

# **[MOVING THINGS AROUND: TIMBER FOR GROWTH IN MULTIGENERATIONAL LIVING]**

## **RESEARCH PLAN DRAFT**

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## **STUDIO: Timber for Urban Density**

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# KEYWORDS

Performance-based Material Specification; Bio-based construction; Multi-generational housing; Flexible Architecture; Density; Adaptation; Impermanence; Future-proofing

# CONTEXT + PROBLEM STATEMENT

*[trends in demographics of households indicate a missing gap in alternate living situations]*  
Amsterdam is experiencing several trends related to its housing shortage, including an influx of expats and immigrants, an aging population, and more diverse family structures. In the coming decades, architecture in Amsterdam needs to address a more diverse demographic spread, as the city currently mainly supports single-person households, and is continuing to develop this type of housing units.<sup>1</sup>

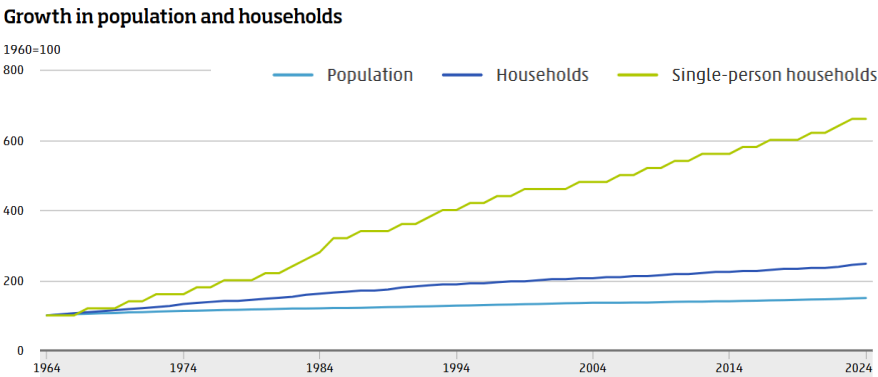


Figure 1\_ Drastic and continuing increase in single-person households (Source:CBS Statistics Netherlands, 2024)

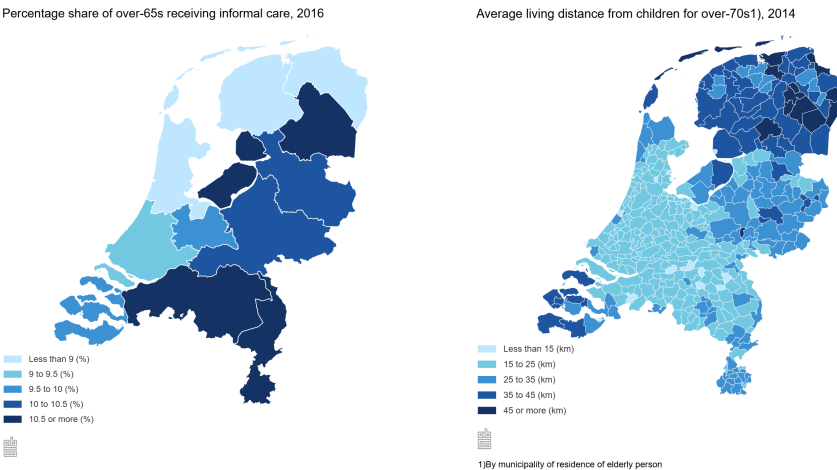


Figure 2\_Mapping of elderly population living alone away from family in the Netherlands (Source:Materials Experience Lab, 2024)

A significant portion of these single-person households consists of an increasing elderly population. Multiple factors, including Dutch legislation, are encouraging older adults to age in place, receiving either

<sup>1</sup> CBS Statistics Netherlands, “Households Today,” webpagina, Statistics Netherlands, accessed November 6, 2024, <https://www.cbs.nl/en-gb/visualisations/dashboard-population/households/households-today>.

informal or no care, rather than moving to nursing or group homes. This trend is linked to studies on feelings of loneliness, which are projected to increase under current living arrangements.

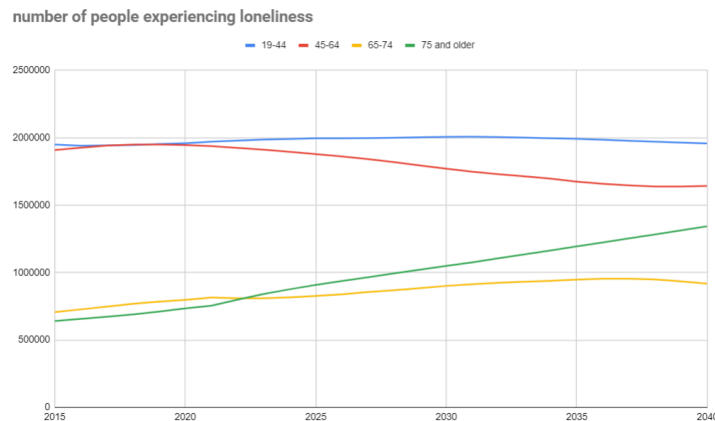


Figure 3\_ Survey of feeling loneliness across different ages. (Source: VTV gezondheid, 2018)

In this way, multigenerational and flexible housing models are reemerging as viable housing typologies to meet the changing dynamics of modern households. These models are especially popular among immigrant populations where multigenerational housing is more common in their culture, but also seeing an increase in popularity in recent years in North America, where they have become the fastest growing housing typology today.<sup>2</sup>

However, most of what is considered multigenerational housing is either highly customized for a specific household in a detached residence or rather makeshift—adapting a single house or neighbouring residences to accommodate necessary changes in living situations. This spirit of adaptation from the user indicates a willingness to take agency over their living environment. It can foster a stronger sense of ownership over their space, which is often lacking in high-density multifamily developments. Within the context of densifying the city, what could this multi-generational living look like within a complex and not just an individual dwelling?

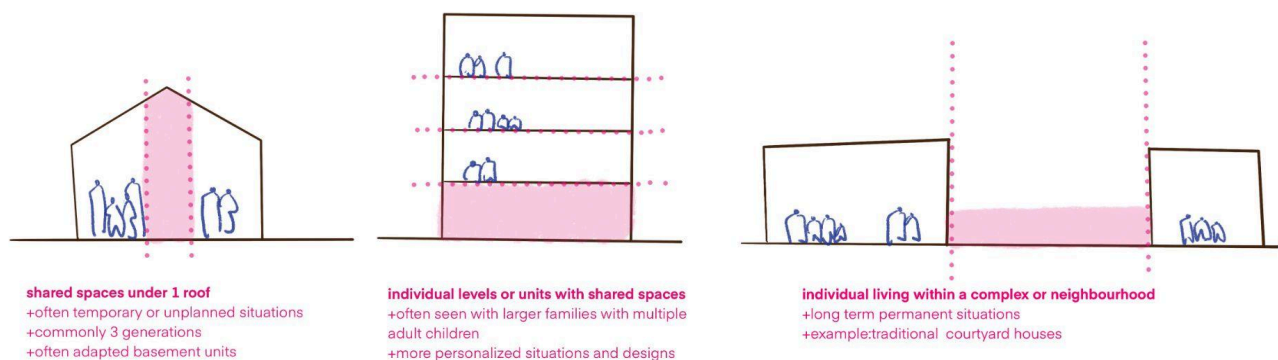


Figure 4\_ Multi-generational living adaptation methods (Source: Author)

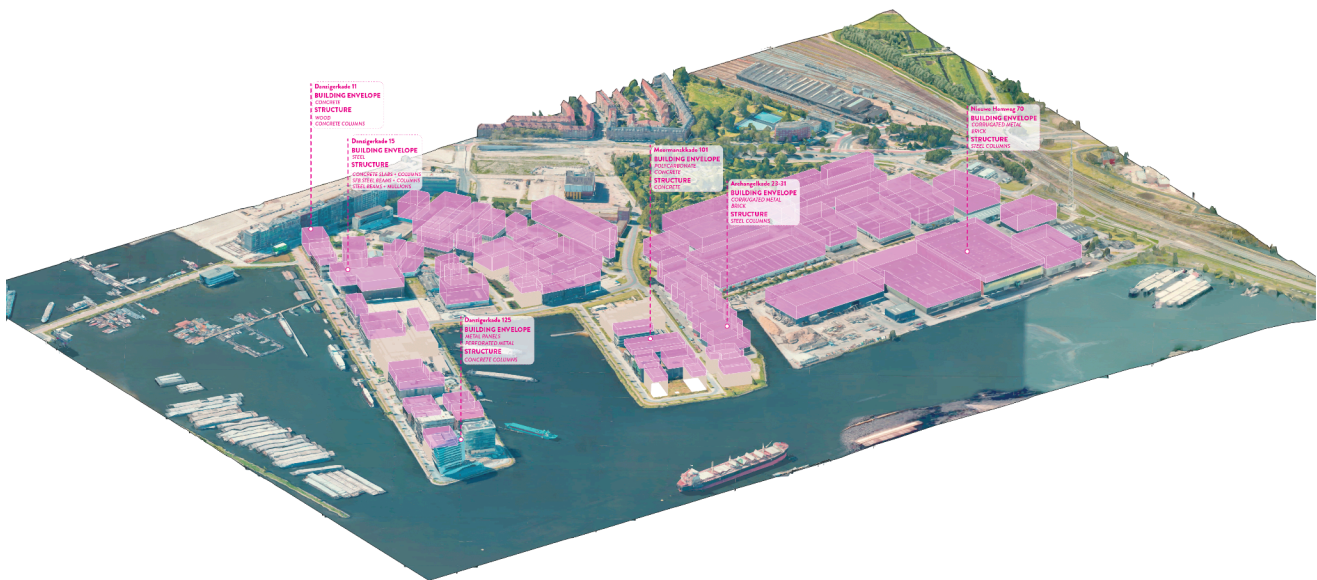
<sup>2</sup> Shina Shayesteh, “Multigenerational Living Isn’t Immigrant Culture, It’s Human Culture,” Strong Towns, 2021, <https://www.strongtowns.org/journal/2021/10/5/multigenerational-living-isnt-immigrant-culture-its-human-culture>.

*[embracing perceived impermanence as flexibility, and allowing for future adaptations]*

As timber construction is being embraced in new construction, it is often perceived by architects and developers alike as an alternate material for sustainability purposes, which can be negotiated later in the design and development phase. The aim of this research and design is to reframe timber not as a replacement for conventional materials but as a catalyst for a distinct architectural language, especially in the context of Amsterdam's urban fabric, traditionally dominated by concrete and masonry. It is compared to these contexts that timber and bio-based materials are often perceived as having a shorter lifespan, and often used in more temporary projects. This is likely due to the inherent fact that they are living materials, with its distinct connection to life and time. However, this association with life can be seen as an advantage, and in this way, the often perceived impermanence of timber can be reframed as something flexible that lives and grows with a changing city.

This graduation research seeks to explore a methodology that rethinks architectural material design by accepting the flexibility and perceived lifespan and impermanence of timber and bio-based materials. Rather than imposing standard solutions, it asks whether we can develop design methods that embrace loose-fits and material-driven forms, opening up the design to multiple futures of adaptation.

Timber, as a material associated with life and time, its inherent aesthetics and tactile material experiences, and its ability to support modularity provide an ideal basis for structures that must evolve as families grow and change. Within the context of the Houthaven neighbourhood, many opportunities emerge for adding to the existing urban fabric to achieve this higher density typology. Through an analysis and mapping of the existing structures, they can be evaluated for their potential in allowing for additional top-up structures.



To address this, three characteristics of timber are identified which establish it as the ideal material choice for this adding to existing structures and “growing” structures that evolve to accommodate: its strength to



weight ratio, its user manageability, and its material experience. Embracing timber's role in self-build and renovation projects as a hands-on material for multigenerational living situations may allow for a further sense of personalization and belonging as it allows for more user agency, making it easier and feel more inclined to rearrange, modify, or expand spaces over time.

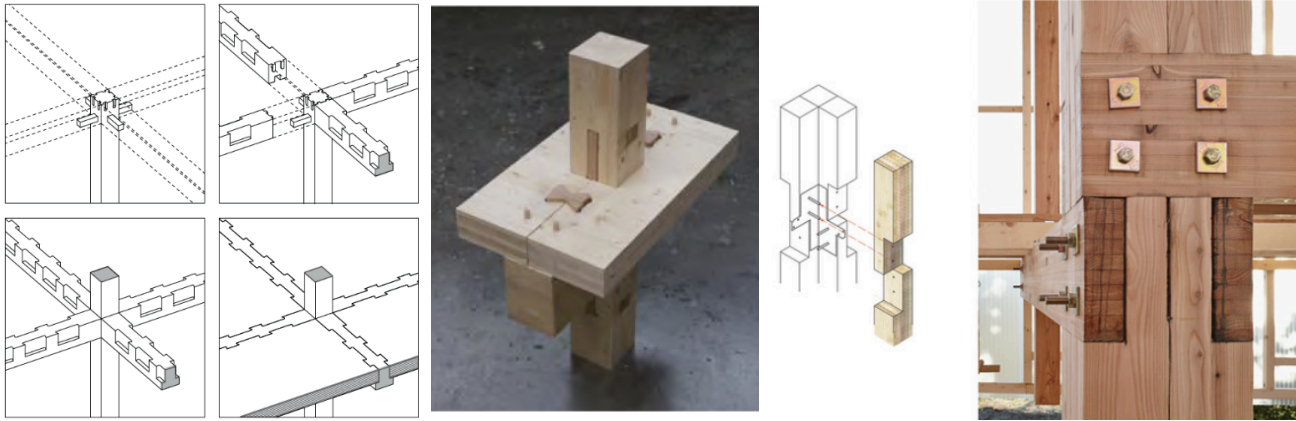


Figure 6 (a)DGJ Architektur, beam to post joint. (b)DGJ Architektur, secondary wood connectors.  
(c)Kengo Kuma & Associates, Nest We Grow Composite Column.

Design for disassembly emerges as an important methodology within this framework of a flexible and changeable structure. Although steel fasteners and connections are widely accepted as the demountable standard, within this framework, there may be a differentiation between the permanency of each connection. For example, a larger shell or framework can be established from more permanent connections, while more easily demountable connections can be utilized by the user or occupant to make changes within a shorter timespan. A study into different timber connections, both wood joinery and fasteners can establish a matrix for selecting the right type of connections that define its purpose and permanence. By leveraging this adaptability, we can create spaces that evolve with the changing social and environmental urban demands of today and tomorrow.

As Amsterdam faces the challenges of housing shortages and growing demand for adaptive, sustainable solutions for aging populations and multigenerational families, timber, with its inherent flexibility and long-term adaptability, offers a unique way to address these needs, reframing perceived impermanence as flexibility within architecture that invites future adaptation for its residents across generations.

## DESIGN OBJECTIVE

Multigenerational housing often forms spontaneously, with families adapting to limited space under one roof, such as transforming basements into units or combining adjacent properties. This thesis aims to address ways we can encourage this adaptable spirit in higher density and multifamily developments within Amsterdam's HoutHaven neighbourhood. The research examines diverse family profiles and potential housing needs, using scenarios to frame how these timber structures can grow and change to the evolving needs of its inhabitants over time. It will study both traditional multi-generational living

typologies designed for that purpose and self-renovated examples that evolved through spontaneous need.

Amsterdam's existing buildings, many with characteristics ideal for adaptive reuse—such as wide frontages, potential for ground-level amenity spaces, and internal courtyards—can be adapted for multigenerational use. As part of the research, potential sites within HoutHaven will be mapped and examine how new timber additions could maximize available space for high-density multigenerational living.

The aim is to develop a design methodology as a way to invite future adaptation and encourage the continuous of use timber. It uses the MinervaHaven neighbourhood as a testing ground for identifying suitable buildings for topping up with mid to high-rise mixed-use hybrids that allow for the incorporation of flexible and potentially multigenerational housing options. The research and this design methodology will be compiled into a playbook encouraging the specification and use of a broader palette of local biogenic material options that support the specific set of values and promote the adaptation of existing buildings to multigenerational uses.

## RESEARCH QUESTION

How can a **material-driven architectural approach** leverage the characteristics of timber and bio-based materials to deliver **high-density multi-generational living** in Amsterdam's existing building stock that **invites continuous adaptation**?

## SUB-QUESTIONS

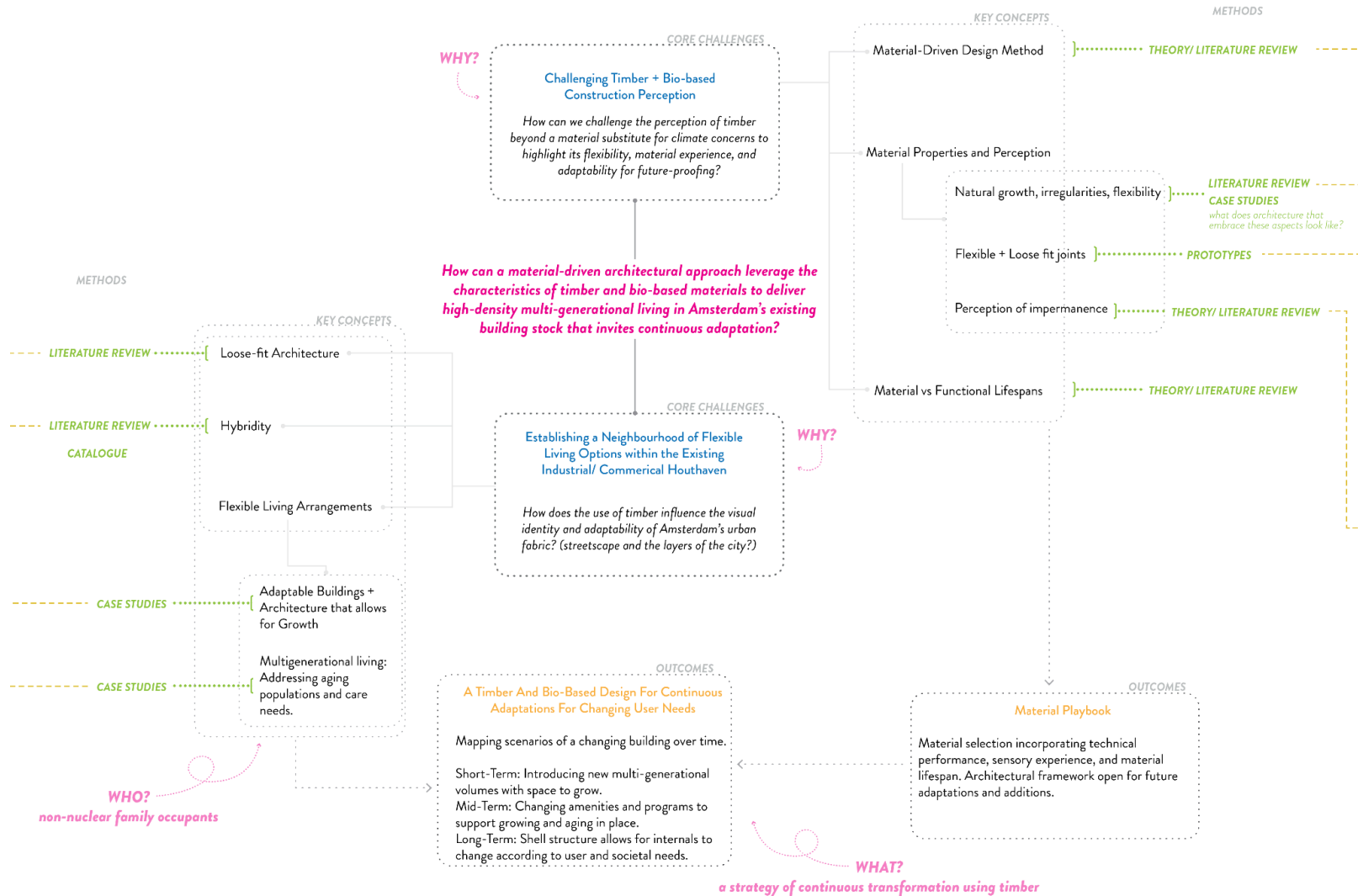
- What are the specific timber attributes that make it the ideal choice for care, adaptive and future proof architecture?
- How can we challenge the perception of timber beyond a material substitute for climate concerns to highlight its flexibility, material experience, and adaptability for future-proofing?
- How does the use of timber in architectural interventions influence the visual identity and streetscape of Amsterdam's urban fabric?

## RESEARCH CONTRIBUTION AND RELEVANCE

This research promotes a material-driven approach to architecture, to allow for a wider breadth of biogenic materials to be utilized for implementing largely missing large-scale adaptable structures for multigenerational living. By embracing timber's inherent qualities, the project addresses contemporary housing shortages and the need for flexible, inclusive living options that accommodate changing family structures over time, including aging in place. The project will explore specific timber qualities—structural efficiency, modular potential, acoustic properties, thermal performance, and biophilic aesthetics—that support a timber shell and bio-based infill system. These findings and the playbook output will encourage

future implementation of timber top-ups for multigenerational complexes for urban planners and policymakers.

## RESEARCH PLAN DIAGRAM



## METHODOLOGY

1. Literature Review (see annotated bibliography)
  - Emerging or re-emerging living typologies: Multigenerational housing
    - ◆ changing social dynamics, space and privacy requirements
  - Material-Driven Design Method
  - Loose-fit Architecture
  - Perception of Impermanence

## 2. Case Study Analysis

### → Material-driven architecture



Figure 7\_ Bamboo Bamboo, Canopy and Pavilions / ILLab. (Source: ArchDaily)

### → Loose fit, adaptable architecture. Shell + Infill Structures

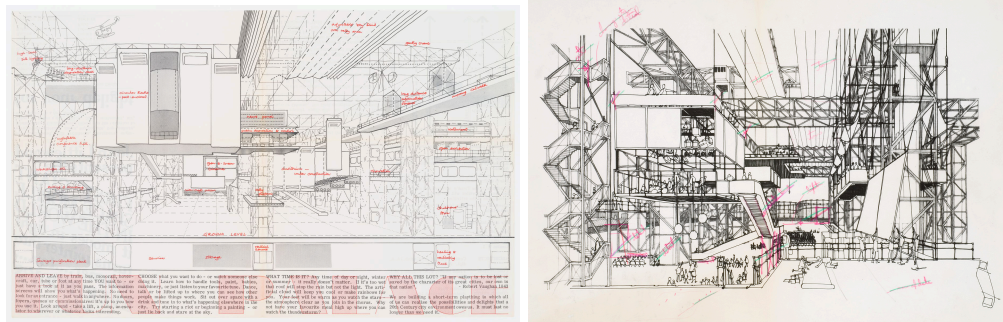


Figure 8\_ The Fun Palace/ Cedric Price. (Source: Canadian Centre for Architecture)



Figure 9\_ Quinta Monroy / ELEMENTAL (Source: Dezeen)

### → Existing multi-generational housing projects



Figure 10\_ A series of multigenerational housing projects (Source: ArchDaily)



### 3. User Profiles and Scenarios

- Develop profiles that account for time and life cycles (from 0–40+ years)
- Different family and individual life stages.

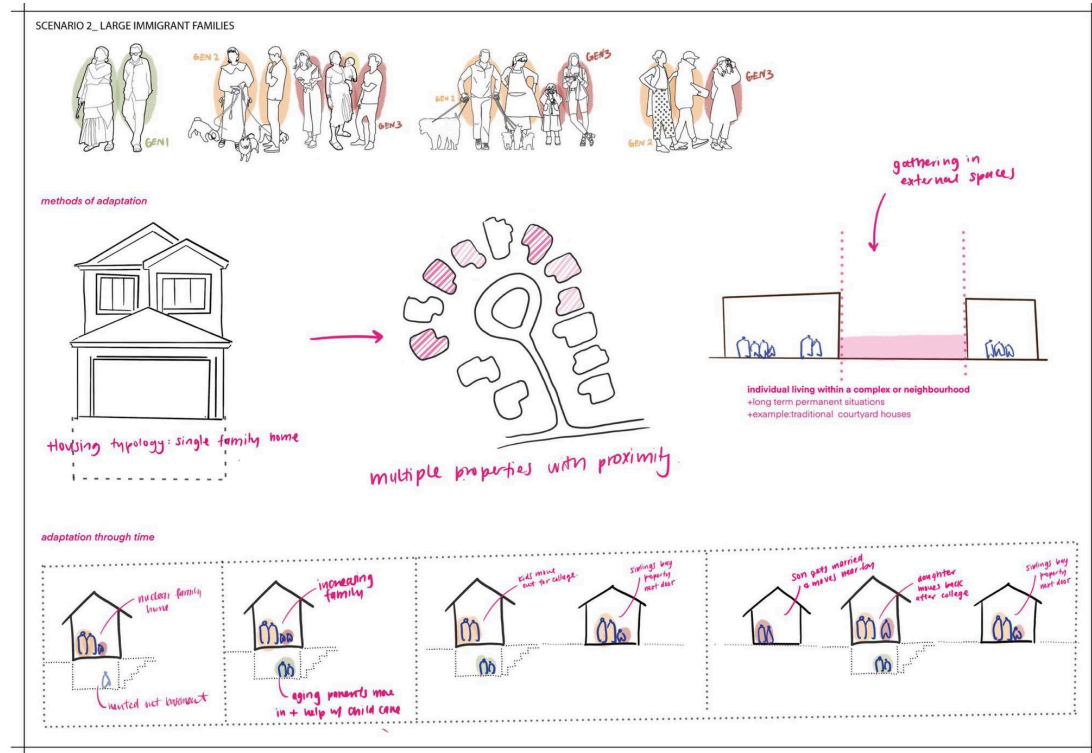


Figure 11\_ Mockup of a user scenario (Source: Author)

### 4. Mapping Amsterdam's MinveraHaven Building Stock

- Identify which buildings have the potential for vertical timber additions
- What are the qualities that support multigenerational housing?

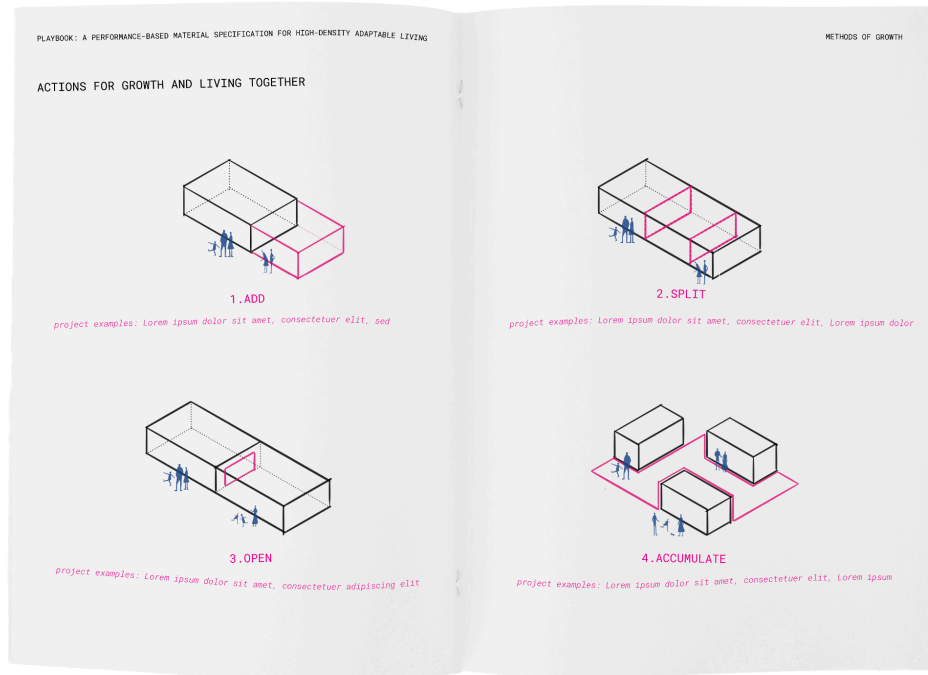


Figure 12\_ Mapping of (a) steel structure vs (b) concrete structure in Minervahaven (Source: Author)

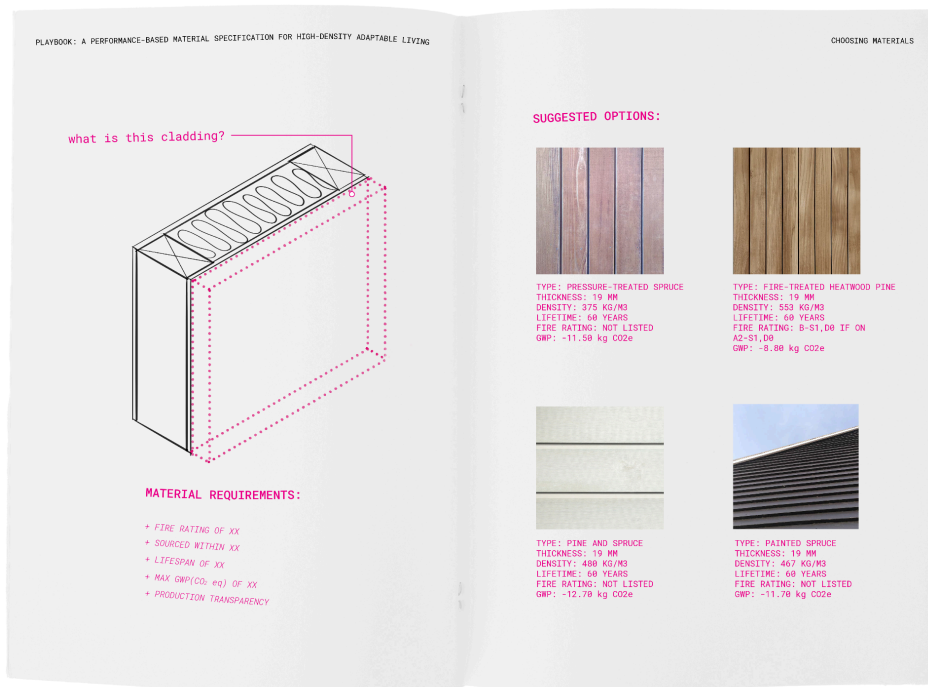
## Predicted Research Outcomes

### 1. Playbook for Adaptation

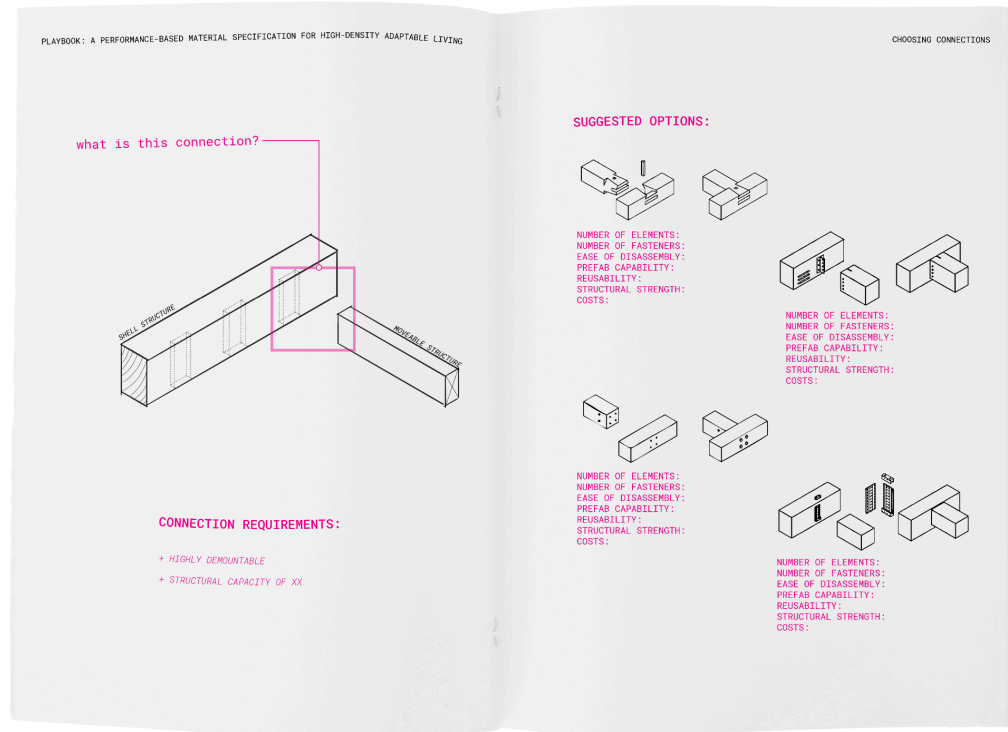
- Performance-based material selection and framework for adaptation and growth of multi-generational shell and infill top-up structure
- Section 1: Identify methods for adaptation and growth



- Section 2: Identify values, performance, and experience that must be met by chosen materials



## → Section 3: Identify type, role, and demountability of connections



## 2. Example design using the playbook

- Mapping scenarios of a changing building over time.
- Short-Term: Introducing new multi-generational volumes with space to grow.
- Mid-Term: Changing amenities and programs to support growing and aging in place.
- Long-Term: Shell structure allows for internals to change according to user and societal needs.

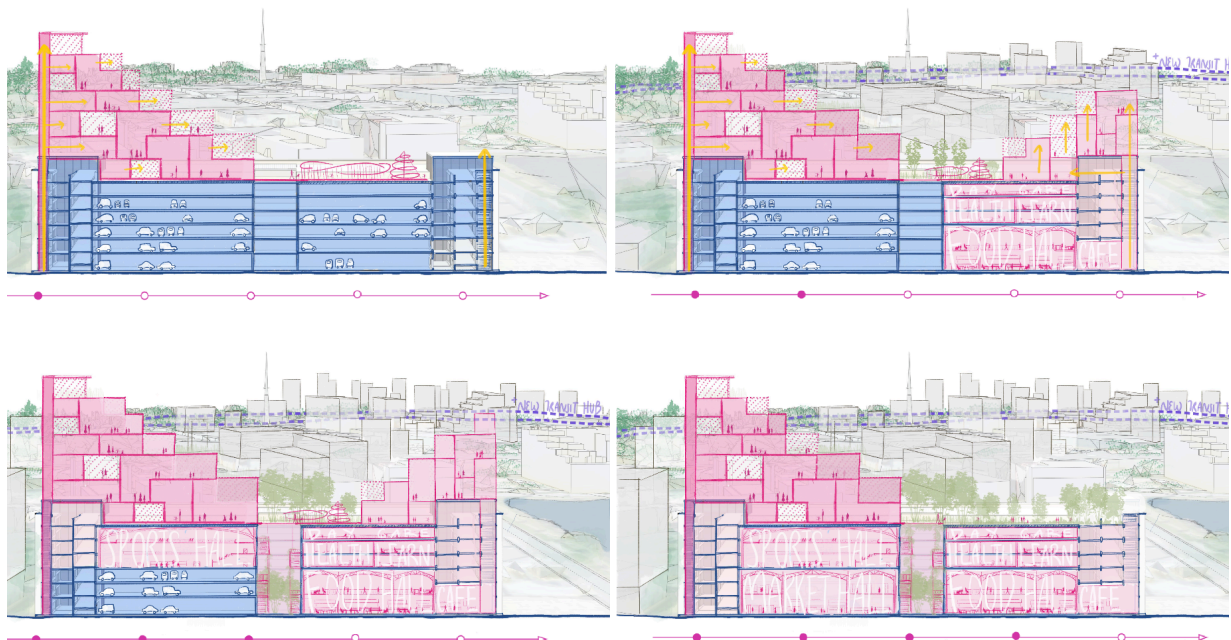


Figure 16\_ Concept sketch of changing housing and amenities over time (Source: Author)



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- explores architectural flexibility by examining how buildings can adapt to changing uses over time.
- projects like the Fun Palace emphasize the importance of integrating time and uncertainty into design, advocating for either inherent flexibility or planned obsolescence to accommodate evolving urban needs and market fluctuations.
- *'Our predecessors,' said Gordon, 'left us with a stock of buildings, which generally have been pretty adaptable and served for a long time. One suspects that many of our buildings are only going to be really suitable for the functions for which they are designed for a comparatively short time.'*

Correa Zuluaga, David. "Designing Material Architectures," 53–60, 2024.

- approach to architecture centred on material-specific design, encouraging architects to work with a material's inherent qualities to shape functional and aesthetic outcomes.
- This process may redefine architectural forms

Hurst, D'Vera Cohn, Juliana Menasce Horowitz, Rachel Minkin, Richard Fry and Kiley. "1. The Demographics of Multigenerational Households." Pew Research Center (blog), March 24, 2022.

- identifying key trends and factors that contribute to their growing prevalence of multigen living.
- social and economic motivations behind multigenerational living, emphasizing its importance for family dynamics and support systems in contemporary society.

Strong Towns. "Multigenerational Living Isn't Immigrant Culture, It's Human Culture," April 10, 2024.

- Positioning mgl as universal human practice rather than a cultural exception.
- Benefits for community resilience and economic stability, advocating for policies that support flexible housing

Žegarac Leskovic, Vesna, and Miroslav Premrov. "A Review of Architectural and Structural Design Typologies of Multi-Storey Timber Buildings in Europe." *Forests* 12, no. 6 (June 8, 2021): 757. <https://doi.org/10.3390/f12060757>.

- various typologies of multi-storey timber buildings in Europe, analyzing architectural and structural designs
- Emphasis on structural qualities and advantages

Karana, Elvin, Bahar Barati, Valentina Rognoli, and Anouk Zeeuw van der Laan. "Material Driven Design (MDD): A Method to Design for Material Experiences." *International Journal of Design* in press (May 20, 2015).

- The original paper that establishes this method for creating experiences centered around specific material qualities
- how materials can shape user interactions – a tactile and experiential approach to material selection

Sheil, Bob, Mette Ramsgaard Thomsen, Martin Tamke, and Sean Hanna. *Design Transactions: Rethinking Information Modelling for a New Material Age*. UCL Press, 2020.

- systems that integrate material properties directly into design processes

Handa, Rumiko. *Allure of the Incomplete, Imperfect, and Impermanent: Designing and Appreciating Architecture as Nature*. London New York: Routledge, Taylor & Francis Group, 2015.

- How embracing natural materials can enhance our connection to the built environment.
- design philosophy that values change and adaptability, aligning with sustainable practices and the transient nature of bio-based materials.

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