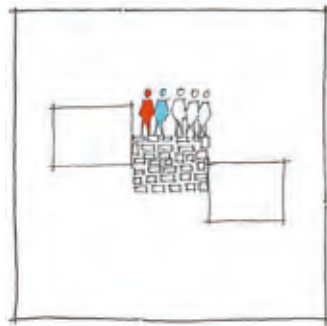


Nurturing Mamelodi

Creating socially cohesive space in Khalambazo and Selbourne & Site,
Mamelodi.



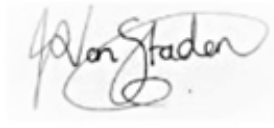
Student: Jade van Staden
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Declaration

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

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

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



DATE: 2021/11/15

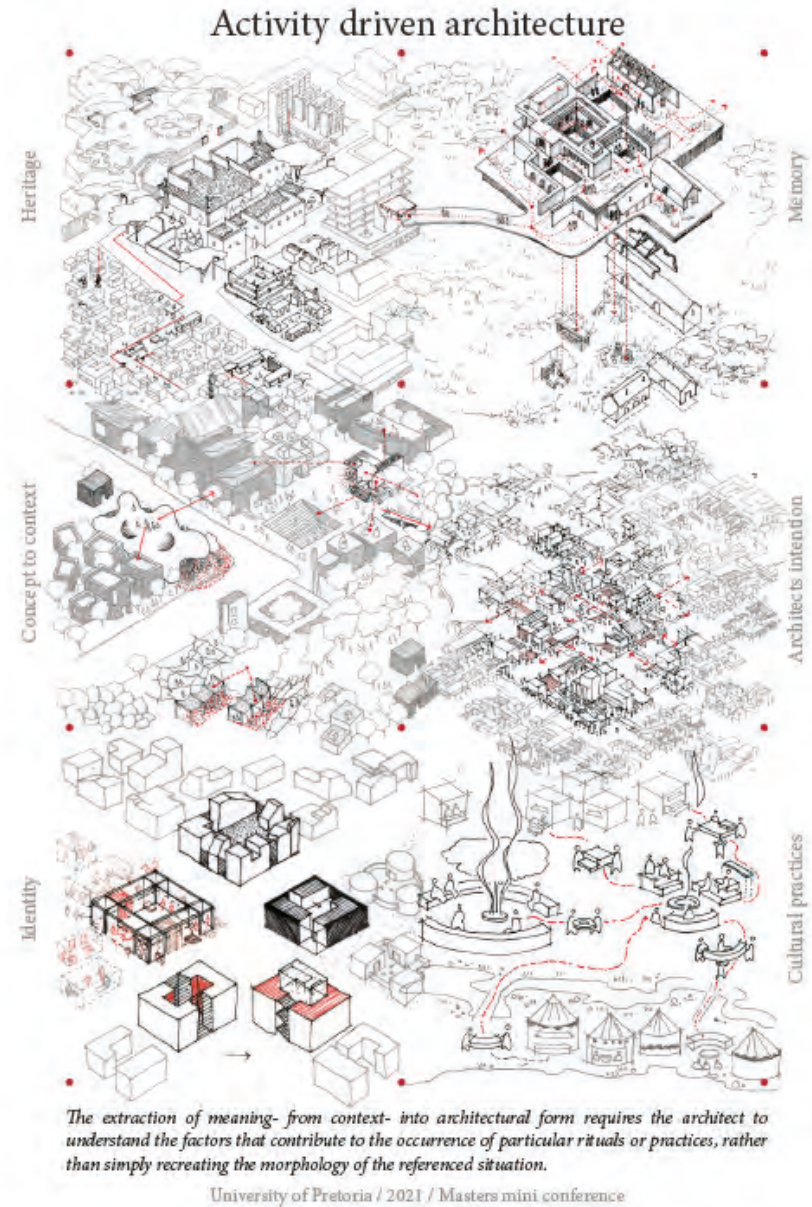


Fig 1: Poster depicting normative position (Forder, Jordaan, Karberg, Thomashoff, Venter, Van Staden 2021).

ABSTRACT

The Khalambazo Buffer Zone is a natural buffer, formed along the banks of the Pienaarspruit. The apartheid government strategically used this landscape condition to divide the communities of Mamelodi into different ethnic zones, and thereby encourage tribalism. Despite a change in political regime, the effects of this urban planning strategy persist in the communities of Khalambazo and Selbourne & Site where the majority Tsonga and Pedi groups are in ethnic conflict with one another.

The intention of the dissertation is to create a socially cohesive space for multiple tribes of Mamelodi. The research employs a participatory design approach in order to generate an informed understanding of the site. A precedent analysis is used to generate a theoretical toolkit to guide and test the iterations of the design process.

As a design response, the dissertation proposes a new landscape condition—a cultural centre that can be reviewed as a constructed landscape which interrogates the natural and vernacular landforms of the site. The cultural landscape explores indigenous food making as a means to express cultural heritage and bring different ethnic groups together. Through this programme and design approach, the dissertation questions the typological understanding of cultural centres in a democratic South Africa.

Keywords: Tribalism, social cohesion, cultural centre, indigenous food making, constructed landscape.

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1 | POSITION AND SITUATION

1.1 | CHAPTER OVERVIEW

The structure of the argument is informed by the research methodology. The project falls within the research field of Urban Citizenship. Therefore, it is required of the researcher to engage with the vulnerable community of Mamelodi, in order to generate a comprehensive understanding of the site and thereby, create a sensitive design solution. Furthermore, the consideration of a community's perspective in the design process contributes to a successful, socially-cohesive space (Hamdi 2002:107). Chapter one of the dissertation will elaborate on this participatory design approach. The findings will be interpreted through a site analysis and problem statement. Thereafter, the methodology uses a multiple precedent analysis, in order to generate a theoretical toolkit to address the contextual issues of the site and inform the future, design approach.

1.2 | OVERVIEW OF METHODOLOGY

The intention of the research is to understand the meaningful interactions that people have with one another, because of their contextual conditions and cultural practices. Therefore, Part One and Part Two of the dissertation's methodology falls within the interpretivist paradigm (du Toit 2014:61). The proposal uses a subjectivist epistemology and relativist ontology, where the researcher uses theory, their own intellect and the interactions with the community, to extract meaning from the collected data (Kivunja et al. 2017:26). The multiple qualitative data methods enable the triangulation of different perspectives, including those of the researcher, fellow students and the participants.

1.3 | ETHICAL CONSIDERATIONS

Reference Number: EBIT 259/2020

Human Participants act as informants for the research, and therefore, ethics clearance has been obtained from the Faculty Committee for Research Ethics and Integrity (2021). The researcher abides by the Code of Ethics for Scholarly Activities (2020) and the Policy and Procedures of Responsible Research (2007).

The researcher accepts that the community may withdraw their participation from the research at any stage, during interviews. The research does not require the personal details of the participants, and the survey questions are not of a private nature. The above ethical considerations respect the anonymity and autonomy of the community (University of Pretoria 2020:4).

The research study considers the current COVID-19 pandemic. Precautions are taken to ensure social distancing is adhered to. Interviews and workshops are conducted outside and masks are worn at all times. The researcher is aware that the Covid-19 Pandemic will have implications on how the community interacts and therefore, may skew the results of the study.

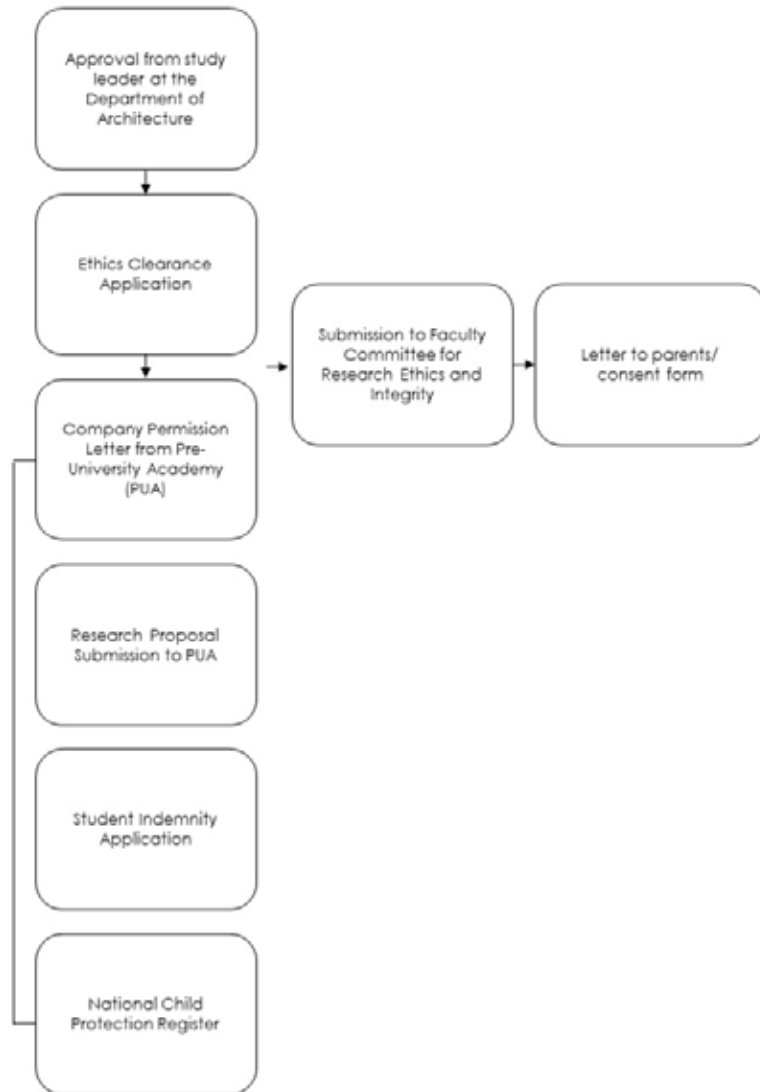


Fig 2: Diagram depicting ethics approval process (Van Staden 2021).

1.4 | SAMPLE GROUP

The research involves the participation of different stakeholders of the Khalambazo and Selbourne & Site communities. The participants include: ten children from Tsako Thabo High School- situated within the Khalambazo Buffer Zone. Fifteen children from greater Mamelodi, who are from the PUA Academy of the University of Pretoria. The child participants are from multiple tribes and are of 15-16 years, ages of acute spatial awareness (Holt et al 2015:73). The research also considers the adult perspectives of fourteen community members whose daily rituals engage with the Khalambazo Buffer Zone, five members from the Thandanani Drop-inn Centre- situated within Selbourne and Site, and five members from SOS Children’s Village- situated within Khalambazo. The mixed sample is able to give both a broader understanding of the socio-spatial reality of Mamelodi and specific perceptions of the focus area.

1.6 | METHODOLOGY PART 1

The participants are approached on-site or through a series of workshops. The participatory approach involves multiple methods of qualitative data collection including: semi-structured, group interviews and different mapping exercises. Group interviews are a preferred datacollection method, as they promote a safe environment in which the community can confidently share multiple views (Lillard 2013:157). The answers to the interviews are recorded using the KoboToolBox (2021), and the mapping and drawing exercises provide an additional frame of reference for the questions.

The primary data is thereafter, interpreted through mapping. The maps serve as the site analysis for the project. The maps are substantiated with journal articles, previous dissertations and newspapers. The findings include the problem statement, which identifies the general, urban and local issues of the site, and the intentions for the project.

Refer to figure 3 for a detailed description of each workshop.

Workshop Scenario	Sample Group	Method	Intention	Analysis
Workshop 1: Functional Understanding Scenario	PUA Learners Tsako Thabo High School Learners Adult Community Members	Mapping Exercise: Community members are asked to: <ul style="list-style-type: none"> Map cultural conflict in Mamelodi. Map safe and unsafe zones in the S&S and Khalambazo districts. Answer a structured Interview concerning cultural conflict, safety and belonging. 	<ul style="list-style-type: none"> To determine the current predicament of tribalism in Mamelodi. To determine the physical and social incivilities of the buffer zone. To generate informants for site selection 	<ul style="list-style-type: none"> Consolidated map of cultural zones in Mamelodi. Consolidated map of physical and social incivilities of the buffer zone.
Workshop 2: Functional Understanding Scenario Functional Requirements Scenario	PUA Learners Tsako Thabo High School Learners	Mapping Exercise: Community members asked to: <ul style="list-style-type: none"> Comment on Khalambazo & S&S districts' streetscape and threshold conditions by marking a photo booklet with different colour stickers: green (civil), orange (unsure) and red (uncivil). Draw their dream home. 	<ul style="list-style-type: none"> To identify physical and social incivilities of the buffer zone. To generate a list of spatial requirements that make community members feel safe and belonging. 	<ul style="list-style-type: none"> Graphical analysis of civil and uncivil threshold conditions Consolidated list of design informants from dream home drawings
Workshop 3: Functional Understanding Scenario Functional Requirements Scenario	PUA Learners Tsako Thabo High School Learners	Urban Dictionary: Community members are asked to: <ul style="list-style-type: none"> To generate a dictionary of S'Pitori spatial words, through a game of 'boggle'. 	<ul style="list-style-type: none"> To generate a 'now' strategy that could encourage spatial cohesion between different cultural groups. To develop a shared spatial language between designer, and different cultural groups. To generate a list of design informants. 	<ul style="list-style-type: none"> Consolidation of spatial words in an urban dictionary design guide.
Site Visit: Functional Understanding Scenario Functional Requirements Scenario	Tsako Thabo High School Learners Adult Community Members	Unstructured interviews: Community members asked to: <ul style="list-style-type: none"> Elaborate on their daily rituals at the buffer zone. Questions concern the customs of the ritual, time and community networks. 	<ul style="list-style-type: none"> To determine existing social capital at the buffer zone. To generate informants for program selection. To determine an accommodation schedule. 	<ul style="list-style-type: none"> Consolidated maps of social capital in relation to site and time. Overlaid incivility maps social capital maps to generate site and program selection.
Workshop 4 and 5: Functional Mockup Scenario	PUA Learners Tsako Thabo High School Learners Adult Community Members	Model making exercise: Community members asked to: <ul style="list-style-type: none"> Generate sensory models/ maquettes of dream reception space. 	<ul style="list-style-type: none"> To develop a conceptual, design approach for the intervention. 	<ul style="list-style-type: none"> Mediation of community's models and designer's models to develop design approach.

Fig 3: Table depicting participatory design approach (Van Staden 2021).

1.7 | FINDINGS | GENERAL ISSUE

Tribalism is the exaltation of a tribe above other ethnic groups. It can be described as a form of extreme patriotism to a tribe (Merriam Webster 2021). Tribes provide a sense of belonging for individuals (Barber 1999:85). However, ethnic divisiveness can give rise to social issues. Tribes violently compete for property, jobs and social amenities in poorer contexts (Baloyi 2018:3, KoboToolBox 2021, Sanou 2015:95). Tribalism is also associated with gender inequality (Abdelrahim 2020: 1071-1072, KoboToolBox 2021, Luthuli 2020:4) gangsterism (Baloyi 2018:3, KoboToolBox 2021, Luthuli 2020:4) and corruption (Abdelrahim 2020:1074, Baloyi 2018:4). These social incivilities discourage democracy.

1.8 | URBAN ISSUE

Tribalism became instrumental in inflicting divisions during apartheid (Chiloane 1990:118, Baloyi 2018:1), and was encouraged in Mamelodi, through different spatial planning strategies:

- Mamelodi was segregated from Pretoria CBD by means of railway lines, an incomplete road infrastructure, and industrial and natural buffer zones (Floyd 1960: 204-205).
- Within Mamelodi, the apartheid government further consolidated different cultural groups into 'ethnic zones' (Chiloane 1990:157) (Refer to figure 5).

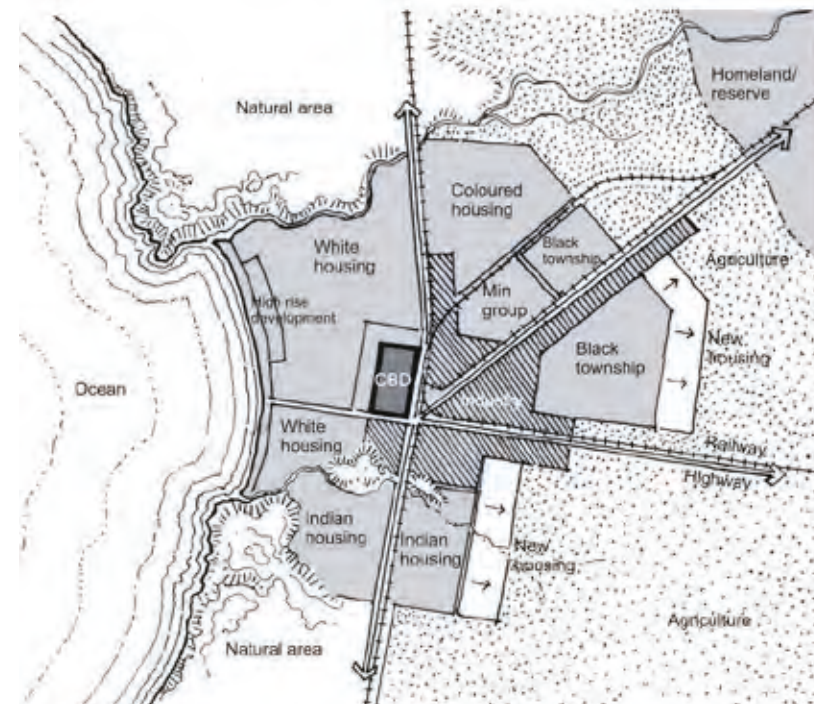


Fig 4: Diagram depicting strategic urban planning strategies during Apartheid (Schoulund 2010).

Different ethnic groups of Mamelodi were segregated from one another by means of natural buffers, industrial buffers and railway lines.

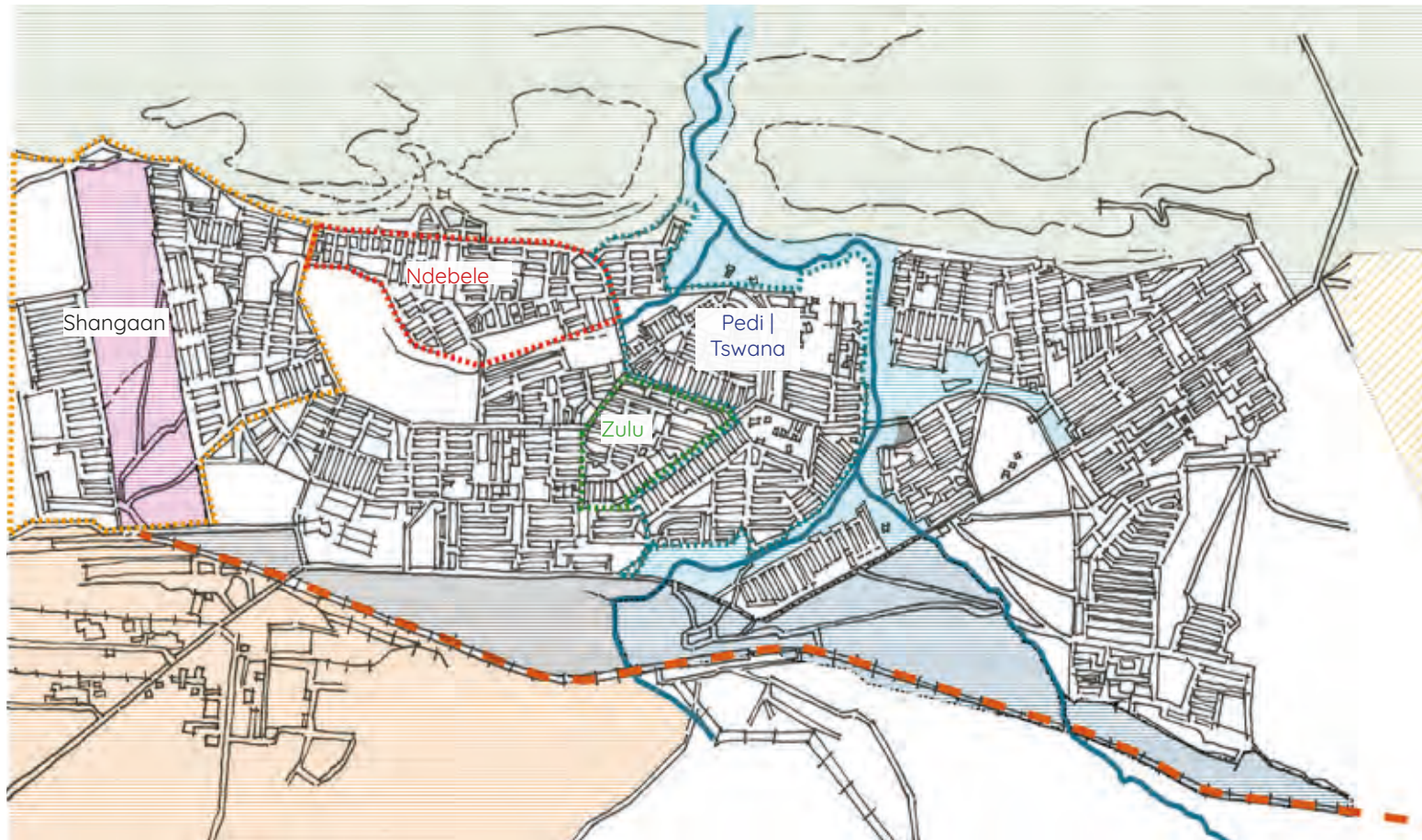


Fig 5: Map depicting Mamelodi's Buffer Zones and ethnic zones (Van Staden 2021, adapted from Chiloane 1990).

1.8 | URBAN ISSUE CONTINUED

Despite the change in political regime, the effects of the apartheid urban condition persist today. This was confirmed by community members, who shared their experiences of tribal conflict at their respective schools, churches and in their residential streets (KoboToolBox 2021). The community were able to identify neighbourhoods where different tribes remain segregated in Mamelodi (KoboToolBox 2021). This information was mapped in figure 6.

Apartheid urban spatial planning strategies create ethnic division in schools across Mamelodi.

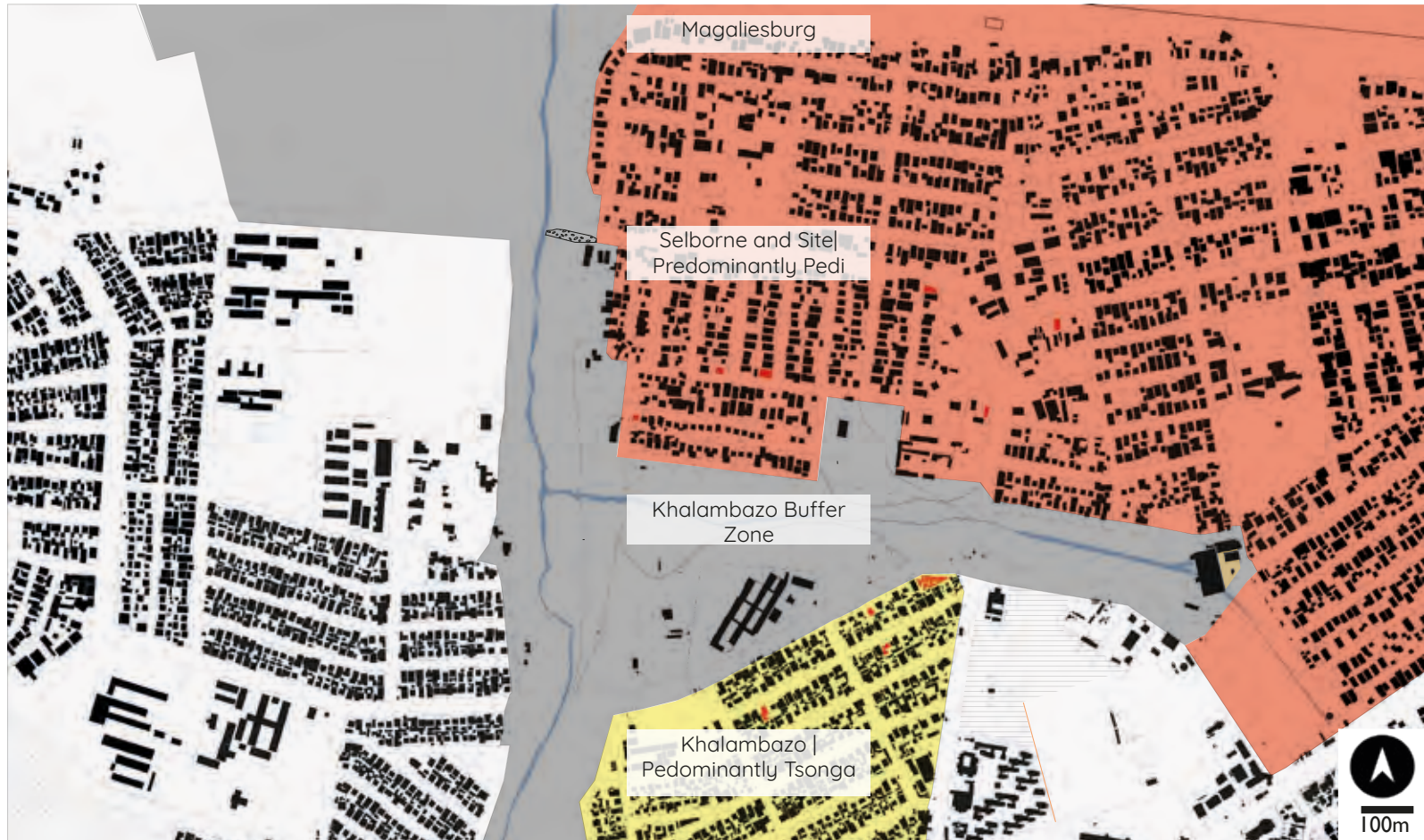


Fig 6: Map depicting the current implications of apartheid spatial planning on schools in Mamelodi (Van Staden 2021).

1.9 | LOCAL ISSUE | CONTEXT

Refer to figure 7.

The focus area of the project is the Khalambazo Buffer Zone, a natural buffer, which was formed along the water banks of the Piernaarspruit. To the north of the river, is the Selbourne and Site District which is predominantly occupied by the Pedi culture and to the south of the river, is the Khalambazo District which is dominated by the Tsonga culture (Chiloane 1990:157, KoboToolBox 2021). The following conditions of the buffer inhibit social cohesion and thereby, encourage tribalism.



The Khalambazō Buffer Zone is situated in Mamelodi East.



Fig 7: Maps depicting chosen site (Van Staden 2021).

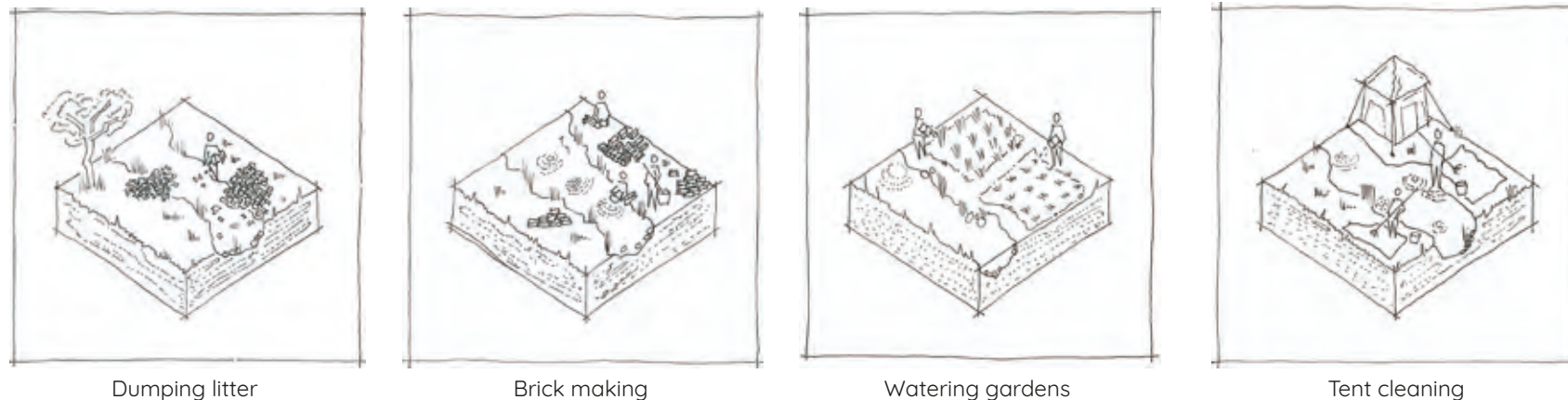


Fig 8: Diagrams depicting how the community uses the Piensaarspruit (Van Staden 2021).

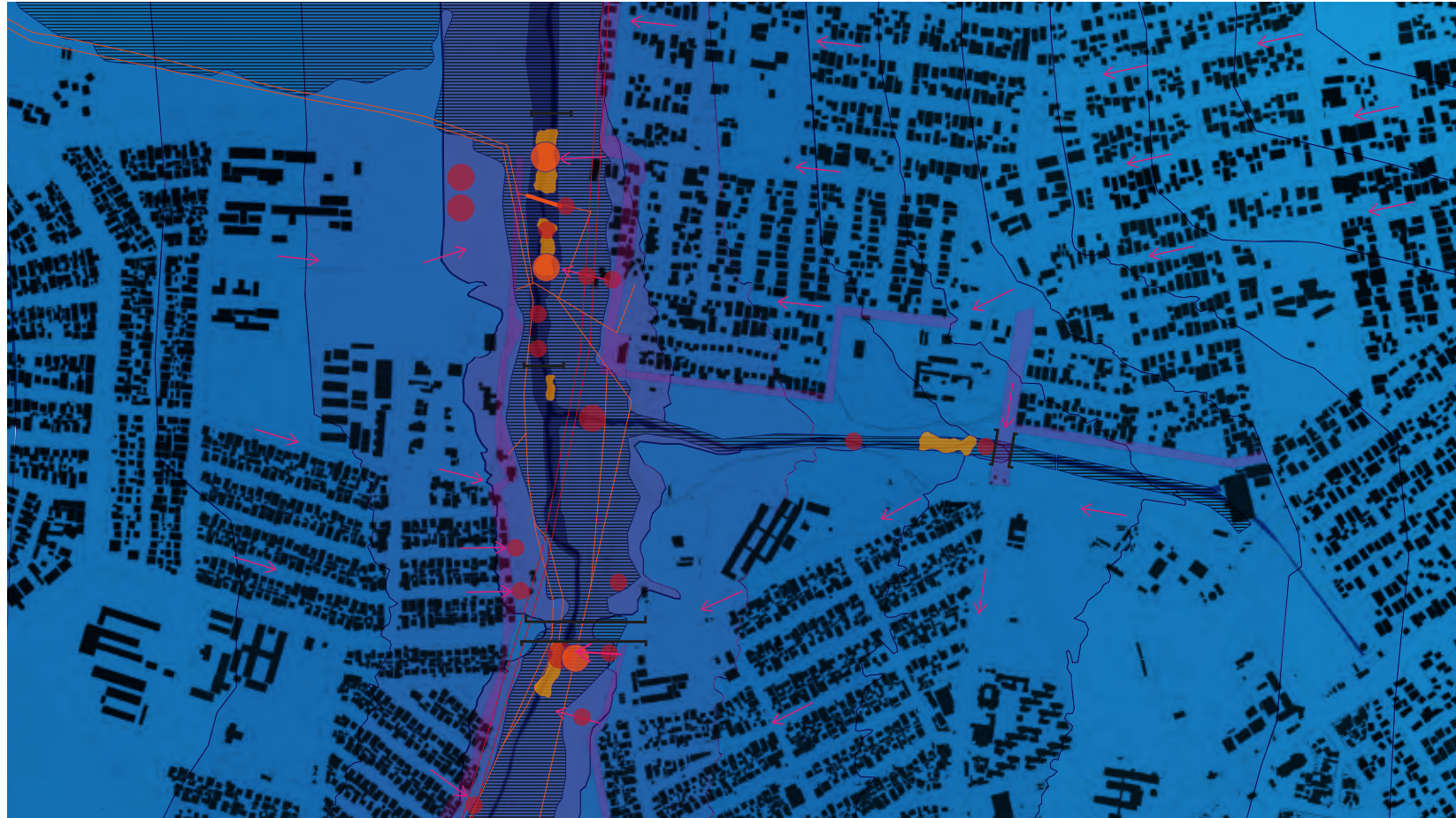
The poor environmental condition of the river discourages social activities.

1.9 | LOCAL ISSUE CONTINUED

The Piensaarspruit acts as a physical and social boundary between the two communities.

There are few safe ways to transverse the river (Darkey et al. 2000:1, KoboToolBox 2021) (Refer to figure 9). The prohibition of movement between the two neighbourhoods, discourages the communities from interacting with one another and the buffer zone.

Dube et al. (2017:51) and Darkey et al. (2000:7) describes the health of the river as “poor because of the very high concentration of pollutants that create uninhabitable conditions for most living organisms.”The surrounding communities recognise that the water is unsafe and are discouraged from using it for social purposes (Darkey et al. 2000:7, KoboToolBox 2021). Rather, the river is mainly used as drinking water for cattle, for dumping refuse, washing tents, making adobe bricks and watering gardens (Darkey et al. 2000:9, KoboToolBox 2021) (Refer to figure 8).



Poor urban planning and a lack of infrastructure negatively influences the health and access of the river.

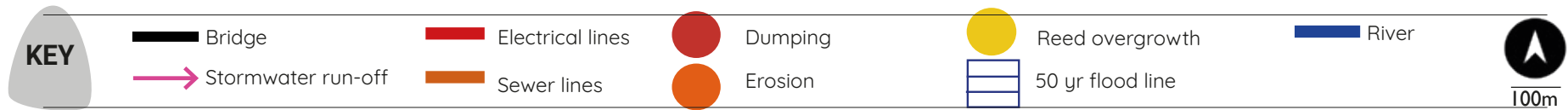
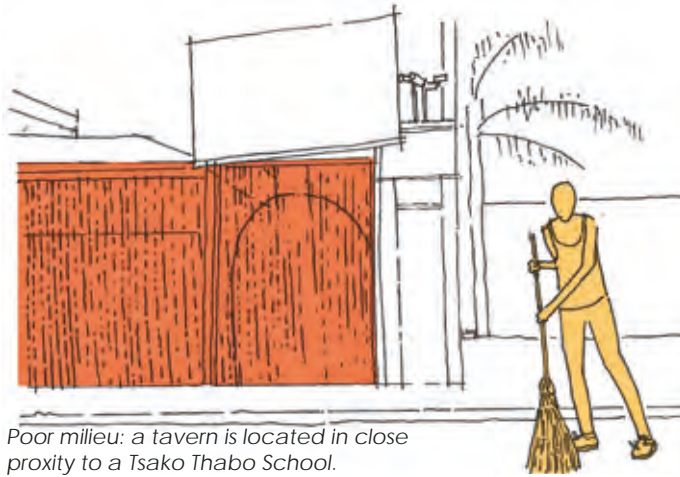
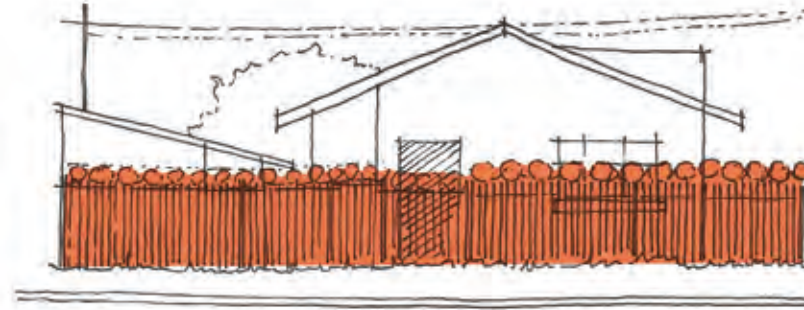


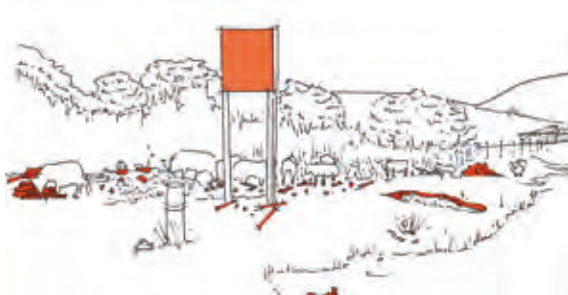
Fig 9: Map depicting hydrological condition of the buffer zone (Van Staden 2021).



Poor milieu: a tavern is located in close proximity to a Tsako Thabo School.



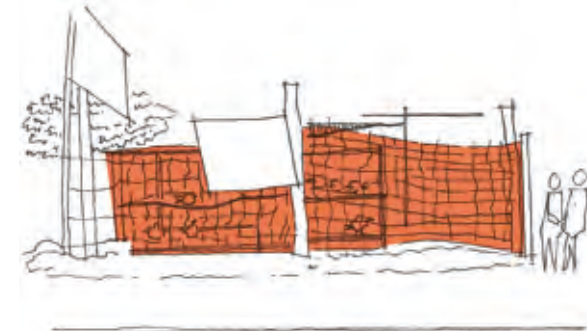
Fenced Households.



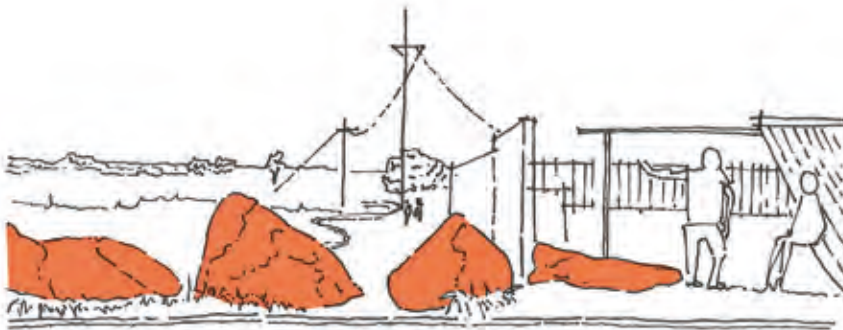
Environmental deterioration: litter, poor animal health.



Fenced Households.



Environmental deterioration: Collapsed structures.



Environmental buffer: large boulders discourage play at Tsomo Park.

Fig 10: Diagrams illustrating the social barriers of the buffer zone (Van Staden 2021).

1.9 | LOCAL ISSUE CONTINUED

A lack of ownership over the site, has negatively impacted the site's safety.

The government's various urban schemes to remediate the site have not been put into effect because the scale of the proposals are too great (City of Tshwane 2005; GAPP 2010). As a result, the majority of the site stands empty. This has resulted in seven 'unsafe zones', identified by the communities (KoboToolBox 2021)(refer to figure 11 and Table 1 in appendix). The zones are made up of a number of physical and social incivilities, which inhibit communities from interacting with one another (Mothowamodimo 2011:13, KoboToolBox 2021, Silinda 2020:1, Veldsman 2019:78-83) (refer to figure 10).



KEY

safe unsafe

Fenced public space

Poor Milieu

Danger zones

Litter | Vandalism

Open space



Fig 11: Map depicting the seven 'unsafe zones' of the buffer zone, identified by the community (Van Staden 2021).



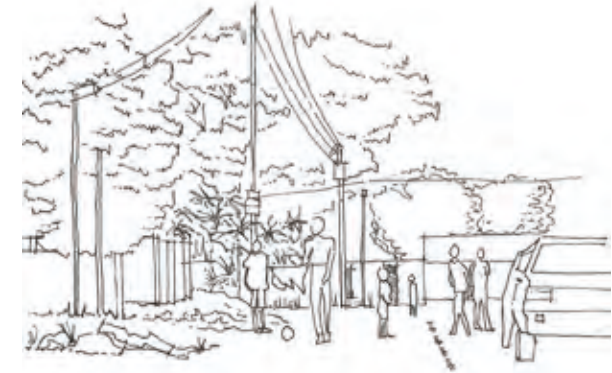
The river's water is used to clean ceremonial tents daily at the buffer (KoboToolBox 2021).



Various church groups conduct baptisms at the river.



Herders guide cattle from the Magaliesberg to the buffer.



School children play in the surrounding streets.

Fig 12: Drawings depicting the rituals of the buffer zone (Van Staden 2021).

1.9 | LOCAL ISSUE

Figures 12 and 13 depict the existing associational life and everyday rituals of the buffer zone. The rituals identified include specific cultural rituals, carried out by the Pedi and Tsonga, as well as daily routines.

Key rituals include (KoboToolBox 202, Selaluke 2021:1, Silinda 2020:1):

- Pedi initiates guide cattle daily from a kraal in the Magaliesburg, through the streets of Selbourne and Site, and down to the Pienaar spruit. Community members pay a monthly stipend to the Sepedi Cattle Association to look after the herd.
- The United Apostolic Faith Church and Thandanani Drop-Inn Centre run a small agricultural workshop for predominantly, Tsonga groups.

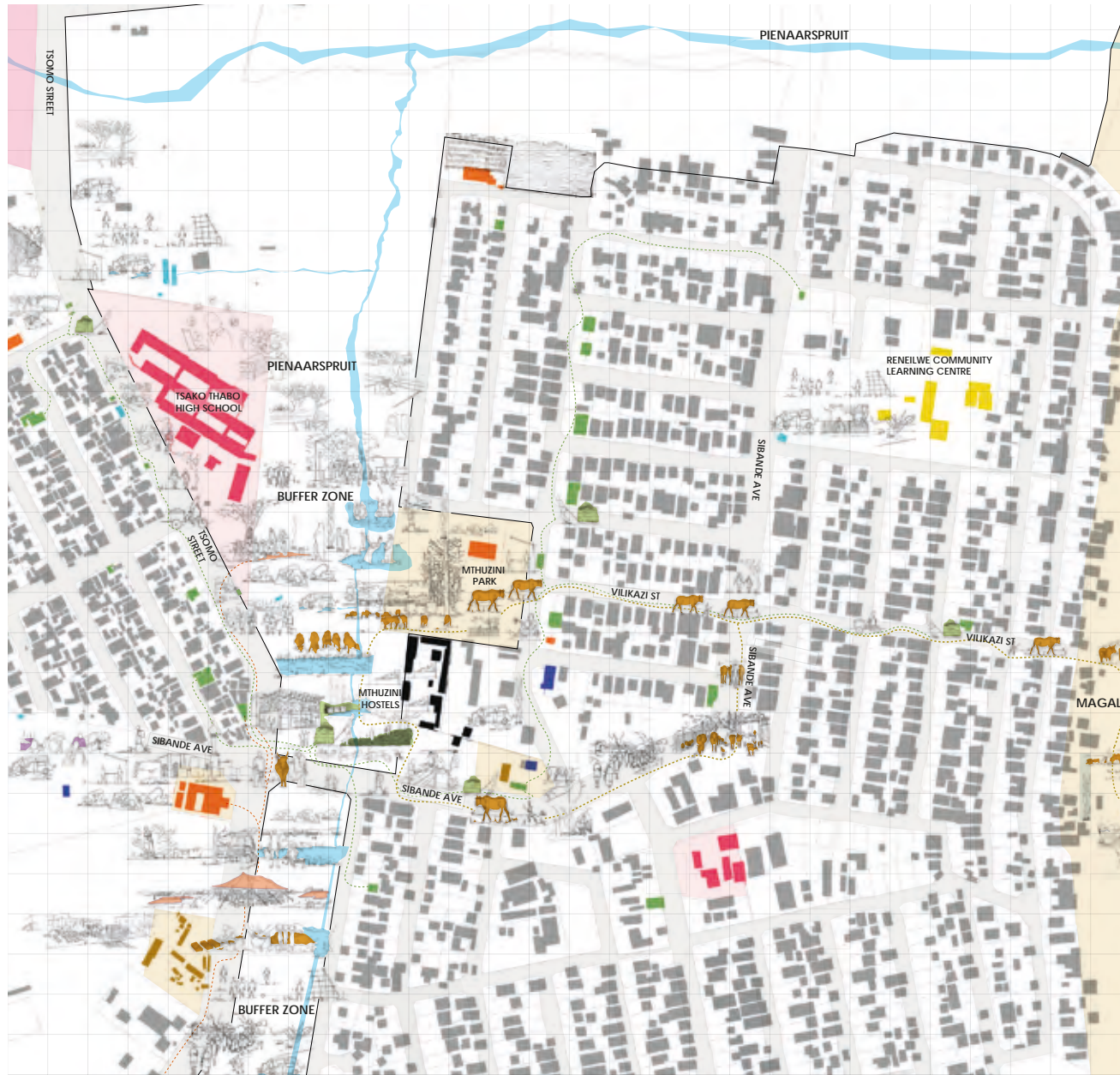
- Three church groups congregate at the Piernaarspruit to perform purity rituals. These churches run food schemes but are short on kitchen facilities.

- Bottles from a network of taverns are collected and sorted at the buffer.

- Ceremonial tents are built, dismantled and cleaned at the buffer. The proceeds of the events go towards running a soup kitchen, located outside of Mamelodi as there are no public kitchen facilities in the area.

- Various school children cross the buffer to school and play areas.

Although there is associational life, these associations and rituals remain independent from one another due to the divisive terrain and its safety issues (KoboToolBox 2021).



Social cohesion requires the networking of the abundant rituals at the buffer zone. Although currently disconnected, these rituals could be potentially connected through food making.



- Potential school network
- Potential church network
- Pedi Cattle Association of S&S
- Bottle recycling network
- Car wash network
- Thadanani Drop-Inn Centre: Food scheme



Fig 13: Map depicting the existing associational life and rituals of the site (Van Staden 2021).

1.10 | RESEARCH QUESTION

How can architecture address the inhibiting physical and social conditions of the buffer zone, which discourage social cohesion amongst the multi-ethnic groups of Khalambazo, and Selbourne and Site, Mamelodi?

1.11 | RESEARCH INTENTIONS

The author takes heed that it is not the role of an architect to infiltrate the community of Selbourne & Site, and Khalambazo with a solution for tribalism. Tribalism is a sensitive matter, which is deeply rooted in cultural and political practices (Abdelrahim 2020:1074, Baloyi 2018:3, KoboToolBox 2021, Sanou 2015:95). Issues of tribalism cannot be resolved only through architectural intervention.

Rather, the intentions of the project are:

To create a shared, social space for multiple tribes of the community.

To recognise and strengthen the existing associational life and daily rituals of the buffer zone.

To positively alter the unsafe conditions of the buffer's landscape and river.

1.12 | METHODOLOGY PART 2

A multiple-precedent analysis examines the current condition of socially cohesive space in South Africa. The buildings under investigation include: The Red Location Museum (Noero & Wolff Architects 2006), The Khayelitsha Service Centre and Paypoints (Louw 2002), and The Refilwe Business Node (Holm Jordaan Architects & Urban Designers 2012).

Precedents were selected using predetermined criteria:

- The intention of the precedents are to encourage reconciliation.
- Their design process involves a level of community participation.
- The precedents are situated in a developing township, where spatial formation is influenced by apartheid, urban planning strategies.

Each precedent is graphically analysed under four themes: **authorship, scale, ritual and threshold**. These themes reoccured from a list of critical theory, which elaborate on different design approaches to creating socially cohesive space (refer to Figure 14 and 15).

Thereafter, a series of visual scales are drawn which illustrate the opposing design approaches relating to the forementioned themes. Using the graphical analysis of each precedent as reference, the precedents are positioned on the visual scales and further compared using a critical literature review. For each scale, the normative position of the project is aligned with successful precedents and design considerations that encourage social cohesion. The scales are also used to generate a theoretical toolkit to address the contextual issues of the buffer zone.

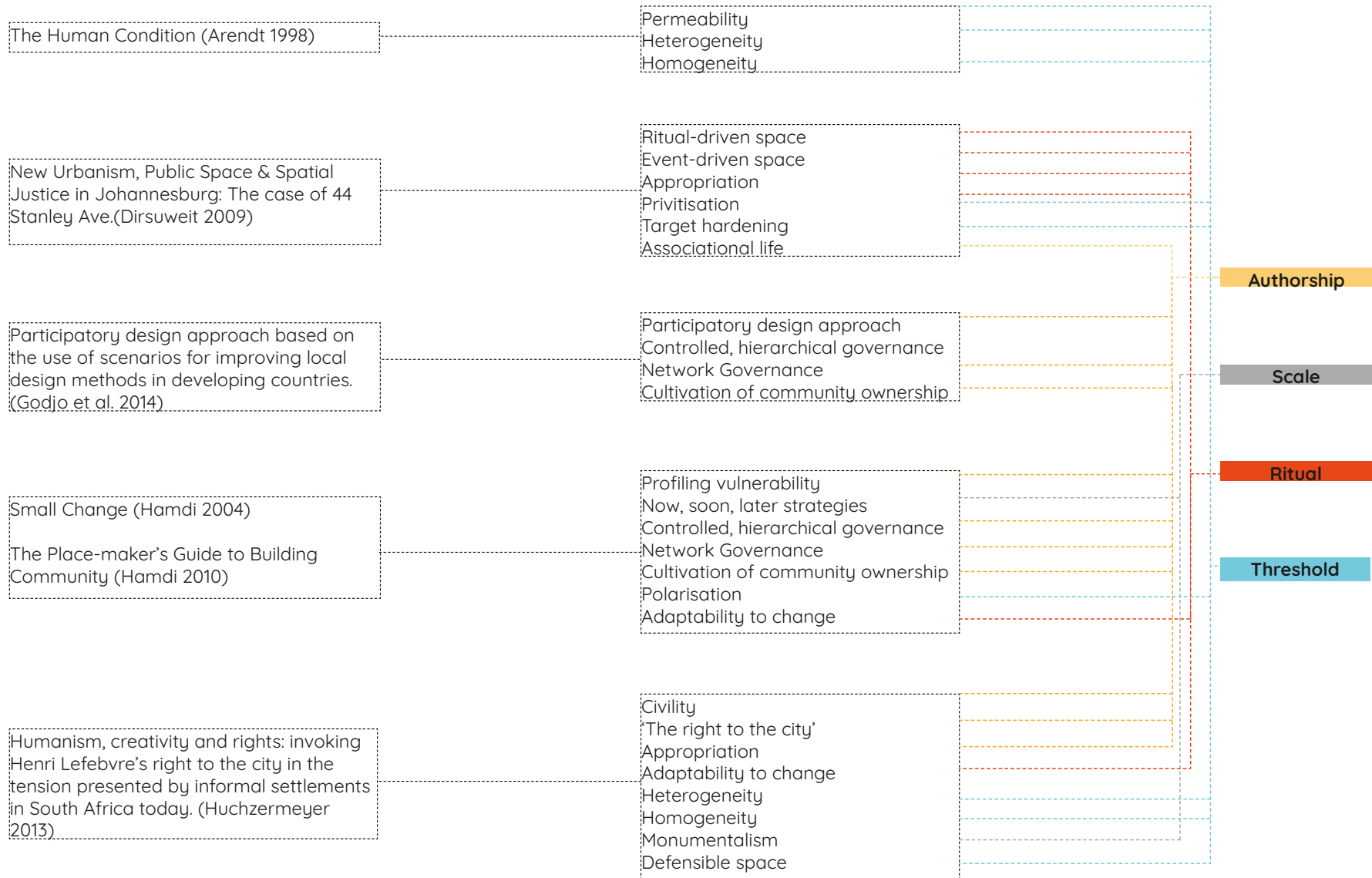


Fig 14: Diagram depicting the derivation of themes for the precedent analyses (Van Staden 2021).

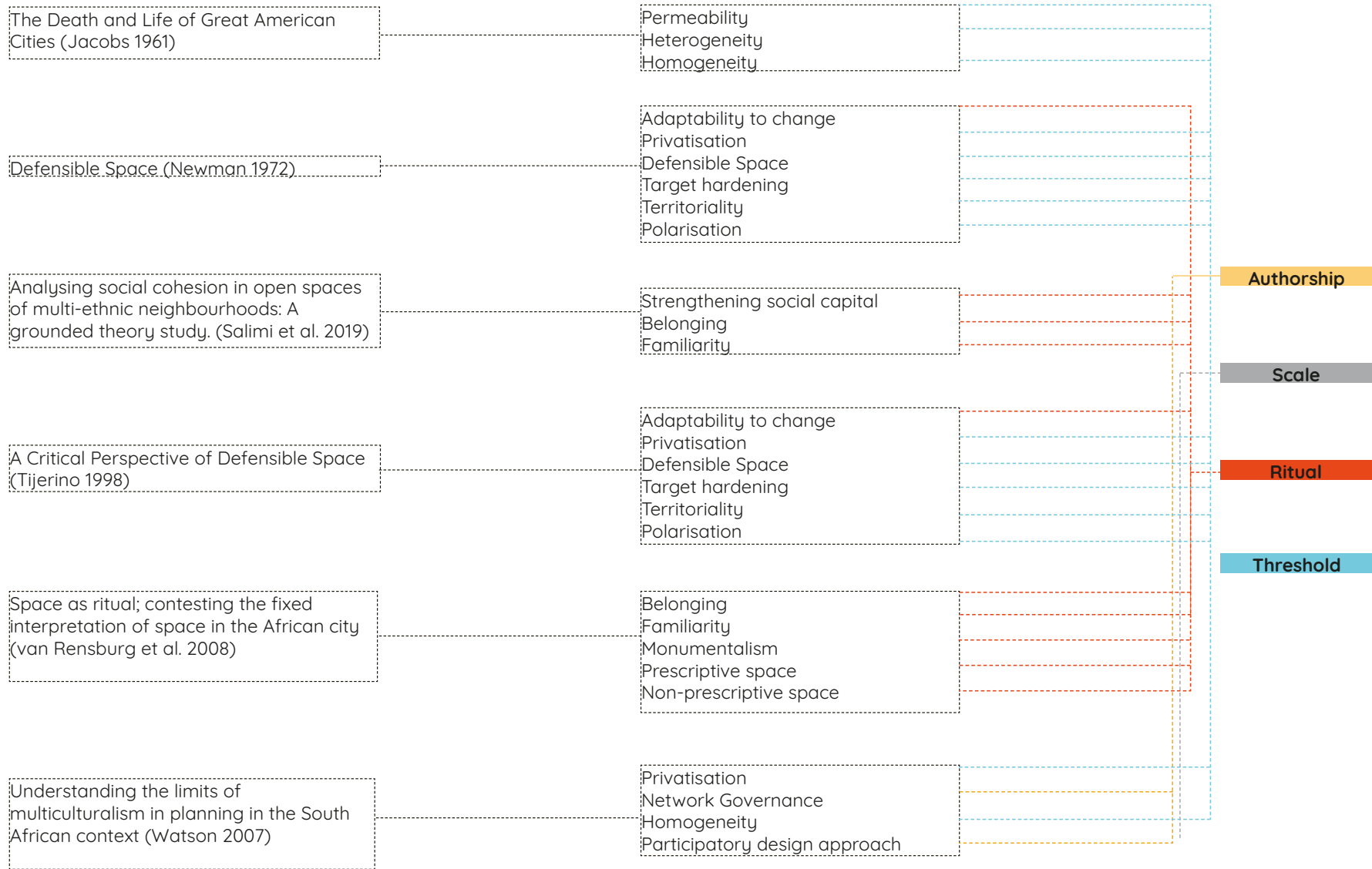


Fig 15: Diagram depicting the derivation of themes for the precedent analyses continued (Van Staden 2021).

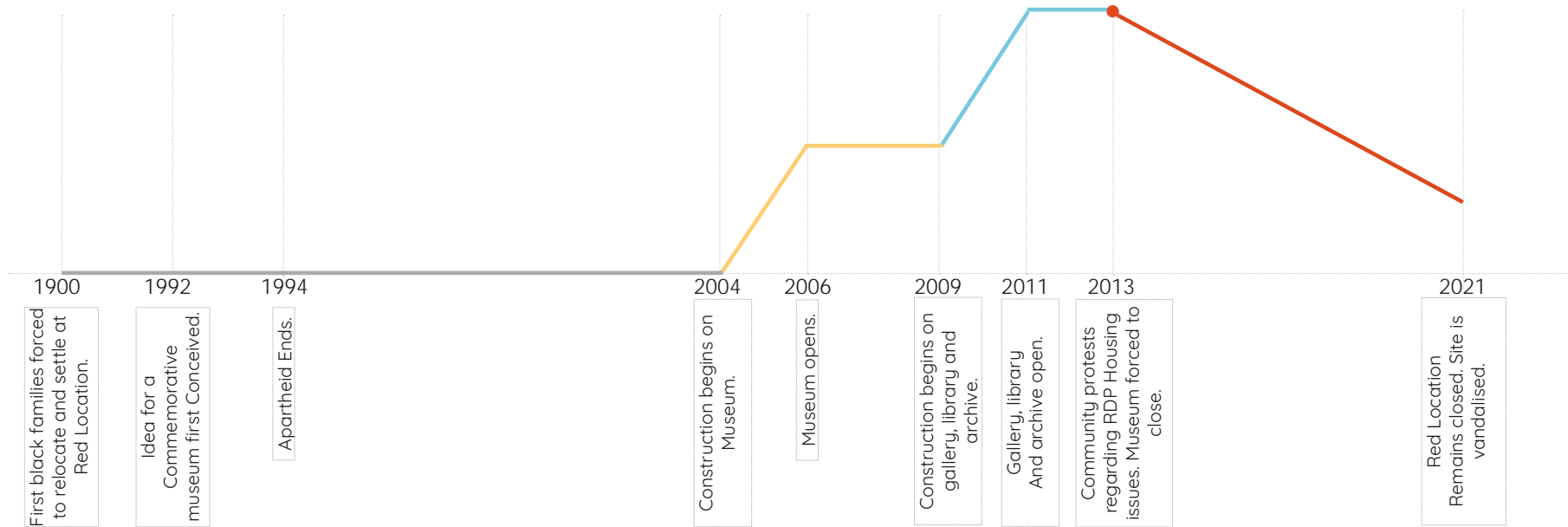
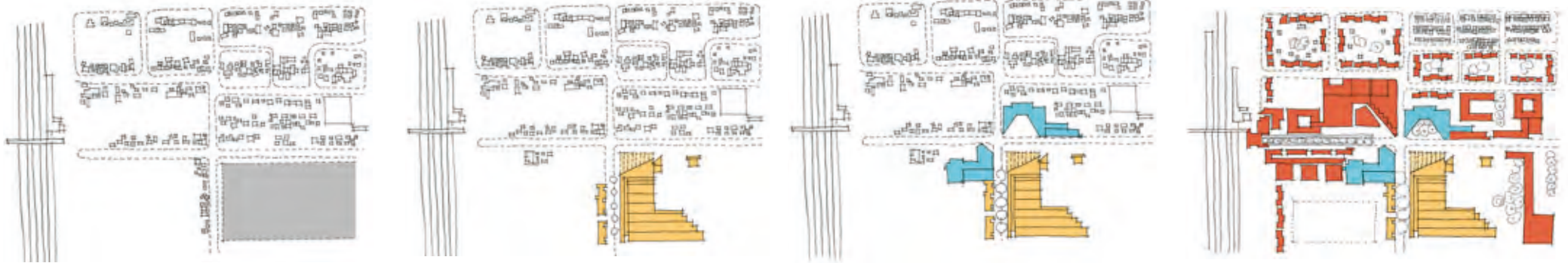


Fig 16: Red Location Museum (Noero 2017).

1.13 | PRECEDENT ANALYSIS | RED LOCATION MUSEUM | (Noero and Wolff Architects 2006)

Red Location is a site of struggle, endured by different ethnic groups of South Africa (Noero 2017). The site is named after corrugated, iron barrack buildings, which imprisoned women and children during the Boer War (Noero 2017). Red Location is also the first black settlement of Port Elizabeth, home to political figures who protested for democracy during Apartheid (Noero 2017).

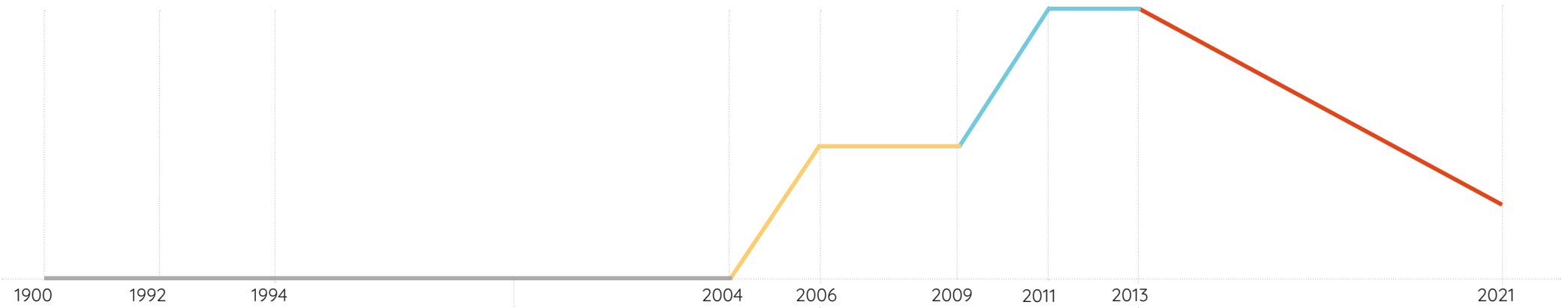
The intention of the intervention was to promote reconciliation by questioning the museum typology. Twelve memory boxes showcased stories of freedom, of different segregated communities (Noero 2017). The investment in the new building, was intended to bring about new freedoms and business opportunities for the community.



THE RED LOCATION MUSEUM

Noero Architects | Wolff Architects
New Brighton, Port Elizabeth
2006

Fig 17: Graph depicting development and degradation of Red Location Museum (Deckler et al. 2006:10, Eicker 2012:61, Van Staden 2021, Verster 2017:41).



Top-down design approach



Scale of intervention angers community. (Verster 2017:41)



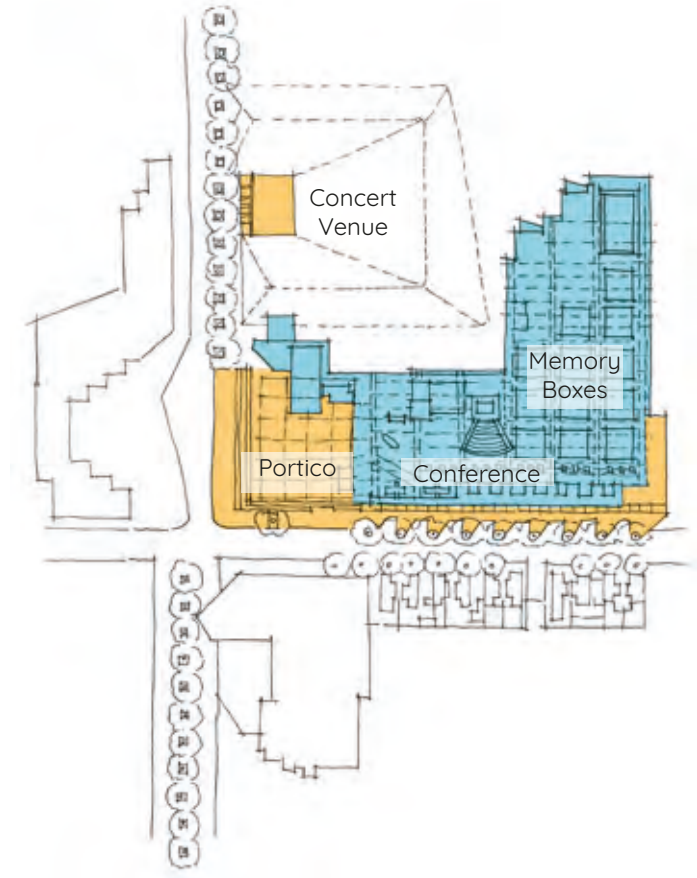
Community gain power through violence, vandalism and closing museum. (Verster 2017)

- Client | Government
- Architect
- Local Community.

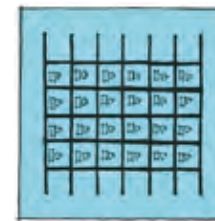
THE RED LOCATION MUSEUM

Noero Architects | Wolff Architects
New Brighton, Port Elizabeth
2006

Fig 18: Diagram depicting authorship of Red Location Museum (Van Staden 2021).



Event-driven architecture
Linear investment in space
Momentary deposit of an artefact into a memory box does not facilitate a habitual connection between community and museum.



Prescriptive Program
Permanent



Non-Prescriptive Program
Transient

Fig 19: Diagram illustrating the degree of continuity regarding community involvement (Van Staden 2021).

Fig 20: Diagram illustrating the degree of changeability regarding programme (Van Staden 2021).

THE RED LOCATION MUSEUM

Noero Architects | Wolff Architects
New Brighton, Port Elizabeth
2006



Fig 21: Sectional diagram depicting scale and activity of street-scape (Van Staden 2021).

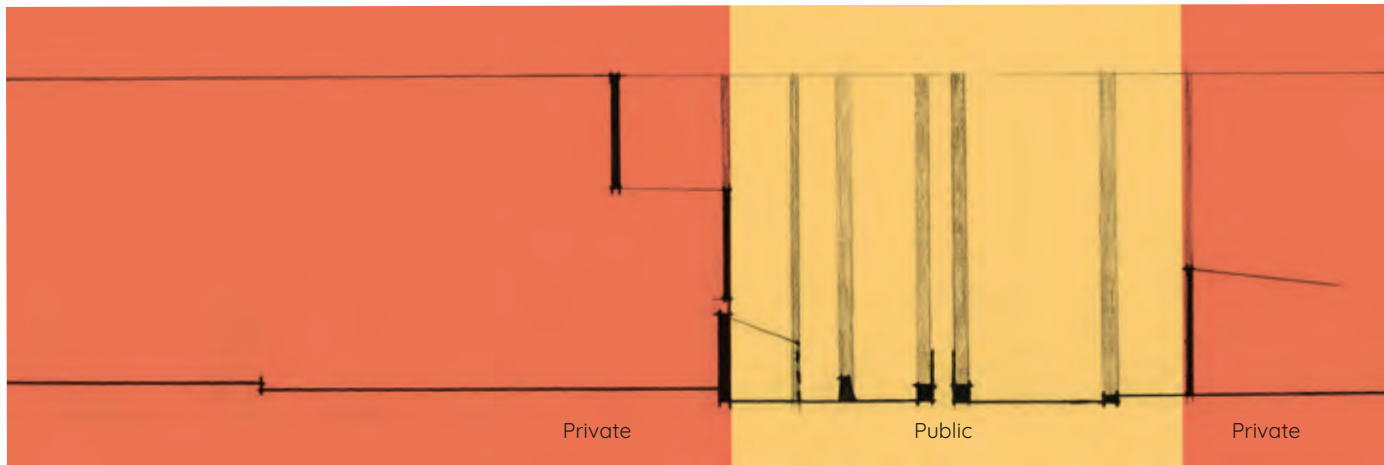
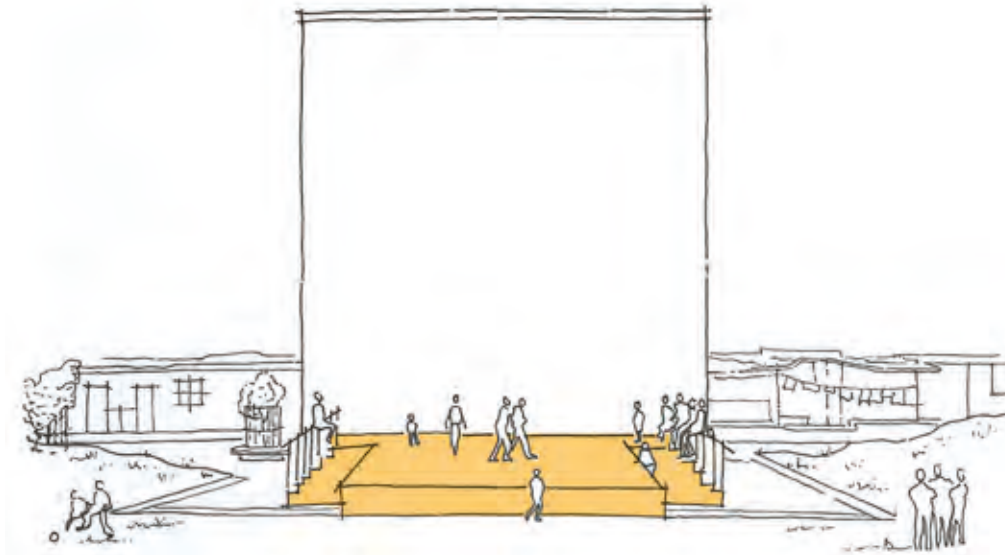
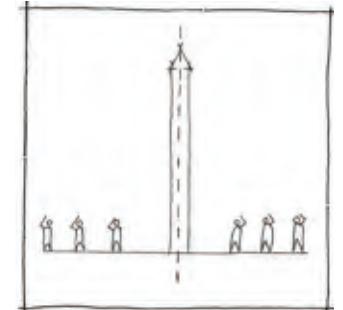
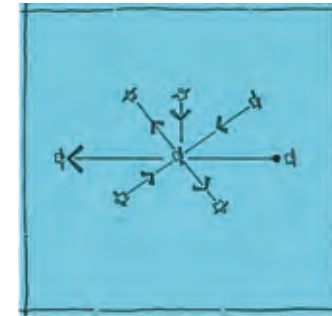
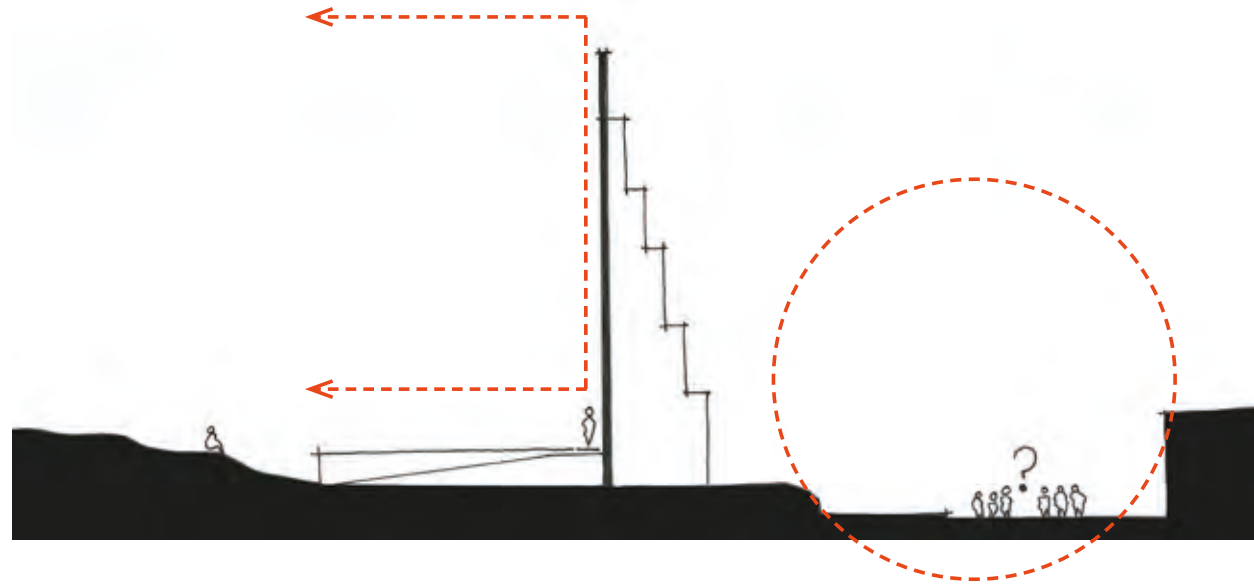


Fig 22: Sectional diagram depicting street permeability (Van Staden 2021).



Plinth
Performance



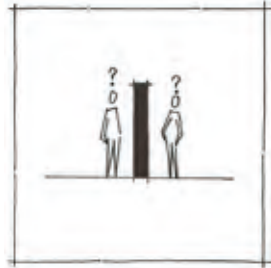
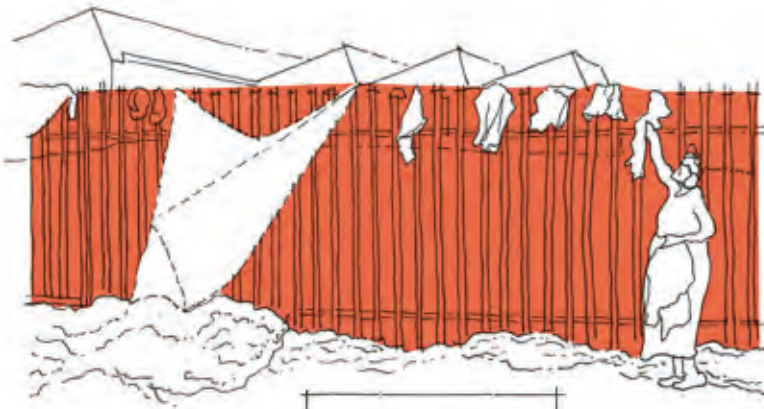
Isolated Architectural Event
Monumental Scale

Street not considered as public
Performance space

THE RED LOCATION MUSEUM

Noero Architects | Wolff Architects
New Brighton, Port Elizabeth
2006

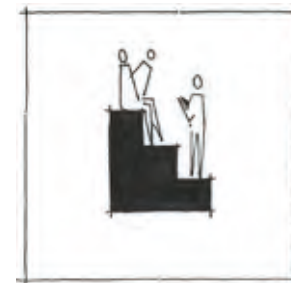
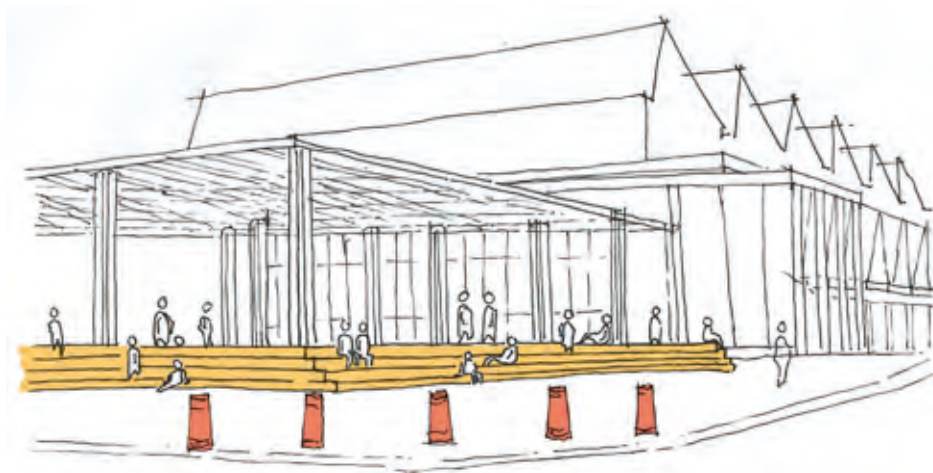
Fig 23: Diagrams depicting performance space and its associated social value (Van Staden 2021).



Fence
Segregation



Fenced Tree
Segregation



Plinth | Stairs
Gathering Space | Play



Kerb
Waiting Space

THE RED LOCATION MUSEUM

Noero Architects | Wolff Architects
New Brighton, Port Elizabeth
2006

Fig 24: Diagram depicting threshold conditions and their associated social value (Van Staden 2021).



Fig 25: The Khayelitsha Service Centres and Pay Points (Louw 2002).

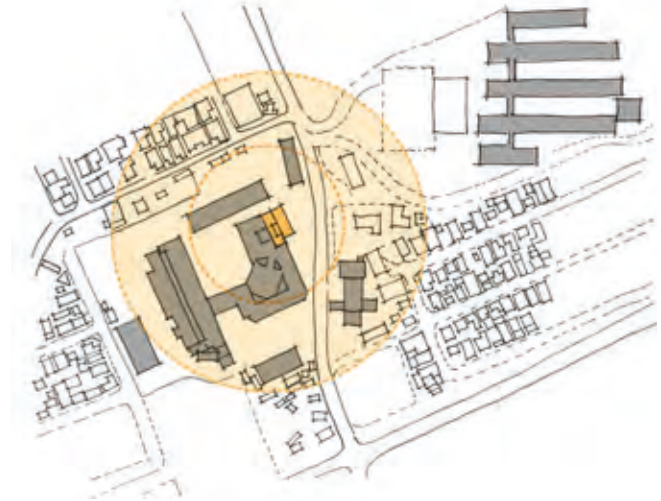
1.14 | PRECEDENT ANALYSIS | KHAYELITSHA SERVICE CENTRES AND PAYPOINTS | (Louw 2002)

The democratic government planned to establish a culture of payment for provided services, within the segregated community of Khayelitsha (Louw 2002:24). However, the community argued that there was no dignified space to pay service levies (Louw 2002:24).

Therefore, the government created an 'architecture of public responsibility', through the provision of four, small-scale service centres. Through a layering of defined thresholds, the buildings encouraged social engagement between the community and their local government (Louw 2002:28)(refer to appendix for complete analysis).



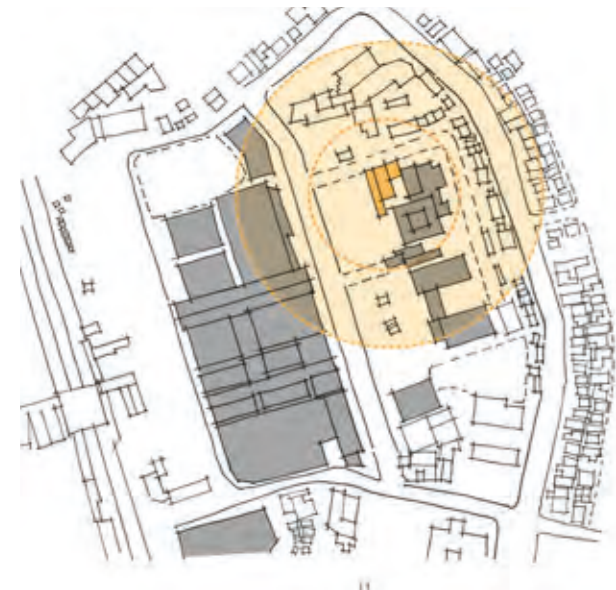
1_Site B



2_Resource Centre



3_Masibambane



4_Site C



Fig 26: Diagram depicting positions of nodal pay-points in Khayelitsha (Van Staden 2021).

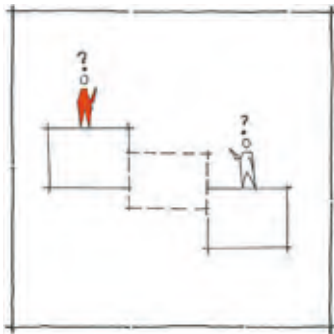
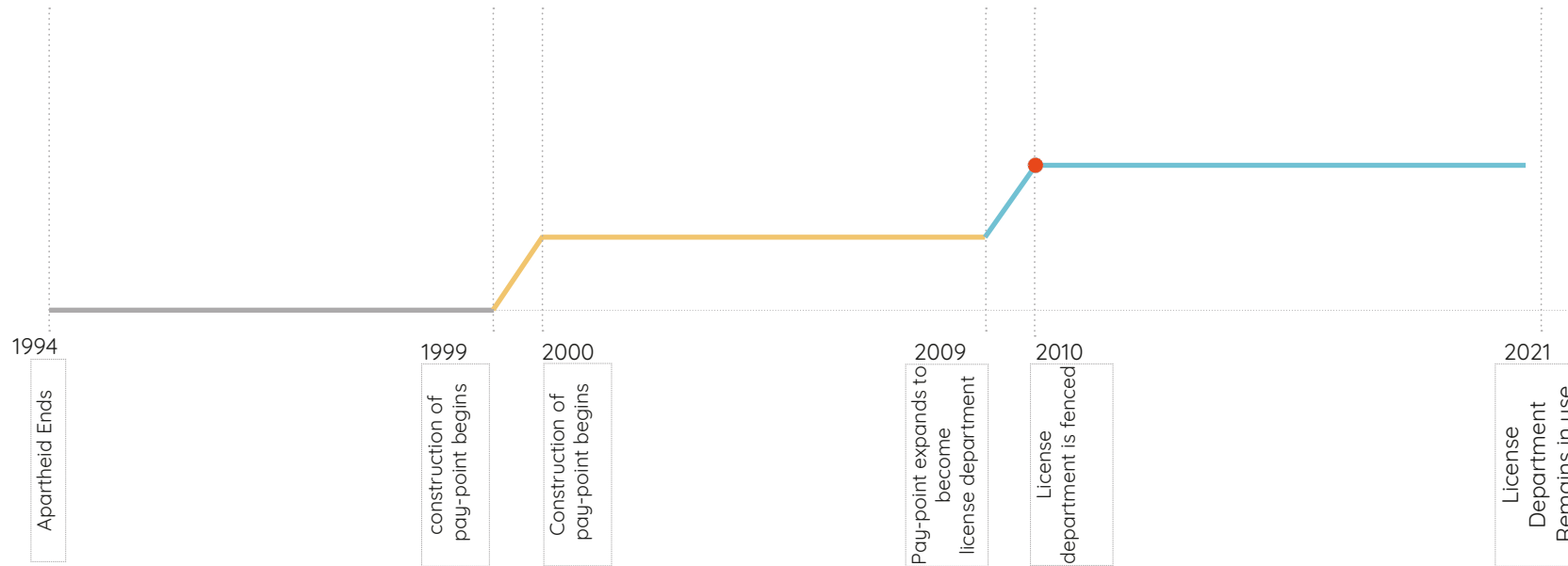


Urban Acupuncture
Strategic positioning of small scale-interventions can collectively create a larger, positive impact on a community. Small gestures are able to create great spatial agency(Hamdi 2004:107).

Fig 27: Maps depicting strategic positioning of nodal pay-points in Khayelitsha (Van Staden 2021).

KHAYELITSHA SERVICE CENTRES AND PAYPOINTS

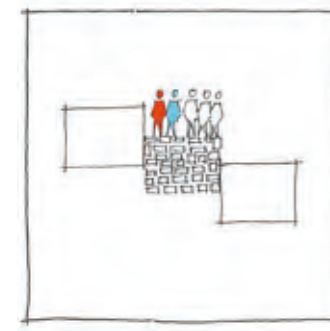
Piet Louw Architects
Khayelitsha, Cape Town
2000



No dignified space to service levies.
Rift between government and local community. (Louw 2002:28)



Architect bridges the gap by engaging both the government and local community in the construction process of the building (Louw 2002:28).



The building serves as a shared, equal space between the government and local community. Shared authorship. (Louw 2002:28).

- Client | Government
- Architect
- Local Community

KHAYELITSHA SERVICE CENTRES AND PAYPOINTS

Piet Louw Architects
Khayelitsha, Cape Town
2000

Fig 28: Graph depicting authorship of the Khayelitsha Service Centres (Van Staden 2021).

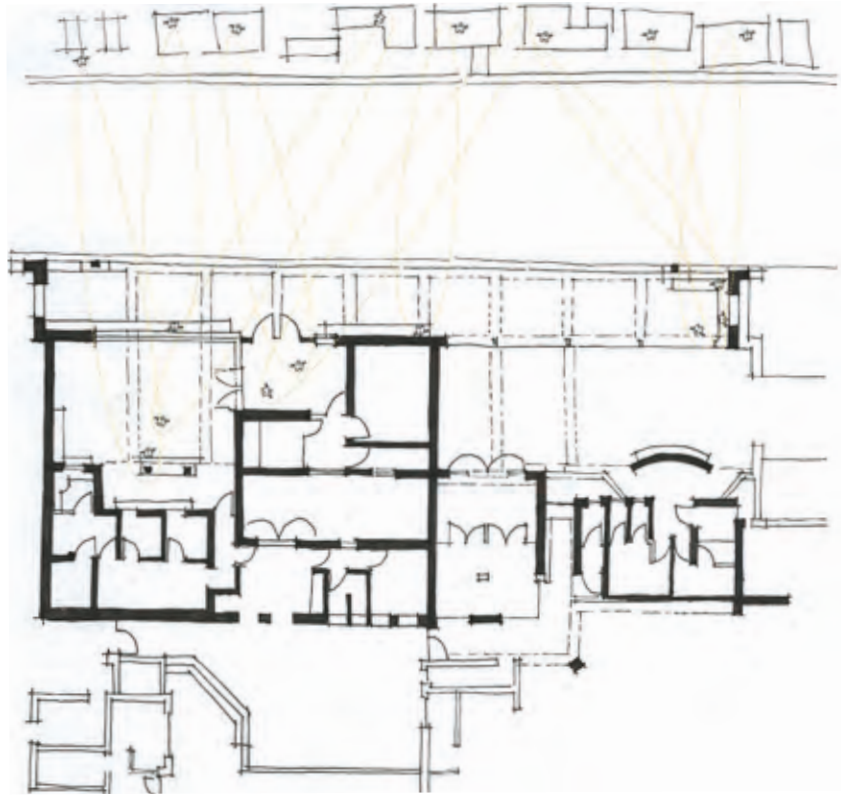


Fig 29: Diagram illustrating the degree of continuity regarding community involvement (Van Staden 2021).

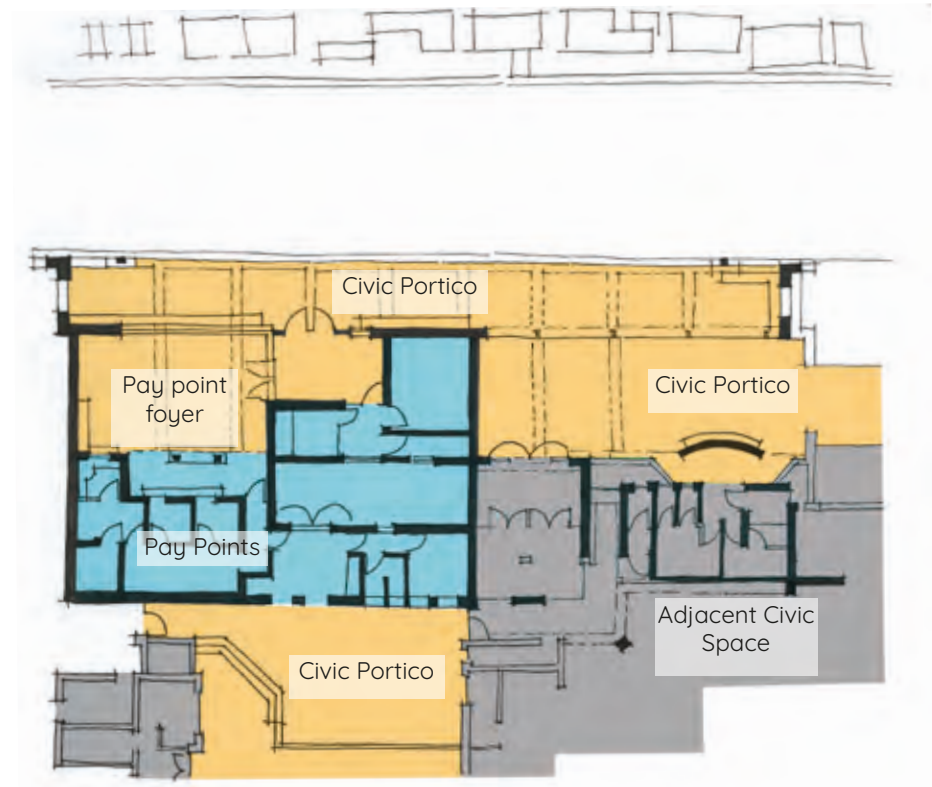
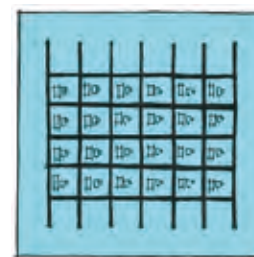


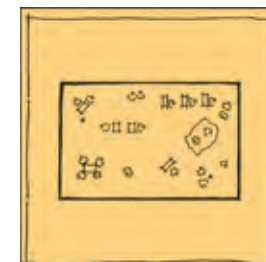
Fig 30: Diagram illustrating the degree of changeability regarding programme (Van Staden 2021).



Ritual-driven architecture
Cyclical investment in space
Recurring payments bring pack the community on a regular basis.



Prescriptive Program
Permanent



Non-Prescriptive Program
Transient

KHAYELITSHA SERVICE CENTRES AND PAYPOINTS

Piet Louw Architects
Khayelitsha, Cape Town
2000

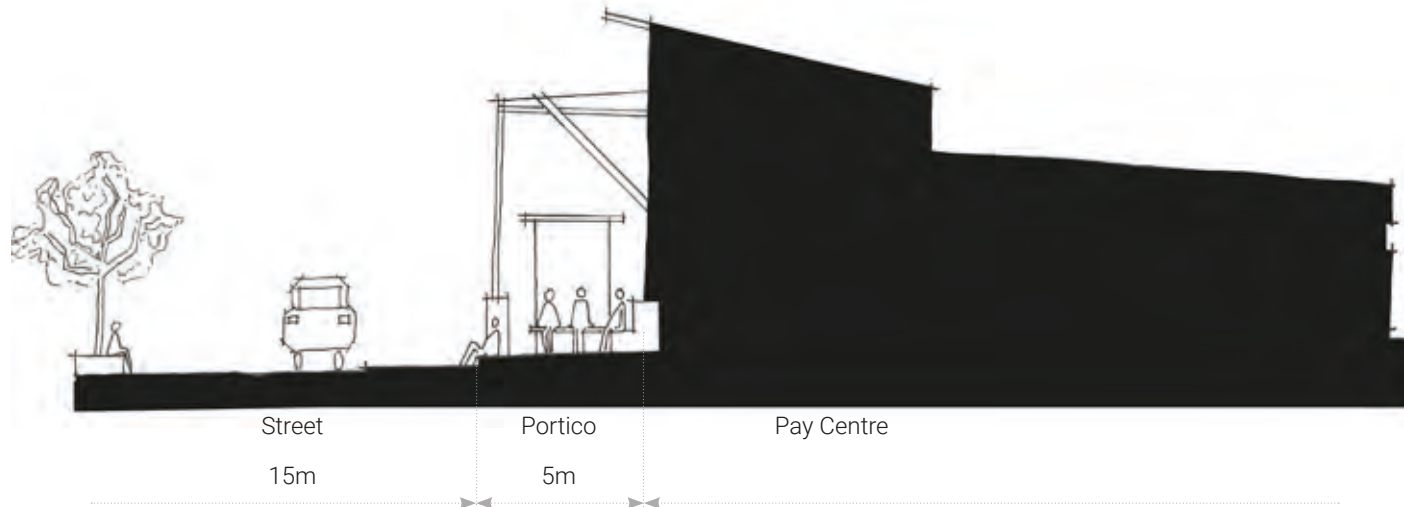


Fig 31: Sectional diagram depicting scale and activity of street-scape (Van Staden 2021).

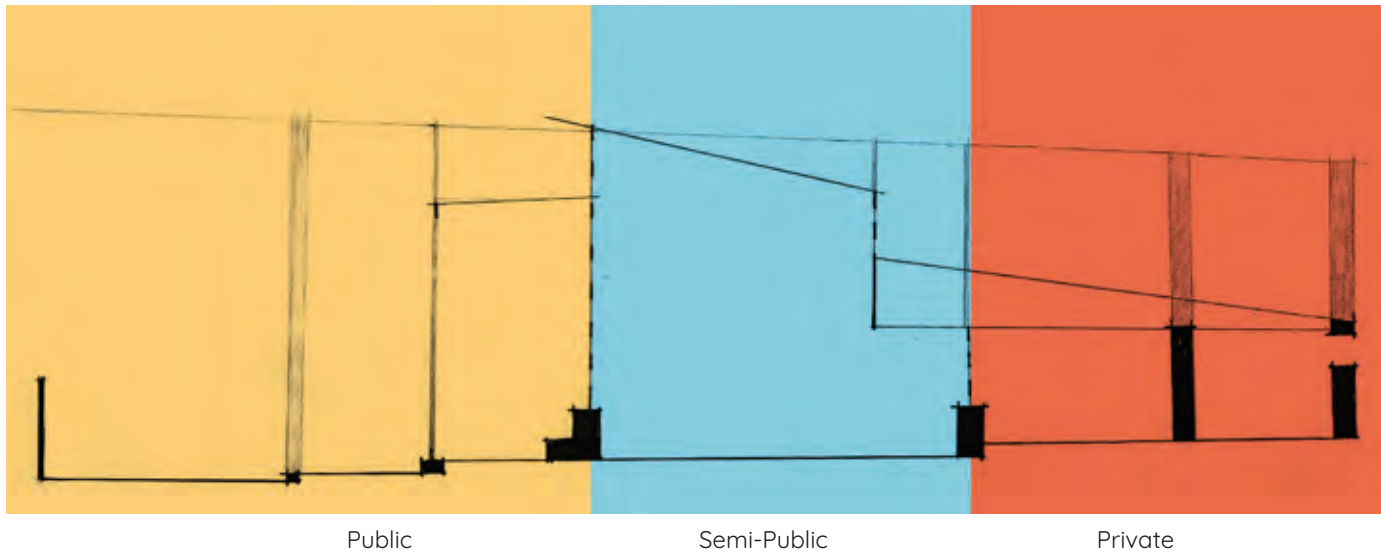


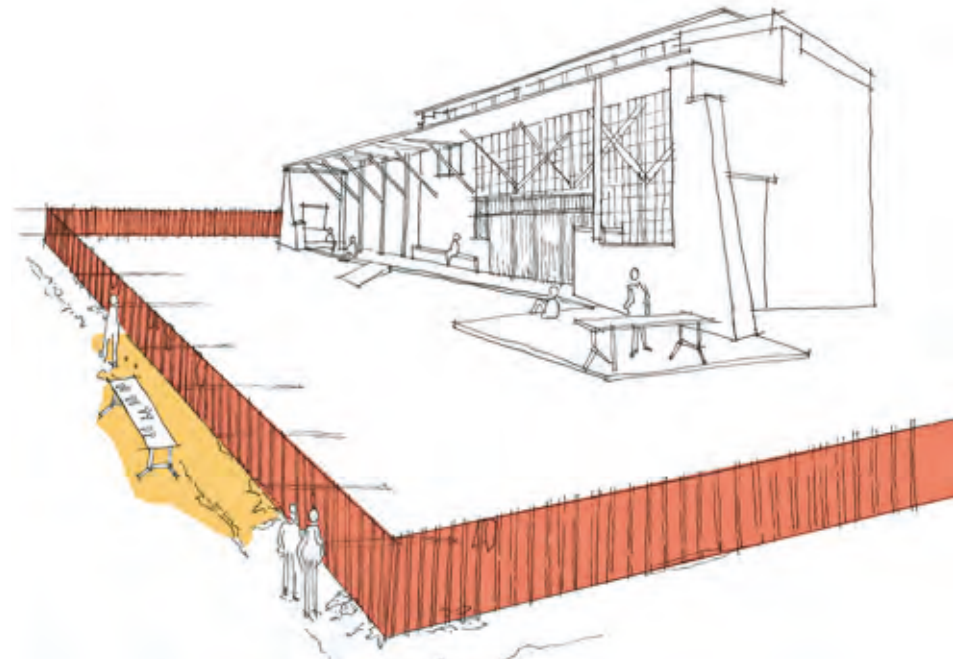
Fig 32: Sectional diagram depicting street permeability (Van Staden 2021).

KHAYELITSHA SERVICE CENTRES AND PAYPOINTS

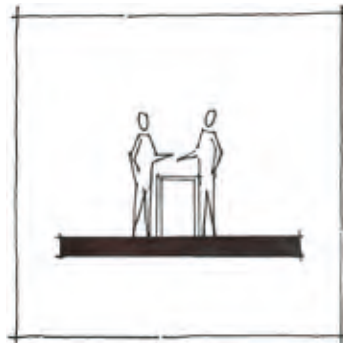
Piet Louw Architects
Khayelitsha, Cape Town
2000



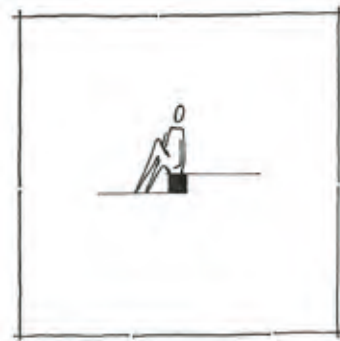
2000_Resource Centre



2010_Lingelethu West Traffic Department



Kerb
Trading space



Kerb
Gathering | Waiting space



Shade | Bench
Gathering | waiting space

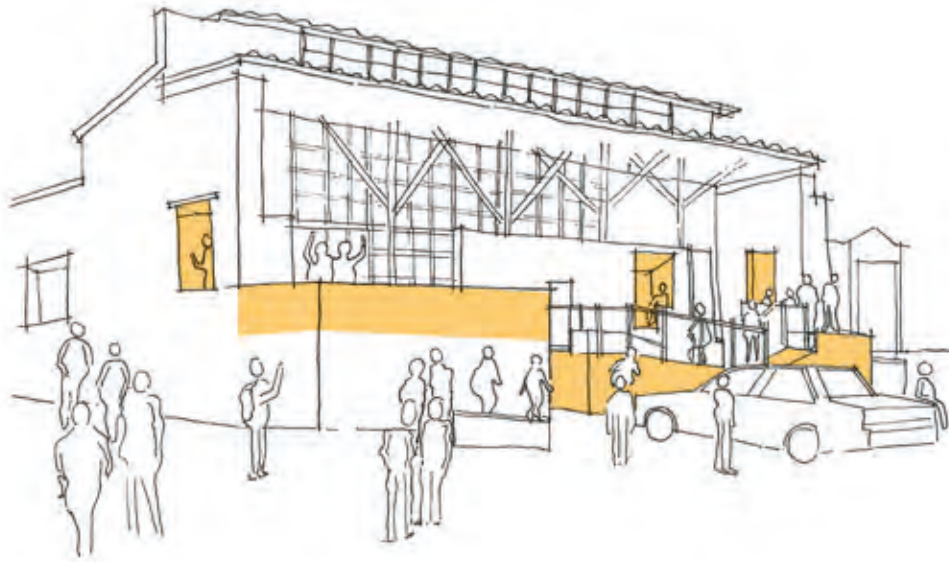


Fence
Trading space
Segregation

KHAYELITSHA SERVICE CENTRES AND PAYPOINTS

Piet Louw Architects
Khayelitsha, Cape Town
2000

Fig 33: Diagram depicting threshold conditions and their associated social value (Van Staden 2021).

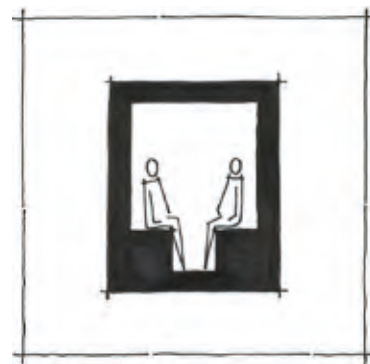


3_Masibambane

4_Site C



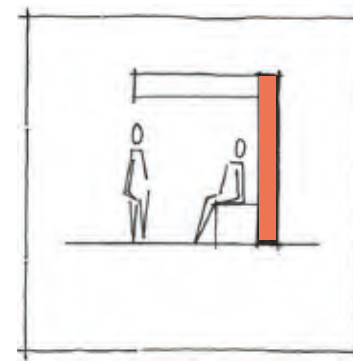
Plinth
Performance space



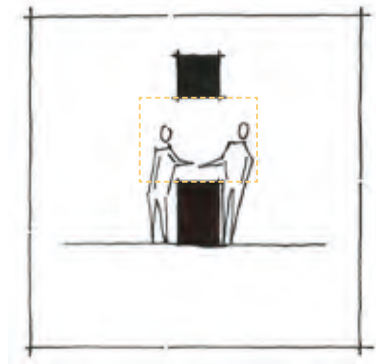
'Window'
Intimate gathering space



Shade | Bench
Gathering | waiting space



Fence pushed back
Gathering | waiting space



'Window'
Trading space

KHAYELITSHA SERVICE CENTRES AND PAYPOINTS

Piet Louw Architects
Khayelitsha, Cape Town
2000

Fig 34: Diagram depicting threshold conditions and their associated social value continued (Van Staden 2021).



Fig 35: Refilwe Business Node (Pienaar 2014).

1.15 | PRECEDENT ANALYSIS | REFILWE BUSINESS NODE | (Holm Jordaan Architects and Urban Designers 2012)

The small-scale intervention forms part of a network of upgrades to transform the urban condition of the Refilwe Township (Pienaar 2014:138). The architects intended to create an 'architecture of dignity' through an open-ended structure that provided basic amenities like shelter, ablutions and seating (Pienaar 2014:138).

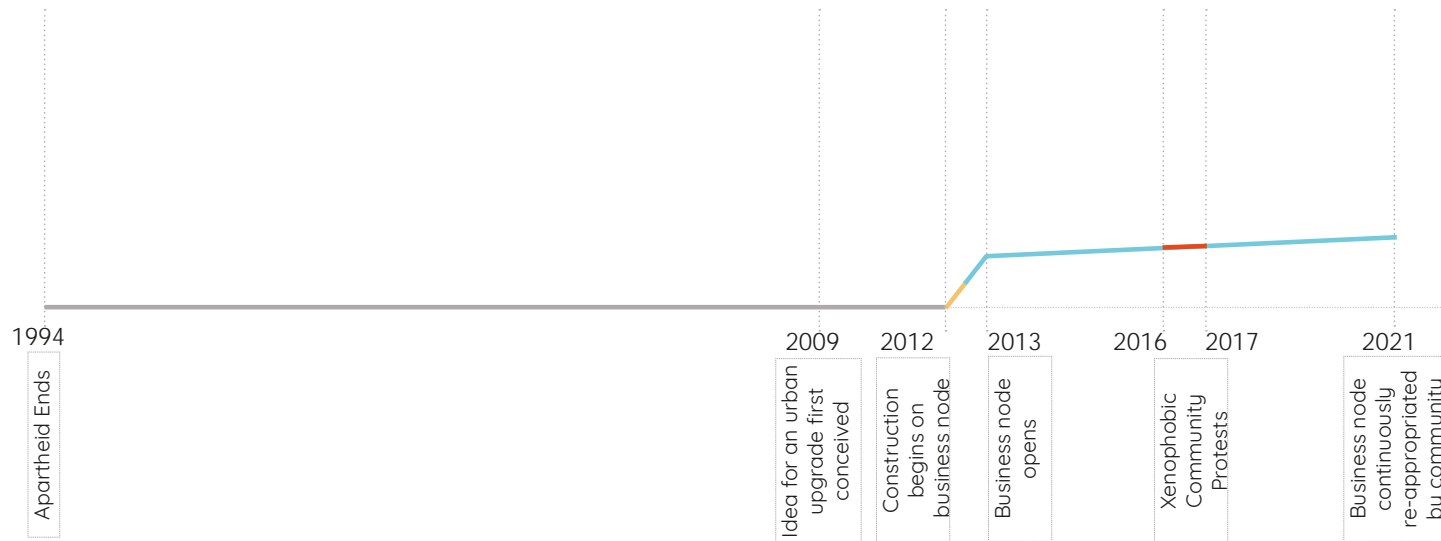
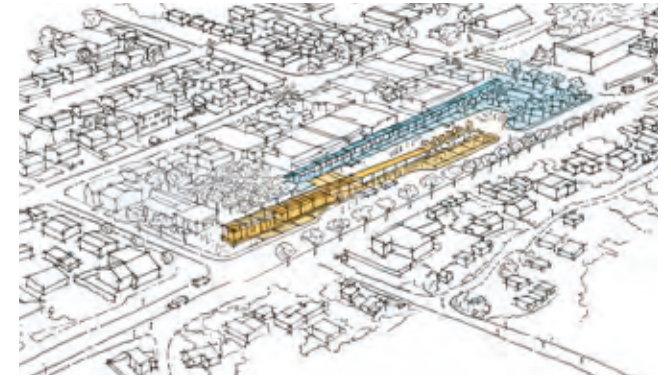
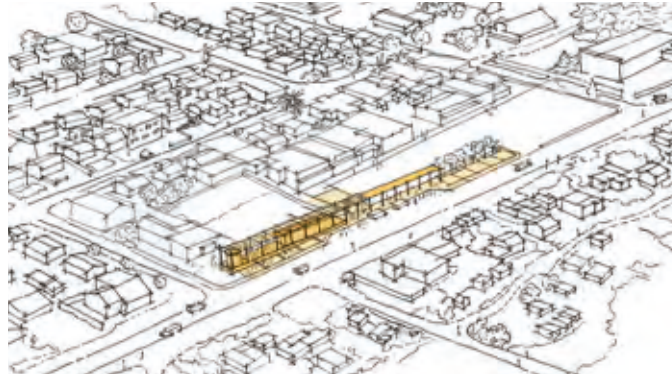
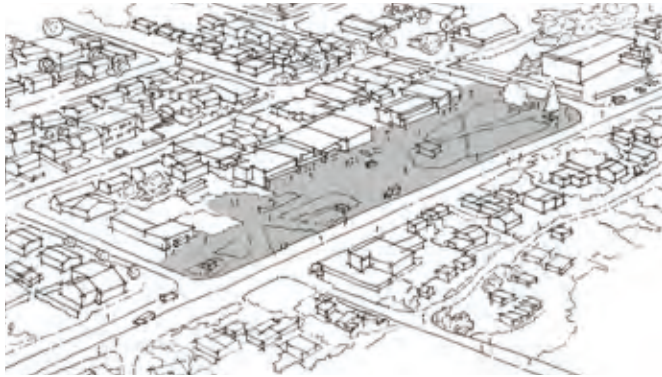
The intervention strengthened existing business networks and enhanced the adjacent property values of the site (Pienaar 2014:139)(refer to appendix for complete analysis).



REFILWE BUSINESS NODE

Holm Jordaan Architects
and Urban Designers
Refilwe, Metsweding, Pretoria
2012

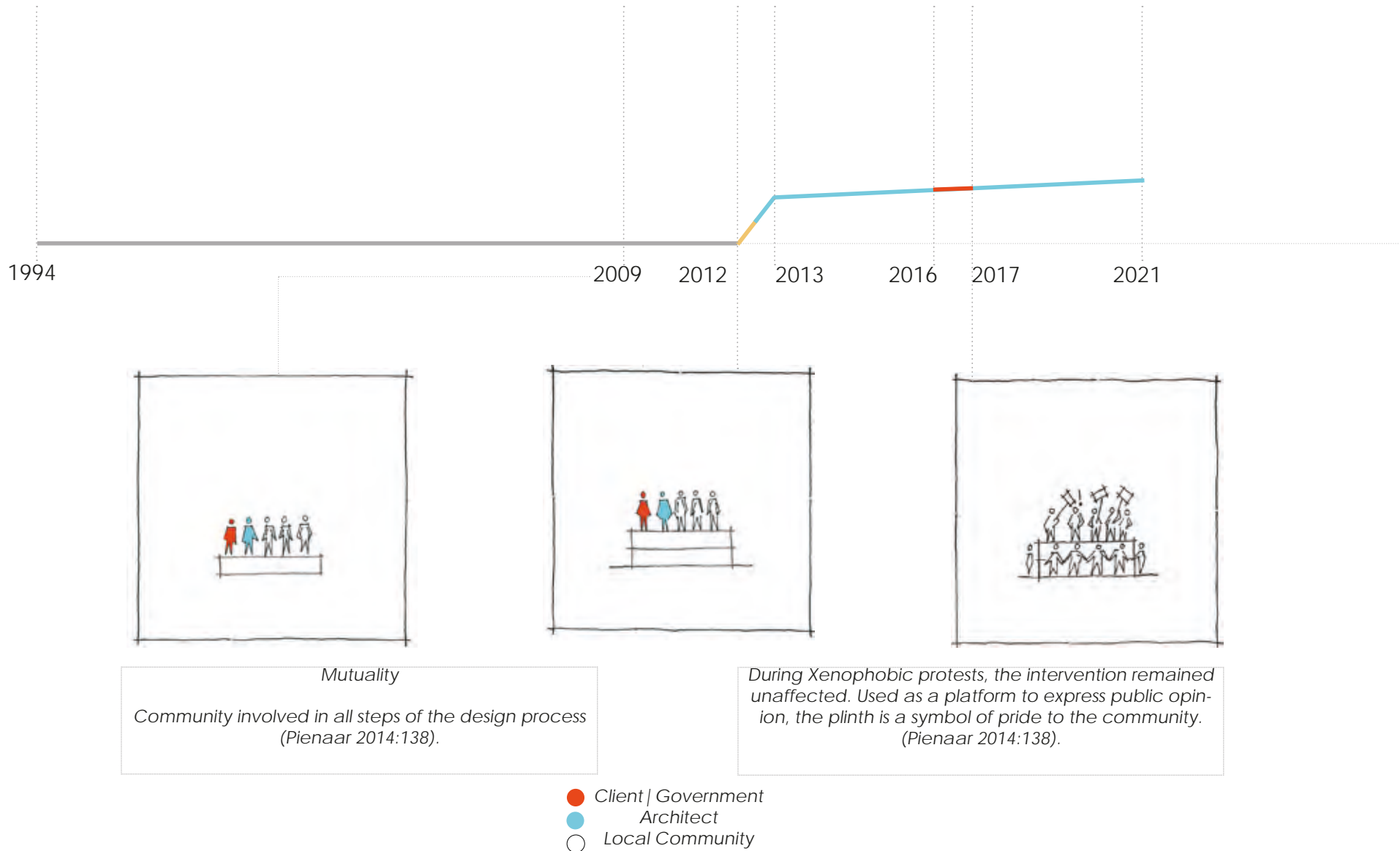
Fig 36: Diagram depicting masterplan for Refilwe Precinct (Van Staden 2021).



REFILWE BUSINESS NODE

Holm Jordaan Architects
and Urban Designers
Refilwe, Metsweding, Pretoria
2012

Fig 37: Graph depicting development of the Refilwe Business Node
(Deckler et al. 2006:10, Eicker 2012:60, Van Staden 2021).



REFILWE BUSINESS NODE

Holm Jordaan Architects
and Urban Designers
Refilwe, Metsweding, Pretoria
2012

Fig 38: Diagram depicting authorship of the Refilwe Business Node (Van Staden 2021).



Fig 39: Sectional diagram depicting scale and activity of street-scape (Van Staden 2021).

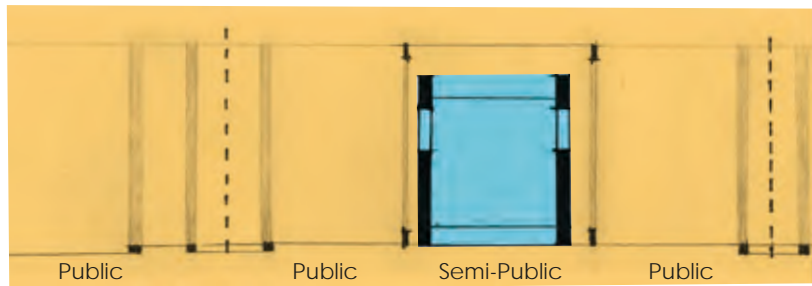
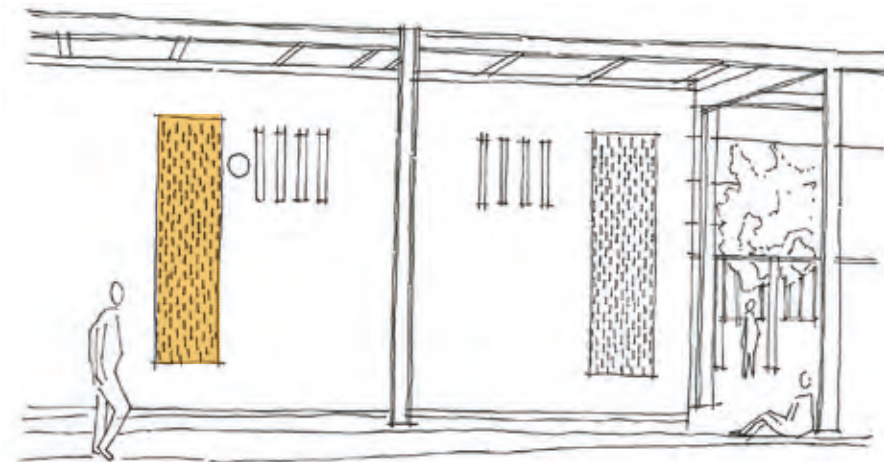


Fig 40: Sectional diagram depicting street permeability (Van Staden 2021).



Breeze block screen
Formalisation of open space with permeable street condition. Privacy. Robust intervention (Pienaar 2014:138).

REFILWE BUSINESS NODE

Holm Jordaan Architects
and Urban Designers
Refilwe, Metsweding, Pretoria
2012

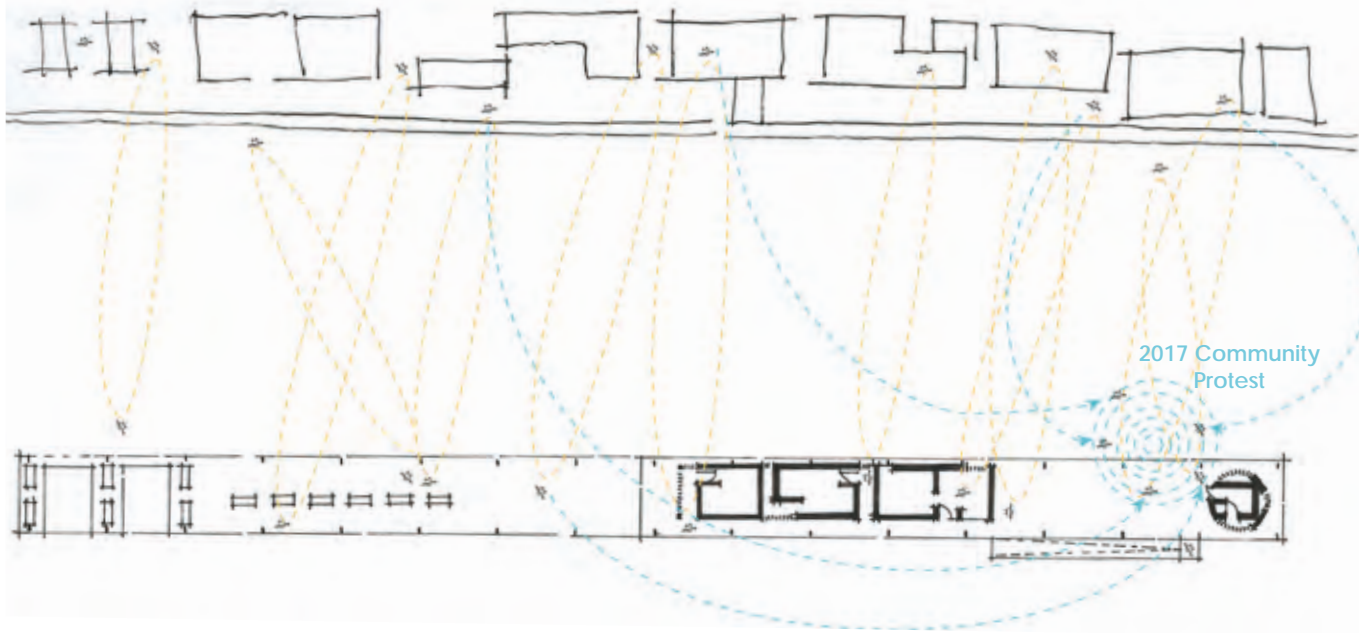
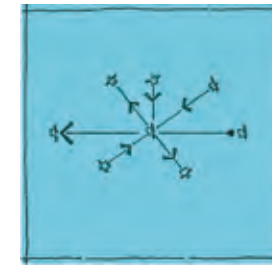


Fig 41: Diagram illustrating the degree of continuity regarding community involvement (Van Staden 2021).



Event-driven architecture

Linear investment in space
Used as a platform for community protests (Pienaar 2014:138).

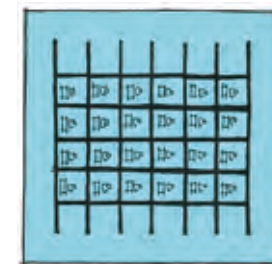


Ritual-driven architecture

Cyclical investment in space
Non-prescriptive Program allows community to play out their multiple daily rituals of work and rest (Pienaar 2014:138).

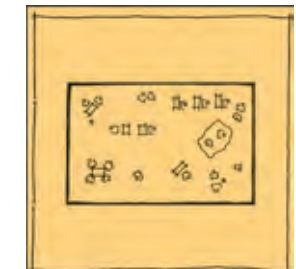


Fig 42: Diagram illustrating the degree of changeability regarding programme (Van Staden 2021).



Prescriptive Program

Permanent

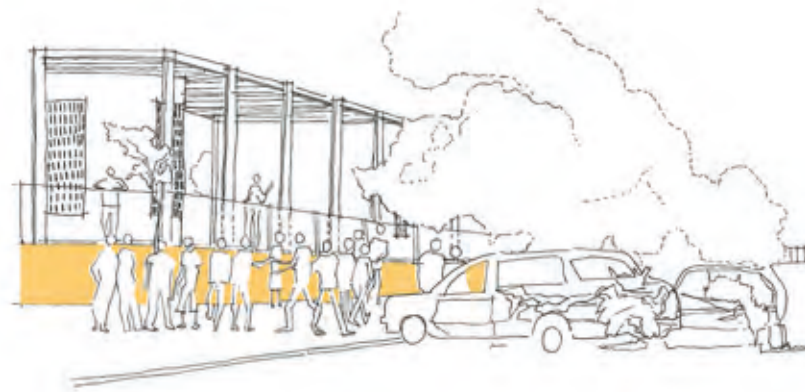


Non-Prescriptive Program

Transient

REFILWE BUSINESS NODE

Holm Jordaan Architects
and Urban Designers
Refilwe, Metsweding, Pretoria
2012



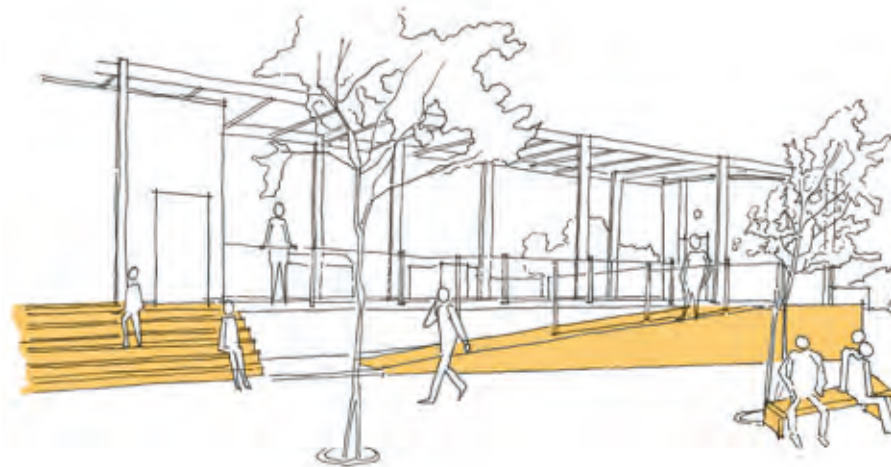
Plinth
Performance |
Protest platform



Tree | Framed Space
Trading space



Shade | Bench
Gathering | Waiting
space



Plinth | Stairs
Gathering Space |
Play



Shade | Bench
Gathering | Waiting
space

Fig 43: Diagrams depicting threshold conditions and their associated social value (Van Staden 2021).

REFILWE BUSINESS NODE

Holm Jordaan Architects
and Urban Designers
Refilwe, Metsweding, Pretoria
2012

1.16 | CRITICAL LITERATURE REVIEW | AUTHORSHIP

(Refer to figure 44)

In a traditional design process, the role of the architect is to provide and the role of a community is to receive a design, which is often imposed upon them (Hamdi 2002:107). This is a hierarchical form of governance, in which the bargaining power is determined by role-players' expertise (Hamdi 2002:108). The developers of the Red Location Museum followed a top-down design approach (Verster 2017:41). The community was not involved at each stage of the design process and once the scale of the project was realised, they rejected the museum and forced its closure (Verster 2017:41). Hamdi (2002:107) proposes network governance to enable community ownership. Network governance is a mesh of social organisations that are sown together by well-networked systems rather than by controlled hierarchies (Hamdi 2002:107). The design of the Refilwe Business Node was determined by a web of government and community role-players, which participated in each stage of the design process (Pienaar 2014:138). The mutual approach meant that during Xenophobic protests, the intervention remained unaffected (Pienaar 2014:139). A similar approach to governance, may assist with the realisation of an urban scheme for the buffer zone. It is, however, difficult to establish a network quickly and therefore, it is important to link the existing associational life of the buffer. The associations have power, they represent a willingness to move from commitments to oneself, to commitments towards one's community (Hamdi 2002:108). Therefore, the project undertakes network governance, mutuality and a participatory design approach, where the architect moves from a provider to an enabler.

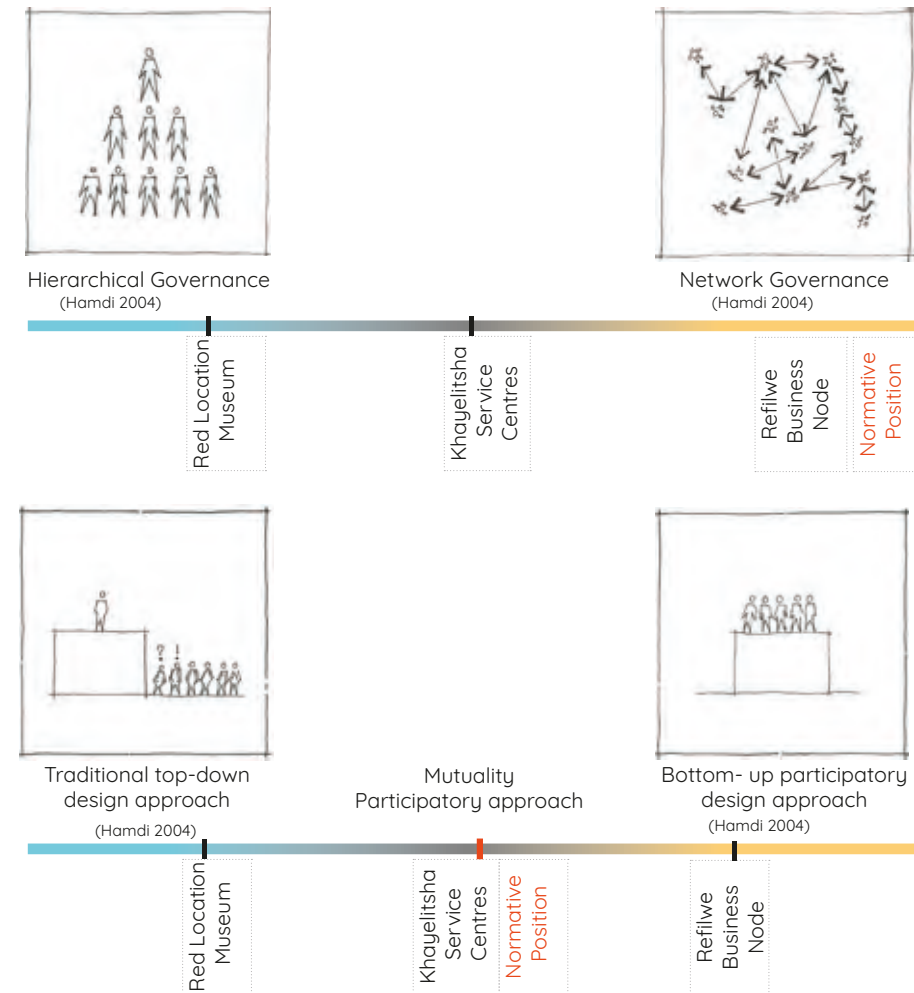


Fig 44: Visual scales depicting hierarchical vs. network governance, traditional design approach vs. participatory design approach (Van Staden 2021).

1.17 | SCALE

(Refer to figure 45)

It is a postmodern misconception that big change requires a monumental, isolated architectural event (De Costa et al. 2008:32, Dirsuweit 2009:89). Public spaces which do not consider the physical and social scale of their surrounding urban conditions are ignorant of a community's constraints, demands and their bodily experiences (De Costa et al. 2008:33). The monumental, Red Location Museum overwhelmed the discrete scale of the surrounding township. The lack of physical integration was reflected in the attitude of the local community which failed to take ownership of the building (Verster 2017:41). In comparison, designs for the Khayelitsha Service Centres and the Refilwe Business Node employed the concept of urban acupuncture. Small scale interventions were strategically positioned throughout the urban landscape to collectively transform the larger urban context (Pienaar 2014:138). These small gestures, at the right places, encouraged spatial agency amongst their communities (Pienaar 2014:138). In terms of the buffer, one building cannot physically or socially alter the multiple unsafe zones. Therefore, urban acupuncture serves as an appropriate urban scheme.

It is also important to consider the scale at which to introduce a project so that it may be well received by a community. Large-scale buildings cannot be justified, when governments are unable to provide basic amenities like housing- as protested at Red Location (Verster 2017:14). In Mamelodi, large-scale urban schemes and buildings are not implemented because of limited resources and management (City of Tshwane 2005; GAPP 2010). Therefore, Hamdi (2004:214) proposes that interventions be introduced through now, soon and later strategies. The initial provision of a small-scale, catalytic intervention, rather than a completed urban scheme or building, enables the community of the buffer to adopt and insert their own meanings into the project. This strategy facilitates ownership rather than dependency (Hamdi 2004:141). Furthermore, the strategy gives the government the time to collect adequate resources for later, larger-scaled intentions. Therefore, the project adopts an incremental approach to creating an urban scheme and a small-scaled, socially-cohesive architecture.

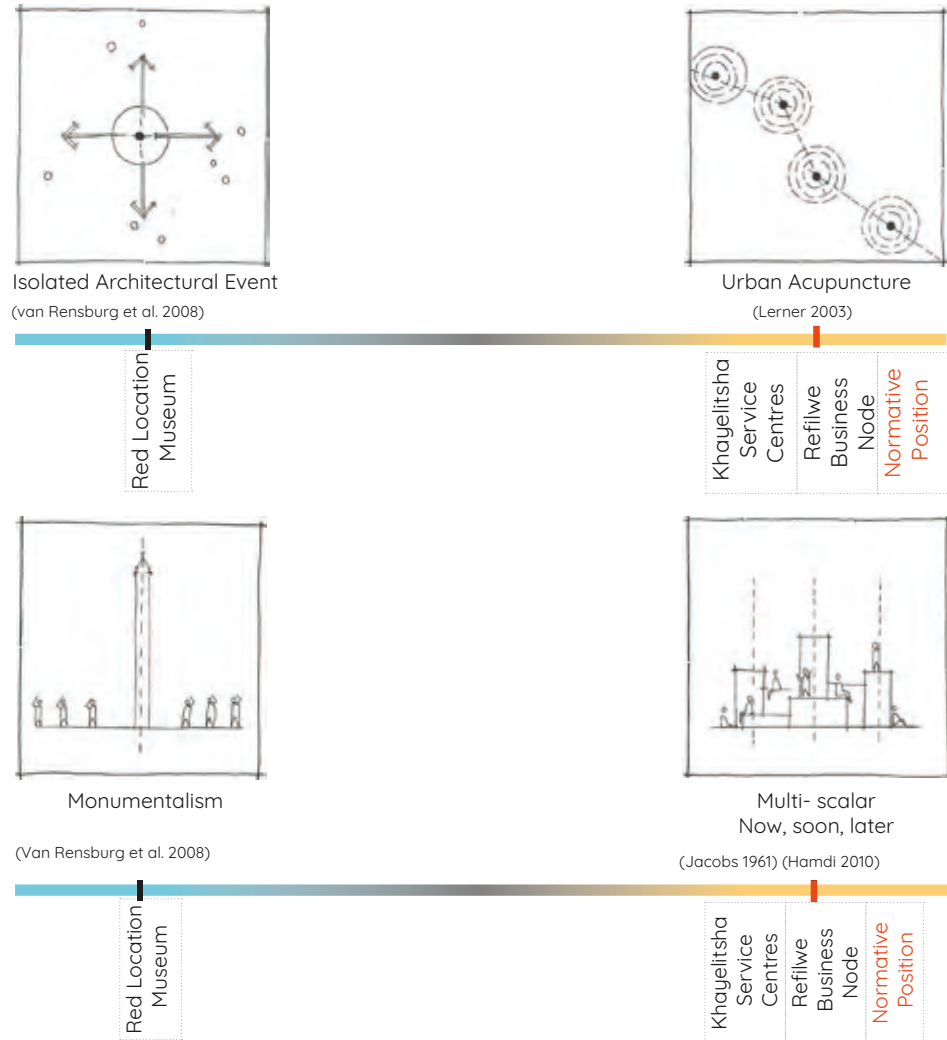


Fig 45: Visual scales depicting isolated architectural event vs. urban acupuncture, monumentalism vs. multi-scalar (Van Staden 2021).

1.18 | RITUAL

(Refer to figure 46)

It is important to consider the interactions between people and space, which emerge from particular forms of gathering. It is argued that event-driven architecture results in a linear-investment in space (Dirsuweit 2009:89). This was analysed at the Red Location Museum, which attempted to involve the local community by allowing them to deposit their own artefacts of struggle into a memory box (Noero 2017). However, this momentary event did not facilitate a habitual connection between community and museum. Rather, social cohesion requires meaningful and repeated contact with space to facilitate a sense of belonging (Dirsuweit 2009:89). The intentions of the Khayelitsha Service Centres and Refilwe Business Node evoked Lefebvre's (1991) notion of the 'right to the city'. The designs of these productive, social spaces were informed by the everyday needs and rituals of the local community. Therefore, the intention of this project is to celebrate a cyclical investment in space, by recognising the existing, everyday rituals of the buffer zone.

The question arises about how to create a socially cohesive space that is accommodating of diverse, cultural rituals. It is argued that the design of many South African public spaces has resorted to symbolic forms to accommodate a multi-ethnic society (De Costa et al. 2008:36, Dirsuweit 2009:100). However, the Red Location Museum successfully showcased the stories of multiple groups through non-prescriptive memory boxes (Noero 2017) and the Refilwe Business Node was able to respond to the everchanging rituals of the community through an open-ended, activity-driven solution (Pienaar 2014:138). Therefore, this project chooses to serve the needs of specific and shared rituals of multiple tribes of Mamelodi through the provision of a non-prescriptive architecture.

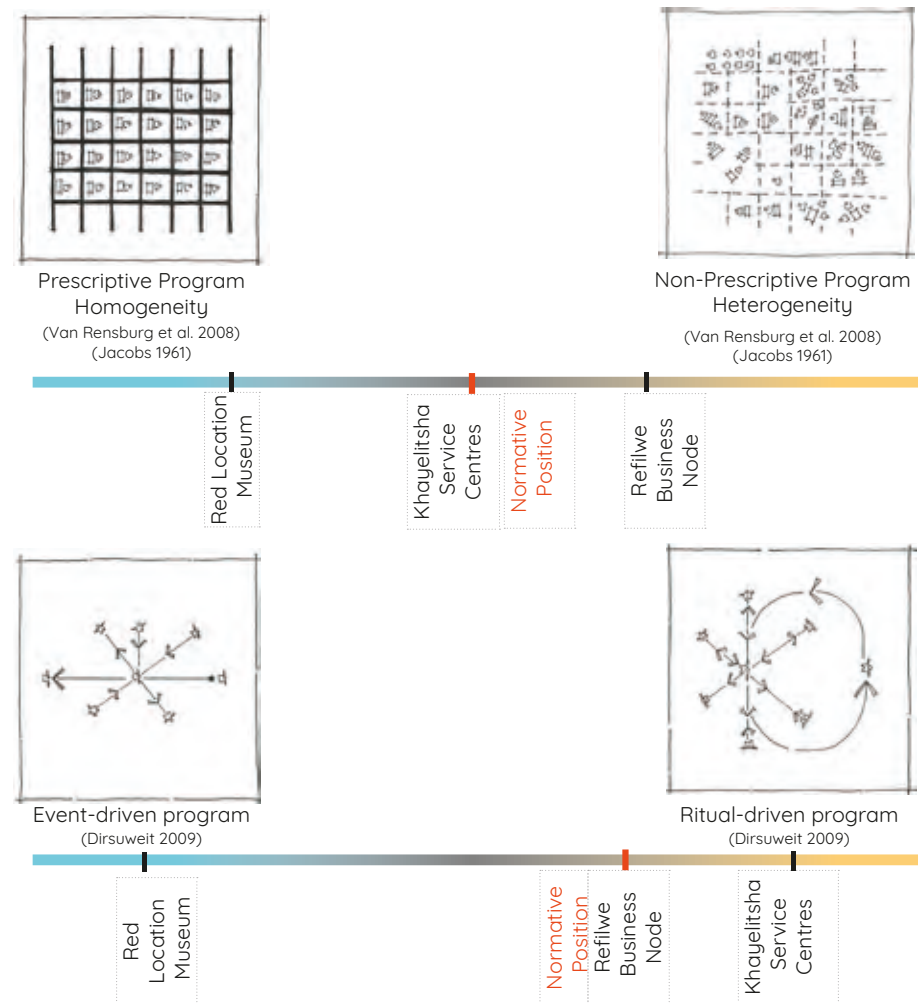


Fig 46: Visual scales depicting prescriptive space event vs. non-prescriptive space, event-driven space vs. ritual-driven space (Van Staden 2021).

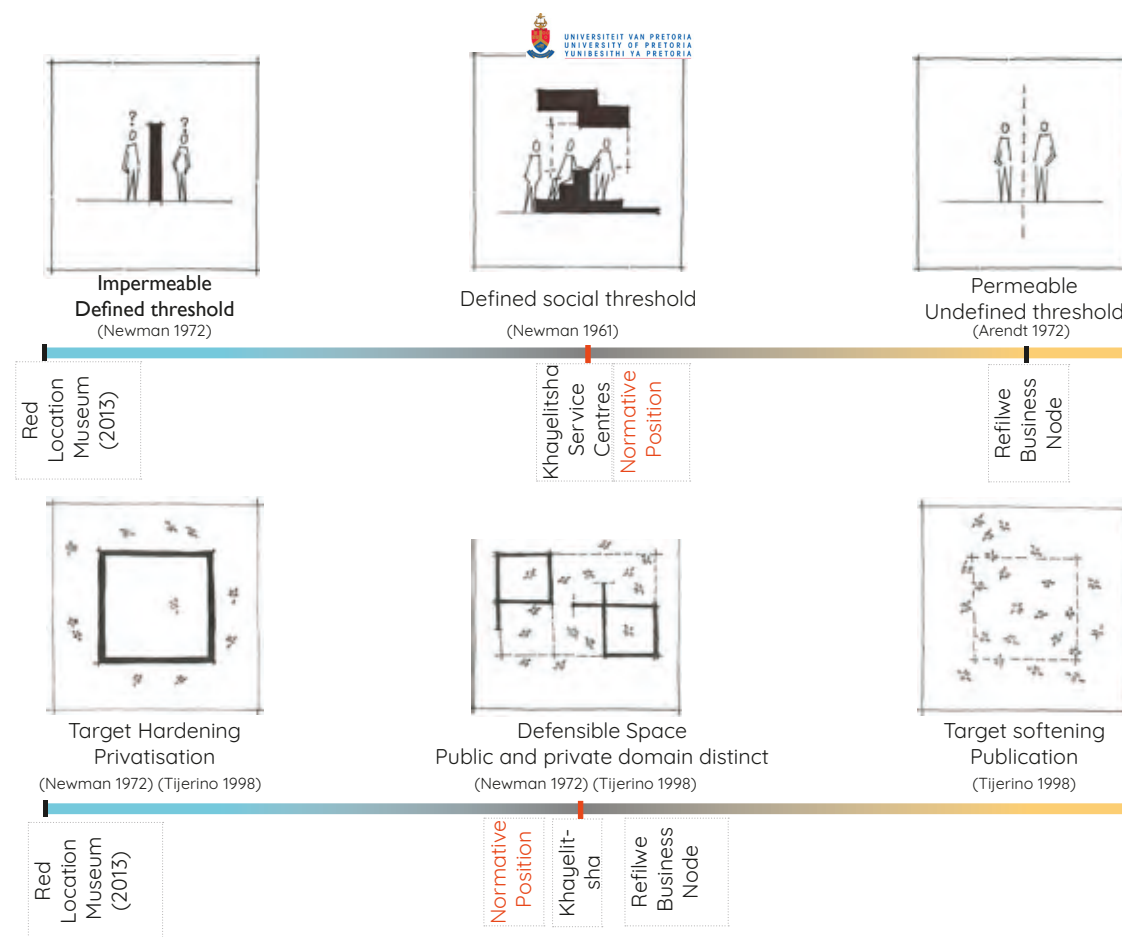


Fig 47: Visual scales depicting threshold permeability, target hardening vs target softening (Van Staden 2021).

1.19 | THRESHOLD

Social cohesion is inhibited when urban citizens fear for their safety in public spaces. Target hardening and territorial demarcation are common design responses, which do not promote democracy (Tijerino 1998:322). After the forced closure of the Red Location Museum, the government barricaded doors and placed a fence around the site, rendering it impermeable and inaccessible to all (Verster 2017:41). Tijerino (1998:324) argues that these physical acts of incivility encouraged social acts of incivility such as vagrancy and vandalism.

Newman (1972) argues for defensible space as a design response to crime deterrence. “Defensible space is an urban model which inhibits crime by creating a physical expression of a social fabric that defends itself” (Tijerino 1998:325).

The design of the Refilwe Business Node achieved this by formalising the site’s existing open space and sidewalk through a permeable threshold condition (Pienaar 2014:138). The public and private domains were defined by a raised plinth. A considered use of brick brise-soleil screens created ‘a building interface with no ‘front’ or ‘back’, a challenge given the central positioning of public ablutions’ (Pienaar 2014:138). Through this considered layout, access was visible to the surrounding community, and pedestrian and traffic movement was controlled. The Khayelitsha Service Centre created a defensible space through a layering of defined thresholds, which encouraged different types of social engagement (Low 2002:28). Therefore, the project recognises the unsafe conditions of the buffer and through defensible space, intends to create security and inclusivity.

2 | URBAN CONTRIBUTION

2.1 | CHAPTER OVERVIEW

The following chapter tackles the urban condition of the Khalambazo Buffer Zone. It questions existing urban proposals through the creation of a cultural landscape which narrates the story of Letsema. The urban proposal is tested against the theoretical framework established in chapter 1.

2.2 | EXISTING URBAN FRAMEWORK

(Refer to Figure 48)

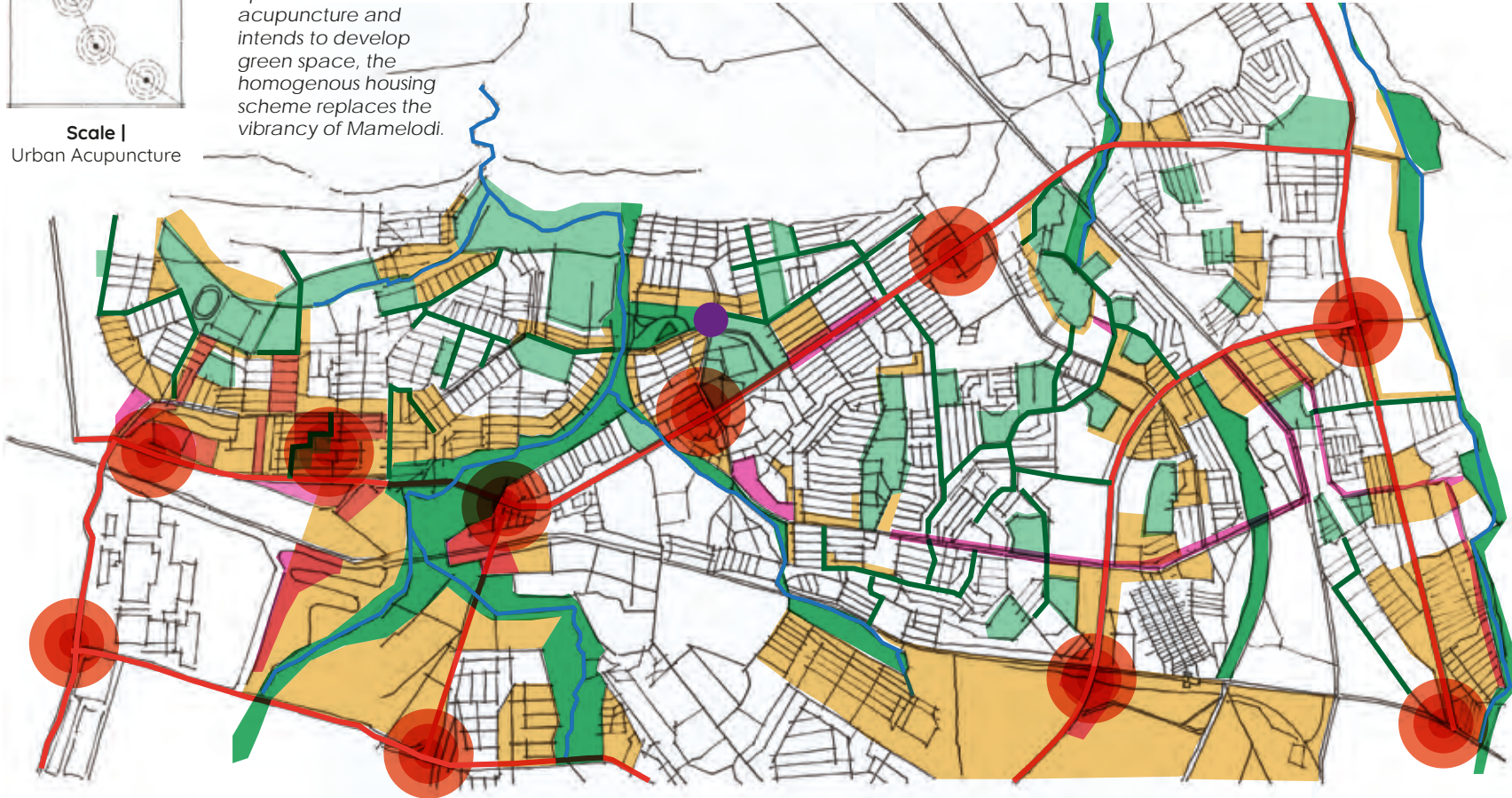
The Composite Regeneration Strategy for Mamelodi (Gapp 2011) was developed by the City of Tshwane to address the urban conditions that discourage investment in Mamelodi. The framework considers urban acupuncture; the intersections between activity corridors create nodes for development. The framework also considers the Local Open Space Plan for Mamelodi West and East (2007) and the Pienaar's River Rehabilitation Framework (2007), in order to develop the buffer's green space and to regenerate the river. However, the author is critical of certain urban intentions. The framework plans to replace the vibrancy of the buffer's surrounding streetscapes with a homogenous, high-density housing scheme. This intention does not accommodate the informality and constant flux of the Mamelodi context. Furthermore, this large-scaled proposal cannot be afforded by the community, and largely depends on the government to carry out its implementation.

Therefore, the dissertation proposes an alternative urban framework for the Khalambazo Buffer Zone.



Scale |
Urban Acupuncture

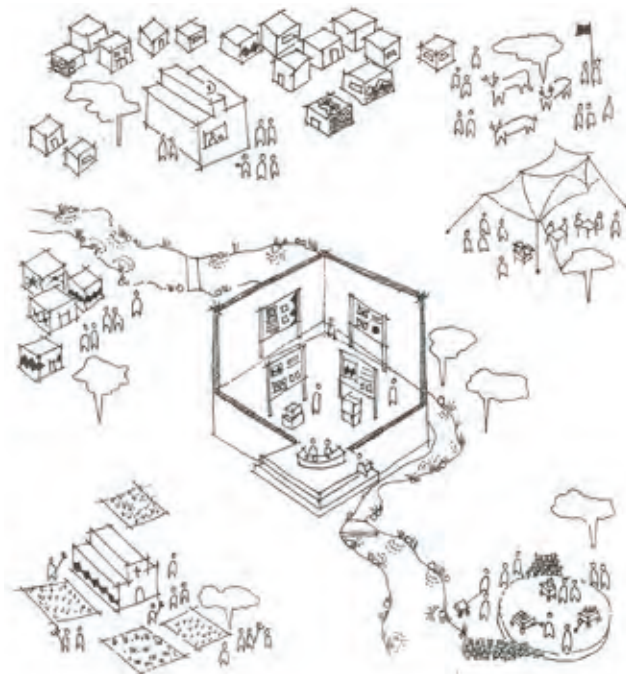
Although the proposal upholds urban acupuncture and intends to develop green space, the homogenous housing scheme replaces the vibrancy of Mamelodi.



KEY

- Nodal Corridor
- Pedestrian Corridor
- Rehabilitation of Piernaarspruit
- Proposed formal nodes
- Proposed development of green space
- Existing green space
- Proposed high density housing
- Proposed mixed use building
- Site |Node

Fig 48: Map depicting Composite Regeneration Strategy (Van Staden 2021, adapted from Gapp 2011).



Typical cultural centre typology:
Insular condition



Productive cultural landscape:
Living cultural heritage.

Fig 49: Diagrams questioning a cultural centre typology (Van Staden 2021).

2.3 | URBAN INTENTION: MAKING A CULTURAL LANDSCAPE

“The cultural landscape is a constantly evolving, humanized, landscape. It consists of a dialect between the natural physical setting, the human modifications to that setting and the meanings of the resulting landscape to insiders and outsiders. Continuous interaction between these three elements takes place over time. Cultural landscapes can be represented as stories, myths and beliefs which may be applied to all landscapes including wilderness landscapes, ordinary landscapes or designed landscapes. The concept of cultural landscape therefore, embodies a dynamic understanding of time in which the past, present and future are seamlessly connected.” (Armstrong 2001:13).

The urban scheme intends to uphold the living cultural heritage of multiple tribes of Mamelodi, through the creation of a cultural landscape, which knits the existing, disconnected associational life of the buffer zone into a unified network, with indigenous food-making practices.

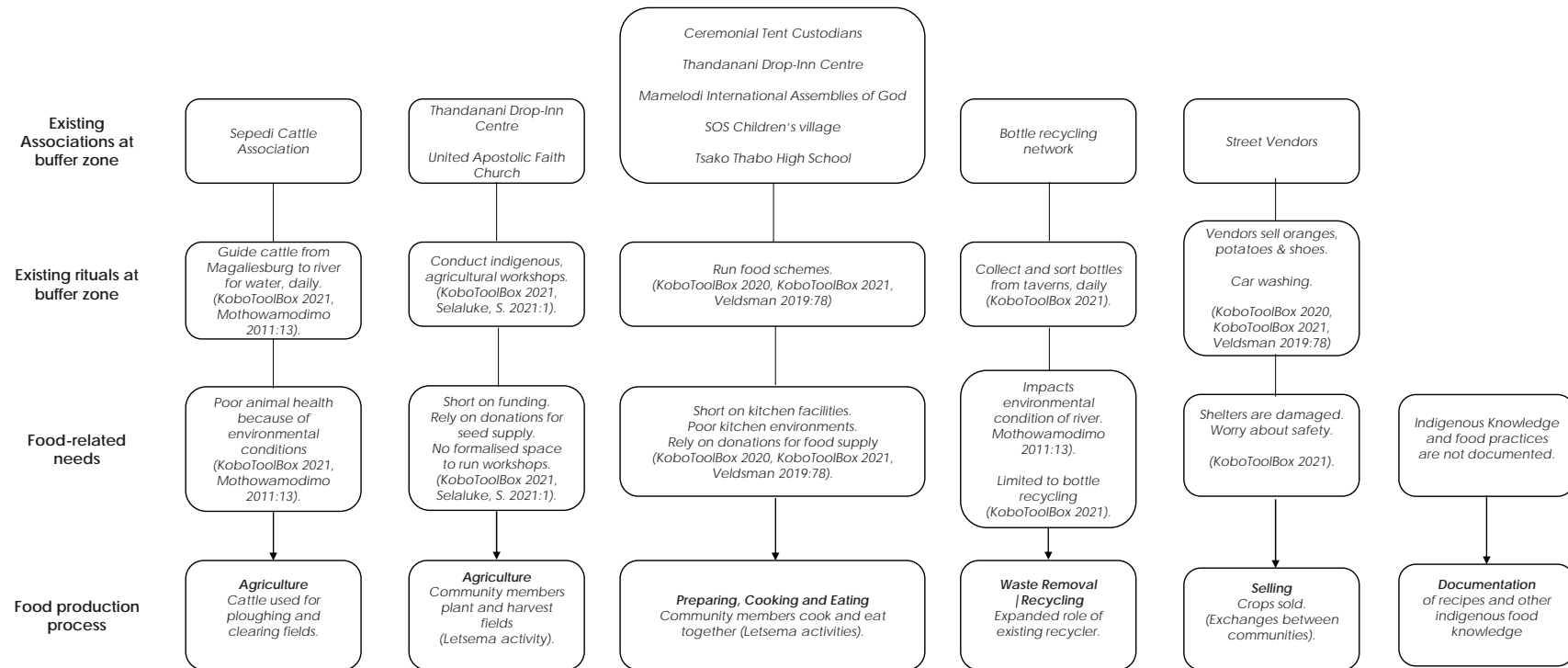


Fig 50: Diagram depicting the food-related needs of the community (Van Staden 2021).

2.4 | URBAN PROGRAMME | INDIGENOUS FOOD AND FOOD MAKING

(Refer to figure 50).

After interviews with various associations of the buffer zone, there were many food-related needs (KoboToolBox 2021) and the everyday routines and cultural rituals could be linked as different processes of indigenous food production. The author argues for indigenous food practices

because they are communally-driven (Lebeloane et al. 2008, Masekoameng 2007). Although, food is individually consumed, it is often communally grown, processed and prepared. Furthermore, indigenous cuisine is an expression of cultural heritage. Thus, indigenous food making can serve as a catalyst for conversations about ritual, culture and tribalism.

2.5 | A FOOD NARRATIVE | LETSEMA

The two neighbourhoods are predominantly occupied by the Tsonga and Pedi, however, the proposal does not exclude those who fall outside these two cultures. Mamelodi is home to many cultural groups (refer to figure 51). In the interest of a democracy, the urban program considers an indigenous food narrative shared by multiple groups of Mamelodi, known as Letsema (Lebeloane et al. 2008:1, Masekoameng 2007:26). Letsema is a voluntary cooperative farming practice whereby community members assist one another to look after cattle and plough, sow and harvest the fields (Lebeloane et al. 2008:1). This voluntary co-operation is based on the belief that “your neighbour’s problem or success is yours too” (Lebeloane et al. 2008:1). Thereafter, the women of the community hold Letsema parties where they communally cook together to reward the volunteers with a meal (Masekoameng 2007:26). Therefore, Letsema is both a food and social cycle that ensures food security, assists in community development and facilitates social cohesion amongst multiple cultures.

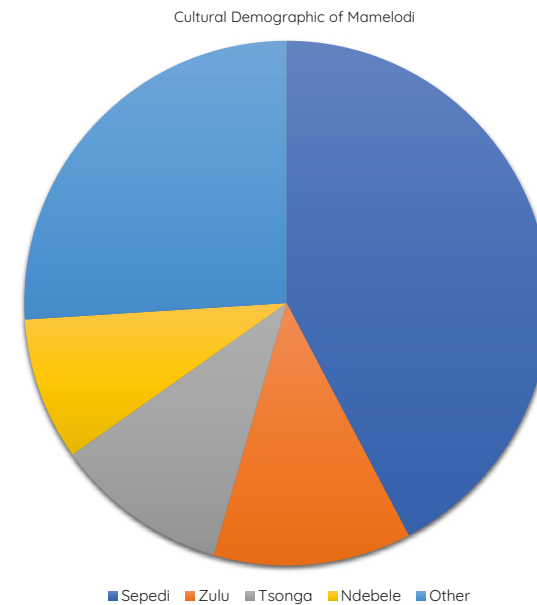


Fig 51: Pie chart depicting the multiple cultural groups of Mamelodi (Van Staden 2021, adapted from World Population Review 2021).








Rituals of Letsema	Rain-making rituals 	Communal, voluntary agricultural practices Seeding Fertilising Planting Weeding Harvesting Drying Threshing Winnowing Storing 	Harvest Rituals 	Insect Farming 	Communal Cattle Rearing Cattle lending 	Communal Cooking: Tempering Mashing Kneading Preserving Grinding Miling Sieving Soaking Boiling Baking Roasting Frying Steaming 	Slaughtering Rituals 
Pedi	x Kgogola mmoko	x Letsema	x Go-Lomo Ritual	x	x Mafisa	x Thophi	x
Tsonga	x Nkelekele	x Buhnu	x Ancestral Worship Ceremony	x	x	x Xigugu	x
Zulu	Rain Queen Modjadji	x Ilima	x First fruits ceremony		x Ukusisa	x Uphuthu	x
Ndebele	x	x Ilima	x First fruits ceremony		x Ukusisa	x Isitshwala	x
Xhosa	Rain Queen Modjadji	x Ilima	x First fruits ceremony		x Ukusisa	x Umngqusho	x
Venda	x Domba dance	x Vhuthu	x Tshifhasi Tshigombela	x	x	x Tshidzimba	x
Tswana	x	x Letsema	x First fruits ceremony	x	x Mafisa	x Bogobe	x

Fig 52: Table depicting the rituals of Letsema, shared by multiple tribes. (Van Staden 2021).








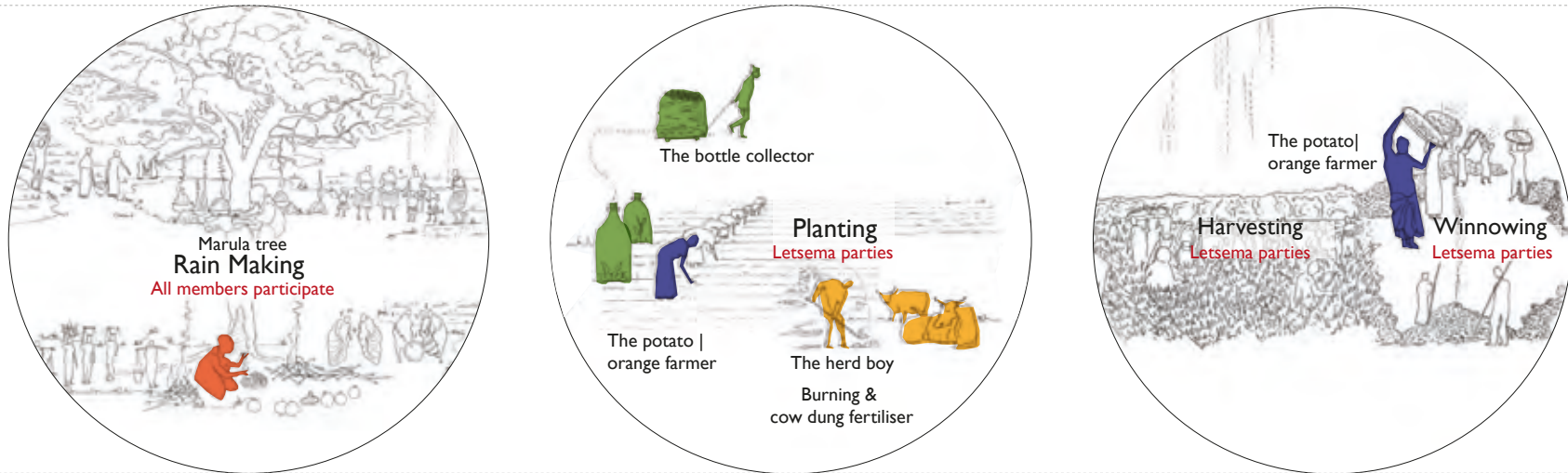
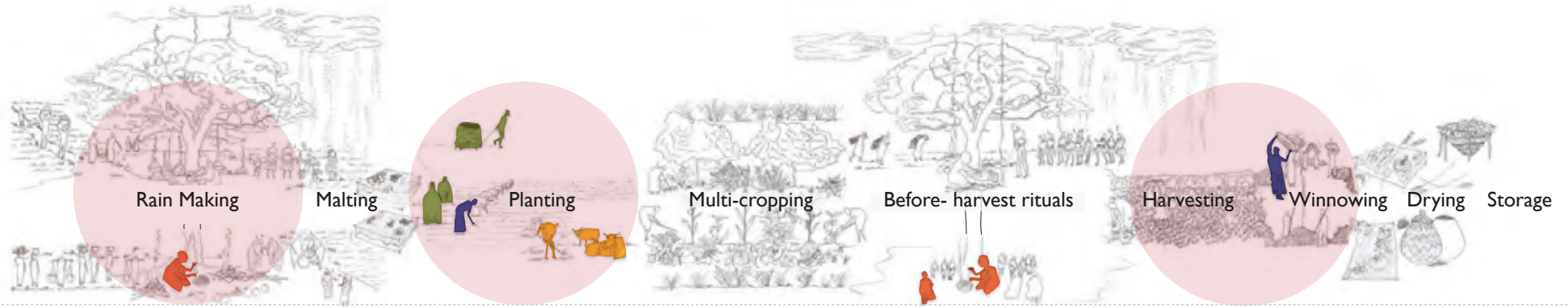
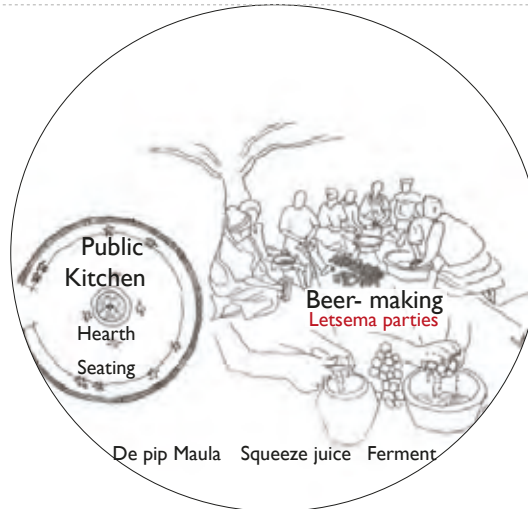
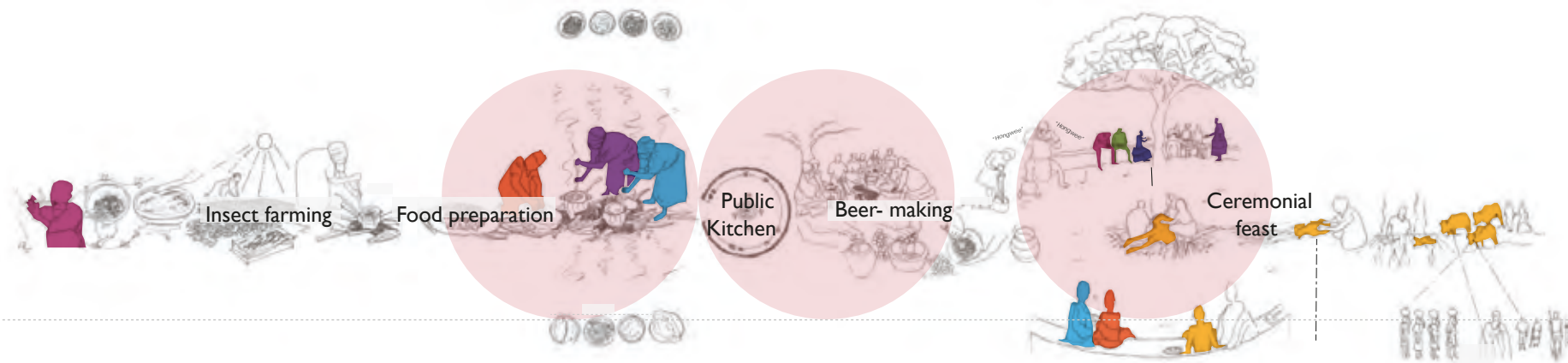
Rituals of Letsema	Milk fermentation 	Beer-making 	Serving Rituals 	Communal Eating 	Cleansing Rituals 	Waste disposal 	Documentation 
Pedi	x Maswi mafi	x Bjala ba sesotho	x	x	x	Food waste generated for ceremonies is a serious problem. A taboo to take food home.	Oral transferral of indigenous food and food rituals. Not well documented.
Tsonga	x Magege	x Marula Beer Mpalwa	x	x	x		
Zulu	x Amasi	x Utywala Umqomnothi	x	x	x		
Ndebele	x Amasi ihiqua	x Umqomnothi	x	x	x		
Xhosa	x Amasi	x Umqomnothi	x	x	x		
Venda	x Milk infused with tart boobab flesh	x Mahafhe	x	x	x		
Tswana	x Madila	x Bokalwa jwa Setswana	x	x	x		

Fig 53: Table depicting the rituals of Letsema, shared by multiple tribes. (Van Staden 2021).



Cultivation

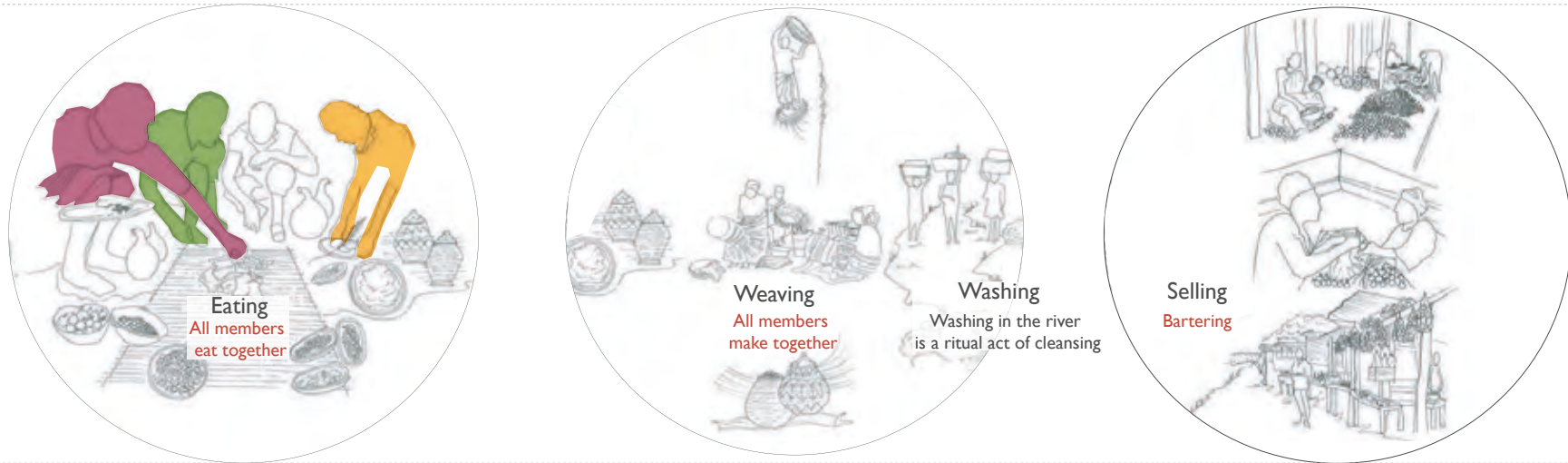
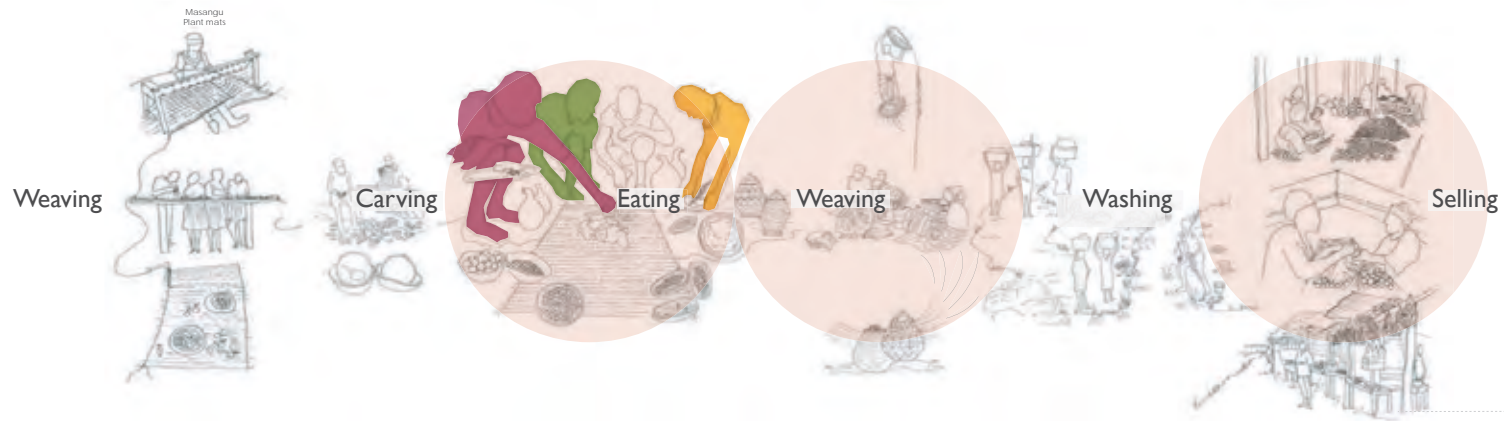
Fig 54: Diagrams depicting the rituals of Letsema (Van Staden 2021).



Liver for slaughterer Intestine for elder women Heart for elder men Head for herdsmen

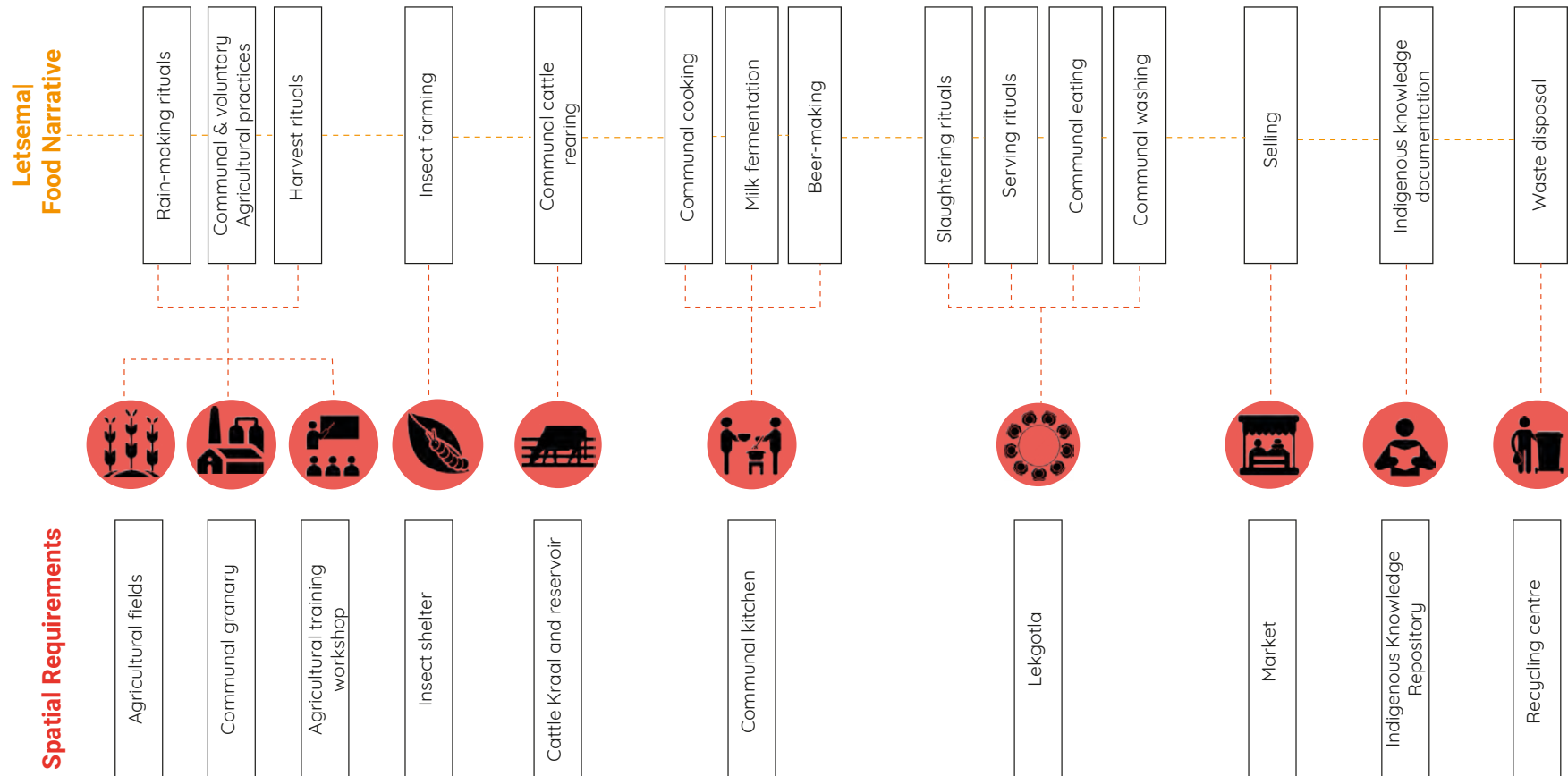
Food Preparation and Eating

Fig 55: Diagrams depicting the rituals of Letsema (Van Staden 2021).



Serving, Eating and Washing

Fig 56: Diagrams depicting the rituals of Letsema (Van Staden 2021).



The rituals of Letsema and their corresponding spatial requirements were identified, in order to develop an indigenous food program for the multiple tribes of the cultural landscape.

Fig 57: Diagram depicting rituals of Letsema and the corresponding spatial requirements (Van Staden 2021).

2.6 | SPECIFIC CULTURAL RITUALS OF THE PEDI AND TSONGA

(Refer to Figure 58)

Although the Pedi and Tsonga both practice Letsema and share other indigenous food making practices, it is important not to homogenise South African culture (Baillie 2020:10). There are nuances between cultures which are contextually specific. In the context of Khalambazo and Selbourne & Site, the Pedi practice cattle rearing because they have taken claim of the Magaliesburg Mountain and are therefore, able to conduct initiation sacrifices (KoboToolBox 2021, Luthuli 2020:10). Whereas, the Tsonga are more agricultural-orientated because of the various agriculture workshops (the United Apostolic Faith Church) located in Khalambazo (KoboToolBox 2021, Selaluke 2021:1). Therefore, in addition to shared rituals, it is important to recognise how the existing and specific rituals of the Pedi and Tsonga could potentially complement each other and be collectively responsible for the making of a meal.

2.7 | URBAN PROGRAMME SUMMARY

Therefore, the programme of the buffer zone can be described as a productive cultural landscape that:

- Addresses the multiple food-related needs of the associations at the buffer.
- Links the existing, everyday routines and associations through indigenous food production.
- Accommodates shared food rituals, such as Letsema, appealing to multiple tribes of South Africa.
- Accommodates the existing and specific cultural rituals practiced by the Tsonga and Pedi.

The program will be further unpacked through mapping the urban scheme.

Food production		Pedi pedi Ingredients Dishes Rituals	Tsonga Ingredients Dishes Rituals	Acts that support social cohesion	Shared space
	Traditional gender roles	Men clear, plough and sow fields, weave sesego baskets. Women weed, thresh and harvest.	Men clear, plough and sow fields. Women plant, hoe, thresh and harvest.	All members of the tribe participate in food production.	-
	Blessing	Kgogola mmoko: - Cultivating inaugurated by rain-making ritual. - Women dress in traditional clothes, carry water to chief. - Chief blesses seed. - Healer leads community to field where rubbish is collected and burnt at chiefs kraal. - Dancing and feasting follows. - Ploughing starts after first rains.	Nkelekele - Cultivation is inaugurated by rain-making ritual - The ancestors need to be notified of cultivation, to prevent poor harvest. - Mud of the first ploughed fields is presented to the ancestors at the gandzelo shrine- the marula tree. - Livestock is slaughtered. - The ancestors are asked to bless and purify the future produce.	All members of the tribe participate in rain-making rituals.	Tsonga: Gandzelo & Huvo Sepedi: Altare & Kgotta
	Seeding: Malting: steeping, germination and drying Storage	Moulting: - Grain seed is soaked in water to swell up. - Seeds placed on racks, kept moist in a cool space for 3-5 days. - Seeds germinate. - Seeds are dried on dry racks. - Previous crops scattered after thrashing will germinate. - Obtain seeds through exchanges with neighbouring communities.	Moulting: - Grain seed is soaked in water to swell up. - Seeds placed on racks, kept moist in a cool space for 3-5 days. - Seeds germinate. - Seeds are dried on dry racks. - Previous year's crops scattered after thrashing will germinate. - Obtain seeds through exchanges with neighbouring communities.	Seeds are exchanged between communities.	Market Tsonga: tihorhini: place of exchange -Sepedi: mmaraka
	Seed	Mohlatswa Wild plum Strychnos pungens Motlhono Kei-apple Dovyalis caffra Marula Marula Sclerocarya caffra Sond Difoiey Prickly pear Opuntia megacantha Ditshidi Sour plum Ximenia caffra Mafaya Ficus sp. Thepe Pigweed Amaranthus thunbergii Serepelele Thorny pigweed Amaranthus spinosus Mokolonyane Black Jack Bidens pilosa Monyaku Wild cucumber Cucumis melo Moswe Black nightshade Lerotho Cat's whiskers Cleome gynandra Mokiti Melon Citrullus vulgaris Mabele Sorghum Sorghum bicolor Leotja Millet Pennisetum glaucum Mafodi Pumpkin Cucurbita pepo. Magapu Watermelon Citrullus lanatus Digo Calabashes Munawa Cowpeas Vigna unguiculata Ditloo marapo Njugo beans Vigna subterranea Lethanye Lang bean Vernonia fastigiata Mobola plum Parinari curatellifolia Gourd Logenaria vulgaris Peanut arachis hypogea African potato plectranthus esculentus Jews Mallow Corchorus olitorius Monkey orange Strychnos coccoloides	Vele Maize Zea mays Timanga Peanuts Arachis hypogea Tindluwa Njugo beans Vigna subterranea Nyawa Cowpeas Vigna unguiculata Kwembe Pumpkin Cucurbita pepo. Muxiji Black Jack Bidens pilosa Thyeke ra xilungu Pigweed Amaranthus Marula Marula Sclerocarya caffra. Nhlatja Sweet potato Pomoea batatas Calabash Logenaria siceraria Mhungu Millet Pennisetum glaucum Gourd Logenaria vulgaris Khalavatlja Watermelon Citrullus lanatus Mbhumbhununu African potato Plectranthus esculentus Xiyakayan Wild cucumber Cucumis melo Jews Mallow Corchorus olitorius Makwakwa Monkey orange Strychnos coccoloides Kei-apple Dovyalis caffra Maphila Sorghum Sorghum bicolor Nthunduluka Sour plum Ximenia caffra Xidlaya-mesisa Thorny pigweed Amaranthus spinosus Mudoro Prickly pear Opuntia megacantha Xinunhwelambeva Cat's whiskers Cleome gynandra	-	Fields Tsonga: masimu Pedi: Thena
	Planting	Traditional process to burn before planting. Spat into holes, made with fingers Dropped and trodden into soil by foot Scattered by women (Quin 1959, Mannig 1967) Multi-cropping over crop rotation: mains crops planted first.	Traditional process to burn before planting. Spat into holes, made with fingers Scattered by women. Multi-cropping over crop rotation: mains crops planted first.	Letsema (Pedi), Buhnu (Tsonga) -Volunteers to make up labour force. Repaid with food. -Communal spirit- belief that 'your neighbour's problem or success is yours too.' -Alleviates poverty and ensures food security. -Acquisition of indigenous agricultural practice. -Letsema is undocumented and unstructured.	

Fig 58: Table depicting the nuanced food rituals of the Pedi and Tsonga ((D'Antuono, L. F 2015, Department of Agriculture Republic of South Africa 2013, Liengme 1981, Lebeloane et al. 2008, Masekoameng 2007, Mpfu 2002, Pasha 2020, Van Staden 2021).

Agriculture	Cultivation	Fertilising	No chemical fertilisation used. Cattle dung, ash after burning fields.	Burn fields. No chemical fertilisation used. Cattle dung not used.	-	Cattle Kraal Pedi: Lesaka Tsonga: Xibala
		Pesticides	Indigenous medicinal plants	Indigenous medicinal plants	-	-
		Weeding	Planting of secondary crops during weeding - suppress future weeds, protects soil from heat. Weeding done by hoe.	Planting of secondary crops during weeding- suppress future weeds, protects soil from heat. Weeding done by hoe.	Letsema (Pedi), Buhnu (Tsonga) -Volunteers to make up labour force. Repaid with food. -Communal spirit- belief that your neighbour's problem or success is yours too. -Alleviates poverty and ensures food security. -Acquisition of indigenous agricultural practice.	Fields Tsonga: masimu Pedi: Thena
		Blessing	The ritual ceremony of the 'first fruits' is held by the chief, prior to harvesting.	Ancestral worship ceremony- -No food is allowed to be harvested before ceremony. -Ripe sorghum is harvested to brew beer- 'byala vutshilo' -Crops are gathered from the fields in a proportional manner and brought to the gandzelo- Marula tree. -Goat or bull is slaughtered. -Ceremony beer is poured over livestock. -The ancestors are asked to notify the community if the crops are ready -The healer will drink beer and spit all over the shrine. -The community will leave the shrine to have a feast. -After the ceremony, the community may harvest. Performed during marula season.	All members of the tribe participate in harvest rituals.	Tsonga: Gandzelo & Huvo Pedi: Altare & Kgotla
		Harvesting	Go-loma ritual forbids the harvesting and usage of crops before the chiefs permission. Delayed until crops reached maturity. The uprooting of plants and removal of branches is forbidden for culturally significant plants. Relishes that are cooked together are picked together.	-No food is allowed to be harvested before ceremony. -Person will become ill. The uprooting of plants and removal of branches is forbidden for culturally significant plants. Woven baskets are used to collect and carry harvest.		
		Drying preservation	Beans, sorghum and millet are placed on seboya clay dry platforms. Indigenous vegetables preserved through sun drying methods. Today's dry racks made of shade cloth/ hale netting.	Masangu- plant mats used for drying. Indigenous vegetables preserved through sun drying methods. Today's dry racks made of shade cloth/ hale netting.	Letsema (Pedi), Buhnu (Tsonga) volunteers to make up labour force. Repaid with food. Acquisition of indigenous agricultural practice. Communal spirit- belief that your neighbour's problem or success is yours too.	Fields Tsonga: masimu Pedi: Thena
		Threshing Winnowing	Dry pods placed on seboya and beaten with morogo threshing stick to free seeds. Flat woven baskets for winnowing. Letsema parties speed up process.	Rihlelo flat woven baskets for winnowing. Letsema parties speed up process.		
		Storage	Sesego - traditional woven silo/ storage baskets. Stores sorghum and corn for over 10 years. Able to maintain low temperatures, Weaving absorbs 'sweating' of sorghum grains. Aloe castanea prevents weevils. (Teiku et al. 2000:210-222) Dried vegetables stored in big clay pots sealed with cow dung. Other crops stored in cool food storage house communal granary	Xirhudzu- Woven, conical baskets are used for storing maize and beans. Made from cocculus hirsutus stems, wound around in circles. Other crops stored in cool food storage house Dulu- communal granary	Both men and women weave different types of baskets. Weaving is a communal ritual.	Communal granary Pedi: sekiri sa dithollo Tsonga: dulu

Fig 58: Table depicting the nuanced food rituals of the Pedi and Tsonga ((D'Antuono, L. F 2015, Department of Agriculture Republic of South Africa 2013, Liengme 1981, Lebeloane et al. 2008, Masekoameng 2007, Mpofu 2002, Phasha 2020 Van Staden 2021).

		Insect farming	Abundant during rain season. Traditionally collected by children. Wild beekeeping - honey is a delicacy. Desert locust Schistocerca gregaria forsk Ditsie Grasshoppers Dictyophorus spumans Ditshosane Termite Coptotermes spp Masotsa Mopane worms Gonimbrasia belina	Abundant during rain season. Traditionally collected by children. Grasshoppers Dictyophorus spumans Tinjiya Locusts Schistocerca gregaria forsk Ditshosane Termite Coptotermes spp Matamani Mopane worms Gonimbrasia belina	-	Insect shelter Bee hives
		Animal Farming	Communal land ownership allows the roaming of livestock all over the area. Cattle and Goats kept in same kraal.	Communal land ownership allows the roaming of livestock all over the area. Cattle and Goats kept in same kraal.	Letsema or mafisa (Pedi), Buhnu (Tsonga) -Herd boys volunteer to look after neighbour's livestock. -One female cow is marked as a token of appreciation (tshwaya). -Once the cow bears calves they are given to herd boy to start his own farm. -Enables community members to acquire livestock and wealth.	Cattle Kraal Pedi: Lesaka Tsonga: Xibala Reservoir
Food preparation Cooking	Plant-based food	Gender roles	Women and girls initiated in the tradition of preparing, cooking and serving food.	Women and girls initiated in the tradition of preparing, cooking and serving food.		
		Tempering Mashing kneading moulding Preserving Grinding pounding Sieving Soaking Boiling Baking Roasting Frying Steaming	Cereal and relishes are served separately. -Morogo (Mashed in small balls (mokhusa), dried, stewed. A relish for cereals and meat) -Tshima (mixed legumes) -Kgodu (Boil citron. Boil sorghum meal. Mix). -Thophi (Boiled maize. Boiled melon. Mix). -Dikgobe (Grind sorghum and beans. Soak sorghum and beans. Boil the sorghum grains. Add vegetables. Delicacy) -Tomatoes, salt and marula kernels added to relish to enhance flavour. -Traditionally cooked in 3-legged cast iron pot.	-Xigugu (Roast, grind peanuts. Roast, grind maize kernels. Mix with honey and boil. Prestigious dish -Xiendla hi vomu (Soak, boil legumes. Boil maize kernels.) Roast, grind peanuts. Mix and boil for 3-4 hours.) -Merogo (Mashed in small balls (mokhusa), dried, stewed. A relish for cereals and meat) -Tihove (type of samp, maize porridge) -Xingwimbi (Ground nuts. Boil, mash pumpkins. Mix) -Mbhacha (Roast nut. Roast maize cobs. Mix.) - Ximbundzu (Traditional maize bread) -Traditionally cooked in 3-legged cast iron pot or Yinkho-clay pot for cooking	Letsema (Pedi), Buhnu (Tsonga) Women hold letsema parties for food preparation of ceremonies. Letsema- volunteers to make up labour force. Repaid with food. Acquisition of indigenous agricultural practice. Communal spirit- belief that your neighbour's problem or success is yours too.	Communal kitchen Tsonga: mayikhweni- 'place of pots' xivava Sepedi: ngwako wa mollow- 'hut of the fire'
	Insect-based food	Mopani worms (squeezed, roasted boiled, dried, rehydrated, stewed roasted. Delicacy)	ku koma Matamani Mopani worms (squeezed, roasted boiled, dried, rehydrated, stewed roasted. Delicacy)	-		
	Meat-based food	Slaughtering	Cattle slaughtered for ceremonies- weddings, funerals. It is blasphemous to kill cattle out of hunger- they exist in a liminal space between human and divine. Execution is carried out by a designated family member. The liver is reserved for the slaughterer and grilled immediately. The heart is reserved for the senior male. The tripe is reserved for the senior female members. Herders and hunters feed on the head of the cow. No part of the cow goes to waste. The congregation drain the blood from the cow, leave it to set and eat it. 'Bobete'- curdled blood- clearest connection to ancestor. The meat is handled with care and eaten fresh.	Livestock slaughtered for ceremonies: Cattle and goats valued above other livestock. Tihuku Chickens are slaughtered at girl and boy initiation. Timbuti Goats are slaughtered at a marriage ceremony. tihomu Cattle/ goats slaughtered at harvest ceremony.	All members of the tribe participate in slaughtering rituals. Different cuts of meat is shared with different members of the tribe.	Tsonga: Gandzelo & Huvo Pedi: Altare & Kgotla
	Milk	Maswi fermented milk (maise is pounded, boiled, water removed and mixed with milk) Storing unpasteurised cow's milk in a calabash container or hide sack to allow it to ferment. The fermenting milk develops a watery substance called umlaza; the remainder is maswi.	Magege Storing unpasteurised cow's milk in a calabash container or hide sack to allow it to ferment.	-	Communal kitchen Tsonga: mayikhweni- 'place of pots' xivava Pedi: ngwako wa mollow- 'hut of the fire'	

Fig 58: Table depicting the nuanced food rituals of the Pedi and Tsonga ((D'Antuono, L. F 2015, Department of Agriculture Republic of South Africa 2013, Liengme 1981,Lebeloane et al. 2008, Masekoameng 2007, Mpofu 2002, Phasha 2020, Van Staden 2021).

	Beer	Fermenting	Beer served at ceremonies-weddings, initiation and funerals. Marula beer (served to men) Sorghum beer.	Beer served at ceremonies-weddings, initiations and funerals. Tsonga known for beer drink music. Marula Beer mpalwa: Marula fruit left to ripen. ku rhumbula makanyi a sharpened bone xirhumbulo extracts pip. ku phosa makanyi: Pips are kneaded to depulp them and pressed to squeeze juice. The juice is diluted with water in a barrel mphonolo or clay pot mbita ku bveketa: The pips are preserved in a basket and pressed. The nhlwo juice of pip is added to barrels to effect fermentation 4 days- beer will have fermented. Each gender group sits in a semicircle with the marula beer at centre. the beer is served in a clay pot called khuwana. Each person is given a calabash kukela, to drink from. When the clay pot is empty the young men lift it up and shout 'Hongwee'.	All members of the tribe participate in beer drink rituals.	Communal kitchen Tsonga: mayikhweni- 'place of pots' xivava Pedi: ngwako wa mollow- 'hut of the fire' Tsonga: Gandzelo & Huvo Pedi: Altare & Kgota
	Serving		Wooden utensils and granaries created by men. Lay, gourd and grass utensils created by women. Calabashes and marula wood handy for utensils.	Calabashes used for beer drinking. Breaking of a calabash symbolises death. Chicken feathers on the food indicates displeasure with meal.	Process of socialisation. Both men and women learn indigenous skills though making utensils.	Verander Pedi: muthundi
64	Eating		Food is eaten communally from the eating mat (sethebe)	Food is eaten communally.	All members of the tribe eat together.	Tsonga: Huvo Pedi: Kgota
	Washing		The formal porridge bowl (mogopo) is scoured thoroughly with sand and water. Exterior and interior is whitewashed with clay. Washing in the river is a ritual act of cleansing	At a funeral, the family wash there hands with water, mixed with cow dung and grass from the inside of a goat's stomach before eating. Washing in the river is a ritual act of cleansing	Members will go as a group to wash there hands.	Communal washing area
	Selling		Surplus sold at local markets.	Surplus sold at local markets.	Bartering exchange-benefit both producers and consumers. Income generation. Farmers days and agricultural shows .	Market Tsonga: tiharhini: place of exchange -Pedi: mmaraka
	Waste		Too much food is prepared at ceremonies resulting in wastage. 'Piggy bag' is highly criticised.	Too much food is prepared at ceremonies resulting in wastage. 'Piggy bag' is highly criticised.	Encourage the sharing of food with neighbours or the needy. Spirit of Ubuntu.	Refuse area
	Documentation		Indigenous food gathering and production is not well-documented (Grenier, 1998:1) Indigenous Knowledge systems should be preserved as heritage for future generations through the creation of regional recipe books. Strengthen nutritional and agriculture research.			Indigenous food library.

Fig 58: Table depicting the nuanced food rituals of the Pedi and Tsonga ((D'Antuono, L. F 2015, Department of Agriculture Republic of South Africa 2013, Liengme 1981,Lebeloane et al. 2008, Masekoameng 2007, Mpofu 2002, Phasha 2020, Van Staden 2021).

2.8 | URBAN PROPOSAL | EXISTING URBAN CONDITION

(Refer to figure 59 and 60)

The topography and the 50-year flood line of the Pienaarspruit, determines the positions of urban interventions. Six development zones were identified by superimposing the previous mapping exercises.



By superimposing the urban analysis maps, spaces where social capital could be improved upon were identified.

Fig 59: Map depicting strategic position of development zones. Superimposition of hydrology, safety and ritual map (Van Staden 2021).

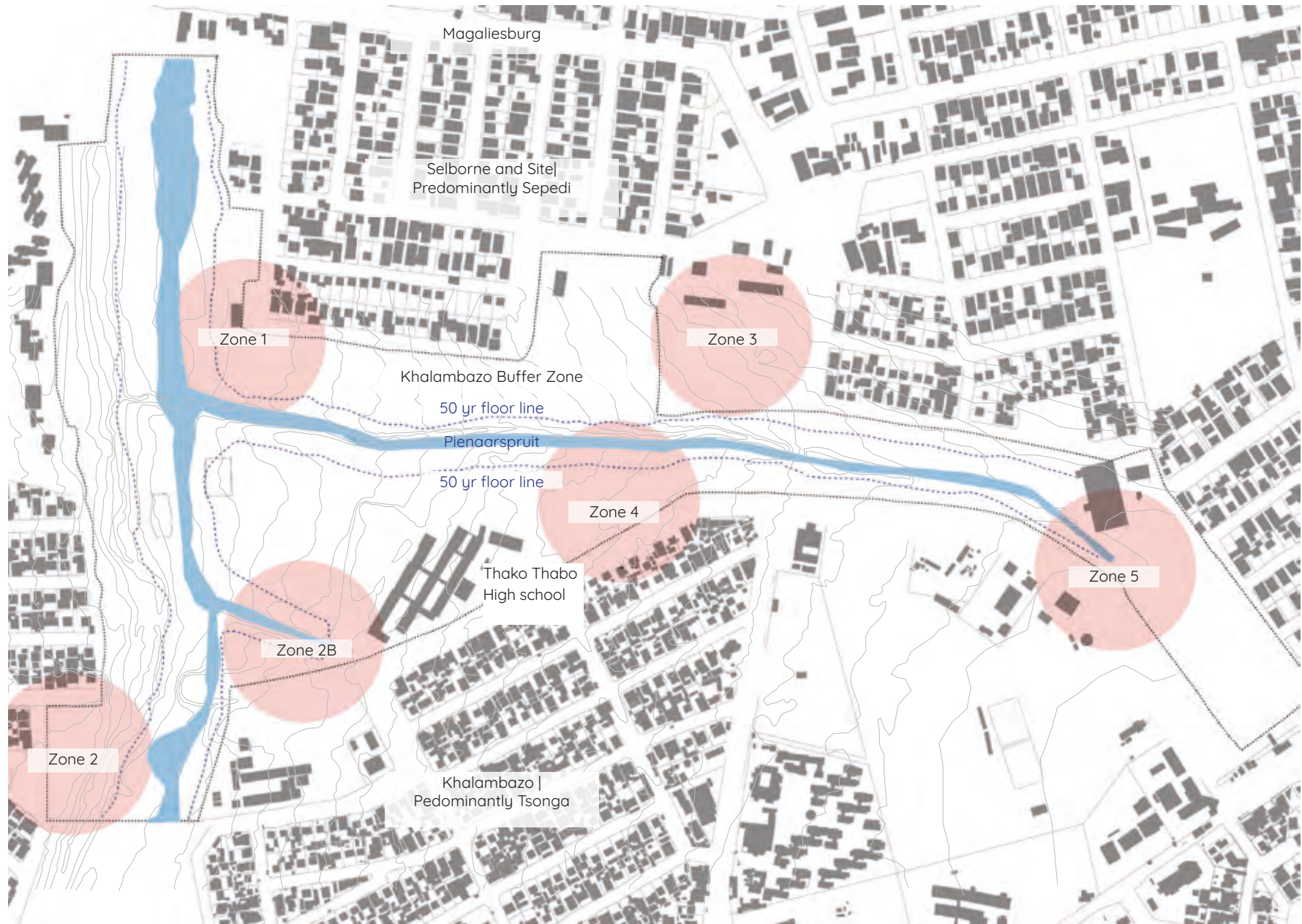
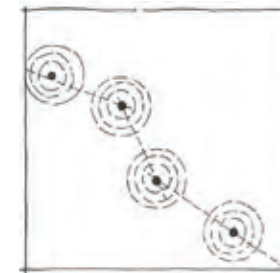


Fig 60: Map depicting the existing urban condition (Van Staden 2021).





Defined social threshold



Urban Acupuncture
Multi-Scalar

Fig 61: Diagrams depicting guiding principles of urban intention.

2.9 | STAGE 1 | WETLAND BUFFER

(Refer to figure 62).

According to the hydrology analysis, the river is an environmental health hazard. The urban proposal intends to rehabilitate the river by surrounding the water channel with a green buffer, which abides by the Buffer Zone Guidelines for Rivers, Wetlands and Estuaries (Macfarlane et al. 2017). Therefore, the wetland buffer encompasses the total area of the 50-year flood line. In doing so, the wetland buffer can restore ecological biodiversity, reduce the impacts of upstream activities and adjacent stormwater run-off, and create a healthier environment for the practice of rituals (Macfarlane et al. 2017).

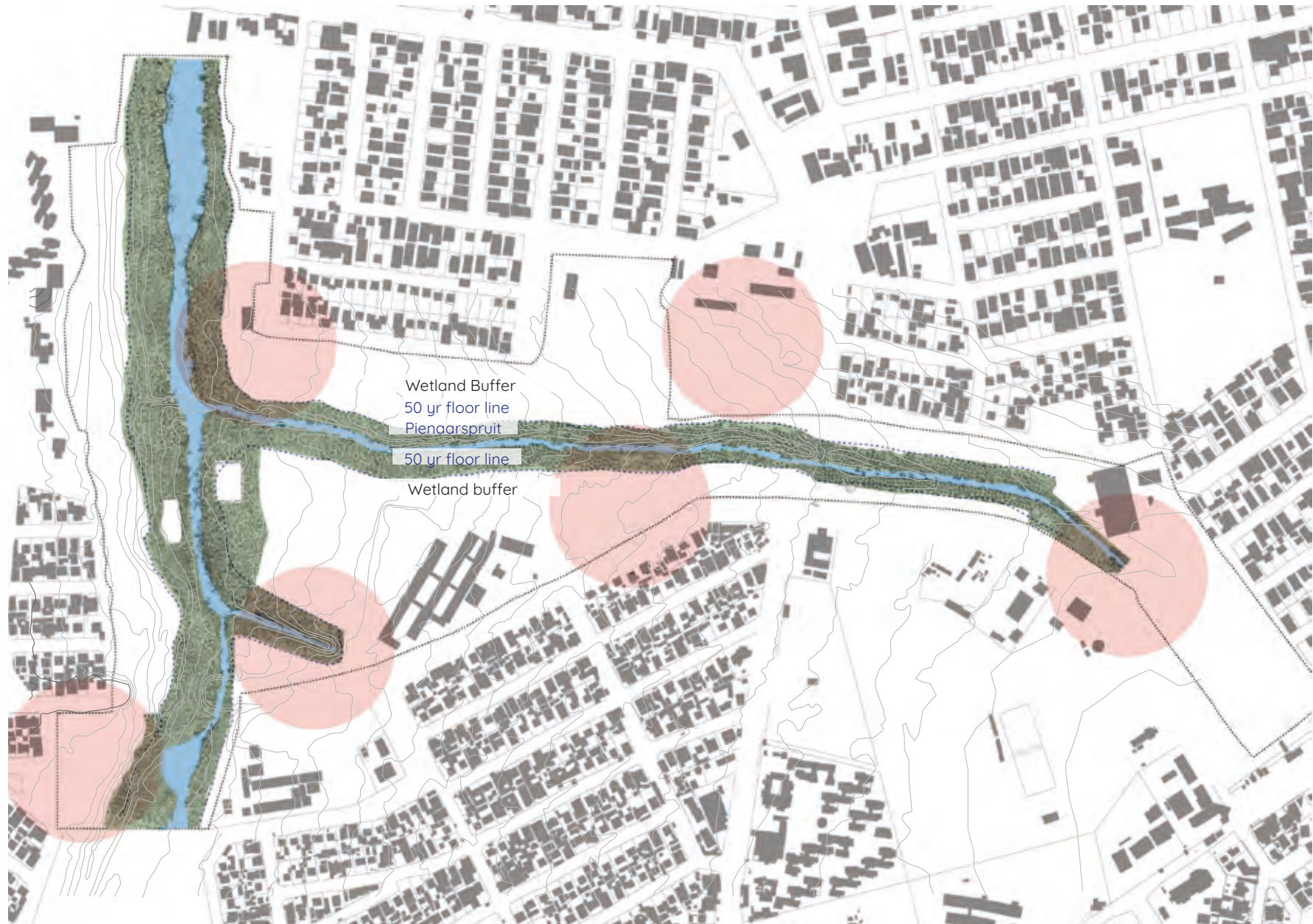
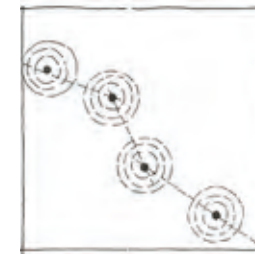


Fig 62: Map depicting wetland buffer (Van Staden 2021).



100m



Urban Acupuncture
Multi-Scalar



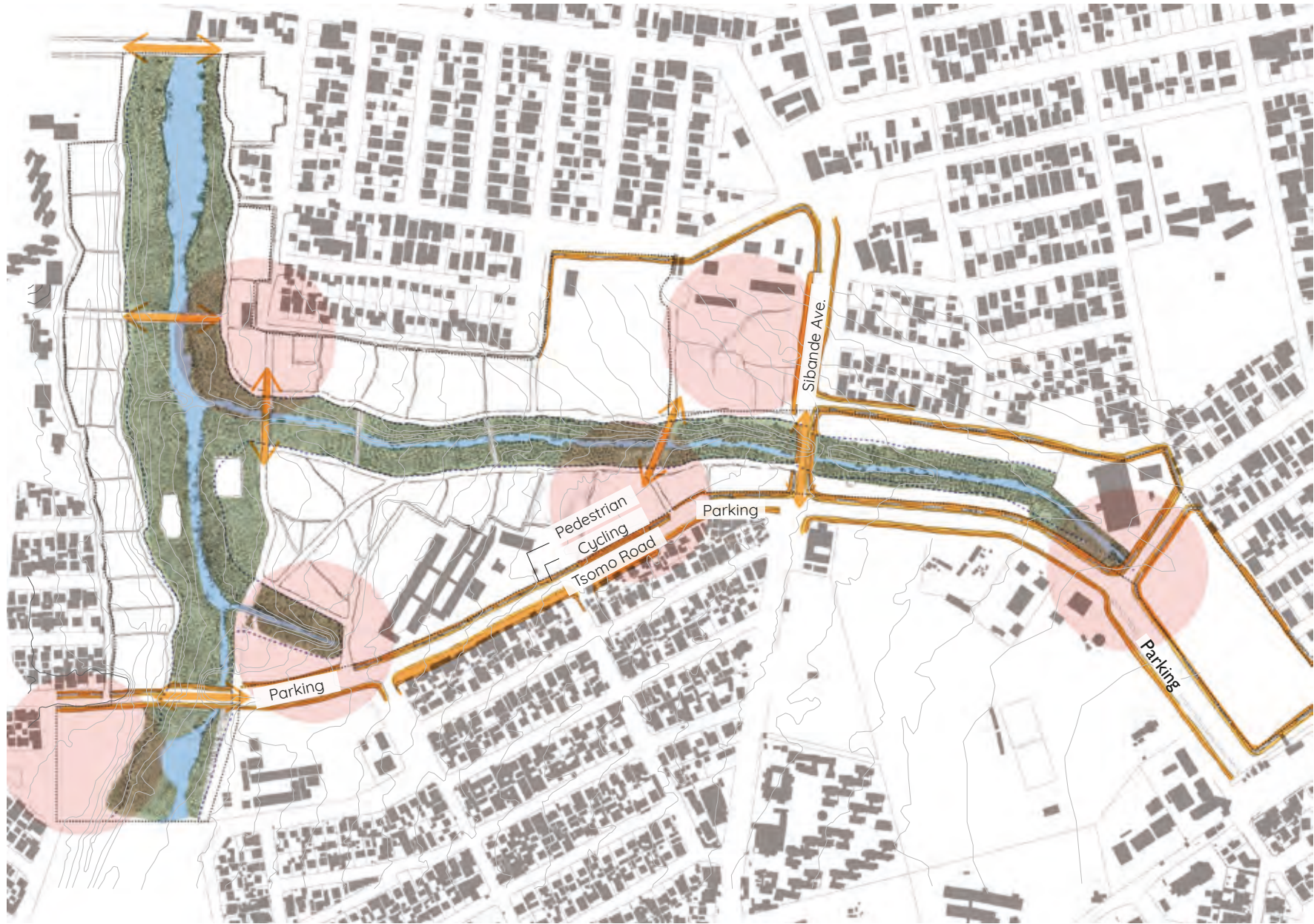
Defined social threshold

Fig 63: Diagrams depicting guiding principles of urban intention.

2.9 | STAGE 2 | DEVELOPMENT OF EXISTING BRIDGES AND ARTERIAL ROADWAYS

(Refer to figure 64).

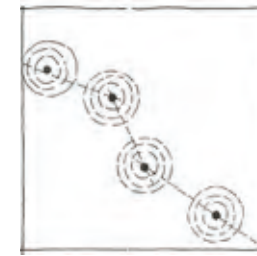
The proposal intends to make the bridges, that cross the buffer zone, structurally safer. This intention will aid the accessibility between the two neighbourhoods and the different development zones. The urban strategy also proposes a pedestrian route, a boundary of bio-swales, a cycling route and parking bays to improve and strengthen the existing, arterial routes. The bio-swale boundary 'greens up' the arterial routes and directs stormwater run-off away from the river.



Existing
Bridge / roadway

Fig 64: Map depicting the development of existing roadways and bridges (Van Staden 2021).





Urban Acupuncture
Multi-Scalar



Defined social threshold

Fig 65: Diagrams depicting guiding principles of urban intention.

2.9 | STAGE 3 | CONSTRUCTION OF RESERVOIRS AND RETENTION DAMS

(Refer to figure 66)

A reservoir or retention dam is constructed at each development zone. The position of each water node considers the buffer's topography and the direction of river flow. The retention dams assist where river flooding is frequent (the junctions between the main river and tributaries). Stormwater collected through the bio-swales is directed to the reservoirs where it can be treated. The retention dams and reservoirs act as anchor points around which future development will occur.

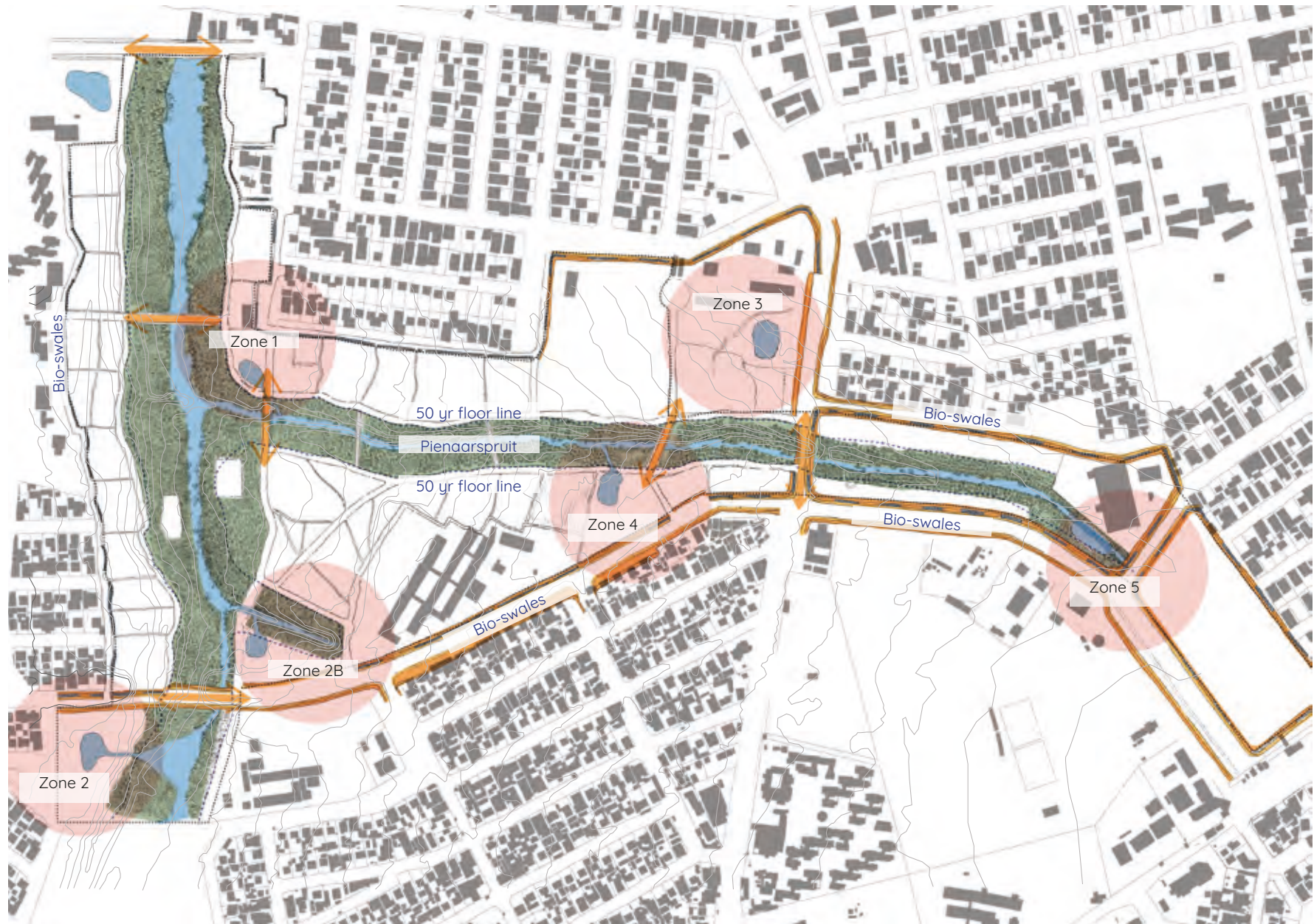
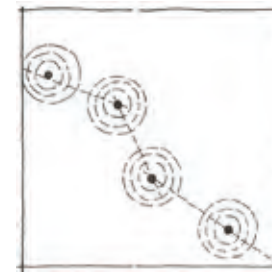
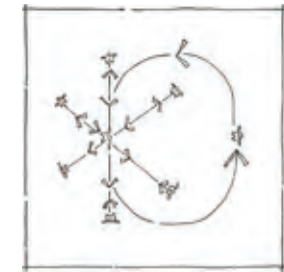


Fig 66: Map depicting the new reservoirs and retention dams (Van Staden 2021).





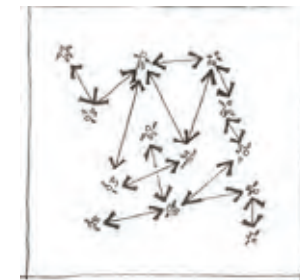
Urban Acupuncture
Multi-Scalar



Ritual-driven program



Defined social threshold



Network Governance
Bottom-up Participation

Fig 67: Diagrams depicting guiding principles of urban intention (Van Staden 2021).

2.9 | STAGE 4 | DEVELOPMENT OF CATTLE ROUTES

(Refer to figure 68)

Two existing cattle kraals were identified at the buffer zone. 6m wide, graveled roads connect the cattle kraals and, retention dams and reservoirs to form three primary cattle routes. These routes can be used by the herders of the Pedi Cattle Association to guide their cattle to and from the water points. In certain areas, these routes run along the 50-year flood line, creating a threshold between the wetland buffer and the future agricultural landscape. The positioning of these routes abides by the regulations of the Pienaar's River Rehabilitation Framework (2007).

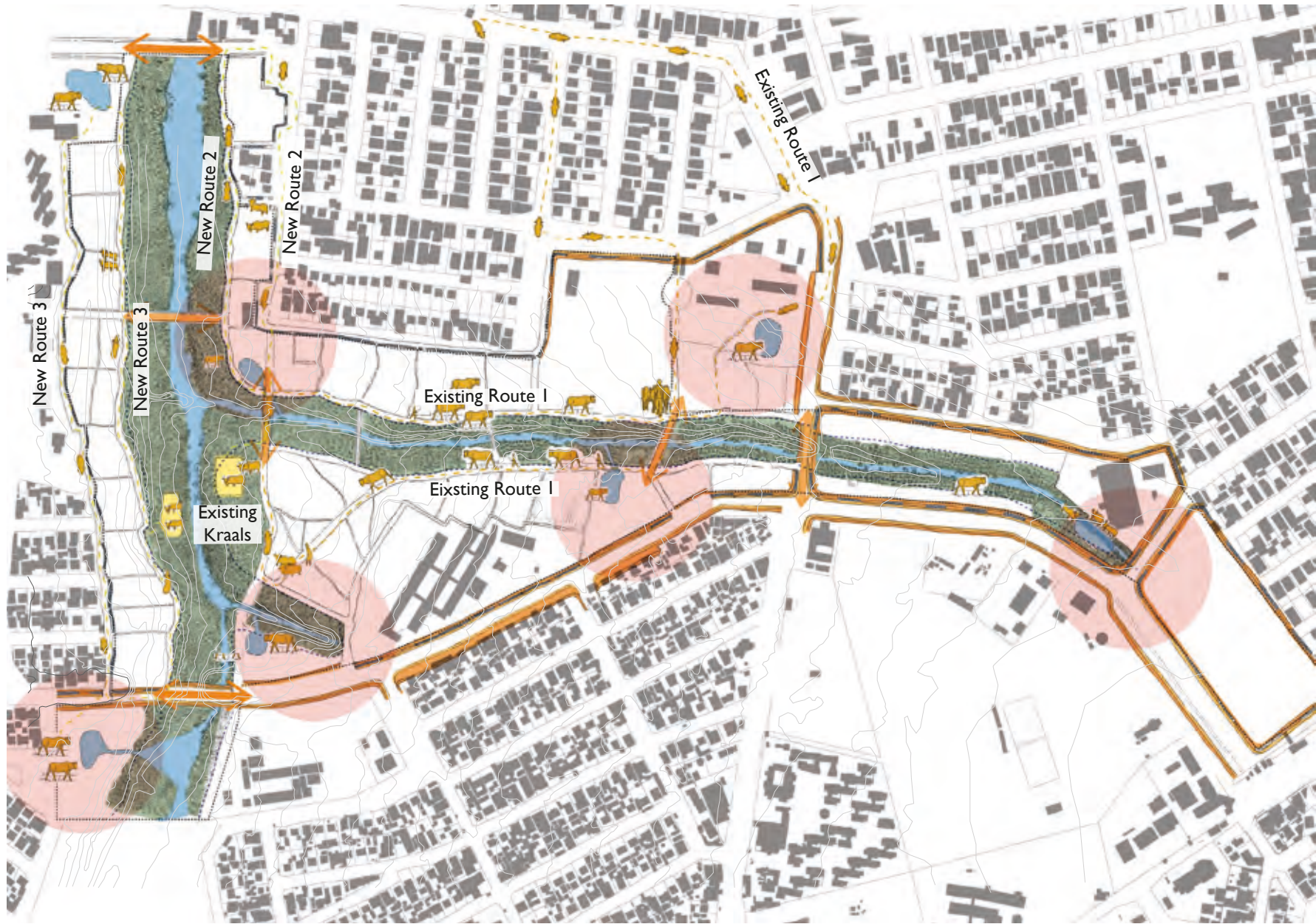
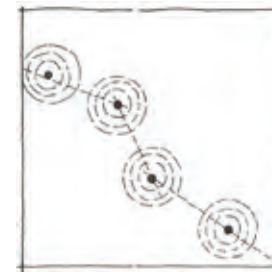
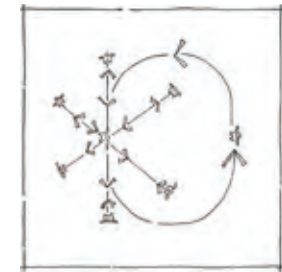


Fig 68: Map depicting the cattle routes (Van Staden 2021).

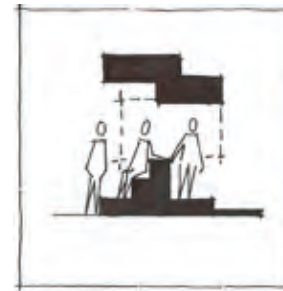




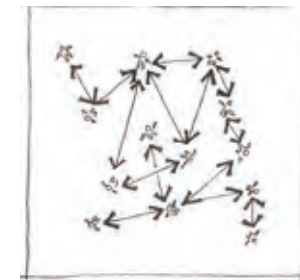
Urban Acupuncture
Multi-Scalar



Ritual-driven program



Defined social threshold



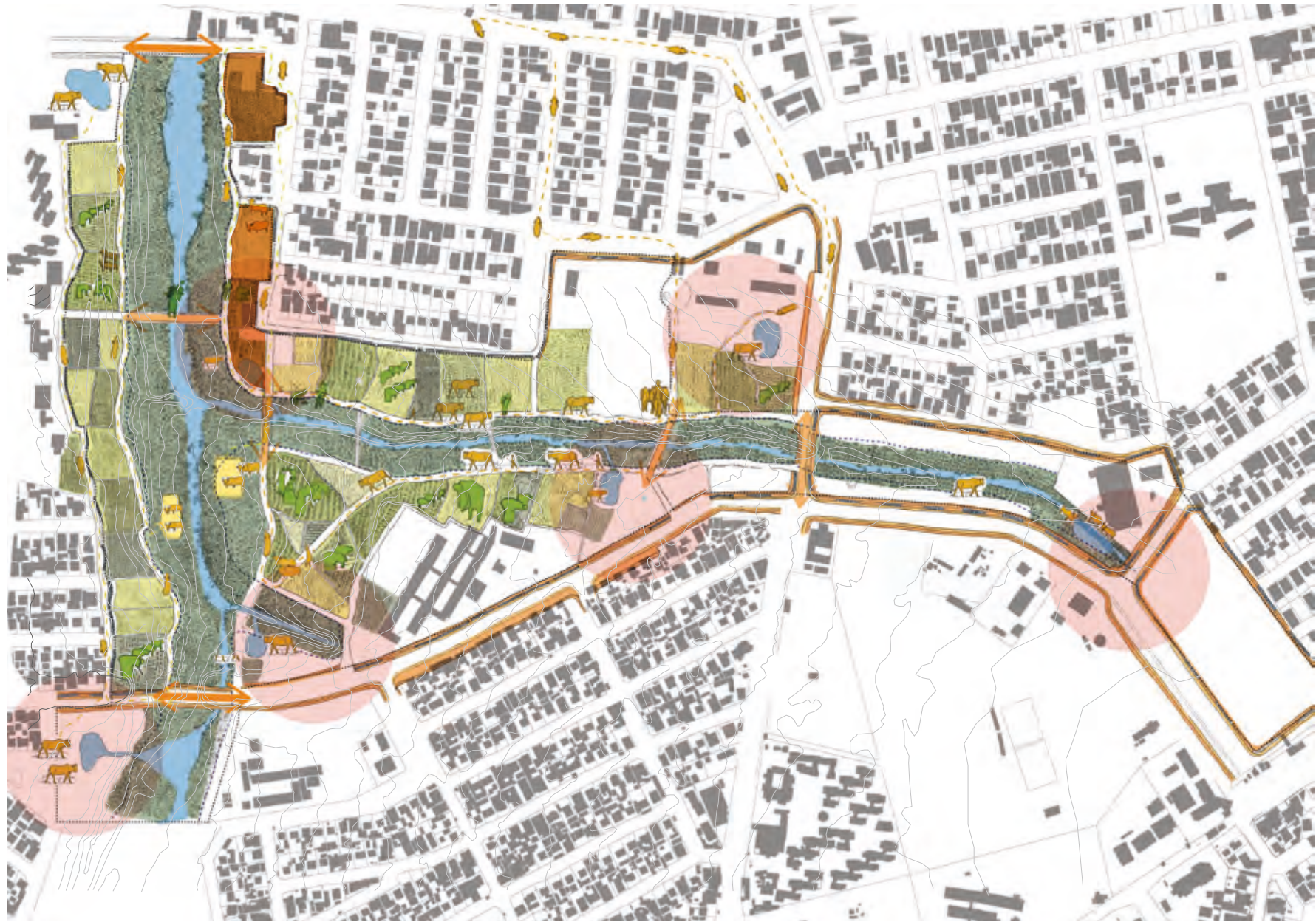
Network Governance
Bottom-up Participation

Fig 69: Diagrams depicting guiding principles of urban intention (Van Staden 2021).

2.9 | STAGE 5 | THE AGRICULTURAL BUFFER

(Refer to figure 70).

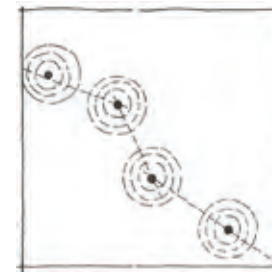
An agricultural buffer is planted along the cattle routes. The intention is that the Pedi cattle would assist with ploughing and clearing the fields whilst making their daily travels. The agricultural communities of the buffer zone (The United Apostolic Faith Church and The Thandanani Drop-Inn Centre) would be responsible for sowing and harvesting the fields. The agricultural buffer supports the multi-cropping of indigenous plant species used in Indigenous South African cuisine.



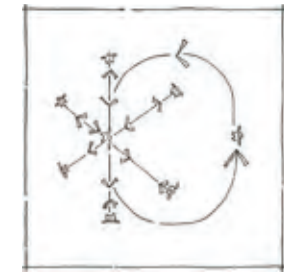
- Existing Agriculture
- New Agriculture

Fig 70: Map depicting the agricultural buffer (Van Staden 2021).





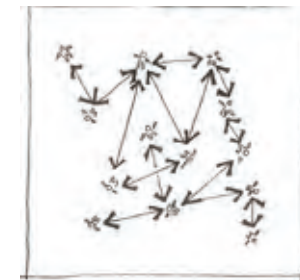
Urban Acupuncture
Multi-Scalar



Ritual-driven program



Defined social threshold



Network Governance
Bottom-up Participation

Fig 71: Diagrams depicting guiding principles of urban intention (Van Staden 2021).

2.9 | STAGE 6: RECREATIONAL ROUTE

(Refer to figure 72).

Existing recreational spaces include the Rethabile Sports Grounds, Mthunzini Play Park and the Tsomo Play Park. The proposal intends to expand upon the role of the Tsomo Play Park as a landscape for environmental learning. It also intends to create a new sports ground for Tsako Thabo High School, which has no recreational space for break times. Access between the new and existing recreational spaces is aided by a green route. Through diverse recreational programs and increased access, the urban proposal encourages the use of multiple recreational spaces.



Fig 72: Map depicting the recreational route (Van Staden 2021).



100m

2.9 | DEVELOPMENT ZONES AND RESPECTIVE PROGRAMMES

(Refer to figure 73).

Each process of indigenous food production is located at the different 'development zones.' The decentralisation of the food narrative, allows for smaller-scaled solutions which can collectively alter the entire urban condition of the buffer. The programme of each zone is determined by a zone's proximity to surrounding urban conditions, existing rituals and existing food-related needs.

Zone 1: An agricultural training workshop.

To provide a dignified space for the existing agriculture workshop at the United Apostolic Faith Church.

Zone 2: An insect shelter.

The wetland buffer and the surrounding agriculture will attract a rich bio-diversity of insects at the Tsomo Play Park. The introduction of an insect shelter would assist in rebranding the park as an 'eco-park'. The shelter would be over seen by Mamelodi High School who currently run environmental workshops and cleanups programs at the park.

Zone 3: A communal granary.

The development zone is at the convergence of the three cattle routes. This is necessary because cattle-drawn carts would deliver the grain to the site. The communal granary would be overseen by the United Apostolic church and Thandanani Drop-Inn Centre who currently run agricultural workshops.

Zone 4: Cultural centre: a communal kitchen and lekgotla.

The development zone is in central proximity to four community organizations that run soup kitchens. The following organizations are in desperate need of kitchen facilities and food supply (KoboToolBox 2021):

- Thandanani Drop-Inn Centre
- Ceremonial tent cleaners run a temporary soup kitchen.
- SOS Mamelodi Children's Village
- Mamelodi International Assemblies of God

Neighbouring the zone, is Tsako Thabo High School. The school children require a dignified space to eat and the school cooks require an adequate kitchen facility to prepare lunches (KoboToolBox 2019, KoboToolBox 2021). Furthermore, indigenous food making is an important indigenous knowledge that the children could benefit from learning and documenting.

Food waste could be dealt with responsibly due to the neighbouring recycling station.

A tree, which is currently used as a shrine in sacrificial ceremonies, is in close proximity to the zone and could serve as an appropriate focus point around which the lekgotla is built.

Zone 5: An indigenous knowledge repository.

The development zone is located next to the Mthunzi hostels. The term 'Mthunzi' is of Xhosa origin and refers to a place beneath the shade- describing the wooded area of the hostels. The zone sits in close proximity to the Pedi initiation reception centre where indigenous knowledge is shared and practiced under the trees. The intention is that each zone has a dedicated hub to recording indigenous practices. These recordings are then collectively stored at the repository.

Zone 6: A street market that runs from Tsako Thabo High School to the Rethabile Sports Grounds.

The market would further support the existing tradesman at the intersection, such as the orange and potato farmers, as well as activate the quiet, undeveloped street edge at the sports grounds. Good nutrition is positively associated with sport performance (Di Giovine et al. 2016).



Fig 73: Map depicting the development zones and their respective programmes (Van Staden 2021).



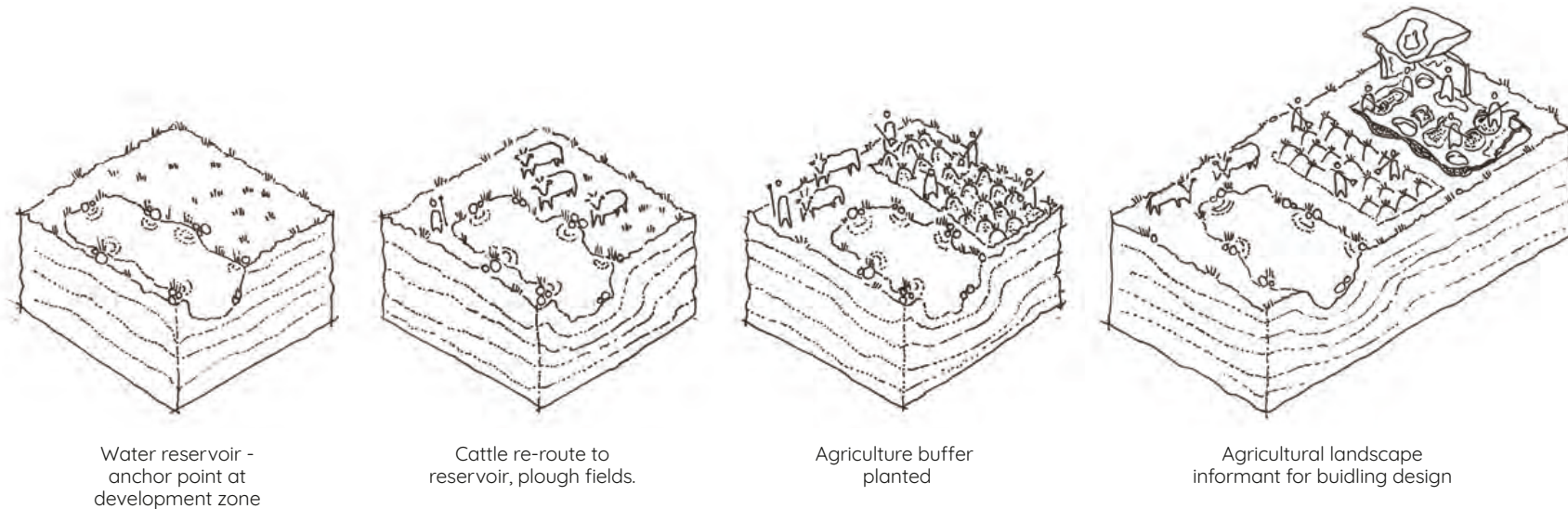


Fig 74: Diagrams depicting an eco-systemic approach to urban and architectural design (Van Staden 2021).

2.10 | REFLECTION OF URBAN VISION

(Refer to figure 74)

The urban contribution considers authorship, scale, ritual and threshold.

The scheme adopts urban acupuncture and implements Hamdi's (2004:214) now, soon and later strategy by developing the landscape in a series of stages or thresholds. The narrative of the cultural landscape is cyclical, whereby each stage of development is informed by the previous steps taken. For each zone, a reservoir/ retention dam is built. The reservoir/ retention dam acts as an anchor point to which the cattle are guided. As the cattle move to the water point, the fields of the buffer zone are ploughed. The fields are planted and the agriculture, in turn, serves a template for form generation (discussed further in architectural contribution). Thereafter, the cycle begins again.

The narrative can be described as an ecosystemic approach to urban design, which allows the community to gradually adopt and participate in the production of space, whilst granting the government time to collect the adequate resources for the development of all the proposed zones.

Each stage or threshold makes use of existing rituals and associations in order to carry out the implementation. In doing so, the landscape reflects the everyday life of the community of Mamelodi, their way of creating space and their sequences and rhythms. Most importantly, the landscape and its narrative of Letsema offers a cultural context for the expression of a living cultural heritage.

Going forward, **the dissertation will develop Zone 4: The Cultural Centre: a Communal Kitchen and Lekgotla**. The zone can be reviewed as the 'core zone'. It would be developed first and include administrative services for the management of the cultural landscape and subsequent zones.



Fig 75: Diagram depicting focus area, Zone 4: The Cultural Centre (Van Staden 2021).

3 | ARCHITECTURAL CONTRIBUTION

3.1 | CHAPTER OVERVIEW

The following chapter unpacks the programme, site and design development of Zone 4: The Cultural Centre. A precedent analysis of Freedom Park is used to identify the types of spaces required for a cultural centre that is representative of multiple tribes in South Africa. The site analysis looks at the environmental conditions of the site, existing routes and rituals, and a brief overview of surrounding structures. Thereafter, a design approach is developed using landscape and architectural theory. The design development is summarized in 3 iterations which are tested using the theoretical framework developed in Chapter 1. The final iteration is taken further for technification.

3.2 | PROGRAMME PRECEDENT

Freedom Park is a cultural landscape that narrates the history and heritage of South Africa through a series of architectural and landscaping interventions, bound by a spiral pathway known as the Mvedzvo (Freedom Park 2020). In order to generate an accommodation schedule for the design project, three spatial typologies of Freedom Park will be analysed, namely: the Isivivane, the traditional kitchen and the Hapo Museum.

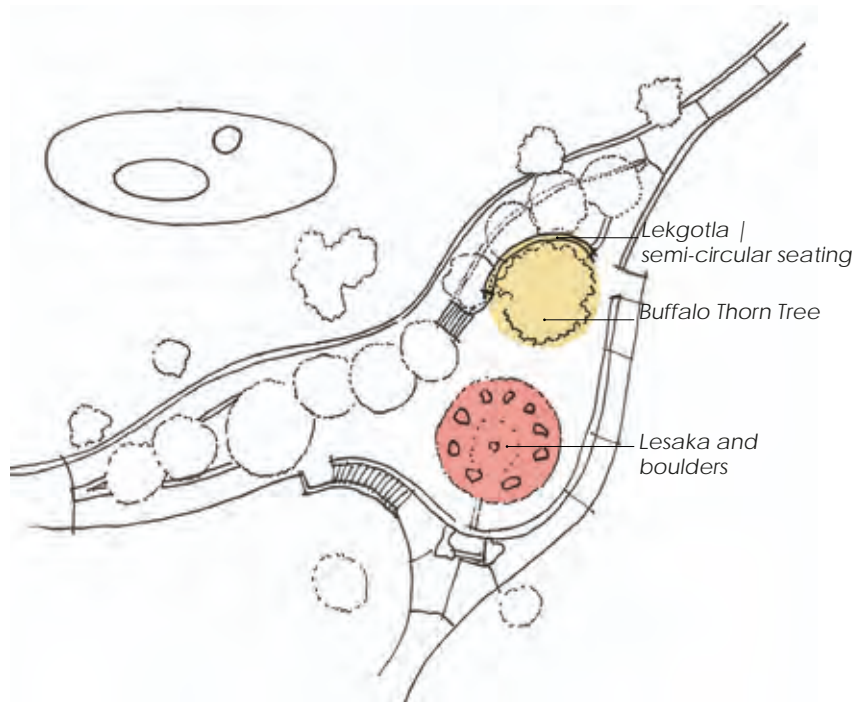


Fig 76: Diagram depicting plan of Isivivane (Archdaily 2020, Van Staden 2021).

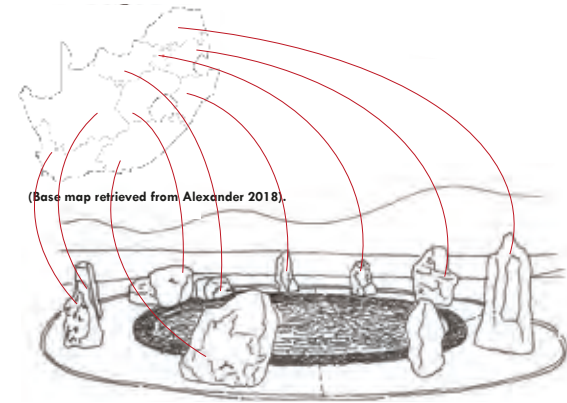


Fig 77: Diagram depicting Lesaka (Van Staden 2021).

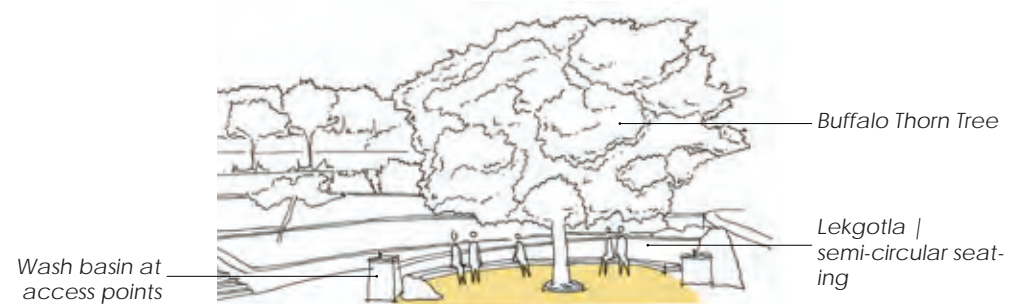


Fig 78: Diagram depicting Lekgotla (Van Staden 2021).

3.2 | PROGRAMME PRECEDENT | FREEDOM PARK (GAPP + Mashabane Rose Architects + MMA + Newtown Landscape Architects 2008)

The Isivivane is composed of the Lesaka and the Lekgotla (Refer to Figure 76). They are reviewed as sacred spaces, therefore, hand washing basins sit at the entrances and exits of the space in order to facilitate cleansing rituals. The Lesaka is a memorial to those who have sacrificed their lives in the fight for a democratic South Africa (Freedom Park 2021). The design of the Lesaka is intended to be non-prescriptive (Young 2011:16). Symbolic references to culture are avoided in order to appeal to multiple tribes of South Africa. Instead, a circular shrine is created from nine boulders, that were collected from each of the provinces (Refer to Figure 77).

Boulders hold great spiritual meaning to multiple South Africans; they are liminal spaces between this world and the ancestors (Ouzman 2003:15). This meaning is formally represented with the design of the Hapo Museum (Freedom Park 2021) (Refer to Figure 82).

Adjacent to the Lesaka, is the Lekgotla. The Lekgotla is a central, public space used for performances, communal eating or to serve as a court of law (Young 2011:11). A Buffalo Thorn tree sits at the centre of semi-circular seating. The tree is used as a shrine during sacrificial and rain-making rituals (Ouzman 2003:15) (Refer to Figure 78).

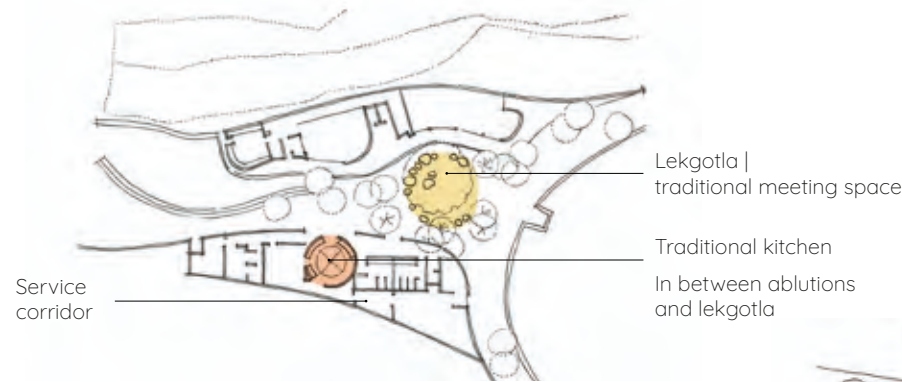


Fig 79: Diagram depicting plan of traditional kitchen (Archdaily 2020, Van Staden 2021).

Ascension of animal spirit

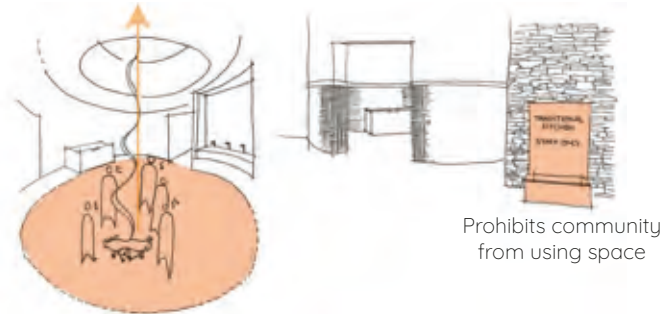


Fig 80: Diagrams depicting traditional kitchen (Ullrich 2020, Van Staden 2021).



Fig 81: Diagrams depicting exhibition space of Hapo Museum (Van Staden 2021).

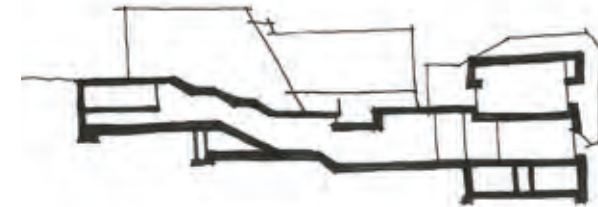


Fig 82: Diagrams depicting Hapo Museum and its formal response to boulders (Van Staden 2021).

3.2 | PROGRAMME PRECEDENT | FREEDOM PARK (GAPP + Mashabane Rose Architects + MMA + Newtown Landscape Architects 2008)

The traditional kitchen is used for the slaughtering of animals during sacrificial rituals (Refer to figures 79 and 80). The circular layout and open roof facilitate the ascension of an animal's spirit. The design of the traditional kitchen includes a central drain, wash basins, cleanable work benches and uses natural ventilation in order to create a hygienic space for meat preparation. The traditional kitchen sits adjacent to ablutions, so that participants can wash and change their clothes after the slaughtering. The traditional kitchen also sits next to the 'modern' kitchen, where meat is refrigerated and meals are prepared. All facilities can be serviced and maintained by means of a service corridor that sits south of the building.

Cultural centres can take on museum typologies which often represent culture through the monumentalisation of cultural artefacts- as is the case with The Hapo Museum. The Hapo Museum narrates the history of Africa through interactive displays and vivid audio-visual presentations. However, it can be described as an insular condition that does little to interact with its surrounding cultural landscape (Baillie 2020:20).



Fig 83: Diagram depicting the lekgotla (Van Staden 2021).

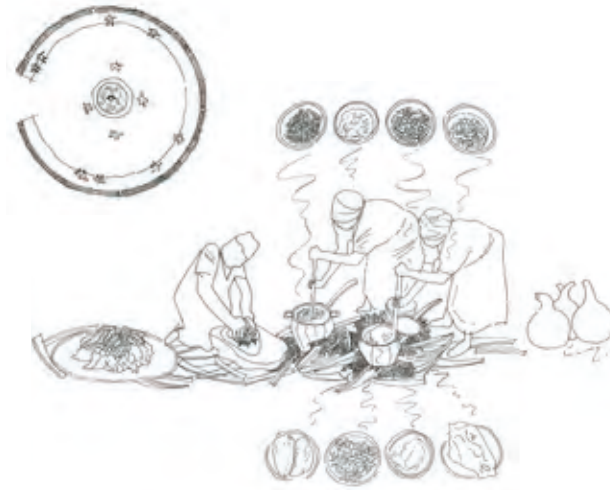


Fig 84: Diagram depicting the communal kitchen and hearth (Van Staden 2021).



Fig 85: Diagram depicting the sharing of indigenous knowledge (Van Staden 2021).

3.3 PROGRAMME ZONE 4

The cultural centre is composed of 3 main spaces: **The Lekgotla, The Communal Kitchen and the Indigenous Knowledge Hub.**

The Lekgotla is spatial typology shared by many South African cultures. It is a central meeting space where all community members come together to discuss tribal matters, celebrate rituals and eat a meal. This is the most important space of the cultural centre and accommodates up to 150 community members. In order for rituals to be performed, the lekgotla requires a central tree for shade, a sacrificial plinth and a stage for dancing and music playing. Currently at the site is an existing sacrificial tree used by many church groups during baptisms and church ceremonies. The project capitalizes on this symbol of communion by centering the new lekgotla around the existing tree.

The Communal Kitchen requires a large enough space to encourage Letsema parties and to cook for 150 community members. Like many traditional kitchens, the hearth is at the centre of the space, around which the preparation of different meals is organised and social gatherings occur.

It is also important to consider security, maintenance and access to the kitchen. Therefore, the communal kitchen is composed of two smaller spaces: the event kitchen which can be booked out by different community members and the take-away kitchen which can be rented by vendors for a longer-term. Equipment and services are lockable, and the expulsion of waste and deliveries need to be accommodated.

Indigenous Knowledge Hub

It was found, through interviews, that the documentation of indigenous food and food making is minimal in Mamelodi (KoboToolBox 2021). The project encourages the advancement of indigenous knowledge through an exhibition of indigenous food making. However, the exhibition is not an insular condition or a monumentalisation of cultural artefacts. Rather, it embraces a living cultural heritage through the creation of audio food booths- private dining rooms where elders can explain recipes and food stories whilst sharing the meal they've prepared at the communal kitchen.

Spaces	Component Spaces	Ritual	Quality of Space	Functional Requirements	Quantitative Requirements	Legislative compliance	Area Size
Market	Take Away Kitchen	Take away meals for passer-bys	Public and semi-public Throughway Well- ventilated Openable space Easy to clean	Cleanable, non-corrosive, non-absorbent preparation benches Extension of kitchen and market Street- interface	-	-	40m ²
	Fruit and Vegetables Plinths	Plinths where community members can buy fruits and vegetables Fruits and vegetables harvested from agricultural buffer at buffer zone Revenue sustains local vendors and maintenance of centre	Public Throughway Well- ventilated Openable space Easy to clean	Fixed, cleanable, non-corrosive, non-absorbent plinths Extension of market Street-interface	-	-	8m ²
Communal Kitchen	Communal Hearth Braai Area	Letsema parties After slaughter, animal cooked within space Traditional food that requires heating: grilling, steaming,boiling, frying	Semi-Public Central space Well-ventilated Easy to clean Warm space Fixed space	Communal hearth Fire pits, Chimneys Ventilation, Fixed, cleanable, non-corrosive, non-absorbent, preparation bench	Kitchen: 300 min. lux 3 communal hearths fire pits 1 bench step = 600x600x510mm 1 x Fire extinguisher	SANS 10400- T, Health Act 63 of 1977	9m ²
	Cold Prep Kitchen	Letsema parties Preparation of foods for serving and cooking Traditional food processes include: kneading, mashing,preserving, grinding, soaking and drying.	Semi-public Well-ventilated Easy to clean Temperate space	Cleanable, non-corrosive, non-absorbent preparation benches Concealed fixtures Sinks Grinding stones Dry racks	Kitchen: 300 min. lux	SANS 1385 Health Act 63 of 1977 20% area of total kitchen (Neufert 1998)	20% area of total kitchen (Neufert 1998) 40m ²
	Cold Room	Chilled food storage (-2 to 5 degrees celcius) Frozen food storage (-40 to 18 degrees celcius)	Private Easy to clean Cold space Lockable	Fixed, cleanable, non-corrosive, non-absorbent, surfaces Space for HVAC VRF Unit for humidity and temperature control	Cooler: 100 min lux. VRF Unit size: 1400x 1120 x 440mm If place on roof- min height 2.1m	Health Act 63 of 1977	9m ²
	Pantry	Dry-food storage	Private Clean space Cool space Lockable	Fixed, cleanable, non-corrosive, non-absorbent, shelving Double doors for deliveries	Stores: 100 min lux.		9m ²
	Equipment storage		Private Easy to clean Temperate space Lockable In close proximity to scullery	Fixed, cleanable, non-corrosive, non-absorbent, shelving			
	2 x Scullery (1 for take away kitchen, 1 for event kitchen)	Washing, cleaning and drying of kitchen utensils and equipment	Semi-public Easy to clean Cool space Lockable	Cleanable, non-corrosive, non-absorbent preparation benches Concealed fixtures Sinks Door to yard	Washing spaces: 300 min. lux		Total area of sculleries: 18m ²
	Beer Brewing Area	Letsema parties Traditional beer making processes: de-pulping and pressing	Private Central space Well-ventilated Easy to clean Cool space Fixed space	Fixed, cleanable, non-corrosive, non-absorbent, preparation benches Fixed seating	Brewery preparation spaces: 200 min. lux		
	Beer Storage Fermentation room	Traditional beer making processes: fermentation Barrel, clay pot storage	Private Easy to clean Cool space Lockable	Fixed, cleanable, non-corrosive, non-absorbent, shelving	Stores: 100 min lux.	SANS 1385 Health Act 63 of 1977 20% area of total kitchen (Neufert 1998)	20m ²
	Bar	Serving of traditional beer	Public and private Well-ventilated Easy to clean Cool space Central island between kitchen and lekgotla	Fixed, cleanable, non-corrosive, non-absorbent, serving benches	Serving stations: 300 min lux.		20% area of total kitchen (Neufert 1998) 40m ²
	Serving Counter	Serving of tradiional food	Public and semi-public Well-ventilated Easy to clean Cool space Central island between kitchen and lekgotla	Fixed, cleanable, non-corrosive, non-absorbent, serving benches			

Fig 86: Table depicting accommodation schedule for communal kitchen and lekgotla (Van Staden 2021).

	Communal Washing Area	Washing, cleaning and drying of kitchen utensils and equipment	Public Easy to clean Cool space	Cleanable, non-corrosive, non-absorbent preparation benches Concealed fixtures and hoses Sinks Adequate drainage Door to yard	Washing spaces: 300 min. lux Total of 100 people: 5 sinks		10m ²
Back of house	Accessible Service Corridor	Allow vehicular access Access to conduits and pipework	Private Cool space Screened off Accessible	Hard surface floor Screening	Entrance and exit: min 6m Vehicular access route: min. 4.5m Slope: not exceed 6% Min turning radius: 12,5m	SANS 10400-U	-
	Refuge Composting Area	Extension to existing recycling station Revenue sustains local recycler and maintenance of centre Sorting and temporary storage of waste Organic material used at cattle doc and school garden beds	Private Cool space Screened off Accessible Well-ventilated Well-lit	Vehicular access Radius of turning circle for refuse truck Hard surface floor Clear signage 10 refuse bins (2 waste bins, 5 compost bins, 3 recycling bins- glass, tin and paper) Tap and hose	Refuse bin: 720mmx575mm x1085mm for 240 l unit	SANS 10400-U	2.25 x no. of bins. x surface area of bins= refuge area 2.25x 10x 0.414 = 9.32m ²
Legkotla	-	Celebratory ceremonies such as weddings and funerals Existing religious ceremonies Canteen for Tsako Thabo High School	Public, Central space, Cool space, Fixed space	Wash basin (at entrances of space) Sacred tree Fixed seats (amphitheatre) Plinth stage Shade	Fixed seats for 150 people 1 bench step = 600x600x510mm	-	Area of seat x number of seats = total area of seats 0.36 x 150 = 54 min. m ²
	Sacrificial Area	Cattle slaughtering for weddings and funerals	Public Central space, Cool space, Easy to clean, Within legkotla	Fixed, cleanable, non-corrosive, non-absorbent, meat preparation bench Fixed seating, Wash basin (entrance of space), Water hose for cleaning space after slaughter Floor drainage, Concealed fixtures, Pyre, Ventillation, IP protection for lighting	Bleeding area, slaughtering: 200 min lux. Boning, grinding, cutting: 500 min lux.	-	16m ²
Public Ablutions	Female bathroom	Bathroom uses	Private, Hygienic space, Easy to clean, Cool space, Concealed fixtures, In close proximity to legkotla	Wash basins, Water closet, Mirrors and bench	Bathroom facilities: 200 min. lux Total of 150 people (75 female + 75 male) Female: 4 WC, 3 WB Male: 2 WC, 3 UR, 3 WB Unisex wheelchair accessible: 1 WC, 1 WB	SANS 10400-P SANS 10400-S	40m ²
	Male bathroom			Wash basins (WB), Water closets (WC), Urinals (UR), Mirrors and bench			
IKS Documentation Room	Scribe room	Documentation of recipes Recipe generation Food anthropology lessons	Semi- public Easy to clean, Warm space, Light, openable space, Central proximity to school gardens and kitchen	Movable seats Black board Openable stoep	Classroom: 300 min lux Accommodate a total of 20 people	SANS 10400-C	20 x 1m ² = min. 20m ²
	Archive	Storage of documentation before sent to IKS epository (zone 3)	Semi- public Clean space Cool space Lockable	Fixed, cleanable, non-corrosive, non-absorbent, shelving	Stores: 100 min lux.	SANS 1385	20m ²
Gardens	Garden Store	Storage of agricultural equipments and seeds	Private Clean space Cool space Lockable	Fixed, cleanable, non-corrosive, non-absorbent, shelving Controlled lighting and ventilation Compost bins Tap and hose	Stores: 100 min lux.	SANS 1385	16m ²
	Staff Locker Rooms	Storage of personal belongings Change room	Private, Hygienic space, Easy to clean, Cool space, In close proximity to school gardens	Female and male locker rooms Fixed lockers, benches and mirrors Washing line	Total of 20 staff members Male: 10 lockers Female: 10 lockers	SANS 10400- P SANS 10400-C Occupation Health and Safety Act, 1993 Facilities Regulations, 1990	
	Staff Ablutions	Bathroom uses	Private, Hygienic space, Easy to clean, Cool space, Concealed fixtures, In close proximity to school gardens	Wash basins, Water closet, Mirrors and bench Shower(SH) Wash basins (WB), Water closets (WC), Urinals (UR), Mirrors and bench	Bathroom facilities: 200 min. lux Total of 20 staff members (10 female + 10 male) Female: 2 WC, 1 WB, 1 SH Male: 1 WC, 2 UR, 1 WB, 1 SH	SANS 10400-P SANS 10400-S	40m ²

Fig 86: Table depicting accommodation schedule for communal kitchen and legkotla (Van Staden 2021).

Cattle Depo.	Cattle Bays Holding pen	For herders to temporarily dock cattle before entering site. Extension to cattle route Surrounding reservoir	Public, Cool space Consider proximity to meal area Lockable	Shade Slope for drainage (1:70) Hose pipe fixed, cleanable, robust trough Close proximity to water Gravel floor surface Lockable gate (tie back to 180 degrees)	No of cows x allowable area per cow= holding pen area 3 x 2,3 m ² = 6.9m ² 2 holding pens	Cattle handling facilities (Department of agriculture and rural development 2021)	35m ²
	Reservoir Bioswales	Assists river flooding Communal gathering point Cattle drinking point Bio-swales- new street life	Public Close proximity to cattle route and cattle bays Entrance space of centre	Volume for water Pump room Filters Seating	Refer to water calculations	-	Refer to water calculations
Administration	Information Reception	Information area Kitchen bookings Event bookings	Public Central, entrance space Well-lit Warm space, Natural ventilation Quiet	Movable seats Fixed, cleanable, non-corrosive, non-absorbent desk	Information desk: 500 min lux.	SANS 1385	16m ²
	Administrative Office	Kitchen bookings Event bookings IKS Programme Maintenance programme	Private Well-lit Warm space, Natural ventilation	Movable furniture Shelving	Office: 200 min lux.	SANS 1385	14m ²
	Safe Room	Safe-keeping of deposits, accounts and documentation	Private Secured space Lockable	Safe	Stores: 100 min lux.	-	2m ²
	Board Room	Socialising Meetings	Private, Light, openable room, Warm space, Natural ventilation	Movable furniture	Meeting room: 200 min. lux	-	14m ²
	Kitchenette	Communal eating, Socialising,	Private Warm space, Natural ventilation	Movable seats Fixed, cleanable, non-corrosive, non-absorbent preparation bench at kitchen Sink Concealed fixtures Microwave oven	Lounge: 200 min. lux Kitchenette: 300 min. lux	SANS 1385 Health Act 1977	4m ²
	Staff Ablutions	Bathroom uses	Private, Hygienic space, Easy to clean, Cool space, Concealed fixtures,	Wash basins (WB), Water closets (WC), Hand rails next to and behind the toilet	Bathroom facilities: 200 min. lux 3 Staff members Unisex wheelchair accessible: 1 WC, 1 WB Door opening of cubicle: min 900mm	SANS 10400-P SANS 10400-S	4m ²
	Staff Parking	Parking for all staff members	Private Access control	Security Gate Staff entrance to admin block	10 parking bays (5x2.5m per parking bay)	-	125m ²

Fig 86: Table depicting accommodation schedule for communal kitchen and lekgotla (Van Staden 2021).

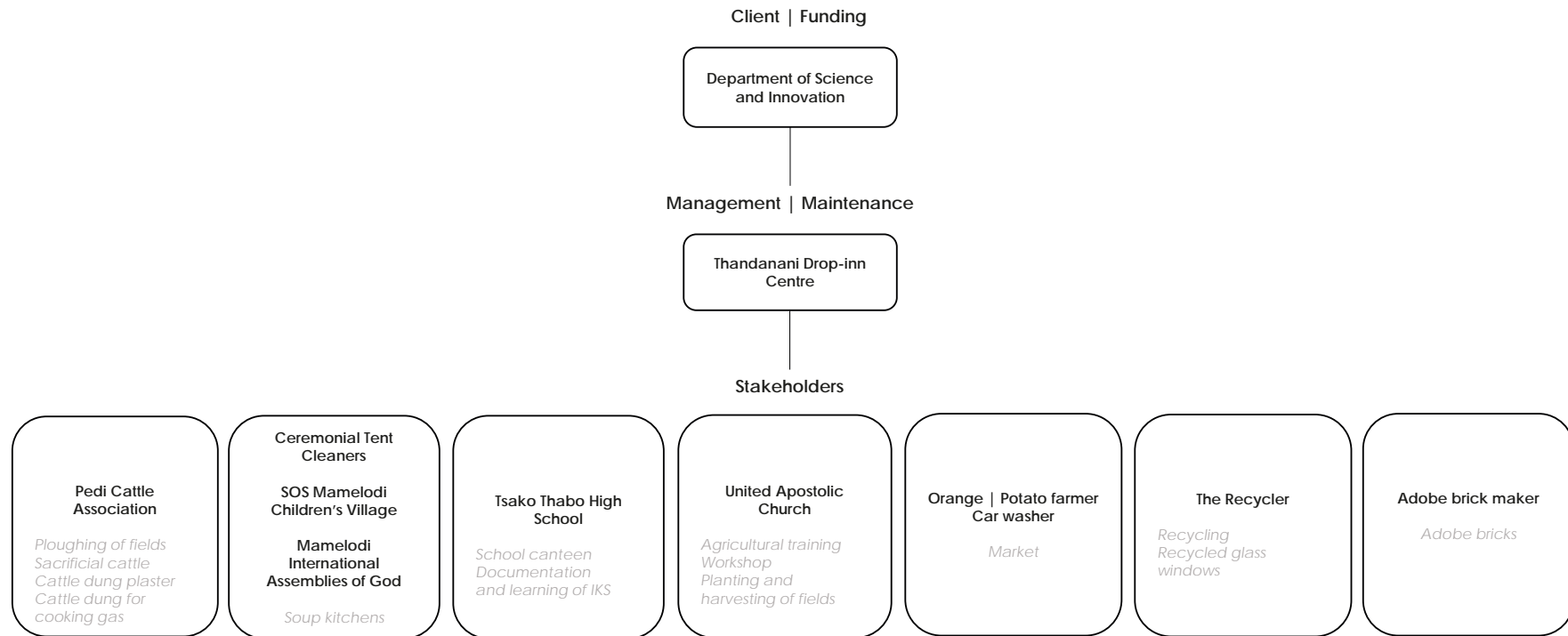


Fig 87: Diagram depicting the management of the cultural centre (Van Staden 2021).

3.4 | CLIENT AND MANAGEMENT

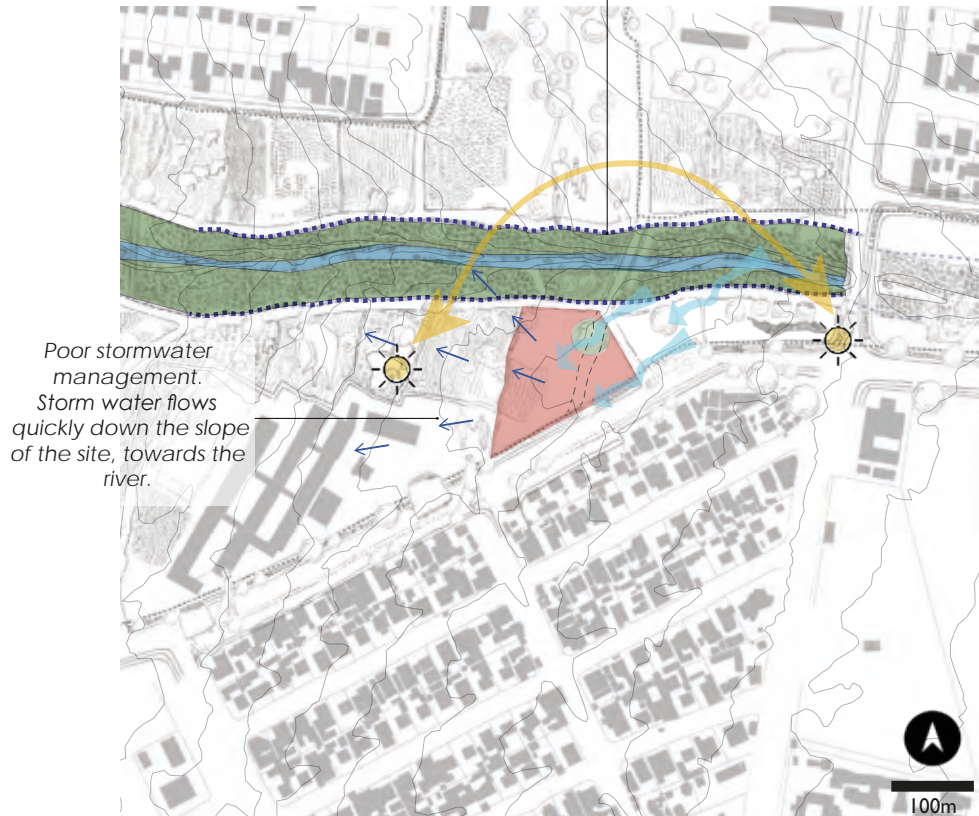
The client of the project is the Department of Science and Innovation (DSI). Aims of the department include (Department of Science and Innovation 2021):

- Create an enabling environment for technology innovation. This involves the improvement of food production by considering indigenous practices of knowledge.
- Facilitate network making between local associations.

Although the DSI are responsible for funding, they do not manage the intervention. The Thandanani Drop-Inn Centre would take on the role of 'manager' for the cultural centre.

Thandanani is a non-profit organisation based in Selbourne and Site. The organisation runs a food scheme where meals are prepared and transported to different 'drug hotspots' throughout Mamelodi. The organisation is dependent on food donations and their kitchen is currently at full capacity. By relocating the organisation to the new cultural centre, not only will they manage a sustainable production of food for local community members, but through their food scheme target the much wider community of Mamelodi. Furthermore, they are currently responsible for conducting indigenous agricultural workshops with multiple schools of the community. The stakeholders of the project are not limited to the diagram above- these were the parties that were interviewed and could be potentially involved in different areas of the intervention.

It is important to consider the proximity of the flood line to the site .An imposition of the wetland buffer and flood line should be avoided to preserve the health of the river.



--- Floodline → Water run-off → Predominant wind direction

Fig 88: Environmental conditions of the site (Van Staden 2021).

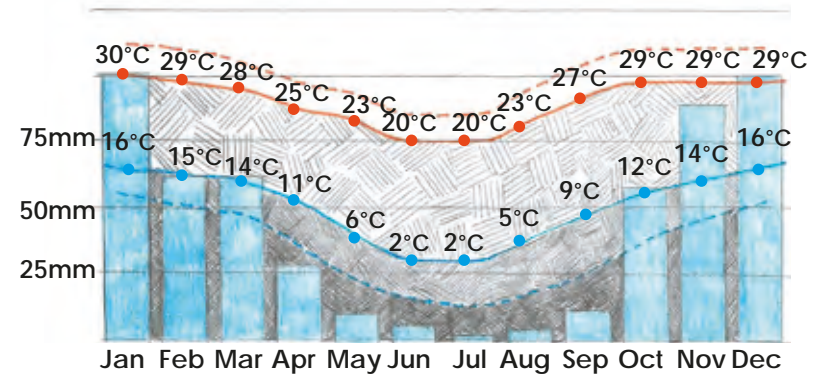


Fig 89: Average rainfall and temperature for Pretoria (Meteoblue 2020)

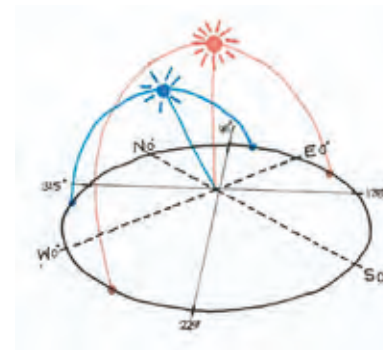


Fig 90: Sun study for Pretoria (CSRI 2011).

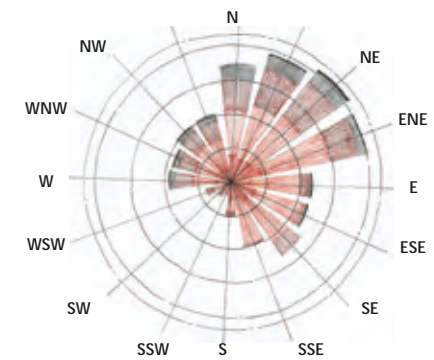


Fig 91: Annual wind conditions for Pretoria (Meteoblue 2020).

3.5 | SITE ANALYSIS | ZONE 4

Existing sacrificial tree is used for baptist rituals.

Proposed agriculture

Portion of Site is currently used as a dumping zone for the school

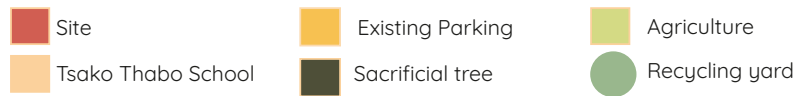


Fig 92: Plan depicting the existing structures and programmes of the site (Van Staden 2021).

The site sits at an intersection of routes. Pedestrian traffic is high.



Poor road infrastructure



Fig 93: Plan depicting the existing routes of the site (Van Staden 2021).

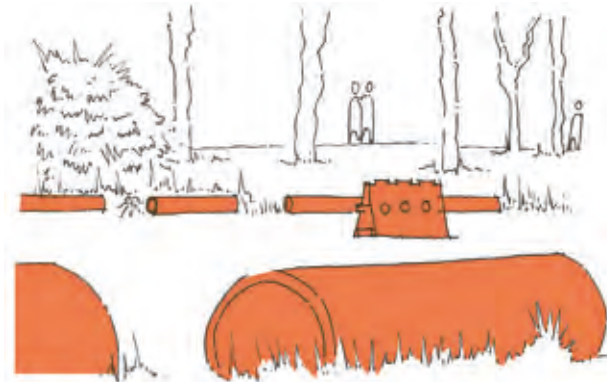
3.5 | SITE ANALYSIS | ZONE 4



A. Local hairdresser



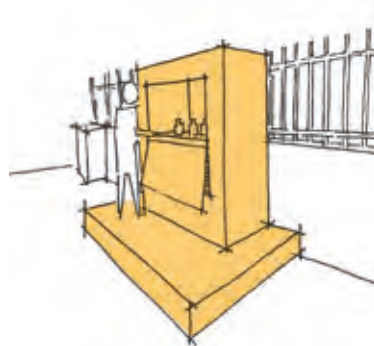
B. School signage



F. Parking demarcation



C. Local street shop



E. Local street shop



D. Local street shop

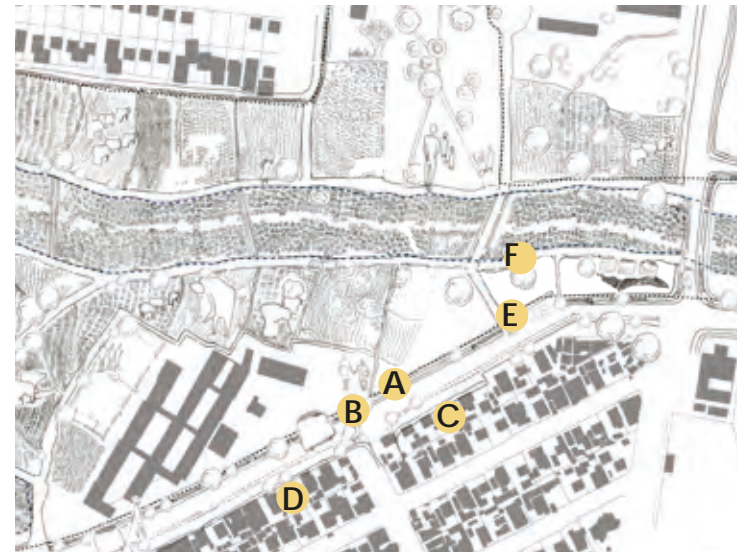


Fig 94: Diagrams depicting threshold conditions of surrounding structures (Van Staden 2021).

3.5 | SITE ANALYSIS | ZONE 4

3.7 | DESIGN APPROACH

The main design informant for the building is the natural and vernacular landscape of the buffer zone. It has been previously mentioned that the natural landscape condition of the buffer was strategically used by the Apartheid government, to segregate the communities of Mamelodi. As a response, the dissertation attempts to introduce a new landscape condition, a constructed landscape, that represents multiple cultures and encourages social integration.

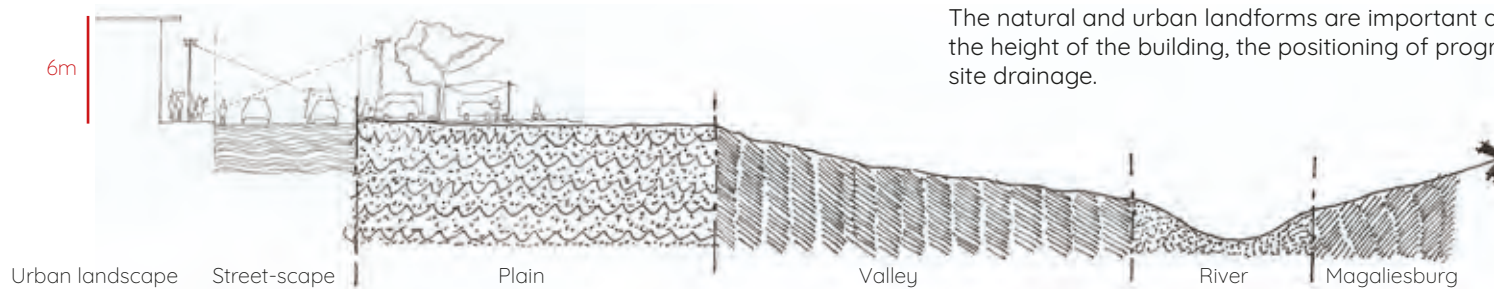


Fig 95: Sectional diagram A-A through site (Van Staden 2021).

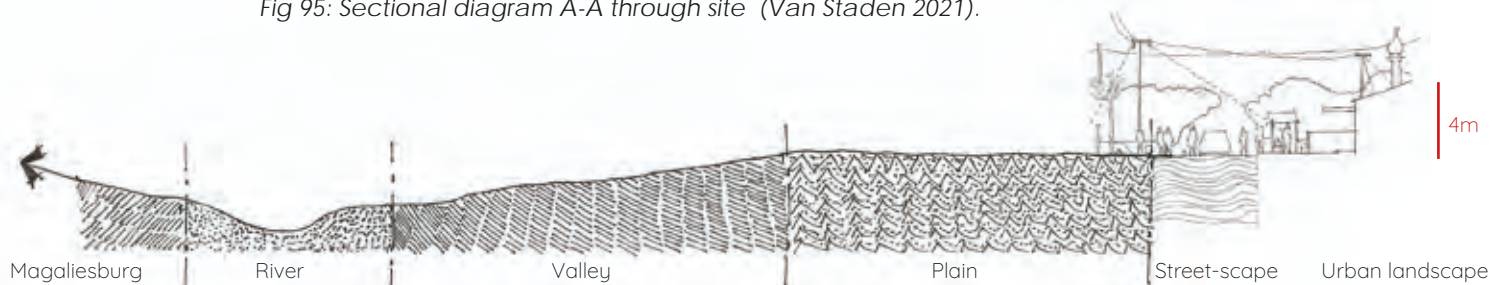


Fig 96: Sectional diagram B-B through site (Van Staden 2021).

3.8 | THE NATURAL AND URBAN LANDSCAPE

A natural landscape is a landscape that is unaffected by human activity (Asadpour 2018:5). Although the majority of the buffer is altered by human occupation, there are land formations that are shaped by natural processes. Sections through the buffer reveal the following land features: the mountain, the river, the valley and the plain (Refer to figure 95 and 96). The buffer zone sits at the foot of the Magaliesberg mountains. Although the mountains serve as a backdrop to the buffer, they are culturally linked to the landscape via the cattle rituals and initiation practices of the Pedi.

The buffer zone is situated at the middle course of the Pienaarspruit (Dube et al. 2017:51). Therefore, the river creates a wide and shallow valley as it meanders through gentle gradients. Refer to the hydrology map (Figure 9), for a full investigation of water movement and water quality at the site. A narrow plain sits between the valley and the streetscape. The reasonably flat surface and stable soil conditions facilitates the practice of rituals. Opposite the street, an urban landscape continues to occupy the plain. The scale of the buildings is small-reaching a maximum height of 6-7m.

The natural and urban landforms are important design informants for the height of the building, the positioning of programs, the built form and site drainage.

3.9 | THE VERNACULAR LANDSCAPE

A vernacular landscape is a natural landscape shaped by the rituals of people (Asadpour 2018:1). “As vernacular landscapes evolve, they acquire layers of meaning that can be interpreted through historical, archaeological, geographical and sociological study” (Asadpour 2018:1). Therefore, the character of the landscape does not only reflect physical changes brought about human intervention, but represents the cultural values, indigenous knowledge and human relationships of a community. At the buffer, in small pockets, the community of Mamelodi are currently shaping their landscape with indigenous agricultural practices; soil bunds and soil mounds (Refer to figure 97, 98 and 99)..

Soil bunds are built along the contour lines of the buffer, in order to slow down water runoff. This sustainable agricultural practice increases water infiltration and prevent soils erosion (SSEM 2021:1). The amount of collected water is dependent on the size of the bund (SSEM 2021:1). Therefore, bigger bunds are required for fruit trees, and are a radius and height of at least 1-3m. Small gaps are created between contour bunds for excess water run-off (SSEM 2021:1).

Yam mounds are built at the beginning of the rainy season (SSEM 2021:3). The loosened soil holds plenty of water, which allows for easy tuber penetration (SSEM 2021:3). Higher mounds shed excess water, create longer tubers and reduce harvesting time (SSEM 2021:3). Therefore, the sizes of mounds range from 30cm to 1m high, and from 1-3m in diameter.

It is important to note that the buffer’s vernacular landscape is constantly changing. The agricultural landforms are physically affected by regional features such as the shape of the landscape, climate, hydrology, animals and plants. As a result, earthen ridges and mounds need to be rebuilt to their original height after each harvest (SSEM 2021:1). The reconstruction is an annual, social event, where community members come together to fetch water and soil from the buffer’s natural landscape. It is therefore, important to interpret the vernacular landscape as a continuous landscape with a living cultural heritage. These agricultural landforms can be reviewed as symbols of resilience, ever-changing, social activity and indigenous knowledge transferal.



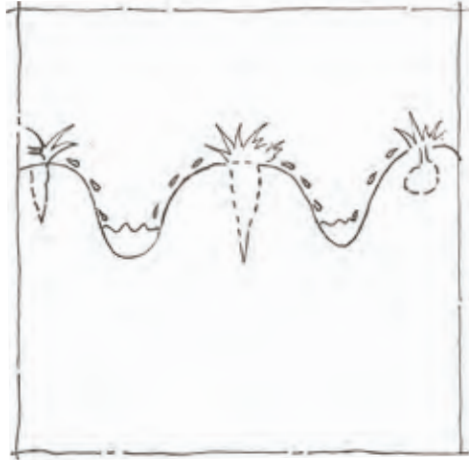
Fig 97: The making of furrows at the buffer zone (Van Staden 2021).



Fig 98: Yam mounds (Kickbike and kettlebell 2021)



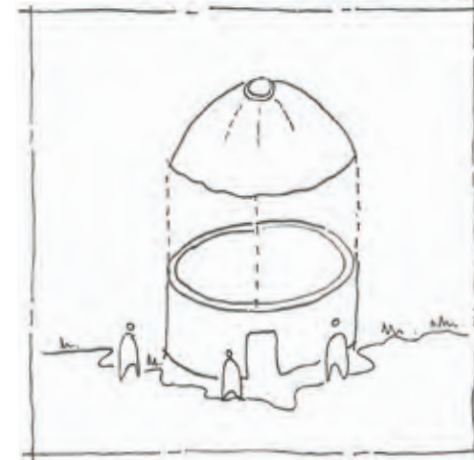
Fig 99: Sectional diagrams through bunds and yam mounds at the buffer (van Staden 2021).



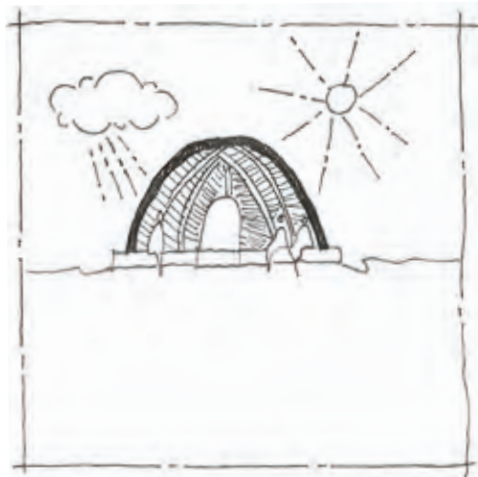
Source of food



Symbol of teamwork | social cohesion



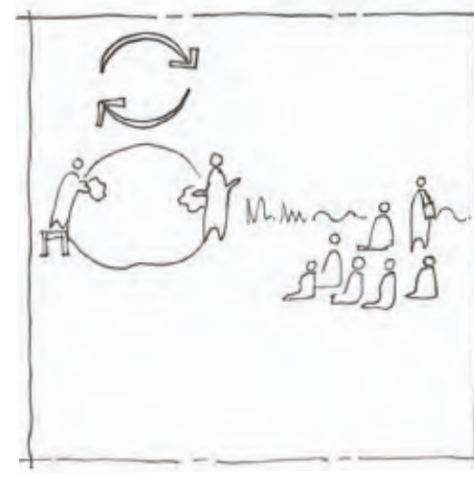
Symbol of the vernacular



Symbol of protection



Symbol of life and death



Symbol of indigenous knowledge transferral

Fig 100: Diagrams depicting the cultural and social meaning of mounds to multiple tribes of South Africa (Van Staden 2021).

3.10 | THE CONSTRUCTED LANDSCAPE

To unpack the design approach for the project, the dissertation will situate the project in a continuum thinking of architectural and landscape discourse.

Theories concerning landscape and the architectural response are constantly evolving. Before the 20th century, landscapes were romanticized through painting (landskip). As a result, the landscape was considered a passive setting for architecture and a passive product of culture (Laboy 2016:78).

Critical reinterpretations of this relationship emerged with modernism. Architecture was considered as a constructed landscape, rejecting the idea that landscape is purely an external condition (Laboy 2016:81). An example of this approach is the design of Villa Savoy (Le Corbusier 1929-31) (Figure 101-102) or the Circa Gallery (StudoMAS 2009). These buildings frame their surrounding landscapes and act as constructed landscapes through an architectural promenade (Laboy 2016:81). Another example, is the design of Säynätsalo Town Hall (Alto et al. 1949-52), a constructed landscape that responds to the Finish context through its topographical intergration, form, material use and tectonic expression (Laboy 2016:81) (refer to figures 103-104).

In the last century, the new ecosystemic way of thinking about architecture and the landscape has expanded the role of the constructed landscape. The contemporary discourse is less concerned with a design's formal response to the landscape, but with the ecological performance of form (Laboy 2016:89). Engaging with landscape ecology is critical if architecture intends to be relevant within the current environmental crisis.

Architectural approach | Positioning

The design of the cultural centre can be described as a constructed landscape, that responds to the topography, materiality and form-making of the existing and vernacular landscape. In addition, the design of the constructed landscape learns from ecological processes to address heating and cooling, stormwater management and waste management.

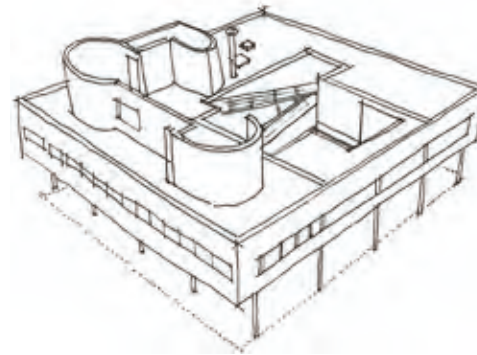


Fig 101: Axonometric of Villa Savoy (Van Staden 2021).

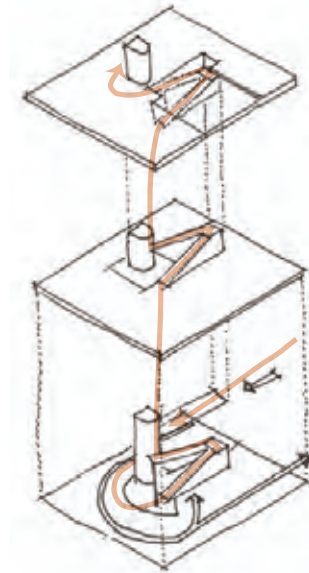


Fig 102: Architectural promenade of Villa Savoy (Van Staden 2021).

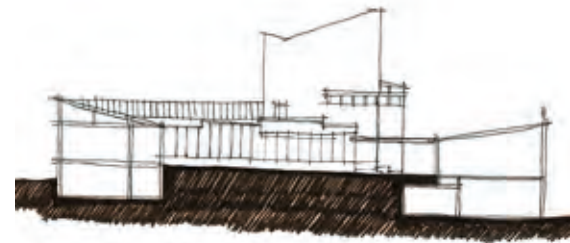


Fig 103: Topographical intergration of Säynätsalo Town Hall (Van Staden 2021).

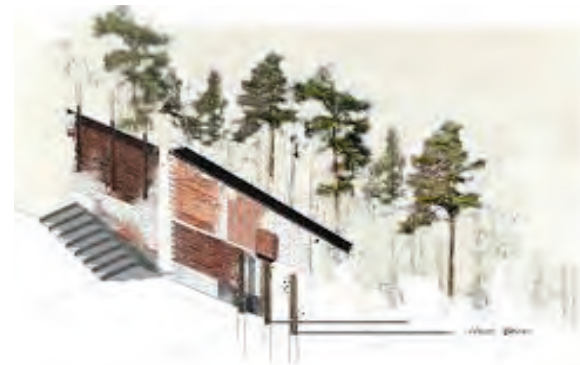


Fig 104: Material response to landscape of Säynätsalo Town Hall (Van Staden 2021).

3.11 | DESIGN DEVELOPMENT | REFLECTION ON ITERATION 1

The evolution of the design can be summarised in three iterations. The iterations are critically analysed in terms of authorship, scale, ritual and threshold.

Intention of iteration

The first iteration focuses on generating a formal language for the design, that emulates the topography of the natural and vernacular landscape of the buffer zone.

Form generation

The design process of the Adhari Galleries (Holtrop 2020) is analysed. Gypsum roofs are cast using textile molds, that resembles the landscape of the site. After removing the textile formwork, the imprint of the landscape remains visible on the roof surfaces. The gypsum castings are assembled with lightweight, structural elements so as not to detract from the artificial and natural landscape.

The author engages with a similar, material-led design exploration. The author builds topographic molds of the natural and vernacular landscape of the buffer, and uses Plaster of Paris Cloth to produce castings (Figures 106-107). The castings are used in different assemblies to meet each zone's programmatic requirements (Figure 107-108). Figure 105 depicts a multi-scalar approach to design, in which the entire landscape of the buffer is cast in order to create the form of the Communal kitchen and Lekgotla.

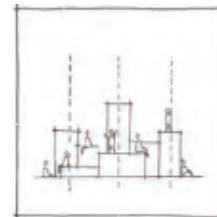
Plan Development

The positioning of the main programs is determined by existing routes and existing programs of the site (Fig 109-110). The communal kitchen folds onto the street and serves as an extension of the street market. The kitchen sits east of the site, next to a potential service corridor. The Indigenous Knowledge hub sits west of the site as an extension of Tsako Thabo High School. To the north of the site is the lekgotla. The space is centred around an existing sacrificial tree. The functional requirements of each space have not been considered.

Section Development

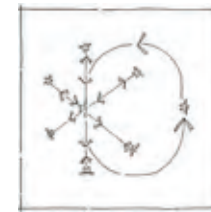
The structure for the Communal Kitchen and Lekgotla is a post and beam system, that supports a casting assembly/ topo-surface (refer to figure 117). The topo-surface dictates public and private space, but does not consider light, ventilation and water collection. Although an attempt is made to break up the topo-surface, the size of spaces remains large (refer to figure 114-115). The structure and topo-surface of the building would be created with concrete. However, the scale of the building and the method of construction relies on machinery and neglects the community. Thus, the iteration does not facilitate authorship or considers the rituals of the site, like adobe-brick making or glass manufacturing.

Summary:



Multi-scalar approach to form generation

Scale of centre is expensive.



Rituals of existing site considered in plan development.

Existing rituals are not considered in the construction process.



Surface forms create different social conditions.

Security and access not considered.



Community does not **participate** in the making of the cultural centre.

Fig 105: Diagrams depicting guiding principles of architectural intention.

The vernacular and natural landscape are modelled. Plaster of Paris is used to generate surface forms.

Different surface forms/ thresholds fulfill different programmatic and social functions.

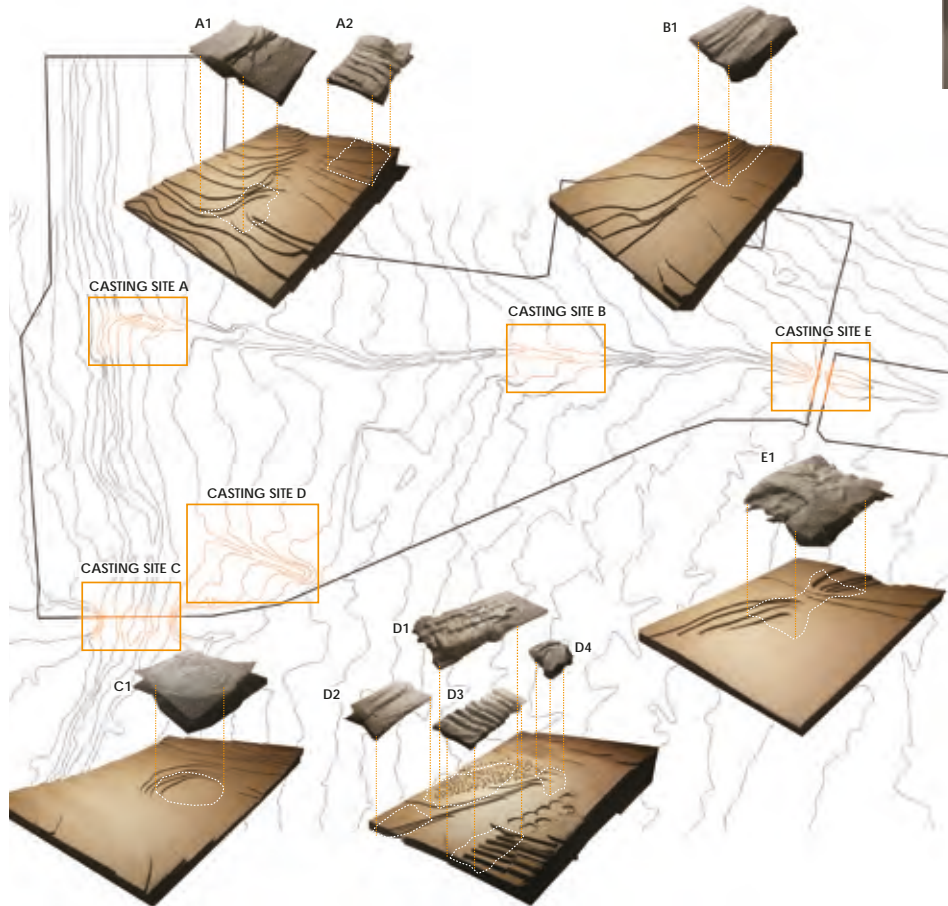
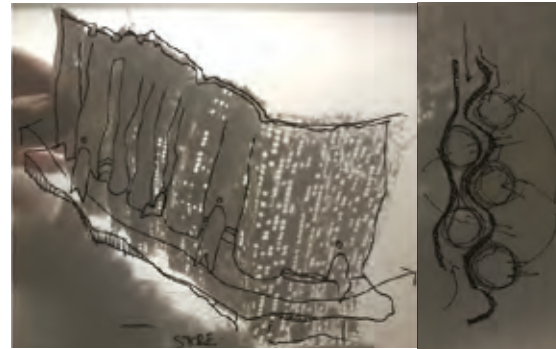
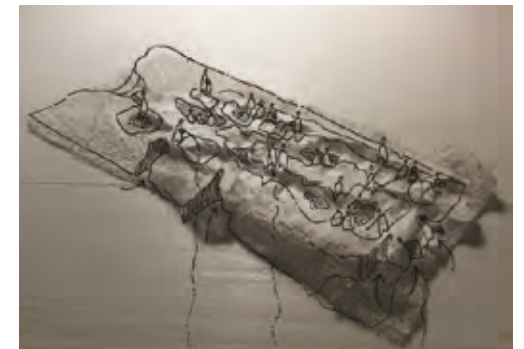


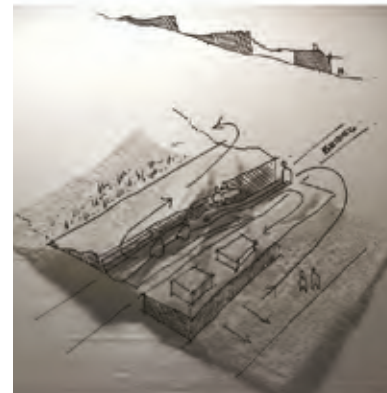
Fig 106: Diagram depicting a multi-scalar approach to design generation.



Zone 2A: Insect shelter



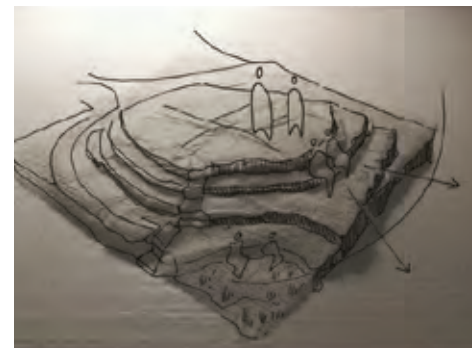
Zone 2B: Communal Granary



Zone 1: Agriculture Workshop



Zone 5: Market Street



Zone 4: Communal Kitchen and Legotla

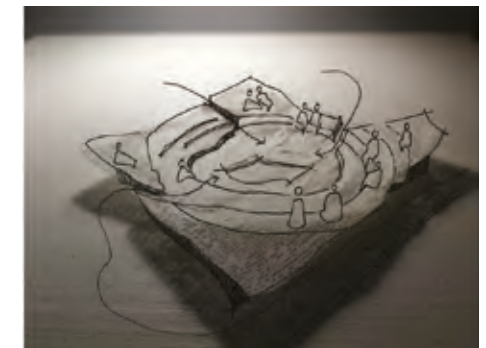
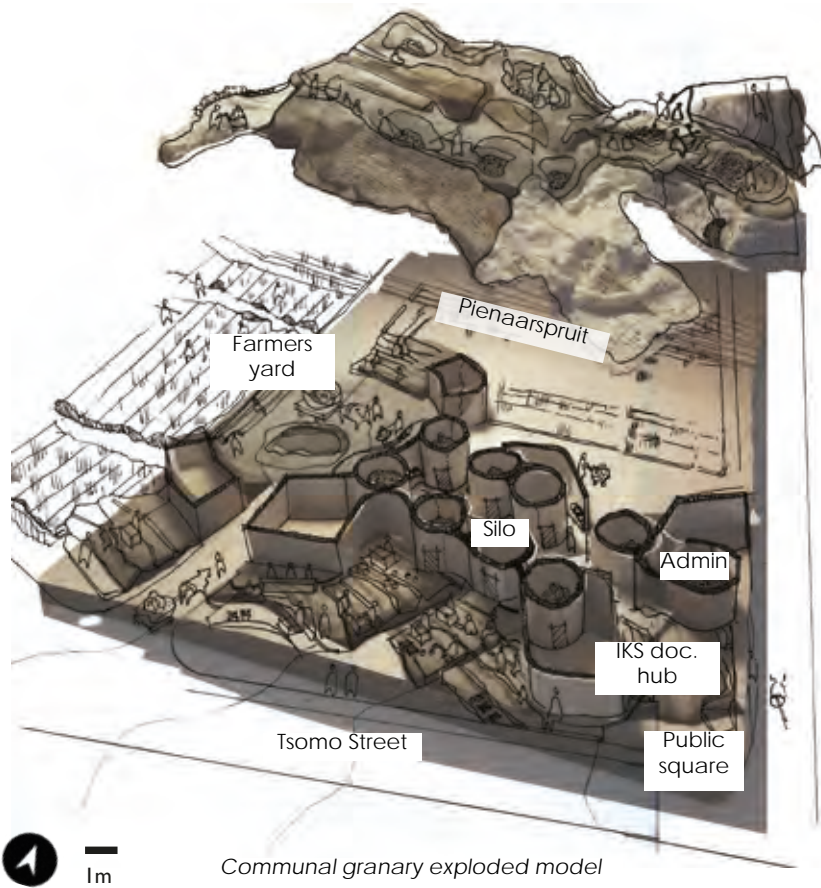
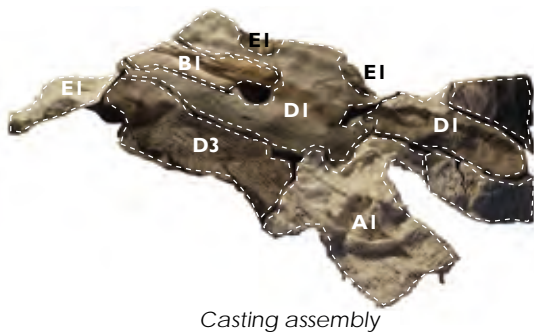


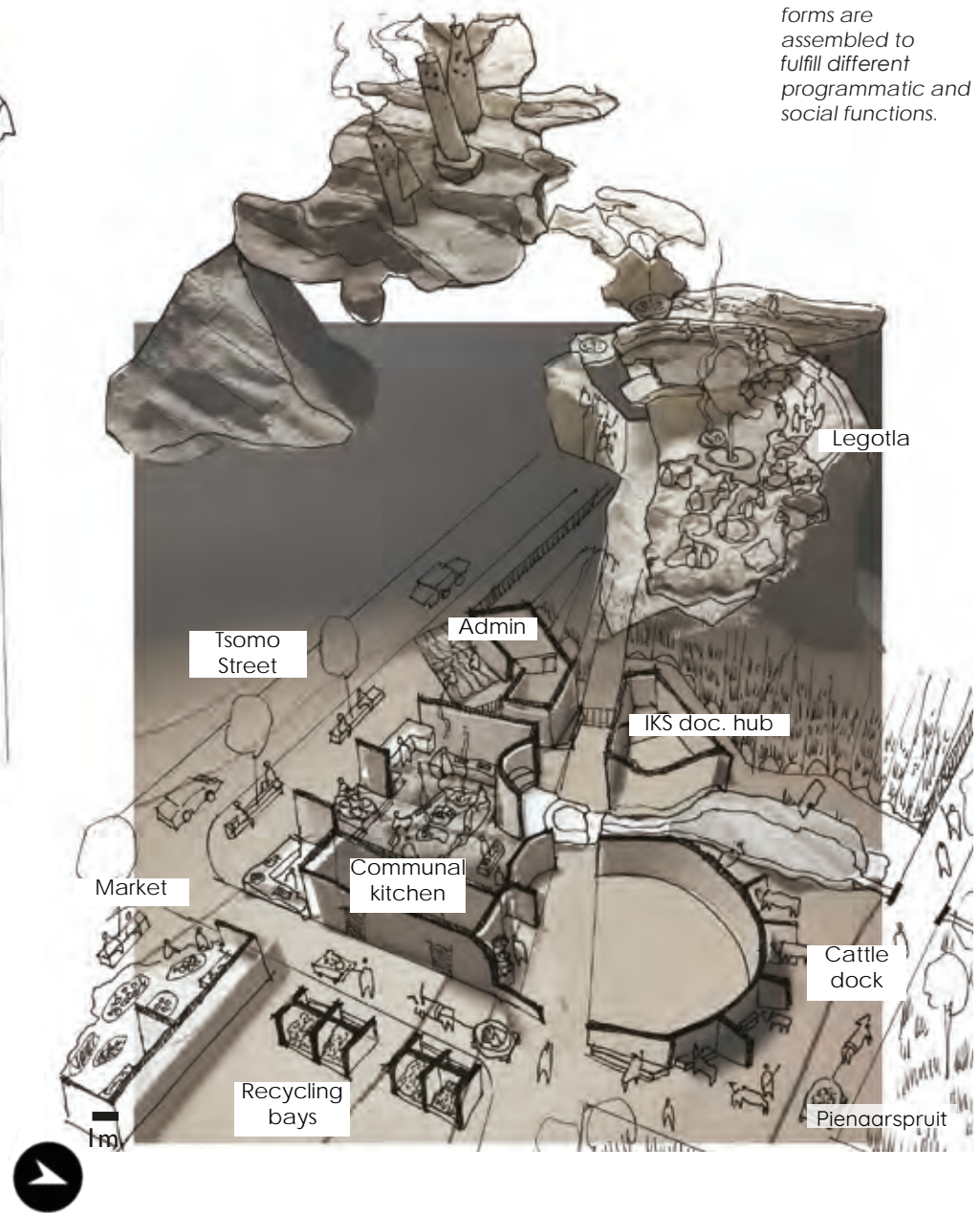
Fig 107: Conceptual proposal for each zone of the buffer (Van Staden 2021).



Communal granary exploded model



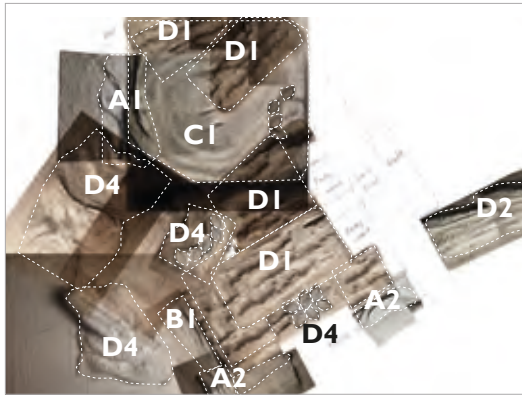
Casting assembly



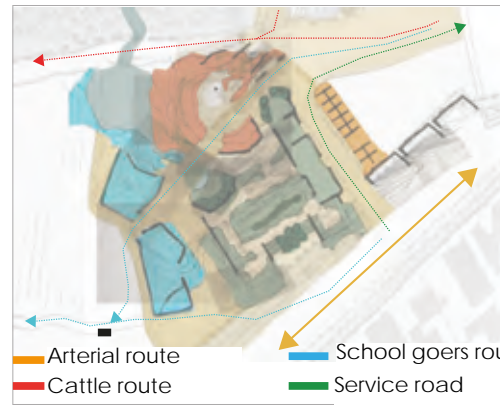
Different surface forms are assembled to fulfill different programmatic and social functions.

Fig 109: Model depicting the casting assembly of the cultural centre (Van Staden 2021).

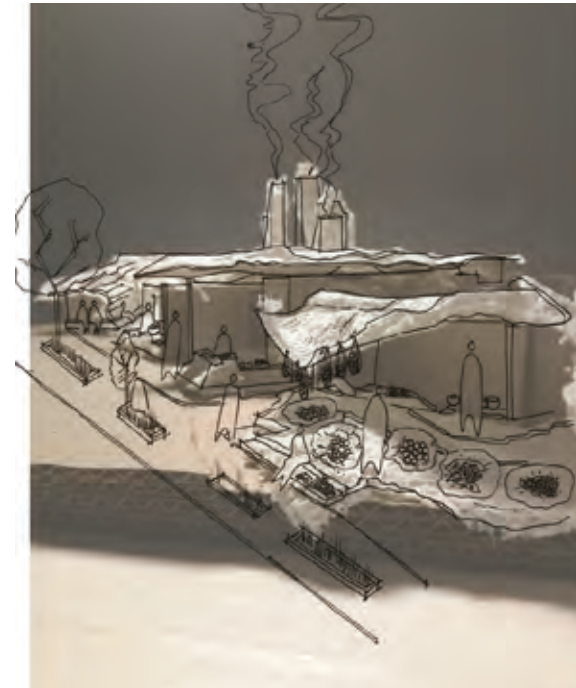
Fig 108: Model depicting the casting assembly of the communal granary (Van Staden 2021)



Casting assembly



Circulation routes



Tsomo Street view:
Fruit and vegetable market

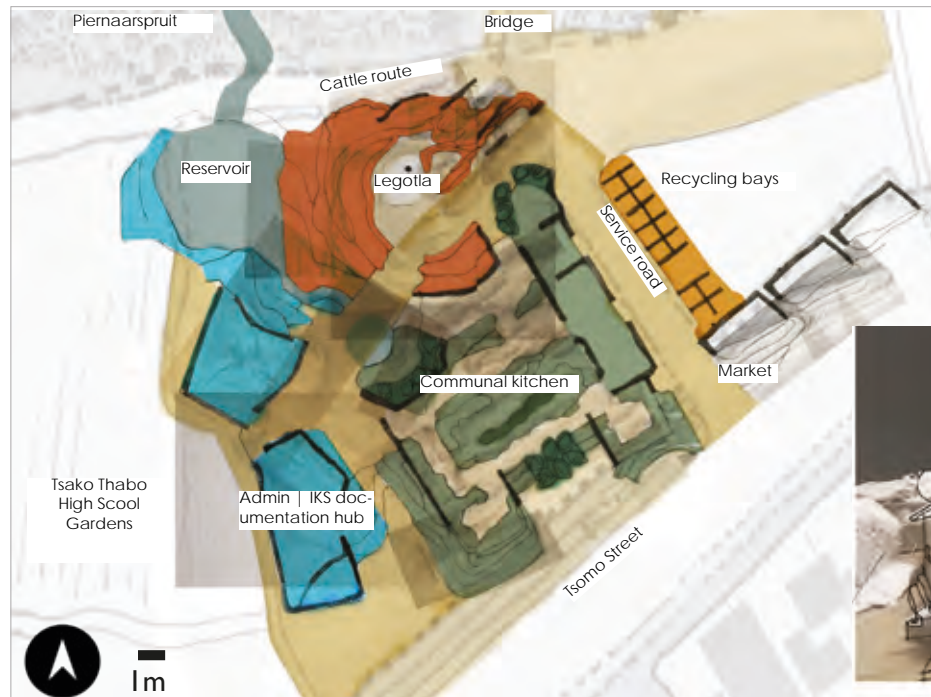
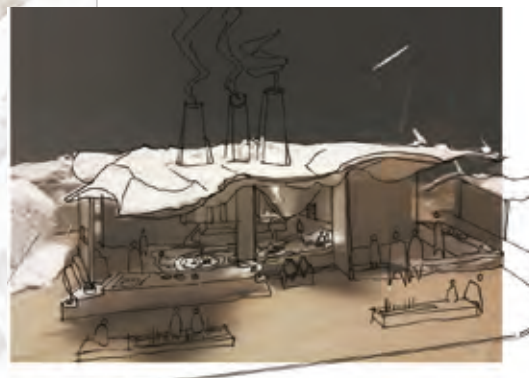
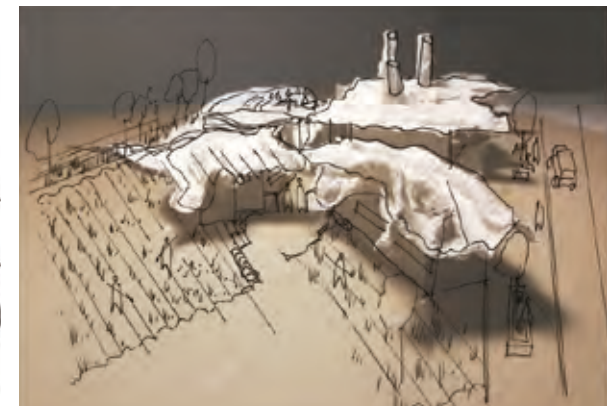


Fig 110: Conceptual plan for the cultural centre (Van Staden 2021).

Positioning of programmes are determined by existing routes and rituals of the site.

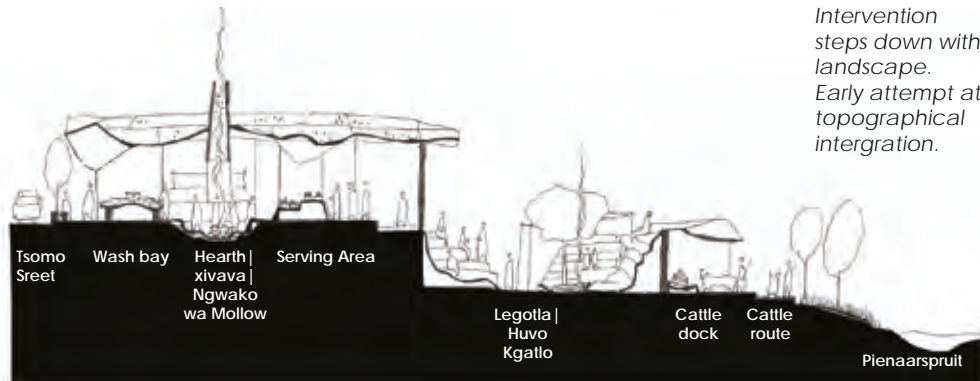


Tsomo Street view:
Communal kitchen



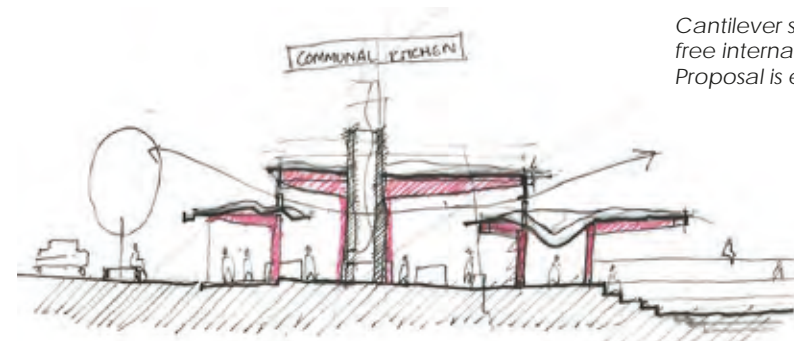
School entrance to communal kitchen and leggotla

Fig 111: Model views of the cultural centre (Van Staden 2021)



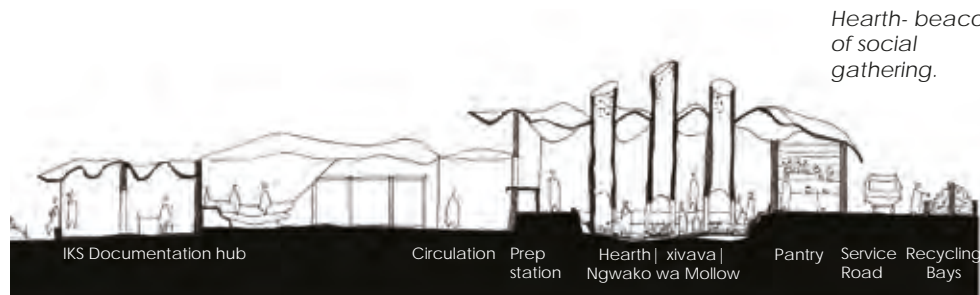
Intervention steps down with landscape. Early attempt at topographical intergration.

Fig 112: Cross section through communal kitchen and lekgotla (Van Staden 2021).



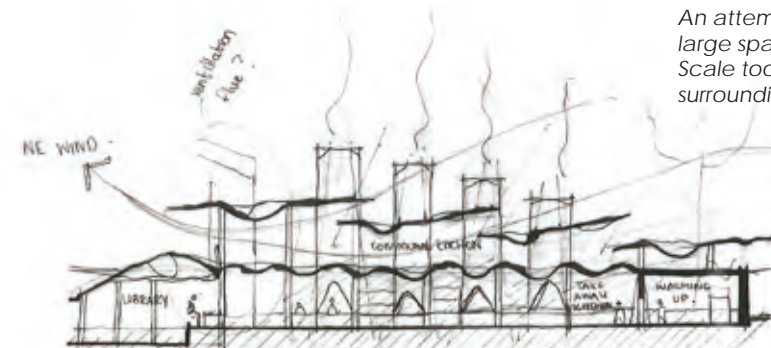
Cantilever structure-free internal space. Proposal is expensive.

Fig 114: Cross section through communal kitchen and lekgotla Cantilever proposal (Van Staden 2021)



Hearth- beacon of social gathering.

Fig 113: Longitudinal section through communal kitchen and IKS hub (Van Staden 2021).



An attempt to break up large spanning roofs. Scale too great for surrounding context.

Fig 115: Longitudinal section through communal kitchen and IKS Hub. Broken roof span (Van Staden 2021).

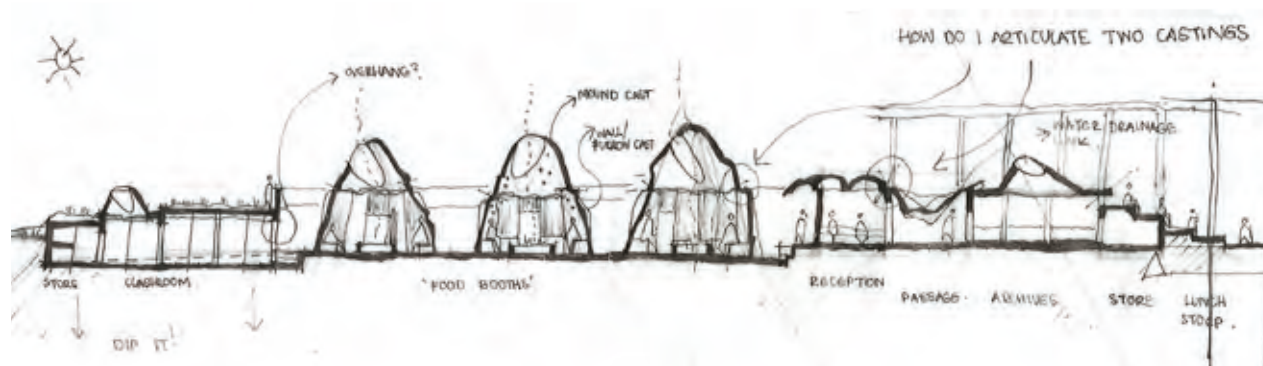
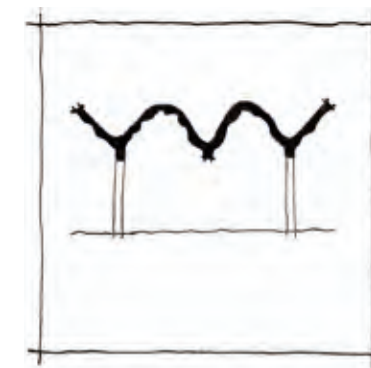


Fig 116: Proposal for food booths and IKS Hub (Van Staden 2021).



Expensive Does not consider community participation.

Fig 117: Diagram depicting structure of Iteration 1: Unified slab supported by columns (Van Staden 2021).

3.12 | REFLECTION ON ITERATION 2

Intention of iteration

The second iteration focuses on reducing the scale of the building so that it is responsive to the urban and human condition. It attempts to develop a method of construction in which the community could play a part and is inclusive of the buffer's existing rituals.

Form generation

The author investigates soil casting, in which the yam mounds, bunds and furrows of the vernacular landscape serve as soil molds for the generation of small concrete castings. The method of construction is a social process in which a community are responsible for shaping the landscape, layering, pouring and lifting the castings.

Plan development

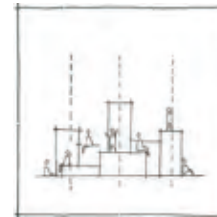
The functional requirements of each program are interrogated. Delivery of goods, cold and hot food preparation and waste management are considered in designing the plan for the kitchen (refer to figure 118). The design of the indigenous knowledge hub is questioned. As oppose to an exhibition, indigenous food knowledge is shared within a 'food booth'.

Too much emphasis is placed on creating a roof form that resembles the buffer's vernacular landscape. With the exception of the lekgotla, there is little topographical integration in terms of how the building sits on the existing site (refer to figure 122). Furthermore, the orientation of the building is aligned with existing routes, as oppose to directly north, which creates a problematic daylighting condition (refer to figure 118).

Section development

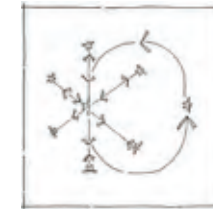
The structure of the buildings is a two-way flat plate (a concrete slab supported directly by concrete columns) with strategically cut holes for the celebration of concrete castings (refer to figure 123). The castings are used to bring light and ventilation into spaces. Due to the fact that the castings are small, in order to manageable and hand-crafted, the experiential quality of the building is reduced.

To waterproof and strengthen the castings, the concrete mixture is composed of lightweight aggregate, reinforced fibres and a coprox waterproof cement additive (refer to figures 124-126). These additives make the construction method complex and questions the initial intention of creating a simple construction method in which the community can be involved.



Scale of centre is appropriate.

Construction too complex for domes to be handeable.

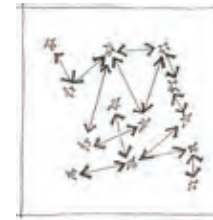


Rituals of existing site considered in plan development and construction process.



The building sits heavily on the landscape. No topographical intergration.

Security and access not considered.



The castings require complex additives and technologies to be waterproofed and lightweight. Questions if a **community** can be involved?

Fig 118: Diagrams depicting guiding principles of architectural intention (Van Staden 2021).

Functional requirement of each space is considered.

3mx3m grid is uneconomical.

The plan accommodates existing routes but is not orientated north. Problematic daylighting condition.

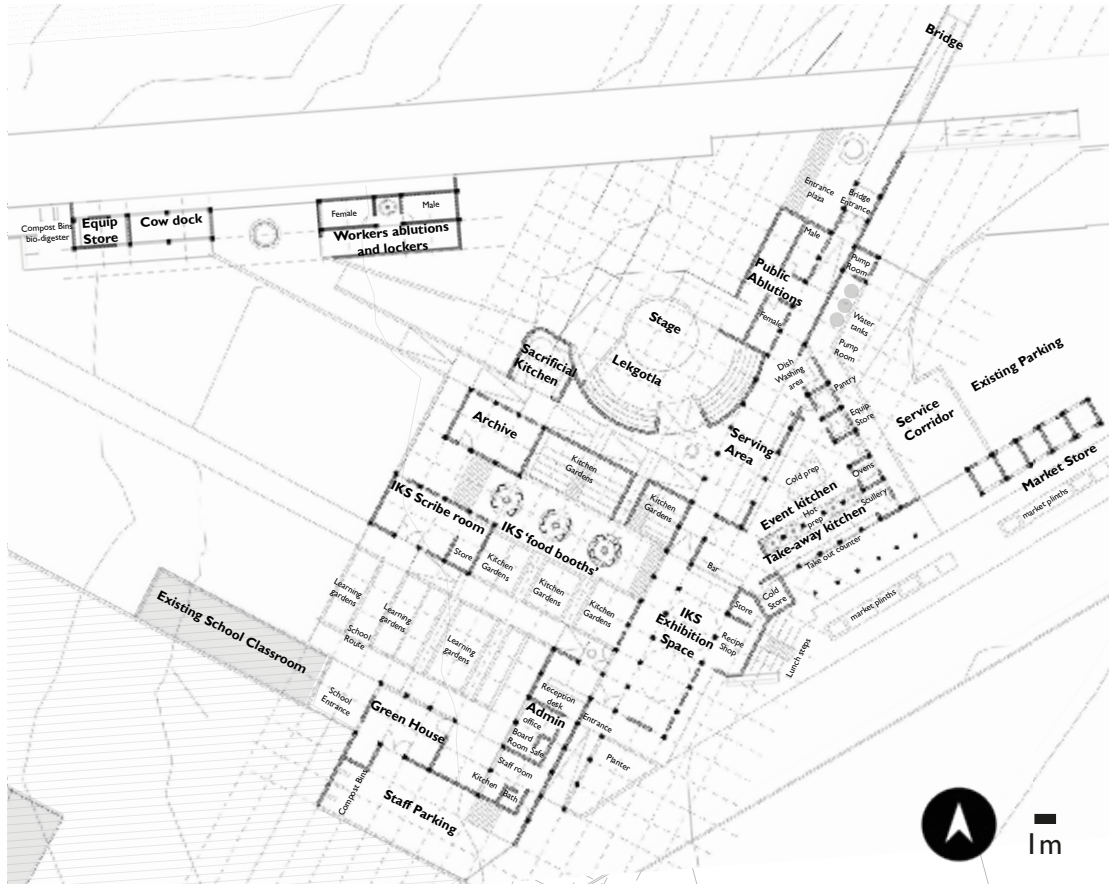


Fig 119: Iteration 2 plan (Van Staden 2021).

Castings serve different ventilation, lighting and programmatic requirements.

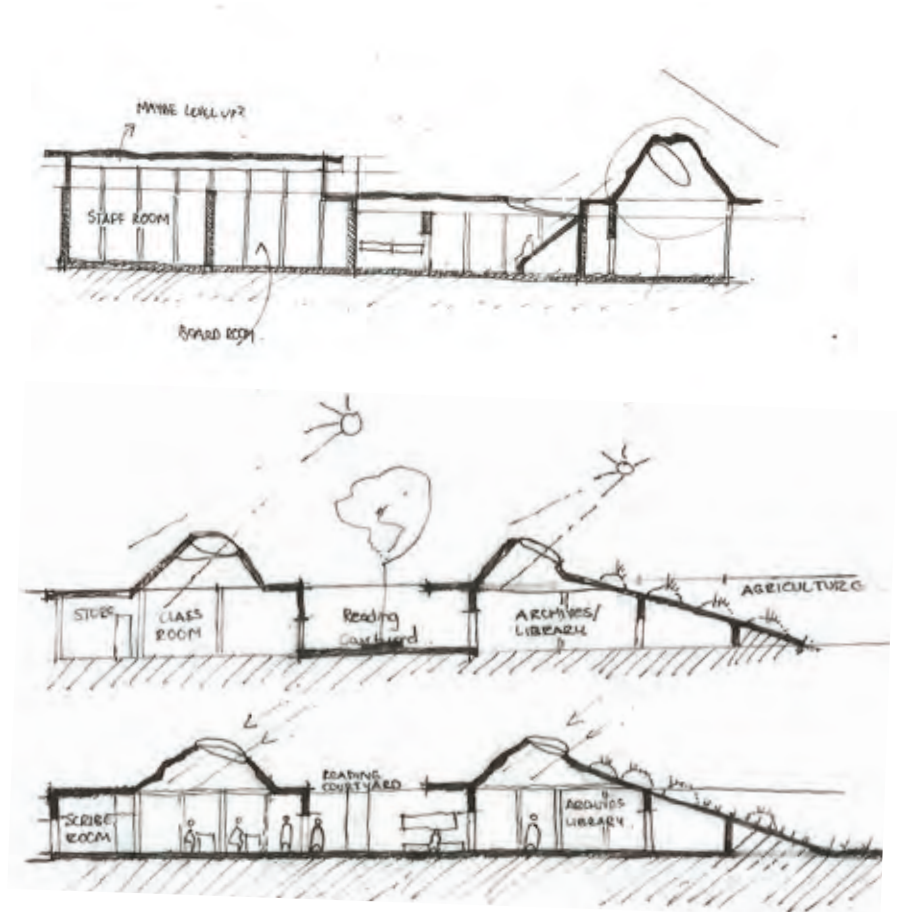


Fig 120: Sectional explorations through the IKS Hub (Van Staden 2021).

Scale appropriate for surrounding context.

Castings too small to have an influence on the spatial experience of the building.

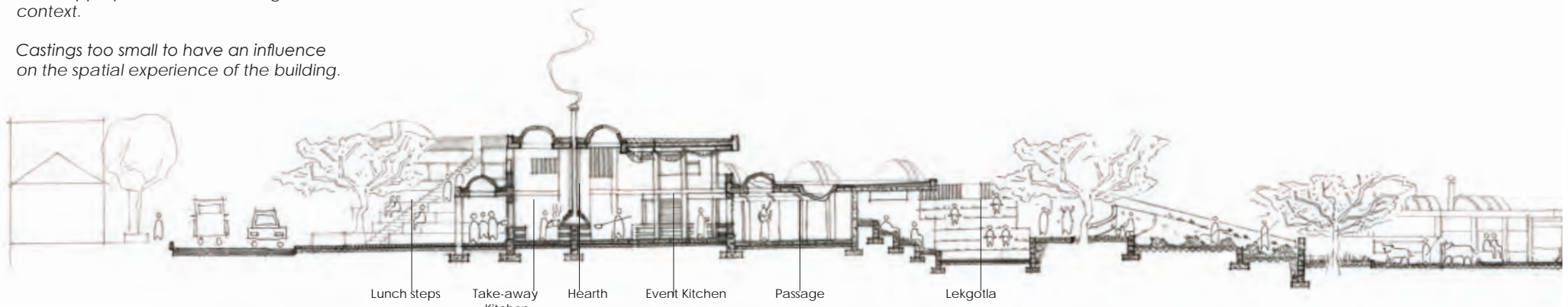


Fig 121: Cross section through communal kitchen and lekgotla (Van Staden 2021).

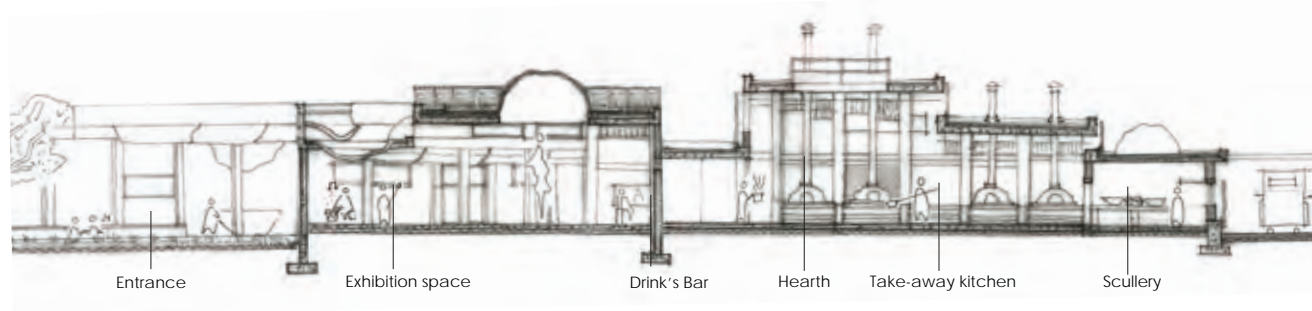


Fig 122: Longitudinal section through communal kitchen and IKS hub (Van Staden 2021).

With the exception of the lekgotla, little topographical integration between building and site.

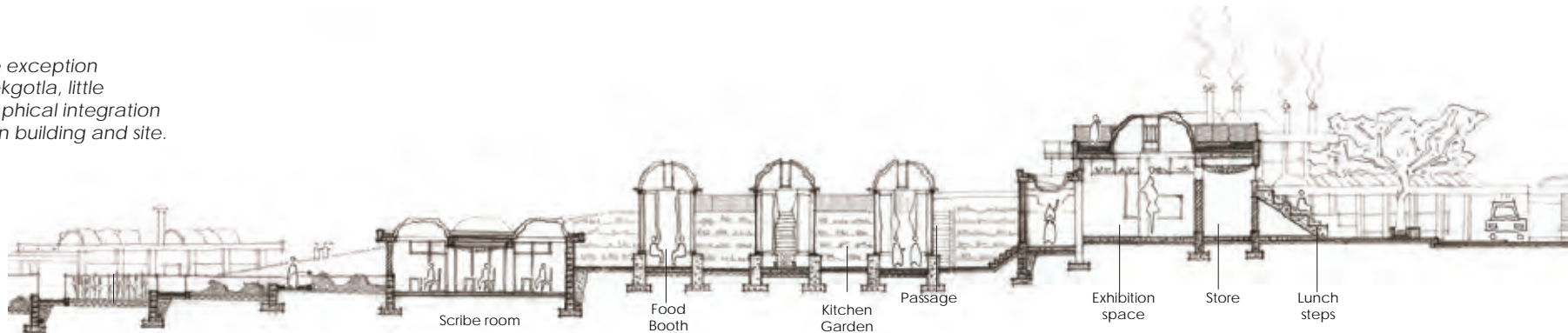


Fig 123: Cross section through IKS hub (Van Staden 2021).

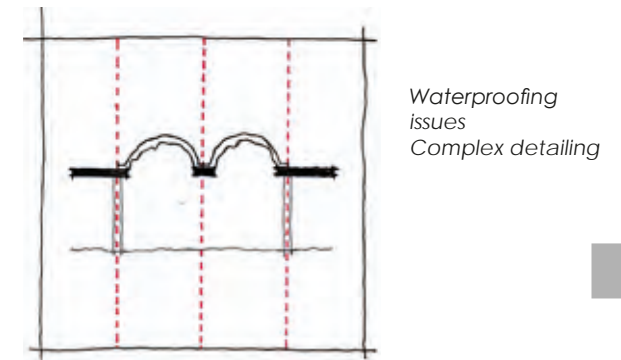


Fig 124: Diagram depicting structure of Iteration 2: Concrete slab with cut holes for strategic placement of castings (Van Staden 2021).

Dome casted on top of roof. Sealed by screed. Glass will crack under movement. Waterproofing issues. Complex additives.

20mm thick recycled glass window (crushed glass mixed with a UV stabilised, clear casting epoxy resin) fixed to aluminium profile with silicone sealant.

120mm thick precast concrete casting (casting mixture composed of: light weight aggregate concrete, Coprox waterproof cement additive and strengthened with SikaFiber reinforcing fibres) secured to in-situ cast concrete roof slab with min 40mm screed laid to 1:50 fall to rainwater outlets.

106

Sealant insufficient for waterproofing.

Repetitive castings will not be perfect.

Dowel pin connection.

Castings too thin. Will still require a crane to position castings.

Sika-112 Crystal clear transparent adhesive sealant, to protect against moisture.

120mm thick precast concrete casting

Fig 125: Iteration 2 construction details (Van Staden 2021)

3.13 | ITERATION 3 | DESIGN RESOLUTION

Intention of iteration

The third iteration interrogates how the building sits on the site. It questions the casting process and whether simpler, human-scale construction methods and technologies could be used to reinterpret the natural and vernacular landscape in a similar way. The iteration prioritises lighting, ventilation and water collection. **The third iteration is taken further for technification.**

Over view of plan and section development

There is no longer a clear distinction between plan and section development. The plan is reconfigured to predominantly north, however, the relationships between core spaces remains the same. The main entrance and administration services are moved to the centre of the building, eliminating the amount of access points and routes to the building.

The land features of the site determine how spaces sit in the landscape. Alongside the streetscape, on the plain, spaces are raised on a plinth. The building creates a new active, threshold condition between the urban landscape and the natural landscape. Different spaces on the plain are unified with circulation routes/ water channels. As the user moves towards the river, spaces become fragmented by the landscape. Spaces are bench cut, or cut and bermed into the valley. The landscape takes priority.

The new structure is composed of concrete columns and steel vault roofs. The vaults are irregular-resembling a series of uneven bunds in the landscape that step down and run along the contour lines. The sloped roofs are informed by the slopes of the existing site, acknowledging the existing landscape that the building has replaced. The high ceilings and wide spans of the vaults create a comfortable user experience. They bring light and ventilation into spaces.

The building can be reviewed as an emergent topography that creates an inhabitable extension of the vernacular and natural landscape. Users are able to experience the land form from below, above and within- facilitating the important cultural and social connections that the community has with the landscape.

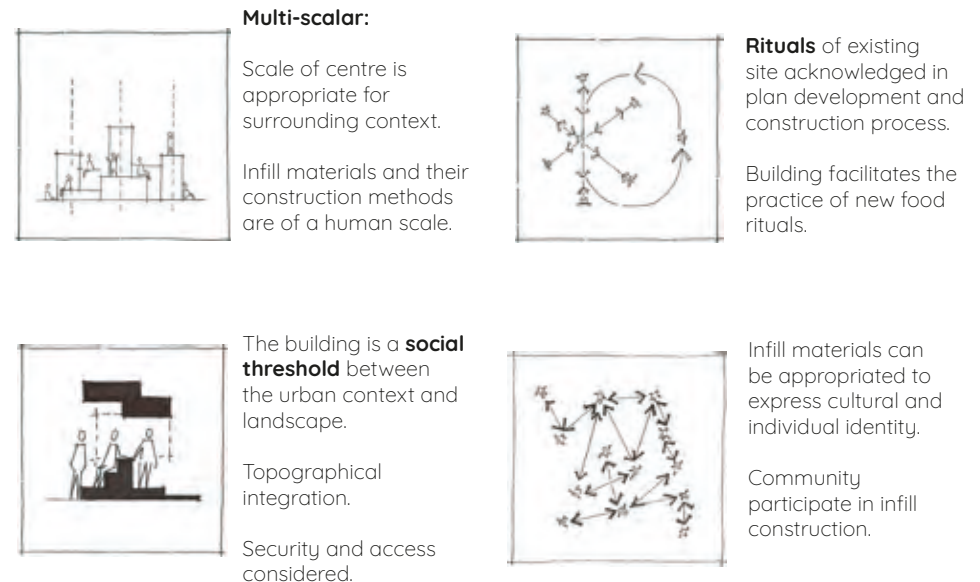


Fig 126: Diagrams depicting guiding principles of architectural intention (Van Staden 2021).

3.14 | THE LEKGOTLA

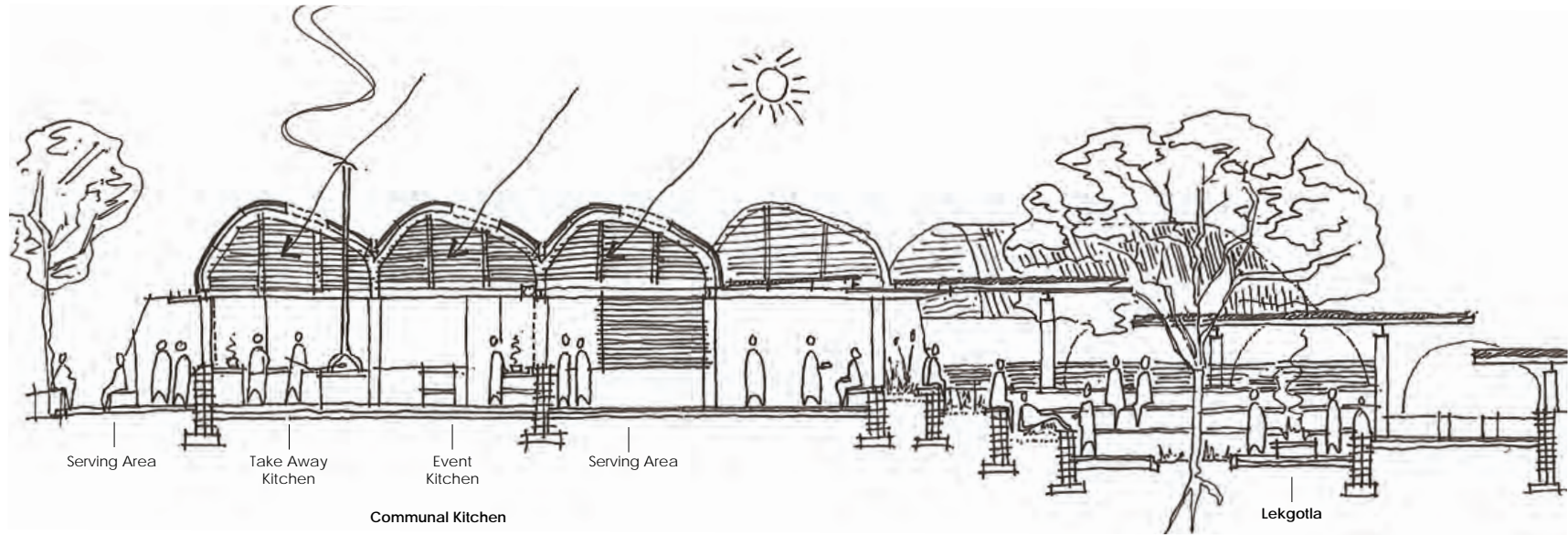
Refer to figure 127 to 128.

The lekgotla sits at the intersection of 3 routes- it is intended to be the most accessible space of the cultural centre. Amongst other rituals, sacrificial slaughtering would be conducted at the lekgotla. Therefore, the procession of cattle from the cattle pen, to the sacrificial plinth, to the kitchen is carefully considered in the design of the lekgotla. This processional route circulates around the space; spectators become immersed within the ritual. The route is ramped to allow for wheel chair access and wide enough to allow a group of community members to march and dance with one another. At the centre of lekgotla is the existing sacrificial tree. It provides shade for those seats which are not protected by the canopy structure of the walkway. The canopy is a steel structure that supports a wattle ceiling, and stretches 2m over the lekgotla. The beams of the canopy step down with the landscape and taper at the ends to reduce the thickness and heaviness of the structure. Between the seats of the lekgotla is lawn. This allows enough space for users to relax, picnic and engage with one another while eating. The upper most tier of the lekgotla is a planter which is populated with indigenous agricultural plants. The plants are cultivated for kitchen use.

3.14 | THE COMMUNAL KITCHEN

The spaces of the communal kitchen are organised around 5 communal hearths-used by both the takeaway kitchen and event kitchen. The takeaway kitchen serves street commuters- creating an active interface between street and building. The event kitchen folds out onto the lekgotla to cater for its users. Both the event and takeaway kitchen have sufficient prep space and a scullery. The cold room sits west of the kitchen- unaffected by daylight. The equipment store and sculleries sit east of the kitchen, where doors lead to an outside yard. Delivery and waste removal trucks are able to access the yard by an adjacent service corridor.

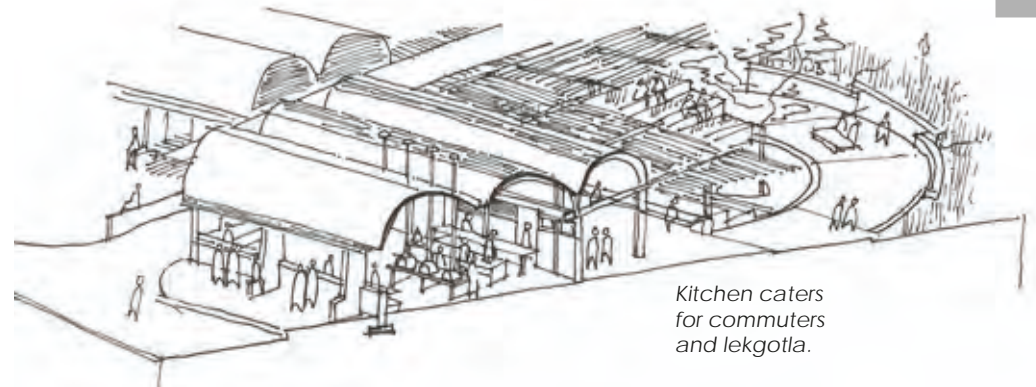
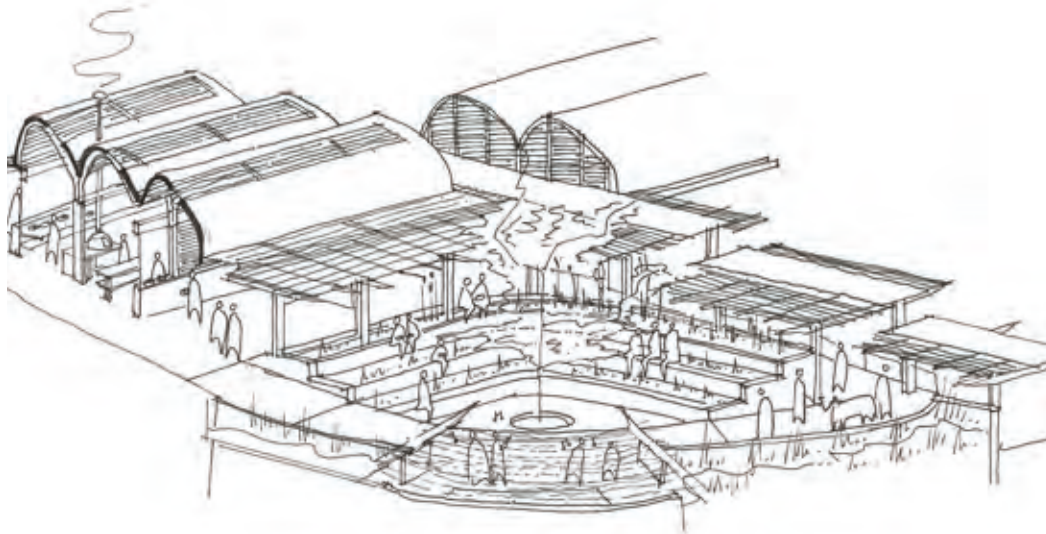
The communal kitchen is a large space in order to accommodate communal cooking and the multiple service rooms. To combat the deep interior space, polycarbonate skylights bring light into the volume. To reduce heat gain, direct sunlight is diffused through a wattle ceiling and ventilation grills on the east and western elevation allow cross ventilation to carry the heat out of the room. The main prep areas experience the double volume space. The small service areas are sheltered by concrete slabs- sufficient space between the concrete slab and metal roof is left to accommodate HVAC systems.



Appropriate Scale

Domed roofs serve daylighting and ventilation requirements.

Fig 127: Cross section through communal kitchen and lekgotla (Van Staden 2021).



Kitchen caters for commuters and lekgotla.

Fig 128: Perspectives of Communal Kitchen and Lekgotla (Van Staden 2021)

Cattle procession to sacrificial plitn.

Spectators enveloped by surrounding procession

The documentation of knowledge unfolds in the landscape, in succession.

Food booths are made private by surrounding berm. Cater for different intimate gatherings.

Commuters wait for the bus within the interface of building and street.

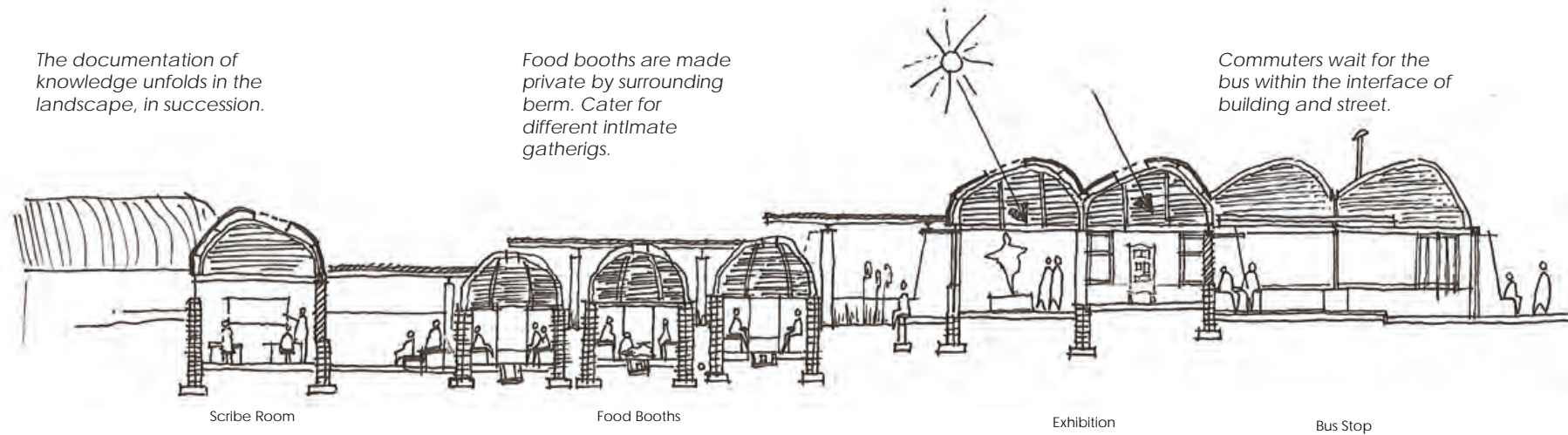


Fig 129: Cross section through IKS hub (Van Staden 2021).

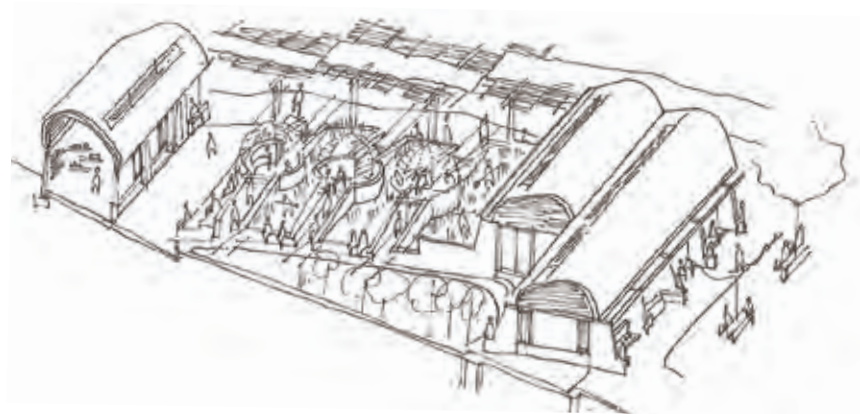


Fig 130: Perspective of IKS hub (Van Staden 2021).

The IKS HUB

The documentation and exhibition of indigenous knowledge fold out onto the landscape. As users enter the building, they encounter the double volumed exhibition room. Light from above skylights penetrate the space through wattle ceilings. Users experience the space as if they were under a tree. The foodbooths are sunken into the landscape creating private, intimate spaces for multiple food rituals. Although the entrances are concealed by the landscape, like agricultural mounds, the dome roofs of the spaces emerge from their surrounding landscape and can be seen as users move down through the central axis of site. The domed structures are reasonably open- they are sheltered by a wattle screens and have a central drain to pump rain water out of the space. The IKS hub ends with the scribe room- where information is recorded, stored and later exhibited to the public. Buttress-like walls flank spaces throughout the project. They create inhabitable pockets for social gathering-particularly along the street interface. The buttress walls support shading elements and can be completely screened for storage or to conceal services.

Irregular arches
reinterpret mounds and
bundts of vernacular
landscape.

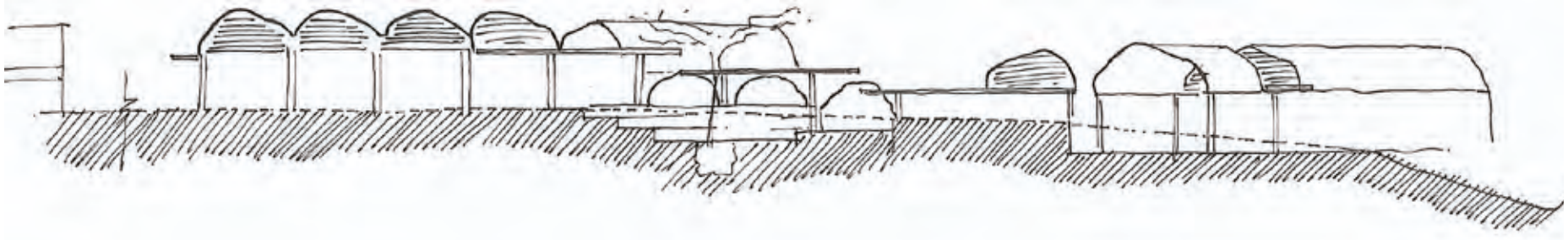


Fig 132: Schematic section through communal kitchen and lekgotla (Van Staden 2021).

Users experience
landscape below,
above, within.

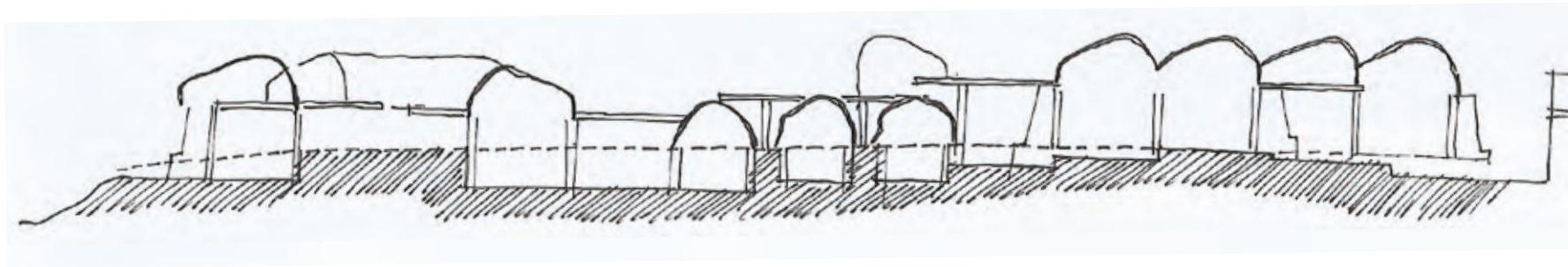
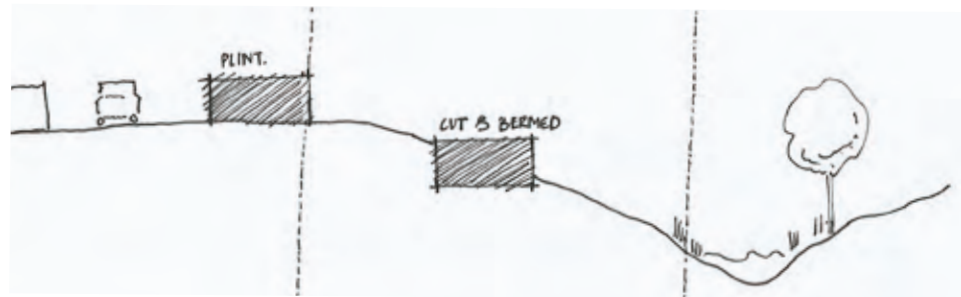


Fig 133: Schematic section through IKS hub (Van Staden 2021).

Building takes
priority towards
street.



Landscape
takes priority
towards river

Fig 134: Topographical Intergration (Van Staden 2021).

Plan orientated north.

Economical 4.5m x4.5m grid.

New entrance at centre of building.

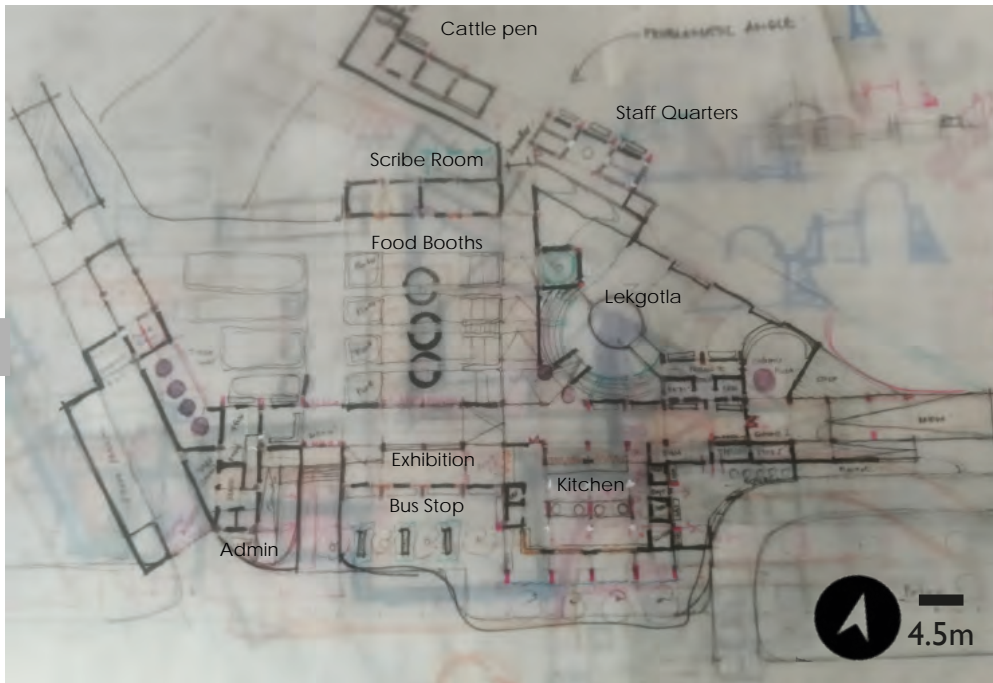


Fig 135: Plan development Iteration 3 (Van Staden 2021).

Fig 136: Plan development Iteration 4 (Van Staden 2021).

4 | TECHNIFICATION

4.1 | CHAPTER OVERVIEW

The following chapter unpacks the technification of Iteration 3.

4.2 | STRUCTURES AND MATERIALITY OF MAMELODI

The existing structural and material assemblies of Khalambazo and Selbourne & Site are unique. They are influenced by the oscillating urban and rural condition of the buffer. As a result, one will find a mosque built with brick that is plastered with mud, a gum pole structure with a metal sheet roof, a steel framed structure with a thatched. The choice of structure and material is subject to availability and local skill. Other factors that influence structural design include the strength of tenure security, portability, mobility, visibility and product display, the need to preserve commuter pathways, theft and climatic conditions (Charman et al. 2020:109). As a result, structures can be permanent, temporary, mobile, or a combination thereof. Thus, the architecture of the urban landscape comprises of an array of structures, materials and space usage that speak to the cultural condition of Mamelodi.

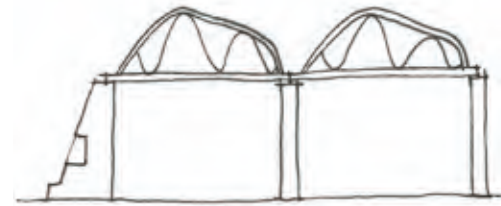


Fig 138: Photos depicting surrounding structures of the buffer zone (Zorn 2021)

4.3 | STRUCTURE

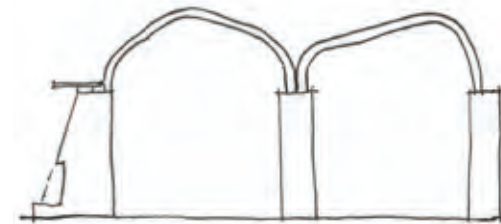
The structure and materiality of the building is informed by the urban, vernacular and natural landscape of the buffer. The primary structure of the building is a frame composed of 254mm wide, steel arches which are anchored to 300x300mm concrete columns. Where two steel arches meet, they are spliced in order to reduce the size of the concrete columns. The arches support structural gutters and secondary steel beams, which hold up the metal sheet roofs. The primary and secondary structure are permanent elements, composed of 'urban' materials that require machinery in order to be assembled (refer to figures 139-140).

Between the frame, are different infill materials including: adobe walls, wattle ceilings and screens, and cattle dung screeds and plasters. The materials of the tertiary structure are described as 'vernacular', temporary, locally sourced and are assembled by the local community. To celebrate the unique relationship between urban and traditional technologies, meetings between the two are articulated with recycled glass windows, voids and shadow lines. The construction process involves multiple parties working together in order to build the articulated structure. This process can be viewed as a celebration of people and parts coming together.



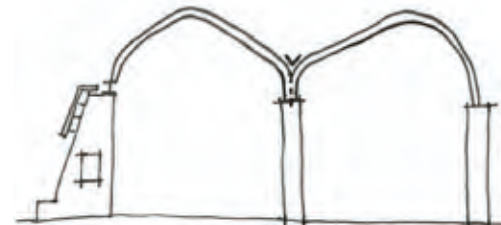
Iteration 1 :

Arch truss as roof structure (not an economical use of steel)



Iteration 2 :

Two arch columns (concrete columns too wide).

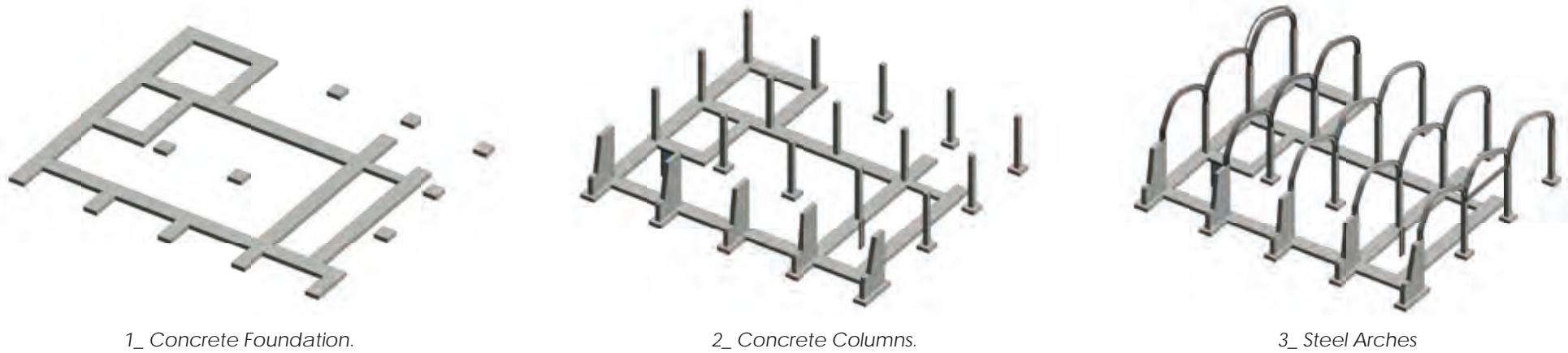


Iteration 3 :

Spliced arches. Structural gutter.

(Economical, light)

Fig 139: Iterations of structure (Van Staden 2021)



Primary Structure

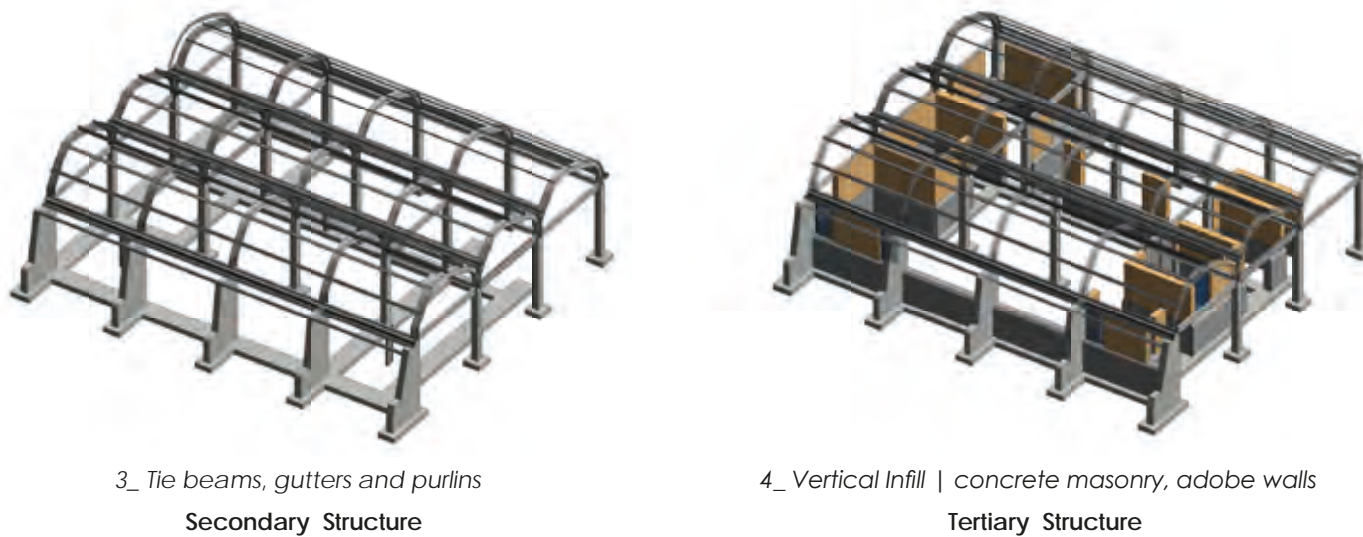
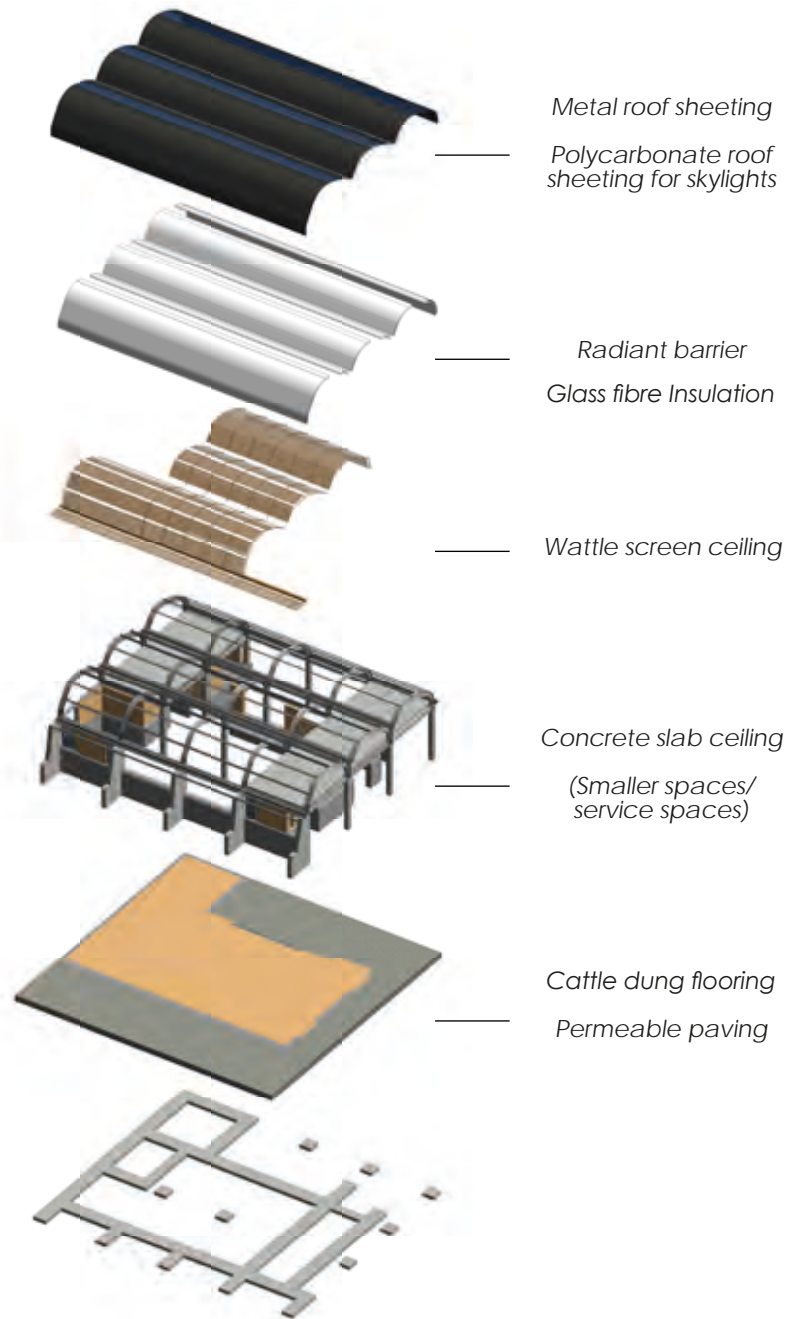
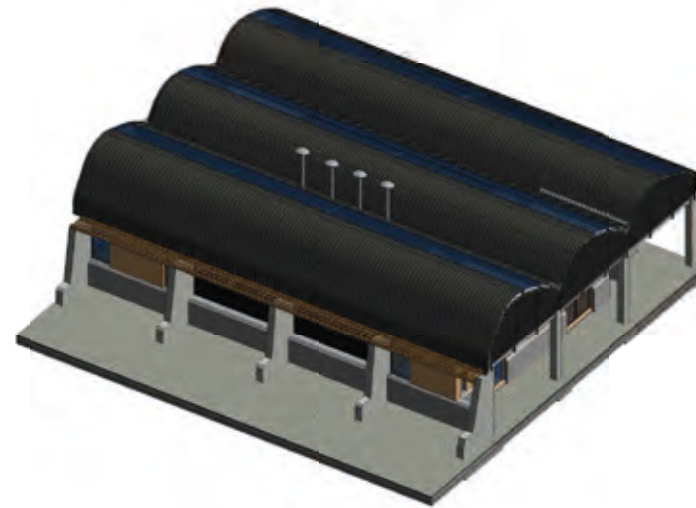


Fig 140: Diagram depicting structure of communal kitchen and the process of construction (van Staden 2021).



6_Horizontal Infill
Tertiary Structure



7_Glass infill, plastering, concrete casted
hearth, steel vents

Tertiary Structure

Fig 141: Diagrams depicting structure of communal kitchen and the process of construction (van Staden 2021).



Wattle screen of public swimming pool



Adobe brick makers



Recycled bottle glass

Fig 142: Photos depicting local rituals and material palette of buffer zone (Zorn 2021).

4.4 | INFILL MATERIALS

The infill materials are specifically chosen because they are readily available at the buffer. By using these infill materials, multiple, local craftsmen are employed. The everyday rituals of the buffer are therefore, recognised and strengthened, and money stays within the community.

The infill materials are sustainable. Locally sourced materials reduce transportation costs, fuel and pollutants (Alexander et al. 2007:30). Infill materials such as adobe, cattle dung and wattle are considered renewable resources (Alexander et al. 2007:30). Furthermore, by using recycled glass windows, construction waste is reduced. These infill materials have low embodied energies that could help compensate for the concrete and steel works of the frame structure.

Temporary infill materials like cattle dung plastering and wattle screens physically succumb to the ever changing urban, vernacular and natural landscape of the buffer. It has been previously mentioned that agricultural bunds and mounds need to be rebuilt every harvest season due to climatic conditions. This rebuild requires a voluntary committee of members, and is regarded as an act of Letsema. The maintenance of the building is an extension of this agricultural ritual. Each harvest season the community can be involved in replastering the cattle dung walls and replacing the wattle screens. The maintenance encourages community participation and prevents spaces from being displaced and forgotten. Furthermore, it facilitates the important relationship between people, building and landscape.

A further investigation of the infill materials is made. Materials are analysed in terms of their function, cultural meaning, their recognition of existing rituals, their material properties, maintenance, environmental impact and their response to the buffers landscape.



Fig 143: Adobe brick (Solid earth 2021).



Fig 144: Existing ritual | The construction process of Adobe brick (Van Staden 2021).

4.4 | ADOBE BRICK

Use | Cultural meaning

Adobe bricks are often used to create traditional homesteads. In this project, adobe bricks are used to build the non-structural walls between the concrete columns.

Existing Ritual | Material Properties:

(Refer to figure 143) Bricks are made with a mixture of 6-part sand, 4-part clay and 4-part water (Ching 2008). 1-Part portland cement is added to the mixture to limit water absorption and to improve the strength of the bricks (Ching 2008:175). The mud is mixed by hand and poured into 300mmx145mmx85mm timber moulds. After initial drying, the moulds are removed and the bricks are allowed to stand on edge. Thereafter, they are trimmed and allowed to dry completely. Bricks are laid and cemented together using a mud mortar made of water and the same soil of the bricks.

The walls are built on a foundation wall of concrete with a 375micron thick damp-proof membrane to prevent the rise of capillary moisture (Ching 2008:175). If not plastered, the walls will weather. However, walls can be easily repaired with mud mortar (Ching 2008:175).

The use of adobe bricks recognises the local construction process which takes place at a site opposite the buffer zone. In addition to the low transportation costs, the making of adobe brick requires no machinery and thereby, encourages community participation. The bricks have a high thermal mass and are fire resistant- ideal for creating a cool kitchen space. Furthermore, the bricks are easy to drill and cheap to maintain.

Landscape response:

The adobe bricks are made of the landscape. They are composed of recycled earth, collected from the construction site.



Fig 145: Cattle dung plaster (Solid earth 2021).



Fig 146: Existing ritual | The plastering process with cattle dung (Van Staden 2021).

4.4 | CATTLE DUNG PLASTERS AND SCREEDS

Use| Cultural meaning:

Cattle dung is used to plaster traditional homesteads and to create floor screeds. Due to the fact that cattle are sacred in many South African cultures, there is a belief that the use of cattle dung will protect the homestead (Berna 2017:1115). In this project, cattle dung is used to plaster the adobe walls and to create interior floors. Cattle dung is a medium for cultural expression. It can be applied to curved walls, made into relief sculptures and inscribed with cultural symbols and messages. Therefore, it facilitates cultural representation and authorship by establishing tactile connections between people, landscape and buildings.

Existing Ritual and material properties:

The design recognises the existing cattle ritual, in which herders guide their cattle through the site whilst on their daily quest for water. The design furthers the responsibility of the herders to collect fresh cattle dung so that it may be used to make plaster. The use of dung not only supports the local Pedi association, but there are also no transportation costs (refer to figure 145).

The plaster is composed of 1-part cow dung, 2-part clay, 2-part sand and 4-part lime (Gur-Arieh 2018: 2683). The soils are hand sifted and mixed to produce a slurry which is spread evenly across the adobe walls and concrete surface beds. Cattle dung is a very good binder and soil stabilizer; it improves the durability of soil by increasing its strength and resistance to water (Gur-Arieh 2018: 2683). The enzymes in dung react with minerals in clay to prevent cracking, creating a smooth floor finish (Gur-Arieh 2018: 2683). Cattle dung also increases the insulation properties of the plasters and is cheap and easy to repair. Therefore, cattle dung plasters and screed have low embodied energies.

Landscape response:

Cattle dung can be described as a seasonal material. According to the season, grass will turn different colours which will influence the colour of the dung and subsequently, the plaster. Colours range from mustards to avocado greens, bringing warmth to interior spaces. With close inspection, it is possible to see grass fibres in the plaster.

Interior spaces need to be robust as well as hygienic. Therefore, plasters and screeds will be sealed with linseed oil. On the exterior, plasters will not be sealed and will need to be repaired seasonally. Thus, the envelope of the building will continue to change in colour as the landscape does.



Fig 147: Wattle ceiling and screen (Solid earth 2021).

4.4 | WATTLE SCREENS

Use | Cultural meaning:

Wattle screens and fences are used to enclose the cattle kraals of the buffer, homesteads and public spaces such as the local swimming pool. In this project, wattle is used to create interior ceilings, and to create screens that hide services or provide shade.

Existing Ritual | material properties:

The design recognises local craftsman who create and sell wattle screens alongside the arterial routes of the site. Fallen branches of acacia trees are collected and dried. Larger wattle is used to create a frame, to which thin, wattle slats are nailed, screwed or tied. Thin wattle branches are flexible and can be bent in all sorts of forms. Furthermore, wattle is a medium of cultural expression in which artisans bend and weave different patterned screens.

The wattle is treated with CCA, which means it is able to last a minimum of 5 years before it needs to be replaced (Insteading 2021). The screens are tied to galvanised steel purlins so that they can be easily removed and replaced, whilst fulfilling different functions. Wattle screens are local, affordable, lightweight and have low embodied energies.

Landscape response:

Wattle trees are of the natural landscape. When light passes through a wattle screen, it behaves as if it were moving through a tree. Interior ceilings made of wattle diffuse the light coming through skylights and create a warm environment that reinterprets the interior of traditional thatched homesteads.



Fig 148: Existing ritual | The process of recycling glass (Van Staden 2021).

4.4 | RECYCLED GLASS

Use: Recycled glass is used to create windows.

Existing Ritual | material properties:

Adjacent to the site, is an informal glass depot which has been upscaled by Dale Rosser (2021) and turned into a glass recycling factory. Glass bottles are collected from a network of taverns, crushed and recycled. Recycled windows are created with a mixture of crushed glass and UV, clear casting epoxy resin (Mohamad 2005:1200). The mixture is poured into moulds and placed in a furnace of up to 61 degrees. Despite the resin additive, recycled glass saves up to 30% of the energy needed to produce glass from raw materials, as crushed glass melts at a lower temperature than raw materials (Mohamad 2005:1166). Recycled window glass has a minimum thickness of 15mm and therefore, has structural integrity. It is tough, almost plastic and abrasion resistant.

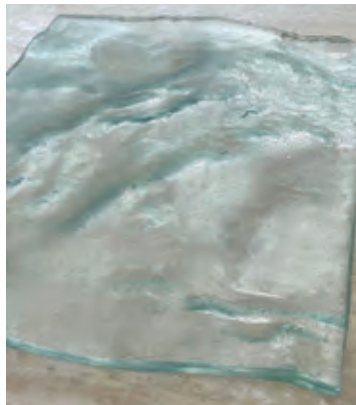


Fig 149: Casted glass (Thorpe 2021).

4.4 | ZINC-ZLUMINIUM ROOF SHEETING

Use: Metal roof sheeting is used to create the roof envelope.

Existing ritual | material properties:

The design uses a 0.47mm thick, Tufdek® IBR profiled roof sheeting which is aluminium-zinc coated. The coating protects the roof sheeting against corrosion and oxidation of steel. The roof requires little maintenances and has great durability- it is able to last the life span of a structure, with minimum maintenance. Like other roof sheets, they have poor acoustic and thermal quality (Safintra 2021:36). Despite this, aluminium-zinc galvanised roof sheeting is light weight, reasonably priced and can be locally sourced from Silverton. Furthermore, there is a local group of welders at the buffer zone that could assist with the steel works, welding and installation of the roof sheeting.

Skylights are made of polycarbonate sheeting, that have the same profile as the roof. Best features are its resistance, lightness and easy fixing to existing roof sheets.

Response to landscape:

A large roof profile was particularly chosen because it resembles the furrows of the agricultural landscape.



Fig 150: Tufdek Zinculem roof sheeting (Safintra 2021).



Fig 151: Sand casted concrete (Thorpe 2021).



Fig 152: Existing ritual | Mound making and concrete casting (Van Staden 2021).

4.4 | EARTH CASTING

Use:

Earth casting is used to create small-scale, precast concrete elements such as benches, the communal hearths and wash basins.

Existing ritual and response to landscape:

Earth casting was explored in the previous two iterations of the design. The existing mounds and bunds of the agricultural landscape were used as templates for the production of concrete domes that could be used as roof elements. This proved impractical. However, earth casting could still be used to create interior and exterior furniture and fixtures. The process involves the creation of a mud mound and timber shuttering at the intended site of the fixture. The mud mound can be inscribed with cultural symbols, maps, names and other meanings. Concrete is poured and once dry, the shuttering is removed by spraying down the casting with water. The product is a casting that resembles the meanings and forms of the vernacular landscape.

Authorship is facilitated through the casting process. The community are responsible for designing the molds for the design, which they consciously and subconsciously create through their daily agricultural practices. The role of the designer is then to recognise and use the castings for the respective functions. Therefore, this dissertation presents only one possibility of the various manifestations that can be created by the community.

The community are also responsible for the casting construction. No heavy machinery is required to make the smaller castings. Rather, the construction process relies on the social practices of layering and pouring the casts as a team and thereby facilitates social cohesion.

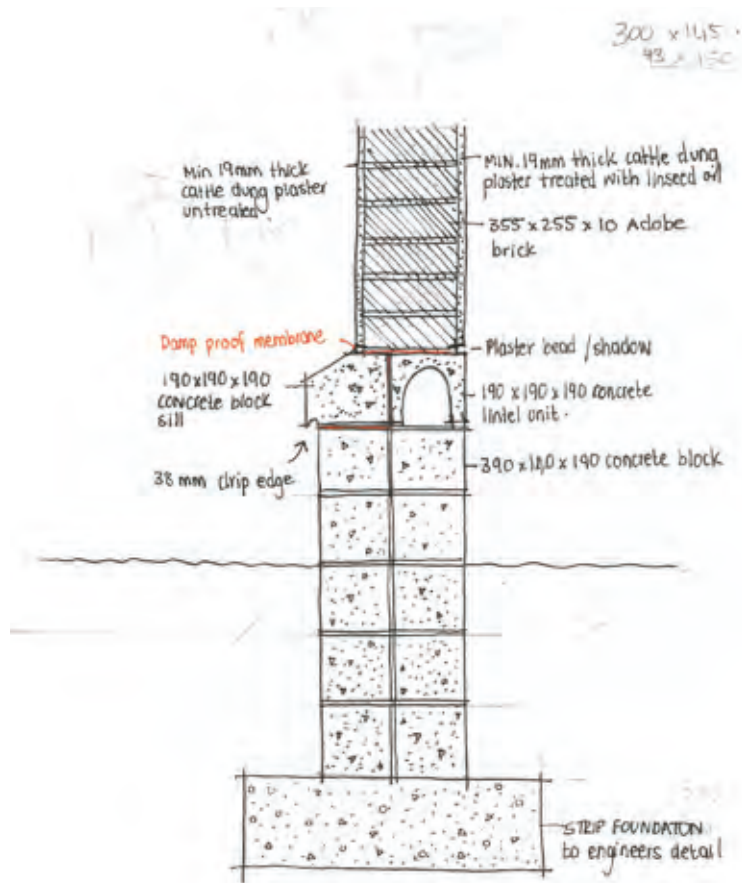


Fig 153: Detail depicting foundation, concrete masonry and adobe wall connection (Van Staden 2021).

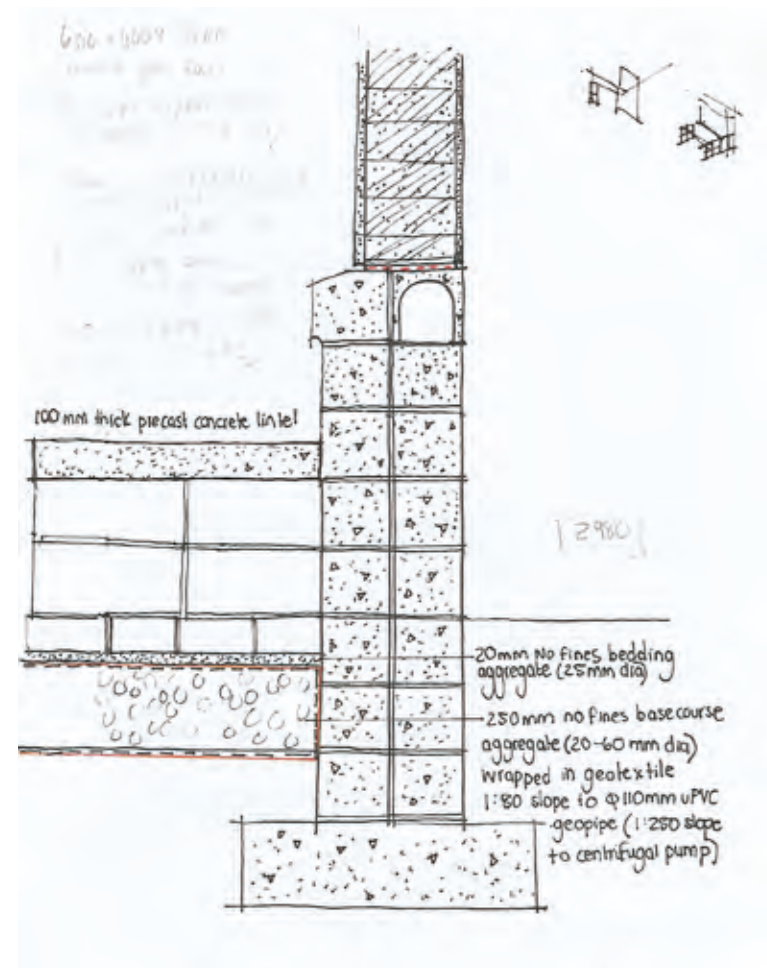
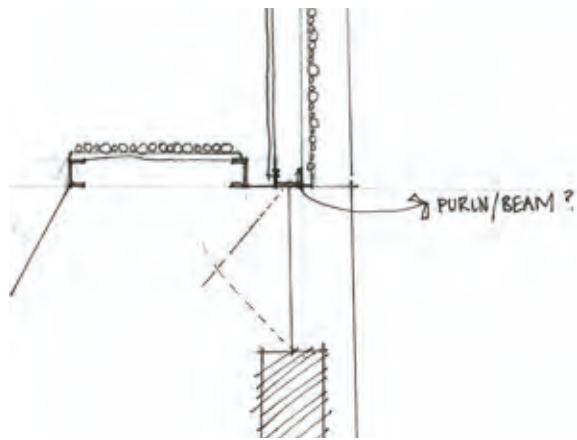
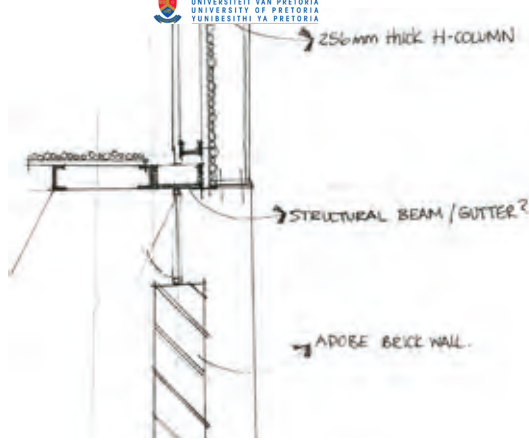


Fig 154: Detail depicting concrete bench and permeable pavement (Van Staden 2021).

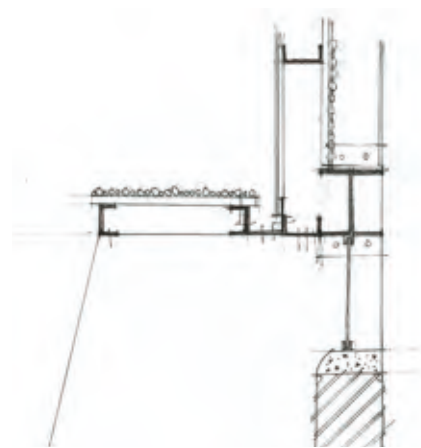
4.5 | STRUCTURAL AND MATERIAL ASSEMBLIES



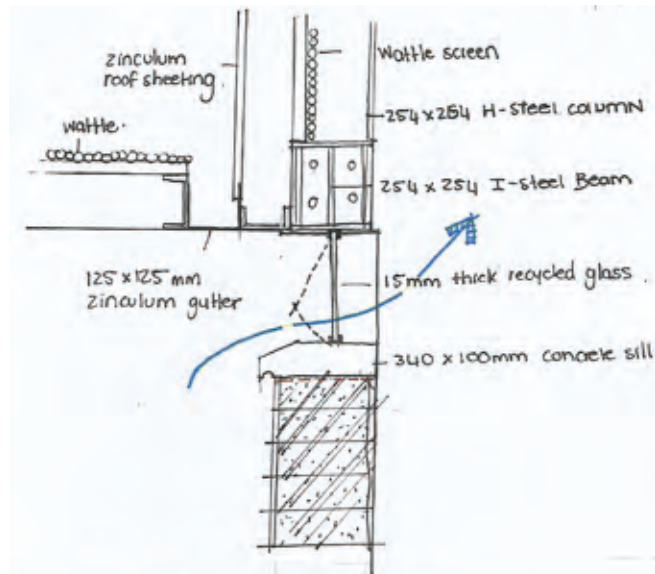
Iteration 1: Purlin as lintel.
(Not wide enough to cap adobe wall)



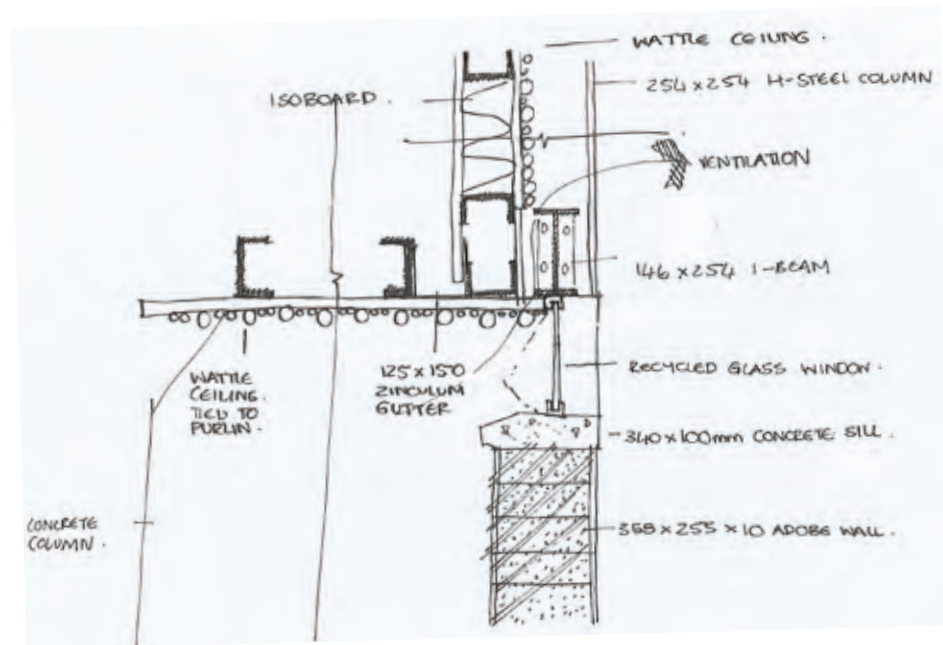
Iteration 2: Gutter as lintel.
(Gutter needs to slope)



Iteration 3: Column sits on beam.
(Roof loads aren't transferred to concrete column)



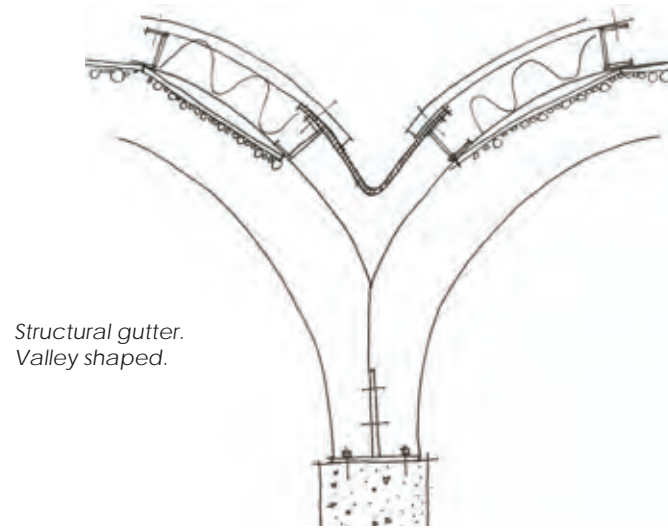
Iteration 4: Beam between column.
(Underside of gutter can be seen).



Iteration 5: Wattle screen below purlin.

4.5 | STRUCTURAL AND MATERIAL ASSEMBLIES

Fig 155:
Detail iterations of roof end and wall connection (Van Staden 2021).



Structural gutter.
Valley shaped.

Fig 156: Iteration 1, central gutter detail.
(Van Staden 2021).

Direct sunlight
is diffused by
interior wattle
ceiling.

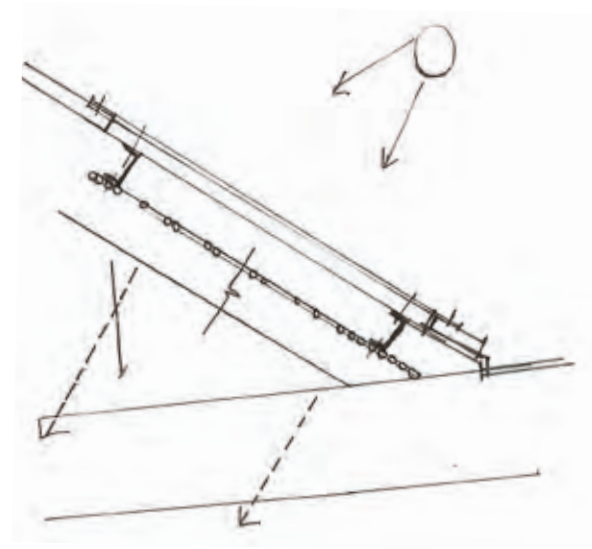
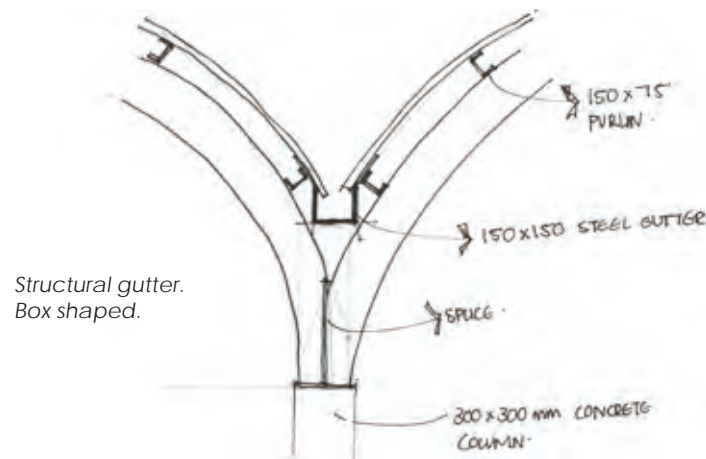


Fig 158: Detail of skylight and wattle screen.
(Van Staden 2021).



Structural gutter.
Box shaped.

Fig 157: Iteration 2, central gutter detail.
(Van Staden 2021).

Wattle screen
to be placed
underpurlin.
Consistent
detail.

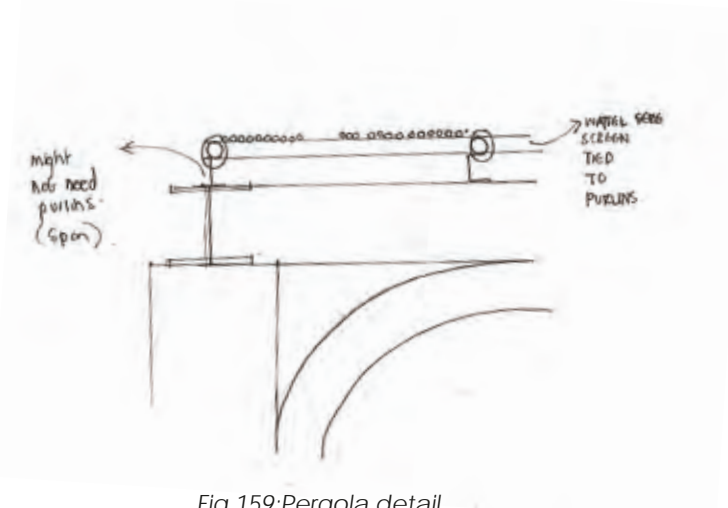


Fig 159: Pergola detail.
(Van Staden 2021).

4.5 | SYSTEMS AND SERVICES

As a further response to the context, the performance and services of the building are informed by the rituals and ecological processes of the natural and vernacular landscape. The roofs of the building and slope of the landscape are used to direct water to collection points. Other systems integrate building and site in less visible, but equally didactic ways such as the geothermal system that exchanges energy with the ground to heat and cool the building (refer to figure 162). The ecological processes of a compost system convert organic food waste, plant off-cuts and cattle dung manure into good fertiliser for mound and bund making, as well as biogas for cooking (refer to figure 160).

Finally, the solar power system harnesses the sun's energy in order to generate electricity for the water pump, geothermal piping pump and methane gas pump (refer to figure 161). Therefore, the water, solar power, composting and geothermal system are integrated; they encourage a sustainable use of resources and ensure that the building not only resembles a landscape, but behaves like one too (refer to figure 163). This dissertation will further investigate the water system.

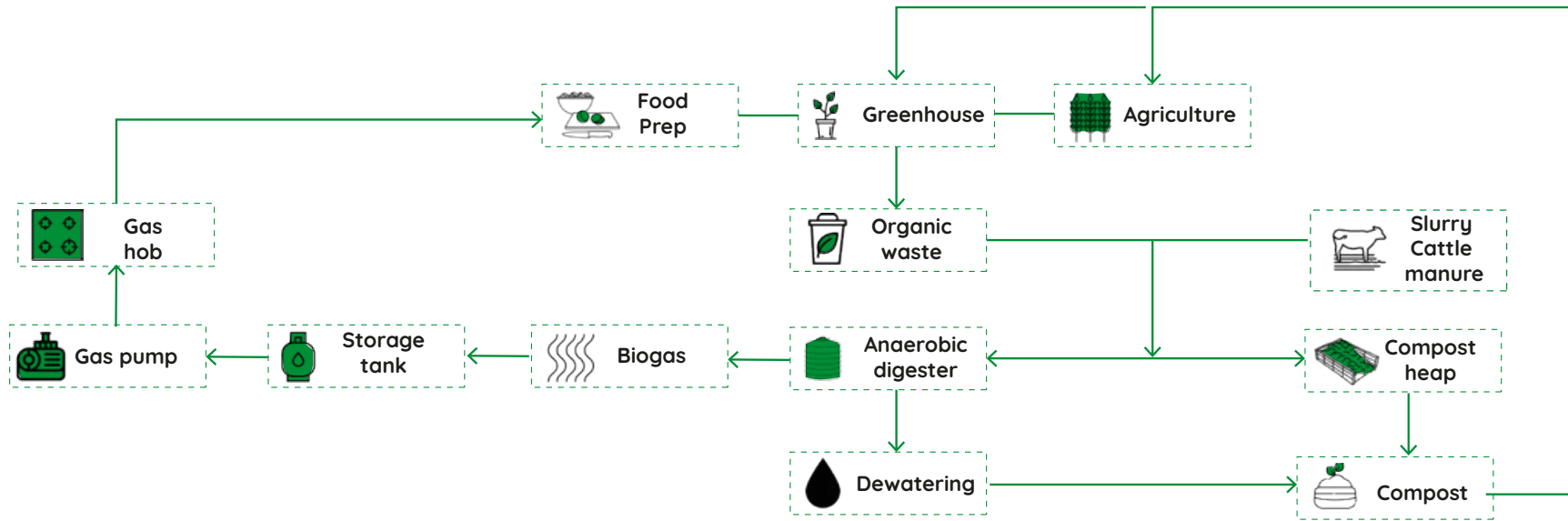


Fig 160: Diagram depicting compost system (Bosman 2013, Van Staden 2021).

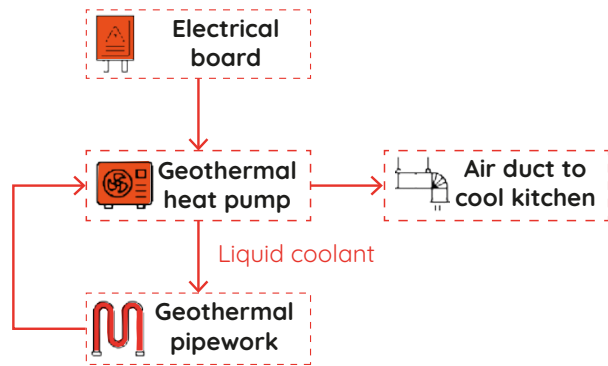


Fig 161: Diagram depicting geothermal system (Bosman 2013, Van Staden 2021).

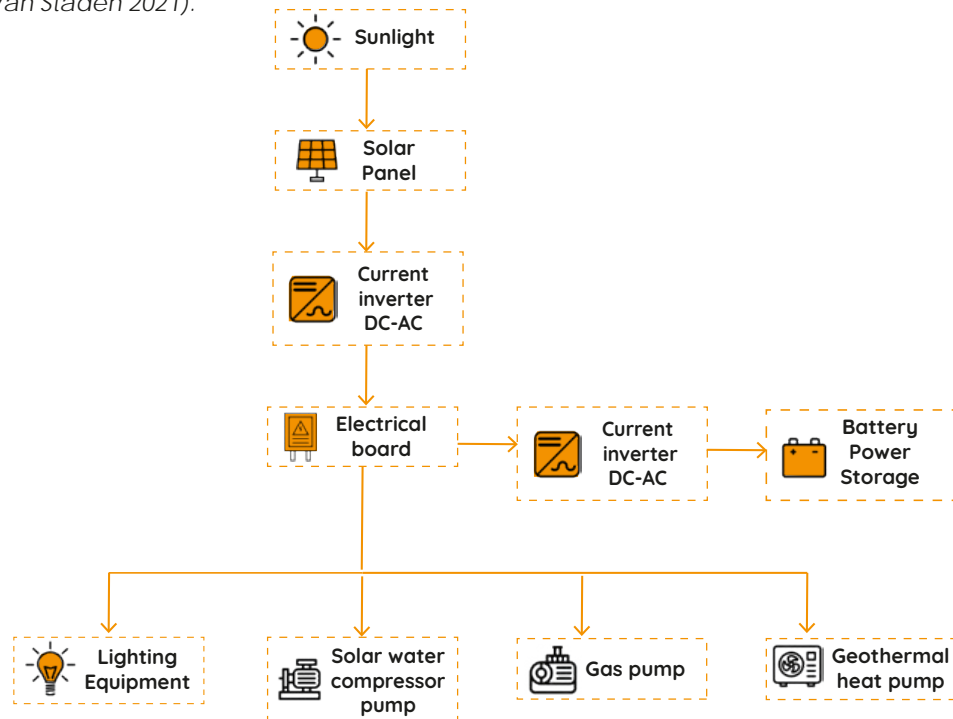


Fig 162: Diagram depicting solar energy system (Bosman 2013, Van Staden 2021).

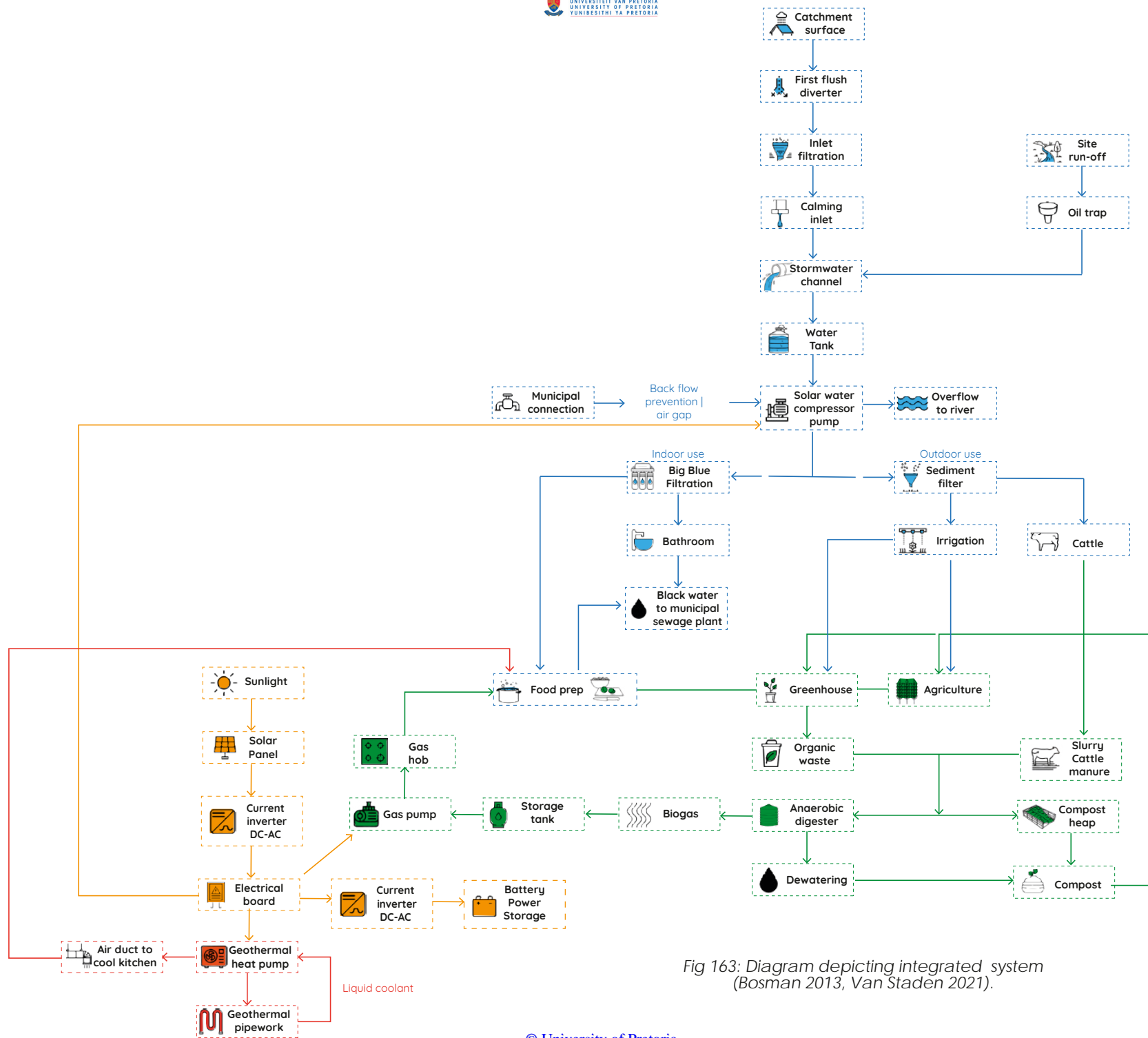


Fig 163: Diagram depicting integrated system (Bosman 2013, Van Staden 2021).

4.6 | THE WATER SYSTEM

Refer to figure 163.

To rehabilitate the river, stormwater is directed away from the site using bio-swales. Bioswales are an effective, green infrastructure that cleans a large volume of water, while recharging the underlying groundwater table and slowing down stormwater runoff (NACTO 2021). The embedded planters create a social threshold, before entering the building.

Rain water is collected from permeable, paved walkways and from the curved roof surfaces by structural, steel gutters. The gutters behave as beams; they provide lateral support for the structure and can be used as a ledge to stand on when the roof sheeting needs to be repaired. Water passes through a leaf and large debris filter at the gutter outlet, before it is directed towards stormwater channels. The stormwater channels follow the slope of the land to the rain water storage tanks (situated at the lowest point of the site). The overflow, is fed into the river. The tanks sit adjacent to a filter and pump room, where water is distributed for outdoor (grey water system) or indoor use (potable water). For outdoor purposes, water is filtered through a sedimentation filter to remove particles that could clog up the drip irrigation system of the greenhouse (Bosman 2013:173). It is not possible for the rain water harvesting system to support the entire site's agriculture. However, the indigenous agricultural practices of the community are encouraged. It has been previously noted that bunds and mounds slow down stormwater runoff (SSEM 2021:1). The bigger the bund the more water is collected for irrigation (SSEM 2021:1). For indoor use, the building uses a big blue filtration system in which water is processed through sediment filters, a carbon filter and a UV steriliser (Bosman 2013:173). Thereafter, the potable water is pumped to the kitchen for food preparation and the wash basins for cleansing rituals.

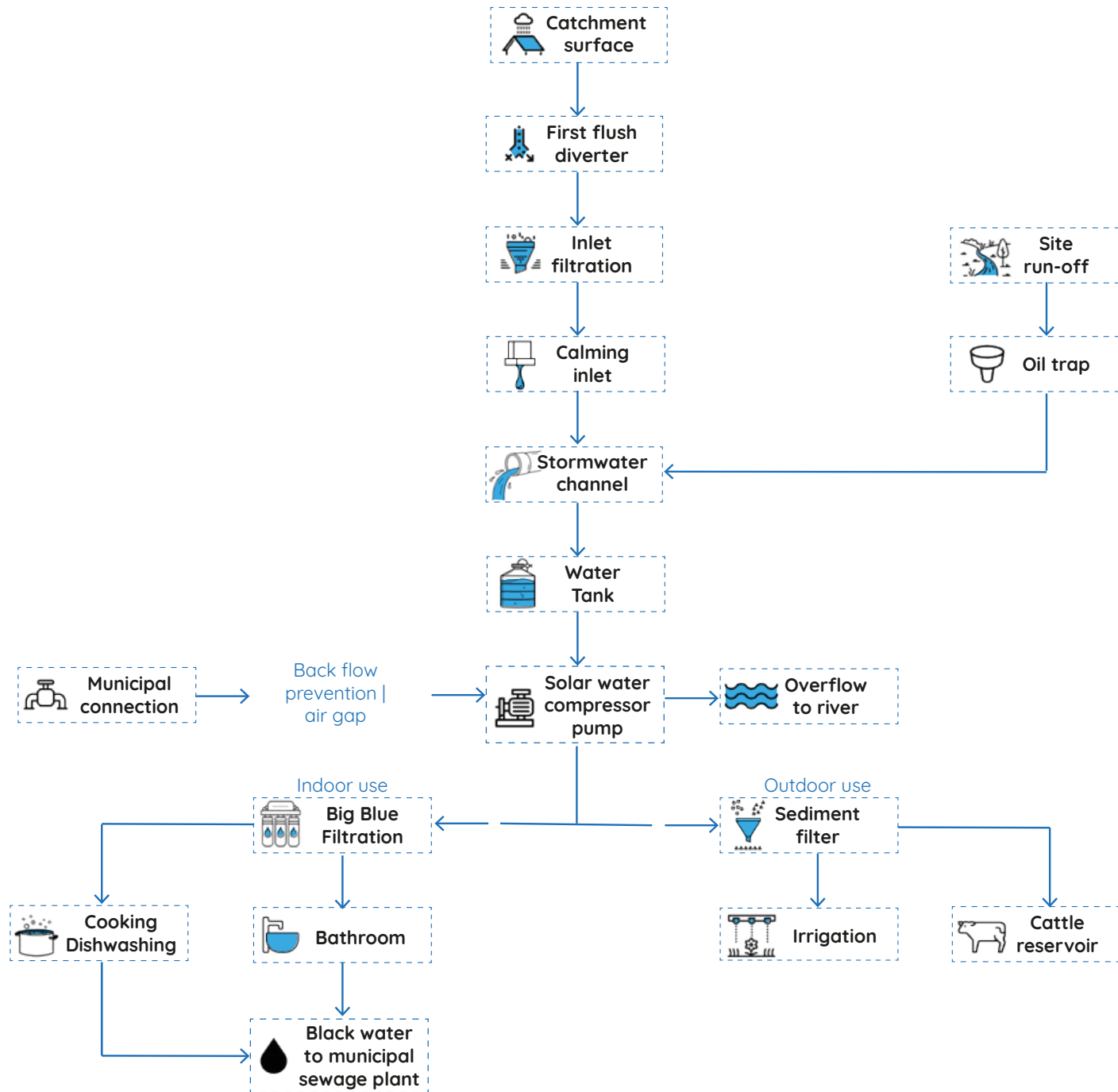


Fig 164: Diagram depicting water system (Bosman 2013, Van Staden 2021).
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IRRIGATION DEMAND Greenhouse, exhibition gardens, lekgotla			
	Planting Area (m ²)	Irrigation req (m/ month)	Irrigation Demand (m ³ /month)
January	242.7	0.16	38.83
February	242.7	0.16	38.83
March	242.7	0.16	38.83
April	242.7	0.16	38.83
May	242.7	0.16	38.83
June	242.7	0.125	30.33
July	242.7	0.125	30.33
August	242.7	0.125	30.33
September	242.7	0.16	38.83
October	242.7	0.16	38.83
November	242.7	0.16	38.83
December	242.7	0.16	38.83
Annual Total			440,46m³ (Total)

COOKING DEMAND Cooking and dishwashing				
	Persons eating	Water req. person/ day (l)	Total water req. per month (l)	Total water Demand (m ³)
January	150	10	46500	46.5
February	150	10	42000	42
March	150	10	46500	46.5
April	150	10	45000	45
May	150	10	46500	46.5
June	150	10	45000	45
July	150	10	46500	46.5
August	150	10	46500	46.5
September	150	10	45000	45
October	150	10	46500	46.5
November	150	10	45000	45
December	150	10	46500	46.5
Annual Total				547.5 m³

WASH BASIN DEMAND Drinking, hand washing, cooking				
	Persons drinking washing	Water req. person/ per day (l)	Total water req. per month (l)	Total water Demand (m ³)
January	150	1	4650	4.65
February	150	1	4200	4.2
March	150	1	4650	4.65
April	150	1	4500	4.5
May	150	1	4650	4.65
June	150	1	4500	4.5
July	150	1	4650	4.65
August	150	1	4650	4.65
September	150	1	4500	4.5
October	150	1	4650	4.65
November	150	1	4500	4.5
December	150	1	4650	4.65
Annual Total				54.75 m³

TOTAL DEMAND				
	Irrigation demand(m ³)	Hand washing demand (m ³)	cooking demand (m ³)	Total water demand / month (m ³)
January	38.83	4.65	46.5	89.98
February	38.83	4.2	42	85.03
March	38.83	4.65	46.5	89.98
April	38.83	4.5	45	88.33
May	38.83	4.65	46.5	89.98
June	30.33	4.5	45	79.83
July	30.33	4.65	46.5	81.48
August	30.33	4.65	46.5	81.48
September	38.83	4.5	45	88.33
October	38.83	4.65	46.5	89.98
November	38.83	4.5	45	88.33
December	38.83	4.65	46.5	89.98
Annual Total				1042.71 m³

Fig 165: Tables depicting water demand calculations (Van Staden 2021).

YIELD

Catchment Surface	Area (m ²)	Run-off coefficient	Area x Runoff-Coefficient
Roof	1060.38	0.9	1061.27
Permeable pavement	1186	0.4	474.4
Paving	686	0.85	583.1
Total			2118.77m²

	Average Montly Precipitation (m)	Area x Run-off Coefficient Total (m ²)	Yield: P(m)x A(m ²)x C
January	0.128	2118.77	271.2
February	0.09	2118.77	190.69
March	0.08	2118.77	169.5
April	0.048	2118.77	101.7
May	0.019	2118.77	40.26
June	0.006	2118.77	12.71
July	0.006	2118.77	12.71
August	0.006	2118.77	12.71
September	0.019	2118.77	40.26
October	0.069	2118.77	146.2
November	0.112	2118.77	237.3
December	0.115	2118.77	243.66
Annual Total			1478.9m³ (Total)

WATER BUDGET

	Total Yield from site water run-off (m ³)	Total onsite water demand (m ³)	Remaining water in tank (m ³)
January	271.2	8998	181.22
February	190.69	85.03	286.88
March	169.5	8998	366.4
April	101.7	88.33	379.77
May	40.26	8998	330.05
June	12.71	79.83	262.93
July	12.71	81.48	194.16
August	12.71	81.48	125.39
September	40.26	88.33	77.32
Set tank to 0 (beginning of rain season).			
October	146.2	8998	56.22
November	237.3	8998	203.54
December	243.66	8998	357.22
Greatest volume of water in tank determines min. size of tank needed.			379.77 m³
Safety factor of 20% is applied			
Final tank size			455.72m³ = 455720 l

Fig 166: Tables depicting water yield calculations (Van Staden 2021).

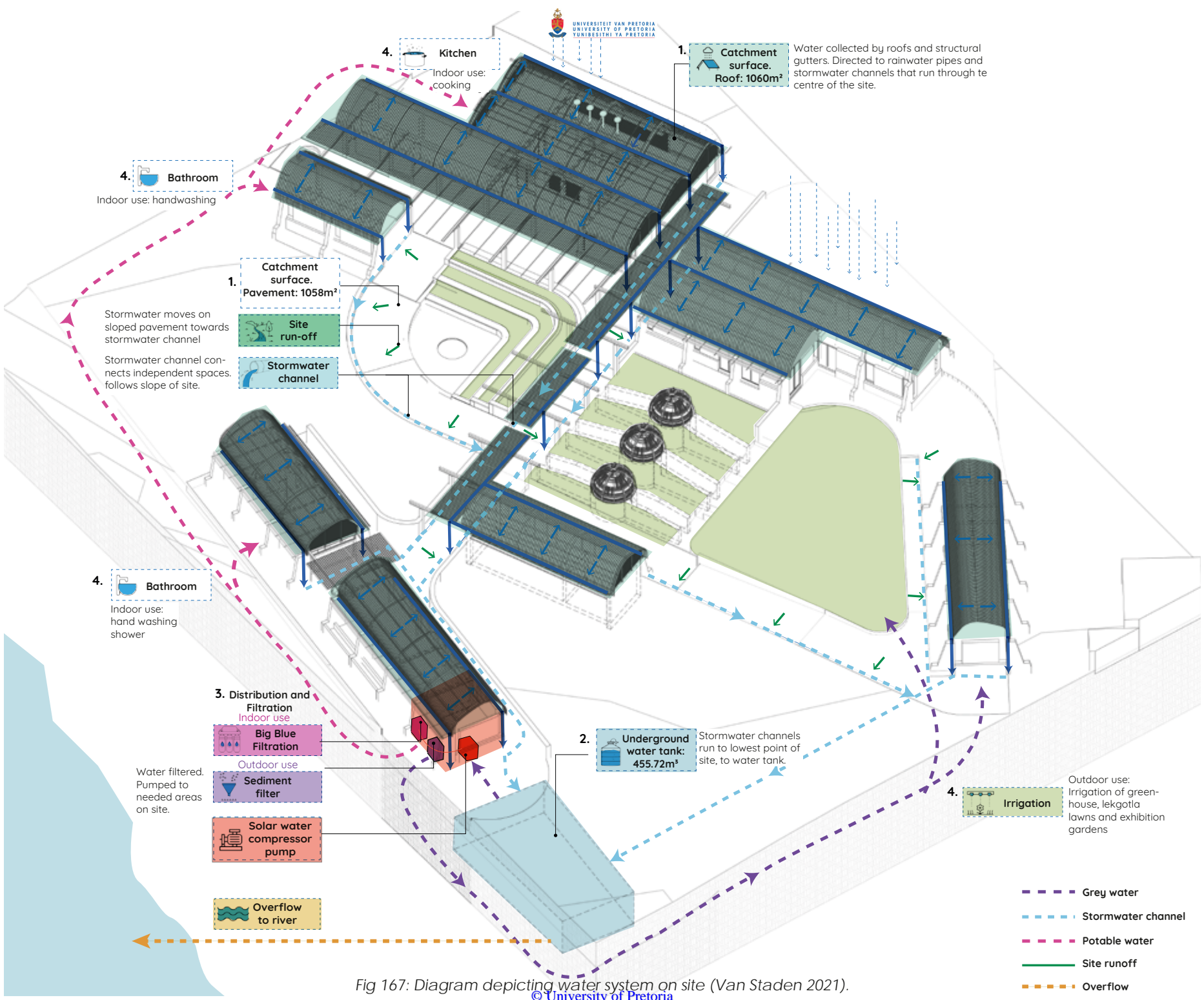


Fig 167: Diagram depicting water system on site (Van Staden 2021).
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4.7 | PASSIVE DESIGN STRATEGIES

The design of the project takes advantage of the free heating and cooling available from the landscape by applying principles of passive design.

Pretoria falls under Zone 2: Temperate interior. Main climatic characteristics include: mild to cool winters with low humidity, and hot to very hot summers with moderate humidity (Bosman 2013:105).

Passive design solutions that are used, include:

- The building is orientated to face north and is exposed to the cooling breezes of the predominant north east winds.
- The design maximises north facing walls and glazing.
- There is minimal east and west glazing.
- The building uses adobe brick walls; thermal mass which keeps the building cool during the day and warm at night.
- The building uses reflective insulation to keep out the summer heat.
- The building uses cross ventilation and passive cooling in summer.

The dissertation will investigate daylighting strategies in greater detail.

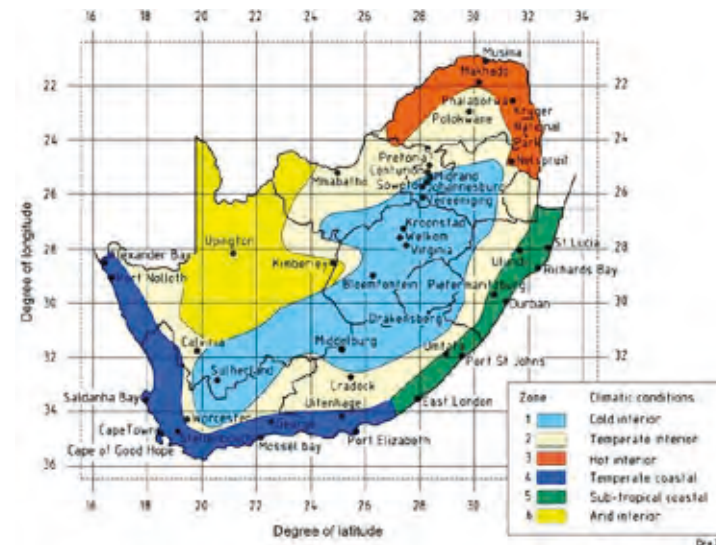


Fig 168: Diagram depicting different climatic zones of South Africa (SABS 2011:12).

4.8 | DAYLIGHTING

Daylighting involves the careful use of daylight apertures to enhance the delivery of natural light in a space (IEA 2000:2). The success of a building daylight system is determined by user comfort and the energy consumption of a building. Daylighting simulations aided the design of the kitchen in achieving an optimum indoor lighting condition.

The Sefaira Plugin was used to generate a baseline analysis of the initial design. A number of iterations/ simulations were made to address the problem areas of the baseline. To measure the success of an iteration, the Daylight Factor (DF) and Spatial Daylight Autonomy (SDA) were considered. DF is the ratio of interior luminance to exterior luminance on a 760mm high, horizontal plain under overcast sky conditions (IEA 2000:2). A DF ratio between 2 and 5 is adequate for the performance of critical visual tasks, such as cooking (Carrier 2020:1). SDA is the percentage of floor area that receives at least 300 lux of sufficient daylight for at least 50% of the annual occupied hours (Sefaira 2019). The Green Star Council awards values that fall between 60 and 90 percent (Green Star 2007). Given the fact that the minimum lux level required for a kitchen is 300 lux, higher SDA readings are desired.

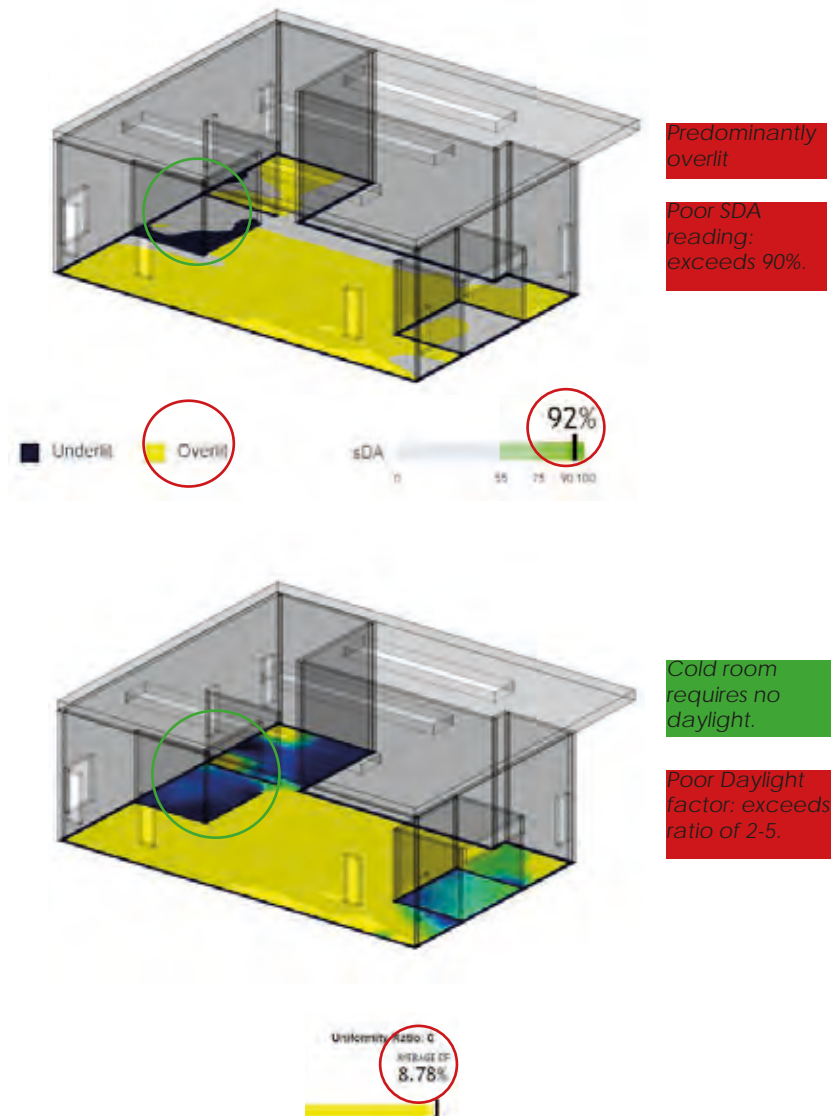


Fig 169: Baseline analysis of kitchen when garage doors are closed (Sefaira 2021, Van Staden 2021)

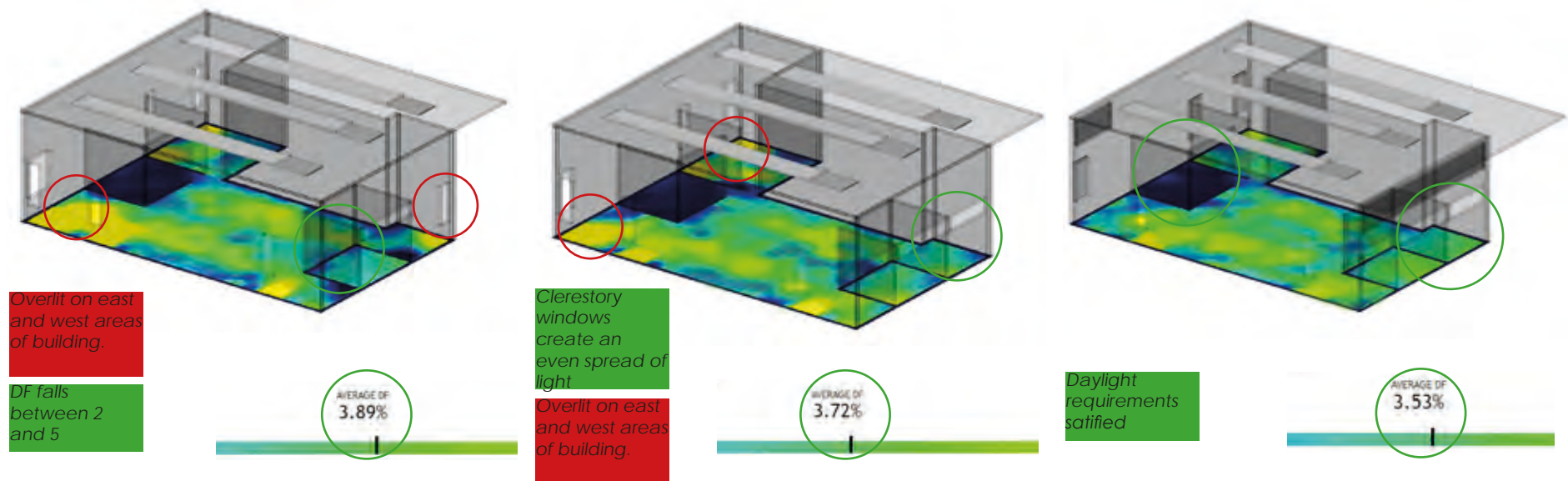
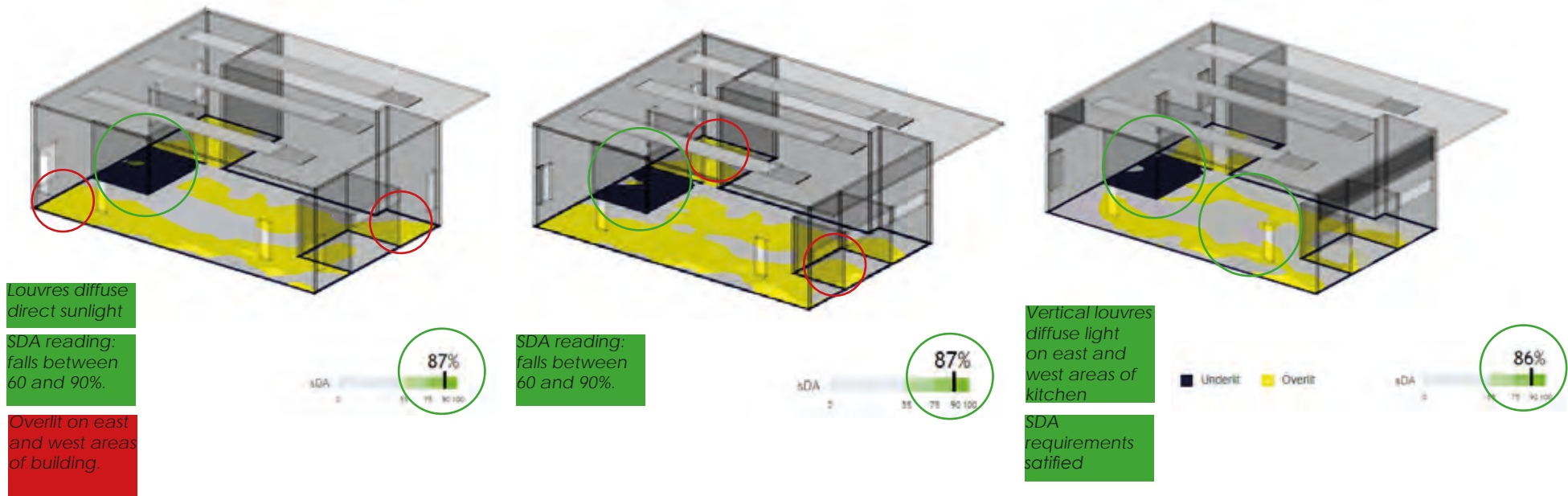


Fig 170: Horizontal louvres under skylight (Sefeira 2021, Van Staden 2021)

Fig 171: Resized windows to meet permissible wall to window ratio (15%) (Sefeira 2021, Van Staden 2021)

Fig 172: Vertical louvres on east and west elevations. (Sefeira 2021, Van Staden 2021)

SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1,04

SB SBAT REPORT

Achieved
4,8

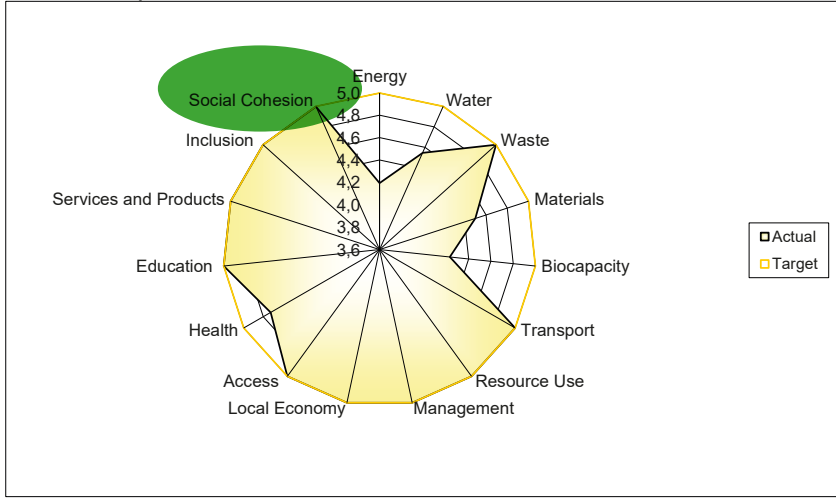
SB1 Project

Nurturing Mamelodi: Creating socially cohesive space in Khalambazo and S&S, Mamelodi

SB2 Address

13415, Mamelodi 608-Jr, Pretoria, 0122

SB3 SBAT Graph



SB4 Environmental, Social and Economic Performance

Category	Score
Environmental	4,5
Economic	5,0
Social	4,9
SBAT Rating	4,8

SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1,04

BI	Building Information	Target	Achieved
		5,0	4,8

BI 1 Building Targets

Code	Category	Target	Achieved
EN	Energy	5,0	4,2
WA	Water	5,0	4,5
WE	Waste	5,0	5,0
MA	Materials	5,0	4,5
BI	Biocapacity	5,0	4,2
TR	Transport	5,0	5,0
LE	Local Economy	5,0	5,0
MN	Management	5,0	5,0
RE	Resources	5,0	5,0
SP	Services and Products	5,0	5,0
AC	Access	5,0	4,7
HE	Health	5,0	5,0
ED	Education	5,0	5,0
IN	Inclusion	5,0	5,0
SC	Social Cohesion	5,0	5,0

BI 2 Priority Key (Not Performance Key)

Code	Priority Key	Score
VH	Very High	5,0
HI	High	4,0
ME	Medium	3,0
LO	Low	2,0
VL	Very Low	1,0
NA	None / Not Applicable	0,0

BI 3 Project Name

Nurturing Mamelodi: Creating socially cohesive space in Khalambazo and S&S, Mamelodi

BI 4 Address

13415, Mamelodi 608-Jr, Pretoria, 0122

BI 5 Site Area

4284 m2

BI 6 Gross Floor Area (GFA)

1093 m2

BI 7 Gross Internal Area (GIA)

710 m2

BI 8 Number of Useable Rooms

28

BI 9 Number of Bedrooms

BI 10 Architect

Name Jade van Staden
Co University of Pretoria

Fig 173: SBAT reading for cultural centre (SBAT 2021, Van Staden 2021).

5 | REFLECTION

There is currently tribal conflict between the communities of Khalambazo and Selbourne and Site. This is primarily because of the Khalambazo Buffer Zone, a natural buffer, that divides the communities both physically and socially.

Therefore, the intention of this dissertation is to create a socially cohesive space that represents and unifies the multiple tribes of the community. The project attempts to do so by creating a cultural landscape and centre that tells the story of Letsema- a communal experience of food shared by multiple tribes of Mamelodi. The design unpacks the narrative by interrogating the divisive natural landscape, the rich vernacular and agricultural landscape, and the urban landscape of the Khalambazo Buffer Zone.

The process involves three main iterations that attempt to reinterpret the existing landscape condition in different ways. The first iteration reinterprets the landscape through relieved concrete roofs, however, the scale of construction is inappropriate. The second iteration attempts to cast the landscape in order to create inhabitable molds, however, the technification is too complex. The final design is reviewed as a constructed landscape which responds to the surrounding landscape conditions through the following strategies:

- The building is topographically integrated with the existing, natural landscape.
- The curved roofed structures are a formal response to the bunds and mounds of the vernacular landscape; they are symbolic forms of social and cultural meaning.
- The structure of the building celebrates the unique oscillating urban and rural condition, by using a combination of 'newer' and vernacular technologies.
- The infill materials of the building can be described as different manifestations of earth. They are temporal and succumb to the climatic conditions of the natural landscape.
- The building makes use of the ecological systems of the natural landscape to assist water harvesting, geothermal heating, solar power collection and compost production.

A theoretical framework of principles of socially cohesive design, guide and test the design approach. They ensure that the building does not only respond to a landscape condition but also to the social condition of the buffer. The design is further summarised in terms of how it facilitates authorship, scale, ritual and threshold.

The project investigates a **multi-scaled approach** to design. Both the urban and architectural contribution of the project is a cultural landscape. At an urban scale, the design attempts to tackle the great buffer **using urban acupuncture**. Small-scale, development nodes are built in stages so to allow a community to accept and take ownership of them. One of the developments zones, the cultural centre (the communal kitchen and lekgotla) is 700 square metres, a reasonably small and affordable public building. The design responds to the height of surrounding buildings and topography, to prevent it from being imposing to the community or to their landscape.

The building attempts to facilitate **authorship and ritual** through its structure and material palette. All of the infill materials are locally sourced from the buffer, and require the existing skills of the community to make and install them. The infill materials encourage a **human-scale of making** and facilitate social gathering through their maintenance. Furthermore, materials such as cattle dung plasters can be moulded and wattle screens can be woven to convey cultural and individual messages of the community. Through these tactile means of making, new rituals are encouraged and authorship is physically inscribed into the building.

This constructed landscape is made up of layers/ **thresholds of social activity**. The boundary condition creates pockets for social gathering, while people wait for their bus or eat their take-aways. Precedents are considered in designing the lekgotla, communal kitchen and indigenous food hubs so that these spaces encourage the communal production and consumption of food. Furthermore, access and security of these spaces is carefully incorporated so that these spaces provide a safe environment for multiple opportunities of engagement.

5 | REFLECTION

Finally, the **participatory approach**, undertaken for the design of the urban scheme and communal kitchen and lekgotla, questions the typological response of a cultural centre. As oppose to insular exhibitions of artefacts, the design attempts to create a shared space for the everchanging, living cultural heritage of Khalambazo and Selbourne & Site by engaging with the community and learning from their landscape, their rituals and their architecture. This approach contributes to our societal acceptance of once another, by celebrating cultural differences and shared beliefs, and can serve as a prototypical model for future public spaces that attempt to tackle cultural issues through indirect means.

Through this process, I have gained a new appreciation for the context of Mamelodi. Although informal settlements are often perceived as unpromising environments, they are rich in cultural and urban fabric. I have learnt about the power that food has in expressing identity and indirectly tackling cultural issues. Finally, although architecture is incapable of resolving all issues concerning tribalism, carefully designed space provides a platform for multiple cultural groups to express their heritage and perhaps, generate empathy for those who are different.



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Fig 174: 1:100 Plan of Cultural Centre (Van Staden 2021).

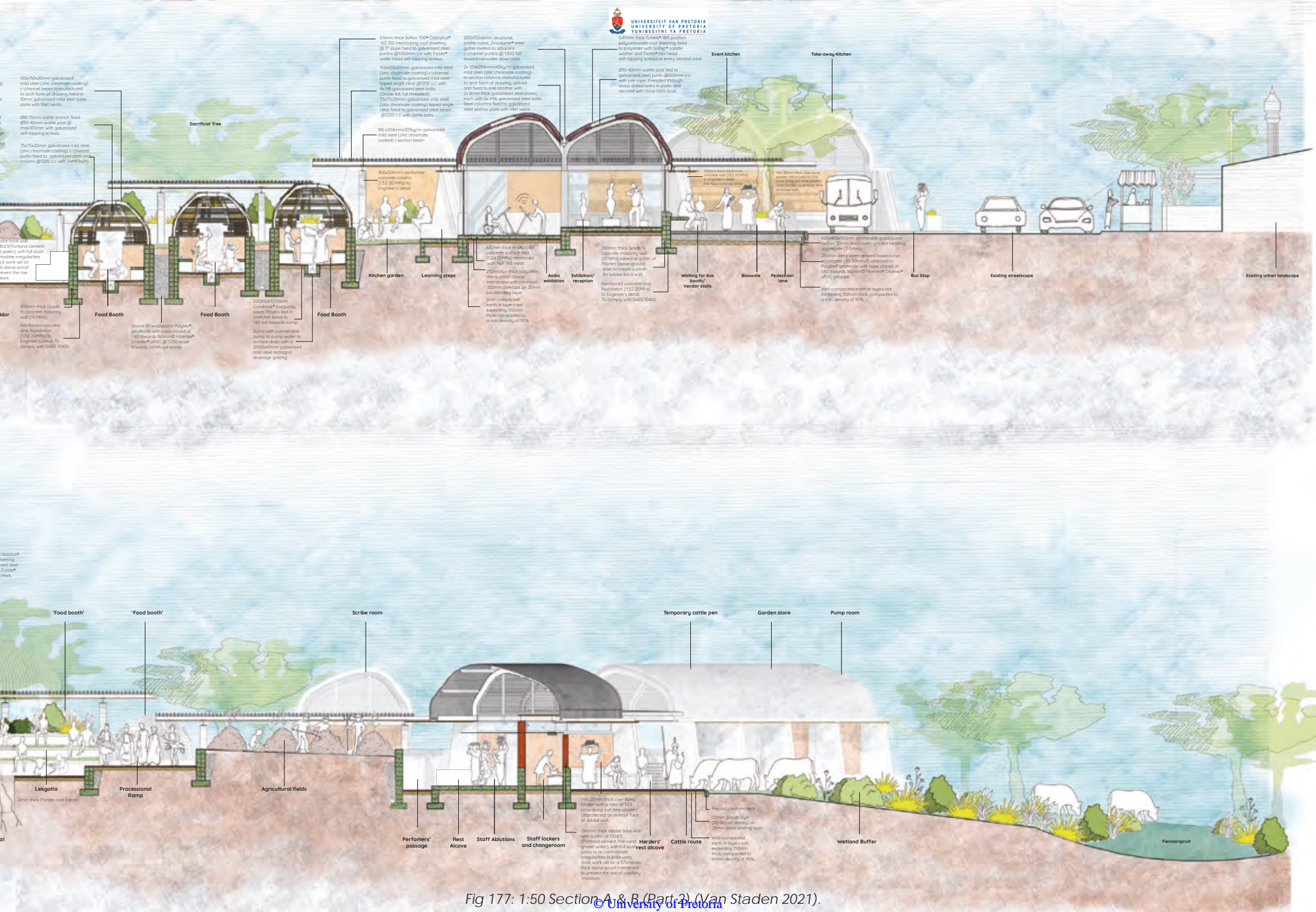


Fig 177: 1:50 Section A & B (Part 2) (Van Staden 2021).

0.47mm thick Zinalume® Tufdek® IBR profiled roof sheeting, fixed to galvanised steel purlins @1200mm c.c. with Fixtite® hex head self-tapping screws at every second crest.

Ø10-15mm wattle branch fixed to wattle post @ max. 100mm c.c. with galvanised self-tapping screws.

Ø30-40mm wattle post tied to galvanised steel purlin @200mm c.c. with jute rope, threaded through sharp drilled holes in purlin and secured with clove hitch knot

150x150x20mm galvanised mild steel (zinc chromate coating) c-channel purlin fixed to galvanised mild steel lipped angle cleat @1200 c.c. with 4x M6 galvanised steel bolts (Grade 8.8, full threaded). 75x75x20mm galvanised mild steel (zinc chromate coating) lipped angle cleat fixed to galvanised steel arch column @1200 c.c. with 2xM6 bolts.

4500x2130mm corrugated, roller-shutter, chromadek/Aluzinc garage door. Garage mechanism (galvanised drum wheel) secured to column with 150x150x3mm galvanised steel angle. Lock and handle combination on the interior side of door.

150x125x1mm profile rolled Zinalume® steel gutter riveted to adjacent c-channel purlins @ 1500 fall toward rainwater down pipe.

300mm thick reinforced concrete wall (13.2 20 MPa) to Engineer's detail. Fair face concrete finish.

390x140x190mm Grade N concrete masonry sill with 38mm drip.

390mm thick Grade N concrete masonry wall (10 MPa) raised at a min. of 190mm above ground level to create a plinth for adobe brick wall.

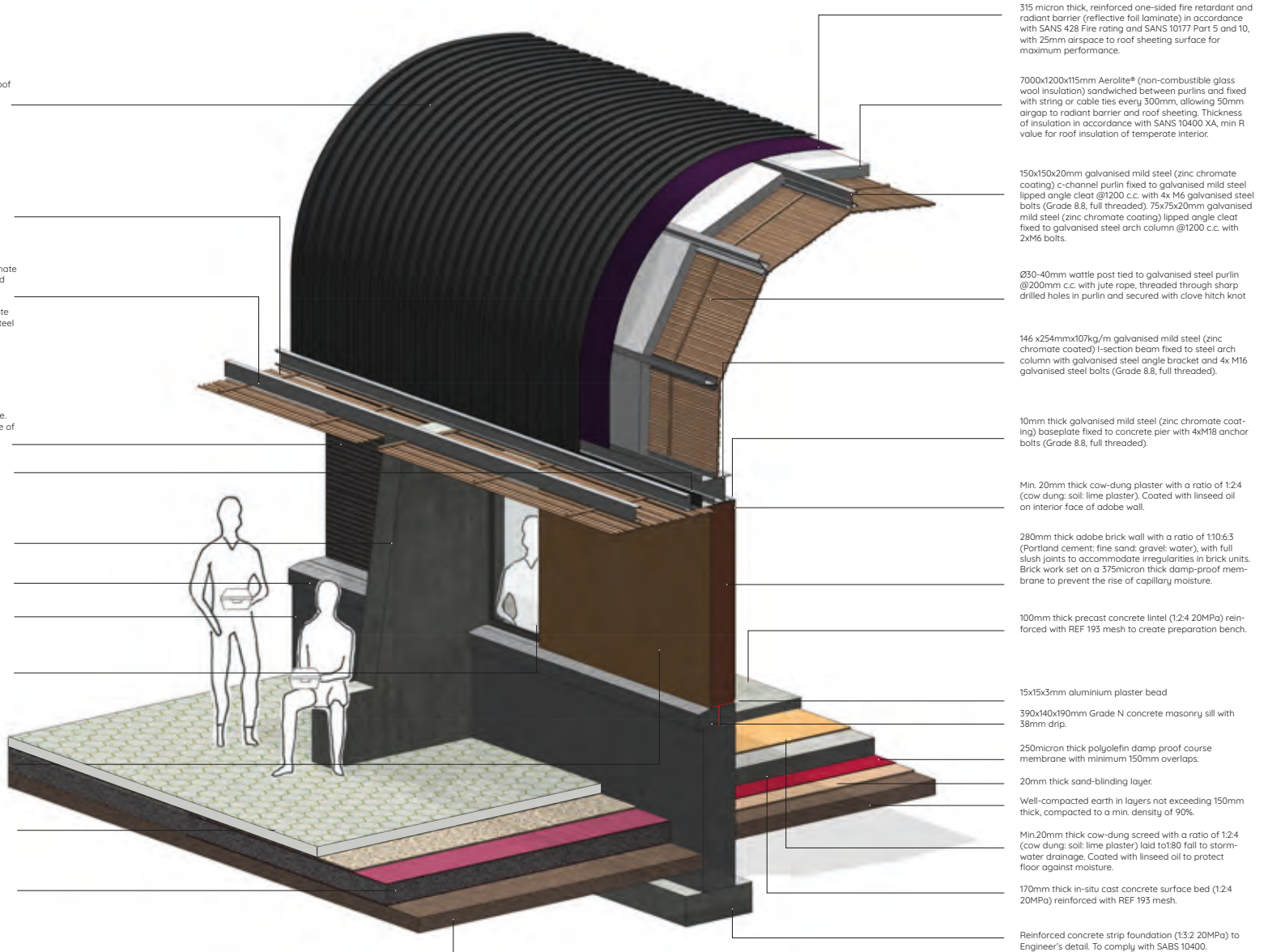
15mm thick recycled glass window (crushed glass mixed with a UV stabilised, clear casting epoxy resin) fixed to aluminium profile with silicone sealant.

Min. 20mm thick cow-dung plaster with a ratio of 1:2:4 (cow dung: soil: lime plaster). Unprotected on exterior face of adobe wall.

600x400x100mm permeable grass paver laid on 30mm deep open-graded bedding aggregate (2-5mm).

250mm deep open-graded basecourse aggregate (30-50mmØ) wrapped in Poly-tex® geotextile with base sloped at 1:80 towards @160mmØ Fibertex® Drainex® uPVC geopipe.

Well-compacted earth in layers not exceeding 150mm thick, compacted to a min. density of 90%.



315 micron thick, reinforced one-sided fire retardant and radiant barrier (reflective foil laminate) in accordance with SANS 428 Fire rating and SANS 10177 Part 5 and 10, with 25mm airspace to roof sheeting surface for maximum performance.

7000x1200x115mm Aerolite® (non-combustible glass wool insulation) sandwiched between purlins and fixed with string or cable ties every 300mm, allowing 50mm airgap to radiant barrier and roof sheeting. Thickness of insulation in accordance with SANS 10400 XA, min R value for roof insulation of temperate interior.

150x150x20mm galvanised mild steel (zinc chromate coating) c-channel purlin fixed to galvanised mild steel lipped angle cleat @1200 c.c. with 4x M6 galvanised steel bolts (Grade 8.8, full threaded). 75x75x20mm galvanised mild steel (zinc chromate coating) lipped angle cleat fixed to galvanised steel arch column @1200 c.c. with 2xM6 bolts.

Ø30-40mm wattle post tied to galvanised steel purlin @200mm c.c. with jute rope, threaded through sharp drilled holes in purlin and secured with clove hitch knot

146 x254mmx107kg/m galvanised mild steel (zinc chromate coated) I-section beam fixed to steel arch column with galvanised steel angle bracket and 4x M16 galvanised steel bolts (Grade 8.8, full threaded).

10mm thick galvanised mild steel (zinc chromate coating) baseplate fixed to concrete pier with 4xM18 anchor bolts (Grade 8.8, full threaded).

Min. 20mm thick cow-dung plaster with a ratio of 1:2:4 (cow dung: soil: lime plaster). Coated with linseed oil on interior face of adobe wall.

280mm thick adobe brick wall with a ratio of 1:10:6:3 (Portland cement: fine sand: gravel: water), with full slush joints to accommodate irregularities in brick units. Brick work set on a 375micron thick damp-proof membrane to prevent the rise of capillary moisture.

100mm thick precast concrete lintel (1:2:4 20MPa) reinforced with REF 193 mesh to create preparation bench.

15x15x3mm aluminium plaster bead

390x140x190mm Grade N concrete masonry sill with 38mm drip.

250micron thick polyolefin damp proof course membrane with minimum 150mm overlaps.

20mm thick sand-blinding layer.

Well-compacted earth in layers not exceeding 150mm thick, compacted to a min. density of 90%.

Min.20mm thick cow-dung screed with a ratio of 1:2:4 (cow dung: soil: lime plaster) laid to 1:80 fall to storm-water drainage. Coated with linseed oil to protect floor against moisture.

170mm thick in-situ cast concrete surface bed (1:2:4 20MPa) reinforced with REF 193 mesh.

Reinforced concrete strip foundation (13:2 20MPa) to Engineer's detail. To comply with SABS 10400.

0.47mm thick Zincolume® Tufdek® IBR profiled roof sheeting, fixed to galvanised steel purlins @1200mm cc with Fittite® hex head self-tapping screws at every second crest.

0.47mm thick Tufdek® IBR profiled polycarbonate roof sheeting, fixed to polyslider with Sofloc® saddle washer and Fittite® hex head self-tapping screws at every second crest. Polyslider base plates fixed to purlins with Fittite® water head self-tapping screws.

150x150x20mm galvanised mild steel (zinc chromate coating) c-channel purlin fixed to galvanised mild steel lipped angle cleat @1200 c.c. with 4x M6 galvanised steel bolts (Grade 8.8, full threaded). 75x75x20mm galvanised mild steel (zinc chromate coating) lipped angle cleat fixed to galvanised steel arch column @1200 c.c. with 2xM6 bolts.

Ø10-15mm wattle branch fixed to wattle post @ max100mm c.c. with galvanised self-tapping screws.

Ø30-40mm wattle post tied to galvanised steel purlin @200mm c.c. with jute rope, threaded through sharp drilled holes in purlin and secured with clove hitch knot.

7000x1200x115mm Aerolite® (non-combustible glass wool insulation) sandwiched between purlins and fixed with string or cable ties every 300mm, allowing 50mm airgap to radiant barrier and roof sheeting. Thickness of insulation in accordance with SANS 10400 XA, min R value for roof insulation of temperate interior.

200x150x6mm structural, profile rolled, Zincolume® steel gutter riveted to adjacent c-channel purlins @ 1:500 fall toward rainwater down pipe.

3 mm thick, reinforced one-sided fire retardant and radiant barrier (reflective foil laminate) in accordance with SANS 428 Fire rating and Sans 10177 Part 5 and 10, with 25mm airspace to roof sheeting surface for maximum performance.

254x254mmx43kg/m galvanised mild steel (zinc chromate coating) H-section columns manufactured to arch form of drawing, spliced and fixed to one another with 2x 8mm thick galvanised steel plates, each with 6x M16 galvanised steel bolts. Steel columns fixed to galvanised steel anchor plate with fillet welds.

10mm thick galvanised mild steel (zinc chromate coating) baseplate fixed to concrete pier with 4xM18 anchor bolts (Grade 8.8, full threaded).

300x300mm reinforced concrete column (13.2.20 MPa) to Engineer's detail.

DETAIL B
SCALE 1:10

Fig 179: 1:10 Detail B (Van Staden 2021).

0.47mm thick Tufdek® IBR profiled polycarbonate roof sheeting, fixed to polyslider with Safloc® saddle washer and Fxitite® hex head self-tapping screws at every second crest.

0.47mm thick Zincalume® Tufdek® IBR profiled roof sheeting, fixed to galvanised steel purlins @1200mm c.c. with Fxitite® hex head self-tapping screws at every second crest.

Ø10-15mm wattle branch fixed Ø30-40mm wattle post @ max100mm with galvanised self-tapping screws.

Ø30-40mm wattle post tied to galvanised steel purlin @200mm c.c. with jute rope, threaded through sharp drilled holes in purlin and secured with clove hitch knot.

0.5mm thick Safloc 700® profiled polycarbonate roof sheeting, fixed to polyslider with Safloc® saddle washer and Fxitite® wafel head self-tapping screws at every second crest.

Ø10-15mm wattle branch fixed Ø30-40mm wattle post @ max100mm with galvanised self-tapping screws.

Ø30-40mm wattle post tied to galvanised steel purlin @200mm c.c. with jute rope, threaded through sharp drilled holes in purlin and secured with clove hitch knot.

150x150x20mm galvanised mild steel (zinc chromate coating) c-channel purlin fixed to galvanised mild steel lipped angle cleat @1200 c.c. with 4x M6 galvanised steel bolts (Grade 8.8, full threaded). 75x75x20mm galvanised mild steel (zinc chromate coating) lipped angle cleat fixed to galvanised steel arch column @1200 c.c. with 2xM6 bolts.

150x150x20mm galvanised mild steel (zinc chromate coating) c-channel purlin fixed to galvanised mild steel lipped angle cleat @1200 c.c. with 4x M6 galvanised steel bolts (Grade 8.8, full threaded). 75x75x20mm galvanised mild steel (zinc chromate coating) lipped angle cleat fixed to galvanised steel beam @1200 c.c. with 2xM6 bolts.

700x1200x15mm Aerolite® (non-combustible glass wool insulation) sandwiched between purlins and fixed with string or cable ties every 300mm, allowing 50mm airgap to radiant barrier and roof sheeting. Thickness of insulation in accordance with SANS 10400 XA, min R value for roof insulation of temperate interior.

200x150x1mm profile rolled Zincalume® steel gutter riveted to adjacent c-channel purlins @ 1500 fall towards rainwater down pipe.

146 x254mmx107kg/m galvanised mild steel (zinc chromate coated) I-section beam fixed to steel arch column with galvanised steel angle bracket and 4x M16 galvanised steel bolts (Grade 8.8, full threaded).

300x300mm reinforced concrete column (1.32 20 MPa) to Engineer's detail.

Growing medium: Indigenous agricultural plant species (see fig 58)

220x108.5x50mm Corabrick® burgundy paver. Pavers laid in stretcher bond to 180 fall towards stormwater channel.

100mm thick in-situ cast concrete slab (1.24 20MPa) reinforced with REF 193 mesh to seat.

20mm thick sand-blinding layer.

Well-compacted earth in layers not exceeding 150mm thick, compacted to a min. density of 90%.

320x300mm precast, reinforced concrete stormwater drainage channel with 180 slope towards water tank. Channel covered with a removable 1000x300x40mm galvanised mild steel regrid drainage grate.

Growing medium: Bermuda Lawn (Cynodon dactylon).

150mm deep layer of topsoil.

Gravel fill wrapped in Polytex® geotextile with base sloped at 180 towards @160mmØ Fibertex® Drainex® uPVC.

Reinforced concrete strip foundation (1.32 20MPa) to Engineer's detail. To comply with SABS 10400.

390mm thick Grade N concrete masonry retaining wall (10 MPa) with weep holes at 1m² intervals.

DETAIL C

SCALE 1:20

Fig 180: 1:20 Detail C (Van Staden 2021).



Fig 181: Storey board | Main Entrance (Van Staden 2021).

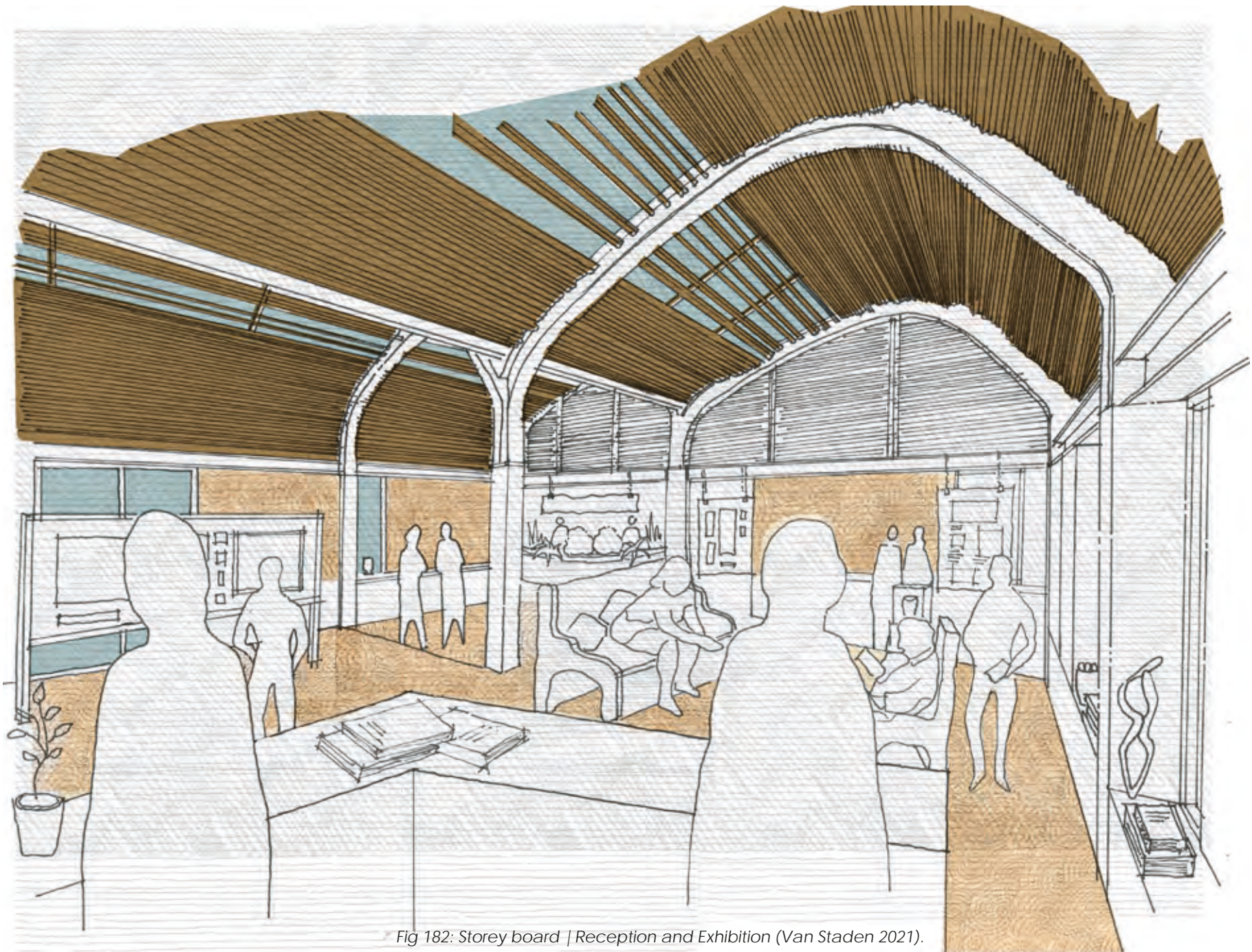


Fig 182: Storey board | Reception and Exhibition (Van Staden 2021).

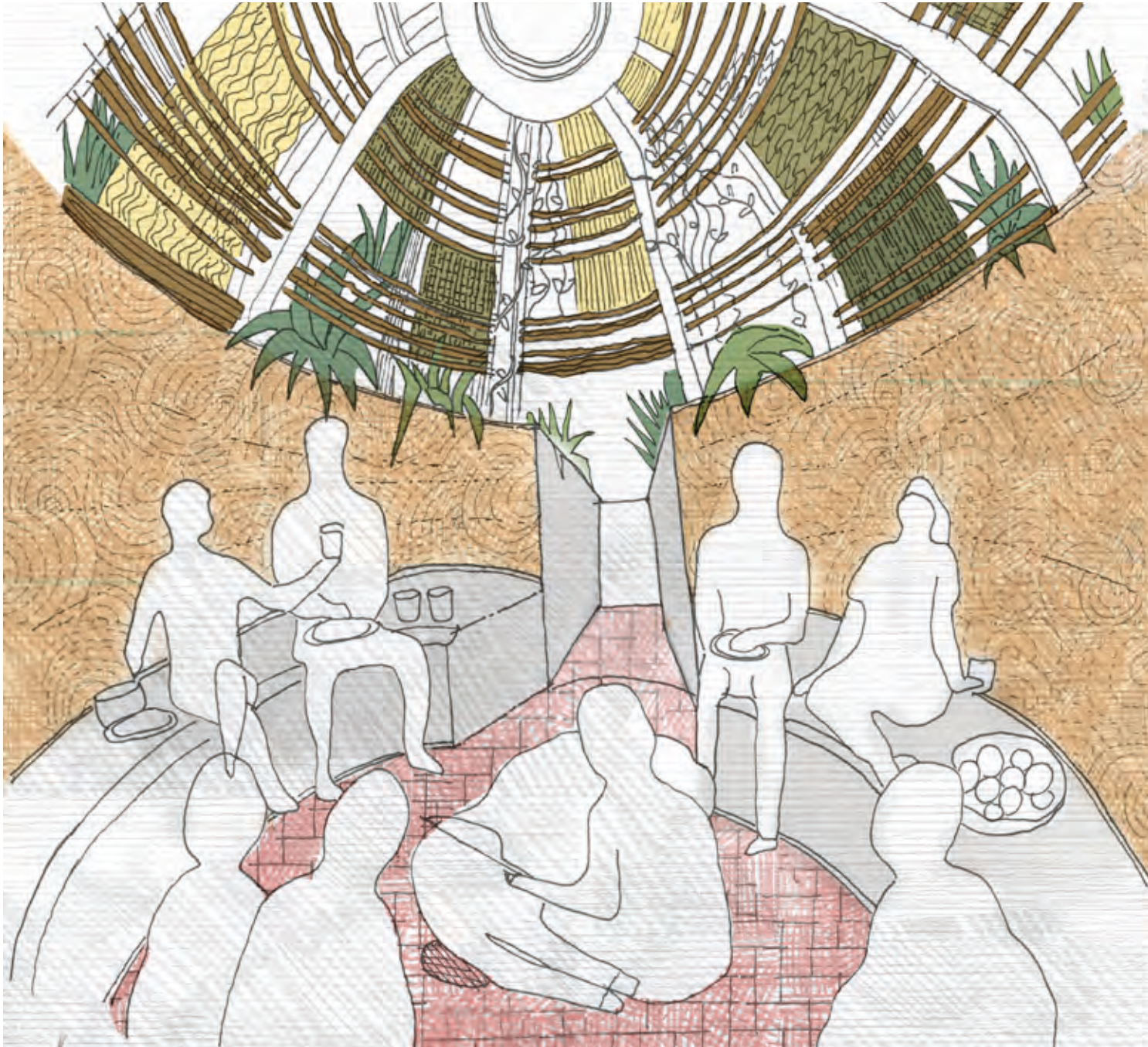


Fig 183: Storey board | Food Booth (Van Staden 2021).

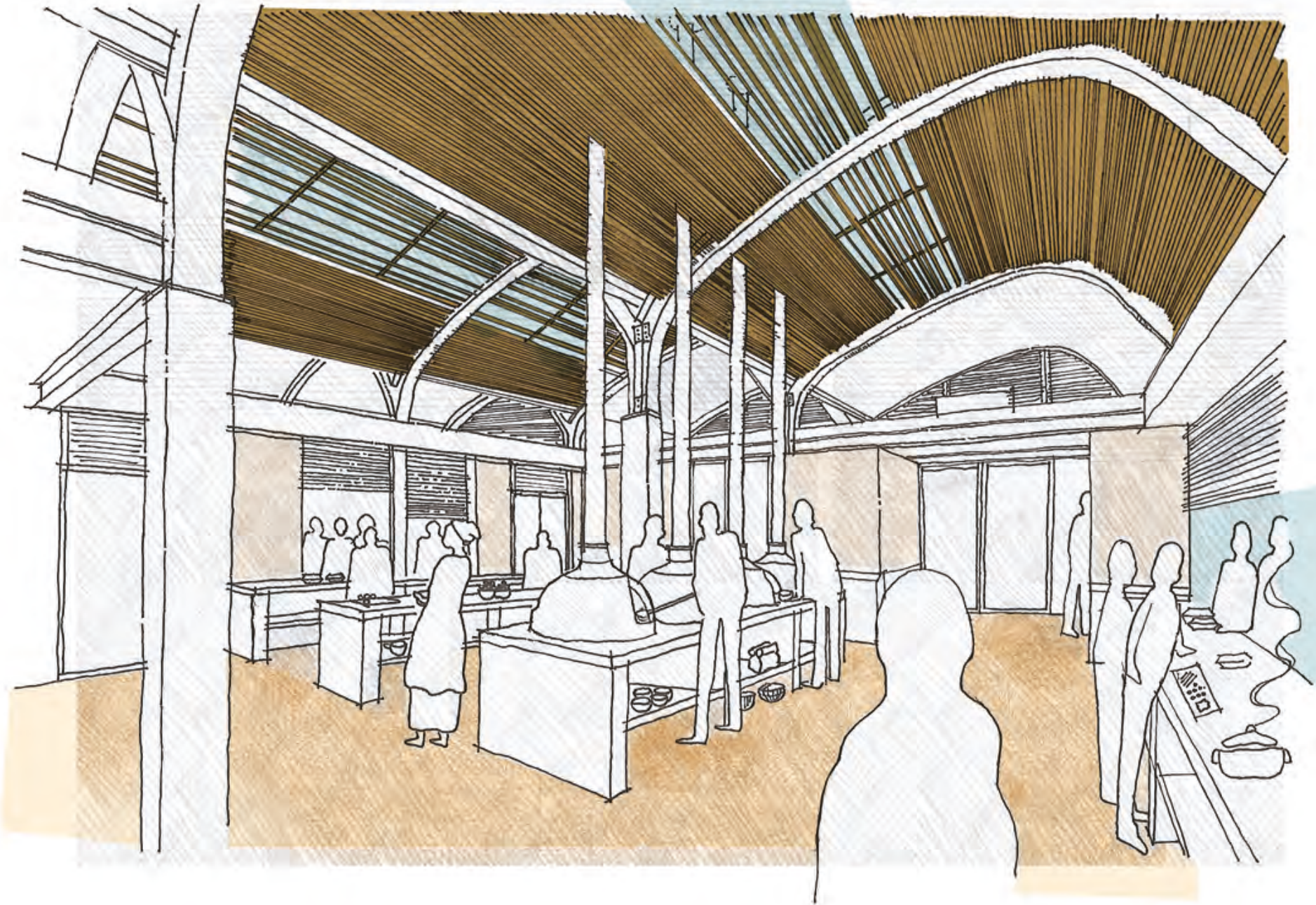


Fig 184: Storey board | Communal kitchen (Van Staden 2021).

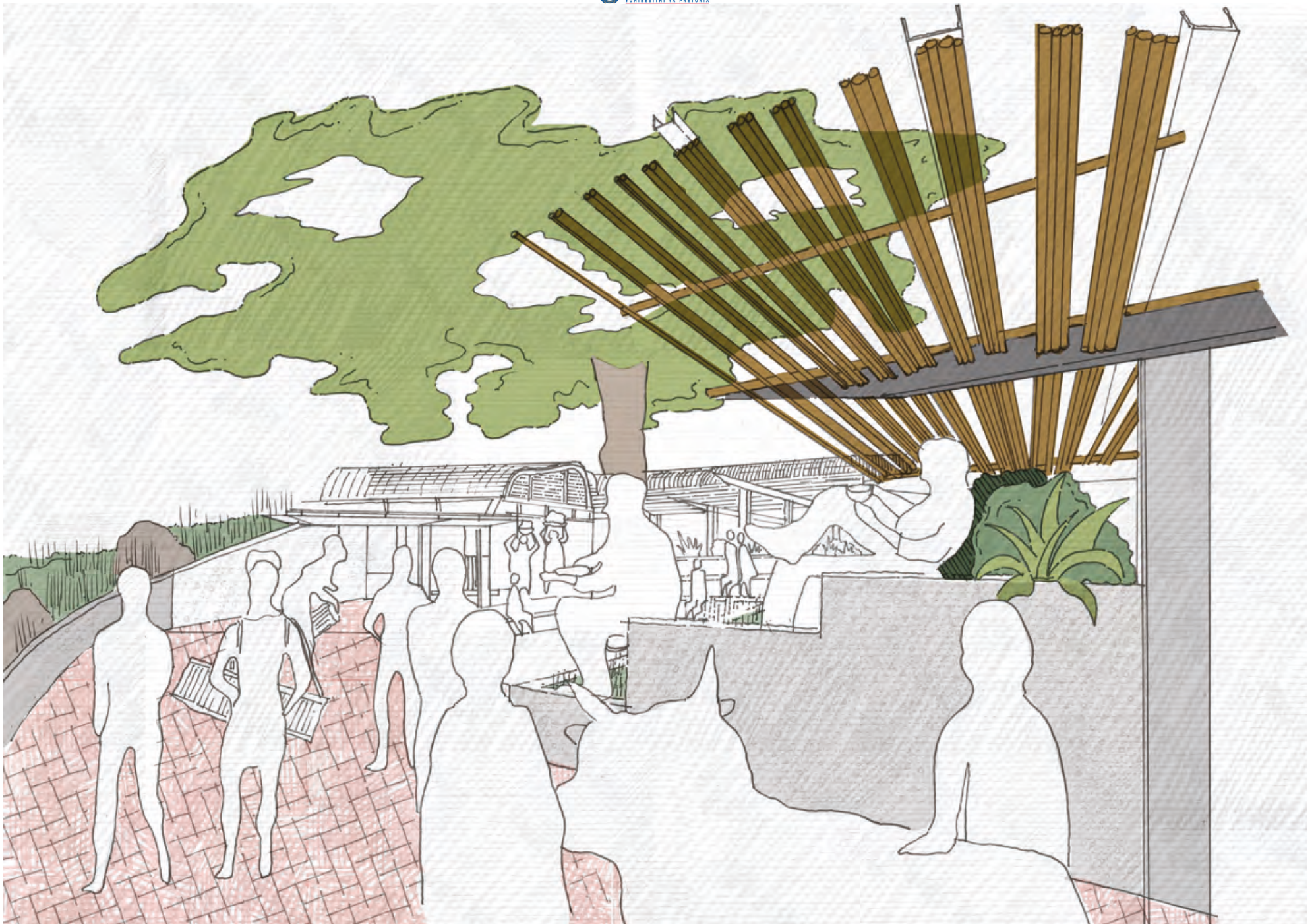


Fig 185: Storey Board | Entrance to Lekgotla from main passage (Van Staden 2021).

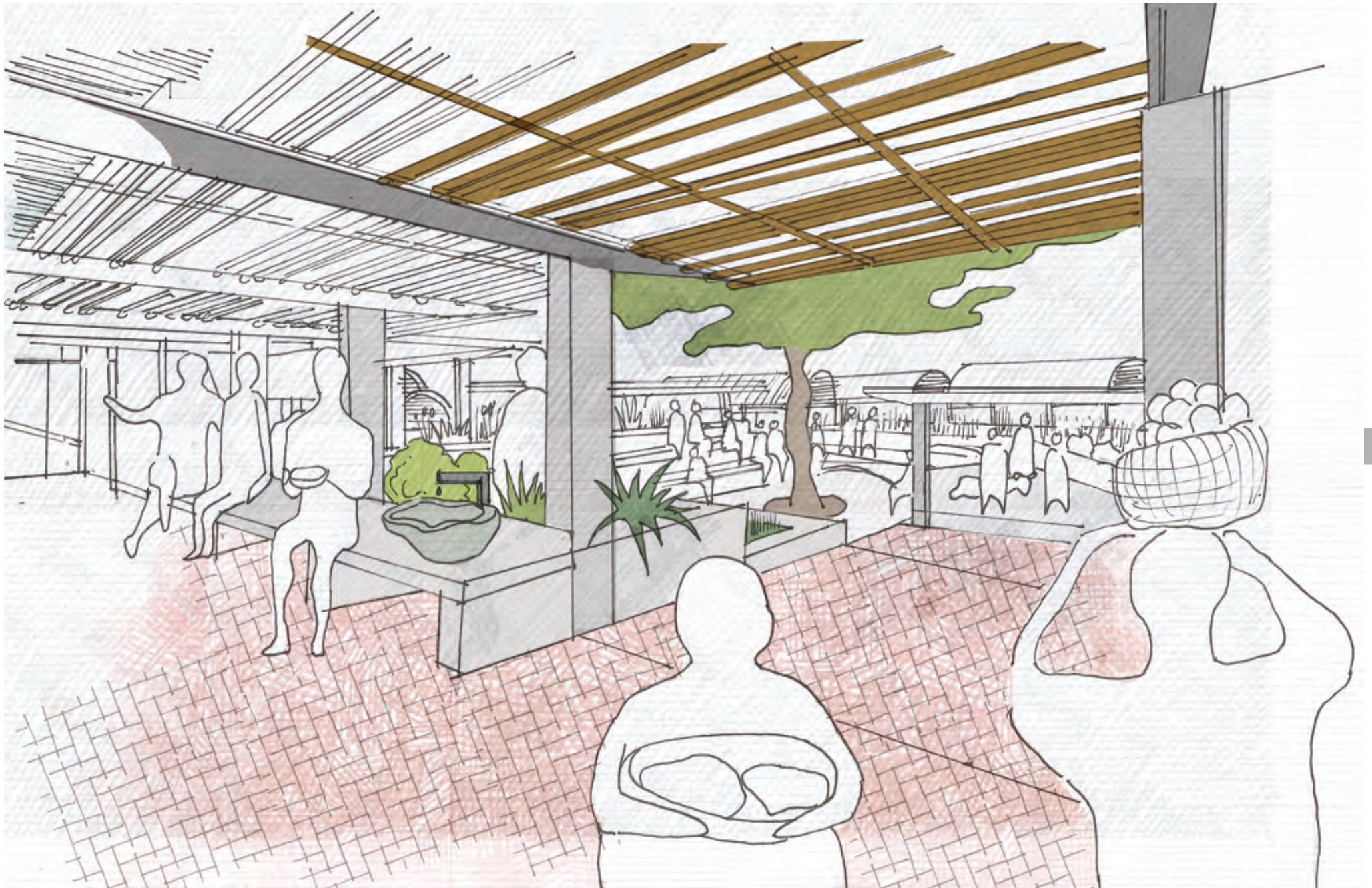


Fig 186: Storey Board | Entrance to Lekgotla from kitchen (Van Staden 2021).



Fig 187: Model photos (Van Staden 2021).



Fig 188: Model photos (Van Staden 2021).

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Liam, I am eternally grateful that God put you next to me in first year.

ZONE 5 Sports Grounds									
Physical Incivility		Evidence	Interviewees	Key comments	Social Incivility		Evidence	Interviewees	Key notes
Fence condition	<input checked="" type="checkbox"/>	Photograph Interview		Broken 'Quickest escape route'	Cultural Violence	<input checked="" type="checkbox"/>	Interview		"Gangsters' burnt the caretakers house because he was foreign".
No lights	<input checked="" type="checkbox"/>	Photograph			Bullying	<input checked="" type="checkbox"/>	Interview		"Bullies wait at the sports grounds to fight."
Poor Milieu	<input type="checkbox"/>				Gender-based violence	<input type="checkbox"/>			
Undeveloped open space	<input checked="" type="checkbox"/>	Photograph Interview		Inactive corridor- 'places to hide' 'The government needs to help'	Drug use	<input checked="" type="checkbox"/>	Interview		Drug hotspot- no surveillance between church and sports field
Litter	<input checked="" type="checkbox"/>	Photograph Interview		River canal used as a dump.	Mugging	<input checked="" type="checkbox"/>	Interview		Easiest escape route for muggers 'They steal the lawn.'
Vagrance	<input type="checkbox"/>				Violence Murder	<input checked="" type="checkbox"/>	Interview		"Child was killed at the river channel corner of church and field."
Vandalism	<input checked="" type="checkbox"/>	Photograph Newspaper Interview		Broken fence Poor maintenance by government	Poor animal care	<input checked="" type="checkbox"/>	Interview		Cattle eat the litter at the river channel
Flooding	<input type="checkbox"/>								

ZONE 3A Mutizinzi Hostels									
Physical Incivility		Evidence	Interviewees	Key comments	Social Incivility		Evidence	Interviewees	Key comments
Fence condition	<input checked="" type="checkbox"/>	Photograph		Vandalised	Cultural Violence	<input type="checkbox"/>			"You cannot step into my territory because you are pedi"
No lights	<input checked="" type="checkbox"/>	Observation			Bullying	<input type="checkbox"/>			
Poor Milieu	<input checked="" type="checkbox"/>	Map Interview		"The dangerous hostels make the park dangerous."	Gender-based violence	<input checked="" type="checkbox"/>	Interview		"Incidences of sexual assault"
Undeveloped open space	<input checked="" type="checkbox"/>	Photograph Interview		The municipality turns a blind eye. Doesn't want to develop the land'	Drug use	<input checked="" type="checkbox"/>	Interview		"Lot of places to hide and do drugs."
Litter	<input checked="" type="checkbox"/>	Photograph Interview		Dumping zone	Mugging	<input checked="" type="checkbox"/>	Interview		Steal material for squatters.
Vagrance	<input checked="" type="checkbox"/>	Interview		"The municipality turns a blind eye. Doesn't want to develop the land' That's why there's vagrancy'."	Violence Murder	<input type="checkbox"/>			
Vandalism	<input type="checkbox"/>			Vandalised fence and existing buildings	Poor animal care	<input checked="" type="checkbox"/>	Photograph		Cattle eat the litter as the pass through site.
Flooding	<input type="checkbox"/>								

Data collected from : (Mothowamodimo 2011:13, KoboToolBox 2020, KoboToolBox 2021, Silinda 2020:1, Veldsman 2019:78-83).

ZONE 3B Mtunzi Park									
Physical Incivility		Evidence	Interviewees	Key comments	Social Incivility		Evidence	Interviewees	Key comments
Fence condition	<input checked="" type="checkbox"/>	Photograph Dissertation	II	Fence removed	Cultural Violence	<input checked="" type="checkbox"/>	Interview		"This is a pedi park. Tsonga don't belong here. Soccer tournaments. The pedi are against foreigners. You cannot step into my territory because you are Sepedi."
No lights	<input checked="" type="checkbox"/>	Observation Interview	I	No lights make the park dangerous	Bullying	<input checked="" type="checkbox"/>	Interview		"This is a pedi park. Tsonga don't belong here."
Poor Milieu	<input checked="" type="checkbox"/>	Map Interview Dissertation	IIII	Park at the centre of 3 taverns, next to the dilapidated hostels.	Gender-based violence	<input checked="" type="checkbox"/>	Interview	II	"Incidences of sexual assault."
Undeveloped open space	<input checked="" type="checkbox"/>	Interview		Beer hall abandoned.	Drug use	<input checked="" type="checkbox"/>	Interview	III	"Lot of places to hide and do drugs."
Litter	<input checked="" type="checkbox"/>	Photograph		There is lots of litter at the park.	Mugging	<input checked="" type="checkbox"/>	Interview		"Gambling takes place at the park. Lots of violence and anger."
Vagrance	<input checked="" type="checkbox"/>	Interview		The are many homeless people who rest at the park and hostels.	Violence Murder	<input checked="" type="checkbox"/>			"Gambling takes place at the park. Lots of violence and anger."
Vandalism	<input checked="" type="checkbox"/>	Photograph		The park equipment is vandalised.	Poor animal care	<input checked="" type="checkbox"/>	Interview		"Cattle eat the litter as the pass through site."
Flooding	<input type="checkbox"/>								

ZONE 4 School Entrance									
Physical Incivility		Evidence	Interviewees	Key comments	Social Incivility		Evidence	Interviewees	Key comments
Fence condition	<input checked="" type="checkbox"/>	Photograph Dissertation	III	Fence condition vandalised. Encircles school- inactive street interface.	Cultural Violence	<input checked="" type="checkbox"/>	Interview		Tsonga and pedi children fight at the school.
No lights	<input checked="" type="checkbox"/>	Interview Dissertation	III	"We had to cut down the trees in front of the fence. It was unsafe."	Bullying	<input checked="" type="checkbox"/>	Interview		"The tribes/gangs wait at the entrance to fight after school."
Poor Milieu	<input checked="" type="checkbox"/>	Map Dissertation	III	School at the centre of 3 taverns. Surrounded by undeveloped buffer zone.	Gender-based violence	<input type="checkbox"/>			
Undeveloped open space	<input checked="" type="checkbox"/>	Interview		Open space not used on site. Hotspot for bullying.	Drug use	<input checked="" type="checkbox"/>	Interview Observation	III	Weed sellers at the entrance gate.
Litter	<input checked="" type="checkbox"/>	Photograph		There is lots of litter at the school.	Mugging	<input type="checkbox"/>			
Vagrance	<input type="checkbox"/>				Violence Murder	<input checked="" type="checkbox"/>	Interview	I	"You can hear guns outside."
Vandalism	<input checked="" type="checkbox"/>	Photograph		Vandalised fence.	Poor animal care	<input type="checkbox"/>			
Flooding	<input type="checkbox"/>								

Data collected from : (Mothowamodimo 2011:13, KoboToolBox 2020, KoboToolBox 2021, Silinda 2020:1, Veldsman 2019:78-83).

APPENDIX

Fig 181: Tables depicting collected data for 'unsafe zones' contined (Van Staden 2021).

ZONE 2 | Bridge

Physical Incivility		Evidence	Interviewees	Key comments	Social Incivility		Evidence	Interviewees	Key comments
Fence condition	<input type="checkbox"/>				Cultural Violence	<input checked="" type="checkbox"/>	Interview Dissertation		"People are divided into different ethnic groups by the river."
No lights	<input checked="" type="checkbox"/>	Interview		"The walk between the school and bridge is dangerous. No activity. No lights."	Bullying	<input checked="" type="checkbox"/>	Interview		"Lots of bullying and violence takes place because of the open land and no street lights."
Poor Milieu	<input checked="" type="checkbox"/>	Interview Dissertation		The walk between the school and bridge is dangerous. There are clubs on the periphery."	Gender-based violence	<input checked="" type="checkbox"/>	Interview		Incidences of sexual assault.
Undeveloped open space	<input checked="" type="checkbox"/>	Interview Dissertation Photograph		There is no activity between school and bridge.	Drug use	<input type="checkbox"/>			
Litter	<input checked="" type="checkbox"/>	Photograph Dissertation			Mugging	<input checked="" type="checkbox"/>	Interview Dissertation		Incidences of mugging.
Vagrance	<input type="checkbox"/>				Violence Murder	<input checked="" type="checkbox"/>	Interview Dissertation		"Many murdered bodies been found at bridge."
Vandalism	<input checked="" type="checkbox"/>	Photograph		Bridge vandalised	Poor animal care	<input type="checkbox"/>			
Flooding	<input checked="" type="checkbox"/>	Interview Photograph Dissertation		"The river flooded one year. Lots of small children drowned."					

ZONE 1| Temporary Bridge

Physical Incivility		Evidence	Interviewees	Key comments	Social Incivility		Evidence	Interviewees	Key comments
Fence condition	<input type="checkbox"/>				Cultural Violence	<input checked="" type="checkbox"/>	Interview		"People are divided into different ethnic groups by the river."
No lights	<input type="checkbox"/>	Interview Dissertation Photograph		"The walk to moreleta park is dangerous. There are no lights."	Bullying	<input checked="" type="checkbox"/>	Interview		Lots of bullying and violence takes place because of the open land.
Poor Milieu	<input checked="" type="checkbox"/>	Map Dissertation Photograph		Poor positioning of bridge. Disturbs flow of river.	Gender-based violence	<input checked="" type="checkbox"/>	Interview		Incidences of sexual assault.
Undeveloped open space	<input checked="" type="checkbox"/>	Interview Dissertation Photograph Newspaper		Structurally unsound bridge. "The walk to moreleta park is dangerous. Its open space."	Drug use	<input checked="" type="checkbox"/>	Interview		Drug hot-spot
Litter	<input checked="" type="checkbox"/>	Water Map Dissertation Photograph		Lots of litter in the river.	Mugging	<input checked="" type="checkbox"/>	Interview		Incidences of mugging.
Vagrance	<input checked="" type="checkbox"/>	Interview Dissertation		"The open space is unsafe. A lot of homeless people stay by the river."	Violence Murder	<input checked="" type="checkbox"/>	Interview		"Many murdered bodies been found at bridge."
Vandalism	<input checked="" type="checkbox"/>	Dissertation Newspaper		The bridge and nearby school is dilapidated.	Poor animal care	<input type="checkbox"/>			
Flooding	<input checked="" type="checkbox"/>	Interview Dissertation		"The river flooded one year. Lots of small children drowned."					

Data collected from : (Mothowamodimo 2011:13, KoboToolBox 2020, KoboToolBox 2021, Silinda 2020:1, Veldsman 2019:78-83).

Reference number: EBIT/259/2020

Dr C Combrinck
Department: Architecture
University of Pretoria
Pretoria
0083

Dear Dr C Combrinck

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Conditional approval is granted.

This means that the research project entitled "Urban Citizen Studios: Public Interest Design" is approved under the strict conditions indicated below. If these conditions are not met, approval is withdrawn automatically.

Conditions for approval

Conditional approval on the understanding that:

- Applications from each student (including application forms and all necessary supporting documents such as questionnaire/interview questions, permission letters, informed consent form, researcher declaration etc) will need to be checked internally by the supervisor. A checklist will need to be signed off after the checking.
- All of the above will need to be archived in the department and at the end of the course a flash disc / CD clearly marked with the course code and the protocol number of this application will be required to be provided to EBIT REC administrator.
- Any personal and demographic data (eg gender, income, education) have provided the motivation that is acceptable based on the supervisor's evaluation.
- Students using organizations data not publicly available or collecting data from employees have the permissions in place.
- No data to be collected without first obtaining permission letters. The permission letter from the organisation(s) must be signed by an authorized person and the name of the organisation(s) cannot be disclosed without consent.
- Images and observation of people will require consent. Images and observation of minors are prohibited.

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 Ethics Committee.

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

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.

The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof K.-Y. Chan

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