# Towards Adaptable Post-War Housing

*Architecture that uses change for greater significance.*

## Reflection

# Towards Adaptable Post-War Housing

*Architecture that uses change for greater significance.*

## Reflection

**Student**
Bernd de Groot
5452929

**Studio**
Heritage and Architecture
Adapting 20C Heritage: Resourceful Housing

**Date**
02-07-2023

**Studio Tutors**
Ana Pereira Roders - *Research*
Lidwine Spoormans - *Design*
Elina Karanastasi - *Building Technology*

# 1. Reflection

This reflection answers questions related to the preliminary results of the research and design during the graduation process.

## 1.1 Mandatory Reflection

1. **What is the relation between your graduation project topic, your master track: Adapting 20C Heritage: Resourceful Housing, and your master programme (MSc AUBS)?**

My graduation project is about the adaptability of post-war housing, which is the capacity of these buildings to effectively accommodate the evolving demands of their context, thus maximising their value through life **(Schmidt III and Austin, 2016)**. On the other hand, there is the concept of cultural significance, which addresses the range of values ascribed to a cultural heritage asset and justifies its designated status **(Avrami et al., 2000)**. Therefore, this graduation project focuses on the development of post-war architecture towards an architecture that uses adaptability for greater significance.

This ties in with the studio: Adapting 20C Heritage: Resourceful Housing. This studio faces two main challenges: the housing crisis and the circular economy. Heritage provides the connection. To solve social issues like energy inequality and climate change, my graduation project utilises the synergy between adaptability and significance. Redesigning the physical environment is essential if our cities are to have a sustainable future. Furthermore, the redesign of adaptable post-war housing can contribute to the studio's development goals of additional housing, better energy efficiency, and a wider variety of typologies.

This is relevant to my master's programme since it focuses on investigating innovative methods that promote more sustainable development and developing an independent, academic attitude that supports architectural design and research in relation to social and technological challenges like those aforementioned.

2. **How did your research influence your design/recommendations, and how did the design/recommendations influence your research?**

**Introduction**

My research used a framework that classifies a building as a series of layers based on the theory by Brand (1997). He defines a building as a series of 'shearing layers' that change at different rates (Figure 1). The more layers are connected, the more difficult and expensive it becomes to adapt a building.

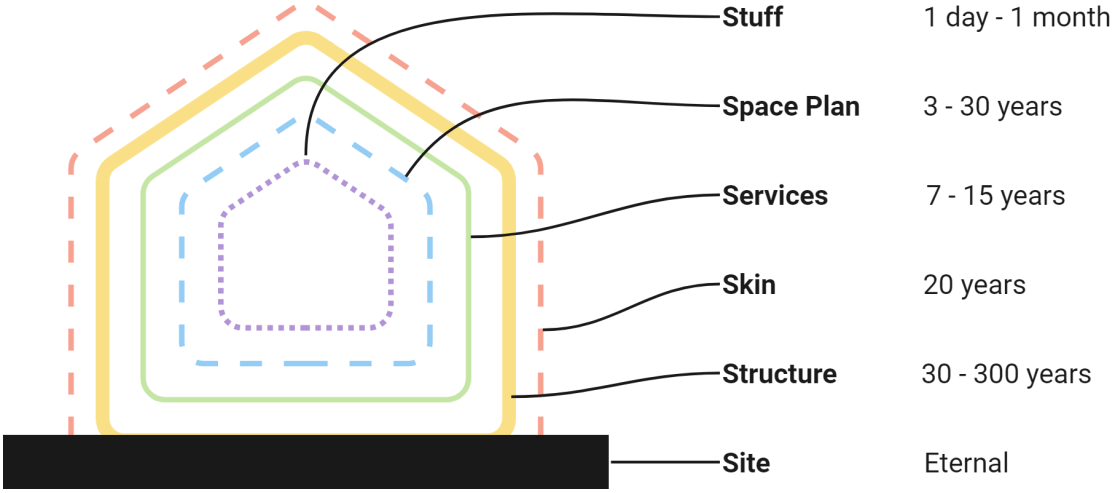


**Figure 1:** A building as a series of layers, according to Brand. **(Author)**

In order to further clarify the types of connections, a series of three connection types (Figure 2) was used based on the findings revealed by Durmisevic (2006).

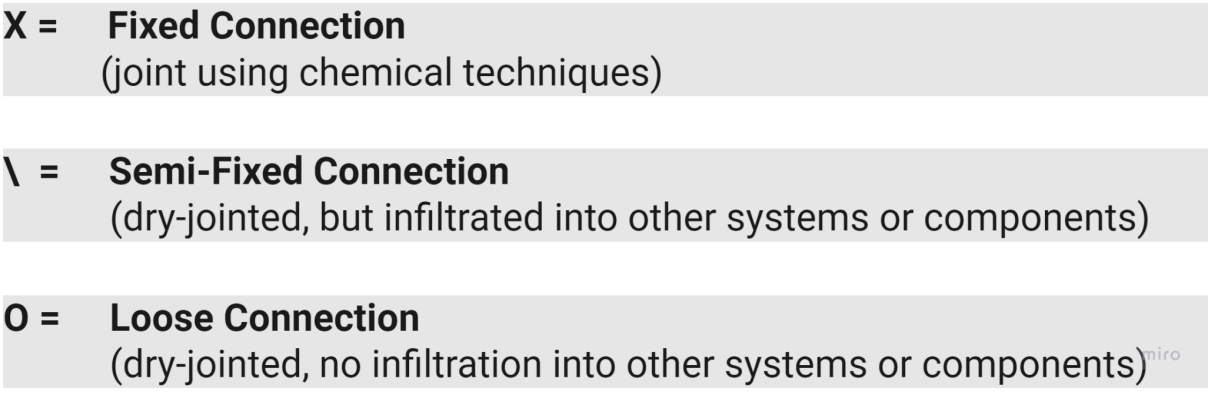


**Figure 2:** Three different classifications of connections. **(Author)**

The layers and connection types were then interpreted using a Dependency Structure Matrix (DSM). A DSM reveals complex interdependencies between the different

building systems. A DSM is an NxN square cell matrix (Figure 3a) that maps the relationships between elements in a single domain. This research will use a static DSM, analysing the case study at a fixed moment in time.

The majority of DSMs are binary, meaning that a dependency can either be present or absent. However, other DSMs employ colour, numerical values, or other symbols to represent additional system features, such as the strength or type of connection **(Schmidt III and Austin, 2016).** This is visualised in Figure 3b using the three different characters (X, \, O), as shown in Figure 2.

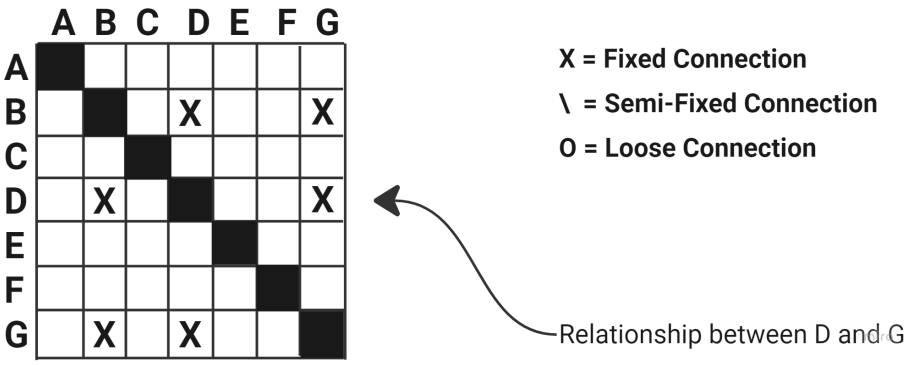


**Figure 3a:** A DSM composed of seven elements. **(Schmidt III and Austin, 2016)**

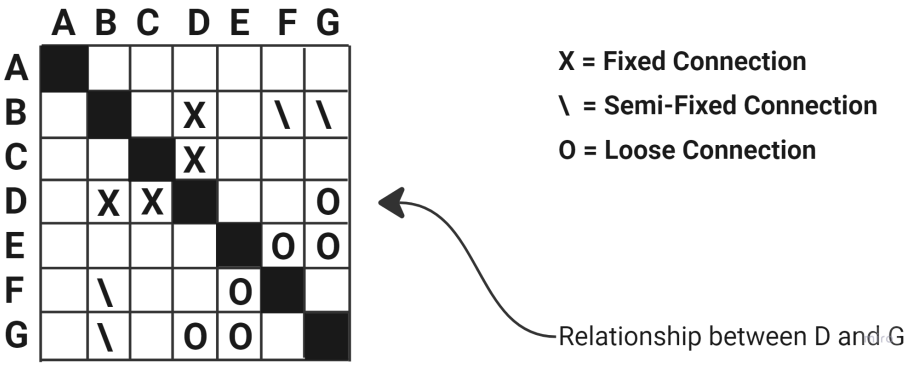


**Figure 3b:** A DSM composed of elements representing system features. **(Author)**

My research looked at internal connections, which are connections between elements in the same building layer, and also at external connections, which are connections between elements in different building layers. This resulted in a single DSM, as shown in figure 4.

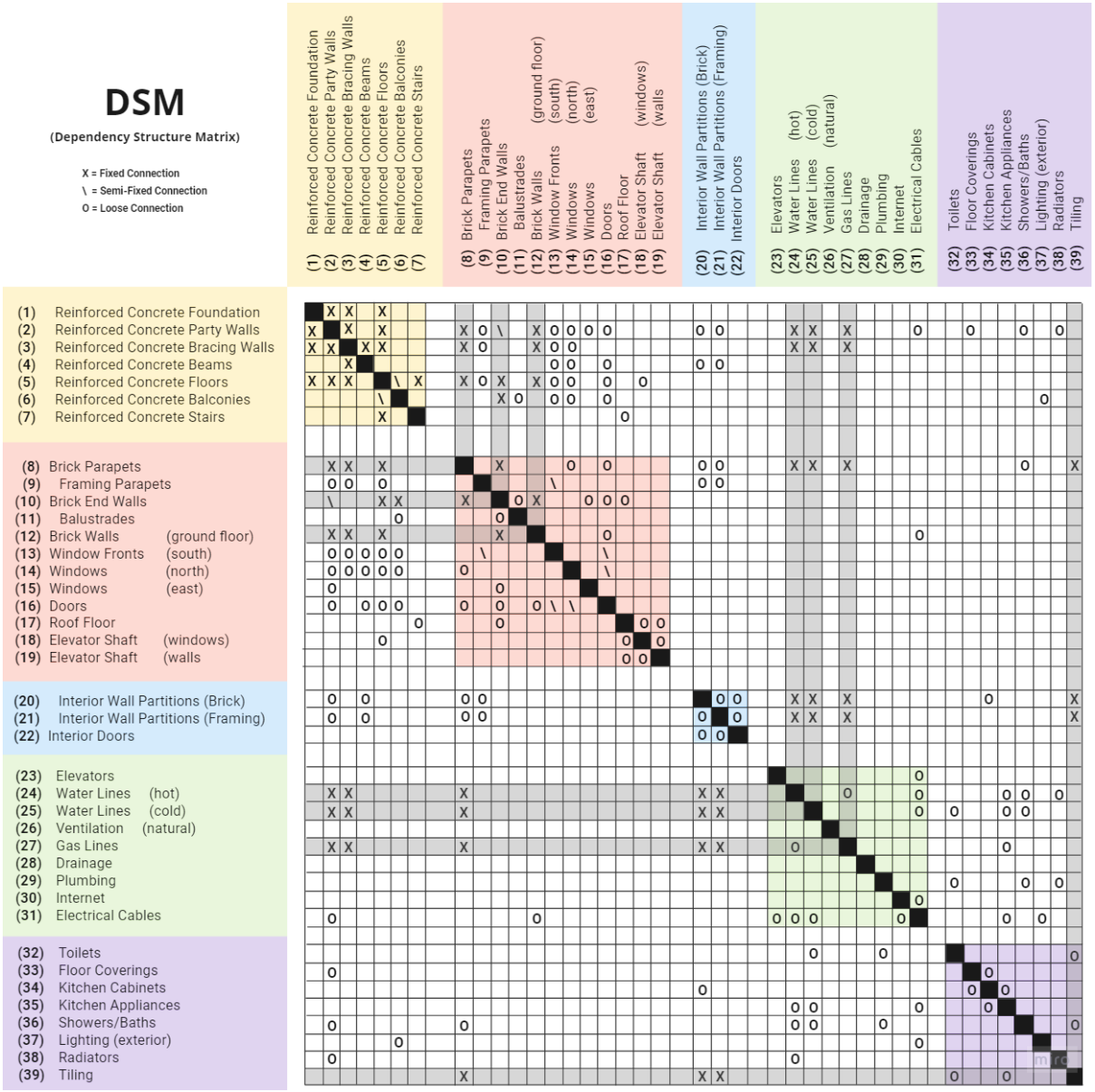


**Figure 4:** DSM showing external relationships between layers. **(Author)**

## Research to Design

Firstly, my research greatly influenced the guiding theme of my research. It focused on designing more adaptability into the existing design of the buildings in order to further improve their capacity to accommodate our always changing society. And doing so without any major building disruptions. During the design process, it quickly became clear that a totally adaptable building is not feasible when doing a redesign. One example of this was with the structure of the building. Figure X shows that the structure layer (orange) consists of only fixed connections; therefore, this layer was categorised as not adaptable. I had to learn to accept this and find another way to

improve adaptability. This developed into a concept that seeks to improve adaptability by adding it to the existing (Figure 5).

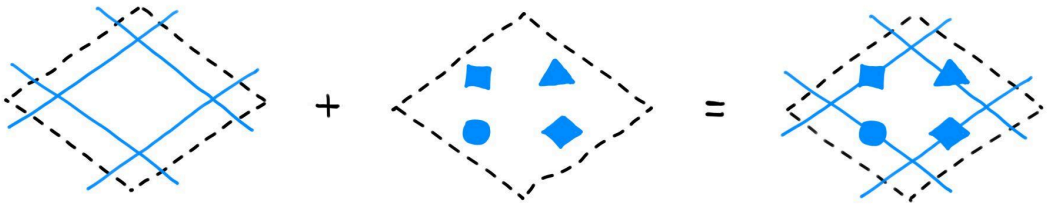

**Figure 5:** Building concept: adaptability by addition. **(Author)**

Secondly, my research focused heavily on seeing the building as a series of layers and classifying the various connections between these layers. This gave a clear overview of opportunities and problems. In the design process once again, there was this moment of acceptance. Not wanting to change the existing, but instead making use of its preexisting qualities and adding to those with newly meaningful built additions. I discovered the adaptability that was already present in the space plan-layer. Thanks to my research on layers/connections and, in part, my funda research, I was able to reveal the preexisting adaptability. I did this by analysing the changes residents have made in comparison to the original floor plans from 1965. I discovered that this inherent adaptability could be seen as an existing attribute that could be utilised for the design process. I developed an intervention strategy that splits existing apartments, creating two new apartment typologies that fit the user's needs while at the same time increasing diversity and affordability.

**Design to Research**

The research presented a set of heritage attributes; I classified attributes using the tangible and intangible matrix developed by **Veldpaus (2014).** These were very important in my design process. And I wanted to respect them as much as possible. At a certain moment during the design process, I decided to change my view on these attributes by interpreting some of them more loosely. A good example of this is the way I have solved the extension of the balconies. The attributes in question were:

**Intangible: Asset-Related**

A-16 Character: Articulation, Interplay, and Rhythm;
A-17 Character: Colour, texture, and detailing to support the façade rhythm;
A-18 Character: Subdued use of colour;
A-19 Character: Flat Facades;
A-20 Character: Refinement of overall composition.

I decided too interpret these attributes in my own way in order to see what would happen to the design. This provided me with more design freedom and allowed me to greatly further my design. This made me realise that these attributes need to be respected but should not limit the interventions that are necessary to improve the building's adaptability.

3. **How do you assess the value of your way of working (your approach, your methods, and your methodology)?**

I believe my research presents a well structured framework that can reveal important information about the building before the design process starts. This contributes to a deeper understanding of the existing, which I consider a key element in a successful, respectful, yet progressive transformation of post-war housing blocks.

On the other hand, the utilisation of a dependency structure matrix necessitates a high level of expertise in the details and relationships between the many building layers and the components that constitute them.

Written texts that discuss the significance of individual buildings, ensembles, and cityscapes play a major role in the attribute classification. In certain situations, documents are unavailable, or have not yet been created. As a result, some case studies are unable to offer the necessary quantity or quality of data.

The connection type classification approach is a condensed version of the more intricate methodology of classification that **Durmisevic (2006)** revealed. Although this simplification keeps the research within the graduation track time constraint, it may degrade the quality of the research output.

Furthermore, I used Funda to analyse the changes residents have made in comparison to the original floor plans from 1965. I discovered that this inherent adaptability could be seen as an existing attribute that could be utilised for the design process. Therefore, this method ended up being one of the most valuable in my entire graduation studio.

4. **How do you assess the academic and societal value, scope, and implications of your graduation project, including ethical aspects?**

My thesis research may offer a scientific framework that seeks to broaden ideas and highlight contrasting aspects of the importance of post-war housing blocks (values and features) by connecting them to adaptability.

Valuable dwelling redesigns might be accomplished with the use of this tool and its scientific foundation. Redesigns that concentrate on the advancement of post-war architecture towards an architecture that uses change for greater significance, considering the many unique attributes and the fact that the needs of society are continually changing.

During the design process, I developed three strategies (Figure 6) that each focused on a specific social value.

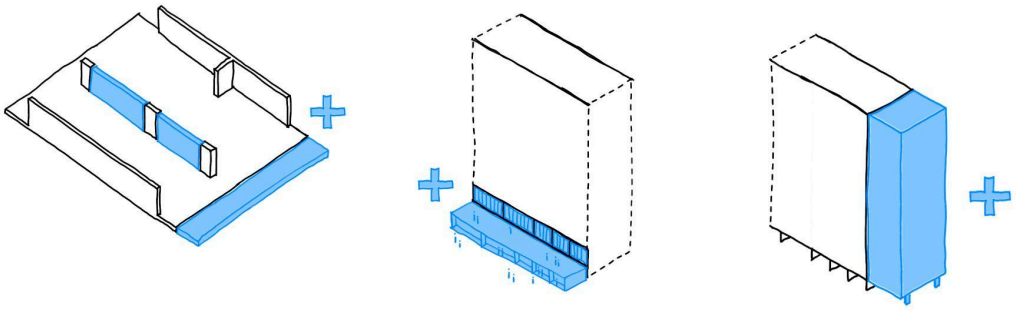

**Figure 6:** Three intervention strategies: splitting, inviting, and addition. **(Author)**

The first strategy: splitting, involves splitting the existing apartment layout into smaller apartments. This is made possible by the preexisting adaptability of the building. Through splitting, two things happen. Firstly, more apartments are created in the same space, which contributes to densification. Secondly, by splitting existing apartments, new apartment typologies are introduced within the building envelope, inviting different household compositions and therefore contributing to increasing the diversity of residents.

The second strategy: addition, involves extending the west-facade balconies, doubling them in size, and adding 13 apartments to the south-facade and five penthouses on the roof. The extension of the balconies transforms the small 1.2m balcony into a 2.4m balcony that can be used for a larger variety of activities, while at the same time providing passive shading in summer. This intervention increases the adaptability of the outdoor area for every apartment. The addition in front of the south-facade introduces 13 new apartments, increasing the urban density.

The third strategy: invitation, involves inviting residents, neighbours, and visitors to more actively use the ground floor and first floor of the building. This is done by introducing adaptable spaces that can facilitate a multitude of functions,

including: bike storage, ateliers, workshops, office spaces, start-up retail spaces, and even housing. The first floor offices can be used as a work from home office, rented out as office space, or even transformed into housing. This strategy increases the level of collectivity and contributes to more diversity.

Ultimately, all three strategies improve the sustainability of the building by including design interventions that promote densification, diversification, collectivity, and adaptability. Furthermore, with these interventions, the thermal envelope is improved and renewable energy is generated through the use of building integrated photovoltaics (BIPV). All this while at the same time respecting the protected and unprotected attributes of the building. This results in a redesign that uses change for greater significance.

## 5. How do you assess the value of the transferability of your project results?

The framework (figure 4) and the interaction thereof in the design process can be a useful tool for industry professionals who want to help transition existing post-war housing projects into more adaptable ones whilst simultaneously respecting heritage significance. Firstly, the tool can provide designers and stakeholders with a lot of information. Information about the layers and all their connections is very important when doing a redesign. Furthermore, it reveals information about the existing adaptability and the protected and unprotected attributes. The gathered information can be used as an argument in favour of re-use instead of the usual demolition.

This can be made even stronger by combining it with the Funda research method. The Funda research was a good method for investigating adaptability. It can reveal what changes in the needs of residents through the years and in which layers this happens. This can be very helpful for designers and stakeholders to know before attempting a transformation. In my case, it revealed a new attribute that could be utilised in the design process.

Further, the design showcases that there are indeed possibilities other than the demolition of what is already built. These can be divided based on the three strategies: splitting, addition, and invitation (Figure 6). These strategies can serve as an example for other post-war housing blocks. The strategies should be implemented by others, all together but also separately from each other based on the needs of other stakeholders.

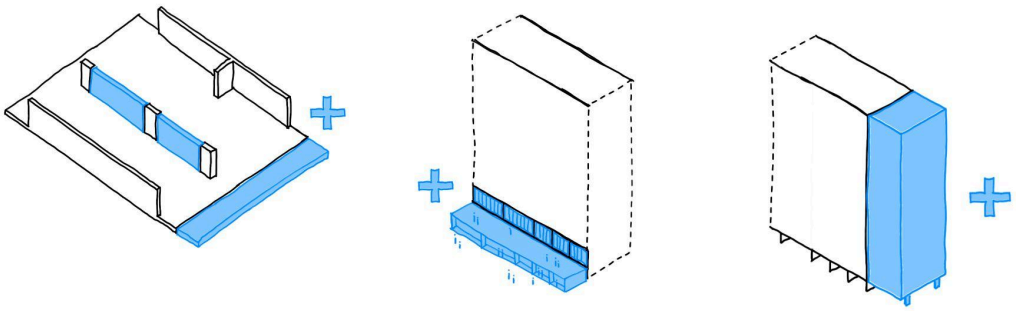

**Figure 6:** Three intervention strategies: splitting, inviting, and addition. **(Author)**

## 1.2 Personal Reflection

1. **What were some of my most challenging moments, and what made them so?**

Although the results and the feedback on the research report were positive, writing the research part of my graduation was very difficult for me. It even got to the point where I thought of giving up. On a few occasions, I thought the research was not good enough, that it was not a coherent story, and that I was just repeating what others had already said.

By pushing through, I just kept on reading and writing and slowly started to get motivated again. I learned to accept that doing research is complicated and that good research takes time and requires perseverance. The pomodoro-method was very helpful with this. This time management method developed by Francesco Cirillo involves timing periods of 25 minutes focused on working on a specific task. After 25 minutes, you take a short 5-minute break. You repeat this cycle 4 times and then take a longer break of 30 minutes. Using this method helped me to continue working and staying focused, even though I didn't really like working on it. From this, I learned that as long as you have a good method and keep trusting in yourself, the results you want will eventually reveal themselves.

2. **What were some of my most powerful learning moments, and what made them so?**

Thinking of a complete and compelling story for my redesign was very difficult. This was probably also the reason for me to procrastinate working on this. As a result, my P3 presentation was lacking in depth and therefore difficult to understand. An example of this is not mentioning what the problem is that I want to solve and failing to mention why I am doing these interventions.

Because of this feedback, I decided to look back at my process so far and to think about the core principles of my research and design. This has allowed me to summarise my design process and to achieve clarity and focus in my head and storytelling.

3. **How did your graduation project influence you personally, as a future architect?**

This project made me realise the importance of research in design.

Firstly, researching academic literature and writing my own academic report showed me the value of research as a means to deeply understand what it is you are working on. Research also allows you to ground your beliefs into theory, giving you

something to fall back on and boosting your confidence in presenting design decisions.

Second, researching the project through Funda, discovering hidden qualities, untold stories, etc. really helped in building a different kind of narrative than the usual story of demolition and building new. It allows you to value what is already there because you know it so well.

Further, I realised the importance of looking back on your process, zooming out, and thinking of how to explain your project in a few sentences. This allows you to get the outline of your story correct.

Ultimately, this research allowed me to develop an academic attitude that involves perseverance, self reflection and hard work, which I think will be great skills to have for the rest of my career as a practicing architect.