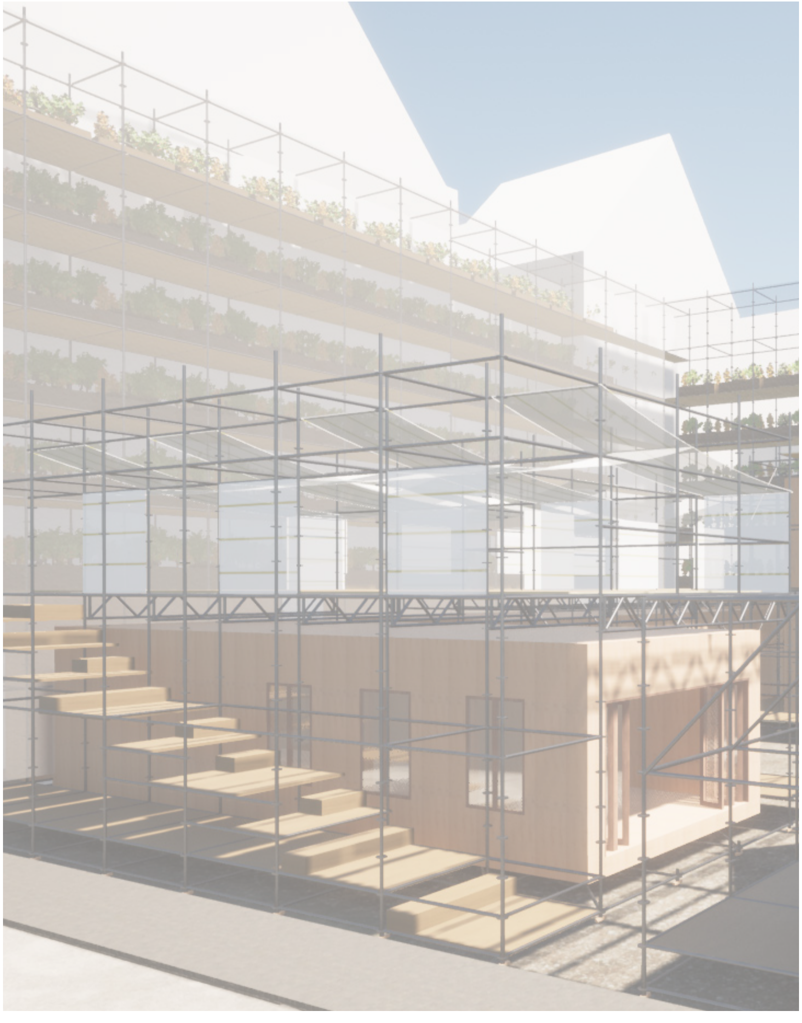
FILL in

transportable urban farm
and community centre



M.Sc. Arch04 - May 2023 - Group 01 - Anna Boglárka Szerján

Project Title	transportable urban farm and community centre
University	Aalborg University Department of Architecture, Design, and Media Technology
Semester	M.Sc. Arch04 - 10. Semester
Project period	1st February - 26th May 2023
Supervisor	Joel Peter Weber Letkemann
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Group	01
Total Pages	111
Appendiy	12

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Abstract

This thesis presents the design of FILLin, a transportable urban farm and community centre located in the heart of Budapest. The objective of the project is to create a place where city-dwellers can gain hands-on experience in agriculture, develop a deeper understanding of their food and its origins, and actively participate in community-building activities. By promoting a sense of belonging and collective engagement, FILLin aims to foster stronger bonds within the urban community and encourage a more sustainable way of city-life.

The project revolves around the design and development of a relocatable structure that can not only adapt to the changing urban landscape but also grow in size and functionality over time. The design approach takes into account the temporary nature of the structure's relationship to the site, addressing the technical challenges associated with such mobility.

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01 PRELIMINARY

The Problem

Urban community gardens possess significant potential as they address two pressing urban issues simultaneously. Firstly, they provide an opportunity for alienated urban residents to engage in community building activities, fostering a sense of belonging and social interaction. Secondly, they offer a more environmentally friendly alternative to unsustainable industrial agriculture practices, promoting a greener and ecologically sound approach to food production.

However, despite their potential, the development of urban community gardens is hindered by the temporary nature of their location in Budapest. The uncertainty surrounding the future use of the land limits the establishment of permanent infrastructure, impeding the ability to fully harness the benefits of these gardens. This lack of permanent infrastructure and uncertain land use poses a challenge to the long-term viability and effectiveness of urban community gardens. It restricts their capacity to engage and serve the community adequately, limiting the potential for social connection and sustainable food production.

Research Question

How can architectural design strategies be utilized to maximize the potential of urban agriculture in Budapest's downtown, given the challenges posed by temporary land use, in order to create a sustainable, educational, and engaging urban farm venue that promotes sustainable food consumption and urban community building?

Reading Guide

The report is structured into five sections: Theoretical Framework, Analysis, Design Process, and Design Presentation. The Theoretical Framework and Analysis sections incorporate research and theoretical backgrounds essential for decision-making in design. Specific insights derived from research or analyses are highlighted using yellow markers, offering the reader a preview and summary of design-related aspects. These markers provide a glimpse into the future, giving an overview of key findings and conclusions.

02 METHODOLOGY

IDP

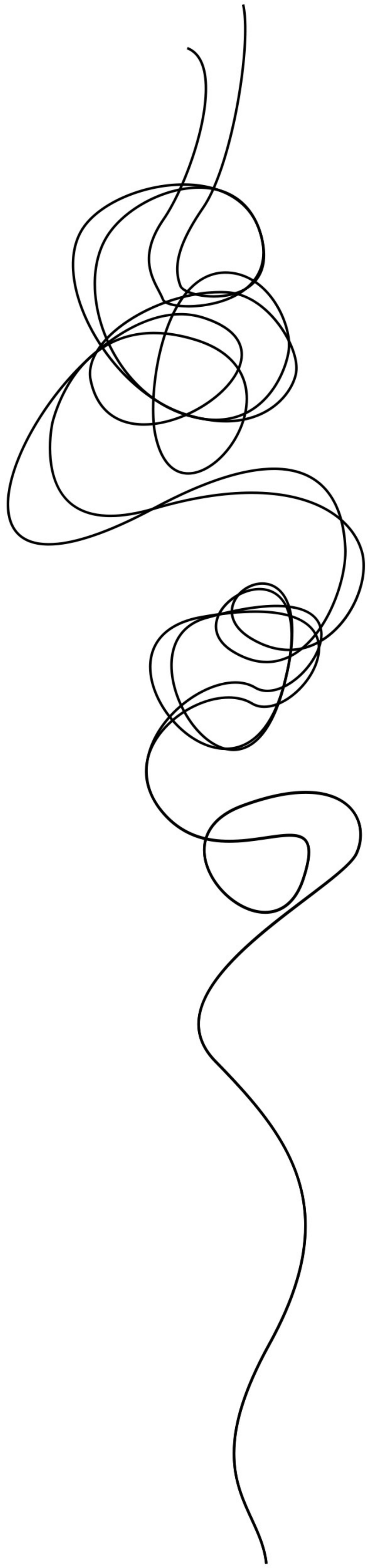
A methodology in any specific field is a systematic approach that outlines the methods and techniques used to carry out a certain task. It not only provides a roadmap of steps to take and how to perform them but also explains the reasoning behind the sequence in which they should be completed. Methodologies often reflect a particular perspective of reality, influenced by a set of theoretical principles. This makes it important to have a well-defined methodology to effectively present and convey ideas in the context of a thesis project. (Architecture Methodologies and Frameworks – IasaGlobal, 2022).

The design of architecture is a multifaceted and intricate process that requires a harmonious collaboration between architecture and engineering fields to achieve holistic design (Knudstrup, 2004). To tackle design challenges effectively, a structured approach, the Integrated Design Process (IDP), is introduced to guide architects in the development of their design from its inception to completion. The IDP ensures a unified approach among the design team by incorporating a methodology that manages the design process.

At Aalborg University, students studying Architecture and Design are taught to use the iterative IDP methodology as the foundation of their projects to facilitate interdisciplinary interaction between architecture and engineering. IDP is divided into five phases: Problem, Analysis, Sketching, Synthesis, and Presentation. During the Problem phase, the design problem is defined and the relevant information is gathered through research and analysis. In the Sketching phase, the preliminary work is used to develop the design proposal. During the Synthesis phase, all aspects of the design are combined to meet the functional requirements and create a cohesive solution. Finally, in the Presentation phase, the design is presented in the form of illustrations, diagrams, and visualizations. This methodology helps to ensure that all aspects of the design are considered and integrated into the final solution(Knudstrup, 2004)

As depicted in the diagram, the design process followed a non-linear path, incorporating loops and iterations. The activities of research, analysis, and design were intertwined throughout the process, indicating an iterative approach. In terms of project progression, two distinct threads were initially pursued.

One thread focused on exploring the social aspects of the project, while the other thread involved conducting research and analysis specifically related to architectural considerations. These two threads operated in parallel, addressing different aspects of the project. During the synthesis phase, the two threads converged, and integration took place. The findings and insights from both the social exploration and architectural research were combined to create a cohesive presentation.



PROBLEM

ANALYSIS

SKETCHING

SYNTHESIS

PRESENTATION

02 METHODOLOGY

Applied Tools and Methods

When embarking on a design process, it is important to employ a range of techniques and processes to effectively shape the final outcome. However, to make the most of these approaches, it is crucial to possess a comprehensive understanding of the tools and sub-methodologies being utilized. This understanding enables designers to navigate through different project phases and address a variety of problems while keeping specific objectives in mind.

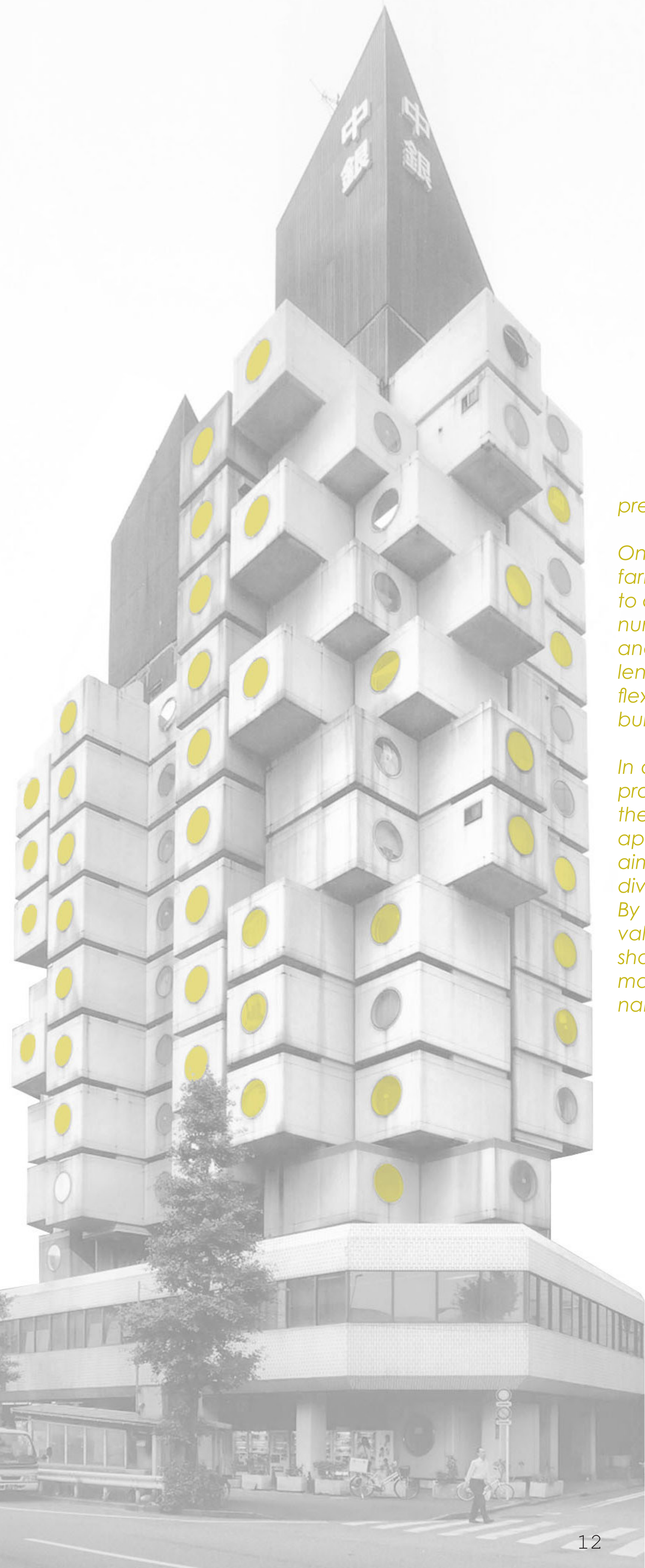
The choice of tools and methodologies plays a vital role in the design process, as they help clarify and resolve issues in a manner that is appropriate for the project at hand. These tools and methodologies serve as guidelines and frameworks that designers can rely on to streamline their work and achieve desired outcomes.

By selecting appropriate tools and methodologies, designers can strike a balance between architectural and engineering considerations. This balance ensures that the design proposal not only meets aesthetic and functional requirements but also addresses structural and technical aspects.

In today's world, there is a multitude of tools and methodologies available to designers. These can range from traditional methods such as sketches, physical models, and hand calculations to more advanced techniques like computer-aided design (CAD), building information modeling (BIM), parametric design, simulation software, and virtual reality.

In the provided table, an overview is presented of the methods utilized throughout the project's development, detailing their mode of usage, purpose, and justification. The table serves as a concise reference, capturing the key information regarding the methods employed, their intended application, and the reasoning behind their selection.

	TOOL	WHAT	HOW	WHY
ANALYSIS	LITERATURE	Literary reviews serve as the foundation of any investigation and play a crucial role in gaining a comprehensive understanding of the subject matter.	This is accomplished through the examination of various sources such as scientific papers, books, articles, and other relevant materials.	These resources can be used to establish a framework and guide the investigation process, providing a solid foundation for the project.
	INTERVIEWS	Personal interaction with experts or target audience can yield valuable insights that differ from those obtained through academic literature.	semi-structured personal interview with activists, volunteers and members of Hungarian community gardens.	to gather valuable insights and feedback about users' needs and preferences and define the functional reqirements.
	CASE STUDY	Examination of existing projects with similar starting points and themes as a source of inspiration in order to put the groundwork for the sketching and synthesis phase.	in-depth analysis of a specific instance or event, in relation to a Urban Agriculture with a critical eye, framing the analytical goal and omitting irrelevant information.	to gain insights and knowledge that can inform the project or problem-solving efforts.
	MAPPING	creating visual representations of geographical data and information of the site.	Mapping can be done both on-site and digitally. On-site mapping involves physically visiting the site and collecting data through observation, measurement, and other means. Digital mapping involves using software or online tools to create maps using data from various sources	to gain significant information about the site and surroundings, including information about the context and setting of a project. It helps to address qualities and obstacles and provides insight into various aspects of the site.
	SITE VISIT	physical inspection of the location and its surroundings where a project is planned to be developed.	Visiting the physical location of a project.	to gain a deeper understanding of the site and its surroundings by experiencing the area with all one's senses, rather than relying solely on digital programs.
	MICRO CLIMATE	Microclimate analysis involves studying the local atmospheric conditions of a specific area to understand how they impact the comfort and performance of a space or design.	Grasshopper plugin- LADYBUG and HONEYBEE	By integrating these tools into the Rhino platform, designers can make informed decisions and optimize their designs for sustainability and performance.
DESIGN PROCESS	HAND SKETCHING	Hand sketching is the act of creating drawings or illustrations by hand, using traditional tools such as pencils, pens, or markers.	Hand sketching involves using pen or pencil to draw freehand, capturing ideas and concepts on paper through manual dexterity and artistic expression.	allows for quick exploration of ideas and facilitates visual communication.
	3D MODELLING	Creating a 3D digital representation enables visualizing the planned building and the various stages of its construction.	Using the Archicad software.	The 3D representation of the building enhances the design process, enabling a grasp of scale and facilitating comprehension of the proposed structure, while also supporting future documentation of the design.
	PHYSICAL MODELLING	Creating schematic models and examining their spatial placement.	Cutting foam unit models and placing them on the site model.	Helps understand the relationship between mass and the surrounding environment, allowing for the exploration of multiple versions.
	MICROCLIMATE	To examine the thermal comfort within the site.	Spacemaker	The thermal sensation of a specific location can be examined under various weather conditions.
	DAYLIGHT SIMULATIONS	Examining indoor lighting conditions.	Grasshopper plugin- LADYBUG	To maximize the utilization of natural light conditions and for the purpose of design evaluation.
PRESENTATION	ILLUSTRATION	Creating explanatory axonometric drawings.	photoshop and Archicad	Schematic diagrams are utilized to visually showcase and explain the various elements of the concept. These diagrams provide a simplified and concise representation.
	RENDERS	Creating a photorealistic rendering of the final design.	TWINMOTION	To showcase the character and appearance of the building.
	REPORT	Documenting the design process in the form of a report involves capturing and presenting the various stages and decisions made throughout the design journey.	INDESIGN	To ensures that the progression of ideas, research, analysis, and design development is presented in a coherent and structured manner.



ill. 3.1 - Nakagin Capsule Apartment, Tokyo

03 THEORETICAL FRAMEWORK
Flexibility

preliminary

One of the main features of the designed urban farm and community centre is its ability to adapt to changing needs. However, this attribute presents numerous challenges, both in terms of structural and functional design. To overcome these challenges, it is crucial to incorporate the principles of flexibility throughout the design process, from the building's structural framework to its interior spaces.

In order to ensure that this flexible approach is appropriately integrated into the design process, a theoretical study of flexibility as an architectural approach was conducted. In this exploration, the aim is to delve into the origins, development, and diverse applications of this vital design principle. By dissecting the multifaceted nature of flexibility, valuable insights can be obtained to inform and shape future design decisions, allowing to adeptly manoeuvre through the numerous facets of this dynamic concept.

The Emergence and Importance of Flexibility in Modern Architecture

The idea of flexibility in architecture began to take shape around the early 1950s, developing into a wide range of theories and practices over time. Walter Gropius, the visionary who first proposed the notion of flexibility, argued that buildings ought to be more than static monuments; instead, they should serve as adaptable spaces that accommodate the ebb and flow of life. He shared his perspective as follows:

„the architects have to conceive building not as a monument, but as a receptacles for the flow of the life which they are to serve, and , that his conception should be flexible enough to create a background fit to absorb the dynamic features of our modern life".

This marked the entrance of the term „flexibility" into the architectural lexicon and challenged the traditional Vitruvian attributes of utility, solidity, and beauty in architecture (Frampton 2007)

Adrian Forty's perspective on flexibility in architecture highlights the importance of considering the long-term implications of design decisions.

"Flexibility is an important modernist term. It offers the introduction of time and of the unknown as parameters in design. It is an argument against the presumption that all parts of a building should be destined for specific uses - a recognition that all uses cannot be foreseen. "

By incorporating flexibility into their designs, architects can create buildings that can adapt to changing needs, user preferences, and other unforeseen circumstances, even after the architects' direct involvement in the project has concluded. The idea of maintaining the illusion of control over a building, as Forty suggests, can be seen as a response to the architect's understanding that once a building is occupied, it will inevitably be subject to changes beyond their control. In many cases, architects may not be involved in future modifications or adaptations of the spaces they design, leaving the fate of their creations in the hands of the building's occupants, owners, or other stakeholders (Forty 2000).

By consciously designing for flexibility, architects can anticipate and accommodate these changes, giving their creations the ability to evolve and adapt while still retaining the essence of the original design intent. This approach allows architects to extend their influence on a building's future use and appearance, even after their direct involvement has ended.

Architectural manifestations of flexibility

The investigation of flexibility in architecture can be approached in different ways, one of the frameworks used for this purpose is the one developed by Professor Robert Kronenburg. He identified four overlaping types of flexibility in architecture: Adaptation, Transformation, Movability and Interaction.

"Flexible buildings are intended to respond to changing situations in their use, operation or location. This is architecture that adapts, rather than stagnates; transforms, rather that restricts; is mobile, rather than static; interacts with its users, rather than inhibits. It is a design form that is, by its very essence, cross-disciplinary and multi-functional; consequently it is frequently innovative and expressive of contemporary design issues." (Kronenburg 2007)

Each of these types relates to different aspects of a building's design and function and can be used to understand how different flexible design tactics are manifested in architectural projects. The examination of the architectural manifestations of flexibility through the four types defined by Kronenburg allows for a more in-depth analysis of the ways in which buildings can be designed to accommodate changing needs over time. On the following page, these 4 types will be introduced according to Kronenburg's interpretation.

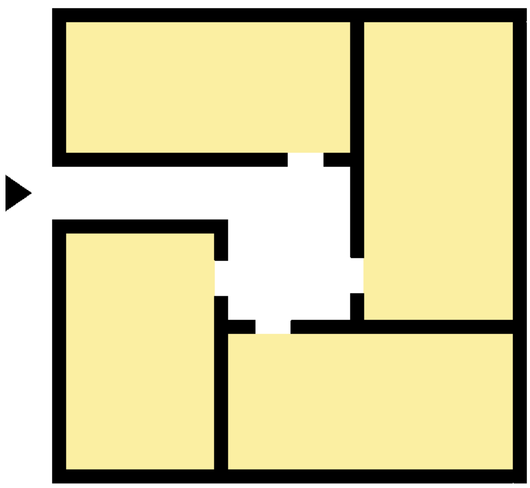
In the design of the proposed FILLin urban farm and community center, it was crucial to ensure the realization of the described flexibility. In order to effectively incorporate the parameters of „time and the unknown" into the future building, further examination is required in the application of flexibility, which will be addressed in the following pages. This examination aims to explore how flexibility can be effectively implemented in the design, allowing for the dynamic expression of time and the unknown, and ensuring the adaptability and resilience of the project.

1. Adaptability

Adaptable architecture is a design approach that focuses on creating buildings that can easily accommodate changes in the future. This type of flexibility involves making alterations that are intended for changes **that persist for longer time periods**, such as variations in the number of occupants or their status. For example, if a family with children moves into a home, the space needs will change as the children grow older and require more space. An adaptable design will have the ability to accommodate these changes with minimal disruption and expense.

-similar spaces
This functionally neutral spaces not only allows for the customization of living spaces by selecting and arranging preferred areas but also provides the opportunity for rooms to easily change functions if necessary. This flexibility enables users to adapt their living space to their evolving needs and preferences. (ill. 3.2) The function of the rooms can be easily modified, as their design is not limited to serving a single purpose. For instance, a living room can be easily converted into a bedroom, and vice versa. This flexibility enables the floor plan to adapt to different user needs and requirements.

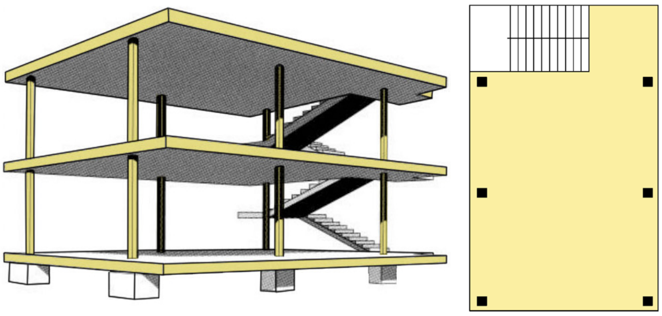
In the design of FILLin, the goal was to create this kind of neutral spaces that can accommodate a variety of different functions. The form and layout of the spaces do not predefine the specific functions they will house, providing the opportunity for diverse uses and allowing for the freedom to shape the spaces according to specific needs and requirements.



ill. 3.2 - similar spaces

-Open plan / Open-ended design
Advancements in building technologies have led to the creation of the open plan, in which non-bearing walls provide a sense of freedom and openness. This design approach minimizes the number of permanent structural elements, allowing for greater flexibility in the use of space. Modular prefabricated dividing walls are often used to enable easy future changes to the layout. The open plan can be considered a flexible design that responds to the varied demands of occupants in different situations. Le Corbusier's Domino House is a notable example of this approach. (Ill. 3.3)

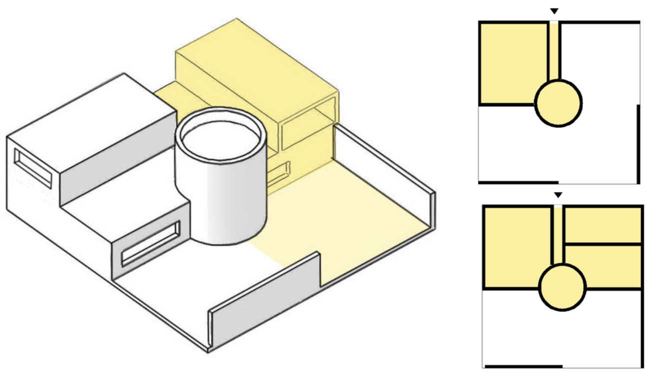
This approach was not implemented in the final design due to the chosen structural considerations for the building.



ill. 3.3 - Domino House layout and perspective

-expandable design
The term „Expandable" refers to something that can be made larger by adding components or elements to it. This tactic pursues flexibility through extendibility, which can be achieved either in a defined zone or a free area. In the defined zone approach, the extension may occur horizontaly or vertically, such as in James Stirling and James Gowan's Expandable House (ill. 3.4). The other approach allows for more freedom in dimension and stages of extension in a free area.

In the final design, this type of flexibility appears mixed with both free area growth and defined area growth. The structural choice of the project, combining scaffolding and u-build elements to form modules, enables growth that occurs partly in a predetermined direction while retaining the possibility of configuration.



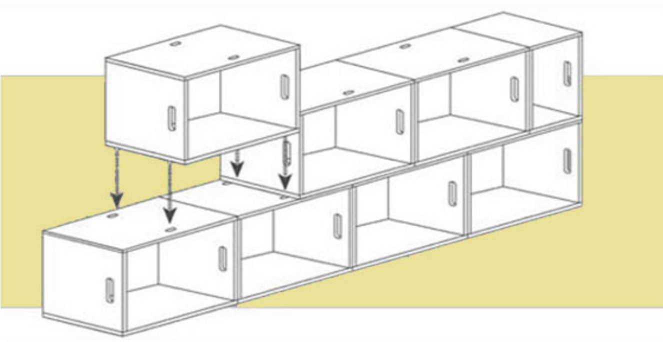
ill. 3.4 - J. Stirling and J. Gowan Expandable House

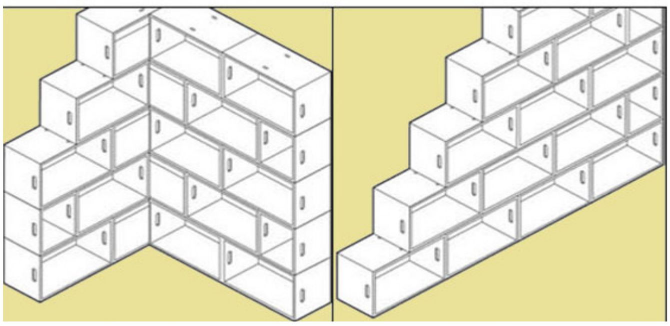
2. transformable

Transformable involves creating spaces that can be easily reconfigured or transformed to meet changing needs or accommodate different functions on a daily basis. This approach is particularly useful for spaces that experience frequent changes in use, such as multi-purpose rooms, exhibition spaces, or event venues. One of the key features of transformable architecture is its ability to accommodate conflicting functionalities within the same space. By using structural changes, such as moveable walls or modular furniture, the same space can be transformed to meet different needs at different times.

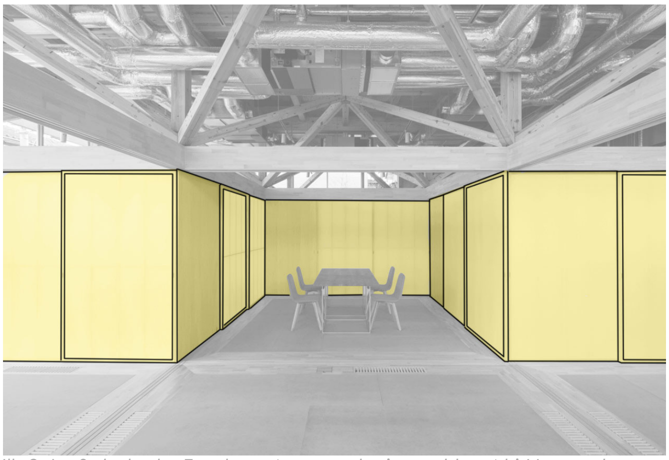
-convertible furniture
This approach incorporates convertible furniture to increase the range of potential functions in a given space, enabling users to customize the area to suit their current needs. This approach is particularly useful in situations where there are limited square meters available, as it is important to maximize the use of every available space. The adaptability of convertible furniture allows for the efficient use of space for multiple purposes. Another example of this approach can be seen in open offices, where the adaptable arrangement of workstations enables the built environment to accommodate changing needs. This category also includes modular furniture pieces, which provide users with the freedom to define a given space through the arrangement of furniture. For example, simple modular furniture boxes function like building blocks, offering endless possibilities for reconfiguration.

Modular furniture was incorporated into the final design, as this approach proved to be an ideal combination with the concept of neutral spaces. By blending these two approaches, the FILLin project created interior spaces that are defined solely based on the users' desires and preferences.





ill. 3.5 -brickbox by Antxon Salvado and Roger Zanni



Ill. 3.6 - Substrate Factory Ayase, designed by Aki Hamada

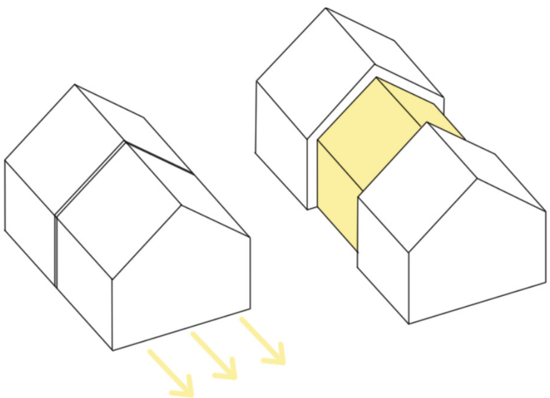
-Movable walls
This approach involves the use of movable wall panels to create the option of merging or dividing adjacent spaces. One of the most iconic examples of this tactic is Gerrit Rietveld's „The Schröder House," built in 1924. This structure showcases architectural features that emphasize flexibility, making it a modifiable home and a widely recognized architectural icon of the 20th century. Rietveld designed the upper floor of the building with the ability to be entirely reconfigured each day, catering to the resident's needs and preferences. Another recent example of adaptive architecture is the Substrate Factory Ayase, designed by Aki Hamada (ill. 3.6). This building incorporates removable exterior walls and reconfigurable interior partitions, enabling it to be effortlessly adapted for various activities.

In the final design of the FILLin project, the use of movable walls was explored. While traditional movable walls were not suitable for the compact size of the project, accordion doors were chosen as a smaller alternative. These accordion doors provided the flexibility and adaptability needed to create versatile spaces, similar to the function of modular wall panels.

-Extendable Building

The term „Extendable" refers to something that can be made longer or larger by stretching or pulling it. In the context of design, this approach involves creating buildings or structures that can change their form, layout, or appearance in response to the evolving needs of their users. T**his kind of transformability is typically fast and can be repeated as required,** despite the likelihood of significant changes within the building that could affect its structural system. Deployable buildings and scissor-hinge structures are examples of such designs, as they can be quickly modified or reconfigured to meet diverse functions and requirements.

Cabin ANNA, designed by Caspar Schols, is a prime example of extendable building design in recent years. The cabin features a double-layered shell that can be slid together or apart, allowing the building to contract or even double its floor area. This innovative design highlights the transformability and adaptability that contemporary architecture can achieve, creating a versatile living space that responds to the changing needs and preferences of its occupants.



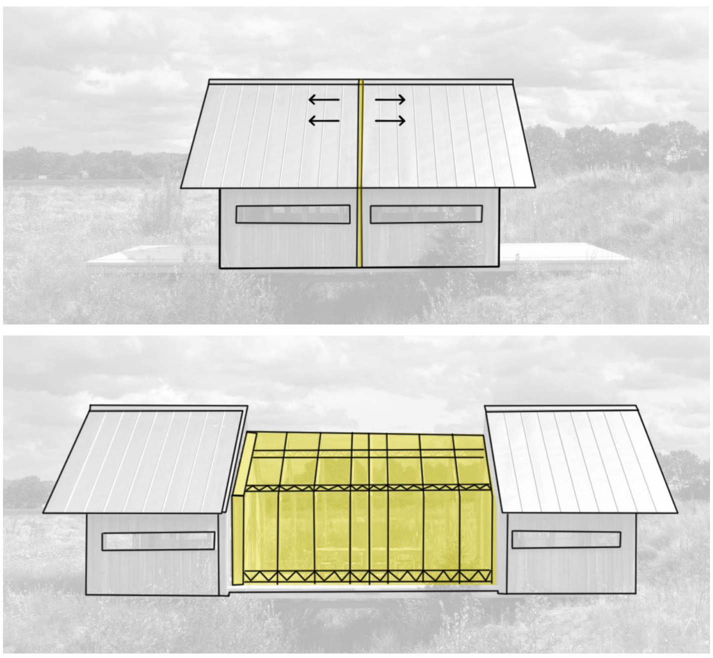


Figure 3.7 - Cabin Anna by Caspar Schols

3. Movability

Movable architecture refers to buildings or structures that are designed to be easily transported to different locations in order to provide specific functions or services. This type of architecture is typicalyly used by organizations or groups that operate in multiple locations or have a need for temporary or mobile facilities. For example, the military often uses movable architecture for field hospitals, command centers, and living quarters for troops in remote locations. Similarly, relief organizations may use movable architecture to quickly set up temporary shelters and medical facilities in disaster-stricken areas. In addition to these more utilitarian uses, movable architecture can also be used for events such as concerts and markets. The structures are designed to be easily assembled and disassembled in order to provide a temporary venue for the event. This category also encompasses mobile homes, which have been purposefully designed and constructed to enable easy transportation either as a complete unit or when disassembled.

During the design of the FILLin project, the concept of mobility played an important role as the goal was to create a structure that could be easily relocated. After exploring various options, the approach of using assembly-based elements was chosen because it allowed for the most flexibility and variation between two assemblies. This approach was crucial in terms of achieving flexibility and also enabled greater user involvement in the construction process.

-Prefabricated

Prefabricated architecture refers to the manufacturing of building components or even whole modules in a factory, which is then transported to the construction site for assembly. This approach provides numerous advantages, including cost savings, faster construction times, and improved quality control. One common application of prefabricated architecture is in the construction of modular homes. These homes consist of pre-built modules that can be quickly assembled on-site, allowing for faster construction times and reduced costs. Modular homes are also highly customizable, allowing homeowners to choose from a variety of design options and finishes. Furthermore, these houses are often adaptable, as adding a new section or remodelling the interior spaces is relatively simple due to their lightweight construction.

Capsule / Plugin design

Capsule architecture is a design concept that involves creating modular, self-contained living spaces that are compact and portable. Capsule architecture is similar to prefabricated architecture, in which pre-built modules are transported and assembled on site. However, unlike prefabricated architecture, the modules in capsule architecture are designed to connect to a pre-existing permanent structural element on site.

One of the most well-known examples of capsule architecture is the Nagakin Capsule Tower in Tokyo, designed by architect Kisho Kurokawa in 1972. The tower is made up of 140 prefabricated capsules, each measuring just 2.5m x 4m. These capsules are arranged around a central core, which contains elevators, stairs, and other shared facilities. While capsule architecture has not become a mainstream building method, it has continued to influence contemporary architects who seek to create adaptable and sustainable living spaces. The concept remains relevant in the face of inc

The implementation of capsule architecture was explored during the design process, as the spatial grid created by the scaffolding structure provided an opportunity. However, as the design progressed, it became apparent that the architectural and structural complexity associated with capsule architecture led to a decision to explore alternative design directions.

-Temporary architecture

Temporary architecture refers to structures, installations, pavilions and buildings that are designed to have a limited lifespan, often with the intention of being taken down or dismantled after a short period of use. These structures can serve a wide range of purposes, from temporary housing and emergency shelters to pop-up shops and exhibition spaces. These structures can be quickly and easily assembled, often using modular or prefabricated components, and can be adapted or repurposed as needed. Temporary architecture can also be used as a means of experimentation and innovation in architecture. Because these structures do not have to adhere to the same regulations and restrictions as permanent buildings, they can be used as a testing ground for new materials, designs, installations and technologies like using scaffolding for temporary purposes in urban environments. This can lead to new and innovative approaches to architecture that can be applied to permanent structures in the future.

Temporary architecture were also incorporated in the design of the FILLin project. By utilizing a combination of scaffolding and textile shading, diverse outdoor spaces can be created within the building, allowing for customization according to user needs.

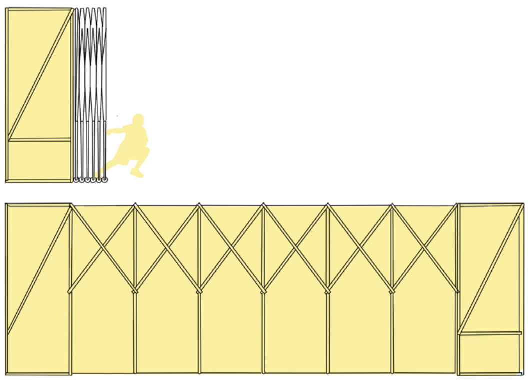


Figure 3.8 - adjustable Street Cinema rests

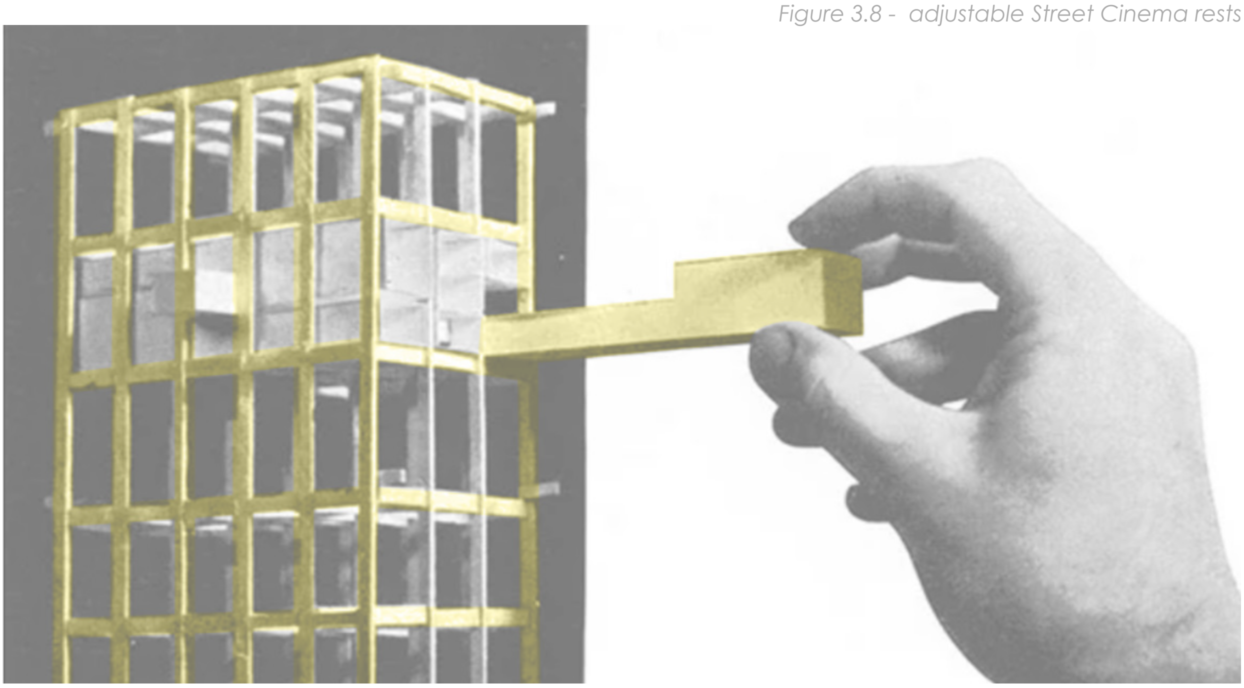
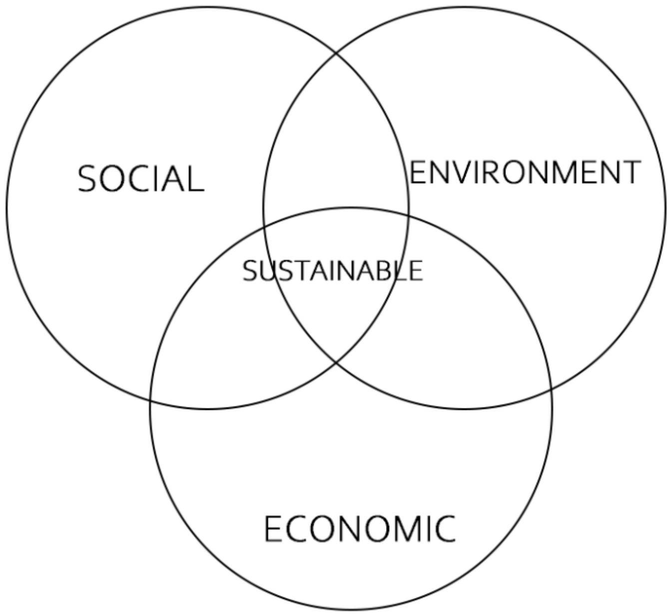


Figure 3.9 - Le Corbusier's l'Unité d'habitation in Marseilles

03 THEORETICAL FRAMEWORK
Sustainability

The concept of sustainable development gained significant importance with the publication of the Brundtland Report in 1987. This report introduced the idea of sustainability, which is based on three pillars: economic, environmental, and social considerations. Sustainability entails finding a harmonious equilibrium between these pillars, ensuring that present needs are met without compromising the ability of future generations to meet their own needs. It involves adopting practices and strategies that minimize environmental harm, promote social equality, and foster economic resilience.(United Nations 1987)

In the design process, the aim is to ensure that a project meets all three pillars of sustainability. However, within the scope of the FILLin project's design, emphasis was placed on social sustainability.



Social sustainability

"development (and/or growth) that is compatible with harmonious evolution of civil society, fostering an environment conducive to the compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population" (Polese, 2000)

The analysis of various architectural manifestations of social sustainability will be conducted based on the five main points outlined by H. Moztarzadeh in 2015. These points serve as a framework to guide the implementation of different social sustainable strategies in design. By examining how these strategies are expressed in architecture, valuable insights can be gained regarding the integration of social sustainability principles into the built environment.

1. Social interaction:
Architects play a crucial role in promoting social sustainability by addressing the importance of social interaction in architectural design. Creating spaces that facilitate socialization and encourage interaction among individuals can enhance social capital and contribute to the development of a socially sustainable environment. By considering the human need for social interaction, architects can design spaces that foster community engagement and promote social sustainability.

Research conducted on Budapest Community Gardens also demonstrates that those gardens with communal spaces are much more active and foster a stronger sense of community. Therefore, during the design of FILLin, it was important to create communal spaces that facilitate multi-level interactions.

2. Architectural identity:
Architecture possesses dynamic and progressive features that contribute to its unique identity, influenced by the land it occupies. Designing spaces that reflect the culture and history of a society enhances its architectural identity. Preserving historic sites, buildings, parks, and museums further strengthens the sense of social identity. Conversely, importing architectural designs that do not connect to the distinctive culture and history of a country can diminish this sense of identity.

The vacant plots that emerge among the densely built structures in Budapest's inner city have become intrinsic to the city's character. Despite their underutilization, these empty spaces have seamlessly integrated into the daily life of Budapest. Surrounded by imposing brick walls, they are a recognizable sight for every resident. When transformed into temporary parks or courtyard cafés, these vacant plots swiftly become cherished locations in Budapest, there is a sense of ownership that everyone can feel in these places, and this emotional connection can be effectively leveraged to attract people. The FILLin project endeavors to unlock the potential of these vacant plots by temporarily activating them with a range of functions, further enhancing the urban experience.

3. Social security:
Creating a sense of security in architectural design is an important aspect of developing social sustainability. This can be achieved by incorporating elements that enhance users' sense of control, designing safe urban facades, and creating defensible spaces. Addressing security considerations in architecture is crucial to foster social sustainability and should be given special attention.

During the layout design of the FILLin farm, careful consideration was given to establishing a direct connection between the building and the public space while also creating a sense of exclusivity that can promote security.

4. Flexibility
Flexibility in architecture is characterized by its ability to adapt to socio-psychological, economic, and environmental factors, as well as the needs of the community. It encompasses three aspects: diversity, adaptability, and variability. Diversity refers to the multifunctional nature of a space, allowing for changes in function as needed. Adaptability involves the flexibility of functions and spatial layout over time. A flexible architecture is characterized by its long-term usability, user experience, incorporation of technological advancements, economic and ecological sustainability, and potential for reuse.

During the design of FILLin, great emphasis was placed on flexibility and its representation in the plan. Design strategies such as neutral spaces, expandable layouts, reconfigurable interiors, and temporary outdoor tents were implemented to achieve flexibility in the design.

5. Social participation:
This aspect emphasizes the importance of engaging in social roles and activities. Active participation in customary activities strengthens individuals' connection to societal values and norms, promoting socialization.

The design of the FILLin project emphasized the importance of user participation, aiming to create a sense of ownership among individuals and enhance their commitment to the project. By involving users in the design process, the project sought to create a deeper connection and engagement.

why urban agriculture?

Contemporary food production is facing significant sustainability challenges; it is a significant contributor to greenhouse gas emissions, including processing, packaging, transport, and retail (United Nations Environment Programme, 2022). Conventional agriculture is also a major contributor to environmental problems such as soil degradation, water pollution, and loss of biodiversity due to unsustainable farming practices like monoculture and excessive use of synthetic fertilizers and pesticides (Horrigan et al., 2002; United Nations, 2022). Furthermore, the increasing industrialization and agribusiness have resulted in a disconnection between urban dwellers and agriculture. This disconnection leads to a lack of knowledge and trust of the food system among city dwellers (Gorgolewski, 2011).

Technological innovation is required to achieve sustainable food production. Examples of successful innovation include high-tech greenhouses in the Netherlands that can produce 20 times more crops per square meter than traditional methods, while using only a quarter of the water (Dutch Greenhouses 2023). Similar technological advancements are needed in other countries to ensure food production can keep pace with the projected population growth, estimated to reach 9 billion by 2050. However, the reality is that many countries are yet to implement these technological advancements.

Dickson Despommier said that if every city globalyly were to cultivate 10% of its produce indoors, it could potentially free up 340,000 square miles of farmland for reforestation purposes, potentially easing the pressure on arable land in the countryside and leading to a more sustainable landscape. This would also help feed the rapidly growing urban population, which is projected to make up two-thirds of the global population by 2050.

Urban agriculture is a compelling solution to address the sustainability challenges of contemporary food production mentioned above. Additionally, urbanization has created a disconnection between urban dwellers and agriculture, leading to a lack of knowledge and trust in the food system. By integrating agriculture into urban spaces, such as rooftops, vacant lots, or vertical farms, urban agriculture can promote sustainable food production, reduce carbon footprint, increase food security, and reconnect urban dwellers with the source of their food.

what is urban agriculture?

Urban agriculture is a practice that involves the cultivation, processing, and distribution of food in or around urban areas. This practice has gained significant attention in recent years as a sustainable and local food source for urban populations. Urban agriculture encompasses a range of different practices, including rooftop gardens, urban farms, hydroponics system, vertical farms, and community gardens. (Deelstra & Girardet, 2000)

Urban agriculture can be categorized into two types: low-tech and high-tech. Low-tech urban agriculture refers to the more traditional and established forms of food cultivation in urban areas. This type of agriculture typically relies on basic and low-cost methods, such as raised beds, simple irrigation systems, and manual labor, and includes community gardens, urban farms, and allotment gardens. In contrast, high-tech urban agriculture refers to the use of advanced technologies and innovative techniques to grow crops and produce food in urban areas. This type of agriculture includes hydroponics, aquaponics, aeroponics, vertical farming, and other similar approaches that utilize indoor, climate-controlled environments and artificial lighting to grow crops year-round. High-tech urban agriculture often involves the use of sensors, automation, and data analytics to optimize growing conditions and maximize yields (Mougeot, 2006).

High-tech urban agriculture is more capital-intensive and relies on more advanced equipment and infrastructure, as well as specialized knowledge and expertise. Low-tech urban agriculture provides social benefits such as community building, social cohesion, education, recreation, and skill-building.

The goal of this project is to integrate low-tech and high-tech urban farming into the project, incorporating the benefits of both approaches. By blending these two approaches, urban farmers can take advantage of innovative techniques and technologies such as hydroponics, aeroponics, and vertical farming to maximize crop yields and minimize resource use, while also fostering a sense of community and connection to the food being produced. By integrating these approaches, urban farming can become a more inclusive and sustainable solution to food production in cities.

COMMUNITY GARDENING
growing food and society

The following study aims to provide a comprehensive overview of community gardens, with a particular focus on those in Budapest. Its main goal is to give an insight into the circumstances and characteristics that foster a strong and active community around urban gardens. The research also aims to serve as a constructive basis and guide for future planning processes by providing a comprehensive understanding of the functioning of community gardens.

One form of urban agriculture is community gardening, which involves the cultivation of food by groups of people within a local community on public or private land mostly in small or micro scale. Urban community gardening has gained popularity in recent years as a worldwide trend. The increasing urbanization and complexity of conventional food distribution systems have led to the emergence of urban agriculture as a sustainable alternative.

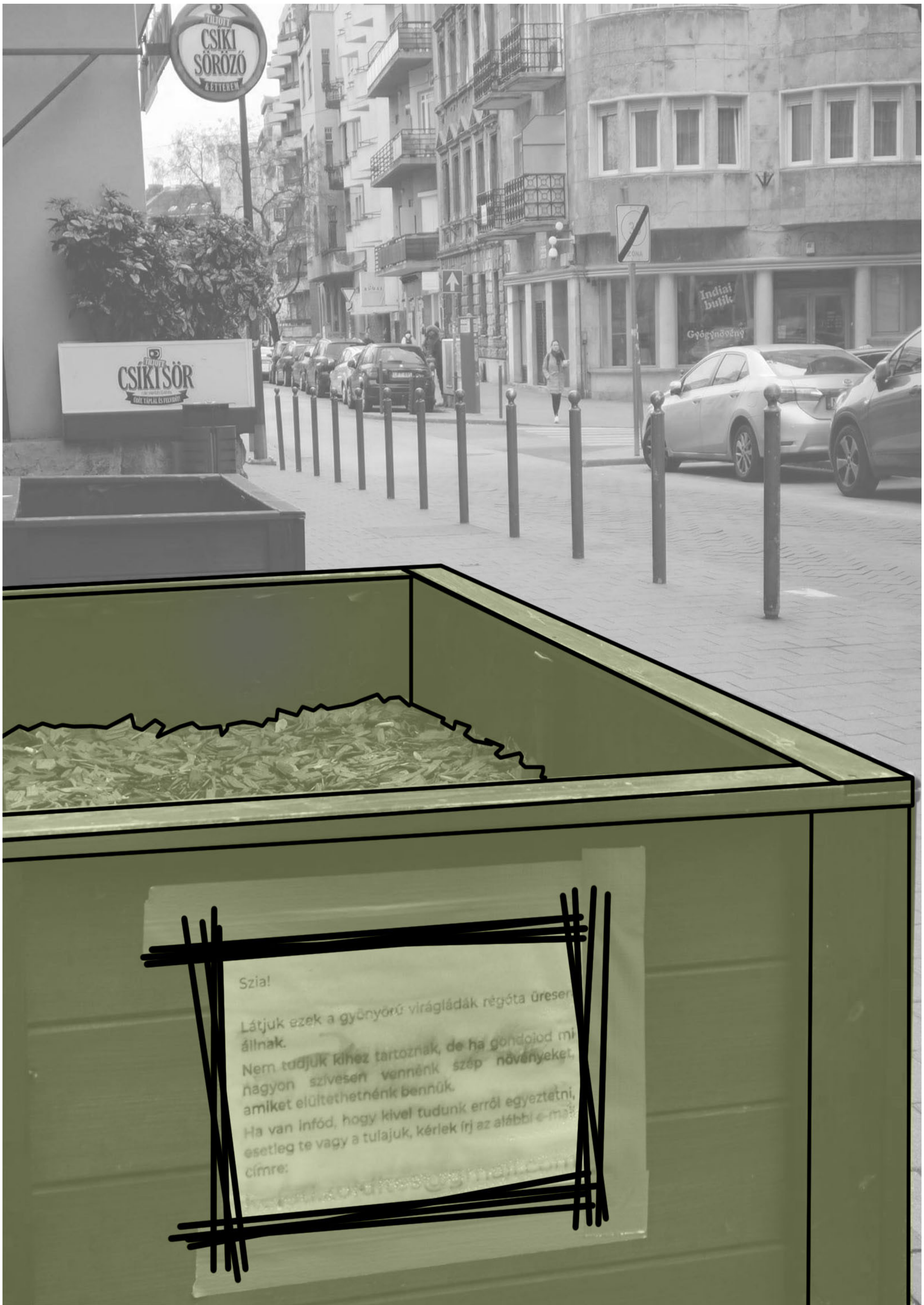
Community gardening has a range of benefits, both practical and social. From a practical perspective, it can help to increase access to fresh and healthy produce in urban areas where it may be otherwise difficult to obtain. It can also promote the development of local food systems, reducing the reliance on large-scale commercial agriculture and the environmental impacts associated with it. (Pourias et al., 2016).

Although the practical advantages of community gardens are important, it is the social perspective that truly highlights its benefits. Through community gardening, social cohesion and engagement can be developed within and beyond the community. It can raise awareness of social issues in multi-ethnic societies and provide opportunities for intercultural dialogue. Additionally, community gardens can provide a space for practical socio-ecological education processes, forming a platform for ecological engagement and eco-activism. Furthermore, community gardening can provide attention restoration and health promotion, as it has been shown to have positive effects on mental and physical health(Zacharias et al., 2014).

In urban areas, where social isolation can be a problem, community gardens can serve as a space for people to connect and build relationships with others in their community. For example, a research study conducted in New York discovered that community gardeners had a lot more social connections, community norms, and trust in one another, compared to people who do not participate in community gardening. Moreover, community gardens have been found to promote civic engagement and activism, as they can serve as a platform for collective action and community organizing community gardens have been used as a means to address various social and environmental issues, such as gentrification, urban blight, and access to healthy food. (D. Armstrong, 2000).

Community gardens can also help to promote sustainable practices and alternative modes of living, by fostering a sense of responsibility and stewardship for the environment. This can lead to the development of community-driven initiatives that focus on creating a more sustainable and equitable urban environment. For example, community gardens in Paris have been used to promote urban agriculture and local food production, as part of a larger initiative to reduce the city's carbon footprint and increase sustainability (Biron et al., 2018).

In conclusion, community gardening goes beyond being a source of fresh food in urban areas. Its true value is found in the social perspective, as it provides a platform for social and cultural development. By bringing people together, it fosters a sense of community and belonging, promotes intercultural dialogue, and encourages civic engagement, which is essential in today's atomized society. In the following sections, Budapest's community gardens will be examined to explore the aspects that contribute to community building around these gardens, with the aim of integrating these identified aspects into future design processes.



Ill. 4.3 - empty flowerbox

In this photo, an empty flower box can be seen placed in a public space located in one of the most densely populated urban areas. The text on the picture reads, "Hi, we noticed that these beautiful flower boxes have been empty for a while. We are not sure who they belong to, but we would love to plant some flowers and take care of them. If you have any information on who we could coordinate with, or if you are the owner, please contact us at this address."

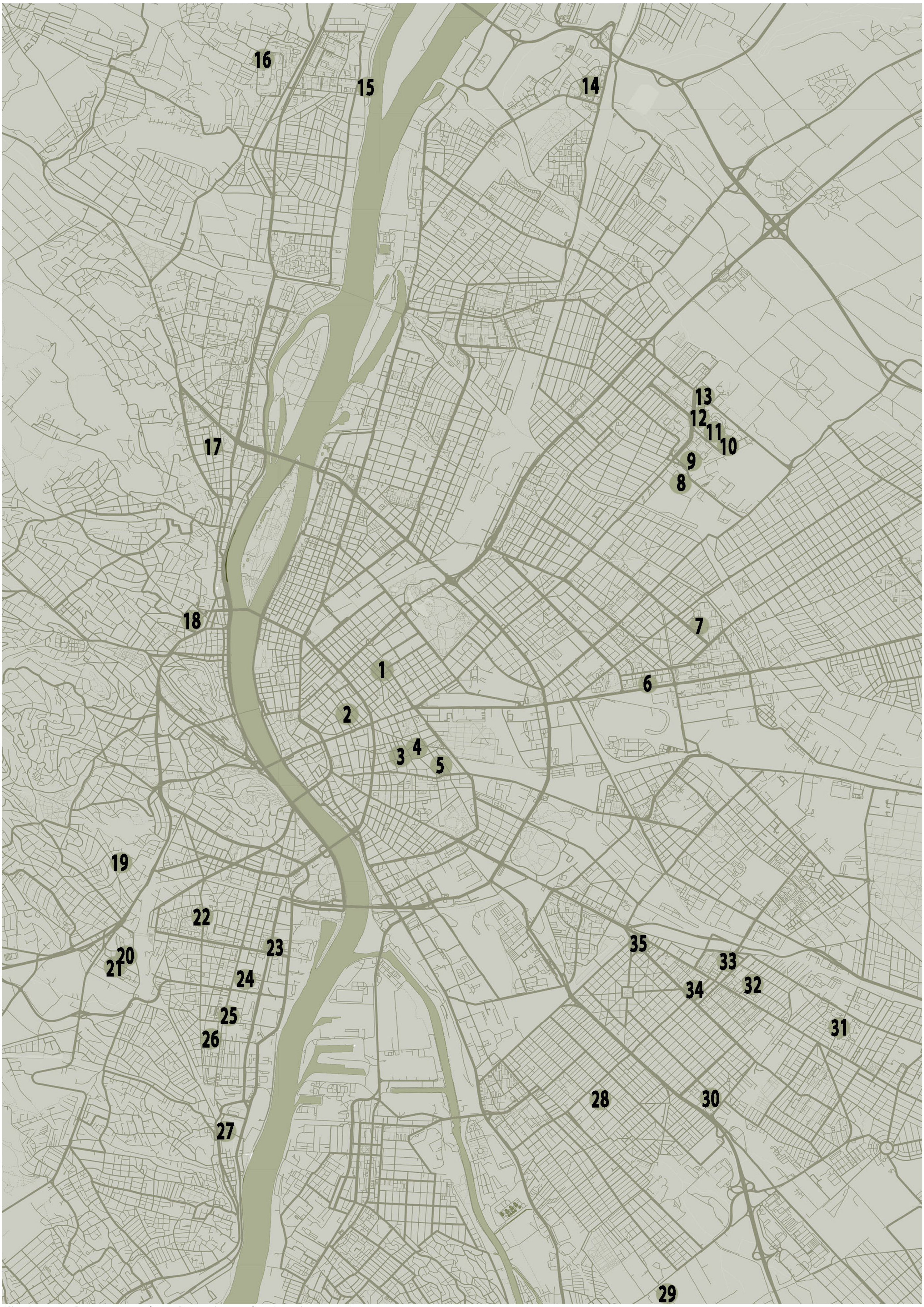
Commnuity Gardens In Budapest

Compared to other European cities, the adoption of urban agriculture in Budapest started relatively late in 2010 when the Center of Contemporary Architecture (Kortárs Építészeti Központ, KÉK) organized multiple lecture sessions for locals and stakeholders on the theme of „How to make the city more livable." which helped to bring community gardens into the public consciousness. In the beginning, the idea of community gardens was met with resistance from local authorities. However, there was considerable interest from the private sector and individual landowners. KÉK and other NGOs worked diligently to locate available spaces and raise awareness about the advantages of urban gardening. Eventually, in 2011, KÉK established Lecsós Garden, Budapest's very first community garden. The success of the first community garden paved the way for increased demand for more community gardens. Consequently, municipalities started to show interest in the concept, offering plots and delegating garden management tasks.

Ill. 4.4 - Green space intensity map of Budapest
Red dots mark the location of Urban Gardens

Despite the closure of Lecsó Garden, its successful operation inspired the establishment of more than 40 community gardens throughout Budapest (ill. 4.5). However, these gardens are not evenly distributed, with only five located in inner-city districts where the green space ratio is the lowest (ill. 4.4). Yet, the demand for community gardens is the highest in these districts, with waiting lists of several years for some gardens (Kertek 2023). This underscores the importance of community gardens for city residents who are eager to engage in gardening activities. In fact, many are even willing to cultivate neglected flower beds in public spaces (ill. 4.3), given the limited availability of community gardens in urban areas.

The lack of available green spaces in Budapest's inner city has created a high demand for community gardens, with waiting lists of several years for some gardens. However, despite the existence of vacant lots, community gardens have largely been pushed outside of the inner city area due to the reluctance of local governments and civil society organizations to initiate the transformation of these lots into gardens. This is often due to the uncertainty surrounding the future development or investment projects planned for these lots, which makes their use as gardens impossible.



Ill. 4.5 - Community Gardens in Budapest

Ill. 4.6 - Collage of Community Gardens in Budapest

In order to gain insight into the factors that contribute to the formation of an active community around urban gardens, an examination was conducted on the community gardens currently operating in Budapest (see appendix 1).

This study compiles information collected about these gardens, such as the year of establishment, land use, immediate surroundings, operator and ownership status, land accessibility, functions, and activity level. After gathering information and conducting personal visits, the community gardens were categorized into three different activity groups based on their level of engagement with the local community. These categories are as follows:

Level 1 - Passive gardens - These gardens only allow garden members to engage in activities within the garden, and there are no programs or opportunities for outsiders to participate.
Level 2 - Semi-active gardens - These gardens only allow garden members to engage in activities within the garden, but outsiders can visit during opening hours and follow their activities on online platforms.
Level 3 - Active gardens - These gardens allow everyone to engage in activities within the garden, and there are programs and opportunities for outsiders to participate as well. The garden and its community actively engage with the local neighbourhood.

Based on the research, the following conclusions can be drawn:

-Community gardens operated by NGOs or civil society groups are generally more active than those operated by local governments. For example, Zugkert and Kisdiófa operated by NGOs, are extremely active, while gardens established and operated by local government show little community activity. KÉK operated gardens have also developed strong communities, such as in the Kisdiófa or IBIS garden.

-Regardless of activity level, all the gardens have a waiting list, which indicates a high demand for urban gardening in Budapest.

-None of the gardens have built infrastructure to organize events during the colder months, which makes it difficult to maintain community engagement year-round.

-The accessibility and location of the gardens play a role in their level of community engagement. Gardens located in densely populated areas or with easy access to public transportation tend to have more community involvement.

-Gardens that incorporate educational activities through teaching plots tend to be more active and also organize programs in collaboration with schools, reaching more people in the process.

-Community gardens can serve as a space for social activism and community building beyond just food production. Some gardens have become hubs for environmental education, cultural events, and social justice initiatives, further connecting them to their local communities. This shows the potential for community gardens to have a broader impact beyond just providing food.

-Active community gardens serve as catalysts for the formation of additional eco-communities. A notable example is the initiative taken by members of a particular community garden who voluntarily engage in cycling to collect household organic waste, which is subsequently composted. This demonstrates how community gardens can inspire and support sustainable practices, fostering a culture of environmental stewardship and resource management.

Based on these conclusions, the following aspects are being implemented in the FILLin project. It is important for FILLin Farm to incorporate educational activities to collaborate with nearby schools and attract more people. Providing opportunities for emerging communities, such as those who collected organic waste by cycling, to form and strengthen is crucial, thus the provision of a clubroom or workshop room for them is essential. As FILLin Farm will be operated by an NGO, having an office on the premises is important for their operations. Both individual and community plots are highly significant, as the communal space facilitates collective activities and educational events, while individual plots allow locals to commit to farming and community engagement by regularly participating in the farm's activities for the maintenance of their plots.

04 ANALYSIS
Case Study

Agrocité de Gennevilliers
A Sustainable and Participatory Urban Agriculture Project

The following case study provides a brief introduction to the R-urban strategy, followed by an in-depth analysis of the Agrocité project from both architectural and social perspectives. The architectural aspect examines the site infrastructure, building structure and mechanical systems, as well as the interior design of the building.
Meanwhile, the social aspect of the study explores the community-building and community-shaping activities of Agrocité. In conclusion, the study presents relevant findings and conclusions drawn from the analysis.

Ill. 4.7 - Paris

R-URBAN

R-urban is a strategy that encourages residents to take a bottom-up approach to enhance urban resilience by creating a network of resident-run facilities. This project was initiated by Atelier d'Architecture Autogérée (AAA), a French architecture firm, and focuses on creating complementarities between key fields of activity like the economy, housing, urban agriculture, and culture to support the emergence of alternative models of living, producing, and consuming. It emphasizes the importance of local closed ecological cycles and collaborative practices among citizens to create flows, networks, and circuits of sustainable production and consumption. Originally, the R-urban concept included three components.

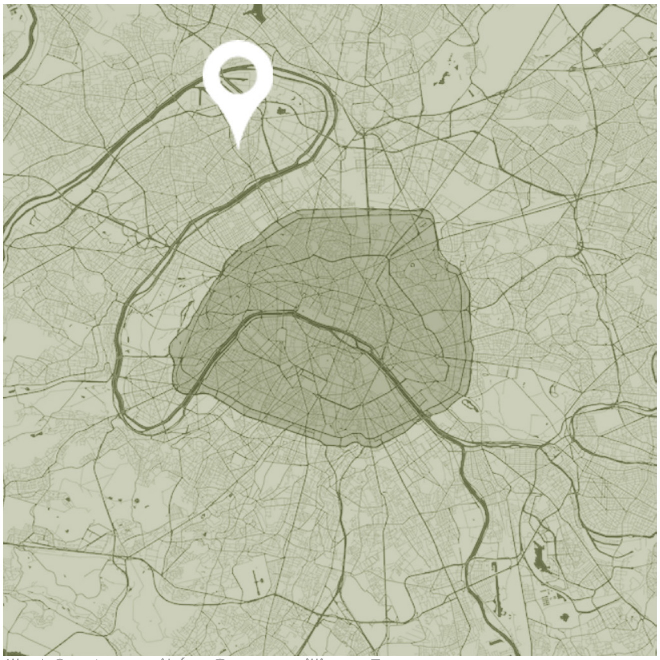
- **AgroCité** is a project promoting urban agriculture, which incorporates a micro-farm, communal gardens, educational and cultural spaces, as well as sustainable energy production, composting, and rainwater harvesting devices.
- **RecyLab** is focused on recycling and eco-construction by employing equipment to transform urban waste into sub-assemblies for eco-construction.
- **ECoHab** is a cooperative and environmentally conscious residential unit that has experimental living spaces and collectively-built areas.

Each of the three components plays a crucial role in fostering a locally closed ecological cycle, where resources are efficiently exchanged to produce commodities that can be shared within the cycle (Petrescu, 2016).

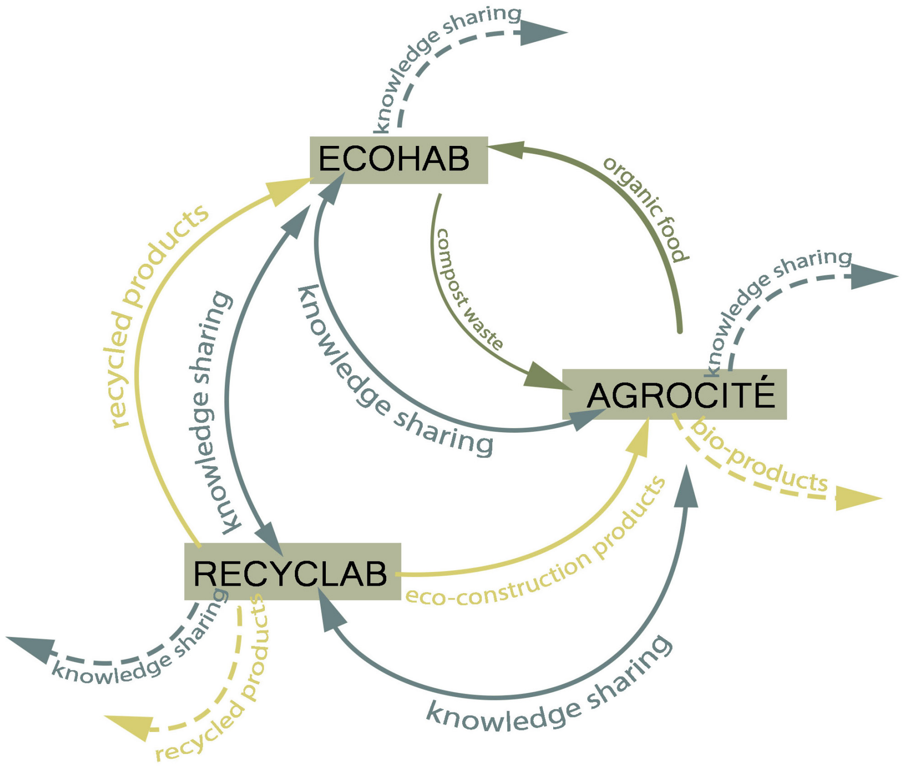
For instance, Agrocité produces **locally sourced and organic food** (green), some of which is shared with EcoHab while the rest is sold to the local community. In return, Agrocité receives household waste that is used to produce more compost for growing. Recyclab collects broken products from the local community and businesses, and the **recycled or repaired goods** (yellow)are exchanged and traded among them. (ill. 4.9)

One of the key strengths of the project lies in the flow of **knowledge and information** (blue) among the three hubs and the local community. Agrocité and Recyclab hold regular workshops and educational activities, sharing their skills and knowledge with each other and with the community. This creates a dynamic learning environment that promotes self-sufficiency, resourcefulness, and resilienc (R-Urban 2015).

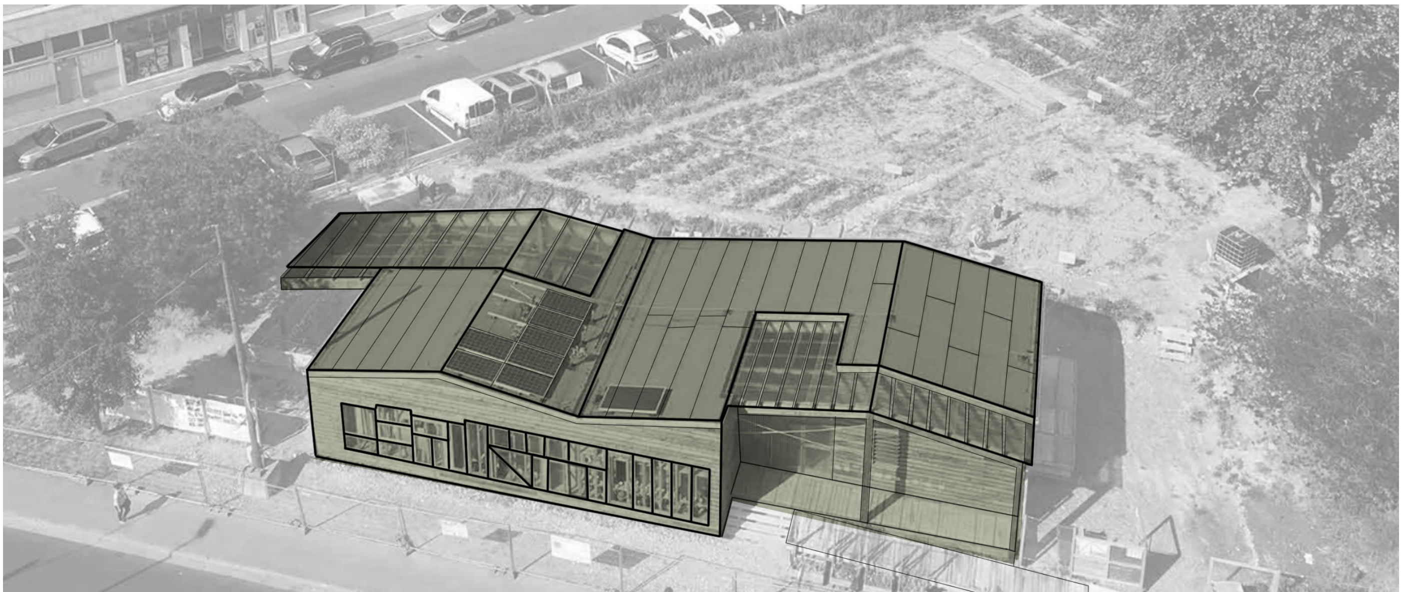
While the diagram provides a simplified representation of the connections between the three units and their environment, the R-Urban strategy is much more intricate and diverse than what the diagram shows. The project has become a model for sustainable urban development, inspiring other initiatives and hubs to emerge in different neighborhoods, cities, and countries.



Ill. 4.8 - Agrocité - Gennevilliers, France



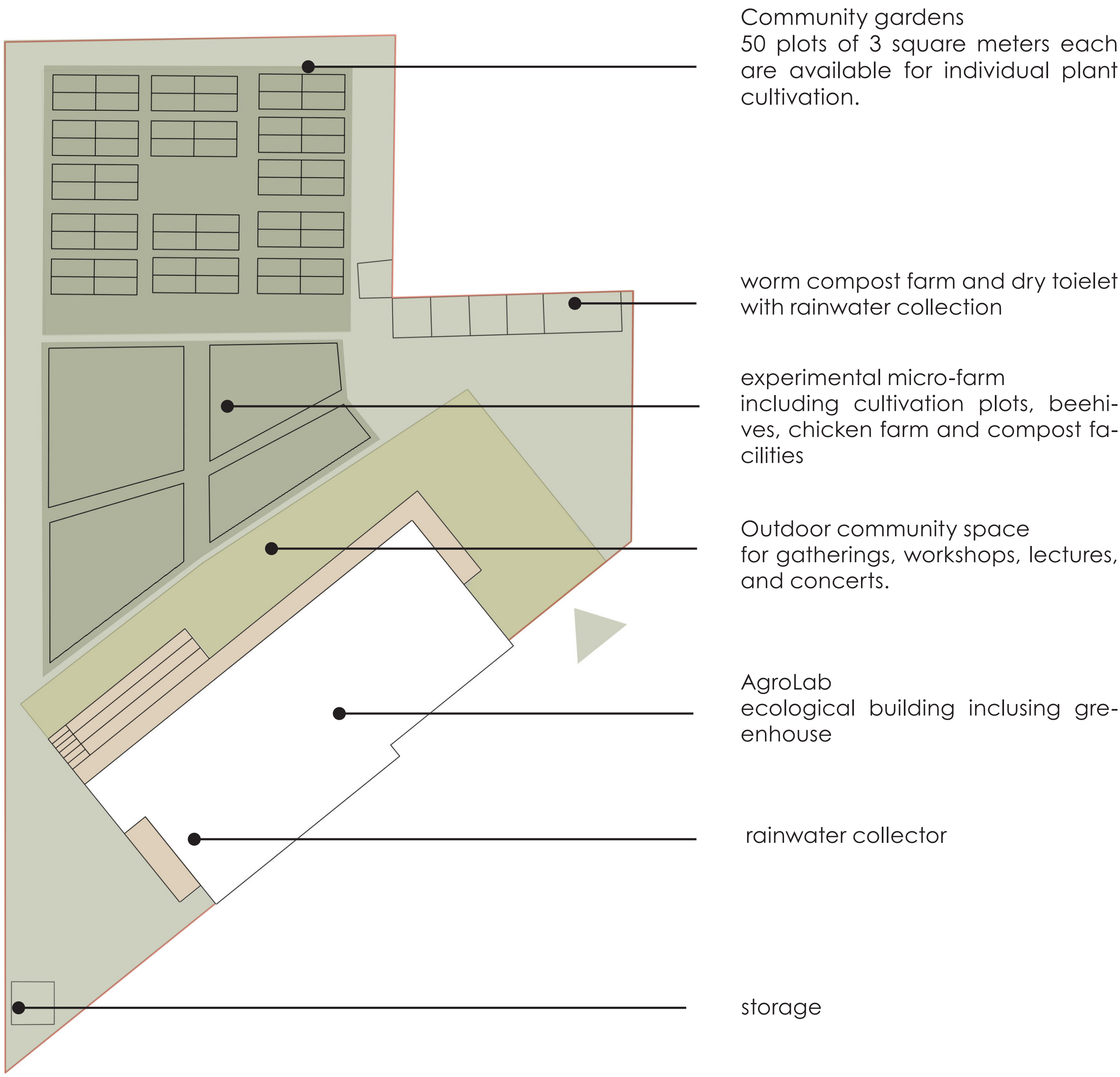
Ill. 4.9 - Circulation of resources in R-Urban



Ill. 4.10 - The site of Agrocité

AgroCité Architectural aspect

Agrocité is an urban community and experimental farm, spanning approximately 1600 square meters. Initially located in the suburbs of Paris in Colombes, the farm was relocated to Gennevilliers, 2 kilometers away, in 2017 due to pressure from the local government. The farm is surrounded by 10-story residential buildings, a playground, and a small retail store. Agrocité can be divided into three main areas: the community garden, the experimental farm, and the AgroLab building. The AgroLab is a single-story, 250-square-meter building situated on the street front. Its naturalistic wooden facade stands out as a unique feature of the area and contrasts with the surrounding tall buildings. The AgroLab serves as a hub for workshops, lectures, events, and research on sustainable agriculture and urban farming. It is designed to be flexible and adaptable, allowing for various configurations and uses.



Ill. 4.11 - AgroLab SiteMap

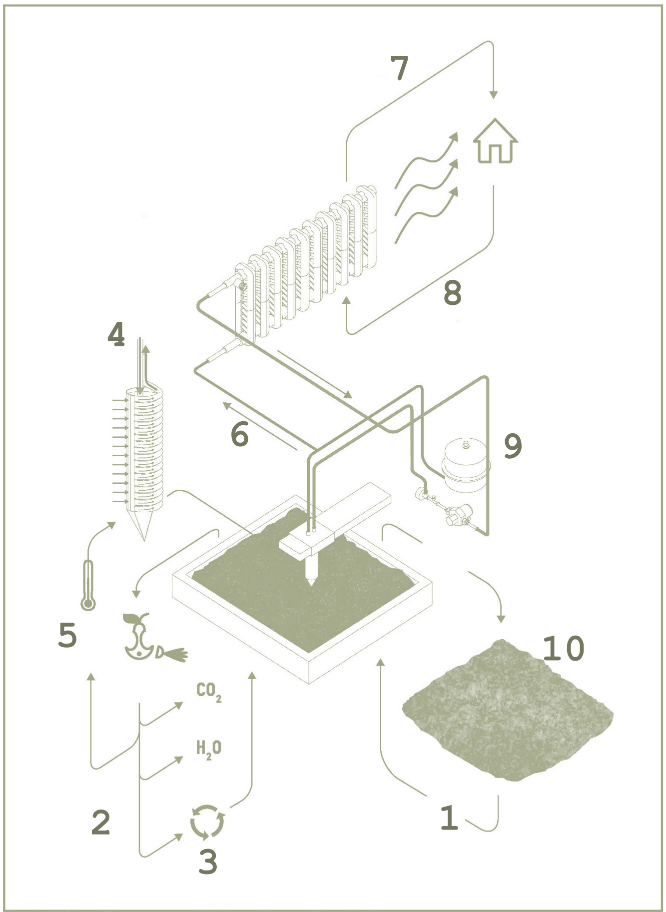
Agrocité Technology

The AgroCité building is primarily constructed using wooden frame structure. The building's foundation is micro-pile, which ensures a solid connection to the ground without causing any permanent damage to the soil (ill. 4.13). The micro-pile foundations are also designed to be easily removable, which is an important feature for sustainability and adaptability. For example, when Agrocité needed to relocate, the foundation was able to be moved along with the building (R-Urban, 2023).

The design of the building prioritizes the use of reused and recycled materials. The majority of the windows in the building, for example, were obtained second-hand. Additionally, salvaged wood and industrial panels were used throughout the construction process. For materials that could not be sourced second-hand, the designers sought to obtain them from ethical and local sources. For instance, the insulation was made from locally sourced straw. (Petrescu, 2016)

The building also incorporates a range of ecological devices, such as rainwater collection, graywater phyto-remediation,compost heating system, Green wall&roof irrigation system and solar energy production (ill. 4.14). These features contribute to the overall sustainability of the building.

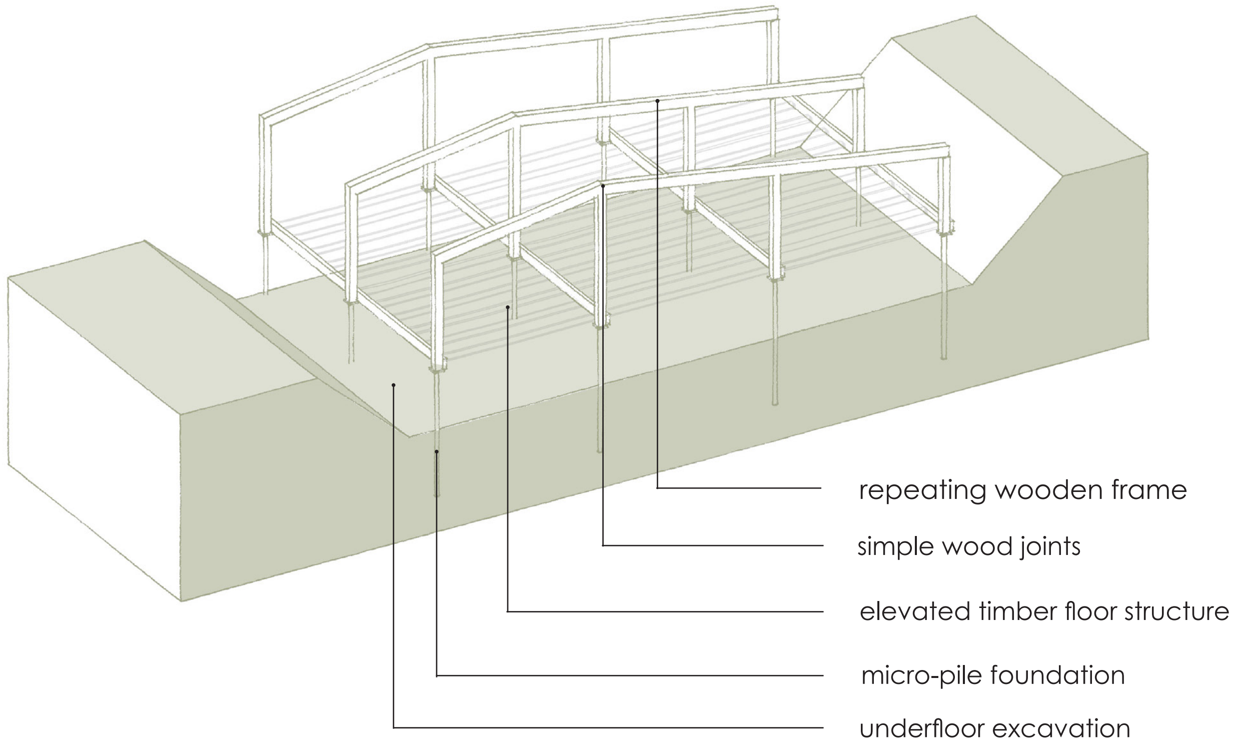
The heating system recovers and reuses the thermal energy generated by the composting process. The temperature inside the 1 m3 volume can reach up to 60°C. In the current design, this system provide heat to the buildings during the winter season with an area of 1.5m x 2m x 1.6m situated underneath the building (R-Urban, 2023)



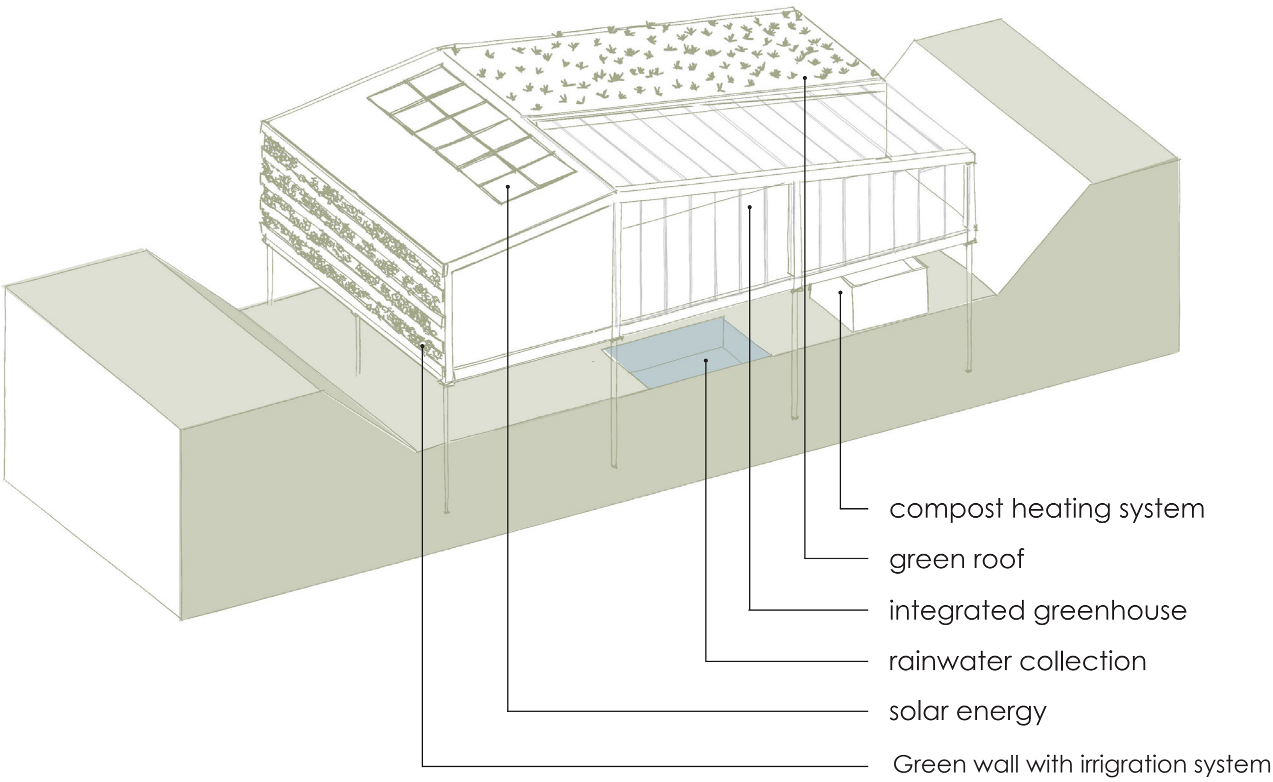
Ill. 4.12 - Compost Heating Prototype

Compost Heating

1.Fresh compost is added to the composting system every three weeks.
2.Microbes break down the compost, producing CO2 and H2O as byproducts.
3.This process is repeated until all waste is fully composted.
4.As the compost breaks down, it generates heat, which is transferred to a heating system via a coiled copper tube placed within the compost.
5. The coiled copper tube can reach temperatures from the compost of up to 60°C.
6. Hot water is then circulated through the heating system, reaching a pressure of 1.12 atm and allowing for air movement via a pressure gradient.
7. This warm water is then used to heat the building.
8. After the water cools down to the air temperature, it returns to the heating system at 25°C and 1 atm pressure.
9.A gauge and valve system monitors and controls the pressure within the system.
10.Once the composting process is complete, the resulting compost can be removed and used to nourish the soil



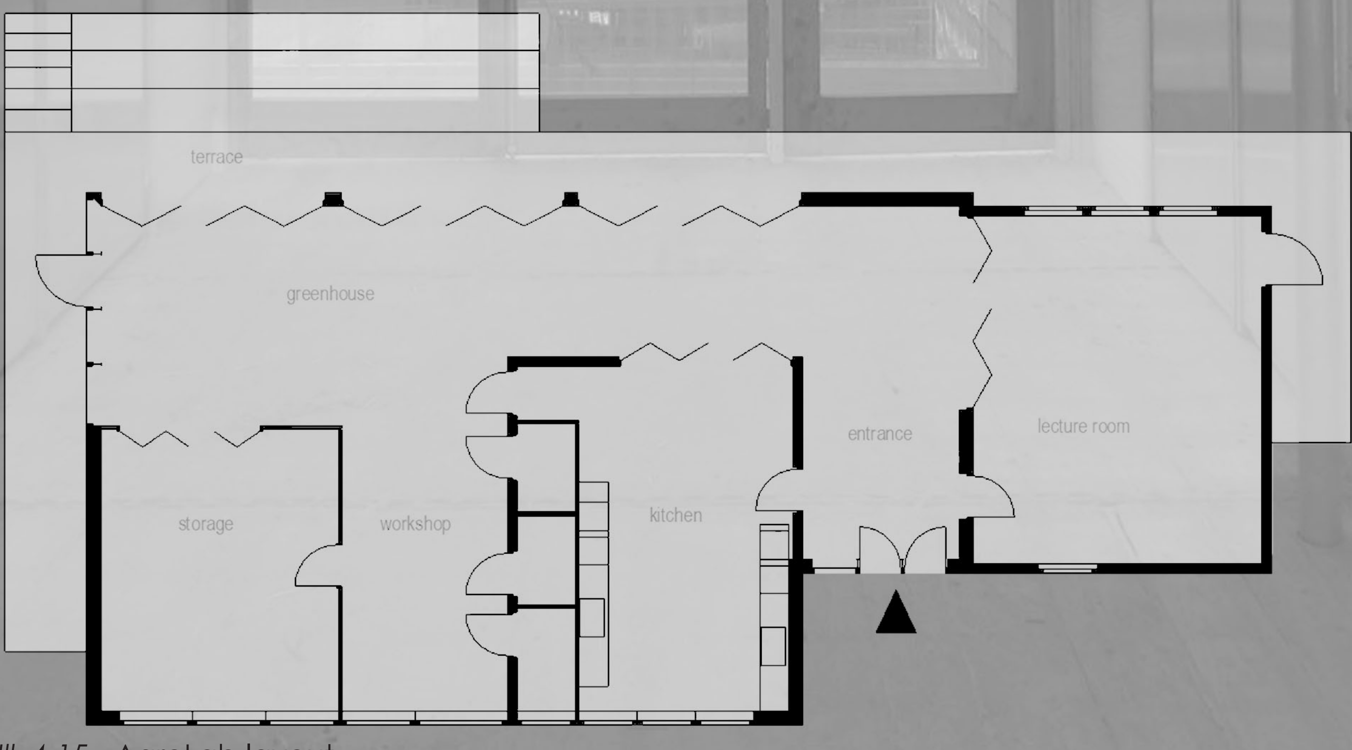
Ill. 4.13 - AgroLab Sematic Structure Drawing



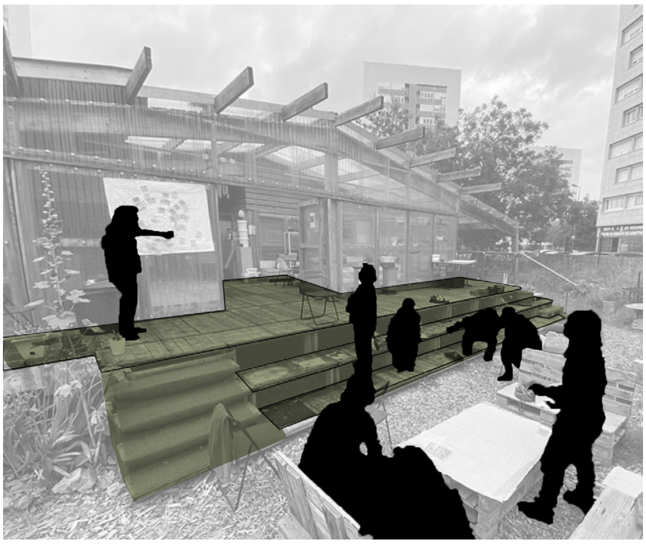
Ill. 4.14 - AgroLab building engineering and tecgnical solutions

Agrocité Interior

The ethos of the design is reflected in the highly flexible interior spaces of the building, which can adapt to a wide range of activities despite its small size. By making the greenhouse area openable, the building becomes a transitional space that blurs the boundaries between the indoor and outdoor environments. This allows for a diverse range of events and activities to take place within the building, promoting a sense of connectivity with nature



Ill. 4.15 - AgroLab layout

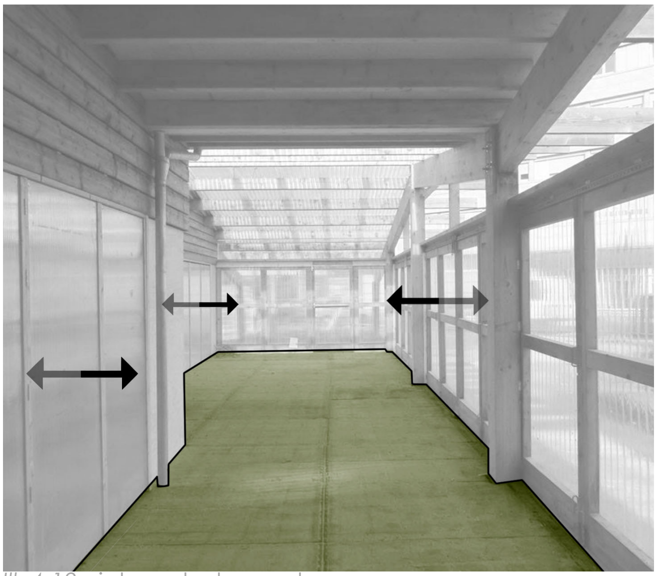


Ill. 4.16- AgroLab terrace

The elevated terrace of the building serves a dual purpose as an outdoor stage for performances and lectures. The sliding doors facing the terrace also allow for seamless integration of the indoor and outdoor spaces, with the doors able to be opened up to create a larger, more flexible area.

Ill. 4.17 - AgroLab kitchen

The kitchen is a central feature in the Agrocité building. Its flexible walls can be opened up to the adjacent „greenhouse" corridor, allowing for seamless access and movement between the two spaces. During café or market events, the kitchen serves as the counter and food preparation area, with modular boxes used as space dividers to create a clear distinction between the kitchen and dining areas. The modular design of the boxes allows for easy reconfiguration to meet the needs of different events and activities.



Ill. 4.18 - integrated greenhouse

The greenhouse in Agrocité is seamlessly integrated into the building and features transparent plastic elements that create a bright and inviting atmosphere. Its multifunctional nature allows it to serve as more than just a greenhouse, providing ample space for events, workshops, and other activities. Additionally, the greenhouse serves as a buffer zone for the other rooms in the building, which can be opened up to the greenhouse to increase their capacity as needed. This feature adds to the flexibility of the space and allows it to adapt to different needs and uses.

Ill. 4.19 - transition

The large doors of the greenhouse effectively eliminate the border between the interior and exterior spaces of Agrocité. By opening up these doors, the boundaries between the indoor and outdoor areas are dissolved, resulting in a harmonious and continuous transition between the two.

Building Community Through Agrocité: Collective Expression and Participation

The first initiation of the Agrocité project in Colombes emerged from a community collaboration. A group of residents who had been gardening in an urban wasteland formed an association with the support of Atelier d'Architecture Autogérée (AAA) and together built AgroCité. In Colombes, the project was nurtured by this well-functioning local community, which had a strong sense of ownership and participation in the project. In 2017, the major turning point happened and AgroCité was forced to leave Colombes. As a result, the urban farm had to relocate to a new site in Gennevilliers, where the community-building had to start from scratch. In Gennevilliers, Atelier d'Architecture Autogérée (AAA) had to manage building a new community around AgroCité. (R-urban, 2023)

Collective Expression

The process of fostering collective expression played a key role in building a new community around Agrocité. The project utilized various strategies to encourage participation. Through practising daily activities together and sharing experiences, a sense of collective dynamics began to emerge among participants. As the project progressed, AAA provided room and support for new actors to propose their own activities and gradually take charge of the project until they became its managers. This eventually led to the creation of a self-managed association, which became responsible for the project as the initiators gradually faded into the background and began to develop new projects. (Elarj, 2022)

Agrocité fosters collective expression through a variety of educational activities, such as training programs, workshops, and educational tours. The programs cover a range of topics related to sustainable living, urban agriculture, composting, renewable energy, and waste reduction. These programs are free and open to everyone. Furthermore, Agrocité's urban agriculture also plays a vital role in community building since the garden owners often have to come together to care for the garden, indicating their active participation in the communal life of Agrocité.

The maintenance and organization of the café and Farmer's market also require a great deal of commitment from the community, making it a collaborative effort. Additionally, it offers an opportunity for nearby residents to become familiar with Agrocité and its activities at anytime.

Agrocité played a pivotal role in shaping the subsequent design process, drawing inspiration from its architectural, interior design, and social-building elements. The research findings highlighted several significant aspects that were deemed important for consideration:

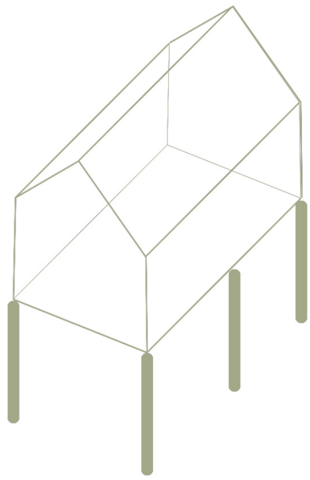
-One of the key architectural features is the use of micro-pile foundation, which not only allows for adaptability to different soil types but is also recyclable (sketch 1). Another example is the simple structural connections in the wooden elements, which not only make assembly and disassembly easy but also enable community participation in construction, contributing to the social aspect of the project (sketch 2)

-Agrocité's interior design serves as a positive architectural example due to its space flexibility that allows for a variety of events to take place, despite the building's small footprint (sketch 3). The integration of the greenhouse into the building is also a good model, as it physically dissolves the boundaries between inside and outside in the summer, while visually blurring them in the winter, creating a transitional space that makes the building more human and nature-oriented (sketch 4). The raised stage area, resulting from the building's elevation, is also a great example that can be effectively utilized du for events (sketch5)

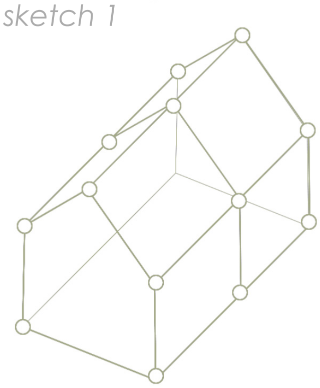
-Agrocité lacks openness towards the street, making it less inviting from an architectural perspective. In future planning, it is essential to consider that the building should not only open towards the internal farm but also towards the street to represent a narrative of a more open and welcoming community.

-The community-operated café is a positive example from a social aspect as it helps to raise awareness about the building and its activities, making them more accessible to the general public. Additionally, the café serves as a gathering place for the community, fostering social connections and creating a sense of belonging.

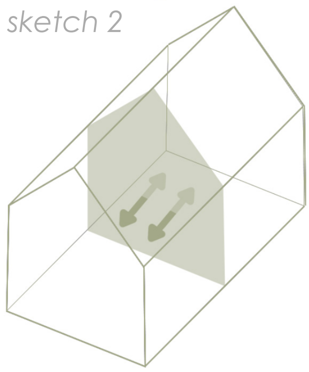
-Collective expression is a useful example of how a dedicated self-organized community can be created. Members are encouraged to organize events based on their interests, which fosters a sense of ownership and responsibility towards the project. This approach empowers individuals and strengthens the community, creating a more inclusive and participatory environment.



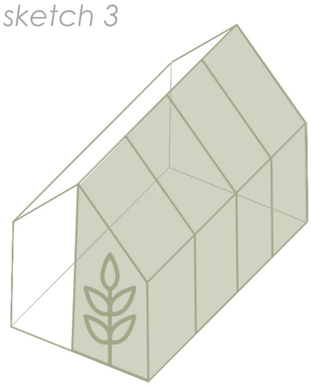
sketch 1



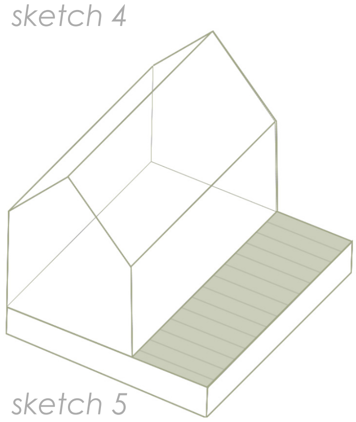
sketch 2



sketch 3



sketch 4



sketch 5

04 ANALYSIS
The users

Understanding the diverse range of potential users and their needs is essential given the project's nature. To gain a comprehensive understanding, visits were made to urban gardens community-building events where conversations took place with people. These interactions provided valuable insights, forming the basis for the creation of three personas that represent the collective of urban gardeners. These personas capture the various characteristics, preferences, and motivations of the target users, enabling the design process to be tailored to their specific needs. By incorporating these personas, the project aims to ensure inclusivity and user-centred design, resulting in a solution that effectively

Ill. 4.20 - preciousplastic

1. PERSONA: Mark

Background: Mark is a young guy in his early twenties who shares an apartment with his friends in Budapest. They recently came up with the idea of growing zucchini and tomatoes in their rented flat. Although they successfully managed the germination phase, unfortunately, the plants died before they could yield any produce. Reflecting on their initial failed attempt, they decided to be better prepared for the next year. They attended a crash course organized by a community garden to gain more knowledge and skills. Despite their eagerness to continue experimenting, they were unable to secure a plot in the community garden for the following year. Nevertheless, they took the knowledge they acquired and are eager to start gardening.

Motivation: Mark represents young adults who have little to no knowledge of gardening but are enthusiastic to try it out. They recognize the need for professional guidance and support to achieve success in their gardening endeavors. Mark and his friends value the learning experience and are motivated to improve their gardening skills. They aspire to be a part of a sustainable and productive urban garden, where they can enjoy the process and eventually harvest their own fresh vegetables.

Goals and Challenges:
-To gain practical skills and knowledge in gardening to successfully grow vegetables in their apartment
-To overcome the challenges they faced in their first attempt

Needs and Expectations:
-Access to resources, workshops, and expert guidance to develop their gardening skills
-Support in understanding the specific requirements and techniques for growing vegetables in an urban environment
-Opportunities to connect with experienced gardeners and fellow gardening enthusiasts for advice and inspiration

By understanding the needs and aspirations of young, inexperienced urban gardeners like Mark, the design process can focus on providing accessible education, tailored resources, and user-friendly gardening solutions.

2. PERSONA: Andrea

Background: Andrea is a young mother who lives in Budapest with her two children. She wishes for her children to have the opportunity to engage in gardening, but unfortunately, their apartment does not have access to a garden. Andrea has been a member of a community garden for several years, primarily for the sense of community it offers and the educational programs that allow her to teach her children about plant cultivation and the importance of environmental conservation. She is an active participant in the garden and, together with other members, has formed a sustainable food circle where they collectively order and distribute locally sourced sustainable produce.

Motivation: Andrea represents young mothers who prioritize their children's exposure to nature and hands-on experiences like gardening. She values the community aspect of the garden, recognizing the benefits of engaging with like-minded individuals and participating in organized educational activities. Andrea aims to instill a sense of environmental responsibility in her children while fostering their connection with nature through gardening.

Goals and Challenges:
-To provide her children with the opportunity to learn about gardening and develop a connection with nature, despite living in an apartment without a garden
-To actively engage in community gardening activities and foster a sense of belonging within the garden community
-To promote sustainable practices and healthy eating habits.

Needs and Expectations:
-Access to community gardening spaces and educational programs suitable for young children Inclusion in a supportive community that encourages knowledge-sharing and collaboration
-Opportunities for her children to develop essential life skills such as responsibility, patience, and appreciation for nature through gardening
-Access to sustainable and locally sourced produce through the sustainable food circle, promoting eco-friendly consumption practices

By understanding the needs and motivations of young mothers like Andrea, the design process can focus on providing family-friendly gardening solutions, creating opportunities for community engagement, and facilitating educational activities for children. Emphasizing the importance of sustainability and fostering a sense of community within the garden can further enhance the overall experience for Andrea and others alike.

3. PERSONA: Pál

Background: Pál is a soon-to-be retiree who has been a lifelong resident of Budapest. Environmental consciousness is of great importance to him, and as such, he has a strong desire to establish a small plastic recycling workshop. His goal is to collaborate with artists to recycle plastic waste in Budapest and provide educational activities and workshops for young people on creating small functional objects or artworks from plastic waste. Pál was inspired by the open-source method provided by Precious Plastic (Precious Plastic, 2023), which motivated him to embark on such an endeavor.
However, acquiring a suitable workshop space is proving to be challenging. He is keen to join forces with like-minded individuals to initiate this project or to collaborate with an existing workshop.

Motivation: Pál represents retirees who are passionate about environmental sustainability and wish to actively contribute to creating a positive impact on the community. He sees his retirement as an opportunity to engage in meaningful activities that address the issue of plastic waste and educate younger generations about recycling and upcycling.

Goals and Challenges:
-To establish a plastic recycling workshop in Budapest and collaborate with local artists
-To provide educational activities and workshops for young people on plastic waste recycling and repurposing
-To acquire a suitable workshop space that meets the needs of the plastic recycling activities
-To join or collaborate with a community of individuals who share similar values and goals in recycling and sustainability

Needs and Expectations:
-Access to a workshop space equipped with the necessary tools and machinery for plastic recycling
-Collaboration with local artists and creative individuals to explore innovative approaches to plastic waste repurposing
-Opportunities to engage and educate young people through workshops and educational programs
-Collaboration and support from a community of like-minded individuals who share a passion for sustainability and recycling

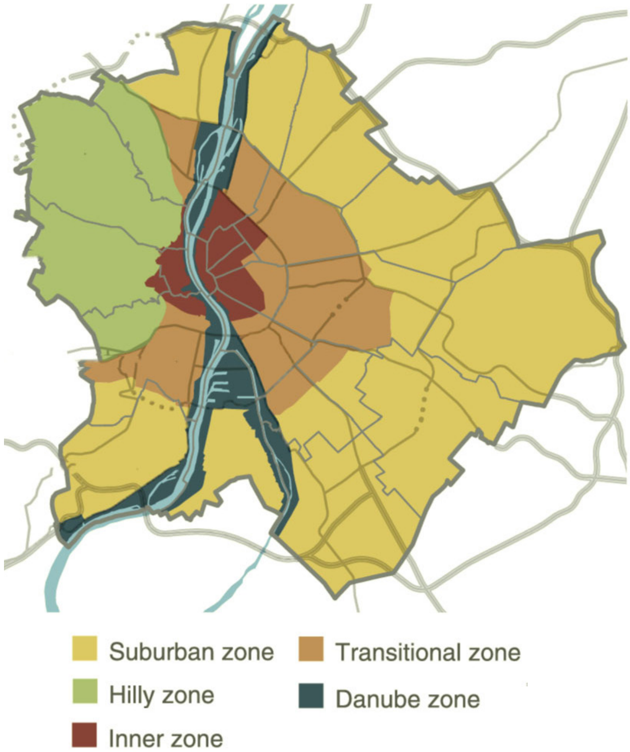
By understanding Pál's motivations and aspirations, the design process can focus on creating opportunities for individuals to realize their own community-building ideas. To facilitate this, the integration of workshop spaces within the farm is necessary. The proposed building should also provide space for organizing events where like-minded individuals can come together and connect. Therefore, a lecture room that can accommodate roundtable discussions, meetings, and club gatherings becomes an important component of the design.

04 ANALYSIS
Budapest

Budapest Macroclimate

This analysis aims to offer a concise yet comprehensive overview of Budapest, covering its historical background and structural aspects. The focus will then shift to examining the city's macroclimate, analyzing the prevailing weather patterns and climatic conditions. Additionally, the analysis will explore the characteristics of vacant plots in Budapest and provide an in-depth analysis of selected plots, shedding light on their potential uses and development prospects.

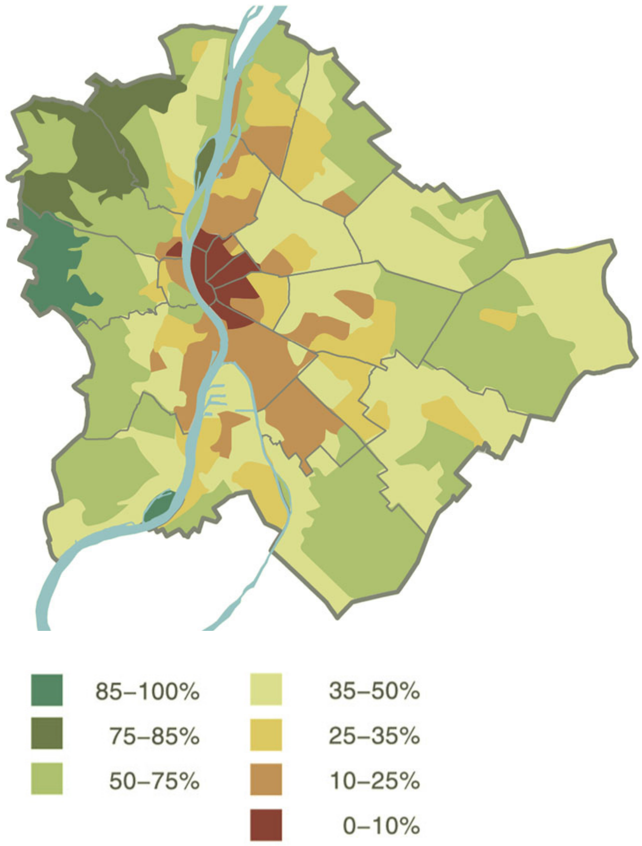
Budapest is the capital and largest city of Hungary, situated in the heart of Europe. With a population of over 1.7 million, it is one of the most populous cities in the European Union. The city is a cultural, economic, and political hub of the country, with a rich history dating back to the Roman Empire. Budapest is situated on the banks of the Danube River, dividing the city into two parts: the flat and evenly developed eastern side, known as Pest, and the hilly and irregularly developed western side, known as Buda. The city center, is surrounded by densely built-up inner residential areas with dilapidated housing stock from the late 19th and early 20th centuries, as well as some transitioning derelict industrial areas and monotonous housing estates from the socialist era. The outer residential belt is dominated by detached family houses with small gardens, while the Budai Hills on the west side of the Danube River rise to an altitude of over 500 meters and are mostly covered by recreational forests forming a protected area.



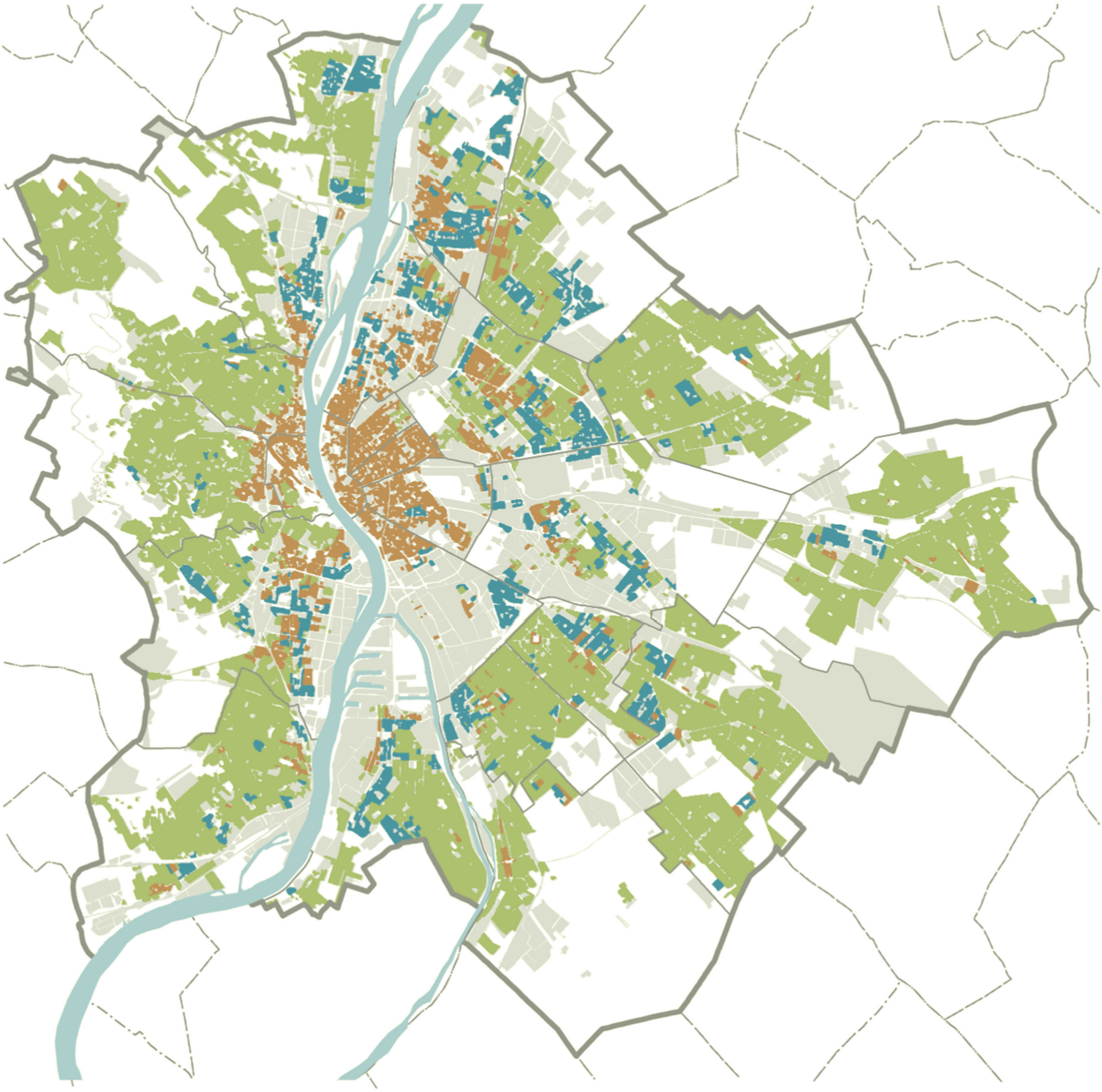
Ill. 4.21- area patterns that determine Budapest's urban structure

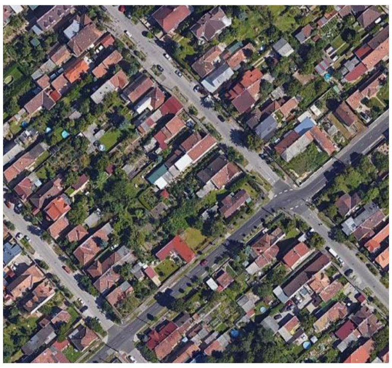
The urban structure of Budapest is determined by network patterns and area patterns that reflect the results of regional and urban development in former eras. The city is divided into five zones with different features, functions, and inherent burdens (ill. 4.21), and the inner zone contains all the historic parts of the city. The transitional zone is the most heterogeneous area, while the suburban zone is mostly formed by rings comprising attached settlements. The hilly zone is where Budapest's wealthiest social level resides, and the extensive forests in the zone guarantee Buda's fresh air. The Danube zone is now viewed as an increasingly valuable strip of land due to the improved water quality, but the changed profile of former industrial areas has not led to an ultimate solution regarding their utilization as a new function yet.

From a human environmental perspective, green area intensity is particularly important. In the inner city, typically on the Pest side, green area intensity ranges between 0-10% due to the densely built urban fabric (ill. 4.22). The per capita active green area is only 148.3m2, which includes 25m2 of touristic forest area and 5m2 of public recreational green area, while the remaining 118m2 consists of all other non-public green areas such as gardens of residential buildings, public institutions, and green areas of economic and transport areas. The distribution of green areas and areas for daily recreation is uneven, with a higher ratio in Buda compared to Pest.



Ill. 4.22 - Features of urban green areas
Budapest 2030 - long term urban development concept





78% FREE STANDING
38% of population

12% ESTATE
34% of population

12% CLOSED ROW
28% of population

Ill. 4.23 The Typology of the City
Budapest 2030 - long term urban development concept

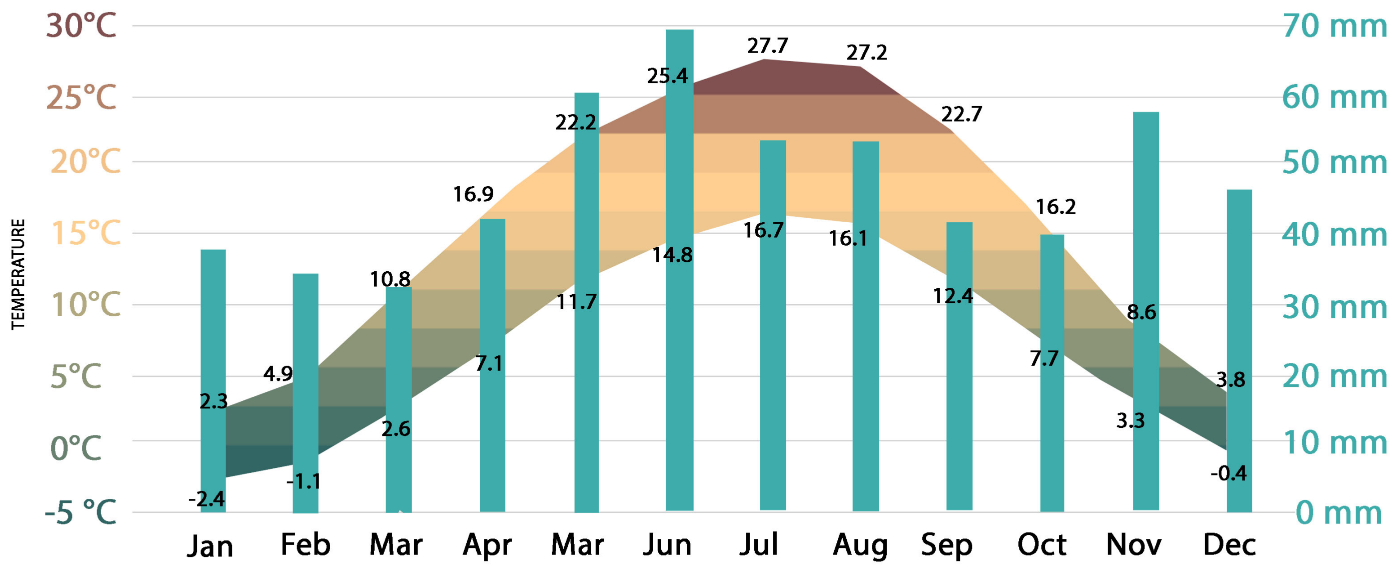
BUDAPEST MACROCLIMATE
Analysing the Weather Condition

The city's macroclimate is influenced by several factors, including its geographic location, topography, and the circulation patterns of air masses. It is advisable to analyze the climate of Hungary within the framework of its immediate natural environment, namely the Carpathian Basin. The climate of this region is determined by its location at the intersection of three major European climatic regions - continental, oceanic, and Mediterranean. The climate of the country is predominantly characterized as a humid continental climate.

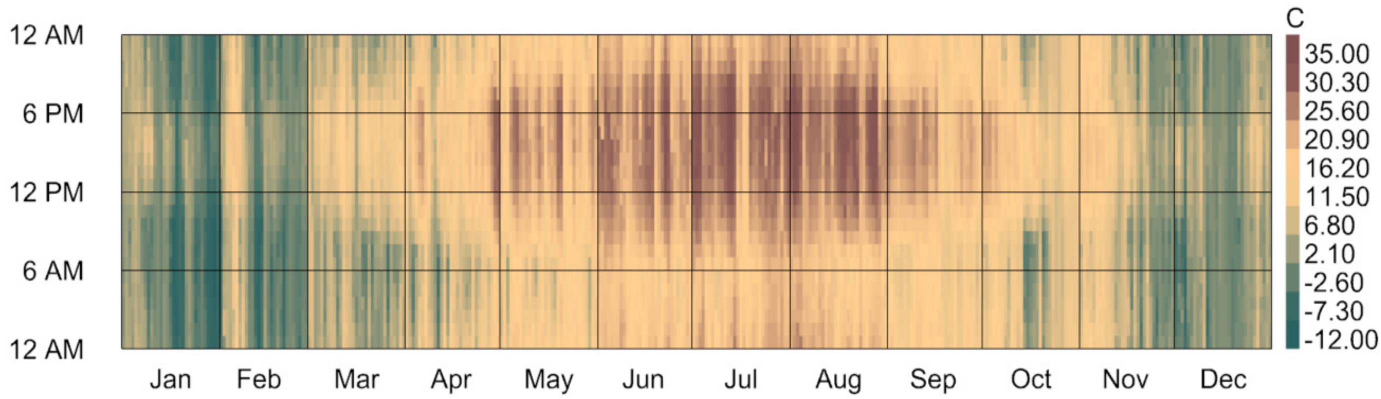
The average temperature in Budapest is around 11.5°C, with the warmest months being July and August, with an average temperature of around 21°C, and the coldest months being January and February, with an average temperature of around 0°C. The annual precipitation is around 600-650 mm, with the wettest months being May and June, and the driest months being February and March. (Ill. 4.24)

Budapest has a moderately humid climate, with an annual average relative humidity of around 70% (ill. 4.27). The city's location in the Carpathian Basin, surrounded by hills, has a significant impact on the local humidity levels. The humid air from the surrounding regions is trapped in the basin, causing the city's humidity to rise.

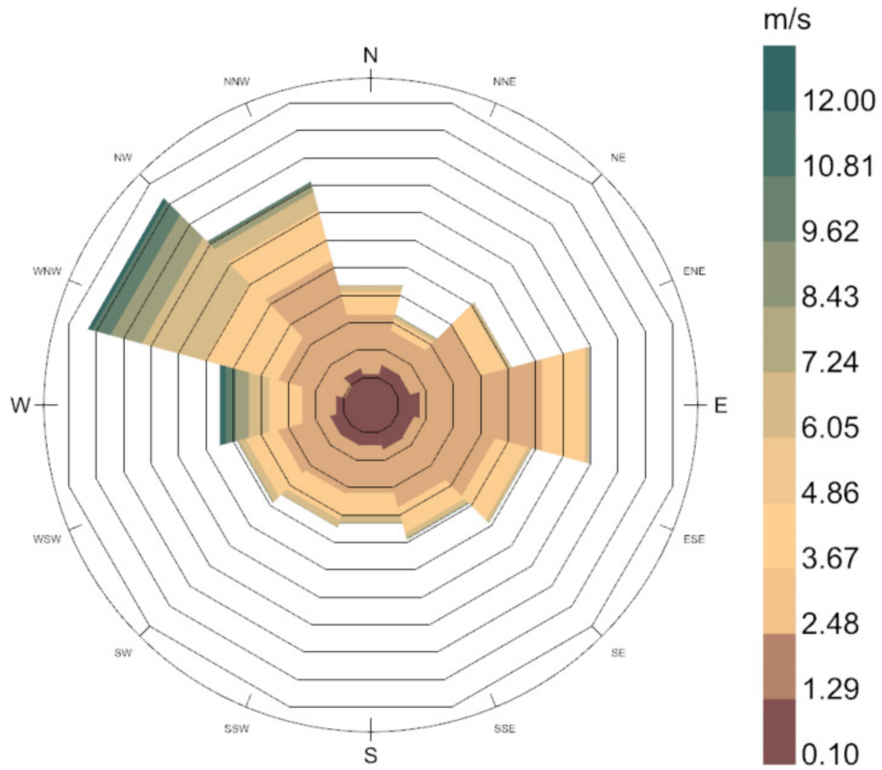
The annual wind rose shows that the prevailing winds in Budapest come from the northwest, with an average speed of around 3.5 meters per second (ill. 4.26). However, this direction accounts for only one-third of the total wind direction changes. When temperature is taken into consideration, the wind direction is significantly different on warm days with temperatures above 26°C. During such days, medium-speed southern to southwestern winds dominate the wind pattern. The seasonal wind speed variations are relatively homogenous throughout the year, with slightly higher speeds in spring and lower speeds in autumn. Nonetheless, daily variations throughout the year are noticeable, with stronger winds during the day than at night, which could explain the city's lack of nocturnal cooling.



Ill. 4.24 - Budapest Hungary Average Monthly Day and Nights Temperatures and Average Monthly Rainfall



Ill. 4.25 - Budapest Hungary Dry Bulb Temperature (C)



Ill. 4.26 - Budapest Hungary Wind speed (m/s)

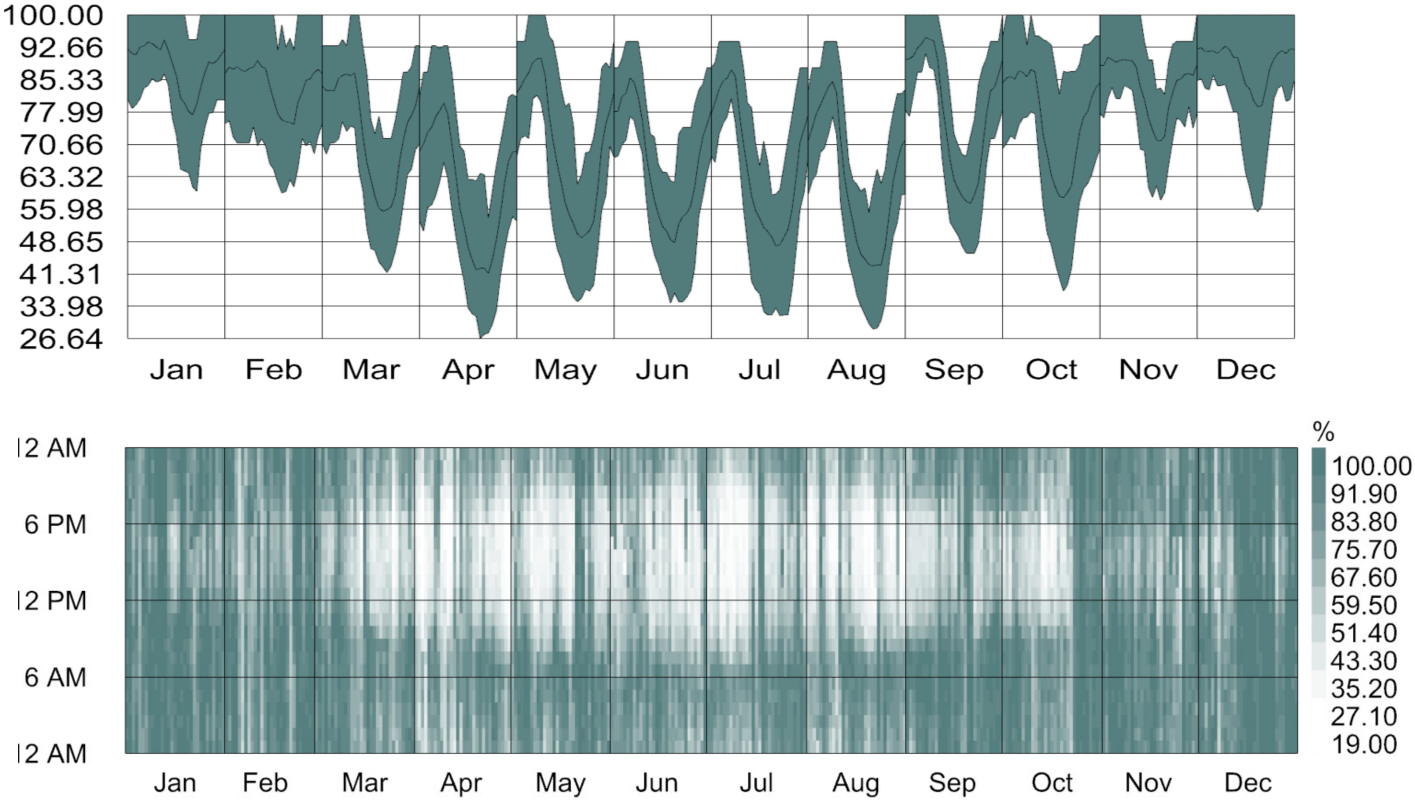
BUDAPEST MACROCLIMATE
Urban Heat Island

The Urban Heat Island (UHI) effect is a phenomenon where urban areas experience higher temperatures compared to their surrounding rural areas due to human activities and infrastructure. This effect is caused by the absorption and retention of heat in the built environment, which can lead to a significant increase in temperature, particularly during hot weather conditions. Budapest, like many other European cities, is vulnerable to the UHI effect due to its urbanization and infrastructure development. Predictions indicate that the city will experience a temperature increase of 13 degrees Celsius by 2070 compared to 1990, and the UHI effect will exacerbate this increase by at least 3-5 degrees Celsius. (L. Szabó. 2021)

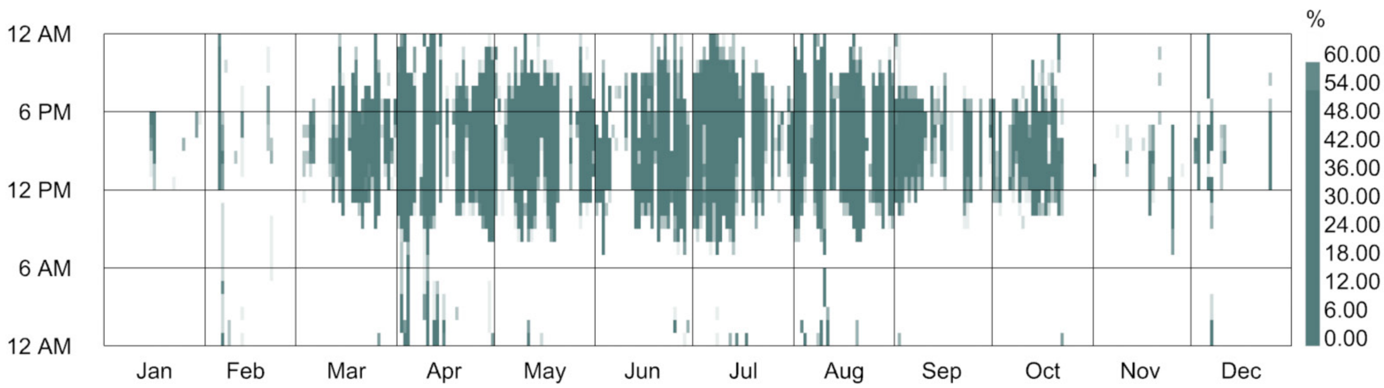
Addressing the challenges posed by the changing climate in Budapest is a complex issue that requires multifaceted solutions. While increasing green spaces alone may not solve the problem, parks can act as small climate islands that improve the quality of life for residents in the surrounding areas. An example of this concept in action is the Auróra Klímagarden (see appendix 01).

The dense urban infrastructure of concrete and other materials contributes significantly to the heat sensation in urban areas. A study of the future project site found that on a typical July day with a temperature of 28 degrees Celsius, the heat sensation can reach 34 degrees Celsius due to the urban heat island effect. However, on an extremely hot August day with a temperature of 35 degrees Celsius, the heat sensation can rise up to 43 degrees Celsius, which is considered an extremely high heat stress level (see appendix 03). As global temperatures continue to rise, it is predicted that there will be more such days in the future, highlighting the need for effective measures to mitigate the impact of the urban heat island effect.

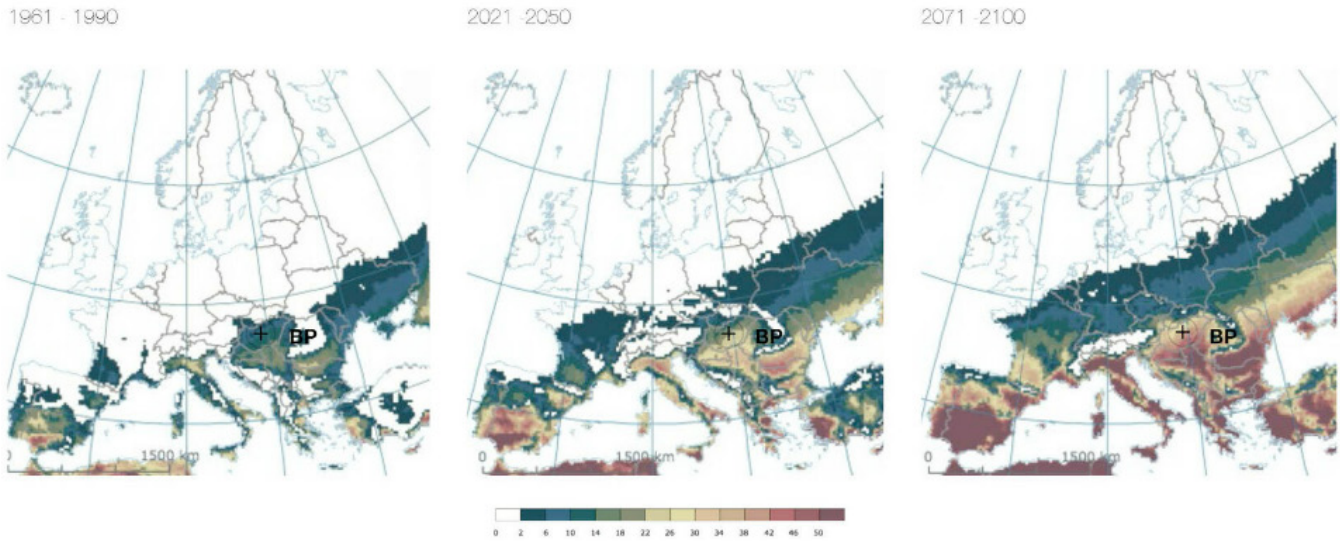
When planning the urban farm and community center, it is crucial to consider both the indoor and outdoor environments. This involves implementing measures such as shading and multi-layer vegetation to reduce the heat sensation and provide a comfortable outdoor environment. During hot summer months with relative humidity below 60% (ill. 4.28), direct evaporative cooling can be utilized to cool the area. Taking these measures into consideration during the design phase can ensure optimal outdoor comfort in the future.



Ill. 4.27 - Budapest Hungary Relative Humidity (%)



Ill. 4.28 - Budapest Hungary Relative Humidity uder 60(%)

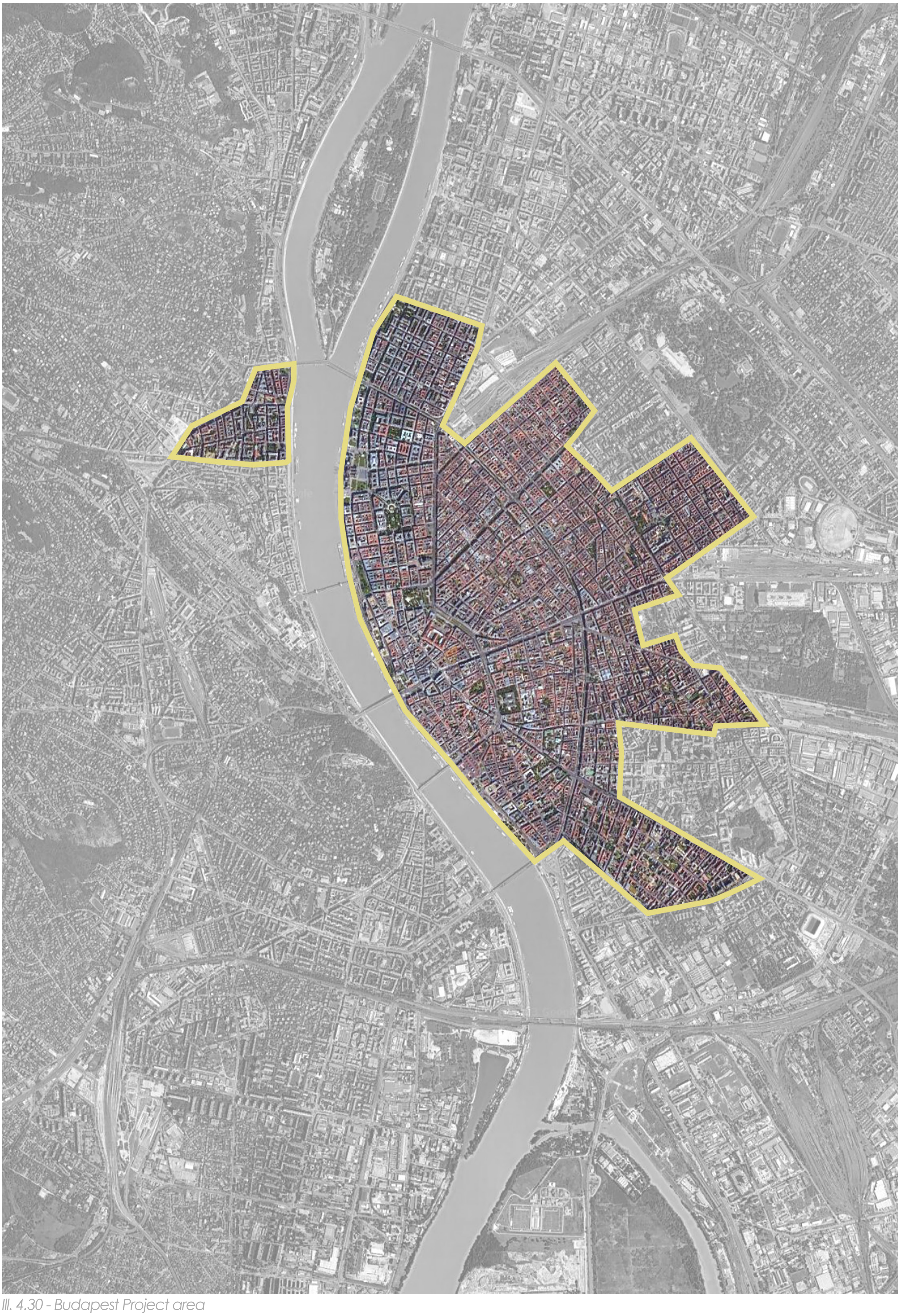


Ill. 4.29 - (European Environment Agency: Climate change, impacts and vulnerability in Europe, 2012)

04 ANALYSIS
Vacant Lots

The FILLin farm and community center will be located on underutilized vacant plots in Budapest, with the concept revolving around the idea of relocating from one such plot to another.

However, it was important to designate a specific area within which this construction would operate. The chosen project area (ill.4.30) is characterized by a high population density and a limited amount of green space in the urban landscape. This makes it an ideal candidate for the development of green infrastructure, allowing the project to have a significant positive impact on the local residents.



Ill. 4.30 - Budapest Project area

the character and Microclimate of Vacant Lots

The sudden emptiness of vacant plots has become an integral part of Budapest's cityscape. Surrounded by old brick houses, often with historical significance, these vacant spaces evoke thoughts of waste, parking lots, overgrowth, or abandonment for many. However, these empty plots hold immense potential to alleviate the monotony of dense urban development, yet their transformation is hindered by the fact that they are owned by private investors, making it difficult to assign a permanent function to them.

Based on the microclimate studies conducted on vacant plots (Appendix 2-3), it can be concluded that solar exposure is the most critical aspect for the future building, as the light conditions within these plots, surrounded by 5-7-story buildings, are often limited. This is not only crucial for internal comfort but also for the implementation of the planned farming area. The microclimate study (Appendix 2) examines which surfaces meet the minimum requirement of 6 hours of sunlight, necessary for plant cultivation. While this can be achieved during summer months, artificial lighting is needed for vertical farming in winter months. Another important observation is that the orientation of the plot is not the most critical aspect, as the height and density of the surrounding buildings in the unpredictable urban fabric largely determine the light conditions on the site. Therefore, accurate modeling of the surrounding buildings is particularly important in the design process to ensure maximum sunlight penetration into the building.

An important finding was the urban heat island analysis conducted on the planning site, specifically the Varsányi Irén Street vacant plot (Appendix 3). This study reveals that due to dense built environment and limited vegetation, the perceived urban temperature can be significantly higher compared to the dry bulb temperature. For instance, on a 33-degree Celsius summer day, the temperature on the vacant plot could reach up to 42 degrees Celsius, which is considered extremely high. Additionally, based on the macroclimate analysis of Budapest, it can be expected that there will be an increase in such extreme heat days in the future.

Ill. 4.31 - Vacant Lots

Ill. 4.32 - Vacant Lots Mood Montage picture

05 SYNTHESIS

The Synthesis section aims to present the theoretical concept of the project, encompassing both its architectural and social aspects. Through storytelling, formulation of architectural and social visions, it seeks to summarize the ideas shaped by research and the theoretical framework, providing a solid foundation for the subsequent design process. The Synthesis concludes with a room program, which represents the first step in the design process, outlining the intended functions and spatial arrangements within the project.

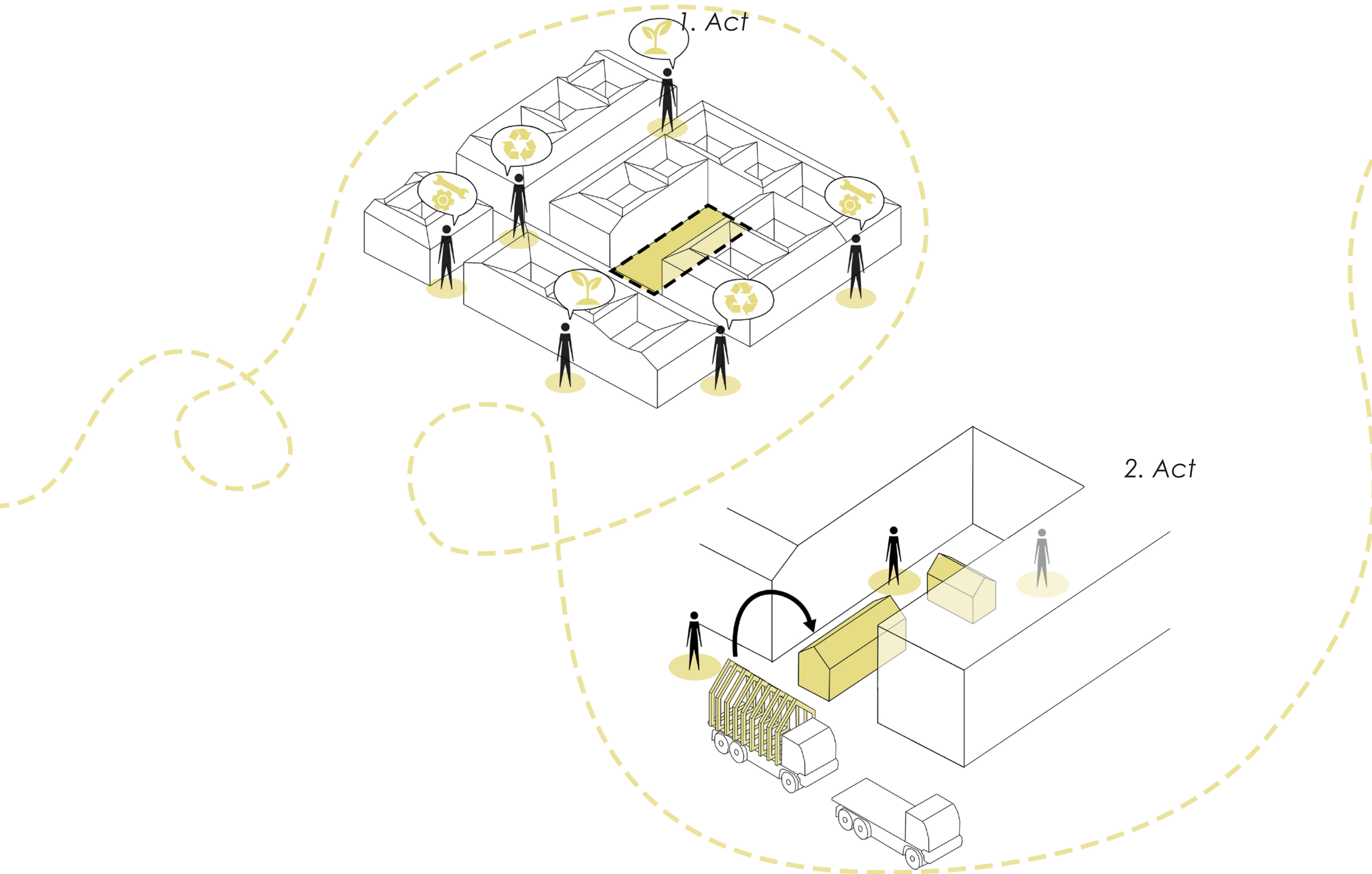
Ill. 5.1 - mood picture

SYNTHESIS
The Story

Fostering Community Empowerment through Urban Farming

1. Act
In a bustling city, residents go about their daily lives, disconnected from each other and their surroundings. The concrete jungle offers little space for greenery and the source of their food seems distant and unknown. There is a desire to take action and make a change.
One day, a group of residents stumbled upon a infill lot, an unused space in the heart of their neighborhood. They saw potential in the lot, a space to grow their own food, create a community garden, and bring people together. But they didn't know where to start.

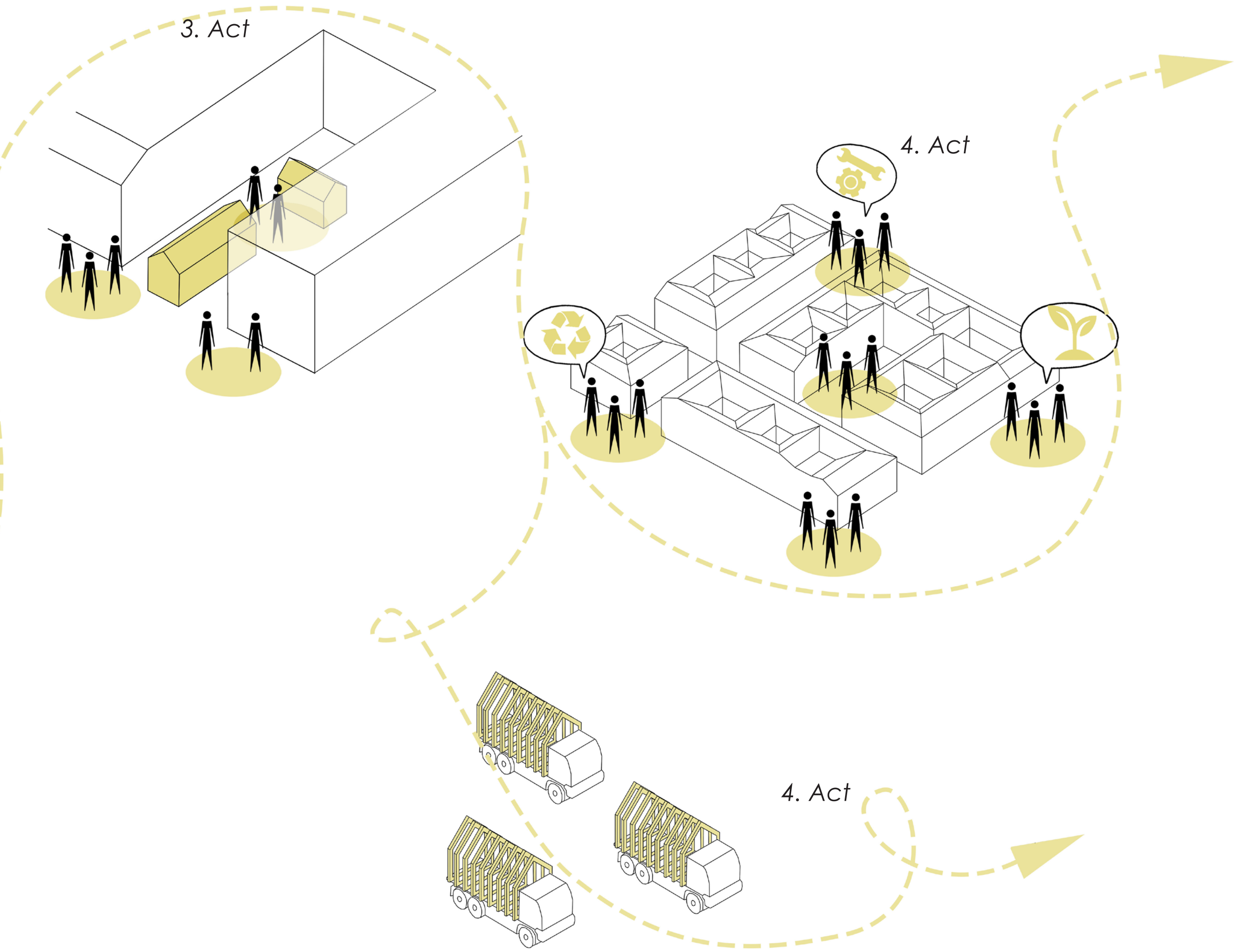
2. Act
That's when they heard about the „FILL-in" urban farm and community center. A temporary structure that would be constructed on the vacant lot for the next 5-10 years, the center provided professional guidance to forge local residents into small communities. The „FILLin" offered a location and professional support to strengthen and empower small communities towards becoming self-sufficient and place for urban farming.



Ill. 5.2 - story of the FILLin project

3. Act
Excited by the opportunity, the residents began to gather, sharing their dreams and ideas for the lot. With the help of the the team behind the „FILLin" center, they worked together to create a plan for a community garden, with individual plots for each family to grow their own food, as well as a common space for community events. education and gatherings.

4. Act
Over time, the small community grew, strengthened by their shared passion for the garden and their desire to improve their neighborhood. They became self-reliant and empowered to pursue their goals without relying on external support.
As the center moved on to another underutilized vacant lot to continue the process of community building among local residents, the small community they had created remained. They continued to tend to their garden, share their harvests with each other, and plan events to bring more people into their community.



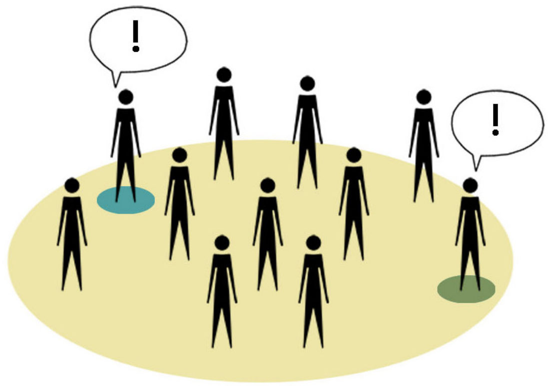
SYNTHESIS

The Vision - Social aspect

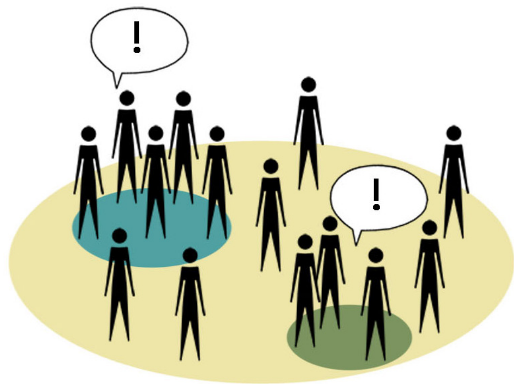
The social vision of the project is centered around fostering a strong and connected local community through a bottom-up approach. The project, named „FILLin," encompasses an urban farming and community center initiative that aims to bring people together through shared activities and experiences. Operated by a non-governmental organization (NGO), FILLin provides a platform for like-minded individuals in the neighborhood to actively participate and engage in urban agriculture and community building.

The FILLin urban farm and community center provide an opportunity for interested local residents to engage in agricultural activities. Through practising daily activities together and sharing experiences, a sense of collective dynamics began to emerge among participants. Committed and active local residents who dedicate themselves to the farm can form small communities through collective expression (page 38, Agrocity Case Study). The FILLin NGO plays a crucial role in supporting the formation and development of these small communities. By providing guidance, resources, and organizational assistance, the NGO helps facilitate the growth and autonomy of the communities. As these communities evolve, they become increasingly self-sustaining and able to carry out activities and initiatives independently. As a result, these communities can continue to thrive even after the relocation of the FILLin structure, maintaining their autonomy and carrying out independent activities and initiatives.

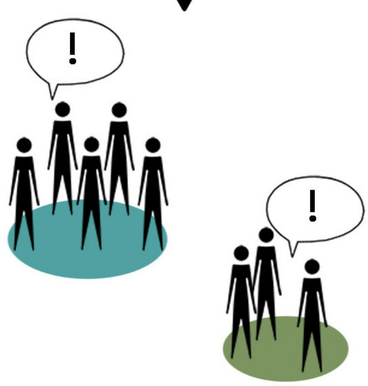
Furthermore, Fill-in plays a crucial role as an educational hub, serving as a platform for knowledge-sharing and skill development. It offers a diverse range of workshops, training sessions, and community events that are designed to inspire and motivate locals to embrace conscious consumption and production habits.



The yellow circle represents the group of local residents who actively participate in cultivation at the Fillin urban farm. The two exclamation marks indicate individuals who have community-building ideas, similar to those described in the „user analysis" (page 40).



These enthusiastic individuals with community-building ideas easily find like-minded individuals among the members of the Fillin farm. The operating NGO of Fillin helps them transform into a strong, self-organized community by providing spaces for workshops, education, and idea exchange fostering collective expression



Following the relocation of the Fill-in urban farm and community center, these small communities remain active and continue their activities to improve their urban environment.

Ill. 5.3 - individuals take action

SYNTHESIS
The Vision - Architectural aspect

The vision for this building is rooted in a departure from traditional, static design principles by introducing time and the unknown into the design. It embraces the concept of a dynamic and adaptable space that continuously evolves alongside its users. At the core of this vision is flexibility, which serves as the driving force behind the building's ability to expand, reconfigure, and even relocate as needed. This inherent flexibility enables the structure to cater to a diverse range of needs and functions, accommodating the ever-changing requirements of its occupants.

The essence of flexibility is deeply ingrained in every layer of the design, allowing for seamless adjustments and modifications to meet evolving demands. The layout, materials, and systems are all meticulously crafted to ensure adaptability and responsiveness. Whether it's the ability to create open collaborative spaces for work, transform areas into recreational zones for leisure, or provide venues for community gatherings and events, the building effortlessly adapts to fulfill its multifaceted role.

The dynamic nature of the building encourages creativity, innovation, and collaboration. Spaces can be easily transformed to accommodate different activities, fostering an environment that inspires productivity and engagement. The design enables users to customize their surroundings, empowering them to create spaces that reflect their unique needs and preferences.

Moreover, the building's flexibility extends beyond its physical aspects. It is designed to embrace evolving technologies, sustainability practices, and changing societal trends. This forward-thinking approach ensures that the building remains relevant and future-proofed, capable of meeting the demands of tomorrow.

Ill. 5.4 - mood pictures by Midjourney

SYNTHESIS
Design criteria

Based on these considerations, the design criteria can be summarized as follows:
Portable: The building structure should be easily assembled, disassembled, and transported.
Flexible design: The design should allow for adaptability and versatility.
Expandable: The structure should have the potential for future expansion.
User participation: Users should have the opportunity to participate in the construction process.
Optimal comfort: The design should prioritize both indoor and outdoor comfort.
Promote community-building: The design should facilitate the creation of a sense of community.

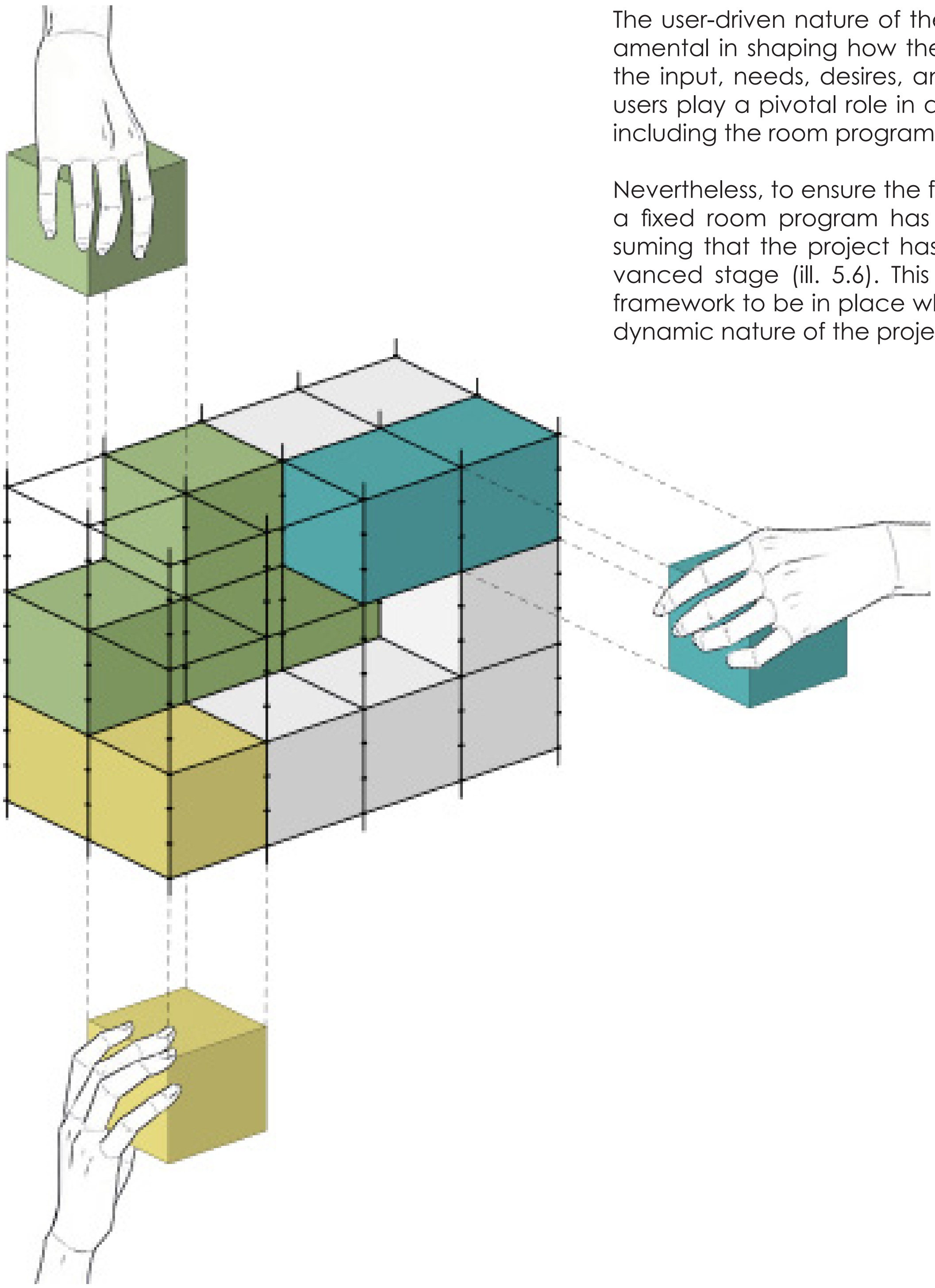
SYNTHESIS
Room Program

The precise definition of the room program for the FILLin farm presents a significant challenge as it involves incorporating the elements of the unknown and time to achieve flexibility in the design.

This dynamic approach recognizes that the room program is not a static entity but rather an evolving concept. Over time, the room program undergoes continuous development (appendix 03), with the specific functions it accommodates at each stage being heavily influenced by the users.

The user-driven nature of the FILLin project is fundamental in shaping how the building is utilized, as the input, needs, desires, and contributions of the users play a pivotal role in defining its functionality including the room program. (ill. 5.5).

Nevertheless, to ensure the feasibility of the design, a fixed room program has been established, assuming that the project has reached a more advanced stage (ill. 5.6). This allows for a practical framework to be in place while still considering the dynamic nature of the project's evolution.



Ill. 5.5 - social contibution to bulding

The room program of the FILLin project encompasses a range of spaces designed to cater to diverse needs and foster a vibrant community.

Vertical farming: This dedicated area allows for year-round cultivation of plants, providing an opportunity for local residents to engage in food production even in small footprint.

Kitchen: the kitchen offers urban farmers a space to process their harvested produce and encourages communal cooking activities.

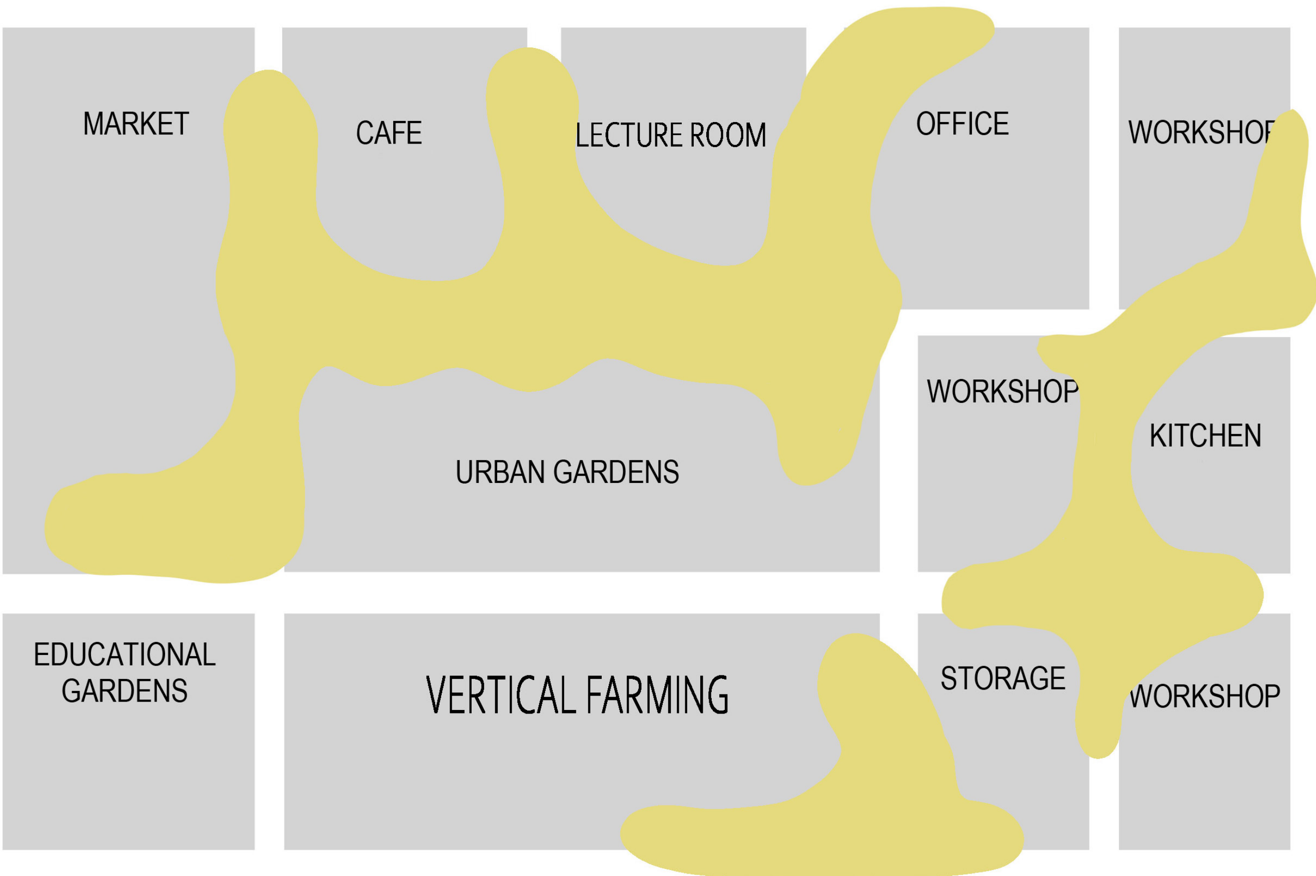
Community/Urban Garden: The outdoor space of the urban farm is collectively cultivated by the community, providing an ideal setting for educational activities, group workshops, and outdoor events that promote learning, collaboration, and community interaction.

Workshops: These designated areas are specifically designed to host various workshops and educational activities. They also serve as a physical infrastructure to support the realization of community-driven initiatives, such as small-scale plastic object manufacturing, as envisioned by one of the presented personas.

Café: Acting as a vital link between the FILLin farm and the surrounding community, the café serves as a welcoming gathering spot where locals can connect with the FILLin project, fostering social interactions.

Lecture Room: Designed to facilitate roundtable discussions, indoor events, and educational activities, the lecture room offers a versatile venue for knowledge sharing, fostering intellectual growth, and community engagement.

The yellow area between the various functions indicates the intention to establish flexible connections among these spaces. (ill.5.6)



Ill. 5.6 - Room Program

06 DESIGN PROCESS

The Design Process is divided into three distinct parts within the report.

The way to the Architectural concept; *This initial part primarily revolves around the exploration and development of the core architectural concept, highlighting the key ideas and failed proposals that led to its formation.*

Developing the concept; *During this phase, the focus is on bridging the design criteria gathered from the research phase with the overall concept. The aim is to establish a clear connection between the criteria and the concept, ensuring that the design reflects the goals and objectives identified in the research.*

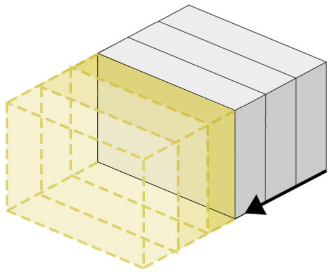
Design implementation; *the focus shifts to the specific steps that bring the design to life. These steps involve translating the concept into practical solutions, refining details, and executing the necessary tasks to transform the concept into an architectural design*

However, it is important to acknowledge that the actual Design Process was not a linear, straightforward progression as presented. It involved a dynamic and iterative exploration of ideas, feedback loops, and constant refinement. The simplified representation in the presentation aims to enhance clarity and facilitate understanding by presenting a logical sequence of events.

DESIGN PROCESS

The way to the Architectural concept

Proposal 1



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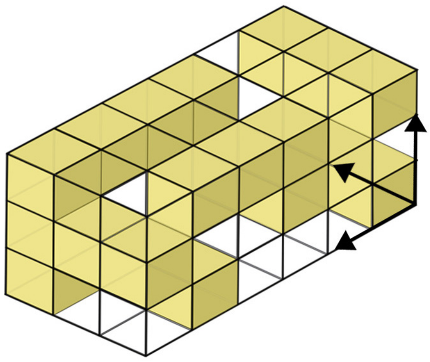
Proposal 2



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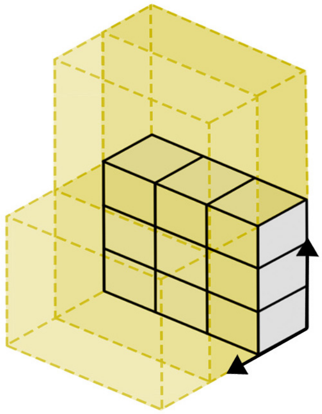
core concept

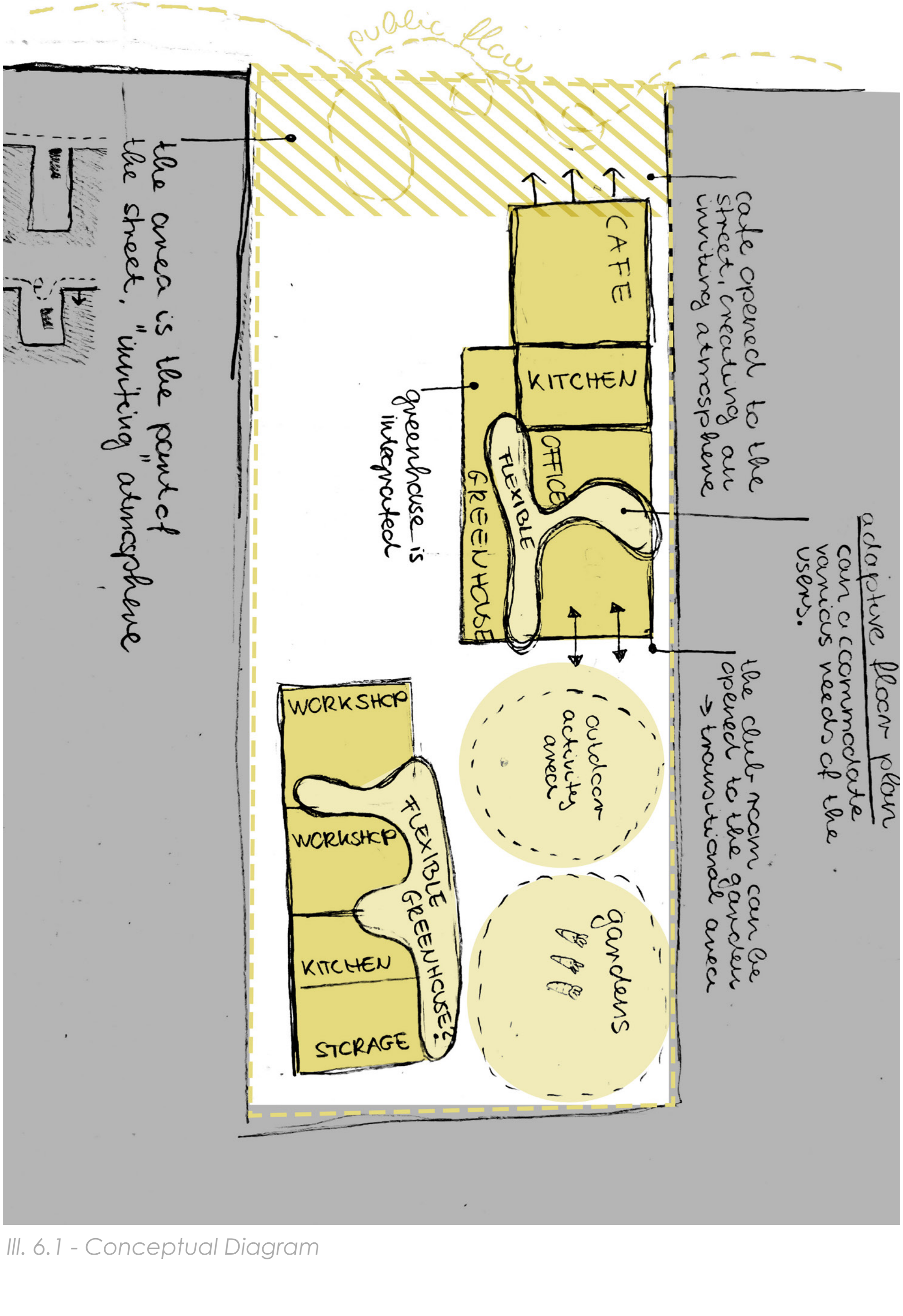


DESIGN PROCESS
The way to the Architectural concept
Conceptual Diagram

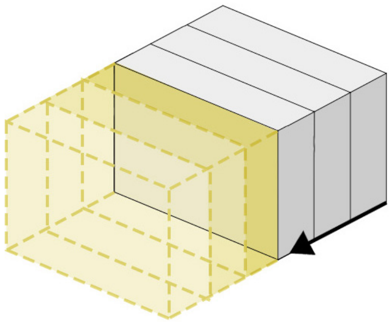
The initial step of the design process involved creating a land use conceptual diagram that condensed the key design approaches into a single image. This diagram serves as a guiding reference and a retrospective point for the subsequent design process. It encompasses the ideas derived from previous research, the functions and their relationships, as well as the connection between the building and the public space.

The building is deliberately offset from the street front, creating a transitional zone between the street and the building—a semi-public space where pedestrians can pause and rest. The workshop area and storage facilities are positioned towards the rear of the site.

The café and lecture room, being areas that will likely be used by the public, are strategically located close to the street front, facilitating easy access. It is also important to establish a connection between these spaces and the garden, creating transitional spaces that blur the boundaries between indoor and outdoor environments.



Ill. 6.1 - Conceptual Diagram

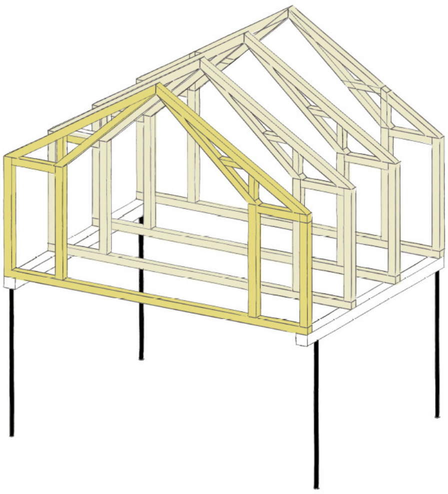


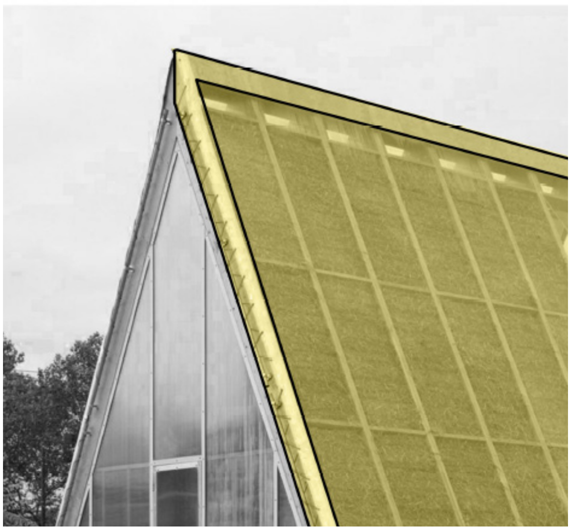
DESIGN PROCESS
The way to the Architectural concept
Proposal 1

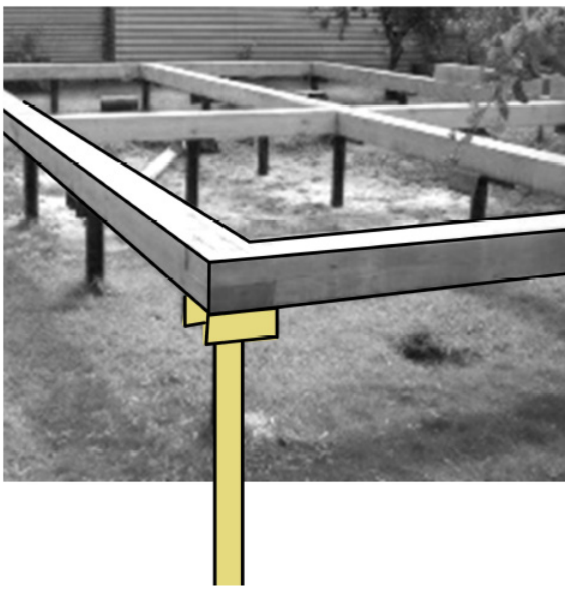
Proposal 1 explored the possibility of the future building expanding in only one dimension. The main structure consisted of a wooden frame secured to the ground using ground screws, establishing a temporary and secure connection to the soil. While the concept had valuable ideas, it quickly became evident that the building, with this approach, would not fully utilize the most valuable aspect of the vacant plots, which is their height. This realization was reinforced by the sunlight analysis conducted on the vacant plots (App.02) As a result, the design required further development to fully utilize the vertical potential of the available space.

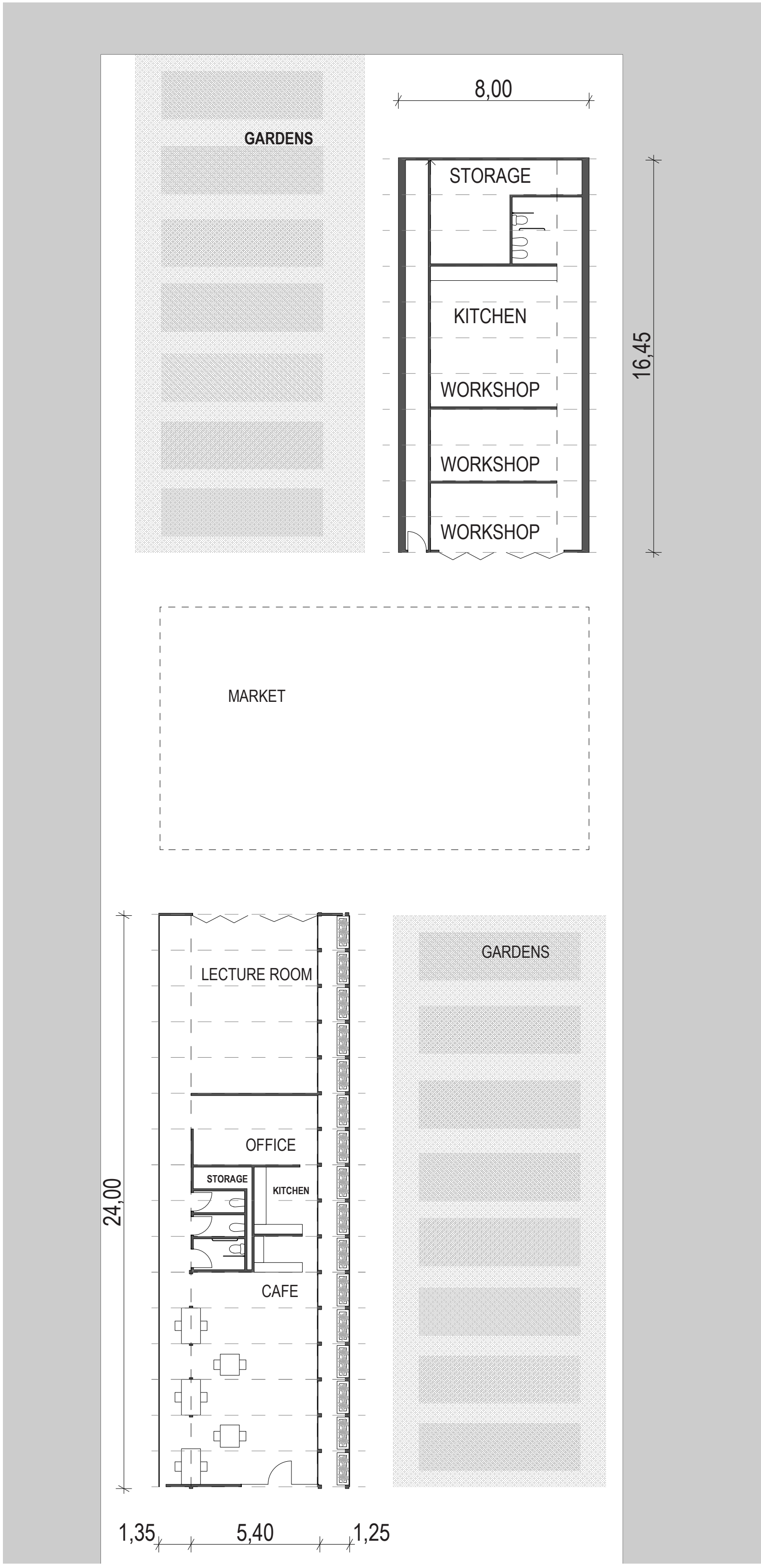
Advantages of the design:
-User involvement: Users can actively participate in the construction process, fostering a sense of ownership and community engagement.
-Environmentally conscious material selection: The design prioritizes sustainable and eco-friendly building materials, reducing the environmental impact.
-Transportable and easily assembled: The design allows for convenient transportation and assembly, offering flexibility and adaptability. -Minimal site impact: The installation of the design leaves no permanent footprint on the site and can be completely removed, including the foundation

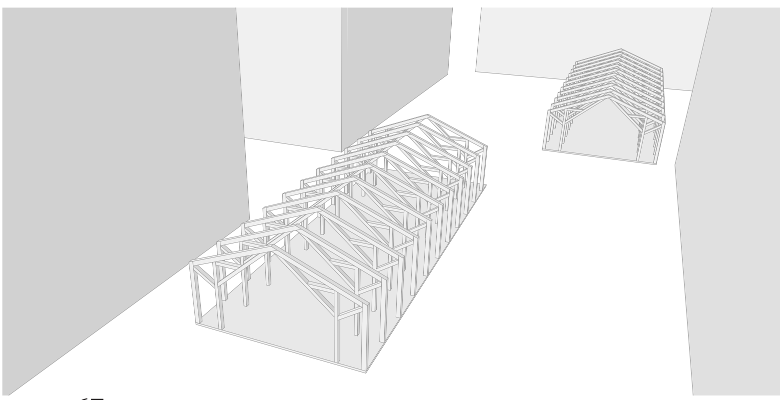
Challenges with the design:
-Limited space for engaging a sufficient number of local residents in urban farming activities.
-Restricted possibilities for further development and expansion due to space constraints.
-Underutilization of vertical expansion potential, limiting the use of available space.
-The expansion of the building reduces the potential area for agricultural purposes.



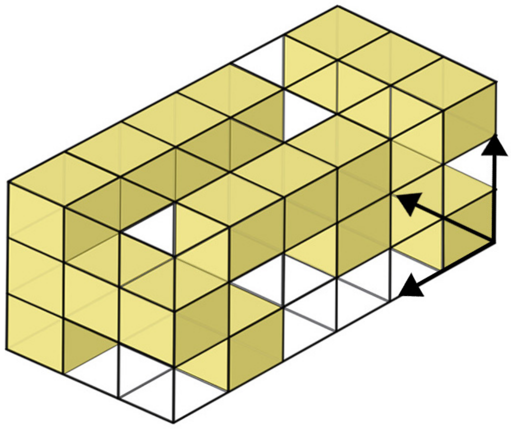








Ill. 6.2 - Proposal 1



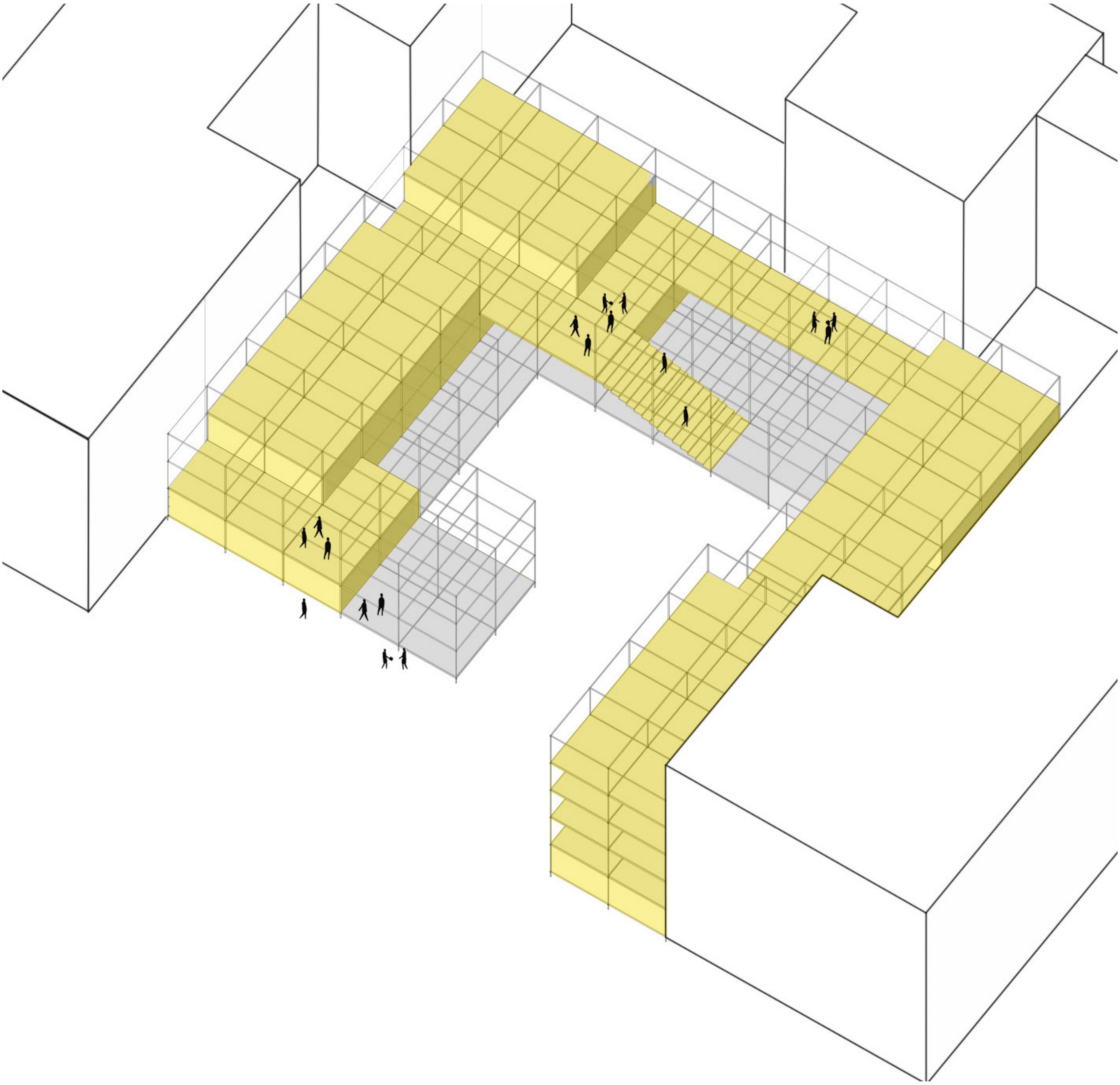
DESIGN PROCESS
The way to the Architectural concept
Proposal 2

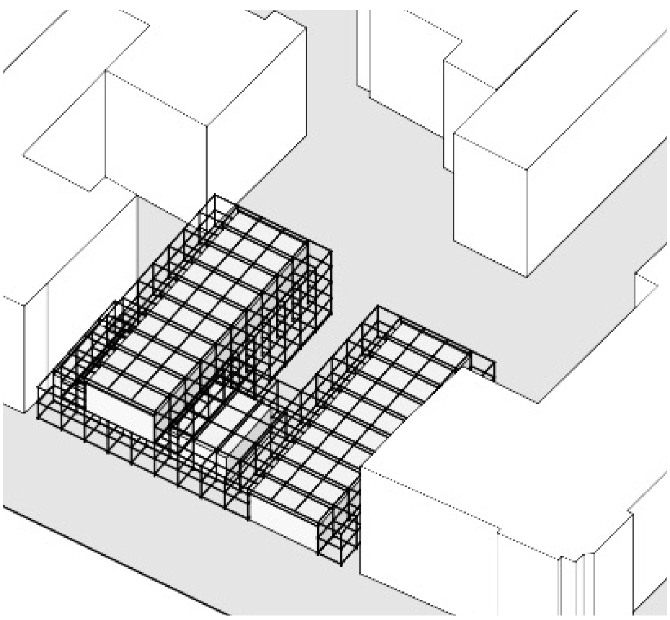
Proposal 2 delves into the exploration of expansion in three dimensions, envisioning the scaffolding as a grid-like structural framework that allows for the integration of functional elements based on user needs. As the project progresses, additional functions can be accommodated within the grid.

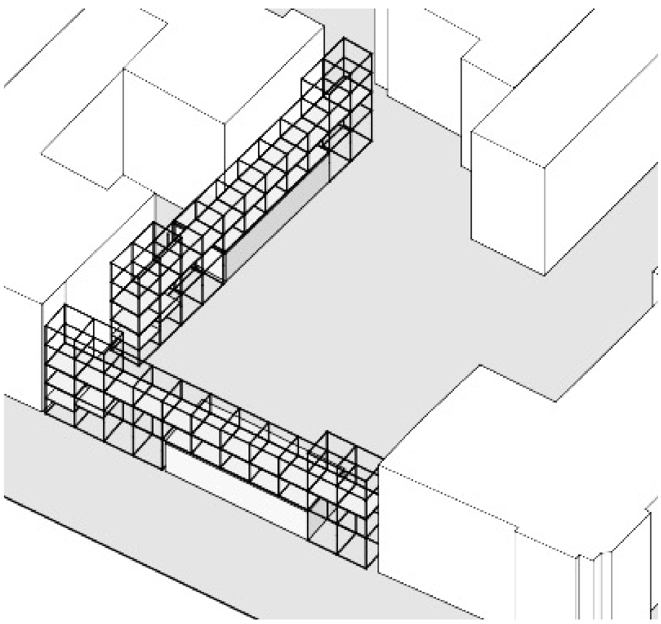
To explore this concept, different approaches were explored, including the implementation of plug-in architecture and the evaluation of compatibility between prefabricated lightweight structural elements and the scaffolding system. However, these attempts led to complex and intricate designs that compromised the original vision of creating a logically expandable modular structure.

Advantages of the concept:
-ability to flexibly adapt to different site conditions
-scaffolding structure
-the ability to utilize the potential of any given vacant lot

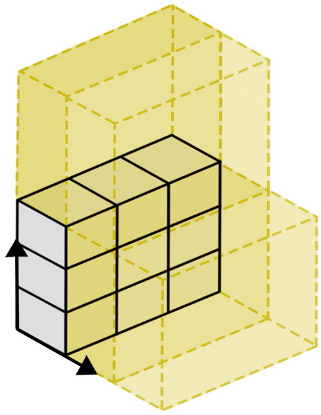
Disadvantages of the concept:
-Users would not have the opportunity to actively participate in the construction process.
-structural incompatibilities may arise when attempting to integrate different building elements with the scaffolding system.







Ill. 6.2 - Proposal 2

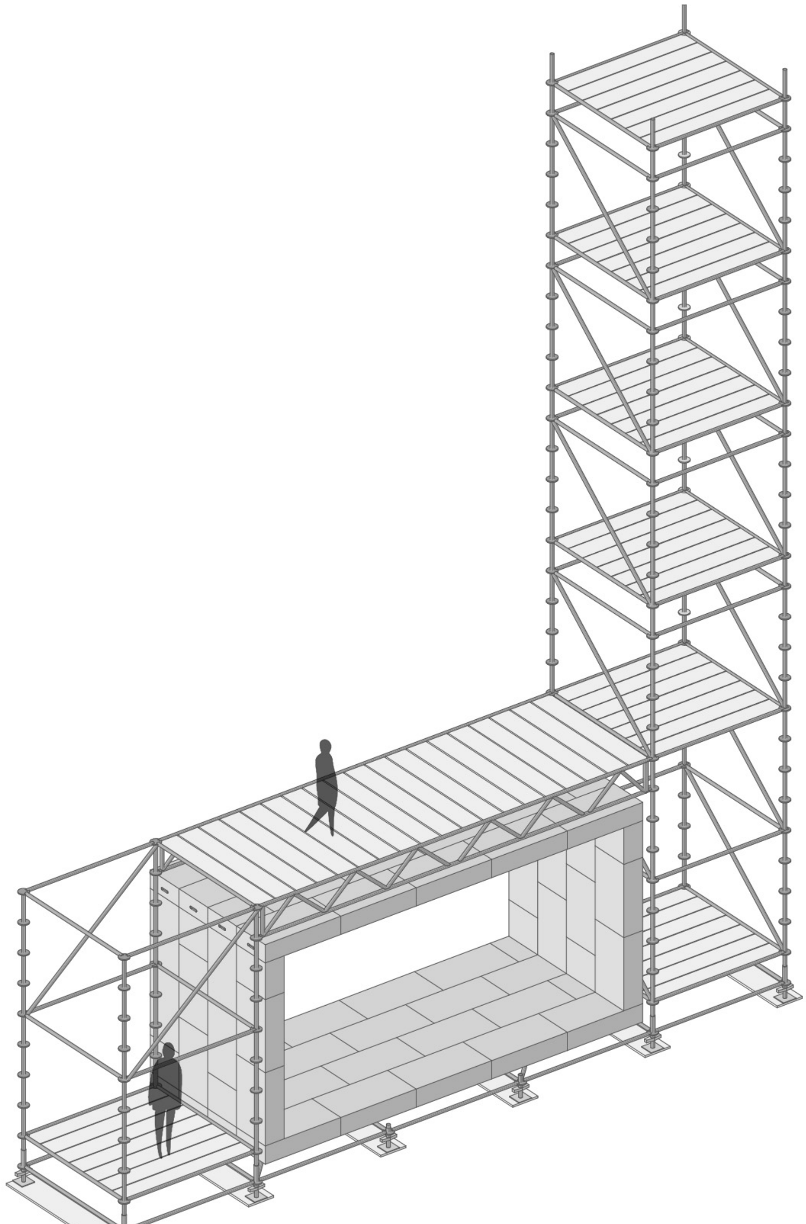


DESIGN PROCESS
The way to the Architectural concept
the Concept

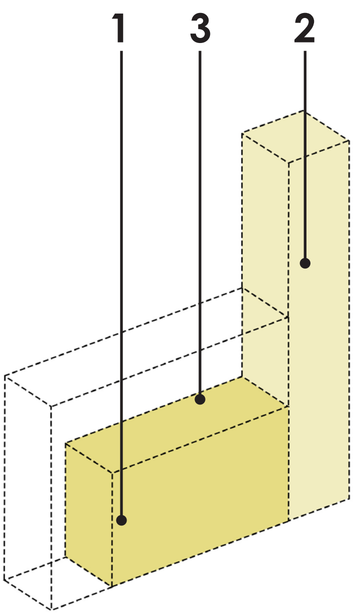
The concept evolved through the integration of the strengths found in Proposal 1 and Proposal 2.
The use of lightweight wooden elements from Proposal 1 was incorporated into the concept, providing a foundation for a sustainable and adaptable structure. This choice allows for a logical and predictable growth of the project.
Proposal 2 contributed to the utilization of scaffolding structures, which enabled vertical expansion, portability, and the incorporation of modular components, providing extensive design freedom.

The core of the concept is a standardized cross-sectional unit that combines scaffolding and lightweight wooden structures. These units, measuring 2 meters in length, offer flexibility in arrangement and expansion due to their modular nature. By placing them side by side (ill. 6.6), the concept can adapt to different spatial requirements, allowing for scalability and customization. Moreover, the units can be vertically stacked (ill. 6.5), maximizing vertical space utilization and accommodating various functions within a compact footprint. This approach offers a logical and flexible framework for potential expansion.

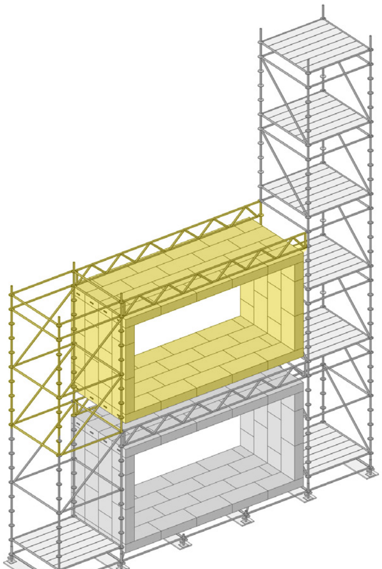
The unit is composed of three primary components, each serving a distinct purpose (ill. 6.4).
1; a lightweight and insulated structure designed to accommodate indoor functions. This portion provides a comfortable and functional space for various activities.
2; is a vertical farm, which allows for vertical cultivation and provides opportunities for urban agriculture.
3; the outdoor communal space and garden are enclosed by the scaffolding structure. This open-air area offers a versatile environment for social gatherings and an urban gardening.



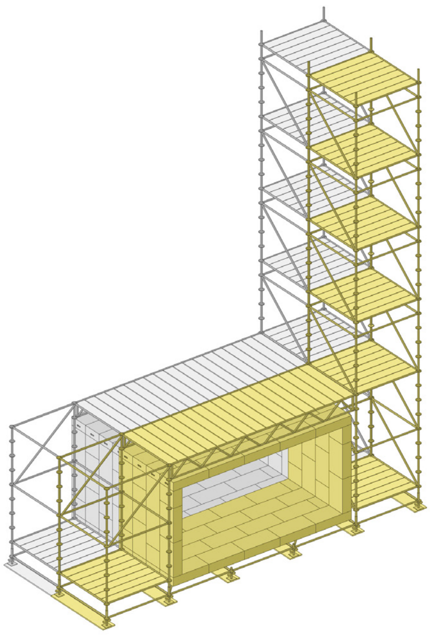
Ill.6.3 -one unit concept



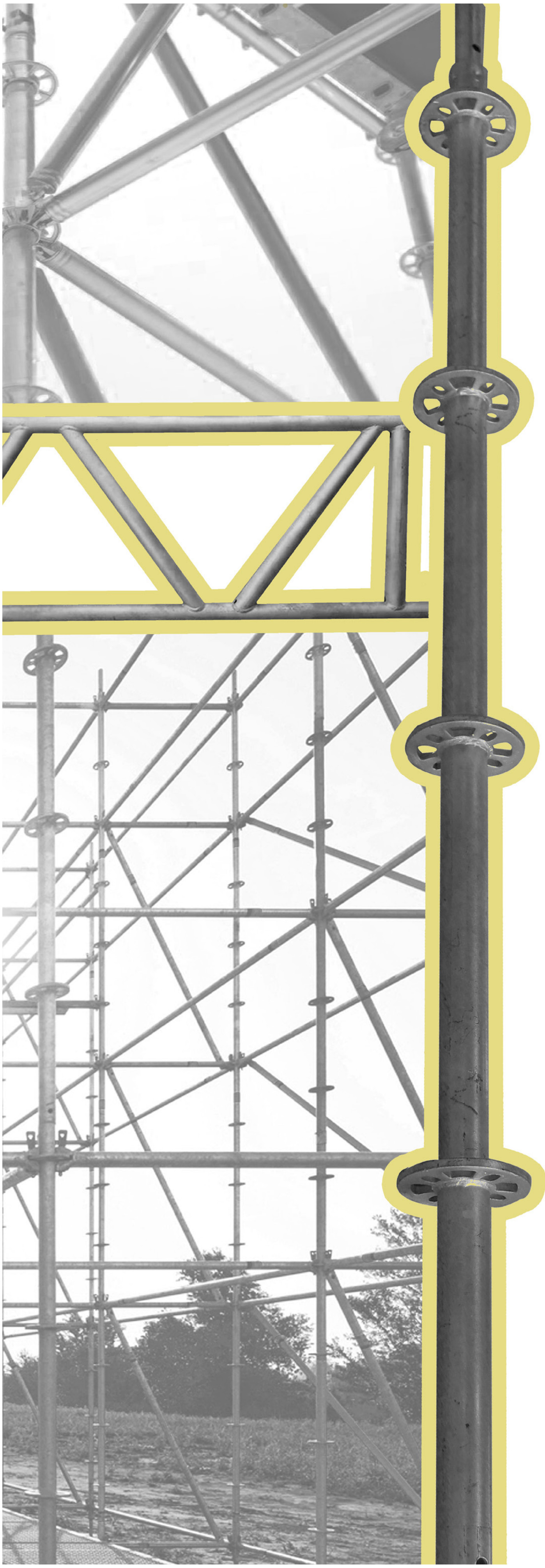
Ill. 6.4 - three components



Ill. 6.5 - vertical extension



Ill. 6.6 - lengthwise extension



Ill. 6.6 - scaffolding structures

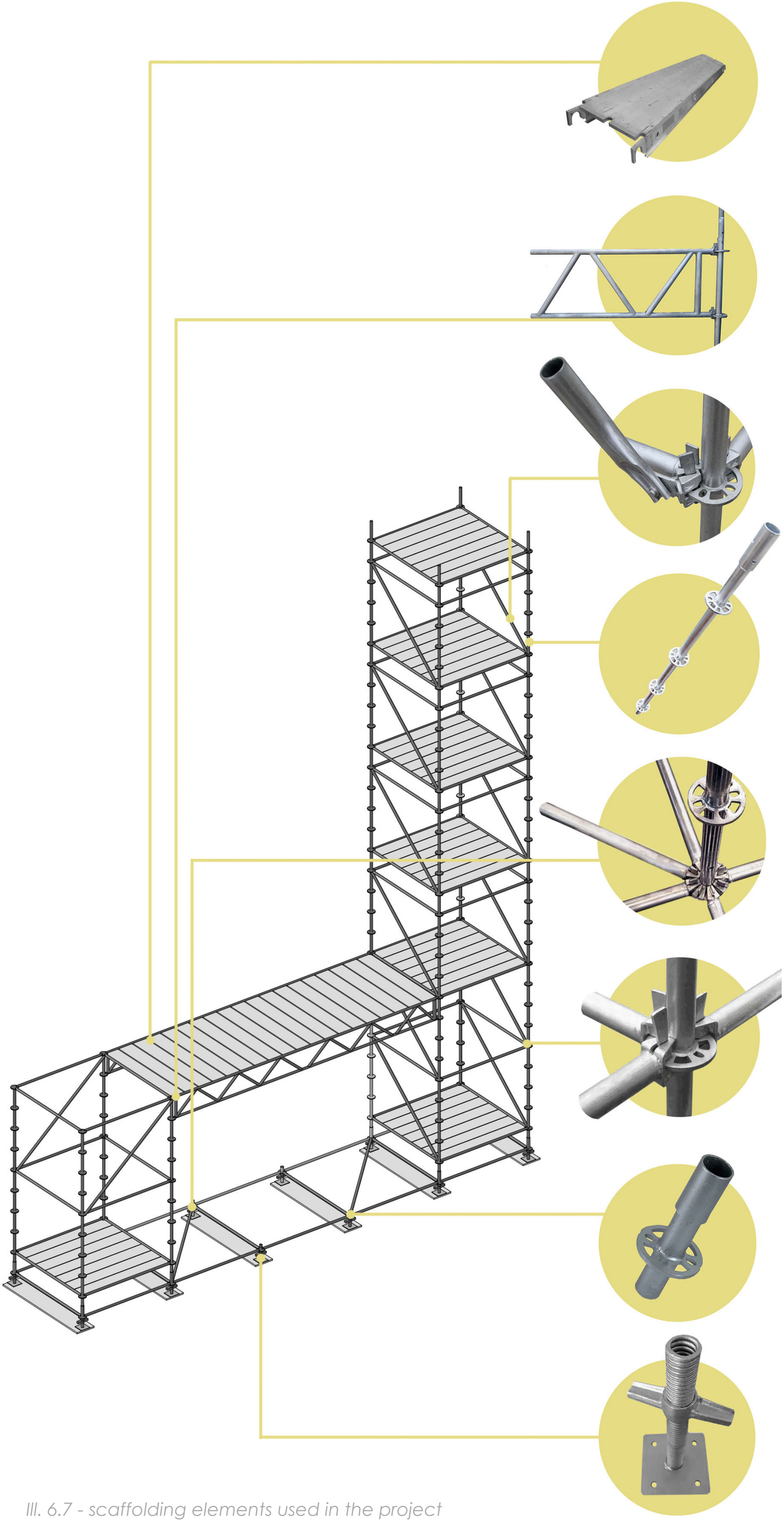
DESIGN PROCESS
Developing the Concept
The structure - scaffolding

In accordance with the requirements for the building structure, the primary focus is on creating a modular design that allows for flexibility in construction methods, as well as easy transportation, assembly, disassembly, and sustainability. With these considerations in mind, the decision was made to utilize a scaffolding structure, specifically the ringlock scaffolding system.

Among the various types of scaffolding available, the ringlock structure was chosen due to its widespread usage in Hungary. This choice offers the advantage of being readily available in the second-hand market, aligning with the project's sustainability goals by reducing resource consumption and promoting reuse.

The ringlock scaffolding system consists of off-the-shelf components that provide a high degree of versatility and customization options. These components can be easily modified to meet specific design requirements, allowing for efficient adaptation to different project needs. Additionally, the materials used in the system are fully recyclable, contributing to the overall sustainability of the structure.

Another significant factor in selecting the ringlock structure was its ability to transmit loads to the ground through mudsills, eliminating the need for permanent foundations. This feature not only simplifies the construction process but also minimizes the impact on the site. By utilizing mudsills, which are temporary load-bearing structures, the building's structural integrity can be maintained while avoiding the creation of a permanent footprint upon relocation.



The decks
These elements provide the walking surface on the scaffolding structure, ensuring a safe and stable platform.

The lattice beam
it is particularly suitable for spanning larger distances and accommodating higher load capacities in a ringlock scaffolding system.

The diagonal brace
Providing additional stability and load-bearing capacity. It connects the vertical standards and ledgers diagonally, effectively reinforcing the structure and preventing lateral movement or sway.

Standards
they are the vertical components of a ringlock scaffolding system. They provide the primary structural support and stability to the scaffolding structure.

The ring
it is placed in every 50cm vertically. It acts as a connecting element, linking the vertical standards and horizontal ledgers, creating a secure and rigid framework.

The ledger
it is a horizontal component of a ringlock scaffolding system that connects the vertical standards. Tt is distributing the load evenly.

Base Colalr
It serves as a connection point between the vertical standards and the base plates (jack), providing stability and support to the scaffolding structure.

The base plate (jack)
It serves to provide a load distributing, stable, and uniform connection between the scaffolding structure and the ground. This 60cm tall metal element ensures a secure foundation for the scaffolding system.

Ill. 6.7 - scaffolding elements used in the project

Ill. 6.8 - U-build

DESIGN PROCESS
Developing the Concept
The structure - U-build

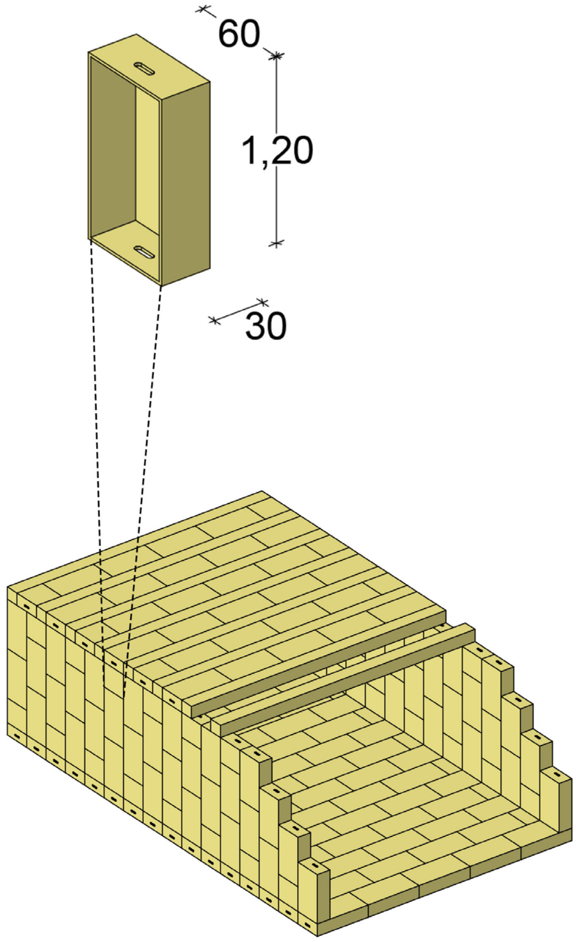
The structure designed for the FILLin urban farm and community centre incorporates modular box elements known as U-build, developed by Studio Bark. The design process prioritized ease of assembly, disassembly, and the potential for future expansion, leading to the selection of the U-build structure with its modular and repeatable box elements.

What sets the U-build structure apart from other similar modular systems is its user-friendly design, which empowers individuals to construct the building without requiring specialized skills or prior knowledge. This aligns perfectly with the vision for FILLin's project, as it promotes user participation, fostering a sense of ownership and community involvement throughout the construction process.

Furthermore, the 30 cm wide modular elements of the U-build structure incorporate adequate insulation, ensuring that the interior spaces of the building provide optimal comfort for occupants.

The use of the U-build structure allows for lengthwise expansion, providing the flexibility to adapt to changing needs and requirements over time. This scalability feature ensures that the building can grow alongside the evolving demands of the urban farm and community centre.

Similar to the external structure, the internal space also utilizes modular elements, allowing users to customize and define the neutral interior spaces according to their specific preferences and needs. This flexibility empowers individuals to create a functional and personalized environment within the building, enhancing the overall user experience.

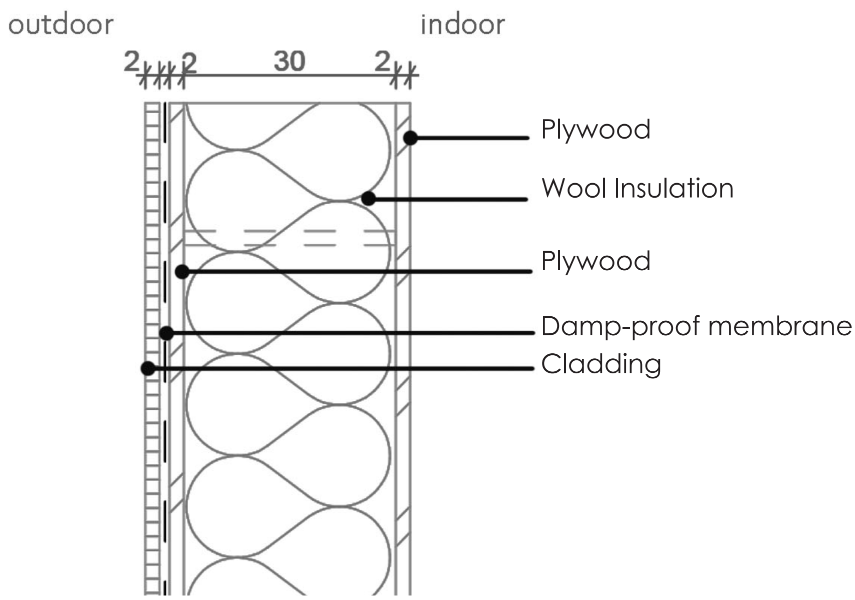


Ill. 6.9 -creation of neutral spaces with U box

A box module has dimensions of 30x60x120 cm. In addition to this, the structure includes custom elements, such as beams for spanning larger distances. However, the essence of the concept is to deviate as little as possible from the use of 30x30x120 cm and 30x60x120 cm modules.

The U-build system's wall elements can achieve a U-value of 0.110 W/(m²K) with 30 cm of insulation, providing effective thermal insulation during the winter months. However, due to the lightweight construction of the building, it lacks significant thermal mass, which would have a cooling effect during hot summer months. Therefore, it is crucial to design the building in a way that promotes natural ventilation.

The inclusion of U-build in the construction process enables user involvement, a significant aspect of the concept. However, it is crucial to acknowledge the structural drawbacks associated with this approach. The absence of a vapor barrier on the interior side due to the modular elements increases the risk of condensation within the structure. Resolving this issue necessitates further investigation and a heightened focus on the importance of ventilation to facilitate moisture dissipation. Moreover, the use of breathable vapor-permeable foil on the exterior side, while intended to protect against environmental factors, exacerbates the problem by promoting moisture condensation within the insulation.

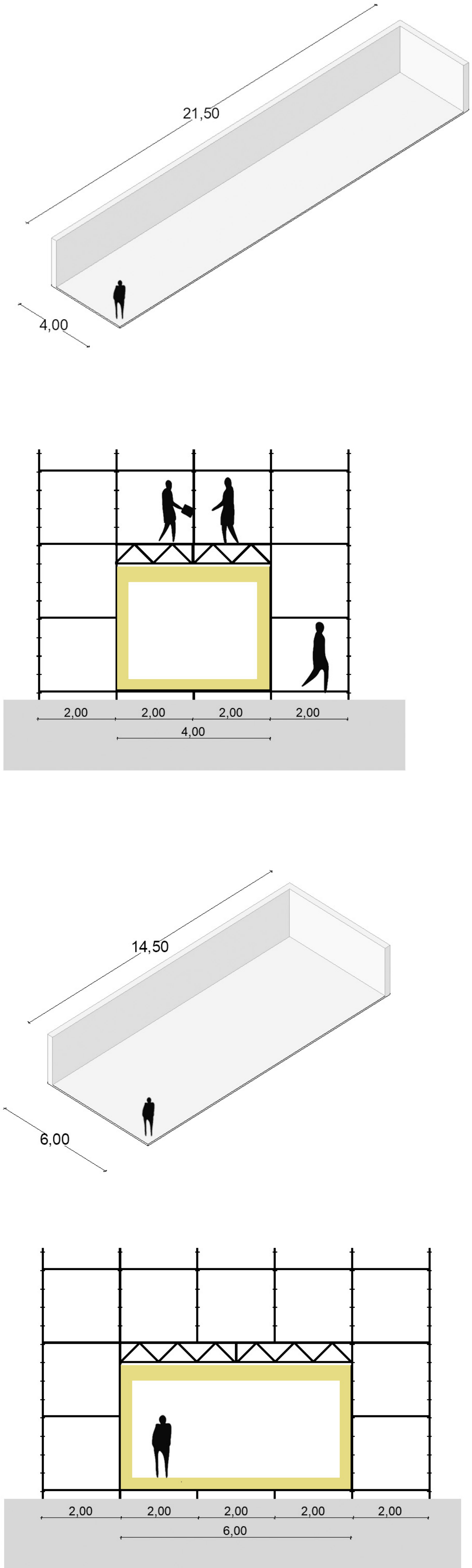


Ill. 6.10 -wall section

DESIGN PROCESS
Developing the Concept

Unit width
The width of the unit is a crucial aspect that was carefully considered in the design process.
The initial step involved determining the suitable width of the indoor space that accommodates the various functional elements. With reference to the 2x2 meter scaffolding dimension and the maximum beam width, it was determined that the width could be either 4 or 6 meters.

the largest indoor space intended for a lecture room/office, capable of accommodating up to 50 individuals, is targeted to be approximately 75 square meters. To achieve this, a room with a width of 4 meters would need to extend over 20 meters in length (ill. 6.22). In order to avoid this unwanted spatial experience, the width was fixed at 6 meters.



Ill. 6.11 - building width

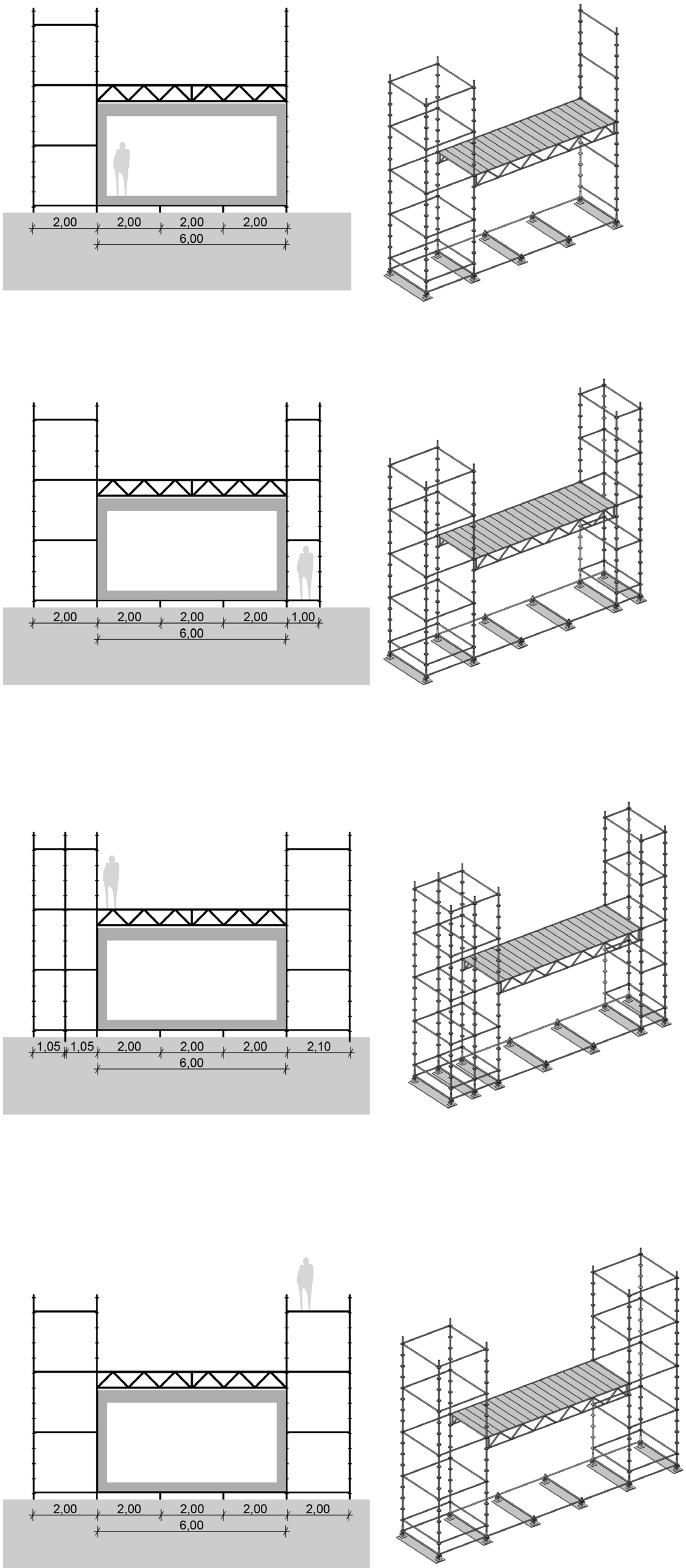
The structure
The scaffolding's modular structure allows for the creation of various configurations using its modular components. However, it is important to follow specific construction guidelines. For instance, the vertical spacing between ledgers should not exceed two meters, and diagonal braces, for example, are available only up to a maximum height of two meters. In selecting the base dimensions, it was crucial to choose elements that are readily available in the used market, leading to the decision to use a standard 2x2 meter grid system of ringlock scaffolding.

In the first version, the vertical farm structure utilizes 2x2 meter scaffolding, while on the other side, only a single scaffold is used. This configuration is structurally unstable as the lattice beam impose excessive loads on the associated standards, which cannot safely transfer these loads to the ground.

In the second version, a 2x1 meter scaffold configuration was considered combined with the 2x2 meter dimension, which could safely transfer loads towards the ground and provide an architecturally advantageous one-meter-wide „walkway" alongside the building. However, the combination of the 2x2 meter and 2x1 meter scaffold grids resulted in complications for a more complex structure.

In the third version, the use of a 2x1 meter scaffold grid was explored for both the vertical farm and the „walkway" section. However, this proved to be disadvantageous as L-shaped connections resulted in a complex structure abd this approach is requiring a significant number of scaffolding elements for implementation.

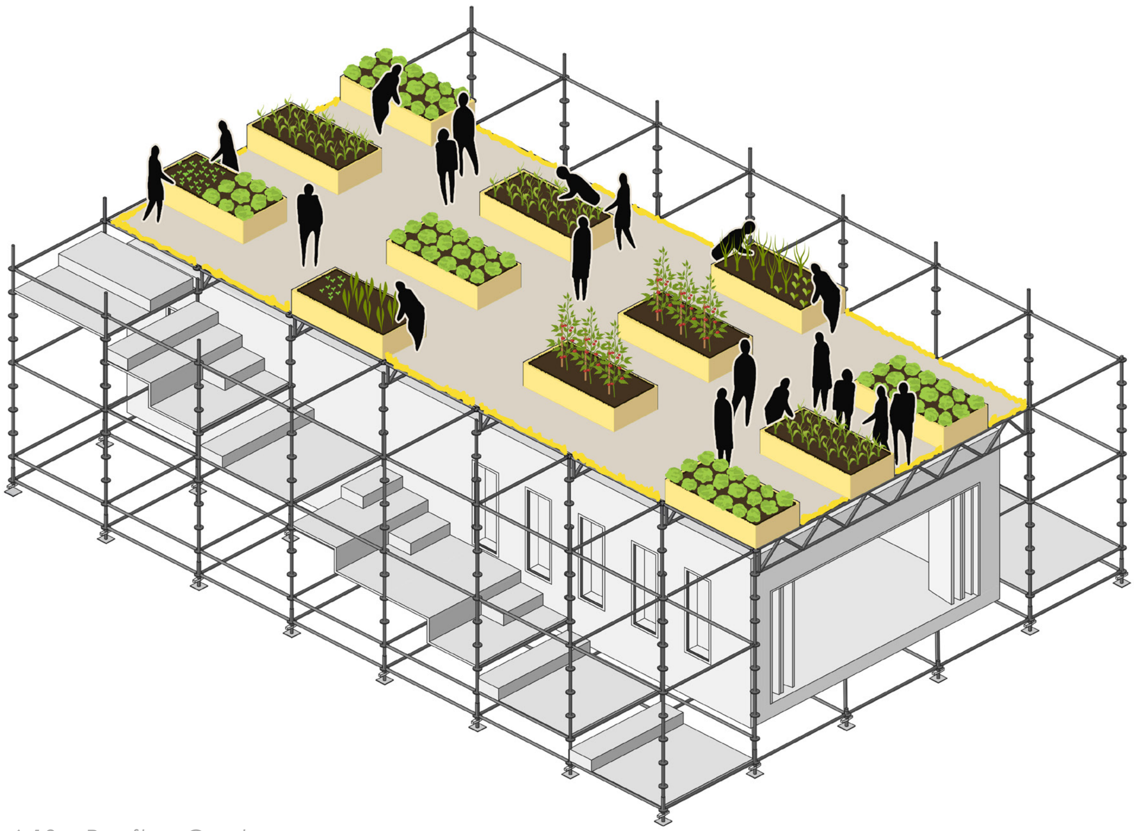
The final version adopted a pure 2x2 meter grid structure. Building with identical elements allows for extensive reconfiguration possibilities and significantly simplifies the construction process. For instance, only one type of diagonal brace needs to be used, which can be applied to every scaffold position.



Ill. 6.12 - scaffolding dimension

DESIGN PROCESS
Developing the Concept
Concept - Rooftop garden

Research conducted on Budapest's community gardens reveals that those gardens with communal plots for educational activities or collective cultivation are more active, attract more local participants, and show greater commitment to community building. Therefore, it is important to integrate such community gardening spaces into the project. As the sizes of vacant plots can vary significantly (appendix 5), it is conceivable that there may not be enough space on the ground for such community gardening activities, and the lighting conditions may not be optimal (appendix 2). As a solution, the community farming area has been incorporated on the top of the building, ensuring that even on small-sized vacant plots, there is dedicated space for community gardening, with improved lighting conditions compared to being on the ground.

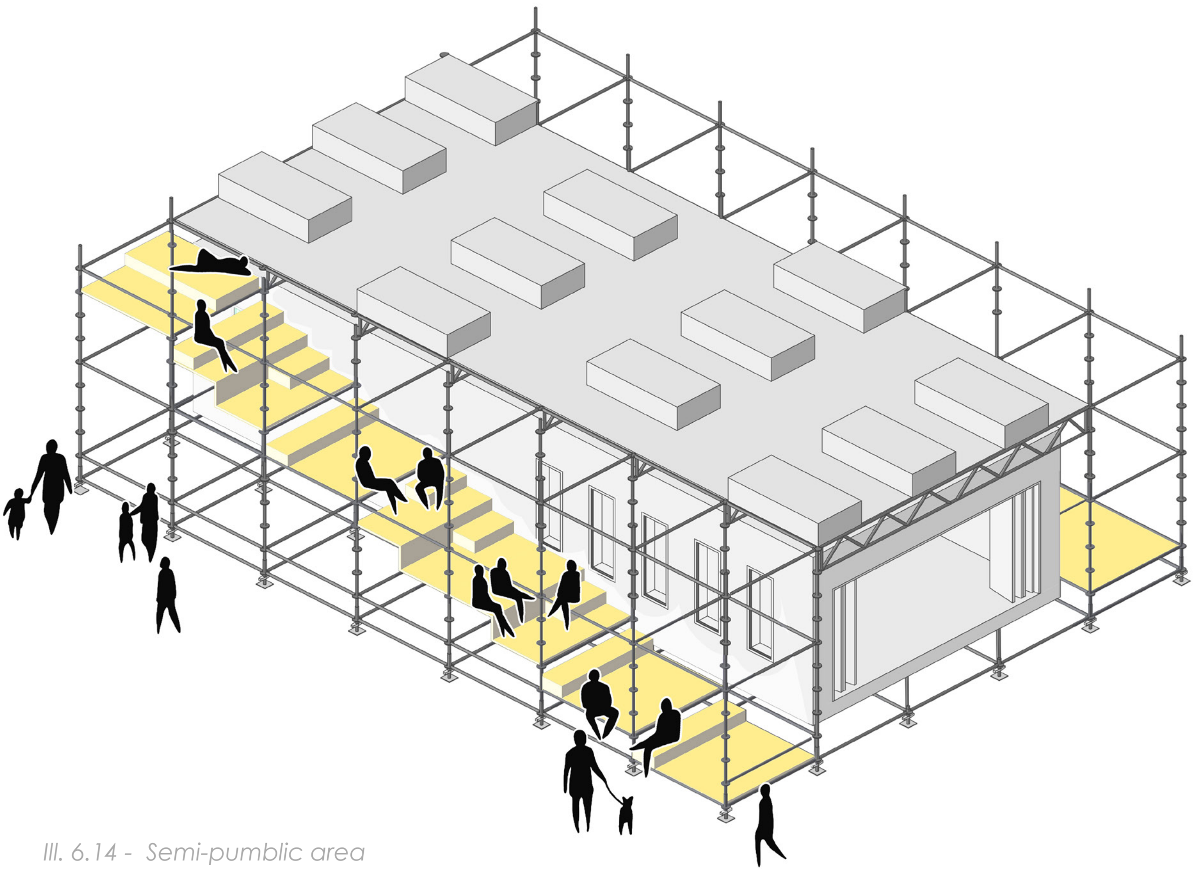


Ill. 6.13 - Rooftop Garden

DESIGN PROCESS
Developing the Concept
Concept- outdoor space

The concept diagram (ill. 6.1) presented the idea of avoiding a sharp boundary between the building and the public space. The goal was to create a semi-public area that would blur the lines between the building and the street, thereby establishing an inviting atmosphere.

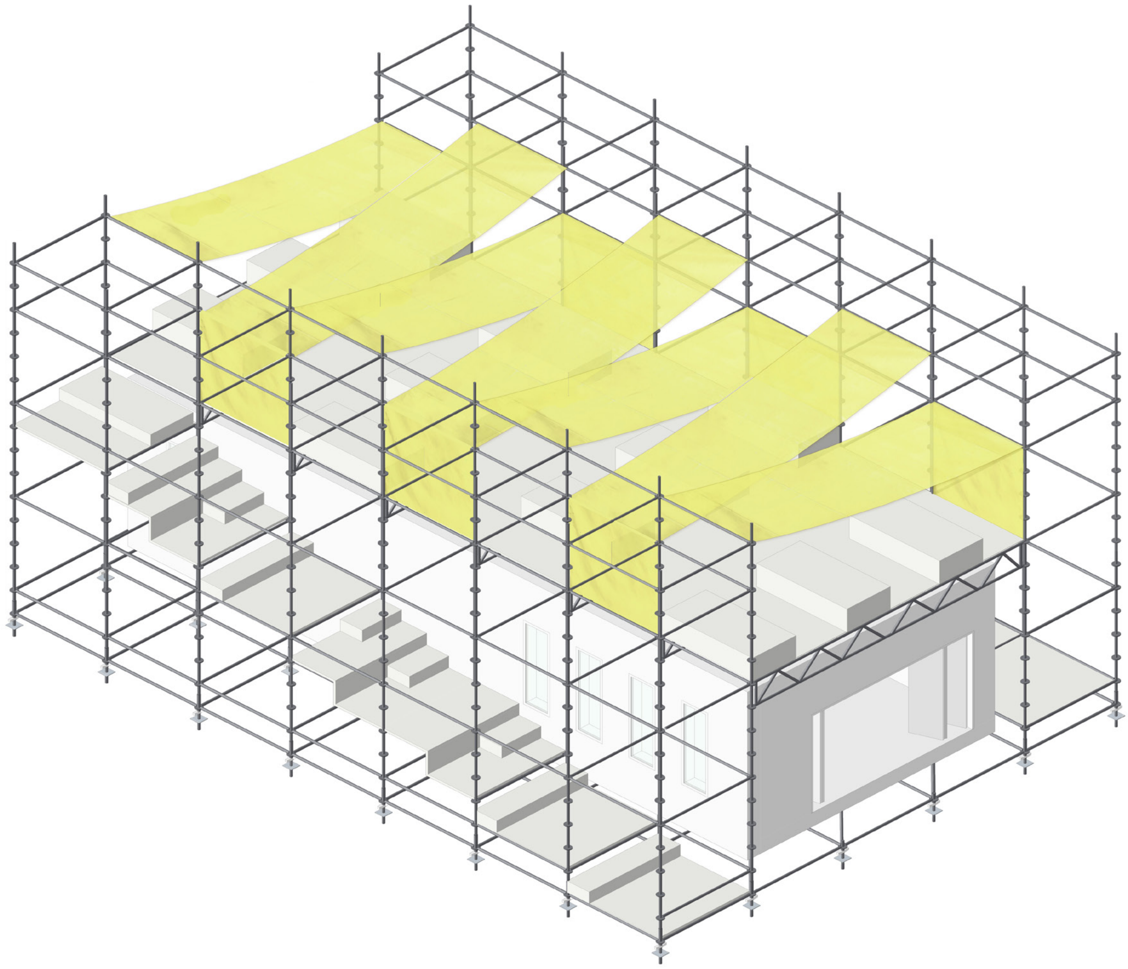
The realization of this concept is achieved through the creation of a spatial „staircase" using scaffolding structures. The strategic utilization of these structures enables the creation of vertical communal spaces that leverage the three-dimensional potential of the environment. Placing these spaces along the street front acts as a bridge, blurring the boundaries between the building and the street, inviting passersby to explore and participate in the activities happening within.



Ill. 6.14 - Semi-pumblic area

DESIGN PROCESS
Developing the Concept
concept - passive cooling

The macroclimatic analysis of Budapest highlights the future challenges of urban climate due to the combination of global warming and the urban heat island effect. However, as the study suggests, effective mitigation can be achieved through evaporative cooling. In order to address this, implementing architectural solutions that passively cool buildings during heat waves is crucial. One effective strategy involves using textiles placed in front of openings, which can be moistened with purified rainwater collected from surrounding roofs. Through evaporation, these textiles cool the incoming airflow, contributing to the passive cooling of the building and enhancing thermal comfort both indoors and outdoors. Additionally, these tensioned textiles offer great opportunities for creating a unique spatial experience or serving as temporary outdoorevent spaces.

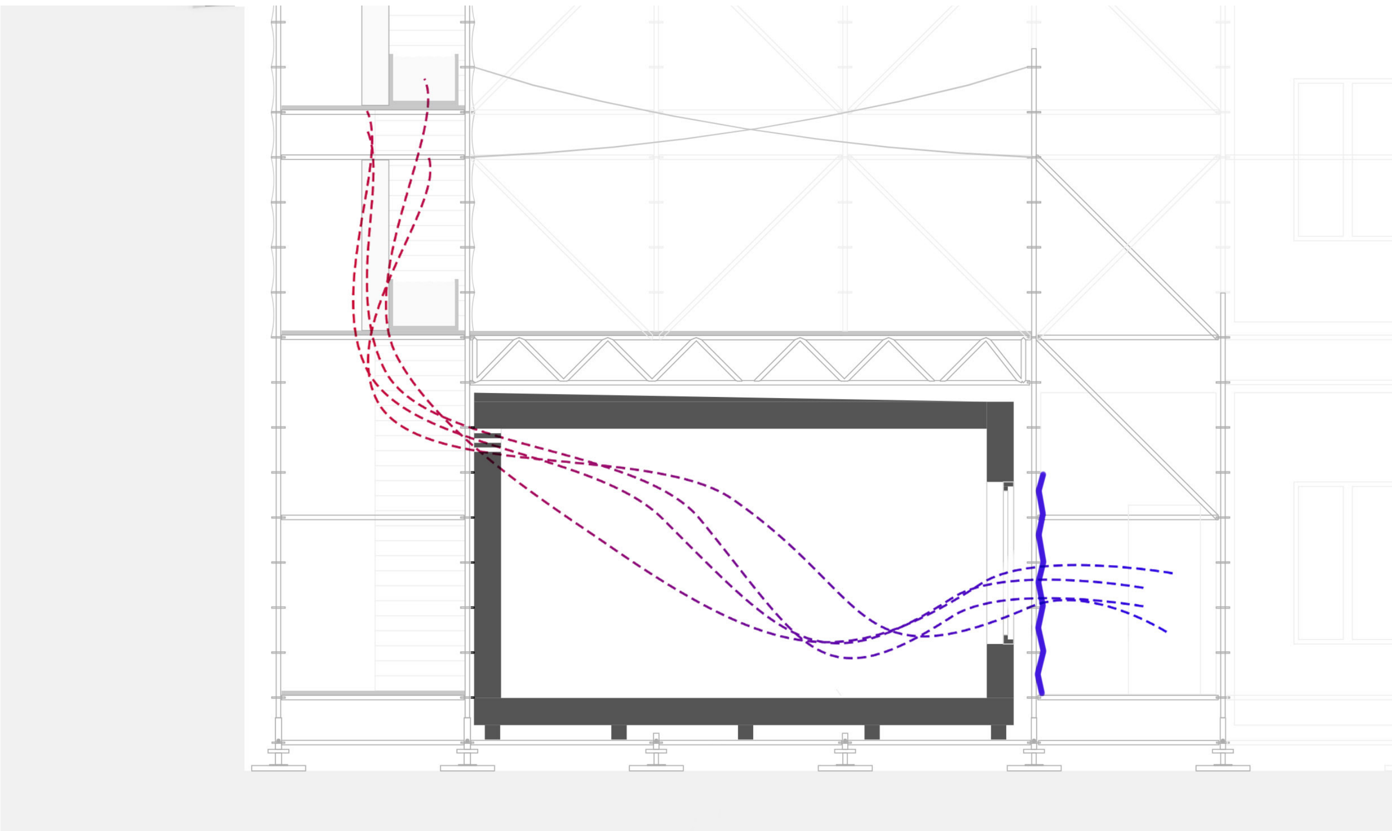


Ill. 6.15 - temporary tent and passive cooling

concept - natural ventilation

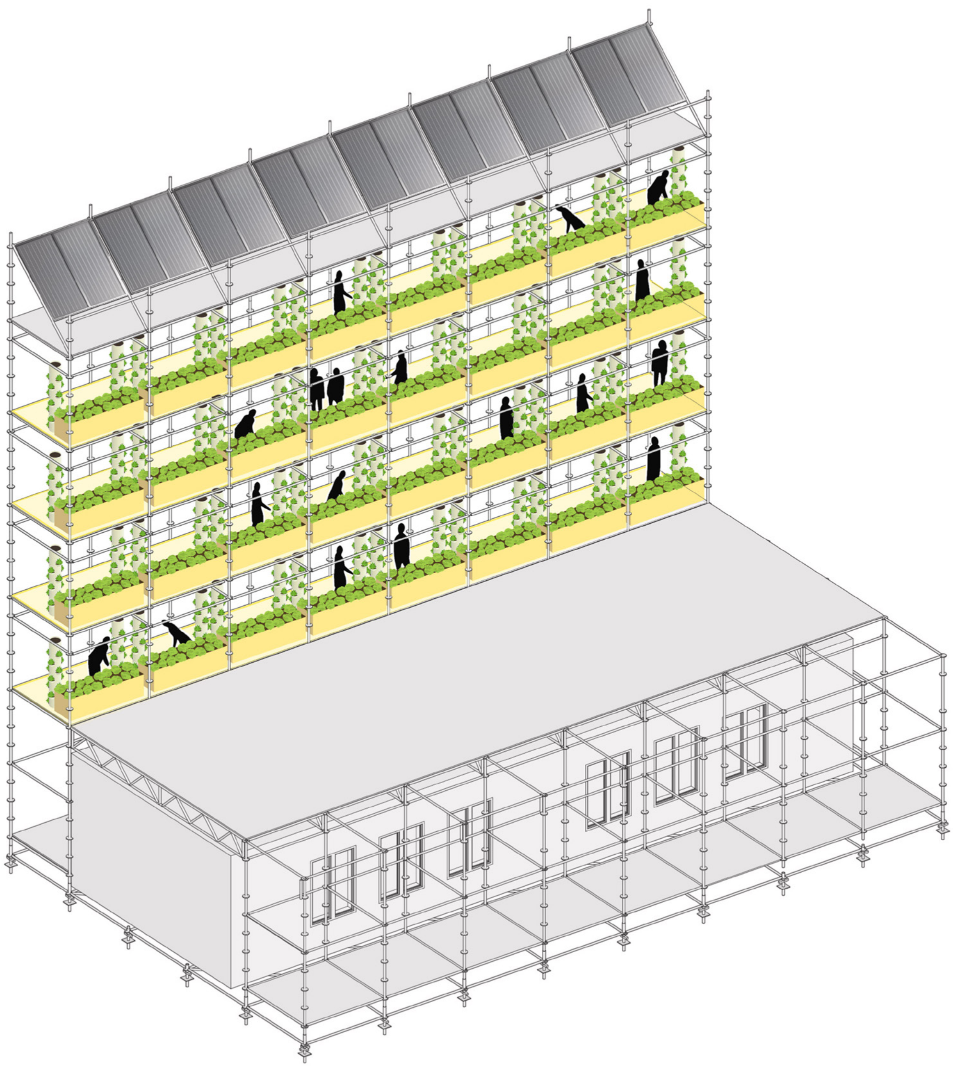
As the project's location may vary, it poses a challenge to rely on natural ventilation according to the prevailing wind direction. The orientation of the building can change, and in urban areas, wind patterns are often unpredictable. To address this, it was crucial to adopt a natural ventilation system that does not rely on specific wind direction.

The vertical farm operates as a solar chimney, harnessing the movement of air from the cooler areas to the warmer areas. This natural airflow is facilitated by the presence of moistened textiles stretched on the scaffolding elements. As air passes through these textiles, it undergoes evaporation and cooling, creating a pleasant and refreshing indoor environment. This passive cooling method effectively cools the indoor spaces during the ventilation process, enhancing thermal comfort and reducing the reliance on mechanical cooling systems.



Ill. 6.16 - natural ventilation and passive cooling

concept - vertical farming



Ill. 6.17 - vertical farming

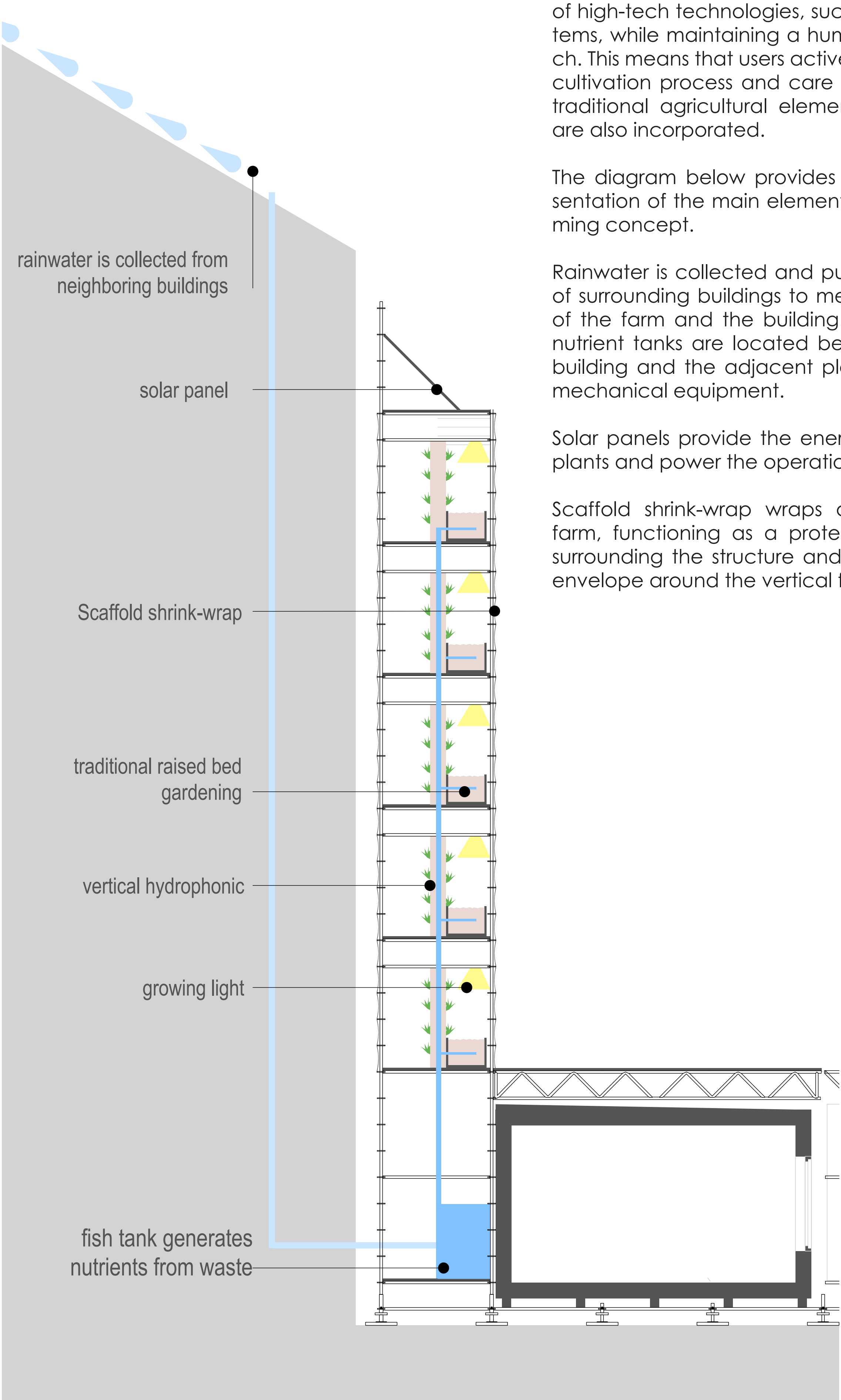
As mentioned before, the goal is to combine low-tech and high-tech urban farming solutions to create a vertical farm that utilizes the advancements of high-tech technologies, such as aquaponic systems, while maintaining a human-centric approach. This means that users actively participate in the cultivation process and care for the plants, while traditional agricultural elements like raised beds are also incorporated.

The diagram below provides a schematic representation of the main elements of the vertical farming concept.

Rainwater is collected and purified from the roofs of surrounding buildings to meet the water needs of the farm and the building. The rainwater and nutrient tanks are located between the planned building and the adjacent plot, along with other mechanical equipment.

Solar panels provide the energy to illuminate the plants and power the operation of the building.

Scaffold shrink-wrap wraps around the vertical farm, functioning as a protective film enclosure surrounding the structure and creating a thermal envelope around the vertical farm.

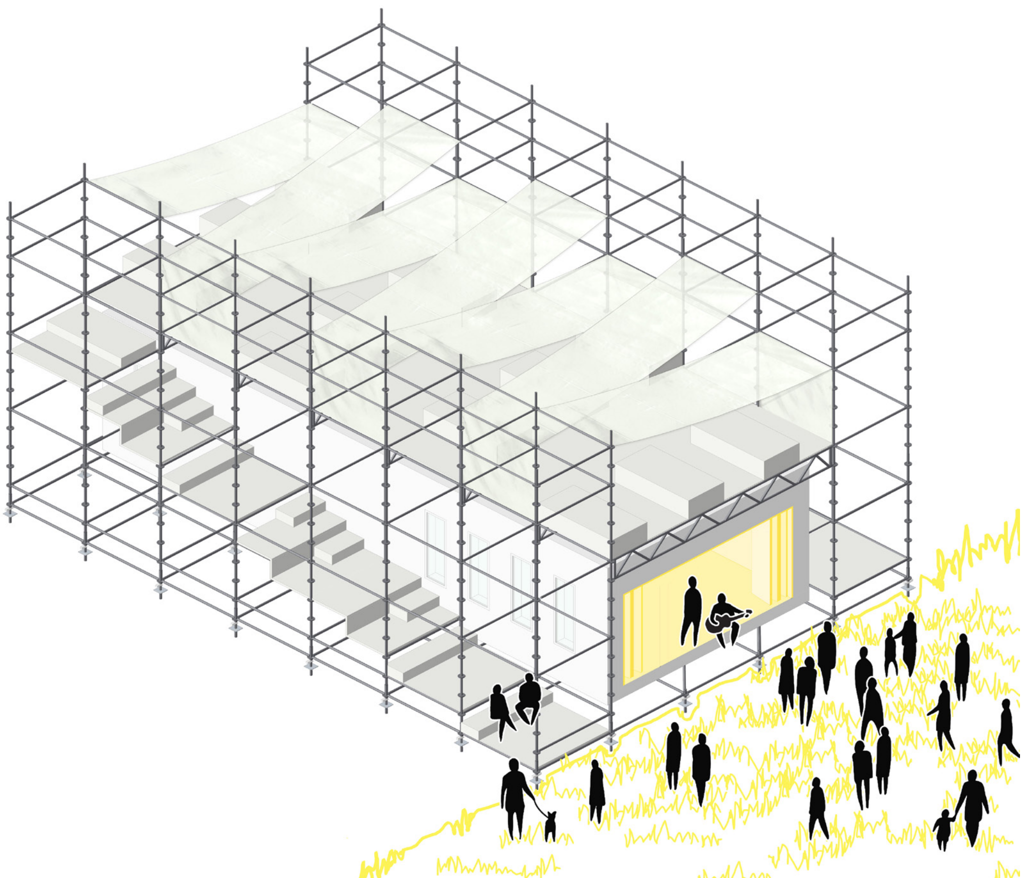


Ill. 6.18 - vertical farming concept diagram

DESIGN PROCESS
Developing the Concept
concept - transitional space

During the conceptualization of the project, it was important to ensure that the building could seamlessly connect with the outdoor space, following the example set by Agrocité.
This creates a transitional area between the indoors and outdoors, offering a multitude of possibilities, such as outdoor concerts, performances, and the realization of indoor-outdoor connections.

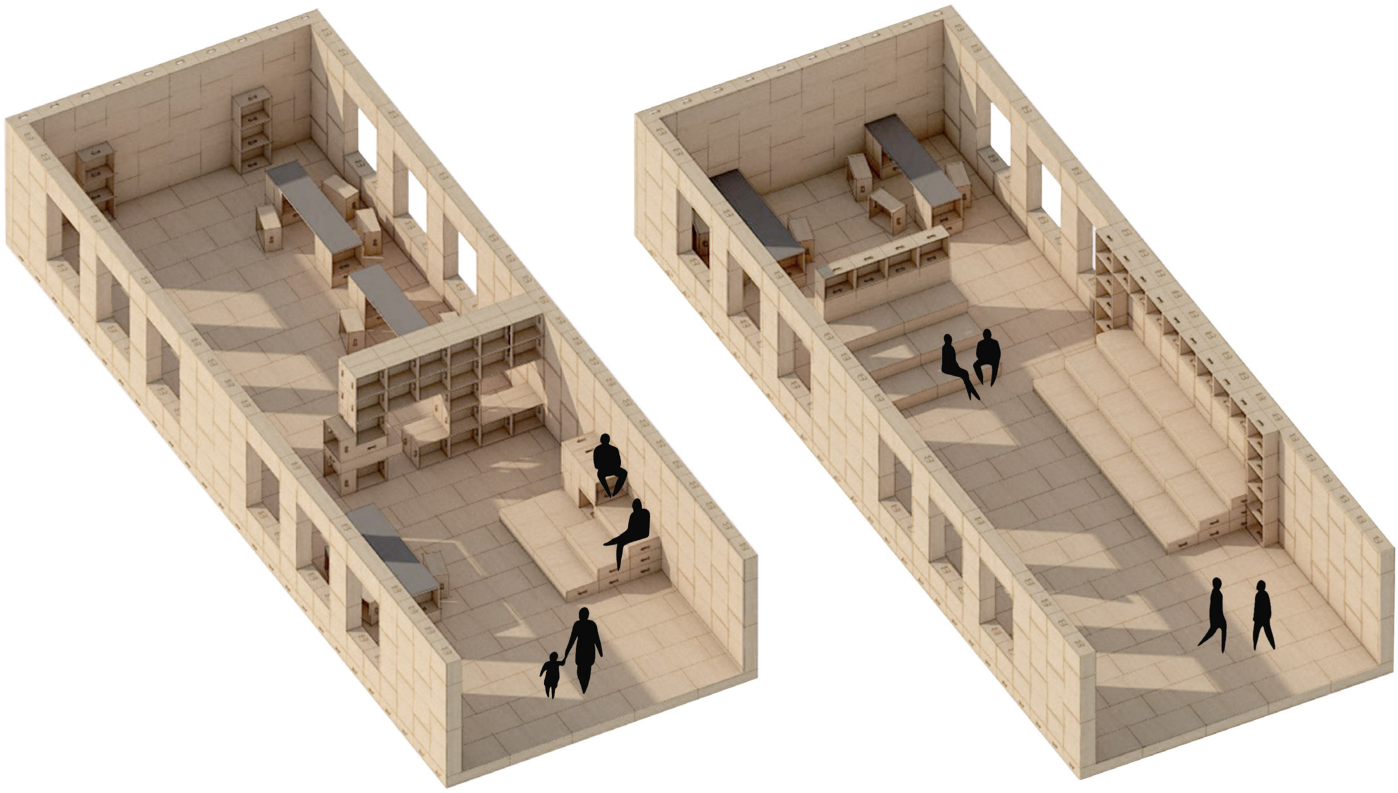
The scaffolding structure's lateral load-bearing capacity allows for the complete opening of the building's short side wall. With the building slightly elevated from the ground, approximately 60 cm higher than the outdoor level, this elevation facilitates the building's transformation into an outdoor stage when opened, establishing a strong connection between the indoor and outdoor spaces.



Ill. 6.19 - transitional

In the design of the building's spaces, the emphasis was placed on achieving flexibility, ensuring that the interior areas can cater to the diverse needs of the users. The use of neutral spaces provides a blank canvas that can be easily transformed and adapted to different purposes. Coupled with modular furniture, this design approach allows for a customizable and dynamic environment.

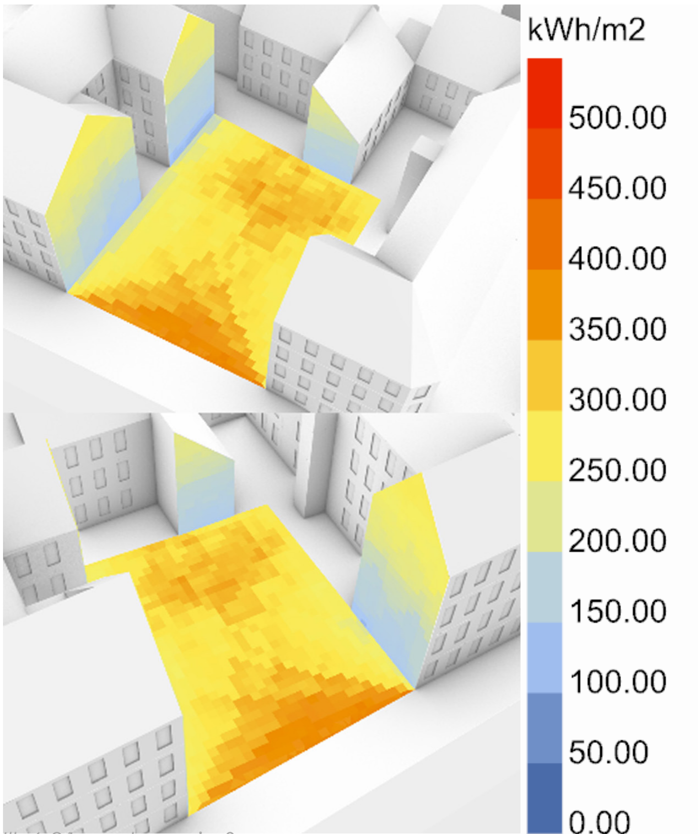
The modular elements offer the users the freedom to define and configure the indoor functions according to their preferences and requirements. They can rearrange the furniture, create different layouts, and transform the space to accommodate various activities, whether it's collaborative work, individual focus, social gatherings, or events. This adaptability fosters creativity, productivity, and a sense of ownership among the users.



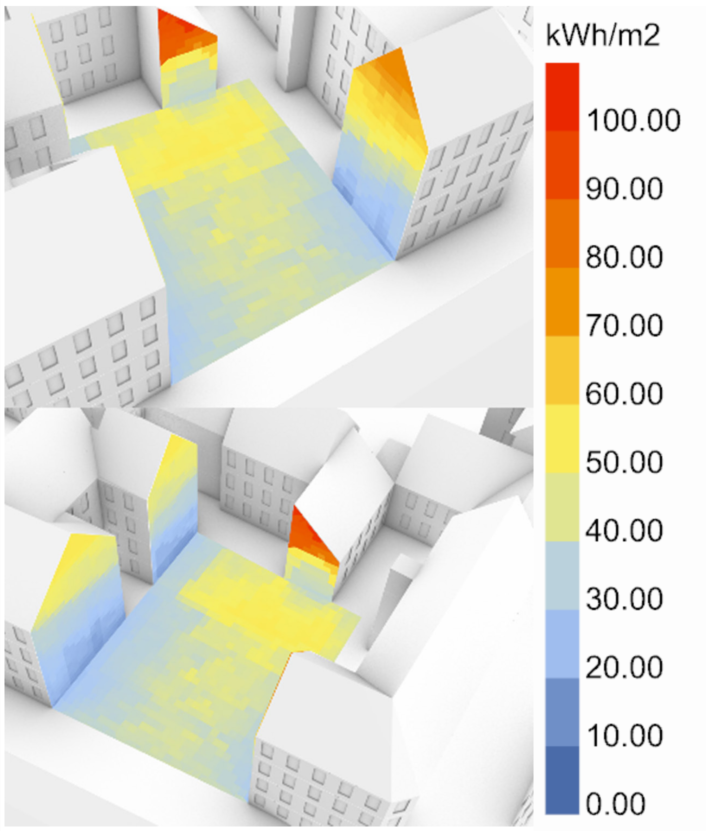
Ill. 6.20 - modular indoor

DESIGN PROCESS
Design Implementation

During the initial stage, an assessment of the site's microclimatic conditions is conducted. Given the urban setting, it is crucial to perform solar analysis due to the varied heights, shapes, and densities of neighboring structures, leading to unpredictable lighting conditions within a specific plot that cannot be predetermined without analysis. These microclimatic analyses offer valuable insights into the optimal positioning of the building. By carefully considering solar exposure and potential light conditions, the design can strategically determine the placement and orientation of the structure to maximize natural light utilization (ill. 6.21 & 6.22)



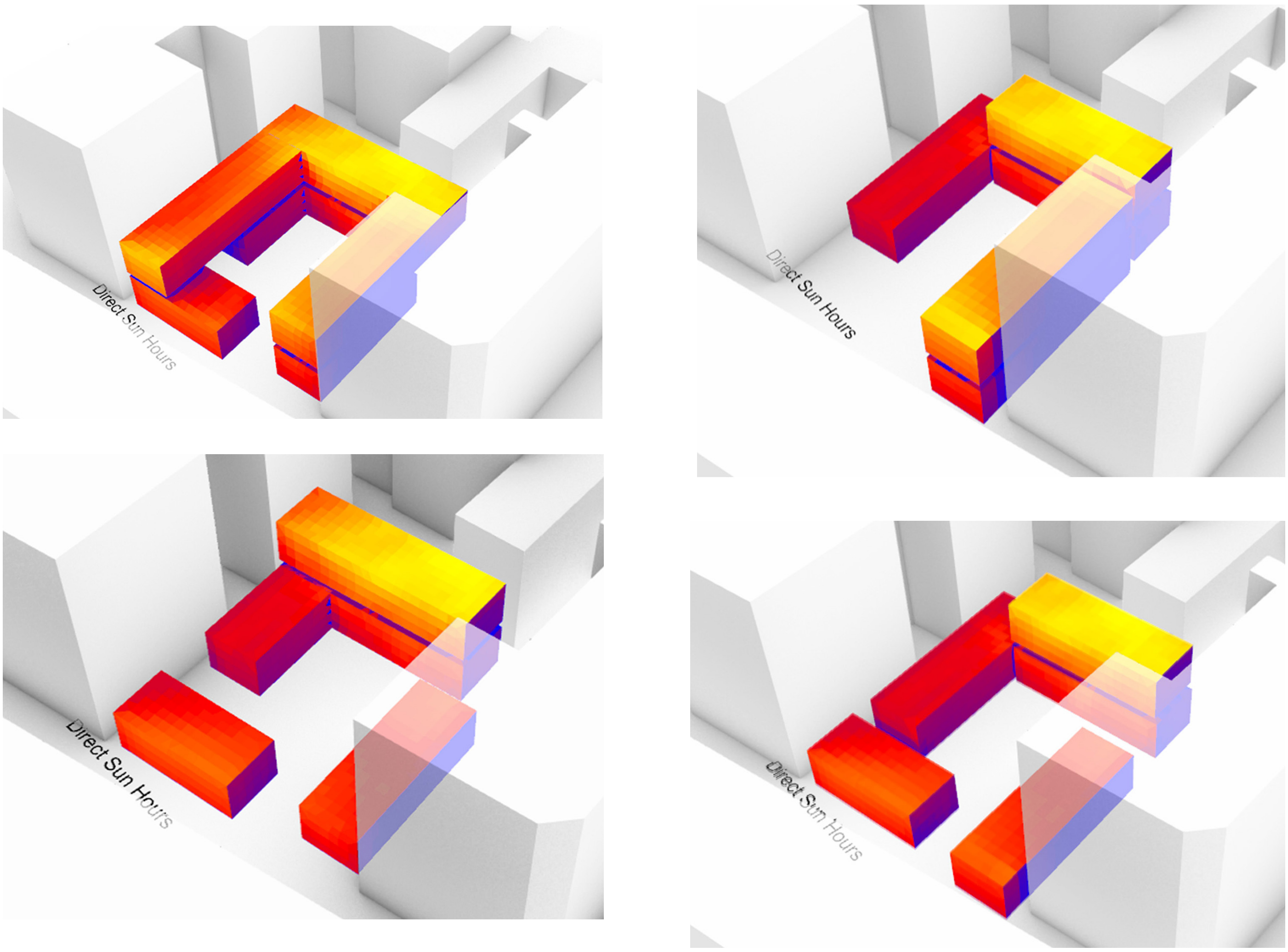
Ill. 6.21 - solar gain Summer



Ill. 6.22 - solar gain Winter

Finding The Form

The selection of the most advantageous building form was the next step in the design process. Each variation was developed based on the same logic, considering factors such as the predefined room program and modular concept. The street-facing side of the site was kept as a single level to avoid shading, while the southern part allowed for experimentation with different levels as it does not cast shadows on the building. Ultimately, the fourth variation was chosen based on considerations of form and mass. Additionally, the analysis of sunlight hours on different facade variations provided insights for the placement of windows, ensuring optimal sunlight exposure on each surface.



Ill. 6.23 - Number of hours of sunlight in different mass varia-

DESIGN PROCESS
Developing the Concept
Design Implementation

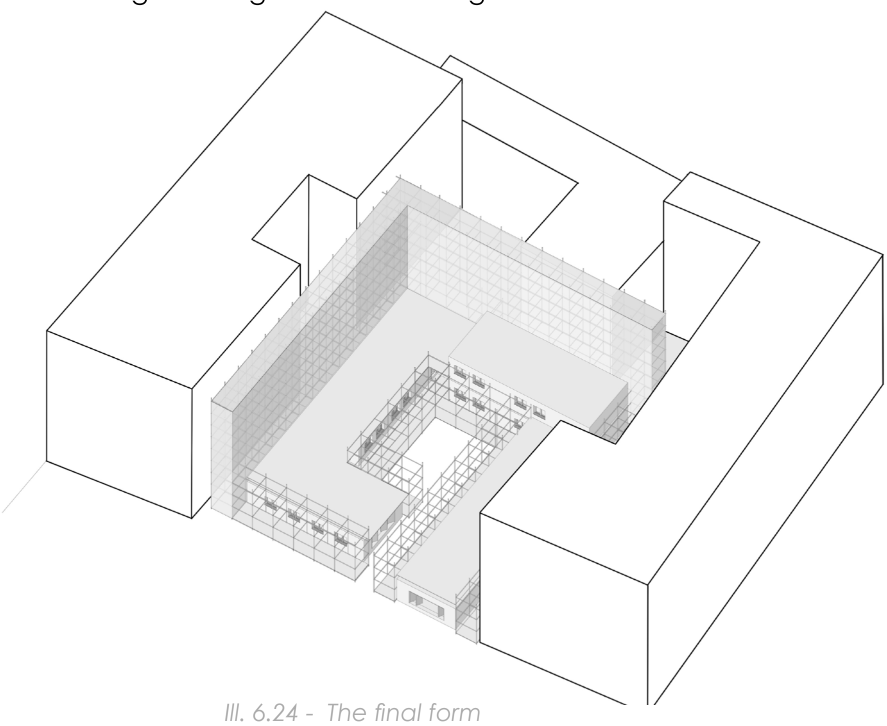
Following the selection of the optimal building form, careful consideration was given to the placement of the vertical farm. To ensure structural stability, it was necessary to incorporate a partial firewall behind the farm. Given the shading effect of the vertical farm, it was decided to position it on the southern side of the plot, enabling the potential placement of solar panels and avoiding shading on the building.

In the first scenario, the vertical farm was situated along the plot boundary, adjacent to neighbouring properties, but this resulted in significant shading of specific interior spaces.

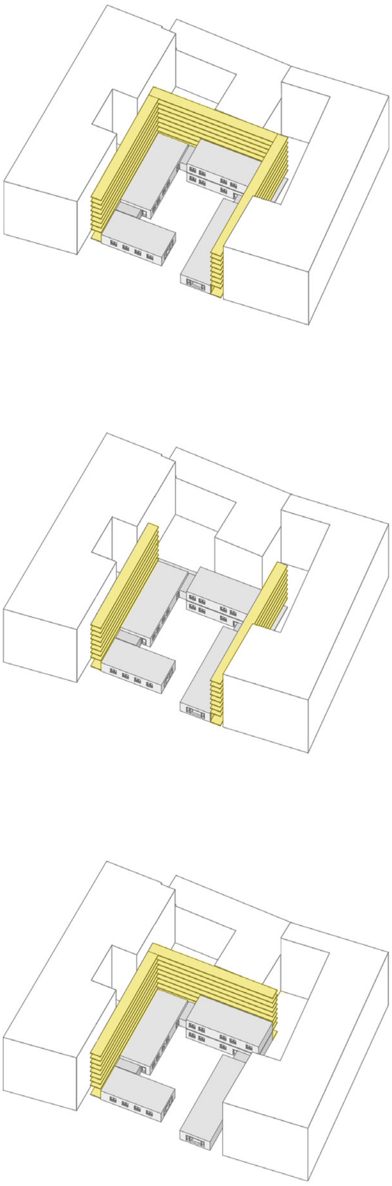
The second scenario explored the absence of a vertical farm on the southern side, revealing increased sunlight exposure in the southern rooms.

Ultimately, the third scenario was chosen, which involved excluding the vertical farm on the eastern side. This allowed for additional light in the northeastern room, although the northwestern room became darker. However, this trade-off was deemed acceptable as the storage function could be located in the darker area.

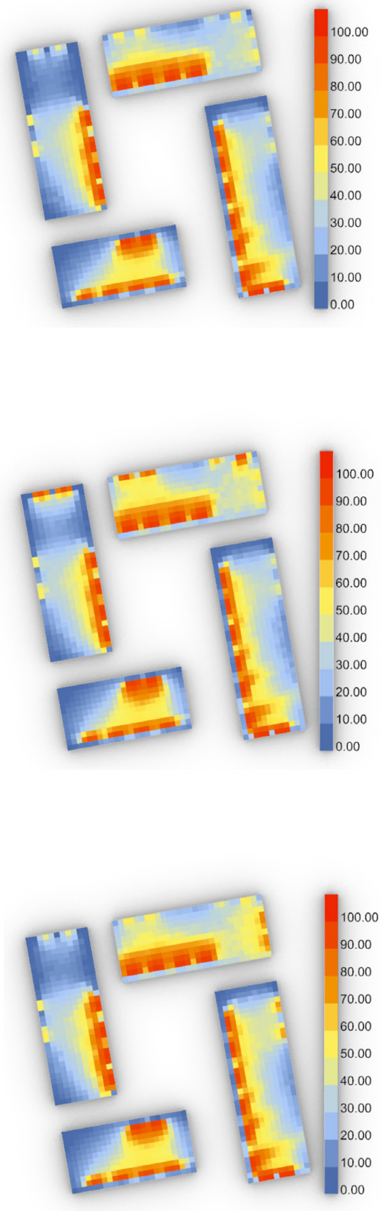
Considering the insights and analyses from these scenarios, the final floor plan was developed, taking into account the optimal placement of the vertical farm and the desired distribution of natural light throughout the building.



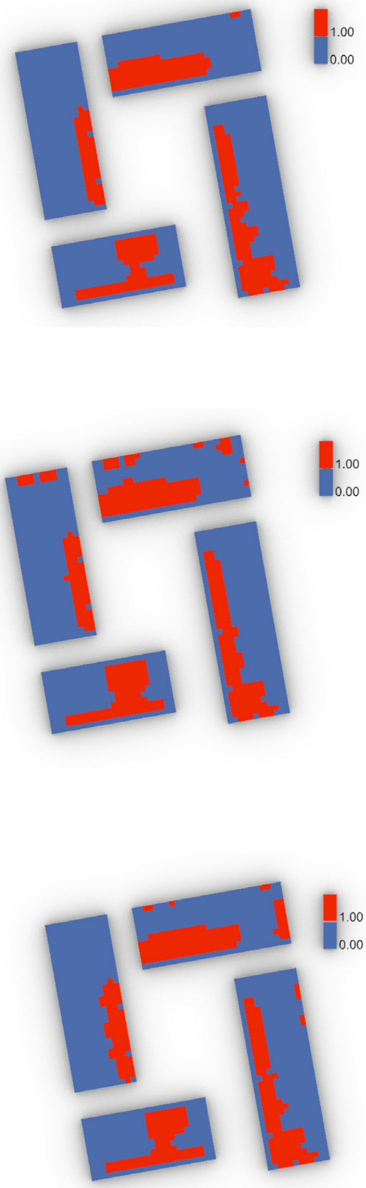
Ill. 6.24 - The final form



ill. 6.25 Variation of vertical farm



ill. 6.26 Annual Daylight Analysis



ill. 6.27 Daylight Autonomy

The positioning of the vertical farm in accordance with the concept is always along the boundary between the neighboring building and the design area. However, it does not necessarily have to be continuous, so it is worth examining where its placement would be most advantageous.

Annual daylight refers to the analysis and assessment of natural light conditions within a building or space over the course of a year. It takes into account factors such as daylight availability, variations in sun position, and the impact of surrounding buildings or obstructions. This analysis helps inform the design of windows, skylights, and interior layouts to optimize natural lighting and enhance occupants' visual comfort and well-being.

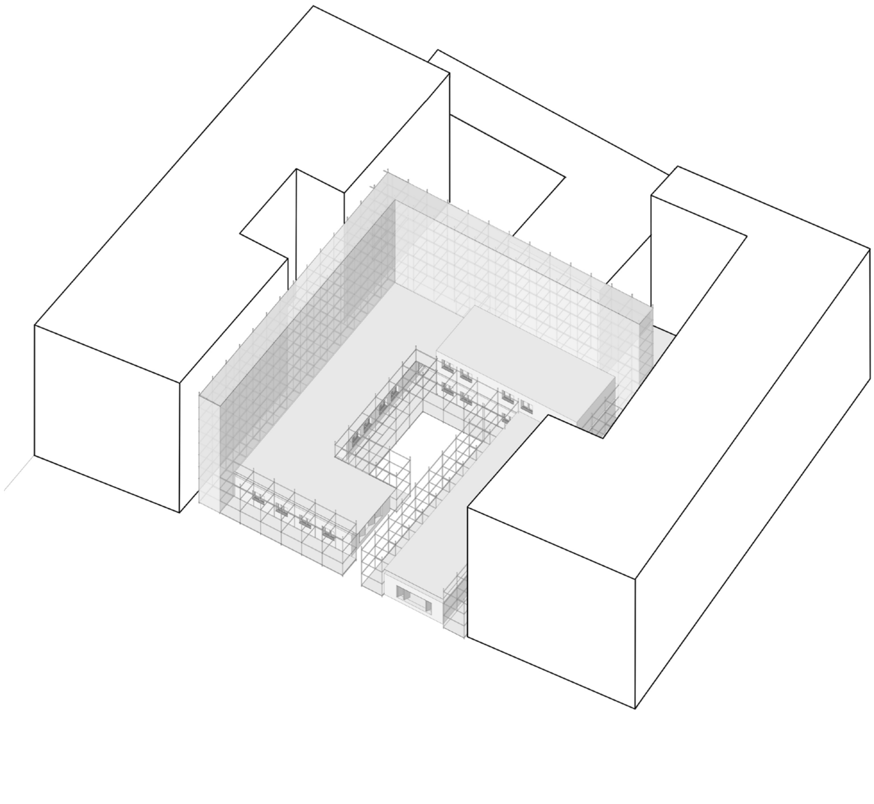
Daylight autonomy (DA) is a metric that measures the extent to which a specific illuminance level is met by natural daylight during occupied hours. For example, with a target illuminance of 300 lux and a threshold DA of 50%, it means that natural daylight levels exceed the target illuminance for 50% of the occupied time. DA provides insights into the effectiveness of daylighting strategies and the reliance on artificial lighting. It guides the design process by informing decisions on window placement, shading systems, and interior layout to optimize natural light utilization.

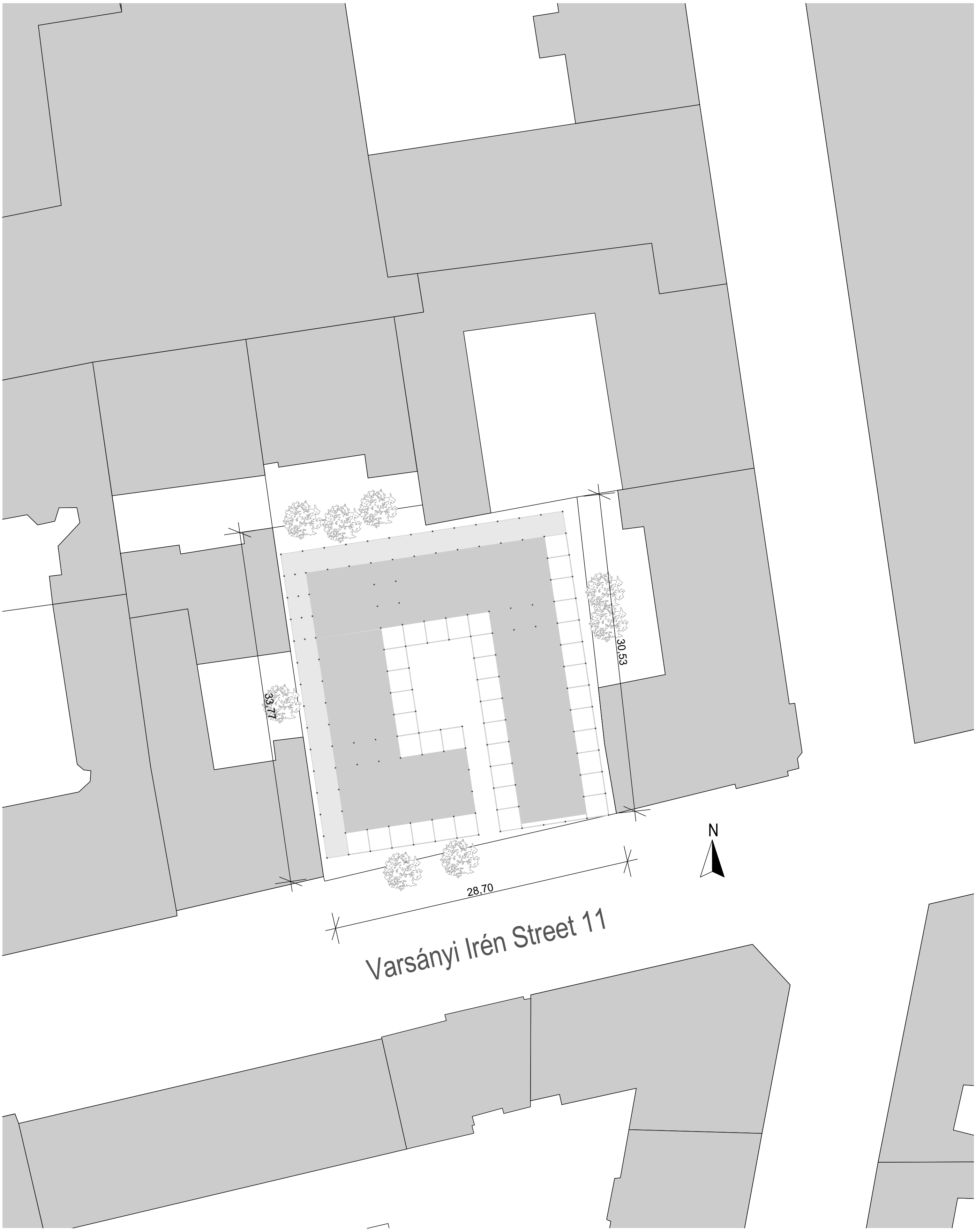
07 DESIGN PRESENTATION

In the following pages, the completed design will be presented through floor plans, sections, and elevations. These visual representations provide a comprehensive overview of the project, showcasing the spatial layout, structural elements, and exterior facades. Through these drawings, the design intent and key features of the project will be communicated, allowing for a better understanding of the proposed architecture.

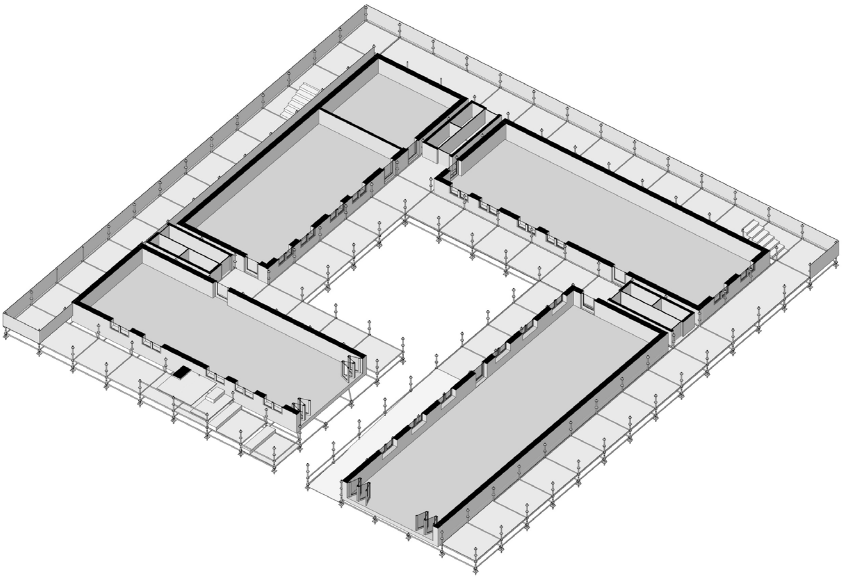
Ill. 7.1 - Visualisation

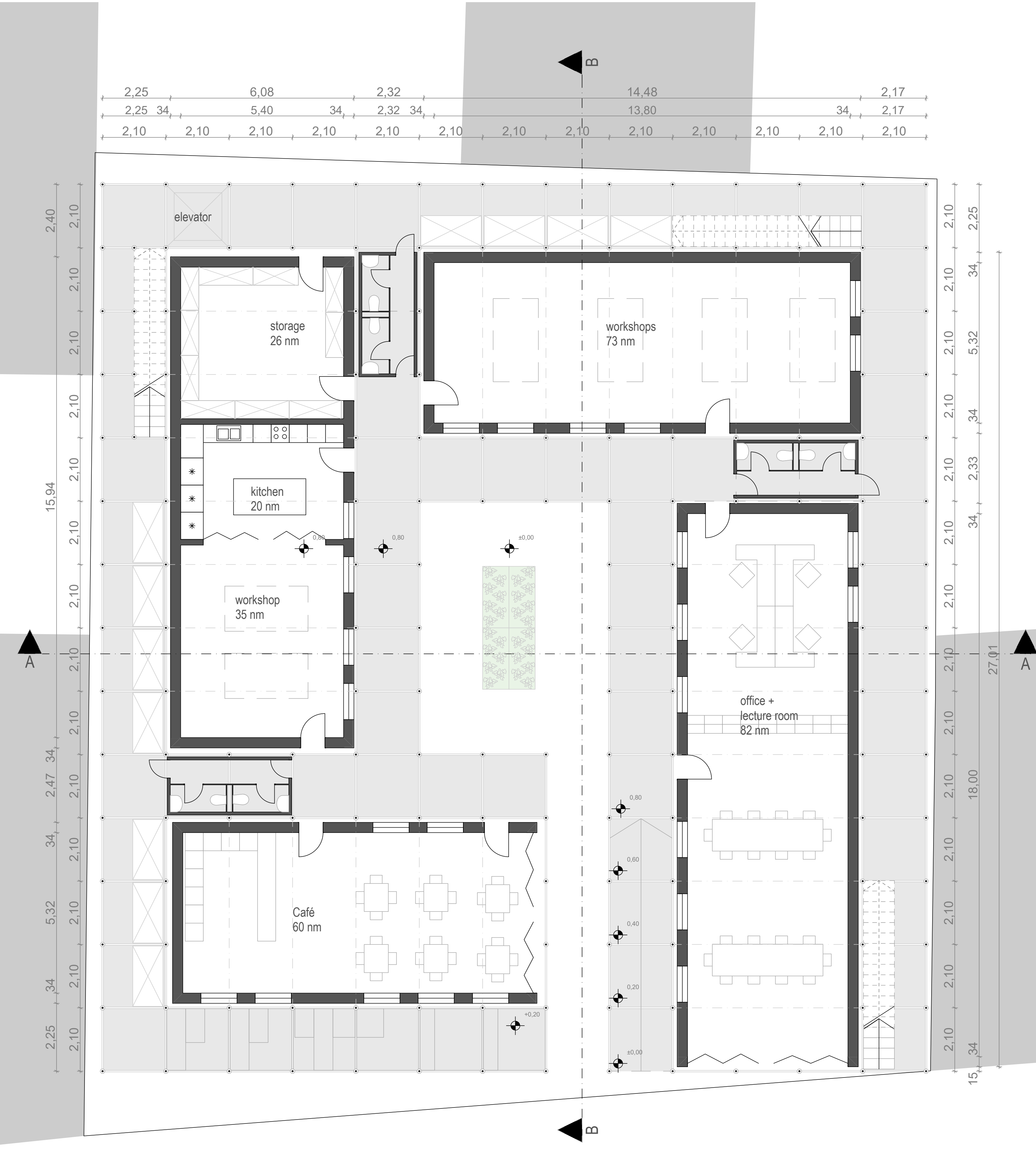
DESIGN PRESENTATION
SITE PLAN
1:500



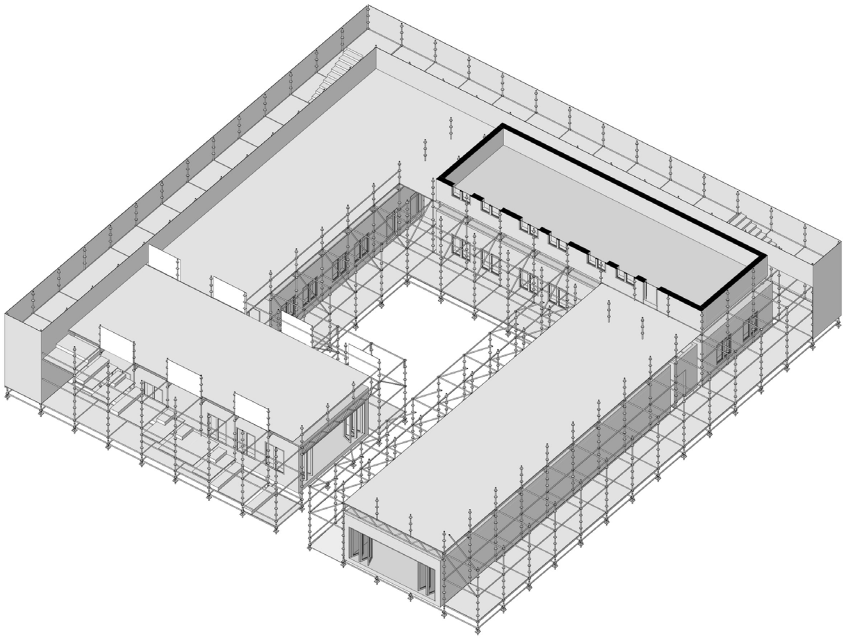

30,53
33,77
N
28,70
Varsányi Irén Street 11

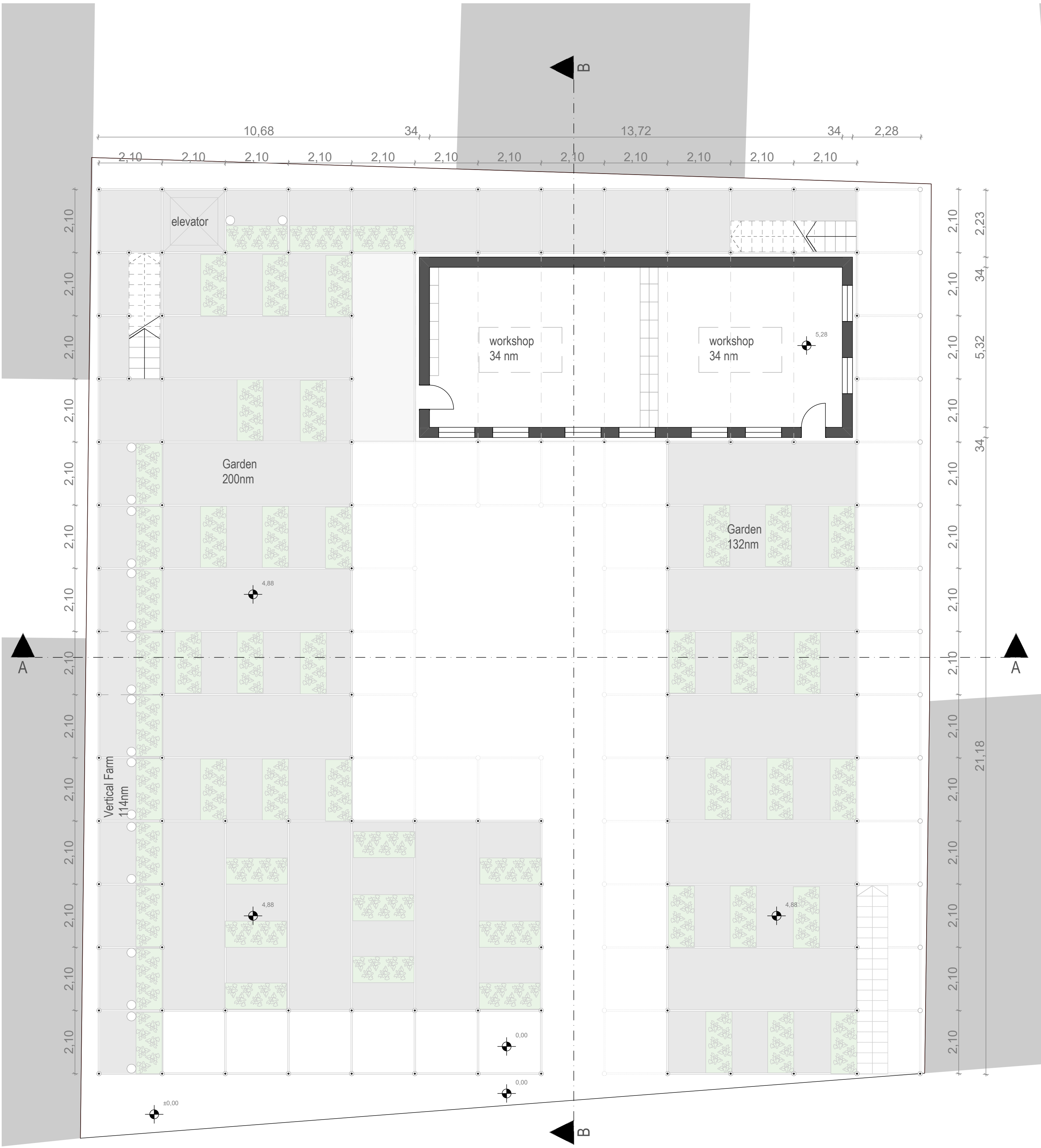
DESIGN PRESENTATION
FLOOR PLAN
1:150



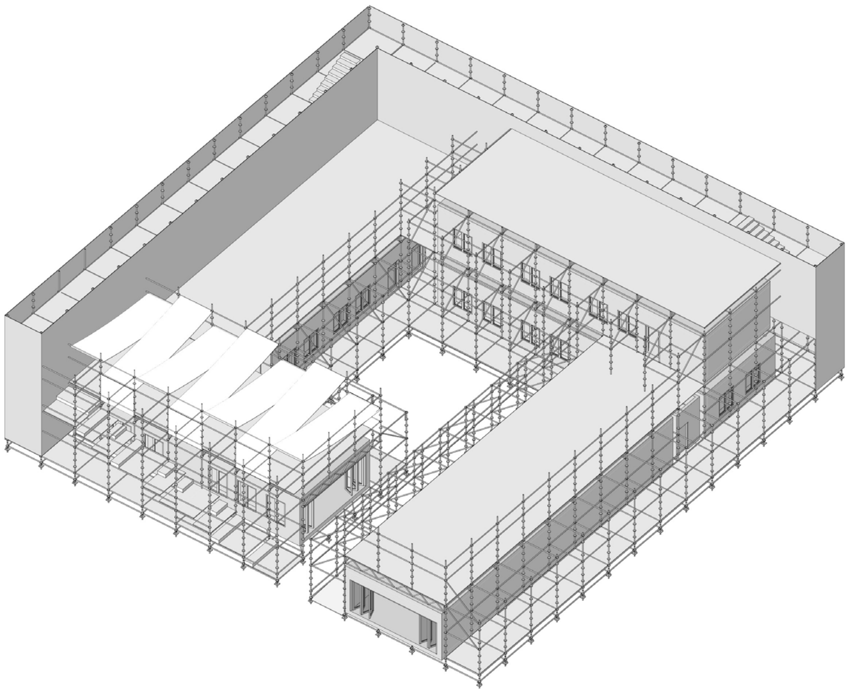

elevator
storage
26 nm
workshops
73 nm
kitchen
20 nm
workshop
35 nm
office +
lecture room
82 nm
Café
60 nm
A
A
B
B

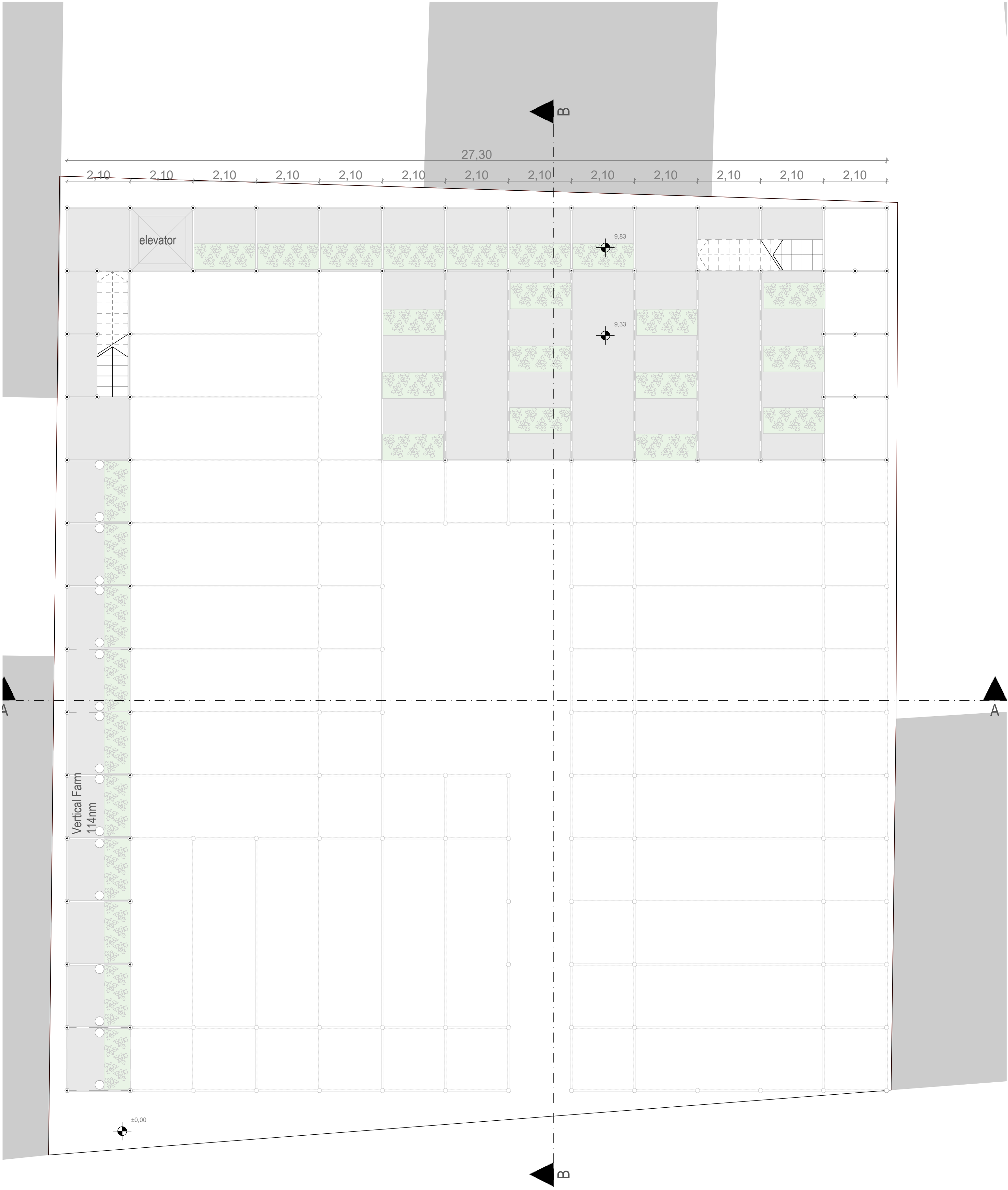
DESIGN PRESENTATION
FIRST FLOOR PLAN
1:150




elevator
workshop
34 nm
workshop
34 nm
Garden
200nm
Garden
132nm
Vertical Farm
114nm
10,68
34
13,72
34
2,28
2,10
2,23
5,32
21,18
A
A
B
B

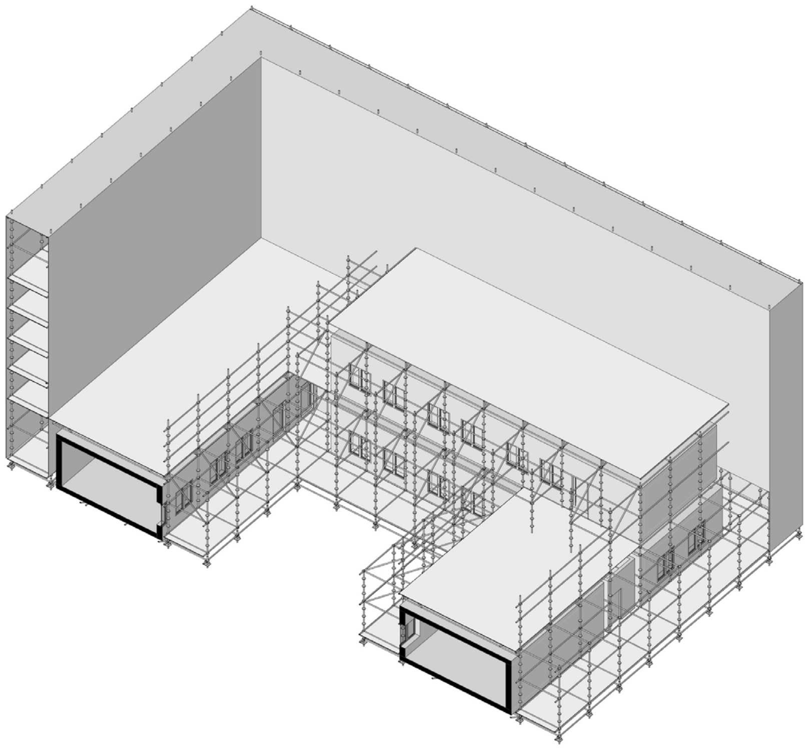
DESIGN PRESENTATION
FARM FLOORS PLAN
1:150

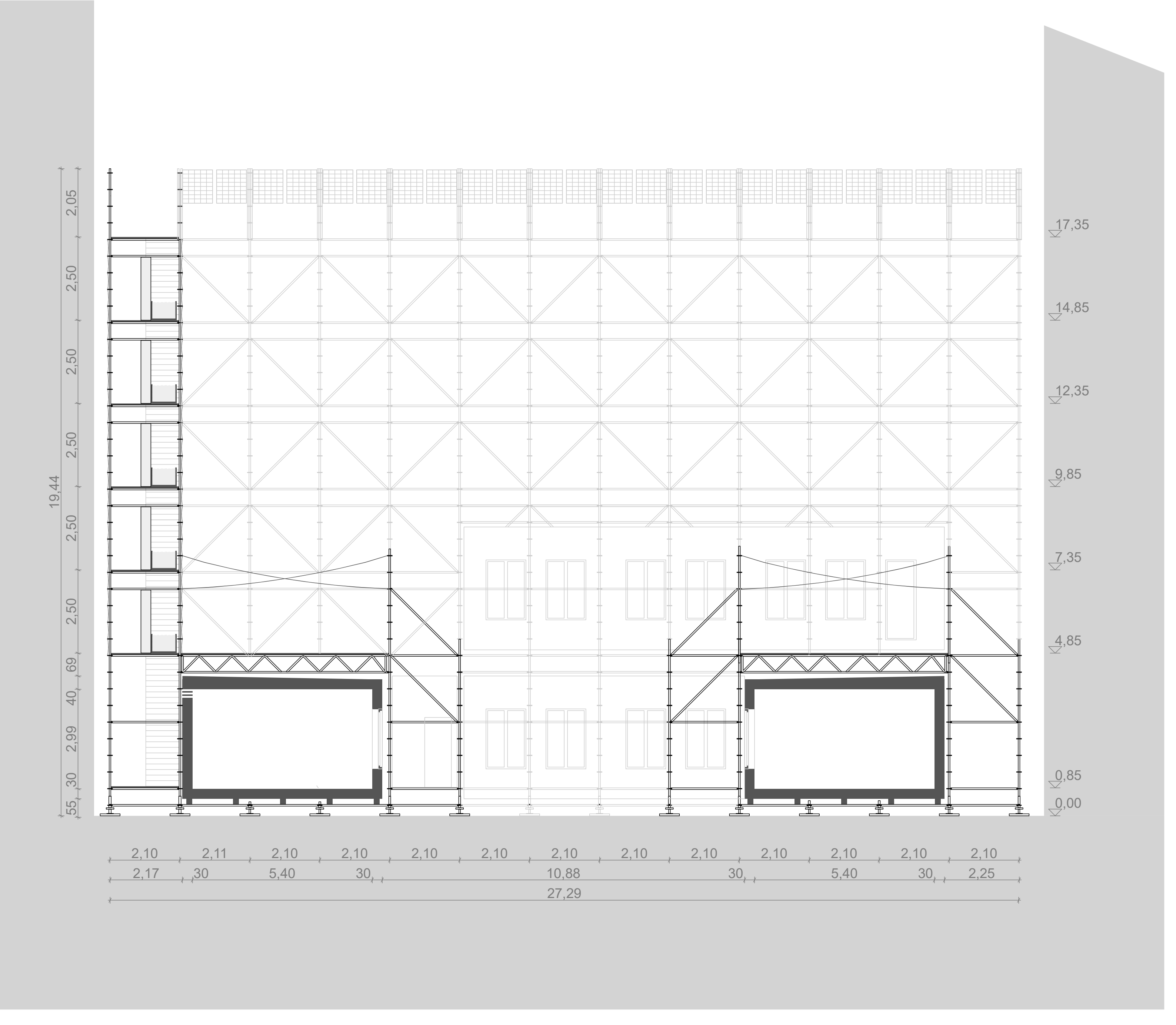




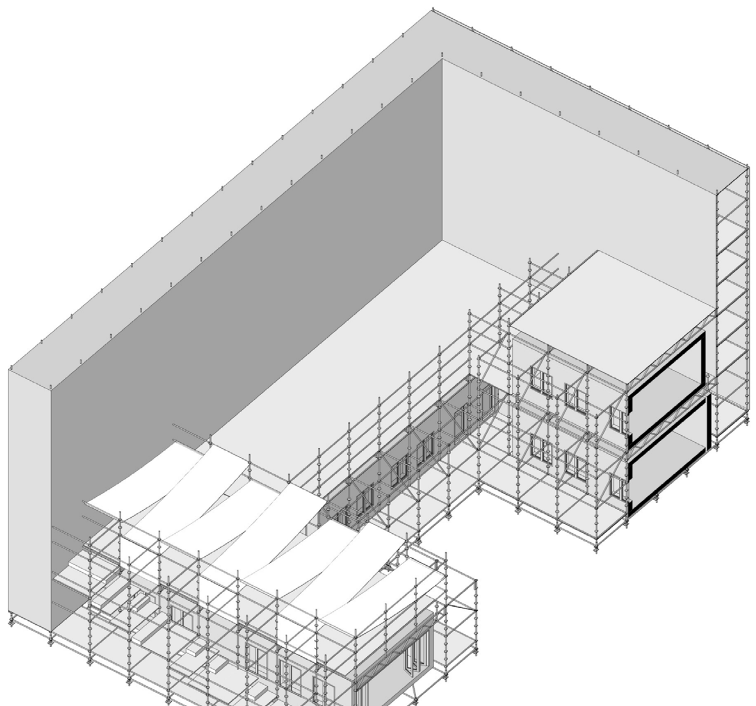
B
27,30
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
elevator
9,83
9,33
A
A
Vertical Farm
114nm
±0,00
B

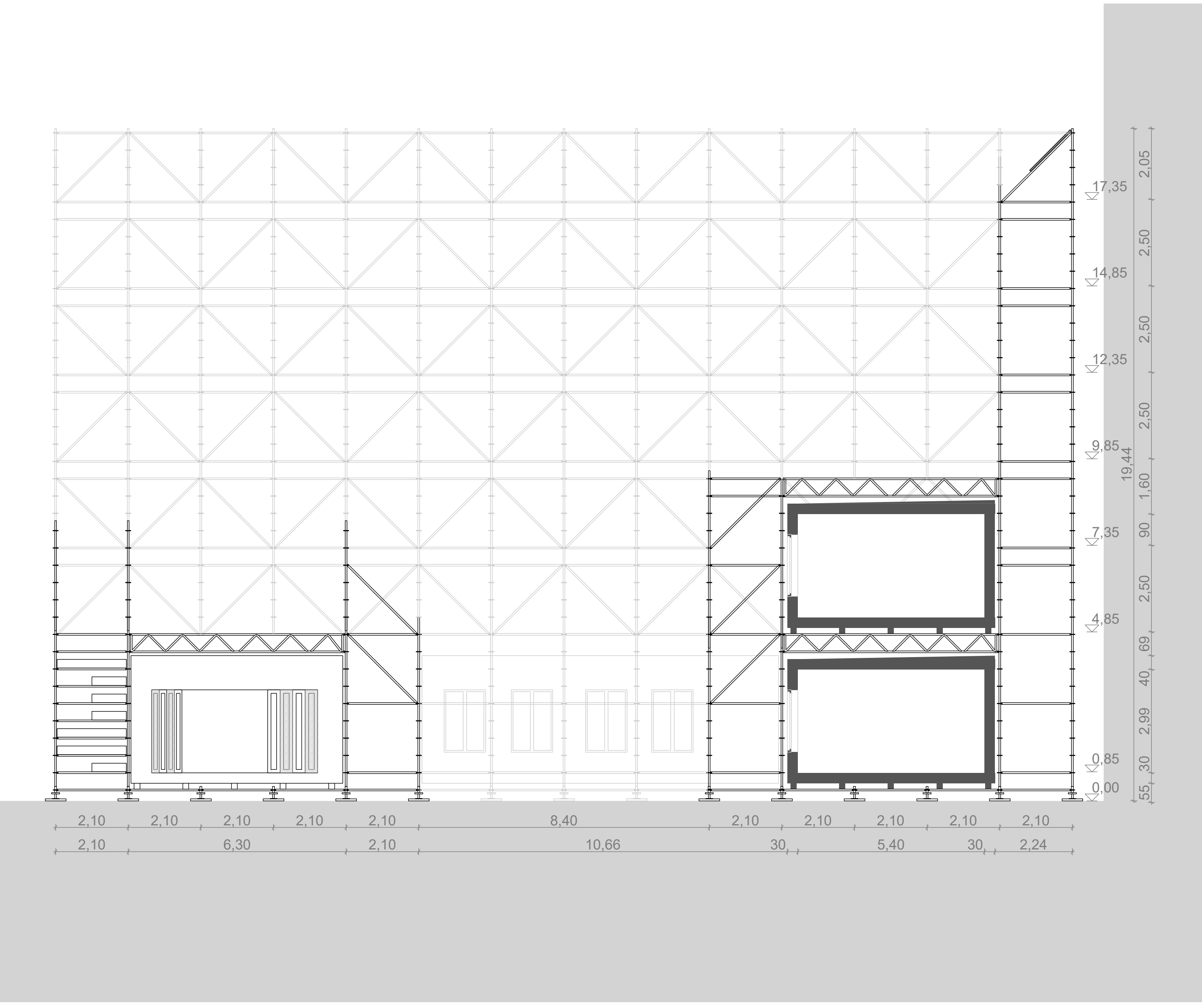
DESIGN PRESENTATION
A-A SECTION
1:150




2,05
2,50
2,50
2,50
2,50
2,50
19,44
69
40
2,99
30
55
17,35
14,85
12,35
9,85
7,35
4,85
0,85
0,00
2,10
2,11
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,10
2,17
30
5,40
30
10,88
30
5,40
30
2,25
27,29

DESIGN PRESENTATION
B-B SECTION
1:150




17,35
14,85
12,35
9,85
7,35
4,85
0,85
0,00
2,05
2,50
2,50
2,50
19,44
1,60
90
2,50
69
40
2,99
30
55
2,10
2,10
2,10
2,10
2,10
8,40
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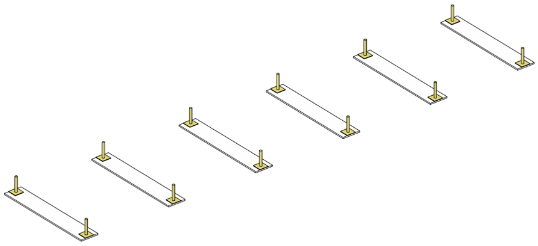
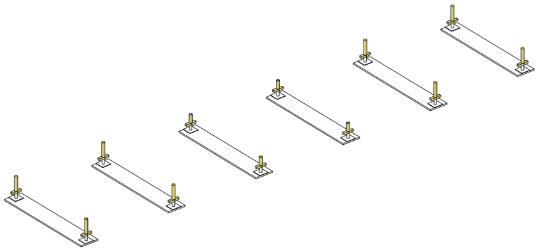
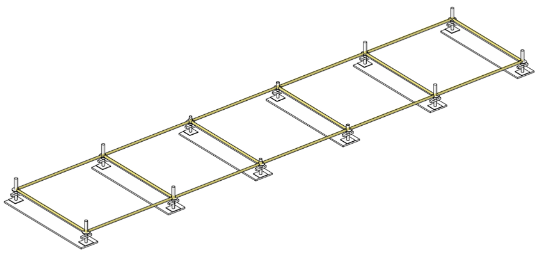
30
5,40
30
2,24



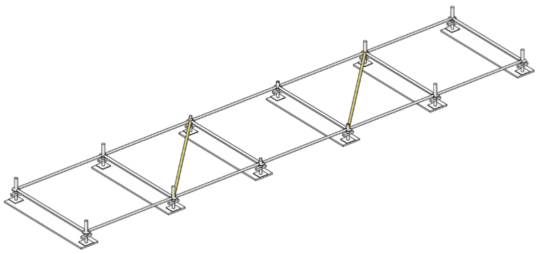
The initial step in the scaffolding assembly process is to position load distributing base plates on the ground. These base plates serve as a stable and secure foundation for the scaffolding structure. On top of the base plates, screw base jacks are placed, featuring threaded heads that allow for height adjustment and leveling. With their typical height range of 40 to 60 cm, the base jacks ensure proper support and stability for the entire scaffolding system.



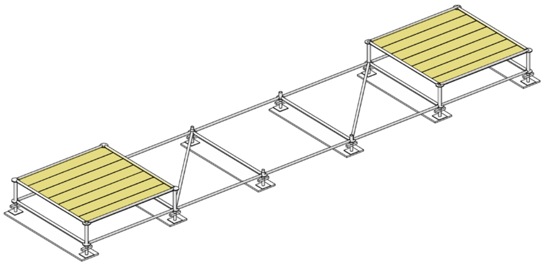
The Base Collar is attached to the Base Jack, and it serves as the connection point for the first level of the scaffolding structure. The Base Collar is typically positioned on top of the Base Jack, securing it in place. It acts as a support and anchor for the scaffolding system, providing stability and allowing the scaffold structure to be built upon it. The Base Collar ensures a secure connection between the Base Jack and the scaffolding platform, forming a reliable foundation for the construction process.



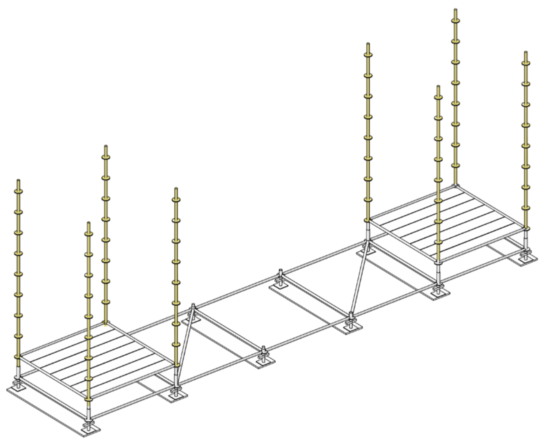
Adjacent Base Collars are connected by utilizing a ledger, which acts as a linking element. The ledger head is carefully wedged into the ring plate, ensuring proper alignment between the hole on the wedge head and the mounting hole on the ring plate. To reinforce the connection, a wedge pin is inserted through the mounting hole, effectively securing the ledger head and the Base Collar together.



After the initial horizontal ledger is securely fastened to the rosettes, the next step involves attaching the horizontal diagonal brace. The horizontal diagonal brace is an essential component of scaffolding as it provides stability and structural integrity. It prevents lateral movement, ensuring the overall safety of the structure. Additionally, the diagonal brace helps distribute weight and forces evenly, enhancing the load-bearing capacity of the scaffolding. The quantity of these braces is determined by structural calculations.



the next step involves attaching modular decks elements to the ledgers. These platform elements are designed to provide a secure and stable walking surface at ground level. By connecting them to the ledgers, an elevated walking platform is formed, allowing users to move safely and efficiently within the scaffolding structure.



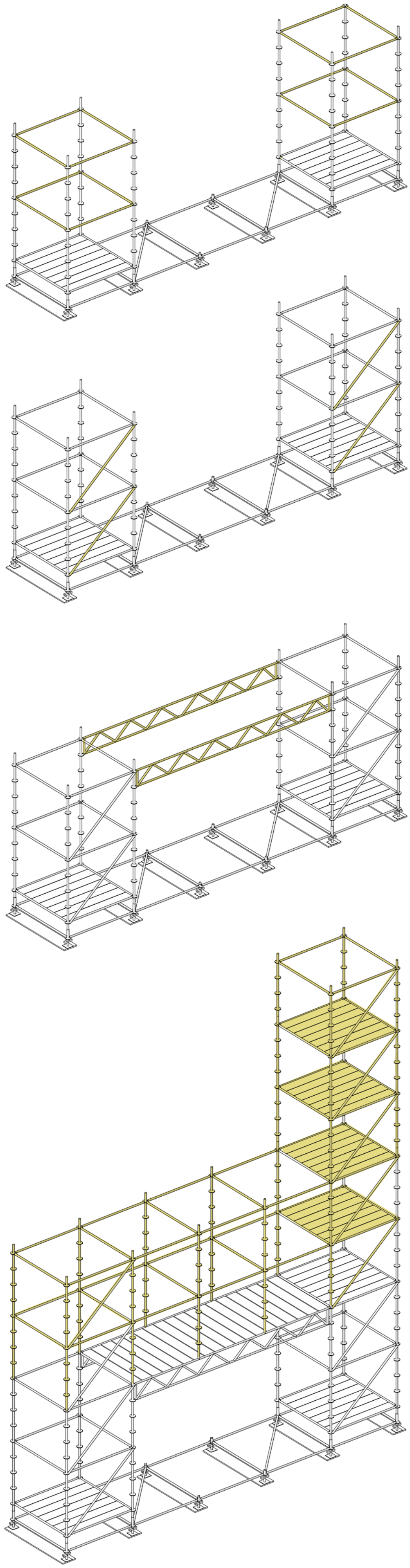
The next step in constructing the scaffolding structure involves inserting the standards into the base jacks. The standards act as vertical supports, providing stability and strength to the scaffold. At regular intervals of 50 centimetres, Rosettes are positioned along the standard elements. These Rosette serve as connection points for the scaffolding components, allowing for a versatile and flexible assembly process.

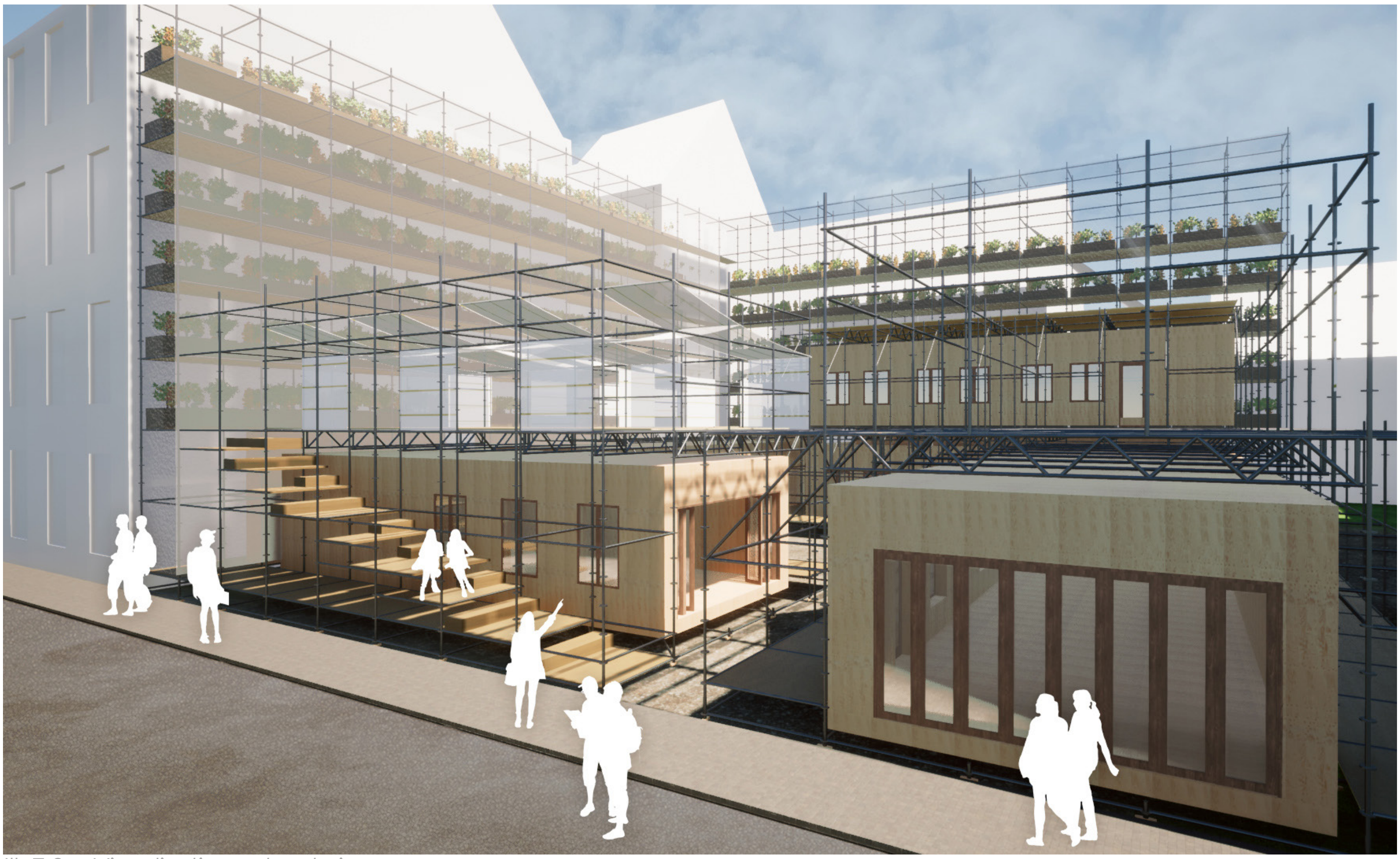
After inserting the standards into the base jacks, the construction process continues by attaching the second layer of ledgers to the rosettes positioned at the top of the standards.

The next step in the scaffolding construction process is to secure the vertical diagonal braces. These elements are connected to the rosettes, providing additional stability and structural support to the scaffold. The diagonal braces are typically positioned at an angle to reinforce the framework and prevent any lateral movement. By connecting them to the rosettes, they effectively distribute the load and forces throughout the scaffold.

The next step is to connect the 6-meter-long lettuce beam, which spans across the bay where the indoor functions will be housed in the lightweight wooden structure. This lattice beam serves as a crucial structural element, providing support and stability to the overall scaffolding framework.

From this point onwards, the steps are repeated in a similar fashion until the desired structure is achieved. The process involves connecting additional standards, ledgers, diagonal braces, and lattice beams as needed to build the scaffolding framework. Each repetition adds strength, stability, and height to the structure,




Ill. 7.2 - Visualisation - street view

Ill. 7.3 - Visualisation - Garden view


Ill. 7.4 - interior view

Ill. 7.5 - Interior view

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Illustrations - All illustrations not mentioned can be regarded as our own.

Ill. 3.1: Capsule Tower, viewed 16 March 2023 from https://worldarchitecture.org/architecture-news/cgegv/nakagin-capsule-tower-living-in-a-long-forgotten-future.html

Ill. 3.5: brickbox by Antxon Salvado and Roger Zanni viewed 16 March 2023 from https://www.designboom.com/design/salvador-zanni-brickbox/

Ill. 3.6: Substrate Factory Ayase, designed by Aki Hamada viewed 23 March 2023 from https://www.archdaily.com/872046/substrate-factory-ayase-aki-hamada-architects

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Ill.4.21-4.23 Budapest 2030 - long term urban development concept. viewed April 01 *from https://knowledge-hub.circle-lab.com/circularnorway/article/4572?n=Budapest-2030-Long-Term-Urban-Development-Concept*

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Ill. 4.31: Vacant Lots In Budapest Google street view

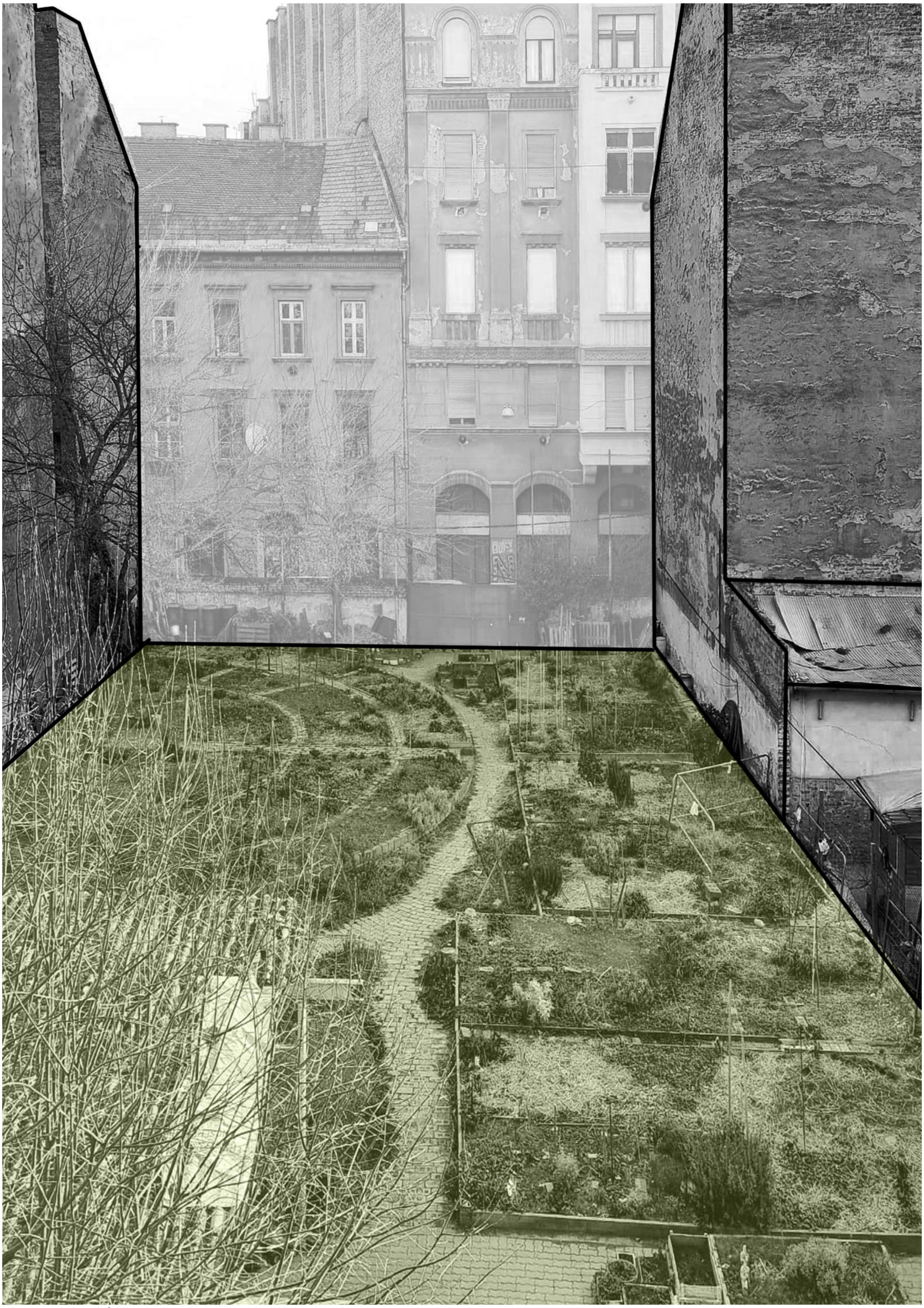
Ill. 5.1 and 5.4: Mood Picture created by Midjourney

01 APPENDIX - RESEARCH ON COMMUNITY GARDENS

kertr	NAME	YEAR	AREA	CULT. AREA	PLOT m2	PLOT qty	LOCATION	LAND OWNER
1	Rózsa	2021	850	144	4	36	downtown vacant lot	Municipality
2	Kisdiófa	2016	700	450	7	48	downtown vacant lot	Municipality
3	Tolnai	2014	400	40	3	11	downtown vacant lot	Municipality
4	Auróra	2019	480	300	200	1	downtown vacant lot	magán
5	Grundkert4	2021	760	216	6	36	downtown vacant lot	Municipality
6	Padlizsán	2019	500	175	5	35	between blocks	Municipality
7	Zugkert	2014	1000	800	10	64	between blocks	Municipality
8	Apollón	2014	500	100	24	3	between blocks	Municipality
9	Újpalota 6.	2019	-	-	-	-	between blocks	Municipality
10	Kőrakás park 35	2014	-	-	-	-	between blocks	Municipality
11	Nyírpalotai	2014	1000	150	6	20	between blocks	Municipality
12	Zöldpalota	2015	-	-	7	24	between blocks	Municipality
13	Újpalota 5.	2016	-	-	-	-	between blocks	Municipality
14	reGARDEN	2013	400	300	5-12	22	schoolyard	School / Municipality
15	Békási	2013	1005	258	7	27	between blocks	Municipality
16	Ófalu	2014	750	210	11	19	suburban plot	church property
17	Zápor	2016	953	184	11	26	parish church	Municipality
18	mechwart	2021	-	-	2	20	inner city park	Municipality
19	Sas	2014	1200	800	10-20	30	suburban environment	Municipality
20	Csárdás kert	2014	590	320	7	27	suburban plot	private property
21	Őrmezei	2013	955	250	3	27	between blocks	Municipality
22	Fraknó	2014	450	260	3	43	between blocks	Municipality
23	Hengermalom	2017	407	250	3	34	between blocks	Municipality
24	Kelenkert	2013	850	400	5	43	between blocks	Municipality
25	Albertfalvai	2015	742	250	5	31	between blocks	Municipality
26	Isten kertje	2014	900	75	5	15	churchyard garden	church property
27	Parti	2013	500	184	6	34	between blocks	Municipality
28	Lázár-kert	2014	-	-	-	-	schoolyard	School / Municipality
29	Dorottya	2017	4000	2000	7	50	suburb	Municipality
30	Zengő	2014	1015	160	6	25	between blocks	Municipality
31	Lőrinci Kertelő	2014	1412	400	10	35	between blocks	Municipality
32	Első kispesti	2012	926	640	5	26	between blocks	Municipality
33	Árnyas Ke	2015	1213	286	7	39	next to panel buildings	Municipality
34	Aranykatica	2013	1024	228	6	40	between blocks	Municipality
35	IBIS	2016	800	260	6	40	hotel garden	IBIS hotel
36	Kalot	2016	1666	1400	18	50	suburb	Municipality
37	Ibolyáskert	2013	700	300	10	16	suburb schoolyard	School / Municipality

OPERATOR	ACCESSIBILITY	ACTIVITY LEVEL	FUNCTIONS
Municipality / KÉK	during opening hours	3	
KÉK	during opening hours	3	
Municipality	Open to public	2	
NGO	during opening hours	3	
civilek	during opening hours	2	
NGO zug	during opening hours	3	
NGO zug	during opening hours	3	
Municipality	when members are present	1	
Municipality	when members are present	1	
Municipality	when members are present	1	
Municipality	when members are present	1	
Municipality	when members are present	1	
Municipality	when members are present	1	
primary school / KÉK	during school hours	3	
Municipality / VKE NGO	when members are present	2	
NGO	when members are present	2	
VKE NGO	open during the day	2	
Municipality	open	1	
civilek	when members are present	3	
KÉK NGO	open during the day	3	
Municipality	open during the day	3	
ÖUB NGO	open by appointment	2	
ÖUB NGO	when members are present	2	
ÖUB NGO	when members are present	2	
ÖUB NGO	when members are present	2	
church community	when members are present	2	
Municipality	when members are present	1	
primary school / KÉK	during school hours	1	
helyi közösségi összefogás	open by appointment	3	
VKE NGO	open by appointment	2	
NGO	open by appointment	3	
civil organization	open by appointment	3	
civil	when members are present	3	
VKE NGO	from sunrise to sunset	2	
KÉK	8-20	3	
NGO	open by appointment	2	
NGO és KÉK partner	during school hours	2	

KISDIÓFA COMMUNITY GARDEN - No. 2



Ill. 7 - Kisdiófa Community Garden

About the Garden

Owner: Erzsébetváros Municipality
Partner: Center of Contemporary Architecture KÉK
Year of Foundation: 2016
Operator: Center of Contemporary Architecture KÉK
Address: 1077 Budapest, Kisdiófa street 4.
Total Floor Area: 700 m²
Cultivated Area: 450 m²
Number of Plots: 48
Size of Plots: 6-7

The Kisdiófa community garden is a green oasis in the middle of Budapest's bustling 7th district, on a plot surrounded by firewalls. Since its establishment, 44 individual/family plots have been developed, where gardeners cultivate a variety of plants, including spices, edible flowers, herbs, and ornamental plants.There are also four study plots in the garden, where students from the Kertész Street Eco-School and foreign trainees take care of their plants and can apply for a thematic competition every year. From a sustainability perspective, the gardeners do not use chemicals and tend to use compost and weeds to replenish, improve and protect the soil. In addition to the residential compost, the garden hosts insects' habitat, some bird feeders and drinkers, and the natural habitat of pollinators such as beehives and flower beds. A small garden pond is designed to create more biodiversity. Water-saving cultivation is essential in the garden, given that people can collect rainwater from the adjacent building used for watering.

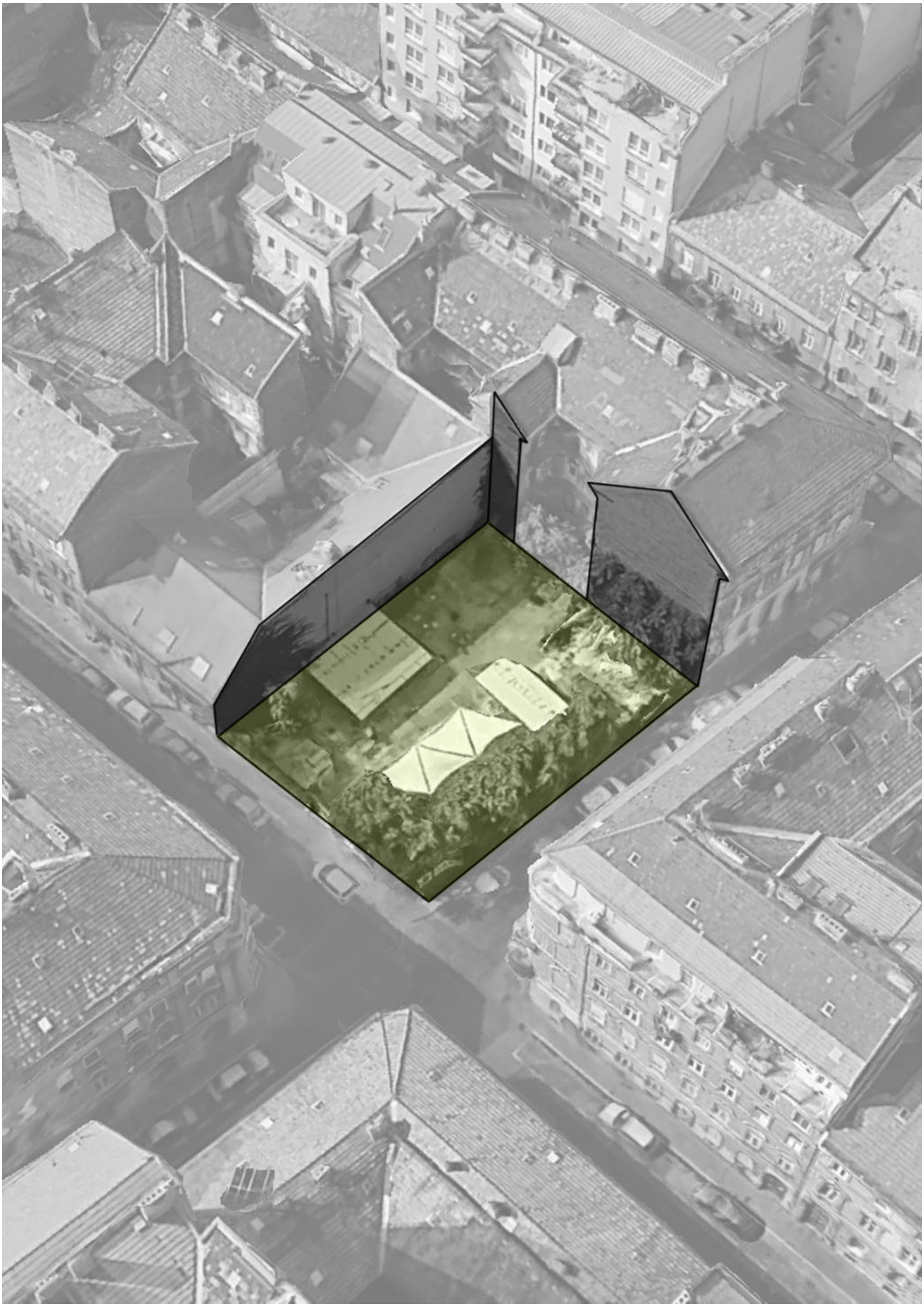
Built environment

The Kisdiófa Garden recently underwent a renovation financed by the local government, which included the construction of a storage space and a covered communal area. The previous solid fence enclosing the garden from the street was replaced with a more delicate and permeable wooden fence, contributing to the improvement of the urban landscape. Additionally, a green wall was built on the adjacent fire wall with the support of the district. Like other community gardens, the constructed elements in the garden are primarily made of recycled materials gathered from clearance, such as the brick pavement made from recycled bricks from neighboring demolitions. It should be noted that the Kisdiófa Garden does not have a closed community space, and events are only held in the garden and the covered communal area.

Community

The Kisdiófa community garden is operated by the Center of Contemporary Architecture (Kortárs Építészeti Központ, KÉK), a nonprofit organization that works to promote sustainable urban development in Budapest. The garden is managed by a group of local residents who are passionate about gardening and community building. The KÉK's activities have contributed greatly to the creation of an active, engaged community around the garden.
One of the ways in which the KÉK activates the community is through weekly compost receptions, which serve as a continuous connection point between the garden and the local community. This allows residents to visit the garden, learn about its operations, and become more involved in its activities.
Unlike many other Budapest community gardens, the Kisdiófa garden is not completely enclosed by a solid fence. Instead, a delicate wooden fence separates the garden from the sidewalk. This contributes to the creation of a more human-friendly environment and allows passersby to peek into the garden and see what activities are taking place.
The garden also hosts open days several times a year during the spring and summer months, which are open to everyone interested. These open days provide an opportunity not only to learn about the community garden but also to showcase the activities of local civil society organizations active in the district. Thus, the community garden provides a platform for local civil organizations to promote their work.
Some garden members also run a producer pickup point, where they collectively order products from small-scale producers that can be picked up in the garden.
This initiative supports small-scale agriculture and helps residents access fresh, locally produced food. Finally, some of the more active garden members have formed eco-circles. The Eco-Circle is a small group that learns, through personal experiences, how to eat healthier and more sustainably, shop smarter, and avoid wasting money and food in an urban lifestyle.

AURÓRA CLIMATE GARDEN - No 4.



Ill. 8 - Aurora Climate Garden

About the Garden

Owner: Józsefváros Municipality
Professional Partner: Auróra Civil Center
Year of Foundation: 2019
Operator: Auróra Climate Garden
Address: 1084 Budapest, Auróra street 9-11.
Total Floor Area: 480 m²
Cultivated Area: 200 m²
Number of Plots: 1

The Auróra Climate Garden in Budapest is located in one of the city's most segregated areas, in the 8th district. Unlike other community gardens in Budapest, it is not divided into plots but rather consists of one large collectively cultivated area. The garden is managed according to the principles of permaculture, with the goal of creating a small climate oasis in the middle of the concrete jungle. The purpose of the garden is not to create a profit or recreational garden but to restore nature in the heart of the city.
What sets this tiny garden apart from other community gardens in Budapest is the civil organization that operates it, the Auróra Civil Center which is located next to the garden.

The Auróra was established as a social enterprise with the goal of connecting cultural programs, the work of civil and activist organizations, community building, and entertainment in an open community. Their aim is to establish a stable base where people, groups, and non-profit organizations working in social or cultural fields can meet, share their ideas, and implement new collaborations together. The Auróra's long-term goal is to develop an innovative and self-sustaining practice that increases the number of socially active citizens, thereby promoting the expansion of democratic practices in Hungary. (Auróra, 2023)

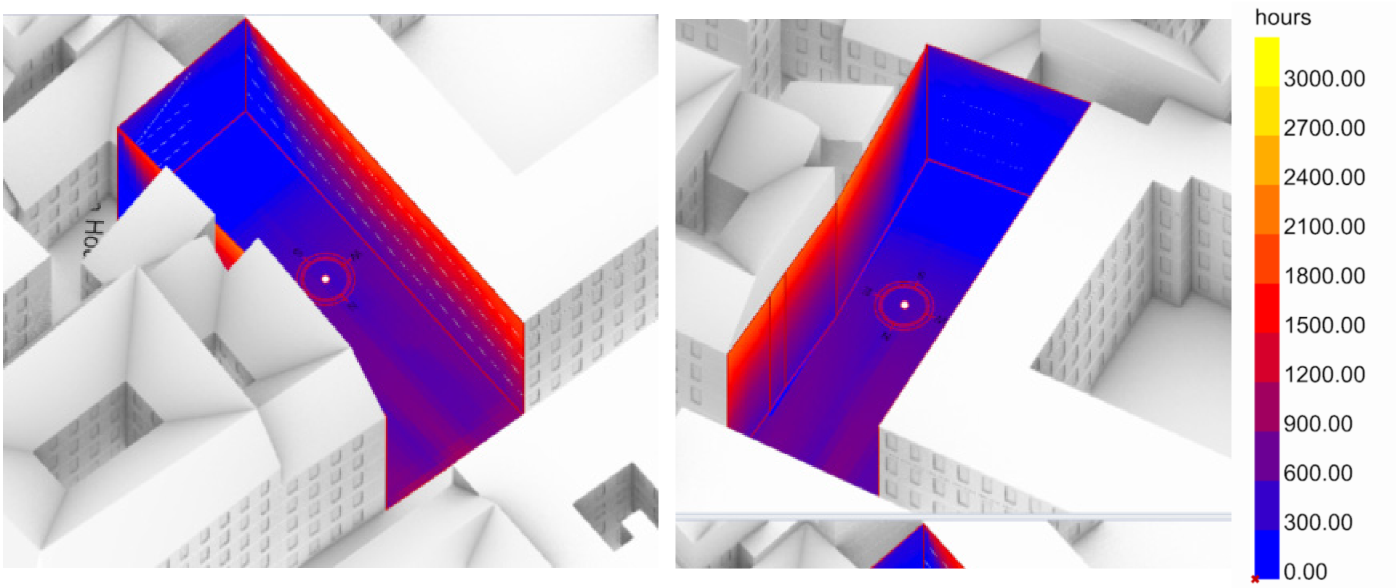
The built environment

The physical infrastructure of the Klíma Garden is relatively simple and minimally constructed, consisting of a closed storage and a covered communal area. Many of the materials used in the construction of the structures were gathered from clearance and donations, in keeping with the sustainable philosophy of the garden. In addition to the structures, the garden also employs a water collection system to collect rainwater for irrigation purposes. This not only conserves water but also reduces the garden's reliance on municipal water sources, further contributing to its sustainability. The location of the Auróra next to the community garden serves as a valuable resource for events and activities that cannot be accommodated in the garden itself. The lot is enclosed by a solid fence for added security and privacy.

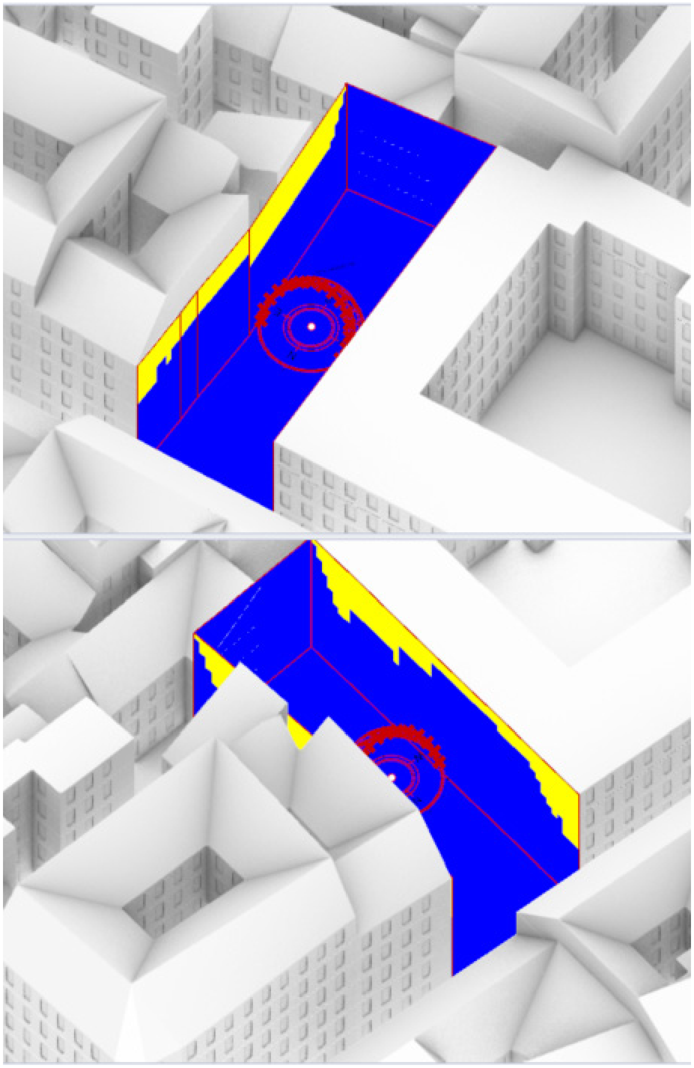
Community

Despite being isolated from the street by solid fence, the garden welcomes visitors every week through open days and compost drop-offs, providing a chance for interested individuals to get to know the space. Moreover, anyone is welcome to garden and start their own project as long as it aligns with the principles of permaculture. In addition to gardening, the Klíma Garden hosts various programs and events organized by different communities and civil organizations. These include craft events, roundtable discussions, educational sessions, and other events. The garden is undeniably active in the local civil scene, contributing to the vibrancy of the community. Klíma Garden has become more than just a place for urban agriculture. Through its open days and diverse community programs, the garden has become a platform for individuals and groups to come together, share their knowledge and ideas, and build new collaborations. However, it cannot be said that a distinct community has formed solely around the garden. Instead, existing local communities use the garden as a venue for events and gatherings.

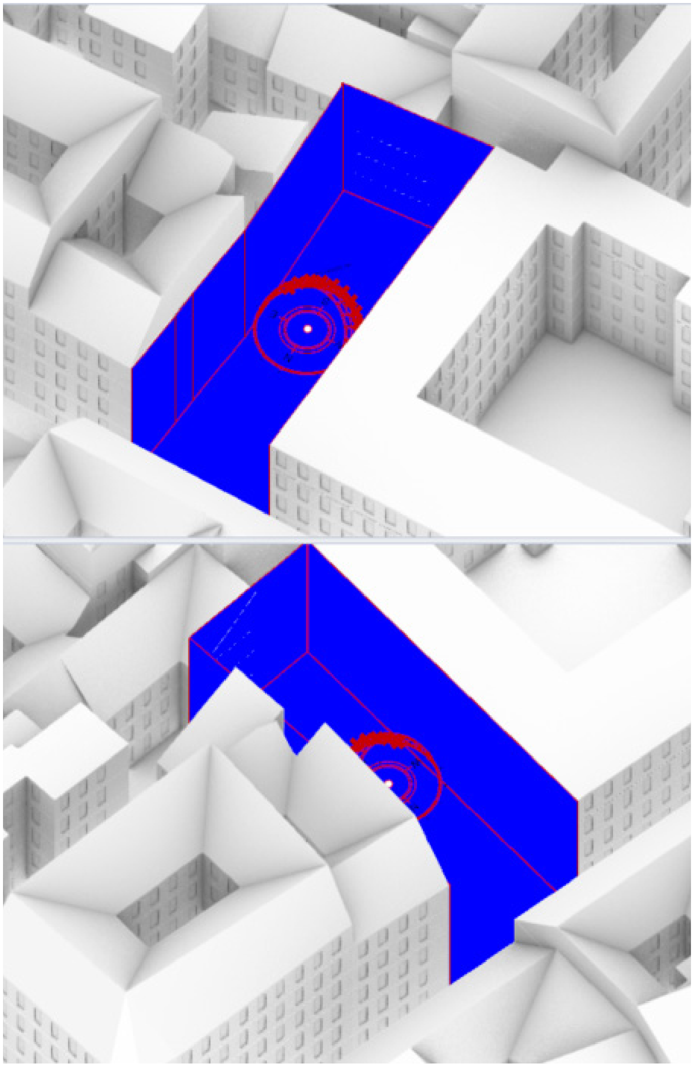
North orientation - Sunhours



North orientation - minimum 6 hours of sunshine on June 26

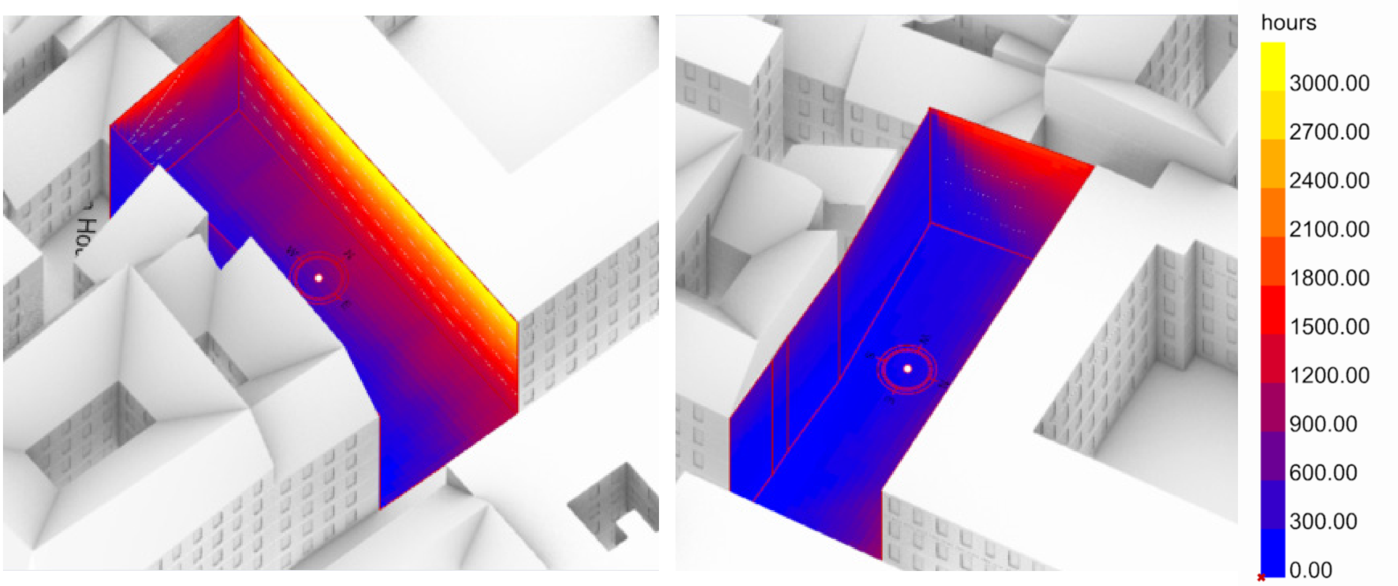


North orientation - minimum 6 hours of sunshine on December 21

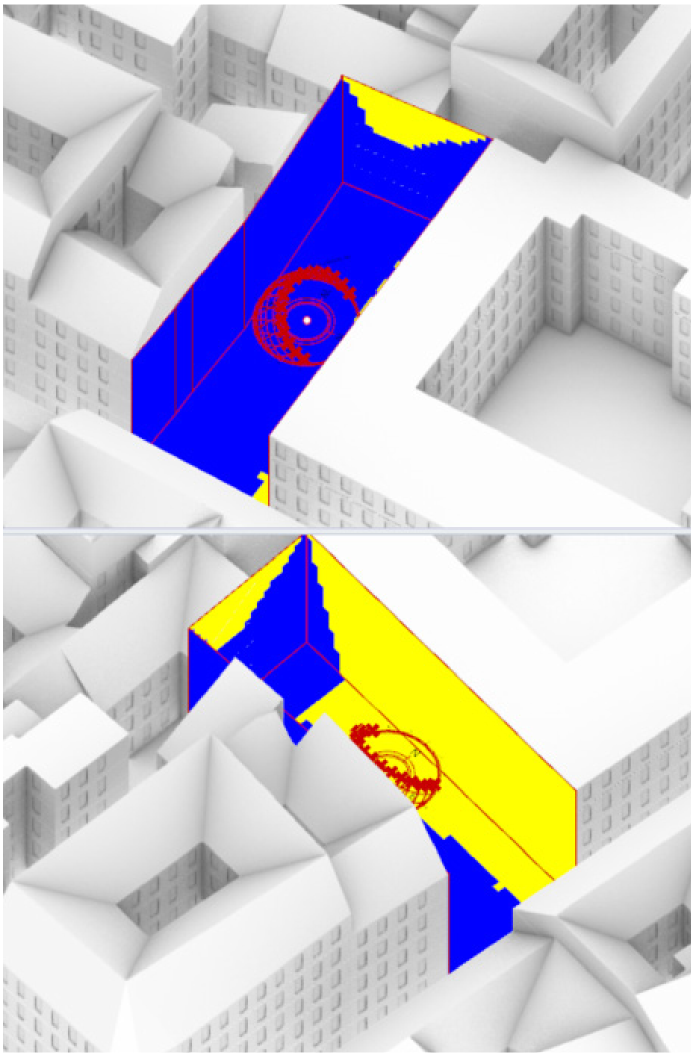


The yellow areas indicate that the area receives at least 6 hours of direct sunlight on a given day, which means that plants can be grown on the area without artificial lighting. The blue areas, on the other hand, receive less than 6 hours of sunlight.

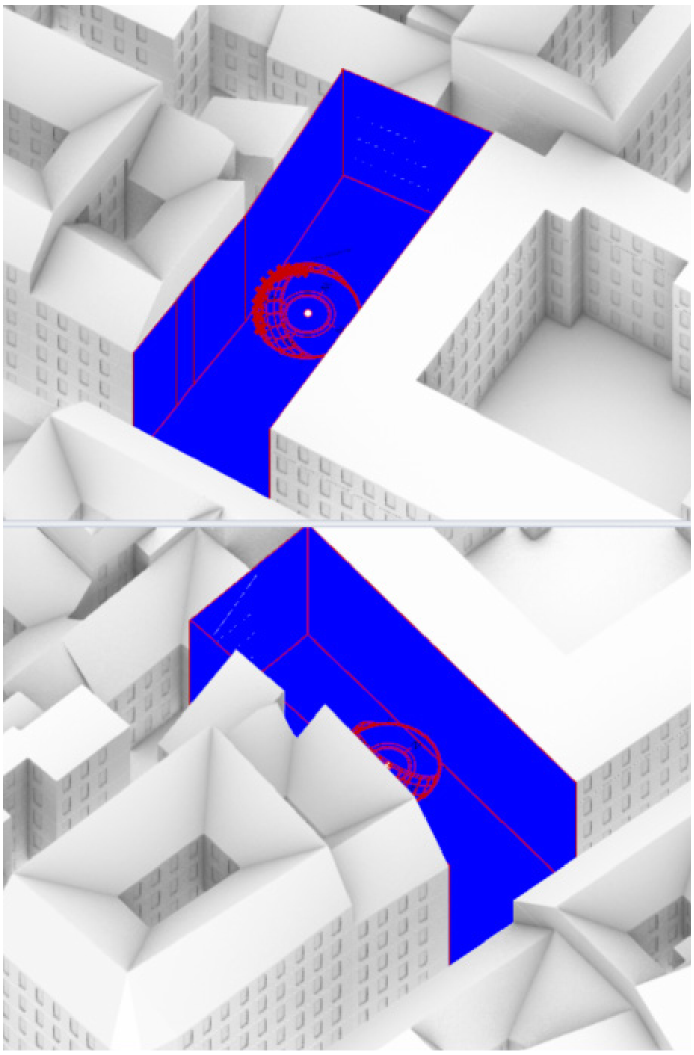
East orientation - Sunhours



East orientation - minimum 6 hours of sunshine on June 26

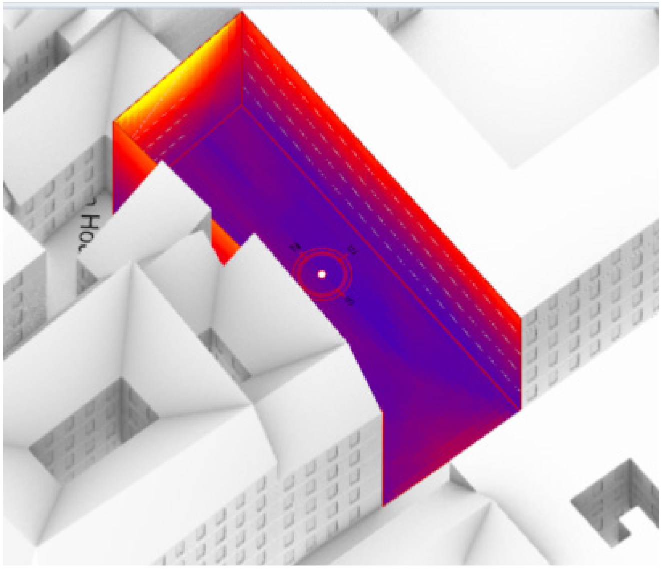


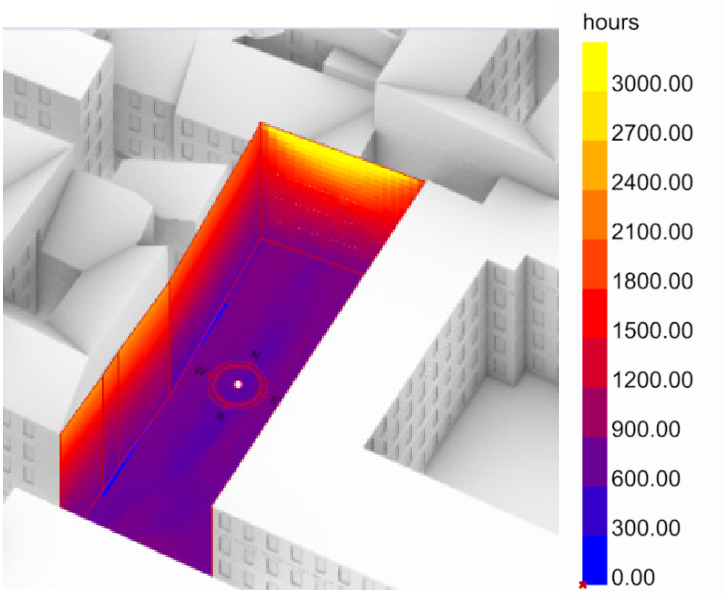
East orientation - minimum 6 hours of sunshine on December 21



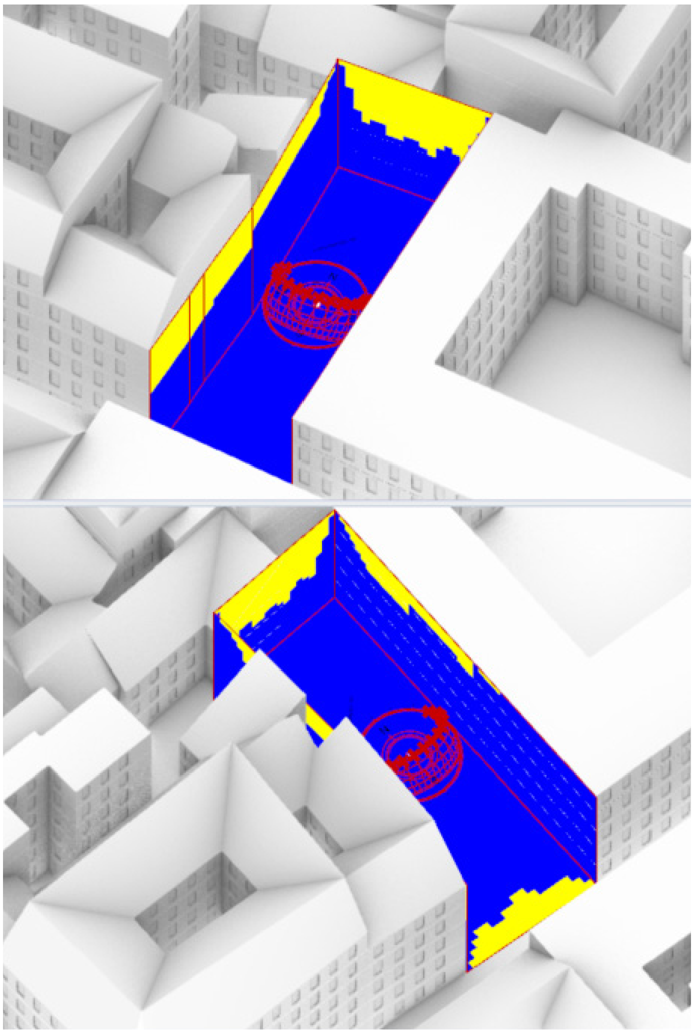
The yellow areas indicate that the area receives at least 6 hours of direct sunlight on a given day, which means that plants can be grown on the area without artificial lighting. The blue areas, on the other hand, receive less than 6 hours of sunlight.

South orientation - Sunhours

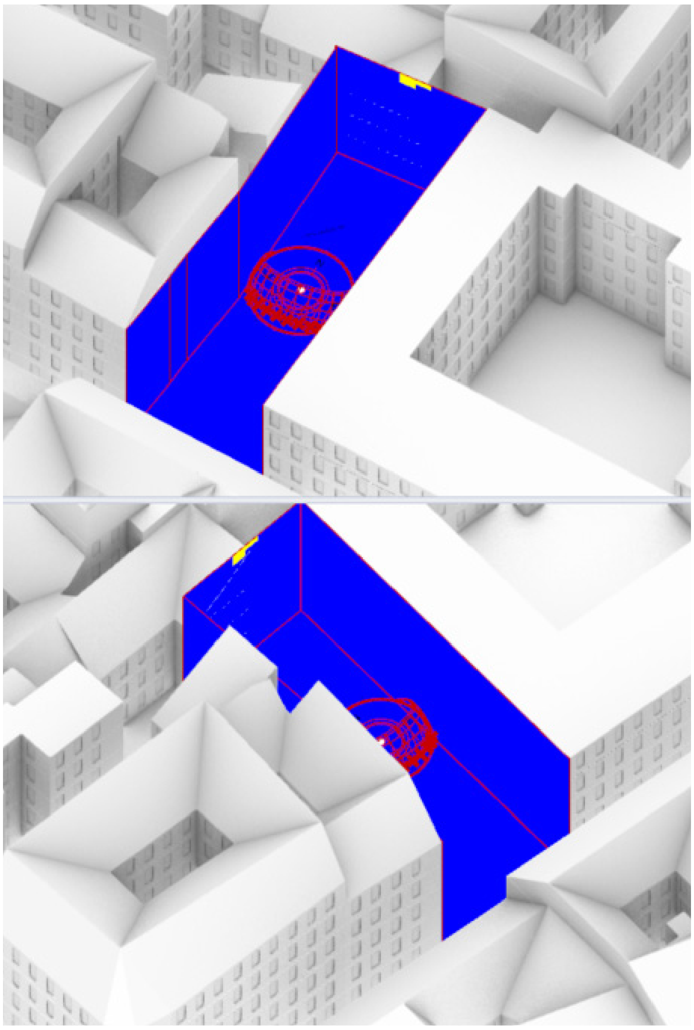




South orientation - minimum 6 hours of sunshine on June 26

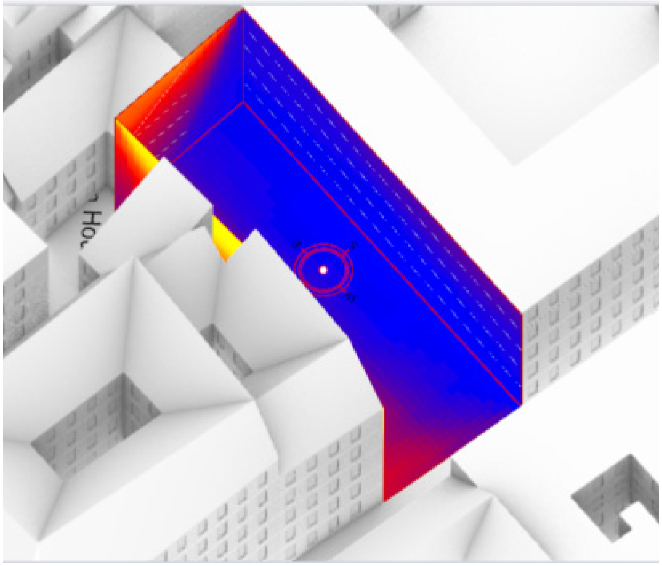


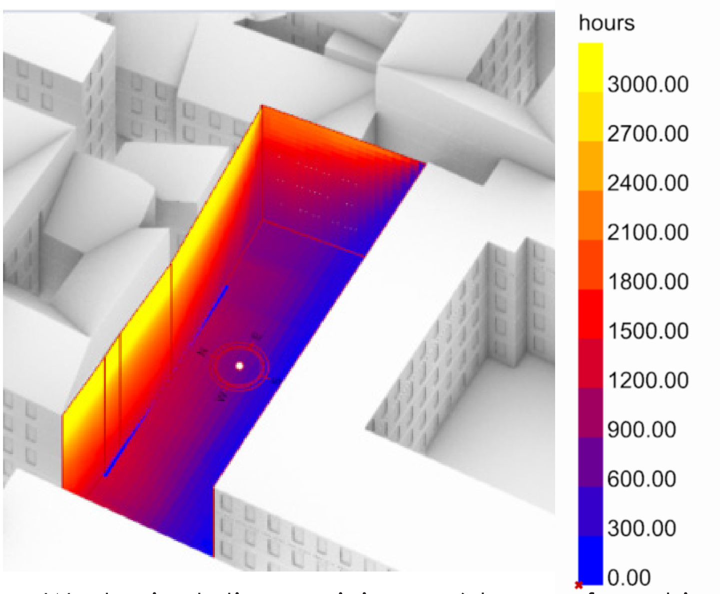
South orientation - minimum 6 hours of sunshine on December 21



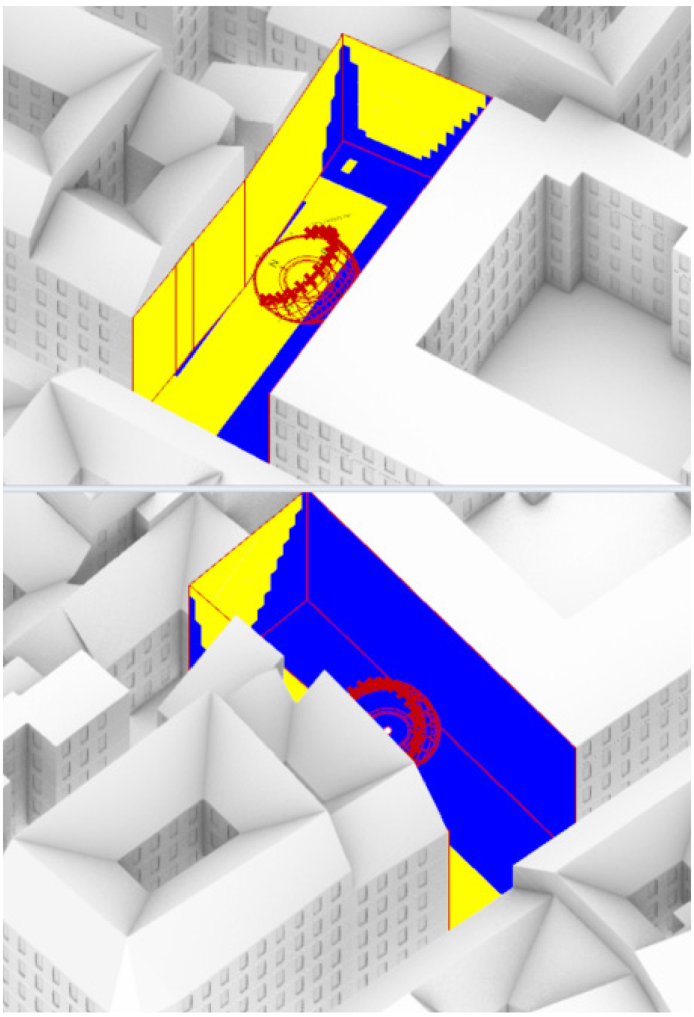
The yellow areas indicate that the area receives at least 6 hours of direct sunlight on a given day, which means that plants can be grown on the area without artificial lighting. The blue areas, on the other hand, receive less than 6 hours of sunlight.

West orientation - Sunhours

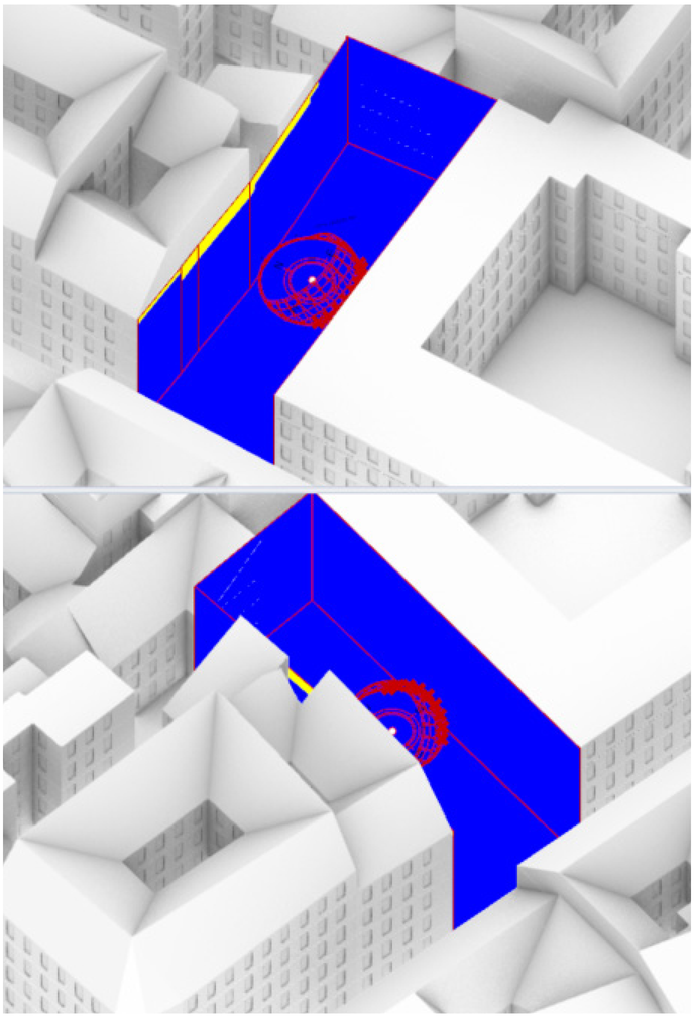




West orientation - minimum 6 hours of sunshine on June 26



West orientation - minimum 6 hours of sunshine on December 21



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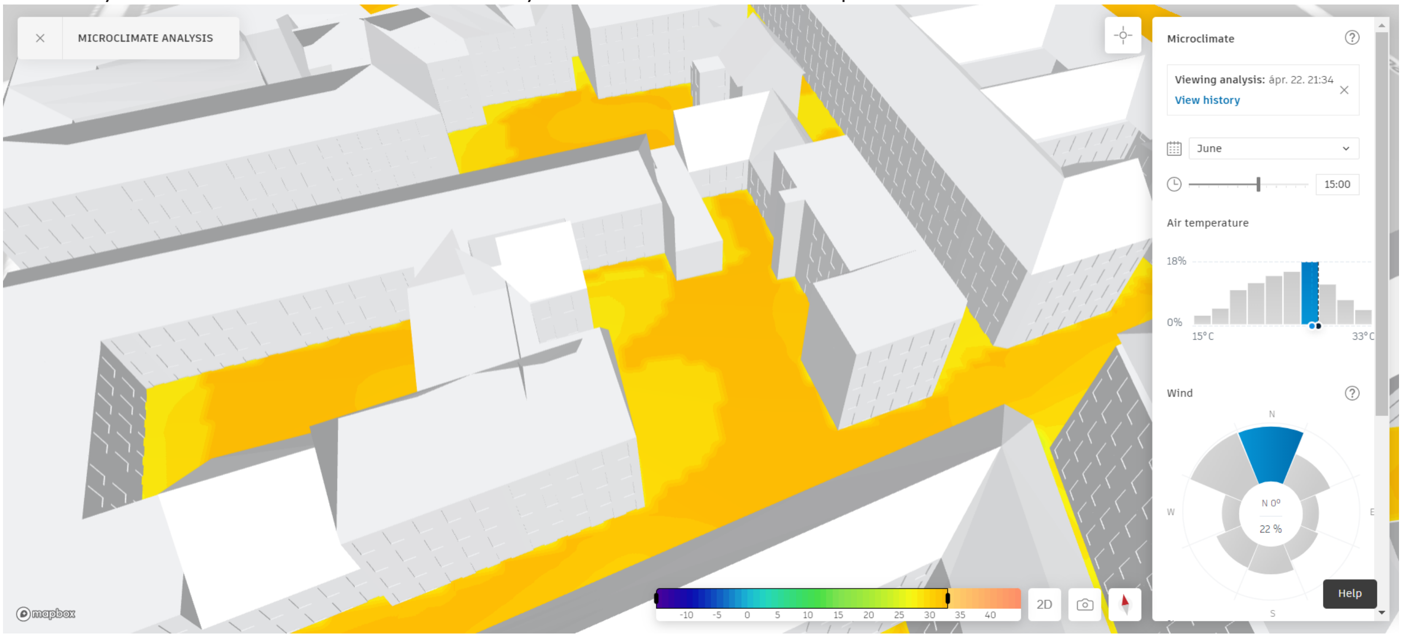
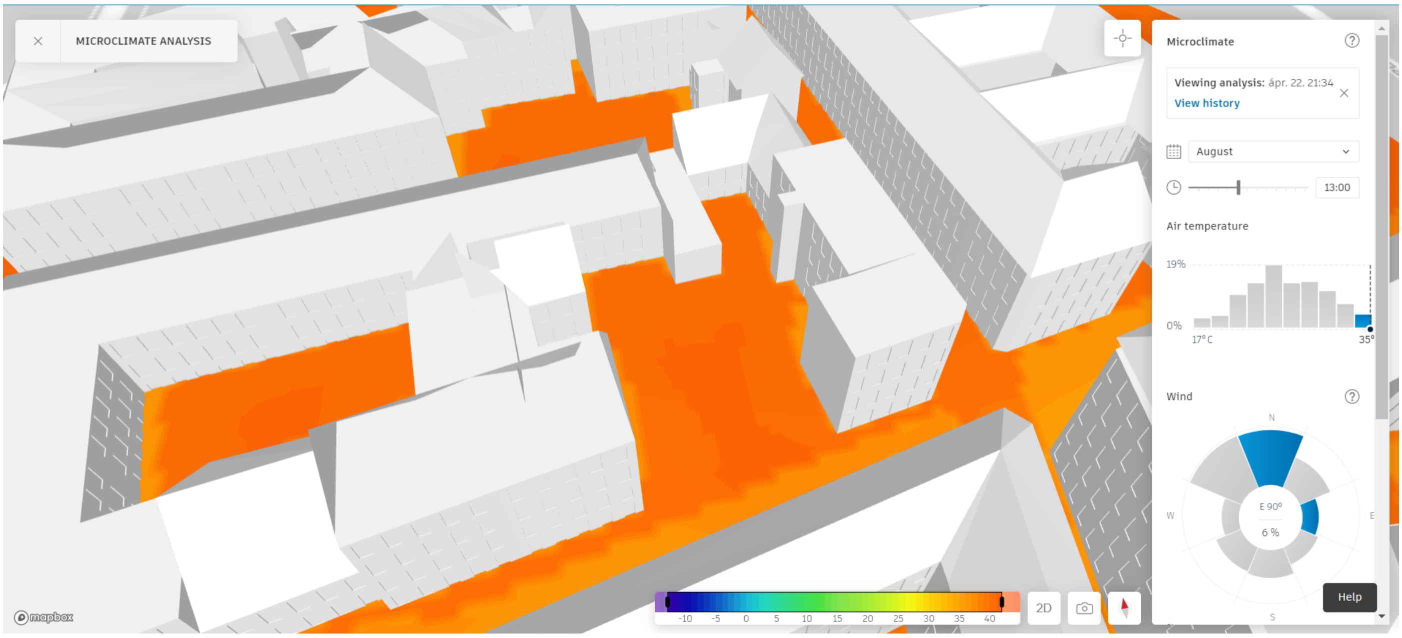
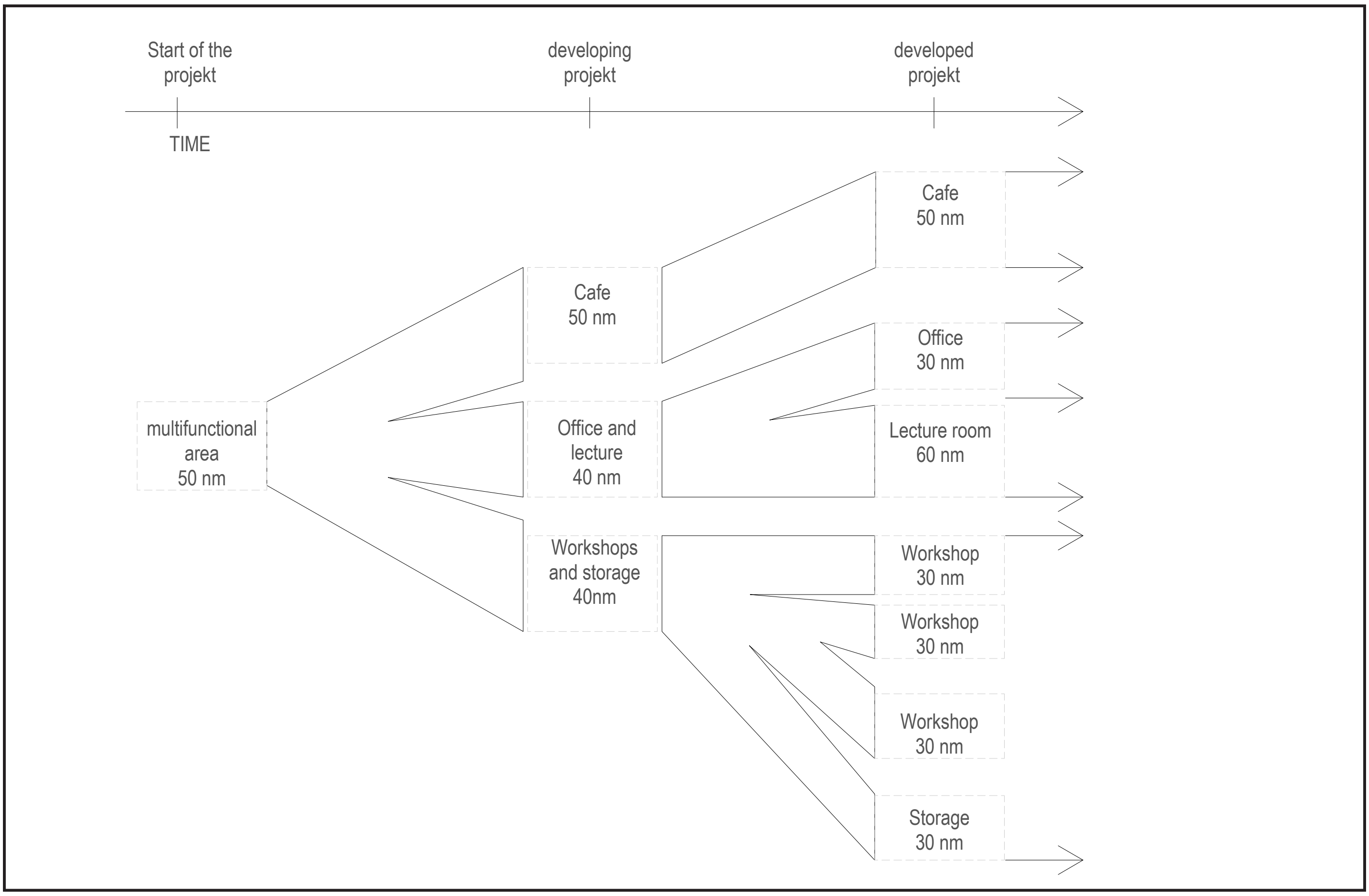
Varsányi Irén Street Microclimate - dry bulb 27°C -> felt temperature 33°C



Varsányi Irén Street Microclimate - dry bulb 33°C -> felt temperature 42°C



04 APPENDIX - DYNAMIC ROOM PROGRAM



05 APPENDIX - VACANT LOTS