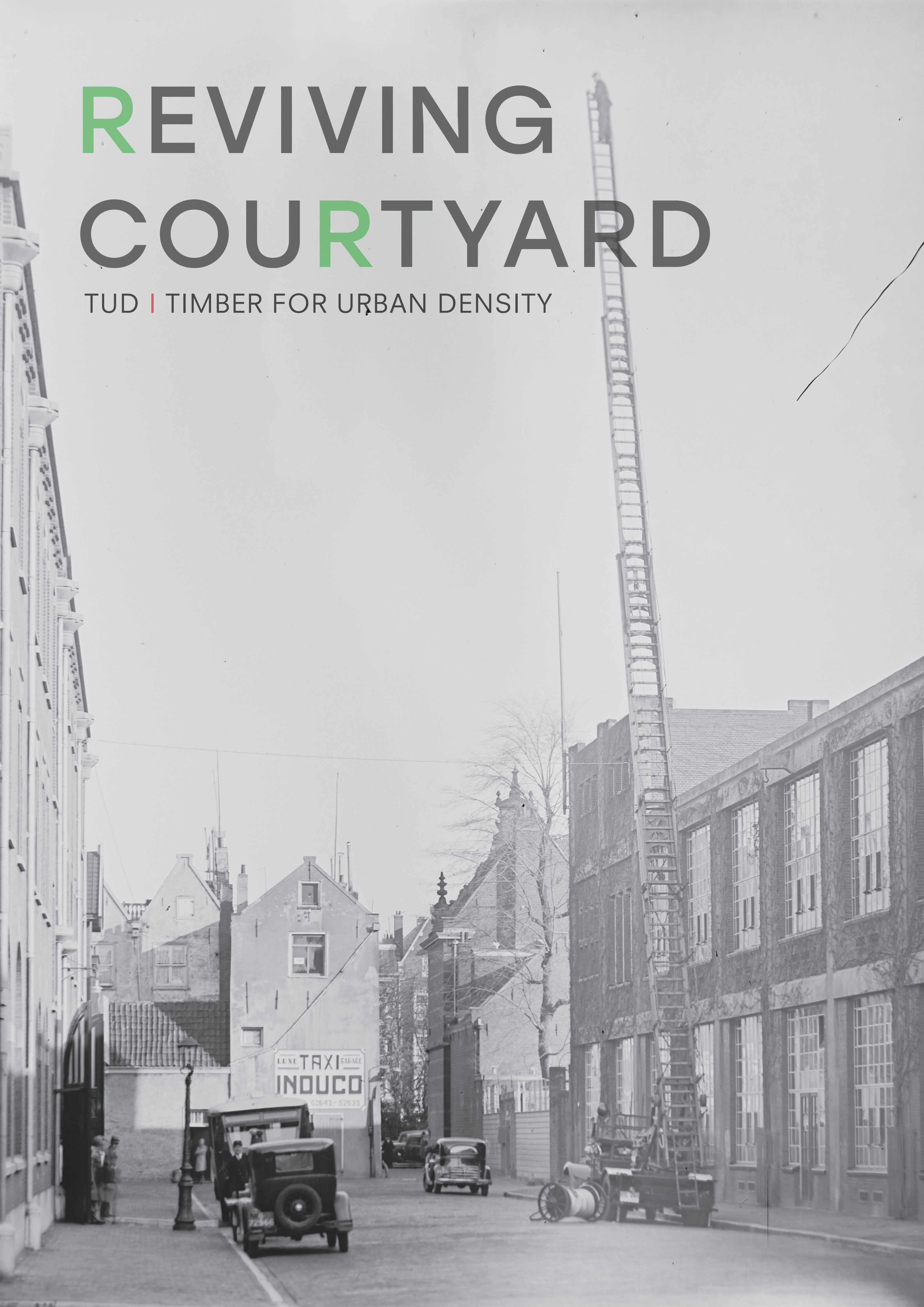
REVIVING COURTYARD

TUD | TIMBER FOR URBAN DENSITY



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TUD I Timber for Urban Density

Author
Roelof Jan Kooistra
5076773

1st Mentor
Loes Thijssen
Architectural Engineering and Technology, Structures & Materials

2nd Mentor
Max Salzberger
Architectural Engineering and Technology, Structures & Materials

TUDelft

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A special word of thanks goes to my good friend Raymen, who joined me on several occasions to think through the design of the bridge. His input was invaluable.

Finally, I would like to reflect on the fact that this is my second graduation. It is a meaningful and somewhat extraordinary experience to complete a master's degree for the second time. My previous Master's in Building Technology was a very different journey, and I came to the Architecture programme with a clear purpose: to focus purely on design. I am proud of what I have achieved here, and glad I made that choice.

Abstract

This graduation project investigates how timber topping-up and bridge interventions can revitalise the Stadstimmertuin in Amsterdam, using the city's historical timber construction tradition as an active design driver. From 1662 until 1899, the Stadstimmertuin served as Amsterdam's principal timber storage and processing yard. Over time, the open courtyard was gradually filled with buildings of varied origin, leaving the site fragmented, largely inactive outside office hours, and disconnected from the public realm. Despite this condition, the block retains the latent potential of a rare, large-scale enclosed courtyard in Amsterdam's historic inner city.

The research is structured around the Double Diamond framework: Discover, Define, Develop, and Deliver. Through which design and research continuously inform one another. The inquiry addresses five interrelated sub-questions spanning site analysis, the structural and spatial logic of Amsterdam's historical timber building tradition, the typology of historical Dutch timber bridges, a revitalisation strategy for the courtyard block and the translation of historical precedent into a contemporary timber building.

Site analysis reveals the Stadstimmertuin as a palimpsest: a layered urban condition in which different periods of transformation coexist without forming a resolved whole. Rather than treating this fragmentation as a deficit, the research proposes it as a generative starting point. The analysis of Amsterdam's timber tradition reveals it as a deeply integrated system in which corbels, bracing elements, and portal frames are not merely structural components, but part of a combined structural and architectural logic, where elements may appear ornamental while simultaneously performing a structural role. This systems-based reading extends into historical Dutch timber bridge typologies, where structural necessity and spatial richness are consistently intertwined. A relationship directly applicable to elevated connections within a dense urban courtyard.

The architectural proposal operates at three levels. Programmatically, the Timber Institute of Amsterdam is introduced as the central anchor: an institution dedicated to timber knowledge and craftsmanship that re-establishes the site's historical identity and sustains activity across the day. Spatially, the topping-up of existing buildings and the introduction of elevated timber bridge connections transform the courtyard from a two-dimensional enclosure into a three-dimensional network of spaces, creating new circulation routes and spatial relationships between previously disconnected buildings. Tectonically, the design reinterprets the historical tradition through glulam structural systems, hardwood connection details derived from Dutch joinery\ and selective steel reinforcement at high-stress nodes maintaining structural clarity and material honesty without formal reproduction.

The enclosed site presents several constraints, including limited crane access, restricted vehicular entry, and close proximity to Amsterdam's waterways. These conditions can be understood as continuities of the historical circumstances that originally shaped the timber-building tradition itself. Water-based transport and prefabricated construction are integrated into the assembly strategy accordingly.

The research concludes that Amsterdam's historical timber tradition gains value when approached as a critical and constructive system rather than as a superficial reference. Providing not only a material and formal vocabulary, but also a disciplined way of thinking about the relationship between structure, space, and place. The result is a hybrid timber architecture that is neither a nostalgic reconstruction nor an abstraction, but a grounded reinterpretation of a specific and locally rooted building culture.

Keywords: timber architecture · urban densification · Amsterdam heritage · topping-up · timber bridge construction · historic timber design · courtyard· adaptive reuse

Summary

The Stadstimmertuin, located in the Weesperbuurt district of Amsterdam, carries a layered urban history extending from 1662, when it functioned as the city's primary site for the storage and processing of structural timber. Despite its historical significance and considerable spatial scale, the site has gradually lost its identity as a coherent public interior. Buildings were incrementally inserted into what was once an open courtyard; the result is an urban block in which multiple autonomous structures coexist without a unifying spatial logic. The area is dominated by municipal office functions, remains largely inactive outside working hours, and is accessible only through two narrow passages, severely limiting its capacity as a collective urban space.

At the same time, Amsterdam's growing imperative for sustainable urban densification combined with the renewed interest in biobased construction materials positions the site as an important test case for contemporary architectural practice. The addition of floors to existing buildings using lightweight engineered timber significantly reduces the structural load on existing foundations and diminishes the environmental impact of urban densification.

The Stadstimmertuin thus presents both a historical and a contemporary argument for timber: a material that is historically embedded in the site's identity and technically suited to the constraints of its urban fabric.

The main research question guiding the project is formulated as follows: How can timber topping-up and bridge interventions revitalise the Stadstimmertuin, using Amsterdam's historical timber construction tradition? Five sub-questions address this central inquiry across the successive phases of the research and design process.

The methodology follows the Double Diamond framework in which research and design are understood as iterative rather than sequential processes. The Discover phase focuses on contextual and historical exploration through site observations, archival research, and photographic documentation. The Define phase synthesises these findings into a conceptual framework governing spatial ambitions and programmatic intentions. The Develop phase translates this framework into architectural proposals through iterative design testing, and the Deliver phase consolidates research conclusions and design outcomes into a final proposal. Throughout, the methodology treats historical analysis not as background context, but as an active instrument from which spatial and structural principles are derived and tested in the design.

A central component of the research is a systematic investigation of Amsterdam's historical timber construction tradition. Encompassing both building structures and bridge typologies. The analysis reveals that the tradition is fundamentally a system of integrated thinking, in which structural principles, connection details, and façade strategies emerge from a common logic of material efficiency, force distribution, and contextual adaptation. Key elements of this tradition include the post-and-beam framework organised through transverse and longitudinal trusses (dwarsgebinten and langsgebinten), the progressive development of floor systems from simple beam layers to complex alternating moerbalken and kinderbalken assemblies, and the evolution of corbel elements (korbelen) from purely functional bracing devices into expressive architectural features.

The analysis of historical Dutch timber bridges further extends this understanding into the domain of urban infrastructure. Portal frames oriented perpendicular to the water flow constitute the dominant structural typology, with intermediate supports characteristically introduced to reduce spans rather than attempting long, unbraced structural solutions. The double drawbridge, exemplified by the Magere Brug, demonstrates a characteristic translation of structural necessity into architectural expression: its curved silhouette is not a formal gesture but the visible result of corbel-based structural logic. This relationship between structure and ornament, consistently present throughout the Amsterdam timber tradition, proves directly applicable to the elevated bridge connections proposed in the design.

The morphological and spatial analysis of the Stadstimmertuin establishes the site as a palimpsest: a condition in which different temporal layers and spatial logics coexist without full integration. The surrounding urban block is characterised by four distinct identities: the high-density infrastructure of Sarphatistraat, the quiet and enclosed Nieuwe Achtergracht, the historically oriented Amstel waterfront and the transitional corridor of Weesperstraat. Each offering different spatial conditions that collectively define the site's urban positioning. Within the block, several spatial anchors are identified: a public courtyard defined by existing trees, private gardens, and individual heritage buildings like the former printing house (Drukkerij) from 1912.

The conceptual strategy is grounded in a targeted reconfiguration of accessibility, programme and vertical connectivity. Selected secondary structures are removed to open a new passage from the Sarphatistraat into the courtyard. Internal plot boundaries are dissolved to reconceive the site as a single, cohesive spatial field. Two elevated bridge connections are introduced between buildings, creating a three-dimensional network of movement and activity. These "anchor points in the air" directly reference the structural and spatial typology of historical Dutch timber bridges, functioning simultaneously as structural elements, circulation nodes, and spatial identifiers.

The design introduces the Timber Institute of Amsterdam as the central programmatic anchor – an institutional framework that re-establishes the site's historical identity as a place of timber knowledge, while primarily functioning as a platform for research, coordination, and governance. It facilitates lectures, public exchange, and strategic work on sustainable forestry, local sourcing, and timber systems, while the architecture reflects these activities without being limited to production or craftsmanship. This institutional programme is complemented by a semi-public plinth with a café and community functions, a residential component extending across the former school and the Nieuwe Achtergracht building, and an auditorium functioning as a connector between the institute and the surrounding urban fabric. The programme is structured to sustain activity across different times of day, ensuring that the courtyard operates as a living urban interior rather than a purely daytime functional space.

The structural system is based on a modular portal frame in glued laminated timber (glulam), positioned to anchor against the existing concrete fabric of the former printing house. The choice of glulam as the primary structural material allows for the continuation of Amsterdam's historical timber logic; modular, repetitive, and force-efficient while accommodating contemporary performance requirements regarding span, prefabrication tolerances, and scalability. Hardwood elements are applied selectively in high-stress connection zones, continuing the historical material logic in which timber species are chosen according to the demands of specific structural positions. Steel connectors are introduced only where timber alone cannot satisfy tensile requirements at column-to-beam interfaces, maintaining the visual and material coherence of the timber language.

The design proposes two typologically distinct bridges. The Arch Bridge, conceived as a reinterpretation of the Dutch drawbridge typology, spans the main passage between Weesperstraete and the former printing house. Its exposed glulam portal frames, recessed from the façade plane for protection against weathering, render the structural logic directly legible. The Tree Bridge spans the broader courtyard between the printing house and the Nieuwe Achtergracht, introducing branching columns as structural supports. A device derived from historical Dutch practice of introducing intermediate supports to reduce spans. The entire construction strategy is informed by the logistical constraints of the enclosed site: prefabricated elements are dimensioned for transport through a 3.7-metre passage and lifted into position by tower crane with water-based delivery via the Amstel serving as a supplementary logistics route. These constraints mirror the historical conditions under which Amsterdam's timber tradition was formed, reinforcing the continuity between site context and construction method.

This project demonstrates that Amsterdam's historical timber tradition, when understood through its structural and spatial principles rather than formal replication, offers a productive framework for contemporary architectural design. The revitalisation of the Stadstimmertuin is achieved simultaneously at three levels: programmatically, through the introduction of the Timber Institute as an institutional anchor that restores the site's identity as a centre of timber knowledge; spatially, through the introduction of elevated timber bridge connections that transform the courtyard from a horizontal enclosure into a three-dimensional network of movement and experience; and tectonically, through a hybrid glulam structural system that translates the core principles of Amsterdam's timber tradition into a contemporary building system suited to the demands of sustainable urban densification. The historical timber tradition of Amsterdam thus functions not as a stylistic reference but as a conceptual framework: one that is capable of generating architecturally coherent, spatially rich, and structurally disciplined responses to the specific conditions of the contemporary city.

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1. Introduction

1.1 Background

Adding floors on top of a building using biobased materials is significantly lighter than building with traditional materials such as concrete and steel, and has a much smaller impact on our carbon footprint (Harte, 2017). Although timber construction and the use of biobased materials have been developing quietly for several decades, this “under-the-radar” revolution is now receiving serious and mature attention. This moment asks architects not only to adopt these materials but also to reflect critically on how they should be used, where their limits lie, and what kind of architecture they can produce.

The historic centre of Amsterdam has a long tradition of building upwards. Adding extra layers to existing buildings is not a new phenomenon here even where it is no longer visible, there is a good chance that buildings were topped up in the past (Gemeente Amsterdam & MUST, 2026). Bringing a city into the next century inevitably means that it must change, and the historic centre is no exception. Heritage should not be seen as something static that we only observe from a distance, but as something we actively participate in and continue to shape (ICOMOS, 1964).

The site of this project is the former Stadstimmertuin. From 1662 until 1899, this was the place where timber for the city of Amsterdam was stored and processed. It is therefore a location with a strong historical connection to wood, craftsmanship, and Dutch timber culture. Over time, the site has continuously transformed. Buildings were placed inside what was once an open courtyard, and as a result, the space no longer functions as a true collective space. Instead, it has gradually become mainly a passage and a place to park.

Within the current situation, two green structures can be identified as spatial anchors. One is a publicly accessible green area; the other is divided into private gardens. These two zones represent the current anchors within the courtyard. Their presence suggests a latent potential: that the site could support a richer network of such moments. By adding new spatial anchor, both at ground level and through vertical connections between buildings , the courtyard could be transformed from a fragmented interior into a coherent whole. Such a network would not only reconnect the site horizontally, but also bridge across buildings vertically, creating a spatial experience that moves through the block in multiple directions.

The ambition is that the Stadstimmertuin can once again become what a courtyard is at its best: a place of calm and withdrawal, a counterpoint to the constant activity of the city outside (Kahn, 1969). Timber as a light, biobased material with deep roots in the history of this specific site is the means through which this transformation is made. The choice of material is therefore not neutral. It connects the intervention directly to the place’s own past, and positions topping-up and bridging not as additions imposed from outside, but as a continuation of a tradition that was always already present here.

1.2 Problem Statement

The inner city of Amsterdam has relatively few public courtyards (Gemeente Amsterdam, Klaas-Bindert de Haan, n.d.). The site of the former Stadstimmertuin was also not a public courtyard but a courtyard of considerable size. After it lost its function, several buildings were placed inside it. These buildings have since been transformed into housing and office spaces, mainly used by the municipality of Amsterdam.

As a result, the area now shows very little activity based on several obversations and small interviews by asking people on the street. The street is mostly a place to pass through or to park. It no longer has the typical characteristics of a courtyard: calm, secluded from the chaos outside (Kahn, 1969). The underlying cause lies in two factors: the courtyard is only accessible through two narrow entrances, limiting the natural flow of people into the space. Additionally, the ground floor program lacks variety. The surrounding buildings are used almost exclusively for offices and housing. Because of this limited mix, the area is active only during office hours. Outside these hours, it becomes quiet and empty.
At the same time, a publicly accessible urban block of this scale can offer a genuine calm within the city centre which is rare in Amsterdam. Most comparable spaces are either privately owned, too small, or not accessible to the general public.This site has the potential to become such a place again. By introducing a new programme, the area could be reactivated at multiple moments during the day and evening.

Timber construction has been the foundation of this place for centuries. The current timber revolution offers the chance to be the next step in this history. Timber is not only historically fitting. It is structurally logical: topping-up existing buildings requires lightweight construction, and engineered timber is among the most suitable materials for adding floors without overburdening existing foundations. Building with timber here is therefore an appropriate response. The place can be revitalised through a new open structure of the courtyard that connects both horizontally and vertically.

Yet precisely because timber topping-up and bridging in a dense historical urban block is a specific and technically complex undertaking. It cannot rest on intuition alone. It requires understanding the site in depth and it requires looking back before looking forward. This is not only fitting for a site where Amsterdam’s timber history was literally made but also urgent: at a time when cities must densify sustainably, biobased construction and vertical extension are among the most relevant architectural answers available. The specific history of this site makes it both possible and compelling to reinterpret Amsterdam’s timber construction tradition. Not merely as inspiration, but as an active design instrument.

1.3 Research questions

This thesis moves continuously between research and design. The two are not sequential but iterative from each ohter. Each informing and sharpening the other throughout the process. The overall structure follows the four stages of the double diamond model: Discover, Define, Develop, and Deliver.

mainquestion:

How can timber topping-up and bridge interventions revitalise the Stadstimmertuin, using Amsterdam’s historical timber construction tradition?

The sub-questions are distributed across the different elements of the double diamond.

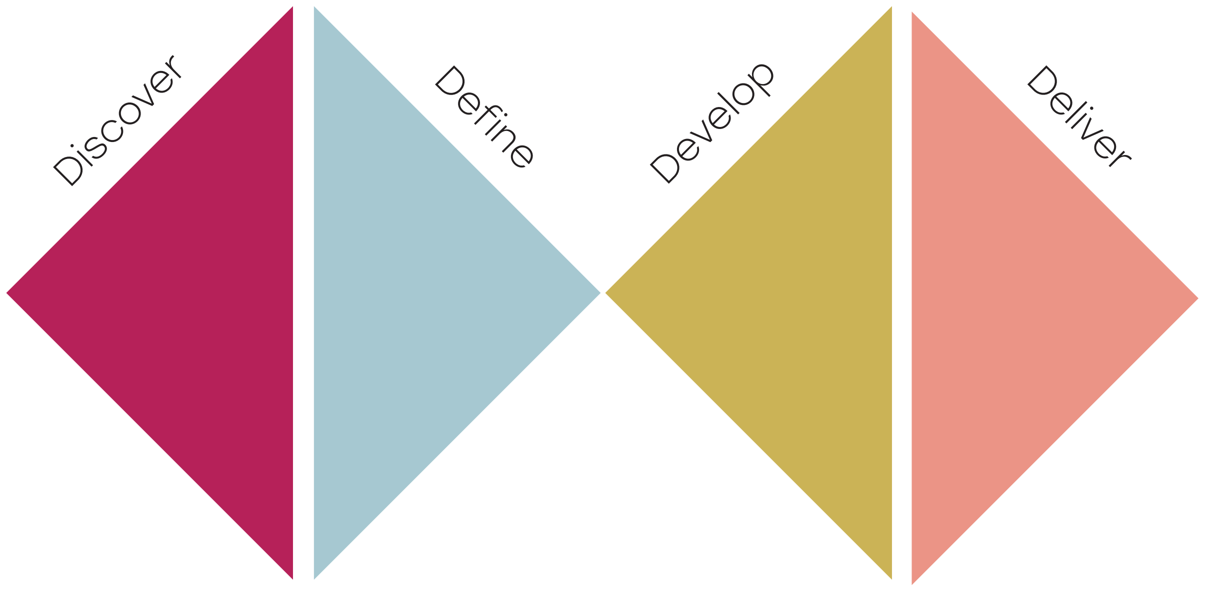

fig. 1: Double Diamond

Discover / Define

What is the current architectural and historical character of the Stadstimmertuin?

What structural principles, connection details, and facade strategies characterize Amsterdam’s historical timber building tradition?

What structural typologies and spatial qualities characterize historical Dutch timber bridges?

Develop / Deliver

How can the Stadstimmertuin be revitalised as an enclosed courtyard block?

How can the historic timber tradition of Amsterdam be used to develop a modern timber building?

1.4 Methodology

The methodology of this research is based on the Double Diamond framework, consisting of four iterative phases: Discover, Define, Develop, and Deliver. Rather than functioning as a strictly linear sequence, these phases continuously inform and influence one another throughout the research and design process.

The first phase, Discover, focuses on exploration and contextual understanding. During this stage, literature research is conducted to understand the current discourse, spatial conditions, and historical background of the site. The plot itself is investigated through mapping, observation, and analysis, while broader theoretical and architectural references help position the project within larger developments and ongoing debates. The purpose of this phase is to identify opportunities, tensions, and emerging directions that can inform the project.

Following this, the process moves into the Define phase. Here, the insights gathered during discovery are synthesized into a clearer conceptual framework. This phase is concerned with determining the central themes, spatial ambitions, and design intentions that will guide the project forward. Rather than producing a final answer immediately, the define phase establishes the conceptual position from which the design can evolve.

The Develop phase then focuses on the active production and testing of ideas. Spatial strategies, architectural interventions, and conceptual proposals are developed through iterative design explorations. Importantly, this stage constantly loops back to the Discover phase; new design outcomes often generate additional questions and require further research or analysis. As a result, the methodology should be understood as cyclical and reflective rather than linear. Research and design continuously inform one another through an ongoing process of testing, evaluation, and refinement.

Throughout the entire process, documentation and reflection remain essential components. The research report records what has been investigated, which methods have been used, and how conclusions and design decisions have evolved over time. However, while the actual process developed iteratively, the report itself presents the material in a more sequential structure. This decision was made to improve clarity and readability, as the logic of a written document differs from the dynamic nature of a design process.

The final phase, Deliver, brings together the outcomes of both the research and the design process. This phase culminates in the final proposal, supported by the main conclusions and the various sub-conclusions developed throughout the project. For each sub-question, a partial discussion and conclusion are carried out in order to already address these sub-questions. This is indicated in the text as D&C | *chapter*.

1.5 Objective and motivation

The motivation behind this research lies in the potential of timber architecture to redefine both the identity of Amsterdam and the way contemporary urban densification is approached. The project focuses on a hidden and often overlooked part of the city, investigating how architectural interventions can reveal new spatial qualities and reintroduce forgotten urban conditions into the public consciousness. In this sense, the project is not only about adding new volume, but also about redefining the character and experience of an existing urban block.

Within the broader discourse on densification, vertical extensions are becoming increasingly common. However, this research argues that densification should not only be understood as a technical act of adding floors on top of existing buildings. Instead, it should also address questions of spatial experience, material perception, and the relationship between users and architecture. Timber plays a central role in this investigation because of its ability to create a different architectural atmosphere, both visually and tactically, while simultaneously functioning as a lightweight structural solution suitable for rooftop extensions.

The project also responds to the historical relationship between Amsterdam and timber construction. Historically, timber structures were often associated with vulnerability and fire risk, which contributed to a broader hesitation toward building with wood in dense urban environments. Today, however, contemporary timber engineering and fire-safety strategies have significantly transformed these perceptions. This research therefore explores how timber can once again become a trusted and visible construction material within the city, not only from a technical perspective but also from an architectural and cultural one. Although extensive technical research on timber construction is already available, this project focuses primarily on the architectural dimension of the discussion. The central question is not simply whether timber construction is possible, but rather how far contemporary timber architecture can go in shaping new forms of urban expression, spatial identity, and public experience. In this context, sustainability remains a key motivation throughout the research. Timber offers opportunities for lighter construction, material renewability, and reduced environmental impact, making it highly relevant within current architectural and societal debates.

1.6 Relevance

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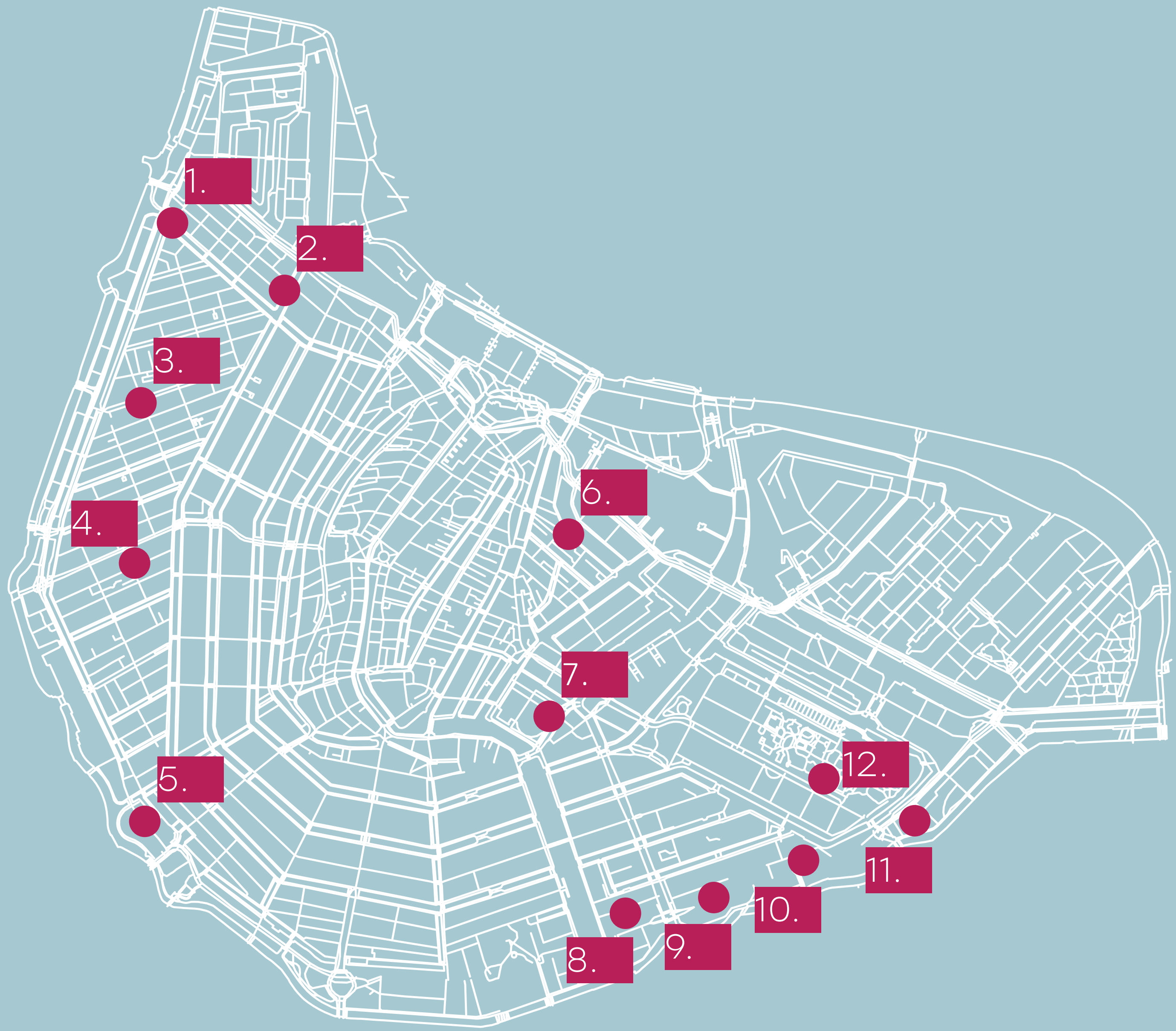
Discover



The site selection process began with a review of the municipal maps and quick-scan analysis provided by the Gemeente Amsterdam, in order to identify potential locations suitable for vertical extension. This initial analytical phase was complemented by a series of on-site explorations. A walking route was undertaken starting in the Jordaan, continuing through the city centre, and extending towards Artis. This allowed for a direct spatial and experiential understanding of the urban fabric.

During this exploration, several key criteria guided the evaluation of potential sites. First, the existing urban structure was analysed to understand its spatial logic and constraints. Second, the presence of inherent architectural or urban quality was assessed. Third, particular attention was given to identifying latent or hidden qualities—elements that could be enhanced or reinterpreted through intervention.

Among the various locations considered, one site clearly distinguished itself: the former timber yard (stadstimmertuin), identified as image 8, position 8. This site holds a strong historical association with timber, which provides a meaningful foundation for the proposed intervention. Moreover, its spatial experience is particularly compelling. From the perspective of the Weesperstraat, the site appears ambiguous and somewhat undefined. However, upon entering, it reveals a courtyard with a distinct and unexpected spatial quality, centred around a well-composed existing building. This contrast between exterior ambiguity and interior clarity contributes significantly to its architectural potential. Additionally, the existing structure appears suitable for vertical extension, further strengthening the site's viability.

2.1 Site selection

Several alternative locations were also considered. The Stopera presented a lot of possibilities in therms of programmatic possibilities, raising questions about how such a site could function under transformation. Another location, identified as number 11, appeared to combine elements of a youth centre with a security-related function, and exhibited an intriguing typological configuration, although its exact use remained unclear. The area around Artis (image 12) was also explored, but was ultimately deemed too limited in scale. In the Jordaan, the postmodern typologies observed in images 3 and 4 were of interest; however, they offered limited opportunities to significantly enhance existing qualities. Location 6, situated within the historic city centre, presented a rich mixture of architectural styles, yet the complexity of the context made vertical extension more challenging.

In conclusion, the courtyard of the former timber yard emerged as the most promising site. It offers a unique combination of historical significance, spatial richness, and potential for development. Compared to the other locations, it stood out decisively, making it the most suitable choice for further design exploration.

fig. 2: Overview of visited buildings

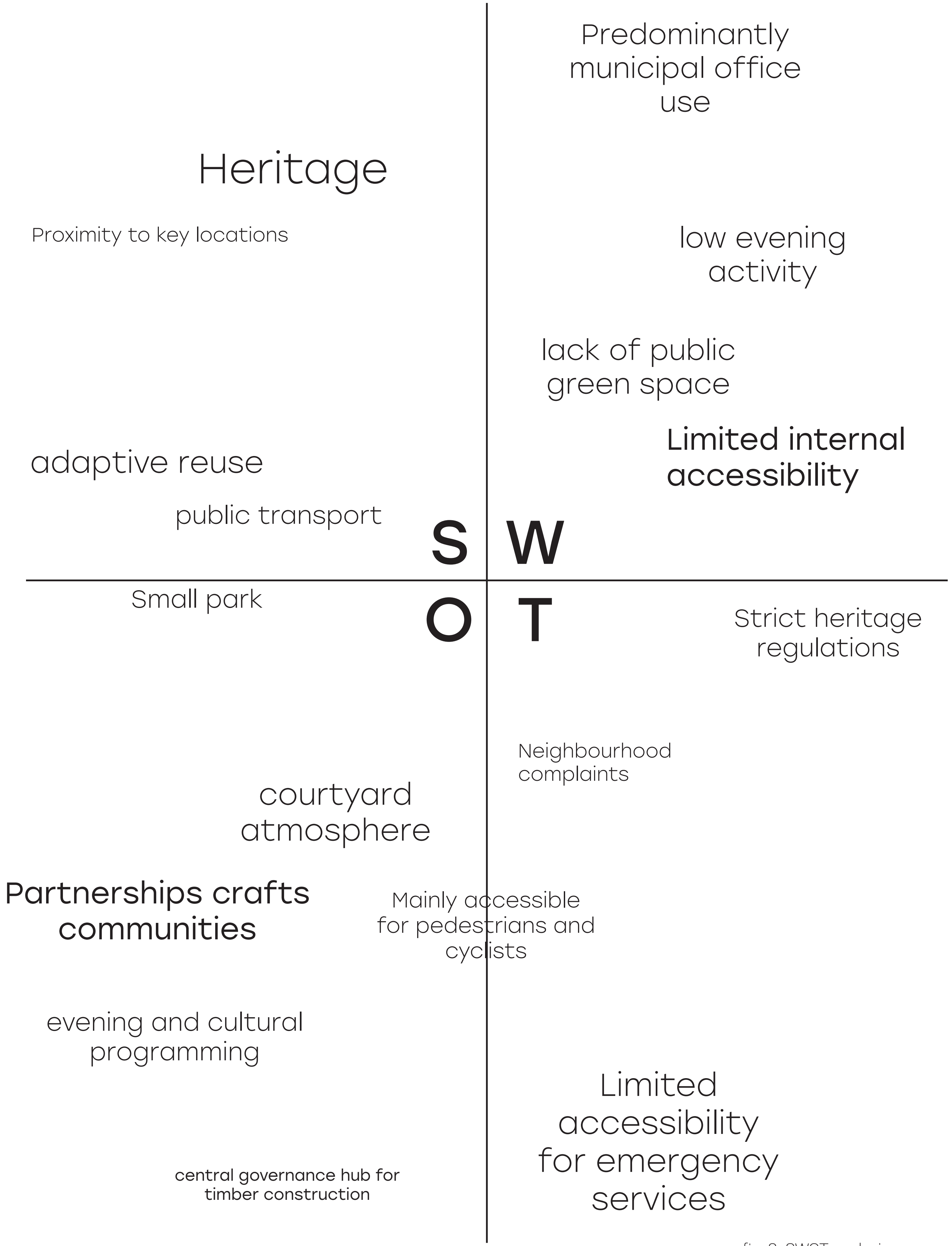


fig. 3: SWOT analysis

2.2 SWOT

This SWOT analysis describes the strengths, weaknesses, threats, and opportunities of the former Stadstimmertuin in Amsterdam. It considers the historical, cultural, and urban context. The main goal of this analysis is to provide a clear overview of the site in order to develop a comprehensive program of requirements that can lead to a sustainable design.

Strengths

One of the main strengths of the site is its strong heritage character. The buildings within the courtyard do not themselves reflect the typical Amsterdam architectural tradition, but the site as a whole does. It was formerly the storage and workspace of Amsterdam's wood craftsmen. After it lost its original function, four buildings were placed on this location. These typical masonry and concrete structures have also lost their original functions over time. Nowadays, they have been transformed into dwellings or office spaces, especially for the City of Amsterdam. These buildings lend themselves well to adaptive reuse, allowing the site to maintain its historic character while accommodating new functions.

The location is also very strategic. Important cultural and financial institutions are nearby, such as the National Theatre Carré and the Dutch National Bank, making the area attractive both for visitors and for professional or cultural activities. Thereby, the site is well connected to pedestrian routes, cycling paths, and public transport.

Weaknesses

Most of the buildings are offices, many of which focus on municipal functions. This creates a monoculture of users and limits the diversity of activities in the area. A direct consequence is that activity is very low in the evenings. The lack of public spaces around the site and in the surrounding blocks makes it difficult for people to enjoy and relax in this unique urban location. Another weakness relates to circulation. The site is fully enclosed by surrounding buildings, leaving only two narrow access roads. This limits accessibility and flexibility for new programs or larger flows of people and emergency services such as ambulances and fire brigades.

Threats

Several external factors pose threats to development. There are strict heritage regulations within the City of Amsterdam. Although this concerns two monuments, these regulations can limit interventions, changes, or expansions on the site. Large-scale redevelopment could provoke complaints from neighbors. Limited access for emergency services may restrict densification or certain types of programs. The area is mainly accessible to pedestrians, cyclists, and public transport users. While this supports sustainable mobility, it may create challenges for programs that require vehicle access. However, this limitation can also be seen as an opportunity, as it allows for more pedestrian-oriented design and potentially reduces car traffic in the area.

Opportunities

Although this site was partially revitalized in 2014, it still holds much more potential. Restoring a courtyard atmosphere could bring life and identity back to the space. There is potential to introduce programs that activate the area in the evenings, increasing public use and vibrancy. The site could host a company or institution focused on timber supply and professional woodworking for the entire city of Amsterdam. While the program would mainly be office-based, the symbolic location makes it very suitable for this purpose. Collaborations with local craft initiatives or communication programs could further strengthen the cultural and professional significance of the site. Limiting car traffic and prioritizing pedestrians and cyclists can improve the quality of public space, making the site more inviting and socially active. This aspect can be seen both as an opportunity and a threat.

Central Governance Timber Hub & Leisure Activities

Amsterdam is one of the first cities in the Netherlands to fully commit to circular construction initiatives. Specifically regarding timber, there are numerous initiatives in the city. For example, a new timber yard has been established in the Amsterdamse Bos. Its goal is to give urban timber a "second life," transforming it from urban waste into usable materials, such as through storage, sawmills, drying facilities, and carpentry workshops. Currently, this initiative primarily focuses on smaller-scale applications, such as cladding, wooden floors, benches, and other public space elements. However, there is significant potential to expand this initiative to the management and production of mature and refined construction materials.

In addition, there are several projects that combine timber use with social engagement. For example, there are open workshops (https://openbarewerkplaats.nl/
) and organizations such as Cordaan, which support both youth and elderly care. One of their activities is a woodworking workshop, where participants can saw, sand, and finish timber. These programs are especially aimed at young people facing social or developmental challenges.

There is great potential for the former Stadstimmertuin site to become an institutional hub that brings together all of these initiatives while providing a broader perspective for the city of Amsterdam. This could be an independent institution that monitors all construction projects, identifies opportunities, and helps companies work with Amsterdam timber in a professional and sustainable manner. By centralizing these efforts, the site could serve as a model for the urban circular economy and foster both educational and professional activities in woodworking.


fig. 4(Gemeente Amsterdam, 2025)

2.3 Photographic Analysis

This chapter presents a photographic analysis of the site and its surrounding context. The aim is to document and interpret both the neighbourhood as a whole and the individual buildings within it. Through a combination of on-site visits, guided tours, and photographic documentation. This analysis captures the current spatial, architectural, and social conditions of the area.

The photographic analysis serves as a tool to reveal the existing situation in detail. The images highlight the aesthetic qualities of the site, drawing attention to what stands out visually and spatially. These observations are further elaborated in the accompanying texts, which reflect on the architectural characteristics and the condition of the built environment. In addition to visual analysis, insights were gathered through conversations with individuals familiar with the buildings, including guides and building managers.

One particularly insightful experience took place within a closed building block along the Nieuwe Achtergracht. Here, access was granted through a guided tour led by a building manager. While direct interaction with residents was not possible, the manager provided valuable information about the current use and management of the complex. For instance, the fact that all entrances are kept locked reflects concerns related to safety and controlled access. While this condition is understandable, it also reveals a potential opportunity for spatial or social intervention, suggesting that the current level of enclosure could be reconsidered.

The building itself is of particular interest, as it is a former fire station that has undergone a significant transformation into residential units. This layered history as combining an institutional past with a contemporary housing function adds complexity and richness to the site. A similar depth was observed within the former timber yard, where an existing relationship between the printing house and the Weesperstraat becomes evident through spatial alignment and architectural expression. More broadly, the photographic analysis reveals a set of buildings that, while varied in function, share certain architectural similarities. The printing house, the schools, and the buildings along the Nieuwe Achtergracht can be understood as part of the same architectural family, characterised by comparable scales, materials, and rhythms. In contrast, the buildings along the Weesperstraat present a distinctly different typology. Here, the architecture is more modern and office-oriented, featuring curtain wall façades and a more corporate expression.

Access to one of the buildings along the Weesperstraat also provided an elevated vantage point over the entire site. This “bird's-eye view” allowed for a comprehensive understanding of the spatial relationships within the block and its surroundings. From this perspective, it became possible to analyse patterns of use, circulation, and occupation, as well as to identify the distribution of functions across the area.

Beyond the physical and functional analysis, particular attention was given to the experiential qualities of the site. Multiple visits were conducted at different times of the day. This was in order to capture variations in atmosphere and activity. This approach provided insight into how the area is perceived and used over time, contributing to an understanding of its overall character.

As a result, the analysis of the broader Weesperbuurt reveals that the edges of the urban block are defined by four distinct identities. Each side of the block exhibits its own spatial and functional character, creating a diverse and layered context. This diversity forms a key opportunity for the design process, offering multiple entry points for architectural intervention and conceptual development.

Weesperbuurt

The study area comprises the urban block within the Weesperbuurt. The first image focuses on the edge along Sarphatistraat, with Weesperstraat visible to the right and the interior block to the opposite side. Between these edges stand two small structures, currently housing a tourist shop and a tobacco store, creating a somewhat marginal and poorly defined Historically, this location functioned as an to the Openluchthofje, which is now obstructed by these additions.

The second image captures the view from beneath Weesperstraat towards the interior courtyard, while the third highlights the highly and congested Weesperplein metro station along Sarphatistraat, a major busy street of.The fourth image again addresses Sarphatistraat, emphasizing its traffic cluding adjacent cycling infrastructure. In contrast, the street long Nieuwe Achtergracht represents a markedly quieter condition, characterized by minimal activity and its at the rear of Royal Theatre Carré. The final image looks from within the block towards the Amstel, evoking the characteristic historic identity of Amsterdam.

In conclusion, the block is defined by four distinctly different urban identities: (1) the highly dynamic and congested Sarphatistraat edge with its major transit node; (2) the nd low-activity along Nieuwe Achtergracht; (3) the culturally recognizable and scenic character facing the Amstel; and (4) the infrastructural, transitional nature of Weesperstraat as a primary thoroughfare. These contrasting conditions underscore the spatial and experiential heterogeneity of the block.

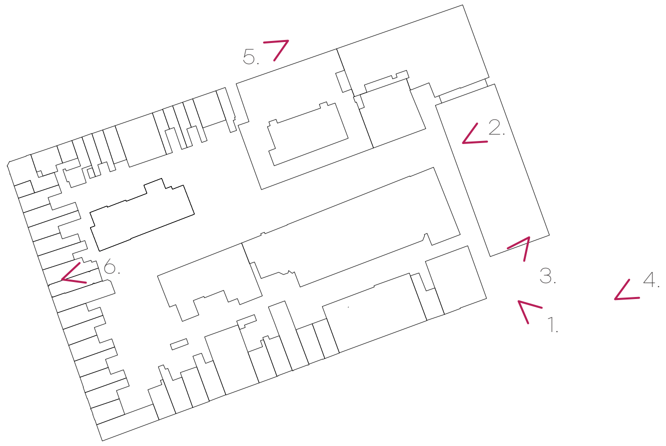


fig. 5: photographic analysis of the Weesperbuurt

4.

5.

6.

Nieuwe achtergracht

The analysed site along the Nieuwe Achtergracht illustrates a layered architectural condition in which historical structures and contemporary interventions coexist. The first image, taken from within the block, highlights a transitional space where old and new converge, expressed through an gallery at the front of the building.

The second image presents a clear modern intervention by Rudy Uytenhaak, while subsequent images document a sequence of spatial conditions ranging from perspectives to views of both transformed and newly inserted elements. Notably, formerly utilitarian structures such as porticoes have been reinterpreted within the new design, whereas older fragments have been preserved and updated with contemporary window frames, maintaining a dialogue between past and present.

Additional images emphasize key historical references, including a gate leading to the former Stadstimmertuin and views towards surrounding contexts such as the Diamantbeurs and Weesperstraat. One image 3 in particular juxtaposes an architectural fragment with a modern reinforcing the contrast between temporal layers. Interior perspectives further reveal spaces such as a distinctive staircase within the contemporary complex and views outward toward a former printing facility.

Collectively, the images convey a coherent narrative of adaptive reuse and architectural integration. Despite its function as social housing, the development maintains a distinct atmospheric quality, enhanced by deliberate design gestures—such as the use of lighting effects—that contribute to a nuanced spatial experience (Alberts, 1984).

2.

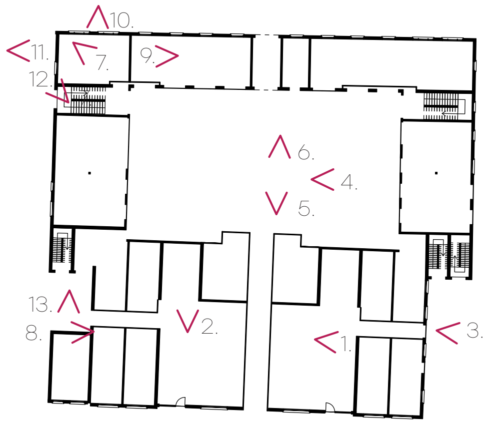
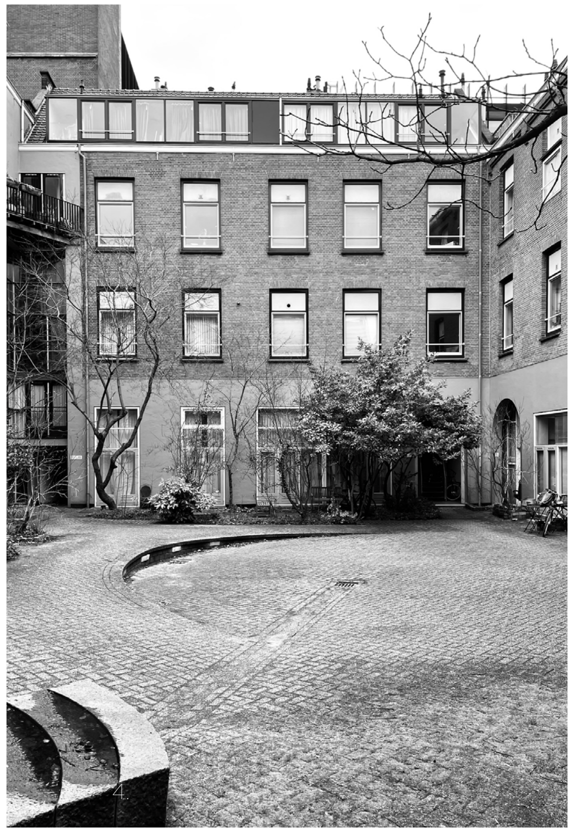


fig. 6: photographic analysis of the Nieuw Achtergracht



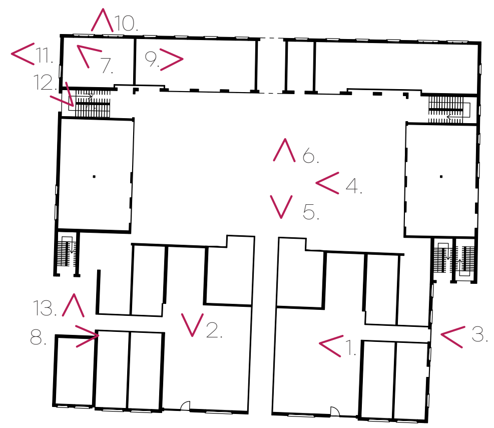
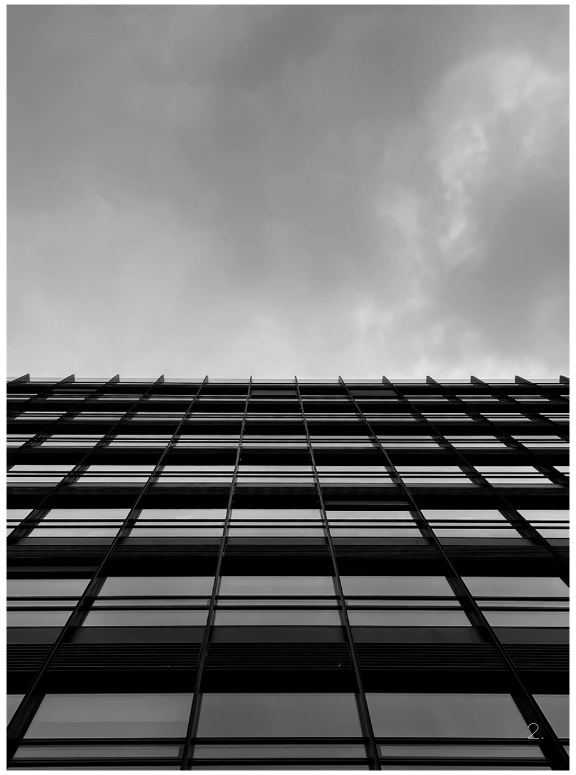


fig. 6: photographic analysis of the Nieuw Achtergracht

Stadstimmertuin



As we move through the Stadstimmertuin, the experience gradually transitions into the courtyard itself. The sequence of images captures this shift in atmosphere and spatial character.

In image 1, we see an extension attached directly to the Press Building, almost appearing as a secondary layer added onto the original structure. Image 2 introduces the western façade of the Curtain Wall building, revealing the more rigid and systematic side of the block. In image 3, the perspective shifts toward the rear side of the diamond-shaped volume of the Diamond Exchange, where the architecture begins to feel less formal and more fragmented.

Image 4 highlights an intervention within the existing printing house, while image 5 positions us at an anchor point within the garden, looking back toward the printing building itself. From this same garden space, the following image reverses the perspective, allowing the courtyard to be understood as a spatial dialogue between both directions.

Image 7 focuses on a typical window composition along the transformed Nieuwe Achtergracht façade, illustrating the rhythm and repetition that define the more controlled architectural language of the project.

The remaining images primarily reveal the backside of the Prism Building, the sculptural form of the printing house. What becomes particularly striking here is the strong contrast between the front and

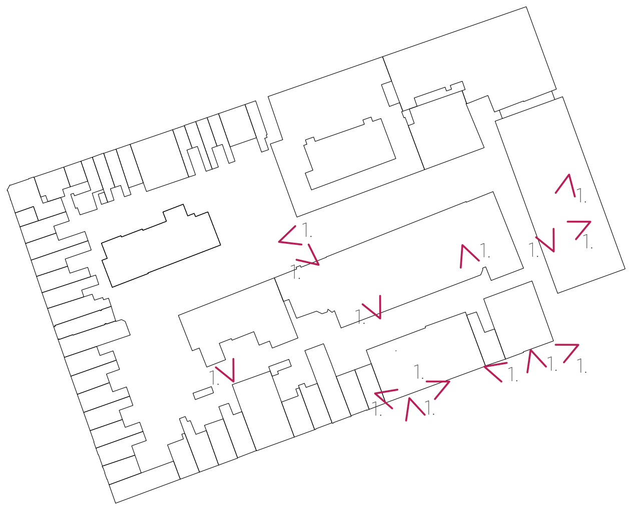
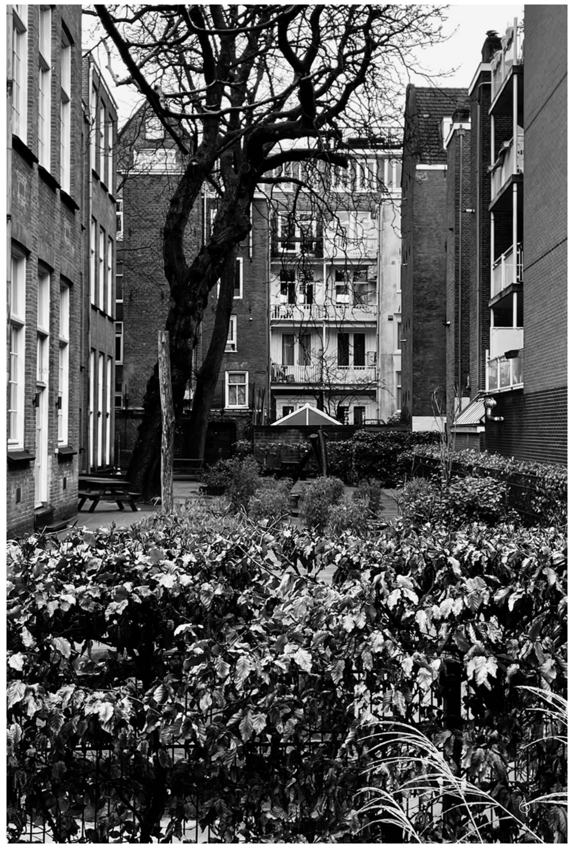


fig. 7: photographic analysis of the Stadstimmertuin



the rear of the block. The front façade appears highly uniform and composed, whereas the backside feels layered, irregular, and almost accidental. Small towers protrude from the roofscape, additional volumes emerge unexpectedly, and a large chimney becomes part of this expressive silhouette. The garden itself also changes character here, becoming more wandering and informal. Together, these contrasting conditions create two very distinct identities within the same urban block.

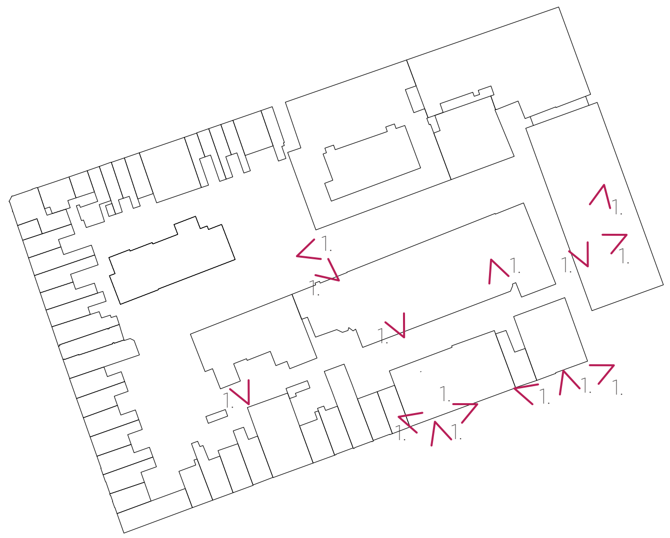


fig. 7: photographic analysis of the Stadstimmertuin

Drukkerij

The former printing house is a 1912 building in Stummertijn and forms the main part of my project. The building has a rigid and clearly structured layout, consisting of two main volumes: the former printing halls, where production took place on both the ground and upper floors, and the former office area, which also accommodated distribution and administrative functions.

The structure is defined by an early reinforced concrete system with a clear rhythm of columns, primary beams, and secondary beams supporting the floors. This structural logic is consistently visible throughout the building and forms the spatial backbone of the interior, as seen in image 1.

From this structural framework, a sequence of spaces unfolds. In image 2, a corridor leads toward the former sanitary facilities, which are still largely preserved in their original state. The same tiled finishes return in image 3, where they become part of the main hall and staircase. This staircase forms a key spatial element, connecting the ground floor with the first floor and reinforcing the vertical organization of the building.

The contrast between functions becomes clear as the building is experienced further. The former office area, visible in image 7, is characterized by a distinctive room with a bay window, while image 8 shows a more transitional corridor space where installations are exposed and the original spatial quality has partially been lost.

On the first floor, shown in images 9 and 10, the original structure remains fully intact, but the spaces have been adapted into office use. The interventions are minimal, allowing the industrial character of the building to remain clearly present.

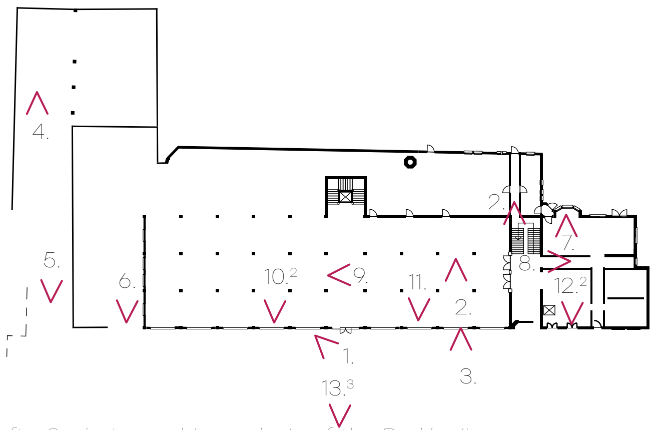
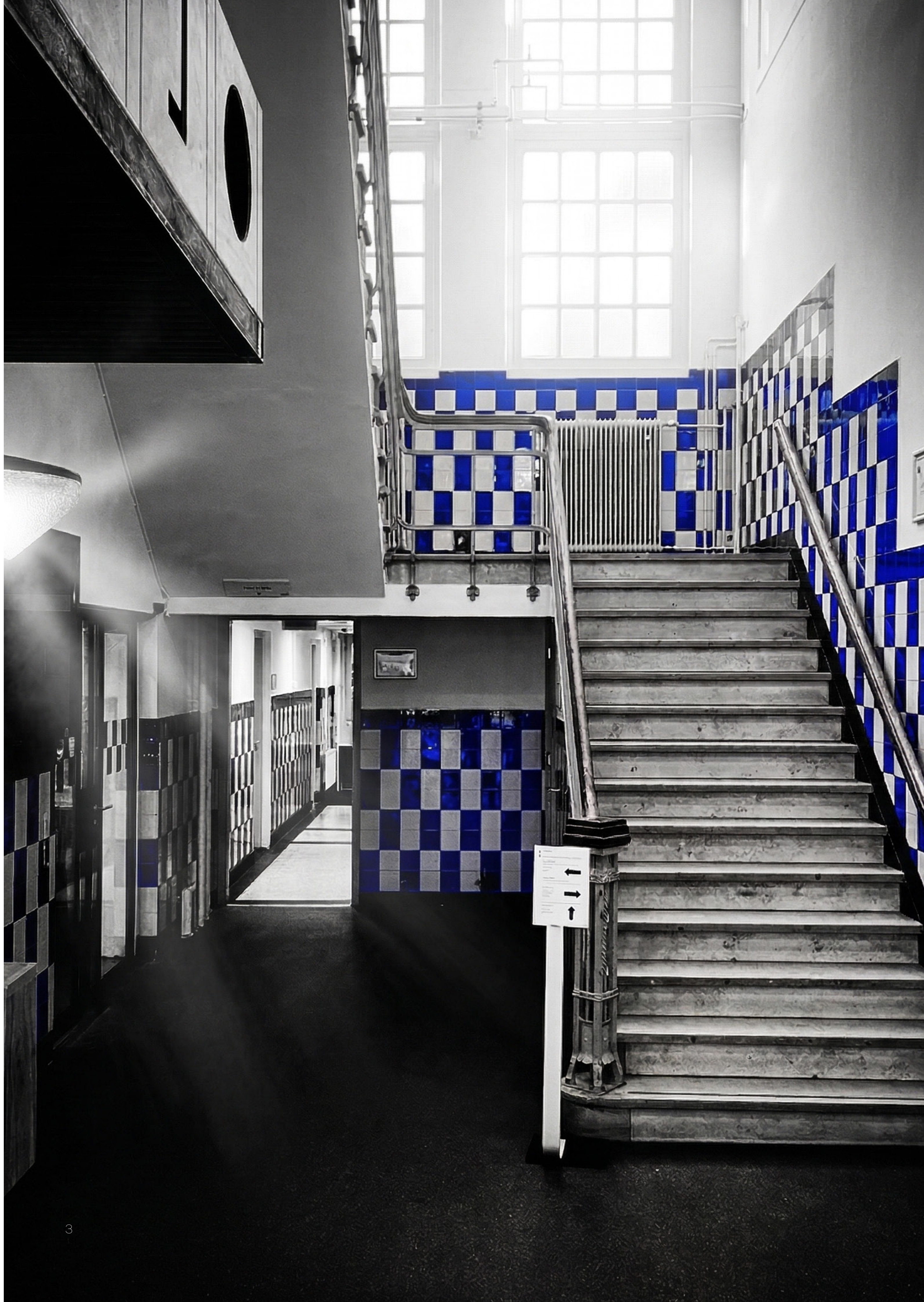


fig. 8: photographic analysis of the Drukkerij



Later additions mark a different layer in the building's evolution. Images 4, 5, and 6 show the bicycle shed, placed between the former printing house and its surroundings. These extensions are purely functional and contrast strongly with the architectural quality of the original structure, suggesting potential for future redevelopment.

Finally, the relationship between building and landscape becomes visible in images 11, 12, and 13. Image 11 shows the ground floor facing the new rear canal, while image 12 reveals the collective courtyard as an intermediate space between building and water. From the roof in image 13, this spatial relationship becomes most evident, showing how the former industrial complex is now embedded in a changing urban context.

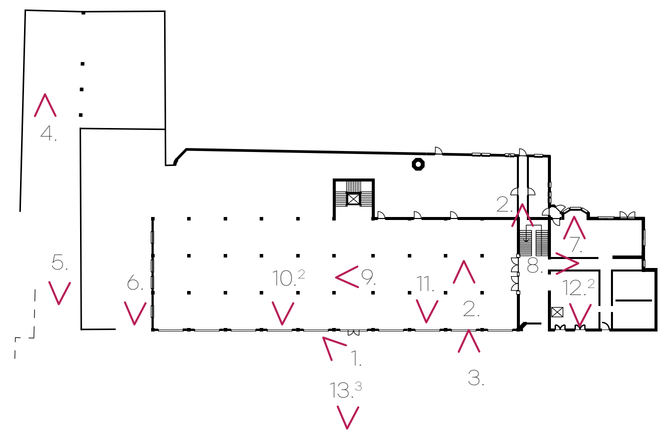


fig. 8: photographic analysis of the Drukkerij

Weesperstaete

Weesperstaete also known as Weesp Building 8, is a transformed former University of Amsterdam building that now mainly functions as an office location and also houses the heritage department of the Municipality of Amsterdam. The building reflects a layered history where academic use has gradually shifted into administrative and office functions.

From the tower in image 1, the city becomes visible in full context, with views toward the former diamond building, emphasizing the building's elevated position within Amsterdam.

Image 2 shows an interior corridor, where the former academic character has been replaced by a modern office environment, though traces of the original structure remain.

Image 3 presents the renovated 2021 dome, offering wide views over Amsterdam and connecting the building's current use to its historical relationship with the former diamond exchange.

Image 4 captures the broader urban setting, overlooking the former Stadstimmertuin. The former printing house, two schools, and the new Achtergracht are visible, with Theater Carré and the Amsterdam skyline in the background, highlighting the site's strong integration into the city.

Overall, the building has evolved from an academic institution into a municipal office and heritage site, while still preserving its historical identity within the urban fabric.

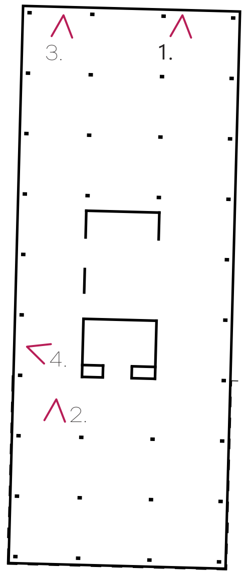


fig. 9: photographic analysis of Weesperstaete

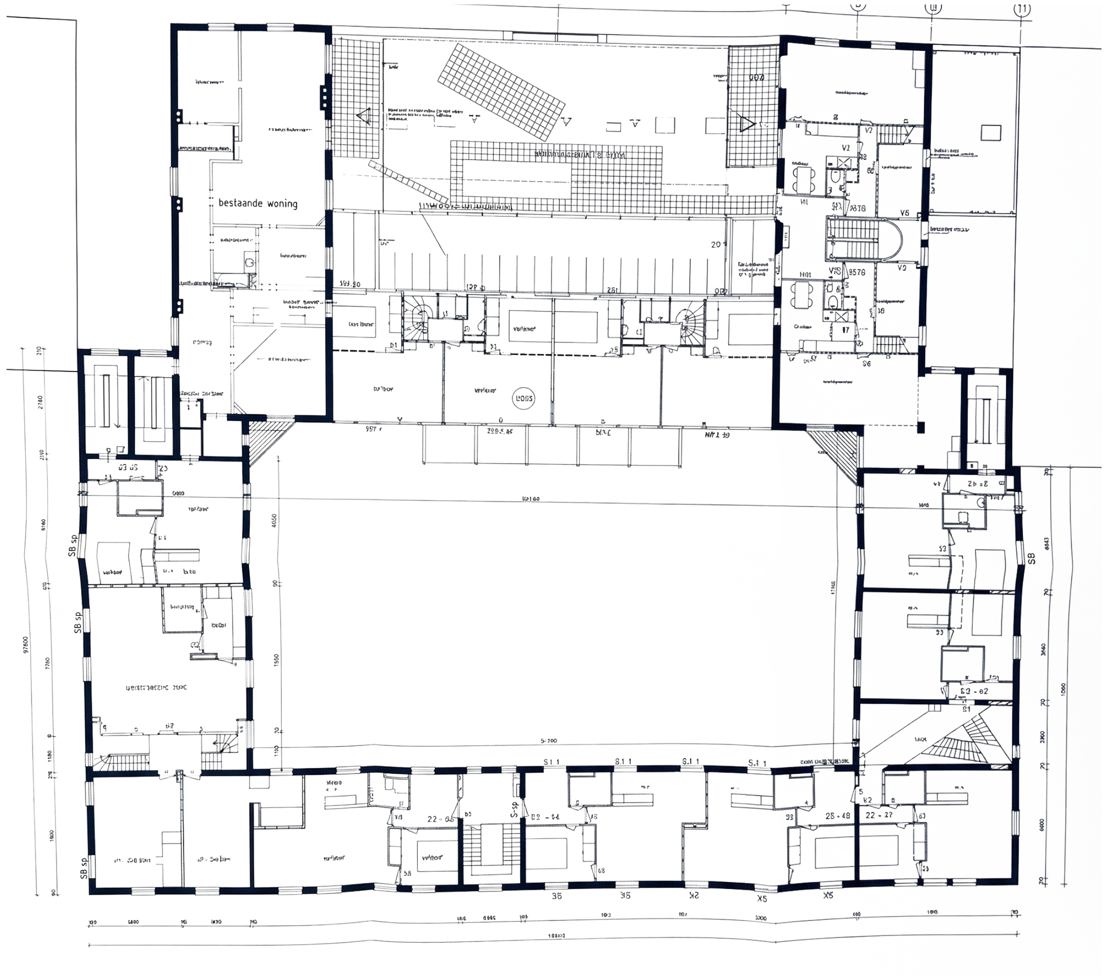


fig. 10 Second floor of nieuwe achtergracht proposed by Rudy Uytenhaak (1983)

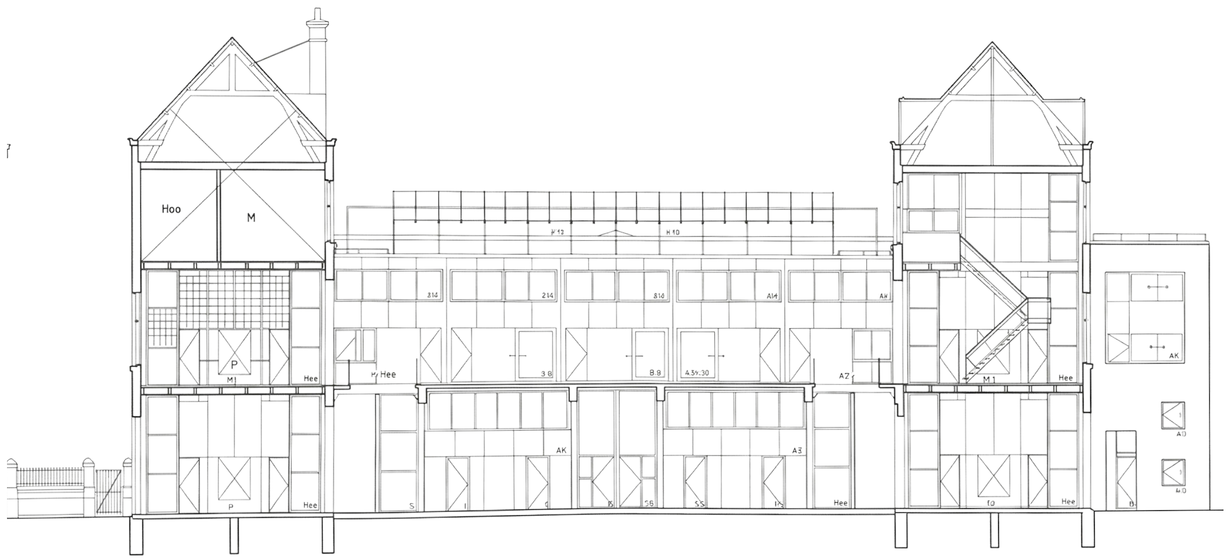


fig. 11 Section proposed by Rudy Uytenhaak (1983)

2.4 Archive

Nieuwe achtergracht intervention Rudy Uytenhaak

An other part of the research involved a visit to the archive of Rudy Uytenhaak Architects. The Nieuwe Achtergracht building is particularly significant within the project, as it is the only part of the block for which original archival material and direct architectural documentation were accessible. Studying these drawings, plans, and documents provided valuable insight into both the architectural intentions behind the project and the broader social ideas that informed its development.

The archive visit also made it possible to understand the building within the context of its own time. The project clearly reflects the architectural and social ambitions of the period in which it was designed. It represents a moment in which social housing was not only approached as a technical necessity, but also as a collective vision for future urban living. Conversations with the architects further reinforced this understanding, especially considering that this was one of Uytenhaak's early projects. The building can therefore be read both as an architectural statement and as a reflection of the optimism and experimental thinking of its era.

Particularly interesting are the participatory ideas embedded within the design process. Comparable to projects by Álvaro Siza, such as the well-known participatory housing experiments in The Hague (Punt & Komma, residents were given opportunities to influence the organization and arrangement of their apartments. In some cases, layouts were explored almost at a one-to-one scale, emphasizing the relationship between architecture and everyday life. This participatory dimension reveals how architecture at the time sought to create not only housing, but also social engagement and collective ownership.

In addition to archival research, conversations with people connected to the building offered further insight into how the architecture functioned in daily use. These perspectives revealed the relationship between the spatial design, the social ambitions of the project, and the lived experiences of its inhabitants. Architecturally, the building is highly compelling, but its true significance also lies in the interaction between form, function, and social intention. Understanding this relationship became an interresting part of the research.


nummer 2 november 86

BRANDKRANT

INFORMATIE VOOR BEWONERS VAN DE VOORMALIGE BRANDWEERKAZERNE

bewoners overleg met woningbouw vereniging

agenda

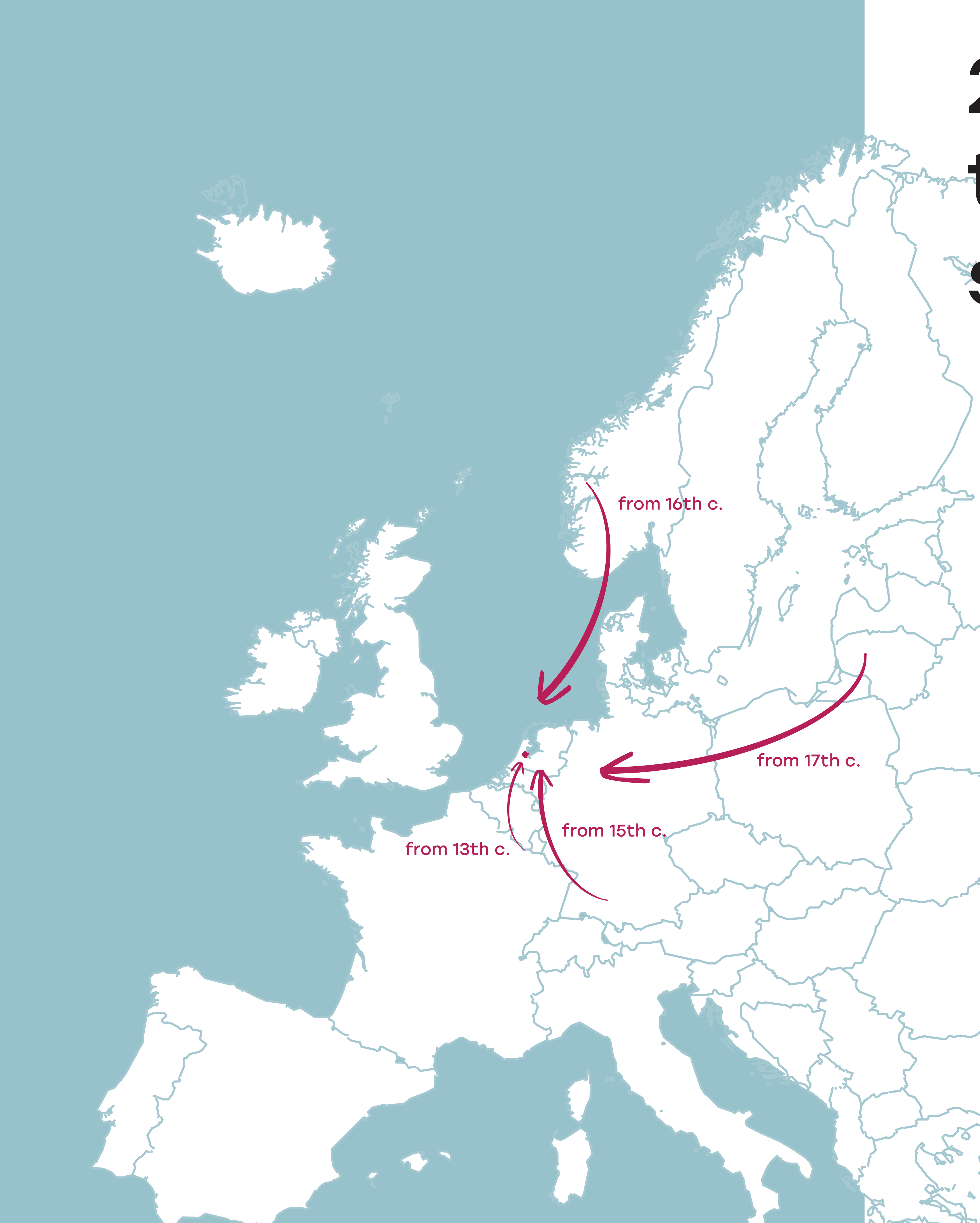
Sjoukje

fig. 12 Fragment from a residents' newsletter about the Nieuwe Achtergracht (1986)


de architect

fig. 13 Review from the architectural journal De Architect (1986)

2.5 Timber flows to the seven provinces



Timber used for construction in Amsterdam can be traced to four main regions (Vink, 1993). The relative proportions and origins of the timber vary across the literature. For example, Schillemans (1947) based his findings on auction records, concluding that 75.5% of the timber originated from the Rhine region, while 14.9% came from North Sea ports, the Baltic States, and Russia/Finland. Only 0.4% was recorded as originating from Scandinavia.

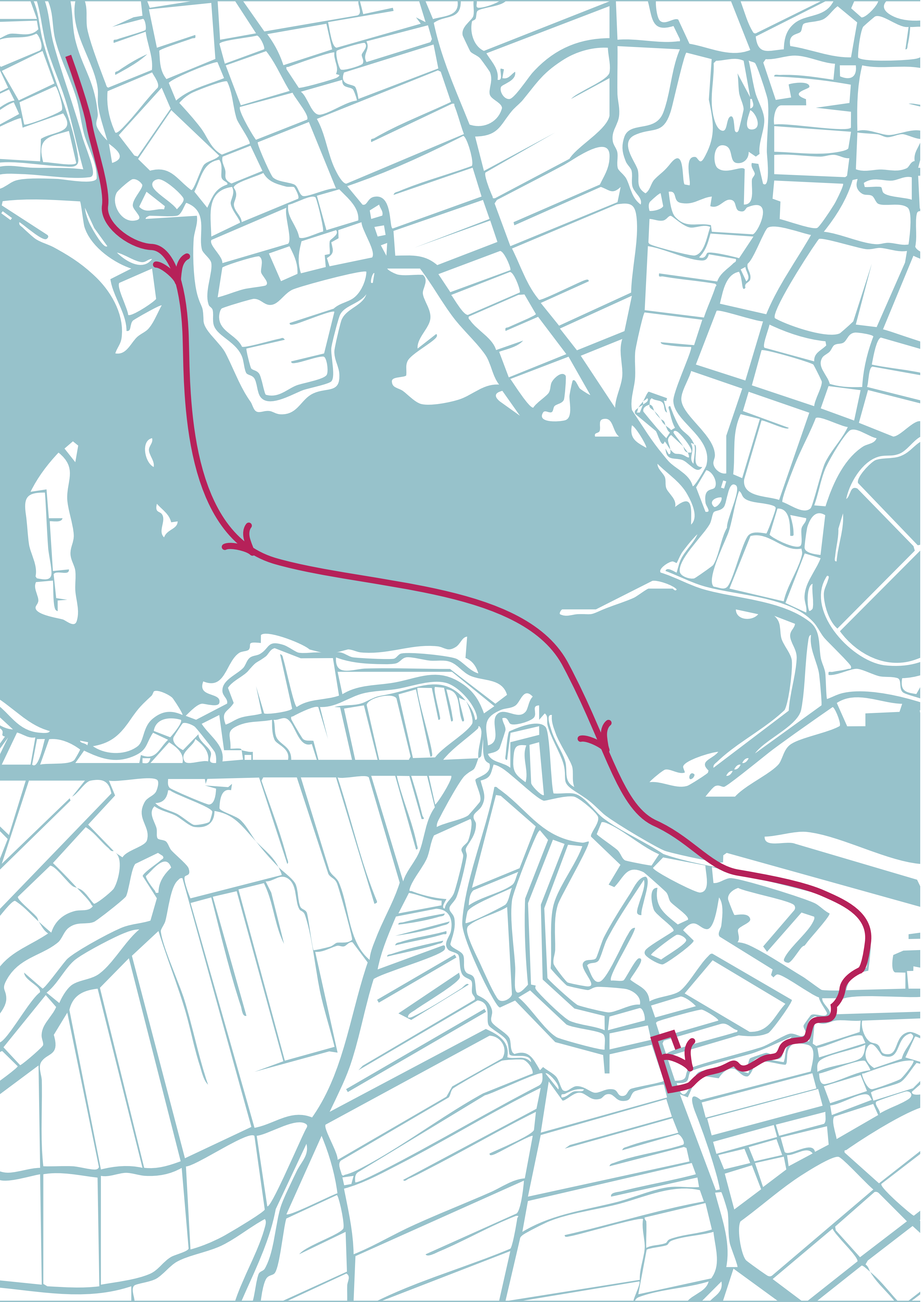
However, these figures present a distorted picture. A significant proportion of timber from Northern Europe, particularly from the Baltic region, was not sold at auction but was directly intended for construction use. Much of this wood was traded directly between merchants and buyers without passing through auction markets, and is therefore underrepresented in such data.

Four principal supply regions can be identified:

The Southern Netherlands and the Rhine and Meuse regions, including the Rhineland and Westphalia, accessed via river transport.
Scandinavia, initially supplying mainly oak, and later increasingly softwood.
Northern Germany and Poland.
The Baltic region, providing oak, beech, and pine.

Trade connections between Holland and the Rhine-Meuse region date back to the 13th and 14th centuries. By the end of the 15th century, timber was increasingly sourced from further upstream, including areas such as the Black Forest. Exports from the Rhine region continued well into the late 18th century.

In the second half of the 16th century, large quantities of oak timber were imported from Scandinavia. During the early 17th century, the use of pine increased significantly in Amsterdam. The Thirty Years' War disrupted supply from the Rhineland, leading to a greater reliance on timber from the Baltic region. After this period, oak imports from the Rhineland resumed. In the second half of the 17th century, the influence of the Scandinavian timber trade gradually declined, a development that was compensated by increased imports from Central and Eastern Germany. (Van Tussenbroek, 2012)



2.6 Amsterdam & Zaandam timber

In the 17th and 18th centuries, the connection between the Zaan region and Amsterdam formed an important part of the Dutch economy. These two areas were closely linked, partly due to their mutual dependence on one another within trade and production systems. Amsterdam developed into one of the major international centres for the timber trade (alongside Dordrecht, it could be argued), while the Zaan region specialised in the industrial processing of wood.

What distinguished this relationship from that of other cities and countries was precisely this strong integration. This collaboration made it possible to import large quantities of timber, which were then processed and subsequently distributed. This system was fundamental for housing construction, shipbuilding, and infrastructure development.

At that time, the Low Countries possessed relatively few forests suitable for timber production. From the Late Middle Ages onwards, they had already become dependent on imported wood. This dependence increased significantly as the population grew. The main trade routes over the centuries ran via the sea primarily from Scandinavia and later the Baltic states or via the Rhine, bringing timber from Central Europe, such as the Black Forest. Timber transported along the Rhine was mainly directed to Dordrecht. Other cities, such as Rotterdam, Haarlem, and Groningen, also played a role, but were far less dominant in this trade (Malcolm, 1930)

The Zaan region lies on the opposite side of the IJ relative to Amsterdam and developed into a unique industrial landscape through the processing of timber. A crucial step in this industrial process was the invention of the wind-powered sawmill by Cornelis Cornelisz van Uitgeest in 1592.

In Amsterdam, this innovation was initially met with resistance and was opposed by the sawyers' guild. As a result, entrepreneurs moved their activities to the Zaan region, where guilds had little to no influence. This led to a rapid growth in the number of sawmills in the area. By the end of the 18th century, there were likely hundreds in operation. The Zaan region was also better suited for timber processing, particularly due to its open landscape. Wind conditions were stronger there than in Amsterdam, which made wind-powered industry more efficient. In addition, the abundance of water made it possible to soak timber for extended periods, an important step in the preparation process. Meanwhile, Amsterdam provided sufficient capital to invest in these industrial activities.

Amsterdam functioned primarily as a centre for the import and financing of timber, whereas the Zaan region became the centre of production. Tree trunks were processed there into planks, beams, and other semi-finished products. Timber was not transported directly to the Zaan region; the most important import hubs remained Amsterdam and Dordrecht.

A crucial shift occurred in the 19th century, when timber was increasingly processed into beams and planks in its regions of origin. This made transportation significantly more efficient. As a result, the importance of the timber-processing industry in the Zaan region gradually declined.

In summary, the strength of the Dutch timber trade lay in the close cooperation between different regions and the clear specialisation of their roles. Amsterdam functioned as the primary centre for import and trade, particularly for timber arriving from overseas, while Dordrecht played a key role in importing timber from the Rhine region. The Zaan region, by contrast, specialised in the industrial processing of wood and served as an important timber market.

2.7 Stadstimmertuinen

1. 16th century - oude timmerwerf
2. 16th century - Scafferij
3. 1571 - Scafferij
4. 1630 - jordaan
5. 1637 - Stadstimmertuin
6. 1899 - Van Reigersbergenstraat in

Timber, much of which came from the Zaan region, was stored in so-called scafferijen, commonly referred to as municipal carpentry yards. Since the sixteenth century, most large cities with appointed city masters possessed a designated site with buildings serving the municipal works department. These sites were known by various names, such as stadstuin (city yard), stadswerf (city wharf), stadstimmertuin (city carpentry yard), stadstimmerwerf, or stadstimmerhuis.

Typically enclosed by walls or arranged as a courtyard, these places were used to store materials for urban construction, including timber, piles, hoisting equipment, scaffolding, wheelbarrows, hammers, and other tools (V. E. Van Essen, 2012). In practice, nearly all building trades were accommodated within such yards. It was also common for the city carpenter and/or an assistant to reside on site in order to oversee daily operations.

What distinguishes the Amsterdam carpentry yard is its remarkable continuity. Although it may have occupied different locations within the city over time, the institution itself persisted. In comparison to other municipal trades—such as stone masonry yards, foundries, bricklaying yards, or boatbuilders' wharves—which tended to exist only for limited periods, the carpentry yard provided a continuous foundation. This continuity reveals something fundamental about Amsterdam's timber-based building culture.

Equally significant is the administrative role of the carpentry yard within the municipal system. It functioned, in part, as a centre of record-keeping, effectively acting as the hub of the entire timber construction process. Over time, more administrators and clerks became involved in monitoring these activities. Nevertheless, the principal responsibility remained the management of municipal carpentry works and the supervision of the yard and its stored materials.

In the sixteenth century, an early carpentry yard was located in the north-eastern part of the former inner city. At the same time, a scafferij existed near what is now the Grimburgwal, close to the Rokin. In 1571, this facility was moved slightly further away. Around 1630, it was relocated to the Jordaan, and soon after, in 1637, to the site that later became known as the former municipal carpentry yard. The final relocation took place in 1899, when the yard was moved to the Reigerbosstraat, outside the city walls as they existed at the tim (G. Van Essen, 2011a)

2.8 Morphological development

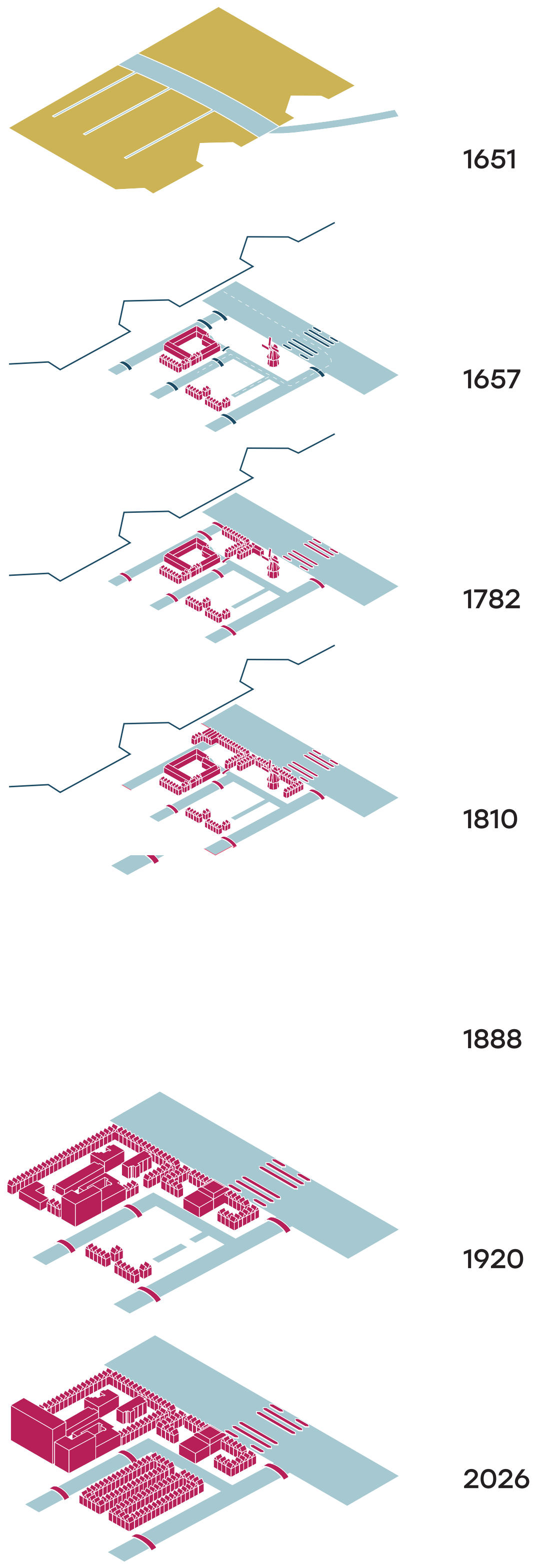


fig. 14 Historical development of the plot

The Illustrations on the left illustrate the morphological development of the plot from the mid-seventeenth century to the present. The site's origins relate to Amsterdam's final major urban expansion of 1651, which established the city's broader framework. Despite this, the area remained largely undeveloped, consisting of open meadows at the city's edge.

By 1657, the former timber yard (stadstimmertuin) had taken on a defined role. Timber arrived by water, was stored in the open landscape, and processed within a courtyard block that integrated production, storage, and processing. This organisation remained largely intact through 1782, while surrounding plots gradually developed.

By 1810, further densification occurred. A branch of the Amstel was filled in to allow housing construction, marking the initial formation of the urban block as recognised today. By 1888, significant change had taken place: early developments of Theater Carré emerged, the original stadstimmertuin had largely been demolished and residential blocks became more prominent.

A key spatial feature throughout this period was the water boundary along the courtyard block's edge. By 1920, this waterway was completely filled in, marking a decisive spatial shift. This period also saw the replacement of earlier building stock with larger institutional and industrial structures, including the Diamantbeurs and a former fire station, reflecting a transition from production to mixed-use.

In the contemporary condition (2026), the block has been further completed through incremental development, with previously open plots now fully built up. Overall, the site evolved from a peripheral production zone into a dense, complex urban block a layered history that informs future architectural intervention.

2.9 D&C | *Reading the Site*

This is the first section of the paragraph in which the sub-question is addressed and a partial conclusion is drawn:

What is the current architectural and historical character of the Stadstimmertuin?

The current architecture of the Stadsstimmertuin can be interpreted as a layered urban ensemble in which historical developments, spatial transformations, and contemporary interventions are interwoven. At the same time, the site is characterized by a degree of fragmentation, resulting in an inconsistent level of spatial and architectural coherence.

Historically, the Stadsstimmertuin has undergone a complex development process in which relocation and transformation played a significant role. The original Stadsstimmertuin was relocated multiple times within Amsterdam before eventually being fixed within the Weesperbuurt. In its morphological evolution, the original urban block with a central courtyard gradually transformed into a more open and fragmented configuration. A clearly defined ensemble was replaced by an urban condition in which multiple buildings were integrated within a newly defined block structure.

The original complex has largely disappeared, although certain functions and spatial principles have been reinterpreted within the current program. Key elements within the present configuration include the former city printing house and several educational buildings, which act as the main historical anchors of the site.

A defining characteristic of the site is the presence of multiple spatial "anchors" that structure its internal logic. The public courtyard functions as a collective and social core, while surrounding private gardens contribute to a strong green and introverted character. However, an overarching spatial coherence connecting these elements is largely absent.

The broader urban context of the Weesperbuurt plays a crucial role in shaping the identity of the site. The neighbourhood is characterized by a high degree of diversity in urban conditions: a busy street edge along Sarphatistraat, an infrastructure-dominated metro zone, a quiet and enclosed edge towards the Nieuwe Achtergracht, and a historically oriented waterfront condition along the Amstel. These contrasting conditions reinforce the layered complexity of the site.

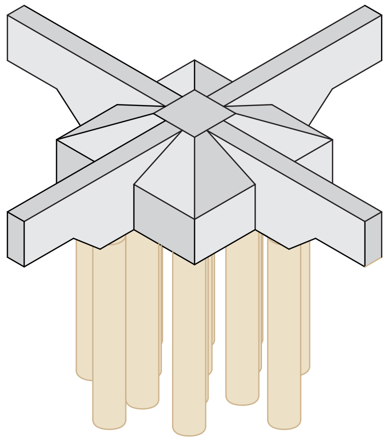
Within this context, the Nieuwe Achtergracht could acts as a key connector, as it is the only element that explicitly mediates between the public street and the inner block structure. Architectural interventions from the 1980s and 1990s, including those by Rudy Uytenhaak, remain visible and contribute to the layered readability of the site.

In addition, the historical development of timber flows provides an important contextual background. The sourcing of timber shifted over time from regional supply chains to more distant international sources, including the Black Forest and later the Baltic region. Amsterdam and Zaandam played complementary roles as trade hub and processing center respectively, forming the economic basis for urban infrastructures such as the Stadsstimmertuin.

Conclusion

The current architecture of the Stadsstimmertuin is characterized by a combination of historical layering and contemporary fragmentation. While certain elements such as the courtyard and the green spatial structures, still refer to the original spatial and functional identity of the site, the overall coherence between the different components remains limited. The result is an urban ensemble that is not governed by a single architectural logic but rather composed of multiple autonomous elements held together by their urban context.

The Stadsstimmertuin can therefore be understood as a palimpsest of urban development, in which different temporal layers, functions, and architectural strategies coexist without being fully integrated into a unified whole.



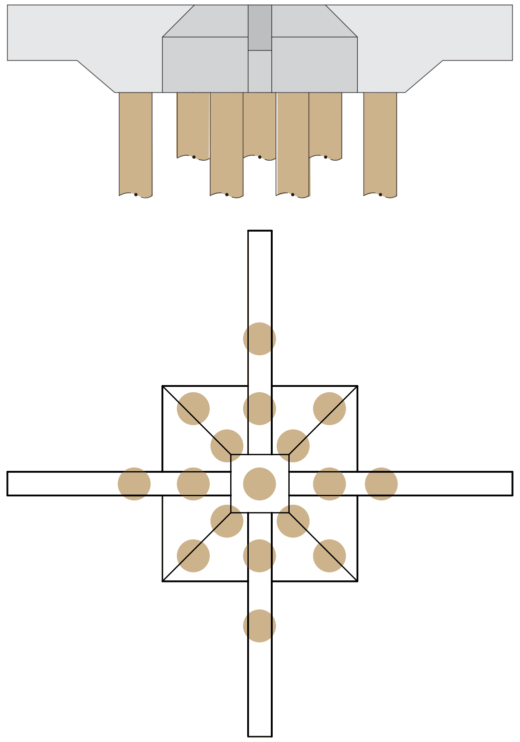
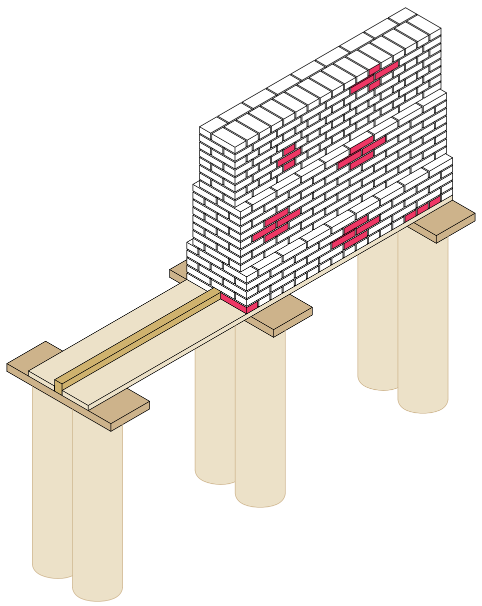


fig. 16 : concrete–timber foundation



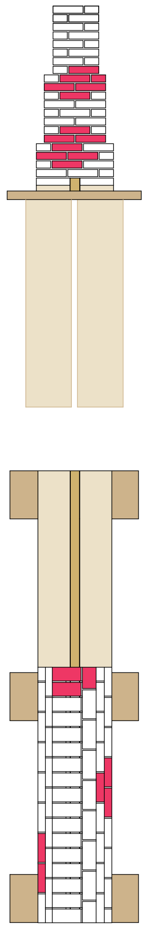


fig. 17 : Amsterdam pile foundation

2.10 Foundations

Foundation principles in the Voormalige Stadstimmertuin

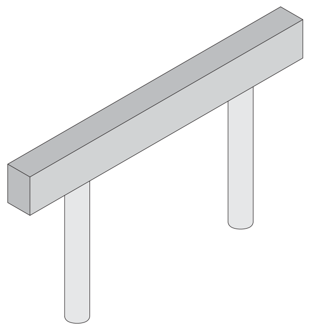
Within the project, various foundation typologies are visible, together illustrating the layered development of the area. In total, three main types of foundations can be distinguished.

The foundation of the former printing house consists of a concrete bearing structure supported by a large number of wooden piles. This refers to the traditional Amsterdam foundation method, in which wooden piles are used due to the soft peat soil. This combination of concrete on wooden piles was specifically applied under the rigid concrete structure of the original printing house section.

A more traditional Amsterdam foundation is also present. This consists of wooden piles with a timber sleeper construction on top, provided with a cushioning intermediate layer so that limited settlement and movement can be absorbed. Above this, masonry is placed, which functions as the load-bearing element for the rising structure. This foundation method was used in the office spaces of the former printing house, but also in the school and partly in the new rear canal development. It is therefore a more flexible and traditional construction method, suitable for lighter or more transformed building parts.

At Weesperstraat and the new interventions along the rear canal, a modern foundation system is visible. This consists of a contemporary concrete construction with concrete foundation beams on concrete piles. This foundation method is rigid and entirely executed in concrete, aligning with the new additions in the area.

Within the project, a clear transition can be observed from traditional wooden pile foundations to modern concrete foundations. These different systems reflect not only the construction period of the components, but also the degree of transformation and redevelopment within the area.



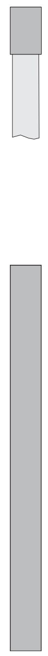


fig. 18 : concrete foundation

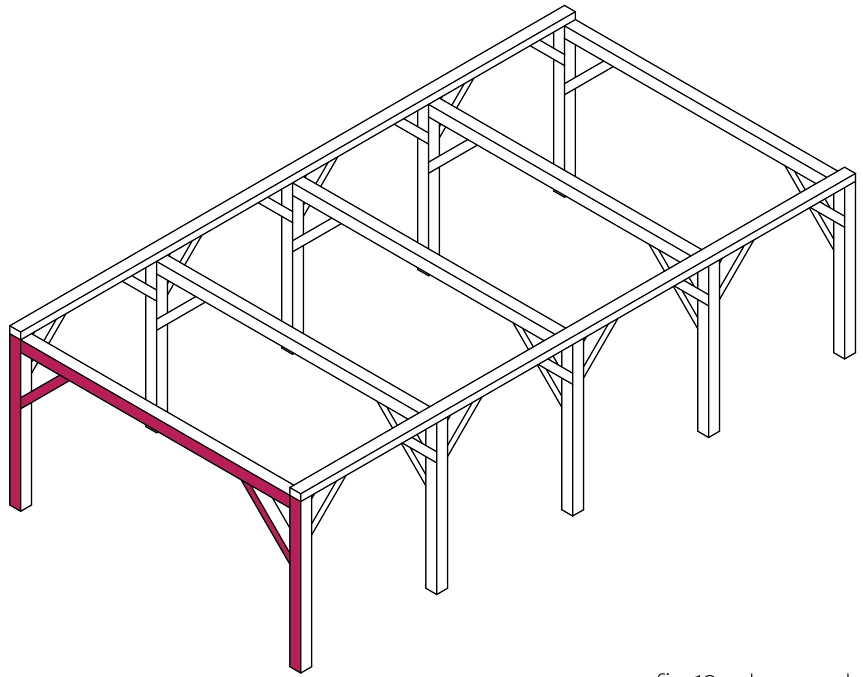


fig 19 : dwarsgebint I cross truss

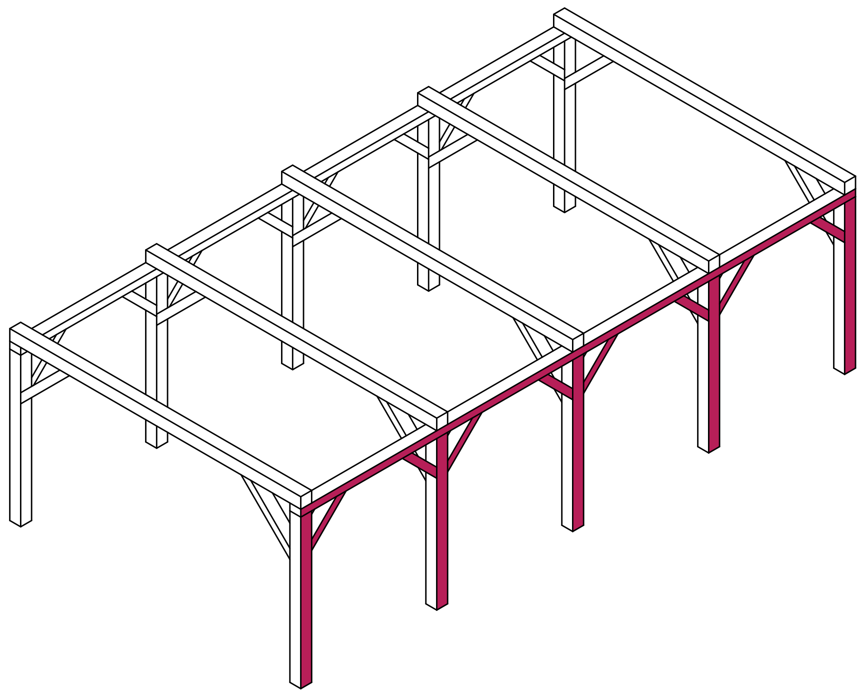


fig 20 : langsgebint I longitudinal truss

2.11 Dutch Historic Timber Construction

Transverse and longitudinal timber framing

The Amsterdam timber construction tradition is closely connected to the timber construction traditions of the rest of the Netherlands. Its basis is therefore the same as that of farmhouses and small rural dwellings. It all begins with a typical timber frame (post-and-beam) structure.

A frame (gebint) is a combination of two or more vertically placed posts and two or more braces used to stiffen the corners between the posts and beams. In essence, they form what we now refer to as portal frames.

There are essentially two families of portal frames: the so-called transverse frames (dwarsgebinten) and longitudinal frames (langsgebinten). Transverse frames are oriented perpendicular to the length of the building, whereas longitudinal frames have their portal aligned parallel to the length of the building. Although the difference in configuration is relatively small, it has a significant impact on how they are constructed and how loads are transferred. This is mainly related to the horizontal members that connect the elements. Both types of frames are traditionally provided with braces to ensure structural stability (Berends, 1996).

Transition to masonry walls

Dutch cities were affected by urban fires during the Middle Ages. Well-known examples include Alkmaar (1328), Dordrecht (1457), Hoorn (1481), Enkhuizen (1512), and Delft (1536). The “stone transformation” of the Netherlands is therefore an important concept in the development of Dutch cities (Van Tussenbroek, 2012) . Before the mid-fifteenth century, there was little urgency to require the use of non-combustible building materials. However, by the early sixteenth century, city authorities increasingly recognized the need for improvement. Administrative measures were introduced, such as prohibiting thatched roofs within city limits.

These regulations were later expanded. New buildings were increasingly required to have masonry side walls and roofs covered with tiles or slate. As a result, timber houses were gradually excluded from urban areas, although timber façades remained permitted for a long time. Enforcement, however, remained a major challenge. As late as 1520, Amsterdam was still largely a timber-built city. The transition to stone progressed slowly, mainly due to active lobbying by groups such as thatchers and carpenters, who exerted influence on master builders and city officials. For them, stricter fire regulations posed a direct threat to their livelihoods (Van Tussenbroek, 2023).

The mandatory use of party walls made of brick rendered timber structural side walls largely redundant. There are examples where masonry walls were initially constructed between timber structures, but it was soon realized that entire walls could be built in brick. The primary objective became the creation of a stiff structural system between party walls. This was mainly achieved through the introduction of floor structures (beam layers).

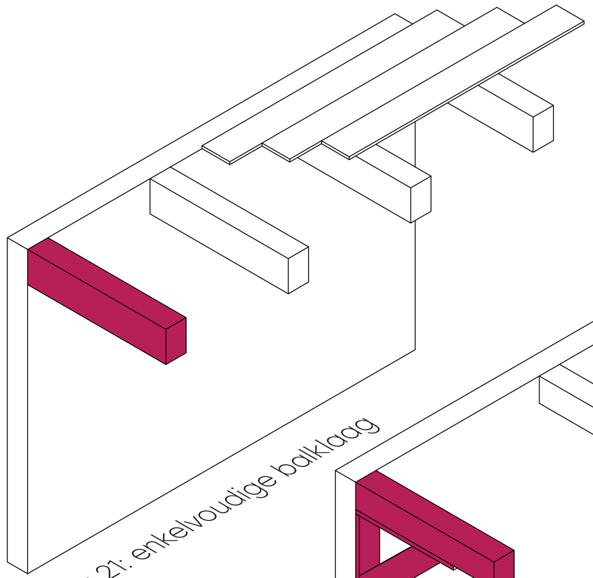


fig 21: enkelvoudige balklaag

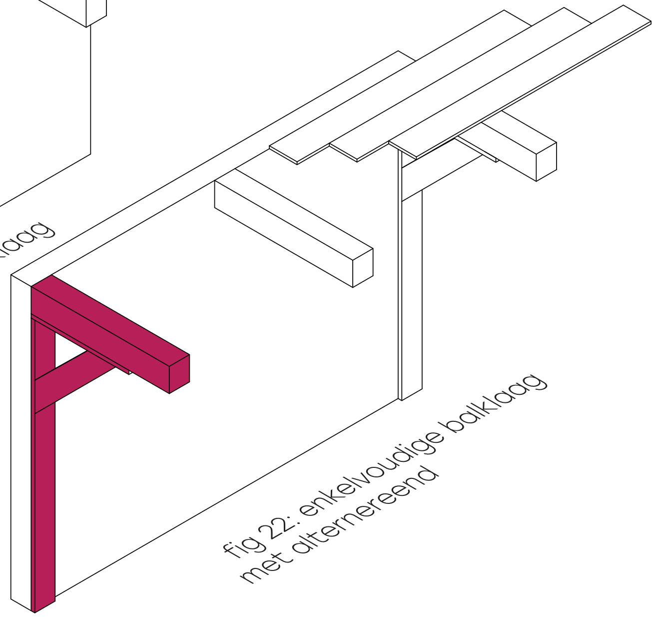


fig 22: enkelvoudige balklaag met alternereend

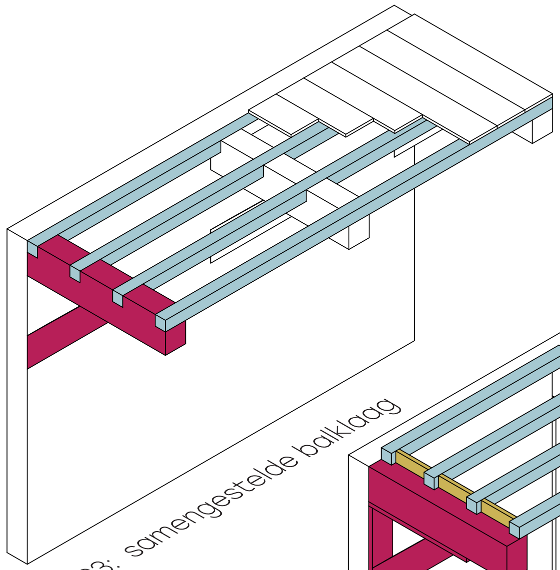


fig 23: samengestelde balklaag

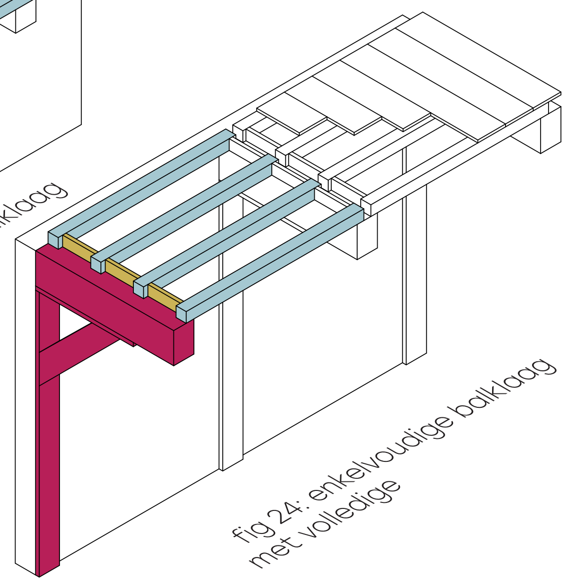


fig 24: enkelvoudige balklaag met volledige

spreidsel I lining wainscot

kopschotje I -

spreidsel latje I lining wainscot slat

Floor joists

Flooring systems

In early timber constructions, the structural system was based on jukken (frames) and gebinten (trusses), which together handled both vertical and lateral forces. The gebinten initially played an important role in the sideways transfer of loads, contributing to the overall stability of the structure. Over time, however, this function diminished, and the lateral contribution of the gebinten became less important. As a result, certain structural elements were no longer necessary, which allowed for more flexibility in the design of the floor structures.

This change led to an important consequence: the distances between the jukken gradually increased. To bridge these larger spans, the beams in the floor structure had to become thicker. However, producing and using increasingly thick beams was not always practical or efficient. At the same time, when floors were placed directly on top of these beams, it created problems with the floor decking, as it no longer formed a well-functioning, closed surface.

To solve these issues, builders developed a more refined structural system. They introduced secondary beams placed perpendicular to the main beams. These secondary beams are known as kinderbalken or kindergebinten, while the main beams are called moerbalken. This system is an example of an alternating structural framework, in which loads are distributed more efficiently across multiple sections.

The first indications of this system date back to the late 13th century, but it became much more common from the 17th century onwards, especially in Dutch cities such as Amsterdam. In many cases, the kinderbalken were square in shape, unlike the rectangular moerbalken. This made it possible to place them either on top of the main beams or recessed within them. When recessed, they contributed more effectively to the stiffness of the structure. When placed on top, they mainly fulfilled a supporting or tensile role.

A practical issue arose when the kinderbalken were placed on top of the moerbalken: the spaces between the beams remained visible from below. To address this, builders used kopschotjes (end boards) to close off these gaps and create a more finished appearance. Additionally, open beam structures could lead to dust falling through the floor. This problem was solved by applying spreidsel, a filling material placed between the beams to prevent dust from passing through.

In practice, there was considerable variation in the dimensions of the moerbalken. Different sizes could even occur within a single building, depending on factors such as cost, availability of timber, and specific structural requirements.

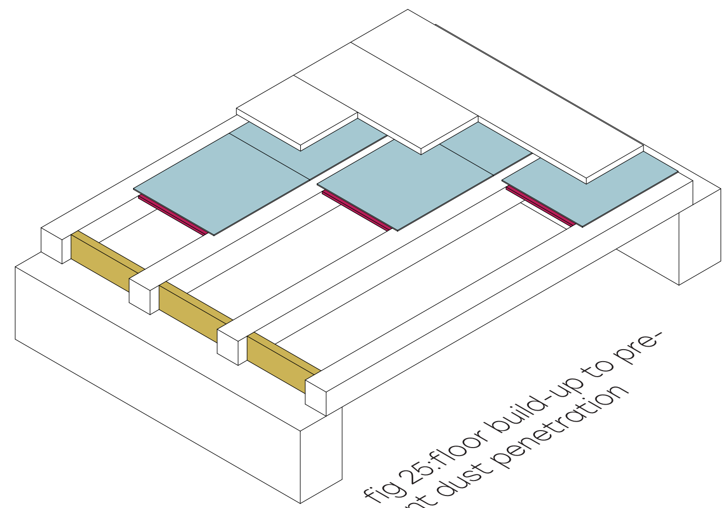


fig 25:floor build-up to prevent dust penetration

spreidsel I lining wainscot

kopschotje I -

spreidsel latje I lining wainscot slat

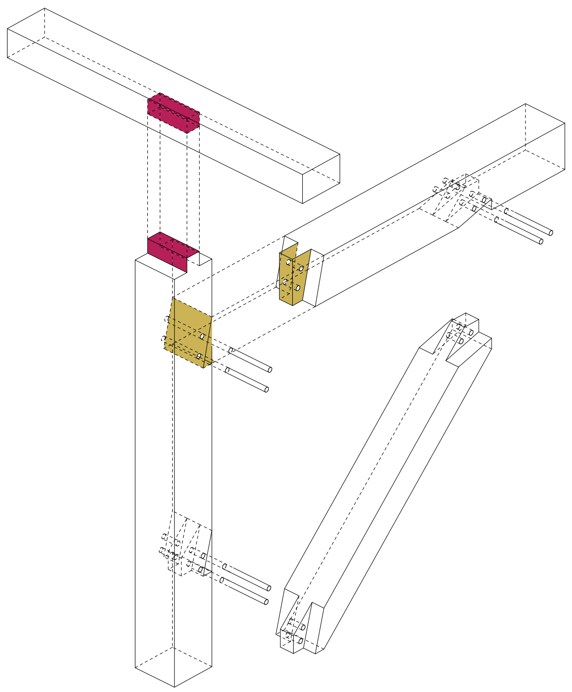


fig 26: tussenbalkgebint I intermediate beam

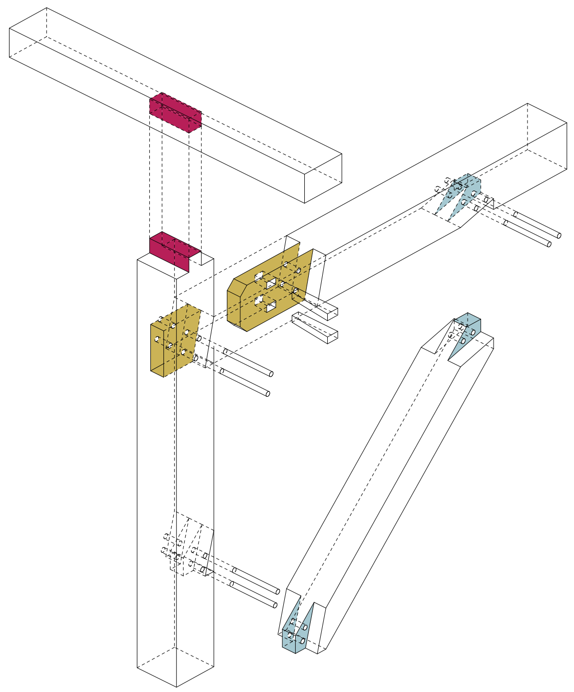


fig 27: ankergebint I ancor beam

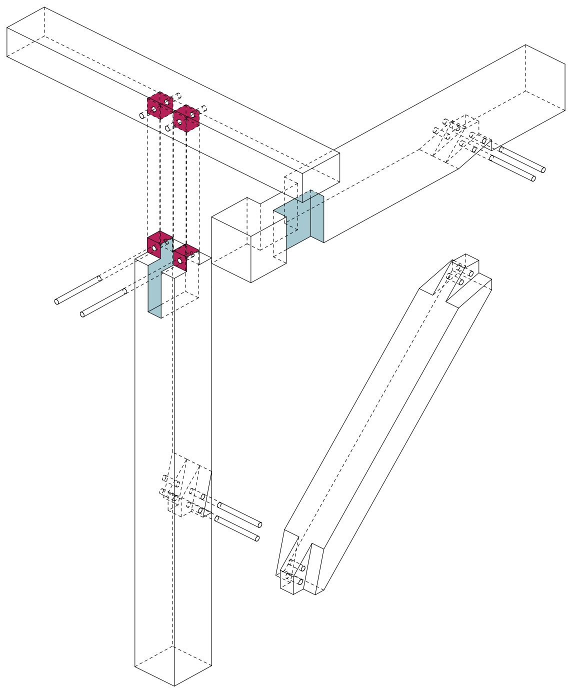


fig 28: kopsbalkgebint I - beam

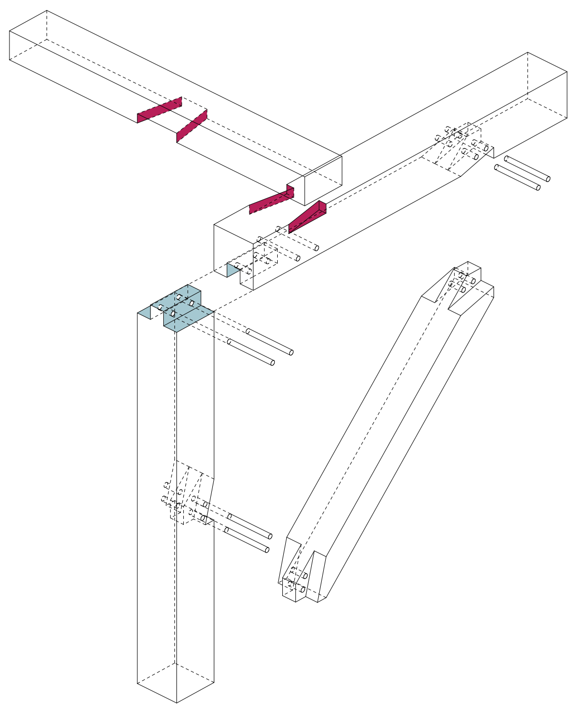


fig 29: dekbalkgebintI - beam

Connections

Main connections of the dwarsgebint

The origins of all these frame types lie in agricultural building. In early constructions, side aisles provided the lateral stability of the structure. As these aisles gradually disappeared, the stabilising function they had fulfilled required alternative solutions – initially through the application of external bracing. In urban contexts, this structural role was eventually assumed by load-bearing brick masonry walls. The choice of timber species has always been subject to considerable regional variation. In Amsterdam and other cities, oak, pine, spruce and fir were the most commonly used structural timbers. Elsewhere in the country, markedly different traditions prevailed: in the Betuwe region, for instance, poplar was a widely used construction material. The species employed was largely determined by what was locally available. (Bot, 2009)

The first group of frame types comprises those in which the beam is positioned on top of the column. The connection is made at the end of the beam by means of a mortise-and-tenon joint at the head of the post. The most characteristic variant is the deck beam frame (dekbalkgebint), in which the primary beam is referred to as the 'deck beam'. A related variant is the head beam frame (kopbalkgebint), in which the beam likewise rests on top of the column, but with both ends locally reduced in section. The head beam is secured behind the column by means of a double mortise-and-tenon connection.

The second group comprises the so-called tie beam frames, in which the beam is not placed on top of the column but is instead inserted into it. In the intermediate beam frame (tussenbalkgebint), the beam is set into the column via an open or closed mortise-and-tenon joint and secured on both sides with wooden pegs. A structurally more robust variant is the anchor beam frame (ankergebint), in which the anchor beam passes entirely through the column, creating two openings at the rear into which wedges are driven. This produces a tensile connection of considerably greater strength than that of the intermediate beam frame. A notable advantage of the wedge is that, owing to its tapered form, it allows for adjustment: driving it further tightens the connection. Like the mortise-and-tenon joint, the wedge connection is fully demountable, rendering the assembly reversible. The head beam frame occupies an intermediate position between these two groups, as the head beam is also secured behind the column – a characteristic it shares with both the anchor beam and intermediate beam frames.

A fundamental distinction between the two groups concerns the positioning of the beam on the column. The deck beam frame and head beam frame both constitute a termination at the top of the column, whereas the intermediate beam frame and anchor beam frame may be positioned at any point along its height.

In all cases, the load-bearing beam is traditionally fitted with a brace or bracket (schoor or korbeel). This characteristic triangular element reduces the effective span of the beam, thereby significantly decreasing the bending moment that the beam must resist. A substantial proportion of the forces is transferred directly through the brace itself. (Berends, 1996)

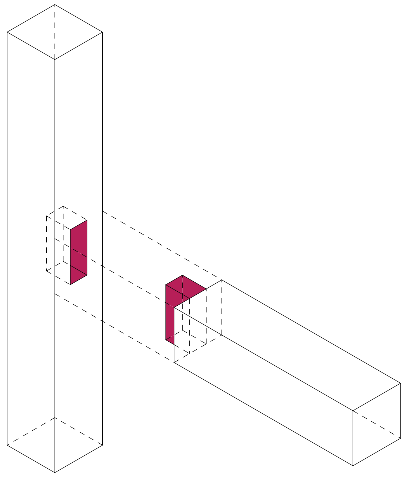


fig 42: Gesloten pen-gatverbinding | Closed pin-hole connection

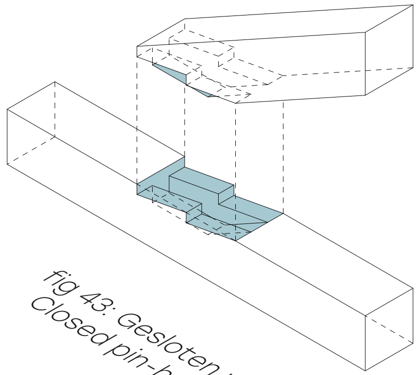


fig 43: Gesloten pen-gatverbinding met dubbele tand | Closed pin-hole connection with double tooth

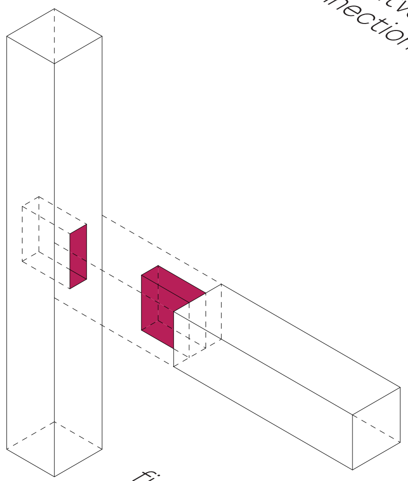


fig 44: Open pen-gatverbinding | Open pin-hole connection

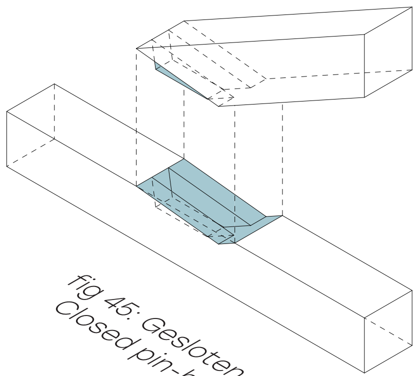


fig 45: Gesloten pen-gatverbinding met hiel | Closed pin-hole connection with heel

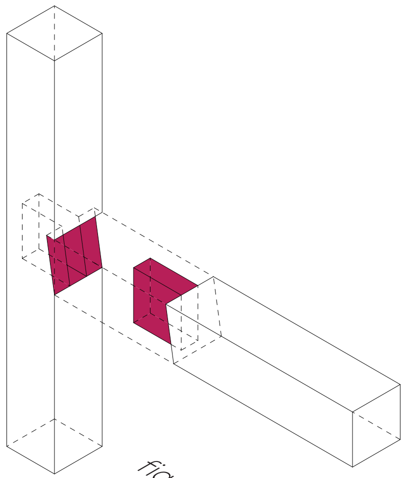


fig 46: Open pen-gatverbinding met tand | Open pin-hole connection with

perpendicular intersections

This chapter does not aim to provide an exhaustive overview of all timber joints relevant to Dutch timber construction. The primary reasons for this are their sheer number, their complexity, and the fact that not all are directly relevant to the present research. Although the study of timber joints is inherently rich—allowing for numerous variations and deeper layers of refinement—it is important to emphasise that this research focuses primarily on underlying principles rather than comprehensive cataloguing. Extensive literature already exists that documents these joints in detail.

Instead, this chapter highlights a selection of more traditional joint types as a means to explore and further develop key structural and constructive principles.

End Connections: Heel and Hook Joints

Within this system, two variants can be distinguished. The first is the heel joint, where the timber is supported by a single recess or step (a "heel") in the receiving element. This additional bearing surface increases stability by providing a defined seat into which the timber can settle. The heel primarily resists longitudinal movement, preventing the element from sliding forward or backward along its axis.

The second variant is the double-tongue connection, in which the timber engages through two distinct interlocking notches at different depths within the receiving element. This creates a more articulated embedding, where the element is locked in two layers of the material. Similar to the heel joint, it remains a pinhole-based system, but with increased geometric complexity.

Mortise and Tenon Variations: Open and Closed Forms

A further distinction can be made between open and closed mortise and tenon joints.

In an open mortise and tenon joint, the tenon remains visible or passes through the element. A key advantage of this configuration is the increased amount of available material for shaping the joint, allowing for more robust cutting and greater flexibility in the placement of pegs. This makes the joint easier to produce and, in many cases, more practical to execute. However, the visibility of the joint introduces considerations related to weather exposure (such as water ingress) and aesthetics.

By contrast, a closed mortise and tenon joint conceals the tenon within the receiving element. While this limits the available space for shaping and pegging, it provides a cleaner appearance and can offer better protection against environmental exposure. These joints may be executed with or without an additional tooth (or shoulder detail).

A closed mortise and tenon joint with a tooth functions in a manner comparable to heel or hook joints, but oriented differently. It effectively creates two connections of support: the connected element partly bears on the column while simultaneously being supported by the projecting member. This makes it a particularly suitable and traditional solution for connecting braces and corbels.

(Berends, 1996)

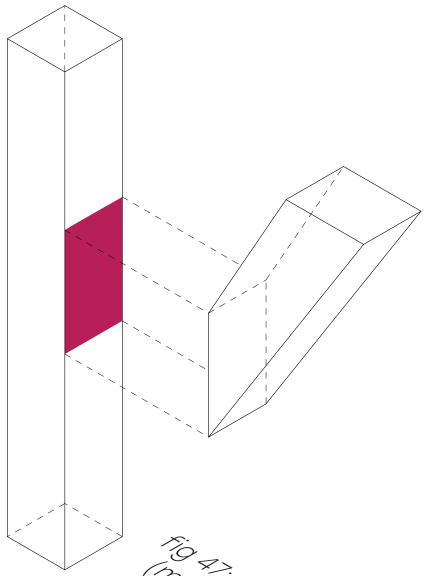


fig 47: Koude verbinding (met houten nagel en spijker) I Dry connection (with wooden peg and nail)

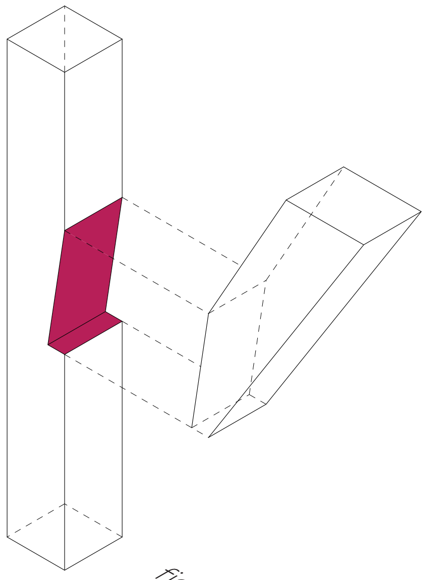


fig 48: Verbinding met tand I Toothed joint

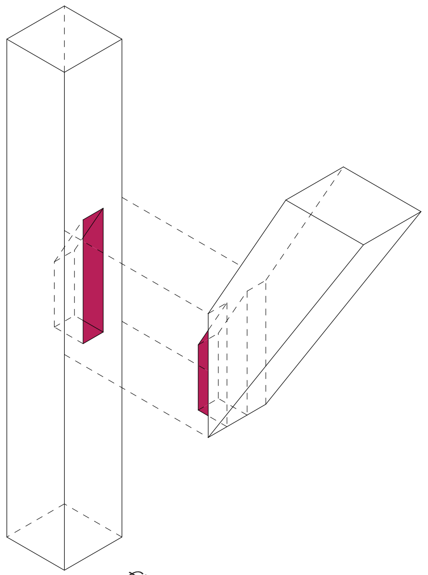


fig 49: Gesloten pen-gatverbinding I Closed ortise-and-tenon joint

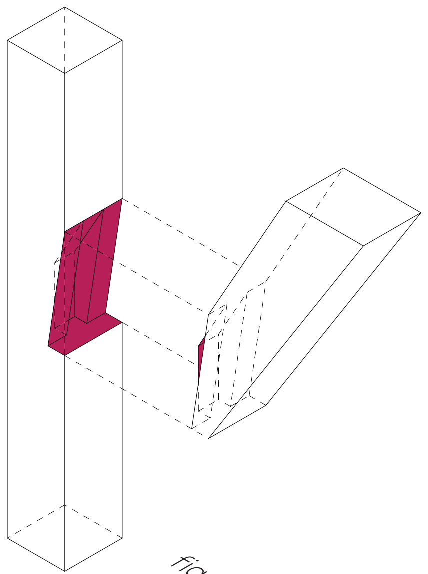


fig 50: Gesloten pen-gatverbinding met tand I Closed mortise-and-tenon joint with tooth

oblique intersections in the vertical plane

This section examines four types of connections between a diagonal brace and a vertically placed column. Each connection type represents a different level of structural complexity and mechanical performance, reflecting the range of joinery techniques available in timber construction.

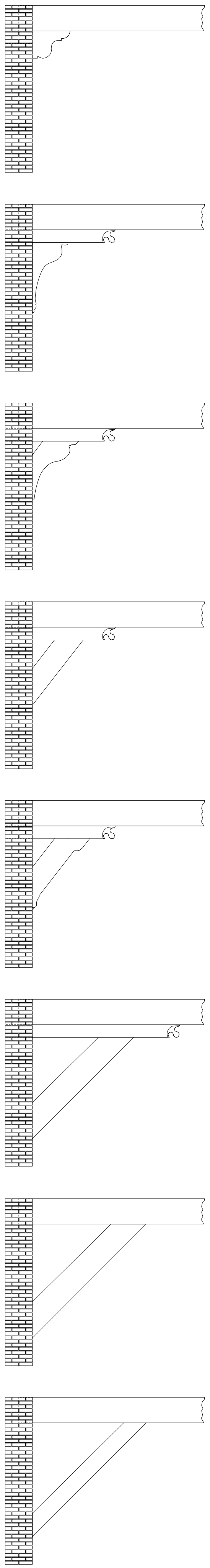
The first is a simple dyr connection, in which the diagonal brace is placed directly against the column without any form of mechanical interlocking. The joint is fixed using either a nail or wooden treenails, which hold the two elements together purely through fastening. While this is the most straightforward and quickest joint to produce, it offers limited structural resistance, as the connection relies entirely on the fastener rather than the geometry of the joint itself. Under significant loading, this type of connection is therefore the most vulnerable to displacement or failure.

The second type introduces a toothed joint, in which a small tooth or step is cut into the surface of the column. The diagonal brace rests against this notch, which mechanically prevents the brace from sliding either upward or downward along the column. This geometric interlock adds a meaningful degree of structural resistance that the simple butt connection lacks. The joint is still secured with a nail or treenail, but the notch ensures that vertical forces are partially transferred through the timber itself rather than through the fastener alone. This makes the notched connection notably more reliable under load.

The third connection type is a mortise and tenon joint, one of the most traditional and widely used techniques in timber framing. In this joint, a tenon , a projecting element shaped at the end of the brace, is inserted into a mortise, a corresponding cavity cut into the column. This creates a fully interlocked connection in which the two timber elements are mechanically bound together. The mortise and tenon joint significantly increases the rigidity of the connection, resisting both rotational and translational movement. It requires a higher level of craftsmanship and precision in cutting but offers considerably stronger performance compared to the two previous types.

The fourth and most complex type is a combined mortise and tenon joint with a tooth. This connection integrates both the notched tooth and the full mortise and tenon system into a single joint, bringing together the advantages of each individual technique. The notch ensures resistance against vertical sliding, while the mortise and tenon provides complete interlocking between the members. Crucially, the combination also results in a significantly larger contact surface between the diagonal brace and the column, allowing forces to be distributed across a much wider area. This improved load distribution reduces localised stress concentrations and enhances the overall structural performance of the joint. As a result, this connection is both the strongest and the most technically demanding of the four, requiring the highest degree of precision and skill in its execution.

(Berends, 1996)



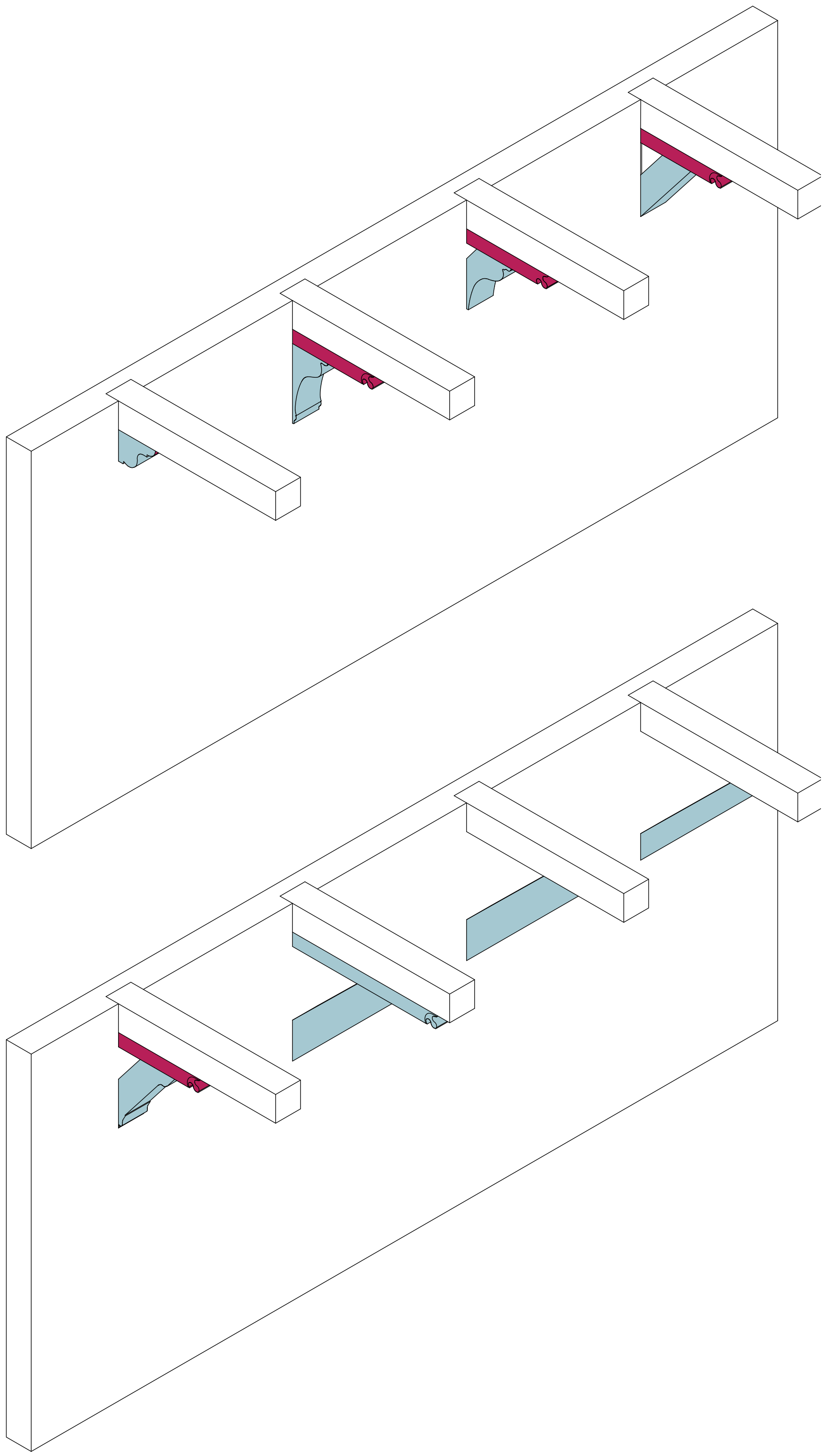


fig 29: Development from bracing
to korbelen en sleutelstukken

Korbelen en Sleutelstukken

Between Structure and Ornament

The ´korbeel´ originally developed as a relatively simple structural element: a triangular brace between column and beam. This form stabilizes the connection and allows forces to be transferred more efficiently. Within the Amsterdam timber building tradition this element has evolved significantly over time. The corbel has not remained merely a functional detail, but has become increasingly robust and ornamental. Instead of a simple triangular brace, it often takes the form of a more elaborated wooden element, such as the so-called swan-neck corbel, which is clearly recognizable as a characteristic historical detail.

The korbeel plays an important structural role by effectively reducing the span of the beam. As a result, the bending moment in the beam is significantly decreased. Part of the forces is transferred directly through the corbel to the column and then further down to the foundation. This means the beam itself can be designed lighter and more slender, since part of the load is "taken over" by the korbeel

In the image on the left, the evolution of the korbeel is visible over time. At a certain point, the so-called sleutelstuk (key piece) emerges as an extension and thickening of the beam's underside. As beams shifted from frame connections to being embedded directly into masonry walls, beam ends became increasingly vulnerable to rot. The key piece, projecting into the wall as a bearing element, allowed only this smaller component to be replaced rather than the entire beam.

Notably, the key piece and korbeel together took on a strongly ornamental role in Amsterdam's timber building tradition. The corbel itself grew progressively thicker and more elaborate, eventually giving rise to a distinct variant known as the zwanenhals (swan-neck) korbeel. At certain point the korbeel was no longer a simple triangular bracket, but a solid, sculpted piece of timber set into the corner.

Within this research and design, it is interesting to reinterpret this historical approach. The idea is not to resolve the moment solely within the structure using steel, but rather through external wooden connections such as the corbel. This approach serves not only a structural purpose but also carries clear architectural value. The connection becomes a visible part of the spatial expression of the building and contributes to the aesthetics and legibility of the structure.

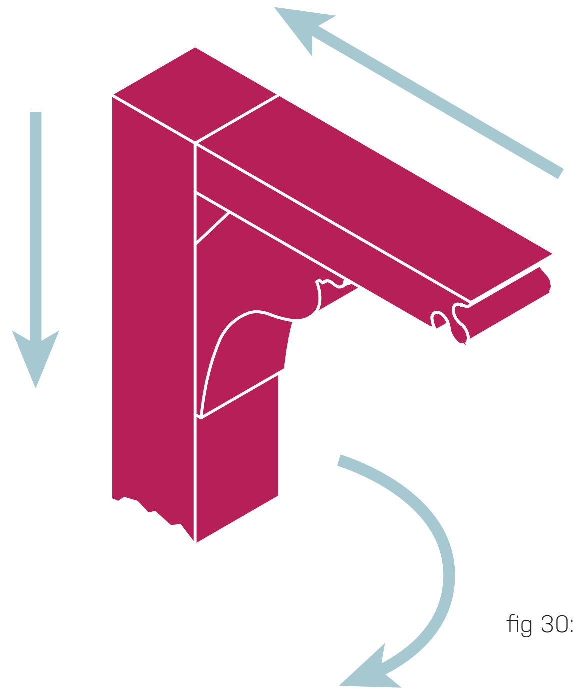


fig 30: Forces absorbed by the korbeel

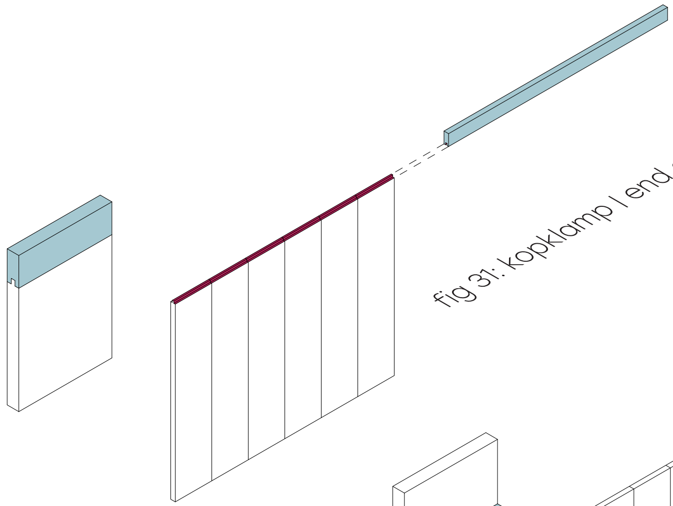


fig 31: kopklamp | end cleat

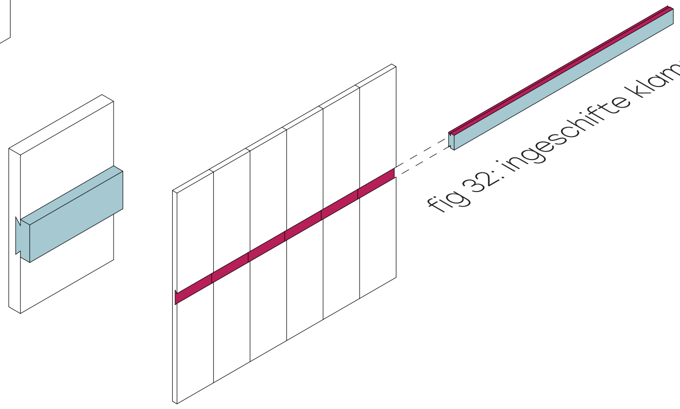


fig 32: ingeschifte klamp | sliding cleat

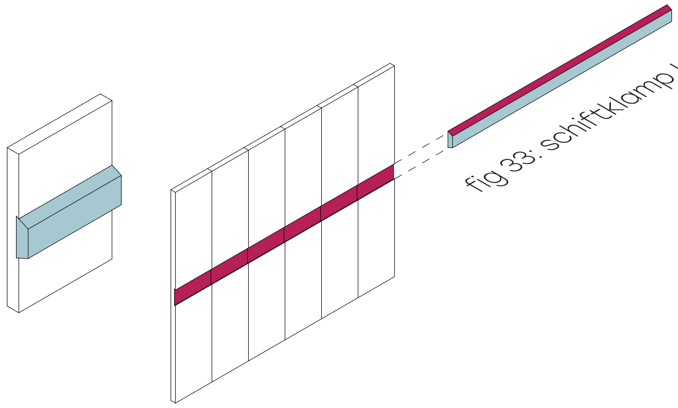


fig 33: schiftklamp | wedge cleat

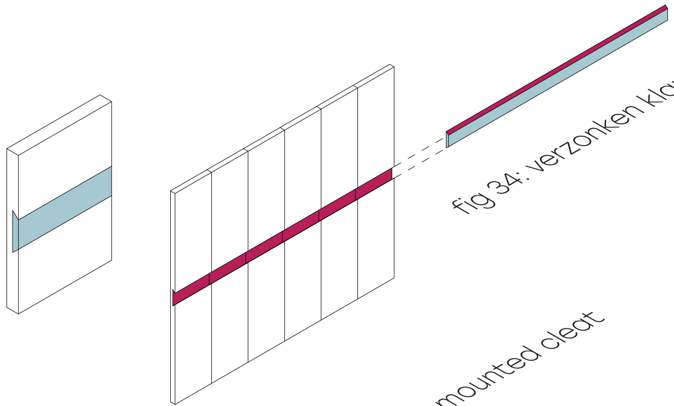


fig 34: verzonken klamp | hidden cleat

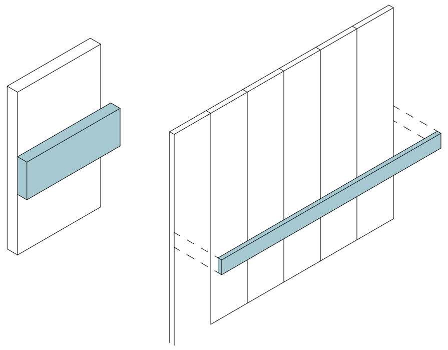


fig 35: opgelegde klamp | surface-mounted cleat

Vertical cladding

vertical cladding and its connections

Within traditional Dutch timber construction, vertical cladding forms an essential component of both the structural logic and the architectural expression. The way timber façade panels are connected not only determines the stability of the façade plane but also governs how the material responds to moisture and temperature variations. In general, two main systems can be distinguished: cleat-based connections and vertical boarding systems such as weatherboarding.

Cleat connections are used to mechanically join vertical timber elements and stabilize the façade as a whole. Within this category, several variations exist depending on the position and detailing of the cleat. The first is the head cleat, where the connection is applied at the edges of the boards, often combined with tongue-and-groove joints to create a more closed façade. Another variant is the recessed cleat, where the connector is partially embedded into the timber, resulting in a more integrated panel assembly. A further type is the embedded or notched cleat with a double interlock, which provides a higher level of structural fixing and reduces relative movement between elements. The simplest form is the applied cleat, where a batten is nailed onto the boarding and primarily serves a fixing and covering function.

Alongside these more rigid connection systems, weatherboarding and vertical plank systems are widely used. In this approach, timber boards are installed vertically with small gaps between them, which are then covered by overlapping boards or narrower cover battens. This system is more material-efficient and allows the timber to move more freely. Minor dimensional changes in the material are accommodated through the open joints and covering layers, reducing internal stress and minimizing the risk of cracking.

The key difference between these systems lies in the degree to which the timber is either restrained or allowed to move. Cleat-based connections create a more controlled and relatively rigid façade assembly, whereas weatherboarding offers a more flexible approach in which material movement is accepted and technically accommodated. As a result, a clear balance emerges between structural rigidity and material behaviour, where the choice of system is directly related to durability, detailing strategy, and the desired architectural expression.

(Orsel & V.d. Spek, 2024)

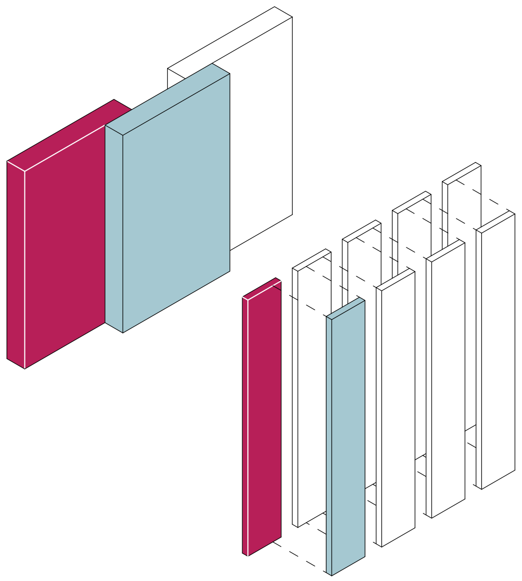


fig 36: verticale potdekseling | lap sliding

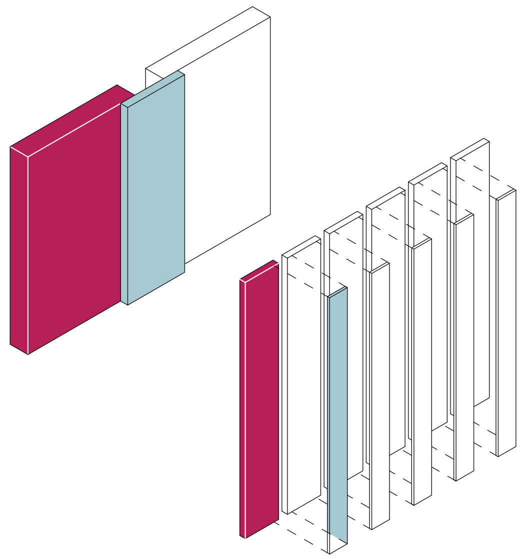


fig 37: met tochlatten | with draft strip

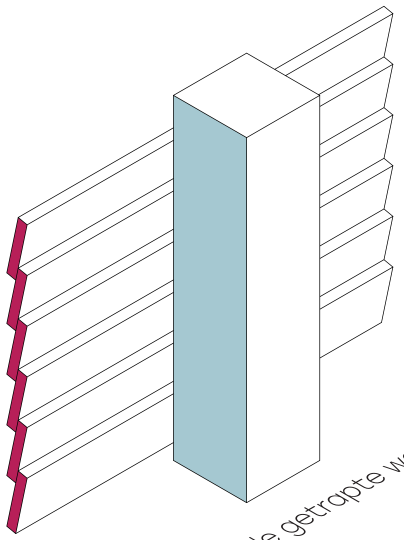


fig 38: potdekseling I de getrapte weeg

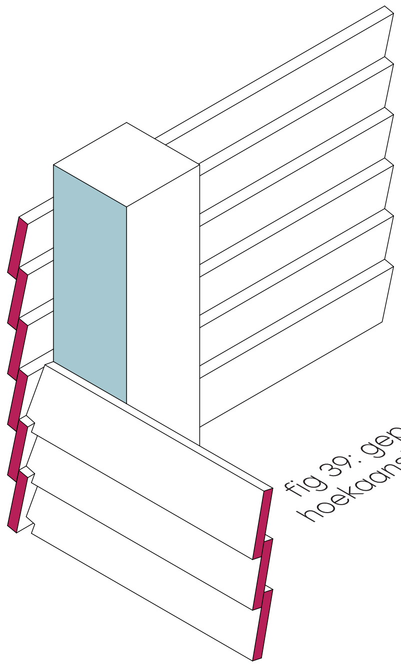


fig 39: gepotdekselde hoekaansluiting

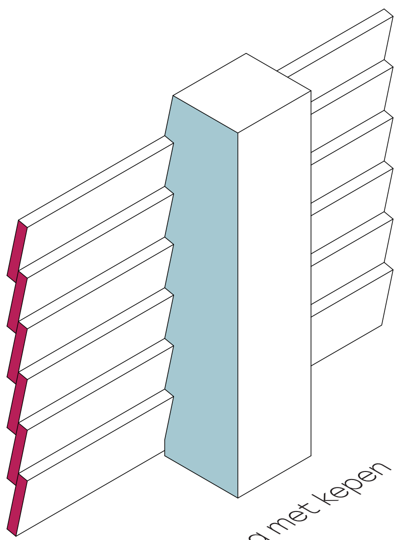


fig 40: potdekseling met kepen

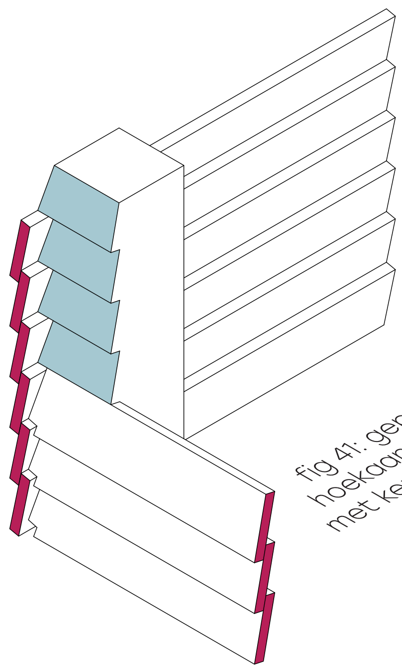


fig 41: gepotdekselde hoekaansluiting met kepen

Horizontal cladding

horizontal cladding and its connections

In the context of horizontal timber cladding systems, a key distinction can be made between two primary construction approaches within poddekseling (stepped cladding) detailing. The main difference lies in the way the cladding boards are articulated and how they interact with the supporting structural elements, particularly at junctions and corner conditions. These systems are fundamentally driven by both construction logic and water management performance, ensuring durability and controlled moisture shedding.

The simplest form of poddekseling is the stepped configuration. In this system, the timber boards are installed in an overlapping horizontal arrangement against a vertical structural column or support. Each board is positioned so that it partially overlaps the one below it, creating a stepped visual effect. This overlapping geometry is not only aesthetic but also functional: it plays a crucial role in water management. Rainwater is guided downwards along the exterior surface of the cladding, preventing direct penetration into the structural layers behind it. The stepped arrangement ensures that water is continuously shed outward, reducing the risk of moisture accumulation within the façade assembly.

In this basic configuration, the connection between the cladding and the supporting column remains relatively straightforward. The boards are simply fixed against the structural support, with the stepped overlap providing the primary mechanism for weather protection. As a result, the construction logic is clear and efficient, with limited complexity in detailing.

A more advanced variant of poddekseling introduces the use of capes, or small interlocking elements integrated into the timber boards. In this system, the façade is no longer solely reliant on simple overlapping, but instead employs a more precise form of geometric interlock.

At junctions, particularly at corner connections, a structural column is again present; however, the timber boards are modified with small “teeth” or notches along their edges. These capes allow the boards from one side of the façade to connect seamlessly with the stepped geometry of the adjacent side. The result is a tighter, more controlled connection where the façade elements lock into each other with higher precision.

In some cases, this interlocking principle is also applied directly to the column itself. The column is designed with corresponding vertical notches or dentations, into which the timber boards are inserted. This creates a deeper level of integration between structure and cladding. Rather than simply being fixed against a flat support, the boards become partially embedded within the structural geometry of the column, increasing both alignment accuracy and visual continuity.

The complexity of this system becomes particularly evident in corner conditions. Here, a double interlocking mechanism is often applied. Both intersecting façades are equipped with complementary toothed profiles, allowing the horizontal battens from each direction to engage with one another. This creates a highly articulated corner detail in which the cladding elements appear to fold into each other.

Visually, this results in a refined and continuous façade expression, where the corner is no longer perceived as a sharp interruption but rather as a structured transition. Technically, however, this solution requires significantly more precision in fabrication and assembly compared to the basic stepped system. The interdependence of both façade directions introduces a higher level of construction complexity, as tolerances must be carefully controlled to ensure proper alignment of all interlocking elements.

(Orsel & V.d. Spek, 2024)

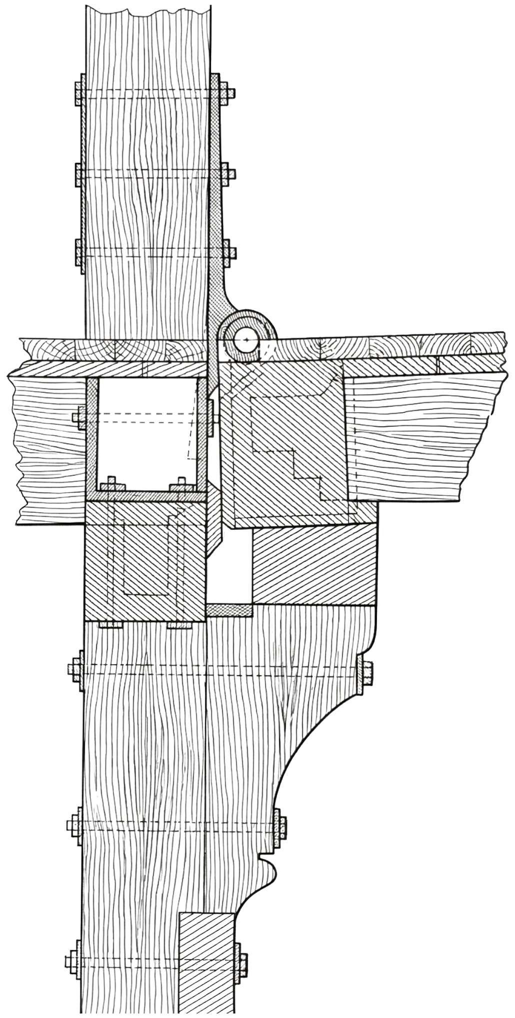


fig. 51 Column bearing (column support detail)(Henket et al., 1889)

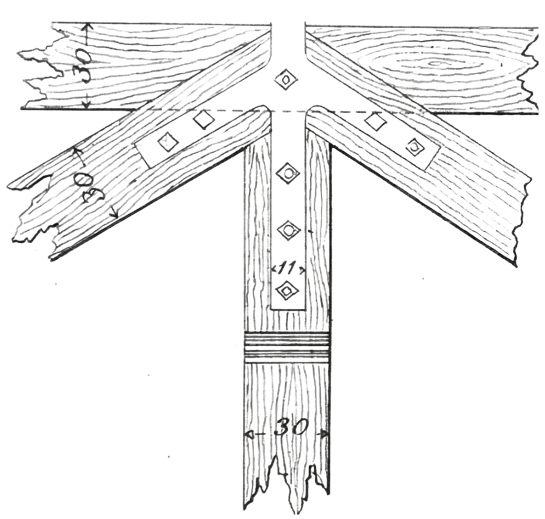


fig. 52 Timber tension rod connection (elevation view)(Henket et al., 1889)

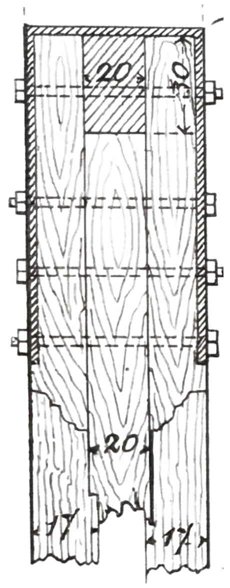


fig. 53 Timber tension rod connection (section view)(Henket et al., 1889)

2.12 Timber bridge construction

Within the Dutch timber construction tradition, clear similarities can be observed between building structures and bridges, particularly in detailing and the way structural elements come together. When multiple beams meet at a column, they are often clamped around the support point, creating both a strong structural solution and an elegant visual element.

As shown in figure x, this detail closely resembles a corbel, especially in its more refined form such as the curved "swan-neck" corbel. Instead of a simple triangular brace, a more expressive, curved form is created, characteristic of Dutch timber architecture. This aesthetic approach is also reflected in the joinery itself (figure 2), where construction and ornamentation are closely intertwined.

Another common strategy is shortening spans to reduce bending moments, achieved through the use of braces and intermediate supports. The form and detailing of these solutions closely align with the broader Dutch timber tradition.

A key difference, however, lies in scale and the influence of industrialization. Larger bridges emerged during a period when steel became increasingly common due to the Industrial Revolution. As a result, timber beams were often combined with steel elements such as bolts and tension rods. By clamping multiple beams together, stronger and stiffer structural elements could be created.

(Oosterhoff et al., 1998)
(Henket et al., 1889)

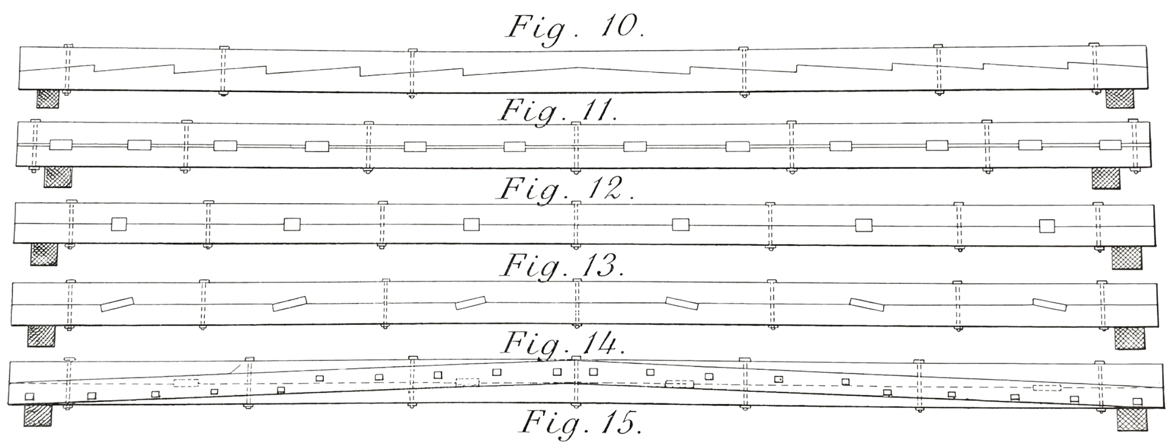


fig. 54 Various reinforcements and offsets of timber beams(Henket et al., 1889)

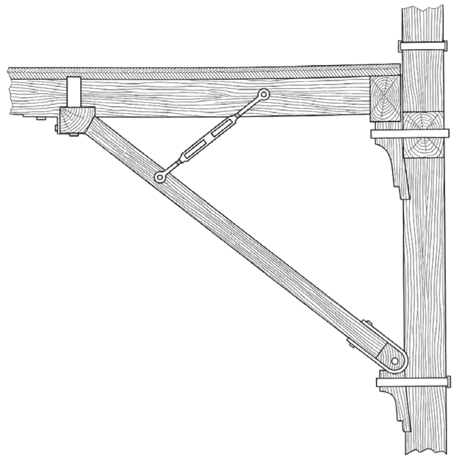


fig. 55 Bridge corbel (Henket et al., 1889)

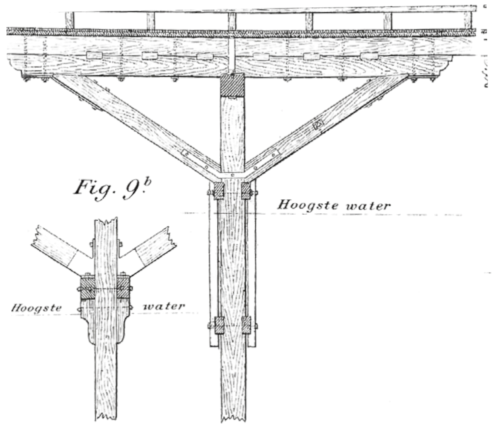


fig. 56 Bridge column with toothed jointing (Henket et al., 1889)

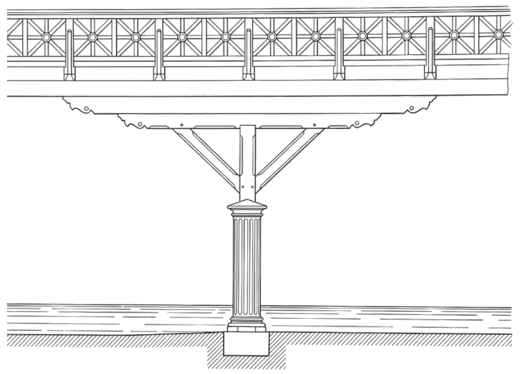


fig. 57 Bridge column with decorative toothed jointing (Henket et al., 1889)

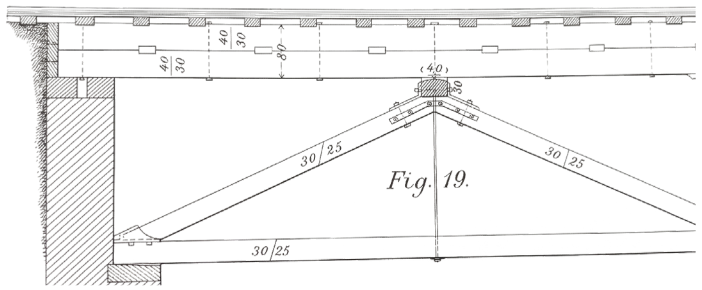


fig. 58 Bridge with timber compression struts (Henket et al., 1889)

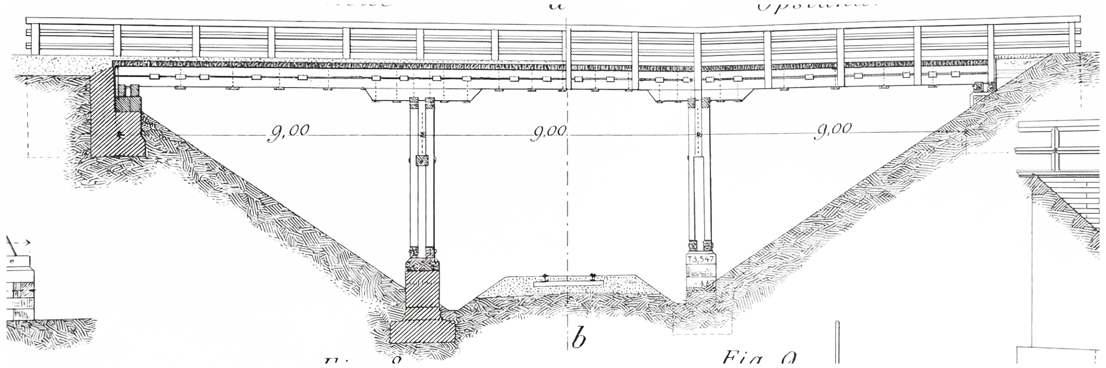


fig. 59 Railway crossing with columns (Henket et al., 1889)

Large spans

Compared to countries such as Germany, Switzerland, and Austria—where timber traditions for large-span structures were highly developed—Dutch construction remained pragmatic. Large spans were less necessary due to the extensive use of waterways and boats.

When larger spans were required, the typical solution was to introduce additional supports in the water, effectively reducing the span. These supports were often decorated, again reflecting traditional timber aesthetics. Nevertheless, Dutch bridges generally remained simple, with limited typological variation.

Structurally, braces, cross-bracing, and trusses were widely used. Interestingly, many bridges function as simple supported structures, resting on their supports rather than being rigidly fixed. Their own weight often provided sufficient stability.

An important development in spanning larger distances was the redistribution of forces. Instead of dividing forces into two directions, braces were sometimes arranged to distribute loads in four directions. This allowed for larger spans but required connections capable of handling tension, leading to the integration of steel components.

(Oosterhoff et al., 1998)
(Henket et al., 1889)

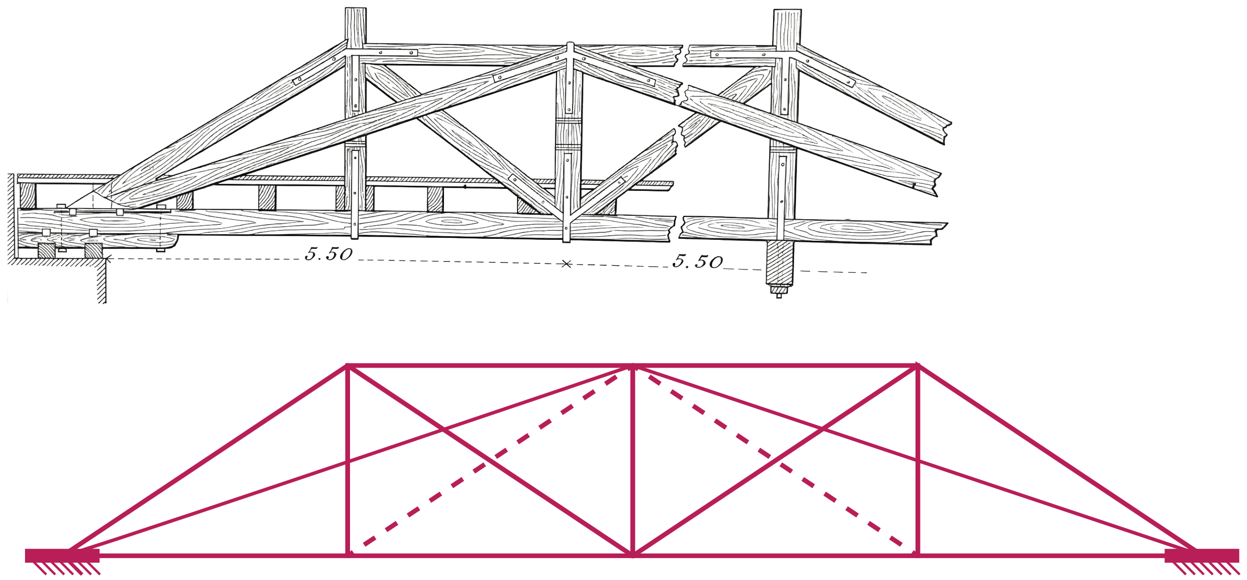


fig. 60 Span on two supports (Henket et al., 1889)

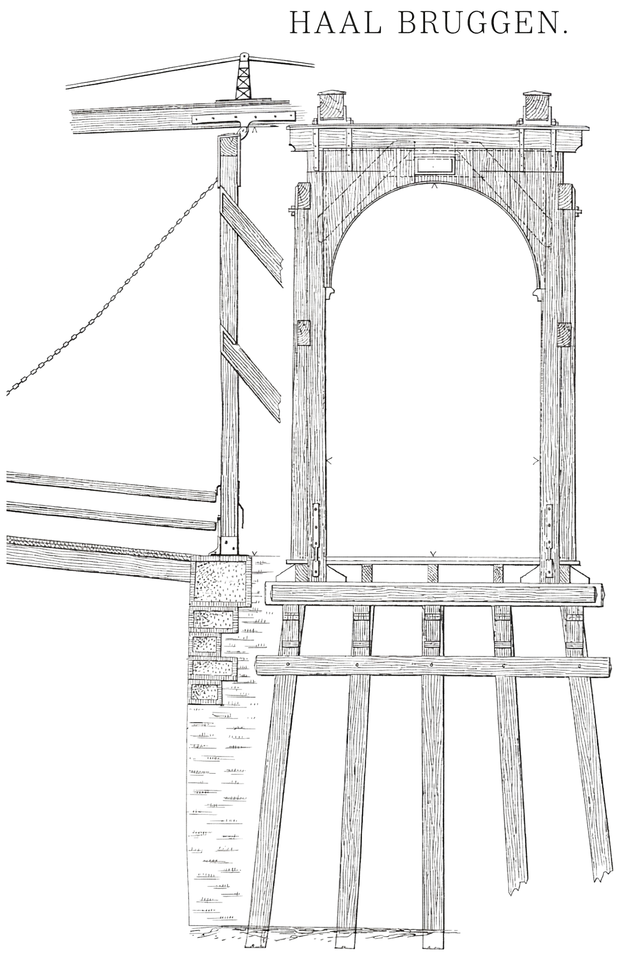


fig. 61 Wooden drawbridge
(Henket et al., 1889)

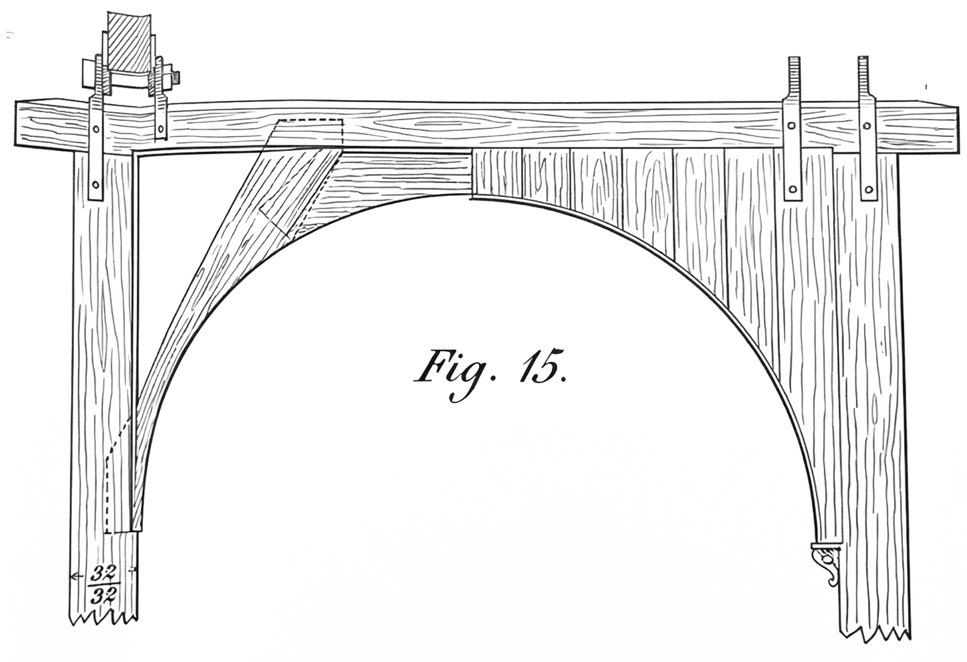


fig. 62 Wooden drawbridge (cutaway structural detail) (Henket et al., 1889)

The double drawbridge typology

A characteristic Dutch bridge type is the double drawbridge, exemplified by the Magere Brug in Amsterdam. At first glance, it appears to feature an arch construction, but closer inspection reveals that it is based on a corbel-like structural principle.

The structure essentially consists of two opposing corbels forming a portal frame. These elements are curved rather than straight, creating an arch-like appearance. Between them, a horizontal element provides additional stability and completes the visual form.

Notably, this structure is often covered with timber cladding. While partly functional as protection, it also enhances the aesthetic quality. This reflects a broader evolution in Dutch timber construction, where purely functional elements gradually became more ornamental.

However, this approach raises questions. While some elements are protected, others remain exposed to weathering, suggesting that durability was not always the primary concern—or that periodic replacement of such bridges was expected.

(Oosterhoff et al., 1998)
(Henket et al., 1889)

2.13 D&C | *Wood, Joint & Skin*

The Amsterdam historical timber construction tradition is characterized by a closely interwoven relationship between structural principles, connection details, and façade strategies. These three components form an integrated system in which construction, stability, and architectural expression mutually influence one another.

The foundation of Amsterdam timber construction lies in a system of timber piles combined with a sill-like transition layer supporting masonry above, creating a critical interface where moisture management and load transfer are key design factors. In the above-ground structure, a distinction can be made between transverse and longitudinal timber framing, which determines how loads are distributed and how the relationship between façade and structure is organised. Over time, lateral framing elements gradually disappear, with load transfer increasingly carried by masonry walls combined with timber floor systems. These floor systems evolve from simple beam layers into more complex assemblies, while lateral stability becomes increasingly dependent on bracing and wall systems.

A key aspect of the Amsterdam timber tradition is the development of connection techniques within post-and-beam structures. Different beam assemblies such as intermediate, anchor, and end beam frames allow for attachment at various column positions. A crucial distinction lies in the ability of certain joints to transfer tensile forces, which strongly influences structural stability and spatial flexibility.

Bracing plays a central role in ensuring stability, reducing bending moments and enabling lighter structural solutions. Over time, these elements evolve from purely functional components into refined architectural features. Similarly, key blocks used to prevent timber decay at the wood-masonry interface develop into corbels that combine structural and decorative functions. Timber-to-timber joints, particularly closed and open mortise-and-tenon connections, directly affect both durability and detailing.
In Amsterdam timber construction, façades are direct expressions of structural logic rather than independent design layers. Vertical cladding systems such as lapsling and lap sliding with draft strip combine moisture protection with aesthetic expression. Horizontal cladding establishes a direct relationship between façade articulation and structural rhythm, creating a visible translation of the underlying construction logic.

Conclusion

The Amsterdam historical timber construction tradition represents an integrated system in which structural principles, connection details, and façade strategies are deeply interconnected. Its evolution reflects a gradual shift from fully timber-based systems toward hybrid constructions combining masonry, timber floors, and structural framing. Traditional joints, corbels, and bracing systems remain essential. Not only as structural solutions but as carriers of architectural expression. The tradition thus demonstrates a continuum in which technical optimisation and ornamentation gradually merge, jointly defining the spatial and architectural quality of Amsterdam timber construction.

2.14 D&C | *Dutch Timber bridge*

Historical Dutch timber bridges are characterized by a pragmatic and context-driven approach to construction, in which structural typologies, material use, and spatial logic are closely interwoven. Developed within a water-dominated landscape, design decisions are directly shaped by limitations in span, material availability, and functional requirements.

A key characteristic is the use of portal structures oriented perpendicular to the water flow, acting as primary load-bearing systems with clear parallels to traditional Dutch timber construction. Rather than attempting large spans, intermediate supports were commonly placed in the water, dividing spans into smaller and more manageable segments. This reflects a broader Dutch design attitude in which water is not overcome but integrated as a design condition. Even in movable bridges such as drawbridges, this logic remains visible, with portal frames organizing lifting mechanisms within a relatively simple structural setup.

From the late 19th century onwards, the rise of railway infrastructure required longer spans, while international influences from England and the United States became increasingly visible. Two parallel strategies emerged: one continuing the tradition of intermediate supports, and another introducing truss-like configurations. These trusses often adopted alternative geometries with shifted support points, resulting in hybrid local interpretations rather than classical diagonal cross-bracing systems.

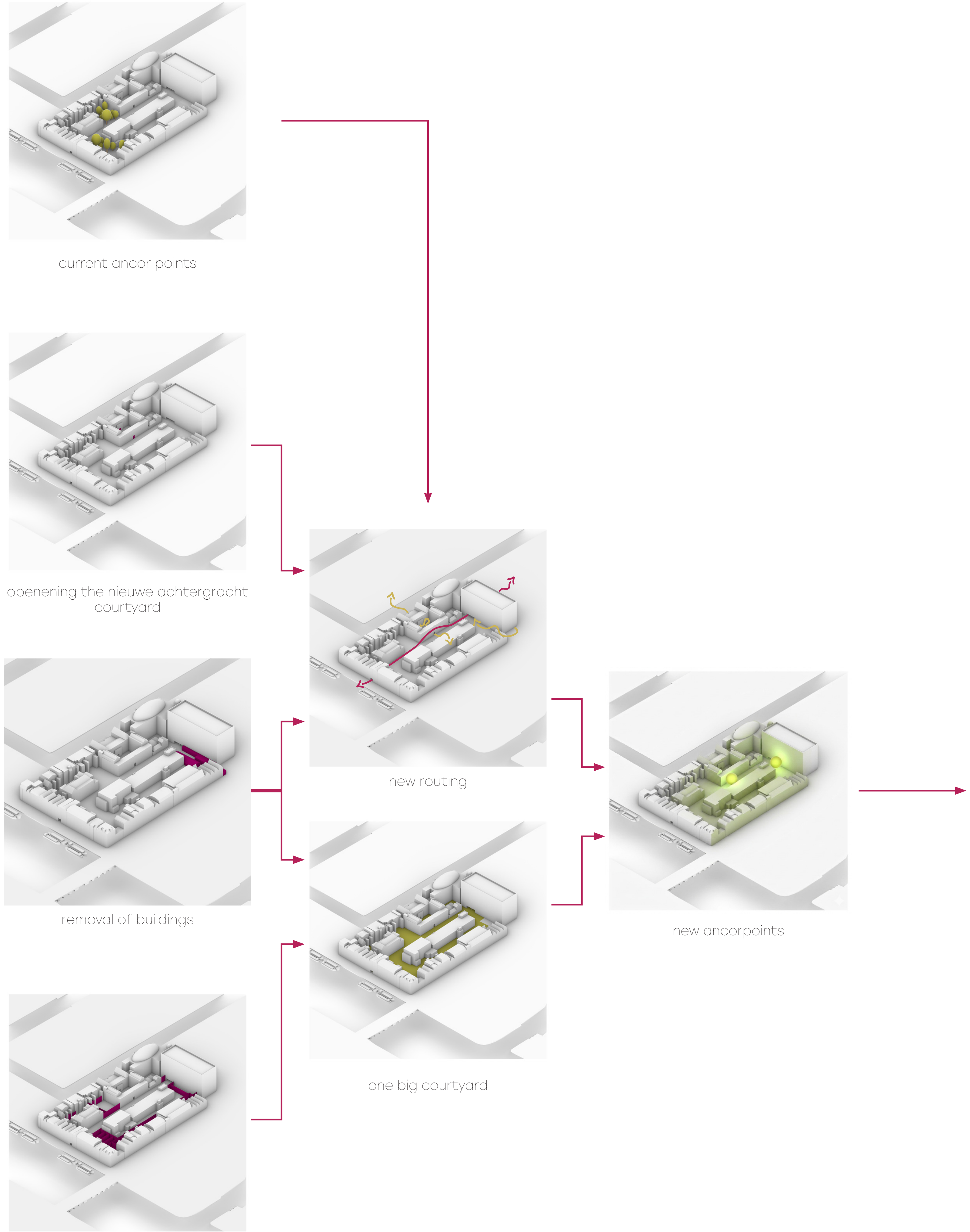
A key aspect is the combination of timber and steel in connection details. For larger spans, timber elements are clamped or reinforced with steel components, allowing tensile forces to be managed more effectively. This hybrid technique compensates for timber's limited tensile capacity while maintaining a predominantly timber-based construction logic, bridging traditional and industrial building methods.

A defining feature of Dutch timber bridges is the strong relationship between structure and ornament. Structural elements such as corbels, braces, and portal frames are visually emphasized, developing into expressive architectural features. In drawbridges, this produces characteristic curved upper forms where structural logic is translated into a recognizable silhouette. Ornamentation is therefore not independent but derived directly from structural necessity.

Conclusion

Historical Dutch timber bridges represent pragmatic and hybrid constructions in which structural simplicity, material constraints, and functional efficiency are central. Dominant typologies consist of portal frames and simple spanning systems, later supplemented by hybrid timber-steel solutions. Throughout this evolution, a strong relationship between structure and ornament persists, resulting in an architectural language in which functional logic and aesthetic expression converge. The Dutch timber bridge can thus be understood as an adaptive system in which local conditions, material constraints, and technical innovation merge into a recognizable and contextual building tradition.

Define



3.1 Concept

The conceptual approach is grounded in a careful reading of the existing conditions, identifying key spatial elements that already structure the site. Central to this are the current anchor points within the plan, most notably the trees that define the character of the courtyard. These elements form the basis of a semi-public garden: a space that is enclosed yet holds the potential to become more accessible and socially integrated.

The proposal introduces a series of targeted interventions aimed at unlocking this potential. One of the primary moves is the reopening of the buildings along the Nieuwe Achtergracht, allowing for increased permeability between the courtyard and its urban surroundings. In addition, several smaller structures–including bicycle storage units and technical installation buildings–are removed. This creates a new spatial opening from the Sarphatiestraat into the heart of the block, establishing a previously non-existent entrance.

A fundamental transformation is achieved through the removal of internal plot boundaries. Rather than maintaining the existing condition of a "block within a block," the site is reimagined as a single, cohesive courtyard in which the buildings are positioned as individual elements within a shared пространственный field. This shift reinforces a collective spatial identity and allows for greater continuity across the site. The reconfiguration of access and circulation plays a crucial role in this transformation. By combining the newly opened courtyard from the Sarphatiestraat with the existing routes and the reactivated edge along the Nieuwe Achtergracht, a more complex and interconnected movement network emerges. These routes begin to overlap and intersect, increasing the intensity of use and activating the courtyard in new ways.

As a result, the intervention introduces additional focal points within the block. Two new centres of activity emerge at ground level, redistributing movement and program across the site. This marks the first step towards a more lively and dynamic courtyard environment. With the proposed vertical extensions of the buildings, these focal points are further reinforced and expanded into the upper levels, creating a layered network of activity.

These key positions also define the locations of two bridges within the proposal. The bridges act as spatial connectors between the buildings, strengthening the relationships between the newly established focal points and supporting the overall cohesion of the design. In doing so, they become integral elements within the emerging architectural and urban logic of the project.

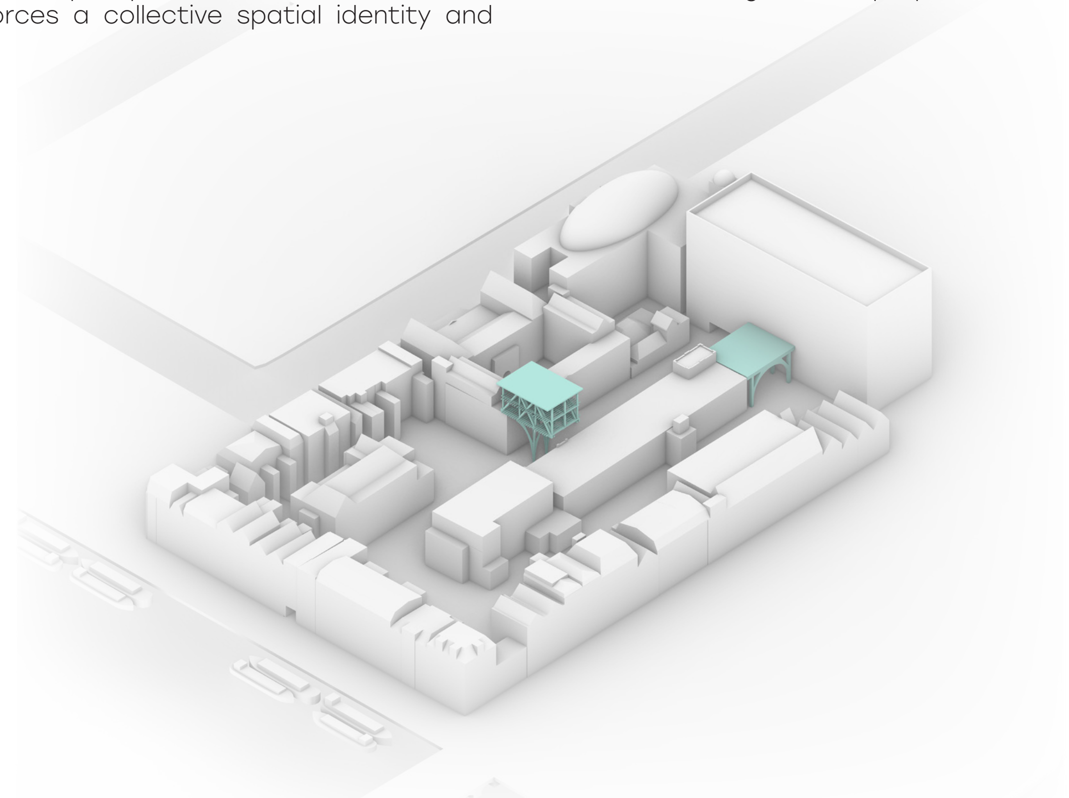


fig. 63 Conceptual development of the architectural intervention

ancor points are the bridges

fig. 64 Programmatic functions grouped and scaled according to ratio

3.2 Design brief

Location:

Former Stadstimmertuin, Amsterdam

Buildings & Volumes

Former fire station – approx. 13122m³
School – approx. 8886 m³
Nieuwe achtergracht (backside) – approx. 3700 m³

Total new programme:

approx. 14,000 m² GFA (gross floor area)

Architectural Atmosphere

Rediscovering the intimacy of the place

Exploring hard boundaries (structural, legal, programmatic) and soft boundaries (visual, spatial, social).

Developing both a strong horizontal connection and a strong vertical connection between the existing buildings.

Technical Performance

Water, Green & Climate

Ecological management
Rainwater management

Building Physics

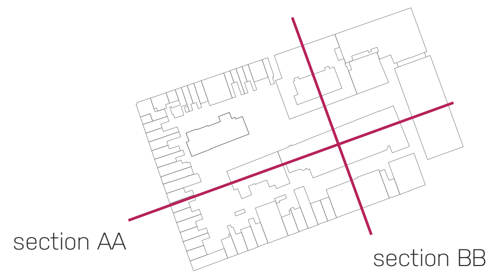
floor (above ground)	: Rc ≥ 5,0 m2K/W
floor (over outdoor air)	: Rc ≥ 8,0 m2K/W
facade (exposed to outdoor air)	: Rc ≥ 6,0 m2K/W
facade (adjacent to unheated space)	: Rc ≥ 2,0 m2K/W
roof	: Rc ≥8,0 m2K/W

party wall	: DnT, Ak ≥ 52 dB
internal floor between conditioned spaces	: DnT, Ak ≥ 52 dB
floor between commercial space and residential units:	: DnT, Ak ≥ 52 dB
floor non-residential buildings	: DnT, Ak ≥ 48 dB

Indoor Environmental Quality

Thermal comfort:	openable windows and external solar shading.
Acoustic comfort:	use soft, sound-absorbing materials.
Installations & Energy:	make use of the nearby canal for a collective heat exchanger.

fig. 65: programmatic sections of the existing situation



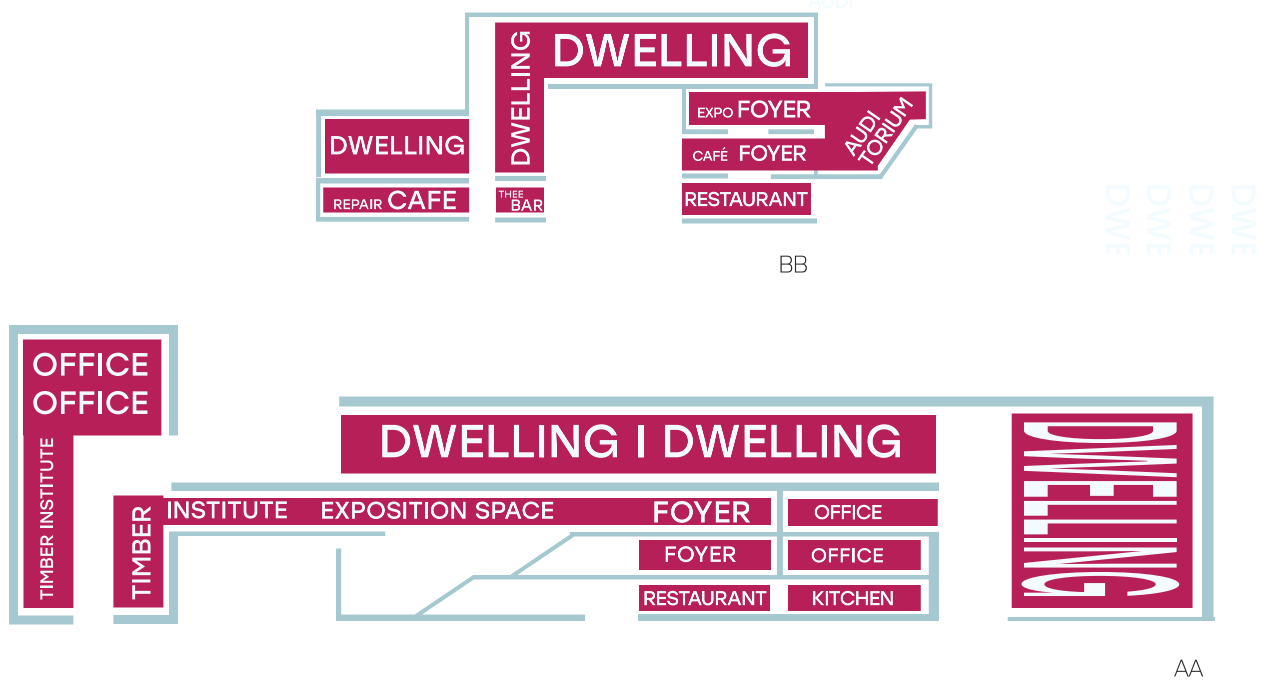


fig. 66: programmatic sections of the proposed situation

3.3 Program distribution

The current programmatic composition of the site is predominantly defined by municipal office functions of the Municipality of Amsterdam. Within the former printing house, a semi-public working environment is present, where office spaces are partially open and can be rented or used for flexible, shared working. This building also contains a canteen, which functions effectively as a social and informal meeting space within the otherwise office-oriented program. The former office areas of the building are primarily reorganised into meeting rooms and enclosed workspaces, maintaining a strong administrative character.

In the former school building, the program has been transformed into dwelling functions. In other surrounding sections, residential use is dominant, reinforcing a clear separation between living and working environments across the site. Overall, the existing condition is characterised by a dual structure: on the one hand, concentrated municipal office functions, and on the other hand, residential occupation in the former school and adjacent areas, with limited programmatic integration between the two.

Proposed Situation

The new design introduces a fundamental reconfiguration of the program distribution, structured around three main programmatic groups: the Timber Institute, an activated public ground floor (plinth), and an increase in residential functions.

A key transformation occurs in the former printing house, which becomes a catalyst for programmatic expansion. Here, a more active and publicly accessible plinth is introduced, containing a restaurant, kitchen facilities, and small-scale supporting offices on the second floor. The first floor functions as a foyer space, acting as a transitional zone between interior program and public courtyard life. From this building, the Timber Institute extends its presence outward, establishing both physical and conceptual connections to the former Stadstimmertuin and surrounding structures.

A spatial and infrastructural link is created towards Weesperstraat and the existing municipal office buildings. In this transformation, the former municipal office program is gradually phased out and replaced by the Timber Institute, which becomes the dominant programmatic driver of the site. The institute not only occupies the former office areas but also redefines their spatial relationships by extending towards the courtyard and adjacent buildings.

In the Nieuwe Achtergracht building, the lower residential layer is opened up and transformed into a semi-public plinth. This layer accommodates small-scale, community-oriented functions such as a café, repair café, and other neighbourhood activities. These are intentionally low-intensity programs, designed to support everyday use rather than generate high visitor pressure. The plinth also supports an auditorium space, which acts as a connector between the Timber Institute and the surrounding buildings. This space can be used in the evening for small-scale public events such as film screenings or debates, extending the life of the courtyard into the night without becoming a large-scale event venue.

The residential program becomes a key structuring element in the Nieuwe Achtergracht building and is conceptually linked to the former school building. Together, they form a continuous residential layer that also acts as a spatial connector between different parts of the site. In this sense, dwelling is not isolated but integrated into the broader spatial system, including transitional zones such as bridges and shared circulation spaces.

A crucial aspect of the new proposal is the introduction of a new circulation route that reorganises movement across the site. Along this route, two primary anchor points are established at ground level, while a second, elevated layer of connection is introduced on the second and third floors. These elevated connections function as bridges between the former printing house, the municipal office buildings, and the Nieuwe Achtergracht building. As a result, a double-layered system of connectivity emerges: one at ground level and one at an elevated level, reinforcing both horizontal and vertical integration across the site.

Develop

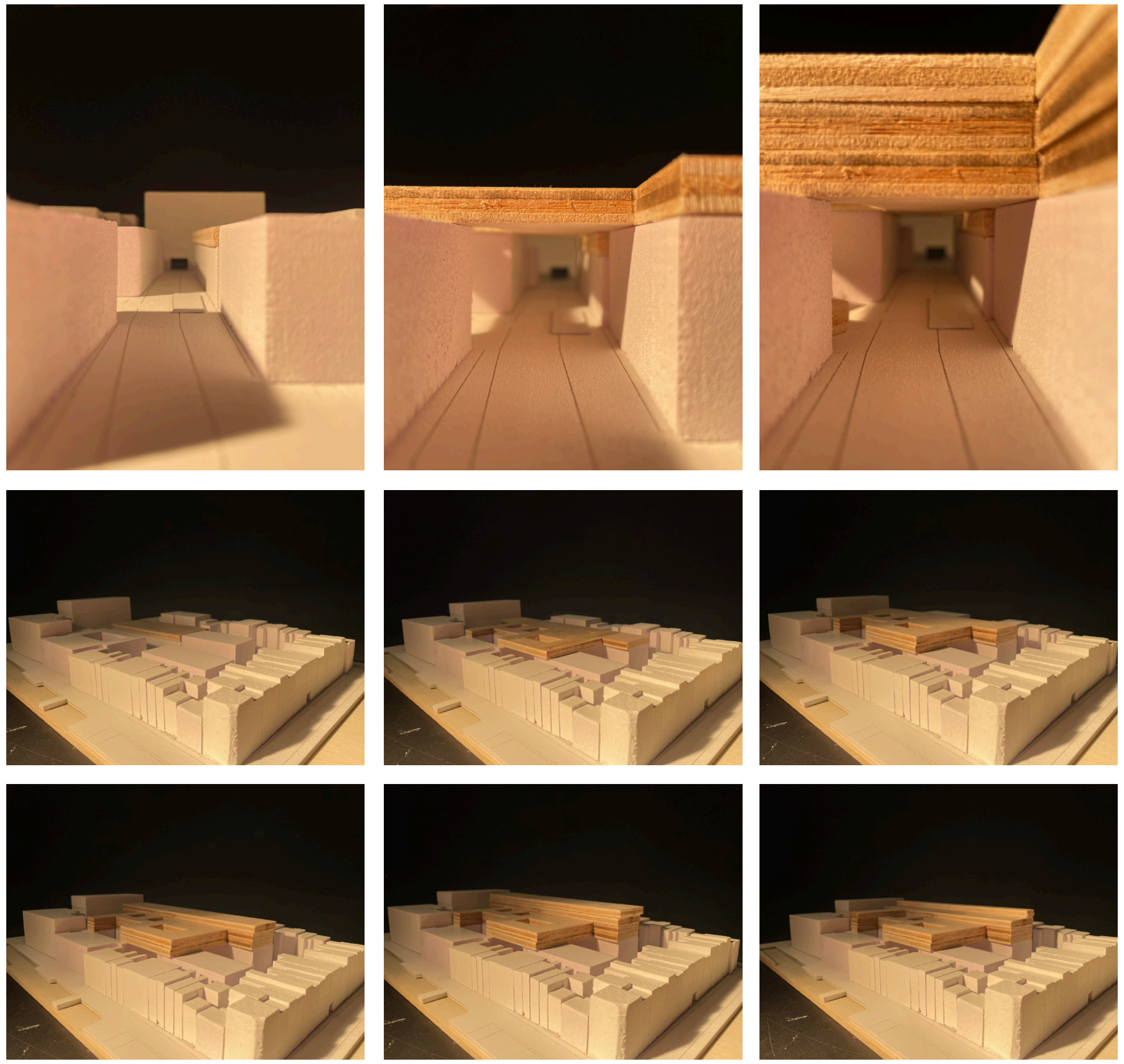


fig. 66: volumes study on urban scale

4.1 Massing

At the beginning of the design process, a physical model of the surrounding urban block was developed in order to investigate the spatial implications of different programmatic insertions. Various volumetric elements were placed within this model to test how bridges, extensions, and stacked layers would influence both the internal passage through the block and its relationship to the wider urban fabric. By incrementally adding one, two, three, and four layers of massing, different scenarios were evaluated in terms of their impact on spatial permeability, block structure, and edge conditions. This iterative approach made it possible to understand how vertical density affects not only the internal circulation but also the external perception of the block as a whole.

A similar exploratory process was applied to the placement of the auditorium. Its size, position, and degree of projection were systematically tested in relation to the surrounding volumes. A key design decision was to allow the auditorium to extend outward on the rear side of the building, rather than projecting into the main passage. This ensures that the passage remains defined by relatively strict and continuous façades, with minimal interruption. In contrast, the rear side of the block accommodates a more fragmented architectural language, characterised by smaller offices, secondary extensions, and incremental additions.

This distinction between front and rear conditions reinforces a broader urban logic within the site. Along the main passage, both the former school and the printing house maintain a coherent and continuous street edge, while the surrounding zones allow for more articulated and irregular volumetric expressions. This pattern is consistent with the wider urban context, where the main street edges are defined by relatively strict façades, whereas the inner and rear-facing sides of the blocks are composed of layered extensions, small annexes, and secondary constructions.

As a result, the massing strategy makes the coexistence of two architectural identities explicit: a structured and continuous urban façade condition along the primary passages, and a more fragmented, additive logic in the rear and transitional zones. The final volumetric composition emerges from this contrast, using massing not only as a spatial organisation tool, but also as a way to reveal and reinforce existing urban typologies.

fig. 67: volume study of the auditorium

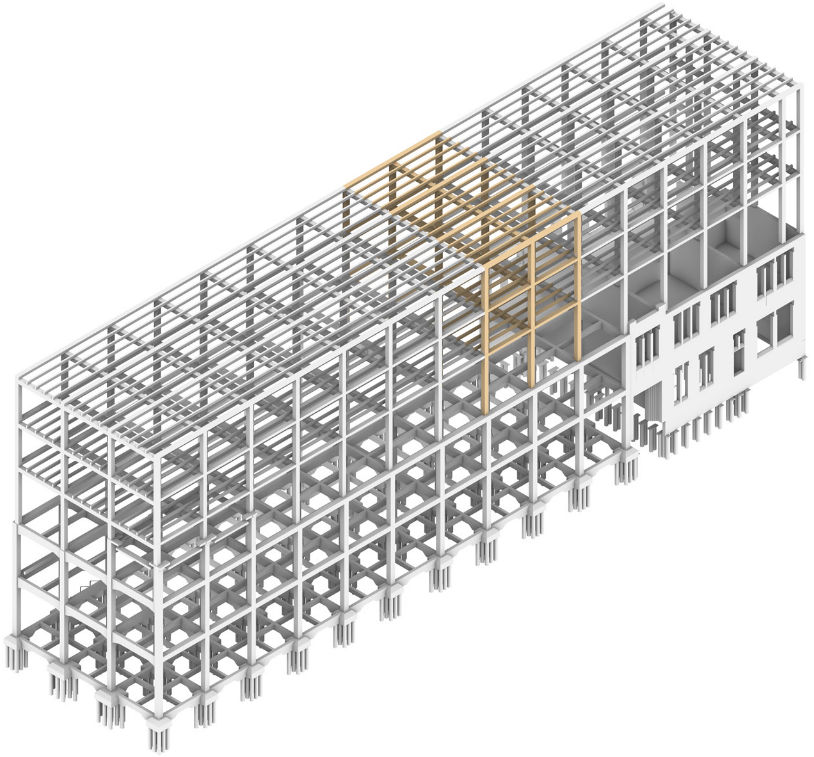


fig. 68: axonometric overview of timber top-up intervention

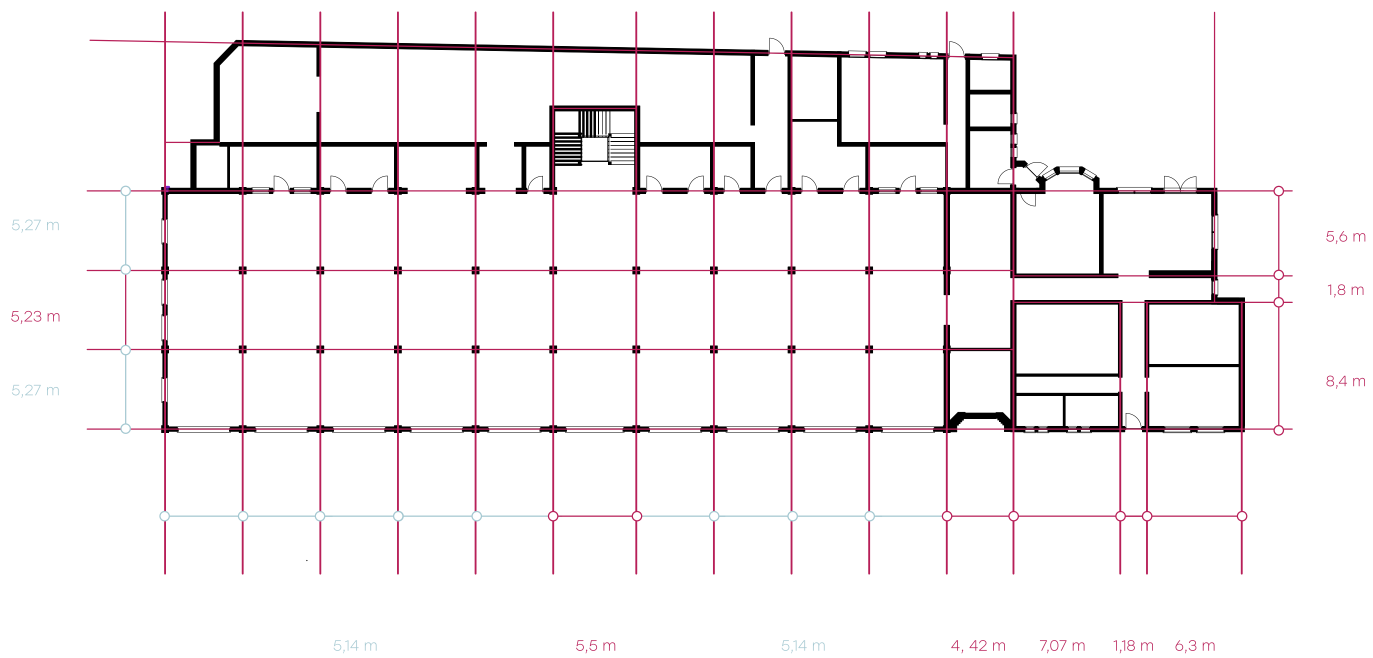


fig. 69: floorplan of structural groundfloor

4.2 Top up frame

The development of the main structural system started with an initial exploration based on a strict and logical grid. This grid provided a clear starting point for organising the building and aligning it with the underlying structural and urban constraints. However, early in the process, the question arose whether the design should instead be driven by the auditorium, which functions as the new spatial and programmatic core of the project. From this perspective, a radial system was considered, in which spatial relations would extend outward from the auditorium as a central node.

Although this radial approach offered a strong conceptual narrative, it introduced a fundamental conflict with the existing orthogonal grid conditions that the building must ultimately respond to. While a limited number of anchor points could be integrated into the existing structure, the radial logic could not be consistently resolved across the full system. This mismatch between conceptual geometry and practical structural alignment raised concerns regarding constructability and integration with the underlying building fabric.

As an alternative, a space frame system was investigated. Architecturally, this approach offers a strong spatial expression and is particularly effective in public, large-span environments. However, when tested in combination with residential functions, the system proved less suitable, as the spatial clarity of the space frame would be largely lost once apartment layouts are introduced. As a result, the architectural argument for a purely radial or space-frame-driven system became weak in the context of a mixed-use programme.

fig. 70: Exploration of the radial grid (side view)

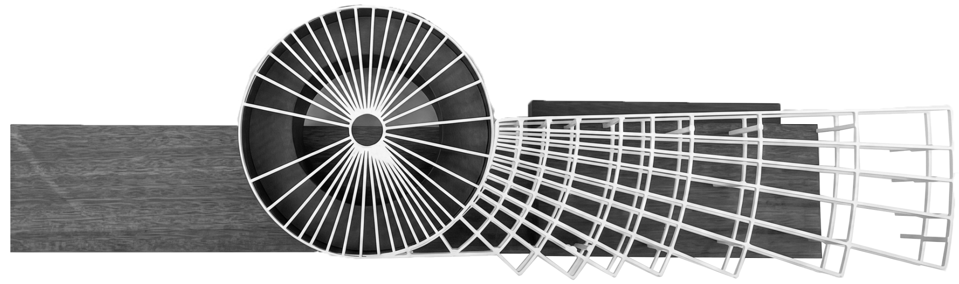


fig. 71: Exploration of the radial grid (top view)

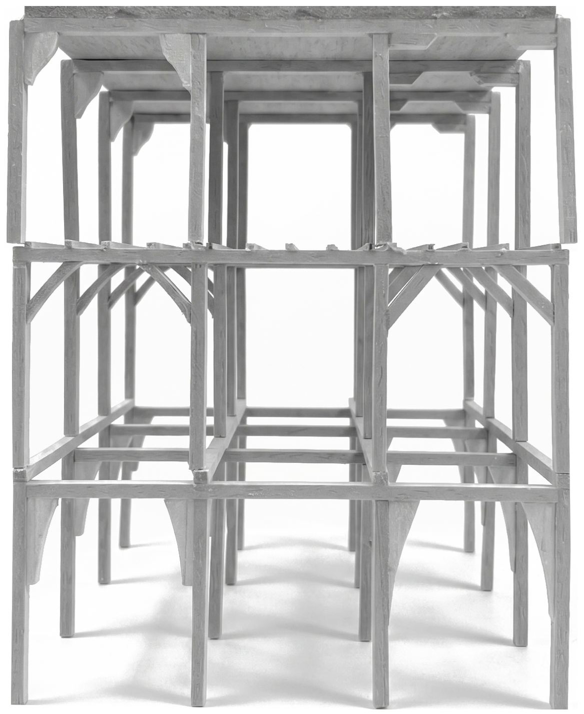


fig. 72: Model exploration of different structural principles based on the Dutch timber tradition

The design direction therefore shifted towards a more pragmatic timber-based structural approach, informed by hybrid mass timber construction principles. The starting point is a regular column grid, which allows both transverse and longitudinal load-bearing connections. A key consideration in this system is the presence of shear walls (schijfwerking), which are aligned with a relatively strict modular rhythm along the building edges. This makes it possible to position portal frames perpendicular to the façade, using the façade line itself as a stabilising boundary condition. In this way, the façade becomes an active structural reference rather than a passive envelope.

By aligning the portal directions in this way, the system maximises the number of effective connection points and load transfer paths. This increases overall structural efficiency and improves the potential for vertical expansion and stacking. The system is therefore optimised not only for initial construction, but also for future adaptability and additional loads.

Within this structural logic, additional attention was given to the form of bracing elements and moment-resisting behaviour. Different typologies were considered, ranging from highly articulated triangular bracing systems to more refined timber detailing strategies. The triangular system offers high structural robustness but results in a heavy and overly rigid expression, which is less suitable for both residential and public functions. It also evokes a more agricultural or utilitarian typology, which does not align with the intended urban character of the project.

Traditional korbelen systems were also evaluated. While these provide a more classical timber expression, they were considered visually and spatially too heavy, reinforcing a predominantly outdoor or infrastructural aesthetic. Instead, the selected structural language aims for a cleaner and more controlled timber expression, while still retaining the logic of moment transfer.

An important design consideration that emerges from this exploration is the possibility of resolving structural moments outside the primary connection zone. Rather than allowing all forces to converge directly at the joint, the intention is to investigate whether certain moment-resisting elements can be shifted outward, away from the main connection node. This would allow the joint itself to remain visually and spatially restrained, while still ensuring structural continuity through externalised detailing strategies.

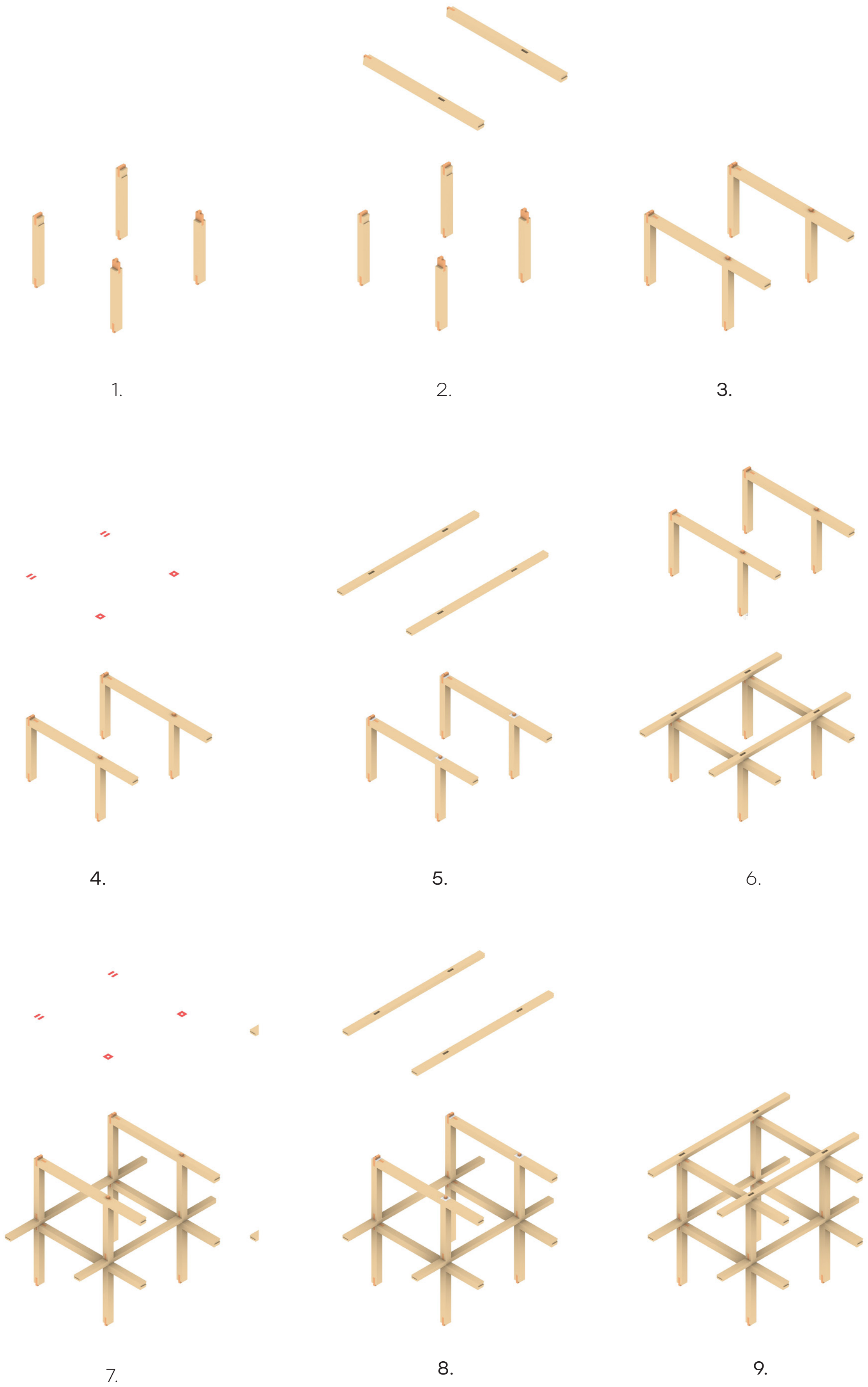


fig. 73: Top-up assembly

Assembly

The assembly of the primary portal frames is predominantly carried out through off-site prefabrication, with only limited on-site installation. This strategy is closely linked to the material behaviour of the structure, which consists of two different types of timber that are sensitive to environmental conditions such as moisture and temperature fluctuations. By prefabricating the majority of the components in a controlled environment, the risk of deformation and material degradation during construction is significantly reduced, ensuring higher precision and structural reliability.

The off-site process comprises steps 1 to 3, in which the individual columns and beams are assembled into complete portal frames. For clarity, the illustration shows only half of a portal frame. In steps 2 and 3, the beams are installed on the columns, resulting in the finished prefabricated frame, which is subsequently transported to the construction site.

On-site assembly (steps 4 to 8) involves the erection and connection of the portal frames. Acoustic separation elements, referred to as Xylofoam plastic layers, are placed between the frames to provide acoustic decoupling. The deck beam is then installed to structurally connect the portal frames, after which the sequence is repeated until the full upper structure is completed.

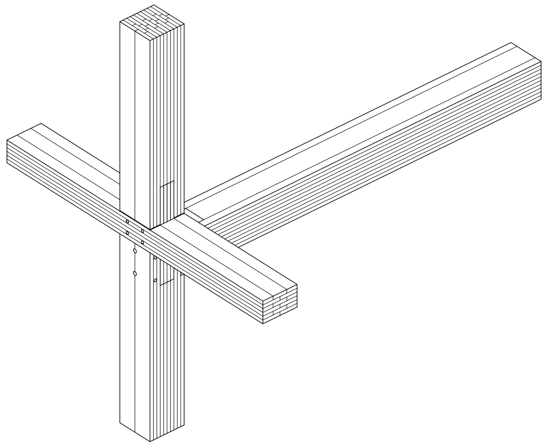


fig. 74: Axonometric view of a structural node from the side

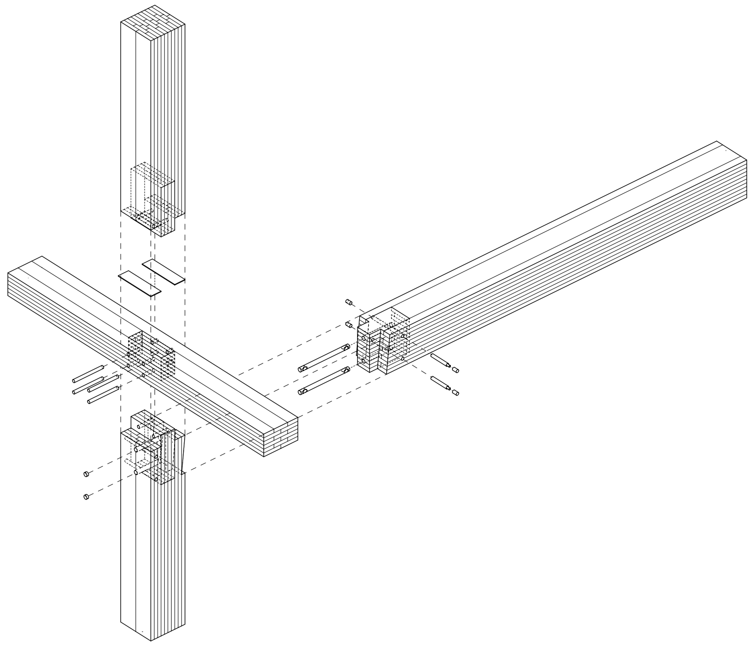


fig. 75: Exploded axonometric view of a structural node from the side

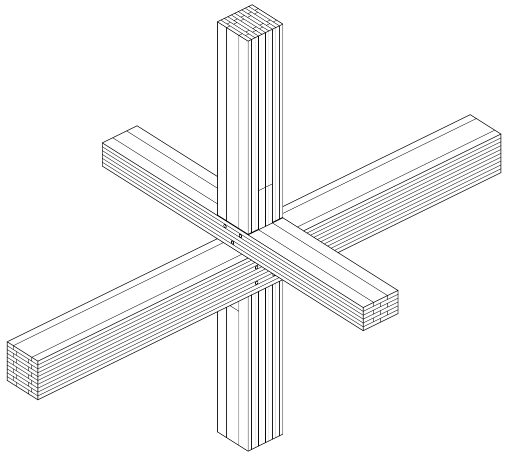


fig. 76: Axonometric view of a structural node in the middle of the construction

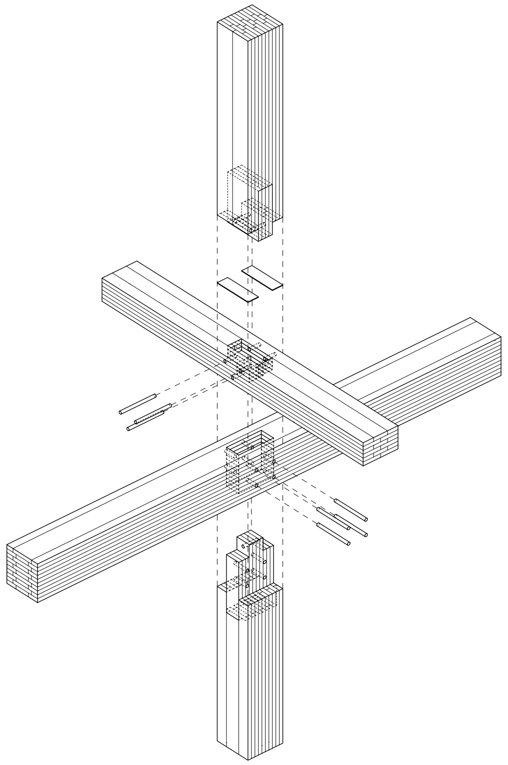


fig. 77: Exploded axonometric view of a structural node in the middle of the construction

4.3 Connections

In this research, a deliberate material distinction is made between softwood and hardwood, specifically focusing on spruce and beech for interior applications. This selection is not solely based on mechanical performance, but also considers availability, processability, and the relationship with production and assembly methods. Spruce is selected for the softwood components. This material is widely used in the construction industry due to its high availability, relatively low cost, and ease of processing. Furthermore, spruce is lightweight, which provides advantages during both transportation and assembly. For these reasons, it is well suited for structural applications where extreme strength requirements are not critical. However, spruce is not suitable for exterior use due to its sensitivity to moisture and weathering. For the hardwood elements, beech is chosen for interior applications. While various alternative hardwood species are available—such as birch, European chestnut, oak, and poplar—beech is selected due to its combination of practical and technical advantages. It is readily available in significant quantities and already applied in practice, which enhances its reliability as a material. Additionally, it is well suited to existing production processes. The use of hardwood in structural connections has been explored since the 1960s and was further developed in the 1980s at ETH Zürich. This research demonstrated the potential of hardwood connections to partially replace steel connectors, which are associated with a high embodied carbon footprint. Compared to softwood, hardwood offers significantly higher density and strength, making it particularly suitable for highly stressed connection zones (Han et al., 2023). For exterior applications, neither spruce nor beech is considered appropriate due to their susceptibility to moisture. In such contexts, Douglas fir is used as the softwood alternative, as it demonstrates significantly greater resistance to weathering and moisture fluctuations. This is commonly combined with oak hardwood connections, which similarly offer better performance in exterior conditions compared to beech. In this study, beech is applied in the form of glued laminated timber (GLT). The structural elements consist of lamellae with a thickness of 45 mm, resulting in three-layer assemblies with a total thickness of 135 mm. The choice for GLT, rather than laminated veneer lumber (LVL), is made deliberately. While LVL relies heavily on adhesive as a structural component, GLT remains closer to the principle of solid wood. From both a conceptual and material perspective, this approach is considered more consistent within the project. The decision to avoid LVL is therefore linked to the intention of preserving the role of wood as the primary load-bearing material. In LVL systems, adhesives play a dominant structural role, causing the material behavior to deviate further from that of solid wood. Within the context of this design, this shift is considered undesirable. All connections in this project are hardwood connections. For interior applications, hardwood dowels are used as the primary connection method, consistent with traditional timber joinery techniques for which many practical examples already exist. These methods are compatible with contemporary production processes, including sawn and finger-jointed solid wood, glued laminated timber, and beech laminated veneer lumber, among other applications. However, where the side face of a beam connects to a column, a traditional dowel connection is not feasible. In these locations, the available timber cross-section is insufficient to transfer the forces through dowels in the conventional manner. Moreover, these zones are subject to significant shear forces, which further limit the applicability of purely wooden connections. For these specific situations, the Timberlinx A095 post and beam connector is used. This steel connector is designed to handle such conditions while maintaining a compact and concealed connection profile (Timberlinx A095 – Post and Beam Connector, n.d.). The use of beech is primarily concentrated in structurally critical zones, where tensile, compressive, shear, and transverse compressive stresses are significant. These zones mainly consist of nodes and connections where bending moments must be transferred. The use of hardwood in these areas

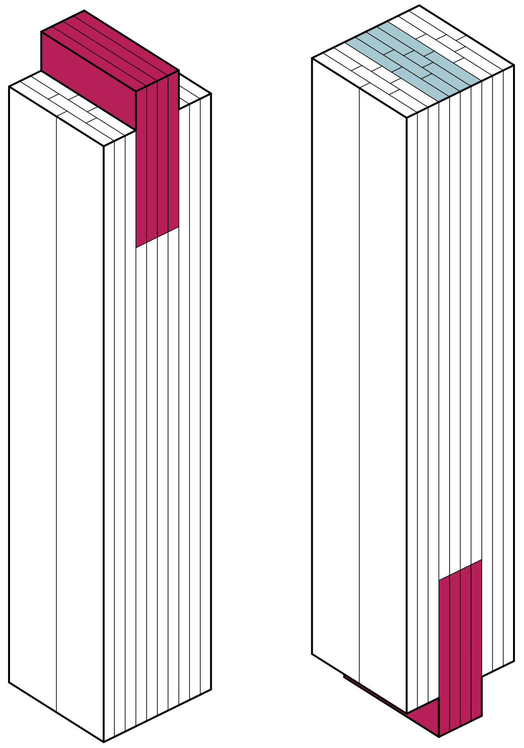


fig. 78: Hardwood connections in glulam side columns

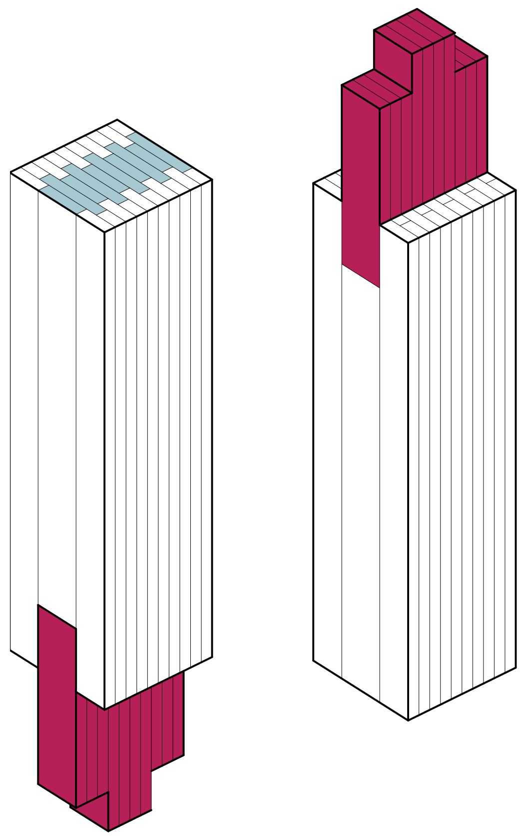


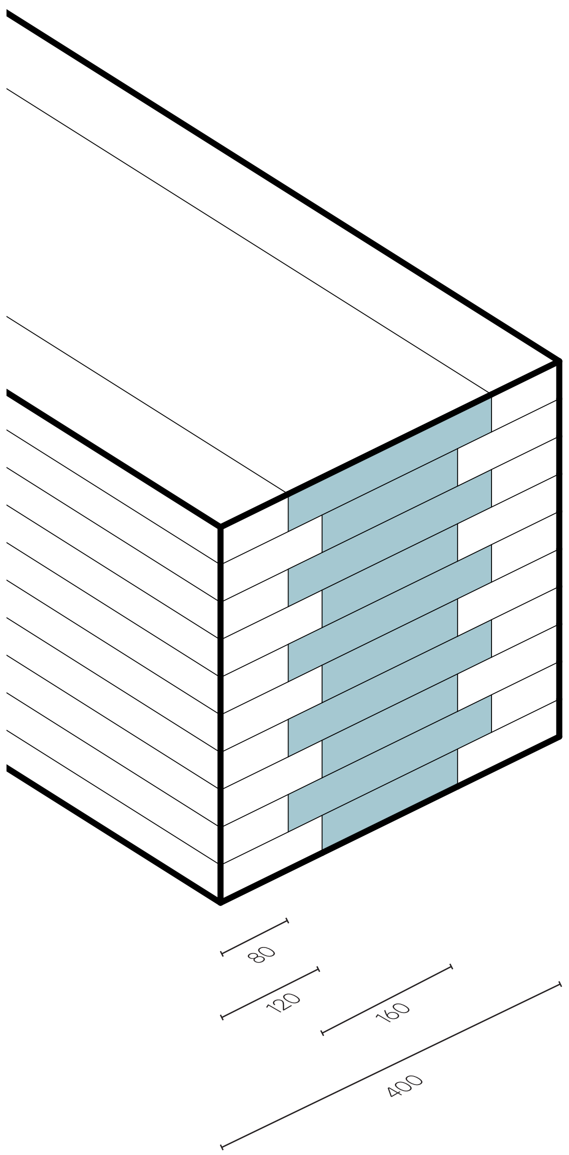
fig. 79: Hardwood connections in glulam middle column

contributes to the overall structural reliability. However, careful consideration must be given to dimensional stability. Beech exhibits higher swelling and shrinkage behavior compared to most softwoods, due to its sensitivity to both moisture and temperature variations. This makes it essential to account for expansion coefficients during design and detailing. Finally, the combination of spruce and beech is intentionally selected for interior use due to their compatibility. Although their swelling behavior differs in magnitude, both species respond predictably to environmental changes when properly detailed. This compatibility ensures a coherent and reliable material system for interior structural applications.

Glulam is composed of laminated timber layers, known as lamellas, which can vary in thickness depending on structural and manufacturing requirements. A common standard thickness is 40 mm, although multiples such as 80 mm or 120 mm can also be used.

In the initial design phase, a subdivision study was carried out to determine how the glulam beams could be organized into different lamella configurations. At the beam ends, where the hardwood connection elements are introduced, portions equal to the thickness of the lamellas were removed in order to accommodate solid hardwood inserts.

The dimensions and proportions of these connection zones were informed by the original proportions found in traditional timber joinery and classical connection details, particularly in relation to the width of the lamellas. In cases where the proportions did not align precisely with the lamella grid, the connection elements were intentionally slightly over-dimensioned towards the hardwood side to maintain structural clarity and continuity.



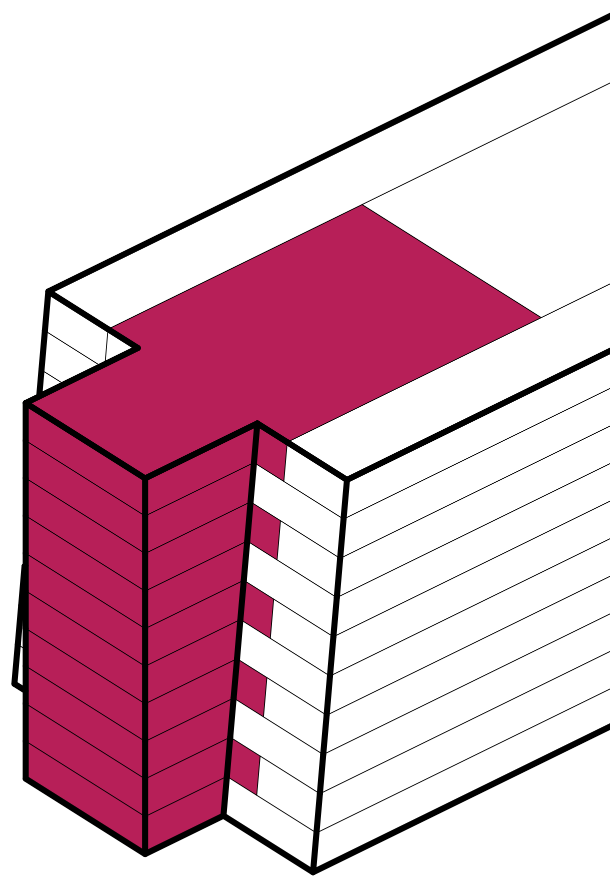


fig. 80: Hardwood connections and laminated timber side beams

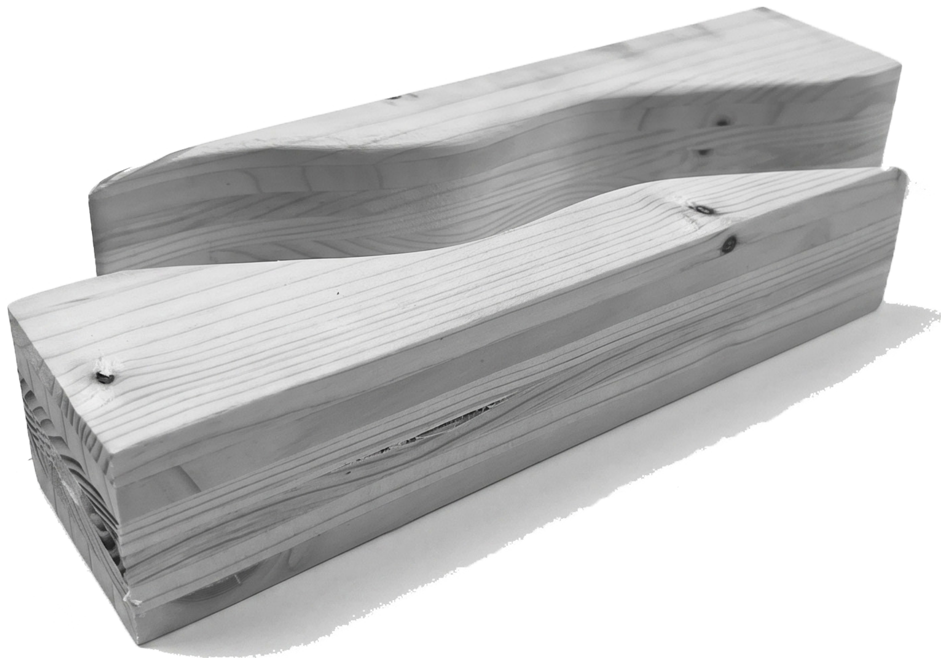


fig. 81:: Experimental glulam corbel model

4.4 Korbeel

The design of the knee brace (korbeel) was further developed through an exploratory process in which the element was reinterpreted as a sculpted timber component rather than a purely structural member. The starting point of this investigation was the question of what happens when a traditionally functional bracing element is "cut out" of a solid timber plate, such as CLT or glulam, in a more expressive and continuous geometry.

This approach can be understood as a material and geometric exploration: by subtracting and shaping a single timber volume, different configurations of the korbeel were studied in terms of both structural performance and residual material logic. The resulting investigations made it possible to understand not only the structural behaviour of such elements, but also the remaining wood structure and fibre orientation that becomes visible through this process. In this sense, the korbeel is no longer treated as an added component, but as a form extracted from a continuous timber body.

The distinction between glulam and traditional timber plays an important role in this exploration. Whereas conventional timber is defined by more variable grain directions and smaller dimensional consistency, glulam allows for a more controlled and predictable structural flow. When cut or shaped in curved or non-standard geometries, glulam reveals a distinct architectural quality, in which structural logic and visual expression become closely intertwined. This makes it particularly suitable for elements that are both load-bearing and expressive.

Through this process, the korbeel evolves from a purely technical bracing device into a hybrid architectural element. It not only resolves structural forces but also communicates them visually through its form and material articulation. This opens up a design strategy in which certain connection points within the structure may be resolved through such carved or integrated timber elements, rather than relying solely on standardised mechanical joints.

Ultimately, this exploration shifts the focus from the question of how the element functions structurally, to how it is perceived and expressed within the architectural whole. The korbeel becomes a medium through which structural logic is made visible, allowing the design to operate simultaneously at the level of engineering performance and architectural articulation.

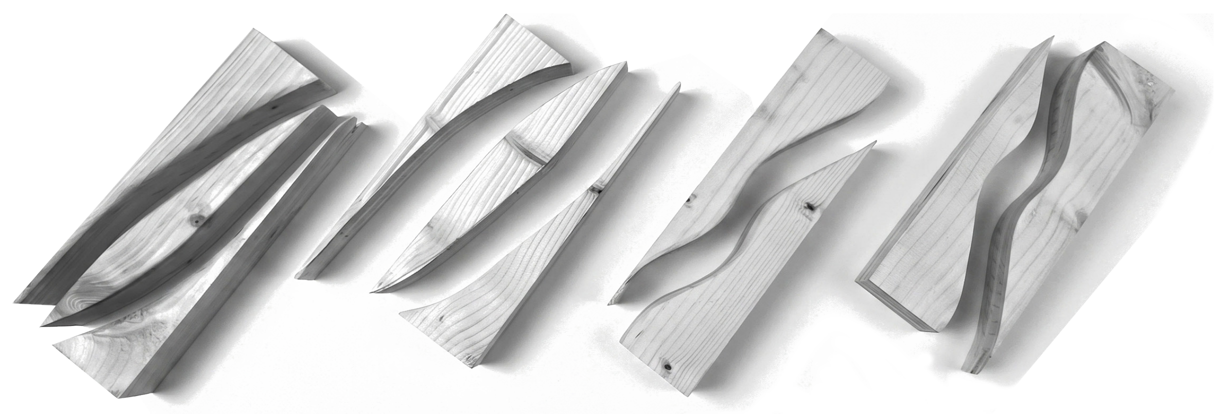


fig. 82: Experimental exploration of different glulam corbels and their forms

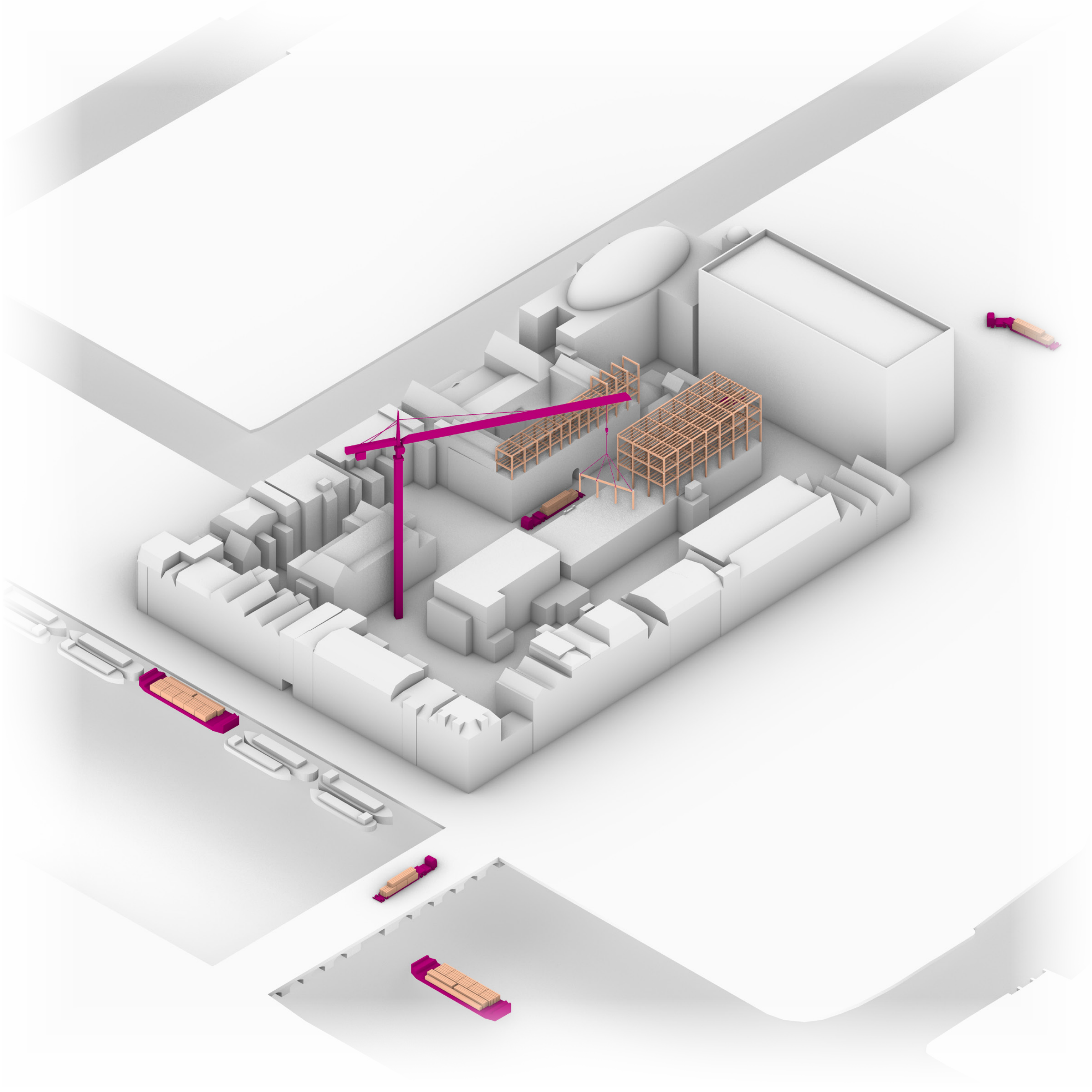


fig. 83: Overview of transport options

4.5 Transport

An important aspect of this site is its limited accessibility. The area can only be reached through two main points for motorized transport using small trucks.

The first access point is located beneath Weesperstraat and has a clearance height of 3.7 meters. This passage serves as the main entrance and is designed to accommodate emergency services such as fire trucks and ambulances.

The second passage has a height of 3.6 meters but is significantly narrower, making it less suitable for regular heavy transport. Furthermore, this access is in fact only for pedestrians and cyclists.

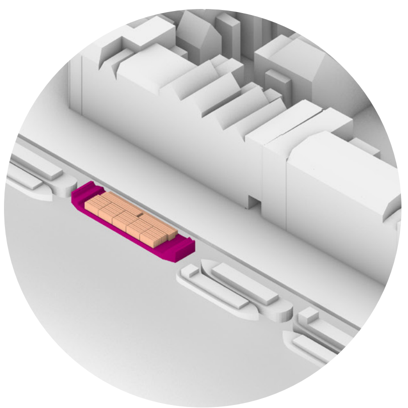
The limited accessibility has direct consequences for construction logistics and the organization of transport on the site. In principle, two feasible transport strategies can be identified.

One option is the use of low-loaders for freight transport. These can access the site via the main entrance under Weesperstraat, as long as the maximum height is respected. This allows for conventional material transport, albeit with certain limitations.

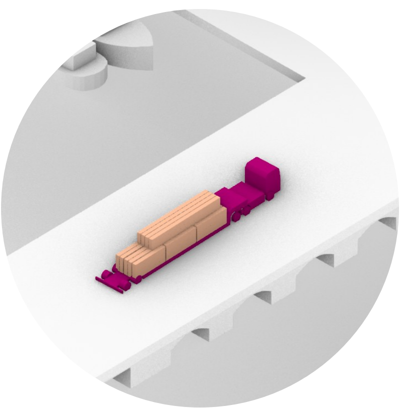
A second, more flexible option is the use of a tower crane. This can be assembled on site and then enables vertical transport of materials within the project area.

An important advantage of this approach is the possibility of using water transport. Materials can be delivered by boat via the Amstel, passing under the bridges. Pontoons can be loaded with timber elements and other construction components, dock along the quay, and then be lifted directly into the site using the crane.

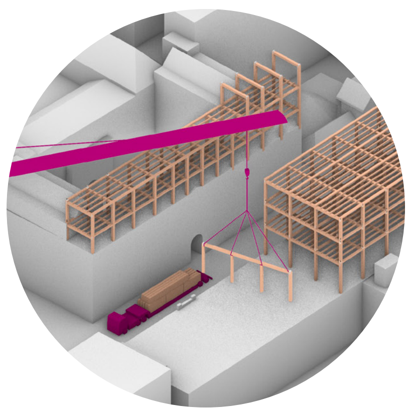
The combination of limited physical access and the location by the water necessitates a hybrid logistics approach, in which road transport via Weesperstraat, waterborne transport, and vertical crane logistics all play a role. This directly affects how the project can be organized and executed.



transport by boat



transport by boat



assembly by tower crane

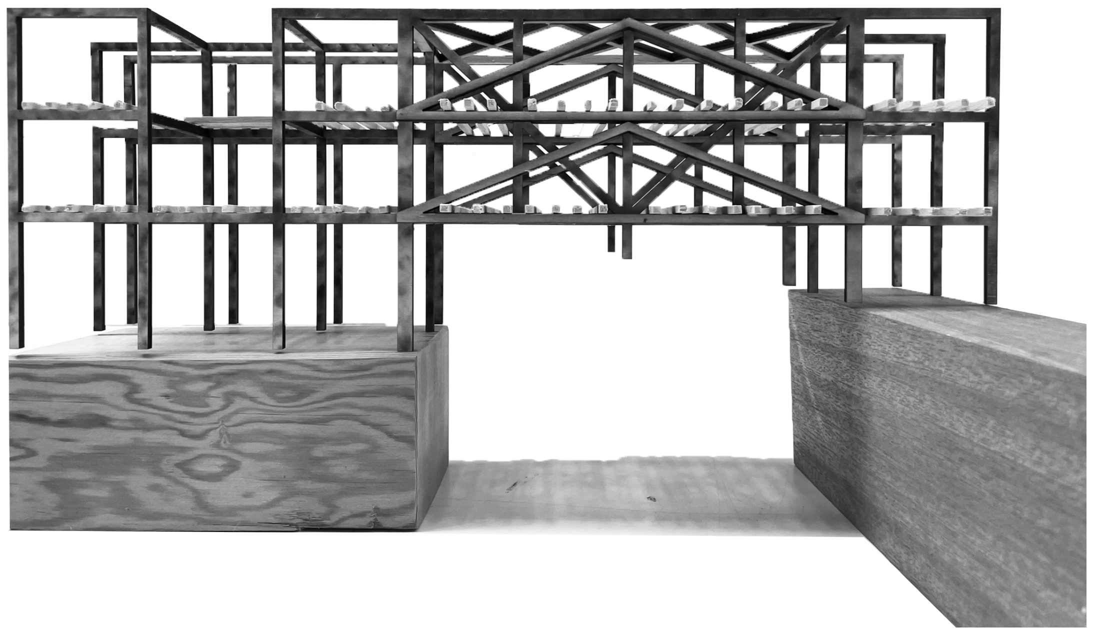


fig. 84: Structural model of the first bridge exploration (front view)

4.6 Tree bridge

The Tree Bridge can be understood as the counterpart—or "sibling"—to the Arch Bridge, though it responds to a fundamentally different spatial condition.

Where the Arch Bridge connects two building edges, the Tree Bridge defines an independent urban space, spanning between the former printing house and the new Achtergracht street.

Initially, the design explored a column-free span. However, this approach was ultimately rejected for three main reasons:

Without a central support, the space felt excessively large and lacking definition. Introducing a column creates a more balanced and spatially coherent composition. Additionally, due to the bridge's greater height compared to the Arch Bridge, users at ground level would otherwise experience little visual connection to the structure above.

Given a span of approximately 10 by 15 metres, multiple support points are required. Instead of distributing this across many columns, the design consolidates the load into two primary columns. These columns branch outward into multiple elements—resembling a tree—before merging again at their extremities.

This branching system is derived from:

an abstraction of the earlier arch logic (mirroring and extrusion of elements), and historical Dutch timber construction methods.

Traditionally, large spans in Dutch timber construction were achieved by transferring forces through side frames, particularly handling tensile forces along the edges. This principle is reinterpreted here, allowing the structure to reduce from multiple supports to just two primary load-bearing points.

Following consultation with the structural engineer, it was determined that directly connecting the two buildings structurally

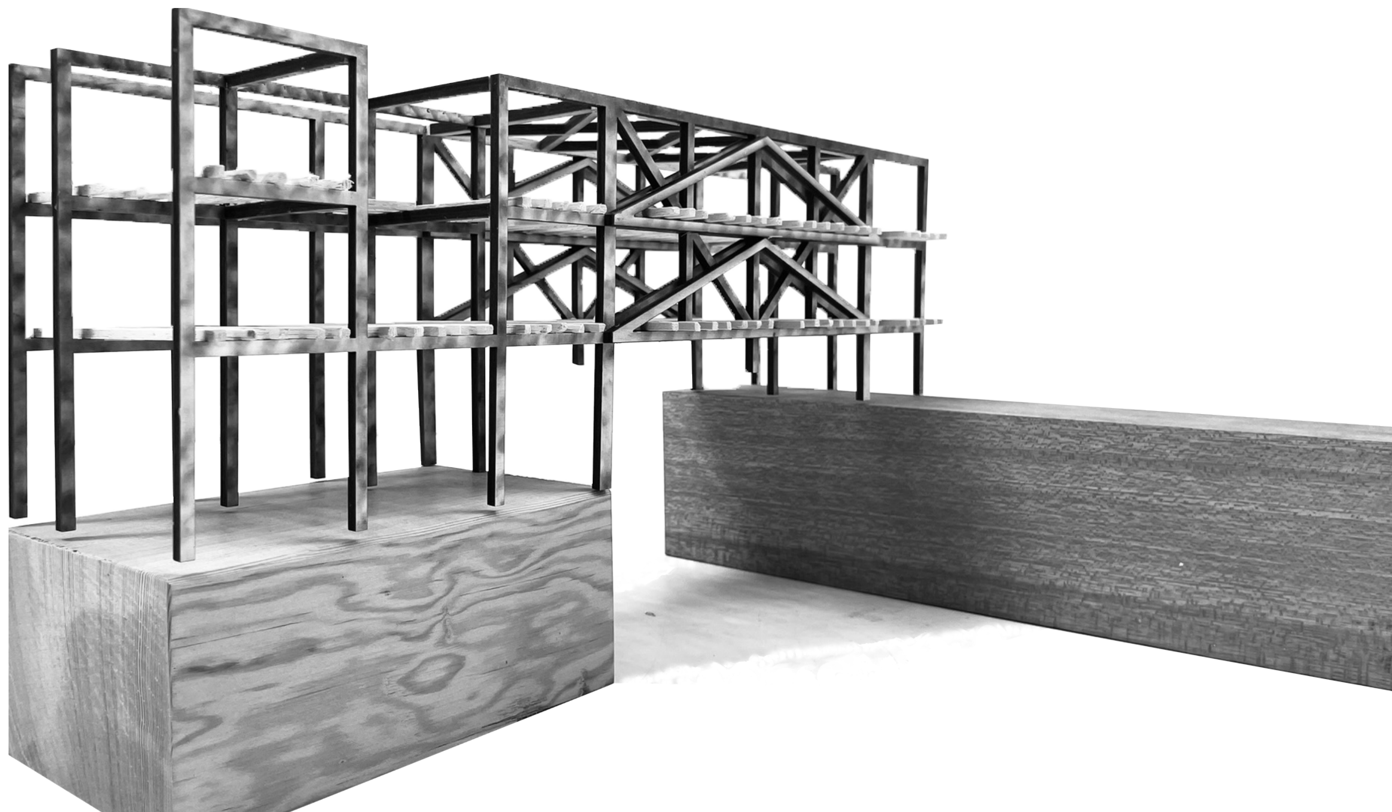
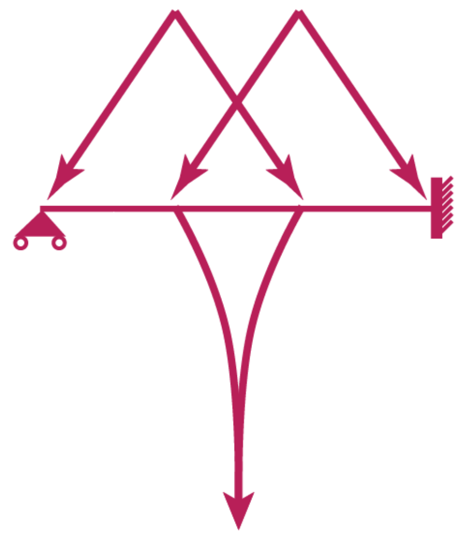


fig. 85: Structural model of the first bridge exploration (perspective view)

fig.86: render of the tree bridge



would introduce excessive stress due to differential movement. Therefore:

one side of the bridge is designed as a fixed support, the other as a hinged connection, with the primary load transferred through the central columns.

Additionally, the existing buildings already carry two to three additional layers, meaning that the foundation capacity is nearly maximised. While the superstructure could accommodate additional loads, the foundation would require significant intervention, making further structural connections undesirable.

Alternative options—such as placing columns within or directly adjacent to the buildings—were also considered. However, interior columns would significantly reduce usable space and disrupt internal layouts.
Timber Tradition and Detailing

The introduction of a central column is not arbitrary; it reflects a broader tradition in Dutch timber construction, where large spans were often reduced rather than maximised. Instead of forcing a long-span solution, intermediate supports were strategically introduced.

Finally, as with the Arch Bridge, careful attention is given to weather protection. All timber connections are shielded by overhanging floor plates, preventing rainwater from penetrating the structure and ensuring long-term durability.

The bridges are designed as a glulam structure composed primarily of softwood elements, combined with hardwood components at the structural connections. The same construction principle is applied in the top-up frame system, where hardwood inserts and joints provide additional strength and durability at critical connection points.

As beech is not suitable for exterior exposure, an alternative hardwood species such as Accoya or oak is proposed for the connection elements. For the primary softwood structure, exterior-grade spruce can be used. All timber elements must be properly treated and impregnated according to exterior performance requirements, in consultation with the future supplier and manufacturer.

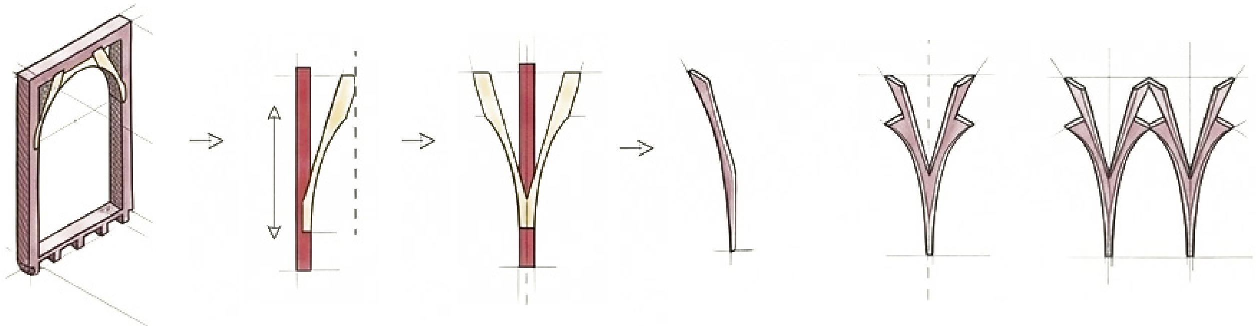
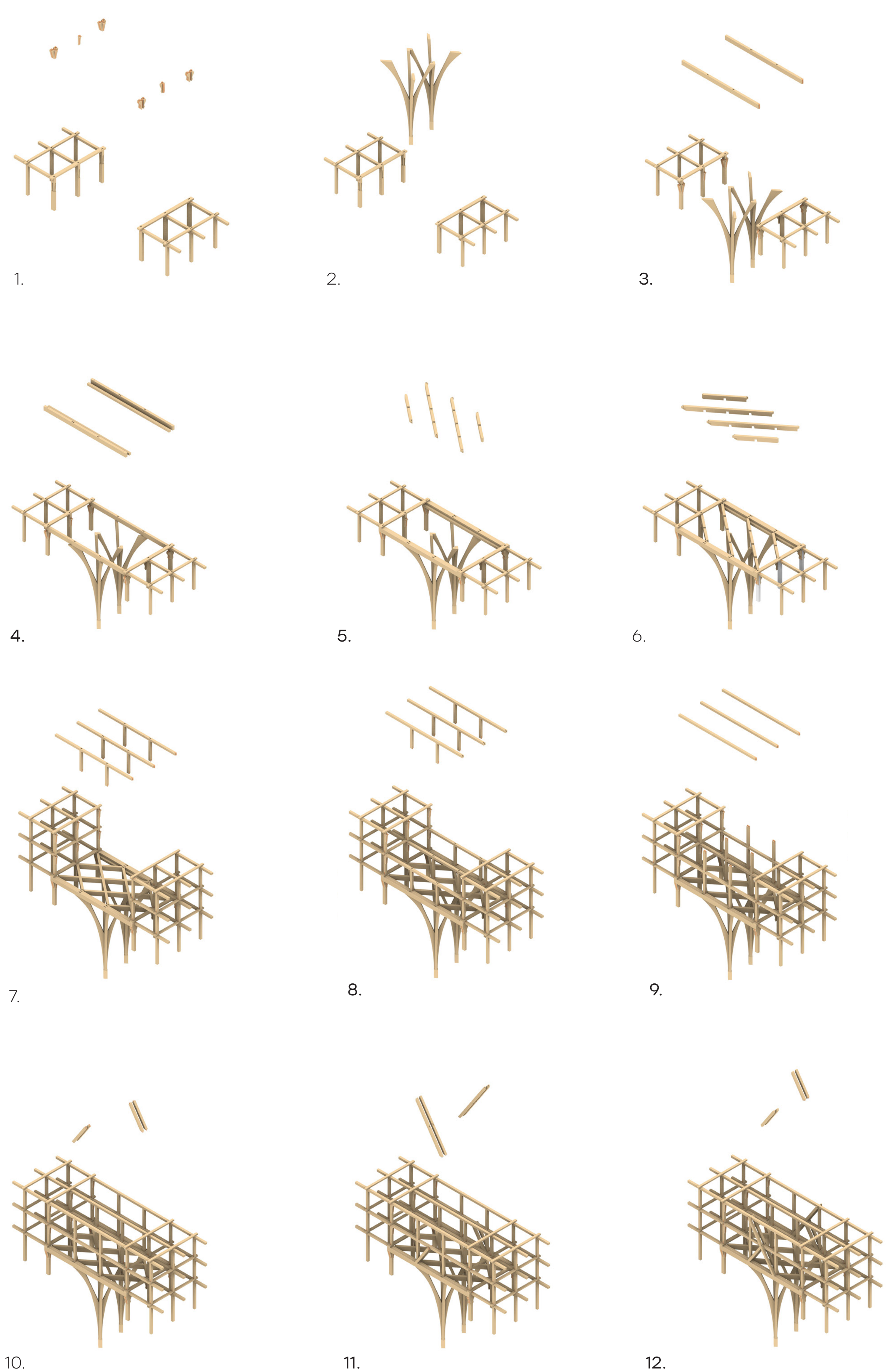


fig. 87 : Sketch development of the column for the tree bridge



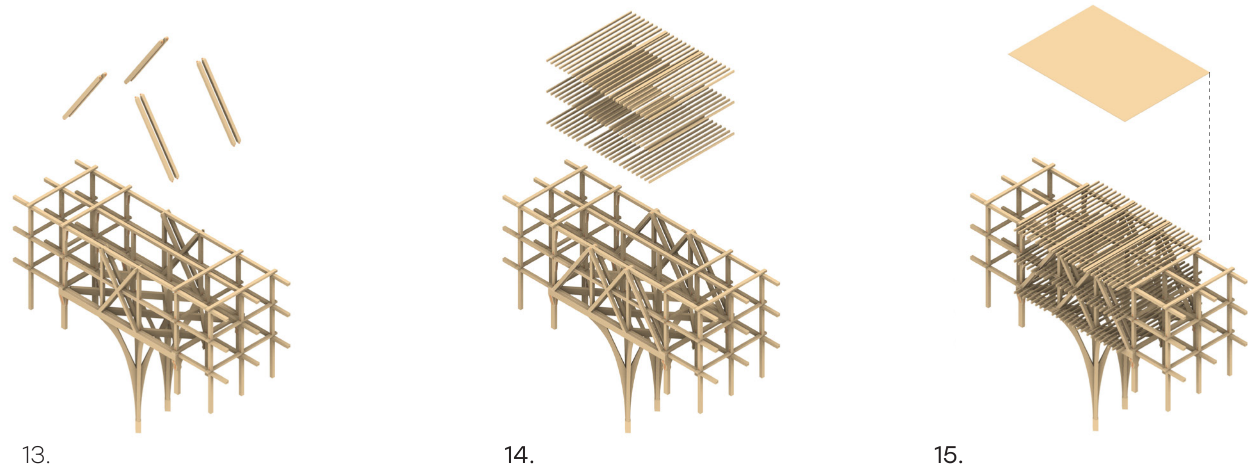


fig. 88 : Assembly of the tree bridge

Assembly

The assembly of the bridge is integrated within the overall structural system and begins with the installation of additional corbels, which are introduced to accommodate and redistribute bending moments. The bridge employs a hybrid connection strategy, in which one side provides a fixed connection while the opposite side functions as a hinged support, allowing controlled movement within the structural system.

The construction process starts with the placement of prefabricated columns, which are delivered on-site and positioned accordingly. Subsequently, a primary beam is installed to connect the two main structural systems, forming a stable linkage between them. This beam is fixed at one end and hinged at the other, ensuring both structural continuity and controlled flexibility. The bridge deck is then constructed in steps 4 and 5.

Following this, the construction of the upper structural system resumes. Additional portal frames are installed by lifting them between the existing structural elements, taking advantage of the available tolerances between columns to allow accurate placement. The roof structure is then completed in steps 7 to 9.

Steps 10 to 12 involve the installation of bracing elements, which provide lateral stability and reinforce the structural behaviour of the system. The final stages (steps 13 to 15) include the placement of floor elements and deck beams. In practice, these latter steps occur iteratively and are partially interchanged during construction; however, they are presented sequentially here for clarity and to maintain legibility of the diagrammatic representation.

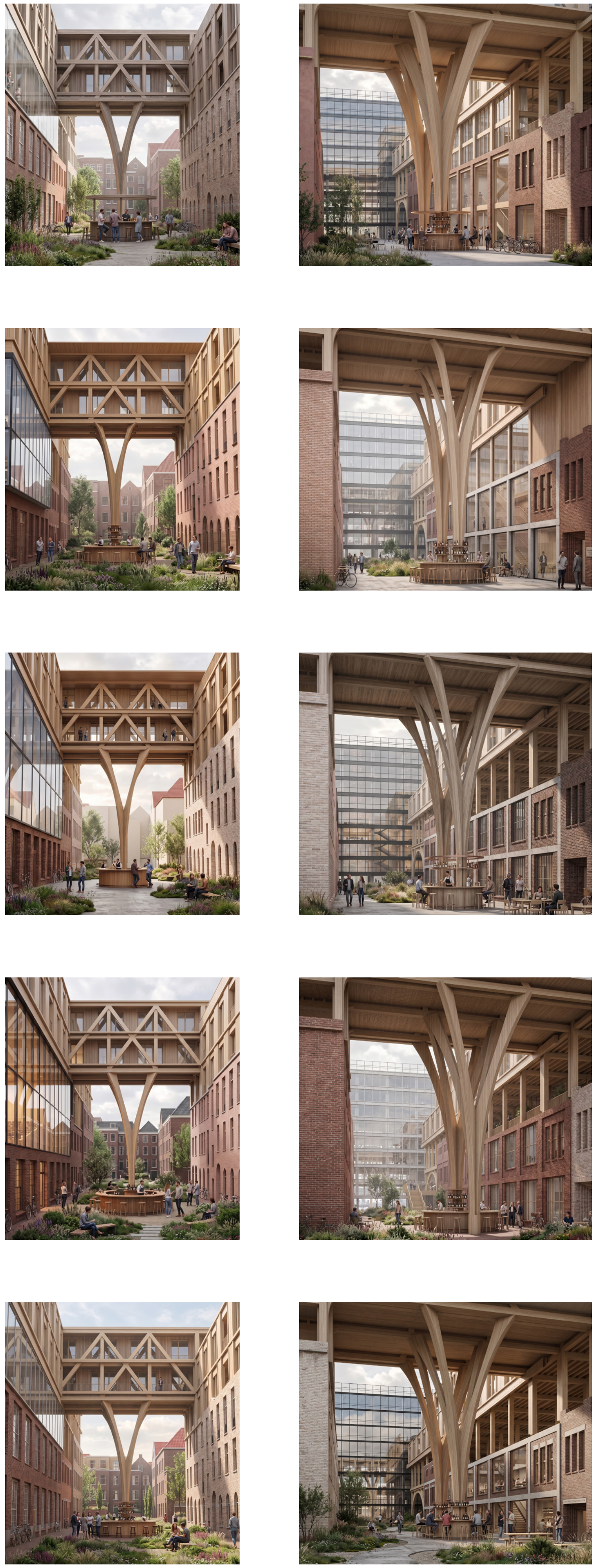


fig. 89: Geometric exploration of the different columns

Column variations

In recent years, artificial intelligence has exerted a significant influence on society at large, and the architectural sector is no exception. On social media, accelerated workflows for generating architectural designs are proliferating rapidly sketches converted instantly into floor plans, façade photographs transformed into workable DWG files, and schematic analyses produced at unprecedented speed. As a curious student, I have explored many of these tools firsthand, yet their output consistently falls short of the design quality I aspire to achieve.

Nevertheless, I maintain that within our discipline, predictive models hold considerable promise particularly in the early stages of the design process, where maximising informational input is most valuable. Applications such as daylight analysis, ventilation modelling, acoustic performance, and sustainability calculations are especially relevant here, given that a building's position and massing are fundamental determinants of its environmental behaviour. The first plugins for Rhino and Revit that enable volumetric manipulation through natural language prompts are already emerging. However, these tools have not yet reached a stage of maturity suitable for professional architectural use: they currently generate geometry of excessive complexity, producing file sizes that are disproportionately large for what are, in essence, forms that should occupy no more than a few kilobytes.

During my graduation project, I employed AI tools primarily for render generation. A notable advantage of platforms such as Gemini is their capacity to process relatively simple Rhino models and sketches, providing immediate visual feedback that communicates design intent. These tools also allow the designer to convey atmospheric qualities and spatial ambitions through contextual input.

A recurring limitation, however, is the tendency of these tools to hallucinate – introducing geometry absent from the original sketch, or incorrectly assigning materials to architectural elements. Developing methodological control over this phenomenon is therefore essential, and I contend that such control is attainable.

To this end, I sought guidance from a pHd'er, former graduate of AE who has been engaged with these developments for over six years. His expertise centres less on image generation and design representation than on the underlying computational models and performance-based calculations. Drawing on both his technical knowledge and his architectural background, he provided valuable insight into how these tools can be approached more rigorously.

These tools are fundamentally code-based, and their output is determined entirely by the input provided. Hallucination occurs most frequently when the designer leaves excessive room for speculation a characteristic that is simultaneously a limitation and a generative quality of the model. Since architects require precise control over their design instruments, it follows that engaging with these tools through structured code is preferable. JSON, or JavaScript Object Notation, proves particularly well-suited to this purpose. It is a lightweight, human-readable data format that organises information as structured key-value pairs. Rather than leaving the model to interpret a design freely, JSON allows the designer to define specific attributes explicitly such as material properties, spatial relationships, and atmospheric intent thereby constraining the model's output to parameters set by the designer.

I began working with this approach from the earliest stages of the project, progressively elaborating the code as the design developed. Conceptual intentions, material choices, and the atmospheric qualities I wished to convey in the renders were incrementally encoded, while the Rhino geometry serving as input grew in both scale and specificity. The result was a body of code that closely mirrors my intentions as a designer and accurately represents what I wish to communicate as an architect. The full code is included in the appendix.

What proved particularly instructive was the model's behaviour in relation to both resolved and unresolved aspects of the design. Elements I had carefully developed and detailed were rendered with clarity and precision. Conversely, areas that remained conceptually underdeveloped were taken up speculatively by the model extrapolated beyond my intentions. This constitutes a form of double confirmation: the tool not only reflects the strength of resolved decisions, but also exposes the latent ambiguities that still require the designer's attention.

fig.89: render of the arch bridge

4.7 Arch bridge

The Arch Bridge is conceived as a reinterpretation of traditional Dutch bridge typologies, particularly referencing both the Magere Brug in Amsterdam and the characteristic Dutch drawbridge.

The design introduces a prominent arch structure while simultaneously reinterpreting conventional timber construction methods. Traditionally, such structures would be clad or concealed; however, in this proposal, the construction is deliberately enlarged and exposed through the use of glue-laminated timber (glulam) elements. This allows the connections—particularly the corbels and interlocking joints—to become highly legible and expressive.

These structural components are unified into a single portal frame, which is repeated four times. In contrast to the main façade, these portals are set slightly back. This decision is primarily driven by material protection: by recessing the timber structure, it is shielded from direct exposure to rain. Earlier iterations placed the structure flush with the façade, but testing showed that a recessed position achieved both better durability and no spatial compromise, while also improving the architectural expression.

A key conceptual decision is that the bridge stands independently, rather than forming a rigid structural connection with adjacent buildings. This autonomy allows it to establish a distinct identity as a place in itself.

Urbanistically, the bridge acts as a gateway condition. Viewed from the Servaasstraat, it frames a visual corridor towards the Stadstimmertuin, effectively drawing people inward. It operates simultaneously as:

a passage between buildings (connecting Weesperstraat and the former printing house), a public space beneath, and an inhabitable layer above, where residents can walk and dwell.

This results in a dual-layered spatial experience, combining circulation and habitation.

Architecturally, while the surrounding façades remain relatively planar—reflecting the logic of infill between concrete columns and beams—the bridge introduces a deliberate deviation by stepping downward. This intervention proved highly effective, as it emphasizes the timber structure and highlights the core theme of expressive wood construction.

A fundamental principle in timber design is understanding the limitations and behaviour of wood. Unlike concrete or stone, timber should not be entirely enclosed. Instead, the structure is expressed, while carefully protected. The recessed positioning ensures that the structure remains dry without relying on excessive technical detailing.

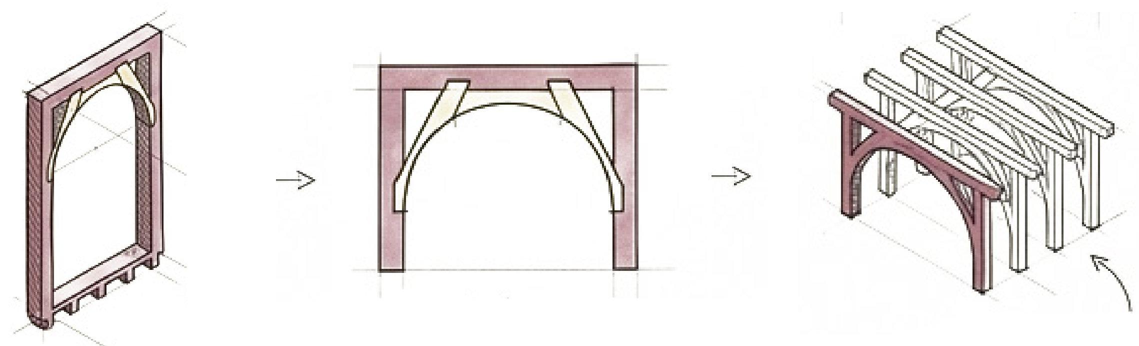


fig.90 : Sketch development of the column for the arch bridge

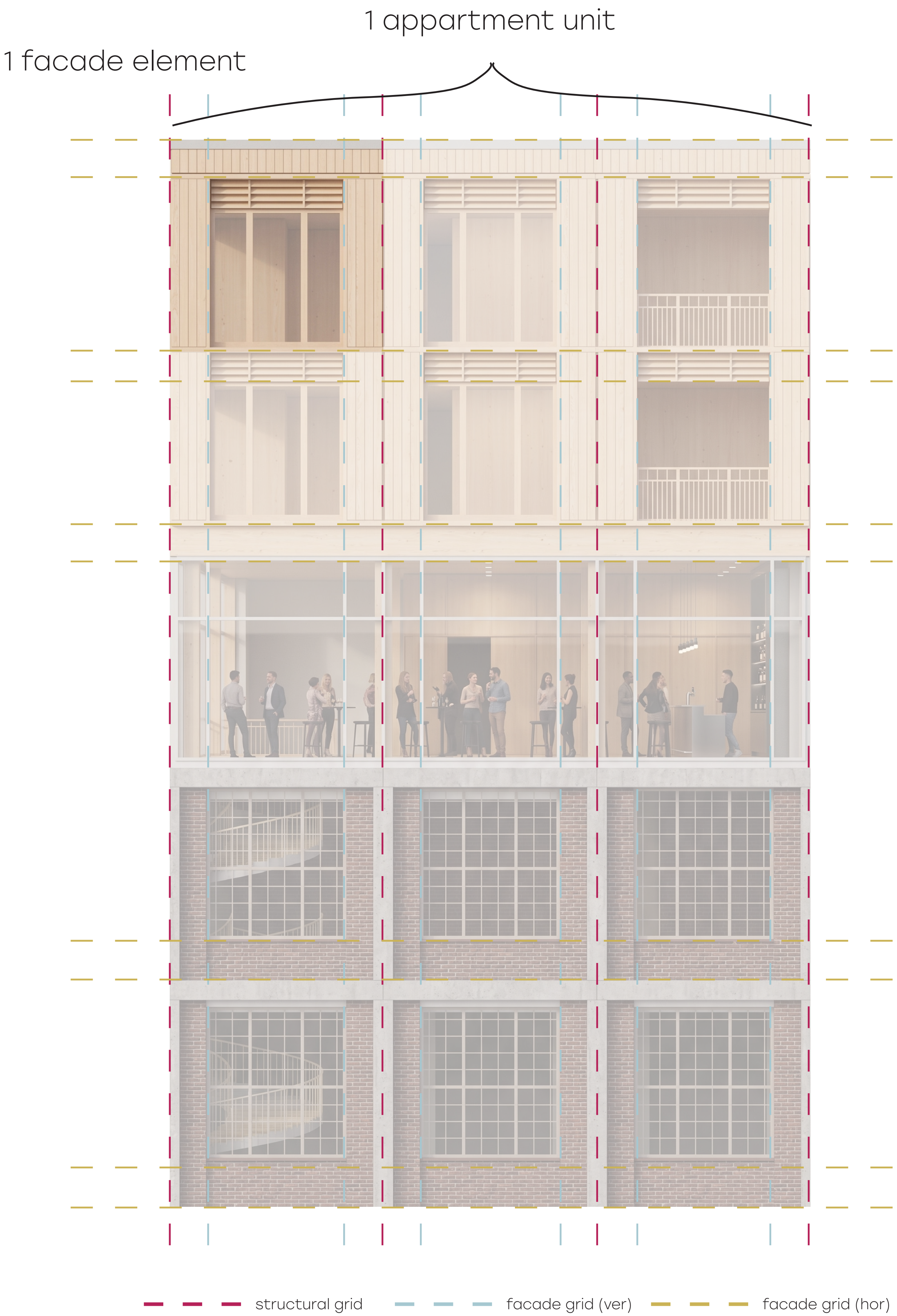


fig. 91: Facade explanation

4.8 Facade

The façade is primarily composed of Akoya timber, which provides a lightweight and durable wooden exterior finish with a refined architectural appearance. The design of the façade is closely related to the underlying formal logic of the building, in which multiple grids interact. While the former printing house is structured according to a dominant structural grid, additional secondary grids are introduced through the positioning of openings and façade articulation, creating a layered spatial rhythm between window openings and solid masonry or cladding zones.

A key characteristic of the former printing house is the presence of a clear structural axis. This axis defines the primary load-bearing line of the HSB (timber frame) elements and is expressed externally through a pronounced expansion joint that subdivides the façade into distinct volumetric blocks. Alongside this structural logic, a second, more continuous rhythm is introduced through the alignment of the window grid, which extends across the façade and establishes visual continuity between different programmatic zones.

A notable inversion compared to the original building condition is found in the vertical distribution of façade elements. Whereas in the original typology windows are typically positioned in the upper part of the façade with masonry below, in the new design the windows are positioned lower, while the upper zone is reserved for cladding and sun shading elements. This inversion creates a different relationship between transparency and opacity, particularly in the plinth, where the foyer is expressed as a continuous curtain wall system. Within this curtain wall, the structural grid remains clearly readable, reinforcing the legibility of the underlying construction system.

Above this plinth condition, the timber cladding is detailed using traditional woodworking principles, referencing classical Amsterdam timber construction techniques. The façade elements are connected using tongue-and-groove (messing-en-groef) joints, ensuring a continuous and precise timber surface. Above the window frames, where sun shading elements are absent, the façade is articulated through a system of interlocking horizontal and vertical battens. In this detailing, two perpendicular timber strips are clamped together, creating a subtle reference to historical timber assembly techniques while maintaining a contemporary expression.

The transition between different façade zones is carefully articulated through changes in orientation. Above the plinth, horizontal battens define the façade rhythm, while the HSB elements are expressed vertically. At the uppermost level, a continuous crown of vertical timber slats forms a unifying architectural cap, visually tying the composition together. This crown element acts as a final connector across the different façade systems and reinforces the overall coherence of the building envelope.

The façade is terminated with a protective roof edge, likely constructed from zinc or aluminium, ensuring effective water protection and durability. Larger structural or projecting elements are executed in glulam, with additional protective layers applied to prevent weathering. These protective detailing strategies ensure that exposed timber components are shielded through carefully designed cap elements and sealing layers, allowing the façade to maintain both its material clarity and long-term performance.

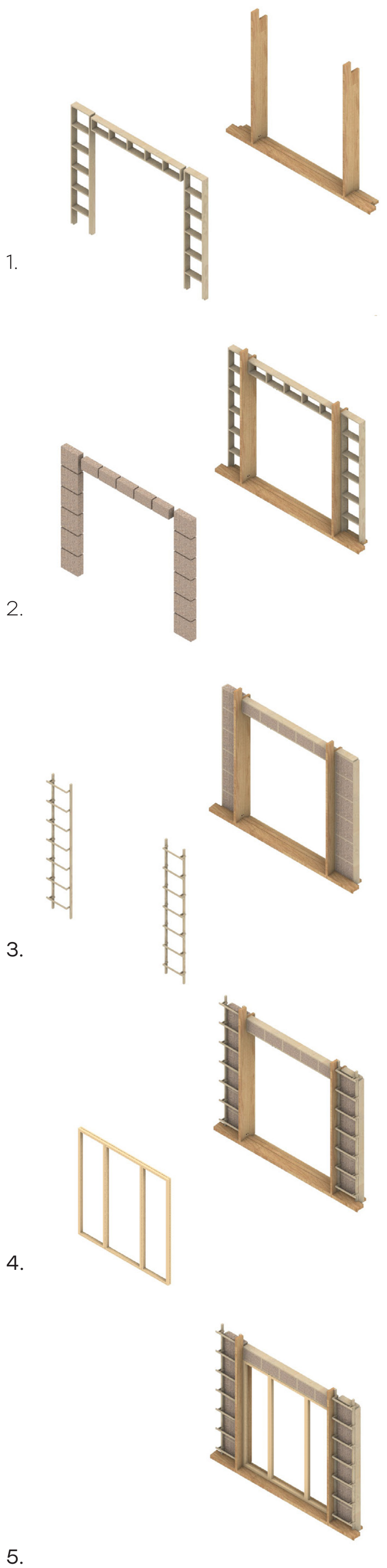


fig. 92: assembly of site of the facade element

Off-site assembly

The façade system is based on prefabricated timber frame (HSB) elements, in which each apartment façade is subdivided into three separate modular components. These elements combine structural and non-structural parts, with some components functioning as load-bearing while others remain non-structural and visually expressed.

The materialisation consists of a hybrid timber system. Laminated Accoya wood is used for the visible and exposed façade components, while standard spruce timber is applied for the concealed structural frame elements. This combination allows for durability and a refined architectural expression, while maintaining structural efficiency.

In the prefabrication phase (steps 1 to 4), spruce timber elements are assembled around the laminated Accoya components, forming a structurally stable frame. Subsequently, insulation is installed within the element, followed by the application of battens that form the basis for the façade finish and cladding. Finally, the window frame, including glazing, is installed, completing the prefabricated façade module ready for transport.

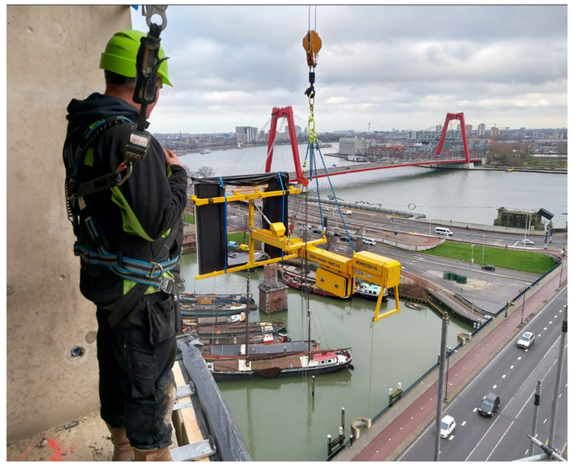


fig. 93: installtion of large facade element (DGMR, 2025)

On-site assembly

On-site assembly begins with the installation of base and top anchor connections, which are designed to be hinged in specific directions to accommodate structural movement while ensuring stability. The prefabricated façade elements are then positioned between the primary structural frame. Additional battens are applied to create a ventilated façade cavity, and supplementary insulation is added at the rear side of the element.

Special attention is given to thermal continuity at the structural interfaces. Since the façade is integrated between the main structural elements, insulation is strategically applied both within the façade modules and around adjacent columns to ensure a continuous thermal envelope.

The process concludes with the completion of the fully installed façade element, resulting in a complete, insulated, and ventilated façade system.

fig. 94: installtion of large facade element (DGMR, 2025)

fig. 95: assembly on site of the facade element

4.9 Acoustics & fire safety

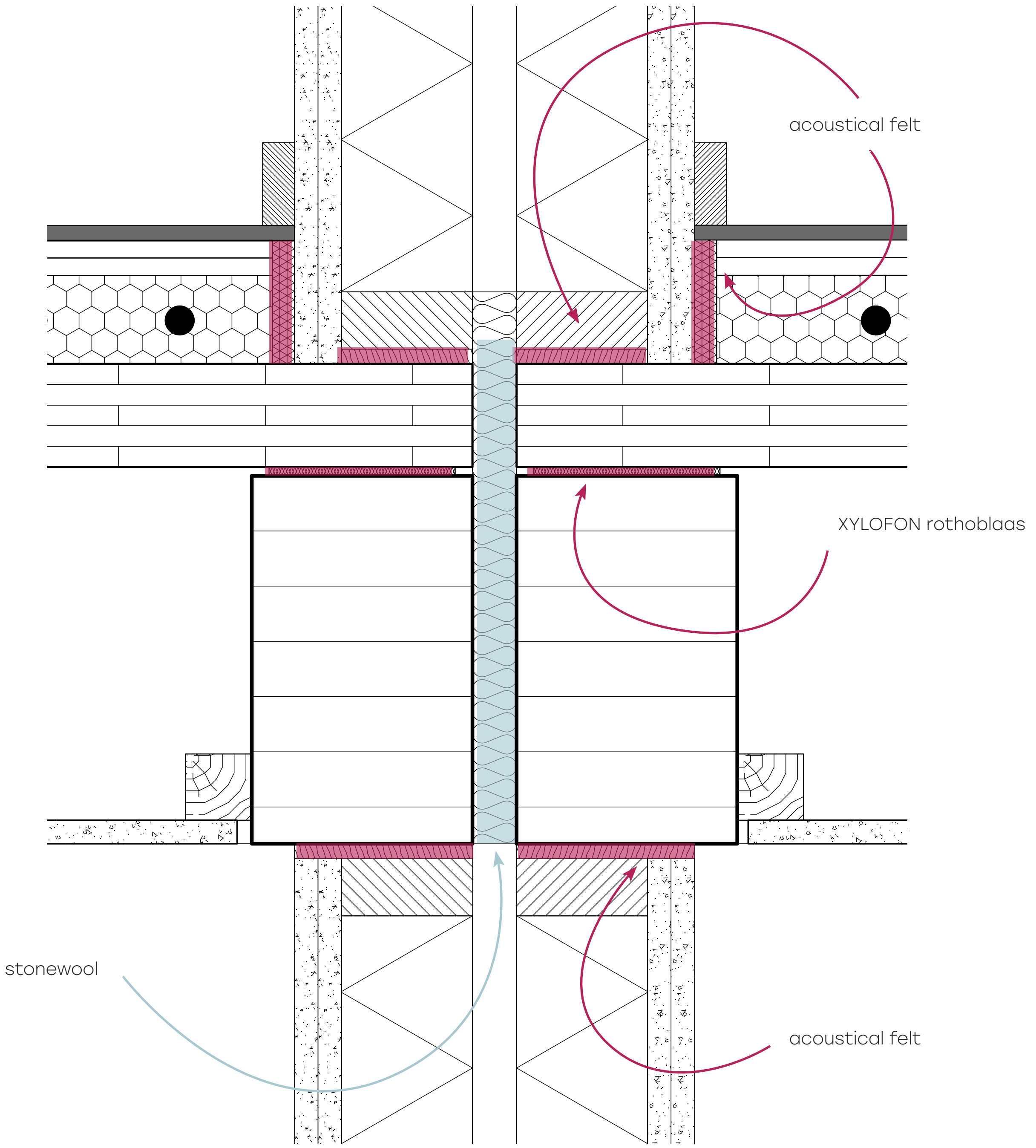


fig. 96: Party wall construction detail

fire break   acoustical decoupling

This is primarily related to the fact that the beam located at the side cannot be fully integrated into the structural enclosure. Apart from this aspect, the entire system is acoustically decoupled. The main acoustic separation is achieved through the application of insulation combined with an air cavity.

A key requirement is that the walls and the applied lining walls remain acoustically decoupled from the primary structure. As a result, the construction achieves an acoustic performance of approximately 52 dB DnT,k. Standard reference values are generally based on specific CT constructions; however, alternative lightweight partition systems were also considered, including the use of a strut wall system and the ClayTec wall system.

The ClayTec timber-frame wall solution was developed to replicate the acoustic behaviour of the strut wall construction as closely as possible. Although the wall thickness is slightly greater than that of the strut wall system, the expected acoustic performance for residential separation walls should, in principle, remain equivalent.

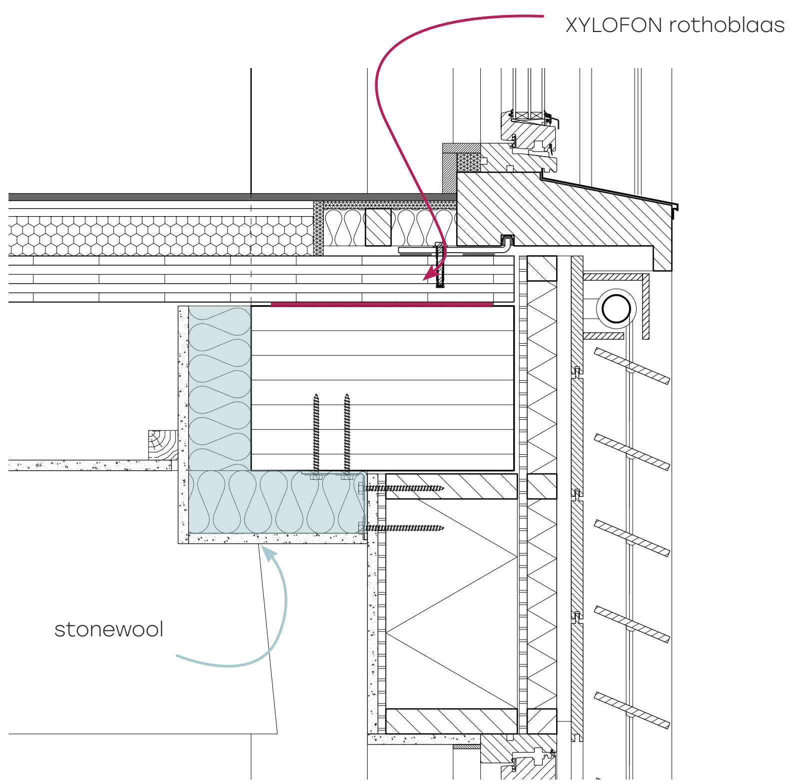


fig. 97: Facade detai with fire breaks en acoustical decoupling

fire break   acoustical decoupling

4.10 D&C | Anchored in air and ground

This project addresses the sub-question: how can the Stadsdeelentuin be revitalised as an enclosed courtyard? In this context, an enclosed courtyard is understood as an internal urban space with controlled accessibility, forming a semi-protected yet connected urban interior.

The design strategy can be understood as a transformation rather than a complete reinvention. The notion of "revitalisation" here refers to the restoration of the site's historical identity as a place of timber production and craftsmanship. Where the courtyard was once associated with hands-on, artisanal making processes, it is now reactivated through the introduction of a regulated institutional framework: the Timber Institute of Amsterdam. This institution becomes the primary programme driver of the entire design.

All spatial interventions are subordinate to this programme. The introduction of the Timber Institute, complemented by supporting functions such as cafés and an auditorium, defines the new operational logic of the site. These programmatic insertions establish the identity and long-term relevance of the courtyard within the city.

From this programmatic core, spatial interventions emerge. The removal of selected buildings and the opening of the former rear street generate new circulation routes and access points at ground level. These interventions increase permeability and introduce new connections between previously fragmented parts of the site. In this sense, the new routes are not the primary driver of the design, but rather a spatial consequence of the introduced programme.

The strategy extends vertically through the introduction of elevated connections between buildings. These bridges create additional spatial relationships above ground level, forming new "anchor points in the air." These points operate as hybrid nodes where circulation and structure intersect, reinforcing the courtyard as a three-dimensional system rather than a purely horizontal space.

Although the courtyard is not intended as a fully active 24/7 environment, the inclusion of semi-public functions ensures a continuous level of activity throughout the day. The spatial experience is designed to support different atmospheres—from morning to sunset—allowing the courtyard to remain accessible, comfortable, and socially engaged across varying moments of use.

In conclusion, the revitalisation of the Stadsdeelentuin is achieved through a programme-led transformation in which the Timber Institute acts as the central organising force. Spatial connectivity and vertical interventions emerge as supporting mechanisms, re-establishing the courtyard as a layered, controlled, and continuously experienced urban interior.

4.11 D&C | Rooted in Timber

The exploration of Amsterdam's historic timber tradition reveals that it should not be understood merely as a construction technique, but rather as a broader system of structural logic, connection typologies, and spatial principles. During the discovery phase of the design process, this understanding was developed through the analysis of existing timber joints, connection systems, and different wood species, as well as by studying bridge structures and their mechanisms of force transfer. Together, these investigations provided insight into how traditional timber systems operate within the Dutch urban context.

A key finding is that the historic timber tradition is strongly based on modularity, repetition, and an efficient distribution of forces within material limitations. This is evident in both historical bridges and building structures, where tension and compression are resolved through relatively simple but highly effective geometric systems. At the same time, it became clear that a direct translation of solid timber construction into a contemporary design is not feasible, mainly due to dimensional constraints (such as the large cross-sections required in solid wood) and modern requirements regarding structural performance, detailing, and constructability.

This has led to a hybrid design approach in which contemporary timber technologies are combined with traditional principles. The use of glulam (glued laminated timber) elements allows the continuation of the historical logic of timber construction while significantly improving structural performance and scalability. Within this system, hardwood is used for critical connection points and dowels, while steel is applied selectively in areas of high stress concentration, such as end connections between columns and beams where timber alone would be insufficient. This selective use of materials reflects a continuation of historical timber logic, where material choices were always closely related to force distribution and structural necessity.

Furthermore, the spatial and logistical conditions of the site played a defining role in the design strategy. The project is located within an enclosed courtyard with limited accessibility, which restricts construction logistics. As a result, prefabrication, water-based transport, and crane assembly become essential constraints that directly influence the sizing and composition of structural elements. In this way, site conditions once again act as a driver of architectural form, similar to how Amsterdam's historical urban fabric shaped traditional timber construction methods.

The development of a portal-based structural system, which connects to an existing rigid concrete framework, demonstrates how historical principles can be reinterpreted within a contemporary context. By anchoring the timber structure to the façade and maintaining a rhythmic spacing between portal frames, the design preserves a sense of order and repetition reminiscent of traditional timber building logic.

Finally, the integration of contemporary performance requirements such as acoustics and fire safety highlights how the timber tradition is not static, but continuously evolving. Whereas these aspects were historically secondary or approached differently, they are now embedded within the design without losing the underlying structural logic. This results in a hybrid architectural system in which historical principles, modern engineering, and contextual constraints converge.

In conclusion, Amsterdam's timber tradition should be understood as a conceptual framework rather than a literal method. Its core principles—modularity, structural clarity, and context-driven construction—remain highly relevant today. By reinterpreting these principles through glulam-based systems and hybrid connections, a contemporary timber architecture emerges that is both historically grounded and responsive to present-day technical and environmental demands.

Deliver

5.1 Discussion

This research set out to investigate how timber topping-up and bridge interventions can revitalise the Stadstimmertuin, using Amsterdam's historical timber construction tradition as an active design language. The five sub-questions addressed in this project collectively approach this challenge from three interconnected angles: the reading and understanding of the site, the analysis of historical timber construction and bridge traditions, and the translation of these insights into a contemporary design strategy. Together, they reveal a set of recurring tensions that deserve critical reflection between fragmentation and coherence, between historical fidelity and contemporary performance, and between typological precedent and programmatic innovation.

The first sub-question established that the Stadstimmertuin is best understood as a palimpsest: a site in which multiple temporal layers, spatial logics, and architectural intentions coexist without being fully resolved into a unified whole. Rather than treating this condition as a problem to be overcome: the design research proposed to accept it as a generative starting point. The site's historical layering from its origins as a timber yard to its subsequent transformations does not provide a single coherent blueprint, but instead offers a range of spatial conditions that can be selectively activated.

This interpretation raises an important question about design strategy: to what extent should an intervention seek to resolve the fragmentation of the Stadstimmertuin in combination with to what extent should it accept and build upon it? The decision to introduce the Timber Institute of Amsterdam as the central programmatic anchor suggests that coherence is achieved not through formal unification but through programmatic focus.

Furthermore, the analysis of the Weesperbuurt as a context of contrasting urban conditions busy street, metro infrastructure, enclosed canal edge, and historical waterfront positions the Stadstimmertuin not as an isolated intervention but as a node within a broader urban network. The Nieuwe Achtergracht emerges as a structuring element that mediates between the interior of the block and the public realm. This is an invertenion of an urban continuity rather than typological restoration.

The second and third sub-questions together construct a detailed understanding of Amsterdam's historical timber construction tradition; both in buildings and in bridges.

What these analyses share is a consistent finding: the historical timber tradition is not primarily a question of aesthetics but of integrated systems thinking. Structural principles, connection details, façade strategies and spatial typologies all emerge from a common logic in which material constraints, force distribution, and contextual conditions are the primary design drivers.

This systems-based reading of the tradition has significant implications for how it can be used as a design language. It suggests that a superficial replication of historical forms would miss the essential character of the tradition. Korbelen, bracing elements, and portal frames are not ornamental features that can be applied independently; they are the visible expression of structural logic. Any design claiming to work within this tradition must therefore engage with it at the level of structural and material thinking, rather than at the level of formal quotation.

The bridge typology adds a further dimension to this argument. Historical Dutch timber bridges exhibit a strong relationship between structural necessity and ornamental elaboration, most clearly visible in the curved silhouettes of drawbridges. The portal frame oriented perpendicular to the water flow establishes a clear structural rhythm that is simultaneously a spatial experience. This parallel between bridge and building structure is particularly relevant for the topping-up and bridge intervention strategy, where the boundaries between structural addition and urban connector are deliberately blurred.

A point of critical reflection is the selective nature of historical precedents drawn upon in this research. The analysis focuses on the dominant traditions of Amsterdam and the broader Dutch urban context. This provides a coherent and well-grounded historical basis, but it also means that the research operates within a relatively bounded tradition. Although many connections are, of course, related to each other worldwide as family.

The fourth sub-question addresses the revitalisation of the Stadstimmertuin as an enclosed courtyard block. The proposed strategy moves beyond the conventional understanding of a courtyard as a horizontal, two-dimensional space. By introducing elevated bridge connections between buildings and establishing new ground-level routes through the removal of select structures, the design reconfigures the courtyard into a layered, three-dimensional experience.

This approach is coherent and well-argued. The introduction of "anchor points in the air" directly connects to the bridge typology explored in the third sub-question, demonstrating how the historical analysis is operationalised as a design tool rather than merely cited as context. The bridges do not function solely as functional circulation elements; they operate as structural gestures that reinforce the spatial identity of the courtyard and create new relationships between previously disconnected buildings.

The programmatic strategy centred on the Timber Institute with supporting functions such as a café and auditorium introduces a clear institutional identity without requiring the full public accessibility of an urban square. This position is both pragmatic and appropriate to the character of the site.

The semi-public nature of the courtyard allows for a controlled yet animated environment, capable of sustaining activity across different moments of the day. One area that merits further reflection concerns the balance between programmatic specificity and long-term adaptability. The Timber Institute functions as a coherent and thematically resonant programme, strongly connected to the site's historical identity. However, the extent to which the spatial configuration remains meaningful if the institutional programme were to change over time is less clearly addressed. Given the long lifespan of architectural interventions in historic urban environments, the question of programmatic flexibility represents a relevant design consideration that could be explored further.

The fifth sub-question addresses the most explicitly design-generative aspect of the research: how Amsterdam's timber tradition can be used to develop a modern timber building. The key finding that the tradition should be understood as a conceptual framework rather than a literal construction method allows for a productive reinterpretation rather than a nostalgic reconstruction. The use of glulam as the primary structural material maintains the logic of modular, repetitive timber construction while addressing the dimensional and performance limitations of solid wood. The hybrid approach combining glulam framing with hardwood connections, selective steel reinforcement at high-stress nodes, and prefabricated assembly reflects a careful negotiation between historical principles and contemporary engineering requirements. The choice to limit steel to structurally necessary points rather than adopting a fully composite system, preserves the visual and material coherence of the timber language. This is a defensible design position and one that aligns closely with the historical tradition in which material choices were always driven by structural necessity.

The influence of site logistics specifically the constraints of the enclosed courtyard on transportation and crane access – reflects a meaningful continuity with the historical condition in which Amsterdam's waterways and urban morphology directly shaped construction methods. Water-based transport and prefabrication are not merely practical responses; they echo the way historical timber construction was formed by its urban context. Similarly, the integration of contemporary performance requirements like fire safety, acoustics, and moisture management does not contradict this logic but extends it into the present, demonstrating that structural clarity and material discipline remain valid principles regardless of technological context.

Across all five sub-questions, a consistent methodological position emerges: the historical timber tradition is most productively engaged when treated as an active design language rather than a passive historical reference. This means understanding its principles at a structural and spatial level, translating them into contemporary material systems, and allowing site conditions, programme, and performance requirements to test and refine their contemporary relevance.

What this research also reveals, however, is the complexity of the relationship between analysis and design. The transition from historical analysis to design proposal is not a linear process, and the research does not always make explicit how individual analytical findings have directly shaped specific design decisions. This is a limitation inherent to most design-research processes but it is worth acknowledging: the richness of the historical material raises expectations about the depth of the translation into design, and not all connections are equally developed.

The scale of this intervention inevitably leaves certain urban questions open. The relationship between the Stadstimmertuin and the broader regeneration of the Weesperbuurt, the long-term implications of timber construction at an urban scale, and the sustainability profile of the material palette all exceed the boundaries of this research. Yet each represents a productive direction for further investigation that follows directly from its findings.

5.2 Conclusion

This graduation project investigated how timber topping-up and bridge interventions can revitalise the Stadstimmertuin, using Amsterdam's historical timber construction tradition. Based on five interrelated sub-questions, the research has moved from site reading and historical analysis through to a concrete architectural strategy that both grounds the design in its historical context and responds to the conditions of the contemporary city. The following conclusion draws together the findings of each sub-question and formulates a final answer to the main research question.

The analysis of the current architectural and historical character of the Stadstimmertuin established that the site is not a unified ensemble but a layered urban condition : a palimpsest in which different periods of transformation coexist without being fully integrated. The courtyard, the green spatial structure, and individual historical anchor buildings retain fragments of the original spatial and functional identity, while the overall coherence of the block remains incomplete. This condition of productive fragmentation, rather than being a deficit to overcome, provides the starting conditions for an architectural strategy based on selective activation and spatial reconnection.

The investigation into Amsterdam's historical timber building tradition revealed a deeply integrated system in which structural principles, connection details, and façade strategies are mutually dependent.

The evolution from fully timber-based construction toward hybrid masonry-timber systems demonstrates a tradition of pragmatic adaptation within consistent material and structural principles. Joints, corbels, and bracing elements are not isolated technical details but the visible expression of a structural logic in which construction and architectural expression are inseparable. This understanding is foundational for any design that claims to engage meaningfully with this tradition.

The study of historical Dutch timber bridge typologies extended this structural understanding into the domain of infrastructure and urban space. Portal frames, hybrid timber-steel connections, and the consistent relationship between structural necessity and ornamental elaboration define a bridge tradition that is both pragmatic and spatially rich. The curved silhouette of the drawbridge and the rhythmic articulation of portal frames are not aesthetic choices but the direct expression of how forces are managed and how material limitations are resolved. This bridge logic proved directly relevant for the design of elevated connections within the courtyard. Those are elements that are simultaneously structural, spatial, and expressive.

The fourth sub-question addressed the revitalisation of the Stadstimmertuin as an enclosed courtyard block. The proposed strategy reconceptualises the courtyard as a three-dimensional system, in which ground-level permeability, elevated bridge connections, and a focused institutional programme: the Timber Institute of Amsterdam that collectively re-establish the site's identity as a place of timber knowledge and craftsmanship. The revitalisation is achieved not through formal restoration but through programmatic reinvention and spatial reconnection, producing a courtyard that is simultaneously historical, active, and architecturally coherent.

The final sub-question examined how Amsterdam's timber tradition can be used to develop a modern timber building. The answer lies in reinterpreting the tradition as a conceptual framework: centred on modularity, structural clarity, and context-driven construction rather than replicating its historical forms. Through the use of glulam structural systems, hardwood connection details, and selective steel reinforcement, the design translates traditional structural logic into a contemporary material palette.

The constraints imposed by the enclosed site restricted logistics, limited crane access, the need for prefabrication and water-based transport mirror the historical conditions in which Amsterdam's timber tradition was formed, reinforcing the relevance of the historical precedent as a design framework rather than a historical curiosity.

The Stadstimmertuin can be revitalised through timber topping-up and bridge interventions that use Amsterdam's historical timber tradition by operating simultaneously at three levels: the programmatic, the spatial, and the tectonic.

At the programmatic level, the introduction of the Timber Institute of Amsterdam re-establishes the site's historical identity as a centre of timber knowledge and making. This institutional anchor gives coherence to an otherwise fragmented site and provides the long-term relevance necessary to sustain the courtyard as a living urban interior.

At the spatial level, the topping-up of existing structures and the introduction of elevated timber bridge connections transform the courtyard from a two-dimensional enclosure into a three-dimensional network of spaces. These bridges, directly informed by the structural typologies of historical Dutch timber bridges, create new spatial relationships between buildings, introduce new circulation patterns, and give the courtyard a recognisable architectural identity rooted in the local construction tradition.

At the tectonic level, the use of glulam structural systems based on typical dutch timber joints now made of hardwood joints as prefabricated construction basedtranslates the core principles of the Amsterdam timber tradition: modularity, structural honesty, and context-driven material logic into a contemporary building system.

The result is a hybrid timber architecture that is neither a reproduction of historical forms nor an abstract contemporary structure, but a grounded reinterpretation of a specific and locally rooted building culture.

Together, these three levels of intervention demonstrate that the historical timber tradition of Amsterdam is not a constraint but a resource one that is capable of generating architecturally coherent, spatially rich, and structurally disciplined responses to the specific conditions of the Stadstimmertuin.

The tradition, when engaged critically and constructively, provides not only a formal and material vocabulary but a way of thinking about the relationship between structure, space, and place that remains wholly relevant to the contemporary city.

5.3 Reflection

My graduation project explores the reactivation of the former Stadstimmertuin site in Amsterdam through a combination of spatial and programmatic interventions, with a central ambition of revitalising the courtyard typology. At the same time, the reinterpretation of Dutch timber construction traditions, combined with contemporary mass timber and hybrid structural systems, forms a second key layer of the project. As such, the design operates at the intersection of urban regeneration, programmatic restructuring, and constructive experimentation.

From the outset, the ambition was to activate the courtyard as a coherent spatial system, where not only new additions but also the existing buildings become integral parts of a continuous whole. The ground floor and upper levels are therefore not treated as separate entities, but as an integrated urban structure in which public functions, working spaces, and eventually housing coexist. The intention was to connect buildings and thereby create a new collective interior courtyard, in which the architectural project is not defined by isolated objects, but by relational space.

A defining characteristic of the design process is that it was not linear, but iterative and exploratory. I continuously started from the existing context: what is already present, what is the historical layering of the site, and how can this be translated into a new programmatic and structural logic? In this process, I studied both the history of the Stadstimmertuin and the broader tradition of Dutch timber construction, as well as contemporary approaches to timber architecture and detailing. Design and research were constantly in dialogue, rather than operating as separate phases.

Instead of developing a fixed concept first and detailing it afterwards, I often began with specific constructive or detail-based questions, such as connections, structural assemblies, and material logic. These were then scaled up into larger spatial and urban decisions. This reverse methodology – from detail to system – ensured that the project remained grounded in constructional reality, rather than becoming purely conceptual.

A major turning point in the process was the decision to shift focus from fully developing the auditorium as a central connector to further elaborating the bridges between the different buildings. Although the auditorium initially acted as a conceptual anchor, the bridge interventions gradually became the primary architectural and spatial drivers of the project. They now define the structure of the overall composition and establish the strongest relationships between the different programmatic entities. In hindsight, this shift also revealed a limitation: had the bridges been developed earlier, the auditorium could have been more fully integrated as a spatial and programmatic element.

The architectural language of the project is strongly rooted in traditional Dutch timber construction principles, such as post-and-beam systems and transverse and longitudinal frame logic. The bridges explicitly reference historical Dutch bridge typologies, reinterpreted through contemporary glulam construction. This results in a hybrid architectural expression in which historical reference and modern timber technology converge, where structure is not hidden but becomes the architectural language itself.

The main tension in the design lies in the relationship between horizontal and vertical systems. The horizontal layer – formed by bridges and spatial connections – is highly articulated and acts as the primary structuring device of the project. Vertical relationships, on the other hand, are mainly established through voids within the existing buildings, allowing visual and spatial continuity across different levels. At the same time, programmatic layers such as housing and the public ground floor remain partially autonomous, creating a deliberate condition of separation within an otherwise interconnected system.

Throughout the process, both spatial and technical dimensions were developed in parallel. Issues such as light, material expression, and the architectural presence of timber were considered from the beginning, alongside technical aspects such as fire safety, acoustic decoupling, and structural detailing. This dual focus ensured that the project operates simultaneously on a conceptual, spatial, and technical level.

Looking back, one of the key lessons concerns the sequencing of the design process. Working from detail proved highly productive, as standard construction details such as firebreaks, acoustic layers, and structural junctions became generative tools for larger architectural decisions. However, the process also revealed the importance of early clarity in defining the main structural and conceptual drivers of the project. The bridges eventually became the dominant element, but required significant time to fully emerge as such.

Less developed aspects of the project lie primarily in the auditorium and in the relationship with certain contextual conditions, such as the Nieuwe Achtergracht area. These parts of the design remain more open-ended and could be further developed to strengthen the overall coherence of the system.

What I take from this project is that architecture emerges in the continuous negotiation between detail and system, between construction and concept. By repeatedly returning to the logic of timber construction and translating it into urban and spatial interventions, the project becomes deeply embedded in both material history and contemporary practice.

In relation to the broader architectural debate, the project contributes to a rethinking of how urban densification is typically approached. The original brief is often framed through the logic of vertical extension and rooftop additions. This project proposes a broader architectural interpretation, in which alternative spatial strategies such as bridge structures, horizontal connections, and infrastructural spatiality are used to redefine what a building can be. Rather than treating densification as an additive vertical act, it becomes a relational and connective operation.

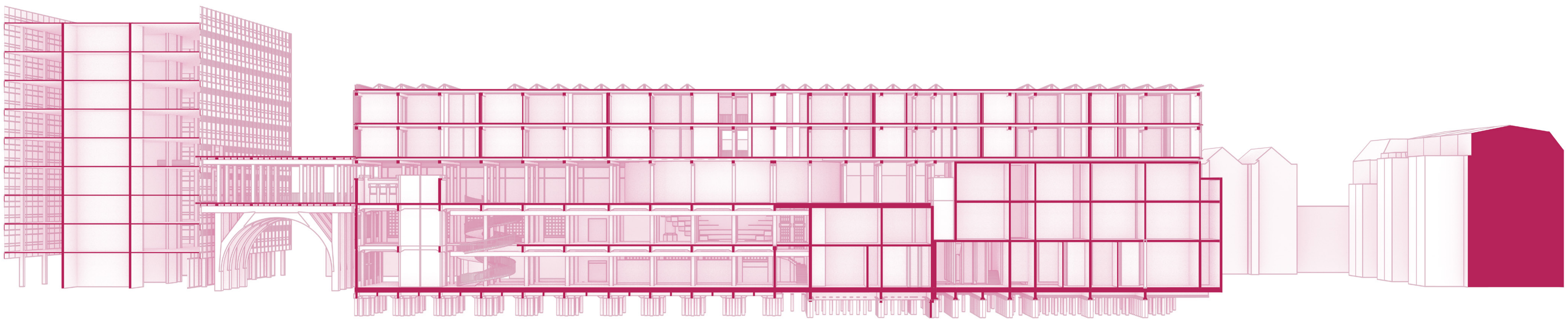
Historically, there was a close relationship between architecture and civil engineering, where construction and design were more integrated disciplines. Over time, these fields have become increasingly separated, particularly through the dominance of steel and concrete in modern construction. The renewed use of timber opens up the possibility of reconnecting these domains. Timber demands an integrated way of working in which structure, detail, and architectural intention cannot be separated.

This resonates with broader academic discussions, for instance within courses such as Bridge Design, where fundamental structural thinking is reintroduced as a foundation for architectural design. Within this framework, design is not only about form or programme, but about the underlying structural logic that generates architecture itself.

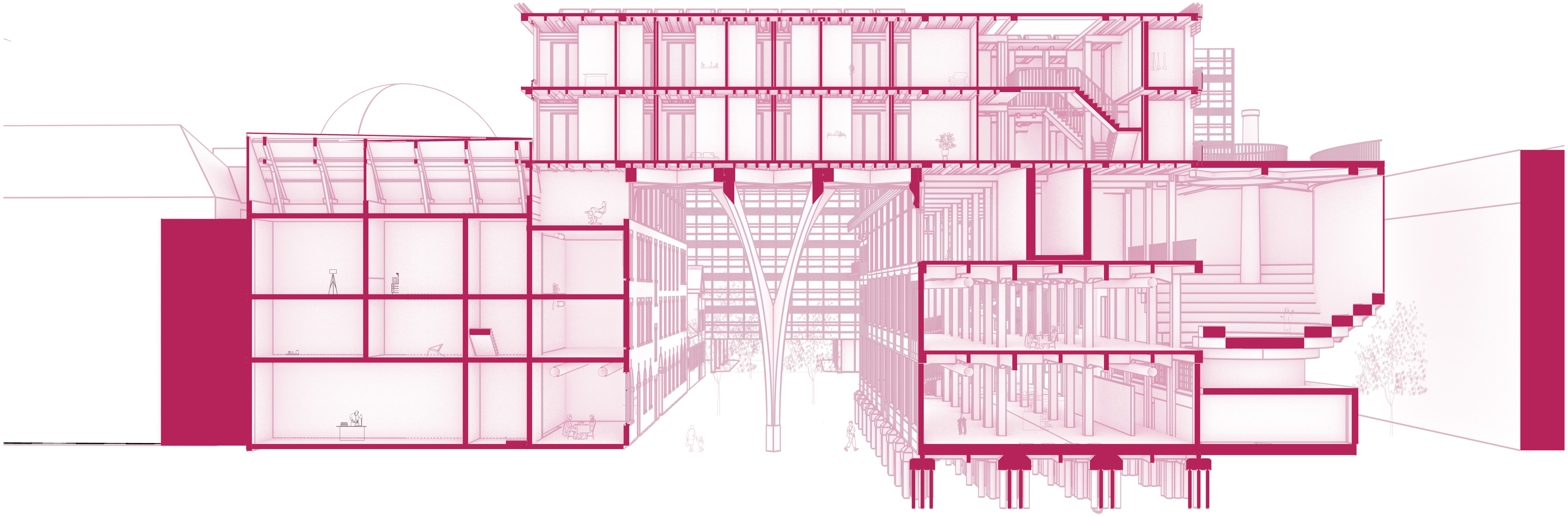
The historical references embedded in the project. Including the period when architecture and civil engineering were still taught within a single faculty reinforce this perspective. They point towards a potential reintegration of disciplines that have drifted apart, suggesting a renewed proximity between architectural thinking and structural engineering.

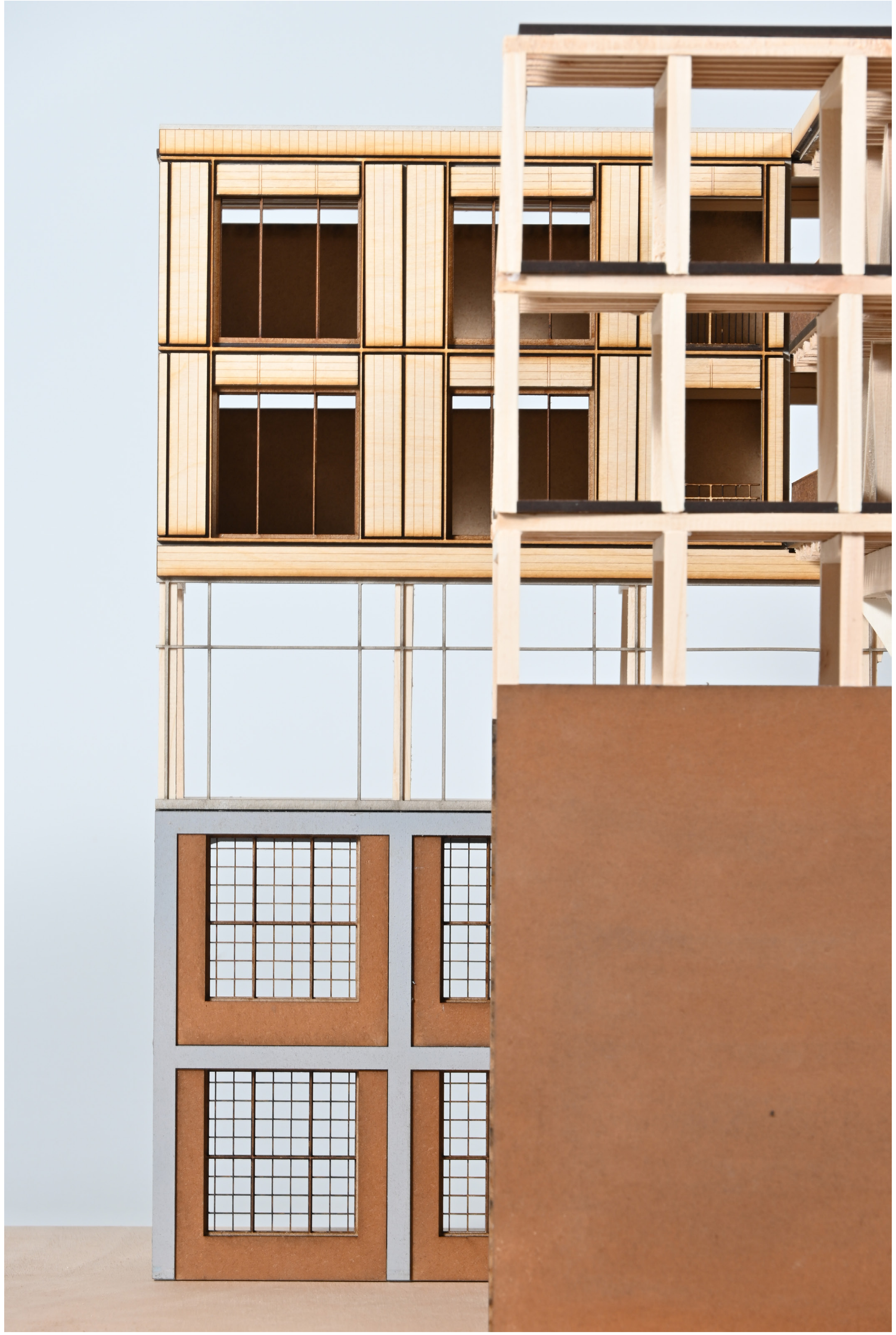
In this sense, the project also touches upon the autonomy of timber as a material system. Timber is not simply an alternative to steel or concrete, but carries its own structural and spatial logic. It inherently reconnects construction, detail, and architectural expression, making it both a material and a design methodology.

section AA



section BB



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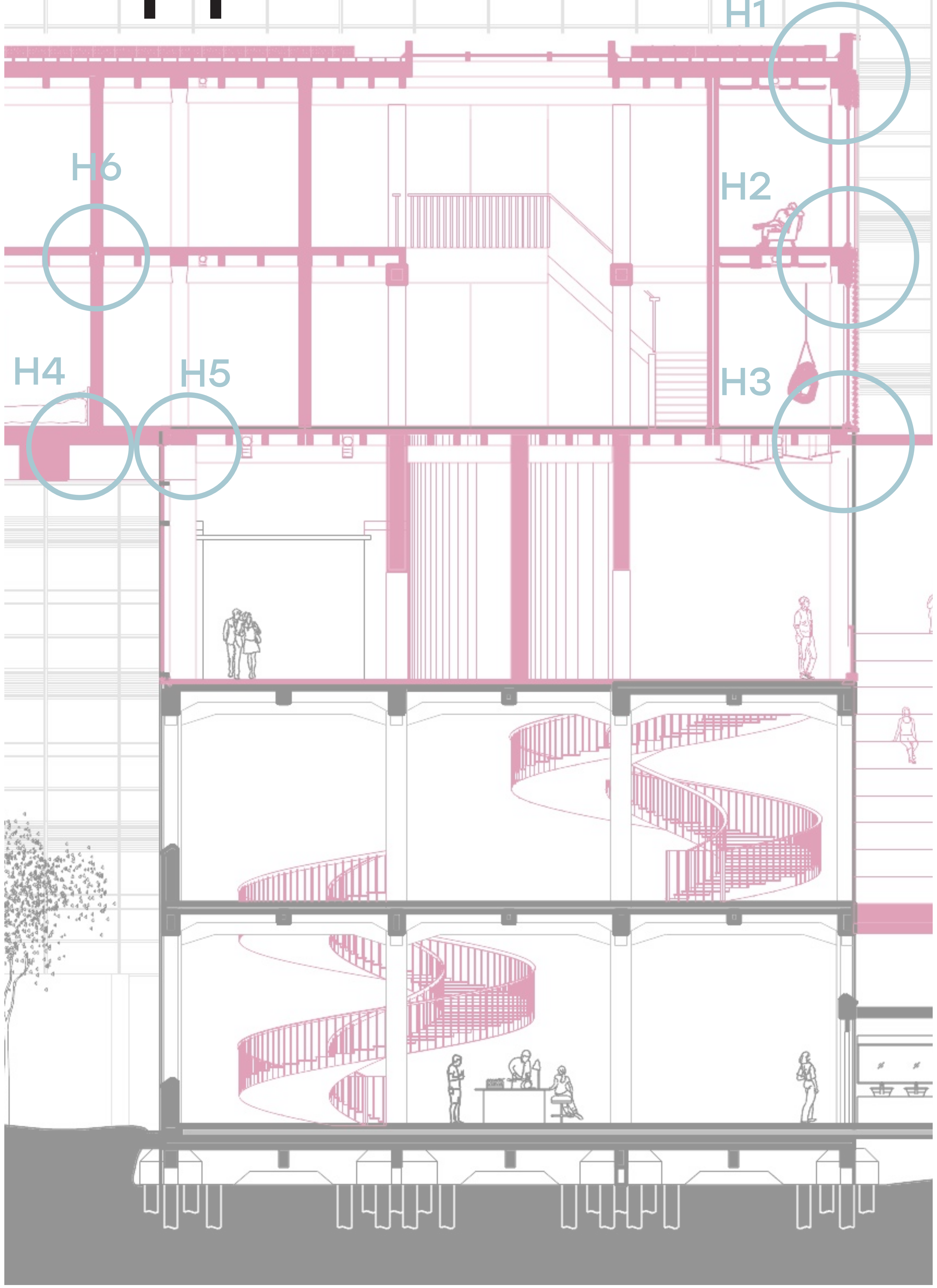
Appendix



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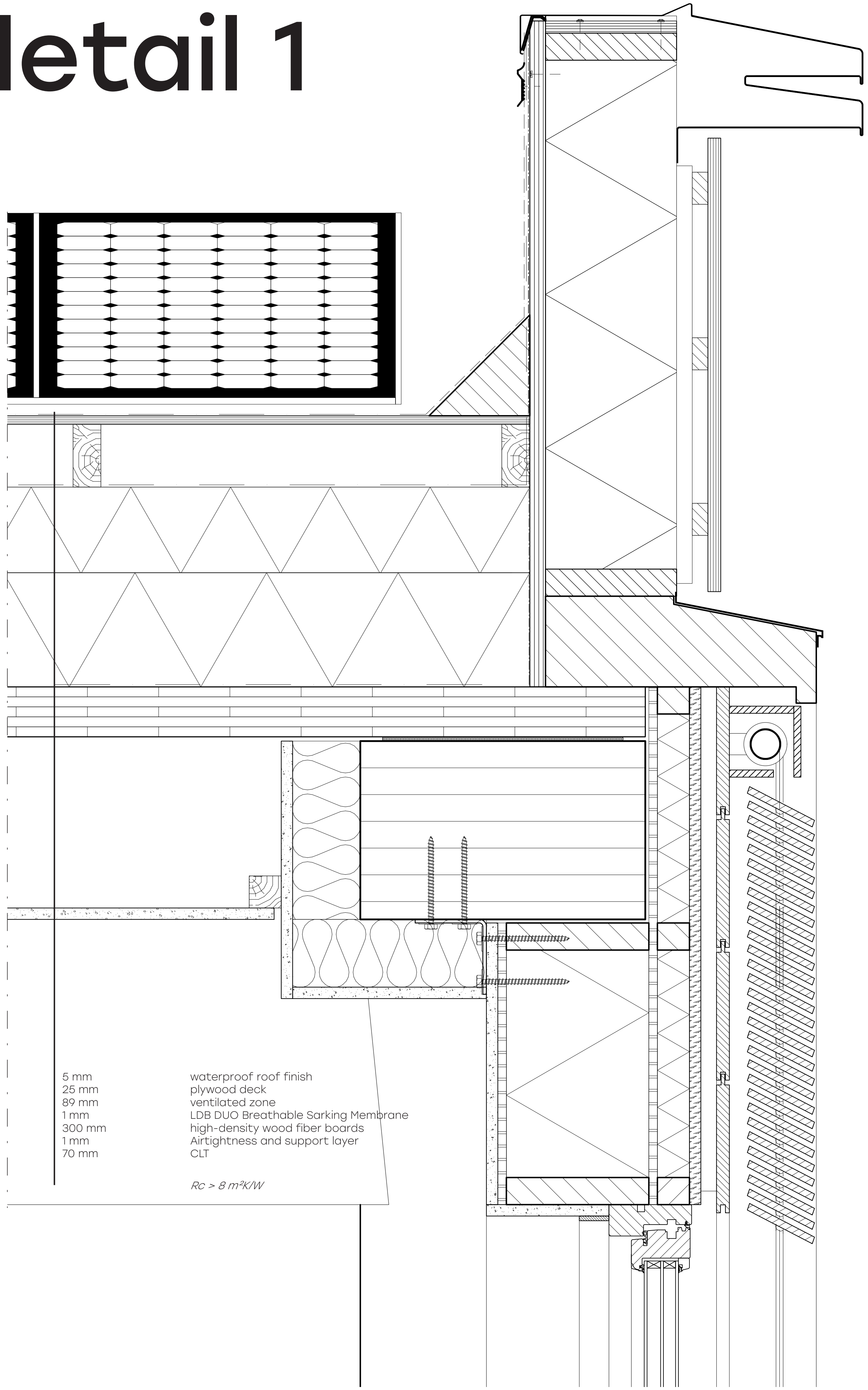

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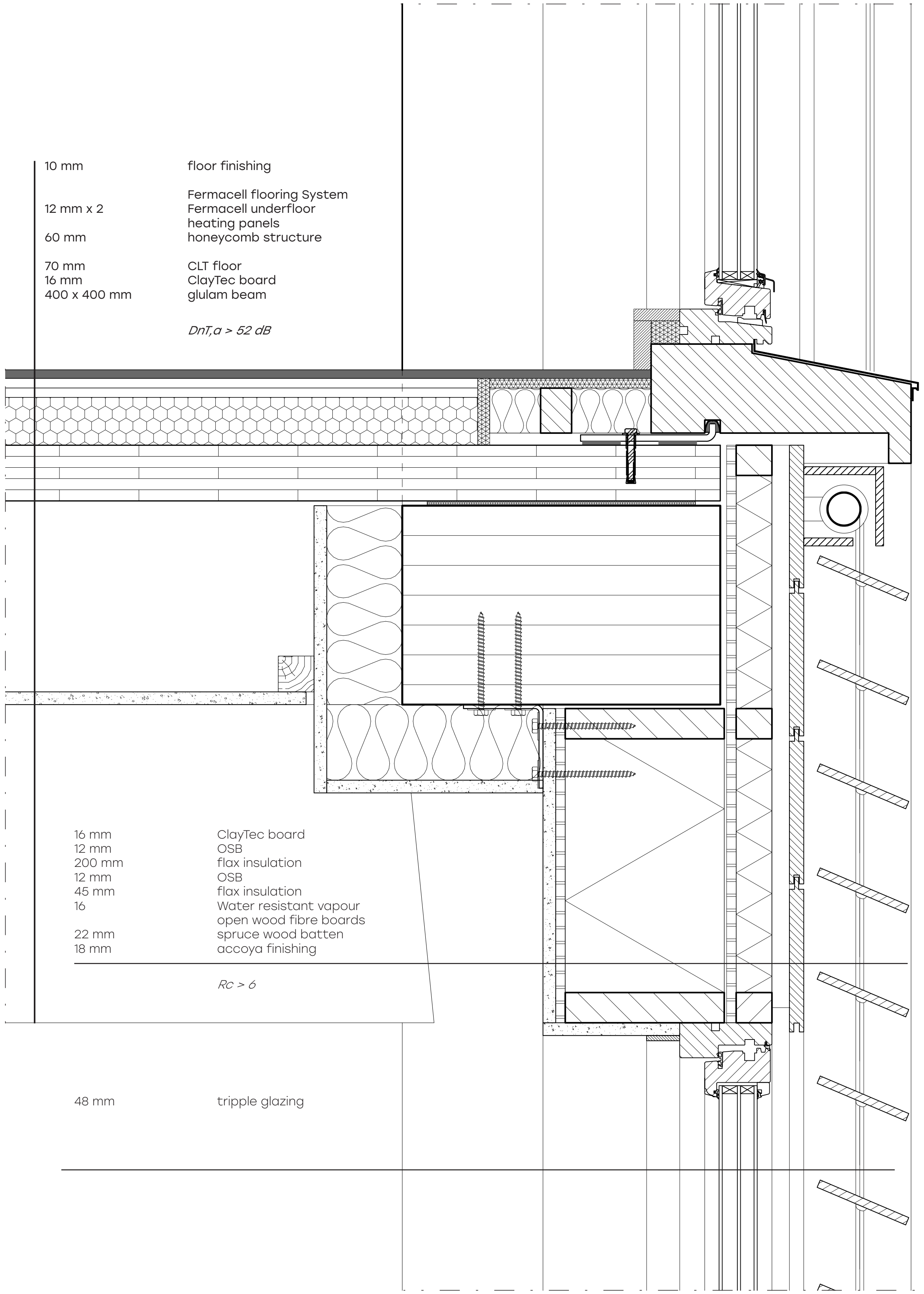

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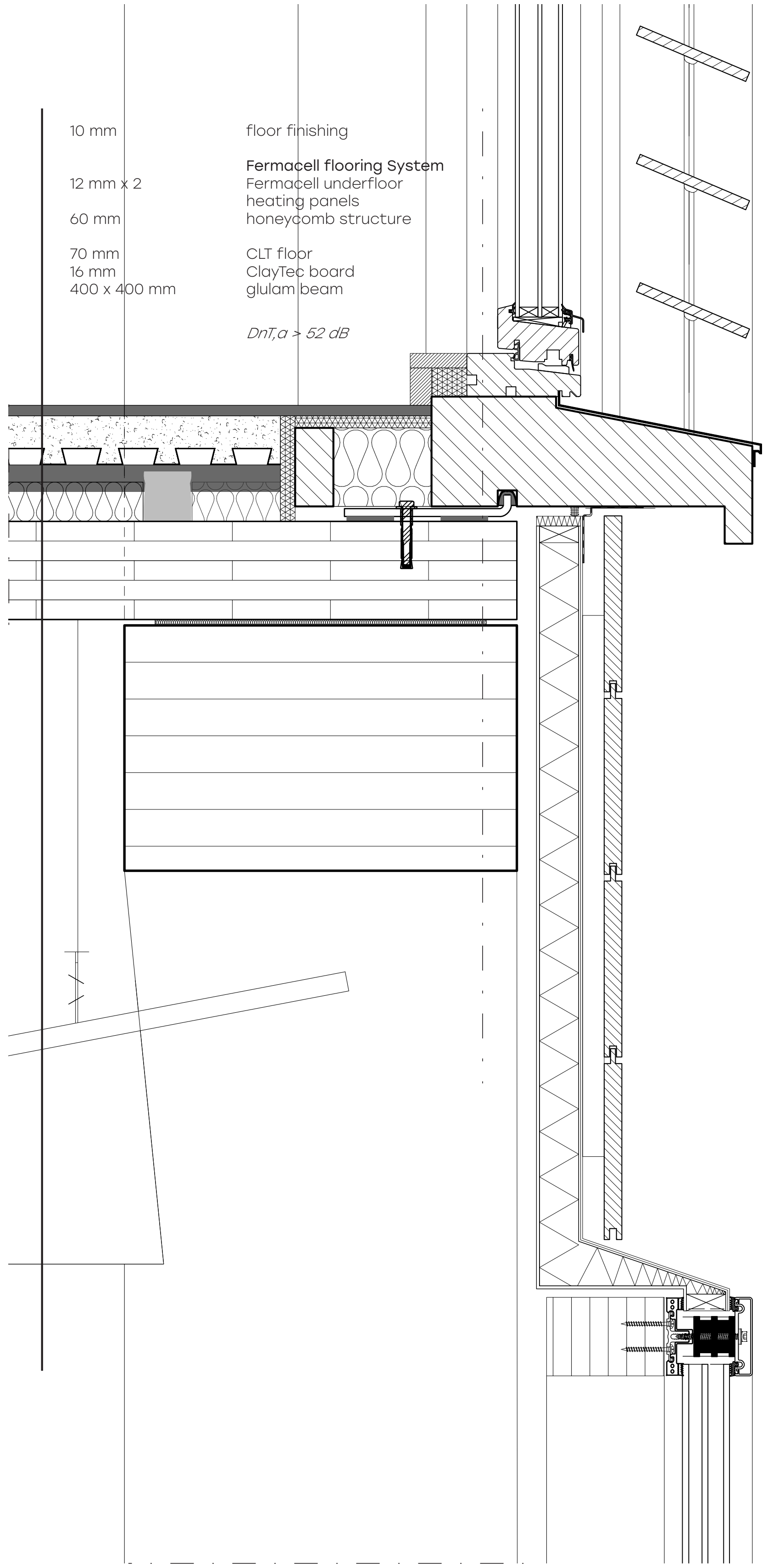
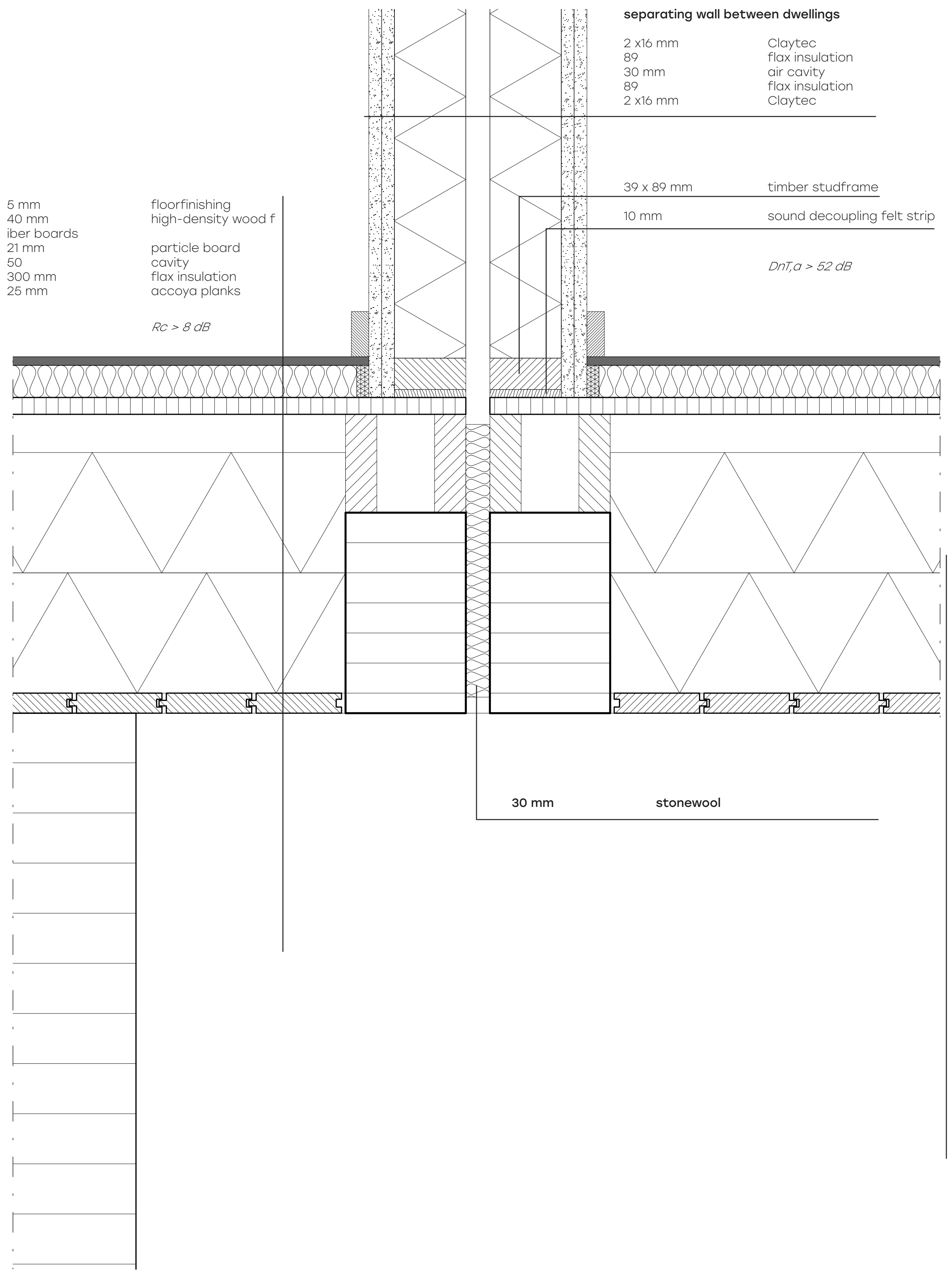
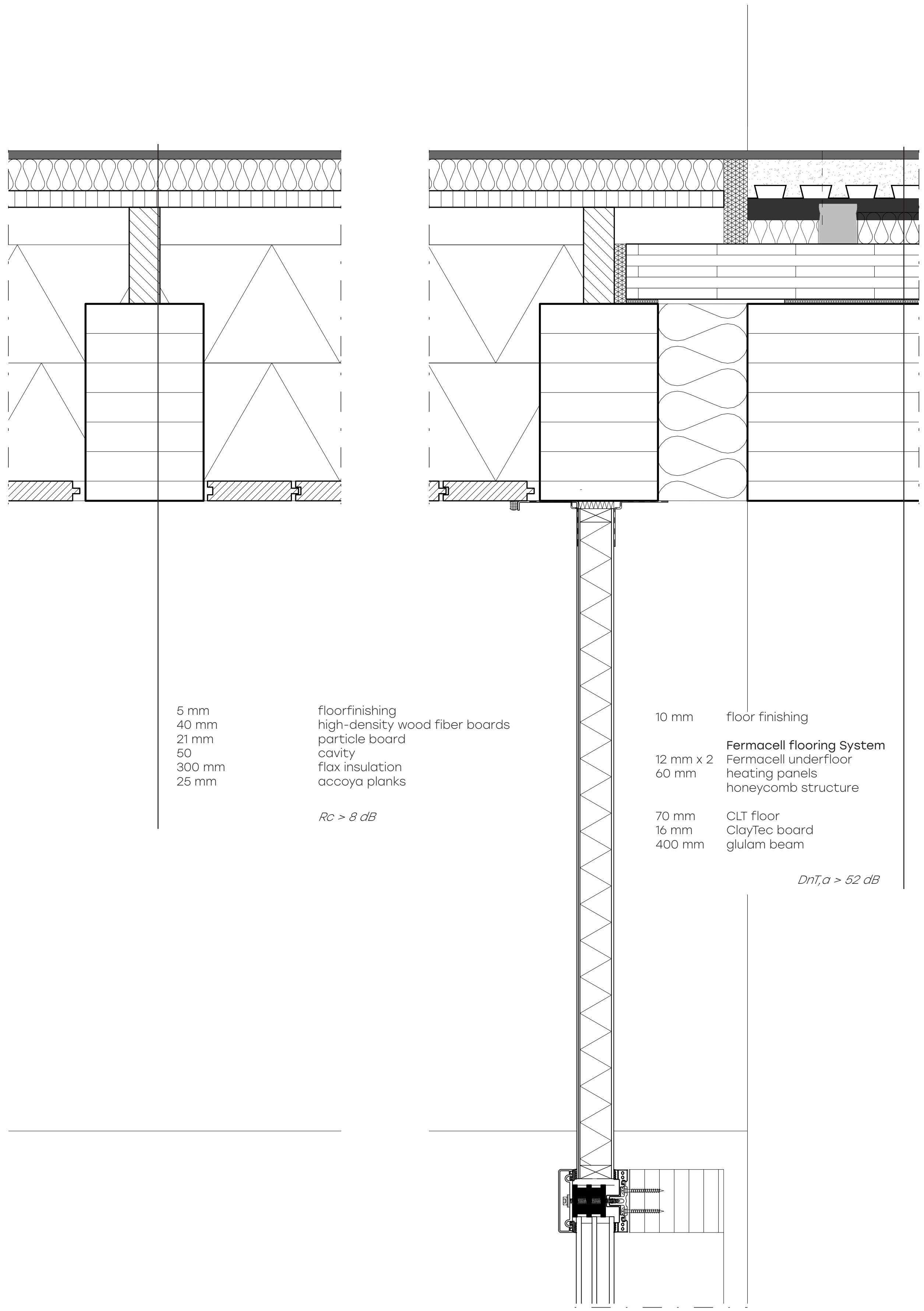


detail H4

verticale potdekseling I -

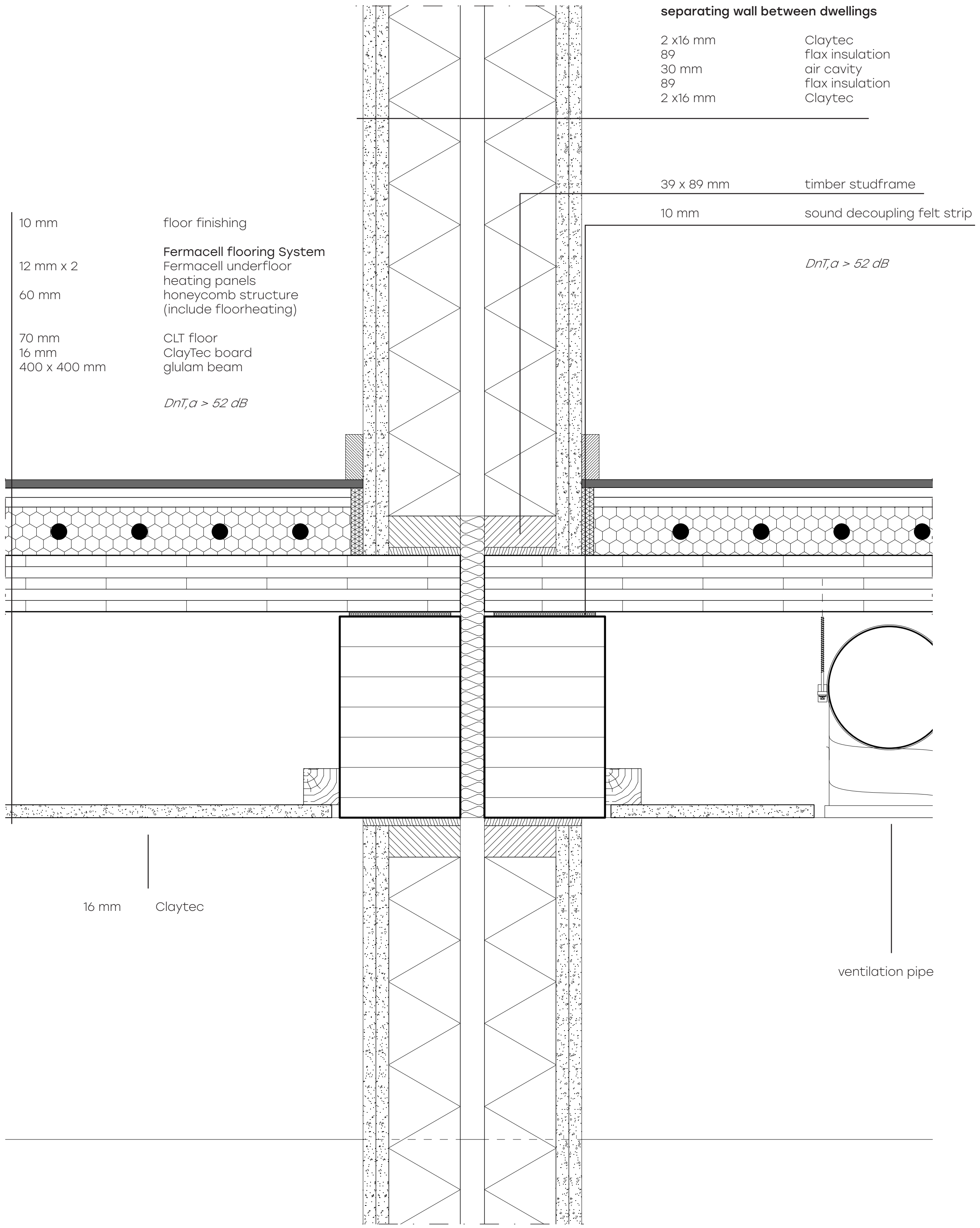


detail H5

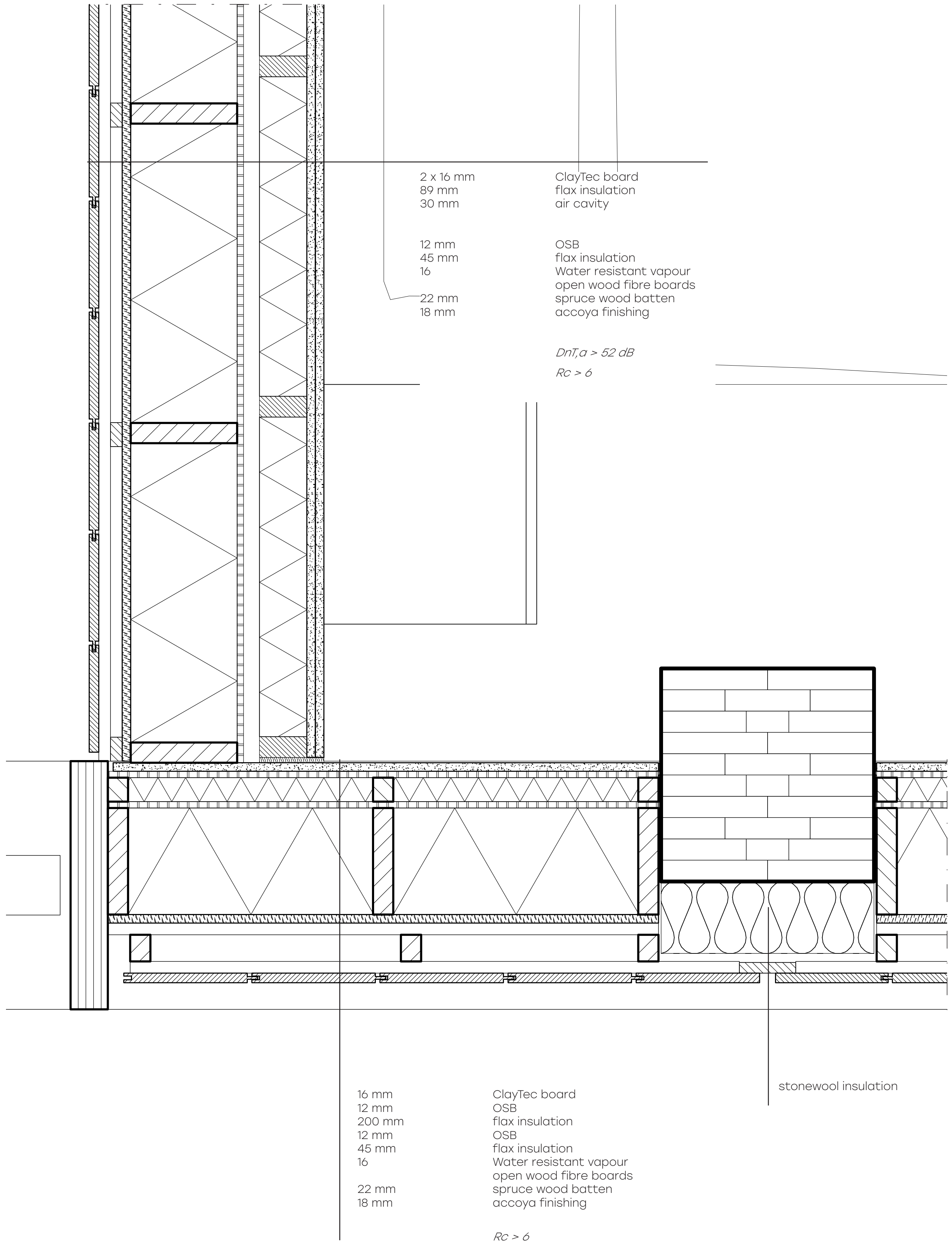


detail H6

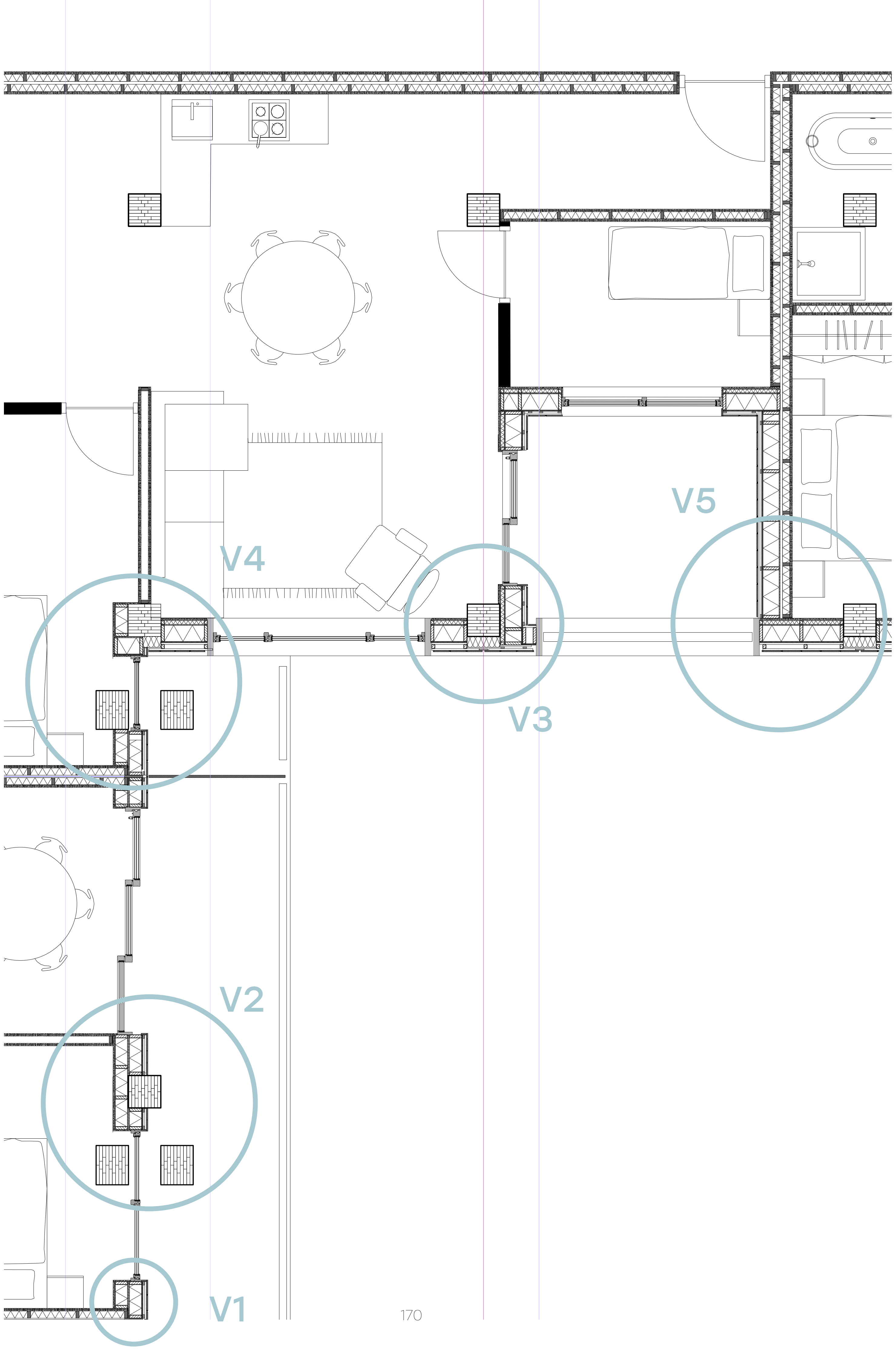
V5



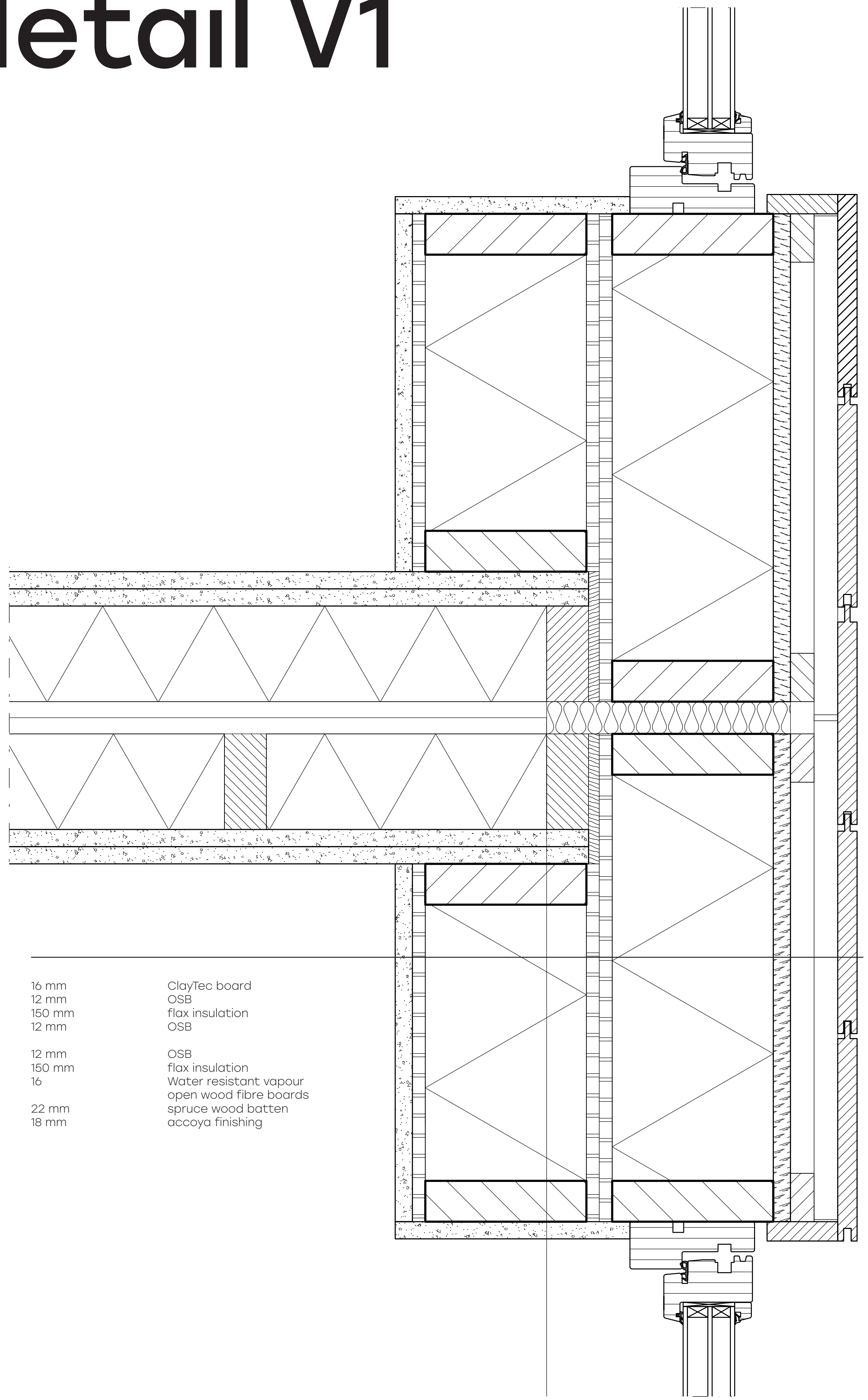
separating wall between dwellings
2 x16 mm Claytec
89 flax insulation
30 mm air cavity
89 flax insulation
2 x16 mm Claytec
39 x 89 mm timber studframe
10 mm sound decoupling felt strip
DnT,a > 52 dB
10 mm floor finishing
Fermacell flooring System
12 mm x 2 Fermacell underfloor heating panels
60 mm honeycomb structure (include floorheating)
70 mm CLT floor
16 mm ClayTec board
400 x 400 mm glulam beam
DnT,a > 52 dB
16 mm Claytec
ventilation pipe



2 x 16 mm ClayTec board
89 mm flax insulation
30 mm air cavity
12 mm OSB
45 mm flax insulation
16 Water resistant vapour open wood fibre boards
22 mm spruce wood batten
18 mm accoya finishing
DnT,a > 52 dB
Rc > 6
16 mm ClayTec board
12 mm OSB
200 mm flax insulation
12 mm OSB
45 mm flax insulation
16 Water resistant vapour open wood fibre boards
22 mm spruce wood batten
18 mm accoya finishing
Rc > 6
stonewool insulation

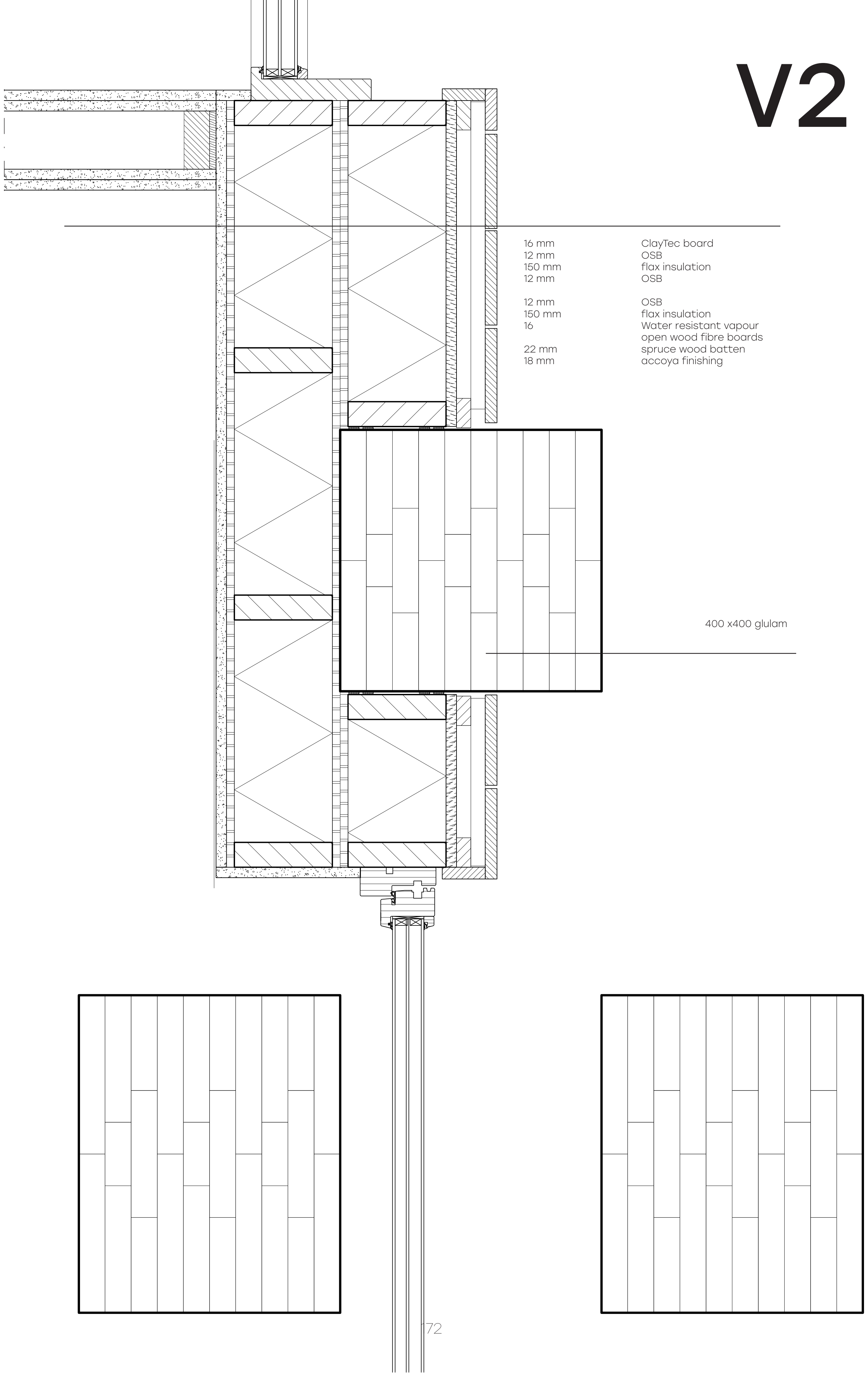


detail V1

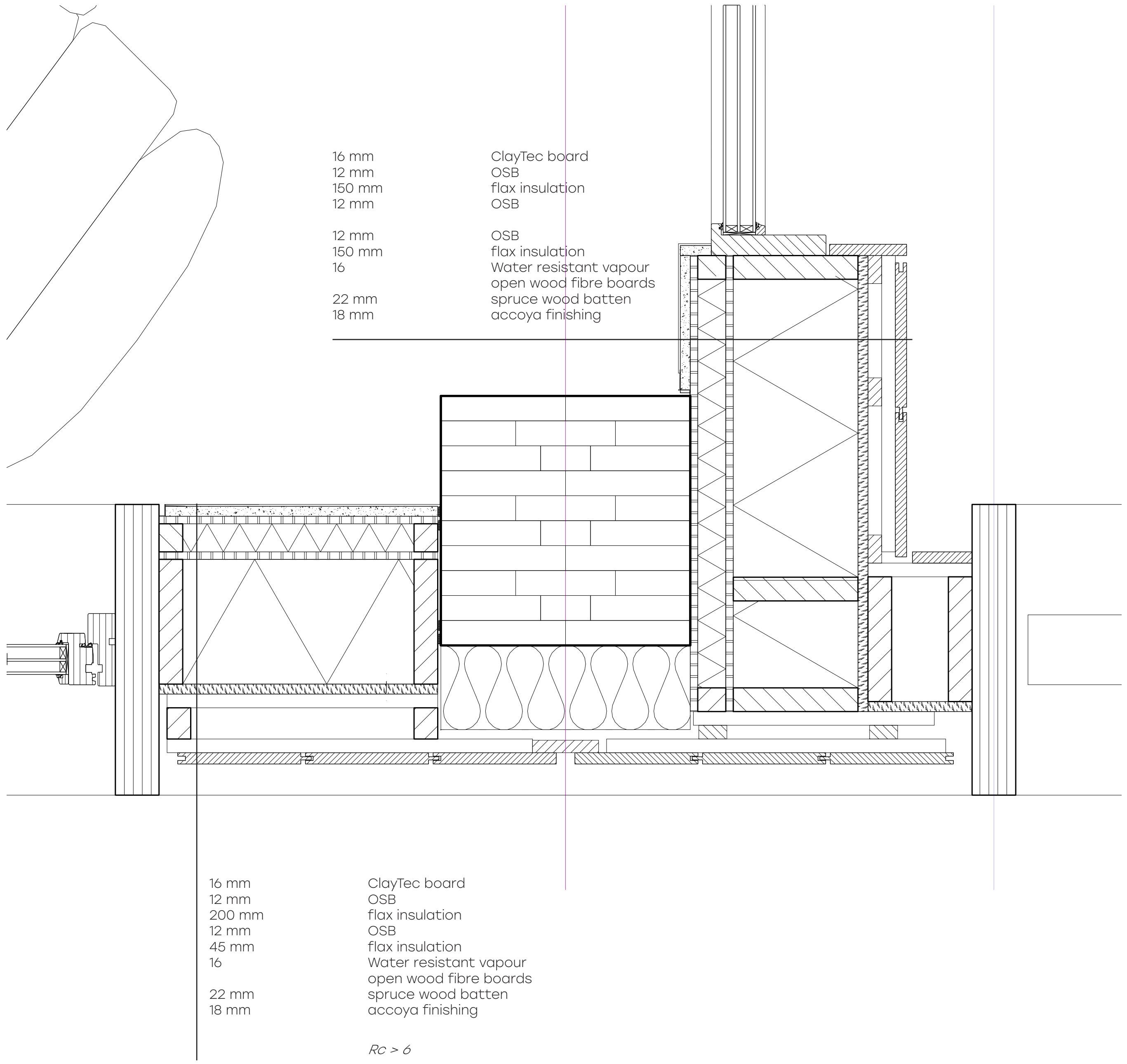


16 mm	ClayTec board
12 mm	OSB
150 mm	flax insulation
12 mm	OSB
12 mm	OSB
150 mm	flax insulation
16	Water resistant vapour open wood fibre boards
22 mm	spruce wood batten
18 mm	accoya finishing

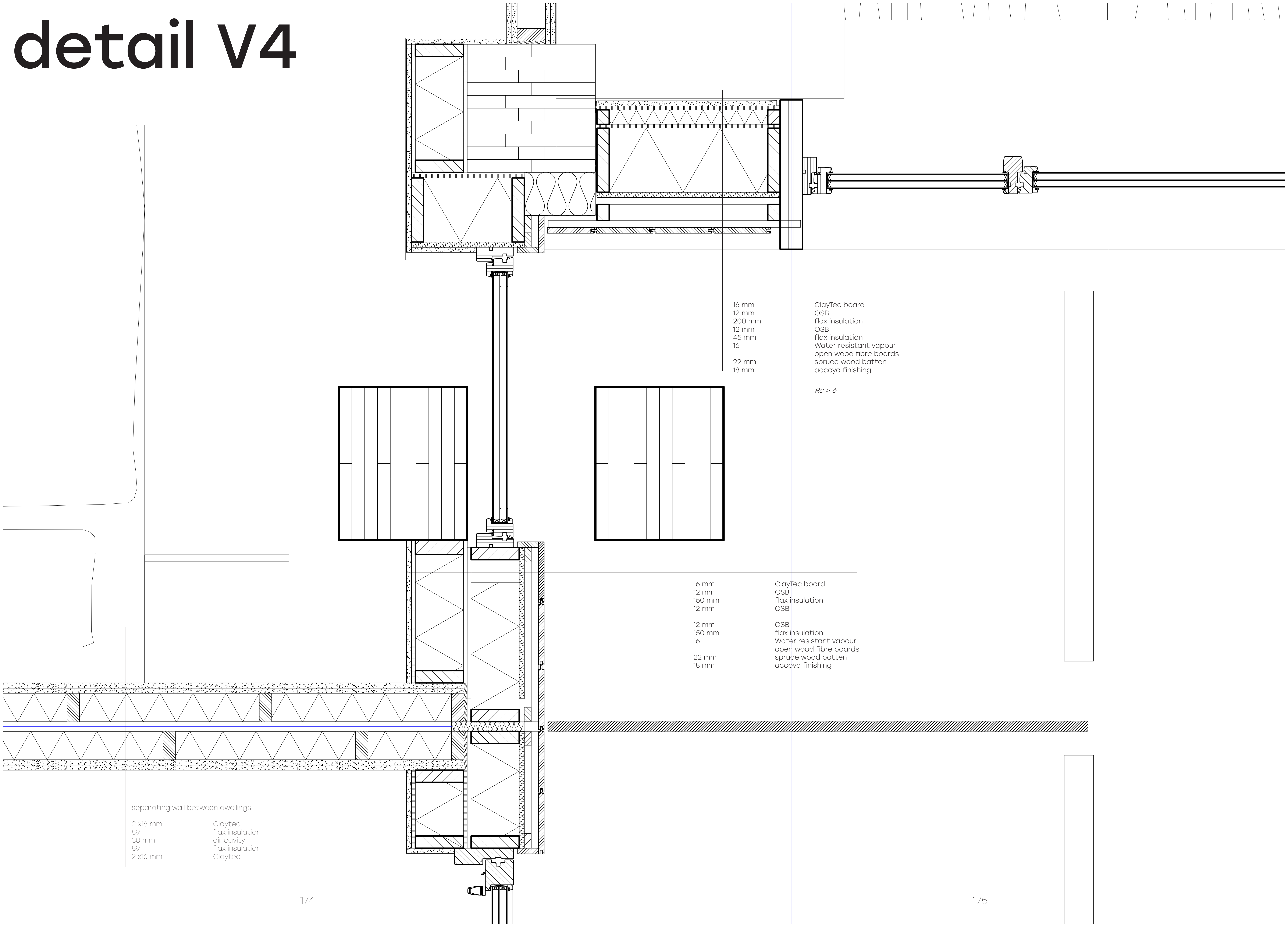
V2


16 mm ClayTec board
12 mm OSB
150 mm flax insulation
12 mm OSB
12 mm OSB
150 mm flax insulation
16 Water resistant vapour open wood fibre boards
22 mm spruce wood batten
18 mm accoya finishing
400 x400 glulam

detail V3

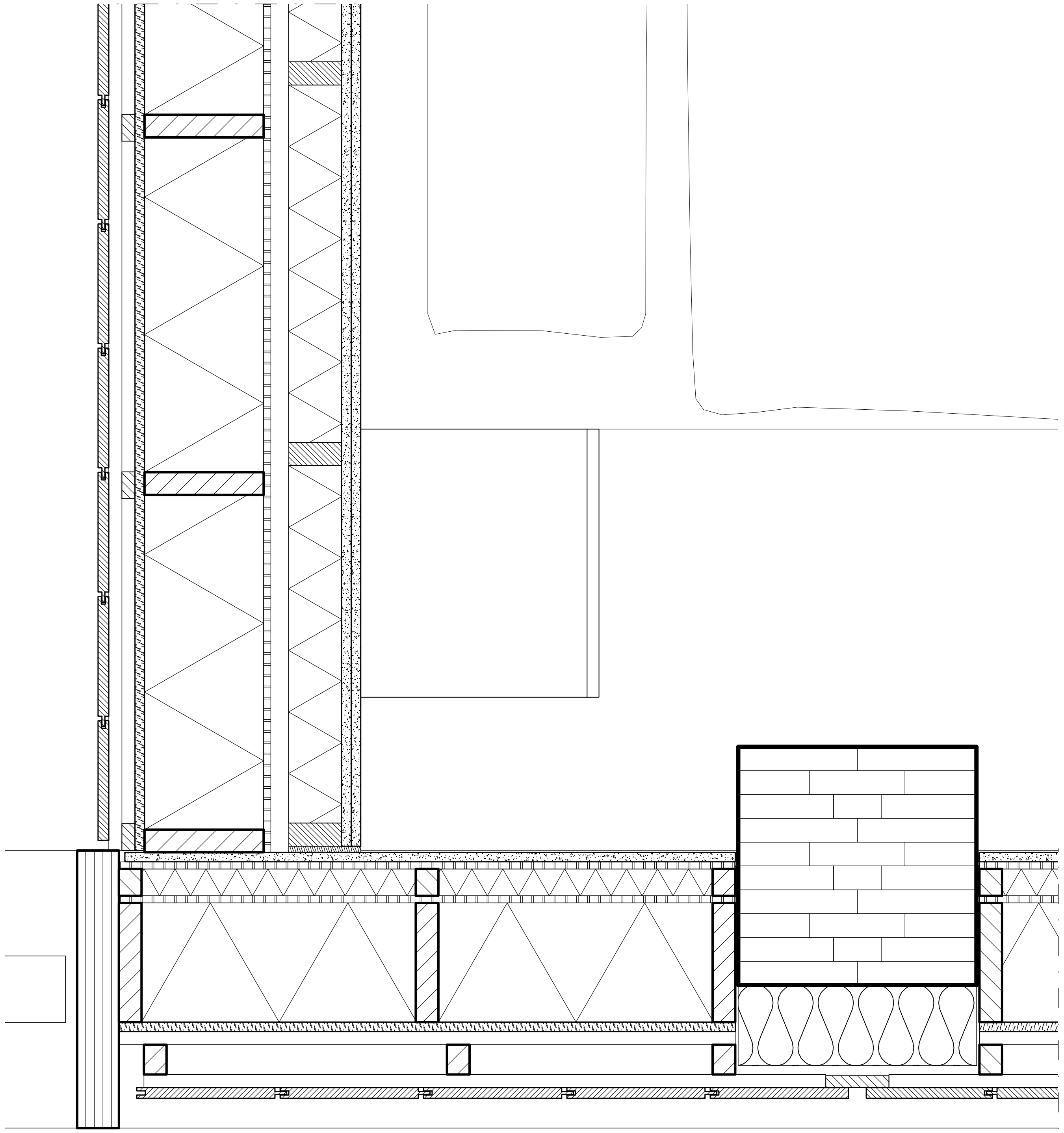

16 mm ClayTec board
12 mm OSB
150 mm flax insulation
12 mm OSB
12 mm OSB
150 mm flax insulation
16 Water resistant vapour open wood fibre boards
22 mm spruce wood batten
18 mm accoya finishing
16 mm ClayTec board
12 mm OSB
200 mm flax insulation
12 mm OSB
45 mm flax insulation
16 Water resistant vapour open wood fibre boards
22 mm spruce wood batten
18 mm accoya finishing
Rc > 6

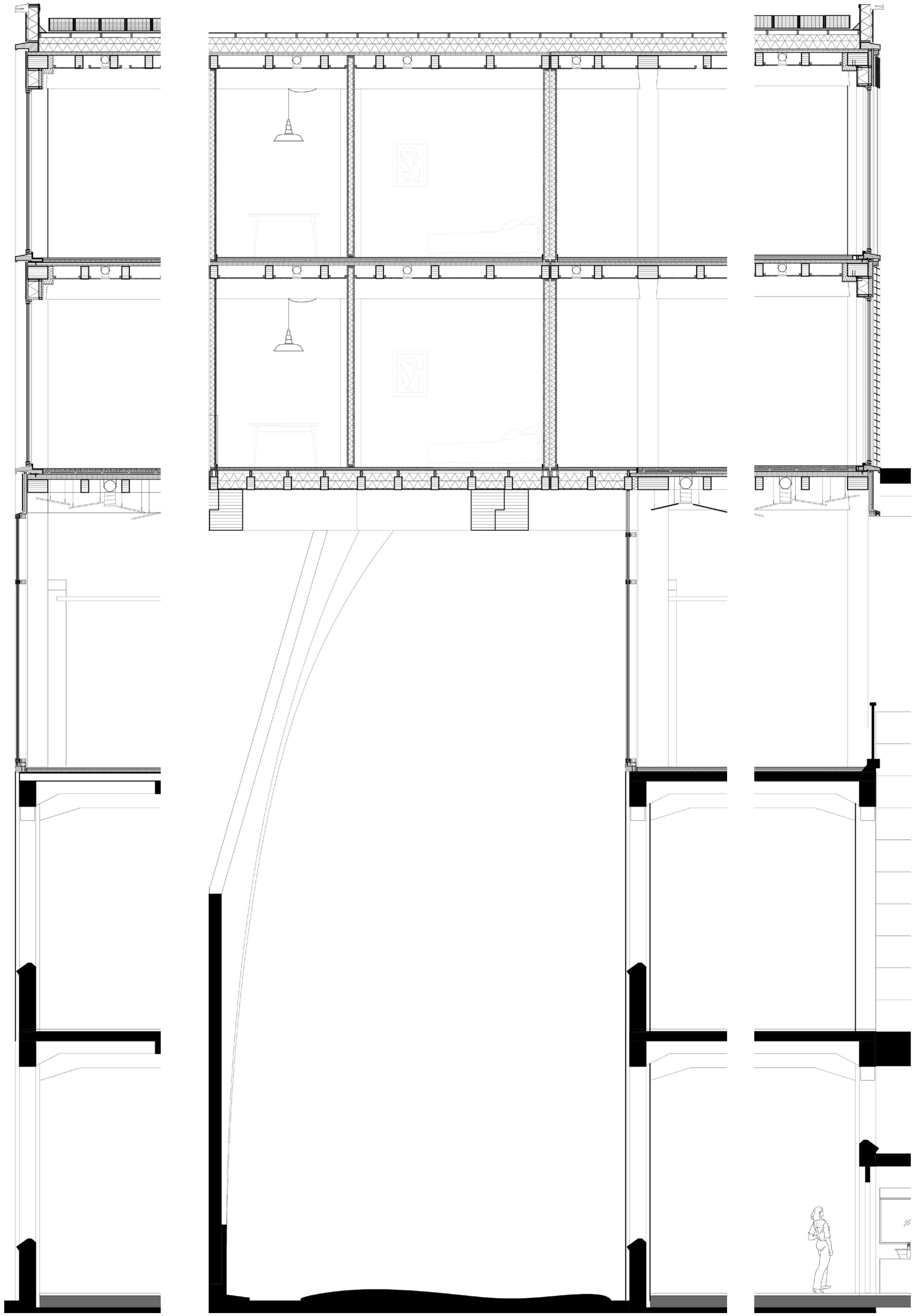
detail V4



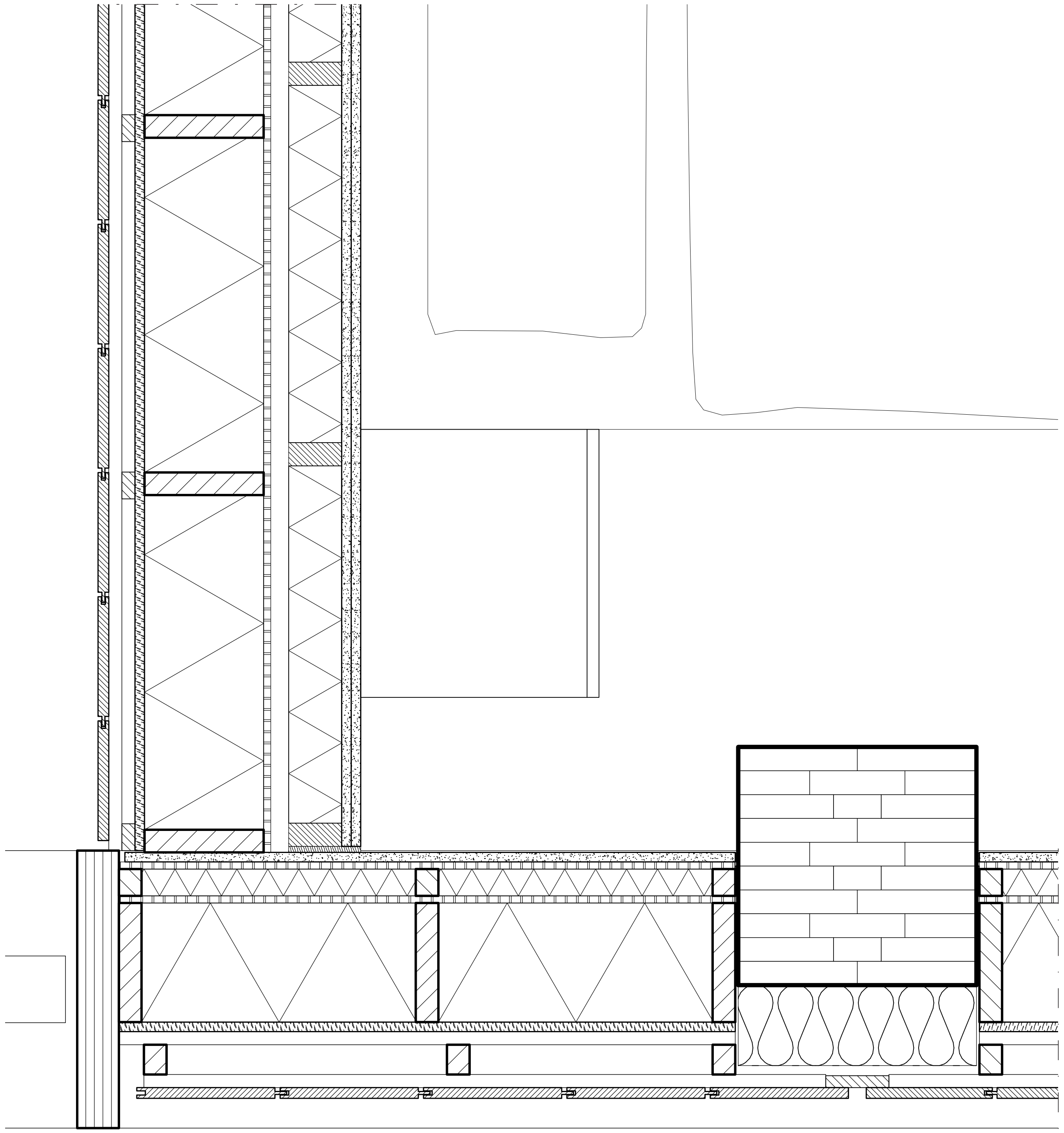
16 mm ClayTec board
12 mm OSB
200 mm flax insulation
12 mm OSB
45 mm flax insulation
16 Water resistant vapour open wood fibre boards
22 mm spruce wood batten
18 mm accoya finishing
Rc > 6
16 mm ClayTec board
12 mm OSB
150 mm flax insulation
12 mm OSB
12 mm OSB
150 mm flax insulation
16 Water resistant vapour open wood fibre boards
22 mm spruce wood batten
18 mm accoya finishing
separating wall between dwellings
2 x16 mm Claytec
89 flax insulation
30 mm air cavity
89 flax insulation
2 x16 mm Claytec

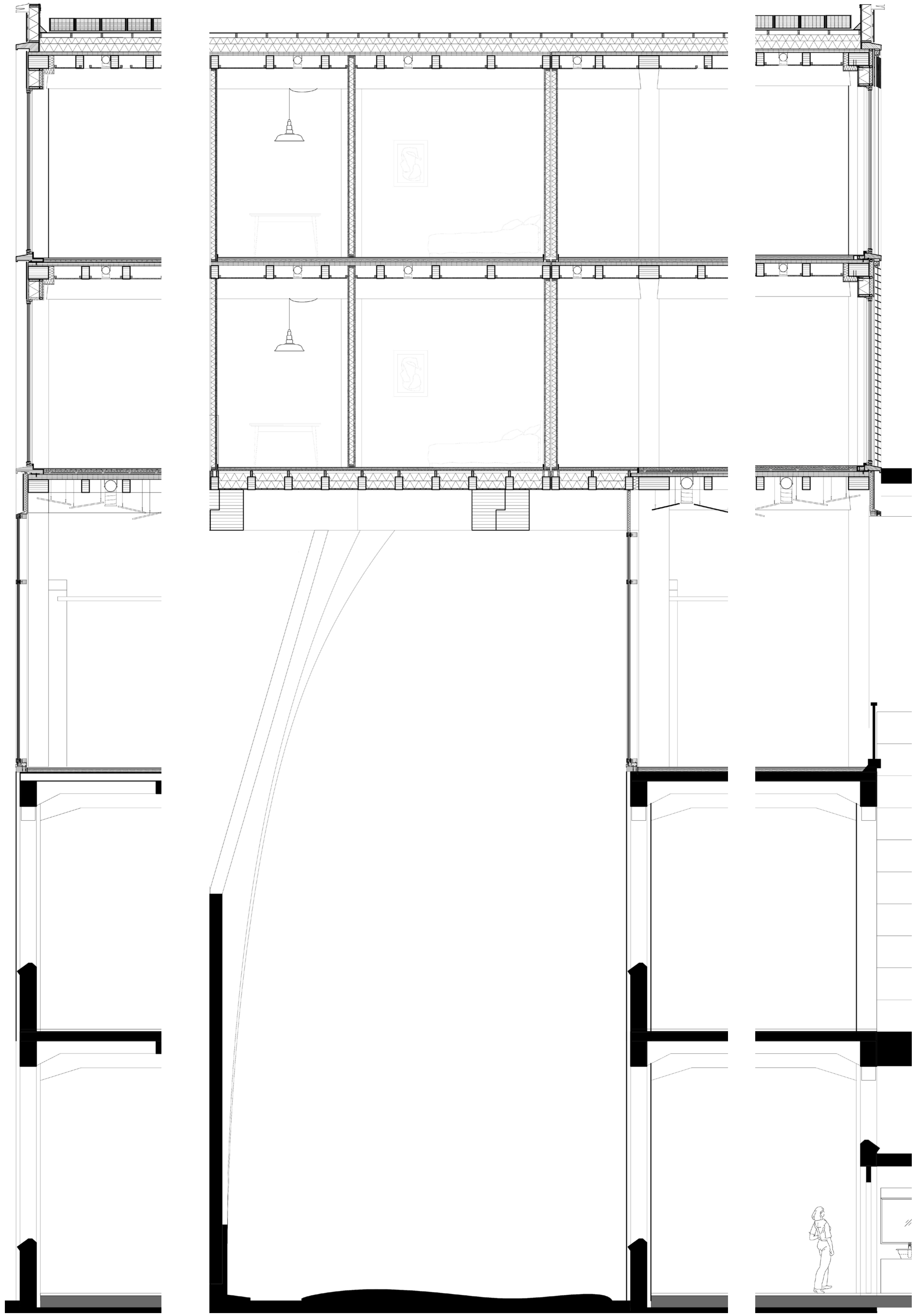
V5





V5





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