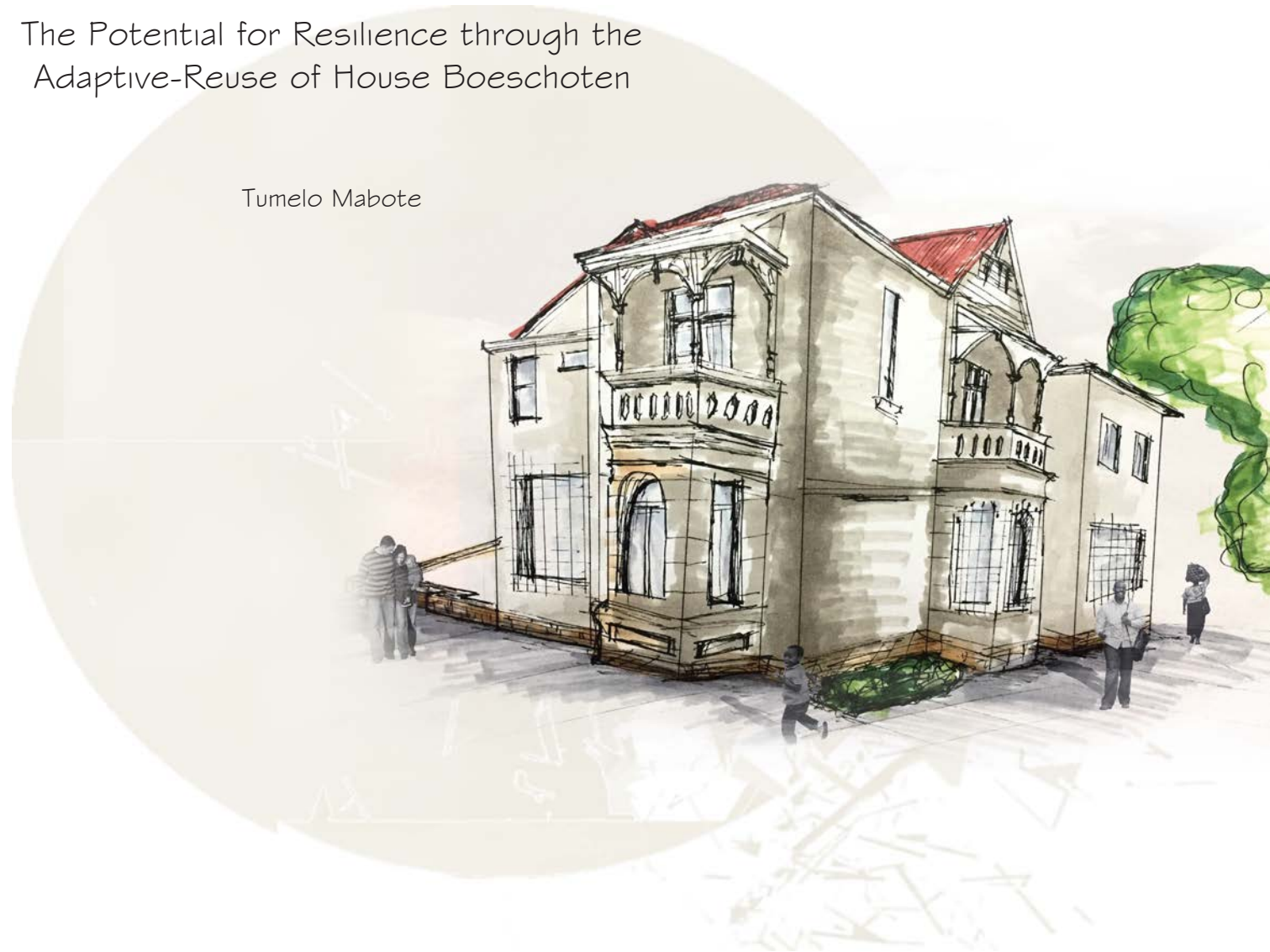


# Shaping The Future

The Potential for Resilience through the  
Adaptive-Reuse of House Boeschoten

Tumelo Mabote



## Declaration

Submitted in partial fulfillment of the requirements for the degree Masters of Interior Architecture (Professional) to the faculty of Engineering, Built Environment and Information Technology

**By Tumelo Mabote**

Department of Architecture

University of Pretoria

2018

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In accordance with Regulation 4(e) of the General Regulations (G.57) for the dissertations and theses. I declare that this dissertation, which I hereby submit for the degree of Masters of Interior Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of the dissertation has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further state that this thesis is substantially my own work. Where reference I made to the work of others, the extent of which that work has been used is indicated and fully acknowledged in the text and list of references.

Tumelo Mabote

## Project Summary

<b>Dissertation title:</b>	Shaping the Future: The Potential for Resilience through the Adaptive-Reuse of House Boeschoten
<b>Project description:</b>	Resilience is generated from the interior as a catalyst to conserve NZASM custom housing typologies
<b>Programme:</b>	Early Childhood Education Research Centre and Extra Mural Facility
<b>Site Description:</b>	East of Pretoria CBD, Sunnyside, Pretoria, South Africa
<b>Site location:</b>	A residential building sharing a site with Oost Einde Primary School and is surrounded by UNISA
<b>Address:</b>	Cnr Joubert St & Justice Mahomed St, Sunnyside, Pretoria, 0002
<b>Research field:</b>	Heritage and Cultural Landscapes
<b>Chosen client and user:</b>	UNISA Early Childhood Education Research Centre and the local community
<b>Interior architectural theoretical question:</b>	What can an adaptive approach contribute to maintaining House Boeschoten's inherent resilience, in order to produce a contingent building, future-proofing its relevance within Sunnyside?
<b>Interior architectural approach:</b>	Heritage Conservation as a strategy for generating interior resilience

### KEYWORDS:

Interior architecture, contingency, resilience, NZASM, adaptive architecture, conservation, heritage alteration

## Abstract

The dissertation investigates the production of resilient buildings as a strategy to future proof the relevance of NZASM heritage in Sunnyside. The study specifically focuses on a NZASM single-family residence located in Sunnyside, known as House Boeschoten, as a test subject to prove the necessity for heritage buildings to generate a high level of resilience in order to survive imminent change.

Since the rule of the NZASM (Nederlandsche Zuid-Afrikaansche Spoorweg-Maatschappij) over the Transvaal ended in 1902 as a result of the Anglo-Boer War, Pretoria has evolved and experienced a number of changes (De Jong 1990:223).

These changes-characterized as political instabilities-have had a detrimental effect on the historical urban fabric of Pretoria. Many of the original NZASM builds that occurred during the regime are currently either derelict sites or severely underutilized. An attempt to regenerate the city by the City of Tshwane municipality through densification and compaction has further compromised the NZASM rich heritage in Pretoria, specifically in Sunnyside (Tshwane 2005:5). Single-family residences such as House Boeschoten are unable to meet the demands of high density housing, further divorcing them from their context. If House Boeschoten is unable to adapt to the changing context, and restore its relevance within Sunnyside, the building will be demolished along with the tangible and intangible memory it holds.

A strategy of combining theory with the in-depth understanding of context is accepted

as a strategy to reverse the inevitable demolition of House Boeschoten. Resilience is unpacked as a primary theory in order to understand the adaptive cycle and how change is experienced in waves. Adaptive-reuse is unpacked as a strategy but also a theory that correlates heritage alteration and adaptive architecture. Lastly the two theories result in the theoretical outcome of contingency, meaning designing buildings that are subject to change, and encompass change that is yet to come (Till 2009:46). Context is investigated in terms of the tangible and intangible, physically and historical, as to better the understanding of place. Cross programs are introduced to test and align with the vision of creating contingent spaces. House boeschoten is then reduced to its essence and reinterpreted through a new addition. The intention is to move the building from a static building towards fluidity. The technification of the new addition produces a design intended for disassembly, accommodating future change without compromising the heritage fabric.



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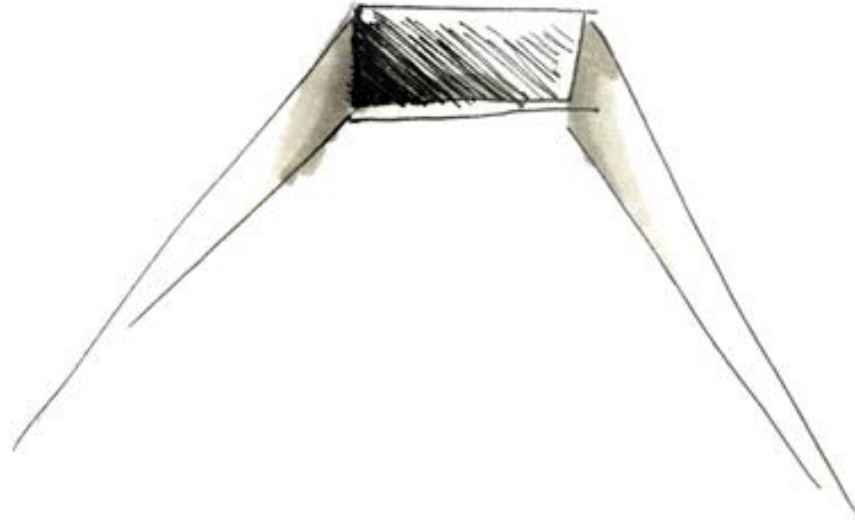




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# CHAPTER ONE: INTRODUCTION

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## 1.1 The Normative Position

“Architecture should speak of its time and place, but yearn for timelessness.”

Frank Gehry (Seferin 2010)

Time is a marker of that which is unstable and in flux, and is widely understood to be crucial to practicing architecture (Till, 2009:95). When considering an office design for example, a project manager will ask how long such expression of brand identity will last. In many cases, time has changed things, and a design is no longer expected to last as long as it once may have been. This is evidence of the way in which zeitgeist influences space and architecture. If interior design is about the design of spaces for people and ongoing rapid change as influenced by time, presenting an inescapable influence for architecture, then designers need to be cognisant of the relationship between people and space that foregrounds time. Gideon appraises the modernist's mastery of time in his book *Time, Space and Architecture* published in 1954. This was one of the earliest signs of western architecture beginning to openly accept the vagaries of time. Philosophers such as Lefebvre critiqued what has become a highly influential modernist design approach, describing that its “manifest[...] expulsion of time is arguably one of the hallmarks of modernity” (Till 2009:84). Although the modernist sought to control time in this way, rather than incorporate its uncertainties, a counter-movement arose around the way in which architecture might incorporate the indeterminacy represented by time. Jeremy Till critiques the concept of 'space-time', which according to Kurtich & Eakin (1993:131) is the

4th dimension, composed of occurrences or events, which are those things happening to someone at a given place and at a given time, resulting in nuances in the experience of a given space. Till suggests the alternative 'time-space' because of its emphasis on time, a correlative of change, as showing greater consideration of the contingent aspect of the discipline (Till 2009:45). In this dissertation contingency is defined as the encompassing of change, the need to provide room for architecture to manoeuvre in a rapidly changing world. My own understanding of architecture is that spaces are contingent, forever changing and evolving, and I argue that we ought to learn to mitigate the consequences of time's denial, by moving towards the expression of contingency in the design of architectural form.

## 1.2 Introduction

Sunnyside is the location of a number of houses designed and built by the Nederlands Zuid-Afrikaansche Spoorwegmaatschappij (NZASM). These specific NZASM houses were owned by high-level employees of the NZASM. The site in question is known as House Boeschoten, located on the corner of Justice Mohamed and Joubert Street, Sunnyside. Today, House Boeschoten is under threat of the City of Tshwane's strategy for densification and compaction, where there exists an urgent need to redefine its relevance within the city's regenerative plans. The failure to do so will lead to the demolition of the building along with the significant heritage and memory it holds of the spatial legacy of the old Sunnyside.

The aim of this study is to unearth and generate

House Boeschoten's inherent resilience through an adaptive-reuse strategy in order to produce a contingent building that can adapt to change. By adapting the site while retaining its identified heritage significance, the relevance of the building is regenerated within its Sunnyside context, ensuring that it is future-proofed, that is, that it can continually adapt going forward into the future.

The following chapter delves further into the theories that will guide the proposal, background, problem statement and research questions. This is followed by the projects aim, rationale and the research method.

## 1.3 Research Field

Heritage and Cultural Landscapes

## 1.4 Context: Background and Site Location

In 1887, the NZASM was established in the Transvaal (De Jong 1990:53). The Netherlands South African Railway Company's construction department designed most of the residences towards the south of the Pretoria station, Salvokop. Many houses towards the east of the train station resemble the houses towards the south. The more wealthy employees of the NZASM built custom residences towards the east and such example of this is the NZASM Guest House on Rissik Street (Bakker et al. 2014:133). The house was occupied by the A. Westenberg and the Van Der Made families in 1898. Another example of the custom NZASM typology is House Boeschoten. This house was seized and occupied by the British military institution during

the Anglo-Boer War, thus this is further evidence that it was a part of the NZASM portfolio. The site is located on what was the “Harmonie” estate, which was home to the Van Warmelo family in 1889, then later occupied by The Harmony Ladies’ Residence of the Norma College in 1899 (Brandt 1913:54). From 1902, after the war, the building was occupied by the Van Boeschoten family. JC van Boeschoten was the second mayor of Pretoria during 1908-1911. In 1937 widower Johannes G. Van Boeschoten, the wife of JC van Boeschoten, second mayor of Pretoria, passed away (Brandt 1913:54). The site was then occupied by the Pretoria College of Education, and the house was utilised as offices. When the college moved to Groenkloof Campus in 1996, the house became vacant, and was subject to vandalism. In 1997 the building became part of the Oost-Eind Primary School, and now houses the Phomolong Centre (pre-school and after-care).

## 1.5 Overview of Problem, Question, Aim and Rationale

Pretoria has undergone several changes throughout its evolution. These changes have manifested as environmental and social stresses or shocks on the urban fabric. The result of the negative impact on the urban fabric is a series of dead urban pockets. Within these dead urban pockets are dormant, underutilised and/or ruined historical buildings. The abandoned buildings are at risk of becoming a site for both detritus and nefarious activity. In order to regenerate areas such as Sunnyside, urban resilience is seen as an opportunity for regeneration, and equips buildings with appropriate systems and programmes that will see them thrive. The City

of Tshwane has actioned a densification and compaction strategy in line with their Tshwane 2055 vision, which aims to create an urban environment that is transit-orientated (City of Tshwane 2005:1).

This is detrimental in its effects on the historical layer of the city, because these buildings are typically low density and residential, becoming obsolete in the light of Tshwane’s urban vision. A lack of relevance means that these buildings will be left to deteriorate until they are eventually demolished, resulting in a loss of a significant part of the city’s heritage. The Sunnyside context is rich in NZASM architectural memory.

This study examines a specific NZASM residential building, House Boeschoten, that has been able to maintain its relevance for over a century. The heritage building’s inherent aspects as architecture are insufficient to deal with the current evolving context, thus it faces demolition in the near future. House Boeschoten meanwhile plays an important part in Sunnyside’s meaning and memory.

In this context it is a question as to what conservation strategy may add to our understanding of the concept of contingency, and Till’s proposition of ‘time-space’. The research questions below are devised in response to this scenario.

In response to this apparent conflict represented in the building, I pose the central question:

### Main Research Question

**What can an adaptive approach contribute to maintaining House Boeschoten’s inherent resilience, in order to produce a contingent build-**

**ing, future-proofing its relevance within Sunnyside?**

Relevant to this central question, the following sub-questions emerge:

- **What can the theory of contingency contribute to defining an adaptive strategy in order to enhance House Boeschoten’s inherent resilience**
- **Which architectural features of House Boeschoten hold both heritage significance and inherent resilience that can support cycles of adaptive reuse**
- **What interior architectural responses are required to ensure that House Boeschoten remains contingent?**

## 1.5.2 Rationale

This dissertation addresses these questions with the aim noted above to re-imagine and re-design House Boeschoten for a continual cycle of adaptive reuse, thereby future-proofing House Boeschoten as a heritage building within a changing Sunnyside context.

To respond to these questions, I apply a systems approach to developing resilient interiors through adaptive re-use, seeking to revive House Boeschoten’s relevance in a way that is both sensitive to its heritage significance as well as cognisant of the mutability of its time-space context. This is achieved by applying three theoretical concepts (Chapter 2), namely: resilience, adaptive re-use, and contingency.

With the stated aim to generate resilience

through the adaptive-reuse of House Boeschoten, the programme will act as a case study to test whether the building is successful in its adapt[ability], and thereby able to cater for a multiplicity of programmes well into the future. Should the building be successful in its ability to facilitate diverse programmes, this will be argued to be evidence of a necessary critical contingency.

Scenario planning is adopted as the strategy for the site. Scenario planning originated from the military, but has subsequently be applied by business corporations required to anticipate the future due to an uncertain environment, where planning is done 10 years ahead (Brand 1994:178). Scenario planning the site, which is currently zoned as part of an education block, requires an education programme to test the building's adaptive capabilities. House Boeschoten will facilitate two programmes, namely an early childhood education research centre, as well as extra mural facilities. The programmes will be anchored by public amenities such as a café and a public library, which aim to improve the interface between public and private space. These programmes are currently in demand and they will form part of a growing network involving neighbouring UNISA's Early Childhood Education Centre, Oost Einde Primary School and the community.

### 1.5.3 Contribution

The purpose of the dissertation is to synthesise the theory of contingency, and introduce its potential for universal application. House Boeschoten is introduced in order to provide a lens for the application of the adaptive-reuse strategy. The study contributes to the existing

body of work that has concentrated on the NZASM housing regime. House Boeschoten has to date not been documented as a heritage site. The documentation thereof, subsequent statement of significance and information gathered on its intangible heritage will contribute to the body of work on NZASM housing in Pretoria. This study makes a theoretical contribution, through the extension of theories of resilience and contingency to adaptive reuse in the field of interior architecture.

### 1.5.4 Delimitations

The investigation and design proposal for House Boeschoten are limited to the social and environmental spheres. Consideration of economic impact lies outside the scope of the dissertation.

## 1.6 Methodology

The study combines qualitative and quantitative methods. Qualitative research involves an interpretative, naturalistic approach to its subject matter by studying things in their natural setting, and interpreting phenomena according to the meaning people bring to them (Groat Wang 2013:218). Quantitative research in this context implies a consolidated literature review that includes:

1. **A review of relevant theory**, following Groat and Wang (2013:142), who notes that "literature reviews synthesise themes within the literature. These syntheses entail assessment and critique of existing perspectives, but also offer new ideas." The study assesses relevant theories pertaining to the altering heritage,

contingency, resilience, and sustainability.

2. **Historical Mapping**, through resources of the University of Pretoria and special collections of Rosa Swanepoel and Van der Waal. Historical timelines of the site and Sunnyside context are consolidated into chronological order.

3. **Urban Mapping** conducted on a macro-scale: desktop studies and observation of urban characteristic such as form and size, heights, typology, programmes and uses (private and public space), heights, as well as hard and softscapes.

4. **Architectural detail and spatial quality** of the house on the microscale documented: desktop studies, observation and face-to-face interviews of site accessibility, exterior and interior configuration, existing interior and exterior conditions, precious and altered heritage fabric.

5. **Analysis NZASM house typologies:** desktop and observational studies of similar house typologies in the area.

6. **Heritage Charters:** assessment of Nations Heritage Resource Act and The Burra Charter (ICOMOS 2013), Australia, the principles of which are used to inform the statement of heritage significance.

7. **Precedents** examined for adaptive-reuse of heritage buildings include the study of regenerative design strategies employed on international and local heritage sites, particularly those with a residential and education focus.

## 1.7 Overview of Chapters

Chapter 1 serves as an introduction to the study, detailing the research problem, research questions, aim, rationale and methodology, and chapter overview.

Chapter 2 comprises a literature review of the

theories and strategies that anchor the study in order to define a theoretical base for resilience, adaptive-reuse, and contingency.

Chapter 3 is a context study of the site. It presents mapping, analysis and documentation of the site, in order to develop the statement of heritage significance.

Chapter 4 consists of precedents that are gathered and assessed in order to inform the design.

Chapter 5 illustrates the concept, design development and the technification of the final design.

Chapter 6 reflects on the study and its contribution towards the field of interior architecture.

## 1.8 Conclusion

The study presents an investigation into the inherent resilience of House Boeschoten so as to identify a strategy for a continual cycle of adaptive reuse, thereby future-proofing the building against a changing context of Sunnyside, Pretoria. The resilience that is maintained will arise from a design intervention at different scales and detail resolutions. For as long as House Boeschoten is able to adapt in order to support a variety of programs with ease, resiliency from the interior out is ensured. This will set a precedent for future proposals that deal with similar typologies within Sunnyside.

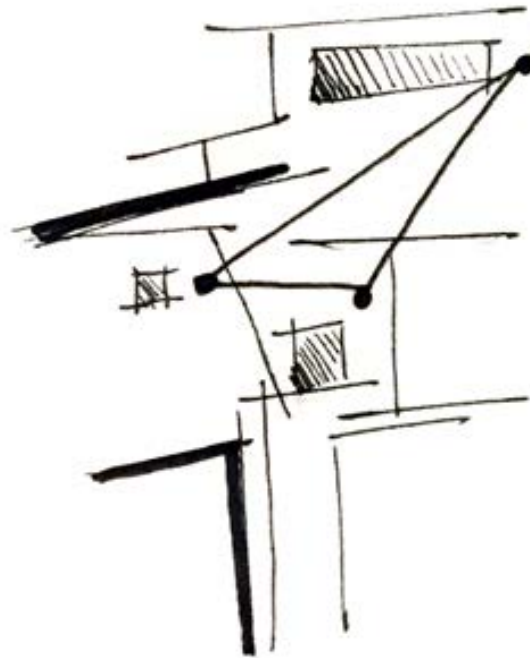




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## CHAPTER TWO: THEORY

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## 2.1 Introduction

This chapter investigates theories of resilience, adaptive reuse and contingency. Resilience, as an overarching theory that considers change on an urban scale, is extended to the discipline of interior architecture. Adaptive architecture is investigated as a method for achieving and coping with change in a heritage building. The concept of adaptive architecture is compared to that of adaptable architecture in an endeavour to identify a strategy for continuous adaptive reuse. It is argued that in bringing the two aforementioned theories together, an interior architecture that is contingent can be achieved. Thus, the notion of contingency is explored in relation to resilience and adaptive reuse. Finally, a framework is outlined that can be applied to the re-design of House Boeschoten in an endeavour to purposely conceive interior architecture that is able to anticipate and facilitate inevitable change.

## 2.2 Theoretical Position In-time

House Boeschoten forms part of a radical shift in the making of architecture. The issues were the result of the NZASM regime, while the unearthing of issues related to the static making of space were manifesting on an international scale. Figure 1 illustrates the theoretical position of House Boeschoten, in relation to the development of theories that will be explored in this chapter.

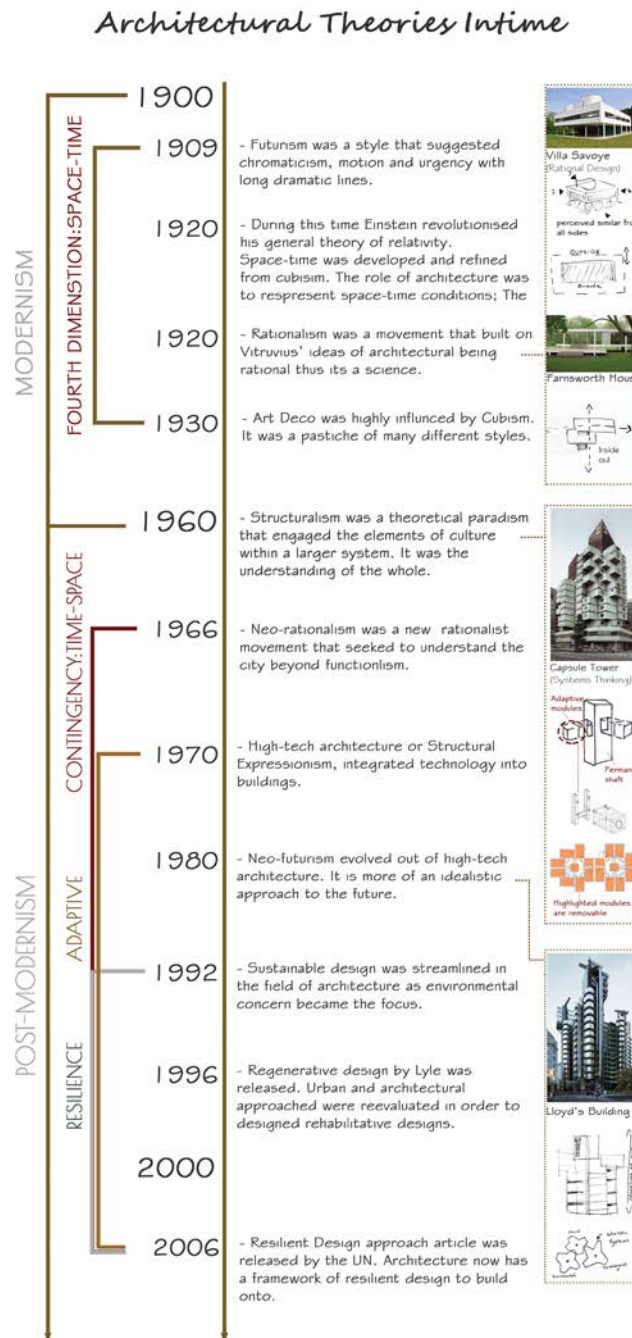


Figure 1: Theoretical position timeline (Author 2018)

## 2.3 Resilience

Resilience is about understanding and engaging with a changing world. As Walker et al. (2006:14) states, "by understanding why systems as a whole are changing, we are better placed to build capacity to work with change, as opposed to being a victim of it". Resilience provides insight into why external and internal factors change over the long term. Moreover, it equips the designer with a lens to recognise House Boeschoten's inherent resilience. Resilience can develop from the bottom-up, but also from the top-down, where Peres et al. (2015:2) have noted, "urban resilience can be described as the capacity of a city to absorb or adapt to change brought about by slow pressures or rapid pulse disturbances". Cities can experience resilience, both in a positive and negative way. Pretoria is an example of a city shaped negatively by political stresses experienced during the city's evolution.

Humans are great short-term optimisers, and I argue that in order to deal with long-term change, a systems thinking approach ought to be applied to the re-design of House Boeschoten (Walker et al. 2006:31). By studying ecosystems around the world, researchers have learned that most systems of nature usually proceed through recurring cycles consisting of four phases: rapid growth, conservation, release and reorganisation (Gunderson and Holling 2002:65). This cycle is known as the adaptive cycle, as it describes how a system copes with change (Fig. 2).

The rapid growth phase exploits new resources and opportunities in order to fast track the process of growth. The second stage is char-



acterised by conservation. According to Walker et al. (2006:76), during this time, energy gets stored, efficiency increases, and internal states become more stabilised and regulated. The transition from the conservative to the release phase can happen instantaneously. The system becomes undone, and the loss of structure prevails (Walker et al., 2006:77). During the chaos of the release phase, the subject is vulnerable to events and smaller influences that can shape the future. The reorganisation phase begins to re-establish an equilibrium and identify constraints, slowly transitioning to the rapid growth phase. These adaptive cycles are repeated constantly and occur on different scales.

Thus, three concepts need to be understood before a resilience framework can be drawn up, and the adaptive cycle applied. Firstly, we live in a social system with embedded ecological systems, where as a consequence, meaningful understanding is obliged to consider both. Secondly, socio-ecological systems are complex adaptive systems that do not change in a linear or predictable manner. Thirdly, resilience ought to be understood as the capacity of a system to absorb a disturbance without exceeding its own threshold and crossing over into a new system with a different identity. All three of these concepts need to be thoroughly appreciated before resilience can be successfully achieved in House Boeschoten.

### 2.3.1 Cycles of adaptation House Boeschoten's Inherent Resilience

Adaptive cycles can be applied to architecture in order to understand how change in-

creases and decreases the leverage that designers have on the functionality of a building. The adaptive cycle can be used as a tool to understand the evolution of House Boeschoten, especially considering the building's remarkable ability to survive a series of different owners and programmatic requirements. This was achieved by adapting and reorganising itself in moments of change.

The first phase is exploitation, which sees rapid growth as a new building exploiting abundant resources and opportunities in order for it to be conceived and constructed. In terms of House Boeschoten, this was during the building's original construction, during which time the Zuid Afrikaanse Republiek (ZAR) was expanding and developing rapidly, and as a result of which the NZASM was established in 1887. House Boeschoten was located on the newly developing Harmonie Estate. Harmonie, and moving to the North, was known for the custom-built rendition of the NZASM typology, which were built for high-ranking officials. This meant that resources for building were abundant, and opportunity was plentiful. House Boeschoten then occupied the conservation phase where the occupants, the Boeschoten family, aimed to live as efficiently as possible in order to conserve the house in all its architectural precision.

The Anglo-Boer War broke out in 1899, and all the NZASM property was seized and occupied by the British military. This constituted a release phase, which resulted in the change of ownership, occupancy and programme of House Boeschoten. The release phase was important for the house because the ability of the spaces to adapt to a new programme was key to its ability to retain a significant percentage of

its original features (even to this day). The release phase is imperative to understanding why buildings can become divorced from their context, because they are unable to absorb change-disturbance, leading to future degradation and irrelevance. However, in the case of House Boeschoten, the building's inherent resilience has, for the most part, been able to endure each release phase without losing any significant degree of the building's architectural integrity. This was achieved through compromise within the interior, succumbing to the need for programmatic change.

The final phase in the adaptive cycle is the reorganisation phase. House Boeschoten was able to transition easily between successive owners and new programmatic requirements in its innate ability to accommodate small incremental change in its interior by each new owner. The benefit in allowing for adaptation is that one can negotiate the degree of adaptation.

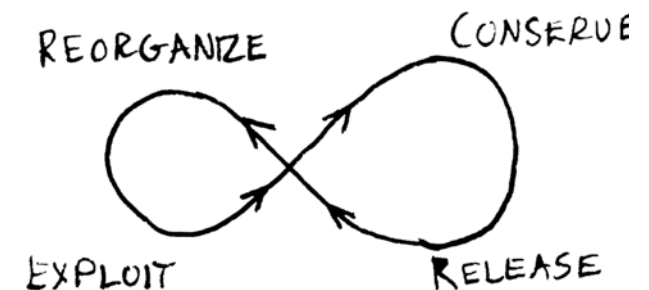


Figure 2: Adaptive cycle (Gunderson and Holling 2002:65)

## 2.4 Adaptive-Reuse Interior Architecture Strategy

Adaptive interior architecture (including reuse) comprises of adapting architecture and altering heritage. According to Kurtich & Eakin (1993:362), adaptive reuse is the injection of an entirely new function into the shell of an older building. The success of adaptive-reuse depends on the sensitivity of the interventional designer in integrating the older original elements with the newer required elements for changed use. The intervention ratio may comprise of mainly old fabric or new fabric, however, the distinction between the two must be succinct. Kurtich & Eakin note that, "The practitioner of interior architecture, trained to resolve contemporary problems while maintaining a respect for history, must exercise the vision and responsibility to recognize and protect architecture." (Kurtich & Eakin 1993:362). Protecting the existing is the most important consideration of adapting existing spaces. A clear understanding of what was and the intention thereof places the interventional designer in an informed position. There is a constant need to question what was, what is and what will be to ensure successful conservation.

### 2.4.1 Adaptive Architecture

In order to comprehend the concept of adaptive architecture, a clear distinction ought to be made between the respective concepts of the adaptable and the adaptive. All architecture is adaptable to some degree by manual means such as opening a window, however, adaptive architecture is concerned with buildings and spaces that are specifically designed

to adapt to inhabitants, the environment or objects (Schnädelbach 2010:2).

The mid-nineteenth century was the start of buildings being developed around the needs they were assessed to have by French restorer Voillet-le-Duc. By the 1950s, operational research became a norm in corporations, and finally building programmes were formalised within the discipline of interior architecture (Brand 1994:178). Soon, programmed spaces became ineffective because time changed the way buildings were used. This manner of change then led to design strategies such as adaptive design, which included scenario planning that involved listing a possibility of use function in order to prepare the design for other possible uses. Brand (1994:178) states "where a plan is based on prediction, a strategy is designed to encompass unforeseeable changing conditions.". By designing spaces based on a strategy, the process of change is far more controlled and the end goal of change is critically considered. The decision to following an adaptive strategy needs to be made in the early stages of design because this informs the kind of spaces that will be produced. Considering adaptivity as a strategy will result in a design that is fluid and flexible and negates the static. "If one wants to design a lovable space, a strategic decision needs to be made at the beginning. The design can take the high road towards beloved permanence, or the low road towards disposability." (Brand 1994:193). More expensive high road developments are much harder to adapt, because of issues such as materiality (Fig. 3&4). Low road architecture's maintenance is a responsibility bestowed onto the owners, allowing for the spaces to change and develop autonomously and organically.

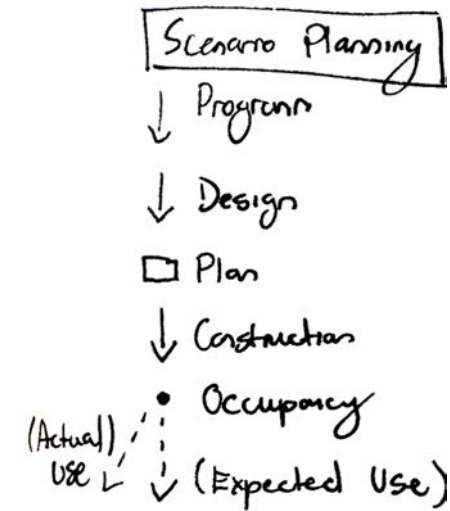


Figure 3: Incorrect Scenario Planning (Brand 1994:181)

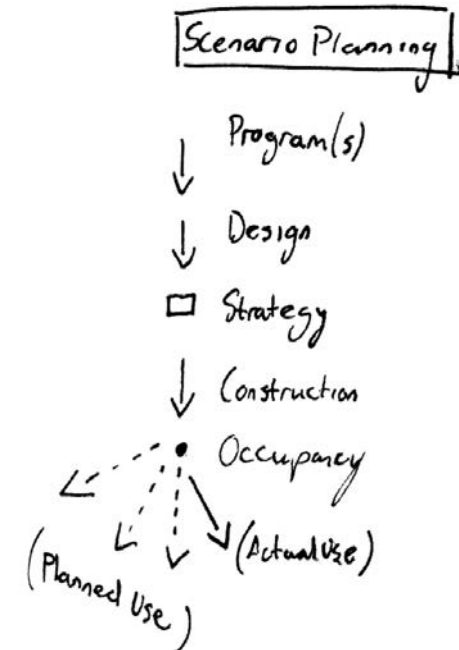


Figure 4: Correct Scenario Planning (Brand 1994:182)

## 2.4.2 The Alteration of Heritage

Scott (2008:17) builds a case for altering architecture because of the alteration's ability to act as a mediator between preservation and demolition. Regardless of the building's age, location or intention, all buildings suffer the fate of either remaining unchanged, alteration or demolition" (Scott 2008:1). In the past, demolishing would have seemed to be an enticing option, due to the promise of a new building, however people inhabiting a space leave a cultural or some level of heritage imprint of themselves, making it crucial to retain a buildings narrative and memory. House Boeschoten is an example due to its historical nature. Any application for the alteration to House Boeschoten should be according to The Burra Charter (ICOMOS 2013) following one or more of the intervention approaches: restoration, preservation and conservation.

Restoration refers to the act of identifying the style and period of a given architecture in order to match its materiality, and renew it. Preservation aims to retain the building in its state of decay, in order to visually represent its memory. Lastly, conservation aims to restore the building's use by altering certain aspects of the building in order to support a new function.

Over and above the types of alteration, the degree of the alteration is equally as important to the sensitivity of the project. Scott (2008:92) suggests, "In the question of degree of intervention, one might say that there are two different categories of alteration, surface and spatial.". Surface prompts considerations of colour and materiality, while space scrutinises configuration. Scott (2008:95) says, "At its most simple,

the alterations will involve either enlarging or subdividing the existing spaces, sometimes combining two or more spaces together". Finally, the interventional designer is equipped with a process of intervening: stripping back, making good, and enabling works. According to Scott (2008:108), stripping back, as referred to earlier, entails the stripping away of rotted fabric. Making good refers to the replacement and repair of fabric, while, enabling refers to the process of removing fabric that could hinder the process of making good.

### Burra Charter

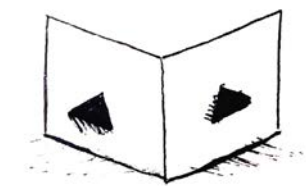
The Burra Charter (ICOMOS 2013) provides guidelines for conservation by listing principles and processes to guide the process. This study is concerned with methods of adaptive-reuse, as described by the Charter, as this provides a method of conservation. ICOMOS (2013:2) states adaptation as changing a place to suit the existing use or proposed use." The Burra

Charter mentions a number of conservation principles applicable to this study, such as conservation management, a cautious approach, knowledge, skills, techniques, and values. Figure 8 illustrates the conservation process, including the processes that directly apply to the conservation of House Boeschoten. The Burra Charter stipulates that adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place, moreover it should involve minimal change to significant fabric, achieved only after considering alternatives (ICOMOS 2013:27). New work is a process that will be used in conjunction with adaptation to House Boeschoten because of the opportunity to densify the site. In addition, the conservation process must be accompanied by a thorough documentation of the site, which is then followed by a statement of significance that identifies tangible and intangible significance. Thus, the application of the principles of the Burra Charter are essential for identifying precious heritage fabric.



Space

Space alteration entails enlarging, subdividing or merging two or more spaces.



Surface

Surface alteration involves dealing with the skin. This can be done through restoring the skin or preserving it.

Figure 5: Degrees of Alteration (Scott 2008:92)

Figure 6: Degrees of Alteration (Scott 2008:92)

## Intervention, insertion and installation

Brooker & Stone (2004:125) advocate for an approach to alteration that promotes a sympathetic and symbolic relationship between the old and new based on an analysis of the existing infustrature. The importance of reuse in altering interior architecture is that it celebrates continuity of the building's embodied patina of its previous purposes. The relationship between old and new, past memory and future memory, is dependent on how the strategies of alteration are understood and applied uniquely by the interventional designer. Brooker & Stone (2004:79) introduce three strategies that can be applied to works of alteration: intervention, insertion and installation (Figure 9).

Intervention provides a sensitive approach to alteration, in which the old and the new become one (Brooker & Stone 2004:79). Insertion is an alteration that exists independently from the original, however, inspiration is drawn from the original fabric (Brooker & Stone 2004:127). Installation involves the existence of an alteration that is isolated from the original, however

tangentially this may be related through concept (Brooker & Stone 2004:127). It is further argued that the memory of a building lies within its original use, as well as an understanding of its identity and relationship with the surrounding context. The intervention acts as a catalyst for the original narrative of the building to be told in a new way, through its alteration (Brooker & Stone 2004:127).

### 2.4.3 The Adaptive Re-use of House Boeschoten

Reuse refers to the re-design of a historical building as a response to change in accordance with a predetermined end. Subsequently, a combination of adaptive architecture and the considerate alteration of historical assets are referred to as adaptive reuse. House Boeschoten is a historical building, thus the strategy of adaptive-ness is that of adaptive-reuse. Resilience theory, as discussed (c.f. 2.2), explains why buildings are exposed to disturbances, including how the adaptive cycle can be applied to a building

in order to generate its resilience. Adaptive-reuse is therefore a strategy used to achieve change continuously, as the building enters its release and reorganisation phases.

## 2.5 Contingency as a Theoretical Outcome

Contingency is present in the production of architecture, as well as in architecture as a profession. Contingency is both a theory and state that encourages architecture to reach an appropriate level of impermanence. Architecture is dependent on other factors and practices at every stage leading to occupancy. Architecture has neither the luxury of solitude, nor the precision of standard methods, or a stable epistemology (Till 2009:45). Jencks (1980:76) states that "architecture is irreducibly plural, an unstable hybrid based partly on codes external to itself, making use of other practices such as engineering and sociology, etc., in unique combination."



Figure 7: Process of alteration (Scott 2008:108)



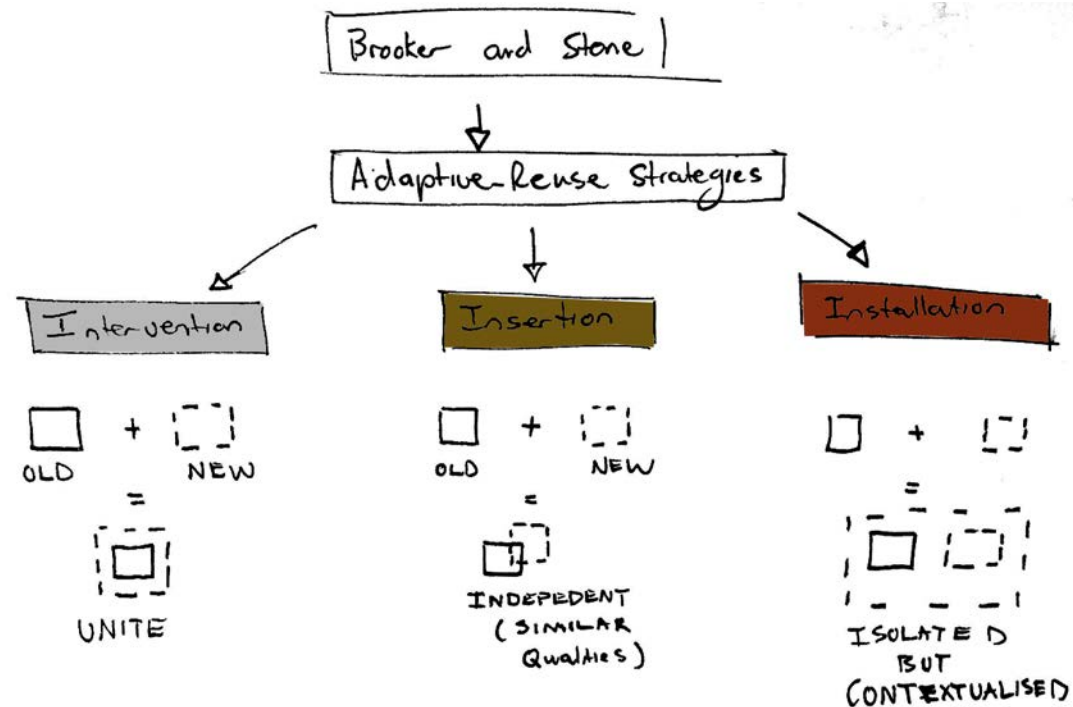
Figure 8: Burra Charter summary (ICOMOS 2013:2)

## 2.5.1 Modernism and the conception of space-time

Early modernist practitioners and theorist of architecture were informed by many ideals that were expressed in Vitruvius' philosophies, such as those expressed in 'Ten Books on Architecture'. Many of these ideals, almost rules, are said by Cinar (2014:1132) to be an act of imposing order, reducing architecture to a mere series of requirements to fulfill, producing an artifact as Vitruvius suggests. The inception of time as a consideration for architecture was the birth of contingency in architecture, becoming apparent in Western architecture during the Modernist movement when architects such as Le Corbusier were influenced by the theory of relativity and cubism, which informed their explorations of space-time. According to Kurtich & Eakin (1993:131) space-time, the 4th dimension, is composed of occurrences or events, which are those things happening to someone at a given place and at a given time.

At the conception of the Modern Movement, Le Corbusier issued a manifesto "the five points of a new architecture" in which he produced constructions in space-time (Gideon 1954:139). Space-time is the concept of unity of parts, as evident in the design of Villa Savoye, where inside-outside space were viewed as complete when viewed from any point on the site, suggesting a view of the whole. People constantly experience in different ways, thus Le Corbusier aimed to control that experience by removing ambiguity from the way we perceive space. Producing facades that display a similar language is a method of controlling perception. The modernist approach to the instability of

Figure 9: Brooker & Stone's strategies for alteration (Brooker & Stone 2004:79)



time was to attempt to master large parts of it. The strategy led to three distinctive approaches: the first was to deny time, the second was to proclaim architecture's role to express timelessness, and lastly, to accept time as a passing condition that could be withstood. The focus was on producing art, possibly refuting the influences of time.

## 2.5.2 Contingency and the reversal to time-space

Contingency as mentioned and developed by Till (2009), however, interchanges the idea of space-time, reading time-space, in order to focus on the conditions that time brings

to bear on architecture. Time creates tension between itself and the linear considerations of architecture, but responding positively to cyclical and paradoxical considerations. Architecture needs to allow for the diverse temporal events of time to coexist, where coexistence must not only include the diversity of events, but the potential of these even to occur, as an added layer of consideration. The argument for contingency by Till (2009:96) is that time, not space, should be seen as the primary context in which architecture is conceived. Thus, Till (2009:96) arrives at a conception of temporalised space, space 'full of' time - rather than spatialised time.

### 2.5.3 Contingency, architectural output

The objective of the architectural concept of contingency, is to lead to the production of architecture that can be deemed provisional. A criteria must be put in place in order to test the presence of contingency. The three constraints of time identified by Till (2009:135) are a way to test the susceptibility of architecture to time and change: functions, tectonics, and aesthetics. Function is identified through examining and determining the complexities of use. Tectonics refers to the essentials of construction. Aesthetics exists in the maintenance of taste (Till 2009:135). Tectonics, functionality, and aesthetics are crucial constraints to this study, considering the intention for House Boeschoten to accommodate several programmes over time. This will influence the approach the continual adaptive-reuse strategy. Ultimately, its adaptive capabilities will classify it contingent or not.

### 2.5.4 Contingency and House Boeschoten

The resulting output of the re-designed House Boeschoten should be a building that is architecturally contingent in its nature when subject to change. In order to support programmatic changes, the structure should readily support alterations to the interior. The criterion for contingency should be its susceptibility to change.

### 2.6 Conclusion

In this chapter, the theories of resilience, adaptive-reuse and contingency were investigated

and synthesised into a single strategy to be applied to House Boeschoten. The rationale for doing so is to ensure the building's ability to respond to and manage an ongoing cycle of programmatic change. In this regard, the inherent resilience of House Boeschoten was proven. Thus, it is concluded that by ensuring resilience through a combination of the identification, as well as introduction of architectural elements that are adaptable, the result will be a building that is able to survive and adapt to future change.

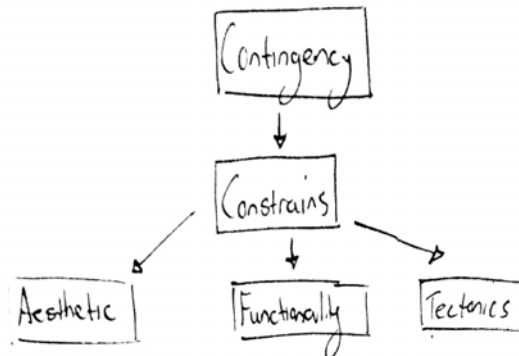


Figure 10: Contingency constrains (Till 2009:135)

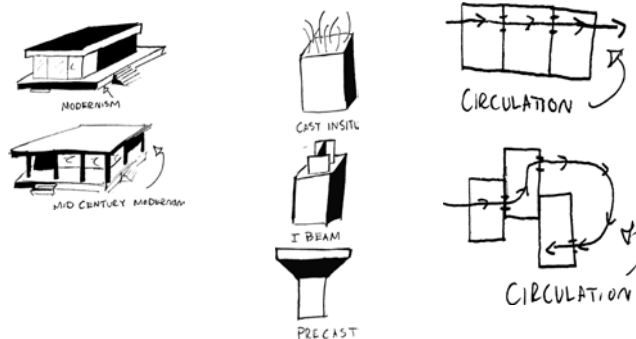


Figure 11: Contingency constrains illustrations (Till 2009:135)

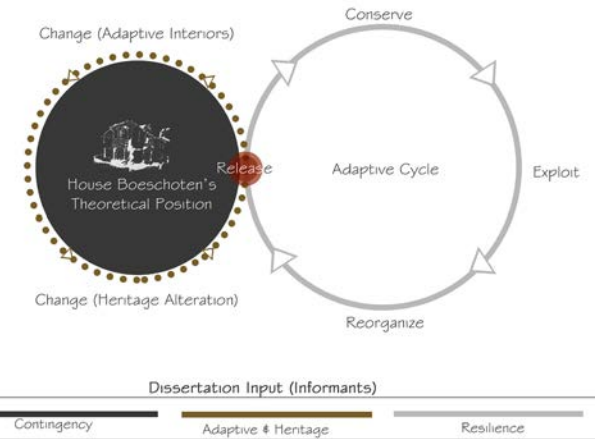


Figure 12: House Boeschoten theoretical position (Author 2018)

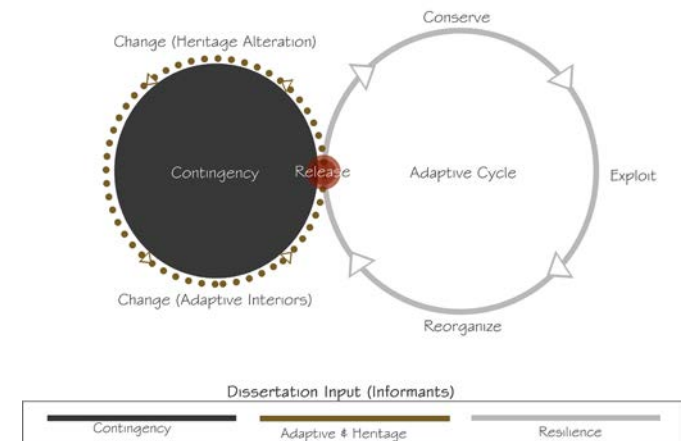


Figure 13: Theory synthesis (Author 2018)

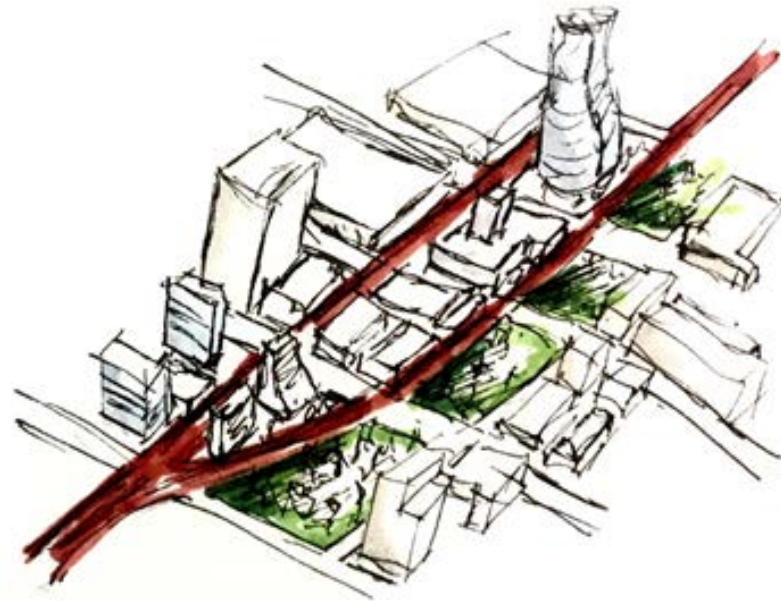




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## CHAPTER THREE: CONTEXT

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## Part 1: Context

### 3.1.1 Context Introduction

Chapter 3 is concerned with the analysis of the context of and the selected site. A thorough understanding of the urban characteristics, spatial qualities and historic aspects guide the identification of programmatic and design developments that will be undertaken. The historical development of the Sunnyside context, and the influences that the NZASM had on the area, are investigated.

A mapping of Sunnyside is conducted so as to understand the urban context. Thereafter, the site and building analysis is undertaken in an endeavour to highlight the heritage and cultural significance of House Boeschoten. This section is concluded with a statement of significance, thereby establishing heritage design guidelines for alteration. Finally, systems thinking is performed to identify an appropriate programme.

### 3.1.2 Historical Development

A significant number of NZASM houses, originally built for high-ranking employees, are located in Sunnyside, east of Pretoria central. In 1887, NZASM was established in the Transvaal (De Jong 1990:53). The NZASM construction department designed most of the residences towards the south of the Pretoria station in the area known as Salvokop. The high-ranking officials felt that they deserved much larger houses, which were located east of the Pretoria Train Station. While these houses exhibit certain characteristics of the NZASM

house typologies, these houses were individually designed. House Boeschoten, the site identified for this dissertation, is an example of the custom NZASM typology. The Boer surrendered and lost to the British in 1902, which resulted in the properties that were owned by the NZASM being seized by the British (De Jong 1990:55). According to Nicholas Clarke (2018), a heritage consultant well immersed in Pretoria's heritage, this is further evidence that House Boeschoten was a building that was part of the NZASM portfolio. The site is located on what was the Harmonie Estate, which was home to a number of families, such as the van Warmelo family, in 1889. Thereafter, the estate was occupied by The Harmony Ladies' Residence of the Normal College in 1899 (Brandt 1913:54). According to Clarke (2018), from 1902, after the Anglo-Boer war, the building was occupied by the Van Boeschoten family. The family was quite well-known in Pretoria because JC van Boeschoten was the second mayor for the town from 1908 to 1911. The house was generally referred to as House Boeschoten in conversation, as it was seen as a landmark. In 1937, the last remaining member of the family passed away (Brandt 1913:54). The site was later occupied by the Pretoria College of Education and the house was utilised as offices. When the college moved to Groenkloof Campus in 1996, the house became vacant and was subject to vandalism. In 1997 the building became part of the Oost-Eind Primary School. Currently, it houses the Phomolong Centre pre-school and after-care centre.

Figure 14 tracks the evolution of House Boeschoten and Sunnyside, by cross-referencing to the political climate of Pretoria, and its

effect on the changes of the context. The changes are cyclical, and are assessed according to the theory of adaptive cycling (c.f. 2.3). The release and reorganization phases are the most important, having led to the most change in the interior of House Boeschoten.

### Building Architectural Style and Housing Typology

There were four NZASM housing typologies allotted according to the status of the employee (Clarke et al. 2006:10). Housing Type A were twelve room dormitory type houses for single employees, while the type A1 had eight rooms, but was fairly similar to Type A (Clarke et al. 2006:10). Figure 3 illustrates Type B and B1 houses were semi-detached double cottages for workers with families, similar to the larger type C and C1 houses (Bakker et al. 2014:119). Houses towards the east of Pretoria Station, close to the Apies River, were designed for employees of status, e.g. managers, they were given custom designed homesteads.

The Wilhelmiens architectural style describes the influence NZASM typology during the ZA period. House Boeschoten is two-storeys high, with a one-metre high sandstone plinth. Flat pitched gables are used to frame the balconies and semi-circular archways are used for the entrances and thresholds. The eastern facade has a veranda, which acts as a secondary entrance into the house. The windows are framed with highly decorative trims and the triangular gable roofs include cavities holding ventilation grilles, which were typical of NZASM Houses.

### 3.1.3 Historical Timeline`

The timeline (Fig . 14) illustrates the develop-

## Historical Timeline of Context

ment of the area currently known as Sunnyside. The timeline simultaneously tracks the evolution of House Boeschoten and its change of use. The objectives of the timelines are to:

- illustrate the development of the immediate context;
- show the change in House Boeschoten's occupancy and function; and
- identify the critical release phases that lead to change on a context and site scales.

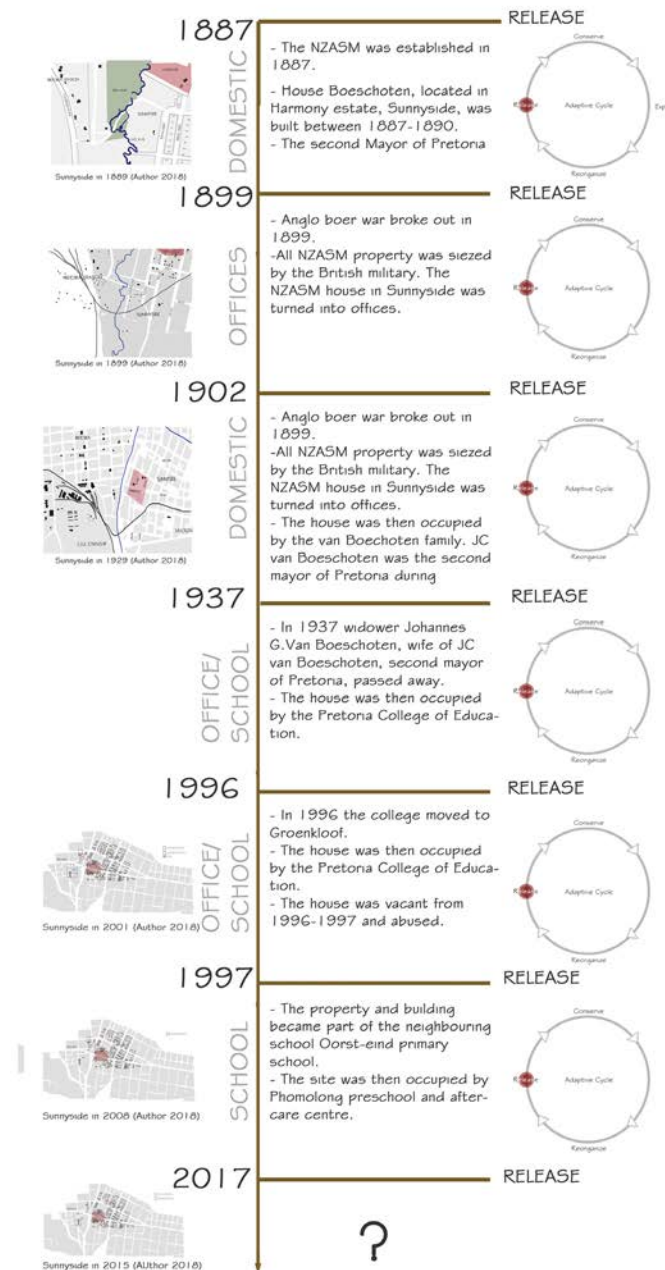


Figure 14: Historical timeline (Author 2018)

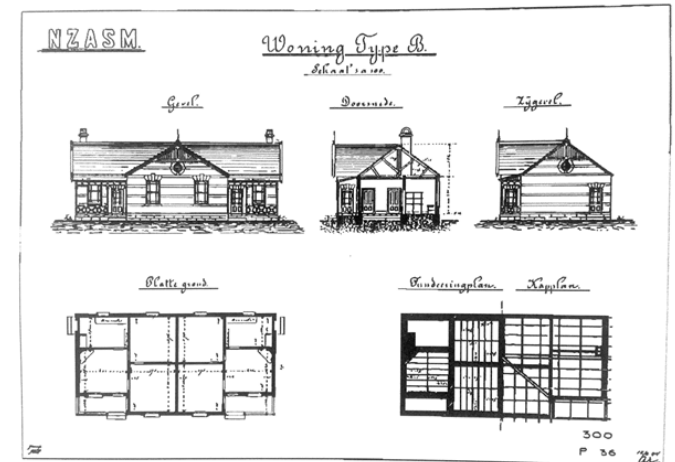


Figure 15: Plan and elevation of Type B semi-detached cottage, NZASM dated 12 June 1894 (De Jong 1990:56)

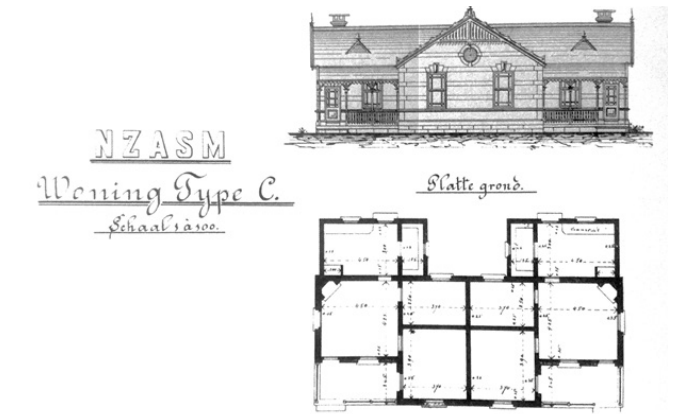


Figure 16: Plan and elevation of Type C semi-detached cottage, NZASM (De Jong 1988)

### 3.1.3 General Site Mapping

- Operational Buildings in Pretoria

Chapter 1 introduced the current urban condition of Sunnyside, immediately around House Boeschoten, which included a series of 'dead pockets', characterised by buildings that are underutilised, dormant and on the brink of complete ruin. In relation to this, mapping commences on a macro-scale. The information gathered is crucial in understanding the extent to which buildings are vacant and/or abandoned. The result of the mapping shows that the majority of vacant buildings are located in central Pretoria, while Sunnyside is more vibrant, with the majority of its buildings currently utilised. The concern in Sunnyside arises where high to medium density buildings are heavily utilised and increasingly being constructed. The low density houses are either abandoned or are underutilised and replaced with high rise apartments.



Figure 17: Map of heritage buildings in Pretoria CBD: operational to abandoned (Heritage Congress Mapping Workshop: Edited Neda (2011:5), edited by (Author 2018)

• City Densification Map

Densification and compaction is a strategy developed by the City of Tshwane as a solution to the influx of abandoned buildings. Figure 7 is the mapping of the area identified for high and low-level density. House Boeschoten falls within the education block. An assumption can be made that the sites that fall within the education block will become medium to high-density buildings in order to serve the residential demand for education. The densification strategy has been underway towards the northern side of Sunnyside since 2015, and is slowly moving down towards the South (Fig. 18).

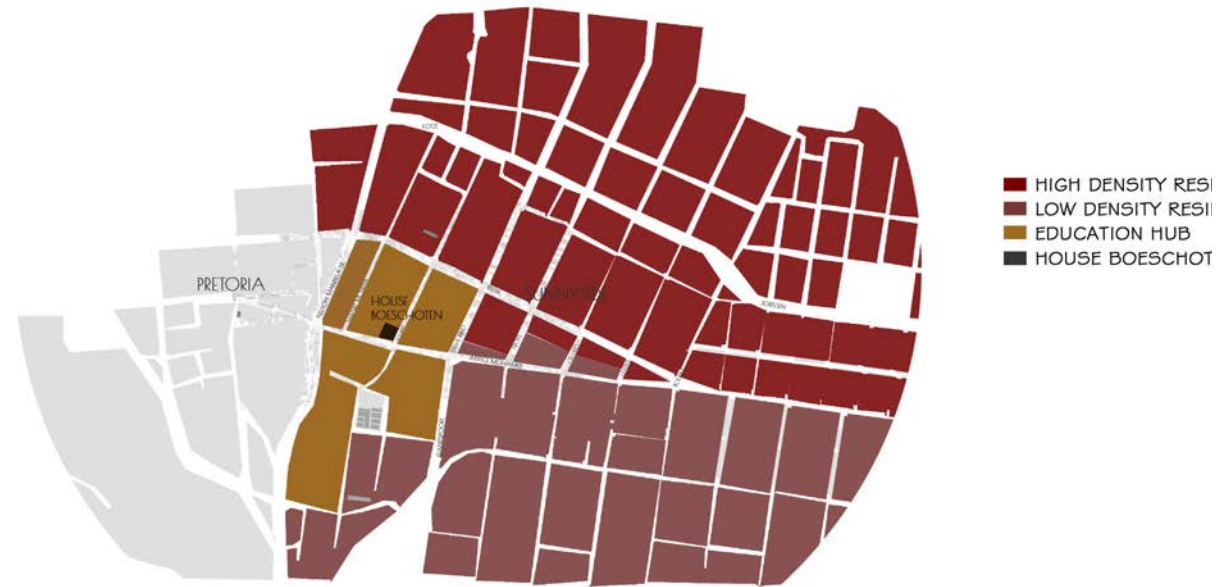


Figure 18: Density Map (South Africa 2005)

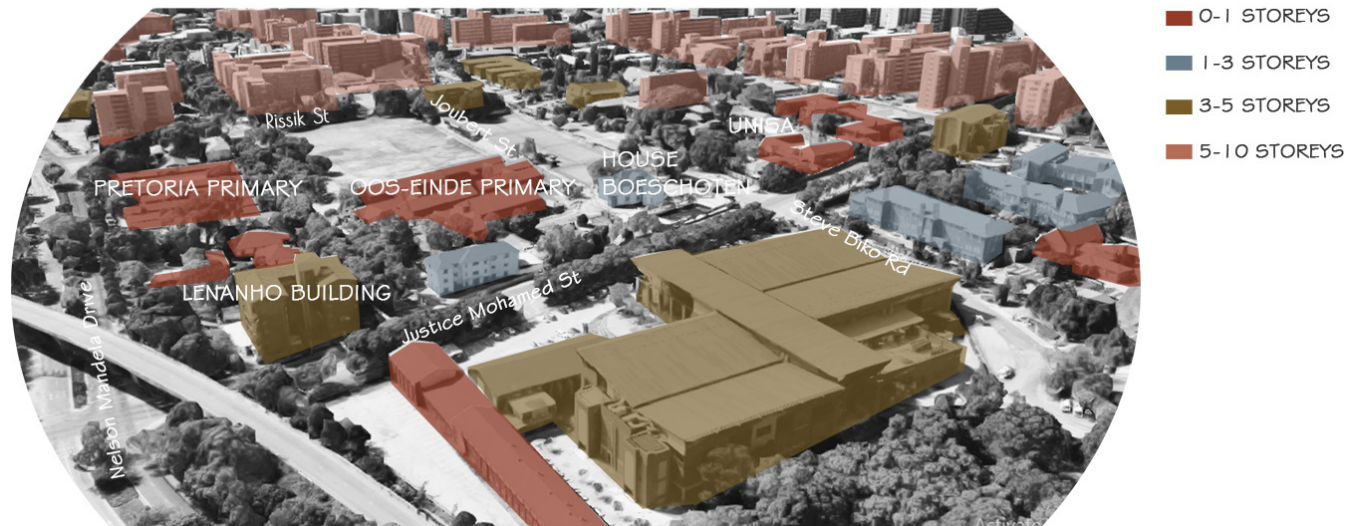


Figure 19: Existing Building Heights (Author 2018)

• Transport and Accessibility

Transport and accessibility is an important aspect of planning for the site. The predominant type of transport, as well as the access it has to the site, influences the way that the site is used. It is noteworthy that this at times goes against the original intention. The majority of the permanent and transitory users of the education block commute in and out by foot. The second highest means of transport is by taxi and private car, followed by busses (Fig.20). House Boeschoten is located on the corner of a main road, Justice Mohamed Street, which flows one-way from East to West. The importance of gearing the education block towards pedestrianisation is supported by the statistics highlighted in Fig. 9. Therefore, it follows that the main entrance to House Boeschoten must be reoriented to the South, to support the pedestrian movement from that direction.

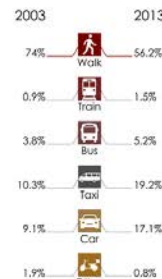
• Typologies and Programmes

Investigating further on the typologies and programmes that are currently occupying the immediate context, provides further clarity as to the effects of densification. The core block is a potential precinct for education. The block has tertiary, primary and pre-primary schools all in a 500m radius. Residential units occupy Sunnyside as one moves out from the education block. The majority of the commercial and mixed-use developments and activities take place towards the North-East of Sunnyside. The residents in close proximity to the education block voiced their concern in this regard, calling for an increase in schooling in lieu of residences. There exists an opportunity to expand the current schools as a part of

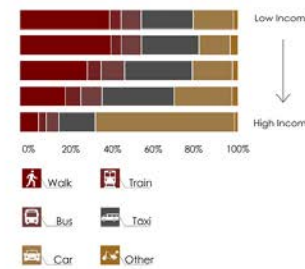
the density and compaction strategy, House Boeschoten being one of the primary sites to expand.



PUBLIC TRANSPORT SPLIT TSHWANE TO SCHOOLS IN TSHWANE



MAIN MODE OF TRANSPORT IN COMPARISON TO INCOME BRACKET



PUBLIC TRANSPORT SPLIT TRAVELING TO TSHWANE

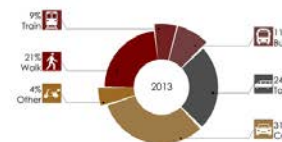


Figure 20: Transport and Accessibility (Author 2018)

- Climate Study: Solar Study & Thermal Comfort

Thermal comfort and sun infiltration contribute to the efficiency of a building, which in turn affects how the inhabitants feel within a given space. Figure 22 illustrates the temperatures of the building during each of the season, expressed by the solar study. The building performs well in the summertime, the thick walls and shading provided by the tree on the Northern face provide sufficient insulation. The building is, however, extremely cold during the cooler seasons, dropping to below freezing during the winter months. The lack of sun penetration during the winter months is the result of both the building's orientation, and the tree that envelops the majority of the building. The summer months receive the most sun because it rises from the South East and sets in the North West. The tree provides less protection on the eastern and western facades.

- Urban Elements: Site Analysis

The site analysis consider aspects that will later inform the design development:

**Built Form, function and orientation:**

House Boeschoten is surrounded by a number of educational facilities. The Eastern and Southern side belong to The University of South Africa (UNISA). The Western side, sharing the same stand as House Boeschoten Erf 1267, belongs to Oost Eind Primary School (refer to Figure 23). Although the buildings are separated by a boundary fence, the primary school owns the entire stand. The far west is occupied by Pretoria Secondary School. The orientation in relation to the street of House Boeschoten

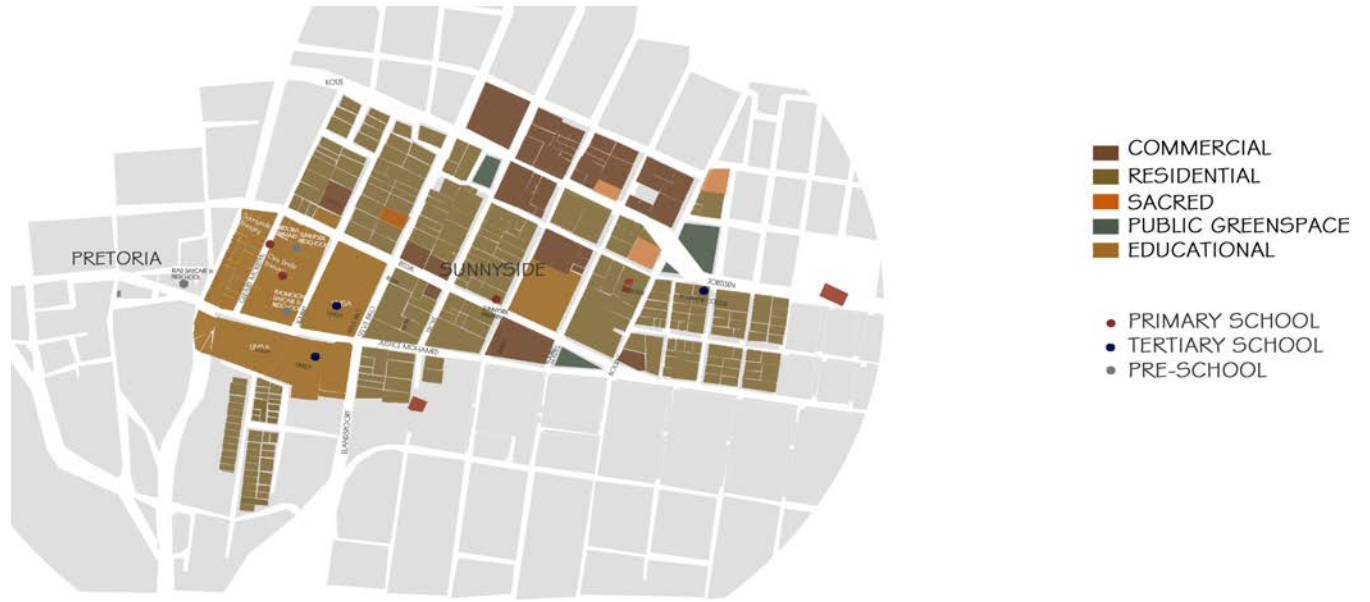


Figure 21: Typologies and Programmes (Author 2018)

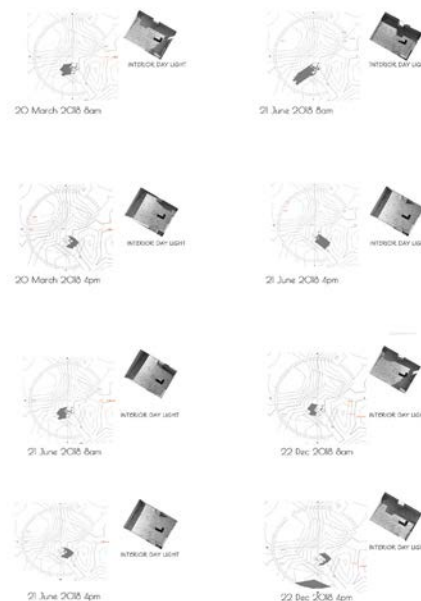


Figure 22: Solar study (Author 2018)

makes it difficult to find the original entrance of the site. The entrance is on the north façade, however, access is only possible from the South Western end of the site. A change in orientation must be made by repositioning the entrance to the building or repositioning the main entrance onto the site.

### Landscape, topography, Connections and views:

The topography of the site slopes excessively towards the West (refer to figure 23). There is one tree close to the Northern side of house Boeschoten that was planted when the building was constructed. The only other vegetation is at the West end of the house, which is a small vegetable garden. The rest of the trees are found on all the pedestrian paths and sidewalks. A massive field occupies some of the House Boeschoten site, and most of the Oost Eind Primary School site, towards the North. There is a direct connection between the primary school and House Boeschoten, on the west boundary of House Boeschoten. The gate allows access from one property to the other, due to the land being owned by Oost Eind Primary School.



Figure 23: Site Plan (Author 2018)



• Urban Elements: Street Conditions

**Paths:**

The sidewalks throughout the block are in good condition, however, the width ought to be increased in order to support the cyclical influx of people (Fig. 26). Trees are located every  $\pm 10m$ , which improves the condition of the sidewalks for the pedestrians. A pedestrian crossing is present but ineffective from UNI-SA south campus to the corner of Joubert & Justice Mohamed, because access is private and only available from the central core of the campuses (Fig. 28). In order to slow traffic down on Justice Mohamed Street, a change in texture or traffic ought to be installed in order to support the pedestrian crossing in Figure 27.

**Districts:**

The education block (precinct) starts from Steve Biko Road and ends on Nelson Mandela Drive (Fig. 24).

**Node:**

An informal transport node exists on the southern corner of Joubert Street & Justice Mohamed Street (Fig.27). The node needs to be formalised for safety, as most pedestrians will enter House Boeschoten by foot from that point.

**Landmarks:**

Legible signage is required on Joubert Street in order to simplify the way finding for the users of the House Boeschoten site. Signage can be in the form of printed banner or painted information on the boundary wall that is visible from Justice Mohamed Street (Fig. 26).



Landmark: bridge acts as a landmark and is a meeting point. The corner under the bridge is popular. It provides a higher level of privacy.

Path: pedestrian path width is ideal for a made rode

Node: Transit point required in order to support the users during peak times. Continuity can be broken by adding a small bus station or taxi stop.

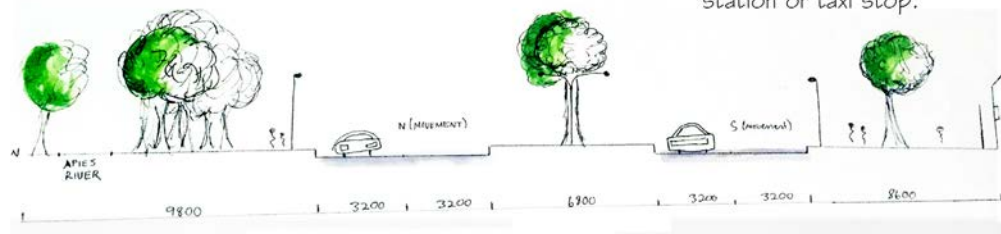


Figure 24: Nelson Mandela street condition north (Author 2018)



Landmark: 3 storey corner building refereed to be pedestrians for orientation

Path: trees improve street condition by proving shade for people and cars.

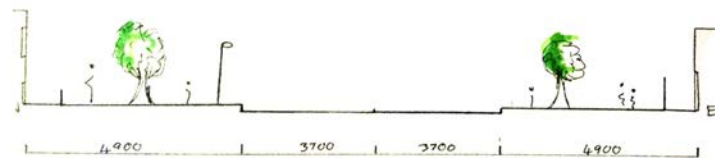
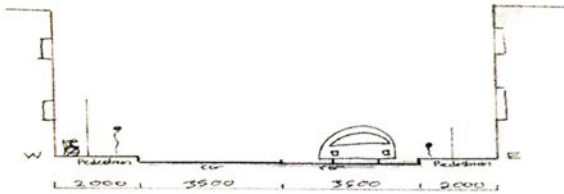


Figure 25: Gerard Moerdyk street condition north (Author 2018)



Path: pedestrian path too small for people to walk on. Large crows move through the space during peak times.

District: identifies as an education precinct.



### JOUBERT ROAD NORTH

Figure 26: Joubert road condition north (Author 2018)



Edge boundary palisade fence transparency improves visual scope.

Path: informal trade takes place on the pedestrian path.

Node: informal transport node because no formal node has been provided for taxis.

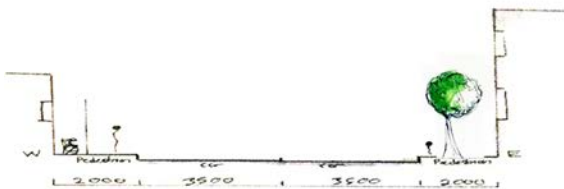


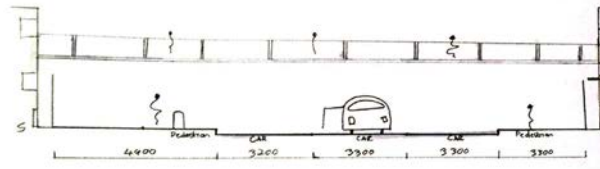
Figure 27: Joubert road condition south (Author 2018)



Path: pedestrian path overhead on bridge.

Edge: boundary wall is closing people visual scope off from the interior.

Path: Street is a one way to the west.



### JUSTICE MOHAMED STREET WEST

Figure 28: Justice Mohamed street west (Author 2018)

### 3.1.4 Documentation and Analysis: House Boeschoten & Similar Typologies

The first aspect of documenting House Boeschoten involves analysing the original function of the building, and how the rooms were utilised. Very little information exists on the intended use of the building, thus a comparative study of similar typologies is the correct way to substantiate certain assumptions. Figure 29 enables an analysis of the various NZASM typologies in terms of their existence within the immediate context.

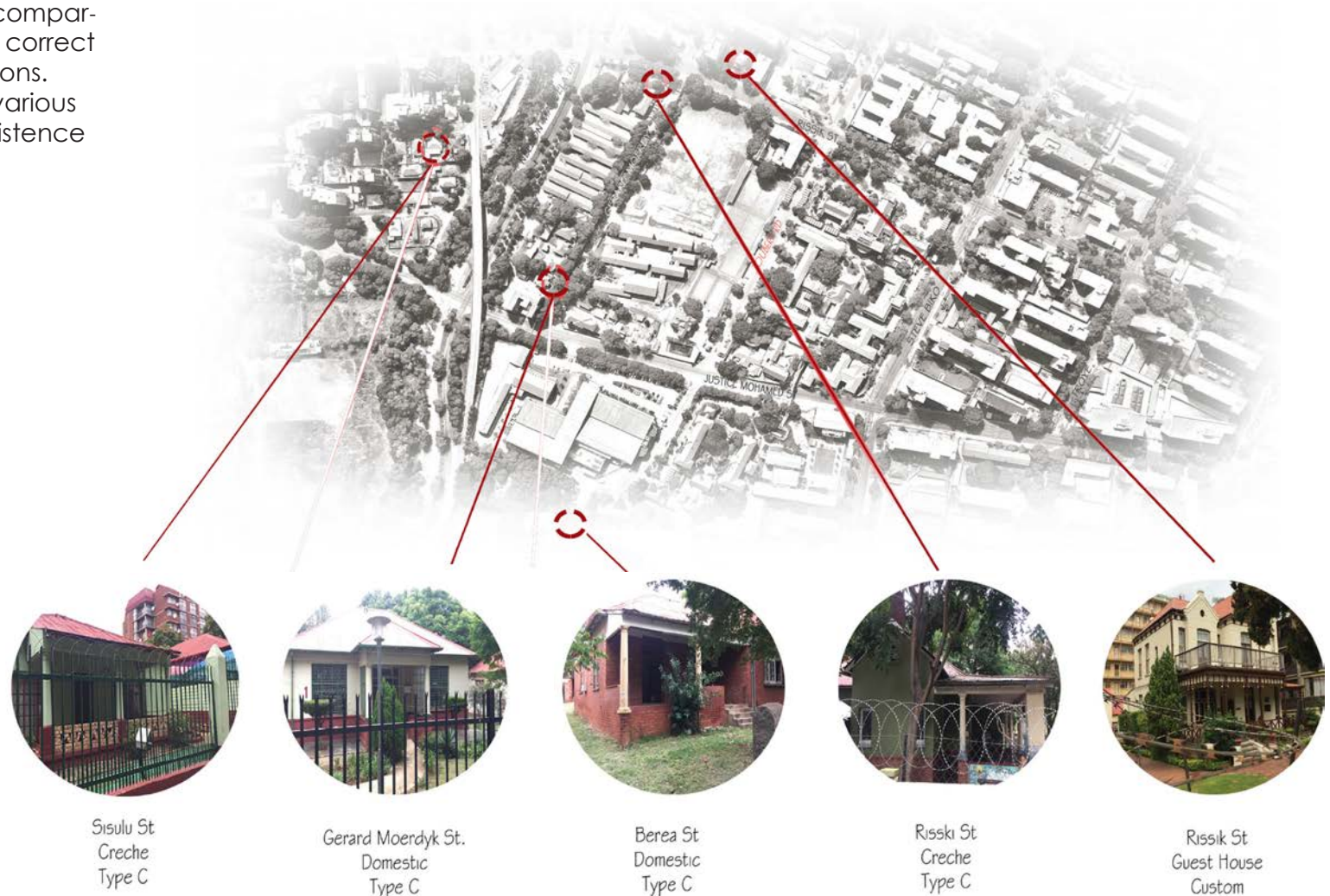


Figure 28: NZASM typologies within Sunnyside (Author 2018)

### 3.1.5 Documentation and Analysis: Interior Analysis and Materiality

The analysis of a heritage interior differs from a typical interior analysis. The analysis is concerned with differentiating the original precious fabric from the altered fabric (Fig 31,32,33). The figures below analyse House Boeschoten's original and precious fabric, both surface and spatially. An analysis is also conducted on materiality and how that is expressed through the furniture, fixtures and equipment.



Figure 29: House Boeschoten's Original Layout (Author 2018)



Figure 30: Ground Floor Interior Analysis (Author 2018)



Figure 30: First Floor Interior Analysis (Author 2018)



Entrance: The floor tiles, door and light are original. The original copper light switches were stolen and replaced with plastic fittings.



Foyer: The floor and staircase have been altered. Parts of the kiaat staircase are original as well as parts of the Oregon pine floor are originals. The decorative ceiling



Room 1: The double doors through the house have been removed. The door frames and decorative trims remain.



Bathroom 1: The sanitary ware has been replaced. The wall and floor tiles remain the original.



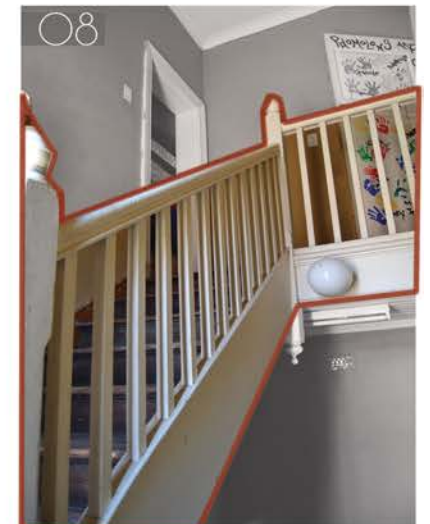
Room 5: The BIC that separates the two rooms is the original. The doors were stolen.  
**Figure 31: Interior Analysis (Author 2018)**



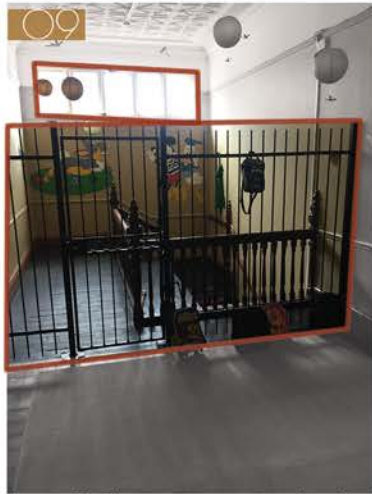
Kitchen 2: The floor walls and ceilings remain in their original fabric. The window pelmets are original through the house.



Room 2: The door from room 2 to 3 was replaced with a security gate in order to isolate the office.



Staircase 2: Original staircase has been painted however stripping back can restore the original fabric.



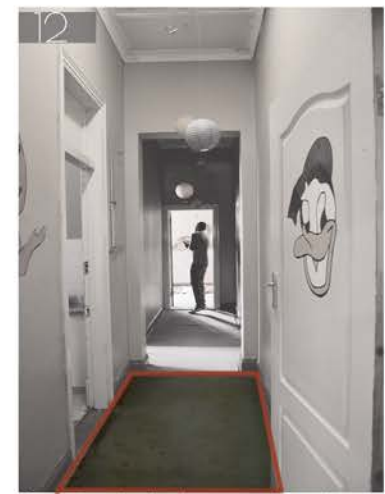
Foyer 3: The window and ceiling finishes remain the original. The security gates were added later on.



Staircase: The staircase is a combination of the original balustrades with alterations to the missing connections. The tread, rise and landings have been painted.



Room 8&9: The room have retained all of their original elements. Room 8 leads out to the terrace.



Corridor: little alteration have been made to the corridors besides the treatment of the floors. The original floor can be restored.



Staircase 2: Its worth noting the storage under both staircases remains unchanged..




Terrace South: The terrace towards the Southern side has been altered. Burglar bars have been added. The original floor finish remains.




Room 16: The room remains unchanged. It is the only room with a slight bevel for an internal BIC.



Kitchen 5: The kitchen original cupboards have been removed and replaces with stainless steel work tops. The plumbing has been altered to support the change.

 Surface Alteration:  
Action: To be stripped back  
then altered as necessary.

 Original Fabric:  
Action: To be restored and  
preserved.

## I. MATERIALITY



**Floor Tiles:**  
Original tiles are  
located in the  
entrance on the  
north facade.



**Suspended Wooden  
Floor:**  
Oregon pine floor  
has been used to  
repair the missing  
planks.



**Suspended Wooden  
Floor:**  
The wooden floors  
on the staircase  
have been replaced  
and stained black.



**Concrete Floor:**  
Original concrete  
floors are located  
in the kitchens  
and bathrooms..



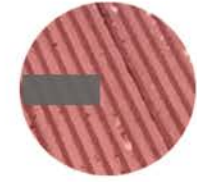
**Plastered Walls:**  
Plastered exterior  
walls have been  
repainted on multi-  
ple occasions.



**Plastered Walls:**  
Interior walls have  
been repainted  
from white to a  
beige hue.



**Sandstone Walls:**  
The sandstone used  
to erect the plinth is  
kept from the original  
structure.



**Roof:**  
Original corrugat-  
ed iron roof..

## 2. WINDOWS & DOOR TYPES



**Window 1:**  
Original triple side  
hung sash window on  
the western and  
eastern facade.



**Window 2:**  
Original vertical slid-  
ing window on the  
hexagonal facades,  
western and eastern  
facade.



**Window 3:**  
Original top hung  
awning window on all  
facades.



**Window 4:**  
Original fixed window  
on eastern facades.



**Window 5:**  
Original top hung  
awning window with  
internal burglar  
bars on all facades.



**Window 6:**  
Altered Side hung sash  
window on the north  
facade. A new window  
was installed to replace  
the damaged.



**Door 1:**  
Semi hollow core  
panel door. All the  
original hardwood  
doors were stolen  
and replaced with  
the panel doors.



**Door 2:**  
Original  
hardwood door.

Figure 32: Materiality (Author 2018)



### 3. DECORATIVE ELEMENTS



**Balustrade 1:**  
The staircase has been altered. Parts of the balustrade is the original *kiat* turned timber.



**Skirting:**  
The skirting is the original solid *meranti*.



**Ceiling:**  
The ceilings throughout are the original decorative timber panels.



**Pillars:**  
The turned timber pillars are from apart of the original structure.



**Window Frames & Pelmet:**  
The beading around the windows are original, including the pelmet..



**Door Frames:**  
The beading around the doors are original, including the pelmet..

### 4. SANITARY & KITCHEN FIXTURES



**Basins:**  
The basins through the house have been replaced including the mixers.



**WC:**  
The water closets have been replaced throughout the house.



**Bath:**  
The original baths have been replaced throughout the house.



**Sink:**  
All kitchen sinks have been replaced with intergated kitchen sink tops.

### 5. LIGHTING FIXTURES & ELETRICAL FITTINGS



**Interior Ceiling Fixture:**  
Original suspended light fixture in the main entrance.



**Interior Ceiling Fixture:**  
Fluorescent tube have been placed in every room.



**Exterior Wall Fixture:**  
Outdoor wall lights were installed at a later stage.

### 3.1.6 Documentation and Analysis: Exterior Analysis

The exterior analysis of House Boeschoten follows the same blueprint as the interior analysis. The figures below place emphasis of the changes that have influenced the building's architectural style.



Figure 33: Exterior Elevations (Author 2018)

### 3.1.8 Introduction to Statement of Significance

The statement of heritage or cultural significance is a report that summarises the significance of a place, determined by the aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value (SAHRA 1999:9). The statement ought to be accompanied by supporting evidence, a thorough study of the place that unpacks the various values. According to the Australian Burra Charter (ICOMOS 2013:2) on conservation principles and processes, the cultural value is embodied in the place itself, its fabric setting, use, associations, meanings, records, related places and related objects.



#### 1. Architectural & Aesthetic Value

The roof is pitched with corrugated metal sheeting, and triangular vent grilles resembling the typical NZASM style. The combination of hipped and gable ends-gambrel roof-communicate the intention to remain true to the NZASM.



#### 2. Architectural & Aesthetic Value

The building was constructed in the late 1880s. It is over 60 years old and classified as heritage.

#### 7. Historical & Scientific Value

The sandstone plinth retains a level of archaeological importance because of its service as a plinth.





### 3. Architectural & Aesthetic Value

The decorative details on the terrace pillars possess a rarity that is associated to the NZASM style and era.

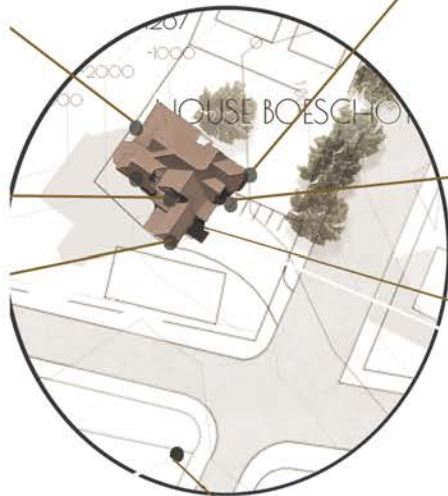


Sandstone loadbearing

1996 photo of staircase

### 4. Architectural & Aesthetic Value

The interior significance is characterized by the originality of the entrance that has remained untouched, as well as the semi altered staircase.



### 6. Social & Spiritual Value

The ephemeral programs that existed within the building serviced the community, and their needs.



Joists

Oregon Timber Flooring

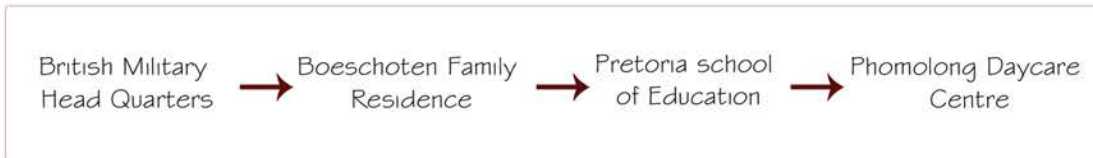
Brick non load bearing

Concrete columns and foundations

Suspended timber floor

### 6. Historical & Scientific Value

The tectonics and construction methods of the particular area are significant to our future research..



### 3.1.9 Legislative Context: Heritage Assessment, Grading and Management

Heritage assets are graded in order to determine who takes responsibility for the asset within the three-tier system for heritage resource management (SAHRA 1999:18). National level functions are the responsibility of SAHRA, provincial levels functions are the responsibility of provincial heritage resource authorities and local level functions are the responsibility of local authorities (Graph 1). Heritage assets can only be graded once it has been proven that they are part of the national estate because of the cultural or other special significance they hold (SAHRA 1999:14) House Boeschoten is considered part of the national estate due to the following:

- it demonstrates the principles characteristics of a particular class of South Africa and NZASM nature;
- it yields information that will contribute to the understanding of the historical context; and
- the building demonstrates a high degree of technical and creative achievement that is unique to the context.

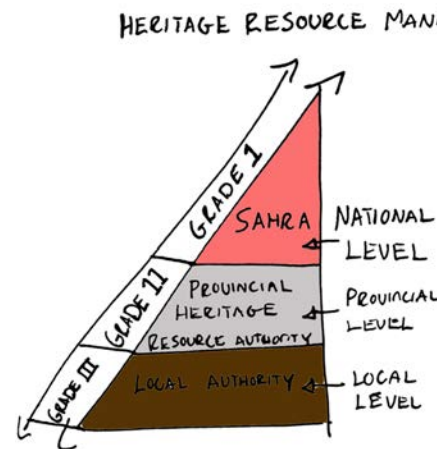
House Boeschoten is deemed to be a Grade 3B local heritage resource (HWC 2015:6). House Boeschoten is representative of the scarce NZASM typology. The building is not placed on the provincial heritage register, thus less stringent laws apply to the regulation of external alteration, and internal alteration need not be regulated. One of the goals of

this study is to assist in provincial registration.

### 3.1.10 Statement of Significance

#### Aesthetic & Architectural Value

- The house was constructed in the late 1800, during 1885-1887. The house is older than 60 years, and is automatically protected by the National Heritage Resource Act of 1999, however it is not listed on SAHRA.
- The building is classified as a Category 2, due to its significance to the province and region in which it is located.
- The physical features of the building are similar to that of the NZASM housing typologies, south of the Pretoria Station (Fig. 23 &26). The



Graph 1: Heritage Resource Assessment (Author 2018)

roof is pitched with sheet metal, triangulate ventilation grilles on the roof and a symmetrical façade. The European influences are evident in the terrace turned timber pillars and their decorative details. The windows and door frames are also decorative.

- All these physical features must be conserved because they are true and reminiscent of the original style, era and possess a precious rarity. All alteration work must seek to work with these aspects in order to celebrate their features. Restoration should be undertaken in the cases of degradation and ruin.

#### Historical & Scientific Value

- The building methods of the late 1800s are important to researchers of the period, as are an understanding of the tectonics and materiality such as sandstone used to construct the plinth; suspended timber floor; solid kiaat timber staircase; decorative skirting, frames, cornices and beading; thick interior and exterior walls; internal electrical wiring; and partially external plumbing (Fig. 34)

- The evidential value is retained in the plinth, which was used as a trench during the Anglo Boer War. The archeologically value must be retained.

#### Social & Spiritual Value

- House Boeschoten has played a part in the community's communal value. The occupants of the house from its inception, have played a part in the growth and evolution of the community. The Boeschoten family were responsible for the upkeep of Pretoria. The third

occupants, the Pretoria College of Education contributed to the education of the community. The current occupants run a day care centre that is home for many of the children within the Sunnyside community. The social value lies within the communal resilience that the build contributes to, through the ability to provide necessary service to the community.

### 3.1.9.2 Heritage Approach to the Site

- Conservation of the entire building will ensure the heritage and cultural significance is maintained. It also implied that the building will retain its relevance within the community through continued use.
- Adaptation will ensure that House Boeschoten will be able to support and adapt to a variety of predetermined function without impacting on significant aspects of the structure.
- Restoration in order to refurbish and repair significant aspects of the building.

### 3.1.9.3 Heritage Guidelines to the Site

- The original structure and architectural style and lexicons must be retained. All alteration must be an extension of the style; however, the addition of the new ought to be distinguishable.
- The original aesthetical features must be conserved however the altered aspects can be further altered, with sensitivity to the rest of

the building.

- All other aspects that have not been identified as precious fabric or significant can be altered in a way that does not affect the precious and original fabric, and is in keeping with the requirements of Grade 3B:
  - Electrical fixtures
  - Door handles
  - Door and wall decays
  - BICs
  - Remaining lighting fixtures

## Part 2: Arriving at Programme

### 3.2.1 Vision: Education Precinct

House Boeschoten lies in an education hub that serves the educational needs of the community, playing an important role in im-

proving the interface between institutions and the public. The resilience being generated from House Boeschoten has the potential to spread to the other buildings in the immediate context, establishing the relevance of the hub as a formal education precinct, rather than individual buildings. The potential for a formal education precinct lies in the ability to create

an education network between the public and the institutions (Fig. 36). The stakeholder network is established by relating UNISA's early childhood education centre to Oost Einde Primary School, and relating the two to House Boeschoten through programme. Through mapping of the programmes in the area, as well as the programmes provided by the UNISA campus as illustrated in figure 37, it was concluded that providing an early childhood education research centre and extra mural facilities would fulfill a need in the community for such programmes, as well as aid the establishment of a stakeholder network through supporting programmes.



Figure 35: Education Precinct Network (Author 2018)

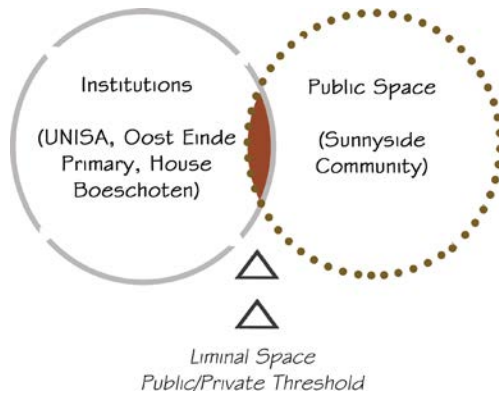
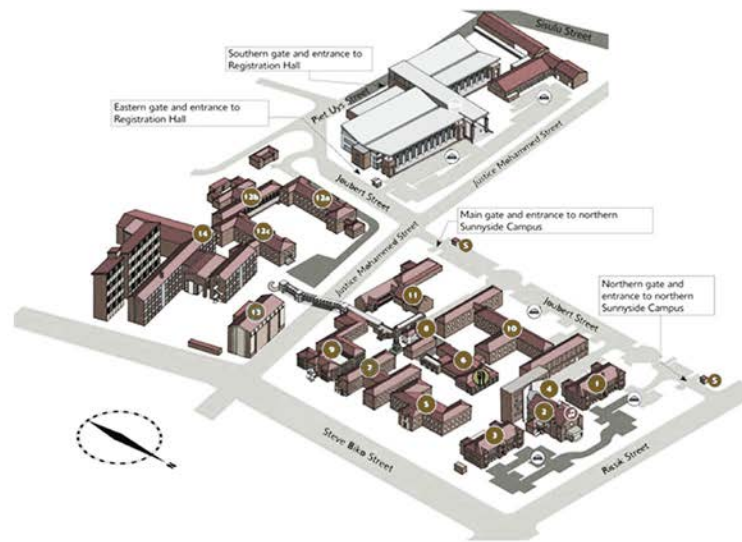


Figure 36: Stakeholders Network (Author 2018)



1. Administration Office
  2. Enoch Sontonga Conference Complex
  3. Higher Education South Africa Office
  4. Day Seminar and Break Away Rooms
  5. SA History Online (Centre for African Studies)
  6. Acacia Restaurant
  7. Oregon Seminar Conference and Training Venues (Law Department)
  8. Kosmos Meeting & Training Rooms
  9. Incubation Hubs and Boardrooms
  10. Centre for Continuing Education and Training
  11. Centre for Continuing Education and Training (ECE Department)
  14. Library (Open, Reference and Special Collection)
- S Security Entrance  
P Parking

Figure 37: Unisa Building Functions (Author 2018)

### 3.2.2 Scenario Planning: Identifying Suitable Programs

Scenario planning is a strategy that goes far beyond just programming, ensuring that the right question is answered to begin with, that no matter what happens there is always room to manoeuvre (Brand 1994:178). The first step of scenario planning is to explore the driving forces that will shape the future environment. For a building this might include changes in technology, in the neighbourhood or tenant use (Brand 1994:182). Thereafter, the identified proponents for change are ranked in according to their importance and uncertainty. The next step is determining future typologies that are a result of these driving forces. For example, the contexts changes to an industrial area, House Boeschoten will lose all its domestic functions in favour of industrial use. Lists of typologies are determined from the most likely to the least likely. Finally, the most likely typologies are selected, and unpacked to discover the most likely programmes, as these are suitable programmes for testing contingency. Figure 34 investigate appropriate programs for House Boeschoten, through scenario planning. House Boeschoten's adaptive capabilities are tested with two programmes related to education: early childhood education research centre and extra murals facility.

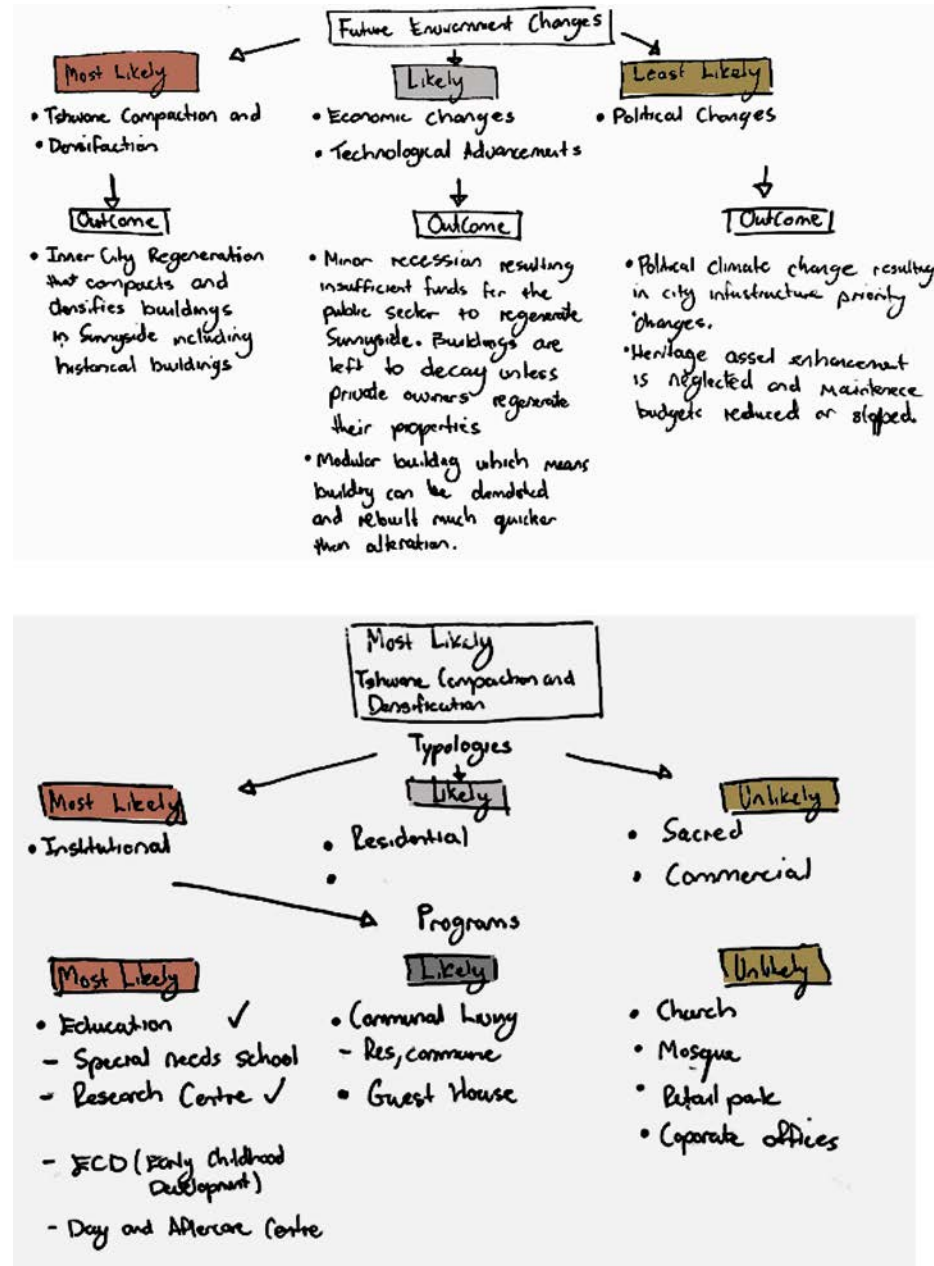


Figure 38: Scenario Planning (Author 2018)



### 3.2.3 Program as a Tool for Testing Adaptability

Typically, the functional requirements of the future inhabitant determine the programme and related spatial requirements. In this study, the programme acts as a tool to test the adaptive ability of House Boeschoten. The objective is to prove that the building's resilience, acting as a regenerative theory, stems from its ability support a variety of predetermined programmes. The ability to support these several programmes through adaptation renders House Boeschoten contingent. The summary below lists the identified programmes and the auxiliary roles they serve:

- ECD Research Centre (supports UNISA ECE and Oost Einde Primary)
- Public Space (supports the community and Oost Einde Primary)
- Extra Mural Centre (supports Oost Einde Primary and the community)

### 3.2.4 Principles Guiding Programme

The programmes mentioned above are each guided by principles that are expressed spatially, in order for the programme to function efficiently. The efficiency is both on a denotative and connotative level.

Agile or activity based working strategies are aimed at creating flexible, provisional and shared office environments:

1. Focus spaces are designed for work that requires silence and concentration.

2. Hub spaces are designed for interaction, collaboration and communication

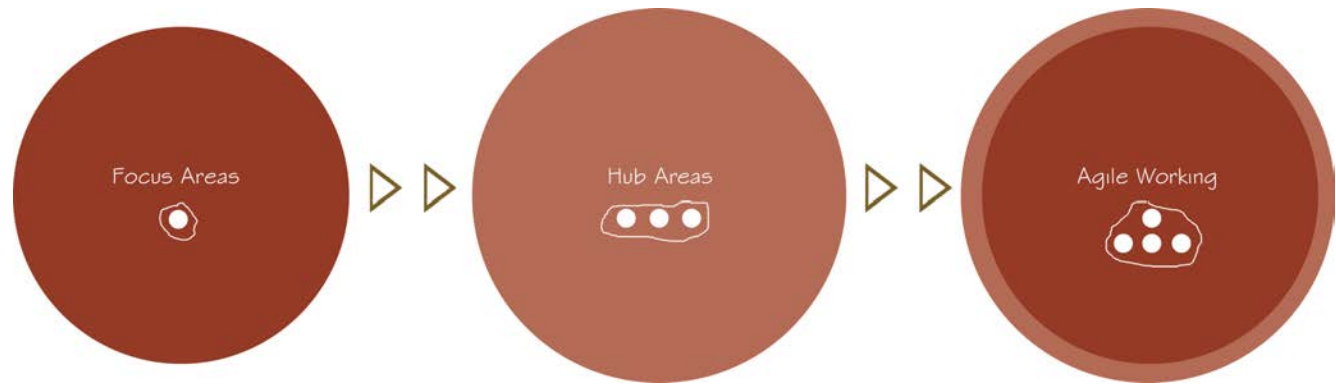


Figure 39: Activity based working strategy (Author 2018)

	Times	Early Childhood Education Research Centre	Extra Mural	Community Space
Morning	6:00 - 12:00	Dry Labs, Conference and Meeting Room, Offices, Library, Server & Storage, Library, Kitchenette, Bathroom, Lobby and Reception	Vacant	Formal/Informal Community Cafe
Afternoon	12:00 - 15:00	Dry Labs, Conference and Meeting Room, Offices, Library, Server & Storage, Library, Kitchenette, Bathroom, Lobby and Reception	Vacant	Formal/Informal Community Cafe
Late Afternoon	15:00 - 19:00	Vacant	Art and Performance Activities, Physical Activities, Academic & Contest Activities.	Formal/Informal Community Cafe

Table 1: Program Timescales (Author 2018)

### 3.2.4 Programme Spatial Requirements and Timescales

This section tabulates the timescales and has indicated the shared spaces according to similarities in spatial intentions.

The ECE Research Facilities are operational from the morning to the early afternoon (Tab 1). The Extra Mural facilities then function from the afternoon to the evening (Tab. 1).

Appendix A identifies the spaces that are required for each space according to their functional and psychological intentions. Spaces that relate through function and experience will share spaces, and are colour coded similarly.

Finally, Figure 34 illustrates the programme users and orders them from permanent to temporary users.

#### Permanent Users



##### Research & Teachers

- The specialist researchers who conduct ECE research
- The extra mural practitioners
- They require a research facility as well as rooms for extra mural activities.



##### Cleaning Staff

- Require areas to store cleaning equipment.
- Require an area to take lunch and tea breaks



##### Grounds Staff

- Require areas to store maintenance equipment.
- Require an area to take lunch and tea breaks

#### Temporary Users



##### Day Visitors

- They are researchers and practitioners from other institutions
- They require a waiting area
- They require a meeting room in order to discuss and consolidate



##### Parents/Guardians

- They accompany, drop off and collect the children
- They require a suitable waiting area and coffee bar



##### Children

- The children assist in research and data collection
- The children require fun and stimulating spaces.
- A small indoor/outdoor play area.

Figure 34: Model Inhabitants(Author 2018)

## 4. Conclusion

In this chapter, House Boestchoten was documented. A summary of NZASM typologies was provided and it was established that the building is an example of houses design purposely for high-ranking NZASM employees. Thereafter, the NZASM architectural and decorative features were identified in House Boeschoten. A statement of significance, written according to the requirements of the Burra Charter, provides a strategy for adaptive reuse. The mapping and building analysis further contributed to a scenario planning process, which identifies the need for the cross programming of ECE Research Centre and Extra Mural Facilities in House Boeschoten. The programmes are in line with the vision of formalising the education precinct through education networks. Finally, the chapter establishes House Boeschoten will regenerate itself and the immediate context, towards a common vision of future-proofing the building within Sunnyside's urban regeneration.







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## CHAPTER 4: PRECEDENTS

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## 4.1 Introduction

This chapter, presents precedents from amongst a variety of international projects. Precedents that have a similar design intention within a similar setting have been selected, such that design guidelines can be determined that might direct the re-design of House Boeschoten in the design development stage. The following criteria were applied when identifying pertinent precedents:

**Adaptive:** the precedent should exhibit a marked degree of adaptiveness, in accordance with the predetermined informants. The design must adapt to a combination of factors: environmental changes, as well as, inhabitant's functional requirements (c.f. 2.3).

**Heritage alteration:** the precedent should be an example of heritage and alteration. The type of alteration must be exemplary in terms of the Burra's Charter of conservation, preservation or restoration (c.f. 2.3).

## 4.2 Analysis Tools

A gradient scale (Graph 1) is used to illustrate the presence and degree of heritage alteration and adaptiveness. Thus indicating to which criteria the precedent is most relevant.

Parti diagrammes are used as part of the analysis and serve to highlight critical Design elements and/or principles.

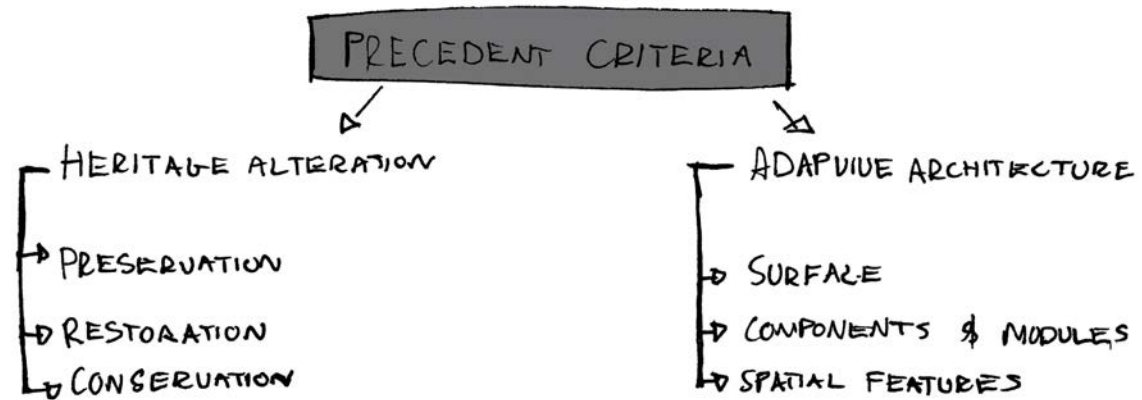
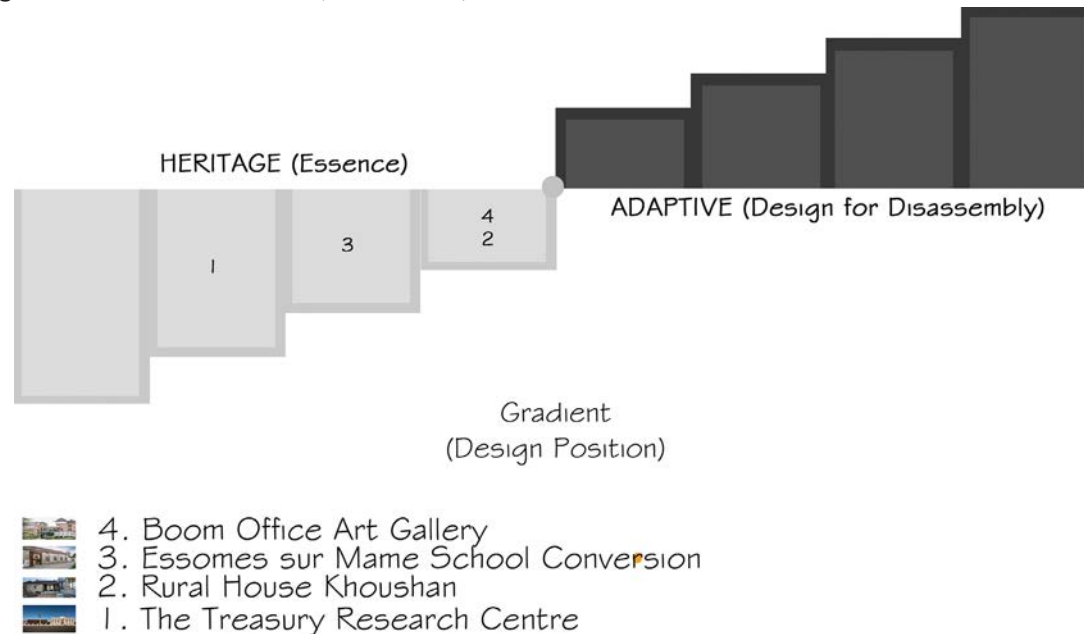


Figure 35: Precedent Criteria (Author 2018)



Graph 2: Gradient Scale (Author 2018)

### 4.3 The Treasury Research Centre

Title: The Treasury Research Centre

Architects/Designers: Architectus

Year: 2014

Location: Thames, New Zealand.

Type: Heritage Preservation by Installation.

#### Heritage and Adaptive Design Method:

The Thames Carnegie building has housed a library for the local community for many years. The designers at Architectus were commissioned to preserve the listed heritage site, as well as to install a new building that will function as a centre for genealogical research and archive facility (Fig. 36). The decision to install a new building alongside the original building was influenced by the demanding spatial requirements of the research and archive facility, that could not be achieved within the existing building without damaging elements of historical importance.

The new building derives stereotypes from the original building in order to create a visual continuity from the old to the new, as seen in Figure 35. The verticality of the pilasters and columns of the old building is repeated in the corten steel façade of the insertion by receding and protruding the panels (Fig. 36). The texture of the brick, stone and plaster is mimicked through the perforated corten steel panel, which appear textured from a distance. Appreciation is given to the scale and proportions of the heritage building by reducing the height and length of the new building. The proportion of the door on the new buildings mirrors that of the old, but still matches the proportions of the host building. The plinth of

the heritage building is repeated in the installation by recessing the base slightly and painting it black, giving the illusion of a shadow line below the building (Fig. 38).

Access to the new building is provided towards the rear end of the building in order to avoid retracting from the continuous facades (Fig. 36). Adding to existing heritage sites without interfering with the existing condition of the heritage building is a feasible way to add

new functions to a site.

#### Identified guidelines and principles:

- Preservation of the old by not tampering with the existing building.
- Installation of a new building with new functions.
- Deriving prototypes such as the linearity and texture of the existing columns and reinterpreting them through the installations facades.



Figure 36: Street facing exterior view (Archdaily 2015)



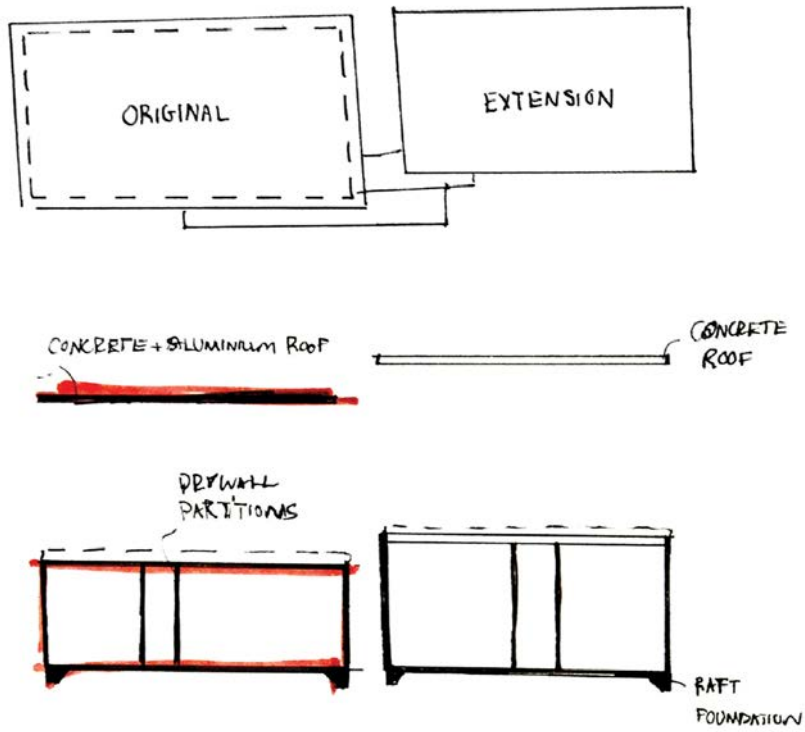


Figure 37: Analysis of structure (Archdaily 2015)

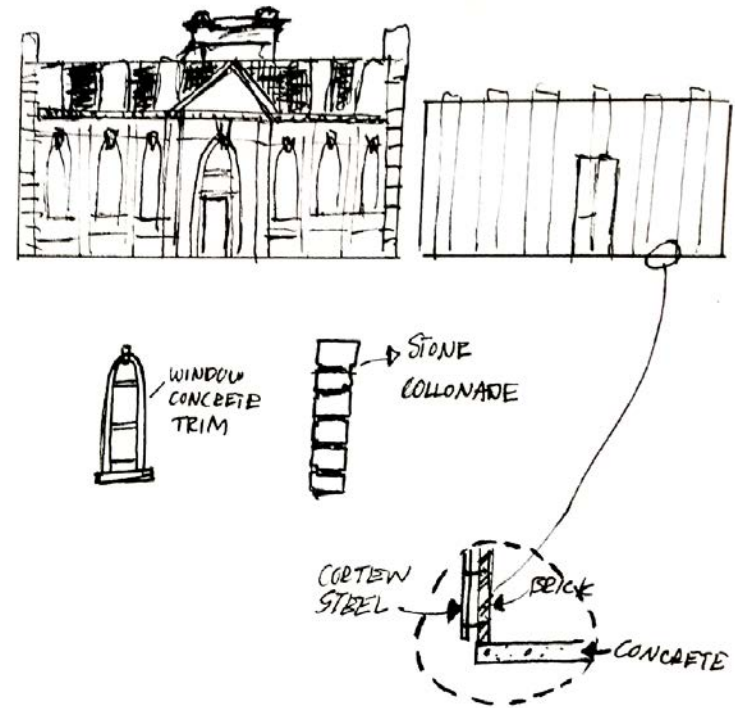


Figure 38: Archive exterior & decorative elements (Archdaily 2015)

## 4.4 Rural House Khouasan

Title: Rural House Khouasan

Architects: Evolution Design

Location: Khouasan, China

Year: 2017

Type: Preservation and Conservation by Insertion

### Heritage and Adaptive Design Method:

A little island located in Khouasan consists of decayed 70-year-old single-family houses that are true to the vernacular architecture of the village. The brief given to Evolution Design was to preserve the stylistic aspects of the house, to restore the domestic function of the house through conservation, and to insert a new building with supporting functions (Fig. 39). The preservation of the existing building was completed with contemporary solutions such as the insertion of a glass roof and a new steel veranda roof.

The new addition contrast the old building in terms of the overall architectural language. The style of the vernacular architecture comprises of gable roofs, stone walls, deep casement windows and concrete floors. The new buildings contrast the previously mentioned elements with a flat roof, box form, concrete walls, floors to ceiling stackable glass doors and power floated concrete floors (Fig. 40). The scale of the new wing is larger than the old building however the degree of contrast is subtle: the use of floor to ceiling glass that allows transparency from the new building into the old (Fig 39). The use of concrete contrast the course texture of stone, moreover, the decision was based on the need for a resilient material

that can deal with coastal moisture that often leads to corrosion. The response to the historical building was to contrast the old with the new, as a means of restoring the local style of architecture but also introducing a new way of building that can enhance the existing context moving forward, both aesthetically, as well as in terms of performance.

### Identified guidelines and principles:

- The preservation of the vernacular architecture through the insertion of a new building;
- The new insertion contrasts with the old building through materiality, scale and proportion;
- The domestic function of the old house is regenerated in order to conserve the building; and
- The original building is left in its decayed state, however, the contemporary insertion is used to aid the preservation process.



Figure 39: Aerial view (Archdaily 2017)



Figure 40: Front view (Archdaily 2017)

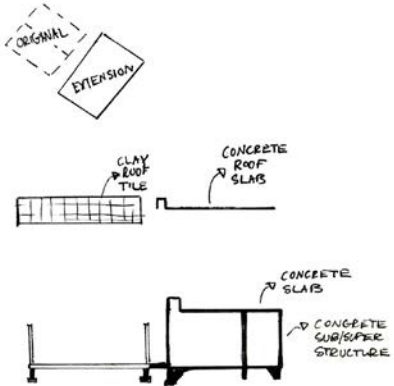


Figure 41: Analysis of structure (Archdaily 2017)

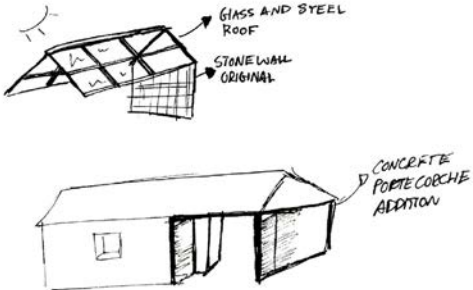


Figure 42: Room exterior & sketch (Archdaily 2017)

## 4.5 Essomes sur Mame School Conversion

Title: Essomes sur Mame School of Conversion  
Architects: ACBS  
Location: Essomes-sur-Marnes, France.  
Year: 2018  
Type: Preservation and Conservation by Intervention

### Heritage and Adaptive Design Method:

The project is the transformation of a former school building into affordable housing units. The response to redesigning the interior of a heritage building by ACBS architects entails the preservation of a partially aged building, and a change of function to generate use and conservation (Fig. 43).

The requirements for the new housing programme required an insertion of interior walls, a new staircase, a new lift and an inclusive entrance. The exterior insertion of a new entrance contrast the existing because of choice to use steel as opposed to masonry (Fig. 44). The contrast of the new and old entrance still share the way in which the corten steel will age and develop a patina over time, which will complement the aged masonry; as well as the rhythm retained in the repetitive placement of the windows.

New windows are inserted on the ground level to contrast the original decayed windows on the first floor (Fig. 45). The corten steel frame and the size and scale of the windows completely diverges from the original style of windows (Fig 20). The entire facade is an act of contrast on multiple levels such as scale, prop-



Figure 43: Street view (Archdaily 2018)

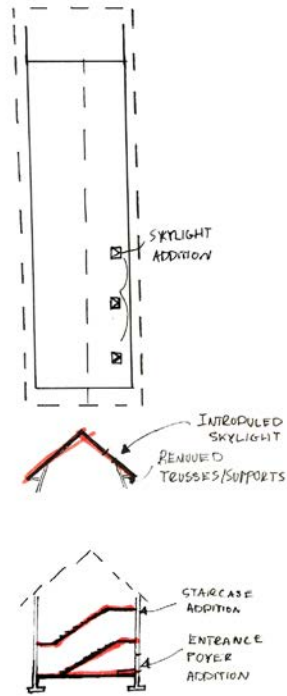
osition, and materiality.

The interior is completely remodeled to create a modern feel, which is the opposite of what the building suggests, despite the exterior clues that have been added (Fig. 44). The interior of a building is often the aspect most able to provide contingency, because of the ease in changing the configuration without impacting heritage aspects. The key to revamping an interior, is to suggest the new interior on the exterior as seen in the precedent.

### Identified guidelines and principles:

- The preservation of an exterior facade;
- The insertion of a contemporary interior, that contrast the exterior;
- Contrasting elements are introduced to the facade to suggest the new interior such as a new corten steel entrance, and new larger windows; and
- The new programme insertion influences the interior spatial changes.

Essence of Structure



Essence of Decorative Elements



Figure 44: Entrance staircase & section sketch (Archdaily 2018)

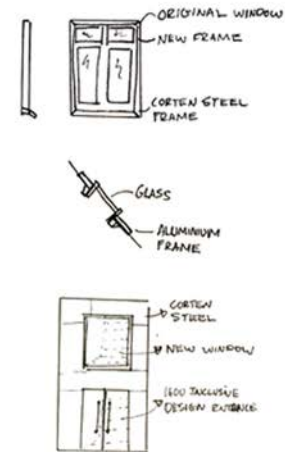


Figure 45: Window sill & decorative elements (Archdaily 2018)

## 4.6 Boom Office Gallery

Title: Boom Office Gallery

Architects: Barend Koolhass

Location: Amsterdam, Netherlands

Year: 2017

Type: Preservation and Conservation by insertion

### Heritage and Adaptive Design Method:

The designers were tasked to insert a new programme between two heritage buildings that will function as an art gallery. The intention of the brief is to preserve the existing building, puncturing the sides of the old building in order to conserve the underutilised interstitial space. The lack of space available between the two buildings influenced decisions to derive prototypes from the old building as a means to continue the design language of the facade. The expression of prototyping is reinterpreted in the use of contemporary materials. The A-frame roof of the old is repeated in the new, with the combination of glass and steel because of the sensitivity transparency allows. The scale of the insertion is much smaller than the old building, coupled by the new building being recessed. The insertion of a new building is a positive step in ensuring contingency when the parallel buildings are related (Fig. 46).

### Identified guidelines and principles:

- The Insertion of a new space between two buildings interstitial space;
- The original buildings are preserved in terms of their stylistic features; and
- Prototypes are reinterpreted in the materiali-

ty and form of the windows, walls, facade and roof and structural I profiles.



Figure 46: Street view (Archdaily 2017)

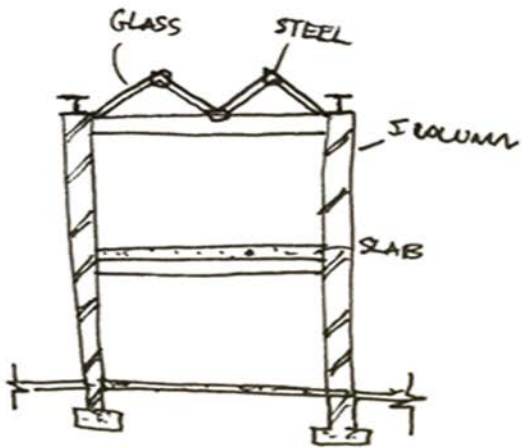


Figure 47: Top floor & section analysis (Archdaily 2017)

Figure 48: Detail of window sill and decorative elements (Archdaily 2017)

## 4.10 Conclusion

The precedents that are investigated and analysed in this chapter inform the design proposed as part of this study, where the process of the proposed intervention involves identifying the response to heritage in terms of preservation, conservation or restoration of an historical site. The major commonality is the tendency to contrast the new with the old through insertion, intervention or installation. The contrast is carried out with respect to existing fabric through materiality, scale, proportion, rhythm and stylistic elements.



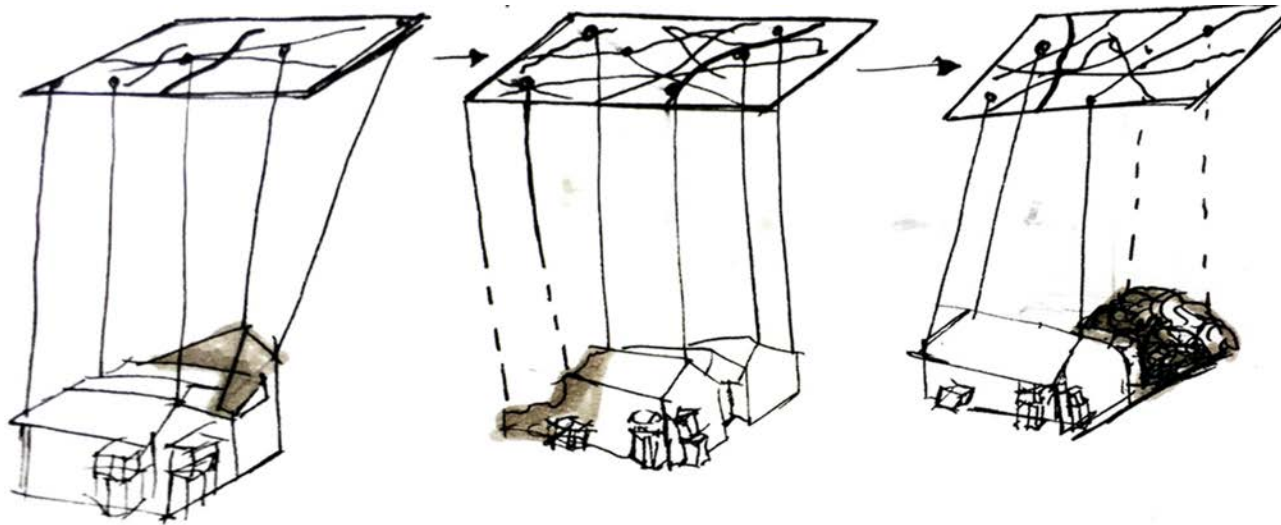




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## CHAPTER 5: CONCEPT

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## 5.1 Introduction

This chapter introduces design informants that will guide the design development. The preceding chapters served to establish an understanding of the existing conditions. This chapter illustrates the reduction of House Boeschoten to its essence, as directed by the building analysis and the statement of significance. Thereafter, the introduction of new programme through insertion is tested. The design approach to design for disassembly, which ensures that the new can always be stripped back to House Boeschoten essence.

## 5.2 Concept Generation Process

The approach to conceptualizing the adaptive reuse of House Boeschoten consists of a 3 step process (Fig. 49):

1. Existing condition: The entire dissertation up until this point investigated House Boeschoten's various layers of significance in order to better understand the original intention of the design of House Boeschoten and what remains of that intention.

2. Reduction to Essence: The statement of significance is illustrated in a graphic manner, making it easier to access visually. The idea is to illustrate the precious fabric of House Boeschoten that must be retained, as well as the parts that can be altered and removed.

3. Design for Disassembly: The reduction to essence is rooted in permanence because of its significance. Design for disassembly is, however, the result of additional space required

by program. The new insertion is designed for temporality, which is supported by the theoretical premise of a contingent approach to space making, encompassing foreseeable change.

## 5.3 Reduction to Essence

In this section the statement of significance is translated into design by reducing House Boeschoten to its significant parts from the inside to the outside.

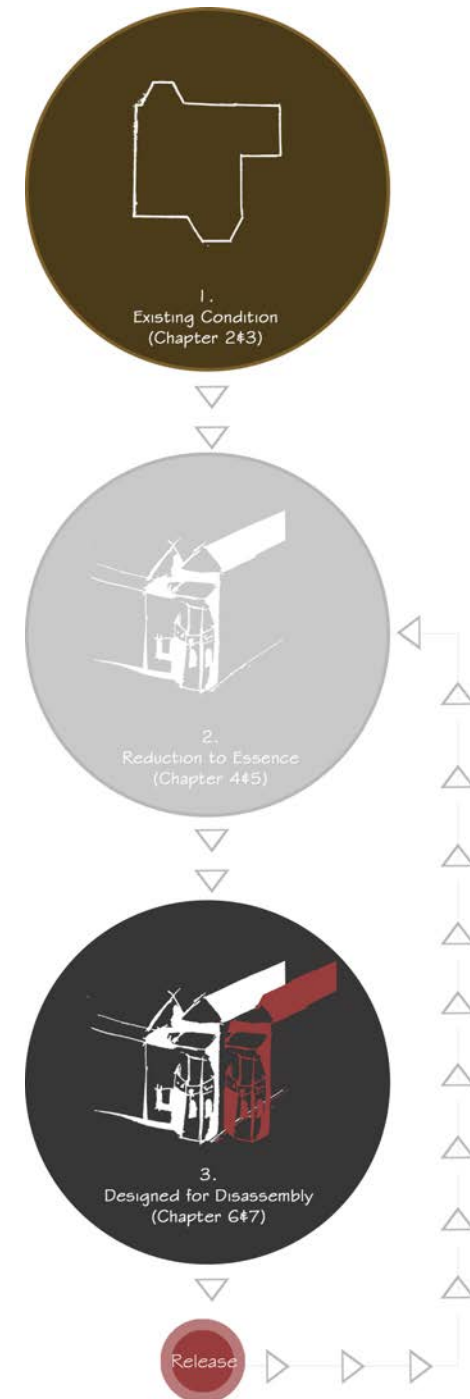


Figure 49: Concept generation process (Author 2018)

### 5.3.1 Essence of Alteration: Architectural Fabric

House Boeschoten's architectural fabric is classified as either precious or altered (Fig. 50). Precious fabric is untouched and maintains the original state and intention of the building. Altered fabric is stripped back. The northern end of House retains most of the precious fabric while majority of the alterations have been made on the southern service end.



Figure 50: Essence of alteration, not to scale (Author 2018)



East Elevation



South Elevation



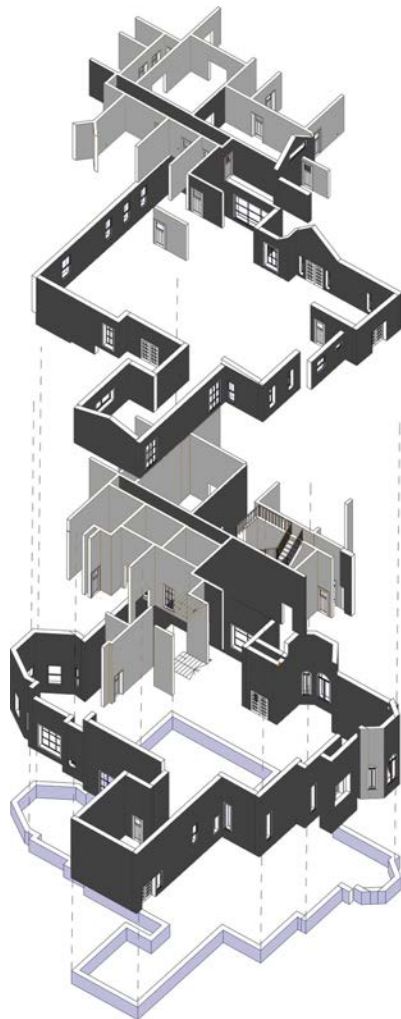
North Elevation



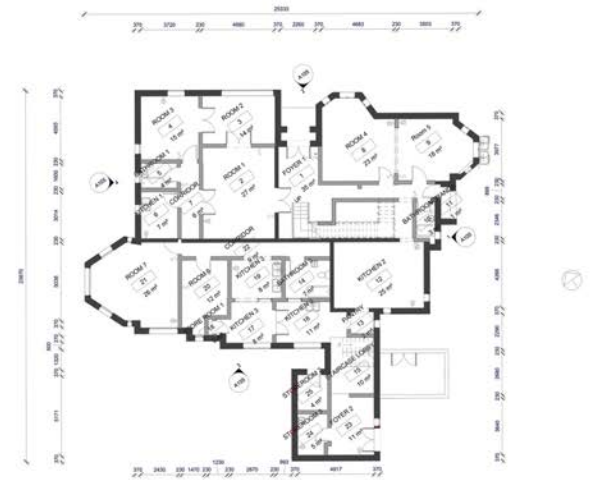
West Elevation

### 5.3.2 Essence of Super Structure

Essence of super structure investigates structural and nonstructural walls. Figure 51 illustrates that the external walls are load bearing, as well as the central walls running from north to south and east to west. Any alteration to the external walls or central walls will require reinforcing.

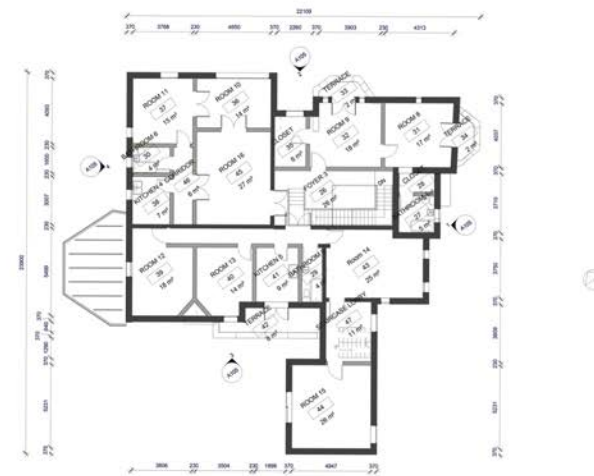


The investigation of *structure* and rational design.



Ground Floor - Walls  
Scale 1:200

■ Load Bearing Walls  
■ Non Load Bearing Walls  
■ Plinth

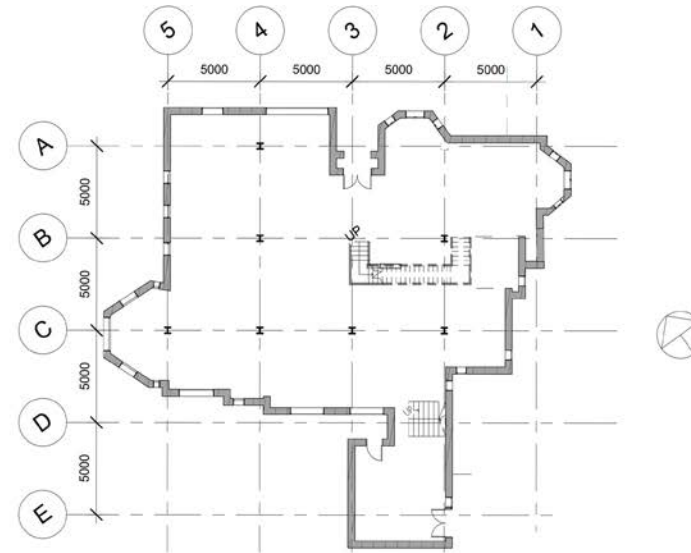
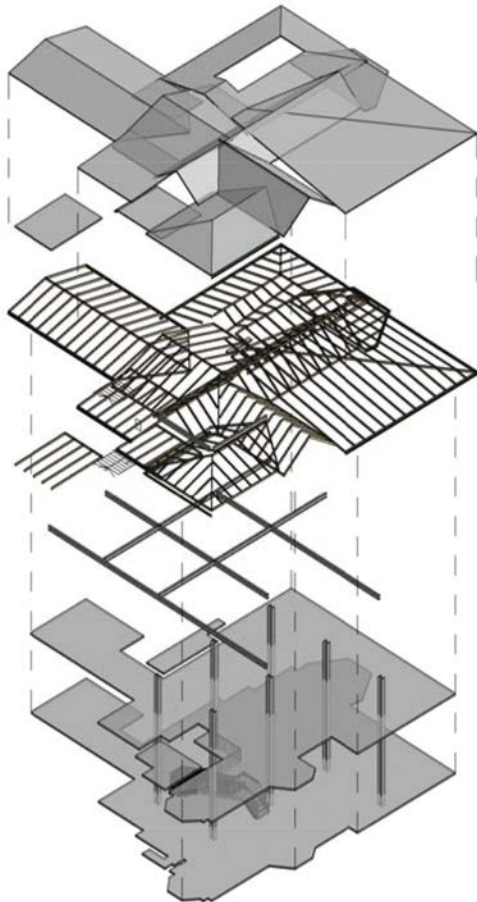


First Floor - Walls  
Scale 1:200

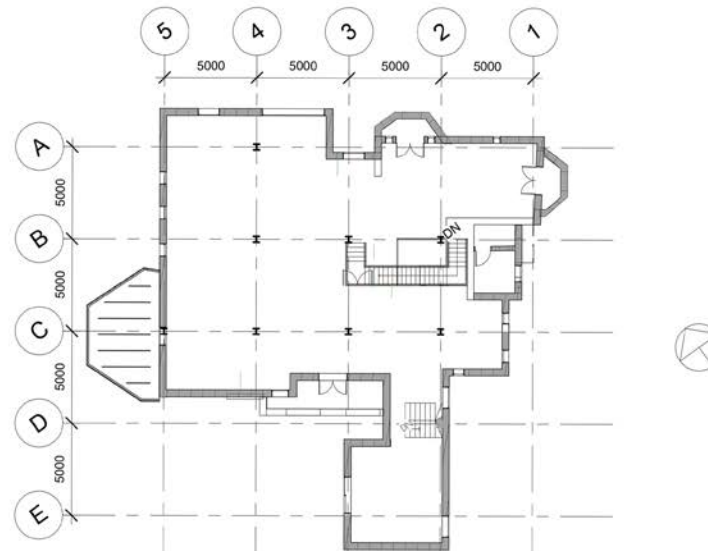
Figure 51: Essence of super structure, not to scale (Author 2018)

### 5.3.3 Essence of Beam and Column

The essence of beam and column identifies a suitable grid for placing structural support. The changes to House Boeschoten will result in the majority of the insignificant interior walls being demolished. Columns and beams will be used to support the structure where the internal load bearing walls are removed. The external walls towards the southern part of the building will also fall away, requiring structural reinforcing.



Ground Floor - Columns  
Scale 1:200



First Floor - Columns  
Scale 1:200

Figure 52: Essence of beam and column, not to scale (Author 2018)



### 5.3.4 Essence of Roof

Figure 53 highlights how the roof configuration is separated into its hipped and gable segments. The south end of the roof is removed, exposing the core of the building because of the shared roof. The new design will merge the new and old roof in order to cover the void, allowing natural light into the building core through clerestory windows.

The *precious* parts of the roof are *retained*. The *altered* parts are possible areas for *additions* and *removal*.

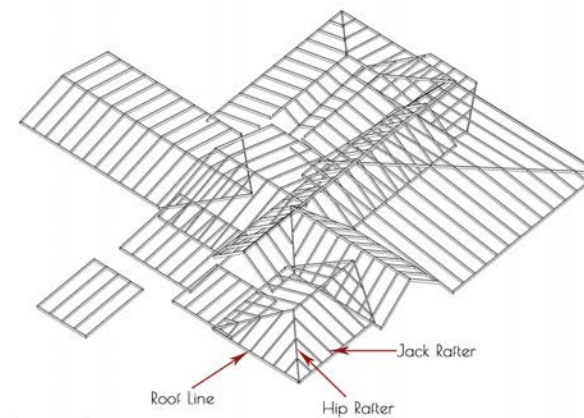
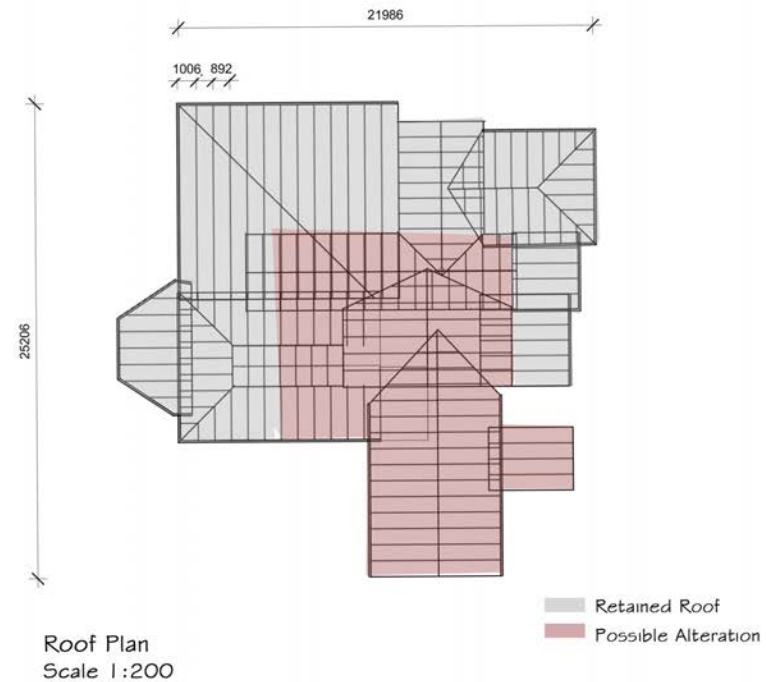


Figure 53: Essence of roof, not to scale (Author 2018)

### 5.3.5 Essence of Design Principles

The language of the building's design is decoded into principles that can be used to better understand House Boeschoten. Symmetry is repeated on the facade of the entrance, from the doors to the terrace. The asymmetrical balance is achieved more on the east, west and southern facades that are not typically exposed to the public. Contrast is achieved in the materiality through texture and colour. The interior and exterior is plastered while the plinth and some of the hexagonal walls are made of sandstone, contrasting the smoothness of the plaster (Fig.54).

Balance & Symmetry



Rhythm



Asymmetry



Repetition



Movement



Unity



Contrast

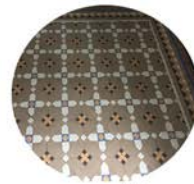


Figure 54: Essence of design principles (Author 2018)

### 5.3.6 Essence of Temporal Decorative Elements

Significant decorative elements are identified in House Boeschoten. The importance is derived from the elements contribution to the buildings character and local vernacular. The originality and precious nature of the element also contributes to the elements significance. Figure 55 illustrates decorative elements that are significant to the buildings identify such as the bay windows and ceiling beading.

The Identification of *important decorative* elements.



Original Entrance Tile



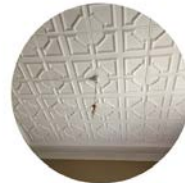
Oregon Suspended Timber Planks



Meranti Timber Turned Balastrade & Handrail



Painted Timber Services Staircase



Pressed Steel Ceiling



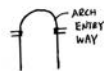
Meranti Skirting



Arched Bay Window Painted Archtrave



Arch Door with Fan Light and Side Light



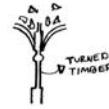
Arch Entrance, Archtrave and Transom windows(Pilaster)

Figure 55: Essence of decorative elements (Author 2018)

### 5.3.7 Essence of Permanent Ornament

The essence of permanent ornament refers to the elements that are built into the building. Ornaments such as the terrace post and brackets, as well as the gables ventilators in figure 54 must be retained and contribute to the building's essence.

The *precious permanent ornaments* are retained



Terrace Post and Bracket



Terrace Masonry Balustrade Detail



Bay Windows with Burglar Bars



Gable Ventilator Timber Detail



Sandstone Plinth

Figure 56: Essence of permanent ornament (Author 2018)

### 5.3.8 Synthesis of Essence

1. Structure: The north-eastern side of the building's interior and exterior walls are retained on both levels because they consist of most of the building's precious fabric and stylistically recognizable features such as the hexagonal wall. The plinth of the entire building is retained as the building's footprint.
2. Beam & Column (Addition): columns and beams are installed in the centre of the building as a means to provide reinforcement in the place of the removed wall. The suspended floors are retained; however the joists and planks are removed and replaced.
3. Roof: the portion of the roof that covers the remaining exterior and interior walls is retained.
4. Temporal Decorative Elements: the temporal decorative elements that are retained are to be reused in a new area of the building if they fall within the removed spaces.
5. Permanent Ornament: only the permanent ornament that falls within the retained section of the building will be retained such as the terraces (Fig. 54).



Figure 57: Retained essence (Author 2018)

## 5.4 Design for Disassembly

Design for disassembly is an approach to design that ensures that House Boeschoten will be fully equipped to deal with change through temporal additions that can be dismantled, reducing House Boeschoten back to its essence. The extension from reduced essence to design for disassembly is achieved through program. Program is necessary for the extension because programmatic change is susceptible to the release phase. The following principles are critical to designing for disassembly to ensure ease in dismantling, removal and coping with change (Brand 1994:191-201):

1. Structural walls and floors are replaced or intergrated with steel beams and columns. The column and beam system occupies less space, can be prefabricated and can be repositioned or removed at any point.

2. The A-frame hipped and gable combination roof towards south western ends of the building must be punctured with a roof that allows light into the darker back end.

3. The reconfigured interior spatial layout follows rectilinear organisation allow for the configurations to grow, subdivide well and efficient use.

4. The new circulation point is placed against the south west longest side of the rectangle, close to the entrance. This reduces the amount of space that is utilized for vertical circulation.

5. Reuse, prefabrication and disassembly building materials are used for infill, once the reduction to the essence of the building has been achieved.

6. Keep the services separate from House Boeschoten's skin. The process of alteration due to adaptation is carried out much more quickly and more simply.

## 5.5 Conclusion

The concept involves the reduction of House Boeschoten to its essence, followed by spatial reconfiguration in support of the identified program through the re-design of the building for disassembly. The chapter restates the need for a building that can cope with the recurring release that results in programmatic and spatial change. The essence of House Boeschoten ensures that the identity and significance of the original building's intention is not lost in the re-design process. Designing for disassembly ensures that the new design is sympathetic to the old, through the ability to dismantle while still maintaining precious heritage fabric.

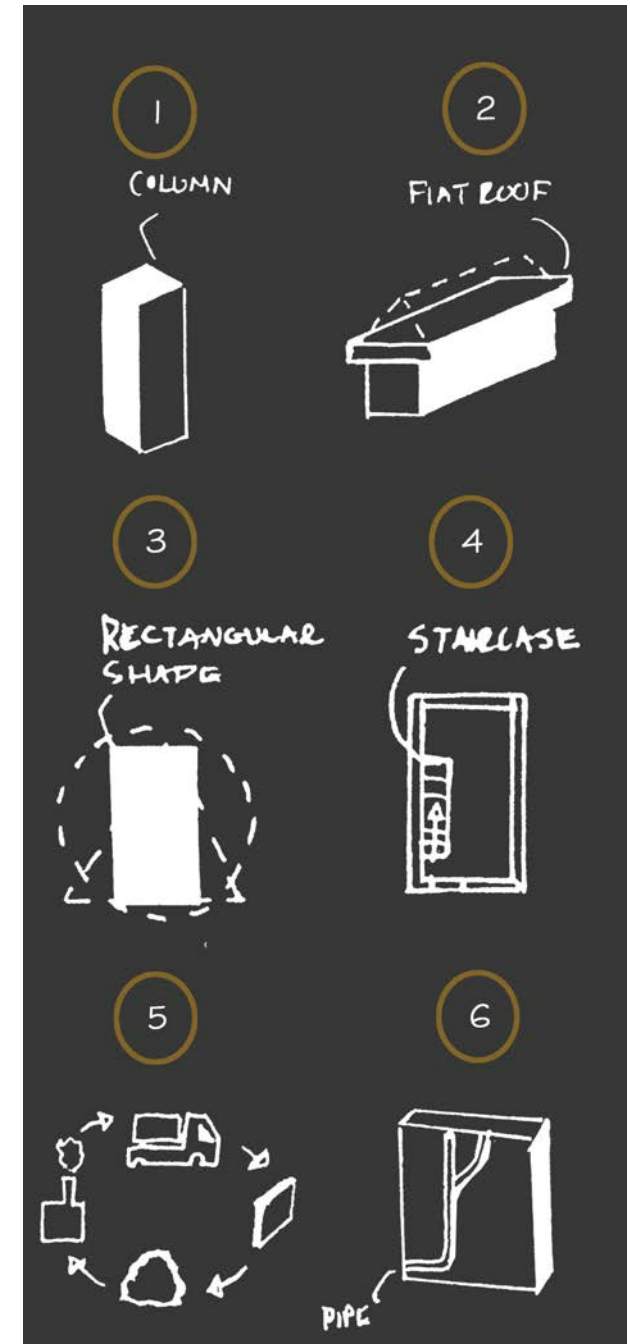


Figure 58: Design for disassembly principles (Author 2018)





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## CHAPTER 6: DESIGN DEVELOPMENT

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## 6.1 Introduction

The design development chapter explores the possibilities of design through an iterative process. The critical design issues are restated in order to provide a lens for House Boeschoten's spatial solutions. The approach to providing new spaces for program, as well as, dealing with the identified design issues without compromising the buildings heritage integrity, is considered by iterating scenarios of insertion, installation and intervention (Brokker & Stone 2004:79-127). The relationship between old and new is further explored through exploring the scales of a familiar new and a contrasting new. Contiguity is explored spatially by assigning multiple sub programs to areas in order to test the fluidity of the space. The fluidity's objective is to respect the existing fabric and complement it.

## 6.2 Principles of Old and New

The iteration of design includes a new addition to the existing, both internally and externally as a means to deal with limited internal space and reorienting the building to improve the street relationship. The principles of old and new address the transition from the old building to the new addition from a design lexicon point of view. The Chapter explores three principles as seen in Figure 59:

**Contrast:** contrasts the intervention with the existing.

**Transform:** transform morphs and distorts certain significant existing architectural elements. This is done in an endeavor to ensure contiguity through architecture that is able to respond to changes to program.

**Reinterpret:** the idea of reinterpreting involves taking the existing significant fabric and reinterpreting this in a contemporary manner.

## 6.3 Design Issues & Informants

The design issues that are critical and need to be addressed by each of the iterations are illustrated in Figure 60. The building needs to be reoriented by designing a new entrance toward the south. This will improve the relationship towards the street. In addition to this the parking should be moved towards the north which will be the new back end of the building. The central core of the building is cold and dark because it receives minimal light thus the new intervention must introduce more light and make use of passive design methods to improve thermal comfort. The building sits on a plinth thus the new addition should be cognizant and celebrate it.

Annexure B simultaneously highlights the design informants that guide the iterative processes. The informants are derived from theory, context, precedents and concept.

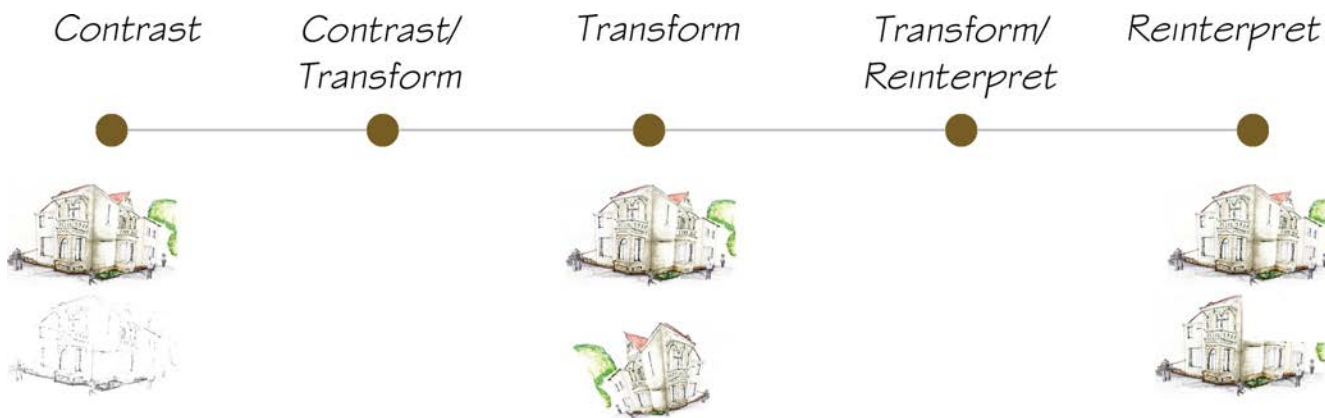
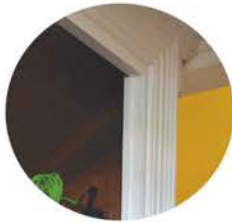
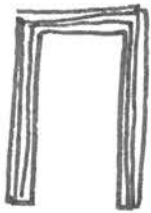


Figure 59: Guiding principles for heritage insertion (Author 2018)

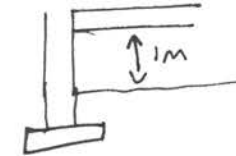
### Doors

All of the interior doors are missing through the house, however the architraves remain.



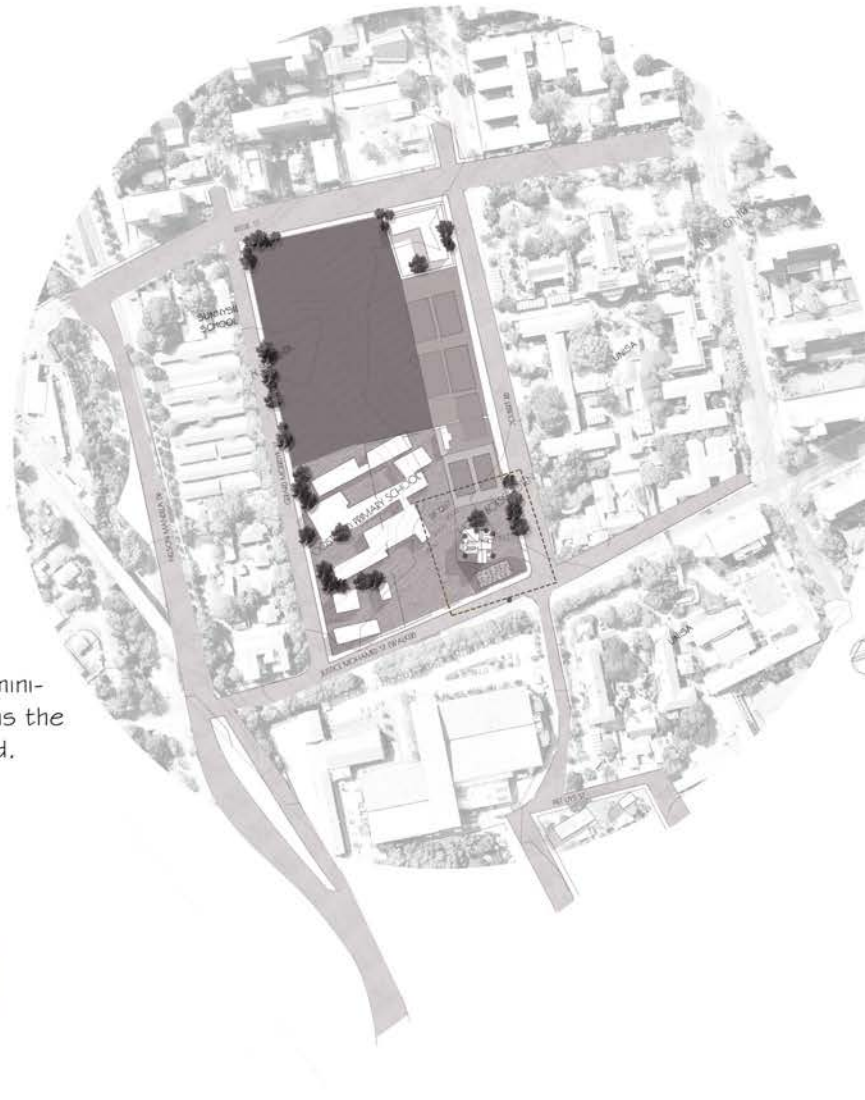
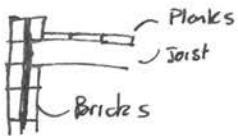
### Plinth

The trench space below the suspended floor is underutilized. The space below is 1 m which can be increased to support the head room required for human occupancy.



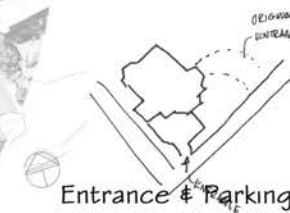
### Floors

The joists holding up the suspended floor are rotten, leading to unstable and loose floor planks.



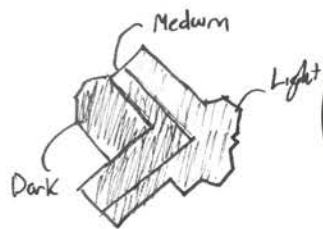
### Orientation

The original stand orientation planned for entrance onto the site from the north east end. The site however is entered on the south east, resulting in the back end of the building facing the street.



### Thermal Comfort

The south western end of the building received minimal light. The implication of the lack of light means the building is dark and cold towards the service end.



### Entrance & Parking

The entrance and parking on site is impractical. The entrance only allows for a car at a time and the parking bays are insufficient.

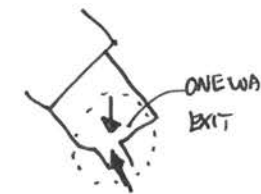


Figure 60: Design issues (Author 2018)

## 6.4 Design Iterations: Outside-In

### 6.4.1 Reinterpret

The following prototypes have been derived and reinterpreted:

- The bay windows hexagonal walls are expressed through the new street facing facade shape.
- The rectangular shape of the old casement windows are repeated with floor to ceiling windows in all the street facing walls.
- The gambrel roof is repeated on the new roof.
- The sandstone plinth is expressed by creating a larger shadow line on the new insertion.



Figure 61: Reinterpret (Author 2018)



Figure 62: Marquette reinterpreted (Author 2018)

## 6.4.2 Transform

The qualities of the original building have been transformed to express the following:

- The existing trench is merged with a new pavillion to create a central public space.
- Light is introduced into the western service end of the building through an atrium and north facing clerestory windows.
- The western end of the new insertion is curved and tucked behind the new facade, to no detract from the reoriented entrance.

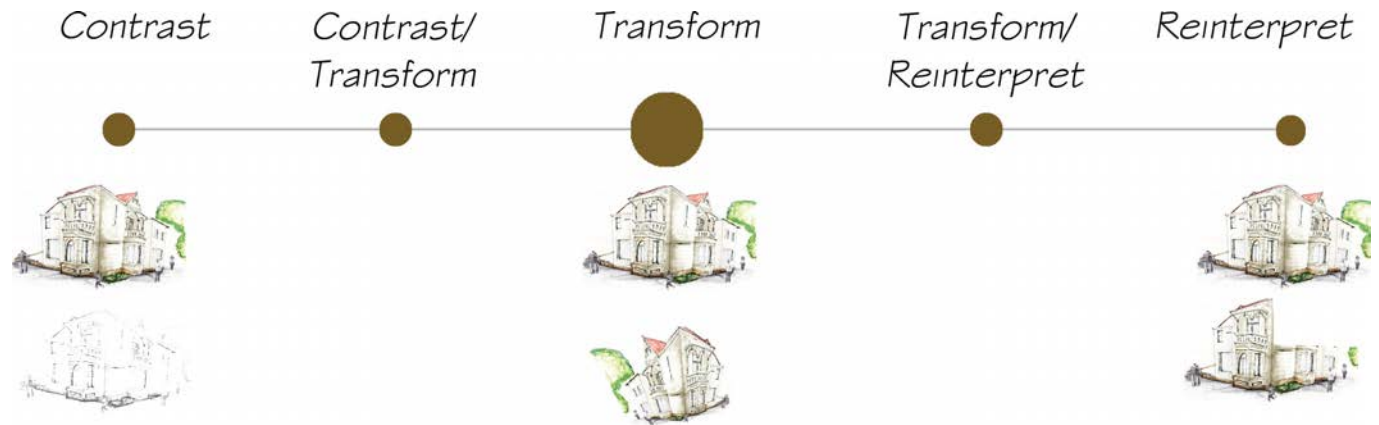


Figure 63: Transform (Author 2018)

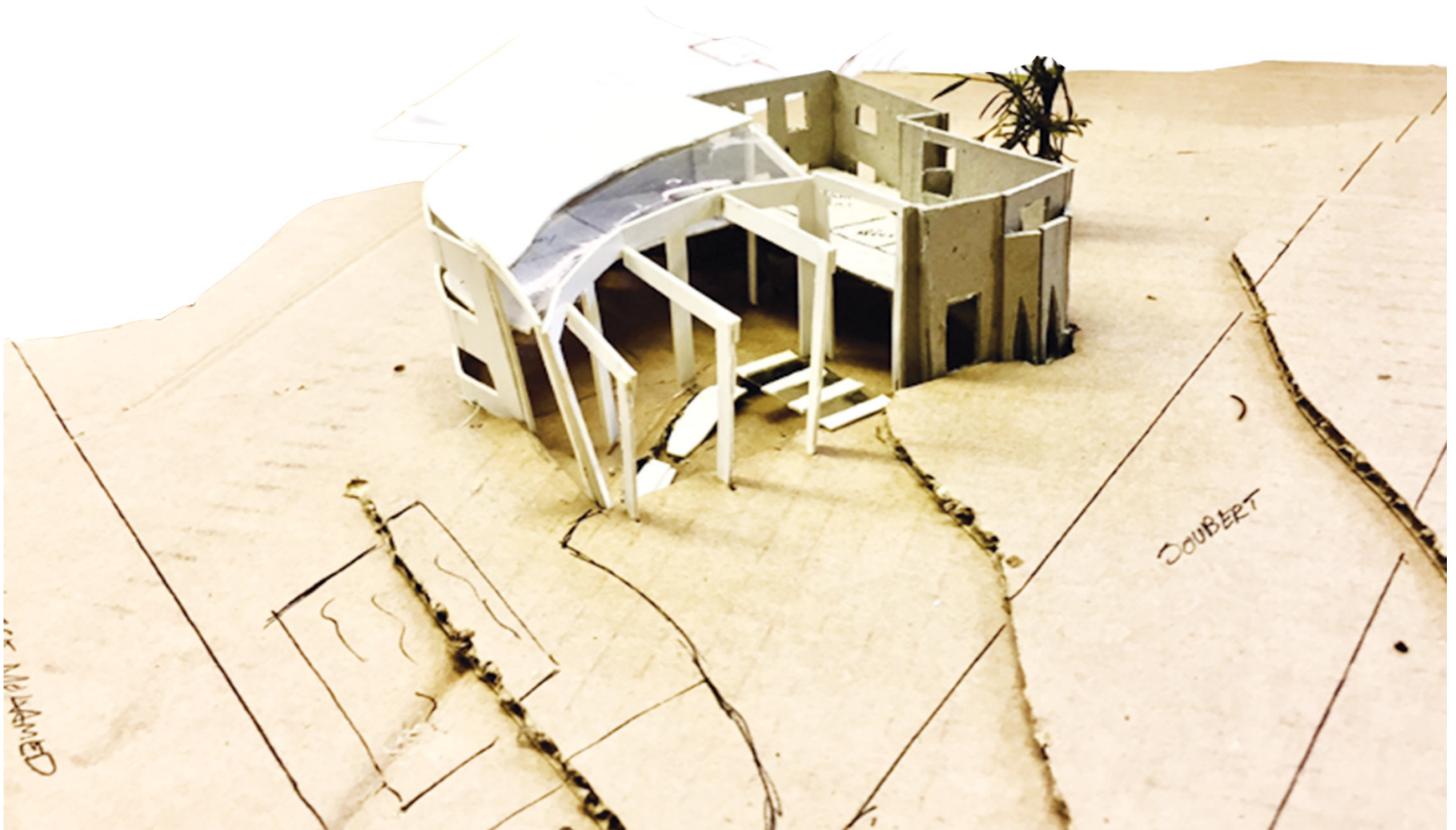


Figure 64: Marquette transform (Author 2018)

### 6.4.3 Contrast

The following contrasts have been inserted:

- The new mono-pitch roof and clerestory windows contrast the existing gambrel roof .
- The minimalist rectangular shape of the building and internal spaces contrasts the complex internal configuration of the old.
- The new vertical circulation punctures the street facing facade and is completely transparent to the public as opposed to the typical internal central staircase.
- The threshold between indoor and outdoor is not clearly defined contrasting the demarcated interior of the old.

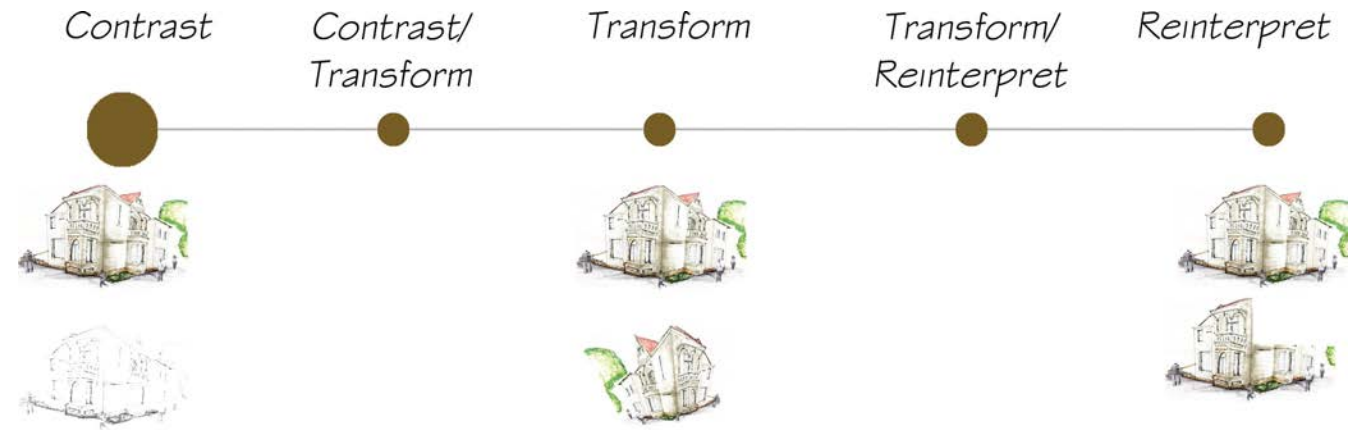


Figure 65: Contrast (Author 2018)





Figure 66: Marquette contrast (Author 2018)

## 6.4.4 Transform and Reinterpret

The following is a synthesis of reinterpret and transform:

- The style and features of the bay windows and hexagonal walls are repeated in the new.
- The new stepped façade gradually protrudes and extends, extending past the old, respectfully announcing a new entrance.
- The gable roof of the old is mimicked in the new roof to represent continuity.



Figure 67: Transform/reinterpret (Author 2018)



Figure 68: Marquette transform/reinterpret (Author 2018)

### 6.4.6 Outside-In Conclusion

Based on the versatility of contrast, transform and reinterpret further two iterations of the in-betweens are explored; transform/contrast, reinterpret/transform. The iteration and principles of reinterpret and transform are the preferred design based on the opportunities identified in the relevant section.

The next section iterates the principles even further but from an interior point of view, focusing on the efficiency of the inside spaces for program as well as the thresholds from old to new fabric.

### 6.5.1 Reinterpret and Transform: Inside-out

The next section introduces program to the internal spaces of the final design selected for House Boeschoten (Fig 78). The programs use of space is intended to illustrate the fluidity of the new design through various scenarios. The successful production of a versatile space, as well as the respectful integration of the new with the space's existing heritage and identity, will deem the space contingent.

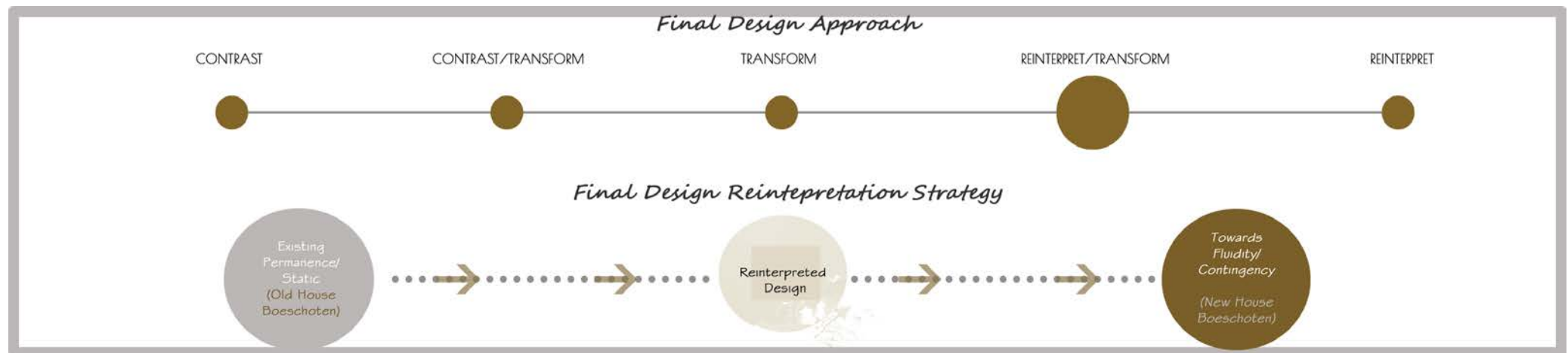


Figure 69: Final design strategy (Author 2018)

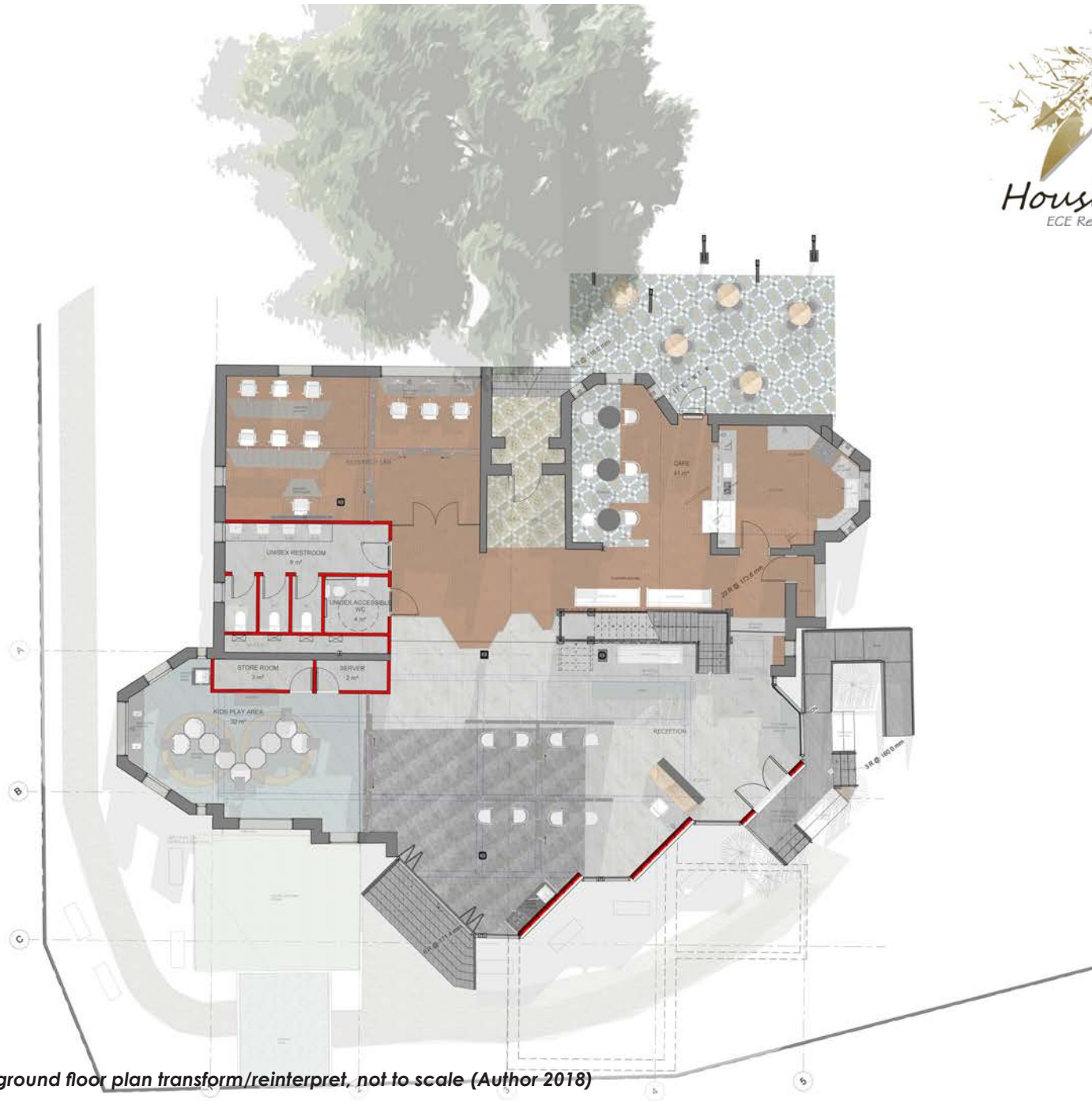


Figure 78: Final ground floor plan transform/reinterpret, not to scale (Author 2018)

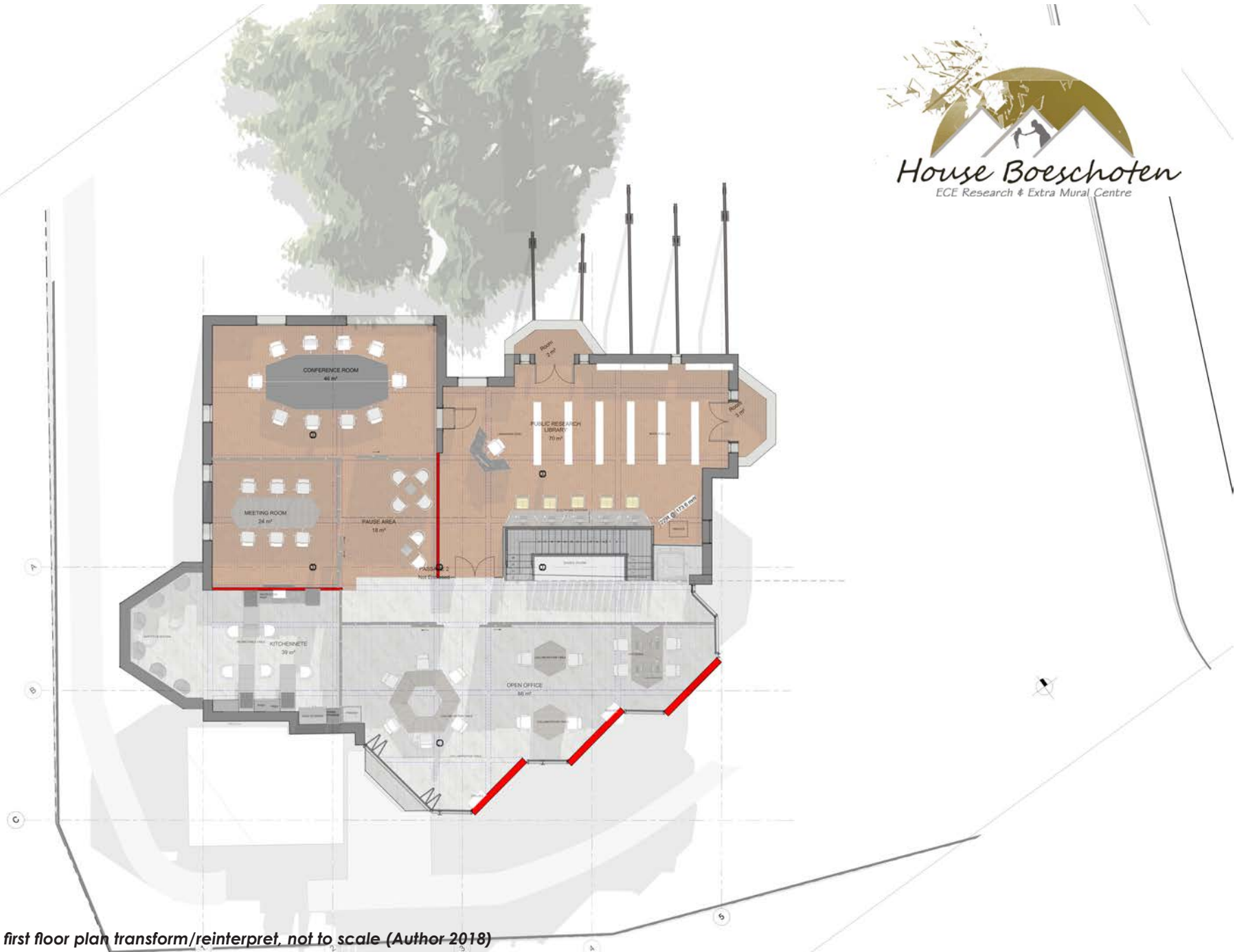


Figure 79: Final first floor plan transform/reinterpret, not to scale (Author 2018)

## 6.5.2 Reception & Art Classes

The reception is the first contingent space where cross programming occurs. The reception serves a formal function in the mornings, accommodating ECE research centre visitors with a waiting and informal meeting area (Fig. 81).

The reception adapts to the extra murals afternoon requirements by transforming into an art studio (Fig. 82). The internal partitions open up, reducing visual obscurity and promoting surveillance. The relationship between inside and outside is facilitated by full length stackable doors to reveal the activity on Justice Mohamed street.

The materials palette for the western side draws on the colourful palette required for child-friendly spaces (Fig. 83). The reception area's palette reinterprets the existing staircase's mahogany stained turned oregon pine. The wood grains and tactile nature of the staircase finish is reinterpreted using glass and steel.

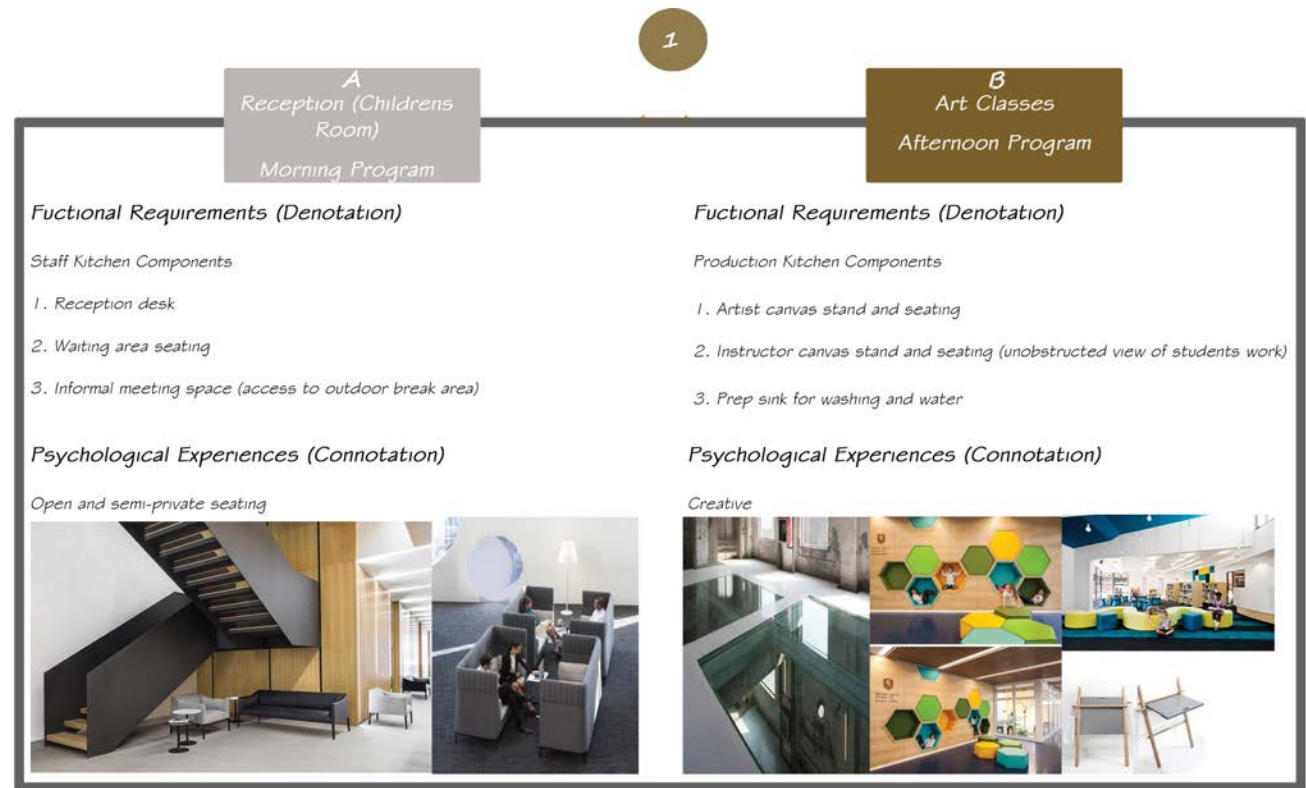


Figure 80: Reception and art classes mood board (Author 2018)

## Space Planning Iterations



GROUND FLOOR  
ORIENTATION

A

Scenario A

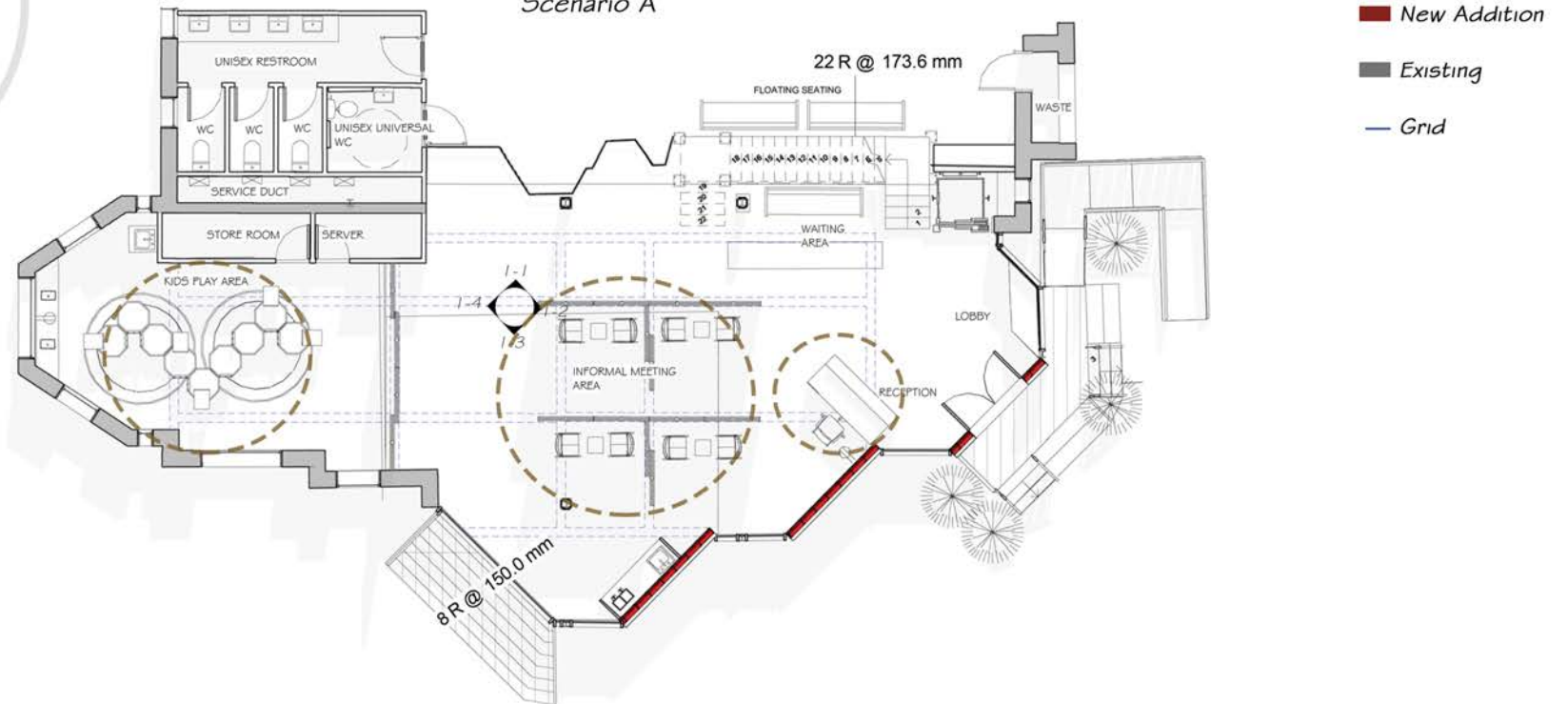


Figure 81: Reception and art classes scenario a floor layout (Author 2018)



B

Scenario B

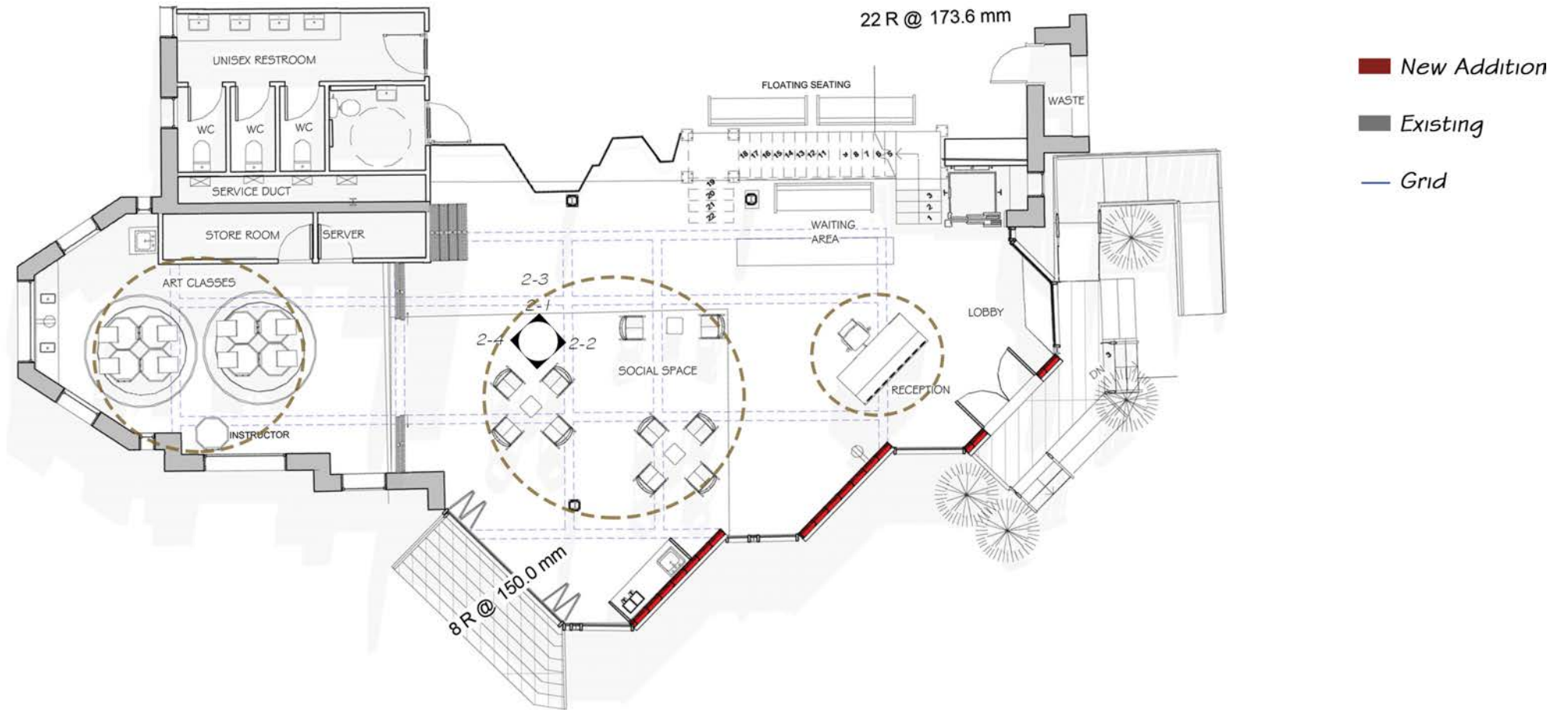


Figure 82: Reception and art classes scenario b floor layout (Author 2018)

# Axonometric

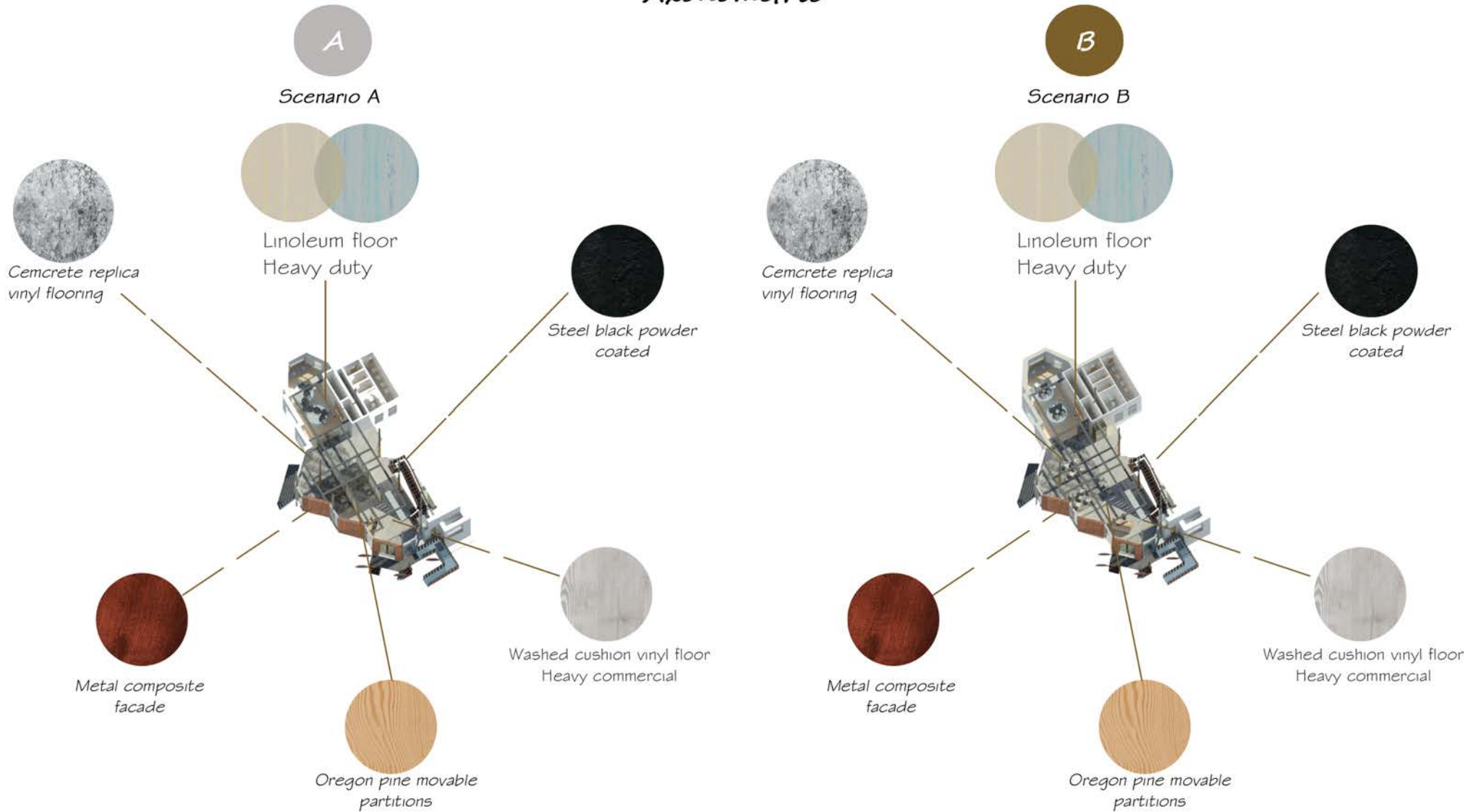


Figure 83: Reception and art classes axonometric (Author 2018)

## 6.5.3 Cafe

The Cafe on north-eastern wing functions as a homogeneous program. The cafe needs to be operational throughout the day thus contingency is expressed in an alternative way to flexible spaces. The area represents majority of the building's essence thus contingency is expressed in the methods of inserting the new without compromising the existing fabric. Should the function change, the addition must be removable or provide the opportunity for stripping back.

A new door is inserted to provide direct access to the outdoor area (Fig. 85). The existing paint on the bay window walls are stripped back to reveal the sandstone that is expressed on the exterior. The internal furniture consists of floating tables and chairs that require no anchoring, providing easy of maneuvering.

The material palette compliments the existing by reinterpreting the neutral tones through texture, form or colour (Fig. 86).

2

Bistro (Cafe)  
All Day Program

### *Functional Requirements (Denotation)*

*Production Kitchen Components* ([websitesrestaurant.com](http://websitesrestaurant.com) restaurant kitchen layout)

1. Food Preparation: Prep sink, cutting & mixing counter.
2. Meal Cooking: hob(gas & electrical), extractor, oven-micro combi, fryer.
3. Washing: sinks, drying racks.
4. Storage: food storage(cold & warm), non-food storage.

### *Service Section*

1. Floating(portable) seating & anchored seating
2. Bar style seating
3. Appliances: espresso machine, water dispenser, display fridge.

### *Psychological Experiences (Connotation)*



Figure 84: Cafe scheme mood board (Author 2018)

# Space Planning Iterations



GROUND FLOOR  
ORIENTATION

Original tile pattern bleeding into the new cafe flooring



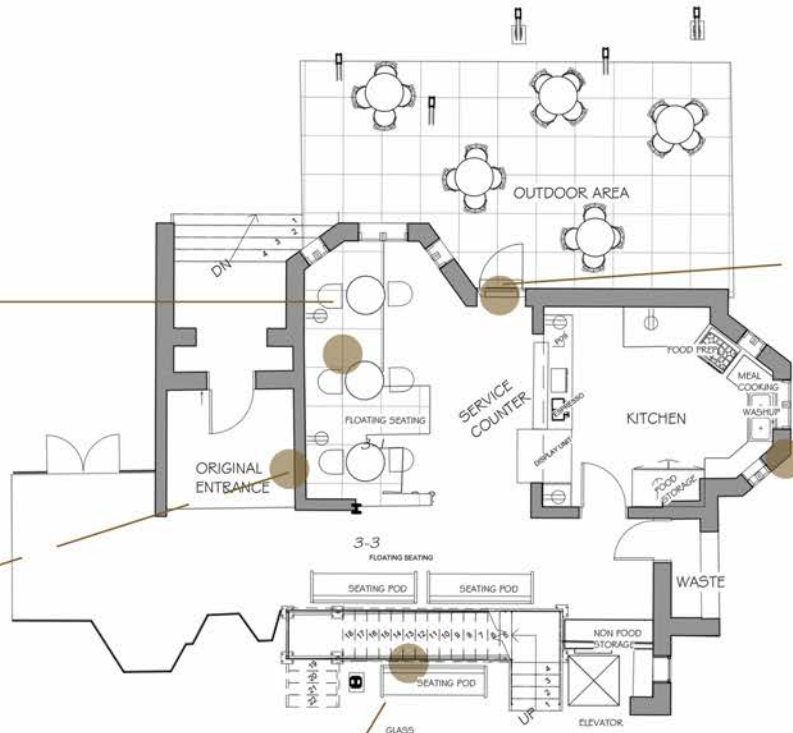
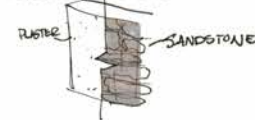
New brass door frame.  
Reiterating existing architrave detail



New arch window inserted to reveal the original entrance and improve natural lighting



Plaster stripped back to reveal sandstone



Retained staircase spandrel detail



Figure 85: Cafe floor layout (Author 2018)

# Axonometric

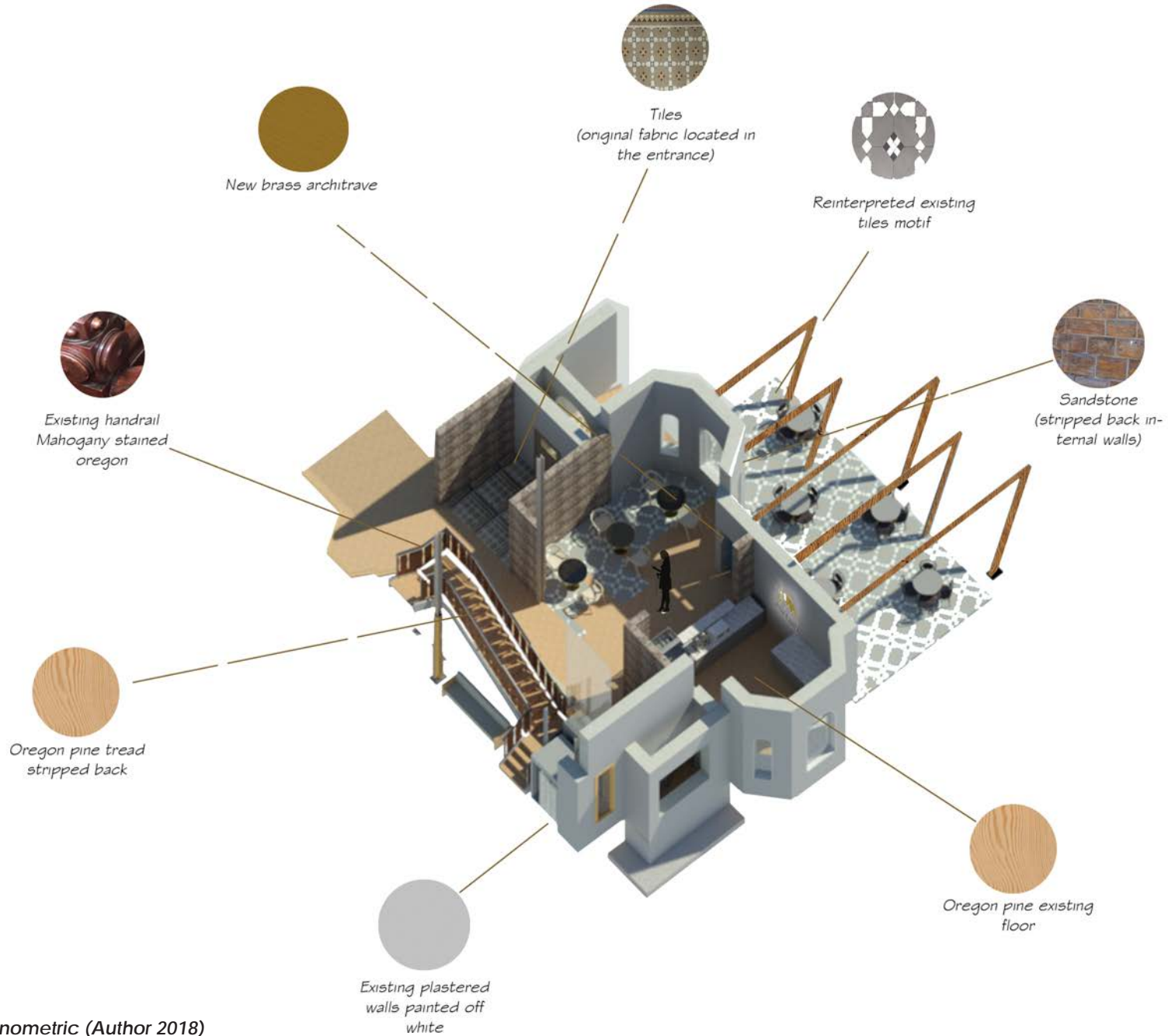


Figure 86: Cafe axonometric (Author 2018)



## 6.5.4 Academic Research Lab, Academic Tutoring and Music Room

The academic research lab is positioned towards the north side private side. Very little traffic passes there in the form of pedestrian and vehicular. The room is designed to accommodate three programs (Fig. 87). The shared space reiterates the need for contingent design in order to accommodate after-hours cyclical changes. All three of the programs share the need for focus areas and hub areas.

The academic tutoring and music functions take place in the afternoons on alternate days (Fig. 88 & 89). The major requirement for the two programs to function is an acoustically treated room, which is a requirement for the research lab as well. The only fixed aspect is the focus plug in desk which are require data and power.

The materials are in keeping with the existing finishes (Fig. 90). The tile pattern found in the entrance is reinterpreted and applied to the acoustic wall panels.



Figure 87: Academic research, tutoring and music room mood board (Author 2018)

## Space Planning Iterations

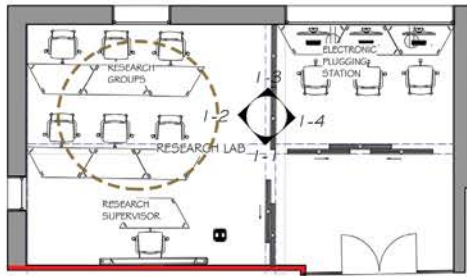


GROUND FLOOR  
ORIENTATION

A

Scenario A

- New Addition
- Existing
- Grid



B

Scenario B

- New Addition
- Existing
- Grid

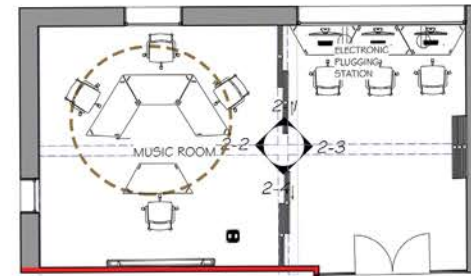


Figure 88: Academic research, tutoring and music room floor layout scenario a and b (Author 2018)





Scenario C

-  New Addition
-  Existing
-  Grid

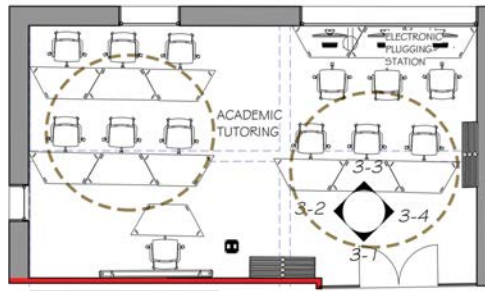


Figure 89: Academic research, tutoring and music room floor layout scenario c (Author 2018)

# Axonometric

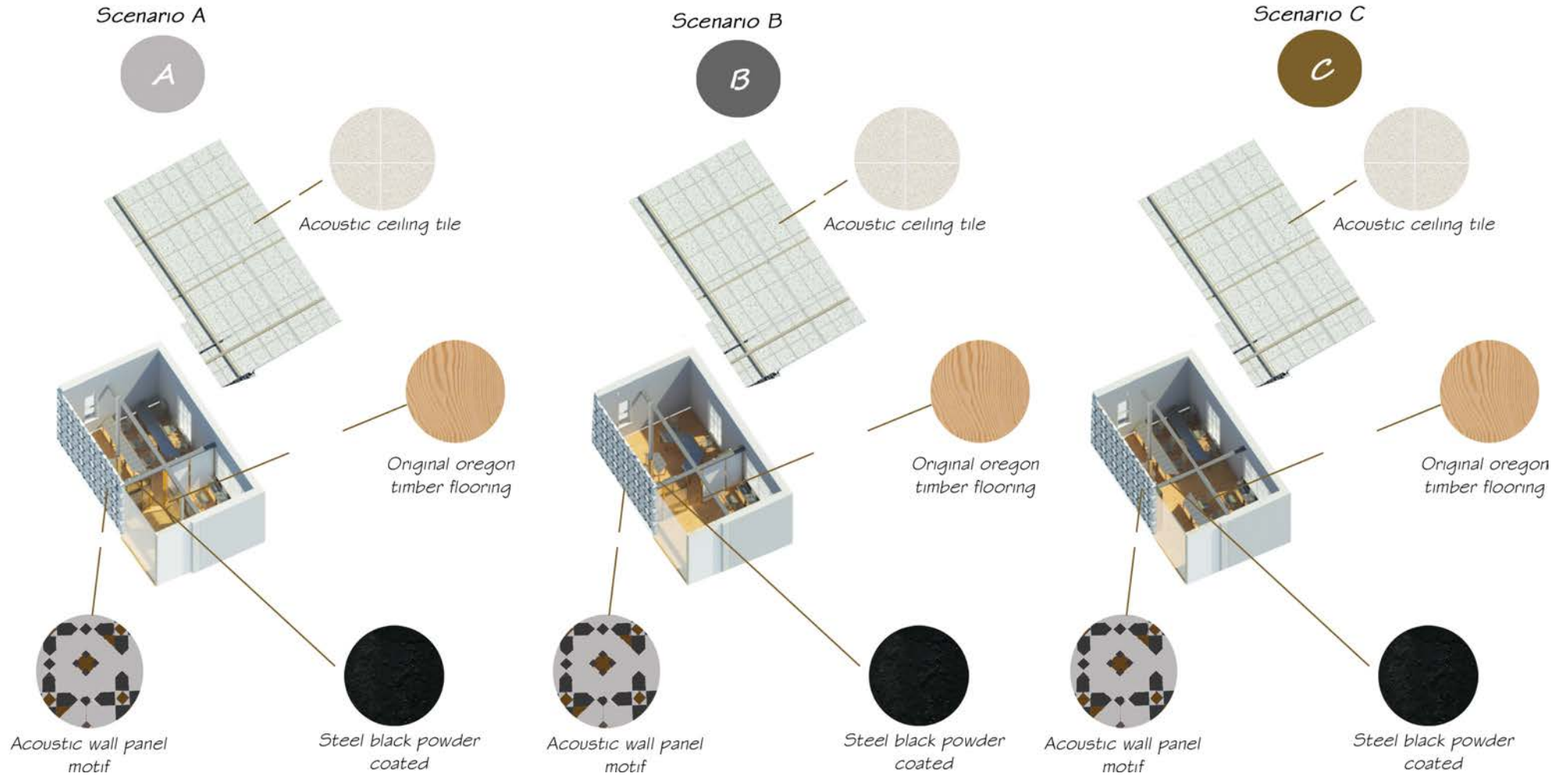


Figure 90: Academic research, tutoring and music room axonometric (Author 2018)

## 6.5.5 Kitchenette and Culinary Classes.

The kitchenette, located in what was a bedroom on the southern end of the building now functions as a kitchenette and a low scale culinary school. The major design consideration pivot around the need for a gas point for the cooking stations. The solution is highlighted in both scenarios with cooking stations on castors that have gas cylinders intergrated (Fig. 93). Once the cooking is done, the space opens up allowing the stackable canteen tables and chairs to assume any position.

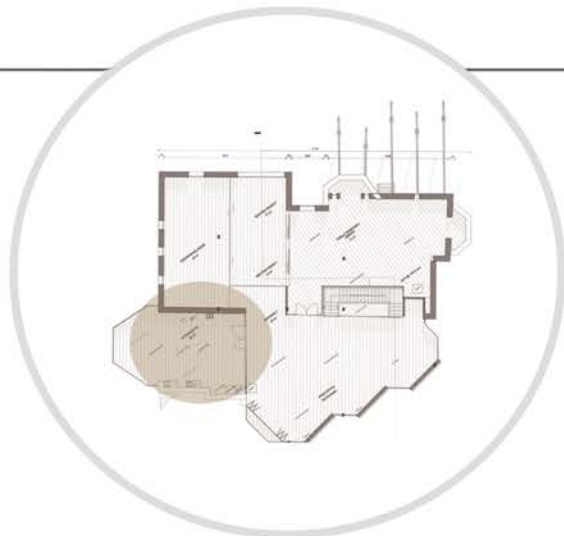
An important heritage feature is the addition of a glass facade that mimics the language of the bay windows (Fig. 92). The addition allows daylight into the dark space, as well as addition bar style seating.

The material palette is clinical. The existing walls are stripped back to reveal the brick-course, which is sealed with an enamel for hygiene purposes. The floors are vinyl tiles with a concrete replicated finished.



Figure 91: Kitchenette and culinary classes mood board (Author 2018)

# Space Planning Iterations



FIRST FLOOR  
ORIENTATION



Scenario A

■ New Addition

■ Existing

--- Grid

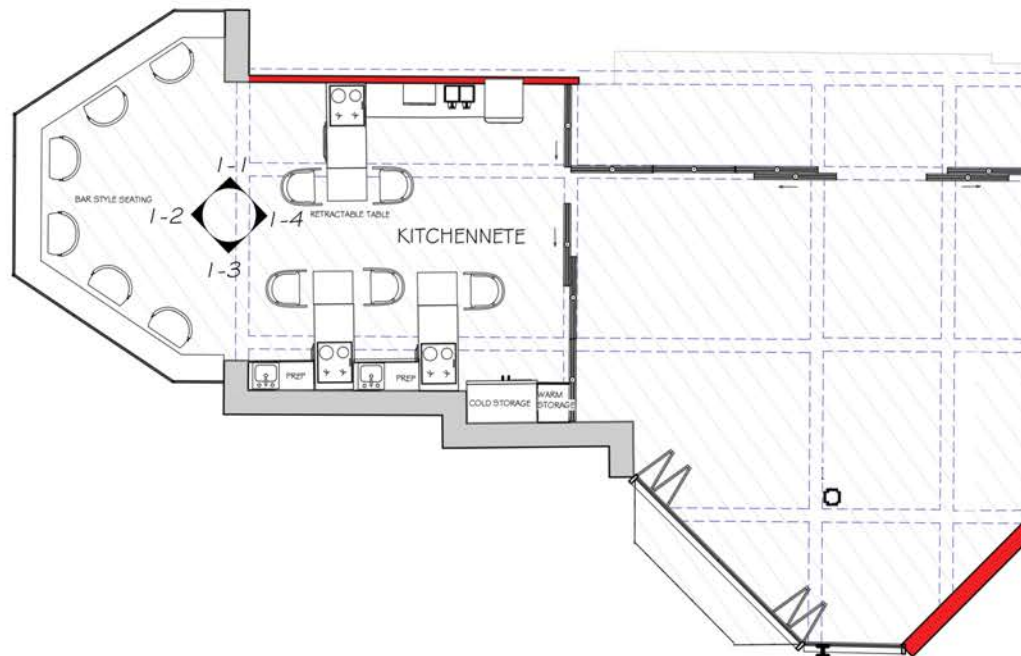


Figure 92: Kitchenette and culinary classes floor layout scenario a (Author 2018)

B

Scenario B

■ New Addition

■ Existing

--- Grid

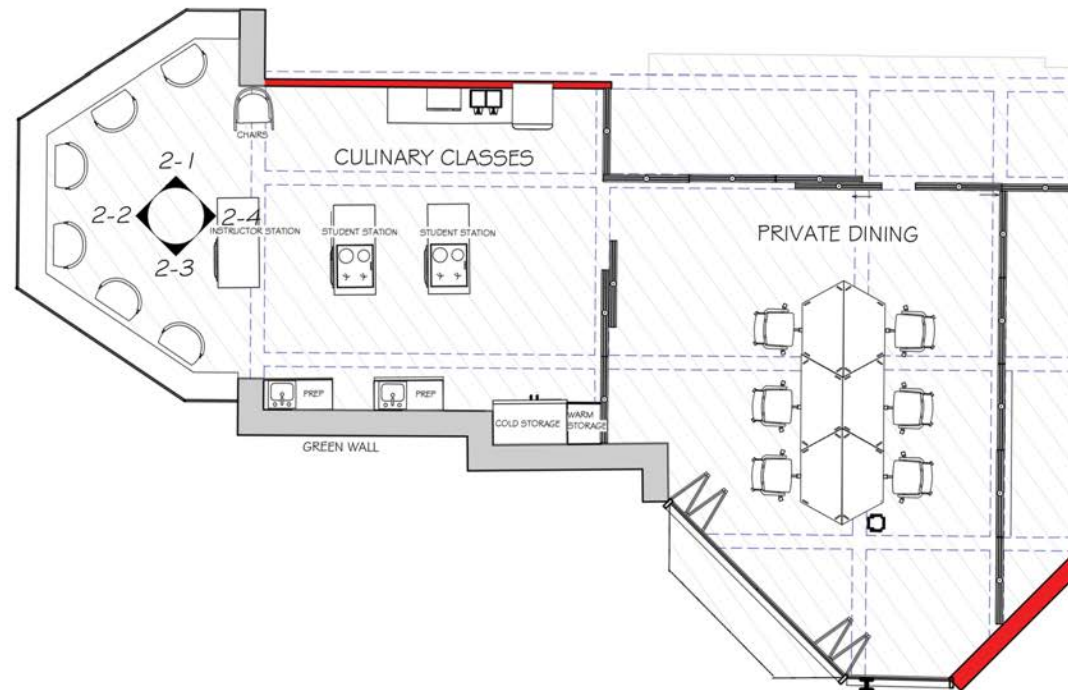
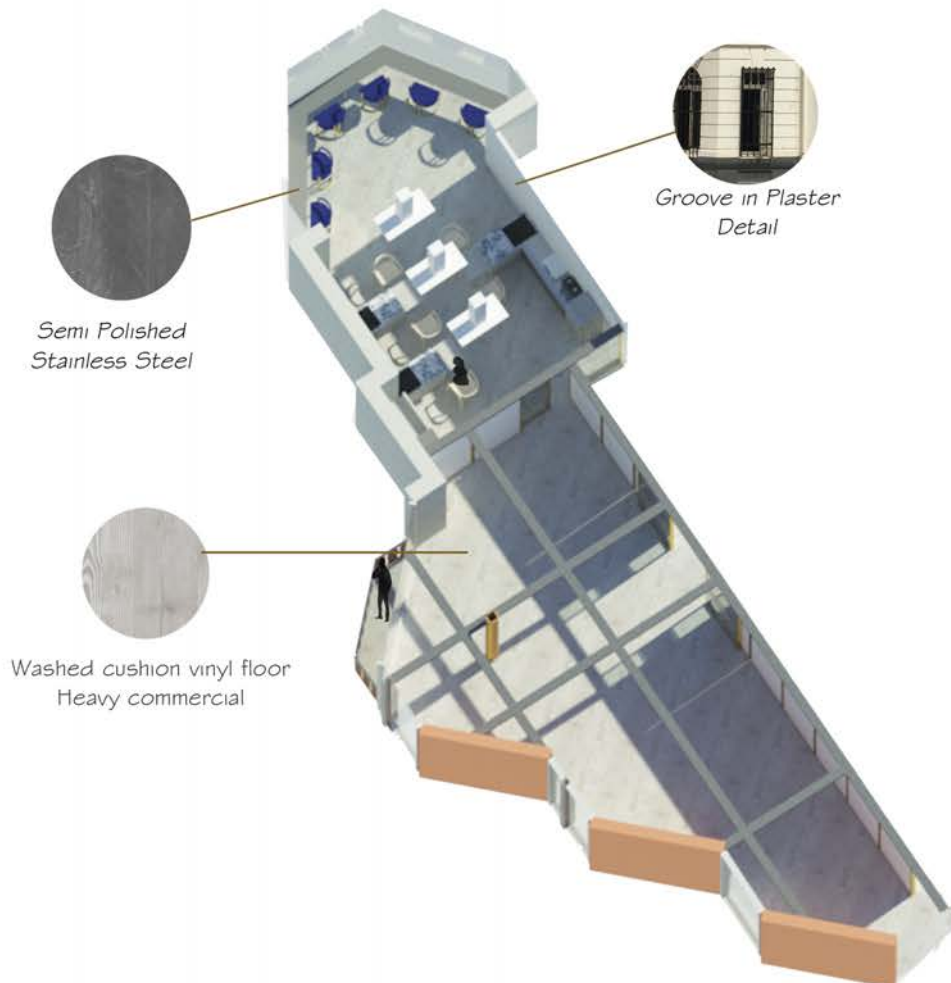


Figure 93: Kitchenette and culinary classes floor layout scenario b (Author 2018)

# Axonometric

Scenario A

A



Scenario B

B

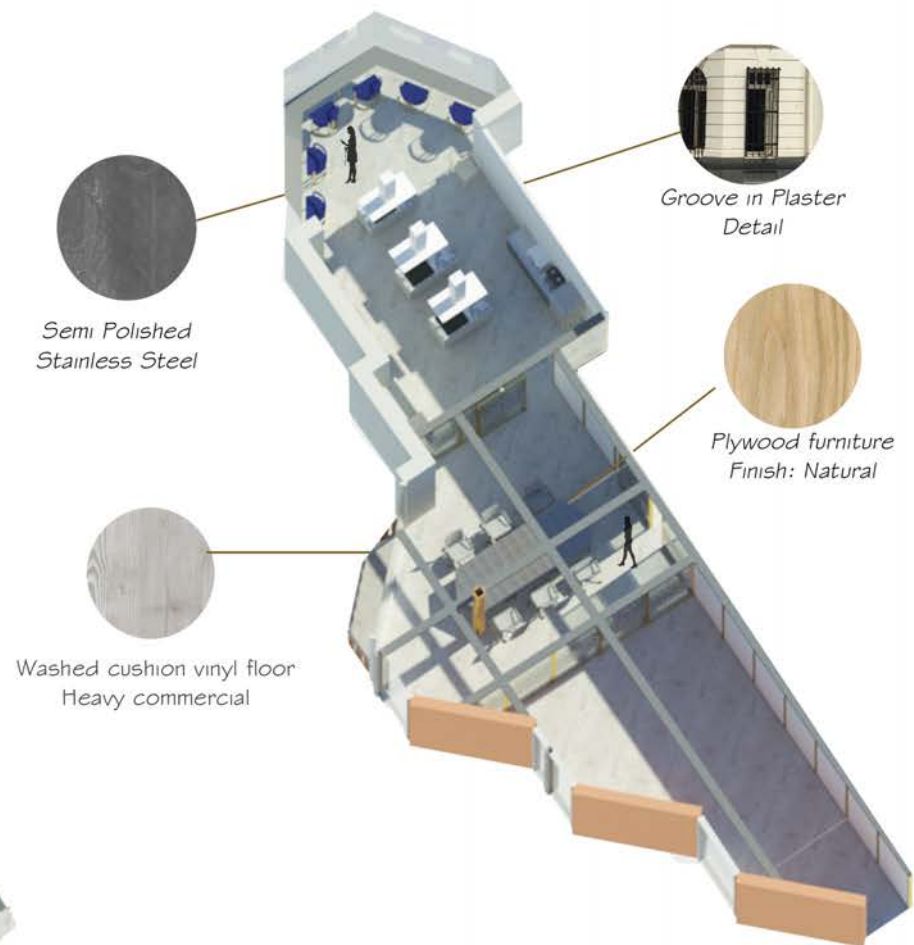


Figure 94: Kitchenette and culinary classes axonometric (Author 2018)

## 6.5.6 Research Library, Conference Room and Dance Studio

The meeting room, conference room and library are interconnected spaces. During the morning, one or all of the spaces functions thus there is a need for a system to compartmentalize the rooms. The exact numbers that will occupy the meeting room fluxes, this requires sliding screens that can unify both meeting rooms (Fig. 96).

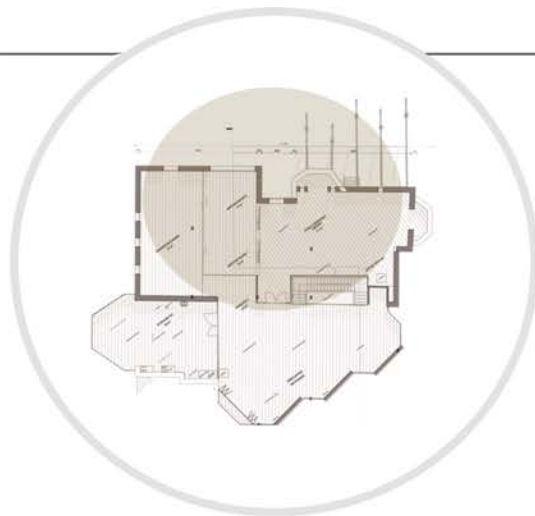
The conference room and meeting rooms reconfigure to accommodate a dance studio. The panels which are screen to demarcate then double up as mirrored walls. The conference tables are placed on castor's and fold up to become a balancing rail alongside the wall as illustrated in scenario c (Fig. 97). Another opportunity is unearthed to explore the connection between the adaptive elements and the stagnant essence of House Boeschoten.

The material palette unifies the entire spaces by drawing inspirations from the exposed trusses and existing oregon pine floor. The light timber tones and brass accents are used to produce an executive finish as referred to in the mood board (Fig. 98).



Figure 95: Research library, conference room and dance studio mood board (Author 2018)

# Space Planning Iterations



FIRST FLOOR  
ORIENTATION

A&B

Scenario A#B

- New Addition
- Existing
- Grid

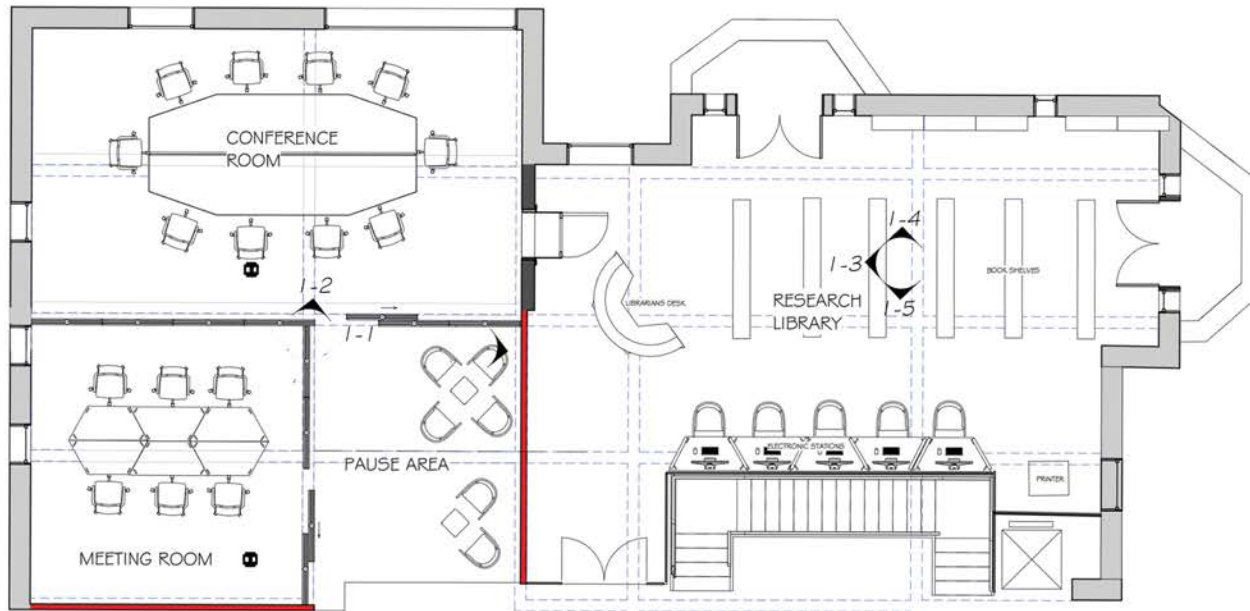


Figure 96: Research library, conference room and dance studio floor layout scenario a&b (Author 2018)





### Scenario C

■ New Addition

■ Existing

--- Grid

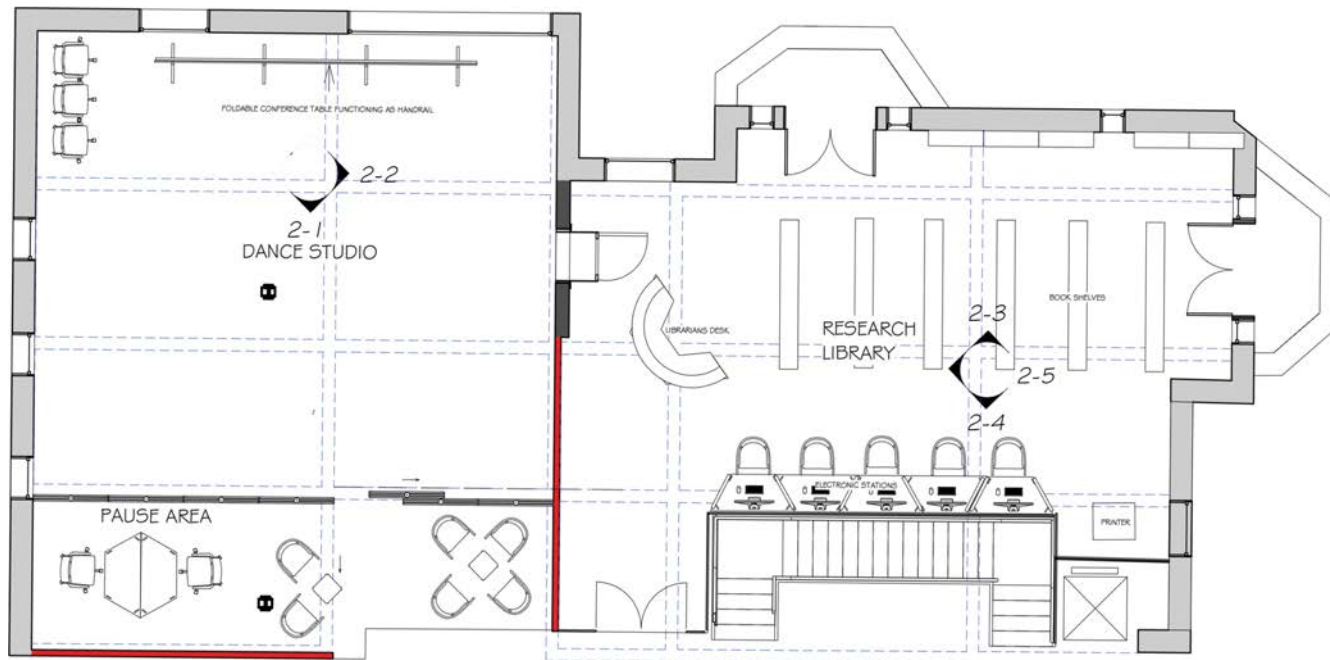


Figure 97: Research library, conference room and dance studio floor layout scenario c (Author 2018)

# Axonometric

A

Scenario A

B

Scenario B

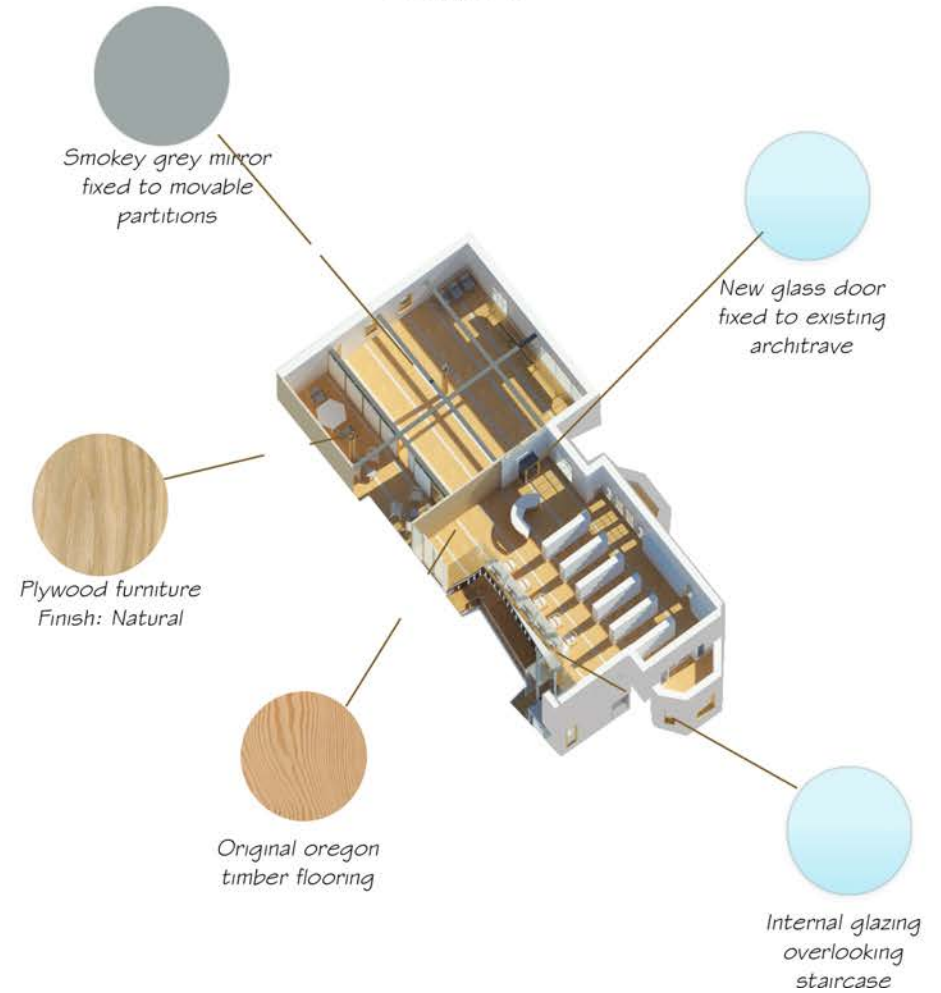
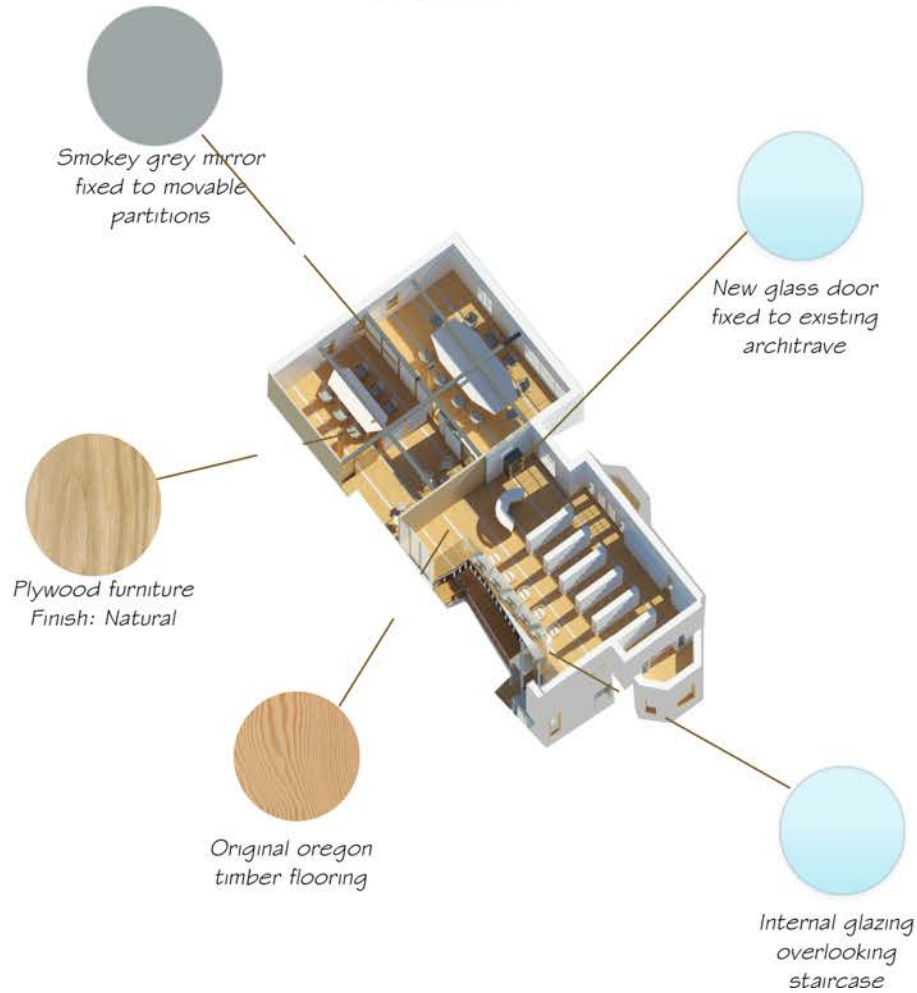


Figure 98: Research library, conference room and dance studio axonometric (Author 2018)

## 6.5.7 Offices and Activity-based Work.

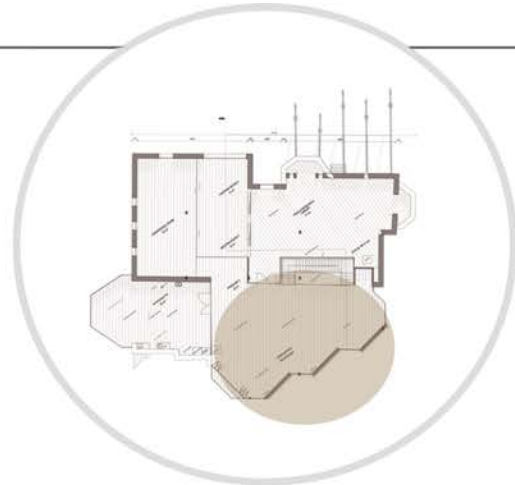
The open plan design for the offices is based on the hot desking principle. There is focus area with fixed desktops and desks, while the rest of the spaces is open to individual and collaborative work (Fig. 99). The layout requires that there be movable screen that can configure isolated areas, as well as flexible furniture that can adapt in line with these changes. The screen solution is not meant to provide soundproof spaces, but rather spaces that suggest temporary privacy (Fig. 101).

The material palette is in keeping with the adjacent kitchenette (Fig. 102). Clean corporate colours and natural wood finishes with the emphasis on the interface and distinction between existing floor/roof and partitions and furniture.



Figure 99: Offices and activity-based work mood board. (Author 2018)

# Space Planning Iterations




FIRST FLOOR  
ORIENTATION



Scenario A

 New Addition

 Existing

 Grid

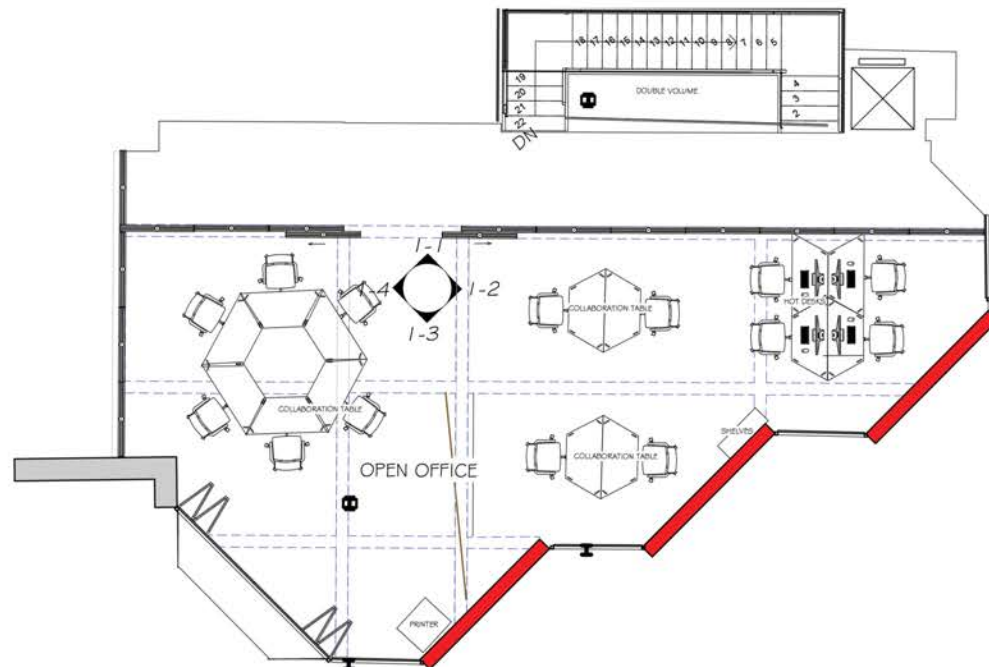


Figure 100: Offices and activity-based work floor layout scenario a. (Author 2018)

B

Scenario B

■ New Addition

■ Existing

— Grid

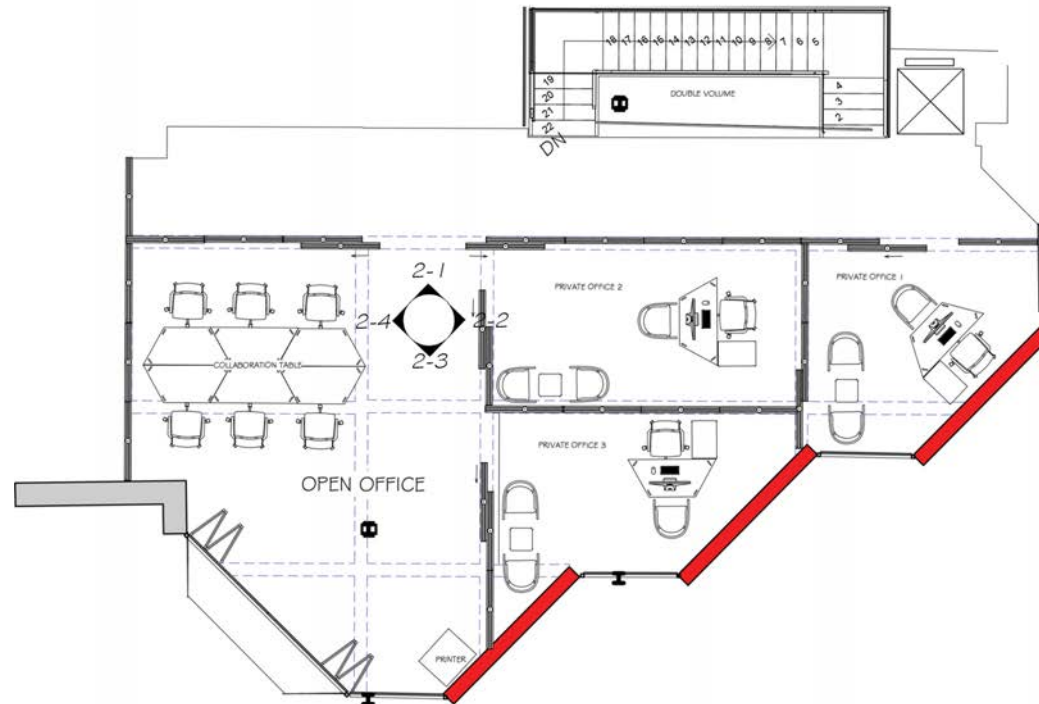


Figure 101: Offices and activity-based work floor layout scenario b. (Author 2018)

# Axonometric

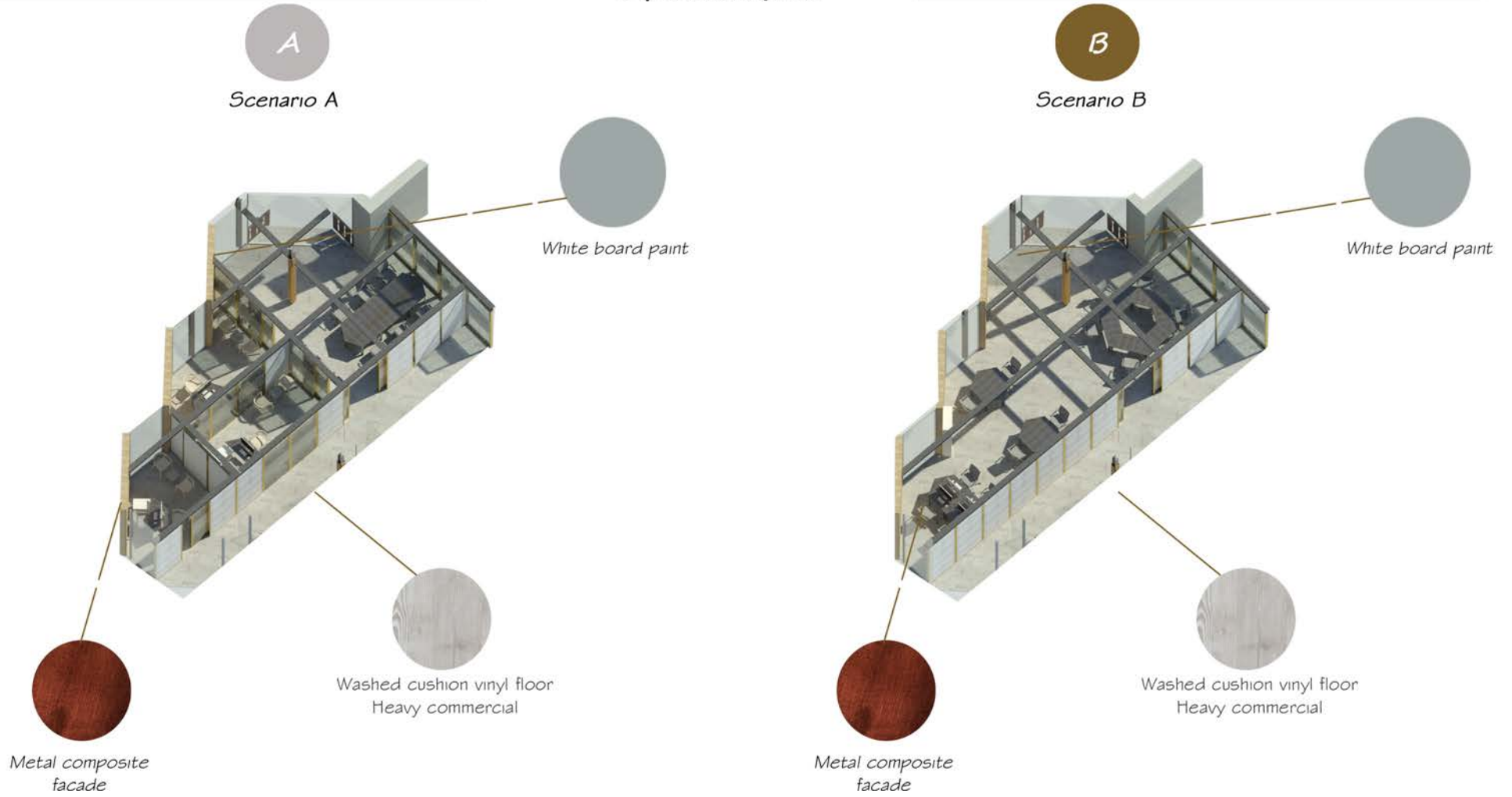


Figure 102: Offices and activity-based work floor axonometric. (Author 2018)

## 6.6.8 Inside-Out Conclusion

This chapter shows how the intervention moves House Boeschoten towards fluidity. The innovation is in the way design can be flexible without compromising the essence of House Boeschoten. The flexibility arises from the need to accommodate separate programs in the morning and afternoon. The programs are allocated to a space according to similarity to keep the adaptiveness within manageable delimitations.

The objective of the design chapter is to select the appropriate scenarios and schemes for each space that will clearly represent contingency and provide opportunity to celebrate the connections of old and new which are covered in the technical chapter.





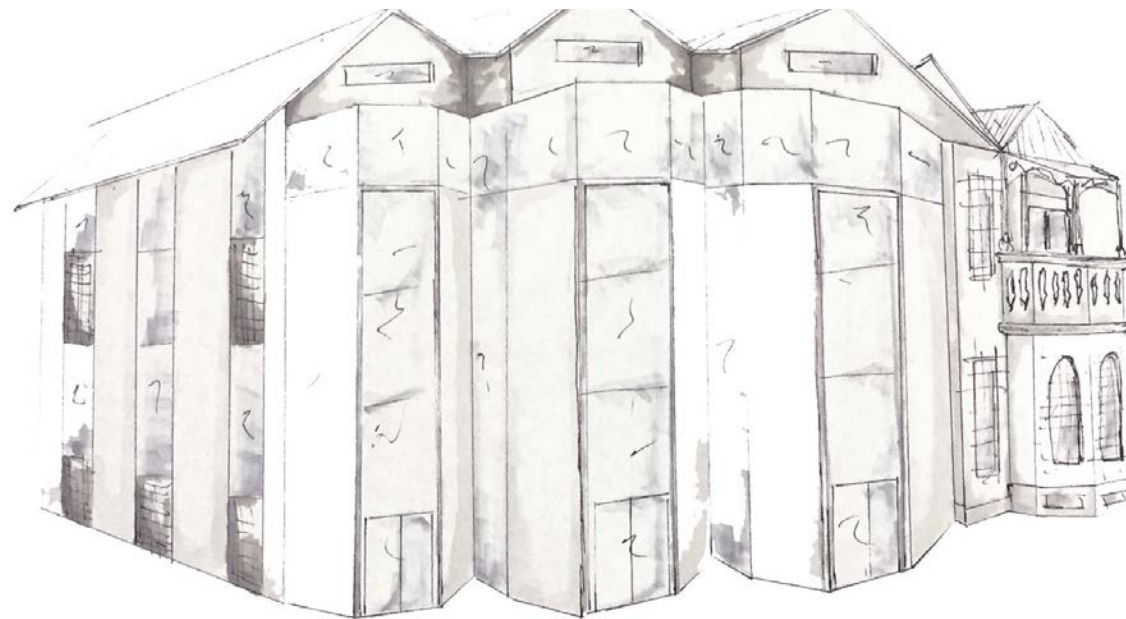


7

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## CHAPTER 7: TECHNICAL DEVELOPMENT

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## 7.1 Introduction

The technical development chapter is concerned with the introduction of pragmatism to the design without losing the theoretical intention. The connection between the original essence of House Boeschoten and the new design for disassembly is unpacked to reveal several degrees of permanence. The intention to achieve contingency requires an explorative strategy to technify specific parts of the building according to the degrees of permanence: fixed, partially fixed, object and furniture. The technical exploration focuses on connecting the new to the essence in a temporal manner, without compromising the existing fabric. Design for disassembly is a strategy that allows the rapid dismantling of a parts once they have reached the end of their life cycle. This approach is beneficial to the essence of House Boeschoten which requires temporal additions that allow for reduction back to historical essence.

## 7.2 Research Questions & Outcomes

### Main research question:

How does the connection of new fabric to the existing fabric allow for stripping back without defacing the original essence?

### Sub questions:

- How can joinery details remain temporary in order to leave no residue on the original fabric?
- How do the temporary connection details

celebrate the essence of Houses Boeschoten?

How do the interface details compliment and reinterpret the existing joinery?

The technical chapter resolves these questions by exposing new connections and joints, as opposed to concealing the fixing details, which are representative of original House Boeschoten. The outcome results in a celebration and juxtaposition of old and new through exposed and concealed fixing.

## 6.2 Degrees of Permanence

Contingency is explored in this chapter as the ability for architecture to become flexible. The complexity arises in the need to express flexibility on various degrees (Fig. 103), considering the need for a rational design in the end. The fixed parts of the building refers to the structural design that serve load bearing requirements. The partially fixed refers to the parts that can be maneuvered to serve an alterna-

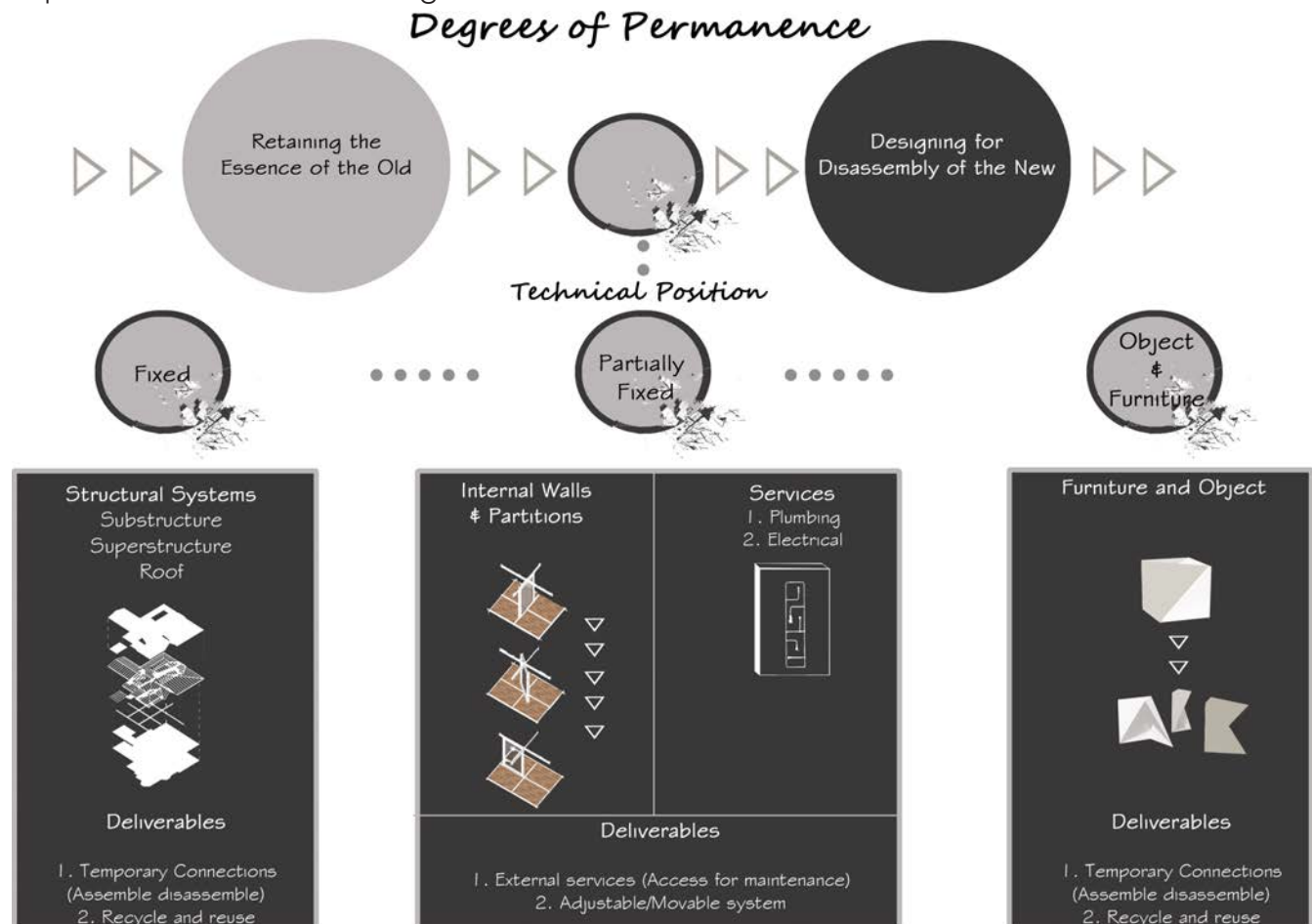


Figure 103: Degrees of permanence strategy (Author 2018)

five use, related to its original use. Object and furniture consists of parts that are completely modular and multifunctional according to the type and uses of that type.

### 7.2.1 Fixed

Fixed refers to the structural system and the ability for that to be designed for disassembly. The fixed is the most permanent part of the building thus removals and additions needs to be thoroughly considered. The fixed explores the connections of original House Boeschoten with the addition of new fabric through the following details:

#### 1. Substructure and Floor:

- The original wooden suspended floor system with tongue and groove planks is connected to new steel section joists with vinyl interconnected floors.
- A new trim detailed is explored which connects the original and new floor finishes which differ slightly in height and finish.

#### 2. Superstructure:

- The connections between the original sandstone walls and the new light steel frame walls is detailed.
- The new h section columns detailed fixing to the existing sandstone foundation wall as well as the boxing up of the steel column.

#### 3. Roof Structure:

- The connection of the new flat roof/ceiling and the existing gable roof/ceiling is detailed
- A detail of the altered original gable roof with a newly inserted clerestory.
- A ceiling and lighting plan for the northern wing on the first floor where the new roof and ceilings alteration are evident.

### 7.2.2 Partially Fixed

The partially fixed is a systems approach to internal partitions. The partitions aren't fully fixed thus they can be removed and have little effect on the heritage fabric. The internal partitions are designed to move, adjust and interconnect. The intentions for the partially fixed is to detail internal walls that have the flexibility too adapt to the inhabitants spatial requirements. The following connections are explored:

#### 1. Grid:

- A detail of how the new grid system is suspended from the existing floor joists and roof trusses.
- A connection detail of how the grid and panels meets the existing walls.

### 6.2.3 Object and Furniture

Object and furniture are the loose items that can be moved or removed with very little effort. The intention for object and furniture is to product a line of individual parts that can be interconnected for assembly, and disas-

sembled for reuse, reconfiguring or recycling. Although object and furniture is not fixed to the building, the connections need to compliment the existing joinery as this forms part of House Boeschotens identity and memory. The following details are explored:

#### 1. Object:

- The old staircase is reorientated and redesigned. The connections between the new steel stringer and the only oregon tread.
- The new perforated steel balustrade and the original turned pine hand rail.
- The new transparent mandrel's connection to the existing floor and stringer.
- The original architraves and door openings that remain are.

#### 2. Furniture:

- Design for disassembly occasional chairs and tables that have a universal application and express connections and materials palette that compliment original House Boeschoten

### 6.3 Precedents of Fixed, Partially Fixed and Object and Furniture.

The precedent are an example of the various degrees of permanents: fixed, partially fixed, object and furniture (Annexure C).

## 6.4 Final Design: Plans, Sections, Elevations and Details

-  3. Olivetti Showroom
-  2. Vitsoe HQ Production Building
-  1. Substrate Factory

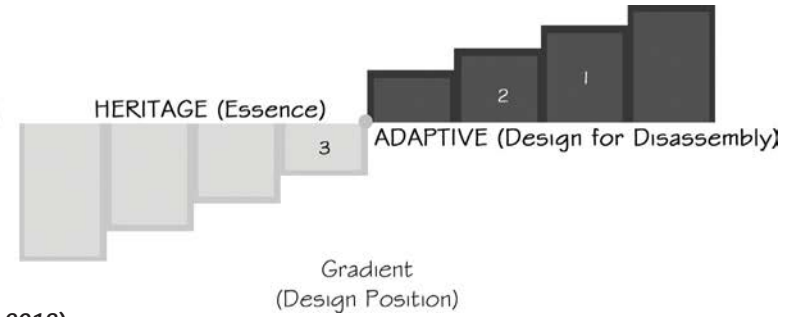


Figure 106: Precedent design position (Author 2018)



Figure 104: Demolition ground and first floor plans, not to scale (Author 2018)



Figure 105: Final site plan, not to scale (Author 2018)







Existing Fabric: Elevations



EXISTING SOUTH ELEVATION  
NTS



Figure 108: South elevation, not to scale (Author 2018)

Existing Fabric: Elevations



EXISTING EAST ELEVATION  
NTS



Figure 109: East elevation, not to scale (Author 2018)



Figure 110: North elevation, not to scale (Author 2018)

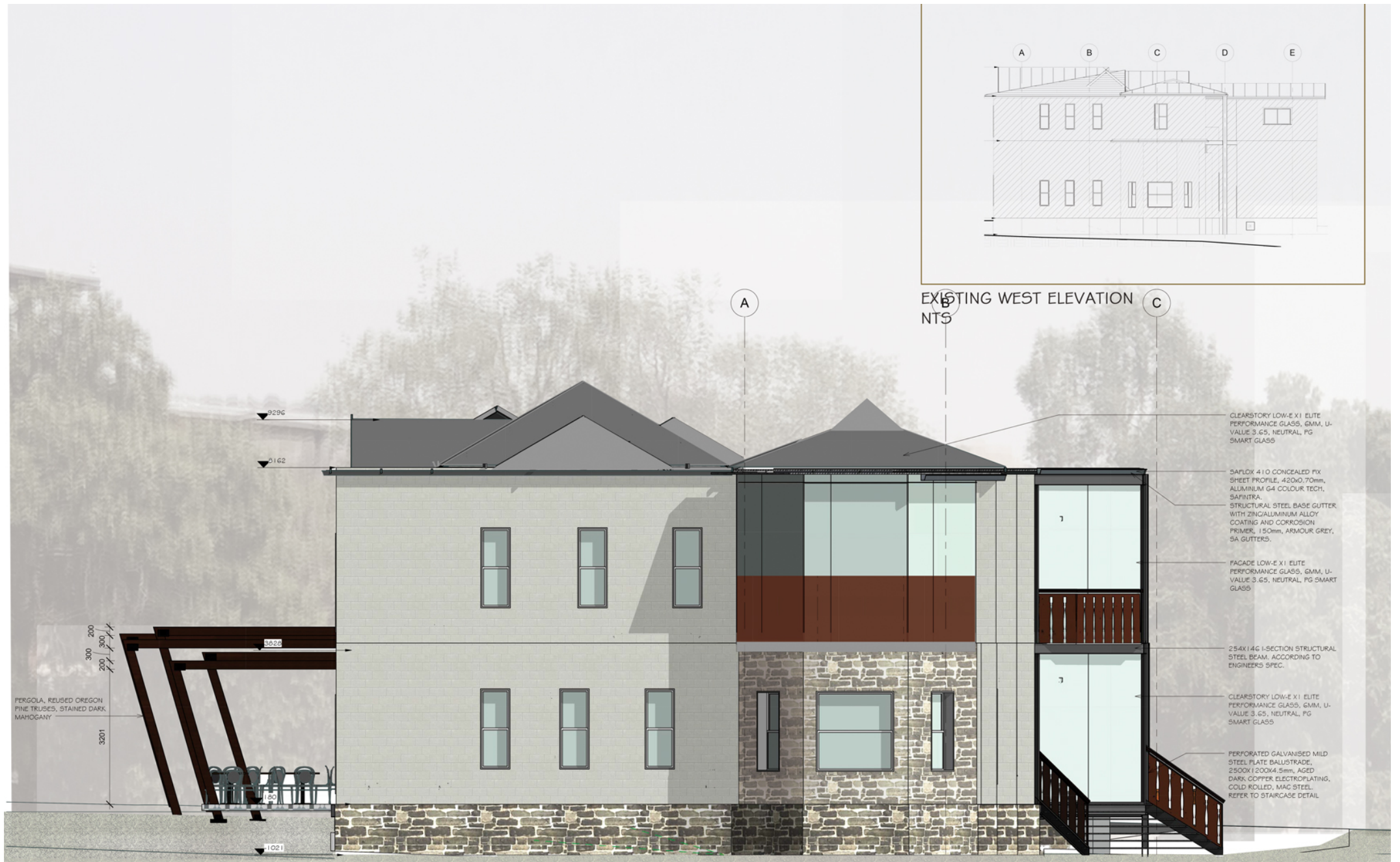


Figure 111: West elevation, not to scale (Author 2018)



Figure 112: Section A, not to scale (Author 2018)

## 6.4.1 Fixed: Substructure, Superstructure and Roof

### Floor

The interface between the existing timber suspended floor construction and the new steel floor joist construction is resolved in (Fig. 114). The existing joists rest on the sandstone walls inner leaf. This is reinterpreted and redesigned for disassembly by fixing the beam hanger to the existing sandstone wall to support a lipped channel joist (Fig. 117)

The new steel frame construction affects the finished floor level heights from old to new due to the substrate underlay below the new floor. The transition between the floor finish height difference is resolved by fixing a brass floor trim (Fig. 118)

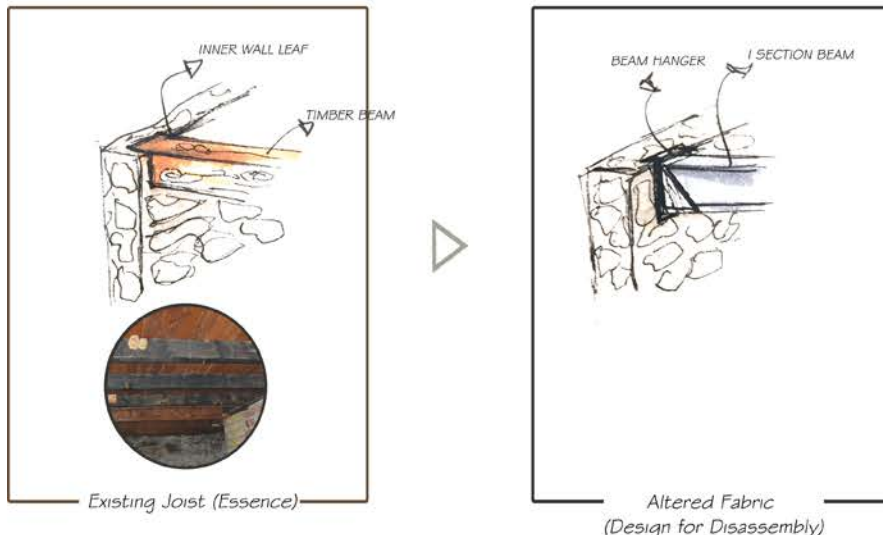
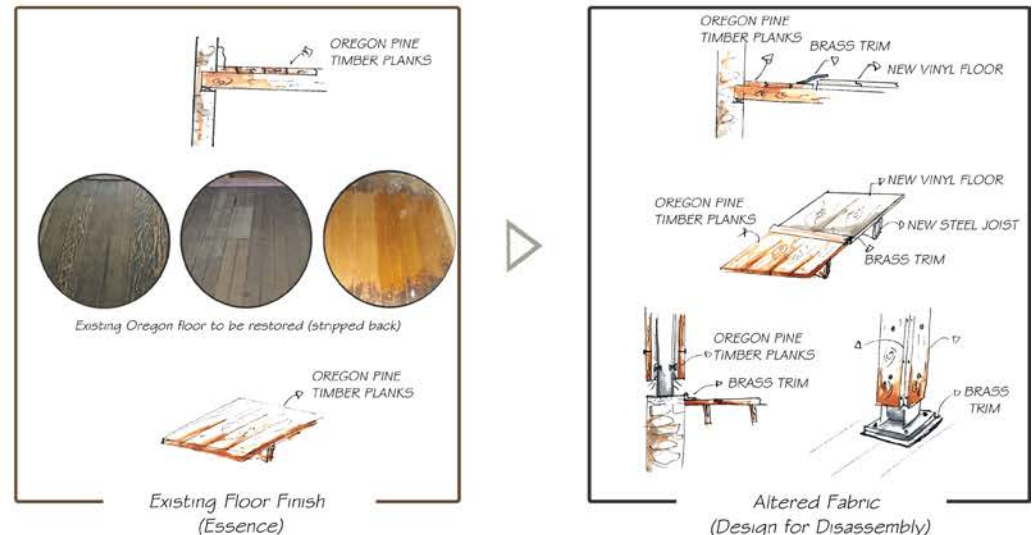


Figure 113: Floor and column exploration sketch, not to scale (Author 2018)

### Exploration



NEW ARBO 189L CUSHION VINYL FLOOR V GROOVE JOINT FIXED TO 21mm PLYWOOD SUBSTRATE, 1220x200x8mm,

PLYWOOD SUBFLOOR, 21mm.

NEW THERMAL INSULATION SUPPORTED BY 30X30 BATTEN BETWEEN JOISTS WITH POLYETHYLENE-REINFORCED VAPOUR BARRIER. LAYED BETWEEN SUBSTRATE BOARD AND INSULATION, 150mm, ISOTHERM

EXISTING OREGON PINE JOIST BUILT INTO INNER LEAF, 150X50mm.

JOIST GALVANISED LIPPED CHANNEL COLD FORMED FIXED TO EXISTING SANDSTONE PLINTH WITH MILD STEEL JOIST HANGER (260X100mm). ACCORDING TO ENGINEERS SPEC.

254X146 I-SECTION STRUCTURAL STEEL BEAM. ACCORDING TO ENGINEERS SPEC.

EXISTING TIMBER WALLPLATE

VENT AIR BRICK EVERY 1500mm<sup>2</sup> PER METRE RUN OF WALL

DPC MIN. 150mm

EXISTING SANDSTONE LOAD BEARING WALL

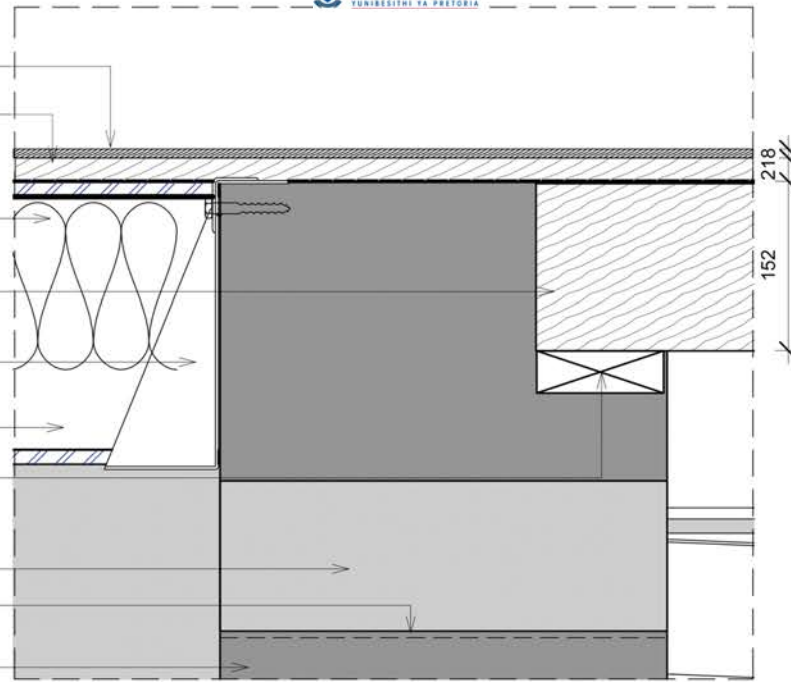


Figure 114: Detail 1 suspended floor construction, not to scale (Author 2018)

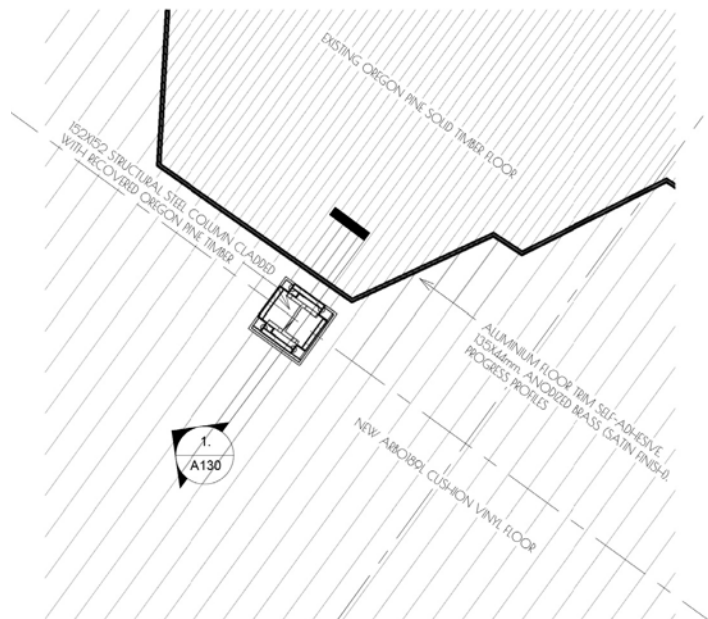


Figure 115: Ground floor column layout plan (Author 2018)

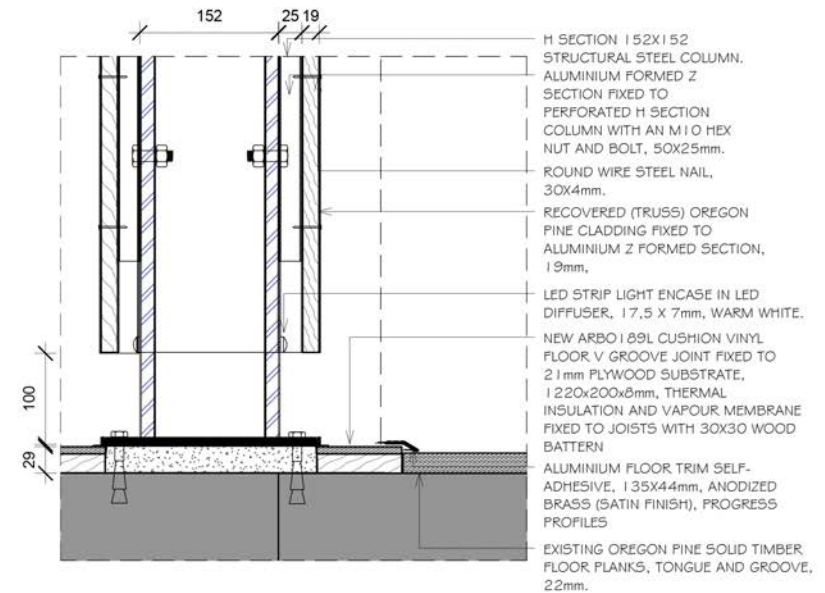


Figure 116: Section 3 column and floor finish, not to scale (Author 2018)

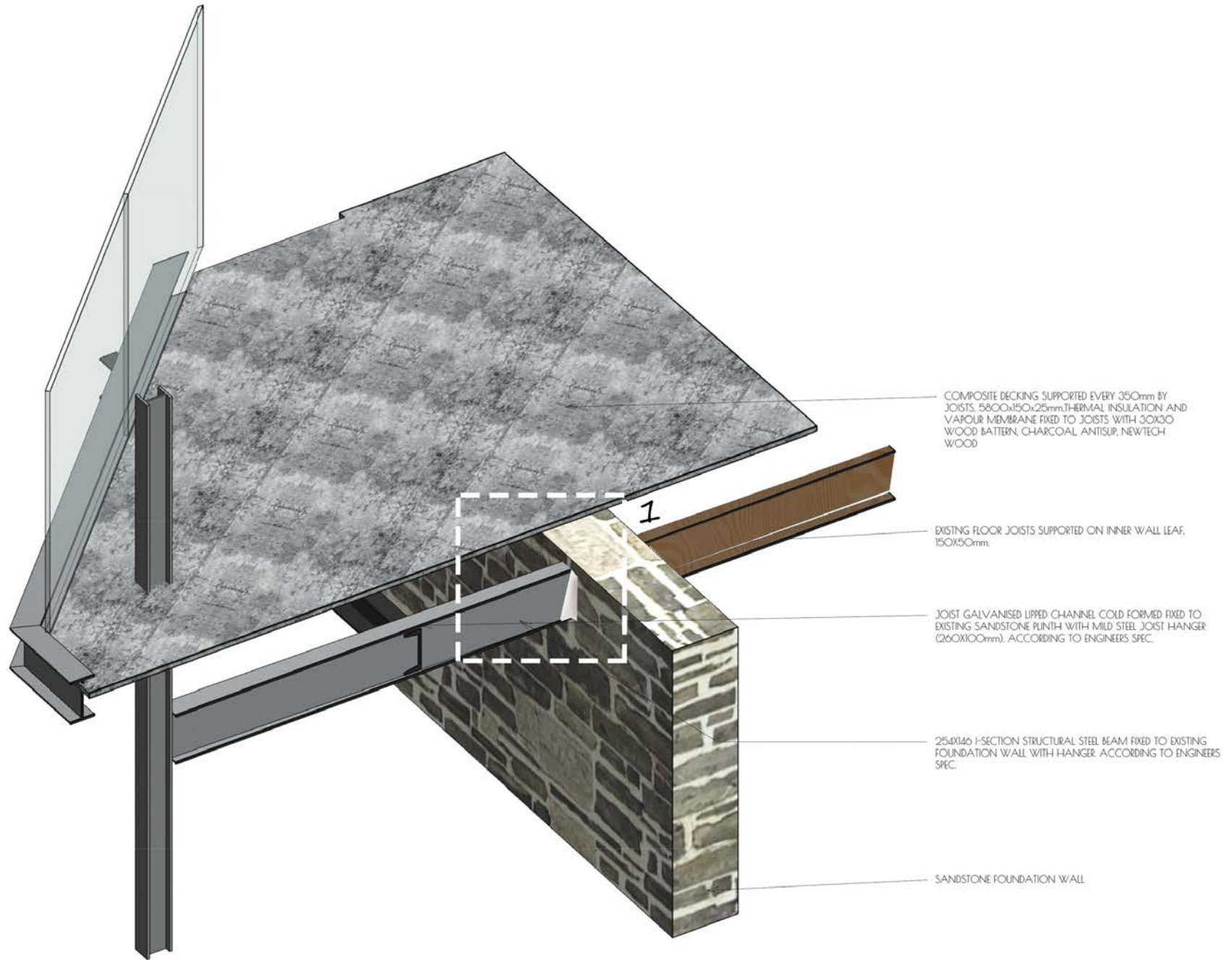


Figure 117: Substructure axonometric, not to scale (Author 2018)





Figure 118: Reception perspective, not to scale (Author 2018)

## Roof

A new flat roof is integrated with the existing combination of hipped and gable roof. The roof interface between the two is resolved by extending over under flashing between the existing corrugated iron roof and the new saflok concealed fix aluminum sheet (Fig. 119). Parts of the old roof are removed to expose the roof truss and create a clerestory window allowing natural light to penetrate the internal spaces (Fig. 121). The high performance glass is fixed to the exposed truss (Fig. 122).

The original pressed ceilings are removed and fixed to the exposed trusses along the slope (Fig. 119). Figure 119 illustrates the fixing of the pressed ceiling to the trusses allowing for the recessed down-lights and shadow-lines where the ends meet.

The interface between the new metal composite facade and the flat roof is illustrated in Figure 120. The facade cladding extends vertically passed the gutter, concealing the roof as well as the flashing that is waterproofing the joint between the new clerestory and flat roof.

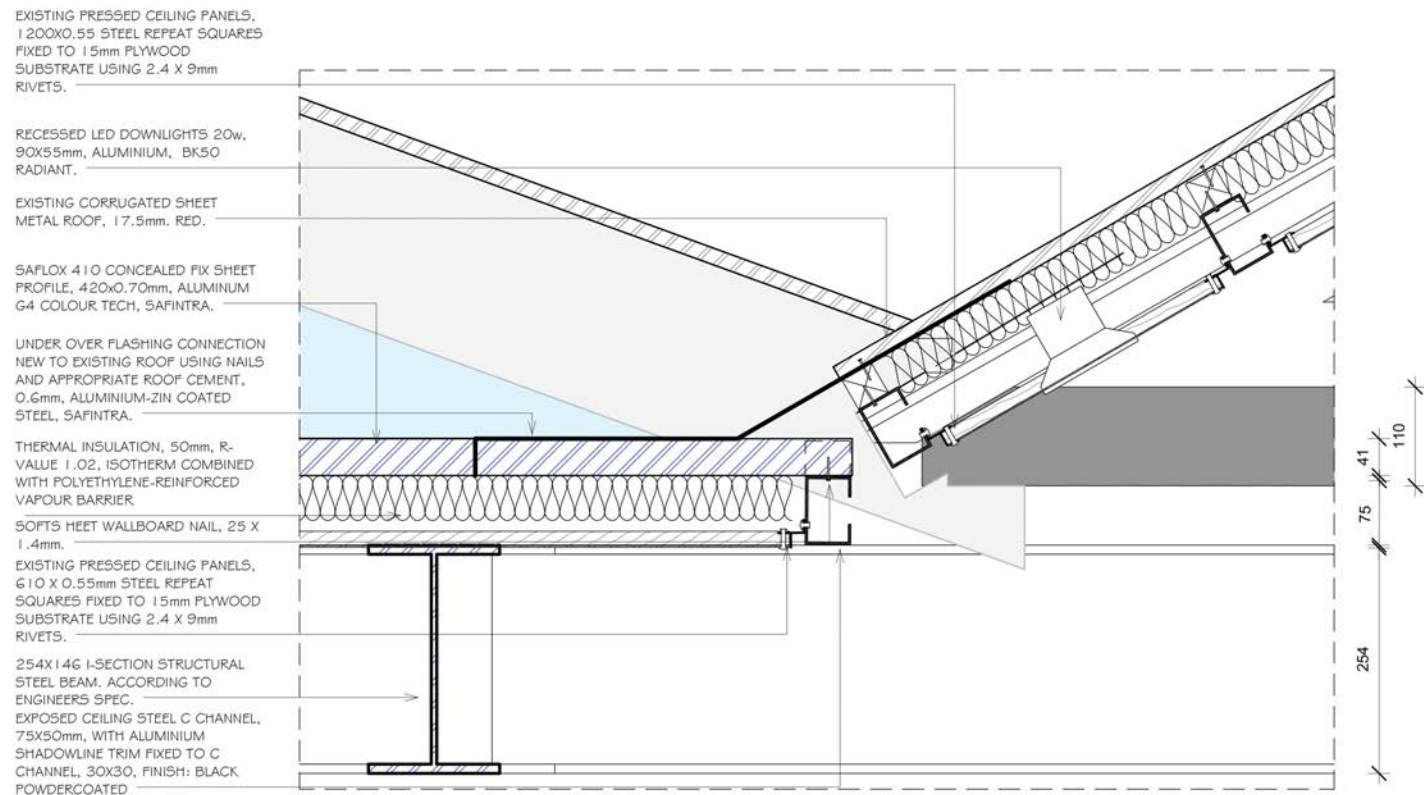


Figure 119: Detail 2 existing and new roof, not to scale (Author 2018)

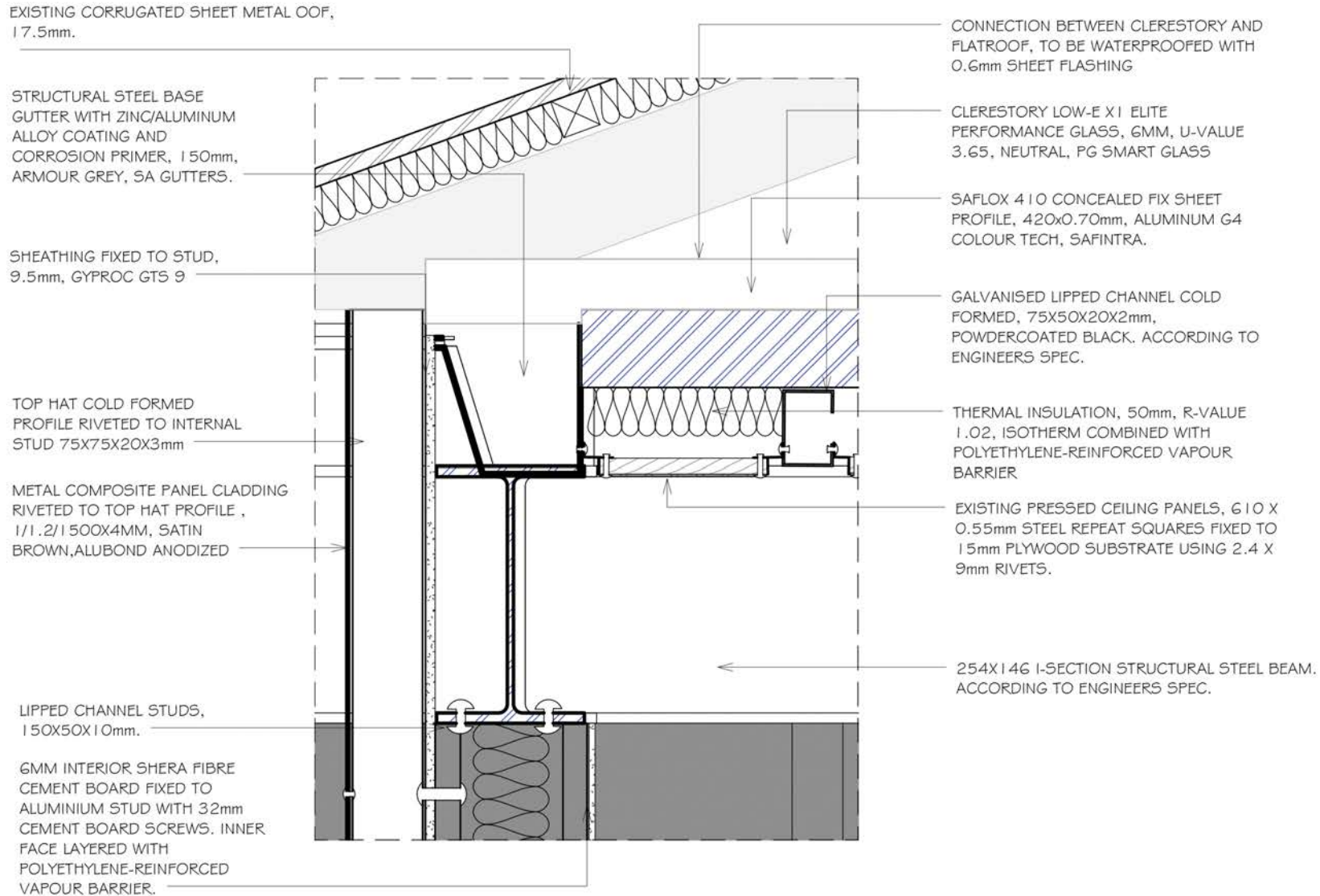


Figure 120: Detail 3 roof and facade, not to scale (Author 2018)

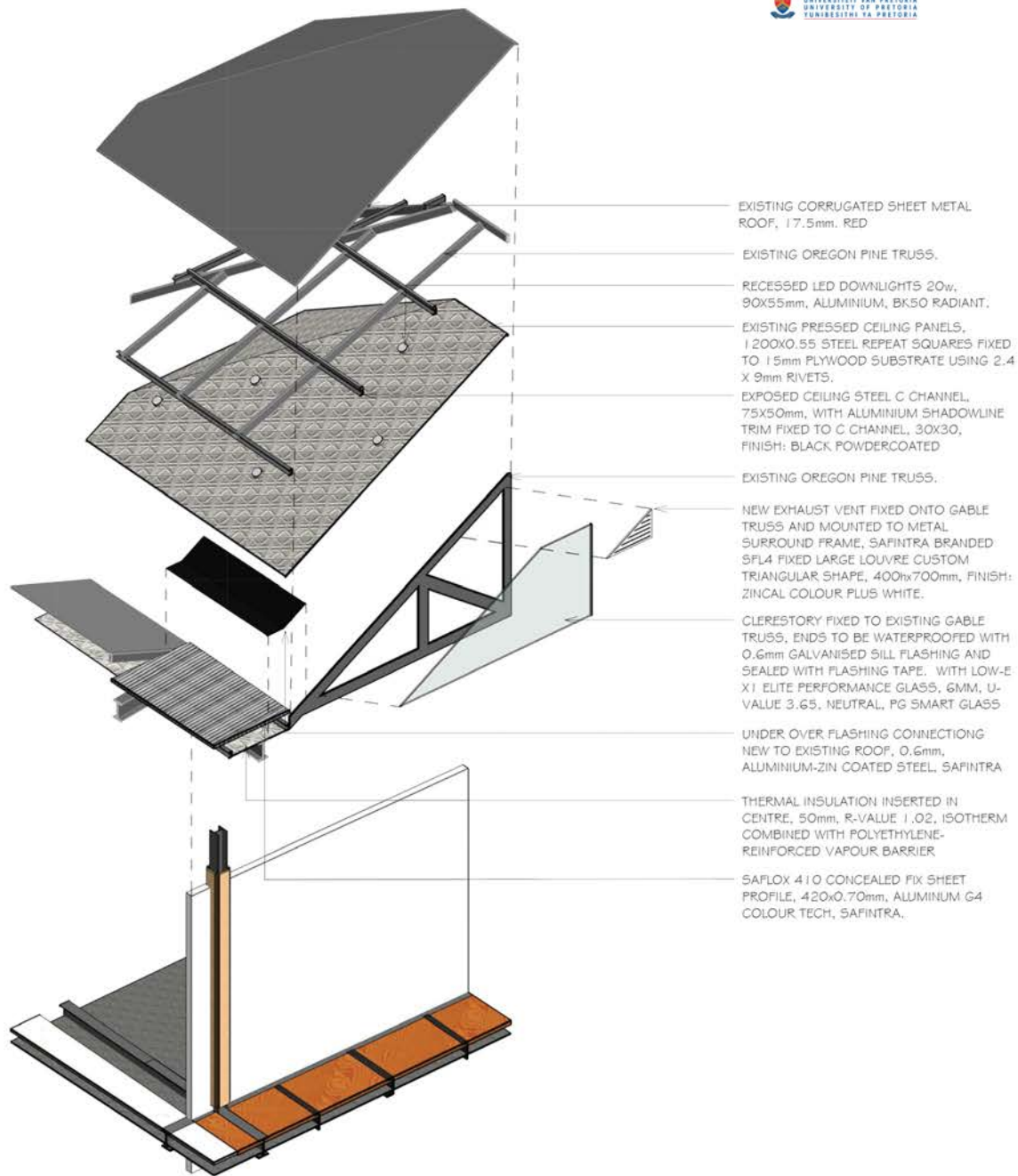


Figure 121: Roof and facade exploded axonometric, not to scale (Author 2018)

Original oregon pine truss.

Reinterpretation of existing vent and pressed ceilings.

New clerestory glazing



Figure 122: Meeting room clerestory perspective, not to scale (Author 2018)

## 6.4.2 Partially Fixed: Grid

The movable partitions grid is inserted into House Boeschoten in lieu of traditional mono-functional spaces to accommodate flexibility of use. The interface between the existing fabric and the grid is resolved through a series of details. The grid is suspended from the original roof beams by steel cables (Fig. 124) The swivel eye bolts are fixed to the joist allowing for removal and future adjustments. The grid is fixed at the extrusions ends to the existing sandstone walls to reduce the swaying (Fig. 123). The wall plate is anchored to the wall, followed by the clipping of the extrusion to the plate.

The movable panels function as walls and doors for the interior spaces, therefore, there lies an opportunity to reinterpret House Boeschoten's original style of doors. Figure 126 illustrates the solid panel as well as the glass sandblasted panel. Figure 127 illustrates the partitions construction.

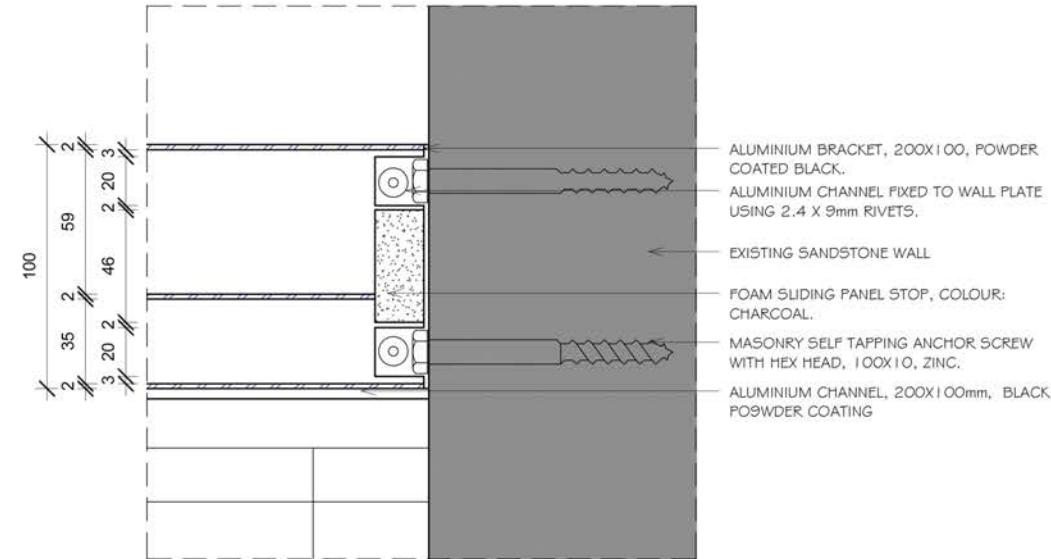


Figure 123: Detail 5 grid wall plate, not to scale (Author 2018)

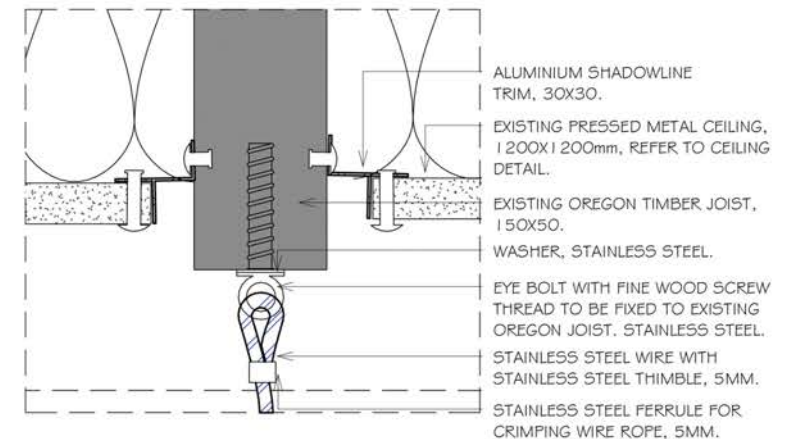


Figure 124: Detail 6 suspended grid to joist, not to scale (Author 2018)

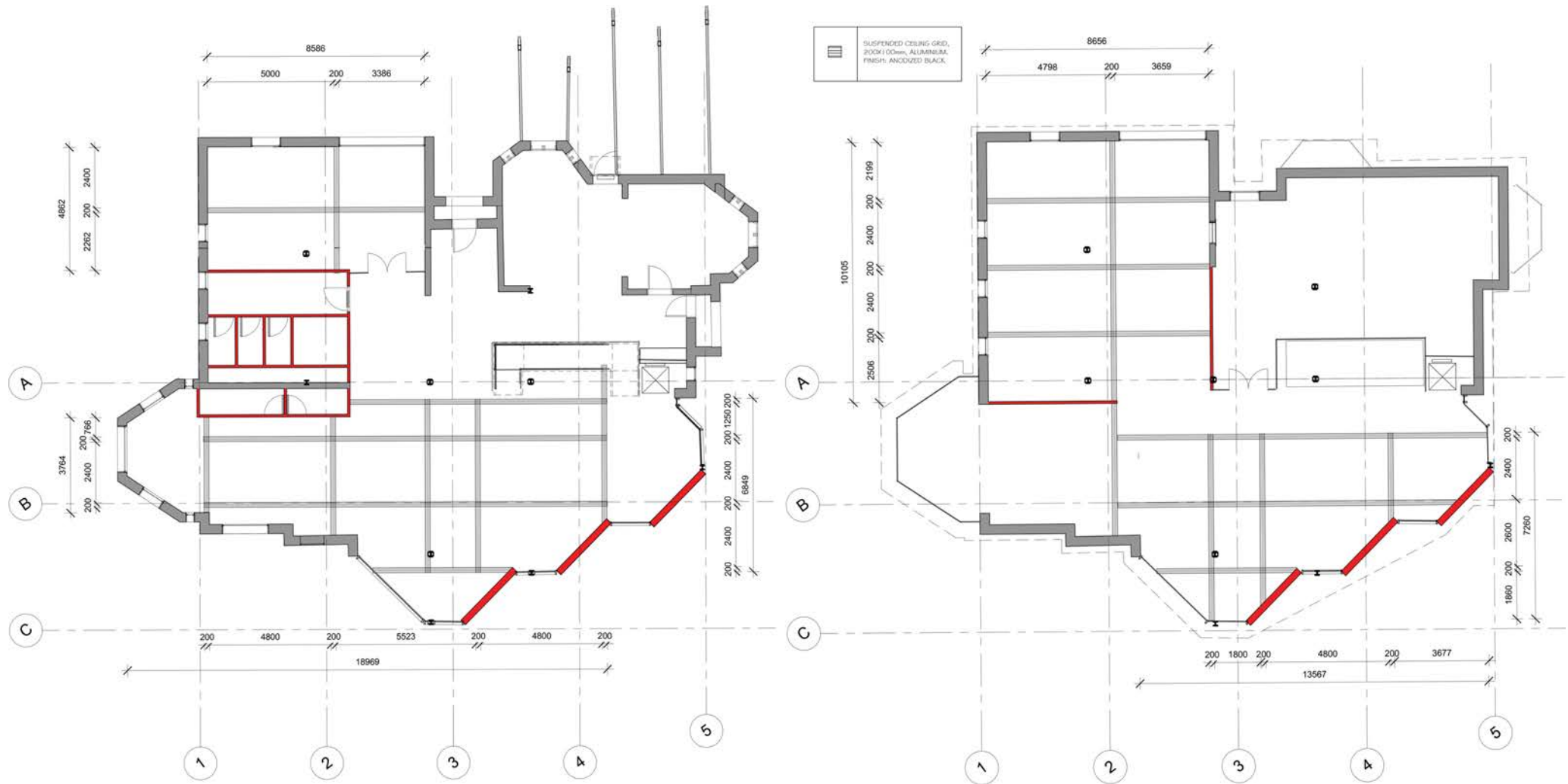
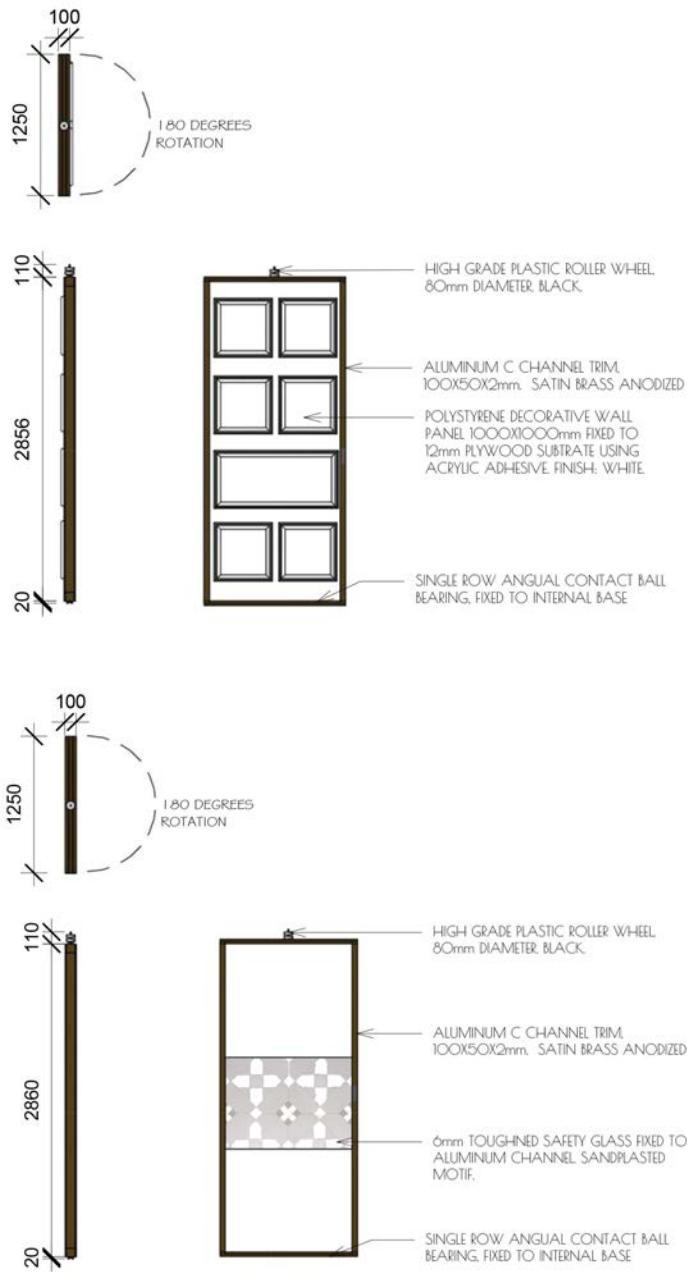
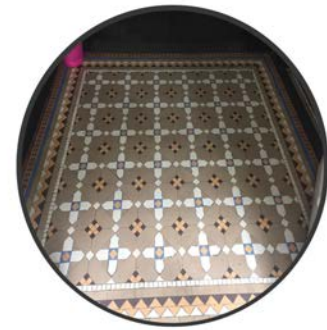


Figure 125: Grid layout ground and first floor plans, not to scale (Author 2018)



Existing door panels located in the original entrance are reinterpreted



Existing tiles located in the original entrance are reinterpreted to form a motif.

Figure 126: Partition types, not to scale (Author 2018)

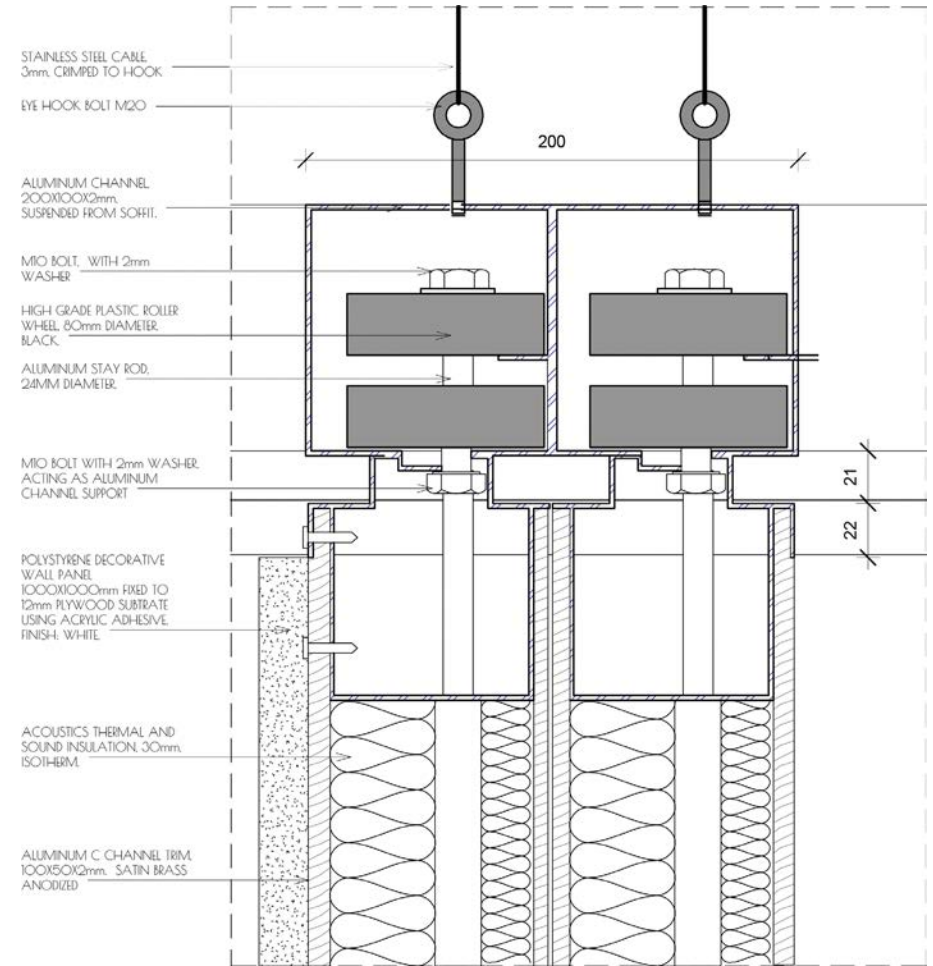


Figure 127: Detail 4 movable partition, not to scale (Author 2018)



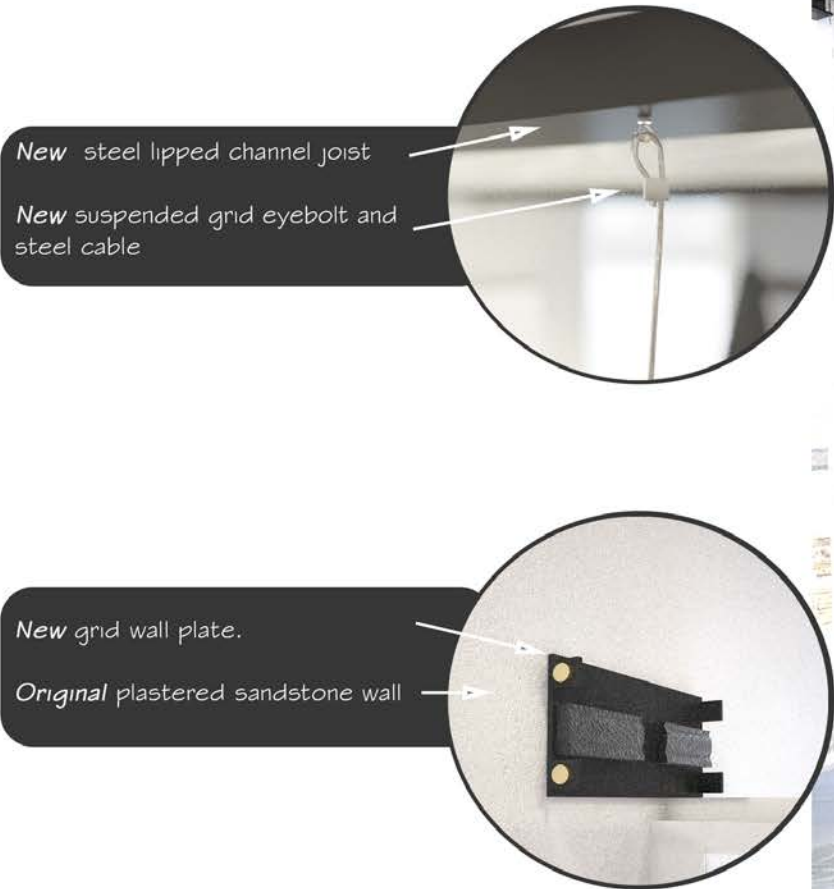


Figure 128: Partition types, not to scale (Author 2018)

### 6.4.3 Object and Furniture: Staircase, Door, Occasional Chair and Table

#### Staircase

The staircase sits at the point where old and new meet. The intention of the new staircase is to celebrate the old and new interface by ensuring the joinery details are pronounced. A new steel c channel stringer with internal brackets support the reclaimed treads oregon pine treads from the original staircase (Fig. 130). The original turned timber balustrade is reinterpreted through a new bronze plated steel sheet with turned timber profile perforations (Fig. 131). The steel sheet is fixed to an angle frame that is attached to the stringer, with all components allowing for disassembly. The handrail is made of turned oregon pine that is slightly elevated from the balustrade with steel

rods to produce a shadow-line. The handrail is the first point of contact, therefore, the tactility of the oregon timber is important in evoking the feel of old House Boeschoten (Fig. 133). The original spandrel (underside of staircase) is reinterpreted through a glass light box. The transparency of the staircase connects both sides of the building giving the illusion of greater space (Fig. 132).

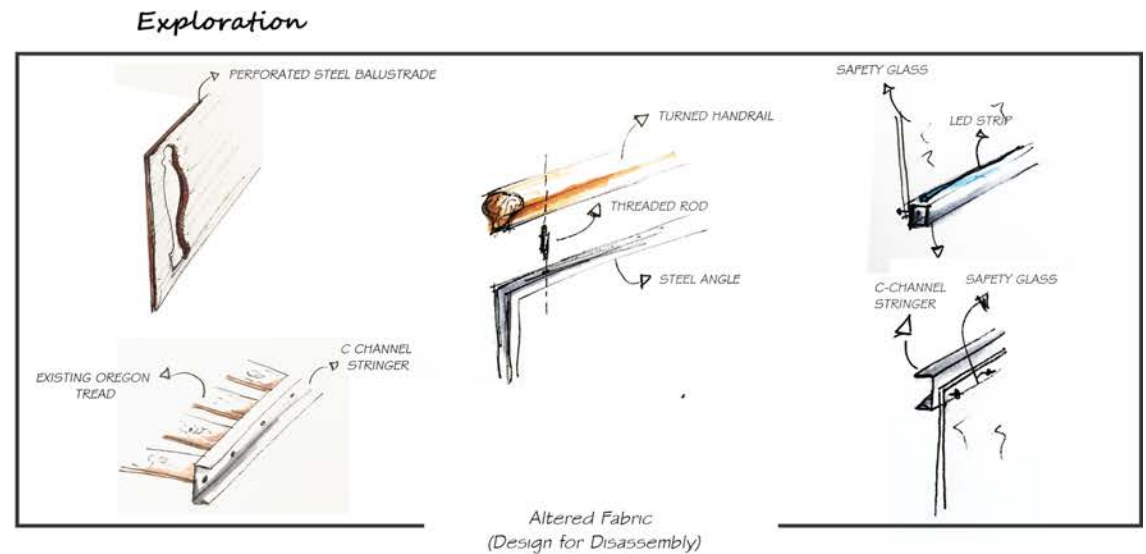


Figure 129: Staircase exploration sketch (Author 2018)

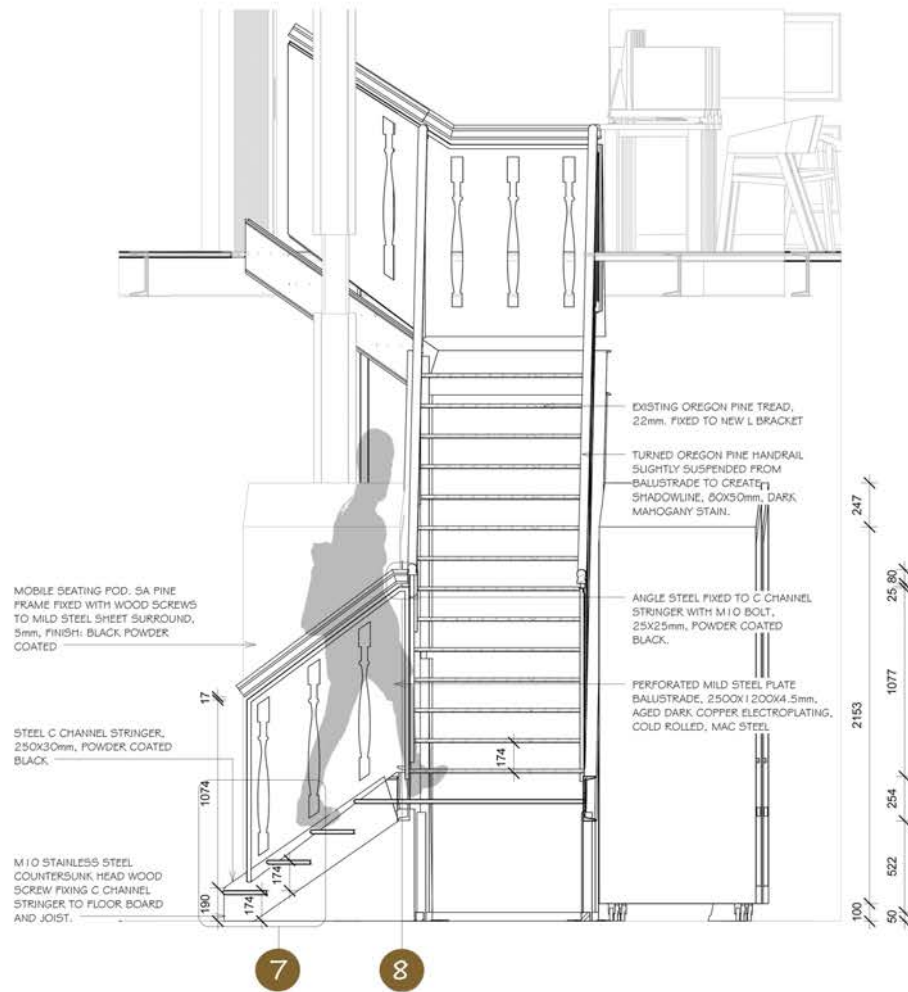


Figure 130: Staircase elevation a, not to scale (Author 2018)

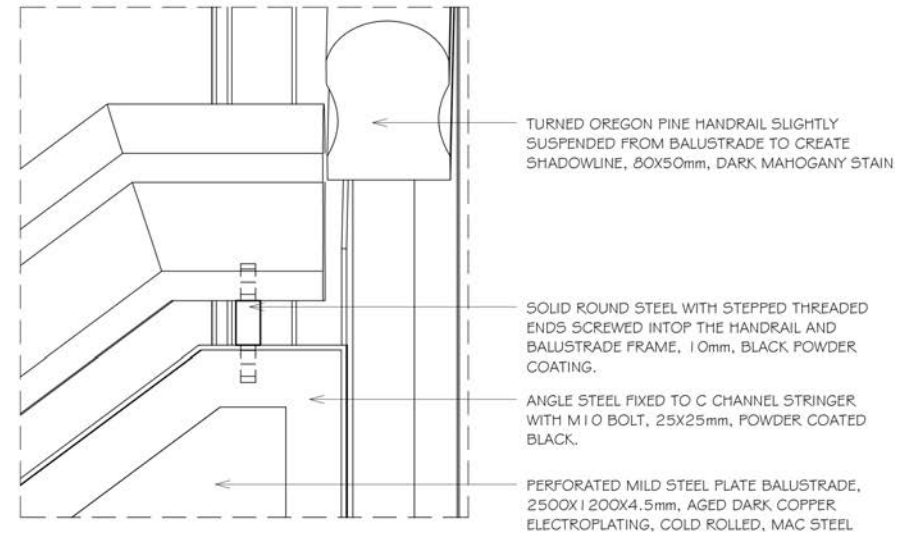


Figure 131: Detail 6 staircase, not to scale (Author 2018)

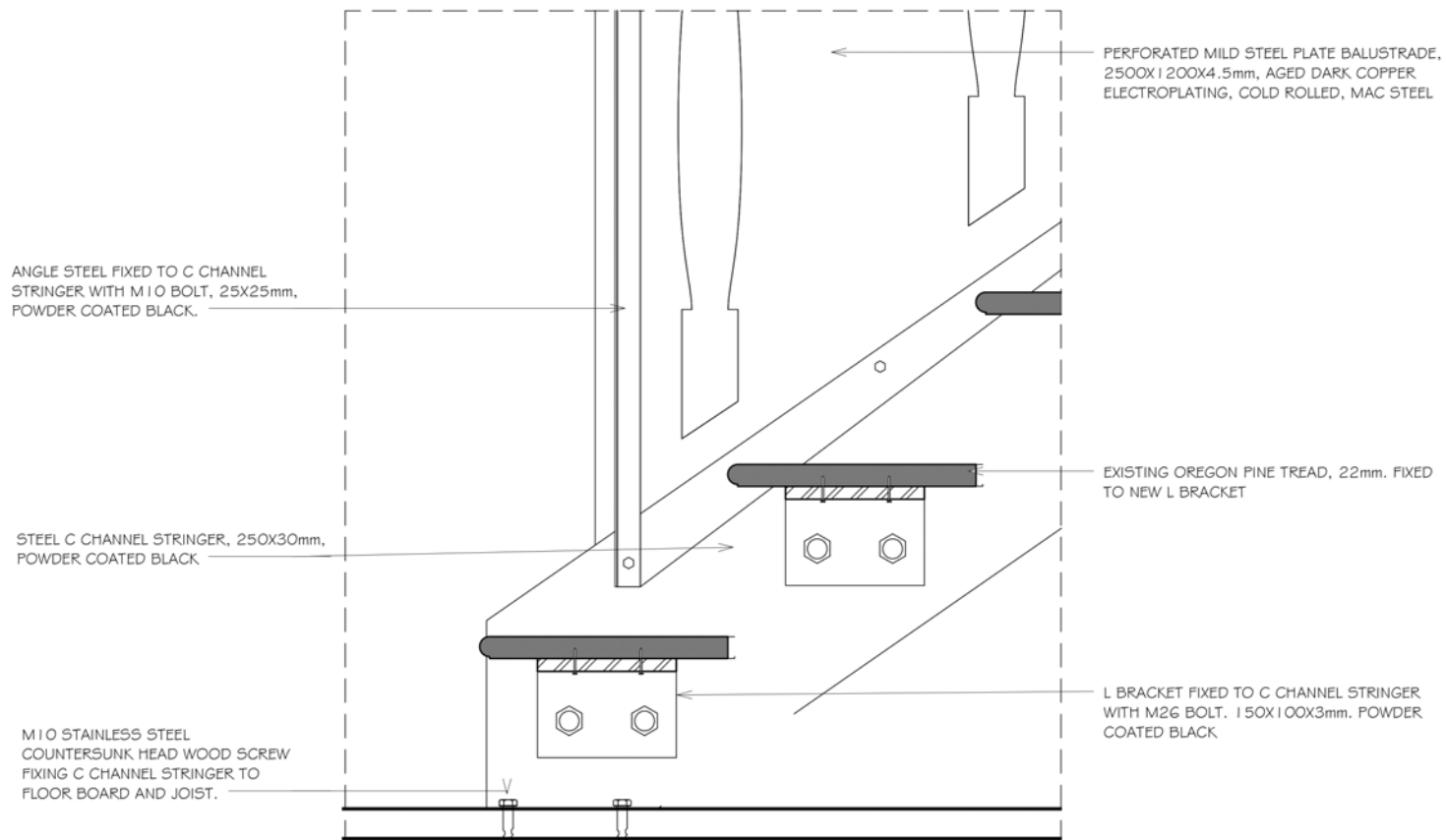


Figure 131: Detail 7 staircase, not to scale (Author 2018)

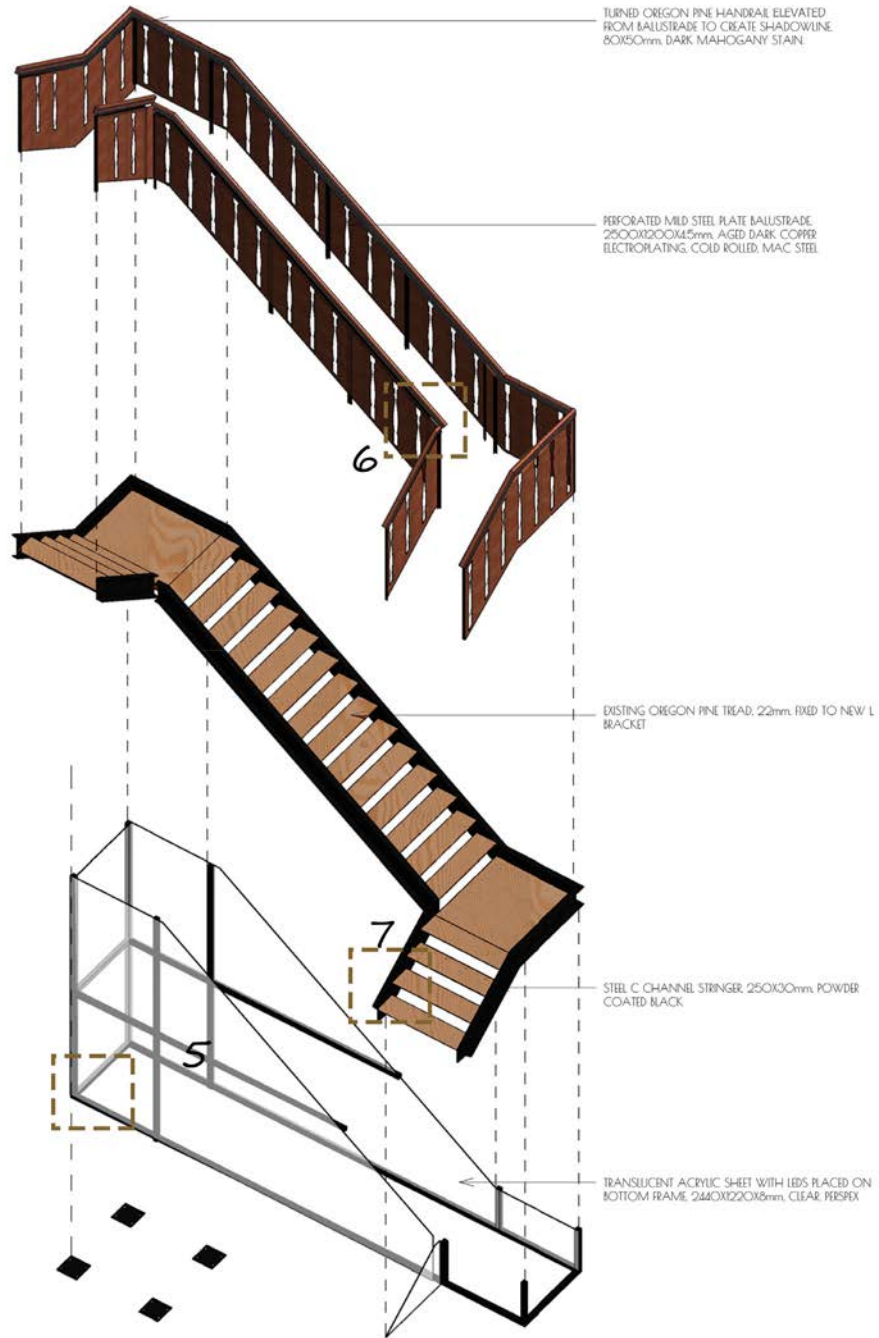


Figure 132: Exploded axonometric staircase, not to scale (Author 2018)

*Reinterpretation of original architraves.*

*Mimicking original oregon pine through sa pine veneer.*



*Original staircase tread re-purposed in new staircase.*

*Reinterpretation of original timber stinger through c channel steel.*



*Mimicked original oregon timber handrail.*

*Reinterpretation of original turned timber balustrade through laser cut profiles in steel sheets.*

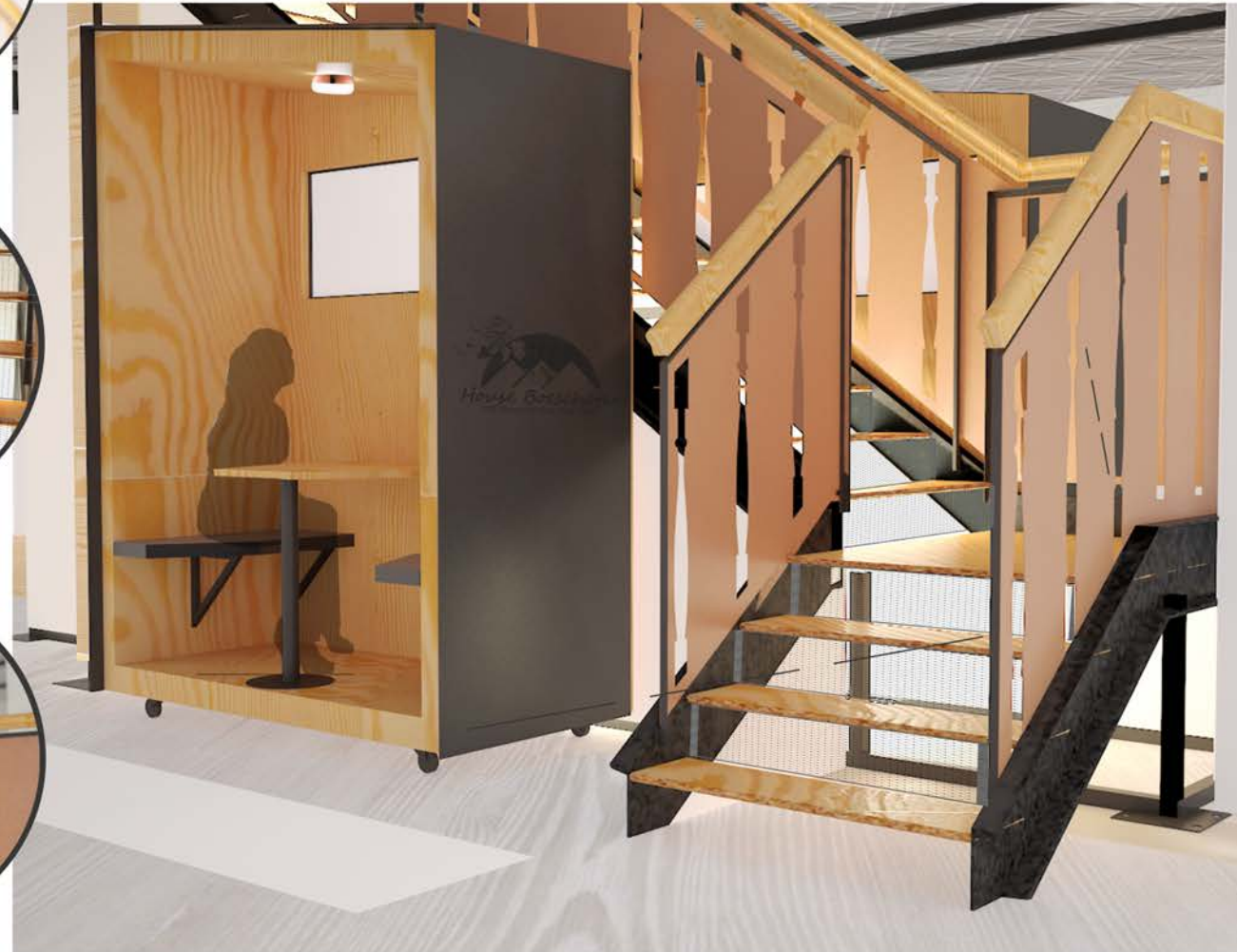


Figure 133: Perspective staircase, not to scale (Author 2018)

## Doors

The strategy to dealing with the door entails respecting the existing architraves, transom windows and door opening by inserting new doors that offset from the original door frame (Fig. 137). The strategy applied to internal doors where the original architraves remain by installing a new steel frame that supports the new pine door. The steel frame acts as a base for the offset door and butt hinges to fix onto (Fig. 138).

The inverse is done for the new entrance door to House Boeschoten. The wall and door is new however an existing double door frame is re-purposed as illustrated in Figure 134. The steel frame sits flush with the new wall, offset inwards into the reception. The existing frame is then fixed on the inside of the steel frame with a new door fixed to the frame. The new

door is designed to mimic an original House Boeschoten door that still remains in the old entrance.

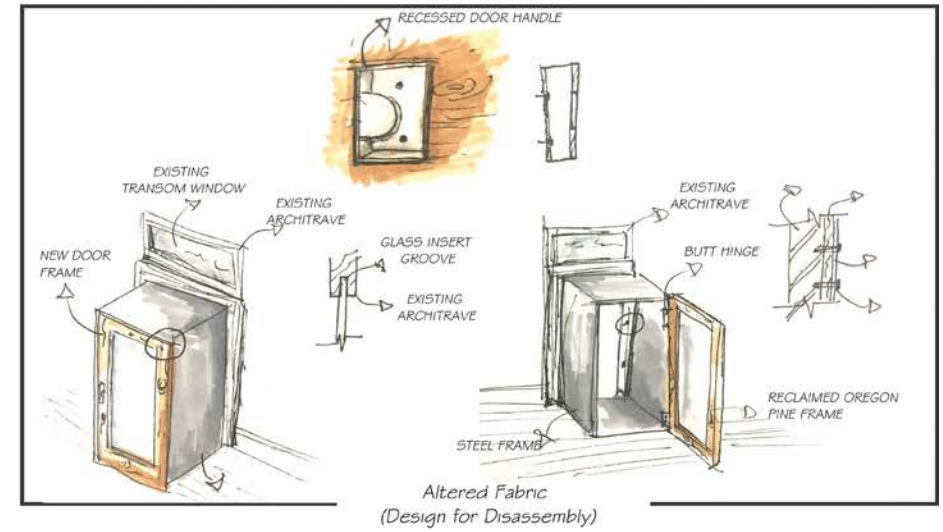


Figure 134: Door and architrave exploration sketch (Author 2018)

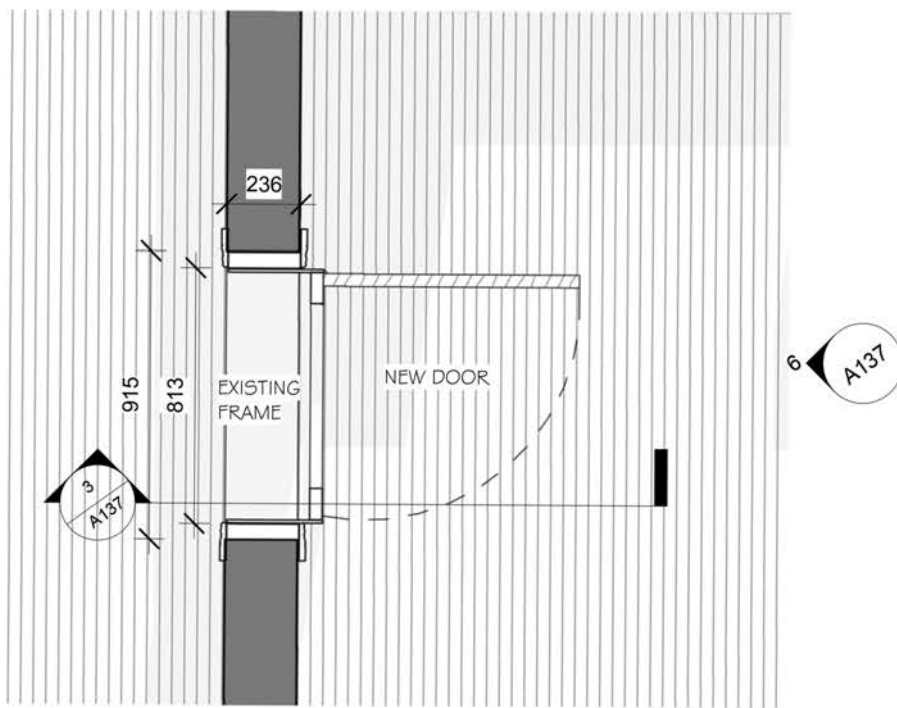


Figure 135: Door and architrave first floor layout plan (Author 2018)

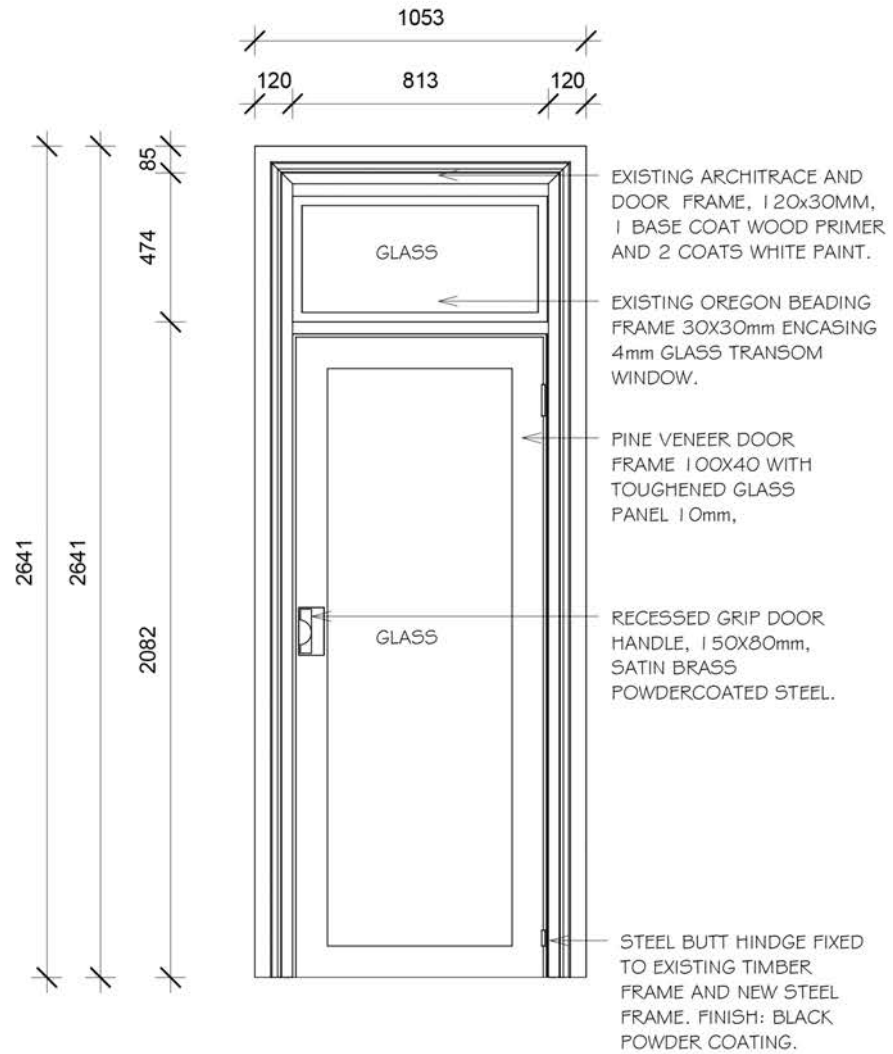


Figure 136: Elevation 2 door and architrave (Author 2018)



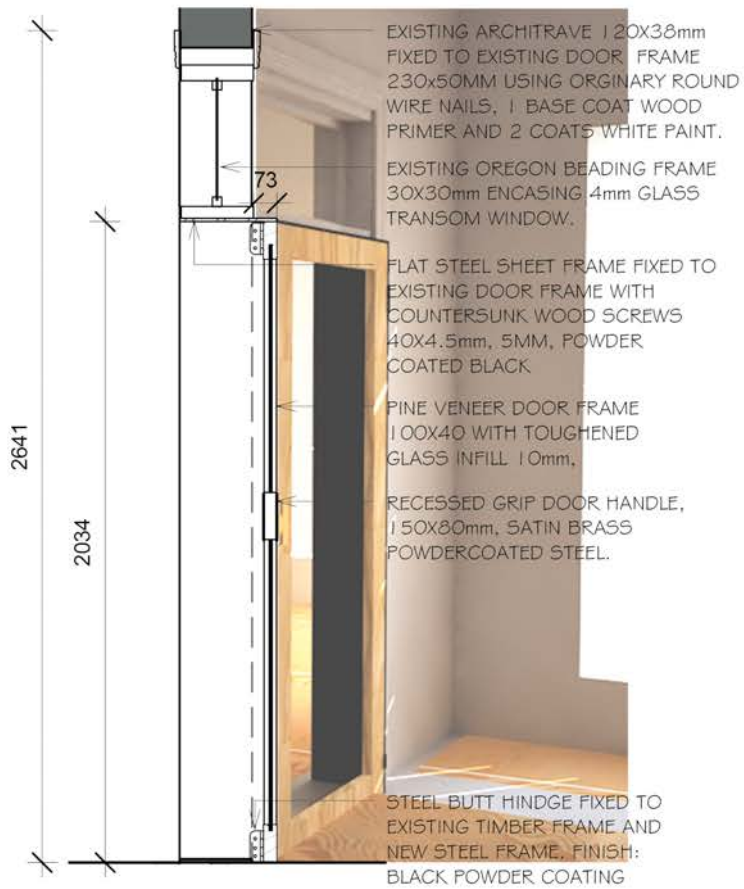


Figure 137: Section 3 door and architrave (Author 2018)

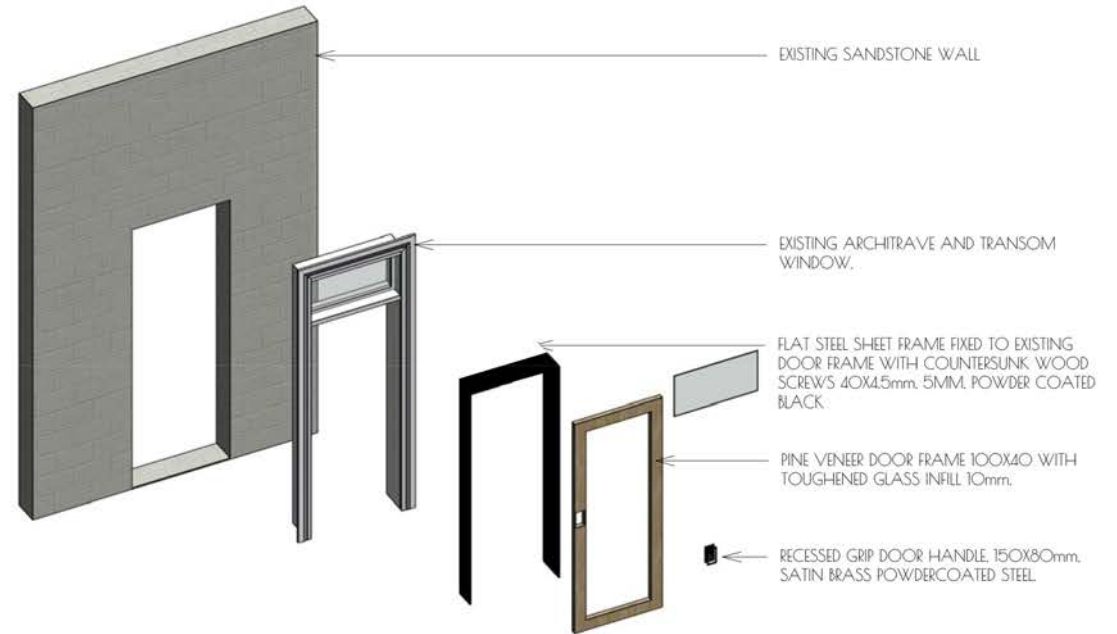


Figure 138: Axonometric of door and architrave (Author 2018)



Figure 139: Perspective door and architrave (Author 2018)

## Furniture

The furniture selected for House Boeschoten represents the reinterpreted style of House Boeschoten through exposed fixing and joinery, timber and steel based materials and NZASM design aesthetic. The selection of the furniture is in keeping with the objective to produce resilient, contingent spaces by selecting items that function in various internal environments.

This intention for the furniture section is to collaborate with Raw Studios on a selected range of items to produce bespoke furniture that speaks to the identity of House Boeschoten.

The criteria for selecting furniture is in keeping with the research question stated at the start of the chapter:

1. The furniture must express the design aesthetic of House Boeschoten based on its essence combined with the reinterpretation.
2. The furniture must consist of interconnected parts. The connection between the parts must be exposed to express the temporality and impermanence of the new as opposed to the concealed permanent fixing that is typical of House Boeschoten's essence.
3. The parts must be recyclable or reusable for the purpose of extending the life cycle of the product through alternative use.



Seating Type A - Occasional



Seating Type B - Task



Table Type A - Task

Description: Stack chair wooden base, epik range

Manufacturer: Raw Studios

Size: 570l x 570b x 860h

Colour: White & Natural

Standard Features: Stacks 4 High, DFD



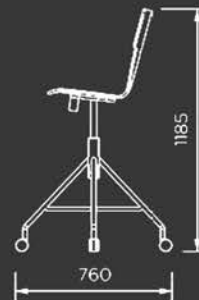
Description: Handi chair with steel base, epik range

Manufacturer: Raw Studios

Size: 760b x 1185h

Colour: White & Natural

Standard Features: DFD



Description: Trapezoidal table, epik range

Manufacturer: Raw Studios

Size: 1400l x 600b x 750h

Colour: Natural

Standard Features: Multiple configurations, DFD

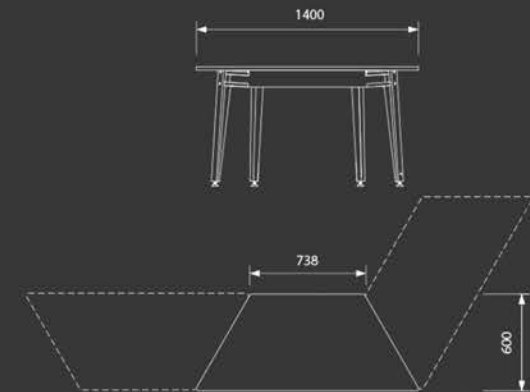


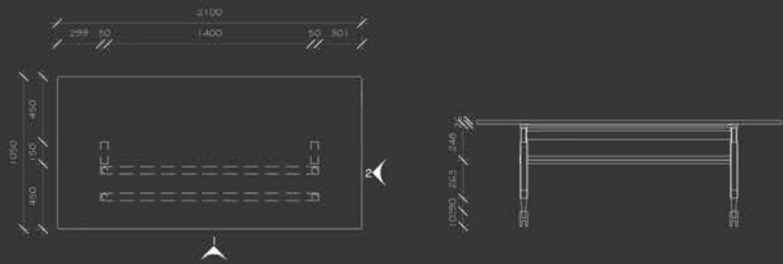
Figure 140: Furniture schedule (Author 2018)



Table Type B - Conference Table Collaboration

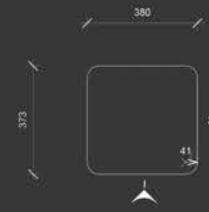


Table Type C - Coffee/Side table



PLAN - CONFERENCE TABLE  
SCALE 1:20

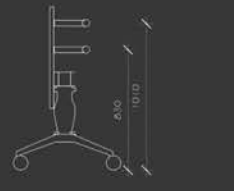
ELEVATION 1 - CONFERENCE TABLE  
SCALE 1:20



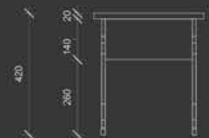
PLAN - COFFEE/SIDE TABLE  
SCALE 1:10



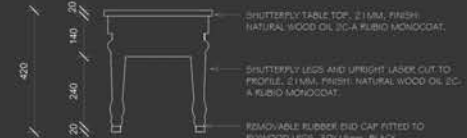
ELEVATION 2 - CONFERENCE TABLE  
SCALE 1:20



ELEVATION 2 - FOLDED  
SCALE 1:20



ELEVATION 1 - COFFEE/SIDE TABLE  
SCALE 1:20



ELEVATION 2 - COFFEE/SIDE TABLE  
SCALE 1:20

Figure 141: Furniture schedule (Author 2018)





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## CHAPTER 8: CONCLUSION

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## 8.1 Conclusion

The dissertation identifies an escalating issue of degenerating NZASM heritage in the form of custom residential typologies. The dissertation identifies contingency as a theoretical solution and a catalyst for regenerating similar sites. House Boeschoten, an unlisted heritage site displaying heritage qualities, is reduced to its essence characterised as its significant parts. The statement of significant is followed by a design strategy to insert new fabric into the existing in order to produce a fluid building. Program in the form of an Early Childhood Education Centre and Extra Mural Facility is tested in the new design to prove its contingency. The success of the intervention is expressed in the technical chapter as an approach to re-interpreting the essence of House Boeschoten through a new addition that is designed and intended for disassembly. The additional fabric respects the original house by expressing temporal connections that allow the building to be reduced back to its essence. In conclusion House Boeschoten is tested against the three constraints of time to prove the presence of contingency. The strategy ensures that the house can survive continual cycles of change, substantiated by precedents of similar situation, the adaptive reuse of House Boeschoten proves the potential for the resilience of Sunnyside's historic buildings.

## 8.2 Contribution

- House Boeschoten is one of a limited number of domestic buildings that resemble NZASM architecture, however, are not significant enough to become listed. The dissertation strategy can be applied to degrading buildings in the South African context, however, the theoretical output and position relates to historic building on other continents (omitting chapter 3 context).
- The reduction of House Boeschoten to its essence explored in chapter 5 in the documentation and blueprint for future design interventions and research inputs related to House Boeschoten.
- The theories of contingency and resilience are extended to the body of research pivoting around adaptive-reuse in the field interior architecture.

### Functionality

Complexity of Use

Scenarios in House Boeschoten are illustrated below to display the capabilities of House Boeschoten to support multiple functions and accommodate shared spaces based on usage intervals. The multiplicity of program in House Boeschotens proves it contingent.



### Tectonics

Degrees of Permanence

The permanence of House Boeschoten's essence contrasted by the design for disassembly addition, results in a building that can be easily and rapidly stripped back to its essence or added onto. This ability supports continuous cycles of adaptive re-use.



### Design and Decorative Elements

Design and Decorative Essence

The essence of House Boeschotens design language provides a blueprint for the new additions to reinterpret. The heritage exists in the reinterpretation of the design and decorative elements, also forming part of House Boeschotens identity.





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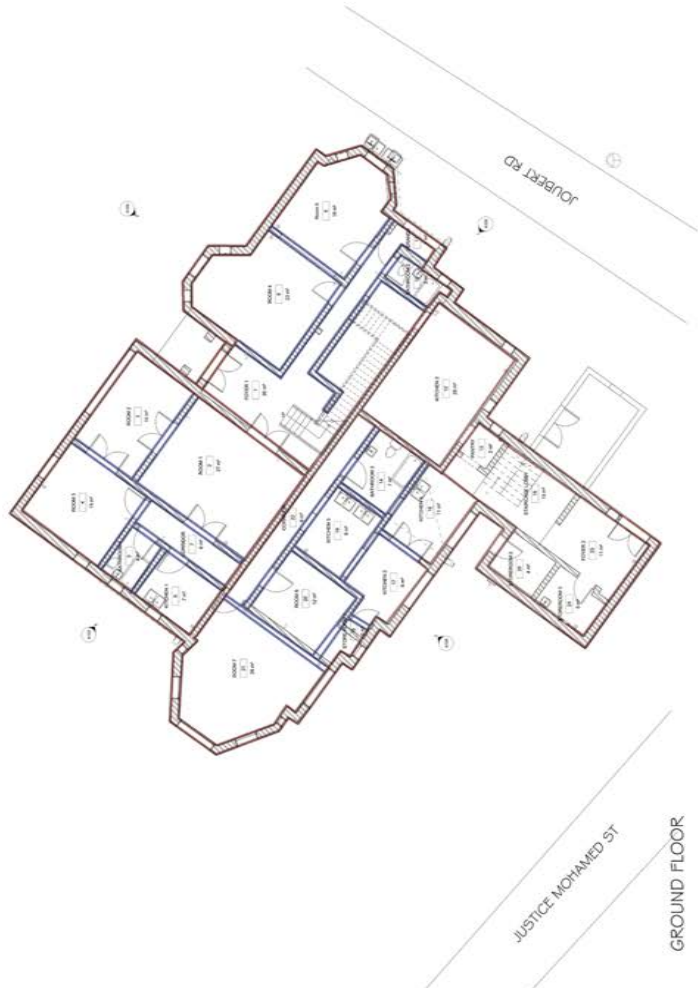
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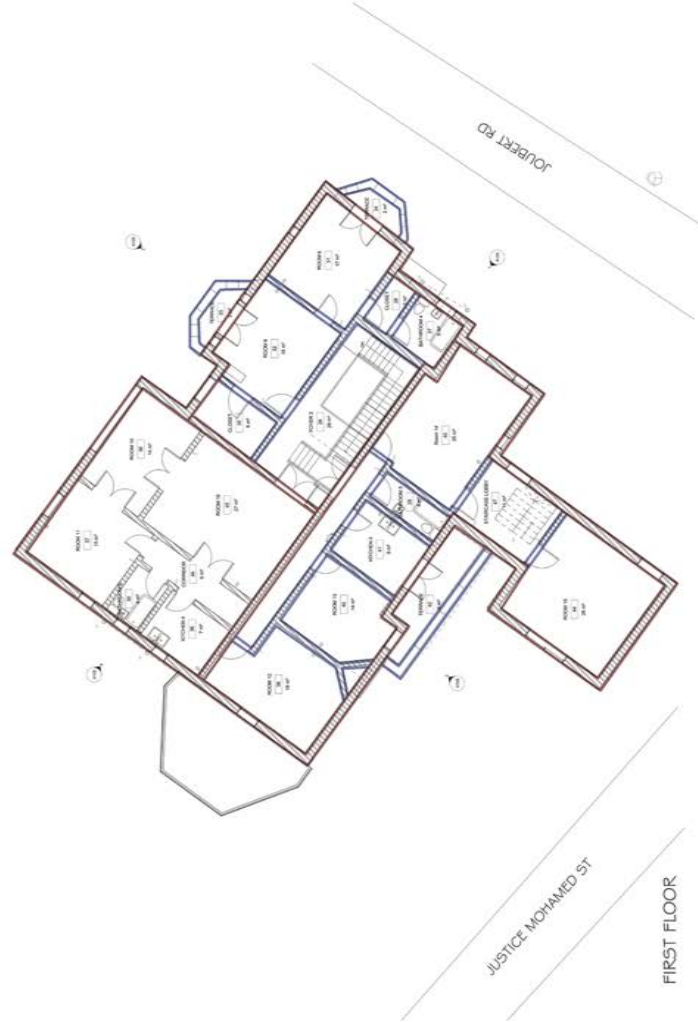
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# Appendix A\_ Heritage Documentation

- WALLS**
- STRUCTURAL/LOAD BEARING WALLS
  - NON-STRUCTURAL/ NON-LOAD BEARING WALLS
- PLUMBING**
- WASTE PIPE
  - GULLY
  - VENT PIPE
- ELECTRICAL**
- DUPLEX OUTLET
  - SINGLE OUTLET
  - TRIPLEX OUTLET
  - DIMMER SWITCH
  - DOUBLE SWITCH
  - THREE WAY SWITCH
  - DISTRIBUTION BOARD
  - ISOLATION



- WALLS**
- STRUCTURAL/LOAD BEARING WALLS
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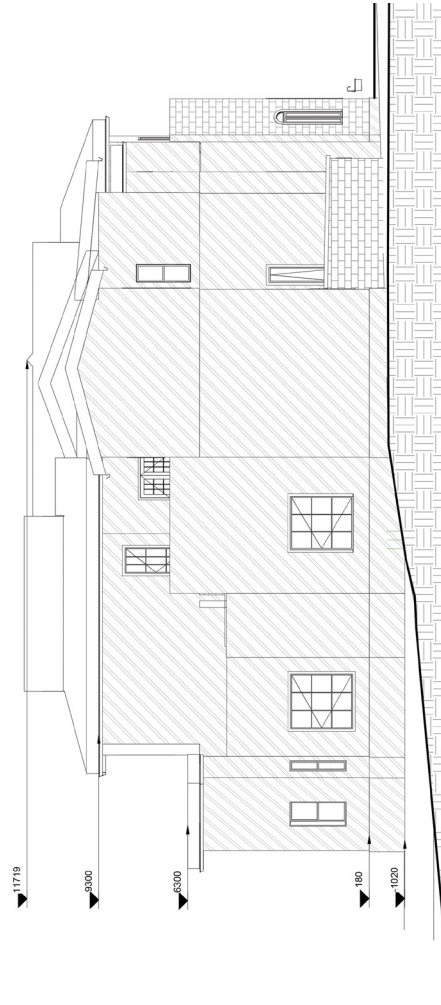




EAST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION



WEST ELEVATION

# Appendix B\_ Program Requirements

Early Childhood Education Research Centre					
Description	Labs (Academic)	Conference Room	Offices x 3	Library	Server
Matching Code	01	02	03	04	05
M <sup>2</sup>	35m <sup>2</sup>	30m <sup>2</sup>	10m <sup>2</sup>	50m <sup>2</sup>	12m <sup>2</sup>
Furniture	10x Multifunctional Desks with chairs 1x Writing board	1x Conference Table and chairs (14 Seater) 1x Server 1x Board 1x TV	1x Work desk and credenza 1x Filing cabinet	Book shelves 1x Desk 2x Long shared desks X5 Individual desks	2x Shelves
Fixtures	500 lux Ambient & task lighting (occupancy and daylight sensors)	500 lux Ambient lighting	500 lux Ambient lighting	500 lux Ambient lighting & task lighting	150 lux Ambient lighting
Equipment	10x Computers 1x Projector & Screen	Audio Visual 1x TV 1x Projector & screen	Computer	3x Computer 1x Printer	Servers Gas suppression
Finishes	Acoustic floor, wall and ceiling treatments.	Acoustic floor, wall and ceiling treatments.	Acoustic ceiling boards, carpet floor.	Acoustic floor, wall and ceiling treatments	Access flooring Additional wall and ceiling fire specs.
Associations and Experiences	Collaborative activity area.	Private meeting area.	Private meeting area.	Private meeting area. Brief activity area. Copying area.	N/A

Early Childhood Education Research Centre					
Description	Storage	Cafe	Kitchenette	Unisex Ablutions	Disabled Ablutions
Matching Code	06	07	08	09	12
M <sup>2</sup>	8m <sup>2</sup>	30m <sup>2</sup>	15m <sup>2</sup>	14m <sup>2</sup>	6m <sup>2</sup>
Furniture	2x long Shelves	8x Tables and chairs set 1x Serving Counter 1x Bar	1x Counter 8x Bar stools	WB counter	N/A
Fixtures	150 lux Ambient lighting	500 lux Ambient and accent lighting 2x sink	300 lux Ambient & task lighting	4x Wc, 4x WB, 4x Urinal 1x Hand dryer, 1x Towel dispenser, 1x Bin, 300 lux Ambient, task and accent lighting	1x Wc, 1x WB, 1x Soap dispenser, 1x Towel dispenser, 1x Bin, 300 lux Ambient, task and accent lighting
Equipment	N/A	POS Ind. Fryer Ind. Hob and gas burner Ind. oven and microwave Fridge and freezer	2x fridge 2x microwave 3x Hob and oven 3x prep bowls	N/A	N/A
Finishes	Standard finishes.	Finishes must complement the conserved fabric Kitchen finishes according to health and safety specs.	Kitchen finishes according to health and safety specs.	Tiled floors & walls	Tiled floors & wallspecs
Associations and Experiences	N/A	Café area. Indoor garden area.	Indoor/outdoor garden area.	The spaces should evoke nostalgia for the old building.	The spaces should evoke nostalgia for the old building.

Early Childhood Education Research Centre					
Description	Meeting Rooms x2	Reception	Meeting Rooms x2	Reception	Meeting Rooms x2
Matching Code	13	14	13	14	13
M <sup>2</sup>	12m <sup>2</sup>	20m <sup>2</sup>	12m <sup>2</sup>	20m <sup>2</sup>	12m <sup>2</sup>
Furniture	1x Meeting Table and chairs (4 Seater) 1x Server 1x Board	1x Reception table 2x Seating clusters	1x Meeting Table and chairs (4 Seater) 1x Server 1x Board	1x Reception table 2x Seating clusters	1x Meeting Table and chairs (4 Seater) 1x Server 1x Board
Fixtures	500 lux Ambient lighting	300 lux Ambient & accent lighting	500 lux Ambient lighting	300 lux Ambient & accent lighting	500 lux Ambient lighting
Equipment	1x Projector & screen	1x Computer	1x Projector & screen	1x Computer	1x Projector & screen
Finishes	Acoustic floor, wall and ceiling treatments..	Double volume ceiling/atrium.	Acoustic floor, wall and ceiling treatments..	Double volume ceiling/atrium.	Acoustic floor, wall and ceiling treatments..
Associations and Experiences	Brainstorming area.	The spaces should evoke nostalgia for the old building.	Brainstorming area.	The spaces should evoke nostalgia for the old building.	Brainstorming area.

Extra Murals Facility						
Functional (Denotation)						
Description	Fine Arts	Dance and Performance Studio	Music Room	Contest Sport	Academic Tutoring	
Matching Code	14	02	01	13	01	
M <sup>2</sup>	35m <sup>2</sup>	50m <sup>2</sup>	35m <sup>2</sup>	30m <sup>2</sup>	35m <sup>2</sup>	
Furniture	10x Artist work station 1x Light Box	Mirrors (several)	10x Music desks and chairs	5x dual facing desks with chairs.	10x mobile tables and chairs	
Fixtures	1000 lux Ambient & task lighting	1000 lux Ambient lighting.	250 lux Ambient, task and accent lighting	500 lux Ambient lighting & task lighting	500 lux Ambient lighting	
Equipment	N/A	Audio	N/A	N/A	1x Computer 1x Projector and screen	
Finishes	Stain resistant floors, walls and ceilings.	Sprung wooden floors. Acoustic walls and ceilings. specs	Acoustic ceiling boards. carpet floor.	Acoustic floor, wall and ceiling treatments	Standard walls, floors and ceilings.	
Associations and Experiences	Stimulating learning and flexible collaboration. Colourful and creative space.	Clean clinical space. Avoiding visual distractions.	Intimate, warm and comfortable spaces	Isolated space with warm, comfortable atmosphere..	Stimulating and colourful learning environment will lots of natural light.	

Extra Murals Facility						
Functional (Denotation)						
Description	Culinary Classes	Outdoor Sports (cricket, soccer, rugby, hockey and swimming)				
Matching Code	08	15				
M <sup>2</sup>	15m <sup>2</sup>	10000m <sup>2</sup>				
Furniture	BICs 10x bar stools	Stands for seating				
Fixtures	500 lux Ambient lighting, accent and task lighting	750 lux Spot lights and other ambient lighting.				
Equipment	1x Espresso bansta stand 3x hob and oven 3x prep bowls	1x Soccer posts 1x Rugby posts				
Finishes	Tiled or stain proof floor and wall finishes.	Natural grass flooring				
Associations and Experiences	Clinical spaces for health and safety reasons.	Outdoor environment with visually pleasing patios and plantation. Mini pause areas in the landscape.				

Psychological (Connotation)



# Appendix C\_ Design Informants

## 2. Context

**Historical Context:**

- House Boeschoten served multiple function; domestic, office and school.
- The building plinth was used as a trench during the Anglo Boer War.
- House Boeschoten is a NZASM custom typology.
- It formed part of Harmonie estate.
- It was named House Boeschoten after JC Boeschoten, the second mayor of Pretoria.

**Physical Context:**

- The building orientation is based on the original site plan, thus the building back end is facing the new entrance and street, and the building entrance is facing the yard.
- The stand is shared and owned by Oost Eind Primary School, and Joubert street is partially part of UNISA site.
- The rest of the site is occupied by two deteriorated tennis courts.
- The tree in front of the northern facade was planted on the day the house was finished, thus cannot be removed.

**Socio-Cultural Context:**

- The prominence of residential buildings in Sunnyside led to the demand of education programs in close proximity.
- The context accommodates a diverse pool of cultures.
- The majority of the education hub users stay outside of sunnyside.
- The immediate context is high is pedestrian traffic, followed by the use of taxis.
- The commercial side of Sunnyside draws all of the education block users during the weekend.

## 3. Precedents

The following **guidelines** are derived from the precedents as a tool to guide the intervention designer response:

**Preservation:** retaining an artifact in its existing condition.

**Conservation:** continuing the use of the heritage asset.

**Insertion:** the integration of old and new, however the new is still distinguishable.

## Informants

### 1. Theory

**Resilience:**

- The adaptive cycles phases.
- Planning for the release phase through designing for disassembly.

**Adaptive Interior Architecture:**

- Adaptive vs adaptable. Designing for changing in predetermined parameters.

**Heritage alteration:**

- This takes place on the surface or spatially. The steps of alteration is guided by the three steps of **stripping back, making good and enabling works.**

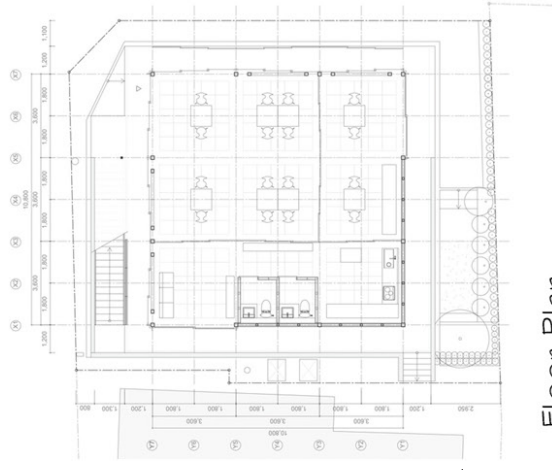
# Appendix D\_ Technical Precedents

Title: 1. Substrate Factory Ayase  
 Architects/Designers: Aki Hamanda Architects  
 Year: 2017  
 Location: Kanagawa Prefecture, Japan.  
 Type: Adaptive Architecture

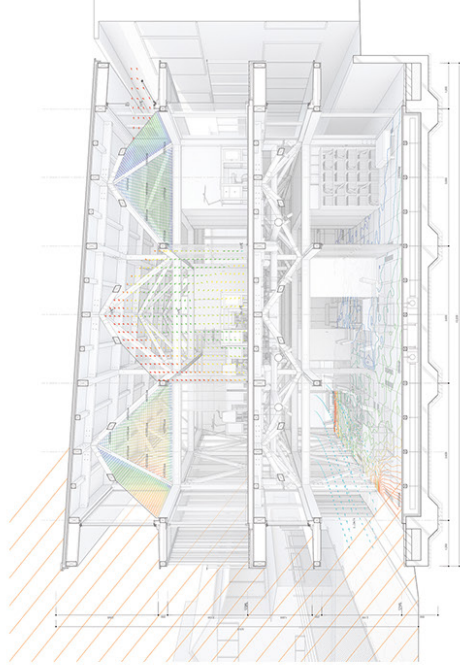


## Identified guidelines and principles:

- Community subprograms coexist through shared spaces without losing their identity
- Adaptive interior grid based on predicted spacial conditions
- Services exposed and placed on the interior and exterior skin to promote adjustibility and renewability.



Floor Plan



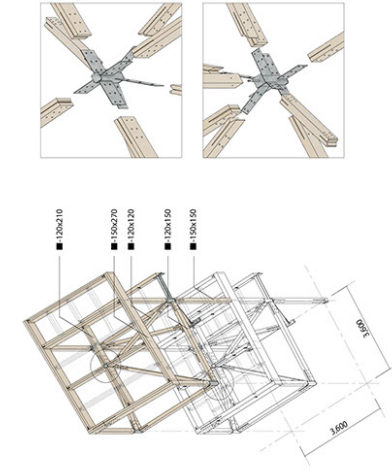
Section



Interior Perspective



Interior Perspective



Title: 2. Vitsoe HQ and Production Centre  
 Architects/Designers: Vitsoe and Martin Francis  
 Year: 2017  
 Location: Royal Leamington Spa, United Kingdom  
 Type: Adaptive Architecture

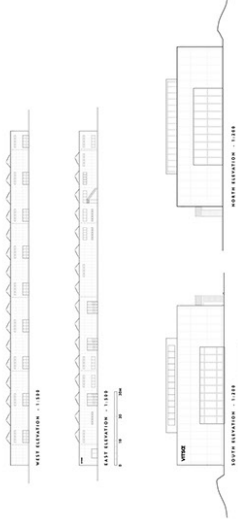


Identified guidelines and principles:

- Kit of parts structure prefabricated offsite and assembled on site.
- Adaptable in response to the changing needs of company, people and environment.
- Framing is made entirely of beech laminated veneer which allows for less cross sections for beams and columns.



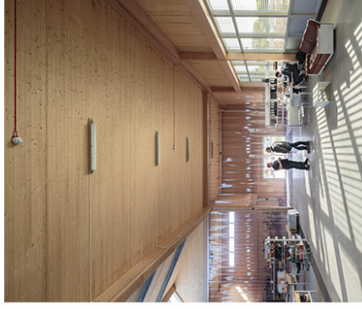
Floor Plan



Elevation



Interior Perspective



Interior Perspective

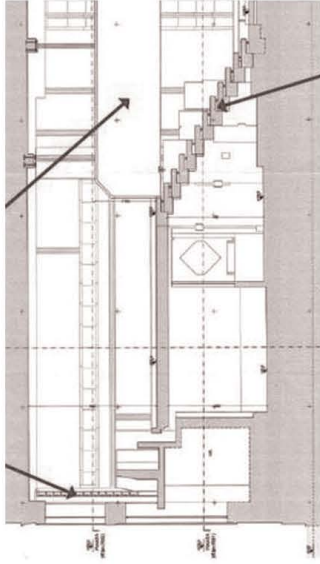


Title: 3. Olivetti Showroom  
 Architects/Designers: Carlos Scarpa  
 Year: 1958  
 Location: Venice, Italy  
 Type: Conservation through Insertion

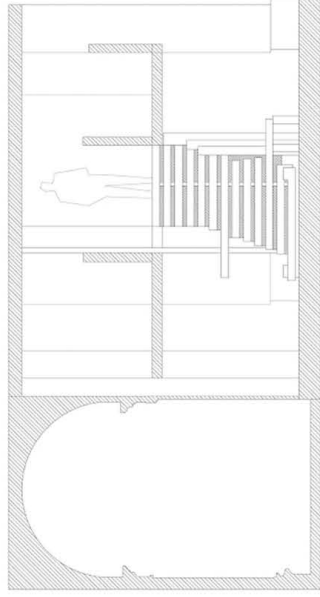


**Identified guidelines and principles:**

- The thresholds between interior and exterior spaces are addressed through interior transparencies to create fluidity.
- The controlled connection of new materials for program functionality with existing materials.



Section



Staircase Elevation



Exterior Perspective



Interior Perspective



Wall detail



Tumelo Mabote

# Future-Proofing the Residue of the Past.

*Encompassing the uncertainties of urban evolution on NZASM heritage through the adaptive reuse of House Boeschoten in Sunnyside.*

**Introduction**  
 Since the rule of the NZASM (Nederlandsche Zuid-Afrikaansche Spoorweg-Maatschappij)<sup>1</sup> over the Transvaal ended in 1902 as a result of the Anglo-Boer War, Pretoria has evolved and experienced a number of changes (De Jong 1990:223). These changes-characterized as political instabilities-have had a detrimental effect on the historical urban fabric of Pretoria.

As the city of Pretoria developed, ownership became an issue which resulted in many of the original NZASM builds that occurred during the regime being either derelict sites or severely underutilized. An attempt to regenerate the city by the City of Tshwane municipality through densification and compaction, has further compromised the NZASM rich heritage in Pretoria, specifically in Sunnyside (Tshwane 2005:5). The strategy to building high rise apartments in close proximity means single-family typologies such as House Boeschoten will be demolished if they are unable to meet the demands of high density housing and restore their relevance to the

context.

This article aims to reverse the imminent demolition of House Boeschoten by adapting the building to serve a new purpose, one that is in line with the cities regenerative efforts. The theories of contingency and resilience are extended to adaptive reuse within the field of interior architecture in order to produce a building that is able to cope with change. A new House Boeschoten that is built to change.

**Context: The Old House Boeschoten**  
 House Boeschoten currently stand in Sunnyside, corner of Justice Mohamed and Joubert Street, however, the Old House Boeschoten was built during the NZASM regime with the intention of permanence.

In 1887 the NZASM was established in the Transvaal (De Jong 1990:53). The Netherlands South African Railway Company's construction department designed most of the residences towards the south of the Pretoria station, Salvokop. Many houses towards the east of the train station resemble those

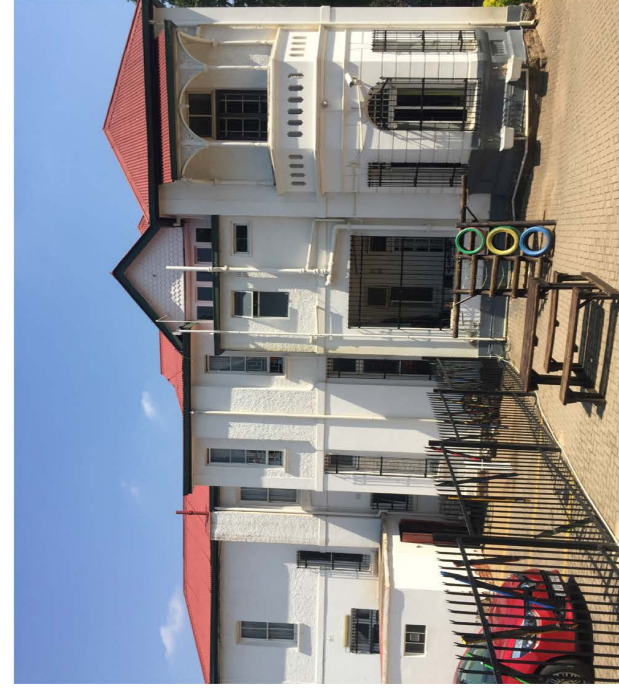


Fig. 01. Above: House Boeschoten (Author, 2018)

located towards the south of the train station. The more wealthy employees of the NZASM built custom residences towards the east and such example of this is the NZASM Guest House on Rissik Street (Bakker et al. 2014:133). The house was occupied by the A. Westenberg and the Van Der Made family during 1898. Another example of a similar custom NZASM typology is House Boeschoten. The custom typology houses were built with one thing in mind and that's permanence. The size of House Boeschoten and the complexity, visually validate the intention of it being a static colonial landmark.

It is argued that the architecture illustrates the intention for permanence, however the reign of the NZASM over Pretoria ended in 1902, requiring a shift in the use of the colonial structures. House Boeschoten was seized and occupied by the British military institution during the Anglo-Boer War, being used as head-quarters, defying its intended domestic use. House Boeschoten was located on what was the "Harmonie" estate, intended for domestic use and home to the van Warmelo family in 1889, then later occupied by The Harmony Ladies' Residence of the Norma College in 1899 (Brandt 1913:54). From 1902, after the war, the building was occupied by the Van Boeschoten family, reverting back to its domestic function. JC van Boeschoten was the second mayor of Pretoria during 1908-1911, resulting in the community naming the property House Boeshoten. In 1937 widower Johannes G. Van Boeschoten, wife of JC van Boeschoten –second mayor of Pretoria- passed away (Brandt 1913:54). The site was then occupied by the Pretoria College of Education, and the house was utilized as offices. When the college moved to Groenkloof Campus in 1996, the house became vacant and was subject to vandalism. In 1997 the building became part of the Oost-Eind Primary School and now houses the Phomolong Centre (pre-school and after-care).

**Pitfalls of House Boeschotens Colonial Architecture**

Two points in the historical background of House Boeschoten are critical informants of why the building was unable to cope with change and maintain its relevance in Sunnyside. Firstly the building tectonics and

design internalized many static ideas. These static idea were typical of the context and the NZASM typologies style of building. This dutch approach to static buildings is very similar to the early modernists inception of time as a consideration for architecture. This became apparent in Western architecture during the Modernist movement when architects such as Le Corbusier were influenced by the theory of relativity and cubism, which served as informants for their explorations of space-time. "Space-time, the 4th dimension, is composed of occurrences or events, which are those things happening to someone at a given place and at a given time." (Kurtich & Eakin 1993:131). The issue with the modernist acceptance of the instability of time, is that they aimed to control. The focus was on the mastery of producing timeless art, rather than the mastering of working with time. The strategy involved three approaches: the first was to deny time, the second was to proclaim architecture's role to express the timeless and lastly, to accept time as a passing condition that could be withstood. The static design of House Boeschoten allows little room for manoeuvring, reducing its ability to respond fluidly to change. One might consider that houses were built to last during that time and their apparent stylistic elements identified them as belonging to a larger whole of possible architectural landmarks. The second issue is one of external factors and stressors. As the political climate of Pretoria became unstable and ownership was repeatedly transferred, this triggered a release on an urban scale. As priorities changed on an urban scale, buildings were forced to respond to these changes such as more people having access to the city centre and requiring accommodation.

What seems to be a pitfall for House Boeschoten also unearths an opportunity to rethink the way we conserve these typologies. Celebrating the heritage that is intrinsic to the NZASM typologies through the empathetic re-purposing of the old, and modernising its current relevance.

**Theoretical Position In-time**

House Boeschoten is a part of a radical shift in the making of architecture. The issues pointed out previously were the doing of the NZASM regime, however the unearthing of issues

related to the static making of space were happening on an international scale as well. Figure 2 illustrates the theoretical position of House Boeschoten as well as the development of theories that will be explored in this article in order to resolves the previously stipulated issues.

### The Extension of Theory to Interior Architecture

Following a literature review on contingency, resilience and adaptive reuse, a cohesive argument is distilled from these theories. The argument serves to motivate a novel approach to the design of interior architecture in heritage buildings. Resilience, as an overarching theory that considers change on an urban scale, is extended to the discipline of interior architecture. Adaptive architecture is investigated as a method for achieving and coping with change in a heritage building. The notion of adaptive architecture is compared to adaptable

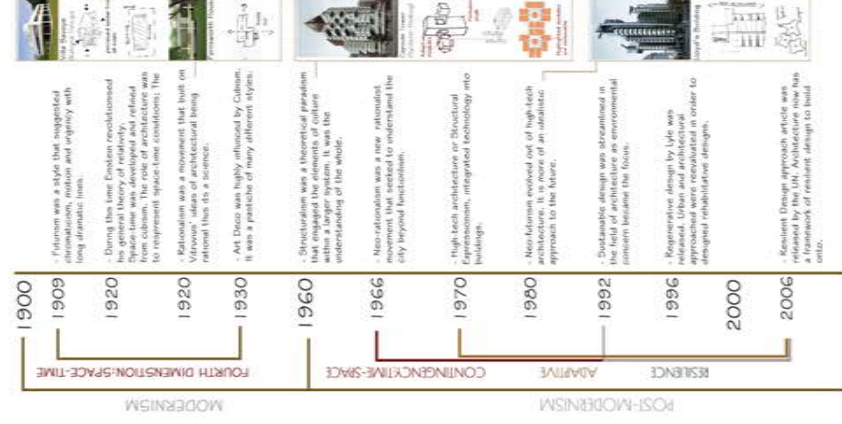


Fig. 02. Above; Development of Theory Boeschoten (Author 2018)

Historical Timeline of Context



Fig. 03. Top; Historical Timeline of House Boeschooten (Author, 2018)

architecture in an endeavour to identify a strategy for continuous adaptive reuse. Consideration for working with a heritage building is given through at investigation into theories by Scott (2008), as well as Brooker and Stone (2004) in relation to requirements by the Burra Charter (ICOMOS 2013). It is argued that in bringing the two aforementioned theories together, an interior architecture that is contingent can be achieved. Thus, the notion of contingency is explored in relation to resilience and adaptive reuse. Finally, a framework is outlined that can be applied to the re-design of House Boeschooten in an endeavour to purposely conceive interior architecture that is able to anticipate and facilitate inevitable change.

**House Boeschooten’s Inherent Resilience**

Resilience is about understanding and engaging with a changing world. “By understanding why systems as a whole are changing, we are better placed to build capacity to work with change, as opposed to being a victim of it.” (Walker

et al. 2006:14). Resilience provides insight into why external and internal factors change over the long term. Moreover, it equips the designer with a lens to recognize House Boeschooten’s inherent resilience. Resilience can develop from the bottom-up but also from the top-down. “Urban resilience can be described as the capacity of a city to absorb or adapt to change or brought about by slow pressures or rapid pulse disturbances.” (Peres et al. 2015:2). Cities can experience resilience, both in a positive and negative way. Pretoria is an example of a city shaped negatively by political stresses experienced during the city’s evolution.

Humans are great short-term optimizers, thus in order to deal with long-term change, a systems thinking approach should be applied to the re-design of House Boeschooten (Walker et al. 2006:31). By studying ecosystems around the world, researchers have learned that most systems of nature usually proceed through recurring cycles consisting of four phases: rapid growth, conservation, release and reorganization (Gunderson and Holling 2002:65). This cycle is known as the adaptive cycle as it describes how a system copes with change as illustrated in figure 4.

The rapid growth phase exploits new resources and opportunities in order to fast track the process of growth. The second stage is characterised by conservation. According to Walker et al. (2006:76) during this time energy gets stored, efficiency increases and internal states become more stabilised and regulated. The transition from the conservative to the release phase can happen instantaneously. The system becomes undone and the loss of structure prevails (Walker et al. 2006:77). During the chaos of the release phase, the subject is vulnerable to events and smaller influences that can shape the future. The reorganization phase begins to re-establish an equilibrium and identify constraints, slowly transitioning to the rapid growth phase. These adaptive cycles are repeat constantly and occur on different scales (Walker et al. 2006:77). Thus, three concepts need to be understood before a resilience framework can be drawn up, and the adaptive cycle can be applied. Firstly, we live in a social system with embedded ecological systems

therefore meaningful understanding must consider both. Secondly, socio-ecological systems are complex adaptive systems that do not change in a linear or predictable manner. Thirdly, resilience is the capacity of a system to absorb a disturbance, without exceeding its own threshold and crossing over into a new system with a different identity (Holling 1973). All three of these concepts need to be thoroughly appreciated before resilience can be successfully achieved in House Boeschooten.

Adaptive cycles can be applied to architecture to understand how change increases and decreases the leverage that designers have on the functionality of a building. The adaptive cycle can be used as a tool to understand the evolution of House Boeschooten, especially considering the building’s remarkable ability to survive a series of radically different owners and programmatic requirements. This was achieved by adapting and reorganizing itself in moments of change.

The first phase is exploitation, which sees rapid growth as a new building exploiting abundant resources and opportunities in order for it to be conceived and constructed. In terms of House Boeschooten this was during the building’s original construction, during which time the Zuid Afrikaanse Republiek (ZAR) was expanding and developing rapidly and NZASM was established as a result in 1887. House Boeschooten was located on the newly developing Harmonie estate. Harmonie, and moving to the north, was known for the custom-built rendition of the NZASM typology, which were built for high ranking officials. This meant that resources for building were abundant and opportunity was plenty. House Boeschooten then occupied the conservation phase where the occupants, the Boeschooten family, aimed to live as efficiently as possible in order to conserve the house in all its architectural faultlessness.

The Anglo-Boer War broke out in 1899 and all the NZASM property was seized and occupied by the British military. This a release phase resulted in the change of ownership, occupancy and program of House Boeschooten. The release phase was important for the house because the ability of the

spaces to adapt to a new program was key to its ability to retain a significant percentage of its original features (even to this day). The release phase is imperative to understanding why buildings can become divorced from their context because they are unable to absorb change-disturbance, leading to future degradation and irrelevance. However, in the case of House Boeschoten, the buildings's inherent resilience has for the most part been able to endure each release phase without losing any significant degree of the building's architectural integrity. This was achieved through compromise within the interior, succumbing to the need for programmatic change.

The final phase in the adaptive cycle is the reorganization phase. House Boeschoten was able to transition easily between successive owners and new programmatic requirements in its innate ability to accommodate small incremental change in its interior by each new owner. The benefit in allowing for adaptation is that one can negotiate the degree of adaptation.

#### An Adaptive-Reuse Strategy

According to Kurtich & Eakin (1993:362) adaptive reuse is the injection of an entirely new function into the shell of an older building. The success of adaptive-reuse depends on the sensitivity of the interventional designer to integrate the older original elements with the newer required elements for changed use. "The practitioner of interior architecture, trained to resolve contemporary problems while maintaining a respect for history, must exercise the vision and responsibility to recognize and protect architecture." (Kurtich & Eakin 1993:362)

The approach to adaptive-reuse applied to House Boeschoten synthesises the articles interpreted understanding of adaptive architecture with the alteration of heritage in order to arrive at a sensible, empathetic strategy for House Boeschoten.

In order to comprehend the concept of adaptive architecture, a clear distinction should be made between adaptable vs adaptive. All architecture is adaptable to some level by manual means, however, adaptive architecture is concerned with buildings and spaces that are specifically designed to adapt to

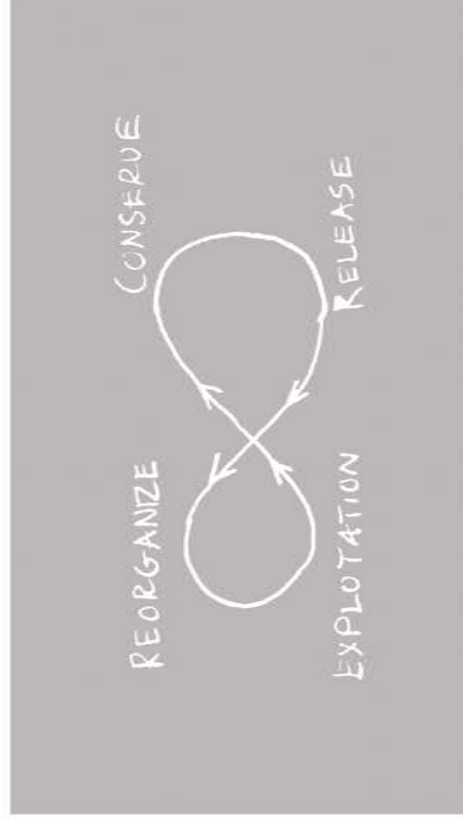


Fig. 04. Above; Adaptive Cycle (Author,2018)

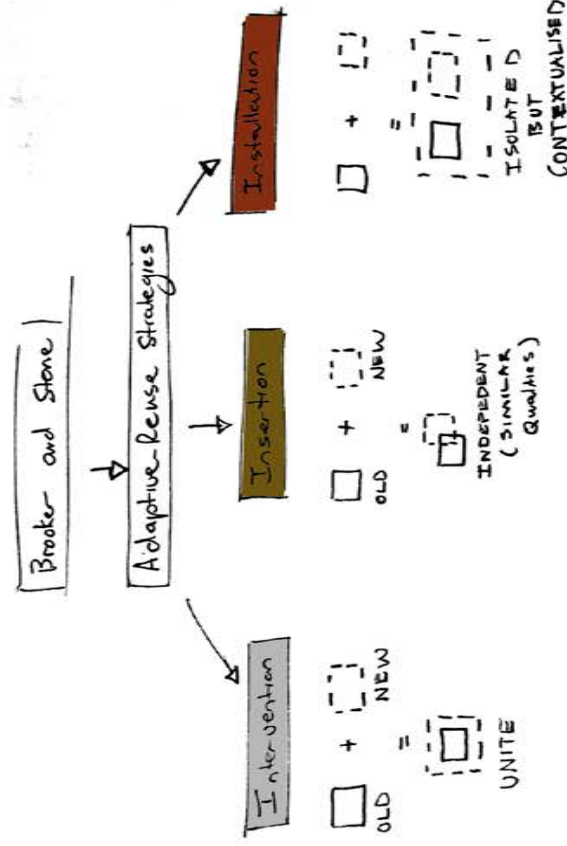


Fig. 05. Above; Brooker & Stone's strategies for alteration (Brooker & Stone 2004:79)



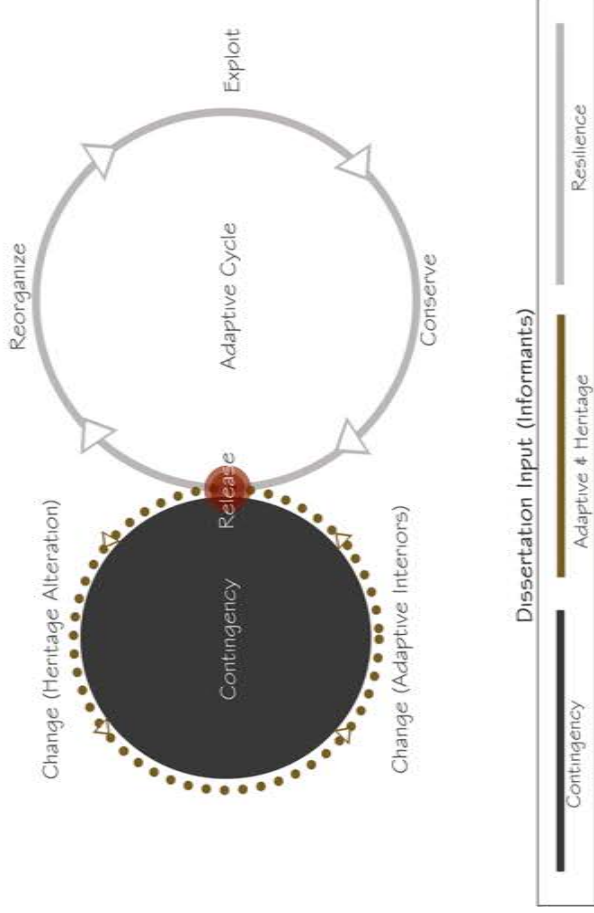


Fig. 06. Above; Theory synthesis (Author 2018)

other possible uses. "A good strategy ensures that, no matter what happens, you always have manoeuvring room." (Brand 1994:178).

Scott (2008:17) builds a case for altering architecture because of the alteration's ability to act as a mediator between preservation and demolition. "A building's fate has one of three options, remain unchanged, alteration or demolition" (Scott 2008:1). In a past time demolishing seemed to be the enticing option due to the promise of a new building. The application of alteration to House Boeschoten should therefore be according to The Burra Charter (ICOMOS 2013) three types of intervention: restoration, preservation and conservation. Over and above the types of alteration, the degree of the alteration is equally as important to the sensitivity of the project. "In the question of degree of intervention, one might say that there are two different categories of alteration, surface and spatial." (Scott 2008:92). Surface prompts considerations of colour and materiality, while space scrutinises configuration. "At its most simple, the alterations will involve either enlarging or subdividing the existing spaces, sometimes combining two or more spaces together." (Scott 2008:95). Finally, the interventional designer is equipped with a process of intervening: stripping back, making good and enabling works. According to Scott (2008:108), stripping back, as referred to earlier, entails the stripping away of rotted fabric. Making good, is the replacing and repairing of fabric.

Fig. 06. Conceptual adaptive-reuse of House Boeschoten. Conceptual image. (Author, 2017)

Reuse refers to the re-design of a historical building as a response to change in accordance with a predetermined end. Subsequently, a combination of adaptive architecture and the considerate alteration of historical assets are referred to as adaptive reuse. House Boeschoten is a historical building, thus the strategy of adaptiveness is that of adaptive-reuse. Resilience theory, as discussed previously, explained why buildings are exposed to disturbances, including how the adaptive cycle can be applied to a building in order to generate its resilience, of which House Boeschoten already exhibits inherently. Adaptive-reuse is therefore a strategy to achieve change continuously, as House Boeschoten enters its release and reorganization phases.

#### Contingency as a Theoretical Outcome

Contingency is present in the production of architecture, as well as the profession. Contingency is a theory and state that encourages architecture to reach an appropriate level of impermanence. Architecture is dependent on others at every stage, until occupancy. "Architecture has neither the luxury of solitude, nor the precision of standard methods or stable epistemology." (Till 2009:45).

Contingency, interchanges the modernist concept of space-time, reading time-space, in order to focus on the conditions produced by time on architecture. In the words of Karatani "because architecture is an event, it is always contingent." "In its multiplicity, time presents a diversity that architecture must accept." (Till 2009:95). Time creates tension between itself and the linear considerations of architecture, responding positively to cyclical and paradoxical considerations. Architecture needs to allow for the diverse temporal events of time to coexist. Coexistence must not only include the diversity of events, but the potential of these even to occur, as an added layer of consideration. The argument for contingency by Till (2009:96) is that time, not space, should be seen as the primary context in which architecture is

While, enabling works is the process of removing fabric that could hinder the process of making good.

Brooker & Stone (2004:125) advocate for an approach to alteration that promotes a sympathetic and symbolic relationship between the old and new based on an analysis of the existing. The importance of reuse in altering interior architecture is that it celebrates continuity of the building's embodied patina of its previous purposes. The relationship between old and new, past memory and future memory, is dependent on how the strategies of alteration are understood and applied uniquely by the interventional designer. Brooker & Stone (2004:79) introduce three strategies that can be applied to works of alteration: intervention, insertion and installation. Intervention is a sensitive approach to alteration, in which the old and the new become one (Brooker & Stone 2004:79). Insertion is an alteration that exists independently from the original, however qualities and inspiration is drawn from the original fabric (Brooker & Stone 2004:127). Installation is the existence of an alteration that is isolated from the original, however slightly related through concept (Brooker & Stone 2004:127). "The memory of a building lies within its original use, as well as an understanding of its identity and relationship with the surrounding context." (Brooker & Stone 2004:128). The intervention acts as a catalyst for the original narrative of the building to be told in a new way, through its alteration.

conceived. Thus, temporalized space full of time- rather than spatialized time. The objective of contingency is to produce architecture that can be deemed as provisional.

Criteria must be in place in order to test the presence of contingency. The three constraints of time are a way to test the susceptibility of architecture to time and change: functions, tectonics and aesthetics.

Function is identified through the complexities of use. Tectonics refers to the essentials of construction. Aesthetics exists in the maintenance of taste (Till 2009:135). Tectonics and functionality are crucial constraints to this study, considering the ability of House Boeschoten to accommodate several programs over time, will influence the approach the continual adaptive-reuse strategy. Ultimately its adaptive capabilities will classify it contingent or not. The resulting essence of the re-designed House Boeschoten should be a building that is entirely contingent in its nature when subject to change. In order to support programmatic changes, the structure should readily support alterations to the interior. The criterion for contingency should be its susceptibility to change.

### Testing Contingency Through Program

Typically, the functional requirements of the future inhabitant determine the program and related spatial requirements. In this article, the programme acts as a tool to test the adaptive ability of House Boeschoten. The objective is to prove that the building's resilience, acting as a regenerative theory, stems from its ability support a variety of predetermined programs. The ability to support these several programs, through adaptation, renders House Boeschoten contingent. The summary below lists the identified programs and the roles they serve as supports:

1. Research Centre (supports UNISA)
2. ECD Research Centre (supports UNISA ECE and Oost Einde Primary)
3. Public Space (supports the community and Oost Einde Primary)
4. Extra Mural Centre (supports Oost Einde Primary and the community)

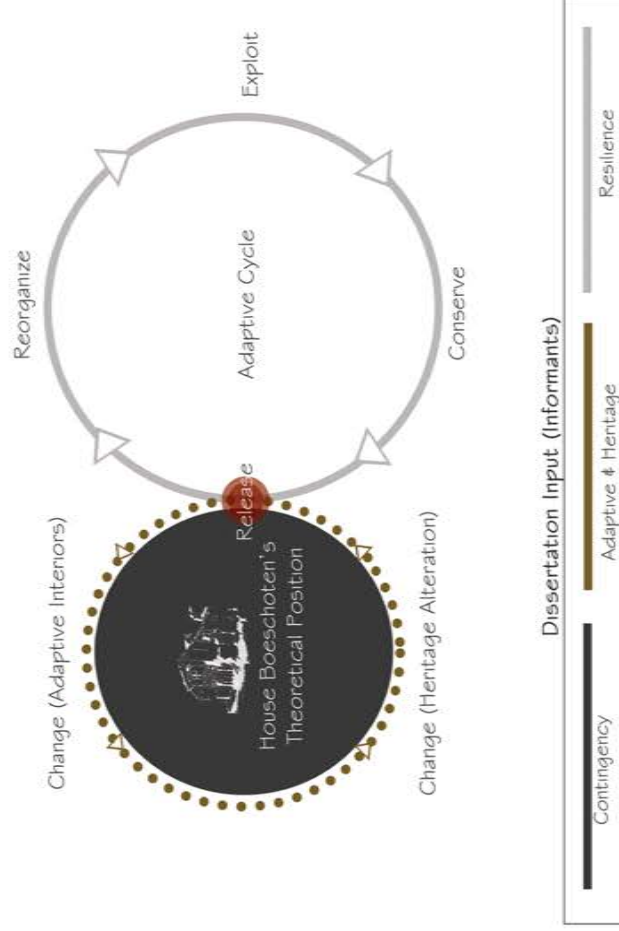


Fig. 07. Above; House boeschotens theoretical position (Author 2018)

Cross programming in House Boeschoten is achieved through timescales, allowing for the building to remain operational for extended periods.

### Contribution to Interior Architecture

The purpose of the article is to synthesise the theory of contingency, and introduce its potential for universal application. House Boeschoten is introduced in order to provide a lens for the application of the aforementioned adaptive-reuse strategy.

This article contributes to the existing body of work that has concentrated on the NZASM housing regime. House Boeschoten has to date not been documented as a heritage site. The article thereof, will contribute to the body of work on NZASM housing in Pretoria. A theoretical contribution is made through the extension of theories of resilience and contingency to adaptive reuse in the field of interior architecture.

### Conclusion

The articles prompts an investigation into the inherent resilience of House Boeschoten in an endeavour to identify a strategy for a continual cycle of

the building against a changing context of Sunnyside, Pretoria.

House Boeschoten as a case study is positioned, theoretically, within early modernism however that is identified as the cause of its stagnant nature. The new position towards contingency is suited to the currently trajectory of contemporary space making.

Theory is localised through place however contingency can be applied universally. The intention of resilience and contingency theories, applied through a strategy of adaptive-reuse, is to create spaces that are able to cope with inevitable change.

For as long as House Boeschoten is able to adapt in order to support a variety of programs with ease, resiliency from the interior out is ensured. This will set a precedent for future proposals that deal with similar typologies in Sunnyside.

## Endnotes

1. NZASM refers to the Nederlandsche Zuid-Afrikaansche Spoorweg-Maatschappij which is The Netherlands South African Railway Company (De Jong 1990:53).

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## Appendix F\_ Posters and Model







*With deepest thanks and appreciation\_*

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