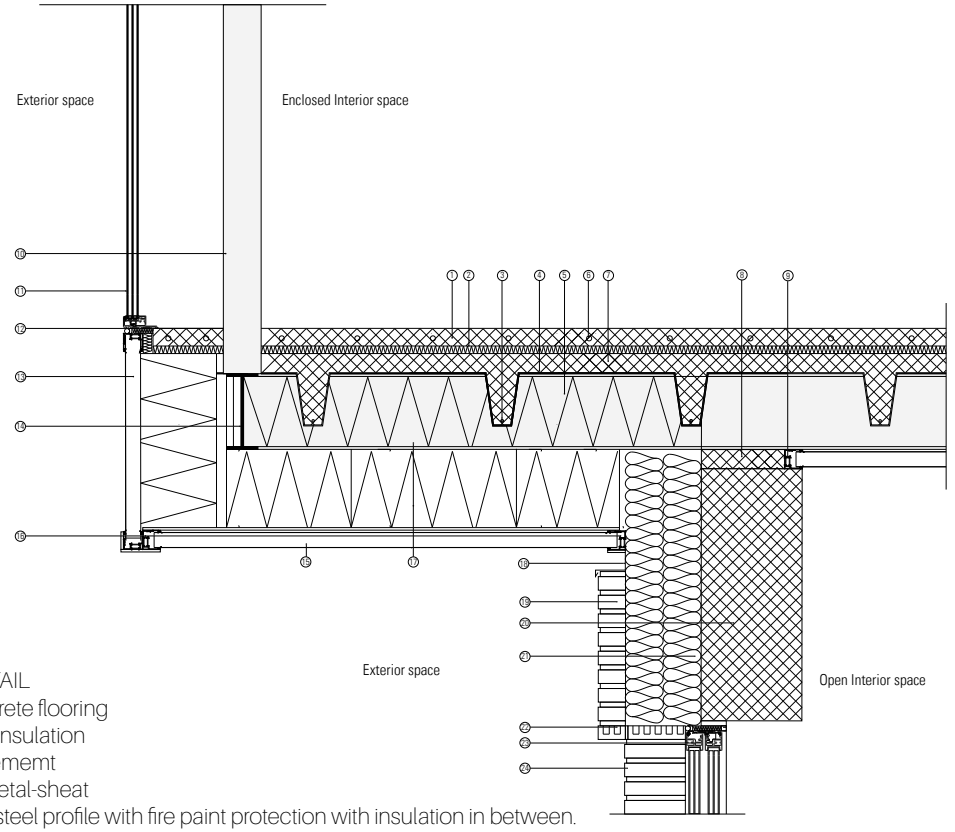
The meeting between the polycarbonate boxes and the exterior facade is the most interesting meetings of the facade. The construction detail shows the principal of how it should be constructed with focus upon the architectural idea.

The main idea is to establish an image of a box extruding the facade, coming from the inside moving out. This is for instance articulated by the small "shadow gap" in the bottom of the polycarbonate box (18). The black zinc and gap, creates a shadow, which hides the polycarbonate frame and establish and image of the polycarbonate to come out from the inside. The boxes should again be expressed as light volumes, while the outer wall as a massive wall.

The windows of the boxes are therefor placed at the front, aligned with the polycarbonate facade (12) in order to create the image of a volume. In contradiction are the windows of the outer wall placed in the back in order to create a sense of depth, which will enhance the mass of the brick wall. Clearly articulating the two contrasting elements both in tactility and form. The exterior brick facade is set back between the beams, this creates scale to the volume and an expression of the inner grid structure, which is a crucial part of the new asylum center.

The push back area is to be made in a decorative brick relief (24), which will reference the level of details used in other red brick buildings as Nordhavn as giving the facade rich tactility and experience with changing shadow play.

The new façade works as the new climate screen of the building. The building are insulated in order to meet the standards of Building code 2015, with 300-350 mm insulation in walls and 500 mm in floor and roof. (Energitjenesten.dk, 2015) The building uses low energy windows with U-values down to 0,77 W/m2k, it is also important to highlight that, when windows not are placed in the polycarbonate exterior walls, insulation is put up behind the polycarbonate in places to prevent heat loss.

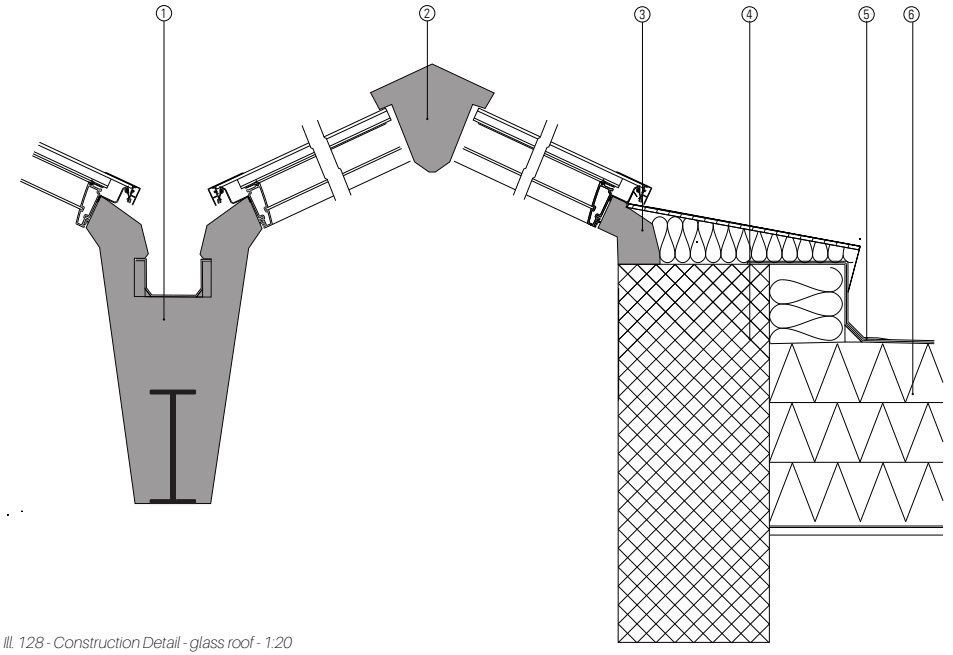


EXTERIOR DETAIL
1. 70 mm Concrete flooring
2. 30 mm Hard insulation
3. wire reinforcememt
4. Trapezium metal-sheat
5. 300 mm INP steel profile with fire paint protection with insulation in between.
6. Floor heating
7. 80 mm Concrete slap + 207 mm trapezium
8. 80 mm New Concrete top
9. Polycarbonate frame (Rodeca, 2015)
10. 140 mm Squared steel profile
11. Three layered glass (U- value_total window: 0,77 W/m2K) (Protec, 2015)
12. Black composite window frame (Protec, 2015) + Polycarbonate frame (Rodeca, 2015)
13. 60 mm Opal Polycarbonate (U- value_total Polycarbonate: 0,87 W/m2K) (Rodeca, 2015)
14. 300 mm INP steel profile with fire paint protection
15. 350 mm Insulation
16. Polycarbonate frame with black alu. cover (Rodeca, 2015)
17. 630 mm Insulation
18. Black Zinc
19. Red Recycled brick
20. Existing concrete beam
21. 300 mm Insulation
22. Red Brick Lintel
25. Black Composite Slidding door, three layered glass (U- value_total window: 0,70 W/m2K) (Protec, 2015)
24. Red Brick Relief

Ill. 125 - Construction detail of polycarbonate meeting brick wall - 1:30

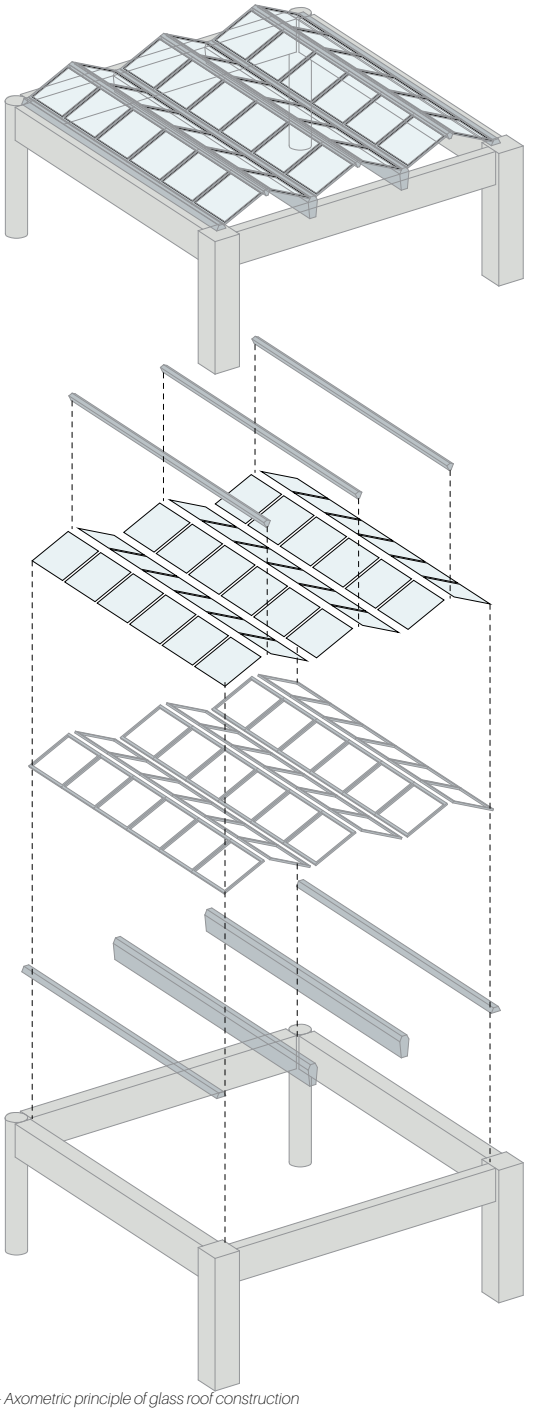
Ill. 126 - South Elevation - 1:600

Ill. 127 - North Elevation - 1:600

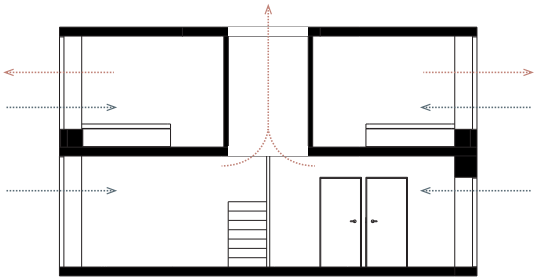


Ill. 128 - Construction Detail - glass roof - 1:20

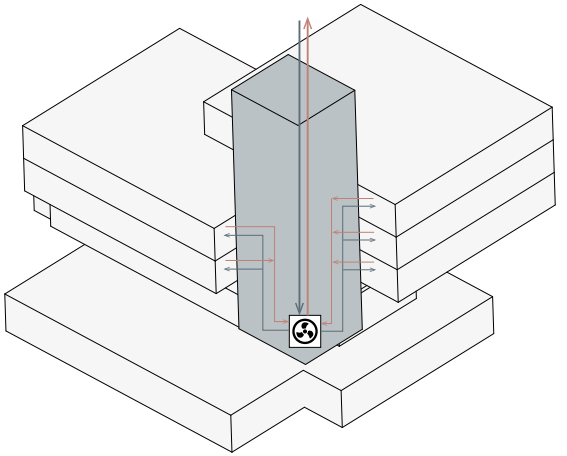
SIMPLE PRINCIPAL ROOF CONSTRUCTION
1. Beam with integrated gutter, made with INP steel profile as load bearing beam.
2. Top mounting bracket and self caring construction principal like Velux Rytterlys (Velux, 2015)
3. Mount with 25 degree angle (Velux, 2015)
4. Exsisting Concrete Beam
5. Asphalt roofing with 40 per mille angle to direct rain water
6. 500 mm Roof Insulation



Ill. 129 - Axometric principle of glass roof construction



Ill. 130 - Ventilation principle of apartments



Ill. 131 - Ventilation principle of the cores

THE ROOF

A diffuse light source

The asylum center is constructed with a new roof, which meets modern standards. The roof is constructed on high and slender crossing beams, which rest on the existing concrete structure. Parts of roof are covered with glazing, which ensures sufficient daylight in the middle of the asylum center. The high and slender beams, creates a diffuse light source spreading out in the spaces under the roof providing natural daylight all around the asylum center.

MECHANICAL VENTILATION

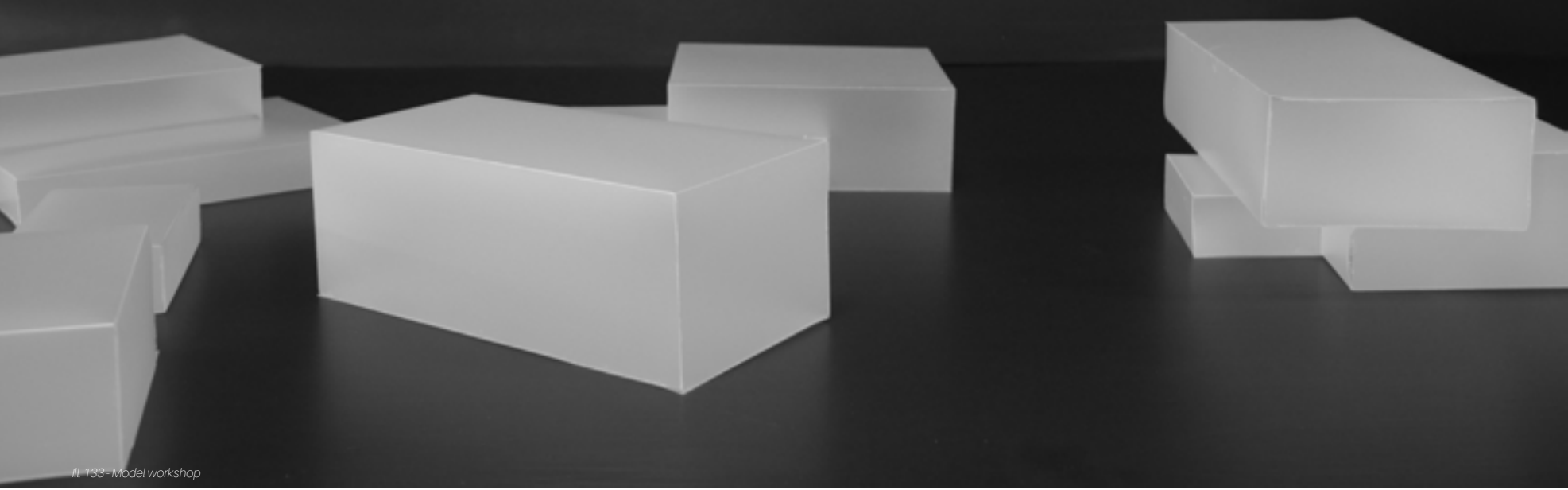
A diffuse light source

The HVAC-system of the building is made by a central aggregate system placed in each of the 6 cores in the building. Pipes are lead vertically through the core and out to the surrounding spaces. Smaller enclosed spaces are to be space ventilated while large open spaces are to be upthrust ventilated.

The building enables mixed-mode, where both natural and mechanical ventilation is utilised and can be the dominant ventilation in different areas of the building. For instance dominant natural ventilation in summer day times and mechanical in winter night times. A principle for efficient natural ventilation in the apartments are for instance to be carried out by enabling stack effect or cross ventilation, as shown in Ill. 130. Mixed mode will create lower energy consumption by minimising the need for mechanical ventilation as creating a better user satisfaction by being able to open up windows manually.

PROCESS

CRITICAL INVESTIGATIONS



Ill. 133 - Model workshop

INITIAL PROCESS

Initial investigations

In the following chapter extractions of the entire design process will be presentated and evaluated for their impact on the integrated design process.
During the process architectural, technical aspects and considerations have influenced the further process and design.

After determine in the analysis phase, to the design an accommodation center for asylum seekers, building on the concept of placing the asylum center in new urban areas acting as an urban catalyst, the design phase was initiated with investions on finding a possibly site for the asylum center.

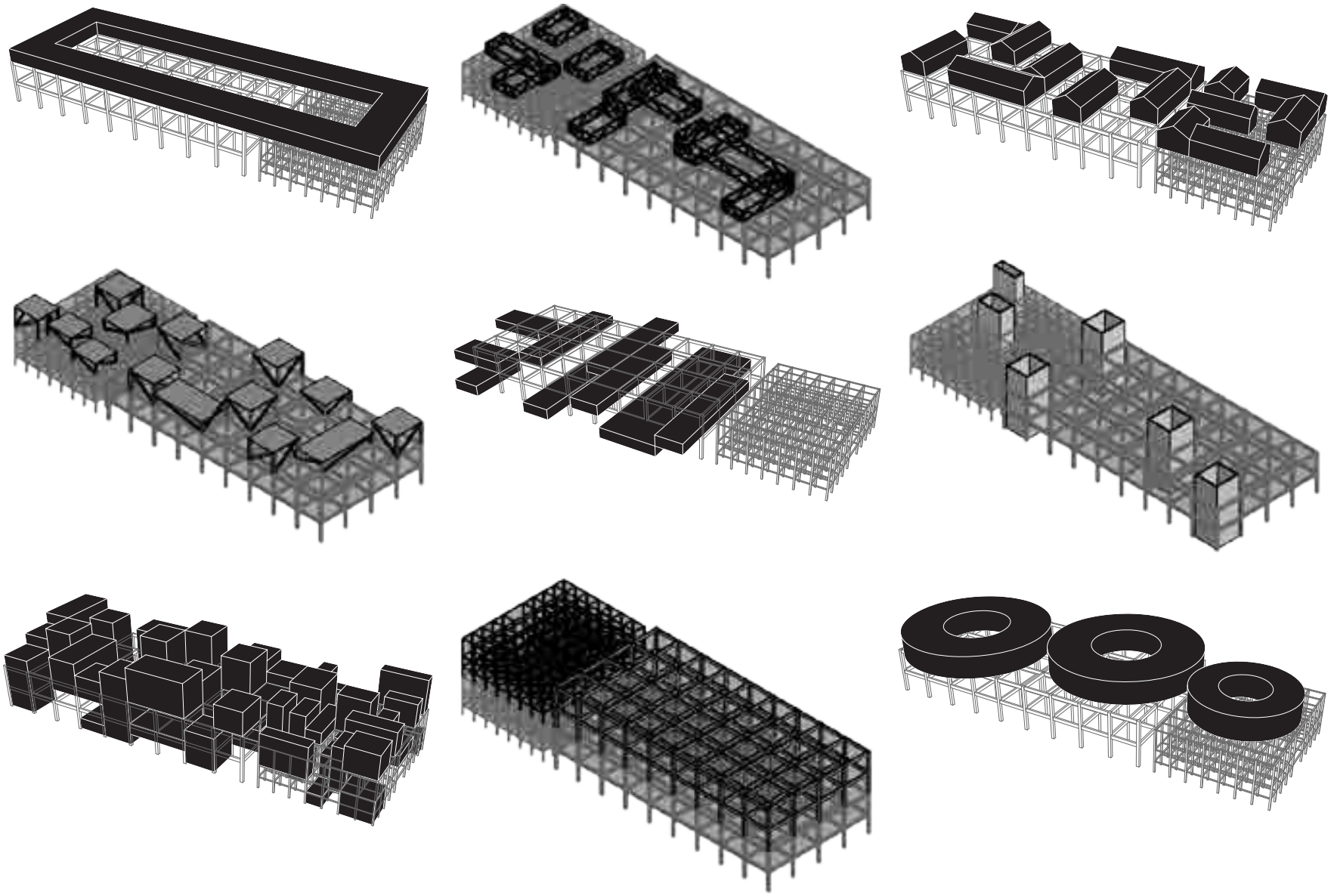
The focus was to find new upcoming or future urban developments, where the concept and vision of the project could be realised. A wide range of possible sites was investigated for their potential, before ending up choosing Nordhavn in Copenhagen. See appendix 4 for further information on the decision of Nordhavn.

Following the site investigations, a potential building site in Nordhavn was investigated and studied, choosing the Pakhus 54 as the plot for the project.

Phase 1

Interpretation of the existing structure
By choosen to designing a project based on and existing building, Pakhus 54, some initital studies of the building structure and composition was done to find out have to adress the building. A large scale model of the existing structure was build and the grid structure became the crux of the design.

Initial investigations of form, structure and space
The design phase was initiated by a workshop focusing on forms and structures and how these could interact with the existing structure and the spatial qualities and atmospheres created, by adding, interacting and interfering different forms and structure to the existing structure.
The deep large building volume of 40 m by 120 m entailed in the initial investigations, natural considerations and reflections on technical aspects like daylight and energy effiency.
The investigations was a mixture of both digital and physical models and varying in different scales.



Ill. 134 - Form structure and space workshop

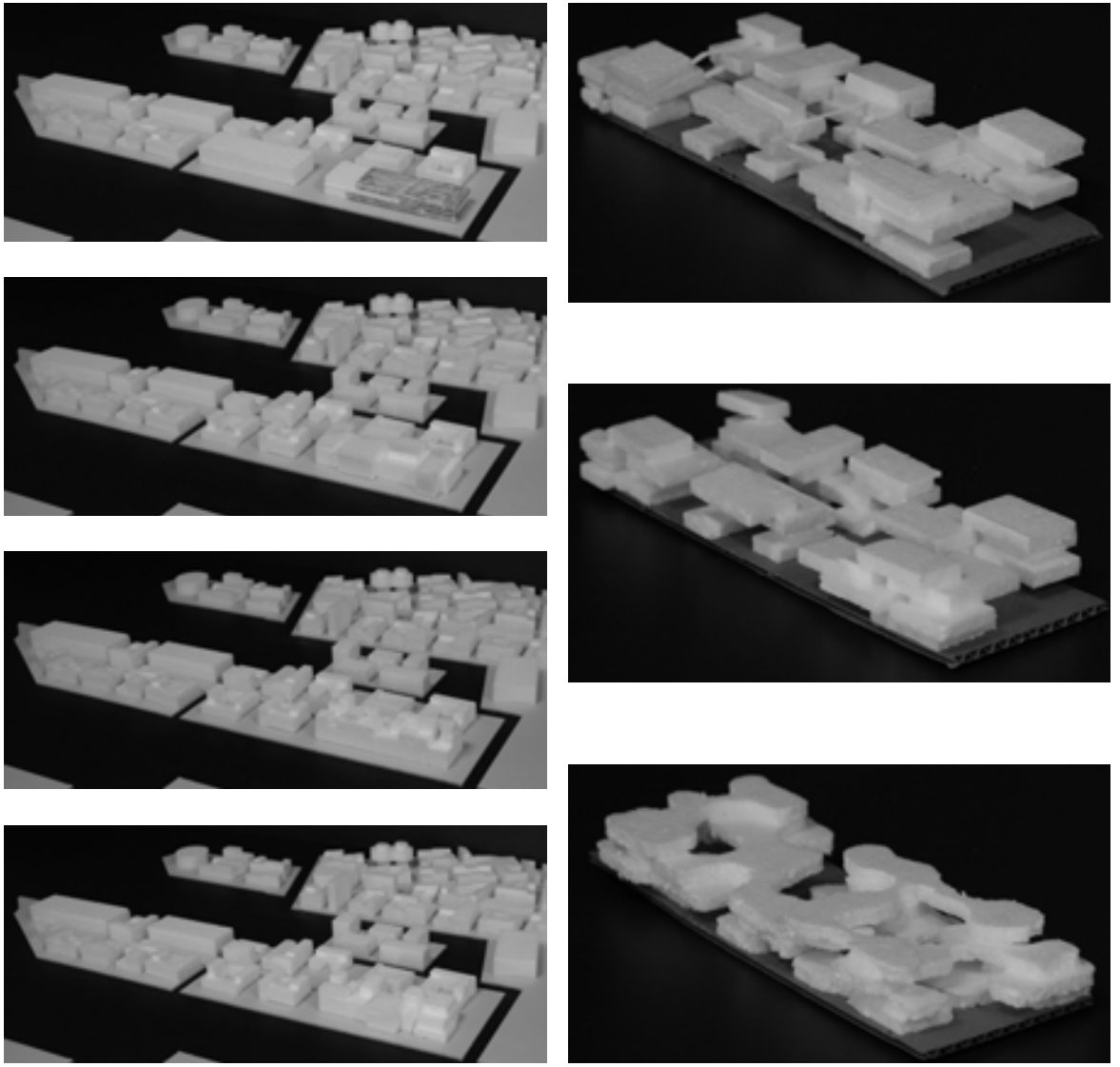
Phase 2

Organising the program

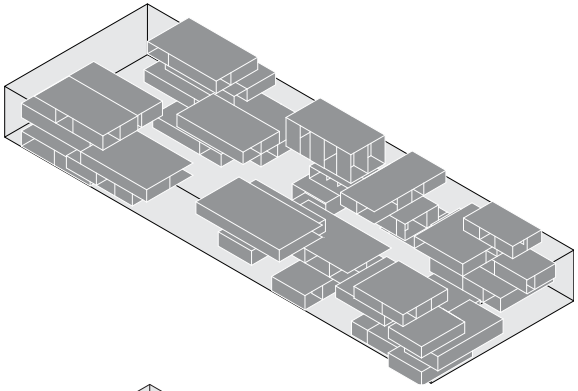
In order to create an understanding of the spatial program and how to address it, a variety of studies were done, focusing on aspect of privacy, accessibility, functionality, flows, arrangement and spatial developments together with considerations on technical implementations.
Studies of the future plans, and visions for the nearby context and surroundings was examined for further interactions and interferings with the urban development together with considerations on adapting to the city.

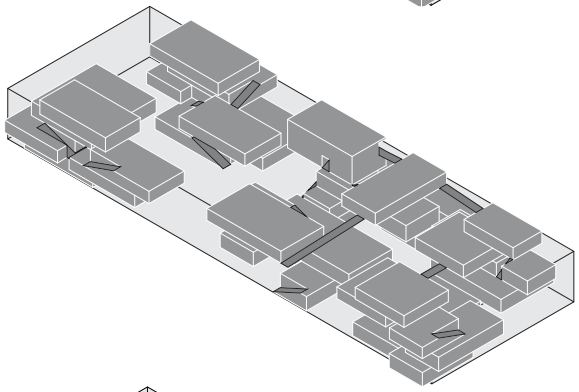
Investigations of plan drawings, sections together with physical as well as digital models and structural investigation impacted this phase.

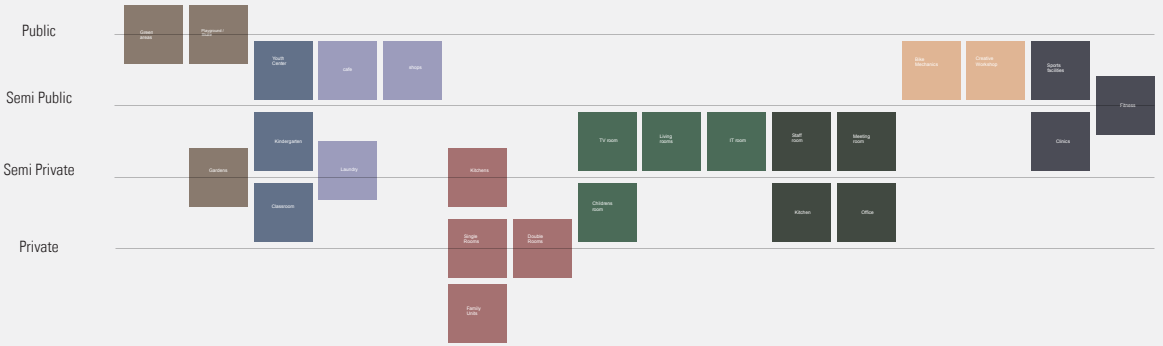
Variations and shift in levels of detailing and scales combined with studies of materiality, focusing on creating spatial atmospheres .

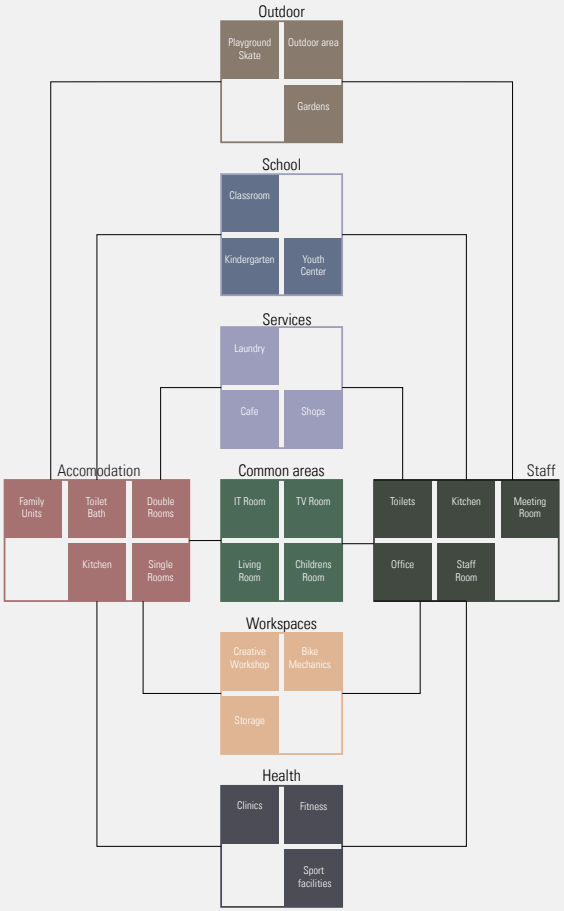


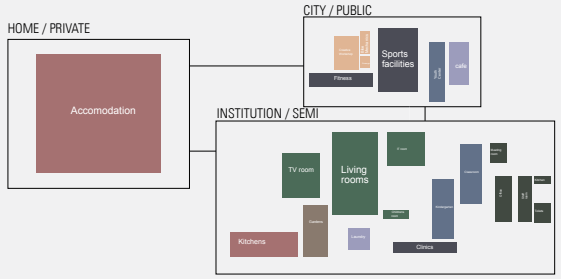
Ill. 135 - Form and contect workshop

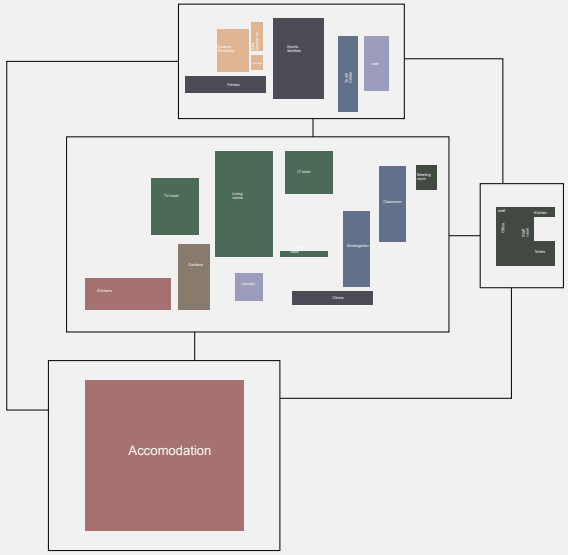





Public
Semi Public
Semi Private
Private
Green areas
Playground / Skate
Youth Center
cafe
shops
Bike Mechanics
Creative Workshop
Sports facilities
Fitness
Kindergarten
Gardens
Laundry
Classroom
Kitchens
TV room
Living rooms
IT room
Staff room
Meeting room
Clinics
Childrens room
Kitchen
Office
Single Rooms
Double Rooms
Family Units


Outdoor
Playground Skate
Outdoor area
Gardens
School
Classroom
Kindergarten
Youth Center
Services
Laundry
Cafe
Shops
Accomodation
Family Units
Toilet Bath
Double Rooms
Kitchen
Single Rooms
Common areas
IT Room
TV Room
Living Room
Childrens Room
Staff
Toilets
Kitchen
Meeting Room
Office
Staff Room
Workspaces
Creative Workshop
Bike Mechanics
Storage
Health
Clinics
Fitness
Sport facilities


HOME / PRIVATE
Accomodation
CITY / PUBLIC
Fitness
Sports facilities
cafe
INSTITUTION / SEMI
TV room
Living rooms
Kitchens
Clinics

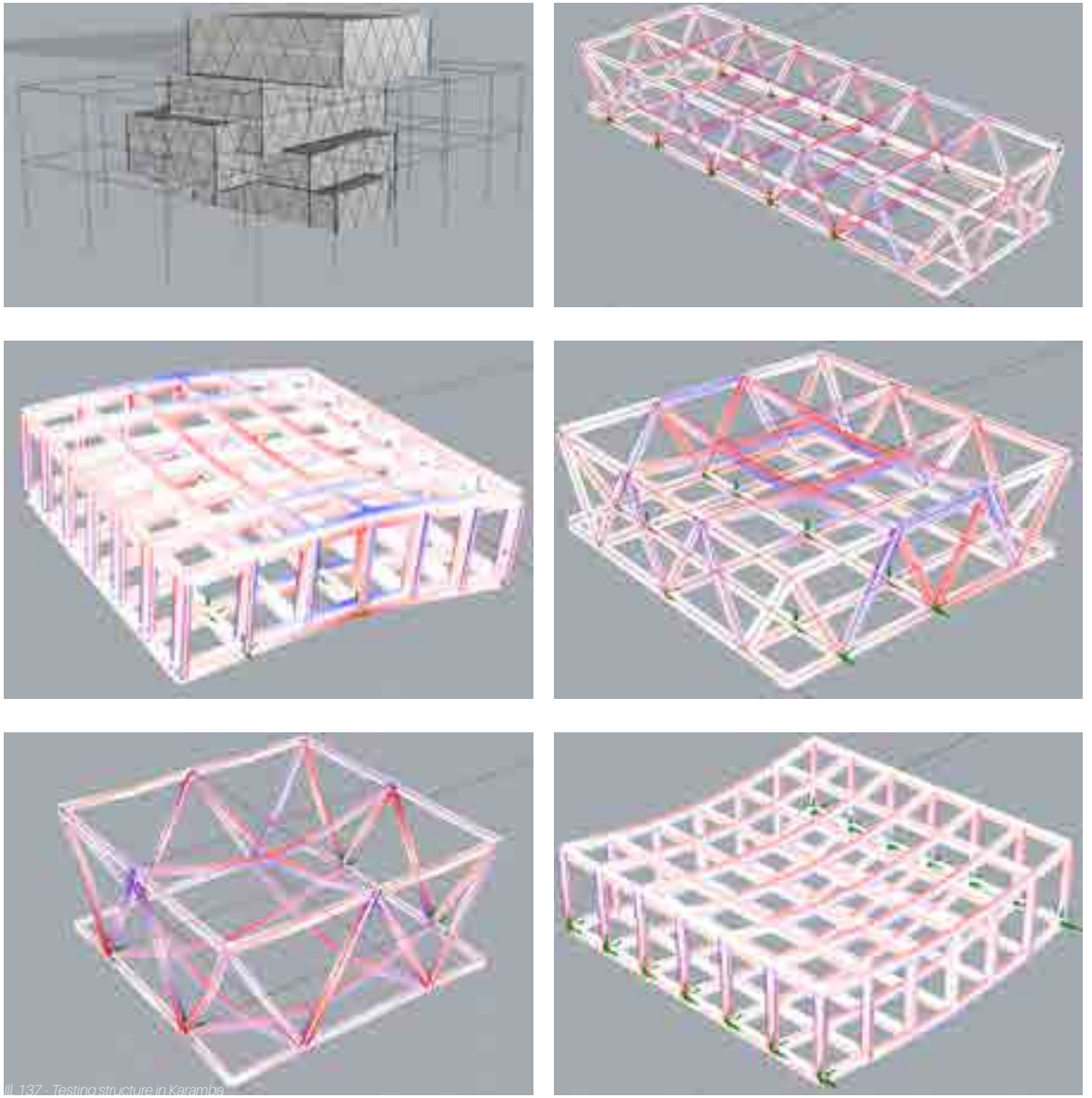

Accomodation

Phase 3

Structural concepts and principles

Simultanously with the concept and spatial programs developed technical and structural concepts and principles was investigated together with static schemes and systems. Initial calculations and combination of structures focusing on structures relying, stabilising and dependent on each other together with initial studies of dimension and potentials for different structures was investigated.

Through the parametric design program grasshopper and the structural plug-in karamba, is informing the project with some guiding structural dimensions, which then is being verified in the structural program Robot Structure and checked by hand calculations.



Ill. 137 - Testing structure in Karamba

Phase 4

Materiality and detailing

In the final phase of the process the final proposal is developed and adjustments are refining some concepts while others are discarded.
Technical considerations are at this point informing the design on a direct level, and where the last principles and studies are made in orden to complete the design.

Detailed constructual principles and considerations on meetings and interference of materials, e.g. polycarbonate and brick, roof details and interior material principles.
Final studies and investigations of elevations interact with the plans and at the same time have reflections of fullfill the demands to energy efficency.

Ill. 138 - Material and facade workshop

EPILOGUE

CONCLUSION

Summerising the project

This project deals with an investigation of architectural potentials in asylum centers. The project starts by discussion the discourse of asylum centers and position the centers within welfare architecture. This position provides the asylum center with new values. The asylum center should now be a part of and contribute to the Danish welfare society, instead of merely be something, which the Danish state need to put money into. The project then seeks to examine this new definition in an architectural conceptual level as in a preliminary design of an asylum center. The values are to be transformed through an architectural embodiment, where interaction and hospitality are the main themes. A tectonic way of thinking architecture is chosen in this unfolding of the values with focus upon the articulating of ideas through the constructive technique.

The project investigates the situation at existing asylum centers, where the centers are often comparable with small remotely located villages with limited contact to the rest of the society. The project chooses to explore how asylum centers can be placed in the city, where the interaction with the society is closest. The project outlines from here a conceptual idea of an urban catalyst. By placing asylum centers in run down areas or in new developing areas, the new inhabitants and the many different programs will work as a catalyst creating instant life and diversity in these areas and when the city develops around the asylum center, it will be moved to another location, leaving spaces for cheap apartments for young couples, student and elderly, which is needed in the city. This ensures social sustainability through diversity and vibrant city life through mixed-used programs.

Nordhavn is one the new development areas in Copenhagen, which have a great potential of being a new lively neighborhood, however in this starting phase only 3,5 % of the apartments is set to contain cheap accommodation and almost no cultural buildings are planned. The project therefore aims on placing an asylum center in this area. An old warehouse is chosen for asylum center, this building will provide the opportunity to create an asylum center, which ties and express past, present and future of Nordhavn.

The architectural concept is based around a continuation of the warehouse as a tectonic metaphor, turning the negative connotations tied to the temporality of asylum center into a feeling of change, movement and progressing from refugee to citizen.

Consequently the concept introduces six stacked groups of light boxes, which inhabits and shapes the old warehouse.

The integrated preliminary design of the asylum center is made upon both architectural and engineering methods with focus upon structural engineering and how that can be integrated in the articulation of architecture. The project strives to open up the asylum center by focusing on creating interaction with its surrounds both by arranging public programs close to the street and literally by making indentations in the old warehouse, which leads people into the asylum center.

The new asylum center is a diverse and vibrant place, with many different activities. The stacked boxes becomes almost a three dimensional landscape shaping the interior space, creating an in-between space, which with its open and multipurpose programs ties the whole building together. Furthermore are the activities in the boxes exposed, as silhouettes on the polycarbonate walls ensuring a lively and ever-changing space. In-between spaces, where the asylum seekers can natural meet the people of the surrounding community.

The light boxes are constructed by a steel structure, which ensures its lightness and also strengthen its ability to cantilever and hereby enabling varied spaces. The existing structure carries the boxes while boxes help stabilizing the structure creating a natural dialogue between them. This construction with light boxes carried by a structure underlies the metaphor of a warehouse.

The interior of the boxes is "stuffed" with warm wooden walls used to create comfortable, welcoming and pleasant places. Wooden plates are used to create small spatial gestures as small folded indentations creating sitting niches, where for example informal meetings between asylum seekers and the staff can occur. Also meeting spaces are made in wood to make these spaces welcoming, expressing hospitality towards the asylum seeker. In general creating spaces where the asylum seeker can feel safe.

The private rooms are located in small apartments, which image a small town house with front gardens. This creates privacy for the individual asylum seekers as the possibility of community feeling by naturally meeting the other asylum seekers in shared kitchen and community spaces.

The design proposal strive to create an asylum center, where the temporary is meant as movement or change from refugee to citizen, whether it is in Denmark or another country. This change is made through a focus on creating interaction and expressing hospitality between asylum seekers and the Danish society. An interaction and hospitality, which works in both directions creating a center and a place, where asylum seekers can feel they belong and re-establish them as citizens. Furthermore a center which gives diversity and vibrancy back to its surroundings.

REFLECTION

The aim of this paragraph is to return to the essential questions raised in the introduction of the project and try to reflect upon the project in a broader perspective.

The project essentially contributes to the debate of a contemporary issue: more and more asylum seekers are coming to Denmark and the asylum centers is under a lot of pressure. How should we accommodate all refugees in Denmark?

Rather than solving a spatial problem, the project aim for a more optimistic approach trying to explore architectural potentials in the design of future asylum centers. The project herby restrains itself from strict economical aspects, in order to set focus upon this exploration. The issue in hand is by nature multifaceted and complex because it directly interferes with Danish societies view on asylum seekers and refugees in general. The project therefore chose to rely on a critical, iterative and interdisciplinary method in order to be able to get a broader understanding of the issue. A method, which implements a range of scientific, architectural and engineering methods in the process in order strengthen the validation of the project from different angles. The project differs from normal architectural assignments, where the architects are assigned to due a specific project, as maybe a school, museum or hospital. By focusing on one specific issue, the project seeks to put the architects on stage in the discussion of how and what we design in our "built" society. Hereby taking note of Kjeld Vindums demands on architects doing so in the article "Architecture creates welfare" (information, 2013).

The project therefor aims to question, whether we should add asylum centers to the groups of welfare institutions. By rising that debate the project had to set focus on the importance of being able to balance between the limitations and potentials within the architectural discipline. As consequence the project naturally do not set out to change the political views on asylum or the laws of the asylum application, but more specific on how a change in the architectural discourse could change the values and our perception of asylum centers. This new position within welfare architecture is a crucial strategy in this project, because it basically enables architects to think of and design asylum centers in the future. It essentially establishes a framework in which we could provide new values and connotations to the design of asylum centers.

This could potentially also work as a framework in which other architects could think of asylum centers in the future. As an example, it is quite similar to designing a public school.
In the 1970's the values of designing a school would have been about "community" values (information, 2013) today it is more maybe more about individuality and variable learning (skolereform, 2014). The provided values would change over time, maybe even from project to project, but the starting point as welfare institution is crucial for these values to emerge.

From the values the project aims to examine them through developing of an architectural idea and preliminary design of an asylum center. The critical analytical methods is again utilized to establish a more holistic architectural idea, where the architecture is not only discussed according to how it should look and work, but takes into consideration parameters as time and place, dealing with the temporality of asylum centers. Its establishment, present and future and in which context it makes sense to establish asylum centers.

These consideration could only have been establish by insisting on interdisciplinary work and different kinds of analytical methods, as interviews, theoretical work, document analysis, architectural registrations, site visits and so on. It is on the same time important to highlight that the chosen analysis naturally have a great impact on the outcome. In addition the project most also take into account individual empathy, when dealing with accommodation of refugees, which also flavor the outcome. The product is still valid in its frame of analysis,

but the method relies on being able to critically discuss the methods applied and to discuss how they can be compared.

The project aims to examine a tectonic way of thinking architecture in unfolding these values and architectural ideas. The tectonic way of thinking architecture is chosen do to its focus on articulating ideas through the constructive technique. The examination and strength of these new values and architectural idea depends as much on their ability to be translated or embodied into architectural form. It is in this translation the value and strength of the project will decide the matter.

Focusing on a tectonic way thinking, construction and structural engineering will naturally be the main focus in this embodiment of ideas. The project therefore delimits itself from advanced climatic investigations as energy performance calculations and indoor climate simulations. However as part of an integrated process and an integrated preliminary design proposal these technical aspects have been discussed and certain strategies have been outlined.

For examples strategies dealing with ventilation, day lighting, acoustics, and climate screen. Considerations, which will ease a future development of the project, and contribute to maintain the architectural ideas from sketch to building. By this notion the project strive to address Anne Beim's concerns of architectural devaluation in the finished product due to lack of technical knowledge. It does so by insisting on engineering as not simple problem solving, where the goal is the right number in the end, but utilizing engineering as a method of creating form. This is for instance seen in the project in the way the metaphor of a warehouse is constructed in different scales. Starting with idea of stacked boxes in a grid, the boxes are constructed from steel members and polycarbonate to provide them with a light appearance contrasting the loadbearing massive concrete grid. Down to the construction detail, which hide the frame of polycarbonate in order to create an image of a resting volume.

Returning to Kjeld Vindum demand of architects being able to discuss how we should build. We essentially mean that the project also shows that if architects really need to get back into the discussion and win back the respect of the society as Kjeld Vindum says,(Information, 2013) the architects should be able to transform their ideas and diagrams into physical architectural form and let that be the strongest medium in which they discuss the built environment.

This project sets up an idea of an urban catalyst, as an answer to the question of how Denmark should accommodate asylum seekers in the future, but it is through the preliminary design proposal that the idea unfolds as an asylum center, which functions melts together with the surrounding. Creating a new welfare institution for social interaction and diversity contributing to the establishment of communities and city life in run down or new development areas. It's actually a social idea, which enrols and contributes to the municipalities vision for Copenhagen and the Danish society in general, where everyone should be able to live next to each other (politken, 2013).

In the end, architects need to be able to examine their ideas and interdisciplinary and tectonic methods could be the key to embody future ideas into the built environment bringing the architects back unto the discussion.

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Illustrations

Ill. 1 – Photo of Nordhavn
Ill.. 2 – Photo of girl in Center Sandholm
http://www.information.dk/sites/information.dk/files/styles/article_full__normal/public/media/2009/04/01/20090401-201938-pic-313424526.jpg?itok=21a_bk6c
Ill. 3 – Photo entrance Center Sandholm http://multimedia.pol.dk/archive/00281/Sandholm_Asylcenter_281581a.jpg
Ill. 4 – Asylum Centers in Denmark – Own Collage
https://www.google.com/fusiontables/embedviz?q=select+col1+from+1V5peeVq__y1YRYiAlzcTILl-tRv6BISVPomVm2g&viz=MAP&h=false&lat=55.998714766637576&lng=11.75144921874994&t=1&z=7&l=col1&y=2&tmplt=2&hml=GEOCODABLE
Ill. 5 – Transportation Flow – Own – based on information from Refugee Welcome
http://refugeeswelcome.dk/bcknd/wp-content/uploads/AsylcenterLimbo_web2.pdf
Ill. 6 – Photo Center Sandholm
http://www.information.dk/sites/information.dk/files/styles/article_full__normal/public/media/2013/07/09/2013/07/09/20130709-201638-150505.jpg?itok=vx_AAF6y
Ill.. 7 – 10 – Own Collages
Ill. 11 – Flow & public / private spaces – own diagram
Ill. 12 – Kulturhus Nordvest– COBE
http://www.coastarc.com/97829/894536/-architecture-/kulturhus-nordvest
Ill. 13 – Nordkraft – Cubo
http://www.visitaalborg.dk/aalborg/nordkraft-her-foerer-fortidens-spor-ind-i-fremtiden
Ill. 14 – Abstraction of Kulturhus Nordvest – Own collage
Ill. 15 – Foyer Kulturhus Nordvest
http://www.coastarc.com/97829/894536/-architecture-/kulturhus-nordvest
Ill. 16 – Reading room Kulturhus Nordvest
http://www.weber.dk/typo3temp/pics/9a09574d82.jpg
Ill. 17 – Material Foyer – Own Collage
Ill. 18– Material Reading room – Own Collage
Ill. 19 – Entrance Livsrum Herning - Claus Pryds
http://www.clauspryds.dk/media/4522/15.gif
Ill. 20 – Room Tietgen Kollegiet – Lundgaard Tranberg
http://tietgenkollegiet.dk/wp-content/uploads/2012/05/V%C3%A6relse-3.jpg
Ill. 21 – Abstraction of Livsrum Herning – Own collage
Ill. 22 – Community room in Livsrum
http://www.clauspryds.dk/media/5604/37.gif
Ill. 23 – Lounge . Livsrum
http://www.clauspryds.dk/media/5590/36.gif
Ill. 24 – Material Conversation room – Own Collage
Ill. 25– Material lounge – Own Collage
Ill. 26 – Connecting asylum centers with new urban ares – Own collage
Ill. 27 – A vibrant city – Own collage
Ill. 28 – Sustainable strategy – Own collage
Ill. 29 – Atmosphere in Nordhavn by COBE
http://www.cobe.dk/img/slide/cobe_nordhavnen_image_34-11.jpg
Ill. 30 – Masterplan Nordhavn by COBE
http://www.cobe.dk/img/slide/cobe_nordhavnen_image_32-11.jpg
Ill. 31 – Contemporary Nordhavn and Copenhagen
http://www.cobe.dk/img/slide/cobe_nordhavnen_image_22-05.jpg
Ill. 32 – Future Nordhavn and Copenhagen
http://www.cobe.dk/img/slide/cobe_nordhavnen_image_23-06.jpg
Ill. 33 – Development for Nordhavn – Own collage
Ill. 34 – Infrastructure at Nordhavn – Own collage
Ill. 35 – Functions in Nordhavn – Own collage
Ill. 36 – Section through Nordhavn – Own collage
Ill. 37 – Section overview – Own collage
Ill. 38 – Atmosphere in Nordhavn – Own collage
Ill. 39 – Materials in nordhavn - own collage
Ill. 40 catalogue of materials in Nordhavn – own photos
Ill. 41 – Rainfall and temperature (Weather and climate.com, 2015)
http://www.weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,romo-kirkeby,Denmark
Ill. 42 – Sun diagram (Claaw.Wordpress.com, 2015) https://claaw.files.wordpress.com/2008/10/winnipeg1.png
Ill. 43 – Wind rose (Dmi.dk, 2015) http://www.dmi.dk/fileadmin/user_upload/Rapporter/TR/1999/tr99-13.pdf
Ill. 44 – Pakhus 54 - Own collage
Ill. 45 – Pakhus 54 – Own collage
Ill. 46 Present masterpan – own collage
Ill. 47 Future masterplan – own collage
Ill. 48 Ground floor pakhus 54 – own col
Ill. 49 First floor pakhus 54 – own col
Ill. 50 Section AA own collage
Ill. 51 Section BB own collage
Ill. 52 explodet axo own collage
Ill. 53 Static scheme - own collage
Ill. 54 dimensions on structural elements
Ill. 55 – load capacity
Ill. 56 – Catalogue of materials at pakhus 54 – Own collage
Ill. 57 – structure of pakhus 54 – own collage
Ill. 58 – Conceptual model – Own collage
Ill 59 – conceptual ide – own col
Ill. 60 – Combining Functions – Own
Ill 61 – Providing Functions – Own
Ill 62 – dividing to privacy- own
Ill 63 – open enclosed spaces
Ill. 64 – Conceptual development – own
Ill. 65 Combining conceptual development – own
Ill 66 – Spacial program – own
Ill 67 – material catalogue separate – own
Ill 68 – material cataloguge shared – own
Ill 69 - material cataloguge mix – own
Ill. 70 –Polycarbonate and structure
https://s-media-cache-ak0.pinimg.com/originals/9d/ac/cd/9daccd648e48b75ccc14b47e89f8d566.jpg
Ill 71 - Gusswerk extension by LP Architects
http://ad009cdnb.archdaily.net/wp-content/uploads/2013/10/525cac00e8e44eff02000a37_gusswerk-

extension-lp-architektur_501-530x794.jpg
ill 72 – materials foyer – own
ill 73 – foyer concept model – own
ill 74 – materialer asylum center – own
ill 75 – asylum center concept model – own
ill 76 – materials apartments – own
ill 77 – apartment concept model own
ill 78 – structure model –own
ill 79 design model – own
ill 80 – organizing program – own
ill 81 – shaping the functions own
ill 82 – the dwellings – own
ill 83 - the space in between – own
ill 84 – Arrival exterior– own
Ill 85 – Siteplan 1:800 own
Ill 86 - served and servant – own (Louis Kahn)
Ill 87 – served and servant around the core - own
Ill 88 – Internal and external flow - own
Ill 89 – Ground floor 1:600 – Own
Ill 90 – Functions diagram ground floor – own
Ill 91 – First floor 1: 600 –own
Ill 92 - Functions diagram first floor – own
Ill 93 – Second floor 1: 600 –own
Ill 94 - Functions diagram second floor – own
Ill 95 – Section AA Overview – Owm
Ill 96 –Section AA 1:200 – own
Ill 97 – Third floor 1: 600 –own
Ill 98 - Functions diagram third floor – own
Ill 99 – Fourth floor 1: 600 –own
Ill 100 - Functions diagram fourth floor – own
Ill 101 – Fifth floor 1: 600 –own
Ill 102 - Functions diagram fifth floor – own
Ill 103 – Sixth floor 1: 600 –own
Ill 104 - Functions diagram sixth floor – own
Ill 105 – Section BB Overview – Owm
Ill 106 –Section BB 1:400 – own
Ill 107 – the box as an element unit – own
Ill 108 – static scheme of the symbiotic structures - own
Ill 109 – symbiotic structures – own
Ill 110 - the material element of the boxes – own
Ill 111 – café and foyer area – interior – own
Ill 112 – café and foyer area – axometric -own
Ill 113 – longe at conversation room – own
Ill 114- conversation room – axometric – own
Ill 115 – the apartment – interior – own
Ill 116 – the apartment – axometric – own
Ill 117 –ground floor plan of the apartment – 1:75 – own
Ill 118 –first floor plan of the apartment – 1:75 – own
Ill 119 – section through the apartment – 1:75 – own
Ill 120 – overview of construction details on box -own
Ill 121 – construction detail of floor in box – 1:20 – own
Ill 122 - construction detail of ceiling in box – 1:20 – own
Ill 123 – west elevation 1:600 – own
Ill 124 – east elevation 1:600 – own
Ill 125 – Construction detail façade – 1:30
Ill 126 – south elevation 1:600 – own
Ill 127 – north elevation 1:600 – own
Ill 128 – Construction detail Roof – 1:20
Ill 129 – axometric principle of glass rood construction
Ill 130 – ventilation principle for apartment
Ill 131 – ventilation principle for cores – own
Ill 132 – Structure model in process – own
Ill 133 – model workshop – own
Ill 134 – Form, structure and space workshop – own
Ill 135 – Form and context workshop – own
Ill 136 – Form and program workshop – own
Ill 137 - testing structure in Karamba - own
Ill 138 – material and façade workshop - own

APPENDIX

APPENDIX 1

Investigations of load capacity on existing structure

For a selected beam element in the building, a principle calculation of the ultimate limit state for a concrete beam is made. The calculations is made with technical informations of the building, such as dimensions and amount of reinforcement. The calculation is made by to demonstrate that the assumptions hold.

Beam in office wing

Width	$w = 0{,}25\ m$
Height	$h = 0{,}45\ m$
Length	$l = 4{,}1\ m$
Span distance	$cc = 4{,}0\ m$

Concrete C30 (Class P)

Compression strength $f_{ck} = 30\ MPa$

Tentor steel

Yield strength $f_{yk} = 550\ MPa$

Consequence Class (CC3-high): $K_{FI} = 1{,}1$

Control class(normal): $\gamma_3 = 1{,}0$

Partial coefficient:

$$\gamma_c = 1{,}4 \cdot \gamma_3 = 1{,}4 \cdot 1{,}0 = 1{,}4$$

$$\gamma_s = 1{,}2 \cdot \gamma_3 = 1{,}2 \cdot 1{,}0 = 1{,}2$$

1,4 in γ_c means that the beam element is prefab, had it been in-situ, it should be 1,45 (EC2)

$$f_{cd} = \frac{f_{ck}}{\gamma_c} = \frac{30}{1{,}4} = 21{,}43\ MPa$$

$$f_{yd} = \frac{f_{yk}}{\gamma_s} = \frac{550}{1{,}2} = 458{,}33\ MPa$$

Reinforcement area

The area of reinforcement is:

$$A_s = \left(\frac{\pi}{4} \cdot d^2\right) \cdot n_{reinforcement}$$

d is the diameter and n the amount of reinforcement sticks.

$$A_s = \left(\frac{\pi}{4} \cdot 12^2\right) \cdot 8 = 905{,}1\ mm^2$$

Loads

Permanent load (own load)

$$g_{beam} = \frac{h \cdot w \cdot l \cdot p \cdot g}{l \cdot cc} = \frac{0{,}45\ m \cdot 0{,}25\ m \cdot 4{,}1\ m \cdot 2300 \frac{kg}{m^2} \cdot 9{,}82\ m/s^2}{4{,}1\ m \cdot 4{,}0\ m} = 0{,}64\ kN/m^2$$

<u>Ultimate limit strength (ULS):</u>

Calculated lineload for beam

Consequence Class (CC3): $K_{FI} = 1{,}1$

schedule 4.1 in Teknisk Stabi

$$P_{dR_{egenlast}} = K_{FI} \cdot \left(1 \cdot\ g_{permanent} \cdot cc\right)$$

$$P_{dR_{ownload}} = 1{,}1 \cdot \left(1 \cdot\ 0{,}64 \frac{kN}{m^2} \cdot 4{,}0m\right) = 2{,}795\ kN/m$$

Vertical equilibrium (Zero line height):

The tension force in the reinforcement have to be the same as the compression force in the concrete, why the zero line height can be found:

$$0{,}8 \cdot x \cdot b \cdot f_{cd} = A_s \cdot f_{yd}$$

$$x = 1{,}25 \cdot \frac{A_s \cdot f_{yd}}{b \cdot f_{cd}} = 1{,}25 \cdot \frac{905{,}1\ mm^2 \cdot 458{,}33\ MPa}{250\ mm\ \cdot 21{,}43\ MPa}$$

$$= 96{,}8\ mm$$

Breakingmoment:

Since breaking moment must be greater than the maximum moment influence the slab can be subjected to examine it:

$$M_{Sd} < M_{Rd}$$

Having d as the distance from the upper edge to the reinforcement, the breaking moment can be calculated.

$$M_{Rd} = A_s \cdot f_{yd} \cdot (d - 0{,}4 \cdot x)$$
$$M_{Rd} = 905{,}1\ mm^2 \cdot 458{,}33\ MPa \cdot (350\ mm - 0{,}4 \cdot 96{,}8\ mm) = 129{,}14\ kN \cdot m$$

Maximal moment afffected by own load and maximal load:

$$M_{Sd,R_{ownload}} = \frac{1}{8} \cdot P_{dR_{ownload}} \cdot l^2$$

$$M_{Sd,R_{ownload}} = \frac{1}{8} \cdot 2{,}795 \frac{kN}{m} \cdot 4{,}1m^2 = 5{,}87\ kN \cdot m$$

Thus, the maximum moment is absorbed as:

Permanent:

$$M_{Sd} < M_{Rd} = 5{,}87\ kN \cdot m\ < 129{,}12\ kN \cdot m$$

Dimensioning of concrete column in office wing

Generally it can be said that short columns fail by yielding, and long columns fail by buckling. In these calculations, the following is checked for deflection. Columns counted only in BGT in this task. Therefore the design loads are used:

Concrete

In the column the properties of the concrete is utilized to absorb pressure optimally.
However, the columns are reinforced so that the steel takes between 10 and 50% of the pressure.
The tension in the steel is calculated by a transformed sectioncut,. Here, an alpha value is used which is found in Teknisk Stäbi
For a selected column element in the building, a principle calculation of the ultimate limit state for a concrete column is made. The calculations is made with technical informations of the building, such as dimensions and amount of reinforcement. The calculation is made by to demonstrate that the assumptions hold.

Column in storage wing

Width	$w = 0{,}4\ m$
Height	$h = 0{,}4\ m$
Length	$l = 13\ m$
Span distance	$cc = 4\ m$

Concrete C30 (Class P)

Compression strength $f_{ck} = 30\ MPa$

Tentor steel

Yield strength $f_{yk} = 550\ MPa$

Consequence Class (CC3-high): $K_{FI} = 1{,}1$

Control class(normal): $\gamma_3 = 1{,}0$

Partial coefficient:

$$\gamma_c = 1{,}4 \cdot \gamma_3 = 1{,}4 \cdot 1{,}0 = 1{,}4$$

$$\gamma_s = 1{,}2 \cdot \gamma_3 = 1{,}2 \cdot 1{,}0 = 1{,}2$$

Calculation values:

$$f_{cd} = \frac{f_{ck}}{\gamma_c} = \frac{25}{1{,}4} = 17{,}86\ MPa$$

$$f_{yd} = \frac{f_{yk}}{\gamma_s} = \frac{550}{1{,}2} = 458{,}33\ MPa$$

Reinforcement area

The area of reinforcement is:

$$A_s = \left(\frac{\pi}{4} \cdot d^2\right) \cdot n_{reinforcement}$$

d is the diameter and n the amount of reinforcement sticks.

$$A_s = \left(\frac{\pi}{4} \cdot 12^2\right) \cdot 4 = 452{,}6\ mm^2$$

Loads

Permanent load (own load):

$$g_{column} = \frac{h \cdot w \cdot l \cdot p \cdot g}{l \cdot cc}$$

$$= \frac{13\ m\ \cdot\ 0{,}4\ m\ \cdot\ 0{,}4\ m\ \cdot 2300 \frac{kg}{m^2}\ \cdot\ 9{,}82 \frac{m}{s^2}}{13\ m\ \cdot\ 4{,}0\ m}$$

$$= 0{,}904\ kN/m^2$$

Number of beams that is supported by the column: 12 numbers – 3 floors of four beams.

Ultimate limit strength (ULS):

Calculated pointload for column

The overall permanent load on the column:

$$P_{d_g} = K_{FI} \cdot \left(1 \cdot\ g_{permanent} \cdot \left(\frac{h}{2} \cdot cc\right)\right)$$

$$P_{d_g} = 1{,}1 \cdot \left(1 \cdot\ 0{,}904\ \frac{kN}{m^2} \cdot \left(\frac{13m}{2} \cdot 4{,}0m\right)\right) = 25{,}9\ kN$$

Reinforcement ratio

The reinforcement ratio, having 4 stiks of 12 mm in diameter is included:

$$\rho = \frac{A_s}{A_c} = \frac{452{,}4\ mm^2}{400\ mm \cdot 400\ mm} = 0{,}283\ \%$$

Examines that the ratio of reinforcing is between the recommended:

$$0{,}2\% < 0{,}283\% < 4\%$$

Elastic modulus:

$$E_{\mathbf{0}\,crd} = \begin{Bmatrix} 1000 \cdot f_{cd}\ for\ f_{cd} \leq 25\ MPa \\ 0{,}75 \cdot E_{0d}\ for\ f_{cd} > 25\ MPa \end{Bmatrix}$$

When $f_{cd} = 17{,}86\ MPa$

Why the first equation is used:

$$E_{\mathbf{0}\,crd} = 1000 \cdot f_{cd} = 1000\ \cdot 17{,}86\ MPa = 17860\ MPa$$

Tension

The critical tension for concrete is found:

$$\sigma_{cr} = \frac{f_{cd}}{1 + \frac{f_{cd}}{\pi^2 \cdot E_{\mathbf{0}\,crd}} \cdot \lambda^2} = \frac{17{,}86\ MPa}{1 + \frac{17{,}86\ MPa}{\pi^2 \cdot 17860\ MPa} \cdot 112{,}583^2} =$$

$7{,}82\ MPa$

Tension in reinforcement:

Can be found in Teknisk Stäbi table 5.14 p. 200

$$a = 24$$

$$\sigma_s = a \cdot \sigma_{cr} = 24 \cdot 7{,}82\ MPa = 187{,}65\ MPa$$

Chek:

$$\sigma_s < f_{cd} = 187{,}65\ MPa < 458{,}33\ MPa$$

Load capacity of column:

Load capacity of concrete:

$$N_c = b \cdot l \cdot \sigma_{cr} = 400\ mm\ \cdot 400\ mm \cdot 7{,}82\ MPa$$
$$= 1251{,}2\ kN$$

Load capacity of Reinforcement:

$$N_s = A_s \cdot \sigma_s = 452{,}4\ mm^2 \cdot 187{,}65\ MPa = 85\ kN$$

There is verified that the load capacity of the reinforcement is less than 50% of the load capacity of the concrete:

$$N_s < 0{,}5 \cdot N_c = N_s < 0{,}5 \cdot 1251{,}2\ kN = 85\ kN$$
$$< 625{,}6\ kN$$

The overall load capacity:

$$N_{cr} = N_c + N_s = 1251{,}2\ kN + 85\ kN = 1336{,}2\ kN$$

The design point load must be less than the columns total load capacity:

$$P_{d_g} < N_{cr} = 25{,}9\ kN < 1336{,}2\ kN$$

APPENDIX 2

Investigations of load capacity on existing structure

The ultimate limit state for beams in storage wing

For a selected beam element in the building, a principle calculation of the ultimate limit state for a concrete beam is made. The calculations is made with technical informations of the building, such as dimensions and amount of reinforcement. The calculation is made by to demonstrate that the assumptions hold.

Beam in storage wing

Width	$w = 0{,}5\ m$
Height	$h = 1{,}0\ m$
Length	$l = 9{,}4\ m$
Span distance	$cc = 8{,}4\ m$

Concrete C30 (Class P)

Compression strength $f_{ck} = 30\ MPa$

Tentor steel

Yield strength $f_{yk} = 550\ MPa$

Consequence Class (CC3-high): $K_{FI} = 1{,}1$

Control class(normal): $\gamma_3 = 1{,}0$

Partial coefficient:

$$\gamma_c = 1{,}4 \cdot \gamma_3 = 1{,}4 \cdot 1{,}0 = 1{,}4$$

$$\gamma_s = 1{,}2 \cdot \gamma_3 = 1{,}2 \cdot 1{,}0 = 1{,}2$$

1,4 in γ_c means that the beam element is prefab, had it been in-situ, it should be 1,45 (EC2)

Calculation values:

$$f_{cd} = \frac{f_{ck}}{\gamma_c} = \frac{30}{1{,}4} = 21{,}43\ MPa$$

$$f_{yd} = \frac{f_{yk}}{\gamma_s} = \frac{550}{1{,}2} = 458{,}33\ MPa$$

Reinforcement area

The area of reinforcement is:

$$A_s = \left(\frac{\pi}{4} \cdot d^2\right) \cdot n_{reinforcement}$$

d is the diameter and n the amount of reinforcement sticks.

$$A_s = \left(\frac{\pi}{4} \cdot 25^2\right) \cdot 18 = 8840\ mm^2$$

Loads

Permanent load (own load)

$$g_{beam} = \frac{h \cdot w \cdot l \cdot p \cdot g}{l \cdot cc} = \frac{1{,}0\ m \cdot 0{,}5\ m \cdot 9{,}4\ m \cdot 2300 \frac{kg}{m^2} \cdot 9{,}82\ m/s^2}{9{,}4\ m \cdot 8{,}4\ m} = 1{,}34\ kN/m^2$$

Ultimate limit strength (ULS):

Calculated lineload for beam

Consequence Class (CC3): $K_{FI} = 1{,}1$

The coefficients on the loads is determined from schedule 4.1 in Teknisk Ståbi

$$P_{dR_{egenlast}} = K_{FI} \cdot \left(1 \cdot\ g_{permanent} \cdot cc\right)$$

$$P_{dR_{ownload}} = 1{,}1 \cdot \left(1 \cdot\ 1{,}34 \frac{kN}{m^2} \cdot 8{,}4\ m\right) = 12{,}42\ kN/m$$

Vertical equilibrium (Zero line height):

The tension force in the reinforcement have to be the same as the compression force in the concrete, why the zero line height can be found:

$$0{,}8 \cdot x \cdot b \cdot f_{cd} = A_s \cdot f_{yd}$$

$$x = 1{,}25 \cdot \frac{A_s \cdot f_{yd}}{b \cdot f_{cd}} = 1{,}25 \cdot \frac{8840\ mm^2 \cdot 458{,}33\ MPa}{250\ mm \cdot 21{,}43\ MPa}$$

$$= 472{,}7\ mm$$

Breakingmoment:

Since breaking moment must be greater than the maximum moment influence the slab can be subjected to examine it:

$$M_{Sd} < M_{Rd}$$

Having d as the distance from the upper edge to the reinforcement, the breaking moment can be calculated.

$$M_{Rd} = A_s \cdot f_{yd} \cdot (d - 0{,}4 \cdot x)$$

$$M_{Rd} = 8840\ mm^2 \cdot 458{,}33\ MPa \cdot (850\ mm - 0{,}4 \cdot 472{,}7\ mm) = 2677{,}7\ kN \cdot m$$

Maximal moment afffected by own load and maximal load:

$$M_{Sd,R_{ownload}} = \frac{1}{8} \cdot P_{dR_{ownload}} \cdot l^2$$

$$M_{Sd,R_{ownload}} = \frac{1}{8} \cdot 12{,}42 \frac{kN}{m} \cdot 9{,}4m^{\,2} = 137{,}2\ kN \cdot m$$

Thus, the maximum moment is absorbed as:

Permanent:

$$M_{Sd} < M_{Rd} = 137{,}2\ kN \cdot m\ < 2677{,}7\ kN \cdot m$$

Dimensioning of concrete column in office wing

Generally it can be said that short columns fail by yielding, and long columns fail by buckling. In these calculations, the following is checked for deflection. Columns counted only in BGT in this task. Therefore the design loads are used:

Concrete

In the column the properties of the concrete is utilized to absorb pressure optimally.
However, the columns are reinforced so that the steel takes between 10 and 50% of the pressure.
The tension in the steel is calculated by a transformed sectioncut,. Here, an alpha value is used which is found in Teknisk Stäbi

For a selected column element in the building, a principle calculation of the ultimate limit state for a concrete column is made. The calculations is made with technical informations of the building, such as dimensions and amount of reinforcement. The calculation is made by to demonstrate that the assumptions hold.

Column in storage wing

Width	$w = 0{,}8\ m$
Height	$h = 0{,}8\ m$
Length	$l = 14\ m$
Span distance	$cc = 8{,}4\ m$

Concrete C30 (Class P)

Compression strength $f_{ck} = 30\ MPa$

Tentor steel

Yield strength $f_{yk} = 550\ MPa$

Consequence Class (CC3-high): $K_{FI} = 1{,}1$

Control class(normal): $\gamma_3 = 1{,}0$

Partial coefficient:

$$\gamma_c = 1{,}4 \cdot \gamma_3 = 1{,}4 \cdot 1{,}0 = 1{,}4$$

$$\gamma_s = 1{,}2 \cdot \gamma_3 = 1{,}2 \cdot 1{,}0 = 1{,}2$$

Calculation values:

$$f_{cd} = \frac{f_{ck}}{\gamma_c} = \frac{25}{1{,}4} = 17{,}86\ MPa$$

$$f_{yd} = \frac{f_{yk}}{\gamma_s} = \frac{550}{1{,}2} = 458{,}33\ MPa$$

Reinforcement area

The area of reinforcement is:

$$A_s = \left(\frac{\pi}{4} \cdot d^2\right) \cdot n_{reinforcement}$$

d is the diameter and n the amount of reinforcement sticks.

$$A_s = \left(\frac{\pi}{4} \cdot 26^2\right) \cdot 8 = 4249\ mm^2$$

Loads

Permanent load (own load)

$$g_{column} = \frac{h \cdot w \cdot l \cdot p \cdot g}{l \cdot cc}$$

$$= \frac{14\ m\ \cdot\ 0{,}8\ m\ \cdot\ 0{,}8\ m\ \cdot 2300 \frac{kg}{m^2}\ \cdot\ 9{,}82 \frac{m}{s^2}}{14\ m\ \cdot\ 8{,}4\ m}$$

$$= 1{,}72\ kN/m^2$$

Number of beams that is supported by the column: 12 numbers – 3 floors of four beams.

Ultimate limit strength (ULS):

Calculated pointload for column

The overall permanent load on the column:

$$P_{d_g} = K_{FI} \cdot \left(1 \cdot\ g_{permanent} \cdot \left(\frac{h}{2} \cdot cc\right)\right)$$

$$P_{d_g} = 1{,}1 \cdot \left(1 \cdot\ 1{,}72 \cdot \left(\frac{14m}{2} \cdot 9{,}4\ m\right)\right) = 111{,}3\ kN$$

Reinforcement ratio

The reinforcement ratio, having 8 stiks of 26 mm in diameter is included:

$$\rho = \frac{A_s}{A_c} = \frac{4249\ mm^2}{800\ mm \cdot 800\ mm} = 6{,}64\ \%$$

Elastic modulus:

$$E_{\mathbf{0}\,crd} = \begin{Bmatrix} 1000 \cdot f_{cd}\ for\ f_{cd} \leq 25\ MPa \\ 0{,}75 \cdot E_{0d}\ for\ f_{cd} > 25\ MPa \end{Bmatrix}$$

When $f_{cd} = 17{,}86\ MPa$

Why the first equation is used:

$$E_{\mathbf{0}\,crd} = 1000 \cdot f_{cd} = 1000\ \cdot 17{,}86\ MPa = 17860\ MPa$$

Tension

The critical tension for concrete is found:

$$\sigma_{cr} = \frac{f_{cd}}{1 + \frac{f_{cd}}{\pi^2 \cdot E_{\mathbf{0}\,crd}} \cdot \lambda^2} = \frac{17{,}86\ MPa}{1 + \frac{17{,}86\ MPa}{\pi^2 \cdot 17860\ MPa} \cdot 60{,}62^2} =$$

$$13{,}01\ MPa$$

Tension in reinforcement:

Can be found in Teknisk Ståbi table 5.14 p. 200

$$a = 24$$

$$\sigma_s = a \cdot \sigma_{cr} = 24 \cdot 13{,}01\ MPa = 2443\ MPa$$

Load capacity of column:

Load capacity of concrete:

$$N_c = b \cdot l \cdot \sigma_{cr} = \ 800\ mm\ \cdot 800\ mm \cdot 13{,}01\ MPa = 8329{,}5\ kN$$

Load capacity of Reinforcement:

$$N_s = A_s \cdot \sigma_s = \ 4249\ mm^2 \cdot 2443\ MPa = 10380{,}5\ kN$$

There is verified that the load capacity of the reinforcement is less than 50% of the load capacity of the concrete:

$$N_s < 0{,}5 \cdot N_c = N_s < 0{,}5 \cdot 8329{,}5\ kN = 4164{,}8\ kN < 625{,}6\ kN$$

The overall load capacity:

$$N_{cr} = N_c + N_s = 8329{,}5\ kN + 10380{,}5\ kN = 18710\ kN$$

The design point load must be less than the columns total load capacity:

$$P_{d_g} < N_{cr} = 111{,}3\ kN < 18710\ kN$$

APPENDIX 3

Structural Verification and calculation

For structural calculations of the project, a typical group of stacked boxes are modelled and verified by finite element method in "Ultimate Limit state" combination in Robot Structural analysis and also in "Service limit calculation" combination for calculating deformation.
Subsequently the most critical member is verified by a hand calculation. Furthermore the moment forces in the existing structure are documented in order to ensure it's not reaching its limitations according to previous calculations.

The structural model is modelled in Rhinoceros and added to Robot using GH2Robot plugin for Grasshopper.

Basis for Calculation

Materials:

Steel:

Young modulus: 21000000000 Pa

Shear module: 81000000000 Pa

Yield Strengh: 235000000 Pa

Tension Resistance: 360000000 Pa

Members:

Steel I-Profile (INP) nr. 30 (DIN 1025 1, Table 6.5, Jensen, 2011) used for caring Slaps:

Height = 30 cm
Width = 12,5 cm
Web Thickness = 1,08 cm
Flange Thickness = 11,30 cm

Steel Squared Pipes for diagonal beams (EN 10210 - table 6.18, Jensen, 2011)

Height = 14 cm
Width = 14 cm
Thickness = 1 cm
Fillet radius 1,5 cm
Area of cross section = 5,09 mm2
Section modulus: $\mathrm{W_{pl}} = 202\ \mathrm{mm^3}$

Concrete beams
For calculation purpose made as squared steel pipes: 100 cm x 40 cm

Concrete columns
For calculation purpose made as squared steel pipes: 40 cm x 40 cm

Loads

Permanent Load:
Trapezim-slap: 1,25 kN/m2
(Additiv Decke - Muncholm - fra tabel s. 2 i pdf: http://www.muncholm.dk/images/pdf/additiv-decke/beregningseksempel.pdf

80 cm tykkelse dæk - udstøbning 20,5 cm)

Payload:

DS/EN 1991-1-1
Public and semi public areas (floor 1 - 4): Category C: 2,5 kN/m2
Apartment areas (floor 5-6): Category A: 1,5 kN/m2

$$S = u_i \cdot C_e \cdot C_t \cdot s_k = 0,72 \frac{kN}{m^2}$$

C_e = 1,0

C_t = 1,0

s_k = 0,9 kN/m2 - EN 1991-1-3 DK NA

u_i = 0,8 - for flat roof, (table 4,8, Jensen, 2011)

Wind Load

Terrain categori: III

v_b = 27 m/s

$Q_p(z)$ = 0.8 kN/m2 (fig. 4.2, p 169, Jensen,2011)

Based on

$$Q_p(z) = \left(\frac{1+7}{ln\left(\frac{z}{z0}\right)} \cdot \frac{1}{2} p(v_b \cdot k_r \cdot ln\left(\frac{z}{z0}\right)\right) \cdot 2$$

Design Loads:

ULS:

The members in Robot are verified using Ulitmate limit state

Consequence class: CC3
Safety factor: k = 1,1

Load combination:

Pa = payload apartments
Pp = Payload public areas
G = gravtiy load
W = wind load
K = Safety factor
D = Dead load

Snow load is set to the dominating load because it sets the highest demands for the structure.

Dominating snow load:

ULS Pa = 1,5 * k * Pa

ULS G = K * G

ULS D = 1K * D

ULS Pp = 1,5 * K * Pp

ULS W = 1,5 * 0,3K*W

ULS:

Ratio in Robot

Verfication of critical member (Robot, mem. No. 666

ULS forces (Robot):

$$N, Ed = 70,48kN$$
$$M_y = 0,37\ kN \cdot m$$
$$M_z = 27.63\ kN \cdot m$$

Maximum Capacity member:
Normal forces: $N_{Ed} = \frac{A \cdot f_y}{\gamma_{M0}} = \frac{5{,}09\ mm^2 \cdot 10^3 \cdot 235\ MPA}{1{,}1} =$ 1087,41 kN

Moment forces y, forces:
$M_{y.c.Rd} = \frac{W_{pl.y} \cdot f_y}{\gamma_{M0}} = \frac{202\ mm^3 \cdot 10^3 \cdot 235\ MPA}{1{,}1} = 43,155\ kN \cdot m$
Moment forces, z, Forces:
$M_{y.c.Rd} = \frac{W_{pl.y} \cdot f_y}{\gamma_{M0}} = \frac{202\ mm^3 \cdot 10^3 \cdot 235\ MPA}{1{,}1} = 43,155\ kN \cdot m$

For normal control class (p. 228, Jensen, 2011)
$\gamma_{mo} = 1,10 \cdot y_3$
$y_3 = 1,0$

Member stability check:

$\frac{70{,}48kN}{1087{,}41\ kN} + \frac{0{,}37\ kN \cdot m}{43{,}55\ kN} + \frac{27.63\ kN \cdot m}{43{,}155\ kN} =$ 0,716

SLS:

SLS is used to check for deformation/deflection:

Design Laods: Factor 1,0

Deformation/deflection = 43 mm in the roof member

The deformation should preferably be:

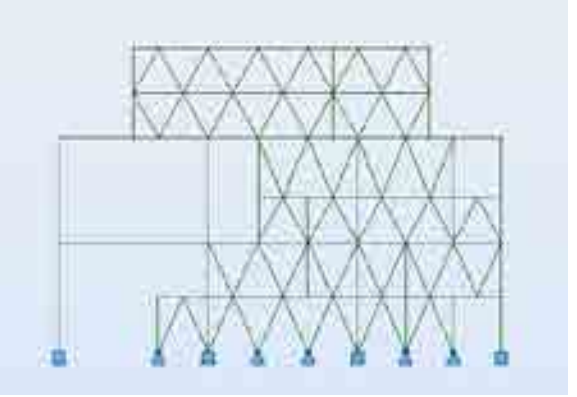
$$u\_max \leq l/200$$

$$43mm \leq \frac{13600}{200} = 68mm$$

l = length of the cantilever in a roof (Eurocode 3, p. 53)

Worst Existing Concrete beams
Critical member no. 1222
My, E = 607,15 kNm

Allowable:
2677,7 kNm > 607,15 kNm



Static scheme

Robot Structure Results

he result of the verification in ULS is shown in the diagram to the right. No members exceed the limit, as no errors or warnings are stated by structural calculations made in Robot structural analysis.

The diagram shows the stresses in the structure. It is notable that the largest stressed are placed in areas with longer distances to the existing structure. This essentially tells a story of the dialogue between two, and how structures are depended on each other. The stacked boxes again becomes a significant system in supporting each other and tranfering forces making sure to be able to have a light structure.

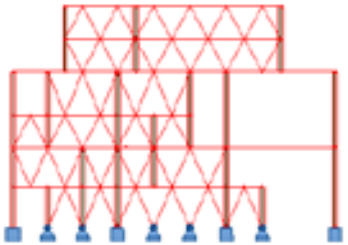
As a result the deformation is largest in the areas longer from the existing grid structure.

Joints have been a great discussion of the structural system. In the end the structural system is made of fixed connections, besides the pinned supports of the steel boxes. It is worth discussion that Robot calculate the joints as strong as the material, which of course in reality depends on how you make the welding. On that thought the concrete looks like on drawings with large concrete foundations, that is made of fixed connection, however it is difficult to examine that from anything else than the old drawings. The results are still logic and valid in relation to how we see the welding and the old drawing material.

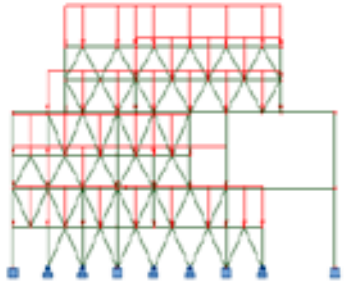
DS/EN 1993-1:2005/DK NA:2007/AC:2009 - Member Verification (ULS) 1 3to8 10to15 17to22 24to32 37to42 34 35 44

Results | Messages

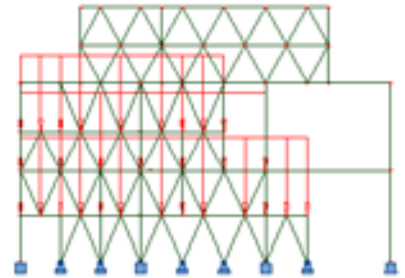
Member		Section	Material	Lay	Laz	Ratio	Case
666	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.80	8 ULS
45	OK	INP Slap 28 cm x 11,9 cm	Steel	16.70	33.97	0.78	8 ULS
50	OK	INP Slap 28 cm x 11,9 cm	Steel	16.70	33.97	0.75	8 ULS
1389	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.73	8 ULS
40	OK	INP Slap 28 cm x 11,9 cm	Steel	16.70	33.97	0.72	8 ULS
1371	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.71	8 ULS
1393	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.69	8 ULS
1400	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.69	8 ULS
646	OK	Steel 14 x 14 cm	Steel	64.47	64.47	0.67	8 ULS
552	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.66	8 ULS
651	OK	Steel 14 x 14 cm	Steel	64.47	64.47	0.65	8 ULS
686	OK	Steel 14 x 14 cm	Steel	64.47	64.47	0.65	8 ULS
691	OK	Steel 14 x 14 cm	Steel	64.47	64.47	0.64	8 ULS
671	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.64	8 ULS
662	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.63	8 ULS
650	OK	Steel 14 x 14 cm	Steel	64.47	64.47	0.61	8 ULS
687	OK	Steel 14 x 14 cm	Steel	64.47	64.47	0.61	8 ULS
663	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.61	8 ULS
664	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.61	8 ULS
39	OK	INP Slap 28 cm x 11,9 cm	Steel	16.70	33.97	0.60	8 ULS
554	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.60	8 ULS
1426	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.59	8 ULS
1386	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.59	8 ULS
1410	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.58	8 ULS
1350	OK	INP Slap 28 cm x 11,9 cm	Steel	17.39	35.39	0.58	8 ULS
55	OK	INP Slap 28 cm x 11,9 cm	Steel	16.70	33.97	0.57	8 ULS
46	OK	INP Slap 28 cm x 11,9 cm	Steel	33.40	67.95	0.57	8 ULS
47	OK	INP Slap 28 cm x 11,9 cm	Steel	34.09	69.36	0.57	8 ULS
549	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.56	8 ULS
818	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.56	8 ULS
817	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.56	8 ULS
86	OK	INP Slap 28 cm x 11,9 cm	Steel	16.70	33.97	0.55	8 ULS
555	OK	Steel 14 x 14 cm	Steel	63.44	63.44	0.54	8 ULS
51	OK	INP Slap 28 cm x 11,9 cm	Steel	33.40	67.95	0.54	8 ULS



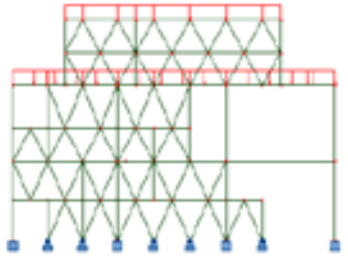
Cases : 1 - (Gravity load - construction)



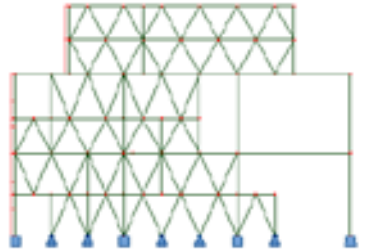
Cases : 2 - (Dead load roof and floor)



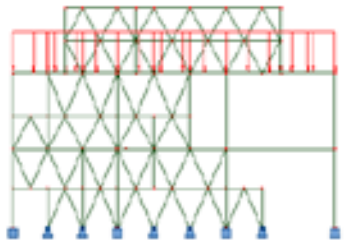
Cases : 3 - (Payload)



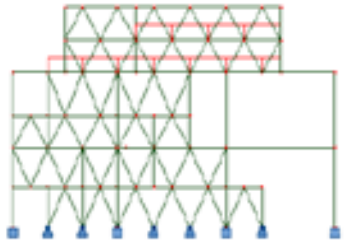
Cases : 4 - (Snow load roof)



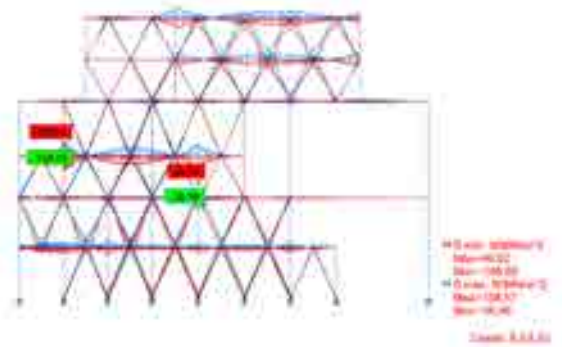
Cases : 5 - (Wind load roof)

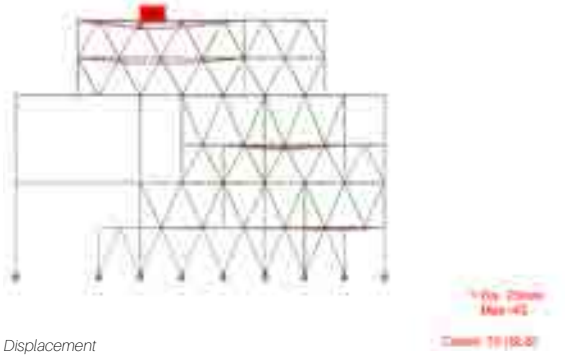


Cases : 6 - (Construction load glass roof)

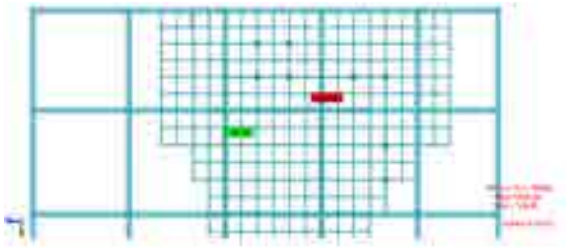


Cases : 7 - (Apartments Payload)

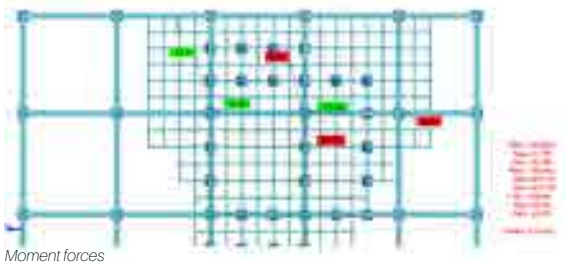




Displacement



Normal forces



Moment forces

APPENDIX 4 - CONVERSATIONS

Thomas vom Braucke, Special adviser for the Danish Immigration Service

Wednesday the 28th of January 2015 we had a meeting with Thomas vom Braucke, a special adviser for the Danish Immigration Service, to inform us about the procedure of the Danish asylum system.

The Danish Immigration Service contracts with the different operators is depending on the directions of rates determined in the Danish Financial Act. The operators are paid by the amount of asylum seekers each center is accommodating, and what kind of applicant they are accommodating. The rates set by the Finance Act, depends on the asylum seekers age and need for special care. For instance, the rates for accommodating an unaccommodated child is higher than a single adult.

When an asylum seeker has been granted asylum, he/she will live in Denmark. The Immigration Service will decide where and which municipality in Denmark a refugee has to live, where the quota for each municipality is determined each year. The decision of municipality is not determined by the location of the asylum seekers accommodation center during the process, but it is possible for the asylum seeker to apply for desired placed.

When the Immigration Service need "Suitable Buildings" to accommodate asylum seekers, several parameters has to be meet before the Immigration Service can make any agreements. The suitable addresses/buildings has to be cost-effective and the local requirements from the municipalities have to permit the buildings for public use, such as asylum institutions.

The Immigration Service and the potential municipality have a dialogue to see if the building meet the needs for places of employments, convenient access to public transport. The remote locations with favorable low rent compensated for the higher cost for transportation.
Any new accommodation center has to provide facilities for self-catering to the asylum seekers, instead of having a larger cafeteria to serve the applicants.

The Immigration Service will not allow accommodation centers in socially disadvantaged neighborhoods, to prevent unsuccessful integration and ghettoization. The centers have to a certain institutional character according to the regulatory. Furthermore, the centers have to meet the health related demands for institutions and fire standards corresponding to fire standards for hotels.

For many years, the Danish Red Cross has been the only operator to accommodate the asylum seekers, but in recent years, more operators are accommodating asylum seekers as well. Besides the Danish Red Cross, the main operators now includes Jammerbugt Municipality, Vesthimmerlad Municipality and Langeland Municipality, which all has centers in other municipalities.

The municipal operators have centers located in Jylland and on few islands and the majority of the Danish Red Cross centers is located at Sjælland.

In the contracts between the Immigration Service and the operators, the operators agreed to activate and educate the asylum seekers, which according to Thomas vom Braucke are done in several ways, depending on the operator.

Many remote municipalities are interested to accommodate asylum seekers, often because of the economic aspects and reasons. To have an asylum center in a smaller remote municipality creates places for employments - teachers, nurses, doctors etc. and are often bringing some life to the local community.

The accommodation centers are located in abandoned buildings, such as school, military barracks and elderly homes, buildings that the municipality already owns and certain capacity to accommodate more than 300 asylum seekers.
Currently the majority of asylum seekers are refugees from Syria, and due to the situation in Syria, many are granted asylum, which shortens their processing time significantly. The centers aim is to introduce the asylums seekers to the associational life and activities in Denmark, to ease the integration, independent which municipality they are located.

Many locals in the communities voluntarily are engaged in the accommodation centers and provide activities for the asylum seekers, from sewing classes, bike repairs, theaters, sports clubs etc.

Jannik Bisp, Functional Manager for Danish Red Cross at Center Sandholm

Besides, of the meeting with Claus Birkelyng at the Center Sandholm, we had a meeting with Jannik Bisp, functional manager for the Danish Red Cross at Center Sandholm.

First, Jannik mentioned that Denmark is one of the better places to apply for asylum, because of the general good condition of the asylum centers, compared to countries in Europe. Furthermore, Jannik praised the collaboration between the authorities in Denmark, the Immigration Service, the police, the Danish Red Cross and the municipalities. If an unregistered asylum seeker was detected anywhere in Denmark, the person would be relocated to the Center Sandholm, and the asylum procedure will begin, where the tendency in other European countries would be to leave them.

According to Jannik, the greater problem is, that the asylum seekers is rolling in across the borders and better collaboration within the EU, could benefit all involved parts. A solution to this problem could be centers run by the EU at the outer borders of EU, which already have been up for discussion.
Jannik pointed out that it worked well with having a collection center (Sandholm) where the respective authorities were gathered, and have close connection to the applicants at the beginning of the process.

Like Claus Birkelyng, Jannik mentioned the issue not having one card the asylum seekers was dependent on, which contain information about their identity, key accessibility for the entrance and separate rooms. Additionally, would a simple way to inform the applicants whether they got mail, having an interview or general information about the processing of their case. In this digitalized world, with WIFI, Internet, Skype etc. could easily be fixed by having an information screen in every room to inform the applicants, and at the same time could be used for private contact with families or national medias.

One of the issues Jannik had to deal with, is the diversity of cultures, backgrounds and living standards the applicants are coming from, where simple problems as turning of the heat pumps, running water and electrical appliance. A simple introduction to the western facilities, toilets, kitchen etc. to help applicants coming from lower living standards, would be appropriate for all parts.

Another problem according to Jannik, is the amount of applicants living in the same rooms and have to share both kitchen and bathroom facilities with many others. The effect of having many applicants to share the facilities, is seen in the poor condition and cleanliness, where the applicants does not feel a sense of ownership. Especially having the opportunity to have access to a private toilet and shower, or at least only have to share it with one other person, would give the applicants a feeling of ownership and a sense of association.

Jannik mentioned an experiment in the socially deprived area Vollsmose in Odense with mainly good success, where the asylum applicants were accommodated in small social housing apartments, together 2 & 2, sharing kitchen and bathrooms. The convenient location in Odense, living amongst local citizens and the possibility for privacy helped the integration of the applicants living in the apartments.

This solution, to accommodate asylum seekers in private apartments in local communities, resembles of the Swedish asylum politic.

Jannik finds the location of centers in local environments, advantageous for the possibilities to be integrated into the community and helps the applicants to establish relations to locals. Furthermore, easy access to infrastructure, healthcare facilities and activities essential for the integration.

At the reception center in Helsingør, the applicants helped to paint their rooms and some of the common facilities, which in Jannik eyes, gave the applicants a sense of belonging and homelike feeling. Furthermore, the quantity of vandalism problems has fallen drastic, where applicants have lived in smaller units or as families, and not have to share facilities with many other applicants.

Jannik stated that the majority of the asylum seekers, close to 60% of the total amount, is young single men in the age of 18-40 years, while families represent 30%, but despite the amount of single men, are been taken more consideration of families and children.

According to Jannik, it is problematic and inconvenient, that especially the single men often are relocated to other rooms of a center or being transferred to other centers of logistic and economic reasons. This constant fear of the possibility of being transferred obstruct the opportunity to feel at home.
The asylum seekers does not have any rights, but rather many obligations, - meeting up for compulsory attendance to interviews with the Immigration Service, weekly or daily attendance etc.
The Immigration Service's limited financial resources have significant influence on the conditions the asylum seekers are living under, where accessibility to the authorities, health care service and public transport is deprioritized in the advantage of a cheaper rent.

Applicants are therefore often located in disused abrasion buildings which subsequently undergo a major renovation due to the wear the replacement of applicants causes. Jannik points out that the buildings must be extremely wear-resistant and able to withstand the wear it causes.

Helle Kortsen, Functional Manager for Langeland Municipality at Center Fredericia

Monday the 9th of February 2015 we visited the Center Fredericia Asylum center, where the functional manager Helle Kortsen showed us around the center and presented the facilities at the center. Fredericia Municipality runs the center as an external operator for the Langeland Municpality, which in total runs eight centers.

The former military barracks, owned by the Fredericia Municipality, opened as asylum center Friday the 17th of October 2014, accommodating at that time 100 asylum seekers and will close down by the end of 2015, with a total rental cost for the Immigration Service of 7.000.000 kr., with no possibility for extension of the rental period. The Fredericia major was in opposition to use the former barracks as asylum center due to the municipality plans of establishing an educational institution. Besides the municipalities opposing against the center, the locals have been giving the center a positive reception.

The center is currently accommodating approx. 500 asylum seekers with 28 different nationalities, with the majority being men (75%). The family-wing accommodates around 30 families (100-150 people) all sharing kitchens, bathrooms and common rooms.

Children in the age of 3-6 years old are integrated into the municipal kindergartens and school kids are phased into the municipal primary and lower secondary schools in special reception classes for asylum seekers. The children are having 20 hours of school each week and during the classes gets introduction to the Danish culture. For applicant over the age of 21 have school lectures for 10 hours a week, and are likewise introduced to the Danish Culture besides the Danish or English classes, which are optional. The majority chooses to learn Danish, which can have a positive influence on their case.

Besides the 10 hours of school the elder applicants have to engage in activities and have to sign for their appearance, - if not attending the activities it has a negative influence for their pocket money. The money are disbursed in cash every 14. day, equivalent to 50 kr. a day, and have to cover for their food, buss tickets etc. At Center Fredericia the applicants have to cook their own food in the temporary installed kitchen, shared with many other applicants, which the condition of the facilities clearly are showing. Most of the furniture at the center are reused beds, tables for other centers, which already have been closed down. A major problem is the applicants understanding of measurable usage, having problems by not turning off the heaters, taps, lights etc.

Some of the activities include different workshops, such as sewing, hairdresser, café, bike mechanic etc. and sometimes mandatory cleaning of the institution.

Helle Kortsen pointed out good relationship between the center and the local police, who are stopping by the center a couple of times every week as a symbolic presence and preventing and to create a good relation and intelligibility between applicants and the police.

Only three times since the opening I October 2014, the police have been send out to the center for smaller controversies. In the opening hours, from 8-16 the center is staffed and between 16-8 the staff is composed by a fireguard.
The center has their own health system related to the centers, with a number of clinics for the nurses to facilitate the applicants, and once a week having a local doctor inspecting the applicants at the center. Pregnant women and children are facilitated at the general healthcare system.

Many volunteers offers their help at the center to engage in activations and workshops for the applicants. The Rotary Foundation are extremely interested to get in touch with the Syrian applicants and get them into work, whereas, as Helle describe it, "The darker their skin are, the faster falls the interests for them"
Despite the center is relative new and have to close down by the end of 2015, many good initiatives are establish, such as football fields, playgrounds and outdoor bench, tables and barbecue arrangements, especially preference the childrens.

Claus Birkelyng, Head of the Police at Center Sandholm

Tuesday the 27th of January we visited Center Sandholm, north of Copenhagen, the only asylum center where all asylum seekers will be at least once during the processing of their application. We had a meeting with Claus Birkelyng, the head of the police unit at Center Sandholm, who informed us about the role of the police from registration to eventual deportation if the Immigration Service rejected their asylum application.

It is the Danish National Police's job to find out who the applicant is, i.e. the applicant's nationality and identity. The police takes fingerprints and photograph of the applicant, and interrogates the asylum seeker on how he/she traveled to Denmark.

Some asylum seekers, despite of rejection asylum, does not want to leave the country voluntarily. In these situations, the police have to ensure, that asylum applicant is traveling out of the country.

According to Claus Birkelyng, many asylum applicants rather want to stay at the Sandholm Center instead of e.g. Center Brovst, because of the close proximity to Copenhagen.

Center Sandholm have since 1989 been used for accommodate asylum seekers, before becoming an asylum center, the old military barracks used to accommodate the Danish Royal Life Guards, which the buildings clearly bear the stamp of.

Claus Birkelyng mentioned some everyday problems they are dealing with, e.g. the need for proper offices and interrogation rooms, which usually have accommodate at least four people. Another immediate problem is the lack of an integrated card for the key-system, ID and pocket money.

Hani Osman, Lutfi Murad and Muhammad, Syrian asylum seekers at Center Fredericia

During our visit to the Center Fredericia, the staff at the center had arranged a meeting with three Syrian asylum seekers, to hear their experiences and opinions of the Danish asylum system and which challenges they are facing.
The three applicants we were talking with was Hani Osman, who studied English literature back home in Syria, where his wife still are. He had chosen to come to Denmark to apply for asylum because of the freedom and democracy. Hani arrived to Denmark December the 12th 2014 to Center Sandholm, before he was accommodate at Center Helsingør for 3 days and then transferred to a remote temporary center at the small isolated island, Jegindø, in the western part of Limfjorden, 30 km. north of Struer. After having spent 40 days at the remote center, killing the time by sleeping, watching TV and trying to reach his wife in Syria, Hani was once again, transferred to Center Fredericia. Here Hani is accommodated in room together with 6 other applicants, all from Syria.

Two of the applicants from Hanis room joined the meeting, - Lutfi Murad a pharmacist who originally is from Palestine but was a refugee in Syria and Muhammad who used to work as a doctor back in Syria. They both arrived to Denmark in the end of December 2014 and like Hani, had a short stopover at Center Helsingør before they were transferred to Jegindø where the three of them met for the first time. By the end of January 2015 they transferred by bus to Center Fredericia and were accommodated in the same room. They all mentioned the convenient location of Center Fredericia, which opposite the center at Jegindø is centrally located I Fredericia ad not isolated at a small remote island.

They were all frustrated about their ignorance and lack of information about the system and the progress of it, especially the randomly prioritizations of different cases. The three of them was all set up for an interview with the Immigration Service at Center Sandholm, three months ahead of their arrival, whilst a common Syrian friend of them they have met at Jegindø, who arrived later than they arrived, are having an interview after only a month. To them, the system seems to be randomly organized, like hoping to winning in the lottery. The same with the arrangement and distribution of beds/rooms, varying from sleeping 2-12 people in a room.

Both Lutfi and Muhammad are well educated and Hani used to study English literature, all used to work at least for 12 hours a day, and now they wait to get a clarification of their future, and eager to get into jobs, and not just waste their time, besides of the mandatory school classes and activities. Especially the lack of activities at Center Fredericia and prospect for a job interview may not happen for a long time to come, even though they have asked for any jobs, tried to arrange work groups for themselves.

Besides the lack of activities and ignorance of the progress of their cases, they are pleased to be here and all they wish for, are to bring their families to Denmark and then get a job and start a new live in Denmark. But they have recently heard that family reunification isn't possible and the Immigration Service is only allowing a temporary residence permit for a year, something the Immigration Service haven't given them any clarification about.

In their eyes all asylum applicant are treated and regarded as being the same, despite the big difference of living standards, cultures, educational and personal backgrounds. The majority of people fleeing from war and have lost many in the war, whilst other applicants are here because of poverty and hunger.

For the future, they all wishes to be reunited with their families and then they want to get a job, move into a house and start a life here in Denmark, because it is important for them to be with their families.