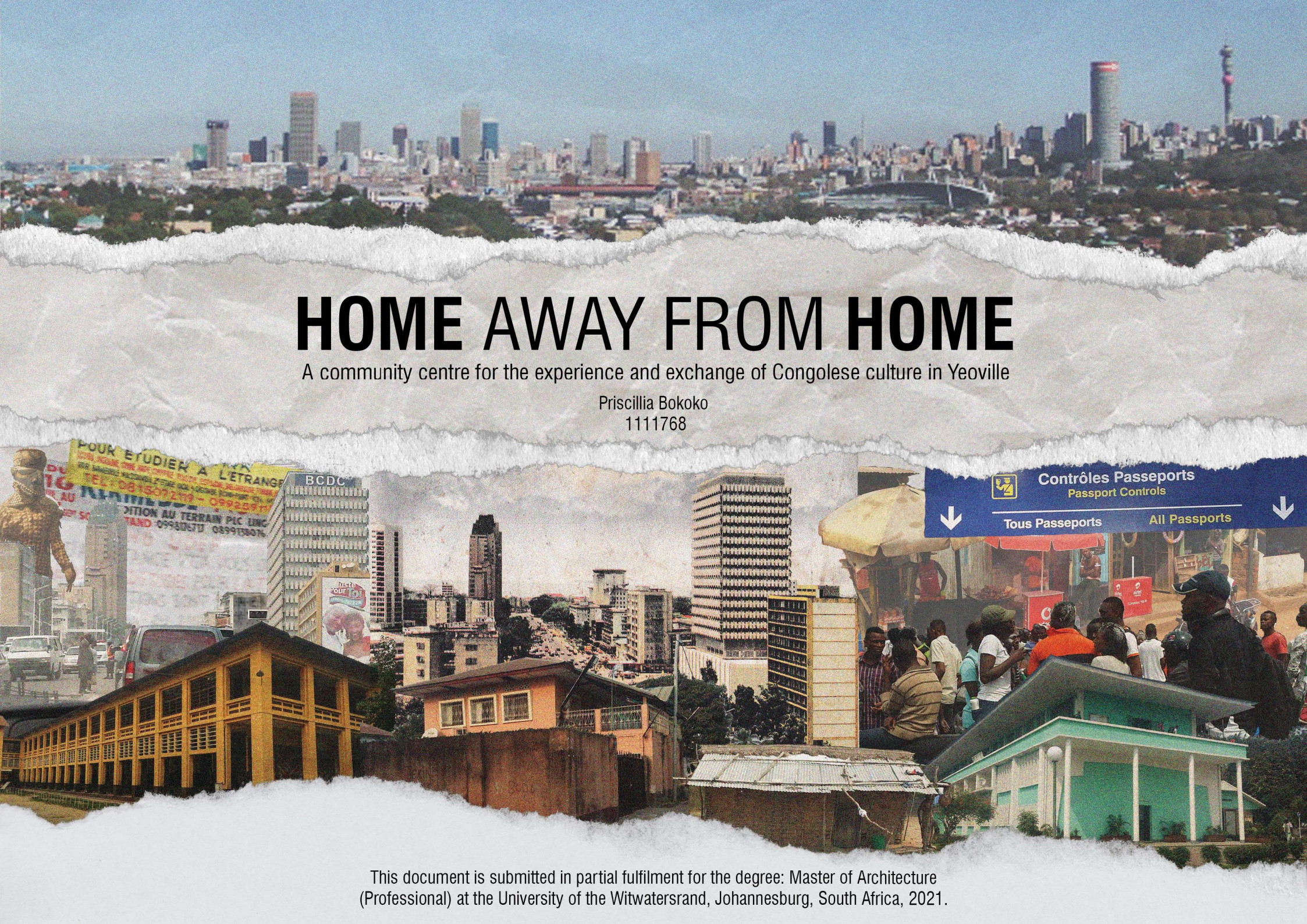




HOME AWAY FROM HOME

A community centre for the experience and exchange of Congolese culture in Yeoville

Priscillia Bokoko
1111768

This document is submitted in partial fulfilment for the degree: Master of Architecture
(Professional) at the University of the Witwatersrand, Johannesburg, South Africa, 2021.

Declaration

I, Priscillia Noémie Bokoko 1111768, am a student registered for the course Master of Architecture (Professional) in the year 2020. I hereby declare the following:

I am aware that plagiarism [the use of someone else's work without permission and/or without acknowledging the original sources] is wrong.

I confirm that the work submitted for assessment for the above course is my own unaided work except where I have stated explicitly otherwise.

I have followed the required conventions in referencing thoughts, ideas, and visual materials of others. For this purpose, I have referred to the Graduate School of Engineering and the Built Environment style guide.

I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my unaided work or that I have failed to acknowledge the source of the ideas or words in my own work.



Priscillia Noémie Bokoko
24 February 2021



Acknowledgments

I would like to express my heartfelt gratitude to those who made this project possible.

Foremost, I am eternally grateful to Jesus Christ for blessing me with the opportunity to study in this field of education, and for His sustenance, grace, and provision throughout my years of study.

Secondly, I would like to express my sincere gratitude to my supervisor, Liale Francis, for the continuous support, guidance, immense knowledge, wisdom, patience, and encouragement throughout this challenging year. I could not have imagined having a better supervisor for my research.

My sincere thanks also goes out to my lecturers, tutors, examiners, colleagues, and friends who have contributed to my learning, growth and experiences over the years. Your critiques, insightful comments, challenging questions, encouragement and prayers have allowed me to build a strong foundation over my years of study.

Last but not the least, I would like to thank my family: my parents Engo Bokoko and Lydie Bokoko, and my brothers Jurgen, Gregory, and Jeremie Bokoko for their continuous emotional, physical, financial and spiritual support throughout my years of education. You are dearly loved.





Abstract

“Home sweet home”; “Make yourself at home”; “There’s no place like home”; “Home is where the heart is”.

‘Home’ has a different meaning to everyone. The term is complex and multifaceted and can represent a place or an idea. It can represent something that is lived-in, to which a plethora of joyous memories are attached.

It is an indicator of the manner and place where people feel a sense of belonging. Home can refer to physical access, domestic inhabitation, psychological connections, and the cultural meaning of our living spaces, where cultural patterns enforce our understanding and sense of home (Gieseeking et al., 2014).

The term “diasporas” describes those who identify with a “homeland” but live far from it. It is defined as migrants or their descendants, “whose identity and sense of belonging have been shaped by their migration experience and background.” (Glossary on Migration (2019), 2016).

Issues of migration and homelessness; power and class; culture and gender, change the impact of the term and the way it is understood as the standard experiences of home cannot be true for every individual, especially when one does not have access to it.

Overall, home is a concept which stems from the question of one’s identity and belonging (Elmo Raj, 2014). Therefore, what does it mean to be at home and how can a migrant community still feel at home away from home?



Contents

2	Declaration
3	Acknowledgments
5	Abstract
8	Statement of Research
10	the Roots: the Theory
12	Chapter 1: Congolese
12	1.1 Background and Introduction
14	1.2 Brief History of Congolese Migration
16	Chapter 2: Culture
16	2.1 Culture for Sustainable Development
17	2.1.1 Sustainable Development
17	2.2 Introduction to Culture
20	2.3 Food and Culture
23	2.4 Sharing of Food
26	Chapter 3: Cuisine
26	3.1 The effects of Urbanisation on Food
26	3.2 Urban Agriculture
29	3.3 Food Self-sufficiency
34	3.4 Education on Farming
36	3.5 Congolese Cuisine
37	3.6 African Leafy Vegetables
39	3.7 Conclusion to Congolese, Culture and Cuisine
40	the Stem: the Site

43 Chapter 4: Community Analysis

- 43 4.1 Site Requirements
- 43 4.2 Context
- 45 4.3 Future Growth
- 46 4.3 History
- 48 4.4 Mapping
- 62 4.5 Site Selection Summary

66 Chapter 5: Precedent Analysis

- 66 5.1 Introduction
- 66 5.2 Galleria Department Store - Gwanggyo, South Korea
- 69 5.3 Vertical Farm - Romainville, France
- 71 5.4 Food Farm Tower - Romainville, France
- 72 5.5 Hydroponic Rooftop Farms - Johannesburg
- 74 5.6 Hillbrow Outreach Foundation Centre - Johannesburg
- 77 5.7 Yeoville Recreation Centre - Johannesburg
- 81 5.8 The Ubuntu Centre - Port Elizabeth, South Africa
- 85 5.7 Conclusions

87 Chapter 6: Program

- 87 6.1 Interpretation
- 89 6.2 Breakdown
- 100 6.3 User Groups

106 Chapter 7: Viability Study

- 106 7.1 Introduction
- 106 7.2 Client
- 107 7.3 Client Proposal/ Project Overview
- 107 7.4 Brief
- 108 7.5 Site Selection (Town Planning)
- 109 7.6 Funding & Economic Sustainability
- 109 7.7 Cost Estimates
- 110 7.8 Implementation
- 110 7.9 Technology, Materiality & Sustainability
- 111 7.10 Impact

112 the Crown: the Building**114 Chapter 8: Design Development**

- 114 8.1 Design Approach
- 114 8.2 Charette & Site Considerations
- 119 8.3 Proposal 1
- 122 8.4 Proposal 2
- 123 8.5 Proposal 3
- 124 8.6 Proposal 4
- 125 8.7 Concept
- 130 8.8 Design Development Summary
- 132 8.9 Final Proposal Development

134 Chapter 9: Technical Systems

- 134 9.1 Choice of Systems

138 Chapter 10: Final Drawings**177 Chapter 11: Conclusion & Reflection****179 Chapter 12: References****188 Chapter 13: List of Figures****199 Chapter 14: Appendices****206 Chapter 15: Ethics Clearance**

Statement of Research

“It is important that we know where we come from, because if you do not know where you come from, then you don’t know where you are, and if you don’t know where you are, you don’t know where you’re going. And if you don’t know where you’re going, you’re probably going wrong.” - Terry Pratchett.

This research is rooted in my experience of being a migrant in a foreign land and it is birthed from a desire to maintain my cultural identity.

The four words which are driving this research are ‘Congolese’, ‘Community’, ‘Culture’ and ‘Cuisine’; each dealing with specific themes:

Congolese:

- Migration

Community:

- Cultural diversity and inclusivity
- Self-sufficiency

Culture:

- Sustainable development
- Cultural Identity

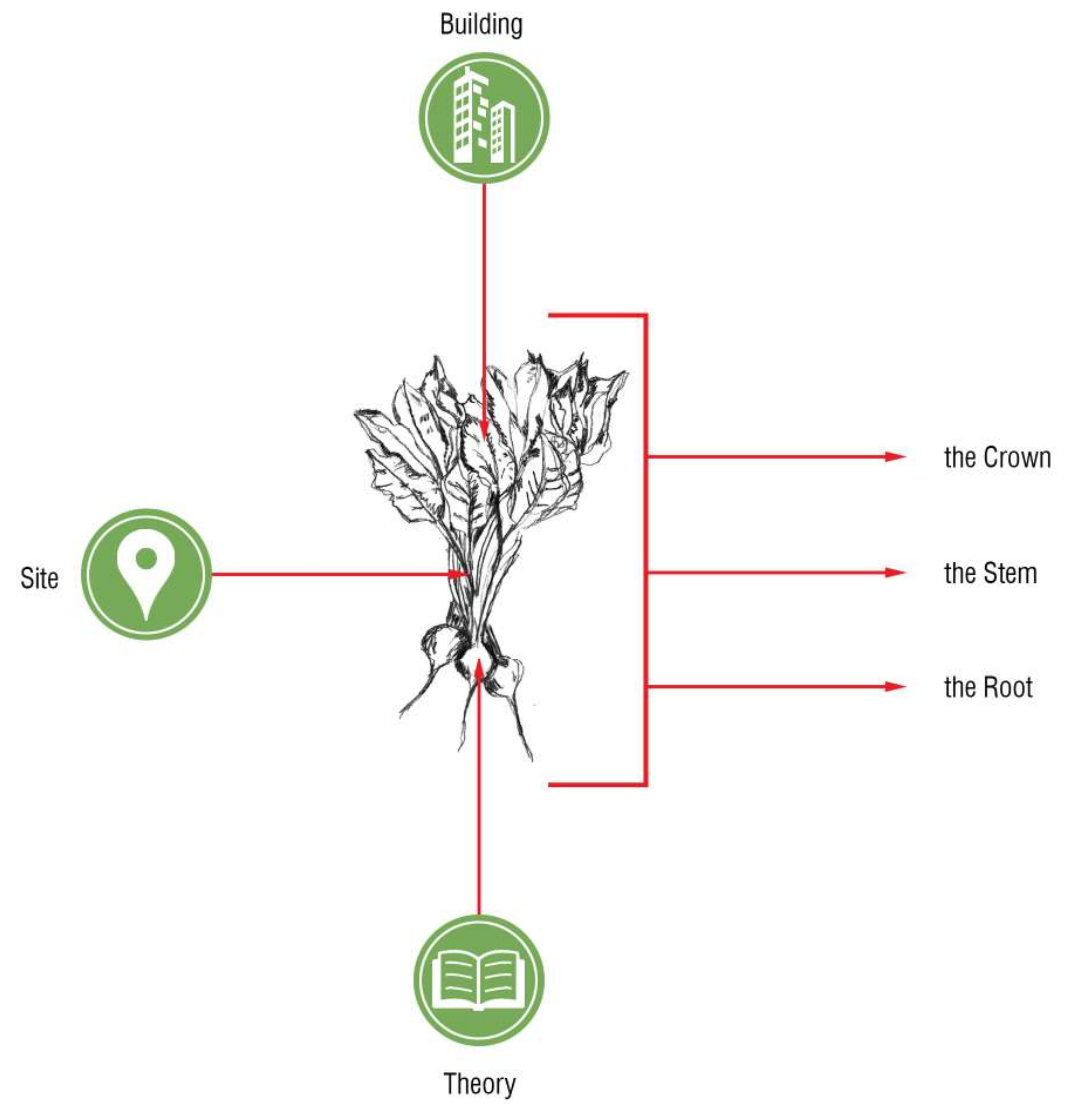
Cuisine:

- Food
- Urban Agriculture
- African Leafy Vegetables

Food is an integral part of this research as it represents one of the primary ways in how I have been able to maintain my cultural identity.

The proposed building intervention, site of intervention and theory are the main components of this research that influence one another and are used to explore how a migrant community can still experience and celebrate its culture despite being in a home away from their own.

Main Components of the Research



the Roots: the Theory



Chapter 1: Congolese

1.1. Background and Introduction

I was born in former “République du Zaïre” in October 1996, a few days before the First Congo War erupted in the country, which was later renamed the Democratic Republic of Congo (DRC). Although the war did not have a direct negative impact on my family, the declining conditions in the country due to political strife influenced my parents not to raise a family under those conditions. Therefore, in October 2000, our family, which by that time had an addition of a brother, immigrated to South Africa.

Our first destination was the luscious land of Kwa-Zulu Natal, where we were taken in by my uncle. November 2000 saw our family grow from 4 to 5 with an addition of second brother. After some time, my father found a job opportunity in the city of Johannesburg, where we relocated, and our family grew again from 5 to 6, with the addition of a third brother. The Bokoko family was complete. The city of Johannesburg was to be our new home away from what had been our home in the city of Kinshasa, DRC.

As the Easter, Winter and Summer school holidays would approach in South Africa, the question I would hear being asked the most by South Africans was “Are you going home?”. “I’m going to Mpumalanga to visit my grandmother” and “I’m going to KZN to escape the cold” were the kind of responses I could hear. I grew somewhat envious of them. Of the fact that home was such a tangible element in their lives. My home was more than 2000 kilometres away! Going there on a regular basis was a luxury that my family could not afford. Deep down I yearned for the day when I could return. That day finally came in 2017. 17 years after having immigrated to South Africa were my feet able to touch Congolese soil again...home sweet home!

As a Congolese-born South African citizen, I struggled to fully integrate myself within the South African community and felt disconnected from my Congolese identity. When I am in South Africa, my surname and inability to speak a native language fluently, reminds me that I am not truly a South African citizen. When I am in DRC, although my surname gives away the fact that I am Congolese, my accent when speaking a native language, and the way I act and think distinguishes me from Congolese people, as I have not obtained the lived experience of that locality (Ahmed, 1999: 341).

This experience of being an outsider searching for a sense of belonging while trying not to feel disconnected is lived by many.

An African proverb expresses that “Your home will always be the place for which you feel the deepest affection, no matter where you are”. To me, ‘home’ represents the nation in which I was born – the Democratic Republic of Congo – and it is from this representation of home that this research will be established.

How can a migrant community still experience and celebrate its culture?

The changes and experiences that come with moving from one community to another include losing cultural norms; adjusting to new cultures; and changes in identity and self-concept. Individuals may identify as “outsiders”, “in-betweeners” with a certain degree of wanting to belong. Everyone’s experience is different, and the experiences and changes that come with migration are not unique to the Congolese community but represent a bigger community of migrants, not only within Africa, but globally too.

However, the Congolese community is used as a vehicle for that exploration of migration and a base for understanding the migrant experience through my own journey and my family’s experience, as I am Congolese and have access to a Congolese community around me.

Therefore, this research seeks to discover the ways in which the diaspora, particularly the Congolese diaspora in Johannesburg, can experience parts of the Congolese culture despite being far away from home, and ways in which they can exchange and share that culture with the local South African community.

1.2. Brief History of Congolese Migration

The Democratic Republic of Congo (DRC) is Africa's second largest country. Even though it is rich in mineral resources, political strife and instability, among many other issues, inhibit the economic growth of the country, preventing many from benefiting from the country's wealth of resources, and resulting in 80% of the population living in poverty ("Overview", 2019).

Preceding the 'Scramble for Africa', Belgium ruled and exploited the country until it gained independence in 1960. Then followed the First (1996-1997) and Second (1998-2003) Congo War, resulting in the deaths of approximately 5.4 million people (Coghlan et al., 2007), with roughly 1.4 million Congolese refugees fleeing the country, more than 70 000 of which fled to South Africa as seen in Table 1 (Flahaux & Schoumaker, 2016: 6).

The Department of Home Affairs have received 152 414 applications for asylum in South Africa since 1994 (Groot, 2004: 38), of which the majority were Congolese refugees who had fled from the 'Second Congo War', which spun from August 1998 to July 2003 (Amisi & Ballard, 2006: 1).

As of 2019, South Africa has the largest number of immigrants on the African continent (World Migration Report, 2020).

Migration is an important element of history. It has been occurring for centuries and will continue to occur for centuries to come. The movement of people across the globe throughout centuries has changed the economic, social, and cultural fabric of the world (Cohen & Sirkeci, 2011).

One of the positive influences of migrants is the culturally rich layer they bring to their host land. Migrants bring along cultures and practices that can either positively or negatively influence the destination's traditional way of life. Therefore, migration serves as a root theme from which the themes of culture and food will grow.

Destination Region and Country	1990	2000	2015
World	401,707	831,179	1,403,757
Africa	340,970	729,658	1,192,697
Eastern Africa	216,199	470,644	874,013
Burundi	36,654	37,951	167,768
Eritrea	407	1,224	1,688
Ethiopia	48	90	102
Kenya	394	235	11,292
Malawi	1,338	2,389	2,210
Mozambique	186	1,174	2,337
Rwanda	62,526	163,420	230,622
South Sudan	N/A	N/A	82,755
Uganda	67,995	95,138	303,580
United Republic of Tanzania	19,354	110,786	58,250
Zambia	27,297	58,237	13,409
Middle Africa	95,515	232,083	239,985
Angola	12,178	17,735	43,192
Cameroon	(no data)	(no data)	3,134
Central African Republic	13,173	260,65	17,219
Chad	98	301	306
Congo	67,316	183,780	170,368
Gabon	2,750	4,202	5,766
Northern Africa	16,237	12,794	1,380
Egypt	99	96	146
Libya	283	320	434
Sudan	15,855	12,378	800
Southern Africa	12,695	13,726	76,548
Botswana	526	1,261	3,391
Namibia	4,707	4,179	2,918
South Africa	7,456	8,208	70,077
Swaziland	6	78	162
Western Africa	324	411	771
Ghana	16	18	30
Mauritania	31	42	90
Togo	277	351	651

fig 2. Stock of Congolese Migrants and Refugees in African Regions and Select Countries, 1990, 2000, and 2015 (Source: Flahaux & Schoumaker, 2016)



Chapter 2: Culture

2.1. Culture for Sustainable Development

Sustainable development has been defined by the Brundtland Report (WCED, 1987) as “development that meets the needs of the present [generation] without compromising the ability of future generations to do the same”. For many years, we have known there to be three pillars of sustainability which are social, economic, and environmental sustainability. As society has developed, the model of sustainability has developed as well, with their being an increasing importance placed on culture. Culture emerged as an issue for sustainable development at the International Meeting for Small Island Developing States, causing it to be identified as the fourth pillar of sustainable development (Nurse, 2006).

Banuri (1990) viewed sustainable development as being confined within modern western values, not having enough regard for other value systems, therefore resulting in an imbalance of global culture between the “west” and the “rest”, through its promotion of western technological civilization as being universal (Aseniero, 1985).

Therefore, contemporary globalisation, which is often driven by western ideals, can positively influence society through the sharing of cultural goods, services, and intellectual property, but can also negatively impact society by threatening cultural diversity and identities (Nurse, 2006). Thus, this model of sustainable development which is primarily western in the eyes of Banuri (1990) is an inappropriate model for this research as it disregards the African context, culture, tradition, and experience.

Figure 1 explains the models through which culture can be integrated as part of sustainable development:

- a) Through including culture as a pillar of sustainable development.
- b) Through having culture as the mediator between the three original pillars of sustainable development.
- c) Through replacing culture as the main pillar and core foundation of sustainable development, an ever-changing cycle.

Culture and Sustainable Development: Three Models

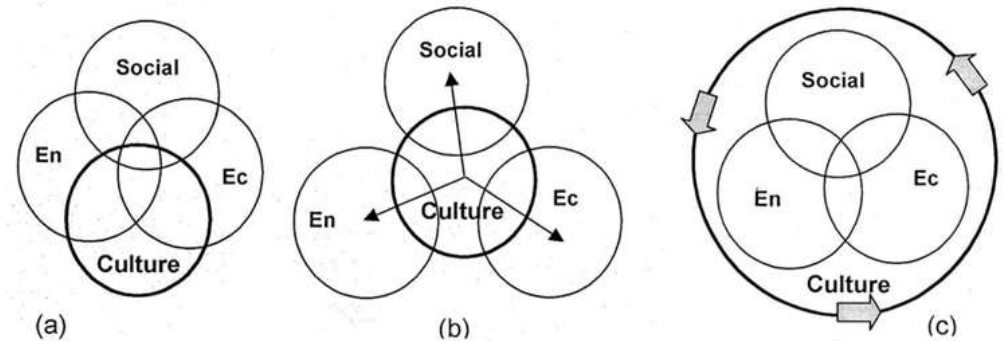


fig 1. Culture and Sustainable Development: Three Models-(a) Culture in sustainable development, (b) Culture for sustainable development, (c) Culture as sustainable development. (Source: Dessein et al. 2015, p. 29).

One can conclude that the model in which culture serves as the main pillar and core foundation of sustainable development is important, as it suggests that culture reflects the essence of an individual outside of economics, outside of the people with whom he/she associates, and outside his/her environment. It leads to the understanding that this model of development places the individual as the focal point for development.

2.1.1. Policies for sustainable urban development

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) documented a policy framework exploring the role of culture for sustainable urban development to assist governments in their implementation of the 2030 Agenda for Sustainable Urban Development and the New Urban Agenda.

It identifies 3 roles that culture plays:

1. “To promote a people-centred approach to sustainable urban development”
2. “To ensure a quality urban environment for all”
3. “To foster integrated policy-making, building on the power of culture”

The policy framework seeks to explore ways in which culture can make a difference to the urban future by recommending that cities be people-centred and filled with culture-centred spaces in ways that culture can be used as a platform for dialogue and peace-building (Culture, n.d.).

In this way, social cohesion and multicultural mutual understanding between urban inhabitants is facilitated, discouraging urban violence and sustaining peaceful and inclusive urban communities as outlined in Goal 11 of the 2030 Agenda (“Cities – United Nations Sustainable Development” n.d.).

This leads one to think that a more “people-centred” approach to development coincides with the sustainable development model where culture serves as the main pillar.

This policy places importance on urban environments to be inclusive towards all its inhabitants, and to consider the culturally diverse nature of their communities as they move towards development.

2.2. Introduction to Culture

The term ‘culture’ is known to be one of the few most complex terms in the English language due to its multi-faceted meaning.

The Journal of Cultural Diversity defines it as “the accumulated knowledge, values, personal and social behaviour, customs, language, and religious beliefs of an entire ethnic group that are learned and passed from one generation to the next” (Gupta, 2010).

For a long time, the concept of culture has related to either cultural heritage or the arts. In his book “Culture and Society”, Raymond Williams (1983: 11-13) outlines 4 definitions of the term:

1. A developed state of mind, making one ‘a cultured person’,
2. The process attributing to a developed state of mind, such as having cultural interests or engaging in cultural activities,
3. The means of the processes such as ‘the arts’ or intellectual work’,
4. ‘A way of life’ practiced by a community which is ‘communicated, reproduced, experienced and explored’.

When it comes to ‘a way of life’, in Africa, culture is interpreted as tradition (Bruyns & Graafland, 2012), being the passing down of customs and beliefs to the next generations. African traditions, which are expressed through many forms such as food, music, and dance, form the base of African culture.

Western definition of culture leans more towards the means through which culture is obtained, such as through cultural institutions such as museums or theatres displaying the arts or intellectual property.

In her study (Bruyns & Graafland, 2012), Leslie Lokko suggested that African traditions such as drumming, funerals and weaving, among many others, do little to assist Africans in understanding the ‘modern’ life. However, this thinking disregards the role which African traditions have in assisting Africans to understand from where they come, and it minimises the opportunities of developing infrastructure to protect, produce and propagate those understandings within a multicultural urban context.

Gupta's definition of culture represents the accumulation of elements which constitute to a community's way of life as supported through Williams' 4th definition of culture. Additionally, where Bruyns & Graafland interpret culture as being rooted in tradition, Leslie Lokko disregards the importance of the role tradition plays in a modern cultural context. This thinking supports the opinion of development being confined within modern western cultural values, excluding African traditional values (Banuri, 1990).

This leads to the understanding that sustainable development through culture should be broadened to include traditional elements of culture that contribute to 'a whole way of life', instead of limiting its focus on preserving the arts or heritage or cultural identities linked to a certain community, as it is this broad understanding of culture that shapes the way humans interact with the environment.

For African cities characterised by large rural-urban migration trends, spatial inequalities as a result of segregated city patterns (Culture, n.d.), and culturally diverse communities resulting from the population of migrants and asylum-seekers, it is highlighted in the Global Report on Culture for Sustainable Urban Development (Culture, n.d.) that culture-based approaches to development can be effective in fostering a sense of belonging and unity among the African people, promoting the culture of ubuntu – I am because you are.

Findings from a study based in Johannesburg (Amisi & Ballard, 2006: 33) saw participants from the Congolese community in Yeoville express their concerns about cultural contamination or domination. The concerns included ensuring that the Congolese community, including children born in South Africa of one or two Congolese parents, did neither drop their culture once they left their home country, nor grow up not knowing their culture and possibly rejecting their Congolese ancestry, regardless of living or being raised in South Africa.

Congolese culture encompasses well-kept tribal and ethnic traditions of the Congolese people, as well as religion, language, literature, theatre, sculpture and mask-making, music, and fashion (Congolese Culture - Friends of the Congo, 2020). The influence of colonisation by Belgium also diversified the culture (Congo — History and Culture, 2020).

A migrant's identity may get lost as he or she lives within the host society (Bhugra & Becker, 2005).

This is suggested through the Acculturation Theory (Berry, 1980) which is explained in the following section.

Many can argue that it is the responsibility of the parents to ensure that culture is not essentially 'lost', however, spaces in the environment can also contribute to sustaining migrant cultures in a multicultural community, especially at times when the parents cannot take this responsibility upon themselves.

In a democratic society, one can conclude that it be mandatory for public buildings to have a social responsibility to their direct context. The impact that a public building has should show sensitivity to the changing cultural, social, economic, and political factors which are shaping and diversifying our society.

2.2.1. Culture case study

Project: The Shree Radhe Shyam Mandir

Architect: *Unknown*

Location: Marlboro, Johannesburg, South Africa

Key components: social responsibility of a public building

This case study highlights the role of a public building in acknowledging, addressing and reflecting its culturally diverse environment, especially within a city that was racially segregated. It is important as it displays the power that policies have in encouraging sustainable development, which in turn helps to sustain the cultural heritage within multicultural and marginalised communities.

The Shree Radhe Shyam Mandir, a Hindu temple for the Gujarati Hindu community found in the predominantly Indian suburb of Marlboro Gardens in Sandton, was built in 1994 to serve their cultural, religious, and social needs (Daya, 2016: 36).



fig 2. Site map of the Shree Radhe Shyam Mandir, Marlboro Gardens, Sandton by Google, Digital Globe, 2019 (https://earth.google.com/web/@-26.09337528,28.09502469,1568.20770455a,394.54833371d,35y,0.00109997h,0t,0r?utm_source=earth7&utm_campaign=vine&hl=en).

The year in which it was built suggests that it was developed at a time when South Africa was being rebuilt as a nation following democracy. The development of such a space can be attributed to the exclusionary nature of the Apartheid policies, such as the Group Areas Act which sought to create and reinforce “cultural vacuum[s]” (Hiralal, 2014: 68), and the impact such exclusionary policies had on non-white communities.

The temple facility still stands till this day and is supported by a priest’s residence and a cultural centre, which remains a space in which the Gujarati Hindu culture can be celebrated through the hosting of cultural and religious events like weddings. Additionally, the cultural centre incorporates a Gujarati School for the preservation of the language and cultures of the Gujarati Hindu community in Sandton.



fig 3. Exterior view of Hindi Temple (Source: Daya, 2016).



fig 4. Exterior view of Cultural Centre (Source: Daya, 2016).

Obtaining an understanding of the cultures of people within a community can influence how a built environment is established and improved upon. This provides an opportunity for development to create a meaningful and valuable relationship between culture and the built environment, one that is mediated by people and their practices.

In aiming to improve the liveability and sustainability of urban areas through means which encourage social cohesion, inclusion and equity, the goal then becomes to:

- Foster cultural integration and inclusiveness in urban areas
- Promote inter-cultural understanding
- Raise inter-cultural awareness

Through encouraging a respect for cultural diversity, as well as promoting an awareness of other cultures, the road upon which peaceful societies are built and sustained begins to be paved.

The goal is not only to make the local community aware of the culture, but to have them participate in the culture and learn from it. Thus, ignorance will be combated with information to ensure that the 'other' is properly understood, breaking down stereotypes and misconceived perceptions some people seem to possess.

Therefore, urban development which incorporates culture at its core, does not only play a role in making a city look attractive, but also plays a role in making it vibrant and sustainable. This kind of development is sustainable as it centers around the inclusion and integration of culturally diverse urban citizens, which can be seen as a good approach to sustainable development, especially for a country with a history of segregation and exclusion.

This highlights the importance of seeking ways to integrate culture into urban strategies and development to ensure cultural sustainability.

2.3. Food and Culture

Food is a psychological necessity for human survival and in many communities it is tied to tradition and, therefore, culture. In a cultural sense, what you eat defines who you are and who you are not, and the practice of eating reaffirms that identity and is an expression of ethnic solidarity. Thus, cultural identity is a symbolic function of food and the cultural practices and celebrations of many communities have food as a core element (Sibal, 2018).

In addition to the physiological need for food comes the physiological need for food familiarity. Foods introduced during one’s childhood is often associated with specific traditional events, such as birthday celebrations and are often attached to good memories (Kittler, 2016). Therefore, one can conclude that food and culture are synonymous.

Urbanisation, from the perspective of the modernisation theory as explained by Gelderblom et al (1994:28), has brought about social transformations, leading to a shift in traditional cultural values to modern cultural values and lifestyles favouring economic growth and advancement.

Modernisation has pushed globalisation, which encompasses global mass production, and an increase in international travel, exchange, and migration (Archer, 2008: 66). In Cultures of Globalisation: Coherence, Hybridity and Contestation; Archer describes modern culture as one which “can be mass produced and disseminated across the world to be consumed” through cultural elements such as “music, television, and food” (2008:4) amongst other elements. However, this has produced a universal and homogenised society, and has influenced models of sustainable development to being confined within modern western values (Bannuri, 1990), which are often labeled as being ‘universal’.

Additionally, Leslie Lokko’s thinking that African traditions do little to assist Africans in understanding modern life (Bruyns & Graafland, 2012) does not consider the impact of modern culture on an individual’s sense of belonging, due to the exclusion of an individual’s multi-faceted social and cultural identity (Verkuyten, 2014), especially when it comes to the African context.

Berry’s Acculturation Theory Model (1980) suggests that societal changes brought about by migration result in 4 cultural changes:

- 1. Assimilation: individuals abandon their cultures and adopt their host cultures.
- 2. Separation: individuals retain their cultures and reject their host cultures.
- 3. Marginalisation: both heritage and host cultures are rejected.
- 4. Integration: heritage culture is retained, and host culture is adopted.

In the first two cultural changes, either the host or heritage culture is excluded, which reflects the lack of cultural diversity in the modern culture and its exclusion of African cultures in favour of a more westernised society, labelling it as “universal”. This does little to enhance an individuals social and cultural identity. Integrated cultural change allows an individual to draw their social and cultural identity from both heritage and host cultures, experience a well-grounded sense of belonging in his/her community, and improving their overall wellbeing in that community (Schwartz et al, 2010: 3 – 4).

Figure 6 shows the developmental perspective of food culture. Food cultural changes – such as consumerisation, commoditisation, delocalisation, and acculturation – are the products of the respective changes in the social dynamics of communities – which are globalisation, modernisation, urbanisation, and migration.

STRUCTURAL CHANGE	FOOD CULTURE CHANGE
Globalisation local to unrestricted	Consumerisation indigenous to mass foods
Modernisation muscle to generated power	Commodisation homemade to manufactured
Urbanisation rural to urban residence	Delocalisation producers to only consumers
Migration original to new settings	Acculturation traditional to adopted

fig 5. Table showing the developmental perspective of food culture (Source: Adapted from Sobal, J. (1999). Social change and foodways. In Proceedings of the Cultural and Historical Aspects of Food Symposium. Corvallis: Oregon State University).

The perspective is that food culture become progressively “developed” as social structures change due to industrialisation. This brings one to question whether societies that are built solely around consumerisation, commodisation, delocalisation and acculturation are truly developed.

Growing trends around food culture such as urban farming, farmer’s markets; the farm-to-table and the slow food movements work to resist such a perspective. These trends and movements seek to reconnect and position people closer to the food sources, as well as to improve the supply of food, making cities more sustainable for all who live in it. This suggests the thinking that the degree to which food cultures and food systems are sustainable should be the main indicator and measure of development. Therefore, it is important to come up with appropriate, sustainable responses to the social structural changes which have influenced food cultures and food systems as outline in Figure 7. These responses are further discussed in Chapter 3.

Structural Change	Food Culture Change	Sustainable Response
Globalisation	Consumerisation	Re-introduction of indigenous foods and education around their importance and health benefits
Modernisation	Commodisation	Promotion of self-sufficient communities through education of home/self-produced foods
Urbanisation	Delocalisation	Decentralisation of food systems in favour of closer proximity to humans
Migration	Acculturation	Integration and exchange of traditional foods with adopted foods to discourage total loss of consumption of traditional foods among migrant communities

fig 6. Table of author’s sustainable response to the developmental perspective on Food culture (Source: Author, 2020).

2.4. Sharing of Food

Global immigration and migration have resulted in an interconnected, multicultural world. When an individual migrates or immigrates, he or she is often stripped of familiarity and comfort and must learn to adapt to their new environment.

Studies show that despite relocating, the customs surrounding the preparations and consumptions of food among migrant communities remain persistent (Brown and Mussell, 1984). The preparation and consumption of food is a medium through which one can access feelings and memories that are often buried in their subconsciousness. People cope with and adapt to the changes that come with migration differently. Some people fight off the loss that comes with it by maintaining a sensorial link to their old home through the consumption of food from home, either on an everyday basis or on special occasions (Mata-Codesal, 2008). Thus, food and language play a vital role to our sense of identity, distinguishing one human group from the next (Fischler, 1988: 275) and allows one to recreate a sense of home.

Food and language are the first cultural traits which humans learn, and the ones which they are most unwilling to change. Gabaccia (1998: 6) researched that after the age of twelve, it is difficult for humans to lose their accents when they learn new languages and the foods eaten during their childhood will always define familiarity and comfort for them. Therefore, were there to be a Cultural Hierarchy of Needs, like Maslow's Hierarchy of Basic Needs, food and language could form part of the base of that pyramid as they are an integral part of one's cultural identity.

There was a study in the African Journal of Food, Agriculture, Nutrition and Development which aimed to explore the food practices and health benefits among the Congolese forced migrant community in South Africa, using Yeoville as a case study. Among the many findings of the research, it was revealed that the participants relied on consuming traditional foods from the DRC, as they found it to be medicinally valuable and much more beneficial to their health than if they were to consume food in their host countries (Drimie & Lakika, 2019).

A similar study exploring the roles that food practices and preference play in fighting off the sense of fragmentation triggered by migration, done on a group of Ecuadorian migrants living in Santander, Spain, revealed that those migrants too experienced strong levels of attachment to Ecuadorian food (Mata-Codesal, 2008). One could conclude that food allows one to experience home, which is connected to culture and the sharing of food allows one to exchange their culture with others. This role that food plays leads one to question the impact food can have for cultural exchange and experience among migrant communities.

Migrants have influenced the sociocultural dimensions of native communities through many activities such as attending a musical performance, but more noticeably through the sharing of food and culinary traditions, resulting in food diversity and greatly enriching native communities (Wmr, 2020).

Food sharing is an activity that is vitally important in culture (Ma, 2015). It is a tool which opens the door for social bonding (Pilcher, 2017), possessing the capacity to unite people; celebrate cultural cohesion, and establish an understanding of the cultural rituals of a community (Brown and Mussell, 1984: 5). It holds great power as it allows for migrants to be better understood and valued in their new communities (Skerry, 2002).

Ouessedik (2012: 55) describes food sharing as a two-way process:

“Immigrants travel with their culinary practices and habits while acquiring new food customs that they adapt naturally to their new life and, occasionally, import to their countries of origin. This mixing takes place, therefore, in both directions, as a reflection of human beings' need to share and dialogue, expressed through food.”

This two-way process is very much what makes the world a melting pot of cultures that has existed since the beginning of time where migrants traded spices, crops, and oils upon their arrival to new places.

When “chicken tikka masala” – a dish originally from the Indian-Pakistani-Bangladeshi nations – became Britain’s national dish, it highlighted the sociocultural contributions of diaspora communities and emphasised the power of food to bring diverse people together, in sharing and preparation (Lal, Reeves & Rai, 2006). What once was known to be migrant food had overtime become established as local food.

The Slow Food movement, which aims to sustain local food cultures and traditions, was compared to a gateway drug for public engagement, environmentalism, and world change because of the ability to find common ground between people when sharing food with them (Koenig, 2011). Food not only becomes a medium through which people learn to understand one another, but it also becomes a platform which can address political, racial, class, oppression, social, environmental, cultural and gender issues within our societies. Therefore, food and the conversations it stirs becomes an important building block for communities and stepping stones for public dialogues (Philips, 2013).

The sharing of food can be a strong indicator of integration when the activity forms close contact between natives and other migrant groups, and not solely within migrant communities. Examples of this can be seen when a migrant invites a native to their house for dinner, to a wedding function or any event where culture is celebrated. A migrant eating food from home in the presence of a native may plant a seed of curiosity in the mind of that native, which then starts a dialogue around what the food is, how it’s made, and where it can be bought. Its taste, if not completely different to what the native is familiar eating, can either be compared to something similar which they have eaten, anchoring them in familiarity, or it can expose them to a different cultural experience.

A report about migrant-native integration (García Santiago and Zubieta Irún, 2003) revealed that African and Eastern European migrants, despite not often sharing the same language, were more likely to formulate close links with the native population compared to Latin migrants, showing that language is no barrier to cultural integration.

Providing migrants with many opportunities to eat foods from their countries has been found to provide them comfort and has allowed them to feel connected to their homes in what has now become their new homes (Mata-Codesal, 2008). However, challenges to consume foods from home are encountered due to lack of availability and access. Therefore, this leads one to understand that cultural security is also essential to the development of a sustainable city and to sustaining culture. It can be defined as the challenge of maintaining cultural identity in the presence of modernisation and globalisation (Nemeth, 2016). It considers the cultural needs and differences unique to all individuals, ensuring that they are well treated according to those cultural needs and not diminished due to their perceived or actual differences (Cultural security, 2020).

The contributions of cultural exchange through food, serving to promote social cohesion, health, and the well-being of culturally diverse communities, need to be recognized by policy makers, as outlined in the UNESCO policy framework, so that positive and appropriate steps towards development can be taken (Wmr, 2020).

Chapter 3: Cuisine

3.1. The effects of Urbanisation on Food

The integration of food production within the urban fabric proves to be beneficial to the ordinary urban citizen. This leads to the understanding that decentralisation development in agriculture and food production systems from the outskirts of cities leads to opportunities for the ordinary urban citizen to be empowered as they become less dependent and more self-sufficient.

In his book *Social change and foodways*, Sobal (1999) outlined that the structural changes brought about by urbanisation as a result of rural-urban migration, had brought about food cultural changes in the form of delocalisation, which saw individuals becoming consumers of food rather than producers of food.

Furthermore, urbanisation has resulted in an increase in population in cities and a change in the diets and agricultural demands of an increasingly diverse city population (Satterthwaite et al., 2010).

These demands are met in ways that empower corporations, farmers, companies, and local and national economies more than they do the ordinary urban citizen, who becomes heavily reliant on outsourcing his or her agricultural demands (Satterthwaite et al., 2010).

Due to urbanisation, less people are employed in the agricultural sector, with more people employed in non-agricultural sectors such as retailing and transport (Cohen & Garrett, 2009).

The long working hours and an increase in sedentary lifestyles result in dietary changes of citizens (Popkin, 2001; de Haen et al., 2003), and a shift is made from diets consisting of indigenous, homemade foods to processed, mass produced and pre-prepared foods. Therefore, continued urbanisation should be done in manners that not only promotes economic growth of the urban environment, but that also protects and promotes the health of urban citizens.

3.2. Urban Agriculture

Former mayor Herman Mashaba of Johannesburg announced in April of 2019 of plans to invest in the inner city through the construction of more accommodation for residents and students during the year 2020 (Retief, 2019). This new investment means that even more people will be able to be accommodated by the city, bringing us to question how the city will accommodate all these people. The provision of affordable housing within the city alone will not be a very effective measure in making the inner city sustainable in the long term.

With two thirds of the world's population predicted to be living in urban areas by 2050 (UN DESA, 2018), where there is a presence of people, there is a need for food. The World Economic Forum states that 80% of food will be consumed in the inner city by the year 2050 (MacArthur, 2019) and statistics also show that up to 60% of households in the less affluent parts of Johannesburg are food insecure (De Wet et al. 2008). Therefore, investing towards a sustainable city will require the merging of urbanism and sustainable food systems, through the integration of ecology in the designs of cities to makes them prosperous (Pickett et al. 2013).

The past quarter century has seen the production of food be pushed to the outskirts of cities. However, transportation of food from farms located on the outskirts of cities to the inner cities is no longer seen as an economically viable solution given the environmental damage of fuels to the atmosphere, as well as the increase of peak oil prices (Philips 2013), which can in turn hike up food prices.

Philips (2013), uses Cuba as a great example to illustrate this point. Prior to 1991, most departments such as the health, education and agricultural departments in the country were centralised. This was due to Cuba's close ties with the Soviet Union, whom the country relied on for affordable fossil fuels responsible for powering this centralised system, which was heavily reliant on transportation due to its large distance away from communities. However, the collapse of the Soviet Union proved to be a very challenging time for Cuba as they could no longer receive this supply of cheap oils.

This resulted in Cuba decentralising its infrastructural system. Most communities now had doctors and clinics throughout the country and there was a huge increase in the number of educational infrastructures.

Most people could access food within walking distances from their communities as urban farms became the main producers of organic foods. The community's health benefited greatly due to decentralisation, as there was a reported decrease in heart disease and diabetes (Zaera & Pae, 2017).



fig 1. Urban farm in La Sazon, Havana, Cuba (Source: McNamara, 2018).

In his book *Decentralization: Definitions, Theories and Debate*, Boko (2002) defined decentralisation as “the transfer of authority from a central government to a sub-national entity”. He further explains the theory of decentralisation as an aim at empowering local communities to handle their needs and challenges to promote their own development.

Urbanisation brought about social changes in the form of migration that influenced food culture in the form of delocalisation, as outlined in figure 6 (Sobal, 1999) of Section 2.3 of this research report. It was suggested that a sustainable response to the food cultural changes be the decentralisation of food systems in favour of closer proximity to humans (Figure 7 of Section 2.3).

This food cultural change in the form of delocalisation resulted in a shift of population transforming into food consumers from being food self-producers due to the increasingly distant sources from which food came (Pelto & Pelto, 1983). Delocalised food systems are characterised by a reliance on distant and anonymous secondary relationships between farmers, processors, preparers, and consumers, while local food systems are characterised by close primary relationships between those who are involved with food (Sobal, 1999). This suggests the thinking that decentralisation of food systems is integral to a city's sustainable development, as seen with Cuban cities.

Decentralisation within agricultural production is expressed as improvement on agricultural services, with the aim of increasing cost effectiveness and sustainability. It is also expressed through the introduction of new systems or the enhancement of existing ones which manage and protect not only agricultural resources, but natural and environmental resources (FAO, n.d.).

The Urban Agriculture Initiative is an example of efforts to decentralise the development of agriculture. Its goal is to decentralise agriculture from the outskirts of Johannesburg to the inner city, creating a close-knit urban agriculture ecosystem.

Its partnerships with various stakeholders, like the Johannesburg Property Company, enable it to re-purpose unused rooftops in the city for agriculture production using aquaponic and hydroponic methods, with a vision to expand production to sidewalks and under-utilised spaces within the city (“Fact sheets - Minerals Council South Africa” n.d.).

With more than 60 active rooftop farms in the city - the JFF Rooftop Farm in Braamfontein being one of them - it hopes to tackle issues of food security and high unemployment, regenerating inner-city communities in the process. This initiative is a good start, seeing as the city of Johannesburg faces dire unemployment issues, especially among its youth. However, these initiatives of urban farming in Johannesburg may not yet be large or established enough to take on the responsibility of supply by the centralised farming systems located on the outskirts of the city, upon which citizens are still heavily dependent. Thus, the more precedents we have, the more advantage is acquired in tackling urban issues.



fig 2. JFF Rooftop Farm, Braamfontein (Source: Author, 2020).



fig 3. JFF Rooftop Farm, Braamfontein (Source: Author, 2020).



fig 4. JFF Rooftop Farm - Spinach pot plants (Source: Author, 2020).

Shortening the distance between people and healthy foods can not only improve access to those foods but it has the potential to make food more affordable. Additionally, farming in the city has benefits such as reducing the urban heat island effect (US EPA, 2014) as plants remove the heat in the atmosphere resulting from carbon emissions through evapotranspiration, and release oxygen into the air, which could potentially lower heat waves that are common in cities like Johannesburg. This suggests the need for general population to be informed of the environmental and health benefits due to urban agriculture.

Due to the compact character of urban areas, there is not enough arable land for farming. Therefore, technologies which support farming without land being present need to be used. Various systems like Hydroponic systems, known as Nutrient Film Techniques, have already been implemented in the many functional rooftop farms within the city. Additionally, with water being a major element in farming, sustainable methods and strategies dealing with water management and storage, such as rainwater harvesting, stormwater treatment, and greywater systems, need to be implemented to better integrate urban farming within the city. These technologies and strategies need to be taught to up and coming urban farmers within the area, as well as the general population.

The Urban Agriculture Initiative is an example of efforts to decentralise the development of agriculture. Its goal is to decentralise agriculture from the outskirts of Johannesburg to the inner city, creating a close-knit urban agriculture ecosystem.

Presently, urban farming has become a worldwide and growing trend that is practiced on unused rooftops around the inner city. Other mediums include greenhouse farming, rooftop farming, aquaponics, hydroponics, aeroponics, vertical farming and food sheds (Philips, 2013). These mediums, as well as the instruments of supply to which these farms market, provide city dwellers with access to fresh and healthier food options. Furthermore, through shortening the distance between people and food, it opens many possibilities for the use of food as a platform for economic growth, education, and cultural exchange to address societal issues such as poverty, inequality, and unemployment.

3.3. Food Self-sufficiency

Cuba's urban farm-fed cities provide are exemplary precedents for self-sufficient cities. Its ecological footprint per capita and its Human Development Index Rating qualify them to be the only nation in the world that is considered to be sustainably developed, according to the World Wildlife Foundation's definition of the term (World Wildlife Foundation, n.d.). It is imperative to acknowledge that total self-sufficiency for many urban communities is an impossible goal (Rogerson, 1993). Urban communities, especially in Africa, have a plethora of needs, of which urban agriculture and food systems are elements to those needs, especially when it pertains to managing poverty in African cities (Rogerson, 1993). As distant and impossible is the goal for urban communities to be self-sufficient, it is crucial to understand and search for ways in which the degree of urban food self-reliance can be extended (Sachs & Silk, 1987).

Self-sufficiency is the capability of providing for one's own needs without outside aid (Merriam-Webster n.d.), especially with regards to food production. The increasing global population and urbanisation have resulted in decreasing resources and climate change, forcing us to rethink the way we live in a sustainable manner and to reconceptualise what a community should look like.

A component of this research explores the decentralising of farming to create a small inner-city network of food supply with a primary goal to allow migrant urban communities in particular to better experience and celebrate their cultures through the foods they consume in the host land. The vision is not only for urban communities to be strengthened, but also for them to be developed towards food self-sufficiency.

Food self-sufficiency refers to the ability of a country to meet its consumption needs for food from its own production, rather than being excessively reliant on buying and importing (Minot, 2010). It is expressed as a ratio between food production and available supply, known as the self-sufficiency ratio (SSR) (Clapp, 2017). Food security exists when a population is physically and economically able to access food that is sufficient, safe, and nutritious at all times, to meet its "dietary needs and food preferences to live an active and healthy life" (World Food Summit, 1996). However, a country or community that is food secure may not be food self-sufficient.

Food self-sufficiency is also directly related to a country's resource availability. Natural constraints such as unavailable land, water and fertile soil can severely hinder a country's agricultural production, thus, decreasing its chances of achieving food self-sufficiency – a problem faced by 66 out of 195 countries in the world (Fader et al. 2013). A country in this situation relies heavily on imports to meet their food needs, which may prove not to work in their favour should a crisis such as the COVID-19 Pandemic hit. Therefore, food self-sufficiency can shield countries from disruptions in the global food market (FAO, 1996).

At a global perspective, food security is the predecessor to food self-sufficiency and holds more importance. However, food self-sufficiency can be a bonus and a good economic indicator of a country or community, especially if that country or community manages to trade its produce in addition to consuming it.

In the map below, South Africa has a self-sufficiency ratio of between 85% to 115%, meaning that the country's food production is close to the same as its food consumption, and also means that the food meets the dietary needs of the population, who experience low hunger levels (Clapp, 2017).



fig 5. FAO Food Balance Sheets, 2007–2011 data for cereals and starchy roots by volume (Source: Clapp, 2017).

This diagram represents data at a national level. A more accurate measure of this data can be obtained when the data is representative of not only the nation, but also the various levels within the nation – the community and household level.

Furthermore, this diagram uses cereals (grains) and starchy roots as the primary indicators of food self-sufficiency. The farming of these cereals and starchy roots need available land, fertile soil, and water, which are often in low supply in urban communities.

Therefore, leafy vegetables can be a suitable and more nutritious alternative measure of food self-sufficiency, especially for urban communities, as they are low input crops and can be farmed in diverse ways (Denby, 2020). In comparison to starchy-based diets, leafy vegetables are high in micronutrients such as pro-vitamin A, iron, and folates, however, their consumption in South Africa is low compared to other African nations, such as the DRC (Shackleton et al., 2009).

This suggests that prioritising urban farming of leafy vegetables could greatly benefit urban communities in becoming food self-sufficient and in developing healthier food choices through the promotion of increased vegetable consumption. Furthermore, leafy vegetables and their diverseness have the ability to cater to a culturally diverse urban community. These are crucial elements to adopt towards an inclusive approach to urban development and extending the degree of urban food self-reliance.

Policies advocating for food self-sufficiency are used by some countries to strengthen their domestic agriculture sector (Clapp, 2017), which can in turn be used to promote urban agriculture in the inner city. This has been noted in the small-scale policy initiatives of Asian countries that encourage home gardens as part of the large-scale programmes which target food self-sufficiency (Yeung, 1987).

However, such attempts to become more self-sufficient can become very expensive, calling for investments in the nation's domestic agriculture sector. With agriculture being unprioritized in many city planning policies, its strong presence and growing implementation proves to play an important role in improving the sustainability of cities. As a result, many farming innovations have sprung up as a response to the various limitations of urban farming in cities.

The COVID-19 pandemic has brought along worldwide social, economic, and environmental restrictions, making it harder for people to buy and access food. This disruption to the food supply chain due to the pandemic (Lal, 2020) has shed light on the importance of small-scale home gardening being a logistical solution to access to fresh food (Galhena et al. 2013).

Informal traders prove to be central key players to food security in Johannesburg. A survey done by the African Food Security Urban Network showed that just under 9 in 10 households in Johannesburg obtain their food from informal markets or street traders (Webster, 2020). Furthermore, an estimated 60% of goods that are sold on the informal township market come from the Johannesburg Fresh Produce Market (Dean, 2020).



fig 6. Informal trader on Abel Street, Berea selling spinach, 'lebu' and 'tunga' green leafy vegetables (Source: Author, 2020).

The street traders usually wake up before dawn to make their semi-weekly trips to the Johannesburg Fresh Produce Food Market where they get to replenish their stock. However, due to trade restrictions during the crisis, supply to chain stores and supermarkets are being prioritised, therefore, disfavours the small informal supply of fresh produce.

Therefore, were farms located closer to where the informal traders sell, this would not only be beneficial for the environment, but it could also increase the economic efficiency of these traders. Additionally, it can also be understood that had residents been practicing small-scale gardening, they might not have been gravely affected by the lack of food supply during a pandemic due to their dependence on external food sources.

This pandemic highlights the need for farming to be decentralised from the outskirts of cities and to be integrated within the inner cities, not solely at a community level, but at a household level. The practice of small-scale gardening would serve as an important contributor to food-security and food self-sufficiency should the economy continue to plummet and affect the income of many citizens.

3.3.1. Food Self-sufficiency case study

Project: Asian Retirement Community

Architect: SPARK Architecture, 2015

Location: Singapore

Key components: Asia's aging population; food scarcity

The challenge embraced in ensuring that senior citizens can still contribute to society through farming businesses highlights this case study's importance.

Spark Architecture designed a concept model for Asian retirement communities for the World Architecture Festival 2015 (Frearson, 2015). The retirement community was also designed to serve as a city farm as depicted in Figure 7.

The concept model was designed in response to two main issues plaguing Southeast Asian cities:

1. the increasing number of people above the retirement age of 65, projected to increase to one fifth of the total population by 2030
2. the city being heavily reliant on imported foods, which contributes to 90% of the total food consumption of citizens, rather than producing home-grown foods.

The goal of the model was to transform these retirement communities into farming businesses that were to be self-sufficient, so that the fruit and vegetable produce yielded from the farm could benefit residents and the city at large.

Residents would benefit by being provided with part-time employment opportunities in the farms, with the profit generated contributing to their healthcare, rent and utility bills. The model was designed to help retired residents feel involved within the community in a different way they had been pre-retirement.

Additionally, the retirement community city farm integrated small-scale home farming in each residential unit typology (Figure 9), and demonstrated various methods of urban farming, such as traditional, hydroponic and aquaponic farming, throughout the entire building – from ground floor to façade to roof (Figure 8).

This concept model serves as a strong precedent that aims to respond to the challenges faced by many growing cities of the world. The model demonstrates the importance of attending to the needs of members of urban communities who are often marginalised or neglected such as the retired communities and how they could be the catalysts for urban development. It shines the spotlight on similar communities such as migrant communities and how their needs could too instigate positive change in urban communities.

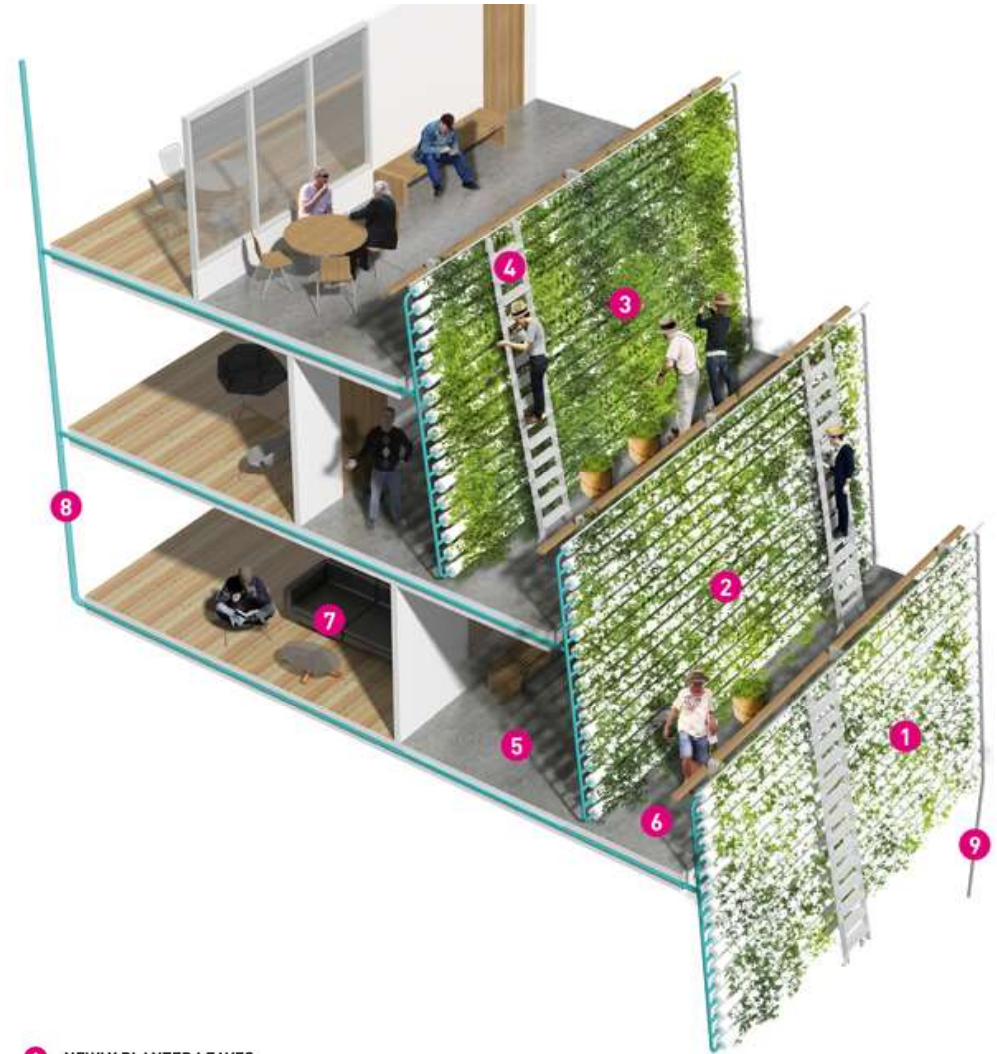
The model also highlights that though an urban community may be food secure, it may not also be food self-sufficient. Where urbanisation has brought about the delocalisation of food, there is a need for people to be reconnected with food through small-scale home farming and large-scale urban farming. Therefore, urban communities can be less reliant on outside sources and become food self-sufficient.



fig 7. Asian retirement community by Spark (Source: Frearson, 2015).



fig 8. Diagram showing possible urban farming methods throughout retirement community building (Source: Frearson, 2015).



- 1 NEWLY PLANTED LEAVES
- 2 15-DAY LEAVES
- 3 30-DAY LEAVES, READY FOR HARV
- 4 HARVEST LADDER
- 5 COVERED WALKWAY
- 6 HARVEST CORRIDOR
- 7 APARTMENT
- 8 NUTRIENT WATER
- 9 USED WATER FOR RECYCLING

fig 9. Diagram showing small-scale home farming through aquaponic farming methods (Source: Frearson, 2015).

3.4. Education on Farming

Food self-sufficiency can occur at different levels: national level; local level; community level; household level and on an individual level. All 5 levels have value and are important. Learning how to cook, starting a garden, and decluttering one's living space are just a few ways an individual can learn to become self-sufficient.

2019 saw up to 2.2 million South African households invest in food gardens (Celliers, 2019), which is indicative of people's drive to become self-sufficient, becoming producers instead of simply consumers of the food they eat. In a way, individuals of these households have become farmers in their own rights, which indicates the urgency in increasing agricultural education through skills and training. In educating one about agriculture, negative social stigmas related to farming should be removed, such as the stigma that gardening is a desperate means to access food that is practiced by the poor, or using gardening as a form of punishment to school children by educators. For it is through educating households and individuals within communities that one can bridge the gaps that are already being filled at a national, local and community level.

3.4.1. Education on Farming case study

Project: The Science Barge

Architect: Ted Caplow, 2008

Location: Yonkers, New York, USA

Key components: education on sustainable farming; hydroponic farming

This case study highlights the importance of accessible agricultural education for the general public. In ushering the path towards sustainable change utilising advanced technologies, it provides a window into what future cities can look like.

The Science Barge is a sustainable, floating urban farm and environmental education centre in Yonkers, New York City. The farm incorporates demonstration greenhouses which implement hydroponic and aquaponic urban farming methods; capitalises on energy supply systems and implements water management techniques such as rainwater harvesting (Philips, 2013).



fig 10. Exterior view of The Science Barge (Source: THE SCIENCE BARGE, 2014).

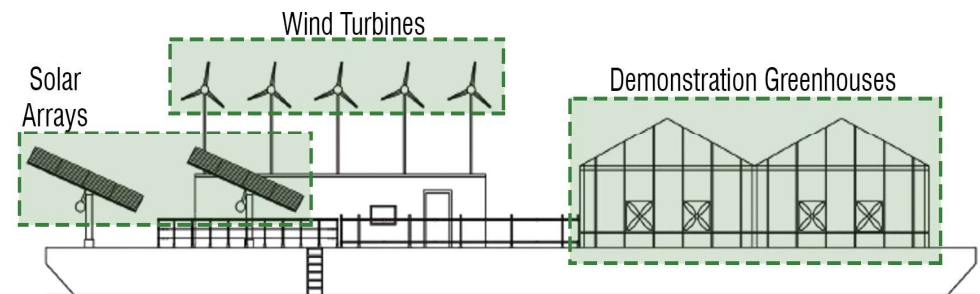


fig 11. Elevation A - A as indicated in site diagram of the Science Barge (Source: THE SCIENCE BARGE, 2014).

In working with local schools, educational programmes are hosted with complex appropriate curriculums created to educate the public on sustainable agriculture and sustainability issues such as renewable energy. Visitors may walk through the demonstration greenhouse and receive explanations as to how each farming method operates. It is mobility along the Hudson River and its proximity to public transport infrastructure also makes it easily accessible to a diverse population.

Farming in urban conditions without land is different to traditional farming methods and requires skills, training on the various new technologies, as well as knowledge on how to navigate the market. Therefore, one can conclude that the education component that is attached to urban farming should not be neglected.

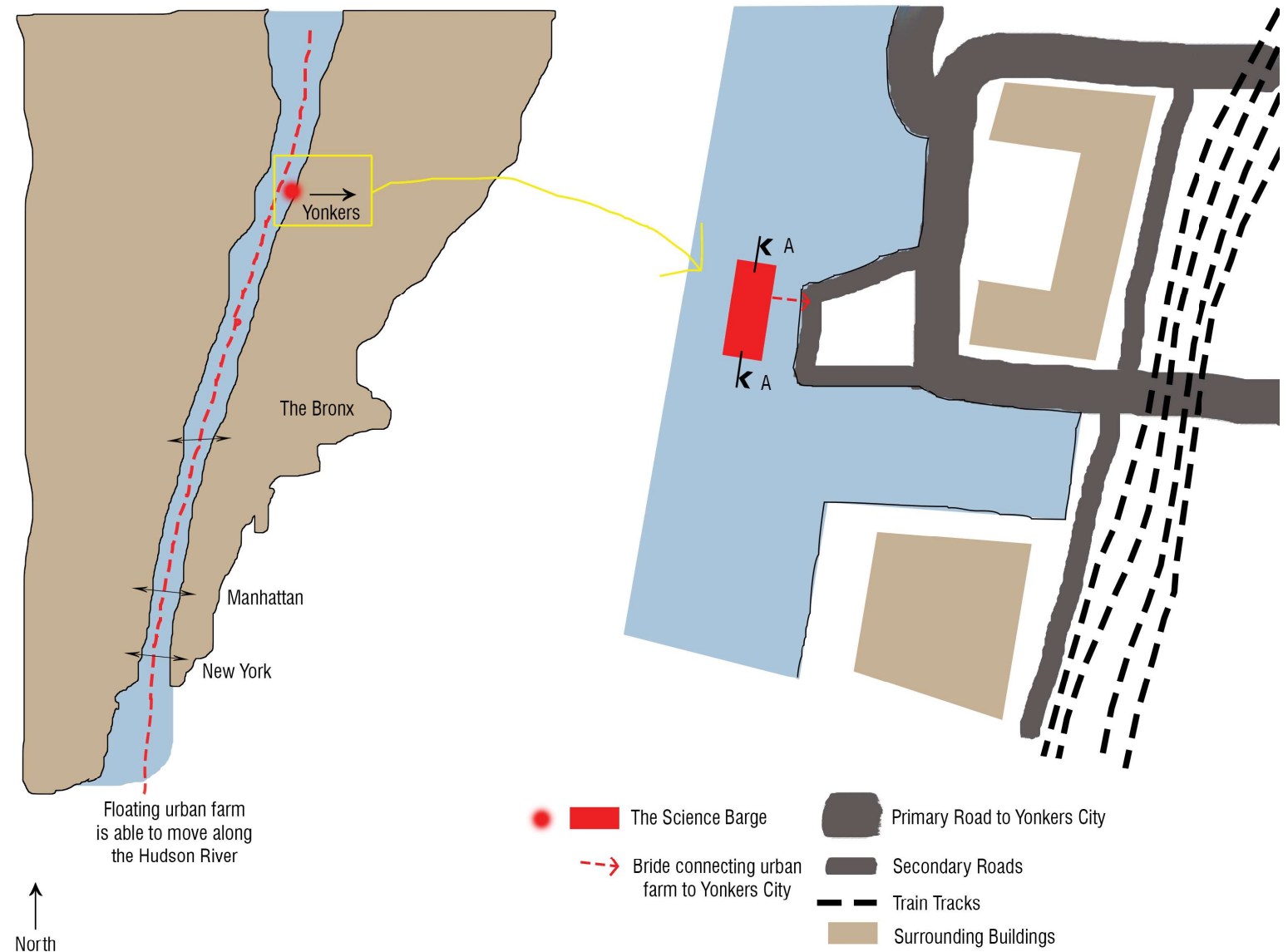


fig 12. Site diagram of the Science Barge (Source: Author, 2020).

3.5. Congolese Cuisine

Vegetables, tubers, and grains form the foundation upon which Congolese cuisine is built. Most of the population depend on domestic agriculture as their main source of income and food, with vegetable production being widespread throughout the country (Wiese et al., 2020).

Meat is often only eaten on special occasions (Hunter-Adams, 2017). Staple foods such as rice and fufu (pap) are commonly accompanied by leafy vegetables, a popular one being Pondou (cassava leaves) as it is available year-round. Leafy vegetables are also believed to prevent diseases, while excess meat consumption is believed to cause gout (Drimie & Lakika, 2019). Contrastingly, South Africans are often perceived to be lovers of meat as it often forms a compulsory part of their diet.

Upon migrating to another country, migrants often have no choice but to adapt to the food environments of their host country. However, health-related studies show that urban diets are often healthier than the migrant's traditional diets (Hunter Adams, 2017), with increasing obesity rates among migrants and high costs of nutrient-dense foods such as fish and vegetables (Igumbor et al., 2012).

Perceptions around food from one's home country compared to food in South Africa reveal interesting discourse around what foods are considered healthy and unhealthy. The results of a study examining the perception of the food environment by Zimbabwean, Congolese and Somali migrants in Cape Town brought about discourse around the smell, purity, taste and overall nutritional value around foods such as chicken, organic vegetables and camel's milk (Hunter-Adams, 2017). Some examples stated by the participants of the study included the rushed growth of chickens and the inability to smell them from miles away, the fertilising of plants and the prolonged storage of meats.

Therefore, evidence that food most certainly is a platform allowing migrants to reproduce culture can be found in this romanticism around food from home, and the craving for food from home experienced by migrants (Stowers, 2012). Foods from home psychologically link a person to their country (Drimie & Lakika, 2019). The discourse around food by migrants can be seen as a way in which they affirm and maintain their ethnic identity while maintaining a distance from the realities of life that they experience in their host countries, as food is a cultural element which is most resistant to change (Nguyen, 2003).

Further findings from the study examining the perception of the food environment by Zimbabwean, Congolese and Somali migrants in Cape Town showed participants displaying an openness to consuming less meat, were there to be an increased diversity and availability of green [leafy] vegetables (Hunter-Adams, 2017), as the most common ones to be found were cabbage and spinach. The ability for one to consume a diverse diet of food in Low to Middle Income Countries such as DR Congo is largely dependent on land access, which includes farmlands, whereas, in Upper Middle Income Countries like South Africa, dietary diversity is dependent on access to money (Hunter-Adams, 2017). It can be easier to encourage healthier and diverse food environments in places where those food options are already desirable (Herford & Ahmed, 2015), such as places that are culturally diverse. Thereafter arrives the challenge of making those foods accessible and affordable, especially in an urban context and in a country where high sugar and processed foods are largely desirable, easily accessible, and affordable (Igumbor et al., 2012).

In a panel series on Academic Thinking on Migration at the United Nations University, panellists recommended an inclusive approach to urban development through suggesting that policies promoting integration and inclusion in urban areas should be aimed at all diverse urban communities and should not specifically target migrant communities (Blocher, 2017). The inclusion of food options that are culturally diverse would serve to integrate diverse communities, making urban environments welcoming for migrant communities. In paying attention to the discourse around food provided by migrants who have entered a new environment, light is shed on the state of food choices and the lack thereof. Efforts towards appropriate food interventions, especially through spatial design, can then be made in a way that is inclusive to all individuals and communities within the urban context, allowing them to experience their culture through foods that are unique to their communities.

3.6. African Leafy Vegetables

African Leafy vegetables (ALVs) are normally the main components of traditional African dishes (Shackelton et al., 2009: 65). It is common for African nations to eat the same type of leafy vegetables. However, the way that these leafy vegetables are prepared and cooked differ from nation to nation. Additionally, the regions in which they grow make the crops identifiable by a genus name, species name (depending on the temperatures and rainfall it needs), and variety (depending on the location in which they grow). For example, cassava leaves are a popular food eaten within the Congolese community, however, Mozambicans are known for favouring the cassava roots and disposing the leaves due to the different variety of cassava that grow in that region, making the leaves toxic.

When ALVs are prepared in the right way and consumed regularly, they provide good source of nutrients (Janse van Rensburg et al., n.d.). The benefits of farming ALVs include the fact that they are cheap to produce and therefore may not cost much as a result; they are diverse and can cater to different nations; and they are also sustainable to produce as they require less pesticides (Denby, 2020). Some problems which occur in farming ALVs on land such as irrigation, drought, pests, and diseases, as well as seed supply, can be counteracted when farming them in urban areas (Liu et al., 2016) and under more controlled conditions provided by vertical farming methods. It is also recommended that ALVs be farmed within or near cities due to their short shelf life (Shackleton, et al., 2009: 38).

Studies show that food diets of Africans are increasingly monotonous, and Africans are eating less traditional foods which include ALVs (Shackleton, et al., 2009). This suggests the thinking that culture is being lost as Africans are adopting a more western way of eating. Many Africans lack the knowledge of what their indigenous foods are as well as how they are prepared (Maundu et al, 1999; Vorster et al, 2007a; Akpavi et al, 2008), and the nutritional value which they hold. As it is common for people not to deviate too far away from food habits; preparation techniques passed down in early childhood by elders have a life-long influence, even if people migrate (Sodjinou et al., 2009). If this indigenous knowledge cannot be passed down effectively from one generation to the next, other strategies need to be implemented to ensure cultural sustainability among Africans and to see an increase in the utilisation of ALVs. Among the youth and urban populations, ALVs are perceived to be foods that poor people eat, while affluent people regard them highly due to their nutritional value (Maseko et al., 2017). This stigma needs to be removed through proper education of African Leafy Vegetables.

Apart from the challenges that come with producing, marketing and consuming ALVs, the main challenge comes when it is time for the post-harvest handling and preservation of ALVs (Smith and Eyzaguirre, 2007). This is because ALVs have a high perishability rate and most of them are seasonal, growing mainly in summer. Preservation through openly drying the leaves of ALVs is practiced in many African nations such as South Africa (Vorster et al., 2007), but is more common in rural areas. However, this method of preservation results in dust and dirt contamination and predation (Shackleton et al., 2009: 108). Although urban areas have better storage facilities, one should consider whether the urban poor can access such facilities.

In my household, my mother often buys a variety of ALVs before they become scarce during winter seasons. Amaranth, roselle leaves, and cassava leaves are the ones commonly bought (Figure 13). She then begins the process of preparing them before they are even cooked. Since these leaves are covered in dirt from the ground, they are washed till they are clean; chopped and then packaged in plastic bags before being frozen in the refrigerator. With an anticipated growth in the Frozen food market in South Africa during 2020-2026 (6Wresearch, 2020), the possibilities of there being a market for frozen packaged ALVs opens opportunities when it comes to the access of nutritious food during winter seasons, especially for the urban poor.

In conclusion the choice of farming African Leafy Vegetables can be seen as an inclusionary response to the culturally diverse nature of cities and a response to ensure cultural security of the diverse urban population. Their nutritional value and ability to be farmed using diverse methods make them suitable to be farmed in urban areas, which may spark innovative ideas on how they can be farmed and marketed to be accessed by the urban population. One such idea could take the form of a public building facilitating the production, processing, distribution, and education of urban farming of ALVs as a platform for the celebration and awareness of diverse cultures in urban communities.

African Leafy Vegetable	Congolese Name	Other Names	Key Nutritional Benefits	Urban Farming Considerations	Height of Growth (for vertical farming purposes)	Final Dish
	Ngai-Ngai	Roselle Leaves (English)	Assists with iron deficiency and low levels of hemoglobin High in Fibre	Annual plant Frost sensitive Neutral, well-drained soil type - Minimum rainfall of 100 - 150mm / month - Full Sun (minimum 6 hours)	2 - 2.5 meters	
	Biteku-teku	Amaranthus (scientific name) Amaranth (English name)	Rich in Vitamin A	Full Sun (minimum 6 - 8 hours) - Well-drained, nutrient rich soil - Frost intolerant	1.2 - 2 meters	
	Pondu	Manihot esculenta (Scientific name) Cassava Leaves (English) Unjumbula (isiZulu)	Can contain up to 25% of Protein	Not more than 12 hours of sunlight - Light, sandy loams soil type that is fertile, moist and deep Minimum annual rainfall of 500mm	Up to 7 meters	
	Matembele	Ipomoea batatas (Scientific name) Sweet Potato Leaves (English)	Reduces risk chronic diseases	Part sun to full sun (minimum 3 to 6 hours) - Drought tolerant - Rich, well-draining, light soil	Up to 6 meters	

fig 13. Table of commonly consumed ALVs in my household (Source: Author, 2020; image sources found in Chapter 13).

3.7. Conclusion to Congolese, Culture and Cuisine

Migration of populations across the world has resulted in culturally diverse urban communities and migrant communities trying to find a sense of belonging while retaining their cultural identities due to being away from what they once knew to be home.

Cultural inclusion within these urban communities allows migrant communities to still experience and celebrate their culture despite being away from home.

Food, an element of cultural identity, is used as a platform through which this can happen, as it serves as a means of experiencing culture and a means of cultural education. Additionally, the sharing of food allows for culture to be exchanged with urban communities. The production of food that is culturally inclusive, through urban agriculture, is a tool for creating sustainable cities. For sustainable cities to be established, there is a need for urban agricultural planning policies, as well as policies that support culture as the main pillar of sustainable development.

Urban agriculture of African Leafy Vegetables serves as an inclusionary response for the sustainable development of a culturally diverse urban community and can be used as a platform to create a strong inner-city network of food supply. Policies and education around urban agriculture are significant towards the empowerment of individuals within those communities.

This research goes beyond the production of food. It is about using the production of food as a means of educating others about one's culture and seeks ways in which architecture can contribute to the creation of culturally inclusive, healthy, and self-sufficient urban communities.

Its goal is to promote the building of a sustainable city with a specific focus on food and culture through educating people to become producers of their own food and become more culturally secure, with the aims of building a socially cohesive, welcoming, and sustainable environment for all urban communities, including diasporic communities of which I am a part.



the Stem: the Site





Chapter 4: Community_Analysis

4.1. Site Requirements

From the previous chapters, the following words summarised the basic characteristics of a site:

- Urban farming
- Cultural diversity

Therefore, the factors which have influenced the site selection are:

Spatial Possibilities:

- An urban environment was to be the best option for a site as it had the presence of 'urban farming' and 'cultural diversity'.
- The city of Johannesburg, particularly the inner city, was identified as a suitable location as it has undergone transformations to reflect the urban melting pot of its cultures.
- Urban farming is increasingly growing in the inner city.

Accessibility:

- Connection to local infrastructure and public transport networks
- Connections to an existing urban farming network

Spaces that bring diverse communities together:

- Proximity to communities perceived to be frequented by the Congolese community
- Proximity to civic buildings and recreational facilities such as public parks

4.2. Context

The suburb of Yeoville in the inner city of Johannesburg has been further identified as a suitable site.

The site is not located within the heart of the Yeoville community, but is located along the edges of 2 the Yeoville and Berea community.

Map 1 (figure 2) highlights the Johannesburg Inner City context within which the proposed Community Centre will be located.

Figure 1 depicts the proposed Community Centre's highly visible location at the gateway of Yeoville and Berea. This strategic placement is intended to showcase and celebrate migrant communities and not hide them.

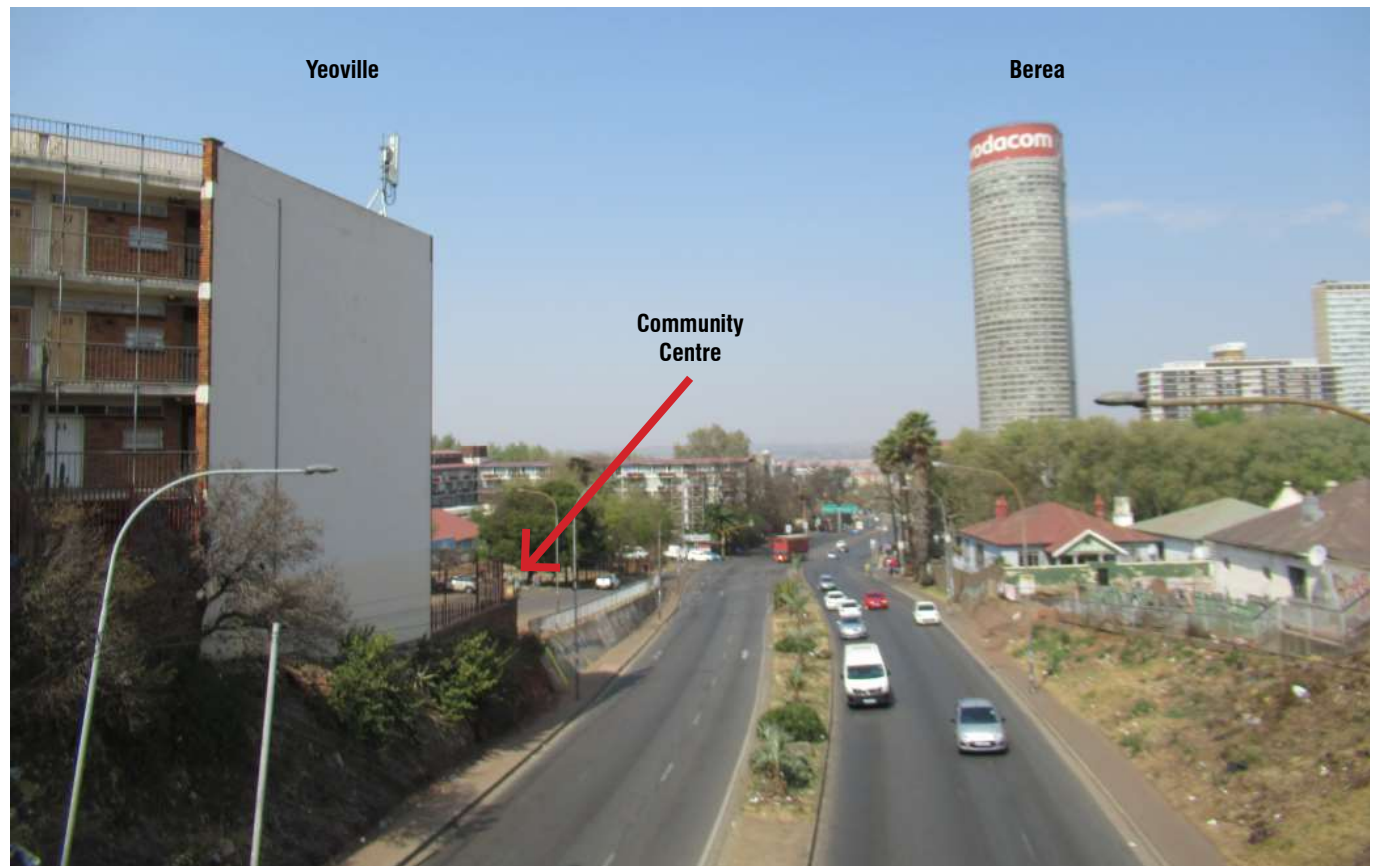


fig 1. Highly visible location of proposed Community Centre (Author, 2020).

Site: ●

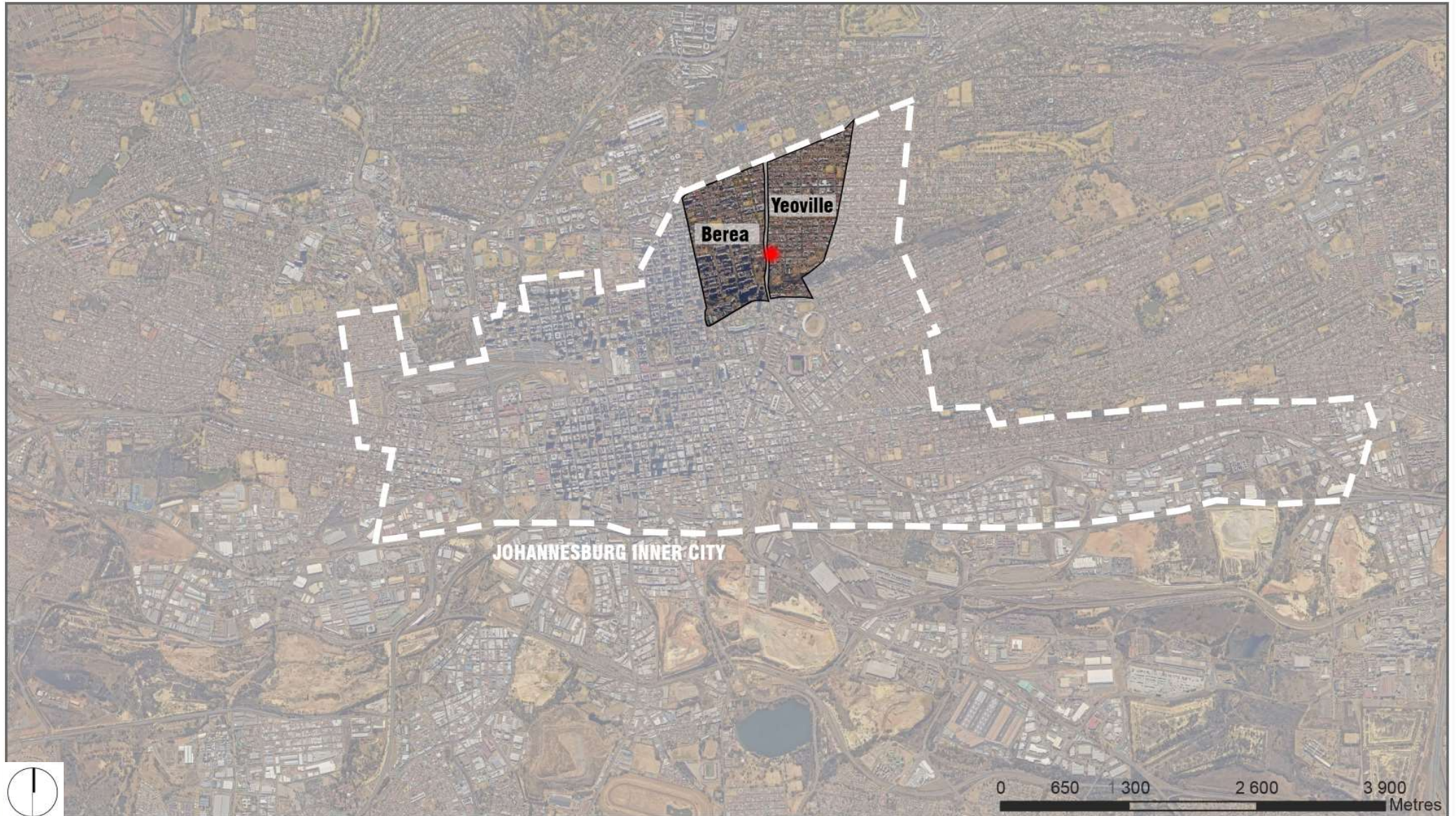


fig 2. Map 1 - Context Map (Author, 2020).

4.3. Future Growth

Property trends give an indication of the growth and decline of the area.

Referring to graphs 1 and 2 of Figure 3 and 4, as of the last 2 to 3 years, there has been a decline in the number of sales of property in Yeoville and Berea, but an increase in sale prices, especially relating to the sectional scheme units compared to the erven.

This may indicate that the areas are increasing in economic value, however, it may take time for it to reflect in the number of sales.

This reflection is dependent on various factors such as perceptions around crime and the overall physical development of those communities

As these communities are located in the inner city, they have been highlighted as priority zones of development by the local government for urban regeneration and renewal, with projects already being successfully completed in Yeoville and Berea.

Therefore, it can be concluded that these communities are suitable for proposals for development which aim to increase transformation and investment into the communities.

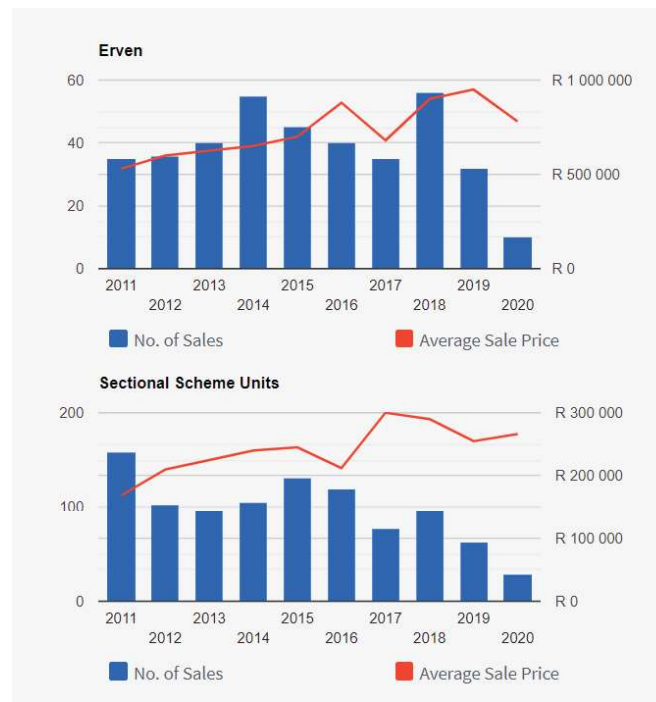


fig 3. Graph of the number of Erven and Sectional Scheme Units sold in Yeoville each year, and the average sale price (Property24, 2020).

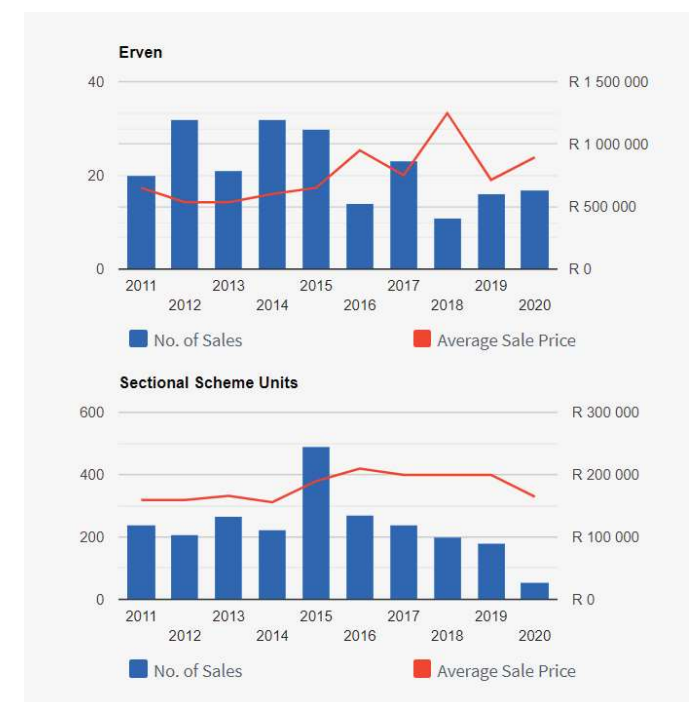


fig 4. Graph of the number of Erven and Sectional Scheme Units sold in Berea each year, and the average sale price (Property24, 2020).

4.4. History

This timeline highlights the history of the Yeoville-Berea community with regards to its cultural diversity.

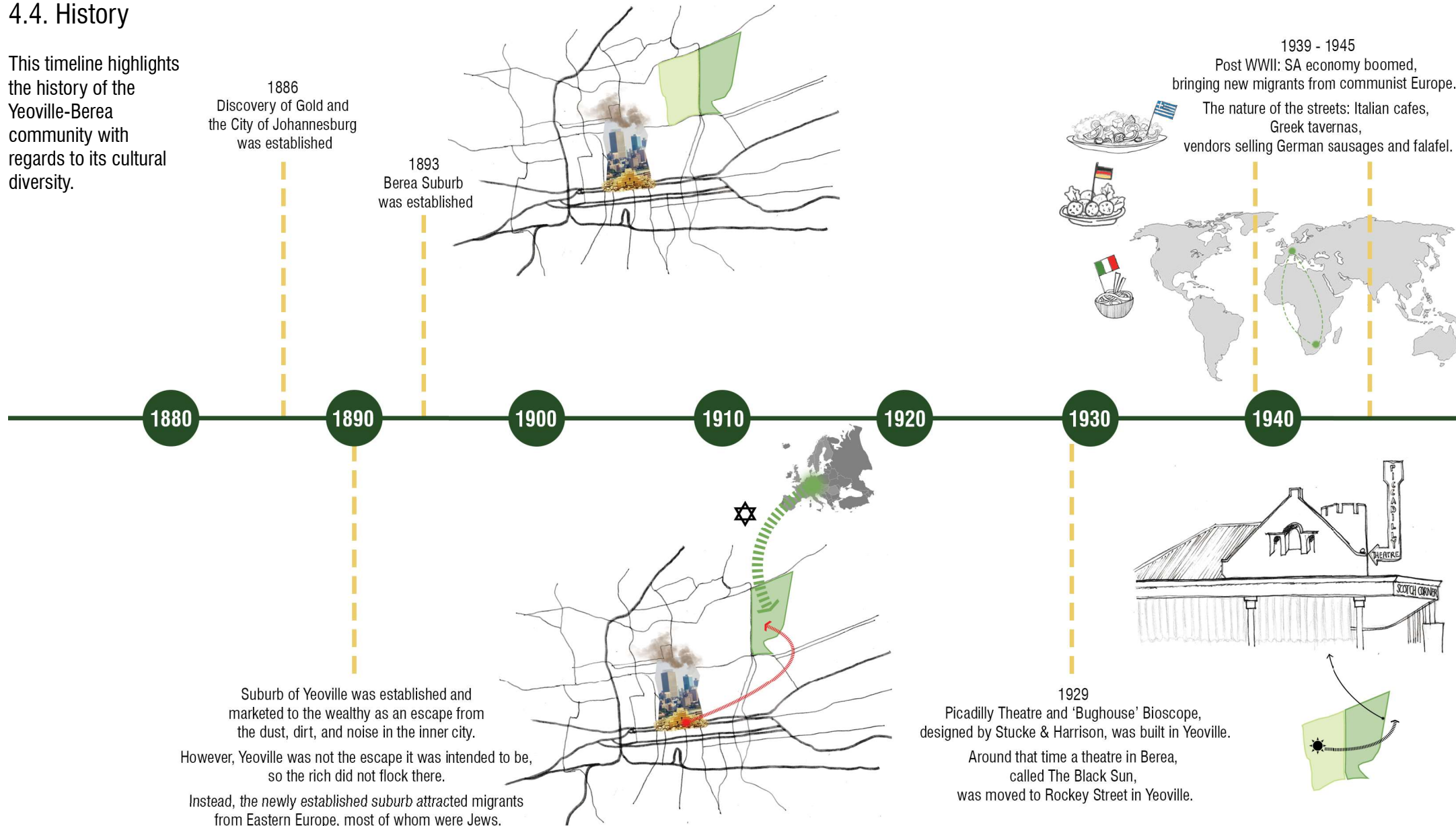


fig 5. Cultural Timeline of Yeoville (Author, 2020).

Group areas act was passed in South Africa.

Yeoville was not impacted by this law as racial mixing still occurred in the community, and it had become a pleasant escape from "white South Africa".

1950

1960

1970

1980

1990

2000

2010

Yeoville had a predominantly *Jewish* demographic

1994

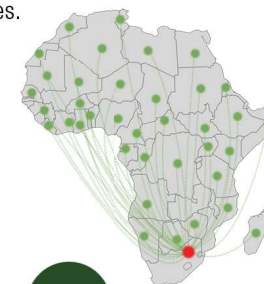
End of Apartheid.

Nelson Mandela became President.

South Africa welcomed refugees.

Early 2000s

The middle class South African population in Yeoville are replaced by migrants from African Countries.

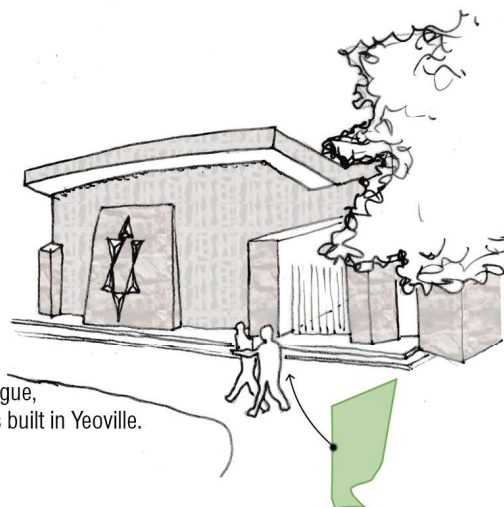


1948

Commencement of Apartheid
(culture of segregation in South Africa)

1963

Jewish Synagogue,
'The Chassidim Shul', was built in Yeoville.



Yeoville was
79% white



1998
Yeoville was more
than 84% black



4.4. Mapping

The following section seeks to explore and justify the community within which the proposed Community Centre will be located.

Map 2 (figure 6) outlines the nature of the community of Yeoville and Berea. This map was created to locate possibilities to strengthen the community aspects of the area.

Map 3 (figure 7) establishes the site in relation to the public transport network within the inner city, assessing its accessibility.



fig 6. Map 2 - Zoning Map of Yeoville & Berea (Author, 2020).

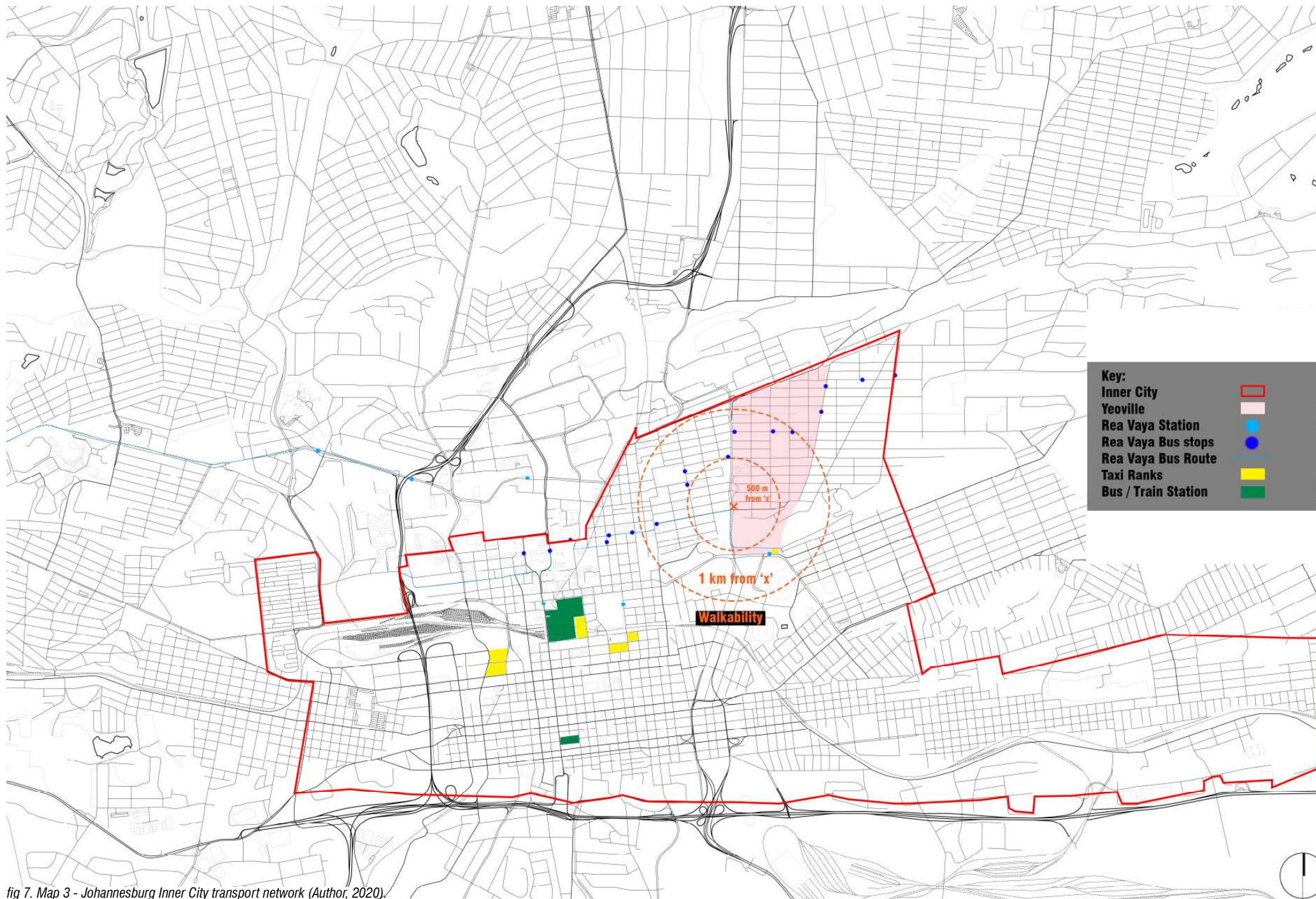


fig 7. Map 3 - Johannesburg Inner City transport network (Author, 2020).

On the following page, Map 4 (figure 8) highlights how accessible the Community Centre is to its surrounding context through private and public transportation, and walkability.

Key:

-  Site
-  Private transportation
-  Walkability
-  Bus stops
-  Main vehicular route
-  Main Bus routes
-  500m distance, 5-8 minutes walking time
-  1km distance, 12-15 minutes walking time



fig 8. Map 4 - Map of Accessibility (Author, 2020).

Map 5 (figure 9) was intended to isolate and highlight the existing public green network to see whether they can contribute to the an existing network of urban farming in some public parks and on inner city rooftops.

Strengthening this network, by making the city greener, will be climatically beneficial to the environment.

Key:

-  Site
-  Public open space
-  Green belt



fig 9. Map 5 - Public Green Network (Author, 2020).

Map 6 (figure 10) was created to show the activity of trade within the communities to establish the level of demand for fresh produce.

The high number of street vendors is indicative of the lack of formal space for trade within the communities.

Map 7 (figure 11) was created to highlight the need for urban agriculture and education within the inner city by locating how far away the existing supply of urban agriculture and institutions that provide agricultural education are from the inner city.

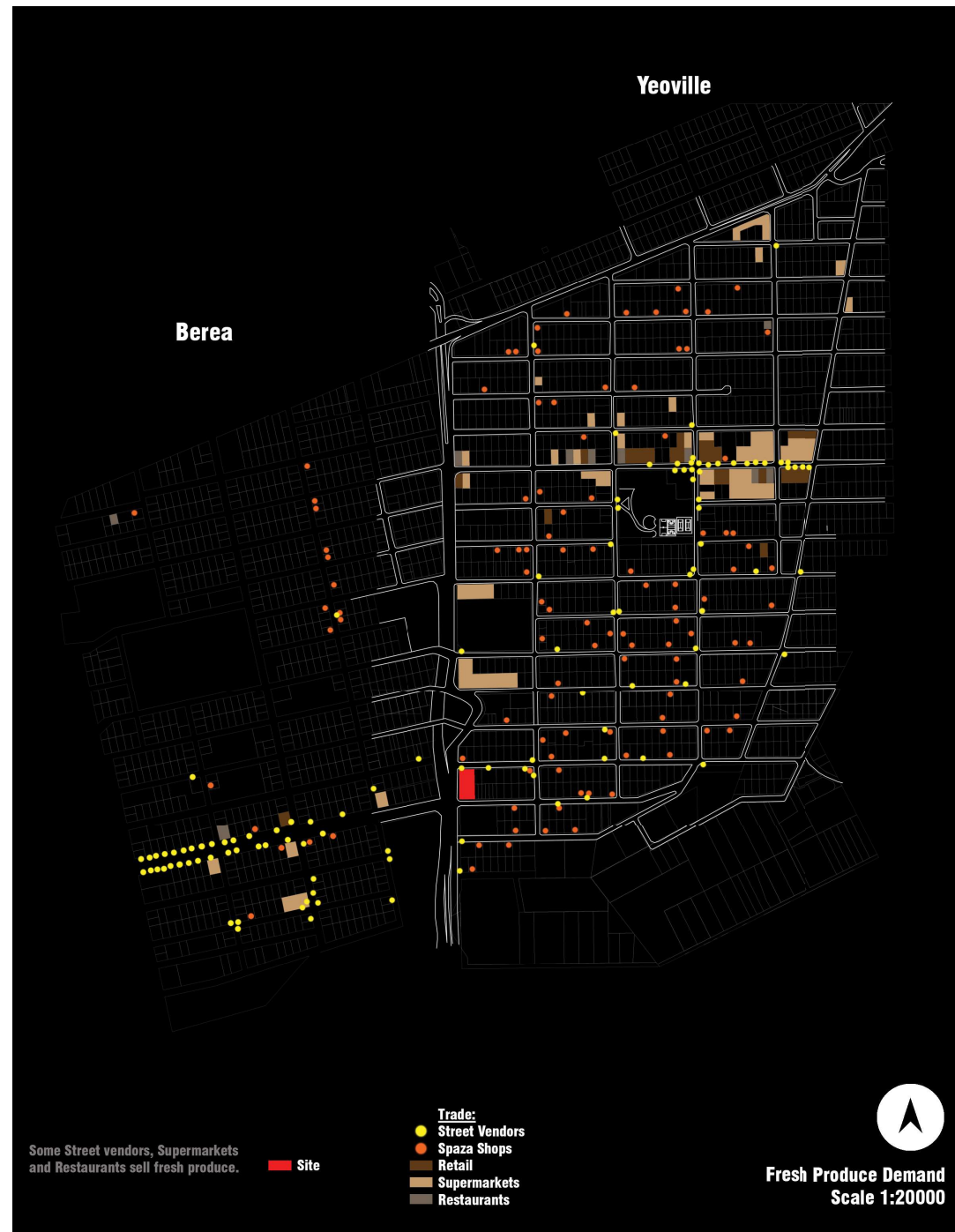
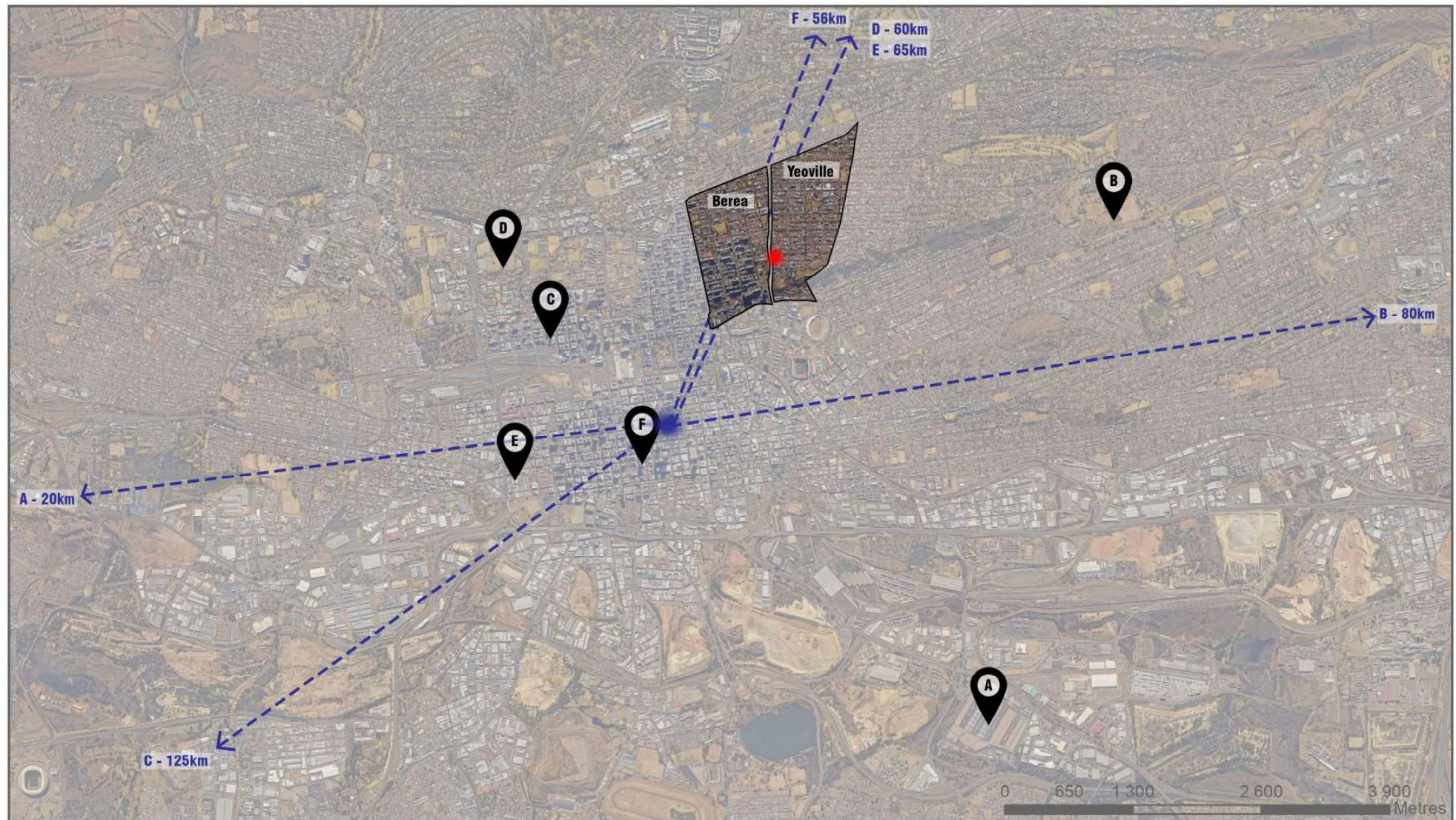


fig 10. Map 6 - Fresh Produce Demand (Author, 2020).



● SITE Location

● Johannesburg CBD

Supply

- A - Joburg Food Market - supplies fresh produce to most of the city
- B - Siyakhana Food Farm - supplies organic produce to the city
- C - Joburg Rooftop Farm - has more than 60 rooftop farms scattered in the city
- D - Wits Food Farm - supplies fresh produce for university students
- E - Urban Agriculture Initiative (WIBC) - supply training programme for urban agriculture
- F - Gauteng Department of Agriculture and Rural Development - supplies policies surrounding agriculture

Institutions providing Agricultural Education

('X' km away from Johannesburg CBD)

- A - Southwest Gauteng TVET College
- B - Buhle Farmer's Academy
- C - Potchefstroom Agricultural college
- D - Forestry and Agricultural Biotechnology Institute
- E - Agricultural Research Council Institute For Agricultural Engineering
- F - Tshwane North College

As Urban agriculture in the city increases, this may be an opportunity for institutions near JHB CBD, such as Wits & Uj, to provide forms of agricultural education.



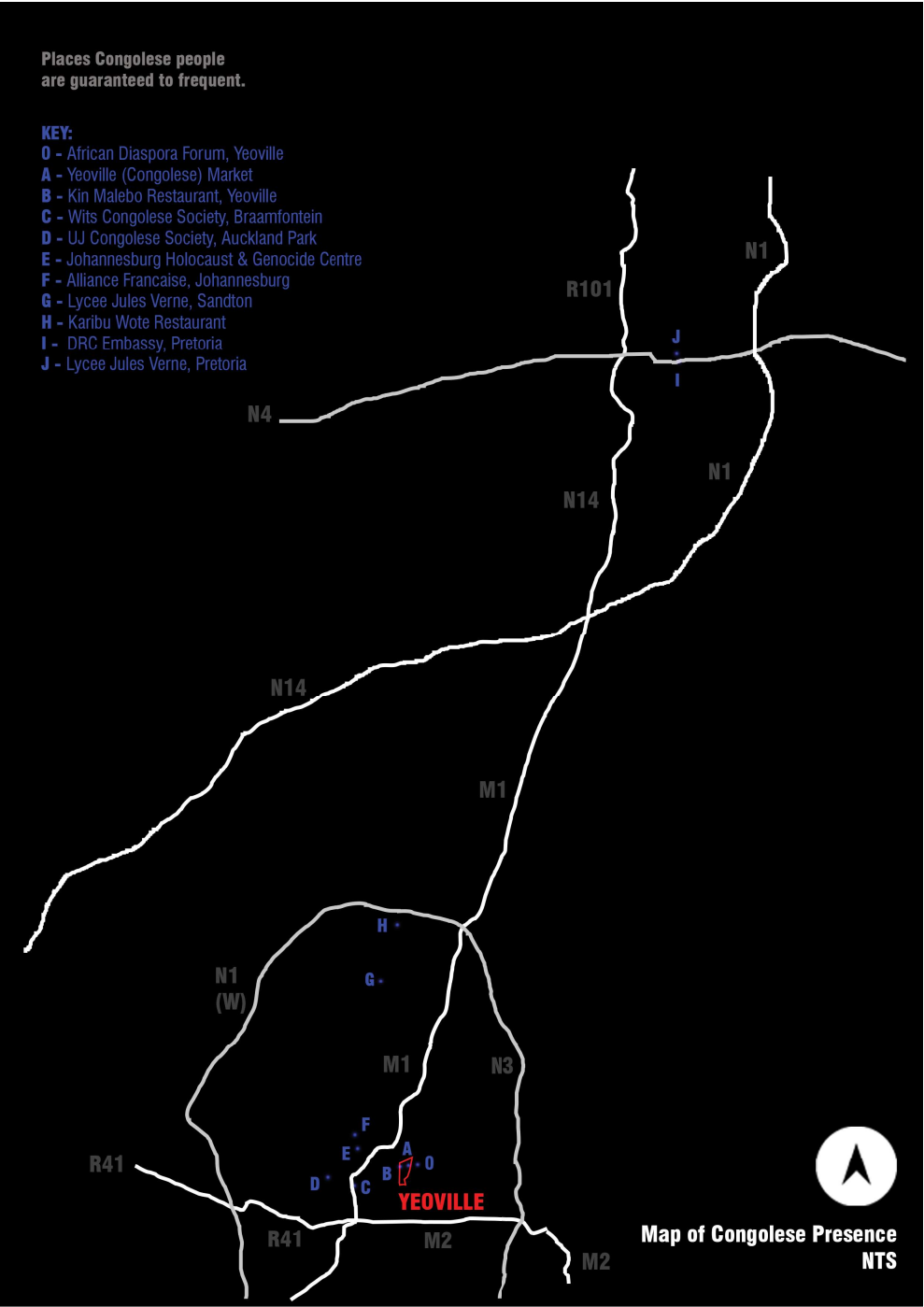
Urban Agriculture (Supply)
Scale 1:50000

fig 11. Map 7 - Urban Agriculture and agricultural education supply (Author, 2020).

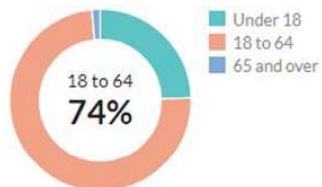
Map 8 (figure 12) was created to map out the places that people within the Congolese community are most likely to frequent such as Congolese restaurants, educational societies and places of education.

Map 9 (figure 13) was created to highlight the multicultural and diverse demographic within which the site is located.

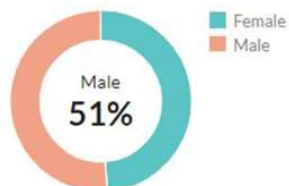
fig 12. Map 8 - Congolese Presence in Johannesburg & Pretoria (Author, 2020).



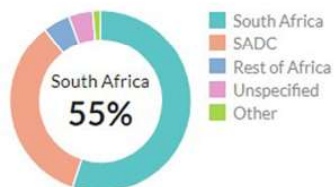
Population by age category



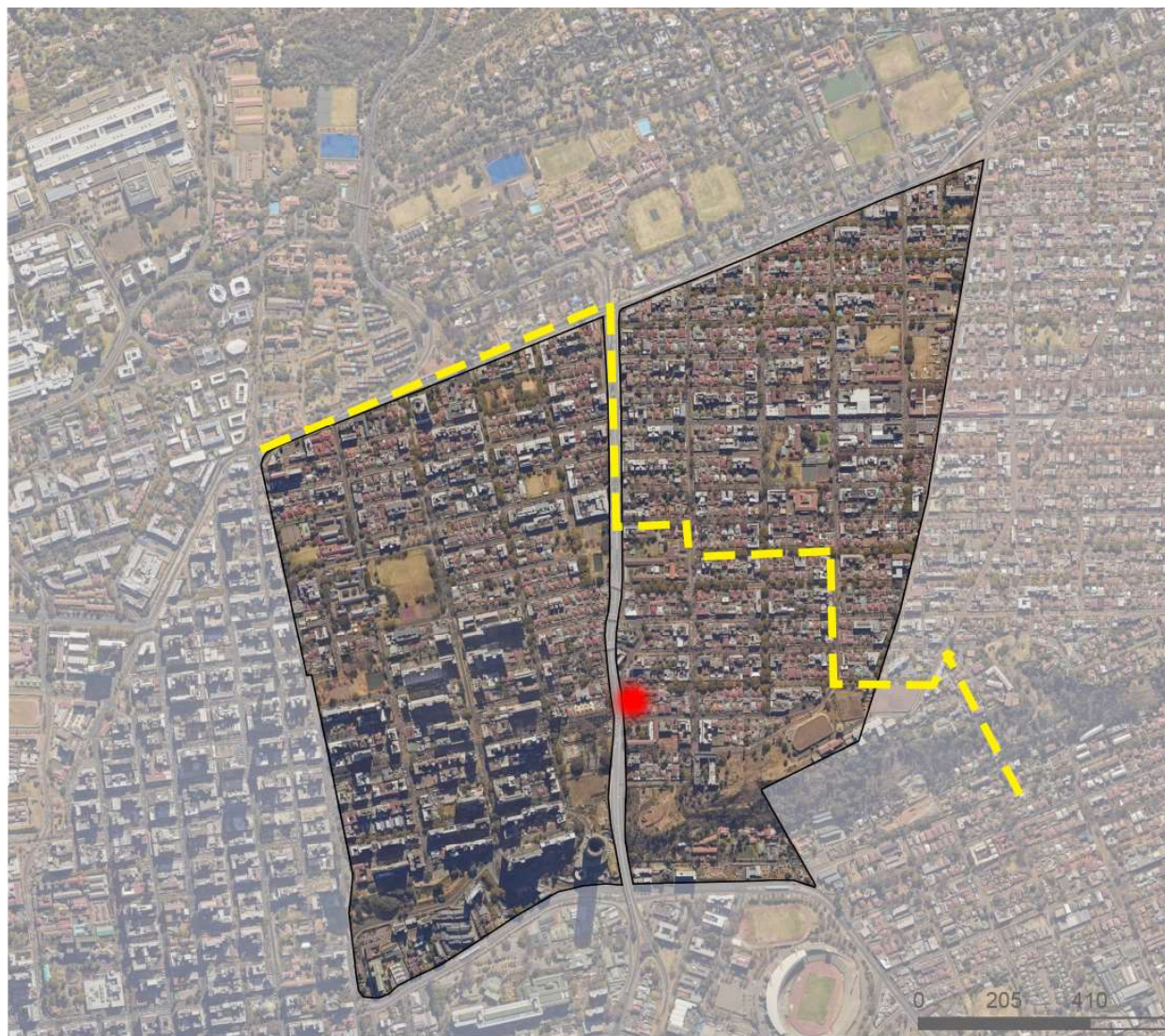
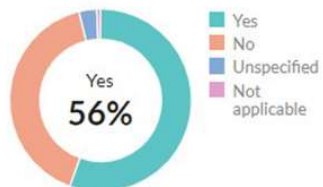
Sex



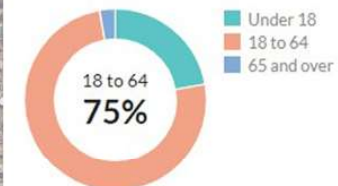
Region of birth



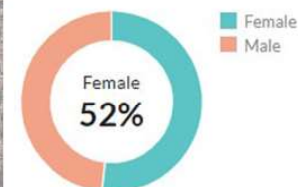
South African citizenship



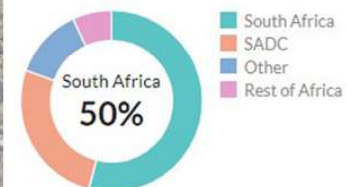
Population by age category



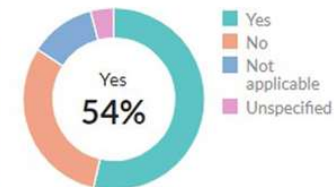
Sex



Region of birth



South African citizenship



BEREA, LOWER YEOVILLE

WARD 64

WARD 67 UPPER YEOVILLE



DEMOCRATICS

fig 13. Map 9 - Demographics (Wazimap profile: Ward 64 & Ward 67, 2020).

Map 10 (figure 15) was created to highlight the opportunities within the community for urban agriculture to be implemented. Public parks and underutilised spaces were identified within the community as potential spaces for farming interventions in the future.

Although public parks may not be feasible spaces for urban farming, a farming space demarcated within Berea Park presents an example for how urban farms can be integrated within the many public farms in the community.

With the help of urban planning zoning policies, underutilised spaces within the city have the potential to receive zonings which prioritise urban farming on those erfs.

The Johannesburg Spatial Development Plan around food, outlined in the Spatial Development Framework 2040, aims to strengthen the urban development boundary of the city through placing an emphasis on food production, agriculture-related investment, and “green energy initiatives” (“Spatial Development Framework 2040.pdf” n.d.).

This development seeks to improve the sustainability of the urban community to improve the liveability of its inhabitants and offers the opportunities for food production to be further integrated within urban communities.



fig 14. Small farm located in Berea Park (Author, 2020).

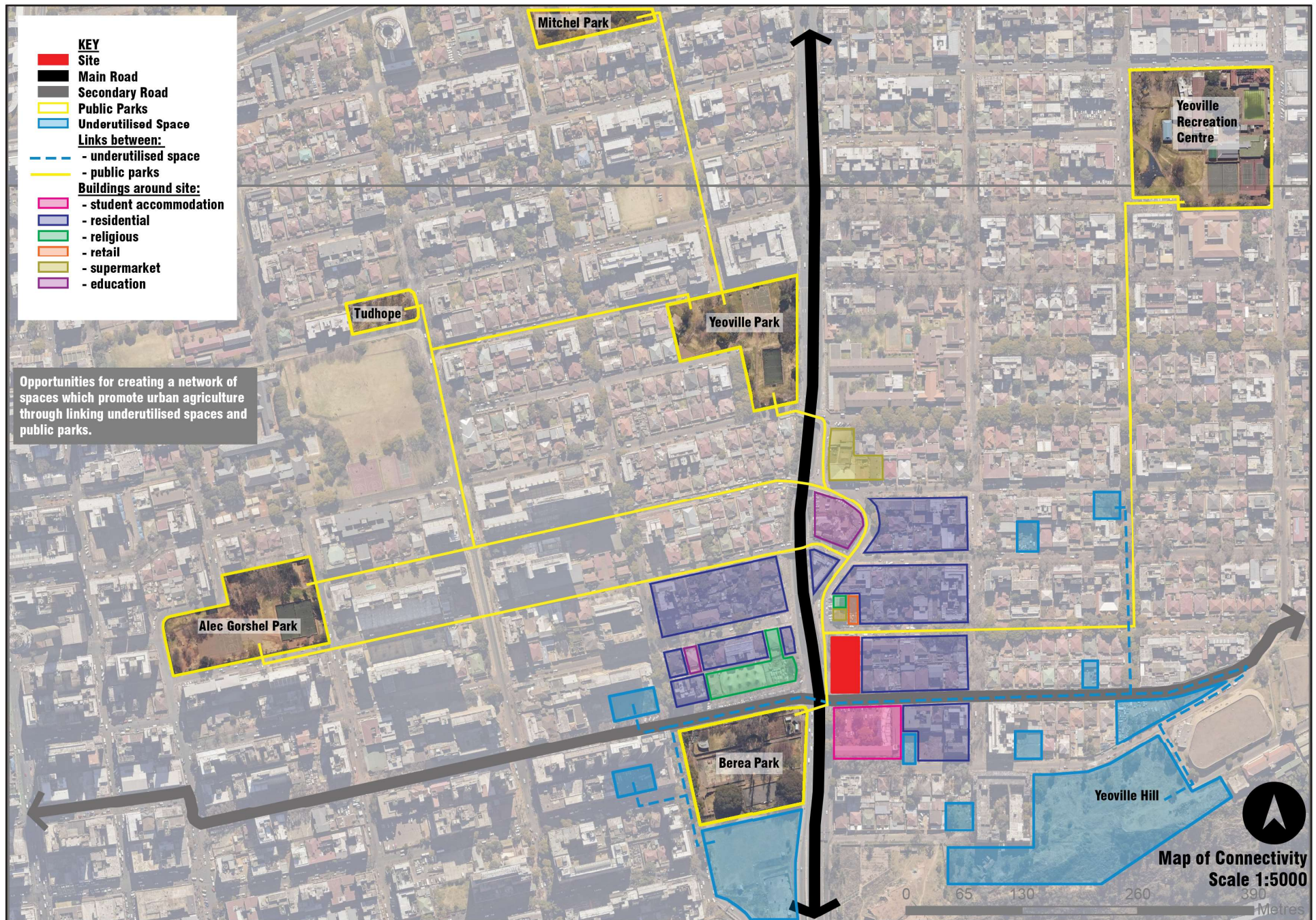


fig 15. Map 10 - Map of Connectivity for Urban Agriculture (Author, 2020).

The Community Centre is located on underutilized city-owned land, in an area with a high concentration of these spaces as indicated by Map 11 (figure 17) on the following page.

This gives the City of Johannesburg an opportunity to provide a space which benefits the diverse community directly by not taking away from the existing public green open spaces.

Figure 16 highlights the current underutilised condition of the site through a series of views of the site.

Key for Map 11 on the following page:

- Site
- Underutilised spaces in Yeoville & Berea
- Concentration of underutilised spaces



16a



16b



16c



16d



16e



16f

fig 16. Views of Site (Author, 2020).
a. Cnr Joe Slovo Drive & Hendon Street
b. Hendon Street threshold
c. Hendon Street Elevation
d. View into site
e. Wall art
f. Harley Street Pavement

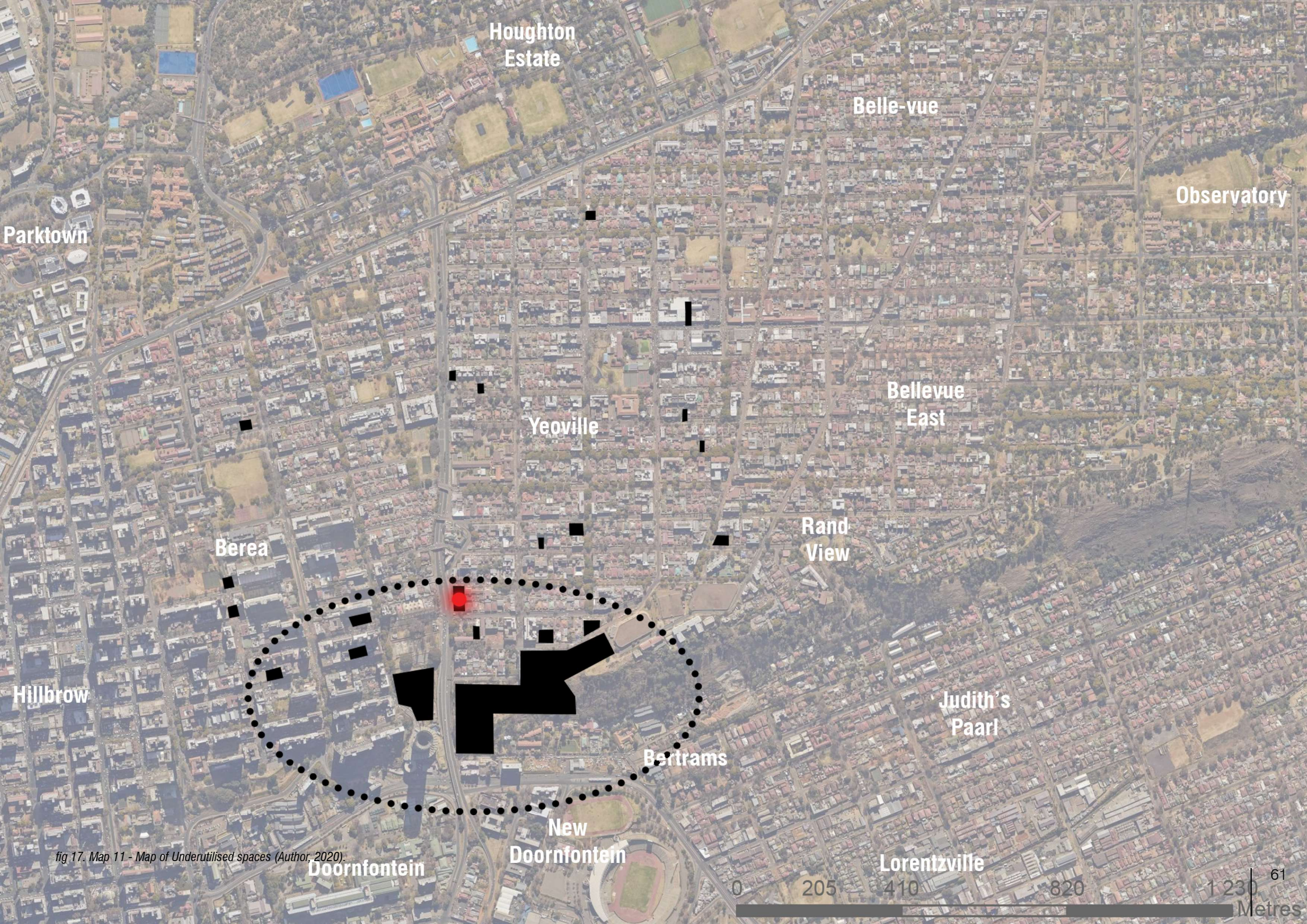


fig 17. Map 11 - Map of Underutilised spaces (Author, 2020).

4.5. Site Selection Summary

Based on the community analysis, Map 12 (figure 18) highlights a summary for why the site was selected.

Map 12 also serves as a summary for the community analysis chapter that has been done through mapping.

Figure 19 on the following page shows the key for Map 12 along with an explanation for each of the main reasons for why the site was selected in order of hierarchy.

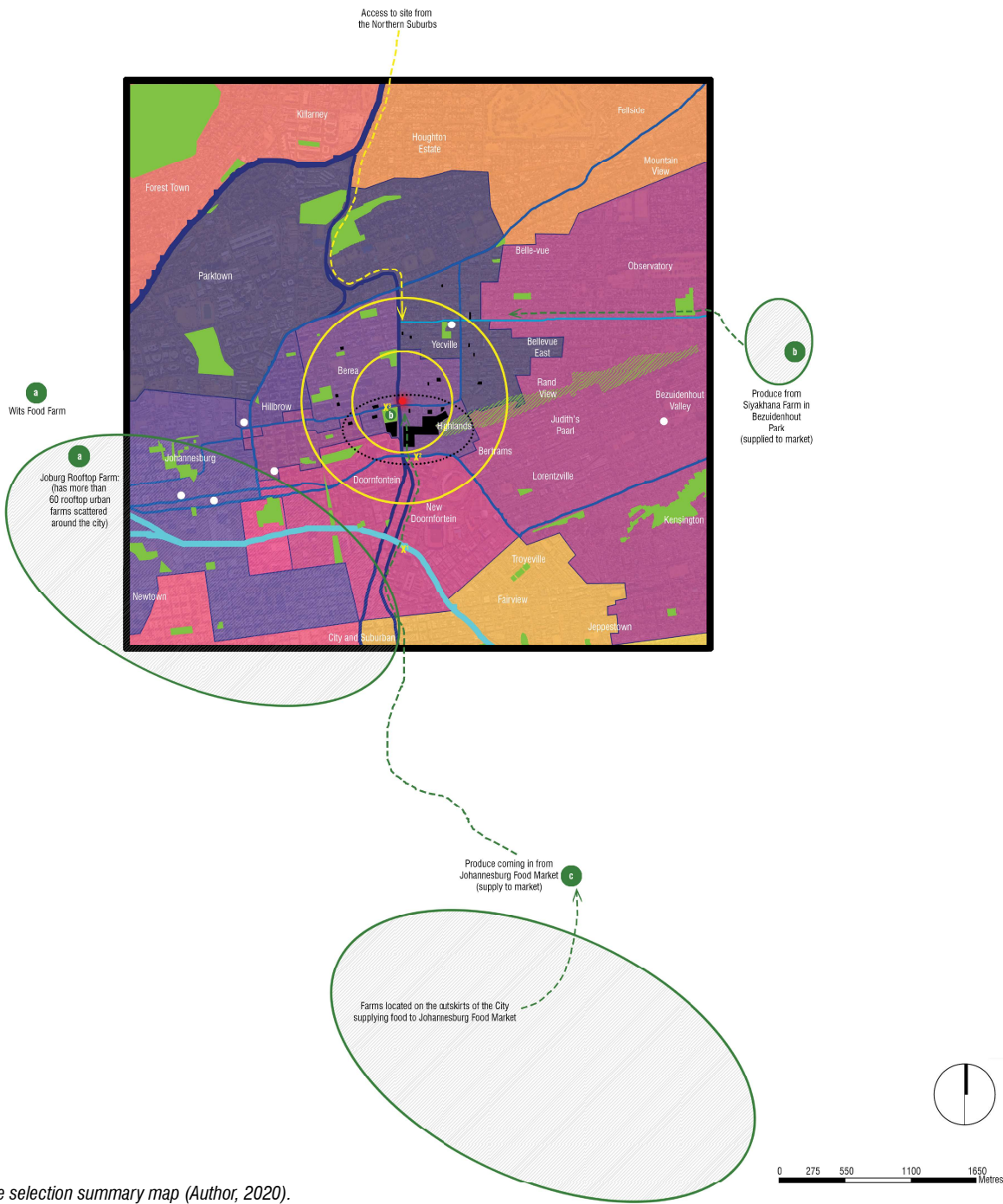


fig 18. Map 12 - Site selection summary map (Author, 2020).

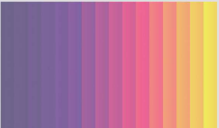
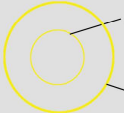
Migrant Communities	Community Centres	Accessibility	Public Green Network	Existing Farming Supply Network	Underutilised / Left-over Spaces
50% % Born in South Africa¹ 85%  The building is in the inner city, bordering the the residential Yeoville and Berea community. These communities are mainly residential communities. The building is situated in an urban and not rural setting as there is a high percentage of migrant communities in the inner city. The building is a celebration of cultural diversity which serves as an opportunity for cultural integration, experience, and exchange. It serves as a visible icon which celebrates the diverse cultures of migrant communities through food, with the hope of providing a catalytic effect which deconstructs an existing xenophobic mentality in our nation. 1. Wazimap profile: City of Johannesburg, Gauteng, n.d. Available from: https://wazimap.co.za/profiles/municipality-jhb-city-of-johannesburg/ (Accessed 9 November 2020).	 Surrounding Community Centres  Proposed Community Centre There is currently 1 community centre in upper Yeoville along the High Street, 2 in Hillbrow and 2 in Johannesburg. Placing the community centre in lower Yeoville bordering Berea provides a space for more cultural integration of migrant communities which not only serve Yeoville, Hillbrow and Johannesburg, but also serves Berea, New and Old Doornfontein, Highlands and Bertrams, closing a gap for opportunity.	 M1 Highway  Main Vehicular Route  Main Bus Routes  Raleigh/Rockey High Street  Train Route  X¹ Ellis Park train station  X² Rea Vaya bus station  X³ Metrobus Stop  Vehicular access along main vehicular route  500m: 5 - 8 min walking time 1km: 12 - 15 min walking time The proposed community centre is easily accessible via walking, private transportation, and public transportation.	 Public Open Space  Green Belt The green belt indicated by the light green hatch is also an important green, communal space within the city. The Yeoville-Berea community boasts 10 public open parks.	 a Existing farming in the inner city The Wits food farm (food supply exclusive to wits students). Joburg Rooftop Farms has more than 60 active rooftop farms within the city.  b Existing farming in public parks Transportation of produce from farms located on the outskirts of cities to the inner cities is no longer seen as an economically viable nor sustainable solution given the increase of peak oil prices, as well as the environmental damage of those fuels to the atmosphere.  c Existing farming on the outskirts of the city Farming produce within the inner city's green network of public parks may take away space from the communities who need and benefit from these green open spaces. Alternatively, underutilised spaces, as well as spaces owned by the city could be better solutions for farming space within the city.  Supply route	 Underutilised / Left-over space  High concentration of underutilised space Some of the underutilised / left-over land is owned by the City of Johannesburg. The building is situated on a site that is both underutilised, holding an unused small car wash structure that is to be demolished, and it is owned by the City of Johannesburg. Due to the higher concentration of underutilised land in lower Yeoville and Berea compared to upper Yeoville and Berea, the building is situated where the concentration is higher, serving as a catalyst in creating a strong and concentrated inner-city farming network supply with a vision of using the underutilised and left-over spaces for this purpose (that is to strengthen the existing farming network supply).

fig 19. Table of Key of Site Selection summary (Author, 2020).



fig 20. Panorama across Joe Slovo Drive & Old Harrow Street (Author, 2020).

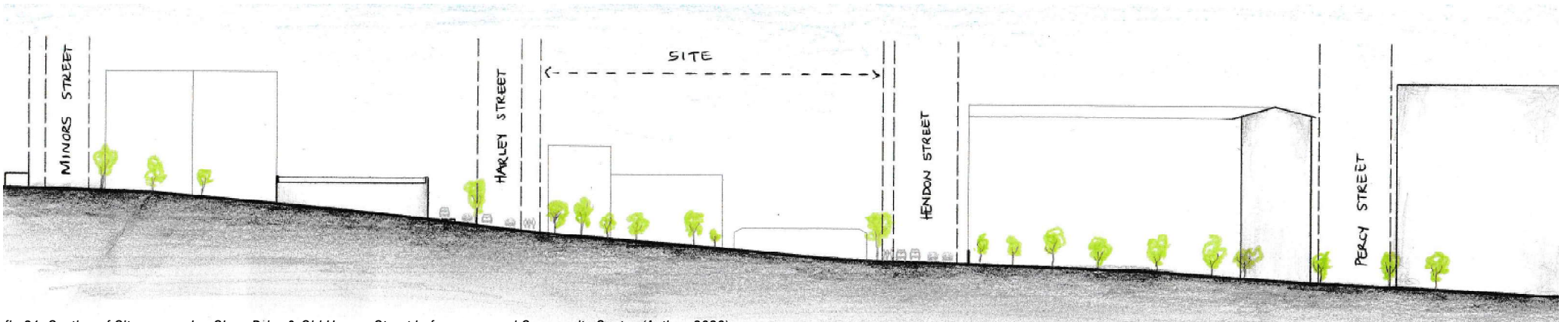


fig 21. Section of Site across Joe Slovo Drive & Old Harrow Street before proposed Community Centre (Author, 2020).

Chapter 5: Precedent Analysis

5.1. Introduction

The following precedents are analysed with the intentions of extracting architectural mechanisms for the purposes of assisting in the design of the proposed community centre.

They have been selected based on the following criteria:

Architectural Precedents - Blue

These precedents are selected based on how they deal with key architectural elements such as circulation, light and facade treatment.

Programmatic Precedents - Yellow

These precedents are selected due to the nature of their programmes and how they can inspire the primary programme of the proposed community centre - food production in urban areas.

Contextual Precedents - Red

These precedents have been selected due to their South African context, and their building typologies as community centres.

5.2. Galleria Department Store - Gwanggyo, South Korea

Architect: OMA

Project Status: Completed

Typology: Retail

Area: 73 721 sqm

This precedent is chosen for its success in transmitting light into the building through its public loop of circulation instead of through a traditional courtyard and windows on the building envelope.

Its public loop of circulation is multi-functional as it triples up as a circulation element, light source, and it maximises on views towards the city.

The Galleria Department store merges retail, culture, city and nature - elements which aim to be explored in the design of the building.



fig 1. Contextual photograph of the Galleria Department Store (Yun, n.d.)

The circulation route is not only responsible for bringing in light and does not solely acting as a circulation route. However, it holds public leisure facilities like Cafes, and provides performance and exhibition spaces, encouraging the public to take the long way up through the building (figure 4).

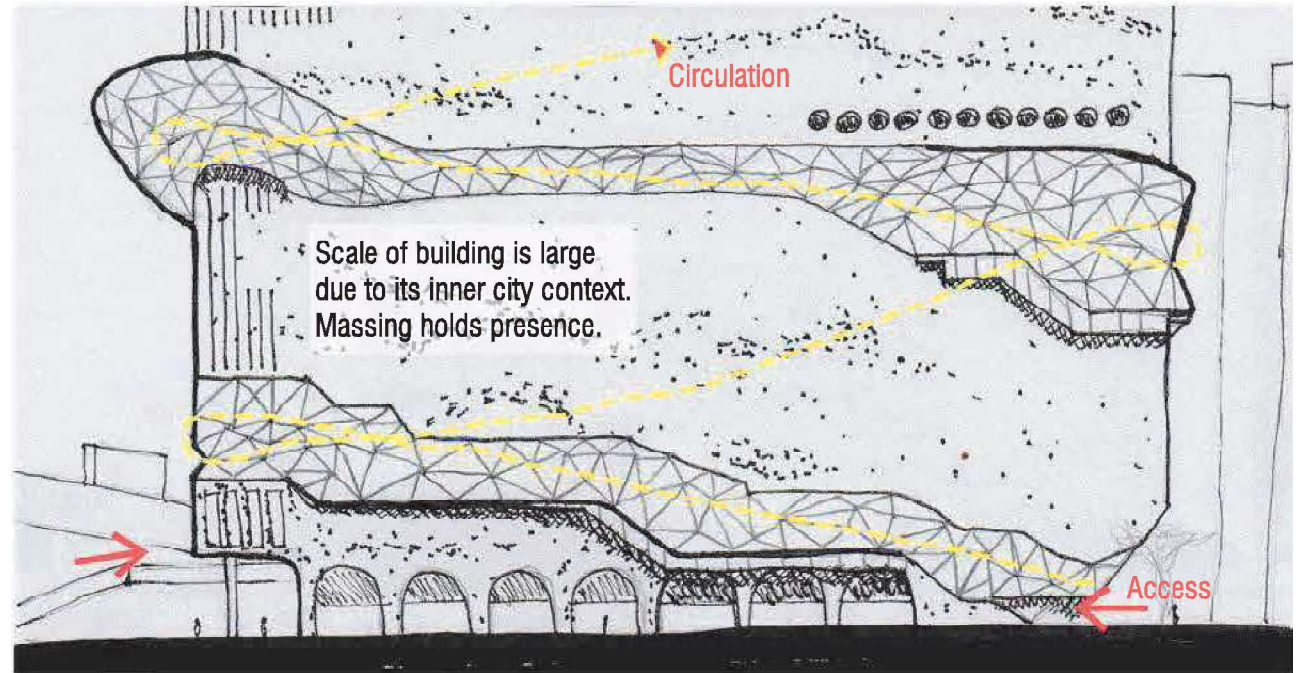


fig 2. Street elevation sketch analysis by author (Adapted from: Yun, n.d.).

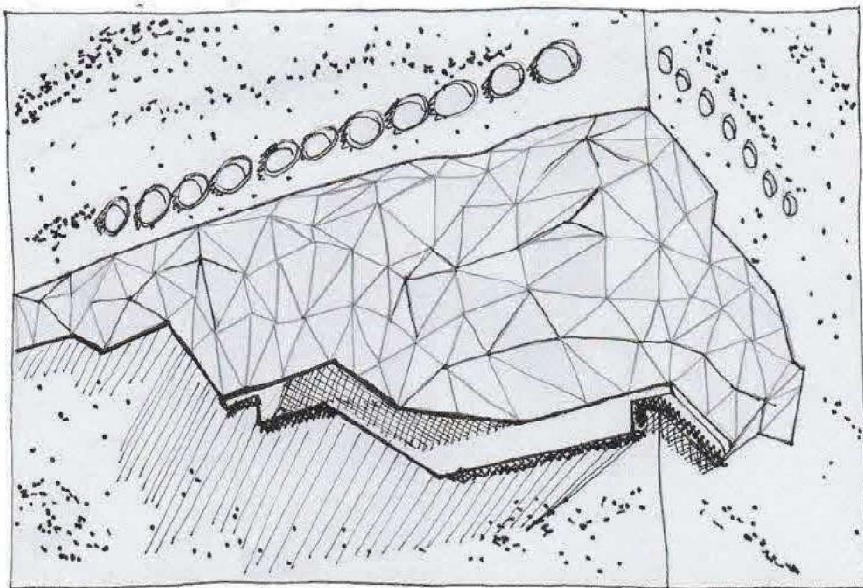


fig 3. Sketch of multifaceted glass facade - the public route within the building (Adapted from: Yun, n.d.).

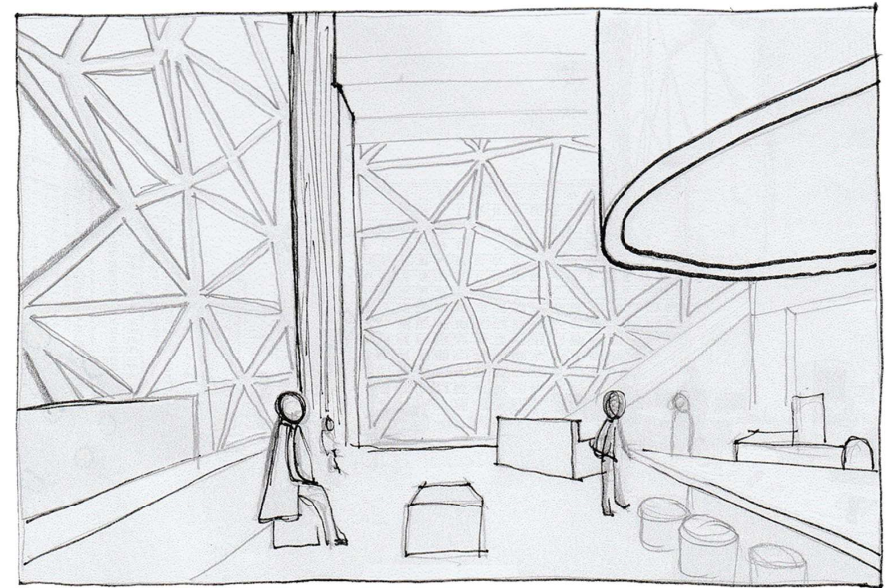


fig 4. Sketch by of spatial nature inside the public circulation loop (Adapted from: Yun, n.d.).

Figure X shows the circulation throughout the building.

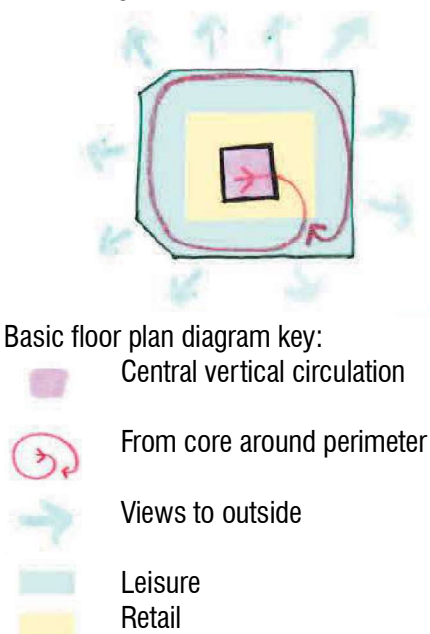


fig 1. Floor plan diagram (Author, 2020).

Individual floor plan circulation analysis key:

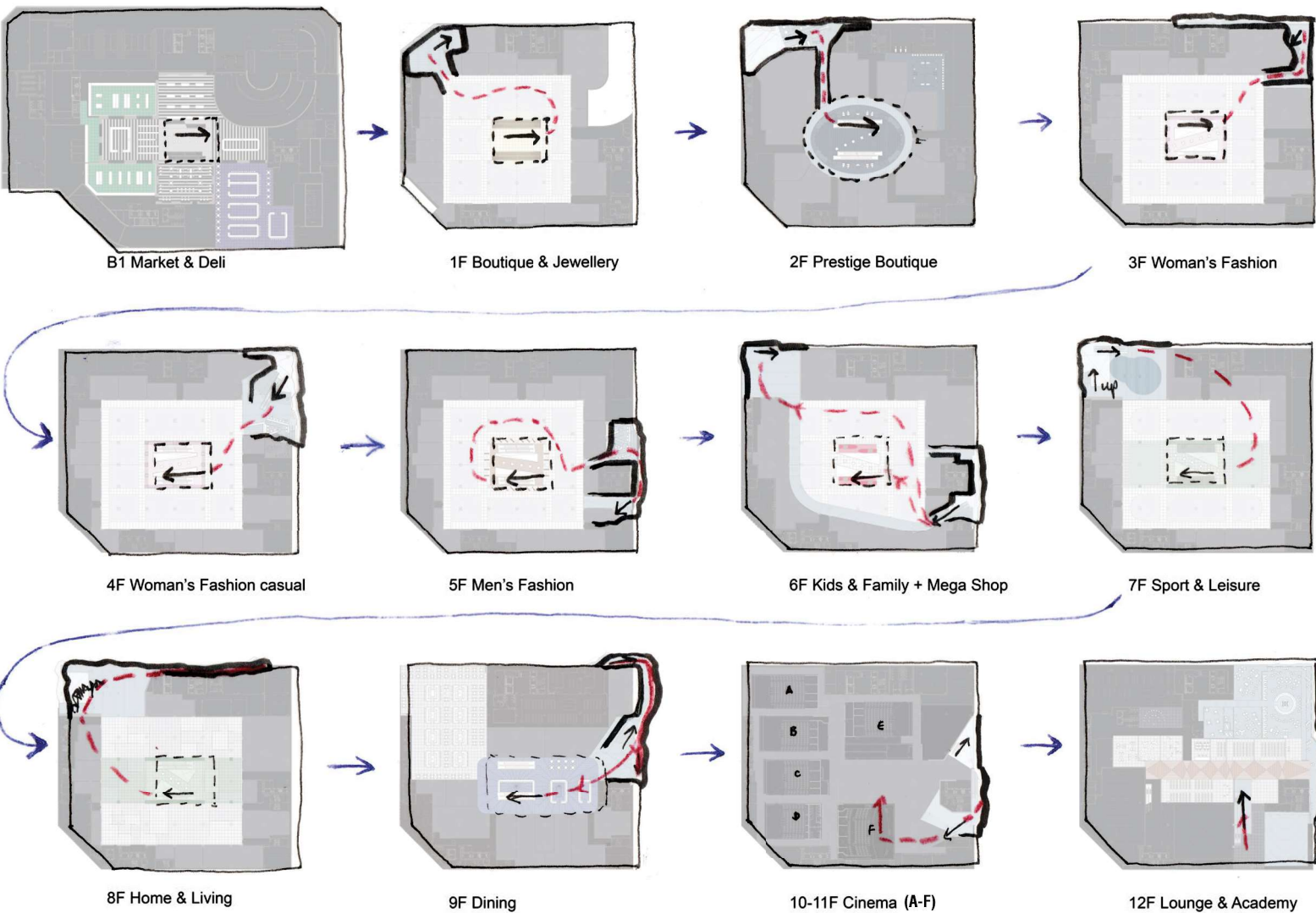
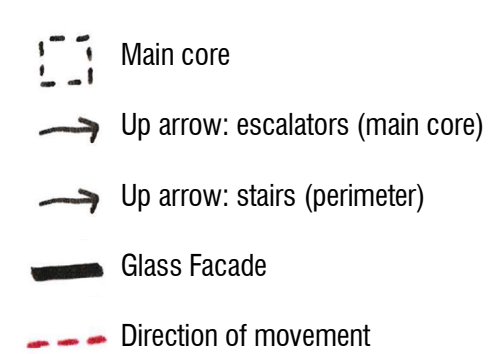


fig 5. Galleria Department Store floor plans with circulation analysis overlay (Adapted from: Galleria-in-Gwanggyo-by-OMA-11 – Aasarchitecture, n.d.)

5.3. Vertical Farm - Romainville, France

Architect: ilimelgo and atelier secousses
 Project Status: Competition
 Typology: Vertical Urban Farm
 Area: 2000 sqm

This project re-imagines the future of urban agriculture with a vertical farming complex in the Parisian suburb of Romainville.

It was chosen to analyse main elements like light and ventilation which architects and designers focus on in vertical farming designs.

Additionally, in highlighting some of the problems in these kinds of designs, one begins to understand what the main focus should be. It is difficult to come across designs which encompass all elements of farming into a building.

Some of these elements include:

- Irrigation systems such a drip-water systems as hand-watering is not an efficient system
- Spaces which store, treat and optimise water quality
- HVAC systems, as greenhouses cannot solely rely on the sunlight as heat source. Furthermore, this comes with additional costs.

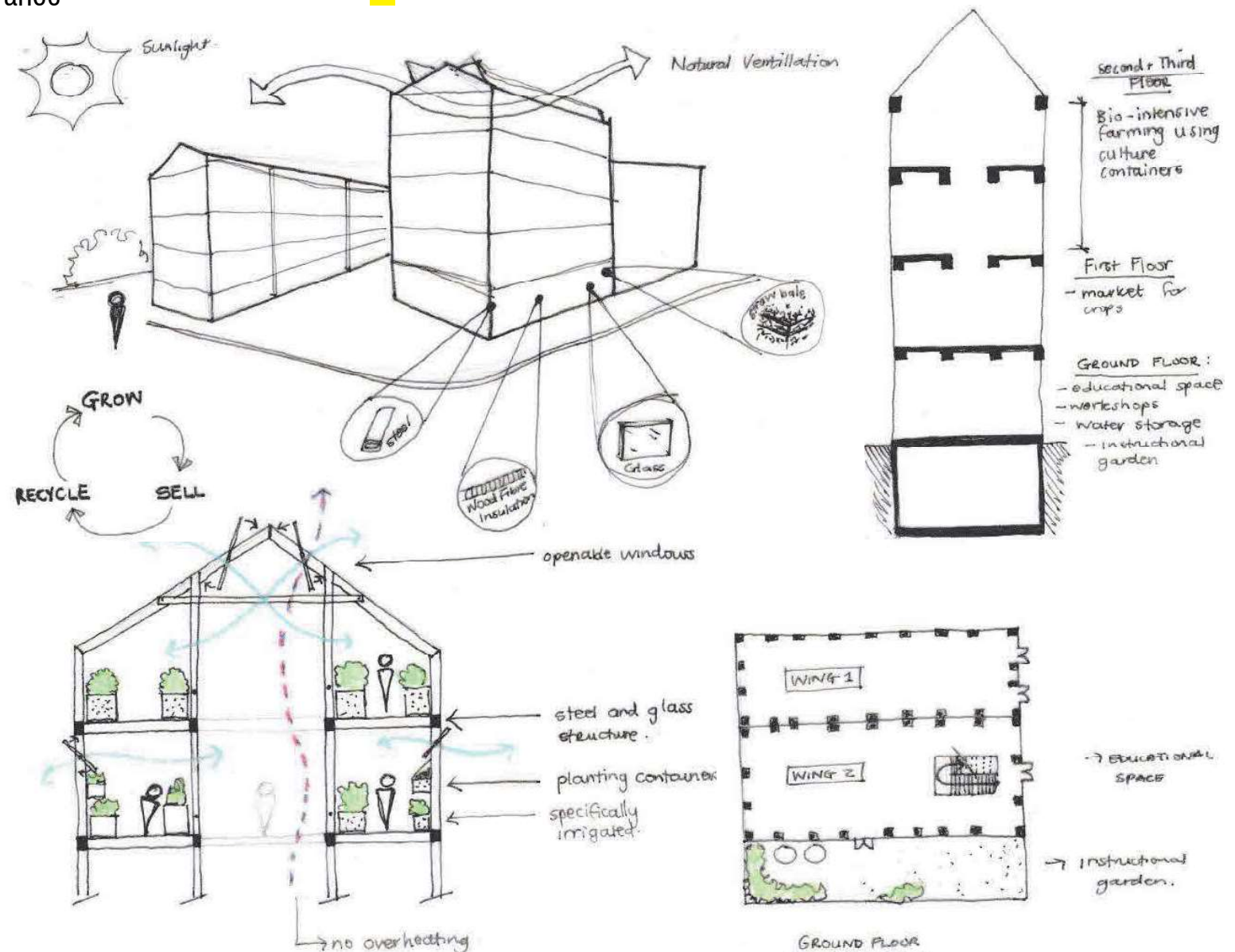


fig 6. Sketch analysis of Vertical Farm (Author, 2020).



fig 7. Site Plan (Source: ilimelgo's vertical farm introduces urban agriculture in grand paris, 2016).

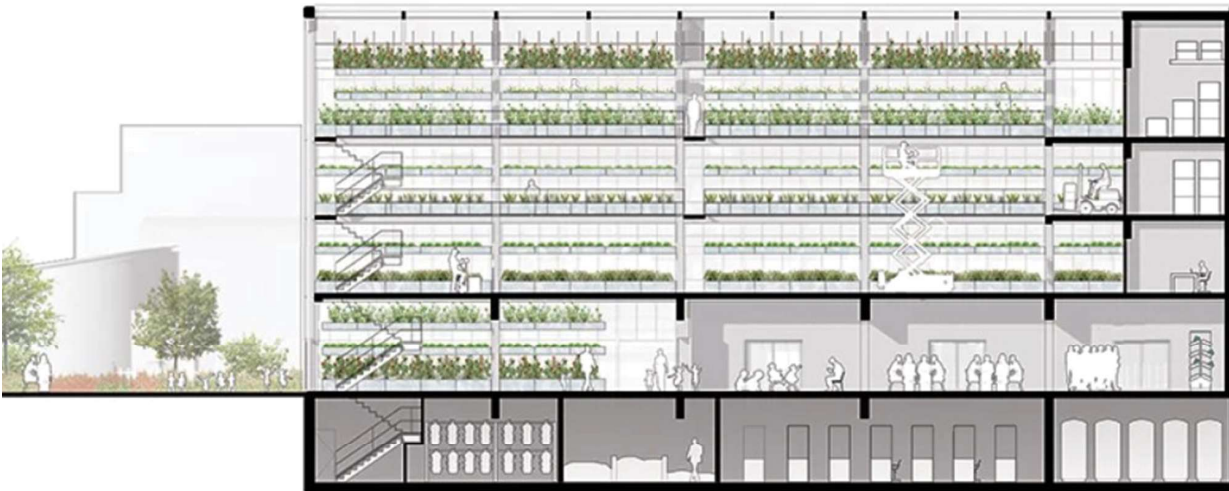


fig 8. Section (Source: ilimelgo's vertical farm introduces urban agriculture in grand paris, 2016).

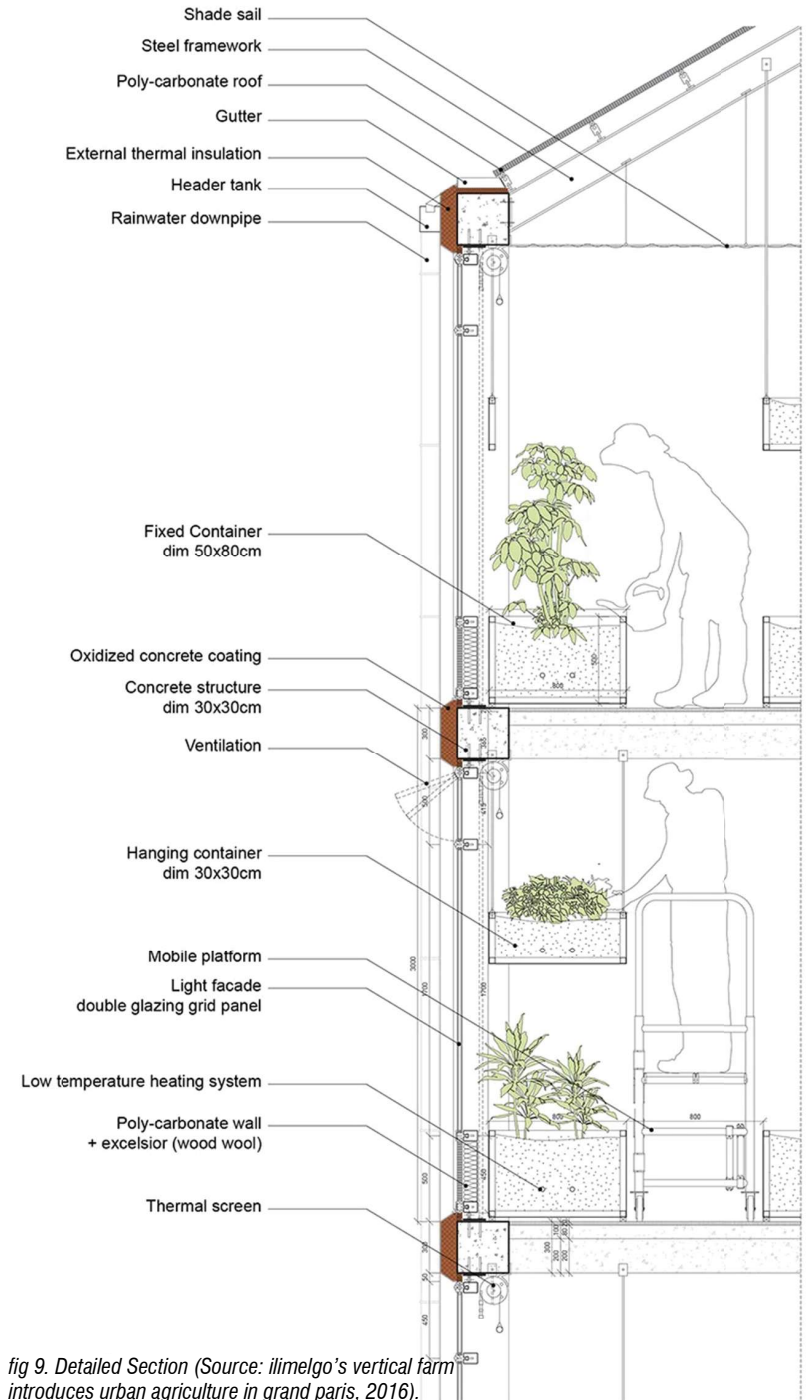


fig 9. Detailed Section (Source: ilimelgo's vertical farm introduces urban agriculture in grand paris, 2016).

5.4. Food Farm Tower - Romainville, France

Architect: ABF- lab

Project Status: Competition

Typology: Housing and Gardening

Project aims to integrate the urban agriculture principles as a catalyst for better living, raising awareness on behaviours towards the environment for social and environmental change.

These futuristic designs serve purpose in inspiring architects, designers and farmers in the movement of possibilities of what farming could look like in urban contexts.

This precedent emphasises key elements to urban farming such as natural light and ventilation optimisation, and waste management.

However, critical elements used in farming are not touched on in these designs. Therefore, this highlights the need for designs to be done with the contribution of farmers, so that attention for detail can be accounted for.



fig 10. Street render (Source: ABF lab guides food farm tower in romainville, france towards the sun, 2016).



fig 11. Interior render (ABF lab guides food farm tower in romainville, france towards the sun, 2016).

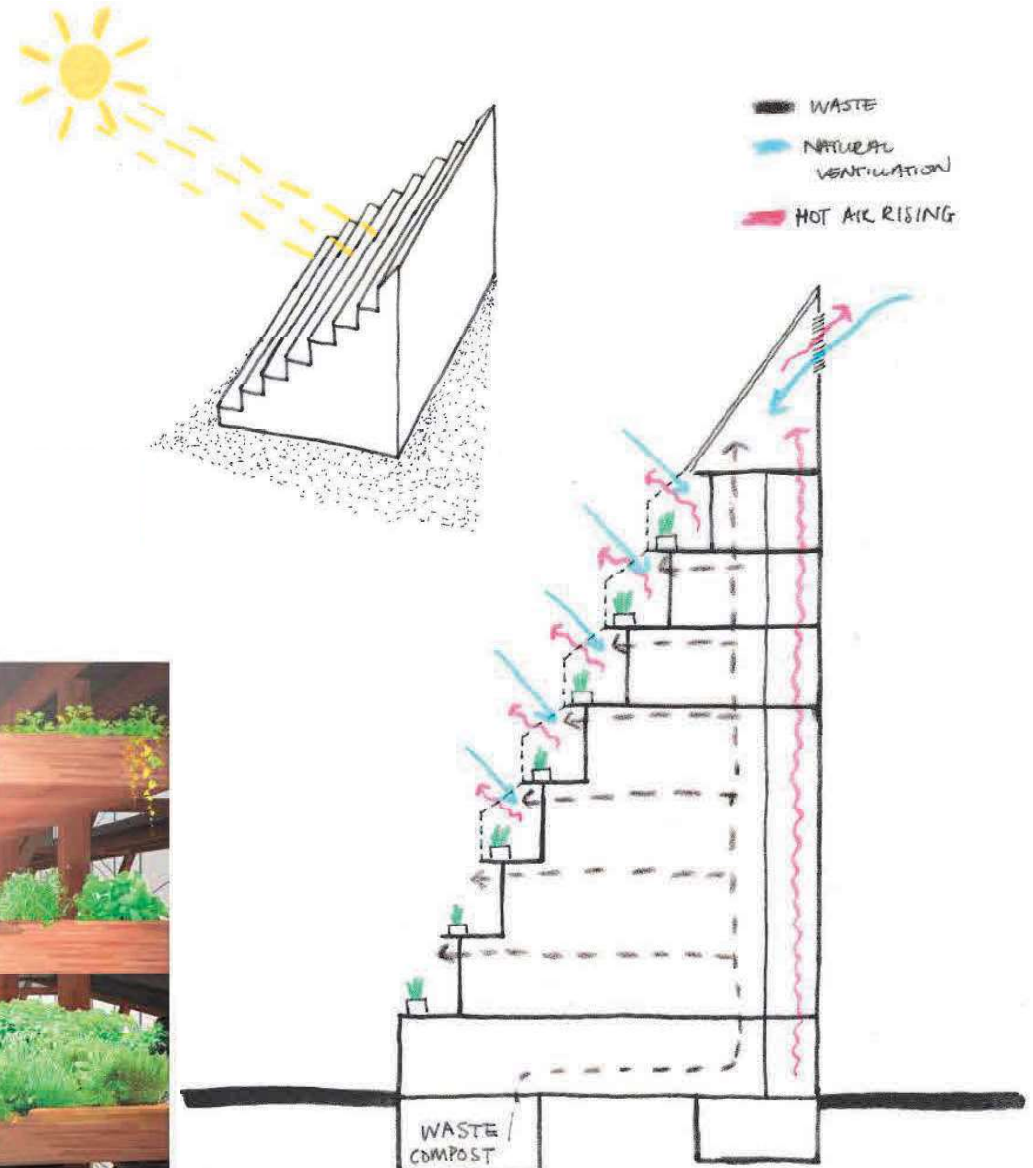


fig 12. Sketch analysis of massing orientation and section of urban farming conditions (Adapted from: ABF lab guides food farm tower in romainville, france towards the sun, 2016)

5.5. Hydroponic Rooftop Farms - Johannesburg

Joburg Food Farmers (JFF) - a rooftop urban farm in Braamfontein - have a network of more than 60 rooftop farms around the inner city, supplying the city's agricultural needs.

Rooftops for the purposes of urban farming are supplied by:

- The Outreach Foundation
- The Jozi Housing Company
- The Joburg Land Company
- FNB Bank City

Food produced through urban farming is done through 2 main methods:

Production Method 1:

1. Each seedling placed in a medium that holds it in a small pot.
2. Pots are placed into holes in trays.
3. Trays are arranged in A-Frame racks of 10 horizontal shelves.
4. The plants roots are fed by nutrient-rich water (Nutrient Film Technique – NFT) which are circulated by pumps from a small tank.
5. Plastic and shade-cloth roof used to cover the crops, protect them from weather and control the temperature inside.

Production method 2:

- Planting under LED lights to quicken planting to harvest time.



fig 13. Yield of produce (Source: "City rooftops: the next frontier for farming", 2019).



fig 14. Pots placed on A-frames (Source: "City rooftops: the next frontier for farming", 2019).



fig 15. Plants fed by nutrient rich water (Source: "Projects", n.d.).



fig 16. A frames covered by cloth roof on top of Rooftop in the city (Source: "Urban Agriculture Initiative", n.d.).



fig 17. Planting under LED lights (Source: "Projects", n.d.).



fig 18. Spinach pot plant (Author, 2020).



fig 19. Planting under LED lights (Source: "Projects", n.d.).



fig 20. JFF Rooftop Farm, Braamfontein (Author, 2020).



fig 21. JFF Rooftop Farm entrance (Author, 2020).

5.6. Hillbrow Outreach Foundation Centre - Johannesburg

Architect: Local Studio

Project Status: Completed

Typology: Community Centre - cultural & education

The Outreach Foundation Centre part of an existing community facility. This precedent was chosen as it is situated in close proximity to the site for the proposed Community Centre in Yeoville.

Building programme:

Ground Floor - Computer Centre

First Floor - Dance Studio

Second Floor - Offices & Meeting Spaces

The building's materiality establishes it as a new addition to its surrounding context - white corrugated steel and clear corrugated polycarbonate as cladding materials.

Site Plan key:

Entrance to public space

◀ P: pedestrian

◀ V: vehicular

Building Types
surrounding public
space

- Religious
- Mixed (Res. + Sup.)
- Retail
- Education
- Community Building (Theatre)
- Residential
- Supermarket

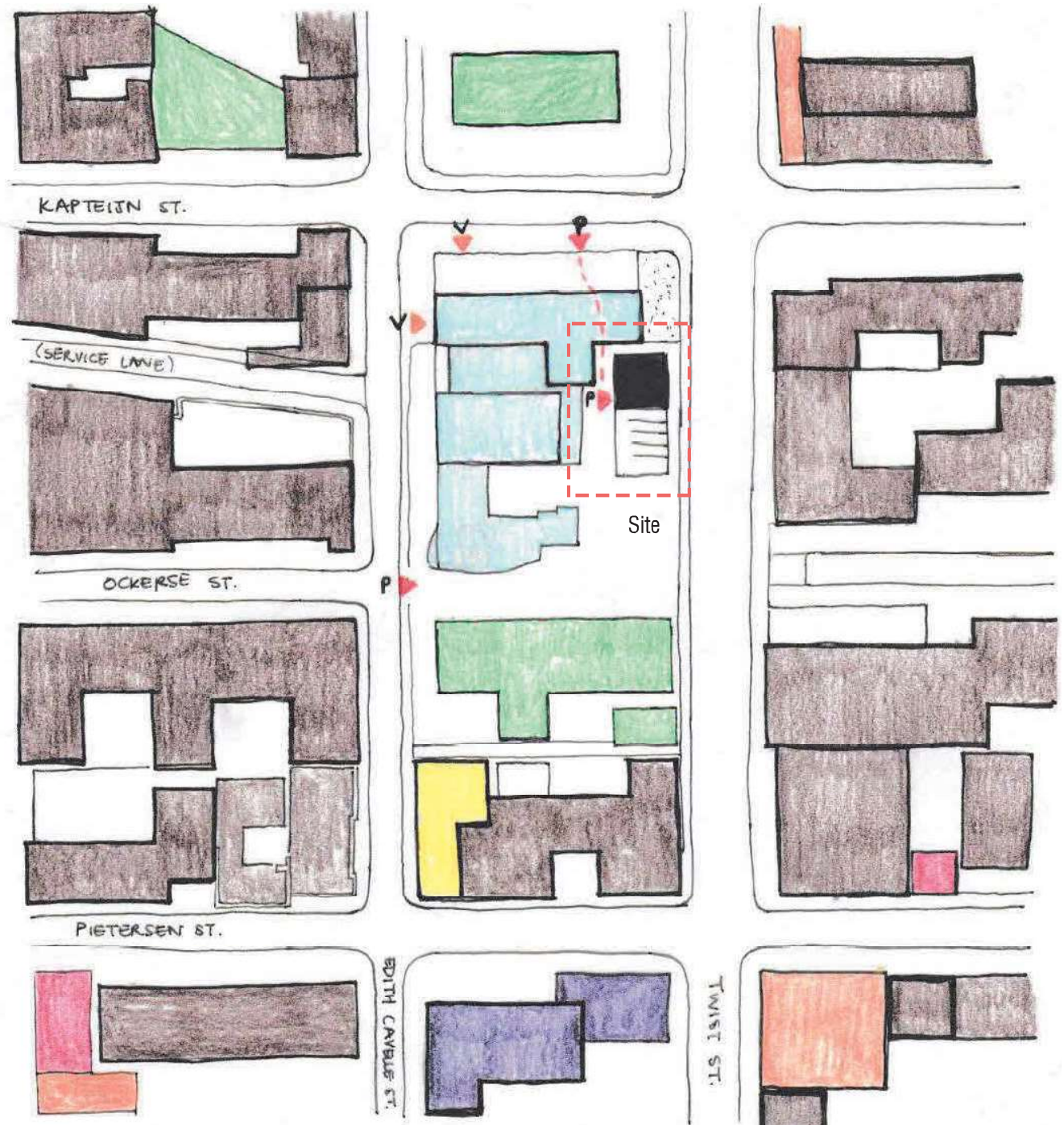
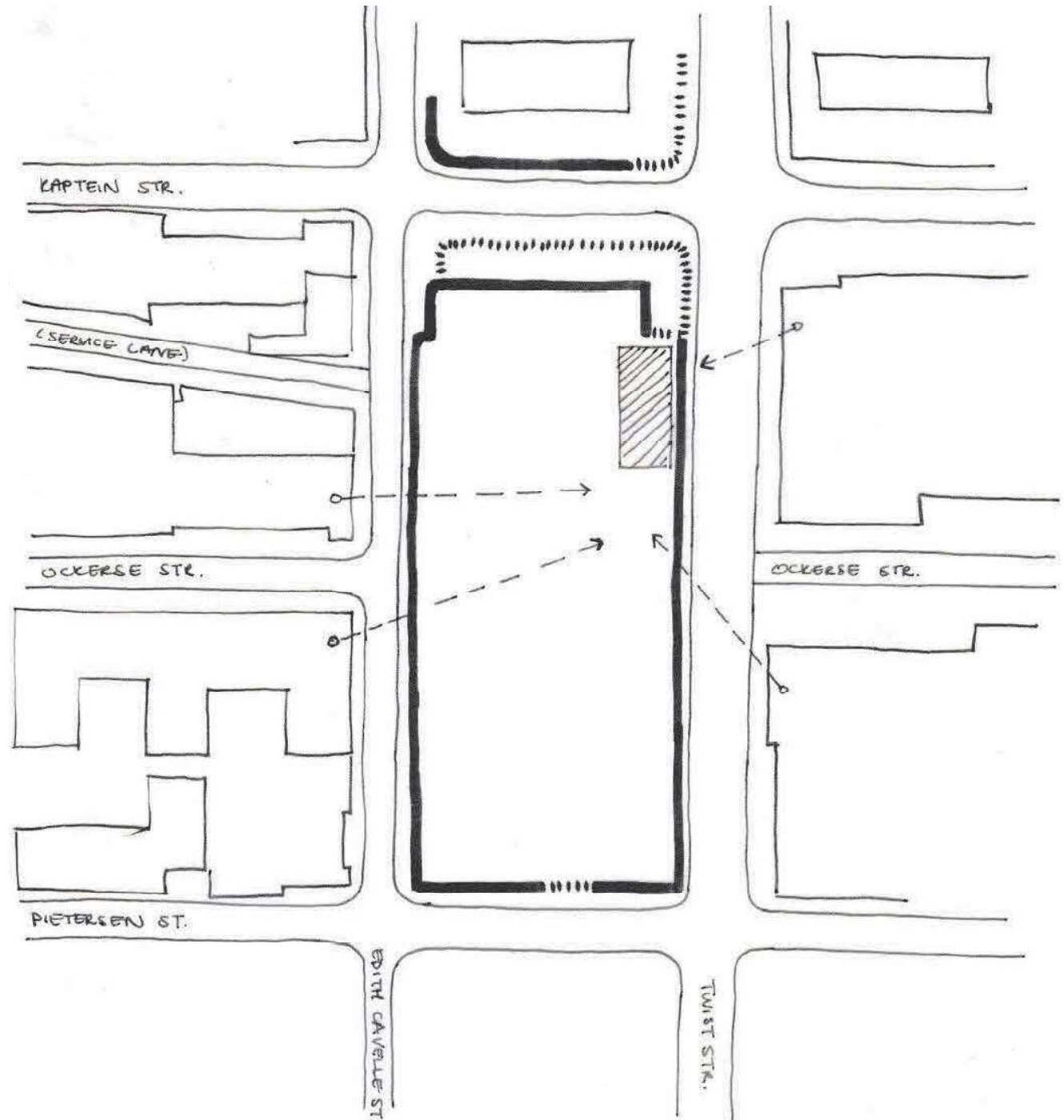
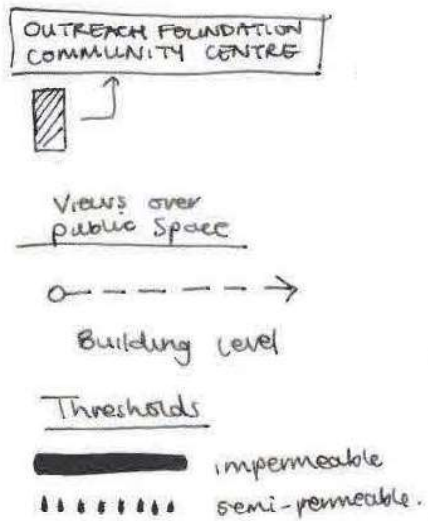


fig 22. Site plan analysis (Author, 2020).

Views over public spaces can often decrease the occurrence of crime around the public space.

Similarly, an impermeable threshold between the street and the public space can do the same, finding balance between pedestrian accessibility and security.

Key:



The analysis has highlighted how closed off the Outreach Foundation Centre is from the street and the public.

fig 23. Threshold and Views analysis (Author, 2020).

The Outreach Foundation Centre lacks a community presence as it not visible to a pedestrian at street level during the day.

However, its presence can be felt during the evening to the residents of the tall apartment buildings whenever light illuminates from the building due to activity.

Therefore, the analysis of this precedent can aid in the design of the proposed Community Centre with regards to how the building integrates with the street, and how its presence can be felt not only at night time but during the day.

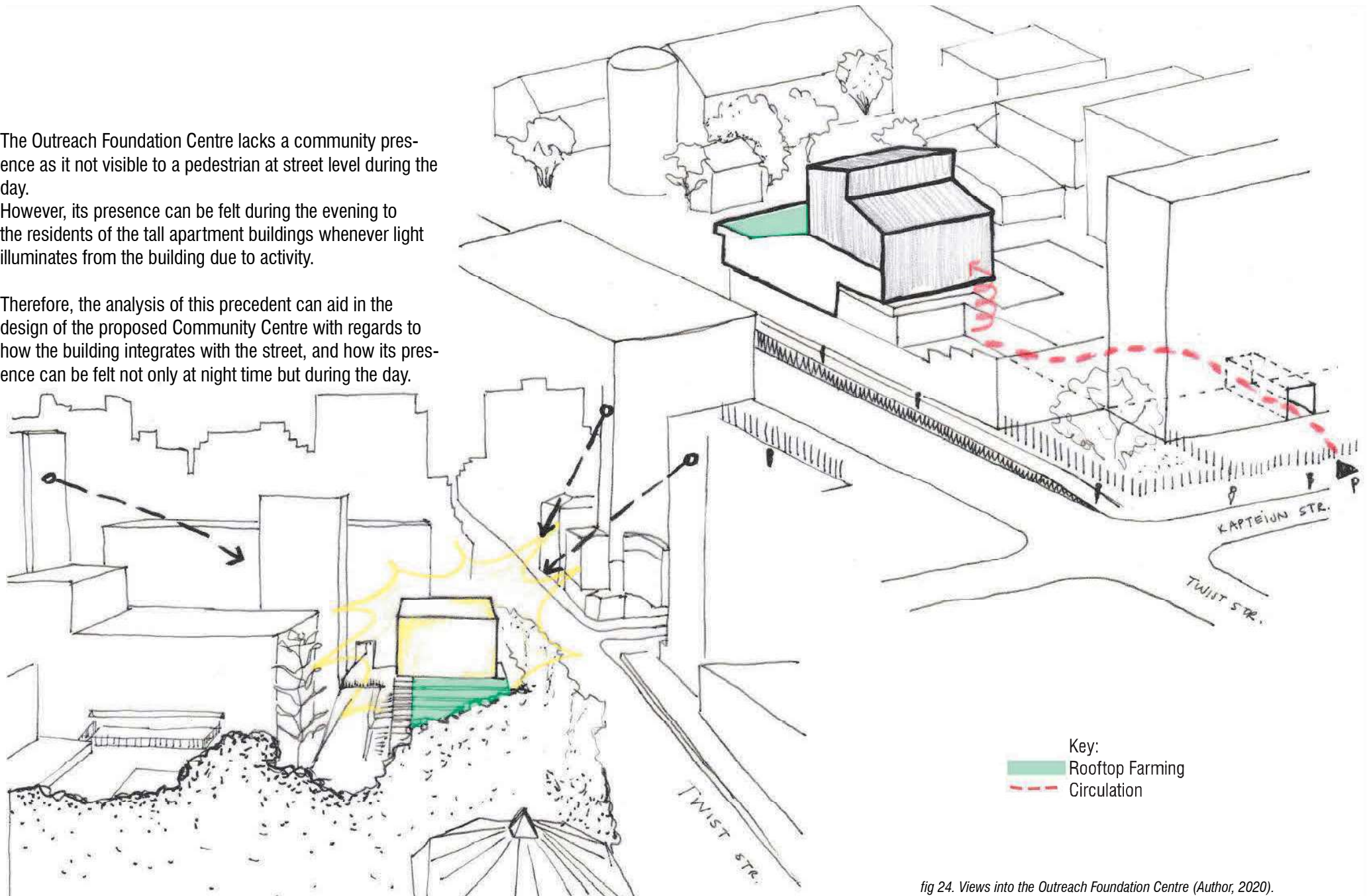


fig 24. Views into the Outreach Foundation Centre (Author, 2020).

5.7. Yeoville Recreation Centre - Johannesburg

Architect: Urban Works & Ntsika Architects
Project Status: Completed
Typology: Community Centre

The Recreation Centre is one of the main public amenities for the Yeoville community.

The Centre and adjacent park is owned by different stakeholders, resulting in a design solution which sought to blur these thresholds.

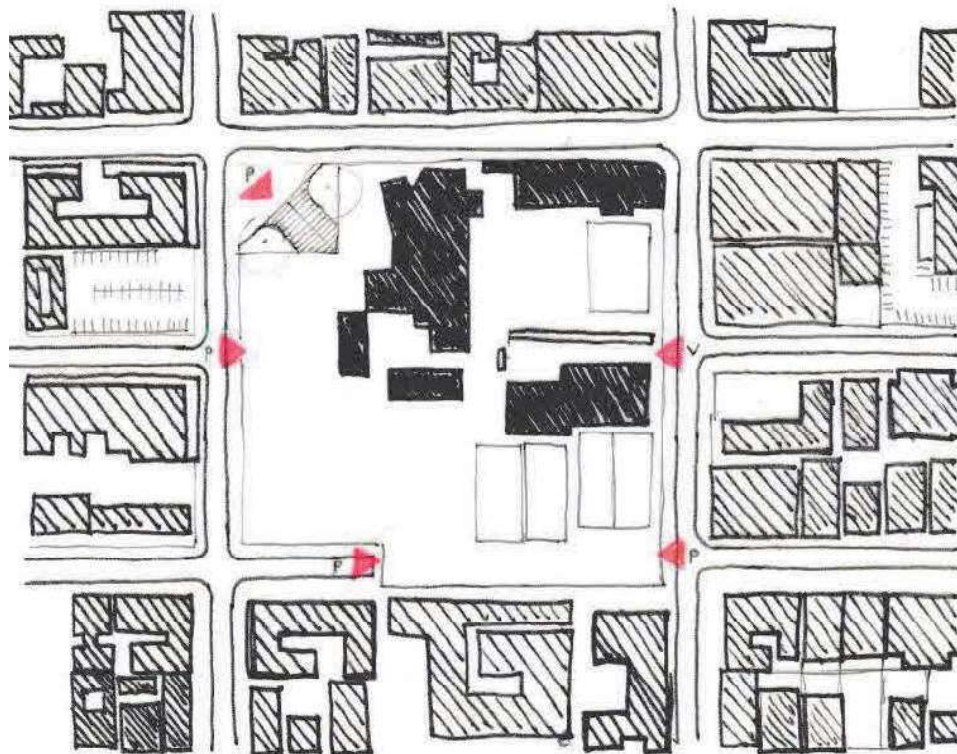


fig 25. Entrance to public space analysis (Author, 2020).

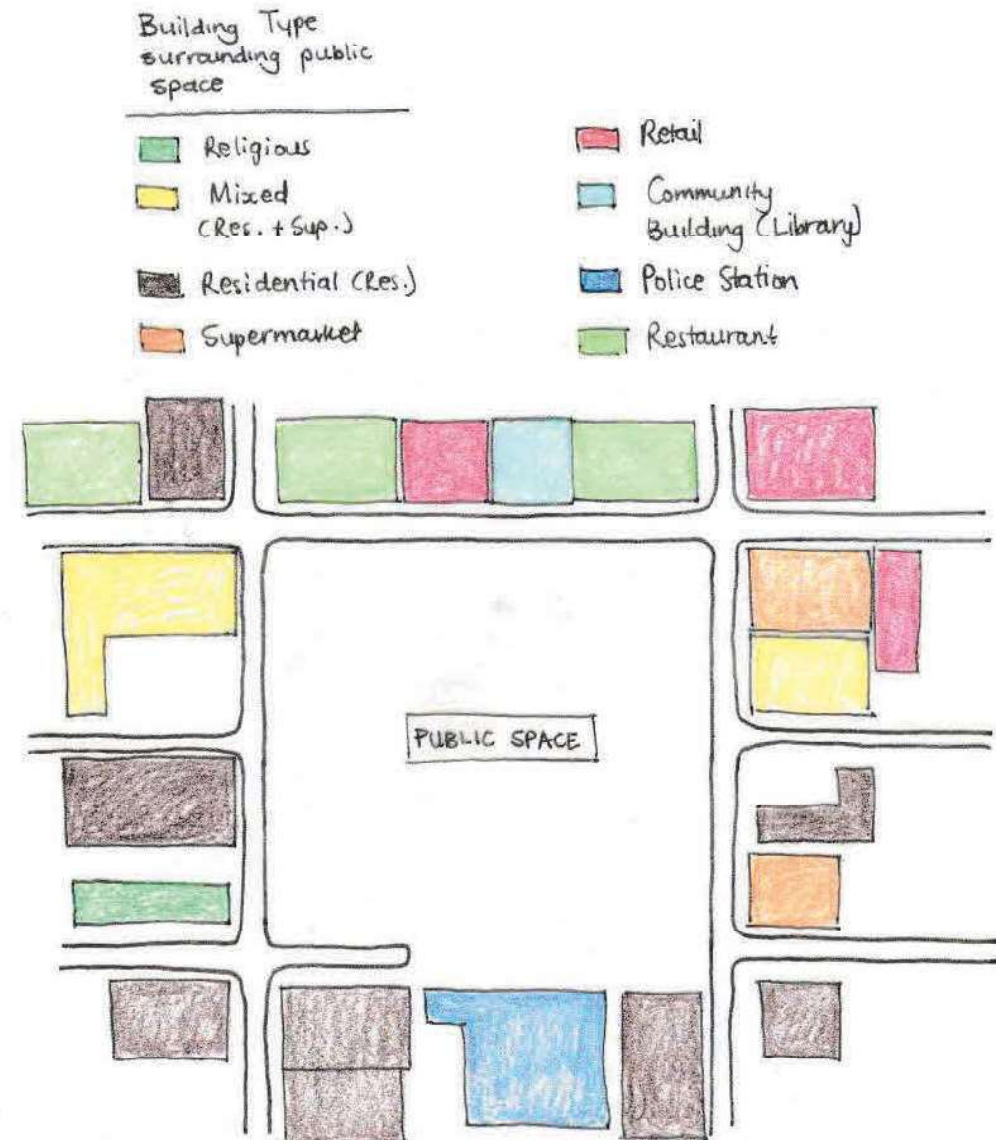


fig 26. Immediate context analysis (Author, 2020).

The focus of the design was to increase the public presence of the Centre through making the foyer of the Recreation Centre and extension of the park.

The original design did not have a fenced boundary edge, which served to extend the park into the building footprint and the street.

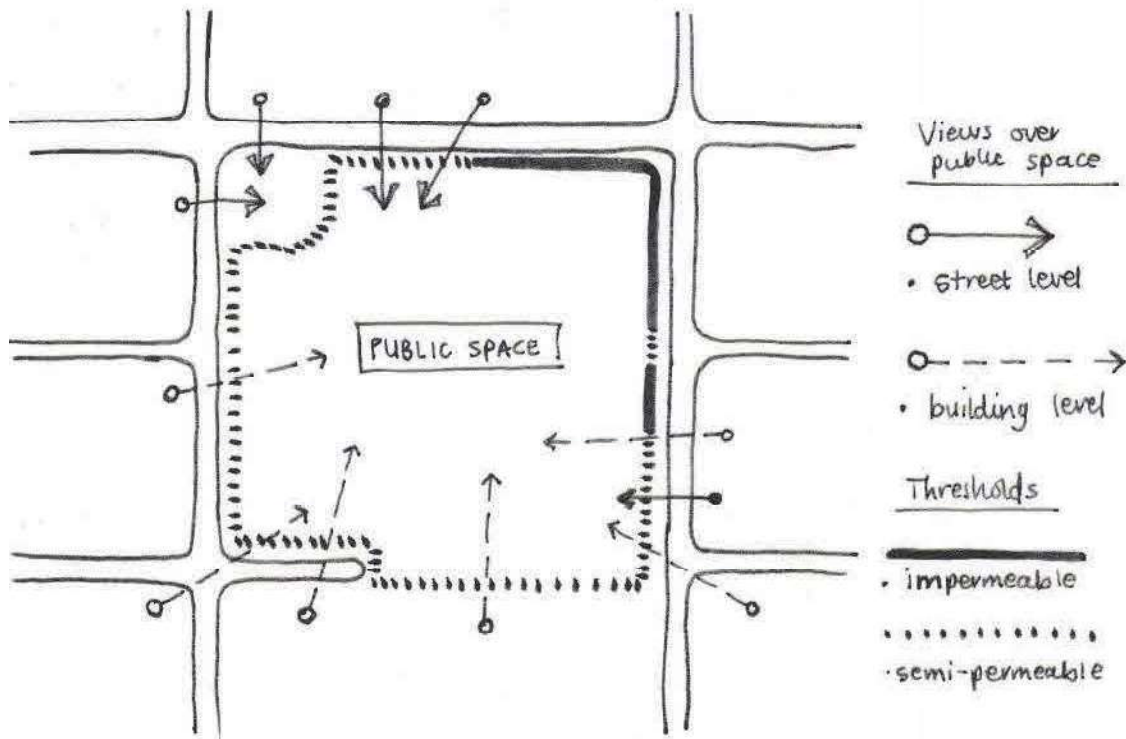


fig 27. Views over public space analysis (Author, 2020).

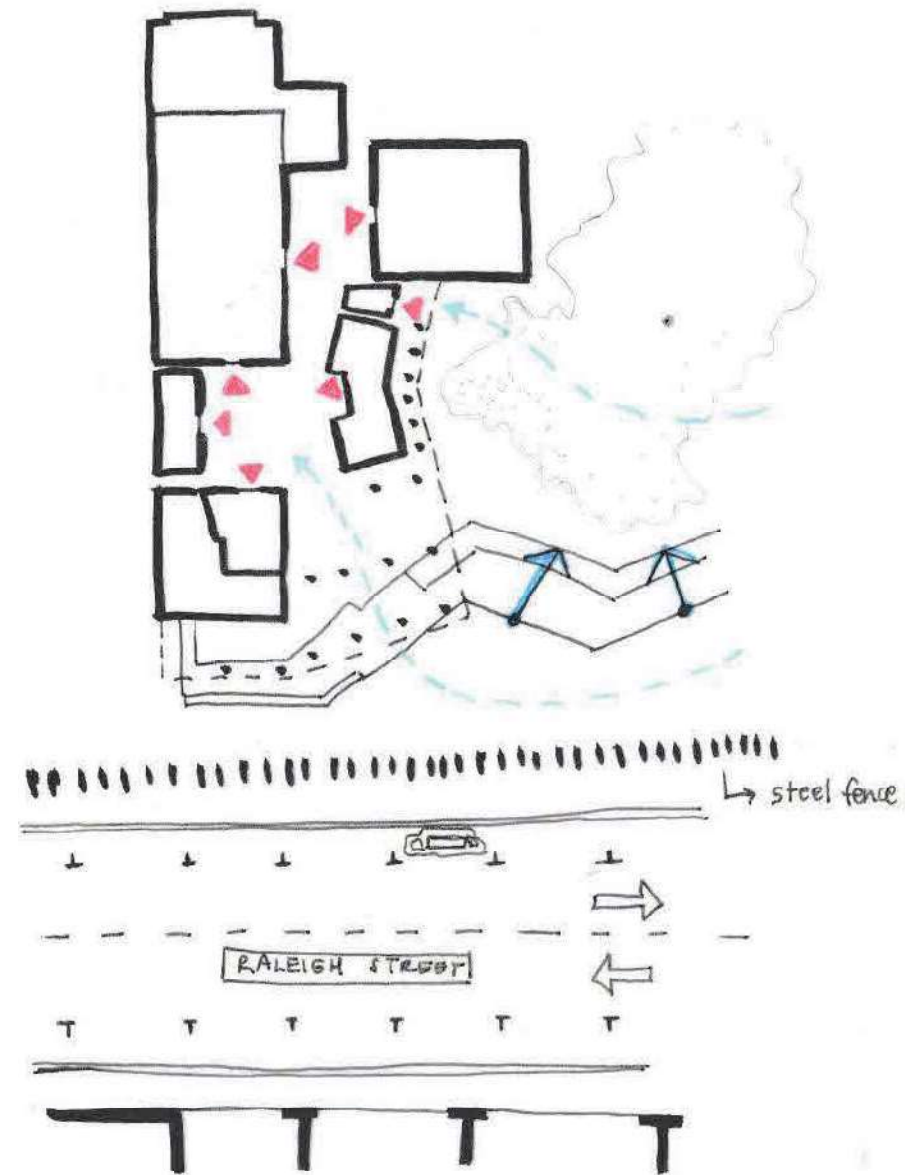


fig 28. Ground floor plan analysis (Author, 2020).

The canopy overhangs serves as mediating the different levels of public space from the street into the building.

This precedent was chosen as it is contextually relevant to the project. It's interesting to analyse an existing public space to see how people relate to it in order to apply successful elements of the precedent in the design, such as layers of public space and participation with the street.

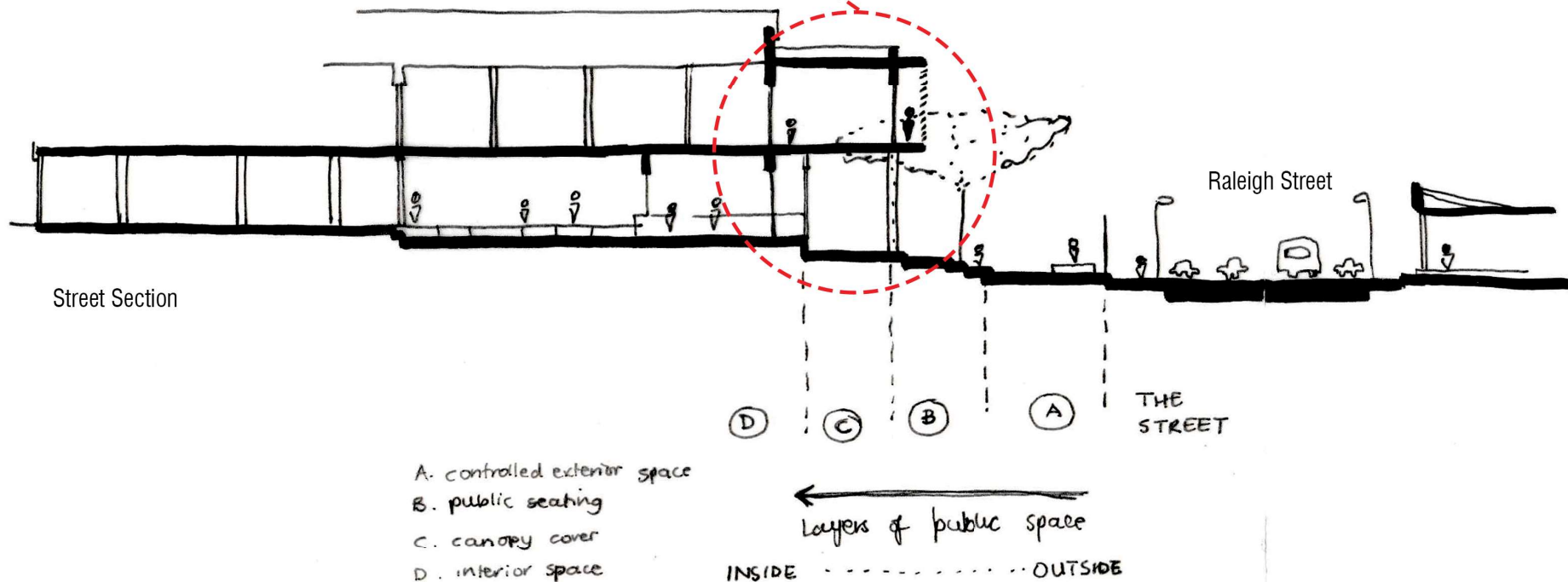
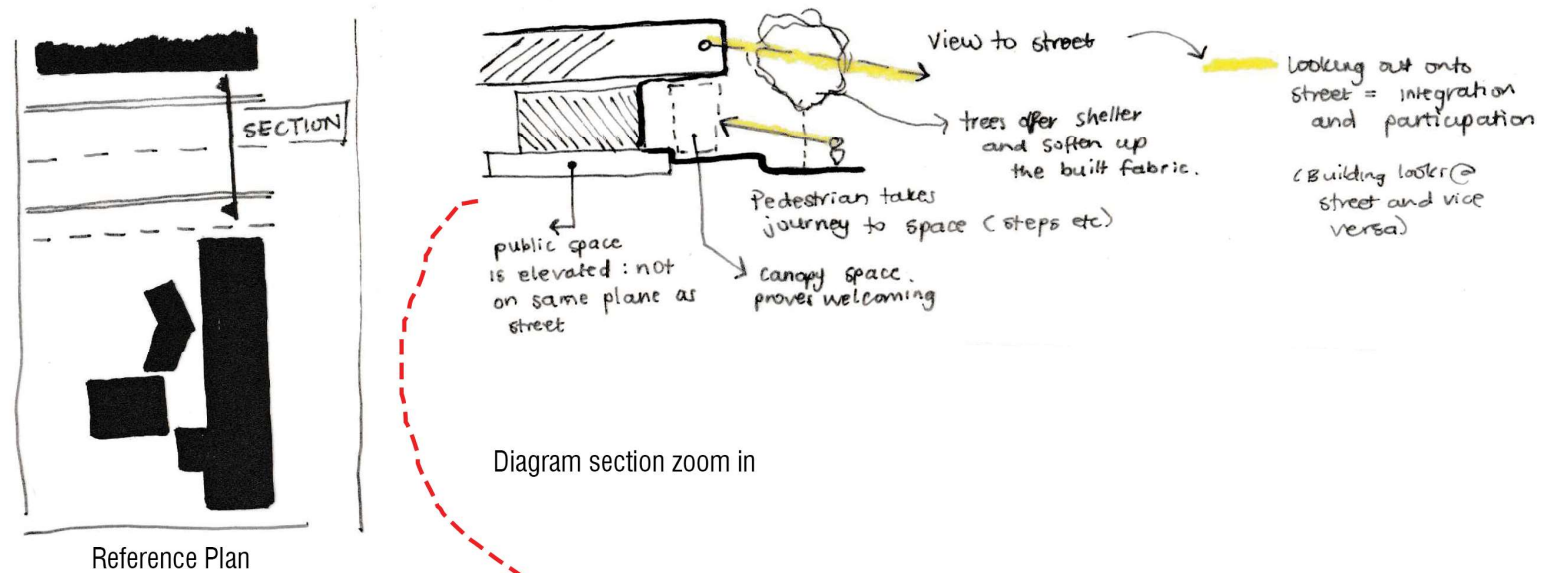


fig 29. Street section analysis (Author, 2020).



fig 30. External threshold condition of the Yeoville Recreation Centre (Author, 2020).



fig 31. External threshold condition of the Yeoville Recreation Centre (Author, 2020).

5.8. The Ubuntu Centre - Port Elizabeth, South Africa

Architect: Field Architecture
Project Status: Completed
Typology: Community & Healthcare Centre
Area: 1950 sqm

This precedent was selected for the following reasons:

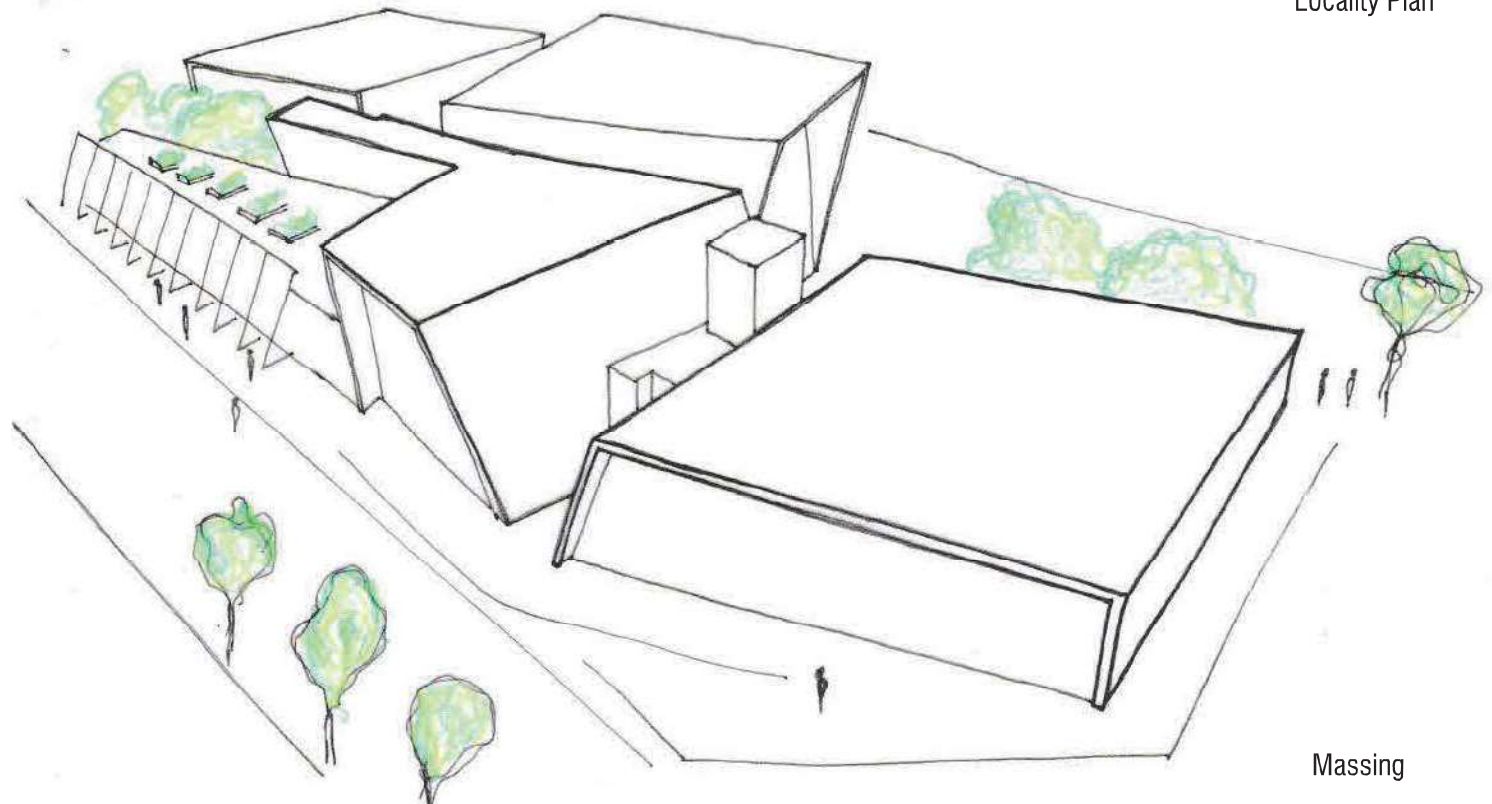
- Programmes involve community empowerment
- Context is in a post-apartheid community
- Design promotes sustainable development and life preservation
- It is funded globally, operated locally

The programme is broken up into 3 masses:

1. Multipurpose wing:
 - Education
 - Concerts
 - Shelter
 2. Empowerment wing:
 - Computer Centre
 - Career guidance
 3. Health wing:
 - Pediatric HIV/TB testing & counseling clinic
- Farming
- Organic rooftop garden
 - Neighbourhood gardens



Locality Plan



Massing

fig 32. Context and Massing analysis (Author, 2020).

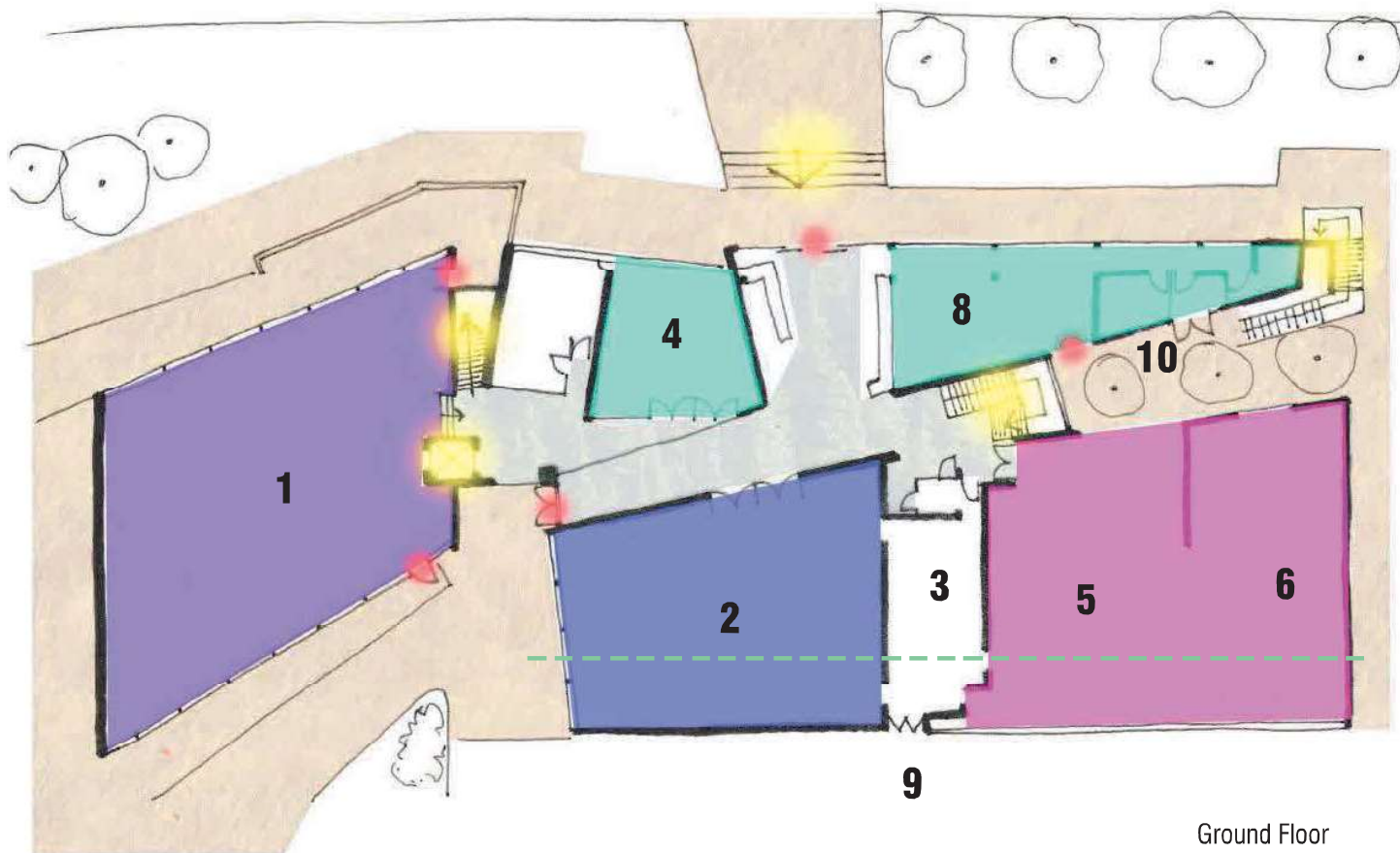
Massing is distributed allowing pedestrians to walk through the building (versus entering through openings placed on the facades).

Programme:

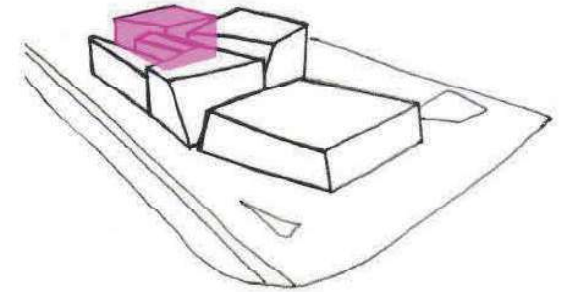
1. Resource / Computer Learning Centre
2. Multi Purpose HALL
3. Community Kitchen
4. Staff Lounge
5. Pediatric HIV/TB Clinic
6. Pharmacy
7. Reception / Entrance Hall
8. Flexible / Expandable meeting rooms
9. Parking
10. Garden Court / to rooftop vegetable garden

Key:

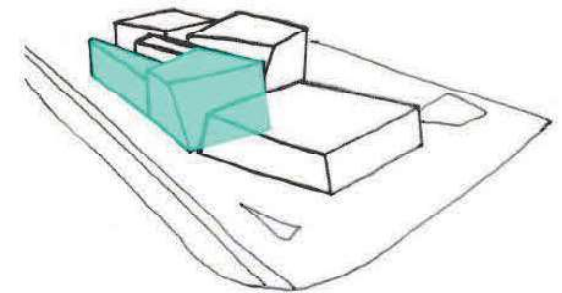
-  Outdoor horizontal circulation
-  Indoor Horizontal Circulation
-  Vertical circulation
-  Entrances
-  Section



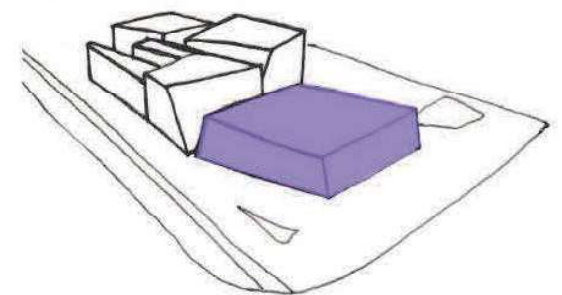
Ground Floor



HIV /TB Clinic



Office Space

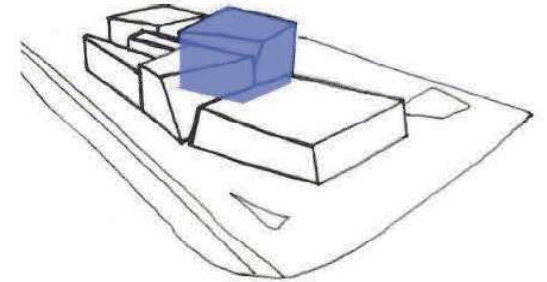


Empowerment Wing

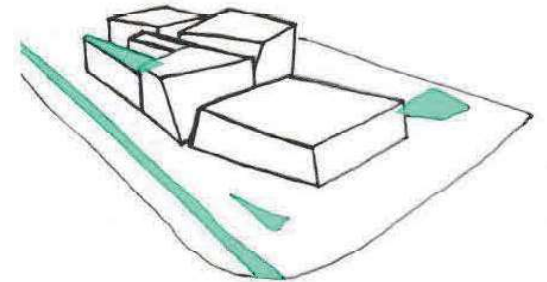
fig 33. Ground floor and massing analysis (Author, 2020).



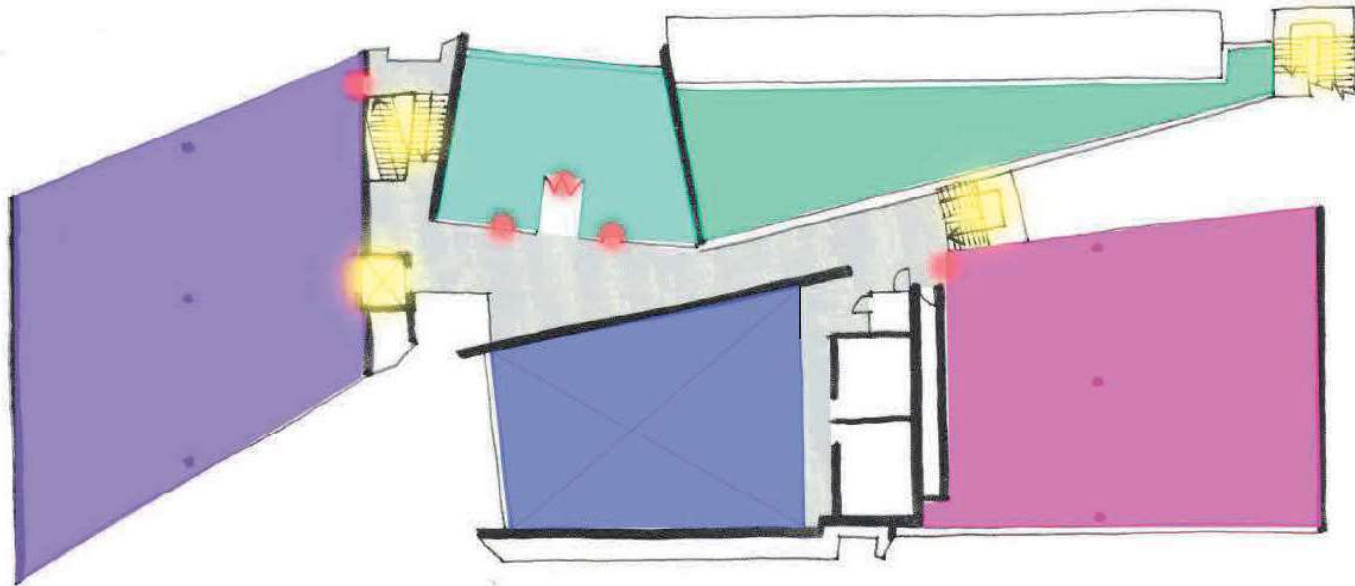
Rooftop Garden



Community Theatre & Multi-purpose Hall



Public & Rooftop Gardens



First Floor

fig 34. First floor and massing analysis (Author, 2020).

The Ubuntu Centre aims to give community members a sense of ownership and to discourage vandalism (graffiti) by creating walkways through the building and not locking the building behind a security wall.

Materiality:

- In-situ concrete
- Gum poles for sun screening
- Overhangs and wooden screens to shield from sun rays
- Folded concrete forms representing volumes which hold each other up, portraying the message of 'Ubuntu' – "I am because you are".

The design sends a message that the community is deserving of a world-class facility. A building whose access is a right and not a privilege.

In conclusion, the way in which the building is well integrated into the community, as well as for its programmatic organisation, makes it a useful precedent to analyse.

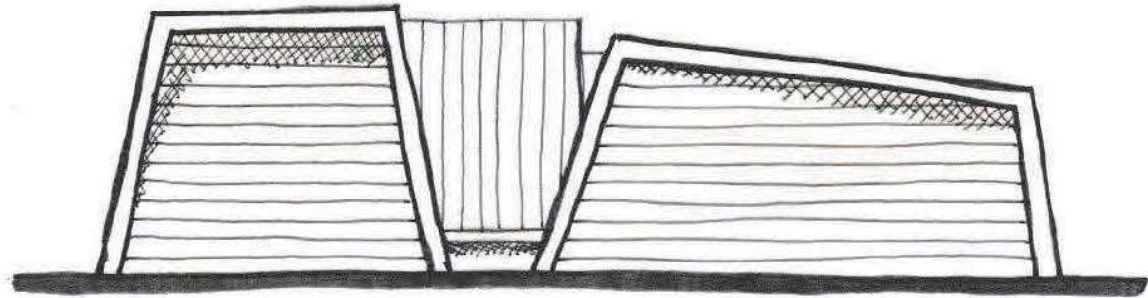


fig 35. Elevation Sketch (Author, 2020).

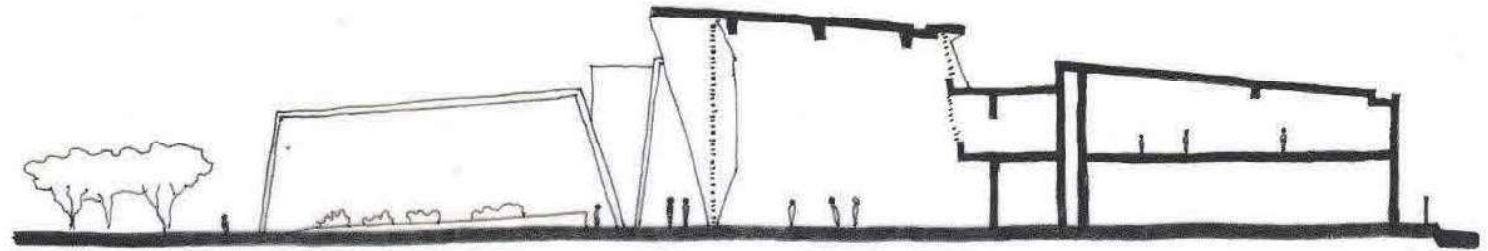


fig 36. Section Sketch (Author, 2020).

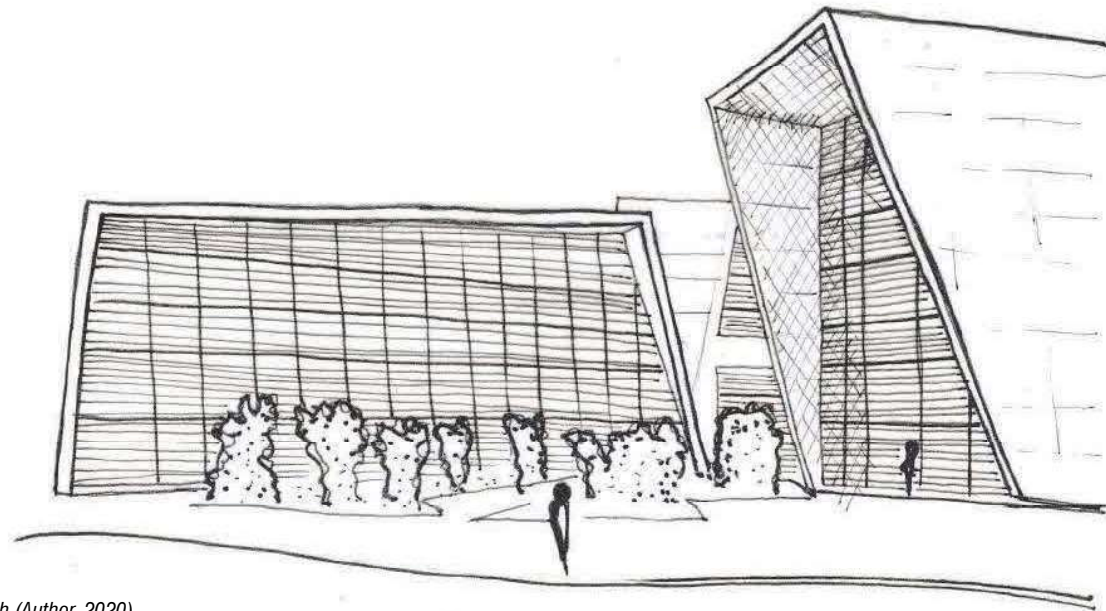


fig 37. Southwest Corner Sketch (Author, 2020).

5.9. Conclusions

These were the key takeaways from the precedents that were analysed:

- there are opportunities for architectural elements, such as circulation, to be interactive spaces rather than simply being functional spaces - expressing the dual nature which architectural elements can possess.
- there is a lack of built and working vertical farming models as most are presented in design competitions. Therefore, there is not enough knowledge to get an idea of the workability of such models in architectural designs.
- there is a need for urban farming models to be tailored towards the level of development of the context in which they are established.
- there are challenges (such as security and crime) in making community centres completely integrated with their urban context and inviting to their communities - something that the Ubuntu Centre, located in semi-urban setting, does better than its urban counterparts - the Hillbrow Outreach Foundation Centre and the Yeoville Recreational Centre.

Chapter 6: Program

This chapter explores the programme of the proposed intervention.

The programmes in the precedents that were analysed in the previous chapter are the foundation and inspiration for the programmes of the proposed community centre:

- Food production through urban farming
- Multi-purpose facility
- Administrative programmes such as offices
- Education programmes
- Dance studio
- Retail

These programmes are tailored to be a reflection of the needs and activities identified in the community and are adapted to incorporate elements which facilitate a production of spaces which promote the experience and exchange of culture for the community.

6.1. Interpretation

The programme of the community centre is primarily influenced by the premise of food being a gateway to cultural experience. Each programme is to promote multi-cultural integration, social cohesion, connection and dialogue through the experience and exchange of foods unique to the Congolese culture.

Secondly, the programme of the community centre is influenced by the premise of food production being an essential building block towards developing a self-sufficient and food-secure urban community.

A user of the building should be able to acquire cultural knowledge not only from eating food, but also from learning about how similar foods are made in their respective cultures and how the food can be farmed in the urban context, as well as in their homes.

Figure 1 represents the programme hierarchy of the community centre.

As food represents this primary gateway, food production becomes the primary programme and the back-bone of the building, for without it, the building would not exist.

Food, the primary programme, sources and supports the secondary programmes, which are supported by the tertiary programmes.

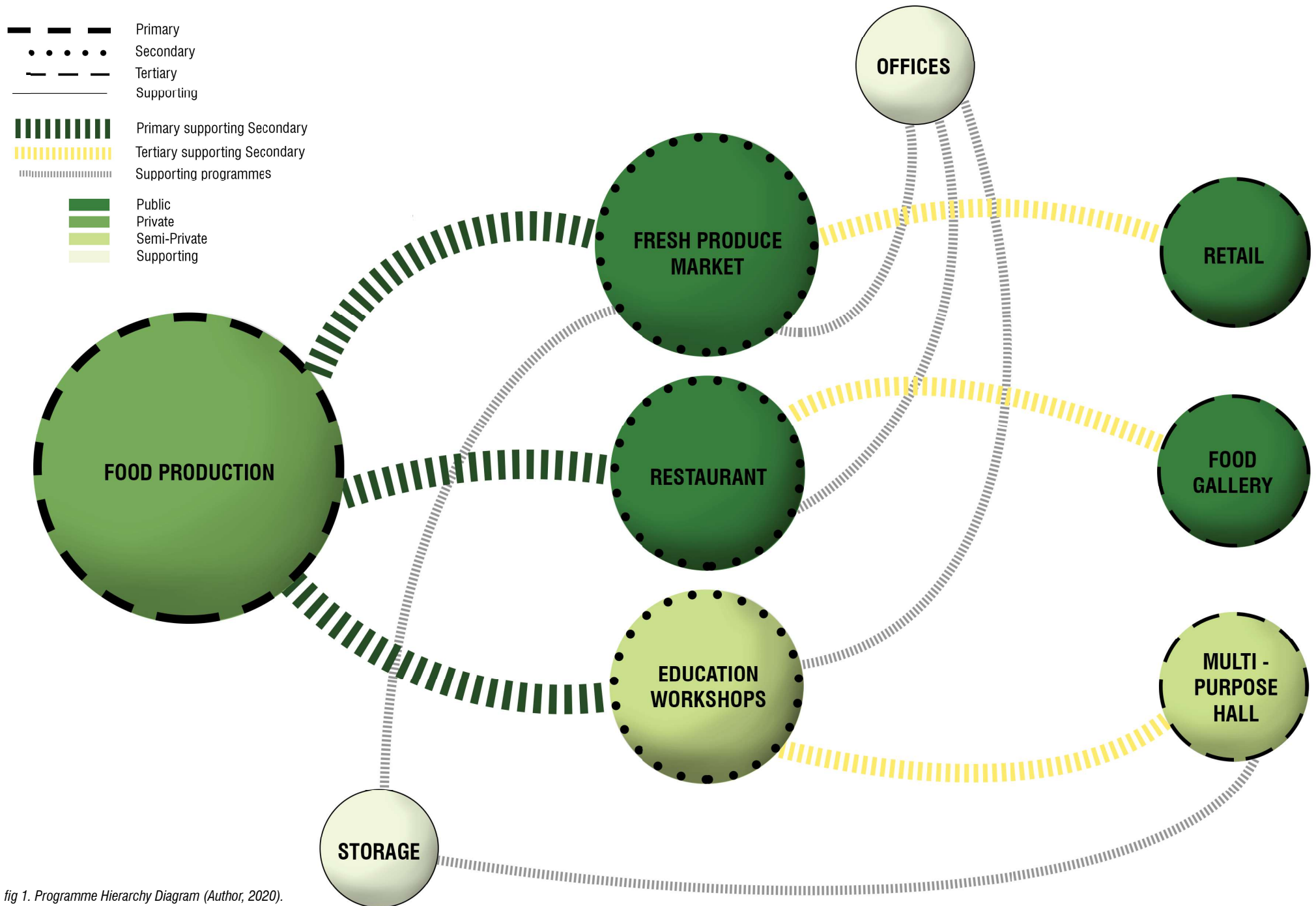


fig 1. Programme Hierarchy Diagram (Author, 2020).

6.2. Breakdown

This section will be breaking down the primary, secondary and tertiary programmes of the community centre.

6.2.1. Food Production: Primary Programme

Food production serves as the back-bone of the community centre.

The building's intent is not for it to be a high-functioning urban farm like the 'Vertical Farm' and 'Food Farm Tower' in Romainville, France, that were analysed in Chapter 5. Rather, it is to function as a demonstrative model which supports the argument for the decentralisation of farming and the promotion of urban farming.

Urban farming is looked at through the lens of making communities self-sufficient and sustainable through education. The food produced from urban farming serves as a platform to know about a certain culture, in this case, the Congolese culture. It serves as a medium through which culture is experienced and exchanged.

Therefore, the building is to function as a facility in which people can exchange knowledge around culture, food, and farming.

There are various urban farming methods and techniques of which a selected few will be demonstrated in the community centre.

Traditional Agriculture method is based on the rural farm model, which makes use of land (Philips, 2013). However, as it is not a feasible method for urban areas due to limited available land resources, it will be demonstrated in the building through the use of planters.

This method of agriculture is called Intensive Agriculture and makes use of raised beds, planters, and trellises. It is most suited for urban areas as higher yields can be produced in smaller areas (Philips, 2013) and the method requires less water and fertiliser, thus, decreasing costs (Markham, 2010).

Greenhouse Farming will also be demonstrated in the building. This method is useful for urban environments as it allows crops to be grown in cold seasons. This is accomplished through using fans, electrical wiring, perforated tubing, and thermostats that are responsible for keeping the greenhouse warm (Philips, 2013).

Rooftop Farming is a method that is commonly practiced in urban areas (Philips, 2013). Done correctly, rooftop farming can be environmentally sustainable as it manages storm-water and reduces the urban heat island effect by decreasing the reflective nature of the roof (Philips, 2013).

Hydroponic Farming is a soil-less farming method where plants are supplied with specific nutrients through water that is a part of a recirculating system (Philips, 2013).

Vertical Farming involves growing food vertically, be it indoors through a soil / hydroponic-based system or outdoors on building facades.

Overall, five methods of urban farming will be demonstrated in the building as part of the food production program.

6.2.1.1. Food Production: Case Study

An example of a variety of food production methods contained within an urban model is showcased in Vicente Guallart's, founder of Guallart Architects, winning design for the Self-Sufficient City Competition for Post Corona Virus China (Dejtjar, 2020).

The design is a model for self-sufficient cities post the COVID-19 Pandemic in Xiong'an New City in China. Through the implementation of various methods of food production, water management, energy production and material reuse, urban occupants are ensured a full life should periods of confinement be extended amidst the pandemic (Brandy, 2020).

The design, which offers a mixed programme including apartments, a kindergarten, shops, and offices, serves as a model for how various methods of food production can be integrated within cities and presents innovative solutions and thinkings around making resilient cities post the COVID-19 pandemic.



fig 2. Model for self-sufficient city in China post COVID-19 pandemic by Gualart architects (ArchDaily, 2020).

FOOD PRODUCTION

食物生产

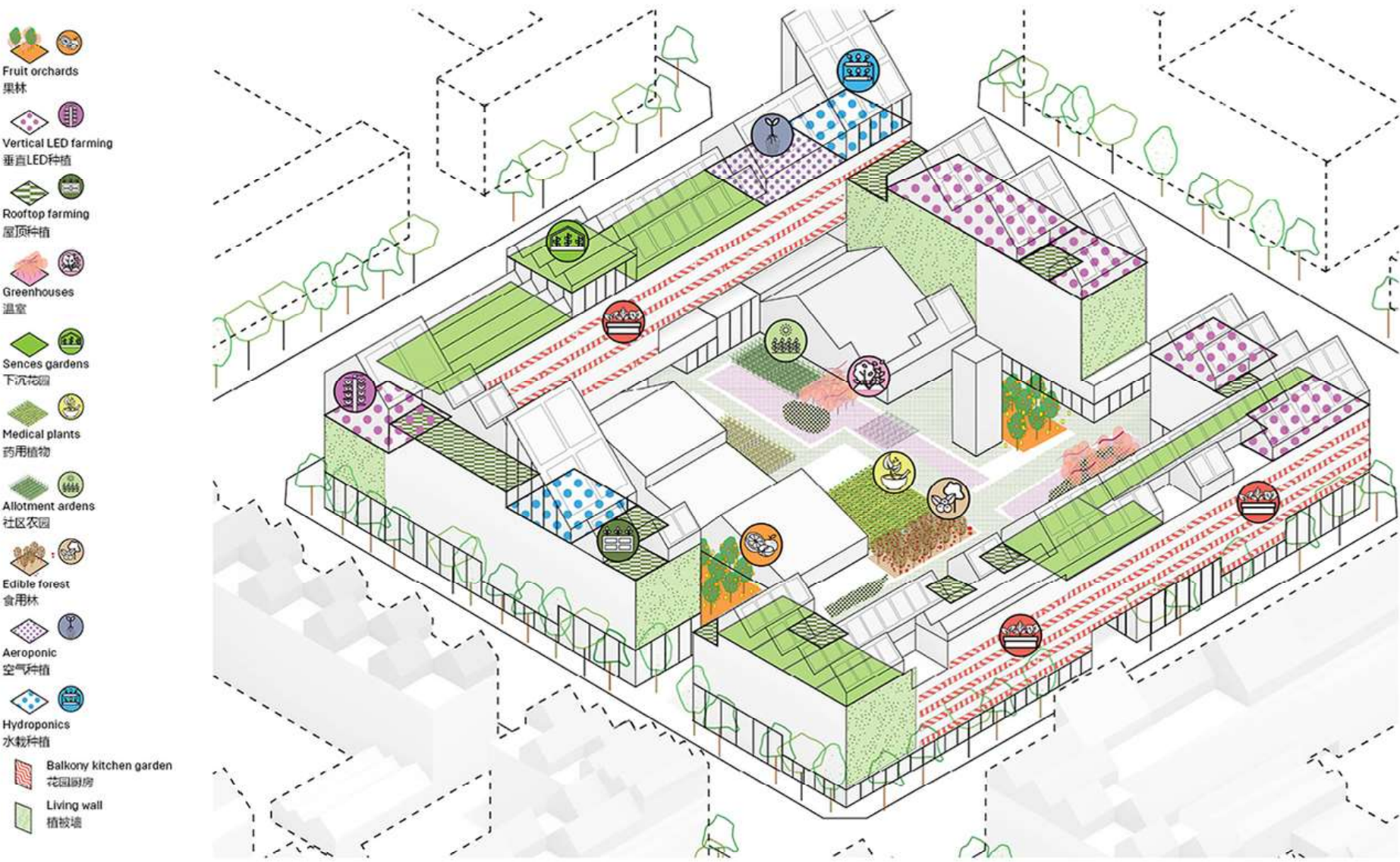


fig 3. Food production methods incorporated in the urban model (ArchDaily, 2020).

6.2.2. Food Preparation

When people migrate, their customs surrounding how their food is prepared and consumed often remains unchanged (Brown and Mussel, 1984). The preparation and consumption of food serve as mediums through which migrants can access feelings and memories of their homes. They are important as they help individuals to cope with migration by allowing them to maintain a sensorial link to their homes, and to maintain their cultural identity and celebrate their culture.

Although it is common for African nations to consume the same type of leafy vegetables, the way these leafy vegetables are prepared after harvest and cooked may differ from region to region or nation to nation.

Cassava leaves, a popular leafy vegetable consumed by the Congolese community, is also consumed by the Malagasy, Nigerian and Sierra Leone community. However, there are similarities and differences regarding how they are prepared and cooked as seen in figure 4 based on individual preferences.

After production of the leafy vegetables through farming methods, food preparation method involves (Achidi et al, 2005):

- Leaf picking: the selection of leaves that are mature. Sometimes the stem of the leaves may be kept or thrown away.
- Blanching / Cleaning: leaves are washed in water enough times until the dirt is removed.

- Pounding / Grinding: using a wooden mortar and pestle, leaves are pounded by themselves or with ingredients such as onions or eggplants
- Storage: if leaves are not consumed immediately, they are stored to be prepared at a later stage.
- Cooking: leaves are cooked using ingredients such as raw peanuts, bicarbonate of soda (used to soften the leaves if too tough), onions, eggplants, palm oil, and fish. However, the ingredients used depend on preference.

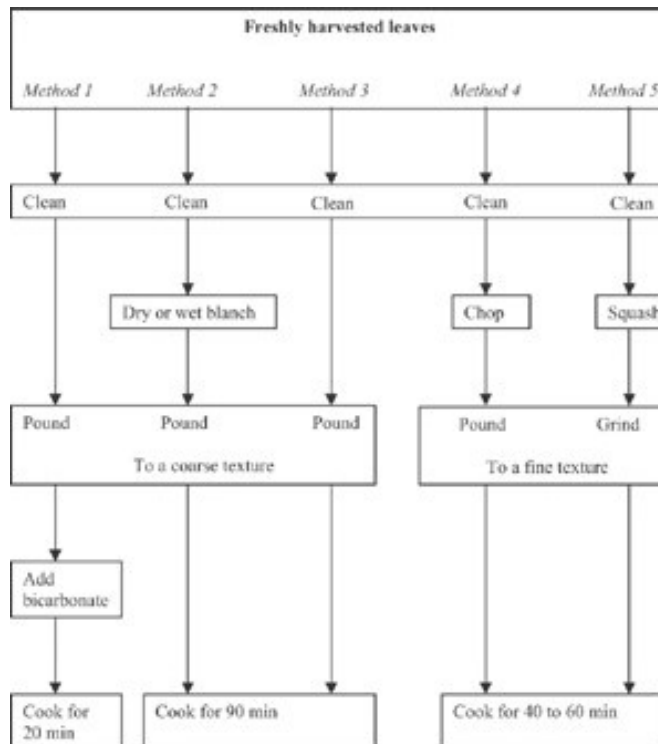


fig 4. Flow chart of the modes of cassava leaf preparation in DRC (1 & 2), Madagascar (3), Sierra Leone (4), and Nigeria (5) (Source: Achidi et al., 2005).

The following points 6.2.2.1 - 6.2.2.4 expands on the food preparation process that is incorporated in my family's household.

The African leafy vegetables shown among the images are Cassava leaves ('Pondu'), spinach, sweet potato leaves ('Matembela'), and amaranth leaves ('Ngai-ngai').

Leaves are selected from either the sweet potato leaves which are farmed in the front garden, or from food markets, along with their ingredients.

Dead leaves are removed and leaves are washed until clean. When cooking amaranth, the stems are removed.

Our household uses either a food processor to grind the leaves or chop the leaves with a knife. The food processor is used when preparing cassava leaves, while amaranth, sweet potato and spinach leaves are chopped with a knife by hand. On my trip to DRC in 2017, I experienced pounding Cassava leaves with a wooden mortar and pestle for the first time.

If the leaves are not consumed directly, they are packaged in plastic bags and stored in the freezer. Each leafy vegetable is prepared differently. Either tinned pilchards, black eyed beans or smoked fish are used in cassava leaves. The leafy vegetables are either eaten with pap, cassava bread, or white rice.

Thus, the importance of food preparation and the process of preparation requires that the proposed community centre have spaces which accommodate food production, food preparation, and storage.

6.2.2.1. Leaf Picking

Prior to the leaf picking process, the green leafy vegetables - specifically Cassava leaves, Amaranth leaves, Roselle Leaves, Spinach and their complementing ingredients - are purchased by my mom in bulk from the Yeoville Market and/or the Johannesburg Food Market (fig 5.2 and 5.4).

Sweet potato leaves are not purchased as they are farmed in a 2,2 x 2,95 meter portion of our front garden which faces north for maximum exposure to sunlight for growth (fig 5.1 and 5.3).

Each family member is involved in this process depending on his/her availability. The leaves are cut from the stem with scissors and placed in a bowl. The process can take 1 hour.



fig 5.1. Our 6,5 square meter Sweet potato leaf garden (Author, 2020).



fig 5.2. A market stall selling green leafy vegetables and other ingredients (Author, 2020).

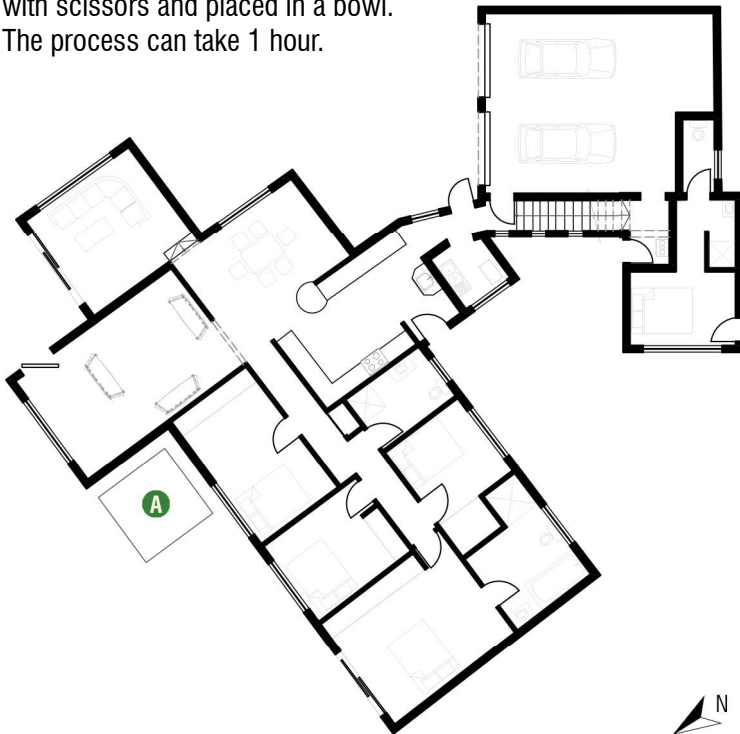


fig 5.3. Ground floor plan of family house - Scale 1:250 (Author, 2020).
Leaf picking takes place in:
• Location A - front garden

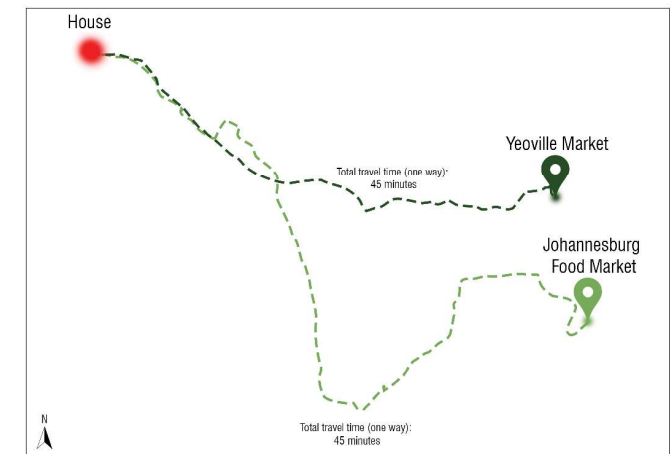


fig 5.4. The markets in relation to our house and the travel time (Author, 2020).

6.2.2.2. Cleaning

The leaves are cleaned twice or three times to ensure that sand particles are removed. New water is used for each wash and the dirty water is used to irrigate the garden.

Due to the large volume of leaves, they are washed in a 75 liter capacity bucket in the back patio near the gully. Often times, the leaves are washed in the En Suite bath tub which has a 300 litre capacity. The key players in this process are my mom, dad or myself and this process can take 30 minutes to an hour.

Some of the leaves, specifically cassava, amaranth, and Roselle leaves, need to be prepared by removing the stems from each leaf before the pounding process. This is a lengthy and meticulous process, taking 4 to 8 hours, and is done by any available family member(s).

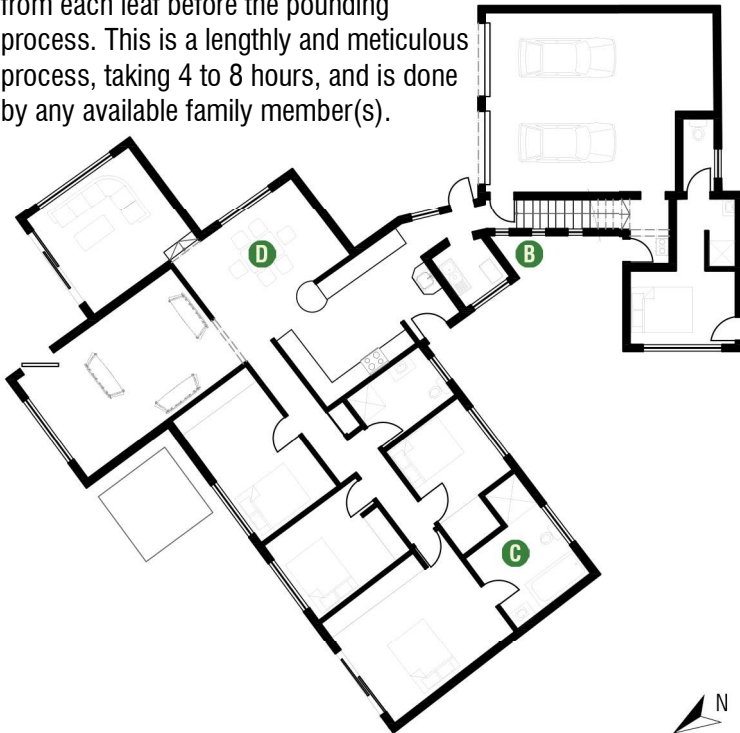


fig 5.5. Amaranth leaves soaked in water in a 75 litre capacity bucket (Author, 2021).



fig 5.6. My brother removing the stems from the amaranth leaves in the dining room (Author, 2021).



fig 5.8. Stems of amaranth leaves removed (Author, 2020).

fig 5.7. Ground floor plan of family house - Scale 1:250 (Author, 2021).
Cleaning takes place in:
• Location B - Back patio near the gully
• Location C - Bath tub in the En Suite bathroom
• Location D - Dining room

6.2.2.3. Pounding / Grinding

After the leaves have been cleaned and the stems removed, they are usually chopped finely with a knife by hand. This process can take up to 2 hours and is usually done by my mother or myself.

As the kitchen counter and dining room table are too low for one to sit down and chop the various leaves, one is left standing for the duration of this process, which can take a toll on one's knees. However, pounding leaves in a wooden mortar with a pestle allows one to sit comfortably and exert the required force. Since most leaves are chopped and not pounded, this process is tiresome. Therefore, kitchens with counters high enough for one to sit on a chair and chop leaves comfortably could serve as a great detail for this process.

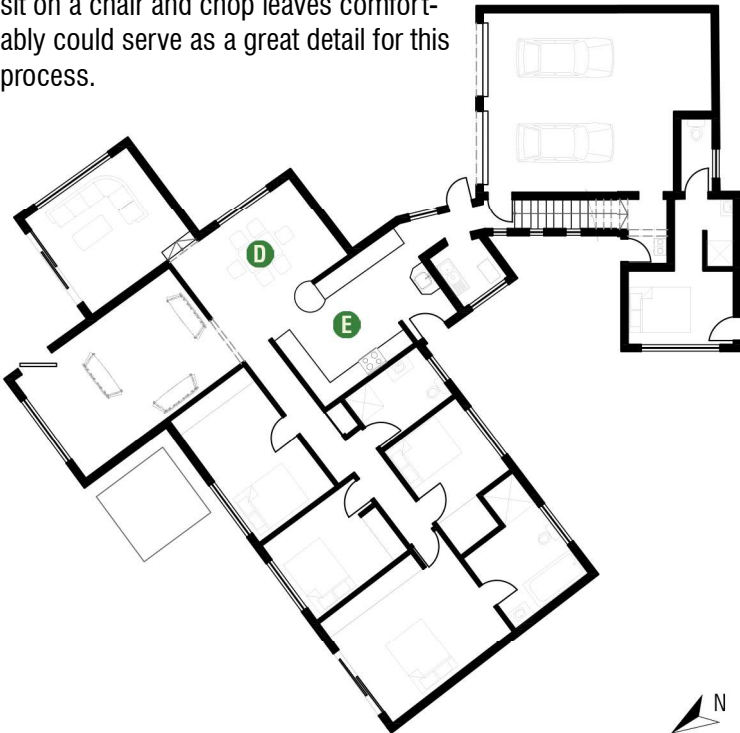


fig 5.9. Cassava leaves pounded finely by my grandmother in DRC (Author, 2017).



fig 5.10. Me pounding cassava leaves during my trip to DRC (Author, 2017).

fig 5.11. Ground floor plan of family house - Scale 1:250 (Author, 2021).
Pounding / Grinding takes place in:
• Location D - Dining room
• Location E - Kitchen



fig 5.12. Sweet potato leaves and stems being cut by hand with a knife on a cutting board on the kitchen counter (Author, 2020).

6.2.2.4. Cooking / Storage

Due to the lengthy and meticulous process of cooking the various leafy vegetables, the task is left to my mother and I.

Cooking these leaves can take up to 3 hours. Therefore, our family invested in an on-stand gas stove due to the electric stove being less powerful, resulting in longer cooking times were it to be used. The gas stove was placed in the span-drel under the stairs leading to the first floor (fig 5.16).

After the leaves have been chopped, they are either boiled until soft or fried (usually the sweet potato leaves) or packaged to be kept in the freezer (300 litre capacity) for later consumption.

Once boiled, complementing ingredients, such as oil, tomatoes, onions, eggplant, and various flavourings, are added.

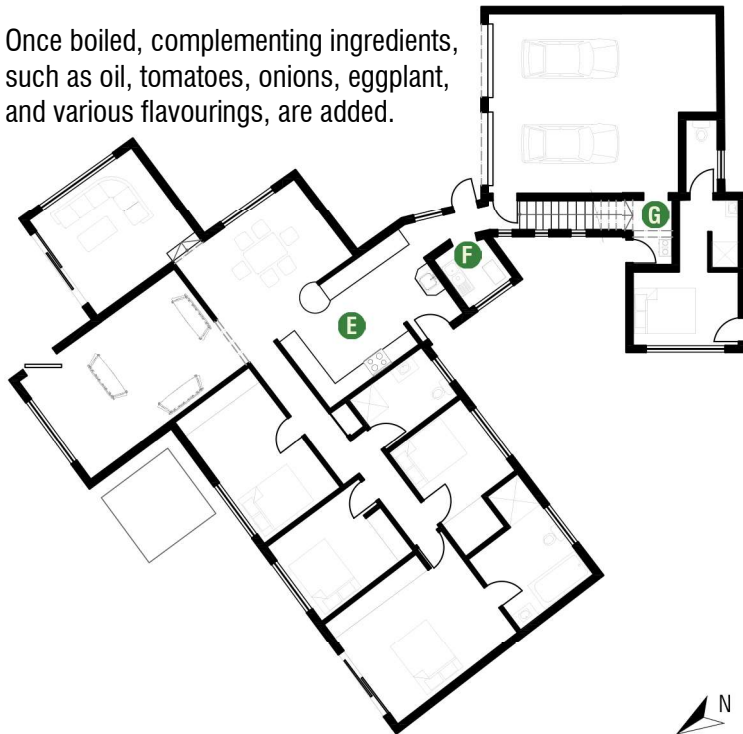


fig 5.13. Amaranth leaves (left) and cassava leaves (right) after having been boiled on the gas stove (Author, 2021).



fig 5.14. Packaged and frozen spinach (2 bottom packets) and cassava leaves (top packet) from the freezer (Author, 2020).

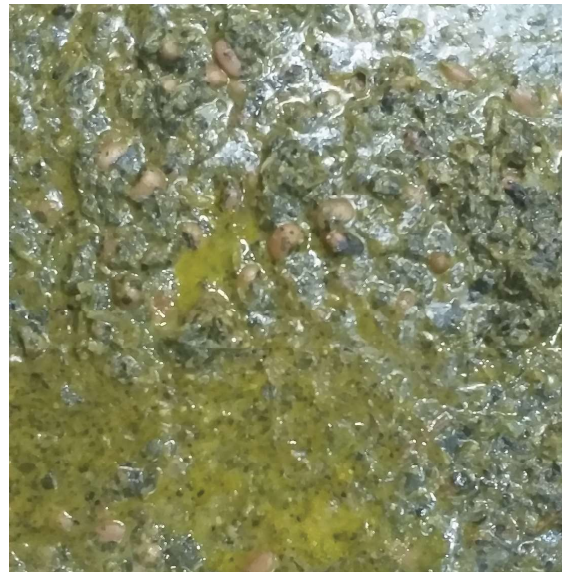


fig 5.15. Cooked cassava leaves ('pondu') with black-eyed beans inside (dish is known as 'Saka madesu') (Author, 2020).

fig 5.16. Ground floor plan of family house - Scale 1:250 (Author, 2021).

Cooking / Storage takes place in:

- Location E - Kitchen with electric stove
- Location F - Scullery where freezer is kept
- Location G - Back kitchen with gas stove



fig 5.17. Plated meal consisting of cassava bread ('kwanga') and cassava leaves ('pondu') ready for consumption (Author, 2020).

6.2.3. Fresh Produce Market: Secondary Programme

Produce from the various farms within the building are to be used primarily by the programmes within the building such as the restaurant. Therefore, the produce shall be bought sold by vendors at the market. Additionally, vendors can also sell fresh produce that has been obtained from external sources, like the Johannesburg Food Farms or from farms near the community such as the Siyakhana Garden in Bezuidenhout Park.

The Fresh Produce Market is intended to function within 4 realms which include (Francis & Griffith, 2011):

- a) The Promenade that facilitates circulation
- b) The Working Market which includes:
 - Vending spaces that accommodates prepared foods, value added products, arts and crafts, and fruits and vegetables, [particularly African Leafy Vegetables]
 - Backstage areas
 - Storage space
 - Composting and recycling
 - Waste management
 - Public restrooms
 - Information kiosk or reception
 - Bicycle parking
- c) The market landscape which represents the building's public courtyard which is a socially programmed open space for leisure and relaxation to balance the working market.
- d) The market neighbourhood which represents that urban context within which the market is located. One to which the market should respond and should integrate.

Although there is another market within the community, the Yeoville Market, one can conclude, from seeing the number of street vendors selling fresh produce among other things in the Yeoville-Berea community, that the Yeoville Market offers limited trading spaces and does not fully accommodate the commercial nature of the community in which it is situated.



fig 6. Yeoville Market on Raleigh Street (Author, 2020).



fig 7. Spinach being sold out of a bakkie on Raleigh street, Yeoville (Author, 2020).



fig 8. Street vendors along Abel Road, Berea (Author, 2020).



fig 9. Fresh produce street trader on Abel Road, Berea (Author, 2020).

The market programme is intended to be flexible, meaning that it acts as a multiple-use space during non-market periods and feeds off the activity from the public courtyard of the building.

It's a space that is intended to be a dynamic space, a space that fosters social life and cultural expression, that is able to change with the needs and seasons, and is able to reflect the diverse and multicultural community in which it is established.

6.2.4. Restaurant: Secondary Programme

The restaurant programme is geared towards African Fine Dining. Supported by the food production programme, it will showcase how African Leafy Vegetables can be cooked in various ways unique to various cultural communities that can be found in the Yeoville-Berea community.

The intention of this is for the food that is prepared to cater to the multicultural African palette and to be culturally inclusive. It is a space for people to come and experience home through tasting familiar foods, and for people to experience and learn about other cultures through tasting new foods.



fig 10. African Corner Restaurant on Kenmere Road in Yeoville (Author, 2020).



fig 11. African Cuisine Kitchen in Berea, Johannesburg (Author, 2020).



fig 12. African Cuisine Kitchen Menu in Berea, Johannesburg (Author, 2020).

6.2.5. Education Workshops: Secondary Programme

The educational workshops consist of farming workshops and cooking workshops.

Cooking workshops allow people to learn how to cook various traditional African meals of which African Leafy Vegetables form staple elements. Nutritional benefits of these foods shall be promoted to encourage people to consume healthier food options.-

Farming workshops allow people to up-skill themselves with practical knowledge on food production, urban farming and sustainability, with the goal of becoming farmers themselves - producers and not solely consumers.

6.2.6. Retail: Tertiary Programme

The retail programme supports the market programme and is aimed at local businesses.

6.2.7. Food Gallery: Tertiary Programme

A Food Gallery is a space wherein food is exhibited. This exhibition would explain the history of the African Leafy Vegetables and the regional African varieties of how they are cooked.

It is a programme which supports the restaurant and education programme of the building.

6.2.8. Multipurpose Hall: Tertiary Programme

The Multipurpose Hall is a space which supports the educational programme of the building.

The space is intended to accommodate meetings run by community organisations; accommodate educational lectures; as well as accommodate entertainment programmes such as public screenings of culturally-related visual material and musical performances.

6.3. User Groups

There are 10 user groups which are to be serviced by the community centre:

Group 1: Local Residents

The main users which are to be serviced by the community centre is to be the Yeoville-Berea community. All residents will be welcomed in the community centre, no matter their ethnicity, income or religion.

The community has a high migrant population and is heterogeneous in many ways. Half of the population are not born in South Africa, nor have South African citizenship.

An iconic point of destination in the community is the Yeoville Market, also known as the Congolese Market, and is frequented by people from an array of African cultures.

Group 2: Scholars

As the farming education is an element in the building, programmes shall cater to primary, secondary and tertiary scholars.

Universities in the City of Johannesburg such as the University of Johannesburg and University of Witwatersrand will use the building as a research/educational grounds facility in urban agriculture of African Leafy vegetables.

Group 3: The Congolese Community

These users consist of refugees, immigrants, migrants, the diaspora, the Wits Congolese Society, and the UJ Congolese Society.

They shall benefit from culture-specific education around the leafy vegetables provided by the building which are unique to the Congolese community.

Group 4: Vendors

These are the people who will be selling fresh produce in the market space.

The fresh produce will either be purchased from the food produced within the building or obtained from other sources, like the Johannesburg Food Market to be sold in the Fresh Produce Market of the community building.

These vendors will also have the opportunity to up-skill themselves through the educational workshop facilities and gain urban farming knowledge.

Group 5: Local Businesses

The retail space which responds to the street is for local business owners who do not sell fresh produce to rent out.

Group 6: Community Organisations

The Yeoville-Berea community has various civil society organisations within the community.

The main ones are:

- The Yeoville Stakeholders Forum (YSF) who represent various NGOs, as well as religious, ethnic, and political groups such as the African Diaspora Forum.

- The SA National Traders Retailers Alliance (SANTRA)

These community organisations will be able to make use of the Multipurpose Hall of the building for programmes and events suitable for that space.

Group 7: Management Team

These users, who manage the day-to-day running of the building, represent the main clients of the community centre made up of a Congolese NGO and a Farming NGO, who are in partnership with the City of Johannesburg. (Please see Chapter 7 for further details).

Group 8: Staff

The staff represent people in charge of the upkeep of the building and those who are employed in the food production, restaurant, workshop, and food gallery spaces.

Group 9: Culinary Business

The restaurant space will be rented out and will serve as a culinary incubator for the specific category of African Fine Dining.

Group 10: Tourists

This group represents people who are from other parts of the city who want to experience what the community centre offers.



fig 13. Ways in which the user engages with food (Author, 2020):

1. Through the buying and selling of food in the market
2. Through the eating of food in the restaurant
3. Through learning about how to prepare food in the workshops (and in the food gallery)
4. Through learning about farming technologies with the aims of becoming more self-sufficient

The aim is for the user is to have a holistic experience (Figure 14):

1. Brain: memories of home; ingestion of knowledge through education
2. Eyes: visual experience of greenery
3. Ears: listening to information and experiencing culture through music
4. Nose: smelling of food
5. Mouth: taste of food
6. Heart: feeling of and connection to home
7. Stomach: flavours of home
8. Hands: practicalities of eating and learning how to cook and grow food
9. Feet: experience through space

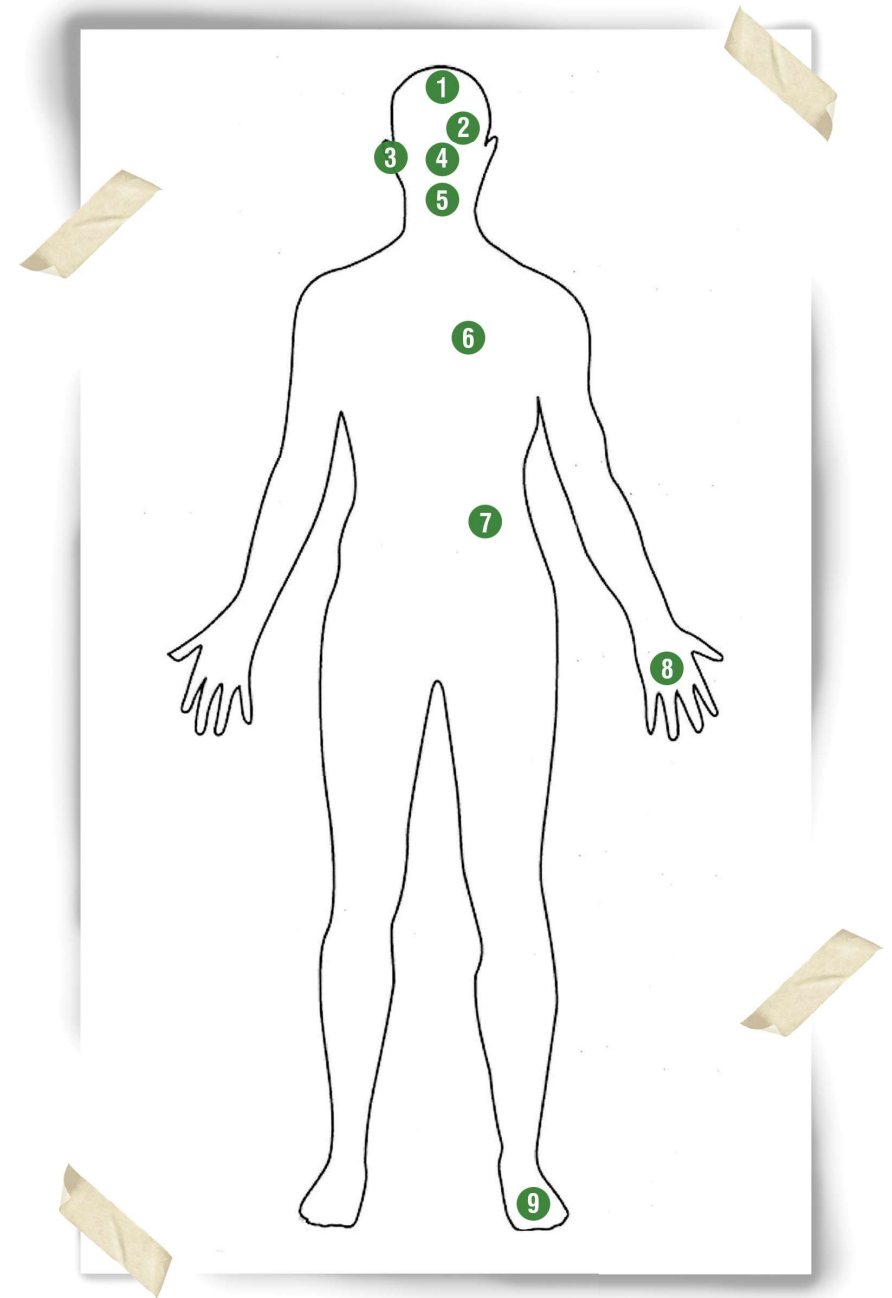


fig 14. A holistic user experience (Author, 2020).

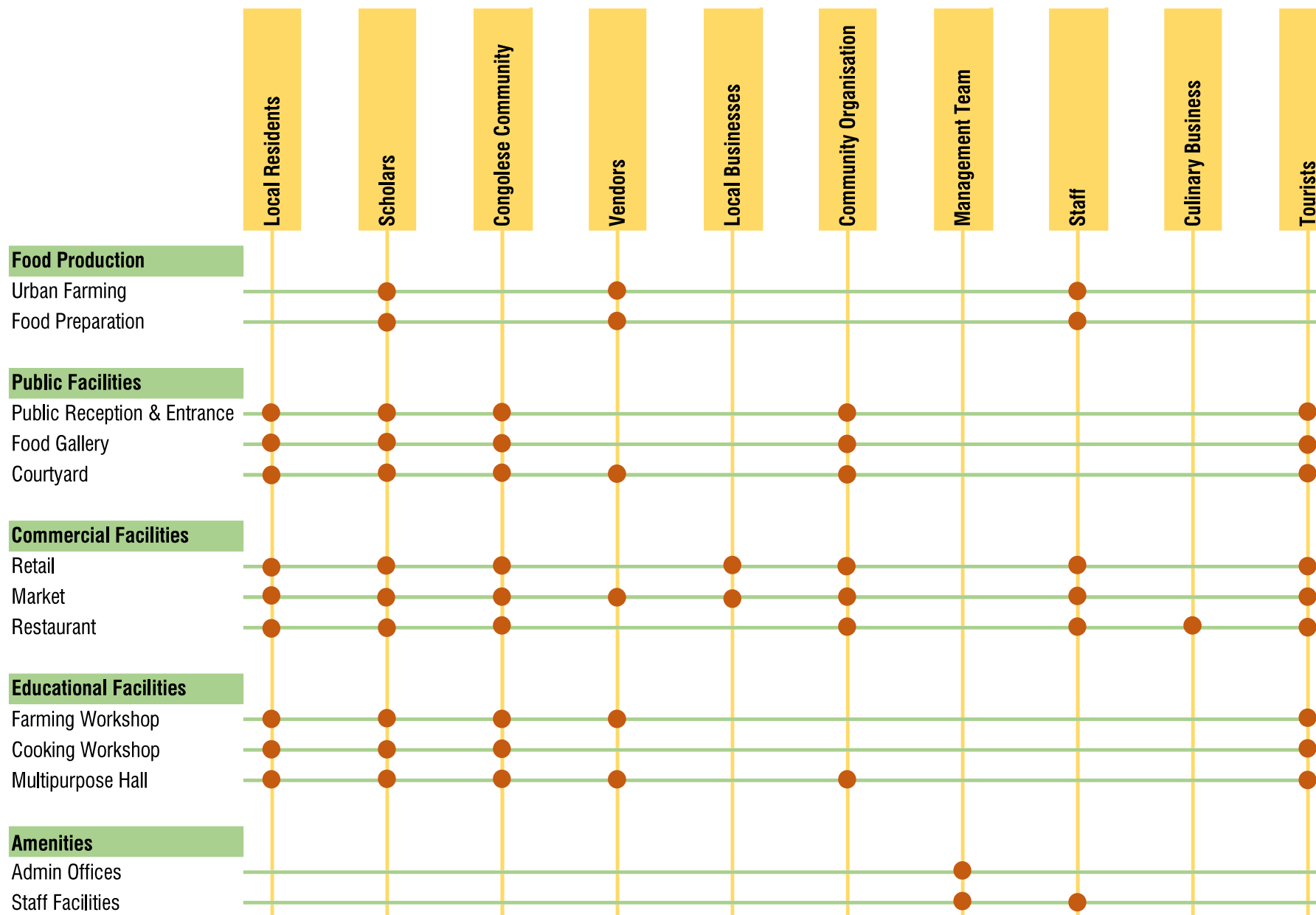


fig 15. User Activity Table (Author, 2020).

ACCOMODATION SCHEDULE	AREA (m²)
Food Production	470
Intensive Agriculture	100
Greenhouse Farming	40
Rooftop Farming	80
Hydroponic Farming	80
Vertical Farming	170
Food Preparation	100
Public Facilities	720
Public Reception & Entrance	280
Food Gallery	100
Courtyard	340
Commercial Facilities	1050
Retail	100
Market	570
Trade Spaces	380
Storage	190
Restaurant	380
Kitchen	70
Dining Area	260
Service Area	50
Educational Facilities	430
Farming Workshop	100
Cooking Workshop	100
Multipurpose Hall	230
Amenities	90
Admin Offices	60
Staff Facilities	30

Meeting Room	20
Kitchenette	10
Ablutions	160
Male Toilets	as per SANS 10400
Female Toilets	as per SANS 10400
Disabled Toilet	as per SANS 10400
Vertical Circulation	64,3
Good's Lift	4,3
Fire Escapes	60
Horizontal Circulation	
Services	70
Ducts	20
Wet Services Duct	12
Electrical Duct	4
HVAC Duct	4
Rainwater Tank Storage	50
TOTAL AREA	3154,3

fig 16. Accommodation Schedule for proposed community centre (Author, 2020).

Chapter 7: Viability Study

7.1. Introduction

This chapter is an extension and iteration of a Client Report that was completed for the course ARPL7002 - Simulated Office Practice in June 2020.

The project was based on a report that was to be presented to a potential client based on Work Stage 1. The aim was to examine both the feasibility and viability of this research proposal from all aspects of the development of the project.

7.2. Client

There will be a partnership between a Congolese NGO and a Farming NGO who will be involved with the running of the building and will be responsible for providing something of use which services the community.

The NGOs, one dealing with the Congolese cultural aspect within the building, and the other dealing with the urban farming aspects within the building, shall form a partnership with the City of Johannesburg. This partnership will be facilitated by the Johannesburg Inner City Partnership.

Two main clients who are in partnership with the City:

The Congolese NGO:

The Congolese Diaspora for Nelson Mandela Legacy are a non-governmental (non-profit) organisation operating in South-Africa who are committed in skills development transfer; ethics and values; conflict resolution and Human Rights Advocacy. Their organisation does not solely promote Congolese culture and support the Congolese community. They stand for Nelson Mandela's Legacy of peace, hope, and dignity, which supports positive attitudes towards foreign nationals in South Africa and promote peace among all who live in South Africa.

The Farming NGO:

The African Association for Vertical Farming is a functioning non-profit organisation. The association is comprised of individual urban farmers; small and medium sized enterprises; research institutions and corporations whose goals and interests are rooted in the sustainable future of farming in Africa.

Their aims include:

- Assisting African cities in the implementation of efficient horticulture supply systems,
- Advocating that urban planning strategies integrate urban farming,
- Improving production methods which in turn increase product quality,
- Community empowerment and poverty upliftment,
- Educating farmers and communities in need to become financially sustainable through using innovative agricultural methods, through organisational, marketing and management knowledge.

Their mission, which is to change the mentality of the public and government around urban agriculture, is to be achieved through network building of individuals, organisations, and research institutions in the urban agriculture sector of African cities.

This lines up with the aim of the research in establishing a strong inner-city link of food supply through urban farming.

The clients are in Partnership with the City of Johannesburg with the help of the Johannesburg Inner City Partnership (JICP).

Their role is to facilitate the inclusive and sustainable growth and transformation of the inner-city stakeholders through collaboration with the City of Johannesburg, other government spheres, as well as the private sector.

They currently support projects such as 'The Urban Agriculture Initiative' (Appendix A) and represent community-based organisations, as well as foreign national communities among a plethora of diverse organisations.

Their goals are to work with these organisations to find sustainable avenues which meet the social, economic and material needs of the inner-city communities, to improve to improve their life quality and make the inner city attractive for tourism, trade and investments.

7.3. Client Proposal / Project Overview

This project is being undertaken to ensure ways in which culture and identity among the Congolese Diaspora can be sustained within the multicultural city of Johannesburg.

The building proposal and construction implementation project will be a cultural community centre for the experience and exchange of Congolese culture, which will be primarily through food and will implement urban farming.

The aim of the project is to promote awareness of the Congolese culture through the introduction of foods, specifically green leafy vegetables unique to the Congolese community.

The vision to create a strong inner-city network of food supply through urban farming, as well as to establish a welcoming urban environment for foreign cultures in Yeoville. The cultural community centre will be a part of the many recreational and public amenities in the community.



fig 1. Client Organisation Structure (Author, 2020).

7.4. Brief

The proposal is in the form of a community centre where Congolese culture can be experienced and exchanged in Yeoville through food. The building will be a place where vertical farming (using indoor technologies) and urban agriculture (rooftop farming) will take place. The building is to serve as a recreational, educational, and cultural centre for the diverse Yeoville community.

The project is to be completed by May 31st, 2022, so that it can be occupied to celebrate the 62nd year of Independence for the Democratic Republic of Congo on the 30th June 2022.

7.5. Site Selection (Town Planning)

Location:

2 Harley Street, Yeoville, the 64th Ward in Region F of Johannesburg (Appendix B).

Active use:

Not active.

Parcel number 1314 consisting of erven 92, 91, 43 and 44, all registered and SG approved, owned by the City of Johannesburg.

Area of combined erven: 1982 m²

Site is not listed under the South African Heritage Resource Agency and has, therefore, not been declared.

Site falls under the City of Johannesburg town planning scheme

Need for Rezoning:

Revisions to the Town Planning Scheme would not need to be applied for at the Local Authority as the proposed use (Community Facility) for the 4 erven fall under the secondary land use rights for its current Residential 4 use zone (Appendix C).

Height Zone:

Height Zone C (which allows for a number of storeys as per Clause 30 outlining the 59 degree height line limitation) – for Johannesburg, maximum is 4 storeys for this height zone (Appendix D).

	PERMITTED	PROPOSED	COMPLIES
FAR	4.0	4.0	Yes
Coverage	100%	100%	Yes
Use Zone	Residential 4	Community Facility	Yes
Density	1 Dwelling per 200 m ²	N/A	-
Height Zone	Height Zone C	Height Zone C	Yes
Building Lines	1.5 meters	1.5 meters	Yes
Parking Requirements	As per land-use scheme	No parking	To council satisfaction

fig 2. Town Planning Information (Author, 2020).

7.6. Funding & Economic Sustainability

Funding towards the construction of the community centre will be done through a combination of public funding and private funding. The funders are not involved in the day to day running of the building.

The community centre will receive much of its funding from the Johannesburg Development Agency as part of the Inner-City Transformation Programme.

Private funding for the building will be received through a combination of donations from Congolese businesses and agricultural businesses. The existing network of funders of the African Association for Vertical Farming, and the Johannesburg Inner City Partnership, are also seen as potential private funders for the building.

Furthermore, the Government of the Democratic Republic of Congo (DRC) may serve as a potential private funder. This may be possible through a liaison between the Client and the Ministry for Culture and Arts of the DRC to partner with the Ministry of Foreign Affairs in the DRC to grant funding for the building as the building participates in the promotion of cultural aspects of the country abroad. This is a wonderful opportunity to increase tourism to the DRC from South Africa and works on further reinforcing the relationship the DRC has with South Africa as members of the Southern African Development Community.

Public funding will amount to 70% and private funding will amount to 30% for the construction of the community centre.

7.7. Cost Estimates

According to the Property Construction cost guideline for 2019, although a Community centre is not listed as a building service, the minimum rate/m² is R3900 for building on land.

Calculations for average building costs based on that minimum rate:

Area of site: 1982 m²

Average rate of building on that land = R3900/m²

Therefore, estimated building costs for site = R 7 729 800

Professional Fee Calculation for Architect according to Table 1 of Board Notice 122 of 2015:

[Cost bracket 6]

Professional Fee = Primary Fee + Secondary Fee for applicable Cost Bracket of Value of Works calculated as (Applicable Value of Works minus Column E) x % in terms of Column D

Professional Fee = R 728 749 + (R 7 729 800 – R 6 500 001) (9.50%)

Professional Fee = R 845 579.905

Therefore, the minimum cost of this project based on the professional architect's fees and the building costs would be R 8 575 379.905.

Overall estimates of this project would be +/- R 10 million if other costs, such as the other professional fees are to be factored in.

The building is not built to generate yearly profits or annual return in investments. Thus, the financial methodologies implemented for ensuring the economic sustainability of the building pertaining to its management, operations and maintenance will be done through fundraising events and through the renting of the restaurant space, market stalls, retail space, and multipurpose hall programmes of the building.

Furthermore, partnership with educational institutions and research initiatives that support urban agriculture is vital for the sustainability of the building. Most agricultural institutions are located far away from the inner city; therefore, this serves as a positive opportunity to educate people in urban farming with the hopes of creating a self-sufficient, sustainable city.

7.8. Implementation

The Professional Team will consist of the Planning Team, Legal Team and Design Team (Appendix E).

Contract Type: Traditional Design-led Contract

- This is a community project that is dependent on funding obtained from grants and donations, therefore, unexpected costs and issues can be avoided, as the funding options may allow for less flexibility with regards to finances, demanding precise execution.
- This is also the reason to omit a Project Manager from the Professional Team, requesting that a professional architect take on role of the principal agent – to cut on costs.

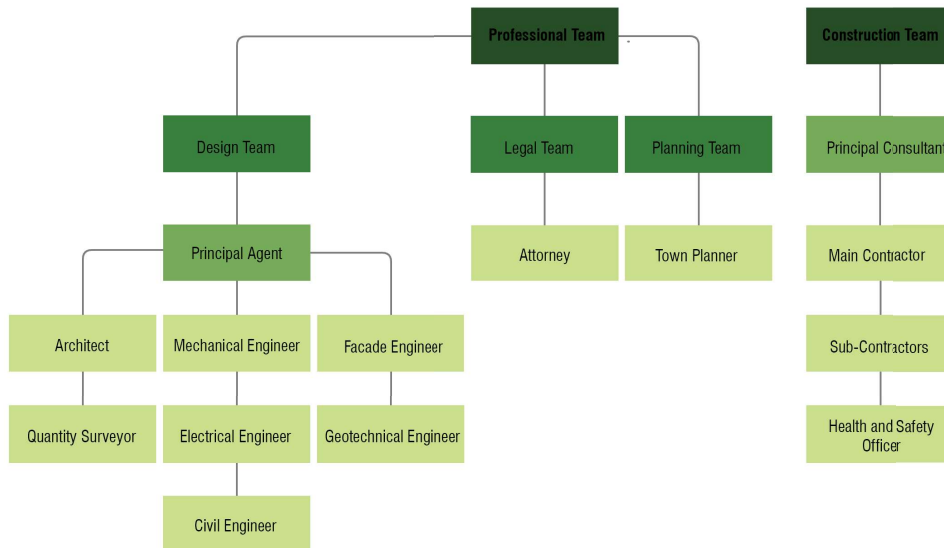


fig 3. Implementation Organisation Structure (Author, 2020).

7.9. Technology, Materiality & Sustainability

The architecture will reflect the context's diverse African culture. The building is a community centre representing the Congolese culture and should reflect that not only through its programme but through its materiality too. As the Democratic Republic of Congo does not have a fixed architectural identity, inspiration in materiality will be drawn from both a western and African materials.

Materiality: concrete, brick, timber, glass.

- Concrete: for the building frame to ensure the ability to take on dead and live loads in the 3 – 4 storey building. The idea is to use concrete in only the building frame as excessive use of concrete is unsustainable. Furthermore, recycled concrete shall be used as aggregate for structural concrete production.
- Brick: will be used as the main building material.
- Timber: will be used for screening and structural elements.
- Glass: to maximise on the north light and the views towards the street and context.
 - All fenestration to comply with SANS 10400 Part XA or SANS 204 (Energy efficiency in buildings). SANS 204 refers to the guidelines for rational design if Part XA does not comply

All materials are available in the geographical area and will be sourced locally and skilled work force will have access to site via the system's transport system.

7.10. Impact

Economic and environmental impact for the larger community will be through the promotion of food security, sustainability and self-sufficiency through the network of urban agriculture that will be created in Yeoville & Berea and the advocacy of policies and town planning schemes which support urban agriculture.

Social impact in the community through the integration and exchange of the cultures of South Africans and foreign nationals through food, in an effort to integrate marginalised nationals within the community, creating a stronger community.

Aside from the probability of providing jobs for those in the construction sector and possibly the agriculture sector, the project aims to impact the social quality of the life of the community through the design of a technically sound, modern, and innovative building that is the beacon and pride for the community. Such buildings should not only be reserved for the more developed areas of the city.

the Crown: the Building



Chapter 8: Design Development

8.1. Design Approach

The proposed design of the community centre aims to integrate findings and explorations related to site, programme, form, structure, concept, materiality, technical systems and details.

This chapter will be a chronological explanation through the design process and thinking behind it.

8.2. Charette & Site Considerations

Initial sketch designs were made through model-making of conceptual massing at scale 1:500, taking into consideration the direct context to which the proposed building should respond.

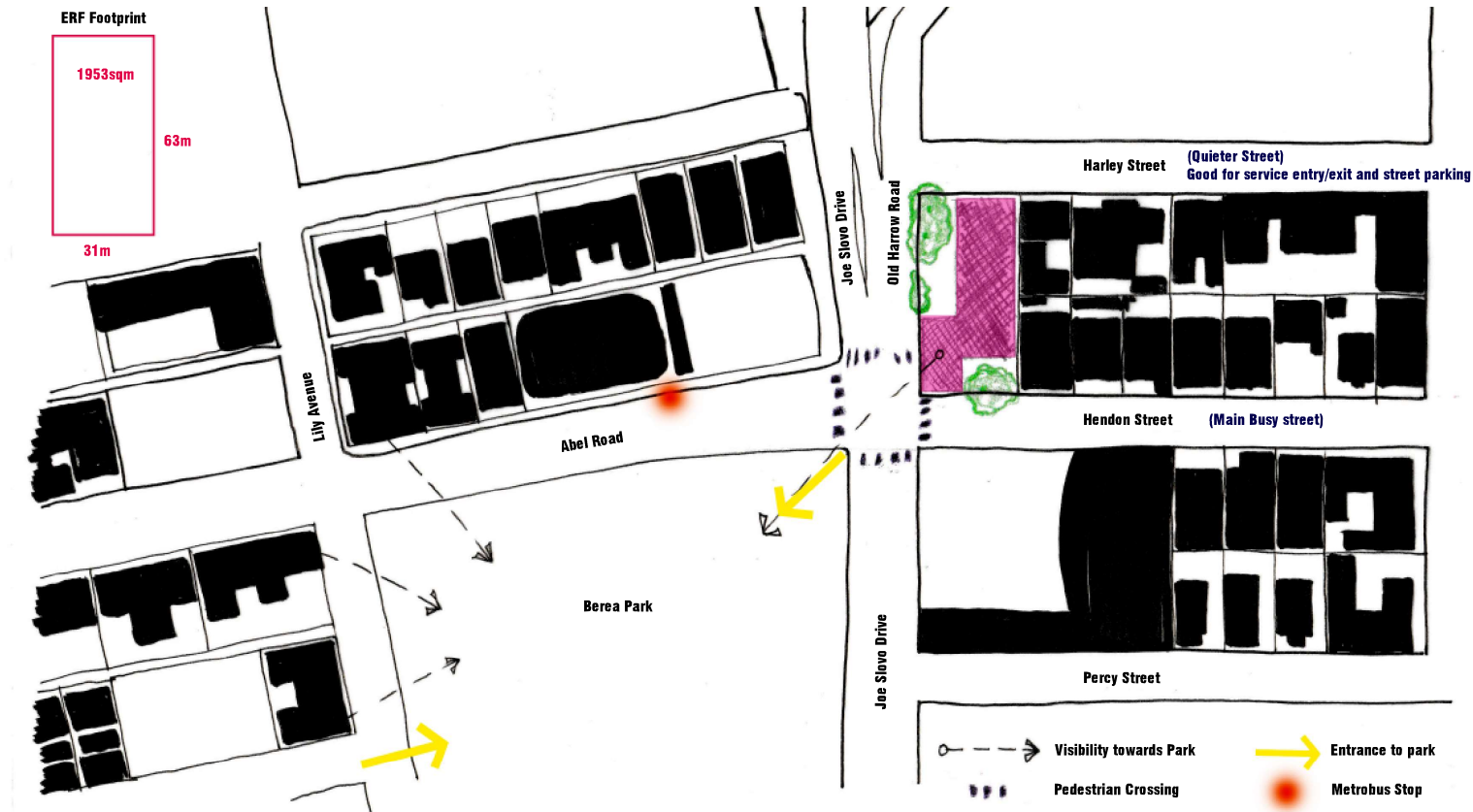


fig 1. Site Diagram (Author, 2020).



fig 2. Site Considerations (Author, 2020).

From top left to bottom right:

- North Orientation
- Sensitivity towards adjacent buildings
- Fall on Site
- Nature of Street
- Views towards & from building
- Surrounding trees and movement through site



Views to South JHB
 --- West & South Edges

● Trees
 --- Movement through site



fig 3. View of site as one drives along Joe Slovo Drive (Author, 2020).



fig 5. View of site from Berea Park entrance (Author, 2020).



fig 4. View of trees around perimeter of site on corner of Harley Street and Old Harrow Road (Author, 2020).

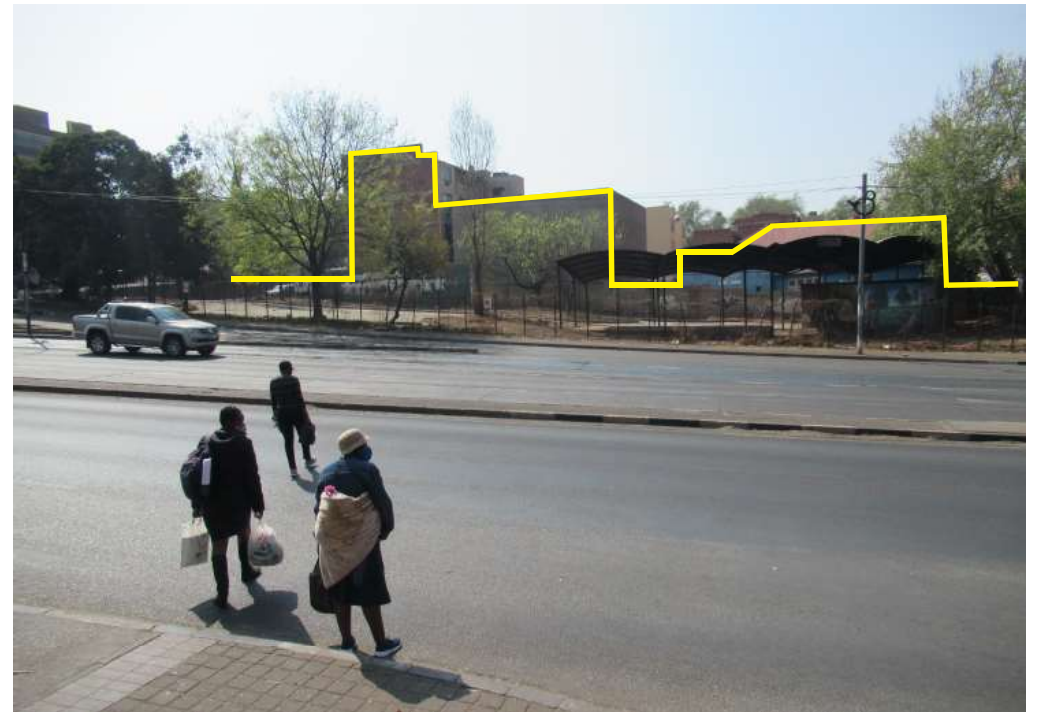


fig 6. View towards adjacent buildings of site (Author, 2020).

Conceptual Massing 1

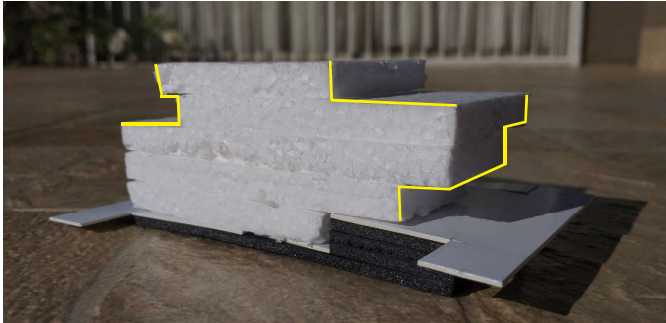


fig 7. Layering of floors to create cut-outs and cantilevers (Author, 2020).

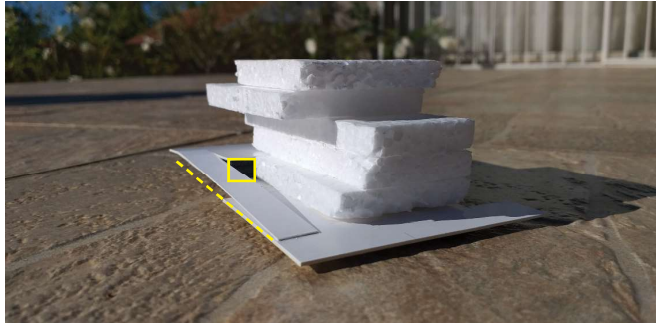


fig 8. Change of slope on 4,8 meters across site allows for certain building functions to be located at semi-basement level (Author, 2020).

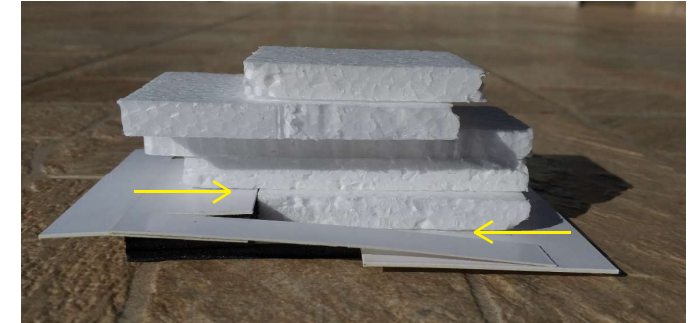


fig 9. Cantilevers allow for possible layering of public space from the outside to inside as analysed in the Yeoville Recreation Centre precedent in Chapter 5. Cut-outs allow for north light to penetrate possible deep building spaces (Author, 2020).

Conceptual Massing 2

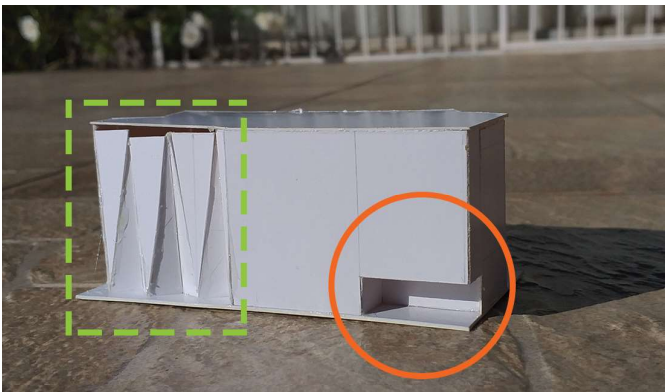


fig 10. Massing model exploring a way to keep the trees which border the site and treatment of the south corner on Hendon Street (Author, 2020).



fig 11. Slanted wall feature using a triangulated facade that can frame the trees in an interesting way (Author, 2020).

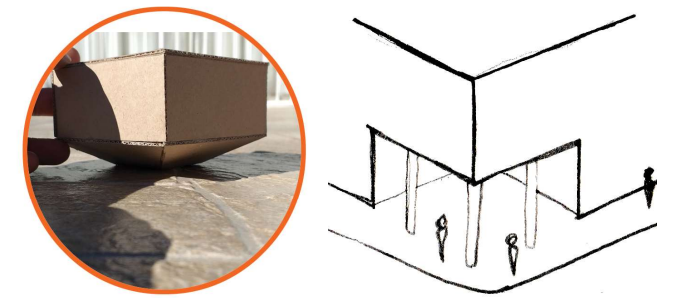


fig 12. Form of auditorium space used to frame possible entry to building (Author, 2020).

Conceptual Massing 3

An exploration of elements within a non-natural farming system to be considered in the design on urban street farms.

Diagram lays out the interconnectivity between the food production structure, the processing of the food, and how urban street farms benefit the people within a community.

As natural farming systems produce less waste, waste management is highlighted as a crucial element within a non natural farming system (Philips, 2013:55).

Adapted withn the diagram is the connection that food has to culture and how the building is birthed within the merging of food and culture.

The model looks at how the life cycle of an urban food system can be distributed within a building.

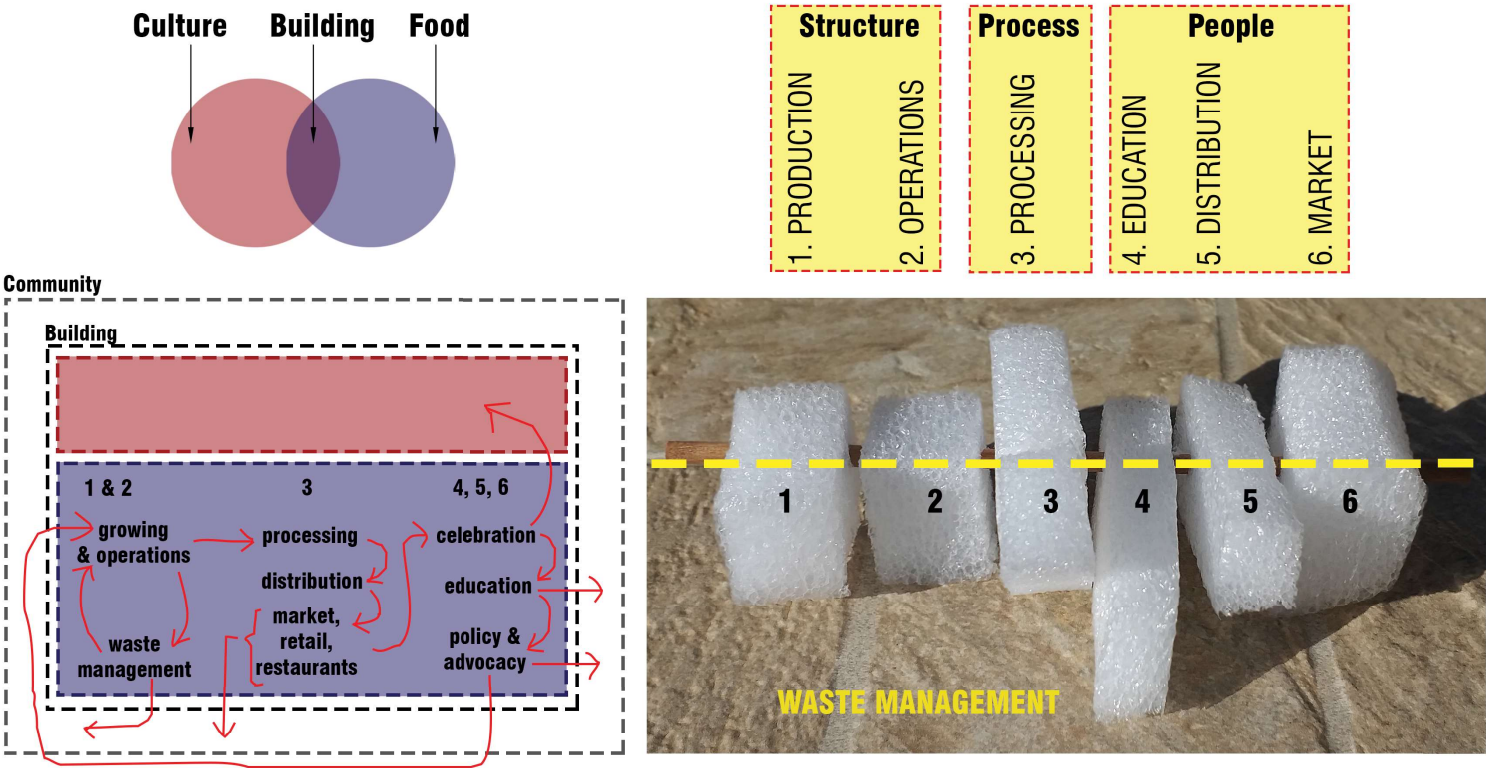


fig 13. Life cycle of the urban food system. Model by Author, 2020 and diagram adapted from Philips, 2013:56.

8.3. Proposal 1

The first proposal was designed for the mid-year review.

The building was designed in response to the need to decrease the impact that a 'bulkier' building mass could have on the street, and in response to movement through the site as opposed to around its perimeter.

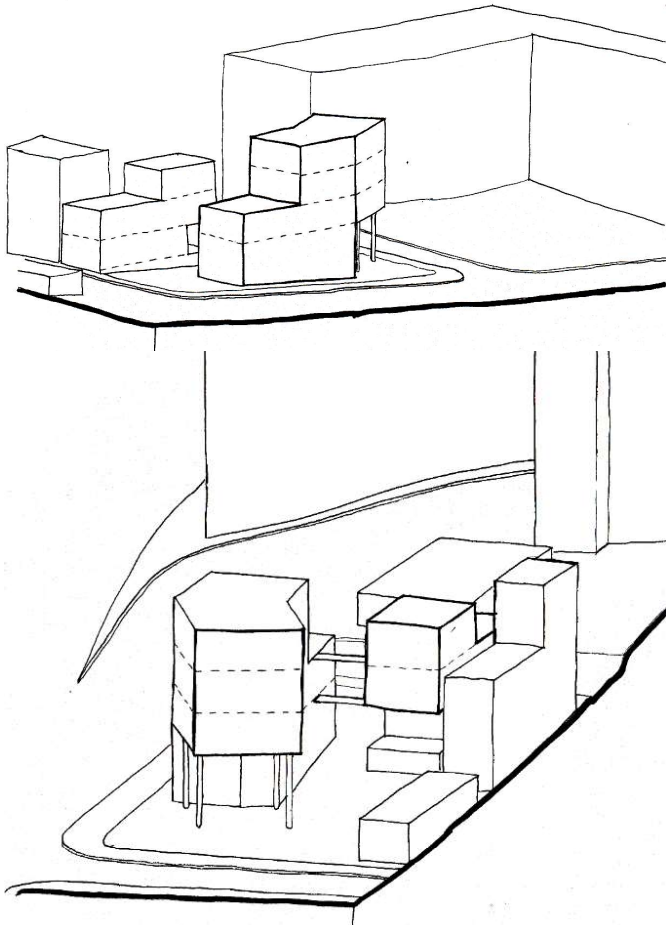


fig 14. Views of massing (Author, 2020).

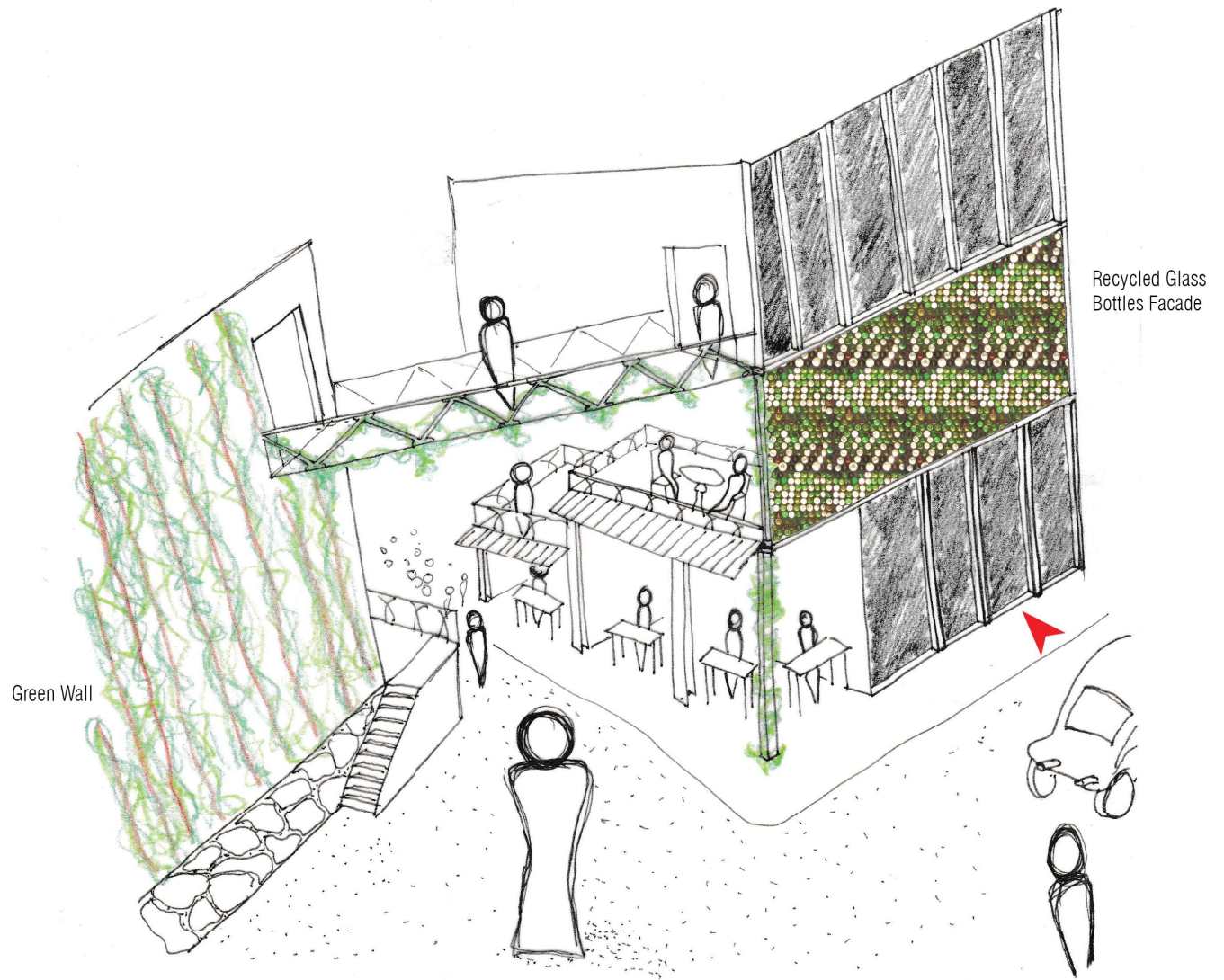


fig 15. View approaching Upper ground floor from Harley Street (Author, 2020).

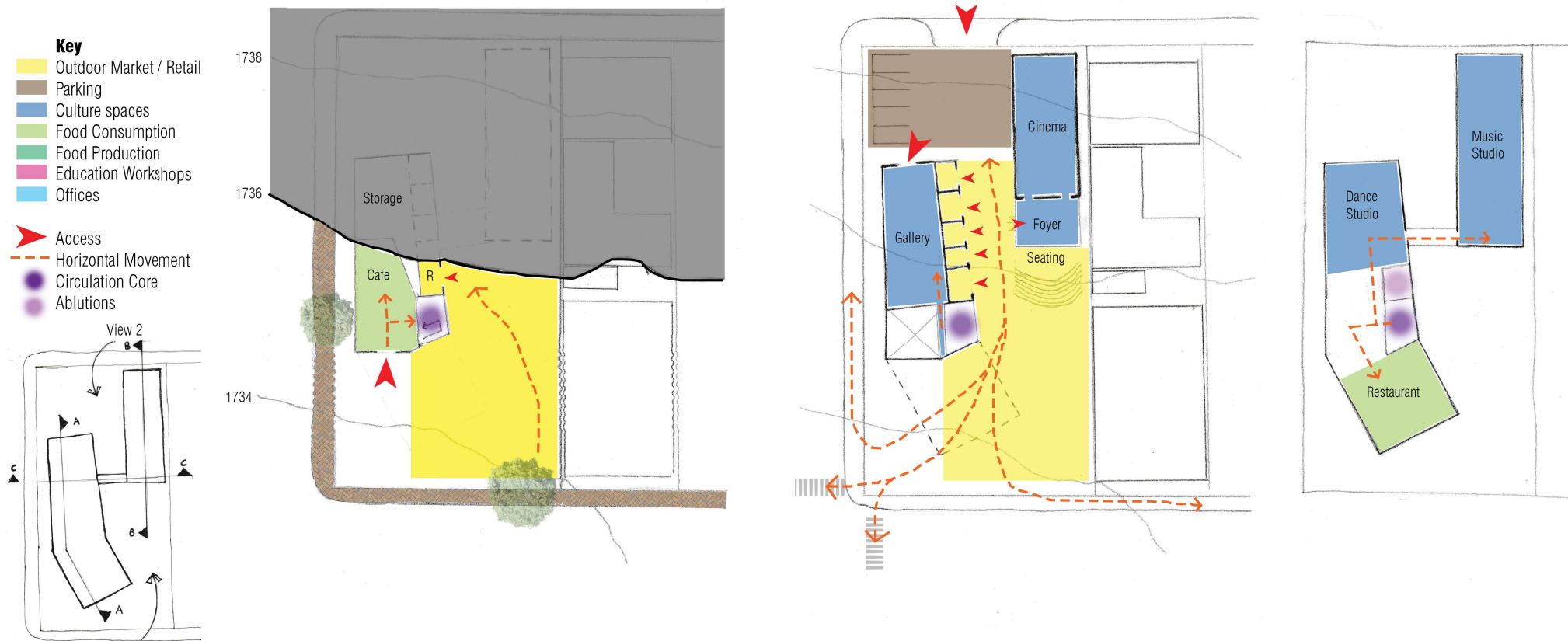


fig 16a. Floor plan diagrams (Author, 2020).

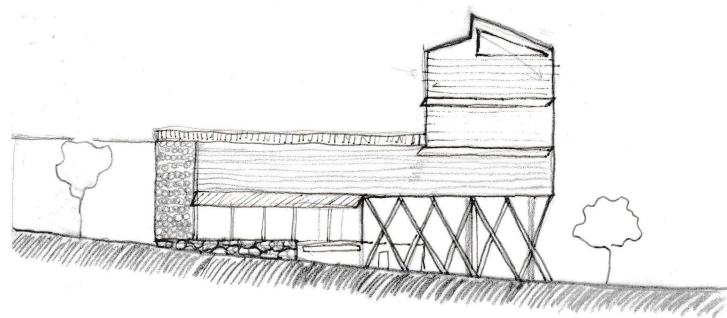


fig 17. West elevation diagram (Author, 2020).

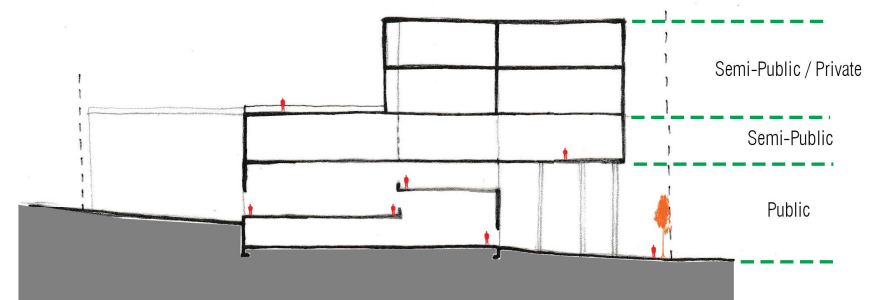


fig 18a. Section A diagram (Author, 2020).

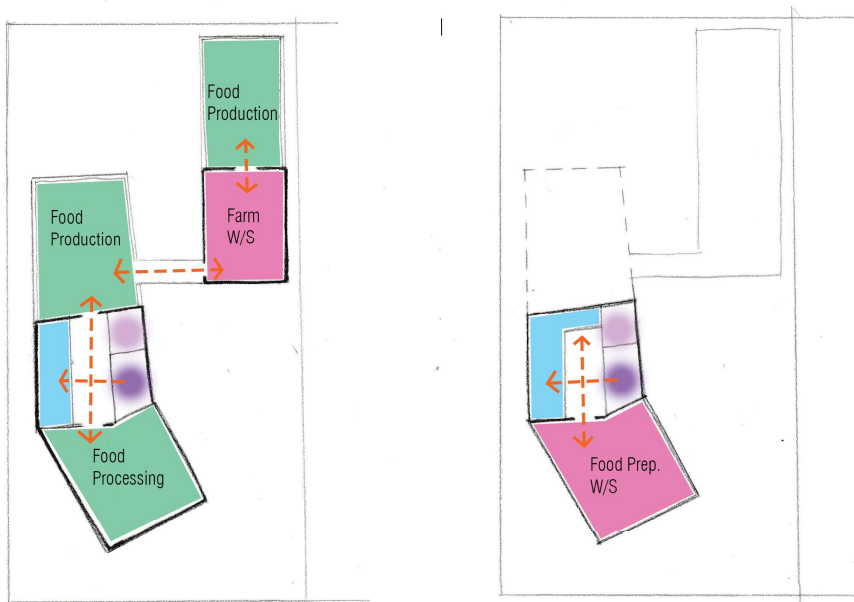


fig 16b. Floor plan diagrams (Author, 2020).

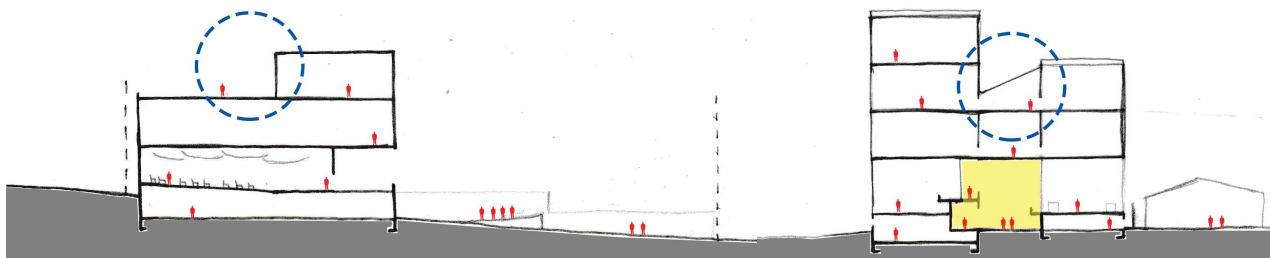


fig 18b. Section B diagram (Author, 2020).

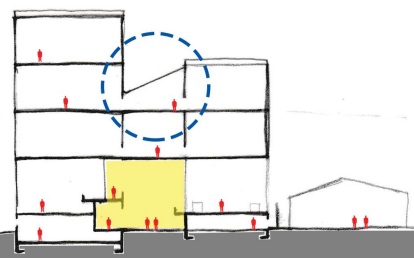


fig 18c. Section C diagram (Author, 2020).

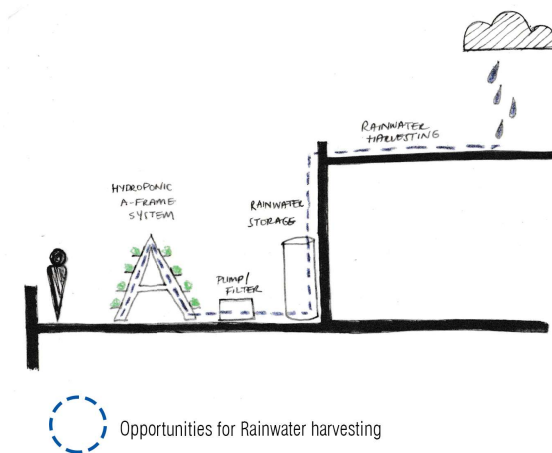


fig 19. Rainwater harvesting diagram (Author, 2020).

8.4. Proposal 2

The design approach for the second proposal was to design from the experience of the users.

Three groups of users were identified:



This proposal was designed from the experience of the Community (Group B).

The building took on the form of a courtyard in an effort to break away from a bulkier mass, but still be responsive to the street as a means of drawing the community into the building through functions such as retail and gallery spaces. The courtyard was seen as a space where 2 different communities can interact.

Additionally, the courtyard form was adopted in an attempt to optimise food production within the courtyard space, as well as on more facades of the building as explored in figure 20.

The roof of the building was designed for efficient drainage and to maximise the possibilities of rainwater collection, as briefly explored in Proposal 1.

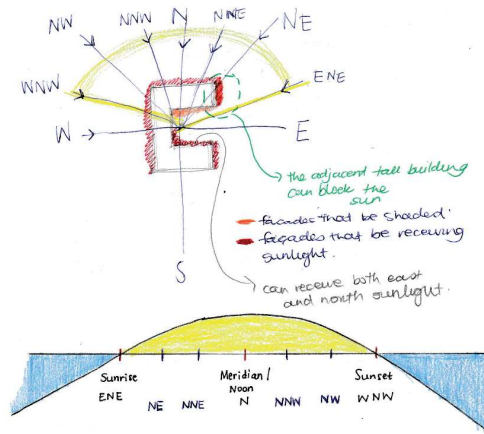


fig 20. Sun Diagram (Author, 2020).

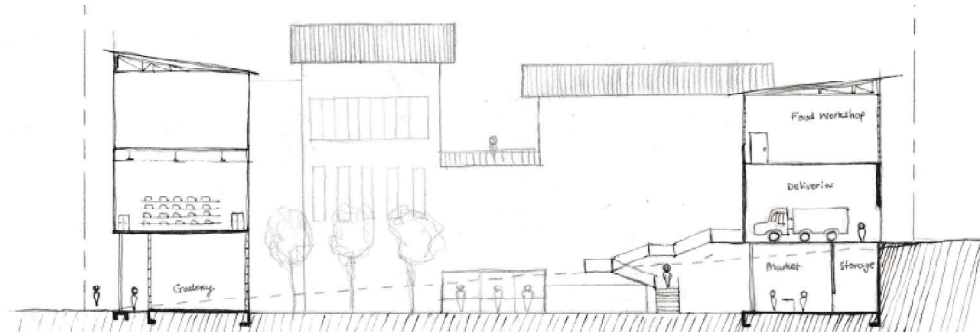


fig 21. Section Diagram (Author, 2020).

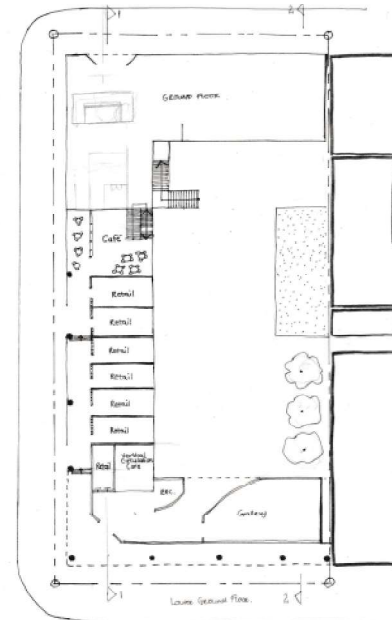


fig 22. Ground Plan diagram (Author, 2020).

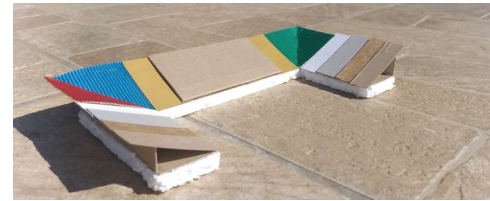


fig 23. Roof exploration (Author, 2020).

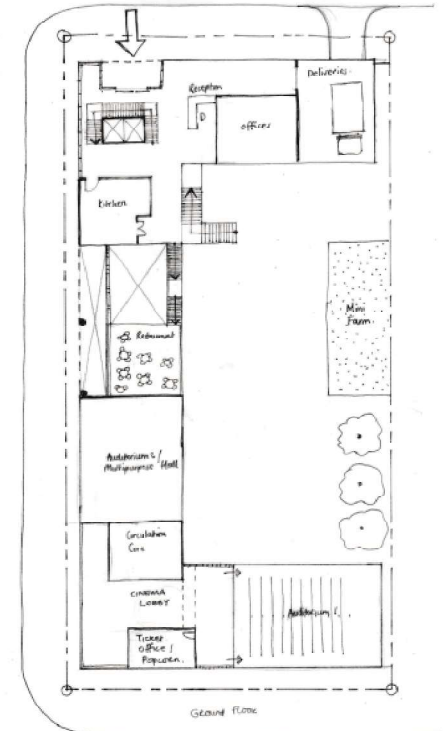


fig 25. Upper ground plan diagram (Author, 2020).

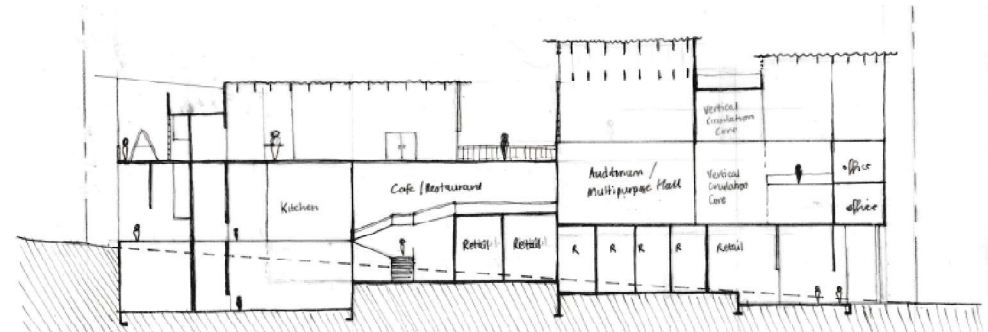


fig 24. Section Diagram (Author, 2020).

8.5. Proposal 3

The design approach for the third proposal was to design from the experience of Groups A and C, as defined in Proposal 2.

This proposal came with the intention and desires of providing parking spaces for employees, staff and users located outside the extents of Community A (Yeoville) and Community B (Berea), as defined in figure 27. Adding a residential component to the building came from the projection of possible increase in density in the community. It was inspired by precedent studies of markets, such as the ‘Santa Caterina Market’ and the ‘Mercat Encants’ both located in Barcelona, Spain, which had unconventional roofs as the main attractive feature of the building. A model was the first attempt at creating a roof type that was unconventional to the types located within the proposed site for the building. Thereafter, sketches were drawn.

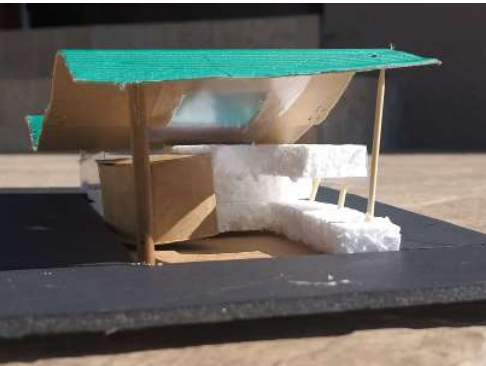


fig 26. Concept model, view 1 (Author, 2020).

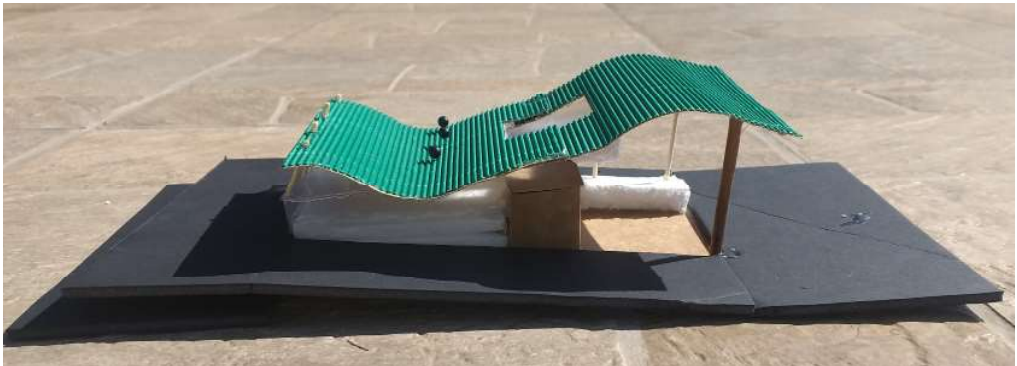


fig 28. Concept model, view 2 (Author, 2020).

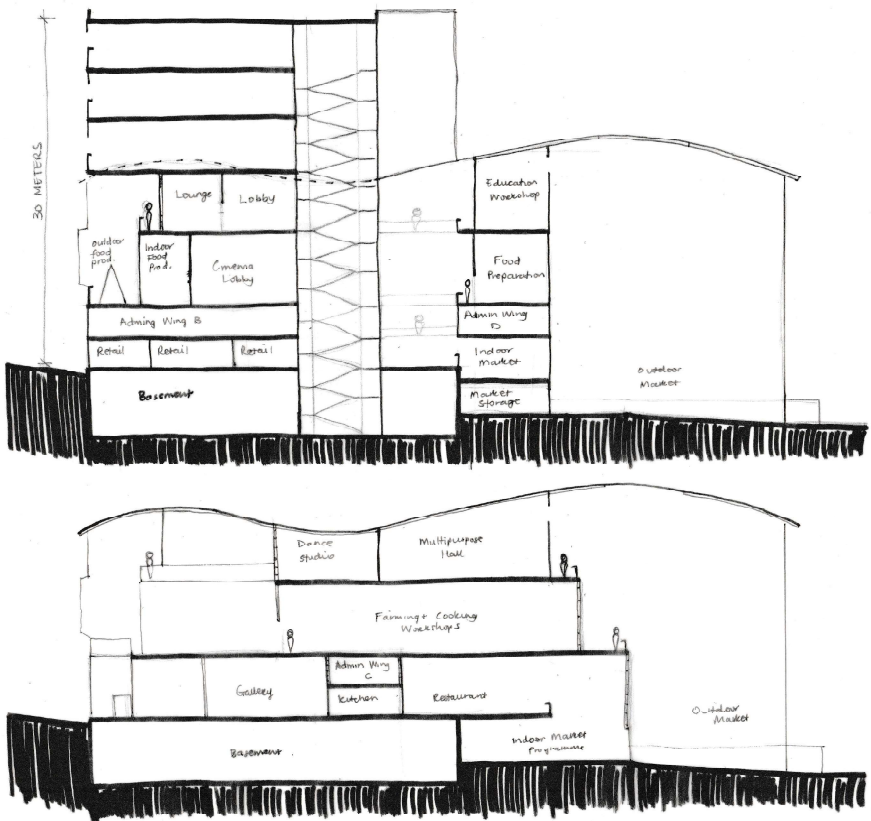


fig 27. Section diagrams (Author, 2020).

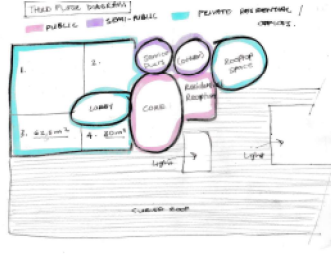
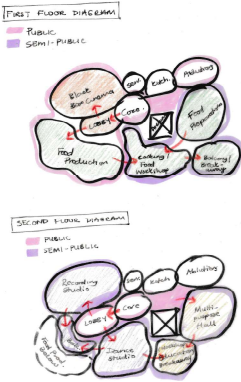
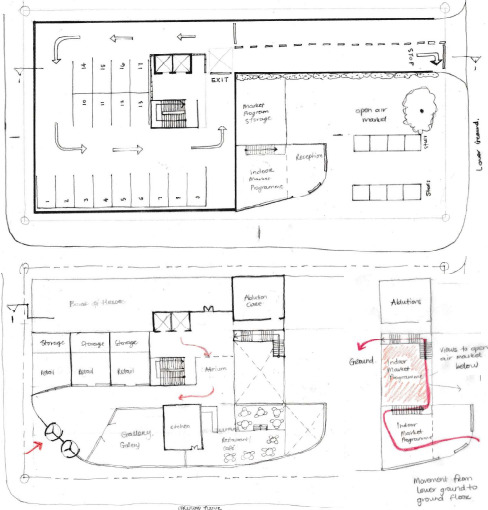


fig 29. Plan diagrams (Author, 2020).

8.6. Proposal 4

This proposal was an improvement to the previous one. The approach was to increase the number of parking and to make further roof explorations.

An emphasis was placed on roof explorations in an attempt to make the building design stand out from its context.

This proposal served as the birth of the concept.

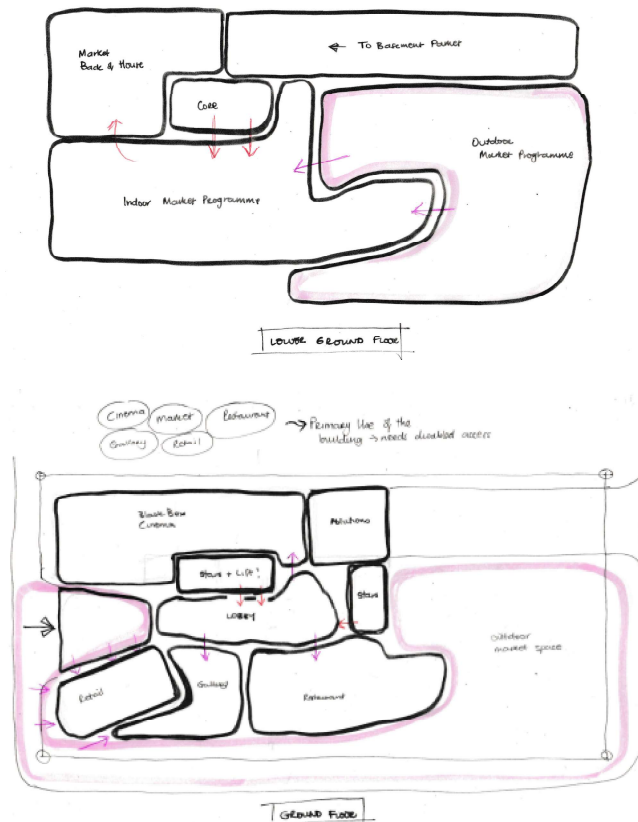


fig 30. Plan diagrams (Author, 2020).

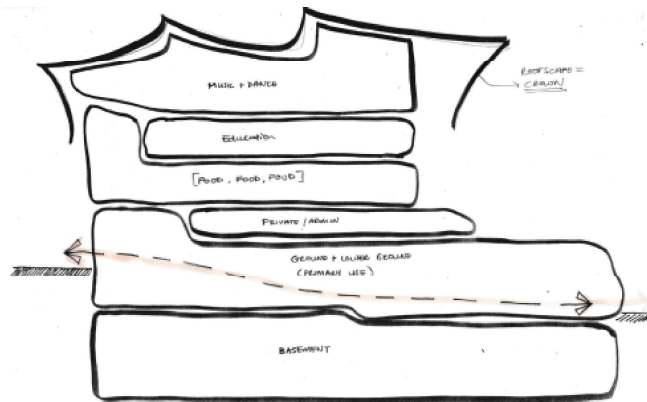


fig 31. Section diagram 1 (Author, 2020).

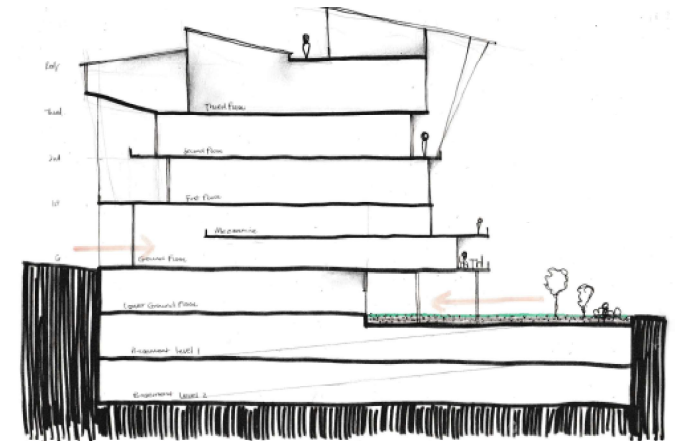


fig 32. Section diagram 2 (Author, 2020).

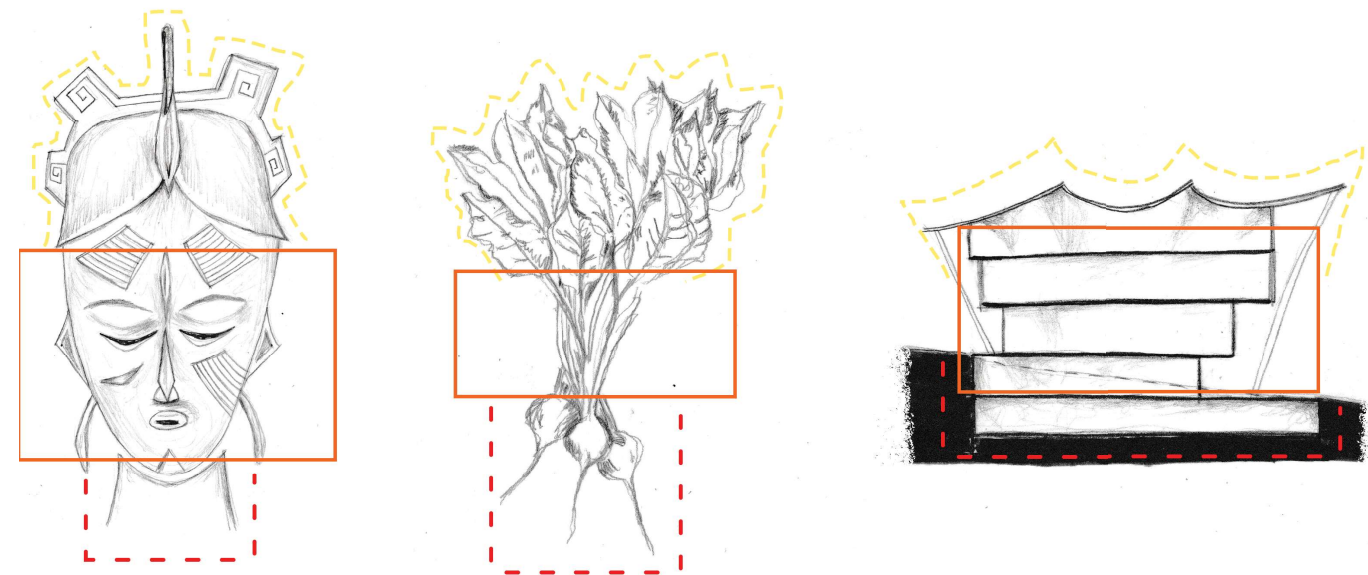
8.7. Concept

The conceptual thematic which aims to be legible at all scales of the design is centered around the community centre being a built interpretation of a traditional African mask.

The roof explorations in Proposal 4 served as the inspiration of this concept, resulting in the conceptual narrative being driven by the presence and symbolism of crowns in traditional African masks, African culture, and African leafy vegetables.

The building form resembles that of a crown and the building's sharp-pitched roof-scape is its crown.

Traditional African masks are often designed with bold immaculate head-pieces that can represent a crown-like element.



Traditional African Mask	African Leafy Vegetables	Building Roof Structure
Crown Mask: carved wood Neck: turns the head & holding up the crown	Crown: top of vegetables Stem: holds up the leaves Roots: growth of the vegetables	Roof: top of building Building: contains building programme Basement: services the building

fig 33. Conceptual thematic diagram of the crown (Author, 2020).

The presence of the crown can be seen in the coat of arms of the Republic of Congo, where the crest is a special forest crown (Journal Officiel de la Republic du Congo, 1963).

Although the coat of arms is not unique to the one belonging to the Democratic Republic of Congo, it is unique to the Congo region which is known for the Congo Basin, the largest tropical rainforest in Africa and the second largest in the world after the Amazon rainforest.

This speaks to the elements of greenery and nature which aim to be incorporated in the building proposal in both a visual and practical manner, respectively.



fig 34. Republic of Congo Coat of Arms (Source: Journal Officiel de la Republic du Congo, 1963).

Traditional African masks are heavily used in rituals and ceremonies and not solely for decorative or amusement purposes.

One role masks play is to ensure a good harvest, where dancing forms an integral part of the harvest rituals (Traditional African masks, 2020).

This role is crucial to the building proposal as food production serves as the primary programme of the building.

The effect of climate change to food production and agriculture in Africa meant that the harvest rituals often proved to be ineffective (Kah, 2016). Quality and quantity of food crop yields are affected by droughts and high temperatures, decreasing food availability, and questioning Africa's future regarding food (Mushita & Thompson, 2013: 1). Therefore, increasing efforts are made by African governments to encourage and support urban agriculture (Obosu-Mensah, 2002: 19).

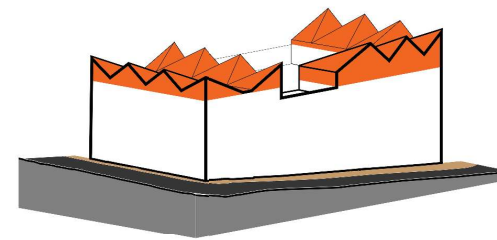
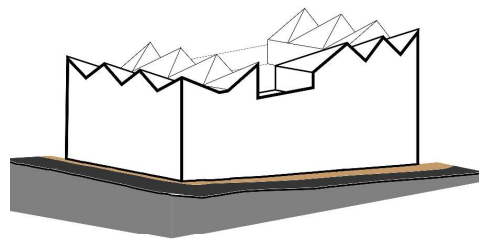


fig 35a. Diagrams highlighting building form, roof form and African leafy vegetables anatomy (Author, 2020).

The anatomy of African leafy vegetables consist of the roots, the stem, and the green crown of leaves on top which gives ALVs a crown-like appearance, seen in spinach and broccoli.

The green colour in ALVs aims to be reflected within the building and on its facade.

Another role masks play is to address tribal needs in a time of peace or war (Traditional African masks, 2020).

This fact addresses the multicultural character within African culture which is often reflected in ethnic tribes and the efforts to bring unity and harmony amongst a diverse people. The building proposal aims to do just that beyond food production.



The traditional African masks are mainly carved from wood, however, terracotta, pottery, copper, brass or leather are among secondary materials used.

These materials, along with their colours, aim to be incorporated in the architectural language of the building.

The crown is also incorporated in the making of traditional African masks, often seen in Congolese and Nigerian masks, which are often sculpted with unique, elaborate crowns (fig X).

Bold, geometrical, and symmetrical patterns incorporated in the design of traditional African masks aim to be reflected in the building's elevation.

Although these patterns serve to identify female and male masks or serve as a form of coded information, in the context of the building's design, these powerful and expressive patterns function to draw positive attention to migrant communities, allowing these communities to be visible, celebrated and deeply rooted within their local contexts.

The building is intended to draw attention to itself through its architecture and is an icon and symbol which gives a new mask or identity to migrant communities, with the aim of deconstructing past and present negative conceptions of migrants or "others" within Johannesburg, and deconstructing a xenophobic mentality by firstly being a space where migrant communities can feel at home away from their homes, and secondly by sharing diverse cultures with its local context.



fig 35b. Diagrams showing geometric and symmetric form of proposed community centre (Author, 2020).





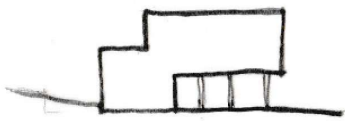
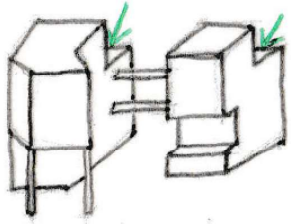
fig 36. Collage of traditional African masks and statues from author's trip to DRC (Author, 2017).

8.8. Design Development Summary

	Conceptual Massing 1	Conceptual Massing 2	Conceptual Massing 3
Massing			
Ground Floor Plan Diagram			
Section			
Takeaway: Pros	- makes allowance for trees on site - considers adjacent building	- massing is less bulky and is more sculpted due to overhangs and cut outs - building steps away from south, west, and north edges - taking advantage of slope by making a semi-basement level	- clear hierarchy of programme - movement of user through urban street farm typology allows user to experience and learn the entire process
Takeaway: Cons	- massing is bulky - lack of response to the street adjacent western facade	- horizontal layering - no consideration to adjacent building receiving sunlight	- one point of entry and exit results in missed opportunity along other edges that may be more active

fig 37. Design Development Summary Table (Author, 2020).

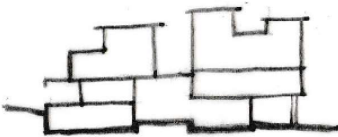
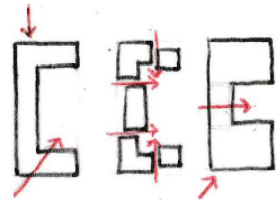
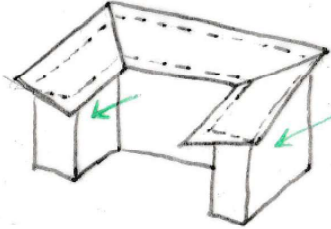
Proposal 1



- building mass is less bulkier and courtyard space is integrated within building
- movement through site through courtyard brings people within and not simply along the perimeter of the building
- rooftop farming possibilities considered

- missed opportunity to maximise ground floor plan due to choice of incorporating semi-private programmes on the ground floor

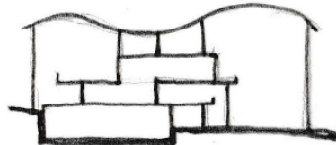
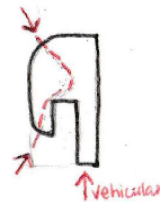
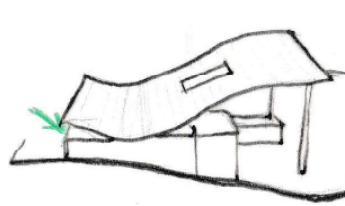
Proposal 2



- courtyard form offers more opportunities for urban farming on building facades and within courtyard
- courtyard serve as a magnet, especially if viewers can access it from all edges
- roof fall offers effective rainwater management opportunities
- advantage of slope taken **into consideration**

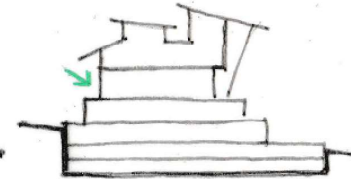
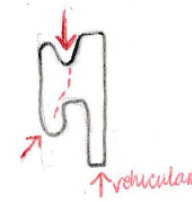
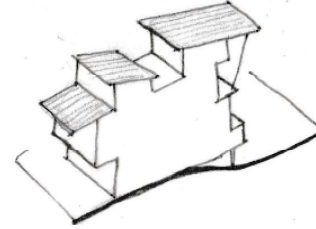
- spaces may be too confined
- edges if not well designed may result in lack of response to the street

Proposal 3



- parking consideration to accommodate certain users
- movement from upper ground floor on north edge to ground floor on south edge allows permeable access for public on ground floor
- curved roof seems devoid of any concept or reason other than for 'aesthetic' purposes
- minimal urban farming possibilities

Proposal 4



- roofs allow for light to penetrate within the building
- roofing is linked to crown concept
- basement parking limits spatial planning possibilities
- minimal urban farming possibilities

8.9. Final Proposal Development

Proposal 2 was chosen as the base for the final proposal. The proposal - a courtyard typology - was developed further with a focus on the design of the roof and the inclusion of various possibilities for urban farming throughout the community centre.

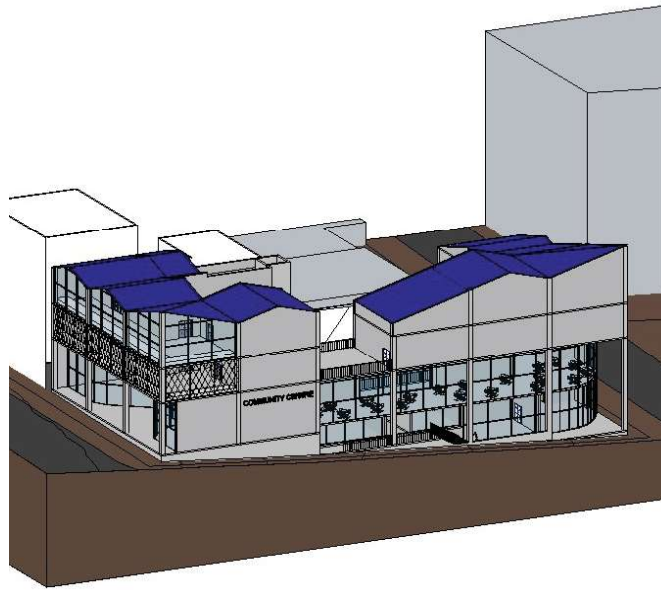


fig 39. Proposal 2, version 1, view 2 (Author, 2020).

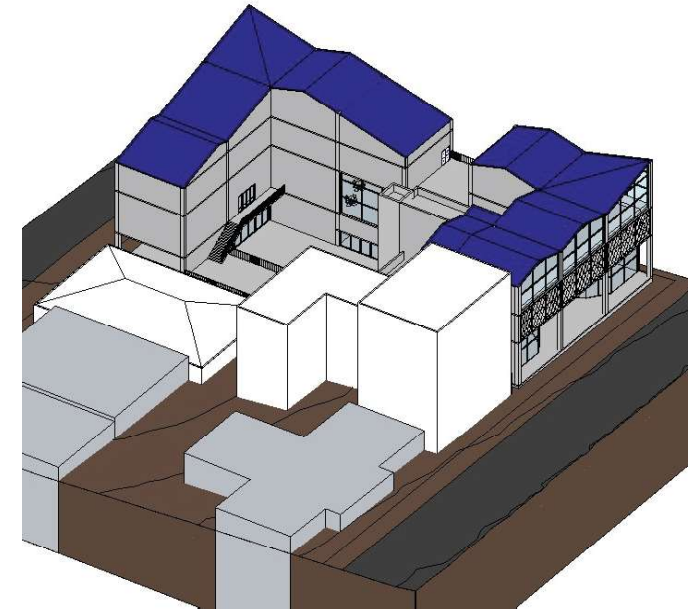


fig 40. Proposal 2, version 1, view 3 (Author, 2020).



fig 38. Proposal 2, version 1, view 1 (Author, 2020).

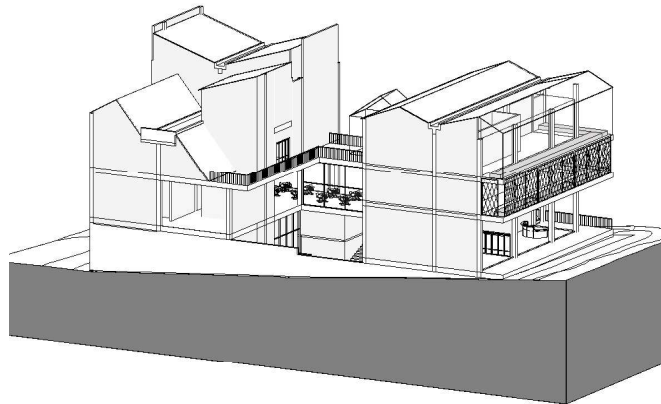


fig 41. Proposal 2, version 2, view 1 (Author, 2020).



fig 42. Proposal 2, version 2, view 2 (Author, 2020).

Chapter 9: Technical Systems Development

9.1. Choice of Systems

Food production serves as the primary programme of the Community Centre and the main concept of the Community Centre is the crown. Therefore, the technical systems around food production and the roof structure are to be explored.

From an aesthetics point of view, the architectural expression of the building must be one that maintains the conceptual thematic of the crown roof - this is done through pitched roofs that are designed to collect and not to simply drain water.

Various roof experimentation and modelling have been explored in an attempt to achieve an efficient roof design.

From a performance point of view, the design of the building should optimise food growth through vertical farming by:

- Taking advantage of north orientation,
- Using sustainable water systems and,
- Having supportive structural system

Food production through hydroponic farming systems and intensive farming is to be incorporated as the facade of the building, and draws inspiration from Oasia Hotel, Singapore.

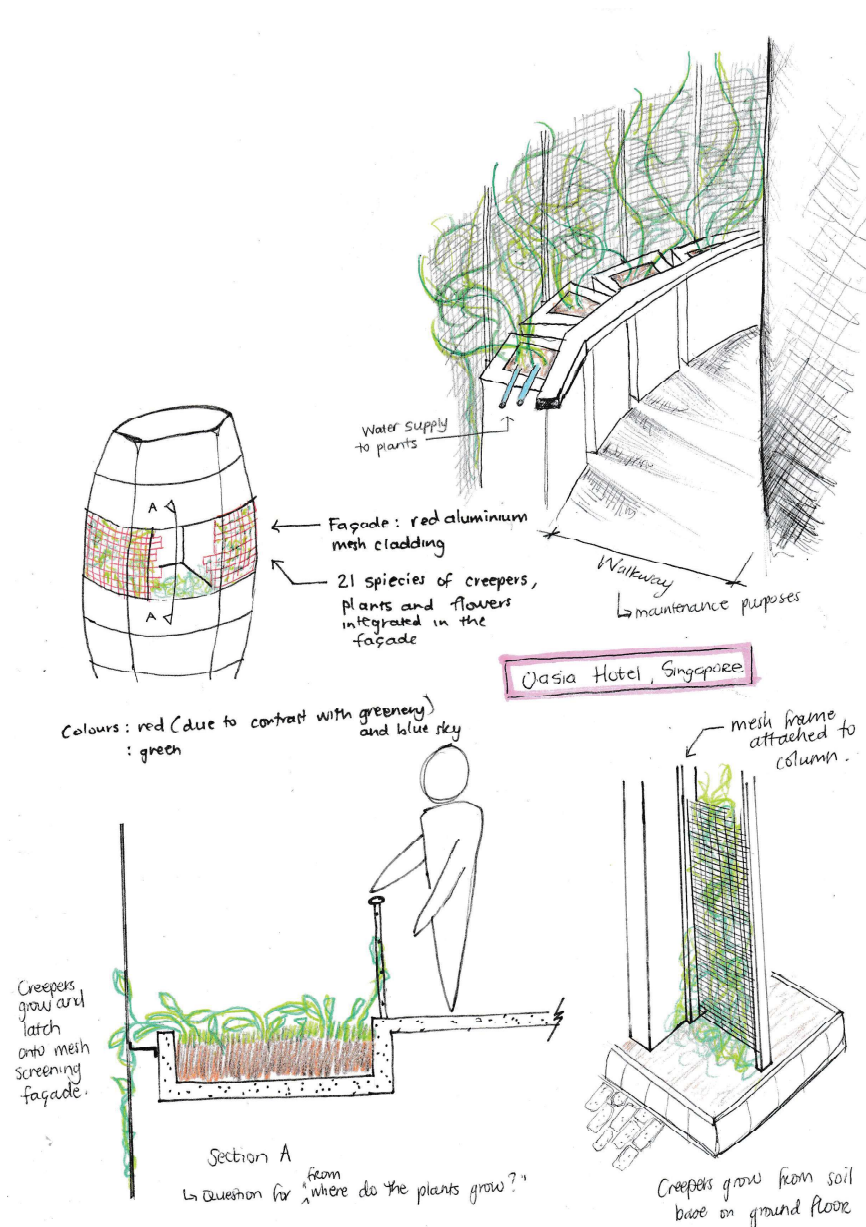


fig 1. Oasia Hotel, Singapore plant growth case study (Author, 2020).

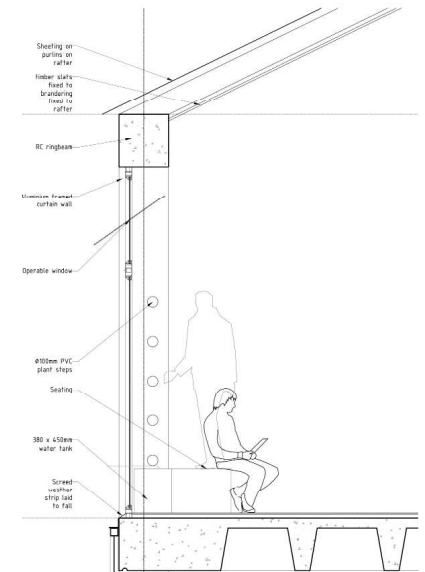


fig 2. Perimeter section exploration through hydroponic system (Author, 2020).

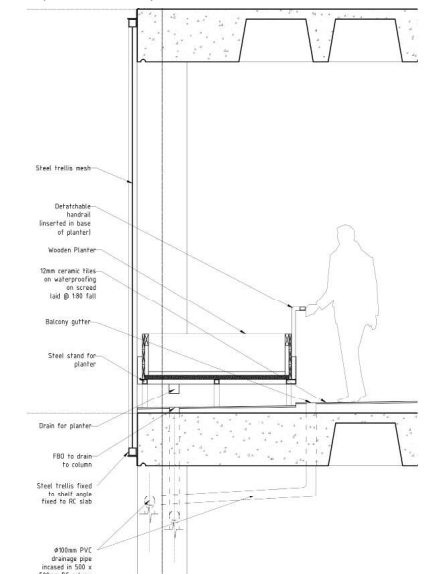


fig 3. Perimeter section exploration through intensive farming using planters (Author, 2020).

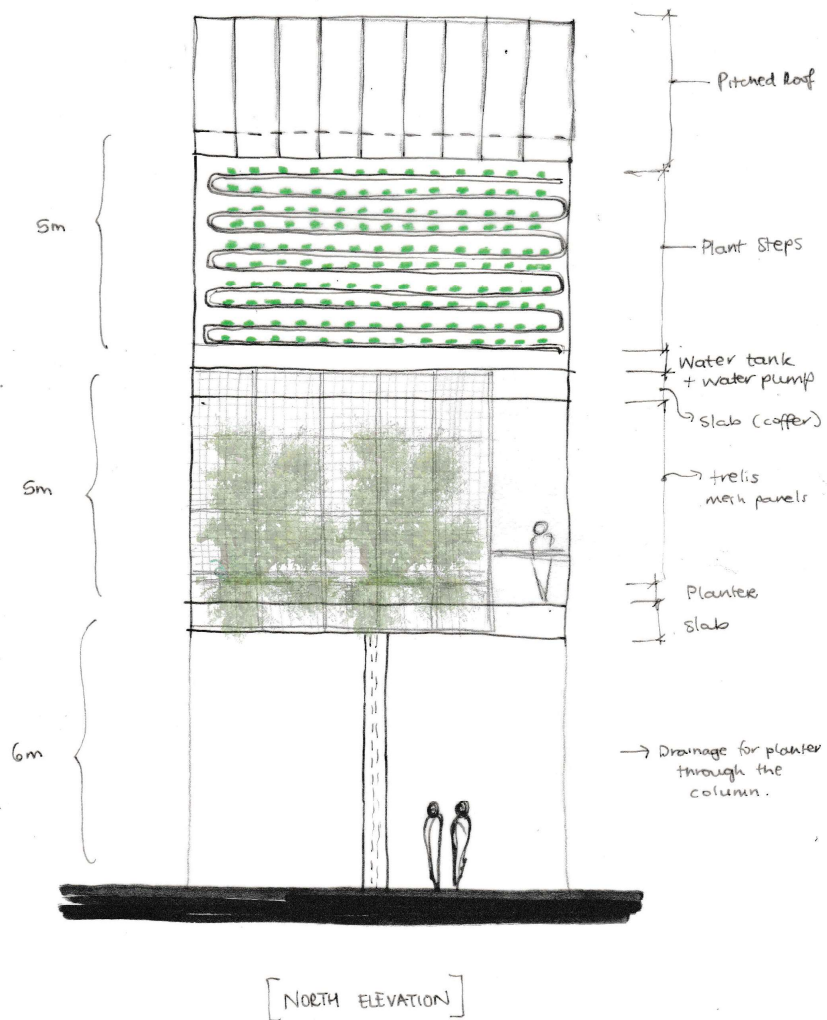


fig 4. North elevation sketch of food system (Author, 2020).

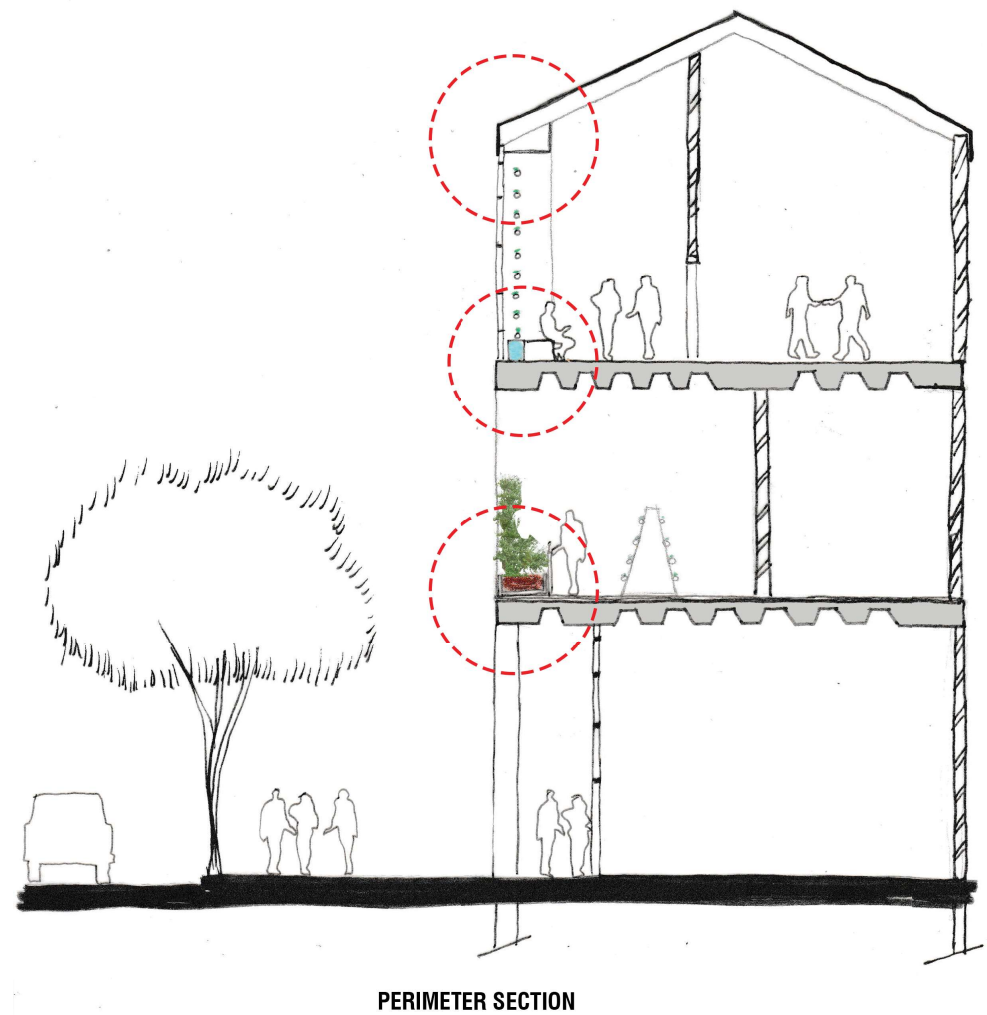


fig 5. Perimeter section sketch through food system (Author, 2020).

9.1.1 Roof Exploration

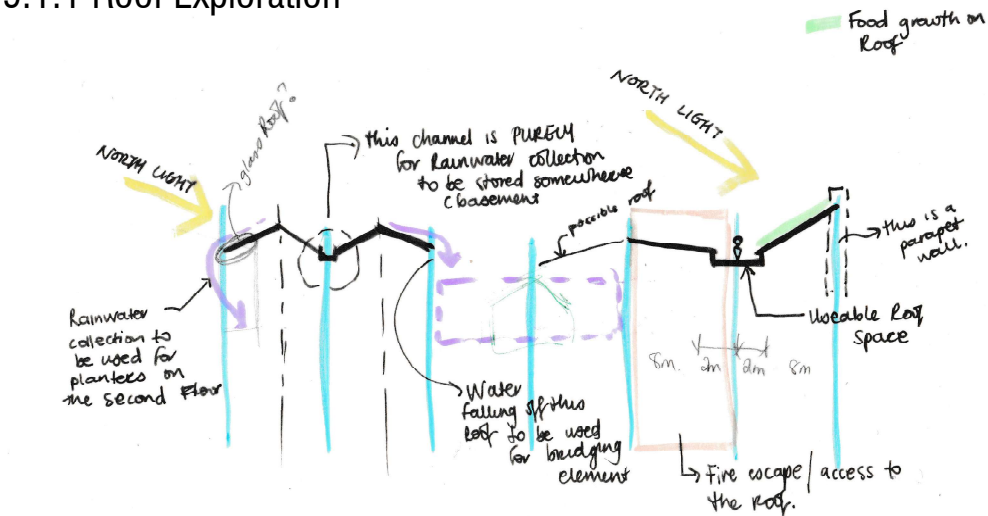


fig 6. Section diagram exploring various rainwater collection options and food growth possibilities for Proposal 2, version 2 in figure 40 & 41 (Author, 2020).

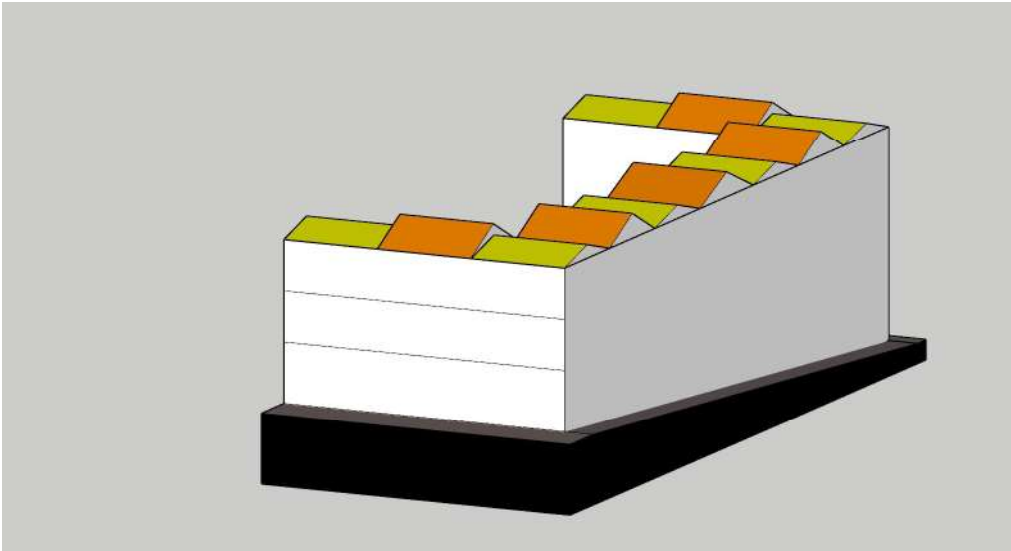
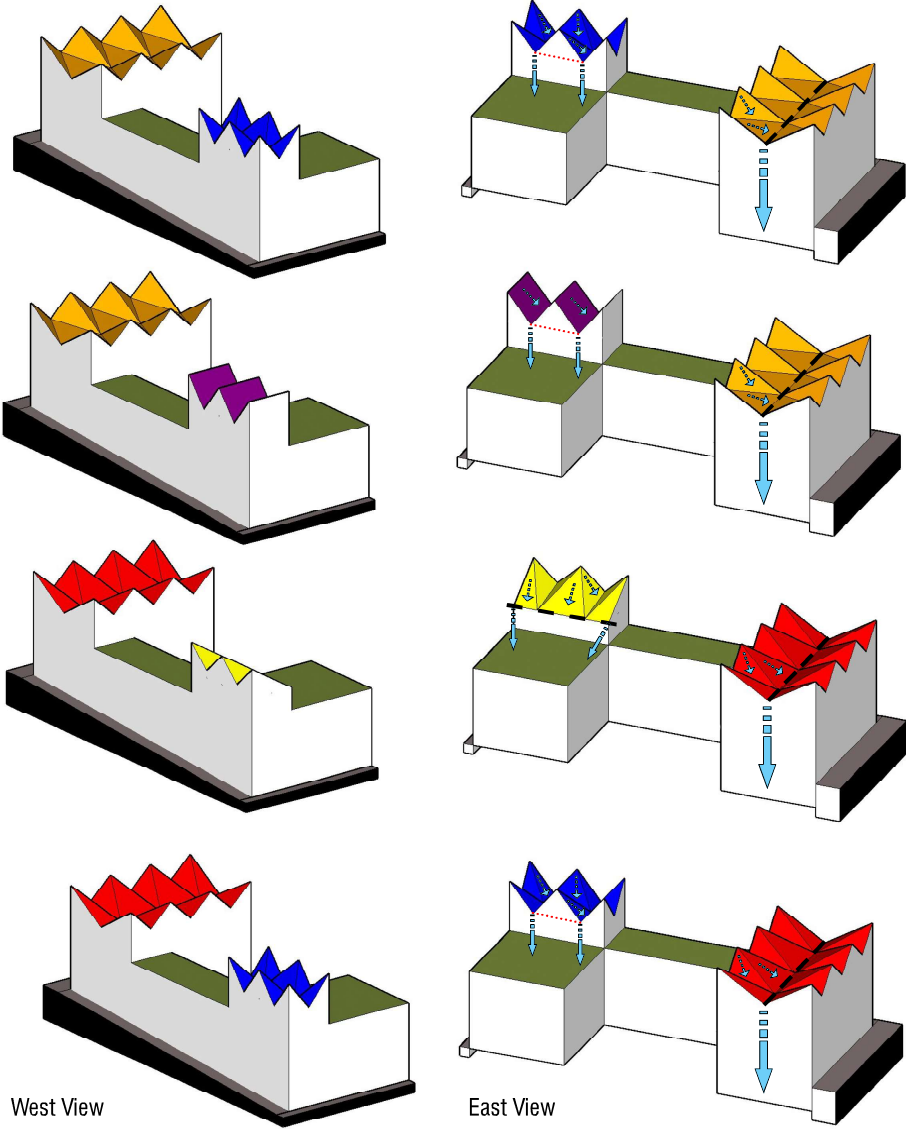


fig 7. Initial conceptual massing of crown roof (Author, 2020).

Crown Roof Iterations

- Roof Type A
 - Roof Type B
 - Roof Type C
 - Roof Type D
 - Roof Type E
- Chosen combo
- Reinforced Concrete Upstand
 - Beam Box Gutter
 - Stainless Steel Box Gutter
 - Drainage to water storage tanks / urban farm
 - Fall of Roof
 - Urban Farming



West View

East View

fig 8. Crown roof massing exploration (Author, 2020).

Chapter 10: Final Drawings

Site Plan_Scale 1:500

The design of a Community Centre in Yeoville aims to deconstruct a xenophobic mentality and create a sense of belonging for certain migrant communities through cultural awareness and inclusivity.

Food is used as a platform in promoting culture for sustainable development as studies show that food from home psychologically links migrants to their home and allows them to reproduce culture. Thus, food production forms an integral part of the buildings spatial design.

Figure 1 (site plan) & 2 (ground floor context plan) show how the community centre is responsive to its immediate context as it seeks to draw people in from their home, recreational, church and retail activities.

Site Plan key:

- A - Residential
- B - Student Accommodation
- C - Educational
- D - Religious
- E - Supermarket
- F - Car Workshop
- G - Berea Park
- H - Bus Stop

(2m contour intervals)

Scale:



fig 1. Site Plan (Author, 2020).



Ground Floor Context Plan

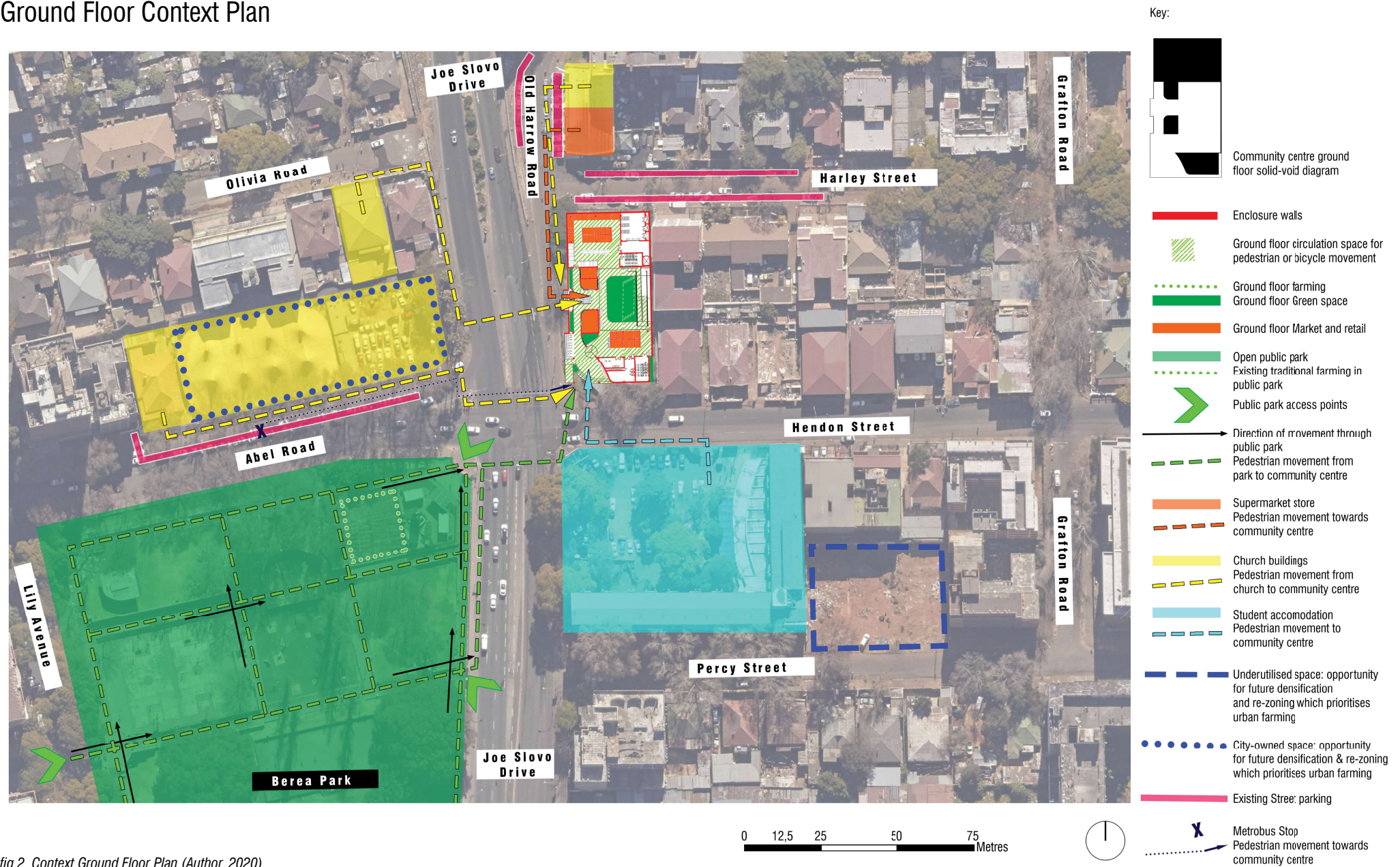


fig 2. Context Ground Floor Plan (Author, 2020).

Ground Floor Plan_Scale 1:100

The ground floor is highly accessible to the public through retail in the form of a fresh produce market visible from the south corner, a small supermarket and cultural stores facing Old Harrow Road, maximizing on the pedestrian street activity.

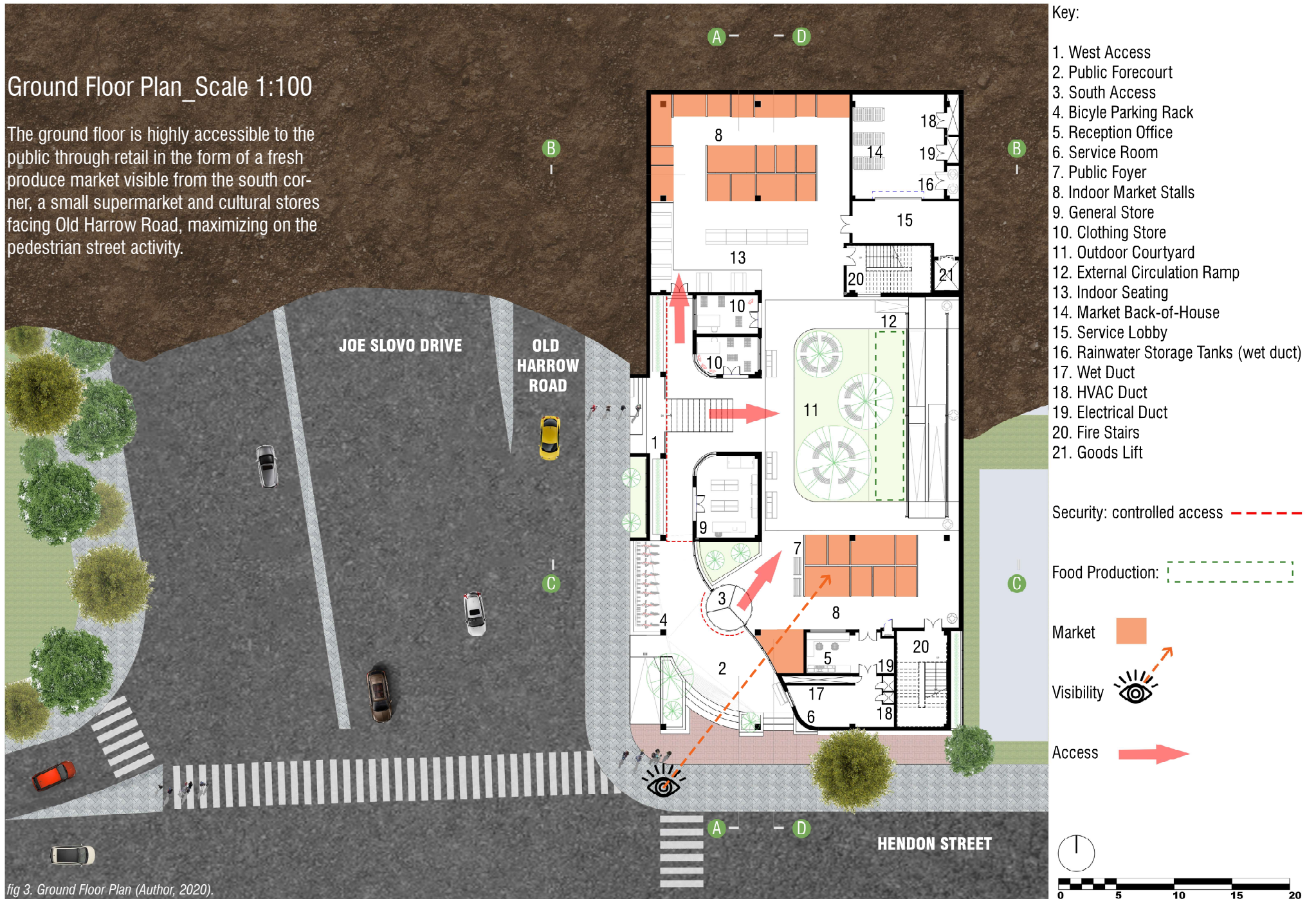


fig 3. Ground Floor Plan (Author, 2020).

Upper Ground Floor Plan_Scale 1:200

Due to the slope of the site, allowing there to be a 4 meter drop from north to south, the Community Centre can be accessed from Harley Street and Hendon Street. This allowed the opportunity for 2 public corners to be created, the more active South corner and the quieter North corner.

- Key:
- 1. Bicycle Parking Rack
 - 2. Northern Public Forecourt
 - 3. Glass Floor Panels
 - 4. North Access
 - 5. Reception & Lobby
 - 6. Office
 - 7. Deliveries
 - 8. Deliveries Lobby
 - 9. Goods Lift
 - 10. Fire Stairs
 - 11. Balcony
 - 12. Exterior circulation ramp
 - 13. Restaurant Storage
 - 14. Restaurant Access
 - 15. Restaurant Bar
 - 16. African Fine Dining Restaurant (100 seats)
 - 17. Restaurant Kitchen
 - 18. Restaurant Food Garden
 - 19. Staff Lockers
 - 20. Ablutions

Food Production:

Ramp Exit:

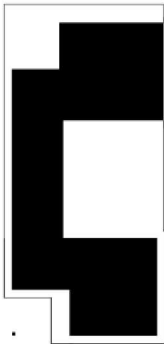


fig 4.1. Upper Ground Floor solid-void diagram (Author, 2020).

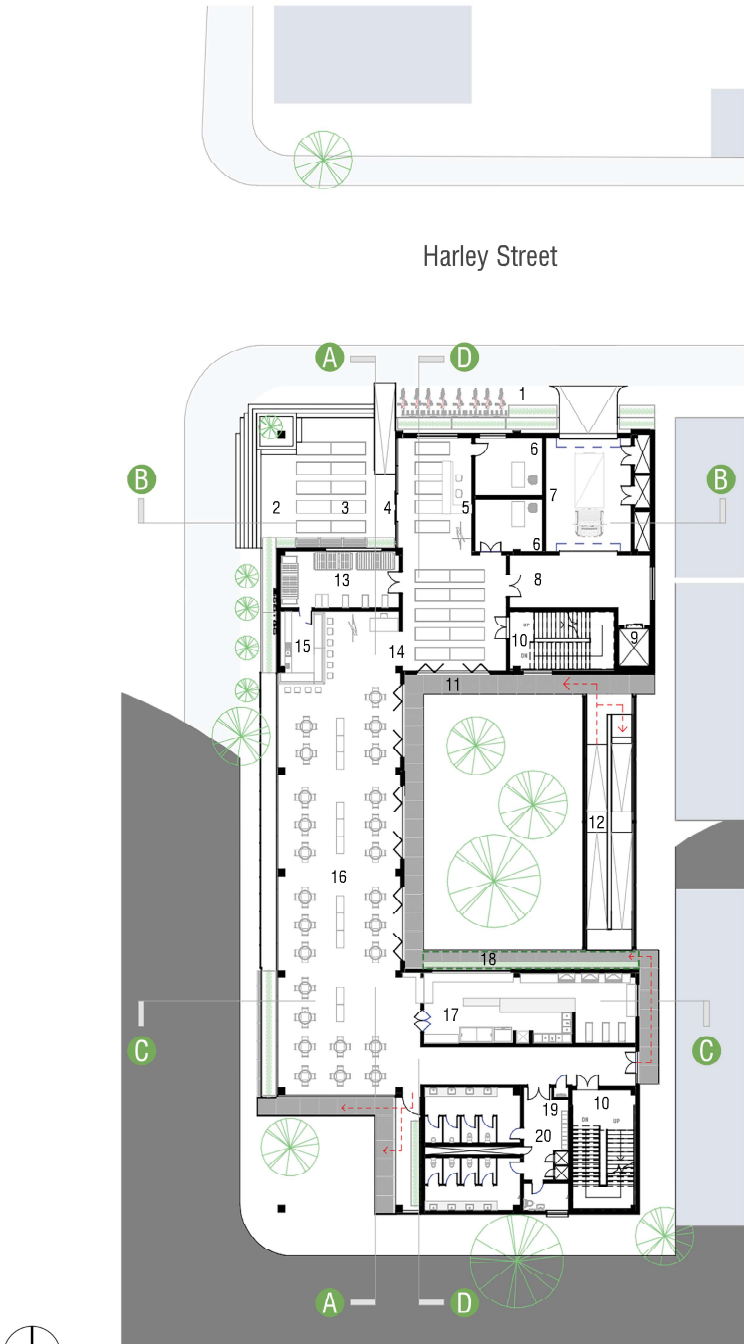


fig 4.2. Upper Ground Floor Plan (Author, 2020).

First Floor Plan_Scale 1:200

- Key:
- 1. Lobby
 - 2. Food Preparation Room
 - 3. Cold Room Storage
 - 4. Farming Workshop
 - 5. Intensive Farming Balcony
 - 6. Greenhouse Farming
 - 7. Food Gallery
 - 8. Exterior circulation ramp
 - 9. Goods Lift
 - 10. Fire Stairs
 - 11. Balcony
 - 12. Multi-purpose Hall Lobby
 - 13. Multi-purpose Hall Kitchenette
 - 14. Multi-purpose Hall
 - 15. Ablutions

Food Production:

Ramp Exit:

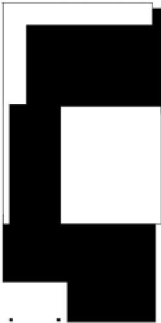


fig 5.1. First Floor solid-void diagram (Author, 2020).

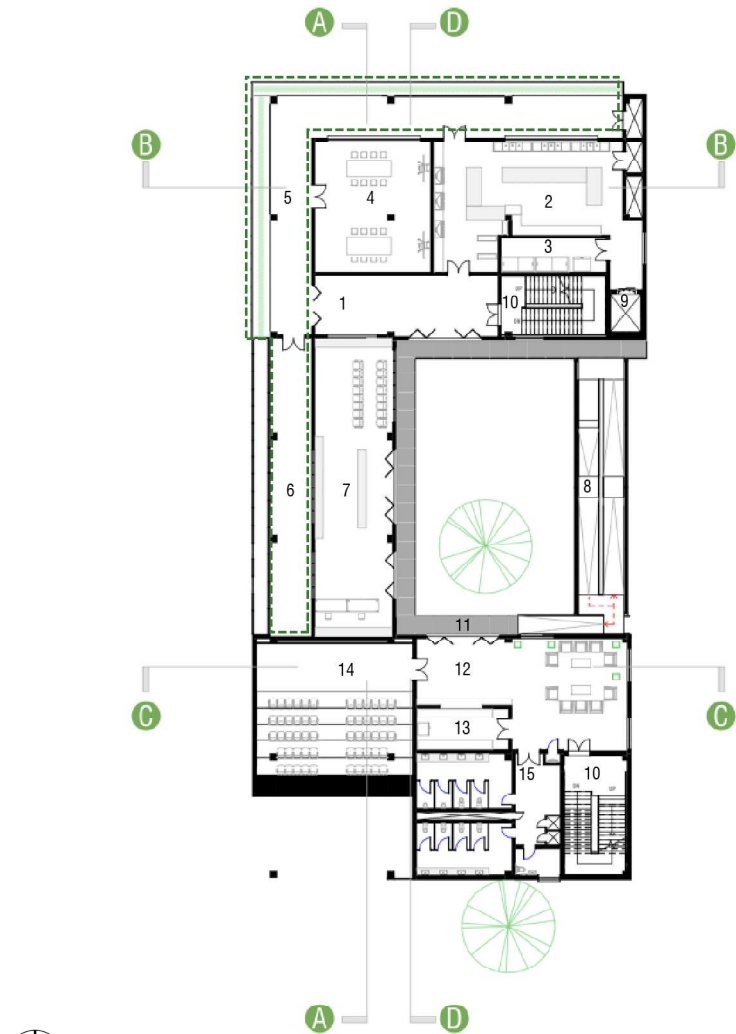


fig 5.2. First Floor Plan (Author, 2020).

Second Floor Plan_Scale 1:200

- Key:
- 1. Lobby
 - 2. Cooking Workshop
 - 3. Farming Workshop
 - 4. Hydroponic Farming
 - 5. Balcony
 - 6. Semi-intensive green roof farm
 - 7. Outdoor seating
 - 8. Deliveries Lobby
 - 9. Goods Lift
 - 10. Fire Stairs
 - 11. Office
 - 12. Storage
 - 13. Multi-purpose Hall (below)
 - 14. A-Frame Hydroponic Rooftop Farming
 - 15. Ablutions
 - 16. Exterior circulation ramp

Food Production:

Ramp Exit:

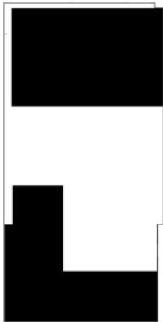
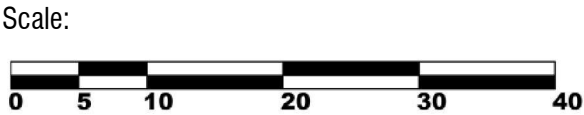


fig 6.1. Second Floor solid-void diagram (Author, 2020).

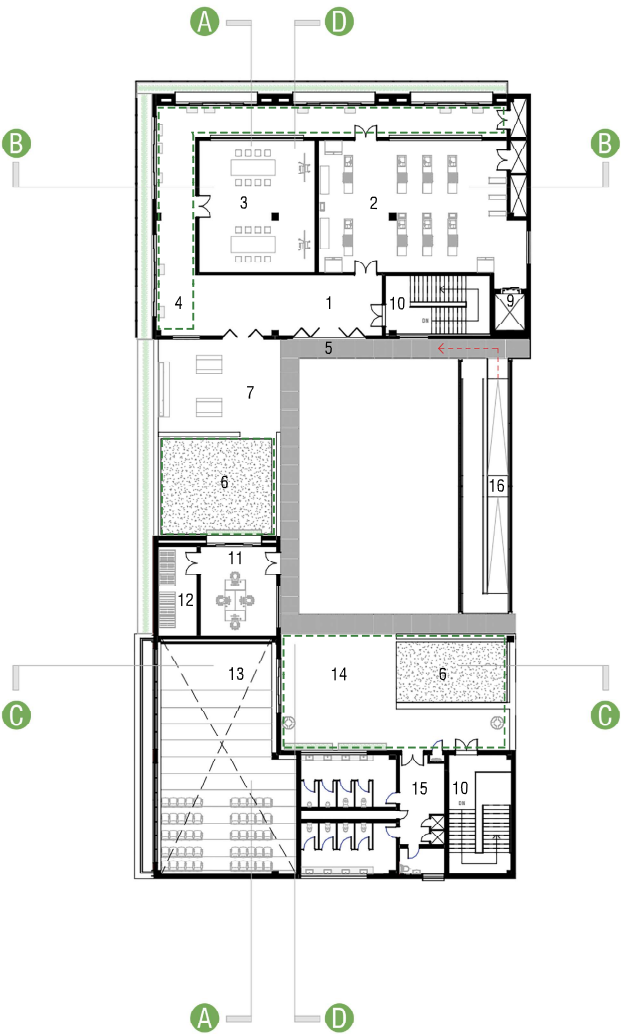


fig 6.2. Second Floor Plan (Author, 2020).

Programme & Circulation

The programme revolves around ways in which people can interact with food.

Public facilities are centered around food consumption, and include the Market, African Fine Dining Restaurant and Food Gallery.

Semi-public facilities are centered around food production and food and cultural education such as farming and workshops.

While private programmes are reserved for offices, storage and service facilities.

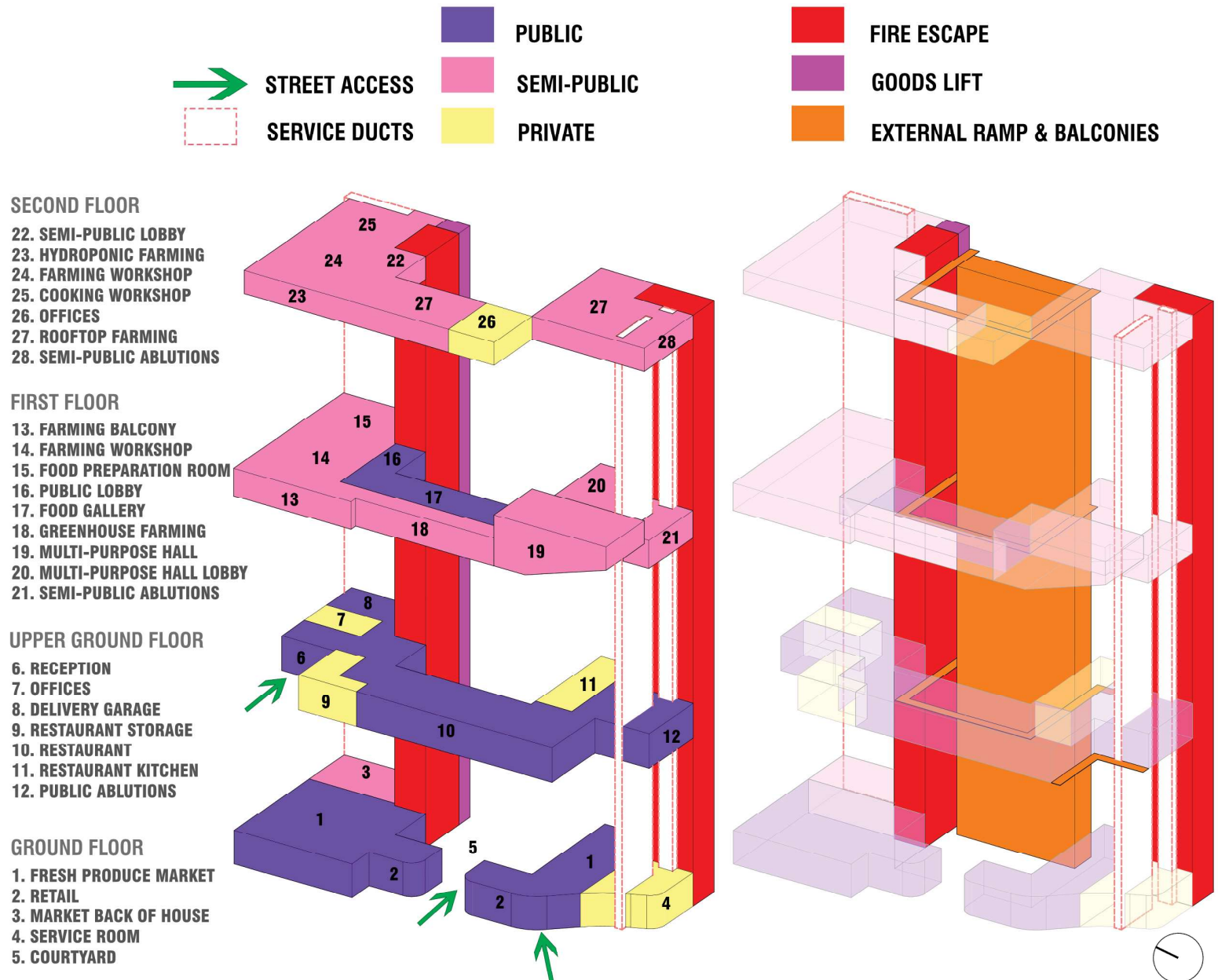
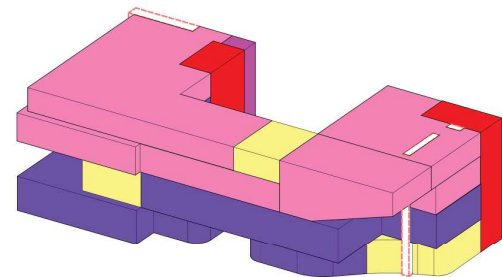


fig 7. Programme & Circulation (Author, 2020).

Roof Plan_Scale 1:150

The following drawings explain the main role the roof plays towards the sustainability of the building.

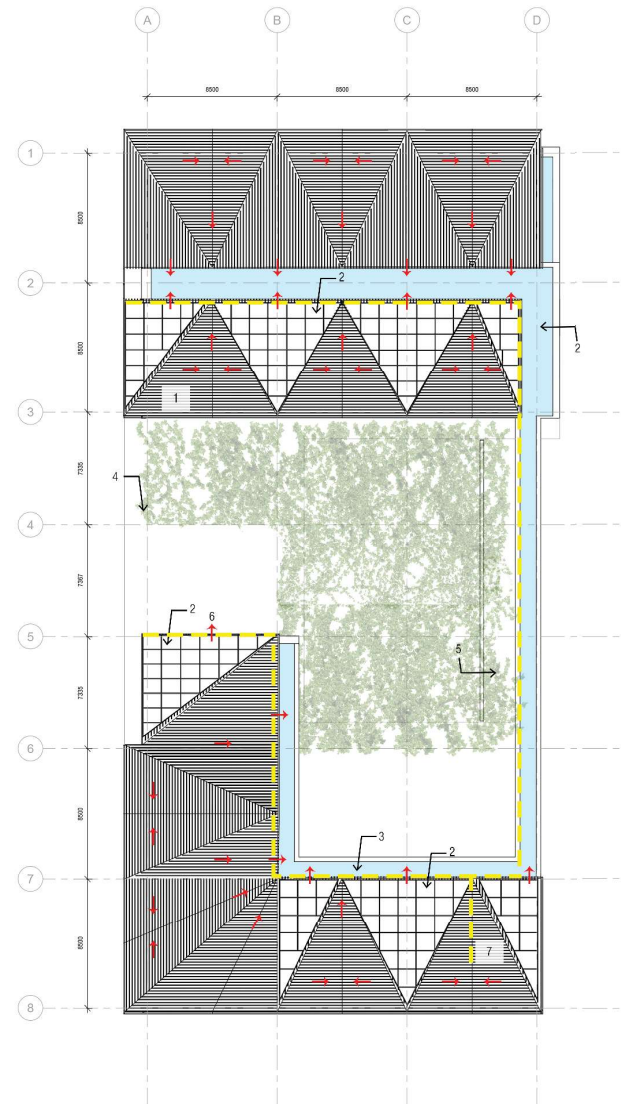
Water:

The building manages stormwater through collecting rainwater via the reinforced concrete stormwater channel of the roof.

The stormwater channel collects the water from the roof through full-bore outlets and rainwater downpipes, storing them in rainwater tanks located on the ground and second floors of the building.

Greywater from the ablutions is recycled for irrigation of the plants that grow on the building's facade.

The water drained from the majority of planters on the building is also not wasted as it is drained to the planters responsible for growing the plant screen on the west elevation.



Key:

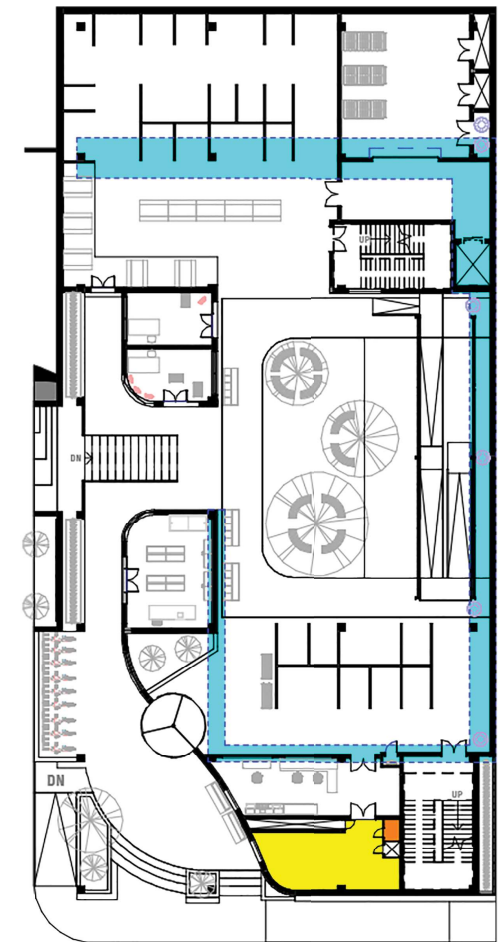
1. Roof Sheetting
2. Custom PV Grid Tied Solar Panel System with Battery back-up
3. Reinforced Concrete Stormwater Channel
4. Plant Trellis along spanning stainless steel wire trellis system
5. External Circulation Ramp (below)

Fall towards stormwater channel →

6. Fall towards roof garden Rainwater storage tank below →

7. Wiring together of PV modules to electrical duct - - - - -

fig 8. Roof Plan (Author, 2020).



Key:

- Solar Panel Battery Bank located in Service Room on Ground Floor
- Electrical Duct
- Location of rainwater down pipes (incased in reinforced concrete columns) that collect water from the stormwater channel on the roof above to ground floor rainwater storage tanks

fig 9. Ground Floor Plan (Author, 2020).

Scale:

Structure:

The building is designed to be as sustainable as possible through its choice of materiality.

The concrete structural frame is composed from recycled concrete aggregate.

An 8.5m structural grid is implemented as it allows for multiplicity of use for future transformation and densification of the site and community, as the concrete frame can be kept and adapted for use.

The building does not expose its concrete frame to prevent thermal loss as much as possible and to reduce energy consumption from excessive heating, ventilation and cooling.

The building envelope is a masonry veneer cavity wall and the roof is composed from klip-lok sheeted, folded Structural Insulated Panels.

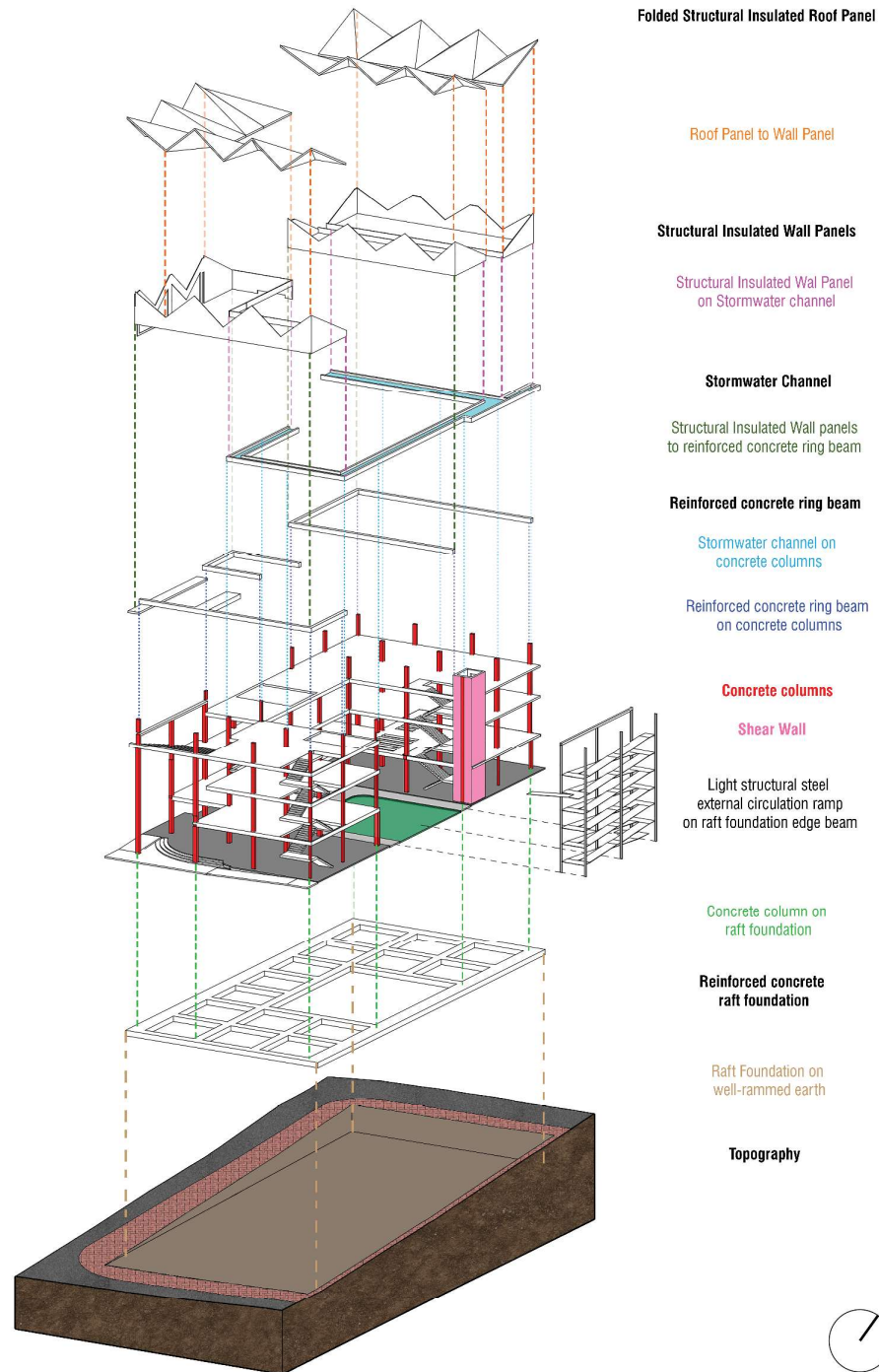


fig 10. Exploded Structural Axonometric (Author, 2020).

Solar Energy:

The Community Centre makes use of solar Photo-voltaic (PV) panels to reduce energy consumption from food production programmes such as the green-house and hydroponic systems, and the food consumption programmes such as the cooking workshops and restaurant kitchen.

The panels are oriented north and are mounted on brackets to the roof sheeting at a 26 degree angle to operate at maximum efficiency for Johannesburg's climate.

Figure X shows the annual supply of energy for the roof area required, while figure Y depicts the annual energy supply given by the calculated system size of the in relation to average system sizes.

Maximum Roof area required (sqm)	No. of PV panels: 1m x 1.6m = 250 W	System Size (kW)	Monthly Supply (kWh)	Annual Supply (kWh)
22.4	14	3.5	413	4954
32	20	5	597	7161
44.8	28	7	826	9909
64	40	10	1180	14165
230	143	35.75	4218.5	50622

fig 11. Photo-voltaic Design Considerations Table (Author, 2020).

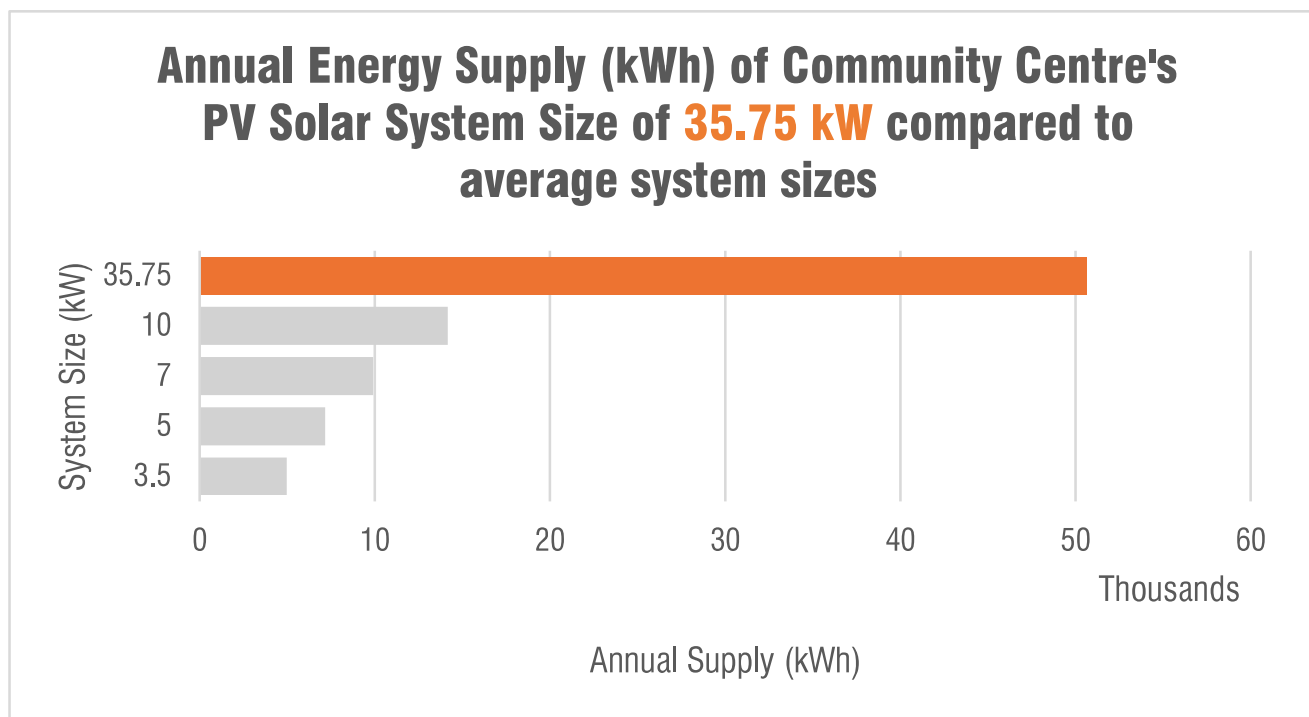


fig 12. Graph comparing average annual energy supply to average system size (Author, 2020).



fig 13. Bird's eye view of roof-scape of Community Centre (Author, 2020).

West Elevation_Scale 1:100

The building elevations showcase its materiality and greenery of the building seen from food production and plant growth.

The materiality of African masks is reflected in the architectural language of the building through terracotta face brick, copper roof, timber screens and steel trellises.

Scale:



fig 14. Render of west elevation from Joe Slovo Drive (Author, 2020).

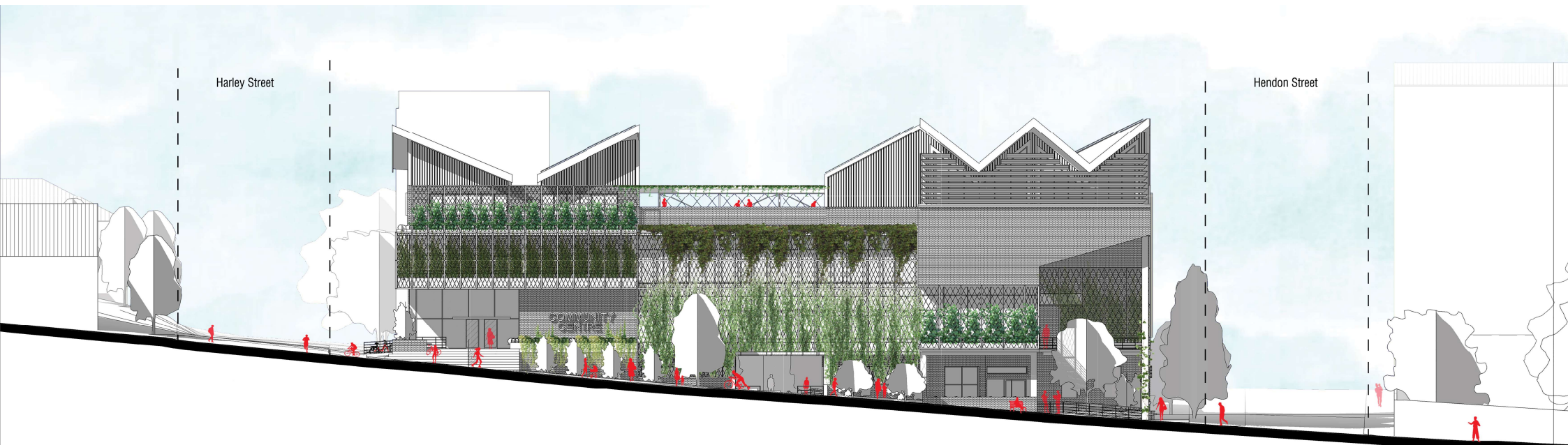


fig 15. West Elevation (Author, 2020).

South Elevation_Scale 1:100

The building is intended to draw attention to itself through its architectural language.

It is also intended to be an icon or symbol which gives a new mask or identity to migrant communities, with the aim of deconstructing past and present negative conceptions of migrants or “others” within Johannesburg, and deconstructing a xenophobic mentality. This is done through it firstly being a space where migrant communities can feel at home away from their homes, and secondly by sharing diverse cultures with its local context.

Scale:



fig 16. Render of south and west elevation from the corner of Joe Slovo Drive and Hendon Street (Author, 2020).

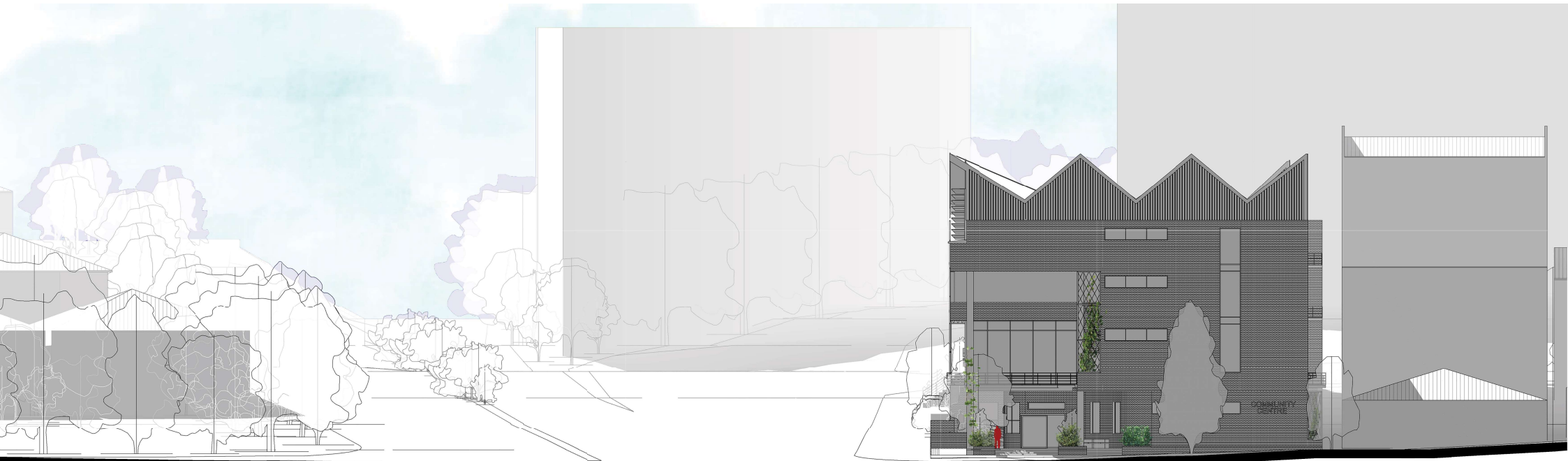


fig 17. South Elevation (Author, 2020).

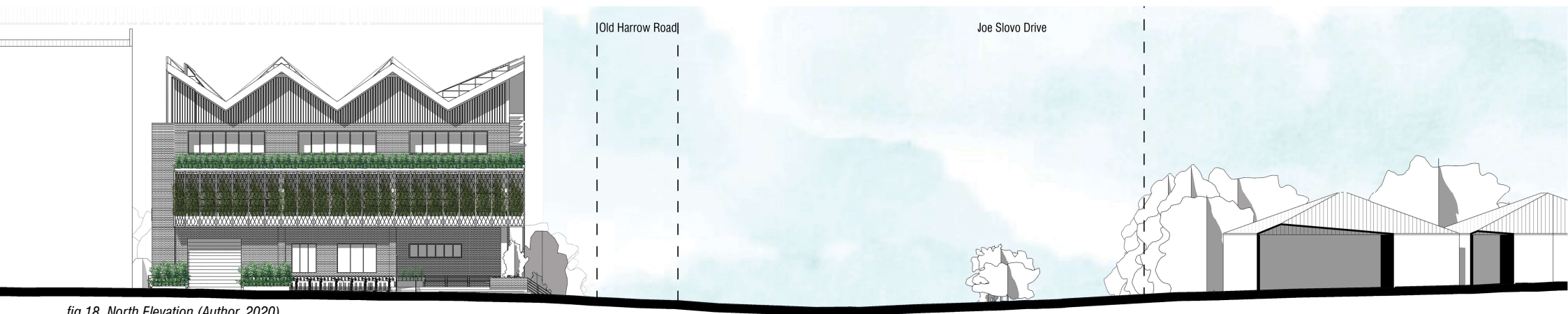


fig 18. North Elevation (Author, 2020).

Scale:



fig 19. East Elevation (Author, 2020).

Section A - A_Scale 1:100

Key:

1. Multi-purpose Hall
2. Farming Office
3. Semi-intensive green roof farm
4. Outdoor seating
5. Lobby
6. Farming Workshop
7. Hydroponic Farming
8. Food Gallery
9. Intensive Farming Balcony
10. Restaurant Balcony
11. African Fine Dining Restaurant
12. Restaurant Bar
13. Restaurant Storage
14. Northern Public Forecourt
15. Southern Public Forecourt
16. Public Foyer
17. General Store
18. West Access
19. Clothing Store
20. Indoor Seating
21. Indoor Market Stalls

Perimeter Section

This section speaks to the building's concept, which is centered around the traditional African mask and the crown.
The overall form resembles that of a crown and the building's pitched roof is its crown.

Scale:

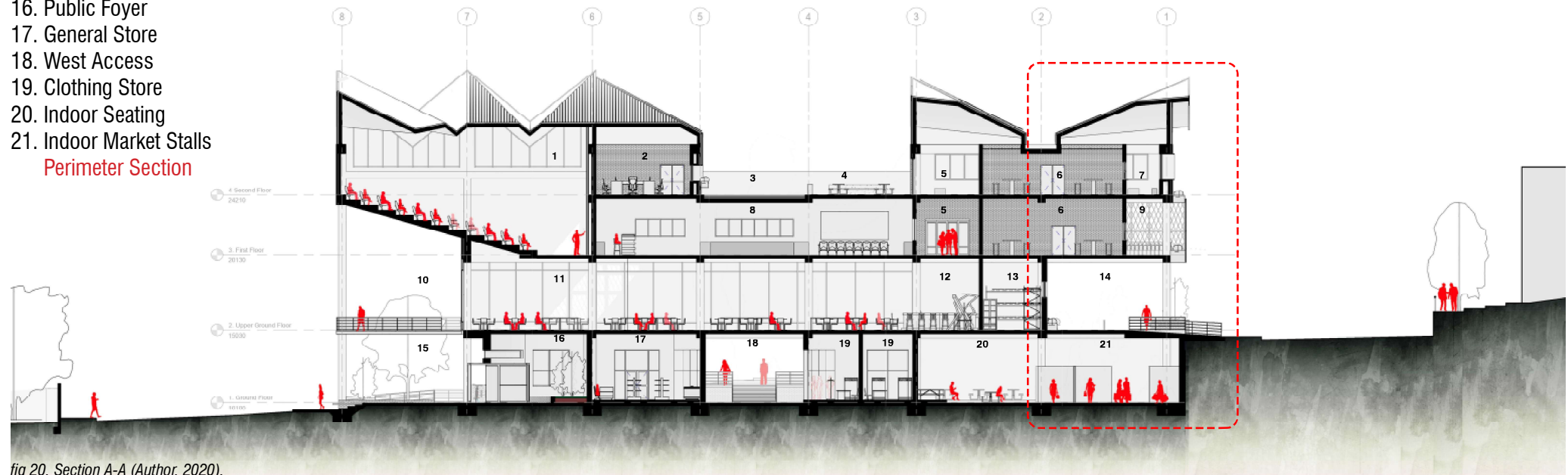


fig 20. Section A-A (Author, 2020).

Section B - B_Scale 1:100

Key:

1. Plant Screen fixed to planter boxes
2. Hydroponic Farming
3. Farming Workshop
4. Cooking Workshop
5. Wet services duct
6. Food Preparation Room
7. Farming Workshop
8. Intensive Farming Balcony
9. Northern public forecourt
10. Glass floor panels
11. Reception & Lobby
12. Office
13. Deliveries
14. Market Back-of-House
15. Indoor Market Stalls

Scale:

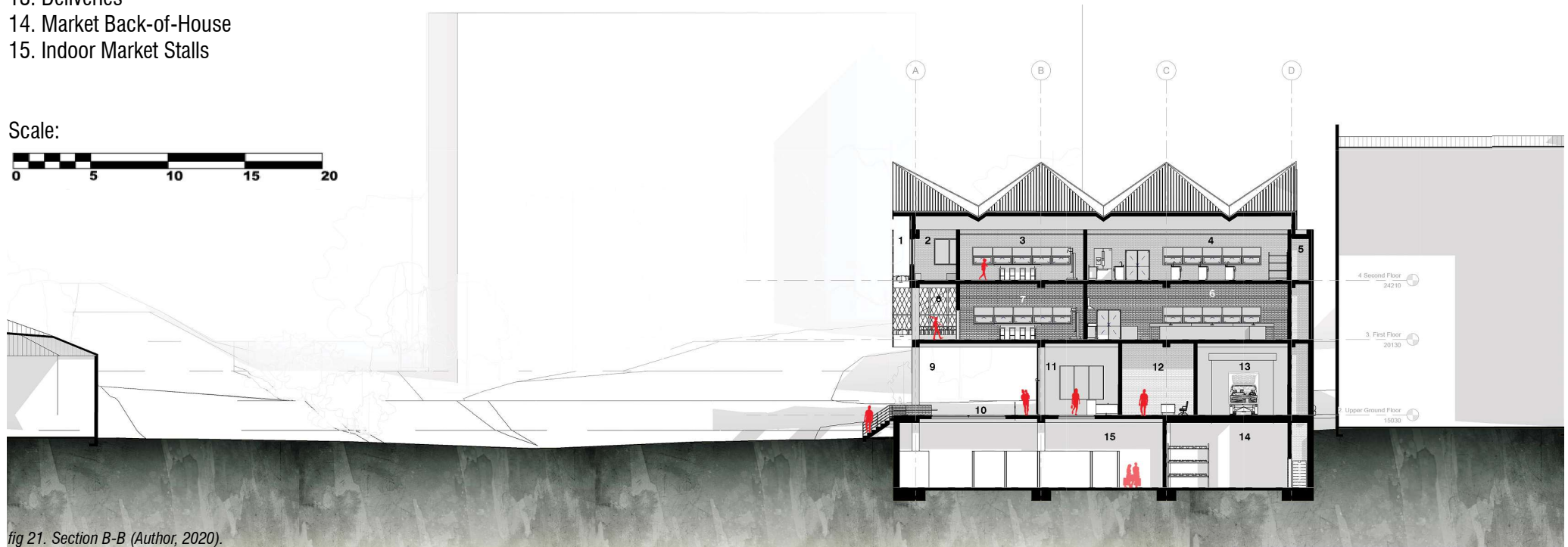


fig 21. Section B-B (Author, 2020).

Section C - C_Scale 1:100

Key:

1. Rooftop Farming
2. Multi-purpose Hall
3. Multi-purpose Hall Lobby
4. Restaurant Kitchen
5. Restaurant
6. Market Stalls
7. Public Foyer
8. Indoor Planter
9. Bicycle Parking

Scale:

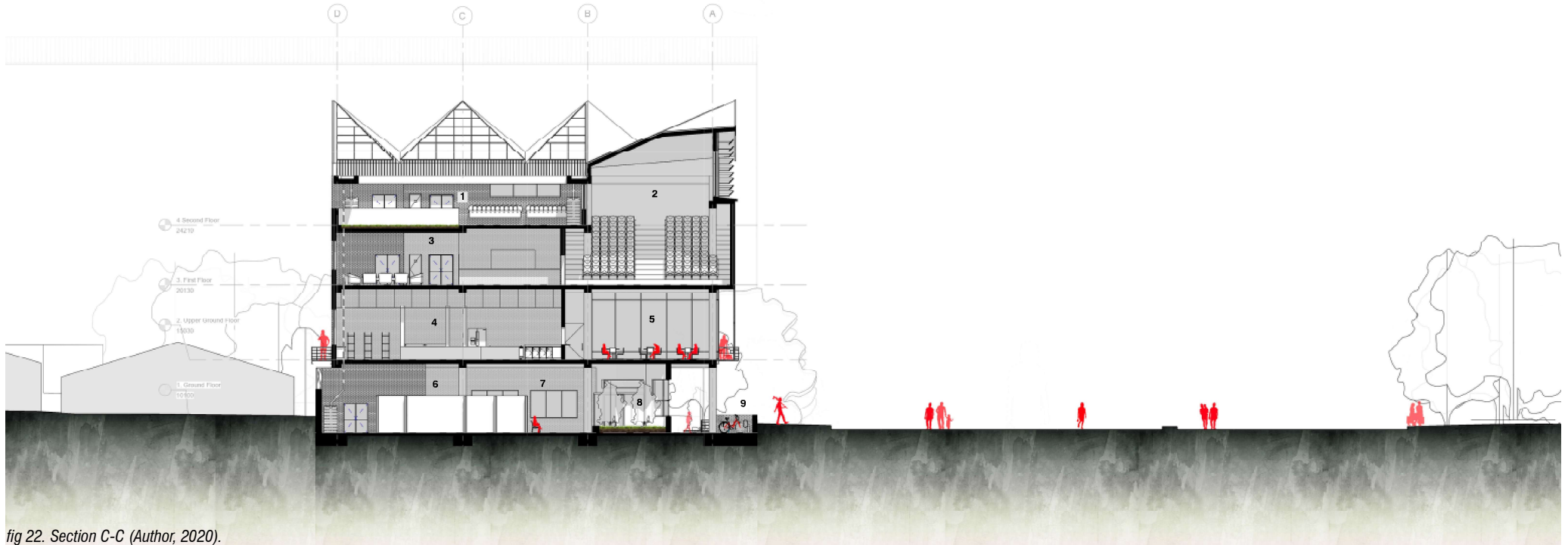
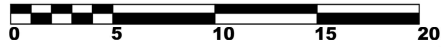


fig 22. Section C-C (Author, 2020).

Section D - D_Scale 1:100

Key:

1. Hydroponic Farming
2. Farming Workshop
3. Lobby
4. Intensive Farming Balcony
5. Reception
6. Bicycle Parking
7. Indoor Market Stalls
8. Indoor Seating
9. Courtyard
10. External circulation ramp
11. Rooftop Farming
12. Multipurpose Hall
13. Restaurant Kitchen entrance
14. Restaurant balcony
15. Public Foyer
16. Reception Office
17. Public Forecourt

Scale:

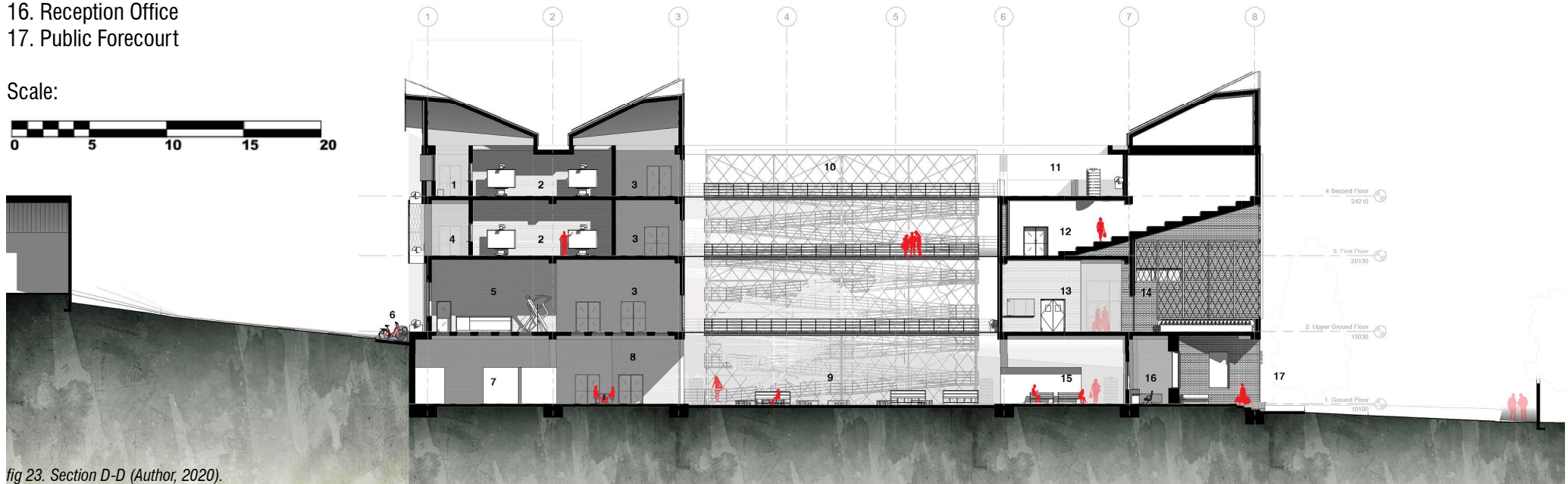
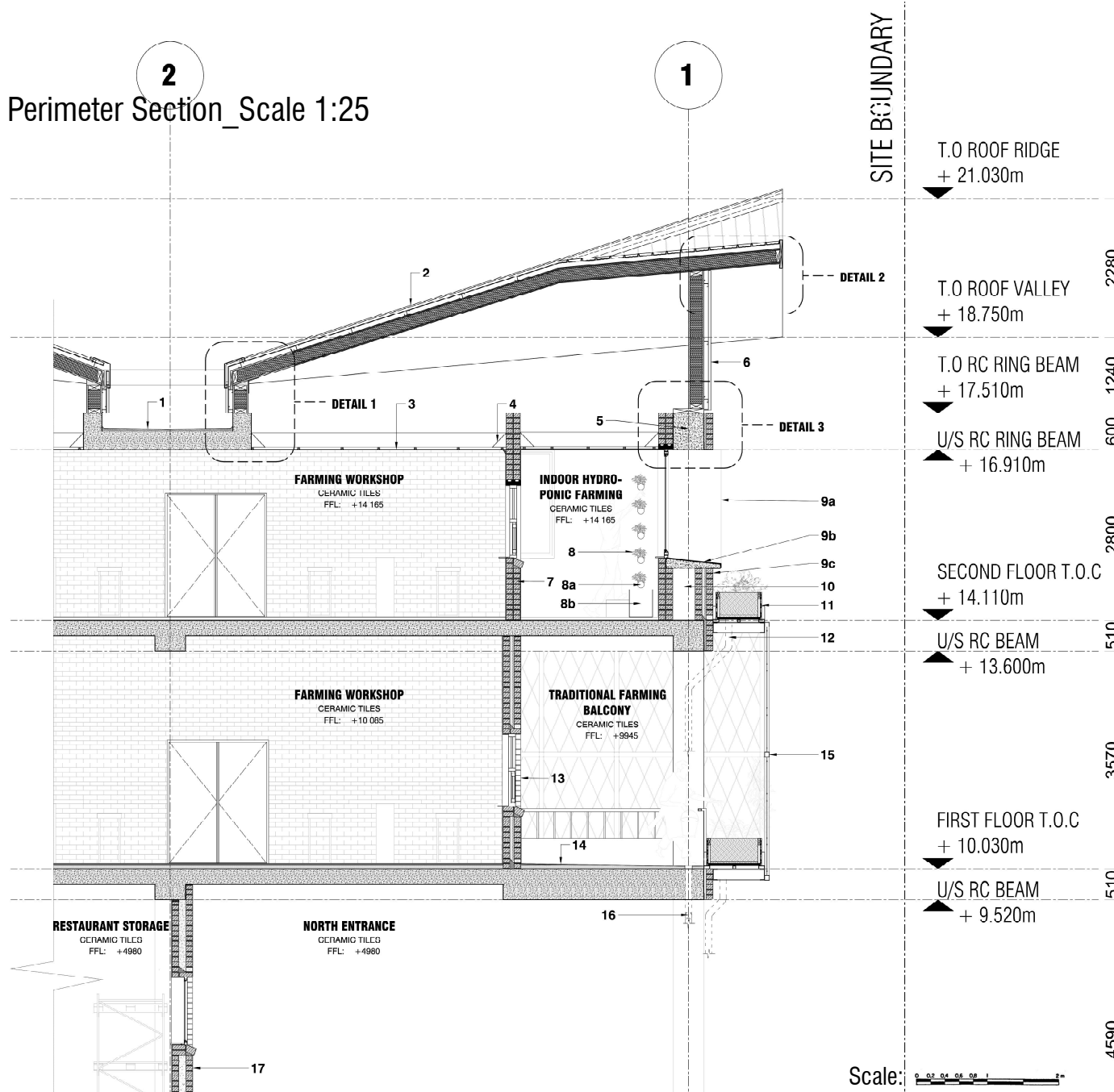


fig 23. Section D-D (Author, 2020).

Perimeter Section_Scale 1:25



1. TWO COATS BITUMINOUS ALUMINIUM PAINT FINISH ON ONE LAYER DERBIGUM SP4 WATERPROOFING MEMBRANE ON MIN. 30mm "POLITERM BLU" THERMAL INSULATING SCREED WITH 45° FILLET ON ENDS LAID @ MIN. 1:80 FALLS AND CROSS-FALLS TO FULL BORE OUTLETS ON 300mm RC STORMWATER CHANNEL TO ENG. DETAIL

2. KLIP-LOK 700 ® ROOF SHEETING FIXED WITH NO.10 - 16 x 16mm LONG SELF-DRILLING WAFFER HEAD PH2 SCREWS ON 75 x 50mm GALVANISED STEEL LIPPED 'Z' SECTION PURLIN @ 950mm C/C ON REFLECTIVE FOIL LAMINATE ON 250mm POLYISOCYANURATE (PIR) INSULATED ROOF PANEL FIXED TO (PIR) INSULATED WALL PANELS ON EACH END

3. 12mm FLUSH-PLASTERED AND PAINTED CEILING ON 6.4mm GYPSUM PLASTER-BOARD FIXED TO 38 x 38mm S.A.P BRANDING @ MIN. 600mm C/C FIXED TO 228 x 50mm S.A.P WALL-HUNG CEILING JOISTS

4. 90 DEGREES 50 x 228 x 2mm STEEL TRUSS HANGER

5. 500 x 600mm RC RING BEAM TO ENG. DETAIL

6. KLIP-LOK ROOF SHEETING FIXED WITH NO.10 - 16 x 16mm LONG SELF-DRILLING WAFFER HEAD PH2 SCREWS ON 75 x 50mm GALVANISED STEEL LIPPED 'Z' SECTION PURLIN ON REFLECTIVE FOIL LAMINATE ON 250mm POLYISOCYANURATE (PIR) INSULATED WALL PANEL

7. 230mm STOCK BRICK WALL PLASTERED ON BOTH SIDES

8. NUTRIENT FILM TECHNIQUE HYDROPONIC FARMING SYSTEM

8a. Ø100mm PVC PLANTING STEPS

8b. 380 x 450mm WATER PUMP

9a. ALUMINIUM PLATE BOX WINDOW TRIM WITH A 130mm PROTRUSION FIXED TO UNDERSIDE OF RC RING BEAM AND UNDERSIDE OF CUSTOM PRECAST WINDOW SILL

9b. ALUMINIUM BENT PROFILE WINDOW SILL SCREWED TO CUSTOM PRECAST CONCRETE SILL ON DPC.

9c. 290mm FACEBRICK VENEER CAVITY WALL WITH 30mm RIGID INSULATION WITH GALVANISED BUTTERFLY WALL TIES & BRICKFORCE AT EVERY 4 COURSES TO ENG. DETAIL. BRICK VENEER SUPPORTED ON 120 x 120 x 8mm STEEL EQUAL SHELF ANGLE. BRICKS PLACED 40mm AWAY FROM RC STRUCTURAL FRAME

10. DOUBLE WALL CAVITY STORAGE SPACE

11. 750 x 455mm WOODEN PLANTER ON STEEL STAND FIXED TO STEEL CHANNELS FIXED TO SLAB EDGE WITH PEIKKO® STEEL THERMALLY INSULATED BALCONY CONNECTOR TO MANUFACTURER'S SPECIFICATION AND DETAIL

12. PLANTER DRAIN CONNECTED TO 10 x 75mm GALVANISED STEEL SQUARE DOWNPIPE

13. 290mm FACEBRICK CAVITY WALL WITH 30mm RIGID INSULATION WITH GALVANISED BUTTERFLY WALL TIES & BRICKFORCE AT EVERY 4 COURSES TO ENG. DETAIL.

14. 500 x 500mm OUTDOOR CERAMIC TILES ON ONE LAYER DERBIGUM CG4/CG3 WATERPROOFING MEMBRANE PLACED IN BETWEEN CEMENT SCREED & TILE MORTAR BED WITH MINIMUM THICKNESS OF 45mm.

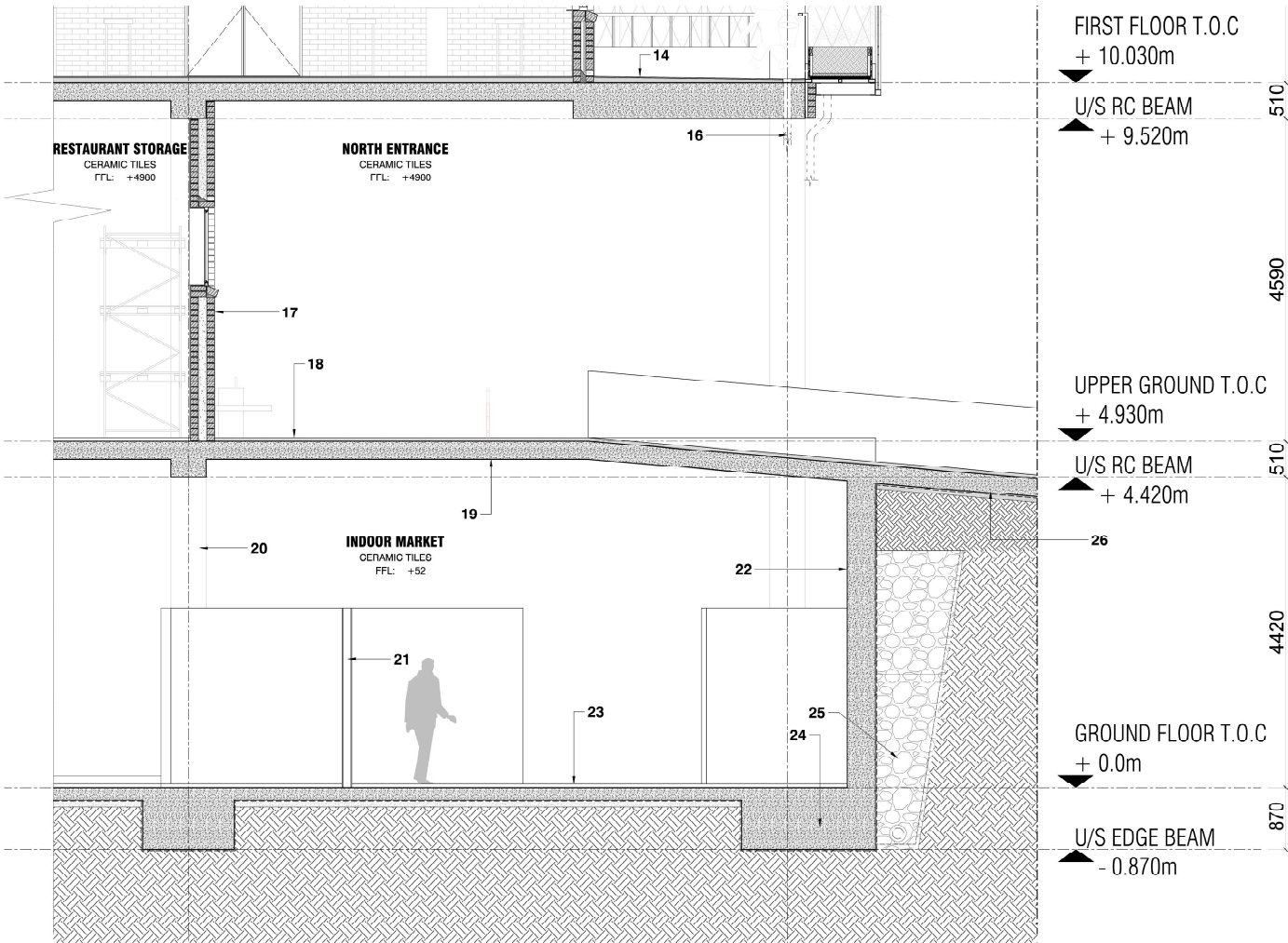
15. STEEL TRELLIS MESH WELDED TO STEEL C-CHANNEL OF RAISED PLANTING BED

16. MIN 45mm CEMENT SCREED LAID TO MIN. 1:80 FALL TO STAINLESS STEEL LINEAR DRAINAGE CHANNEL TO Ø100mm PVC DRAINAGE PIPE INCASED IN 500 x 500mm RC COLUMN TO

17. 330mm FACEBRICK CAVITY WALL WITH 110mm WEAK CONCRETE INFILL TO ENG. DETAIL.

fig 24.1. Perimeter Section (Author, 2020).

Perimeter Section_Scale 1:25



Scale: 0 0.2 0.4 0.6 0.8 1 2m

fig 24.2. Perimeter Section (Author, 2020).

- 14. 500 x 500mm OUTDOOR CERAMIC TILES ON ONE LAYER DERBIGUM CG4/CG3 WATERPROOFING MEMBRANE PLACED IN BETWEEN CEMENT SCREED & TILE MORTAR BED WITH MINIMUM THICKNESS OF 45mm.
- 16. MIN 45mm CEMENT SCREED LAID TO MIN. 1:80 FALL TO STAINLESS STEEL LINEAR DRAINAGE CHANNEL TO Ø100mm PVC DRAINAGE PIPE INCASED IN 500 x 500mm RC COLUMN TO PLANTER BELOW
- 18. CERAMIC TILES ON MIN. 40mm SCREED ON 255mm RC SLAB
- 19. 203 x 133mm STEEL I-BEAM INTERMEDIATE SUPPORT FOR GLASS BLOCK FLOOR
- 20. 500 x 500mm RC COLUMN
- 21. 140mm DRYWALL MARKET STALL PARTITIONS
- 22. DIMPLED DRAINAGE MEMBRANE ON TORCH-ON WATERPROOFING MEMBRANE ON BITUMINOUS WATERPROOFING MEMBRANE ON ELASTOMERIC – WASHED 400mm RC RETAINING WALL TO ENG. DETAIL
- 23. CERAMIC FLOOR TILES ON MIN. 40mm CEMENT SCREED ON 170mm RC RAFT FOUNDATION TO ENG. DETAIL ON DPM ON CONTINUOUS BITUMINOUS WATERPROOFING MEMBRANE ON 80mm SAND-BINDING LAYER ON WELL-RAMMED HARDCORE
- 24. 870mm RC RAFT FOUNDATION EDGE BEAM TO ENG. DETAIL
- 25. WASHED DRAINAGE FILL AROUND Ø100mm AGRICULTURAL DRAIN WRAPPED IN BIDEN CLOTH, TOPPED WITH GEOTEXTILE DRAINAGE FABRIC TO PREVENT FINER MATERIAL FROM SETTLING IN THE DRAINAGE LAYER
- 26. 1:12 REINFORCED CONCRETE DISABLED ACCESS RAMP TO ENG. DETAIL ON CONTINUOUS BITUMINOUS WATERPROOFING MEMBRANE ON SANDBINDING LAYER ON WELL-RAMMED HARDCORE

Details_Scale 1:5

The technical detail exploration of the building shifted from focusing on the technicalities of food production happening throughout the building to focusing on the roof envelope of the building. The roof is a folded and pitched roof made from structurally insulated panels (SIP).

The building is described as a built interpretation of a traditional African mask, thus:

- Its foundation can be seen as the neck which holds it up;
- Its facade consisting of masonry veneer cladding, 'klip-lok' sheeting, curtain walls, windows and doors can be seen as its face;
- Its roof can be seen as its elaborate headpiece or "crown".

The roof functions as a service space for the building programmes, and is designed to collect rainwater for storage, therefore, it is not intended to be habitable.

The details showcase the following:

Detail 1: SIP roof and wall panel to storm-water channel connection detail.

Detail 2: SIP roof panel to wall panel connection detail.

Detail 3: SIP wall panel to ring beam connection detail.

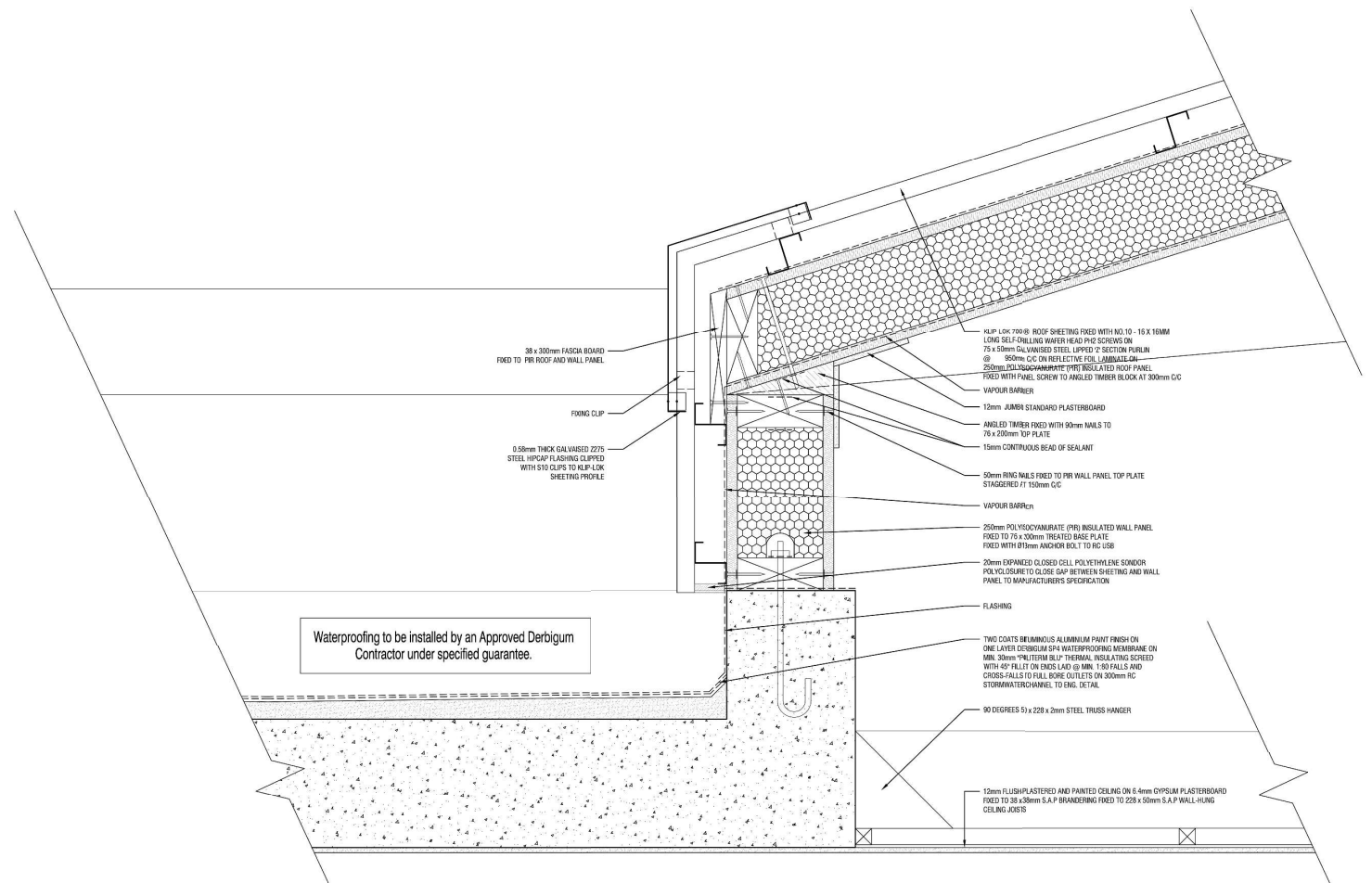
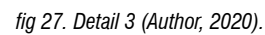
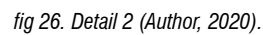


fig 25. Detail 1 (Author, 2020).



Urban Farming

African leafy vegetables form the base of food production in the building due to its inclusive nature in being eaten across all African nations, its ability to be farmed in small spaces, and with diverse farming systems.

4 main African Leafy Vegetables eaten in my household is to be farmed in a total farmable area of 432 meters square (out of a total building area of 5250 meters square).

Johannesburg's mild and temperate climate provides an average temperature of 25 degrees and average rainfall per annum of 790mm.

However, these selected leafy vegetables mainly do well in tropical, moist climates.

Therefore, based on Johannesburg's climate, the inclusion of diverse farming methods proves highly beneficial as it allows for both seasonal and non-seasonal harvests, with the ability of hydroponic farming to increase yields by 2 to 4 times over soil farming.

African Leafy Vegetable	Names	Temperature [°C] & Sunlight	Minimum Rainfall per annum	Soil Farming Requirements	Soiless Farming?	Final Dish
	Ngai-Ngai <u>Roselle Leaves</u>	23 - 29 Full Sun (min. 6 hours)	640mm / annum	Neutral, well-drained soil	Yes	
	Biteku-teku <u>Amaranth</u>	14 - 20 Full Sun (min. 6 - 8 hours)	254mm / annum	Well-drained, nutrient rich soil	Yes	
	Pondu <u>Cassava Leaves</u>	25 - 32 Full sun (max. 12 hours)	500mm / annum	Light, sandy loams soil that is fertile, moist and deep	Yes	
	Matembele <u>Sweet Potato Leaves</u>	15 - 29 Part sun to full sun (min. 3 to 6 hours)	600mm / annum	Rich, well-draining, light soil	Yes	

fig 28. Farming considerations of selected African leafy vegetables (Author, 2020).

Sustainability Axonometric

The building responds to its orientation by having plant and timber screens on its west façade and deep-set windows and roof overhangs on its north façade. The plant screens grow on steel trellises which are supported by the facebrick building façade. It makes use of passive cooling techniques through roof gardens and the courtyard towards which most spaces open. Air can move through, making the spaces cool and well-ventilated.

The peaks in the roof structure allow for stack ventilation in big spaces like the cooking workshop and multipurpose hall.

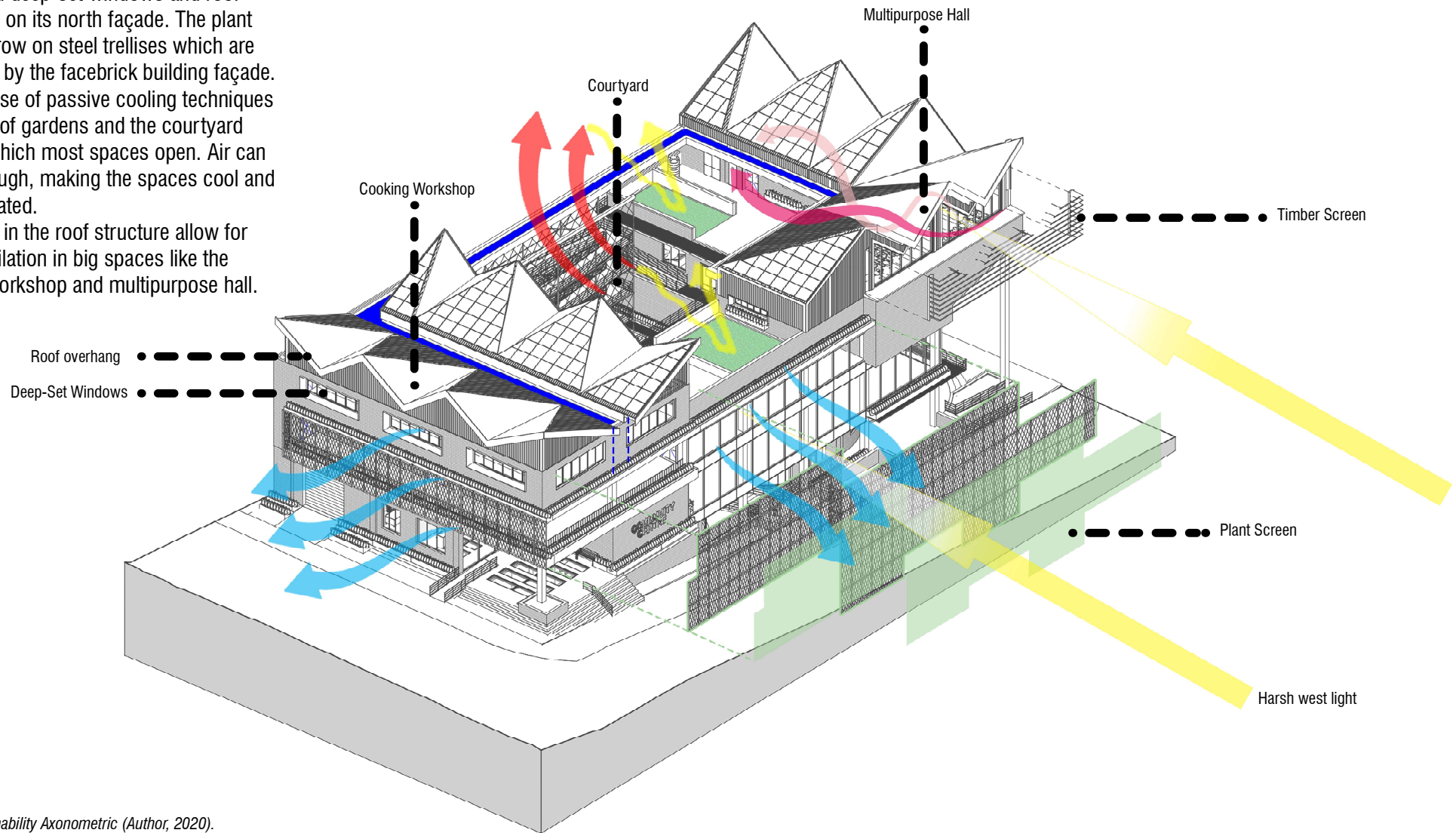


fig 29. Sustainability Axonometric (Author, 2020).



fig 30. Render of plant screen on west elevation (Author, 2020).

Sustainability Section

This section through the courtyard illustrates the elements of sustainability the building uses.

The building maximises on its north orientation for optimal food growth.

Utilising solar energy, custom solar panels are fixed flush with the 26-degree roof angle for maximum efficiency in Johannesburg.

Stormwater is managed through the collection of rainwater for storage and for farming use.

Greywater is harvested for irrigation of plants.

The courtyard is shaded through planting.

Key:

Sun rays to solar panels

Sun rays to food production

Rainwater harvesting

Greywater harvesting

Food production

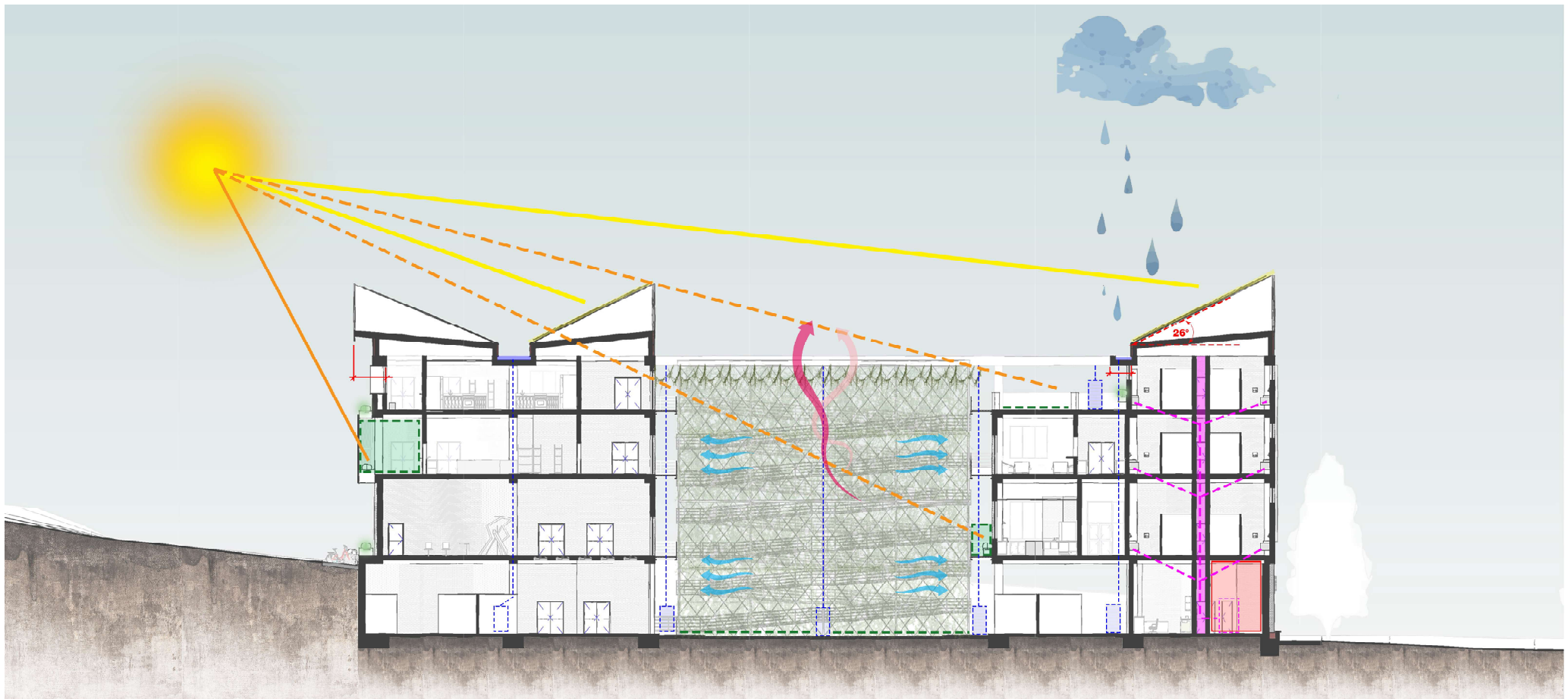
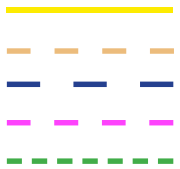


fig 31. Sustainability Section (Author, 2020).



fig 32. Street corner before intervention (Google Maps, 2017).



fig 33. Street corner after intervention (Author, 2020).

South Corner

The south corner of the building is intended to be a vibrant, eye-catching and welcoming invitation to the Community Centre. It is the first impression of the building and the users first taste in experiencing what the building is all about.

In having art that reflects the cultures of the migrant communities on the building, a strong connection to the Community Centre can be established.

fig 34. Cold south corner (Author, 2020).



fig 35. Vibrant south corner (Google Maps, 2017).





fig 36. Community Centre north corner view from Joe Slovo Drive (Author, 2020).

Interior Perspectives

The following interior perspectives show the process of how the Community centre works.

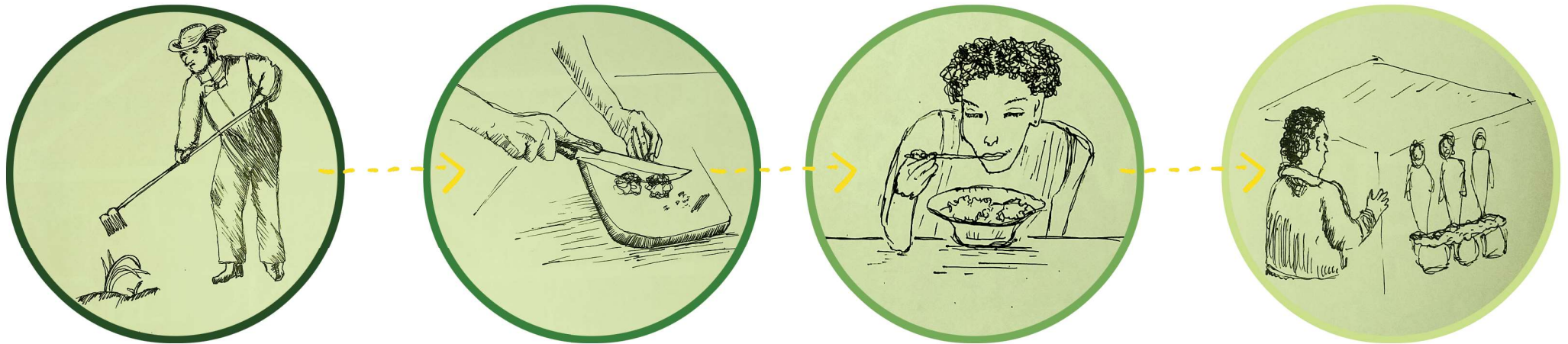


fig 37. Building programme process (Author, 2020).

A) Food Production

Food is produced through various methods throughout the building on each floor:

- Traditional farming in the courtyard of the ground floor (fig. 38).
- Intensive farming using raised planting beds fixed to first floor slab edge (fig. 39).
- Greenhouse and indoor farming on the first floor (fig. 40).
- Indoor hydroponic farming via the Nutrient-Film-Technique on the second floor (fig. 41).
- Rooftop farming through semi-intensive rooftop gardens and A-frame hydroponic systems on the second floor (fig. 42).

B) Food Preparation

The produce is prepared in the food preparation room on the first floor (fig. 43).

The African leafy vegetables are cleaned, chopped, cooked and stored.

C) Food Consumption

The food prepared is used within the building and sold in the market (fig. 44).

D) Food Education

The food is learnt about in the multipurpose hall and workshops (fig. 45).



fig 38. Traditional farming in the Courtyard (Author, 2020).



fig 39. Intensive farming on the first floor balcony (Author, 2020).



fig 40. Greenhouse and indoor farming on the first floor (Author, 2020).



fig 41. Indoor hydroponic farming on the second floor (Author, 2020).



fig 42. Rooftop farming on the second floor (Author, 2020).



fig 43. Food preparation room on first floor (Author, 2020).



fig 44. Green Leaf Market on ground floor (Author, 2020).



fig 45. Multipurpose Hall on the first floor (Author, 2020).

Chapter 11: Conclusion & Reflection

The intent of the building is not for it to be a high-functioning vertical farm, but to function as a demonstrative model which promotes urban farming and food self-sufficiency.

It is to serve as a welcoming space wherein all urban communities can exchange knowledge around culture, food, and farming.

Urban farming is looked at through the lens of making communities self-sufficient and sustainable through education.

Food serves as a platform to know about a certain culture, in this project's case, the Congolese culture.

Therefore, the Community Centre serves as a medium through which culture is experienced and exchanged and is a catalyst for strengthening diverse multi-cultural communities.

The Community Centre gives the multicultural community of Yeoville a new identity through the celebration of culture, serving as the crown of the community as it empowers migrant communities by making them feel at home.

Similarly, this academic research has given me the opportunity not only to explore my architectural identity, but my Congolese identity as well.

It represents the crown of my architectural education and is a reminder of the love I have for my culture and the passion I have to share it with others, which is the heart of this academic research..

It has motivated me to deepen my cultural and self knowledge so that I can be better positioned to contribute to the wealth of the built environment.

Chapter 12: References

Abstract

Elmo Raj, P. (2014). The Concept of Home in Diaspora. *Lapis Lazuli. An International Literary Journal*, 4(2), 85-97.

Gieseeking, J.J., W. Mangold, C. Katz, S. Low, & S. Saegert (eds.). (2014). *The People, Place, & Space Reader*. New York: Routledge.

Glossary on Migration (2019). (2016). Available from: <https://www.iom.int/glossary-migration-2019> [Accessed 1 September 2020].

Chapter 1

Ahmed, S. (1999). Home and away: Narratives of migration and estrangement. *International Journal of Cultural Studies*. 2(3):329–347. doi.org/10.1177/136787799900200303.

Amisi, B & Ballard, R. (2006). 'In the Absence of Citizenship: Congolese refugees struggle and organisation in South Africa' in Ballard, R, Habib, A & Valodia, I (eds) *Globalisation, Voices of Protest: Social Movements Post-Apartheid South Africa*. Petermaritzburg: UKZN press

Coghlan, B., Ngoy, P, Mulumba, F, Hardy, C., Bemo, V., Steward, T., ... Brennan, R. (2007). Mortality in the democratic Republic of Congo: An ongoing crisis. *International Rescue Committee and Burnet Institute*. Available from: <https://www.rescue.org/report/mortality-democratic-republic-congo-ongoing-crisis>. [Accessed: 19 March 2020].

Flahaux, M.-L., & Schoumaker, B. (2016). Democratic Republic of the Congo: A migration history marked by crises and restrictions. *Migration Information Source: Online Journal of the Migration Policy Institute*. Available from: <https://www.migrationpolicy.org/print/15616#.XZUB5S2ZPs0>. [Accessed: 16 March 2020].

Groot, Fredde (2004). 'Challenges of the UNHCR's Programme for urban Refugees in South Africa' in Loren B. Landau (ed.) *Forced Migrants in the New Johannesburg: Towards a Local Government Response*. Johannesburg: Forced Migration Studies Programme: WITS, pp. 37-42.

Overview. (2019). Available from: <https://www.worldbank.org/en/country/drc/overview> [Accessed 19 March 2020].

World Migration Report. (2020). Available from: https://publications.iom.int/system/files/pdf/wmr_2020.pdf [Accessed 24 February 2020].

Chapter 2

Archer, K Ed. (2008). *Cultures of globalization: coherence, hybridity, contestation*. (Rethinking globalizations no. 12). London: Routledge.

Aseniero, G. (1985). "A Reflection on Developmentalism: From Development to Transformation." In H. Addo. *Development as Social Transformation*. (London: Hodder & Stoughton): 48-85.

Banuri, Tariq (1990). "Modernization and its Discontents: A Cultural Perspective on Theories of Development" in Marglin, F and S. Marglin eds. *Dominating Knowledge: Development, Culture, and Resistance*. Oxford: Clarendon: 73-101.

Berry, J. W. (1980). Acculturation as varieties of adaptation. In A. M. Padilla (Ed.), *Acculturation: Theory, models, and some new findings* (pp. 9 –25). Boulder, CO: Westview.

Bhugra, D., & Becker, M. A. (2005). Migration, cultural bereavement and cultural identity. *World psychiatry : official journal of the World Psychiatric Association (WPA)*, 4(1), 18–24.

Brown, L. K. & Mussell, K. (Eds.) (1984). *Ethnic and regional foodways in the United States: the performance of group identity*. Knoxville: University of Tennessee Press.

Bruyns, G & Graafland, A (Eds.) (2012). *African perspectives, [South] Africa: city, society, space, literature, and architecture*. (Delft School of Design series on architecture and urbanism no. 7). Rotterdam: 010 Publishers.

Cities – United Nations Sustainable Development. (n.d). Available from: <https://www.un.org/sustainabledevelopment/cities/> [Accessed 7 June 2020].

Culture: urban future; global report on culture for sustainable urban development; summary - UNESCO Digital Library. (n.d). Available from: <https://unesdoc.unesco.org/ark:/48223/pf0000246291> [Accessed 2 March 2020].

Daya, J.M. (2016). *Samaj belonging in the in-between: reviving the greater Transvaal Gujarati Hindu community in Johannesburg*. Thesis. Available from: <http://wiredspace.wits.ac.za/handle/10539/24070> [Accessed 10 August 2020].

Drimie, S & Lakika, D. (2019). "The food we eat here weakens us": Food practices and health beliefs among congolese forced migrants in South Africa - A case study of Yeoville in Johannesburg. Available from: <https://www.ajfand.net/Volume19/No2/Lakika17135.pdf> [Accessed 16 March 2020].

Fischler, C. (1988). Food, self and identity. *Social Science Information*. 27(2):275–292. doi.org/10.1177/053901888027002005.

Friends of the Congo. (2020). *Congolese Culture - Friends Of The Congo*. Available from: <https://friendsofthecongo.org/congolese-culture/> [Accessed 6 September 2020].

Gabaccia, D. (1998). *We Are What We Eat: Ethnic Food and the Making of Americans*. Harvard: Harvard University Press.

García Santiago, A. & Zubieta Irún, J. C. (2003). *Inmigrantes en Cantabria. La inserción social y laboral de los inmigrantes extranjeros en Cantabria*. [Immigration in Cantabria. Social and labour integration of the foreign immigrants in Cantabria]. Santander: Fundación Marcelino Botín.

Gelderblom, D. & Kok, P. (1994). *Urbanisation: South Africa's Challenge Volume 1 Dynamics*. Pretoria: HSRC Publishers.

Hiralal, K. (2013). Mapping Free Indian Migration to Natal Through a Biographical Lens: 1880-1930. *New Contree*, 66, 97-119. Sabinet Academic Database.

iexplore.com. (2020). *Congo — History And Culture*. Available from: <https://www.iexplore.com/articles/travel-guides/africa/congo/history-and-culture> [Accessed 6 September 2020].

Kittler, PG. (2016). *Food and culture*. Seventh edition ed. Australia: Cengage Learning.

Koenig, L. (2011). Repair Interview: Josh Viertel of Slow Food USA. Available from: <https://wererepair.org/repair-interview-josh-viertel-of-slow-food-usa/> [Accessed 3 June 2020].

Lal, B.V., P. Reeves & J. Rai. (2006). *The Encyclopedia of the Indian Diaspora*. General Editor, B. Lal. Editions, Didier Millet, Singapore.

Ma, G. (2015). Food, eating behavior, and culture in Chinese society. *Journal of Ethnic Foods*. 2(4):195–199. doi.org/10.1016/j.jef.2015.11.004.

Mata-Codesal, D. (2008). *Rice and coriander sensorial re-creations of home through food: Ecuadorians in a Northern Spanish city*. Working paper N° 50. Sussex Centre for Migration Research. University of Sussex. United Kingdom.

Nemeth, E. (2016). *What is Cultural Security? Different perspectives on the role of culture in international affairs*.

Notre Dame. (2020). *Cultural Security*. Available from: <https://www.notredame.edu.au/majarlin/about/cultural-security> [Accessed 7 September 2020].

Nurse, K. (2006). *Culture as the Fourth Pillar of Sustainable Development*. Commonwealth Secretariat. London.

Oussedik, S. (2012). *Food and Cuisine: Part of the Migration Process*. Institut Europeu de la Mediterrania. Available from: www.iemed.org. [Accessed 6 April 2020].

Pilcher, J. (2017). *Food in world history*. Routledge, New York.

Philips, A. (2013). *Designing urban agriculture: a complete guide to the planning, design, construction, maintenance and management of edible landscapes*. Hoboken, New Jersey: John Wiley & Sons.

Schwartz, S, Unger, J, Zamboanga, B & Szapocznik, J. (2010). Rethinking the Concept of Acculturation Implications for Theory and Research. *The American psychologist*. 65:237–51. doi.org/10.1037/a0019330.

Sibal, V. (2018). FOOD: IDENTITY OF CULTURE AND RELIGION. JULY-AUG, 2018 Volume 6,:10908-10915).

Skerry, P. (2002). *Beyond Sushiology: Does Diversity Work?* Available from: <https://www.brookings.edu/articles/beyond-sushiology-does-diversity-work/> [Accessed 6 April 2020].

Verkuyten, M. (2014). *Identity and Cultural Diversity: What Social Psychology can Teach Us*. Oxon: Routledge.

WCED (1987). *Our Common Future*. Oxford: Oxford University Press.

Williams, R. (1983). *Culture and society, 1780-1950*. New York: Columbia University Press.

World Migration Report. (2020). Available from: https://publications.iom.int/system/files/pdf/wmr_2020.pdf [Accessed 24 February 2020].

Chapter 3

6Wresearch. (2020). *South Africa Frozen Food Market (2020-2026) | Overview, Revenue & Forecast*. Available from: <https://www.6wresearch.com> [Accessed 5 September 2020].

Akpavi, S., Batawila, K., Wala, K., Kossi-Titrikou, K., Amouzou, K., Kokou, K., Chango, A., Butare, I. & Akpagana, K. (2008). *Sociocultural factors influencing the availability and the consumption of food plants in Togo*. Paper presented to Theme 1: Just Famine Food? What Contributions can Underutilised Plants Make to Food Security? At the International Symposium on Underutilised Plants for Food, Nutrition, Income and Sustainable Development, Arusha, Tanzania, 3–7 March 2008

Blocher, J. (2017). Lessons from the UNU Panel Series on Academic Thinking on Migration. 21. Available from: <https://migration.unu.edu/publications/reports/cities-of-welcome-inclusion-of-migrants-and-refugees-in-urban-areas.html> [Accessed 5 September 2020].

Boko S.H. (2002) Decentralization: Definitions, Theories and Debate. In: Decentralization and Reform in Africa. Springer, Boston, MA. https://doi.org/10.1007/978-1-4615-1111-3_1

Celliers, J. (2019). *How urban agriculture can contribute to food security*. Available from: <https://www.farmersweekly.co.za/opinion/by-invitation/how-urban-agriculture-can-contribute-to-food-security/> [Accessed 1 June 2020].

Clapp, J. (2017). *Food self-sufficiency: Making sense of it, and when it makes sense*. Food Policy. 66:88–96. doi.org/10.1016/j.foodpol.2016.12.001.

Cohen M., Garrett J. (2009). *The food price crisis and urban food insecurity*. London, UK: IIED

Dean, S. (2020). *Spazas, food hawkers with permits, get greenlight to trade*. Available from: <https://www.farmersweekly.co.za/agri-news/south-africa/spazas-food-hawkers-with-permits-get-greenlight-to-trade/> [Accessed 4 April 2020].

de Haen H., Stamoulis K., Shetty P., Pingali P. (2003). The world food economy in the twenty-first century: challenges for international co-operation. Dev. Policy Rev. 21, 683–696 (doi:10.1111/j.1467-8659.2003.00232.x)

De Wet, T., Forrester, C., Korth, M., Patel, L. (2008). *Johannesburg Poverty and Livelihoods Study*. Research Report, Centre for Social Development in Africa, Johannesburg.

Denby, K.J. (2020). *Harnessing the benefits of African leafy vegetables for smallholder farmers and their households*. University of York. Available from: <https://gtr.ukri.org/projects?ref=BB%2FR020345%2F1> [Accessed 7 April 2020].

Drimie, S & Lakika, D. (2019). *“The food we eat here weakens us”: Food practices and health beliefs among congolese forced migrants in South Africa - A case study of Yeoville in Johannesburg*. Available from: <https://www.aifand.net/Volume19/No2/Lakika17135.pdf> [Accessed 16 March 2020].

Fact sheets - Minerals Council South Africa. (n.d.). Available from: <https://www.mineralscouncil.org.za/industry-news/publications/fact-sheets> [Accessed 7 June 2020].

Fader, M., Gerten, D., Krause, M., Lucht, W., Cramer, W. (2013). *Spatial decoupling of agricultural production and consumption: Quantifying dependences of countries on food imports due to domestic land and water constraints*. Environ. Res. Lett. 8 (1), 014046 (15pp).

FAO (n.d.). *Decentralized Development in Agriculture: An Overview*. EASYPol. Available from: http://www.fao.org/docs/up/easypol/342/decen_dev_in_agri_012en.pdf [Accessed 1 June 2020].

FAO. (1996). *Food and International Trade Technical Background Document*. Available from: <http://www.fao.org/docrep/003/w2612e/w2612e12.htm> [Accessed 31 May 2020].

Frearson, A. (2015). Spark’s model for Asian retirement community. Available from: <https://www.dezeen.com/2015/11/17/home-farm-spark-model-asian-retirement-housing-communities-city-farms/> [Accessed 4 September 2020].

- Galhena, D. H., Freed, R., & Maredia, K. M. (2013). Home gardens: A promising approach to enhance household food security and wellbeing. *Agriculture and Food Security*, 2(1), 8. <https://doi.org/10.1186/2048-7010-2-8>.
- Herforth, A., & S. Ahmed. (2015). "The food environment, its effects on dietary consumption, and potential for measurement within agriculture-nutrition interventions", *Food security*, pp. 505–520. Available from: <http://link.springer.com/10.1007/s12571-015-0455-8>. [Accessed 13 August 2020].
- Hunter-Adams, J. (2017). Exploring Perceptions of the Food Environment Amongst Congolese, Somalis and Zimbabweans Living in Cape Town. *Int Migr*, 55: 78-87. doi: [10.1111/imig.12274](https://doi.org/10.1111/imig.12274)
- Igumbor, E., et al. (2012). "“Big food”, the consumer food environment, health, and the policy response in South Africa", *PLoS Medicine*, 9(7): 1–7.
- Janse van Rensburg, W, Joubert, E, Mailula, N, Mashele, B, Motshepe, J, Ndenla, E, van den Heever, E, Venter, S, Vorster, I. (n.d.). African Vegetables research at ARC – Roodeplaat. Available from: <http://portal.geographie.uni-freiburg.de/forschungsprojekte/indigeno-veg/Institutions%20presentations/ARC%20Roodeplant.pdf>. [Accessed 6 June 2020].
- Liu, T, Yang, M, Han, Z & Ow, DW. 2016. Rooftop production of leafy vegetables can be profitable and less contaminated than farm-grown vegetables. *Agronomy for Sustainable Development*. 36(3):41. doi.org/10.1007/s13593-016-0378-6.
- Lal, R. 2020. Home gardening and urban agriculture for advancing food and nutritional security in response to the COVID-19 pandemic. *Food Security*. 12(4):871–876. doi.org/10.1007/s12571-020-01058-3.
- MacArthur, E. (2019). *Our food system is no longer fit for the 21st century. Here are three ways to fix it*. Available from: <https://www.weforum.org/agenda/2019/01/how-to-build-a-circular-economy-for-food/> [Accessed 17 February 2020].
- Maseko, I. & Mabhaudhi, T. & Tesfay, Samson & Araya, H.T. & Fessehazion, Melake & Du Plooy, Christian. (2017). *African Leafy Vegetables: A Review of Status, Production and Utilization in South Africa. Sustainability*. doi.org/10. 16. 10.3390/su10010016.
- Maundu, P., Ngugi, G. W. and Kabuye, C. H. S. (1999). *Traditional Food Plants of Kenya*, National Museum of Kenya, Nairobi, Kenya
- Merriam-Webster. (n.d.). *Self-sufficient*. In Merriam-Webster.com dictionary. Accessed from: <https://www.merriam-webster.com/dictionary/self-sufficient> [Accessed 31 May 2020].
- Minot, N & Rashid, S. (2010). *Are Staple Food Markets in Africa Efficient? Spatial Price Analyses and Beyond*. Michigan State University, Department of Agricultural, Food, and Resource Economics, Food Security Collaborative Working Papers.
- Nguyen, M. (2003). Comparison of food plant knowledge between urban Vietnamese living in Vietnam and in Hawaii. *Economic Botany*. 57(4): 47–80.
- Pelto, G & Pelto, P. (1983). Diet and Delocalization: Dietary Changes since 1750. *The Journal of interdisciplinary history*. 14:507–28. doi.org/10.2307/203719.
- Pickett, ST, Cadenasso, ML & McGrath, B Eds. (2013). *Resilience in ecology and urban design: linking theory and practice for sustainable cities*. (Future city no. v. 3). Dordrecht; New York: Springer, pp. 355-360.
- Philips, A. (2013). *Designing urban agriculture: a complete guide to the planning, design, construction, maintenance and management of edible landscapes*. Hoboken, New Jersey: John Wiley & Sons.
- Popkin B. M. (2001). The nutrition transition and obesity in the developing world. *J. Nutr*. 131, S871–S873 [PubMed]

Retief, C. (2019). *JOBURG DREAMS: Mashaba announces R20-billion investment to rebuild Joburg's inner city*. Available from: <https://www.dailymaverick.co.za/article/2019-04-25-mashaba-announces-r20-billion-investment-to-rebuild-joburgs-inner-city/> [Accessed 27 March 2020].

Rogerson, C. (1993). Urban Agriculture in South Africa: Scope, Issues and Potential. *Geo-Journal*, 30(1), 21-28. Available from: <http://www.jstor.org/stable/41145711> [Accessed 3 September 2020].

Sachs, I.; Silk, D. (1987). Introduction: urban agriculture and self-reliance. *Food and Nutrition Bulletin* 9 (2), 2-4

Satterthwaite, D., McGranahan, G., & Tacoli, C. (2010). Urbanization and its implications for food and farming. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, 365(1554), 2809–2820. <https://doi.org/10.1098/rstb.2010.0136>

Shackleton, CM, Pasquini, MW, Drescher, AW, Pasquini, MW & Drescher, AW. (2009). *African Indigenous Vegetables in Urban Agriculture*. Routledge. doi. [org/10.4324/9781849770019](https://doi.org/10.4324/9781849770019).

Smith, I & Eyzaguirre, P. (2007). *African leafy vegetables: their role in the world health organization's global fruit and vegetables initiative*. *African Journal of Food, Agriculture, Nutrition and Development* (ISSN: 1684-5358) Vol 7 Num 3. 7.

Sobal, J. (1999). *Social change and foodways*. In *Proceedings of the Cultural and Historical Aspects of Food Symposium*. Corvallis: Oregon State University.

Sobal, J. (1999). *Social Change and Foodways*. Available from: http://people.oregonstate.edu/~calvert/food-resource/ref/symposium_sobal.html [Accessed 7 September 2020].

Sodjinou, R., Agueh, V., Fayomi, B. & Delisle, H. (2009). 'Dietary patterns of urban adults in Benin: Relationship with overall diet quality and socio-demographic characteristics', *European Journal of Clinical Nutrition*, vol 63, pp222–228

Stowers, S. (2012). "Ecology of food and nutrition gastronomic nostalgia: Salvadoran immigrants: Cravings for their ideal meal", *Ecology of Food and Nutrition*, 51: 374–393.

UN DESA. (2018). *68% of the world population projected to live in urban areas by 2050, says UN*. Available from: <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html> [Accessed 26 February 2020].

US EPA, O. (2014). *What You Can Do to Reduce Heat Islands*. Available from: <https://www.epa.gov/heat-islands/what-you-can-do-reduce-heat-islands> [Accessed 6 June 2020].

Vorster, H. J. I., Jansen van Rensburg, W., van Zijl, J. J. B. and Venter, S. L. (2007). 'The importance of traditional leafy vegetables in South Africa', *African Journal of Food, Agriculture, Nutrition and Development*, vol 7, no 4, www.ajfand.net/Vol7No4.html

Vorster, H. J., Jansen van Rensburg, W. S., Van Zijl, J. J. B. and Venter, S. L. (2007a). *The importance of traditional leafy vegetables in South Africa*. *African Journal of Food, Agriculture, Nutrition and Development*, vol 7, no 4. Available from: www.ajfand.net/Vol7No4.html [Accessed 9 April 2020].

Webster, D. (2020). *Not all Joburg's street traders are trading*. Available from: <https://www.newframe.com/not-all-joburgs-street-traders-are-trading/> [Accessed 31 May 2020].

Wiese, B.M., Payanzo, N., et al. (2020). Democratic Republic of the Congo. Available from: <https://www.britannica.com/place/Democratic-Republic-of-the-Congo> [Accessed 10 August 2020].

World Food Summit. (1996). *Rome Declaration on World Food Security*.

World Wildlife Foundation. (n.d.). *Living Planet Report 2006*. Available from: https://www.panda.org/knowledge_hub/all_publications/living_planet_report_timeline/lpr_2006/ [Accessed 7 September 2020].

Yeung, Y.-M. (1987). Examples of urban agriculture in Asia. *Food and Nutrition Bulletin* 9 (2), 14-23.

Zaera, A & Pae, H Eds. (2017). *Imminent commons: urban questions for the near future: Seoul Biennale of Architecture and Urbanism 2017*. New York, NY: Actar Publishers.

Chapter 4

“Spatial Development Framework 2040.pdf”. (n.d.). Available from: <http://www.parkview.org.za/docs/townplanning/Johannesburg%20Spatial%20Development%20Framework%202040.pdf> [Accessed 19 March 2020].

Chapter 6

Achidi, AU, Ajayi, OA, Bokanga, M & Maziya-Dixon, B. (2005). The Use of Cassava Leaves as Food in Africa. *Ecology of Food and Nutrition*. 44(6):423–435. doi.org/10.1080/03670240500348771.

Brandy, K. (2020). *guallart architects proposes its “self-sufficient city” for a post-COVID era*. Available from: <https://www.designboom.com/architecture/guallart-architects-self-sufficient-city-housing-post-covid-08-11-2020/> [Accessed 14 September 2020].

Brown, L. K. & Mussell, K. (Eds.) (1984) *Ethnic and regional foodways in the United States: the performance of group identity*. Knoxville: University of Tennessee Press.

Dejtiar, F. (2020). *Vicente Guallart Wins Self-Sufficient City Competition for Post-Coronavirus China*. Available from: <https://www.archdaily.com/945679/vicente-guallart-wins-self-sufficient-city-competition-for-post-coronavirus-china> [Accessed 14 September 2020].

Francis, M., & Griffith, L. (2011). The Meaning and Design of Farmers’ Markets as Public Space: An Issue-Based Case Study. *Landscape Journal*, 30(2), 261-279. Available from: <http://www.jstor.org/stable/43324378> [Accessed 14 September 2020].

Markham, B. L. (2010). *Mini Farming: Self-Sufficiency on 1/4 Acre*. New York: Skyhorse Publishing.

Philips, A. (2013). *Designing urban agriculture: a complete guide to the planning, design, construction, maintenance and management of edible landscapes*. Hoboken, New Jersey: John Wiley & Sons.

Chapter 7

AECOM Cost Property and Construction Guide for 2019/20 - Association of South African Quantity Surveyors (ASAQS). (n.d.). Available from: <https://www.asaqs.co.za/news/463197/AECOM-Cost-Property-and-Construction-Guide-for-201920.htm> [Accessed 11 June 2020].

Building Regulations South Africa - An Introduction. (n.d.). Available from: <https://www.sans10400.co.za/> [Accessed 12 June 2020].

Fact sheets - Minerals Council South Africa. (n.d.). Available from: <https://www.mineralscouncil.org.za/industry-news/publications/fact-sheets> [Accessed 7 June 2020].

Guideline - Professional Fees - South African Council for the Architectural Profession. (n.d.). Available from: <https://www.sacapsa.com/page/ProfFees> [Accessed 12 June 2020]. – Board Notice 122 of 2015

Town Planning Schemes. (n.d.). Available from: <https://eservices.joburg.org.za/sites/cgis-maps/Pages/Town-Planning-Schemes.aspx> [Accessed 12 June 2020]. – City of Johannesburg Town Planning Scheme 2018

Chapter 8

Journal Officiel de la Republic du Congo. (1963). Available from: https://en.wikipedia.org/w/index.php?title=Coat_of_arms_of_the_Republic_of_the_Congo&oldid=961906520 [Accessed 13 September 2020].

Kah, H.K. (2016). The Laimbwe Ih'neem Ritual/Ceremony, Food Crisis, and Sustainability in Cameroon. *Journal of Global Initiatives: Policy, Pedagogy, Perspective*, 10, 5.

Mushita, A., & Thompson, C. (2013). At issue: More ominous than climate change? Global policy threats to African food production. *African Studies Quarterly*, 13(4), 1-25

Obosu-Mensah, K. (2002). Changes in official attitudes towards urban agriculture in Accra. *African Study Quarterly*, 6(3), 19-32.

Philips, A. (2013). *Designing urban agriculture: a complete guide to the planning, design, construction, maintenance and management of edible landscapes*. Hoboken, New Jersey: John Wiley & Sons.

“Traditional African masks”. (2020). In: Wikipedia. Available from: https://en.wikipedia.org/w/index.php?title=Traditional_African_masks&oldid=977389209 [Accessed 13 September 2020].

Chapter 13: List of Figures

Front Cover

City of Johannesburg Image: *Johannesburg for Tourists*. (n.d.). Available from: <https://www.southafrica.to/provinces/Gauteng/towns/Johannesburg/Johannesburg.php> [Accessed 18 September 2020].

Bokoko, P. (2017). Collage of DRC [photographs].

Declaration & Acknowledgements

Bokoko, P. (2017). Chutes de Zongo, Seli Safari Resort, DRC - Panorama [photograph].

Abstract

Bokoko, P. (2017). Chutes de Zongo, Seli Safari Resort, DRC - Rainbow [photograph].

Contents

Bokoko, P. (2017). Chutes de Zongo, Seli Safari Resort, DRC - Waterfall [photograph].

Contents

Bokoko, P. (2020). Main components of the Research [diagram].

Chapter 1

fig 1. United Nations. (2011). Map of Democratic Republic of the Congo. No. 4007 Rev. 10. Available from: un.org/Depts/Cartographic/map/profile/drcongo.pdf [Accessed 19 September 2020].

fig 2. Flahaux, M.-L., & Schoemaker, B. (2016). Democratic Republic of the Congo: A migration history marked by crises and restrictions. Migration Information Source: Online Journal of the Migration Policy Institute. Available from: <https://www.migrationpolicy.org/print/15616#.XZUB5S2ZPs0>. [Accessed: 16 March 2020].

Bokoko, P. (2017). Ndjili International Airport - Kinshasa, DRC [photograph].

Chapter 2

fig 1. : Dessein, J., Soini, K., Birkeland, I., Fairclough, G., Horlings, L., De Beukelaer, C., Matejic, J., Stylianou-Lambert, T., Mihaila, M., Spinozzi, P., Cicerchia, A., Johannisson, J., Kangas, A., Lapka, M., Dragicevic Sesic, M., Siivonen, K., Skjerven, A., Plebanczyk, K., Tomka, G., Reimer, M. (2015). *Culture in, for and as Sustainable Development*. Conclusions of COST Action IS 1007 Investigating Cultural Sustainability. doi.org/10.13140/RG.2.1.3380.7844.

fig 2. Google Earth. (2020). Site map of the Shree Radhe Shyam Mandir in Marlboro Gardens, Sandton. Available from: https://earth.google.com/web/@-26.09337528,28.09502469,1568.20770455a,394.54833371d,35y,0.00109997h,0t,0r?utm_source=earth7&utm_campaign=vine&hl=en [Accessed 7 September 2020].

fig 3. Daya, J.M. (2016). *Samaj belonging in the in-between: reviving the greater Transvaal Gujarati Hindu community in Johannesburg*. Thesis. Available from: <http://wiredspace.wits.ac.za/handle/10539/24070> [Accessed 10 August 2020].

fig 4. Daya, J.M. (2016). *Samaj belonging in the in-between: reviving the greater Transvaal Gujarati Hindu community in Johannesburg*. Thesis. Available from: <http://wiredspace.wits.ac.za/handle/10539/24070> [Accessed 10 August 2020].

fig 5. Sobal, J. (1999). *Social change and foodways*. In Proceedings of the Cultural and Historical Aspects of Food Symposium. Corvallis: Oregon State University.

fig 6. Bokoko, P. (2020). Table of author's sustainable response to the developmental perspective on Food culture [table].

Chapter 3

fig 1. McNamara, T. (2018). SAGE – Urban Farm-Fed Cities: Lessons from Cuba's Organopónicos. Available from: <https://sagemagazine.org/urban-farm-fed-cities-lessons-from-cubas-organoponicos/> [Accessed 7 September 2020].

fig 2. Bokoko, P. (2020). JFF Rooftop Farm, Braamfontein [photograph]

fig 3. Bokoko, P. (2020). JFF Rooftop Farm, Braamfontein [photograph]

fig 4. Bokoko, P. (2020). JFF Rooftop Farm - Spinach pot plants [photograph]

fig 5. Clapp, J. (2017). *Food self-sufficiency: Making sense of it, and when it makes sense*. Food Policy. 66:88–96. doi.org/10.1016/j.foodpol.2016.12.001.

fig 6. Bokoko, P. (2020). Informal trader on Abel Street, Berea selling spinach, 'lebu' and 'tunga' green leafy vegetables [photograph]

fig 7, 8, 9. Frearson, A. (2015). Spark's model for Asian retirement community. Available from: <https://www.dezeen.com/2015/11/17/home-farm-spark-model-asian-retirement-housing-communities-city-farms/> [Accessed 4 September 2020].

fig 10, 11. "THE SCIENCE BARGE". (2014). Available from: <https://agriculturaurbana.com/2014/01/03/the-science-barge/> [Accessed 7 September 2020].

fig 12. Bokoko, P. (2020). Site diagram of the Science Barge [diagram].

fig 13. Bokoko, p. (2020). Table of commonly consumed ALVs in my household [table].

Banerjee, N. 2018. 16 Health Benefits of Amaranth Leaves That You Must Know? Available from: <https://pharomeasy.in/blog/16-health-benefits-and-nutritional-value-of-amaranth-leaves/> [Accessed 7 September 2020].

Binu, S. (2018). *Bring home Roselle leaves for its amazing health benefits*. Available from: <https://www.netmeds.com/health-library/post/bring-home-roselle-leaves-for-its-amazing-health-benefits> [Accessed 7 September 2020].

Growing Sweet Potatoes Vertically: Planting Sweet Potatoes On A Trellis. (n.d.) Available from: <https://www.gardeningknowhow.com/edible/vegetables/sweet-potato/growing-sweet-potatoes-vertically.htm> [Accessed 14 August 2020].

How to Grow Amaranth | Guide to Growing Amaranth. (n.d.). Available from: <http://www.heirloom-organics.com/guide/va/guidetogrowingamaranth.html> [Accessed 7 September 2020].

"How to Grow Amaranth for Greens". (2014). Available from: <https://www.hobby-farms.com/how-to-grow-amaranth-for-greens-2/> [Accessed 7 September 2020].

Li, R. (2018). Structure-guided and natural product-derived small molecules as antibiotic and anticancer agents. *Journal of Regenerative Medicine*, 07, p.38. doi.org/10.4172/2325-9620-C3-013.

Roselle. (n.d.). Available from: <https://www.echocommunity.org/resources/4155c-cc7-37ae-4857-9da9-9372e1d2d633> [Accessed 7 August 2020].

Howeler, RH, Litaladio, N & Thomas, G. (2013). *Save and grow: cassava: a guide to sustainable production intensification*. Rome: Food and Agriculture Organization of the United Nations.

Bokoko, P. (2017). Collage strip of Congolese meals [photographs].

Chapter 4

Bokoko, P. (2020). Cover Page [photograph].

fig 1. Bokoko, P. (2020). Highly visible location of proposed Community Centre [photograph].

fig 2. Bokoko, P. (2020). Map 1 - Context Map [map].

fig 3. Yeoville Property Trends : Property24.com. (n.d.). Available from: <https://www.property24.com/johannesburg/yeoville/property-trends/5932> [Accessed 17 September 2020].

fig 4. Berea Property Trends : Property24.com. n.d. Available from: <https://www.property24.com/johannesburg/berea/property-trends/5920> [Accessed 17 September 2020].

fig 5. Bokoko, P. (2020). Cultural Timeline of Yeoville [diagram].

fig 6. Bokoko, P. (2020). Map 2 - Zoning Map of Yeoville & Berea [map].

fig 7. Bokoko, P. (2020). Map 3 - Johannesburg Inner City transport network [map]

fig 8. Bokoko, P. (2020). Map 4 - Map of Accessibility [map].

fig 9. Bokoko, P. (2020). Map 5 - Public Green Network [map].

fig 10. Bokoko, P. (2020). Map 6 - Fresh Produce Demand [map].

fig 11. Bokoko, P. (2020). Map 7 - Urban Agriculture and agricultural education supply [map].

fig 12. Bokoko, P. (2020). Map 8 - Congolese Presence in Johannesburg & Pretoria [map].

fig 13. Bokoko, P. (2020). Map 9 - Demographics [map]

Wazimap profile: Ward 64 (79800064), City of Johannesburg, Gauteng. (n.d.). Available from: <https://wazimap.co.za/profiles/ward-79800064-city-of-johannesburg-ward-64-79800064/> [Accessed 5 March 2020 a].

Wazimap profile: Ward 67 (79800067), City of Johannesburg, Gauteng. (n.d.). Available from: <https://wazimap.co.za/profiles/ward-79800067-city-of-johannesburg-ward-67-79800067/> [Accessed 18 March 2020 b].

fig 14. Bokoko, P. (2020). Small farm located in Berea Park [photograph]

fig 15. Bokoko, P. (2020). Map 10 - Map of Connectivity for Urban Agriculture [map]

fig 16. Bokoko, P. (2020). Views of Site [photographs]

fig 17. Bokoko, P. (2020). Map 11 - Map of Underutilised spaces [map]

fig 18. Bokoko, P. (2020). Map 12 - Site selection summary map [map].

fig 19. Bokoko, P. (2020). Table of Key of Site Selection summary [table]

Migrant Communities Source

Wazimap profile: City of Johannesburg, Gauteng. n.d. Available from: <https://wazimap.co.za/profiles/municipality-JHB-city-of-johannesburg/> [Accessed 9 November 2020].

fig 20. Bokoko, P. (2020). Panorama across Joe Slovo Drive & Old Harrow Street [photograph].

fig 21. Bokoko, P. (2020). Section of Site across Joe Slovo Drive & Old Harrow Street before proposed Community Centre [diagram].

Chapter 5

fig 1. Jun, H. S. (n.d.). Galleria-in-Gwanggyo-by-OMA-00 [Online image]. Aasarchitecte. <https://aasarchitecture.com/2020/03/galleria-in-gwanggyo-by-oma.html/galleria-in-gwanggyo-by-oma-11/>.

fig 2. Jun, H. S. (n.d.). Galleria-in-Gwanggyo-by-OMA-03 [Online image]. Aasarchitecte. <https://aasarchitecture.com/2020/03/galleria-in-gwanggyo-by-oma.html/galleria-in-gwanggyo-by-oma-11/>.

fig 3. Jun, H. S. (n.d.). Galleria-in-Gwanggyo-by-OMA-04 [Online image]. Aasarchitecte. <https://aasarchitecture.com/2020/03/galleria-in-gwanggyo-by-oma.html/galleria-in-gwanggyo-by-oma-11/>.

fig 4. Jun, H. S. (n.d.). Galleria-in-Gwanggyo-by-OMA-05 [Online image]. Aasarchitecte. <https://aasarchitecture.com/2020/03/galleria-in-gwanggyo-by-oma.html/galleria-in-gwanggyo-by-oma-11/>.

fig 5. Galleria-in-Gwanggyo-by-OMA-11 – aasarchitecture. (n.d.). Available from: <https://aasarchitecture.com/2020/03/galleria-in-gwanggyo-by-oma.html/galleria-in-gwanggyo-by-oma-11/> [Accessed 11 February 2021].

fig 6. Bokoko, P. (2020). Sketch analysis of Vertical Farm [diagram]

fig 7, 8, 9. ilimelgo's vertical farm introduces urban agriculture in grand paris. (2016). Available from: <https://www.designboom.com/architecture/ilimelgo-architects-vertical-farm-grand-paris-03-22-2016/> [Accessed 23 May 2020].

fig 10, 11, 12. ABF lab guides food farm tower in romainville, france towards the sun. (2016). Available from: <https://www.designboom.com/architecture/abf-lab-food-farm-tower-france-02-17-2016/> [Accessed 22 May 2020].

fig 13,14. "City rooftops: the next frontier for farming". (2019). Available from: <https://www.farmersweekly.co.za/agri-technology/farming-for-tomorrow/joburg-rooftops-the-next-frontier-for-farming/> [Accessed 23 May 2020].

fig 15. "Projects". (n.d.). Available from: <https://futurefarmssa.co.za/projects/> [Accessed 23 May 2020].

fig 16. "Urban Agriculture Initiative". (n.d.). Available from: <https://www.jicp.org.za/urban-agriculture-initiative/> [Accessed 18 February 2020].

fig 17, 19. "Projects". (n.d.). Available from: <https://futurefarmssa.co.za/projects/> [Accessed 23 May 2020].

fig 18. Bokoko, P. (2020). Spinach pot plant [photograph].

fig 20. Bokoko, P. (2020). JFF Rooftop Farm, Braamfontein [photograph].

fig 21. Bokoko, P. (2020). JFF Rooftop Farm entrance [photograph].

fig 22. Bokoko, P. (2020). Site plan analysis [diagram].

fig 23. Bokoko, P. (2020). Threshold and Views analysis [diagram].

fig 24. Bokoko, P. (2020). Views into the Outreach Foundation Centre [diagram].

fig 25. Bokoko, P. (2020). Entrance to public space analysis [diagram].

fig 26. Bokoko, P. (2020). Immediate context analysis [diagram].

fig 27. Bokoko, P. (2020). Views over public space analysis [diagram].

fig 28. Bokoko, P. (2020). Ground floor plan analysis [diagram].

fig 29. Bokoko, P. (2020). Street section analysis [diagram].

fig 30. Bokoko, P. (2020). External threshold condition of the Yeoville Recreation Centre [photograph]

fig 31. Bokoko, P. (2020). External threshold condition of the Yeoville Recreation Centre [photograph]

fig 32. Bokoko, P. (2020). Context and Massing analysis [diagram]

fig 33. Bokoko, P. (2020). Ground floor and massing analysis [diagram]

fig 34. Bokoko, P. (2020). First floor and massing analysis [diagram]

fig 35. Bokoko, P. (2020). Elevation Sketch [diagram]

fig 36. Bokoko, P. (2020). Section Sketch [diagram]

fig 37. Bokoko, P. (2020). Southwest Corner Sketch [diagram]

Chapter 6

fig 1. Bokoko, P. (2020). Programme Hierarchy Diagram [diagram]

fig 2, 3. ArchDaily. (2020). *Vicente Guallart Wins Self-Sufficient City Competition for Post-Coronavirus China*. Available from: <https://www.archdaily.com/945679/vicente-guallart-wins-self-sufficient-city-competition-for-post-coronavirus-china> [Accessed 14 September 2020].

fig 4. Achidi, AU, Ajayi, OA, Bokanga, M & Maziya-Dixon, B. (2005). The Use of Cassava Leaves as Food in Africa. *Ecology of Food and Nutrition*. 44(6):423–435. doi.org/10.1080/03670240500348771.

fig 5. Bokoko, P. (2020). Food preparation in my household [photographs]

fig 6. Bokoko, P. (2020). Yeoville Market on Raleigh Street [photograph]

fig 7. Bokoko, P. (2020). Spinach being sold out of a bakkie on Raleigh street, Yeoville [photograph]

fig 8. Bokoko, P. (2020). Street vendors along Abel Road, Berea [photograph]

fig 9. Bokoko, P. (2020). Fresh produce street trader on Abel Road, Berea [photograph]

fig 10. Bokoko, P. (2020). African Corner Restaurant on Kenmere Road in Yeoville [photograph]

fig 11. Bokoko, P. (2020). African Cuisine Kitchen in Berea, Johannesburg [photograph]

fig 12. Bokoko, P. (2020). African Cuisine Kitchen Menu in Berea, Johannesburg [photograph]

fig 13. Bokoko, P. (2020). Ways in which the user engages with food [diagram]

fig 14. Bokoko, P. (2020). A holistic user experience [diagram]

fig 15. Bokoko, P. (2020). User Activity Table [table]

fig 16. Bokoko, P. (2020). Accommodation Schedule for proposed community centre [table]

Chapter 7

fig 1. Bokoko, P. (2020). Client Organisation Structure [diagram]

fig 2. Bokoko, P. (2020). Town Planning Information [table]
Town Planning Schemes. (n.d.). Available from: <https://eservices.joburg.org.za/sites/cgismaps/Pages/Town-Planning-Schemes.aspx> [Accessed 12 June 2020].

Appendix A

Fact sheets - Minerals Council South Africa. (n.d.). Available from: <https://www.mineralscouncil.org.za/industry-news/publications/fact-sheets> [Accessed 7 June 2020].

Appendix B

Property Search. (n.d.). Available from: <https://csg.esri-southafrica.com/portal/apps/webappviewer/index.html?id=34ec3dcf8d8642bb9ed7f795cbfe8faf> [Accessed 20 March 2020].

Appendix C, D

Town Planning Schemes. (n.d.). Available from: <https://eservices.joburg.org.za/sites/cgismaps/Pages/Town-Planning-Schemes.aspx> [Accessed 12 June 2020].

AECOM Cost Property and Construction Guide for 2019/20 - Association of South African Quantity Surveyors (ASAQS). (n.d.). Available from: <https://www.asaqs.co.za/news/463197/AECOM-Cost-Property-and-Construction-Guide-for-201920.htm> [Accessed 11 June 2020].

Appendix E

Bokoko, P. (2020). The Professional Team [table]

fig 3. Bokoko, P. (2020). Implementation Organisation Structure [diagram]

SANS 10400 Part A, SANS 10400 XA, SANS 204

Building Regulations South Africa - An Introduction. (n.d.). Available from: <https://www.sans10400.co.za/> [Accessed 12 June 2020].

Board Notice 122 of 2015

Guideline - Professional Fees - South African Council for the Architectural Profession. (n.d.). Available from: <https://www.sacapsa.com/page/ProfFees> [Accessed 12 June 2020].

Chapter 8

fig 1. Bokoko, P. (2020). Site Diagram [diagram]

fig 2. Bokoko, P. (2020). Site Considerations [diagram]

fig 3. Bokoko, P. (2020). View of site as one drives along Joe Slovo Drive [photograph]

fig 4. Bokoko, P. (2020). View of trees around perimeter of site on corner of Harley Street and Old Harrow Road [photograph]

fig 5. Bokoko, P. (2020). View of site from Berea Park entrance [photograph]

fig 6. Bokoko, P. (2020). View towards adjacent buildings of site [photograph]

fig 7. Bokoko, P. (2020). Layering of floors to create cut-outs and cantilevers [photograph]

fig 8. Bokoko, P. (2020). Change of slope on 4,8 meters across site allows for certain building functions to be located at semi-basement level [photograph]

fig 9. Bokoko, P. (2020). Cantilevers allow for possible layering of public space from the outside to inside as analysed in the Yeoville Recreation Centre precedent in Chapter 5. Cut-outs allow for north light to penetrate possible deep building spaces [photograph]

fig 10. Bokoko, P. (2020). Massing model exploring a way to keep the trees which border the site and treatment of the south corner on Hendon Street [photograph]

fig 11. Bokoko, P. (2020). Slanted wall feature using a triangulated facade that can frame the trees in an interesting way [photograph]

fig 12. Bokoko, P. (2020). Form of auditorium space used to frame possible entry to building [photograph]

fig 13. Bokoko, P. (2020). Life cycle of the urban food system [diagram]

Philips, A. (2013). *Designing urban agriculture: a complete guide to the planning, design, construction, maintenance and management of edible landscapes*. Hoboken, New Jersey: John Wiley & Sons.

fig 14. Bokoko, P. (2020). Views of massing [diagram]

fig 15. Bokoko, P. (2020). View approaching Upper ground floor from Harley Street [diagram]

fig 16. Bokoko, P. (2020). Floor plan diagrams [diagram]

fig 17. Bokoko, P. (2020). West elevation diagram [diagram]

fig 18 a - c. Bokoko, P. (2020). Section Diagrams [diagram]

fig 19. Bokoko, P. (2020). Rainwater harvesting diagram [diagram]

fig 20. Bokoko, P. (2020). Sun Diagram [diagram]

fig 21. Bokoko, P. (2020). Section diagram [diagram]

fig 22. Bokoko, P. (2020). Ground plan diagram [diagram]

fig 23. Bokoko, P. (2020). Roof Exploration [diagram]

fig 24. Bokoko, P. (2020). Section diagram [diagram]

fig 25. Bokoko, P. (2020). Upper Ground plan diagram diagram [diagram]

fig 26. Bokoko, P. (2020). Concept model, view 1 [picture]

fig 27. Bokoko, P. (2020). Section Diagrams [diagram]

fig 28. Bokoko, P. (2020). Concept model, view 2 [photograph]

fig 29. Bokoko, P. (2020). Plan diagrams [diagram]

fig 30. Bokoko, P. (2020). Plan Diagram [diagram]

fig 31. Bokoko, P. (2020). Section diagram 1 [diagram]

fig 32. Bokoko, P. (2020). Section diagram 2 [diagram]

fig 33. Bokoko, P. (2020). Conceptual thematic diagram of the crown [diagram]

fig 34. *Journal Officiel de la Republic du Congo*. (1963). Available from: https://en.wikipedia.org/w/index.php?title=Coat_of_arms_of_the_Republic_of_the_Congo&oldid=961906520 [Accessed 13 September 2020].

fig 35a. Bokoko, P. (2020). Building form, roof form and African leafy vegetables anatomy [diagram]

fig 35b. Bokoko, P. (2020). Geometric and symmetric form of proposed community centre [diagram]

fig 36. Bokoko, P. (2017). Collage of traditional African masks and statues from author's trip to DRC [photographs]

fig 37. Bokoko, P. (2020). Design Development Summary Table [diagram]

fig 38. Bokoko, P. (2020). Proposal 2, version 1, view 1 [model]

fig 39. Bokoko, P. (2020). Proposal 2, version 1, view 2 [model]

fig 40. Bokoko, P. (2020). Proposal 2, version 1 , view 3 [model]

fig 41. Bokoko, P. (2020). Proposal 2, version 2, view 1 [model]

fig 42. Bokoko, P. (2020). Proposal 2, version 2, view 2 [model]

Chapter 9

fig 1. Bokoko, P. (2020). Oasia Hotel, Singapore plant growth case study [diagram]

fig 2. Bokoko, P. (2020). Perimeter section exploration through hydroponic system [diagram]

fig 3. Bokoko, P. (2020). *Perimeter section exploration through intensive farming using planters* [diagram]

fig 4. Bokoko, P. (2020). North elevation sketch of food system [diagram]

fig 5. Bokoko, P. (2020). Perimeter section sketch through food system [diagram]

fig 6. Bokoko, P. (2020). Section diagram exploring various rainwater collection options and food growth possibilities for Proposal 2, version 2 in figure 41 & 42 [diagram]

fig 7. Bokoko, P. (2020). Initial conceptual massing of crown roof [model]

fig 8. Bokoko, P. (2020). Crown roof massing exploration [model]

Chapter 10

fig 1. Bokoko, P. (2020). Site Plan [diagram]

fig 2. Bokoko, P. (2020). Context Ground Floor Plan [diagram]

fig 3. Bokoko, P. (2020). *Ground Floor Plan* [diagram]

fig 4.1. Bokoko, P. (2020). Upper Ground Floor solid-void diagram [diagram]

fig 4.2. Bokoko, P. (2020). Upper Ground Floor Plan [diagram]

fig 5.1. Bokoko, P. (2020). First Floor solid-void diagram [diagram]

fig 5.2. Bokoko, P. (2020). First Floor Plan [diagram]

fig 6.1. Bokoko, P. (2020). Second Floor solid-void diagram [diagram]

fig 6.2. Bokoko, P. (2020). Second Floor Plan [diagram]

fig 7. Bokoko, P. (2020). Programme & Circulation [diagram]

fig 8. Bokoko, P. (2020). Roof Plan [diagram]

fig 9. Bokoko, P. (2020). Ground Floor Plan [diagram]

fig 10. Bokoko, P. (2020). Exploded Structural Axonometric [diagram]

fig 11. Bokoko, P. (2020). Photo-voltaic Design Considerations Table [table]

fig 12. Bokoko, P. (2020). Graph comparing average annual energy supply to average system size [graph]

fig 13. Bokoko, P. (2020). Bird's eye view of roof-scape of Community Centre [diagram]

fig 14. Bokoko, P. (2020). Render of west elevation from Joe Slovo Drive [diagram]

- fig 15.* Bokoko, P. (2020). West Elevation [diagram]
- fig 16.* Bokoko, P. (2020). Render of south and west elevation from the corner of Joe Slovo Drive and Hendon Street [diagram]
- fig 17.* Bokoko, P. (2020). South Elevation [diagram]
- fig 18.* Bokoko, P. (2020). North Elevation[diagram]
- fig 19.* Bokoko, P. (2020). East Elevation [diagram]
- fig 20.* Bokoko, P. (2020). Section A-A [diagram]
- fig 21.* Bokoko, P. (2020). Section B-B [diagram]
- fig 22.* Bokoko, P. (2020). Section C-C [diagram]
- fig 23.* Bokoko, P. (2020). Section D-D [diagram]
- fig 24.1.* Bokoko, P. (2020). Perimeter Section [diagram]
- fig 24.2.* Bokoko, P. (2020). Perimeter Section [diagram]
- fig 25.* Bokoko, P. (2020). Detail 1 [diagram]
- fig 26.* Bokoko, P. (2020). Detail 2 [diagram]
- fig 27.* Bokoko, P. (2020). Detail 3 [diagram]
- fig 28.* Bokoko, P. (2020). Farming considerations of selected African leafy vegetables [table]
- fig 29.* Bokoko, P. (2020). Sustainability Axonometric [diagram]
- fig 30.* Bokoko, P. (2020). Render of plant screen on west elevation [diagram]
- fig 31.* Bokoko, P. (2020). Sustainability Section [diagram]
- fig 32.* Google Maps. (2017). Johannesburg, Gauteng, South Africa. Available from: <https://goo.gl/maps/1sw4v8G4HDJxtG3s7> [Accessed 16 November 2020].
- fig 33.* Bokoko, P. (2020). Street corner after intervention [diagram]
- fig 34.* Bokoko, P. (2020). Cold south corner [diagram]
- fig 35.* Bokoko, P. (2020). Vibrant south corner [diagram]
- fig 36.* Bokoko, P. (2020). Community Centre north corner view from Joe Slovo Drive [diagram]
- fig 37.* Bokoko, P. (2020). Building programme process [diagram]
- fig 38.* Bokoko, P. (2020). Traditional farming in the Courtyard [diagram]
- fig 39.* Bokoko, P. (2020). Intensive farming on the first floor balcony [diagram]
- fig 40.* Bokoko, P. (2020). Greenhouse and indoor farming on the first floor [diagram]
- fig 41.* Bokoko, P. (2020). Indoor hydroponic farming on the second floor [diagram]
- fig 42.* Bokoko, P. (2020). Rooftop farming on the second floor [diagram]
- fig 43.* Bokoko, P. (2020). Food preparation room on first floor [diagram]
- fig 44.* Bokoko, P. (2020). Green Leaf Market on ground floor [diagram]
- fig 45.* Bokoko, P. (2020). Multipurpose Hall on the first floor [diagram]



THE URBAN AGRICULTURE INITIATIVE

Fact sheet



Minerals Council's rooftop garden

HELPING PROVIDE INNOVATIVE FOOD SECURITY AND EMPLOYMENT SOLUTIONS

The Urban Agriculture Initiative aims to create an urban agricultural ecosystem by repurposing disused rooftops and making use of hydroponics and aquaponics to produce agricultural produce for Johannesburg's inner-city communities.



The initiative was established by the Johannesburg Inner City Partnership, in which the Minerals Council South Africa (Minerals Council) is a key stakeholder. The Minerals Council has participated in and funded a pilot project to assess the feasibility of growing herbs and vegetables on the rooftops of inner-city buildings including the Minerals Council itself. The first crop was planted on the rooftop of the Minerals Council building for the benefit of an agripreneur. Many successful basil crops have already been harvested and sold to the Johannesburg Fresh Produce Market and surrounding cafes and coffee shops.

Johannesburg is one of many cities in the world turning to inner-city farming with the objective of addressing high unemployment and food insecurity while regenerating neighbourhoods.

The Minerals Council had hoped the project would extend beyond rooftops to sidewalks and even to other under-utilised spaces for the benefit of the people of Johannesburg's inner city and beyond, which it has. New projects are being implemented in Tswane.

MINERALS COUNCIL SOUTH AFRICA URBAN AGRICULTURE INITIATIVE

QUICK FACTS

WHO AND WHEN

Participants in the Urban Agriculture Initiative include the Minerals Council, the Johannesburg Inner City Partnership, the Wouldn't It Be Cool (WIBC) Incubation and mentorship organisation, FNB, Africa Housing Company (AFHCO), University of Johannesburg, Stay City, Thebe Investment Corporation, BothaRoodt Fresh Produce Agency, and green business support organisation Sophiatown BizCre8.

The Minerals Council hosted the launch of the Urban Agriculture Initiative on 11 October 2017.



“The Minerals Council hopes the project will extend beyond rooftops to sidewalks and even to other under-utilised spaces for the benefit of the people of Johannesburg’s inner-city and beyond.”



THE ROOFTOP GARDENS OF JOHANNESBURG

Kagiso Seleka is an agriprenuer who is currently running the rooftop garden on the Minerals Council building in Johannesburg’s inner city. Kagiso had some farming experience when the WIBC initiative identified and trained him as one of its first rooftop farmers.

Kagiso has since produced some 15kg of basil, lettuce and lemon balm and has orders for at least six months. His hydroponic farming method does not require soil – a practice dating back to the time of the Hanging Gardens of Babylon in 600BC. His basil grows in just 21 days as hydroponic plants mature much faster than crops in other mediums. Ntlanhla plans to increase his range of crops to include spinach and carrots.

GROWING THE PROJECT

The success of the Minerals Council’s pilot project has led the Department of Small Business Development (DSBD) to fund the start-up costs of another 24 projects in the inner city of Johannesburg – helping to provide sustainable employment to 24 farmers. The DSBD will review the entire project in 2019 with a view to increasing available funds.

Property owners in the city have made 60 buildings available for these rooftop farms. The Minerals Council intends to give farmers an additional 400m² on its 93-year old heritage building.

HYDROPONICS AND AQUAPONICS – THE ADVANTAGES

- Crops are grown in special water solutions without the need for soil or large open spaces
- A very small area is required to produce a sustainable crop
- Water consumption is significantly reduced as 95% is circulated and reused
- Production can be increased 100 times per square metre by extending the gardens upward
- Soil erosion is eliminated
- Hydroponic plants mature much faster than crops in other mediums

CONTACT DETAILS

MINERALS COUNCIL SOUTH AFRICA

T +27 11 498 7100
E info@mineralscouncil.org.za

MEDIA

T +27 11 880 3924
E mineralscouncil@rasc.co.za

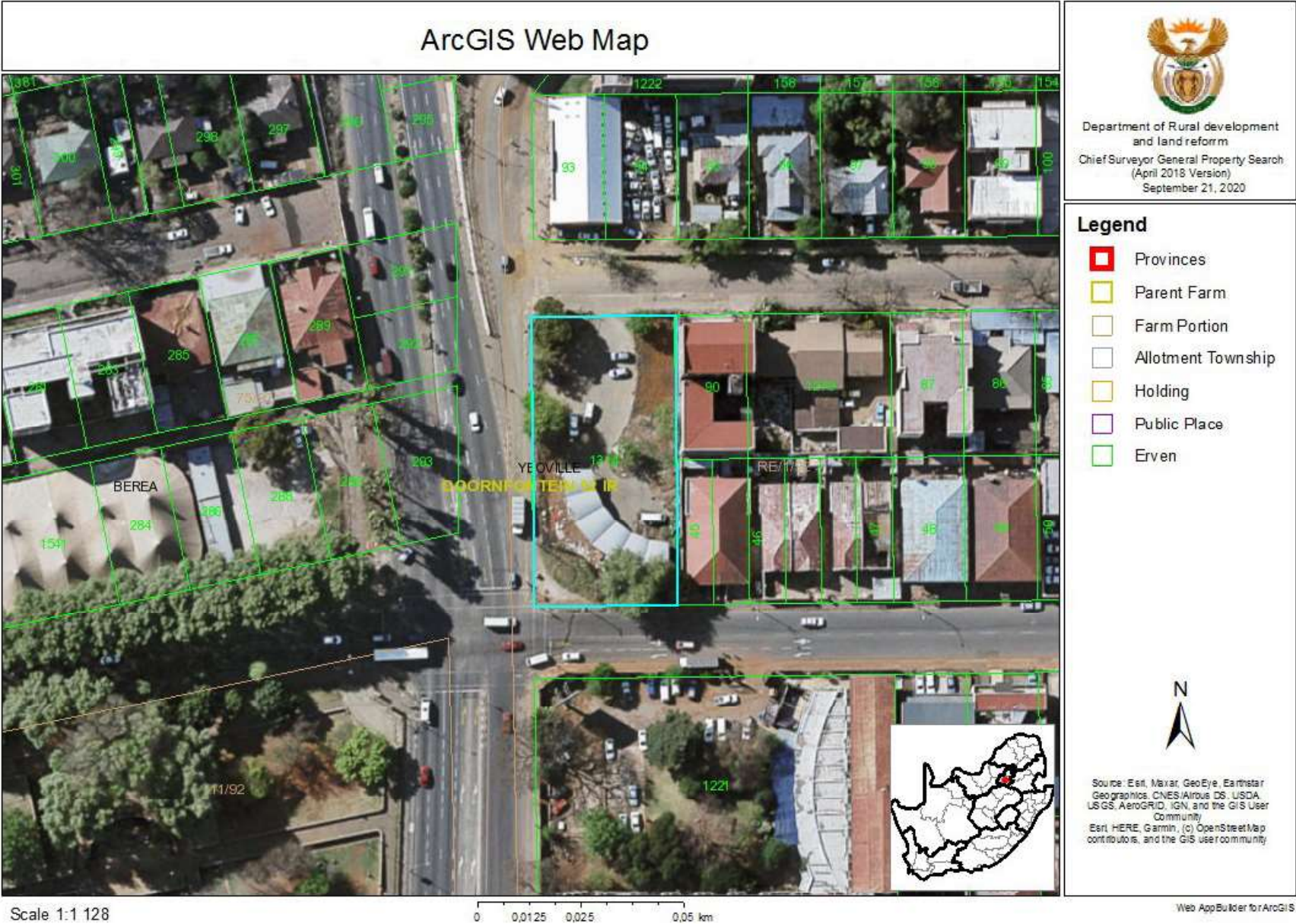
@Mine_RSA

www.facebook.com/Mine

5 Holland Street, Johannesburg 2001
PO Box 61809, Marshalltown 2107

www.mineralscouncil.org.za

Appendix B - Locality Plan



Appendix C - Table 2

ZONE	(1) USE ZONE	(2) NOTATION	(3) PRIMARY LAND USE RIGHTS	(4) SECONDARY LAND USE RIGHTS	(5) PROHIBITED LAND USES
1	RESIDENTIAL 1		Dwelling house	Religious purposes, place of instruction, child care centre, social halls, institutions, residential buildings (excluding hotels), special buildings, sport and recreation clubs, public or private parking areas, medical consulting rooms, tavern/shebeen, guest house.	Uses not in columns (3) and (4)
2	RESIDENTIAL 2		Dwelling units	Residential buildings, religious purposes, places of instruction, child care centre, social halls, institutions, special buildings, sport and recreation clubs, public or private parking areas, medical consulting rooms, guest house, tavern/shebeen	Uses not in columns (3) and (4)
3	RESIDENTIAL 3		Dwelling units, residential buildings	Religious purposes, places of instruction, child care centre, social halls, institutions, special buildings, sport and recreation clubs, public or private parking areas, medical consulting rooms, guest house, tavern/shebeen	Uses not in columns (3) and (4)
4	RESIDENTIAL 4		Dwelling units, residential buildings	Religious purposes, places of instruction, child care centre, social halls, institutions, special buildings, sport and recreation clubs, public or private parking areas, medical consulting rooms, guest house, tavern/shebeen	Uses not in columns (3) and (4)

Appendix D - Table 4

(1) Height Zone	(2) Number of storeys	(3)							
		Johannesburg	Sandton	Rodepoort	Randburg	Lenasia	Modderfontein	Walkerville	Edenvale
A	3	0	0	0	0	0	0	0	3
		6	2	4	3	1	1	1	4
		7	3	5		2	2	2	5
		8	4	6		3	3	3	6
			5	7		4	4	4	7
			6	8		5	5	5	8
			7	9		6	6	6	9
			8	10		7	7	7	10
			9	11		8	8	8	11
			10	12		9	9	9	
			11			10			
B	5	5	1	3	2				
C	As per Clause 30	1		1	1				0
		2		2					1
		3							2
		4							

Appendix 5 - Table of Professional Team

Professional	Role	When/where they are required
Town Planner	To assist with amendment to town planning scheme – rezoning.	Workstage 4 once documentation to be sent to Local Authority is finalised.
Attorney	To assist with alterations to the title deeds of the erven that are owned by the City of Johannesburg.	After approval for amendment to the town planning scheme has been granted by Local Authority.
Professional Architect	To be appointed for full appointment from Work Stages 1 to 6 outlined in Board Notice 121 of 2015. To design the spatial requirements of the community centre according to brief. The architect will be offering her full services towards the project, therefore, taking on the role of the Professional Architect, Principal Consultant and Principal Agent	Workstage 1 to 4
Principal Consultant	To manage and administer the services to the consultants.	Workstage 1 to 6
Principal Agent	To manage and administer the building contract.	Workstage 5 to 6
Civil Engineer	To ensure that the building structure is adequately designed for the internal and external loads it will be taking, that includes the foundation and the concrete frame structure as required by the National Building Regulations	Workstage 3 to 6
Mechanical Engineer	To be involves as specialists in HVAC, piping, and water supply of the building.	Workstage 3 to 6
Electrical Engineer	To design the wiring and lighting systems of the building, especially pertaining to the vertical farming spaces and the cinema spaces. To ensure the electrical supply to the building.	Workstage 3 to 6
Geotechnical Engineer	To examine the subsurface soil conditions of the site and advise building upon possible dolomitic soil.	Workstage 3 to 6
Façade Engineer	To assist in the rational design of the façade of the building, according to regulations stipulated in SANS 10400 Part XA or SANS 204.	Workstage 3 to 6

Appendix 5 - Table of Professional Team

Quantity Surveyor	To estimate and control the construction costs and to draft up a bill of quantities.	To be done after technical documentation in Workstage 4.
Main Contractor	To execute the work activities that are required for the completion of the project. To assist in monitoring the construction site safety.	Workstage 5: Construction
Subcontractor	Appropriate subcontractors to be <i>selected</i> by the Contractor and Principal Agent or <i>nominated</i> by the client and Principal Agent. Eg. Demolition of existing structure on site.	Prior to the commencement of Workstage 5: Construction
Health and Safety Officer	To facilitate health and safety meetings on site; identify risks related to construction upon regular inspection; distribute safety and health instructions to subcontractors.	Workstage 5: Construction



SCHOOL OF ARCHITECTURE AND PLANNING
HUMAN RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE
PROTOCOL NUMBER: SOAP09/03/2020

PROJECT TITLE: Home away from Home: A community centre for the experience and exchange of Congolese culture in Yeoville.

INVESTIGATOR/S: Priscillia Bokoko (Student No: 1111768)

SCHOOL: Architecture and Planning

DEGREE PROGRAMME: Master of Architecture Professional (MARCH Prof)

DATE CONSIDERED: 19 September 2020

EXPIRY DATE: 19 September 2021

DECISION OF THE COMMITTEE: Approved

CHAIRPERSON



(Dr Brian Boshoff)

DATE: Signed under lockdown: 21.9.20

cc: Supervisor/s:

Liale Francis

DECLARATION OF INVESTIGATORS

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we guarantee to endure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

School of Architecture & Planning
University of the Witwatersrand
Private Bag 3 Wits 2050
Johannesburg South Africa
www.wits.ac.za

T	+ 27 11 717 7623
F	+ 27 11 717 7649

(The following musical notation is transcribed from the score page shown in the image.)

Signature

Date _____

School of Architecture & Planning
University of the Witwatersrand
Private Bag 3 Wits 2050
Johannesburg South Africa
www.wits.ac.za

T	+27 11 717 7623
F	+27 11 717 7649



POUR ETUDIER A L'ETRANGER
TEL: 0815072119 - 0992597119
CONDITION AU TERRAIN PLC LING
TAND: 0993067119 0899178076

BCDC

Contrôles Passeports
Passport Controls
Tous Passeports
All Passports