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Nourished Roots: The kitchen as a living ecosystem, reappropriating a barn in the centre of Skeerpoort

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Nourished Roots

The kitchen as a living ecosystem, reappropriating a barn in the centre of Skeerpoort.

Kerry Clifford | 2115439



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Kerry Clifford



01 March 2024

Figure 0.1 :
Front cover
Nourished Roots
[Author, 2024]

Figure 0.2 :
Cover inside leaf
Nourished Roots 02
[Author, 2024]

Nourished Roots

The kitchen as a living ecosystem, reappropriating a barn in the centre of Skeerpoort.

Kerry Clifford
2115439

This document is submitted in partial fulfilment for the degree:
Master of Architecture (Professional)
at the University of the Witwatersrand,
Johannesburg, South Africa, 2024.

"The idea of home is ultimately a cultural construction whose malleable limits go beyond its physicality. A home, and its kitchen, is therefore a diffuse entity."

Anna Puigjaner

Acknowledgements

Firstly, I would like to thank Kiki my supervisor for her encouragement and support throughout not only this year but also previous years of my architectural studies. You have always challenged me to go beyond what I thought to be capable of. You are incredibly knowledgeable and have continued to push me forward this year even during the times I really did not have the inspiration or motivation to move forward. Thank you for refining my many ideas into something still complex, yet well rounded.

To my friends who have shared this emotional and physically tiring journey with me, I would not have been able to do this without you. Keagan and Kayla you both have been my beacon of love and light, reminding me that this is not the be all and end all of everything, our mutual struggles and accomplishments have brought us closer, and I am forever grateful for the friendship we have built. Daron your dark sense of humour on days where we just couldn't do it any longer really lifted my spirits and encouraged me to "just get it done." Georgie our coffee breaks and your warm hugs, I will cherish forever.

To my parents for allowing me the opportunity and privilege to have been able to do this, I am forever grateful. Dad your weekly phone calls of encouragement were always a highlight, Ma your creativity and brilliant mind is forever inspiring.

Sue and Pops your constant love and support has been unbound I cannot express how grateful I am for the both of you! Francois you have supported me and encouraged me long before I started this journey, you are my support system, always grounding me, and showering me with unconditional love.

Thank you, thank you, thank you

Glossary

Nourish / past tense: Nourished
1. Provide with food or other substances necessary for growth, health and good condition.
2. Keep (a feeling or belief) in one's mind, typically for a long time.

Root / plural: Roots
1. The part of a plant which attaches it to the ground or to a support, typically underground, conveying water and nourishment to the rest of the plant via numerous branches and fibres.
2. The basic cause, source, or origin of something.

Gut - Brain Axis
1. The gut–brain axis is the two-way biochemical signalling that takes place between the gastrointestinal tract (GI tract) and the central nervous system (CNS)

Biophilia
1. According to a theory of the biologist E. O. Wilson) an innate and genetically determined affinity of human beings with the natural world.

Commensality
1. The term commensality is used in subtly different ways, and there is not a consensus on what it entails. It could have come from the Latin 'commensalis', literally meaning the sharing of the table.
(Jönsson et al., 2021).

Food In/security
1. Exists when people are undernourished due to the physical unavailability of food, their lack of social or economic access, and/or inadequate food utilisation
2. Defined as a state which exists when all people, at all times, have physical and economic access to sufficient, safe, nutritious food to meet their dietary needs and food preferences for an active life.



Figure 0.3 : Opposite **Roots (Raices)** [Painting by Frida Kahlo, 1943]

Abstract

In the centre of Skeerpoort, where the archaic Magaliesberg mountains whisper narratives of time and the fertile landscape breathes life into every seed, a barn stands vacant. Built in 1885 it has a long history, having served as a tobacco crop storage facility, a field infirmary during times of conflict, and a community gathering hall. The barn now waits for a new purpose. Nourished Roots revives the structure.

Addressing perspectives, processes and the practice of sustainable redevelopment, the thesis places itself in the field of designing for cultures of conversion. Biophilic architectural principles and adaptive reuse merge to create a place of nourishment and rehabilitation of place, people and community. The research reads context through the study of gastronomy as relationship between food and culture. Nourished Roots introduces the process of (food) fermentation to connect land, space and people by drawing parallels between the human metabolism and the 'gut health' of a building.

The design explores and amplifies the architectural significance of the kitchen as a key element in the process of food preparation, production and consumption as well as gathering space and a living organism in which traditional fermentation processes have both practical and symbolic meaning.

The barn and its newly emerging surrounding serve as a rescaled pantry, scullery, kitchen and dining room. Together they function as a 'living classroom' for a rather eclectic community with diverse challenges and needs.

The extended programme sets a precedent for sustainable agricultural practices, food storage and production as well as offering an alternative way of living, learning and working. Rooted in the local agricultural traditions of Skeerpoort the thesis considers the intervention as an innovative approach to support food security in the area as well as preserving its biodiversity.

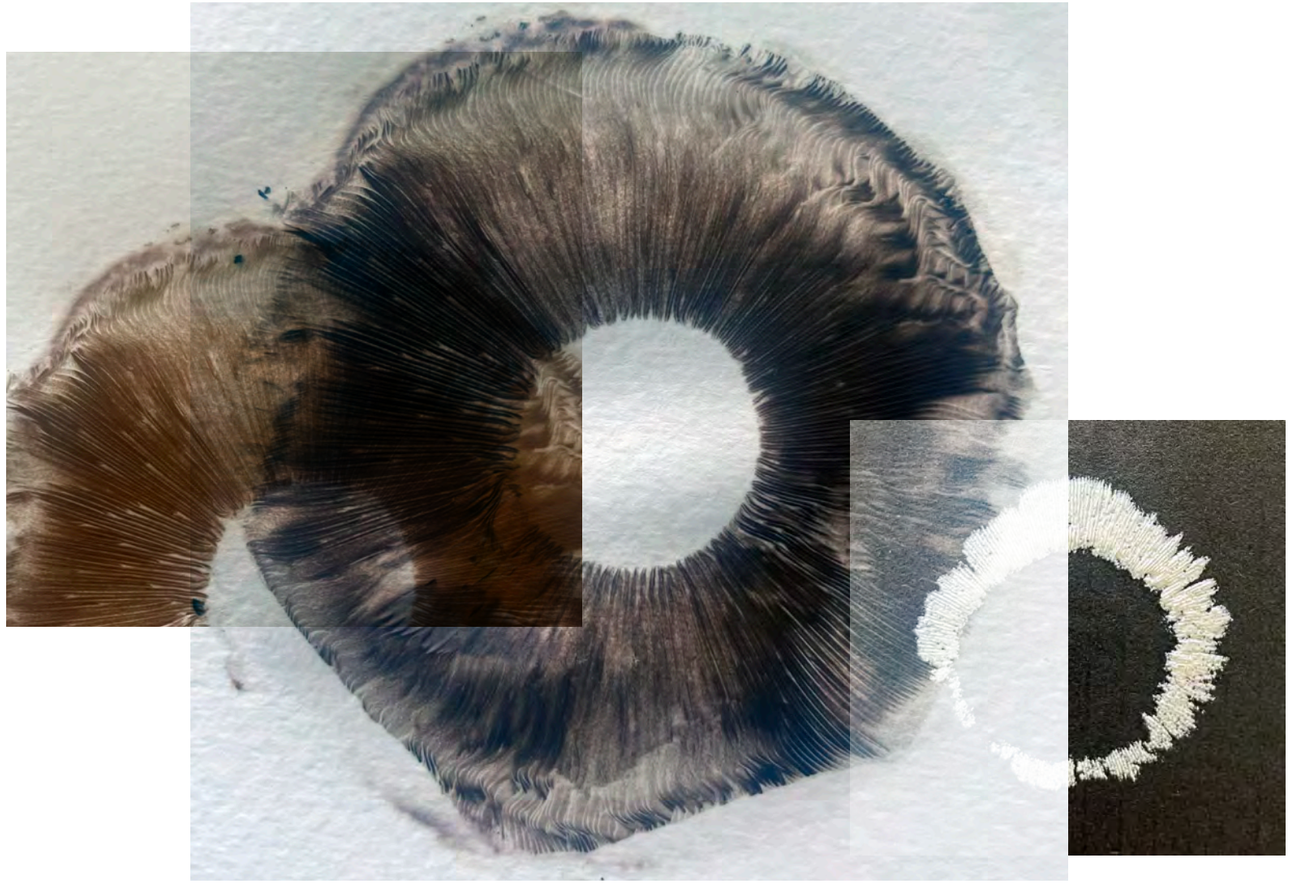


Figure 0.4 :
Opposite
Mushroom spore prints
[Author, 2024]

Preface

As a child, my mother would often take us to visit her friend who lived on a farm in Magaliesberg called Kokopelli. These trips were the highlight of my childhood, and we spent countless hours playing outside, exploring the vast wonders the farm had to offer. We would walk, run, and swim in every nook and cranny of that beautiful farm, discovering new adventures each day.

The farm featured a gorge with caves and a stream, where we would hike and splash in the water. My mother and her friend Aletta added to the magic by naming different parts of the hike. Monkey Lane, with ropes and root vines for swinging across the stream, was a favourite. They also set up hammocks in the trees along the gorge's banks, where we spent hours playing in the dappled light. Another enchanting spot was Fairy Lane, where I loved building fairy homes with sticks, grass, rocks, leaves, and flowers. Kokopelli farm was more than just a place to visit; it was a realm of endless exploration and boundless creativity. Each visit to the farm was a new adventure, filled with discovery, play, and the simple joys of being immersed in nature.

Weekends not spent at Kokopelli were spent at my grandparents' plot in Kalkheuvel West, a 10-minute drive from Hartbeespoort Dam. It was a lot smaller than Kokopelli but filled with the same amount of magic, immersed in nature. The house perched on top of a hill overlooked the Witwatersberg Mountains to the south of the Magaliesberg Mountains.

I spent much of my childhood here and I can only truly appreciate how much of a blessing it was now, to have spent so much time immersed in nature. We lived in the bustling area of the East Rand, where I longed for weekends to be spent in nature. In 2012, my parents divorced and decided to enrol me in Pecanwood College Boarding School, located on the south end of Hartbeespoort Dam.

I spent my teen years growing up in this area, exploring the surrounding regions like Skeerpoort. I then spent the first year of my studies living in Braamfontein until COVID-19 happened. Then, I moved in with my father in Benoni for two short weeks before moving back to Hartbeespoort to live with my partner.

I now call Hartbeespoort my home and have for a very long time. The attachment I feel to the mountains is unmatched. I travel almost three hours each day to and from Wits, and I honestly wouldn't have it any other way. The feeling you get when you spend a weekend away in nature is the feeling I experience every day!

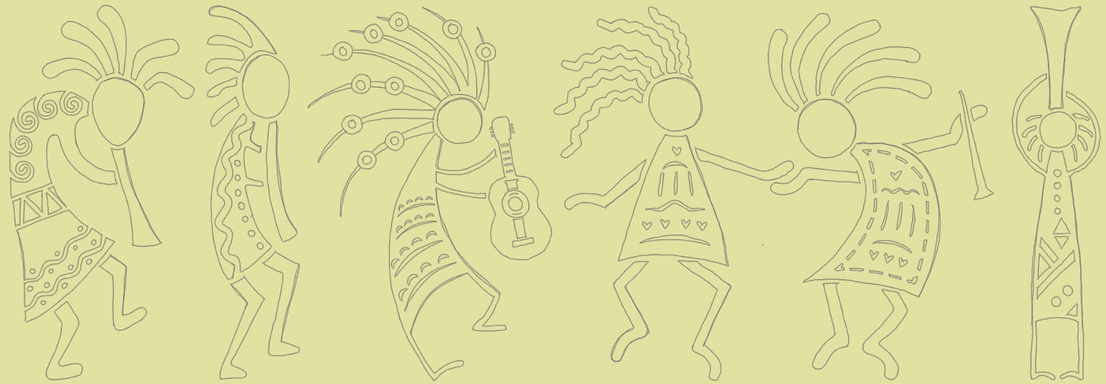
This is why I have devoted my thesis to the connection we, as humans, feel to nature and why it is so important.

Figure 0.5 :
Opposite
Kokopelli Drawings
[Author, 2024]

Kokopelli

The humpback flute playing petroglyph is mostly found in South America and is depicted as a fertility deity.

The Kokopelli is said to oversee both fertility in childbirth and fertility in agriculture. It is said that the music from the flute is to chase away unwanted weather and infertile circumstances.



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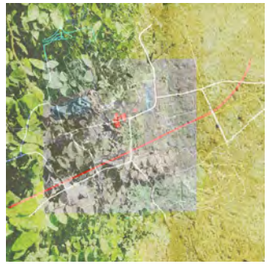
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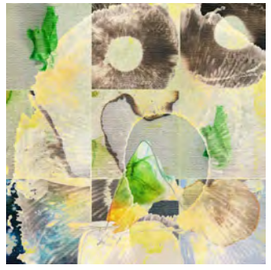
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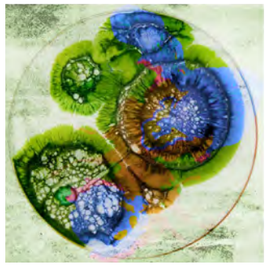
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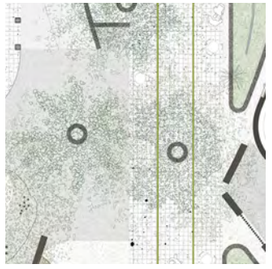
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Intro

General overview of this thesis

"Nourished Roots" is a thesis that re-appropriates a barn in the centre of Skeerpoort, aiming to transform the barn in to a kitchen that functions as a living ecosystem, embodying the ideology of a healthy building or kitchen and exploring what the 'gut health" of a building might mean in an architectural context.

To guide readers through this thesis, I have organised the chapters as follows: **Physical locus, The Gut, The Kitchen, The Ingredients, The [product]ion and The Making.**

The diagram to the left depicts the way in which the chapters are linked to each other while expanding on their own histories, theories, knowledge and precedents.

Physical Locus explores both the physical and conceptual setting, beginning with a contextual analysis of the broader site and focus site, moving towards the conceptual narratives of this thesis.

The Gut chapter delves into the theoretical setting, investigating what the gut health of a building might entail and the principles that could influence this.

TheKitchen chapter explores the socio-cultural setting of this thesis, focusing on culinary traditions and exploring cuisine and their programmatic influences.

The Ingredients chapter centres on design analysis, specifically the site analysis.

The [Product]ion chapter outlines the design process thus far. And then finally the last chapter, **The Making** showcases my final design drawings.



Figure 0.6 :
Opposite
Neural thesis map
[Author, 2024]



Figure 1.1 :
Opposite
Physical Locas Collage
[Author , 2024]

Physical Locus

Physical Setting & Conceptual Setting

This chapter explores both the physical setting and conceptual setting of this thesis.

Exploring the intersection of the natural environment, the local community and sustainable practices within the Magaliesberg Biosphere, focusing on the area of, Skeerpoort.

[1.1] Context

Magaliesberg

The Magaliesberg mountain range is one of the oldest in the world, guessed to be about 2.3 billion years old. Stretching over 120 kilometres, the mountain range starts in the west, Rustenburg and stretches to the east in Bronkhorstspruit, lying just north of Johannesburg and Pretoria. The Magaliesberg mountain range consists of multiple different ecosystems, from grasslands to dense forests, the range is characterized by its hardy terrain, with cliffs and valleys.

Historically, the Magaliesberg area is truly significant, home to many archaeological sites including the Cradle of humankind, a UNECSO World Heritage Site, home to the discovery of human habitation dating back over two million years. The mountain range is home to many culturally rich and diverse sites including many battlefields from wars in the past.

Magaliesberg Biosphere Reserve

The Magaliesberg Biosphere was officially designated as a Biosphere reserve in 2015 by UNECSO, the United Nations Educational, Scientific and Cultural Organisation. The reserve stretches over 350 000 hectares of land including parts of both the North-West and Gauteng provinces. The area marks a transitional zone between two biomes, the Central Grassland Plateaux and the Sub-Saharan Savannah, with a mix of the Afromontane Forest,
Because of this unique transition of biomes, the area is home to a wide variety of plant and animal species. The Magaliesberg Biosphere Reserve aims to balance their conservation and preservation of the natural world while integrating sustainable development. The area is a popular tourism destination especially because it is located relatively close to big cities and has a variety of eco-tourism things to do including the historical and cultural sites found all over.

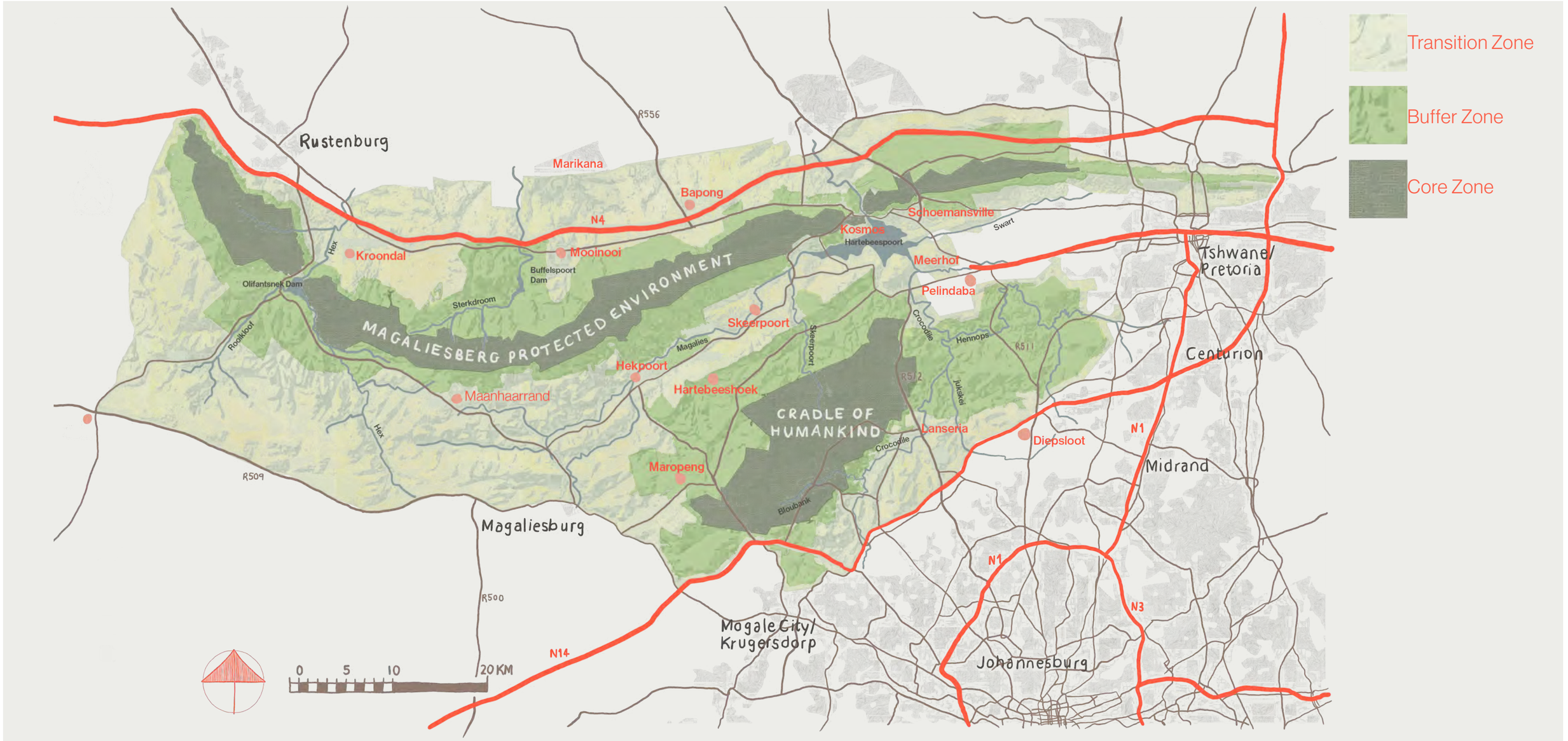
“The Magaliesberg, A place of wilderness and war, a mountain chain linking the magnificence of nature with our turbulent history.”

- Vincent Curruthers



Figure 1.2 :
Opposite
Map highlighting Skeerpoort and surroundings
[Author, 2024]

Figure 1.3 :
Following Spread
Map of Magalies Biosphere zones
[Author, 2024]


Transition Zone
Buffer Zone
Core Zone
MAGALIESBERG PROTECTED ENVIRONMENT
CRADLE OF HUMANKIND
Rustenburg
Marikana
Bapong
Kroondal
Mooinooi
Olifantsnek Dam
Buffelspoort Dam
Sterkdroom
Rooikloof
Hex
Skeerpoort
Magalies
Hekpoort
Maanhaarrand
Hartebeeshoek
Maropeng
Magaliesburg
Mogale City/ Krugersdorp
Schoemansville
Kosmos
Hartebeespoort
Meerhof
Pelindaba
Crocodile
Hennops
Swart
Tshwane/ Pretoria
Centurion
Lanseria
Diepsloot
Midrand
Johannesburg
Bloubank
Juiskei
R556
R511
R512
R509
R500
N4
N1
N3
N14
0 5 10 20 KM

Skeerpoort

Skeerpoort is a small town located just 7km southwest of the Hartbeespoort Dam at the foot of the Magaliesberg mountain range, in the eastern North-West province of South Africa. Skeerpoort forms part of the greater Magaliesberg Biosphere, known for its rich biodiversity and natural beauty. Skeerpoort is characterised by its rural nature and agricultural community and is referred to as a "rural tourism node" by the Madibeng Local Municipality.

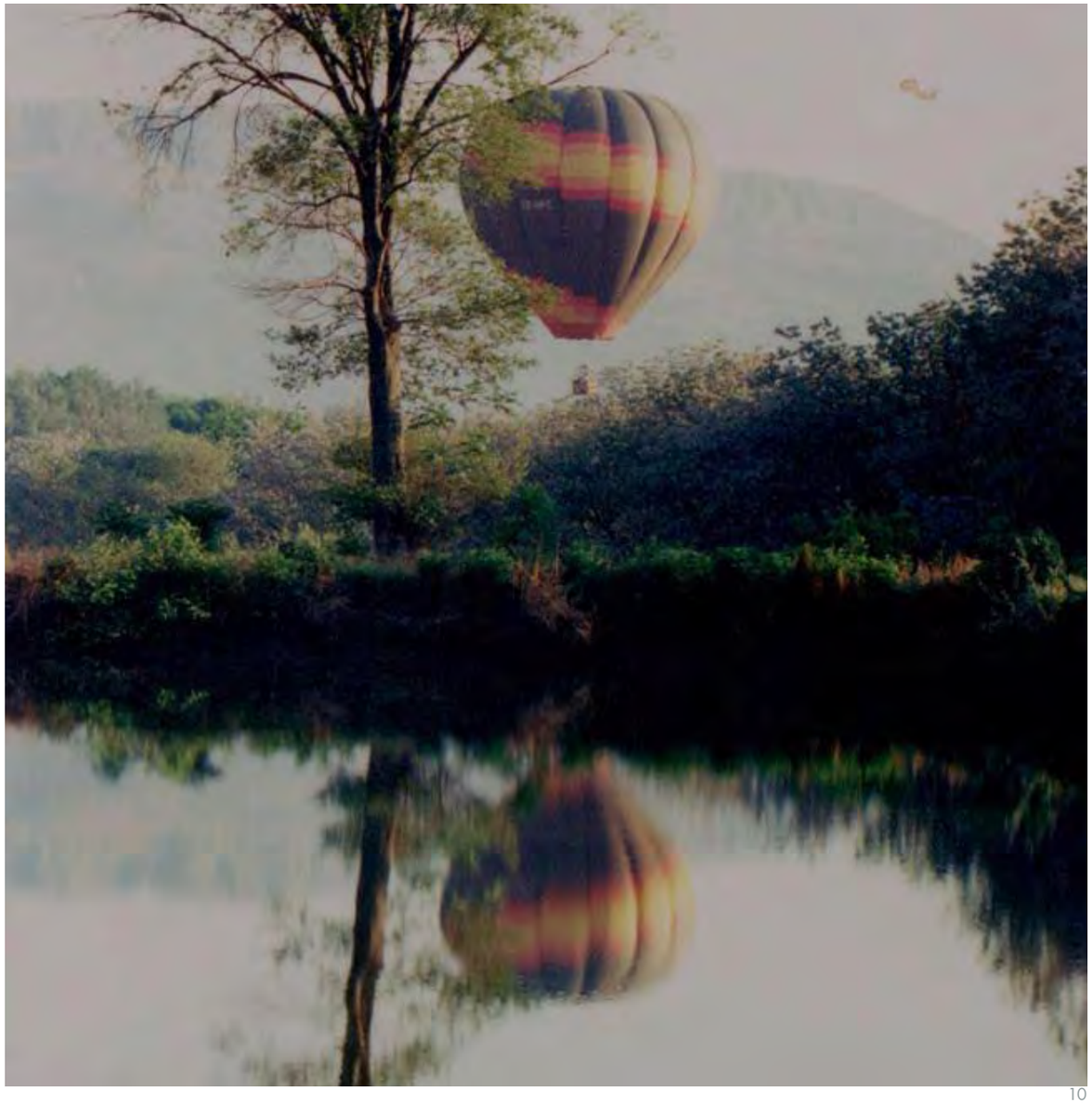
The municipality envision a mixed tourism corridor stretching from the South to the North. The extract below is taken from the Madibeng Tourism Development Zones for 2024/25.

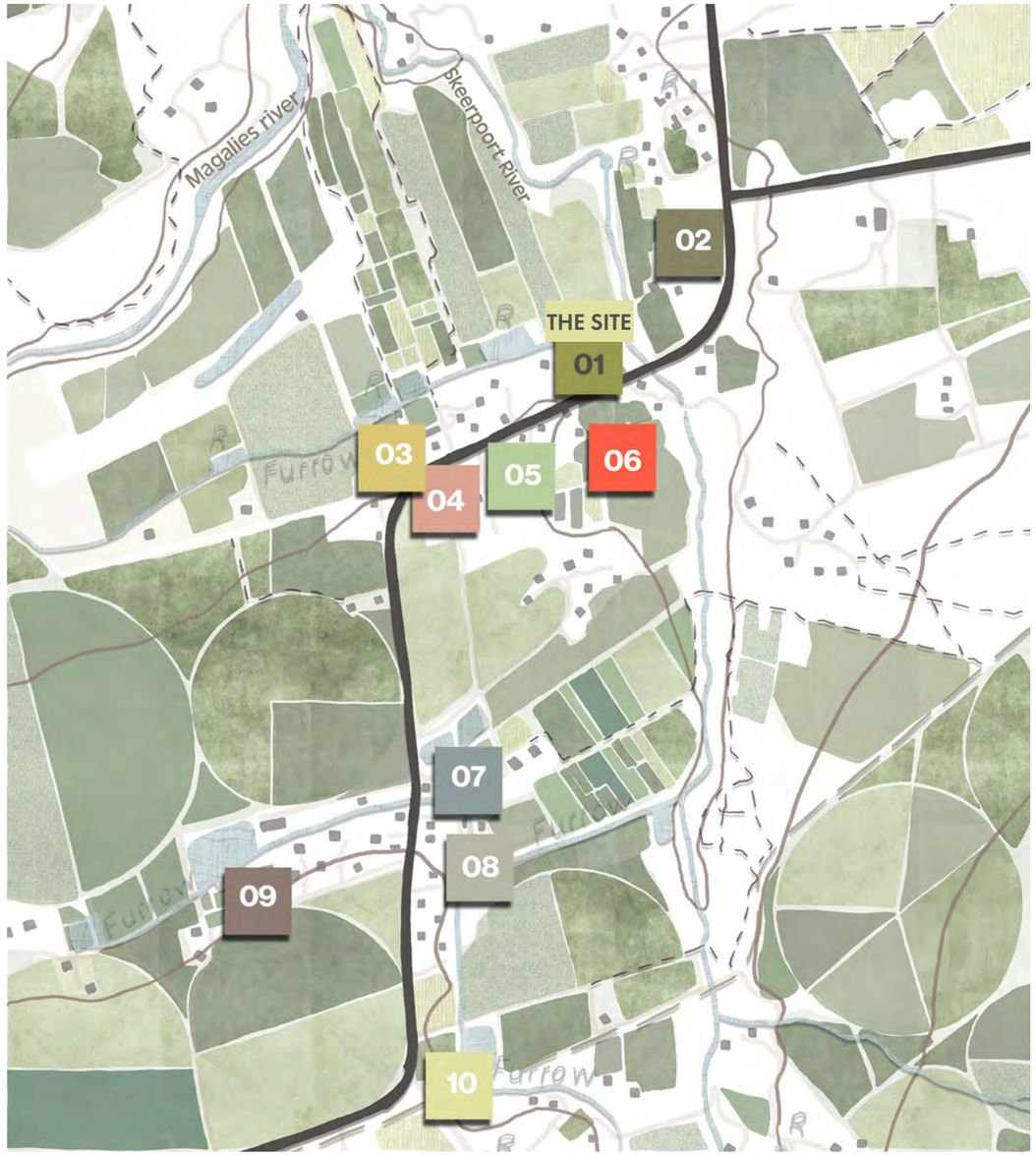


"The development of this zone can be achieved by persuading those travellers en route to and from Sun City and Rustenburg to spend time exploring the area as part of their overall holiday experience. In view of the contrasts in scenery, climate and facilities, and the natural resources (water sources, mountain ranges, etc.), this would simply require enhanced marketing of the area and the provision of more user-friendly information outlets within the area."

Figure 1.4 :
Above
Map showing sites proximity to the Hartebeespoort Dam and the Magalies and Skeerport River system
[Author, 2024]

Figure 1.5 :
Opposite
ZS-HPC, Scrooby's Farm, Skeerpoort
[No author, circa 1991]







Scroobys Barn
Located on my chosen site, first building built in Skeerpoort.



Van Gaalen Kaasmakerij
Established in 1994, the farm is a tourist attraction not only for their cheese making but for their hiking and mountain bike trails scattered all over their farm and adjadcent farms.



Skeerpoort Supermarket
The local spaza shop in the area other than the shop inside of the total garage.



Oostermoed Total Garage
Local farmers stop for petrol for their machinery, and a hot spot for travellers moving toward the Magalies Meander.



Laerskool Skeerpoort
Located south west from my chosen site across the road.
Has an influence on my program.



Tangaroa Strawberry Farm
Located across the road from my chosen site, and is a tourist destination for strawberry picking. The farm was a sheep farm dating back to 1881 before becoming a strawberry farm in 1999.



Die Ou Pastorie
built in 1914 as a parsonage for the Dutch reformed church. From 1938 - 1948 the building was used as a police station and today it is a restaurant.



NG Gemeente Skeerpoort Church
The church was founded in 1951, however this building now housing the church was only built in 2013.



Capital Stud
built in the 1880's and is a proclaimed heritage site.



Skeerpoort Handelhuis
Owned by a Muslim family and is home to the oldest hardware store in the area and a favourite for the local communities.

Figure 1.6 :
Opposite
Contextual Street Map of Skeerpoort main road
[Author, 2024]

Skeerpoort

The area has been inhabited for thousands of years, only 1500 years ago the Bantu speaking peoples began migrating into the area during their search for fertile land. These communities consisted of pastoralists and agriculturalists that began cultivating the land and herding livestock in the area. The Tshwane speaking people, one of the Bantu speaking groups became the most dominant cultural group in the area, establishing a presence long before the European Settlers came.

The name Skeerpoort or Scheerpoort comes from the Dutch words "Shaving Gate" It is said that the name comes from the early Dutch settlers, the Voortrekkers moving up north to escape the British controlled Cape Colony during the 19th century. The name could possibly refer to the passage or valley between the mountains, however there is another theory that the name originated from the settles travelling between Rustenburg and Pretoria, where they would stop near the river or "poort" to freshen up and shave "skeer" before traveling further.

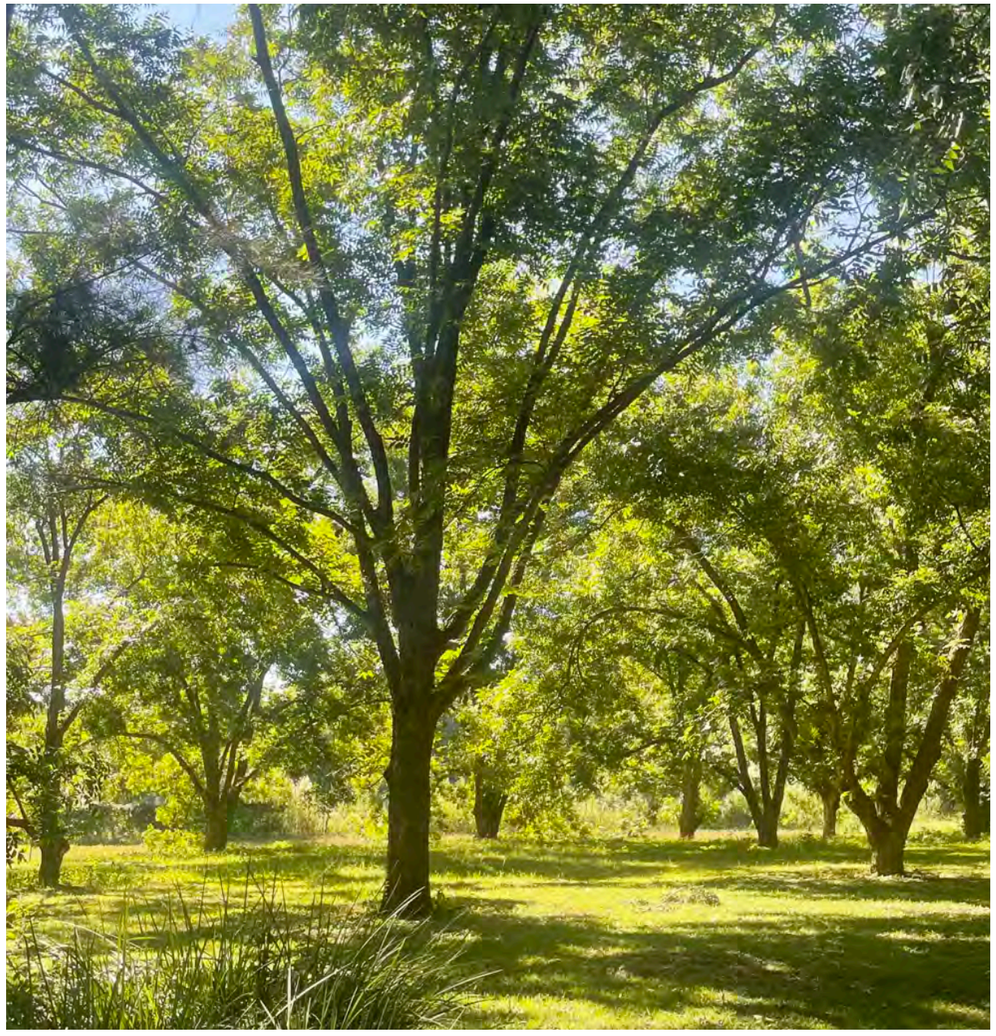
The Dutch settlers began to establish farms and homes in Skeerpoort contributing to the agricultural development of the land, the area quickly became known for its fertile land.

Today Skeerpoort remains an agricultural community with a mix of descendants from these various groups. The area forms part of the greater Magaliesberg Biosphere and the main road that runs through the area is the start of the infamous Magalies Meander, making the area an ideal location to capitalize on the tourism.



Figure 1.7 :
Opposite
Pecan nut trees on site
[Author, 2024]

Figure 1.8 :
Below
"Die ou Pastorie - The original parsonage soon after its construction in 1914"
[no date]



[1.2] Biodiversity
Flora found in Skeerpoort

As Skeerpoort is situated within the Magaliesberg Biosphere Reserve it shares the overall rich biodiversity of the area. The landscape within Skeerpoort is a mixture of agricultural land, where food crops and pecan nuts are cultivated, and natural vegetation including grasslands, bushveld and area of indigenous trees. Because the area is so close to the Magaliesberg mountain range a lot of the area's natural vegetation is preserved and protected.

The vegetation found in Skeerpoort is mainly a mixture of indigenous trees, grasslands and herbs that are all important to the local ecology, while also having cultural and economic value as these plants provide food, medicine and materials.

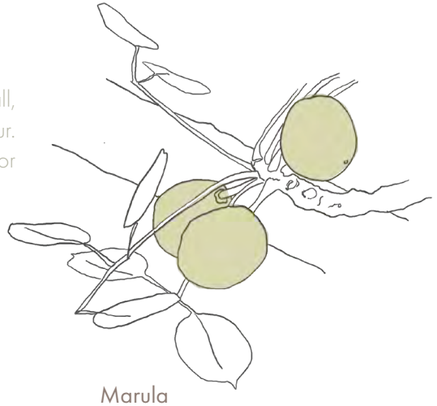
Edible plant species



Wild Figs
[Ficus spp.] :
Lots of different species of wild figs grow in the Magaliesberg area, with their fruit being edible. These figs are also important food source for birds and animals.



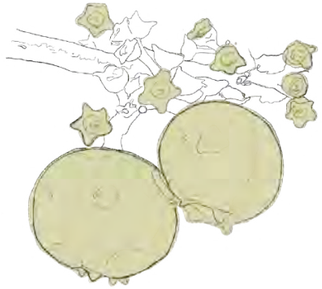
Sourplum
[Ximenia caffra] :
These shrubs produce small, edible fruits with a sour flavour. The fruits can be eaten raw or used in jams and preserves.



Marula
[Sclerocarya birrea] :
Known for its juicy, nutritious fruits, the Marula tree is famous for the alcoholic beverage Amarula, made from the fermentation of their fruit. The fruit is rich in vitamin C, and the seeds yield oil used in certain cosmetics and for cooking.



Num-num
[Carissa macrocarpa] :
Commonly known as the Natal Plum, this spiny shrub produces small, red, edible fruits with a sweet and sour taste. The fruits can be eaten fresh or used in preserves.



Wild Medlar
[Vangueria infausta] :
The wild medlar produces small, brown fruits with a sweet, apple-like taste when fully ripe. The fruits are traditionally eaten fresh or dried.

Figure 1.9 :
Opposite
Edible plant species
[Author, 2024]

Medicinal plant species



Wild Dagga [Leonotis leonurus] :
Most commonly known as Lion's Tail, this plant is used in lots of traditional medicine to treat flu's, colds, coughs, and other respiratory issues. It also has mild psychoactive properties.



Sutherlandia [Lessertia frutescens] :
Also known as the Cancer Bush, is traditionally used for its medicinal properties, it is believed to help with stress, infections, and as a general health tonic.



African Potato [Hypoxis hemerocallidea] :
The tuber root of this plant is used in traditional medicinal practices to boost the immune system and treat conditions like prostate issues and inflammation.



[Aloe spp.] :
Lots of different Aloe species, including Aloe marlothii [Mountain Aloe], are found in the region. Aloe gel is used traditionally for treating burns, wounds, and skin irritations.

Figure 1.10 :
Opposite
Medicinal and utility plant species
[Author , 2024]

Utility plant species



Silver Cluster-Leaf [Terminalia sericea] :
The wood of this tree is used for the making of tools, furniture, and fencing. The leaves have medicinal properties, and the bark is used for the processing of leather which is called tanning.



Wild Olive [Olea europaea subsp. africana] :
The wood of the wild olive tree is hardy and durable, which makes it a suitable material for carving and making furniture. The leaves and fruits also have medicinal properties.



Kiepersol [Cussonia spicata] :
Kiepersol is also known as the Cabbage Tree, this plant is used in traditional medicine for the treating of various ailments. The wood is thought to also be used for the carving and making of utensils.



Buffalo Thorn [Ziziphus mucronata] :
The wood of the Buffalo Thorn is used for the making of tools and furniture. Its fruits are edible, and the plant has also has various medicinal properties, including the treatment of wounds and respiratory issues.

Fauna found in Skeerpoort

There is a wide variety of mammals found in the area including lots of small buck, like the duiker and steenbok, bigger buck includes Kudu and warthogs. Birdlife in Skeerpoort is abundant and the area is a hot spot for bird watching.

The most significant bird found in the area is the Cape Vulture, where their breeding colony is nestled right on top of the mountain of the Skeerpoort area. Smaller birds like Kingfishers and weavers thrive in both the agricultural and natural landscape.

The natural landscape of the area supports the ideology of eco-tourism, contributing heavily to the economy of the area. The biodiversity of the area is heavily tied to its agricultural practices, where the cultivation of crops as well as the preservation of the natural vegetation buffer helps preserve the local biodiversity, allowing for eco-tourism.

Because of the Magaliesberg Biosphere Reserve the area serves as a buffer zone, where the agricultural practices are balanced with their conservation efforts, preserving the natural environment while supporting the local communities' livelihoods.



Figure 1.11 :
Opposite
Photograph of vulture breeding site sign on-top of the mountain
[Author , 2024]

Figure 1.12 :
Below
Drawing of Cape Vuture
[Author , 2024]



[1.3] Food Insecurity
In the North West Province

As defined by the World Bank,

"Food Security is when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."

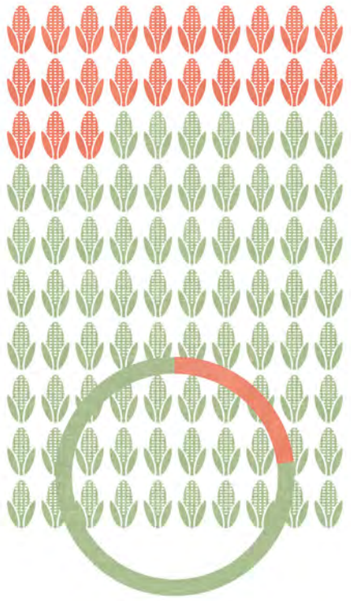
They've categorised four dimensions of food security, including:

Availability: The stable presence of enough quantities of food, referring to domestic production, food imports or food aid.

Access: The capability of individuals to obtain food, depending on certain factors like income, food costs, and the distribution of food within households and communities.

Utilisation: The "correct" use of food, which includes having a diet that provides all necessary nutrients and the competence to prepare and eat the food in a way that is healthy and contributes to an individual's well-being.

Stability: The constant availability, access, and utilization of food over time, without risk of sudden disturbances due to things like an economic crisis, climate change, or a war.

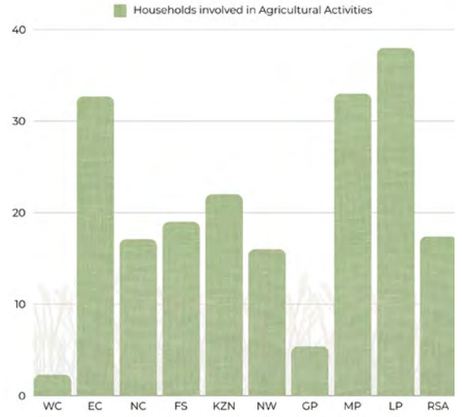


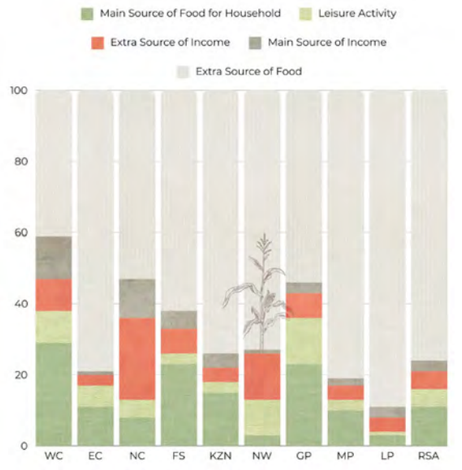
23,1% of households, nationally, considered their access to food as inadequate or severely Inadequate

The North West is the second province after the Northern Cape to have considered their access to food inadequate or severely inadequate



32,6% of households, in the North West, considered their access to food as inadequate or severely inadequate





Food security in the context of my thesis extends beyond these simple "four dimensions", it embodies a holistic approach connecting the well-being of individuals with the health of the environment, their bodies and the richness of local resources. Food education is by far the most important dimension of food security. To be able to teach communities about foods that are readily available in the area and how they can be utilised or cooked to be able to support both physical and mental well-being.

To encourage the understanding of the connection between what we eat and how that relates to how we feel, particularly referring to gut health, will overall empower communities to make informed decisions about what they eat, how they eat it and how they can contribute to their health and the sustainability of the ecosystem.

Food security can also be about nurturing a deep, mutual relationship between communities and the land they inhabit.

Through the integration of traditional practices, modern knowledge about gut health, and local wisdom, my thesis aims to create a model where complete food security is achievable through a symbiotic relationship with the natural environment, ensuring that for generations to come, there will be a thriving, resilient environment that continues to provide and nourish its inhabitants.

Figure 1.13 : Opposite **Infographics** [Author , 2024]





Figure 1.14 :
Opposite
Aerial photograph taken of farmscape in airplane
[Author , 2019]

Figure 1.15 :
Aerial photograph of harvest hands on sweet potato field in Skeerpoort, North West Province, South Africa
[Klaus Leidorf, no date]

Conceptual Setting
[1.4] Contextual narratives

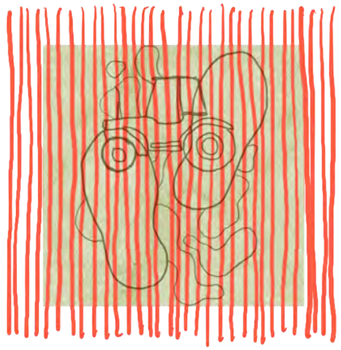
Figure 1.16 :
Opposite
Contextual Narratives
[Author , 2024]

Natural environment



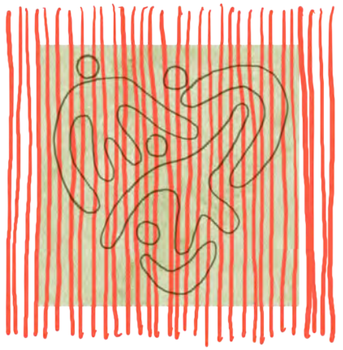
Skeerpoort, set within the Magaliesberg Biosphere, blends both natural biodiversity and rooted agricultural traditions. Among the indigenous plants and historic landscapes lies a site where agricultural practices are woven into the land, a site that will foster a deeper connection between the community, the built environment and the natural surroundings.

Economy



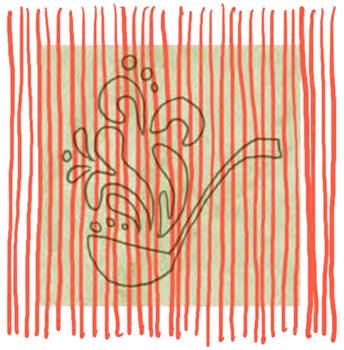
Skeerpoort economy operates through its blend of agriculture and eco-tourism. Its proximity to tourist attractions like Hartbeespoort dam, the Cradle of Humankind and the travel routes to destinations that run through and around the village to places like Magaliesberg or Sun City make the area an ideal location for an intervention driven by eco-tourism with a focus on the natural environment and agricultural setting. An intervention that can aid in the development of Skeerpoort's local economy and community.

Community



The multi-layered need exists on multiple scales that are deeply rooted in the construct of community development and empowerment. The immediate community being the individuals living on the farm, the larger community being the town of Skeerpoort and surround towns and finally the other community which talks to the idea of individuals who do not fit into the 'normal' societal construct seeking a different way of living.

Gastronomy



Skeerpoort's history of inhabitance for thousands of years is filled with rich diversity all drawn to the valley because of the fertile land, this overall influenced the way in which people today grow and eat crops.

[1.5] The Barn and its Memory

According to a cornerstone, shown in the image on the right, the barn was constructed in 1885, making it over 139 years old. It is thought to be the first structure to be built in the Skeerpoort area, which gives it significant historical value. The barn, was built by the Scrooby family, the barn is built in a typical English style barn, although the barn was built by the scrooby family who were technically a boer family.

The Scrooby family bought the land from Andries Pretorius, after whom Pretoria was named. It is made up of three portions that are connected to one another and the walls are 600 millimetres thick, timber hardwood flooring, and corrugated iron roofs that were transported from England through Maputo. On top of a stone foundation, the handmade clay bricks, which are made from the soil in the valley, are constructed, and the timber flooring is suspended between them.

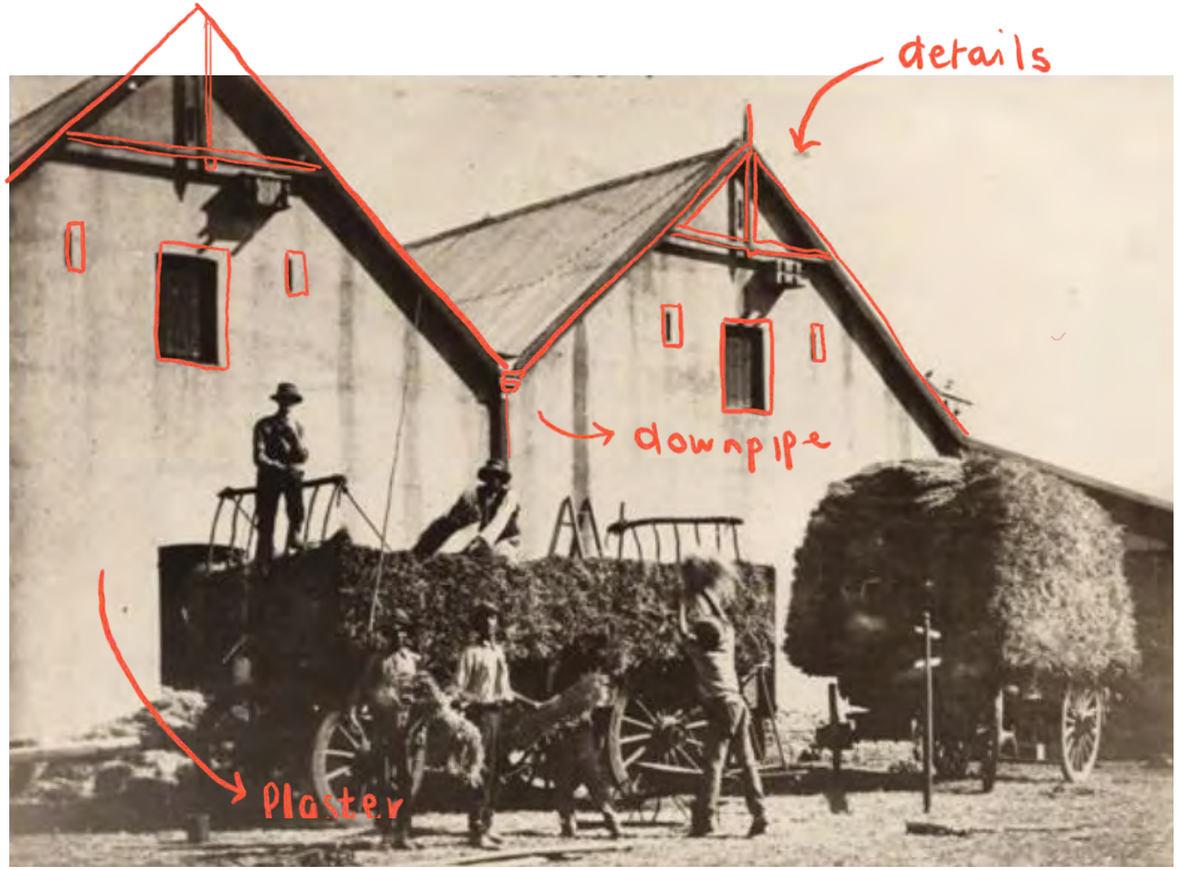


Figure 1.17 :
Above
Scroobys barn
[No author , no date]

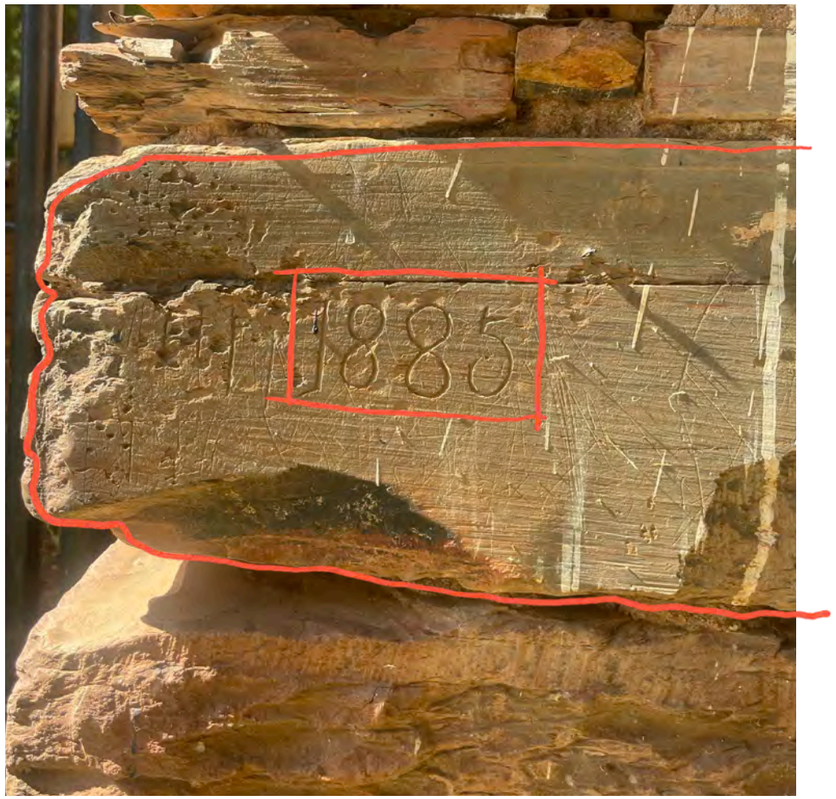


Figure 1.18 :
Above
Corner stone of barn
[Author , 2024]

After serving as a field hospital during the Boer War and later becoming the first church in the Skeerpoort area, the barn was initially utilised for the storing of wheat and tobacco as well as other agricultural products. As the accompanying graphic demonstrates, the reappropriation of this historic barn is a crucial component of my thesis.

The map shows the complete extent of the site within its context. A school is located across the road.

The following spread features a precedent study focusing on different approaches to reappropriation.

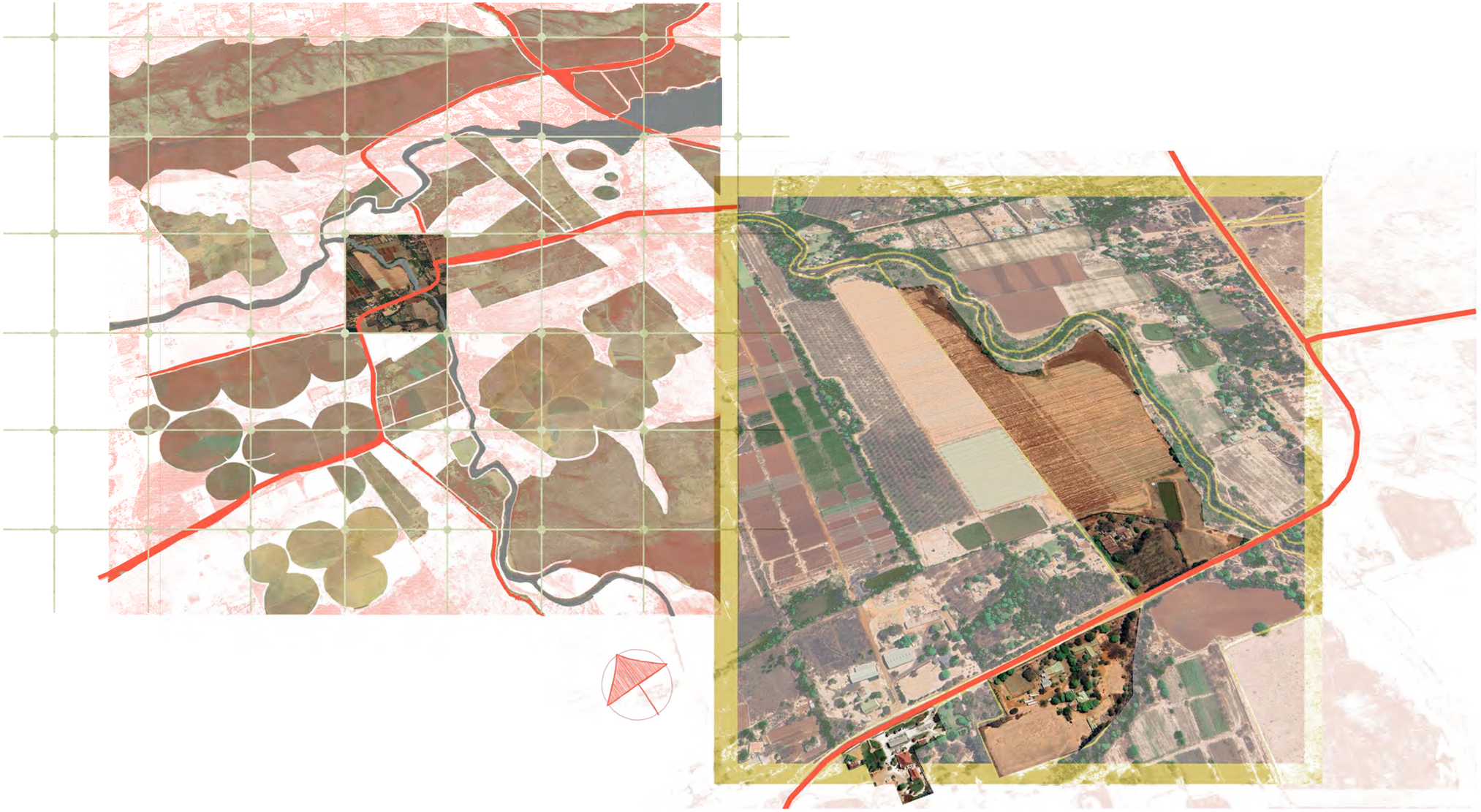


Figure 1.19 :
Opposite
Greater site location
[Author , 2024]

[1.6] Old & New Different approaches to reappropriation

Zero Waste Bistro Restaurant, New York, USA

A temporary restaurant space designed by Maria Francisca González, was built focusing on themes of "circular economy, new material innovations, and sustainable design." The space is made entirely of recycled and recyclable materials, carefully curated furniture and culinary equipment all either recycled or recyclable. The building materials used are recycled food and drink containers turned into environmentally friendly building materials by 'The ReWall Company'. (Kumbhani, 2020)

This project has both programmatic and materiality influence for my thesis, the use of otherwise regarded 'trash' is transformed and reappropriated into something interesting to look at, and feel I imagine, is quiet spectacular. "From trash to glamour."





Figure 1.20 :
Far left
Zero Waste Bistro installation
[Photo by Nicholas Calcott,for Arch Daily 2019]

Figure1.21 :
Opposite
Zero Waste Bistro installation
[Photo by Nicholas Calcott,for Azure MAgazine, 2018]

Zeitz Museum of Contemporary Art Africa / Heatherwick Studio

The largest contemporary African art museum in the world is an adaptive reuse project done by the architects, Heatherwick Studio. The building was formally a grain silo complex, standing vacant from 1990 up until 2017. The new programme was accommodated by carving away at the cellular structure of over 40 silo tubes. The architects literally carved away at the inside of the building creating new functional spaces. They removed the walls in between the concrete structure and inserted these ornate gigantic windows completely transforming the building. (Zeitz Museum of Contemporary Art Africa / Heatherwick Studio, 2017)

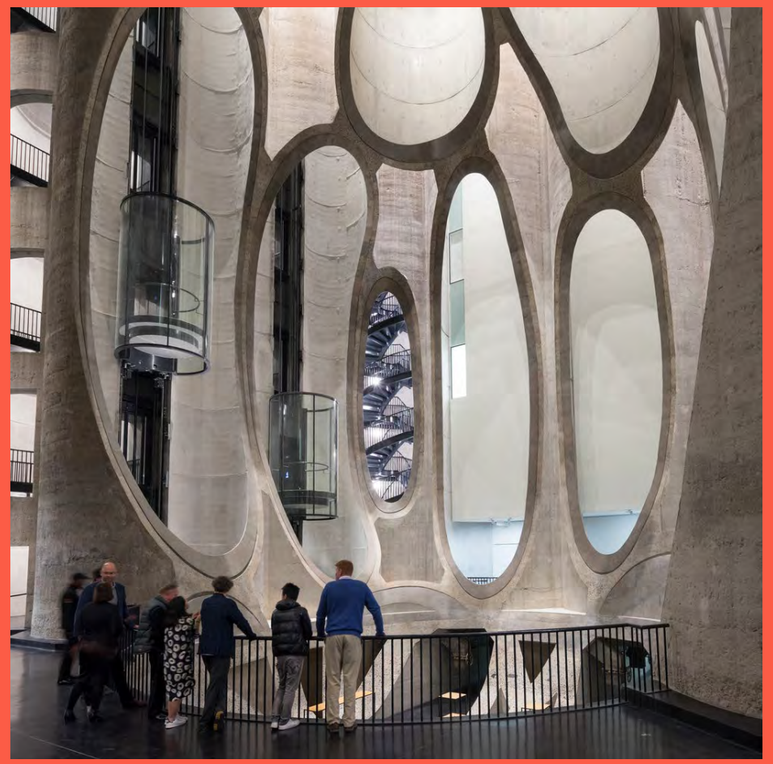
In terms of my thesis, I think its key to note that the slightest transformation in the interior of the barn can completely change the way in which the space is experienced. The materials of the museum are still raw revealing what used to be there which I also think is appropriate in my context.



Before



After



Interior

Figure 1.22 :
All Images of Zeitz Mocaa
[From Heatherwick Studios website, no date]



Figure 2.1 :
Opposite
The Gut Collage
[Author , 2024]

02

The Gut

Theoretical Setting

This chapter provides the theoretical setting for my thesis, and a focus on my reasearch question surrounding what a buildings "gut health" might look like, as well as how biophilic design principles , materiality and lessons learnt from fermentation might help achieve a building that exists in harmony with its natural surroundings and context.

It is imperative to first understand the human body and the role of the gut, this knowledge will significantly benefit the understanding of how to build a living kitchen culinary space for its occupants. Understanding how we, as humans' function and interact with our own natural biosphere will ultimately help us recognise and draw similarities in understanding how a building can function as a living ecosystem in harmony with its ecological environment.

Exploring how the adaptive reuse and revitalization of existing buildings can incorporate concepts of gut health may lead to transforming these structures into dynamic, living ecosystems that fulfil modern needs.

Additionally, applying the principles of fermentation [such as transformation and preservation] to building maintenance and design could promote the long-term health and functionality of the structures.

Research Question:

What is the gut health of a building?

The integration of biophilic design principles and the concept of biophilia into architecture raises the potential to enhance the "gut health" of buildings, fostering environments that strengthen the connection between humans and nature while promoting a balanced ecosystem.

Additionally, exploring how the notion of "gut health" in buildings can influence the creation of self-sustaining systems offers insight into efficient management of waste, resources, and energy, paralleling biological processes within natural systems. This approach invites a deeper investigation into how buildings can function similarly to living organisms, contributing to both environmental and human well-being.

What is the gut health of a building, and how can understanding this idea inform the design of a building that functions as living ecosystem, promotes sustainability, inhabitant well-being, and ecological harmony? Understanding the juxtaposition between the built environment and the natural world will allow us to realise a narrative that intertwines many theories including, the gut-brain axis, the art of fermentation, and biophilic design. Through understanding what 'fermented architecture' might mean as a concept, and how patterns in nature as well as rooted relationships help shape the built environment, enabling us to foster a deeper connection between ecological harmony and physical well-being.

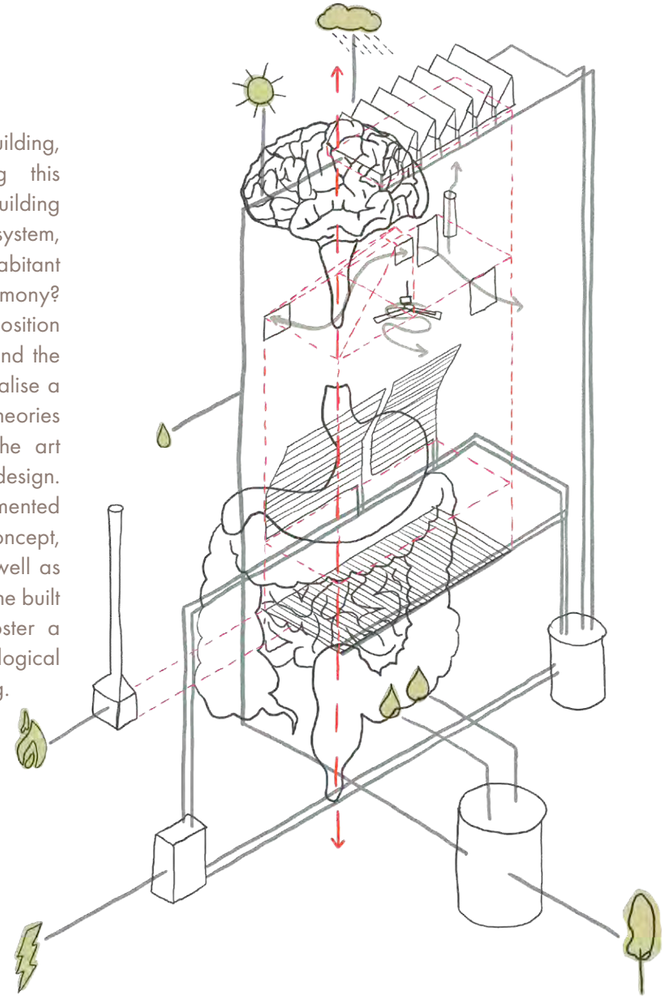


Figure 2.2 :
Opposite
The Gut heath of a building
[Author , 2024]

[2.1] Understanding the Gut - Brain Axis & its influences

The Gut - Brain Axis

The gut-brain axis is a complicated and dynamic communication network within our bodies, connecting the gastrointestinal tract with the central nervous system. It is a bidirectional [functions in both directions] link between the enteric nervous system and the central nervous system connected via the vagus nerve, which is the largest nerve in the human body. (Mayer, Nance and Chen, 2022) This relationship involves the connection and intricate signalling pathways of hormonal, neurological and immunological systems.

The Vagus Nerve and its Neural Pathways

The vagus nerve is the longest cranial nerve, running all the way from the base of your brain all the way to the large intestine. These nerves form part of the main nerves of your parasympathetic nervous system, this system controls all the involuntary motor and sensor functions within our bodies, all the functions we have no physical control over, including, your digestion, heart and respiratory functions, speech, mood and many other functions. (Vagus Nerve: What It Is, Function, Location & Conditions, no date)

The vagus nerve and the connection of its various neural pathways play a significant role in the way our bodies respond to stress, influencing our emotional and mood regulation. If our bodies vagus nerve is not functioning the way it should be, it is often associated with anxiety and depression.

The figure to the right shows that the cerebral cortex makes up about 80 percent of your brain's mass. It contains grey matter, predominantly neuron cell bodies (light purple), and white matter axons (dark purple). It is deeply wrinkled in order to fit more neurons into a small space.

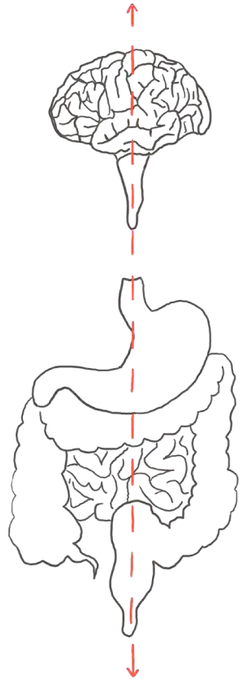




Figure 2.3 :
Far left
Gut Brain Axis
[Author , 2024]

Figure 2.4 :
Left
The Vagus Nerve
[Author , 2024]



Figure 2.5 :
Above
Cerebral cortex
[Professor Michael R Peres , no date]

Signals in the system - Hormonal & Neurochemical

The brain and the gut are constantly communicating through various hormones and neurochemicals. Hormones affect and regulate so many different functions within our bodies including, growth, blood sugar and pressure, fertility, sleep, sex drive and metabolism. (Hormone - LH, ICSH, Endocrine | Britannica, 2024).

The billions of neurons found in our brains communicate with each other via chemical messengers commonly known as neuroactive substances. A neurochemical balance within our bodies is vital if there is an imbalance it could lead to a wide variety of neurological diseases. “Various factors, for example stress, diet, genetics, and toxins such as alcohol and nicotine, contribute to this imbalance.” (Ghulam Md, 2023).

The gut produces a variety of neurotransmitters, one that were often familiar with known as the “feel good” hormone, serotonin. Most of the body’s serotonin is synthesised in the gut and the main role of serotonin is regulating sleep, mood and appetite. (Jessimy, 2024)

Another neurochemical produced by the gut is known as Gamma-aminobutyric acid [GABA], known to have a calming effect in the body, it functions as an inhibitory neurotransmitter, it blocks or inhibits certain nerve transmissions which aids in regulating moods and anxiety. (Pugle, 2023)

I know reading about the brain and all its functions may not appear to have anything at all to do with architecture, but bear with me! Understanding the complexity of our bodily functions and the influence of these intertwined connections will ultimately help me understand how to design a building that functions in harmony with its occupants and surrounding ecological environment.

We can draw certain parallels between the vagus nerve and the conceptual idea of the gut health in buildings, just like the vagus nerve connects many systems within the body, enabling communication, the vagus nerve in a building can be described as the operational systems, the ecological connection and the structural integrity of the building. If these systems fail, then ultimately the building cannot function cohesively as a whole.

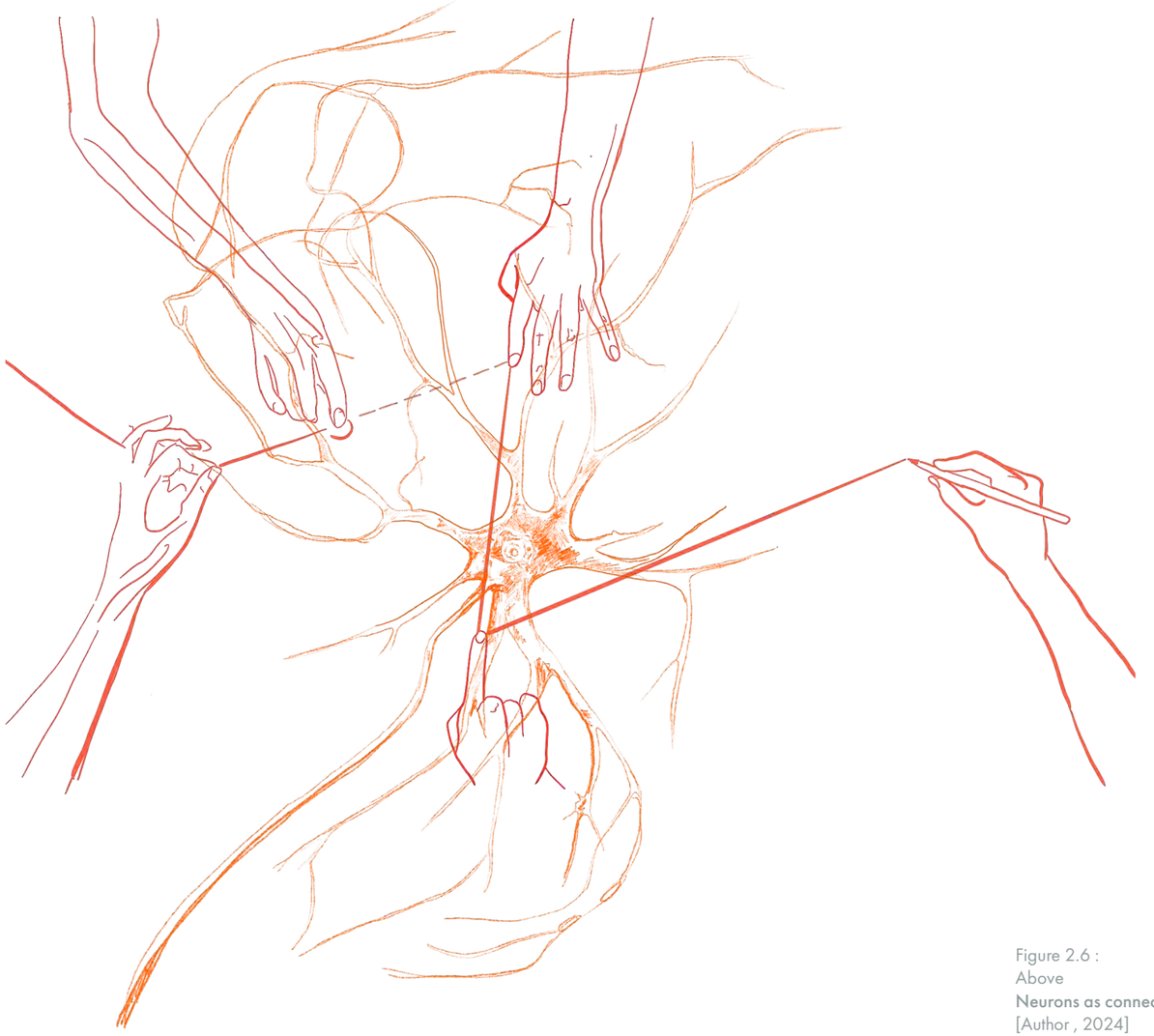


Figure 2.6 :
Above
Neurons as connectors
[Author , 2024]

Interactions of Immune cells:

The body's immune system has an incredible influence on the gut-brain axis. Between 70 – 80% of our bodies immune cells live in the gut, (Wiertsema et al., 2021), they constantly interact with the gut microbiome and microbiota. If there is an unhealthy interaction between the immune cells and the gut microbiota, inflammation occurs disrupting your bodies entire working system. A poor lifestyle and diet can cause inflammation which negatively affects your gut microbiota and in turn negatively effects your immune cells causing you to have a weakened immune system.

A connection can be drawn between the body's immune system and the environmental and structural integrity of a building. A buildings structural design, use of materials and ecological integration ensures its functionality, durability and sustainability. If the relationship of these factors fails to work cohesively with each other, it will ultimately cause "inflammation" with in the building causing it to fail one way or another, resulting in degradation and ecological imbalance.

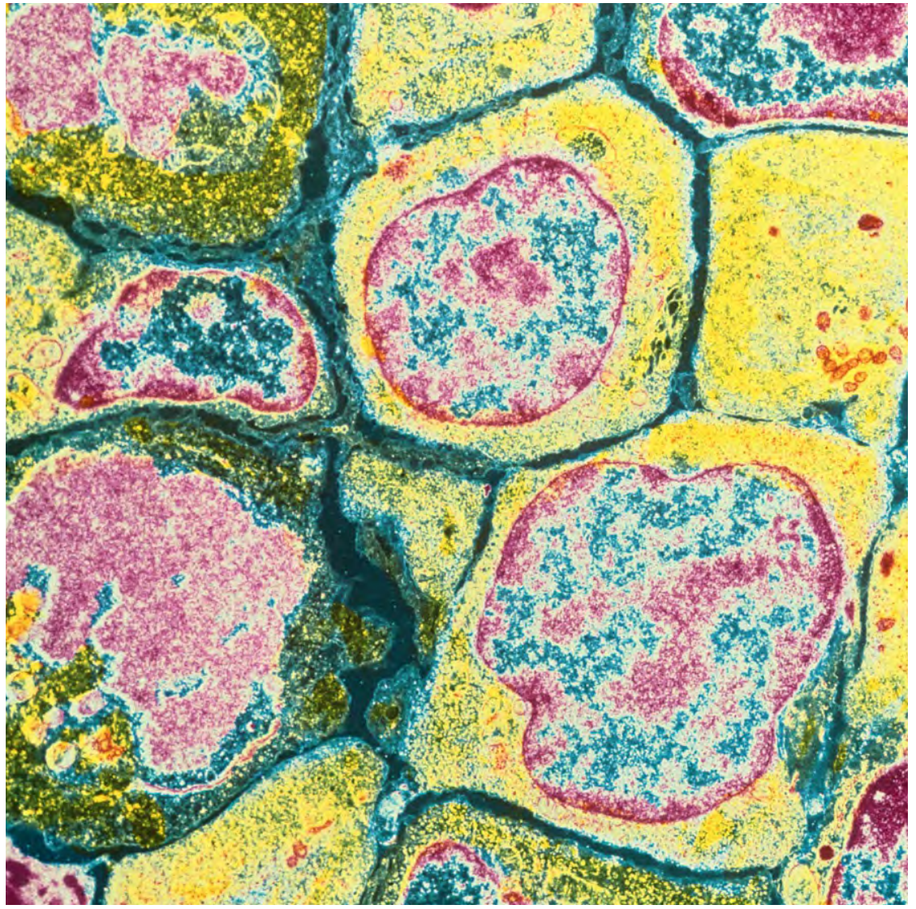


Figure 2.7 :
Opposite
Stem cells in bone marrow divide and transform into blood cells, under microscope.
[Science Photo Library / Via Batsford, no date]

Your Microbiome

Your microbiome consists of trillions of bacteria, viruses and fungi found in and on your body. Bacteria and microbes are often considered to be dangerous and harmful, however there are certain bacteria and microbes that are crucially important for your digestive system, immunity, and your brain and heart health. (Robertson, 2023) Most of the microbes are found in the cecum of our large intestine and are referred to as the "Gut Microbiome". Studies show that there are more bacterial cells living in your body than actual human cells.

There are only about 30 trillion human cells and roughly 38 trillion bacterial cells found in our bodies.
(Sender, Fuchs and Milo, 2016)

Think of your gut microbiome as trillions of tiny creatures living inside of your gut microbiome, consisting of everything from your mouth to your colon, this includes your stomach your small intestine and your large intestine. In understanding the recent studies around the world focused on the bidirectional communication between the gastrointestinal tract and the central nervous system, commonly known as the Gut-Brain Axis, there are many ways the gut microbiome communicates with the brain. One of the ways our gut microbiome does this is, the microorganisms found in our gut produce metabolites, [substances made after the microorganisms break down food, and other things ingested like toxins], one of the most common metabolites produced are short-chain fatty acids. (Silva, Bernardi and Frozza, 2020)

These short-chain fatty acids have neuroactive properties and can directly influence our brain's function. The types of food we eat result in the type of short-chain fatty acids being produced in our gut and overall influence our brains in different ways. Gut micro-biota dysbiosis, which is the term used for an imbalance in the microbial equilibrium, an imbalance occurs when the microbiota is unable to protect themselves from harmful pathogenic organisms ultimately causing inflammation and a wide range of other health disorders associated with inflammation of the gut. (Gómez de Cedrón and Ramírez de Molina, 2020) There are currently many studies that show gut microbiota dysbiosis has been implicated in behavioural and neurological pathologies, including depression, Alzheimer's and Parkinson's, proposed treatments for early onset cases include the manipulation of the microbiota, through a change of diet and the direct administration of certain short-chain fatty acids into the gut. (Silva, Bernardi and Frozza, 2020)

The ecological integration of plants, animals and the materials used in the design of a building can be compared to the interaction our bodies have with microorganisms in a positive way. A building's balanced "microbiome" can be described as its healthy use of local and sustainable materials and the way in which it creates harmonious interactions with its inhabitants, being either humans or nature. The systems within the building need to be well connected, and the relationship it has to its inhabitants and its natural environment need to function seamlessly creating a resilient and proactively functioning building.

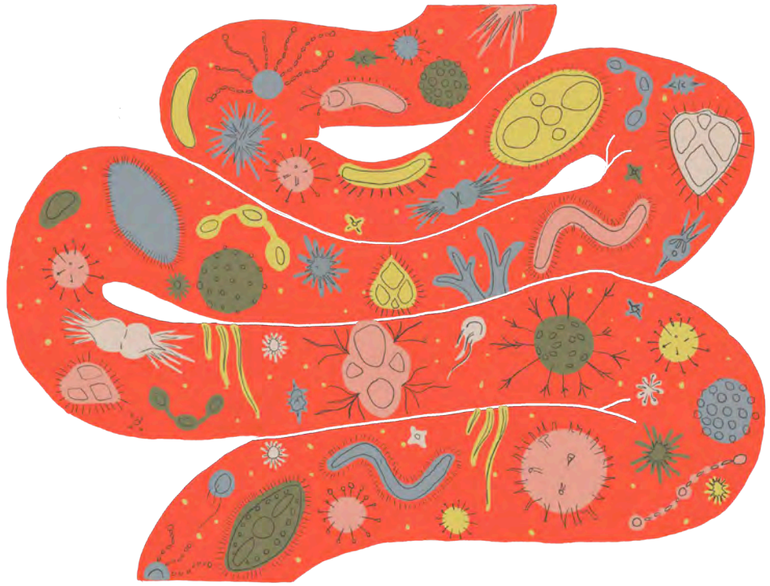


Figure 2.8 :
Above
Microbiome in gut
[Author , 2024]

Fermented goodness & Probiotics

Probiotics are live micro-organisms that have a variety of health benefits that aid in supporting our gut health. Many fermented foods are rich in probiotics, yogurt, sauerkraut, pickles, kefir, and kimchi are a few of the more commonly known fermented foods. These fermented foods aid in strengthening the diversity and stability of our gut microbiomes. Probiotics found in these types of foods interact with our existing gut microbiome in a positive way aiding in the digestive process and help regulate our appetites.

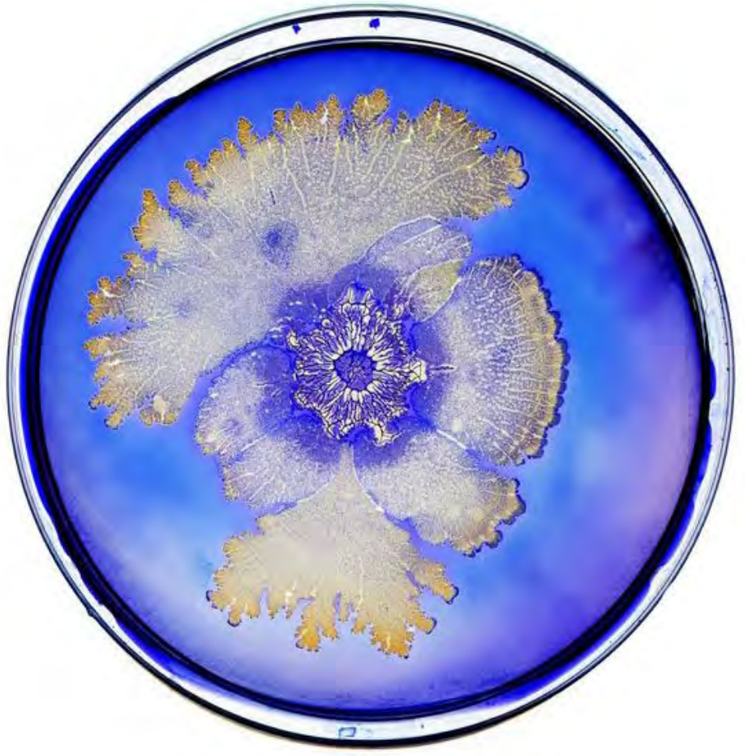
Studies show that what we consume fermented foods it can have a positive influence on the gut-brain axis, and that the saying 'you are what you eat' is not such a cliché after all. Researchers found that individuals who introduced and consumed more fermented food rich in probiotics had reduced social anxiety. (Hilimire, DeVylder and Forestell, 2015) Probiotics ultimately reduce symptoms of anxiety and depression through the production of neuroactive compounds and reduced inflammation in the gut. Other research found through a pilot study showed depression patients being administered a probiotic daily showed alleviated symptoms of their depression. (Wallace et al., 2019)

In the design of a culinary space that is dedicated to the overall well-being of its occupants and surrounding ecological environment, the understanding of the gut-brain axis is imperative, it has significant practical implications for both mental health interventions and dietary choices. The gut-brain axis being a central communication network within our bodies significantly influences both our mental and physical health. By understanding and supporting a healthy gut microbiome we can foster these intense interconnected systems within our bodies.

Knowing and understanding this knowledge of a holistic approach to health can be so beneficial in designing a space that will ultimately teach this knowledge not only through its program but also in the way the space is built and functions, this involves the creation of a building that is in harmony with its ecological and social environment, promoting sustainability and resilience.

If the building were the gut-axis then the occupants are the microbiomes that inhabit the space, and if the building were the part of a variety of microbiomes inhabiting the ecological environment it is vital that the occupants, building, and natural environment are all in harmony with one another.

Implementation of this theory into the design of the living kitchen we can draw certain key principles, the first being symbiotic relationships, there is a symbiotic relationship between the gut and its microbiome, we can mirror this relationship between the building and it social and ecological environment. Resilience and adaptability, the gut is resilient and adapts to external stressors, the building should be designed with adaptability and flexibility in mind, using flexible design methods so that spaces can adjust to different culinary activities. It is also important that other design elements are adaptable like the lighting and furniture so that the usability of the space is maximised.



Designing the space with an efficient nutrient and waste management system is crucial for the kitchen to function in harmony with nature. Just like the gut processes nutrients and waste. The use of healthy materials will also be used in the design of the spaces, just like the gut needs a balanced and healthy diet to function at its best, the materials used should emit similar principles of sustainability and health, using natural, ethically, and locally sourced materials. The gut is incredibly regenerative and has the ability to heal itself, the same understanding can be applied to the design of a building, the spaces should promote mental and physical well-being.

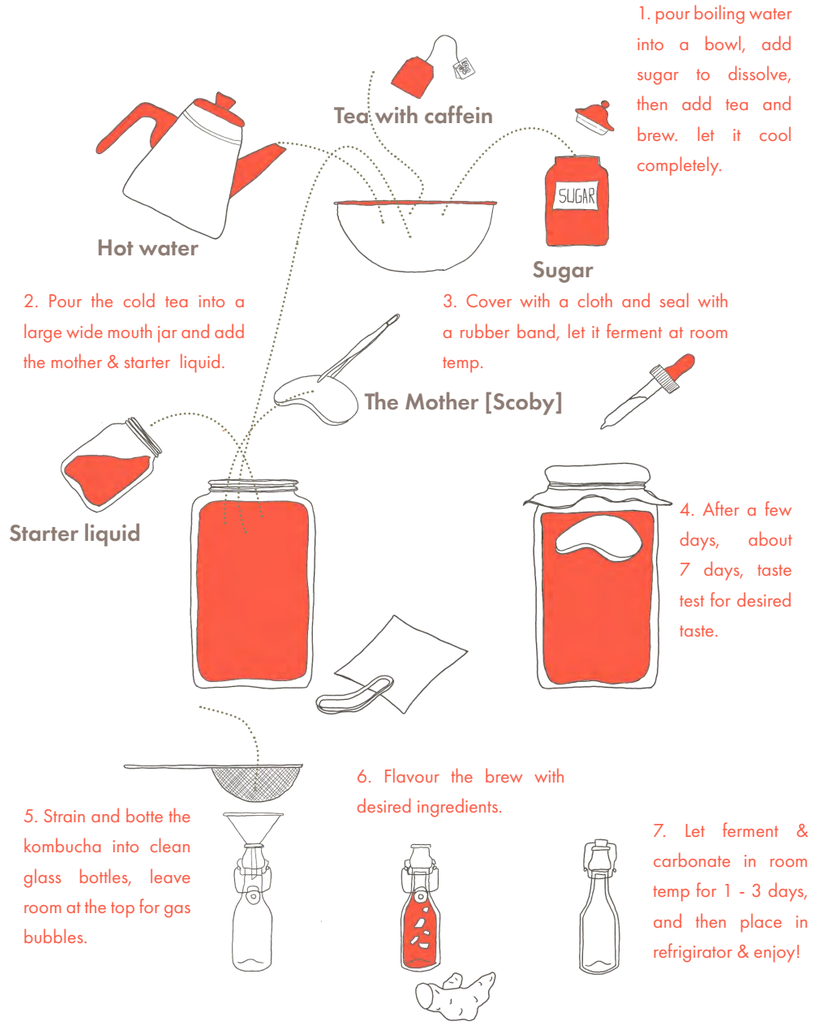
Figure 2.9 :
Probiotic Bacteria under microscope,
[Manipulated by Synthetic biologist Tal Danino, 2017]

[2.2] Fermentation

The Process

Fermentation is an incredibly important part of our civilisation, expanding back thousands of years. Fermentation highlights yet again the significance of micro-organisms and our relationship with them. Fermentation is most commonly known as a process of turning raw ingredients into preserved and nutrient rich foods, however fermentation also is a key factor in our human physiology, our bodies use the process of fermentation in more than one way. When we exert our muscle cells too much to the point where they cannot acquire oxygen fast enough, fermentation occurs in the muscles producing lactic acid to keep up with the body's energy requirements, lactic acid in muscles is the stiffness you feel after exercising.

The fermentation process also occurs in the gut, foods that is are not easily digested in the stomach are broken down in the small intestine by tiny organisms called microbes. Fermentation is used in a variety of industries including the animal feed industry, the biofuel and natural energy production industry as well as the medical and pharmaceutical industry to produce antibiotics and probiotics. (Jozala, 2017)



Making Kombucha

The Mother

Fermentation is a metabolic process that begins with a carbohydrate, a sugar or starch that is then transformed by microorganisms, like bacteria and yeast, into an alcohol or acid. It is an anaerobic process, meaning an oxygen free environment is essential for this process to occur. There are two types of fermentation involved in the gastronomy world.

The first is Lactic Acid Fermentation, this involves the transition of a carbohydrate into lactic acid by a bacterium, this is used in the production of foods like yogurt and sauerkraut. The second method of fermentation is known as Alcohol Fermentation, a process fundamental for the brewing of beer and wine, where a yeast, most commonly used [Saccharomyces cerevisiae], converts sugars into ethanol and carbon dioxide.

Acetic Acid Fermentation falls under alcohol fermentation, but this is the process of converting ethanol into acetic acid, which results in creating vinegars, as a result of Acetobacter bacteria.



Figure 2.10 :
Left
Making Kombucha
[Author, 2024]

Figure 2.11 :
Above
Textile sheets created from SCOBY, the "mother" (symbiotic cultivation of bacteria and yeasts).
[Paula Gonzalez, 2019]

History of Fermentation

Fermented foods are likely to be a part of the first type of foods ever consumed by humans. Not because they planned for their food to be fermented but because fermentation is an inevitable process that happens to raw foods when left alone and not preserved, for example, the juice from grapes would only be sweet for a few days before turning into a drink that we now know today as wine. Although there is no record of the discovery of fermentation, from as far back as 3000 – 4000B.C.E the Babylonians and Egyptians were already mass-producing foods like bread and wine. (Hutkins, 2008)

As civilisations grew in the Middle East and Mediterranean it is clear that the production of more fermented foods prevailed. Fermentation also evolved in China and the Far East around the same time as, although these foods were vastly different from the foods in the Middle East. (Hutkins, 2008)

During the Roman Empire the production of fermented foods expanded, and new technologies evolved. They travelled carrying fermented foods and drink as it lasted much longer than other forms of food. They also apparently preferred the wine and beer over water because water was often unavailable as a reliable source during their travels.

The trade of foods like cheese and bread, and drink like wine and beer became more prevalent during these times and became a form of craft. Hutkins makes an interesting argument that says, **"The popularity of fermented foods and the subsequent development of technologies for their production directly contributed to the cultural and social evolution of history." (Hutkins, 2008)**

It is utterly crazy to think that up until only two hundred years ago, microorganisms were only "discovered" and still that discovery was criticised right up until the middle of the 19th century, after having such an important role in the history of food production for so many years before that. Only then were the processes and microorganisms involved in fermentation studied.



Figure 2.12 :
Opposite
Fish sauce factory fermentation in Xiapu,China
[Photograph by: Kah-Wai Lin , no date]

Fermentation & Architecture

"Architecture and Fermentation, from the technical point of view, seem to be disconnected and to have nothing in common. Despite this, human architecture and fermentation both share same goal. Both disciplines aim to host living beings and/ or biological processes within the spaces they create. These spaces are intended to establish specific "indoor" conditions that benefits the living beings they contain."

- (De La Rosa Morón, 2022)

During the process of fermenting foods, the environment in which the ingredients are placed, for instance a jar, are carefully controlled, in order to control the growth of microorganisms so that they can go about their business, transforming raw ingredients into foods that are nutritious, flavour and contribute to gut health. The environment is essentially a space where life can flourish benefiting the entire process and the end result.



Fermentation and architecture are more alike than we think, they both require an extensive understanding of the processes that they support. In fermentation an extensive understanding of the intricate requirements needed for the microorganisms to thrive. In architecture its about extensively understanding the type and method of materials used in the building, how the natural world will interact with the building and how these factors will influence the inhabitants of the space. In both cases the underlying similarity is producing a controlled environment that either produces nourishing food or a space that nourishes its inhabitants. In architecture, there are analogies between biological fermentation processes and the adapting, changing, and beneficial nature of the built environment.

When drawing the parallel between architecture and fermentation we can compare the fact that the "gut health" of the building being the systems, structural design, use of materials and ecological integration, all need to work together in harmony to create a space where the natural world, inhabitants can coexist and flourish.

The buildings "gut health" essentially depends on a variety of biophilic design principles, including lots of natura light and natural ventilation, temperature regulation and a connection and integration of nature.

Figure 2.13 : Opposite **Controlled environments** [Author , 2024]

[2.3] Patterns in Nature

Biomimicry

Nature is full of intrinsic patterns that offer a blueprint for the creation of harmonious and sustainable building designs. These patterns in nature represent the interconnectedness and efficiency found in all different types of natural systems and ecosystems. In architecture, incorporating these patterns found in nature will foster environments that resonate with human biology and psychology while seamlessly resonating with the physical natural site.

How are we able to learn from nature and apply this knowledge to the design of buildings?

Since the very beginning humans have relied on nature for inspiration and guidance in architecture. It is human instinct to seek shelter and comfort from the natural elements. Early civilisations constructed structures made from readily available materials and build structures that resemble caves and nests. The way in which humans observe and emulate natural forms and processes to solve problems in a sustainable and innovative way has since been known as Biomimicry.

The concept of biomimicry is deeply rooted in the observation of natural systems and involves emulating natures patterns and strategies to solve human based problems like, design and engineering in a sustainable way.

The term biomimicry is derived from the Greek words "bios" which means life and "mimesis" which means to imitate. Since early civilisations humans have looked to nature for inspiration, mimicking natural processes in their designs and technological advancements.

For example, Leonardo da Vinci studied the forms of birds to try and understand the mechanisms involved in flying. He then went on to design flying mechanisms that resemble the anatomy of birds, long before there was any term associated with what he had done. (Pawlyn, 2019)

It was only in the 1957 that a biophysicist by the name of Otto Schmitt coined the term "biomimetics", after he was working on an electrical device that mimicked the electrical action of a nerve. (Vincent et al., 2006) A few years later Schmitt used the word biomimetics in a paper he wrote for the Third Int. Biophysics Congress called "Some interesting and useful biomimetic transforms". It was only in 1974 when the word officially became a word and was published in Websters Dictionary with its definition:

"The study of the formation, structure, or function of biologically produced substances and materials (as enzymes or silk) and biological mechanisms and processes (as protein synthesis or photosynthesis) especially for the purpose of synthesizing similar products by artificial mechanisms which mimic natural ones."

(Vincent et al., 2006)

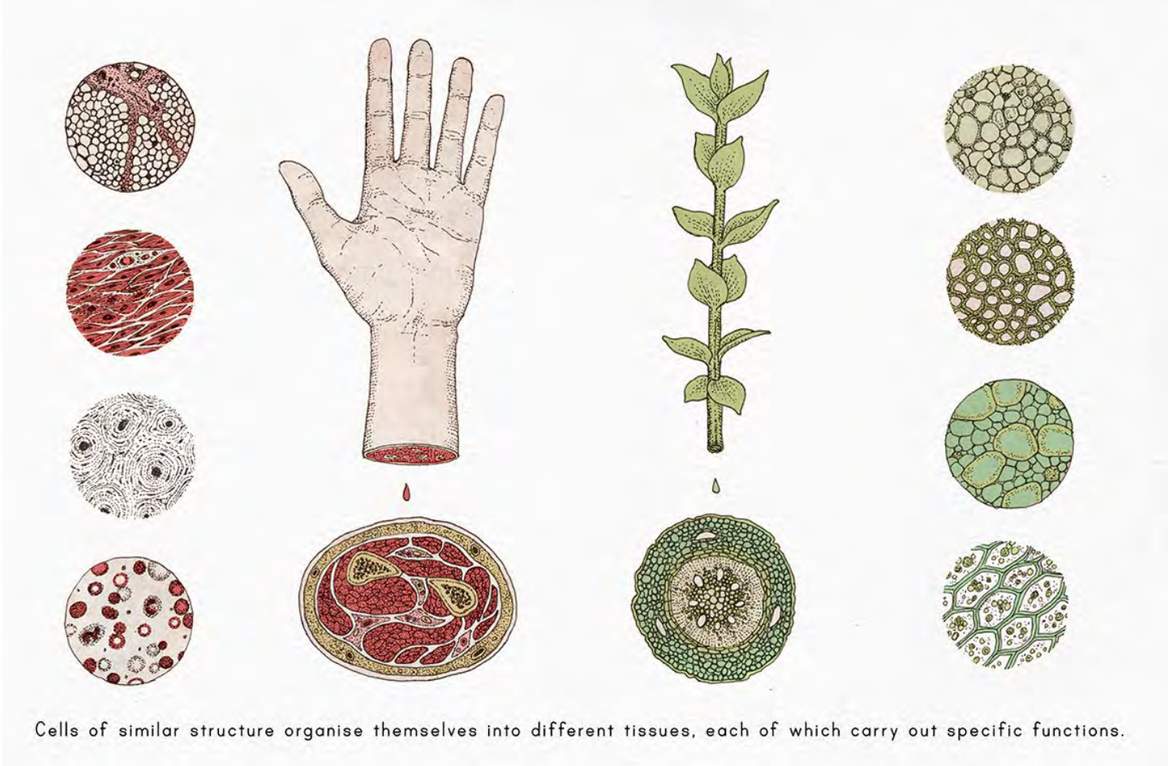


Figure 2.14 :
Levels of complexity
[Illustration by Vivien Matineaur , 2024]

Janine Benyus, a biologist and author, was the first to popularise the term and concept of biomimicry. She wrote a book, published in 1997 called "Biomimicry: Innovation inspired by Nature" where she outlined in depth ways in which the study and emulation of nature's systems can address issues surrounding sustainability, resource efficiency and resilience in the manmade world. (Benyus, 2002)

In her book she articulated three main principles of biomimicry:

• Nature as a Model: This involves the studying of natural forms, processes and systems and then imitating or taking inspiration from these designs and processes to solve human problems.

• Nature as a Measure: This is based on billions of years of evolution the natural world has endured and learned. This means that we can use nature as a natural benchmark for evaluating the sustainability and efficiency of designs.

• Nature as a Mentor: By viewing nature as a mentor, we can respect and learn from the natural world, ultimately fostering a deeper connection and appreciation for the natural world. "Biomimicry is a new way of viewing and valuing nature. It introduces an era based not on what we can extract from the natural world, but on what we can learn from it." (Benyus, 1997)

When drawing similarities between the complex symbiotic relationships of our gut microbiome and the dynamic interactions that exist between a building and its environment, we must recognise that balance, diversity and a harmonious relationship with its environment are all key factors. By modelling natures principles through the use of biophilic design and biomimicry we are able to create an environment in which the inhabitants are supported all round. By respecting the natural world, we can view architecture or a building as a living entity, capable of nourishing all life forms, enable sustainability and maintain a balanced and adaptable relationship with its diverse environments.



Figure 2.15 :
Opposite
Standing with shadows
[Author , 2024]

Rooted Relationships

Rooted relationships including the symbiotic plant and fungi interactions or the mutualistic bond between animals and their habitats, act as insightful metaphors and practical guidelines for the architectural design of a building. These interactions found in nature highlight the principles of collaboration, resilience, adaptation and sustainability, when integrated into the design of a building can create spaces that are in harmony with their surrounding context as well as beneficial to their occupants. In the context of the barn, it acts as a main protagonist of adaptation, these principles are deeply rooted in the site's history, its ecological and social context and in the memories the barn holds.

Symbiotic relationships in nature as a metaphor for design

Lichen are organisms that result from a mutualistic relationship between a fungus and another photosynthetic organism, usually a bacterium or green alga, where both organisms benefit from what they provide each other. The fungus grows around the bacterium or algae cells and benefits from a continues supply of nutrients produced by either the bacterium or algae. The bacterium or algae benefits from the water and nutrients absorbed by the fungus. Lichen can thrive in most environments and can inhabit many different surfaces including tree bark and rocks. The way in which lichens filter sunlight and capture nutrients from their surrounding context mutualistically benefiting itself is a precedent for the design of buildings.

Collaboration is also highlighted through the symbiotic relationships include the relationship between mycorrhizal fungi and the root system of plants. The fungi actually integrate itself into the physical structure of the plant root, creating structures called "hyphae" that act as roots extending further into the ground expanding the plants nutrient-gathering capacity, in return the plant provides the fungi with the nutrients it needs to survive.



Another example would be the way in which bees pollinate flowers when collecting nectar, which supports the reproduction of the plant and supports the survival of their colony.

Using these symbiotic relationships as a precedent for building design highlights the importance of collaboration, resilience and sustainability. The integration of living systems into the building design will enhance the symbiotic relationship between the building and nature; by providing a habitat for these natural systems the building will benefit through improved air quality and aesthetic and thermal aspects. Nature is resilient, ecosystems are diverse and abundant and are often able to withstand or recover from disturbances.

On the following page is a precedent focused on the encouragement of a symbiotic relationship between the built environment and nature.

Figure 2.16 : Middel
Lichen on site
[Author , 2024]

[2.4] Living materiality 01

bio-receptive concrete solution by Respyre

‘we have developed concrete and a concrete plaster that accommodate the growth of moss on surfaces. any surface covered in moss, small or large, becomes an autonomous and natural respiratory system for the city. our system is committed to the natural cycle of resources and the sustainability of the environment. with this, respyre empowers cities to breathe,’

- Respyre Group

I am particulary interested in their Respyre roof tiles, these tiles are traditional in the sense that they mimic those made from clay, concrete and slate. Roof tiles have been used for many years all around the world as roofing chioce, but what makes these Respyre roof tiles so incredible is, first they enhance the aesthetic appeal of a building and secondly they have amazing sustainable benifits.

They naturally insulate the building, lowering energy consumption, the moss also aids in air purification as the moss filters carbon dioxide in the air and releases oxygen. Respyre has only just released the technology to grow the moss on vertical surfaces, and so there are no precedent examples.

Growing process:

01. Applying
The “bioreceptive concrete” is applied to a surface and then a “bio-enhancing gel” is applied to accommodate the moss spores.

02. Watering
A temporary irrigation system is used for the beginning stage of the moss growth.

03. Growing
The moss growth starts with a green mat called protonema, which eventually grows into a layer of moss within the span of a 12 week period.

04. Self-sustaining
When the moss is fully grown it is able to survive on its on in most climates.

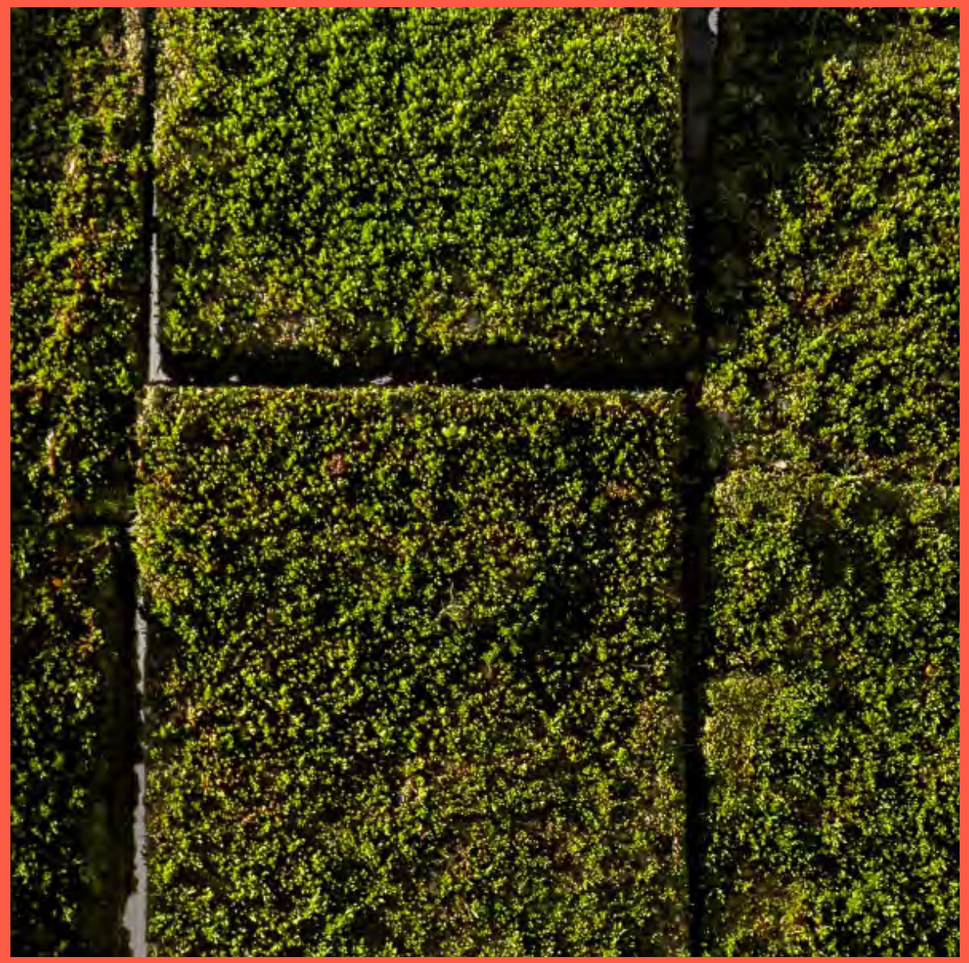




Figure 2.17 :
Opposite
Bio-receptive moss concrete
[Respyre , 2024]

The barn is rooted in the memories it holds

The barn itself is rooted in its context and holds memories of past occupants and events. There is often a lot of criticism around the way memories are formed or manipulated, for example the way in which certain historic preservationists choose places to preserve and the reasons why. Places embody memories, even when those memories may be controversial or contested. (Mayes, 2013) There are many mechanisms that highlight the connection between memory and place, places can serve as a mnemonic aid, which means that places can remind us of individual and collective memories. Places can remind us of personal experiences that may not have anything to do with the place being visited, places that evoke these memories are also able to encourage the exploration of broader societal memories linked to the specific place that they might not fully understand yet.

Old buildings and old places evoke a sense of continuity in people, with memory being a key factor in this. Memory aids in forming both individual and collective identities, As Hoelsher and Alderman put it, "Whether one refers to 'collective memory,' 'social memory,' 'public memory,' 'historical memory,' 'popular memory,' or 'cultural memory,' most would agree with Edward Said who said that many 'people now look to this refashioned memory, especially in its collective forms, to give themselves a coherent identity, a national narrative, a place in the world." (Mayes, 2013)

Identity is shaped by memory, and therefore defines us as individuals and as a society. Memories and identities of old buildings and places are often contested because of what might have occurred there in the past. Although the memory and identity of a place can also evolve and be viewed and interpreted differently over time, highlighting the changes in collective identities and creating new ones.

Buildings should be built and maintained to be able to adapt to new narratives and contexts, parallel to the way in which our gut health is able to respond to different environments and diets, adapting to suit our needs the best it can. The barn can be defined as a space with historical memories and future possibilities, adaptable while maintaining a connection to its past.

Adaptation and reappropriation are key components of a building's "gut health," enabling the barn to remain a vibrant and functional part of the community in the future. A building with a sustainable "gut health" is one that is resilient, able to adapt, and constantly restoring itself by way of integrating its past, present, and future in a harmonious and maintainable manner.



Figure 2.18 :
Middel
Rooted barn
[Author , 2024]

[2.5] Biophilia

A love of all bio

Biophilic design is based on the term Biophilia, which is a term that has been around for centuries. The term was first coined by a social psychologist Erich Fromm where he wrote about biophilia as "the passionate love of life and all of that is alive" (Fromm, 1974) Later a Harvard biologist Dr Edward O. Wilson redefined biophilia as what he believed and saw as humans "innate tendency to focus on life and lifelike processes." The word biophilia comes from the Greek words, 'bios' means life or living things and 'philia' means love or affinity. (Wilson, 2007)

Biophilia – "the innate tendency to focus on life and life like processes ... To affiliate with life is a deep and complicated process in mental development. To an extent still undervalued in philosophy and religion, our existence depends on this propensity, our spirit is woven from it, hope rises on its currents."

– E. O. Wilson [1984]

Wilson formalised the word biophilia as a scientific hypothesis, emphasising that this innate tendency to feel connected to life is hereditary. This is supported by psycho-evolutionary theories that suggest our emotional responses are rooted in our human evolution. According to Wilson a connection to nature is undeniably essential for our emotional well-being. Our evolutionary need for a connection was also explored by a social ecologist, Stephan Kellert, he said that "the 'the inherent human inclination to affiliate with natural systems and processes, most particularly life and life-like features of the non-human environment'. (Kellert, 2008)

This means that biophilia is a natural part of us that we inherited, we did not learn this feeling. Biophilia is also emotional as it effects our psychological well-being. Biophilia highlights the relationship between humans and nature, it shows both our ability to adapt to ever changing environments as well as our emotional connection to nature. (Totaforti, 2018)



Figure 2.19:
Middle
human, nature & built environment connected relatioship.
[Author , 2024]

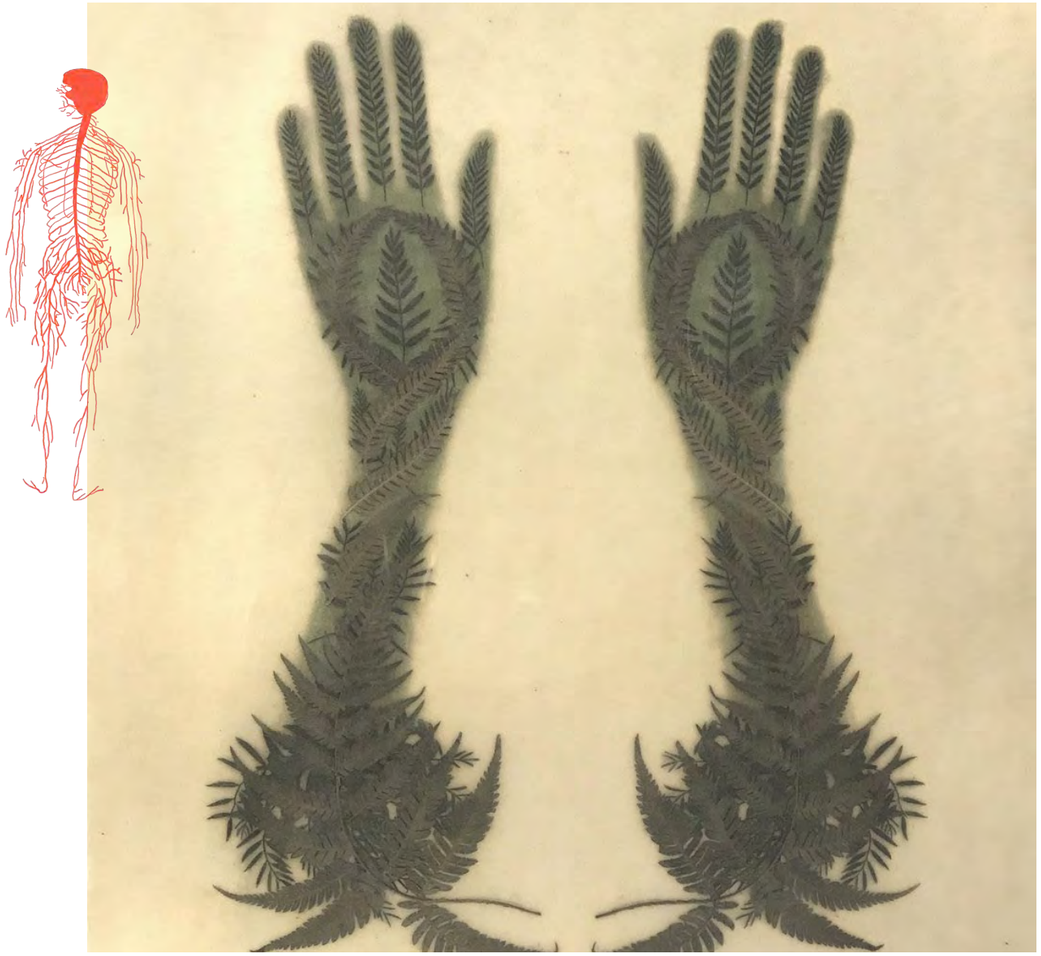


Figure 2.20 :
Right
"Traces" pigment, wax on paper
[Valerie Hammond, 2024]

There are thousands of theories being studied around Biophilia in relation to technology, psychology and many more, however, in the realm of architecture the word biophilia has transcended into the term Biophilic design, an architectural approach to reconnect people with nature within the built environment, to overall promote well-being. Buildings designed with biophilic design principles are not simply used, they are experienced, fostering a deeper and more meaningful connection to the natural world.

Stephan R. Kellert has identified eight biophilic values along with their associated benefits in his book - Nature by Design: The practice of biophilic Design. He states that the content of these values varies, often depending on people's cultures, backgrounds, experiences and learnings. (Kellert, 2018) I have highlighted 5 of his values I think are crucial in the design of this building.

• "Affection: The human tendency to express strong emotional attachment and at times love for features of the natural world. Commonly associated benefits include the ability to bond, care, and connect emotionally with others. "

• "Attraction: Peoples inherent aesthetic attraction and ability to perceive beauty in nature. Associated benefits include feelings of harmony and symmetry, emotional and intellectual development, and enhanced capacities for imagination and creativity."

• "Exploitation: The tendency to utilise the natural world as a source of materials and resources. Commonly associated benefits include enhanced security, extractive abilities, and practical skills."

• "Intellect: The inclination to use nature as a means for advancing rational thought and intellectual development. Benefits include cognitive skills, empirical and observational abilities, critical thinking, and learning."

• "Symbolism: The tendency to employ the image of nature to advance communication and abstract thought. Important benefits include the capacities of language and culture, intellectual development, and enhanced imagination and creativity."
(Kellert, 2018)



Figure 2.21 :
Above & Opposite
Ecosystem in contained environment - Terrarium
[Author, 2024]



Kellert then goes on to explain that people will not benefit from these types of values and contact with nature without engaging in constant learning and experiences with nature. Long lasting exposure and learnings from nature will only benefit people exponentially, while short term exposure to nature will only benefit people momentarily. Unfortunately, in today's world many people are disconnected from nature, focused on an urban, technology-based way of living. Kellert has developed a set of biophilic design principles based on the idea that we humans have evolved in an adaptive reaction to the natural world. He believes:

"Human functioning depends on being part of an ecological system of interrelated, mutually reinforcing, and integrated parts that constitute a whole greater than its constituent elements. This means that designing the built environment to meet our inherent tendencies to affiliate with nature ecologically connected and complementary ways."

(Kellert, 2018)

What he is basically saying is that as humans we rely on being a part of an interconnected ecological system, and when designing the built environment, we need to design the spaces that innately connect and balance our desired need to connect with nature. The biophilic design principles have been summarised into 5 main points.

The first one is ensuring that humans have a repeated and sustained engagement with nature, maintaining a continues bond with natural elements in our everyday lives.

The second is a focus on our evolutionary adaptations to the natural world, which over time has advanced our health, fitness, and overall wellbeing.

The third principle is to encourage an emotional attachment to certain settings or places, the creation of spaces that resonate deeply with individuals.

The fourth principle is the promotion of positive interactions between individuals and nature, fostering a sense of responsibility and connection to both natural and human communities.

The fifth and last principle of biophilic design is to develop mutual reinforcing, interconnected and integrated architectural solutions that ultimately enhance a harmonious relationship between the built environment and the natural world. (Kellert and Calabrese, 2015)

The practical application of biophilic design principles focuses on 3 different types of experiences. A direct experience of nature, refers to the direct visual connection with elements of nature, including light, plants, water, fire, animals, air, natural landscapes, and weather. An indirect experience of nature, includes the incorporation of natural elements into the design of a space, including, natural geometries, natural materials, natural colours, naturalistic forms and shapes, simulation of natural light and air and images of nature, the patina and age of time present in design elements, and the use of biomimicry in the design process. (Kellert and Calabrese, 2015)

An experience of space and place, these types of experiences are a little more complex.

The first is "prospect and refuge", prospect refers to longer views of a surrounding setting so that individuals can perceive both dangers and opportunities. Refuge refers to a place of safety and security, successful biophilic design uses the continues connection of prospect and refuge, for example a visual connection from the inside of a house to the outside.

The second is "organised complexity", this refers to human's desire of complexity in natural and built settings, these spaces evoke feeling of opportunity, however there is a balance between too much complexity, which can feel overwhelming whereas organized complexity evokes feeling of coherence and connection.

The third is "Integration of parts to wholes", this means that people prefer spaces where the different elements form a cohesive whole, where spaces are linked with clear boundaries and central focal points through functionality or thematically. (Kellert and Calabrese, 2015)

The fourth is "Transitional spaces", this refers to the clear connection between spaces, using distinct transitions. The fifth is "Mobility and wayfinding", the absence of clear pathways and entry or exit points cause confusion and anxiety, people want to move through a space easily. The sixth is "Cultural and Ecological Attachment to Place", this refers to us humans having a natural desire for familiar places, evoking a sense of resource control, safety, and mobility. Our connection to place is strengthened through culturally relevant designs that give a place a distinct identity, promoting a connection to the local ecosystems and promoting a desire to conserve and sustain that local ecosystem. (Kellert and Calabrese, 2015)

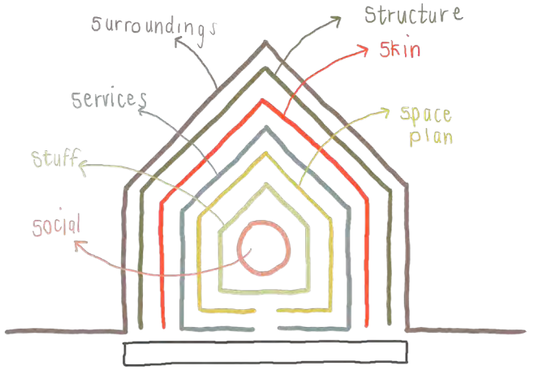


Figure 2.22 :
Left
Adapted diagram by Frank Duffy
[Author, 2024]

Biophilic design and the application of this harnesses our instinctive affinity for the natural world, which has been studied for years. Through the integration of these design principles, we can design spaces that foster a deeper connection not only with our selves but with the natural world, promoting over all well-being and an improved experience with the buildings we design and live in.

This approach to design is grounded in our evolutionary need to interact with nature, ultimately supporting our mental, physical, and emotional health. In relation to the study of the gut and how that theory can transcend into the gut health of a building, the fact that we are so richly connected within our own bodies especially to what we eat and experience, overall enhances the fact that we are deeply rooted and connected to the natural world, and this should be prevalent in our built environment.

To promote the idea of the 'gut health' of a building, the principles of biophilic design will be applied, not only to create a space that is sustainable within its context, but to foster and nourish the buildings connection to the natural world and its inhabitants. Direct and indirect experiences with nature in the building will resonate with our human innate connection and our desired need to resonate with nature, emphasising the concept of biophilia. The creation of spaces not only meet its programmatic functions but also nourishes the connection between humans, place and nature will ultimately ensure the building remains a living entity that supports the well-being of its occupants much like that of a healthy gut.

What do living materials look like?

The following page is a precendent exploring more "living materials" highlighting the beauty in what nature can offer us in the creative industry.



Figure 2.23 :
Below
Biophila collage
[Author, 2024]

[2.6] Living materiality 02

Suzanne Lee: "Biocouture"

Suzanne Lee is a London based creative director of "Biocouture" a science fashion company investigating growing clothing from bacteria.

This jacket is made from cellulose, which is grown and produced by millions of bacteria grown in a bucket of green tea – essentially the jacket is made from kombucha.

The 'eco-textile' is grown in flat sheets which are then cut to shape, sewn together or moulded over 3D forms. (designboom, 2010)



Figure 2.24 :
Below left
"Biocouture"
[Suzanne Lee, 2014]





Aniela Hoitink – Living Skin

Aniela Hoitink is an artist based in the Netherlands that focuses on the incorporation of microbiology and textile. She has made a number of garments made from mycelium in petri dishes, this is evident in the circular shapes seen above. (Fernández, 2016)



Figure 2.25 :
Below middle
Living Skin
[Anne Hoitink, 2016]





Kathrine Barbro Bendixen - Lighting

Kathrine repurposes discarded cow intestines into intricate lighting fixtures. Her creativity is blended with sustainability, transforming something regarded as waste into an interesting artwork. Her work is a blend of functionality and environmental consciosness. (Inside Out, no date)



Figure 2.26 :
Below right
Lighting
[Kathrine Barbro Bendixen, 2019]



Reflection

By incorporating the use of "Living Materiality", with a focus on growth, adaptability and response to external environments, the building becomes dynamic and symbiotic with its surroundings. In the context of my thesis, the incorporation of "Living Materiality" into the building design, aligns with biophilic design principles, adaptive reuse and the metaphore I have used to compare the built environment to fermentation.

These materials celebrate the regenerative and symbiotic cycles and relationships present in both the natural world and the gastronomy realm central to my thesis, creating sustainable, responsive spaces that embody the interconnectedness of the built environment, nature, and their communities.



Figure 3.1 :
Opposite
The Kitchen Collage
[Author , 2024]

The Kitchen

Socio - Cultural Setting

This chapter explores the history and socio - cultural influence of cuisine in South Africa. The way in which food has been prepared and stored will ultimately influence the programmatic functions and the specific design requirements of certain spaces within the building design.

[3.1] History of cuisine in South Africa

Kitchens, Food Preparation & Storage

South Africa's culinary history is just as rich and diverse as our culturally diverse heritage. The evolution of kitchens, preparation of food and storage practices reflects the countries varied influences, including that from indigenous culinary practices, colonial influences, Asian and African influences, Apartheid Era and "Township cuisine" to the now modern kitchen and contemporary cuisine.

This chapter delves into the complex relationships between indoor and outdoor cooking practices, focussing on how diverse settings influence culinary techniques and the design of facilities where food is produced and eaten. It dives into different ways of food preservation, preparation, and cooking, investigating how these practices have changed across cultures and climates.

It also looks into the cultural aspects of eating, namely how traditions and social practices impact the constructed forms connected with meals and food preparation.

This chapter aims to provide a comprehensive understanding of the cultural and architectural implications of culinary practices by investigating how food is preserved, prepared, cooked, and consumed. It will also provide valuable insights for the design of spaces that foster a deeper connection between food, community, and the environment.



Figure 3.2 :
Opposite
GLORY TO MAMAS
[Painting by Hugues Matumona, 2021]

Indigenous Culinary Practices

Before the arrival of European settlers in South Africa, the indigenous communities including the San, known as the hunter-gathers, the Khoi-Khoi, known as the pastoralists, and the Bantu, known as the first farmers, had already established and sophisticated methods of food preparation and storage.

The San people did not domesticate animals or cultivate crops; however, they did categorise hundreds of plant species along with their uses, from medicinal to nutritional and much more. The San relied on a diet of wild game, plants and insects that they either hunted or foraged, and used fire pits to cook meat and stone tools to prepare food and grind roots and seeds. (San - Bushmen - Kalahari, South Africa..., no date)

Hunting is done by the men and is a team effort, the arrow belonging to the man who killed the animal has the inherent right to share the meat and feast with the rest of the tribe, however, the foraging done by the women is not shared with the tribe, and only eaten by her immediate family. (Hernandez, 2022)

The pastoralists, known as the Khoi-Khoi are also indigenous people of South Africa derived from the San communities throughout the western area of South Africa.

The Khoi-Khoi purposefully divided themselves from the San people however their language and cultural beliefs are very similar. They were the first livestock farmers in South Africa, raising cattle, goats and sheep. (Hernandez, 2022)

They were a nomadic group of people, meaning they would only settle in one place according to seasons and animal grazing patterns before moving again. Their homes were made from lightweight materials and were easily taken apart for their constant travels making their architecture very adaptable.

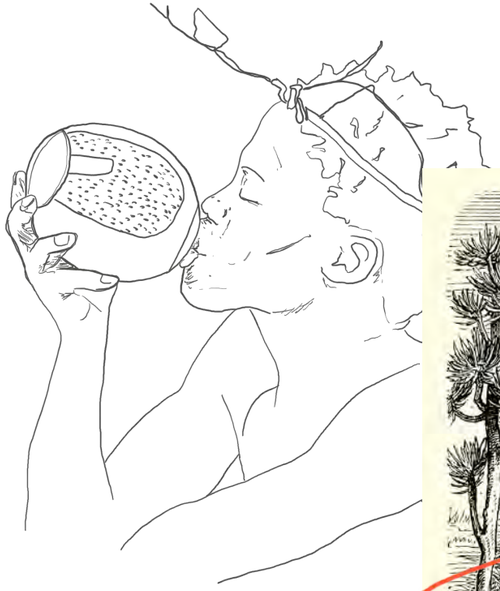


Figure 3.3 :
Above
Man drinking from ostrich egg
[Author, 2024]



Figure 3.4 :
Opposite
"Vintage engraving of a village of the Khoikhoi. The Khoikhoi or Khoi,are the native pastoralists people of south western Africa."
[Ferdinand Hirts Geographische Bildertafeln,1886]

In the Khoi-Khoi society, animals were a sign of wealth, providing food, shelter, clothes and transport, unlike the San people where everyone was considered equal, and goods were shared. The Khoi-Khoi people only ate their livestock when they died or for special occasions like a wedding or funeral. Women would milk the animals, and forage for wild plants to eat. Similarly to the San people they killed game for an everyday source of food.

The first farmers in South Africa are said to have moved from areas in West Africa, including Cameroon, and are known as The Bantu speaking farmers. This is why many languages spoken in central and southern Africa sound so similar. They are said to have first settled along the east coast of South Africa before moving more inland for more fertile land. They adopted a more permanent way of living settling for longer periods of time so that their crops could grow. They rapidly changed the environments they lived in utilising a system now called "Slash and Burn" where they would chop down trees and burn grass making way for their crops, using the wood to create shelters and using the burnt debris as fertilizer.

As they moved further inland, they met the Khoi-Khoi people and realised that they had lots in common. The first farmers taught the Khoi-Khoi about their farming methods and the way in which they forged iron to create tools and weapons, and the Khoi-Khoi taught the farmers about all the medicinal and healing properties found in plants. The first farmers lived in round shelters made from mud and grass, they separated their areas according to how they stored food, kept the cows and communal areas.

It is said that these early farmers settled in the Magaliesberg valley during the 6th century during the iron age and decided so because of the climate and rich soil conditions. ('Magaliesberg Association for Culture & Heritage: MAGALIES MEMOIR No 1 - Magaliesberg Biosphere', 2020)

Figure 3.5 : Opposite
Illustration and caption from Origins of the African People of the Johannesburg Area by [Revil Mason Johannesburg: Skotaville, 1987]



"The Earliest Tswana settlement at Broederstroom 1500 years ago. The huts may have been shaped like those in the drawing. They were built by using clay plaster in place on the curved roof of the stick framework. Some of the huts had raised floors. Skulls of the ancestors were kept in a clay jar near the houses and the men were busy smelting iron ore in furnaces in front of the houses. The men on the right are preparing the brown spongy iron ore for smelting in the furnace. Domestic goats stand on the left of the picture. These were the earliest domestic animals to reach the Magaliesberg Valley. The men in the back of the picture are carrying a dead impala. These early Tswana people got much of their meat from hunting wild animals."

Extract from Cradle of Life by Vincent Carruthers (Struik Nature, 2019)

Two types of crops were grown by these farmers, Sorghum and millet which were grinned into a powder to make porridge and beer. It was only after a few years that the Europeans introduced wheat to the first farmers.

It is said that grains were stored in baskets above ground raised by stones, called granaries. (Doke et al., 1962) Other produce was stored in underground pits underneath the cattle kraal, either clay fire baked or lined with cow dung; it is said that the cow dung methane gas-controlled insect infestation. (Russell, 2022)



Figure 3.6 :
Above
Graneries in Ethiopia
[A. Davey, 2007]

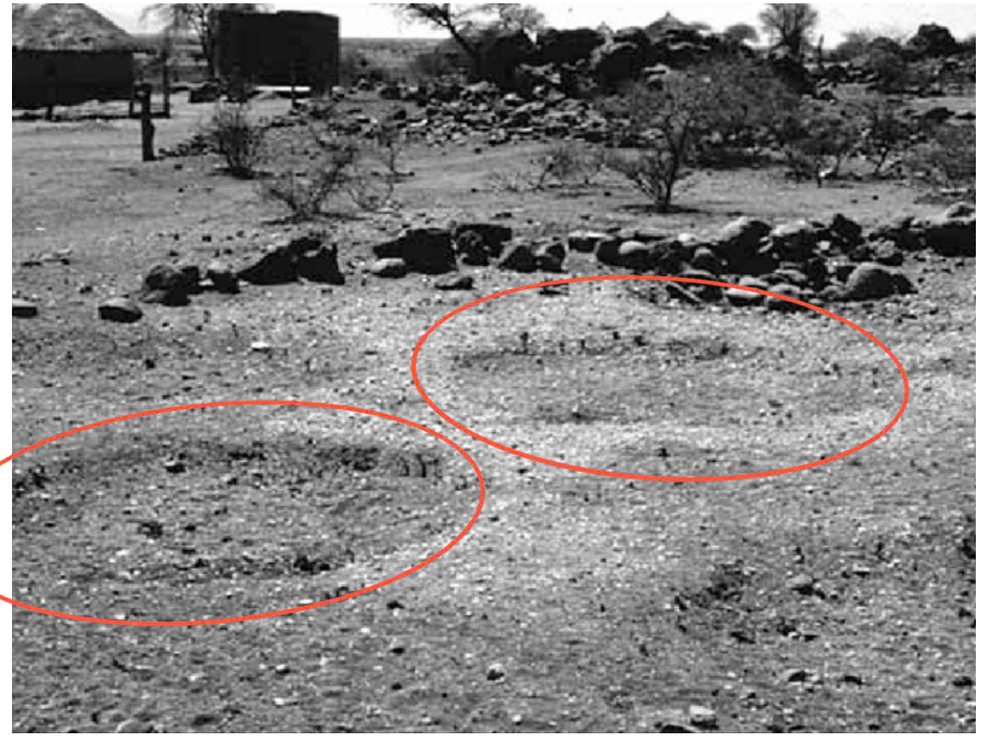
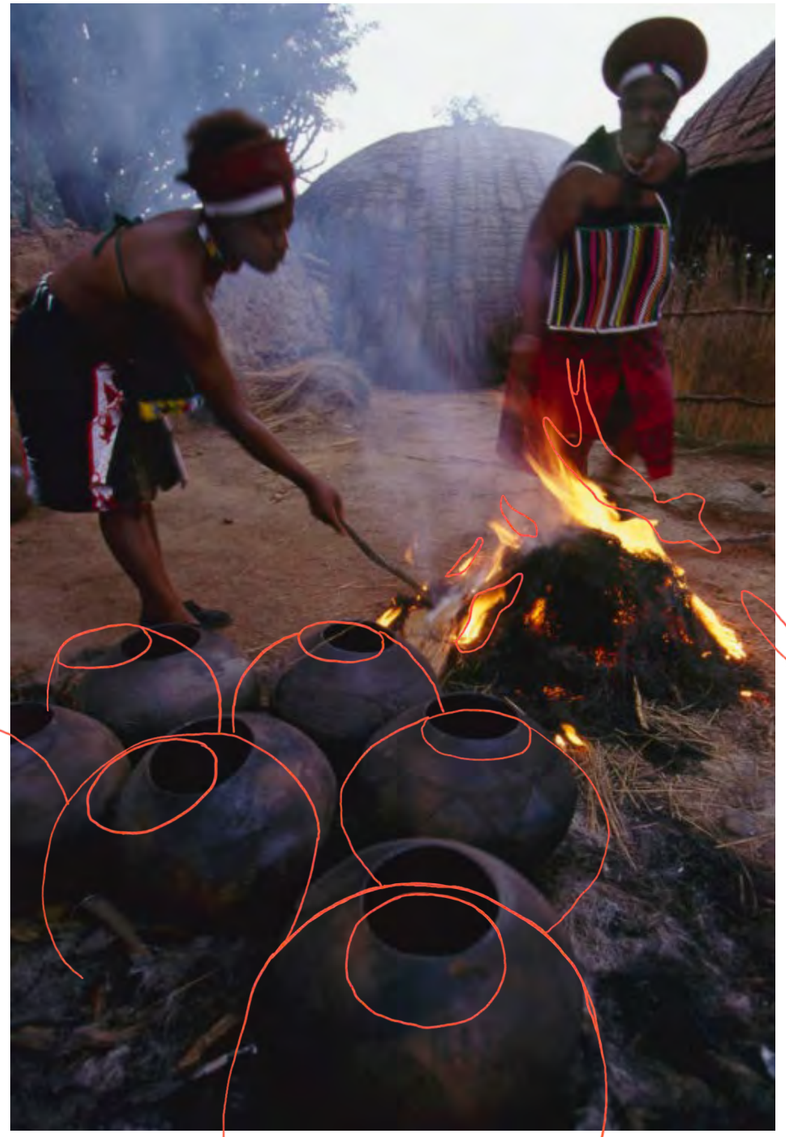


Figure 3.7 :
Above
Tops of storage pits in 19th century cattle kraal
[Thomas N. Huffman, 2012]

Fermentation and sun-drying are two types of traditional food processing techniques and knowledge found in Africa; these techniques were developed to create low-cost food preservation with no refrigeration. To name a few traditional food preservation techniques; threshing, winnowing, de-hulling, peeling, dry milling, wet milling, roasting, cooking, parboiling, blanching, sun-drying, smoke drying and fermentation. (Aworh, 2023)

Sun-drying is a technique that involves the use of sunlight to remove moisture from produce, it requires lots of space, hight temp, low humidity and is particularly labour intensive. Fruits and vegetables such as tomatoes, peppers, onions and other vegetables are preserved through drying. Meat and fish have been preserved using a variety of techniques including smoking, salting and curing. Biltong is a method of curing and drying all kinds of meat and has a rich historic link in south Africa. Their food preparation methods included boiling or steaming of foods in clay pots, while meat was cooked over an open fire.





"Traditionally, coiled pots are rubbed with a stone to achieve a smooth surface before they are fired. Thereafter, potters working in rural KwaZulu-Natal usually follow a two-stage firing procedure. Once pots are cool enough to remove from the fire after the first firing, they are blackened in a second firing."

(Klopper, no date)

Figure 3.8 :
Left
Fish being dried at Broederstroom, not far from my site.
Author, [2024]

Figure 3.9 :
Right
No title - Clay pots being fired
[Roger de la Harpe, no date]

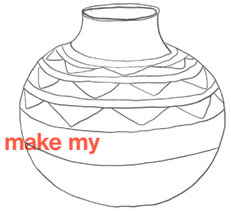
Traditional fermentation is still so prevalent in today's society and is said to improve the nutrient value of foods, put in simple terms the process of fermentation makes proteins easier to digest and increases the amount of minerals that can be absorbed into the body.

Fermented foods commonly found in South Africa include:

Umqombothi is a sorghum based alcoholic beverage, as shown in figure x

Mahewu is a fermented sorghum porridge made with finger millet malt (rapoko) and baobab (mabuyu) powder.

Amasi (in Ndebele, Zulu and Xhosa), emasi (in Swazi), maas (in Afrikaans), or mafi (in Sesotho), is a thick curdled sour fermented milk product



I work hard every day to make my beer (umqombothi),

Wake up early every morning to please my people with African beer umqombothi),

I make sure the fire burns to make my beer (umqombothi),

My special beer umqombothi (umqombothi),

Is African beer.

We MaDlamini (everybody),

Uph'umqombothi (come and drink my),

We MaDlamini (magic beer),

Uph'umqombothi".

(Yvonne Chaka Chaka's hit song Umqombothi) (Goitsemodimo, 2020)

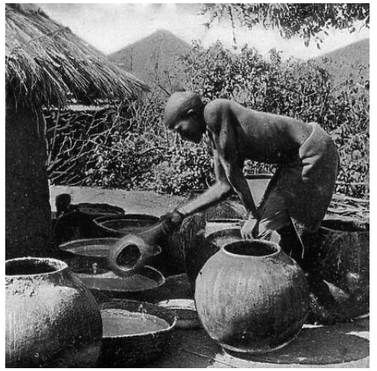
Figure 3.10 :
Opposite Top
Zinkhamba filled with beer, some covered with coiled grass lids (izimbenge). A woven grass beer strainer in the foreground and, in the background, two large storage pots (izimbiza).
[Roger de la Harpe [no date]

Figure 3.11 :
Opposite bottom left
Native African Matabele man brewing beer at the side of a hut.
[Mary Evans, 1930]

Figure 3.12 :
Opposite bottom middle
Brewing traditional African beer
[Poco_bw, 2020]

Figure 3.13 :
Opposite bottom right
Sotho beer ewer/ beaker
[Gosiame Amy Goitsemodimo, 2020]





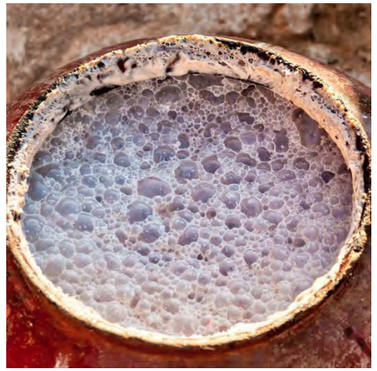






Figure 3.14 :
Left
Native South African women brewing beer by their huts.
[Coloured lithograph by G-F Angas, no date]

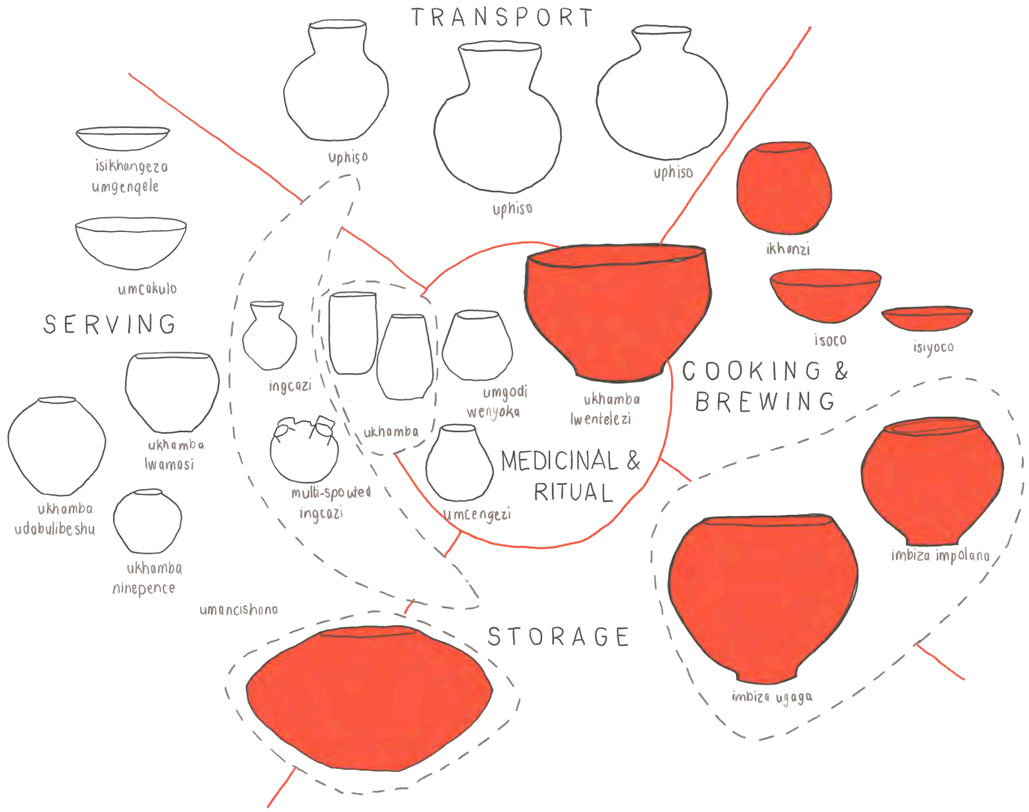


Figure 3.15 :
Above
Different pots and their uses
[Author, 2024]

Colonial Cuisine Influences

During the mid-17th century, the Dutch East Indian Company decided to create a resting and restocking station in the Cape as a halfway point between their trips to Indonesia. It is said that Jan van Riebeeck's first project after arriving at the Cape in 1652, was to create vegetable gardens to produce the fresh food needed by the passing ships. The Dutch introduced a variety of new crops and farming techniques along with new life stock including sheep and pigs to South Africa.

Wheat, barley and grapes are among the few crops introduced. Their cooking setup was characterised by large hearths used for open fire cooking, with the introduction of large iron pots and pans, the most used and still extremely prevalent today is the "Potjie Pot", which is a round, cast-iron, three-legged pot. (Naidoo, 2013)

The Dutch settlers brought their cooking traditions with them to South Africa and adapted their methods to best suit the available produce. Wild game like venison, bushpig and Guinea fowl were the meats commonly used in their stew with the addition of any readily available vegetables.

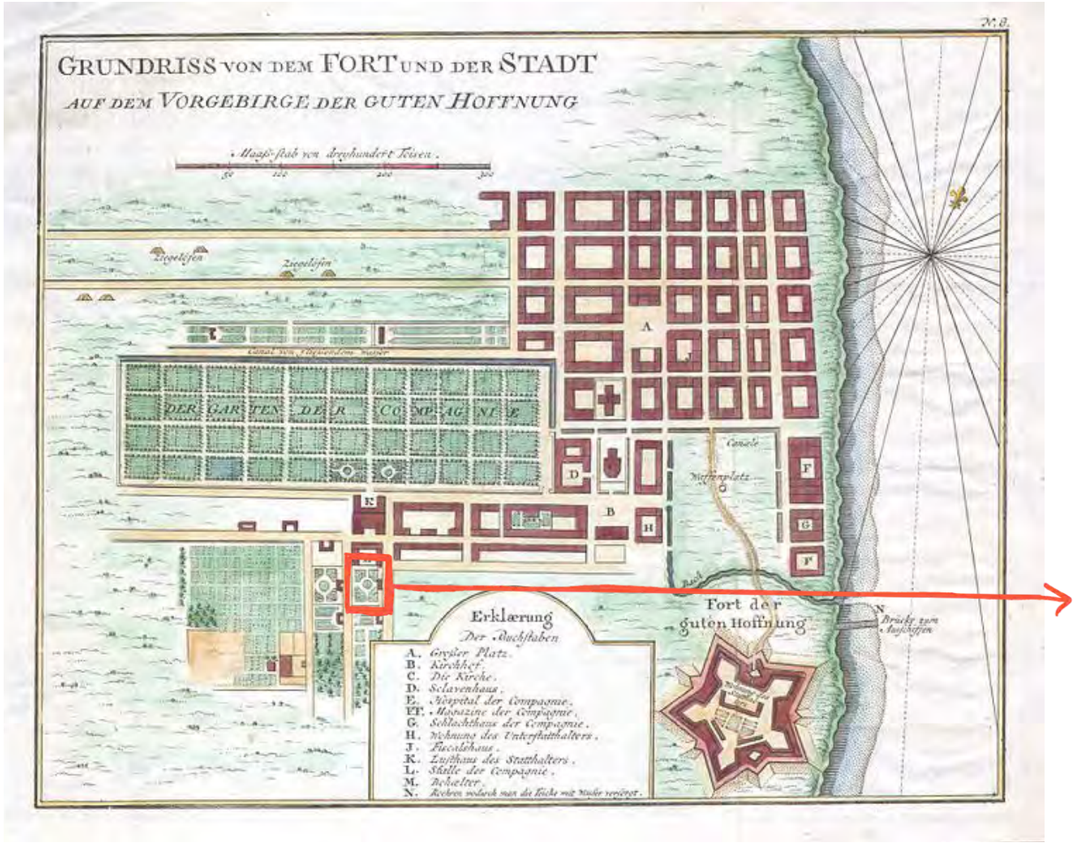




Figure3.16 :
Far Left
Cape Town by Jean-Nicholas Bellin, [c.1750]

Figure 3.17 :
Left
Aerial view of the 19thc section
[no date]

The Dutch introduced the bread oven and the baking of traditional baked goods including some of South Africa's most loved, like malva pudding, vetkoek and milk tart. (Bowers, 2023)

They learned a lot from the indigenous people of South Africa including how to cook their meat over an open fire and learnt about the indigenous plants and herbs and began incorporating these elements into their stews, or more commonly known is South Africa, their Potjies. The indigenous people replaced their use of clay pots for the potjie pot. Food storage during this time also evolved with the development of more refined cellars used for the preservation of fruits and vegetables and the curing or salting of meats and fish.

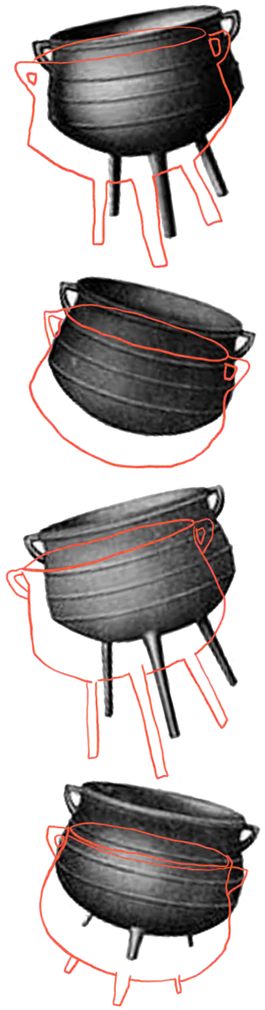


Figure 3.18 :
Opposite
Outdoor wood burning oven, Kleinplasie Living Open Air Museum, Worcester, South Africa
Photo taken by:
[o1camera1mom, 2014]

Figure 3.19 :
Left
Three-legged Pots from the Falkirk Iron Co. Catalogue. Catelogue used at the time.
[G.B. Bailey, 2011]

The German colonists influence comes from their introduction of "Wurst" which means sausage, and this is where the infamous boerewors eventually developed. The French Huguenots were another European country that settled in the Cape during the 16th century, they didn't have much influence on the type of foods that were eaten but the way in which food was consumed.

They changed the way food was served. They introduced the idea of multiple courses, and changed the dynamic around how food was selected and presented around the dining table. (de Bruin, 2021) The afrikaaner culture ultimately developed from these colonists.

The British colonisation during the 19th century also influenced the development of hearty stew or potjies in south Africa with the addition of potatoes and different methods of cooking meats. Tea, sugar and more baked goods, including scones and cake. The open fire cooking methods were replaced with large cast iron stoves and ovens that became a popular addition to homes. They also introduced more advanced methods of food preservation technologies including jams and canned food.

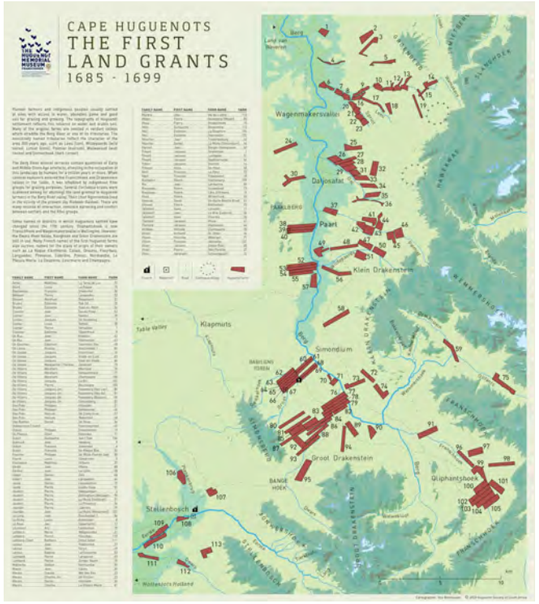


Figure 3.20 :
Left
Huguenot Farms and the First Land Grants Map
[Cartographer: Ilze Boonzaaier, 2020]

Between 1685 and 1699 around 300 Huguenot refugees settled at the Cape of Good Hope. They brought with them their knowledge of wine making and began cultivating crops. Today the wine grown in the Cape is internationally acclaimed.

Cape Malay Cuisine influences

The Cape Malay cuisine began during the Dutch settler's arrival, where slaves from Indonesia, Malaysia and East Africa were brought to South Africa to work in the homes of the Dutch settlers. They introduced a variety of spices and culinary techniques that evolved our cuisine tremendously. They adapted their recipes to suit the locally available ingredients, creating dishes well known today as Bobotie, Bredie and Briyani.

Present in many of their dishes is a unique blend of spices called Masala. They utilised the open fire hearths and introduced the use of a mortar and pestle for their spice grinding. The Koeksister is also an addition made by the Cape Malay community to South Africa's cuisine. (Cape Malay Cuisine | A Rich History Of The Flavours And Spices, 2020)



Figure 3.21 :
Above
Garam masala spices being grinded in a mortar and pestle.
Author [2024]



Figure 3.22 :
Left
People of South Africa : a woman with mortar and pestle
[Scheub, Harold, ca. 1967-ca. 1976]

Indian cuisine Influences

In the late 19th century almost 200 years after the arrival of the Malay slaves, the first paid group of labours from India arrived in the harbour and were sent to work in the sugar cane plantations, railways and fisheries mainly in and around KwaZulu-Natal at the time. They also brought with them a variety of new flavours, spices and alternative cooking methods. Legumes became more prevalent in our cuisine. Traditional Indian cooking methods, such as tandoors and open fire stoves, were adapted and integrated into the local methods. (Govender, 2018) Curries and samosas as well as Bunny chows have become extremely popular and are a significant part of South African cuisine today.

The original tandoor is made up of clay and the food is cooked with fired charcoal, as seen in the image to the right. Today electrical and gas tandoors have been developed and are used more commonly.



Figure 3.23 :
Above
Adobe Stock Image of Tandoor
[Mehmet, 2024]



Figure 3.24 :
Above
Indentured Indians working on a sugar cane field
[No Author, between 1900 and 1921]

Apartheid Era and "Township" Cuisine Influences

During the apartheid era severe economic and social restrictions were imposed on many South Africans, mainly the back communities. Forced removals and segregated led to the development of overcrowded townships on the outskirts of cities, with inadequate infrastructure and resources. Today settlements are still found all over South Africa. This cuisine is characterized by its creative nature and resourcefulness in the ability to transform simple historically influential ingredients into nutritious and flavourful ingredients.

Township kitchens are small and resourceful making use of open fires or small stoves. During the apartheid era many dishes were invented with the use of the countries historic influences that are still so prevalent in South Africa's society today. Pap or Maize meal is a staple in most people's diets, often served as a breakfast dish or a side dish for lunches and dinners. Umngqusho combines maize and beans, butter, potatoes, and is often flavoured with onions, garlic, lemons, chillies and spices.

Chakalaka is a spicy vegetable relish made from onions, tomatoes, carrots, and peppers and is often spiced with curry powders. The Kota or Gatsby similar to the Bunny Chow is also rooted in the township cuisine and thrives in today's society as a "street food"

As Chef Mokgadi Itsweng points out,

"A lot of people who worked on the mines had very little time to eat and weren't allowed to eat in many restaurants and cafes because of apartheid segregation laws. You couldn't just go out at lunchtime and buy food and often you only had time to eat while you were miles underground in a shaft. So that's how the kota came about – women started making these sandwiches, with these easily available, cheap, carb-heavy fillings to sustain the men who were working underground. You were carrying your lunch in the bread."

(Smith, 2021)

There is a strong influence of indigenous cooking methods and ingredients, including the cooking of meat over an open fire, most commonly known as a "braai" in South Africa and the use of staple foods the maize meal, beans, spinach and pumpkin. Meat and protein sources come mainly from inexpensive cuts of meat, beans and lentils are the main form of protein found in this cuisine. Innovation and entrepreneurship have thrived in the township culinary scenes, where eateries known as "shisanyama" or "chisanyama" serve a variety of grilled meats and the above-mentioned meals.



Figure 3.25 :
Opposite
Roadside food stall with large cooking pots Johannesburg, South Africa
Photo taken by [Rich Townsend, 2018]

Modern Kitchens & contemporary cuisine in South Africa Today

Kitchens today have modernized with the influence of global culinary trends and technological advancements. Equipped with modern appliances like gas and electrical stoves, microwaves, and fridges that all make food preparation, preservation and storage more convenient. Contemporary South African food today celebrates the countries cultural heritage, blending that of traditional African, European and Asian influences. Restaurants and the food market in South Africa offer diverse options that include traditional ingredients and dishes as well as the international demand.

South Africans history of kitchens, food preparation and preservation are undeniably a reflection of resilience and adaptability. From the indigenous culinary practices that were able to harmonise with their changing environments due to the influence of colonisation, slavery and global modernisation, our cuisine and culinary traditions have continued to evolve. South Africa's cuisine represents a rich blend of history and innovation and continues to evolve vibrantly. It is important for me to integrate these methods of cooking, storage and preservation into the design of my building, and not to design the conventional westernised kitchen.



Figure 3.26 :
Above
A street vendor cooks at a barbecue in a township on the outskirts of Cape Town, South Africa
[Thomas Trutschel, no date]



Figure 3.27 :
Above
The Soweto Kota Festival - Times Live
Article by
[Petru Saal And Kgaugelo Masweneng, no date]

[3.2] “Take - Aways”

“Take Aways” is a collection of knowledge and practices from the previous section- culinary history, that I will be utilising in the programmatic/ functional/materiality aspects of my thesis building design.

The following spread is a precedent focused on the seating arrangement around the fire, and why it is important in the Xhosa tradition.

There after are further precedents focused on collaborative spaces, specifically the collaboration between man and nature

There after, I explore business models related to the programmatic function of my building, and what made them a success or a failure.

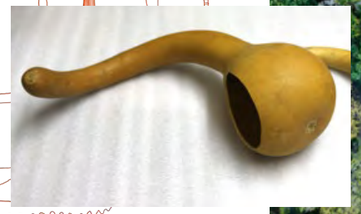






seperate kitchen spaces for different foods

Mix of traditional and modern utensils and cutlery



Dried pumkins from farm can be turned into utensils



Drying of foods - Summer months the foods are layed flat and protected from flies and insects
Winter months the food is hung as there are hardly any flies during winter.



Landscaped areas throughout entire site - not as manicured as the colonial influence - but inspiration.



Different counter hights required for different food preparation.

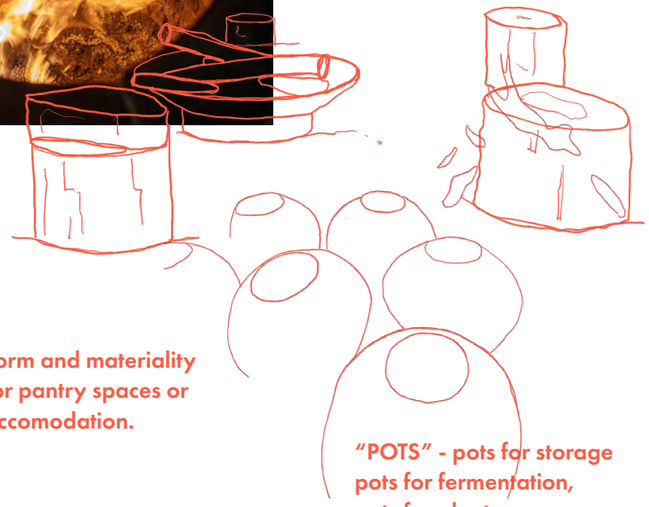


Fire on the ground -
Fire above the ground
&
Fire in the ground.



Threshold spaces are key between inside and outside





Form and materiality for pantry spaces or accomodation.

“POTS” - pots for storage
pots for fermentation,
pots for plants.

Figure 3.28 :
Opposite
Take - Aways Collage
[Author, 2024]

[3.4] Sitting low

iThongo seating collection - Andile Dyalvane's

iThongo, meaning "ancestral dreamscape" in Xhosa, refers to the way in which messages (uYalezo uLwimi lwabaPhantsi) are transmitted from the ancestors.

24 sculptural chairs crafted from hand-coiled clay, each inspired by a symbol drawn by Andile. The symbols represent specific words spoken in the Xhosa language.for example a few of the chairs have names like; entshonalanga (sunset), igubu (drum), umalusi (herdsman) and izilo (totem animals).

The chairs are designed to be as low as possible, highlighting the cultural importance of being close to the earth, grounded, so that the communication with ancestors can be celebrated. The chairs are placed in a spherical arrangement with a fire hearth at the centre. (Carlson, 2021)





Andile Dyalvane
uMama (Mother), 2020

Earthenware

symbolism / fermentation

What I makes this precident so important is that it highlights the importance of being close to the ground, physically and mentally, not only for the relationship with ancestors, but for the relationship with the land.

This precedent will inform the way in which the planning of dining or communal spaces are created, focused in a circular form. I think this encourages interaction, focus and celebration.

Figures 3.29 : Opposite
iThongo seating collection
Photography by [Adriaan Louw for Southern Guild, 2021]

[3.5] Collaborative spaces

Andrés Jaque

Andrés Jaque is a Spanish born architect and writer. His Firm is called "Office for Political Innovation" where he focuses on the crossroads between design, research and environmental activism with a focus on sustainable architecture. He is also a professor and dean at the graduate school of Architecture at Columbia University. (Ayers, no date)

Jaque is most widely known for his Reggio School in Madrid – a school with a focus on flexibility, transparency and a connection between interior and exterior environments. The spaces are designed to promote collaboration amongst the children and entice creativity. (Paula Pintos, 2022)

"The design of Reggio School is based on the idea that architectural environments can arouse in children a desire for exploration and inquiry. In this way, the building is thought of as a complex ecosystem that makes it possible for students to direct their own education through a process of self-driven collective experimentation."

- Andrés Jaque



Figure 3.30:
Above
Reggio School
by Andrés Jaque
Photo taken by
[José Hevia, 2022]

His thinking in terms of the building being thought of as a complex ecosystem is something I am extremely interested in for my thesis. As a successful model with a similarity in programming my project also incorporates learning spaces, community engagement and sustainable design.

Spaces should be designed not only to 'arouse in children a desire for exploration and inquiry' but should be designed to do the same for adults. I think the most successful element of this building is the interior spaces that are dedicated to nature blurring the lines between interior and exterior. His use of materiality is also something to note, in an Arch Daily article they mention that:

"The overall amount of material used in the facades, roofs, and interior partitions of the building has been reduced by 48% just by replacing a big part of the construction with simple strategies of thermal insulation and mechanical systems distribution."

This is quite incredible because although the materiality of the building is rather simple, yet innovative, the spaces feel bright, colourful and inviting.



Figure 3.31:
Above
Reggio School
rendering by
Andrés Jaque firm
[2022]

Andrés Jaque

Andres Jaque's latest project is not a building but an installation called Transspecies Kitchen installed at the Middleheim Museum in Antwerp, Belgium. It is a project in collaboration with a stone fabricating company called M-Marble Project.

The project is apart of a running series in his firm where they interrogate the architecture of eating processes from an eco-political perspective.

"Kitchening is less physical than ecological and political. Kitchening is the realm of collective living. It is evidence for the impossibility of individual life. As such, the ultimate form of kitchen-ing is zymology (bacteria and fungi-based fermentation). The Transspecies Kitchen is an outing of digestion, as an infrastructure where the politics of life-making are intervened by post-carbon cooking."

- Andrés Jaque



Figure 3.32:
Above
Transspecies Kitchen by Andrés Jaque
Photo taken by
[José Hevia, 2022]

The installation kitchen is made entirely from waste stone from quarries, according to Jaque only 30% of these stones extracted are used and the rest is transformed into waste. The installation challenges the notion of the stone industries waste making by transforming the "waste" into something functionally beautiful.

This "post-carbon kitchen' functions as a cooperative gut, conceptually representing the fact that metabolism is not a self-organised process, but a collaborative process that relies on non-human relationships. In other words, the kitchen is highlighting the fact that we humans rely so much on micro-organisms for our metabolism. The Transspecies Kitchen blurs the lines between kitchening, eating, and decomposing, creating a uninterrupted pattern of molecular advance. (Paula Pintos, 2022)

The kitchen installation has not connection to electricity or gas and only relies on the collaboration of humans and other organisms. The focus foods are all fermented foods focusing on gut health and the collaboration of these foods with microorganisms to create tasty and nutritious meals.









Figures 3.33 :
Above
Transspecies Kitchen by Andrés Jaque
Photos taken by
[José Hevia, 2022]

[3.6] Business Models - Case Study

Jamie Oliver's Fifteen



Figure 3.34 :
Opposite
Fifteen Cornwall
Watergate Bay Hotel
Website
[no date]

Figure 3.35 :
Bottom
Fifteen on Old Street in London
[Giulia Mule, 2016]

In 2002, Jamie Oliver launched a program, and a restaurant called Fifteen in London. The main purpose of the program was to provide culinary training opportunities to disadvantaged and unqualified young people. 15 young people were recruited and trained for the period of an entire year.

The concept of Jamie's program aimed to combine a passion for food with his mission to give back to the community, helping youngsters who were unemployed or inexperienced start fresh in life. Jamie focused on the use of local and sustainable ingredients, with influence of Italian cuisine, he promoted the use of seasonal produce and wholesome eating.

The culinary training program involved fifteen students who were enrolled into an apprenticeship program, trained by professional chefs and given the opportunity to learn everything they would need to know about the industry, from the business side to the cooking techniques and the "front of house" operations.

Profits made from the business model were reinvested into the program funding the training of 15 new students each year. Jamie's goal was to create a sustainable model where the restaurant business itself provided the means to train and uplift individuals, offering them a chance to build a career in the hospitality industry.



Over the span of 17 years Jamies social intervention trained hundreds of chefs, many of whom made a real success of themselves in the culinary world. The program became global with restaurants being opened in Amsterdam, Australia and Cornwall. Jamies program even reached South Africa in 2012 teaming up with The Singita School of Cooking in the Kruger National Park.

In 2019, unfortunately, due to financial complications Jamie closed the doors to not only the program Fifteen but a total of 22 of his restaurants. His legacy remains an inspiring model around the world. (Witts, 2019)

Jamie had this to say in an interview shortly after he closed Fifteen:

"Fundamentally, Fifteen was about social mobility. That's a phrase I've only learnt in the past few months. But it's so important."

Singita Community Culinary School



Figure 3.36 : Opposite
Singita culinary school graduates
[Singita website, no date]

Singita is an "ecotourism and conservation brand," for over 100 years they've been devoted to wildlife conservation. Their first location is known as the Sabi Sand Reserve, purchased nearly a 100 years ago the area was used as a hunting concession but is now a nature reserve. Their brand is about providing luxury hospitality, and they have lodges situated in the Kruger national park, Zimbabwe, Tanzania and Rwanda.

The Singita Community Culinary school in South Africa is a program that enrols 6 young, disadvantaged adults from their local communities, into a yearlong culinary development course. Students are taught in their demonstration studio, and gain experience working in their lodge kitchens. After their one-year course the students are given a six month fully paid job working in their lodge kitchens.

"Students spend time learning the basics in the state-of-the-art demo studio at Singita Lebombo Lodge, which operates as a fully functioning practical and theory classroom, followed by hands-on experience in the five Singita lodge kitchens in South Africa. They emerge with skills, real-world training, knowledge, creativity and confidence to take on a commis chef role in any professional kitchen."

The Singita Community Culinary school first opened in 2007 at their Kruger National Park location, in 2015 a second school opened at their lodge in Tanzania and then in 2021 they opened an-other school in partnership with the Rwandan Muhabura Integrated Polytechnic College.

The Singita Lowveld Trust is their conservation partner which sponsors 6 students each year and their lodge guests fund additional scholarships through donations, judging by the prices of their accommodation it appears they cater for international clientele.

Their "demonstration studio" or school is located at their Singita Lebombo Lodge in the Kruger where they offer "luxury" cooking classes to guests, according to their website a R3 800 donation is required per person, per cooking class, and the funds are contributed to their program. (Singita Community Culinary School at Lebombo Lodge | African Safari, no date)

Their focus is to achieve long-term community development within their areas, enabling their communities to also thrive both economically and socially. According to their website, 103 students have graduated from the SCCS at Singita Kruger National Park since it opened.

Their Survey in March of 2023 suggested that:

- 92% of their graduates are currently employed full-time.
- 25% of those are employed at Singita and 92% are working in the Kruger area.
- 92% of their employed graduates are professional chefs.
- 44% of their graduates have advanced to the Junior Sous Chef level or further.

I think what makes this business model successful is their commitment to conservation and community development, along with their luxury element. They cater for high end travellers who value and enjoy the "exclusive experience" and sustainable practices showcased. Through their career development for the local community, they are strengthening communal ties and promoting socio-economic uplifting. The culinary school is also equipped with a diverse amount of learning opportunities and the hands-on experience they gain working in the lodges is an amazing opportunity.

What I would like to take from this case study is the use of a "niche" program, the restaurant can be promoted as a "niche once in a lifetime experience" catering to the more affluent communities for their financial support. From the start I wanted the students to be the ones cooking in the restaurant kitchen and their business model proves that this is very possible.

Ladles of Love Community Kitchens



Ladles of Love started in 2014 when their founder Danny Diliberto opened a soup kitchen in Cape Town, serving over 70 hot meals a day. They have since expanded with warehouses in the Western Cape and Gauteng proving food relief to local communities. Today they serve nearly one million meals a month. (Hendricks, 2020)

In 2020 shortly after the pandemic started Ladles of Love began working with the Pan African Women's Organisation, to set up 21 grants that would provide selected women in disadvantaged communities a kitchen set up, where they are able to prepare at least 1000 meals a day for their communities in a clean and safe environment.

"The grants include all necessary equipment, such as a two-plate gas burner, two large pots, cutting boards, knives, the training manual, and all cleaning equipment. Ladles of Love also provides three months of training to help them use their new kitchens to the best of their ability."

Figure 3.37 :
Far left
Danny Diliberto founder of Ladels of Love
Photo taken by
[Tina Ddamulira, 2021]

Figure 3.38 :
Right top
Micheal Williams with his soup.
Photo taken by
[Ashraf Hendricks, 2020]

Figure 3.39 :
Right Bottom
Volunteers serving soup at the Hope Exchange
Photo taken by
[Ashraf Hendricks, 2020]





Michael Williams
[shown on the left]
said that he has been receiving food from "Danny" for five years. He said that he has been homeless for 20 years and sleeps outside near a train station. He said that the food distribution is really helpful "especially when there's nothing to eat".

Ladles of Love do not provide the bulk of the food needed for cooking however, they have teamed up with nonprofit organisations that fund these kitchens and monitor them.

There is not a lot of information regarding whether or not this community kitchen grant has been successful or not, however there is lots of news surrounding their continues efforts to partner up with larger organisations to aid in food insecurity in South Africa.



Figure 4.1 :
Opposite
The Ingredients Collage
[Author , 2024]

04

The Ingredients

PART ONE - Site Analysis

This chapter explores the sites limitations and opportunities, presenting the reader with a comprehensive understanding of the site, its atmosphere and materiality as well as the surrounding context that is well connected to the site. This chapter also explores the programme and how it is connected to the site.

[4.1] Site Analysis
Hiking the mountain

On the 17th of May I hiked to the top of the Magaliesberg mountain. There are hiking and mountain bike trails running all through out skeerpoort connecting the farms. This particular farm that I hiked on is called Vergenoeg.

You could hike from my site, through Van Gaaleens cheese farm all the way up to Vergenoeg is you wanted to.







Figure 4.3 :
Left
Views on Hike
[Author, 2024]

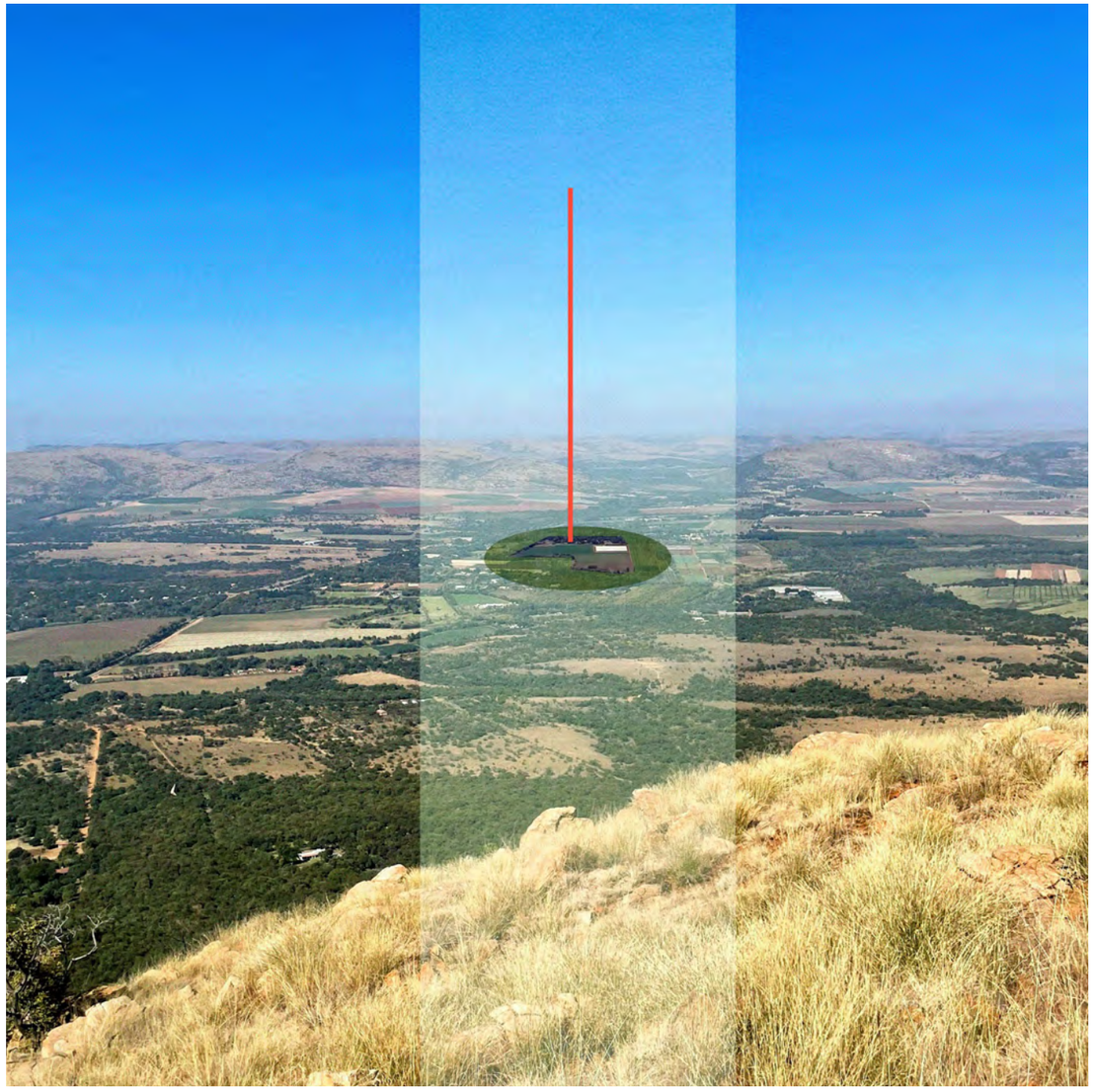


Figure 4.2 :
Right
POV of the site from on top of the mountain
[Author, 2024]

Site Information

Adress: S42 on R560, Skeerpoort, Hartbeespoort, 0232

Entire Site Area: 41 Hectares

Focus Site Area: 15.4 Hectares

Farm Parcel number: 4/477 & 62/477 & RE/5/477

Zoning: Agriculture

Ownership: Privately owned

Ward: 29 Madibeng Municipality

The entire Skeerpoort used to be one large farm before it was broken up into smaller parcels and sold.

The focus of my thesis will be concentrated on the middle Parcel [4/477], however I have shown three parcels that all belong to the same owner and the farming happens on all three parcels. The parcels actually extend across the road.

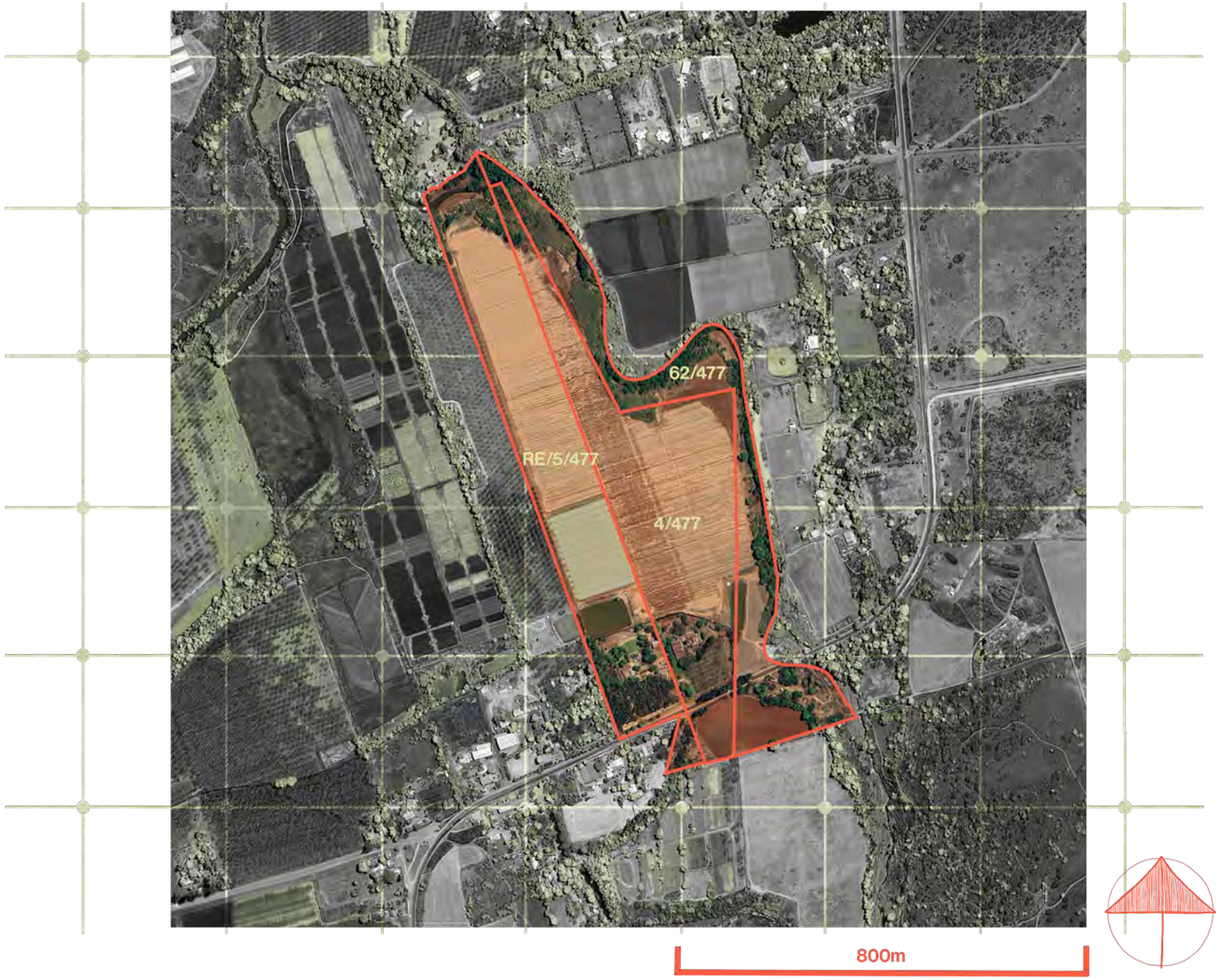


Figure 4.4 :
Entire page
Map showing site boundaries
[Author, 2024]

Hiking trails

This map shows the trails in the Skeerpoort area, Van Gaalens cheese farm has named and documented all the trails. The trails spread across over 30 private farms and have over 80km of single track for mountain biking throughout the entire valley.

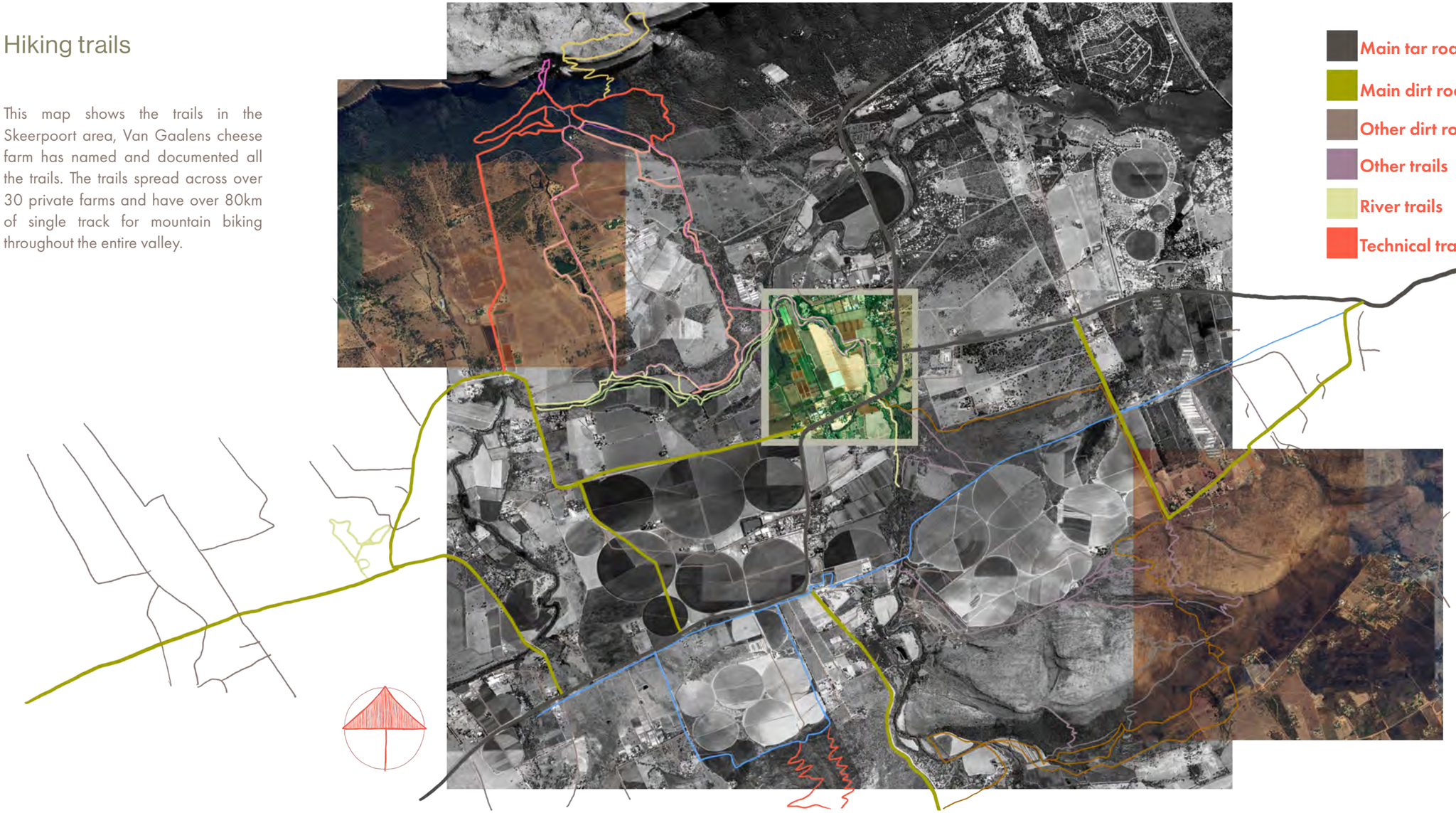


Figure 4.5 :
Entire page
Hiking trails
[Author, 2024]

Focus area

This map shows the focus area of parcel 4/477, where the barn is located and where the intervention will take place.

The barn is fairly visible from the street, however there is a row of trees and the pecan nut orchard creating a barrier between the barn and the street.



Figure 4.6 :
Entire page
Focus area of site
[Author, 2024]



Figure 4.7 :
Above
Pecan nuts growing in the orchard.
[Author, 2024]

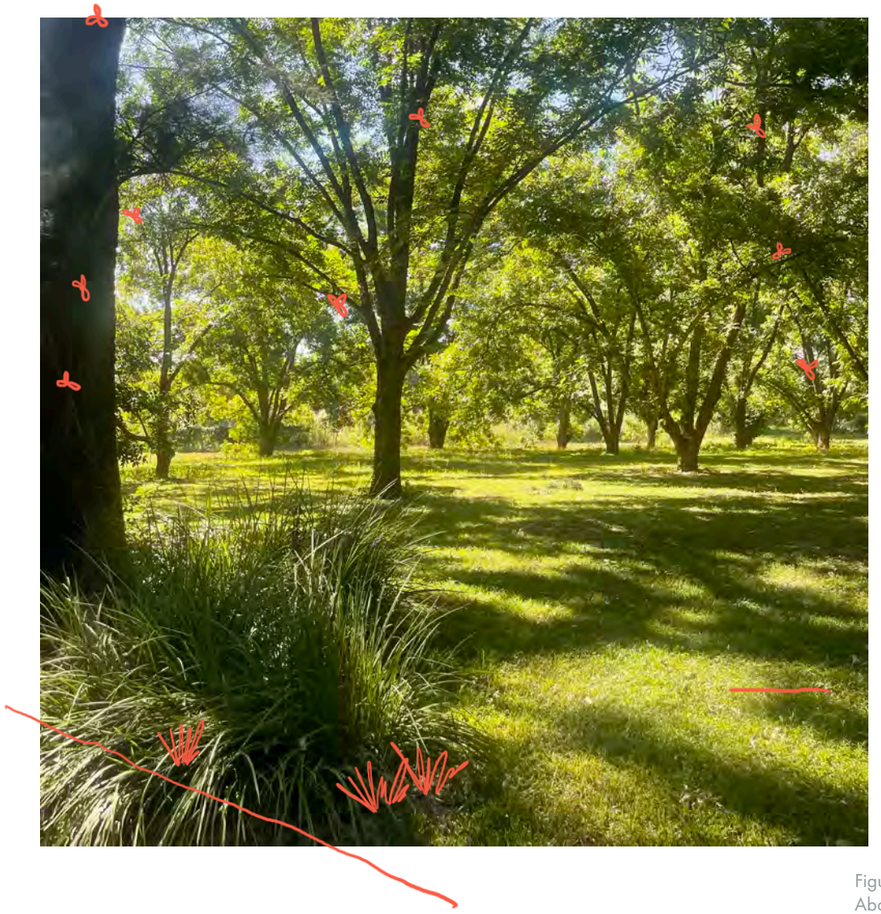


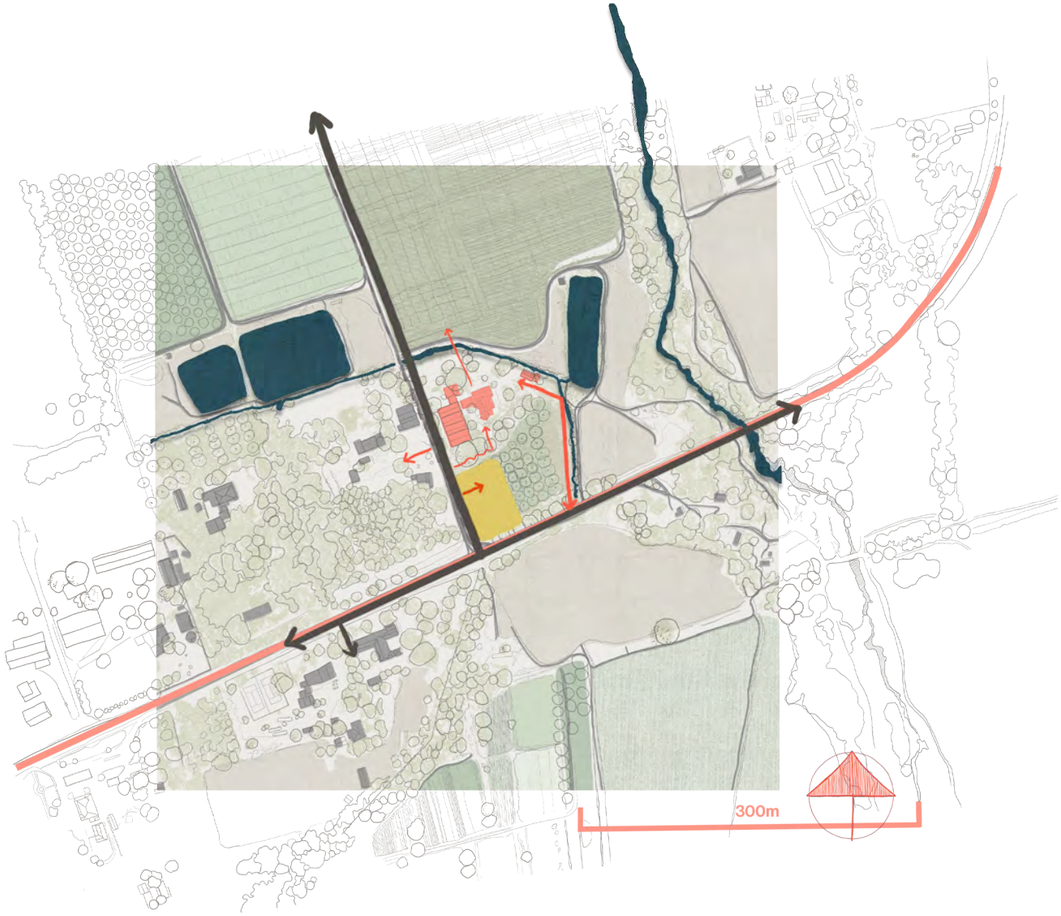
Figure 4.8 :
Above
Pecan nut trees blocking the view from the street.
[Author, 2024]

Access, Existing Structures & Water Systems

Figure 4.9 highlights both the current and proposed access to the site as well as the existing water system on the site. The main access to the site is through the servitude road connecting the fields to the barn and farm house to the street. Highlighted in yellow is where the parking will be situated, and the orange arrow on the right side of the plan represents a new proposed entrance for services and the accommodation.

The water system on the site is apart of a larger network connection most of the farms in the area. Furrows and dams are connected to the main river source which is the magalies river. Sluice gates open and close providing farmers with the right amount of water they need for their crops.

Figure 4.10 highlights the existing structures on and around the site. The barn is central with the farmers house to the left and the dilapidated house to the right. The school across the road is also highlighted.



Access & Water Systems

Figure 4.9 :
Above
Access & Water Systems
[Author, 2024]

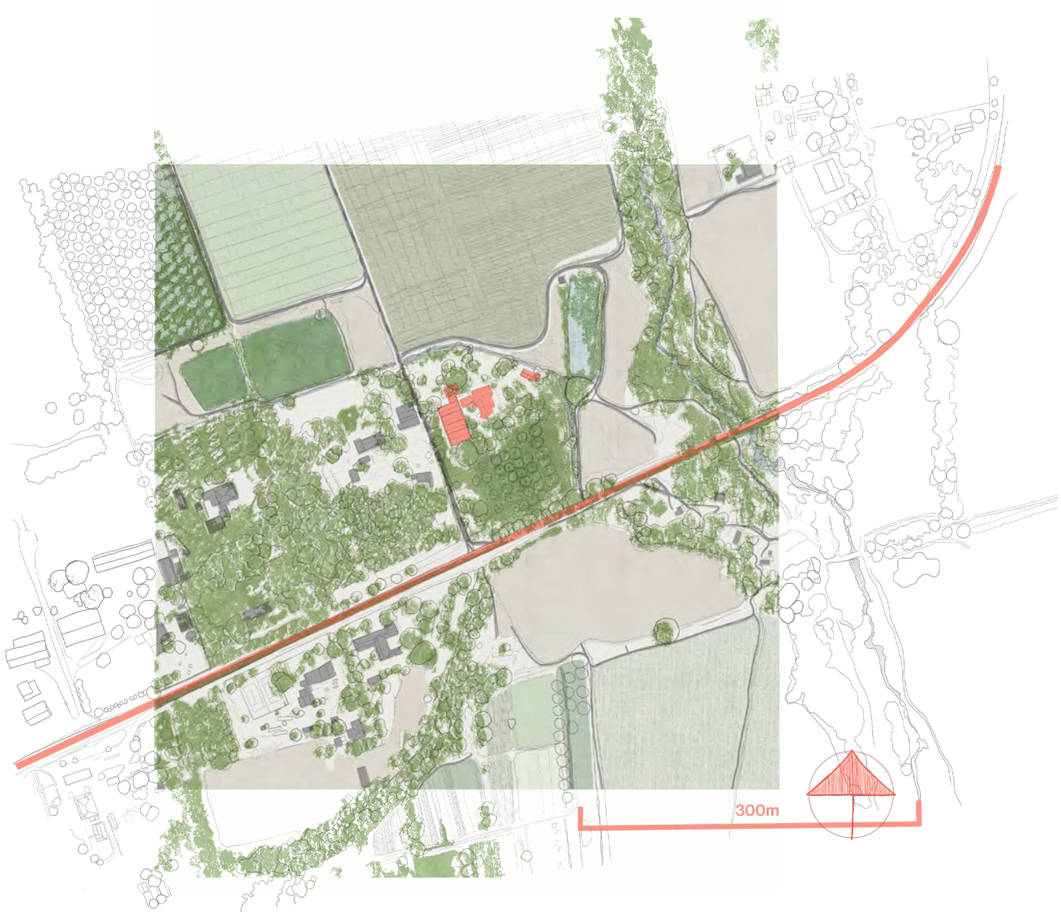


Existing Structures

Figure 4.10 :
Above
Existing Structures
[Author, 2024]

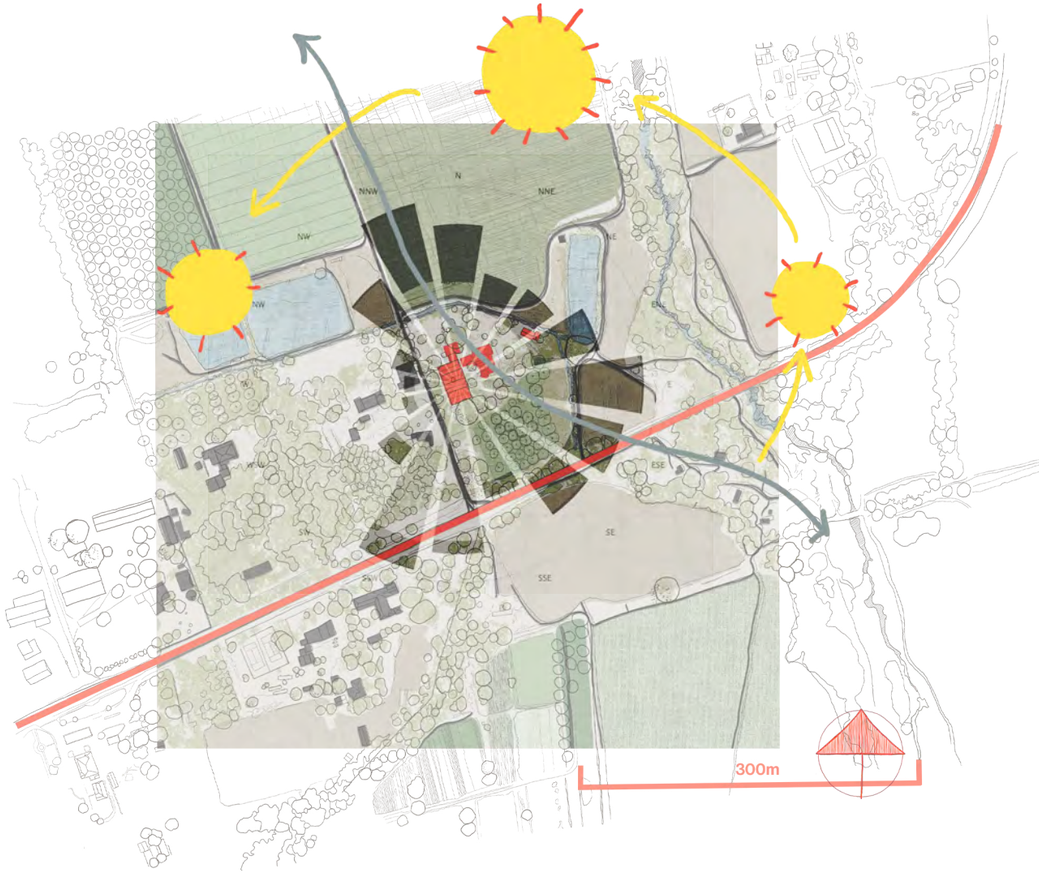
Vegetation, Sun & Wind

Figure 4.11 highlights the abundance of vegetation on and surrounding the site. Figure 4.12 represents the wind on the site as well as the sun path. The average winds move through the site from both the north western direction and the south eastern direction. The sun path moves from east to west providing the site with ample light, however the barn area is heavily shaded by the vegetation.



Vegetation

Figure 4.11 :
Above
Vegetation
[Author, 2024]



Sun & Wind

Figure 4.12 :
Above
Sun & Wind
[Author, 2024]

[4.2] Farming the fields

This diagram explores what is typically farmed on the site according to the seasons. It also reflects the growing pattern and period in correlation with one another.

This will influence the programmatic design of the building as the uses for different spaces will be in conjunction with what is being sowed, grown or harvested.

During the summer months, from September to March, broccoli and cauliflower are grown under the netted area, along with pumpkins planted on 2.3 hectares. The first pumpkin crop is planted in September and harvested in November, followed by a replanting.

In the fields at the top of the farm, white maize is cultivated primarily for silage as animal feed or for harvesting and selling the corn kernels, contributing significantly to the local market because of its large yield.

The bottom half of the farms fields is dedicated to 10 hectares of Lucerne planting, which grows year-round but lies dormant during winter months, re-emerging in early spring, around late August or early September. He harvests the Lucerne for animal feed.

To maintain soil health, oats are planted as cover crops where the broccoli, cauliflower, pumpkins, and maize were previously grown. The oats not only help replenish the soil by removing diseases left behind by previous crops but also enrich it with nutrients, improving the soil fertility, after they have been cut.

When the oats are harvested, their roots absorb the harmful pathogens left in the soil, and the stems are then cut, raked, baled, and sold. The bales are typically sold in early spring (late August to early September), during the drought-prone season when feed in the market becomes scarce.

October marks the beginning of the rainy season, so the summer crops are sown in late August and September to capitalize on the upcoming rains and to replenish feed as the oat supply is sold, coinciding with a high market value.

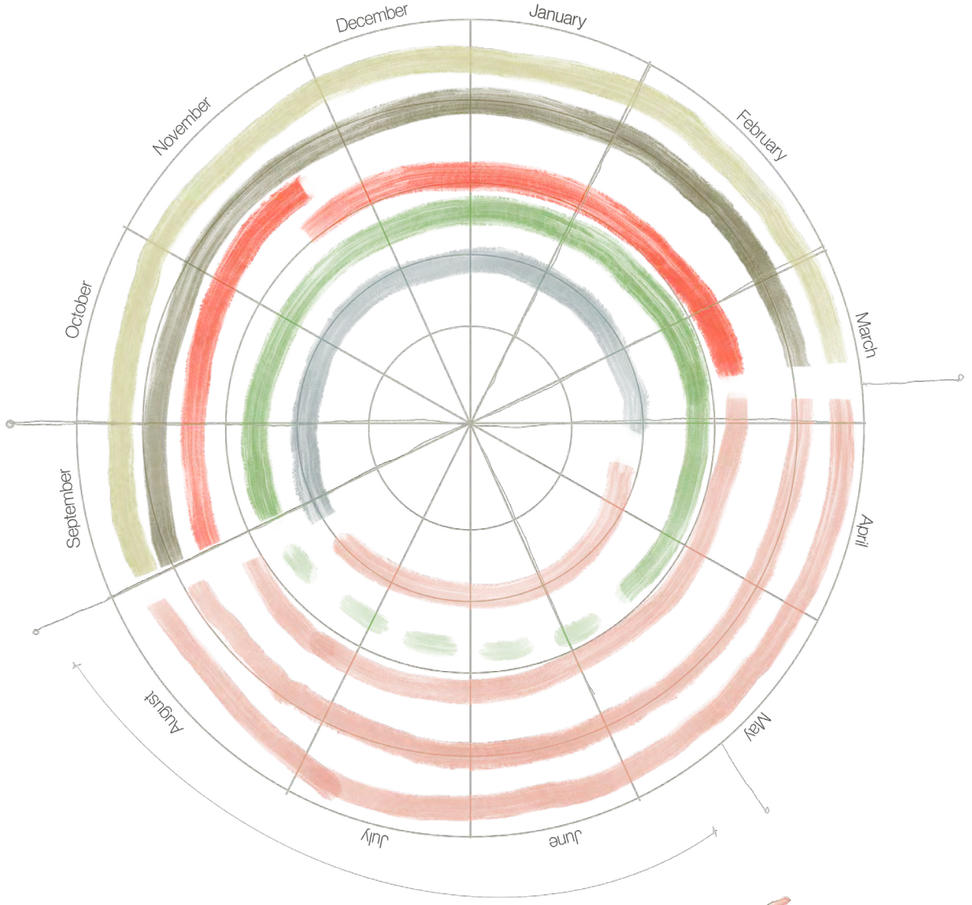
Additionally, the farmer cultivates flowers on 0.3 hectares, driven by personal passion and for private use.

Cover crops are plants grown primarily to improve and protect the soil, rather than for harvest. They are typically sown during off-seasons or in between main crops to provide several key benefits to the agricultural ecosystem.

Cover crops help prevent soil erosion, improve soil fertility, enhance moisture retention, and suppress weed growth. They also play a crucial role in controlling pests and diseases by breaking the life cycle of harmful pathogens that might linger in the soil.

Figure 4.13 :
Opposite
Plants grown on site
[Author, 2024]

Figure 4.14 :
Following Spread
Site visit textures
[Author, 2024]



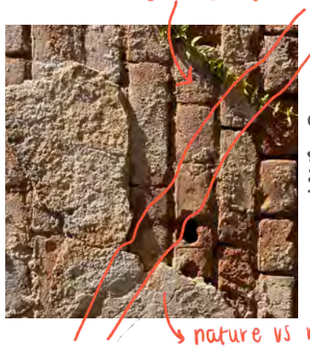


[4.3] Site Visit

Textures of the barn and surroundings







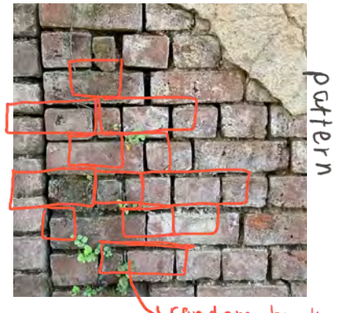


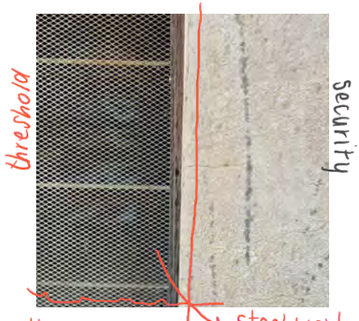


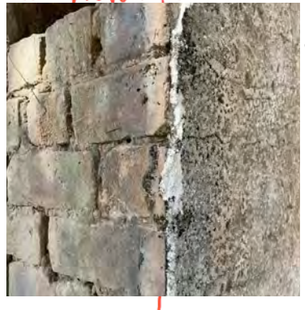




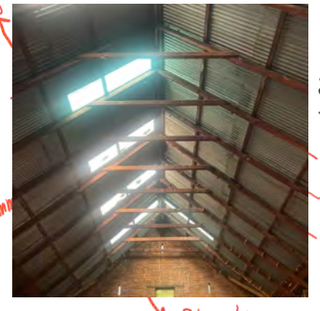




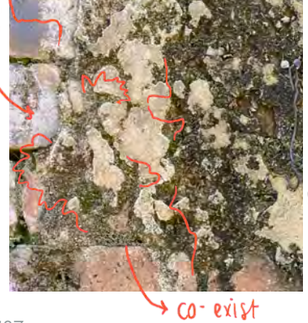


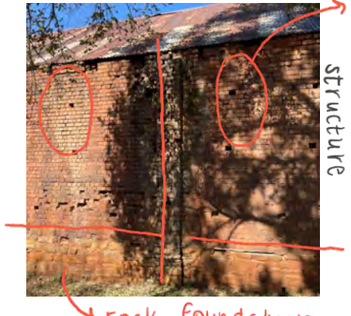






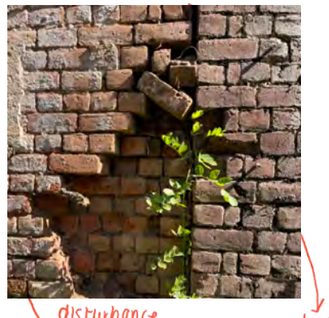
















[4.4] Programme

The **primary program** encompasses a culinary school and production house, focusing on the importance of fermentation for gut health. It functions as an educational hub, teaching communities about the benefits of sustainable food practices, agriculture, and fermentation. A working farm component is integrated into the design, providing hands-on experience for individuals interested in agriculture, farming, and the cooking and processing of food. The overall theme of regeneration is enhanced through the inclusion of a feeding scheme that aims to address food insecurities within the community.

By focusing on the site's produce and the education surrounding sustainable living and cooking methods, the feeding scheme empowers individuals to take charge of their nutritional needs. Additionally, a museum or archive dedicated to the cultural and agricultural heritage of Skeerpoort will document traditional farming techniques and the region's ecological history, offering visitors a deeper connection to the area's past while reinforcing the importance of sustainable practices for the future.

The **secondary programme** includes an accommodation aspect for visitors and students. The accommodation aspect focuses on visitors and students who no longer fit into ordinary societal standards and are seeking an alternative lifestyle with a focus on well-being and a harmonious relationship with the environment.

A shop or restaurant encompassing the values of the project and enhancing sustainable living practices. Fermentation workshop and production spaces will be included. The fermentation workshops aim to include the health and wellness aspect of the programme.

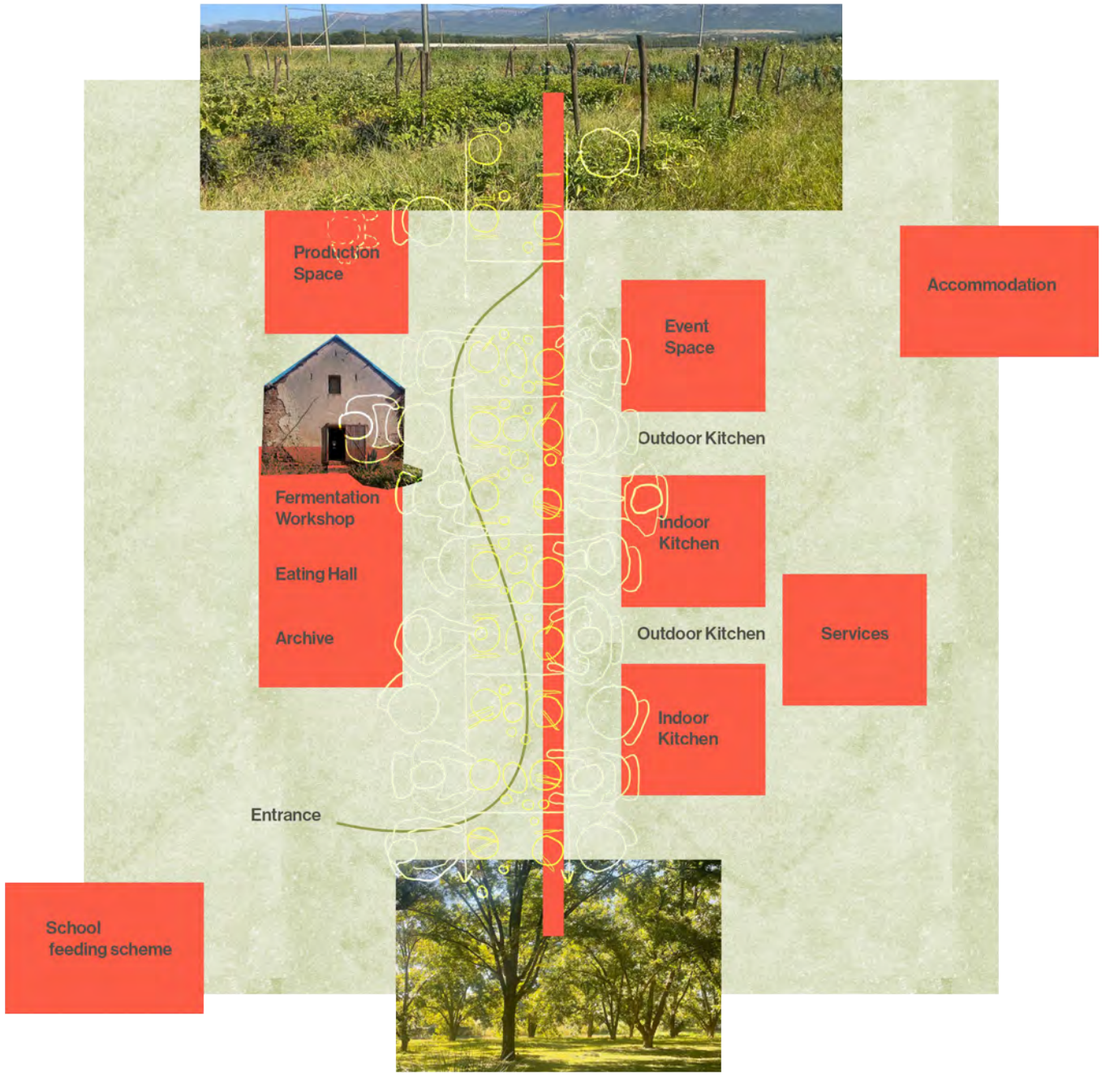


Figure 4.15 :
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Programme collage
[Author, 2024]

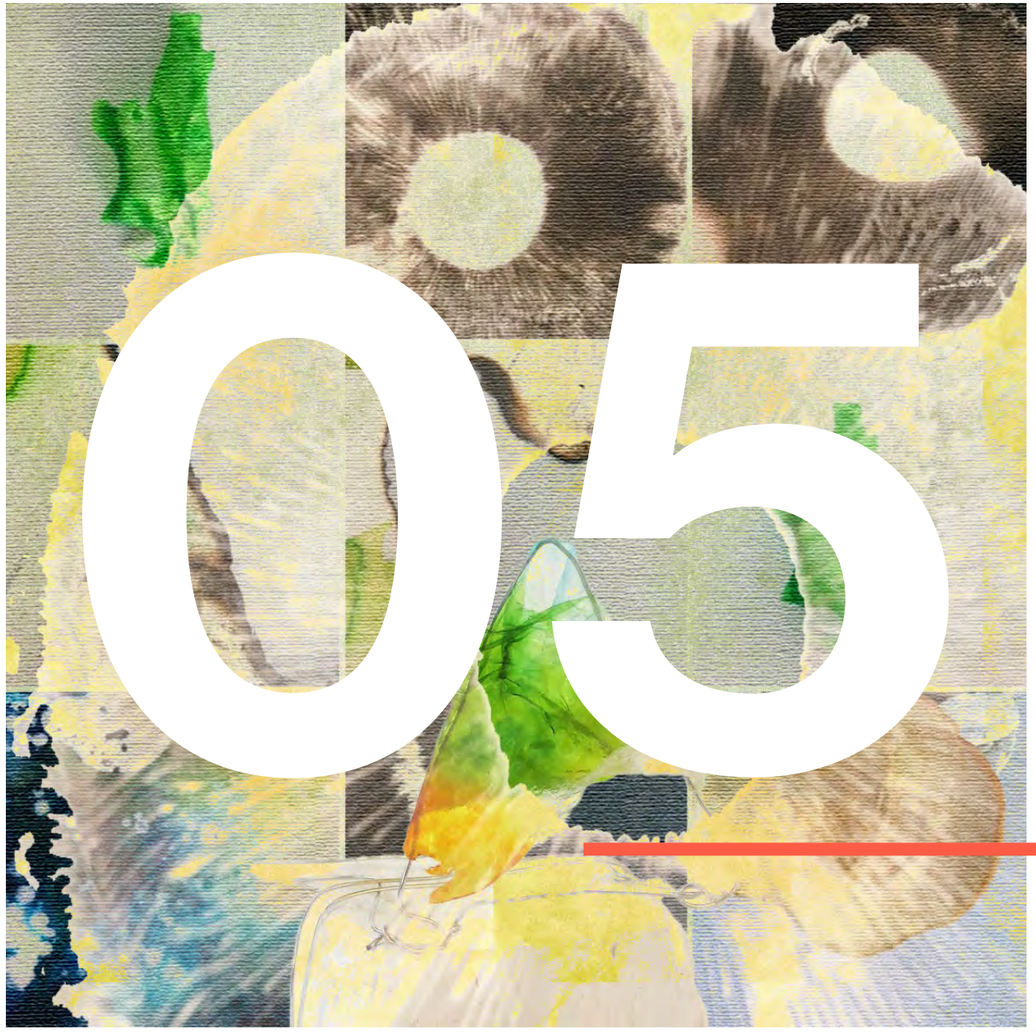


Figure 5.1 :
Opposite
The [Product]ion
Collage
[Author , 2024]

05

The [Product]ion

PART TWO - Design Process

This chapter examines the design process from start to present. A comprehensive look at the early stages of design informatics. the development of design narratives, the back and forth between planning and form progression and the selection of materiality and its influence.

[5.1] Charette Explorations

Texture, form, materiality

The Charette review took place in the beginning of the year, during a formative stage of my early conceptual approach to my thesis. During this period, I knew that I wanted to explore the relationship between nature and the built environment, particularly the way in which they intersect and influence one another.

My first interest was centred around the concept of 'skins' both the interior and exterior envelope of the barn, before I had decided to theoretically and conceptually look at the 'gut health' of a building, this was about preservation, adaptation and transformation.

The charette forced me to refine my ideas and encouraged the conceptual development of the buildings gut health, viewing the barns as a living entity, with its own 'skin-like' or bodily functions that can adapt and transform according to its programmatic or environmental conditions. I focused on patterns and lessons I could find in nature, particularly in my household, or garden. The textual qualities and transformative qualities of these objects inspired me to delve deeper into the buildings envelope and how it can breathe, adapt and respond to its social and environmental context.

Moulding

The first exploration began by moulding a simple form where I then layered in some foliage, exploring the materiality relationship between the clay and foliage, which links to my conceptual approach of the integration of nature with the built environment. The relationship between the solidity of the clay and the delicacy of the foliage, although completely different these two materials create a beautiful image, complementing one another forming a harmonious relationship where they co-exist. How can we integrate nature into the design of our building not just as a decorative element, but as integral parts of the design that change and adapt over time.

Skins

The second exploration began by again moulding forms both simple and a little more abstract, where I then created a "bio plastic" as seen in figures x x x.

I then used the bioplastic that I created to engulf the clay form either as an outer skin or as a inner skin. The bioplastic material represents an idea of blending traditional, natural and local materials, with innovation as a sustainable alternative.

Imprint

The fourth exploration involved a series of mimicking what micro-organisms might look like under a microscope in a Petri dish. Mushroom spore prints, using mushrooms I had in the fridge as well as mushrooms found in the garden, revealing the delicate radial spore dispersal. I then experimented with oil, water and food colouring where I dipped pieces of paper into the mixture revealing unpredictable interesting patterns. I then took a small plant from the garden and froze it in a circular container, once frozen revealed the plant frozen in time, symbolising my interest in preservation as well as the fragility of the relationship between the natural world and the built environment.

Shelter

The third exploration involved the experimentation of house hold food items. I cut up fruits and vegetables into thin slices and let them dry out over a period of a week, revealing interesting textures and details within the fruits. I then threaded the foods through wire and created these organic 'roof' structures over the clay forms. This exploration was inspired by my interest in the use of organic materials in the built environment and the meaning of permanence, and whether building should be designed to embrace change and natural decay.

Agar Plant Based Bioplastic



Figure 5.2 :
Opposite
Bioplastic
[Author , 2024]

Recipe	Brittle	>		Flexible
Glycerine [g]	0.0	1.4	2.7	5.4
Water [ml]	40	40	40	40
Agar [g]	1.6	1.6	1.6	1.6

Recipe

1. Add agar, water,glycerine and a drop of food colouring into a pot.
2. Cook over medium hear and stir until the mixture becomes viscous.
3. Then with a spoon remove the froth, ensuring the plastic will have a smooth finish
4. Pour the mixture into any kind non stick mould
5. After 24 hours remove the plastic from the mould, and there you go!

Moulding

Clay & tickey creeper

What I like about these forms is the contrast between the clay and the tickey creeper, although this was more of conceptual exploration relating to my concept, I like the way in which the greenery almost appears to be escaping from the form.









Figure 5.3 :
Left side of page
Moulding Iterations
[Author , 2024]

Skins

Clay, bioplastic & wire

What I liked about this investigation was the use of malleable bioplastic, which could almost be sculpted into any form. I really enjoyed how light streamed through the bioplastic, as well as the contrast between the substantial form and the lightweight element of the bioplastic.











Figure 5.4 :
Right side of page
Skins Iterations
[Author , 2024]

Shelter

Clay and foods

What I like about these forms is the contrast between the very substantial form at the base and the lightweight structure on-top. The dried fruits also added interest to the shadows, and I liked how the light streamed through, despite the fact that is was not photographed well.



Figure 5.5 :
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Shelter Iterations
[Author , 2024]







Figure 5.6 :
Right side of page
Imprint Iterations
[Author , 2024]

Imprint

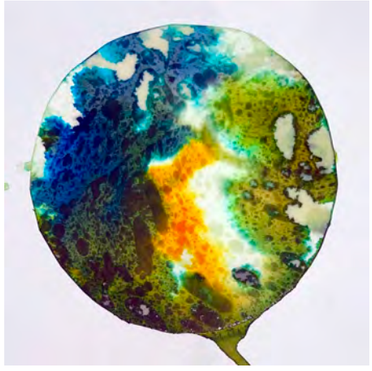
Mushroom spores, Food colouring & Frozen foliage

Mushroom spore printing process involves placing the mushroom on a sheet of paper, white for darker spores and black for lighter spores. Leave the mushroom covered in a glass for +24 hrs, before revealing the imprint and spraying with hairspray.

For this I cut out circular disc shapes from paper and then combined food colouring, oil and water in a container, I then dipped the discs in the mixture and let them dry over night revealing these really incredible patterns.

For this exploration I dug out a bunny ear plant and rinsed off the roots, before placing it into a circular container filled with water, and then placed it in the freezer overnight, which I then photographed the next day in a series of different lighting.









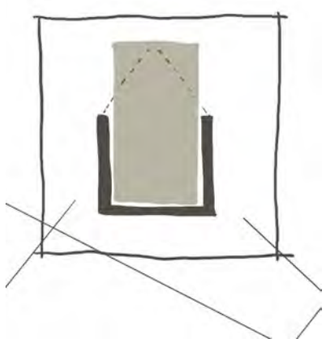




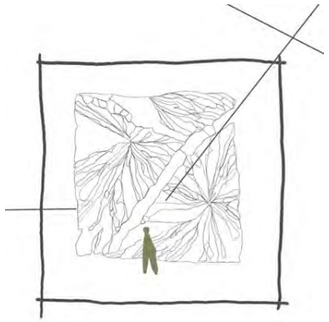
[5.2] Design Development
Design Narratives

Despite the fact that the architectural design process is in fact not a linear process, I have attempted to represent the progression of my design in the most comprehensible way possible, highlighting significant moments of change in the design process.

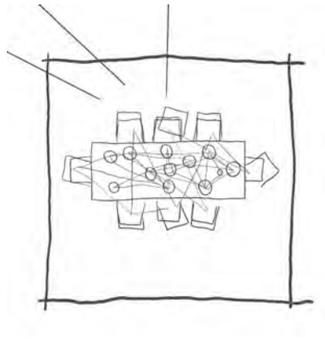
From the beginning I have defined certain design narratives that have guided the process.



"Disturbance = Collaboration"
This refers to the idea that by creating a disturbance on the site and within the barn will ultimately lead to a new collaboration between nature, people and the barn.



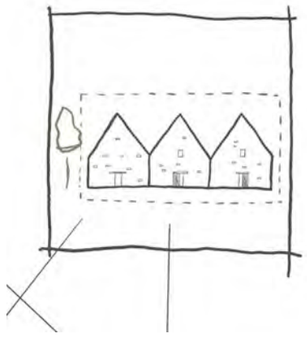
"Biophilic Design"
This refers to my theoretical understanding of biophilic design and my desire to implement the principles into the design of my project.



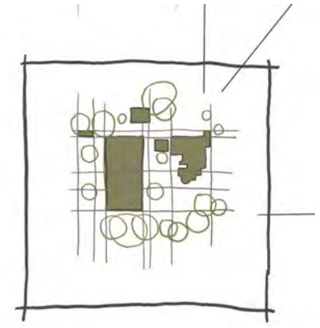
"The Kitchen"
The core programmatic design feature in my project, understanding what spaces are needed referring to The Kitchen Chapter Take-Aways and using this knowledge to design both indoor and outdoor kitchen spaces.



"Rooted Relationships"
This refers to the barns relationship to its context and the way in which it is rooted in the memories it holds, it also refers to the relationship the barn has formed with its natural environment over time and then finally it refers to our human need and desire to be connected to the earth, rooted to the land that provides for us.



"Preservation"
A theme that runs right through my thesis from theory to practical development. Preservation refers to my desire to preserve the barn as much as possible in its original form, theoretically it relates to the fermentation and the preservation of cuisine knowledge.



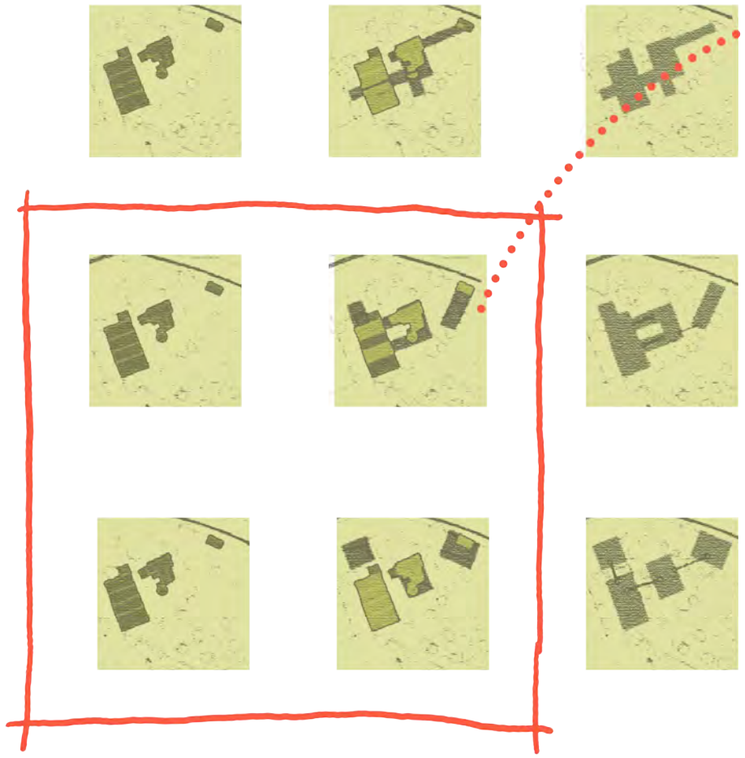
"Model, Mentor, Measure"
Three defined principles from my theoretical understanding of biomimicry and i have applied this through mapping the existing structures and trees on site and using them as guides

Figure 5.7 :
Entire page
Design narratives
[Author , 2024]

Conceptual Development

I started the first conceptual development by sketching over the existing barn and farm house, to try and figure out a way of linking the forms through corridors, courtyards or through separation - focusing on the threshold spaces.

I then decided I like the idea of "separation" and used the lines of the barn and the existing trees as a guideline for my programming.





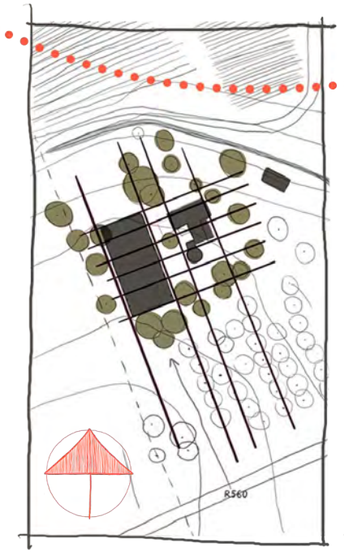
The graphic below represents my first attempt at a site strategy. My first focus was on preservation, guided by the barn and existing trees.

My second focus was about rooted paths, and the idea of collaboration through separation - too really celebrate the threshold spaces.

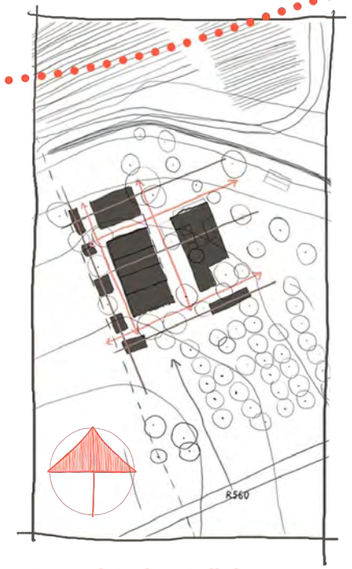
The third focus was a central axis which I named the Harvest Table - linking the farm fields to the central courtyard and then out into the pecan nut trees where I intend to extend the programme.

I then discovered that the existing farm house is in fact not structurally sound and that the foundations are crumbling.

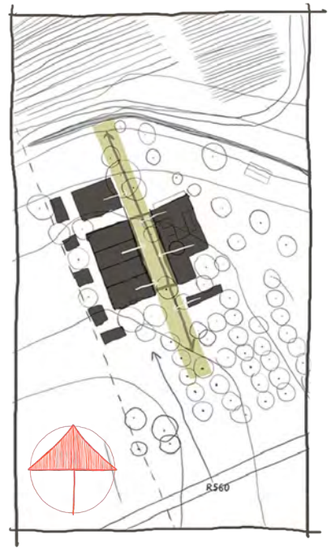
Ultimately, I decided early on that the best possible thing to do would be to demolish the existing farm house. It was built much later after the barn and holds no real historic significance. The house is also currently vacant.



Preservation, guided by the barn and existing trees



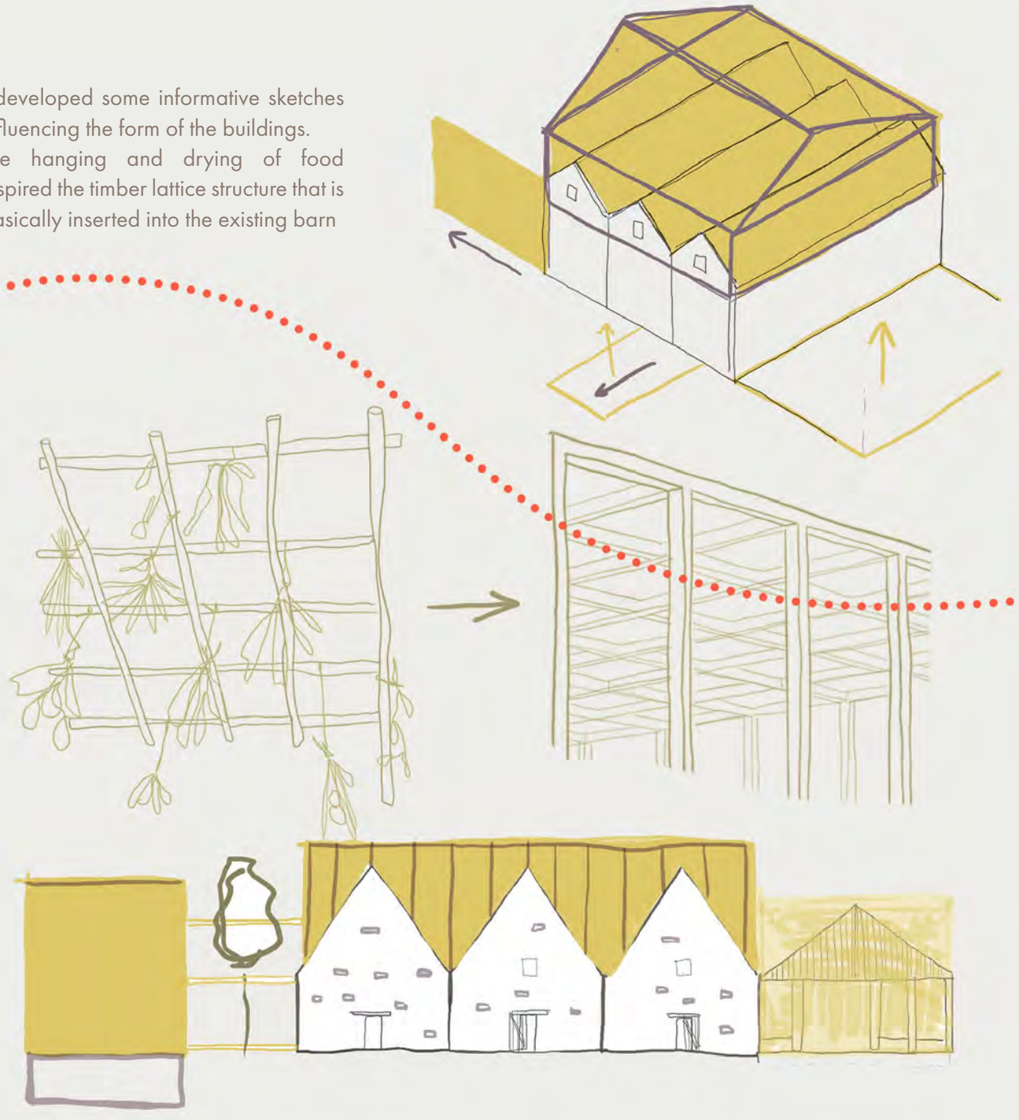
Rooted Paths, Collaboration through seperation

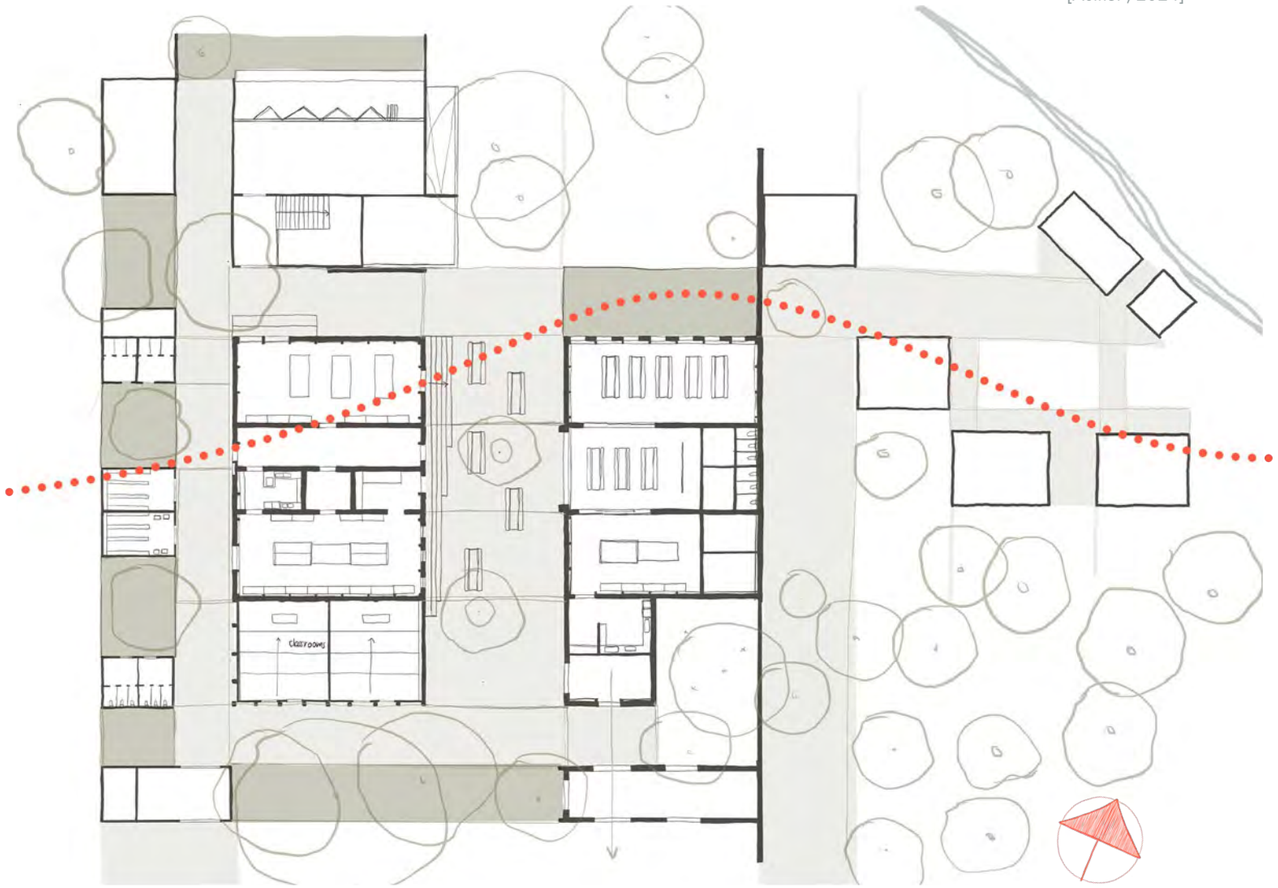


Central Axis Harvest Table

Figure 5.8 : Entire page
Conceptrual development - planning
[Author , 2024]

I developed some informative sketches influencing the form of the buildings.
The hanging and drying of food inspired the timber lattice structure that is basically inserted into the existing barn

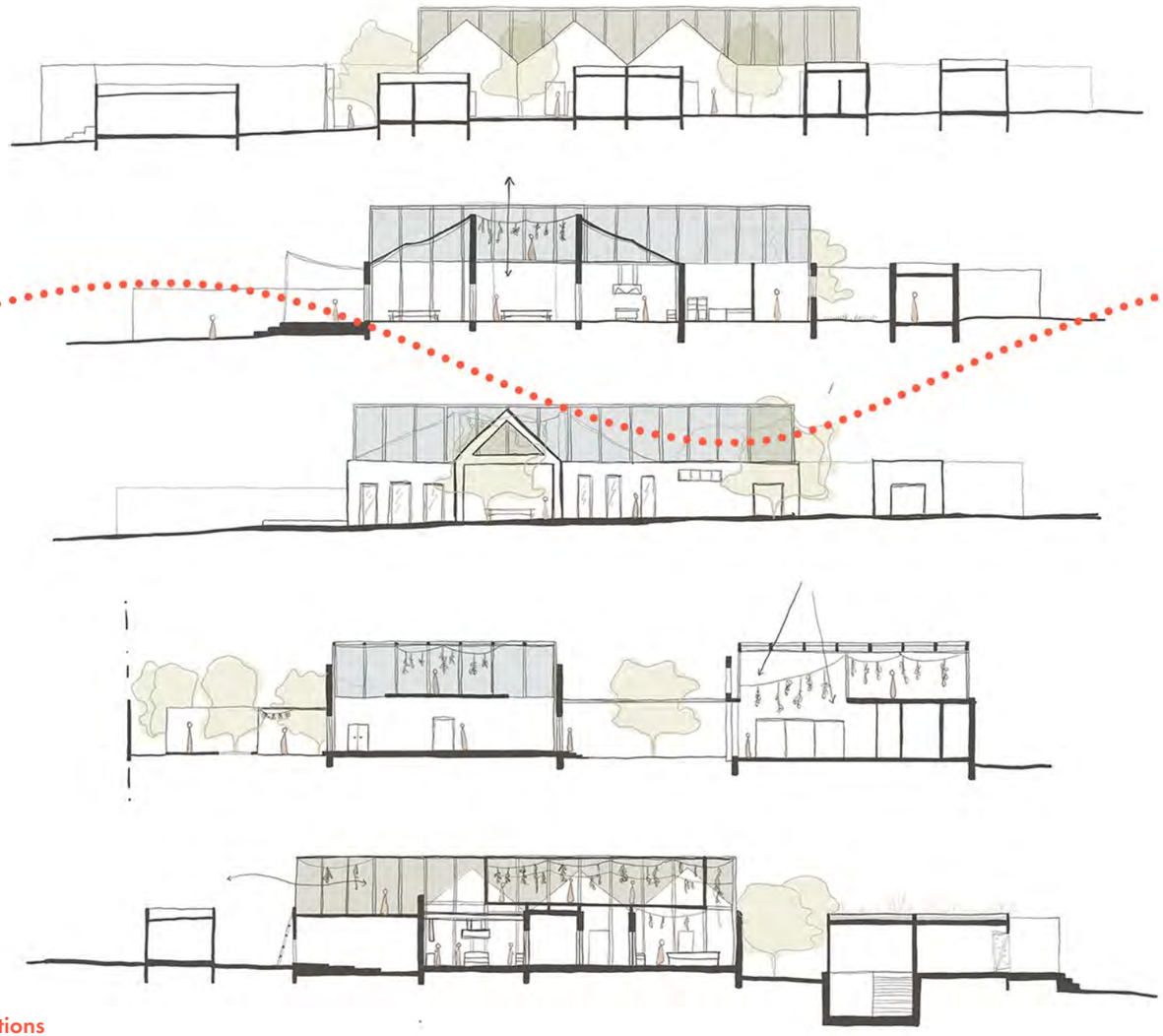




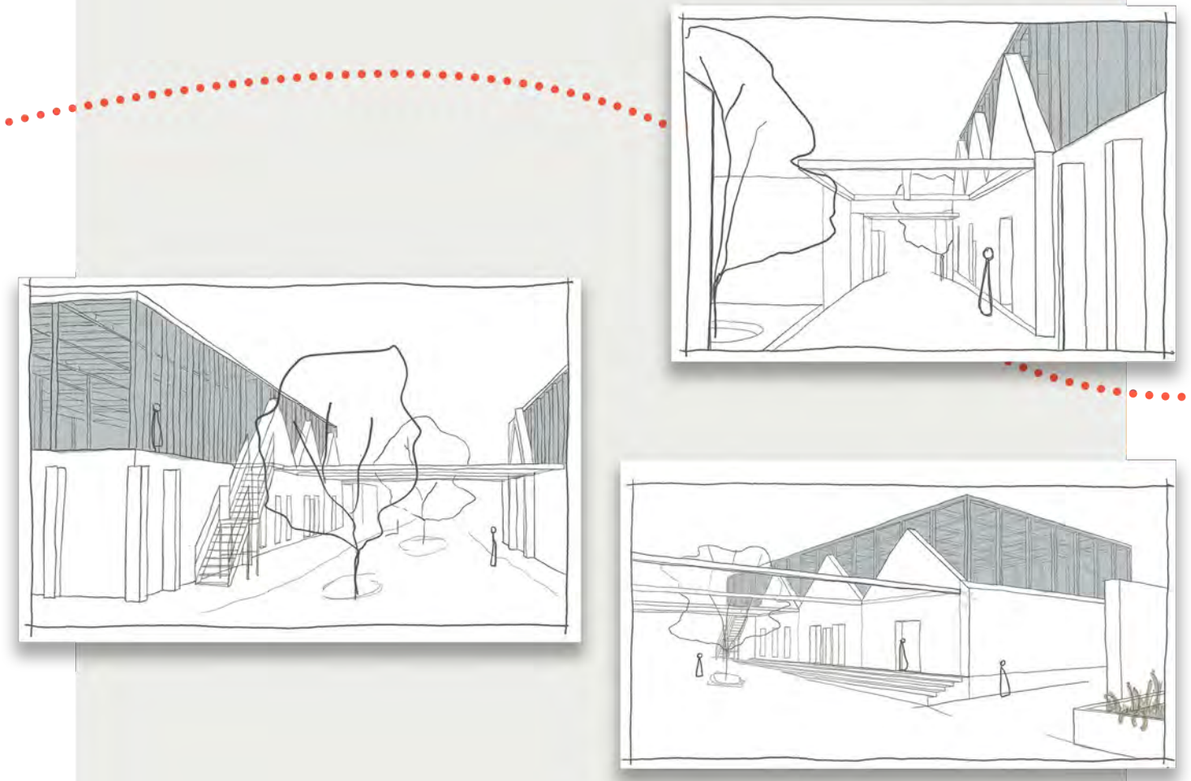
Ground Floor Plan

Figure 5.9 :
Entire page
Conceptrual development - skeches and plan
[Author , 2024]

Figure 5.10 :
Entire page
Conceptrual development - sections and 3Ds
[Author , 2024]



Sections



3D Views

Reflection of Conceptual Development Review

Overall the feedback was relatively positive, questions from external examiners were focused on the programmatic orientation of the building, questioning the viability of the project, however I feel I have now solidified this through my theoretical and socio - cultural settings.

One question I kept getting asked when a lecturer or peer looked at my plan was **"Where is the Barn?"**

I then decided it would be in my best interest to celebrate the form of the barn in plan and completely change the orientation of the surrounding buildings.

Shortly after the Review I began conceptually sketching new master plans.

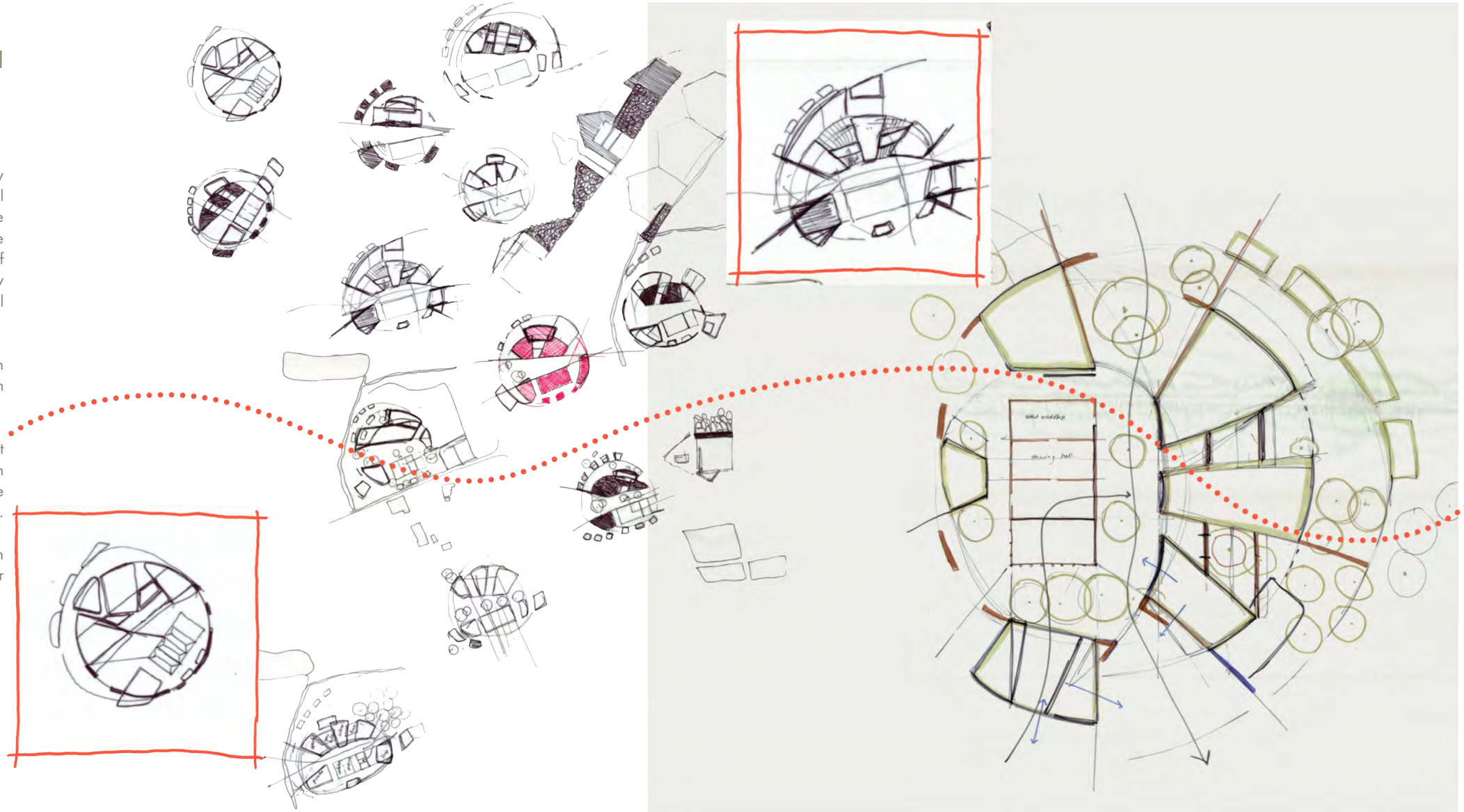
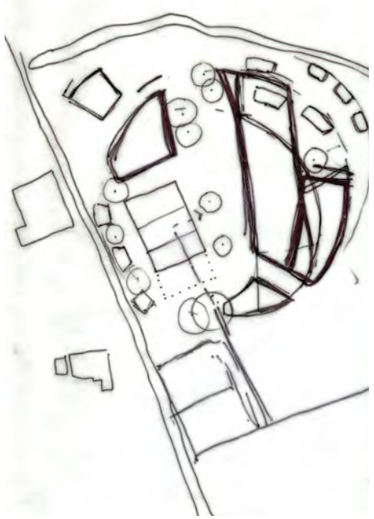


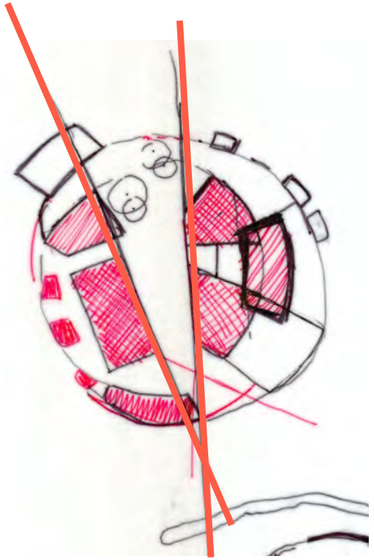
Figure 5.11 :
Entire page
Conceptual development - plan
[Author , 2024]

Key moments in plan progression

Figure 5.12 :
Entire page
Plan progression
[Author , 2024]



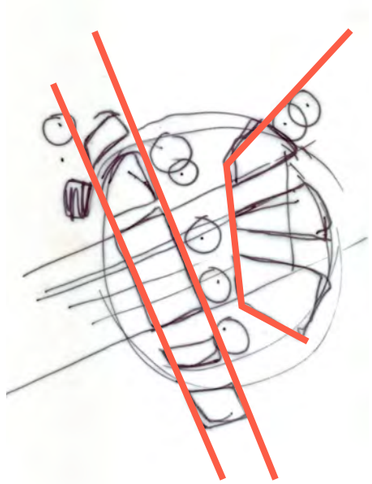
I started by creating a radial axis around the barn, the smaller building to the left of the plan are still very similar to that of the review. I wanted to create an opening towards the north - to optimise light and the view.



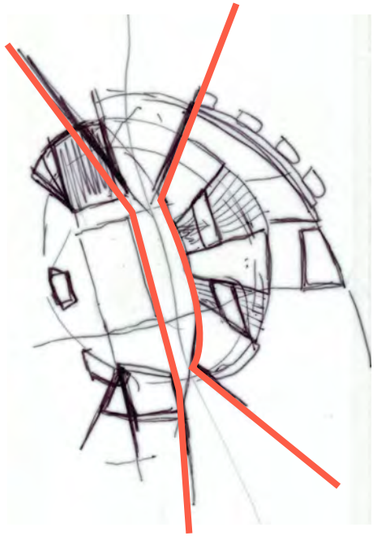
I then formalised that opening by creating a "V" shaped courtyard. I broke up the building on the right creating an courtyard transition space, with a designated servicing building between the two.



Above I decided the arrangement of the smaller buildings to the left did not make sense any more so I removed them, increasing the length of the barn programming in plan. I broke up the building to the right further creating more courtyard spaces along side the central courtyard.



The "V" shaped courtyard was not successful as it blocks the central access from field to pecan nut orchard, so I angled the opening on either side.
I then used the lines of the barn in plan to guide the placement and angle of the building to the right.



In this plan I created a double funnel - from field to courtyard and courtyard to pecan nut orchard. I also expanded the programming to the right linking the accommodation.

[5.3] Tectonics

This tectonic exploration focuses on what the surrounding buildings of the barn might look like, with a focus on materiality, structure and form.

In this exploration I focused on the buildings appearing heavy and grounded in the landscape with a lightweight roof structure made from timber. I explored what that roof might look like and the way it connects.

At first i was set on the timber structure being a pergola spanning the distance between two buildings, but after further development and critique i have decided that the buildings themselves will feature a light weight timber roof and the "inbetween" spaces will feature a simplified shading approach.

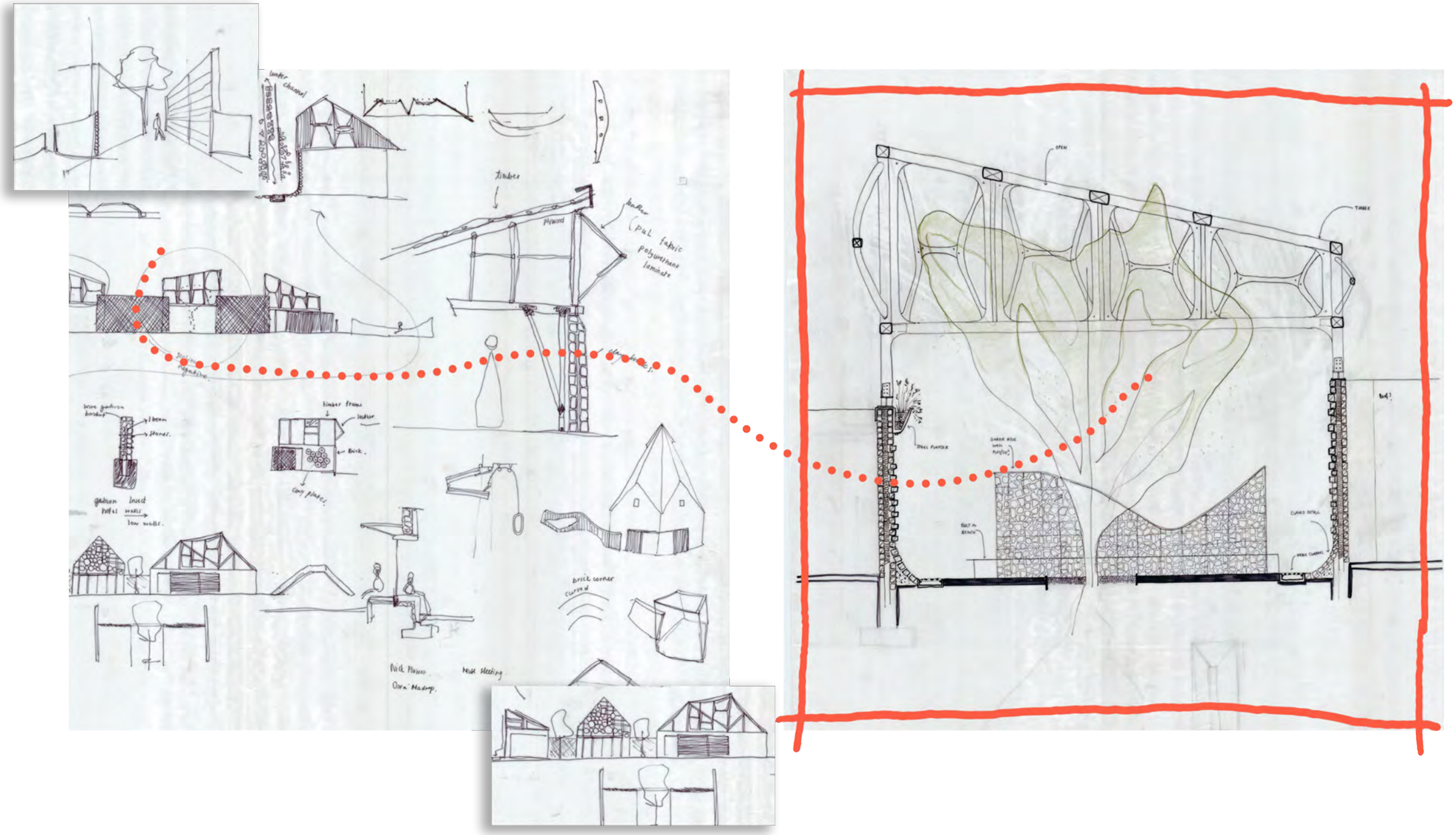
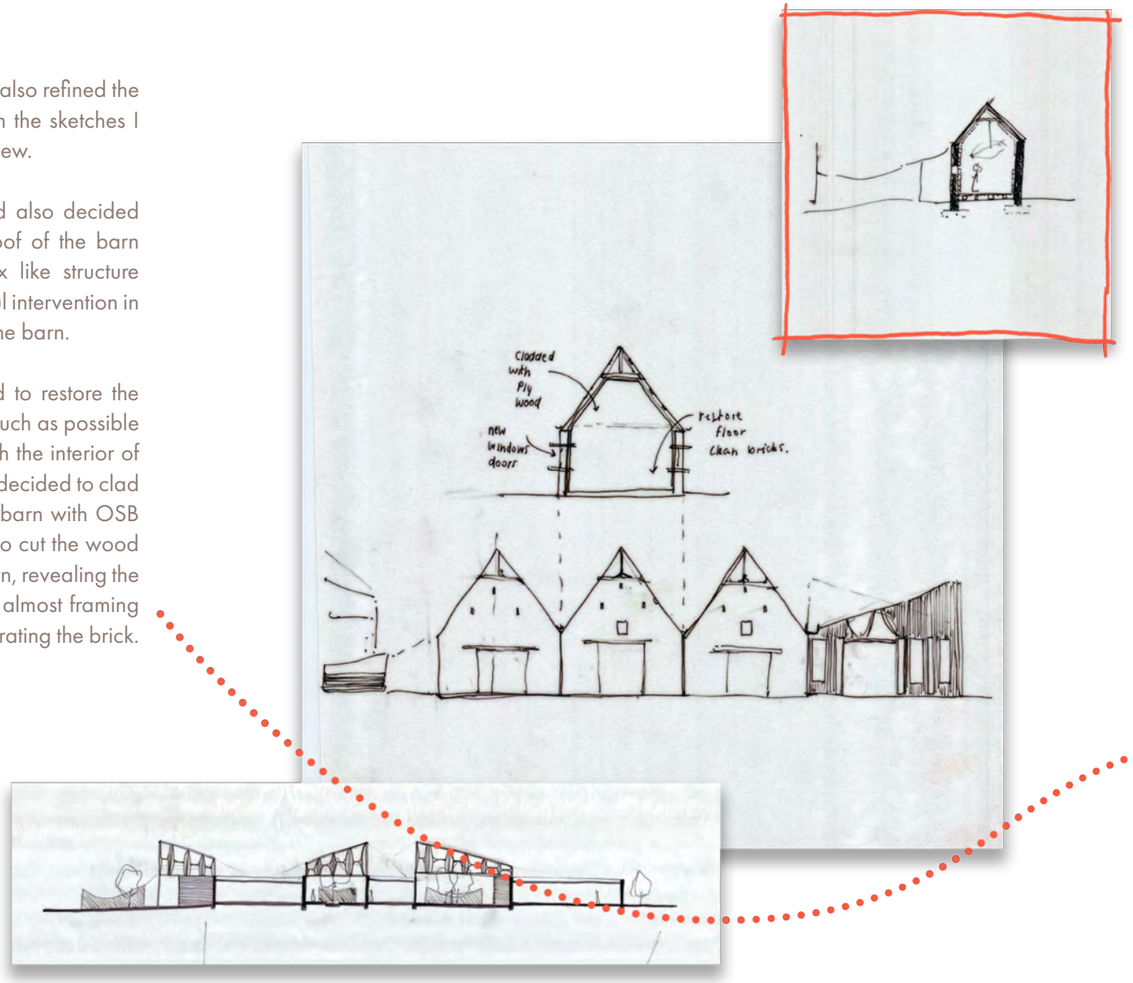


Figure 5.13 :
Entire page
Tectonic explorations
[Author , 2024]

This tectonic exploration also refined the master plan further, from the sketches I had drawn after the Review.

During this period I had also decided that by removing the roof of the barn and "inserting" the box like structure would not be a successful intervention in the re appropriation of the barn.

To date, I have decided to restore the exterior of the barn as much as possible and then experiment with the interior of the barn. Thus far I have decided to clad the entire interior of the barn with OSB or Plywood, the idea is to cut the wood in certain parts of the barn, revealing the original clay red bricks, almost framing them in their glory, celebrating the brick.



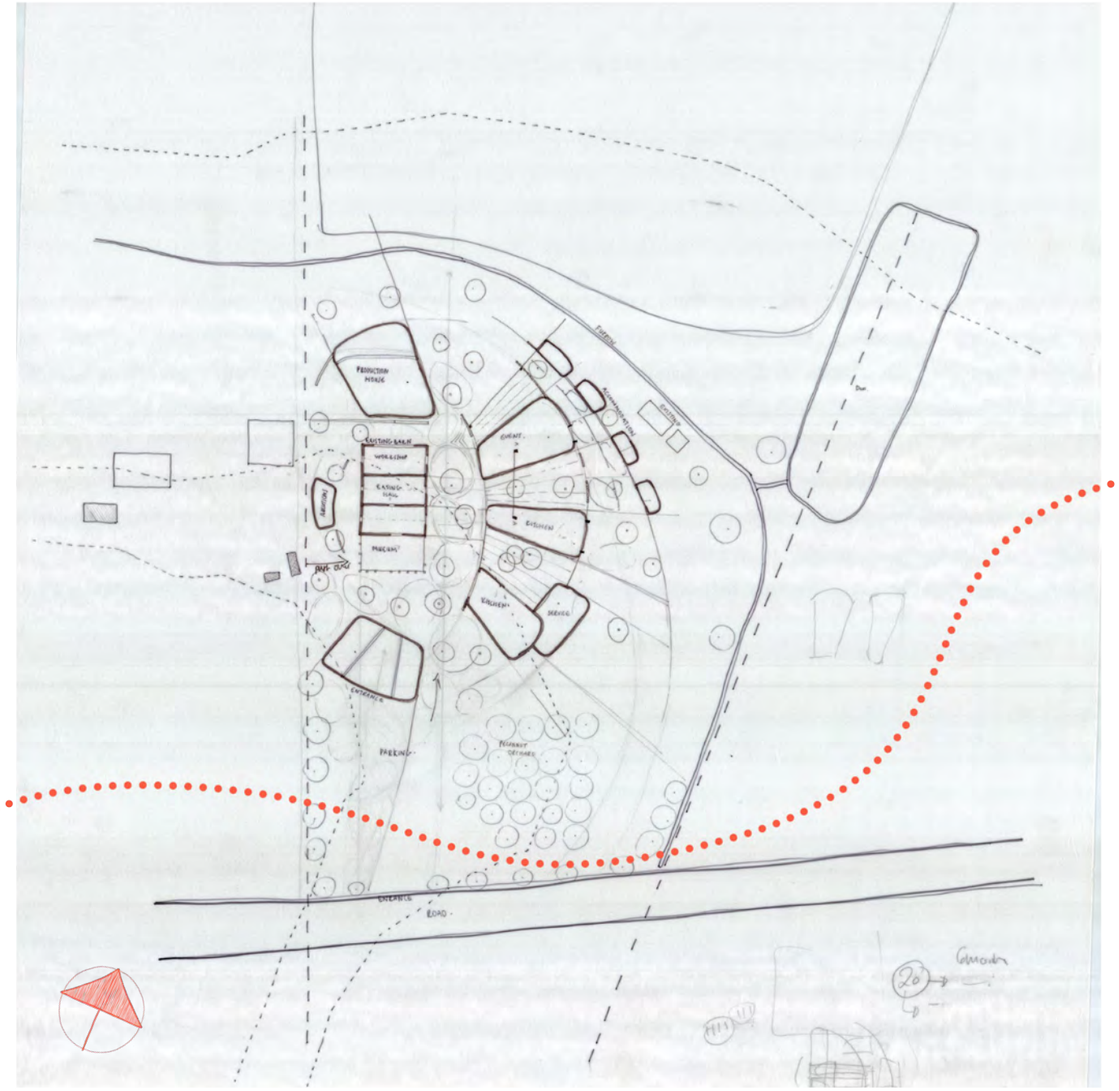


Figure 5.14 :
Entire page
Tectonic explorations continued
[Author , 2024]

Further Conceptual Development

For the final review before the exam I presented a set of drawings, including the progression of the plan with more detail in terms of program and aesthetic qualities. The focus of the review was the tectonics of my roof design, as I had opted to use a specific type of moss growing roof tile mentioned on page 63.

In order to use these specific roof tiles, the angle of the roof needs to be 15 degrees which ultimately limited my design.

After this review I explored an array of other roof designs opting for the use of a low level planted roof.

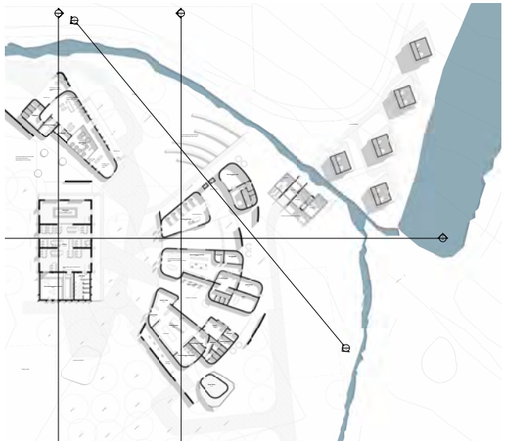






Figure 5.14 :
Entire page
Tectonic explorations continued
[Author , 2024]



Figure 5.14 :
Entire page
Tectonic explorations continued
[Author , 2024]

Figure 5.14 :
Entire page
Tectonic explorations continued
[Author , 2024]

Figure 5.14 :
Entire page
Tectonic explorations continued
[Author , 2024]

Further Conceptual Development

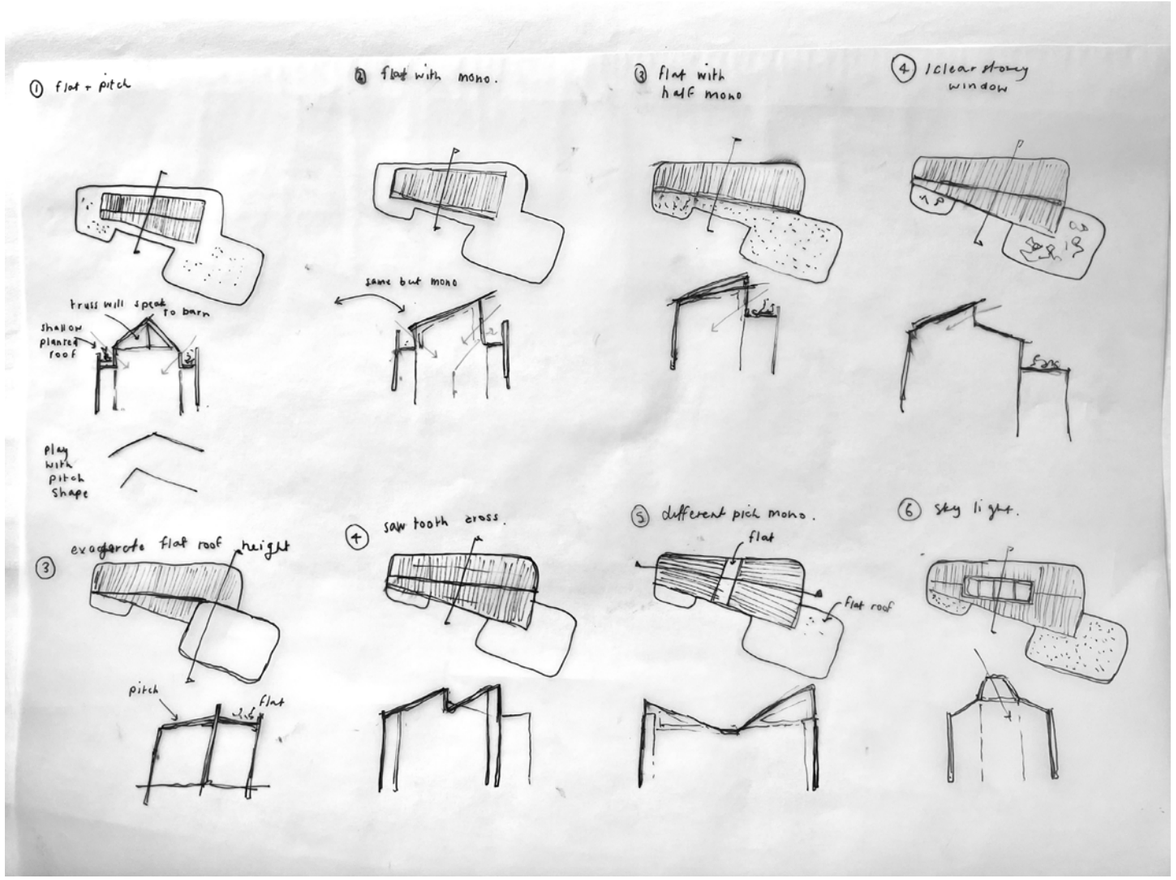


Figure 5.14 :
Entire page
Tectonic explorations continued
[Author , 2024]

The image on the left depicts several different roof options that were explored. The roof plays such an important role in the overall architectural language of the building and is something I found very difficult to articulate the way in which I wanted the them to look and be experienced.

The representation of the building in plan is deceiving because the buildings are separated and the form makes them seam smaller in scale than what they actually are.

I ultimately decided to develop option 1 moving forward into the exam. I felt that the pitched roof paid homage to the existing roof structure of the barn - while allowing light to flood into the space. The concrete roof space also allowed for the services required for the kitchens as well as accommodated my desire to have a planted roof.

The images to the right represent further conceptual development, exploring the spaces in-between the building and a sense of the landscaped areas.



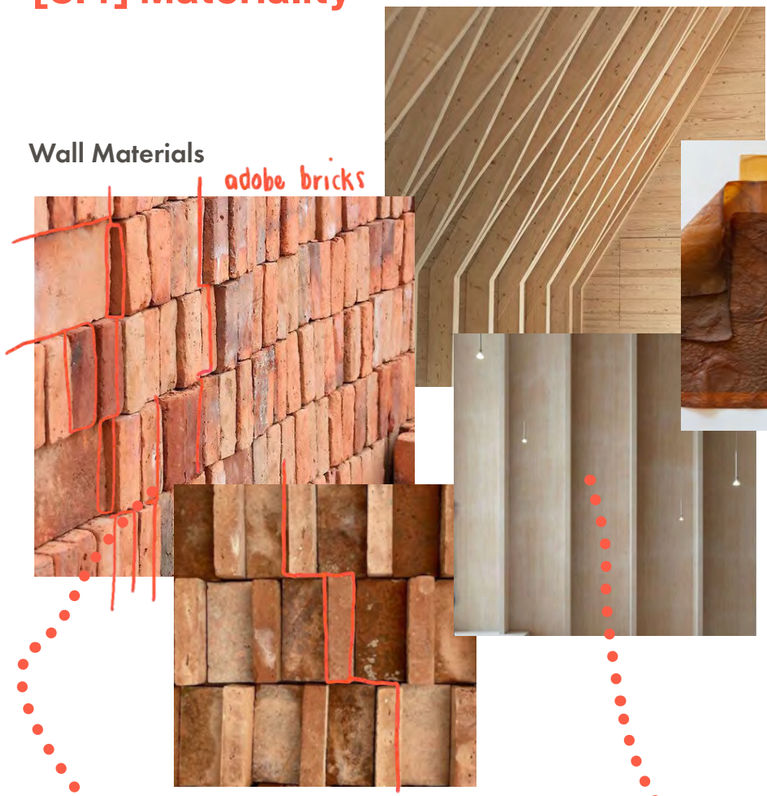




Figure 5.14 :
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Tectonic explorations continued
[Author , 2024]

[5.4] Materiality

Wall Materials



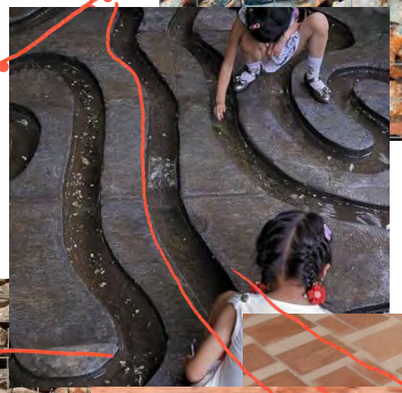
For wall materials the of use Red Clay bricks hand made on site to mimic that of the barn, will best support the approach and requirements of the intervention. I would lay the bricks in a more contemporary pattern

Plywood or OSB for the cladding of the interior of the barn

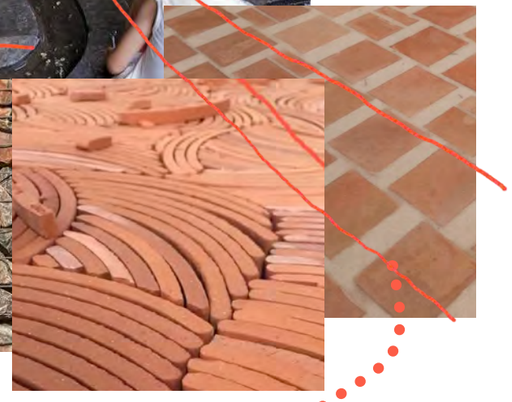
Landscaping







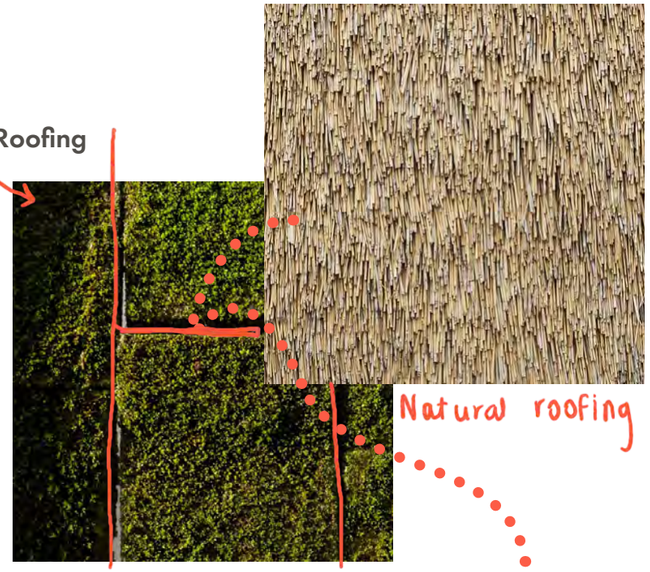




For Landscaping I will incorporate the use of gabion walls and insect hotels.

Recycled bricks and roof tiles to be used from the demolition of the existing farmhouse.

Roofing



For the roofing material I will use Respyre RoofTiles, a recent technological advancement where the concrete tiles allow and promote the growth of moss, making it a living roof.

For roofs where I don't intend on using the Respyre RoofTiles I will be using thatch.

I later decide to use a low level planted roof due to construction restrictions with the use of the Respyre Rooftile.

Figure 5.15 :
Entire page
Materiality exploration collage
[Author , 2024]

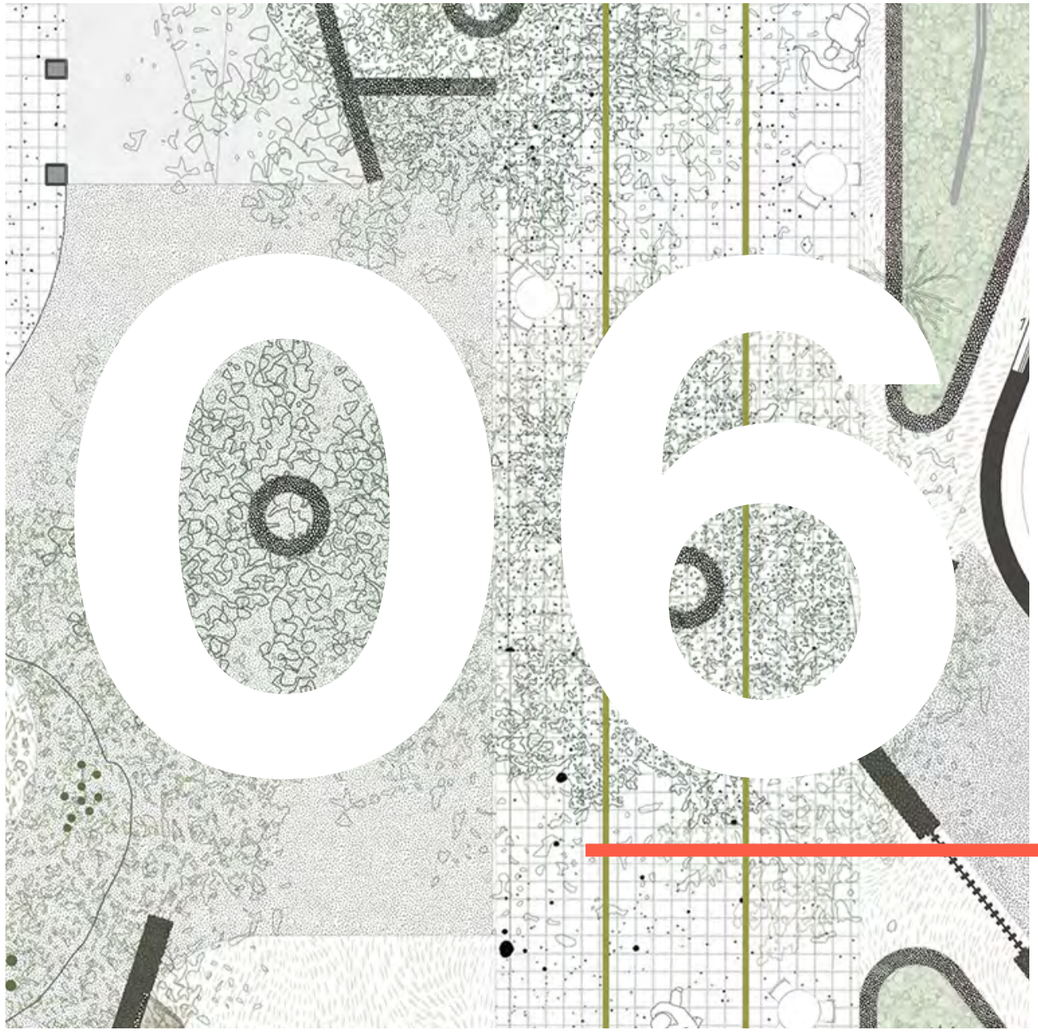


Figure 6.1 :
Opposite
The Making collage - A closer look at the detail
[Author , 2024]

The Making

This chapter showcases my final design drawings, as well as an overview of what I presented at my final exam. This chapter also includes a conclusion and reflection to my Masters in Architecture.

[6.1] Final design drawings



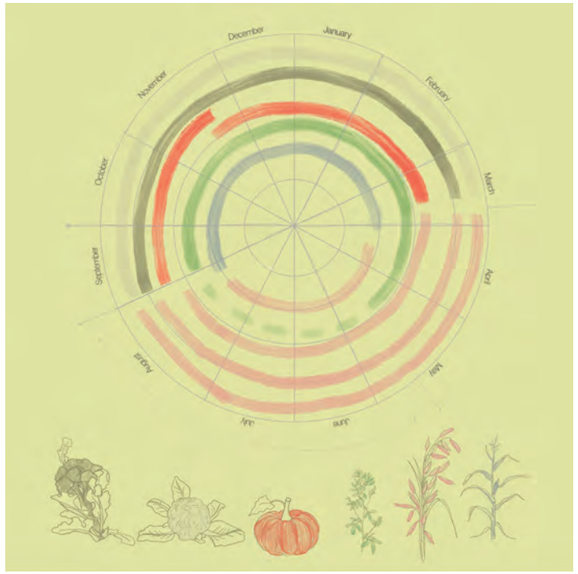
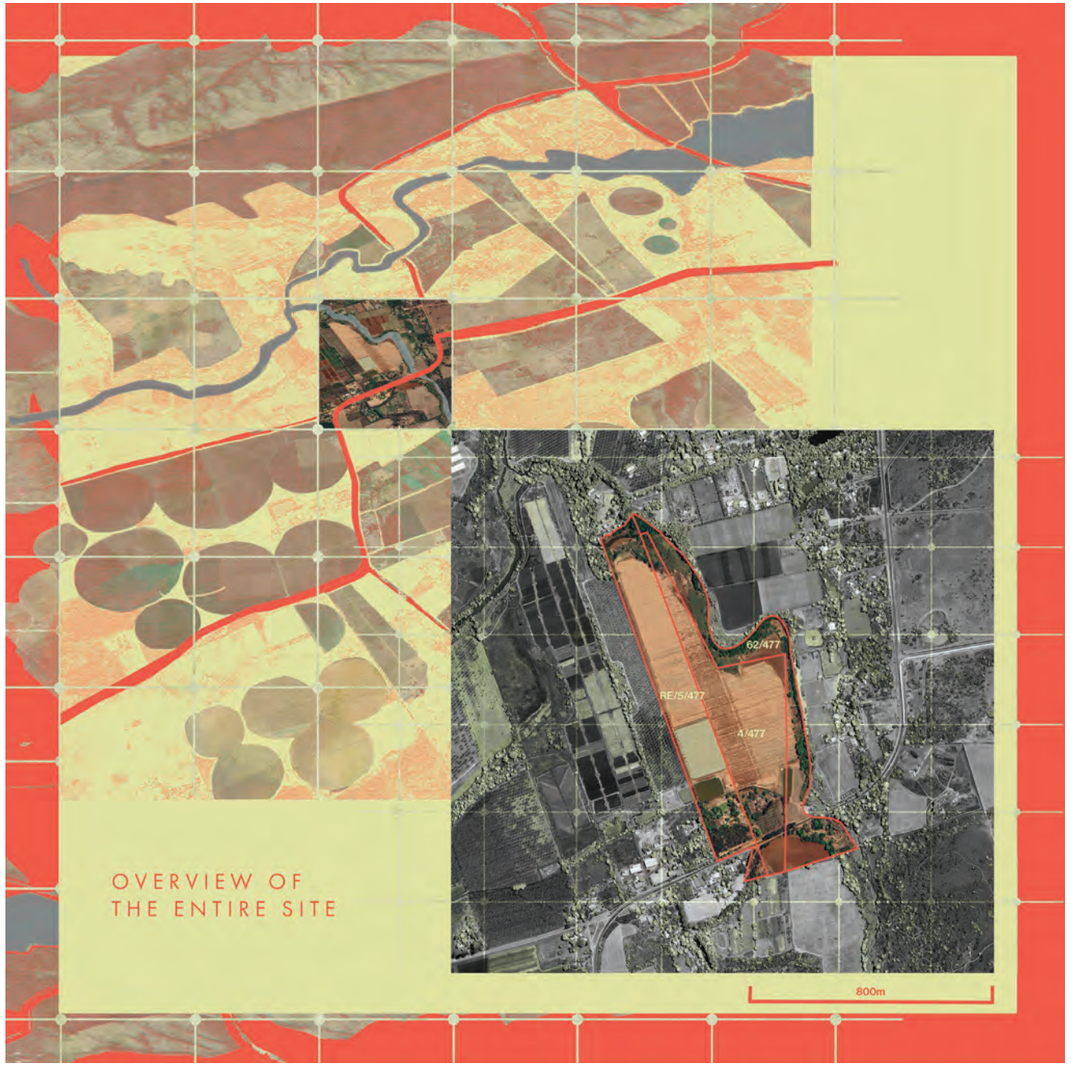




Figure 6.2 :
Opposite
Rendered collage - fermentation garden
[Author , 2024]

Figure 6.3 :
Above left
Plants grown on Site Chart
[Author , 2024]

Figure 6.4 :
Above right
POV of the site - as presented at my exam
[Author , 2024]



Site Plan



Figure 6.5 :
Opposite
Overview of Entire Site - as presented at my exam.
[Author , 2024]

Figure 6.6 :
Right
Rendered Site Plan
[Author , 2024]

Floor Plan

The floor plan visually accentuates the different building forms and the use of landscaping on the site. It also gives a greater sense of the scale, while the use of paving highlights the links between specific buildings as well as highlights the central axis.

The existing structures and elements of the barn are colour coded through a key on the right side, through this key you can see that my intervention was minimal on the existing structures.



01 - Guest Parking
02 - Servitude
03 - Entrance Corridor

THE BARN
04 - Outdoor Deli Seating
05 - Deli & Archive
06 - Eatery
07 - Bar
08 - Guest Ablutions
09 - Bar Stoep
10 - "Fermented" Garden

NORTH KITCHEN
21 - Practice Kitchen
22 - Outdoor Dutch Ovens
23 - Meeting Room
24 - Admin Office
25 - Break Room
26 - Braai Pit
27 - Flexible Outdoor Space

MIDDLE KITCHEN
28 - Demonstration Kitchen
29- Culinary Lab

40 - Crockery & Cutlery Storage
41 - Cold Rooms
42 - Pantry
43 - Root Cellar
44 - Outdoor Storage
45 - Cleaning Supplies
46 - Stock Receiving
47 - Staff, Student & Campsite Parking

ACCOMMODATION
48 - Camp Site
49 - Communal Student House

THE PRODUCTION KITCHEN
11 - Dry Storage
12 - Cold Room
13 - Ablutions
14 - Recieving
15 - Vegetable Sort & Wash Area
16 - Pickling & Preserving Area
17 - Brew House
18 - Bottling & Packaging for Brew House
19 - Dispatch

20 - Constructed Wetland

30 - Wash Area
31 - Bulk Cold Room
32 - Bulk Pantry
33 - Staff Ablutions
34 - Staff Outdoor Area

SOUTH KITCHEN - Eatery Kitchen
35 - Service Area
36 - Break Area
37 - Cooking Side
38 - Prep Side
39 - Wash Area

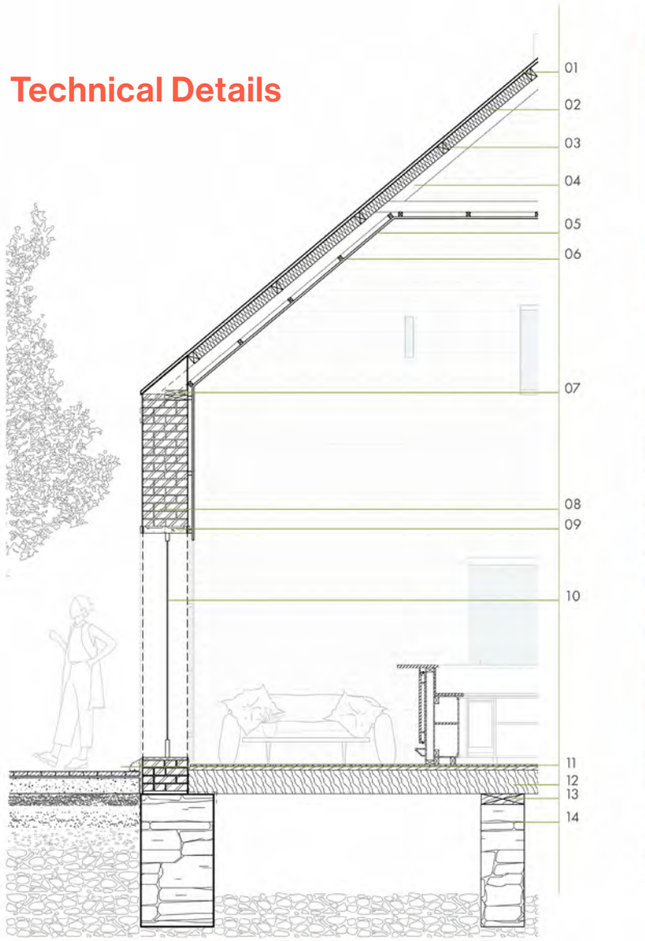
50 - Two Sleeper Accommodation Pods

51 - Furrow
52 - Farm Service Road
53 - Fields

Existing
New

Figure 6.7 :
Opposite
Floor Plan
[Author , 2024]

Technical Details



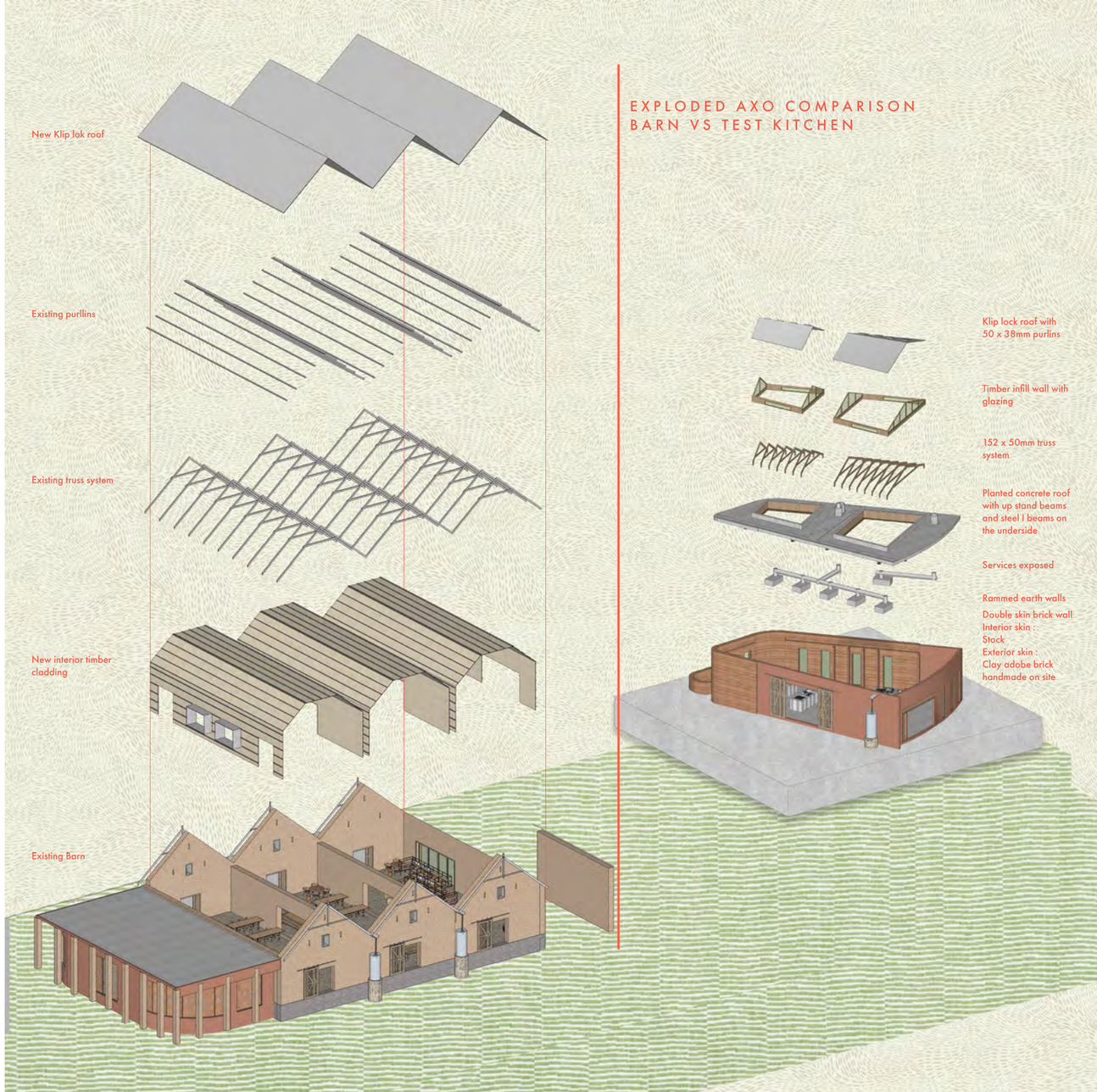
BARN SECTION & ELEVATION DETAIL |

01 - New Klip lok roof
02 - New Insulation
03 - Existing 114 x 75mm Purlins
04 - Existing Truss System
05 - New 21mm ply wood cladding
06 - New 38 x 38mm brandering fixed to existing
07 - Existing wall plates
08 - Existing 480mm clay brick wall
09 - New Lintel
10 - New timber glazed sliding door
11 - Existing refurbished timber sub floor
12 - Existing Joists
13 - Existing wall plate
14- Existing stone foundations



Figure 6.8 :
Left
Barn Section and Elevation Detail
[Author , 2024]

Figure 6.9 :
Left
Exploded Axo Structure Comparison
[Author , 2024]



Site Axis and Zones

Figure x represents the central axis or as I call it "the harvest table" highlighting the connection between the fiend, building and the people.

Figure x is a diagrammatic exploration of the different types of use zones with in the building, showing how the program spirals radially from public to private spaces. It also visually represents the impact of the central axis.

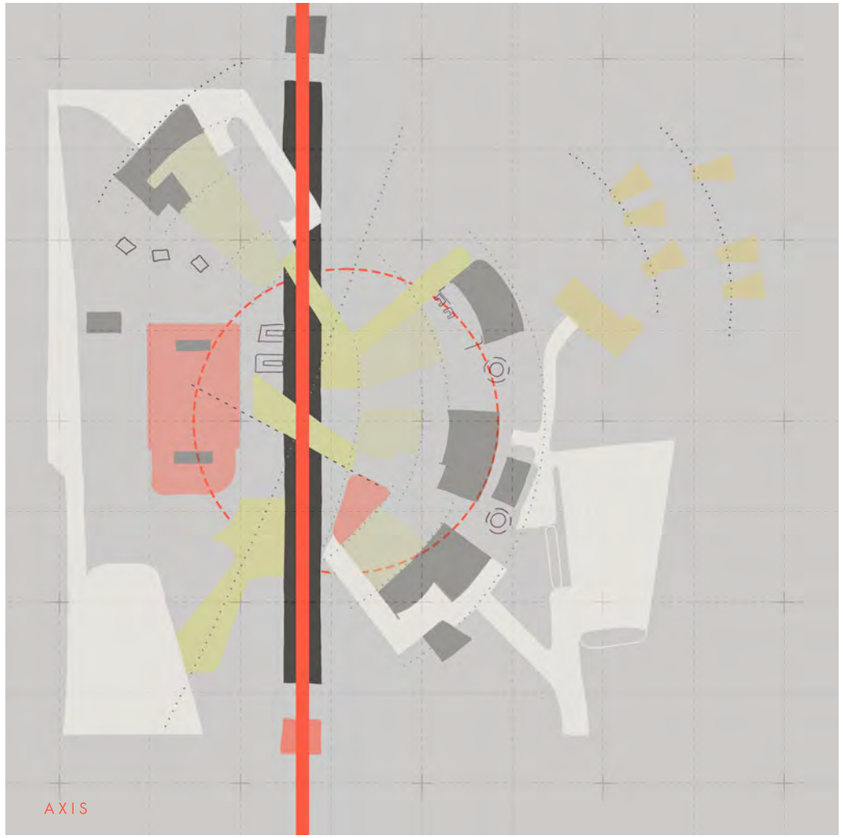


Figure 6.10 :
Left above
Axis through site
[Author , 2024]

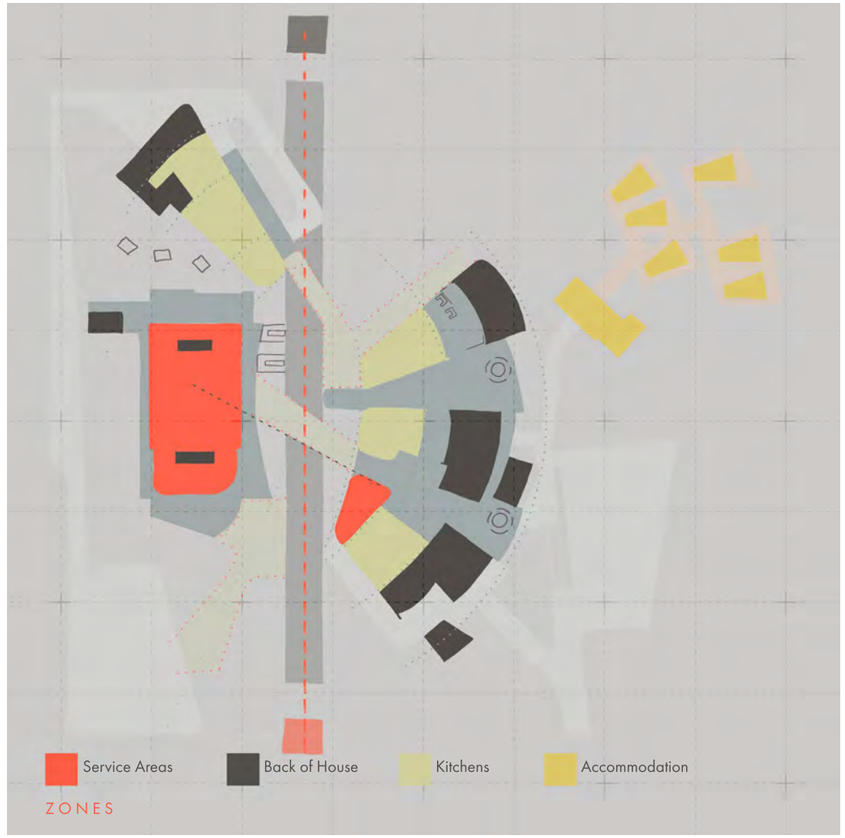


Figure 6.11 :
Right Above
Zones of site
[Author , 2024]

Site Use - Weekly vs Weekend

The figures to the right represent the different ways in which the buildings are used and by whome during the week vs the weekends.

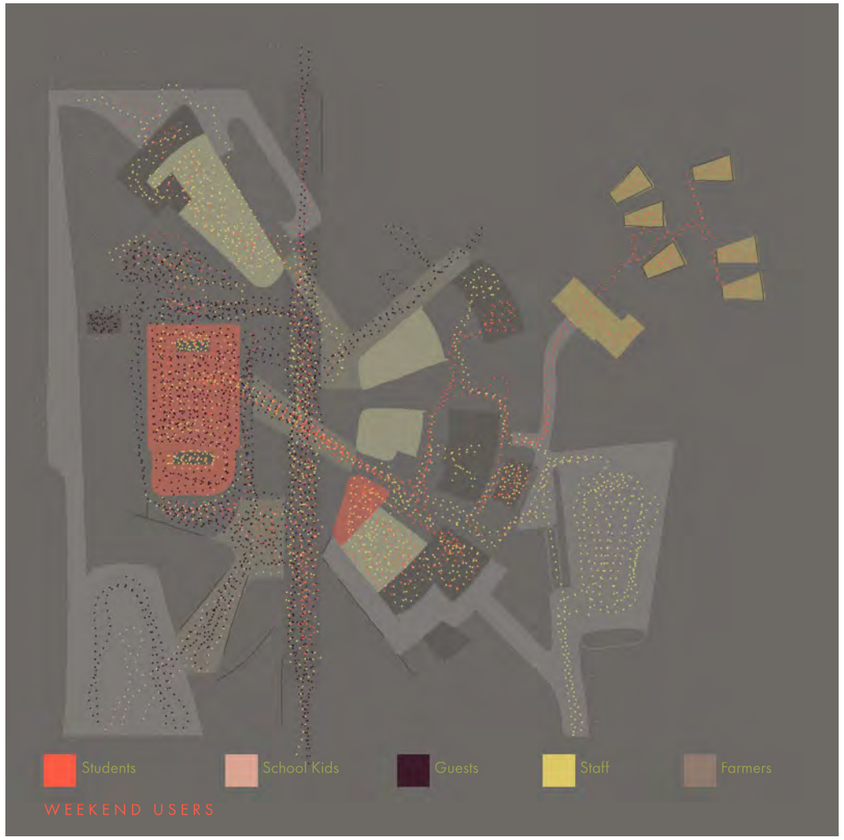


Figure 6.12 :
Left above
Weekend users of Site
[Author , 2024]

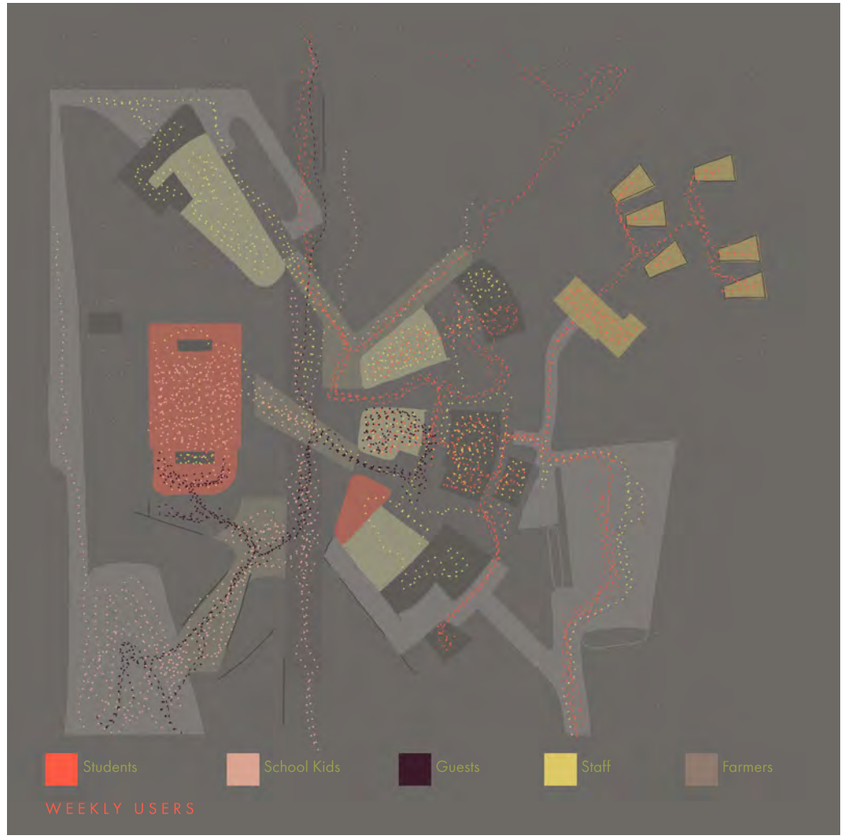
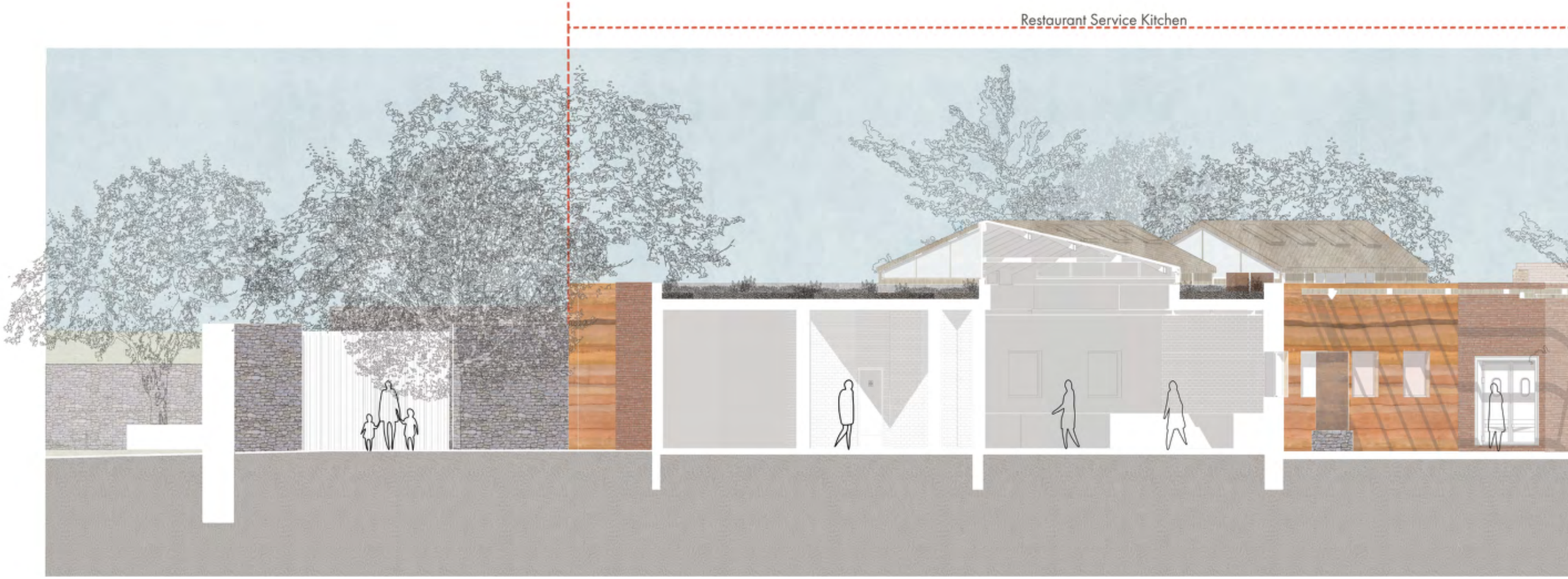


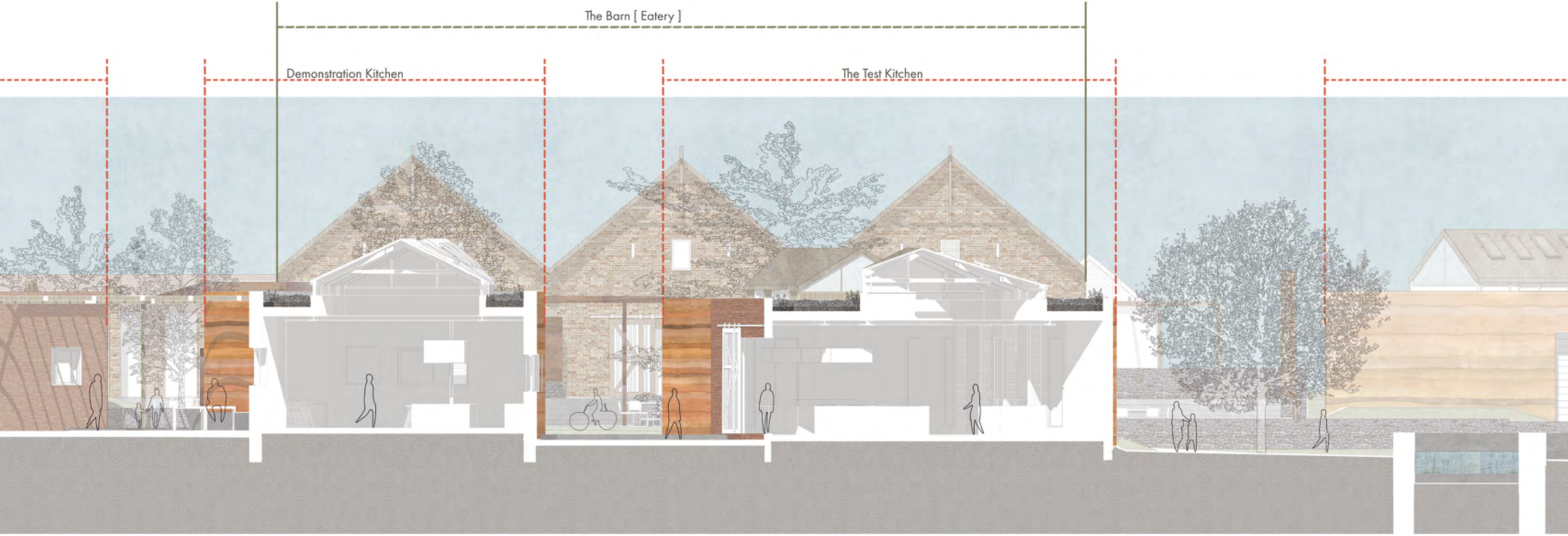
Figure 6.13 :
Right above
Weekly users of Site
[Author , 2024]

Long Sectional Elevation

This sectional elevation spans across three spreads, highlighting the scale and spacial poetics of the spaces.

Visually the long sectional elevation also explores the materiality of the building.




The Barn [Eatery]
Demonstration Kitchen
The Test Kitchen

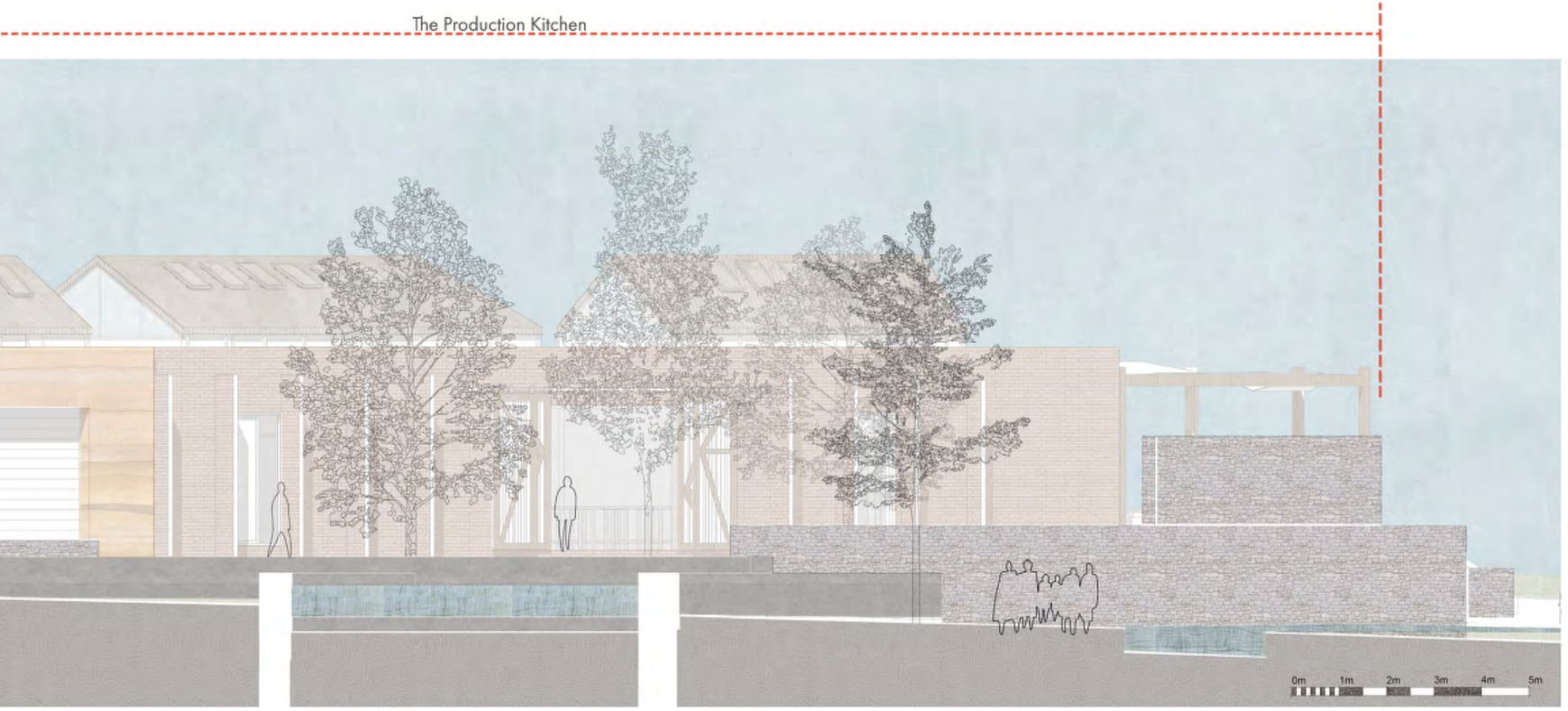


Figure 6.14 :
Last 3 Spreads
Long Site Sectional Elevation
[Author , 2024]

Production Kitchen

Elevation & Section

0m 2m 4m 6m 8m 10m



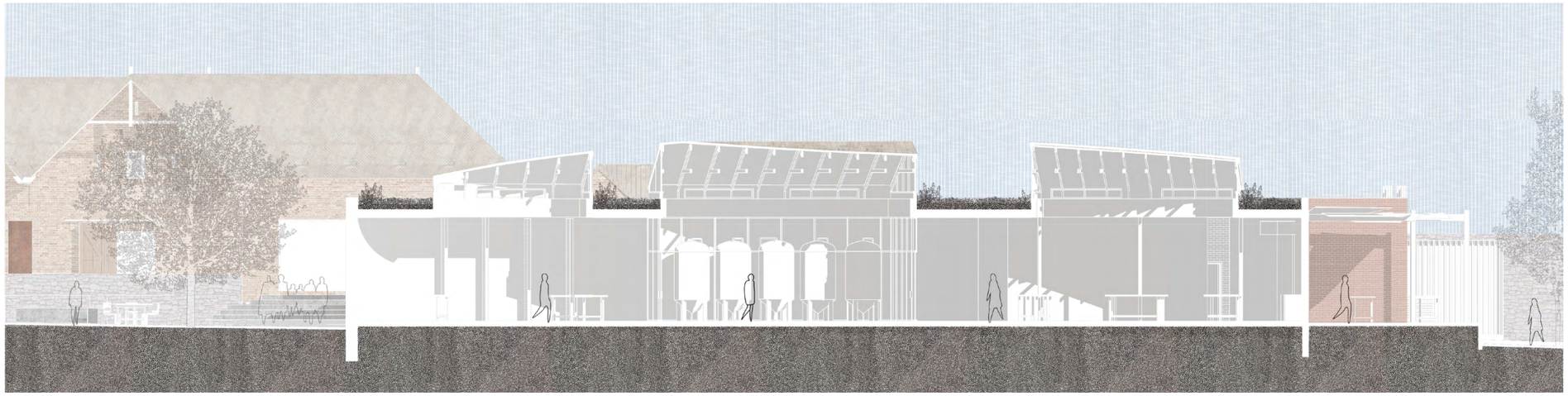


Figure 6.15 :
Right above
Elevation of production house
[Author , 2024]

Figure 6.16 :
Right below
Section of production house
[Author , 2024]

Production Kitchen 3D



Figure 6.17 :
Entire page
Internal collage rendering of production kitchen
[Author , 2024]

Central Axis “Harvest Table” 3D



Figure 6.18 :
Entire page
Harvest table collage rendering
[Author , 2024]

Entrance Corridor 3D



Figure 6.19 :
Entire page
Entrance corridor collage rendering
[Author , 2024]

Outdoor Cooking Area 3D



Figure 6.20 :
Entire page
Outdoor cooking space collage rendering
[Author , 2024]

Central Axis 3D



Figure 6.21 :
Entire page
Central axis collage rendering
[Author , 2024]

Outside the Production House 3D



Figure 6.22 :
Entire page
Entrance to production kitchen collage rendering
[Author , 2024]

Site Sectional Elevations





Journey of the Broccoli

The Journey of the Broccoli visually represents the narrative of the produce, in this case the broccoli moving through the site, from field to kitchen, to street.

The visual also takes a closer look at the programmatic function of the spaces and how the broccoli moves through these spaces.

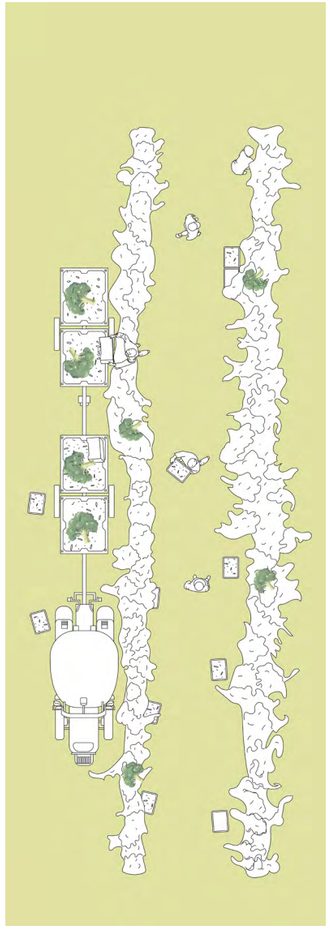
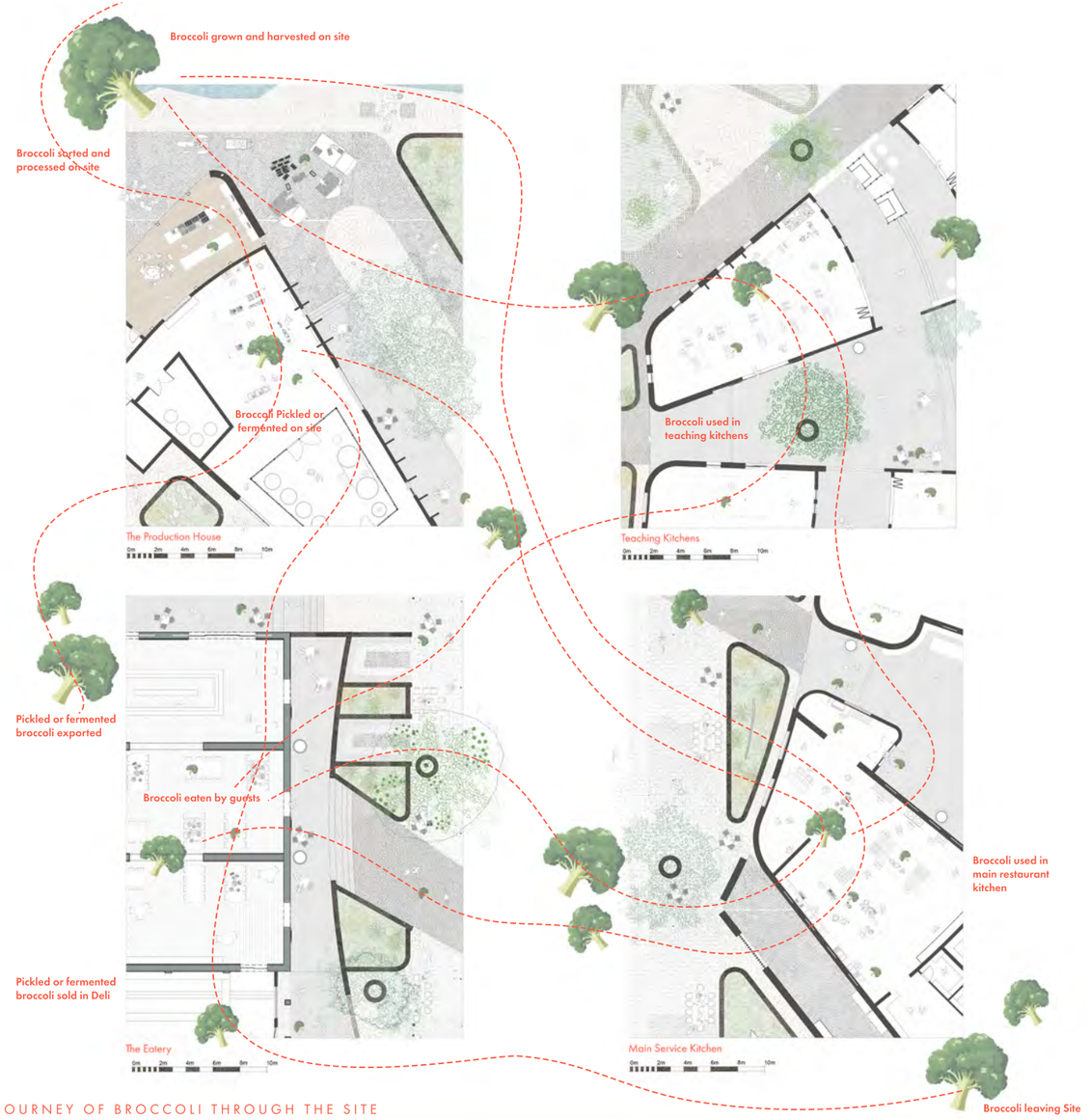


Figure 6.23 :
Entire previoud page
Site sectional elevations
[Author , 2024]



JOURNEY OF BROCCOLI THROUGH THE SITE

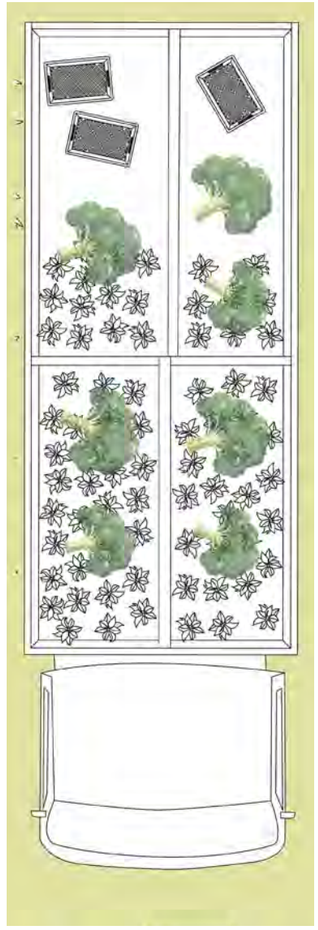


Figure 6.24 :
Entire page
Journey of the broccoli through the site graphic
[Author , 2024]

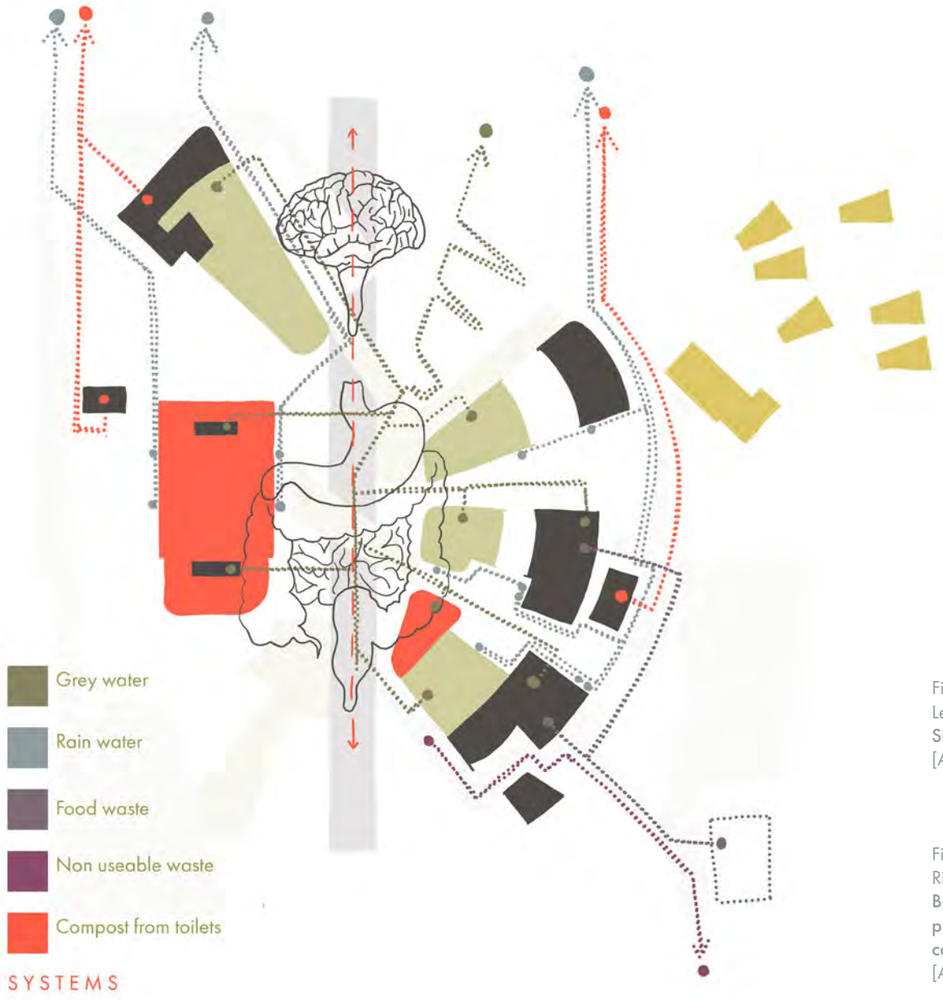


Figure 6.25 :
Left
Site Systems diagram
[Author , 2024]

Figure 6.26 :
Right
Barn adjacent production house collage rendering
[Author , 2024]

[6.2] Conclusion and Reflection

As I sit back and reflect on the journey that led to this moment, it is hard to believe how far I have come. The road to completing my architectural thesis was not an easy one, and there were moments when I questioned myself and my design. From the outset, I felt a sense of reluctance and doubt, often comparing my work to that of my peers and wondering if my design had the same power and impact. I struggled with the notion that my ideas might not be as bold or innovative as others, and this lack of confidence held me back for much of the process.

However, a significant shift occurred about a month before the final exam. I began to understand and appreciate the value in my work and its potential to contribute meaningfully to the architectural conversation. I found a renewed sense of confidence, knowing that my design—though perhaps different—was grounded in the principles I believed in and had worked so hard to develop.

This transformation in my thinking was a pivotal moment in the completion of my thesis and has been one of the most rewarding aspects of this entire experience.

I am incredibly humbled and honoured to have been awarded the Corobrick Award for the Best Use of Clay Masonry. This recognition feels like a testament not only to the hard work and dedication I put into the project but also to the journey of personal growth that accompanied it. It serves as a reminder that perseverance, even in moments of self-doubt, can lead to meaningful achievements.

I would like to thank my supervisor, Kiki once again, who was a constant source of support and guidance throughout this process. Their encouragement and insightful feedback played a crucial role in my development as both a designer and a thinker. I also want to thank my friends, who have been my sounding board, my critics, and my source of strength.

Their unwavering belief in me helped me push through moments of uncertainty and gave me the courage to keep moving forward.

In conclusion, this thesis has been a journey of both professional and personal growth. It has taught me the importance of trusting in my own vision and abilities, even when doubt creeps in. It has shown me the value of persistence, collaboration, and support. And ultimately, it has reaffirmed my passion for architecture and the impact it can have on the world around us. I am proud of what I have accomplished, and I look forward to the opportunities that lie ahead.





Figure 6.26 : Right
Images taken at the Corobrik Student Architecture Awards at Wits
[Francois Lategan , 2024]

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Appendices

[A] Ethics Clearance

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG | SCHOOL of ARCHITECTURE PLANNING

20 August 2024

Clifford Kerry

2115439

TO WHOM IT MAY CONCERN

RESEARCH ETHICS APPROVAL

Nourished Roots The kitchen as a living ecosystem, reappropriating a barn in the centre of Skeerpoor

This letter serves to confirm that the Ethics application for the above titled study has been approved. The researcher has been granted clearance to proceed with the research study or project.

Protocol/clearance number is: **SOAP012/03/2024**

Yours sincerely

Motsei Choabi
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[B] Viability Report

Feasibility & Viability

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2.2. Organisation Structure
2.3. Financial Structure
2.4. Social Impact
2.5. The Market Users

3. THE PROFESSIONAL TEAM
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3.4. Methods of contracting

4. BUDGET
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5. THE PROJECT
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6. APPENDIX

[1] Executive Summary

The scope of this project involves the repurposing and appropriation of an existing barn in Skeerpoort, South Africa, within its dynamic environmental and social context. The project seeks to transform the barn, currently vacant, to address multi-layered needs within the community, including community development and empowerment on various scales.

This Viability report evaluates the feasibility and potential success of the project. Various aspects including the client, the professional team, the market, financial considerations, site conditions and implementation are examined to determine if the project is viable. The main purpose of a viability report is to provide investors, developers, and decision-makers, with the information they need to make informed decisions about whether to proceed with the project. It helps to identify potential challenges and risks early in the project.

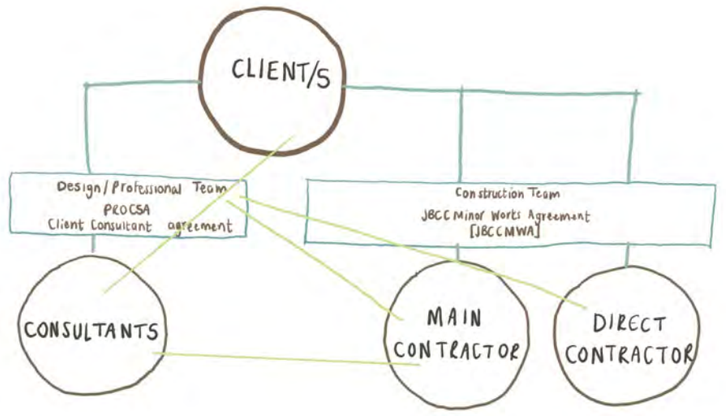
[2] The Client [Commissioning Agent]

2.1 The Client

The client is the current owner of the land who currently uses the land for farming purposes but is seeking to reinvent and reappropriate the barn on site, expanding his knowledge about food preparation and production, while sharing his knowledge with various communities on different scales.

Other clients include the local government as the proposed development would benefit them tremendously in terms of their development plans for the future of the area. The United Nations Educational, Scientific and Cultural Organisation [UNESCO] Man and Biosphere programme [MAB] is a programme that was developed with a focus on the conservation of the Magaliesberg biodiversity while maintaining cultural values and pursuing economic and social development, they are exceptionally keen to invest in the project. The local restaurants around the area are also interested in investing in the project because it will eventually benefit them.

2.2 Organisational Structure



2.3 Financial Structure

The owner will secure initial capital funds for the project, via a bank loan while simultaneously engaging with wealthy private investors in the area. This will not be enough to cover the costs of the entire project, so the client has decided to partner with The United Nations Educational, Scientific and Cultural Organisation [UNESCO] Man and Biosphere programme [MAB], which comprises of the national as well as provincial government stakeholders and Municipal Stakeholders.

2.4 Social Impact

The proposed project will not only create more job opportunities within the local economy but will benefit the entire Madibeng Municipality and greater government in terms of tourism and education.

2.5 The Market Users & Occupiers

- Local Community
- Individuals interested in agriculture, cooking, and processing food.
- Culinary Students
- Individuals seeking an alternative lifestyle with a focus on wellbeing and a harmonious relationship with the environment.
- Tourists

[3] The Professional Team

3.1 Professionals Required

Management [Project Manager]

A project manager will not be appointed for the project. The Architect will be appointed according to the PROCSA Agreement is for the full scope of services including the roles of the Professional Architect, the Principal agent, and the Principal Consultant.

Legal [Attorney – Conveyancer]

The Attorneys responsible for the processing and transfer of the property to the client.

Planning
[Town Planner – Land Surveyor]

This project will require a Town Planner to obtain the consolidation of the two properties, both properties are owned by the same owner. Approval from the local Madibeng Municipality will need to be motivated according to their development and planning schemes centred around tourism. A Land Surveyor is required to do a cadastral survey and SG diagrams for the submission and approval of the two properties to be consolidated.

Design
[Architect – Quantity Surveyor – Engineers – Specialists]

The Architect's appointment according to the PROCSA Agreement is for the full scope of services including the roles of the Professional Architect, the Principal agent, and the Principal Consultant. The project is heavily design driven; therefore, the Principal Agent will be responsible for all the roles, including liaison with the client and ensuring that the project is completed successfully, on time, and within budget.

The Quantity surveyor will liaison with the architect, consulting engineers and contractors to protect the client's interest. They are independent experts who manage the cost, bill of quantity, and procurement for the building project, with a focus on minimize costs while at the same time maintaining quality and legal standards. They will provide procurement advice, manage project finances, and advise on risk management and value engineering.

Conventional Engineers as well as Building Specialist are required for specific roles throughout the project timeline. Specialist with a focus on sustainability and Ecology will be required for specific building techniques. A specialist will be required for the evaluation of the existing structures and to advise on construction.

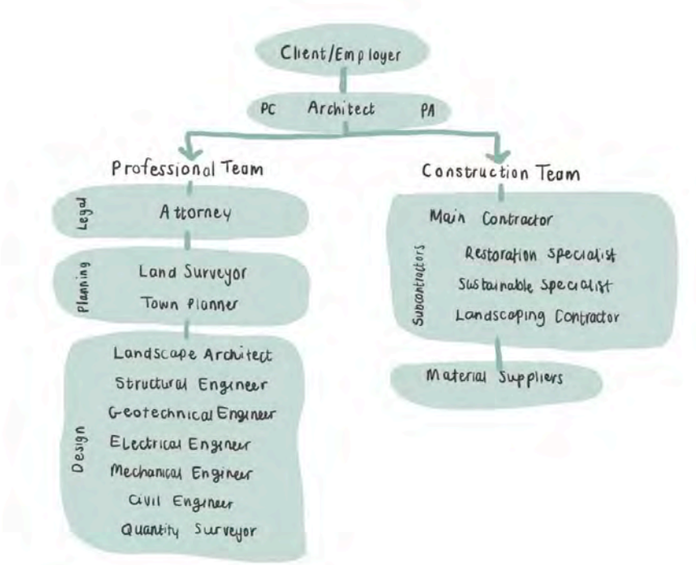
A Landscape architect will be required for the design of the public space and preservation of existing plants.

A geotechnical engineer might be required due to the existing structures on site and the fact that the soil is very clay like.

Construction
[Construction Manager]

The Construction Manager will oversee and coordinate the construction of the project, managing materials, budget, schedules, and quality control. The Construction manager will also handle contract management, risk mitigation, and communication between different members of the professional team. Another Key role of the Construction Manager is to ensure compliance with health and safety regulations, solve problems that arise, and ensure projects are completed efficiently and to SANS building regulations and standard.

3.2 Organisational Structure



3.3. Project Timeline

[Stage 1]
Inception - 4 weeks

[Stage 2]
Concept and Viability - 4 weeks

[Stage 3]
Design Development - 6 weeks

[Stage 4]
Documentation and Procurement - 50 weeks

[Stage 5]
Construction - 30 weeks (to overlap with stage 4)

[Stage 6]
Closeout - 8 weeks

3.4. Methods of Contracting

Multiple contracts will be signed amongst the Client and Professional team. Contracts mitigate disputes and disputes would reduce the project viability. Due to the specific nature of the project the services of the professional team including the architect as principal agent and principal consultant, the project will be procured with the PROCSA Client Consultant Agreement.

The PROCSA Client Consultant Agreement is designed to provide a clear and standardized framework for the engagement of consultants in construction projects, this will ensure that the interests of both parties are protected and that the project is carried out smoothly and efficiently.

An open tender process will be used to determine a transparent and fair appointment of a contractor, this will provide opportunity and focus on local skills development for smaller contractors in the area. The JBCC Principle Building Agreement will be signed between the contractor and the client. This contract is most commonly used and promotes fair and efficient project delivery while minimizing any disputes that may arise.

[4] Budget

4.1. Professional Fees

According to the Board Notice 471 of 2023 under the Guidelines for Professional Fees in terms of Section 34[2] of the Architectural Profession act, 2000 Act 44 of 2000 the professional fees will be determined according to a Project Cost Based Fee. Due to the nature of the project including high-performance requirements and the projects demand for a sophisticated level of design and detail the project will be regarded as a "High Complexity Building." Refer to Appendix 02 – Calculation of Architect fees based on Project cost-based method.

4.2. Source of Funding

Source of Funding is to be in partnership with the local government and Madibeng Local Municipality academic agriculture and tourism reasons, Non-Government Organizations such as the Magaliesberg Biosphere aswell as private investors in the area who are interested in the overall scheme of the project.

4.3. Capital Costs

Capital costs thankfully do not include the purchasing of the site but do include the consolidation of the two sites and amendment of the SG diagram, but because the local government is interested in the proposed development the cost will be minimal. Other capital costs include the construction and renovation of the proposed project, the furnishing with equipment and infrastructure to operate functionally. Refer to appendix 01 – Total Construction Cost.

4.4. Operational Costs

Operational costs are the overheads associated with the project that do not generate revenue, the total operating costs of the project can be separated into two categories, Variable costs, and Fixed costs. Variable costs include the maintenance of the building, the utilities, consumables, and contract usage. While the Fixed costs which are the costs that do not change with an increase or decrease in revenue, include salaries and equipment.

[5] The Project

5.1. Project Brief

Context

In Skeerpoort there is a decrease in tourism due to the construction of newer and easily accessible roadways when moving from areas like Rustenburg or Sun City to Pretoria or Johannesburg, Skeerpoort forms part of the Magaliesberg Meander and the site provides an opportunity for a revival of tourism through the area. The existing barn provides a great opportunity for an intervention, Through the programming the site will address not only the local communities needs but also the traveling tourists. The building design will challenge the traditional narrative of a kitchen, emphasizing its metaphorical significance and its impact on mental well-being. The building's design will focus on cultivating a symbiotic relationship with the natural environment, integrating biophilic and sustainable design principles to create a kitchen space that not only nourishes the body, gut and mind but also regenerates the surrounding environment.

Programme

The primary programme encompasses a culinary school and production house, focusing on the importance of fermentation for gut health. Functioning as an educational hub, teaching communities about the benefits of sustainable food practices, agriculture, and fermentation.
A working farm component is integrated into the design providing a hands-on experience both for individuals interested in agriculture and farming as well as the cooking and processing of food. The overall theme of regeneration is enhanced through the aspect of a feeding scheme that aims to address food insecurities within the community. By focusing on the sites produce and the education surrounding sustainable living and cooking methods, the feeding scheme empowers individuals to also take charge of their nutritional needs.

The secondary programme includes an accommodation aspect for visitors and students. The accommodation aspect focuses on visitors and students who no longer fit into ordinary societal standards and are seeking an alternative lifestyle with a focus on wellbeing and a harmonious relationship with the environment.

A shop or restaurant encompassing the values of the project and enhancing sustainable living practices. Fermentation workshop and production spaces will be included. The fermentation workshops aim to include the health and wellness aspect of the programme.

5.2. Site Selection

Site Location

The chosen site for my research is in Skeerpoort, a village just 7km southwest of the Hartbeespoort Dam,
situated in the eastern North-West province, South Africa. The site forms part of the greater Magaliesberg Biosphere and is characterised largely by its rural nature and agricultural community described as a "rural Tourism node" by the Madibeng Local Municipality. The site is home to the first building built in Skeerpoort back in 1885. The building still stands strong today and is in a prime position within the context of Skeerpoort and provides the opportunity for development.

Site Information

Adress: S42 on R560, Skeerpoort, Hartbeespoort, 0232

Site Area: 25.7 Hectares

Farm Parcel number: 4/477 & 62/477

Zoning: Agriculture

Ownership: Privately owned

Ward: 29 Madibeng Municipality

Spatial Planning and Land Use Management Act

Skeerpoort is located in the North West and is governed by the Madibeng Local Municipality Spatial Development Frameworks.

5.3. Technical Feasibility

Site

The site is on a main road and truck route, therefore access to the site is very accessible. The road forms part of the beginning of the infamous Magalies Meander. There will be a focus on the use of smaller trucks for the transport of local materials that do not mitigate disrupting the flow of traffic. The entrance to the site is off the main road and there is plenty of space for construction vehicles and trucks to drive directly into the site without disturbing the community on the road.

Labour

The focus of the build will be on the use of local and readily available materials and labour, however due to the nature of specialised sustainability elements in the design specialists will be required during certain parts of construction. An expert on historical renovations will also be required to evaluate the best way to move forward with building.

5.4. Viability

Economic Viability

According to the Madibeng Spatial Development Plan 2015, Skeerpoort falls under 3 major development plans and is to be developed as a rural tourism node.

1. Reinforcement of Rural Service Centres

This refers to the development and investment for further education and training [FET] Collages which coincidently coincides with the overall concept of the project.

2. Tourism and Conservation

Skeerpoort falls under the Heritage Tourism and Agri Tourism sectors and part of the development plan is to retain the unique offerings of the area while emphasising that some leisure and entertainment plans will be supported. The proposed development will enhance both the Heritage of the Building and Agricultural aspect of the site.

3. Corridor Development

The development plans include the extension of the existing R512 Tourism Corridor to include Skeerpoort.
The project fits into the Development Plans of the Local Municipality and if successful will contribute tremendously to the economic growth of Skeerpoort and surrounding areas.

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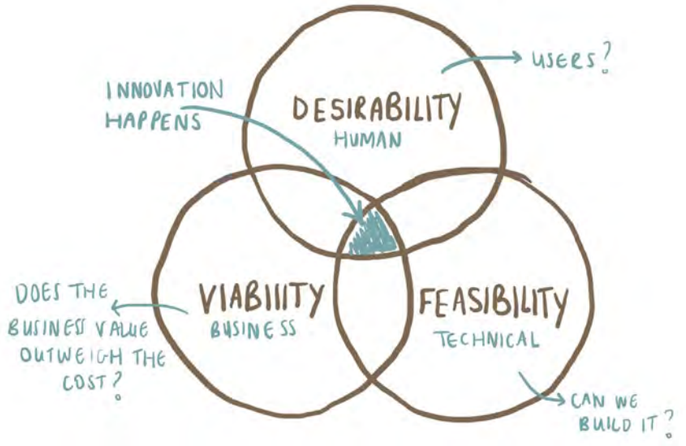
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Social Viability

The project focuses a significant amount on Social Sustainability, the complex history of the site and the context of the barn are rich and are intended to be acknowledged throughout the design process. Focusing on one of my key questions "How can the barn be transformed or re-appropriated while currently existing as a vacancy with a need that is multi-layered in its diverse fragmented landscape?" The multi-layered need exists on multiple scales that are deeply rooted in the construct of community development and empowerment. The immediate community being the individuals living on the farm, the larger community being the town of Skeerpoort and surround towns and finally the other community which talks to the idea of individuals who do not fit into the 'normal' societal construct seeking a different way of living. The project seeks to engage with these different communities through the programme of the proposed building and the site context.

Ecological Viability

The design of the building focuses on the potential to cultivate a symbiotic relationship with the natural
environment. Through the exploration and integration of biophilic design principles as well as sustainable
design principles to create a kitchen space that not only nourishes the body but also regenerates and existing environment. By examining the ecological impact of the building design, the overall aim of the project is to inspire a new paradigm in architecture that harmonizes with nature and fosters resilient communities.



Implementation

Design, Materiality and Construction

The client wants the renovation of the existing structures to appear minimally invasive retaining elements of the historic beauty as a node to what the building used to look like, however the client is keen to explore new and innovative sustainable technologies within the renovation and design of the new structures.

Most materials used in the design of this project are to be locally sourced and crafted, drastically reducing transportation and labour costs. The project will be designed in a way that can be constructed by local contractors, builders, and craftsmen. The focus of the design is the harmonious relationship between man, building and environment, with this comes the focus on local craft and local readily available materials, however there will be certain elements of the design that will require more technical skill in terms of the sustainable systems that will be implemented into the design.

[6] Appendix

Appendix 01
Total Construction Cost

	Program	Quantity	Rough Area [m^2]	Rates per m^2	Construction Cost
CULINARY SCHOOL	Classroom	3	100	R 19 600,00	R 1 960 000,00
	Kitchen	2	250	R 19 600,00	R 4 900 000,00
	Storage	2	60	R 8 800,00	R 528 000,00
	Coldroom	1	15	R 19 600,00	R 294 000,00
	Office	2	30	R 8 800,00	R 264 000,00
	TOTAL				R 7 946 000,00
PRODUCTION HOUSE	Food Processing area	1	130	R 19 600,00	R 2 548 000,00
	Fermentation Storage	1	100	R 19 600,00	R 1 960 000,00
	TOTAL				R 4 508 000,00
COMMUNITY KITCHEN	Workshop area	1	120	R 19 600,00	R 2 352 000,00
	Event space	1	120	R 19 600,00	R 2 352 000,00
	TOTAL				R 4 704 000,00
RESTAURANT & RETAIL	Restaurant	1	220	R 10 300,00	R 2 266 000,00
	Retail	1	40	R 10 300,00	R 412 000,00
	TOTAL				R 2 678 000,00
ACCOMODATION	Guest pods	10	1000	R 10 300,00	R 10 300 000,00
	Common areas	2	100	R 10 300,00	R 1 030 000,00
	TOTAL				R 11 330 000,00
ABLUTIONS	Male & Female		100	R 10 000,00	R 1 000 000,00
	TOTAL				R 1 000 000,00
PUBLIC SPACE	Entrance	1	100	R 19 600,00	R 1 960 000,00
	Outdoor recreational		500	R 19 600,00	R 9 800 000,00
	TOTAL				R 11 760 000,00
BUILDING TOTAL CONSTRUCTION COST					R 43 926 000,00

Appendix 02
Calculation of Architect fees based on Project cost-based method.

HIGH COMPLEXITY					
Cost Bracket	Value of works		Primary Fee	Plus, secondary fee	
	From	To		Add %	On balance over
	A	B	C	D	E
1.	1	200 000,00	15 798,28	24,41%	1
2.	200 001,00	650 000,00	64 622,16	23,47%	200 001,00
3.	650 001,00	2 000 000,00	170 206,35	17,31%	650 001,00
4.	2 000 001,00	4 000 000,00	403 845,93	15,09%	2 000 001,00
5.	4 000 001,00	6 500 000,00	705 596,92	14,69%	4 000 001,00
6.	6 500 001,00	13 000 000,00	1 072 897,87	12,76%	6 500 001,00
7.	13 000 001,00	40 000 000,00	1 901 782,84	12,33%	13 000 001,00
8.	40 000 001,00	130 000 000,00	5 230 998,63	12,33%	40 000 001,00
9.	130 000 001,00	260 000 000,00	16 321 445,09	11,52%	130 000 001,00
10.	260 000 001,00	520 000 000,00	31 306 890,75	11,26%	260 000 001,00
11.	520 000 001,00	1 040 000 000,00	60 593 982,10	10,98%	520 000 001,00
12.	1 040 000 001,00	0	117 678 990,65	10,16%	1 040 000 001,00

Using Cost Bracket: 6
The primary fee is:
R5 230 998,63

The secondary Fee:
[(R43 926 000,00 – R40 000 001,00) x 12.33%] = R484 075,67

Total Fee:
R5 230 998,63 + R484 075,67 = R5 715 074,30

