Exploring the potential of latent space in the inner city of Pretoria

Toward architectural remedies for regenerating and weaving urban fabric

Annemie Vermeulen

2019

Fig. 01. Front page; Pretoria inner city's potential vibrancy regenerated from the latent spaces riddling the built fabric (Author, 2019)

DECLARATION

In accordance with Regulation 4[e] of the General Regulations [G.57] for dissertations and theses, I declare that this dissertation, which is hereby submitted for the degree Masters 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 thesis has already been, or is currently being, submitted for any such degree, diploma or any other qualification.

Moreover, I declare that this thesis 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.

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Submitted to fulfil part of the requirements for the degree of Master in Architecture (Professional), Department of Architecture, Faculty of Engineering, Built Environment and Information Technology. University of Pretoria

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PROJECT SUMMARY

//Case Study area

//Macro case study area:

Pretoria inner city

The area is bounded by Steenhoven Spruit in the west and the Apies River in the east. Boom Street borders the North, with Willow and Scheiding forming the Southern edge.

//Miso case study area:

The length of Nana Sita Street, including the northern and southern bordering blocks.

//Micro case study area:

Old Land Bank block. 25°45’06.0”S 28°11’14.2”E

The block is bounded by the four roads Paul Kruger, Visagie, Bosman and Nana Sita.

//Programme

Bank of Nourishment

Middle ground & overarching: Culinary Art School

Low end: Building Livelihoods Centre

High end: Research Laboratories

//Client

Tshwane Metropolitan Municipality

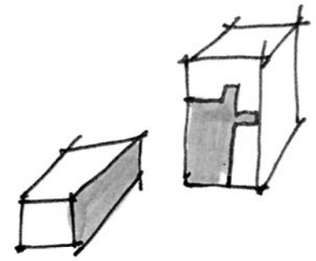
PEN (Participate Empower, Navigate) (NPO),

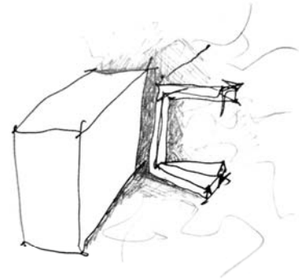
Steyn’s Hands-on Culinary School

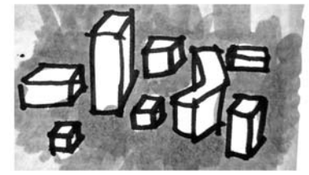
Agricultural Research Council, Department of Energy

Keywords:

Latent space, urban morphology, regeneration, palimpsest, weaving, nourishment, food, education, livelihood, hearth







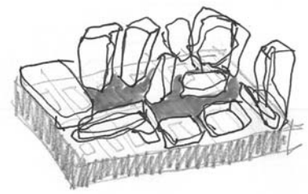


Fig. 02. Right; Compilation of sketches of latent space and potential strategies (Author, 2019)

ABSTRACT

This dissertation explores the potential of latent space in the inner city of Pretoria. The exploration is guided by the intention of finding architectural remedies for regenerating and weaving urban fabric. Urban morphology refers to the study of change in built fabric over time and focusses on the patterns of growth. The unique urban morphology of Pretoria produced an opportunity within the blocks, where fragmented spaces are locked away. These ill-defined in-between spaces in blocks are referred to as latent spaces, so-called due to their hidden potential. The overarching intention of the architectural solution is to delineate a new relationship between the inner city user, buildings, and latent space, to create off-street user-relief spaces, through the application of palimpsetic strategies developed from urban, architectural, heritage, contextual, programmatic and technological investigations. These strategies were conceptualised as the design approach, consisting of additions and alterations to the existing built fabric as well as new infill through connections, insertions, extensions, and appropriations. The strategies are further developed to form structural components used in combination to intervene with the existing. The components generate the technological response, and it is here that the freestanding strategy is included, which refers to new infill separate from the existing buildings.

A programmatic framework of low, middle and high-end functions is outlined to further enable the activation of latent spaces. The intervention is nestled within the geometry, history and current needs of the site, morphing from the context. Through using a palimpsetic approach to design with old buildings, a new layer is added to the built fabric whilst adapting and transforming the old to be improved. This approach weaves the fragmented internal and external latent spaces together to form a threshold dialogue where the inner city fabric is regenerated. Furthermore, the dissertation reimagines a building from a single element to a thread of spaces. This action leads to an architecture of dispersed internal spaces, interwoven with open, external communal space, where the realm of the citizen is extended past the existing buildings, in-between the new architecture and up-onto new raised public accessible platforms. Complexity and diversity occur by encouraging brief encounters, greetings and interactions through the diverse programme that mixes multiple stakeholders and activities in the same spaces.

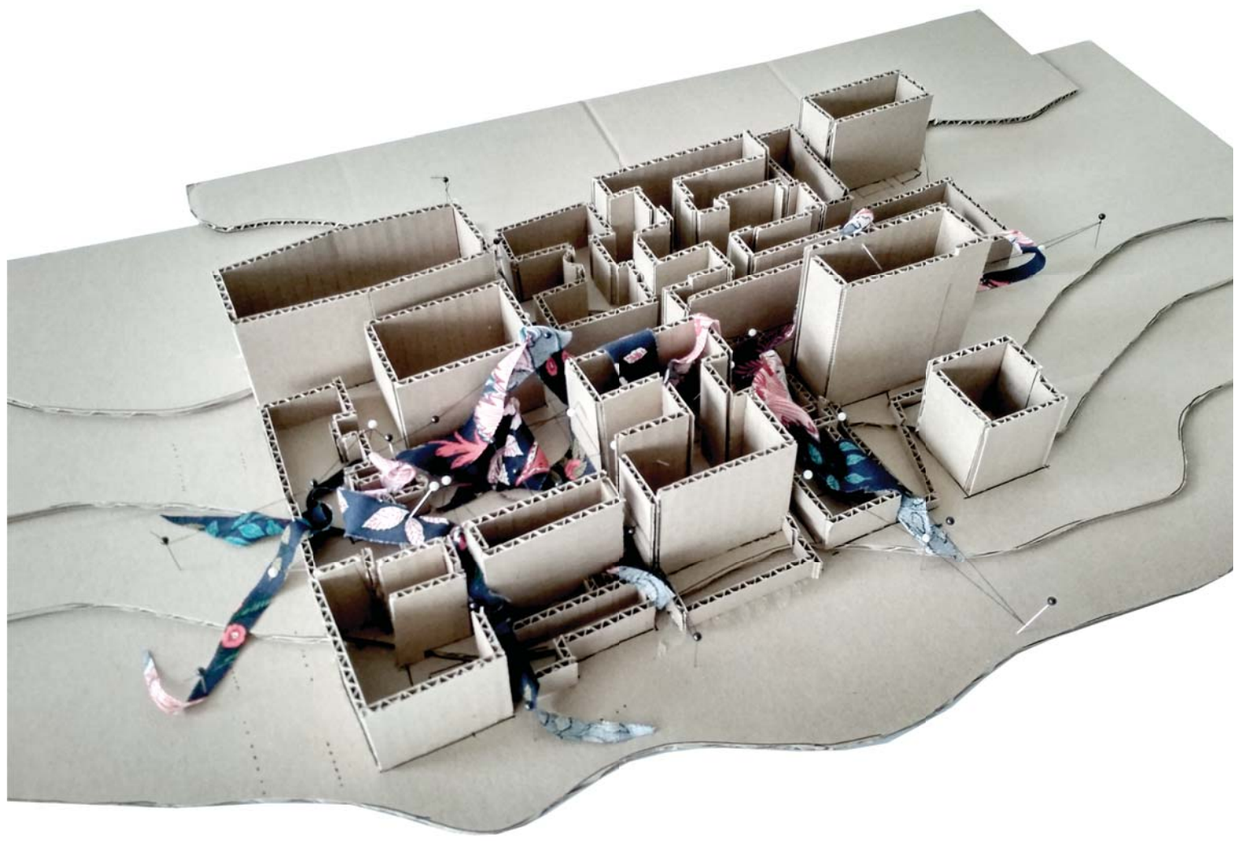


Fig. 03. Right; Early conceptual model of the latent space activation of the block (Author, 2019)

THANKS

Thanks Marc, for your encouragement and belief in me, as well as our beer-in-hand design ramblings throughout our Architectural education – you are my favorite person.

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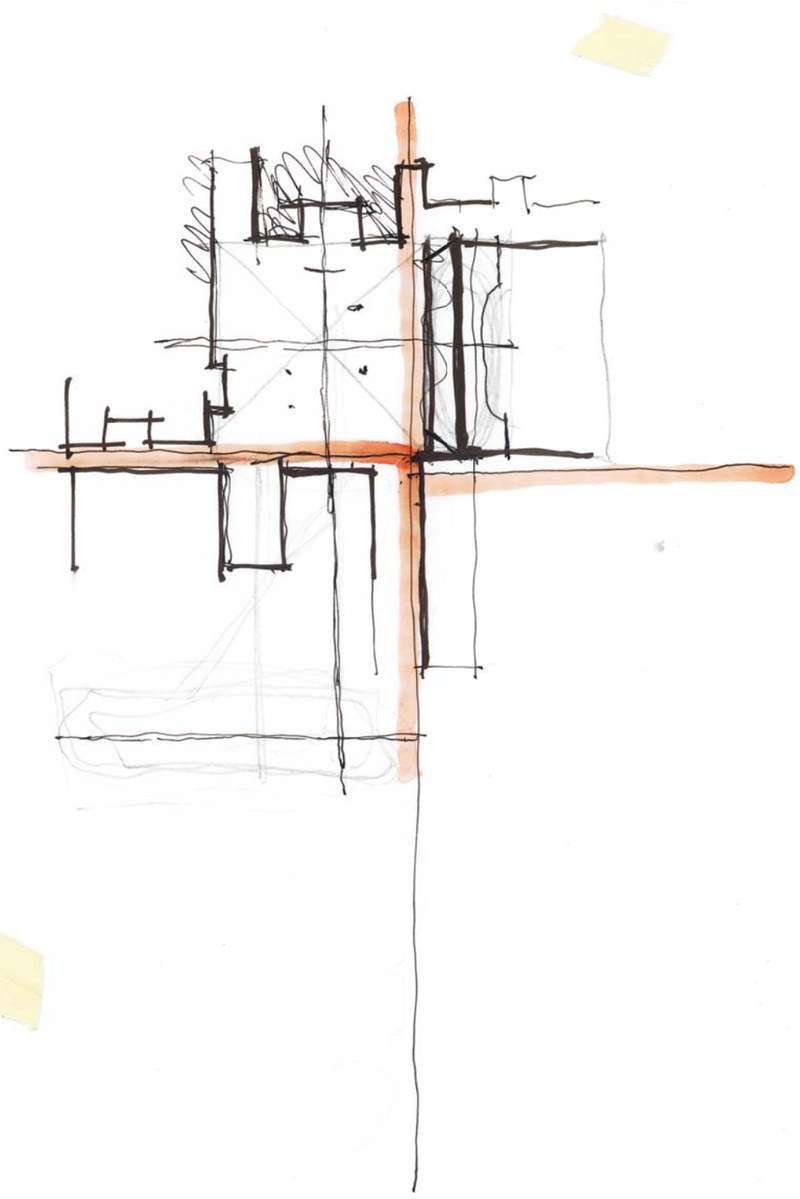

Fig. 04. Top; Potential axes through site (Author, 2019)

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01

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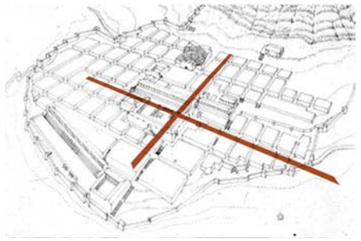
setting the scene

BACKGROUND & CONTEXT



Pretoria inner city is where fleeting movements and moments are enveloped by tall cliffs of concrete and brick, formed on the edges of oversized[1] urban blocks. Although still a fairly young city of 164 years (Meiring, 1980:11), she boasts a rich architectural palimpsest and a vivid history of urban design strategies, layering the city's developing built fabric. The wide streets, bustling with traffic, push the various informal activities to the fringes of the streetscape, resulting in a small contested pedestrian realm. Narrow sidewalks and limited off-street spaces for public use enforce a harsh environment on the city user (Dewar, 1998:369). South African cities are "overtly hostile to pedestrians [...] offering no shade, no cover, no features of interest or stimulation [and] no short cuts" (1998:369).

The origins of this unforgiving landscape lie within a contrasting perspective of Philadelphia, the Greek word referring to brotherly love and care. Pretoria was founded in 1855 to support the surrounding farmers with amenities and trade possibilities (Pieterse, 1942:16-18). Church Square, then called Market Square, was the central market space for the farmers to sell fresh produce and cattle (Fig. 06) (1942:23). The square also acted as *uitspanplek* [place of rest and replenishment] when the church held communion, as farmers from afar would camp out in the square (Fig 07). Around the square, plots were laid out in groups of twelve where one plot, called a *dorpserf* [village plot], was 36.8 meters in width and 69.3 meters in length. This size is larger than the average plot of South African towns of the time, as seen in Port Elizabeth, established in 1820 (South African History Online, 2011 (1)) with erf sizes of approximately 15 meters in width and 30 meters in length (Google Earth, 2019 (1)) or Robertson, founded in 1853 (South African History Online, 2011 (2)), with 20m x 45m *erven* [plots] (Google Earth, 2019 (2)). This stark physical difference in plot size indicates Pretoria's different urban design influences compared to other settlements of the time in South Africa.

The urban design influences impacting on Pretoria can be traced back to Greek and Roman town planning. These ancient cultures made use of a north-south and east-west axis[2] with a central communal space at the intersection. The application of these ancient principles can be seen in Priene, Turkey – a Hellenic era settlement from 350 BC – and in Timgad, Algeria, a Roman Empire settlement from 100 AD (Fig. 02). The perpendicular streets formed rectangular blocks that spread out from the core. These principles were further developed by the Roman military through *Centuriation*[3]. A system was developed with plot sizes ranging from *actus* to *jugerum* and *heredium* that ends with a century that is the whole camp size (20x20 *actus*) (Zancanella, Vedovato & Rossi, 1981). The Pretoria *dorpserf* has an exceptional proximity in size to that of a *jugerum* (35.5m x 71m), which is the amount that two oxen can plough in a day (Zancanella et al., 1981). The people of Pretoria had to provide for themselves as there were limited external resources available. Therefore the early settlers needed large enough plots for subsistence farming and residency (De Klerk, 2018).

Fig. 05. Previous page; Inner city streetscape (Author, 2019)

Fig. 06. Opposite Top Left; Market Square circa 1890 (Anon, 1890)

Fig. 07. Opposite Middle Left; Communion held in the square (Anon, 1905)

Fig. 08. Opposite Right; Roman Centuriation measuring units (Aurhor, 2019; Adapted from Zancanella et al., 1981)

Fig. 09. Opposite Bottom; The growth and axes of Pretoria (Author, 2019; Adapted from Jordaan, 1989)

Fig. 10. Avove Top; Priene, Turkey, note the central communal areas (Prinsloo, 2013)

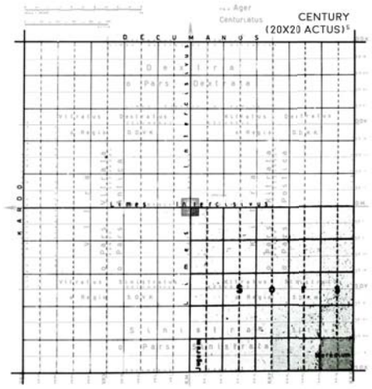
Fig. 11. Above Middle; Timgad, Algeria, note the grid and main axes (Prinsloo, 2013)

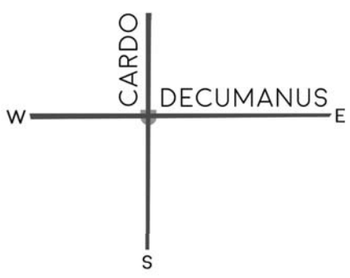
Fig. 12. Above Bottom; Timgad, arial photograph of remnants (Geopolicraticus, 2012)

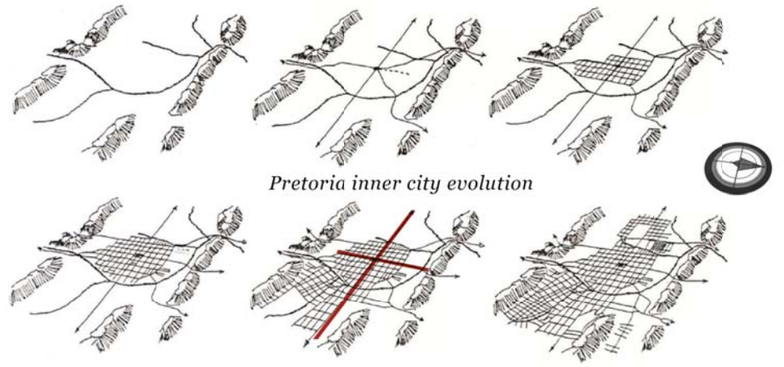
1 Pretoria's city block, at approximately 216 x 140m, is larger than most South African city blocks (average at ±70mx70m) (Google earth, 2019).

2 During the Roman Empire, the two axes were formally referred to as the Cardo (north-south) and Decumanus (east-west) (Zancanella et al. 1981).

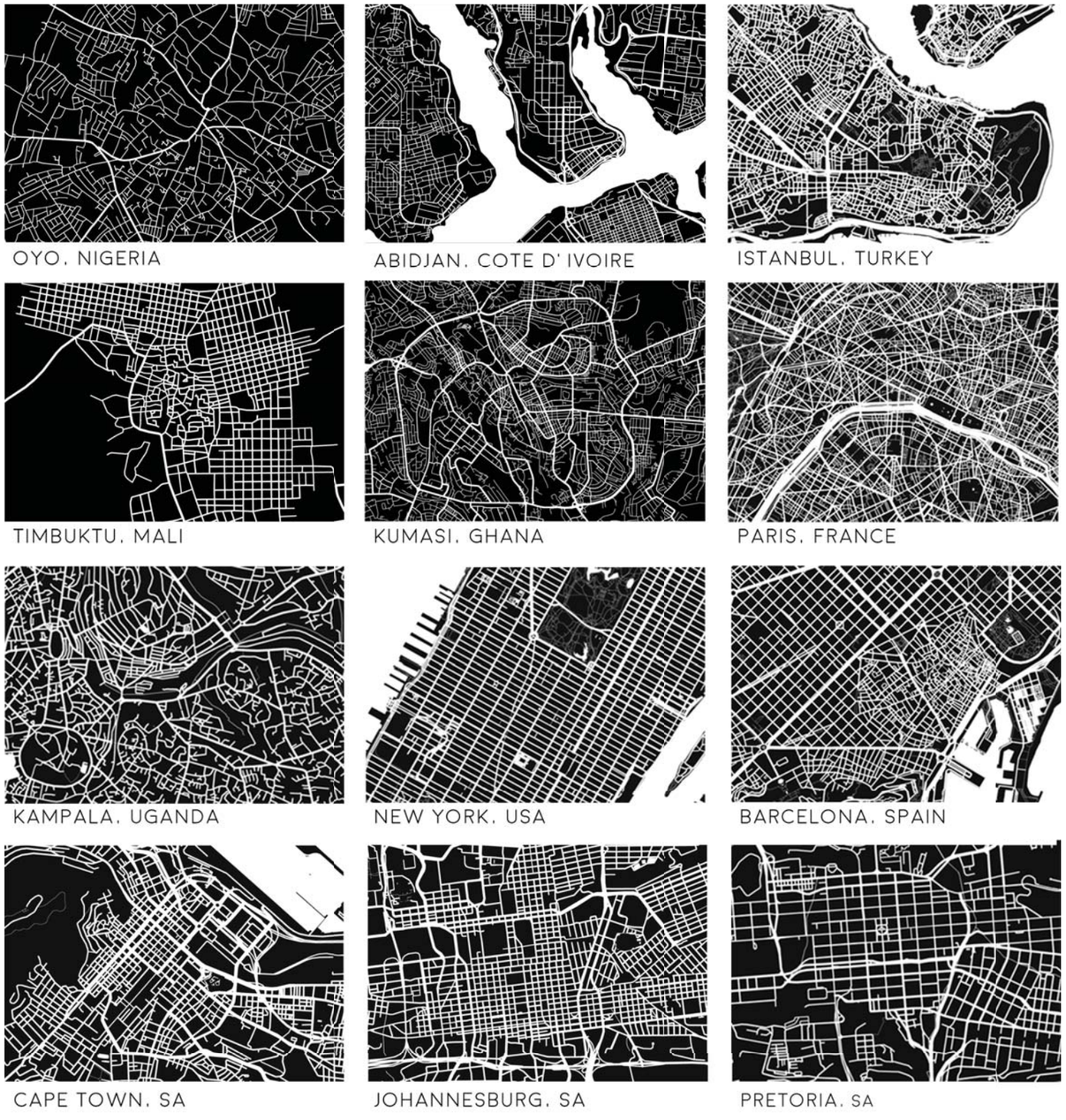
3 Centuriation refers to the strict ordering of a military camp developed by the Romans (Zancanella et al. 1981).







Urban morphology is a term used in urban design that refers to “the study of change in the physical form and shape of settlements over time [and] focuses on patterns and processes of growth and change” (Carmona, Heath, Oc & Tiesdell 2010:77). Morphology has many spatial informants including topography, the pedestrian or the vehicle that determine the layout, shape and size of city blocks. The beginnings of human settlements developed from pedestrian movement that produced a delicate morphological grain as seen in Istanbul, Kumasi and Kampala (Fig. 14). Later expansions of initial settlements as seen in Barcelona, or during colonial development such as New York or Abidjan (Fig. 14) have structured gridscapes, focused on the motorcar dominating the built morphology.



The influence of the Roman colonial grid is evident in Pretoria, although the mode of transport was the *ossewa* [ox wagon]. This vehicle influenced the street size and particularly Church Square’s design according to the *ossewa’s* turning circle (Pieterse, 1942:24). Topography and water sources are definite influences of the morphological development of Pretoria as the inner city is situated between two rivers, the Apies in the east and Steenhoven Spruit in the west, and two ridges part of the Magaliesberg range, north and south of the central area of Pretoria. The rivers were used for irrigation by means of a furrow network and the ridges on either side dictate the sprawling directions into the east and west. Furthermore, town planning development schemes such as the Freeway proposal of 1967 (Bruinette, Hugo, Kruger & Stoffberg: fig.5A) – including the Ringroad scheme (Fig. 41) – was later partially implemented through Nelson Mandela Drive and Nana Sita Street. These schemes broadened roads to create thoroughfares through the city and moved inner city focus away from the pedestrian towards private vehicular transportation, which is in contrast to the recommendation given in the 1993 Structure plan of Pretoria to provide a balance of accessibility for both vehicle and pedestrian (Plan medewerkers, Plankonsult, & EVS, 1993:242). Carrying out these disruptive strategies contributed to the loss of delicate inner city fabric, ensuing an oversupply of vehicular space. A mutual issue that all cities share is densification and how to provide for necessary urban density increase, without disrupting the image of the city or decreasing the already limited public open space (1993:247).

Fig. 13. Opposite; Morphology showing various spatial informants (Author, 2019; Adpated from Google maps, 2019)

Fig. 14. Bottom left;Pretoria and the initial morphological informants (Author, 2019; Adpated from the Van Der Waal collection, 1900)

Fig. 15. Bottom Right; Pretoria’s origins of oxwagon transport and subsistence farming (Author, 2018)

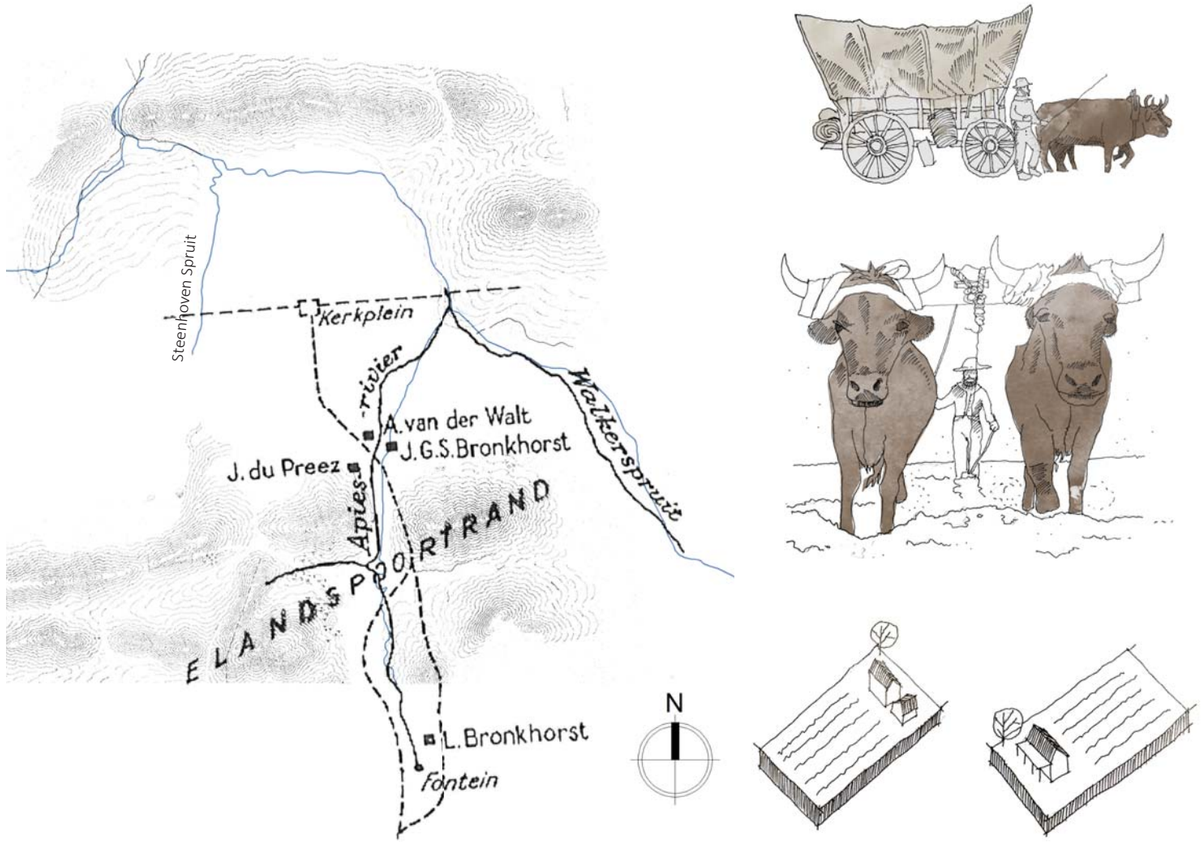


Fig. 16. Above; Various latent spaces, Pretoria inner city (Author, 2019)

Fig. 17. Opposite Top; Map of Pretoria inner city latent spaces (Author, 2019) Line drawing map (Heritage Inventory, 2018)

Fig. 18. Opposite Bottom; Family of social spaces in the inner city (Autor, 2019) Line drawing map (Heritage Inventory, 2018)

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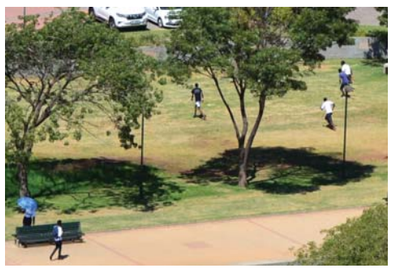


LATENT SPACE

The town planning of Pretoria resulted in large scale city blocks and wide streets that mostly alienate the pedestrian due to their sheer scale and size. A further problem arising from the morphological development of Pretoria is the fragmentation of the block fabric, where buildings become islands detached from each other. This occurrence is called “Modernist urban space” (Carmona et al., 2010:77), referring “to buildings as separate freestanding ‘object-buildings’ [surrounded by] amorphous ‘space’” (2010:77). A hybrid of both attached façades (resulting in well defined block edges), and detached façades (leading to island buildings) exist in the inner city. However, due to the building facing the street, both these conditions result in lost spaces in the centre of the block.

In this dissertation these formless, ill-defined in-between spaces in blocks are referred to as latent spaces, so-called due to their hidden potential. These spaces are leftover segments between built forms, specifically in urban environments. Latent spaces are either inaccessible or underutilised fragments that are deemed lost (Trancik, 1986:3) and are characterized as spaces leftover after planning for municipal infrastructure such as parking lots, emergency services, or other functional reasons. Furthermore, latent space includes spaces that have been abandoned and are in need of repair and/or protection.

> Urban spaces are now what is left over
> between individualistic buildings of
> no communal importance
> (Crane, 1960:281).

There are several spaces in Pretoria which have over time, either been implemented to serve the citizen, or have been civic spaces, since the origins of Pretoria that have been adapted to suit the needs of the changing environment. One such space is the network of arcades in Pretoria (Fig. 18). Some of these arcades are still used as thoroughfares with some permanent shops and pedestrians passing through, yet the historical sense of place is lost and the pause spaces are limited (Allers & Breytenbach, 2015:28). As soon as an arcade has insular functions and becomes overtly mono-functional (mainly retail), a space meant for relief and pausing becomes a mall typology of consumption and hurried life. Another type of city-internal space is the public civic square such as Church- and Pretorius Squares (Fig. 18). Although these large open landscaped spaces have a formal and controlled nature, they have adapted to informalities such as school children playing soccer in front of city hall (Fig. 19) or flower (Fig. 20) and art vendors in Church Square, and people sleeping on the edges of these spaces at night. This adaptability and allowing for appropriation by people are perhaps what saved these spaces from abandonment and kept them alive and in good use.

A reconsideration of current Local Authority legislative practice can lead to the reinterpretation of building lines, servitudes, separated *erven*, and the concept of ownership. The review of legislation can lead to merging several service alleys into one large service area for a part of the block, freeing up service access and latent spaces for a person on foot or by bicycle to enter and access the middle of the block, where additional otherwise inaccessible spaces lie.

The morphological development patterns and resulting city fabric of Pretoria are detrimental to the pedestrian, leading to substantial pedestrian/vehicular conflict. This indicates that the city is in dire need of spaces that can contribute to the lived experience of the citizens, away from the harsh streetscape. To provide a secondary network of public spaces through the existing blocks, will allow the primary vehicular networks to remain functional and allocate designated areas for the citizen's daily activities in safer spaces. This might be done by using and consolidating the many lost spaces in the large city blocks. The city of Tshwane envisions expanding public transport networks and transforming Paul Kruger Street to a pedestrian realm. Consolidating the internal block spaces is in line with the Tshwane 2055 vision (City of Tshwane, 2013) as it provides a finer grain fabric focused on feet as mode of transport that interlinks the enlarged public transport network. Through the addition of events and activities within the interior of the fragmented blocks, pause spaces and pockets of relief will allow an expansion of the realm of the citizen.

The proposed intervention re-imagines architecture from individual, insular objects to threads of spaces interlinked by open areas and walkways that encourage interaction between different users and functions.

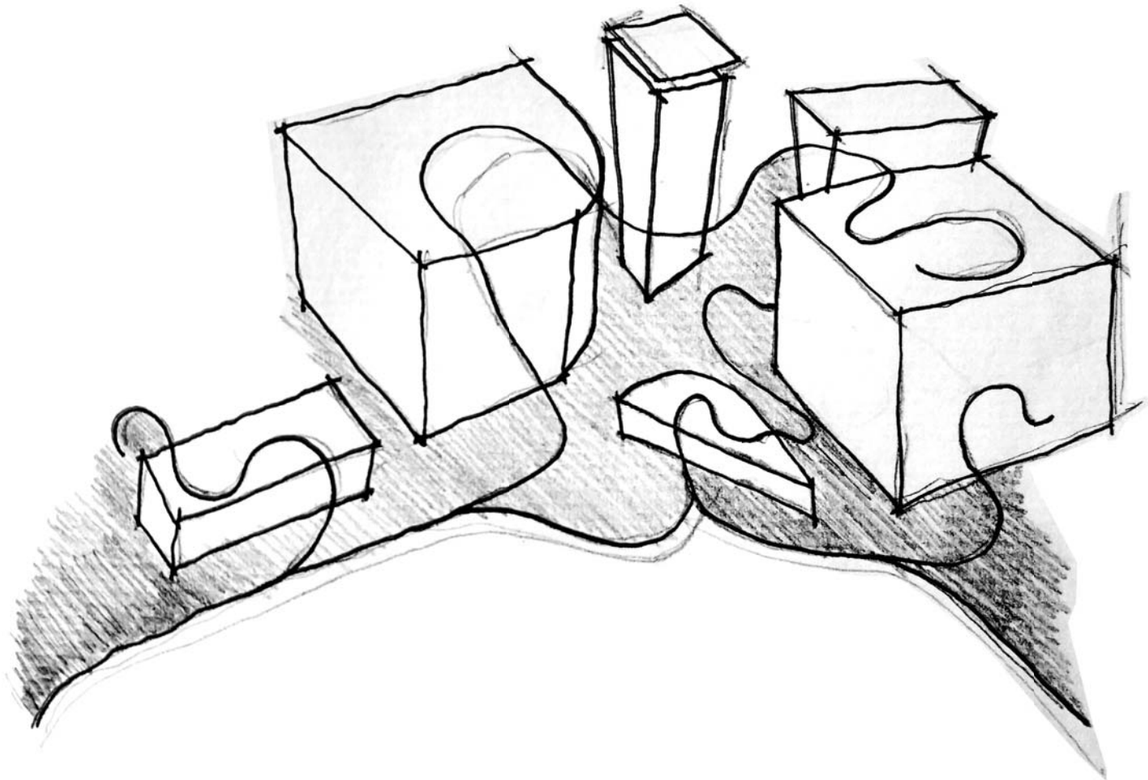


Fig. 21. Opposite; A thread of architecture stitching multiple spaces (Author 2019)

Furthermore, architecture should be a catalyst to encourage interaction between the user and the surrounding space, where building edges interact with and morph into the context. Designed spaces should have multiple facets, uses and stakeholders, allowing complex and diverse activities, interaction and form. An aspect related to latent spaces is creating porous block edges to present possibilities for the pedestrian realm. Permeability refers to the extent that "an environment allows people a choice of routes through and within it. In general terms, it is a measure of the opportunity for movement" (Carmona et al., 2010:81). This approach has discovery and exploration at its roots where existing networks are connected, enhanced and new links are revealed.

From the above mentioned issues and background to the dissertation, the following architectural spatial questions arise.

Main research question

What informants determine architectural strategies to regenerate and replenish latent space in Pretoria's inner city?

Detailed research questions

- What types of spaces and activities can architecture provide to create pockets of relief for inner city users in Pretoria?
- How can architecture allow for complexity and diversity in interaction between different activities, stakeholders and functions?
- How can designed spaces accommodate change over time and appropriation by people, fauna and flora?

Research Paradigm

The methodological paradigm which adequately suits this dissertation is interpretivist (Henning, 2004:20). This paradigm allows for a qualitative approach towards data collection and analysis (Nieuwenhuis, 2016:60). Interpretivism requires the researcher to consider various places, objects and people to find meaning and to understand a phenomenon in its context (Henning, 2004:20).

Research Design

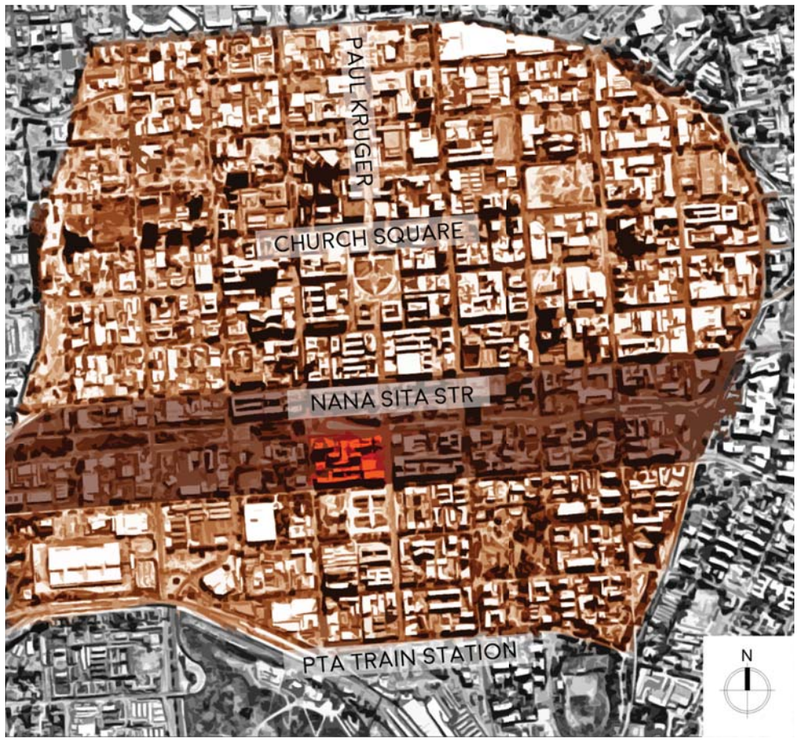
The research design most appropriate for the proposed intervention, is an exploratory case-study. A case-study is a bounded system (Nieuwenhuis, 2016:75), where the development of an "in-depth understanding of a single case" is sought. By studying "a phenomenon within its real-world context", data is collected in "natural settings" (2016:83). This warrants a "variety of lenses" to be used in analysing[4] the phenomenon (Nieuwenhuis, 2016:83).

Fig. 22. Bottom; Proposed case-study with sampling area, nts. (Author, 2019; Adapted from Google Maps, 2019)

Fig. 23. Opposite; Analysing data through following appropriate steps (Author, 2019; Adapted from Creswell 2009:185)

Fig. 24. Opposite Bottom; Contextual and heritage lenses formed to envelop initial investigations (Author, 2019)

The selected area of this case-study in the inner city of Pretoria has multiple scales (Fig. 22). The proposed macro scale area is bounded by Steenhovenspruit in the west and the Apies River in the east. Boom Street borders the North, with Willow and Scheiding forming the Southern edge. The Meso case-study is the length of Nana Sita Street and the bordering blocks. The Micro case-study area is the Old Landbank block, bounded by the four roads Paul Kruger, Visagie, Bosman and Nana Sita.



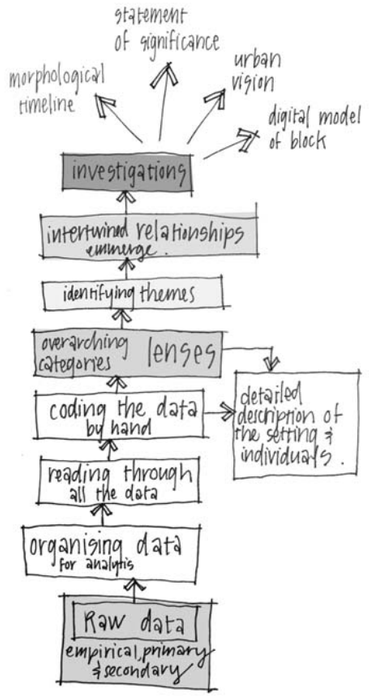
4 The lenses are used in both literature and design research, depending on the specific theme (Fig. 24).

Data Collection

The researcher spent time on the selected site to capture empirical data through field studies (Du Toit, 2015:68), involving five data collection methods or tools (Nieuwenhuis, 2016:83). Firstly, transect walks were done to broadly establish the "social network" (Du Toit, 2015:68), as well as environmental and economic opportunities. Secondly, a map-drawing exercise was conducted to visualise the networks of the study area. Thirdly, "audio-visual materials" (Creswell, 2009:180), such as photographs, were taken of people, architecture, details and the streetscape. The fourth tool focuses on the same aspects as tool three, via sketches and diagrams. The fifth tool was observations of people, architecture, streetscape and movement. Additionally, primary and secondary data were gathered through archives, documents (LeGreco, 2014:77) and desktop studies.4

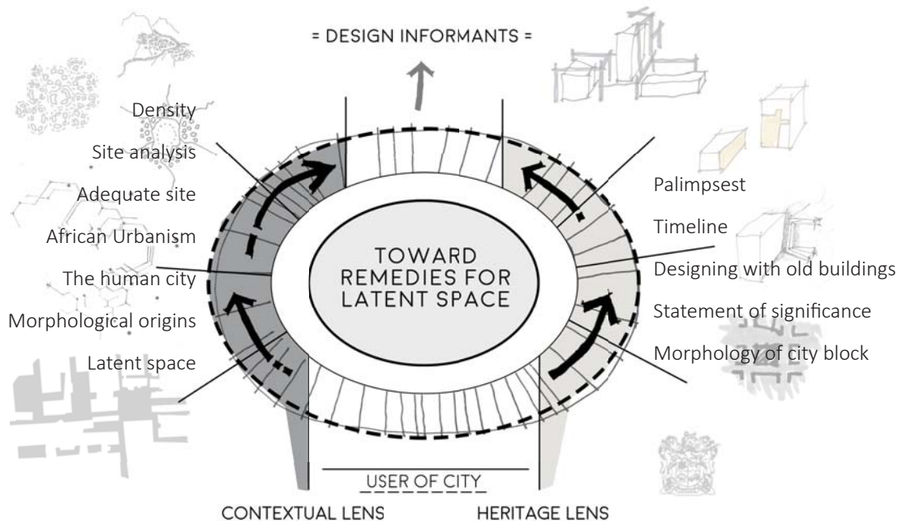
Data Analysis: informing outputs

Data analysis and interpretation involves a deeper understanding in order to make "sense out of text and image data" (Creswell, 2009:183). This is an iterative process constantly reflecting on the data and interrogating the interpretation thereof (Creswell, 2009:184). In order to analyse the data, an adaptation from Creswell's (2009:185) figure is used. A set of steps is described below and envisioned in Fig. 23.



Firstly, all the empirical, primary and secondary data collected should be presented as raw data. The next step is to organise the data, either via digital or other filing systems to properly store the data for analysis. Then all data should be perused to understand its broad meaning. Next, hand-coding (Nieuwenhuis, 2016:116) is done whereby pieces of data are marked by using symbols or labels to signify their meaning. Relational themes are identified through the coding. This sets the scene for specific lenses to emerge that act as overarching categories to guide the dissertation exploration (Fig. 24). The last step is to construct a set of investigations, based on the lenses developed from the categories and themes, involving both urban and block scale.

Finally the investigations inform the following outputs: morphological timeline; urban & precint visions; heritage statement of significance; heritage approach, and a digital model of the block. These elements inform the architectural design approach as they become design informants.



RESEARCH DELIMITATIONS & ASSUMPTIONS

It is assumed that the Tshwane 2055 vision (City of Tshwane, 2013) is implemented, leading to the increase of pedestrianised streets, use of public transport, and people frequenting the streets. This in turn, results in a decline of private vehicles and parking in the inner city.

This case-study is particularly relevant to Pretoria inner city. Because of Pretoria's unique urban morphological opportunities, it may be less applicable to other South African or international cities. Furthermore this dissertation does not seek to fully resolve the political, economic, town planning and ownership challenges inherent in the inner city. This is an architectural design solution dealing mainly with the opportunity of latent space in large city blocks.

ROADMAP

The theoretical exploration for this dissertation starts off with the various investigations regarding site, context and heritage. These investigations are framed by two overarching lenses namely, contextual and heritage. The point of inception is exploring the contextual lens, as the context is of utmost importance to understand the immediate elements of the dissertation. The contextual lens analyses the surrounding spaces and activities, and provides a broader setting for the architectural design to relate to. Moreover the site choice for the dissertation is discussed and the focus area with site specific delimitations and assumptions are given.

The heritage lens chapter follows on the contextual investigations by addressing the context with the factor of time. The history and heritage of the site is gathered and investigated to understand the story behind the resultant built fabric.

Hereafter an architectural application chapter follows that reviews the appropriate theories regarding the global shift in perspective towards interconnected thinking, as well as other architectural theories that inspire the design.

To further inform the architecture, the appropriate programme for portraying the intentions set by this dissertation is discussed and unpacked.

All chapters preceding the concept chapter are used as informants of the subsequent architectural exploration and solution.

The final chapters showcase the resultant architecture in terms of the conceptual development into design and technical resolution, and the solution to the problem as identified in the current chapter.

Fig. 25. Right; Latent space as positive space, a plaster of paris model (Author, 2019)

02

CONTEXTUAL LENS

Macro case study area & urban vision

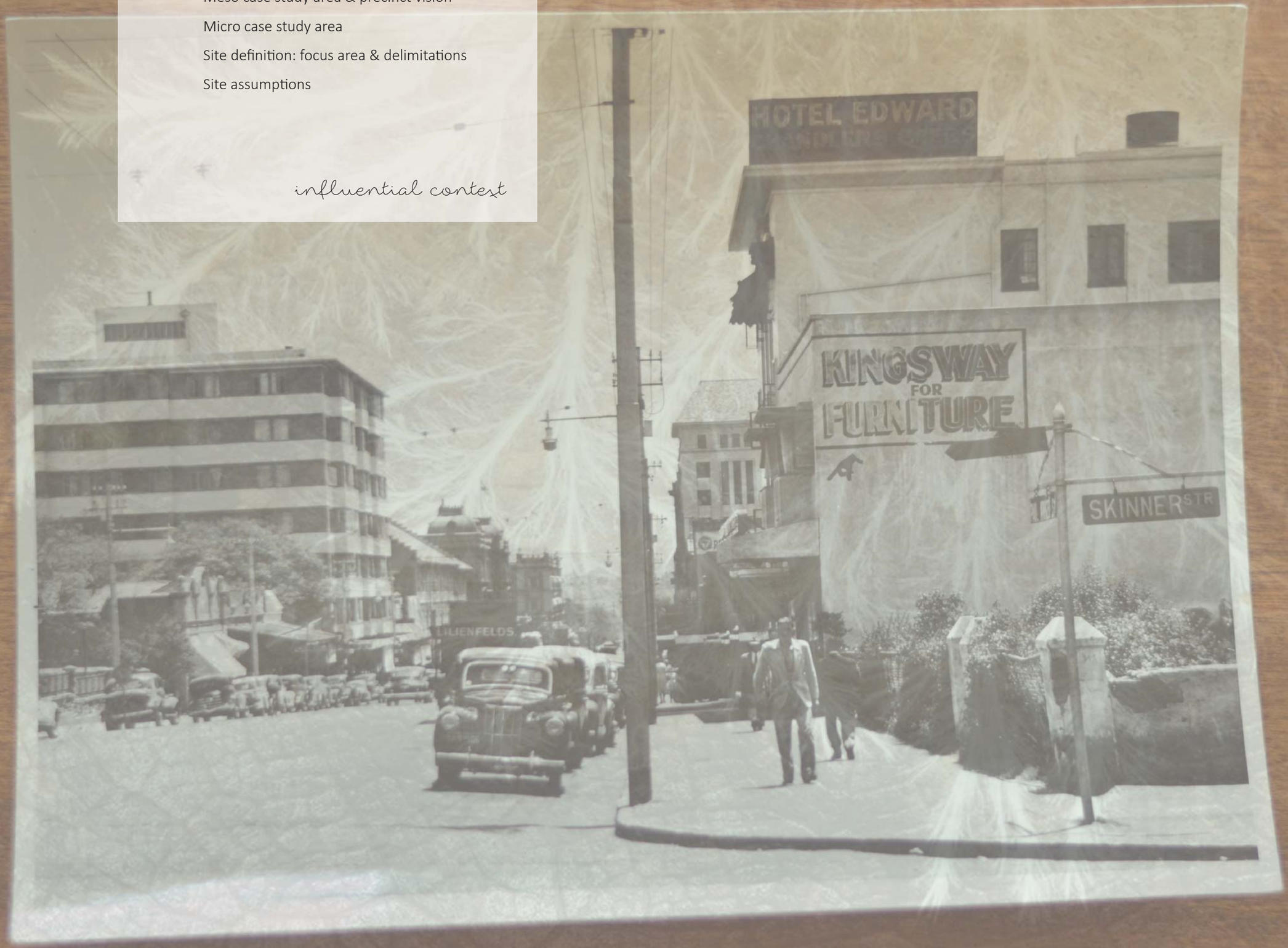
Meso case study area & precinct vision

Micro case study area

Site definition: focus area & delimitations

Site assumptions

influential context



MACRO CASE STUDY AREA & URBAN VISION

A common interest shared by the mapping group[5], is the design of cities for people. The mapping group suggested that Pretoria has the latent potential to, yet again, become a city designed to meet the needs of its citizens. The focus on people is already present in the city, to some degree, through its recessed building edges and diagonal building corners that draw people in, the multiple interactive public nooks of relief and street corners that act as a clustering point for public life. Lastly, through the use of flora users are invited to comfortably interact with the architecture. These elements have been defined as the soft edges of the city, as seen in Fig. 28.

Although the city displays an inspiring diversity of users it allows limited access to a soft interface for its people. This can be seen through the many barriers, securitization and poorly maintained spaces; as well as the rough monotonous textured finishes that do not allow for comfortable haptic interaction. Furthermore, there are blank façades that do not entice spontaneous interaction. These elements were defined as the hard edges of the city (Fig. 29).

General mapping was completed which includes land-use, public transport and building heights. Furthermore, transect walks where undertaken to map and observe the density of people and how they use the space.

A surprising conclusion from the mapping overlay in Fig 30., illustrates that people tend to congregate in closer proximity to older buildings of lower height. Possible explanations could be that these older, mostly heritage buildings provide humane elements at street level such as stairs or overhangs and adjacent predominantly-retail land-use and activities. Newer high-rise buildings often lack a street level human interface.

Another conclusion from the mapping is that denser pedestrian movement and activity happens along and around the taxi ranks, but less so with bus stops. From the overlay in Fig. 31. it seems that people use the taxi network far more than the bus routes. A further conclusion could be that the bus routes are not suitably aligned to the majority of job destinations, and that the taxis are more flexible to supply this need.

Urban vision: For People

Eight design principles were developed from a synthesis of Jan Gehl[6] and Joel Kotkin's[7] urban design values, based on a human centred city. These principles relate to the mapping group's findings in the city, of an overpowering number of hard edges and limited soft edges. The urban vision *For People* incorporates the soft edge principles to imagine the design of Pretoria inner city for its people.

5 Members of Master in Architecture (Professional) mapping group of 2019: Fourie, G., Guan, K., Jairam, P., Songabau, C., Spies, B., Vermeulen, A.

6 Jan Gehl is a Danish architect and urban design advisor practicing in Copenhagen. The "Gehl team" places emphasis on "people centred urban design" (gehlpeople.com, 2019) to redirect cities' focus toward the pedestrian and the cyclist to make cities for people.

7 Joel Kotkin is a professor in urban studies at the Chapman University of California, United States of America. He has published multiple books and articles relating to social and economic trends in the USA and internationally. The urban vision in this dissertation focuses on his book The Human City: Urbanism for the rest of us, 2016.

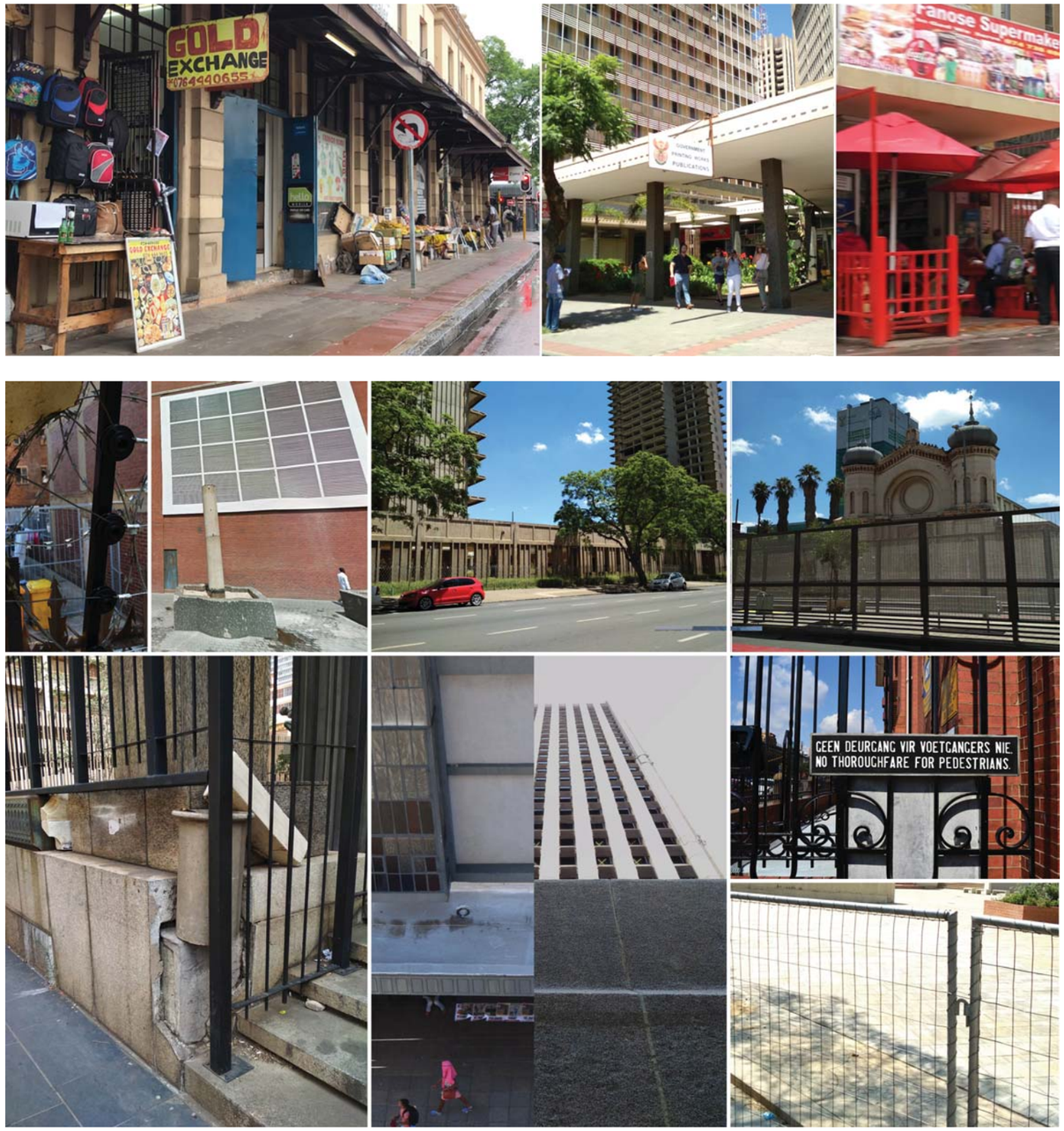


Fig. 26. Previous page; Historic photo of Pretoria, cnr of Skinner and Paul Kruger Street toward Church Square (Author, 2019; Adapted from Anon, circa 1950)

Fig. 27. Above Top; A city for its people (Author, 2019)

Fig. 28. Opposite Top; Soft edges of Pretoria inner city (Author, 2018; Spies, 2019)

Fig. 29. Opposite Bottom; Hard edges of Pretoria inner city (Author, 2018; 2019)

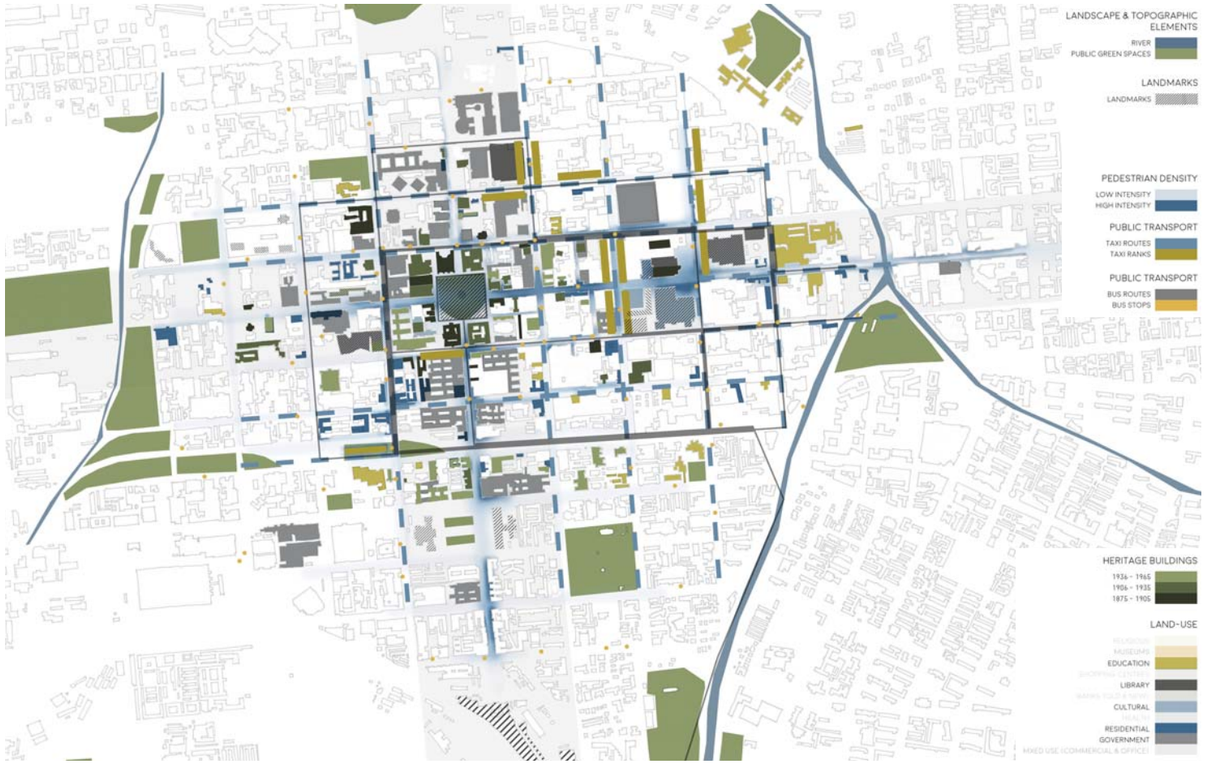


Fig. 30. Top; Overlay of various mapping layers (Fourie et al., 2019; Kirsten et al., 2018)

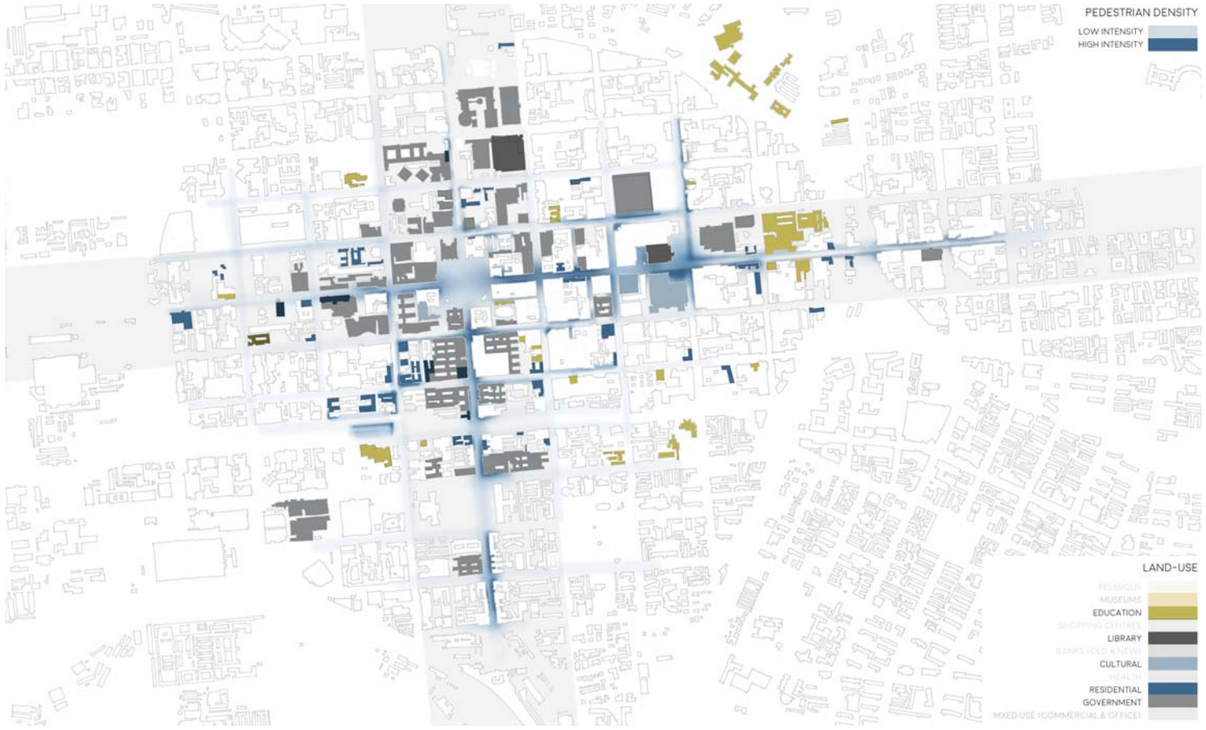


Fig. 31. Bottom; Mapping overlay of pedestrian movement density and land-uses (Fourie et al., 2019; Kirsten et al., 2018)

Fig. 32. Top; Mapping overlay of pedestrian movement density and heritage buildings (Fourie et al., 2019; Kirsten et al., 2018)

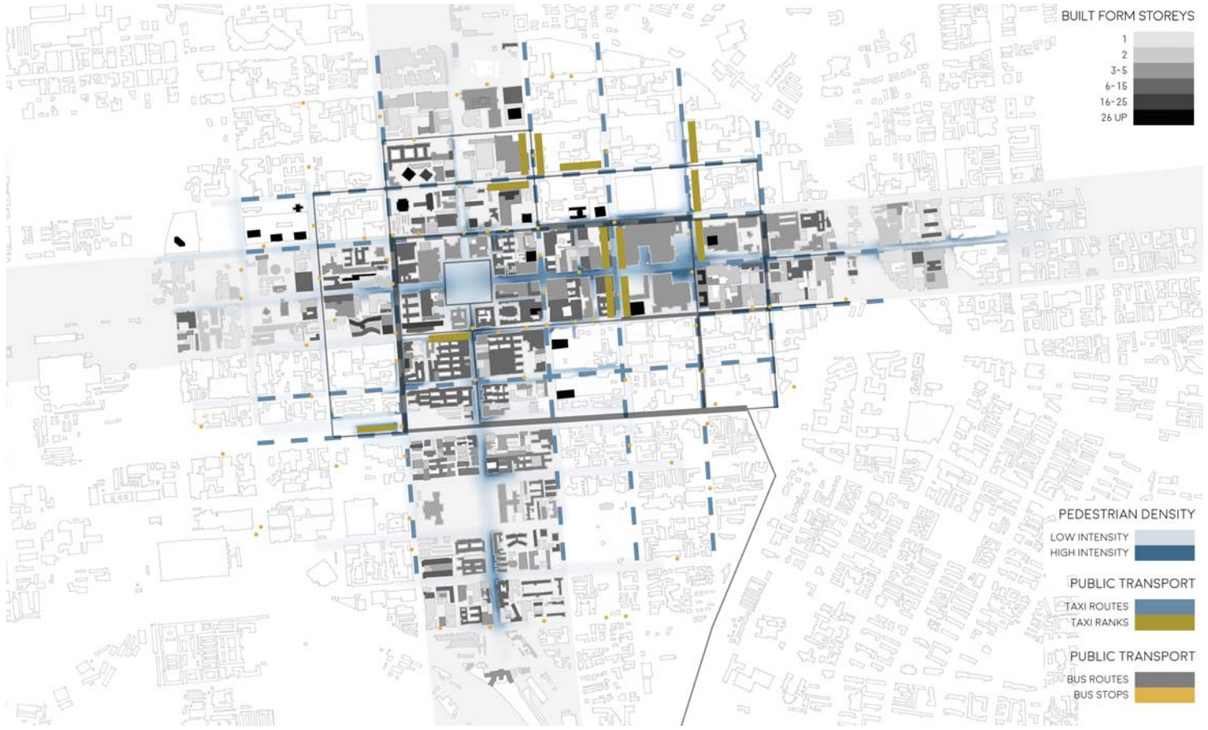
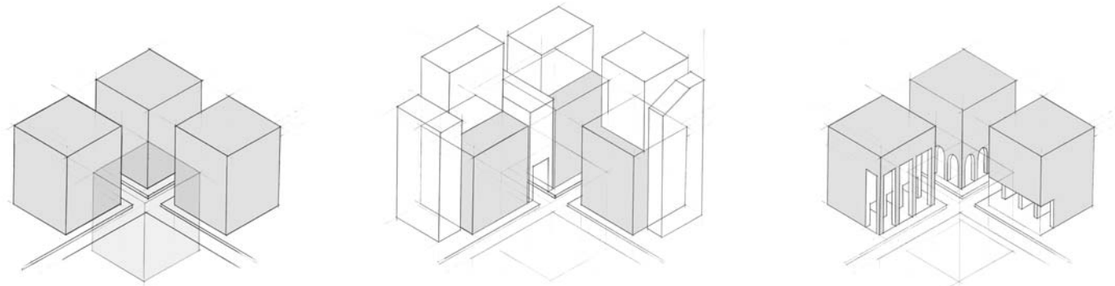


Fig. 33. Bottom; Mapping overlay of pedestrian movement density and modes of public transport (Fourie et al., 2019; Kirsten et al., 2018)



00 BASELINE

01 URBAN DENSITY INCREASE

02 PERMEABLE THRESHOLDS

03 CELEBRATED BUILDING CORNERS

04 PUBLIC COURTYARDS OF RELIEF

05 BIOPHILIC DESIGN

06 HUMAN SCALE DESIGN ELEMENTS

07 INCLUSIVE DESIGN

08 HUMANE URBAN TEXTURES

The eight design principles

Baseline condition of the inner city 00

Appropriate densification of activity through additional built fabric 01

Permeable and multi-functional building thresholds 02

Celebrated building corners 03

Public courtyards of relief 04

Biophilic design through additional natural elements 05

Human scale design elements that binds the building to the ground 06

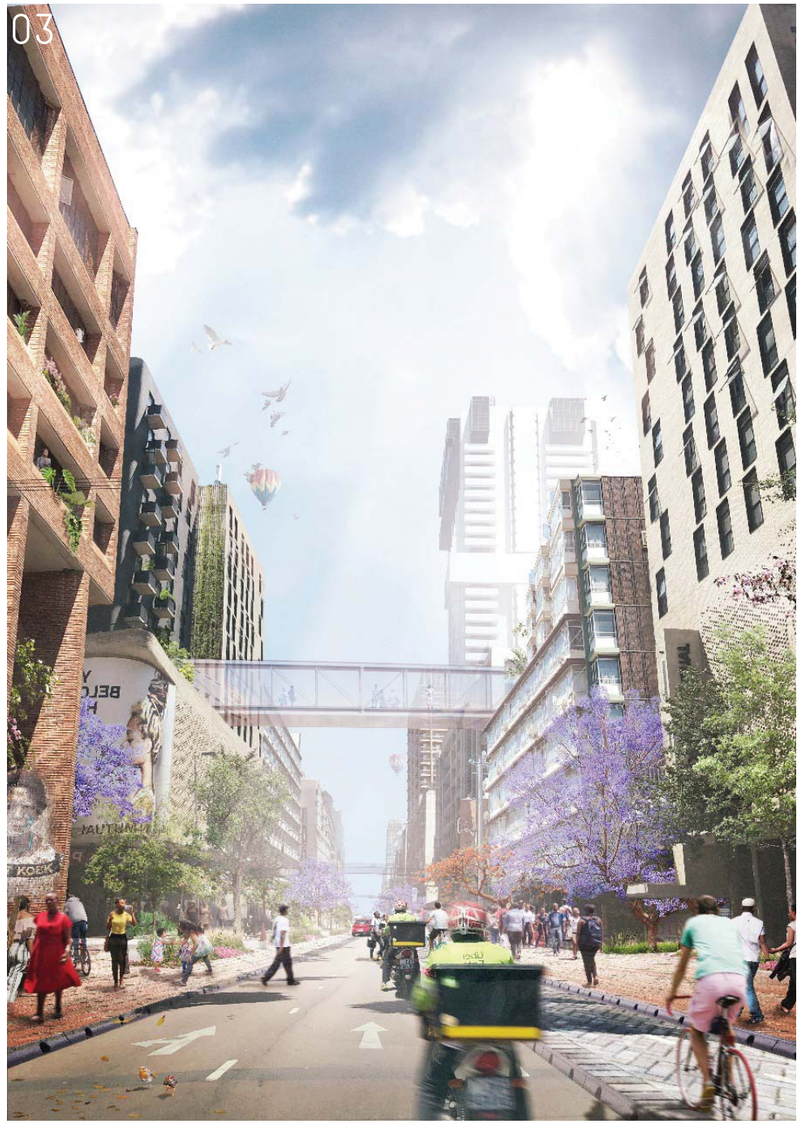
Inclusive design for disabled, elderly and children 07

Humane urban textures to provide a softer interface for the citizen 08

Fig. 34. Above; The eight design principles develop from the mapping (Fourie et al., 2019)

Fig. 35. Opposite; 01 Current oversupply of vehicular space (Fourie et al., 2019); 02 Transformation of the inner city (Fourie et al., 2019); 03 The benevolent city for its people (Fourie et al., 2019)

With the eight design principles the urban vision sequence wat created. The first image shows the current condition in the inner city, where the second image shows the transformation that will occur when designing with the *For People Design Principles*. The third and final image displays the benevolent city with multiple added amenities and activities to the streetscape, less private vehicles, and ultimately focus directed back towards the citizen.



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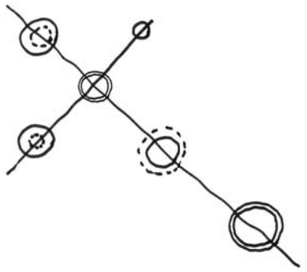

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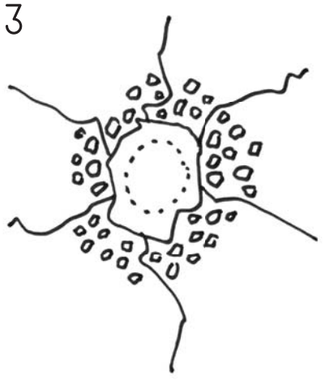

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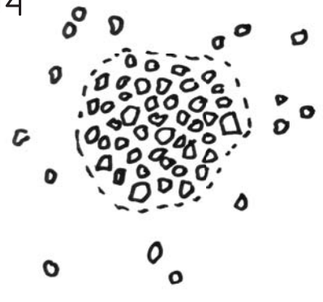

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MESO CASE STUDY AREA & PRECINCT VISION

The meso case study area or precinct is the length of Nana Sita Street, including the northern and southern bordering blocks. This area is delineated by the author and fellow Master in Architecture (Professional) student Gustav Kruger to incorporate both their sites. By creating a precinct vision, both architectural responses are contextualised within a broader vision for Pretoria. The opportunities presented by this precinct is the meaning of (or lack of) heritage, morphology, natural resources and street activity. To show these different opportunities, certain elements were mapped in the area including the plot layouts, zoning, pedestrian movement density, current uses (land use and activities), buildings of value (heritage), public green spaces, Gautrein bus routes, scarred spaces, A Re Yeng bus routes, edge conditions, and taxi ranks and routes.

The precinct vision, the *Urban Reconnecting Strip*, is strongly influenced by Gerald Steyn's African Urbanism principles of city-making. This local expert's findings on African city planning and development are chosen for the precinct vision above the Gehl and Kotkin urban design values. It was found to be a relevant progression to incorporate African ideas of urban design to understand how local historic entities have gone about making cities, rather than applying foreign first world principles. Steyn derived five main principles from his precedent- and typology development studies in Africa of how African cities are structured as well as which elements are vital to the workings of the city (Steyn, 2002); (Steyn & Roodt, 2003); (Steyn, 2006); (Steyn, 2007). These five principles are described below:

01 Universal place making

There is a universal nature of place making, related to communal open space (Steyn, 2007:61) and Kevin Lynch's (1960: 46-89) city image elements such as nodes, paths and landmarks that define the layout of a city.

02 Regional

African cities all tend to be site and circumstance based (Steyn, 2007:62), meaning that regional materials are used and local topography is taken into consideration.

03 Central Market place

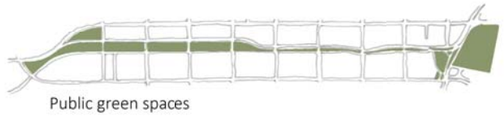
An important element in African city design is the market place (Steyn, 2007:62). Most often, streets and squares for commerce are present in the core of a city.

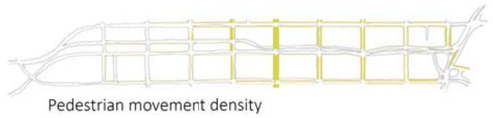
04 Horizontal density

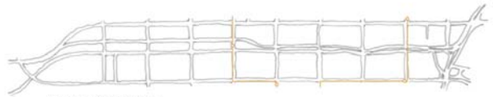
African cities are compact and horizontally dense resulting in close knit communities far denser than an Arabic counterpart (Steyn, 2007:62).

05 Village urbanism

Finally, a city of African origin displays an urbanism of villages (Steyn, 2007:62), referring to small self-sustaining units that make up a larger whole. Within the small unit or neighbourhood, mixed uses are sought.







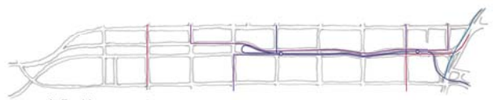
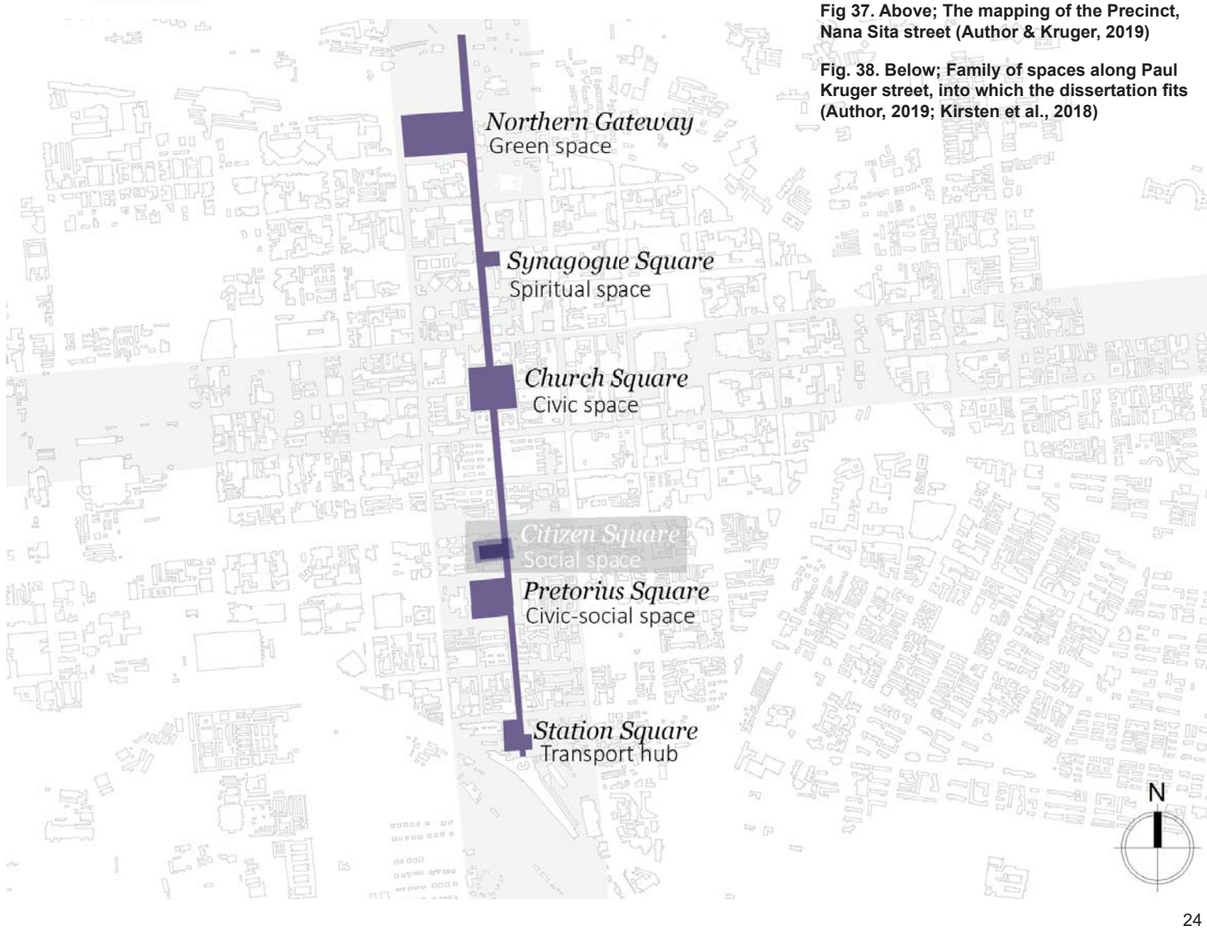
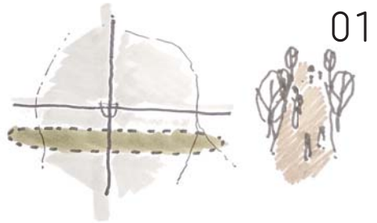


Fig. 36. Opposite; The five African Urbanism principles (Author, 2019)

Fig 37. Above; The mapping of the Precinct, Nana Sita street (Author & Kruger, 2019)

Fig. 38. Below; Family of spaces along Paul Kruger street, into which the dissertation fits (Author, 2019; Kirsten et al., 2018)





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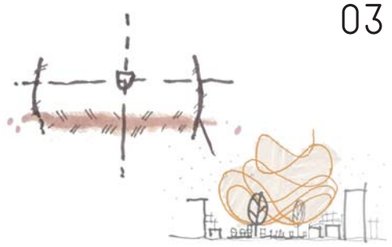

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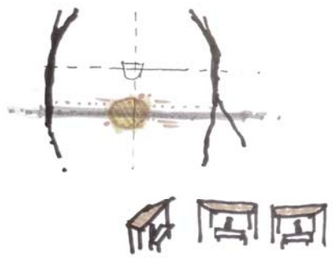


05

Fig. 39. Above; Urban reconnecting strip's five strategies (Author, 2019)

The Precinct vision: An Urban Reconnecting Strip

The precinct vision consists of five strategies focused on the regeneration of the different socio-economic-natural and spatial environmental elements along Nana Sita Street. The Tshwane inner city regeneration vision (City of Tshwane, 2015:50) proposes that recreational parks and green spaces along the Apies River and Steenhoven Spruit be created. The precinct vision incorporates Tshwane's ideas and extends them by adding a green corridor along Nana Sita Street. Tshwane's 2055 vision further foresees that Paul Kruger Street, the main north-south axis of Pretoria, will be pedestrianised (City of Tshwane, 2013:102) and it will become the Government Boulevard of inner city Pretoria (City of Tshwane, 2015:21). Due to the influx of pedestrians on this main axis, ample foot traffic is envisioned throughout Pretoria with ease of access to any part of the CBD, through the expansion of the public transport network (2015:70) which in turn will be fuelled by the green corridor stitching the disparate north and south of Pretoria.

An *Urban Reconnecting Strip's* five strategies (Fig. 39:

01 Interface Creation

Currently, a great number of government departments are on Nana Sita, but these buildings have no public interface. The precinct vision group proposed to create a street and public interface, where appropriate, facing Nana Sita to increase public open space and improve civic and citizen relations.

02 Ring Park

Tshwane 2055 envisions recreational green spaces along both the Apies River and Steenhoven Spruit to create a Ring Park. The precinct vision will use Nana Sita as the connecting corridor between the two disparate sides of Pretoria. An important element of Pretoria is its water. Storm water, in particular, is a pressing issue in cities, and by allowing for natural ground infiltration and diverting the surplus storm water into bioswales toward purification and rehabilitation nodes on the Eastern and Western edges of Nana Sita, a reconnection with the rivers and the prominence of water is reinstated.

03 Scar Repairing

The implementation of the altered Skinner street (now Nana Sita) broadening, that was adapted from the Ring-road scheme of 1967 (Bruinette *et al.,* 1967:Fig.8C) (Fig. 41) produced a scar in the urban fabric of Pretoria, cutting off the southern part of the city from its centre. This strategy of repairing the scar includes the consolidation of Nana Sita into a solitary two-way traffic stream, to incorporate the current eastern stream in the proposed green corridor as a pedestrian boulevard. The reconnecting strip is an urban recreational park where small scale commerce can happen spontaneously along the pedestrian routes. To free up space for the envisioned strip, scattered parking lots are consolidated into strategic, frequent nodes of parking. Moreover, on the remaining portion of Nana Sita Street, traffic is slowed and controlled through cobblestones and speed bumps for a friendlier pedestrian crossing.

04 Small scale urban production & water rehabilitation

Tying into the agrarian roots of Pretoria, a rekindling of produce and subsistence living is introduced with small scale compact fruit and vegetable production. Furthermore, this strategy incorporates village urbanism that advocates for self-sustaining units in the city, which means local food production and distribution, combined with supportive functions for families. Alongside the green corridor, rainwater run-off is captured from roofs and streets; then led to furrows and bioswales that run in the *Urban Reconnecting Strip* from the middle of Nana Sita Street (at the Paul Kruger intersection). The swales are sloped to either side where, at the lower end, the water collides with wetlands at Steenhoven Spruit (West) or the Apies River (East) (D). Here, at both ends the water is further rehabilitated and recreational programs can cluster.

05 Economic Injection

O'Connor (1983:196) mentions that many African cities have commercial spaces as a central component in the city centre. This notion is echoed in Pretoria where Church Square was initially a market place for the surrounding farmers, which relocated to the Market Square (Fig. 40) South of the Sammy Marks Building, replaced by Strijdom Square, now Lillian Ngoyi Square. The current large fresh produce trades hall is the Asiatic bazaar in Marabastad. The multiple relocations portray the shift in focus of central Pretoria, from produce distribution, to a formalised business district. At the intersection of Paul Kruger and Nana Sita Streets, a new central market place is envisioned to rekindle the lost connection of Pretoria's agrarian past. Coupled with the notion of public commercial space is street vending and informal trading that happens along pedestrian routes. Street vending occurs mostly along built fabric's active edges, to create a second layer of activity on the street. The precinct vision creates active edges on building façades, consisting of retail and services along Nana Sita that will spur the organic growth of street vendors.

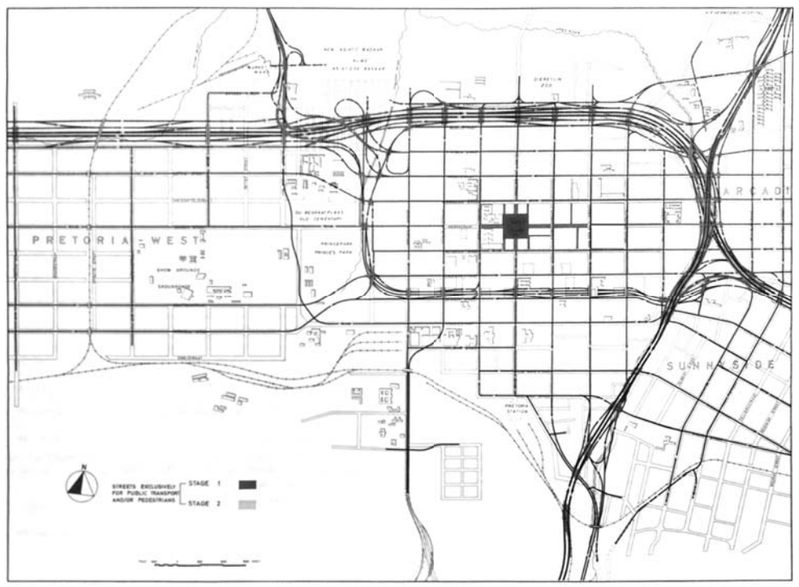


Fig. 40. Above; Market Square as open field (Anon, 1914); Market Square trades hall (Braune & Levy, 1900)

Fig. 41. Left; Full implementation of Ring-road Scheme. Note resemblance to the current pedestrian realm, Nelson Mandela and Nana Sita Streets (Bruinette et al., 1967)

Fig. 42. Below; The Urban Reconnecting strip (Author, 2019)

An Urban Reconnecting Strip (Fig. 42) – a new public realm that stretches along Nana Sita Street implementing partial pedestrianisation, landscaping and bioswales along with zones allocated for certain replenishing programmes.

Fauna realm (A) [aviary, entomology lab, small species]; Intersection of man (B) [transport hub, street activity, central market square]; Flora realm (C) [Productive agricultural towers, transport incubators].

MICRO CASE STUDY AREA

A site needed to be identified in order to showcase how fragmented urban fabric and the surrounding latent spaces in the inner city of Pretoria can be consolidated and regenerated to allow the citizen's realm to expand into the chosen site. Six potential sites were pinpointed (Fig. 44) due to them having three or more of the following qualities: street activity, latent open fragmented space and latent built fabric, heritage, proximity to axes or important nodes, vertical density, beneficial existing programmes, and a range of building styles. The listed qualities were deemed necessary by the author during the selection of a site, to fulfil the architectural intentions set in this dissertation as well as to create a rich palette for an architectural response to grow from.

Brief descriptions of the six potential sites:

01 Marabastad block

Inherent Marabastad heritage, street activity, proximity to primary school that is a beneficial existing programme, and latent spaces in the middle of the block.

02 Shop house block (across from synagogue)

Street activity, heritage shop house typology (limited artefact left in Pretoria), located on the prominent north-south axis of Pretoria (Paul Kruger Street), and a large proportion of latent space on the block, in the form of a parking lot.

03 012 Central block

Street activity, vertical density, on prominent east-west axis of Pretoria (Church Street), and most of the latent spaces of the block have been regenerated by the African Beer Emporium and 012 Central through the creation of a social public space in the block.

04 Volkstem block

Street activity, proximity to church square, vertical density, heritage building (Volkstem building as national monument and other buildings older than 60 years), latent courtyard space behind the Volkstem building, wide range of building styles.

05 The Land and Agricultural Bank block

Street activity, on prominent north-south axis of Pretoria (Paul Kruger Street), beneficial existing programmes, vertical density, heritage (Land and agricultural bank and other buildings older than 60 years), wide range of building styles, latent space located internally on the block, latent abandoned building.

06 South African Agency for Science and Technology block

On prominent north-south axis of Pretoria (Paul Kruger Street), beneficial existing programs, heritage (buildings older than 60 years), latent spaces found internally on the block, wide range of building styles.

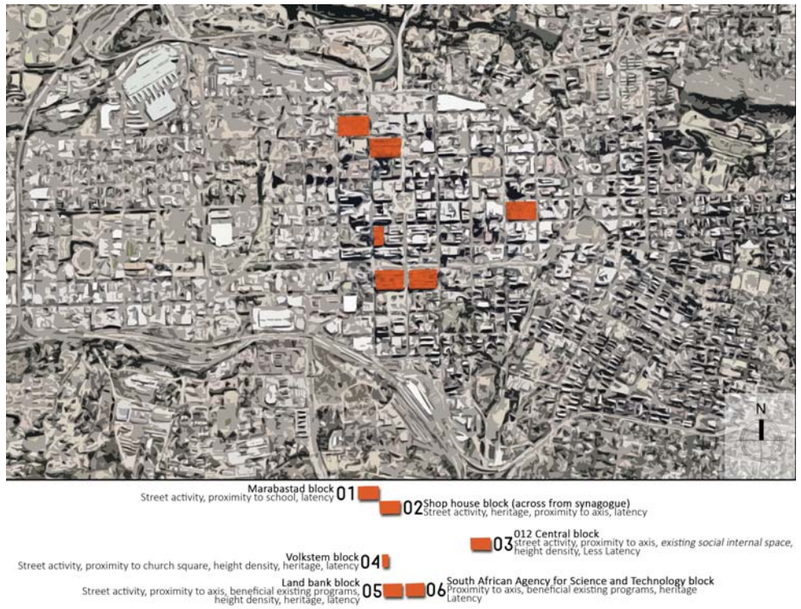


Fig. 43. Opposite; Six potential sites (Author, 2019; Adapted from Google Maps, 2019)

Fig. 44. Left; Site choices in Inner city Pretoria (Author, 2019; Adapted from Google Maps, 2019)

Fig. 45. Below; Chosen Land Bank block (Author, 2019; Adapted from Google Maps, 2019)

SITE CHOICE

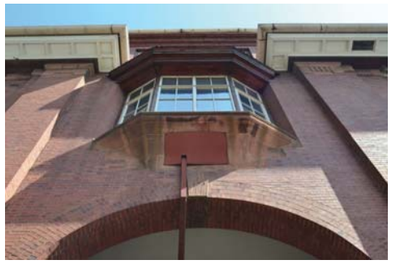
The Land and Agricultural Bank block was picked. This site was picked as it contains many different architectural styles, as well as an adequately sized latent pocket in the middle of the block that has the potential to be developed with integration of the surrounding façades. Of all the sites mentioned above, this site indicates the highest number of qualities (all seven) that were part of the selection criteria.

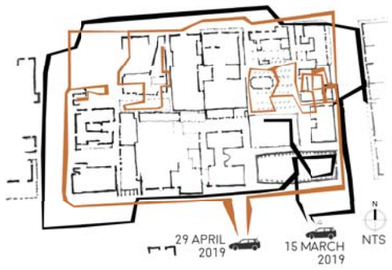
Fig. 46. Top; The Land and Agricultural Bank street façade - east (Author, 2019)

Fig. 47. Middle Top; The Land Bank western façade Art Deco piece (Author, 2019)

Fig. 48. Middle Bottom; Façade detail, arch keystone, bay window and eaves (Author, 2019)

Fig. 49. Bottom; Transect walks where photos were taken and observations made (Author, 2019)





The Land and Agricultural Bank block

The case-study block sits on an intersection between Nana Sita Street, a morphological scar cutting through the inner city; and the main Cardo axis, Paul Kruger Street. Formerly called Market Street (Andrews, 1985:1), Paul Kruger Street extends from Church Square, the old *Markt Plein* [Market Square]. This block exhibits latent potential and opportunities including heritage value, height and density, beneficial existing programmes, street activity, and proximity to axis. The extent of latent fragmented spaces is adequate and shows capacity for activation and connections to be made. The block has a large number of building types and programmes: crafts, nutrition, luxury, residential, educational, spiritual, and business oriented. Identified clusters where different patterns and elements intersect provide opportunities for new architecture to be generated.

The old Land and Agricultural Bank building

The Land and Agricultural bank is a two and a half storey English Neoclassical Renaissance building. The first portion of the building, on the southern corner of Paul Kruger Street, was completed in 1914 and designed by Wilhelm de Zwaan (1867-1948) (Andrews, 1985:9; Artefacts.co.za, 2019 (1)). An addition was made to the North of the building in 1922 by Cowin, Powers and Ellis (Artefacts.co.za, 2019 (2)) continuing the same style, scale and proportion (Le Roux, 1993:31). The final addition was added in 1932 by Gerard Moerdyk (1890-1958) (Le Roux, 1993:31; Artefacts.co.za, 2019 (3)), respecting the street façade and keeping the order, style and proportion. Yet, the addition's western elevation (facing the block interior) morphs into an Art Deco piece (Fig. 46) that represents the style of the era it was built in. Moerdyk's addition morphs with time and therefore it is a good example of a palimpsetic approach to architectural conservation. The southern wing was demolished in 1966 to make way for the Land and Agricultural Bank's new high-rise Modern administrative offices named the Hannes Smit Building, designed by Johan de Ridder (1927-) (Le Roux, 1993:20; Artefacts.co.za, 2019 (4)).

Historically, the Land and Agricultural Bank provided services and support to farmers, echoing the agrarian perspective of Pretoria. The building became home to UNISA's Mathematics department after the Land Bank moved to the Hannes Smit Building (Cape and Transvaal Printing, 1973:82). Thereafter, it housed the 'Southern African Catholic Bishops Conference' programme, naming the building Khanya House. The building currently accommodates an Attorney firm, Maluleke Msimang and Associates.

SITE DEFINITION

Towards a focus area on the block

Transect walks

The site visits were structured to understand various elements. Firstly, to comprehend the block and its components as a whole, and secondly to establish a focus area on the block by considering the inter-relationships (or lack thereof) of different activities and fragmented spaces. Photographs provided a palette of architectural idioms and materials from the immediate context. By developing an understanding of the block's idioms and materials, an architectural design solution, derived from its contextual cues, emerged.

Layer investigations

Through layering multiple physical aspects of the site (Fig. 58) such as barriers (varying in permeability), space appropriation by people, openings and overhangs, and potential active edges, clustering occurs that inform where the opportunities for architectural intervention lies.

The conclusions drawn from the layered clustering indicated that internal spaces are less active as there is no public access, and the potentially active edges (Fig. 58) can be accessed through extending the internal spaces and programmes to the exterior areas on the inside of the block. Granting access to the public for activities and passages in the middle of the block can help draw the pedestrian into the block to further activate the latent interior block spaces.

Focus area & site delimitation

In order to draw pedestrians into the site and allow the spread of the citizen's realm, the energy of the main pedestrianised axis (Paul Kruger Street) should be harnessed. The Land and Agricultural Bank has a portal (Fig. 60) vehicular entrance that can be easily transformed to accommodate a primary pedestrian access point leading to the middle of the block.

It is from the Land and Agricultural Bank Building that the new architectural intervention finds the inception point and grows to extend into the latent pocket in the middle of the block, behind the Land Bank. This action continues the language of morphing and layering, as initiated by the latest addition to the building.

Furthermore, the focus area of the block (Fig. 60) encompasses the surrounding façades of the latent pocket, with particular focus on the latent aspects of the internal facing façades. The latent elements include a lack of harnessing or controlling light, missed opportunities to provide multi-functionality, and potential for internal and external space interaction.

SITE ASSUMPTIONS

The plans of each building used to intervene have not been accessed, but thorough overall measurements have been done from Google Earth as well as on-site measurements and investigations. Photographic materials from vantage points were further used to determine some of the structural grids of the existing buildings where access was not possible. Moreover it is assumed that the different public and private stakeholders present on the site will agree to the consolidation or adjusting of the plot boundaries, facilitated by the Metropolitan Municipality of Tshwane. It is further presumed that the parties involved will deal with the resultant service issues that may arise to accommodate the new internal public space and other programmes, owned and managed by third party private entities. The existing private stakeholders will receive compensation in that a latent segment of their building is improved, or they benefit directly from the new intervention. Furthermore, the existing buildings' fire escapes and routes are left unchanged, or where they are tampered with, are merged with the new intervention's services to adequately suit Local Authority Building Regulations including the SANS 10400 Part D, Public Safety; Part O, Lighting and Ventilation; Part R, Storm water Disposal; and Part T, Fire Regulations.

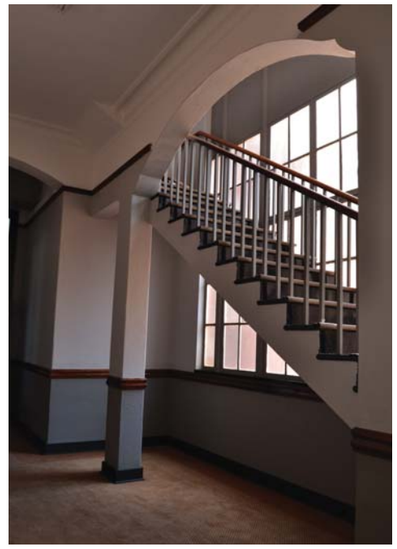


Fig. 50. Top; The Land and Agricultural Bank connection to attic rooms (Author, 2019)

Fig. 51. Middle; The Land Bank 1922 staircase detail, steel and timber (Author, 2019)

Fig. 52. Bottom; Timber interior infill panels between concrete structure (Author, 2019)

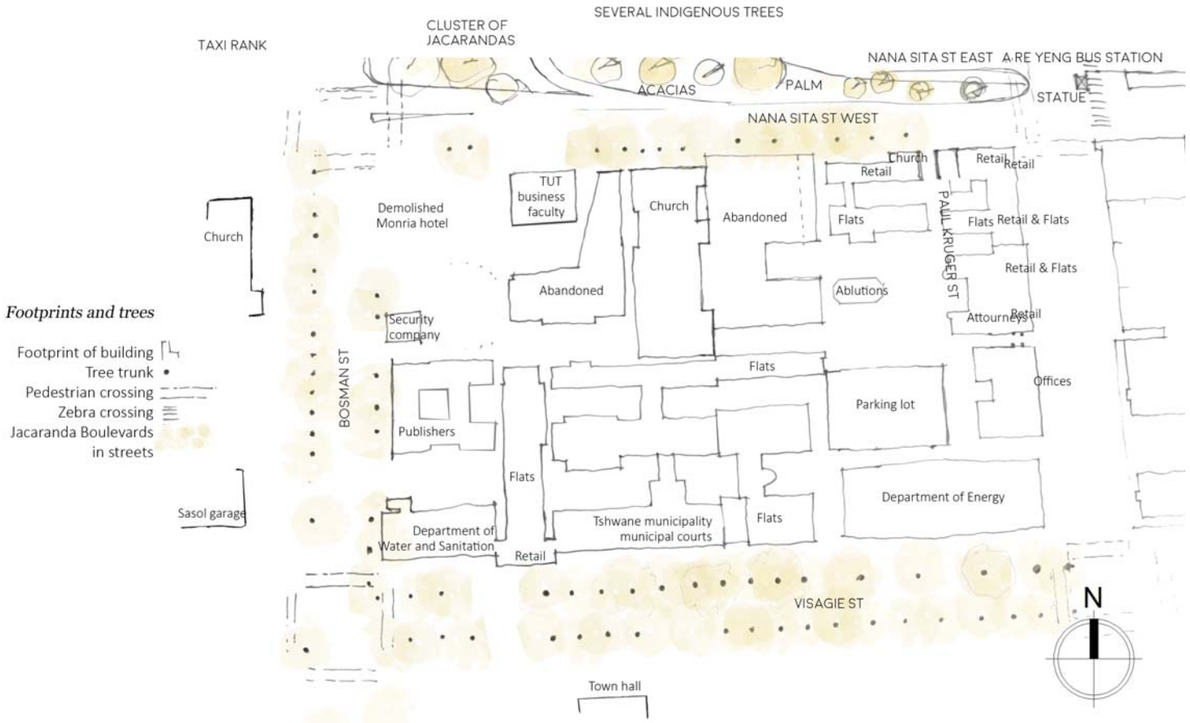


Fig. 53. Top; Footprints and trees layer (Author, 2019)

Fig. 54. Bottom; Barriers varying in permeability (Author, 2019)

Fig. 55. Top; Activity and movement density (Author, 2019)

Fig. 56. Bottom; Appropriation of space (Author, 2019)

Fig. 57. Top; Openings and overhangs (Author, 2019)

Fig. 58. Bottom; Latent space classification (Author, 2019)

Fig. 59. Opposite Top; All layers combined to identify clustering (Author, 2019)

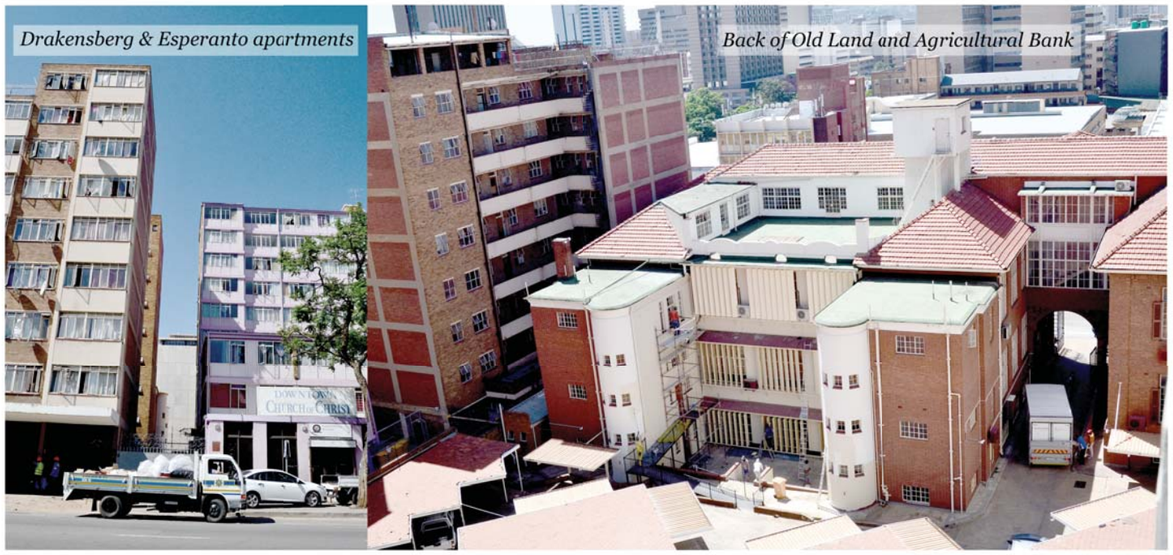
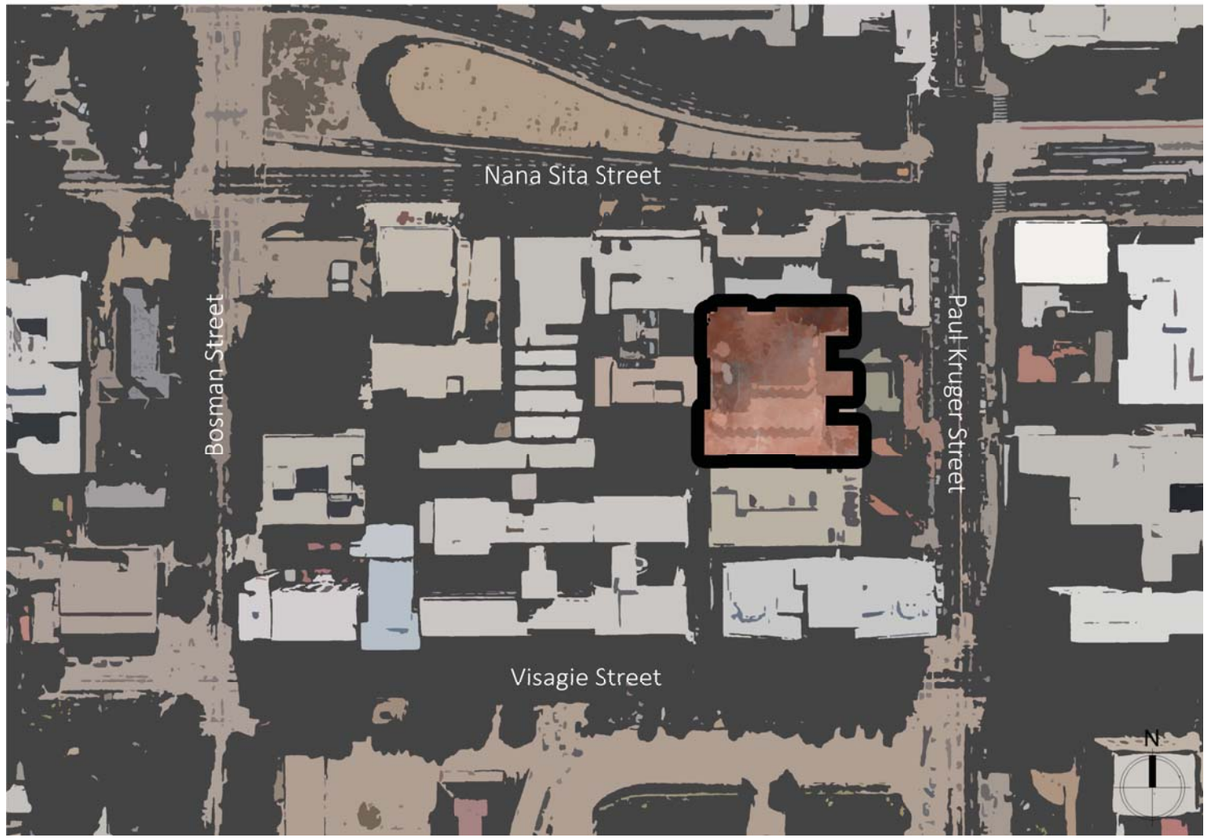


Fig. 60. Site focus area as the latent pocket in the middle of the block with adjacent façades (Author, 2019)

Latent pocket in middle of block and adjacent façades



HERITAGE LENS

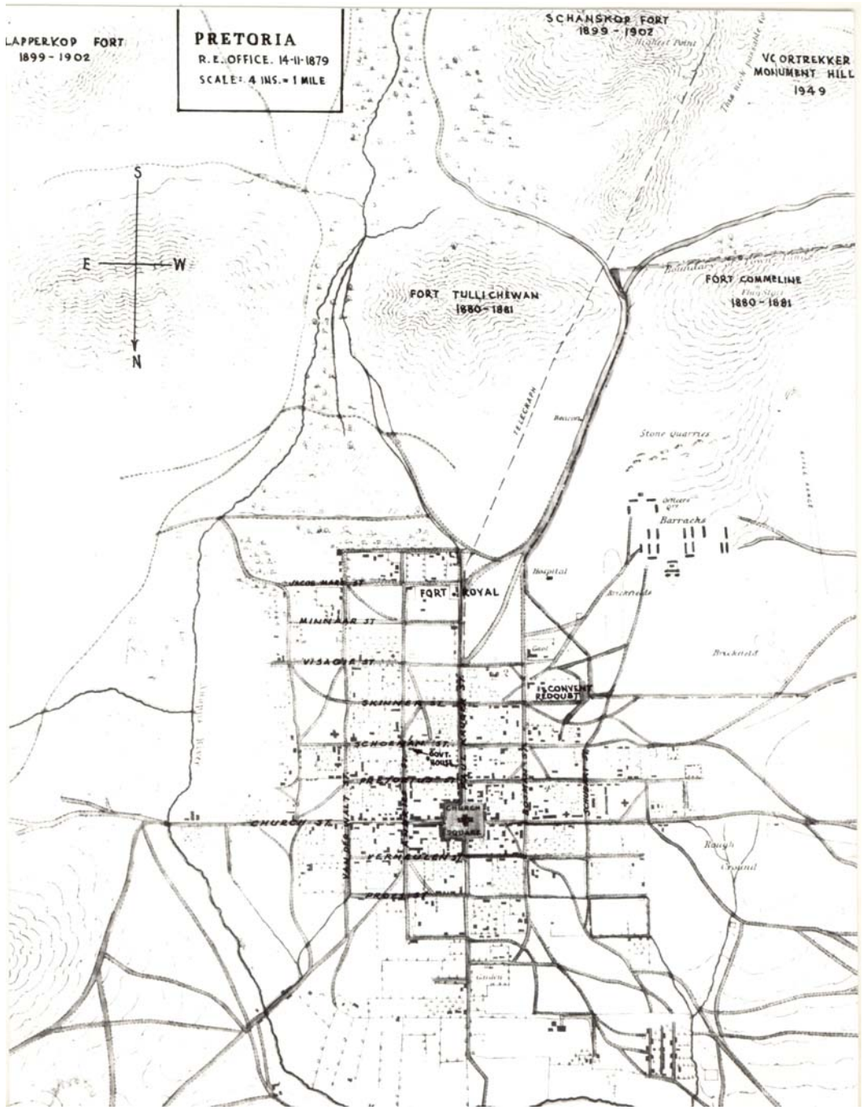
- Morphology of city block
- Values-based approach towards designing with history & context
- Statement of significance
- Attitude towards heritage practices
- Resulting approaches and strategies
- Precedents

historical influences

Fig. 61. Previous page; Markt Straat, Pretoria Author, 2019; Adapted from A.T.B. Boekhandel, nd:129)

Fig. 62. Below; Pretoria Sketch Map showing early Pretoria morphology (R.E. Office, 1879)

The following sections unpack the heritage aspects of the dissertation utilising the "six necessary design stages when working in historic contexts" outlined by Barker (2019:2). The first of Barker's (2019:3-16) design stages is **recognition**, where the designer should identify important fabric that has value or significance on the selected site. The second design stage is **analysis**, where the recognised fabric is analysed and studied to determine the amount of value it holds. Thirdly, an appropriate **attitude** towards dealing with heritage is needed. The fourth stage, in the current study combined with stage three, is determining the intended **approach** or dialogue with the historic fabric. The fifth stage is where all the previous stages' findings amalgamate to develop a specific **strategy** or multiple strategies that will be used to intervene with the existing. The last stage is **expression** that reveals the architectural design response utilising materiality, technology, light, form, and space. Expression is not dealt with in this chapter, but will be handled in the later chapters on the architectural solution that showcases the intentions laid out by stages one throughout five.



MORPHOLOGY OF CITY BLOCK

(RECOGNITION & ANALYSIS)

The investigation of the morphology of the block was done by consulting various Directories of Pretoria, comprising a list of alphabetical trades, streets, and buildings of specific years in Pretoria's history. These directories and historic photos were accessed at the Es'kia Mphahlele library at Sammy Marks square in Pretoria inner city. The directories give a listing of the land use and activities on each plot, while the images portray the streetscape. The directories are so detailed that when information is extracted from each directory and overlaid, the analysis of the layers that developed over time gives an understanding of architectural typological evolution forming a morphological image of the block (Fig.63, 64, 71, 72, 78).

There are several patterns of programmes clustering spatially or thematically on corners or along the prominent streets. The patterns include the resident of the property becoming a business owner, or a corner location becoming a prominent spot for a café or a grocery store. The shift from a residential typology, which catered for small scale subsistence farming on the large plots, to shops and businesses, resulted in the fragmentation and obsolescence of the internal areas of the block. The street edge receives the focus of the building as the interaction or visual connection with the passer-by is key to the success of a business (Wolf, 2005:399), where the backyard transforms into service and workshop areas or has no use at all.

Throughout the development of the block there were a large number of building types and programmes that have come and gone, with some staying on as long term additions to the block. The programme fields range widely, including tailoring, shoemaking, residential, tea lounge, cafés, restaurants, a trades hall, the Land Bank, educational spaces, religious places, general office space, grocery store, drug store, doctor's office, timber trading, masons and brick sellers, hotels and a florist. From the wide assortment of bygone programmes, very little has remained, resulting in a city block with latent potential with regards to its multi-functionality and vitality. The new architecture and accompanying programmes will attempt to harness this potential by adding a range of programmes and re-instilling the lost rich palette that gives vibrancy and livelihood to the city; a form of resilience that helps the city to regenerate and gain density. The programme development will be further discussed in chapter 5.

1899

1. Residential
2. Catholic church
3. Convent
4. Trading & Timber yard
5. Goods Store
6. Café
7. Drug store
8. Square
9. Boarding house
10. Shoemaker
11. Butcher
12. Music warehouse
13. Grocer
14. Stone merchant
15. Medical Doctor
16. Dentist
17. ZASM offices
18. Masons

x. Vacant house

xx. Vacant plot

Fig. 63. Top; Morphological image of the block in 1899 (Author, 2019)

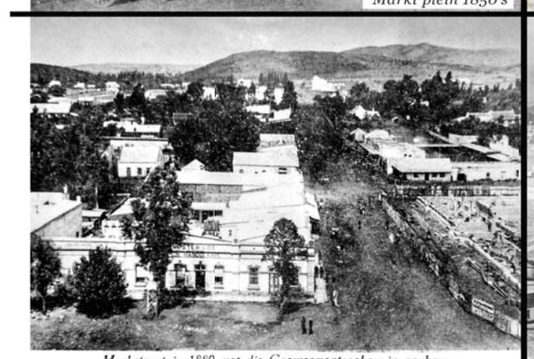
Fig. 64. Bottom; Morphological image of the block in 1913 (Author, 2019)

1913

1. Residential
2. Catholic church
3. Convent
4. Old prison
5. Bar
6. Shoemaker
7. Café
8. Tailor
9. Boarding house
10. Store
11. Blacksmith and farrier
12. Volunteer Institute
13. Square
14. Butcher
15. Music warehouse
16. Grocer
17. Catholic Presbytery
18. Medical doctor
19. Union department of Agriculture- Entomology

x. Vacant house

xx. Vacant plot


Markstraat in 1889 met die Goewermentsgebou in aanbou.

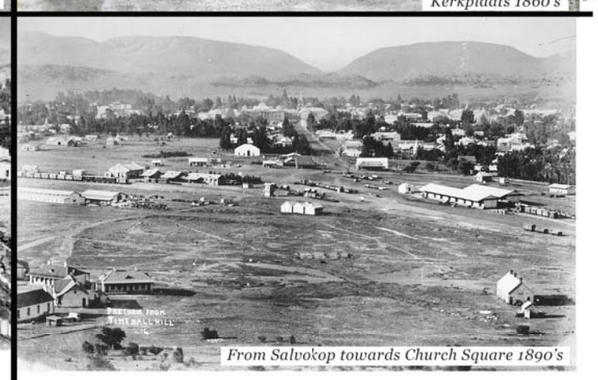


Fig. 65. Left Top; Pretoria 1872 (Baines in Allen, 1971)

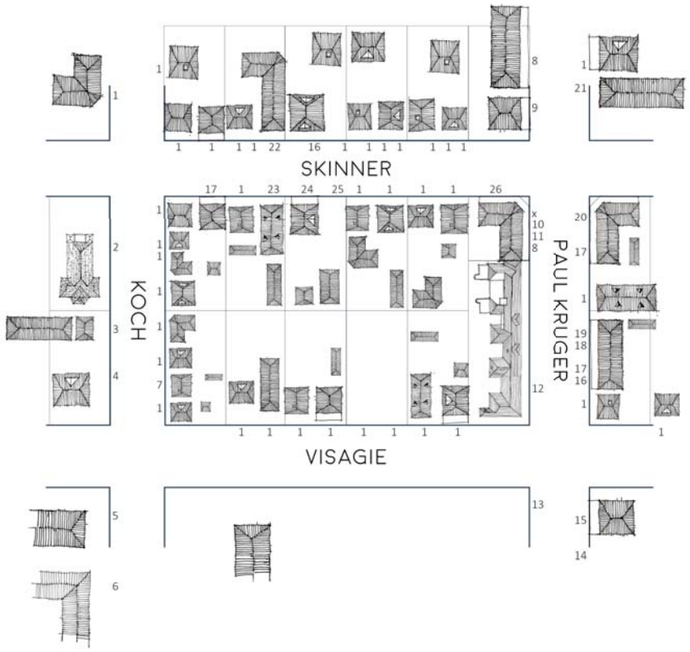
Fig. 66. Right Top; Pretoria from the south road 1873 (Oates in Allen, 1971)

Fig. 67. Left Middle; Market Square circa 1890 (Anon, 1890)

Fig. 68. Right Middle; Kerkplaats circa 1860's (Anon in Allen, 1971)

Fig. 69. Left Bottom; Market Street with Parliament building under construction (Anon in Allen, 1971:260)

Fig. 70. Right Bottom; Aerial view from Timeball Hill in the 1890's (Es'kia Mphahlele, 1890:293)

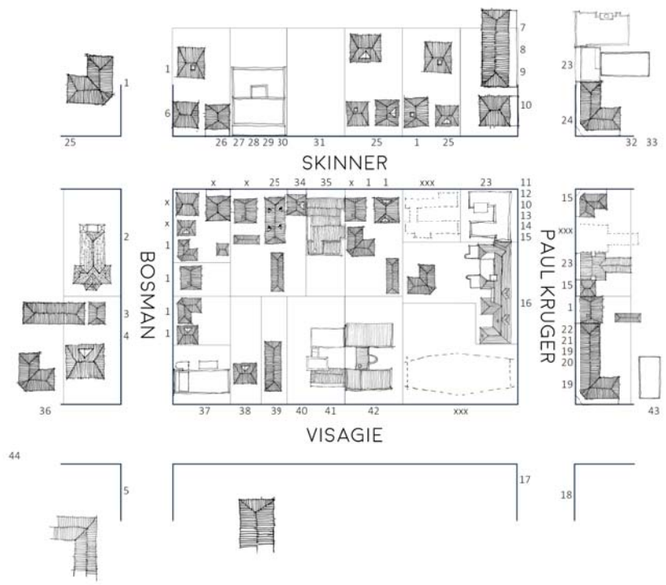


1943

1. Residential
2. Catholic church
3. Loreto House Schoo
4. Roman Catholic Presbytery
5. Side of Royal Mint
6. Fire station
7. Service club
8. Bazaar
9. Butchery
10. Leather Company
11. Boot repairs
12. Land and Agricultural Bank
13. New City Hall
14. Transvaal Museum
15. Geological survey Dept.
16. Store
17. Café
18. Store room
19. Hairdressers
20. Bottle store
21. Furnishers
22. Flats
23. Trades hall
24. S.A. Typographical Union
25. Apostolic Church
26. City Square Chambers
x. Vacant

Fig. 71. Top; Morphological image of the block in 1943 (Author, 2019)

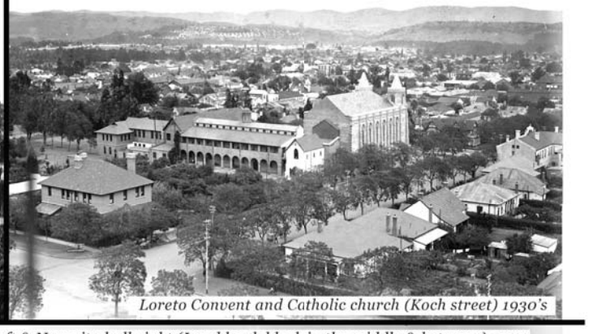
Fig. 72. Bottom; Morphological image of the block in 1965 (Author, 2019)



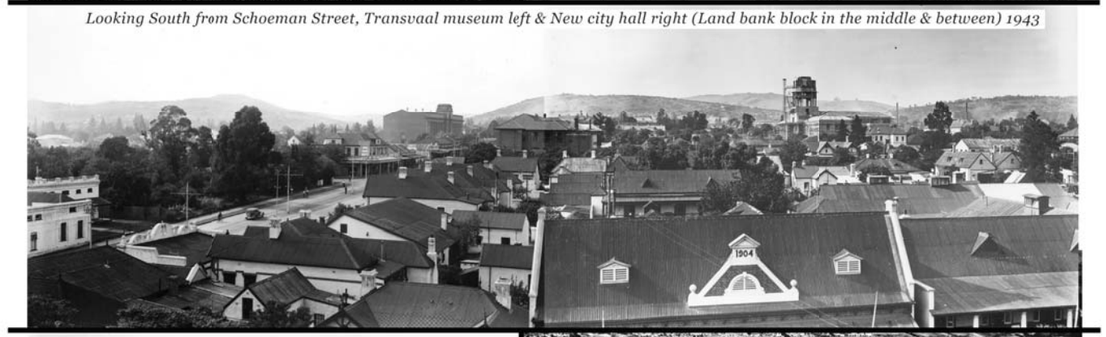
1965

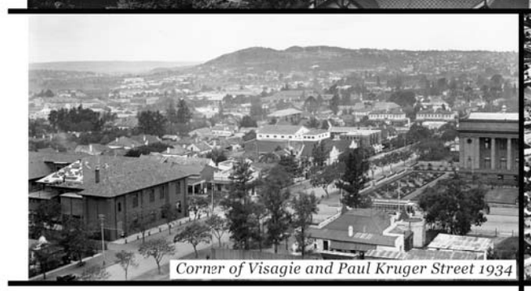
1. Residential
2. Catholic church
3. Loreto House School
4. Roman Catholic Presbytery
5. Fire station
6. Health Board
7. Bazaar
8. Butchery
9. Frutaria (Fruit & Veg Shop)
10. Dry Cleaners
11. Grocer
12. Jacaranda Florist
13. Radio & Electrical repair Service
14. Porto Santo
15. Wholesalers
16. Land and Agricultural Bank
17. City Hall
18. Transvaal Museum
19. Jewellers
20. Café
21. Hairdressers
22. Dress Shop
23. Flats
24. Furniture Shop
25. Bristol Hotel & annexes
26. Milburn Court
27. Toy shop
28. Drug store
29. Realtor
30. Investors
31. Back of Garage
32. Parking lot
33. The foundation for Education Science and Technology
34. Shop
35. Trades hall
36. Rosary Lodge
37. Continental Hotel
38. Caxton Tea Lounge
39. Municipal Offices
40. Rondalia insurance
41. Rondalia touring
42. Citrus exchange
43. General Pier Joubert Building
44. S.A. Mint
x. Vacant house
xxx. Building in progress


Land and Agricultural Bank original southern wing 1915


Loreto Convent and Catholic church (Koch street) 1930's

Looking South from Schoeman Street, Transvaal museum left & New city hall right (Land bank block in the middle & between) 1943




Corner of Visagie and Paul Kruger Street 1934


Aerial view of Pretoria inner city 1948

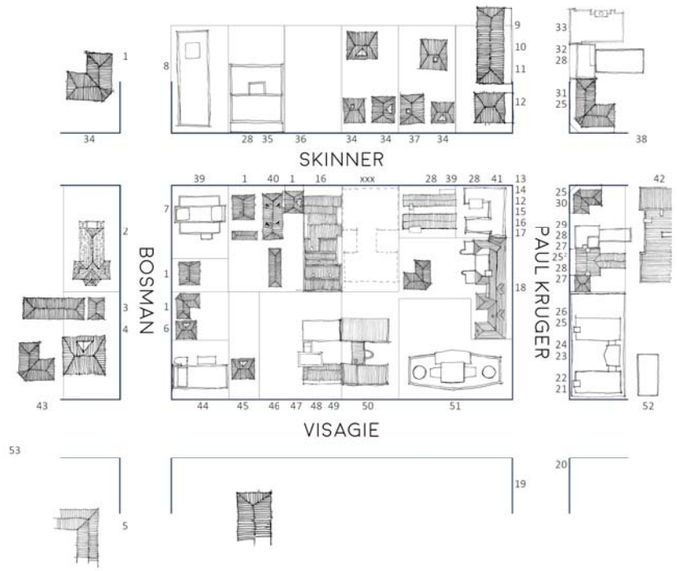
Fig. 73. Left Top; Land and Agricultural Bank of South Africa on the north-west corner of Paul Kruger and Visagie Street (Anon, 1960:2093)

Fig. 74. Right Top; Aerial view of Pretoria from Visagie Street looking north-west with the Loreto Convent in front (Anon, 1930: 2309)

Fig. 75. Middle; The Transvaal Museum with The new City Hall during construction (Anon, 1935:2611,2591)

Fig. 76. Left Bottom; Aerial view of the corner of Visagie and Paul Kruger Street during the construction of the new City Hall (Anon, 1934:2078)

Fig. 77. Right Bottom; Aerial view of Pretoria CBD (Anon, 1948:1331)



1973

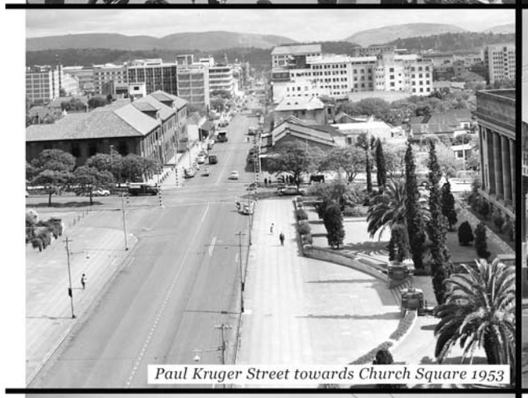
1. Residential
2. Catholic church
3. Loreto House School
4. Roman Catholic Presbytery
5. Fire station
6. Continental Hotel sales office
7. Monria Hotel
8. H.B. Phillips building
9. Bazaar
10. Fish and Chips
11. Frutaria (Fruit & Veg Shop)
12. Dry Cleaners
13. Delicatessen
14. Porto Santo
15. Radio & Electrical repair Service
16. Wholesalers
17. Duke's Family centre
18. UNISA Mathematics department
19. City Hall
20. Transvaal Museum
21. Bank of Lisbon & S.A.
22. Store
23. Credit centre
24. Snack bar
25. Furnishers
26. Butcher
27. Outfitters
28. Flats
29. Supermarket
30. Gift shop
31. Post office furniture shop
32. Goodwood house
33. Hotel Edward
34. Bristol Hotel & annexes
35. Drug store
36. Back of Garage
37. Compuquip store
38. Parking lot
39. Café
40. African Commerce Development
41. Golden egg restaurant
42. Didacta building
43. Rosary Lodge
44. Continental Hotel
45. SATU House
46. Hairdressing
47. Rondalia insurance
48. Rondalia touring
49. Textige shop
50. Citrus exchange
51. Land & Agricultural Bank
52. General Piet Joubert Building
53. S.A. Mint

xxx. Building in progress

Fig. 78. Top; Morphological image of the block in 1973 (Author, 2019)


Paul Kruger Street, General J.C. Smuts funeral 1950


Aerial view of City Hall. Citrus exchange in construction (right) 1945


Paul Kruger Street towards Church Square 1953


Corner of Paul Kruger and Skinner Street: Typological corner building 1953

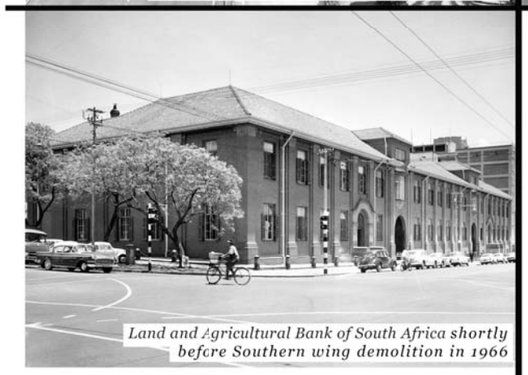

Land and Agricultural Bank of South Africa shortly befcre Southern wing demolition in 1966

Fig. 79. Left Top; Funeral procession of General J.C. Smuts along Paul Kruger Street (Anon, 1950:322C)

Fig. 80. Right Top; Aerial view of the new City Hall in Paul Kruger Street with the Transvaal Museum and the NZASM Head Office (Anon, 1935:3053)

Fig. 81. Left Middle; Paul Kruger Street looking north from the Paulhof Building (Anon, 1953: 872)

Fig. 82. Right Middle; Corner of Paul Kruger andSkinner Streets (Anon, 1953: 483)

Fig. 83. Left Bottom; Land and Agricultural Bank of South Africa on the north-west corner of Paul Kruger and Visagie Street (Anon, 1960:2093)

VALUES-BASED APPROACH TOWARDS DESIGNING WITH HISTORY & CONTEXT (RECOGNITION & ANALYSIS)

Considering the Burra Charter[8], the National Heritage Resources Act (NHRA)[9], the Tshwane Heritage Resources Management Framework[10], and other articles[11] on architectural heritage, significance and conservation; Orbaşli's (2008:38) strategy was preferred by the author because of its perceived tangibility and specific visual values rather than broad categories of handling old buildings and places. Orbaşli (2008:37-46) deals with conservation in the built environment, applying consolidated theories for architectural conservation by attributing values to the buildings to understand their significances.

Using this approach, a quick but concise analysis of significance is done graphically. The system is designed to be read as cue cards that develop an overall initial understanding of the block and its particular buildings to establish where and how to intervene, if at all. The number of icons a building receives, builds an argument towards its conservation, as well as how to adapt and understand what can be altered. This exercise is an introduction to the statements of significances, a further analysis of the physical- and historical context.

+ Value-icons

+ Statement of significance

= Establishing where and how to intervene, if at all.

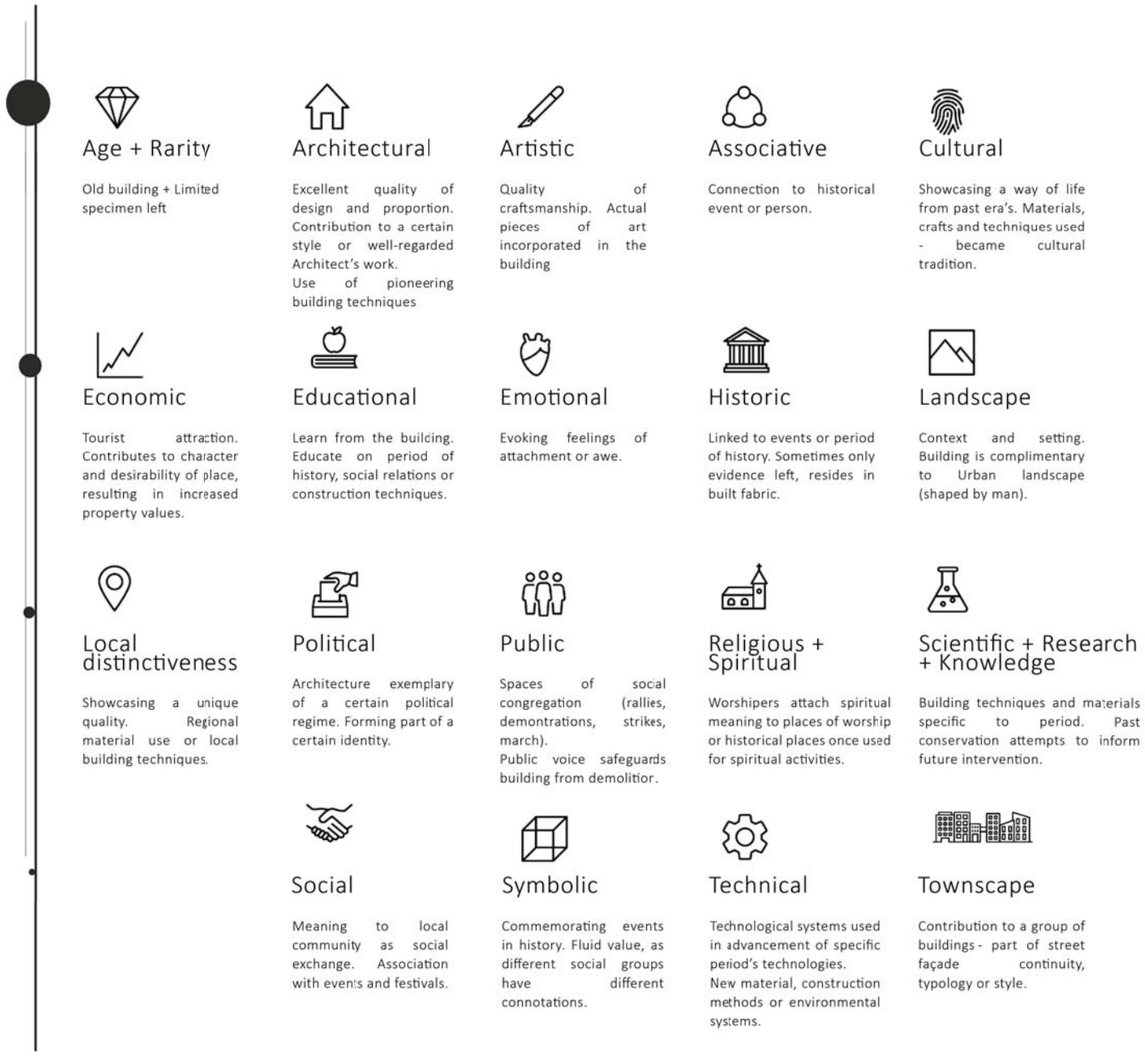


Fig. 84. Above; The nineteen values developed by Orbaşli, with icons from ICON54 (Méder, Shrieber, & Tintner, 2017)

8 The Burra Charter is the Australian heritage Charter based on the International Charter for the Conservation and Restoration of Monuments and Sites (ICOMOS, drafted in 1964 Venice) that handles the processes and guidelines to conserve places of cultural significance in Australia (Australia ICOMOS Burra Charter, 1999:1).

9 The National Heritage Resources Act consists of an "integrated and interactive system for the management of the national heritage resources" (RSA, 1999:1) and to "empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations", but most importantly the act helps with the "identification, assessment and management of the heritage resources of South Africa".

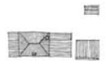
10 This framework is a heritage register that takes the NHRA's section 3(3) into consideration with specific reference to the application thereof in Tshwane, noting the values deemed important by the NHRA (City of Tshwane, 2008:491).

11 Other documents or articles consulted:

McCarthy, C. 2012. Re-thinking threats to architectural heritage. International Journal of Heritage Studies, 18:6, 624-636.

Australian Heritage Commission. 2000. Protecting Local Heritage Places: A guide for communities. Canberra: Australian Heritage Commission.

3 07



1920's
Residential house | Altered, moderate condition | 1 Storey

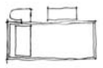
2x Chimney brick detailing
Rooftrusses in good condition
One of two remaining buildings of
the residential period on this block.

4 05

1980's
Lapa uitgewers | Good condition | 3 Storeys

Mosaic tile detailing on façade
Exemplary façade design of the 1980's in Pretoria
Scale

4 05



1965
Continental Hotel | Good condition | 9 Storeys

Typical functional-modernist building
No shading on façades
Structural expression
Rhythm + proportion

2 08

1951
SATU House | Moderate condition | 5 Storeys | Corrigal & Crickmay

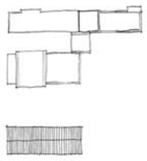
Brick pattern on façade
Structural expression
Overhang
Scale

5 04

1950's
Building | Moderate condition | 2 Storeys

Red brick façades
Roof ventilation detailing
Old tea house?

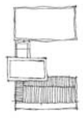
6 02



1980's?
Rondalia addition | Good condition | 8 Storeys

Concrete + mosaic façade detailing
Structural expression
Artistic roof detail

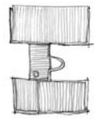
4 05



1962
Rondalia building | Good condition | 8 Storeys

Concrete + mosaic façade detailing
Structural expression
Rhythm + proportion
Artistic roof detail

2 08



1951
Citrus Exchange | Good condition | 5 Storeys | Burg Lodge and Burg

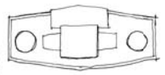
Limestone? carving façade details
Early Modern with a prominent Art-Deco curve
High quality façade material
Rhythm + proportion
Scale

8 00

1990's Apartments
Two storey building | Good condition | 2 Storeys

Reusable brick façades

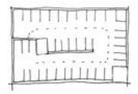
2 08



1966
Energy department | Good condition | 10 Storeys | Johan de Ridder

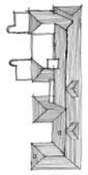
Various architectural details on façades
Good example of a Modernist building in Pretoria
High quality stone work on Eastern & Western façades
Proportion + Shape

8 00



2012
Parking lot | Good condition | 9 Storeys

1 15



1915; 1922; 1932
Land and Agriculutral bank | Good condition | 2½ Storeys
Cowin, Powers & Ellis | Gerard Moerdijk [1932 addition]

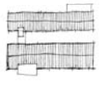
Numerous architectural details on façades:
bay windows, arches, pilasters, keystone detail,
and water channels. Good example of an English
Neo-classical renaissance style
High quality brick façades
Proportion + Rhythm
Scale

4 05

1958
Drakensberg apartments | Poor condition | 8 Storeys

Typical example of early functional-modernist
flats building in Pretoria
Rhythm

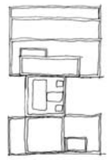
6 02



1965
Esperanto apartments | Good condition | 8 Storeys

Scale breakdown

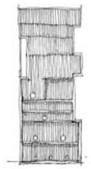
5 04



1974
Karel Schoeman | Abandoned, gutted, bad condition | 10 Storeys

Artistic overhang + roofscape detailing

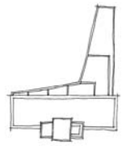
5 04



1950's
Industrial warehouse | Altered, good condition | 2 Storeys

Typical roofscape of an industrial heritage building
Ventilation strategy
Gables

7 01



1980's
TUT | Abandoned, gutted, bad condition | 14 Storeys

Structural expression slab detail
Shading provided
Expressive ground floor plan

7 01

1990's
TUT | Good condition | 8 Storeys

Structural expression slab detail
Shading provided
Expressive ground floor plan

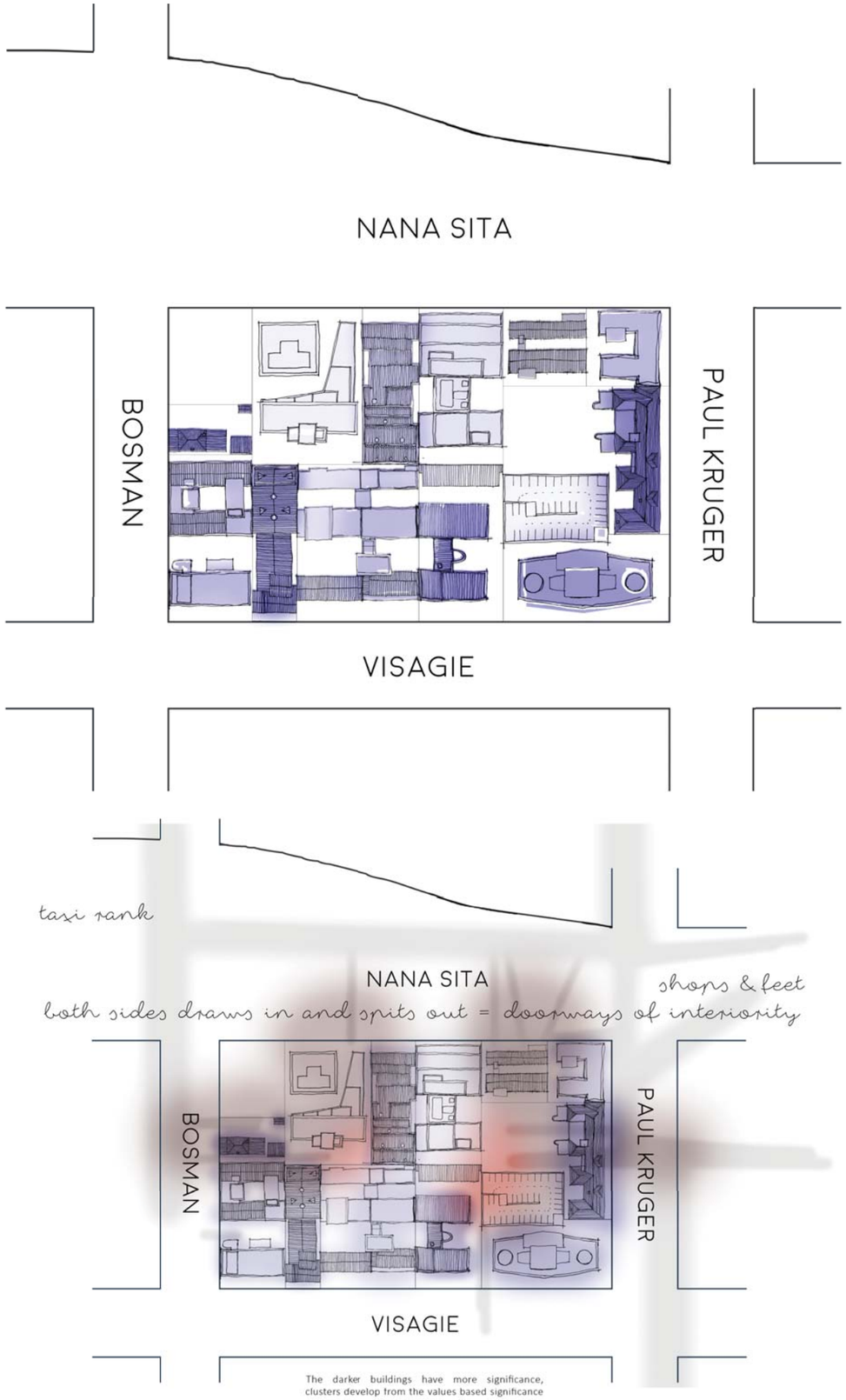


Fig. 85. Opposite Top; Darker purple refers to more valuable buildings (Author, 2019)

Fig. 86. Bottom; Map of potential design positions (in red) with consideration to valuable buildings and potential access points (in grey)(Author, 2019)

The analysis of firstly the block, then buildings with a high score of Orbaşli's values, and finally other buildings incorporated within the proposed architectural design, considers the various values with specific regard to the architectural significance. This approach is based on the specific values that the Burra Charter deems important, and encompasses the smaller category values of Orbaşli's strategy. The Burra Charter's values are used, because South Africa has adopted this Charter to be used as a guide for "basic principles and procedures to be followed" (Artefacts.co.za, 2019 (5)) when dealing with heritage. The overarching values, given alphabetically with no hierarchy, are: aesthetic, historic, scientific and social (Burra Charter, 1999:12). These values are used as a guide, and may be grouped together as the different values overlap and are not mutually exclusive.

The chosen block's significance as a whole, in the city:

Bounded by Nana Sita, Paul Kruger, Visagie, and Bosman streets

Historic and scientific values

This block's size is still untouched as it was laid out originally, but the erf boundaries have been manipulated over time. The block lies directly south of Nana Sita Street which is a scar left by the partial implementation of the Ring road Scheme of 1967 (Bruinette, Hugo, Kruger & Stoffberg, 1967). Paul Kruger Street, originally Market Street (Andrews, 1985:1), demarcates the block's eastern boundary and according to Tshwane's 2055 vision the street will be pedestrianised. Furthermore, Paul Kruger Street is the main north-south axis of Pretoria's urbs quadrata namely, the Cardo axis. The block sits on the fringe of the Museum-cultural district, halfway between Church Square and Pretoria Station. Situated next to City Hall's Pretorius square, it has contextual significance in framing the square. The buildings on the block focus on their street façades to create an edge to the block and a continuous rhythm. This, along with functional accessibility reasons, led to the formation of internal spaces locked away inside the block creating a certain accidental interiority.

Aesthetic and social values

The block's historical uses, functions and activities contribute towards the block's intangible qualities. The multiple types of functions on the block contribute to the rich programmatic history of the site. Patterns, clusters and typologies of buildings and functions emerged when the block's morphology was analysed. The historic imagery of the block shows a fine grain fabric with neighbourly horizontal density. The imagery further indicates dense foliage and pristine Highveld ridges as backdrop that has all been lost in the concrete urban context. These lost elements should be reclaimed to foster a new homeliness for people to return to the city.

Old Land and Agricultural Bank of South Africa Building *[15/19 values score]*

(Fig. 45-47, 49-51)

Aesthetic value

The Land and Agricultural Bank is a two and a half storey English Neo-Classical Renaissance building. The building has numerous architectural details on the façades, including bay windows, carved wood entrance door, feature arches of sandstone, brick pilasters, keystone details and water channels cast into the pavement slabs. Furthermore, it has artistic value due to the brick detailing of the façades, the high quality ironmongery and timber interior.

To the author's knowledge, this is the only example of a Neo-Classical building in Pretoria that morphs into an Art Deco building and due to this it has great significance in its uniqueness. The building contributes to the rich palimpsest of Pretoria in that it is a representative example of a building type from the 1910's, 20's and 30's in Pretoria. The street façade deals well with rhythm, proportion and scale in its urban environment, by framing the streetscape and strengthening the Cardo axis through its linearity.

Scientific value

The high quality brick façades are part of the architectural-technological development in South Africa that focused on the use of materials found locally. Pretoria was known for brick quarries on the slopes of its flanking ridges. The quarry of John J. Kirkness, founded in 1888, came to be the "pioneer of the production of high quality bricks in South Africa" (Artefacts.co.za, 2019 (6)) and provided "brick, tile, and […] pottery" to the community of Pretoria.

Historic and social values

This structure is the first building erected for the Land and Agricultural Development Bank of South Africa (Jacobs & Makhura, 2013:111). This Bank had a great impact on the lives of farmers during the last century, regarding laws and legislation, such as the Native Land Act that passed in 1913 (SAHO, 2015) and other legislation issued by the Land Bank. The current programme and owner of the building is an Attorney firm, Maluleke Msimang and Associates.

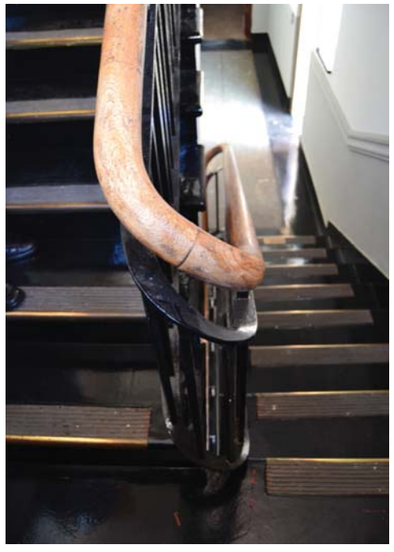
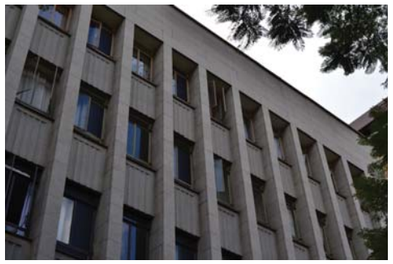


Fig. 87. Top; The Land and Agricultural Bank staircase of 1936 addition (Author, 2019)

Fig. 88. Middle Top; The Land and Agricultural Bank staircase of 1936 addition (Author, 2019)

Fig. 89. Middle Bottom; The Land and Agricultural Bank western façade circulation (Author, 2019)

Fig. 90. Bottom; Western façade shading attempt (Author, 2019)



Citrus Exchange Building *[08/19 values score]*

Aesthetic, scientific and historic values

The Citrus Exchange is a five storey building completed in 1951, designed by Burg, Lodge, and Burg (1935-1960) (Le Roux, 1993:21). The façade is a-symmetrical, announcing the entrance, which creates a pleasing rhythm and proportioning. Street facing window setbacks have carved sandstone details and the street façade has sandstone cladding, while the back façades are all amber-brown face brick. The building is built in an early modernist style, with parapet, 2˚ pitch corrugated roof and steel windowpanes. The Citrus Exchange deals well with scale in its context, through framing the streetscape and Pretorius Square with stepped threshold spaces, including a fenced garden and porch. The building is an example of the precise craftsmanship of 1950's Modernism in Pretoria and contributes to the rich palimpsest of the city. The vertical circulation's façade (Fig. 91) has a prominent curve reminiscent of Art Deco, giving the building its own unique character. It may be that this curve responds to the old Land Bank's Art Deco addition of 1932. Historically the building housed the Citrus Exchange and the current program is residential. In circa 1990 a two storey concrete frame with brick infill block of apartments was built at the back of the *erf*.

Fig. 91. Left Top; Citrus Exchange curve detail (Author, 2019)

Fig. 92. Left Middle Top; Citrus Exchange street façade windows (Author, 2019)

Fig. 93. Left Middle Bottom; Citrus Exchange street interface (Author, 2019)

Fig. 94. Left Bottom; SATU House (Author, 2019)

Fig. 95. Opposite Top; Hannes Smit Building roof detail (Author, 2019)

Fig. 96. Opposite Middle Top; Hannes Smit Building atrium (Author, 2019)

Fig. 97. Opposite Middle Bottom; Residential house (Author, 2019)

Fig. 98. Opposite Bottom; Residential house enclosed front porch (Author, 2019)

SATU House *[08/19 values score]*

Aesthetic and scientific values

SATU House is a five storey building completed in 1951, designed by Corrigal, Crickmay and Partners (Le Roux, 1993:21). The façades show the structural reinforced concrete grid of the building with brick infill panels and steel windows. The building is an early Modernist piece, similar to the Citrus Exchange, but the functionalist influence is more prominent. The street façade's panels have a brick cross pattern. The roof idiom is functional with a terrace and corrugated iron canopy over. The façade is pushed forward onto the street out of line with the rest of the façades. The building is an example of the 1950's design thinking and building techniques that paved the way for efficient construction in South Africa.

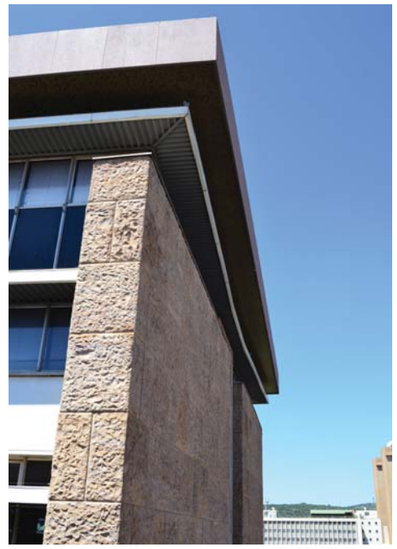
Historic and social values

SATU House was established in 1951 for the South African Topographic Union (Le Roux, 1993:21). The building has been adaptively reused as apartments at the upper levels and retail/commercial on ground floor. Activating the street façade is crucial for the reactivation of the urban environment. Rhythm, proportion, and scale is handled well by the building as it forms part of the street edge framing the City Hall and Pretorius Square.

The back of SATU House is a two storey building in brick and red painted corrugated iron resembling an earlier industrial style of Pretoria. Although further investigation was required to understand its significance, the building was inaccessible.

Hannes Smit Building

New Land and Agricultural Bank of South Africa *[08/19 values score]*



Aesthetic, scientific and historic values

The Hannes Smit Building is nine stories high and was designed by Johan de Ridder and completed in 1966 (Le Roux, 1993:20). Built in the late Modernist style influenced by Brazilian architecture of the time, the building has an animated roof space with terrace and structural elements framing spaces. The northern and southern façades are slightly angled on plan, with *brise soleil* detailing. The east and western façades are made of chiselled sandstone that have been sourced from Clarens or similar quarries (Crafford, 2019). The building has a symmetrical plan with a service core flanked by two atriums and offices on the rims. A statue, 'The sower and the reaper', sculpted by Hennie Potgieter, stood in the garden in front of the building on the corner of Paul Kruger and Visagie Street. The sculpture has since been moved to the Voortrekker Monument (Green, 2019) and the garden has been fenced off.

Historic and social values

The building was built as an expansion of the Land Bank's offices and currently it is owned by the Government and occupied by the Department of Energy. The administrative, insular function negates the street-activity context and the opportunities presented by the corner *erf* is not utilised. The first part of the Old Land Bank, built in 1914, was demolished to make way for this building. Tabula rasa[12] is a main concept of modernist thought, displayed by this building's existence, as a clean slate point of departure is favoured above a palimpsetic approach.

Residential house of 1920's *[07/19 values score]*

Historic and aesthetic values

This house is the only remaining example of a residential typology of circa 1920's in this block, showcasing an early previous century Pretoria central vernacular, reminiscent of the NZASM and post-NZASM detached housing. The building is approximately 110 years old and accompanied by its rarity, gives it automatic value of uniqueness. The details and craftsmanship is displayed in the fireplace mantelpiece, brick fireplace flue, and front door ironmongery. It is an example of a typical house of Pretoria, modest with *stoep* [porch], large roof space and minor ironmongery or brick details. The small house stands detached on its plot and it is threatened in the urban context by a fast developing city that needs density to combat the urban sprawl. A palimpsetic layering of building types could be used to maintain and protect small typologies without denying densification. Currently the building is used by a security company and as living quarters.

Scientific value

The *stoep* was drastically altered and closed off, but elements including the chimney and fireplace, the front door and surrounding stained glass detailing remain intact and in good condition. The chimney details and ceramic flues are exemplary of the time it was built in and should be protected.

12 Tabula rasa refers to the action of demolishing buildings, sometimes even many buildings, or a whole block, to make way for a new large Modernist structure.

The simple, modest building techniques led to new ways of building and paved the way for Pretoria regionalist thought. The main roof structure is unchanged, but an IBR profile steel surround has been installed at the eaves. The surround and *stoep* alterations can be removed to restore the building's traditional typological quality to showcase the scientific value.

Fig. 99. Left Top; Residential house removable IBR profile steel surround (Author, 2019)

Fig. 100. Left Middle Top; Drakensberg Apartments (Author, 2019)

Fig. 101. Left Middle Bottom; Drakensberg retail ground floor (Author, 2019)

Fig. 102. Left Bottom; Esperanto Apartments (Author, 2019)

Drakensberg Apartments *[05/19 values score]*

Aesthetic and scientific values

This eight-storey building's date of completion is unknown, but from historic images of Pretoria (gathered from the Es'kia Mphahlele Library historic section) it is evident that the apartment block was erected between 1953 and 1960, and it is therefore rationalized that the style is functionalist modernist. It has various architectural features which are indicative of the era it was built in, including a concrete street canopy with curved corner, boxed roofscape and typical one-size-fits-all repetitious factory steel windows of the time. The concrete frame structure is hidden behind the façade materials that undulate between plastered brick and face brick on the street façades. The building is in dire need of repair and maintenance, but is still fully functional. The Drakensberg Apartments are part of the architectural palimpsest of Pretoria and an example of functionalist modernism in South Africa. The building contributes to its urban context through the active street edge and human scale street overhang. Furthermore it enriches Pretoria's urban "brick city" feel with the use of brick façades.

Social value (and social-contextual)

This building has remained an apartment block with retail/commercial ground floor facing the street. The demographic of the city has changed completely from the original upper income bracket residents to younger residents from a lower income bracket, often sharing a two bedroom apartment with up to ten people.

Esperanto Apartments *[02/19 values score]*

Aesthetic and scientific values

This 1965 apartment block (Cape & Transvaal Printers, 1965:1717) was built with influence from the functionalist modernism style with main focus on affordability and modular structural units. The building has two wings, a front wing with three storeys and a back wing with eight storeys. The vertical circulation is expressed and the back wing is lifted off the ground to allow for parking underneath the structure. The Esperanto apartment block functions well in the urban context, due to the tall back wing providing passive surveillance over the commercial lower front wing. The back wing grants privacy and noise reduction for the residents as it is pushed back into the block.

Social value (and social-contextual)

This building has remained an apartment block with a retail/commercial ground floor facing the street. The demographic of the city has changed to a younger population (Census, 2011) and the building has proven to accommodate this shift in residency. The street facing three storey wing reflects a human scale with an active ground floor interface, while the bulk of the building is set back to greatly reduce the perceived scale at street level.

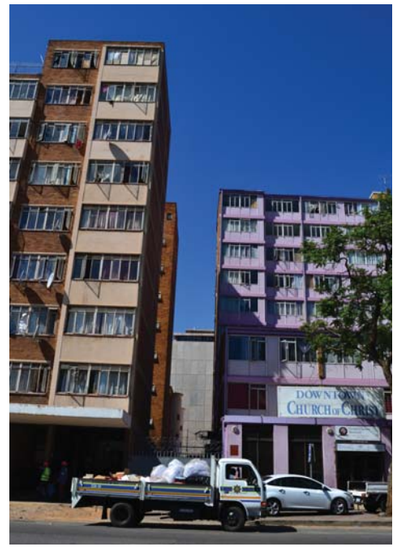
Karel Schoeman Building *[04/19 values score]*

Aesthetic and scientific value

This ten storey building was erected in 1973 (Cape & Transvaal Printing and Publishing, 1973:98) and has minor artistic patterning on the façades. This building represents a combination of two architectural styles. Firstly, a modernist approach is used in the functional column-slab structure and secondly, an overall bulky appearance of thick slabs and large expressive window and façade details, pointing toward a brutalism aesthetic.

Social value (and social-contextual)

The original function of this building was offices. While it is still owned by the Government's Department of Health, it has been abandoned and was occupied by homeless people or other refuge seekers. To avoid the illegal occupation of the building, it has been gutted and stripped of all materials except the structure and brick façade panels. The ground floor has been bricked up completely in an attempt to prohibit habitation. Homeless people have appropriated and occupied the only space left open, namely the canopy area in front of the building. The Karel Schoeman Building negates its context, firstly by its original insular function with no street interaction, and secondly by barricading the building from appropriation. The relation to the urban environment has worsened drastically with its abandonment, gutting and boarding up. This building is detrimental to its surroundings in its current state, as a dark looming box of unlawful activities harbouring negative growth in the city.



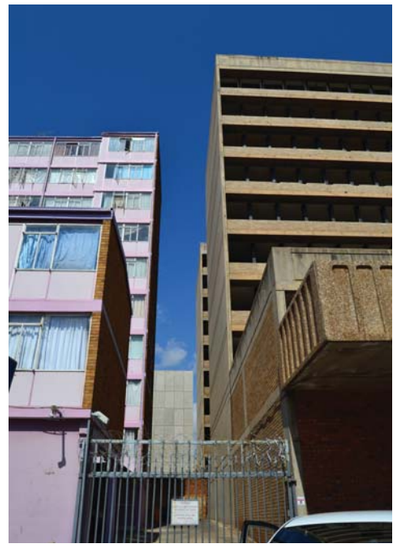


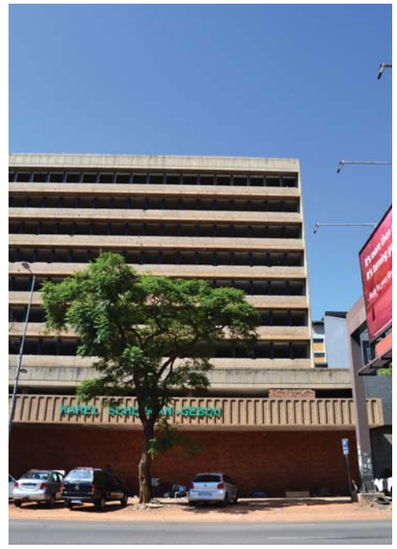
Fig. 103. Top; Two apartment blocks' interface (Author, 2019)

Fig. 104. Middle Top; Esperanto and Karel Schoeman Building (Author, 2019)

Fig. 105. Bottom Right; Karel Schoeman Street Façade (Author, 2019)

Fig. 106. Bottom Middle; Homeless taking shelter under eave (Author, 2019)

Fig. 107. Bottom Left; Children playing on the streets around apartments (Author, 2019)



ATTITUDE TOWARDS HERITAGE PRACTICES

Read with timeline (Fig. 109).

Three prominent schools of thought regarding heritage practices have emerged over time, including French, English and later Italian, impacting heritage conservation versus preservation strategies. The French school, led by Viollet-le-Duc (1814-1879), was one of the earliest attempts of humanity to advocate for the preservation of buildings. This entailed restoration of built fabric to its original glory by mimicking the style and material of the old. This stance was brought about to protect old buildings, as no previous era practiced cataloguing and scientific identification of heritage buildings (Semes, 2009:117). John Ruskin (1819-1900) led the English school of thought as an opposing view to Viollet-le-Duc's French school (Semes, 2009:117). The English school of thought suggests an anti-restorative approach to old buildings. Ruskin focused on the conservation rather than preservation of old buildings. Boito criticised both these schools at the end of the nineteenth century, referring to the French as falsification and the English as a "fatalistic refusal to intervene" (Semes, 2009:124). To synthesize these two opposing views, a third school emerged. The Italian school tried to find a middle path between Viollet-le-Duc and Ruskin by "restoring original fabric" (2009:124) and only adding necessary material in a "modest and differentiated" style. The key aspect that characterised the Italian school was its "urbanistic" contextual focus.

After the basis of conservation and restoration was set out by these European schools, several charters were drafted to govern the rules on working with old buildings. The Athens heritage Charter was written at the First International Congress of Architects and Technicians of Historic Monuments, held in Athens in 1931 (Semes, 2007:132). The Venice Charter, drafted in 1964, is based on the Athens Charter and forms the base of Modernist conservation theory. In South Africa heritage practice is based on the Australian ICOMOS Burra Charter, drafted in 1999, that delineates different types of heritage fabric, how to identify these types and how to deal with them. Until today, new conservation strategies are issued to further expand restoration and conservation practices.

> The main task of the artist, critic or historian
> [is] to discern the spirit of the time
> and give it adequate expression
> (Semes, 2007:145).

Fisher (2014:360) and Semes (2007:146) agree that heritage conservation has evolved past strict traditional rules that placed heritage on a pedestal, to be viewed and admired from a distance. Conservation has shifted towards the understanding that the built remnants of the past are "layered in time and living" (Fisher, 2014:360) which means that they are preserved in time, yet actively contributing to the present condition. Fisher compliments heritage projects in the built environment that respects the heritage, but adds a new "narrative which embodies something of our own time". Bollack (2013:16) explains that old built fabric is an "architecture of fragments, of incomplete parts [and] recovered stories." She further states (2013:16) that when an addition threads itself into the old fragments and parts, a dynamic new existence is created between the old and new. This effort to design "with history" (2013:21) redresses the original structure that was neglected or unnoticed before the contemporary integration (2013:11). Fisher and Bollack's views highlight an attitude towards heritage conservation, that is palimpsetic in nature by knitting and layering the new with the old, respecting the existing while representing the zeitgeist.

> An old building is not an obstacle but rather a foundation
> for continued action (Bollack, 2013:9).

Fig. 108. Opposite; Five intervention types in dealing with old buildings (Bollack, 2019:23,65,113,141,179)

Fig. 109. Next page; Timeline of Heritage practices towards a palimpsetic approach (Author, 2019)

An example of this palimpsetic approach to heritage is illustrated in Françoise Bollack's book *Old Buildings New Forms* (2013) where she discusses several architectural strategies to design with old fabric. The strategies are insertions, parasites, wraps, juxtapositions, and weavings.

01 Insertion refer to interventions that are placed into the "older volume" (2013:23) and depends on the existing structure to protect it, which creates a co-dependent relationship between old and new. The "container is the carrier of memories" and the "inserted piece has its own identity" (2013:23) that breathes new life into the otherwise forgotten architecture.

02 Parasite interventions creates a situation between old and new fabric where not only the new benefits, but both parties can take advantage of the relationship. The old provides vital elements such as structural support, existing infrastructure, and guides the form making of the new intervention. The parasite in turn offers new unexpected use and space that "can be distinguished by colour and materials or by form" (2013:65).

03 The next intervention type "**wraps** the older structure in a new mantle" (2013:113) that provides protection to or envelops a smaller structure. This strategy can often undermine the existing fabric and make it obsolete, as the new intervention provides shelter and protection that removes the intended purpose of the old building. On the other hand, "the new enclosure can also create new spaces, 'the in-between'" (2013:113) that allows the existing to be incorporated "into a different whole" (2013:113).

04 To **juxtapose** a new intervention against the old fabric is to refrain from engaging with the old (2013:141). There is no visible connection or relation between the old and new, with "no blurring of boundaries [or] transfer of architectural elements" (2013:141). This results in an aloof contribution of the new by keeping visual distance.

05 A woven intervention refers to the architect **weaving** "the new work in and out of the original building fabric" (2013:179) that creates an inseparable relationship between old and new. The existing structure and other elements of the original are modified, altered, and "reused actively", ensuing an interconnectedness that produces a "knitted fabric" (2013:179) as the resultant intervention.

> The architect and owner reclaim the hidden value
> of the old building and re-present it as a living
> contemporary object, using it in the present and
> ensuring its long-term preservation (Bollack, 2013:23).

A timeline regarding influences and progression of heritage conservation and preservation thought throughout the ages. Each period had an influence and some are highlighted. To the right, the timeline grows wider representing the vast amount of knowledge on dealing with heritage spread, with specific reference to a palimpsetic approach.

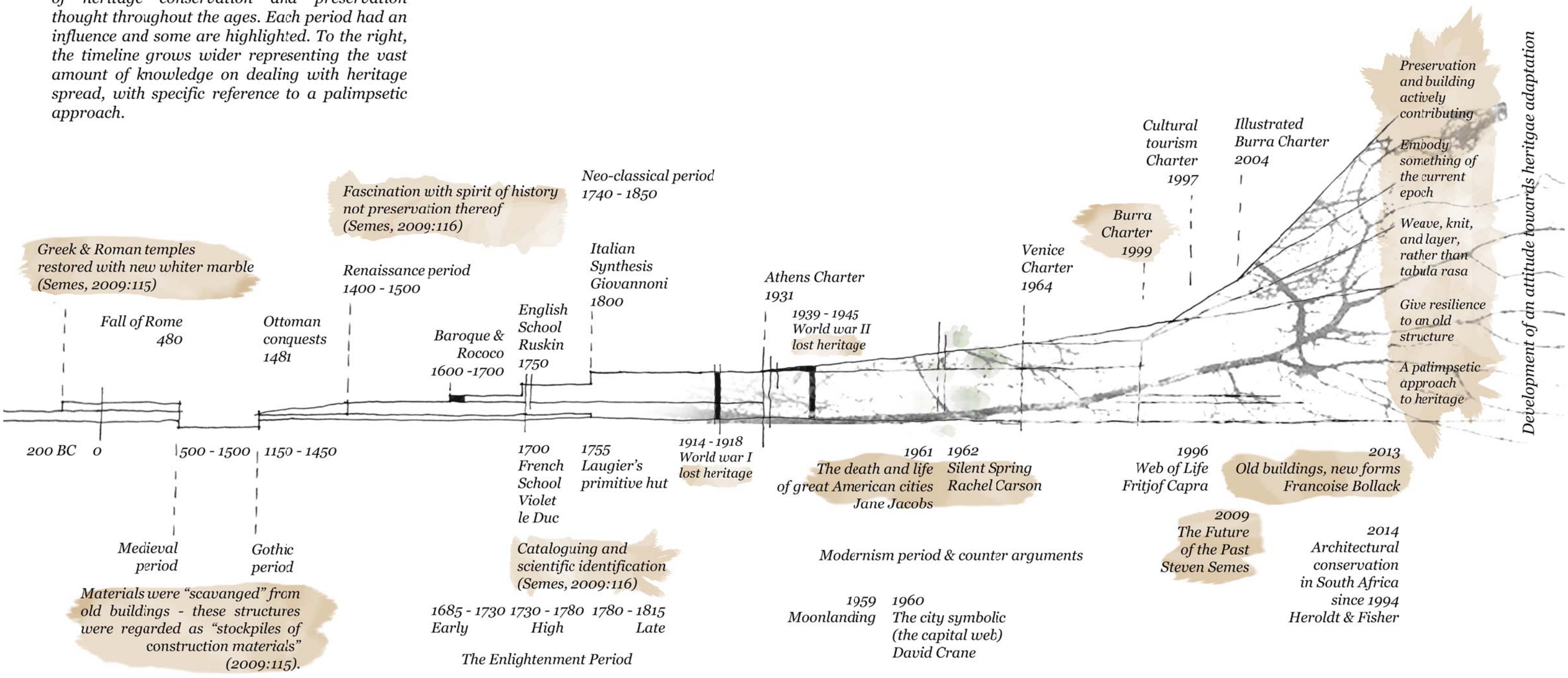


Fig. 110. Bottom; The Land and Agricultural Bank elevations and 3D showing potential intervention location (Author, 2019)

Fig. 111. Opposite top;Karel Schoeman Elevations and potential intervention areas (Author, 2019)

Fig. 112. Opposite Middle Left; Karel Schoeman 3D showing potential intervention areas (Author, 2019)

Fig. 113. Opposite Bottom; Parking lot northern elevation and 3D showing potential intervention area (Author, 2019)

RESULTING APPROACHES AND STRATEGIES

The approach towards designing with heritage takes shape in this dissertation as different methods of intervening according to each building dealt with. The resulting strategies are strongly influenced by the types developed by Bollack. The intervention transforms the environment and creates a dialogue between the existing and the new addition. This allows for prototypes and idioms to be derived from the context. The attitude towards heritage is palimpsetic, yet recognisable. The additions make use of innovative technology of the time and acts as separate and new (Fisher, 2014:361), in essence representing its own zeitgeist. The existing fabric will undergo; calculated demolition, reprogramming and refurbishment. Finally the intervention should provide and preserve living heritage to allow the story of place to grow back.

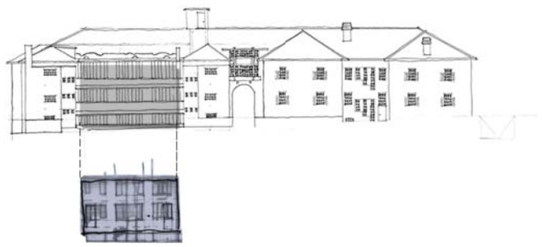
A different story is born,
a new plot is composed out of the old words,
a new interpretation has taken place
(Machado, 1976:48).

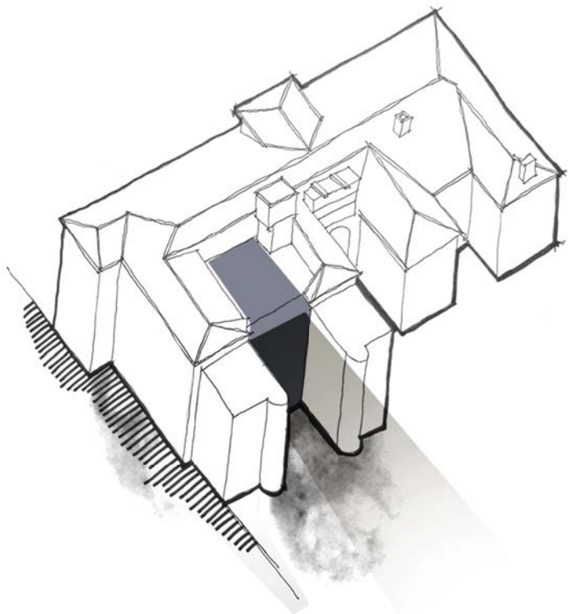
The following are summaries of the different intervention strategies, programmes and attitudes to be implemented with each respective building.

Old Land and Agricultural Bank of South Africa

An intervention that touches the existing lightly and respects the old fabric (Fisher, 2014:360) is needed, with little to no internal alteration. The existing western façade has inadequate shading to protect it from the harsh western sun which is where the necessary intervention should occur. The architectural addition should disrupt the least possible while improving the condition of this façade. Hereafter, activities can extend into the site and meet with the new freestanding intervention.

New Programme: Activated ground floor street interface, new meeting spaces in the 1936 western façade's centre, new threshold space in courtyard in front of western façade, and existing attorney's office to remain functional.

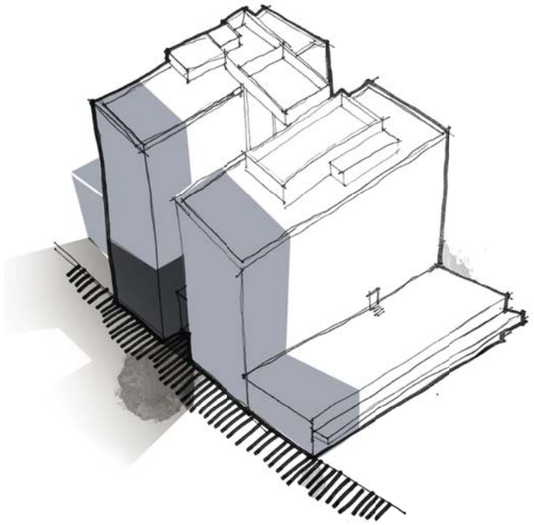


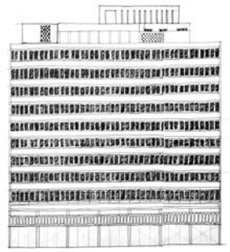


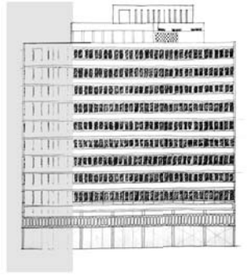
Karel Schoeman Building

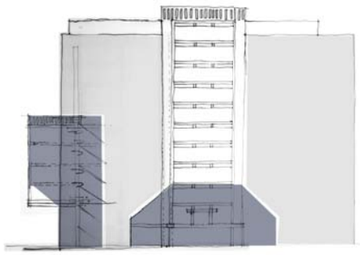
As the whole building has latent potential, large scale intervention is possible through the complete refurbishment and partial demolition to reduce the eastern and southern façades' scale. The concrete rubble from demolition can be reused as aggregate and new programmes are scripted to reactivate the building. Furthermore, insertion (Bollack, 2013:23) and wrapping (Bollack, 2013:113) additions should be made to mediate the scale of the building in its context. This strategy extends the boundary between the internal and external spaces by providing multiple threshold spaces. The building's façade is lifted up to welcome interaction and shelter for the people using the spaces. The existing plan is cut away to reveal interactive and flexible space.

New programme: Building livelihoods center (female homeless shelter including skills training and temporary accommodation), bar, ablutions, formal seminar spaces for the culinary school, and research laboratories in the southern part of some upper floors. The remainder of the building is refurbished for use as rentable office spaces.





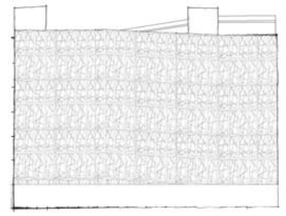




Parking lot

The building has little heritage value, but a consideration towards the embodied energy of the existing structure should be given. The functional value of the building should be exposed and latched onto which provides the building with new value and significance. A parasitic (Bollack, 2013:65) relationship is cultivated with the existing parking remaining functional, while harnessing the potential of the blank northern façade, through adding habitable space.

New programme: Food growing hydroponic structure with growing classrooms and administration block



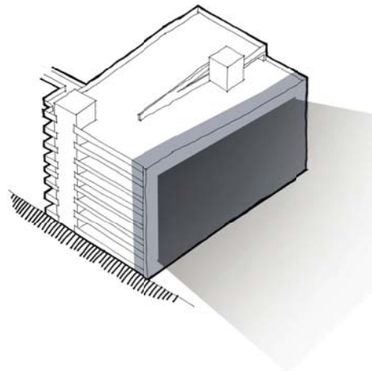


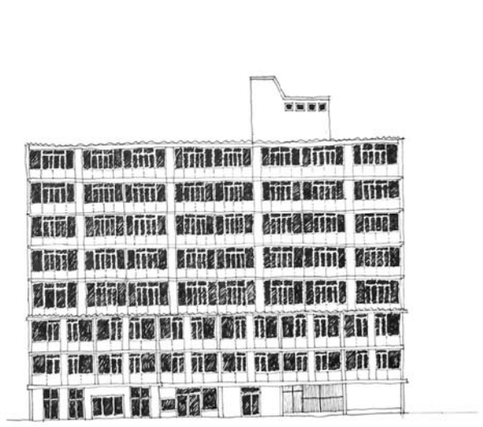
Fig. 114. Top; Elevation and 3D of Esperanto apartments with potential expansion shown at the back (Author, 2019)

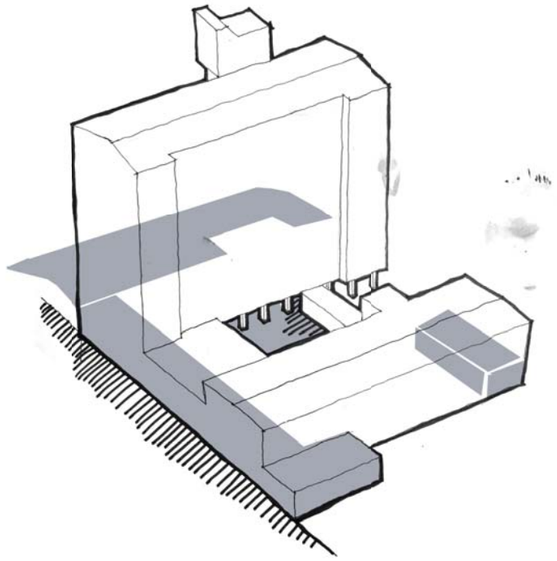
Fig. 115. Bottom; Southern elevation and 3D of the circa 1990 apartments (Author, 2019)

Esperanto Apartments

General refurbishment and maintenance is required while the programme remains apartments and retail ground floor, with the possibility of extending the retail into the site. Children living in these apartments play on the circulation areas that warrants a supervised safe space to be provided for the children.

New programme: Haberdashery and Day care, with supervised play areas for children.

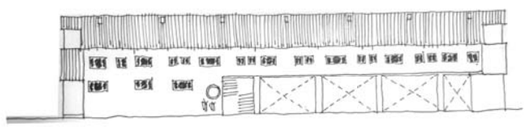


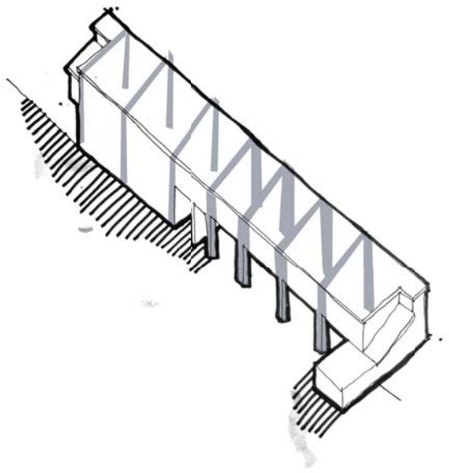


1990's Apartments [on Citrus]

Adaptively reuse the existing structure of the building, demolish internal panels, and re-purpose the brick and windows in the new intervention. By enveloping the column and beam leftover-structure with a new shell a combination of insertion (Bollack, 2013:23) and parasitic (2013:65) types of intervening are proposed. Material designed to harness shaded space will be used in the addition to reflect the advancement of technology and the spirit of the early 21st century.

New programme: Culinary plant library and research centre for the students, with food growing hydroponic structure and growing classroom over the building.





MORGAN LIBRARY PRECEDENT

Renzo Piano Building Workshop, New York, USA, 2006

Contextual, Insertion into existing fabric, and Palimpsetic approach informant

Piano met the challenge of the site by creating a central atrium in the courtyard shared by the historic buildings plus three subordinate elements: a connector between the 1906 library and its annex, an entrance pavilion, and a four-story administrative support building fronting 37th Street (Bloszies, 2012:98).

The programmatic needs of Piano's intervention guides the use of light. The enclosed inner courtyard where people gather lets light in to immerse the space and create a feeling of openness in an area that would otherwise be dark as it sits nestled in-between built fabric. Circulation spaces are found between the old and the new and the façades are glass to allow ample light. Placing glass elements between the bulk of the new intervention and the existing differentiates the new from the old and creates a defined border. In doing so, the line between old and new remains crystal clear. As opposed to the light and airy collective spaces, the collection is kept darker and secluded in the various white enclosed boxes (Bloziers, 2012:99).

The three existing buildings are not of the same era and portray each style respectively. Piano did not attempt to take a subordinate stance to the heritage fabric or try to merge the different styles. He rather used a vivid simplistic style that takes the approach of combining the fabric anew to form a stronger image and connection of the greater whole. He stitched the old fabric with a new material that wasn't there previously. This approach resonates with the Japanese term *Kintsugi* [golden joinery] which is a method that the Japanese use to fix broken objects (Jobson, 2014). The philosophy is to acknowledge that the object has broken into pieces, and rather than to dispose of the object it is repaired and the break lines are celebrated with gold, silver or platinum lacquer (2014).

To recognize the history of the object and to visibly incorporate the repair into the new piece instead of disguising it (Jobson, 2014).

The disparate existing buildings were joined by a new lacquer of modern technology to create a complete and integrated solution. This notion of 'repairing' the existing situation with a new insertion will be applied in this dissertation's architectural solution, as an intention is to combine various buildings into one intervention. Another lesson from the Morgan library is to bathe spaces of communal activities and gathering in light. These light spaces intersperse other intimate spaces of the building that need to be sheltered from direct sunlight, which create a vibrant relationship.

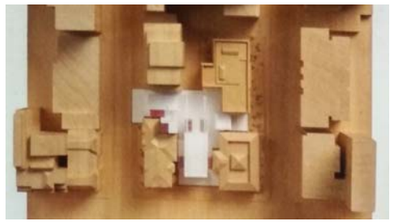


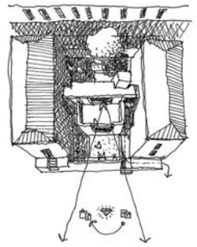
Fig. 116. Top; Internal closed courtyard of Piano's addition to the Morgan Library (Denanché, 2012)

Fig. 117. Middle Top; Glass used in circulation spaces to procide light to the interior (Denanché, 2012)

Fig. 118. Middle Bottom; Top view of model showing new intervention in white (Goldberg, 2012)

Fig. 119. Bottom; Piano's white box in-between the existing wings (Denanché, 2012)

Fig. 120. Bottom Right; Kintsugi, method of reparing broken objects with golden laquer (Jobson, 2014)



RAHIMA MOOSA MOTHER & CHILD HOSPITAL PRECEDENT

26’10 South Architects, Johannesburg, South Africa, 2016

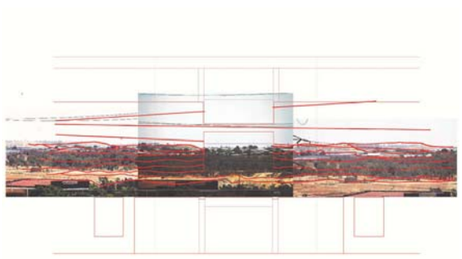
Mural by artist Lorenzo Nassimbeni

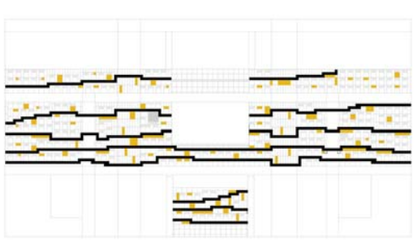
Contextual, Insertion into existing fabric, and Palimpsetic approach informant

A quaint patterned addition made to the existing Rahima Moosa Mother and Child Hospital, nestled between two protruding wings. The intervention is a small floating box in complete contrast to the existing, with a vivid new façade of patterns that is an abstraction of the surrounding landscape of the hospital. The geometry and proportion of the inserted architecture is in harmony with the existing building, designed by Gordon Leith (26’10 South Architects, 2016). The architectural rhythm and scale and of the new replicates “the original pattern of blocks joined by perpendicular links” (2016), and through this strategy the new is subordinate to the old, albeit in strong contrast at first glance. The addition is intrinsically linked to the context through the mosaic patterns.

The black tiles, in a mixture of matt and shiny, represent the lines of the landscape translated from an ink drawing. The gold tiles represent the gold mines of Johannesburg and the material that lies in the ground there (De Klee, 2016).

The mural has been designed as a playful puzzle to uplift the frightening experience that the children and mothers go through (De Klee, 2016). The space will be used as a research facility for Professor Ashraf Coovadia leading the “Empilweni Services and Research Unit (ESRU), a paediatric research unit” (26’10 South Architects, 2016). Lessons learned from this intervention include that although a new piece of architecture may look foreign and contrasting, it is in the proportioning, geometry, rhythm and scale where the subtle connections to the exiting lie. To translate the old details, structural elements or grids as idioms to inform the new will be a strategy implemented in the architectural solution of this dissertation.





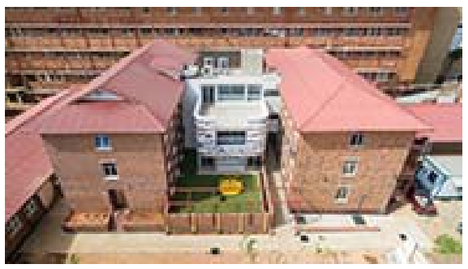


Fig. 121. Top; Line drawing of the concept (2610south.co.za, 2016)

Fig. 122. Middle Top; Close up op mosaic artwork on façade (2610south.co.za, 2016)

Fig. 123. Middle Middle; Interface between old and new with playground (2610south.co.za, 2016)

Fig. 124. Middle Bottom; Artwork tile drawing (Nassimbeni, 2016) on (2610south.co.za, 2016)

Fig. 125. Bottom; Artwork concept drawing (Nassimbeni, 2016) on (2610south.co.za, 2016)

Fig. 126. Right above; Bird’s eye view of the new link addition (2610south.co.za, 2016)

The story of the architectural narrative followed in this dissertation, is laid bare in the next chapter. It is pertinent to review the influential authors and different perspectives that brought about the holistic understanding of architecture, nestled in its context and cognisant of the heritage values, as revealed in the contextual and heritage lens investigations.

ARCHITECTURAL APPLICATION

Continuum of interconnected thinking

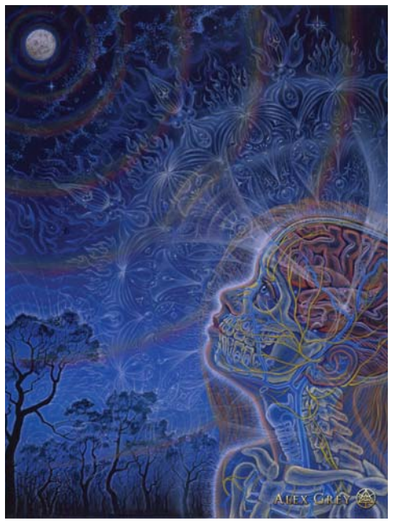
Resilience & holism

Traces & places

Palimpsest

Urban density and compaction

design informants



EMERGENCE OF INTERCONNECTED THINKING: THE ARCHITECTURAL STORY

The architectural narrative of this dissertation flows from the 1960s change in perspective, initiated by Jane Jacobs' book *The Death and Life of Great American Cities* (1961) and Rachel Carson's *Silent Spring* (1962). These women's views were radical in opposing the dominant Industrial worldview of the 1960's. Their individual views stem from a long developing relationship concerning the natural world and the perceived boundary between it and humans. Fritjof Capra's book *The Web of Life* (1996) combines the many views of the shift towards holistic thinking with focus on interconnectedness.

These influential authors' views resonate with Laugier's argument to look towards nature for inspiration in rethinking how architecture is put together. The perceived boundary between man and nature should be obliterated to move towards a holistic understanding that we are equally part of the cosmos, just as the dandelion, worm, bird, and bee are all connected and intertwined. In architecture, this refers to a building and its context working as a unified system with closed loop processes. An interconnected worldview finds expression in architecture as Sustainable and Regenerative design paradigms[13]. This ecological movement is in direct opposition to the structured, controlled utopian views of the Modernist period. Although the architecture of this dissertation will not focus on the new resultant paradigms, the notion of holism and resilience will find application.

Fig. 127. Previous page; Fungal mycelium (Hyde, nd)

Fig. 128. Above Top; Marc Antoine Laugier's Primitive hut (Laugier, 1755)

Fig. 129. Above Bottom; Wonder (Grey, 1996)

13 The two seminal publications on the beginnings of sustainable thinking is that of Benyus's book Biomimicry: Innovation inspired by nature (1997) and McDonough & Braungart's book Cradle to Cradle: Remaking the way we make things (2002). Regenerative design is a paradigm that moves beyond sustainability where it incorporates stewardship. Seminal author publications are Du Plessis and Cole's Motivating change: shifting the paradigm (2011), Mang's Toward a Regenerative Psychology of Urban Planning (2009), Mang & Reed Designing from place: a regenerative framework and methodology (2012) and Hes & Du Plessis's Designing for hope: Pathways to regenerative sustainability (2015)

RESILIENCE & HOLISM

Social-ecological resilience has been deemed as: the amount of disturbance a system can absorb and still remain within the same state; the degree to which the system is capable of self-organization; and the degree to whichthe system can build and increase the capacity for learning and adaptation (Wilkinson, Porter & Colding, 2010:26).

The redevelopment and activation of the latent internal block spaces attempts to harness the theory of resilience as a metaphor (Wilkinson et al., 2010:30) to be used in the context of an urban environment's ability to self-organise and stay in a state of equilibrium. Pretoria is already a resilient city, to some degree, as many changes and disturbances have been inflicted upon her, yet she is still functioning and providing, if limited, to her citizens. A resilient city is one that harbours complexity and diversity through its functions and systems. These systems should be able to handle disruptive behaviours (Folke, 2006:254) of changing socio-economic climates within a social-ecological system such as a city (Du Plessis, 2008:5). The capacity of the city to adapt and allow for change over time is enhanced by rekindling interconnected relationships, starting at micro scale on each city block. This will lead to broader relationships developing and existing ties reconnecting.

The following theories are investigated due to their ability to facilitate the 'bounce-back ability' of Pretoria as a resilient city, in their architectural application. Inter-relationships between theories are expressed in the complexity of the architecture, allowing for appropriation, connections, extensions and insertions that promote resilience in an architectural intervention.

ANDERSON'S TRACES AND PLACES (2009)

Traces are "marks, residues or remnants left in place by cultural life" (2009:5). Traces are either physical elements such as buildings and graffiti, or non-physical elements including events and activities. These marks left by daily activities give meaning to a place and makes it memorable. The continuous production of traces in built fabric create transient, dynamic places that are "in fluid states of transition as new traces react with existing or older ones." The different traces can form a pattern with other places' traces and become webs that are "entangled and (con)fused" (2009: 11). Users of the spaces create marks or changes, left behind intentionally or not (2009:8), contributing to the architecture and the patina of the building. The proposed intervention attempts to create a user interface that enables interaction and appropriation by people, fauna and flora. The design encourages traces by allowing for an extended pedestrian realm in and around the building, to create pockets where traces can be left behind. Finally, the new intervention should show the changing of seasons as delicate remnants left by long passage of time.

Traces often remain in place as shadows and echoes of places past (Anderson, 2009:11).

Fig. 129. Top; Artists impression of a resilient city (Pearson, 2014)

Fig. 130. Bottom; People and places connected by strings of traces (Author, 2019)

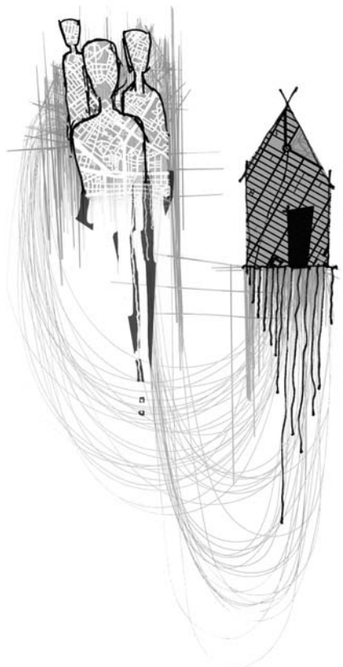


Fig. 131. Conceptual exploration of palimpsest in heritage (Author, 2019)

PALIMPSEST

The word palimpsest has different applications always referring to layering and adding to the existing. Various dictionary definitions describe palimpsest as “a text erased, or partly erased, underneath an apparent additional text” (Encyclopaedia Britannica, 2007), or as “something having usually diverse layers or aspects apparent beneath the surface” (Merriam Webster Dictionary, 2019). Machado (1976:46) explores the notion that “formal intervention on existing form” is a concept of palimpsest. Through erasing and reworking parts of the existing to create new spaces, the architecture transforms into palimpsest.

Furthermore, to perceive the context in a palimpsetic nature allows an understanding that change is the only constant. Time is continuous, but to capture multiple moments in time is to capture architecture. Therefore, considering architecture in its morphological context allows for a palimpsetic building to emerge that adds a new layer and morphs from its context. Hereby fragmented latent spaces on the block are replenished and made useful by contributing to the expansion of the pedestrian realm in Pretoria inner city.

> Architecture must aim to re-establish contact between places and between people and places, to be part of an environment that is enhanced by its presence (Plan, 2018:6).

In the inner city where little room is left for a volatile, unpredictable future, which may hold unanticipated variables, it is of great importance to use space effectively. This is in harmony with palimpsest, where disused built fabric become crucial reusable spaces.

> We should not to forecast what will happen, but try to make provisions for the unforeseen (Habraken, 1972).

When designing a building the architect should recognise that change may happen; it is inevitable. The architecture should therefore be able to change and expand while remaining durable and robust throughout the different uses, events and activities it hosts over time. Moreover, the spaces should respond to the climate and the changing of seasons to represent the passage of time, palimpsest in motion.

URBAN DENSITY AND COMPACTION

A mutual issue that all cities share is densification and how to provide for necessary urban density increase, without disrupting the image of the city or decreasing the already limited public open space (Plan medewerkers et al., 1993:247). The Tshwane 2055 vision states (2013:40) that there will be a substantial increase in African city populations by 2050 which is one of the underlying motives for their densification and compaction strategy of 2005 (City of Tshwane, 2013:197). An important objective stated in the National Development Plan of 2030 which relate to the development of urban areas “is that travel distances need to be shorter” (2013:197). This warrants that a great number of the population working in cities need to live closer by, or in the city centre itself, where public transport should be “safe, reliable, affordable, and energy efficient” (2013:197). In broad terms it is envisioned to build a “denser and more livable” city that utilizes an “efficient spatial form” that will deal with aspects pertaining to “spatial fragmentation and socio-economic equality” (2013:197) which in turn will lead to a holistic resilient city.

> Compaction and densification will bring about certain benefits that include greater resource efficiency, increased access to economic opportunities, and reduction of the City’s carbon footprint (City of Tshwane, 2013:197).

Another benefit or outcome of densification in the inner city of Pretoria, is less vehicles on the roads, which in turn can lead to less tarred area and greater public open space areas. The Tshwane 2055 plan to introduce pedestrianised streets in Pretoria is not a new concept and has been a long brewing strategy of several governing bodies since the 1980s (Plan medewerkers, 1980:201). The pedestrianisation of Paul Kruger Street from Station Square to Church Square is reiterated in the 1993 Structural plan of Pretoria (Plan medewerkers et al., 1993:249) and extended in the Tshwane 2055 vision to incorporate the section of road to the north of Church Square. This produces another benefit to the streets of Pretoria in increased foot traffic that may lead to the growth of economic activity, and increased liveability along the Cardo axis, which can infiltrate the adjacent blocks. The application of density and compaction in this scheme will be dealt with in the Concept chapter.

05

PROGRAMME

Influences

African roots of communal living and shared space

Current population and immediate needs

Health, nutrition and nourishment

The Bank of Nourishment

Accommodation schedule

Precedents

to facilitate latent space regeneration

Fig. 132. Previous page; Mycelium growing under a log (Gruié, 2004)

Fig.133. Top; First nomadic peoples of South Africa, Sotho woman and highveld (SA-venues, 2019; Engelbrecht et al., 1955; Author, 2019, adapted from TheSchoolRun, 2019)

Fig. 134. Middle; Different types of compounds (Steyn, 2015:22)

Fig. 135. Molokwane village plan (Pistorius, 1992)

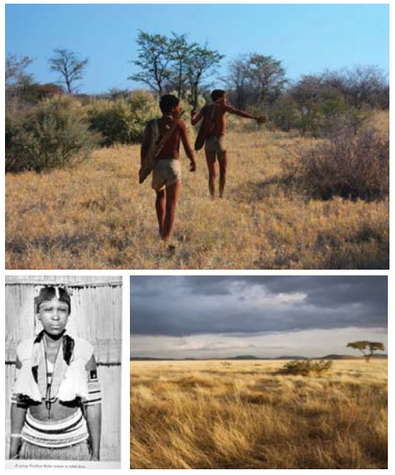
Fig. 136. The morphology of a compound house typology in Zaria (Steyn 2007:61)

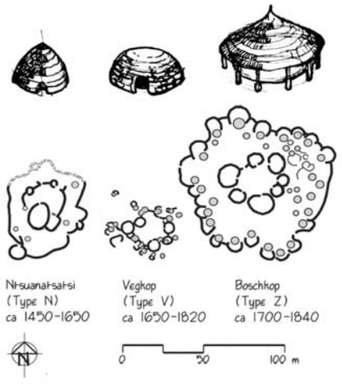
INFLUENCES

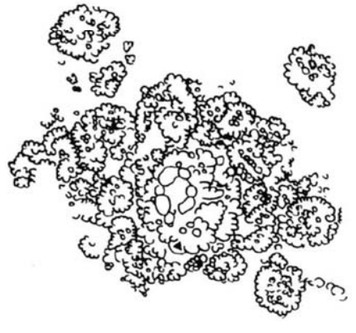
The main programmatic influences are the block's historic value and the current needs of the citizens. As an African city, the historical context of communal living and shared space have to be considered. The sharing of space has to be incorporated into an appropriate programme that compliments the architectural design. The City of Tshwane's 2055 vision further influences the programme choice through the pedestrianisation of Paul Kruger Street (City of Tshwane, 2013:102), and extended public transport networks, resulting in accumulated foot traffic with potential to infiltrate the Land Bank block. Moreover, the urban and precinct visions situate the design within a new greener citizen and pedestrian friendly Pretoria inner city, with focus on building interfaces and interconnectedness of infrastructural systems, users and activities. The programme aims to combine these aforementioned influences to create a coherent network of spaces for public use in the internal latent spaces of the block.

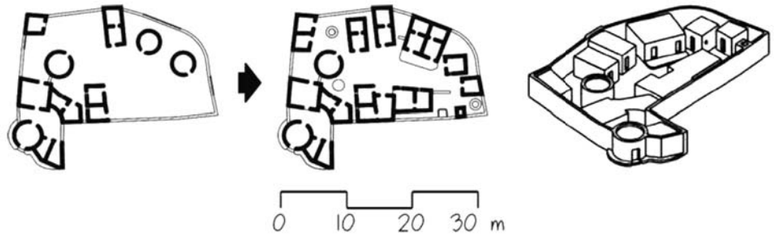
AFRICAN ROOTS OF COMMUNAL LIVING AND SHARED SPACE

As people started creating permanent living environments in Africa, a compound typology developed with an "inward-focusing" (Steyn, 2007:61) courtyard space surrounded by various small buildings that house separate functions. The courtyard space is where "cooking, socialising and craft industries all took place" (2007:61). The first nation to inhabit Southern Africa was the San, which is a nomadic hunter gatherer society which lives off of what nature provides (Barnard, 1992:37). This nation was driven away by other new settlers such as the Bantu people or the Zulu tribes. The Sotho people were the first to settle in the lower Apies river valley, where later Umsilikazi drove them out to build his own settlement (Engelbrecht et al., 1955:68). Certain typologies developed around the homesteads of the Bantu people of South Africa. A central meeting space, the Kgotla, and animal pens are enveloped by a circle of outer huts and walls (Steyn, 2015:22). Steyn conducted various studies on the history and origins of African cities. A significant finding that he made is that a market place is frequently the centre of a city, as echoed by White, Pienaar and Serfontein (2015:176) that "meeting points" of trade routes often formed the centre of a town. Further findings from Steyn are that communal open space is usually in abundance, and that cities are site and circumstance specific. He refers to these findings as African urbanism characteristics (2007:62). He further mentions that a city of African origin displays an urbanism of villages, referring to small self-sustaining units that make up a larger whole (2007:62). The clustering of objects to form a whole reverberates in the architecture as an interconnected cluster of spaces, rather than a singular building. Through the African heritage of place making (White et al., 2015:5), different programmatic spaces are linked with communal spaces.









CURRENT POPULATION AND IMMEDIATE NEEDS

A predominantly young population resides in Pretoria inner city (Statistics South Africa, 2012) (The City of Tshwane, 2013:55), reflecting amongst other aspects young parents struggling to support their children. The residents of the case study block should be enabled through the programme to provide for their families. Many children play (Fig. 137) unattended around the block on the streets and building circulation spaces. This should be addressed to provide secure supervised areas for the children's safety, and to offer stimulating learning activities for the children. Homelessness in Pretoria is particularly evident on the Land Bank block, with many people taking refuge under the overhangs of abandoned buildings. With the rise in crime against the homeless in Pretoria (Mitchley, 2019), it is even more pertinent to provide the basic needs of shelter, safety and nutrition to the people who are most vulnerable.

HEALTH, NUTRITION AND NOURISHMENT

A new ranking system, led by Richard Davies (Millington, 2019), rates countries from healthiest to unhealthiest (Amory & Mitchell-Rose, 2019). Called "The Indigo Wellbeing Index" (Fig. 138), it makes use of ten key metrics to rate countries namely "blood pressure, blood glucose, obesity, depression, happiness, alcohol use, tobacco use, exercise, healthy life expectancy, and government spending on healthcare". According to this index, South Africa is the unhealthiest of 150 countries that formed part of the data. The Wellbeing Index graph shows that the South African government is spending a sufficient amount on healthcare, yet we score the lowest of all participating countries. Perhaps some of the healthcare budget can be redirected towards education in health and wellbeing. As most of the metrics used for the rating system relate to nutrition and diet, people should be informed of the problems caused by unhealthy eating. Through the proposed intervention, preventative knowledge can be provided for the people instead of treating the resulting ill health years later. This notion is echoed by the Department of Health that provides a "Healthy-Lifestyle Campaign" (Department of Health, 2019) to the public where the department creates awareness about subjects such as nutrition and physical activity through free prescriptive booklets and exercise guidelines.

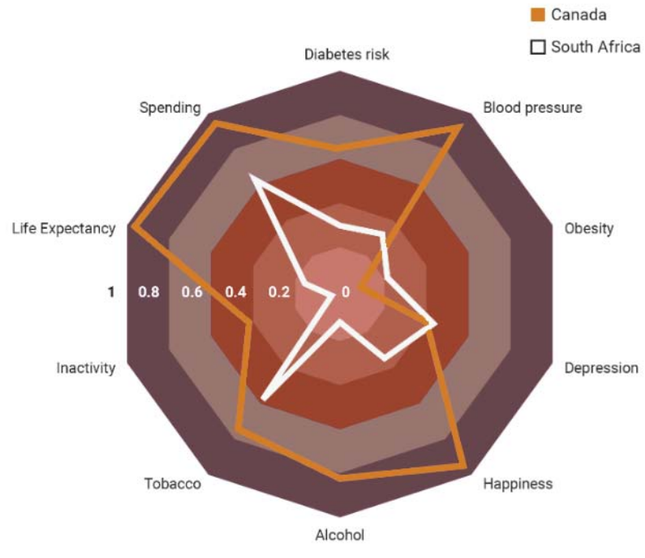


Fig.137. Top; Children playing, Makeshift room; Family strolls (Author, 2019)

Fig. 138. Left; The Indigo Wellbeing Index: Highest and lowest scores: Canada vs. South Africa (Amory & Mitchell-Rose, 2019; Adapted by Author, 2019)

THE BANK OF NOURISHMENT

To re-purpose some of South Africa's healthcare budget towards wellbeing education is an opportunity for the Tshwane Metropolitan Municipality to start a public-private partnership with several private stakeholders and the citizen as user (Fig.142). The programme consists of three legs: a low end programme where providing assistance with little to no income is envisioned; a middle ground and overarching programme that generates income to fund the building's workings and maintenance; and a high end programme, to enable growth and to balance the feasibility of the project through support provided by high value stakeholders (large business entities).

Low end programme

The not-for-profit organisation, PEN (Participate Empower Navigate) is incorporated as the low end interface that provides for the homeless, residents, and children of the area through a Building Livelihoods Centre. It consists of a community (soup) kitchen, day care and supervised play area, female homeless shelter, and an empowering programme for the homeless to volunteer for work in the vertical fields of the new intervention or learn other skills such as sewing, cooking, or child care. The yields produced from each volunteer's piece of land, or other products they create can be sold in the weekly markets and the volunteers keep the proceeds. A portion of the vertical fields is used by the culinary school where the produce is used in the restaurant and in the school workshops.

Middle ground and overarching programme

A culinary school, with lecture halls, research centre, meeting spaces, administrative offices, plant nursery, vertical agricultural fields, fresh produce drying spaces and restaurant is the link between the high and low end programmes. It is envisaged that the cultural food knowledge of nomadic gathering and subsistence farming is rekindled by including the history and applications in the curriculum of the culinary school, as well as through communal workshops, sporadic markets/vendors and public gathering spaces with hearths that occur in the public courtyards interseprsed within the new architecture. Moreover, a new social space driven by food is cultivated to inform the citizens about nourishment. The concept of an open building that stitches various functional realms with public spaces is strongly influenced by David Crane's Capital Web (1960), where he explains that "providing a continuum of functional shelter is implicit in the notion of space-shelter continuity, where our buildings, open spaces, and streets get to be one unified system" (1960:287). He further mentions the metaphor of city as house where "the 'living room' is in the street and the home offers only sleeping and storage facilities" (1960:288).

High end programme

The high end has new research laboratories that are used by the culinary school in association with the Agricultural Research Council (ARC) and the Department of Energy to forward research on agricultural yields and improving sustainable energy systems and storage capacities. The research is focussed on providing more with less, in a growing urban population such as Pretoria, as the biggest stress on energy and food production and consumption lies within densely populated urban areas (Iles, 2005:83; Mbiba, 2005:194). Furthermore, the intervention will facilitate the Energy Department's 2025 vision of a 30 percent increase in clean energy sources, as seen on the vision plaque in the Hannes Smit Building, in by providing space for photovoltaic panels on the hydroponic growing structures and other new clean energy systems testing. New research by a team from Rice University (USA) shows the potential to capture the wasted radiated heat from photovoltaic panels through nanotubes that turn the energy into light and then to electricity (Grossman, 2019).

The team has a theoretical prediction that their nanotube-photovoltaic panels can obtain an efficiency of 80 percent, an unprecedented increase from 20 percent of the captured energy converted in current solar panels. It is innovation such as this that will be encouraged in the research labs of the programme.

Through this interwoven programme an architectural intervention can replenish the spaces with life and activities, whilst nourishing the citizen with food knowledge and building livelihoods.

Growing programme

The vertical agricultural fields act as an extension of the three programme legs. It is proposed that a hydroponics system is utilised on the vertical growing structures, as the yield produced is more substantial. The average yield per acre for tomatoes in soil is five to ten tons per harvest, where hydroponic growing yields sixty to three hundred tons per acre (Resh, 2013:6). Moreover the planting densities of hydroponics are higher than that of soil farming, resulting in saving land and water as well as eliminating "agricultural runoff and chemical pesticides" (McBride & Yehia, 2016). Resh (2013:390-399) and others (Antonius, 2013; McBride & Yehia, 2016) mostly refer to vegetables and fruit produce for hydroponic production. This informed the decision to plant vegetables and fruit that are most suited to hydroponics. The growing structures will accommodate various types of produce especially plants that climb on structures (Fig. 139), including tomatoes, cucumber, squash, beans, and peas (Griffiths, 2016:78).

According to the *City of Pretoria 1913 Handbook* (Pretoria Municipality & South African Railways 1913:113-116), many different fruits can be grown in the district of Pretoria. Enormous profits were made by farmers in the area growing citrus including lemons, naartjies, and grapefruit (1913:116) as well as stone fruits, "such as apricots, peaches, plums, and nectarines, [and other fruit such as] table grapes, apples, pears, and figs"(1913:113). A known agricultural strategy of splaying out fruit trees (Fig. 141) for increased sun exposure and reachability, indicates that a fruit tree is a viable option for tying to and growing on a structure when provided with a fifteen litre pot to grow in (Fernandez, 2015).

As fruit and vegetables all require different conditions of sun exposure and nutrient solutions, the structure will be organised into a growing palette that compliments each plant. Furthermore, the palette introduces companion planting relying on specific symbiotic attributes of flora. Hydroponics and the growing palette is further explored in the Techné Chapter.

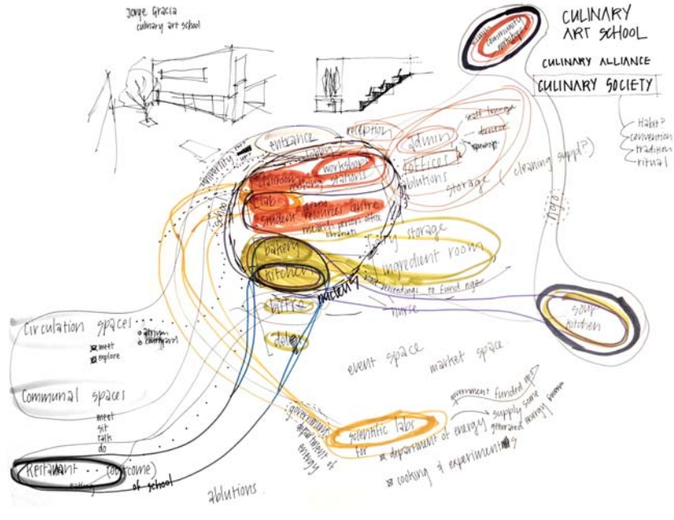


Fig. 139. Above; Various vegetables and fruits growing on structures (Reddy, 2019; Sellin, 2019; Vanheems, 2017; Garden.eco, 2019)

Fig. 140. Left; Conceptual three leg programme development and interrelations Author, 2019)

Fig.141. Bottom; Splaying of trees trained by wires, referred to as an espalier technique (Palmers, 2018)

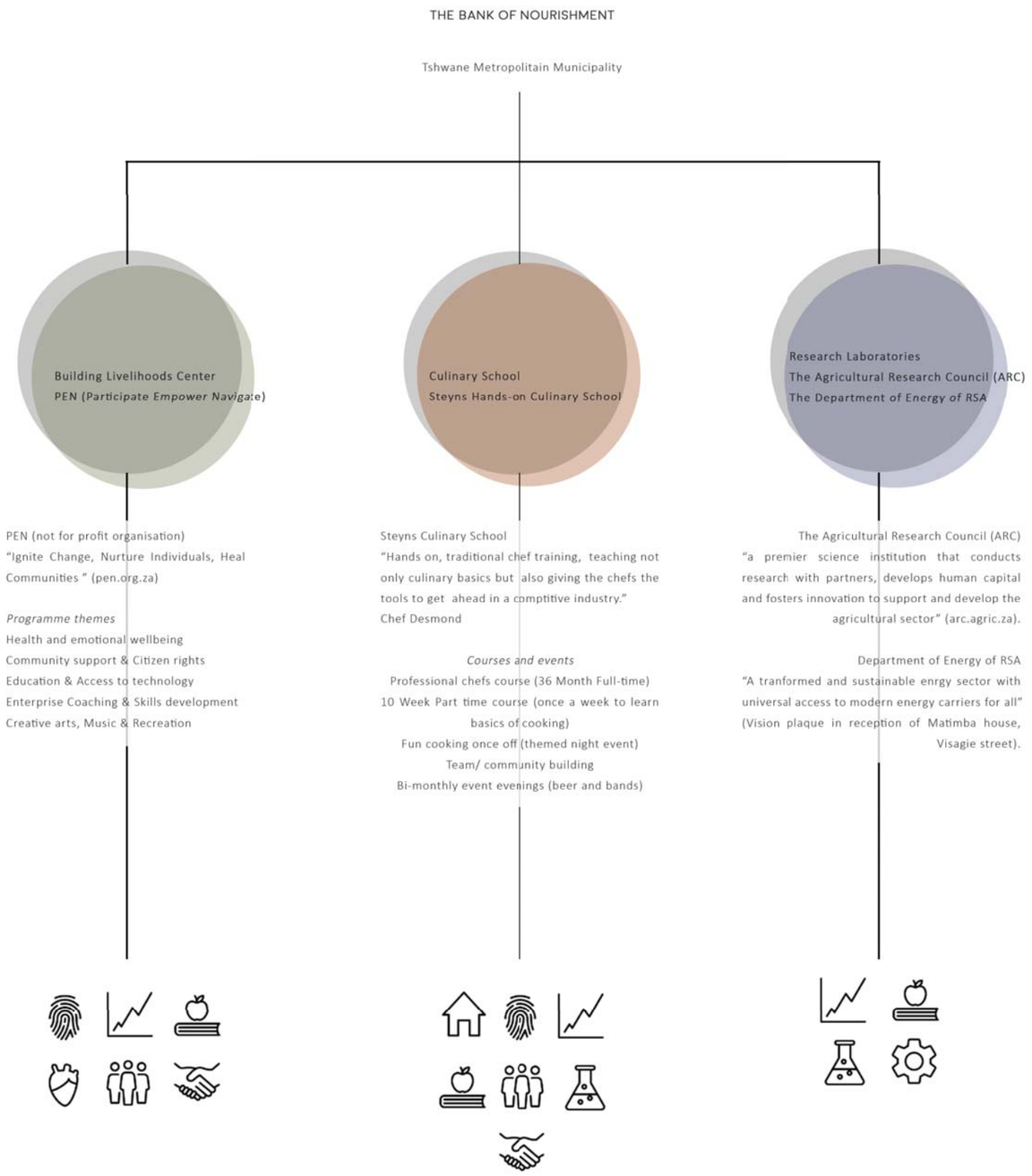


Fig. 142. Above, The three legs of the Bank of Nourishment with corresponding managing bodies and their mission statements or provided activities (Author, 2019)
The overarching public managing partner facilitates the interrelations between the private and public stakeholders. Orbaşli's values (Fig. 84.) are translated as deliverables of the three programme legs that provide multiple amenities for the city and its people

ACCOMMODATION SCHEDULE

Space	*Spatial quality*	*Description of properties and requirements*	*Size*	*Amount*	*Total m²*
middle ground programme		***Nourishment Education***			
		Learning spaces			
Lobby	External space, robust materials.	Sound lobby to reduce noise from entering the lecture halls by providing an intermediate threshold.	$9m^2$	1	9
Lecture halls	Controlled space: sound, light, and ventilation.	Insulated cavity walls to block external sound. Acoustic ceiling for appropriate reverberation with absorptive wall panels. Static absorptive seating with narrow desk. Fixed lecturer desk in front with stove top, sink, and overhead extraction. Adequate lighting for learning space: 200 lux. Mechanical ventilation.	$85m^2$	2	170
Flexible lecture hall	Controlled space: sound, light, and ventilation.	Same acoustic and light properties as above, adjustable seating arrangement. Mechanical ventilation.	$55m^2$	1	55
Seminar spaces	Quiet space, light and sound controlled.	Insulated drywalls, even southern light, & adequate amount of lighting for general working space: 100 lux	$33m^2$	2	66
Ablutions (Female, male, and Dis.)	Hygienic space, privacy from external view.	Easily cleanable surfaces. Culinary school: 3 years of study with up to 60 students in a year, and specialised chef course with 20 pupils (total of 200 pupils). Public use: average amount of daily visitors taken as 100. Total of 400 people: 200 per sex = female 4 wc's, 4 hwb's; male 2 wc's, 4 urinals, 3 hwb's; 1 unisex Dis. wc with hwb).	$90m^2$	1	90
Culinary Workshops	Hygienic space. User comfort: ample light, ventilation.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Movable cooking desk units for ease of cleaning and rearranging to fit bigger or smaller groups or different styles of teaching (ex. group work or individual tasks). Adequate lighting for cooking space: 150 lux	$65m^2$	3	195
Cold room	Hygienic, cold, and functional space.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Temperature and humidity controlled. Mechanical ventilation.	$25m^2$	1	25
Pantry	Hygienic, dry, and functional space.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Temperature (25°C) and humidity controlled. Mechanical ventilation.	$25m^2$	1	25
Growing classrooms	External space, semi shaded, robust materials.	Classes on pedestals to have balustrades, non slip floor material.	$50m^2$	3	150
Fresh produce drying	External space, semi shaded and secure.	Handrails on rooftop walkways. Sub-structure of pergola to receive tensile cables and hooks to hang produce to dry. Adequate precaution should be taken with walkways on polycarbonate sheeting.	$80m^2$	1	80

Space	Spatial quality	Description of properties and requirements	Size	Amount	Total m²
Hydroponic planting structures	External space, dappled light filtering through the structure.	Appropriate cable system for plants to grow on and service from below with suspension bridges.	400m^2	n/a	400
Hydroponic nursery	External space, dappled light for seedlings.	Needs own hydroponics sub system as nutrients needed for seedlings differ from the larger plants.	80m^2	1	80
Hydroponics system room	Functional space, ventilation.	Mechanical ventilation (high humidity space) Robust surfaces, pumps and equipment placed on vibration separating footings.	20m^2	1,5	30
Resource center	Quiet atmosphere, soft even natural southern light.	Books and other paper based documents sheltered from direct light. Absorptive material used as floors and panels on wall to reduce sound reverberation. Adequate even lighting for library: 100 lux.	160m²	2	320
Reception/ librarian	Quiet atmosphere, user comfort: light & ventilation	Adequate lighting for typing & filing office: 300 lux.	10m²	1	10
Plant library	Green house: controlled space, humid and hot.	Humidity & temperature controlled. Mostly shaded in winter months: indoor grow light system.	70m^2	1	70
		Administration block			
Reception	User comfort: light & ventilation.	Adequate lighting for typing & filing office: 300 lux. Natural ventilation.	10m^2	1	10
Offices	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	10m^2	8	100
Technical office	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	10m^2	1	10
Directors PA office	User comfort: light & ventilation.	Adequate lighting for typing & filing office: 300 lux. Natural ventilation.	10m^2	1	10
Directors office	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	20m²	2	40
Staff Ablutions (Unisex and Dis.)	Hygienic space, privacy from external view.	Easily cleanable surfaces. (Place of work 6-25 persons: min. 2 wc and 2 whb).	30m^2	1	30
Kitchenette	Hygienic space. User comfort: ample light, ventilation.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for cooking space: 150 lux. Natural ventilation.	10m^2	1	10
Meeting room	User comfort: light & ventilation.	Adequate lighting for conference rooms: 300 lux. Natural ventilation.	20m^2	1	20
Boardroom	User comfort: light & ventilation.	Adequate lighting for conference rooms: 300 lux. Natural ventilation.	30m^2	1	30

Space	Spatial quality	Description of properties and requirements	Size	Amount	Total m²
middle ground programme		***Nourishment Consumption***			
		Restaurant			
Seating	Comfortable and sociable space: Stoep. Shaded from sun, yet open to Pretoria's temperate climate.	Sheltered from wind and cold when necessary, with roller blinds. Overhead pergola permanently sheltering from sun and rain. Terraced seating platforms, with adequate lighting for general spaces in restaurants: 100 lux. Natural ventilation.	260m^2	1	260
Internal seating	Comfortable space, privacy, exclusivity.	Acoustically absorptive for conversation privacy, natural ventilation, and lighting of 100 lux.	57m²	1	57
Cold prep Kitchen	Hygienic space. User comfort: ample light, ventilation.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for cooking space: 150 lux.	35m²	1	35
Hot prep Kitchen	Hygienic space. User comfort: ample light, ventilation. Fire regulations.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for cooking space: 150 lux. Overhead extraction for each stove top, and appropriate fire extinguishing equipment at hand.	94m²	1	94
Ex. Ablutions (Female, male, and Dis.)	Hygienic space, privacy from external view.	Existing amount of 2 wc's and hwb's per gender adequate. To be refurbished with new sanitary fittings, and easily cleanable surfaces. Dis. wc to be included.	30m²	1	30
Barista	Hygienic space. User comfort: ample light.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for cooking space: 150 lux.	10m²	1	10
Scullery	Hygienic space. User comfort: ample light, ventilation.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for cooking space: 150 lux.	29m²	1	29
Cold room	Hygienic, cold, and functional space.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Temperature and humidity controlled. Mechanical ventilation.	6m²	1	6
Pantry	Hygienic, dry, and functional space.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Temperature (25°C) and humidity controlled. Mechanical ventilation.	7m²	1	7
		Bar			
Bar counter and serving	Hygienic space. User comfort: ample light.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for serving space: 100 lux.	100m²	1	100
Bar seating	Comfortable and sociable space: Stoep. Shaded from sun, yet open to Pretoria's temperate climate.	Sheltered from wind and cold when necessary, with roller blinds. Permanent shelter from sun and rain. Adequate lighting for general spaces: 100 lux. Natural ventilation.	71m²	3	213
Manager's office	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	10m²	1	10

Space	*Spatial quality*	*Description of properties and requirements*	*Size*	*Amount*	*Total m²*
Safe	Secure space, robust materials.	Space within the office, consider the design to be impenetrable from all sides. Only access with combination from the office.	1m²	1	1
Ablutions (Female, male, and Dis.)	Hygienic space, privacy from external view.	Easily cleanable surfaces. Maximum capacity of clients at bar is 200. Min. sanitary provisions in licensed bars: Female: 1 wc for up to 12 people, plus 1 for 13-30, plus 1 for every additional 25 females = 5 wc's, 3 hwb's. Male: 1 wc for 150 men and 1 urinal for 75 men = 2 wc's, 1 trough urinal, 3 hwb's. 1 unisex Dis. wc with hwb).	60m²	1	60
Bar drinks storage	Hygienic, dry, and functional space.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Temperature (25°C) and humidity controlled. Mechanical ventilation.	26m²	1	26
		Service and general			
Deliveries and refuse area (service yard)	External space. Robust surfaces, functional space, exposed services.	Sheltered from sun and rain, naturally ventilated space.	150m²	1	150
Produce sorting & packaging	Hygienic, space. User comfort: lighting and ventilation.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Lighting for materials handling, wrap, pack, label and despatch: 150 lux. Mechanical ventilation: large work area.	125m²	1	125
Circulation spaces & service access	Non-slip, robust materials. User comfort: lighting.	Materials to withstand high foot traffic, and high sun and rain exposure qualities (UV stability) as most circulation spaces are external. Adequate lighting for stairs & corridors: 100 lux.			
Fire escapes	Non-slip robust materials, lighting, fire regulations.	Appropriate fire regulations to be followed SANS 10400 Part T(16, 17, 18, 19, 20, & 21): Door swings in direction of escape route, adequate disability equipment for staircases, appropriate corridor widths and open areas for assembly points. Adequate lighting for stairs & corridors: 100 lux.			
Gardening & maintenance storage	Dry, and functional space.	Easily cleanable and robust materials. Humidity controlled with mechanical ventilation.	4m²	3	12
Grounds manager office	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	10m²	1	10
Security boxes	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	5m²	3	15

Space	*Spatial quality*	*Description of properties and requirements*	*Size*	*Amount*	*Total m²*
low end programme		***Nourishment Social***			
Communal courtyards	External sociable space: Stoep. Partially shaded from sun, yet open to Pretoria's temperate climate.	Non-slip, robust materials, easily cleanable. Materials to withstand high foot traffic, and high sun and rain exposure qualities (UV stability).	80m²	5	400
Braai area	Sociable space: Stoep. Open to Pretoria's temperate climate.	Non-slip, robust materials, easily cleanable. Materials to have high sun and rain exposure qualities (UV stability).	50m²	2	50
low end programme		***Nourishment to Facilitate***			
		Female homeless shelter (Building livelihoods center)			
Reception	User comfort: light & ventilation.	Adequate lighting for typing & filing office: 300 lux. Natural ventilation.	10m²	1	10
Mentor & managers office	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	10m²	1	10
Social worker office	User comfort: light & ventilation.	Adequate lighting for general office: 300 lux. Natural ventilation.	10m²	1	10
Staff Ablutions (Unisex and Dis.)	Hygienic space, privacy from external view.	Easily cleanable surfaces. (Place of work 1-5 persons: min. 1 wc and 1 whb, and 1x Dis. wc and whb).	20m²	1	20
Skills development workshop spaces: Cooking, cleaning, and sewing classes.	Hygienic space. User comfort: ample light, ventilation.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for cooking space: 150 lux. Adequate lighting for working with textiles: 300-1000lux (task lighting).	70m²	3	140
Kitchen	Hygienic space. User comfort: ample light, ventilation. Fire regulations.	Easily cleanable and non-corrosive surfaces to SAHPRA standards. Adequate lighting for cooking space: 150 lux. Overhead extraction for stove top, and appropriate fire extinguishing equipment at hand.	20m²	1	20
Lounge area	Comfortable and sociable space: Stoep. Shaded from sun, yet open to Pretoria's temperate climate.	Sheltered from wind and cold when necessary, with roller blinds. Adequate lighting for general spaces: 100 lux. Naturally ventilated.	80m²	1	80
Sleeping pods	Quiet controlled space, user comfort: ventilation, sound and light.	Acoustically absorptive interior and insulated walls, floor and ceiling to keep out external sound. The pods are lifted off the floor with vibration separating footings, to reduce the structural noise transferred. Natural ventilation within each pod, and lighting of 100 lux.	5m²	38	190

Space	*Spatial quality*	*Description of properties and requirements*	*Size*	*Amount*	*Total m²*
Female Bathrooms	Hygienic space, privacy from external view.	Easily cleanable surfaces. Maximum capacity of women shelter, semi-permanent and day users: 80. Min. sanitary provisions for boarding: 1 wc for 5 persons, and 1 hwb for 3 persons (up to 60 and then 1 per 40) = 16 wc's, 21 hwb's . 2 unisex Dis. wc with hwb - 1 per floor). Showers & baths: 1 for 10 persons (at least one bath) = 6 showers and 2 baths. These totals are divided into two equal amounts for 1st and 2nd floor ablutions.	60m^2	2	120
Day care	Quiet controlled space, user comfort: ventilation, sound and light.	Acoustic ceiling for appropriate reverberation with absorptive wall panels and flooring. Adequate lighting for learning space: 200 lux. Mechanical ventilation.	80m^2	1	80
Play spaces	External spaces, shaded from the sun	Non-slip, robust materials, easily cleanable. Materials to have high sun and rain exposure qualities (UV stability).			
Children & caretakers ablutions	Hygienic space, privacy from external view, yet accessible to aid children	Maximum capacity of day care: 30 pupils. Min. requirements for pupils under 5: 1 wc per 10 = 3wc's and 3hwb's. 1 Unisex Dis. wc for caretakers.	15m^2	1	15
high end programme	***Nourishment Research***				
Agricultural research labs	Controlled space: Hygienic, and functional space, even southern light.	OCTANORM cleanroom system. Certifiable for all GMP/ISO classes. Built modularly, allowing for high flexibility. Lighting for laboratories (task): 300 lux. Mechanical ventilation.	200m^2	1	200
Sustainable energy research labs	Controlled space: Hygienic, and functional space, even southern light.	OCTANORM cleanroom system. Certifiable for all GMP/ISO classes. Built modularly, allowing for high flexibility. Lighting for laboratories (task): 300 lux. Mechanical ventilation.	110m^2	2	220
temporal programme	***Nourishment Temporal***				
Monthly cooking events & training workshops Weekly soup kitchen Weekly fresh produce market Seasonal festivals	Appropriated space: External courtyards and walkways transform into markets and event spaces.	Storage room to keep decorations and foldable tables and chairs for markets, workshops, events, festivals, and soup kitchen.			
Total					4850

NEST WE GROW PRECEDENT

Kengo Kuma & Associates + College of

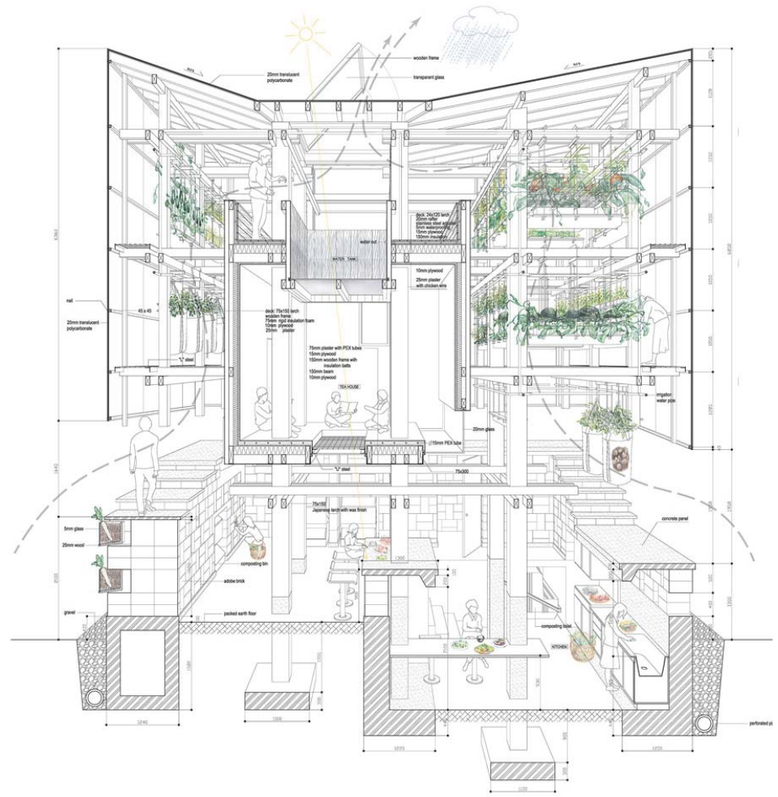
Environmental Design UC Berkeley, Japan, 2014

Programmatic, Technological informant

Nest We Grow is a project that brings “people in the community together to store, prepare and enjoy local foods in the setting of Hokkaido, Japan” (Kuma, 2014). This project illustrates that food can be used in a building to bring people together with an open hearth at its core. The openness of the building is striking as it is an interior space that lends itself to the outside and vice versa (Fig. 144). Through layering thresholds, an interior space is created that still remains external. The ground plane material is sympathetic to its environment where the plinth grows from the ground with the usage of rammed earth walls and straw bale construction with a rough earthen coloured finish. The timber structure with polycarbonate sheeting is a light shell that seemingly floats above the earth.

Fig. 143 Left; Compilation of Nest We Grow façade and semi internal spaces (Sha, 2014)

Fig. 144. Below; Section of Nest We Grow showing spatial relationship of food, growing, harvesting, storing, and cooking (Kengo Kuma & Associates, 2014)



CULINARY ART SCHOOL PRECEDENT

Gracia Studio

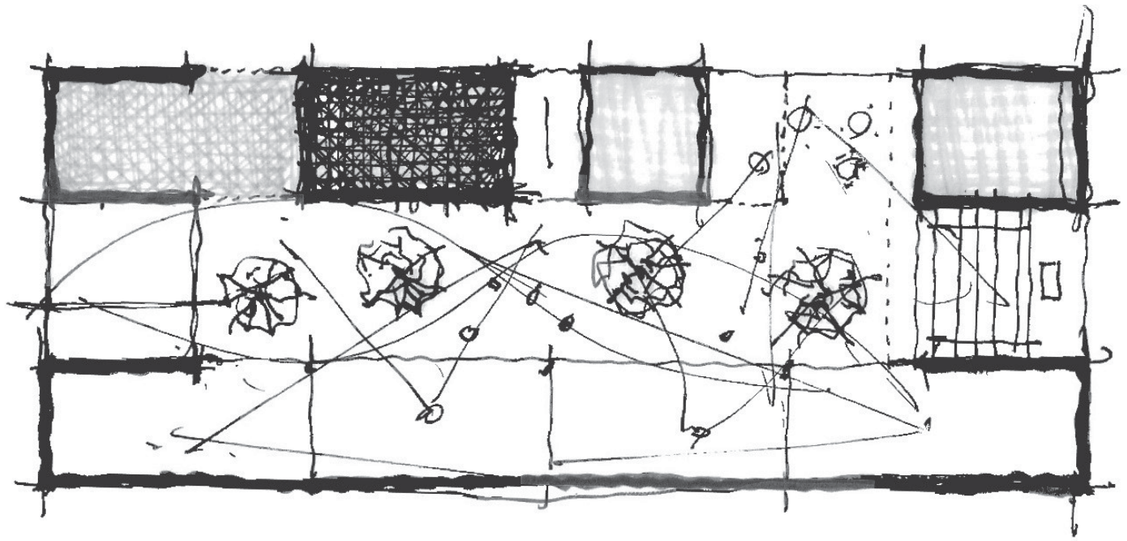
Tijuana, Mexico, 2010

Programmatic informant

The Culinary Art School in Mexico has a similar contextual situation to that of South Africa as it is a third world country combined with first world elements that struggle to cope with the gap between. The school is built on a small site with a limited budget that warrants innovation (Gracià, 2011). It was pertinent to keep the cost low through the "use of new technologies and local materials" (2011). The plan is organised around a central communal space (Fig. 146) which necessitates that "the two main volumes face each other, creating a transition space: the grand plaza" (2011). Facing the project inwards allows students and professors alike to be aware of their colleagues in the surrounding spaces, as glass façades are utilised to blur the barrier of internal and external space. A student notes that "we are always in-between, inside and outside simultaneously" (2011). The relevant aspects of this precedent is the organisation of the plan around open communal spaces, the interconnectedness of the different rooms, lecture halls and workshops allowing a visual continuity of space, and the combination of spaces needed for such a school. These aspects will be translated and utilised in this dissertation to create a new innovative culinary school.

Fig. 145. Top; Culinary Art School with intimate lecture room, courtyard and high end cooking workshops (Gracià, 2011)

Fig. 146. Below; Conceptual plan of two wings centred around an open courtyard space (Garcià, 2011)



FNB SQUARE SOUP KITCHEN PRECEDENT

Group of individuals

CBD, Johannesburg, South Africa, 2016

Contextual, programmatic informant

East of the Kerk Street Mosque in Johannesburg, a well-kept public courtyard space resides[14]. Here, the homeless and business people mingle and co-exist without trouble or fear. There are ample seating spaces in the form of grand marble balustrade seating and wide staircases (Fig. 147). The homeless sit around waiting for 12pm when they will receive half a loaf of bread and a polystyrene cup of soup. The elderly are served first and second helpings are allowed. More affluent people frequent the space in between/through the homeless that are waiting to be served (standing/ sitting). There are many shop goers bustling through and people going to the mosque. The space is mostly overshadowed by the tall FNB building to the north of the square but despite this, people meander and sit in the space. The homeless can sit around the square and eat their lunch, not disturbed or removed. They are tolerated and accepted in the space. When consulting the team who run the informal soup kitchen, it emerged that they are an energetic group of individuals (Fig. 148) who spontaneously took initiative to provide food for the many homeless people in the CBD of Johannesburg. The soup kitchen is funded by the volunteers' own salaries and any donations given by the passer-by. The group has an agreement with FNB (the assumed owner of the square) to operate in the square. The business men and women and any other passer-by often give a donation to the group of volunteers, indicating that such an intervention placed next to affluent people, provides opportunities for direct donations. People are more likely to donate and have concern for an issue if they are confronted by it.

Across the FNB square is a bakery with spill out space, an open air bar and a restaurant that are frequented by working people, shoppers and other passer-by's. The thoroughfare through the square allows access to many feet, and the soup kitchen is right in the centre of it. The resilience of the soup kitchen is its adaptability and informality. It can shift, move, change, or relocate with ease as it consists of a singular table. This is an important aspect to consider when designing a soup kitchen; that the informality is what makes it flexible to suit any circumstances that it is confronted with. This square shows how dynamic a space can be when interaction is encouraged between different users, stakeholders and other participants that make up the diverse city society.

The courtyard space of Kirk Street Mosque is significant in its usage activities and arrangement/planning of space. It functions effectively, illustrating the possibility for integration of a variety of income level citizens within one functioning body of space in the inner city of Johannesburg. This is a worthy precedent of diverse combinatory functions used in one public space, owned by private entities.

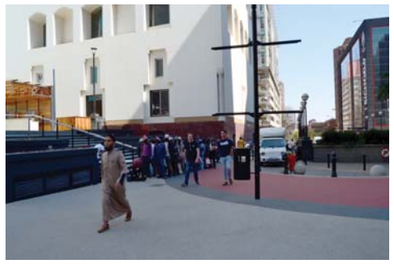
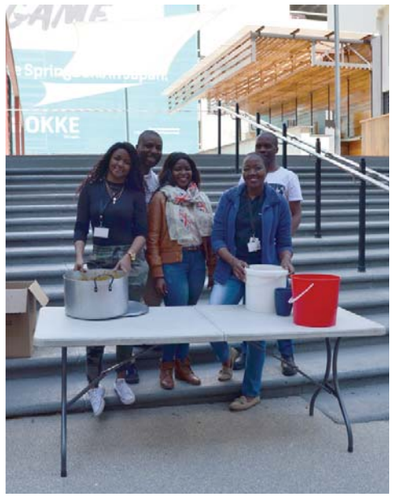
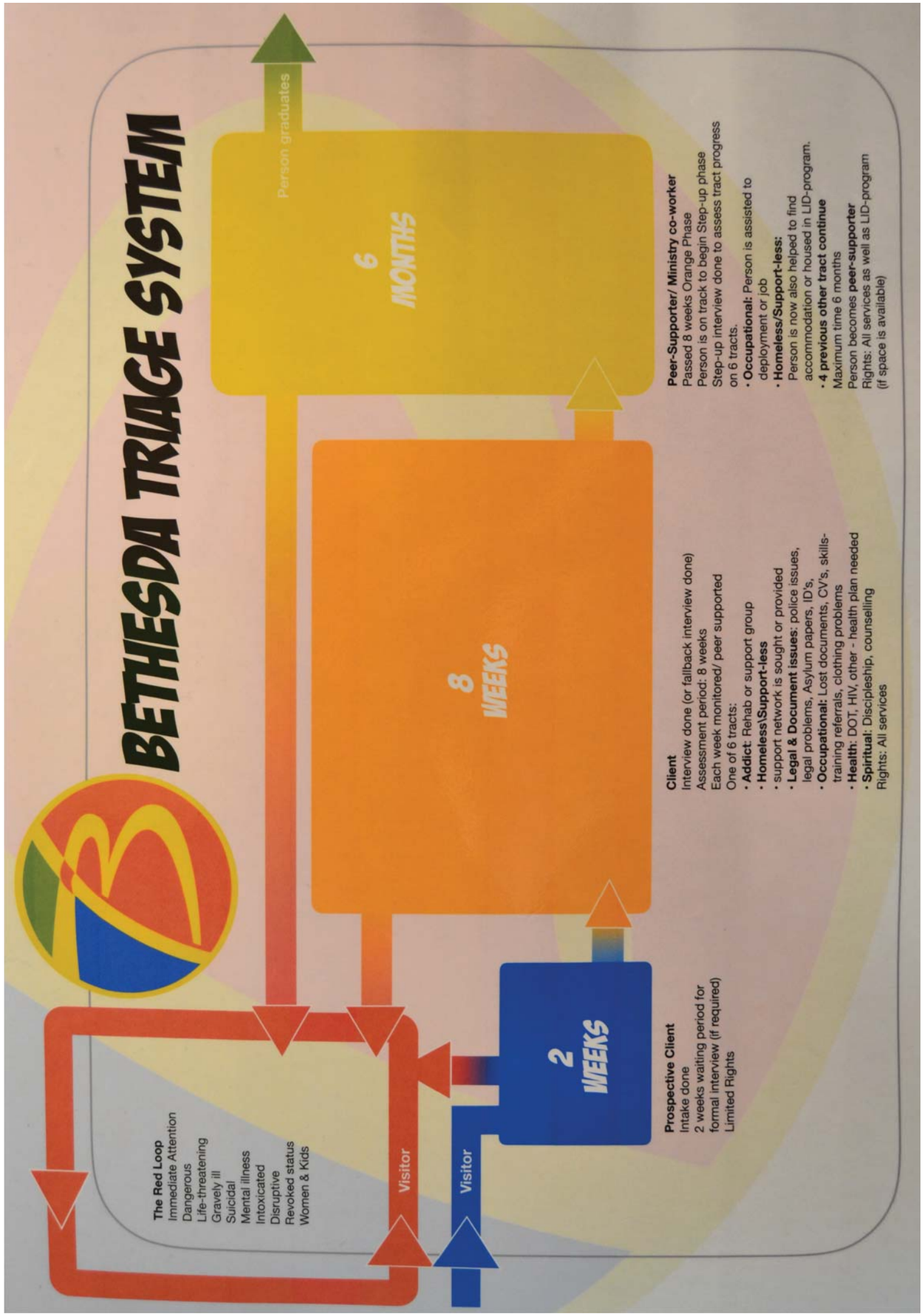


Fig. 147. Above; Compilation of the FNB square space and various users (Author, 2019)

Fig.148. Below; Group of individuals running the Soup Kitchen (Author, 2019)



14 All information described here was gathered on site through informal interviews with passer-by's and the group of individuals who run the soup kitchen, as well as observations made while on site.



VOS STREET 'DROP-IN CENTRE' PRECEDENT

PEN (Participate Empower Navigate)

Sunnyside, Pretoria, South Africa, 1992

Contextual, programmatic informant

Located in the suburban neighbourhood of Pretoria, a small government owned house provides for the homeless people of Pretoria. During a site visit, Katleho Ncaphe, manager of the Vos Street Drop-In Centre, gave detailed descriptions on the inner workings of the centre.

The people who find themselves in this vulnerable state are mostly opportunity seeking parents who need to earn money to send home to their children who are either in rural areas of South Africa, or other countries of Africa (Ncaphe, 2019). The parent migrates to large urban areas or cities where most job opportunities lie.

The Vos street Drop-in Centre provides specifically for the male population of homeless in Pretoria and other centres cater for females, as rape accusations are mitigated through separating sexes.

The Drop-in Centres run by PEN have a system through which the homeless are guided (Fig. 149). The first stage is initial assessment by a social worker to assist with mental health patients, which are taken to correct facilities, or to rule out opportunists that are dishonest about their situation. After the initial assessment, the people are taken into the programme, consisting of skills teaching, to empower them to get a job and start building their own livelihoods. The centre provides other amenities such as help with CV writing, mentorship, locker facilities with a secure held-on-site key system, laundry room, showers, phone charging points, lounge area with television and piano, and a once a week soup kitchen. A building next door is being fitted with bunk beds for the homeless that have gone through the 6 month empowering system that have found jobs, but cannot yet afford rent of an apartment. This is often the case as their salary would amount to R2500 a month where they send R2000 home to their families, and left with R500 cannot afford accommodation, let alone any other amenities. The PEN centres are therefore trying to aid in providing transitional housing for the hard working, but not yet earning enough parents, stranded on the streets.

The provided skills learning is gender specific, where men prefer certain skills to increase opportunities to obtain work, such as welding, fixing pipes and electrical fittings. The best job possibilities are as plumber, electrician or other hard labour construction jobs. Similarly, female skills development is focused on cooking, cleaning and sewing. There are a few exceptions, but this is the norm. According to Katleho, there should always be a choice of skills to develop, as all people do not have the same abilities or interests.

To grow ownership and a sense of community, the homeless in the programme are encouraged to help with cleaning and washing up. There is a recycling drop-off next to the centre where the homeless can help with sorting to earn a daily salary of R100. The availability of the adjacent job opportunity is conducive to creating a network of opportunities for the vulnerable.

Fig. 149. Opposite; Photo of the Bethesda Triage System used by PEN to aid and empower the homeless (Author, 2019)

Fig.150. Above; Spaces and amenities provided by the homeless shelter, including lockers, lounge and dining space, and recycling sorting facility next door (Author, 2019)

06

CONCEPT

Overarching intentions and design informants: Toward design intentions

Design intentions: found in answering the initial architectural spatial questions

The conceptual approach to accomplish the intentions

the design set up

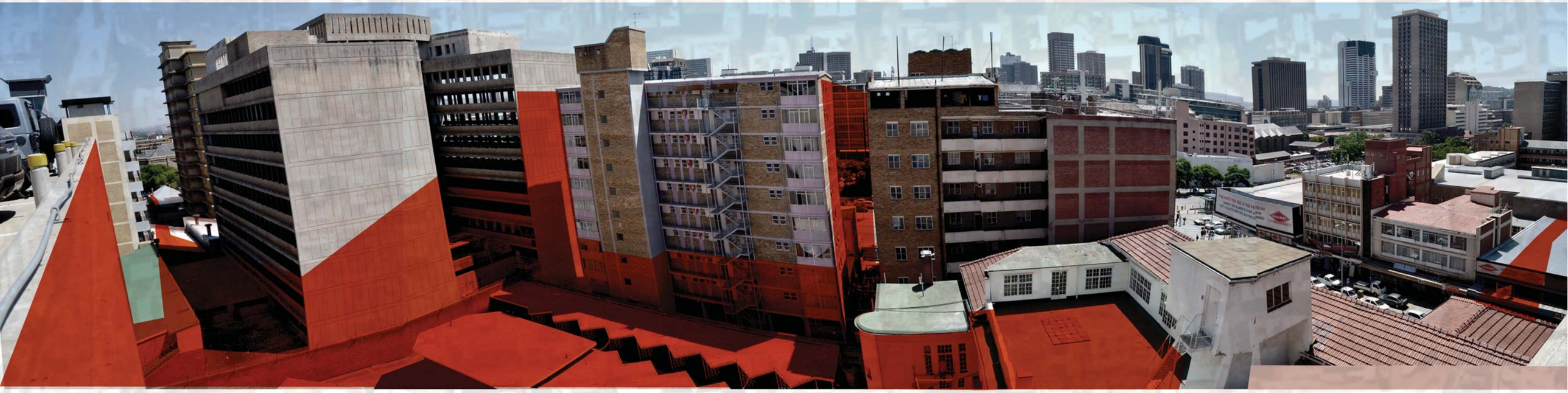


Fig. 151. Previous page; Focus area on site (Author, 2019; Google Maps, 2019)

Fig. 152. Opposite; Conceptual diagrams of methods of intervention (Author, 2019)

OVERARCHING INTENTIONS AND DESIGN INFORMANTS: TOWARD DESIGN INTENTIONS

As delineated in the introduction chapter, the main research question posed was to investigate what informants determine architectural strategies to regenerate and replenish latent space in Pretoria's inner city. The overarching intention of the proposed intervention is to delineate a new relationship between the inner city user and latent space, to create off street user-relief spaces through the application of palimpsetic strategies developed from the contextual and heritage lens investigations.

The intervention is nested within the geometry, the history and the current needs of the site, morphing from its context. Through using a palimpsetic approach to design with old buildings, a new layer is added to the built fabric, whilst adapting and transforming the old to be improved. This approach weaves the fragmented internal and external latent spaces together to form a threshold dialogue where the inner city fabric is regenerated.

The design informants gathered from the various investigations, as explored in the previous chapters and hierarchically ordered, are as follows:

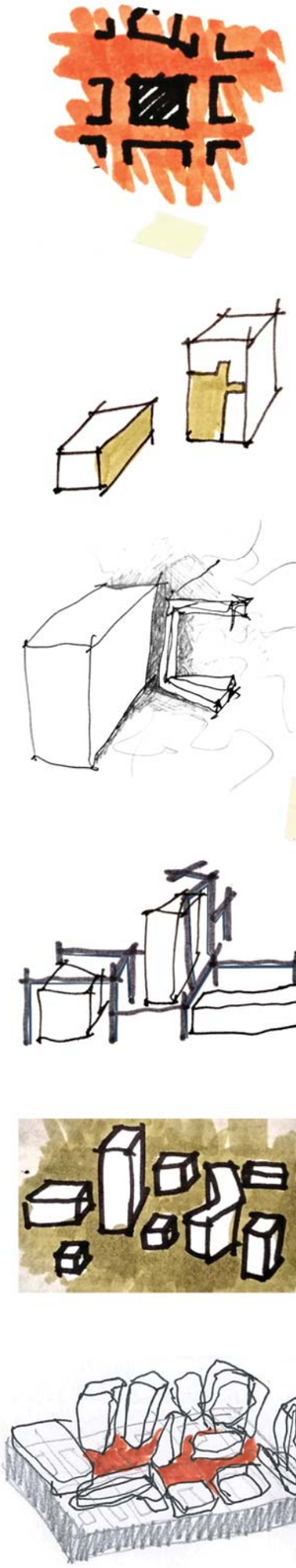
- Palimpsetic approach to layering the site, as derived from the heritage chapter.
- Existing built fabric that fuels the development of contextual idioms used to adapt and latch onto (connect to, insert into) the existing buildings.
- Movement patterns and potential movement routes through the site, creating axes and line-of-sight-pathways.
- Active and 'soft' user interface or edge, developed in the urban vision, applied to the new building that allows pause spaces for the passer-by and daily users.
- Existing land-use and activities that inform where the new proposed architecture positions itself within the block's internal spaces to connect and extend them.
- Communal activities and shared spaces, derived from the precinct vision and background of African roots, are key elements to bind the new architecture.

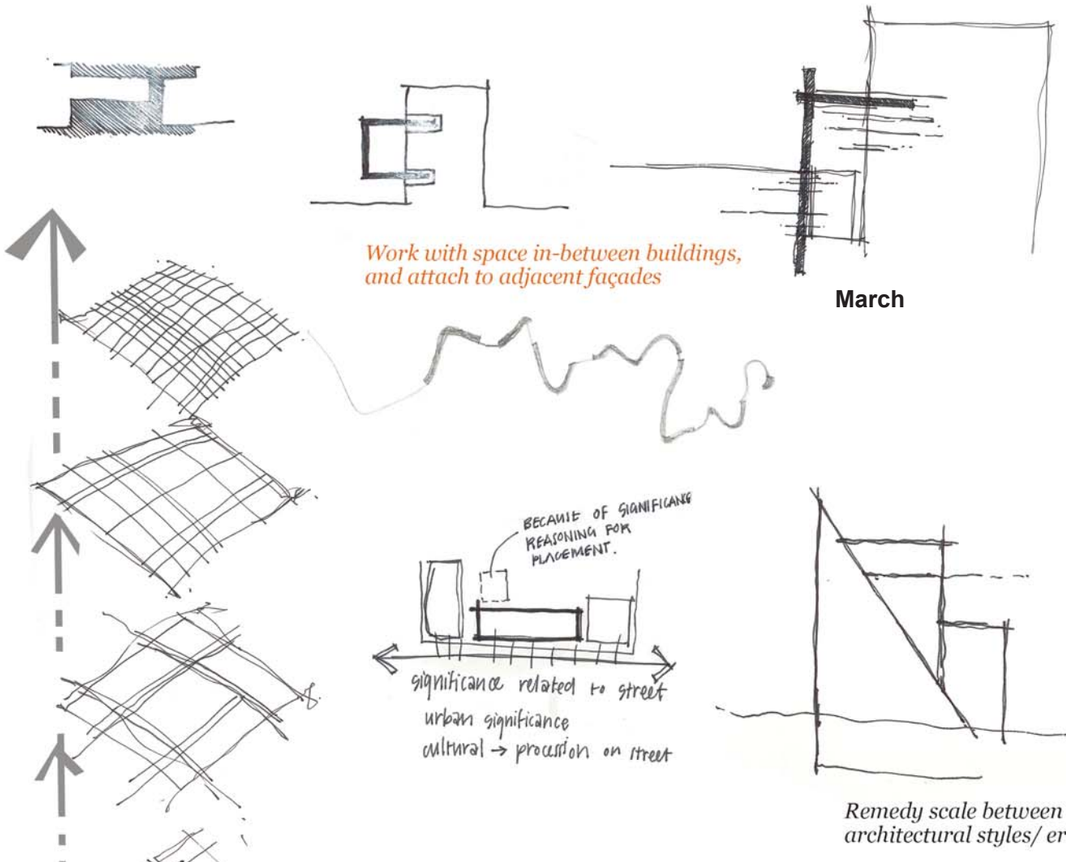
DESIGN INTENTIONS: FOUND IN ANSWERING THE INITIAL ARCHITECTURAL SPATIAL QUESTIONS

Further questions were posed in the introductory chapter that specifically refer to the search for architectural solutions. The answer to the question of what types of spaces and activities can architecture provide to create pockets of relief for inner city users in Pretoria, is encapsulated in the programme of the building. Public space and activities, driven by food, is interspersed through various elements of the programme such as the culinary school workshops and lecture halls, bar and resource centre. The next question of how architecture can allow for complexity and diversity in interaction between different activities, stakeholders and functions can be answered through re-imagining a building from a single element, to a thread of spaces. This action leads to an architecture of dispersed internal spaces, interwoven with open external communal space, ultimately blurring the line of internal and external space. The realm of the citizen is therefore extended past the existing buildings, in between the new architecture and even up onto new raised public accessible platforms. Complexity and diversity is further intended to occur by encouraging brief encounters, greetings and interactions through the diverse programme that mixes multiple stakeholders and activities in the same spaces. The last question of how designed spaces can accommodate change over time and appropriation by people, is answered through the building's fringes that are robust, to be painted (graffiti) on and used as notice boards, and certain elements extend to accommodate attachments to it. Organic temporal growth is captured through people latching onto the building or leaving something of themselves behind; these patina-like fragments become the extensions of the designed spaces. The architectural result is a prototype of novel ways in which to knit and densify the urban fabric – block per block – in the inner city of Pretoria.

There is an inherent need for a city to have density without impacting the amount of open space, so it is proposed to provide a calculated densification strategy. The dissertation deals with densifying the inner city in an unusual manner that provides the city with new threads of multifunctional spaces and amenities, whilst offering open public space in-between. This concept is referred to in this dissertation as threshold space, where the minimum amount of space is occupied by building and the rest is given to the public realm. A threshold refers to a space that is in-between, neither inside nor outside, the transitional space that connects different elements. Here, this term is used as a metaphor for the new architecture that consist of various small internal spaces interspersed with external spaces, with the largest amount of spaces being both internal and external, creating a threshold architecture. The whole design itself acts as a threshold building connecting in various instances with the existing fabric.

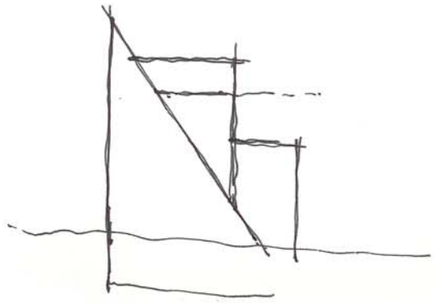
The concept that synthesizes the outlined design intentions is a design that draws people and activities into a collective space to create complexity and diversity in interaction between the different stakeholders, programmes and spaces.





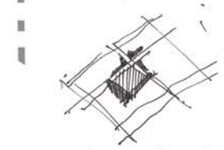
Work with space in-between buildings, and attach to adjacent façades

March



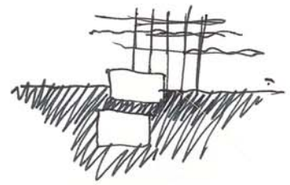
Remedy scale between various architectural styles/ eras.

adapting scale of site

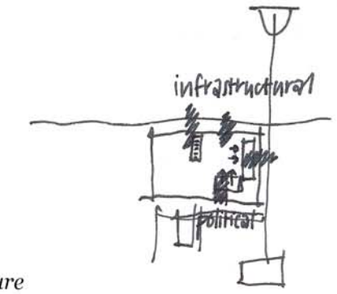


Focus on the small grained first to accomplish small growth, fueled by Tshwane Metropolitain Municipality. block per block

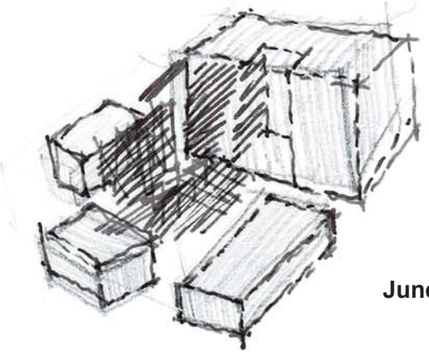
Canopy type structures providing amenities to elements above or below



Strongly connect and insert into the ground, light structure above



March



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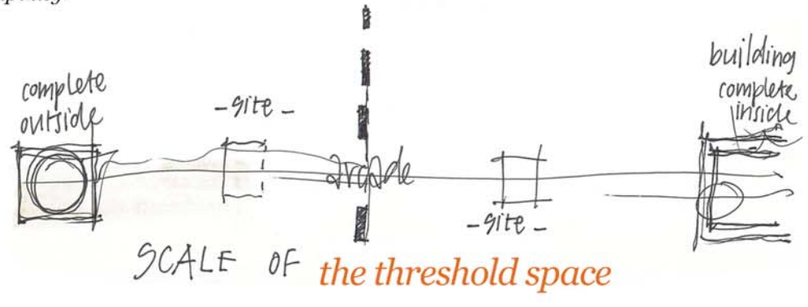
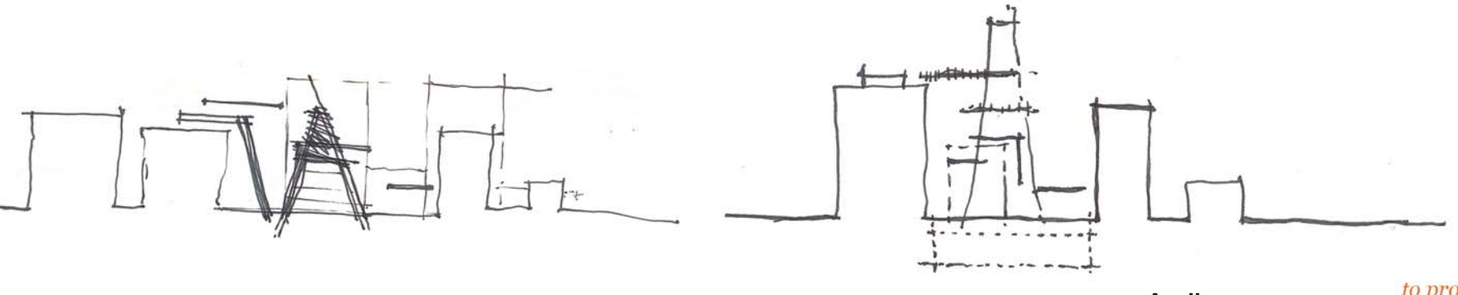
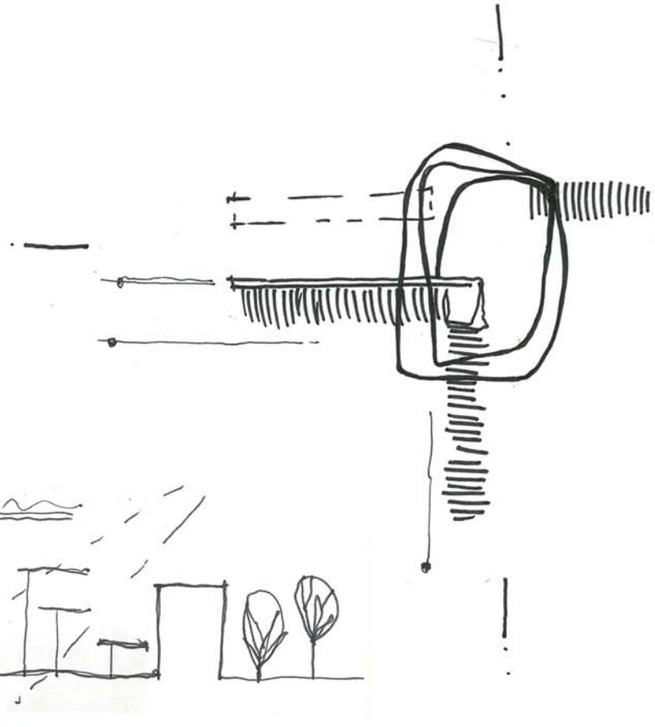




April

Fig. 153. Conceptual diagrams towards an architectural spatial concept (Author, 2019; Google maps, 2019)



raised plinths, platforms, and permeable screens

to provide the optimum user comfort, semi-shaded in Pretoria climate of wind still dry winters, to afternoon summer storms, with windy equinox transitions

THE CONCEPTUAL APPROACH TO ACCOMPLISH THE INTENTIONS

Four conceptual design strategies were derived from various urban, architectural, programmatic and theoretical conclusions in this dissertation. These strategies are strongly influenced by Bollack's strategy types (2013:22) along with the arguments made by Semes (2007:145) and Fisher (2014:360) for a layered approach to working with old buildings. These strategies are implemented on the latent spaces in, and between, the urban fabric to consolidate and replenish the fragmented spaces of inner city Pretoria. These conceptual strategies bind spaces and facilitate the design intentions by responding to the various design informants. The four strategies are connections, insertions, extensions, and appropriations. They are defined below to discuss what the spatial consequences of each strategy are.

01 Connections

Existing networks, both pedestrian and programmatic, are connected with new inter-linkages. New connections between old and new architecture are formed through addition. Different stakeholders and users are connected through the intervention.

02 Insertions

With the insertion of activities and events in the internal areas of the block, as well as into existing buildings, the spaces are regenerated and given a new lease on life. The insertion activates the latent potential of the space.

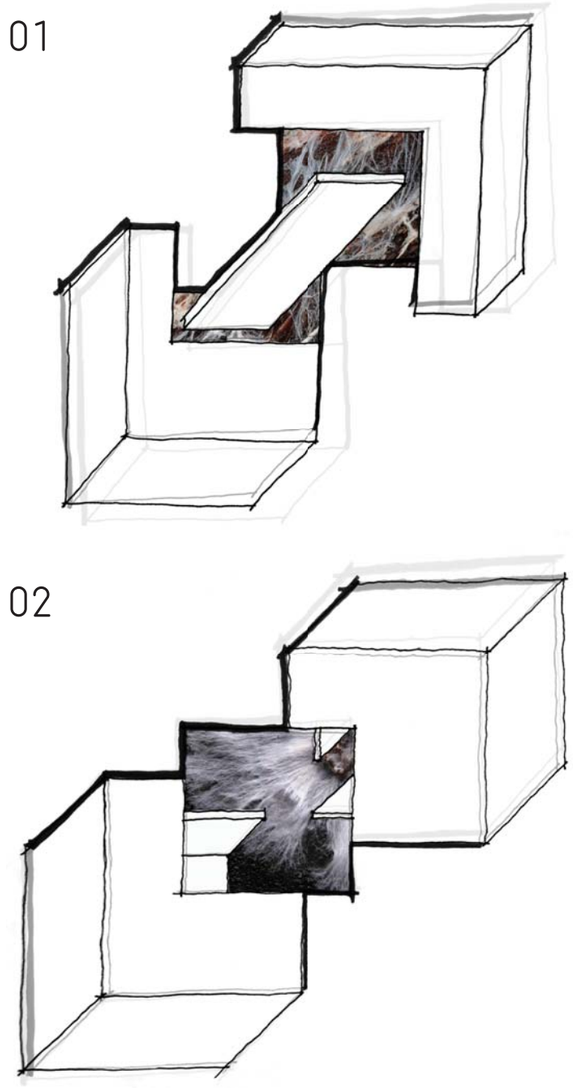
03 Extensions

Extending the existing functions and spaces of the block create a foundation from which the new architecture can grow. This strategy obscures the line of internal and external areas by introducing multiple layers of threshold space.

04 Appropriations

After the new intervention is placed, people are encouraged to appropriate the space, creating temporary additions and organic growth of market and vendor space within the block. Currently, people appropriate spaces on the fringe of the block by attaching their activities to fences and columns. The spill-out activity in front of shops is another element latched onto by other vendors.

All of the above strategies are explored and refined in the design process and development. The strategies are applied to the internally facing elevations of the existing buildings and the surrounding ground plane, to make the existing buildings face inward to activate the latent spaces and unlock the potential thereof. Moreover, the strategies give new abilities to the latent spaces and facilitates integration into the urban fabric.



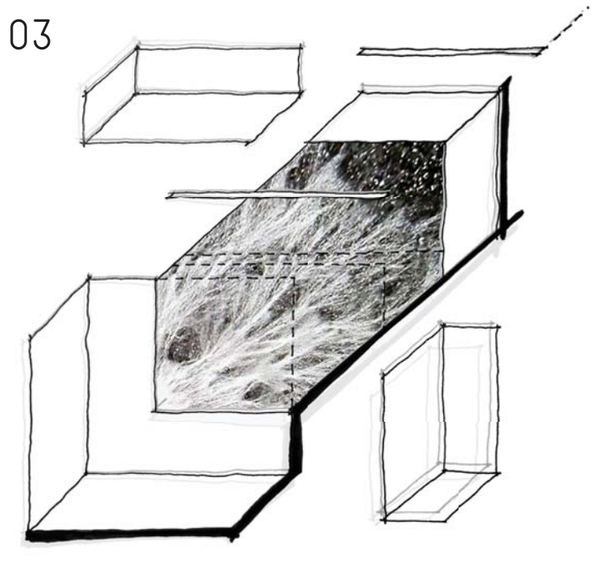
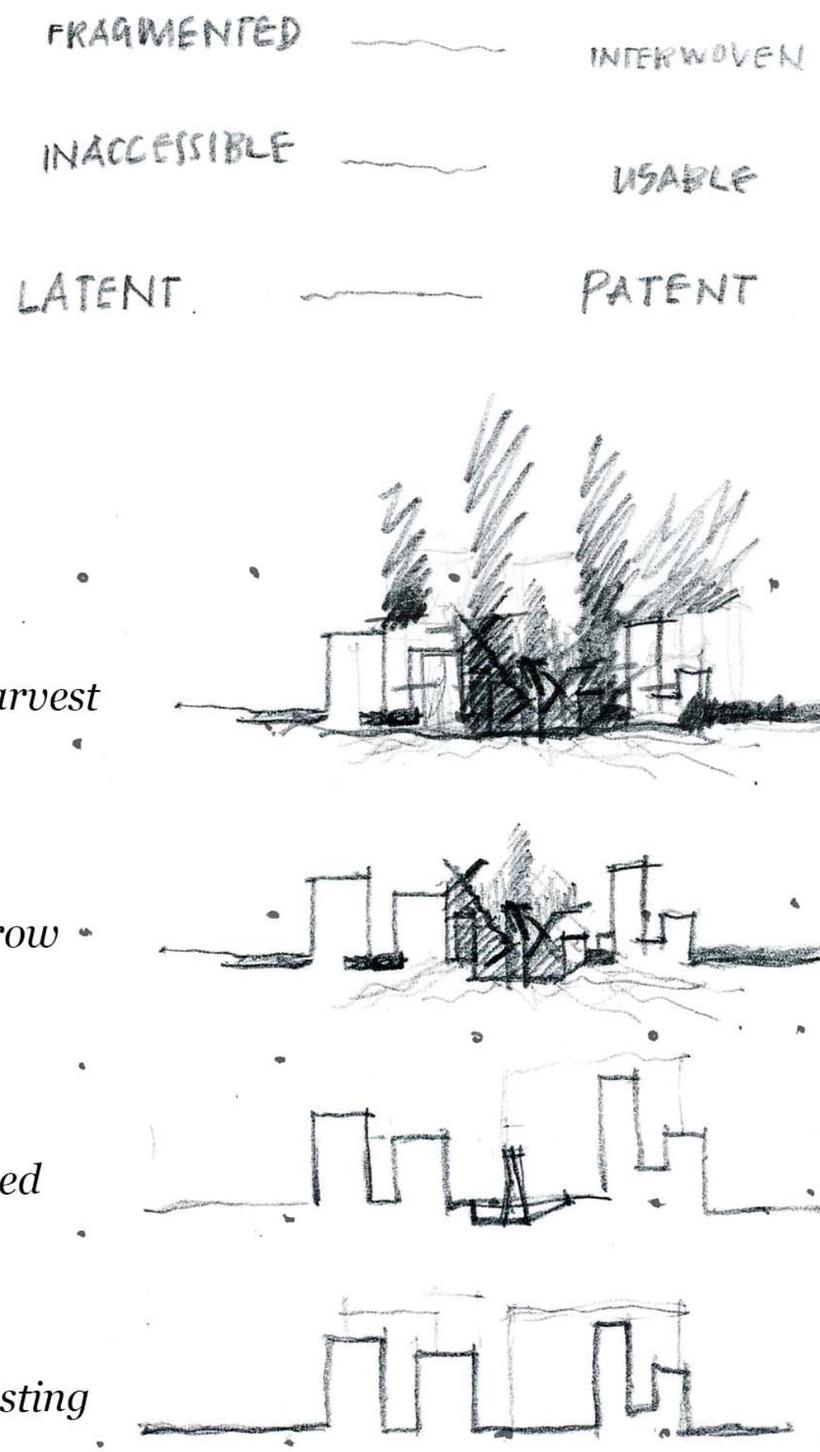


Fig. 154. Left; The four conceptual strategies (Author, 2019)



Fig, 155. Opposite; Diagram of scheme inception point and how the design grows from it to develop amenities that the citizens and users can harness. In doing so reviving the latent inaccessible fragmented spaces to interwoven usable regenerated spaces (Author, 2019)

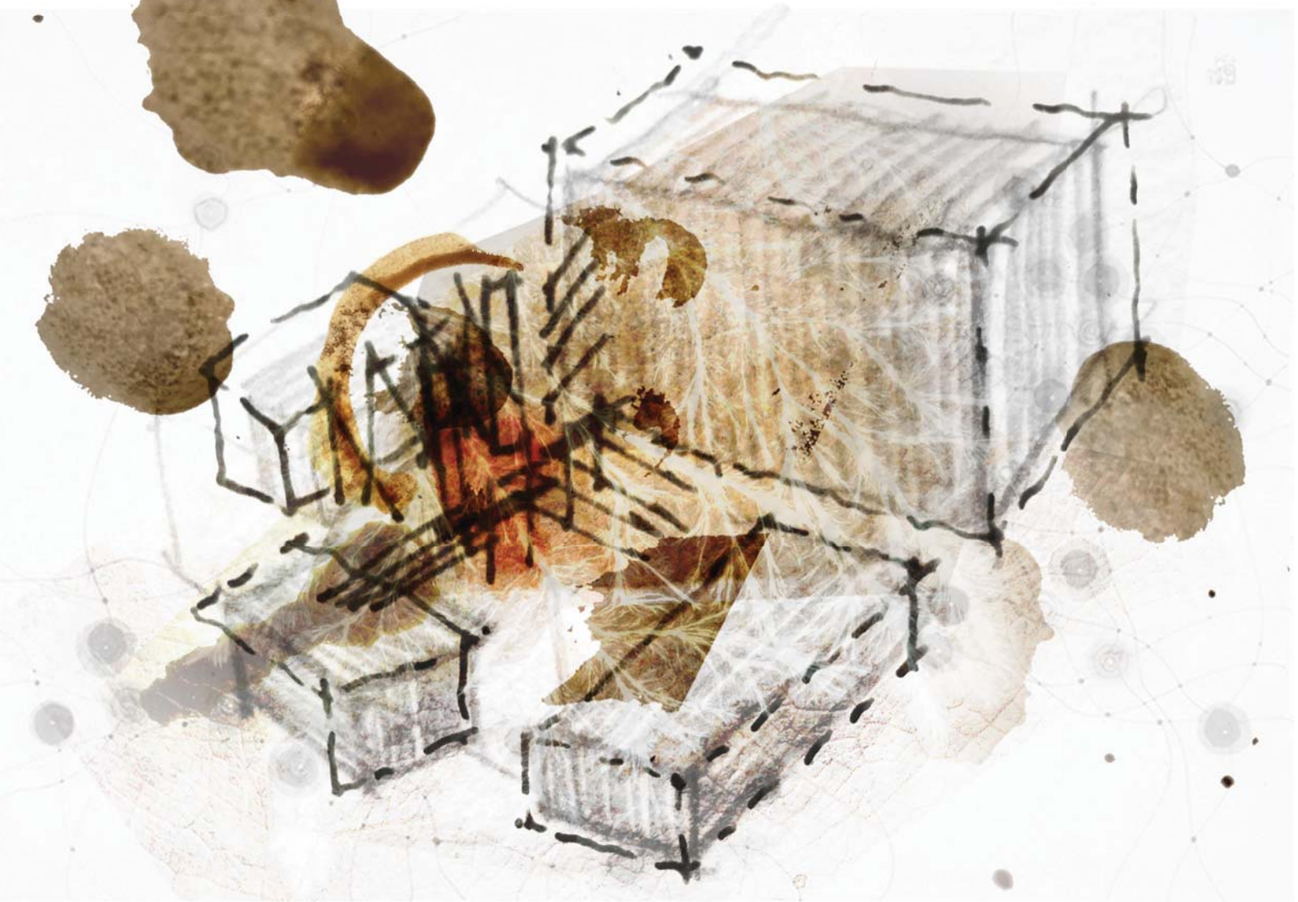
Fig. 156. Left Top; "Space first; then structure" (1998:35) (Author, 2019)

Fig. 157. Left Middle Top; Nucleus of space in the centre with arms reaching outwards (Author, 2019)

Fig. 158. Left Middle Bottom; The space in the middle draws people in (orange) and creates complexity and diversity (green) (Author, 2019)

Fig. 159. Left Bottom; The concept of the dissertation: A multiple threshold space that has arms stretching out to capture and draw people into the space to interact with various other users (Author, 2019)

Palimpsetic solution
to layer the site



Fig, 160. Opposite; Concept - Palimpsetic solution to regenerate latent spaces by layering the site (Author, 2019)

07

DESIGN DEVELOPMENT

Development and progress

Sketch Plans as progress

Unpacking the design

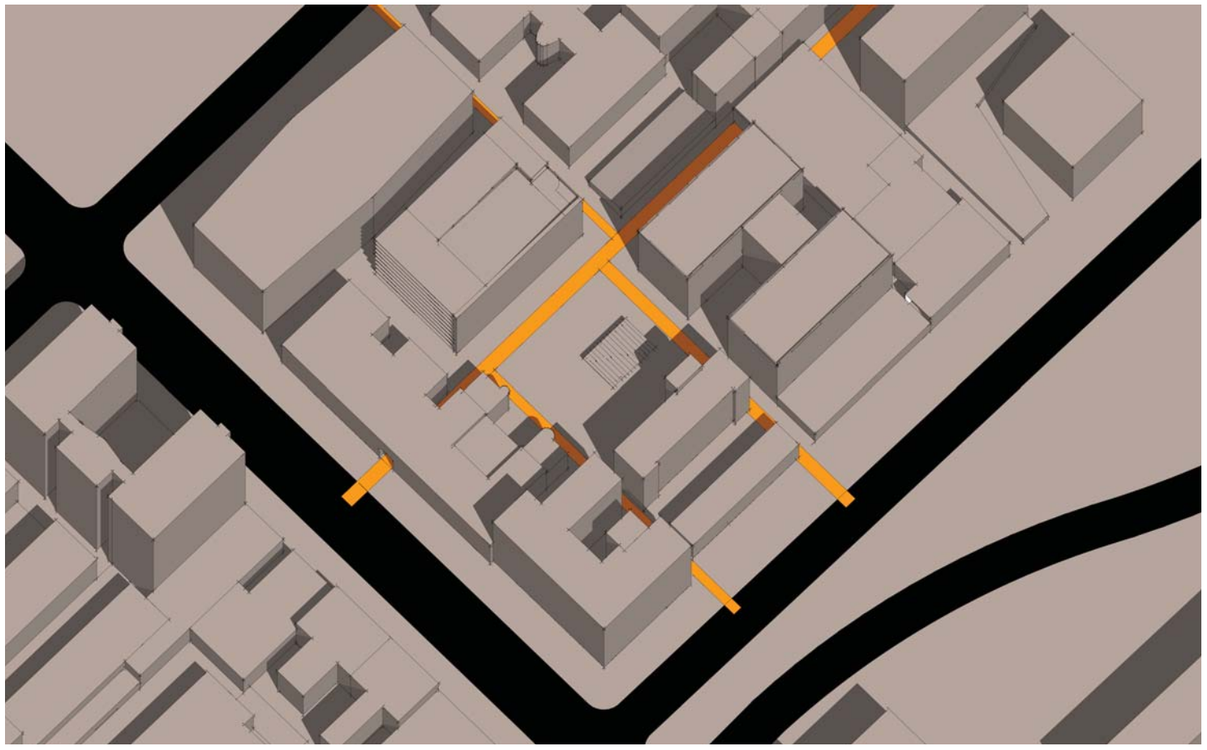
finding a design solution

Fig. 159. Previous page; View towards central communal gathering space (Author, 2019)

Fig. 160. Middle; Existing fabric with potential pedestrian axes across the site, connecting the internal areas with the streetscape (Author, 2019)

DEVELOPMENT AND PROGRESS

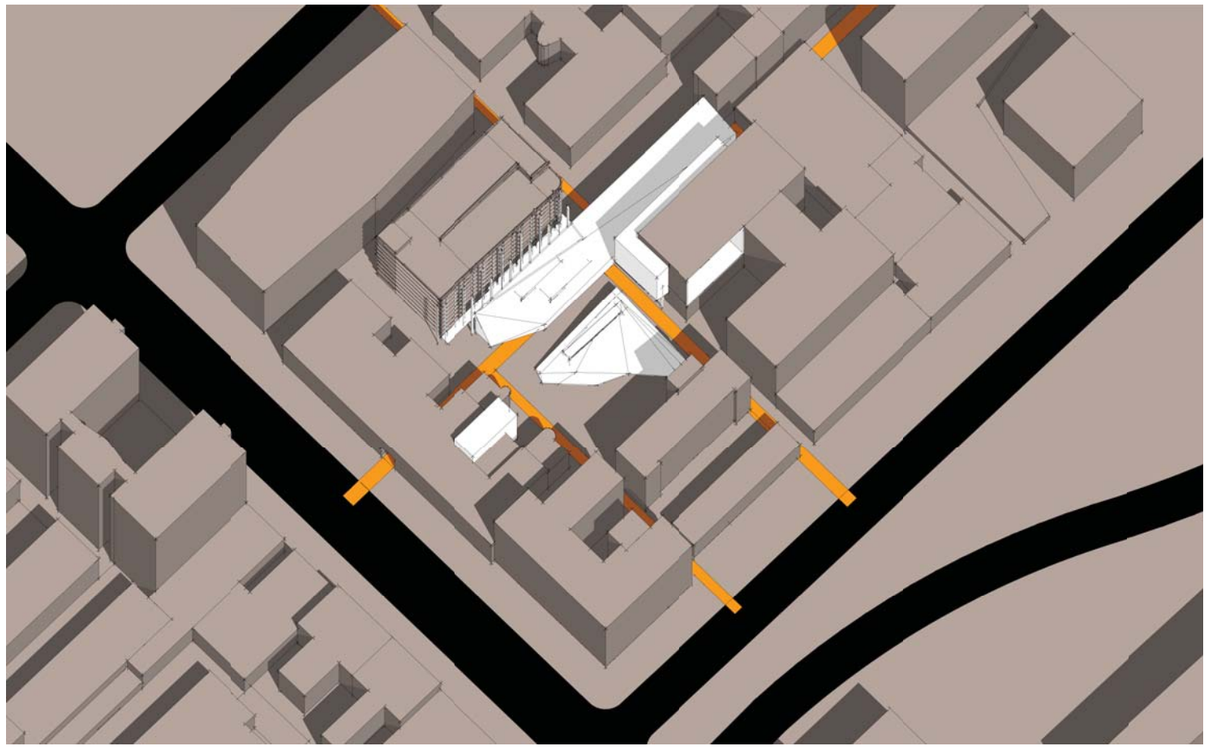
Various design iterations were completed as the project progressed to explore where and how to intervene with the existing. Testing and refining the attitudes developed in the heritage chapter and applying the conceptual strategies of connection, insertion, extension and appropriation. Furthermore the configuration of the architectural pieces and their interconnection was considered in the pocket of open space in the middle of the block, with multiple proposed access routes cutting through the spaces.

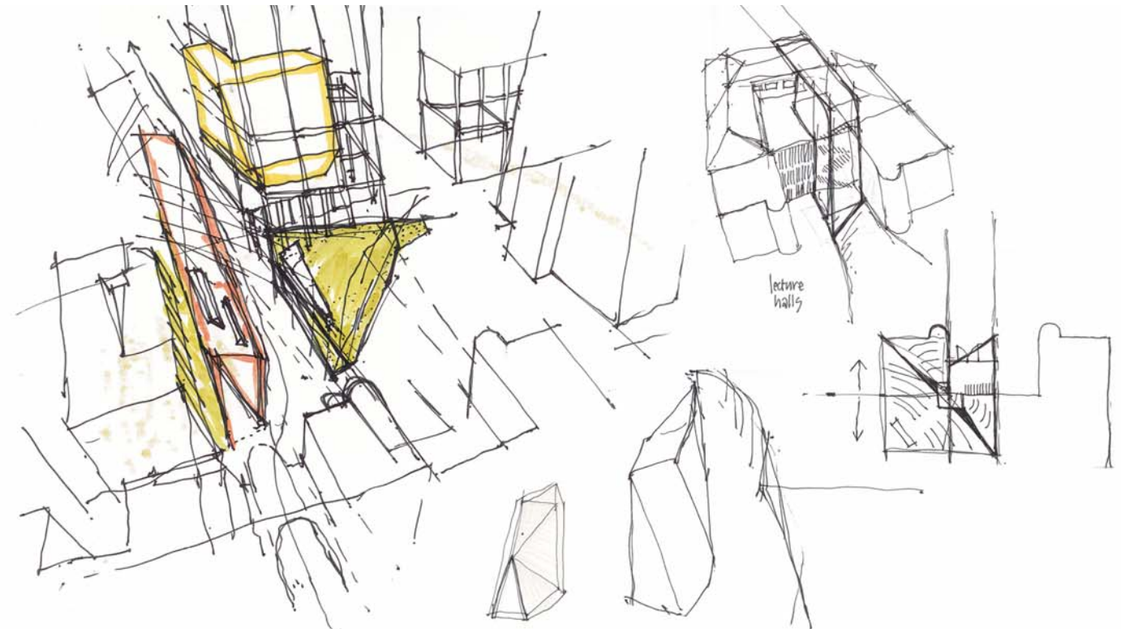


The first design placement mostly explored the notion of insertion, where multiple objects were inserted into the latent space and adjacent buildings. Here, the author came to grips with the scale of the space and the surrounding buildings. It was quickly identified that the Karel Schoeman Building (KSB) and the parking lot's scale had to be reduced by the new architecture to mediate between the heritage building east and these tall and bulky shapes.

Fig. 161. Middle; First design iteration exploring scale (Author, 2019)

Fig. 162. Below & Opposite Bottom; Sketches from the initial design exploration (Author, 2019)





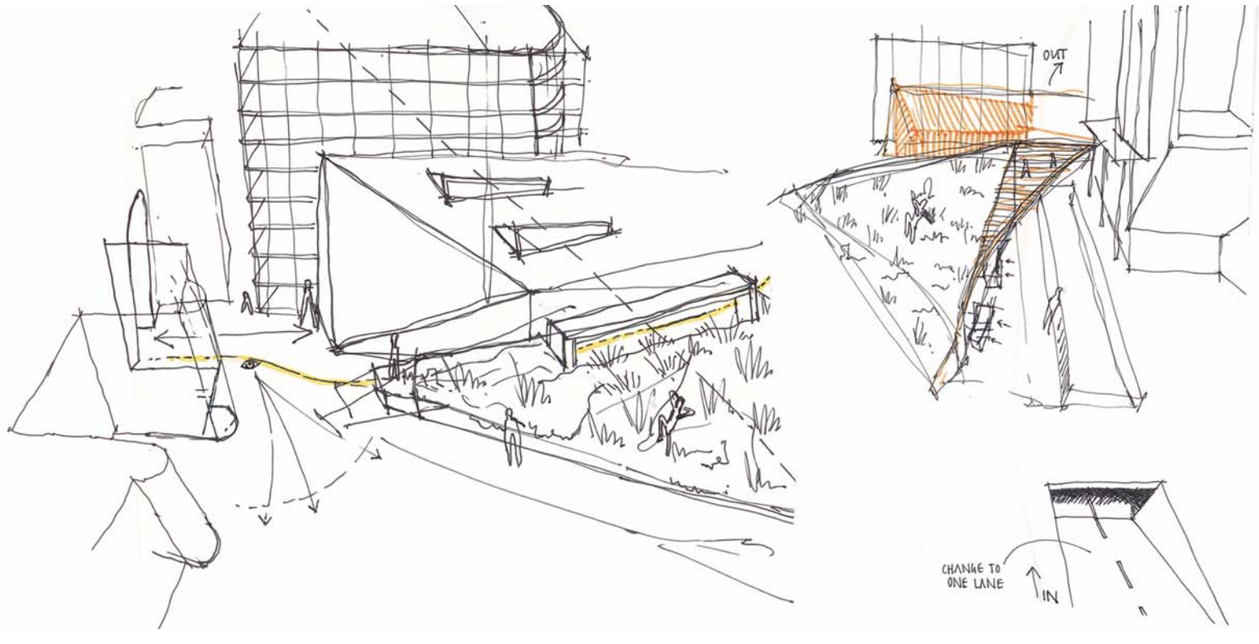
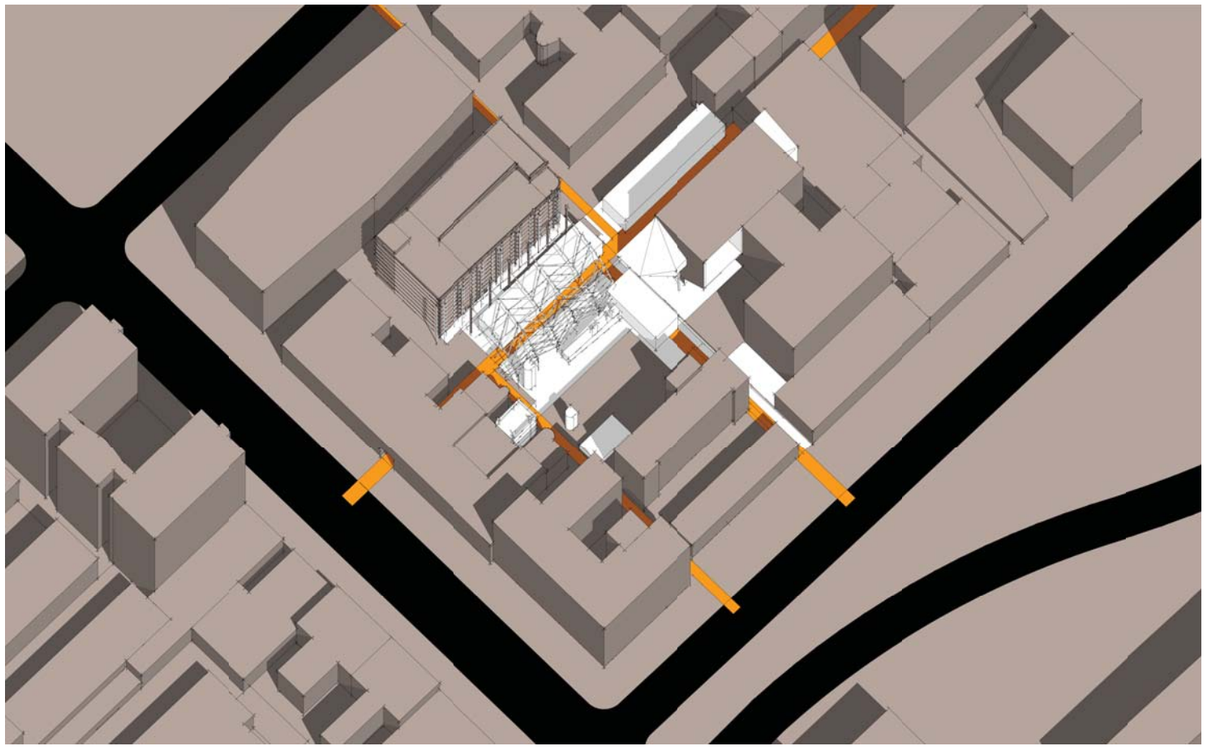


Fig. 163. Middle; Second design iteration exploring extension of grids (Author, 2019)

Fig. 164. Below; Grids and spatial extension (Author, 2019)

The second design iteration revealed the notion of extension. The structural grid of the existing parking lot was extended to create a threshold space, to allow a large semi-internal space, avoiding the removal of a large portion of open space for public use. The addition to the old Land Bank was minimized to an external section only, to interfere least, whilst improving the condition. Further extensions from the Land Bank into the latent space was tested. To test the reduction of scale of the KSB, a connection was made to the eastern blank façade.



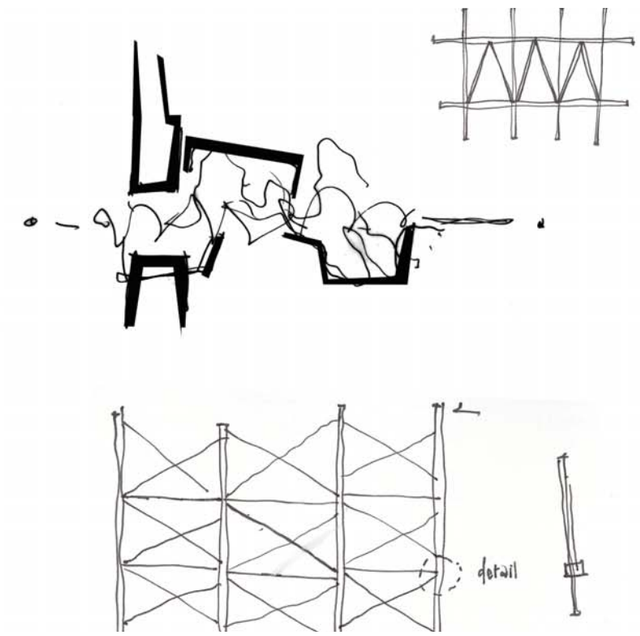
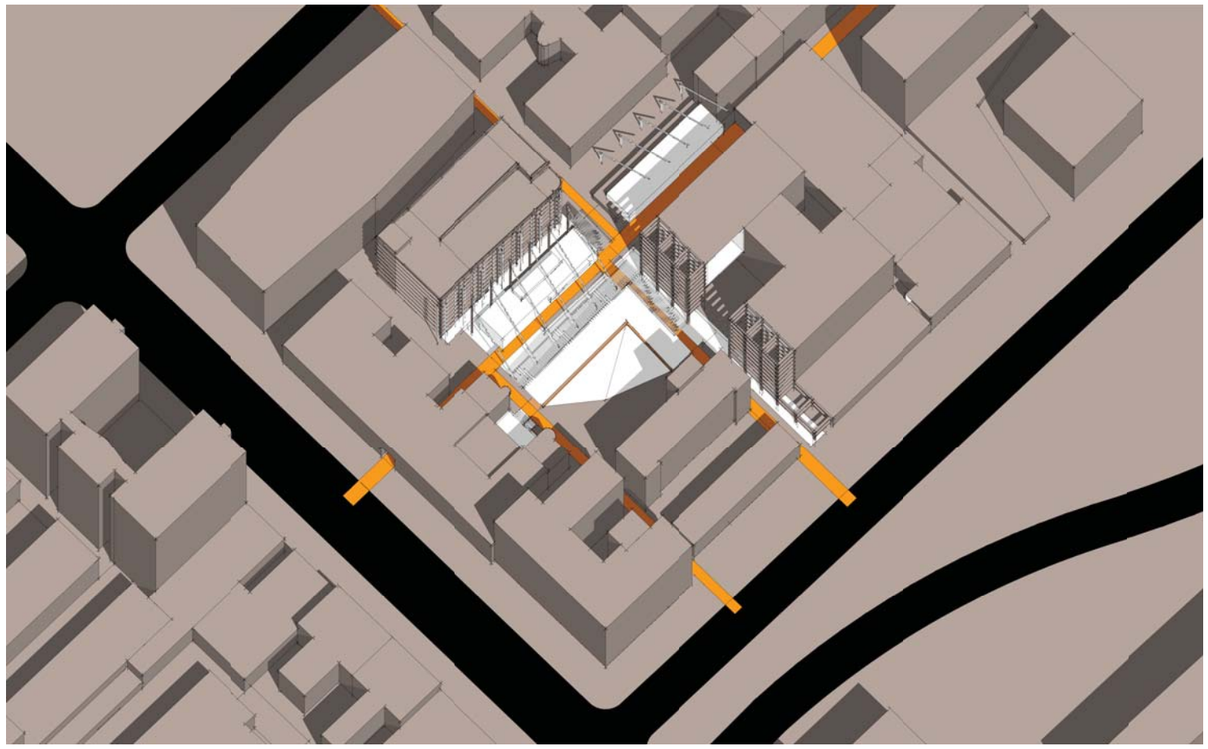


Fig. 165. Middle; The third iteration nestling into the site (Author, 2019)

Fig. 166. Bottom; Sketches exploring growing structures and spaces underneath (Author, 2019)

The third design development simplified the 'insertion shapes' to relate better to their context and the design starts to nestle itself within the site geometry. The scale reduction of the KSB here, was done through a southern addition-connection, by exposing the structural grid (demolishing infill) on the eastern façades, and by cutting back the ground floor façades to allow deeper infiltration within the building envelope. The extension of the parking lot's structural grid is simplified and a more favourable shape, with better accessibility and sun exposure, is implemented.



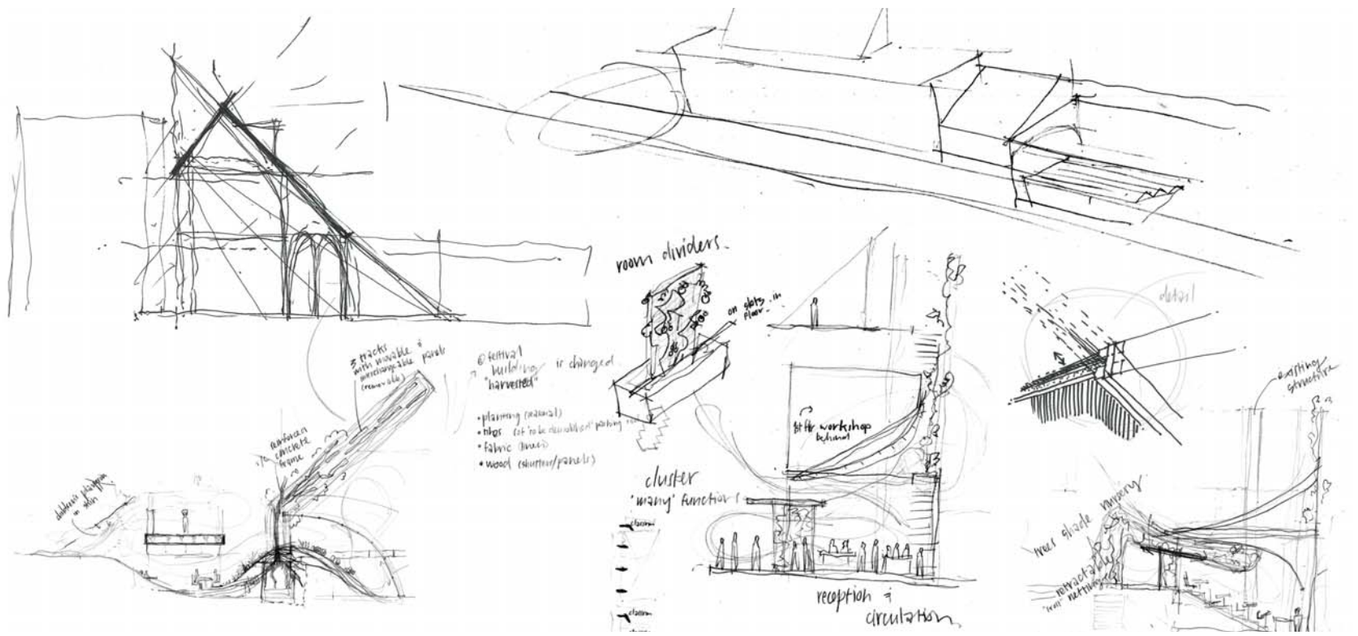
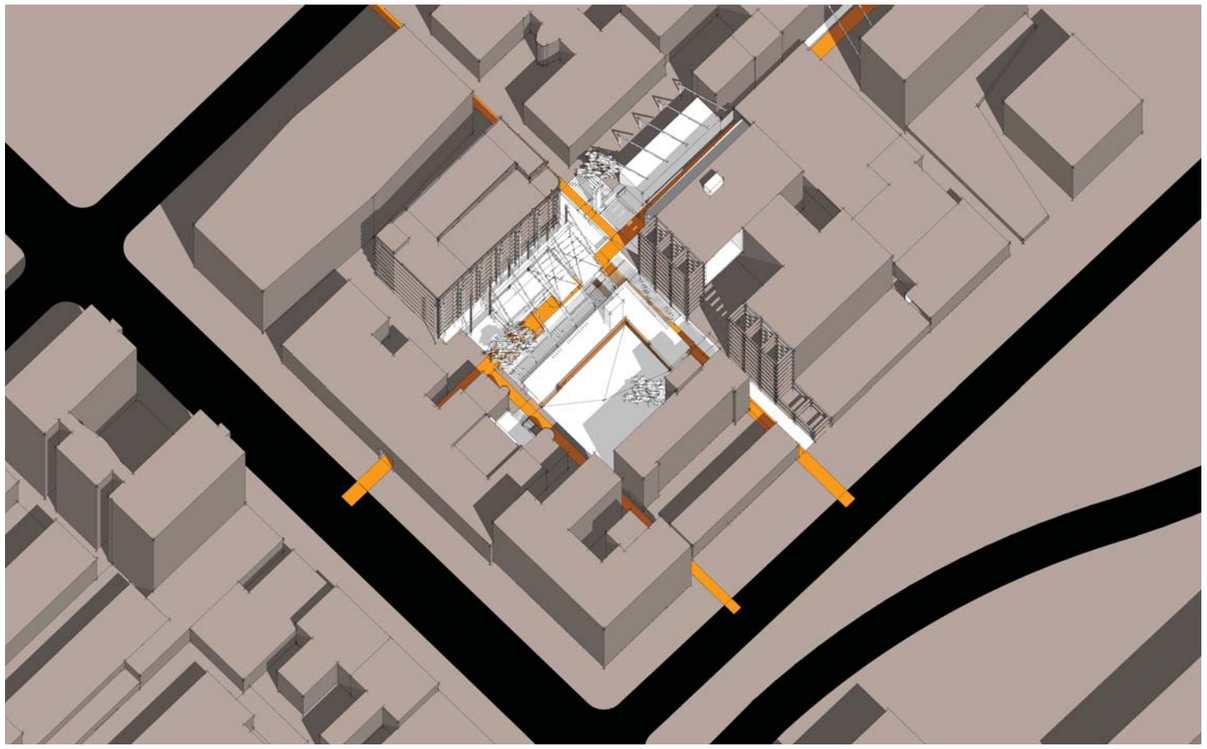
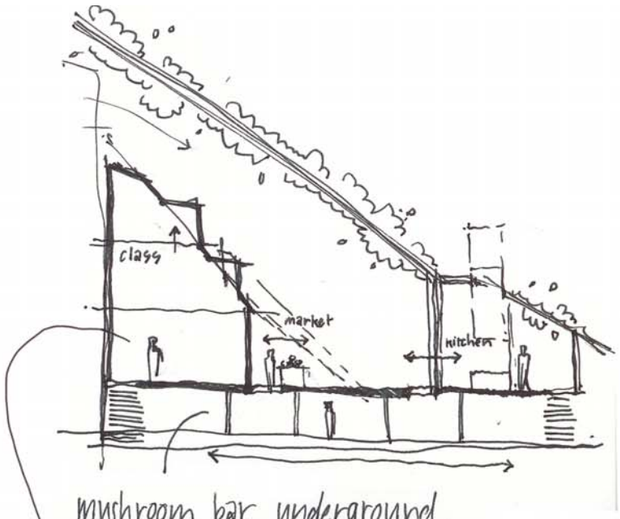


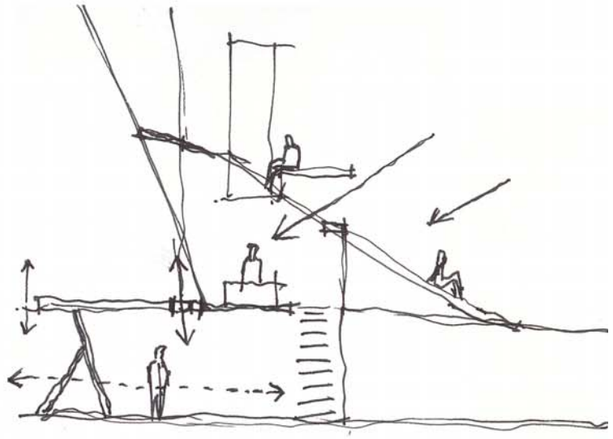
Fig. 167. Middle; Fourth iteration creating interplay between levels (Author, 2019)

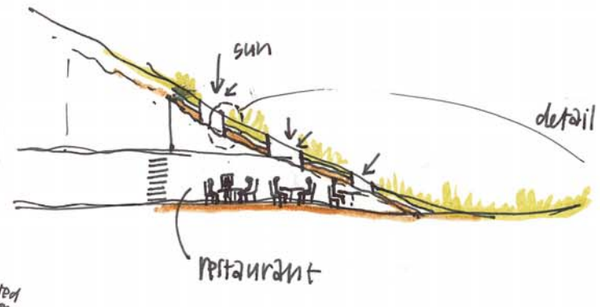
Fig. 168. Below & Opposite; Spaces below ground and sectional exploration (Author, 2019)

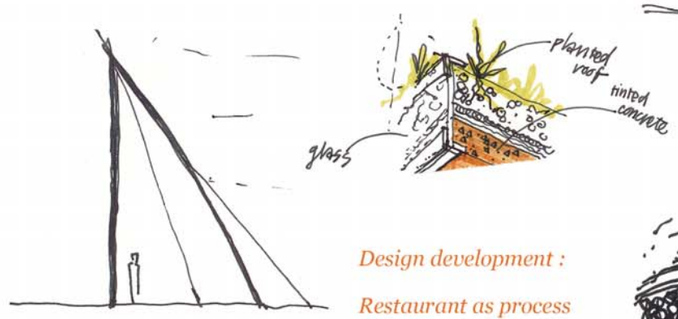
The fourth development starts to integrate and interconnect the separated internal spaces with courtyards, braai areas, and seating spaces. An interplay between levels start to appear, where the basement is opened up and platforms or pedestals are placed to mediate between levels and scales. This interplay creates a 'finer grained' architecture that consists of multiple threshold spaces. Chimneys are added as the kitchen and braai areas start to take shape. The lines of the new architecture connect with the surroundings' geometry to create a new extension morphing from the context.

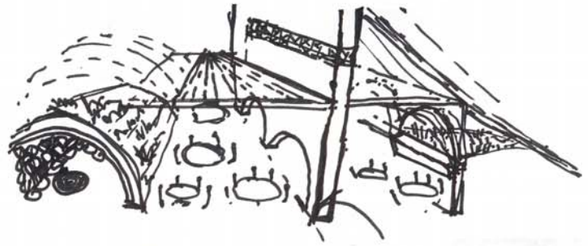










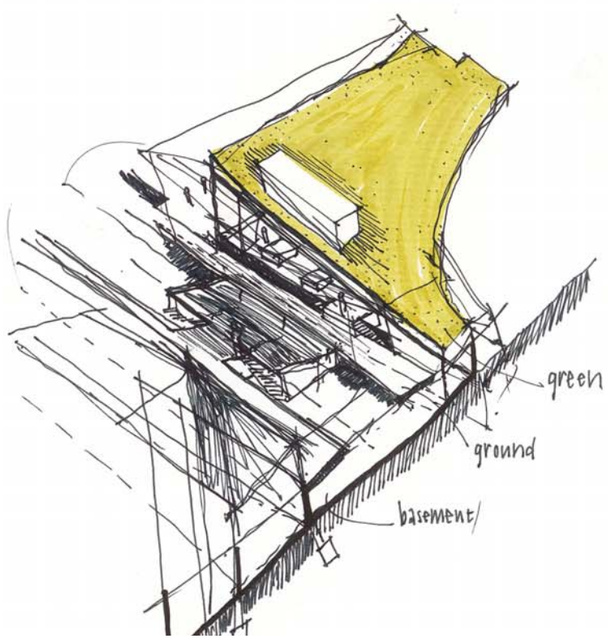


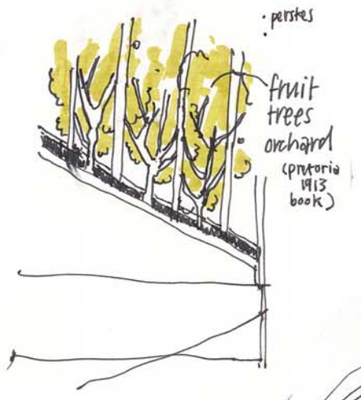
Design development :

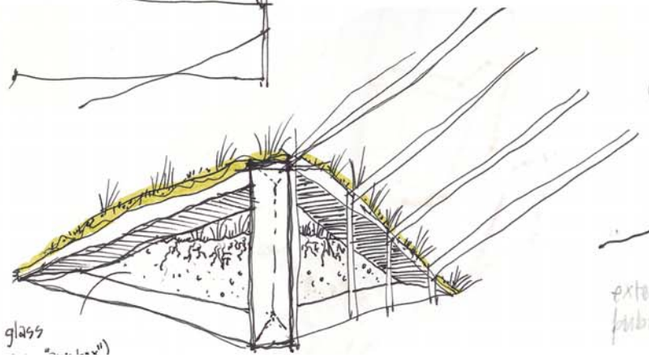
Restaurant as process nursery, level and programme interplay

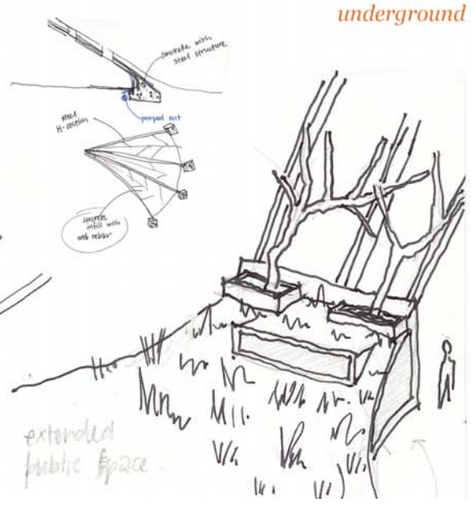
green roof

restaurant underground









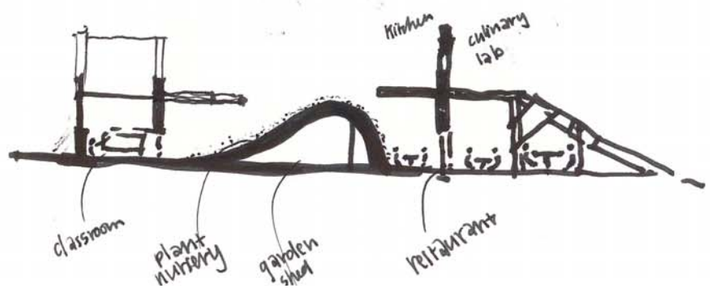
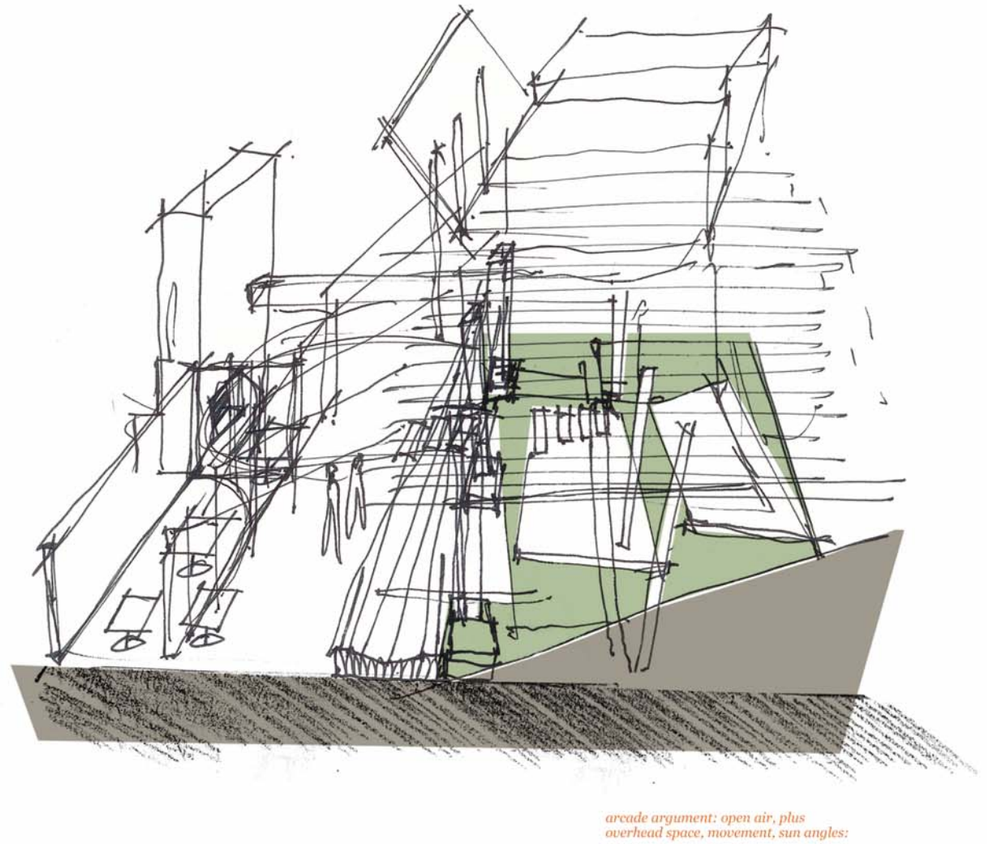


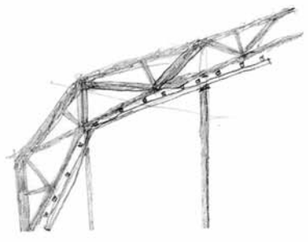
Fig. 169. Middle; Fifth iteration design coming together with services and circulation (Author, 2019)

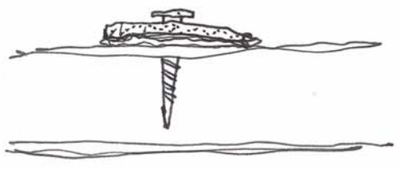
Fig. 170. Below & Opposite; Pergola space exploration of Restaurant and Karel Schoeman addition (Author, 2019)

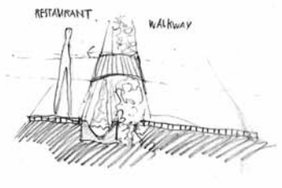
The fifth design iteration adds more programme to the architecture, resulting in varying complexity in spaces and increased area. Circulation spaces start to emerge as various elements, activities, and stakeholders overlap and collide. The concept of a hearth as centre to the new architecture is created and the fireplaces are then used to downscale the space and ground it firmly. Another pergola space is added to the north, that houses the restaurant, to create semi-internal spaces that allow light through in a generally under lit environment; due to the overshadowing of neighbouring buildings.

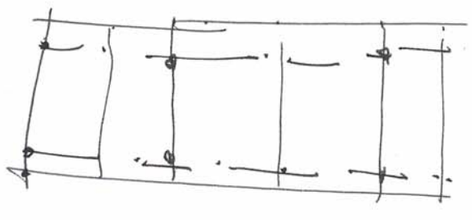


arcade argument: open air, plus overhead space, movement, sun angles:









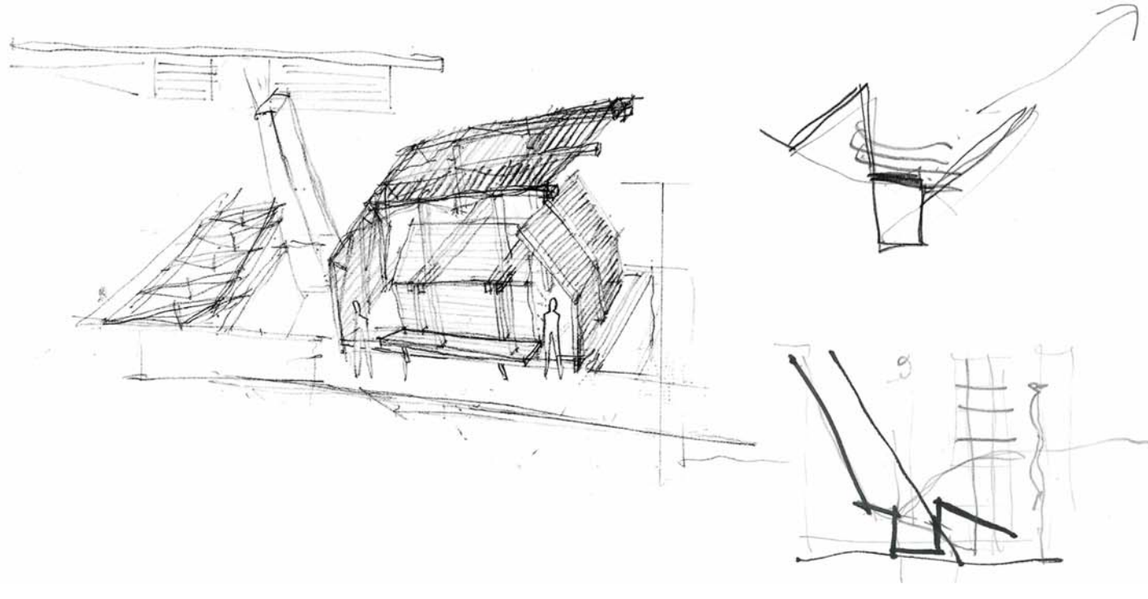
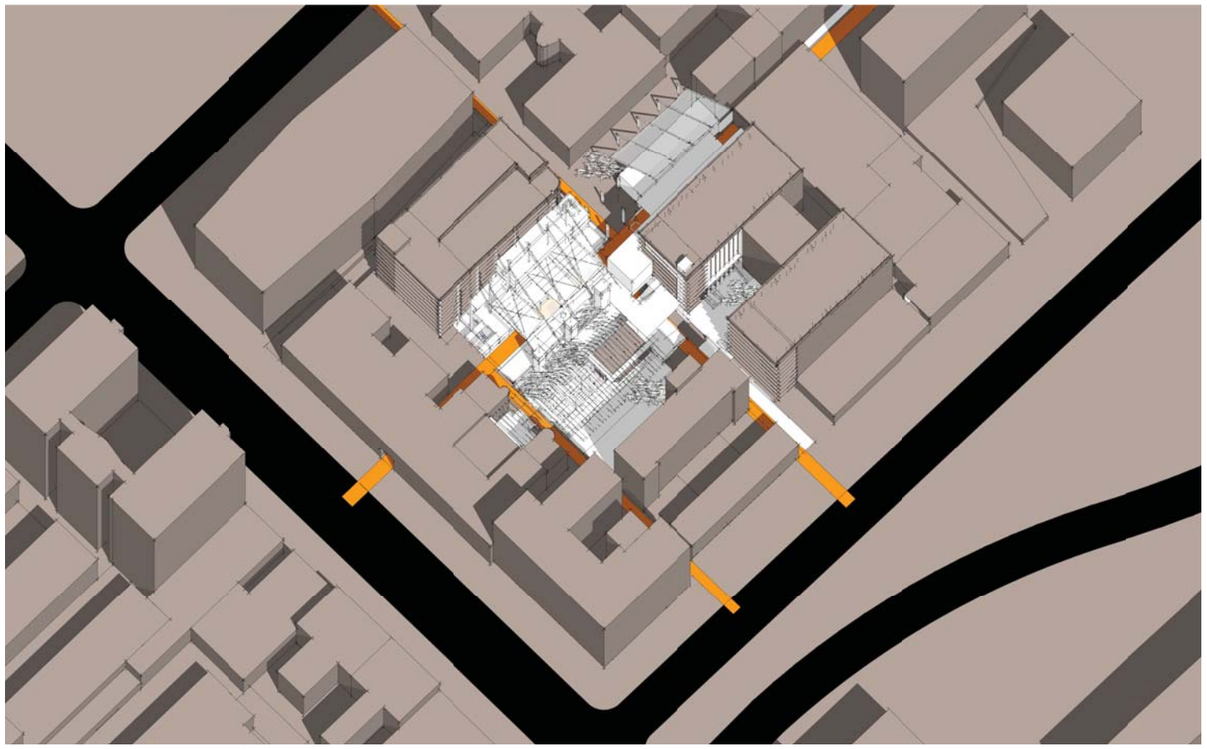
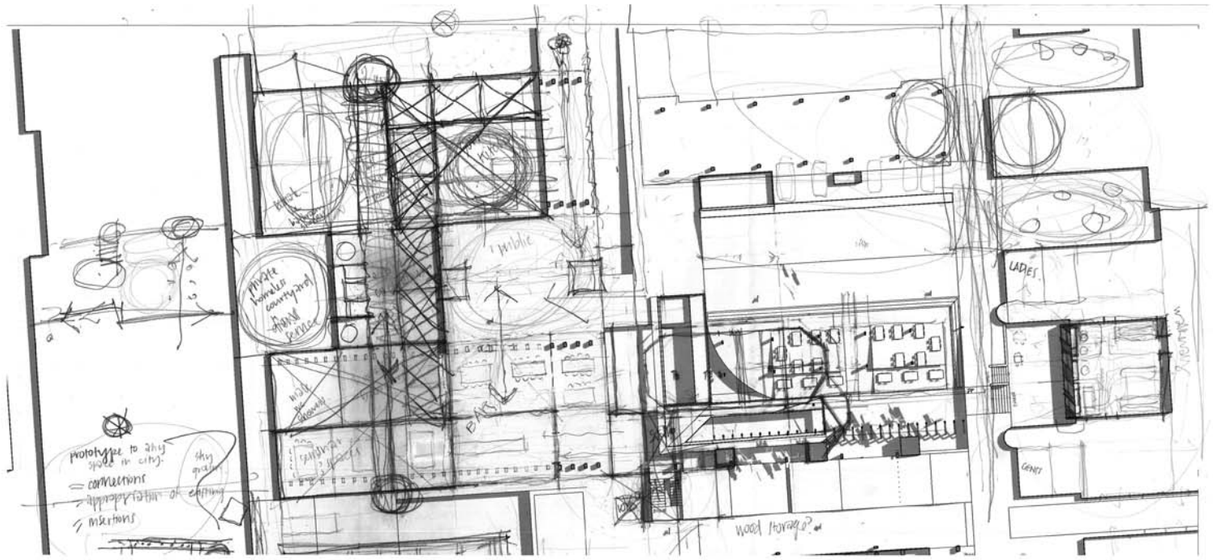


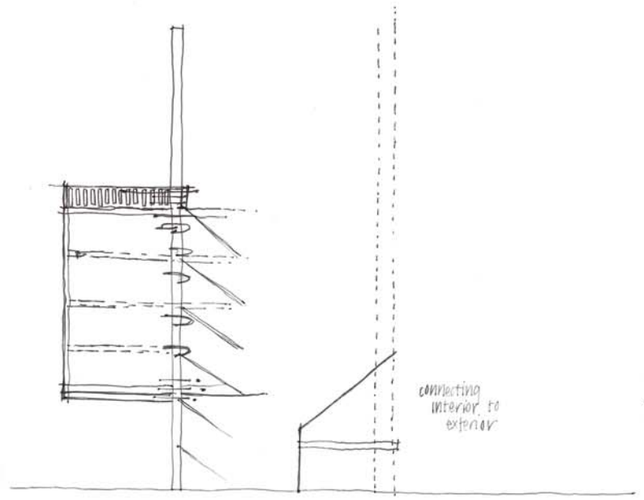
Fig. 171. Middle; Sixth iteration retaining existing ablutions and expanding to the west (Author, 2019)

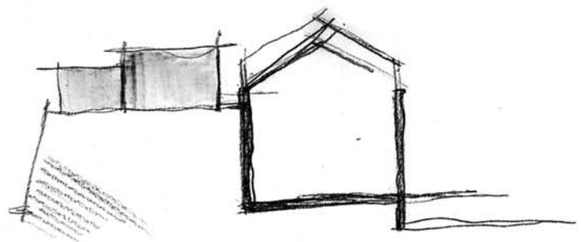
Fig. 172. Below & Opposite; Incorporating existing ablutions into design and Karel Schoeman intervention (Author, 2019)

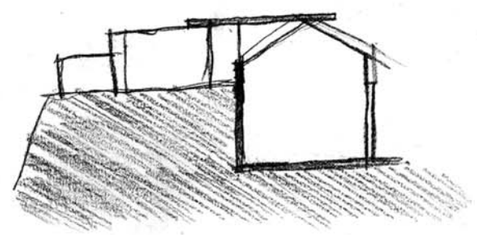
The sixth iteration shows progression in terms of the KSB connections and extension as well as a new chimney iteration with expressed flutes and difference in size to yet again mediate between the different scales. However, the most important aspect of this iteration is the decision to keep and refurbish the existing ablution block in the middle of the latent pocket, which was previously thought to be demolished, as access to the site was only granted at this time. This choice was led by the necessity to have ablutions for the restaurant, and it now seemed unreasonable to demolish the ablutions merely to provide new ones in their place. This opened up new possibilities for connection and extension to and from the existing. The underutilised (therefore latent) semi-flat roof of the existing ablutions can now be used and integrated within the new design to make the space usable and accessible (regenerate). This will further strengthen the relationship between the old and new. When assessing the ablution block a number of construction techniques and elements stand out, such as timber rafters supported by small painted red lattice girders that can now inform the new architecture and technology.

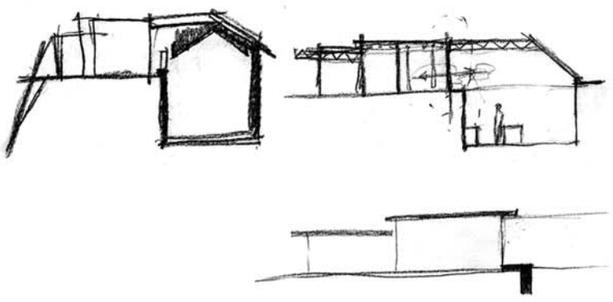












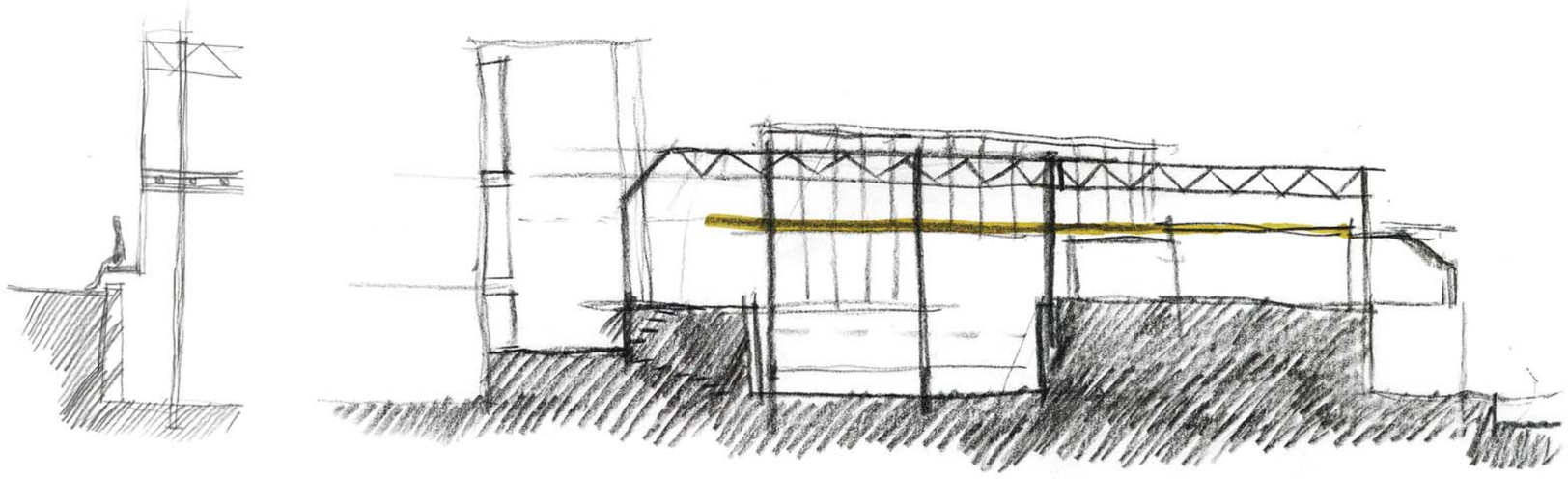
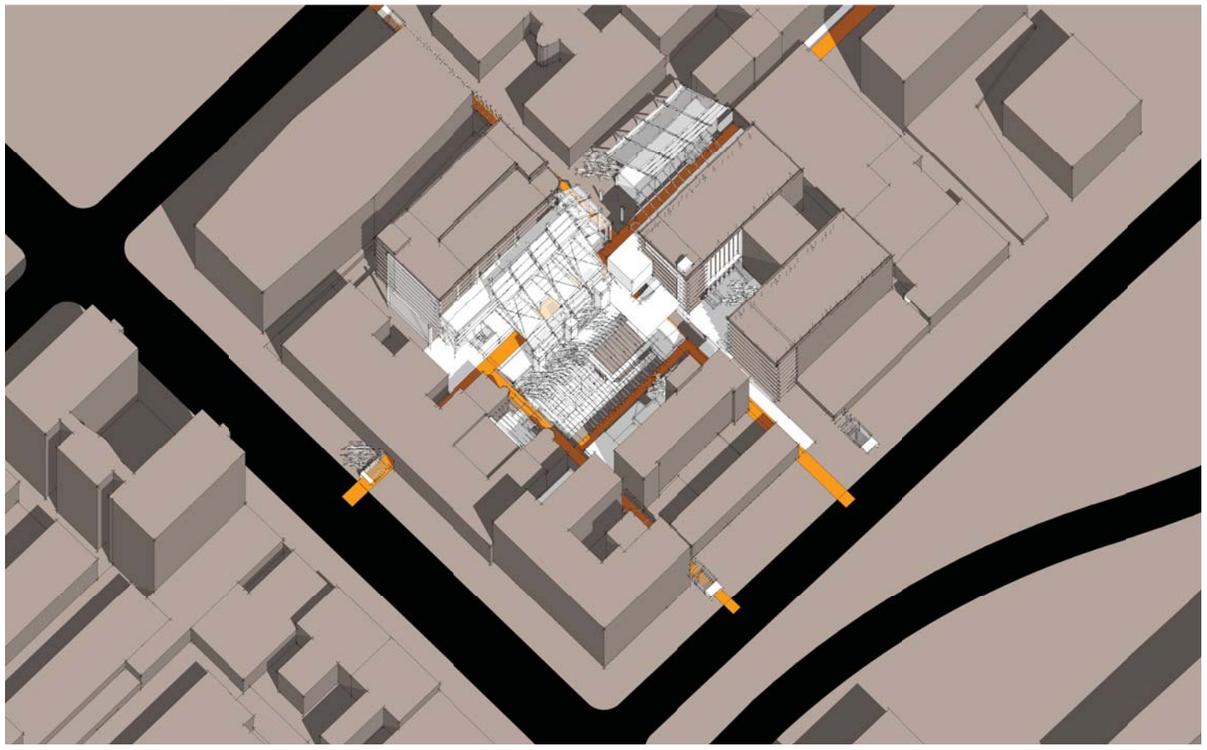
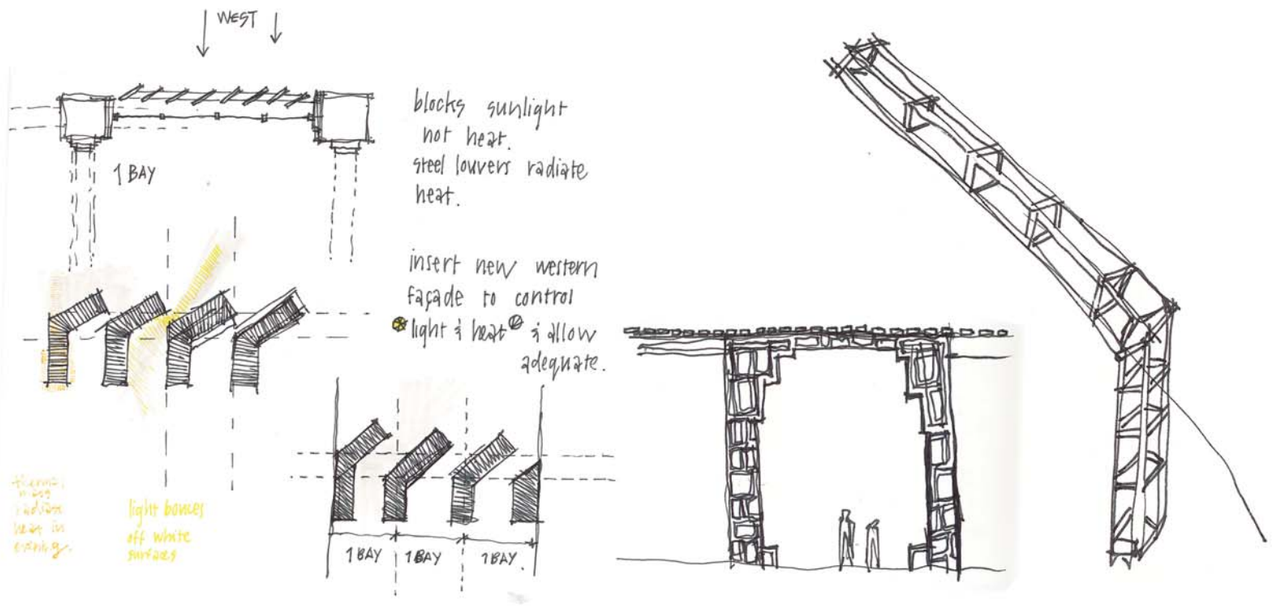


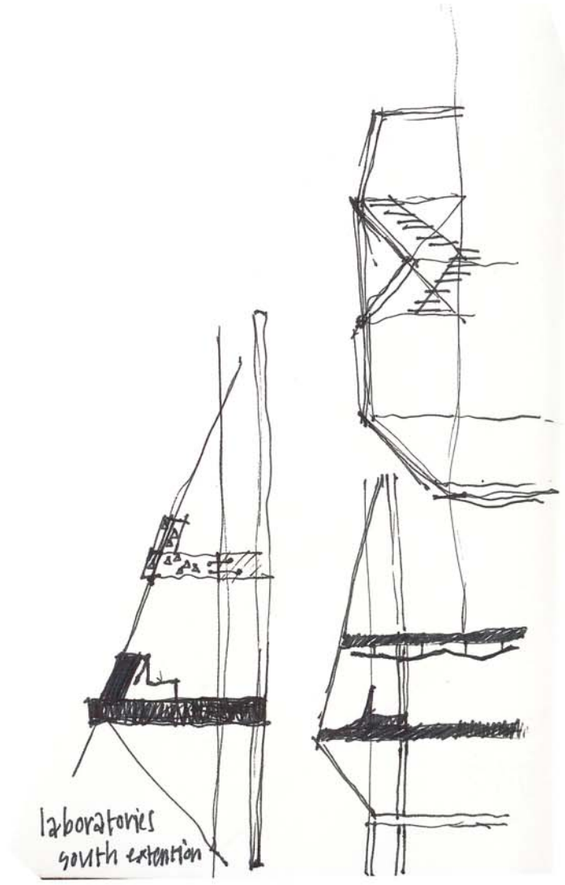
Fig. 173. Middle; Final design iteration with activity scoops (Author, 2019)

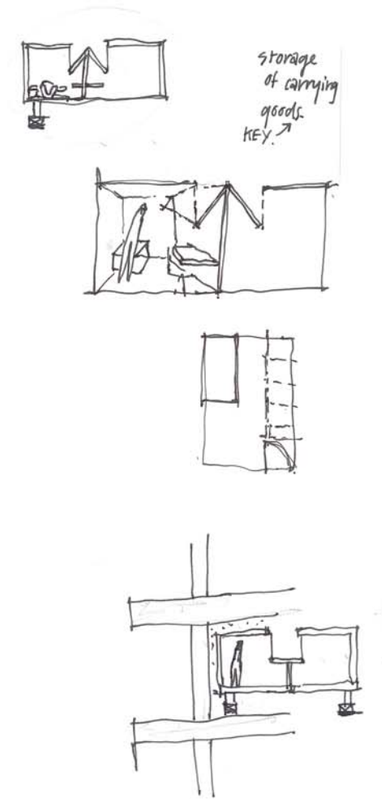
Fig. 174. Below & Opposite; Exploring strategies of connection, extension, and insertion (Author, 2019)

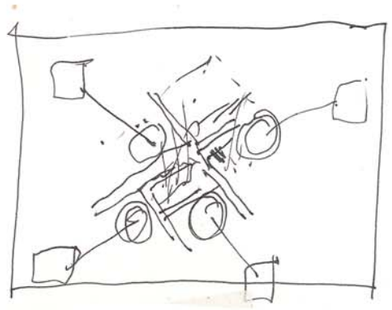
The last iteration during this phase of the project's development shows the integration and downscaling of the Esperanto apartments. This iteration further indicates the expansion of the administration, increased food production space (vertical hydroponic structures), and the addition of Photovoltaic (PV) cell panels to the top of the growing structures to generate electricity primarily for the hydroponics system, and secondarily for the other functions of lighting and mechanical ventilation such as the research centre, plant library, and lecture halls. Finally, activity scoops are designed on the fringes of the block to draw people into the space (along with the extension of retail ground floor into the block) and to allow for organic growth of vendor stalls and markets.

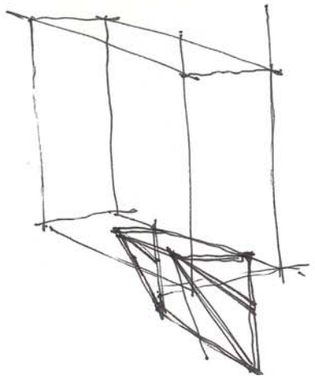












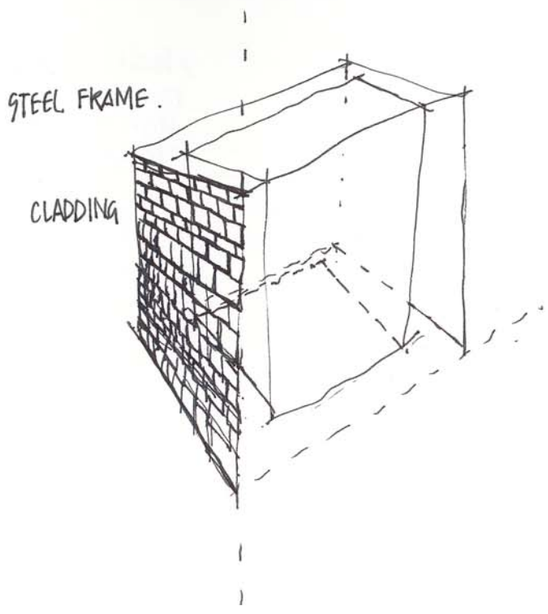
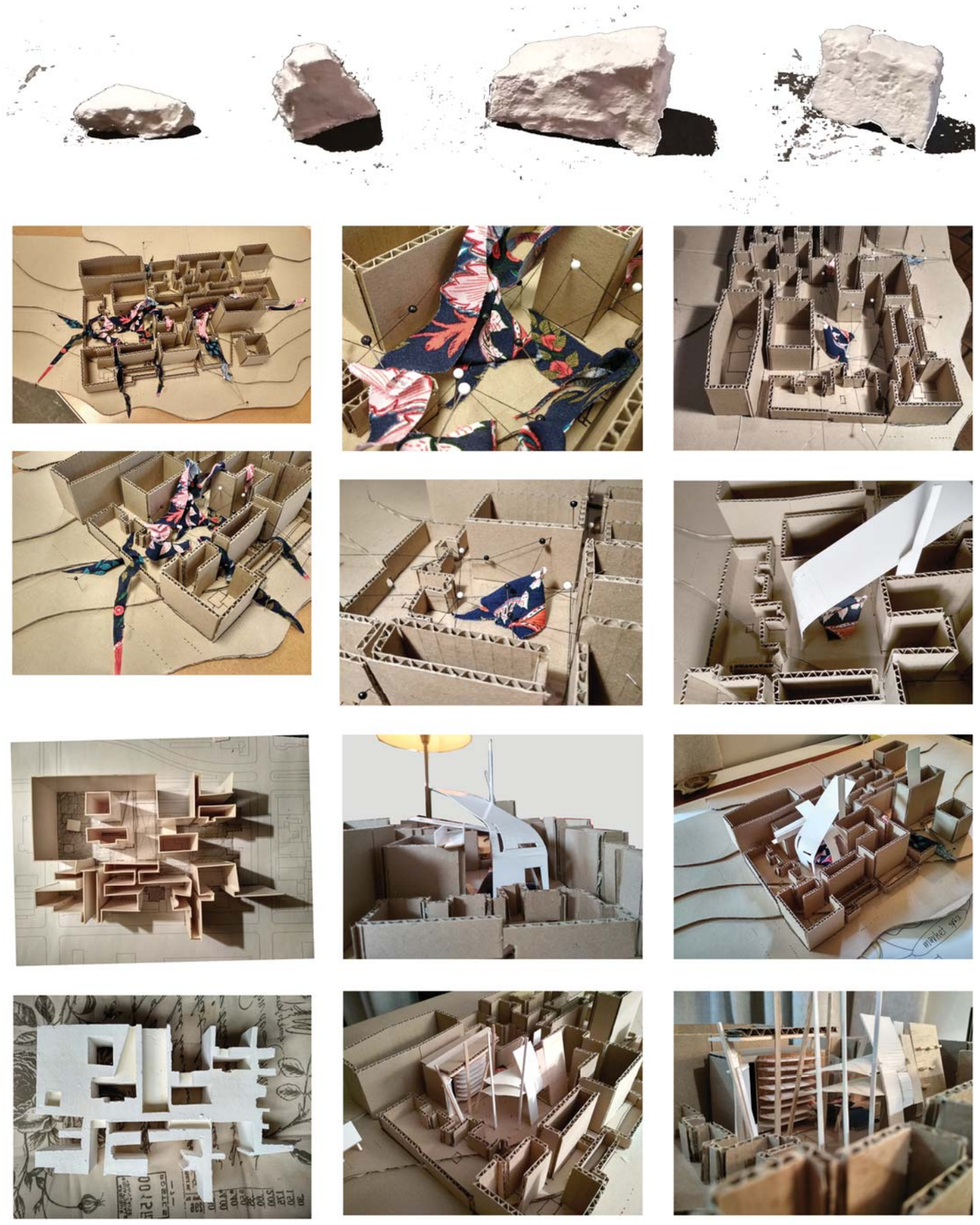
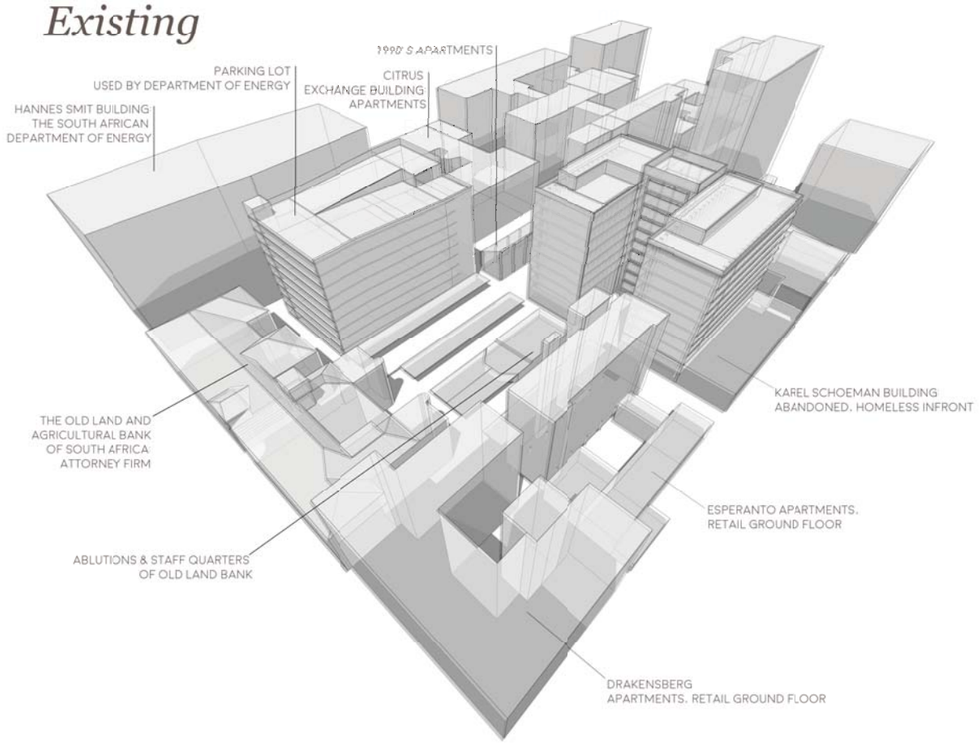


Fig. 175. Compilation of different model building exercises (Author, 2019)



Existing



Demolition

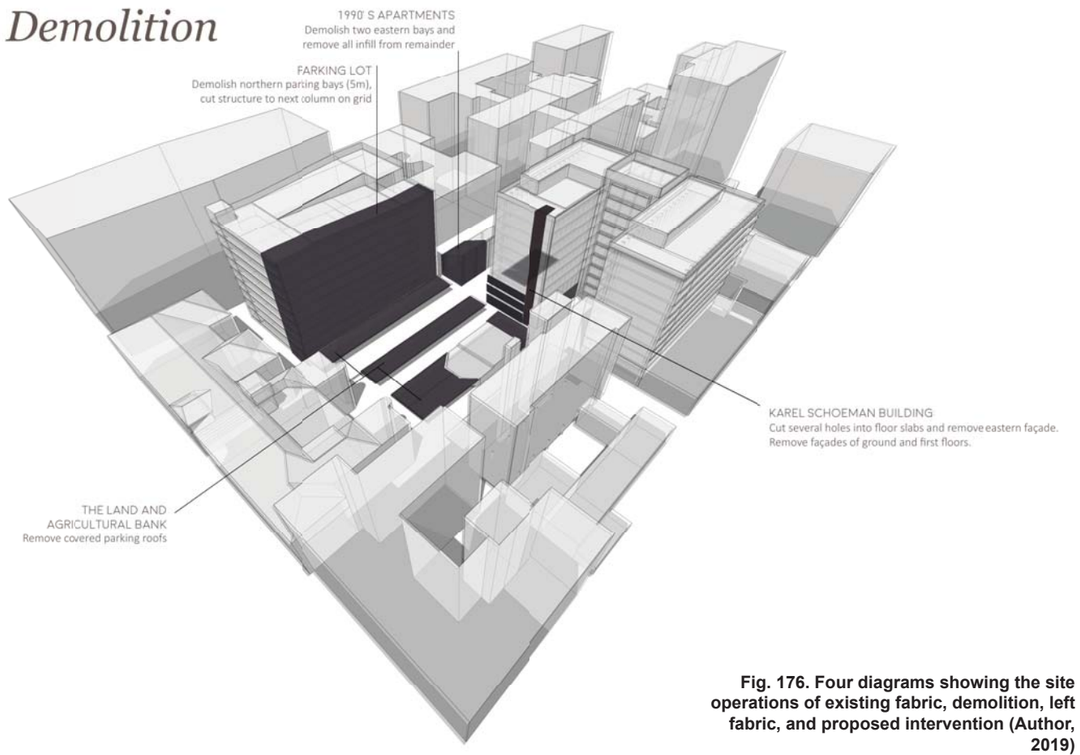
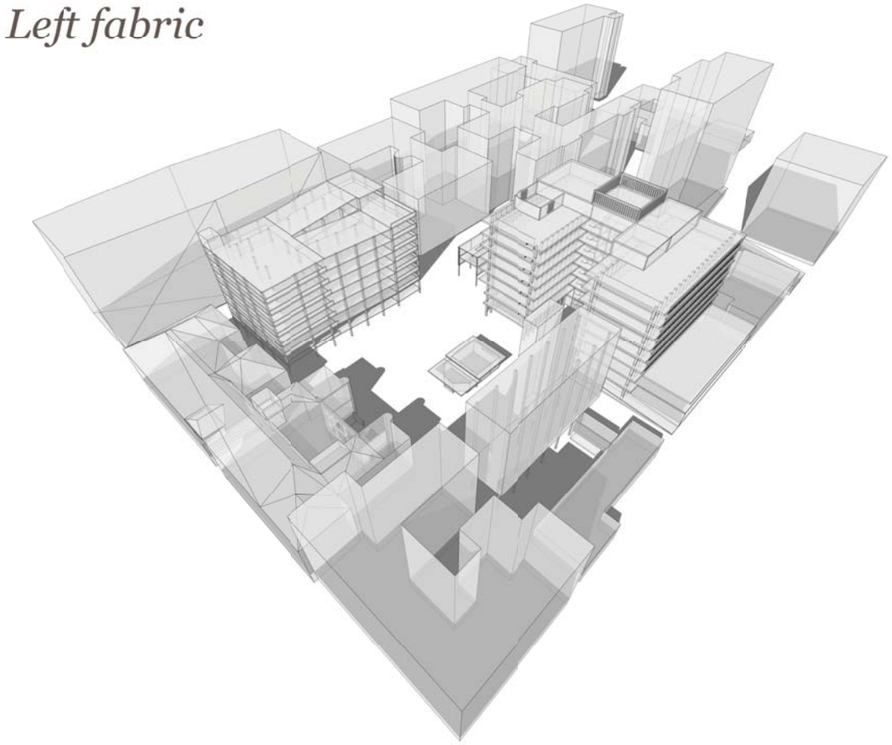


Fig. 176. Four diagrams showing the site operations of existing fabric, demolition, left fabric, and proposed intervention (Author, 2019)

Left fabric



Proposed

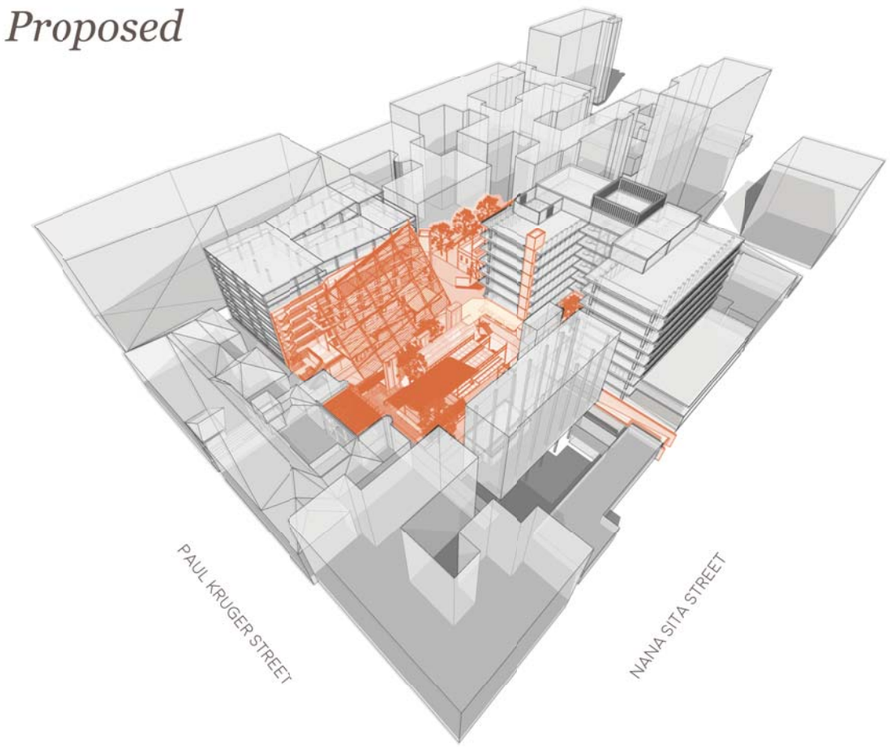
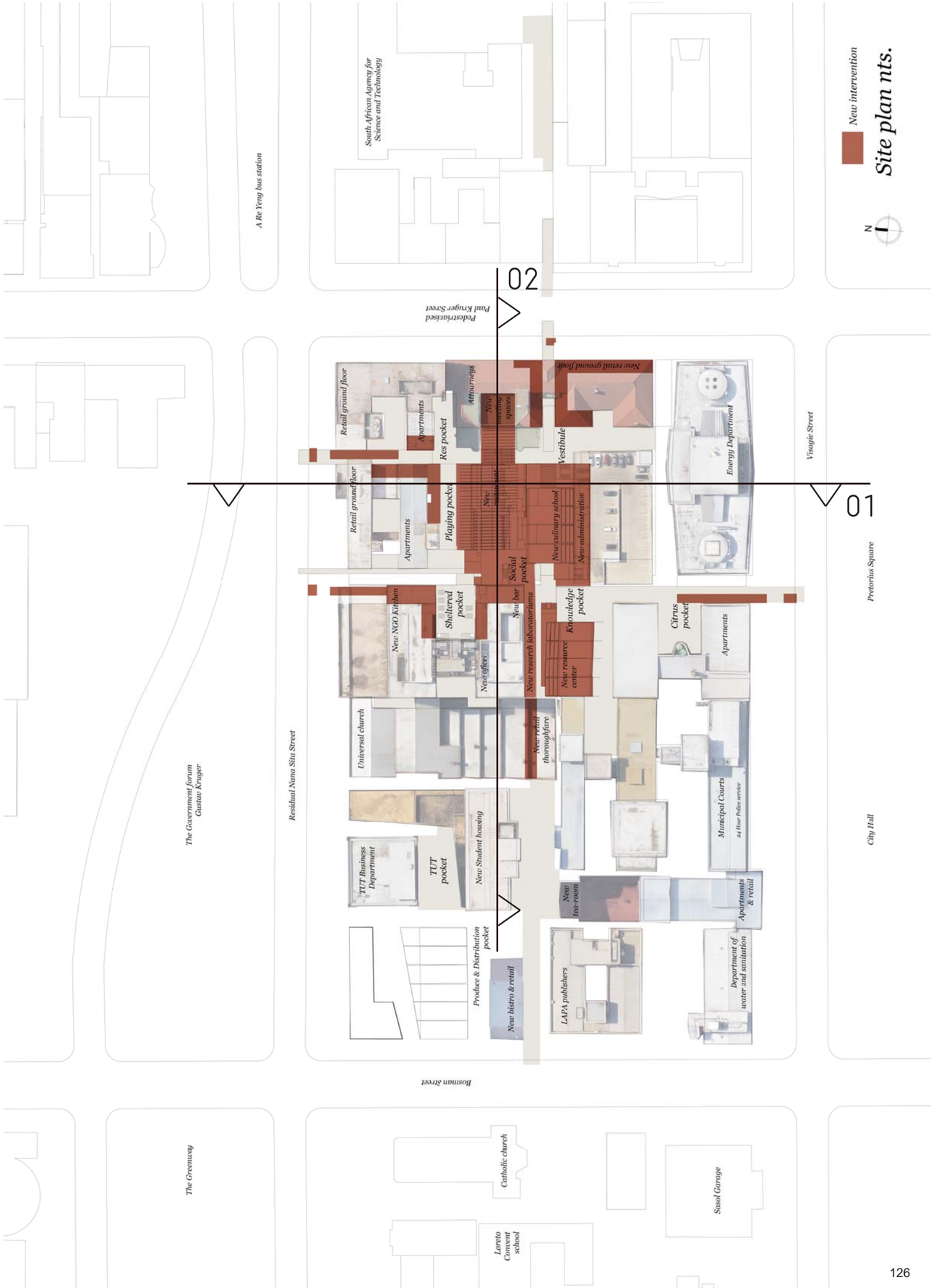


Fig. 177. Opposite; Site plan showing section cuts and extent of intervention (Author, 2019)

JUNE

SKETCH PLANS. SECTIONAL ELEVATIONS.

AND RENDERS



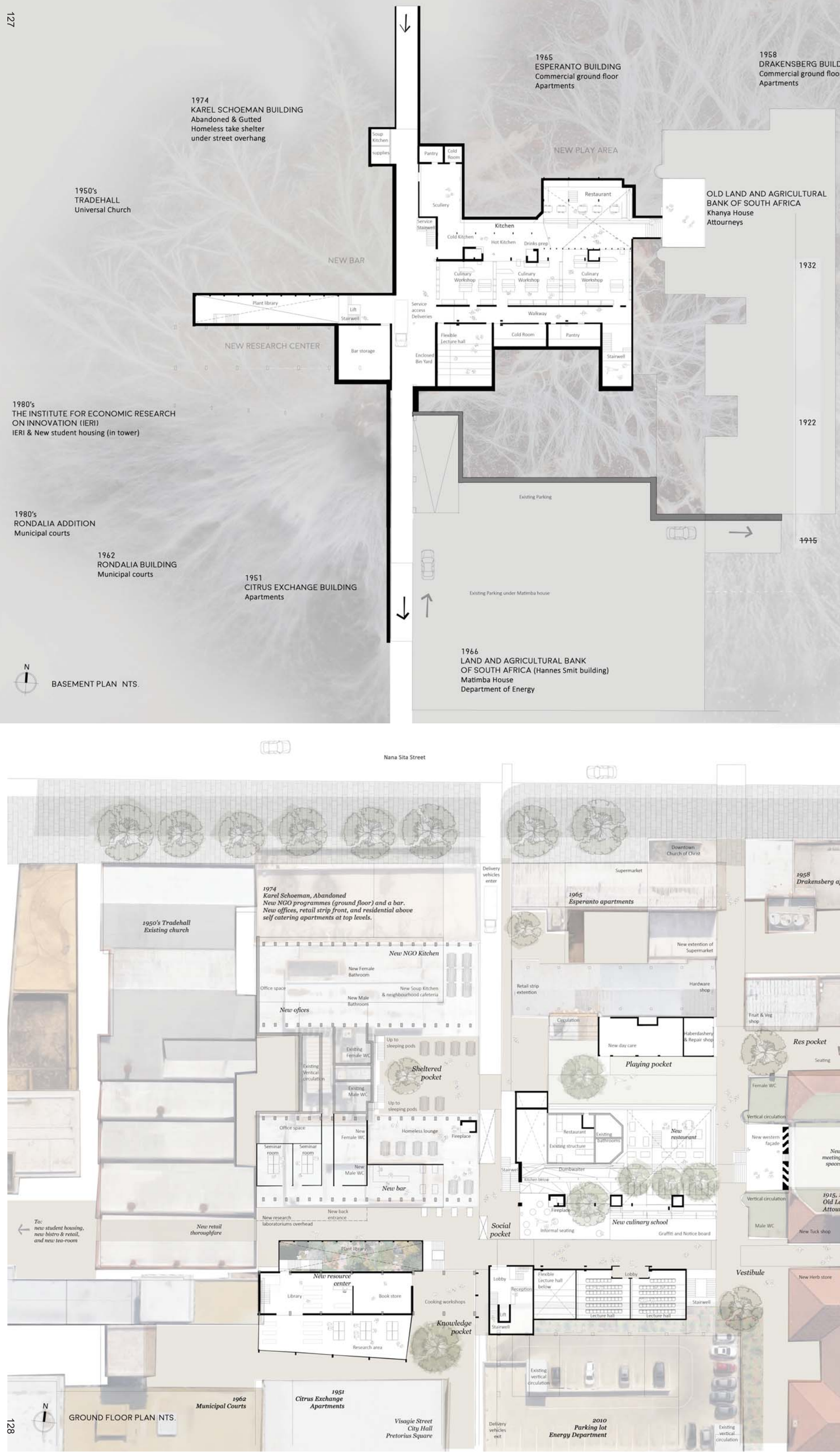


Fig. 178. Below; Basement plan (Author, 2019)

Fig. 179. Opposite; Ground floor plan (Author, 2019)

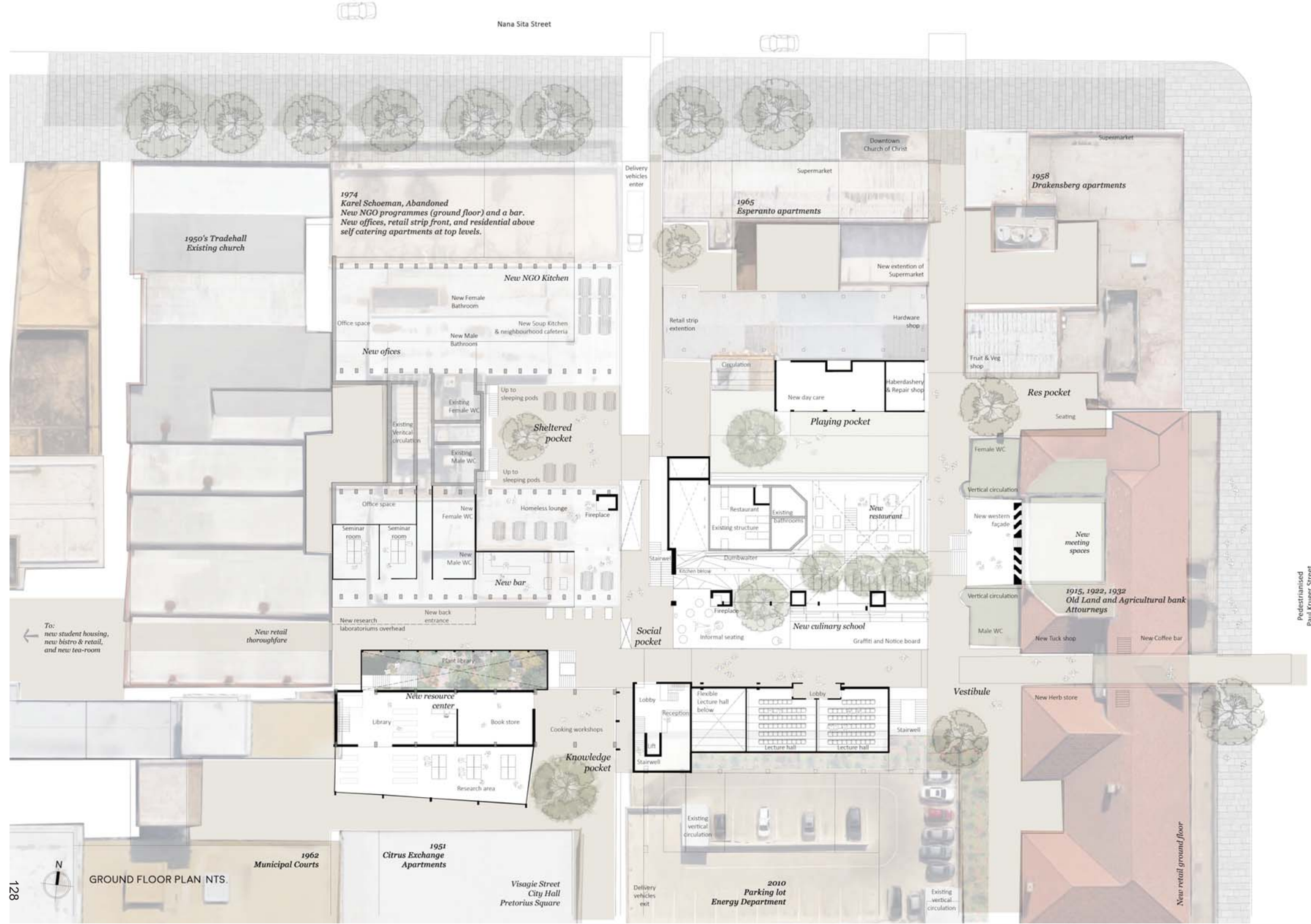
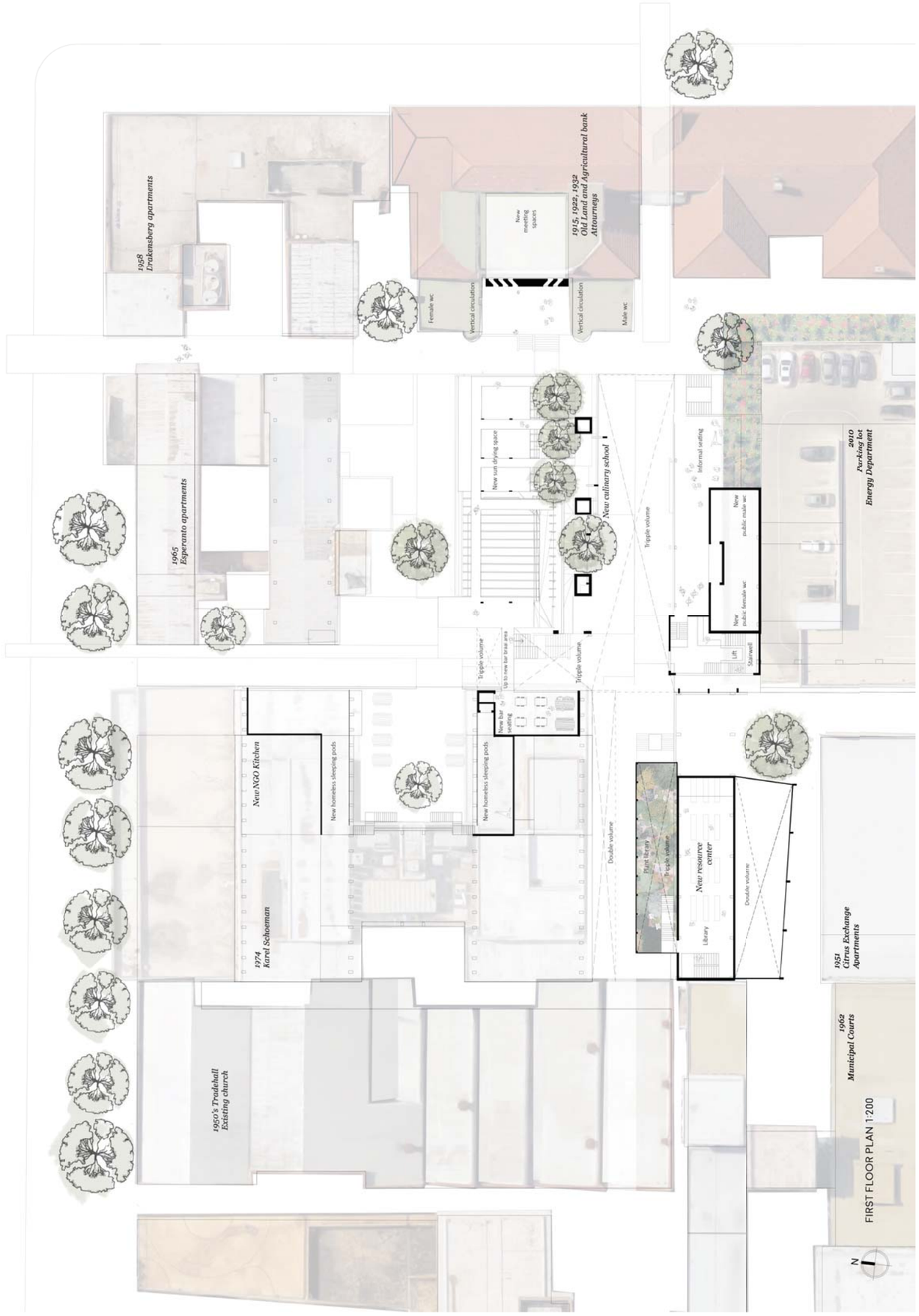


Fig. 180. Opposite; First floor plan (Author, 2019)

Fig. 181. Below; Second floor plan (Author, 2019)



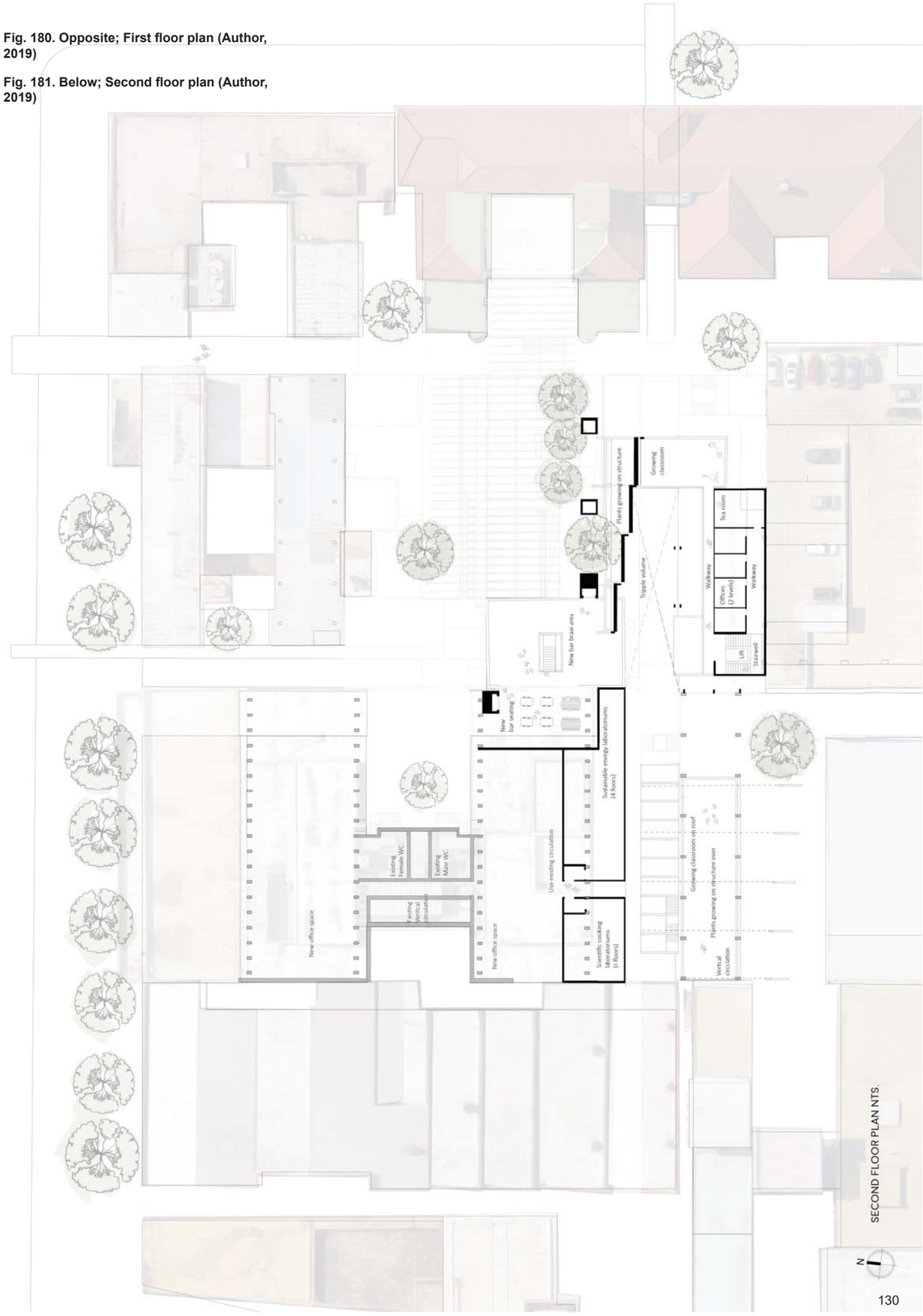
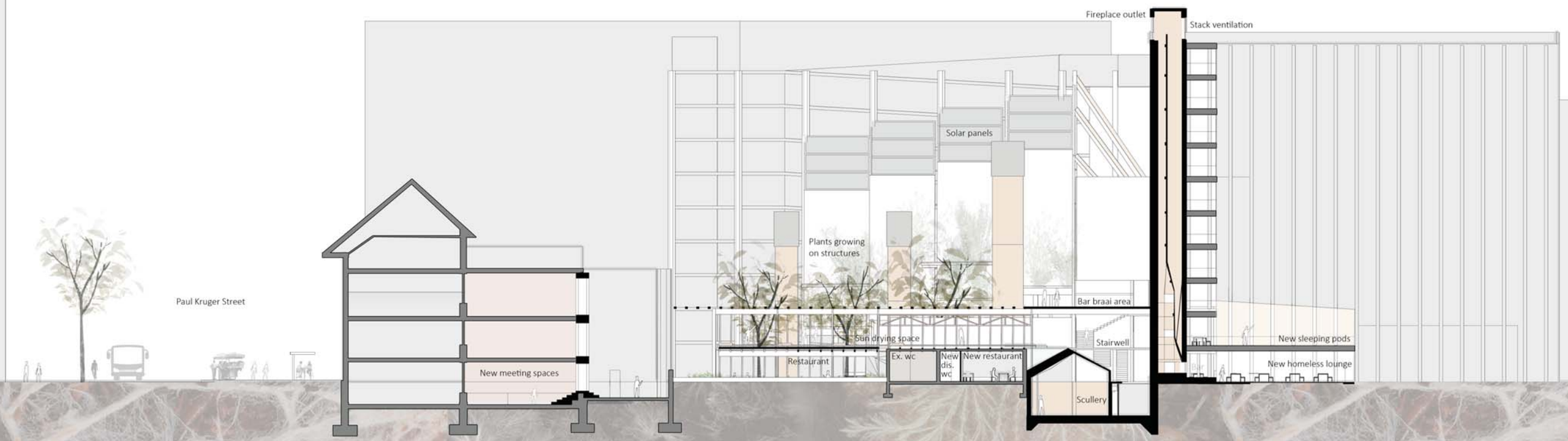


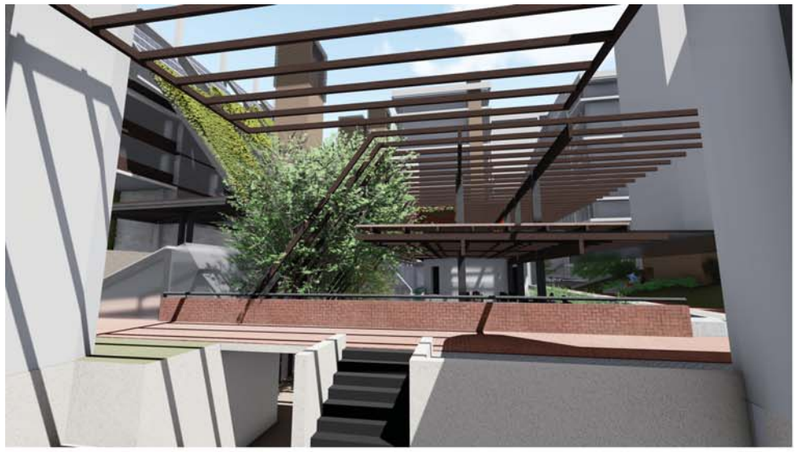
Fig. 182. Section 1 through culinary school
(Author, 2019)

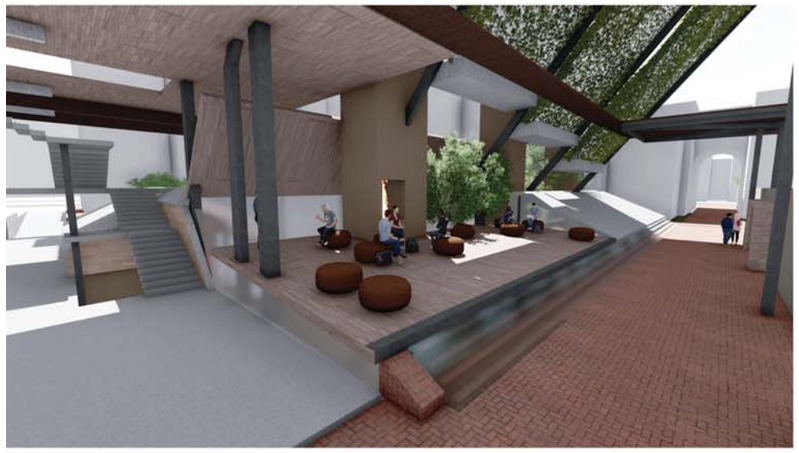
Section through culinary school [1] nts.

Fig. 183. Section 2 through Land Bank and restaurant spaces (Author, 2019)



Sectional elevation [2] nts.





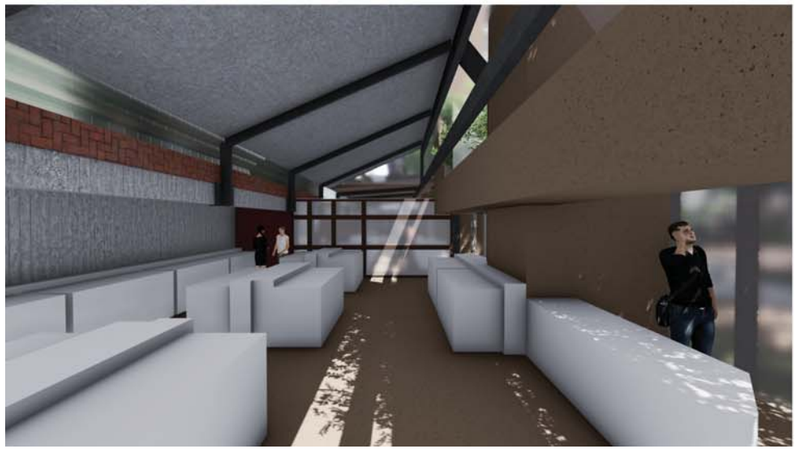


Fig. 184. Opposite top; View from Land Bank to restaurant (Author, 2019)

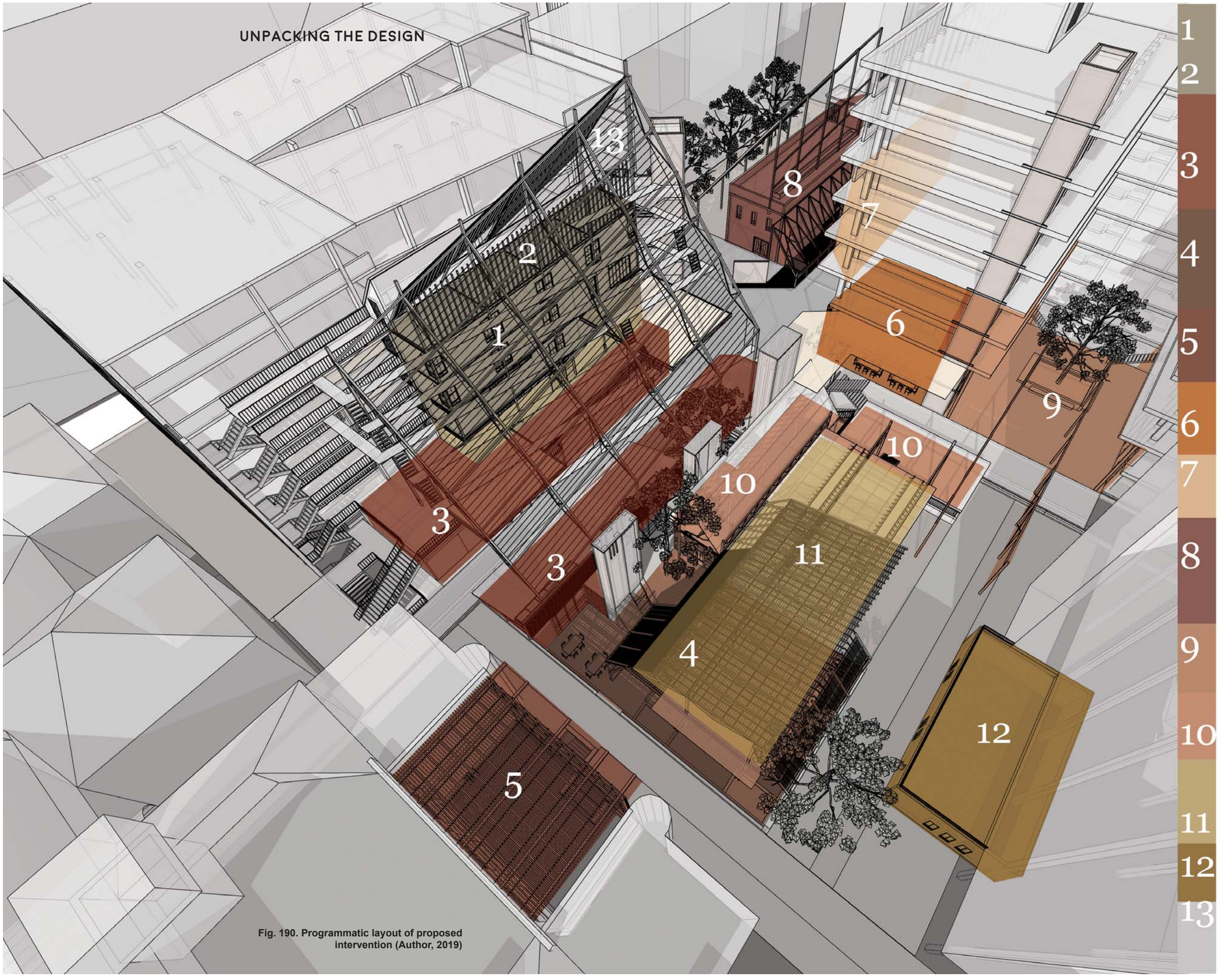
Fig. 185; Opposite middle; Restaurant with dappled light and level platforms (Author, 2019)

Fig. 186; Opposite bottom; Culinary workshop space with overhead grafitti roof.

Fig. 187. Top; Restaurant and existing ablutions interaction and integration (Author, 2019)

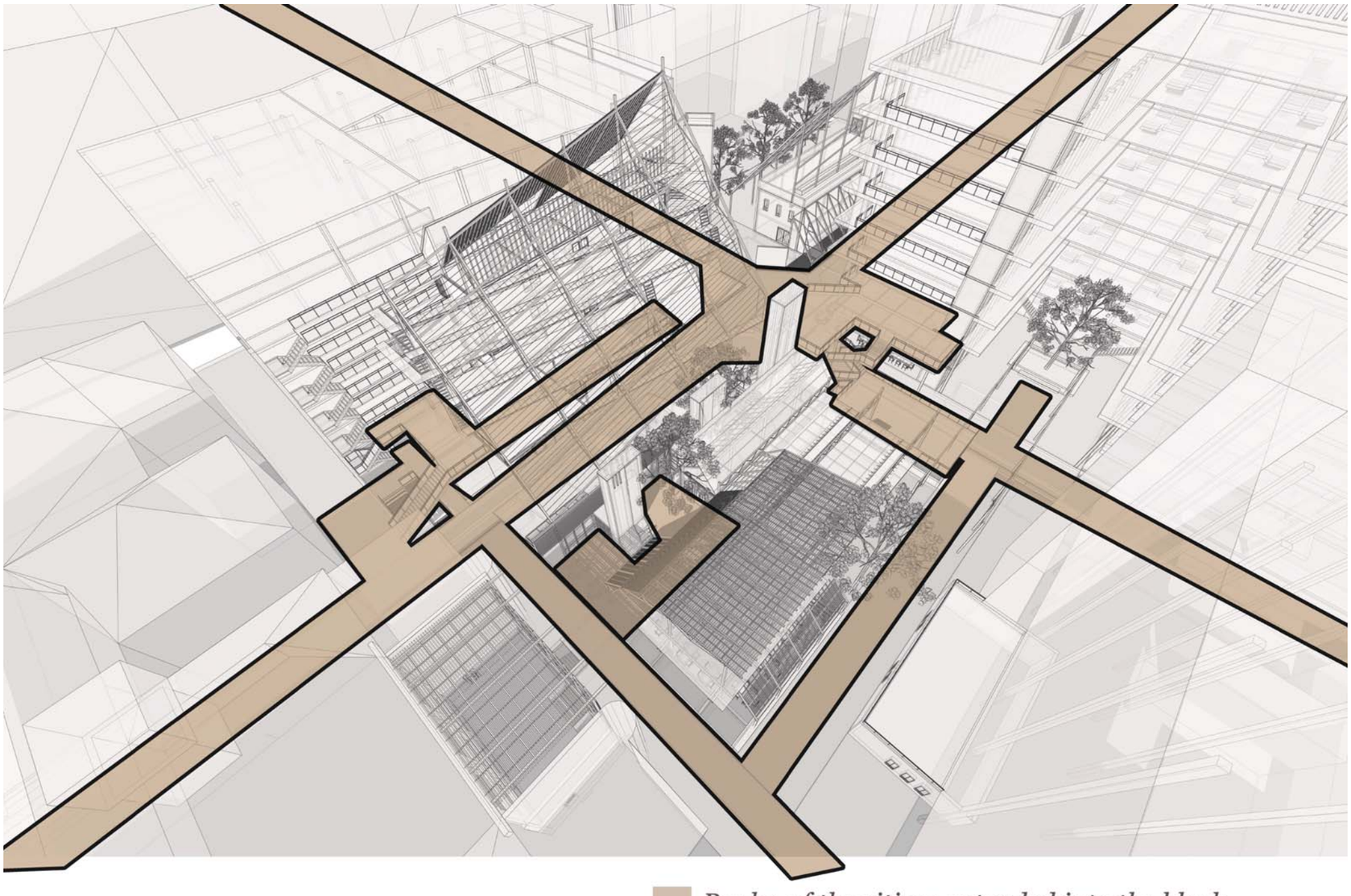
Fig. 188. Middle; View towards waiting and informal meeting platform (Author, 2019)

Fig. 189. Bottom; Student's research centre and plant library (Author, 2019)



1 ADMINISTRATION OF CULINARY SCHOOL
2 PLANT NURSERY
3 CULINARY SCHOOL LECTURE HALLS AND WORKSHOPS
4 RESTAURANT
5 NEW PERGOLA COURTYARD TO WESTERN FACADE
6 BAR
7 RESEARCH LABORATORIES
8 CULINARY SCHOOL STUDENT RESEARCH CENTRE AND PLANT LIBRARY
9 BUILDING LIVELIHOODS CENTRE
10 KITCHEN AND SCULLERY
11 DRYING OF FRESH PRODUCE
12 DAY CARE
13 HYDROPONIC VERTICAL FIELDS

Fig. 190. Programmatic layout of proposed intervention (Author, 2019)



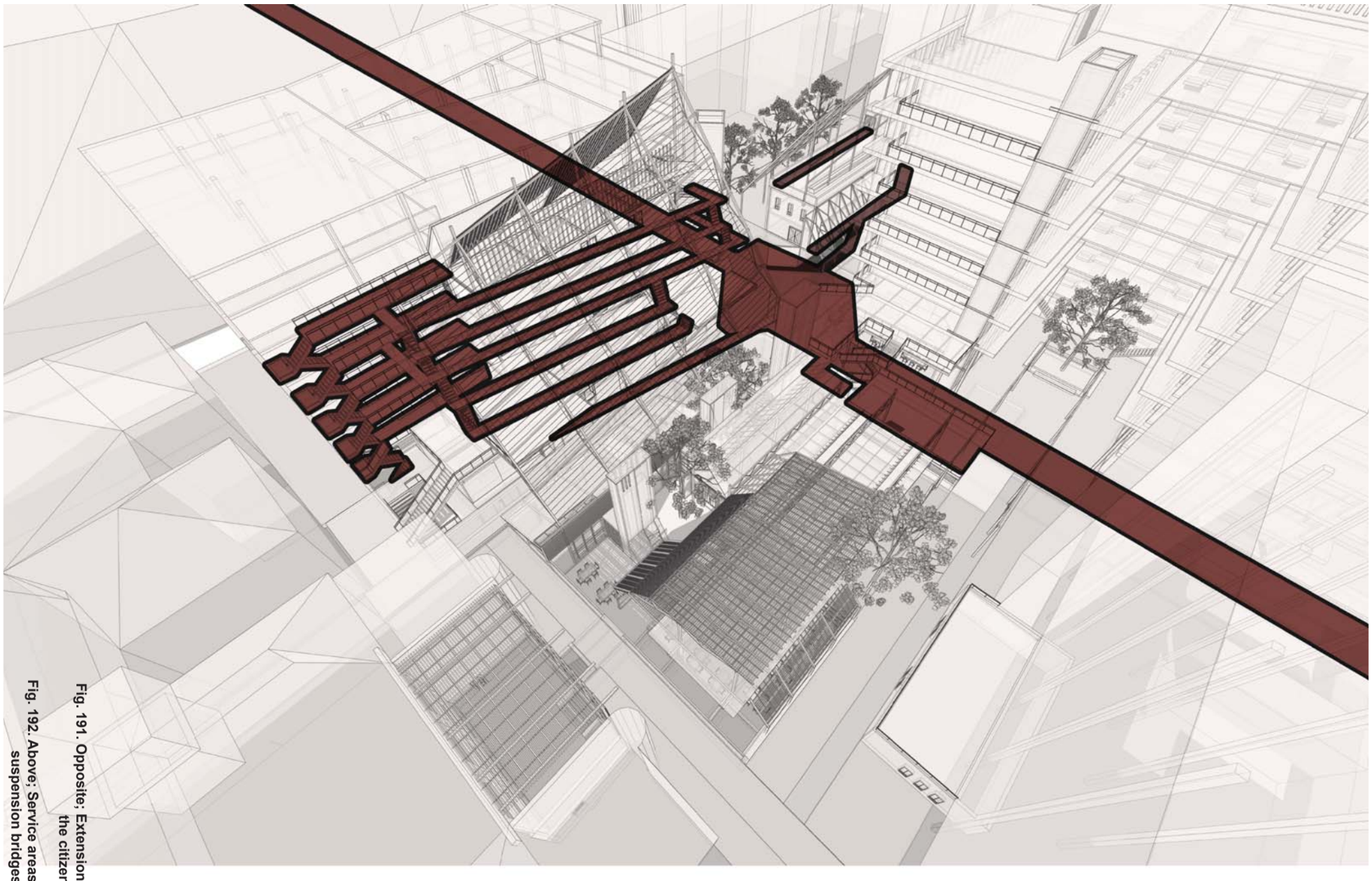


Fig. 191. Opposite; Extension of the realm of the citizen (Author, 2019)

Fig. 192. Above; Service areas, catwalks, and suspension bridges (Author, 2019)

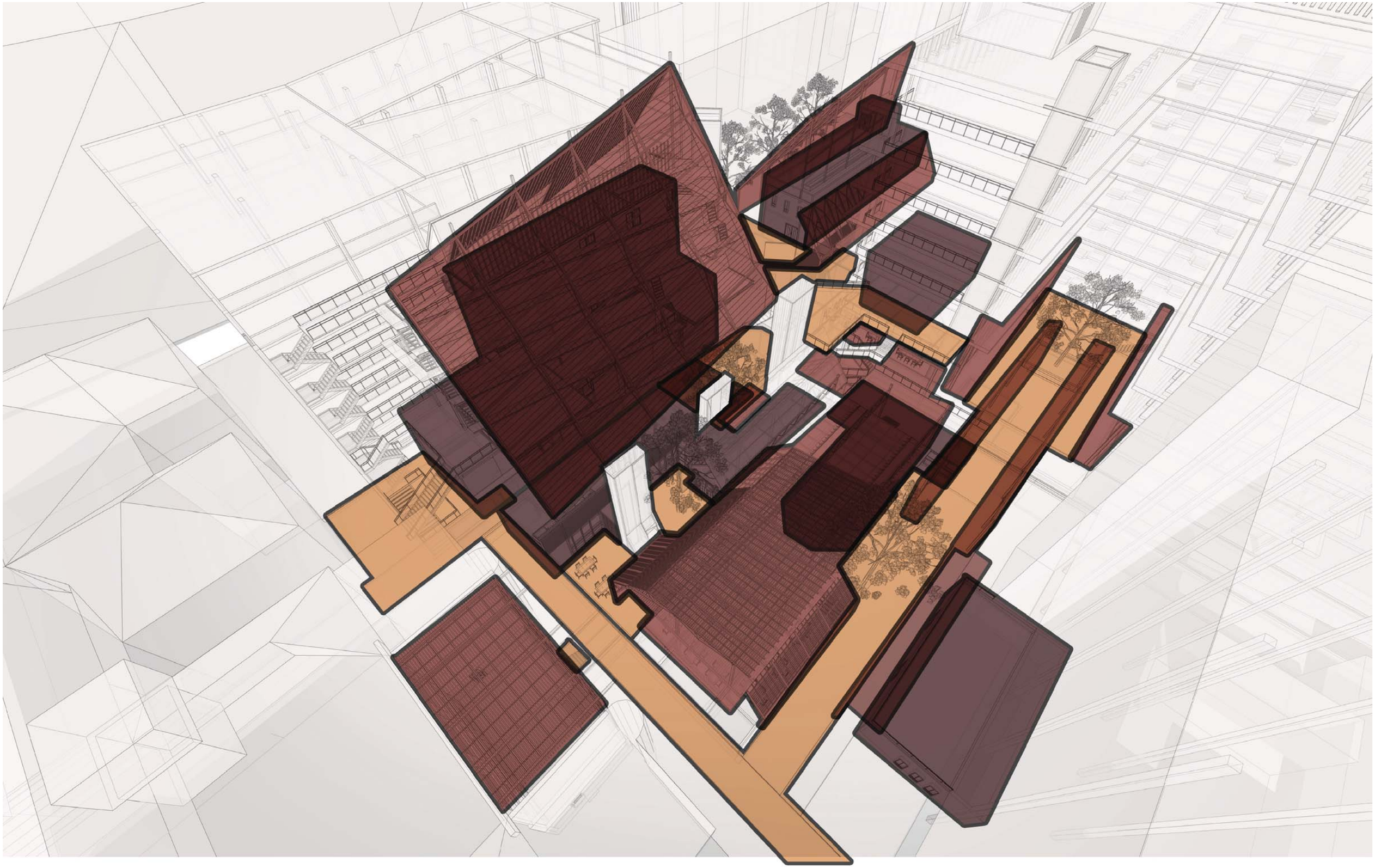


Fig. 193. Space delineation between internal, threshold, and external spaces (Author, 2019)

08

TECHNÉ

Towards a technical concept

Existing material palette

Structure: Hierarchy and materialty

Structural Precedent

Structural components

Macro, meso, and micro climate investigations

Environmental strategies

Design implementation of Holm's principles

Systems

Technical development

finding a technical solution

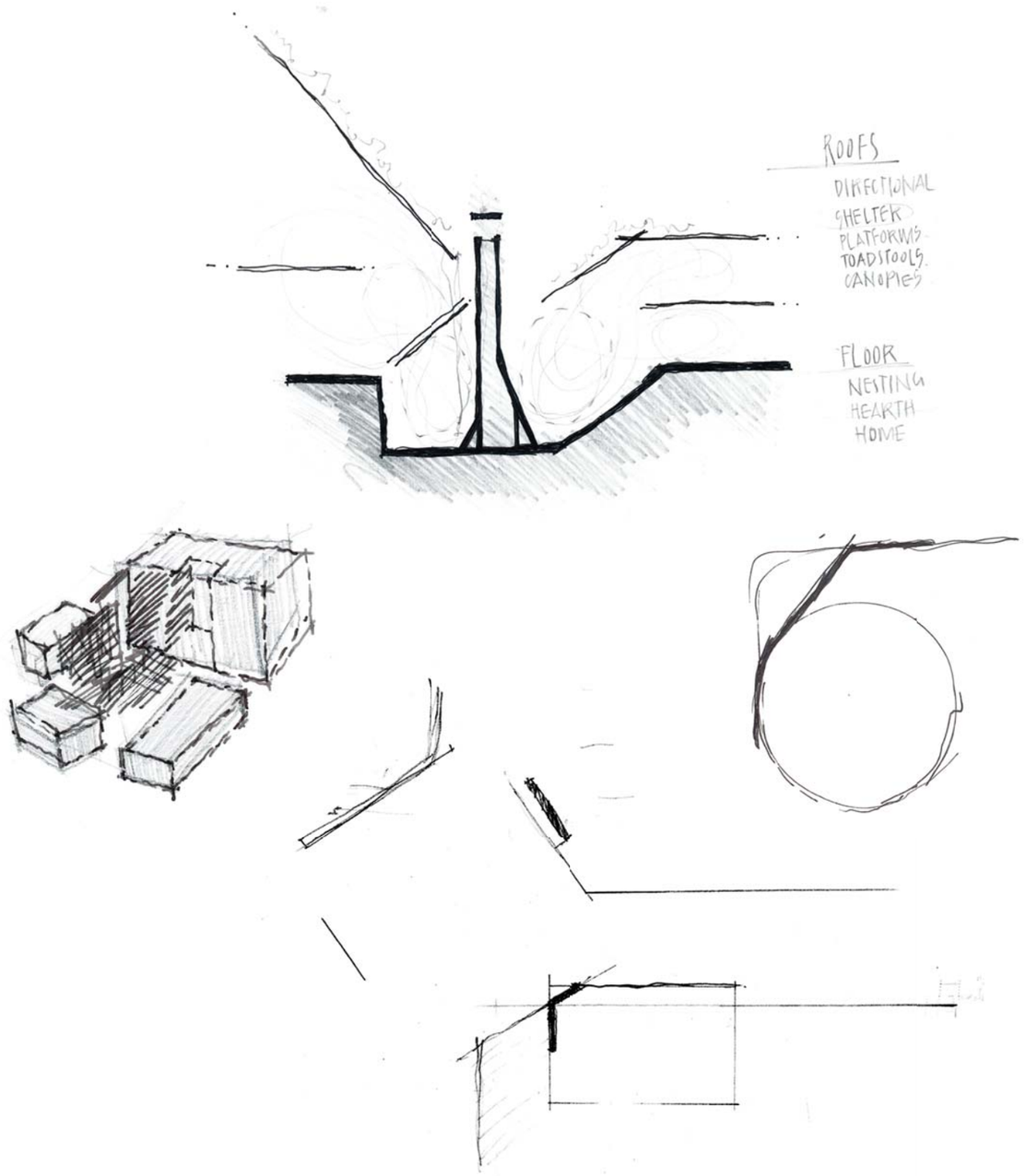
Fig. 194. Previous page; Multiple elements woven to form space - View towards Restaurant pergola (Author, 2019)

Fig. 195. Below; Compilation of concept drawings (Author, 2019)

Fig. 196. Opposite; Impression of palimpsetic layering of strategies as technical concept (Author, 2019)

TOWARDS A TECHNICAL CONCEPT

The technical inception is derived from the design concept, referring to architecture that is able to draw people into a space to create complexity and diversity in interaction between different users, activities and spaces. This conceptual handling of space, and the other informants of the project, led to a palimpsetic approach to layering the site that adds to and morphs the existing fabric. From this articulation the technical concept can be understood as a layering of structural elements that is palimpsetically placed over one another to create complexity and diversity in the structure of the new architecture, as well as in the connection between old and new.



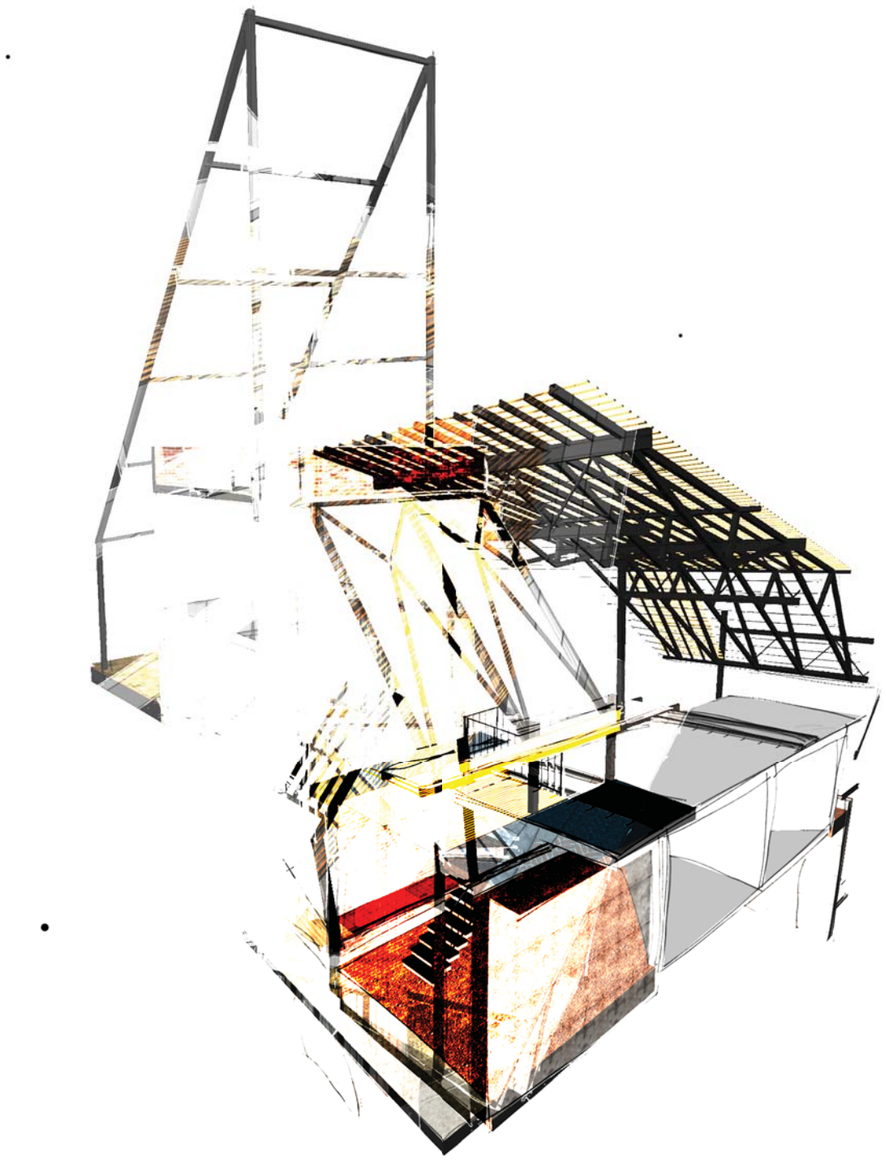
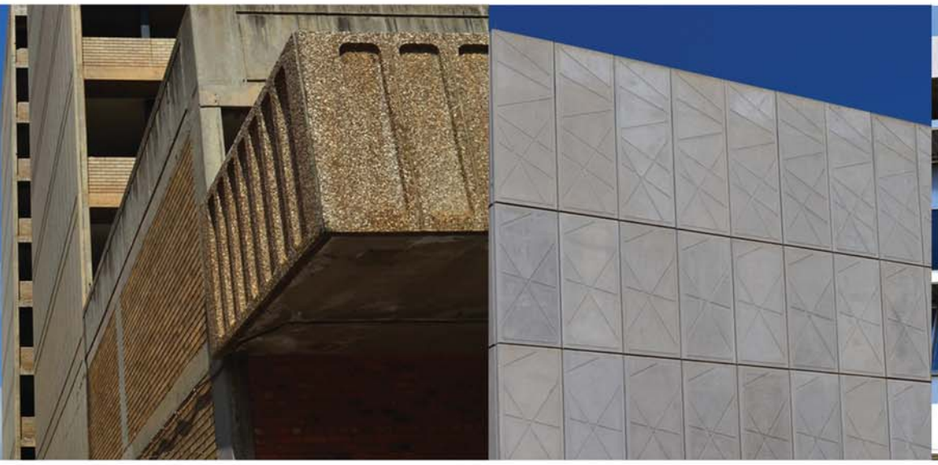


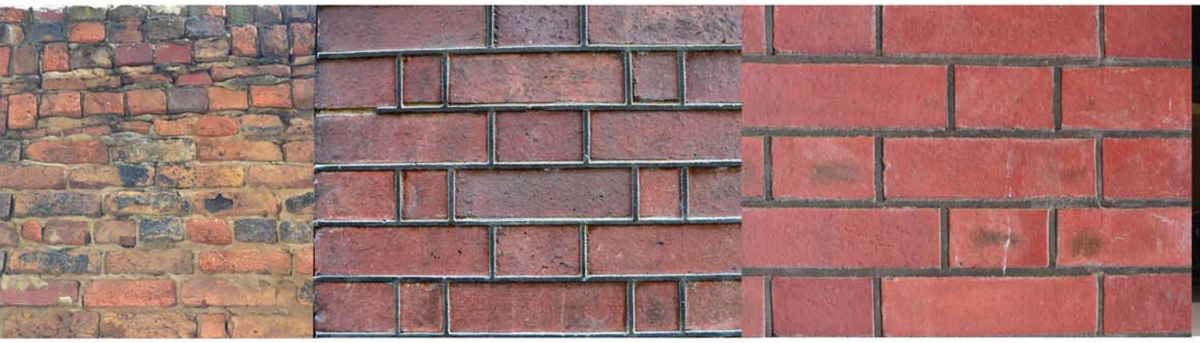
Fig. 197. Compilation of various existing materials on site (Author, 2019)

EXISTING MATERIAL PALETTE



Multiple concrete elements

Stone chiselled walls, shaped stone plinths



Various colours of face brick façades and detailing,

Timber used as detailing and internal cladding or room dividers.

Tile and Mosaic wall and floor finish

Timber and steel used together, Steel window and gate frames

STRUCTURAL HIERARCHY AND MATERIALITY

The physical structure is hierarchical: primary structure, secondary and tertiary structure (Fig. 198). The structural hierarchy starts off by growing from its setting, utilising contextual materials of concrete and brick. The concrete elements to be demolished can be re-used as aggregate in the new concrete. The use of brick is an extension of the existing buildings on the fringes of the block through to the middle of the block, used symbolically to refer to the extension of the realm of the citizen into the block.

The secondary structure is a foreign object in the context, as a new technology of galvanised mild steel members (SHS, square hollow sections) employed for the constructibility in small tight spaces such as the urban setting of the new architecture. Moreover, the steel can be easily de-constructed and disassembled to make alterations to the structure or to be reused in another environment.

The tertiary structure is a mixture of lightweight elements and elevated roof planes. The lightweight external wall system is made up of light gauge steel members with various cladding methods, including a selection of polycarbonate sheets, high tech translucent pillow ETFE (Ethylene Tetra Fluoro Ethylene) system. Privacy is gained within these composite panels by inserting insulation and OSB into them. The interior is then wallpapered or left as bare OSB or polycarbonate sheeting. The final addition to the ends of structure is in fine timber elements, such as Bamboo slats Saligna beams and Rhino Wood, to mediate between the user and the architecture creating a softer interface. The tertiary structure facilitates future development and appropriation by people through the light weight gauge steel system that is easily de-constructed to be reused elsewhere or added onto to expand the programme. The cladding of the composite panels can easily be changed or removed as it is a dry works system, to suit new needs that the building might require. Appropriation by the public that use the building is discussed below under the structural component *Appropriation.*

A wide range of materials are selected to limit the amount of product that is consumed/depleted/spent. Using a little from many, rather than everything from one can ensure a lighter footprint on the earth. Using a variety of materials further enables the structural sub-components to be used in preferred environments and utilised in spaces that play on the materials' strengths.

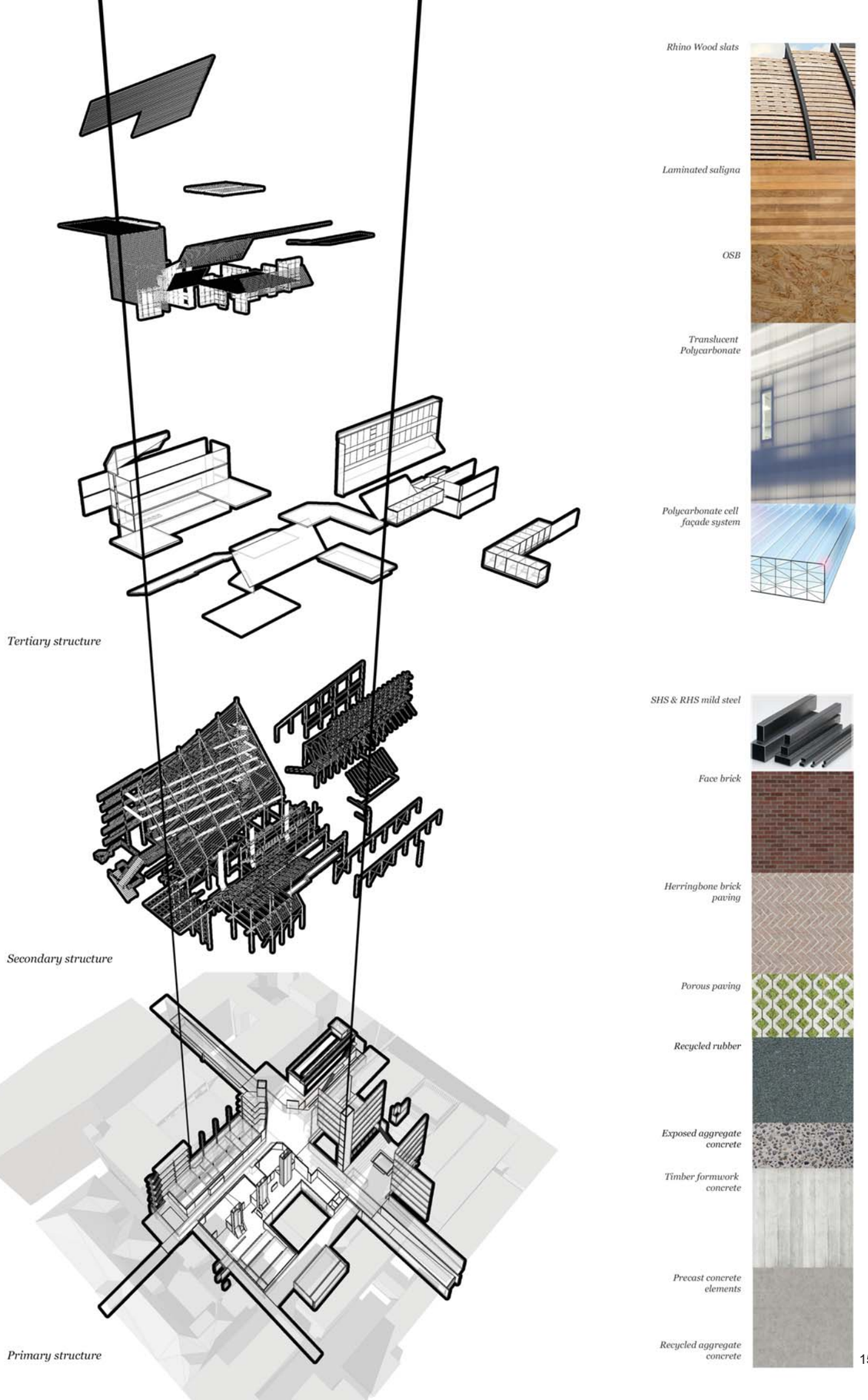


Fig. 198. Opposite; Structural hierarchy shown in exploded view (Author, 2019), with corresponding new material palette (Rhinowood, 2017; Risinger, 2017; Anon, 2018; Anon, 2018; Exopavers, 2013; Anon, 2014; Anon, nd)

EDEN PROJECT STRUCTURAL PRECEDENT

Nicholas Grimshaw, Cornwall, UK, 2000

Programmatic, Technological

The project was designed in the early days of sustainability to initiate greening the world. The developers of the project argue that it is the best classroom in the world, as it is not just a greenhouse, but a hands-on learning experience (Eden Project, 2017 (1)). The bubble ETFE (Ethylene Tetra Fluoro Ethylene) structure was developed for its ability to fit onto any topography and the space frame structure allows for the largest most economic spans. The project revitalised a derelict site to showcase how adapting spaces with latency, may allow a whole new narrative of hope and care to be instilled by the intervention.

> The Eden Project, an educational charity,
> connects us with each other and the living world,
> exploring how we can work towards a better future
> (Eden Project, 2009).

The large spans of the specially designed space-frames serve as inspiration to create a similar individual member steel lattice truss system that can span large distances. The ETFE façade is an inspirational technology that allows plant growth by transmitting the valuable UV light the plants require (Eden Project, 2017 (1)). Furthermore the pillow system provides adequate insulation to prevent extensive heat gain and loss as incurred by a mere single pane glass façade. A specialized adjustable shading system, Architen ETFE Intelligent Printing System (Architen Landrell, 2016), is available to use in conjunction with the ETFE cushion system that allows the user to control the amount of sun that infiltrates the space. The suspension bridges used in the Eden Project is an appropriate example of light weight elements that can span a long distance with no structural columns needed. The structural support of these bridges lies in the tensile strength of the structural steel cables and the end supports. This type of walkway will be implemented in the design for the service spaces of the plant growing hydroponics structure.

Fig. 199. Above; Compilation of Eden project showing large dome containing the rainforest biome, ETFE used to allow sunlight through and space frame to span great distances as well as a suspended walkway (Eden project, 2017(2)).

Fig. 200. Oppoiste; Extension and connection to existing ablutions (Author, 2019)

CONCEPT INTO STRUCTURAL COMPONENTS: EACH STRATEGY

Connection

Connecting to the existing through new steel elements, or chemically anchored to existing slabs, or cast into with appropriate movement/ expansion joints.

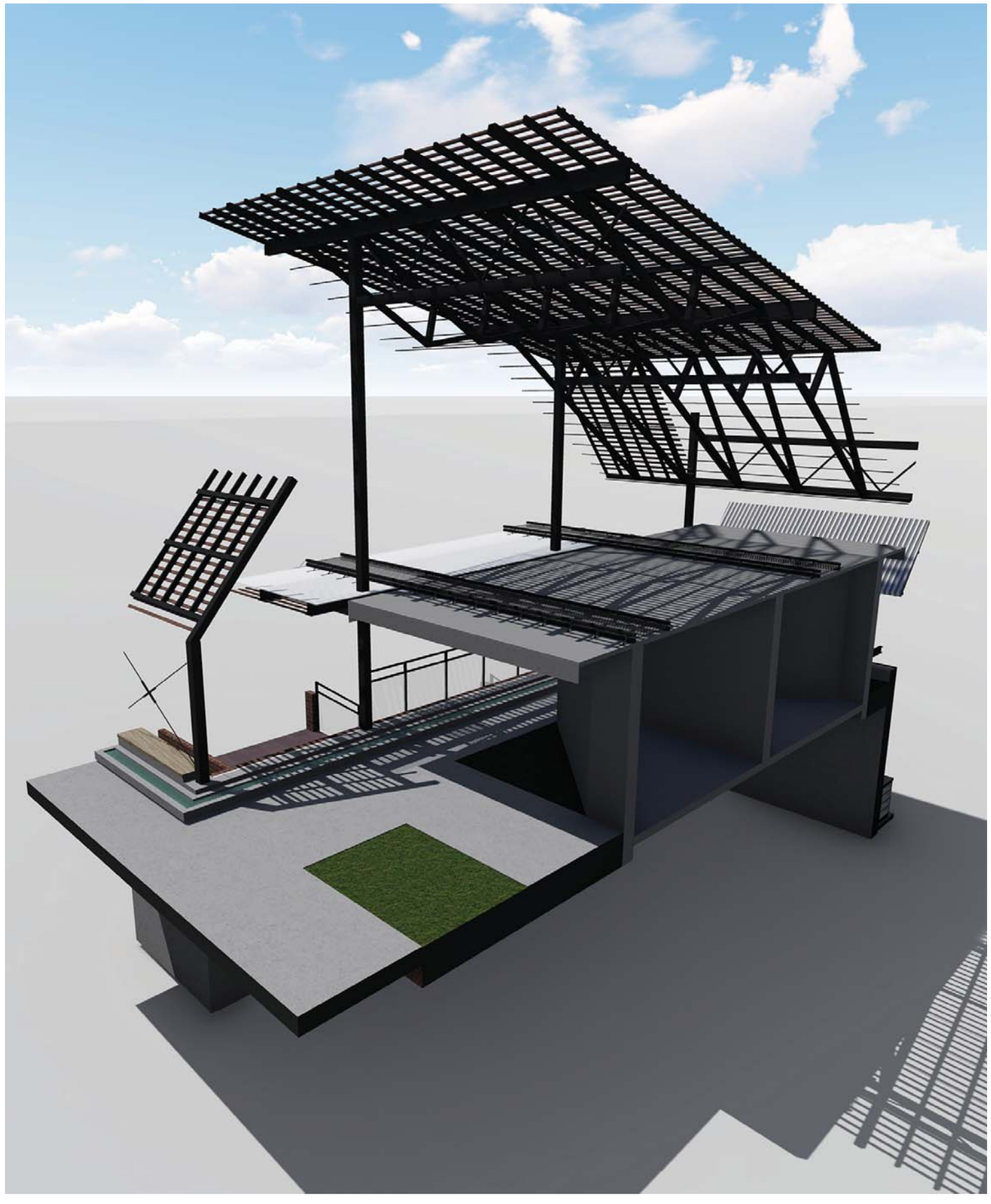


Fig. 201. Below; Land Bank insertion depicting new pergola into existing courtyard space (Author, 2019)

Fig. 202. Opposite; Karel Schoeman Connection and extension (Author, 2019)

Insertion

Inserting new basement into the site where the rest of the architecture grows from. After calculated demolition, insertion of lightweight infill. The addition of elements into the existing spaces or structures.

Extension

Extending the existing structural grid to form grid of the new architecture. Extension of internal spaces and activities to external areas, creating multiple threshold spaces, blurring internal/external boundary.

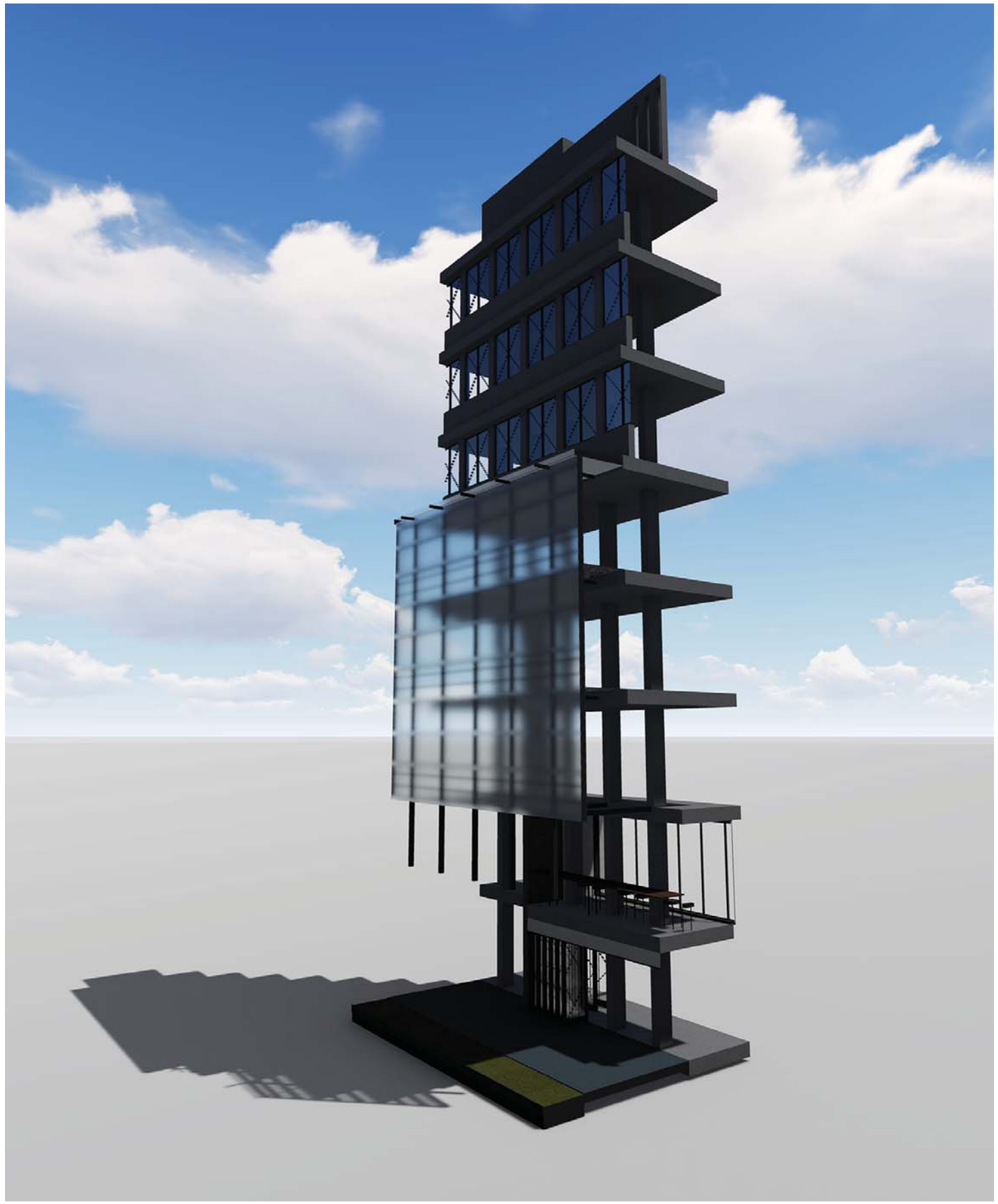


Fig. 203. Below; Parking lot addition, as freestanding (Author, 2019)

Fig. 204. Oppoiste; Extension of 1990's apartments with appropriation of building fringes (Author, 2019)

Freestanding

Here the latent pocket itself is activated and given new life, by adding activities and architecture into it. The architecture has nestled itself within the site geometry and although freestanding, ties back into the context.

Appropriation

The building's fringes are robust, to be painted (graffiti) on and used as notice boards, and certain elements extend to accommodate attachments to it. This extension facilitates organic temporal growth by allowing people to latch onto the new architecture with their market stalls or other temporary structures they wish to add. Appropriation of the structure further includes the plants growing on the steel trusses with varying life cycles and changing seasons, maintained by people.

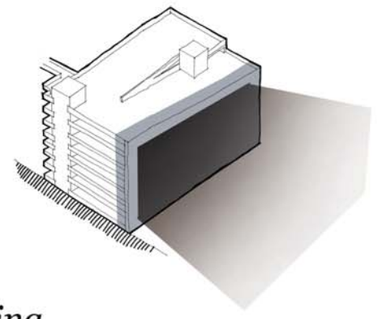
Extension
Freestanding

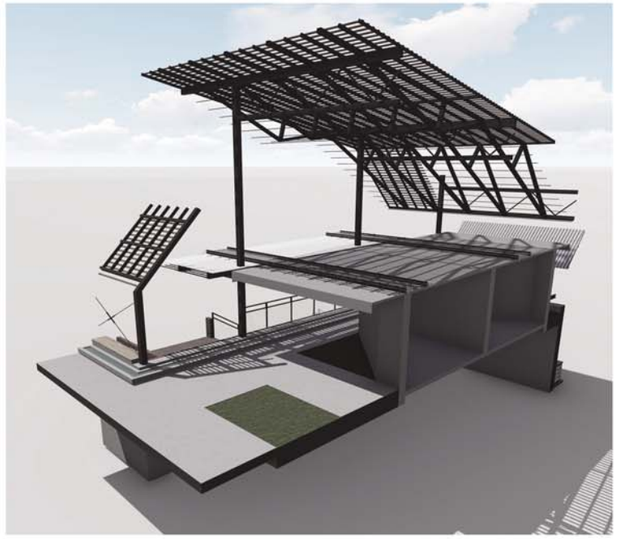
Parking lot

2012
Parking lot | Good condition | 9 Storeys

Adaptable concrete frame structure

Consider embodied energy in existing structure. The functional value of the building should be exposed and latched onto. Bollack refers to this strategy as parasitic (2013:80). Expressing the function provides the building with a new significance.





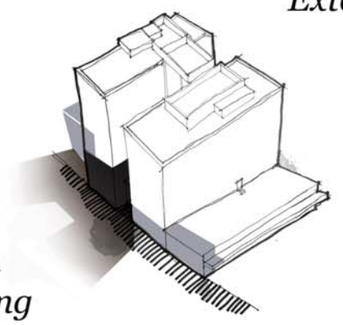
1974
Karel Schoeman | Abandoned, gutted, bad condition | 10 Storeys

Karel Schoeman building

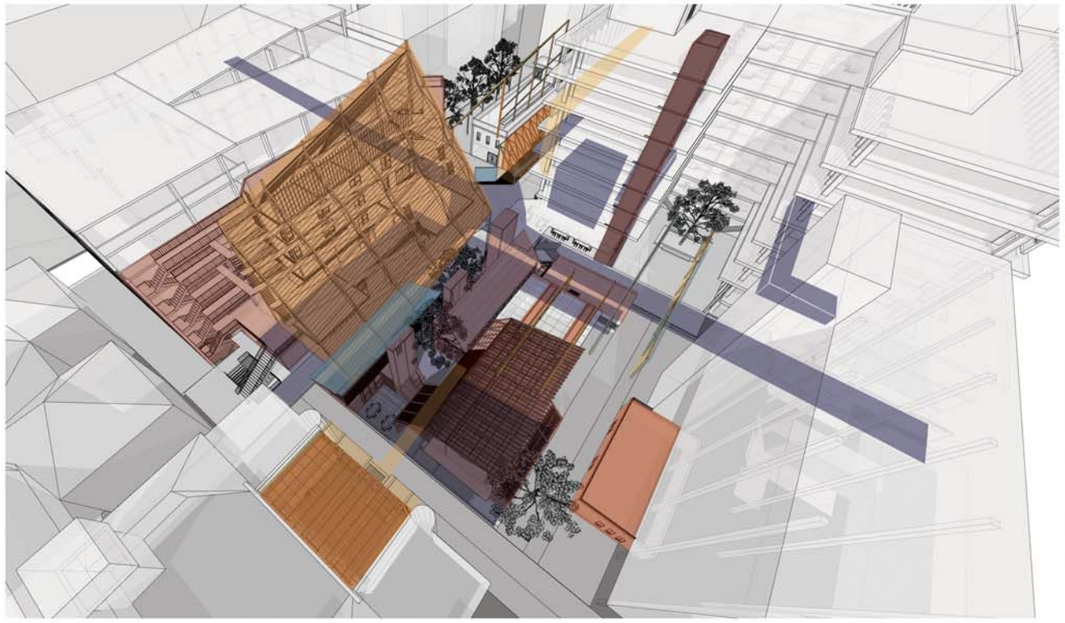
Artistic overhang + roofscape detailing

Complete refurbishment and partial demolition to reduce the eastern and southern façades' scale. The concrete rubble from demolition can be reused as aggregate and new programmes are scripted to reactivate the building. Furthermore a wrapping (Bollack 2013:150) addition should be made to mediate the scale of the building in its context. This strategy extends the boundary between the internal and external spaces.

Connection
Insertion
Extension



Connection
Freestanding



Concept to structural components

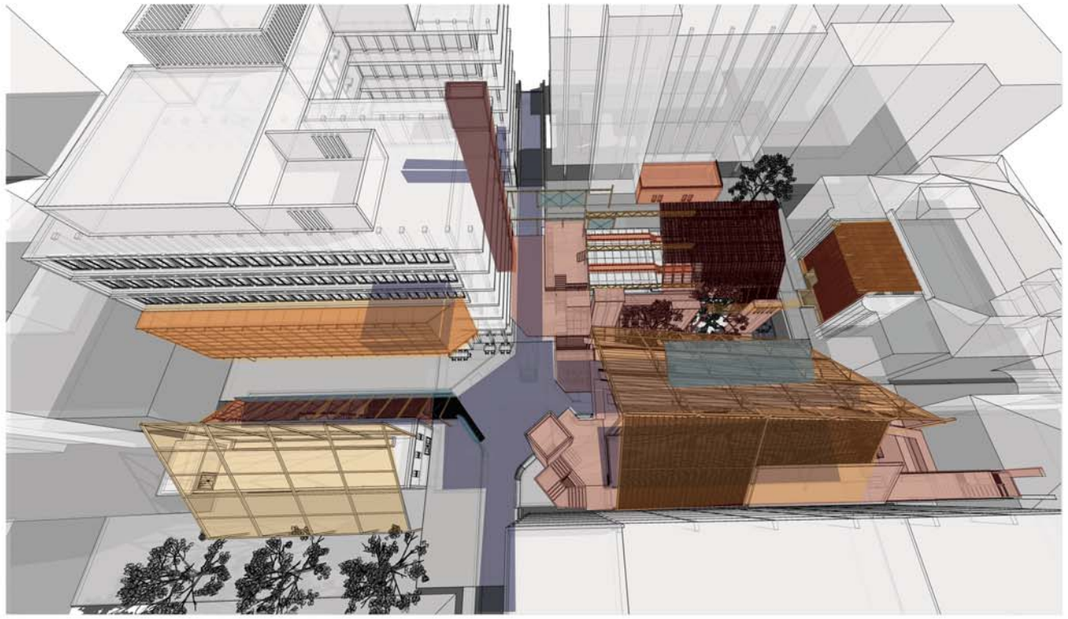
Connection

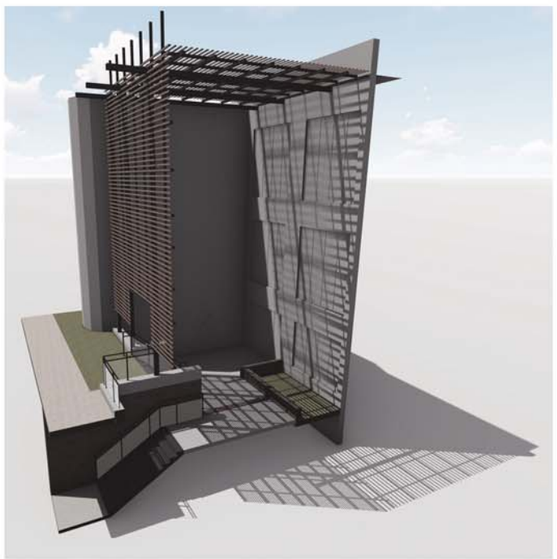
Insertion

Extension

Freestanding

Appropriation

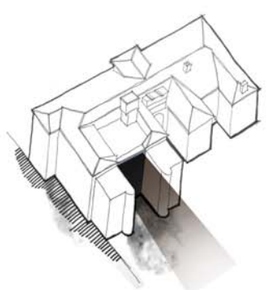




Old land and agricultural bank of South Africa
1915; 1922; 1932

Cowin, Powers & Ellis | Gerard Moerdijk
Good condition | 2½ Storeys
[1932 addition]

Numerous architectural details on façades:
bay windows, arches, pilasters, keystone detail, and water channels. Good example of an English Neo-classical renaissance style
High quality brick façades
Proportion + Rhythm
Scale



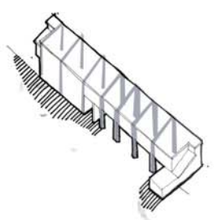
Connection
Extension
Insertion

Fig. 205. Concept into structural components: the technical expression. Each strategy is represented by a colour, creating variations when overlaid (Author, 2019)

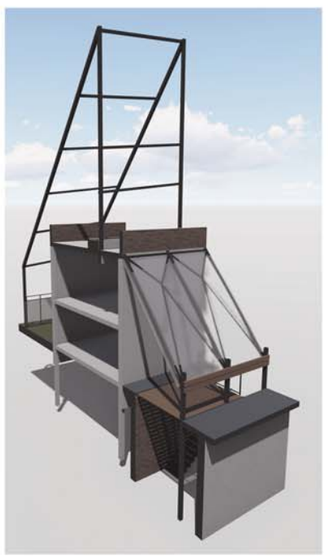
1990's apartments on Citrus
Brick and concrete building | Good condition | 2 Storeys

Reusable brick façades,
adaptable concrete frame structure.

Adaptively reuse the existing structure of the building and repurpose the brick and windows in the new intervention. Envelop the column and beam remnants with a new shell. Technnicaly advanced materials, designed to harness shaded areas are used in the addition.



Connection
Extension
Appropriation



CLIMATE INVESTIGATIONS

Several investigations follow at varying scales, that include the annual rainfall for South Africa, Holm's principles of energy conscious design and Climatic data for Pretoria, such as climatic zone, wind rose, yearly temperatures, and a shadow study of the site.

MACRO

Rainfall data

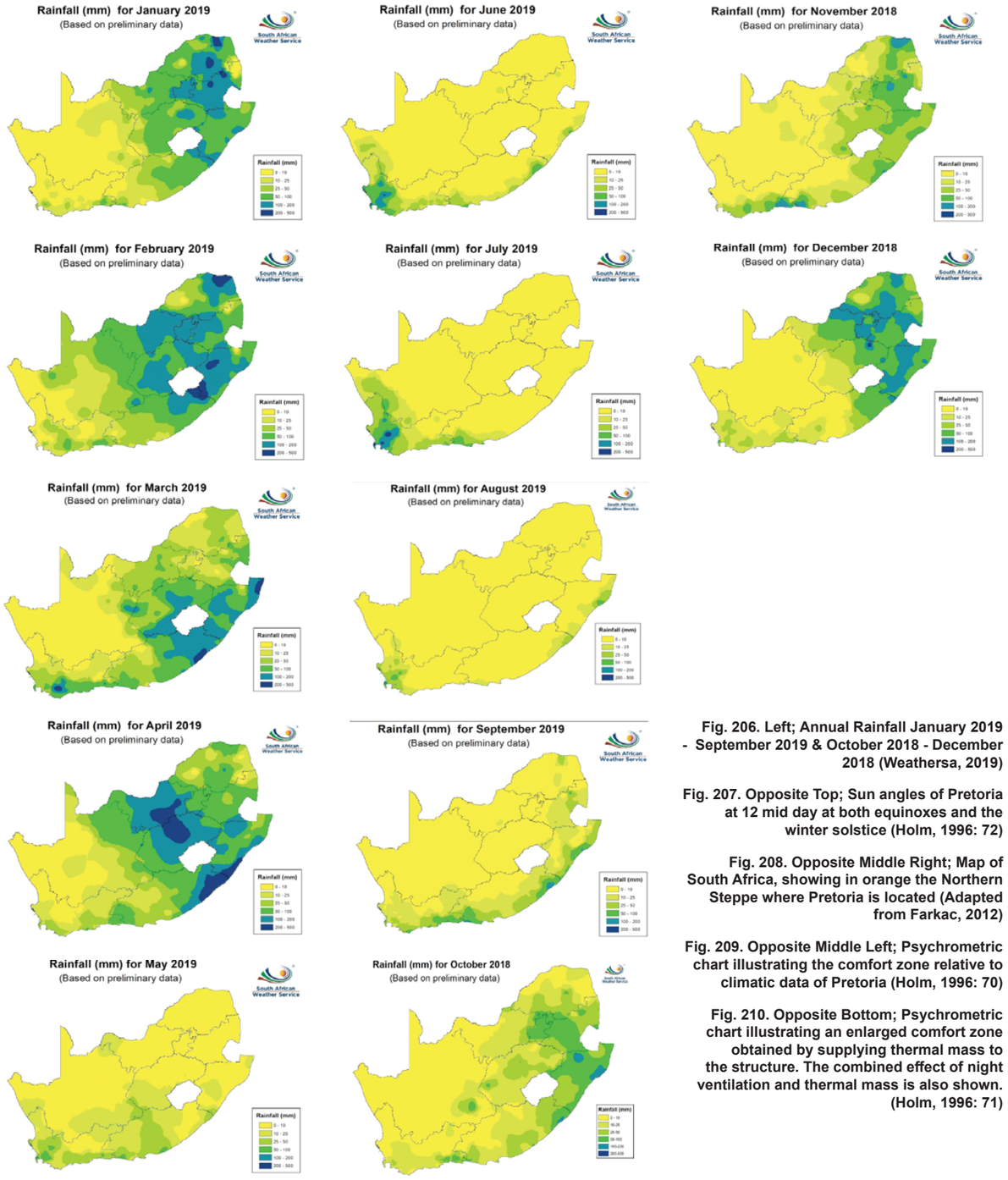


Fig. 206. Left; Annual Rainfall January 2019 - September 2019 & October 2018 - December 2018 (Weathersa, 2019)

Fig. 207. Opposite Top; Sun angles of Pretoria at 12 mid day at both equinoxes and the winter solstice (Holm, 1996: 72)

Fig. 208. Opposite Middle Right; Map of South Africa, showing in orange the Northern Steppe where Pretoria is located (Adapted from Farkac, 2012)

Fig. 209. Opposite Middle Left; Psychrometric chart illustrating the comfort zone relative to climatic data of Pretoria (Holm, 1996: 70)

Fig. 210. Opposite Bottom; Psychrometric chart illustrating an enlarged comfort zone obtained by supplying thermal mass to the structure. The combined effect of night ventilation and thermal mass is also shown. (Holm, 1996: 71)

MESO I MICRO

Holm's principles of energy conscious design for Pretoria (1993:69-73)

Climatic zone

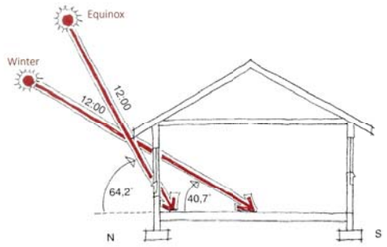
Northern Steppe.

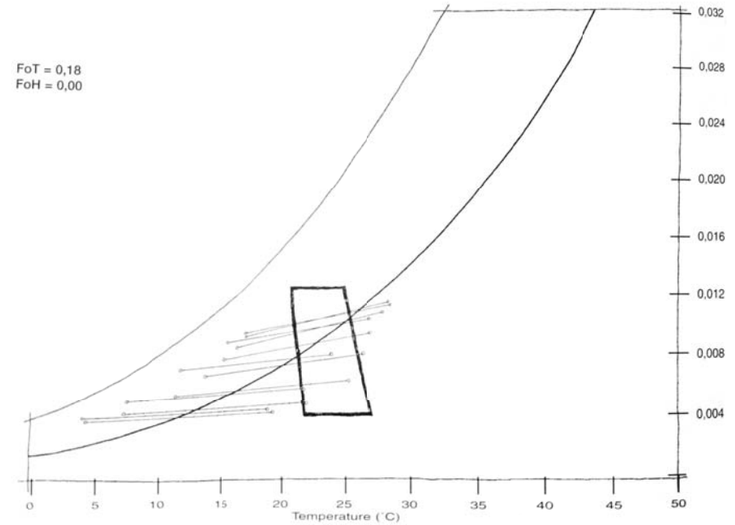
Location

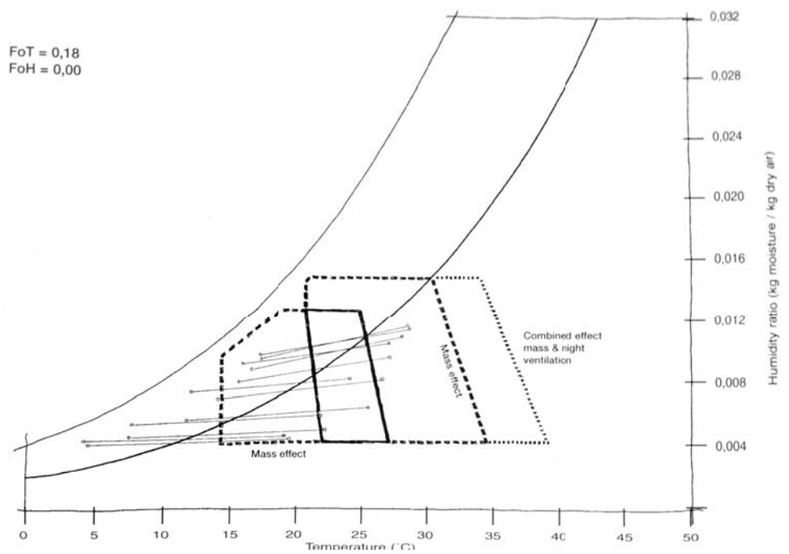
25,8° to 30,7° East and 22,0° to 25,9° South.

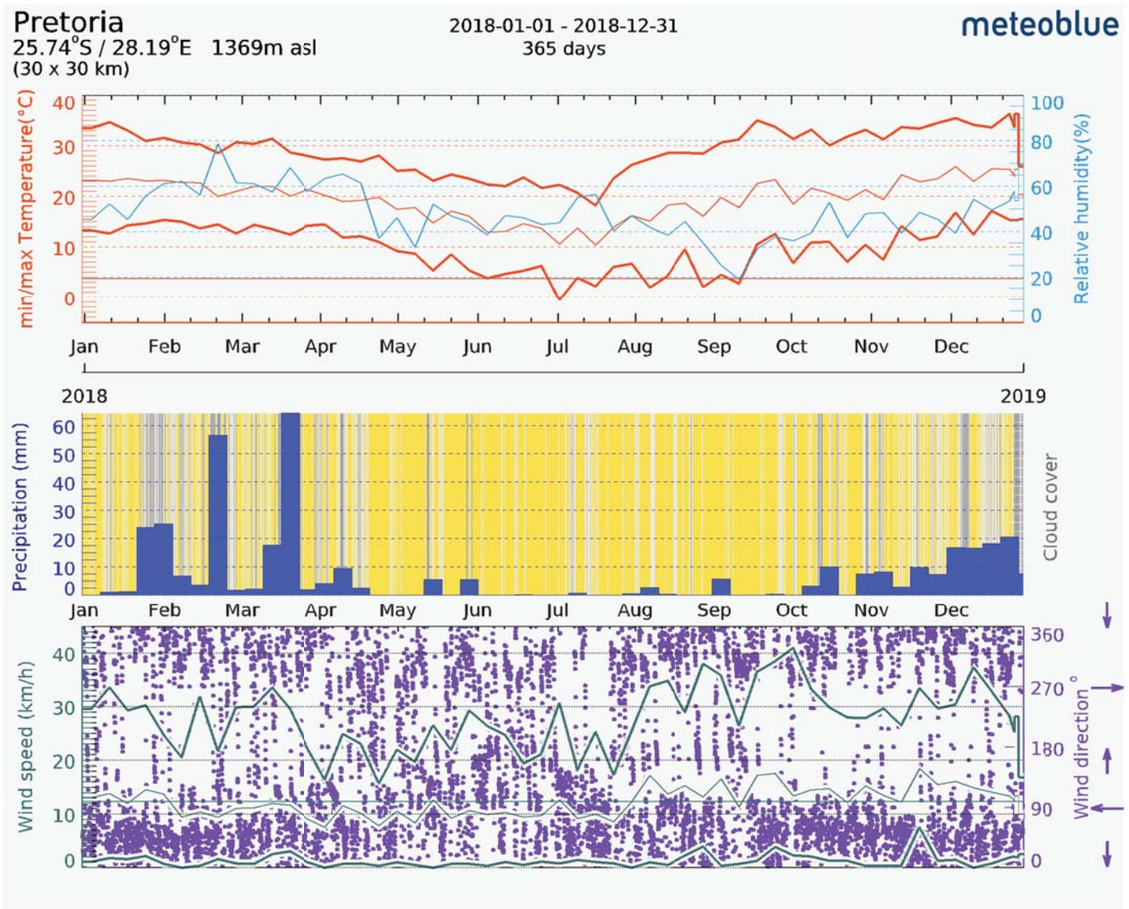
Description of zone climate

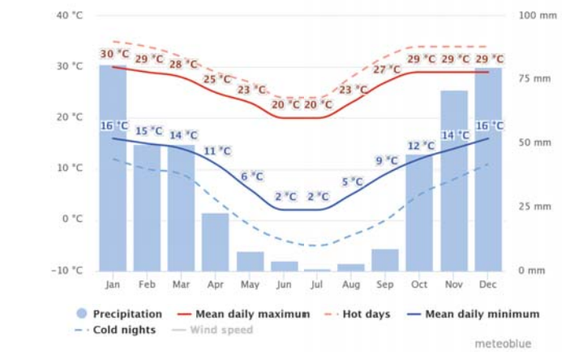
Summer rainfall with distinct afternoon thunderstorms and dry winters. The daily temperature fluxuates as much as 18° degrees between the highest and lowest average temperatures (Meteoblue, 2019). Between 16° and 30° in January or between 2° and 20° in June and July. The sun is harsh in this climate with 202,8 sunny days in Pretoria (2019) and a moderate humidity.

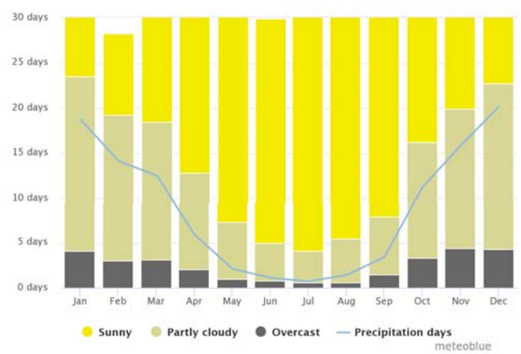


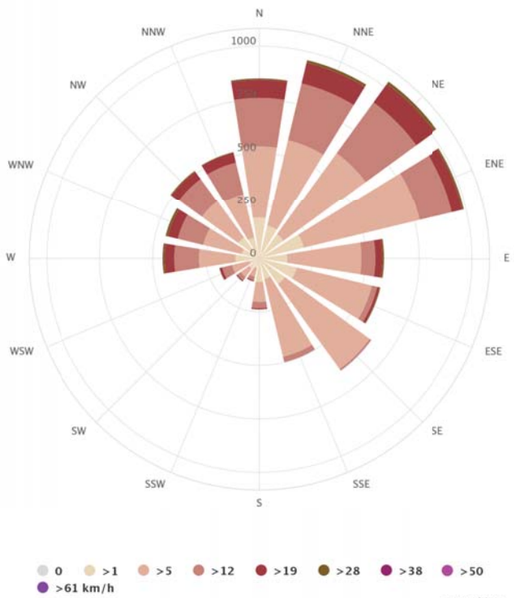












Several important factors were identified, through understanding the climate at various scales, that need to be considered when designing in a temperate climate, and are listed below.

Pretoria receives little to no rainfall in winter months (Fig. 211), and soaring numbers in the summer with short thunderstorms brought on by thermal air movement (Napier 2000:9.8). This warrants the use of water catchment during the wetter months to be kept in storage for the dry months.

The temperature and cloud cover graphs (Fig. 212) show an overwhelming amount of warm, sunny days. This enforces the use of shading devices, trees, and structures in public open areas and general outdoor areas that receive excessive sun exposure.

The windrose (Fig. 213) indicates the prevailing wind direction as north-east, as it has the most hours. Napier (2000:9.8) confirms that the dominant wind direction can change in winter to north-west. Therefore, the proposed architecture should shield the user in the north-east and north-west of the site with trees, screens or similar design elements to slow wind speeds.

The micro climate shadow study (Fig. 214) of the site shows a large amount of overshadowing, caused by the surrounding buildings, on parts of the site. Advanced technology is needed to harness the little sunlight that darker southern spaces receives. Moreover, if the new inserted architecture is not overshadowed by built fabric on the western and eastern façades, it should be shielded from the low angle of the sun.

Fig. 211. Opposite top; Three climatic charts of Pretoria (Meteoblue, 2019)

Fig. 212. Opposite bottom left; Temperature and cloud cover graphs (Meteoblue, 2019)

Fig. 213. Opposite bottom right; Windrose of Pretoria (Meteoblue, 2019)

Fig. 214. Shadow and solar study of site (Author, 2019)

22 December

08am

22 December

10am

22 December

12pm

22 December

14pm

22 December

16pm

21 March

08am

21 March

10am

21 March

12pm

21 March

14pm

21 March

16pm

21 June

08am

21 June

10am

21 June

12pm

21 June

14pm

21 June

16pm

22 September

08am

22 September

10am

22 September

12pm

22 September

14pm

22 September

16pm

Ventilation

Ventilation is dealt with in section (Fig. 216) to show types of strategies implemented in spaces with different needs. The spaces vary from the most controlled spaces with multpiple strategies such as the Culinary School lecture halls where thermal mass, night ventilation and geothermal ventilation is implemented. On the other end of the scale is the least controlled space that makes use of few strategies such as the restaurant seating area with a shading device and natural ventilation as it is an open outdoor space.

Light

Sefaira investigation of light to assess baseline model and improve design (Fig. 217-219) for adequate amount of lux for cooking spaces and better controlled spaces for human comfort.

Baseline model (Fig. 217)

The baseline case is greatly over-lit in the open air restaurant seating area, even though the neighbouring buildings overshadow the site. The culinary workshop space has better sun control, but it varies too greatly for a space that needs to be controlled. An increase in shading devices is required on the northern and eastern façades of the workshops and seating area. The southern windows of the workshops allows ample even light to bounce into the space, the same evenly spread light is sought on the northern façade.

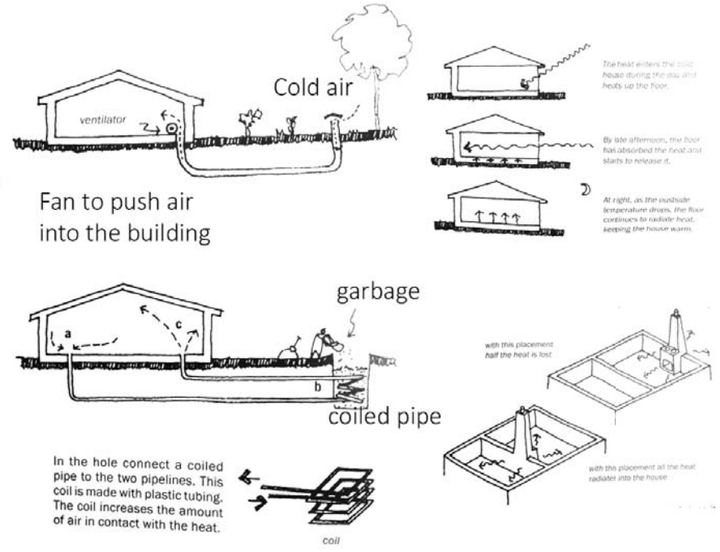
First iteration (Fig. 218)

Added shading devices to the entire northern façade of the workshops to give full solar controll in the space. Western and eastern shading elements are then added to the restaurant pergola space to keep lower sun angles out.

Second iteration (Fig. 219)

The pergolas over the restaurant seating was extended to cover a larger area and lower sun angles from the east. Screens were added to the eastern corner of the workshops to provide protection from the eastern sun shining over the low Land Bank Building. Potential wind funnelling may occur in the adjacent alleyways, between tall buildings as cities create turbulent wind conditions (Napier, 2000:9.12.1). This should be considered and sheltering elements added to the vulnerable areas of the building such as the north eastern corner during the summer months.

Fig. 215. Left; Drawings of various environmental strategies to consider in a temperate climate such as Pretoria (Van Lengen, 2008:276-279)



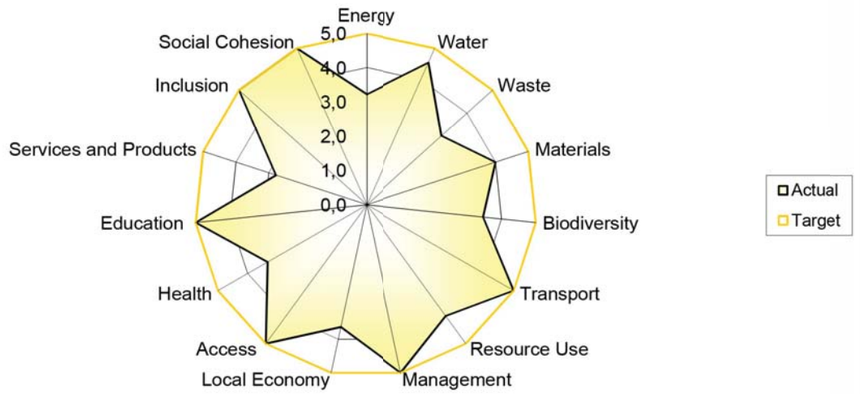
SUSTAINABLE BUILDING ASSESSMENT TOOL

1,04

		Achieved
SB	**SBAT REPORT**	**4,1**

SB1	**Project**
	Exploring the potential of latent space in the inner city of Pretoria
SB2	**Address**
	399 Paul Kruger street, Pretoria

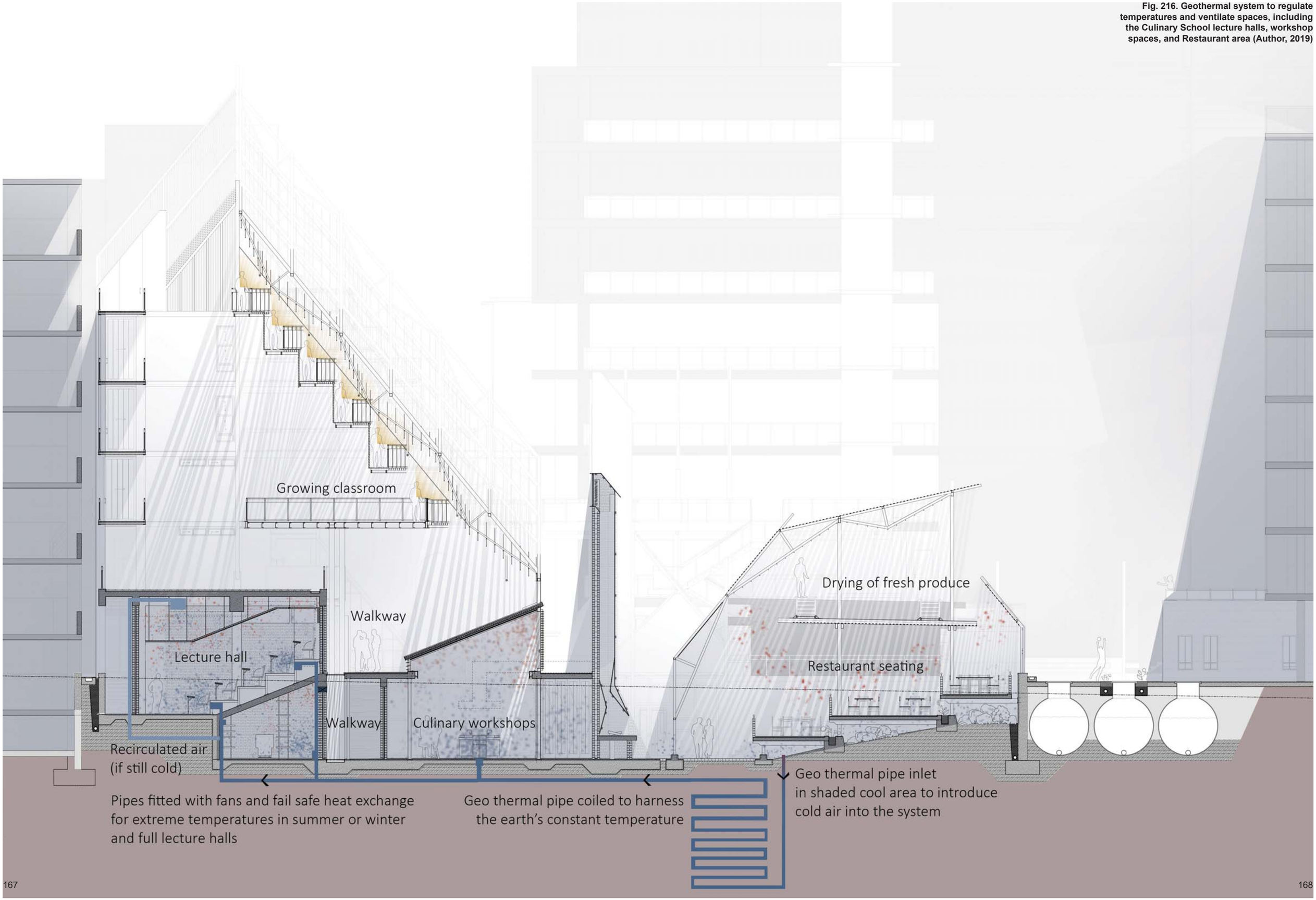
SB3 SBAT Graph

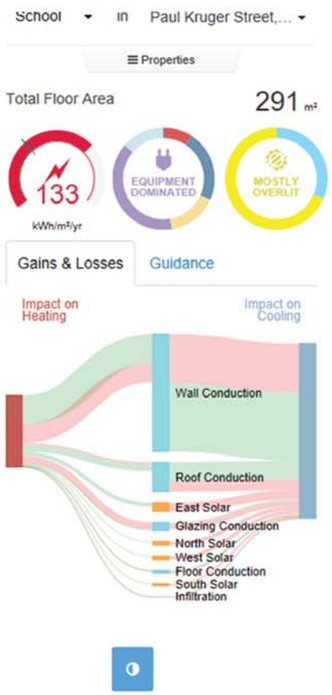


SB4 Environmental, Social and Economic Performance	Score
Environmental	3,6
Economic	4,5
Social	4,2
SBAT Rating	4,1

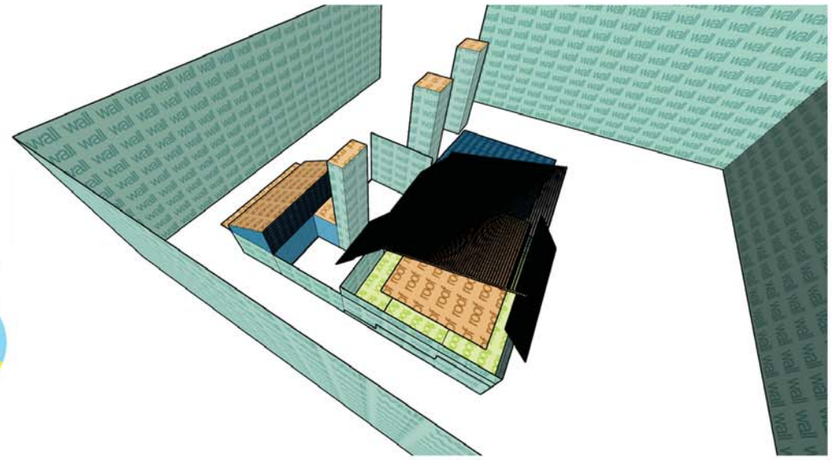
SB5 EF and HDI Factors	Score

Fig. 216. Geothermal system to regulate temperatures and ventilate spaces, including the Culinary School lecture halls, workshop spaces, and Restaurant area (Author, 2019)





Over- and under-lit



The Baseline model has adequate illuminance, between 75% and 100% occupied hours with 400 lux as is required in teaching spaces. In isolation this is considered acceptable, but if glare and heat-gain are taken into account, it is problematic. These are seen in the Over-lit and Under-lit graph where most of the floor area has over 1000 lux of direct light, for more than 250 occupied hours per year. The Spatial Daylight Autonomy (sDA) should be between 60-80%, but the Baseline model is at 100% and the ASE (natural light) should be fairly low or as low as possible, yet it is 69%.

The daylight factor in the culinary workshop spaces range from 1.5 (low) to an average of 4 (relatively adequate with artificial lighting required part-time) and more than 5 at the northern façade. This fluctuation is unacceptable in a learning environment and should be better controlled with shading. Lastly, the direct sunlight can cause glare and thermal discomfort; in summer thermal gain is considered negative, while in winter it is welcomed. The problem would be to keep the glare out, which shading devices could potentially assist with.

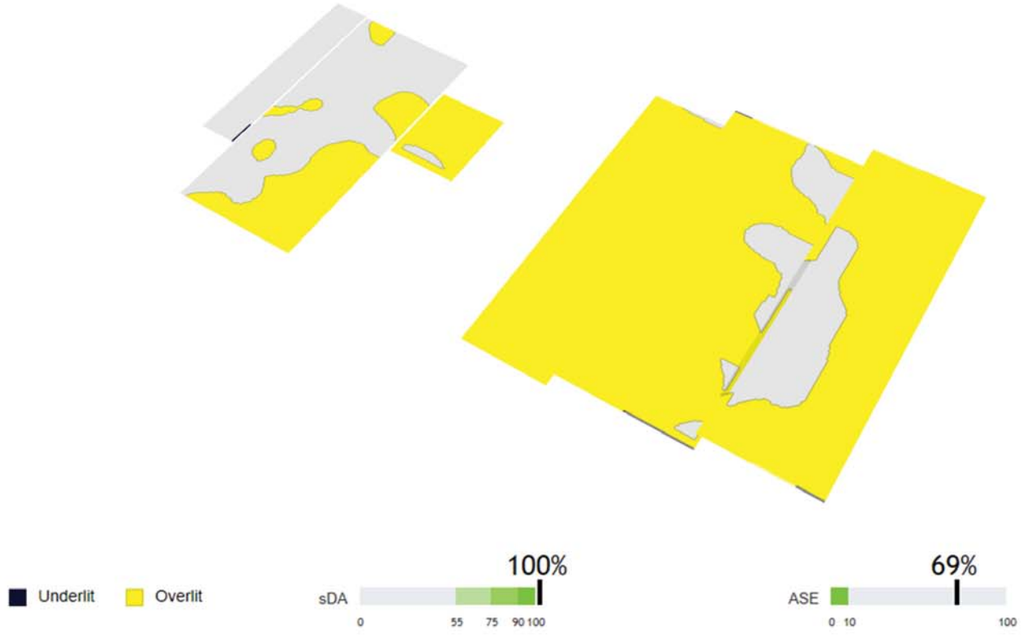
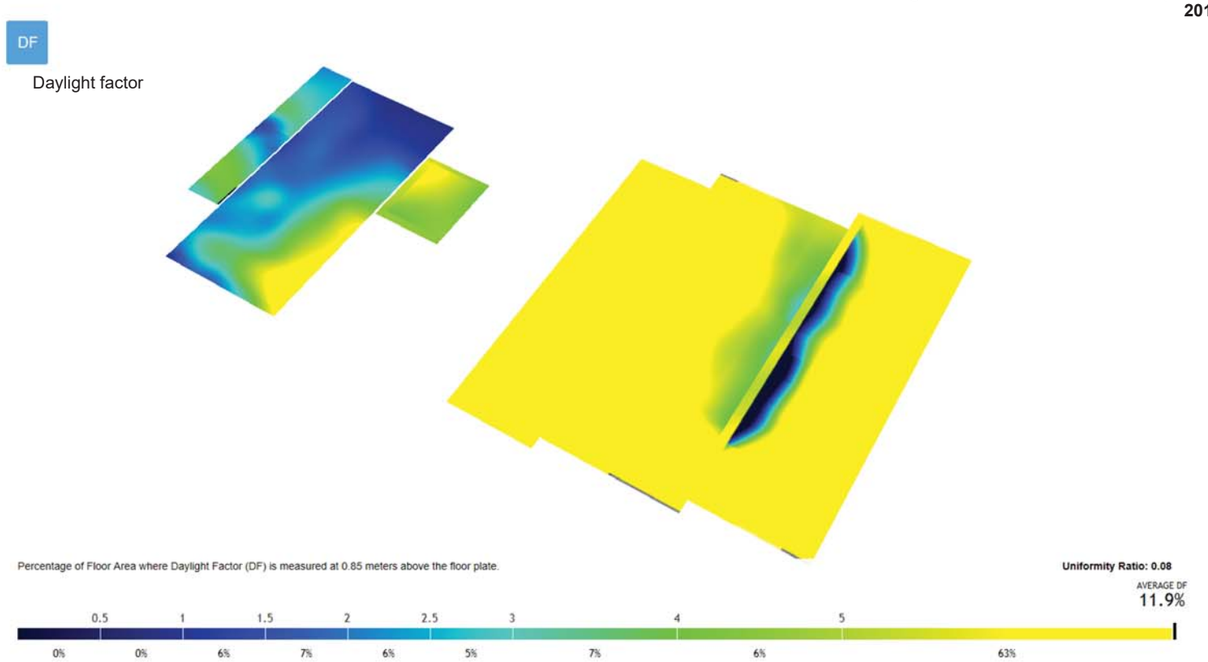
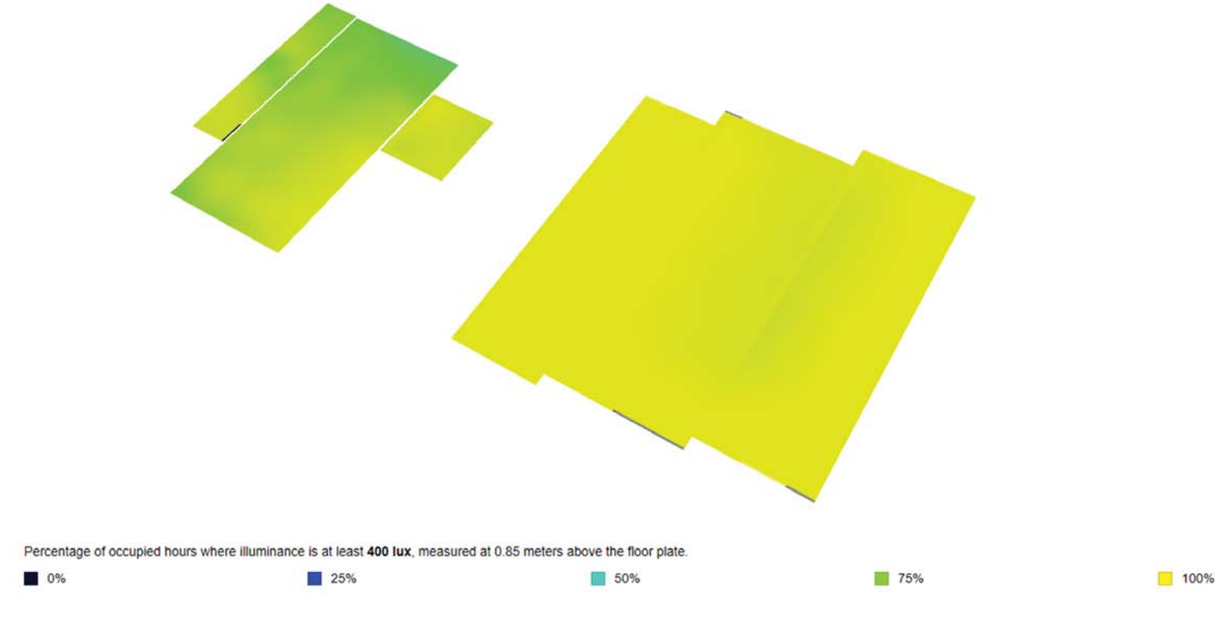
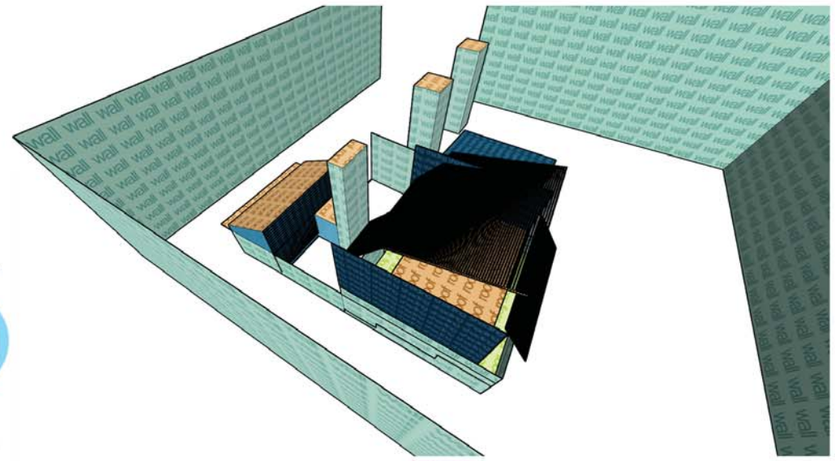


Fig. 217. Baseline Sefaira model (Author, 2019)







The first iteration's illuminance went down to 75% with the cooking workshop as low as 50% illuminance. The occupied hours with 400 lux as is required in teaching spaces is not met with natural lighting, which is acceptable for the controlled space, as the lighting on working surfaces should be even, and consistent, best achieved with artificial lighting. Glare and heat-gain are less problematic as the illuminance and daylight factor decreases. The Over-lit and Under-lit graph is still high for more than 250 occupied hours per year, yet the internal workshop space varies less.

The Spatial Daylight Autonomy (sDA) is still at 100%, although this number includes the external seating area. When considering the Over- and under-lit graph of the workshops, an evenly lit space is seen. The ASE (natural light) is slightly lower than the baseline of 69%, at 58%. The daylight factor in the culinary workshop spaces is 0.8 (low) to an average of 2.5 (under-lit), which. These outcomes are more suited to learning spaces that need to be controlled in terms of glare and evenly spread light. The adequate amount of 150 lux can now be manually controlled through pendants ceiling lights and task lighting in the space. The external restaurant seating space is still over-lit and under-performing, the next iteration treats this space specifically.

Over- and under-lit

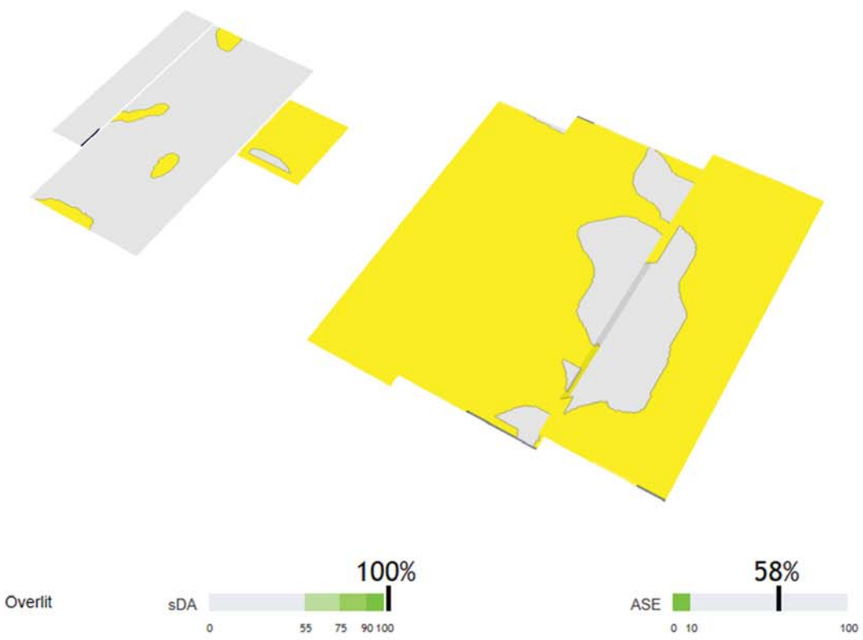
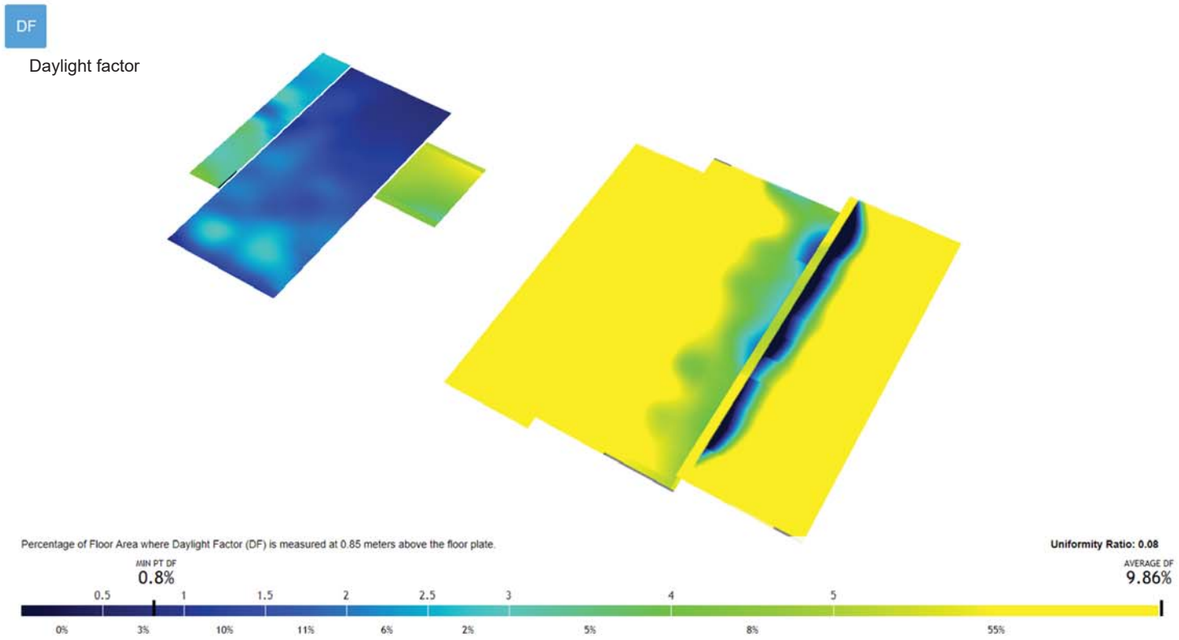
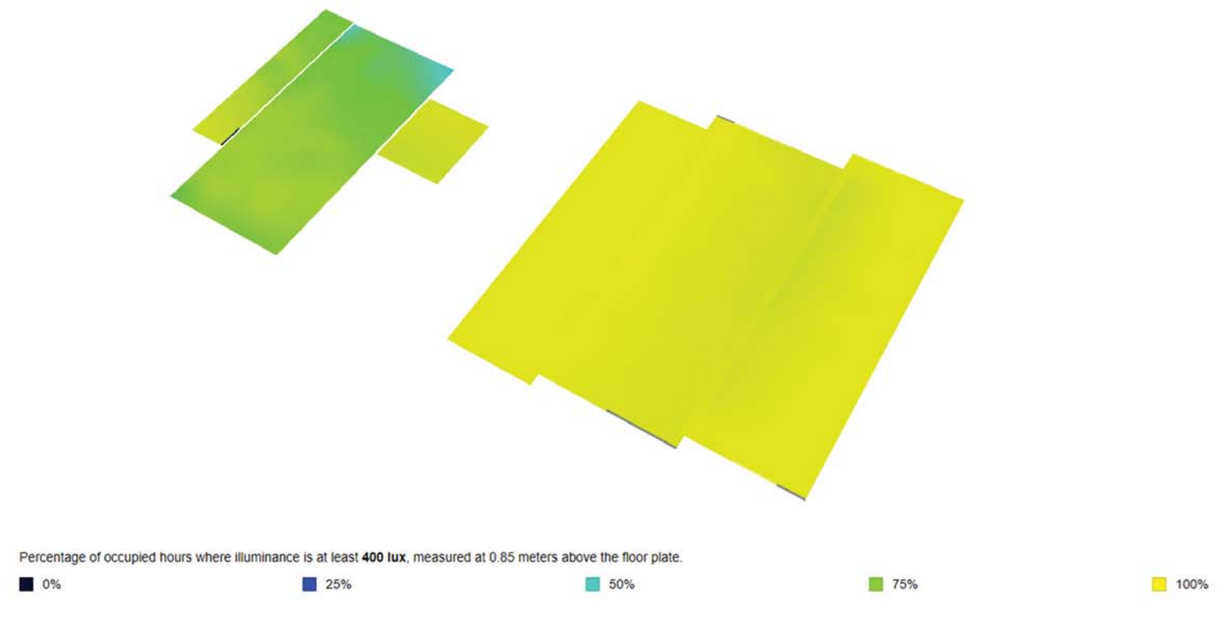
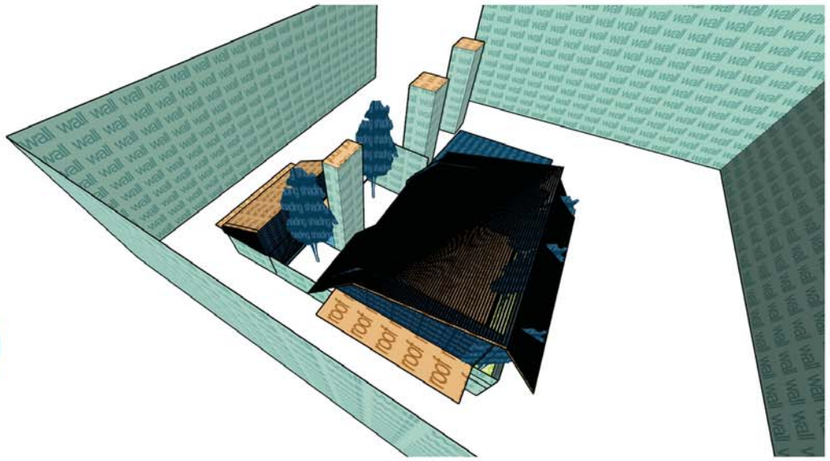


Fig. 218. Iteration 1 Sefaira model (Author, 2019)



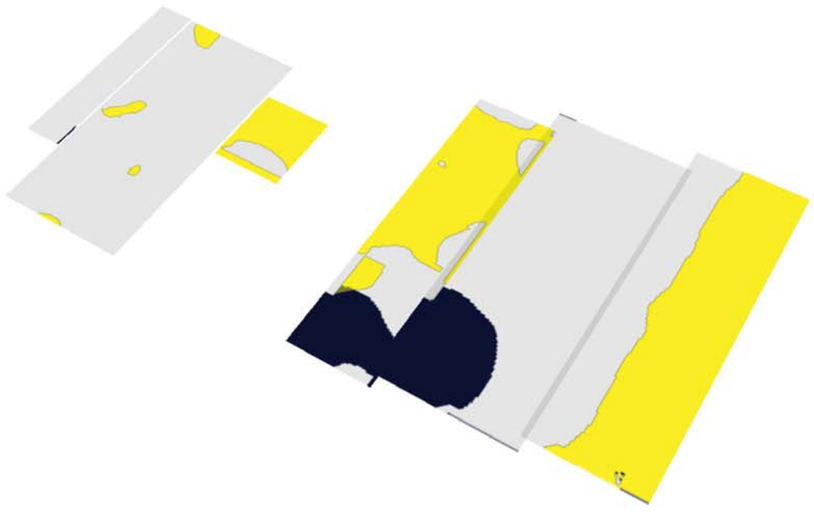
Illuminance





The second iteration's illuminance receded to between 60 percent and 75 percent that is adequate evenly spread lux, except for the lower corner of the restaurant seating which can be remedied with artificial lighting, when necessary. The cooking workshops has an evenly spread illuminance of just under 75 percent creating an ideal controlled environment . The occupied hours with 400 lux as is required in teaching spaces is still not met with natural lighting, which is acceptable for the controlled space, as the lighting on working surfaces should be even, and consistent, best achieved with artificial lighting. Glare and heat-gain are no longer threats to the average of spaces. The Over-lit and Under-lit graph is still too high, but the internal workshop space is appropriately and evenly lit. Furthermore, the largest portion of the restaurant's seating is well lit, with the edges facing more fluctuation. The Spatial Daylight Autonomy (sDA) lowered to 92 percent, which is a slight improvement. The ASE (natural light) decreased considerably to a mere 26 percent that is more suited appropriate for the programme. The daylight factor in both spaces is appropriately controlled with 0.3 (very low) to an average of 4,06 (well-lit with some artificial lighting required). These outcomes are most suited for learning spaces that require control and protection. The adequate amount of lux can be controlled by artificial lights in the space. The external restaurant seating space is now mostly well shaded from the sun, not refraining from providing choice for customers who would prefer a sunny spot.

Over- and under-lit



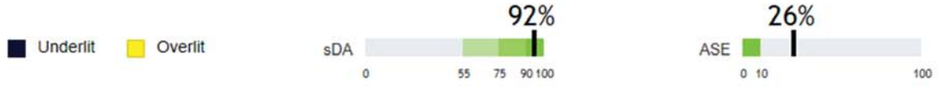
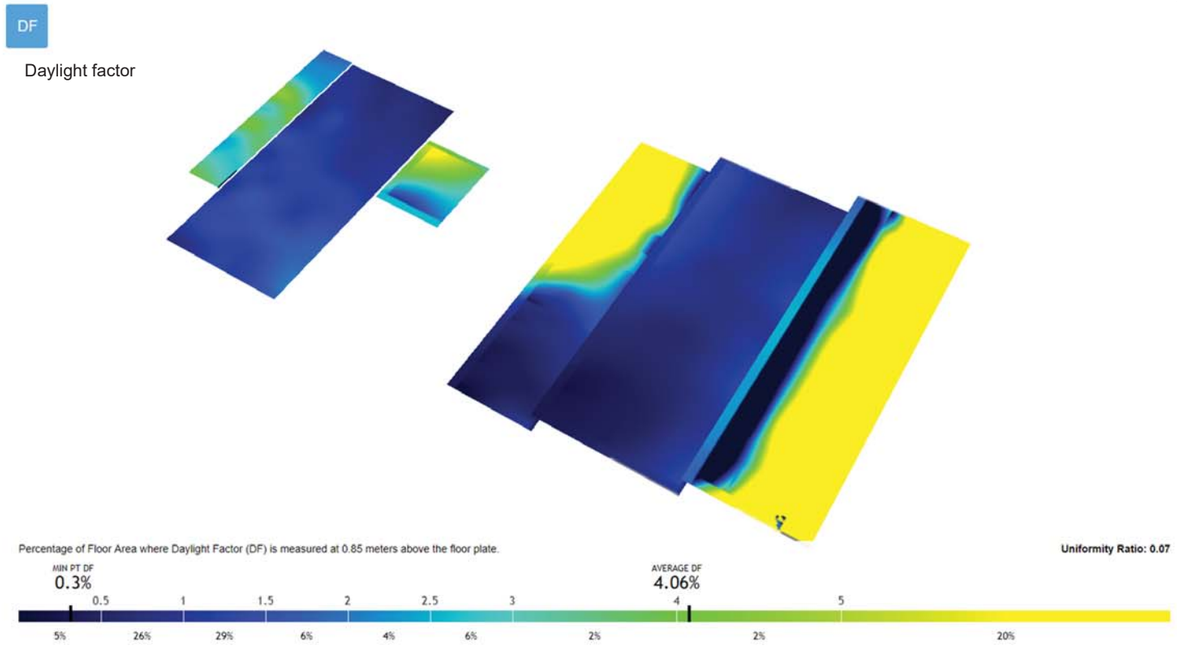


Fig. 219. Iteration 2 Sefaira model (Author, 2019)



Illuminance

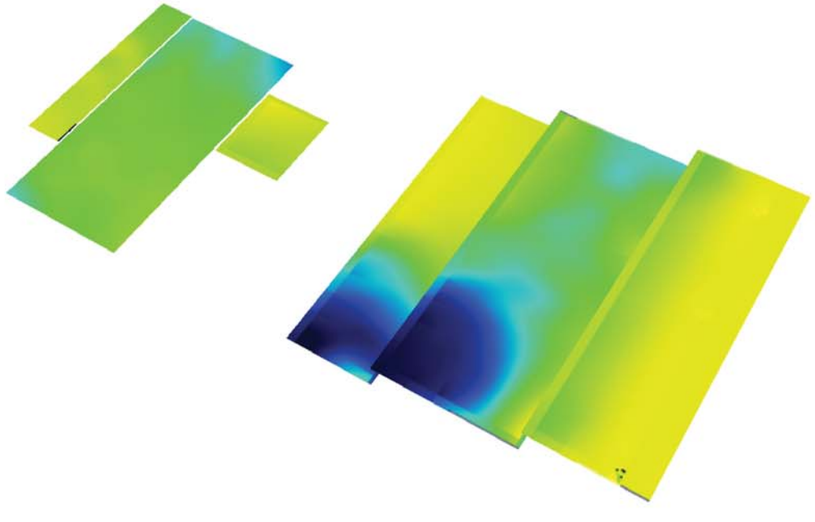
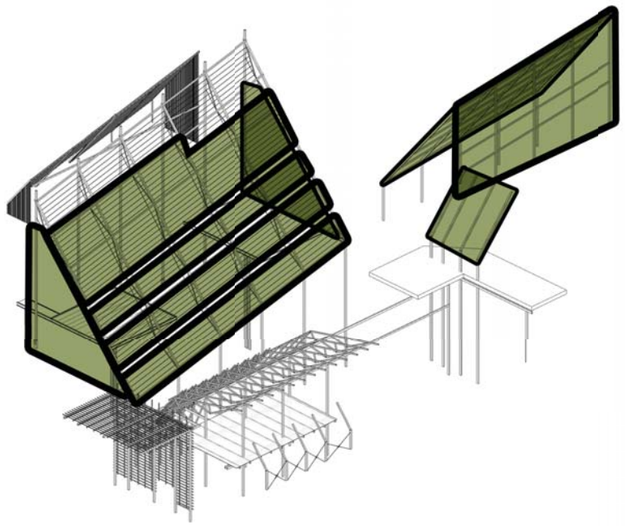
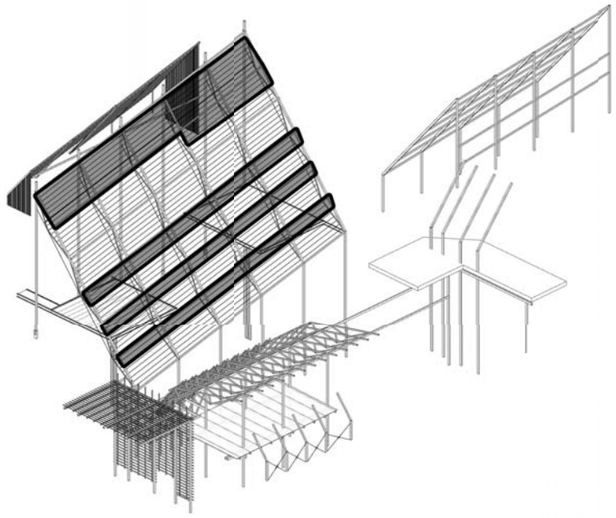


Fig. 220. Top; Hydroponic plants as shading (Author, 2019)

Fig. 221. Bottom; Photovoltaic panels as shading (Author, 2019)



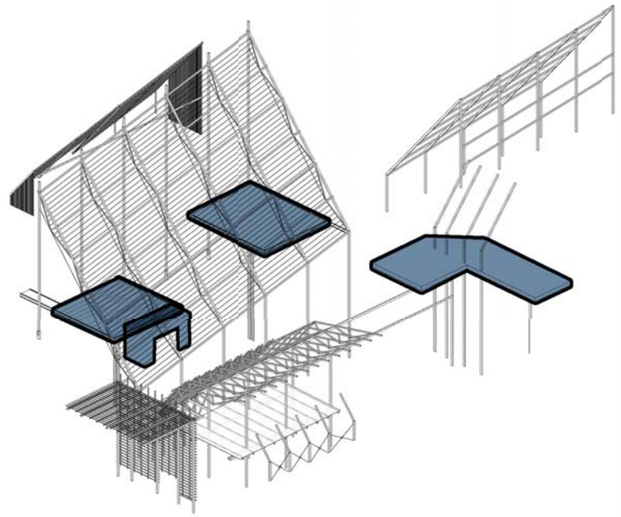
HYDROPONIC VEG AND FRUIT PLANTS AS SHADING



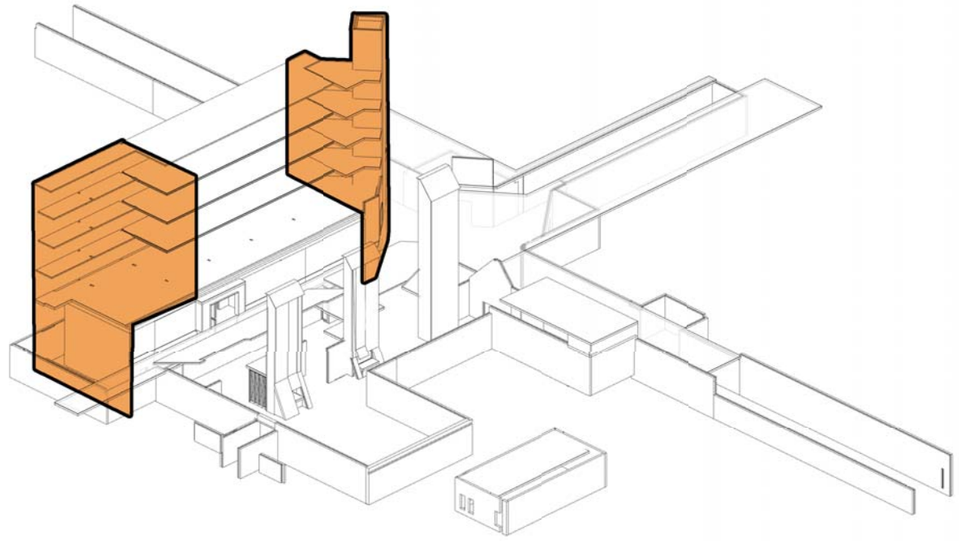
PV PANELS AS SHADING DEVICES

Fig. 222. Top; Thunderstorm protection (Author, 2019)

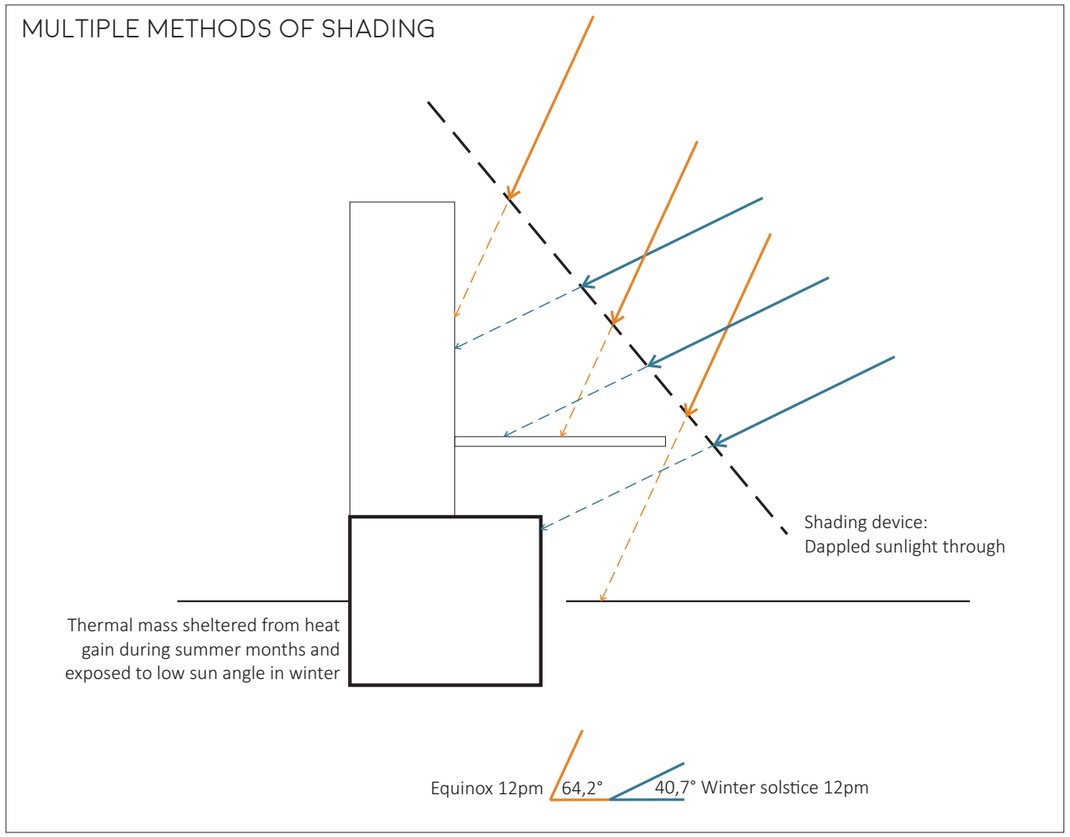
Fig. 223. Bottom; Eastern and western buffer zones (Author, 2019)



THUNDERSTORM PROTECTION IN PUBLIC SPACES



THERMAL MASS AND EASTERN AND WESTERN BUFFER



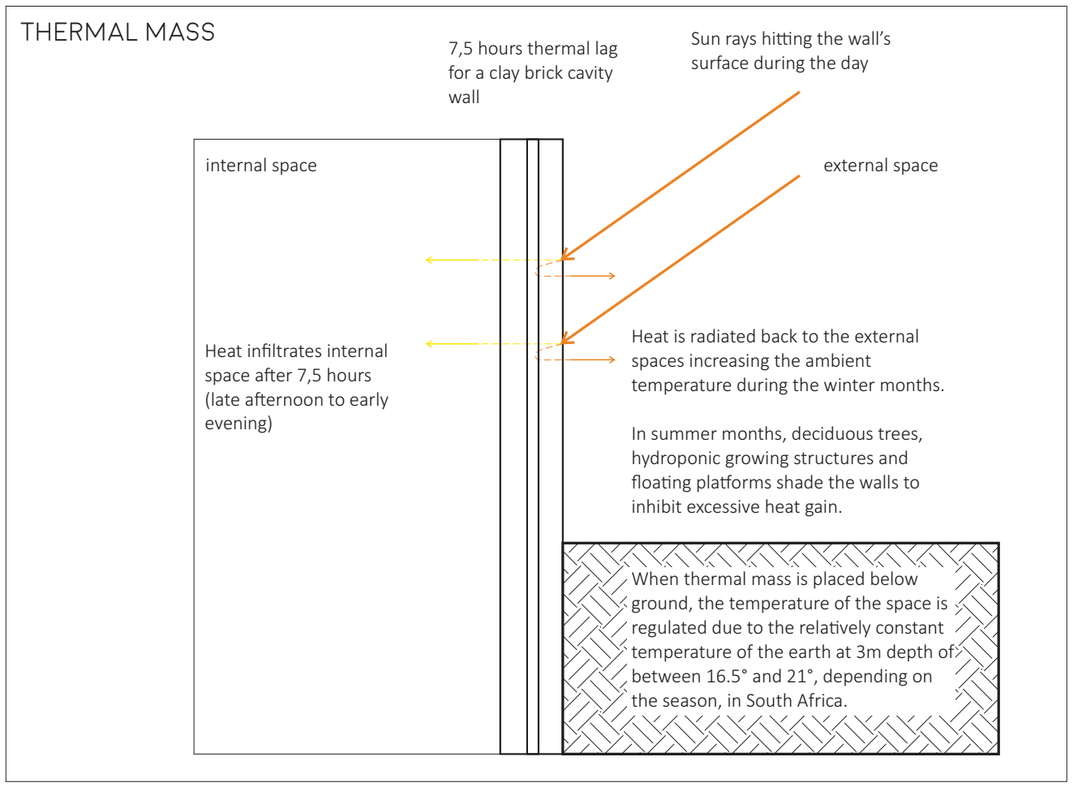


Fig. 224. Opposite Top; Methods of shading (Author, 2019)

Fig. 225. Opposite Bottom; Thermal mass (Author, 2019)

Fig. 226. Below; Night flushing of lecture halls (Author, 2019)

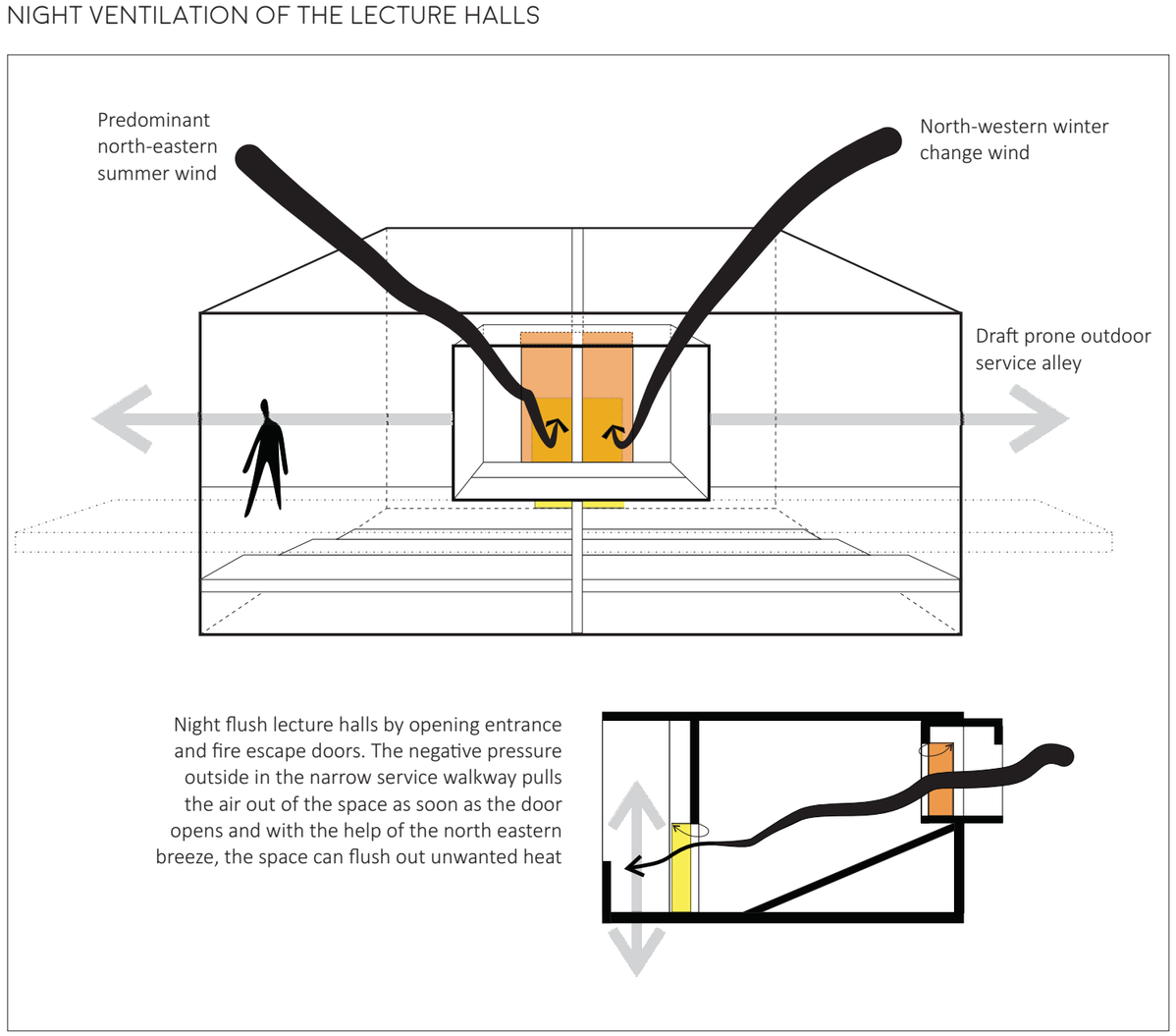
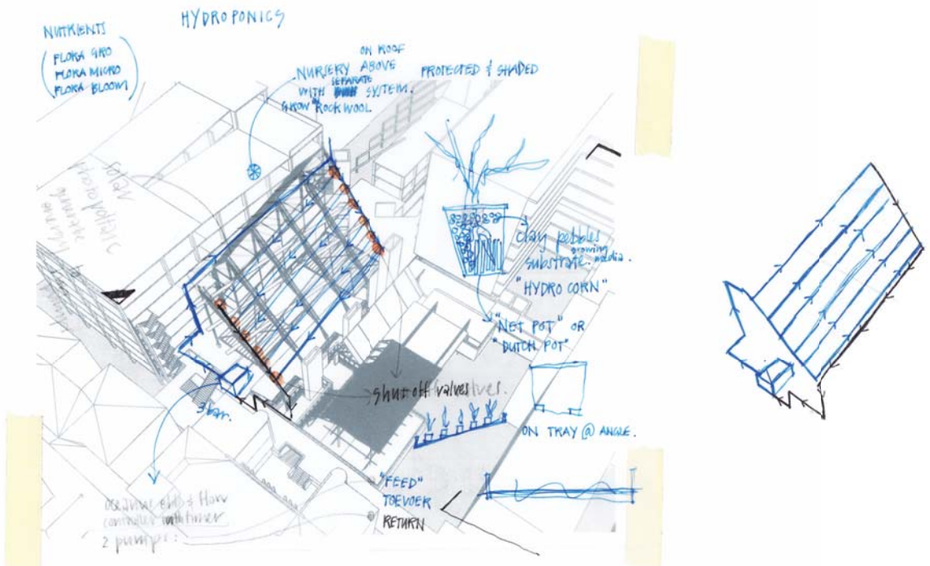


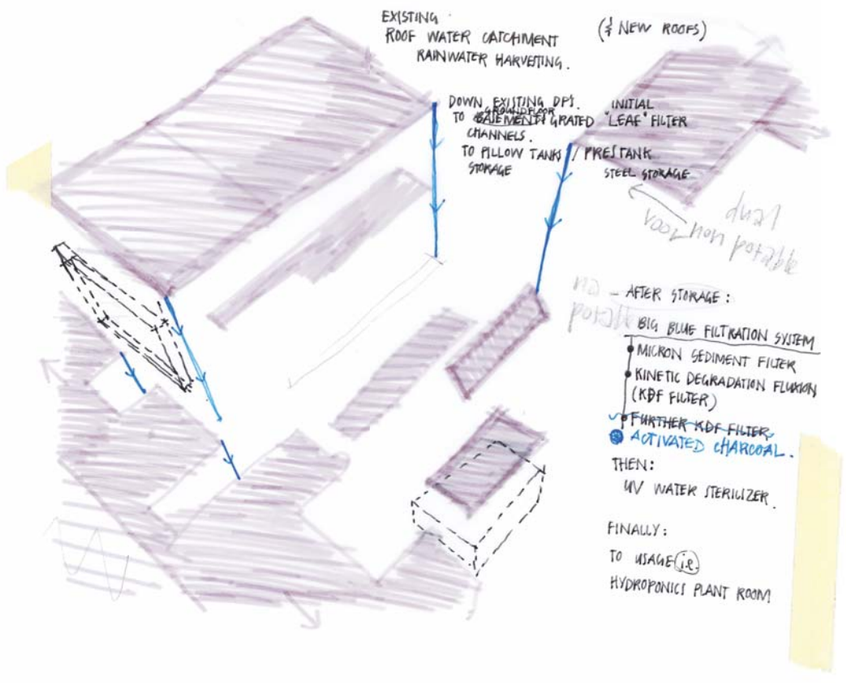
Fig. 227. Below; Conceptual exploration of an adequate hydroponics system and an appropriate water harvesting strategy (Author, 2019)

SYSTEMS

Hydroponics system, Water harvesting, Bio-gas production, Photovoltaic cell panels, Indoor growing light system.

Two systems were investigated with greater depth, namely the outdoor-hydroponics system and water harvesting, as seen in Fig. 227, 229-232. The descriptions opposite are of the additional systems that comprise the rest of the integrated systems diagram (Fig. 228).





Bio-gas production

Inputs	Organic cuttings and plant waste from hydroponics and restaurant
System	Bio-gas tank
Outputs	Methane gas
Production	Cooking classes gas hobs

Photovoltaic system

Inputs	Solar energy
System	Photovoltaic cells
Outputs	Energy, electrical
Production	Power hydroponic pumps, surplus used to power mechanical ventilation, and indoor growing lights

Indoor growing light system

Inputs	Energy from photovoltaic system
System	Indoor growing lights
Outputs	Adequate amount of heat and light for plants to grow in winter (overshadowed period)
Production	Seedling cuttings, winter shelter for some plants.

Fig. 228. Integrated systems diagram (Author, 2019)

INTEGRATED SYSTEMS DIAGRAM

Photovoltaic (PV) cell System

Annual sunshine in Pretoria

Annual rainfall in Pretoria

Water harvesting from existing and new roofs to gutters, down pipes, & r/c channels; to inlet

Initial filtration of leaves and other large objects

Solar inverter

DC

AC

Big Blue Filtration System
Micron sediment filter
Kinetic degradation
Fluxion (KDF) Filter
Further KDF Filter

UV water sterilizer

Overflow to storage off-site

Underground water storage tank

Pump

Hydroponics
Ebb & Flow system:
- Flood the plants in Dutch buckets with nutrient water down PVC pipe branch
- When branch is full the top shut-off valve closes
- Wait five minutes and open bottom shut-off valve to drain nutrient solution back into basement tank, where it is remixed and stored for the next cycle (Fernandez, 2014).

Trimmings and other plant 'waste'

Booster pump

Hydroponics water tank mixing water and nutrient solution

Nutrient solution (Organic tea)

Nitrogen
Phosphorous
Potassium
Calcium nitrate
Magnesium sulfate

Fish droppings (Aquaponics on adjacent site)

Trimmings and other plant waste

Organic waste

Inlet

Biogas digester

Outlet
Nutrient rich fertilizer

Desulfurizer

Gas pump

Pressure gauge

Gas hob cooking in Culinary School workshops

Kitchen organic waste

Full spectrum LED grow lights used in June when the greenhouse is mostly overshadowed.

Plant Library Greenhouse

Distribution board

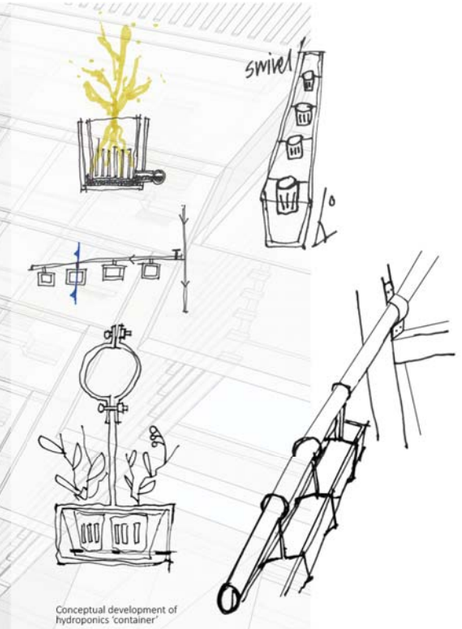
AC

DC

Inverter

48V DC Battery bank

Fig. 229. Ebb & Flow outdoor hydroponics system (Author, 2019)



Hydroponics
Ebb & Flow system:

1. Nutrient solution added to filtered rainwater in the basement tank.

2. Pump the nutrient water up to the top of the growing structure.

3. Flood the plants in Dutch buckets with nutrient water down each PVC pipe branch.

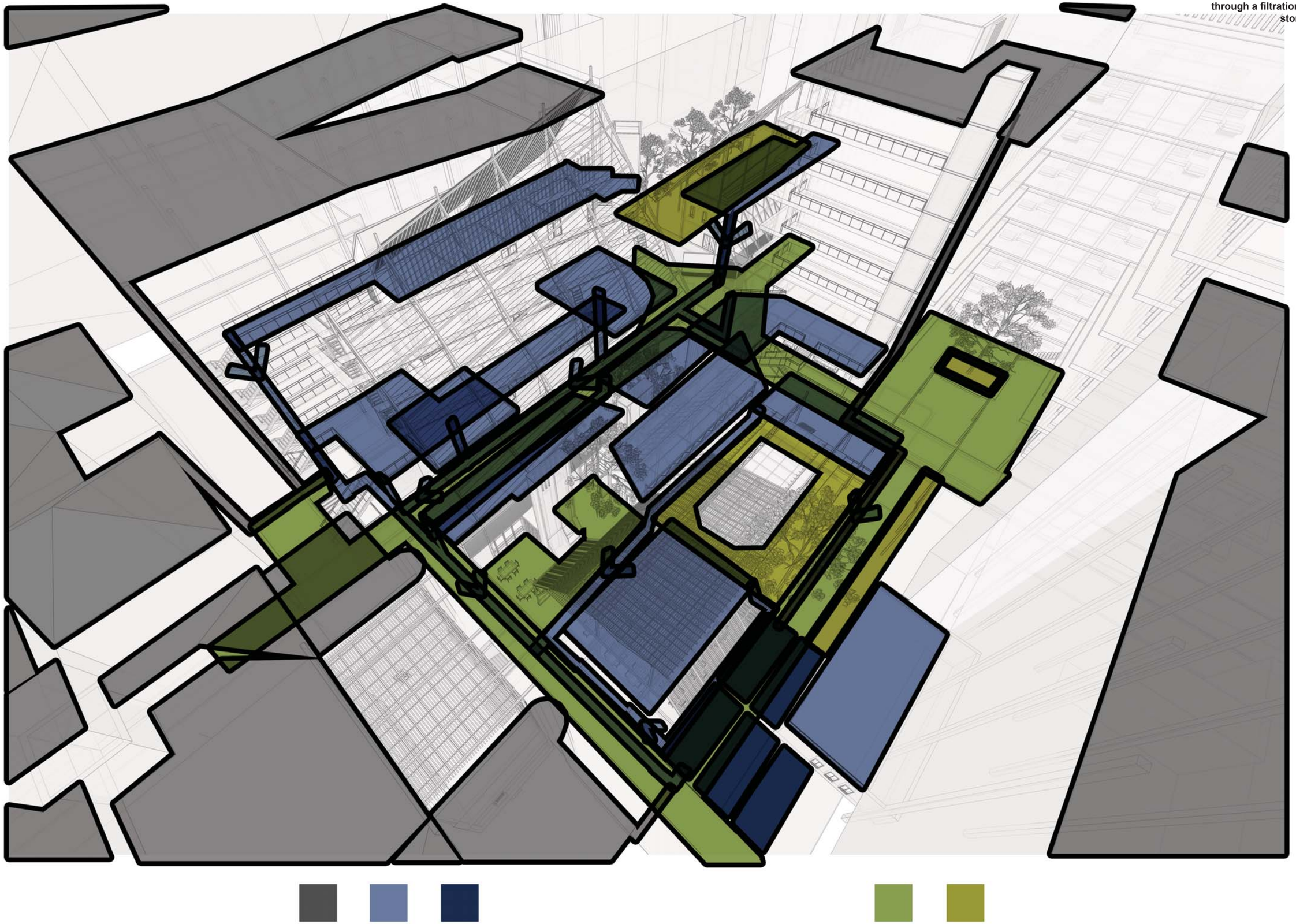
4. Each branch is separated by a shut-off valve on either side (mechanically operated).

5. When a branch is full the top shut-off valve closes (bottom valve remains closed).

6. Wait five minutes and open the bottom shut-off valve to drain nutrient solution back into basement tank, where it is remixed and stored for the next cycle (Fernandez, 2014).

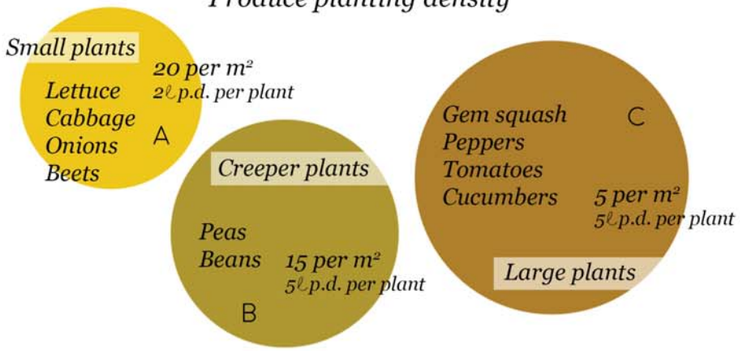
PVC pipe system, Electricaly controlled shut-off valves

Fig. 230. Waterharvesting from existing and new roofs and hard and soft surface run-off through a filtration system to underground storage tanks (Author, 2019)



Existing roofs, New roofs, Underground water storage tanks, Hard run-off, Soft run-off

Produce planting density



Area calculation of hydroponic fields

		length	width	rows	square metre
Main structure					
	Northern face	28,1	0,4	5	56,2
	Western face (triangle)	36,8	0,4	1	14,72
	Eastern face (triangle)	31,6	0,4	1	12,64
Total					83,56
Second structure					
	Combined	20	0,4	10	80
Additional structure on block					
	Combined	20	0,4	10	80
Total					243,56

243.56 / 3 = 81,2 m²

per type of crop A, B, and C

A- 20 x 81,2 *m²* = 1624

B- 5 x 81,2 *m²* = 406

C- 15 x 81,2 *m²* = 1218

] Amount of plants (Demand) To water calculations

Kilograms of produce and estimated gross profit per harvest

Lettuce = 2,35 kg/m² x 81,2m² = 190,8 kg (R30 per kg = R 5724)

Tomatoes = 56,04 kg/m² x 81.2m² = 4550,5 kg (R15 per kg = R 68257,5)

Beans = 4,71 kg/m² x 81,2m² = 382,5 kg (R40 per kg = R 15 300)

01 *Obtain rainfall data for area & calculate catchment area*

Catchment area

		square metre
Existing roofs	Karel Schoeman	1554,1
	1990's Apartments	183
	Parking lot	1089,8
	Energy Department	1410,6
	Land Bank	1384,3
	Esperanto Apartments	655,5
	Ablutions	163,2
Total		6440,5
New roofs		72,3
		99,9
		103,2
		112,4
		66,5
		97,5
		390,8
Total		942,6
External floor		1416,4
Permeable paving		229,4
Total		9028,9

AREA CALCULATIONS

Catchment	Area, A (m²)	Runoff Coefficient, C	C (weighted)
Existing roof	6440,5	0,85	0,68
New roof	942,6	0,85	0,10
Paving (rubber)	1416,4	0,9	0,16
Paving permeable	229,4	0,75	0,02
TOTAL	8086,3		0,86

Fig. 231. Opposite Middle; Conceptual layout of planting to achieve highest density (Author, 2019)

Fig. 232. Current and following two pages; Water harvesting tables (Author, 2019; Adapted from Pieterse, 2015)

02 *calculate montly rainwater yield*

RAINWATER YIELD CALCULATION

Month	Ave. rainfall, P (m)	Yield (m³) (Yield = PxAxC)
January 2019	0,15	1038,18525
February 2019	0,15	1038,18525
March 2019	0,075	519,092625
April 2019	0,1	692,1235
May 2019	0,01	69,21235
June 2019	0,005	34,606175
July 2019	0,005	34,606175
August 2019	0,005	34,606175
September 2018	0,0175	121,121613
October 2018	0,075	519,092625
November 2018	0,05	346,06175
December 2018	0,2	1384,247
ANNUAL AVE.	0,8425	5831,14049

TOTAL YIELD

Month	Total Yield (m³/month)
January	1038,18525
February	1038,18525
March	519,092625
April	692,1235
May	69,21235
June	34,606175
July	34,606175
August	34,606175
September	121,121613
October	519,092625
November	346,06175
December	1384,247
ANNUAL TOTAL	5831,14049

03 *calculate montly water demand*

HYDROPONICS DEMAND 2 litre PLANTS

Month	Entity (plants in system)	Entity demanc / day (l)	Alt demand (m^3/month)
January	1624	2	100,688
February	1624	4	181,888
March	1624	4	201,376
April	1624	2	97,44
May	1624	2	100,688
June	1624	2	97,44
July	1624	2	100,688
August	1624	4	201,376
September	1624	4	194,88
October	1624	2	100,688
November	1624	2	97,44
December	1624	2	100,688
		ANNUAL TOTAL	1575,28

HYDROPONICS DEMAND 5 litre PLANTS

Month	Entity (plants in system)	Entity demand / day (l)	Alt demand (m^3/month)
January	1624	5	251,72
February	1624	10	454,72
March	1624	5	251,72
April	1624	5	243,6
May	1624	5	251,72
June	1624	5	243,6
July	1624	5	251,72
August	1624	10	503,44
September	1624	10	487,2
October	1624	5	251,72
November	1624	5	243,6
December	1624	5	251,72
		ANNUAL TOTAL	3686,48

DRINKING FOUNTAIN DEMAND

Month	Entity (Persons drinking)	Entity (5) demand / day (l)	Alt demand (m^3/month)
January	100	2,5	7,75
February	100	2,5	7
March	100	2,5	7,75
April	100	2,5	7,5
May	100	2,5	7,75
June	80	2,5	6
July	80	2,5	6,2
August	80	2,5	6,2
September	100	2,5	7,5
October	100	2,5	7,75
November	100	2,5	7,5
December	100	2,5	7,75
		ANNUAL TOTAL	86,65

TOTAL DEMAND

Month	Total demand (m^3/month)
January	360,2
February	643,6
March	460,8
April	348,5
May	360,2
June	347,0
July	358,6
August	711,0
September	689,6
October	360,2
November	348,5
December	360,2
ANNUAL TOTAL	5348,4

04 *water budget*

WATER BUDGET (WITHOUT TANK)

Month	Yield (m^3)	Demand (m^3)	Monthly balance
January	1 038,2	360,2	678,0
February	1 038,2	643,6	394,6
March	519,1	460,8	58,2
April	692,1	348,5	343,6
May	69,2	360,2	-290,9
June	34,6	347,0	-312,4
July	34,6	358,6	-324,0
August	34,6	711,0	-676,4
September	121,1	689,6	-568,5
October	519,1	360,2	158,9
November	346,1	348,5	-2,5
December	1 384,2	360,2	1 024,1
ANNUAL AVE.	5831,1405	5348,41	

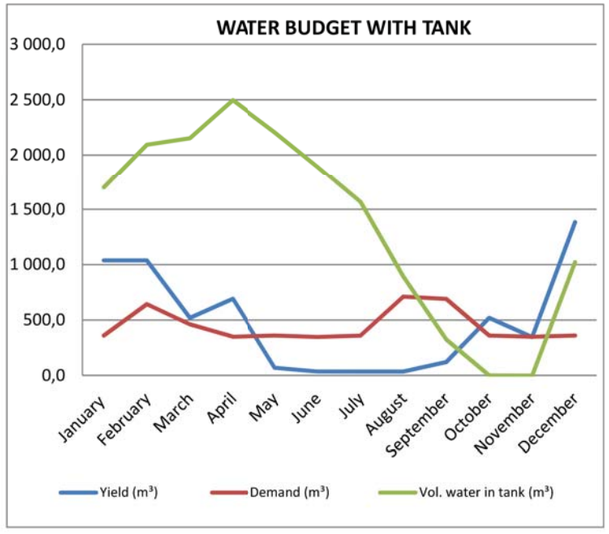
05 *determine minimum tank size*

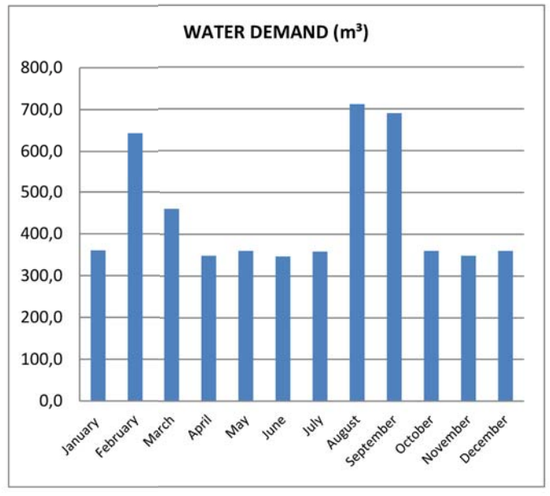
WATER BUDGET (ACCUMULATIVE)

Month	Yield (m^3)	Demand (m^3)	Monthly balance	Vol. water in tank (m^3)
January	1 038,2	360,2	678,0	1 699,6
February	1 038,2	643,6	394,6	2 094,2
March	519,1	460,8	58,2	2 152,5
April	692,1	348,5	343,6	2 496,0
May	69,2	360,2	-290,9	2 205,1
June	34,6	347,0	-312,4	1 892,7
July	34,6	358,6	-324,0	1 568,7
August	34,6	711,0	-676,4	892,3
September	121,1	689,6	-568,5	323,8
October	519,1	360,2	158,9	0,0
November	346,1	348,5	-2,5	-2,5
December	1 384,2	360,2	1 024,1	1 021,6
ANNUAL AVE.	5831,14049	5348,41		

Note: the tank starts with 0 in October

The minimum tank size is equal to the accumulative maximum water in the tank = 2496m^3.
= 2 496 000 litres
The limited space on site can fit twelve underground tanks of 20 000 litres, amounting to 240 000 litres; 240m^3 can be stored on site
The remainder of 2256m^3 is stored underground on the western side of the block.





flow of water in system

1. Rainfall

2. collect to gutters

3. Flow in channels & underground pipes toward pump room

4. initial leaf filtration & pumped to storage tanks

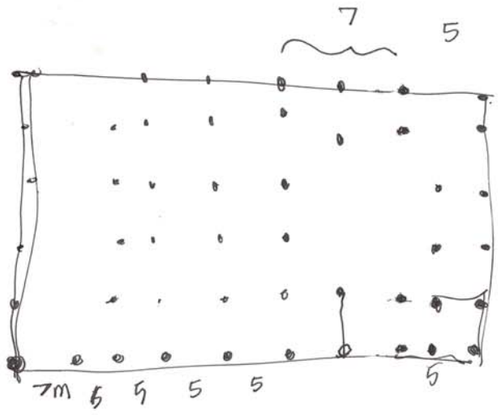
5. filtration system:
Big Blue Filtration System
_ Micron Sediment filter
_ Kinetic degradation Fluxion (KDF) Filter
_ Further KDF Filter

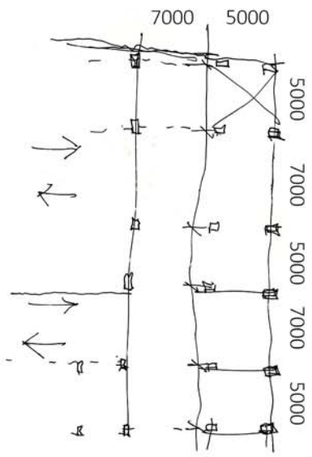
6. UV water sterilizer

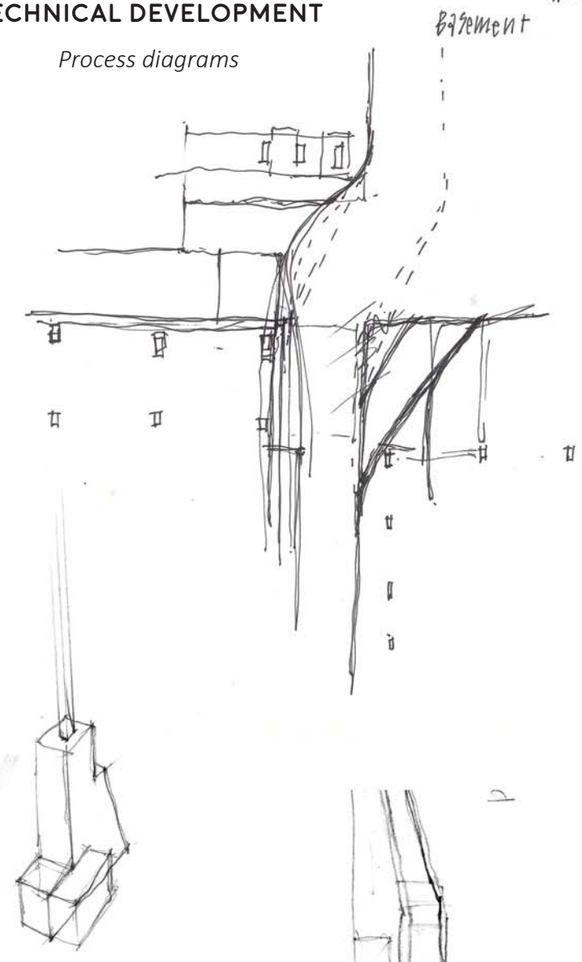
7. To hydroponic systems room, drinking fountains, & channels

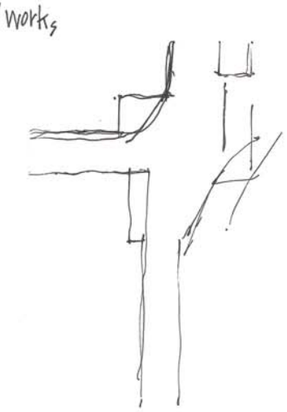
TECHNICAL DEVELOPMENT

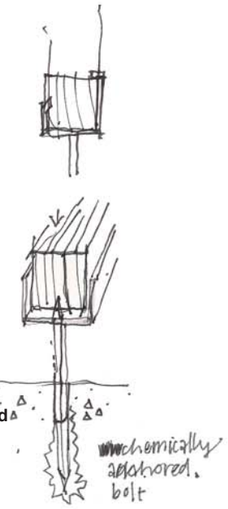
Process diagrams











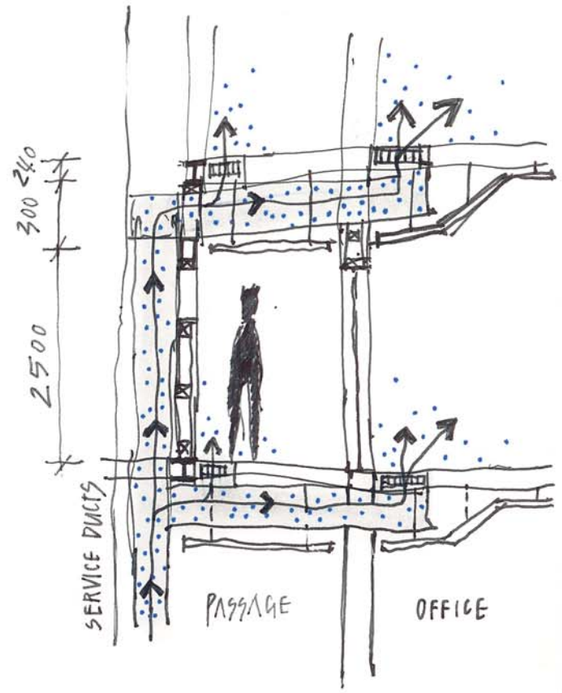
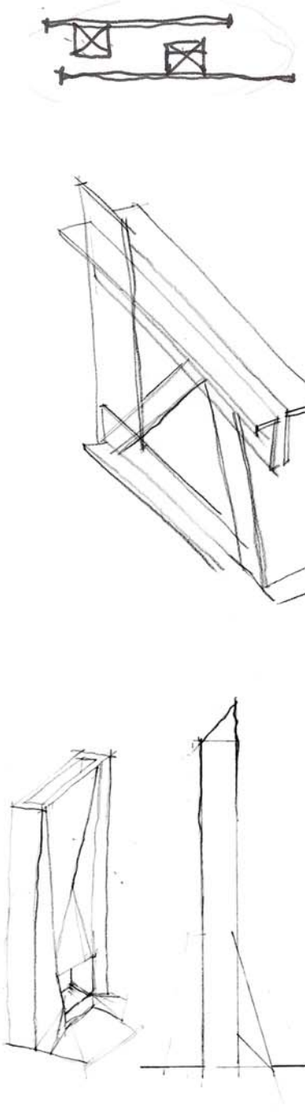
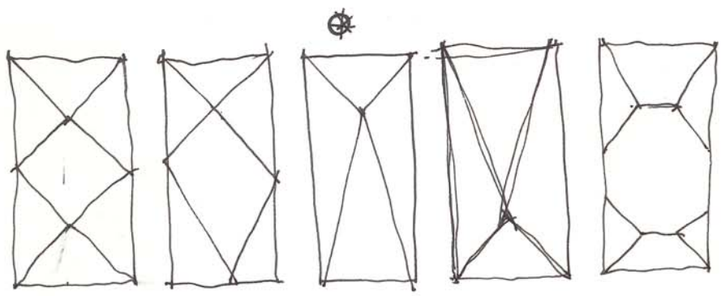
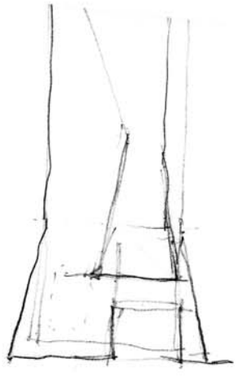
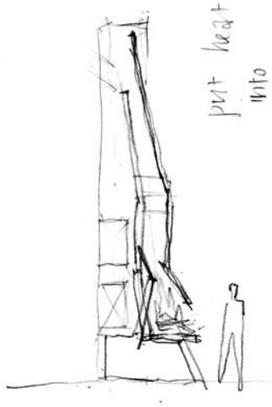


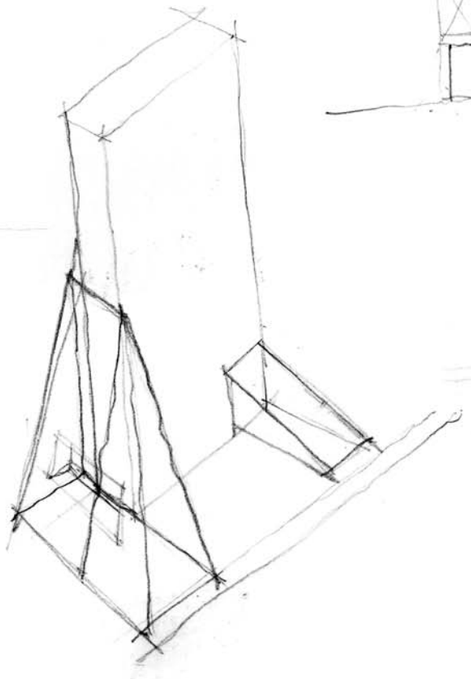
Fig. 233. Process diagrams and sketches of the fireplace, steel structure, ventilation, and grid influence (Author, 2019)

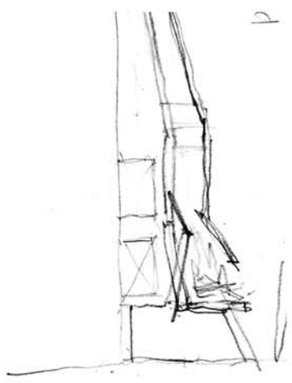


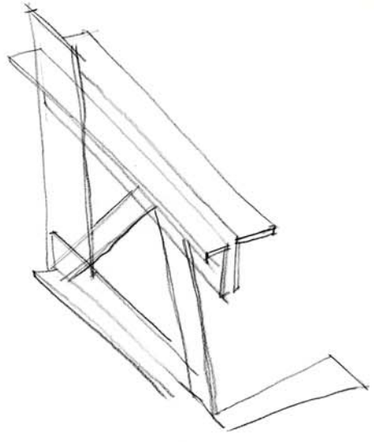


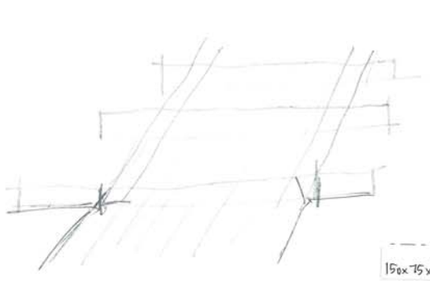


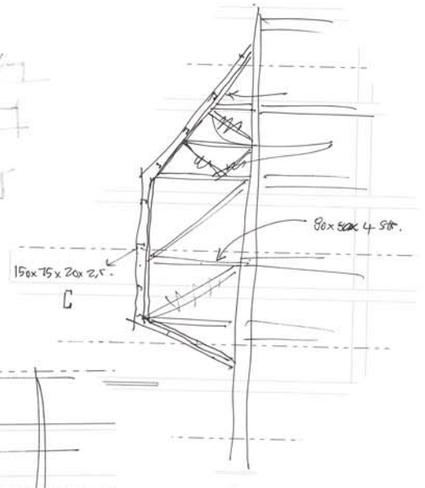


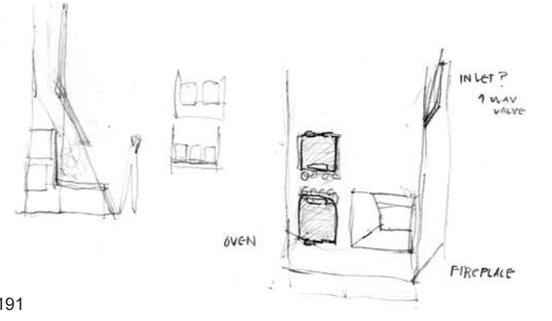


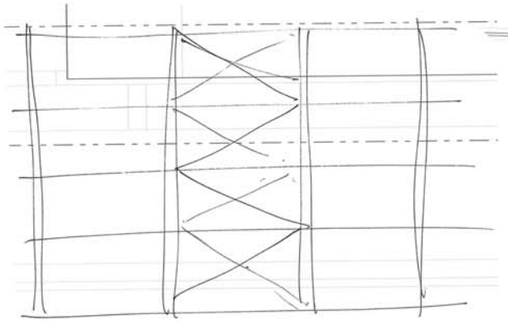












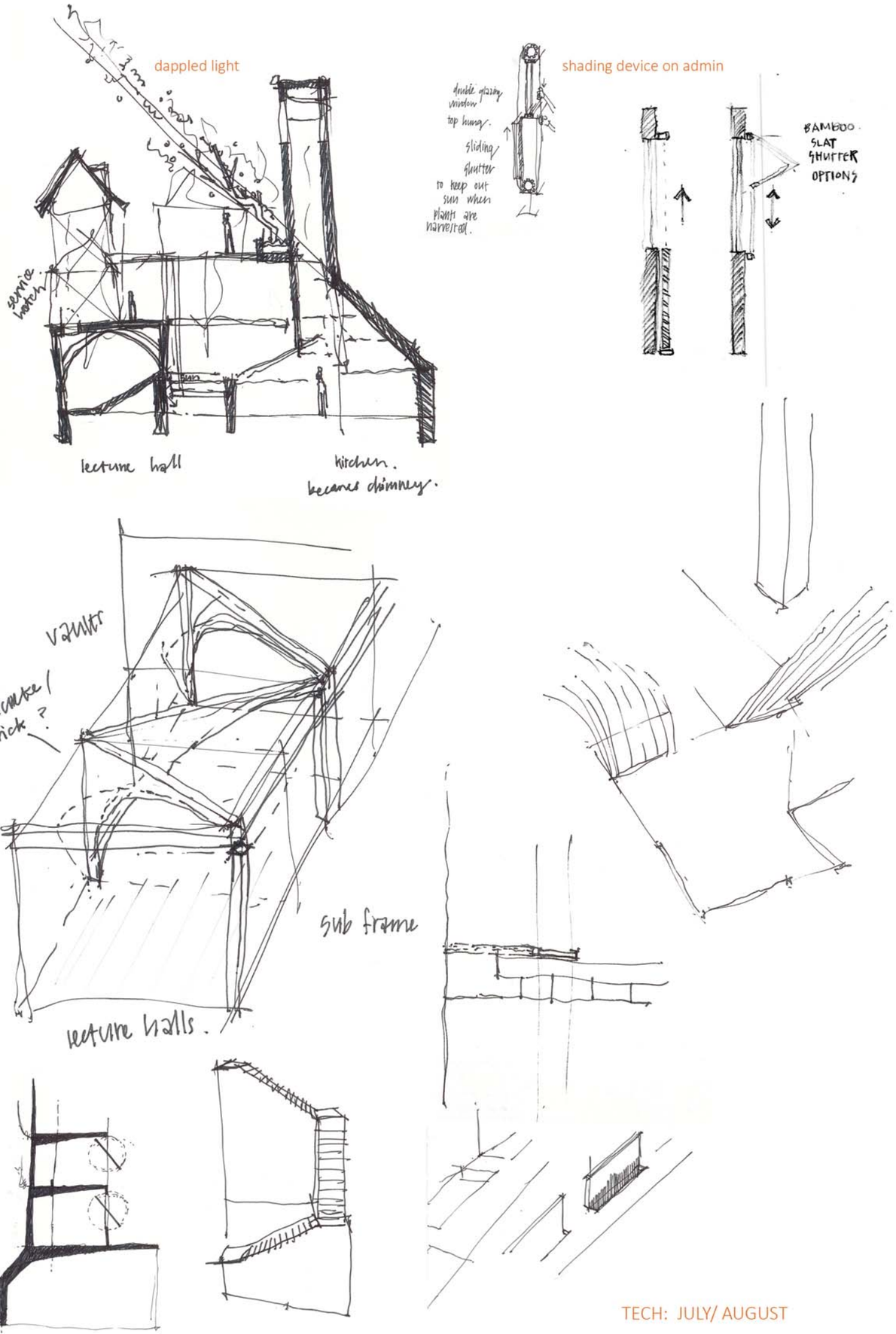
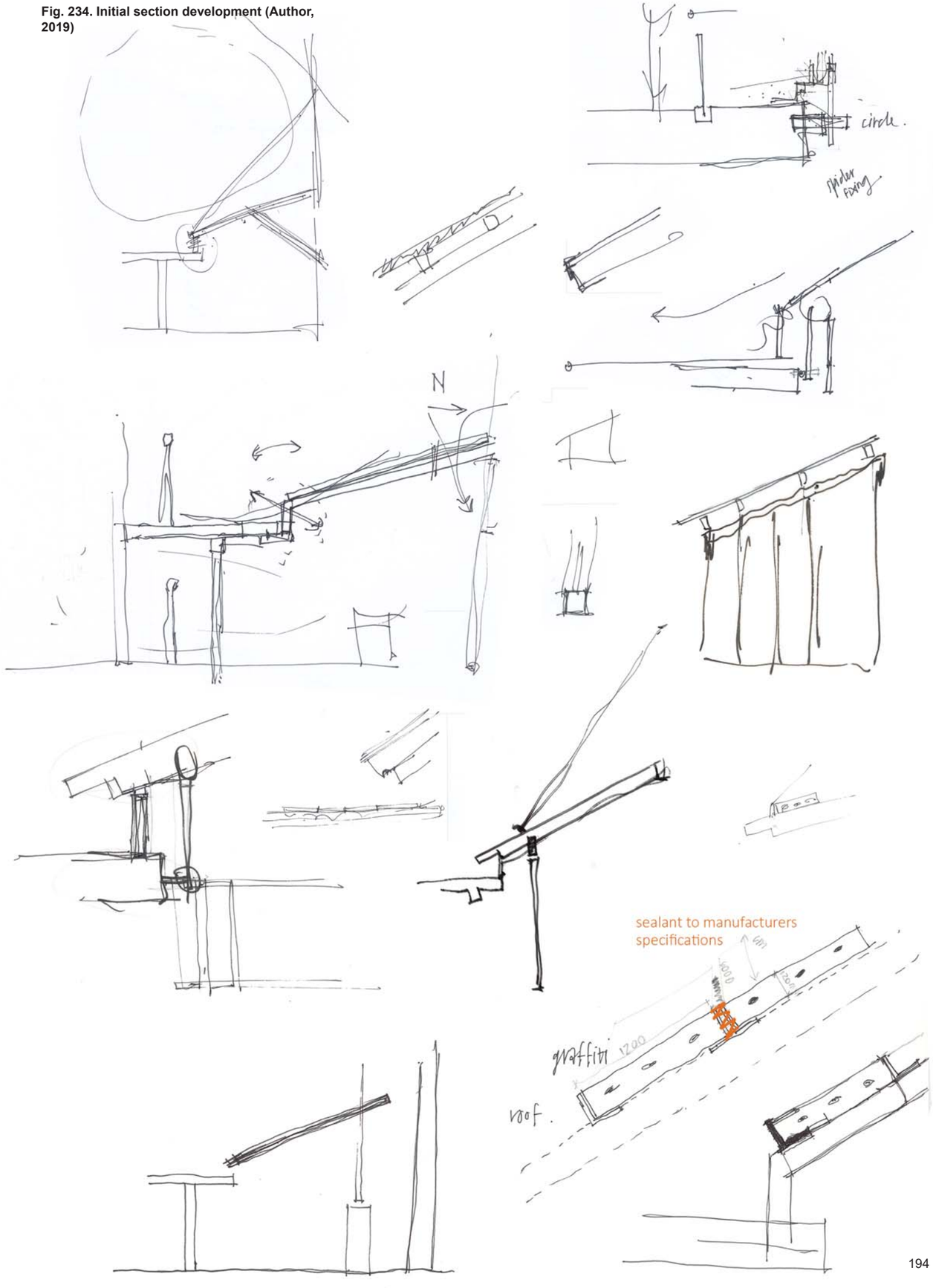
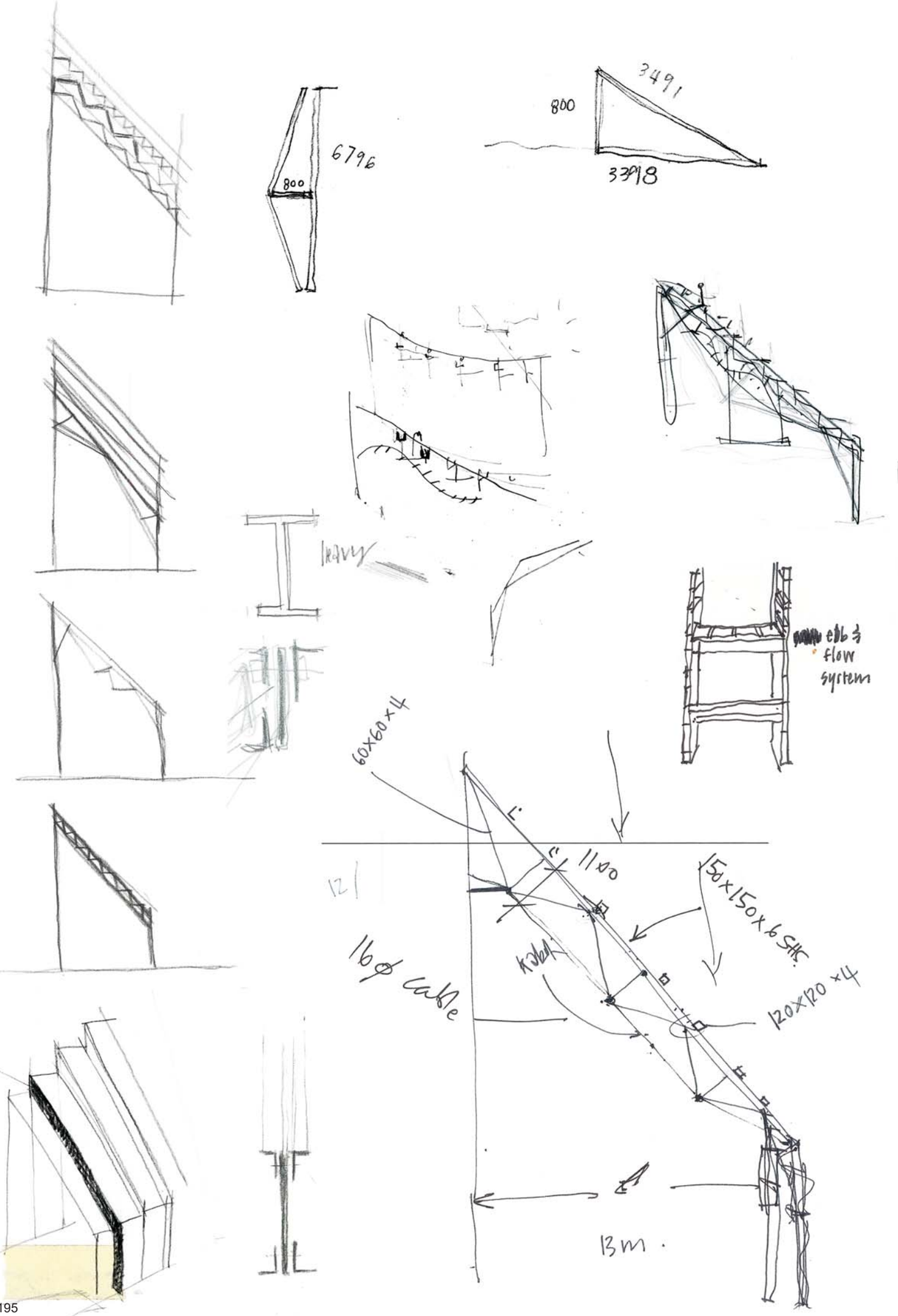


Fig. 234. Initial section development (Author, 2019)





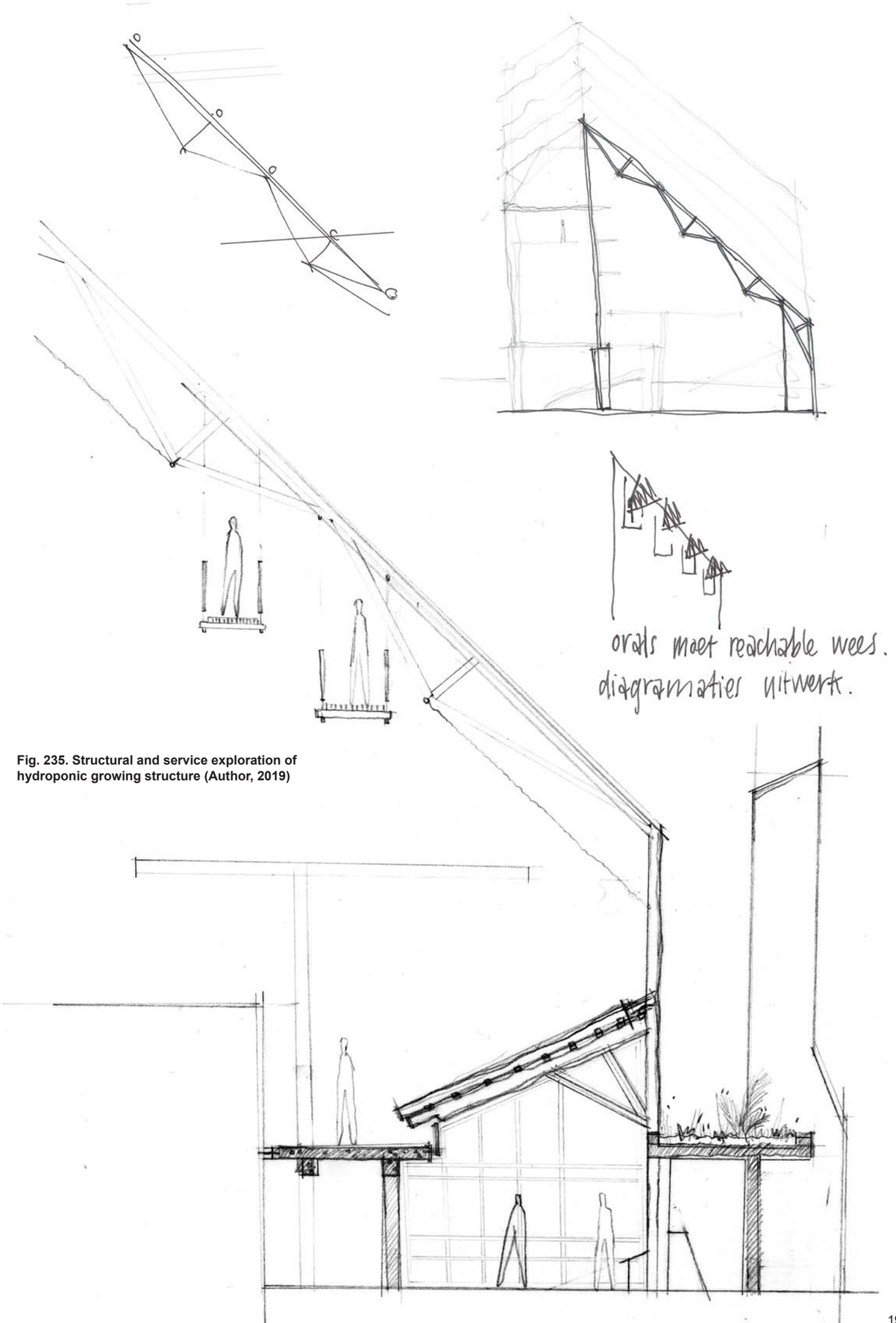
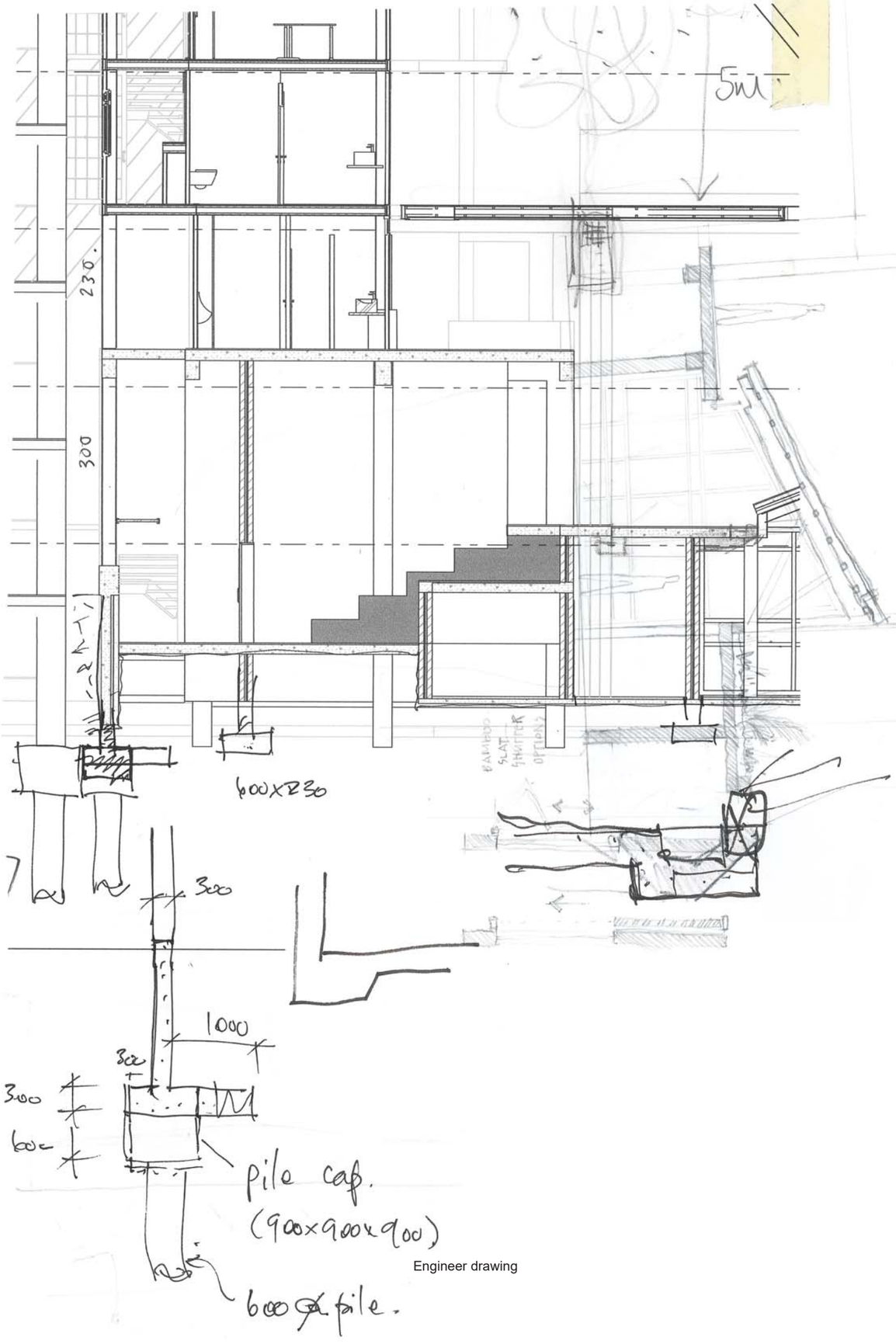
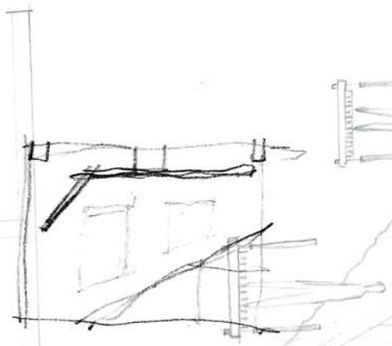


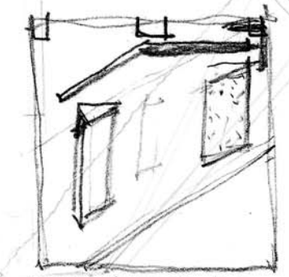
Fig. 235. Structural and service exploration of hydroponic growing structure (Author, 2019)

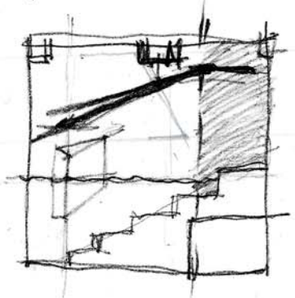
Fig. 236. Further sectional explorations and details (Author, 2019)

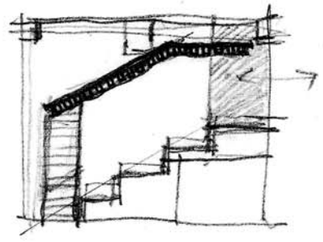


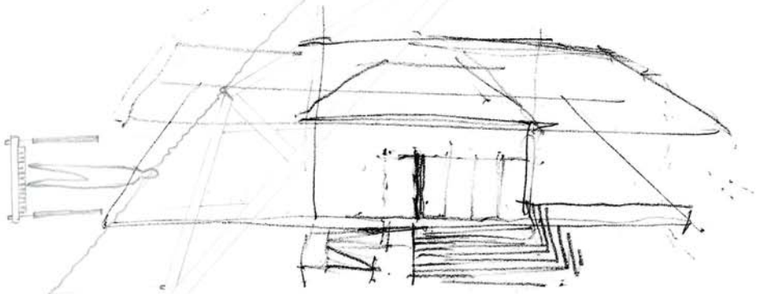
Engineer drawing

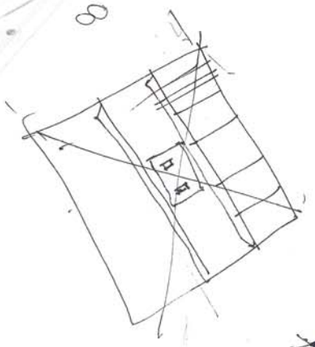


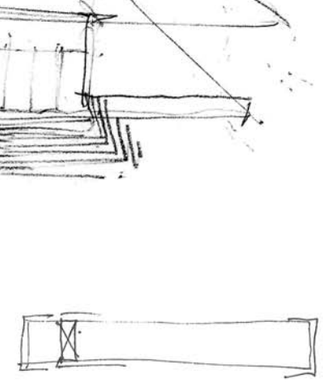


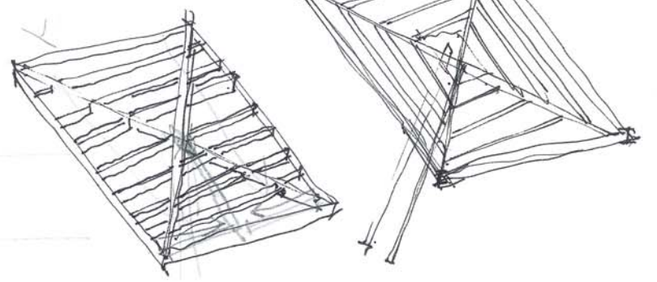


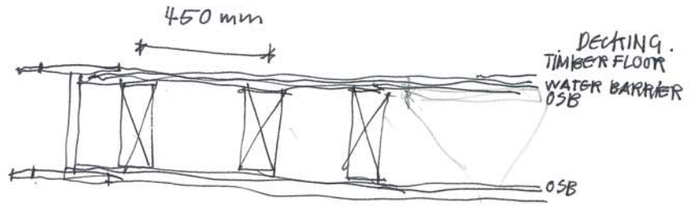


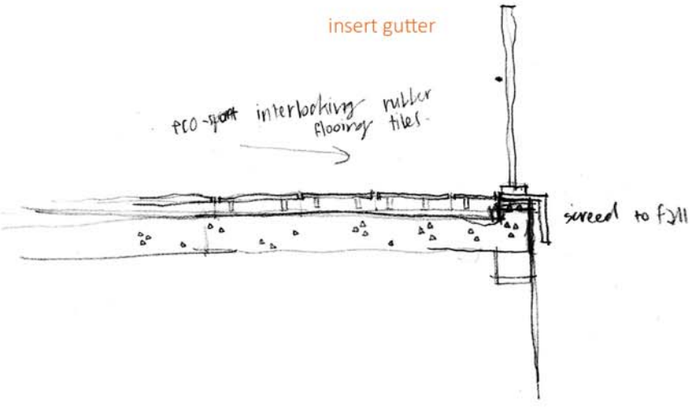












09

FINALÉ

The final documentation

Photos of exam pin-up

Final model

final proposed solution

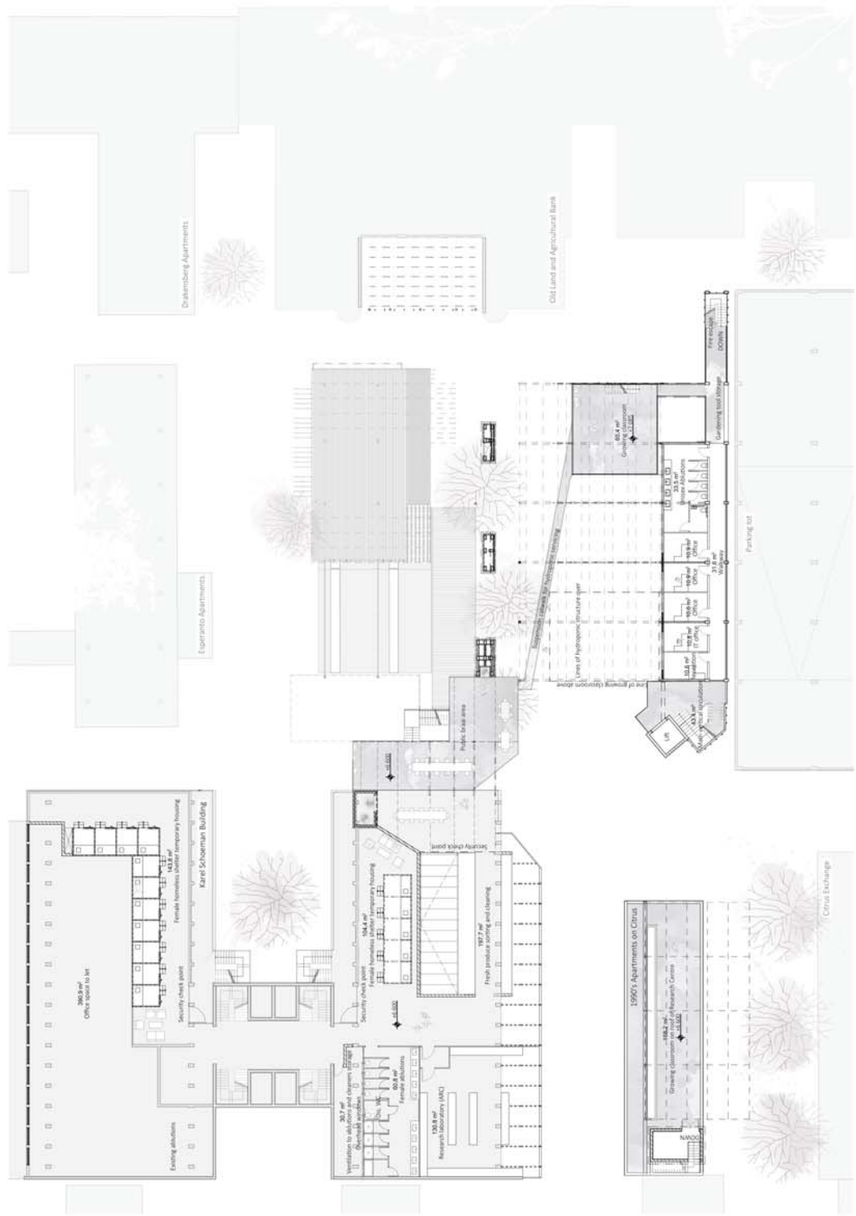
THE FINAL DOCUMENTATION

Plans, sections, details, and renders

Fig. 237. Previous page; Final model expressing the new intervention in white triplex with existing buildings shown in corrugated brown cardboard (Author, 2019)

Fig. 238. Diagrammatic plan showing section cuts (Author, 2019)

Roof and block plan nts

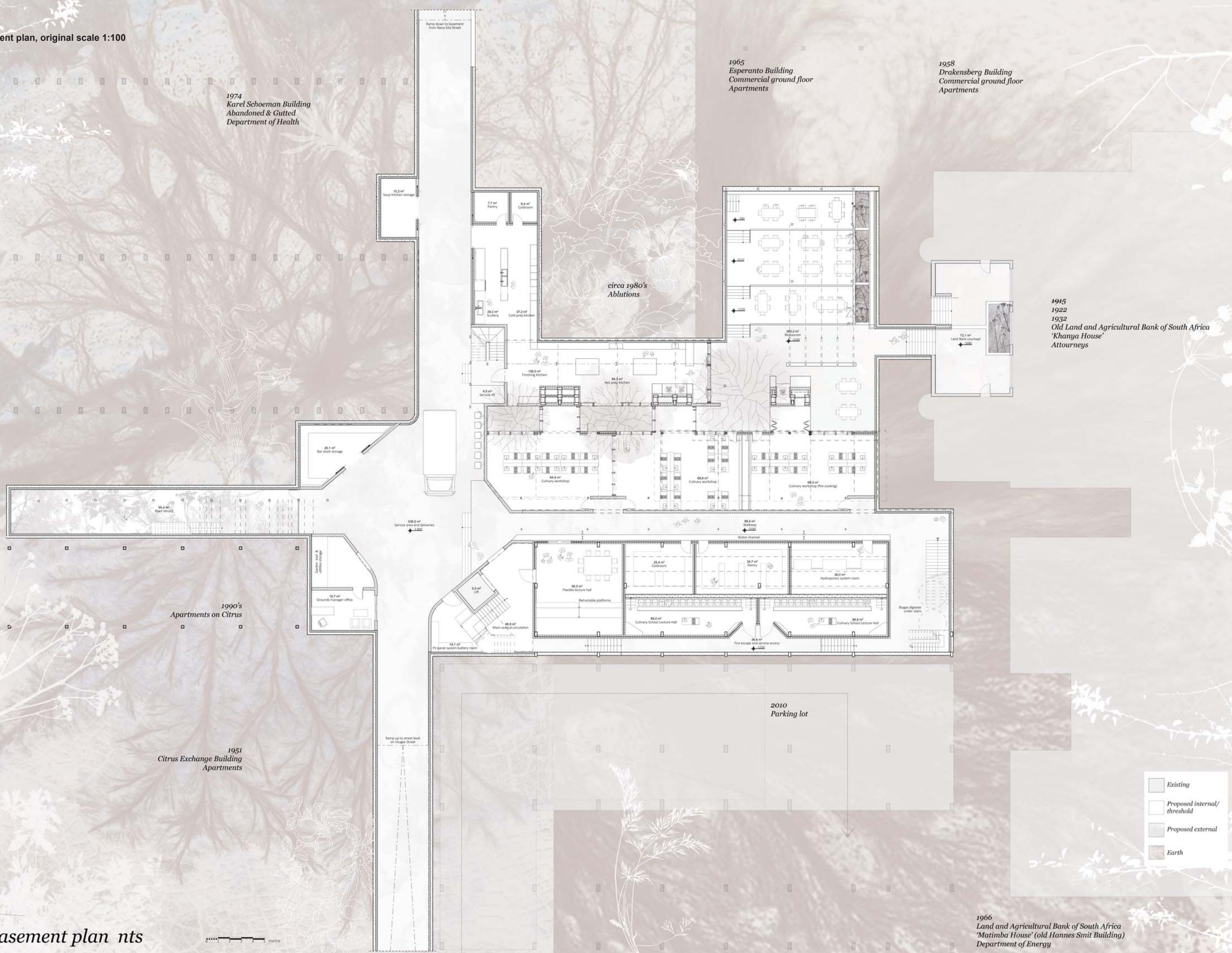


Typical upper floor plan (second floor) nts

Fig. 239. Roof and block plan, original scale 1:500 (Author, 2019)

Fig. 240. Typical upper floor plan (second floor), original scale 1:200 (Author, 2019)

Fig. 241. Basement plan, original scale 1:100
(Author, 2019)



Basement plan nts

Fig. 242. Ground floor plan, original scale 1:100 (Author, 2019)

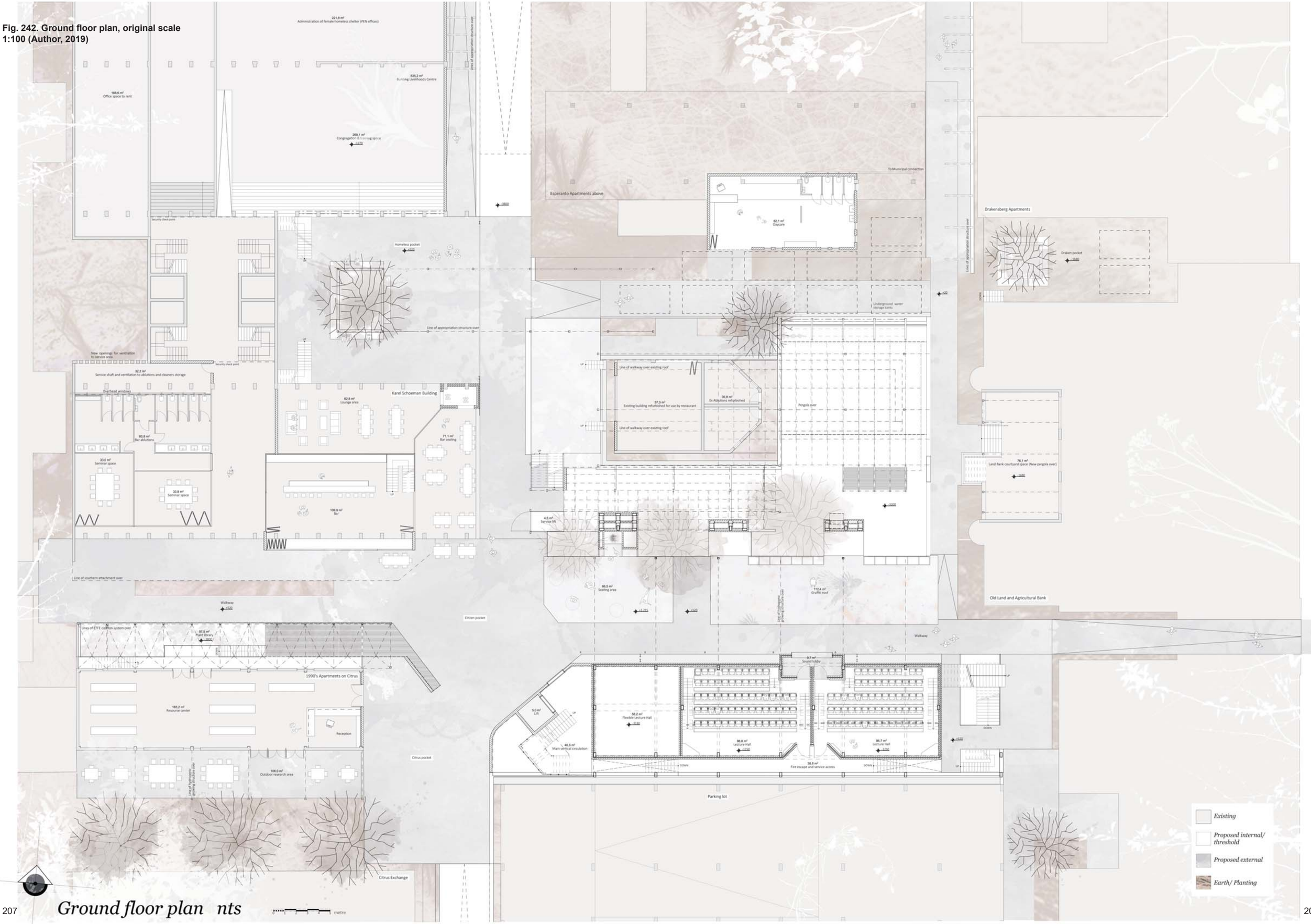


Fig. 243. First floor plan, original scale 1:100
(Author, 2019)

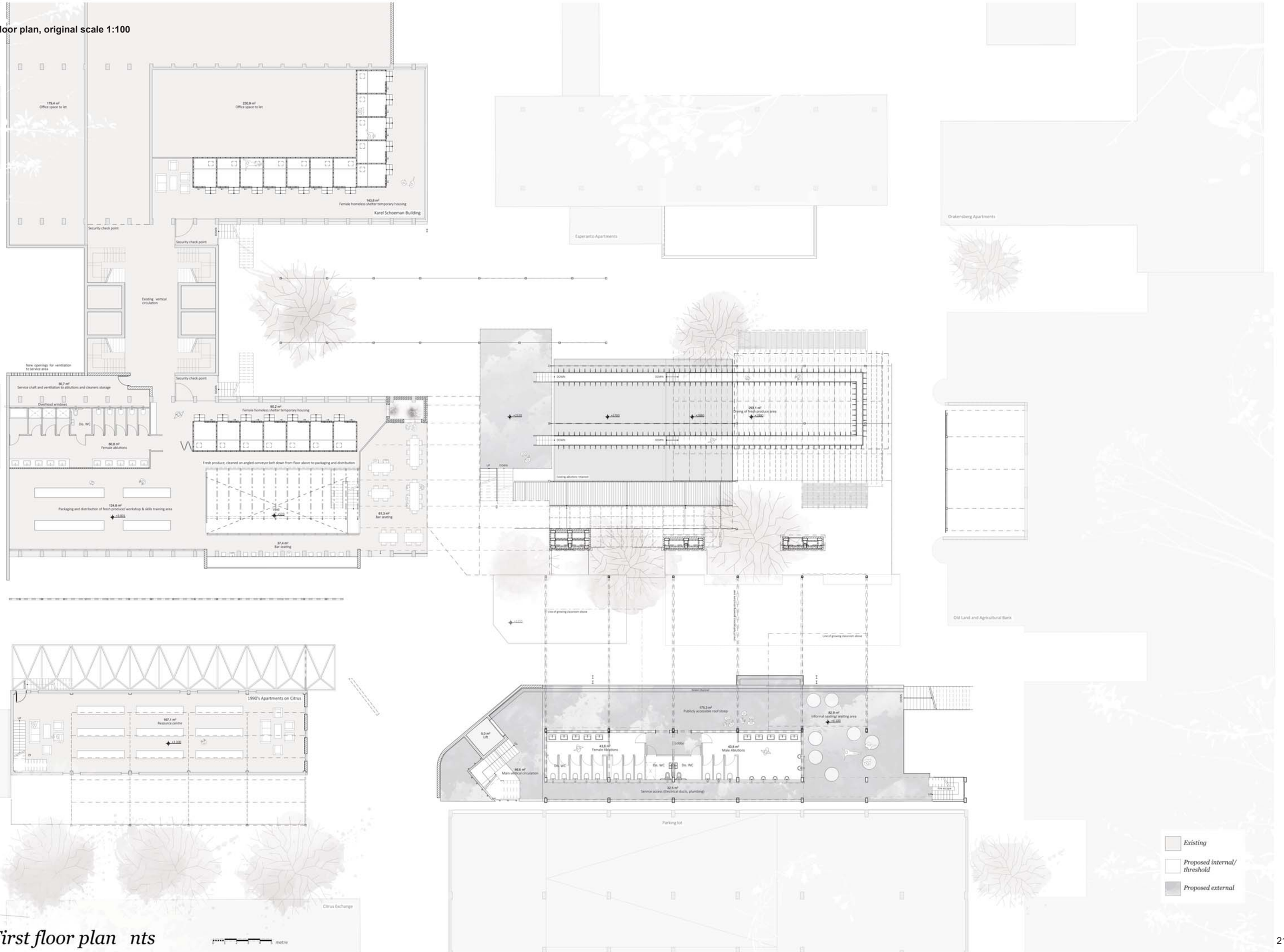


Fig. 244. Section AA, original scale 1:20
(Author, 2019)

Section AA nts

Fig. 245. Section AA segment, original scale 1:20 (Author, 2019)

Existing parking lot

Floating walkway note:
40mm leveling screed with Pudlo cement waterproofing additive to 120mm x 1200mm x 2000mm Prestressed ECHO structural slabs; bolted to matte black 220 x 80 x 6mm hot rolled m/s channels primed and finished with two coats enamel paint, Dulux or similar approved.

Growing classroom

Toadstool Canopy note:
Matte black 6 x 1200mm m/s checker plate flooring, primed and finished with two coats enamel paint, Dulux or similar approved, fixed to 220 x 80 x 6mm m/s hot rolled channel sub-structure with Hilti plate fastener disc to manufacturer's specification.

Flue note:

Purpose made matte black 25mm m/s plates as flue to chimney, fixed to brick wall with matte black m/s t-section framework, primed and finished with two coats enamel paint, Dulux or similar approved.

2 x m/s extractor fans to opening of chimney, bolted to r/c columns with m/s angles and m/s screen mesh with m/s frame to opening, all primed and finished with two coats matte black enamel paint, Dulux or similar approved.

Public roof space

9930

2920

Accessible roof note:
40mm Recycled rubber tiles with pedestal drainage system glued with Chemrex® CX-941 waterproof Polyurethane Adhesive to manufacturer's specification onto screed (with min 1:80 fall to gutter) on in-situ 250mm r/c slab with movement joints every 10m.

Detail 1

Walkway

Walkway note:
40mm x 1200mm Recycled rubber sheets glued with Chemrex® CX-941 waterproof Polyurethane Adhesive to screed (with min 1:80 fall south) on 250mm r/c slab. Chemrex® CX-22 Seam Sealant applied to rubber sheet seams to manufacturer's specification.

6270

Graffiti roof note:
Painted 40mm screed (including Ref. 100 mesh) with Pudlo waterproofer cement additive on 120mm x 1200mm x 19000mm ECHO prestressed structural slabs placed horisontally @ 21° pitch, fixed to matte black (primed and painted) 120mm x 120mm x 5mm square hollow section @ 3200mm centres to manufacturer's specifications. Gyproc rockwool acoustic ceiling boards with shiplap edge fixed to soffit with aluminium extruded sections to manufacturer's specifications.

Graffiti roof

Fire break note:
Occupancy break between Admin building and existing parking lot through sprinkler system.

Fire escape & service access

Absorptive acoustic panelling

Lecture hall

Ceiling note:
White 1980 x 1188 x 12,5mm Gyproc Rigitone acousitc ceiling panels with shiplap edge, suspended from soffit with T-section and wire hangers to manufacturer's specifications. On diagonal ceiling - Matte varnished 38mm x 25mm Saligna ceiling strip @ 75mm ctc, screwed @ 450mm intervals to celing plank (running in perpendicular direction).

5130

Precast r/c channel with m/s expanded metal sheet over, fixed with head painted m/s bolts

Agricultural drain:
160mm dia. Drainex HDPE flexible slotted drainage pipe wrapped with Kaytech bidim geotextile with 300mm overlap as per manufacturer's specification to fall.

Seating structure note:
M/s 80 x 80 x 5mm hot rolled square hollow sections (SHS) welded, primed, and fixed to primary structure with 2 x 10mm m/s bolts and 3mm m/s base plate @ 600mm centres. Structure clad with sanded & matte varnished 18mm OSB fixed with 12 x 25mm self drilling screws to SHS's.

Hydroponics system note:
Ebb and flow water and nutrient cycle system. Pumps placed on vibration separating footings to isolate sound & discourage transmission through structure.

Hydroponics system room

Mechanical ventilation of storage spaces

3540

Walkway

Culinary workshops

Extractors

3805

Recycled Rhino Wood, 150 x 25mm slats, fixed with purpose made m/s swing fasteners, primed and finished with two coats of enamel paint to SHS structure.

Purpose made matte black 150 x 150 x 6mm m/s SHS lattice truss with 60mm m/s bars as web members, manufactured off site in segments and welded in place, primed and finished with two coats of enamel paint, Dulux or similar approved.

Fig. 246. Section AA segment, original scale 1:20 (Author, 2019)

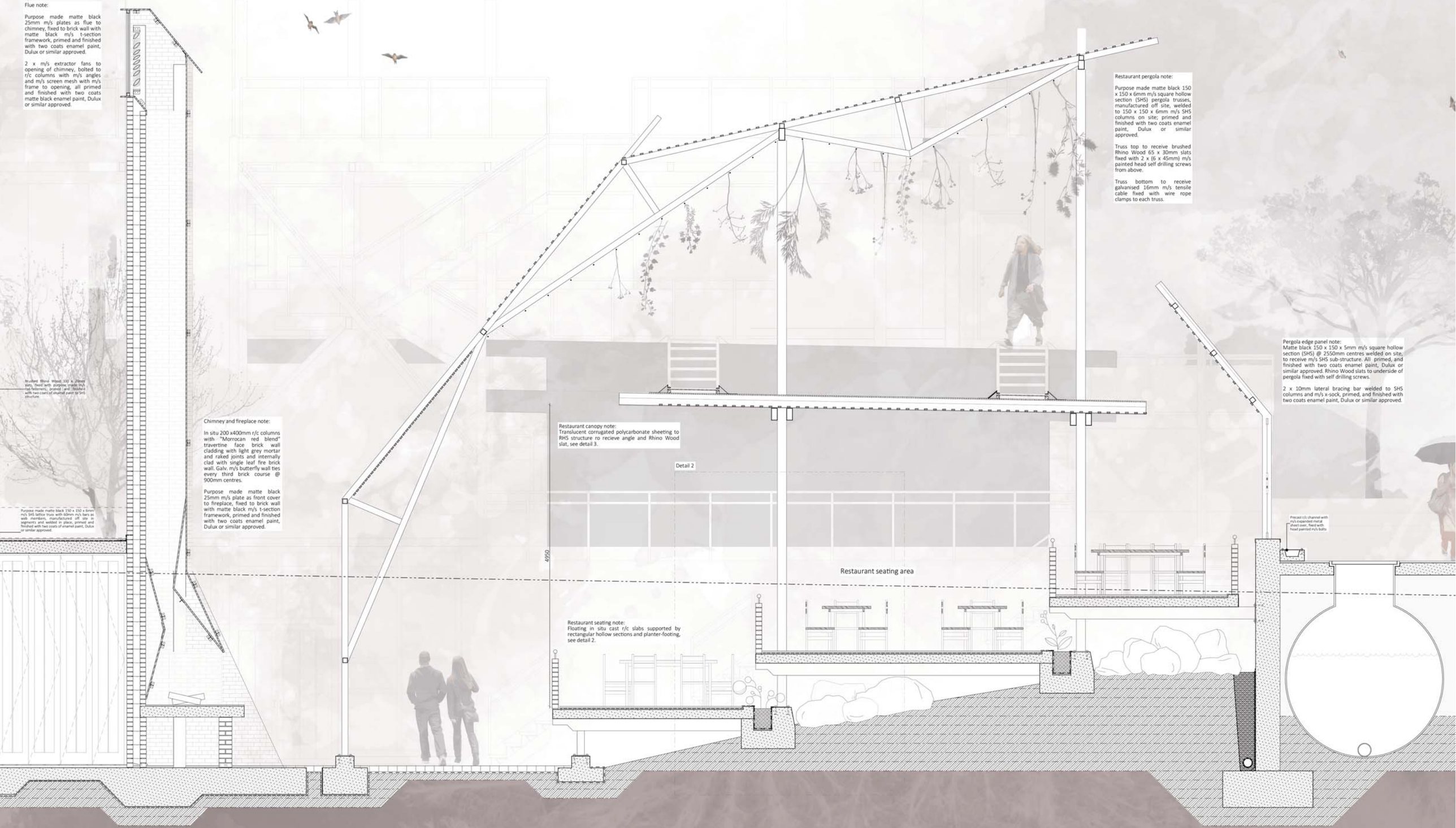


Fig. 247. Section AA segment, original scale 1:20 (Author, 2019)

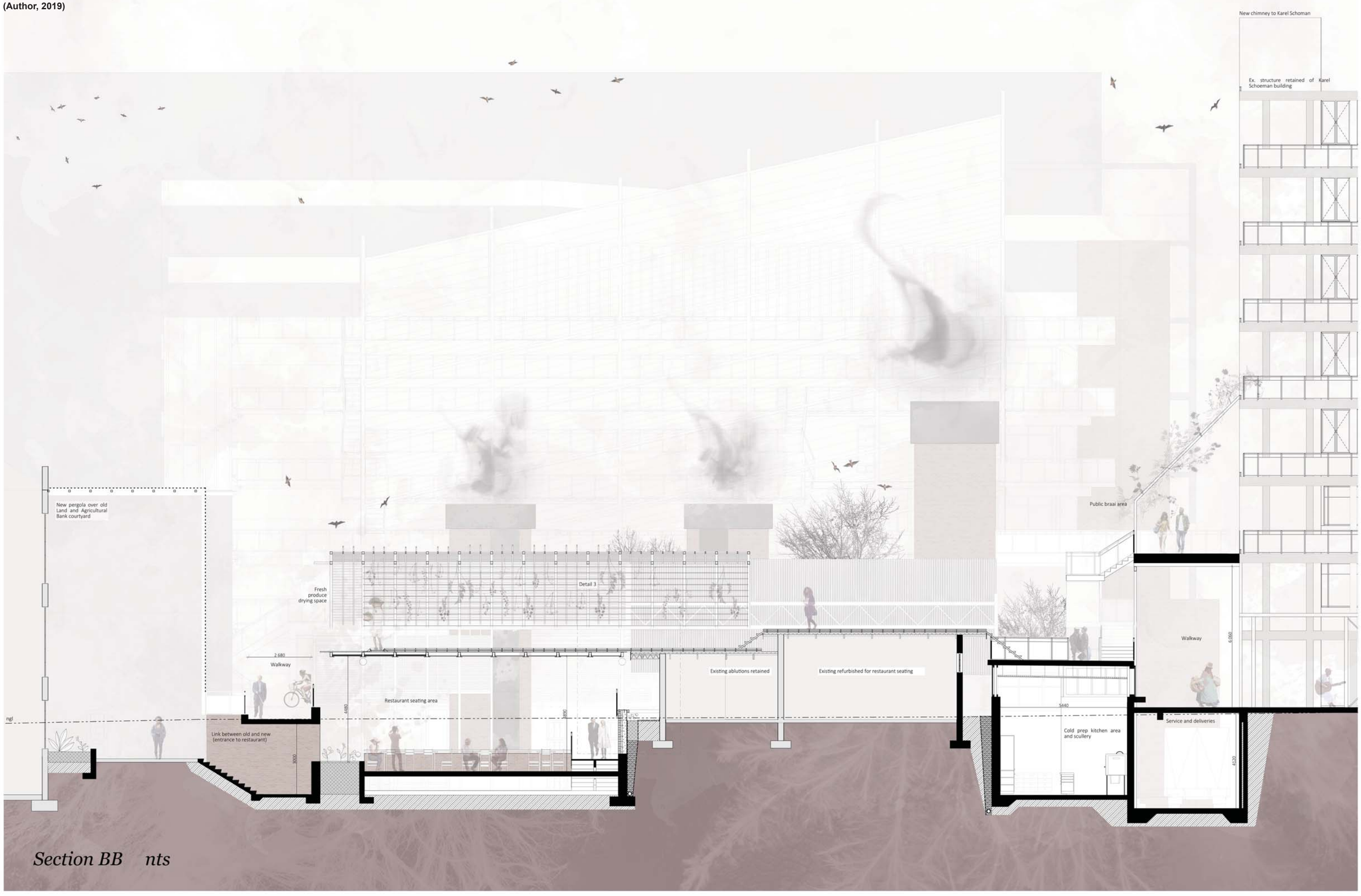
Hydroponics structure note:

Purpose made matte black 150 x 150 x 6mm m/s square hollow sections (SHS's) manufactured off site, welded in place on site, primed and finished with two coats enamel paint, Dulux or similar approved.

The internal webs of the truss are 60 x 60 x 4mm m/s SHS's and the bottom member of the truss is a galvanised 16mm m/s structural tensile cable fixed with wire rope clamps.

Service access of Ebb & Flow hydroponics on matt black expanded metal suspension bridges, primed and finished with two coats enamel paint, with stainless steel wire rope mesh between the bridges.

Fig. 248. Section BB, original scale 1:50
(Author, 2019)

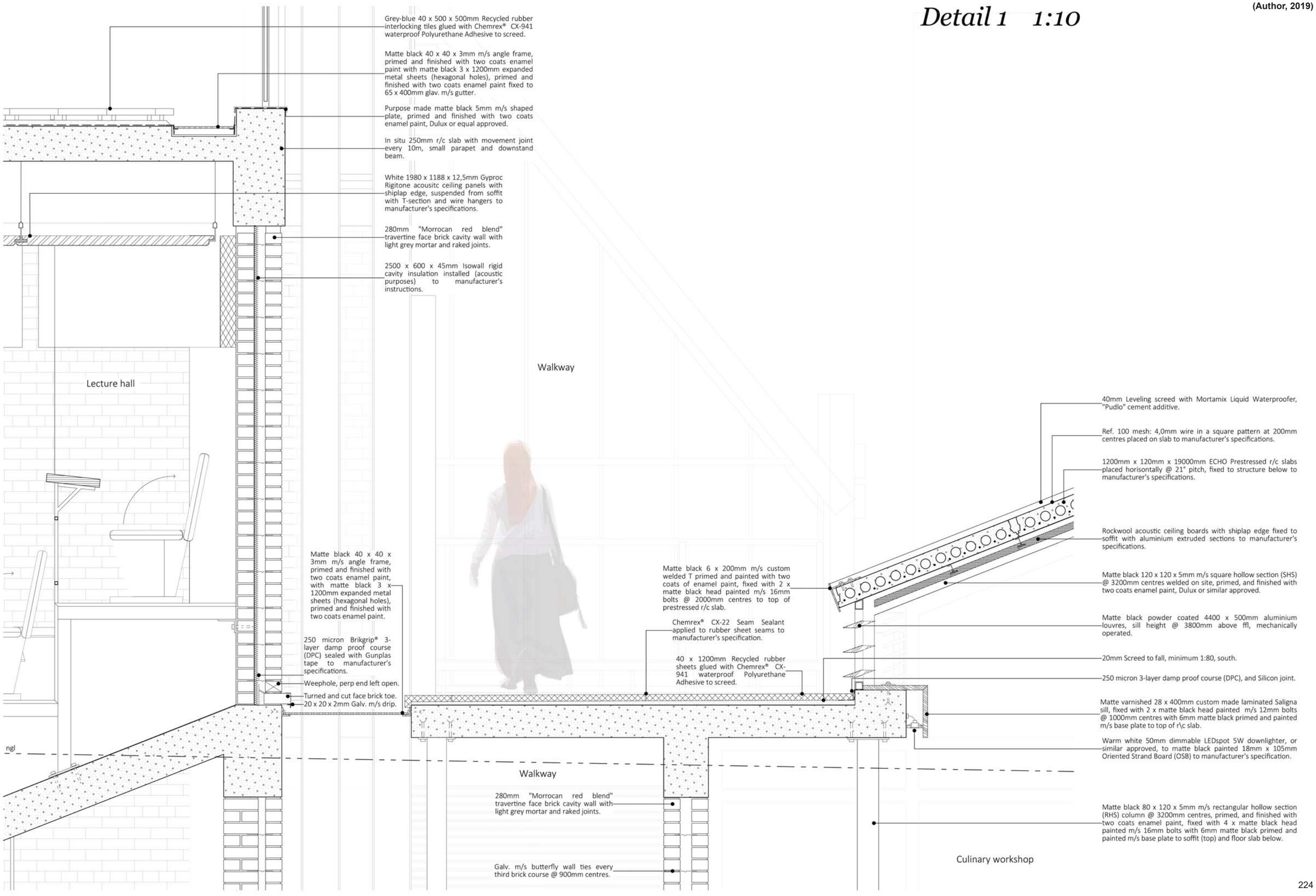


Section BB nts

Fig. 249. Section CC, original scale 1:50
(Author, 2019)

Fig. 250. Detail 1, original scale 1:10
(Author, 2019)

Detail 1 1:10



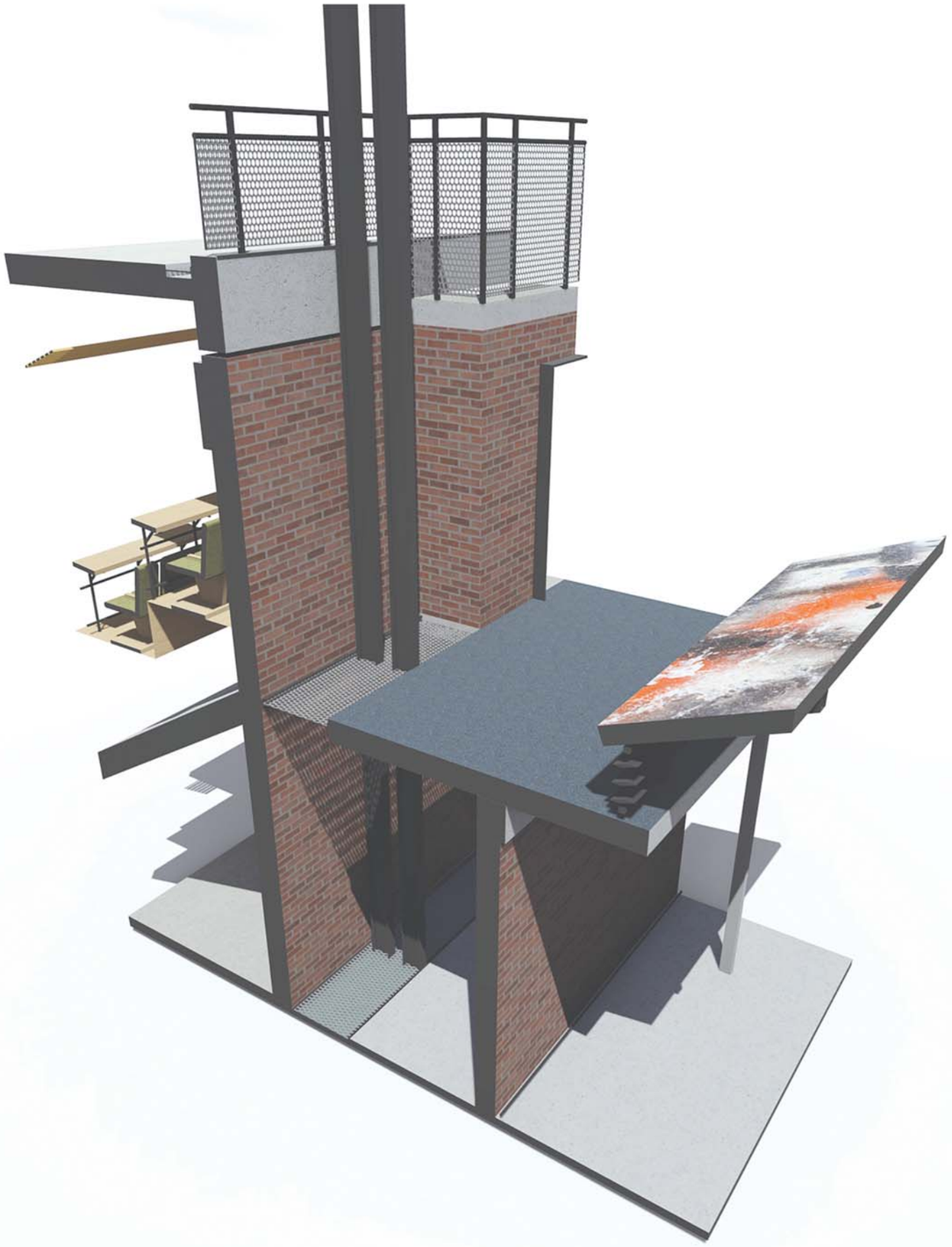
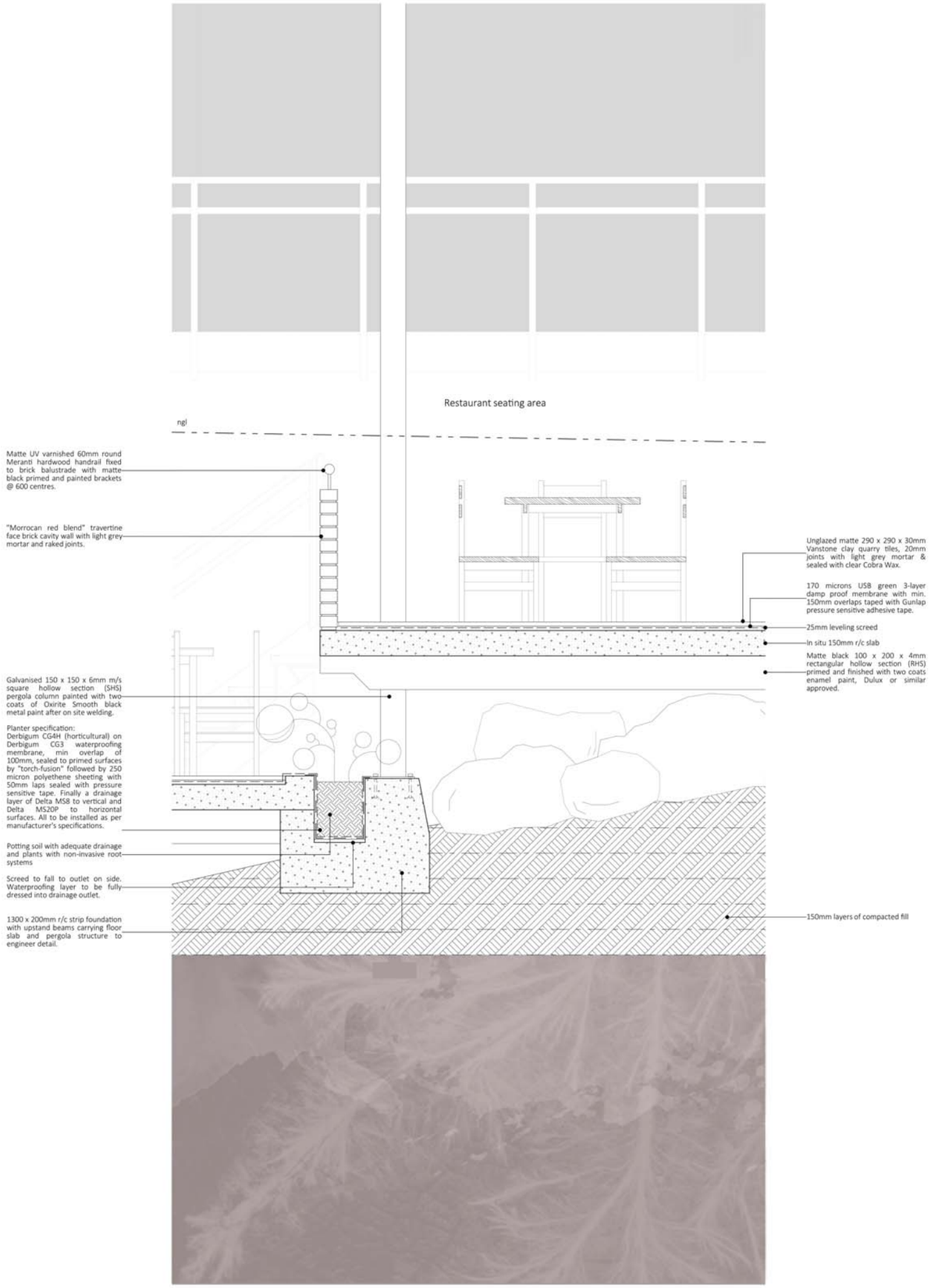


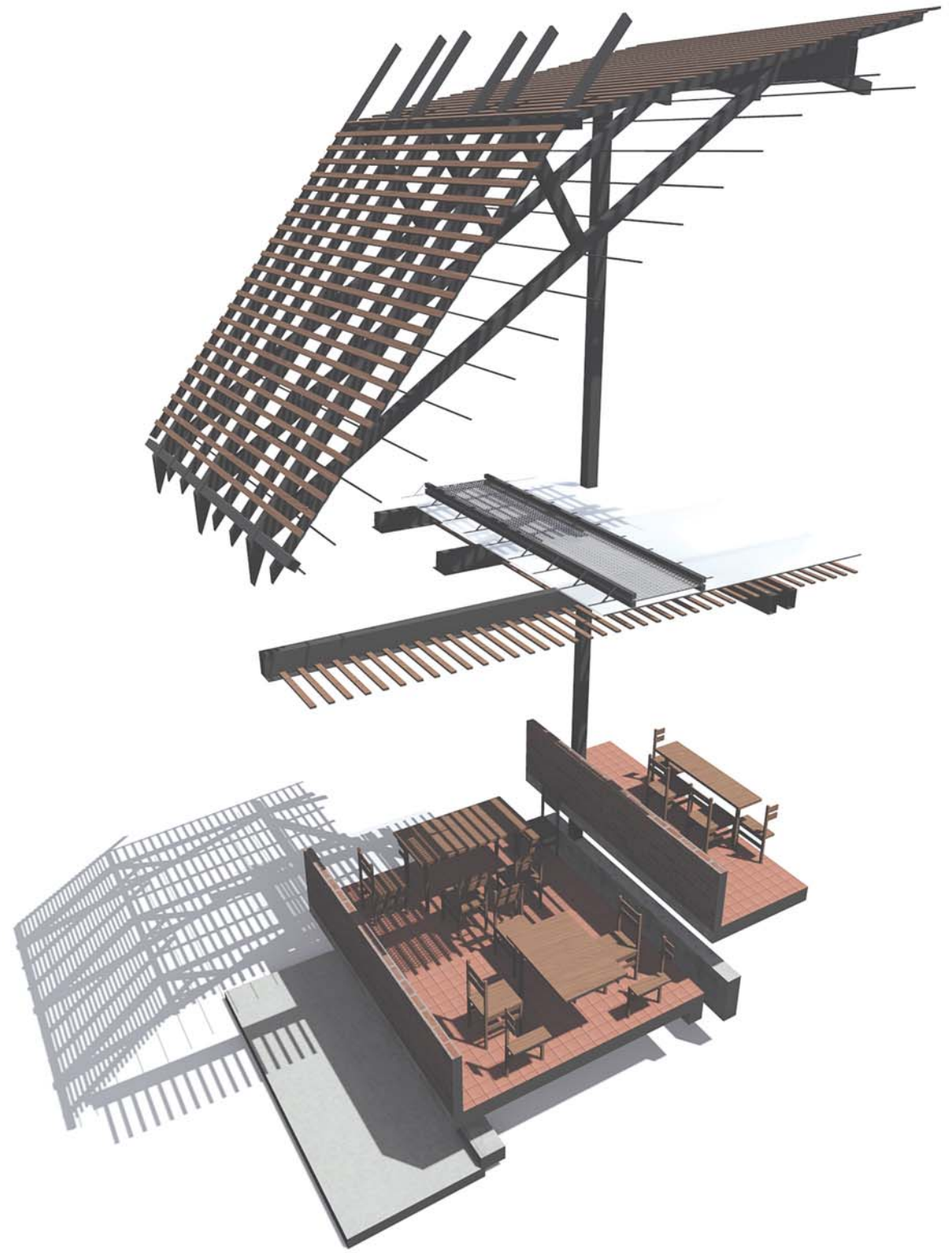
Fig. 251. Opposite; Detail 1 in 3D
(Author, 2019)

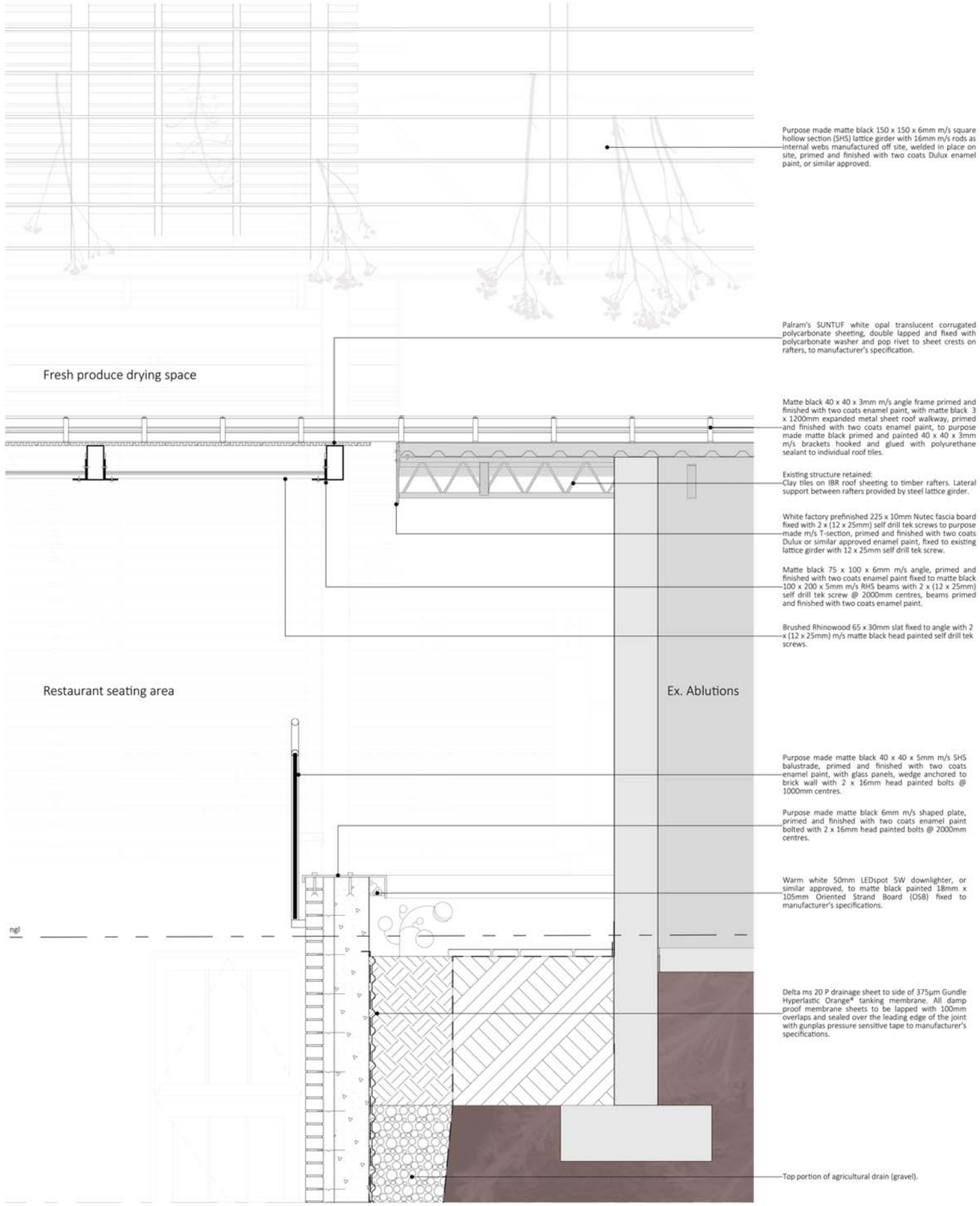


Detail 2 nts

Fig. 252. Opposite; Detail 2, original scale 1:10 t(Author, 2019)

Fig. 253. Below; Detail 2 in 3D (Author, 2019)





Detail 3 nts

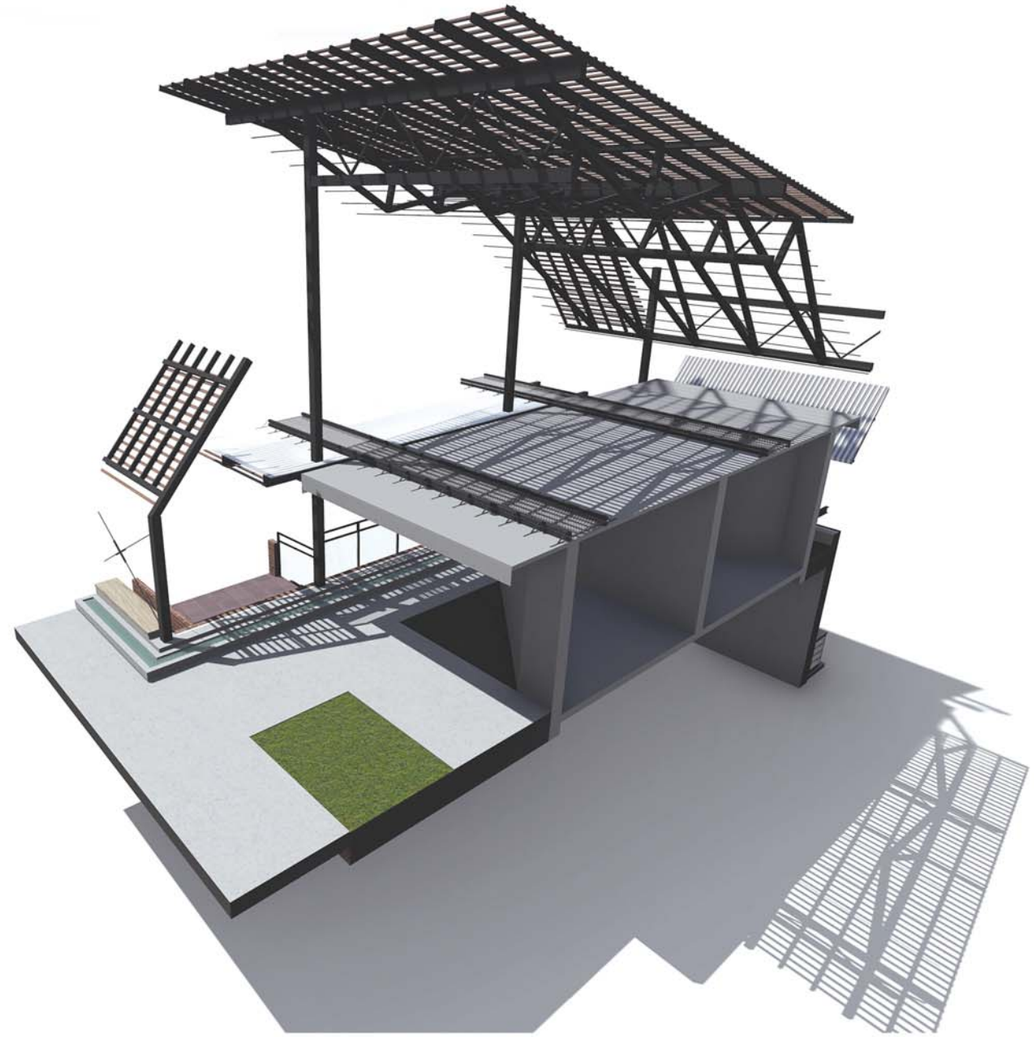
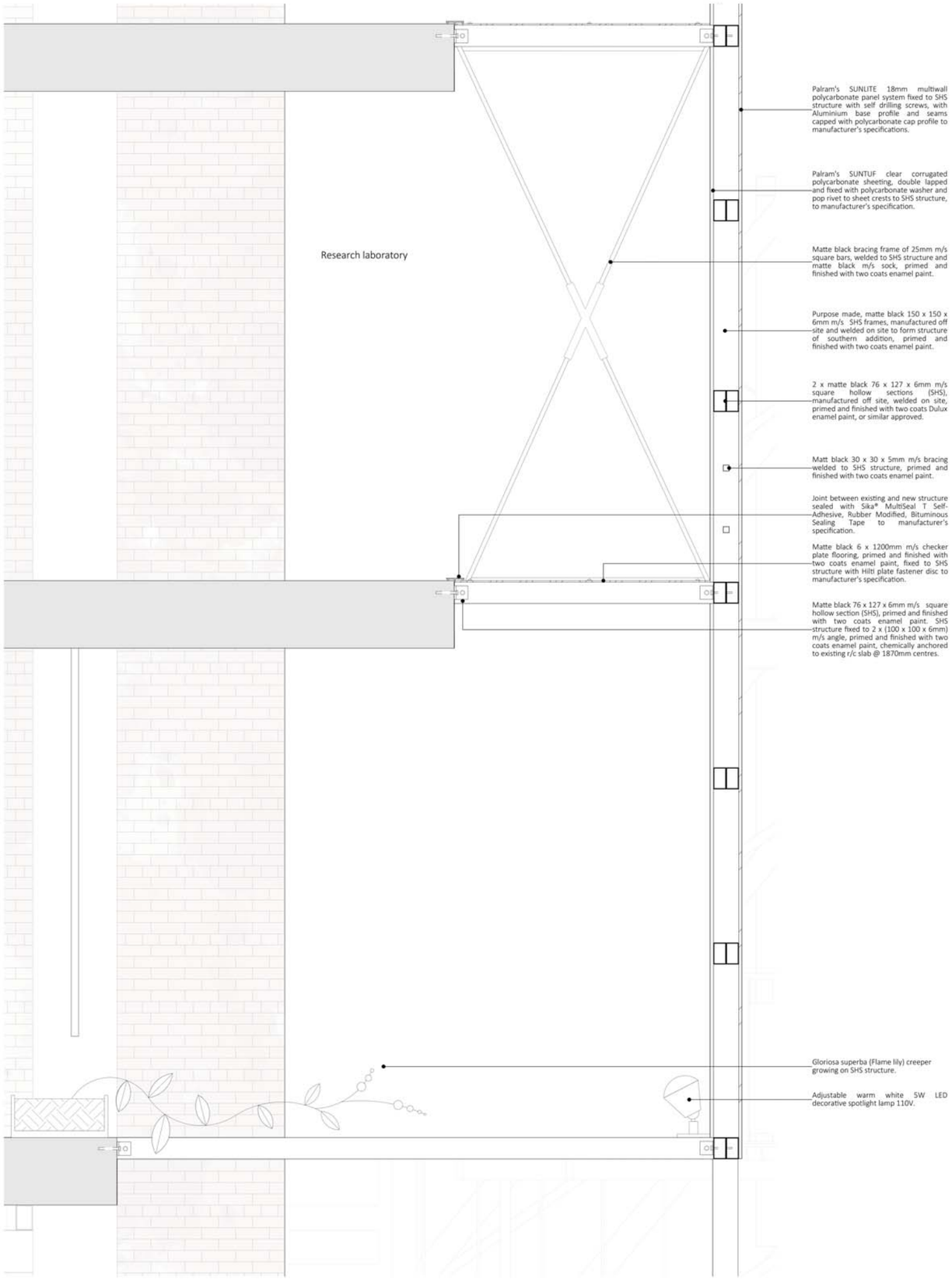


Fig. 254. Opposite; Detail 3, original scale 1:10 (Author, 2019)

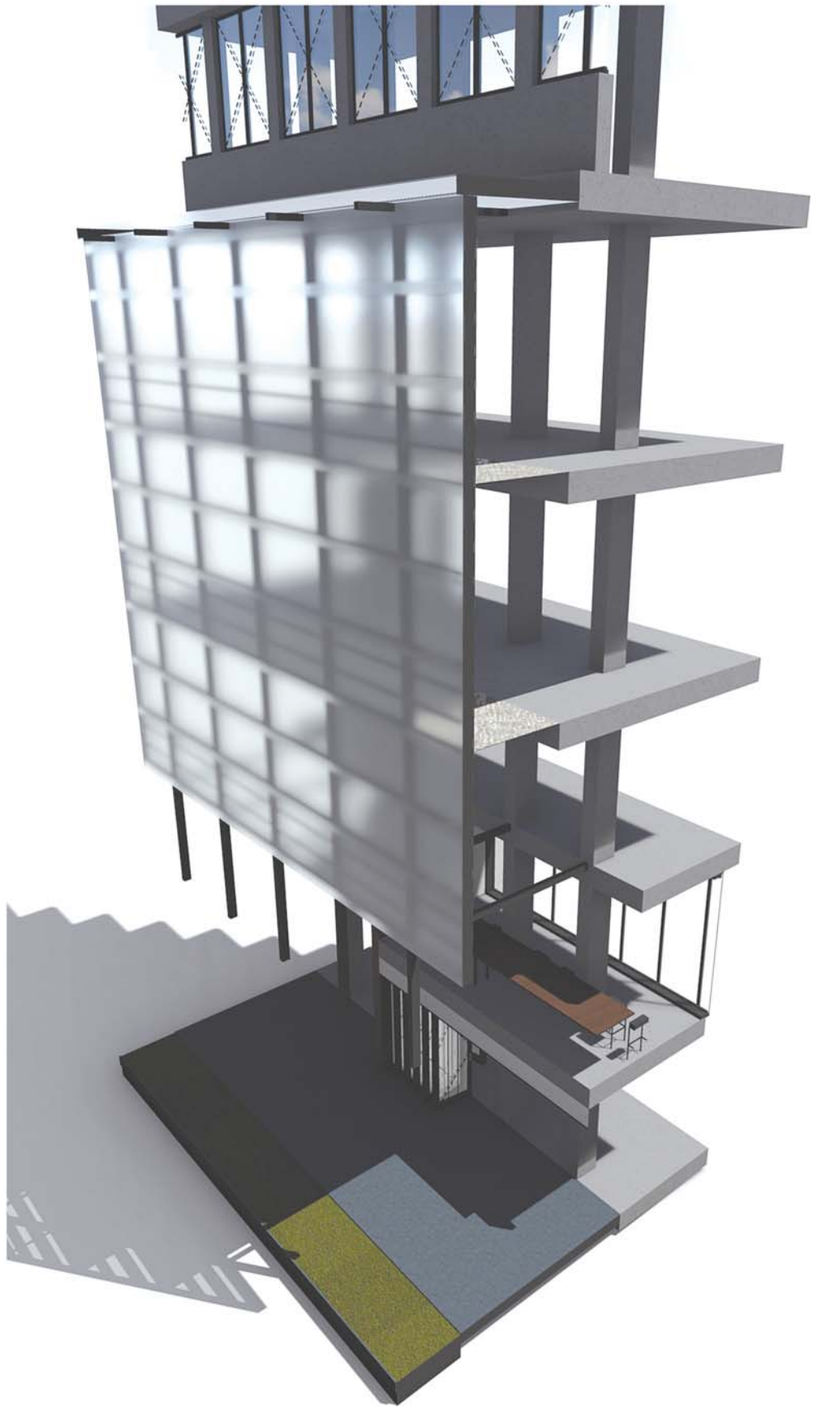
Fig. 255. Below; Detail 3 in 3D (Author, 2019)



Detail 4 nts

Fig. 256. Opposite; Detail 4, original scale 1:10 (Author, 2019)

Fig. 257. Below; Detail 4 in 3D (Author, 2019)



Karel Schoeman Building south-eastern corner: Bar area

Bar upper level seating and plant library

Internal communal space

Fig. 258. Compilation of renders (Author, 2019)

Culinary School lecture hall

Culinary workshop space

Kitchen with open fireplace

Connection between old Land Bank and new restaurant

Building Livelihoods Centre courtyard, and pop-up soup kitchen

Hydroponics structure and graffiti roof

Fig. 259. Bird’s eye view of the Bank of Nourishment (Author, 2019)

Fig. 260. Bird's eye view of the Bank of Nourishment (Author, 2019)

Fig. 261. The restaurant pergola with drying space above and children's day care and play area to the right (Author, 2019)

Fig. 262. Restaurant seating area
(Author, 2019)

PHOTOS OF EXAM PIN-UP

Exhibition space

Fig. 263. Above; 1st segment of presentation focussing on design (Author, 2019)

Fig. 264. Below; 2nd segment of presentation focussing on technical (Author, 2019)

Fig. 265. Above; Panorama of exam exhibition space (Author, 2019)

Fig. 266. Opposite Bottom; Design exam (Barker, 2019)

Fig. 267. Below; Technical exam (Barker, 2019)

Fig. 268. 1:1000 Plaster of paris model of the latent space on the block as positive space (Author, 2019)

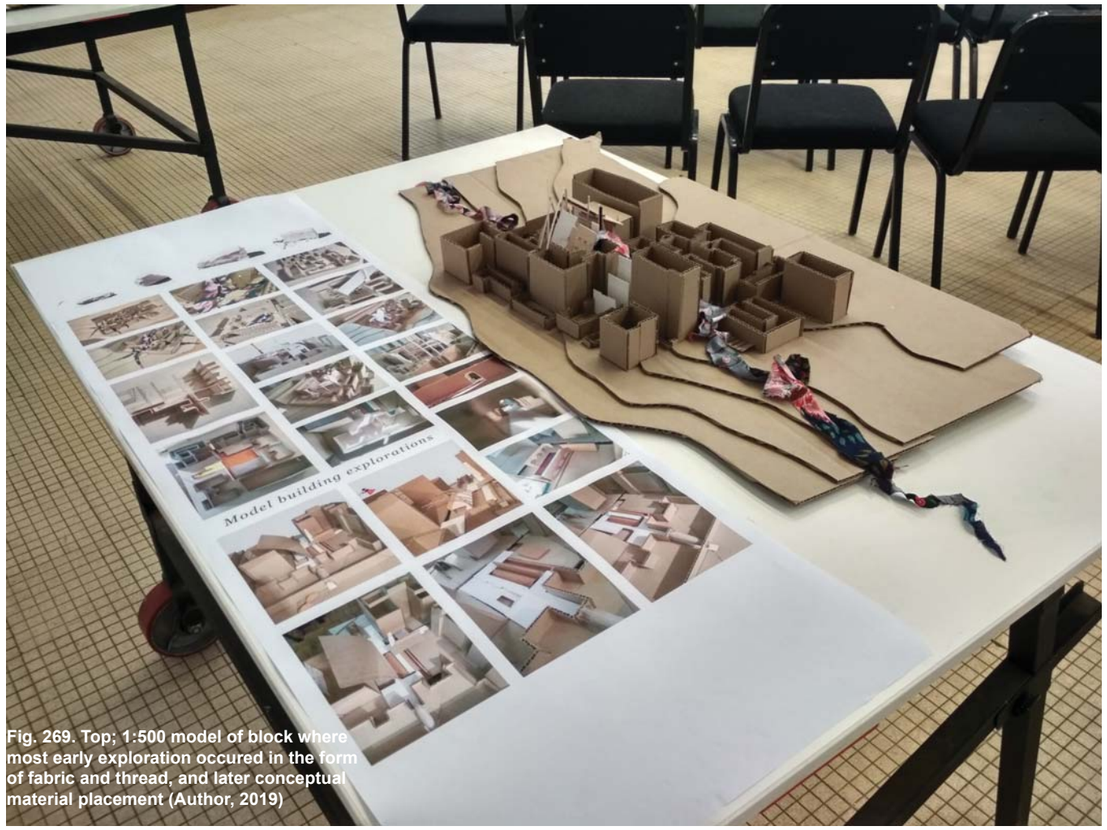


Fig. 269. Top; 1:500 model of block where most early exploration occured in the form of fabric and thread, and later conceptual material placement (Author, 2019)

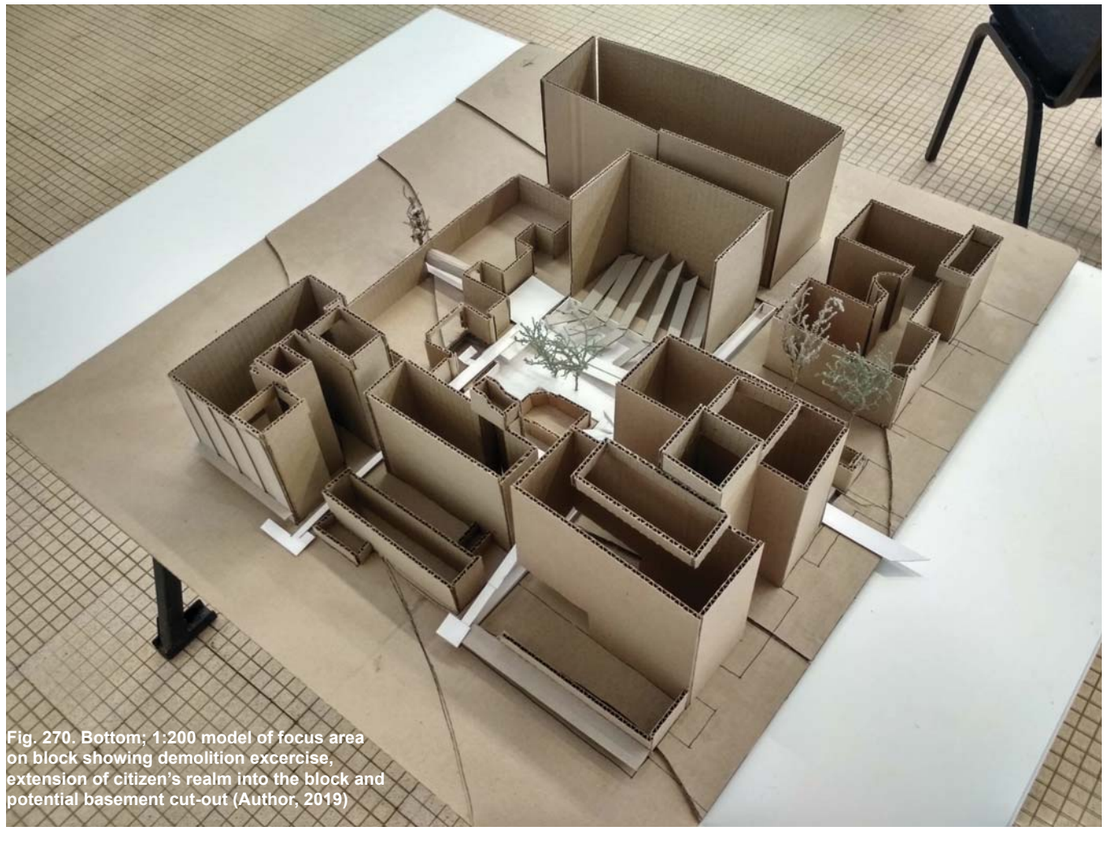
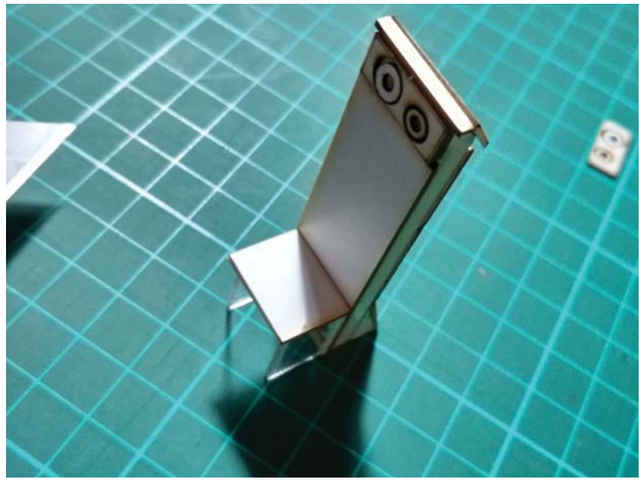


Fig. 270. Bottom; 1:200 model of focus area on block showing demolition excercise, extension of citizen's realm into the block and potential basement cut-out (Author, 2019)

PHOTOS OF FINAL MODEL

Building process



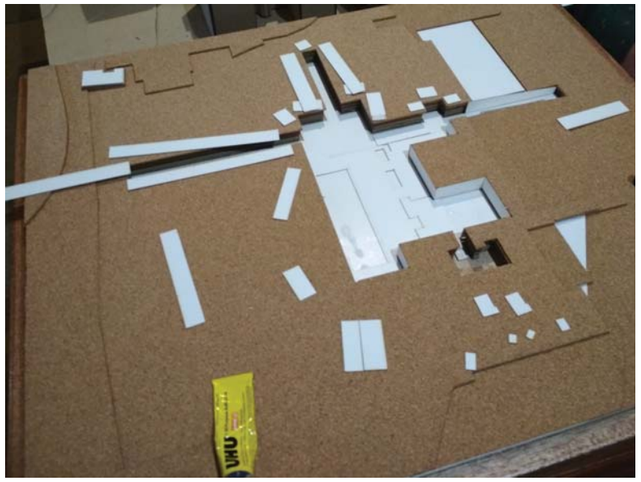
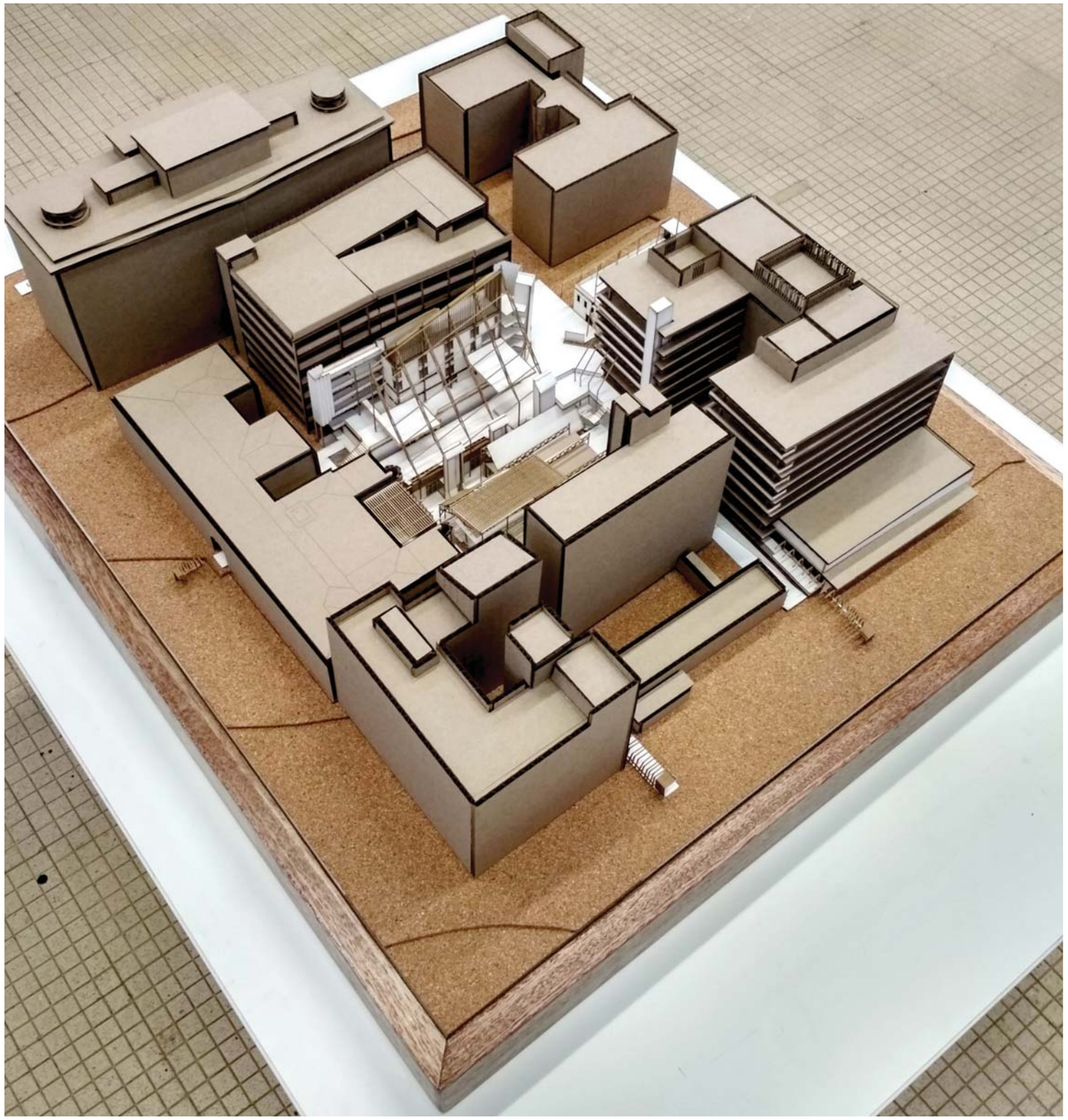


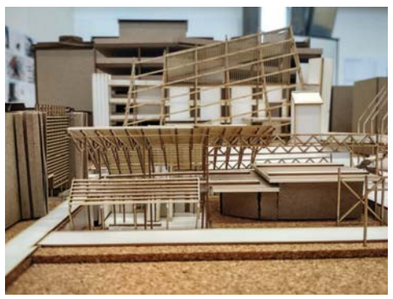
Fig. 271. Building process: base first, then existing buildings, finally new intervention in segments (Author, 2019)

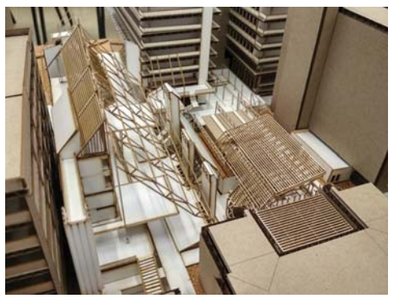
PHOTOS OF FINAL MODEL

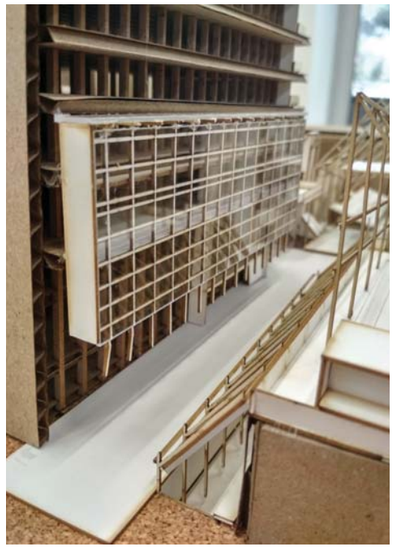
Final completed model

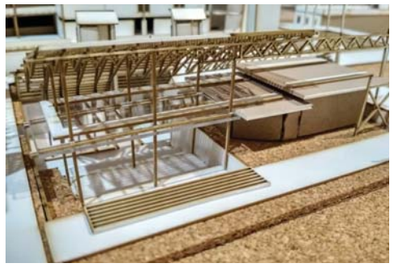
Fig. 272. Current page and Next; Compilation of images of the final model (Author, 2019; Barker, 2019)

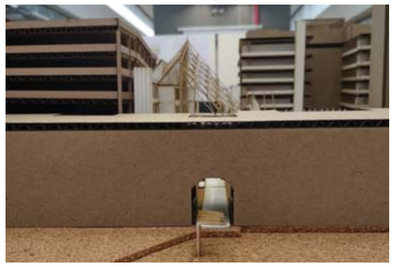


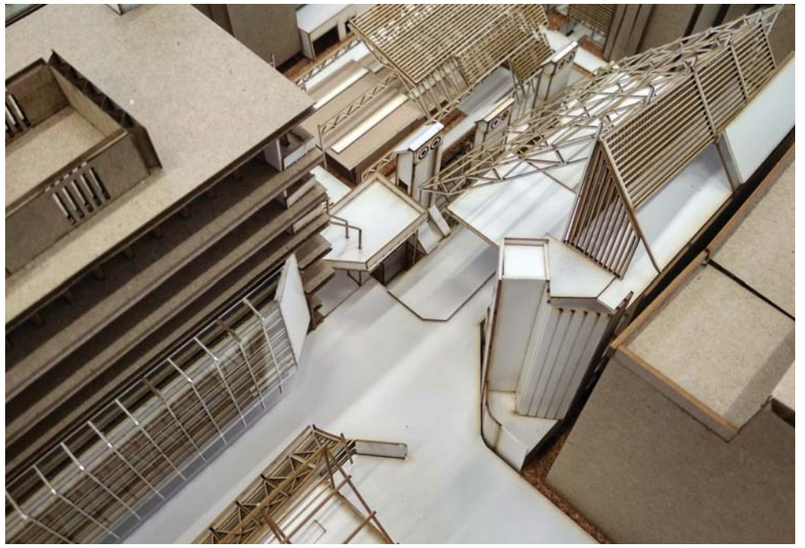












CONCLUSION

10

fin

Fig. 273. Previous page; Extentions from and connecting to the existing, creating in-between threshold space (Author, 2019)

This dissertation aimed to discover the potential of latent space in the inner city of Pretoria. The exploration was guided by the objective of finding architectural remedies for regenerating and weaving urban fabric.

The overarching intention of the architectural solution was to delineate a new relationship between the inner city user, buildings, and latent space to create off-street user-relief spaces. This intent was accomplished through developing strategies that form structural components to intervene with existing urban morphology, utilising architectural, heritage, programmatic, and technological considerations that integrates the context. By using a palimpsetic approach to design with existing buildings, a new layer is added to the built fabric whilst adapting and transforming the old to be improved. This approach knits the fragmented internal and external latent spaces together to form a threshold dialogue where the inner city fabric is regenerated. Furthermore, the dissertation reimagines a building from a single element to a thread of spaces. This action leads to an architecture of dispersed internal spaces, interwoven with open, external communal space, where the realm of the citizen is extended past the existing buildings, in-between the new architecture and up-onto new raised public accessible platforms. Complexity and diversity occur by encouraging brief encounters, greetings and interactions through the diverse programme that mixes multiple stakeholders, uses, and activities in the same spaces.

The goal of this dissertation is to act as prototype for future densification in the inner city of Pretoria, where missed opportunities should be harnessed. The case study area (Land Bank block) can act as a catalytic project when the strategies are applied to other blocks in Pretoria inner city. Further research should be done to develop the strategies into appropriate methods of intervention, applying them to varying architectural and urban design spaces. In addition, further research is required regarding ownership, regulation and land planning in the city. The common architectural practice and legislation should be questioned and possibly altered to suit the flexible and varying needs of the complex scenarios that originate in Pretoria's vibrant environment. Moreover, a challenge presents itself aligning multiple public and private vested interests in order to facilitate the implementation of the concept.

This flexible approach should ensure the growth and resilience of the socio-ecological-urban system, allowing it to thrive in future through change.

11

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Fig. 274. Previous page; Norman Eaton travel journal (Spies, 2015)

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11 APPENDICES

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo

Reference number: EBIT/E11/2019

25 April 2019

Prof A Barker, Mr JN Prinsloo & Ms C Karusseit
Department Architecture
University of Pretoria
Pretoria
0028

Dear All

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Approval is granted for the application with reference number that appears above.

1. This means that the research project entitled "*Masters professional dissertation in architecture, landscape architecture and interior architecture*" has been approved as submitted. It is important to note what approval implies. This is expanded on in the points that follow.

2. This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Research Ethics Committee.

3. If action is taken beyond the approved application, approval is withdrawn automatically.

4. According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.

5. The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof JJ Hanekom
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

MPROF ETHICS APPLICATION: HERITAGE AND CULTURAL LANDSCAPES

Std No	Surname	Name	Preliminary Title	Study leader	Programme	Vulnerable Peoples
14004969	Fourie	Giselle	NON-FACESINNON-PLACES	Prof Arthur Barker	Museums and the city	
14025435	Kirsten	Paolo	Architectural phenomenology and the design for human experience,	Derick de Bruyn	Forgotten civic programs	
11060400	Kruger	Gustav	Towards a new spatial identity	Prof Arthur Barker	Urban and Heritage anaylsis as design generators	
14156955	Labuschagne	Breniann	THE POTENTIAL OF RESOURCE SHARING TO EVOKE PERCEPTIVE GROWTH IN ALTERNATIVE EDUCATION	Dr Nico Botes	Education Resource Sharing, material and meaning	Young adults. Secondary data will be relied upon exclusively.
18344977	Masuku	Boineelo	A HEALING ARCHITECTURE	Dr Nico Botes	Healing and Empowerment of the homeless	
11157306	Matshaya	Ihsam	City spaces of memory: Commemorative architecture as a tool for creating spaces of collective identity	Johan Swart	Commemorative Architecture	
18022473	Moodley	Duren	Interior [Re]Urbanism : The Semi-permanent Adaptive Reuse of A Vacant Automobile Dealership in Arcadia	C Karusseit		
13090292	Schmidt	Dirk	Retaining communal interactions through Co-Housing	Abre Crafford	Co-housing	
29162310	Thobejane	Lebo	Symbiotic Synergy: Insertions under and around the Joe Slovo overpass structure in the City and Suburban precinct	Z khan		
12032086	van der Walt	Amy	Revitalising the Breytenbach Theatre as a social catalyst in the historic social block of Sunnyside	N Botes	Theatre	
10262662	Vermeulen	Annemie	Multi-faceted space: Intertwining the inner city	Prof Arthur Barker	Mixed-use	

Fig. 275. Previous page; View of the Bank of Nourishment (Author, 2019)

ETHICS APPLICATION: TYPICAL QUESTIONS (semi-structured interviews)

M(Prof) Department of Architecture

		MInt(Prof)	ML(Prof)	MArch(Prof)
		Interior Architecture	Landscape Architecture	Architecture
1	**CONTEXT**			
	Urban	What route do you take to walk to university?	Do you use the park on a regular basis? If not, why?	How is this space used at night?
	Climatic	Is your living room comfortably warm in the winter?	Is this space very windy in the summer?	Can you sit in the shade in summer?
	Historical	How long has your family lived in this house?	What significance does this place hold for you and your community?	How long has your family lived in this area?
	Personal	What aspects about working in an open plan office have a negative impact on your productivity?	Do you enjoy being in the public square?	Do you feel safe in the streets around your house?
	Cultural	What activities do you take part in in the local community hall?	How do you use this space to celebrate weddings?	As an adult, what type of sport do you take part in?
2	**FUNCTION**			
	Accommodation	How many customers would you like to accommodate at your restaurant?	What facilities are required for garden maintenance?	What facilities are needed for teaching staff?
	Organisation	What is the ratio of nurses to patients?	What is the proportion of walkway area to recreational space?	What facilities should be located at the entrance area of the building?
	Health and Safety	Is the art gallery accessible for wheelchair users?	How do you secure the premises?	How many telephone operators sit in a typical call centre?
	Access and circulation	Do you find visitors to this place often get lost and inquire for directions?	How many busses need to be accommodated at the entrance area?	Is heavy and regularly maintained equipment needed on the 5th floor?
3	**TECHNOLOGY**			
	Operations	How many stores like this will be opened in the next year?	What was this site used for over its lifetime?	When will this mine close and how many jobs will be lost?
	Systems	Is the lighting system easily accessible for alterations?	Where does the dirty water go?	How do you deal with a fire in this building?
	Environment	Do you have to use a heater/fire to keep warm in the winter?	How is the water in the dam cleaned?	For how long is the air conditioning used every day?
	Maintenance	How often do you have to replace the carpets?	How often do you water the lawn?	How often is the building cleaned?
	Materials	What are the noisy activities in your building? (acoustic separation/treatment)	What type of vehicles will drive through this park? (road construction)	Are acids used in the production space? (floor surface)
	Furniture/fittings	What specialised furniture is required for the beauty therapy room?	Are there enough benches to sit on?	How many employees need to have their own separate desks?

Annemie Vermeulen

Latent space: developing a prototype to knit urban fabric

Pretoria's inner city is riddled with latent spaces in the large scale blocks. Developing a prototype able to knit the urban fabric may nourish and replenish these latent spaces.

Fig. 01. Above; Ties of the human existence (Ruarte, 2013; Van Vooren & Oerder, 1889; Vermeulen, 2019)

Background & Context

Setting the scene

Pretoria inner city is where fleeting movements and moments are enveloped by tall cliffs of concrete and brick, formed on the edges of the oversized[1] blocks. Although still a fairly young city of 164 years (Meiring, 1980:11), she boasts a rich architectural palimpsest and a vivid history of urban design strategies, layering the city's developing built fabric. The wide streets, bustling with traffic, push the various informal activities to the fringes of the streetscape, resulting in a small contested pedestrian realm. Narrow sidewalks and limited off-street spaces for public use enforce a harsh environment on the city user (Dewar, 1998:369). South African cities are "overtly hostile to pedestrians [...] offering no shade, no cover, no features of interest or stimulation [and] no short cuts" (1998:369).

This unforgiving landscape's beginnings lie within a contrasting perspective. Pretoria was founded in 1855 to support the surrounding farmers with amenities and trade possibilities (Pieterse, 1942:16-18). Church Square, then called Market square, was the central market space for the farmers to sell fresh produce and cattle (1942:23). Around the square, plots were laid out in groups of twelve where one plot, called a *dorpserf*, is 36.8 meters in width and 69.3 meters in length. This size is larger than the average plot of South African towns of the time, as seen in Port Elizabeth, established in 1820 (South African History Online, 2011) with *erf* sizes of approximately 15 meters in width and 30 meters in length (Google Earth, 2019) or Robertson, founded in 1853 (South African History Online, 2011), with 20m x 45m *erfs* (Google Earth, 2019). This stark physical difference in plot size indicates Pretoria's different urban design influences compared to other settlements of the time in South Africa.

The urban design influences impacting Pretoria can be traced back to Greek and Roman town planning. These ancient cultures made use of a north-south and east-west axis[2] with a central communal space at the intersection. The application of these ancient principles can be seen in Priene, Turkey – a Hellenic era settlement from 350 BC – and in Timgad, Algeria, a Roman Empire settlement from 100 AD (Fig. 02). The perpendicular streets formed rectangular blocks that spread out from the core. These principles were further developed by the Roman military through *Centuriation*[3]. A system was developed with plot sizes ranging from *actus* to *jugerum* and *heredium* that ends with a century that is the whole camp size (20x20 *actus*) (Zancanella, Vedovato & Rossi, 1981). The Pretoria *dorpserf* has an exceptional proximity in size to that of a *jugerum* (35.5m x 71m), which is the amount that two oxen can plough in a day (Zancanella et al., 1981). The people of Pretoria had to provide for themselves as there were limited external resources available. Therefore the early settlers needed large enough plots for subsistence farming and residency (De Klerk, 2018).

General issue

Urban morphology is a term used in urban design that refers to "the study of change in the physical form and shape of settlements over time [that] focuses on patterns and processes of growth and change" (Carmona, Heath, Oc & Tiesdell, 2010:77). Morphology has many spatial informants including typography, the pedestrian or the vehicle that determine the layout, shape and size of blocks. The beginnings of human settlements developed from pedestrian movement that produced a delicate morphological grain (Fig.03) as seen in Istanbul, Kumasi and Kampala. Later expansions of initial settlements as seen in Barcelona, or during colonial development such as New York or Abidjan have structured gridscapes, focused on the motorcar dominating the built morphology.

Urban issue

The colonial grid influence is relevant to Pretoria, although the mode of transport was the *ossewa*. This vehicle influenced the street size and particularly Church Square's design according to the *ossewa's* turning circle (Pieterse, 1942:24). Typography and water sources are definite influences of the morphological development of Pretoria as the inner city is situated between two rivers (east and west) and two ridges (north and south).

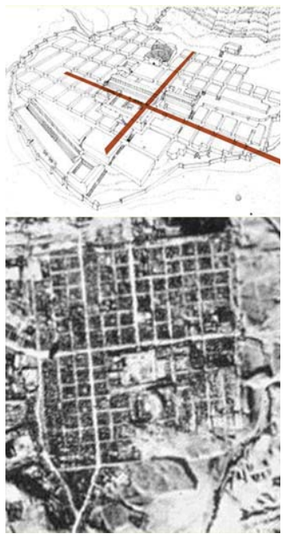
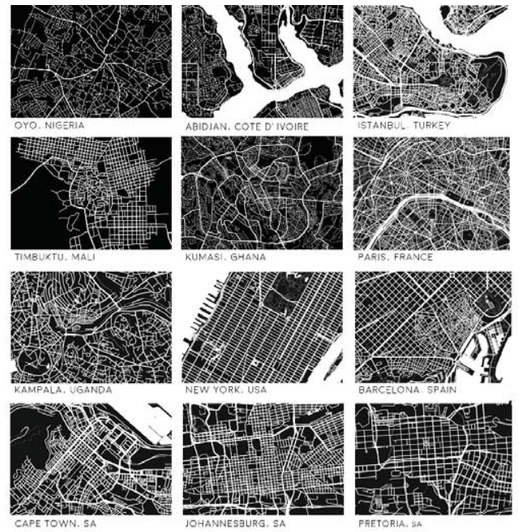


Fig. 02. Below Left; Priene and Timgad's grid (Adapted from Prinsloo, 2013)
Fig. 03. Below Middle; Morphology with different spatial informants (Vermeulen 2019)
Fig. 04. Below Right; Pretoria *dorpserf* size influences (Vermeulen 2018).



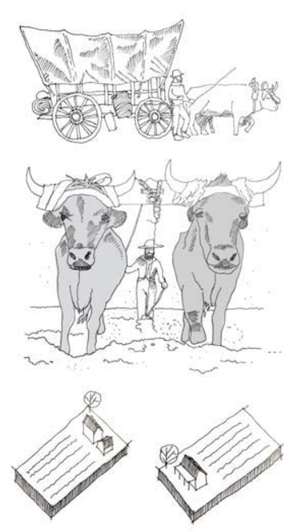


Fig. 05. Left; Latent spaces in Pretoria inner city (Vermeulen, 2019)
Fig. 06. Opposite; Palimpsetic attitude towards heritage (Vermeulen, 2019)

The rivers were used for irrigation by means of a furrow network and the ridges on either side dictate the sprawling directions into the east and west. Furthermore, town planning development schemes such as the Freeway proposal of 1967 – including the Ringroad scheme (Bruinette, Hugo, Kruger & Stoffberg, 1967) – was later partially implemented through Nelson Mandela Drive and Nana Sita Street. Carrying out these disruptive strategies contributed to the loss of delicate inner city fabric, ensuing an oversupply of vehicular space.

Latent Space

The above mentioned urban design informants of Pretoria resulted in large scale city blocks and wide streets that mostly alienate the pedestrian due to their sheer scale. A further problem arising from the morphological development of Pretoria is the fragmentation of the block fabric, where buildings become islands detached from each other. This occurrence is called “Modernist urban space” (Carmona et al., 2010:77), referring “to buildings as separate freestanding ‘object-buildings’ [surrounded by] amorphous ‘space’” (2010:77). In this paper these formless, ill-defined in-between spaces in blocks are referred to as latent spaces, so-called due to their hidden potential. These spaces are leftover segments between built forms, specifically in urban environments. Latent spaces are either inaccessible or underutilised fragments that are deemed lost (Trancik, 1986:3). The types of spaces characterized as latent include the spaces leftover after planning for parking lots, emergency services, or other functional reasons. Furthermore, latent space includes spaces that have been abandoned and are in need of repair and/or protection.

There are several spaces in the city which have over time, either been implemented to serve the citizen, or have been civic spaces since the origins of Pretoria that adapted to suit the needs of the changing environment. Such a space is the network of arcades in Pretoria. Some of these arcades are still used as thoroughfares with some permanent shops and pedestrians passing through, yet the historical sense of place is lost and the pause spaces are limited (Allers & Breytenbach, 2015:28). As soon as an arcade has insular functions and becomes overtly mono-functional (mainly retail), a space meant for relief and pausing becomes a mall typology of consumption and hurried life. Another type of city-internal space is the public civic squares such as Church- and Pretorius Square. Although these large open landscaped spaces have a formal and controlled nature, they have adapted to informalities such as school children playing soccer in front of city hall or flower and art vendors in Church Square. This adaptability and allowing for appropriation by people are perhaps what saved them from abandonment and kept them alive and in good use.

A consideration toward current legislative practice can lead to the reinterpreting of building lines, servitudes and separated *erfs*. To merge several service alleys into one large entrance takes the pedestrian to the middle of the block, freeing up other latent spaces.

Architectural positioning

Attitude towards heritage practices

Three prominent schools of thought emerged over time, including French, English and later Italian, impacting heritage conservation versus preservation strategies. The French school, led by Viollet-le-Duc, was one of the earliest attempts of humanity to advocate for the preservation of buildings. This entails restoration of built fabric to its original glory by mimicking the style and material of the old. This stance was brought about to protect old buildings, as no previous era practiced cataloguing and scientific identification of heritage buildings (Semes, 2009:117). John Ruskin led the English school of thought that had an opposing view to that of the French (2009:117). This school of thought suggests an anti-restorative approach to old buildings. Ruskin focused on the conservation rather than preservation of old buildings. Boito criticised both these schools at the end of the nineteenth century, referring to the French as falsification and the English as a “fatalistic refusal to intervene” (Semes, 2009:124). To synthesize these two opposing views, a third school emerged. The Italian school tried to find a middle path between Viollet-le-Duc and Ruskin by “restoring original fabric” (2009:124) and only adding necessary material in a “modest and differentiated” style. The key aspect that characterised the Italian school was its “urbanistic” contextual focus.

After the basis of conservation and restoration was set out by these schools, several charters were drafted to govern the rules on working with old buildings. The Athens heritage charter was written at the First International Congress of Architects and Technicians of Historic Monuments, held in Athens in 1931 (Semes, 2007:132). The Venice charter, drafted in 1964, is based on the Athens charter and forms the base of Modernist conservation theory. In South Africa we base our practices on the Burra charter, drafted in 1996, that delineates different types of heritage fabric, how to identify these types and how to deal with them. Until today, new conservation strategies are issued to further expand restoration and conservation practices.

“The main task of the artist, critic or historians, therefore, [is] to discern the spirit of the time and give it adequate expression” (Semes, 2007:145).

Fisher (2014:360) and Semes (2007:146) agree that heritage conservation has evolved past strict traditional rules that placed heritage on a pedestal, to be viewed and admired from a distance. Conservation has shifted towards the understanding that the built remnants of the past are “layered in time and living” (Fisher, 2014:360) which means that they are preserved in time, yet actively

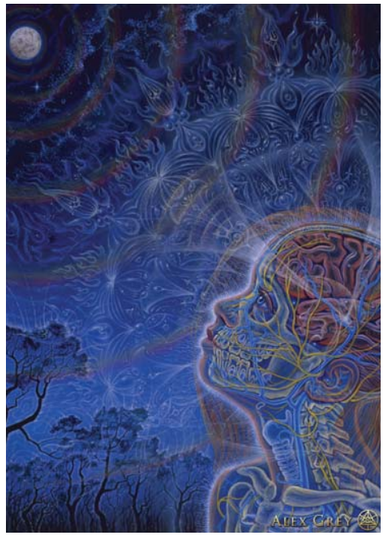


Fig. 07. Left; Marc Antoine Laugier's Primitive hut of 1755 (Ruarte, 2013)
Fig. 08. Left Middle; Perceiving interconnectedness (Grey, 2017)
Fig. 09. Opposite; Timeline of heritage practice and influences (Vermeulen, 2019)

contributing to the present condition. Fisher compliments heritage projects in the built environment that respects the heritage, but adds a new "narrative which embodies something of our own time". Bollack (2013:16) explains that old built fabric is an "architecture of fragments, of incomplete parts [and] recovered stories." She further states that when an addition threads itself into the old fragments and parts, a dynamic new existence is created between the old and new. This effort to design "with history" (2013:21) redresses the original structure that was neglected or unnoticed before the contemporary integration (2013:11). Fisher and Bollack's views highlight an attitude towards heritage conservation that is palimpsetic in nature, where knitting and layering the new with the old, respects the existing while representing the *zeitgeist*.

"An old building is not an obstacle but rather a foundation for continued action" (Bollack, 2013:9).

The approach towards designing with heritage takes shape in different methods of intervening according to each building dealt with. The project transforms the environment and creates a dialogue between the existing and the new addition. This allows for prototypes and idioms to be derived from the context. The attitude towards heritage is palimpsetic, yet recognisable. The addition makes use of innovative technology of the time and acts as separate and new (Fisher, 2014:361), in essence representing its own *zeitgeist*. The existing fabric will undergo; calculated demolition, reprogramming and refurbishment. Finally the intervention should provide and preserve living heritage to allow the story of place to grow back.

"a different story is born, a new plot is composed out of the old words, a new interpretation has taken place" (Machado, 1976:48)

Architectural continuum

In this paper, the architectural positioning flows from the 1960s change in perspective, initiated by Jane Jacobs' book The Death and Life of Great American Cities (1961) and Rachel Carson's Silent Spring (1962). Their opposing views stem from a long journey and developing relationship between the natural world and the perceived boundary between it and humans. Fritjof Capra's book The Web of Life (1996) combines the many views of the shift towards holistic thinking with focus on interconnectedness.

These influential authors' views resonate with Laugier's argument to return to nature illustrated through the famous depiction of Architecture's muse pointing towards the primitive hut. The perceived boundary between man and nature must be obliterated to move towards a holistic understanding that we are equally part of the cosmos, just as the dandelion, worm, bird, and bee are all connected and intertwined. This worldview finds expression in architecture as Sustainable and Regenerative design paradigms.

The ecological movement is in direct opposition to the structured, controlled utopian views of the Modernist period. Although the architecture of this dissertation will not focus on the new resultant paradigms, the notion of holism will find application.

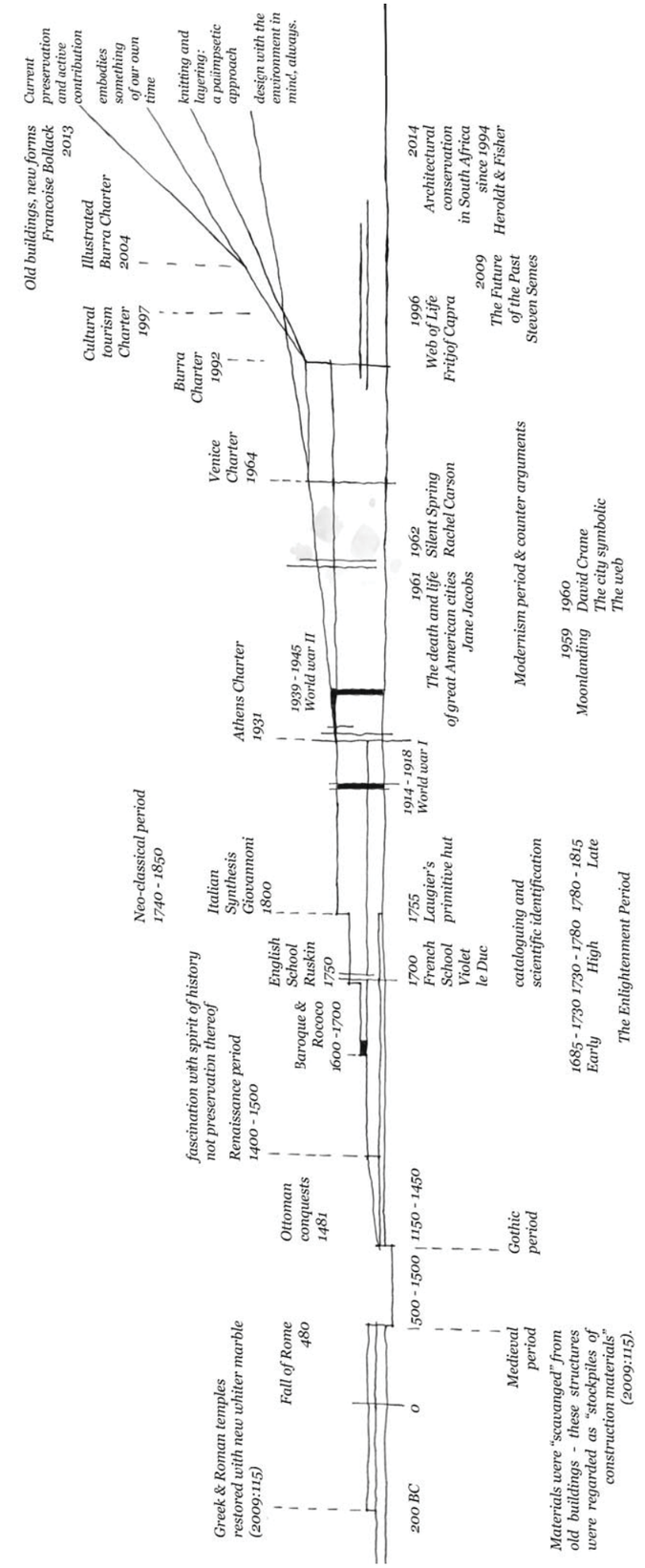
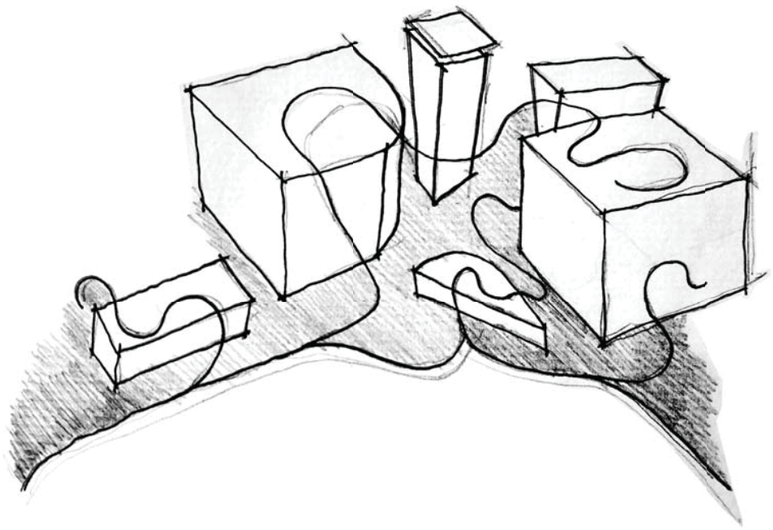


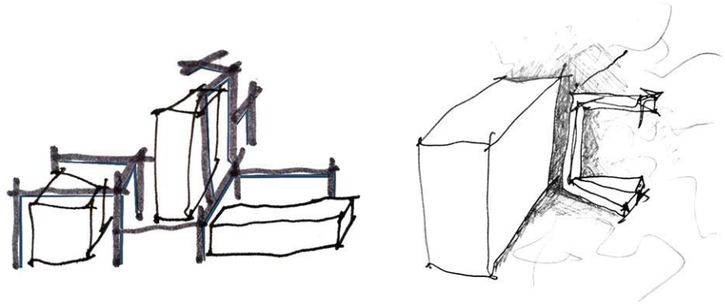
Fig. 11. Right; A thread of interlinked spaces (Vermeulen, 2019)
Fig. 12. Opposite Right; Adding layers and traces left behind forming a patina (Author, 2019)



Architectural issue and intent
The morphological development patterns and resulting city fabric of Pretoria indicate that the city is in dire need of spaces that can contribute to the lived experience of the citizens. This might be done by using and consolidating lost spaces in the city in new and innovative ways to give back space to the city user. Through the addition of events and activities within the interior of the fragmented blocks, pause spaces and pockets of relief will allow an expansion of the realm of the citizen. Interiority is sought to grow within the city block, creating a finer grain fabric focused on feet as mode of transport.

The architectural dissertation on which this paper is based re-imagines architecture from individual, insular objects to threads of spaces interlinked by open areas and walkways that encourage interaction between different users.

Furthermore it proposes that architecture should be a catalyst to encourage interaction between the user and the surrounding space, where the building interacts and morphs with its context. The designed spaces should have multiple facets, uses and stakeholders, allowing complex and diverse activities and interaction. An aspect related to latent spaces is creating porous block edges to present possibilities for the pedestrian realm. Permeability refers to the extent that “an environment allows people a choice of routes through and within it. In general terms, it is a measure of the opportunity for movement” (Carmona et al., 2010:81). This approach has discovery and exploration at its roots where existing networks are connected, enhanced and new links are revealed.



Architectural application

Anderson’s traces and places
Anderson (2009:5) refers to traces as “marks, residues or remnants left in place by cultural life”. Traces are either physical elements such as buildings and graffiti, or non-physical elements including events and activities. These marks left by daily activities give meaning to a place and makes it memorable. The continuous production of traces in built fabric create transient, dynamic places that are “in fluid states of transition as new traces react with existing or older ones.” The different traces can form a pattern with other places’ traces and become webs that are “entangled and (con)fused” (2009: 11). Users of the spaces create marks or changes, left behind intentionally or not (2009:8) and this is the root of the architectural contribution. The architecture attempts to create a user interface that enables interaction and appropriation. The design encourages traces by allowing for an extended pedestrian realm in and around the building, to create pockets for traces to be left behind in.

“Traces often remain in place as shadows and echoes of places past” (Anderson, 2009:11)
Anderson’s traces of the architecture becomes the patina of the building, resulting from continuous interaction of people and animals with the building’s interface, and the changing of seasons as delicate remnants left by long passage of time.

Palimpsest
The word palimpsest has different applications always referring to layering and adding to the existing. The Encyclopaedia Britannica describes palimpsest as “a text erased, or partly erased, underneath an apparent additional text”, where the Merriam Webster Dictionary defines it as “something having usually diverse layers or aspects apparent beneath the surface.” Machado (1976:46) explores the notion that “formal intervention on existing form” is a concept of palimpsest. Through erasing and reworking parts of the existing to create new spaces, the architecture transforms into palimpsest.

Furthermore, to perceive the context in a palimpsetic nature allows an understanding that change is the only constant. Time is continuous, but to capture multiple moments in time is to capture architecture. Therefore, considering architecture in its morphological context allows for a palimpsetic building to emerge that adds a new layer and morphs from its context. Hereby the fragmented latent spaces on the block are healed and replenished.

“Architecture must aim to re-establish contact between places and between people and places, to be part of an environment that is enhanced by its presence” (The Plan, 2018).

In the inner-city where little room is left for a volatile, unpredictable future, which may hold unanticipated variables, it is of great importance to use space effectively. This is in harmony with palimpsest, where disused built fabric become crucial reusable spaces.

“We should not to forecast what will happen, but try to make provisions for the unforeseen” (Habraken, 1961).

When designing a building the architect should recognise that change may happen; it is in fact inevitable. The architecture should therefore be able to change and expand while remaining durable and robust throughout the different uses, events and activities it hosts over time. Moreover, the spaces should respond to the climate and the changing of seasons to represent the passage of time, palimpsest in motion.

The conceptual approach
Four conceptual design strategies were developed and are used as prototype for regenerating latent space in the city of Pretoria. These strategies are new connections, insertions, extensions, and appropriations.

The prototype is applied to the internal façades of the buildings, to face inward and incorporate the latent space adjacent to it. Moreover, the prototype gives new abilities to the latent spaces and facilitates integration into the urban fabric. These intervention and prototyping strategies become new ways to consolidate the inner city fabric.

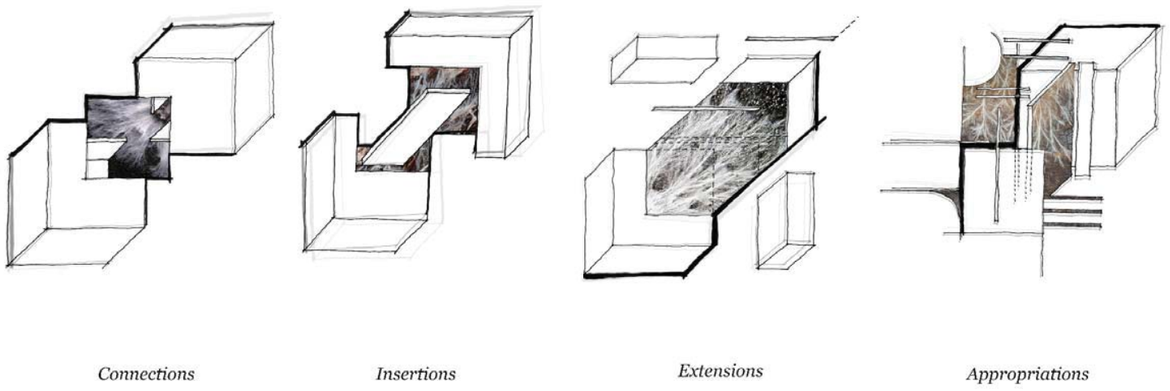
Connections
Existing networks, pedestrian and programmatic, are connected with new inter-linkages. New connections between old and new architecture are formed through the addition. Different stakeholders and users are connected through the intervention.

Insertions
With the insertion of activities and events in the internal areas of the block, as well as into existing buildings, the spaces are regenerated and given a new lease on life. The insertion activates the latent potential of the space.

Extensions
Extending the existing functions and spaces of the block create a foundation from which the new architecture can grow. This strategy obscures the line of internal and external areas by introducing multiple layers of threshold spaces.

Appropriations
After the new intervention is placed, people are encouraged to appropriate the space, creating temporary additions and organic growth of market and vendor space within the block. Currently, people appropriate spaces on the fringe of the block by attaching their activities to fences and columns. The spill-out activity in front of shops is another element latched onto by other vendors.

Fig. 13. Below; The four strategies of the prototype (Vermeulen, 2019)



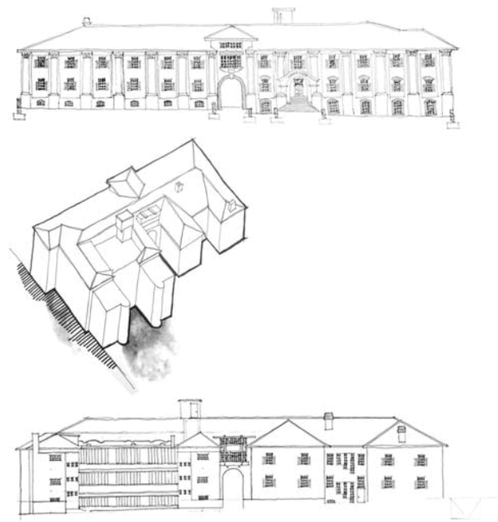
Case study area

From mapping Pretoria inner city, five potential sites were identified. These sites were pinpointed due to certain inherent qualities that include street activity, latency, heritage, proximity to axis, height density, and beneficial existing programmes.

The Land and Agricultural Bank block
The block chosen as study case area sits on an intersection between Nana Sita Street, a morphological scar cutting through the inner city; and the main Kardo axis, Paul Kruger Street. Formerly called Market Street, Paul Kruger Street extends from Church Square, the old Markt Plein. This block exhibits latent potential and opportunities including heritage, height and density, beneficial existing programmes, street activity, proximity to axis, and latency. The extent of latent space is adequate and shows capacity for activation and connections to be made. The block has a saturated amount of building types and programmes: crafts, basic needs, nutrition, luxury, residential, educational, spiritual, and business oriented. Identified clusters where different patterns and elements intersect provide opportunities for new architecture to generate.

The old Land and Agricultural bank building
The Land and Agricultural bank is a two and a half storey English Neo-Classical Renaissance building. The first portion of the building, on the Southern corner of Paul Kruger Street, was completed in 1915 by Cowin, Powers and Ellis. An addition was made to the North of the building in 1922 continuing the same style, scale and proportion. The final addition was added in 1932 by Gerard Moerdijk, respecting the street façade and keeping the order, style and proportion. Yet, the addition's western elevation (facing the block interior) morphs into an Art Deco piece that represents the style of the era it was built in. Moerdijk's addition morphs with time and therefore it is a good example of a palimpsetic approach to conservation. The Southern wing was demolished in 1966 to make way for the Land and Agricultural Bank's new high-rise Modern administrative offices (Hannes Smit building).
Historically, the Land and Agricultural Bank provided services to farmers and supported them, echoing the agrarian perspective of Pretoria. The building's use changed to UNISA's Mathematics department after the Land Bank moved to the Hannes Smit building (Cape and Transvaal printing, 1973:82).

Fig. 14. Below Left; Case study area (Adapted from ArcGIS imagery 2019)
Fig. 15. Below Right; Image name or title (Author, 2017)



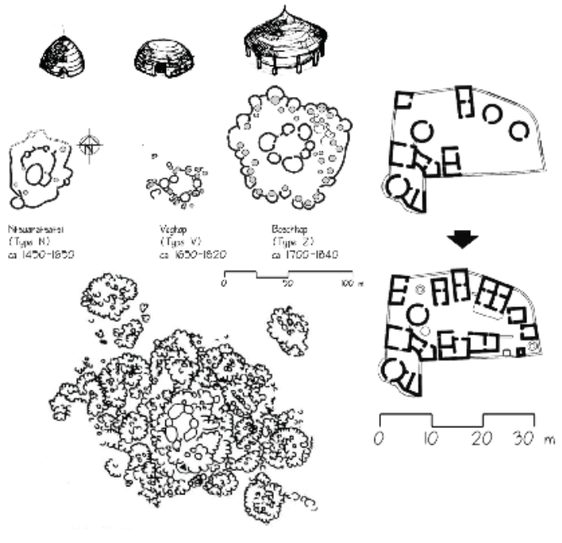
Thereafter, it housed the ‘Southern African Catholic Bishops Conference’ programme, naming the building Khanya House. The current use of the building is an Attorney firm, Maluleke Msimang & Associates. It is from this building that the new intervention’s point of interception grows into the latent space of the block.

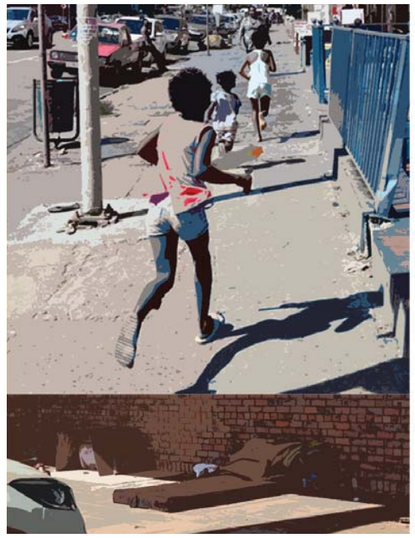
Towards a programme

Influences
The programmatic influences considered are the block’s historic value and the current needs. As an African city, the historical context of communal living and shared space have to be deliberated. These informants have to be incorporated into an appropriate programme accompanying the architectural prototype. African roots of communal living and shared space

As people started settling down in Africa, a compound typology developed with an “inward-focusing” (Steyn, 2007:61) courtyard space surrounded by various small buildings that house separate functions. The courtyard space is where “cooking, socialising and craft industries all took place” (2007:61). The First nation to inhabit Southern Africa was the San, who is a nomadic hunter gatherer society which lives off of what nature provides (Barnard, 1992:37). This nation was driven away by other new settlers such as the Bantu people or the Zulu tribes. The Sotho people were the first to settle in the lower Apies river valley, where later Umsilikazi drove them out to build his own settlement (Engelbrecht et al., 1955:68). Certain typologies developed around the homesteads of the Bantu people of South Africa. A central meeting space, the Kgotla, and animal pens are enveloped by a circle of outer huts and walls (Steyn, 2015:22). Steyn conducted various studies on the history and origins of African cities. Some of his findings are that a market place is frequently the centre of a city, communal open space is usually in abundance, and the cities are site and circumstance specific. He refers to these findings as African urbanism characteristics (2007:62). He further mentions that a city of African origin displays an urbanism of villages, referring to small self-sustaining units that make up a larger whole (2007:62). The clustering of objects to form a whole reverberates in the architecture as an interconnected cluster of spaces, rather than a singular building. Through the African heritage of place making, different programmatic spaces are linked with communal spaces.

Fig. 16. Below Left; First nomadic peoples of South Africa, Sotho woman and highveld (SA-venues, 2019; Engelbrecht et al., 1955) (Vermeulen 2019)
Fig. 17. Below Right; Compilation of different types of compunds and (Steyn, 2007; 2015; Pistorius, 1992)
Fig. 18. Opposite top; People observed around the case study area (Vermeulen, 2019)





Current population and immediate needs
A predominantly young population resides in Pretoria inner city (Statistics South Africa, 2012), reflecting young parents struggling to support their children. The residents of the case study block should be enabled through the programme to provide for their families. Homelessness in Pretoria is particularly evident on the case study block, with many people taking refuge under the overhangs of abandoned buildings. With the rise in crime against the homeless in Pretoria (Mitchley, 2019), it is even more pertinent to provide the basic needs of shelter, safety and nutrition.

Health, nutrition and nourishment
A new ranking system, led by Richard Davies (Millington, 2019), rates countries from healthiest to unhealthiest (Amory & Mitchell-Rose, 2019). Called “The Indigo Wellbeing Index”, it makes use of ten key metrics to rate countries namely “blood pressure, blood glucose, obesity, depression, happiness, alcohol use, tobacco use, exercise, healthy life expectancy, and government spending on healthcare”. According to this index, South Africa is the unhealthiest of 150 countries that formed part of the data. The Wellbeing Index graph shows that the South African government is spending a sufficient amount on healthcare, yet we score the lowest of all participating countries. Perhaps some of the healthcare budget can be redirected towards education in health and wellbeing. As most of the metrics used for the rating system relate to nutrition and diet, people should be informed of the problems caused by unhealthy eating. Through the intervention, preventative knowledge can be provided for the people instead of treating the resulting ill health years later.

The Bank of Nourishment
The budget dispersal is an opportunity for the Tshwane Metropolitan Municipality to start a public-private partnership with several private stakeholders and the citizen as user. A non-profit organisation (NPO) should be incorporated as the interface that provides for the homeless and residents through a Community (Soup) Kitchen, homeless shelter and a programme to work in the vertical fields of the building.

It is envisaged that the cultural food knowledge of nomadic gathering and subsistence farming is rekindled through communal workshops, sporadic markets/vendors and gathering areas with hearths. Moreover, a new social space driven by food is cultivated to teach the people about nourishment. A culinary school, with lecture halls, research centre, meeting spaces, vertical agricultural fields, and restaurant is the link between the high and low end programmes. The high end has new research laboratories that are used by the culinary school in association with the Agricultural Research Council (ARC) and the Department of Energy to forward research on agriculture and sustainable energy. Through this interwoven programme the architectural prototype can replenish the spaces with life and activities, whilst nourishing the citizen.

Conclusion

The proposed intervention will delineate a new relationship between the inner-city user and latent space, to create off street user-relief spaces through the application of the prototype.
The intervention is nested within the geometry, the history and the current needs of the site, morphing from its context. Through using a palimpsetic approach to design with old buildings, a new layer is added to the built fabric. This approach weaves the internal and external spaces together to form a threshold dialogue where the prototype grows from. A building as a single element is questioned and re-imagined as a thread of spaces that create architecture. From the African roots, the concepts of communal activities and shared spaces are key elements to bind the project. Brief encounters, greetings and interactions are encouraged through the diverse programme that is interwoven with public spaces. The application of the prototype in this intervention can lead to novel ways in which to knit the urban fabric – block per block – in the inner city of Pretoria.

Endnotes

1. Pretoria's city block, at approximately 216 x 140m, is larger than most South African city block size (average at ±70mx70m) (Google earth, 2019).
2. During the Roman Empire, the two axes were formally referred to as the Kardo (north-south) and Decumanus (east-west) (Zancanella et al. 1981).
3. *Centuriation* refers to the strict ordering of a military camp developed by the Romans (Zancanella et al. 1981).

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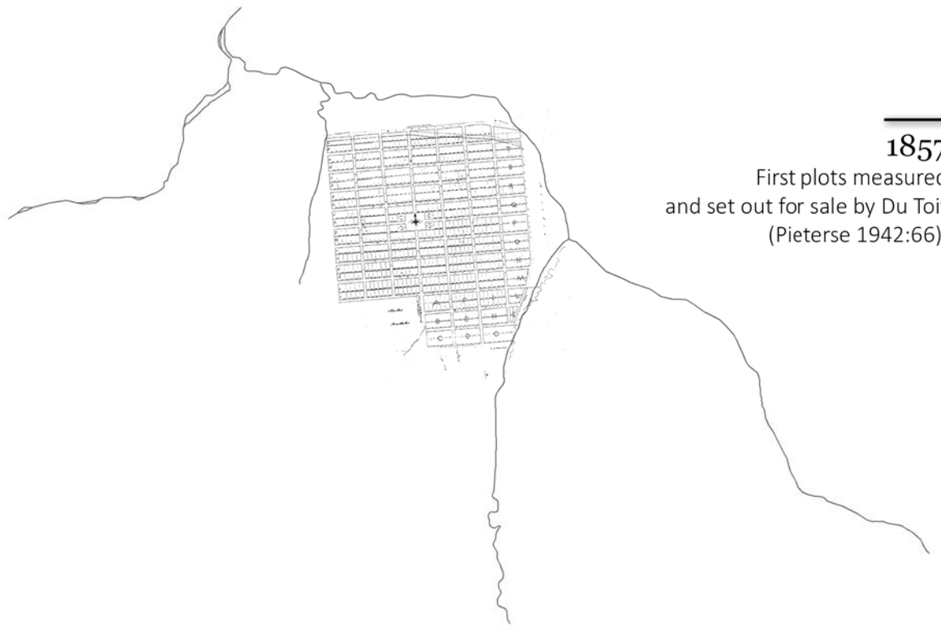
Morphology of Pretoria

Settlement to city

All maps and images consulted are in the UP Van Der Waal Collection

1830

Umsilikazi's kraal:
grasslands with fertile soil, where indigenous trees grow along the rivers
(Engelbrecht, Agar-Hamilton, Pelzer & Behrens, 1955:61).



1857

First plots measured
and set out for sale by Du Toit
(Pieterse 1942:66).

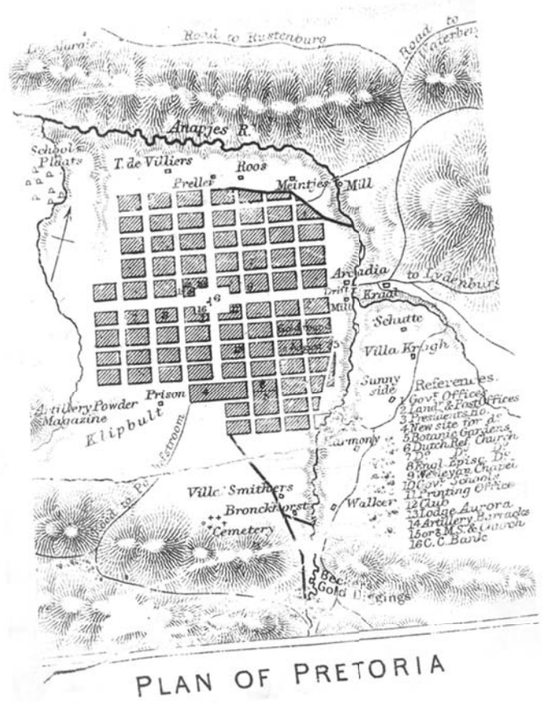
1850's

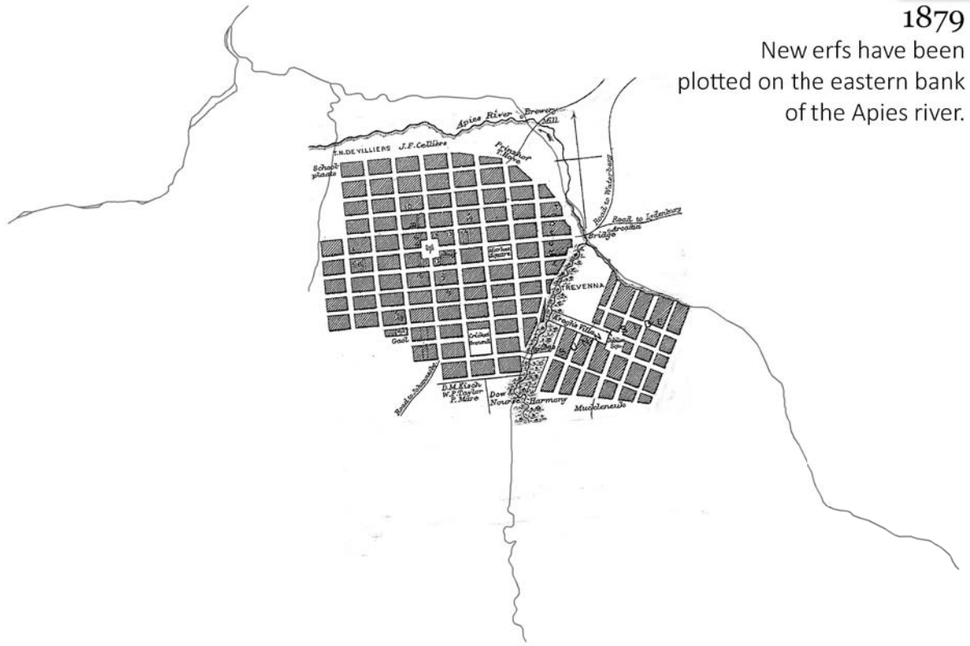
Church built
in 1858
(Afrikana 2015)

First congregation, Pretoria Philadelphia,
in vernacular (wattle and daub, thatched) building
on Church Square with surrounding farmlands (Pieterse 1942:10).

1878

Private farms still border
the eastern bark of
the Apies river.



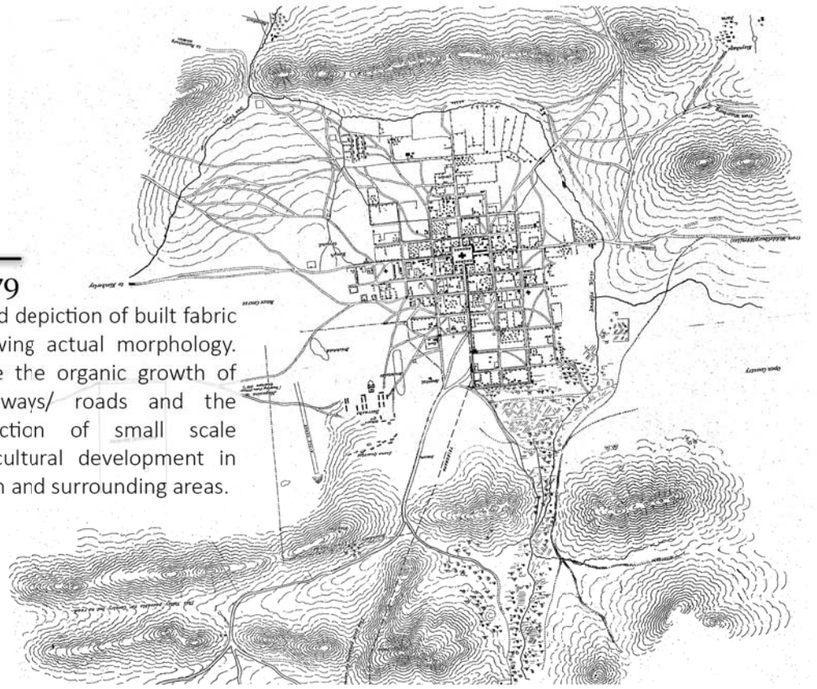


1879

New erfs have been plotted on the eastern bank of the Apies river.

1889

Rapid expansion of Pretoria, to the east.

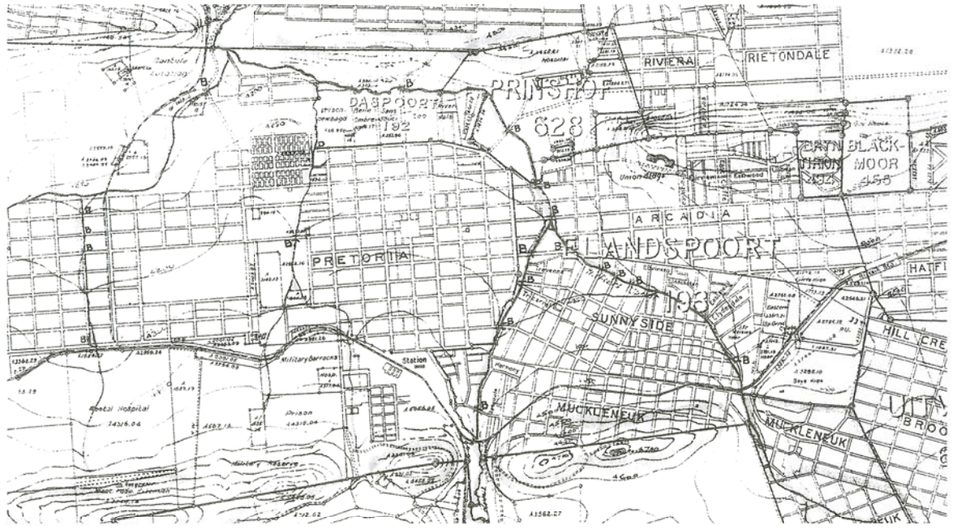


1879

Good depiction of built fabric showing actual morphology. Note the organic growth of pathways/ roads and the depiction of small scale agricultural development in town and surrounding areas.

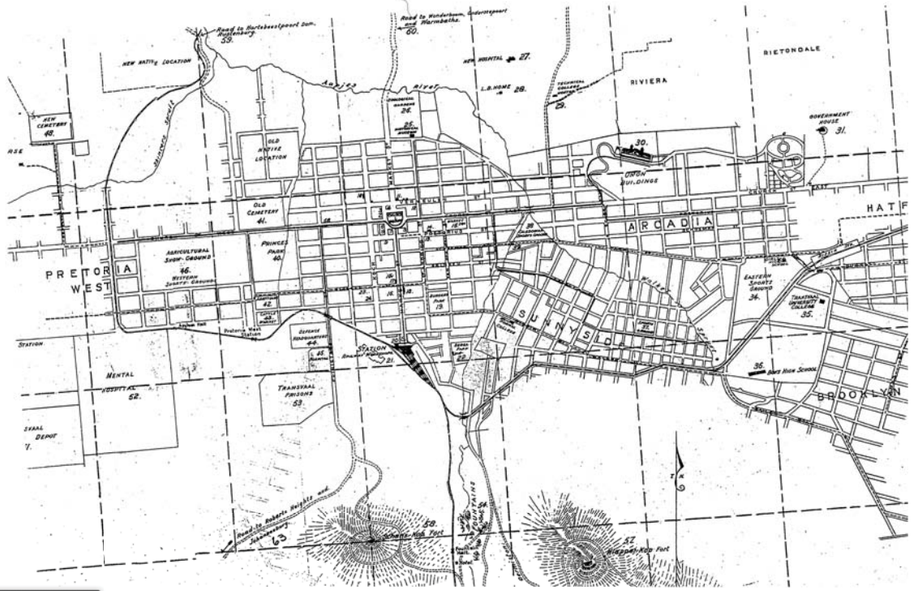
1900

Arcadia and Trevenna taking shape. Note turning of plots to accommodate furrows from river.



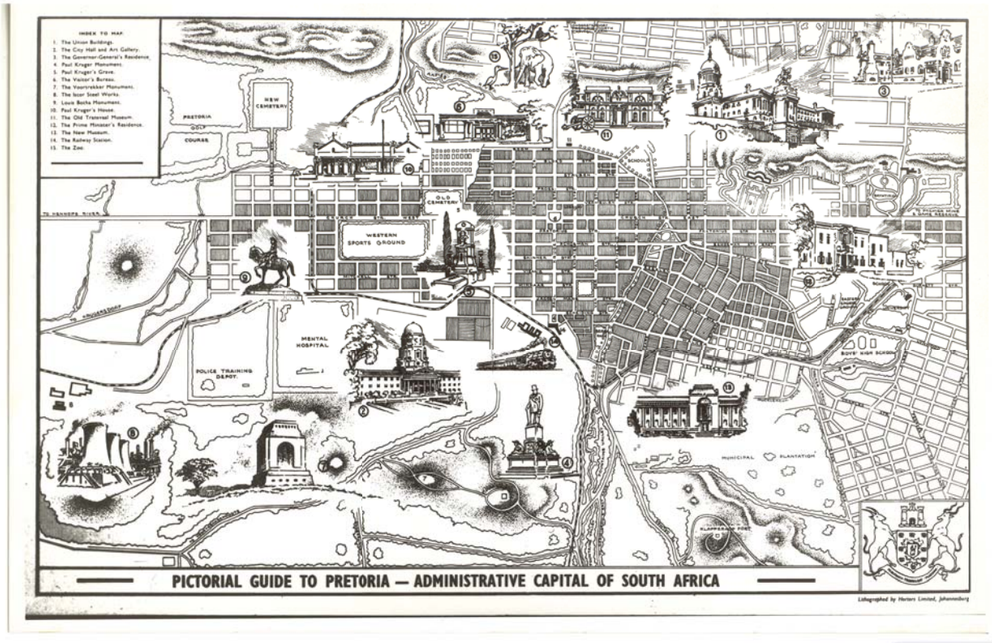
1928

Various eastern suburbs are emerging and western industrial expansion is under way.
Note the different larger farms (Elandspoort, Daspoort, Prinshof) that have been subdivided



1936

Depiction of infrastructural developments such as the railway and roads out of Pretoria.
Note the numbering of important buildings that have been erected



1950's

Pictorial guide to Pretoria showing
important buildings and other features.

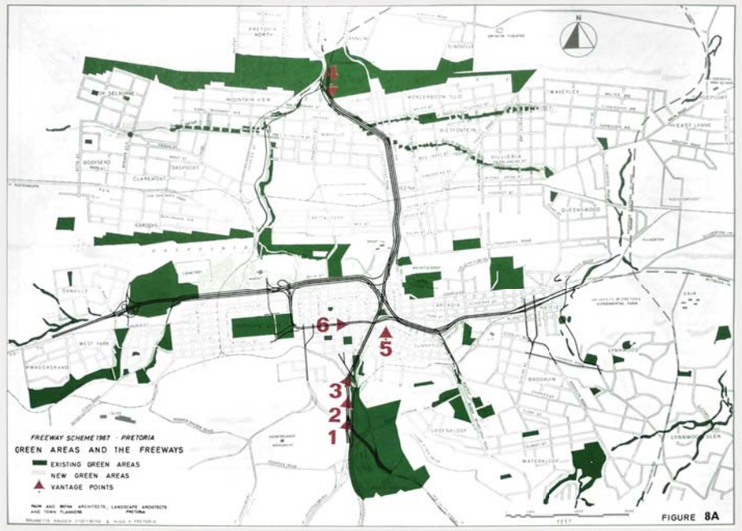
2018

Current built fabric of Pretoria

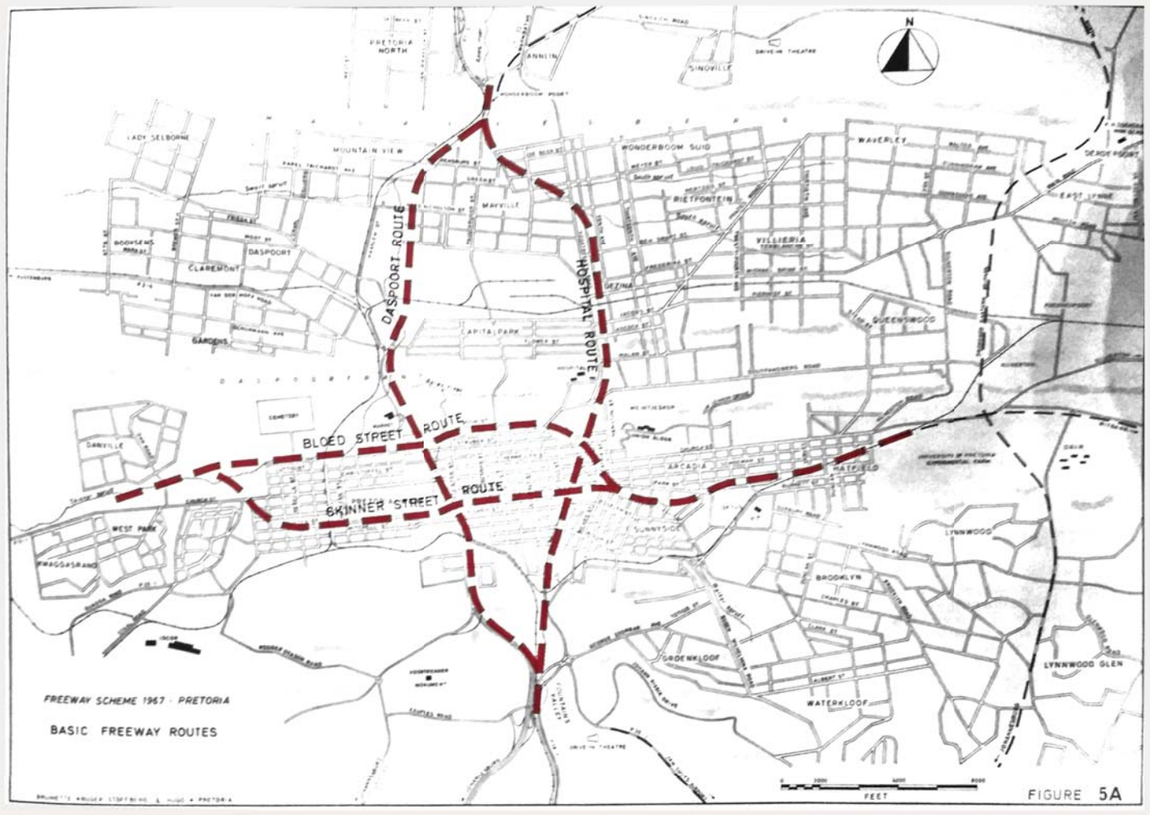
Freeway proposal 1967

(including the Ringroad Scheme)

(Bruinette, Hugo, Kruger & Stoffberg, 1967)

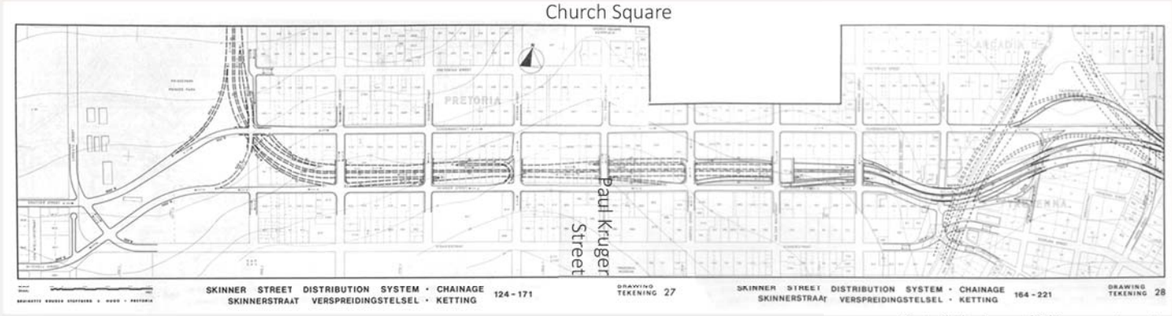


Relation of green areas to Pretoria central.

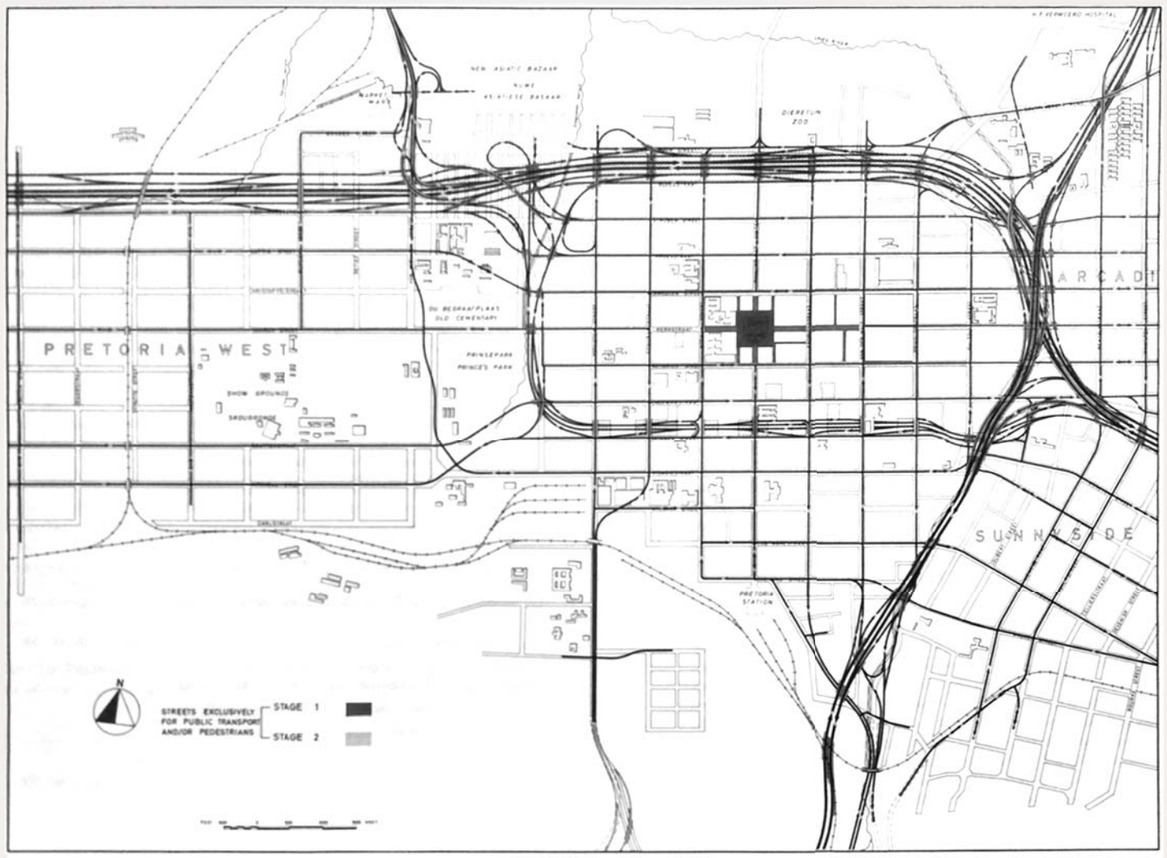


Main routes planned for the scheme.

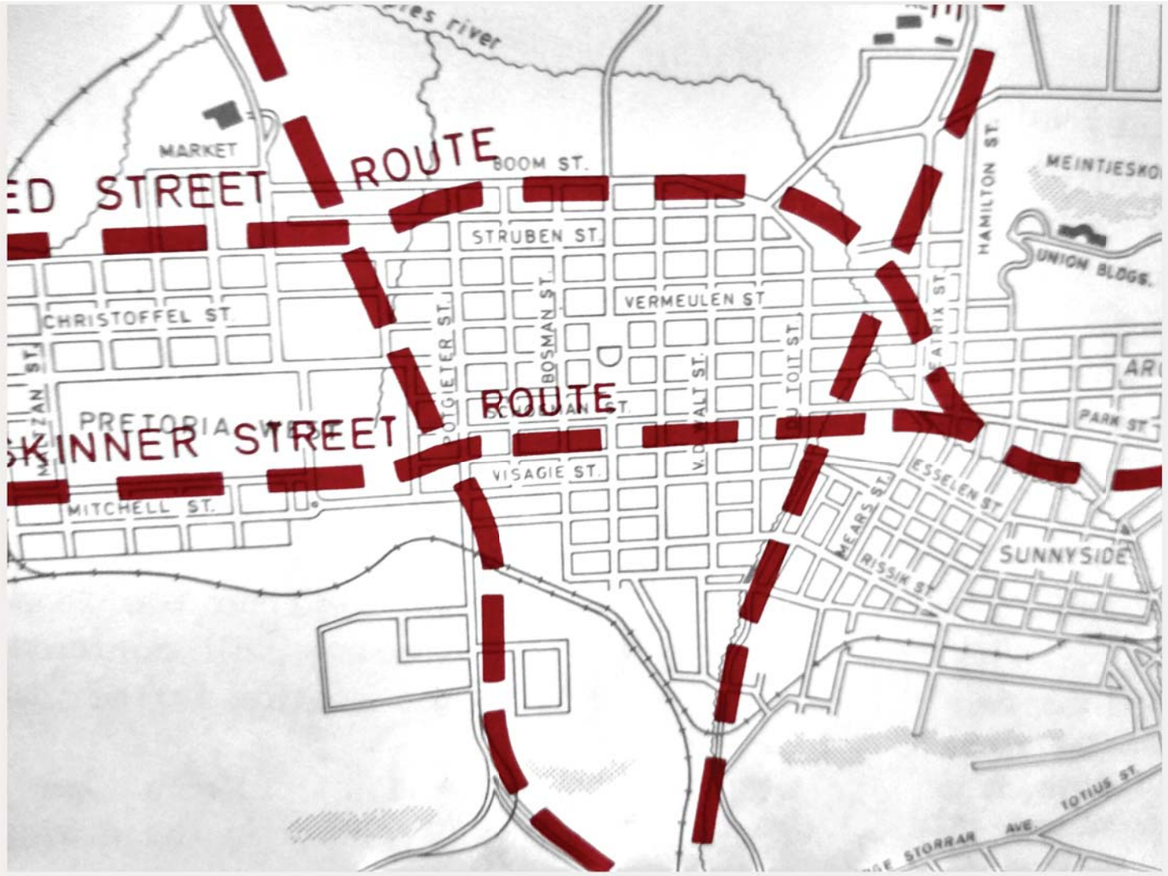
Church Square



Detail design of Skinner street,
many blocks' morphology to be erased.



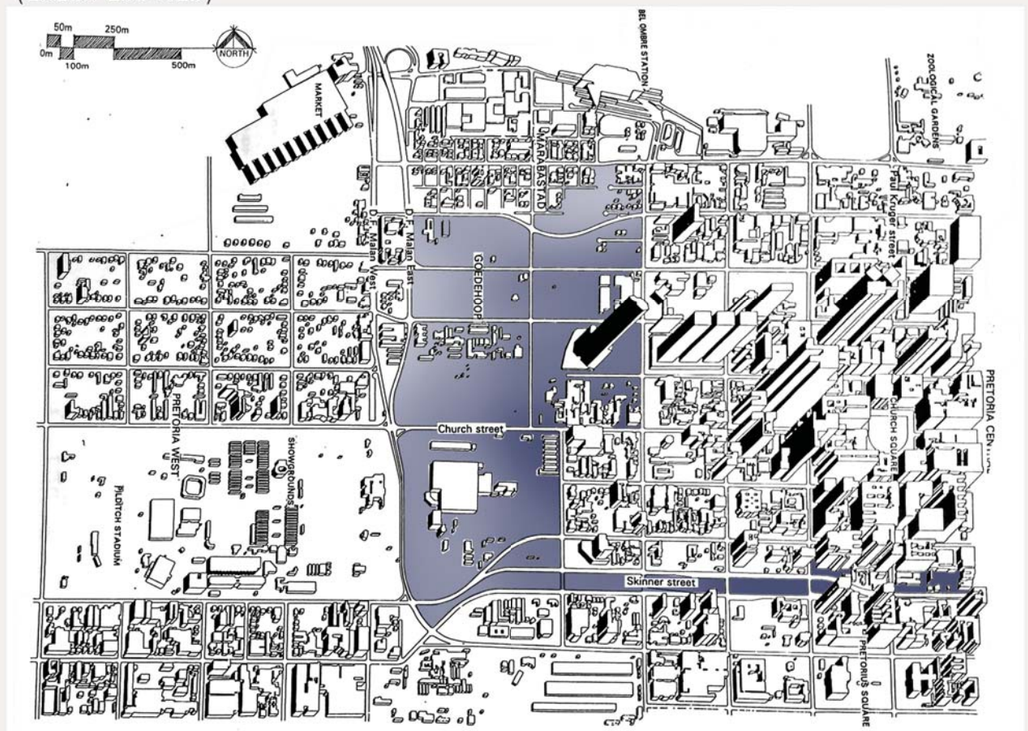
Pedestrian realm vs Traffic realm
Full implementation of Scheme.
Note resemblance of current pedestrian realm,
Nelson Mandela and Nana Sita streets.



Pretoria sliced by the vehicular routes through.

Pretoria scarring

Disturbed fabric after partial implementation of 1960's schemes (Eitzen 1994:19)



Exploring the potential of latent space in the inner city of Pretoria

Toward architectural remedies for regenerating and weaving latent urban fabric and spaces

Annemie Vermeulen
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//Programme
Bank of Nourishment
Middle ground & overarching:
Culinary Art School
Low end:
Building Livelihoods Centre
High end:
Research Laboratories

//Keywords
Latent space, morphology, regeneration, palimpsest, nourishment, food, education, livelihood, hearth.

//Micro case study area
25°45'06.0"S 8°11'14.2"E Old Land Bank block.
The block is bounded by the four roads
Paul Kruger, Visagie, Bosman and Nana Sita.

//Research field
Heritage and Cultural Landscapes, Environmental Potential

//Client
Tshwane Metropolitan Municipality
PEN (Participate Empower, Navigate) (NPO),
Steyn's Culinary School, Agricultural Research Council,
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Fig. 01. Pretoria inner city's perceived vibrancy (Author, 2019)

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Fig. 01. Pretoria inner city's perceived vibrancy (Author, 2019)

[Background and Context] Pretoria inner city, where fleeting movements and moments are enveloped by tall cliffs of concrete and brick, formed on the edges of the oversized blocks. The wide streets, bustling with traffic, push the various informal activities to the fringes of the streetscape, resulting in a small contested pedestrian realm. Narrow sidewalks and limited off-street spaces for public use enforce a harsh environment on the city user (Dewar 1998:369).

[General issue] Urban morphology is a term used in urban design that refers to "the study of change in the physical form and shape of settlements over time [and] focuses on patterns and processes of growth and change" (Carmona, Heath, Oc & Tiesdell 2010:77). Morphology has many spatial informants including topography, the pedestrian or the vehicle that determine the layout, shape and size of blocks.

[Urban issue] Pretoria's urban design informants have resulted in the large scale city blocks and wide streets that mostly alienate the pedestrian due to their sheer scale. A further problem that arose from the morphological development of Pretoria is the fragmentation of the block fabric, where buildings become islands detached from each other. In this dissertation these formless, ill-defined in-between spaces on blocks are referred to as latent spaces, due to their hidden potential as inaccessible, underutilised fragments.

[Architectural issue] Through the addition of events and activities within the interior of the fragmented blocks, pause spaces and pockets of relief will allow an expansion of the realm of the citizen.

The proposed intervention re-imagines architecture from individual, insular objects to threads of spaces interlinked by open areas and walkways that encourage interaction between different users and functions.

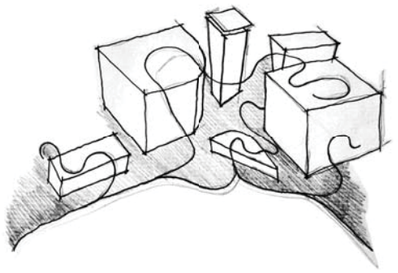

Fig. 02. A thread of architecture stitching multiple spaces(Author, 2019)

Furthermore, architecture should be a catalyst to encourage interaction between the user and the surrounding space, where building edges interact with and morph into the context. Designed spaces should have multiple facets, uses and stakeholders, allowing complex and diverse activities, interaction and form. An aspect related to latent spaces is creating porous block edges to present possibilities for the pedestrian realm.

[Architectural intent and contribution] The overarching intention of the architectural solution is to delineate a new relationship between the inner city user, buildings, and latent space, to create off-street user-relief spaces, through the application of palimpsetic strategies developed from urban, architectural, heritage, contextual, programmatic and technological investigations. These strategies were conceptualised as the design approach, consisting of additions and alterations to the existing built fabric as well as new infill through connections, insertions, extensions, and appropriations.

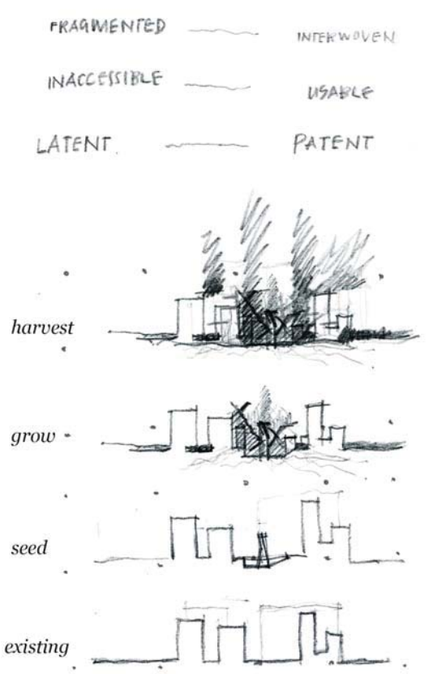

Fig. 03. Reviving fragmented, latent, and inaccessible spaces to interwoven usable regenerated spaces (Author, 2019)

[General issue] Urban morphology is a term used in urban design that refers to "the study of change in the physical form and shape of settlements over time [and] focuses on patterns and processes of growth and change" (Carmona, Heath, Oc & Tiesdell 2010:77). Morphology has many spatial informants including topography, the pedestrian or the vehicle that determine the layout, shape and size of blocks.

[Urban issue] Various disruptive town planning strategies implemented in Pretoria contributed to the loss of delicate inner city fabric, ensuing an oversupply of vehicular space. This results in large scale city blocks and wide streets that mostly alienate the pedestrian due to their sheer scale and size. Furthermore, the city is an unforgiving landscape with narrow sidewalks and limited off-street spaces for public use.

[Latent space] A further problem arising from the morphological development of Pretoria is the fragmentation of the block fabric, where buildings become islands detached from each other. In this dissertation these formless, ill-defined in-between spaces in blocks are referred to as latent spaces, so-called due to their hidden potential. Latent spaces are either inaccessible or underutilised fragments that are deemed lost (Trancik, 1986:3).

[Intention & Contribution] By providing a secondary network of public spaces through the existing blocks, the primary vehicular networks can remain functional, whilst allocating designated areas for the citizen's daily activities in safer spaces. This might be done by using and consolidating the many fragmented spaces in the large city blocks. The proposed intervention re-imagines architecture from individual, insular objects to threads of spaces interlinked by open areas and walkways that encourage interaction between different users, functions and spaces. Furthermore, a dialogue between old and new is created through a palimpsetic approach to layering the site by using new technology to represent the zeitgeist. The architectural result is a layering of complex interwoven spaces that utilise various structural strategies to regenerate and weave the latent urban spaces. The strategies facilitate the 'bounce-back ability' of Pretoria (Wilkinson, Porter, Colding, 2010:26), as a resilient city, in their architectural application and their inter-relationships are expressed in the complexity of the architecture.

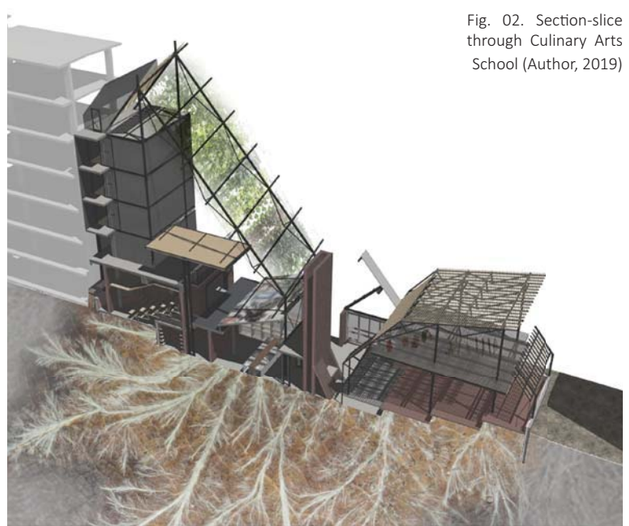

Fig. 02. Section-slice through Culinary Arts School (Author, 2019)

[Structural system] The physical structure is hierarchical: primary structure, secondary and tertiary structure. The structural hierarchy starts off by growing from its setting, utilising contextual materials of concrete and brick. The secondary structure is a foreign object in the context, as a new technology of galvanised mild steel members. The tertiary structure is a mixture of lightweight elements and elevated roof planes.

[Systems] Primary system, Hydroponics. Sub systems, Rainwater harvesting, Bio digesting, Photovoltaic panels

[Environmental strategies]
Light and ventilation for user comfort, geothermal pipes

Fig. 03. Impression of palimpsetic layering of strategies (Author, 2019)