To Inherit:

PERSISTENCE AND THE CONTINUAL REMAKING OF THE TSHWANE PUBLIC WORKS DEPARTMENT

LAURA NIN THOMASHOFF

U15079784

2021

Fig. i *Photograph of the ruined Electric workshop*

DECLARATION

In accordance with Regulation 4(c) of the General Regulations (G.57) for dissertations and theses, I declare that this dissertation, which I hereby submit for the degree Master of 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 my dissertation has already been, or is currently being, submitted for any such degree, diploma or other qualification.

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

15 November 2021

SIGNATURE DATE

Fig. ii *Photograph of the Stonemason's workshop*

PROJECT SUMMARY

STUDY LEADERS:	Dr Arthur Barker and Silindzile Shongwe
COURSE COORDINATOR:	Dr Arthur Barker
STUDY FIELD:	Memory, Legacy and Identity
	Submitted in fulfilment of part of the requirements for the degree Master in Architecture (Professional). Department of Architecture, Faculty of Engineering, Built Environment and Information Technology, University of Pretoria
SITE LOCATION:	Department of Public Works and Infrastructure Workshops
ADDRESS:	115 Minnaar Street, Pretoria Central, Gauteng, South Africa
SITE DESCRIPTION:	An overgrown platform between the southern Mechanical Workshop and the Labourers Accommodation
CLIENTS:	The Department of Public Works and Infrastructure, the DPWI Expanded Public Works Program, the City of Tshwane

Fig. ii *Photograph of the ruined interior of the electric workshop*

ACKGNOWLEDGEMENTS / BEDANKINGS

I would like to thank the lingerers and inhabitants in studio, especially for the last few months of 2021. This year has not been easy. Every laugh, every coffee, and every piece of advice has been greatly appreciated.

Dr. Nico Botes and Dr. Carin Kombrink, thank you for knowing I would become an architect even before I did. Dr. Arthur Barker, thank you for insisting that I follow my gut. Thank you for every bit of insight, critique and advice. Silindzile Shongwe, thank you for your patience and your guidance throughout the year. Marguerite Pienaar, thank you for introducing me to Fragile Architecture in 2018, even if I didn't really understand it. To Marga Viljoen, thank you for editing my dissertation.

Baie dankie aan my ma en pa, Fritz en Karlien, vir al julle geduld en ondersteuning. Dankie vir die hulp toe ek julle uiteindelik toegelaat het om te sien waarmee ek besig is. Dankie vir die koffie en die printing, en veral dankie vir al julle hulp met die modelbou. Julle is my inspirasie.

Aan Ursula, Amelie en Ben Jooste, sonder julle sou daar nie 'n volle voorlegging gewees het nie. Dankie vir die pragtige modelle. Dankie vir julle geduld en ondersteuning, veral die laaste maand. Julle het die jaar soveel ligter gemaak! Dankie aan Inge Wilkinson vir die bome. Ons almal maak 'n goeie span!

Fig. iii *Photograph of the interior of the mechanical workshop*

ABSTRACT AND PROJECT SUMMARY

ABSTRACT

The dissertation investigates the potential of a fragile approach to industrial heritage in the City of Tshwane with the aim of revitalising the industrial legacy of the DPWI Workshops.

Over the past century, the DPWI Workshops have been altered and adapted to suit the ever-changing context of the city. The site has directly contributed to the making of many of the buildings in the city, both by manufacturing essential parts of buildings and by honing the skills of artisans. Since 2018, the site has haltered all activities and the site has fallen into disrepair.

The site is considered redundant in its context as industrial space. The buildings are underutilised, yet valuable as unique examples of the industrial history of the city.

The dissertation aims to reintroduce the DPWI workshops as an active contributor to the making of the city through providing technical training opportunities. Additionally, the goal is to continue the narrative of change evident on the site, as an extension of industrial heritage in the city. By using fragile architecture, the intent is to prioritise items associated with memory as a continuation of the past.

Fig. iv *Photograph of the outside of the DPWI Mechanical Workshop*

Fig. v *time-lapse of a maquette being made and unmade*

1

The redundancy of the Tshwane Public Works Department Workshops

Fig. vi *time-lapse of a maquette being made and unmade*

INTRODUCTION

A built artefact persists through time. Its material sheds, accretes, stays useful, takes on new uses, persists, decays, becomes ruinous or is razed or celebrated as a monument or memorial. All the possibilities become a palimpsest of a 'text' encoded in its fabric, traces of its existence, or memory that it once was or might have been.

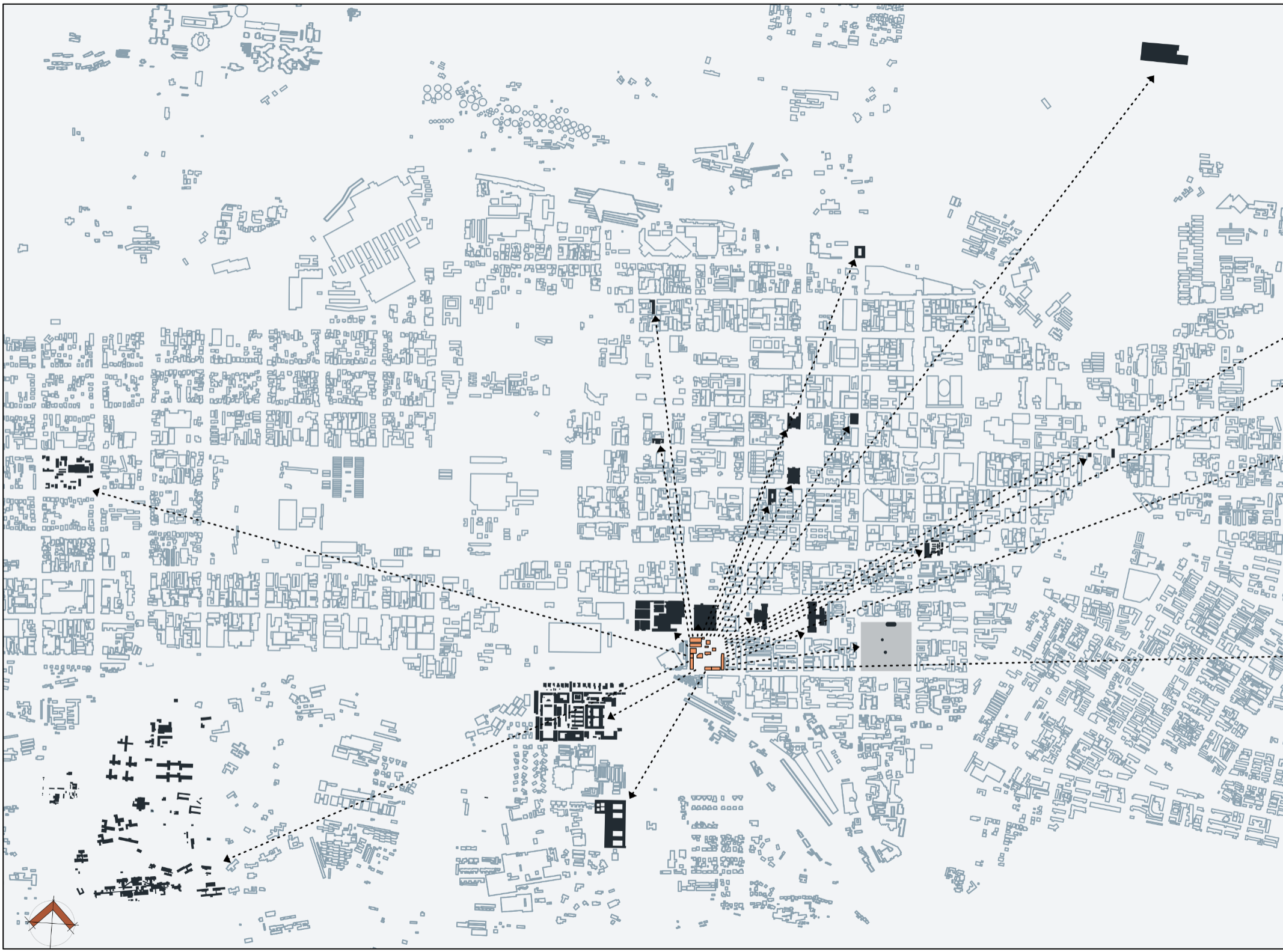
(Clarke and Fisher 2018:16-23).

Introduction

In the past 100 years, the Department of Public Works and Infrastructure Workshops in Minnaar Street, Pretoria CBD, have been built, demolished, adapted, and abandoned on numerous occasions. As a place always on the edge of development in the city, the site has constantly been overlooked (Le Roux, Botes and Pretoria City Council, 1993; City of Tshwane,2021). In some town planning frameworks, the site had (apparently unintentionally) been consolidated with its neighbours (ARUP, 2012). In other frameworks, roads cut through the middle of the site (Die Volkstem, 1930). Thus, there is an appeal to the disregard of the Workshops, however unintended.

Stance

The context is the origin of every architectural design project. From the context, the opportunities and challenges of the project can be identified. The context includes understanding the historical narratives and fabric, the physical conditions, the social and architectural significance, and the functional role. In summary, contextual studies uncover the site's origins, life, and functions (Peres, 2015: 89). From this perspective, a nuanced approach to space-making can be developed that suits the context (Pallasmaa, 2000: 84).



1. BACKGROUND

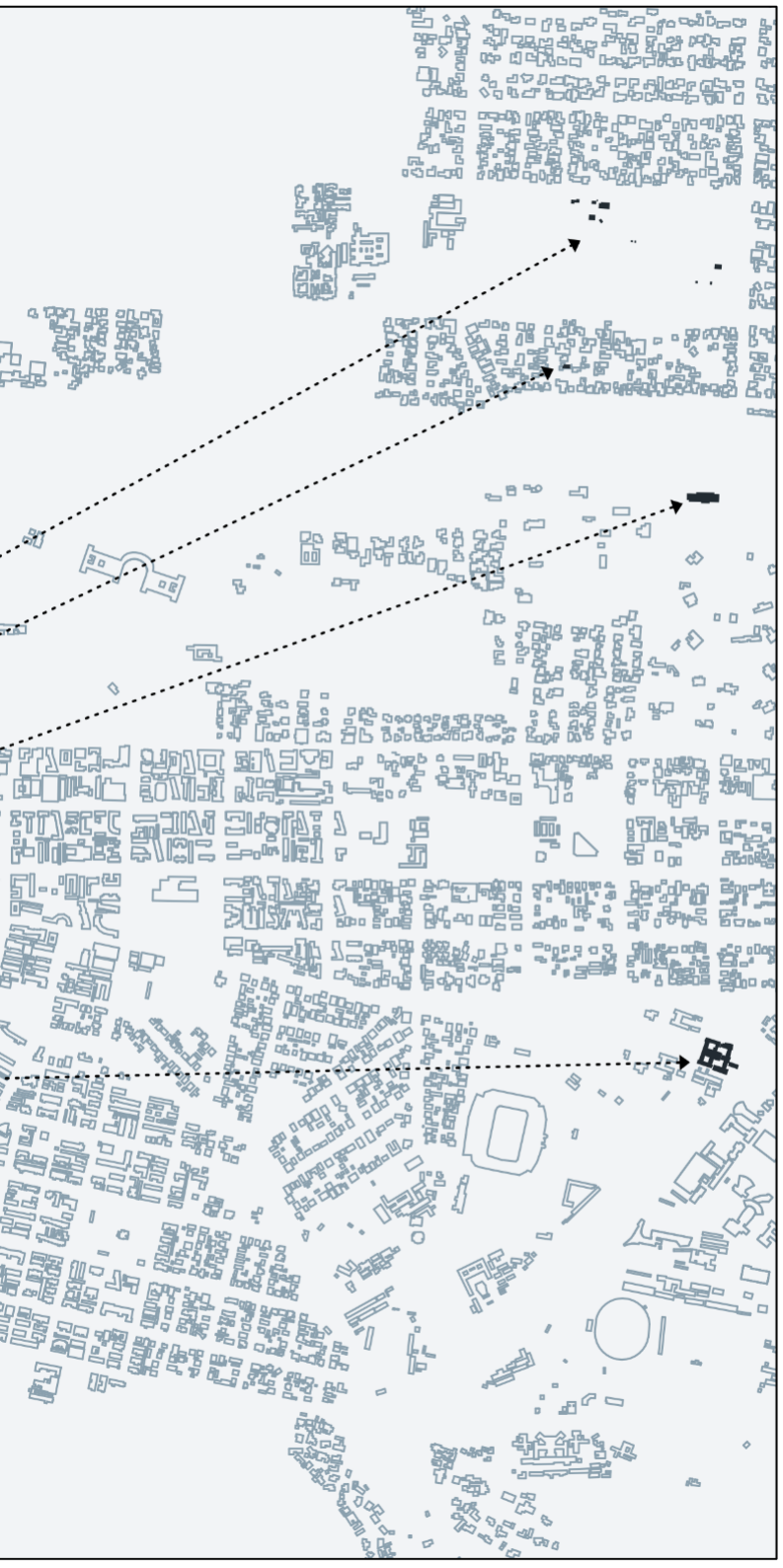


Fig. 1.1 *Locations of buildings historically constructed by DPWI (Artefacts.co.za. n.d.; 2021) adapted from City of Tshwane base drawing (Pienaar, M. n.d.)*

1.1 DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE

The Department of Public Works and Infrastructure (DPWI) has significantly contributed to the development, historical identity, preservation and maintenance of public assets in Tshwane. DPWI originated in Pretoria as the Departement Publieke Werken in 1887. In its 15 years of operation, DPWI instilled the European continental-influenced character of public buildings in the city, with a preference for brick as a building material (Fisher, 1998: 129-130).

After the first Anglo-Boer War, DPWI reestablished itself as the Public Works Department in 1912. Many training and job opportunities for artisan builders were created to alleviate poverty. The widespread popularity of the Kirkness brick is partly due to Public Works' support (Fisher 1998: 129).

The involvement of DPWI with the Council for Scientific and Industrial Research (CSIR) and the National Building Research Institute (NBRI) during the 1950s and 1960s produced essential developments in climate centred design. The research contributed to the transition from street-centred design towards supporting climate control devices (Ibid.: 136).

The current role of DPWI encompasses implementing the Tshwane Regeneration Project and the maintenance and management of public assets. Additionally, Public Works serves as a regulator of the built environment and is heavily involved in poverty alleviation through programmes like the Extended Public Works Program (EPWP). However, DPWI is no longer an advocate for innovation (Clarke and de Villiers, 2015:63-83; Public Works Department, n.d).

Locations
1 - Railway
2 - Pretoria Station
3- Ditsong
4 - Bosman Station
5- Municipal Fire station
6- Old fire station
7- City Hall
8-Dairy Mall
9- Npc Building

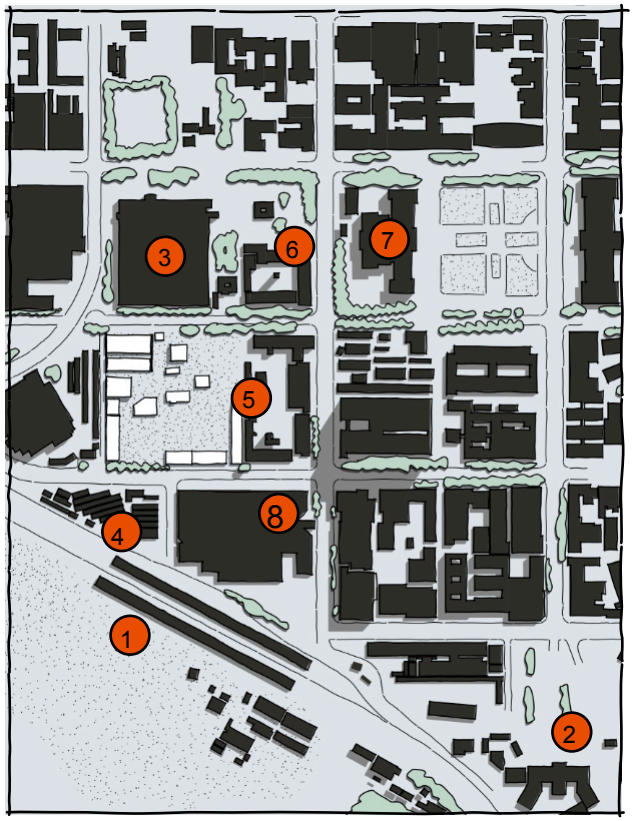


Fig. 1.2 *context map*

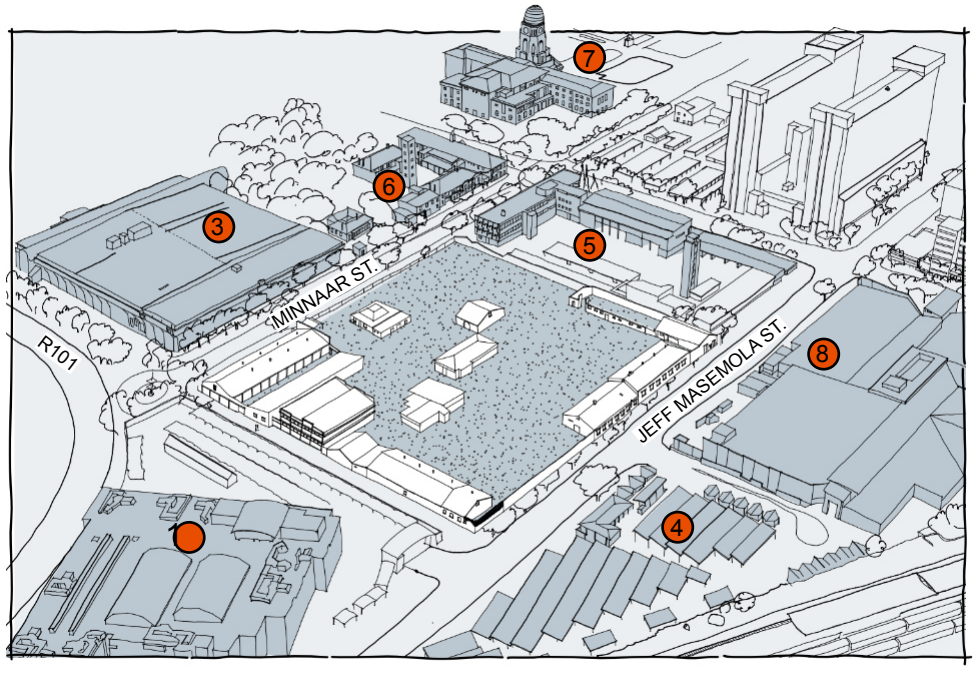


Fig. 1.3 *Context perspective*

1.2 THE MINNAAR STREET WORKSHOPS

Site and context

The location of the Workshops is at 115 Minnaar Street, on the edge of the Pretoria CBD. The city's southwest quadrant is known for its abundance of governmental and municipal buildings (Le Roux, Botes and Pretoria City Council, 1993: 63-64).

Additionally, the proximity of the railway and the Pretoria Station to the site has resulted in a confluence of the light industrial, commercial, public transport and civic contexts.

Figures 2 and 3 show the site is situated between the Ditsong Museum of Cultural History to the north and Bosman Station (a long-distance taxi rank) to its south, with the Fire Station to its east and the NPC Building (South African Post Office) to its west.

An informal north-south pedestrian axis along the western boundary connects Bosman Station with the inner city. The R101 (Sophie de Bruyn Street) abruptly cuts through Minnaar Street, resulting in a weak termination of the partially implemented Museum Park (Le Roux, Botes and Pretoria City Council, 1993: 64; Jordaan, 1995).

As illustrated in fig. 1.4, since the establishment of the Workshops on the site in the early 1900s, they served as supportive infrastructure to the surrounding context with various additions, adaptions and demolitions to suit the city's changing needs (Google Earth, 2021; Jansen, 2014: 9-12).

In 2014 an expansion and upgrade of the workshops was undertaken, which resulted in the workshops relocating temporarily. However, by 2018, all activity was halted on the site. As a result, the Workshops gradually fall into disrepair due to neglect, although the site remains well-guarded.

Fig. 1.4 *Timeline of changes to the DPWI Workshops since 1937*

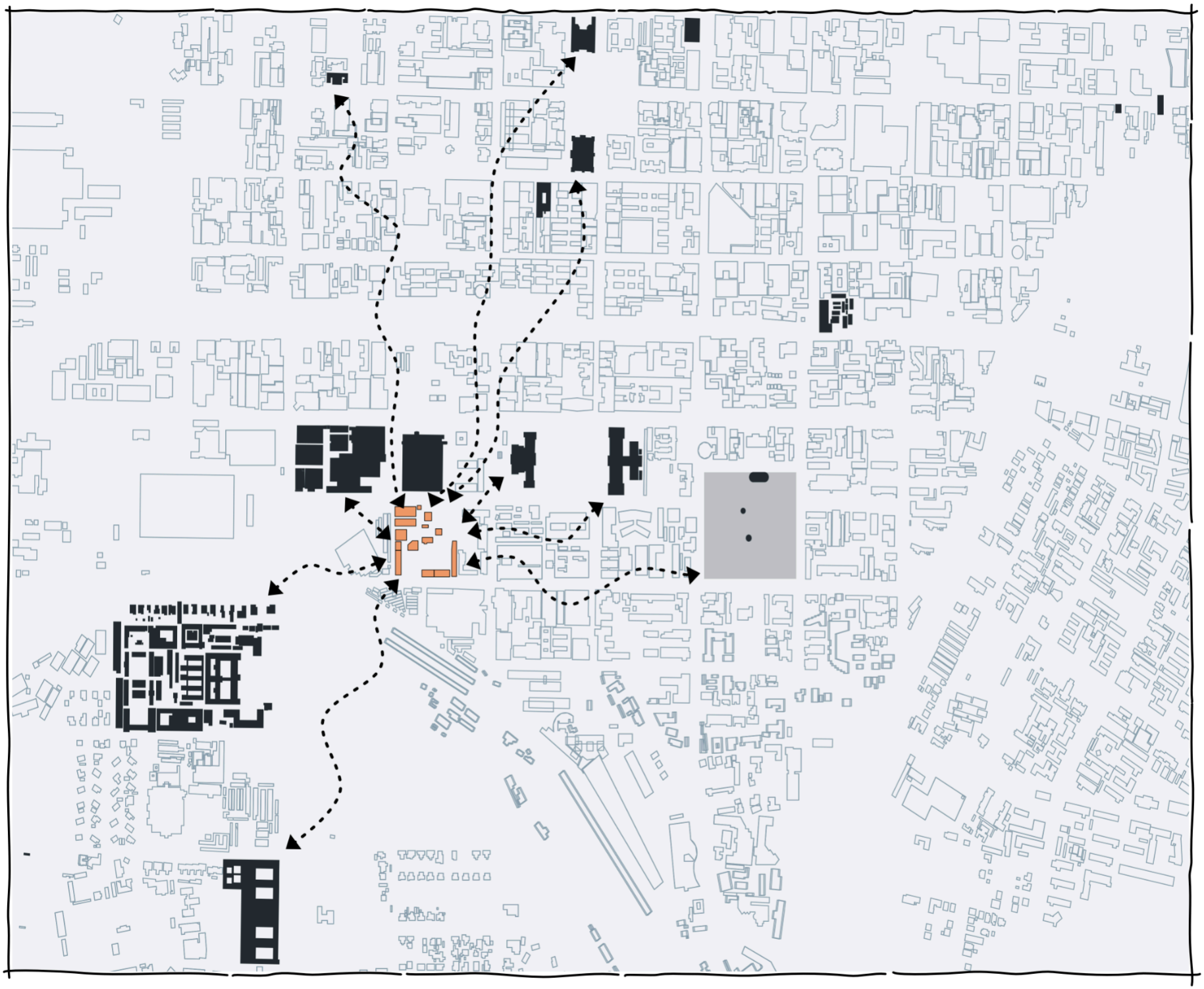


Fig. 2.1 *Non-comprehensive map of buildings built by DPWI. Pretoria Figure Ground (Pienaar n.d.)*

2. BUILDING THE ARGUMENT

2.1 IN SERVICE OF THE CITY

General Context, Concerns and Intentions

The DPWI plays an essential role in the city: the regulator of the built environment, public assets manager, and job creator and educator (Public Works Department, n.d).

Part of the scope of DPWI is the supervision and implementation of the City of Tshwane Inner City Regeneration Programme proposed in 2011 (Department of Public Works, 2012).

Although DPWI is currently involved in numerous projects in the city, historically, the site responsible for making, maintaining, and training the city's citizens no longer serves that purpose.

Therefore, the general concern is that the site no longer actively contributes to the remaking of the city. This dissertation intends to tie into existing DPWI frameworks and actively engage the public in the urban regeneration of the City of Tshwane.

Fig. 2.1 *1937 Aerial Photograph of the Department of Public Works Workshops (Adrian de Villiers)*

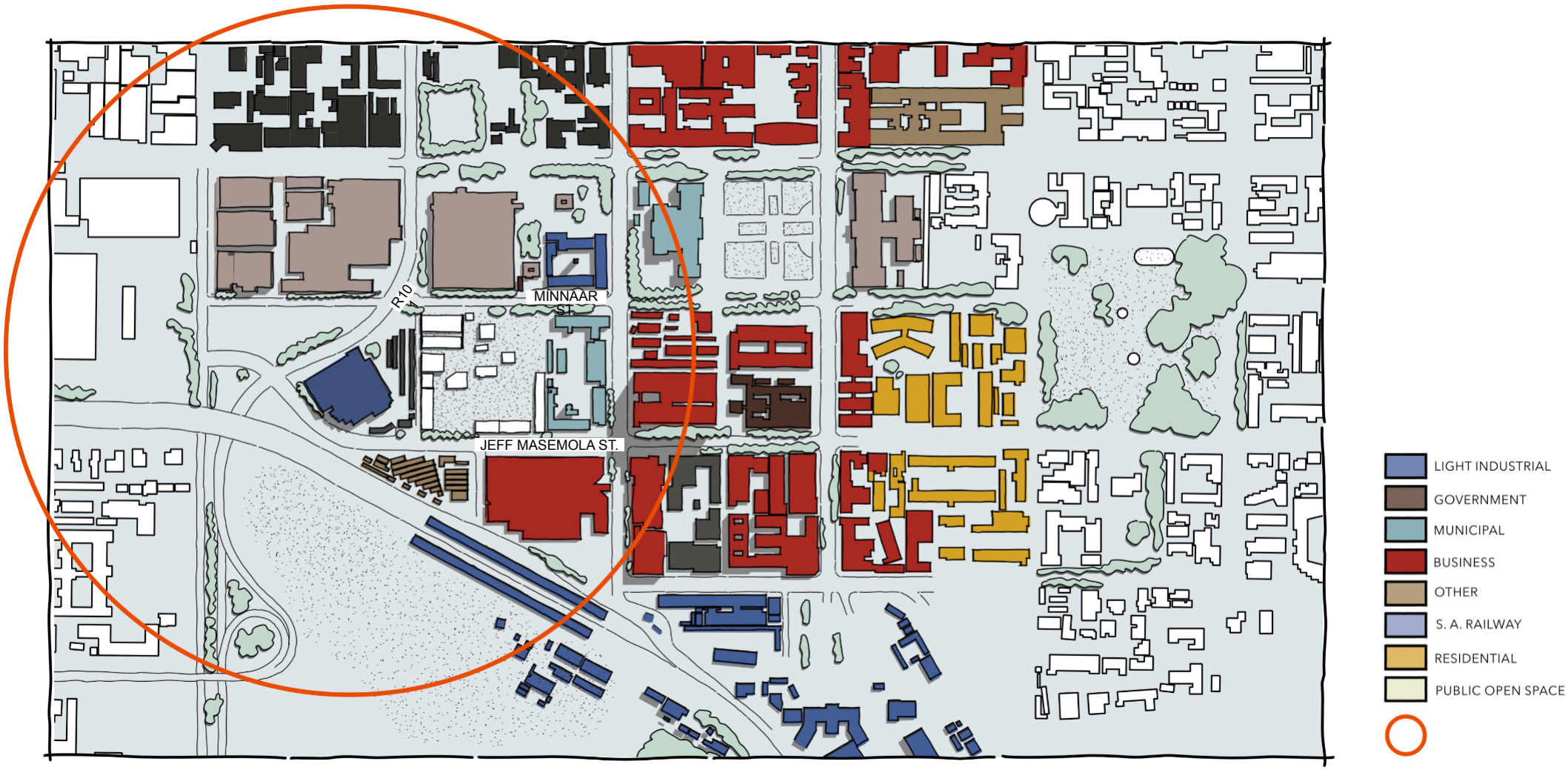


Fig. 2.3 *Site in context indicating the use of the surrounding buildings*

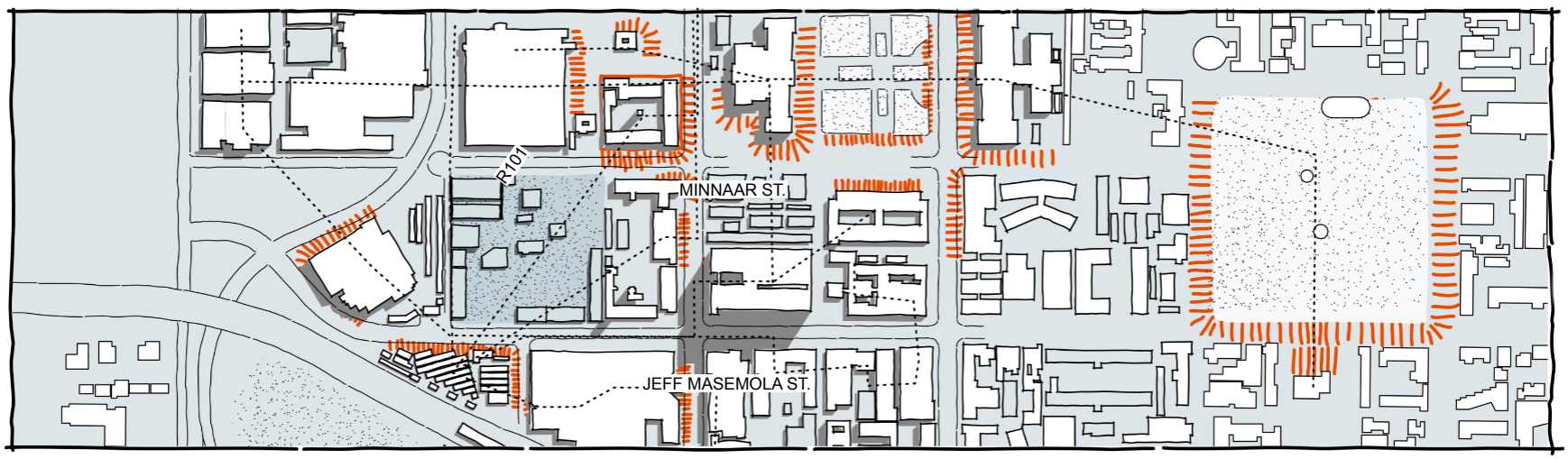


Fig. 2.5 *Site in context with landmark buildings with active edges*

2.2 A DISCONNECTED SITE

Urban Context, Issue and Intention

The Pretoria Station is situated approximately 500m from the DPWI Workshops. As mentioned earlier, due to the proximity of the railway lines and other associated infrastructure, the edge of the southwestern city quadrant has largely remained defined by its industrial legacy (Le Roux, Botes and Pretoria City Council, 1993: 59).

Locations
3- Ditsong
4 - Bosman Station
5- Municipal Fire station
6- Old fire station
7- City Hall
8-Dairy Mall
9- Npc Building

Fig. 2.4 *Urban context of the DPWI workshops*

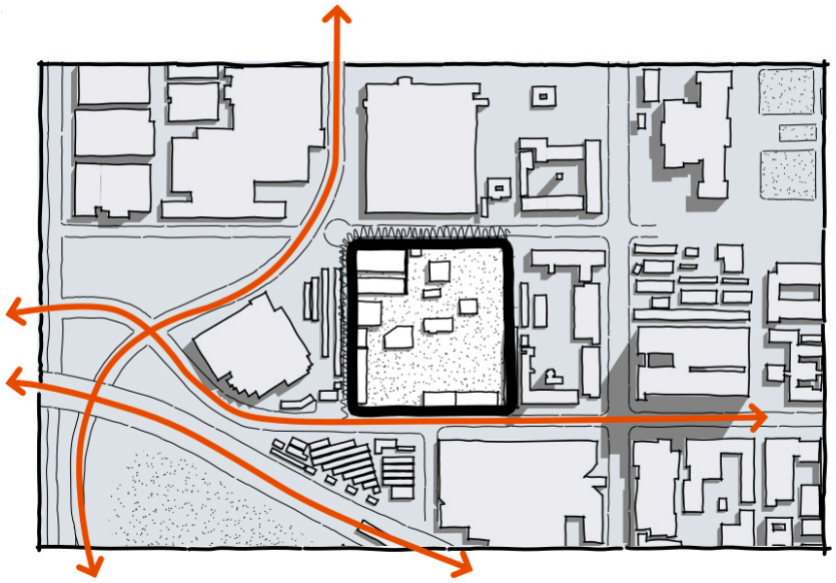


Fig. 2.6 *Isolation of the site due to roads*

Figure 2.6 indicates the 1967 ring road directly impacts the site's disconnection (Jordaan, 1989: 29) since the western link (the R101 or Sophie de Bruyn Street) cuts through Minnaar street, which reduces the possibility of east-west pedestrian movement. The combined effect of Minnaar Street as a dead-end, the untraversable four-lane regional road (Sophie de Bruyn Street) towards the city and the high congestion of taxis around Bosman Station (Jeff Masemola Street)is the isolation of the site.

The Dairy Mall's service entrance fronts on Jeff Masemola Street, resulting in a dead public edge. Despite the notable public interface, the NPC Building (South African Post Office) has no linkages towards Minnaar Street and Sophie de Bruyn Street.

Figure 2,5 shows the site is surrounded by landmark buildings such as the Distong Museum of Cultural History, the Old Fire Station and the Municipal Fire Station, Bosman Station and Pretoria Station. The City Hall and the Ditsong: Museum of Natural history is within walking distance from the site, linking within Burgers Park. The Dairy Mall could be considered a commercial anchor.

The urban concern is that the site is isolated from its immediate context despite being surrounded by prominent landmarks and everyday destinations. The urban intention of the design is to revitalise the site as an active contributor to the city's built context and reveal the change that has taken place represented on the site.

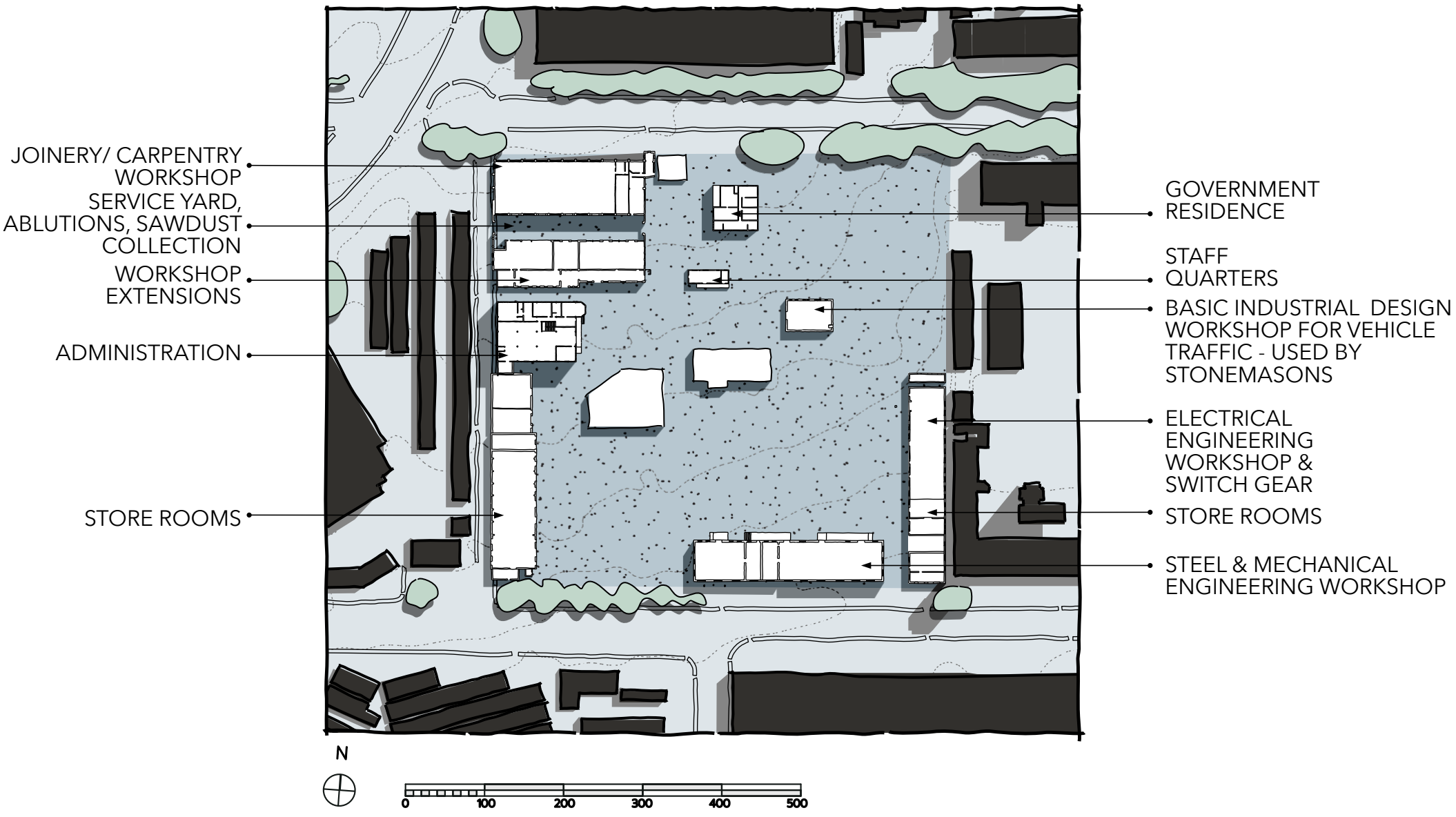


Fig. 2.7 *Locations of existing buildings on site*

2.3 REMAKING AND THE HISTORY OF THE EVERY DAY

Architectural Concern

The buildings on site were consistently adapted, demolished, and modified due to the predominantly industrial purpose of the site, as seen in Figure 8 (Jansen, 2014: 12).

Therefore, the site has been valued more for its utilitarian purpose than its architectural representation (Clarke and Fisher, 2018:16-23). In this ever-changing environment, consideration of the historical context of the site becomes the primary imperative.

The Smithsonian-inspired urban framework (for Minnaar Street) from the 1990s was only partially implemented through street furniture. The Ditsong Cultural History Museum was built concurrently with South Africa's transition to democracy, but it did not critically engage with representations of historical identity (Swart and Proust, 2019: 220).

As illustrated in figure 2,9, the site contains historic buildings representing various eras in the city's industrial development and the DPWI (Fig. 9). It also illustrates the ever-changing utilitarian nature of industrial technologies (Jansen, 2014), which is the main challenge of most industrial heritage sites in the country (Clarke and Fisher, 2018: 16-23).

Since the 2014 HIA conducted by the DPWI, significant changes have occurred (Jansen, 2014: appendix). Two historical storerooms were demolished to make room for new buildings, the asphalt that covered most of the site was removed, and all temporary shading structures were torn down (Refer to Figs 8&9). Since the preparations for further development on the site halted in 2018, grass, shrubs and small trees sprouted, covering the exposed soil (Fig. 2.8.

The main architectural concern is that the site's neglect has led to the decay of its industrial heritage. The continual changes to the industrial buildings also mean little remains of the narrative of the changes on the site. Recent interventions either demolished or altered the historical buildings in an insensitive and inconsiderate manner.

The architectural intention is to continue the narrative of remaking on the site by investigating the intersection between an industrial architecture that has to be functional, adaptable and revitalising, but simultaneously fragile, subtle and responsive to the context.

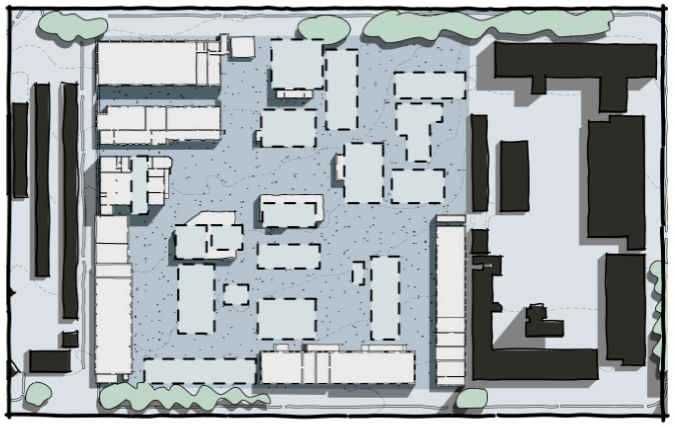


Fig. 2.7 *Loss: resulting footprints of modified and demolished buildings*

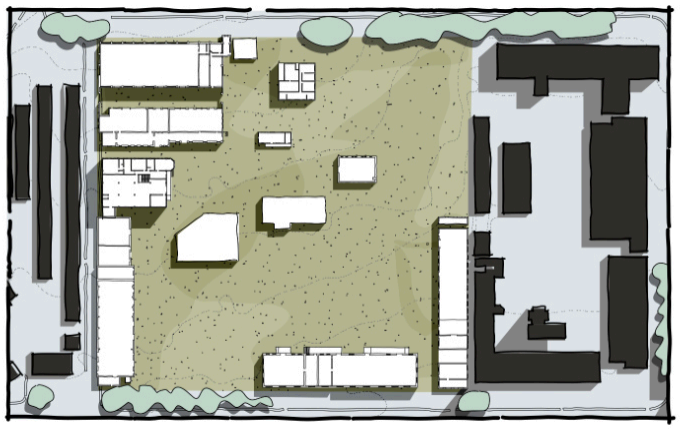


Fig. 2.8 *Reclaimed natural landscape*

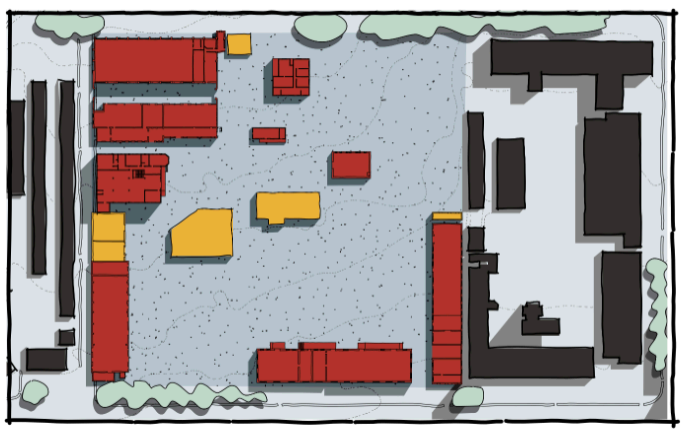


Fig. 2.9 *Buildings in red - of historic significance. Buildings in yellow - recent changes*

3. THE DISSERTATION

3.1 PROJECT STATEMENT

The dissertation investigates a subtle approach to revitalising the industrial legacy of the Workshops in the City of Tshwane through a deliberate focus on contextual appreciation, public value and utility.

3.2 RESEARCH QUESTIONS

How does one mediate between existing industrial heritage, revitalised industrial utility and public service programs? Can the mediation be done sensitively yet actively improve the value of the site?

How can the reclaimed natural condition of the site inform the design process? Can the reclaimed natural condition of the site's landscape be protected and encouraged alongside the appreciation of the industrial heritage?

How can industrial programs be reintroduced to the site in a way that directly engages the public?

How can the continuous change of the industrial site be celebrated without inhibiting the progression of technology?

Can the industrial legacy for the City of Tshwane be reframed to focus on the undervalued history of the everyday people involved in making the city?

3.3 PROGRAM INTENTIONS

The key programmatic intent of the dissertation is to serve the public interest regarding work opportunities relating to the DPWI Expanded Public Works Program.

The framework will address the legacy of local craft by proposing a commemorative craft repository with a series of demonstration spaces to invite public participation. It will include facilities with varying public engagement, from a works application office to a resource centre.

The design focus will be on the vocational training of EPWP participants.

3.4 METHODOLOGY

The research design intends to allow for creative freedom and non-chronological development. The research aims to inform a framework for an integrated assessment and design response to the existing condition of the site (Hofstee, 2011: 124-126; Wang and Groat, 2013: 387,392).

Context study

An initial comparative analysis of change of the context will be made through layering historical material such as maps, urban frameworks, and available aerial photographs. The condition of the public interface to the site will become the initial informants to an urban framework to identify the research problems for the dissertation.

Site Visits

Multiple site visits will contribute to the integrated assessment and understanding of the spatial potential of the site and its context. Throughout the design process, it will also serve as a gauge to critically reflect on the appropriateness of the developing design.

Desktop Studies

Information about the site's current role in the city will be gathered through the consultation of existing HIAs, relevant literature, previous urban frameworks for the CBD, government documents relating to the Tshwane Regeneration Project, and the DPWI Extended Works Program to develop a programme.

Theoretical Lens

Existing heritage strategies and approaches to design in existing contexts will be critiqued. Literature about Urban Regeneration, Palimpsest and Fragile Architecture will be consulted to inform the assessment criteria of the Integrated Assessment and inform the approach to a design response.

Integrated assessment of the value of the site

The value of each existing building will be assessed and analysed through the constructed theoretical lens. Appropriate design responses to each building will then be suggested. Finally, the individual assessments and analyses will be considered parallel to their context to construct a map of significance.

Statement of value

The Statement of value will follow the Integrated Assessment, which will identify the design constraints of the existing site (Mason, 2002: 23-25).

Site Framework

An informed response will be established through the theoretical lens, desktop studies, site visits, and integrated assessment. The framework will include a broader programmatic intent for the site and interventions that involve existing buildings, and the public interface and integration of the site will be established. The delimited site for the design moving forward will also be identified. The framework will be refined through continually revisiting the site framework as the architectural design develops.

Precedent studies

A better understanding of design approaches to similar contexts can be gained through critical studies of relevant precedents and insight into an informed application of industrial programs in the design. These will include precedents relating to a South African heritage landscape with connections to an industrial origin, industrial heritage projects in an urban context and contemporary expressions of industrial projects that could be interpreted as fragile architecture.

Application, iteration and interpretation

An initial response to the integrated assessment within the site framework will be made. A series of iterations, informed by the precedent studies and critical reflection, will develop and be integrated to develop the design moving forward.

Assumptions

The assumption is that changes to the broader context can be made as long as it falls within the public realm. This includes minor changes to pedestrian routes and access to the site, especially on Sophie De Bruyn Street. It is also assumed that the informal washing and maintenance of taxis on Jeff Masemola Street will be accommodated within a proposed transport hub. It is assumed that the DPWI Workshops are relocated permanently and that the site as-is is considered redundant for its original purpose. It is assumed that accommodation for black labourers has historically been provided on the site, as the HIA conducted by the DPWI speculated (Jansen, 2014).

Limitations and delimitations

The project will centre around the design of industrial workshops. Therefore the elements that fall outside the scope of architecture should be considered indicative of the intention of the design. The proposed design intervention will be situated within a larger framework. The detail-development of the design will be limited to the identified site and its immediate context. The site framework will be sufficiently resolved to provide context for the project's generator.

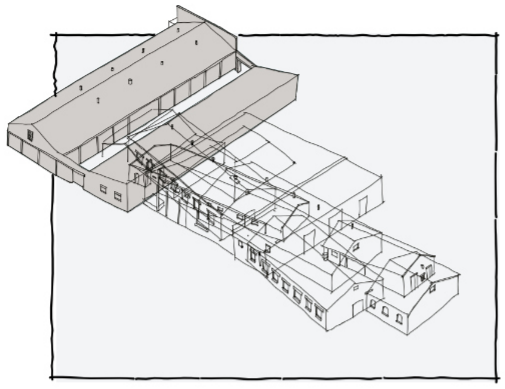


Fig. 4.1 *Stasis versus change*

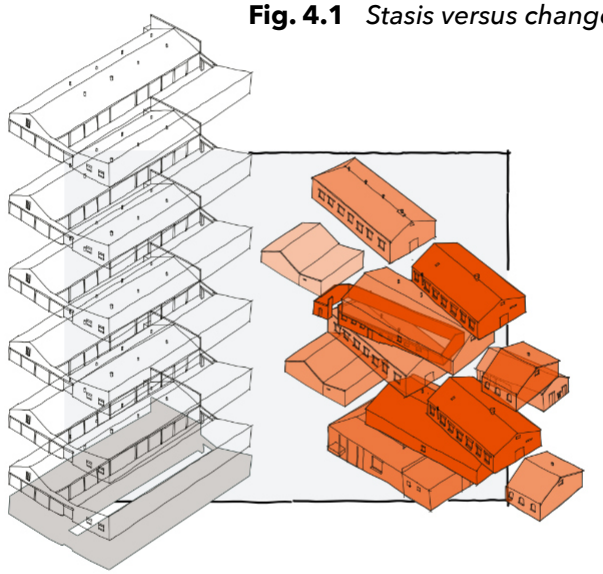


Fig.4.2 **Value**-*neutral*

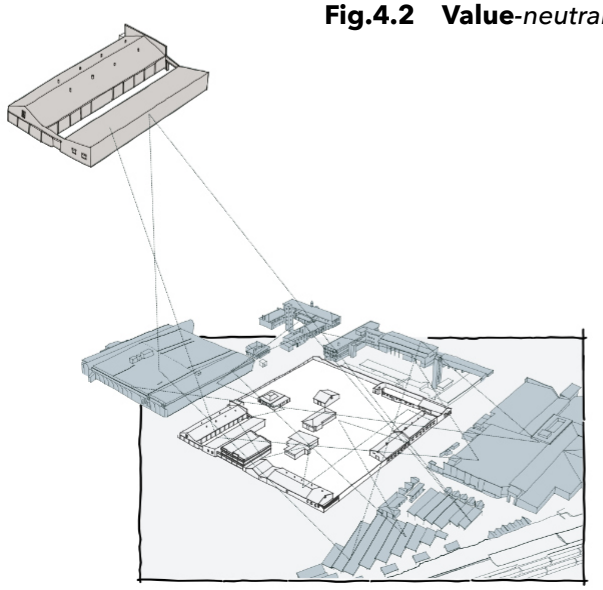


Fig.4.3 **General** *resilience*

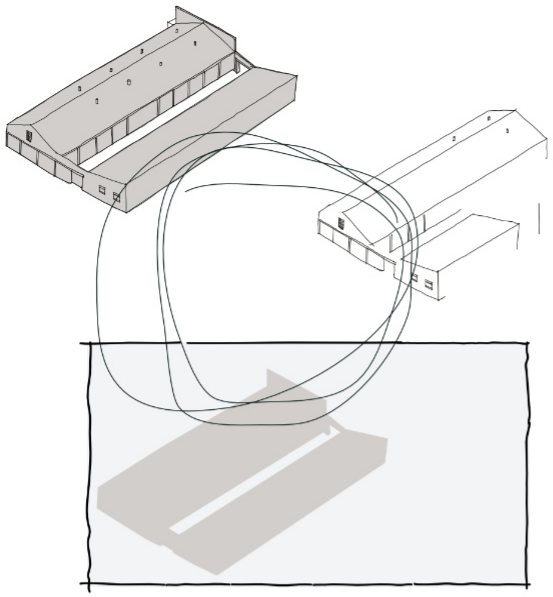


Fig. 4.4 *Recovery*

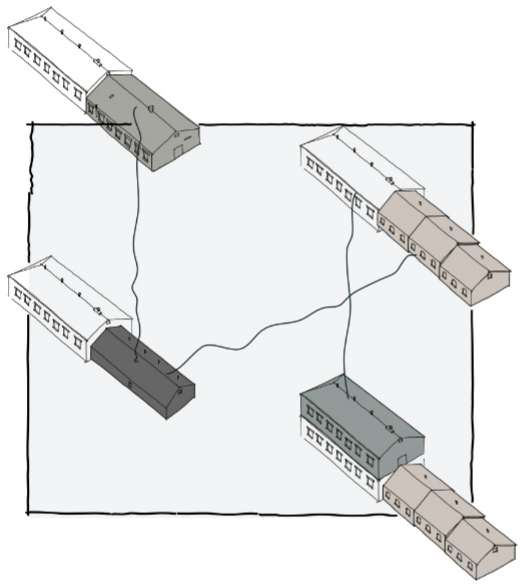


Fig. 4.5 *Evolution*

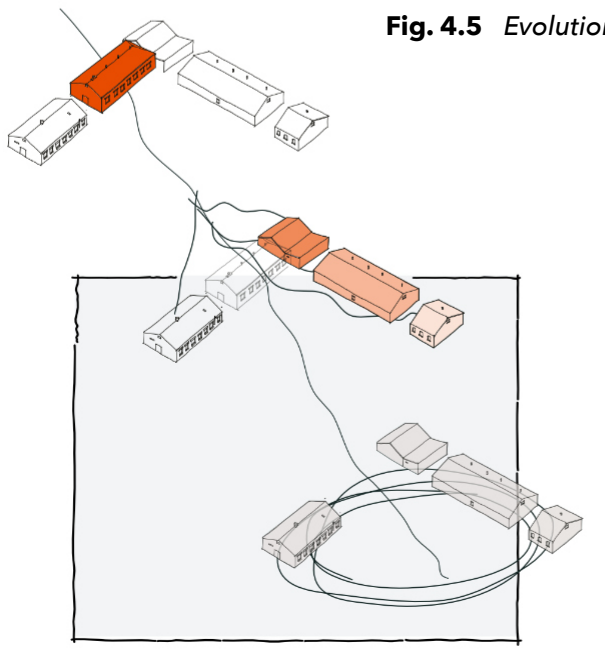


Fig. 4.6 *Transformation*

4. THEORETICAL POINT OF DEPARTURE

The literature review intends to introduce theories of urban resilience, remodelling and fragile architecture. The goal is to inform the assessment criteria for the Integrated Assessment and guide the design response.

4.1 URBAN RESILIENCE

The investigation of the theory of urban resilience applied to the City of Tshwane intends to guide a programmatic and urban response to the site. Peres (2016: 96-107) highlights the core principles of urban systems resilience.

As illustrated in Figure 4.1, stasis and change are both considered characteristics associated with resilience. Systems can persist despite the changing conditions (stasis) or evolve or transform to suit the current context (Peres 2016: 97).

A resilient system is value-neutral (Figure 4.2). It can add value to its context while also diminishing the context depending on the perspective. However, a resilient system does not imply a healthy system (Ibid.: 97, 102-105).

Figure 4.3 illustrates aiming to design a condition for a specific resilience in a context might undermine the overall resilience within its system. It is thus advisable to consider the condition from a holistic standpoint and aim to design for a general resilience. (Ibid.: 98, 100-102).

According to Peres (Ibid.: 99), three manifestations of Resilience Theory in urban settings are interpreted as recovery, evolution and transformation.

Recovery is when the whole system is maintained. This manifestation has a quality of persistence, where a system manages to bounce back to a similar or the same condition after times of stress. (Fig.4.4)

They maintain that evolution is a form of internal flexibility within systems. It allows for unreliable sub- systems to be replaced by other sub- systems to fill the needs of the context without a complete collapse. (Fig. 4.5)

As illustrated in fig.4.6, transformation takes place when an entire system collapses or drastic changes to systems take place. If the context changes enough and the system no longer serves a resilient purpose, some systems change or collapse altogether (Ibid.).

Mechanisms for enhancing adaptive capacity include diversity, redundancy and modularity (Ibid.).

As illustrated in fig. 4.7, diversity allows for a variety of options or paths in a system, which encourages flexibility with the available options (Ibid.: 162).

Redundancy (fig.4.8) provides a fallback if circumstances change. The contextual changes are independent of time and scale (Ibid.: 173).

Modularity, as described in fig. 4.9, focuses on strengthening internal connections to allow for versatile use of the same module (Ibid: 178).

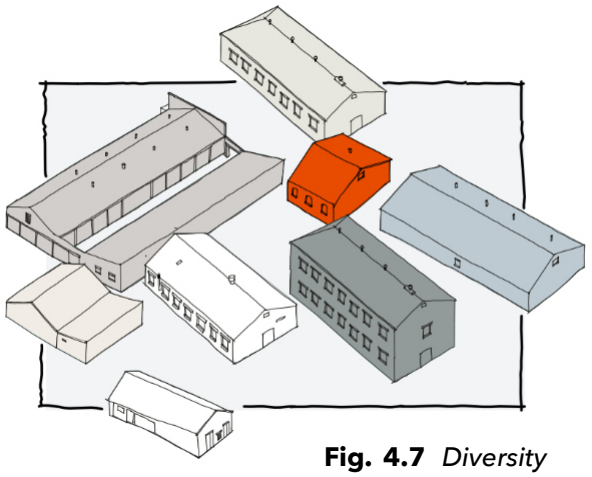


Fig. 4.7 *Diversity*

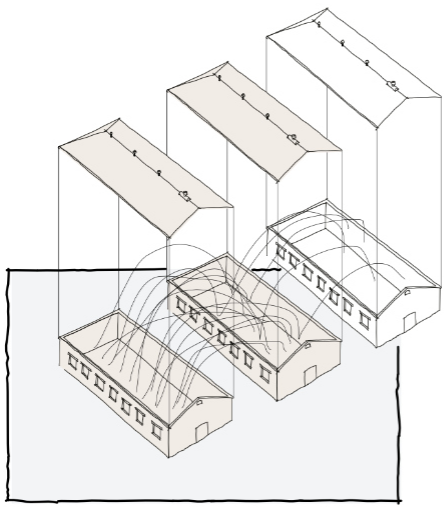


Fig. 4.8 *Redundancy*

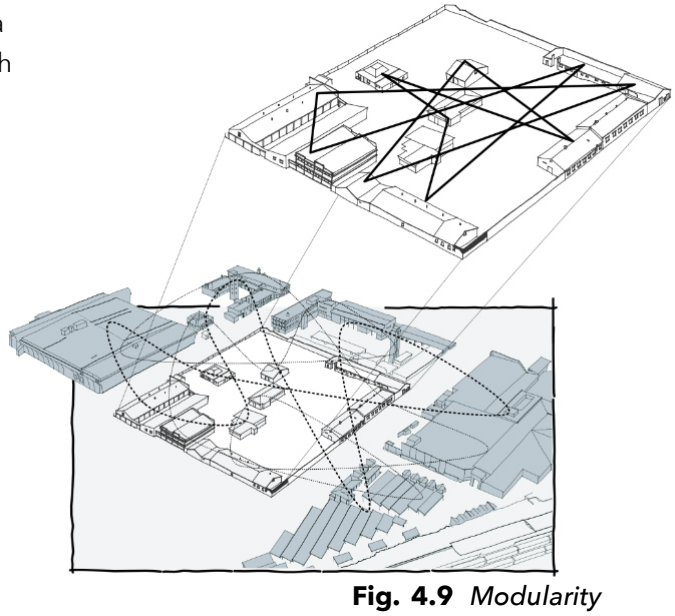


Fig. 4.9 *Modularity*

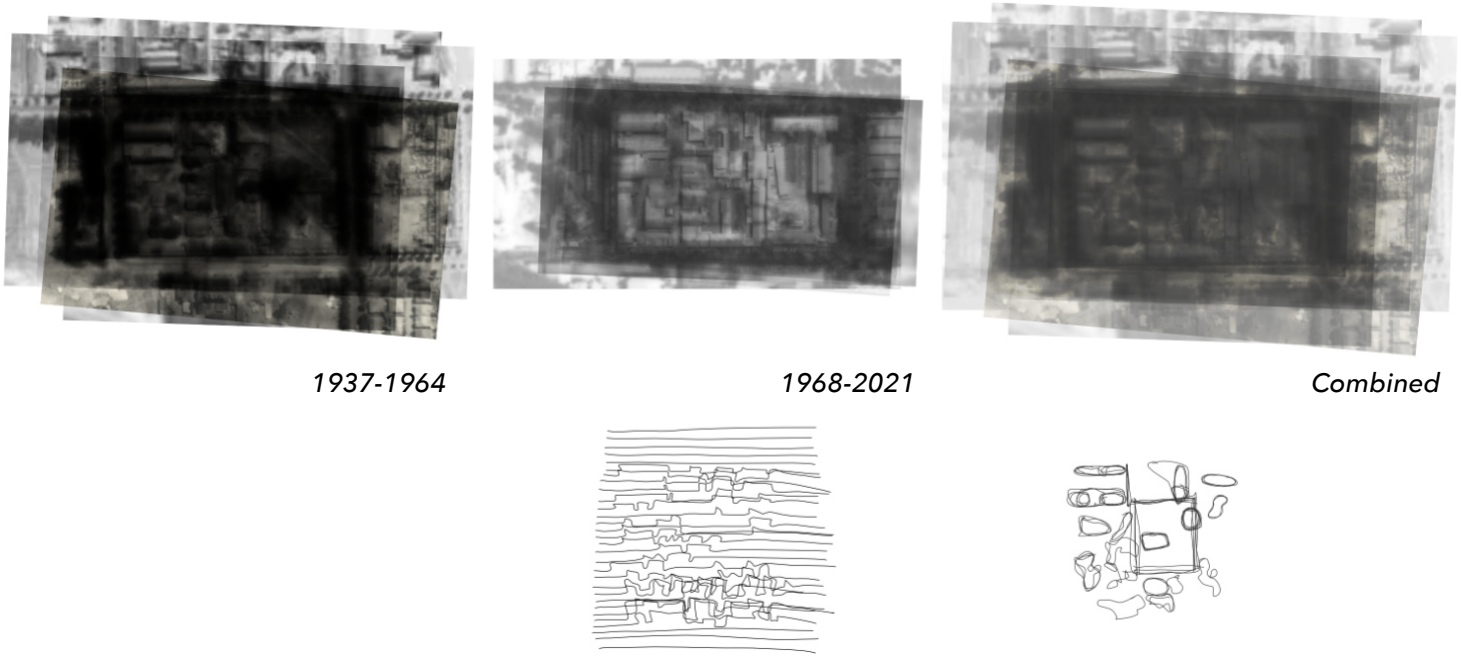


Fig. 4.10 *Layered historic and aerial photographs*

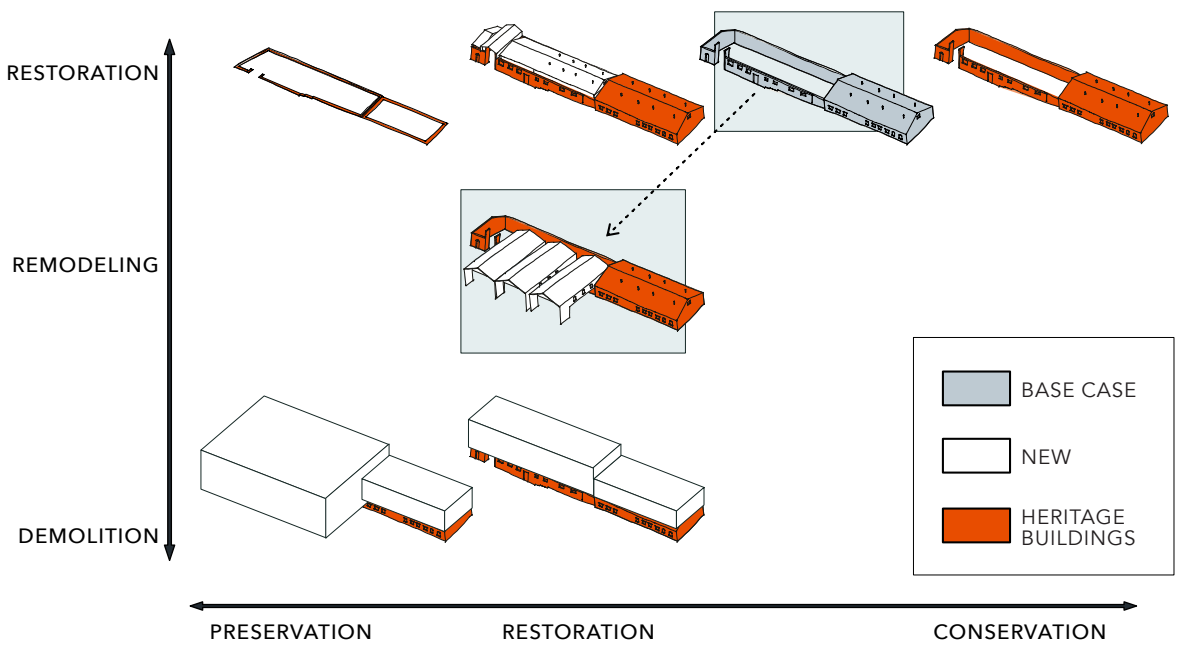


Fig. 4.11 *Graph depicting design attitudes and approaches to built heritage*

4.2 REMODELLING THROUGH PALIMPSEST

History as an informant is considered either a repository or the same material to be altered (Machado, 1976: 48-49). The past as a repository can act as a restrictive force to the design process as it frames the historical context as a set of rules to follow. Instead, Machado proposes a process of remodelling the past. By remodelling, Machado suggests applying palimpsest to change the material while still maintaining its essence. (Ibid.: 46-48). Through this process of remodelling the site or building, how it does or does not acknowledge the cultural context over time becomes apparent (Ibid.: 49).

4.3 PRESERVATION-CONSERVATION CONTINUITY

The current emphasis on heritage protection in South Africa focuses on safeguarding previously neglected histories (Fisher et al., 2003: 74-45). However, this intent is not evident in the immediate urban context and is not evident on site.

Postcolonial thought has transformed the reasoning supporting heritage value to appreciate multiple- and hybrid perspectives best understood through the layering of meanings and identities (Hosagrahar, 2012: 82-83). Considering heritage architecture as a scaled approach allows one to consider interventions on historic sites fluidly, according to Barker (2020: 144).

The scale is adapted into a graph that allows a non-dialectical approach to built heritage to be formed (fig. 4.11). On the x-axis the attitude towards

heritage preservation or conservation is made, with the y-axis determining the approaches to the interventions towards the built heritage, from continuity to contrast (Barker 2020:134).

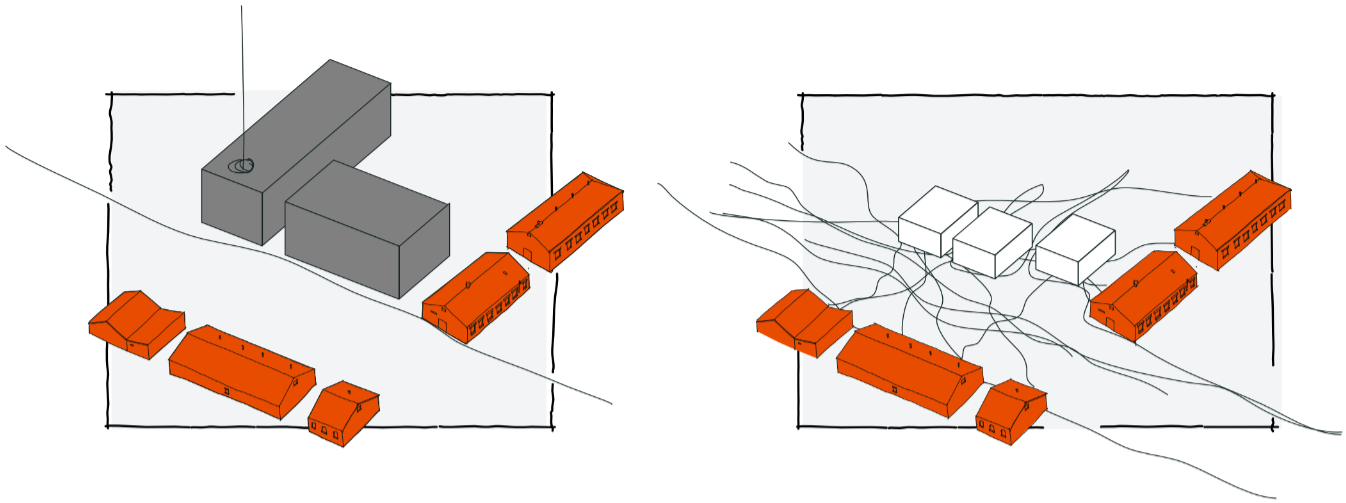


Fig. 4.12 *Fragile architecture as described by Palasmaa (2000:81-83)*

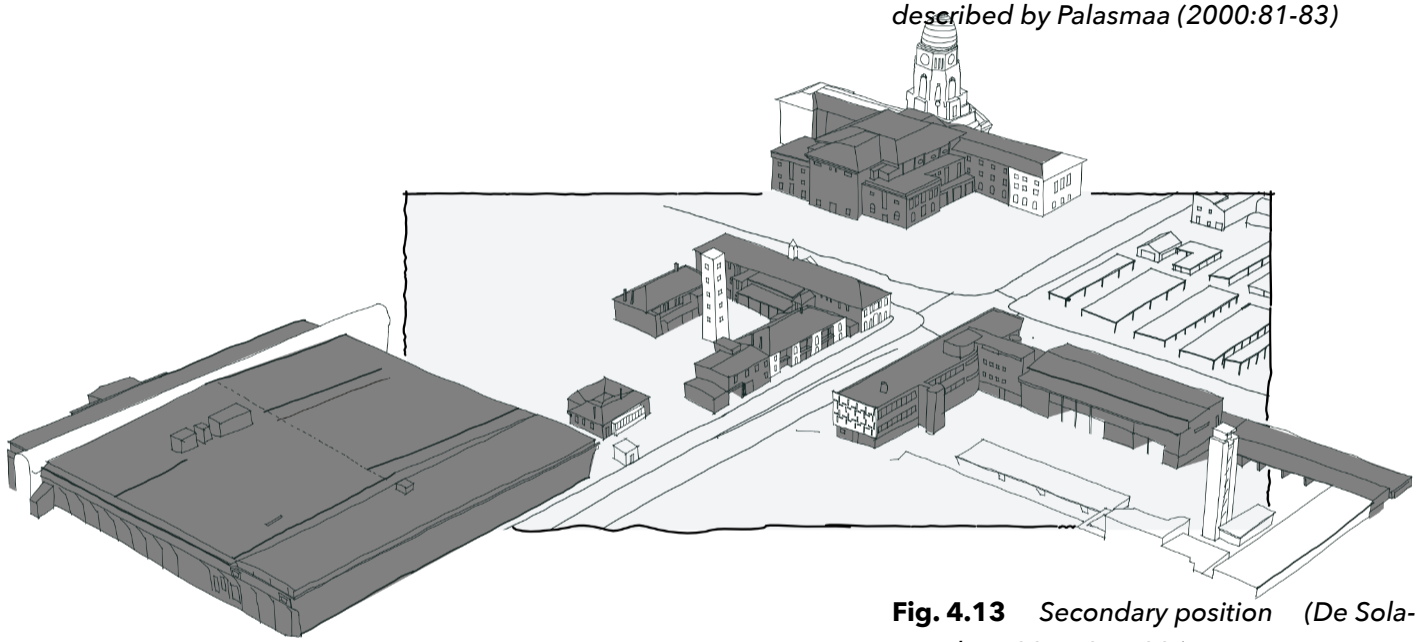


Fig. 4.13 *Secondary position (De Sola-Morales 1987:621-622)*

4.3 DE-EMPHASIS

Pallasmaa (2000:81-83) describes the idea of fragile (or weak) architecture as an approach that is responsive and contextual. Where "architecture of strong structure and image" is characterised by its powerful or controlling impact on the spaces it creates, "architecture of weak structure and image" encourages a substantial contextual subtlety, nuance and imperfection (Pallasmaa 2000:81-83).

(Fig. 4.13) De Sola-Morales (1987:622) recognises that 'weak' architecture relegates architecture to a secondary position. This position of secondary importance is what is understood as 'weak', and what is ultimately considered the most significant.

Fragile architecture is explored further in fig. 4.14 with the description of monitu as moments of recollection. This is the recollected memory after the architecture has been seen (De Sola-Morales 1987:621-622).

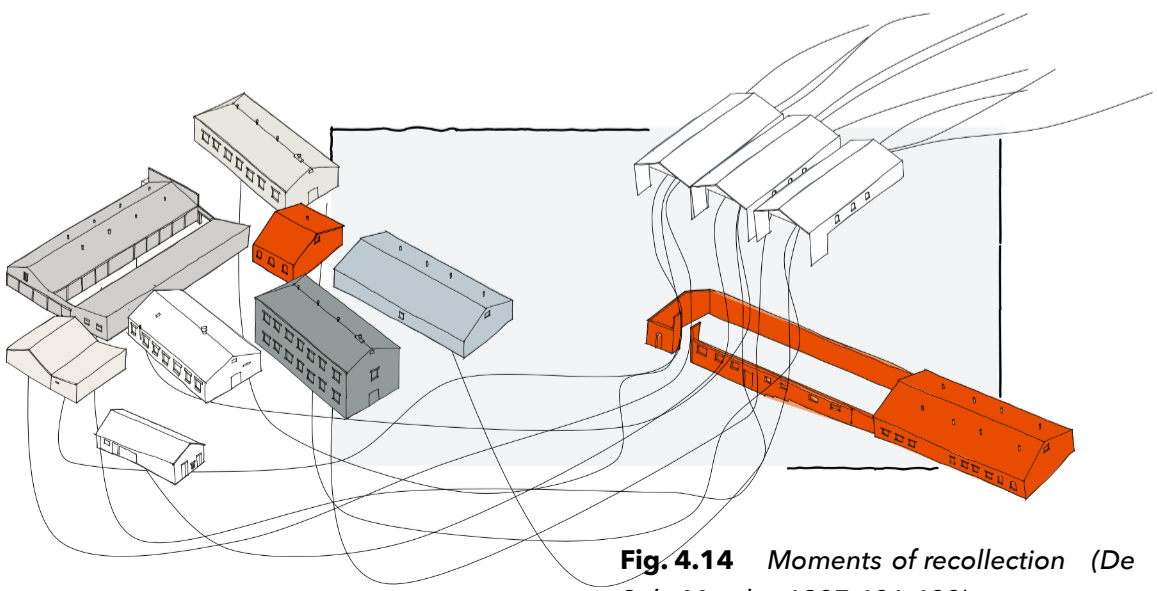


Fig. 4.14 *Moments of recollection (De Sola-Morales 1987:621-622)*

2

Preservation-conservation continuity and overlapping values

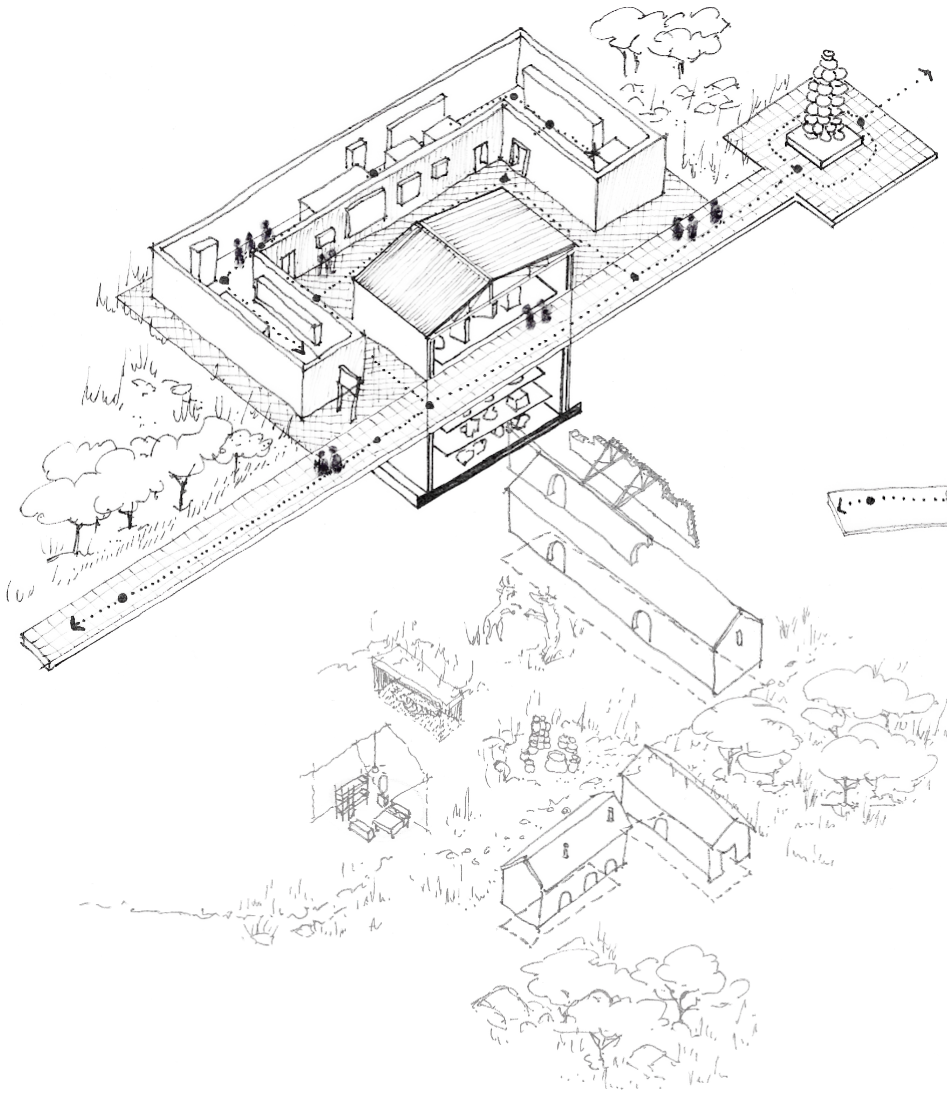


Fig. 5.1 *Architectural representation of memory as a linear narrative*

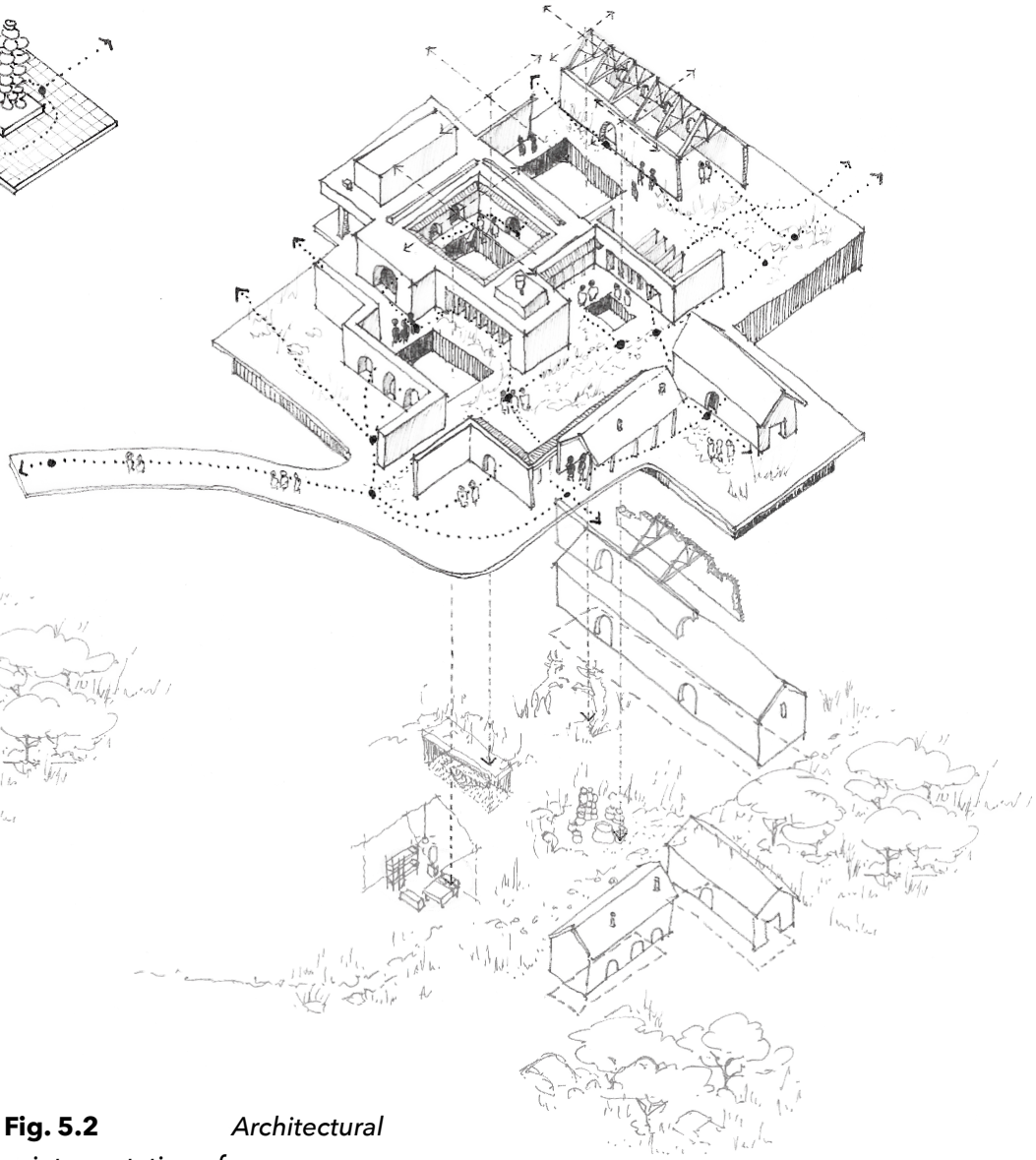


Fig. 5.2 *Architectural interpretation of memory as a part of overlapping narratives*

The discourse on heritage preservation in South Africa has shifted to value neglected and underrepresented narratives (Fisher et al., 2003: 74-75). Recent heritage projects in South Africa have incorporated a narrative experience as the backbone for architectural representation of the past.

As illustrated in Fig. 5.1 the general approach to representing memory in architecture is to encourage a specific path through a space to experience a singular narrative. Memories are revised to be consumed as a series of events from the past, where representative items are memorialised out of context. Thus, the items that are associated with memory become less accessible.

The approach proposed in Fig. 5.2 is memory as a part of overlapping narratives. This includes a variety of experiential devices which allow memory to be explored from different perspectives. The overlapping narratives allow for a holistic interpretation of memory and are celebrated alongside an understanding of the context it represents. As a result, the accessibility of items associated with memory are prioritised, and the present is viewed as a continuation of the past (De Sola'-Morales, 1987: 620).

The outcome of the value assessment, the precedent studies and the site framework is to define the value of the site and derive a polycentric strategy through a process of overlapping systems and considerations (Ibid.)

Fig. 5.3 *Existing store rooms on site*

5. INTEGRATED VALUE ASSESSMENT

5.1 ASSESSMENT FRAMEWORK

The integrated Value Assessment framework is used to determine a scaled approach (Barker 2020) to the assessment of the non-dialectic value of the site. The criteria are derived from an understanding of urban resilience principles (Peres and Du Plessis 2016: 96-107) and conservation values developed by the Getty Foundation. The Integrated Value Assessment aims to uncover valuable aspects to consider when making design decisions. Mason's (2002: 23-25) value assessment framework is adapted to include criteria besides heritage value.

Values are matched to physical resources and characteristics, threats and opportunities are analysed to inform a statement of significance, and a design response is generated. Many of the descriptors for the criteria are interdependent of one another (Mason, 2002: 11).

Public interface value incorporates aspects concerning the contribution the object or place makes to the current urban context. It includes spatial and programmatic relations to external systems, the definition of edges, human scale and access points (Ibid.: 99).

Utility refers to the current expression of resilience exhibited on site relating to programmatic redundancy, modularity and diversity. This includes the ability for the object or place to continue operating as intended or to absorb change and adapt to a more suitable program (Ibid.: 161-162, 173-178).

Historical characteristics are defined as physical aspects of an object or place representing historical socio-cultural values and affiliations. The historical characteristics include age, type or typology, traces of change, “place attachment”, and uniqueness. (SAHRA, online)

Architectural characteristics are described as spatial, material and typological physical aspects of an object or place that merit recognition as contributors to place identity regardless of other associations (Mason 2002: 8-13).

Environmental value is used to determine the value of the physical landscape and the contribution it makes to the site as a whole. (Ibid.)

Through the analysis, a gradient of responses will be derived. Many buildings on the site have different values, ranging from historically significant to potentially regenerative. Therefore, it is essential to consider the overlapping situations emerging from the site.

5.2 THE ASSESSMENT

The integrated value assessment is conducted by consulting existing Heritage Impact Assessments of the site, by consulting existing Heritage Impact Assessments of the site, site visits and photographs, and evaluating desktop case studies. The intention is to gain a detailed insight into the condition of the site and the nuanced potential between structures.

The Site

According to the National Heritage Resources Act, the site and structures are protected from demolition. It falls under Level III protection, with particular structures falling under Level II (Act No. 25 of 1999).

The structures have intrinsic, comparative, and contextual significance as examples of industrial heritage buildings in Pretoria (Act No. 25 of 1999). Furthermore, the lack of use since 2018 has changed the context of hard surfaces into a reclaimed landscape since the industrial-grade paving around the workshops has been removed. Currently, the site is covered in grass and young invasive shrubs and trees.

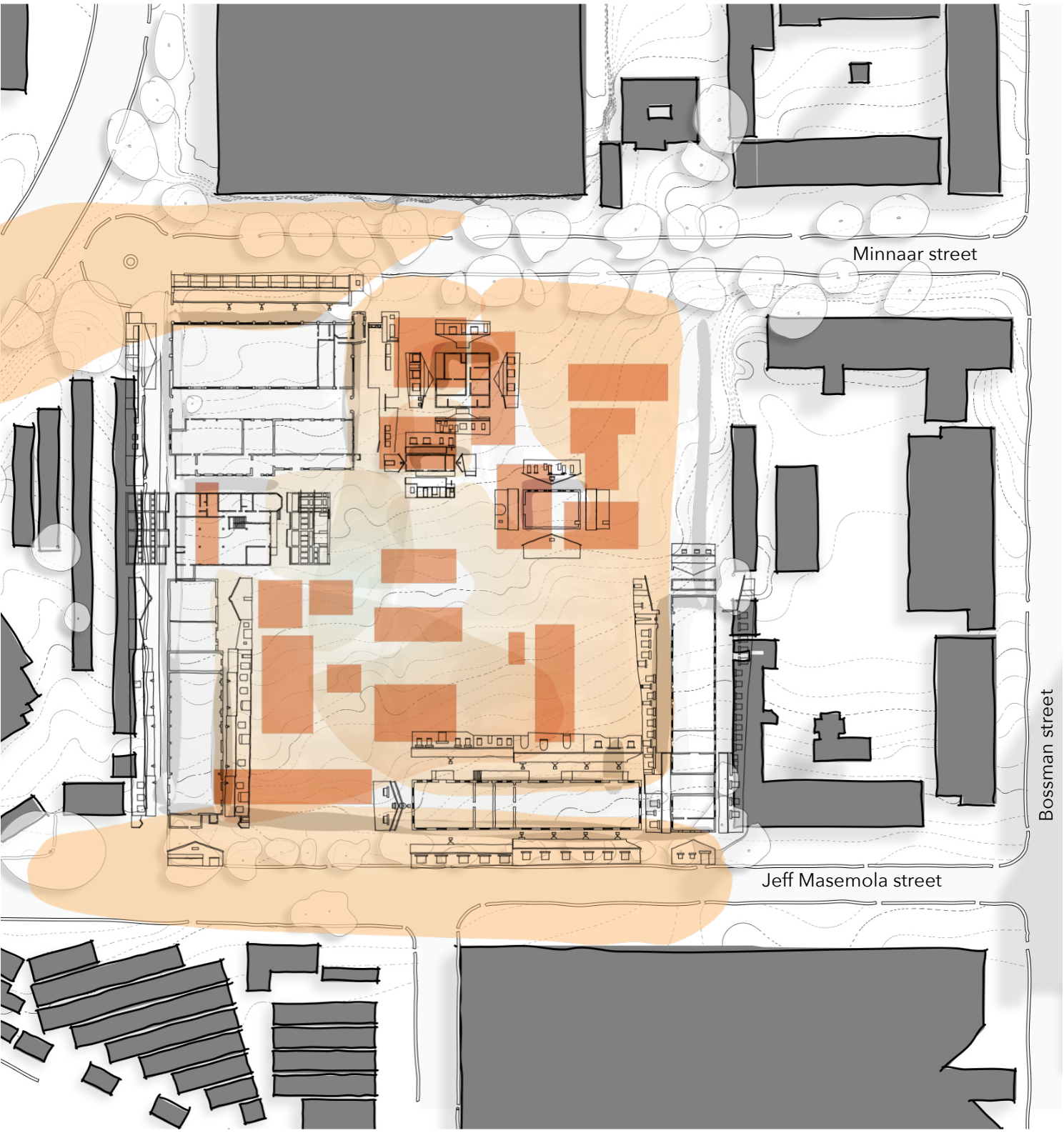


Fig. 5.4 *Value assessment of the General Workshops*

Fig. 5.5 *Identified characteristics of value*

General workshops and store rooms

Public interface value: The western edge of the building defines the alleyway. There are three windows on this edge. The building is barely visible from Jeff Masemola street, along the southern perimeter.

Utility: The buildings have predominantly been used as storage. The interior of the building is almost completely dilapidated. The ceilings are disintegrating, the internal partitioning is almost entirely removed, and all fixtures have been stripped. Nevertheless, the building holds potential for evolution, especially in terms of program (Peres, 2016: 99, 189).

Historical characteristics: The rooms are estimated to have been built between 1920 and 1935. The buildings are built on sandstone plinths, which could date the buildings as far back as 1910. The openings into the rooms are defined either by large concrete lintels or segmental brick arches. Internal openings between rooms are large arched openings. The original vents on the roof are intact.

Architectural Characteristics: It is critical to retain the east elevation of the building, as the gradual development of the site is demonstrated in the segmented character of the building. In addition, the unaligned openings in the building are characteristic of the utilitarian nature of industrial heritage sites.

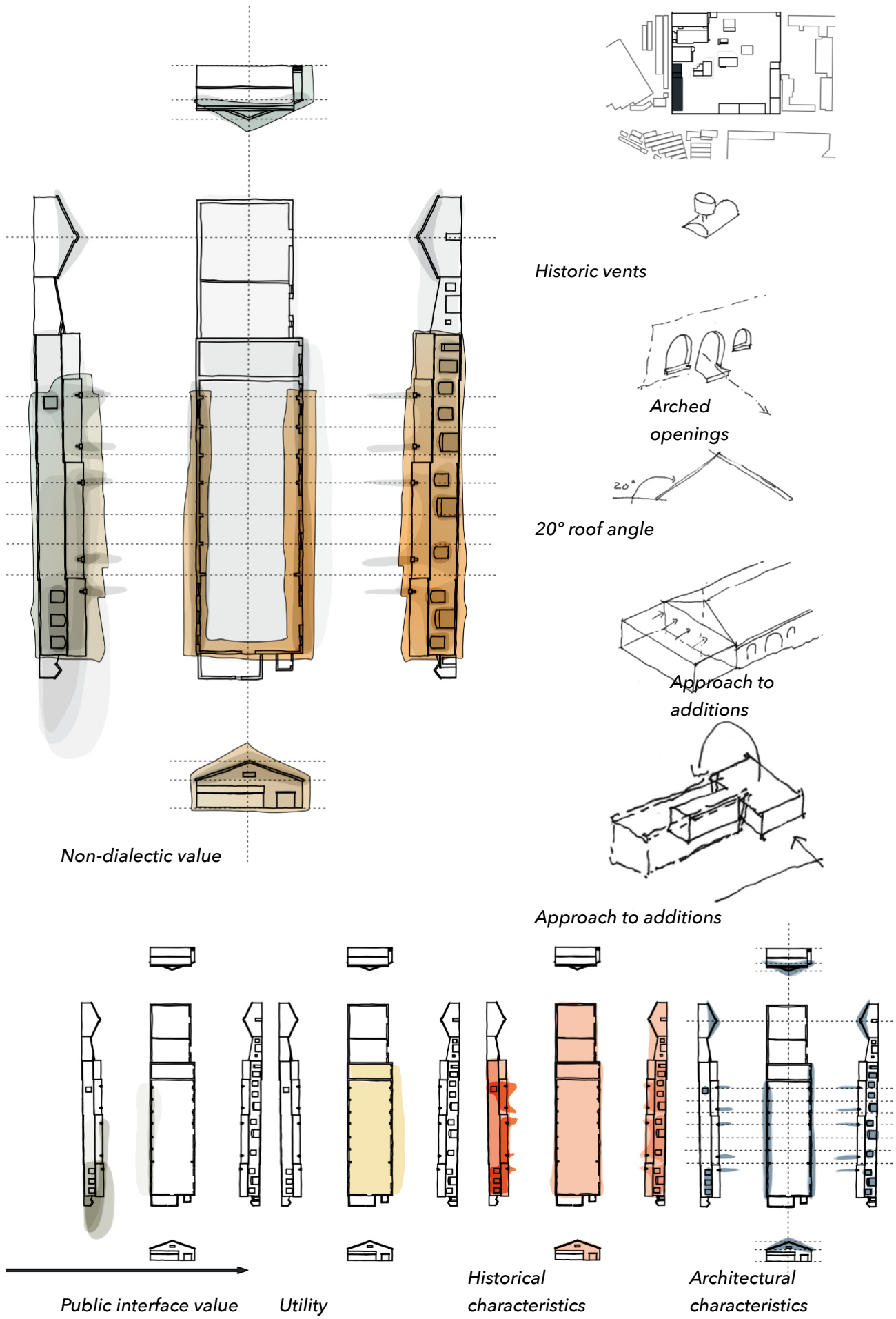
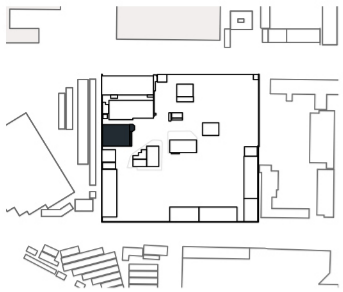
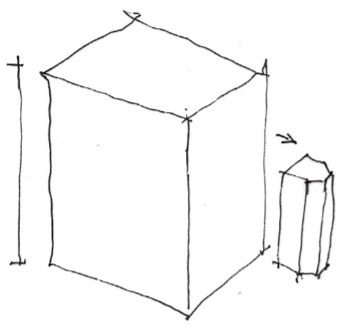


Fig. 5.6 *Value assessment of the General Workshops*

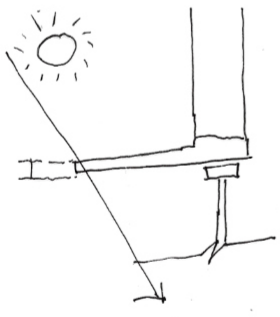
Fig. 5.7 *Identified characteristics of value*



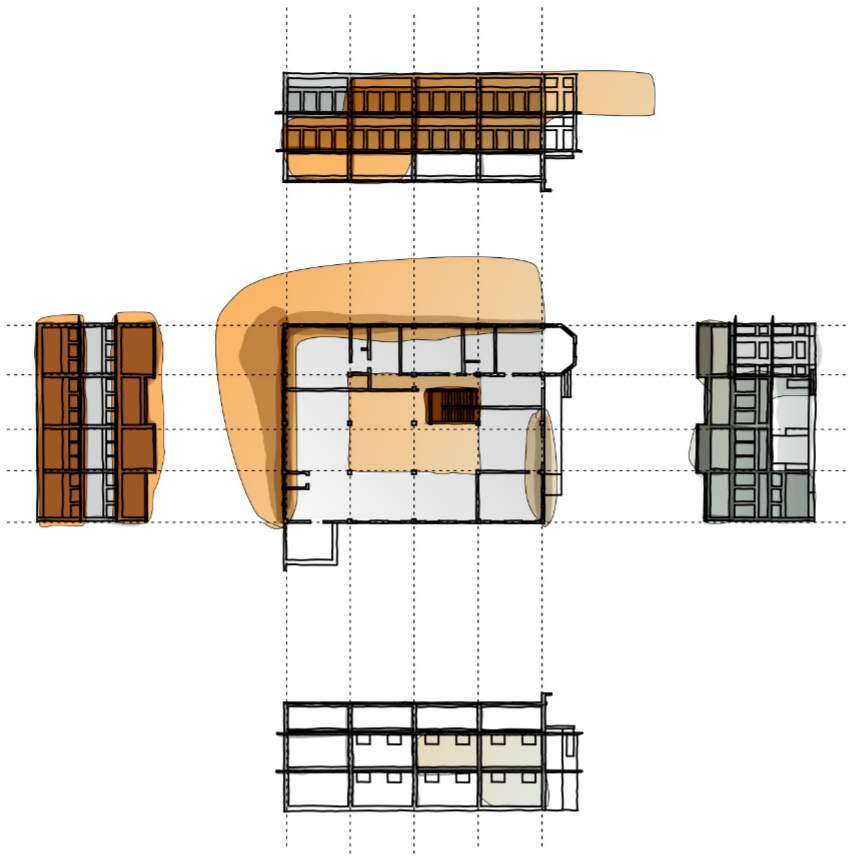
Location plan



Hexagonal viewing box



Thin concrete roof overhang



Public interface value *Utility*

Historical characteristics *Architectural characteristics*

Administration Building

Public interface value: The Administration building is the tallest building on the site. The back of the building forms part of the western alleyway between the site and the Post Office. The street edge is articulated with windows framed in characteristically thin concrete overhangs.

Utility: The more robust elements like the concrete and brick structure is in operable condition. The building has, however, suffered from water damage and general neglect. The shading devices and the windows are significantly damaged. The building is rigid (restrictive?) in its design. It does not allow for diversification and variability as the needs of the site change. The concrete portal frame has the potential for transformation (Peres, 2016: 99, 189).

Historical characteristics: The building was constructed in the early 1940s, during a shortage of materials and artisans in South Africa. As a result, the third floor was never completed, standard size steel frame windows were used, and lower quality building materials were used.

Architectural Characteristics: The thin concrete overhangs of the building are notable.

Fig. 5.8 *Value assessment of the General Workshops*

Fig. 5.9 *Identified characteristics of value*

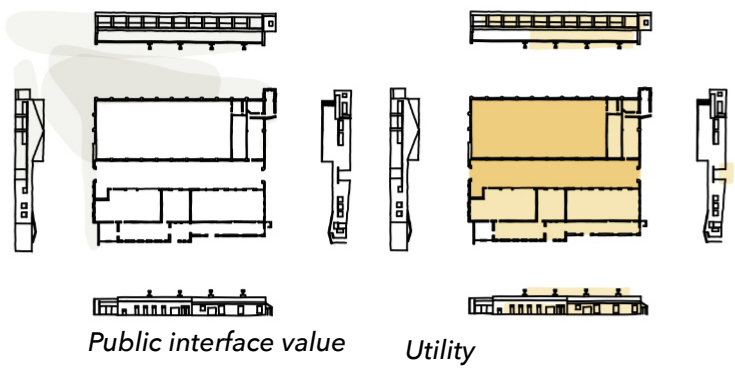
Carpenters workshops

Public interface value: The building defines the north-western corner of the site and forms an integral part of the Minnaar Street edge and the western pedestrian alleyway.

Utility: With minor repair work, the northern workshop would be operational as a carpentry workshop. The "Supervisor Box" needs significant attention. The workshop can be described as highly modular, which allows for flexibility, scalability, and variability in operations (Peres, Ibid.:188-189). The southern additions have fallen into disrepair and would need significant intervention to regain functionality.

Historical characteristics: The building dates from the late 1930s and represents a rare example of the early influence of modernist innovation in industrial buildings in South Africa. Built as a concrete portal frame and red Kirkness infill bricks, the building showcases elements unique to the 1930s industrial architecture built by PWD. The building has historically correct ventilators.

Architectural Characteristics:- The parapet seen on the east elevation features the art-deco PWD monogram. The entrances to the service yard from both the east and west is defined by curved walls. The double pitch roof is particularly significant due to its association with the industrial heritage of the region. The English bond is also notable.



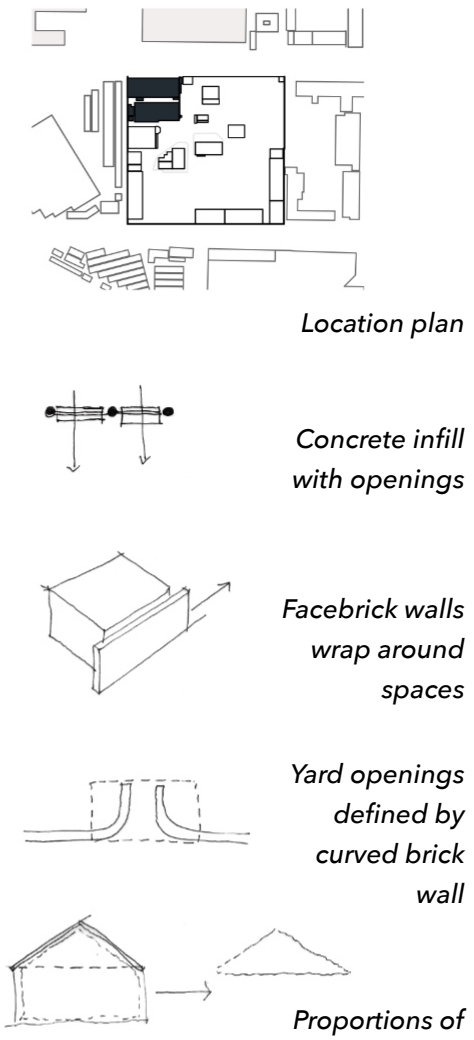
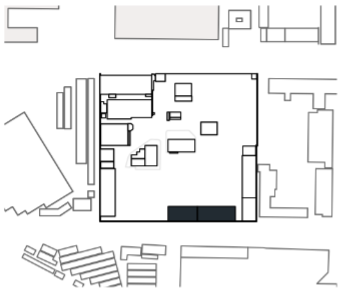
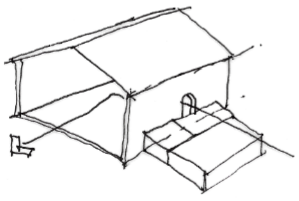


Fig. 5.10 *Value assessment of the General Workshops*

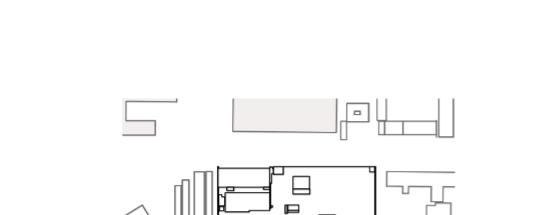
Fig. 5.11 *Identified characteristics of value*

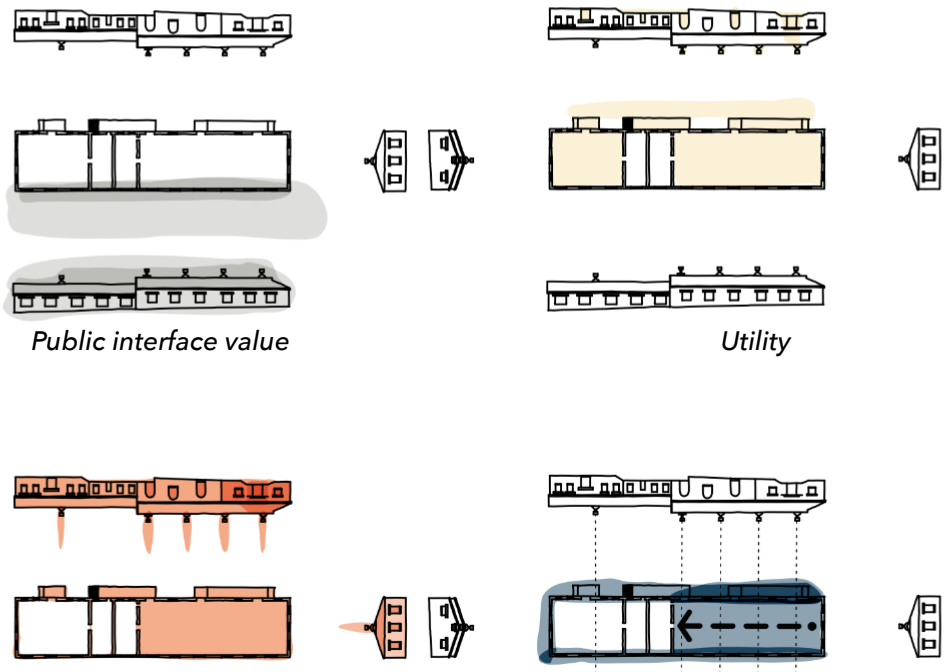


Location plan



Internal continuation





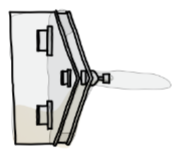
Public interface value

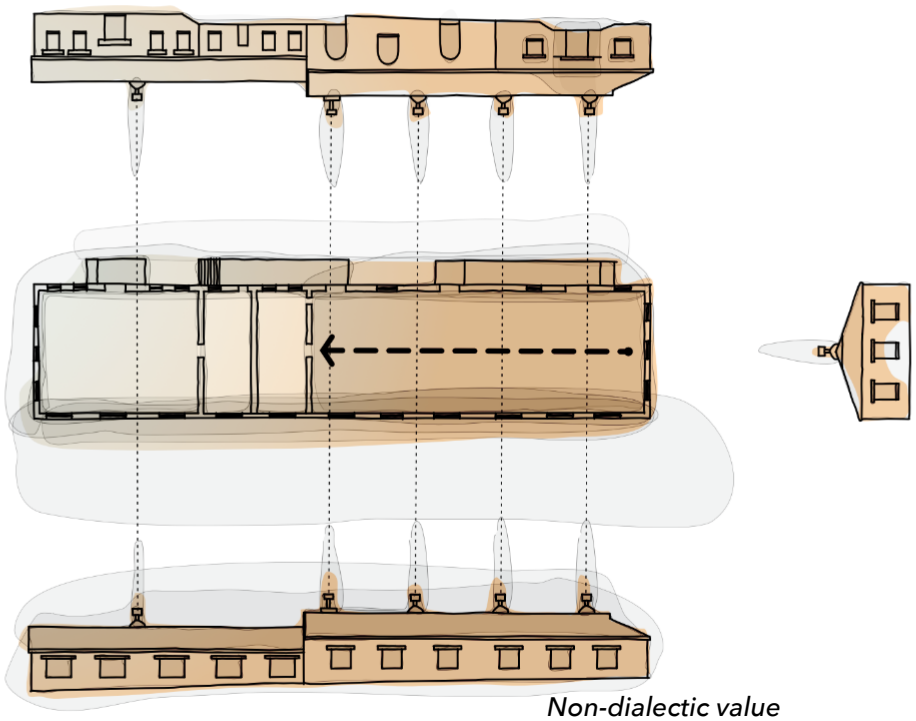
Utility

Historical characteristics

Architectural characteristics

Proportional associations





Non-dialectic value

Mechanical engineering workshops

Public interface value: The workshops define the edge of Jeff Masemola Street with a pedestrian-friendly scale on the sidewalk scale and windows and doors opening towards the street. The windows and ventilators distinguish the building from the generic environment created by the Dairy Mall across the street.

Utility: The building has been designed to accommodate heavy vehicles. There are multiple service pits in the floor, and the building has an ample ceiling height for the operation of large machinery. Outside the entrances, large hoisting beams are to be installed. There are two platforms and two ramps that lead into the building. With some recovery efforts, the functionality of the building can be regained.

Historical characteristics: The building is similar in typology to the general workshops and storerooms. Governmental vehicles and equipment were most likely serviced and fixed here. The industrial windows are painted Oregon Pine. In some cases, the timber windows were replaced with steel window frames possibly made on site.

Architectural Characteristics: The southern wall of the workshop acts as a retaining wall, with a 1000mm fall between the sidewalk and the workshop floor. The building steps with the fall of the site. Both the north elevation and south elevation are significant. In certain instances, longer lintels than necessary were used to support openings.

Fig. 5.12 *Value assessment of the General Workshops*

Fig. 5.13 *Identified characteristics of value*

Electric engineering workshops

Public interface value: The southern room of the workshop provides direct access to the street. The building used to accommodate an electrical substation. During the construction of the Dairy Mall, a new substation was installed across the street from the workshop. The now-vacant substation room provides a spatial opportunity to incorporate infrastructural development on site.

Utility: Due to the state of disrepair of the building, a transformation of the system needs to be considered. In addition, the original program as an Electrical engineering workshop needs to be reconsidered in the context of the design.

Historical characteristics: The footprint of this building can be traced to maps from 1904 and 1907 (Act No. 25 of 1999).

Since 2014, Most of the building has fallen to ruin. The roof has largely collapsed. The gable over the main entrance no longer exists. The hoist and large doors have also been removed. The external walls of the building are still intact, but the interior is beyond restoration.

Architectural Characteristics: The building has typological similarities to the general workshops and the mechanical engineering workshops. The main difference is that this building has no segmental brick arches over openings. The building steps with the slope of the site, lending to a unique west elevation.

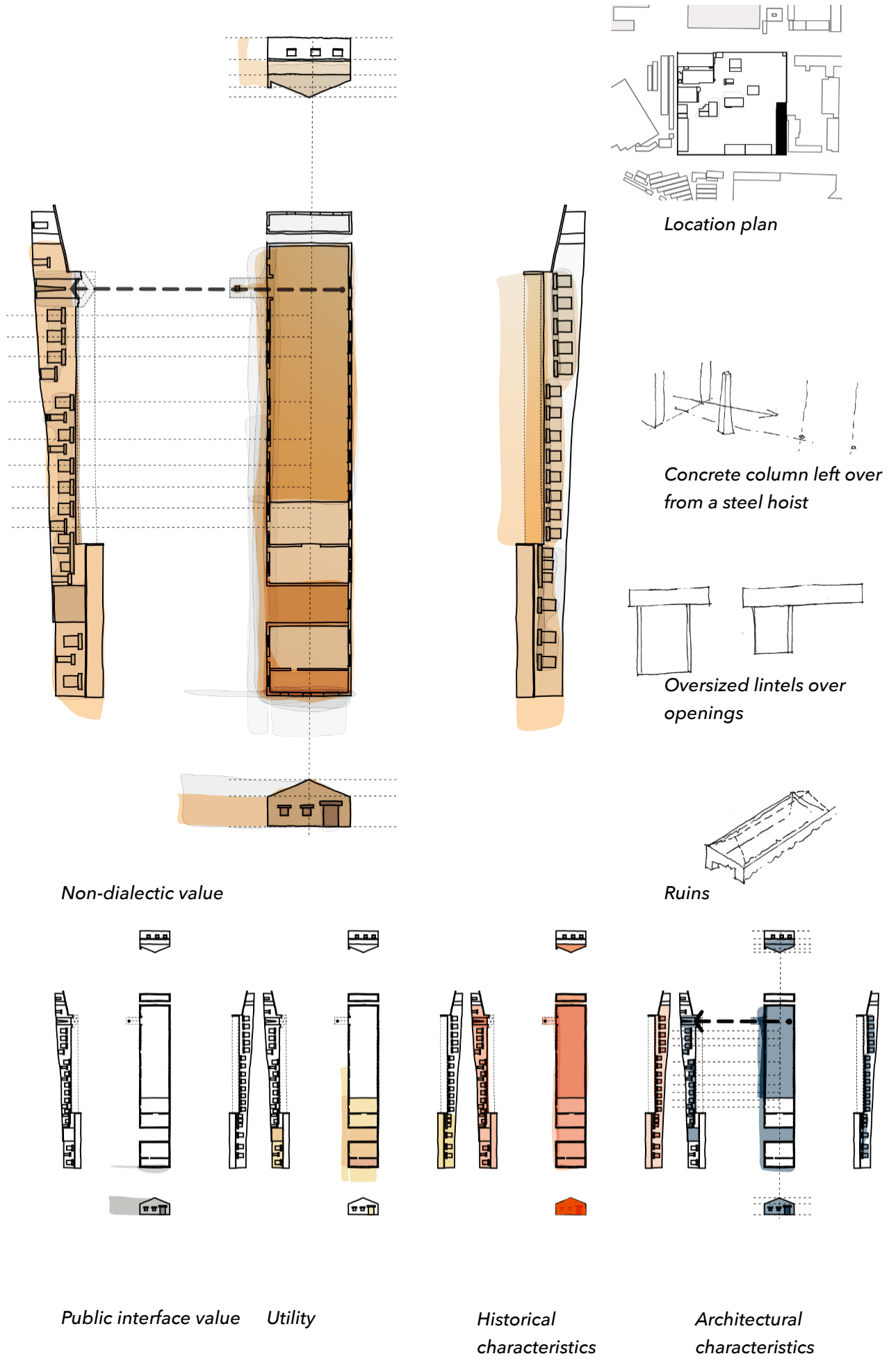
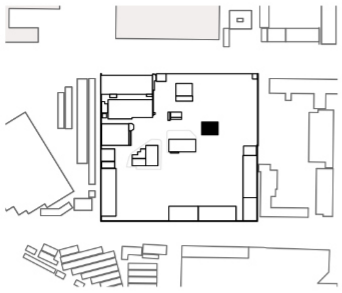
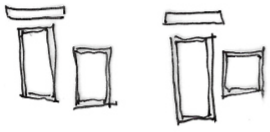


Fig. 5.14 *Value assessment of the General Workshops*

Fig. 5.15 *Identified characteristics of value*

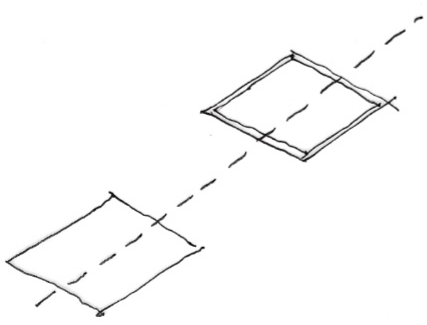


Location plan

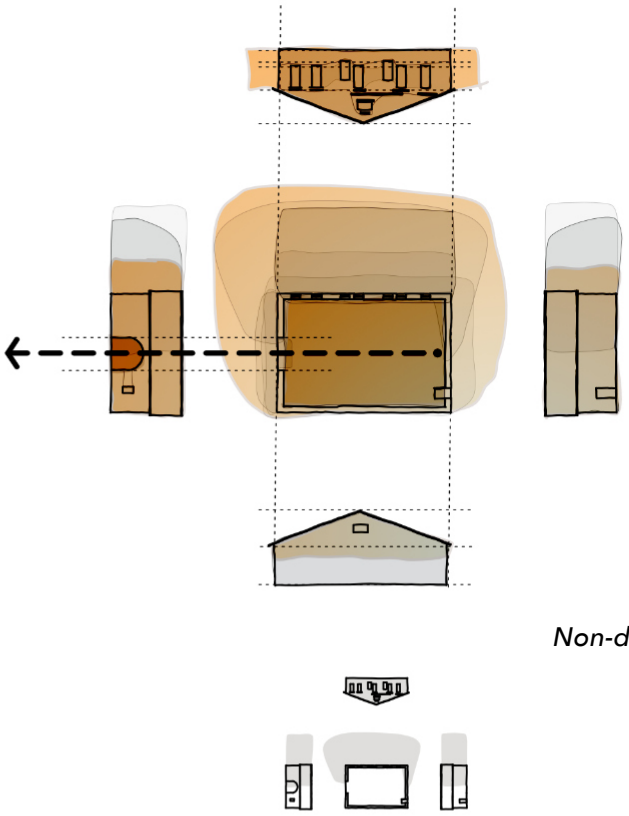


Varying openings with reused standard steel windows

Arched openings



Connection of existing openings to new openings



Non-dialectic value

Public interface value

Utility

Historical characteristics

Architectural characteristics

Stonemason's workshops

Public interface value: The characteristic north elevation of the stonemasons' workshop faces Minnaar Street. The steel frame windows have been sourced from other buildings in Pretoria and differ in shape and size. The organisation is haphazard, with either straight or arched brick lintels over the windows.

Utility: The arched doorway on the western elevation allows vehicular access for the delivery of material and heavy equipment. The southern wall has a large opening that has temporarily been closed with painted plywood. If the workshop door is closed, the interior is dark despite the windows on the northern side. There is no ventilator in the roof of the workshop. The floor of the workshop is damaged where stone cutting equipment has been removed.

Historical characteristics: This building had housed one of the biggest lathes in South Africa until the lathe was sold for scrap before 2009 (Jansen, 2014: 23).

There are remnants of sandstone, quartzite, and granite in the vicinity of the building (Ibid.). The bricks used for the construction of the workshop date to the 1920s. The building is constructed in English bond. Between 1948 and 1958, much of the front portion of the building was demolished. Between 1964 and 1968, with the site's redevelopment, additions to the building were done, effectively extending the building once again. In the 2018 redevelopment, this addition was removed.

Architectural Characteristics: The workshop has significantly been altered from its original form. The resulting architecture is, however, significant in the historical narrative of the entire site. The 20-degree double pitch roof, the span of the trusses, the reuse of windows, doors and lintels, and the overall change to the character of the building.

Fig. 5.16 *Value assessment of the General Workshops*

Fig. 5.17 *Identified characteristics of value*

Labourers accommodation

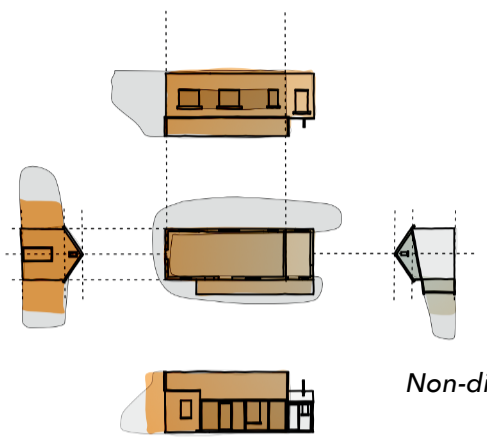
Public interface value: The labourers' accommodation is located towards the centre of the site. It has little influence on the urban context as it is barely noticeable from the street. However, the scale of the building contributes to the overall scale of the site.

Utility: Until recently the building has been used for storage and ablutions on site. The interior of the building needs significant intervention to be operational as the ceiling has collapsed, the services have been removed, and the screed is crumbling.

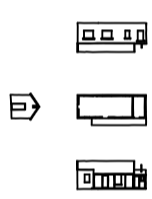
The walls are intact, and none of the windows is broken. So, the natural light inside is sufficient for everyday activities.

Historical characteristics: It is speculated that the building served as on-site accommodation for labourers, which contributes to the socio-historical value of the building (Jansen, 2014: 35). The veranda, the building's sandstone plinths, and the arched brick lintels over the openings on the southern elevation are noted. Two door openings have been removed and bricked up. Both the bricked-up doorways and the original building were constructed using a Dutch Bond, with the arched brick lintels adding to the wall's texture. The concrete lintels over the window openings on the northern elevation are similar to other instances on the site. The doors and windows are typically dated between 1890 and 1910.

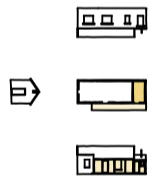
Architectural Characteristics: The deep reveal of the front entrance of the building is notable. The 35-degree open gable roof has been lapped many times. The north and west elevations have been whitewashed, with some instances of plastered walls. The porch faces south and has been extended towards the eastern side of the building.



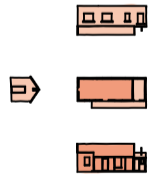
Non-dialectic value



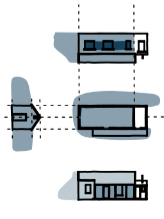
Public interface value



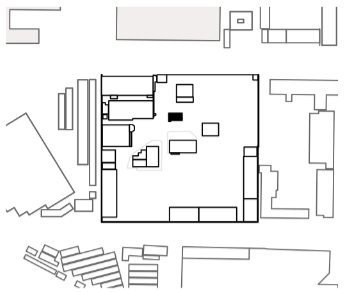
Utility



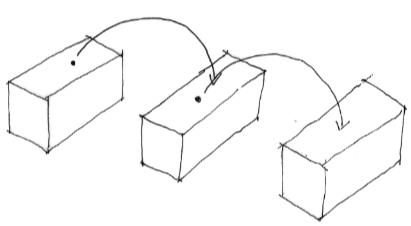
Historical characteristics



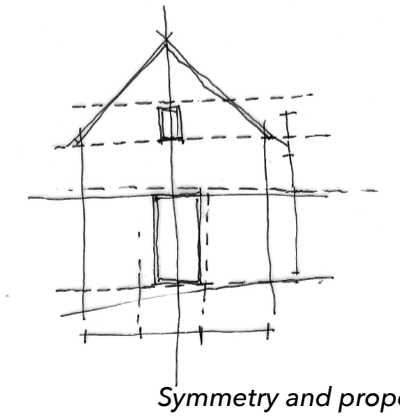
Architectural characteristics



Location plan



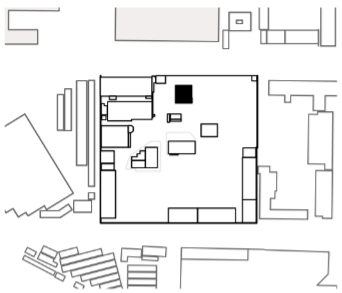
Opportunity for repeatable proportions



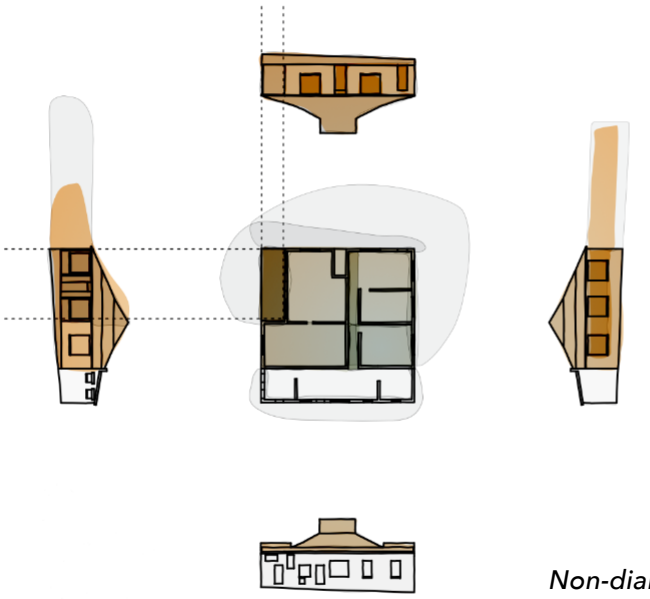
Symmetry and proportion

Fig. 5.18 *Value assessment of the General Workshops*

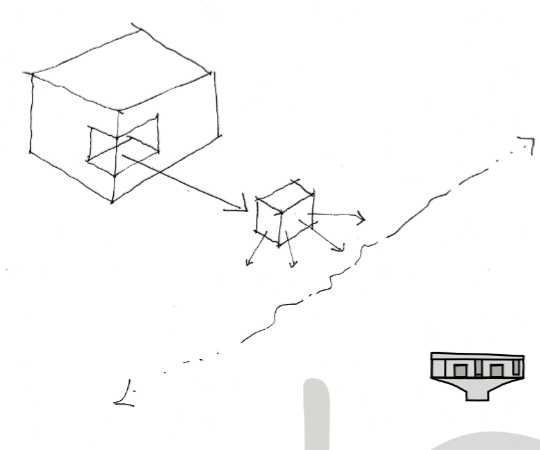
Fig. 5.19 *Identified characteristics of value*



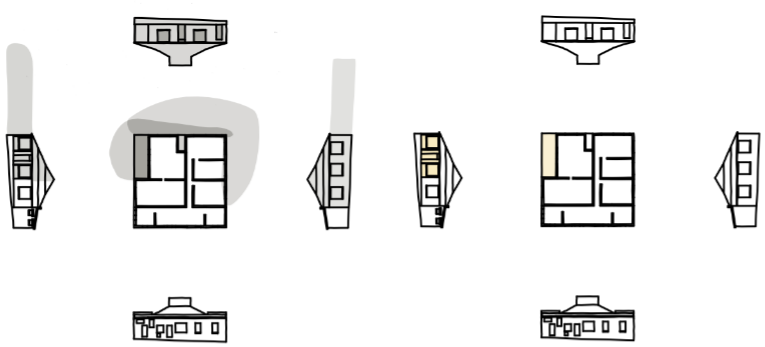
Location plan



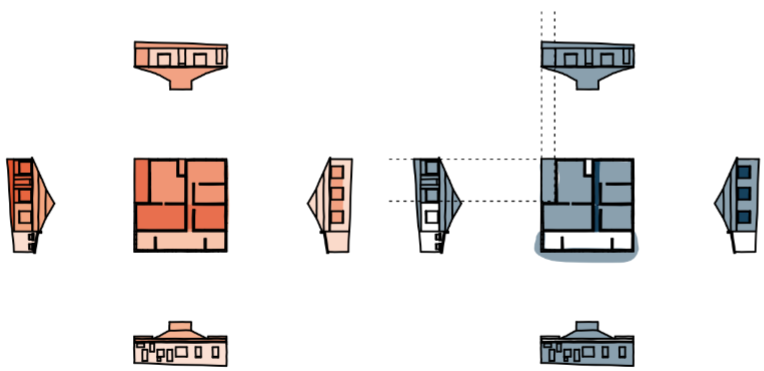
Non-dialectic value



Porch overlooking a walkway



Public interface value *Utility*



Historical characteristics *Architectural characteristics*

Supervisor's residence

Public interface value: The building faces Minnaar Street. Many of the adaptions made to the building have altered the northern facade significantly. Little of the original character of the building remains. The porch might have wrapped around most of the building. The front door of the building most likely faced Minnaar Street. The Dutch gabled roof is distinct in the context.

Utility: The suspended timber floor of the building has been haphazardly covered in protective sheets to varying degrees of success. The fireplace has been completely removed. In some instances, the roof sheeting is perforated with rust, and the ceilings have collapsed in two rooms. It is clear that the building has only been used as a home for a very short period. For the most part, it was used for storing protective wear.

Historical characteristics: According to Jansen's Heritage assessment, the house is typical for a government residence classified as "Edwardian" and unique to this city area (2014: 25). The building was constructed in 1903 and exhibits construction techniques typical of the period, such as the use of quartzite foundation stones and imported ventilators from Cowell's Foundry, Blackburn UK (Jansen, 2014: 27). Most of the profiled ceilings in the house have been removed. Steel frame windows were installed where the veranda was enclosed. Most of the original timber frame windows and doors were removed.

Architectural Characteristics: Similar to the stonemasons' workshop, the house has been adapted beyond its original form. Both express the changing nature of the site and DPWI, but more work is needed to transform the supervisor's residence for it to contribute to the site again.

Fig. 5.20 *Value assessment of the General Workshops*

Fig. 5.21 *Identified characteristics of value*

1.3 THREATS AND OPPORTUNITIES

The resulting overlap map indicates the scale of sensitivity to consider when responding to the context. The warm tones indicate the sensitivity of the built objects, from red as highly sensitive to yellow as less sensitive. The cool tones indicate the sensitivity of the spatial responses, from dark grey as highly sensitive to light grey as less sensitive.

Threats

The overall threats present on site are the neglect of the buildings and recent careless demolitions and additions (Mason, 2002: 25). With the site's current trajectory, more buildings will fall into disrepair without intervention. Furthermore, it will not be sufficient to only repair the workshops to introduce resilience to the site, as its current use is considered redundant from DPWI's perspective. Additionally, the site does not serve its context due to the ever-changing cultural meaning of this area of the city (Ibid.), and it should evolve.

Opportunities

The opportunities on the site are in response to some of the severe losses to the exhibited industrial heritage. The removal of the redundant concrete paving and tarred surfaces between the buildings have resulted in a landscape reclaimed through pioneer grass species and invasive shrubs.

The architectural opportunity on the site is to reinterpret the modest construction of all the buildings to commend its historical contribution to the city

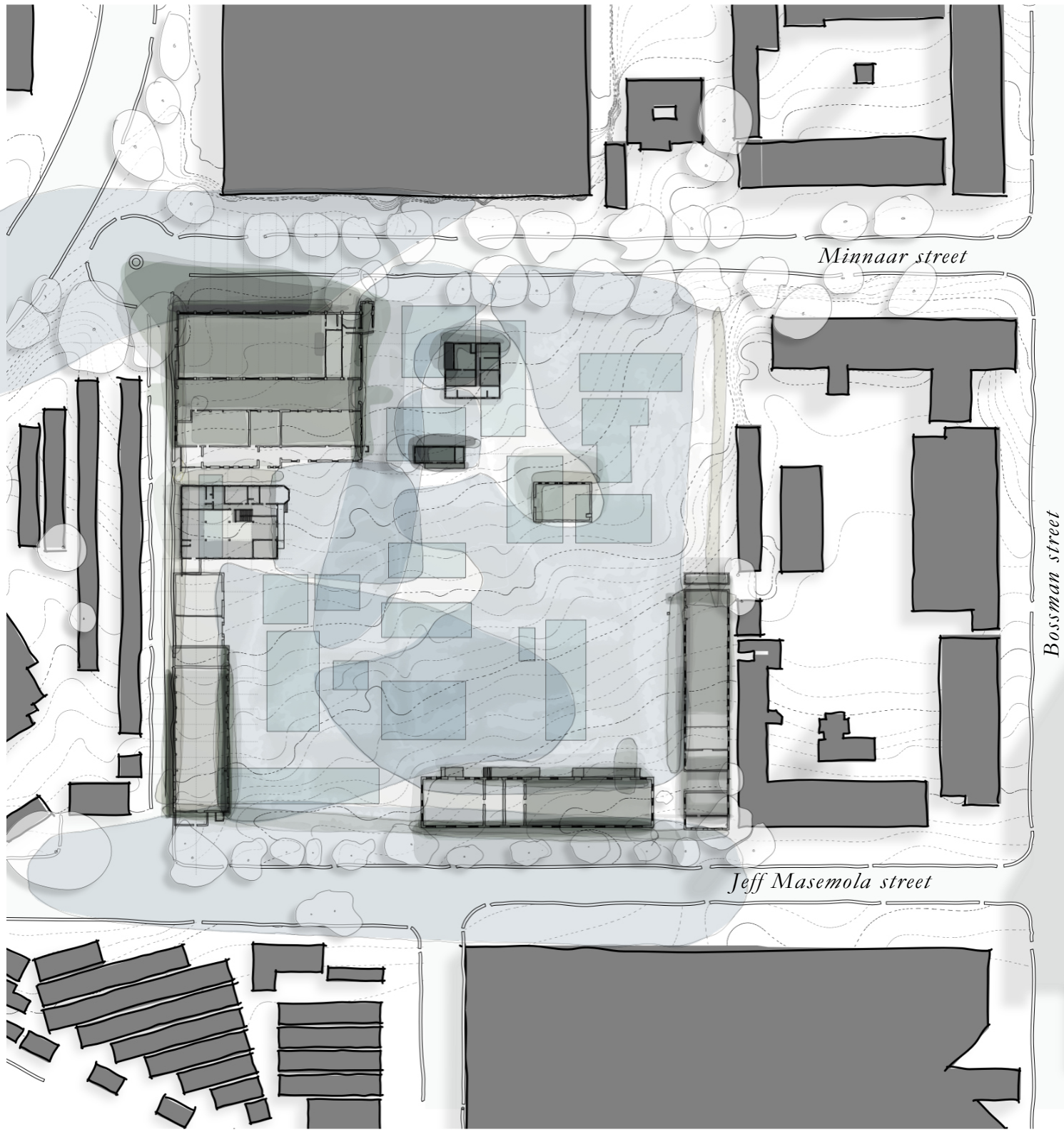


Fig. 5.22 *Value assessment of the General Workshops*

Fig. 5.23 *Identified characteristics of value*

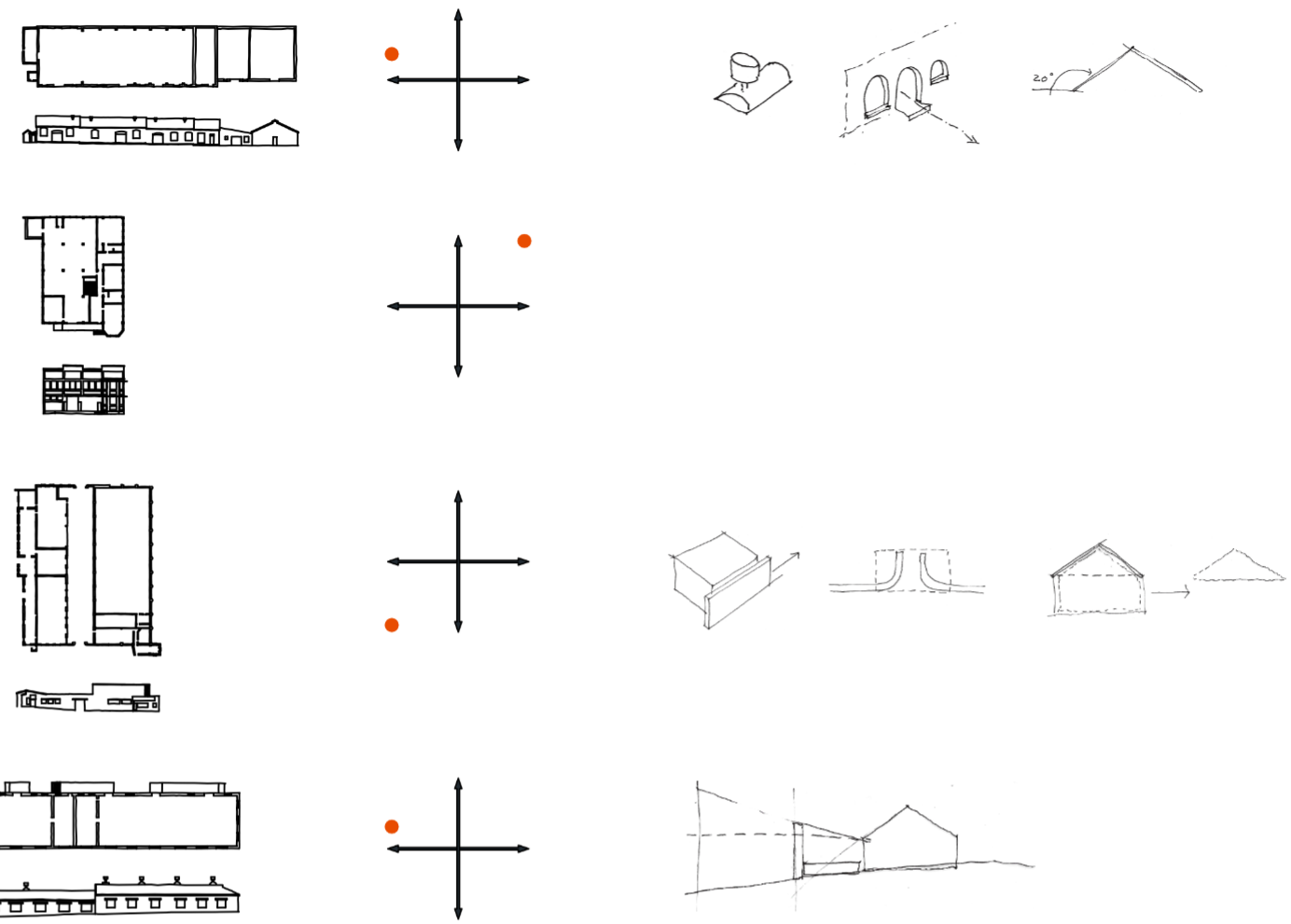


Fig. 5.24 *Value assessment of the General Workshops*

Fig. 5.25 *Value assessment of the General Workshops*

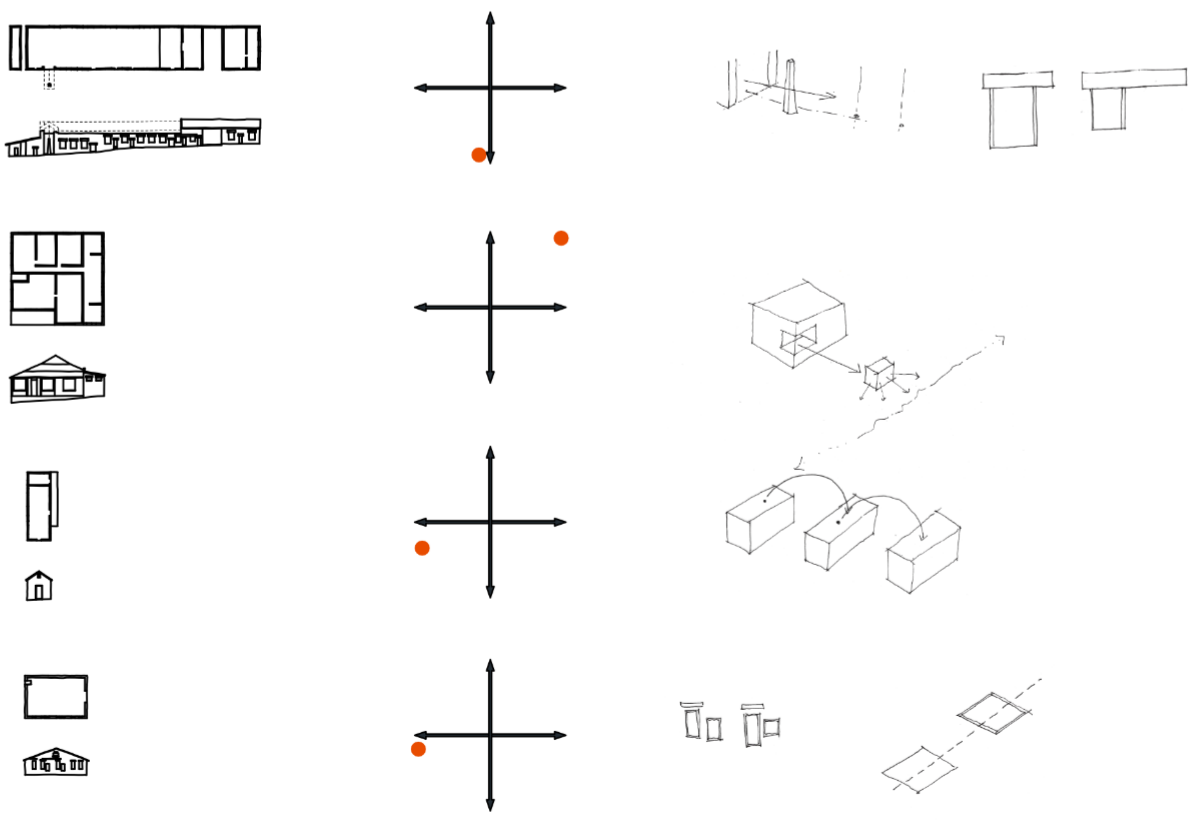
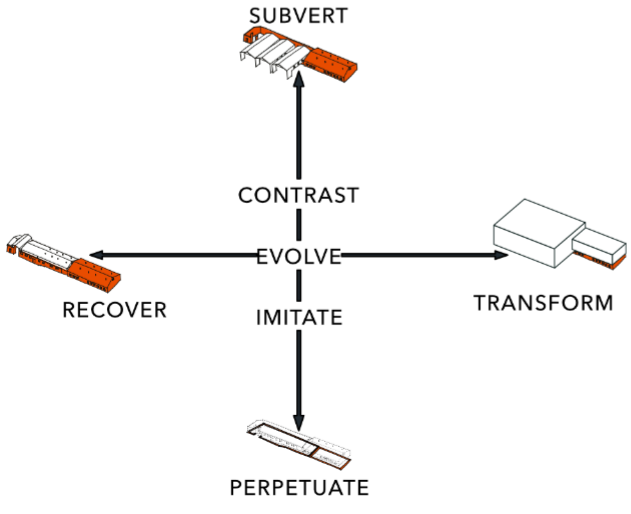


Fig. 5.26 *Identified characteristics of value*



6. STATEMENT OF VALUE

The Statement of Value aims to delineate the position regarding adopting the site's tangible aspects. The intention is to avoid collapsing all values into an "aggregate statement of significance" (Lowenthal 2002: 23) as the diversity of value contribute to the nuance of the project.

The significance of the site is the remaining industrial heritage in the city centre. It represents the changing everyday working conditions of many people over time and its value is toward the city.

The scale of the single-storey buildings on the site needs to be taken into consideration, as well as the character of the buildings (Jacobs 1993: 6.3-4).

The last century of use on the site has significantly modified the landscape. The recent reclaimed natural state of the site should be appreciated, protected and actively rehabilitated. Invasive species should be removed and local alternative grass and shrub species.

The palimpsest of material change should be celebrated. Additions, expansions and alterations in the past exhibit the developing nature of technology, and the pragmatic reality of adapting to those changes.

Changes to the current buildings are encouraged if it improves the utility. The changes should also be done in the spirit of the existing fabric. This includes the use of standard materials in innovative ways, the reuse of materials from elsewhere and the incorporating contemporary ideas of technological progress.

The site

Height is restricted to three storeys above the ground level, with care not to overshadow the existing context.

The landscape

There is a combination of native, exotic and invasive species that have grown in the current landscape. The landscape is reclaimed, though it should not be assumed that the current condition should be left unaltered.

It is nonetheless reassuring to notice that after a few years without intervention, the site is able to recover after decades of being covered in hard surfaces.

The invasive species are incrementally removed and replaced with plants that suit the biome. The larger exotic trees on site are incorporated in the site framework if they pose no threat to the environment or the heritage buildings.

Artefacts

Everyday artefacts found on the site, like unusable tools or redundant materials, are incorporated in the proposed additions.

In-between

Many of the significant buildings are located towards the edges of the site. After the demolitions in 2018, the interior of the site is vast. The additions to the site frame the remaining significant buildings around the landscape.

New buildings - old techniques

The roofs of the significant buildings are double pitched with a slope of 20 degrees or 35 degrees. The new workshops allude to the pitches of the existing buildings.

The proportions of the new buildings are informed by the buildings of value. The existing workshop widths are either 11m wide, or 14m wide, with a flexible column grid of 6m.

The openings of the existing buildings are usually defined by an exposed oversized lintel that extends past the window into the wall. The windows are steel-framed, or Oregon Pine window frames. This can be interpreted as any openings of significance in addition to the site.

Many of the materials used to build the workshops are redundant or standard materials found in other projects in the city. Standard and repeatable materials like steel sections and windows are incorporated.

7. PRECEDENT STUDIES

7.1 COAL DROPS YARD, LONDON

Context

The Coal Drops Yard is a recent redevelopment of industrial warehouses and coal stores in Kings Cross, London. The original building consists of two elongated Victorian coal warehouses with a cobbled yard in-between. The Coal Drops Yard forms part of a larger redevelopment project of King's Cross and is situated between Central Saint Martins to the east and Gasholders London to the west (Kafka, 2018: 30-31).

Approach to Architecture

One of the challenges to the architects were the constraints of the site. The two industrial warehouses sit roughly parallel, with a 39m difference between the buildings' widest points. This resulted in activating an ample open space between the workshops (Ibid.). In addition, the lower ground public space is also accessible through the northern and southern ends, with a tight scale for the street and articulated shopfronts (Ibid.).

The iconic roof, in this case, is the distinctive landmark introduced on the site, which "establishes a strong visual connection between the parallel structures" (Kafka, Ibid.). On the other hand, the "flourish" (Ibid.: 30) has been criticised for the fact that it could have been a public thoroughfare but instead chose to house a sizeable commercial anchor (Ibid.).

A scaled approach to heritage (Barker, 2020: 144) is evident in the design. The primary structural additions are independent of the original warehouses. Still, the materials used are either reminiscent of the industrial architecture of the context, or in the case of the slate roof tiles, directly sourced from the original quarry (Ibid.).

Critique

The implementation of the concept of responding to the existing buildings is something to learn from; for example, the way newly built work meets the existing buildings while also extending the old (existing) is sophisticated and practical. The response is remarkably suitable to its historical context despite it making incredibly bold gestures. The context is also industrial in nature, close to Kings Cross Station (Ibid.).

Fig. 7.1 *Coal Drops Yard (Heatherwick Studio:2019)*

7.2 RED LOCATION MUSEUM VS. DRILL HALL (COMPARATIVE)

Public Value, Utility, Historical characteristics

Both the Red Location Museum and the Drill Hall are located in historically divisive contexts. Red Location Museum, Gqeberha (Port Elisabeth), was intentionally designed to confront visitors with the way museums have been used, to frame historical narratives (Deckler, 43). However, the project has been met with controversy because a museum, to commemorate the recent past, was prioritised over basic infrastructure for the neighbourhood (Roux, 2018: 407).

The current condition of the Drill Hall, Johannesburg, is the result of a century of conflict (Deckler, Graupner and Rasmuss, Ibid.: 27 -29).

Memory

Twelve boxes contain different memories of the struggle in Red Location and South Africa that are supposedly representative of the greater community (Ibid.: 45). The goal was to preserve and value different people's experiences of the tumultuous period and accommodate a non-linear reading of history.

Historic Context

The approach to the historical context was to reinterpret artefacts like the sawtooth factory roof present in 1980s union posters and reusing materials often present in the context like standard steel frame windows, concrete blocks and rusted corrugated sheets. These materials were historically associated with a "sub-standard" built environment. The unconventional ways the materials were used were intended to subvert that expectation

Change

Over time the museum was rejected by the community. The museum was built in a context in dire need of basic housing. The priorities from the start were misaligned.

Today the most active contribution the building makes is towards the street, with a well-designed interface between the public and its memory.

Fig. 7.2 *Red Location Museum (Roux 2018)*

7.3 LIGHT STUDY

Carpenter's Workshop

The DPWI Carpenter's workshop was chosen as the baseline for the comparative study (Fig. 7.3). The iterative study is based on the proportions of the 1:200 sectional maquette. The aim is to explore how manipulating the roof of the maquette influences interior light.

Johannesburg Drill Hall

With the adaptation of the Drill Hall, the new roofs are separated from the original building (Fig.). The roofs are a contemporary interpretation of the original building profile. The removal of the infill brickwork transforms the concrete columns into an arcade which allows more light to enter the building.

Maquette 2

The proportions of the Carpenter's workshop are modified to enable a high clerestory to allow southern light to enter the space (refer to Fig.).

Red Location Museum

The saw-tooth roof profile of the Red Location Museum (Fig.7.6) allows for ample southern light to enter the space. The practical application of the design compliments the historical significance. (Deckler, Graupner and Rasmuss, 2008: 43).

The saw-tooth roof steps down to create a pedestrian-friendly scale on the street and breaks the imposing size of the building (Ibid.).

Maquette 3

The saw-tooth factory typology is adapted to slope towards one side of the building (refer to Fig. 7.7). The intent is to allow for a consistent internal illuminance throughout the day. The slope is to compliment the context of the site.

Factory Diestre

The approach to roof lights as in Factory Diestre is adapted to apply to the proportions of the Carpenter's workshop. The northern windows, as in Factory Diestre Hidden Architecture 2019) are removed (see fig. 7.8). The intent is to manipulate the light to suit various internal tasks.

Coal Drops Yard

Figure 7.9 shows the roof of the Carpenter's workshop lifted off the walls to express the difference between the old and the new uses (Kafka, 2018: 30-31), thus allowing celebratory moments inside and around the space.

Fig. 7.3 *Sectional maquette through DPWI Carpenter's Workshop*

Fig. 7.4 *Sectional maquette based on aspects of the Johannesburg Drill Hall*

Fig. 7.5 *Sectional maquette exploring South facing clerestories*

Fig. 7.6 *Sectional maquette based on Red Location Museum*

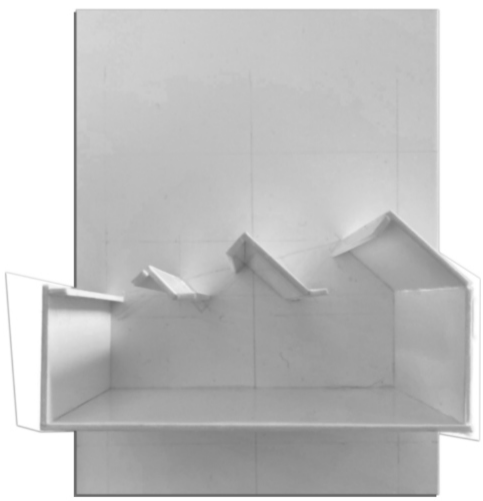


Fig. 7.7 *Sectional maquette exploring a sloping saw-tooth roof*

Fig. 7.8 *Sectional maquette adapted from Factory Diestre*

Fig. 7.9 *Sectional maquette based on the Coal Drops Yard*

Fig. 7.3-7.9 *Iterated maquettes comparing various approaches to roof design and the affect it has on the internal light quality of the maquette*

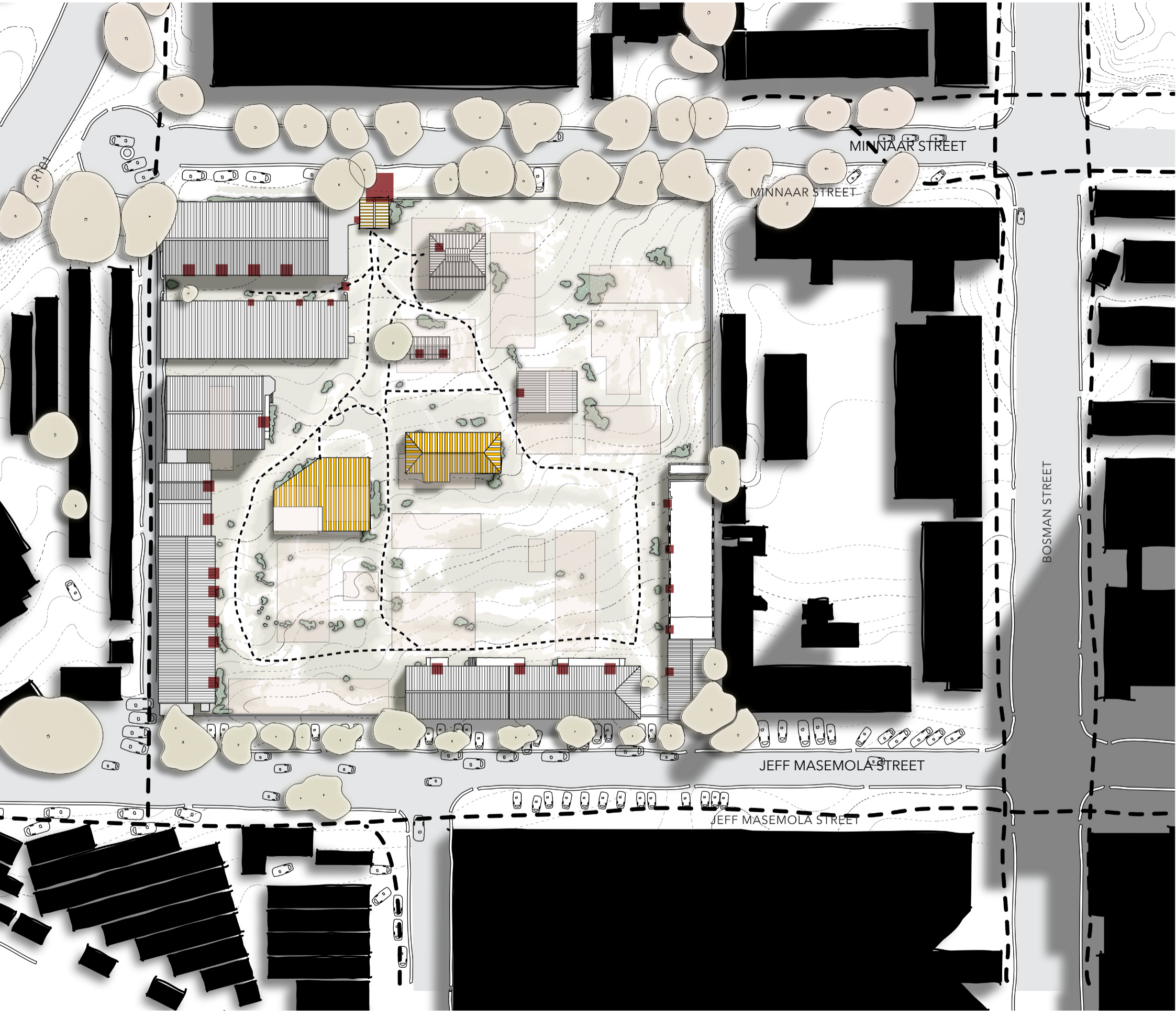


Fig. 8.1 *Site analysis depicting entrances, lost heritage, reclaimed landscapes, footpaths on site and predominant pedestrian movement*

8. DESIGN BRIEF

8.1 ENVIRONMENTAL CONDITIONS OF THE CHOSEN SITE

Since Tshwane's climate is described as temperate interior (climactic zone 2) solar protection and shading are two highly effective strategies to reduce energy usage and improve internal comfort in buildings (SANS 204: 2011; Conradie, 2018).

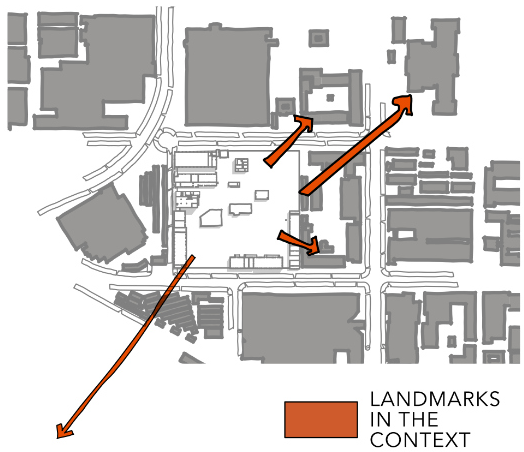


Fig. 8.2 *Landmarks visible from the site in the context*

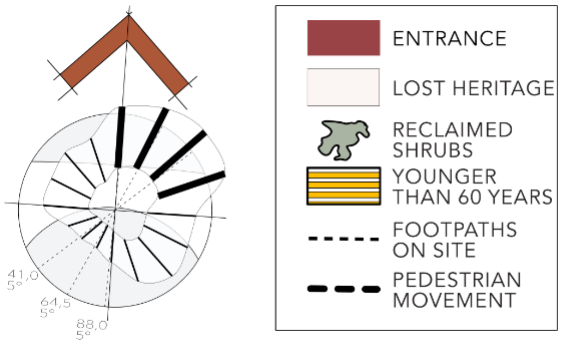


Fig. 8.3 *Landmarks visible from the site in the context*

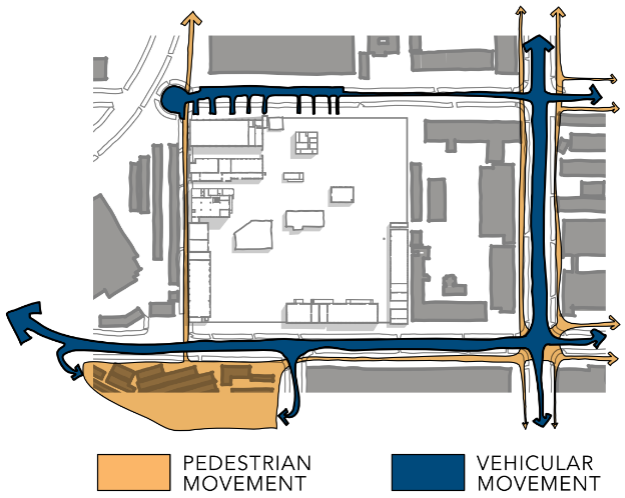


Fig. 8.4 *Site accessibility and movement*

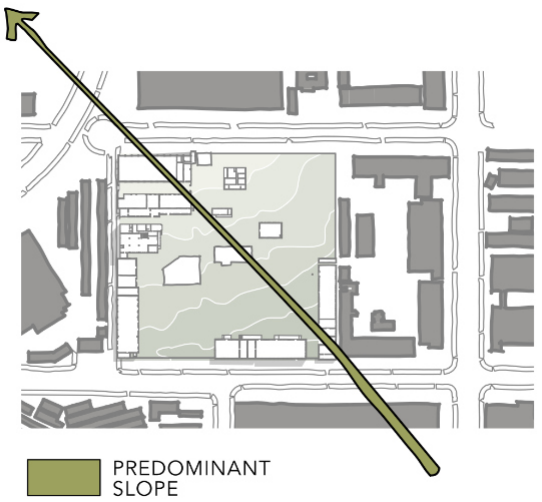


Fig. 8.5 *Contours and predominant slope of the site*

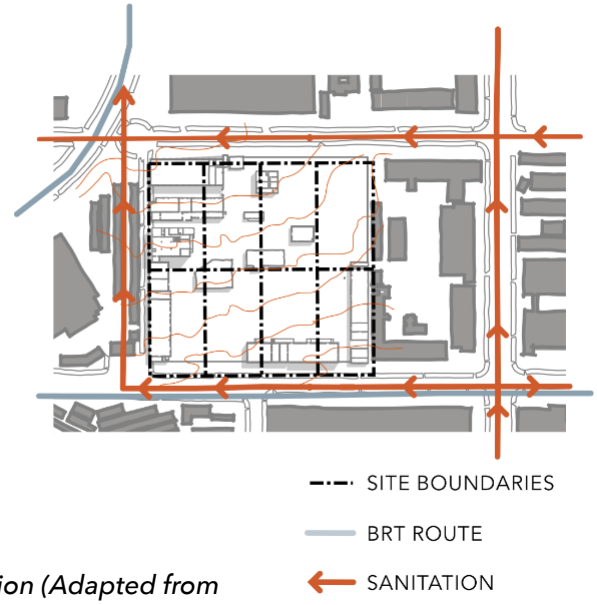


Fig. 8.6 *Cadastral information (Adapted from Tshwane GIS)*

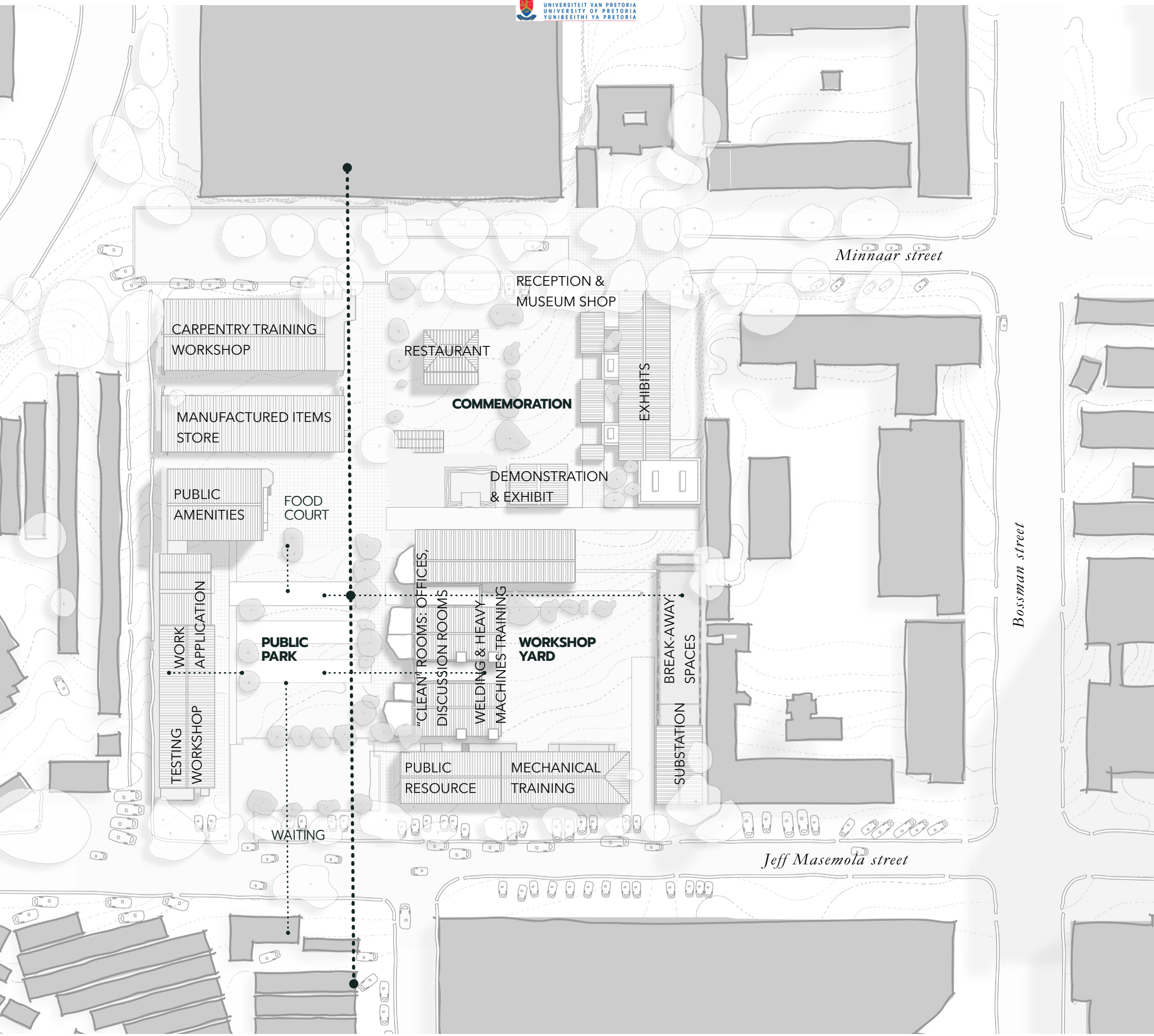
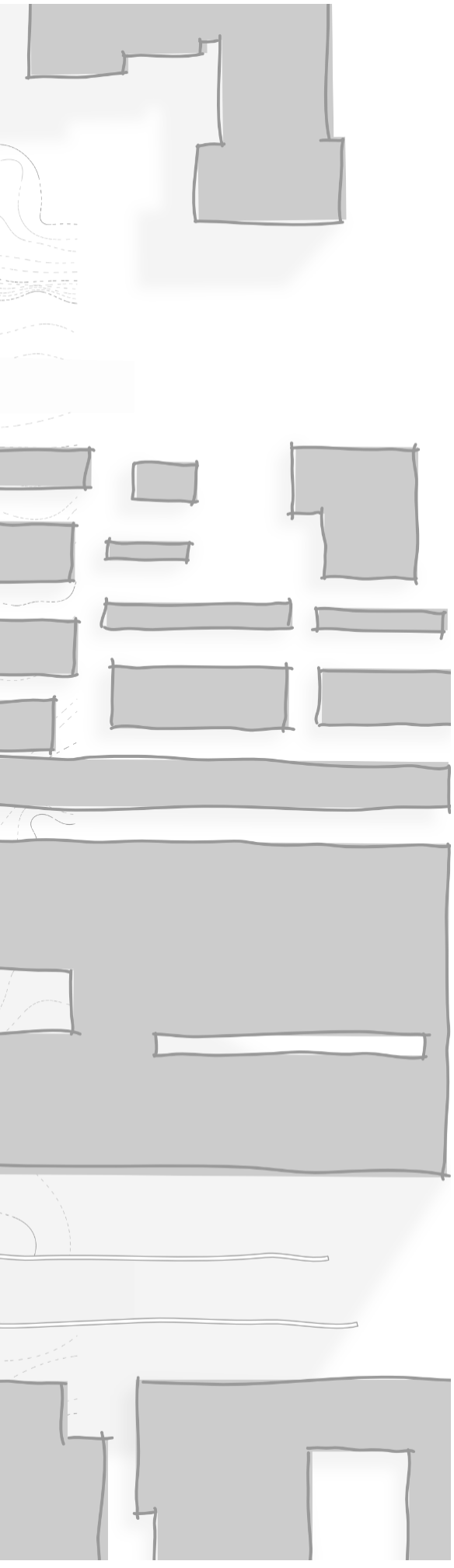


Fig. 8.5 *Arrangement of the program on site*



8.2 DESIGN BRIEF

Historically, DPW has been involved in the creation of work opportunities associated with the built environment. The design goal is to facilitate the direct accessibility of the public to participate in the making of the city by opening up the site with a new pedestrian walkway. The leading programmatic intent is to serve public interest regarding work opportunities relating to the Expanded Public Works Programme (EPWP). The current target for EPWP is "poor local South Africans willing and able to work, with predetermined targets for women, youth and persons with disability" (Department of Public Works and Infrastructure, 2021: 5-6).

The intent is to celebrate the labourers and everyday people actively involved in making the city by celebrating the craft of building as a city maker. It is also important to acknowledge the relationship between DPWI and the making of the City of Tshwane.

The craft museum and repository particularly commemorate and safeguard the legacy of the people and the crafts historically involved in the built environment of the City of Tshwane.

A works application office and test workshop support applications for work opportunities in the city.

As an extension of the EPWP, participants train in the training workshops on site. The facility requires a series of workshops, including a welding and heavy machines training workshop, a carpentry workshop, electrical engineers training workshop and a masonry and construction workshop. The supporting spaces needed are discussion rooms, offices and seminar spaces.

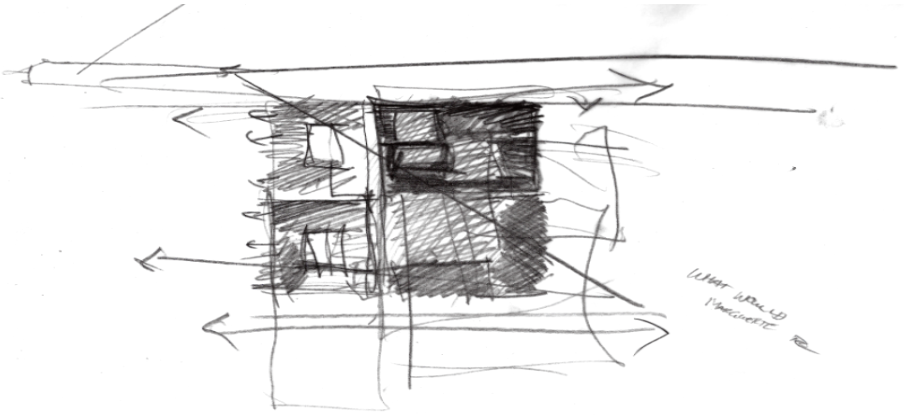


Fig. 8.6 *Iteration 1 of site framework exploring heights and connections*

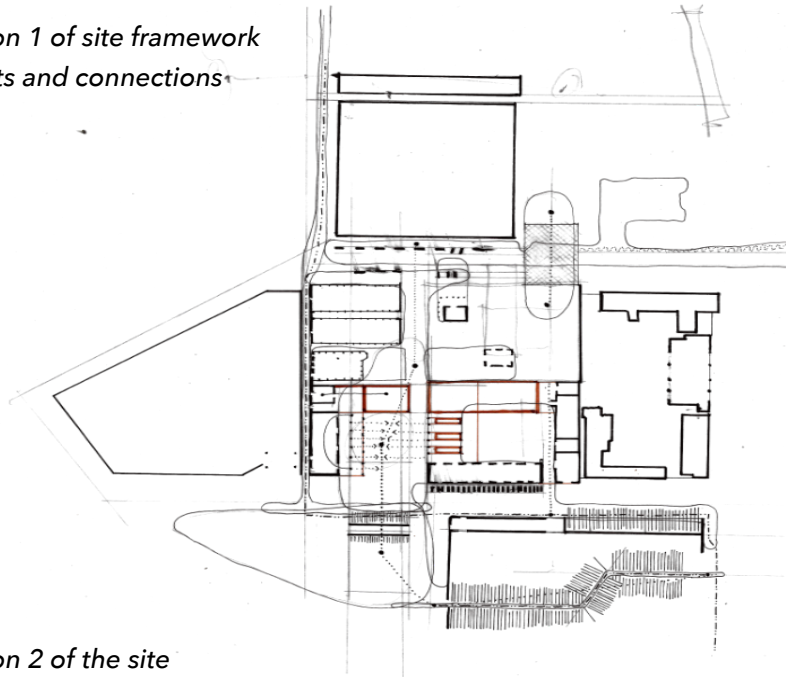


Fig. 8.7 *Iteration 2 of the site framework focusing on parcels, connections, movement and edge engagement*

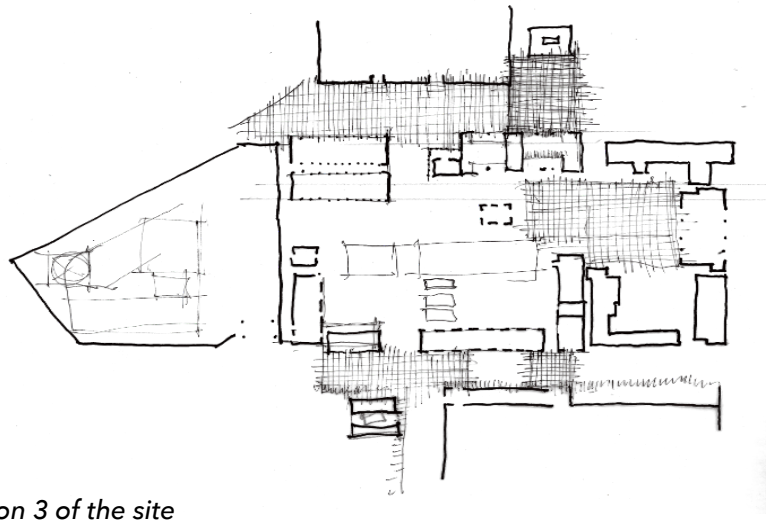


Fig. 8.8 *Iteration 3 of the site framework considers the opportunities for public open space on the edges of the site*

8.3 SITE FRAMEWORK

The site frameworks aim to address the concern of isolation from the context. The reclaimed landscape, the historical context, urban connectivity, the edges of the site and public accessibility are considered.

The public walkway connects Jeff Masemola and Minnaar Streets. The intention is to encourage pedestrian movement through the site between Bosman Station and the city. As well, the intent is to encourage the public to engage with the activities on the site by redirecting the north-south pedestrian movement away from Sophie De Bruyn Street.

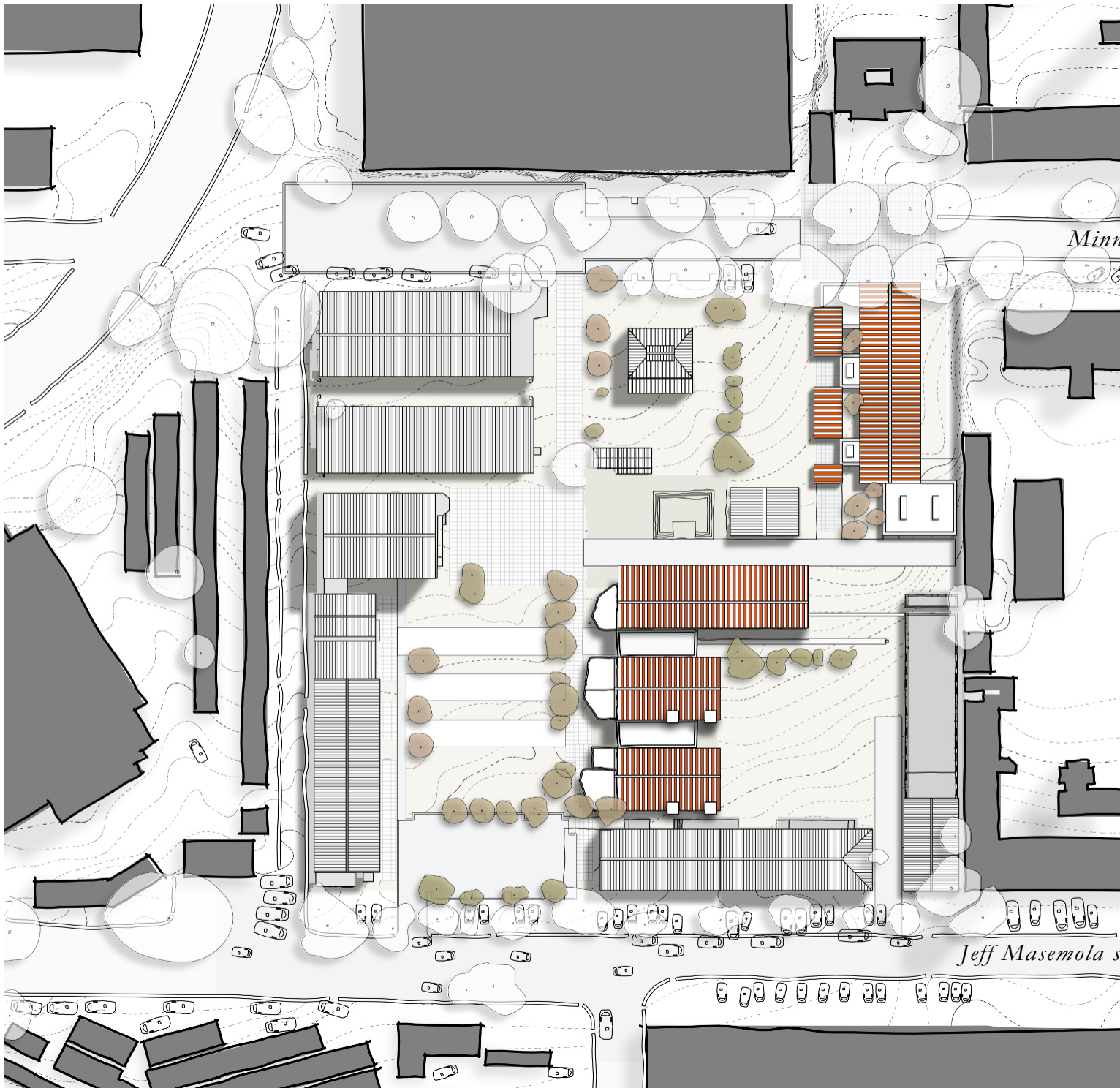
The surface treatment of the public walkway differentiates the main route from the secondary paths on site. The walkways connect the Cultural History Museum with Bosman Station.

Define the edges

The southern edge forms part of the existing sidewalk on Jeff Masemola Street. A raised surface extends to connect with Bosman station to ease pedestrian crossing and add friction to the road. The edge reads as transparent due to the public parking and drop-off area between the road and the small park (Jacobs, 1993:6.3-5).

Steps lead from the main path to the grassy landscape. The bio-swales capture stormwater and soften the impact of the parking area. The main pedestrian route is next to the proposed workshops on site. Secondary paths branch off the main route.

Except for the Carpenter's workshop, the existing buildings on Minnaar Street do not define an edge to the site. The framework proposes a public entrance for the Craft Museum and Repository with engaging exhibits facing the street and sidewalk (Jacobs, Ibid.:6.3-4). The entrance to basement parking is on Minnaar street.



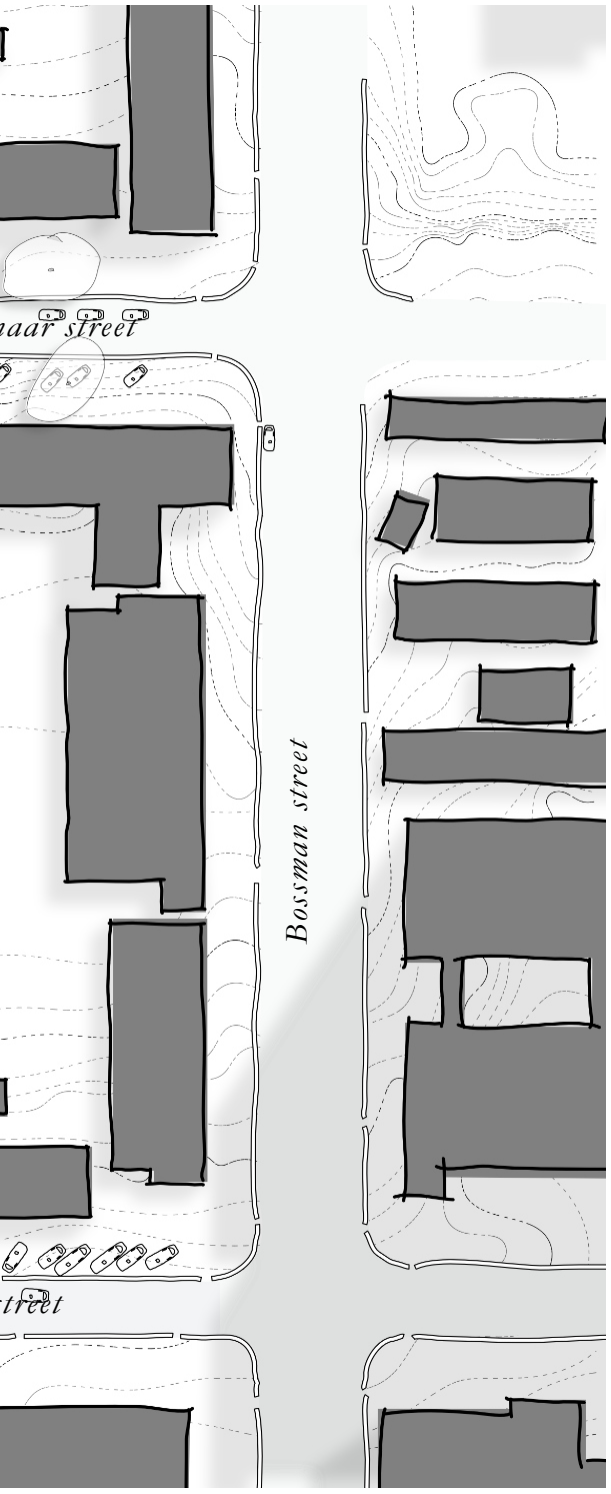


Fig. 8.9 *Arrangement of the program on site*

Fig. 8.10 *Arrangement of the program on site*

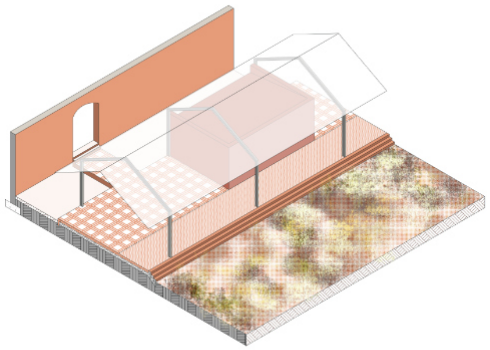


Fig. 8.11 *Arrangement of the program on site*

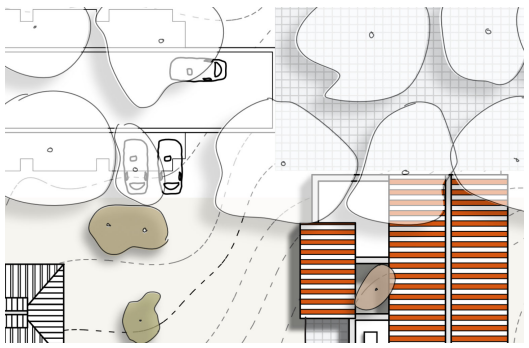


Fig. 8.12 *Arrangement of the program on site*

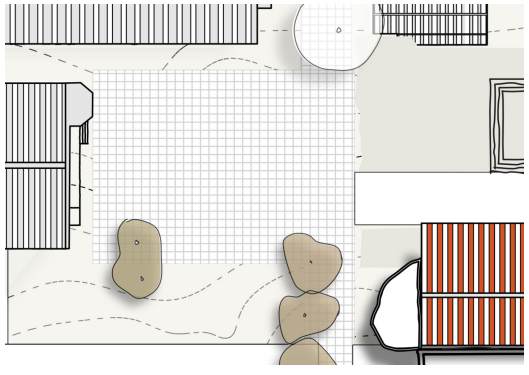
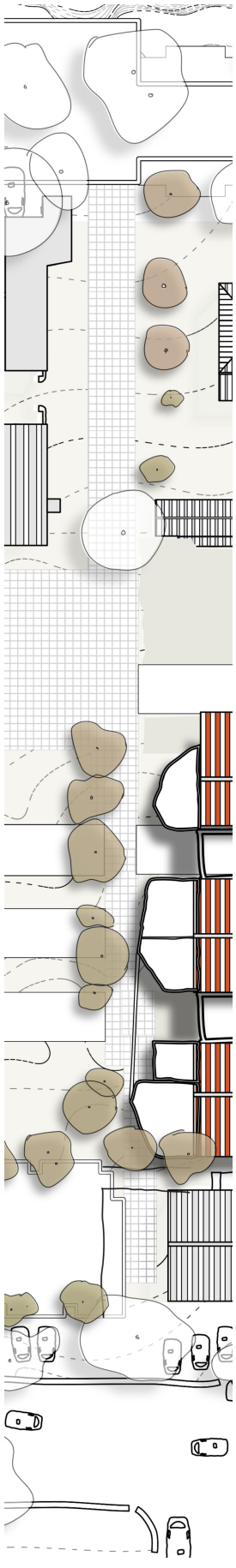


Fig. 8.13 *Arrangement of the program on site*



Moments in-between

The broader linger areas are found where the pedestrian route and the secondary paths intersect. These moments are defined with focal points like water fountains, signage, benches, or a small commemorative sculpture.

Public park

The bio-swales capture most of the runoff accumulated on-site during the rainy seasons. The invasive grass species are systematically replaced with indigenous varieties. The areas of tall grass are kept within the boundaries of the lost heritage and in the planters allocated to the edges of buildings.

Commemoration

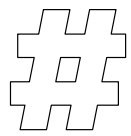
The proposed buildings respond to the existing grain of the site in scale, proportion, and rhythm. The additions should complement the character of the historic context (Ibid.: 6.3-5 - 6).

The proposed Craft Museum and Repository frames a commemorative garden and demonstration courtyard between the Supervisor's residence, the Labourers' accommodation, and the proposed Extended Works Training Hub.

Central square

The central square connects a series of important places on site. The square connects the Administration Building with the food court, the restaurant, the public craft workshops, carpentry workshops, the site information centre and the main entrance to the Expanded Works Training Hub.

Fig. ix *Photograph of the Stotemason's Workshop .*



The Expanded Works Training Hub

Every workshop on the site is partially constructed from redundant or reused materials from another project, on-site, or in the city. The resulting palimpsest changes the material to acknowledge the evolving context (Machado, 1976: 48-49).

The use of standard construction materials influenced the resulting industrial architecture. The front elevation of the Stonemasons' workshop (Fig. x) results from arbitrarily placed timber and steel windows in a hastily built brick wall. The remnants of a removed carport isis still evident on its facade.

These practical choices made were based on the limited palette of materials at the time. Similarly, the west elevation of the Carpenter's workshop is too narrow to accommodate four steel windows, which results in an unusual asymmetrical three window design (Fig. xi). It suggests that the construction of the carpenter's workshop was somewhat unplanned.

With this idea of redundant material exchange in mind, the potential of remaking through reuse and standard construction materials in the industrial heritage context is applied.

Fig. x *Photograph of the Stotemason's Workshop .*

Fig. xi *Photograph of the inside of the Carpenter's Workshop*

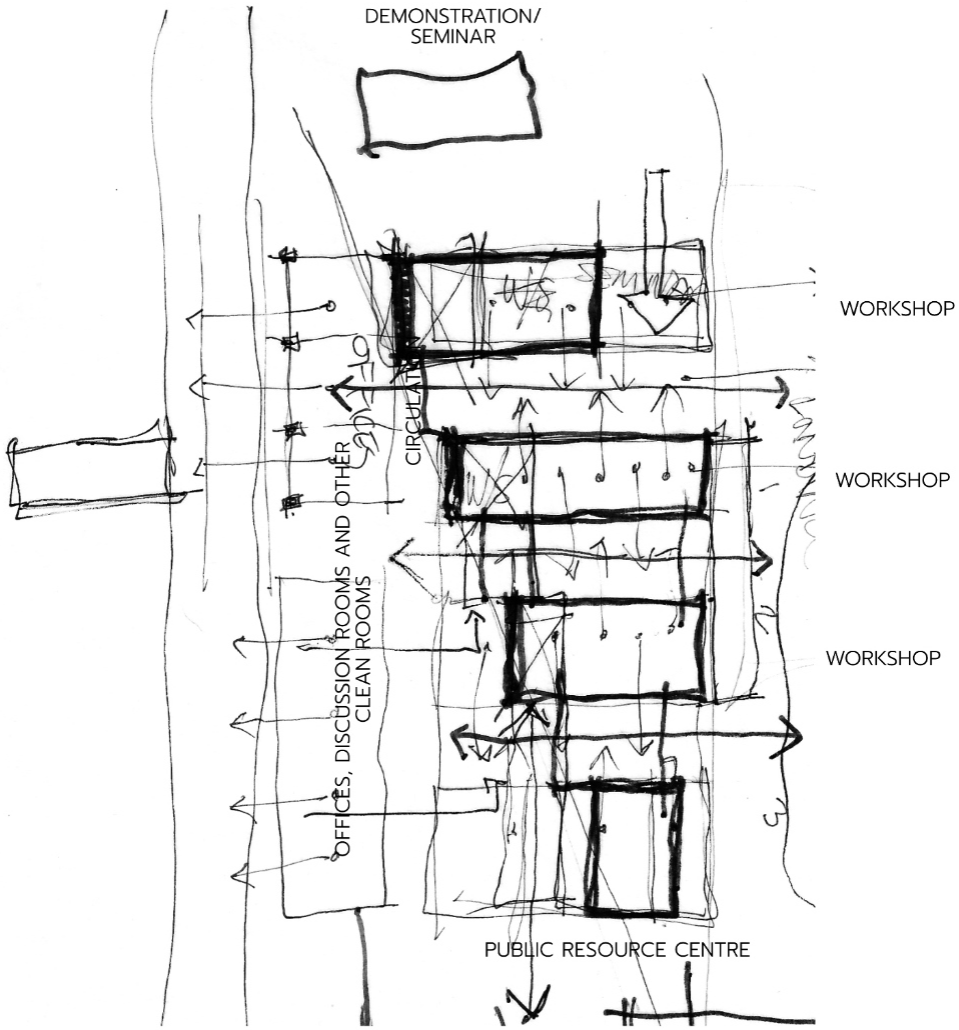


Fig. 9.1 *Programmatic concept*

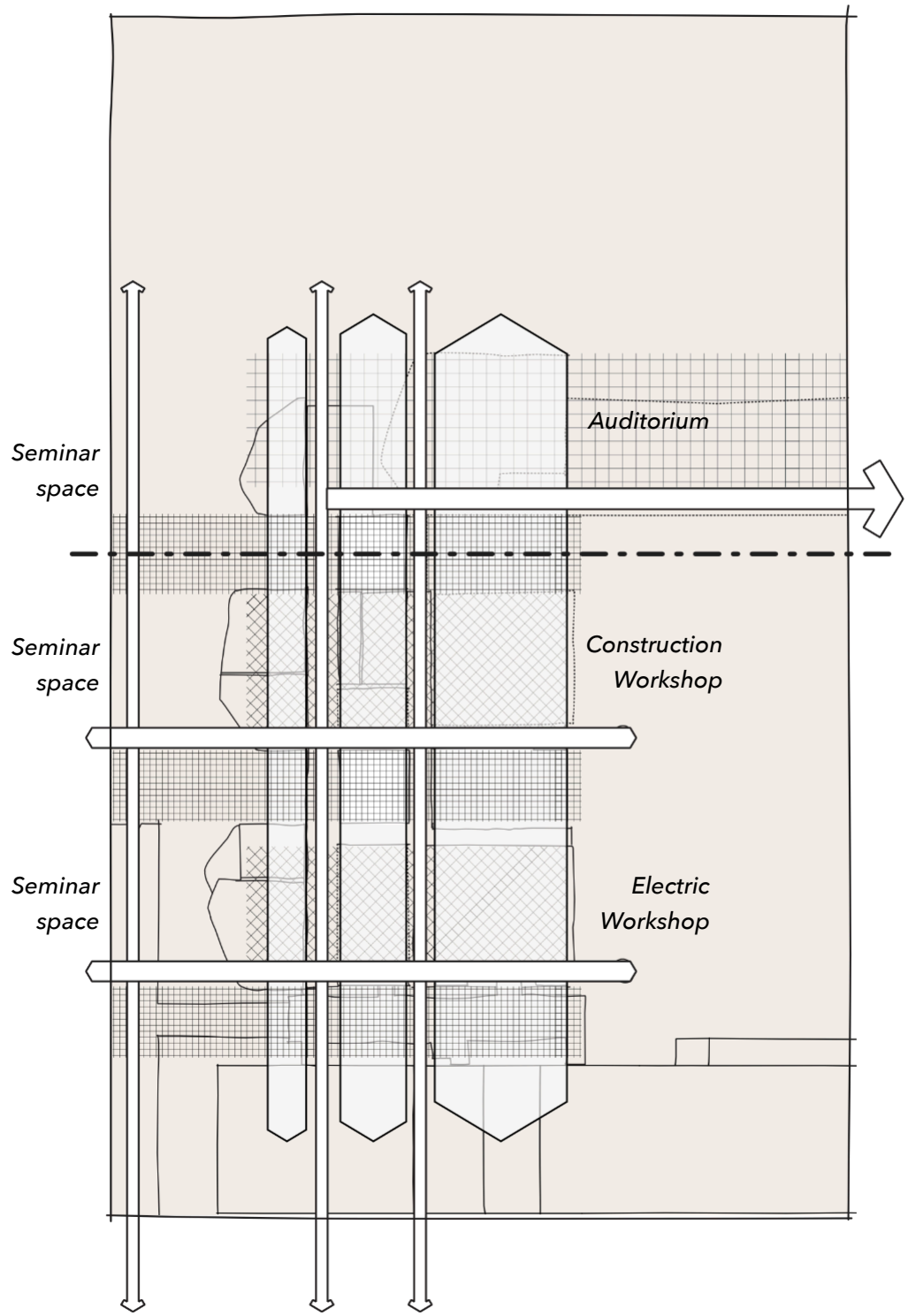


Fig. 9.2 *A scaled approach: hierarchy of importance of spaces*

9. DESIGN DEVELOPMENT

9.1 DESIGN CONCEPT

The program for the building is a series of training workshops accompanied by an auditorium and smaller seminar spaces.

Supplementary spaces include offices, participant break-away spaces, a vestibule for the auditorium, circulation, storage, ablutions, and change rooms.

The internal spatial condition of the existing carpentry workshop forms the reference of the design. Therefore, the design concept is primarily a critical reinterpretation and mediation between the existing elements on site.

Scaled approach

As the building mediates between the two conditions; i.e., the public walkway and the workshop yard, the building proceeds in function. The seminar spaces are associated with the public walkway (west) and the workshops with the workshop yard (east). [explain how this mediates the two sides]

Three warehouse structures

In an attempt to maximise the southern light, and reduce the amount of western sun, the design is portioned into smaller structures, connected with a mutual walkway.

Remaking

The proportions of the existing buildings are taken into consideration. Long, repeatable themes are considered as an opportunity to extend the spaces where necessary.

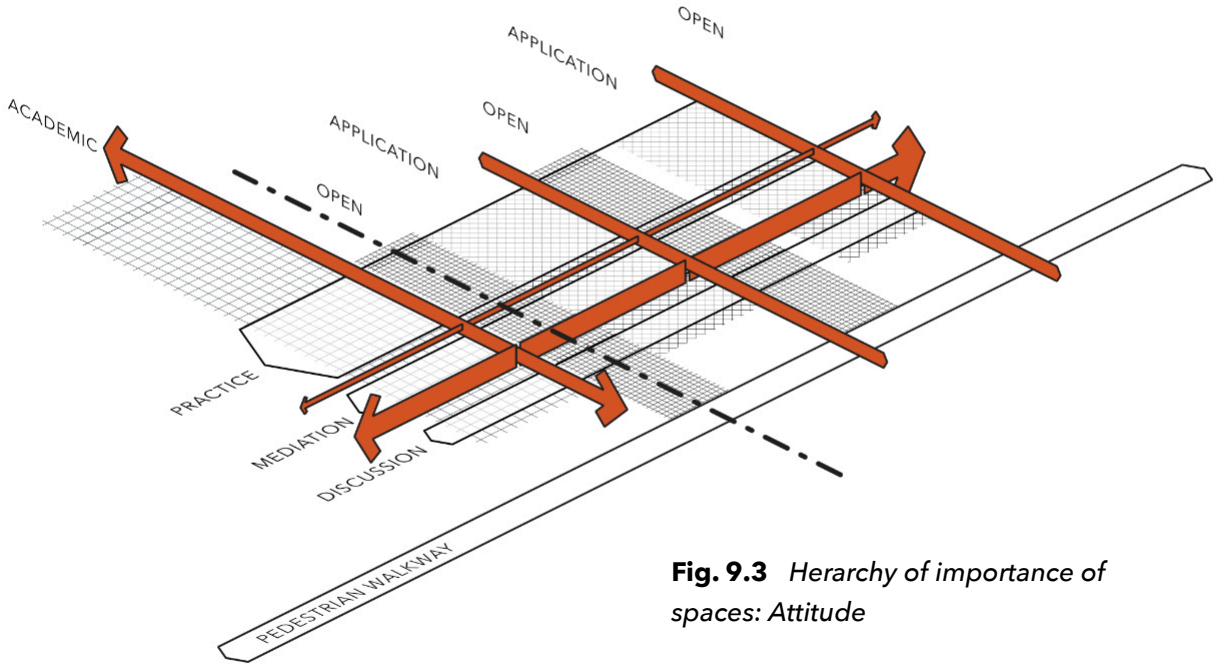


Fig. 9.3 *Herarchy of importance of spaces: Attitude*

9.2 ITERATION OF THE DESIGN

Iteration 1

The initial concept sketch focused on translating the framework into a broad spatial and programmatic intent. The building completed the "courtyard" between the Ruin, the Mechanical Workshop and the Stonemasons' workshop, with the office and admin spaces located in the northern wing and the workshop spaces on the western leg.

This iteration did not consider the effect that a series of noisy workshops on a public walkway would have, especially since the nature of the majority of the site is already industrial.

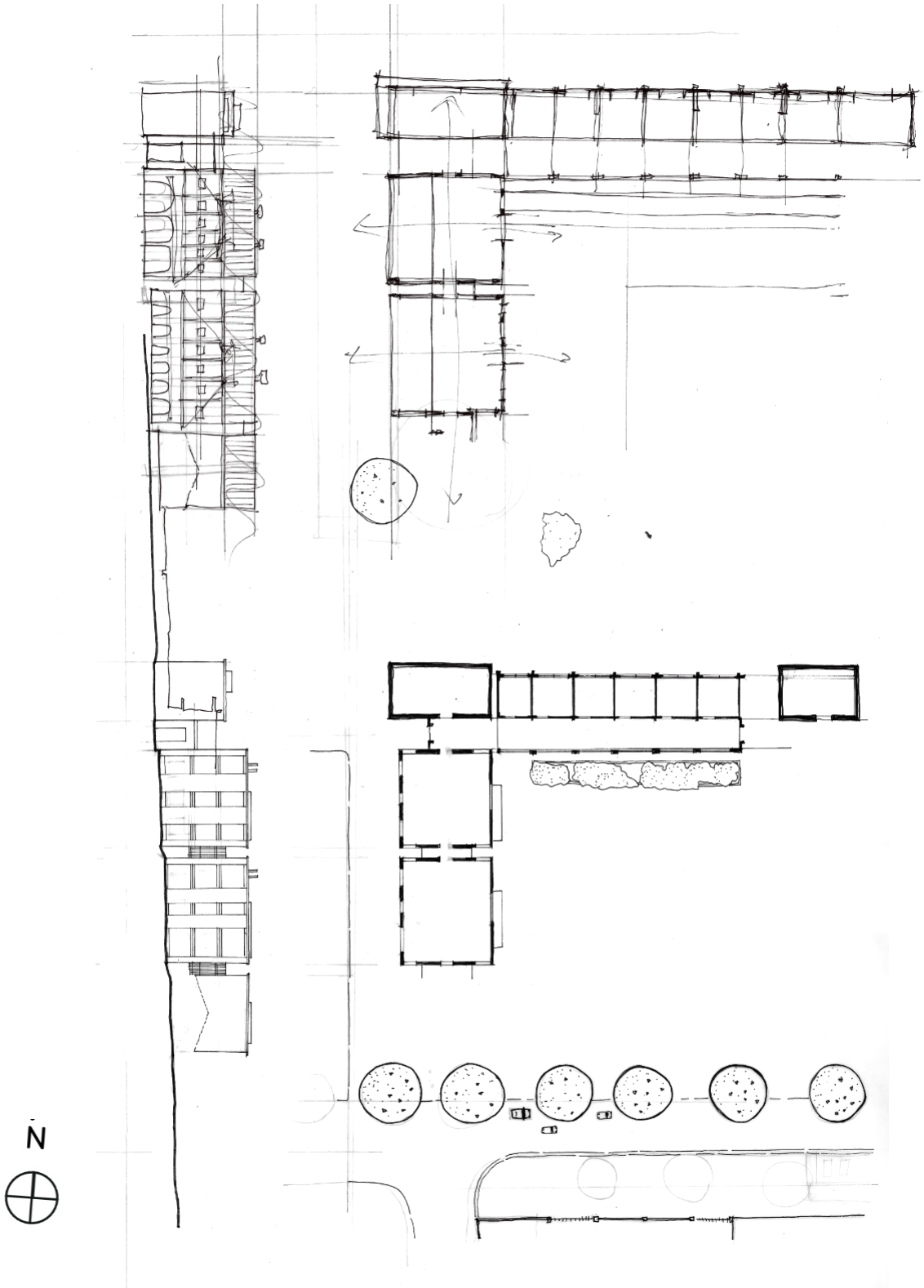
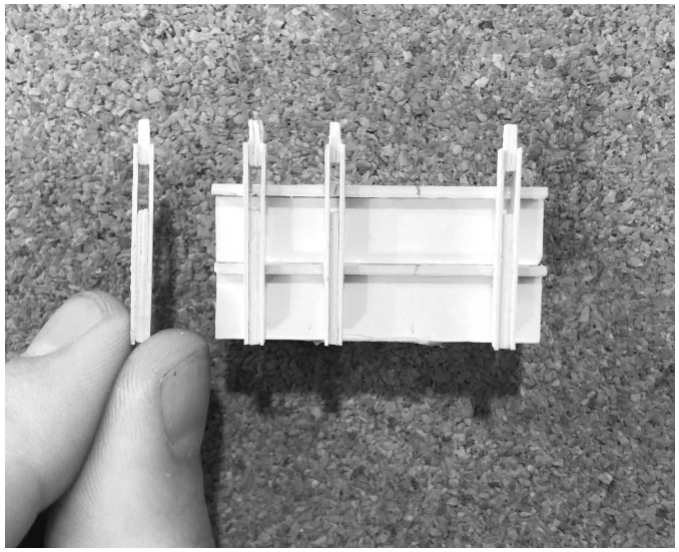


Fig. 9.4 *Sketches: Iteration 1*



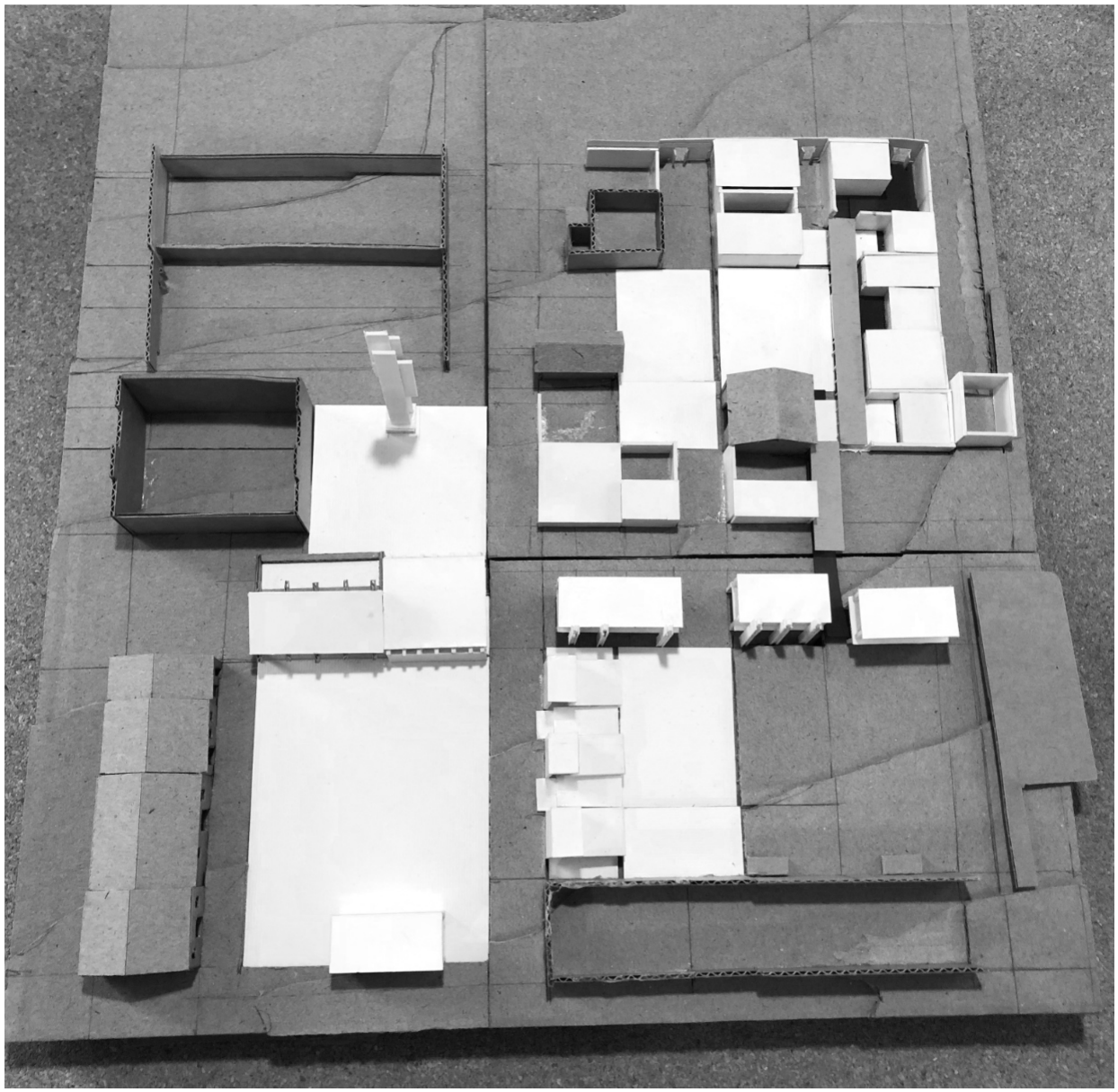


Fig 9.5 *Iteration 1 maquette*

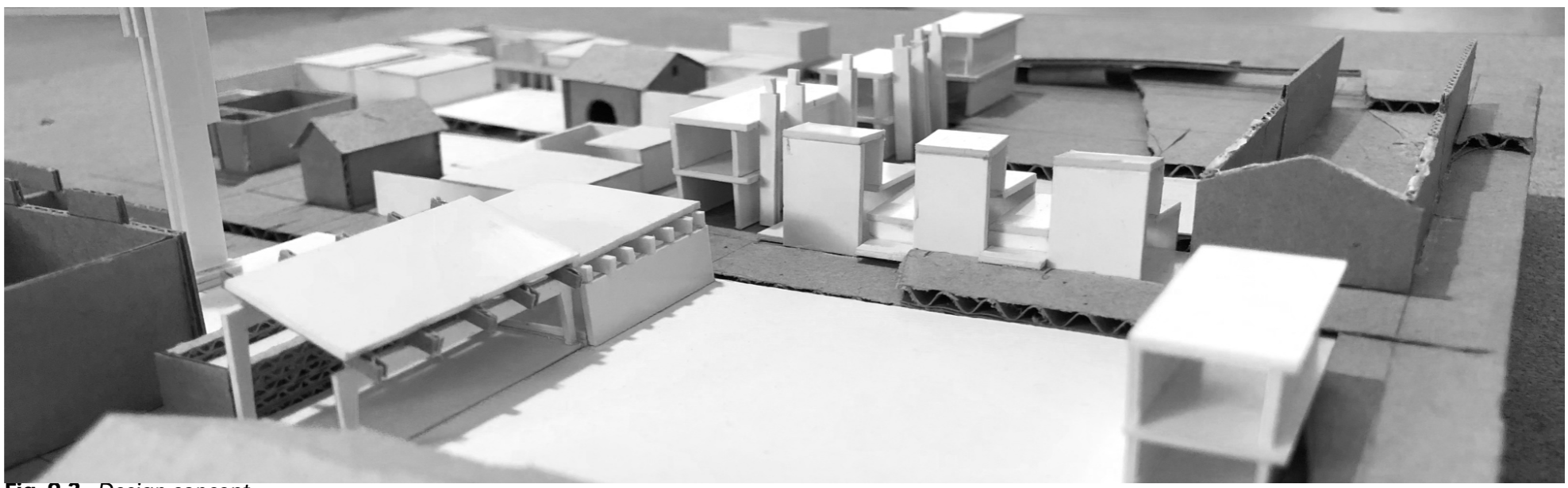
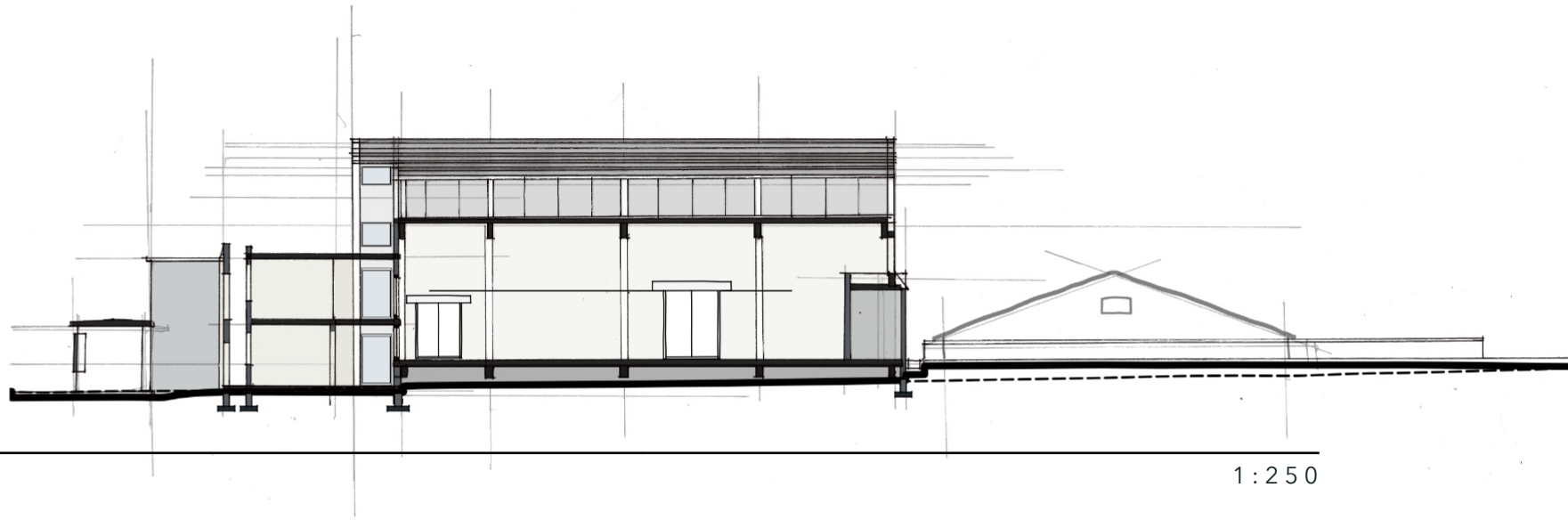
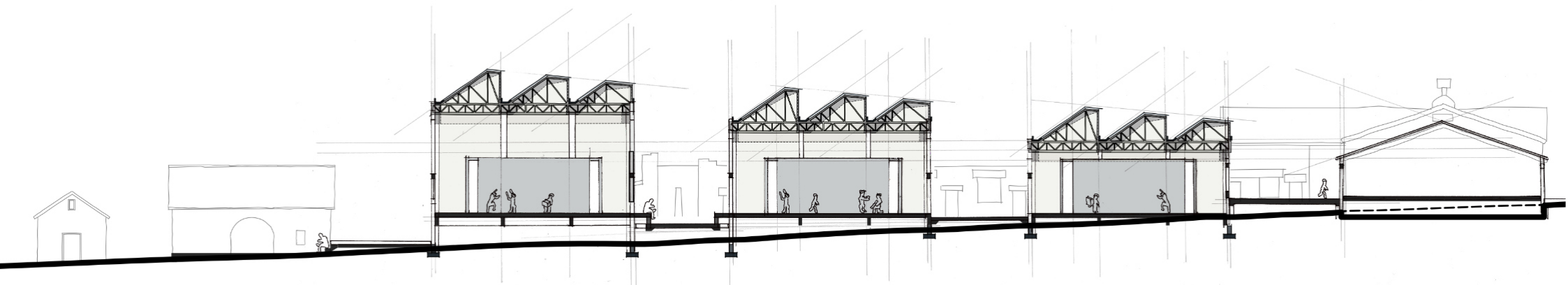


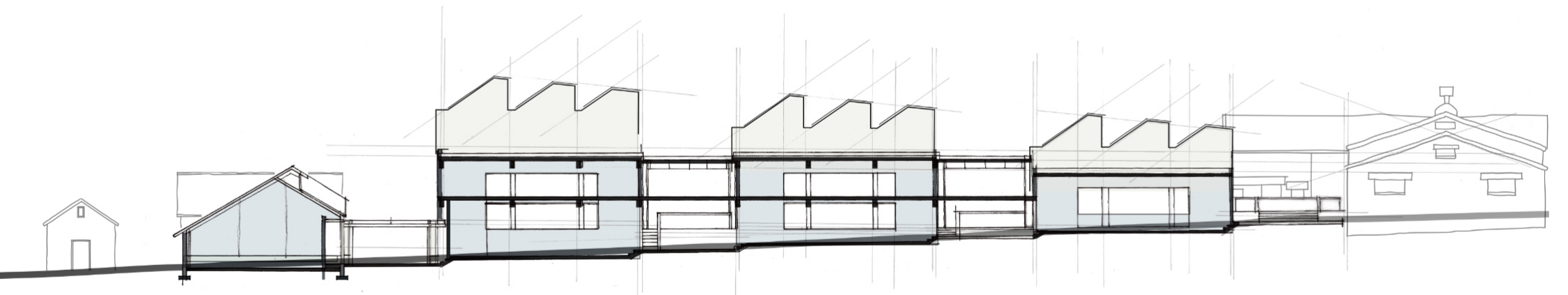
Fig. 9.3 *Design concept*



SECTION 1 1:250



SECTION 2 1:250



SECTION 3 1:250

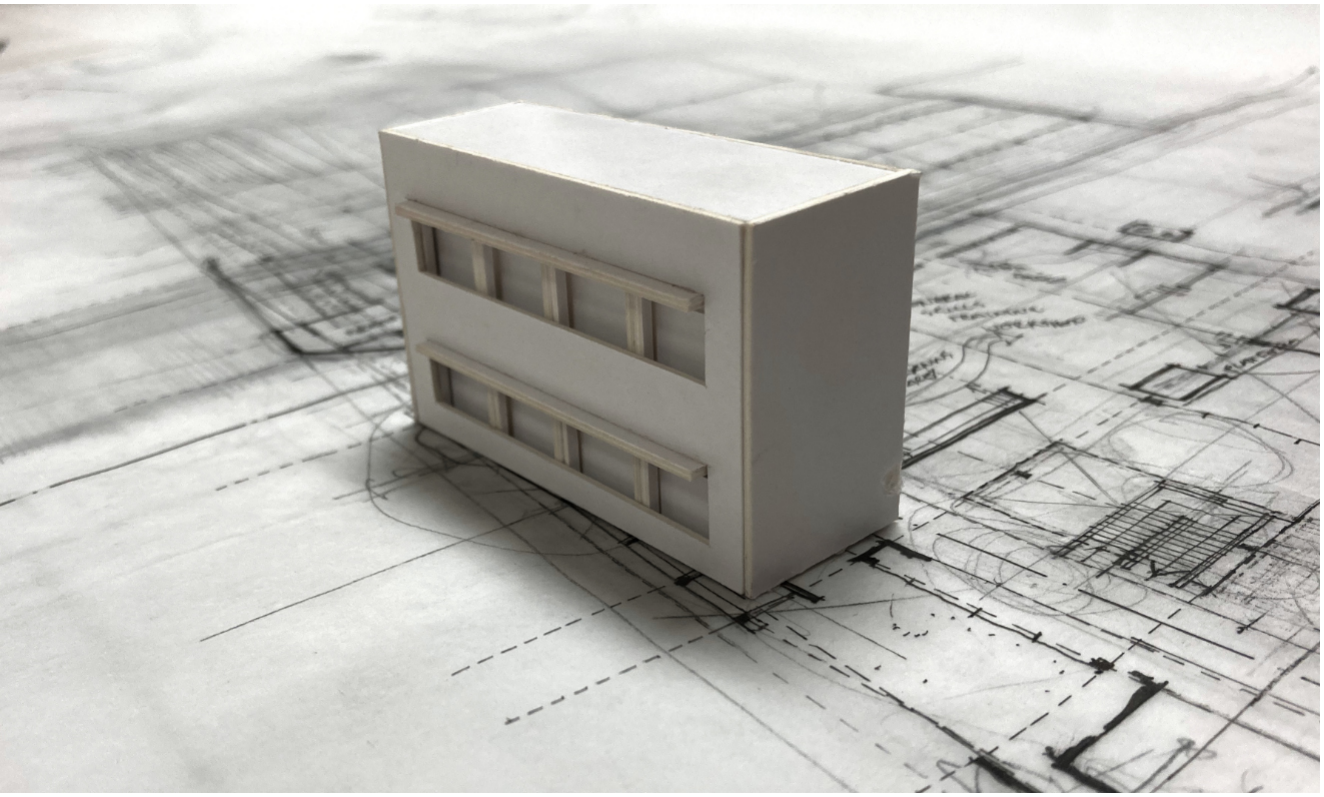
Iteration 2

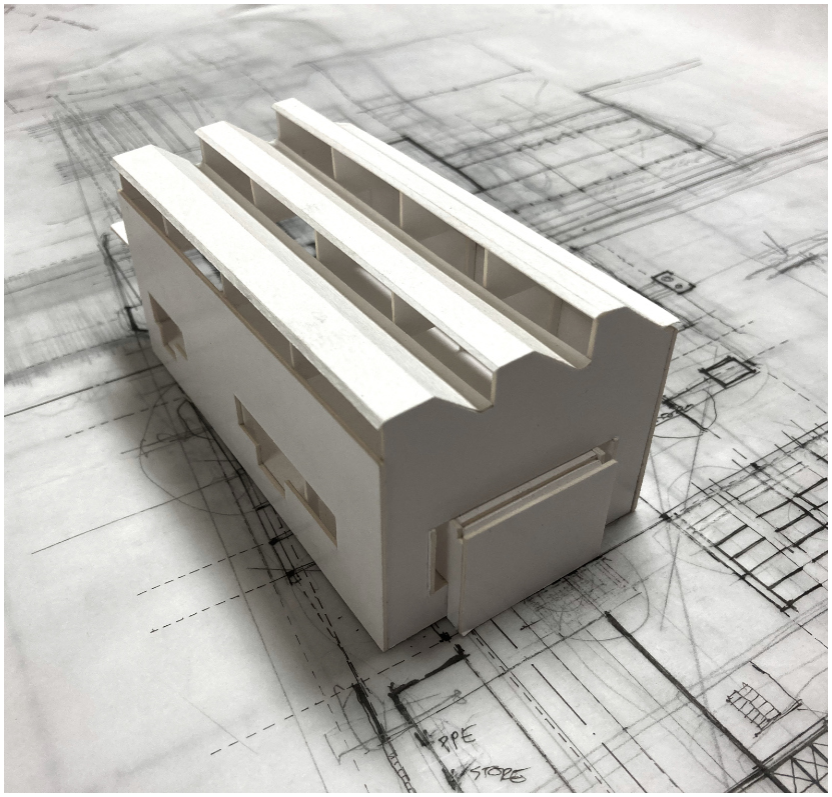
The design is an intuitive response to the proposed public walkway, the spatial constraints of the existing buildings on site, the 3m fall and the site's orientation. As the site runs predominantly north-south, the intent was to minimise the western exposure of the building. The building is divided between the public interface and the industrial activities associated with making. In section, the building meets the height of the existing workshop and then gradually moves to a three-storey workshop. An adapted saw-tooth roof is used to allow southern light to enter the workshops.

Figs. 9.5 *Iteration 2*

GROUND FLOOR PLAN 1:250

Fig. Iteration 2





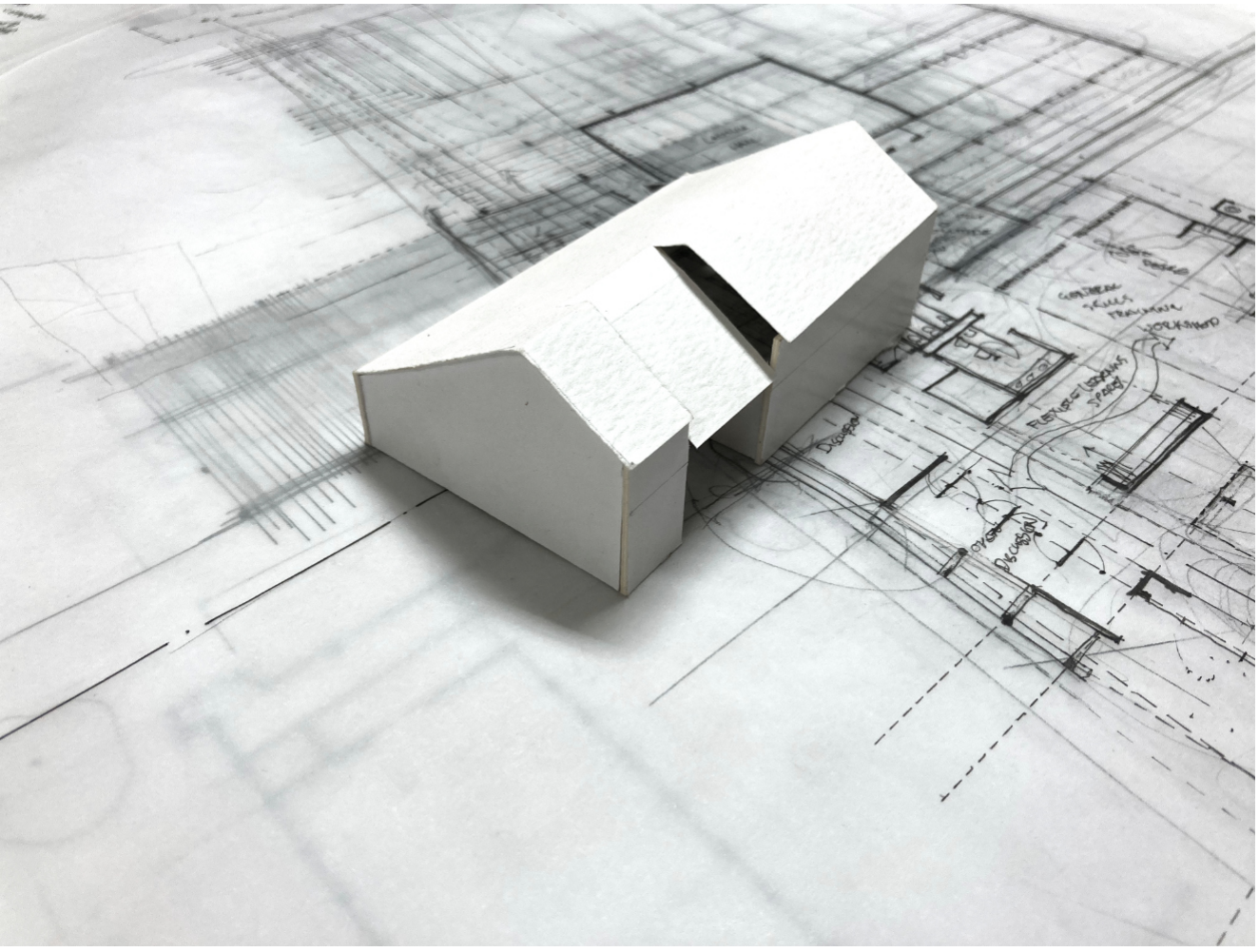
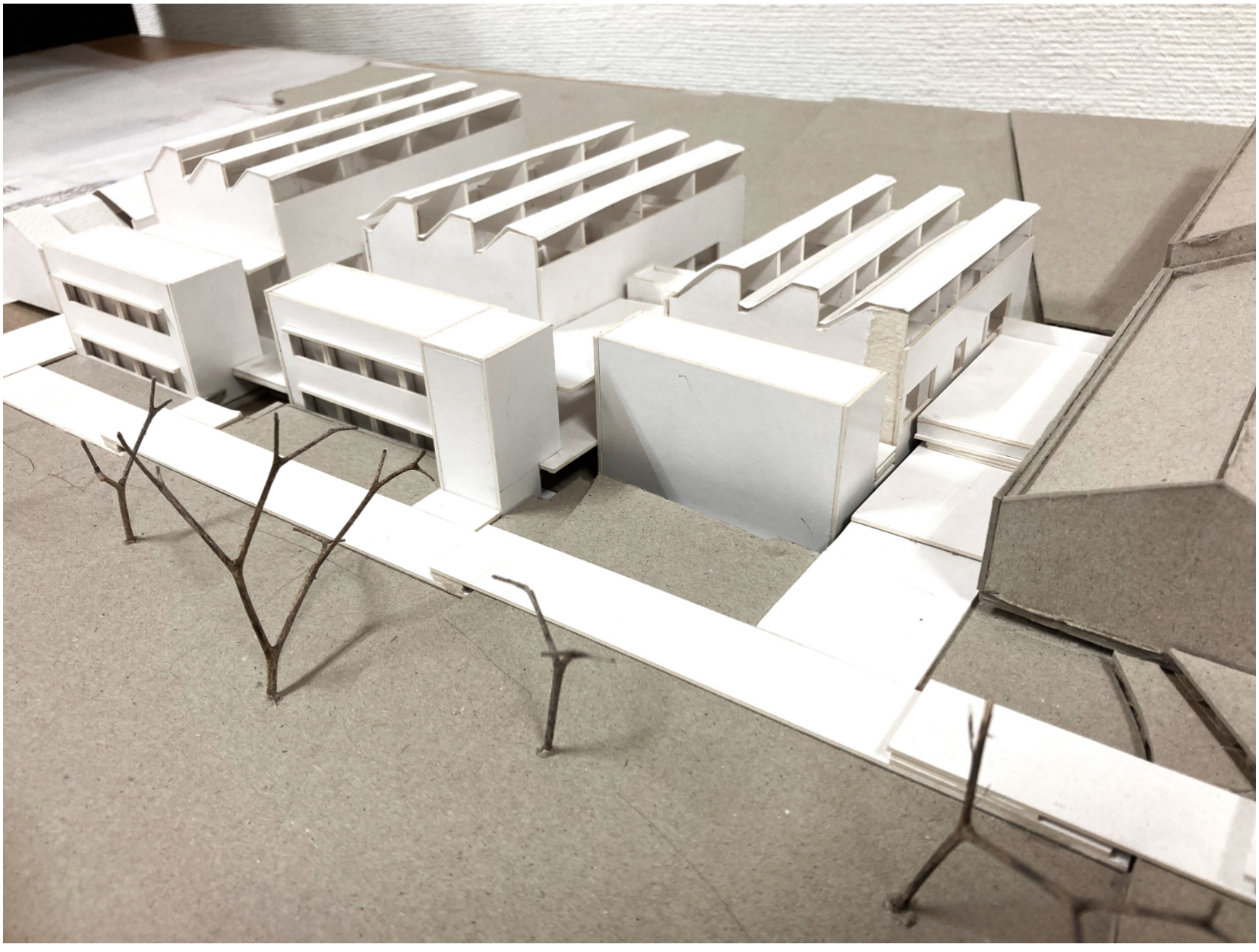
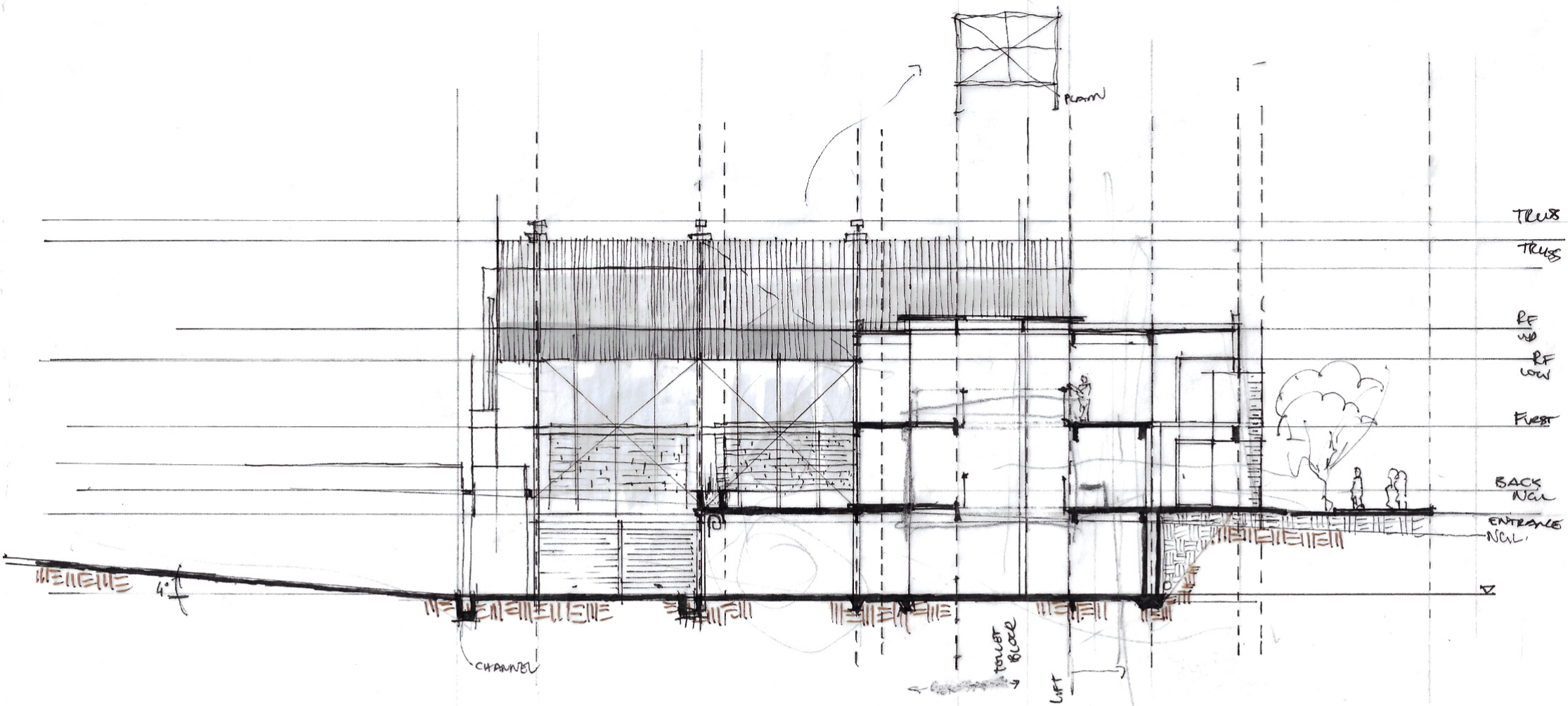


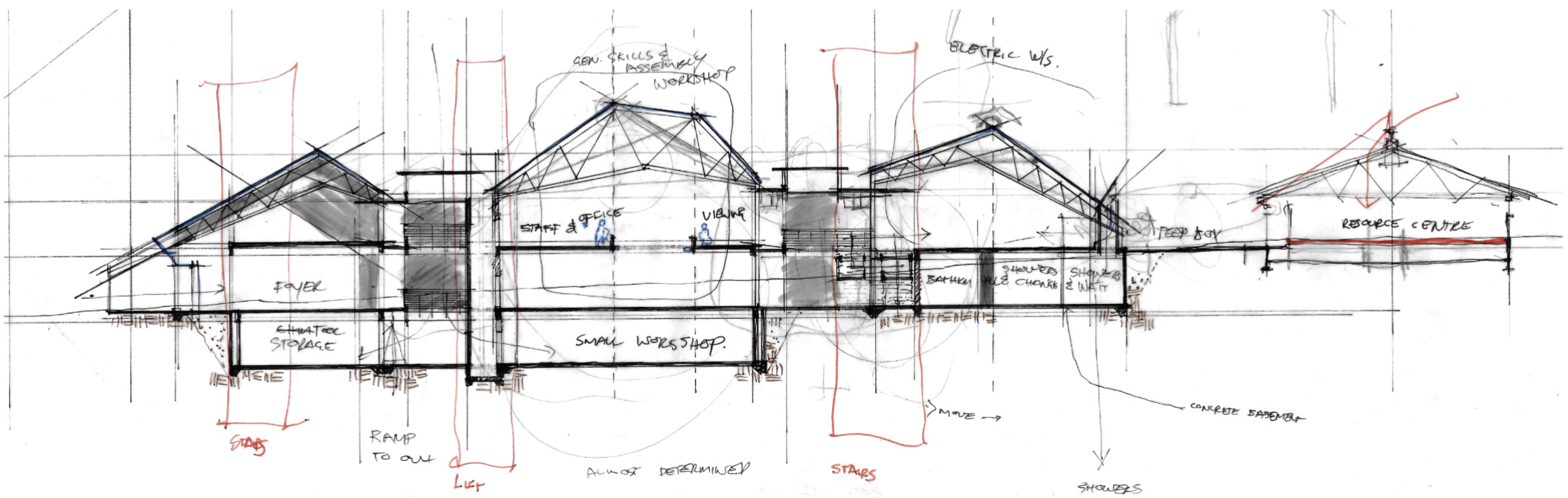
Fig. 9.5 *Iteration 2 maquettes*





SECTION 1 1:250

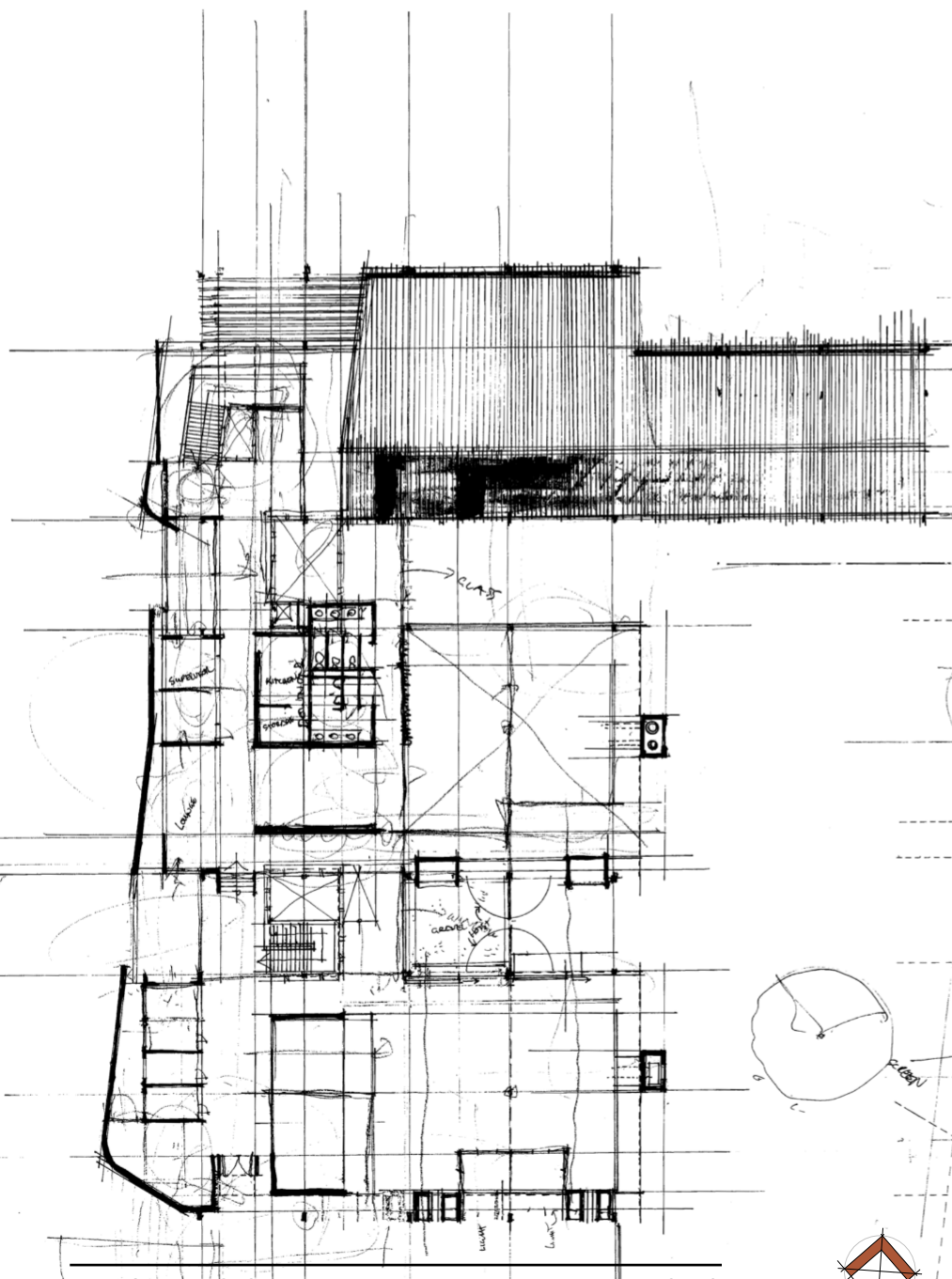
Figs. 9.7 *Building section with the workshops in elevation*



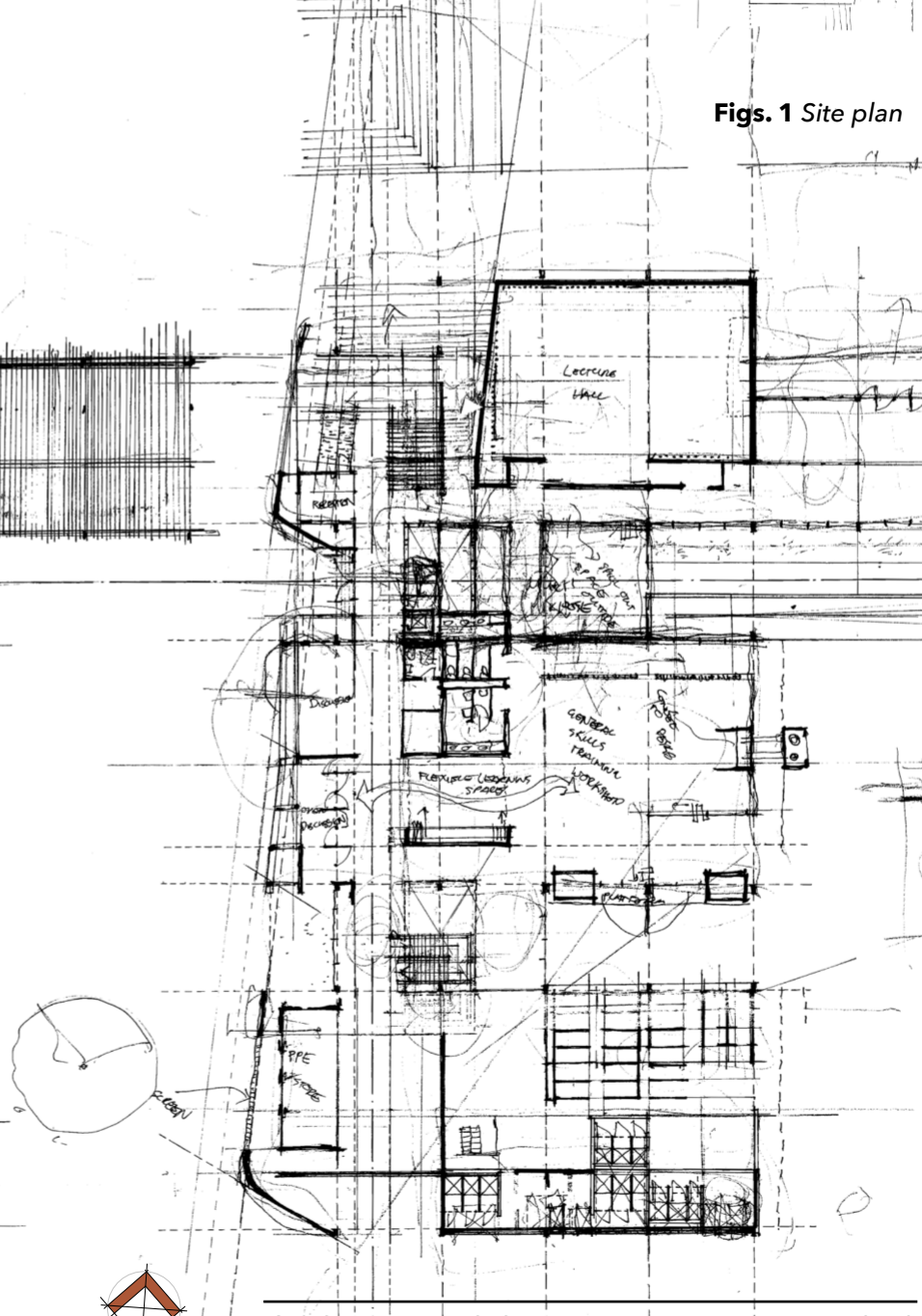
SECTION 2 1:250

Iteration 3

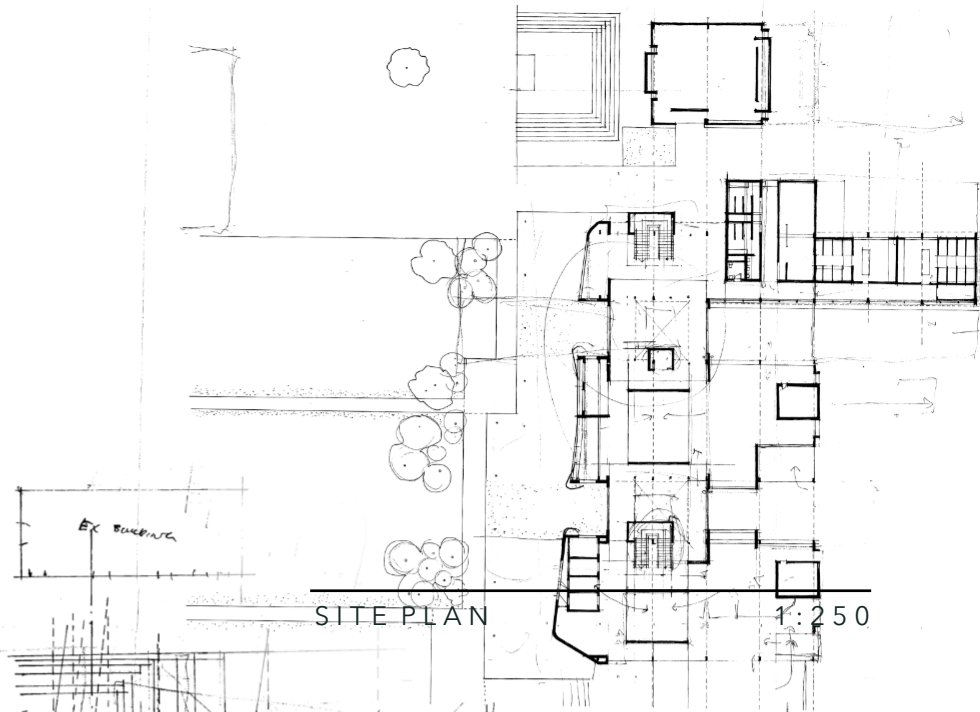
These iterations focus on the roof shapes as a response to heritage. Workshop spaces as opposed to interstitial spaces are considered. Modularity and materiality are considered. Brick walls undulate underneath the steel frame structures.



FIRST FLOOR PLAN 1:250

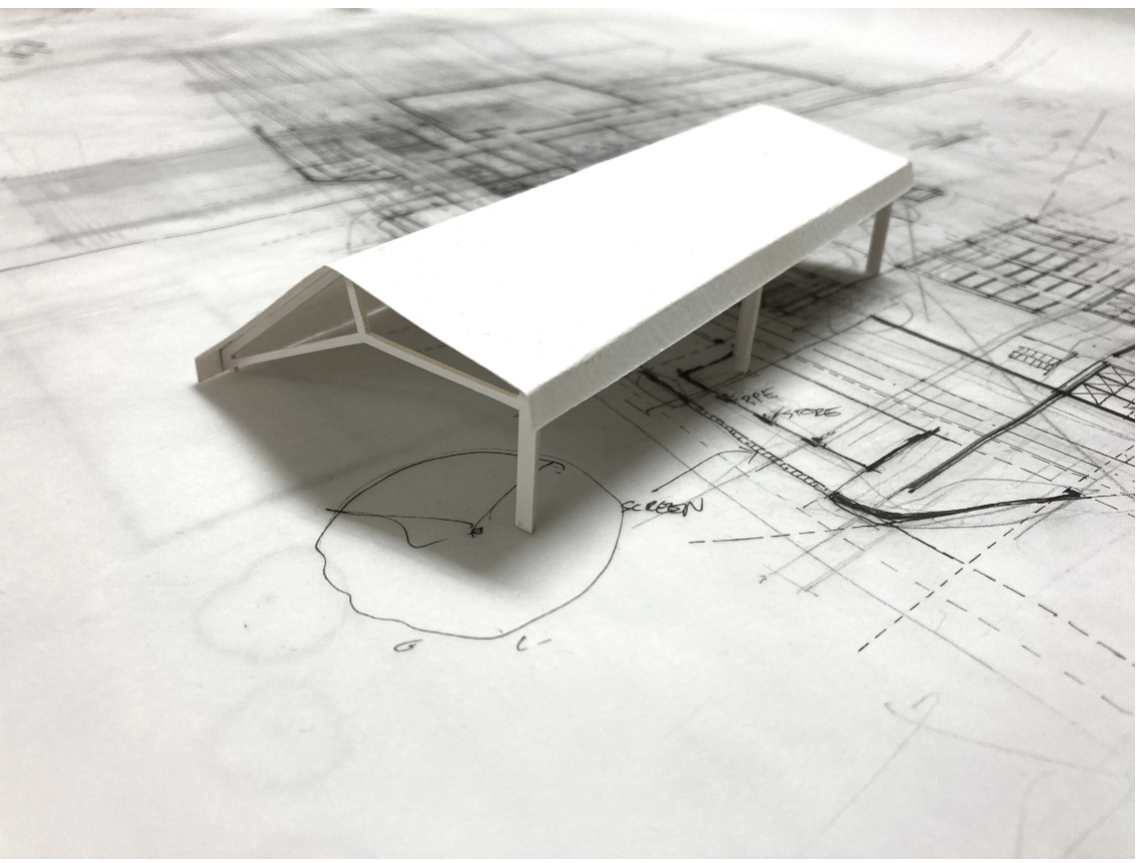


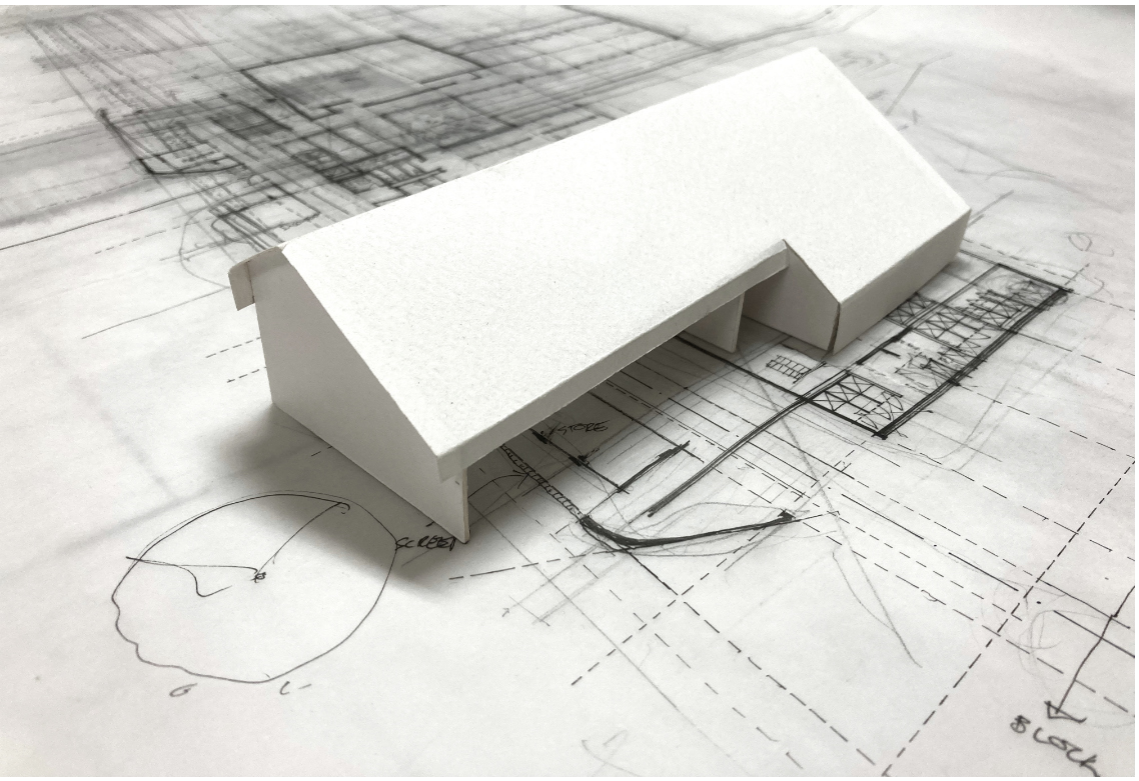
GROUND FLOOR PLAN 1:250

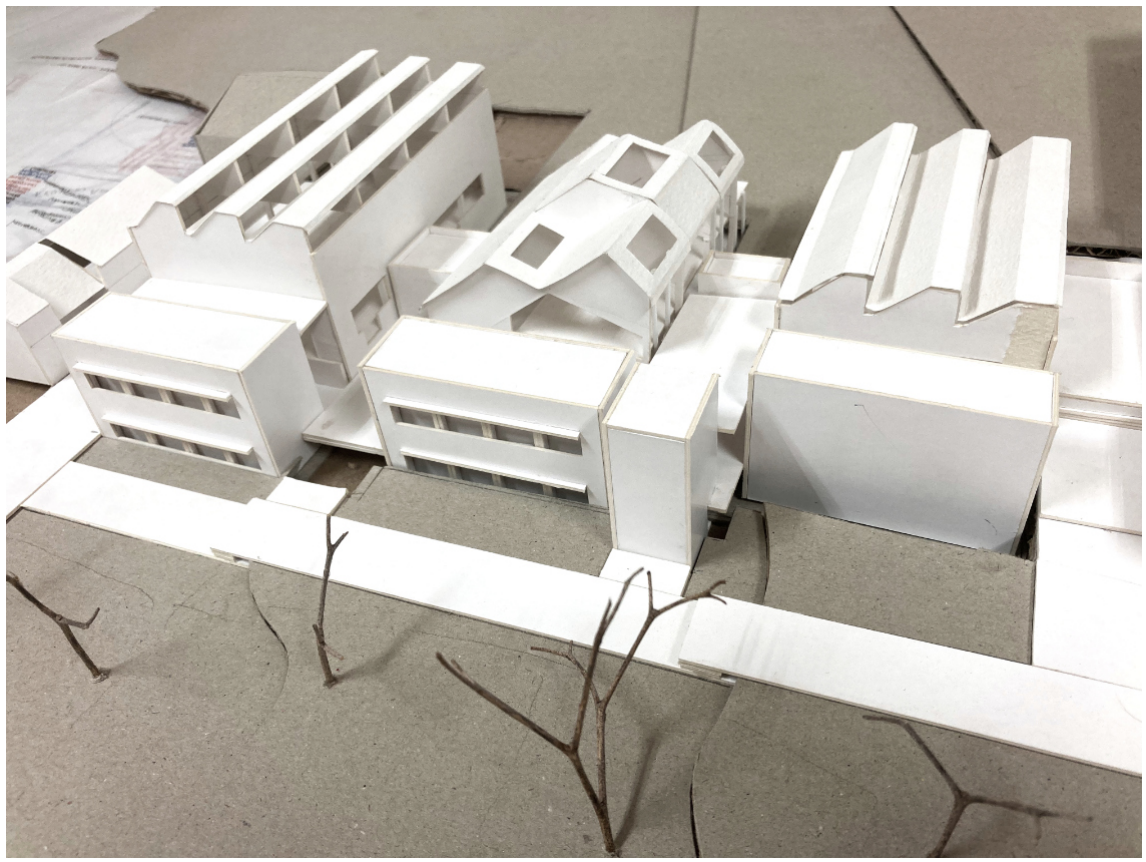


SITE PLAN 1:250

Figs. 1 *Site plan*







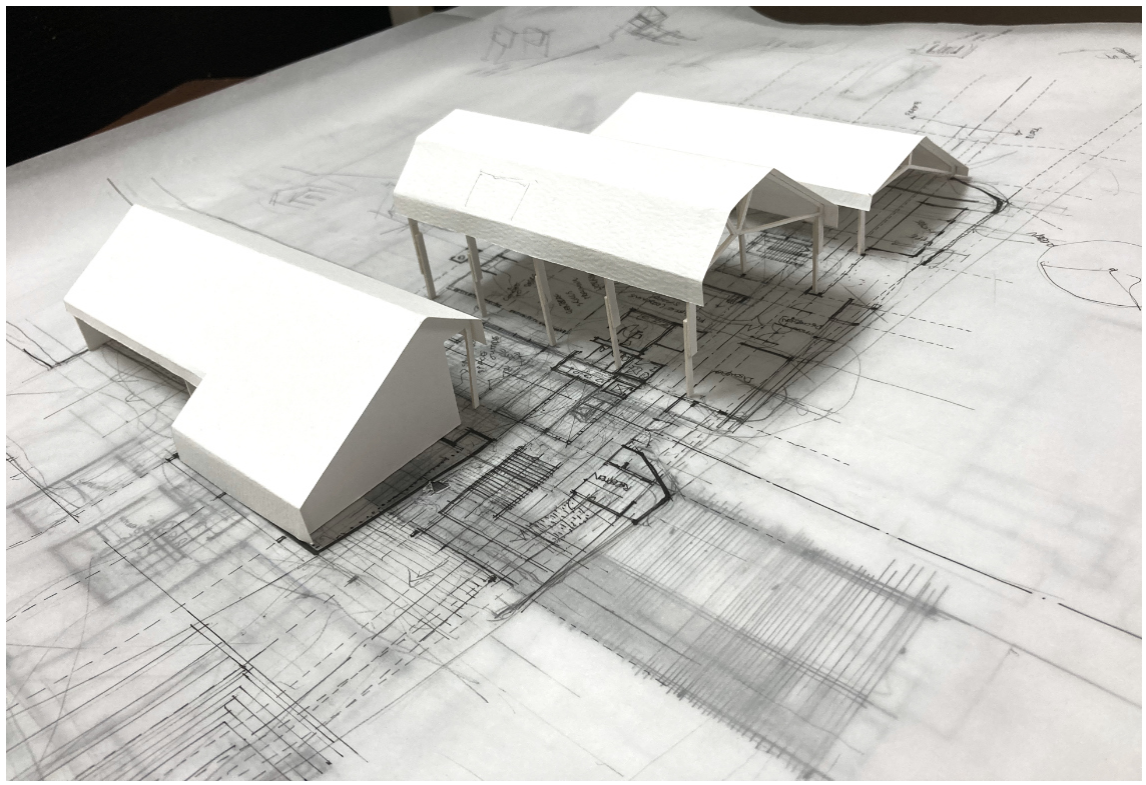
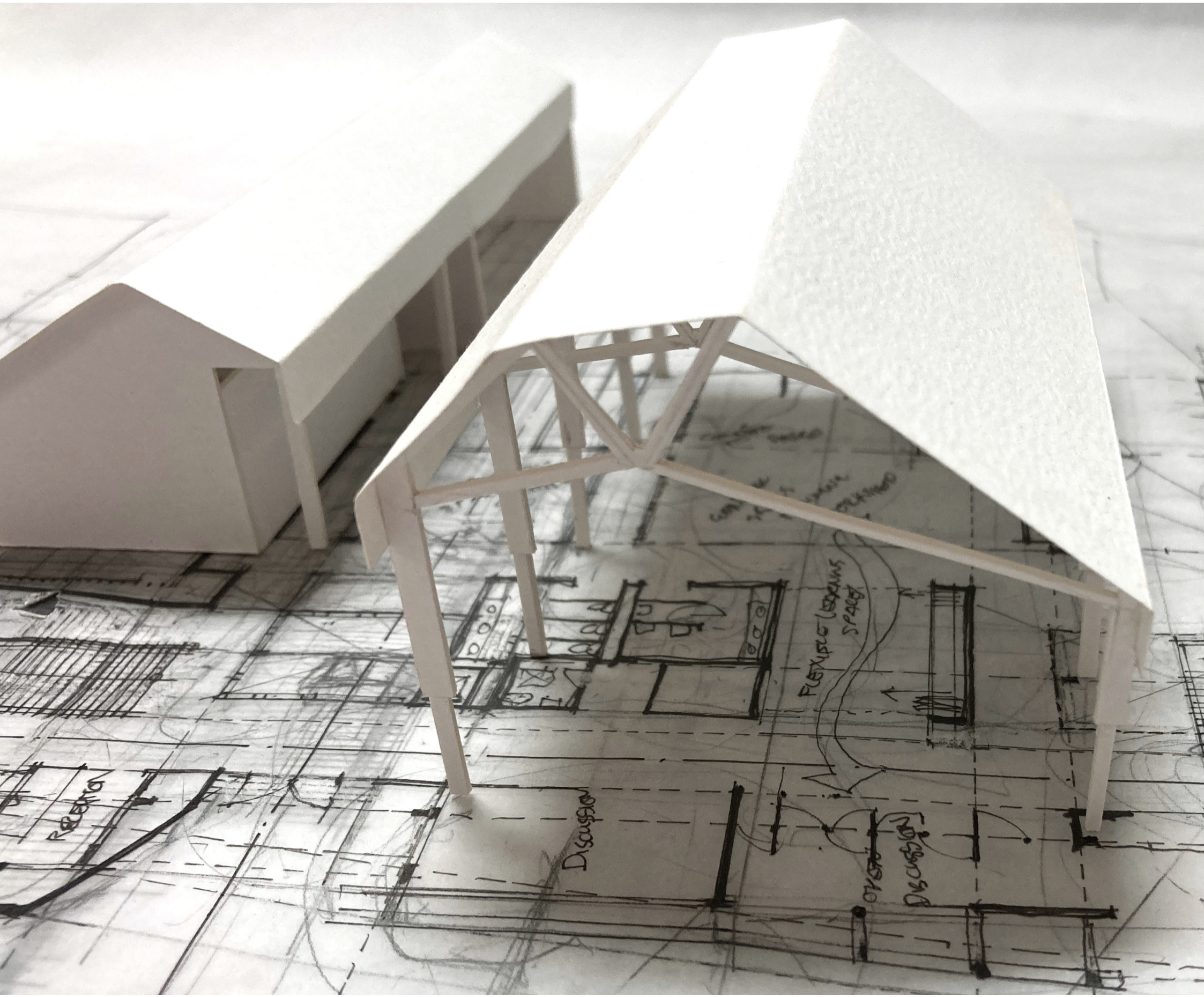
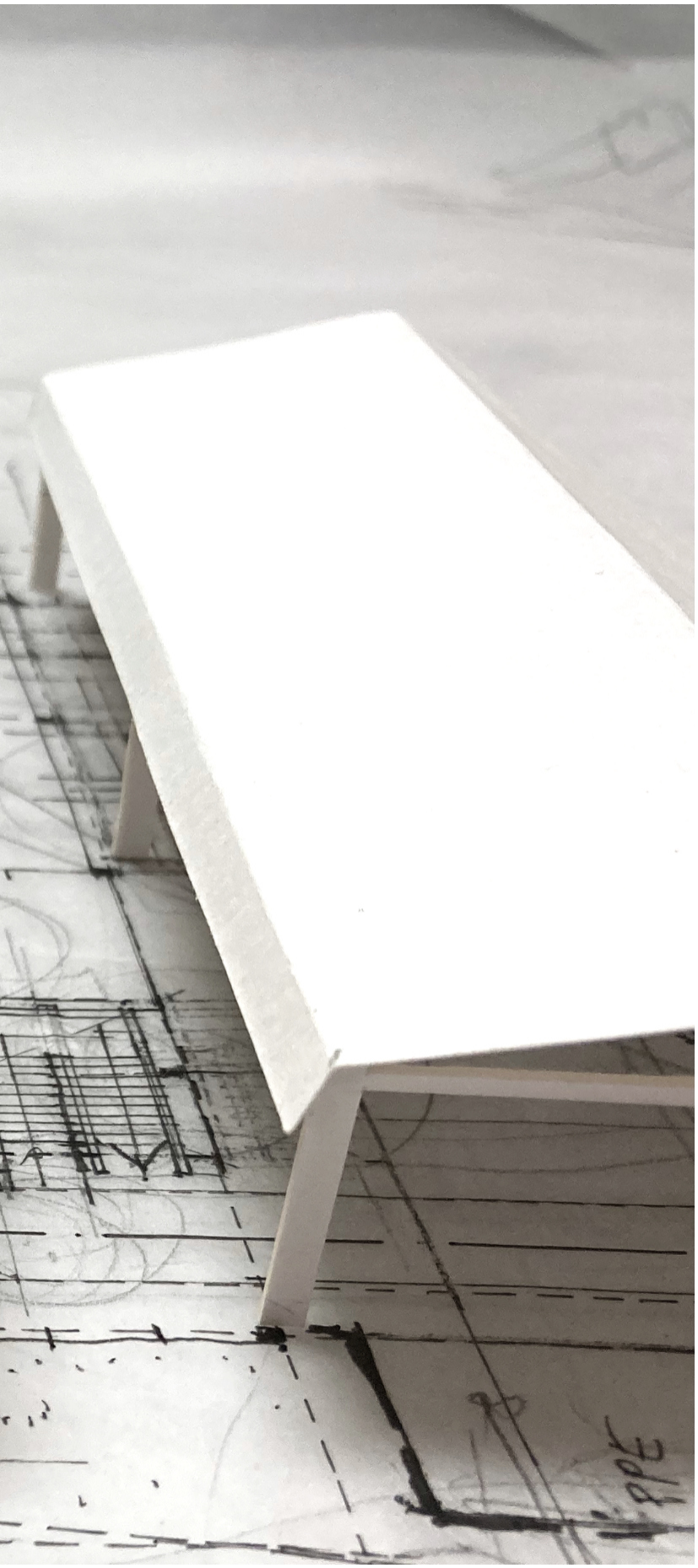


Fig. 9.7 *Iteration 3 Maquettes*



10. DESIGN EXPLAINED



10.1 RESPONDING TO THE HISTORY OF THE EVERYDAY

The limitations and opportunities as set out by the Statement of Significance indicate that any changes to the site should be considered as part of the whole. The individual buildings obtain their value from the context.

An organisational grid is determined from the context. The six-metre north-south grid continues the underlying structural logic of the Mechanical workshop. The 14m width of the new workshops is based on the Stonemasons Workshop and the Carpenters Workshop. The main entrance of the EPWP Hub aligns with the entrance to the ruin, with the remaining column of the hoist as the focal point.

The west elevation requires significant heritage consideration as it directly impacts the spatial experience of the existing fabric, especially from the public interface. As for the roof, the existing 20-degree double pitch roof typology is reinterpreted and reconsidered as a variation on the existing.

In plan, the new building thus steps away from the existing buildings to reveal and frame the important qualities of the existing context. Rounded brick edges, echoing existing brick details on site, introduce entrances on the western facade.

The EPWP Hub is located over the footprint of two heritage workshops that have been demolished since 2014 (Jansen, 2014). This provides an opportunity to expose traces of the lost heritage by remaking the footprints inside the EPWP Hub in the characteristic polished red concrete floor of some of the remaining workshops on-site (Machado, 1976: 49).

The lower edge of the roof of the Electric workshop correlates with the height of the existing building. The new platform between the buildings lifts off the natural ground to meet the height of the existing platforms.

The existing door of the Resource Centre is recessed into the building, similar to the new entrance. This is done to define the interstitial space between the Electric workshop and the Resource centre.

Fig. 10.1 *Organisation of the building*

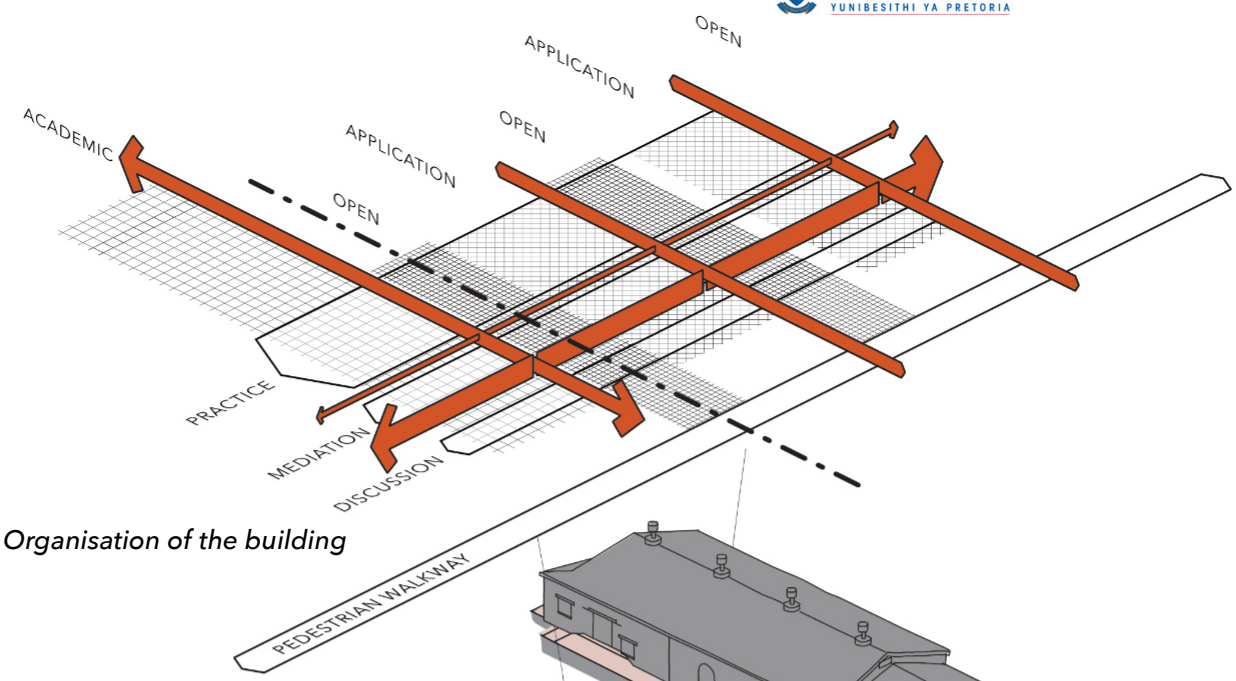


Fig. 10.5 *Organisation of the building*

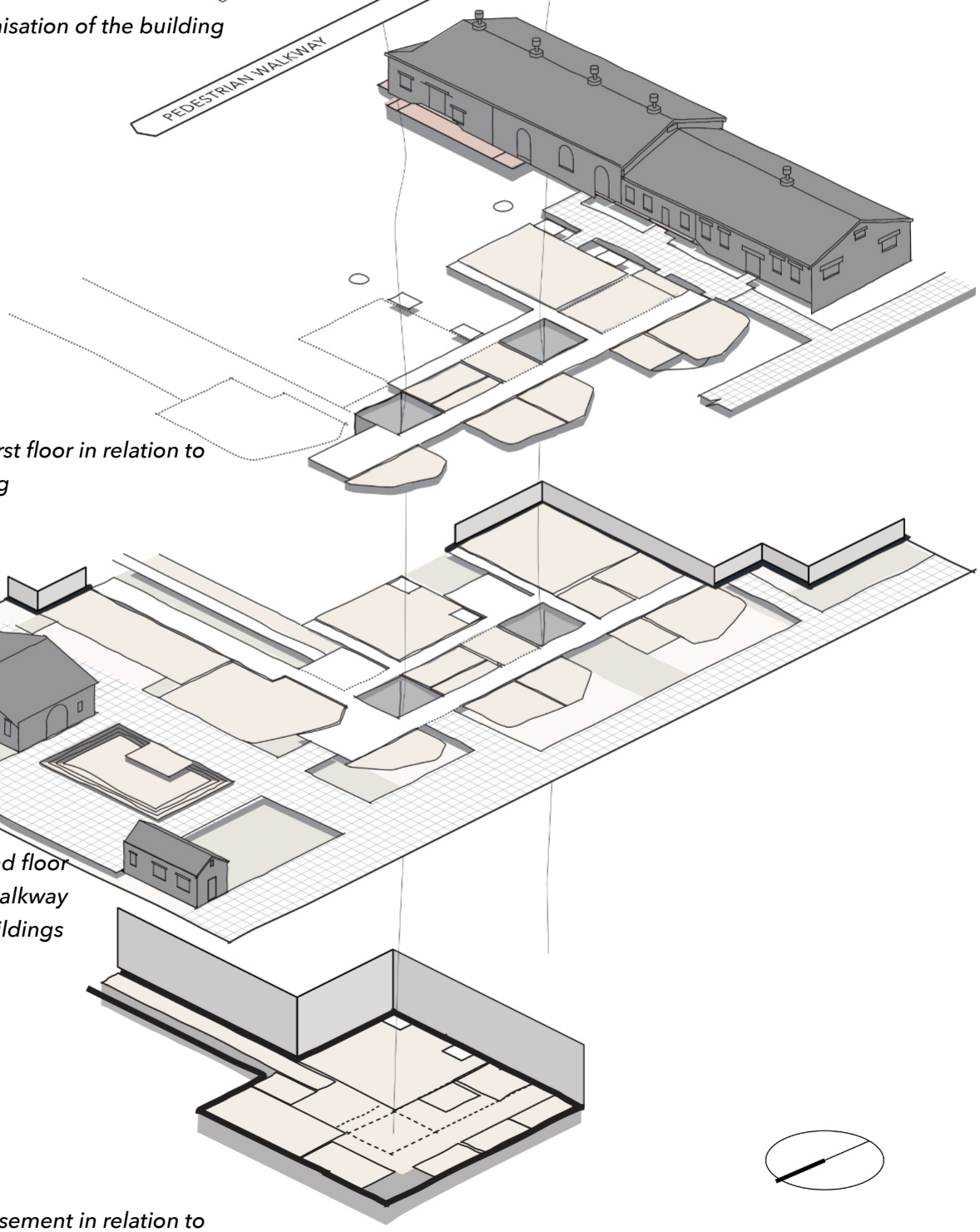


Fig. 10.6 *First floor in relation to existing building*

Fig. 10.7 *Ground floor with public walkway and existing buildings*

Fig. 10.4 *Basement in relation to ground floor*

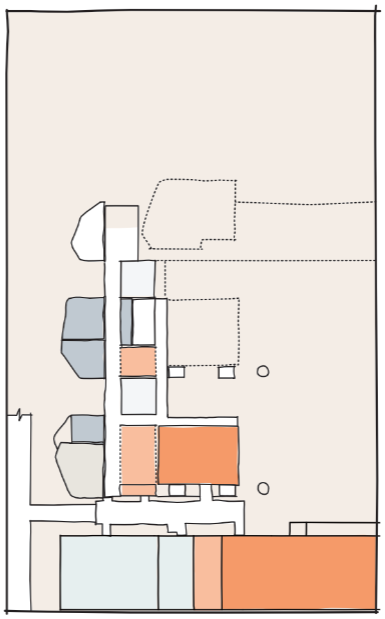


Fig. 10.8 *First Floor Diagram*

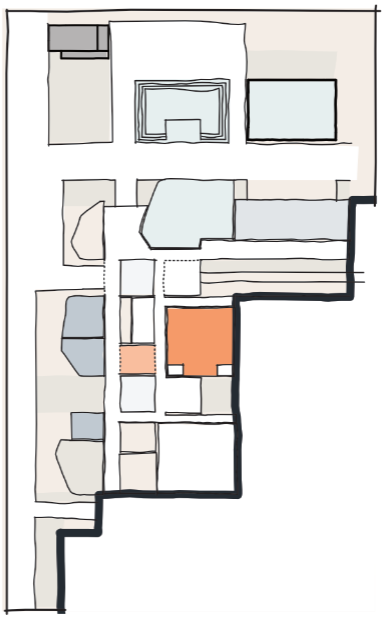


Fig. 10.9 *Ground Floor Diagram (Author 2021)*

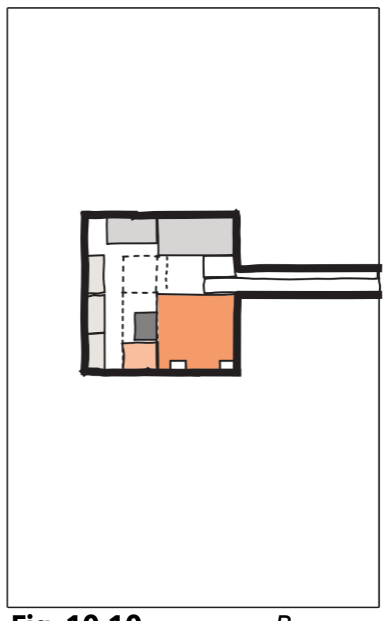


Fig. 10.10 *Basement Diagram*

10.2 BUILDING PROGRAM AND SPATIAL ORGANISATION

Refer to fig. 10.5. The building is organised along with a series of axial zones. The intersections between the axes guide the use of the rooms in that intersection. These zones are informed by the existing heritage on-site and the distance between the public walkway, the new building, and the training yard. The aim is to engage with the public regarding the industrial activities on the site while still maintaining a protected separation between the training activities and the public walkway. The discussion rooms offer an opportunity to serve as this buffer.

Figs 10.6 and 10.7. indicate the atriums and the vertical circulation located where the mediation zone intersects with the open zone. The hierarchy of movement is informed by the two heritage axes: The door of the existing Mechanical workshop (now resource centre) and the remaining gable and concrete column of the hoist of the old Electrical workshop.

The building is a training facility aimed at offering EPWP participants introductory construction skills training and safety practices. The level of training is explicitly targeted for entry-level participants entering government-funded infrastructure projects in the city. Furthermore, the facilities are equipped to carry out short refresher courses in construction, mechanical maintenance, electrical installation and management, both academic and applied.

The three training workshops are equipped to each allow up to thirty participants at a time, depending on the course. (SANS 10400 Part-A) The Electrical training workshop is aimed at familiarising participants with the installation and maintenance of typical electric infrastructure in buildings. The General Construction Workshop trains participants in both dry and wet construction techniques on a rotating basis. The Machinery and Welding Workshop familiarise participants with more dangerous equipment, which tends to be noisier.

The discussion rooms and offices are situated towards the western edge of the building and form the buffer between the public walkway and the Workshops Yard. The director- and staff offices and kitchenette are located on the first floor. The first and ground floors have expandable discussion rooms to accommodate up to 12 participants (Neufert, 1985: 263-293;SANS 10400 Part-A).

The flexible learning spaces both open into the workshops and towards the discussion rooms. If more floor area for the workshops is required, the flexible learning spaces can be adapted to accommodate the expansion. Similarly, discussions with larger audiences are held, the discussion rooms can spill into the flexible learning spaces. The spaces can also house exhibits of projects or demonstrations of craft development (Neufert,1985: 191-193).

The change rooms are located underneath the Electric Training Workshop. This includes showers and lockers, with the PPE store located next to the change room. Lightwells allow light to wash the pause spaces between the showers and locker rooms, naturally illuminating the change rooms without allowing the public to intrude on the participants' privacy.

The northern section of the building is dedicated to academic training. The lecture hall can accommodate 120 participants (SANS 10400 Part-A), including eight accessible seats, as per EPWP's intent to accommodate higher recruitment of people with disabilities. In addition, the large sliding door of the lecture hall opens into the public amphitheatre to expand the learning space rapidly. It also provides access to demonstrations showcased outside.

When the doors are opened, the courtyard between the lecture hall and the General Construction workshop serves as a vestibule to the lecture hall.

The participant breakaway room is intended for participants to rest between practical courses. It accommodates a small tuck shop and kitchenette, with refrigeration for meals. Participants are encouraged to make use of the food court across from the EPWP Hub.

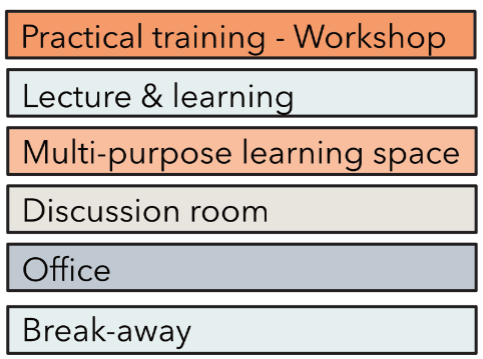
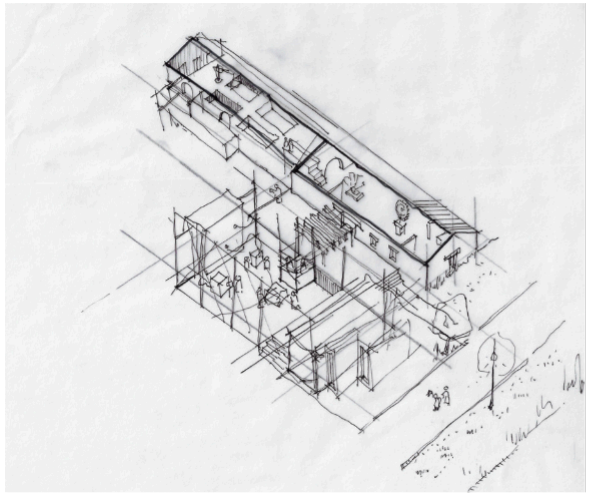


Fig. 10.11 *Programmatic key for the diagrams*



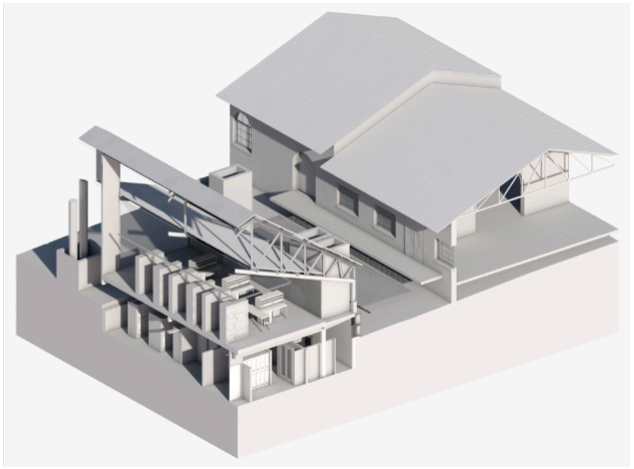
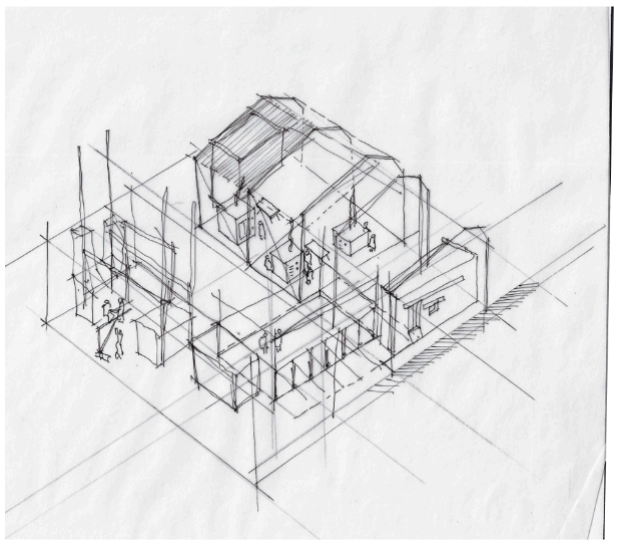


Fig. 10.12 *electric training workshop - resource centre - discussion rooms - change rooms - public viewing spaces - multi-purpose expandable workshop space - PPE store.*



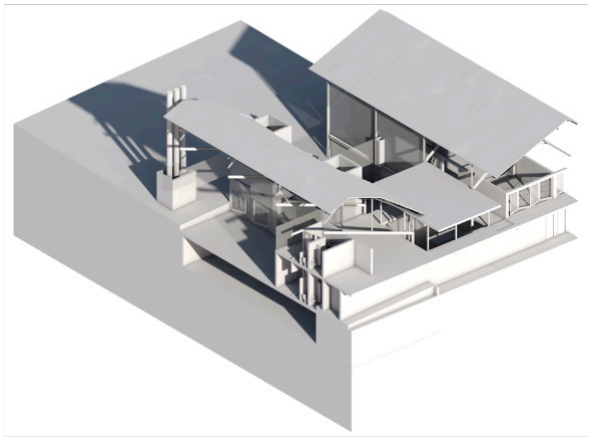
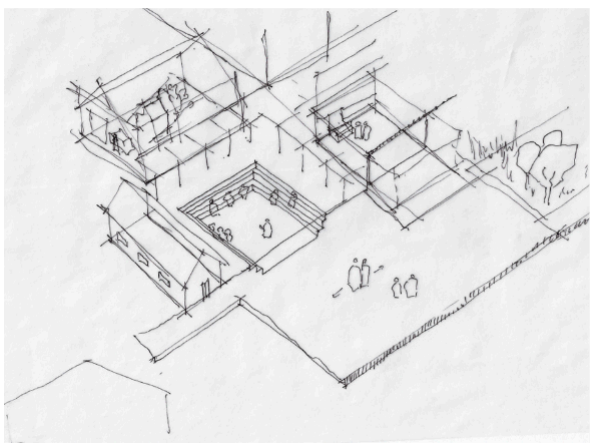


Fig. 10.13 *general training workshop - welding and assembly workshop - atrium - discussion rooms offices - public viewing spaces - multi-purpose expandable workshop space - store rooms - bathrooms*



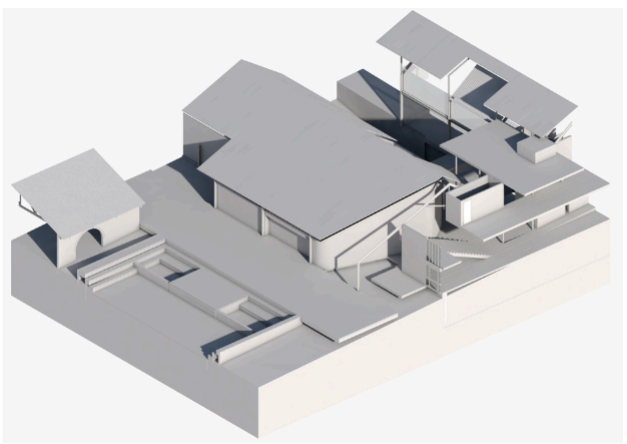


Fig. 10.14 *public pedestrian route - entrance - reception - public amphi - demonstration spaces - lecture hall - participant breakaway spaces - offices - public viewing spaces*

10.3 MOMENTS OF RECOLLECTION

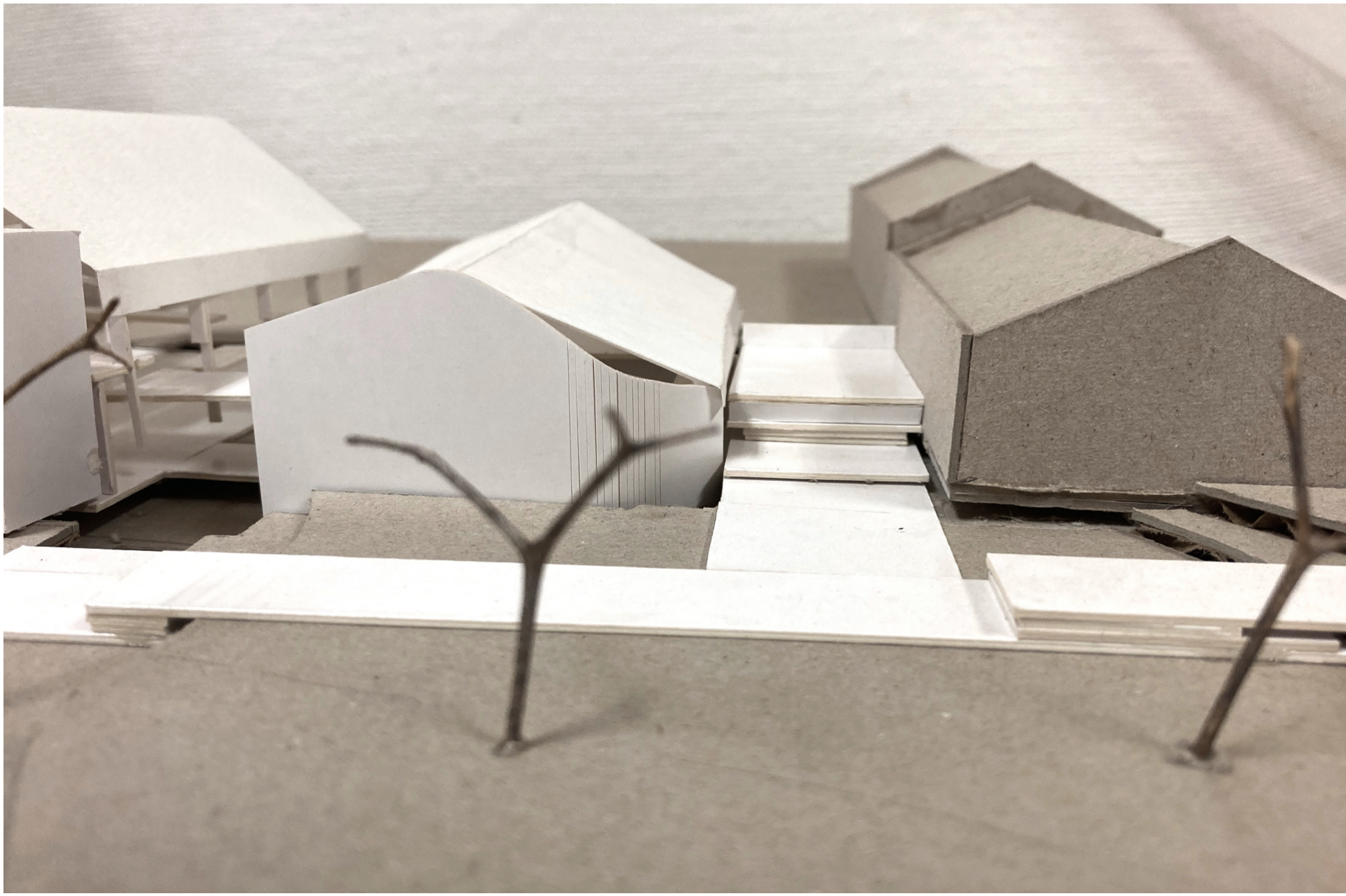


Fig. 10.15 *Maquette showing the connection between the old and new*

11. MAKING

11.1 TECHNOLOGICAL REASONING

Tectonics

The approach to the tectonics of the project is understood through Semper's elements; the earthwork, the hearth, the frame and roof, and the light enclosing membrane (Frampton, 1995: 5), where the hearths are analogous for the light wells and the chimneys. As illustrated in Fig.11.1, the frame and roof structure folds over the enclosing brick building below it. The enclosing brick building, in turn, transitions to protecting the building from the western sun. The roof structure becomes the workshop space.

Modules

Furthermore, the use of repeatable and standard structures and materials not only contributes to the resilience of the techne (Peres 2016: 178) but also responds to the findings of the statement of value. The use of a repeated module (Ibid.) that is adapted to suit the varying requirements is evident on various scales. On a building scale, the new workshops are conceptually adapted standard modules to the existing buildings on site. The portal frame designed for the workshops is repeated throughout the project. Custom extensions to the steel portal frames are added to allow light to enter the building in various ways. The openings in the western facade are defined using exposed standard precast lintels.

Standard factory steel frame windows are used in the workshop roof lights. The 'mentis' grating walkways celebrate the pragmatic use of the material in industrial settings.

Participants as craftsmen

The cooperation between the craftsman and the machine (Wright 1901) is valued in the construction of the building by EPWP participants. As the building is in itself a government project, the construction of the EPWP Hub will be in itself a training opportunity (Department of Public Works and Infrastructure 2021:5).

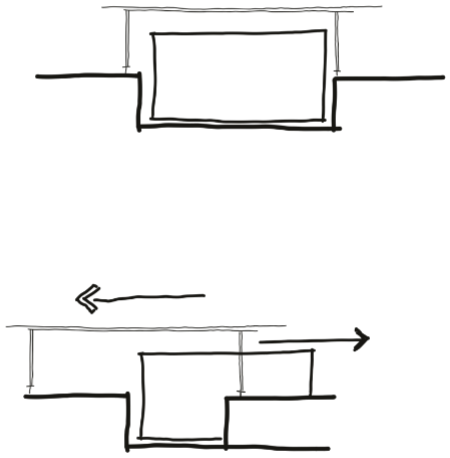


Fig. 11.2 *Technological parti illustrating the separation of the earthwork, the frame and roof, and the enclosing membrane*

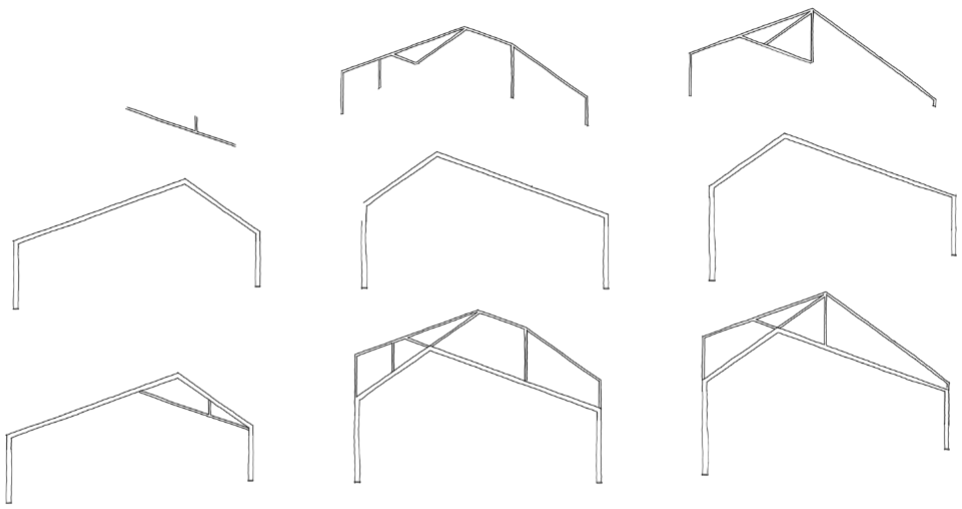


Fig. 11.3 *Technological parti illustrating the separation of the earthwork, the frame and roof, and the enclosing membrane*

Fig. 11.1 *Development of technological section*

11.2 ITERATIONS

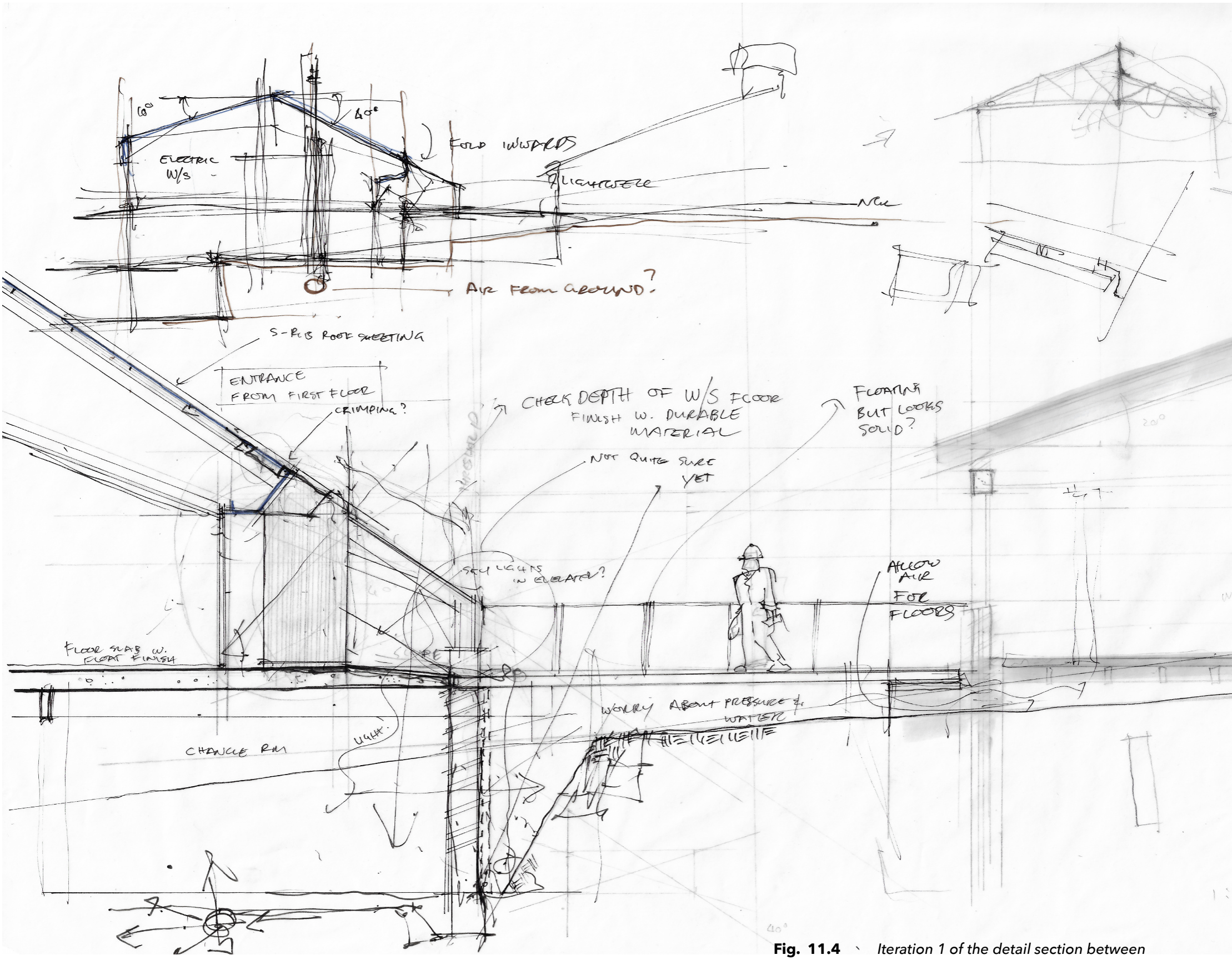


Fig. 11.4 *Iteration 1 of the detail section between the existing building and the new workshops*

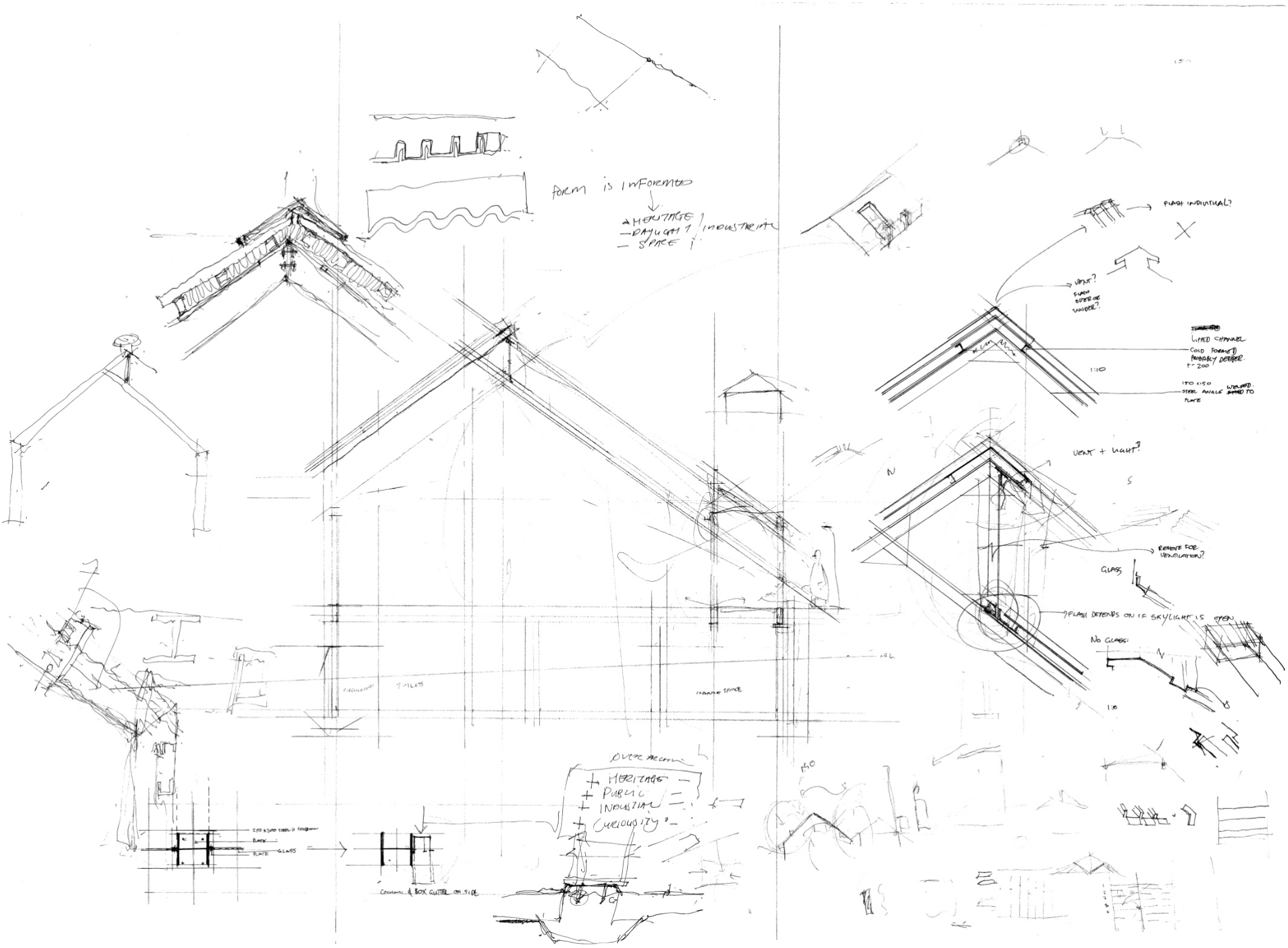
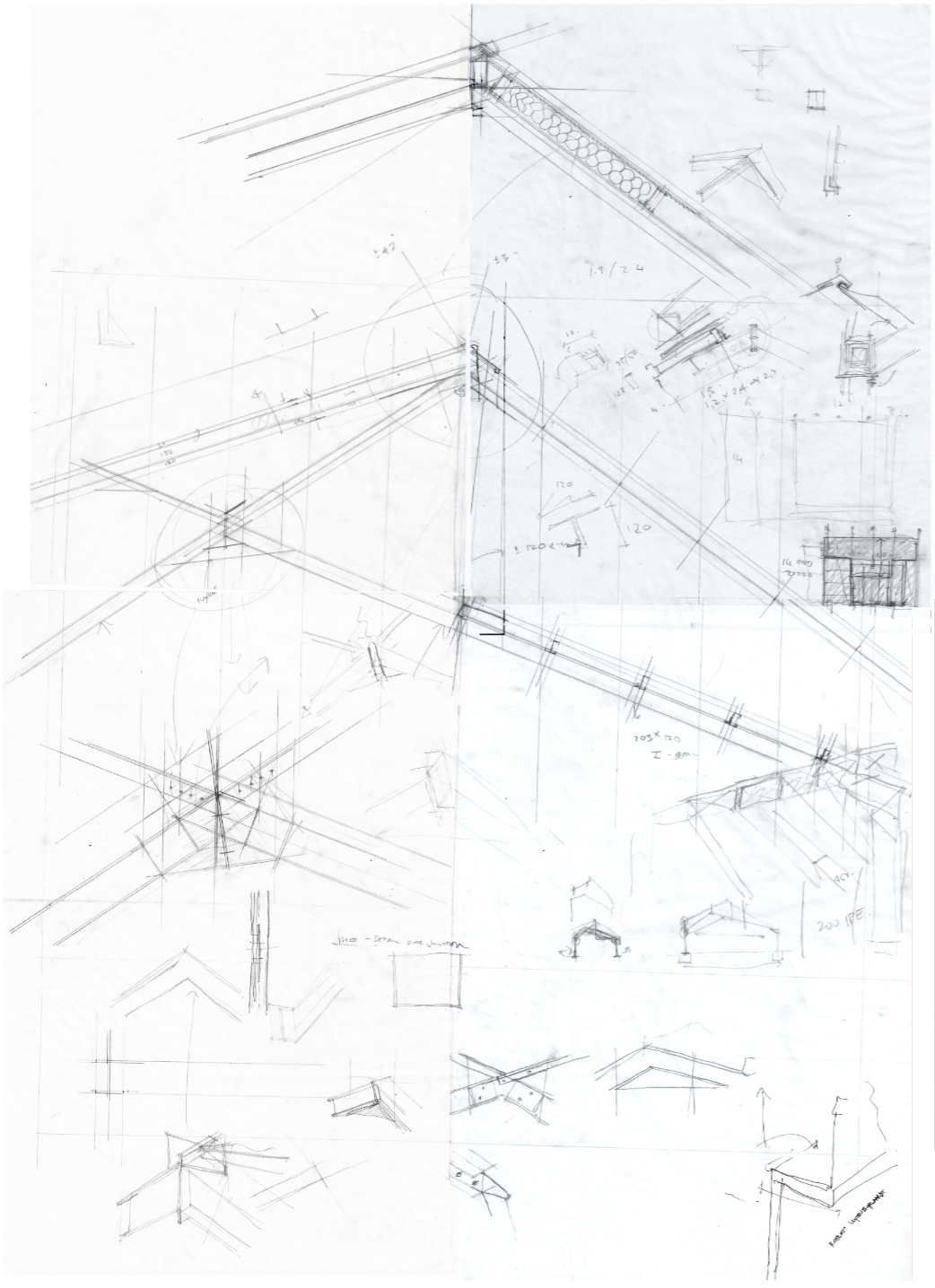


Fig. 11.5 *Development of steel connections in the portal frame*

11.2 ITERATIONS



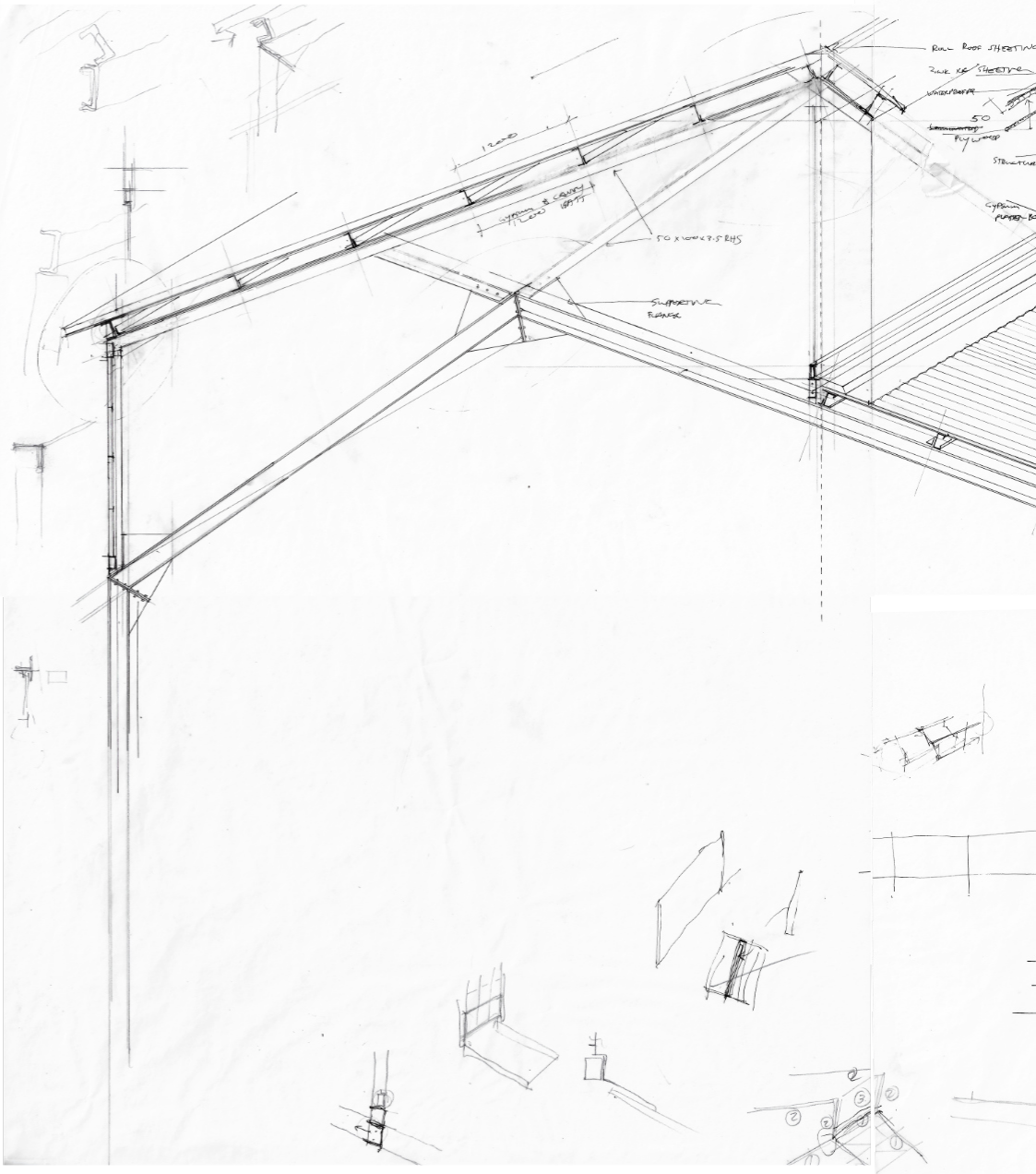


Fig. 11.6 *Iteration 3 of the detail section between the existing building and the new workshops*

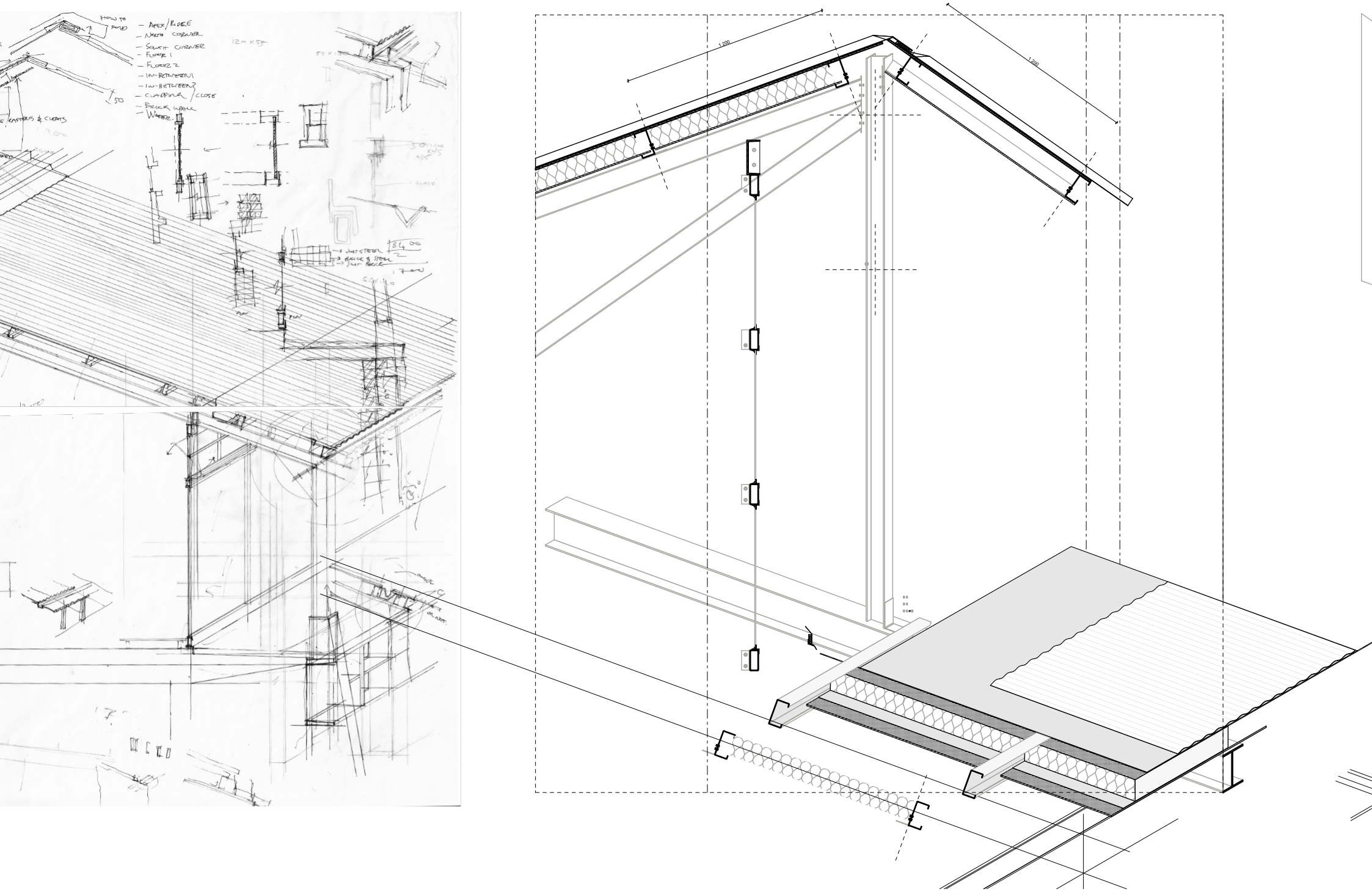


Fig. 11.7 *Iteration 4*

11.3 INHERITED TECHNOLOGIES

The brick screens are inspired by the English bond present on the site. The aim is to reinterpret the bond as a translucent screen. The bricks are sourced from demolition projects in the city.

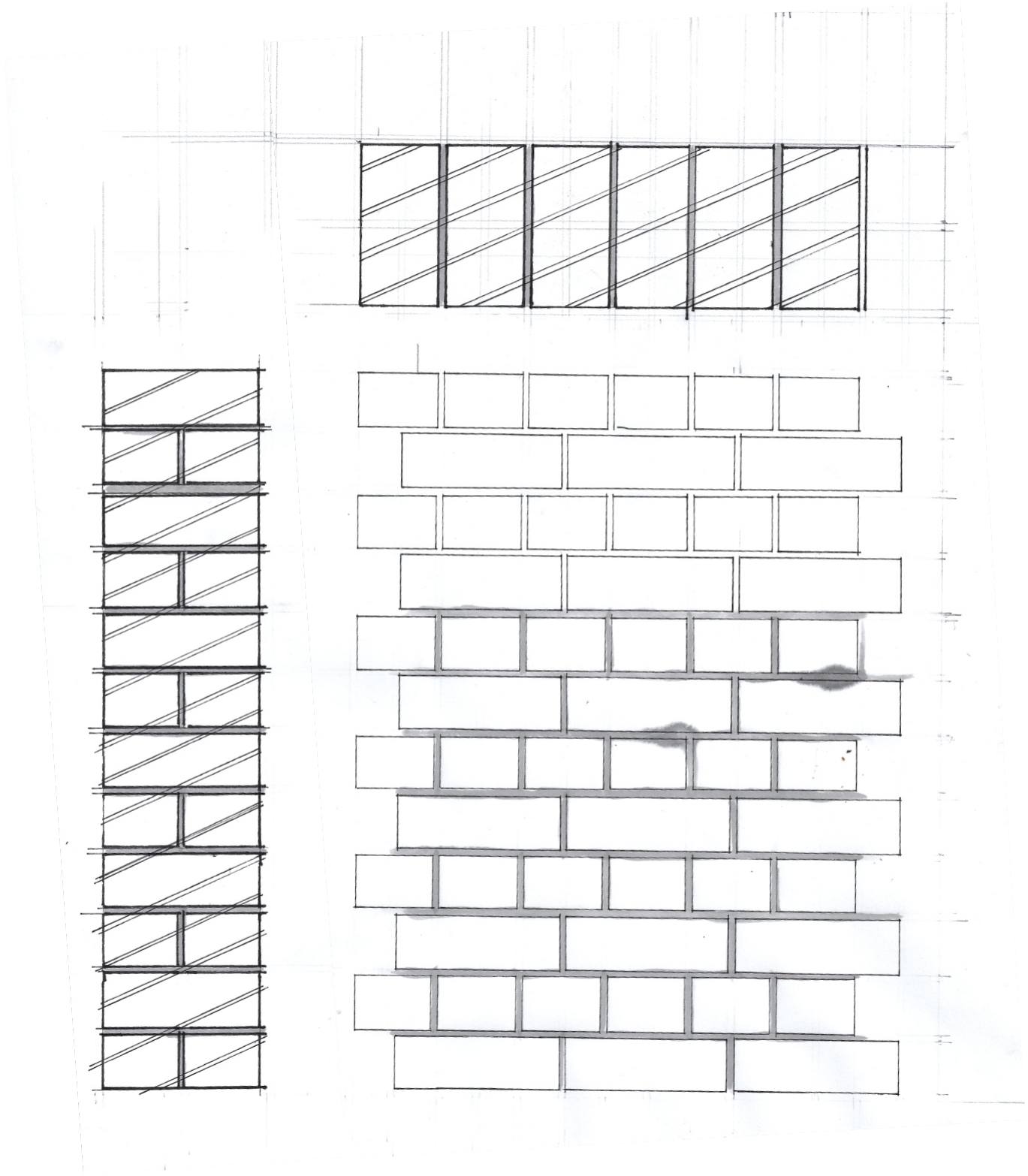


Fig. 11.8 *Section, elevation and plan of existing english bond of the majority of buildings on site*

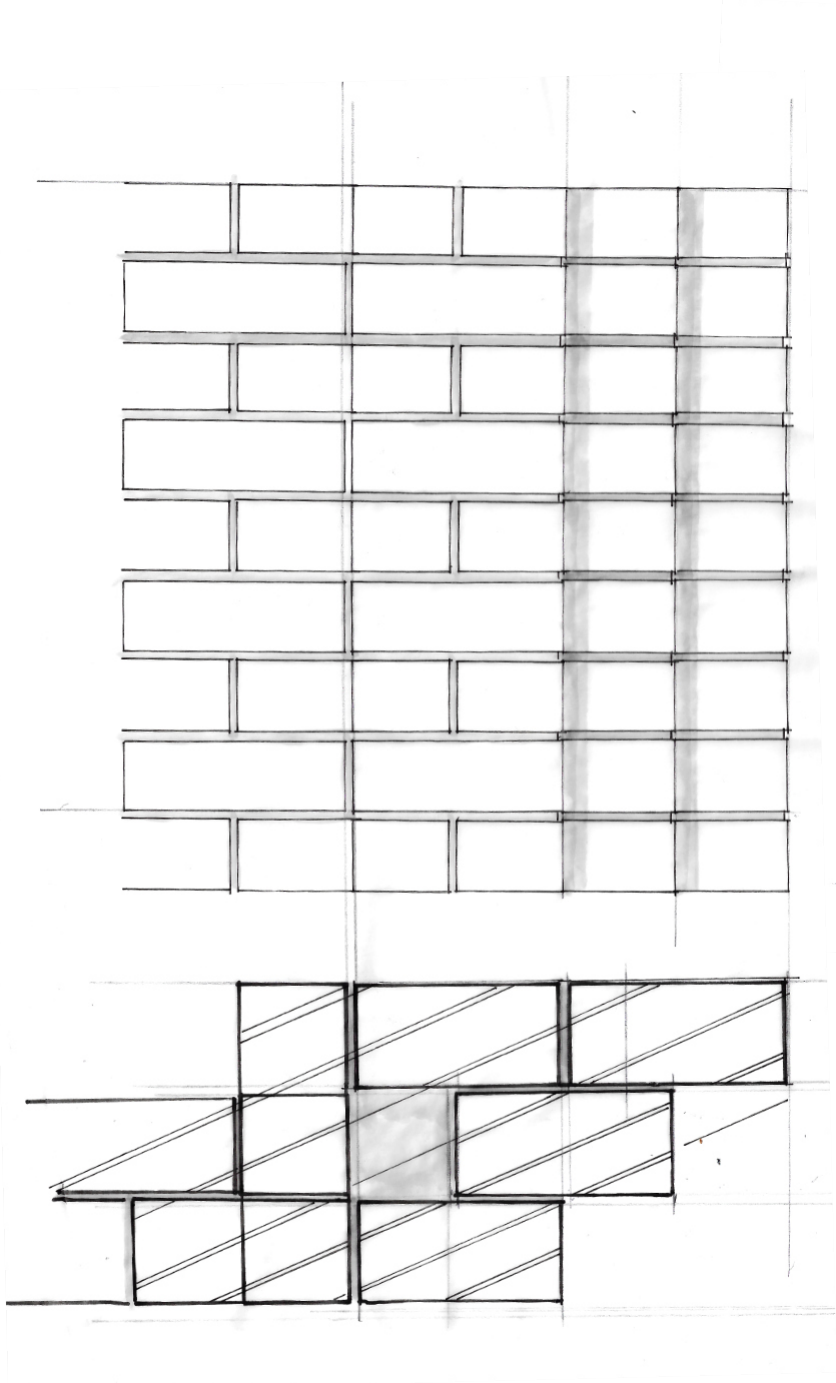


Fig. 11.9 *Plan and elevation of the connection between the wall and the screen*

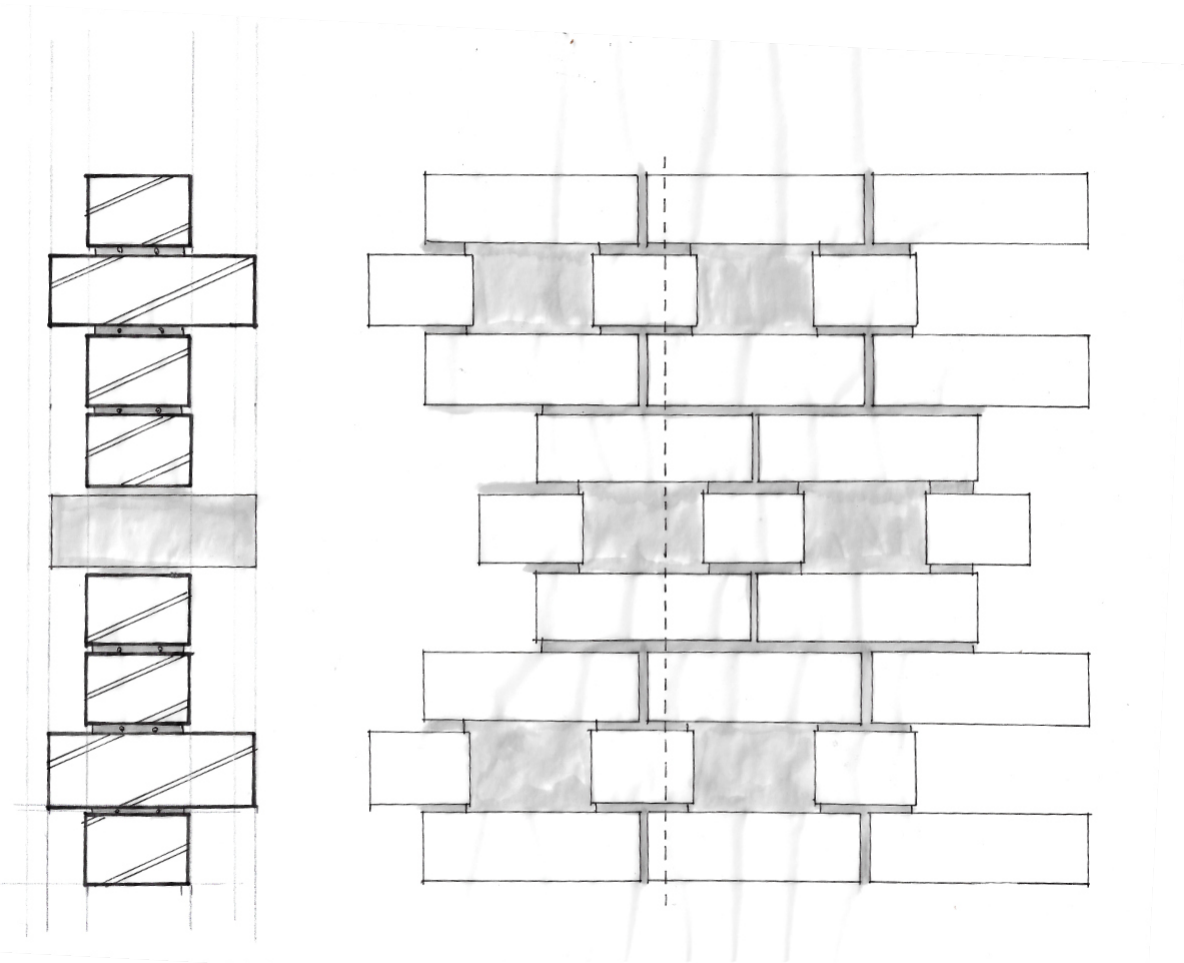


Fig. 11.10 *Section and elevation of the developed brick screen with protruding bricks*

11.5 DAYLIGHT (ENVIRONMENTAL STRATEGY)

Sun Angles

The western edge of the building is exposed to significant afternoon sun that is addressed through shading devices and minimising the size of openings. Where openings occur, vertical shading devices are implemented in front of it, or the openings are deep-set within thick walls (Ching and Shapiro, 2019).

Illuminance

The Daylight Factor, or DF, describes the quality of light inside a space. The DF is influenced by the shape of the opening. An irregular DF creates an uncomfortable working environment, which can result from tall, narrow windows. Wide windows evenly distribute the illuminance over the area (Ching and Shapiro, 2019). The recommended average DF for workshop spaces is 5%, with a minimum of 2,5% (Neufert, 1984:32).

The size of the roof light in the workshop is partially determined by the required DF in the workshop. The intent is to achieve a consistent internal illuminance to minimise the required electric lighting inside the building.

SEFAIRA Iterations

Baseline (fig. 11.11): the first iteration is used as a baseline to compare the following iterations. The goal is to have a working environment of 500 lux throughout the year. Furthermore, the intention is to have an even distribution of light throughout the building, with a DF between 2.5% and 5%.

Iteration 1 (Fig. 11.13): the windows on the eastern edges are removed and the shape of the middle roof is adapted. However, this resulted in an undesired DF between 1% and 3,39%.

Iteration 2 (Fig. 11.15): some external shading is added. The shading devices (roof overhangs) addresses the overlit quality inside, but it also reduces the DF.

Iteration 3 (Fig. 11.16): Clerestory windows on the northern and southern elevation, with light shelves, improve the DF in addition to the even distribution of light inside.

SBAT Rating

The building has achieved an SBAT rating of 4.1, scoring high in the categories of transport, social cohesion, education, access to a local economy and services and product. Water consumption is partially alleviated with a water harvesting system. Bio-swales on site capture the runoff off the parking and walkways, which is used to irrigate the park.

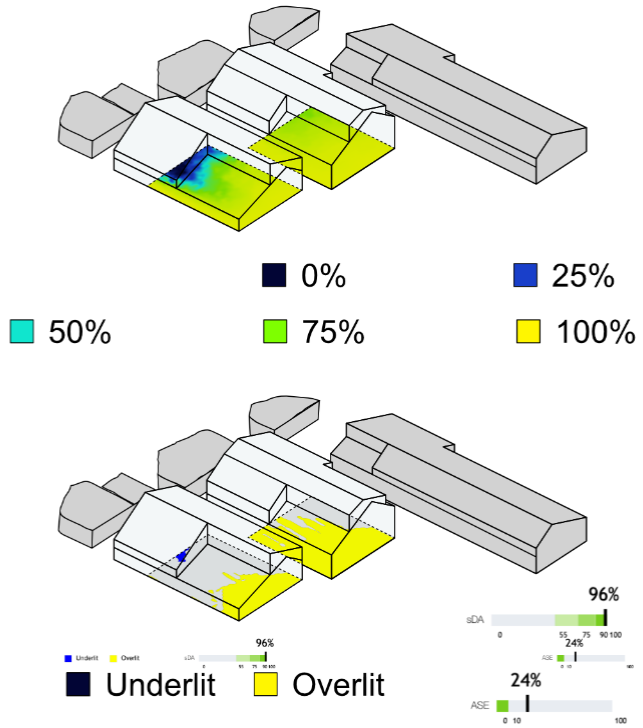


Fig. 11.11 *Baseline*

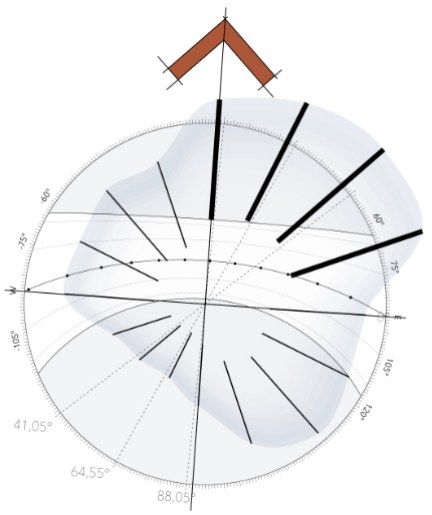


Fig. 11.12 *Wind rose and sun angle*

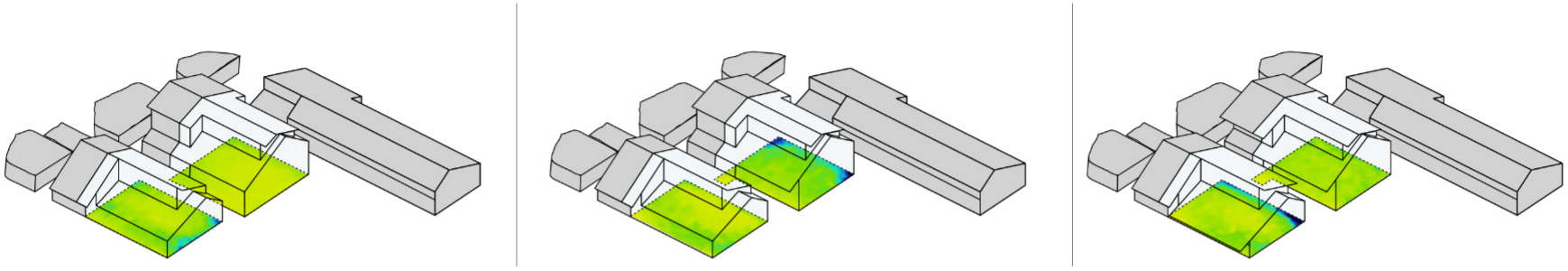


Fig. 11.13 *Daylighting iteration 1*

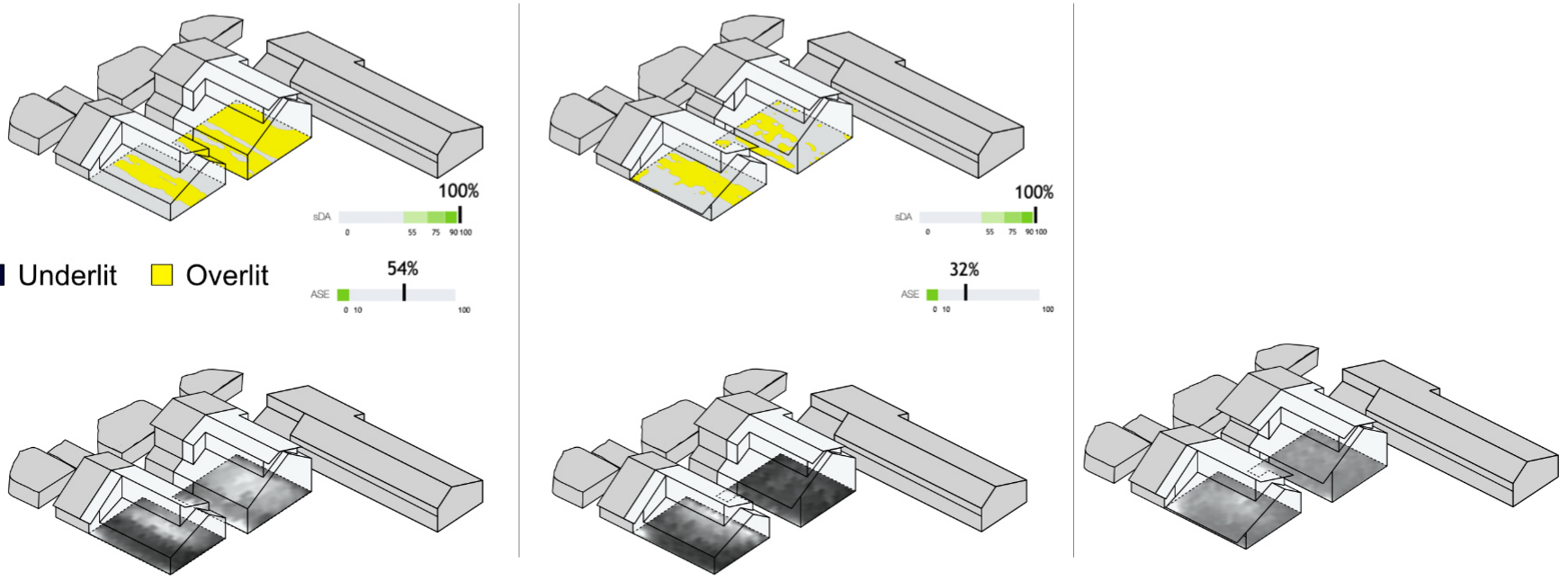


Fig. 11.15 *Daylighting iteration 2*

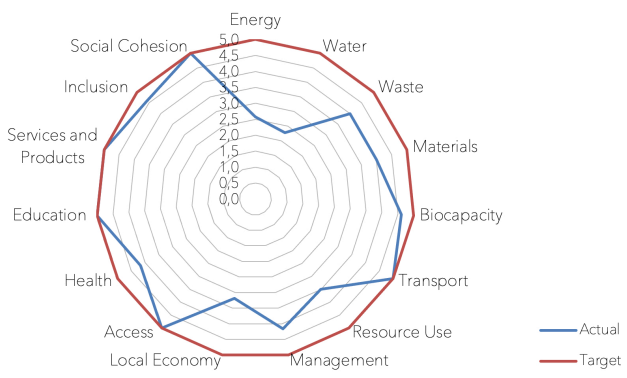


Fig. 11.14 *SBAT rating*

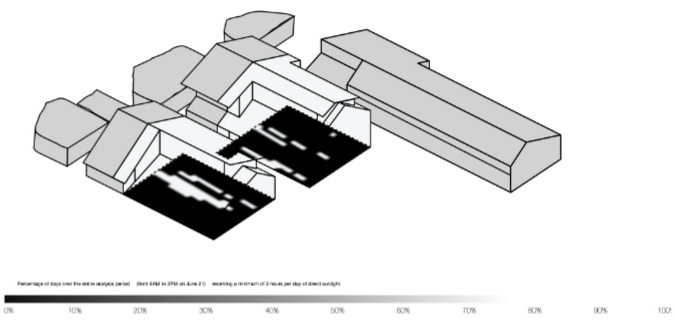


Fig. 11.16 *Daylighting iteration 3*

11.5 WATER

The water captured by the roofs of the Extended Works training hub is used by the participants for training. The training includes the mixing of binding materials, the making of structures, the testing of waterproof efficacy and the cleaning of surfaces. The current site has an average annual rainfall-runoff of 537,4 kℓ. The roofs of the Extended Public Works Training Hub have the potential of harvesting 1 780,3 kℓ. annually. (Refer to Fig. 11.18).

The roofs of the workshops, the interstitial spaces, and the training yard can harvest 1 773,8 kℓ annually, calculated as per SANS 10400 Part-R. This is used to supplement the activities in the wet construction training workshop. Between April and September, the wet construction activities rely entirely on the municipal water supply. Thus less water-intensive training courses are scheduled during this time of the year, as shown in Fig. 11.18-19

Refer to Fig. 11.17. The harvested water from the workshop roofs is stored in two 15 000ℓ elevated water tanks with two additional 20 000ℓ storage tanks underground.

The water captured by the roofs of the seminar spaces,101,2 kℓ annually, will feed to the bio-swales on-site, which irrigates the park.

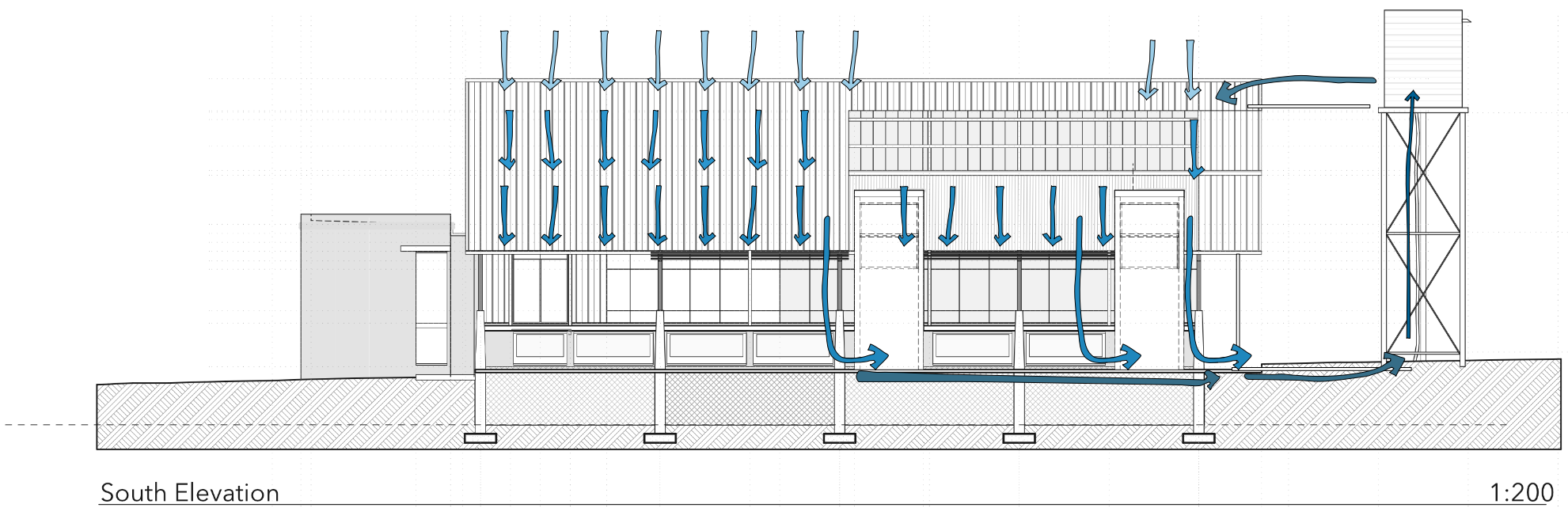


Fig. 11.17 *Daylighting iteration 1*

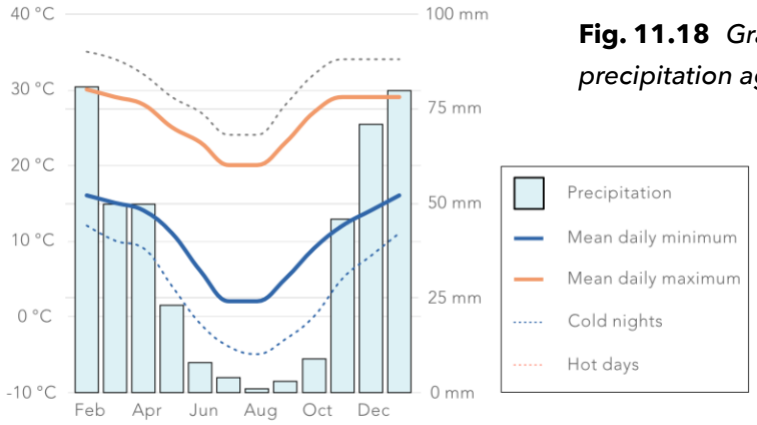


Fig. 11.18 *Graph depicting precipitation against temperature*

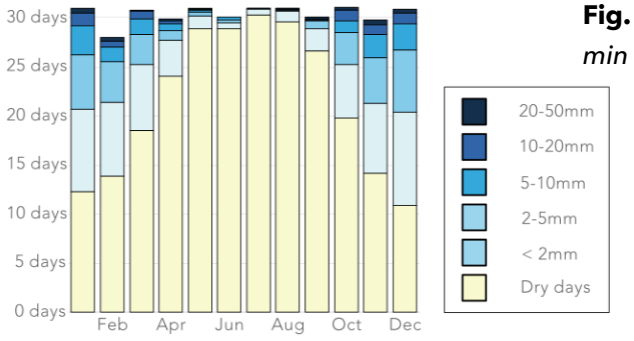


Fig. 11.19 *Graph depicting annual min and max precipitation*

	AVERAGE RAINFALL (mm)	AREA THE SITE (M2)	RUNOFF COEFFICIENT	TOTAL k
January	154	21900	0,6	2 023 560
February	75	21900	0,6	985 500
March	82	21900	0,6	1 077 480
April	51	21900	0,6	670 140
May	13	21900	0,6	170 820
June	7	21900	0,6	91 980
July	3	21900	0,6	39 420
August	6	21900	0,6	78 840
September	22	21900	0,6	289 080
October	71	21900	0,6	932 940
November	98	21900	0,6	1 287 720
December	150	21900	0,6	1 971 000
Average annual runoff	732	1224	0,6	537 406
of site Total Runoff				9 015 480

Fig. 11.20 *Table with potential annual rainfall on the site*

	AVERAGE RAINFALL (mm)	AREA OF ROOFS WORKSHOPS (M2)	SEMINAR SPACES (M2)	INTERSTITIAL SPACES (M2)	PAVEMENT (M2)	RUNOFF COEFFICIENT	TOTAL (Kℓ)
January	154	1224	154	145	1325	0,9	374, 539
February	75	1224	154	145	1325	0,9	182, 405
March	82	1224	154	145	1325	0,9	199, 430
April	51	1224	154	145	1325	0,9	124, 036
May	13	1224	154	145	1325	0,9	31, 617
June	7	1224	154	145	1325	0,9	17, 024
July	3	1224	154	145	1325	0,9	7, 296
August	6	1224	154	145	1325	0,9	14, 592
September	22	1224	154	145	1325	0,9	53, 506
October	71	1224	154	145	1325	0,9	172, 677
November	98	1224	154	145	1325	0,9	238, 343
December	150	1224	154	145	1325	0,9	364, 811
Average Rainfall Runoff of areas	732	1224 806110	154 101157	145 95660	1325,2 873009	0,9	1 780, 275

Fig. 11.21 *Table with potential average rainfall collectable from the EPWP Hub roofs*

WORKSHOP ROOFS

SUMMER RAINFALL = 140 MM2 PER M2 ROOF PLAN AREA SERVED

	WORKSHOPS ROOF AREA (M2)	INTERNAL CROSS SECTIONAL AREA (MM2)	DIAMETER FOR DESIGN GUIDANCE (MM)
ROOF 1	85,5	11970,0	123
ROOF 2	85,5	11970,0	123
ROOF 3	171,1	23954,1	175
ROOF 4	85,5	11970,0	123
ROOF 5	85,5	11970,0	123
ROOF 6	31,3	4382,0	75
ROOF 7	111,5	15610,0	141
ROOF 8	396,5	55506,5	266
TOTAL AREAS	1223,6	171304,4	467

Fig. 11.22 *Table calculating the min diameter for gutters and dwownpipes for the workshop roofs*

FLAT ROOFS

SUMMER RAINFALL = 140 MM2 PER M2 ROOF PLAN AREA SERVED

	WORKSHOPS ROOF AREA (M2)	INTERNAL CROSS SECTIONAL AREA (MM2)	DIAMETER FOR DESIGN GUIDANCE (MM)
Flat roof 1	43,1	6028,4	88
Flat roof 2	43,1	6030,5	88
Flat roof 3	67,4	9437,7	110
Flat roof 4	72,6	10164,3	114
Flat roof 5	72,6	10164,3	114
TOTAL AREAS	298,8	41825,1	231

Fig. 11.23 *Table calculating the min diameter for gutters and dwownpipes for the flat roofs*

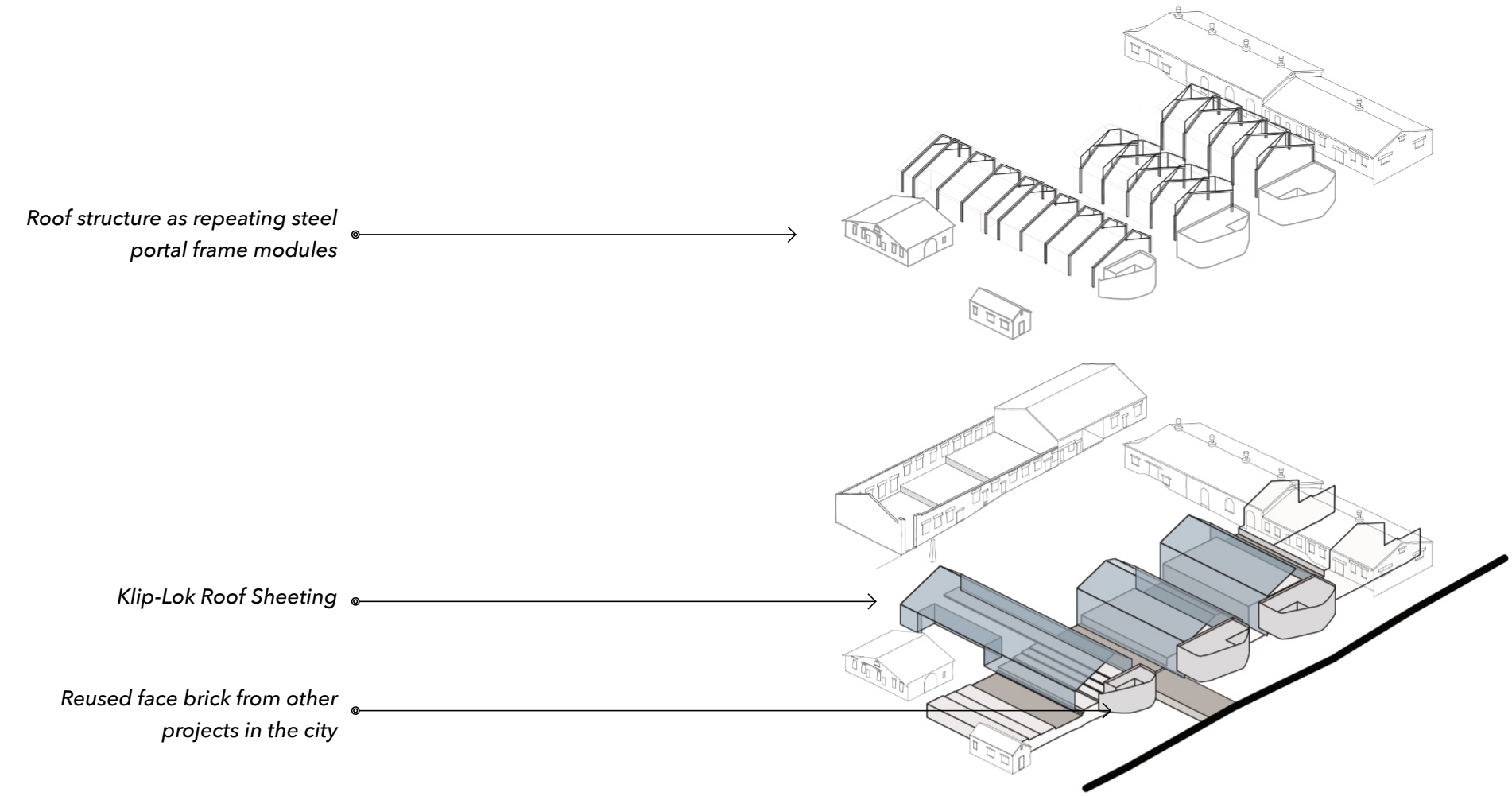


Fig. 11.24 *The assembly of the workshops and their parts*

12. ASSEMBLY

The excavation

Historically the landscape has been reshaped multiple times. This includes the recent removal of almost all external hard surfaces and soil platforms prepared for further site development as proposed in the 2014 HIA (Jansen, 2014). Thus further excavations and changes to the landscape would unearth the traces of the demolished workshops.

Due to stonemasonry activities, remnants of sandstone, granite and quartzite have been identified on the site (Ibid.: 23).

These remnants, along with broken bricks and quartzite foundation stones found in the excavation, are collected. The collected material is used as a mosaic in the atriums. Face bricks from ongoing demolitions in the city are reused on the western facade. The excavated soil is repurposed to create the platform for the workshop yard.

Structure

Concrete columns support the workshop floors. The steel portal frame system functions independently as a structure over the concrete floors of the workshops and seminar space. The face brick walls serve as infill for the concrete frame structure of the seminar spaces. The tanked basement is constructed using concrete blocks, with an access ramp towards the workshop yard.

New and old modules

The steel portal frame module repeated throughout the project is designed to accommodate adaptations to the profile. This reduces waste in custom manufacturing. The secondary structure comprises steel T-sections.

Where roof lights puncture the roof, the roof sheeting used is recycled corrugated steel sheets to correspond with the existing roofs on-site (Wegelin, 2009: 187-195, 226, 237).

The brick screens on the western elevation are built using recycled red face brick from demolitions of buildings with some heritage value. An English bond is used in the southern portion. This transition to a stretcher occurs farther from an existing workshop.

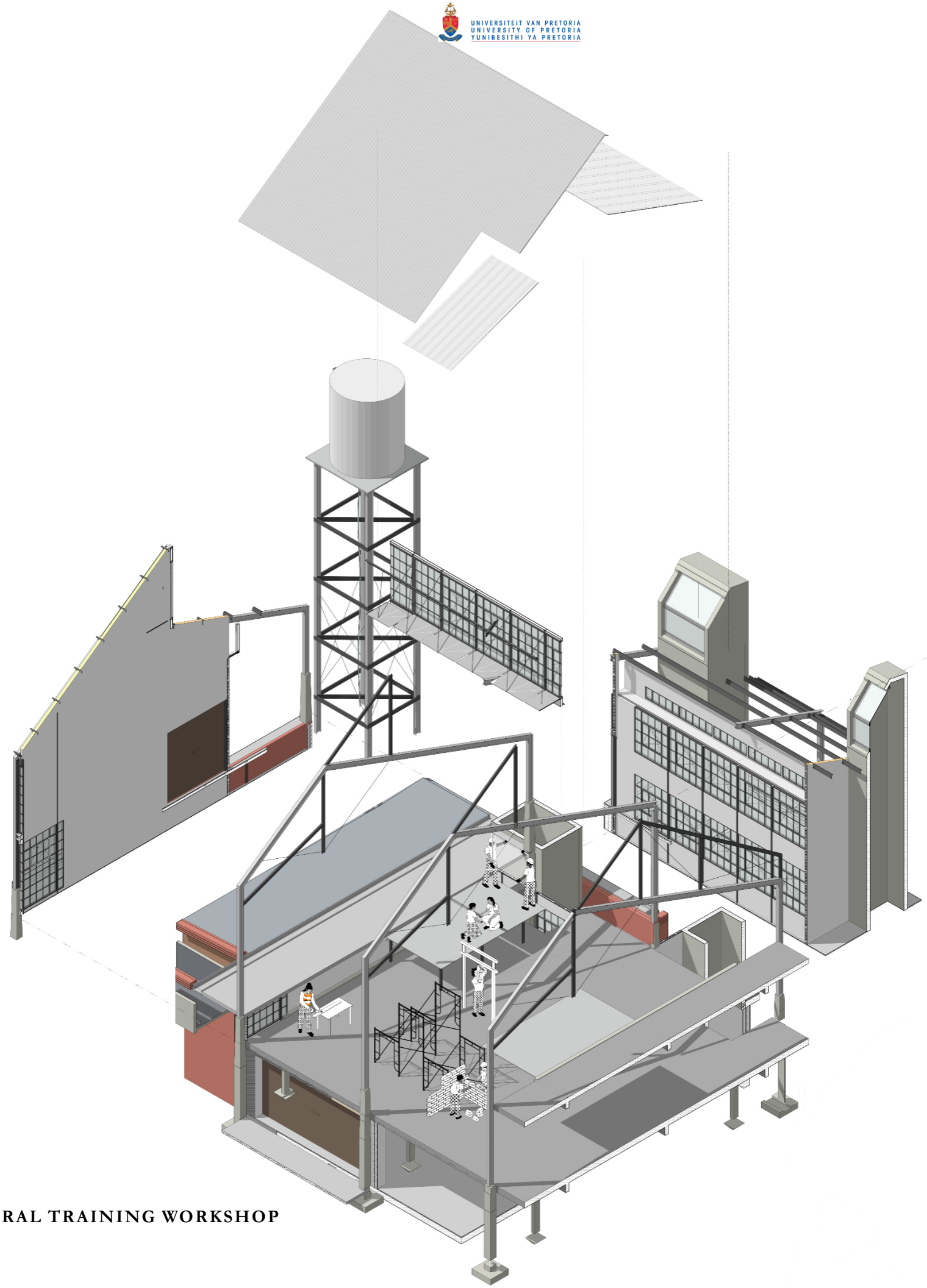
The concrete beams over the new windows in brick walls are exposed. The beam extends to the brick screen and acts as a supporting structure. Precast concrete window modules are used as high windows for the basement and change rooms.

The atriums

The atriums allow for double volume spaces as well as vertical circulation. The floor is finished with a polished rubble aggregate and mosaic pieces comprising of the remnants of sandstone, granite and quartzite on the site. Since these spaces are designed for people instead of machinery, the floor will not wear down as fast as in the workshops.

The roof

The columns extend from the retaining wall. The steel portal frame is fixed to the extended concrete column. This design references the remaining concrete columns of the hoisting equipment still present on site.



GENERAL TRAINING WORKSHOP

PLAN AND AXONOMETRIC

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Amphi
A: 177 m²

EX. STONEMASON'S WORKSHOP
A: 157 m²

LECTURE HALL
A: 136 m²

SOUND LOBBY
A: 14 m²

AV Rm
A: 10 m²

STUDENT LOUNGE
A: 115 m²

ATRIUM
A: 41 m²

MILL SPACE
A: 41 m²

HELP DESK
A: 6 m²

FEM BATHRM
A: 12 m²

SHARED OFFICE
A: 21 m²

STORE
A: 12 m²

CONSTRUCTION WS
A: 133 m²

MALE BATHRM
A: 12 m²

BIC
A: 2 m²

DISCUSS
A: 28 m²

MULTI PURPOSE
A: 49 m²

WELL
A: 3 m²

WELL
A: 3 m²

ATRIUM
A: 41 m²

S-02

Mill Space
A: 41 m²

SUPPLIES
A: 9 m²

SAFETY DEMONSTRATION
A: 37 m²

F BATH & CHANGE
A: 95 m²

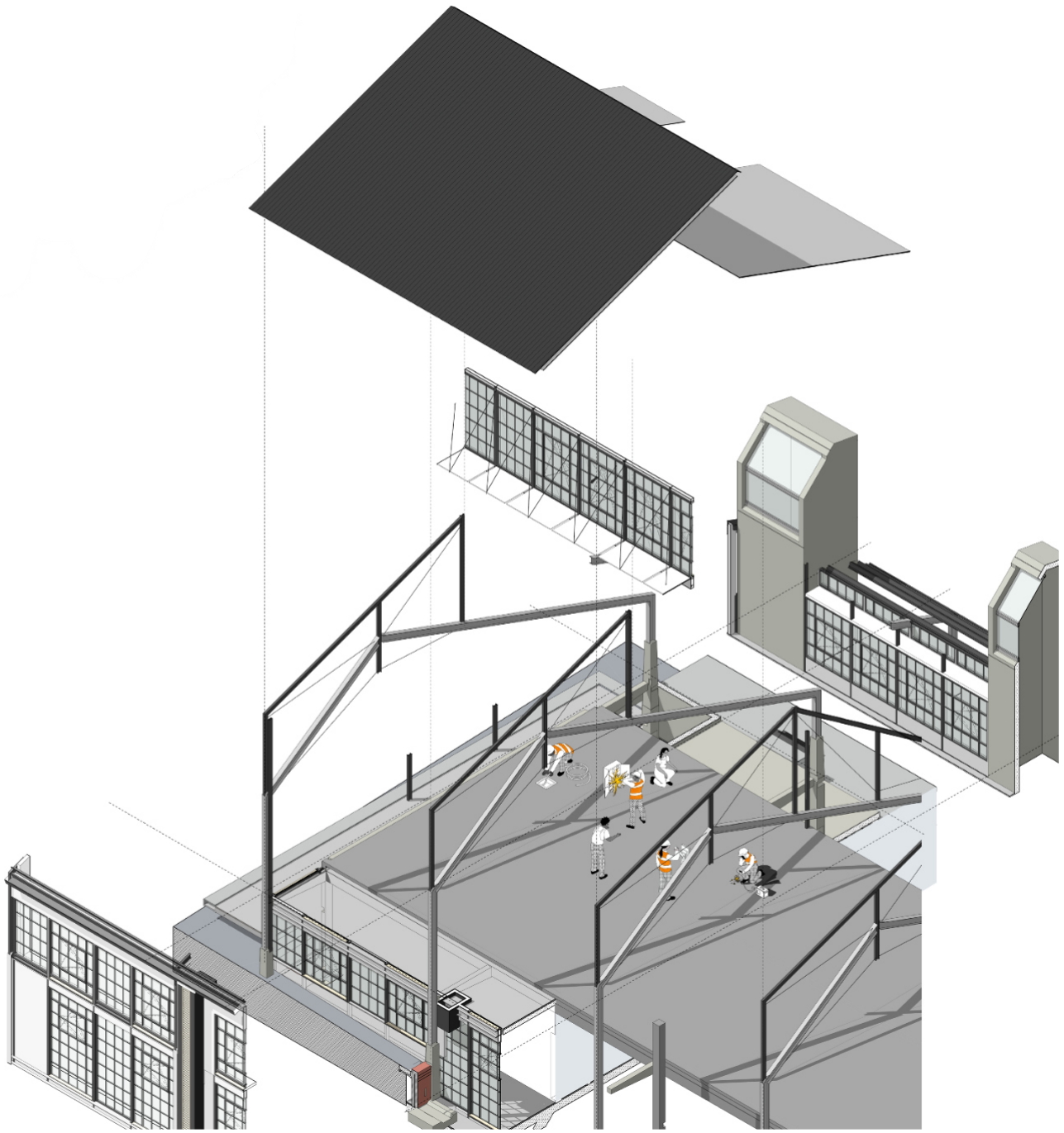
STORE
A: 3 m²

M BATH & CHANGE
A: 99 m²

PPE STORE
A: 34 m²

SUPPLIES
A: 7 m²

GROUND FLOOR PLAN 1:250



ELECTRIC TRAINING WORKSHOP

PLAN AND AXONOMETRIC

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

SUPERVISOR'S OFFICE
A: 22 m²

FEM BATHRM
A: 13 m²

KITCHENETTE
A: 9 m²

VIEWING DECK
A: 11 m²

SUPPLIES
A: 6 m²

FEM BATHRM
A: 12 m²

OFFICE
A: 11 m²

SHAREDOFFICE
A: 14 m²

EXHIBITION SPACE
A: 33 m²

ATRIUM
A: 41 m²

S.02

SPECIAL TOOL STORE
A: 12 m²

MATERIALS STORE
13 m²

ELECTRIC WS
A: 145 m²

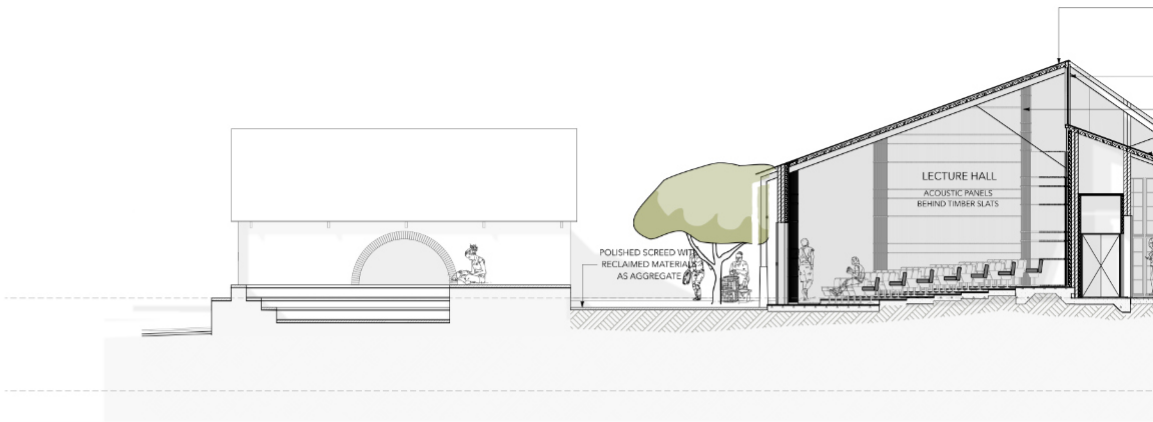
LARGE DISCUSSION SPACE
A: 71 m²

MULTI-PURPOSE
A: 52 m²

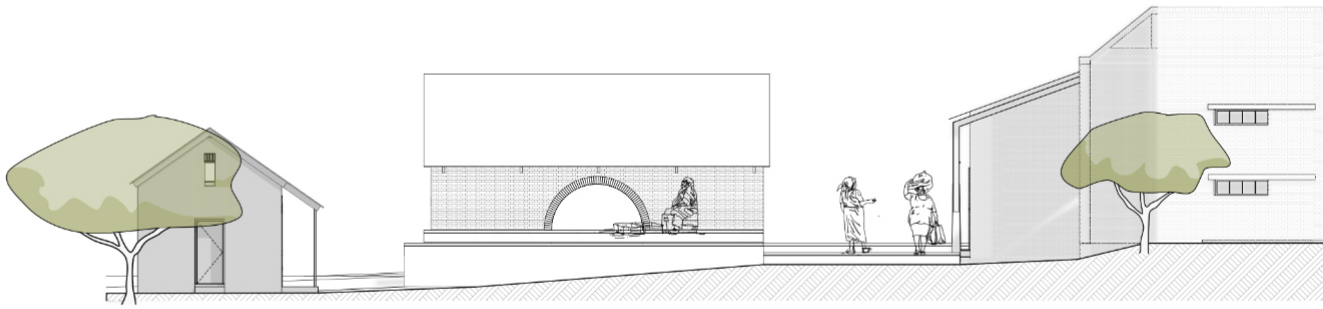
S.02

FIRST FLOOR PLAN 1:250

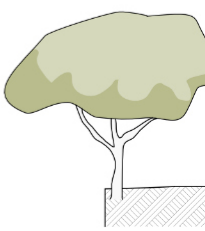
SECTION **1:250**



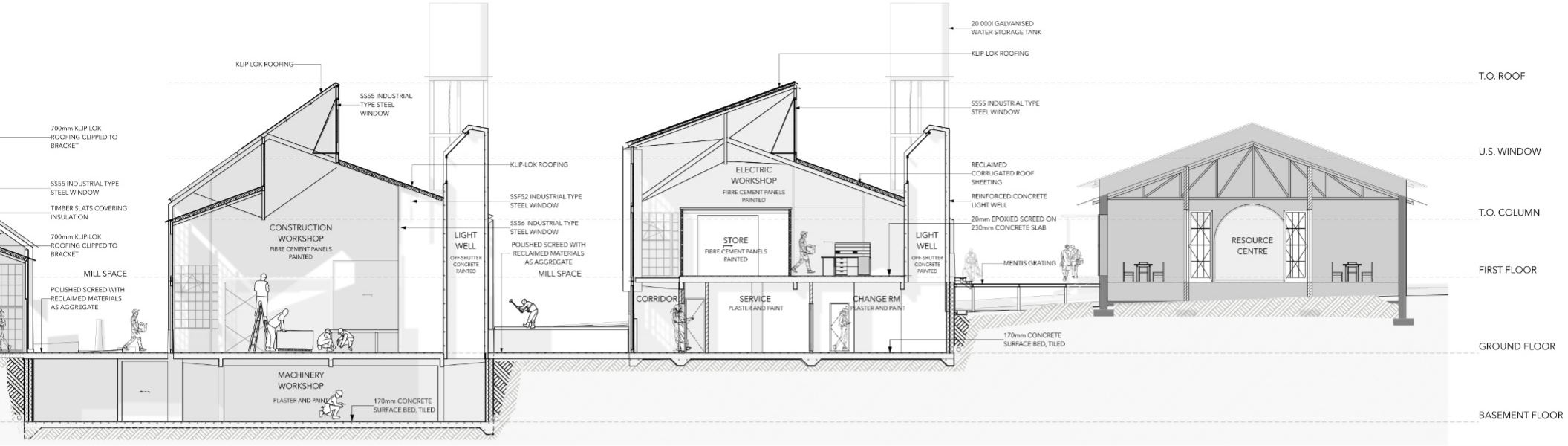
WEST ELEVATION **1:250**

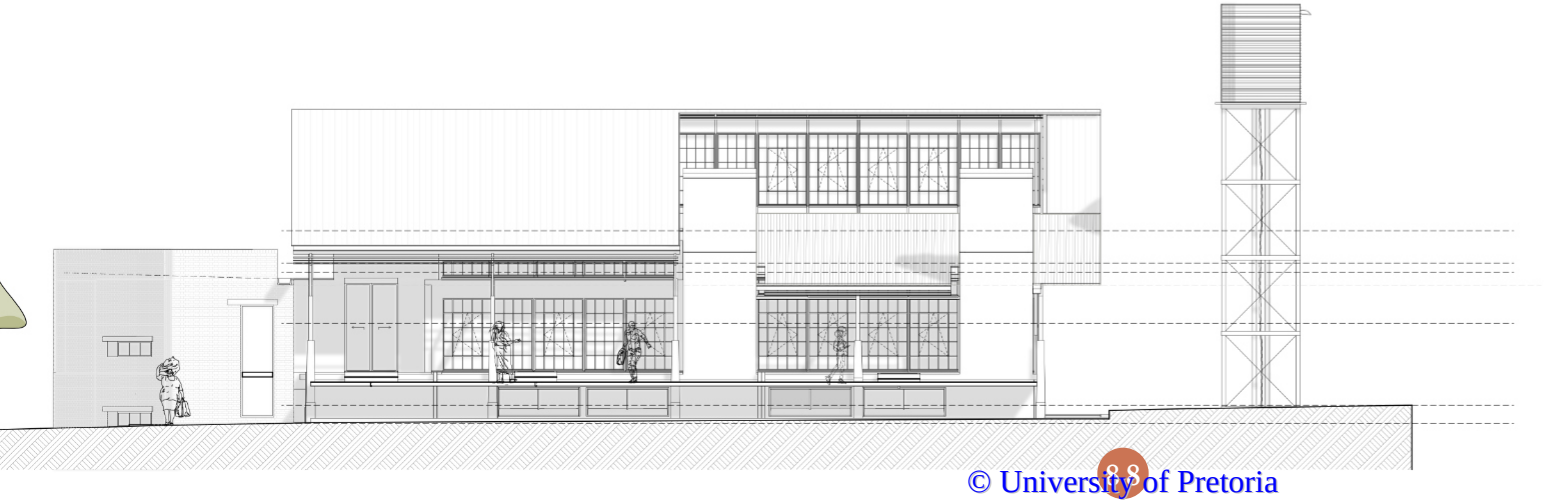


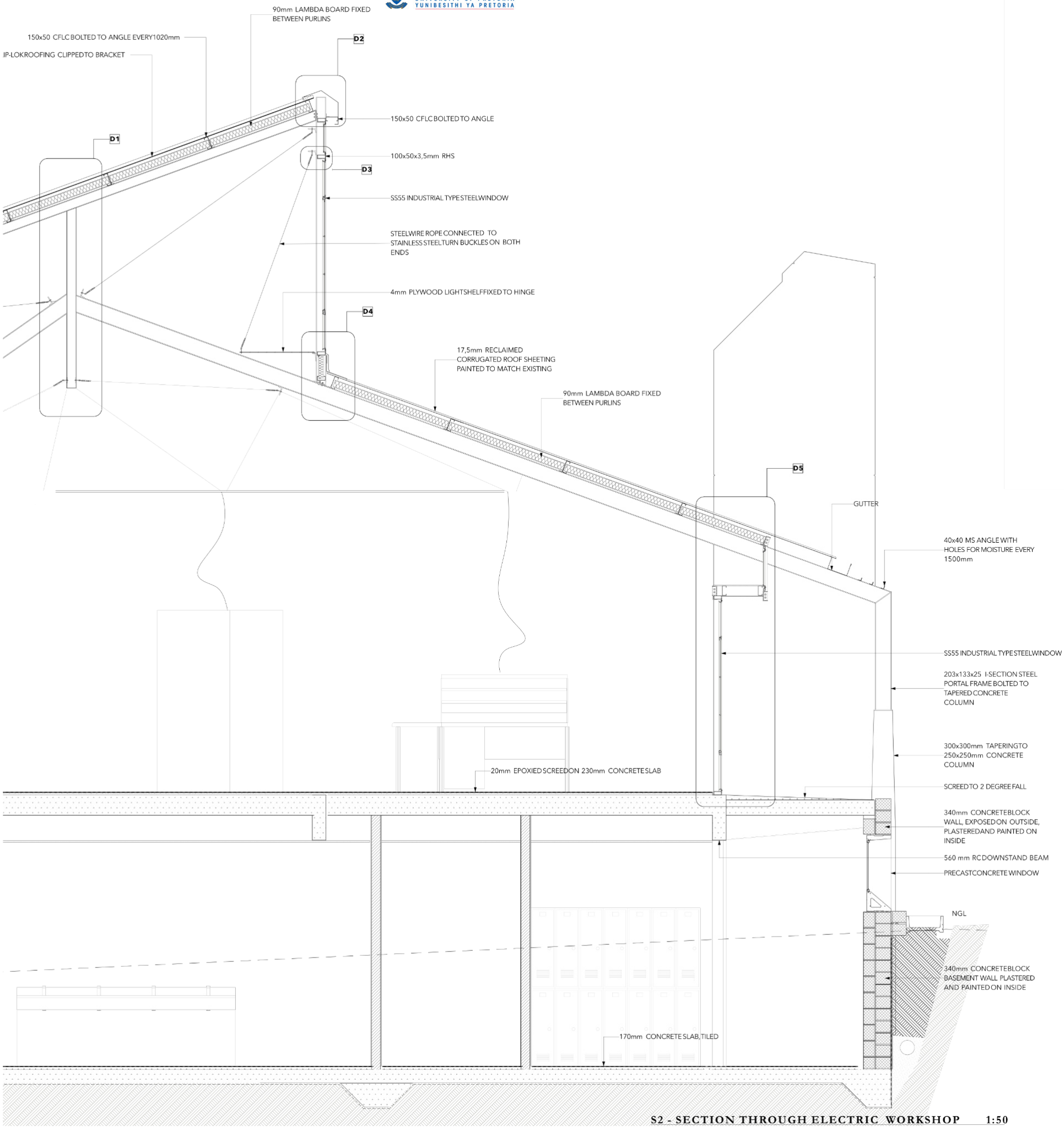
SOUTH ELEVATION **1:250**



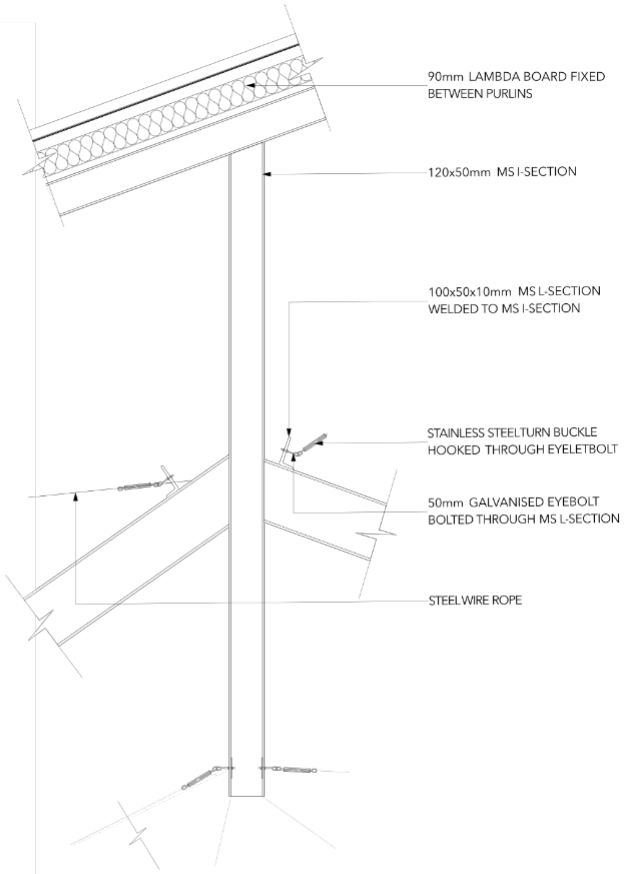
SECTION AND ELEVATIONS



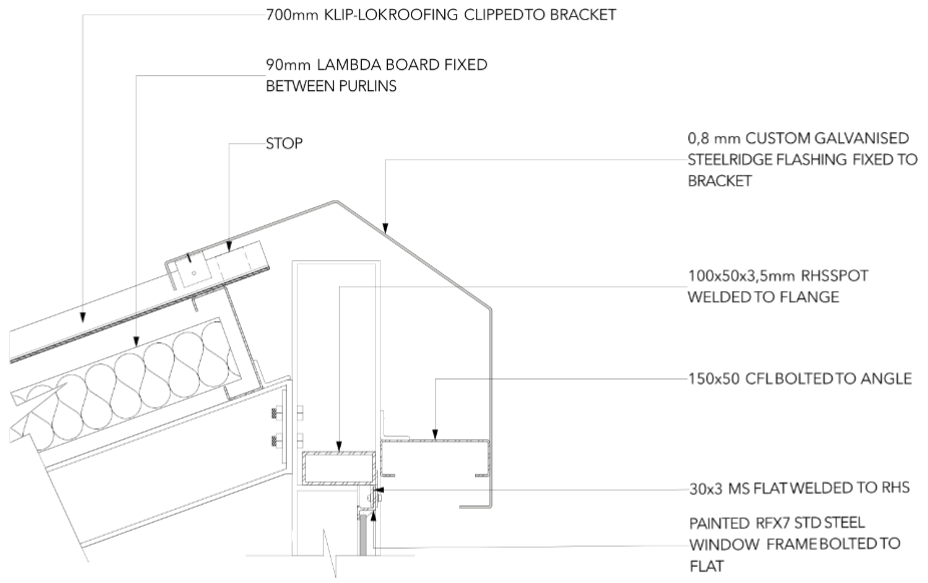




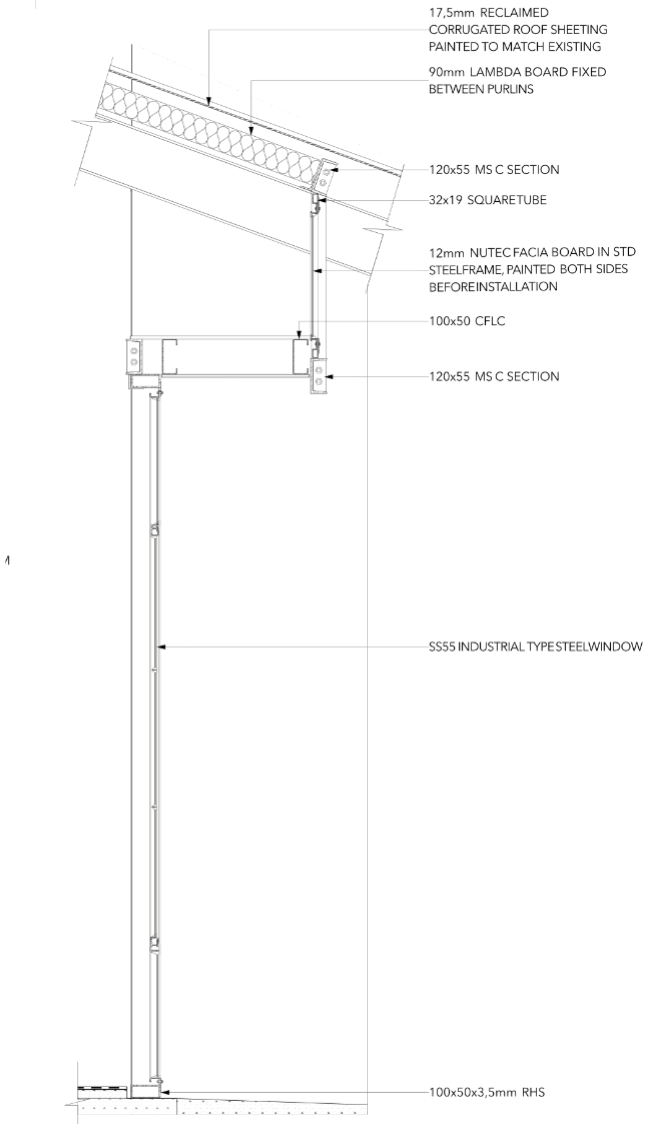
S2 - SECTION THROUGH ELECTRIC WORKSHOP 1:50



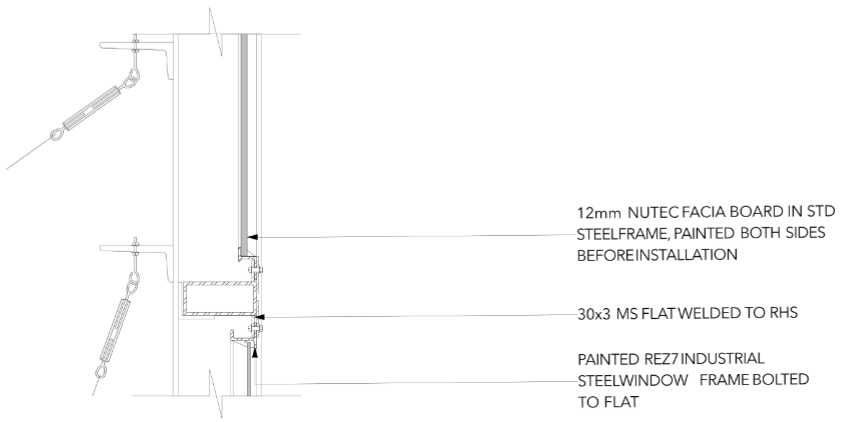
D1 - CONNECTION DETAIL 1:10



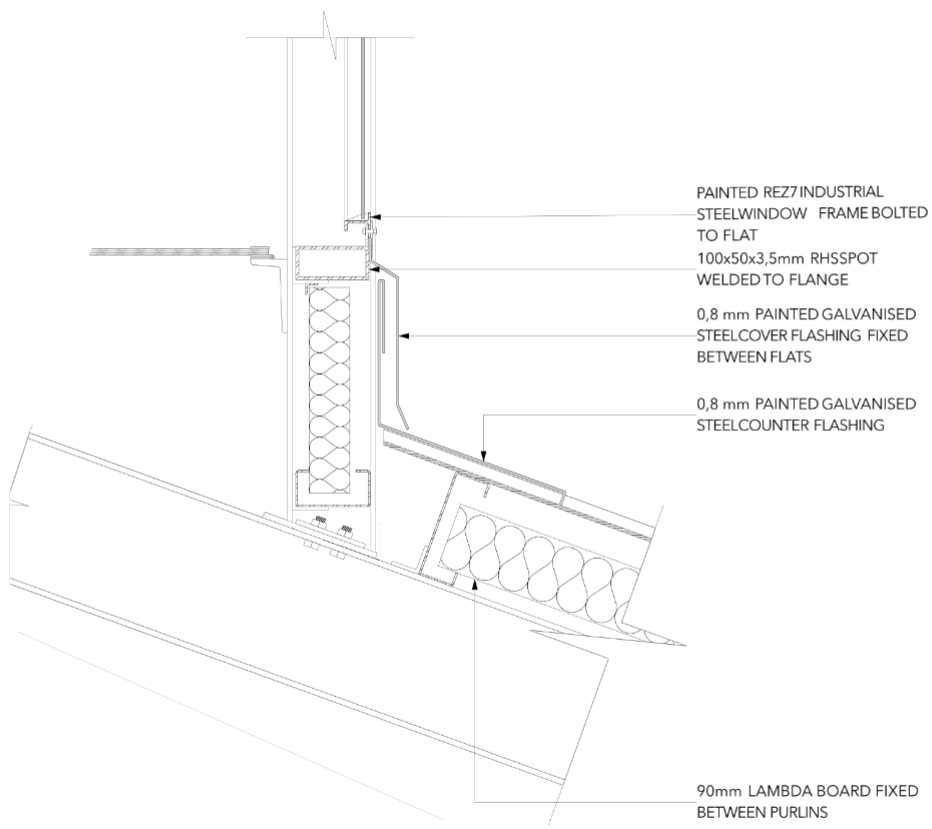
D2 - RIDGE FLASHING 1:5



D3 - SKYLIGHT DETAIL 1:10



D3- CONNECTION DETAIL 1:5



D4 FLASHING DETAIL 1:5

4

In Conclusion

13. REFLECTION

The dissertation investigates the potential of a fragile approach to industrial heritage in the City of Tshwane.

Second place

The approach from the start of the project is for the interventions to undulate between moments of primary and secondary positions (De Sola`- Morales 1987: 621-623). The in-between spaces, like the atriums and connections to the existing buildings, are given prominence over the rest of the building. The main entrance is essentially located between two shed structures.

Ultimately, the location for the building intends to frame the public park between the existing structures on the site.

Recovery, evolution and transformation

Strategies aimed at incorporating urban resilience are applied to the design (Peres). The site evolves to suit the changing context of the city, from a predominantly underutilised industrial program to a place that engages the public in industrial training opportunities.

The EPWP Hub accommodates the introduced program, with the intent of recovering and expanding the utility in the existing workshops.

The old electric workshop is preserved as a ruin and is thus transformed into a recreational garden.

Value

The value of the context is not understood as an aggregate of characteristics, but instead as a resource of possible informants. The contextual proximity of the identified instances increases their value.

An emphasis on the preservation of previously neglected histories is placed by considering the change on site as part of a continuum. Instead of making a deliberate distinction between 'old' and 'new', the project is rather emphasising that this is merely the next step in the narrative of the remaking of the workshops.

The attitudes and strategies employed exist on a scale between conservation and preservation, between demolition and restoration (Barker 2020: 144).

The EPWP Hub is a palimpsest of historical and new technologies influenced by the context, and to some extent constructed by the environment itself.

To Change

The mediation between the existing industrial heritage and the revitalised industrial utility of the buildings is approached as an opportunity to highlight moments of historical significance as the development of skill.

The DPWI has historically been involved with developing skills in the country, specifically concerning vocational training.

By extension, the implementation of the Extended Works Program continues this legacy. By implementing a basic training facility within the context of industrial heritage, a meaningful layer of access to knowledge is provided.

The public walkway that connects with the inner city provides direct access to work opportunities.

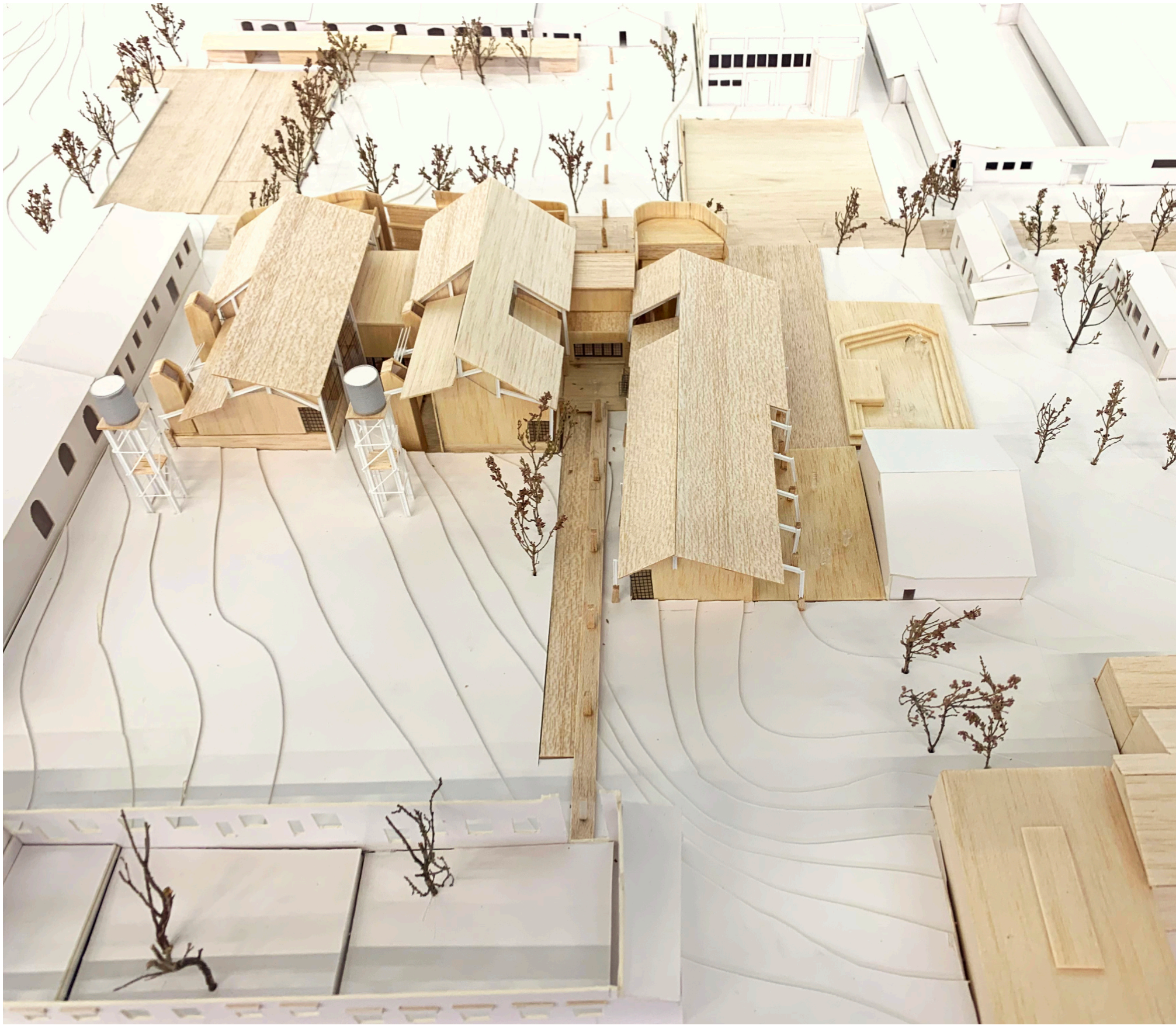
The change to the landscape is appreciated both as a palimpsest of historical events and as recovering green infrastructure. Like an archaeological dig, the making of the bioswales and basements uncover glimpses of the lost heritage on-site. The invasive shrubs and grasses are replaced with local alternatives, encouraging the process of recovery.

The progression of technology over the last century is showcased side-by-side. The complex narratives of the making of the city become accessible to the public that is responsible for the making of the city.

In time

As with the existing workshops and warehouses on the site, the significance of the EPWP Hub will run its course. The building will eventually become redundant in its current form and would need to evolve under the pressures of its context. This suggests that parts of the building will eventually be taken apart and reused somewhere else in the city.

The steel portal frames and roofs are the easiest to repurpose. These will be disassembled and used in different projects elsewhere. The standard window frames will be ideal to reuse as it is transported and installed with ease. What remains are the concrete floors and the brick walls. With further development of the site, these elements will form part of new interventions, leaving only traces of the EPWP Hub behind. Eventually, the interventions will become just another layer of palimpsest on the site (Machado 1976: 48-49), with only a 'recollection of the architecture after it has been' (De 'Sola Morales, 1987: 623).



14. LIST OF FIGURES

14. LIST OF FIGURES

15. REFERENCES

ANON. 1930. 'Plan vir 'n Mooier Pretoria', *Die Volkstem*, 29 April, Available at: http://hdl.handle.net/2263/482 (Accessed: 10 April 2021)

Artefacts.co.za. n.d. *Departement Publieke Werken Zuid-Afrikaansche Republiek*. [online] Available at: <http://www.artefacts.co.za/main/Buildings/archframes.php?archid=378> [Accessed 15 April 2021].

Artefacts.co.za. n.d. *Public Works Department*. [online] Available at: <http://www.artefacts.co.za/main/Buildings/archframes.php?archid=1952> [Accessed 15 April 2021].

Artefacts.co.za. n.d. *Public Works Department*. [online] Available at: <http://www.artefacts.co.za/main/Buildings/archframes.php?archid=1952> [Accessed 15 April 2021].

BACCINI, F. 2017 'The Persistence of Buildings and the Context Problem', *Footprint: Delft Architecture Theory Journal,* 2(10), 85-104: Available at: https://doi.org/10.7480/footprint.11.1 (Accessed 20 March 2020)

BARKER, A. 2020. 'Limiting binary thinking: architectural design in historic urban contexts', *South African Journal of Art History*, 35(2): 121-149.

Available at: https://www.researchgate.net/publication/350566959_Limiting_binary_thinking_architectural_design_in_historic_urban_contexts (Accessed: 04 April 2021)

BRUINETTE, Kruger, Stoffberg & Hugo, Raadgewende Ingenieurs. 1967. *Deurpadskema 1967, Pretoria*. Pretoria: Bruinette, Kruger, Stoffberg & Hugo, Raadgewende Ingenieurs.

CAPITOL CONSORTIUM.1999. *Pretoria inner city integrated spatial development framework : ISDF Executive Summary:* Available in AAUP Archive

CHING, F. D. K. 2019. *Building construction illustrated*. 6TH edn. Hoboken, New Jersey: John Wiley & Sons. Available at: https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=2333361 (Accessed: September 20, 2021)

CITY OF TSHWANE. City planning and Development Department. 2015. Tshwane Inner City Revitalisation Strategy: The Government estate development framework. Available at: http://www.tshwane.gov.za/sites/Council/Council%20Resolutions/Council%20Resolutions%202015/12.%20Council%20Resolutions%2029%20October%202015/01.%20Government%20Estate%20Development%20Framework.pdf (Accessed 26 April 2021)

CITY OF TSHWANE. City Planning and Development Division. 2008. 'Tshwane Town-Planning Scheme'. Available at: http://www.tshwane.gov.za/sites/Departments/Economic%20Development%20and%20Spatial%20Planning/Previous%20Schemes/Tshwane%20Town-Planning%20Scheme%202008.pdf (Accessed: 03 April 2021)

CITY OF TSHWANE. National Treasury, Department of Co-operative Governance and Development Bank of South Africa. 2015. Urban Investment Partnership Conference: Tshwane. Available at: http://www.treasury.gov.za/comm_media/presentations/Urban/UIPC%20-%20Tshwane.pdf (Accessed: 26 April 2021)

CLARKE N.J. and Fisher, R.C. 2018. 'The Industrial Archeology of the NZASM in South Africa and some of its unique artifactual Residue', *Architecture South Africa,* (93): 16-23. Available at: https://saia.org.za/assets/docs/archsa/ASA93.pdf (Accessed: 30 March 2021)

CLARKE N.J., Kuipers, M. and Swart, J. 2015. 'Lessons learnt from the Re-centring Tshwane Lab' in Clarke, N and Kuipers, M. (eds.) (2015). *Re-Centring Tshwane: Urban heritage strategies for a resilient Capital*. Brooklyn Square: Visual Books: 101-123

CLARKE, N.J. and De Villiers, A. 2015. 'Church Square, The Old Synagogue and the Old Government Printing Works' in Clarke, N. and Kuipers, M. (ed.) *Re-Centring Tshwane: Urban heritage strategies for a resilient Capital*. Brooklyn Square: Visual Books: 63-83.

DE LA SOLA'-MORALES, I. 1987. 'Weak Architecture' in Hays, K. M. and Wilcox, J. (eds.) 1998. *Architecture theory since 1968*. Cambridge, Mass: MIT Press (Columbia books of architecture).

DE LA TORRE, M. and Mason, 2002. 'Introduction' in De la Torre, M. (ed.) *Assessing the Values of Cultural Heritage,* Los Angeles: The Getty Conservation Institute: 3-4.

DECKLER, T., Graupner, A. and Rasmuss, H. 2008. *Contemporary South African architecture in a landscape of transition*. 2nd. edn. Cape Town: Double Storey Books: 26-29, 30-33.

DELMOND, E. 2004. 'Re-Envisioning Greater Johannesburg: South African Heritage Development in the First Decade of Democracy', *African Arts* 37(4): 30-35, 94. Available at: http://www.jstor.org/stable/3338027 (Accessed 16 March 2021)

DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE 2012. *EPWP Recruitment Guidelines*. Expanded Public Works Programme:Cape Town,http://www.epwp.gov.za/documents/Final_Recruitment_Guidelines-2018-05-23.pdf (Accessed: 10 May 2021)

DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE. Inner City Regeneration Programme. 2012. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjO6bjM8tDwAhUKMuwKHQ7hCFcQFjAAegQIBBAD&url=https%3A%2F%2Fpmg.org.za%2Ffiles%2Fdocs%2F121128innercity_0.ppt&usg=AOvVaw2DAqTPxRERBcoHDzzobqix (Accessed 10 May 2021)

FISHER, R.C. 1998. 'The Third Vernacular: Pretoria regionalism - aspects of an emergence' in Fisher, S.C., Le Roux, S. and Maré, E. (eds.) *Architecture of the transvaal*. 1st edn. Pretoria: University of South Africa: 123-148

FISHER, S.C., Le Roux, H., Murray, E. And Sanders, P. 2003. "The modern movement architecture of four South African cities". *Docomomo,* 28(1): 69-75

FRAMPTON, K. 1995. Frank Lloyd Wright and the Text-Tile Tectonic. In: Cava, J (ed.) Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture. Massachusetts, The MIT Press. pp. 93-120

GARNER, G. 2011. *Johannesburg: ten ahead: a decade of inner-city regeneration*. Craighall Park: Double G Media.

GERNEKE, G. 1998. 'From Brazil to Pretoria: The second wave of the modern movement' in Fisher, S.C., Le Roux, S. and Maré, E. (eds.) *Architecture of the transvaal*. 1st edn. Pretoria: University of South Africa: 55-78

GROBBELAAR A. and Anton Hoffman Associates 1993. *Building construction and graphic standards*. 1st edn. Muldersdrift: Anglo-Rand Publications.

HIDDEN ARCHITECTURE. 2019. *Factory Diestre - Hidden Architecture*. [online] Available at: <https://hiddenarchitecture.net/factory-diestre/> [Accessed 5 September 2021].

HOLM, D. 1998. 'Kerkplaats and capitalists: the first architects in context' in Fisher, S.C., Le Roux, S. and Maré, E. (eds.) *Architecture of the transvaal*. 1st edn. Pretoria: University of South Africa: 55-78

JACOBS, A. B. 1993 'Great Streets' in Watson, D., Platbuss, A. and Shibley, R.G. (eds.) *Time-saver standards for urban design*. New York: McGraw-Hill Companies

JANSEN A. 2012. 'Historian's Report', in Mashabane Rose Associates (firm) *Operation Reclaim (Pretoria) Heritage Impact Assessment Part 2*. Submitted to HIA adjudication Committee 31 January 2013: 59-133.

JANSEN A. 2014 'Heritage impact assessment', in *Minnaar street workshops: demolition, rebuilding/upgrading and restoration of buildings*. Submitted to HIA adjudication committee.

JORDAAN, G. J. & Holm Jordaan Holm. 1995. *Museum Park Brochure*. Pretoria: Pretoria City Council

JORDAAN, G. J. 1989. "Pretoria as Urbs Quadrata". *Architecture SA*, 17(5): 26-29

KAFKA, G., 2018. *Coal Drops Yard: Heatherwick Studio raises the roof*. [online] The Architects' Journal. Available at: <https://www.architectsjournal.co.uk/buildings/coal-drops-yard-heatherwick-studio-raises-the-roof> [Accessed 24 September 2021].

KEATH, M. 1998. 'The Baker School' in Fisher, S.C., Le Roux, S. and Maré, E. (eds.) *Architecture of the transvaal*. 1st edn. Pretoria: University of South Africa: 79-98

KRUGER, P. W. B. and Viljoen, C. J. 1972. *Meesterplan vir pretoria : eerste verslag insake beleid*. Pretoria: Stadsraad.

LE ROUX, S., Botes, N. and Pretoria City Council. 1993. *Plekke en geboue van Pretoria : 'n oorsig van hulle argitektoniese en stedelike belang*. 1st edn. Pretoria: City Council of Pretoria.

LIPMAN, A. 2004. "Architecture, Heritage, History, Memory," *Acta Structilia : Journal for the Physical and Development Sciences*, 11(1): 44–60.

LOWENTHAL, D. 2002 'Stewarding the Past in a Perplexing Present' in De la Torre, M. (ed.) *Assessing the Values of Cultural Heritage,* Los Angeles: The Getty Conservation Institute: 5-30.

MACHADO, R. 1976. 'Old buildings as palimpsest. Towards a theory of remodelling', *Progressive Architecture,* 57(11), 46-49.

MASON, R. 2002 'Assessing Values in Conservation Planning: Methodology Issues and Choices' in De la Torre, M. (ed.) *Assessing the Values of Cultural Heritage,* Los Angeles: The Getty Conservation Institute: 5-30.

MUNRO, K. 2018. 'A rich and interesting legacy: Part 2 and 3', *Architecture South Africa,* Issue 94: 24-38. Available at: https://saia.org.za/assets/docs/archsa/ASA94.pdf (Accessed: 26 April 2021)

NEUFERT, E. And Jones, V. 1985. *Architects' Data Second (International) English Edition*. 2nd edn. London: Collins Professional and Technical Books.

PALLASMAA, J. 2000. 'Hapticity and time: notes on fragile architecture', *The Architectural Review,* 207(1239), 78-84.

PERES, E.M. and Du Plessis, C. 2016. *The translation of ecological resilience theory in urban systems.* Thesis (PhD) University of Pretoria. Available at: http://hdl.handle.net/2263/56100 (Accessed 23 April 2021)

PERES, E.M. and Roos J. 2015. 'Towards a resilient Capital' in Clarke, N. and Kuipers, M. (ed.) *Re-Centring Tshwane: Urban heritage strategies for a resilient Capital*. Brooklyn Square: Visual Books: 85-99.

Pretoria (South Africa). City Planning Department (1993) *Pretoria Struktuurplan : 1993*. Pretoria: Stadsraad van Pretoria.

ROUX, N. 2018. "'a House for Dead People': Memory and Spatial Transformation in Red Location, South Africa," *Social & cultural geography*, 19(4), pp. 407–428.

South African National Standard 2012, *SANS 10400-Part A: SPart A: General principles and requirements*, SABS Standard Division, Pretoria accessed: 20 September 2021, http://sans10400.co.za/wp-content/uploads/2012/12/SANS10400A.pdf

South African National Standard 2012, *SANS 10400-Part R: Stormwater disposal*, SABS Standard Division, Pretoria accessed: 20 September 2021, http://sans10400.co.za/wp-content/uploads/2012/12/SANS10400A.pdf

WANG, D. and Groat, L. N. 2013. *Architectural research methods*. 2nd edn. Hoboken: Wiley. Available at: https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=1166322 (Accessed: 13 May 2021).

WRIGHT, F. L. 1901, 'The Art and Craft of the Machine', Brush and Pencil, 8(2):78-84. [online] Available at: https://www.jstor.org/stable/25505640 (Accessed on 20 September 2021)

WEGELIN, H. W. 2009. *Construction primer for Southern Africa*. 1st edn. Pretoria: Visual Books.