



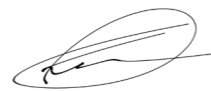
**COMMUNITY CENTRIC CONSTRUCTION**  
Exploring Alternative Methods for Informal Settlement  
Development

# DECLARATION

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

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

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



Darren Franciscus  
08-November-2024

Submitted in fulfillment of part of the requirements for the degree of Master of Architecture (Professional), Department of Architecture, Faculty of Engineering, Built Environment and Information Technology (EBIT).

University of Pretoria 2024

# THANK YOU

TO MY FAMILY

for the incredible, unwavering support throughout my architectural journey

TO MY FRIENDS

for all the love and encouragement you have graced me with

TO PROF. COMBRINCK

for inspiring me and opening my eyes to wider potential of our profession.

TO THE PEOPLE OF MELUSI

for welcoming myself and inspiring this project through your resilience and open-mindedness

<b>COURSE NAME  </b>	Design Project Discourse [DPD 801]
<b>YEAR  </b>	2024
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<b>RESEARCH FIELD  </b>	Public Interest Design
<b>CLIENTS  </b>	- Department of Agriculture - City of Tshwane Municipality - Department of Higher Education
<b>PROGRAMME  </b>	Vocational Training Centre Community Hall Bamboo Farm
<b>STUDY AREA  </b>	City of Tshwane
<b>SITE LOCATION  </b>	Booyens Nursery Theo Slabbert Street Melusi Informal Settlement [a.k.a. <i>Malusi; Gomorrah</i> ]
<b>SITE COORDINATES  </b>	25° 43' 27" S 28° 07' 06" E

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## COMMUNITY CENTRIC CONSTRUCTION

Exploring Alternative Methods for Informal Settlement Development

### ABSTRACT

The United Nations often defines informal settlements as areas of scarcity, framing them as problem zones with limited positive aspects. This project challenges that view, proposing that informal settlements hold the potential to address the shortage of accessible housing in rapidly urbanizing cities. Research by the Unit for Urban Citizenship highlights Melusi as an example of how social networks and grassroots construction practices can help solve urban challenges in Sub-Saharan Africa.

Aligned with Max-Neef's (1991) Human Scale Development Framework and public interest design principles, the project focuses on transforming the Booyens Nursery into a multi-use vocational training and community center. This space will teach residents to work with bamboo, empowering self-sustaining development strategies for future projects. Repurposing much of the site for public use and urban agriculture, the initiative seeks to reconnect Melusi with the city, fostering a collaborative approach to urban renewal.

The use of bamboo introduces a sustainable building material for Melusi residents, setting a precedent for the broader South African construction industry. Designed through extensive community engagement, the center's dynamic program aims to meet residents' needs, creating a hopeful model for informal settlements. This project underscores the critical role architects can play in transforming these areas into thriving, sustainable communities, proving that thoughtful design can bring lasting, positive change.

### KEYWORDS

Public-Interest Design; Human Scale Development; Alternative Building Technologies, Informal Settlement Development, Bamboo Architecture

# TABLE OF CONTENTS

## 1. INTRODUCTION

PROBLEM STATEMENT  
DESIGN INQUIRY  
CONTEXT  
PROGRAMME  
DESIGN CONCEPT

## 2. THEORETICAL FRAMEWORK

PUBLIC INTEREST DESIGN  
HUMAN SCALE DEVELOPMENT  
GRASSROOTS DESIGN PRACTICE

## 3. KEY CONCEPTS

DIDACTIC SPACES  
PERFORMATIVE ACTION  
IMMERSIVE ARCHITECTURE  
FLEXIBLE PROGRAMMES  
CIVIC ARCHITECTURE

## 4. URBAN FRAMEWORK + VISION

EXISTING CONDITIONS  
RE-ZONING OF BOOYSENS NURSERY

## 5. DESIGN PROCESS + ITERATIONS

DESIGN PROCESS + ITERATIVE DEVELOPMENT

## 6. TECHNICAL INQUIRY

WHY BAMOO  
BAMBOO IN SOUTH AFRICA  
TECHNICAL DEVELOPMENT  
PRE FINAL SECTION AND DETAILS

## 7. CRITICAL REFLECTION

## 8. REFERENCES

# 01 INTRODUCTION | PROBLEM STATEMENT

*“The project aims to **address the future development of informal settlements** and how architects can **strategically implement alternative building technologies** informed by meaningful community engagement to **holistically realise the fundamental needs of the people of Melusi.**”*



FIGURE 01: Informal Settlements in South Africa (VPUU 2019)

# | PROBLEM STATEMENT

This project aims to address a range of issues analysed in Melusi through extensive community engagement efforts and propose a building programme that could approach such issues in future.

## 01 Rapid Urbanisation

Rapid urbanisation in South African cities has led to the significant expansion of informal settlements, as urban areas struggle to accommodate the growing influx of people. With limited affordable housing and inadequate infrastructure, millions of residents live in overcrowded, makeshift homes without access to basic services such as water, sanitation, and electricity. This issue exacerbates poverty, unemployment, and social inequality, putting immense pressure on municipalities to find sustainable housing, infrastructure, and service delivery solutions in rapidly growing urban spaces.

## 02 Substandard Living Conditions

### i) Poor Building Materials

The dwellings in Melusi for the vast majority make use of substandard building materials such as corrugated sheeting and wattle posts which lack durability to stand up to extreme weather as well as the local climate.

### ii) Heat Stress

Much of the construction in informal settlements uses substandard materials, requiring constant repair. Melusi, like many settlements, consists mainly of corrugated sheeting and masonry structures. Mabuya & Scholes (2020) note that poor building conditions

increase health risks, with material choice affecting vulnerability to heat stress and other natural elements, highlighting the need for alternative building methods (Hugo 2023).

### iii) Vulnerability to Extreme Weather

Many residents in Melusi have dwellings that are located within areas vulnerable to flooding as much of the settlement exists within a wetland.

## 03 Impeded Needs Satisfaction

### The Need for Subsistence

Melusi residents highlight unemployment as a key issue, worsening financial struggles. They also note the settlement's location limits local job opportunities, making it harder to meet subsistence needs.

### The Need for Creation

Melusi residents cite financial struggles and personal insecurities as barriers to creative expression. While construction isn't an issue, limited access to spaces and activities, along with transportation costs, further hinder opportunities.

### The Need for Understanding

Residents pointed to limited educational opportunities as the main barrier to understanding, along with a lack of jobs. They stressed the need for self-reliance in creating opportunities. Inaccessibility to technology like laptops, phones, and wi-fi further hindered their ability to apply for jobs and higher education.

FIGURE 02: Housing Crisis in South Africa (Bosch 2024)

# | DESIGN INQUIRY

*“How can the architecture of a vocational training spatially manifest itself as a synergic satisfier of Melusi resident’s most pressing fundamental needs based on the **HSD Development Framework?**”*

This design inquiry focuses on creating a vocational training centre to revitalize Booyens Nursery and the surrounding Melusi area by addressing the fundamental needs of residents, following Max Neef’s (1991) Human Scale Development Framework.

Through a two-year community engagement process led by the Unit for Urban Citizenship’s Co-Creating Wellness Studio, these core needs were identified, forming the basis for a suitable design response.

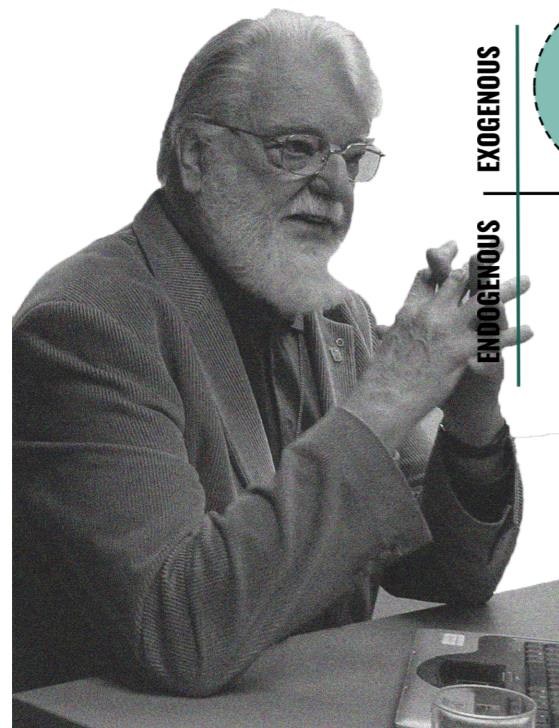
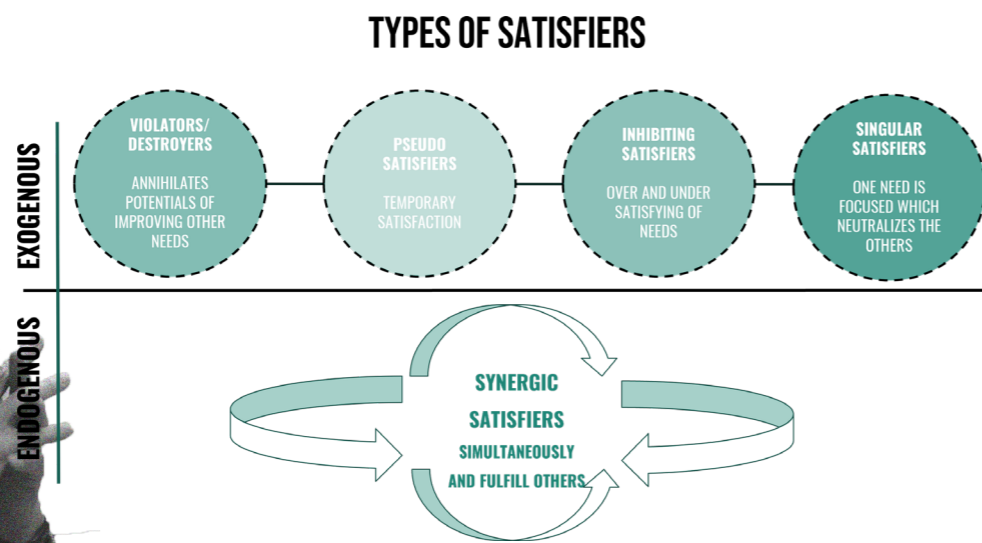


FIGURE 04 : Manfred Max Neef (Berrios 2013)

FIGURE 05 : Synergic Need Satisfiers (UUC 2024)



# | BUILDING PROGRAMME

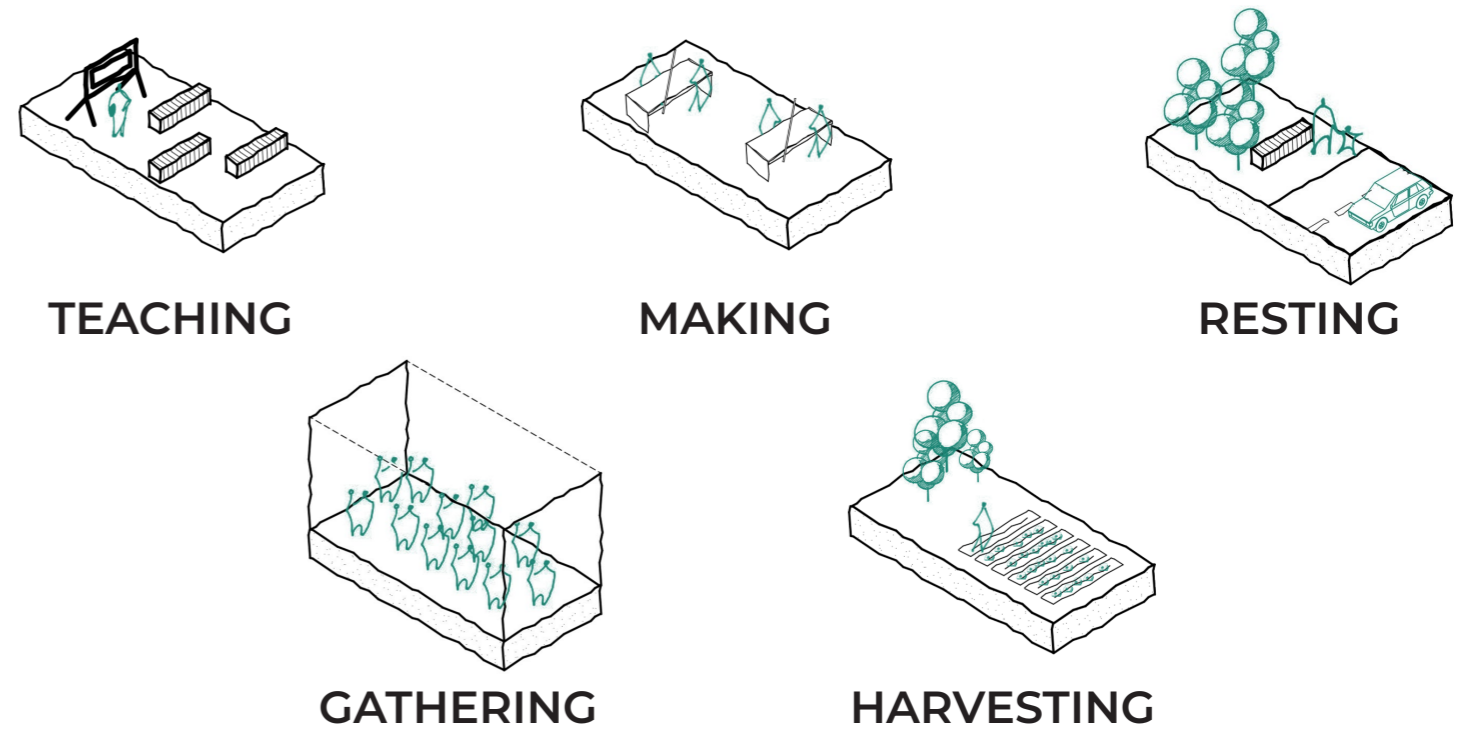


FIGURE 03: Programme Diagrams (Author 2024)

## VOCATIONAL TRAINING

The building programme aims to respond to needs by highlighting which needs have most regularly been cited by the residents of Melusi. The community engagement process determined that the needs for subsistence, creation and understanding had the widest reaching concern amongst respondents.

The final proposal aims to address these needs through a single, integrated intervention: a flexible building program that includes a vocational training center constructed from locally sourced materials and a revitalized public space. This space repurposes a neglected nursery for productive land use, supporting bamboo growth and small-scale subsistence farming, ultimately fostering public wellness and enhancing spatial agency.

# | CONTEXT

Melusi |

Resilience, Community and Progress

The Informal Settlement of Melusi, located in the western part of Tshwane and bordering the neighbourhoods of Clarens and Booyens, exemplifies the inherent potential within many of South Africa's informal settlements and the challenges locals face in realizing that potential. Melusi has experienced exponential growth since its establishment in around 2008 and currently is home to over 27,000 residents (Hugo 2023). Moreover, Melusi features three distinct regions which vary greatly in terms of their density, access to municipal services and degrees in formalisation (Figure XX). In terms of building materials, living conditions within the settlement reflect the techniques and resources commonly used in informal settlements across South Africa. The Unit for Urban Citizenship (2023) could observe that the majority of dwellings in the settlement had been constructed with materials such as corrugated sheeting and wattle poles (FIGURE XX). While the use these materials may satisfy their fundamental need for housing and shelter, they unfortunately leave residents at risk of the adverse effects of extreme weather such as high temperatures and heavy rain (Hugo 2023). Despite this, Melusi and its people can stand as a testament to the resilience that may be shown by South Africa's growing urban population facing the exclusionary practices they face from the wider housing economy and ever-growing housing backlog in South Africa.

Booyens Nursery |

A Symbol of the Fractured Relationship between Local Governance and its People

The site of Booyens Nursery exists in a dilapidated state mirroring the fractured relationship between the city of Tshwane and the residents of Melusi, a rapidly expanding informal settlement in the north-west of Pretoria. Having been the subject of conflict between the two parties due to the demands of Melusi residents for fair access to water and electricity as part of the formalisation process of the settlement, the vast site of the nursery sits in a state of limbo, failing to serve a functional nursery, historically used for the growth and housing of trees for the city of Tshwane while also standing as a testament to the city's inability to satisfy the needs of residents within the settlement. Moreover, the land on which the nursery sits has been shrouded with a sense of fear and hopelessness as residents have reported incidents of violent crime taking place behind the green wall of trees surrounding its interior.

As a response to an extensive community engagement process between the Unit for Urban Citizenship, this project seeks to rehabilitate this nursery, repairing its relationship with the people of Melusi and their relationship with the city of Tshwane.

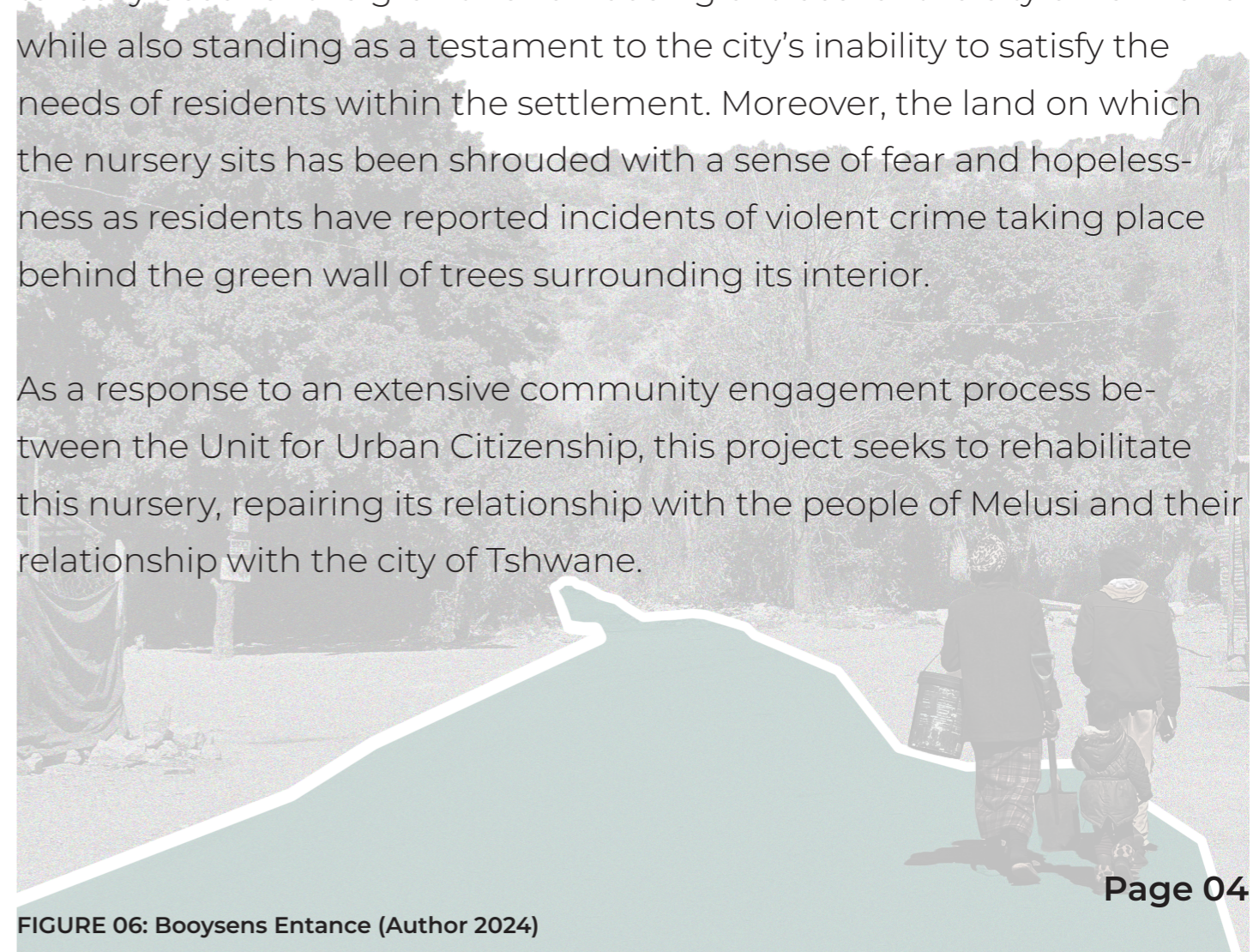


FIGURE 06: Booyens Entance (Author 2024)



# | DESIGN CONCEPT



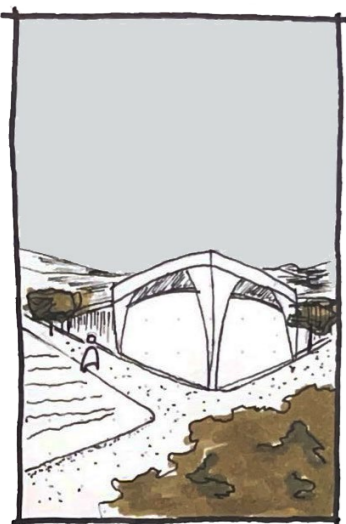
## 01 Designing Experiential Public Spaces

The space surrounding the building programme has been designed to create a journey that leads visitors through an experience of discovery through the architecture and landscaping. Immersing users in all things bamboo from growth of the material to building.



## 02 Extension of High Street

The proposed urban framework of the project extends the high street into Booyens Nursery. Through taking notes of the informants of the existing space usage surrounding the site, the new proposal reactivates the nursery as a high active public node facilitating passive surveillance within the site.



## 03 Civic Architecture for Melusi

The proposal aims to grant residents a new architectural sense of identity balanced with a strong appreciation of local methods of construction alongside novel approaches to material and building technology.

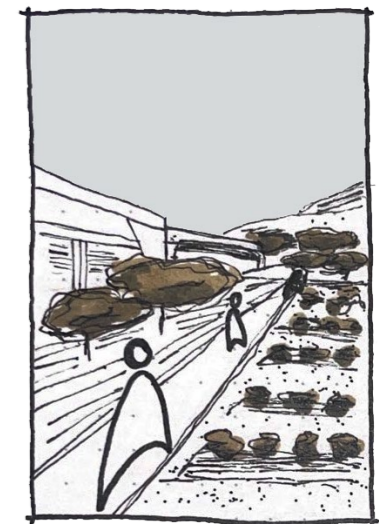
## 04 Introduction of Public Activity Nodes

In finding ways to promote agency and community building around the design proposal, common communal activities like subsistence farming have been introduced along high traffic areas bordering the site, to encourage placemaking.



## 05 Productive Landscaping

The effective use of productive landscaping along the site perimeter responds directly to the resident's need for subsistence and participation. Along the site itself to give back directly to the community through locally organised efforts of managing crops and land use.



## 06 Open/Performative Workshop Spaces

Makers spaces and workshops are designed facing the main streets with high activity to create learning experiences for passers-by and familiarise locals with the building techniques as well as the material of bamboo.

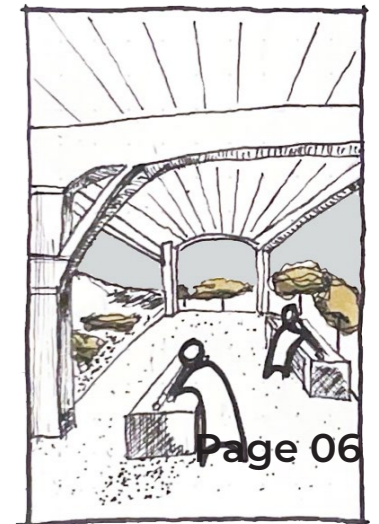


FIGURE 11: Conceptual Diagrams (Author 2024)

# 02 THEORETICAL FRAMEWORK

## PUBLIC INTEREST DESIGN

Public Interest Design (PID) is fundamentally understood as the architecture of social engagement as described by Bell (2013: 76). It works in the ethical stance that architects have a responsibility to work in the interest of the wider public and social good. This frames PID as a social process and less so as architecture, which is concerned with the production of formal objects (Ferdous & Bell 2020: 85). This also expands on architecture in terms of more dispersed interests as opposed to the limited interests of a particular individual or group (Ferdous & Bell 2020: 85). Moreover, PID originates from the theoretical roots of Lefebvre's (1991) concept of the right to the city, in which he argued that the residents of the city have the right to produce, reproduce and make use of space.

However, he also claims that the obstructions caused by private, individual, and corporate interests prevent this bottom-up process from being realised (Ferdous & Bell 2020: 86). This understanding of PID has therefore framed the necessary response for the architecture to be produced.

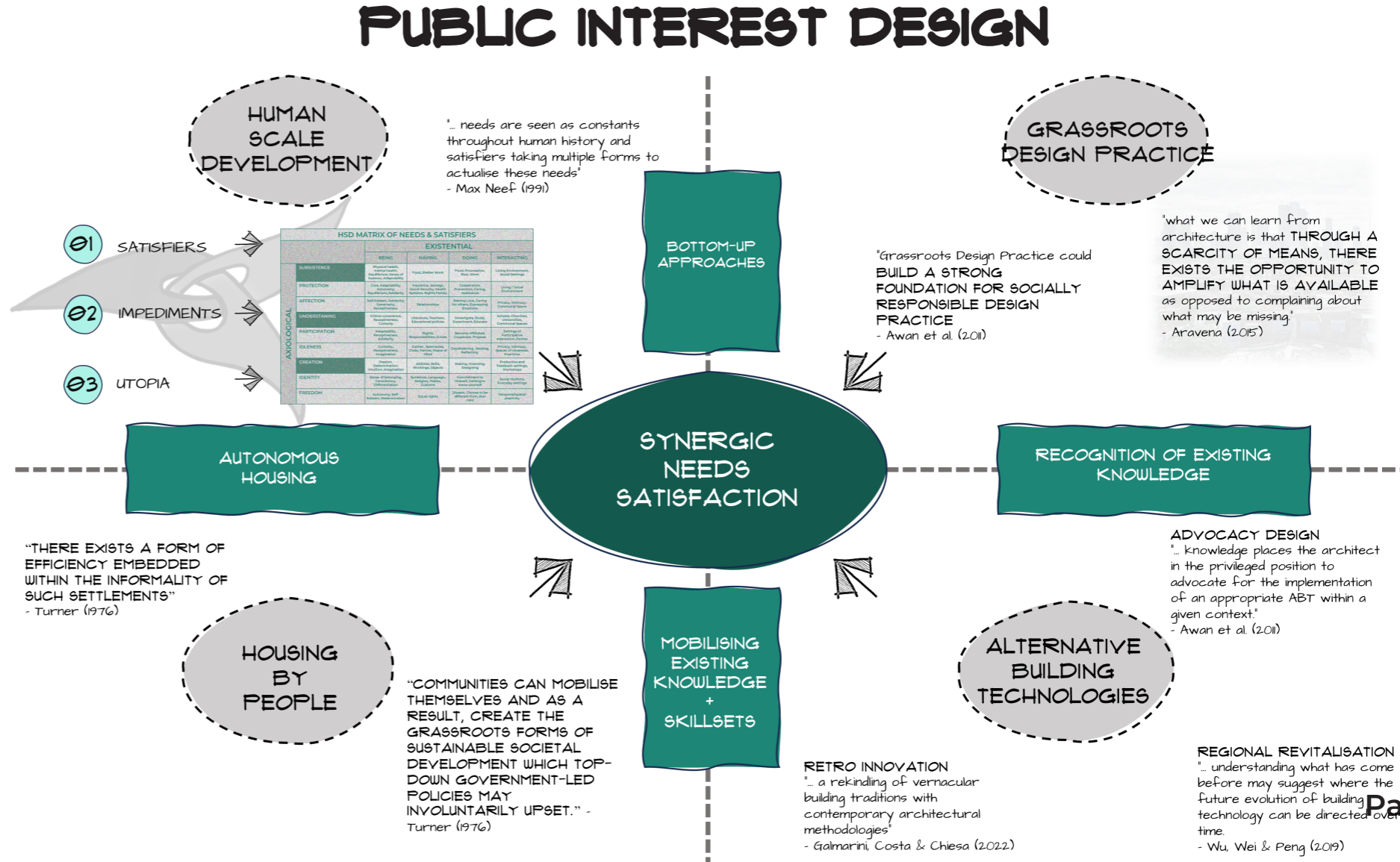
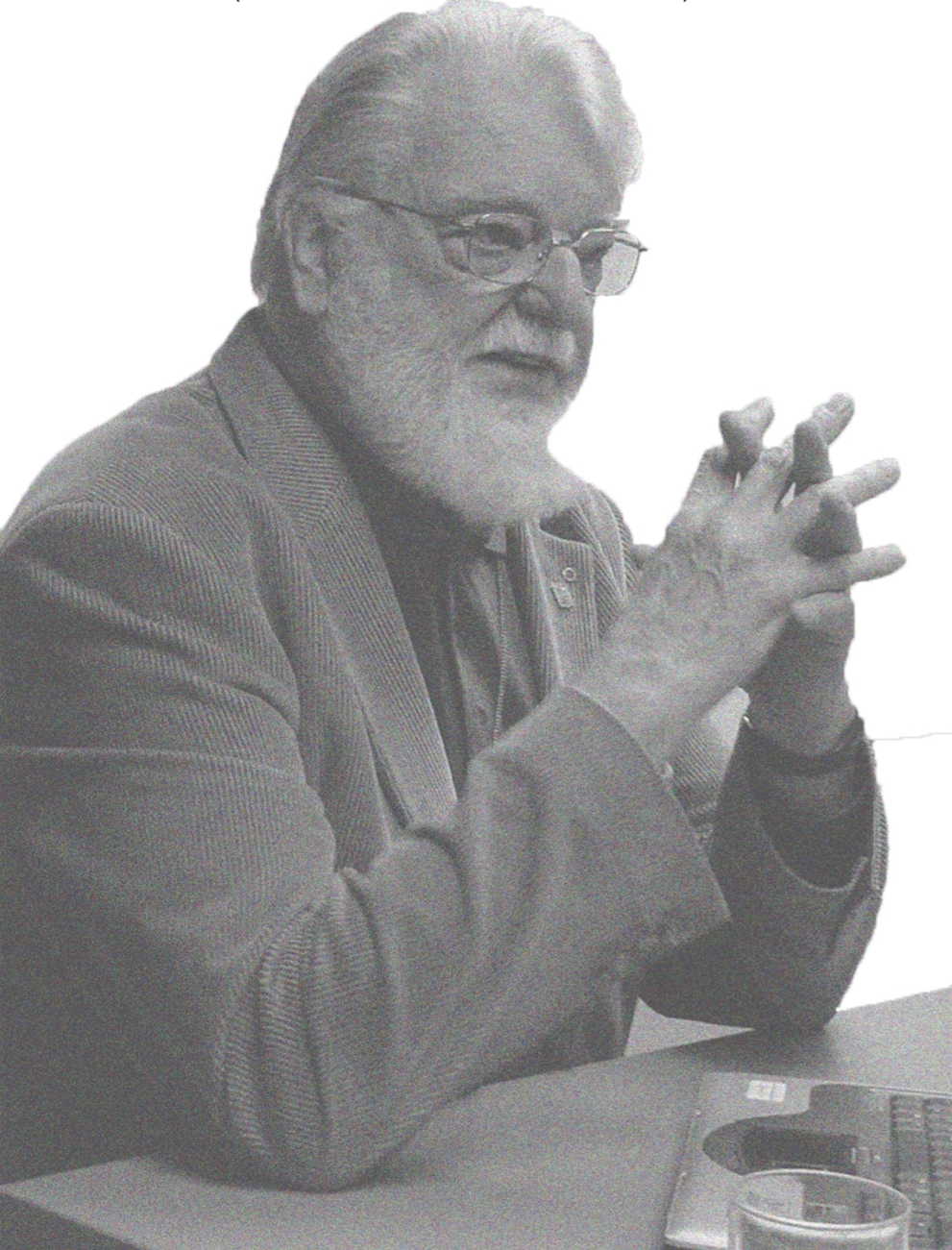
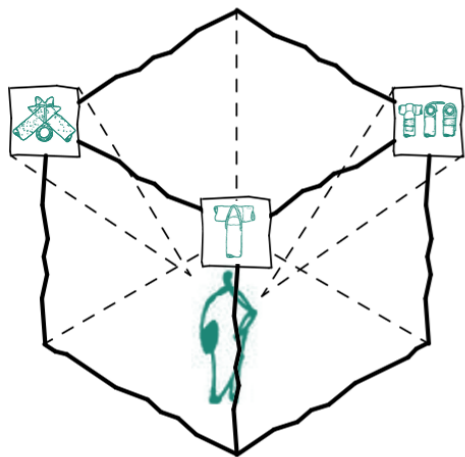


FIGURE 12: Theoretical Framework Diagram (Author 2024)

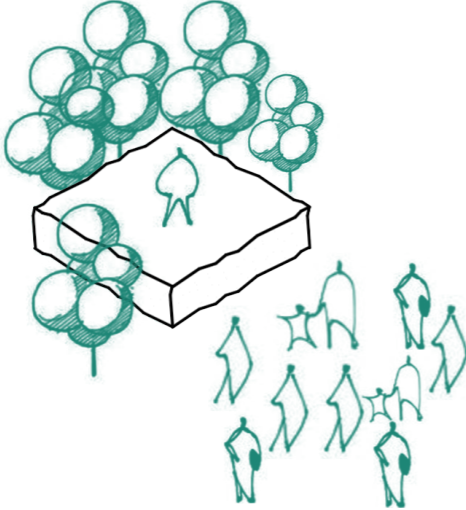
# 03 KEY CONCEPTS



**DIDACTIC SPACES**

The project visualises **didactics spaces that aim to teach users through the design** itself.

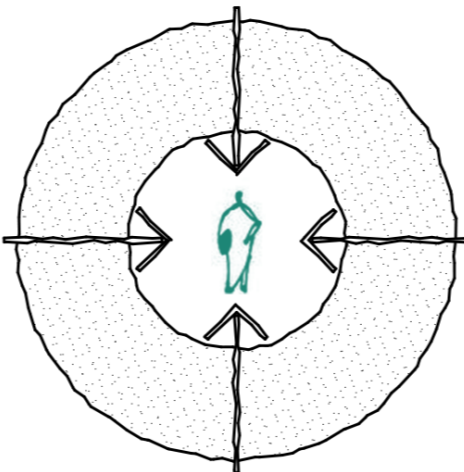
**Through exposing structural elements and intricate connection details,** the architecture becomes a hands-on learning tool, encouraging occupants to explore and understand its construction directly from the space itself.



**PERFORMATIVE ACTIONS**

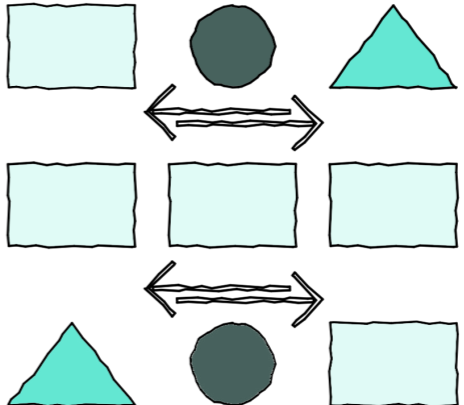
**Workspaces designed as performative action** environments prioritise adaptability and interaction. Facilitatin user’s needs of **understanding, participation and creation**

These spaces **encourage creativity, productivity, and engagement,** making the workspace an active participant in enhancing work processes.



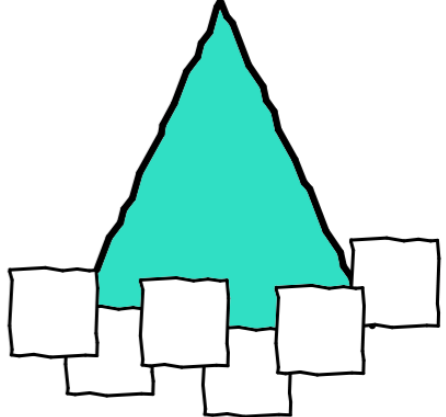
**IMMERSIVE ARCHITECTURE**

The concept of immersive architecture uses **material choice and key touchpoints to create a sensory-rich experience for end-users.** Practically, bamboo textures and finishes that engage both senses and spaces become more than functional—they evoke emotional connections, **drawing end-users deeper into the building programme and creating more enriching learning experiences.**



**FLEXIBLE PROGRAMMES**

**Flexible building programs and adaptive capacity** allow structures to respond to changing needs over time. By incorporating modular layouts, movable partitions, and multipurpose spaces, buildings can evolve with their users, **extending their lifespan and functionality. This adaptability supports sustainable development and reduces the need for frequent, resource-intensive renovations.**



**CIVIC ARCHITECTURE**

Civic architecture shapes community identity by creating spaces that reflect shared values and history. **This space aims to be a landmark of local pride, fostering connection and belonging.**

The final proposal invites public interaction, reinforcing a collective identity and encouraging **a sense of place and purpose, satisfying the need for identity through space.**

FIGURE 13: Diagrams of Key Concepts (Author 2024)

# 04 URBAN FRAMEWORK + VISION

## EXISTING CONDITIONS



The design intervention on Booyens aims at preserving the majority of the existing nursery orchards.

These orchards therefore become a part of the overall master plan of the new re-zoned site. Tying into the wellness promotion aspects of the proposed area.



FIGURE 14: Analysis of existing site conditions (Author 2024)

## EXISTING ACTIVITIES ON SITE



The existence of communal subsistence farming and other taking place throughout Melusi shows that residents have already taken up agency in creating employment opportunities through the action of gardening and productive landscaping.

FOOTBALL FIELD ON SITE

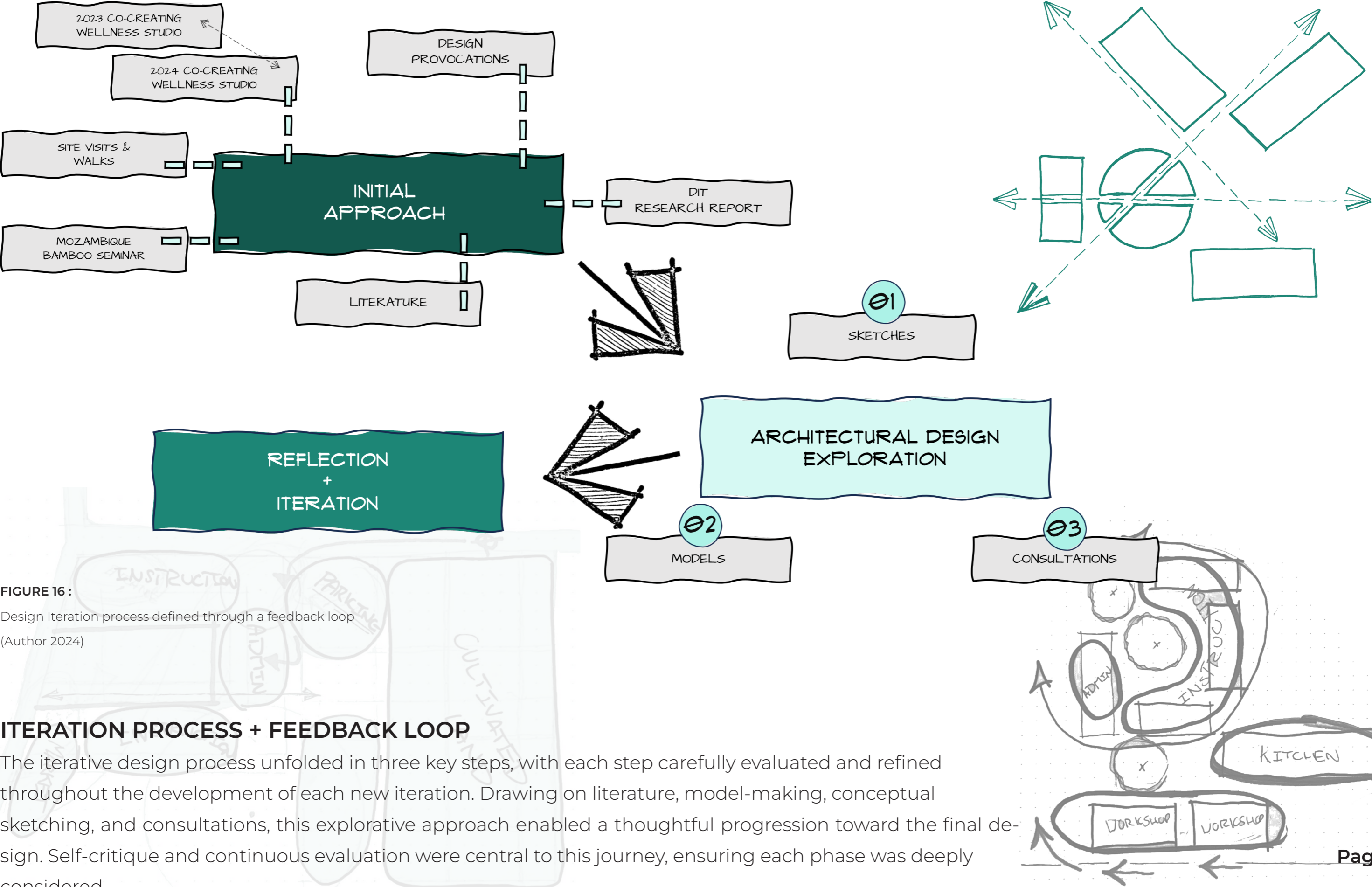


MIXED ACTIVITY ON MAIN STREET





# 05 DESIGN PROCESS AND ITERATIONS



**FIGURE 16 :**  
 Design Iteration process defined through a feedback loop  
 (Author 2024)

## ITERATION PROCESS + FEEDBACK LOOP

The iterative design process unfolded in three key steps, with each step carefully evaluated and refined throughout the development of each new iteration. Drawing on literature, model-making, conceptual sketching, and consultations, this explorative approach enabled a thoughtful progression toward the final design. Self-critique and continuous evaluation were central to this journey, ensuring each phase was deeply considered.

# ITERATIONS

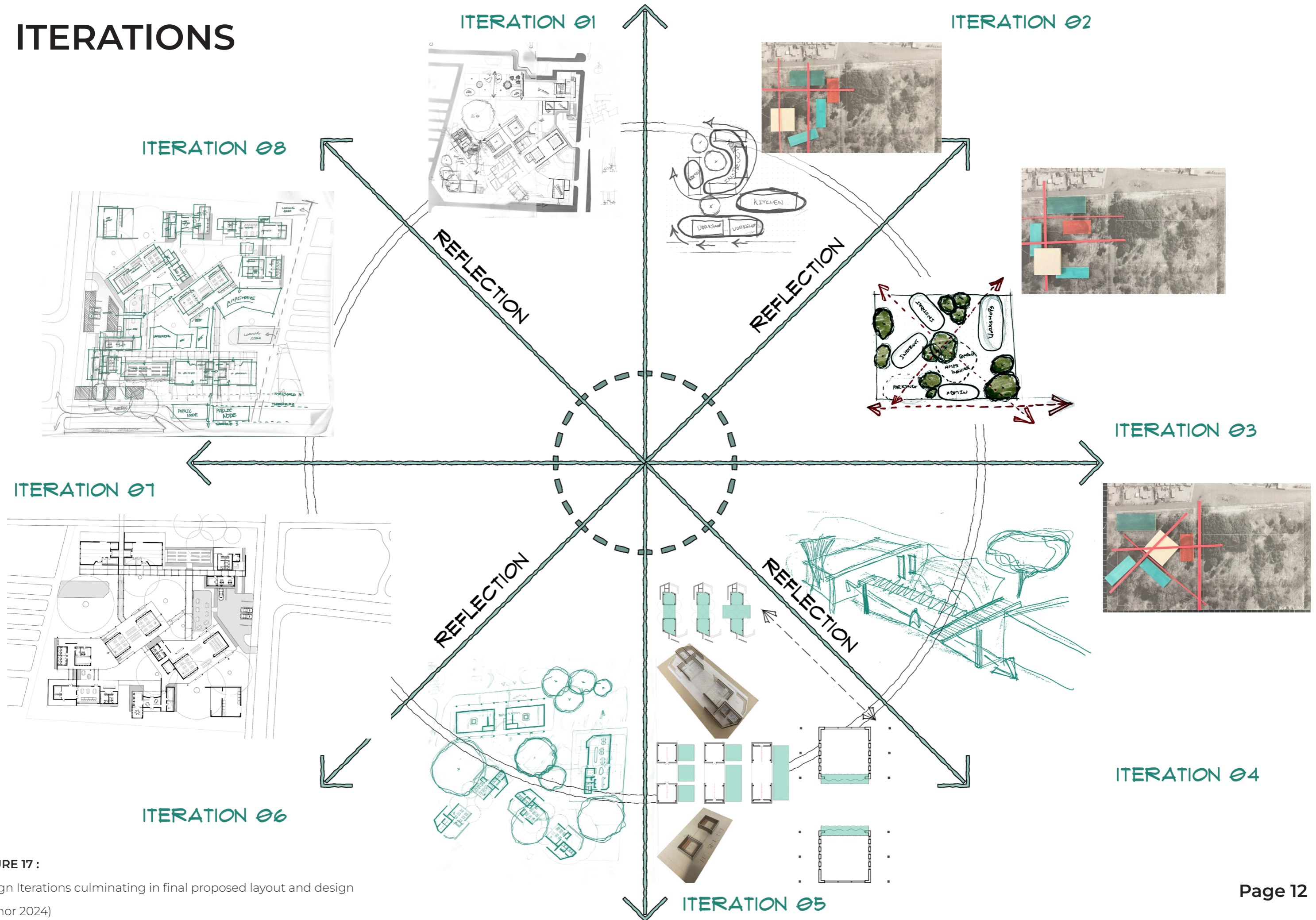


FIGURE 17 :  
Design Iterations culminating in final proposed layout and design  
(Author 2024)

# 06 TECHICAL INQUIRY

How can **bamboo as a material** be utilised in creating a didactic learning environment for the **synergic satisfaction of users fundamental needs of understanding, creativity and subsistence?**

The project aims to explore the following:

How spaces can showcase material limits and connections to aid users in understanding its intrinsic qualities and multi-faceted nature.

## Why Bamboo?

Bamboo is an ideal material for South African informal settlements due to its sustainability, rapid growth, and strength. It regenerates quickly, reduces deforestation, and provides affordable, durable housing, promoting eco-friendly construction while supporting local economies and environmental resilience.



FIGURE 18: Growthrate of Bamboo compared to other forms of timber materials (Author 2024)

## Bamboo in South Africa

### BAMBUSA BALCOA



**LOCATION:** Found mainly at high altitude such as the Drakensburg and other mountainous areas.

**DESCRIPTION:** A hardy, evergreen bamboo that grows in clumps

**GROWTH:** Height: 3-5 meters

**USES:** Primarily used in Gardens as decor and soil stabilisation.

**SUITABLE FOR CONSTRUCTION**

### Thamnocalamus tessellatus



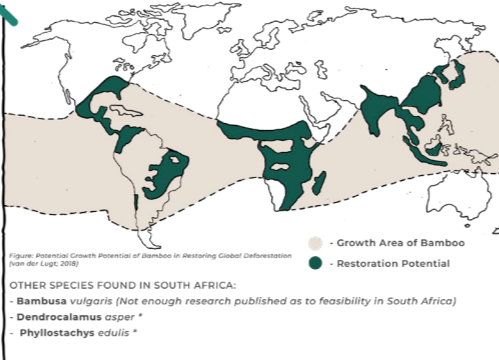
**LOCATION:** Found mainly at high altitude such as the Drakensburg and other mountainous areas.

**DESCRIPTION:** A hardy, evergreen bamboo that grows in clumps

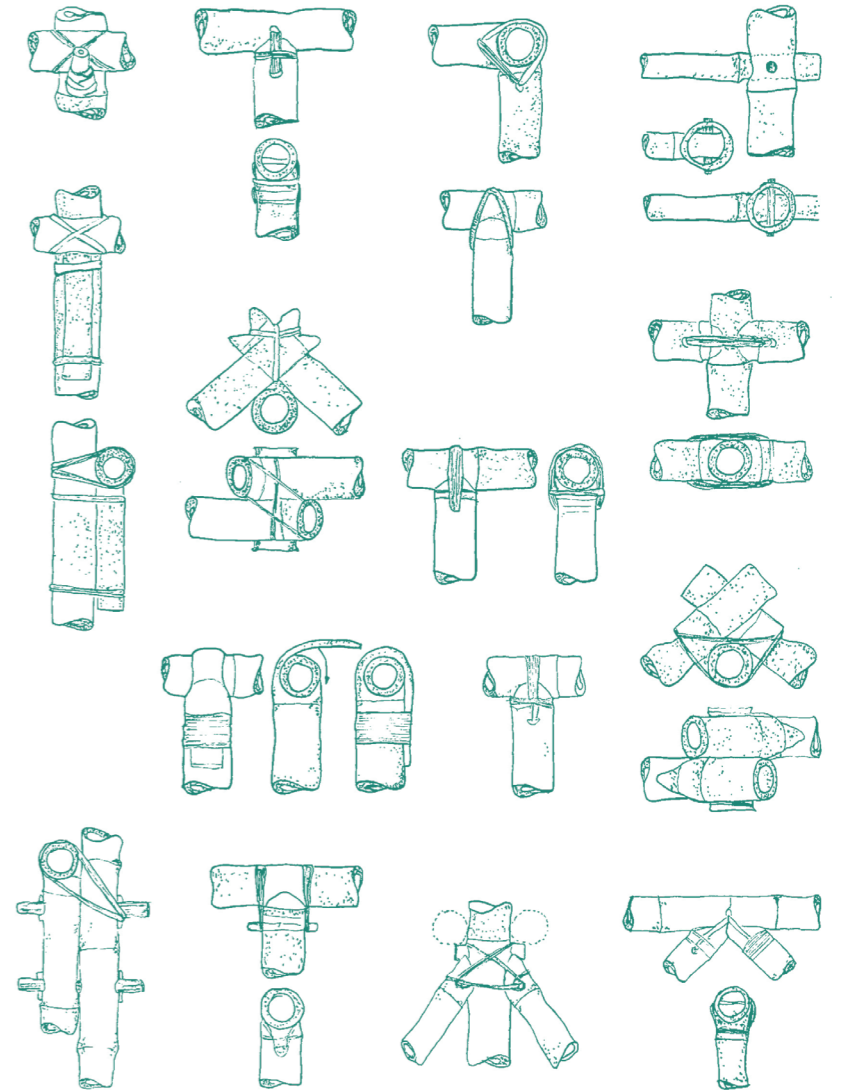
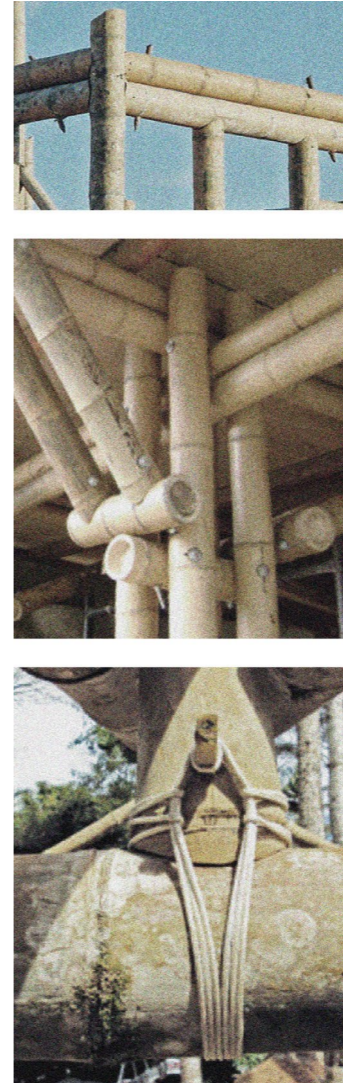
**GROWTH:** Height: 3-5 meters

**USES:** Primarily used in Gardens as decor and soil stabilisation.

**NOT SUITABLE FOR CONSTRUCTION**



## JOINERY DETAILS

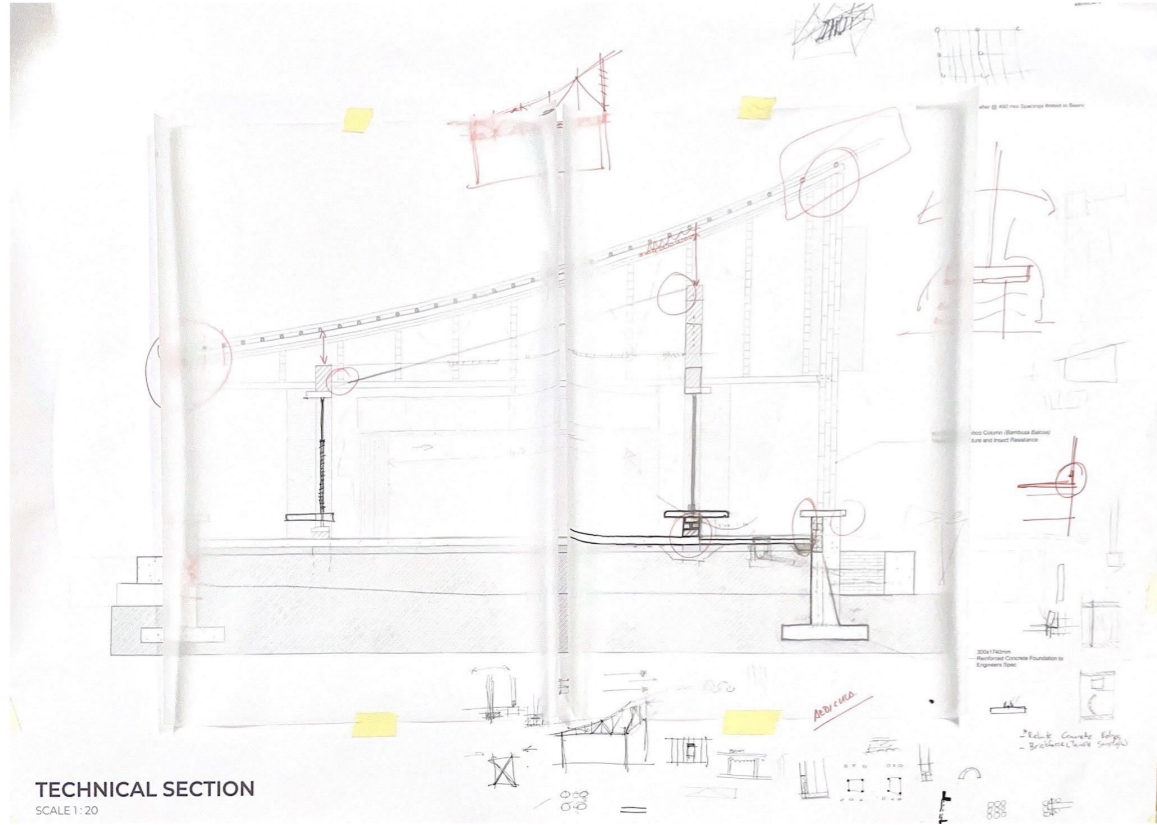


Minke (2012) writes that bamboo construction relies on strong joints to transfer forces between elements. Due to bamboo's hollow structure, nails or screws can cause splitting without pre-drilling, and bolt holes must be well-aligned.

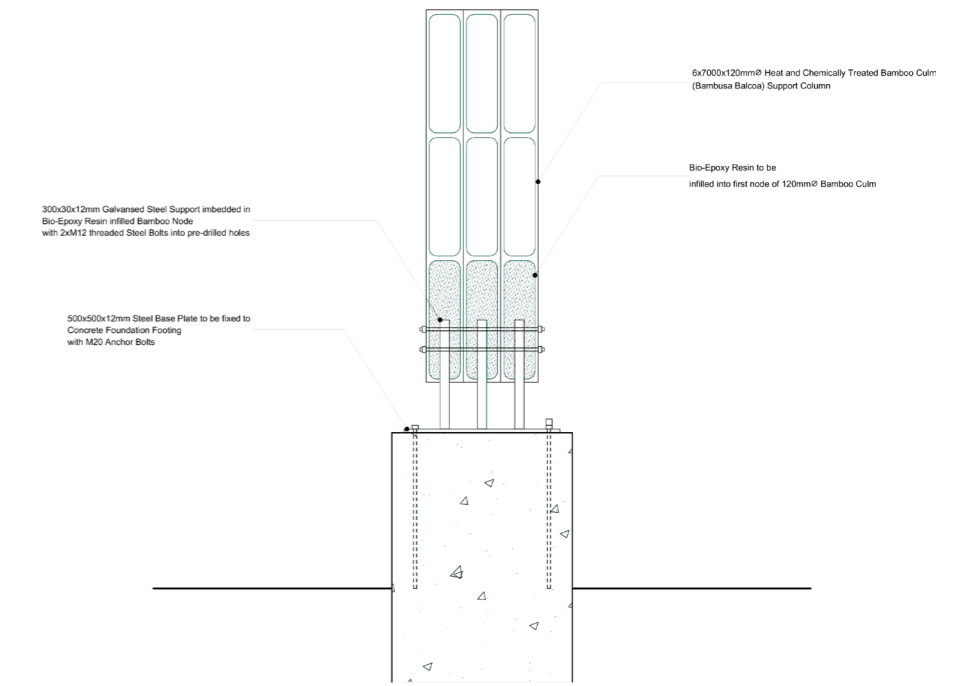
Anti-corrosive materials are essential for outdoor joints.

To prevent splitting, internodes near joints should be filled with cement mortar or epoxy. Traditional bindings have been replaced by synthetic fibers or wire. Force transfer is optimized with cuts like "fish mouth" or by using wooden or palm pins, such as termite-resistant "chonta." Concrete filling can strengthen joints, but a coarse mix is recommended to minimize contraction.

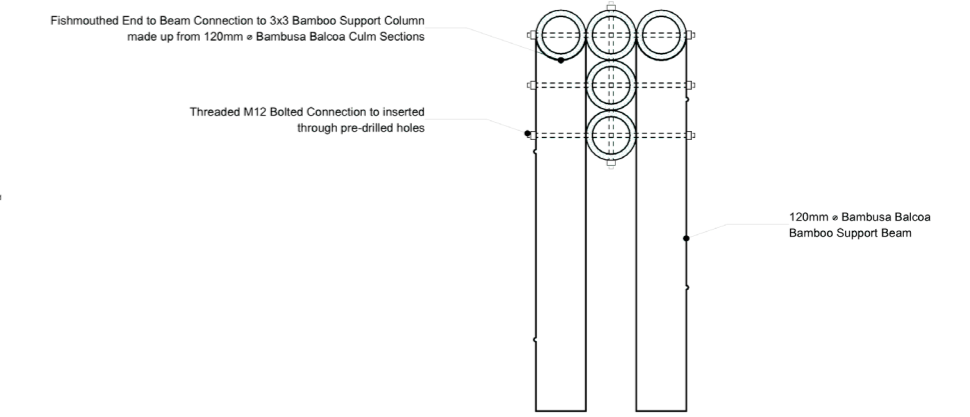
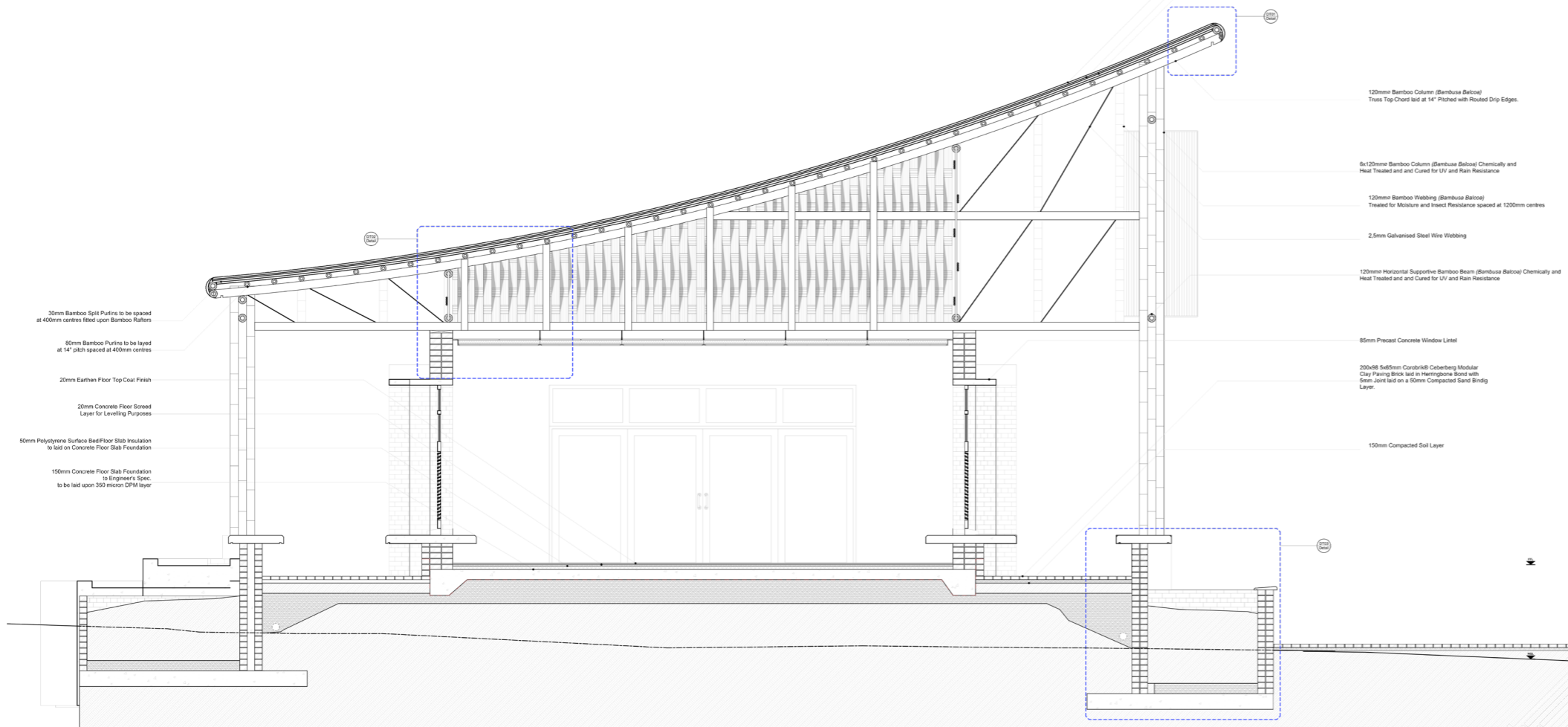
# PRE-FINAL TECHNICAL SECTION



# PRE-FINAL DETAILS



## BAMBOO COLUMN FOOTING



## BAMBOO COLUMN TO BEAM CONNECTION

## TECHNICAL SECTION

SCALE 1:20

## 07 CRITICAL REFLECTION

This project has been a deeply personal journey and a truly humbling experience. Through forging connections with the community members of Melusi, I've been stretched and inspired, not only in attempting to introduce new materials to an environment where they may be unfamiliar, but in witnessing the remarkable spirit of resilience that exists in informal settlements. It has been both challenging and awe-inspiring to see how individuals endure, adapt, and find ways to survive through even the smallest of efforts.

I have learned invaluable lessons from observing how community members share knowledge, work together, and construct their homes with resourcefulness and ingenuity. Their collaborative approach to building and repairing, along with their self-taught expertise, has deepened my respect for local knowledge systems—systems I now feel a strong responsibility to advocate for in my future work.

My two years with the Unit for Urban Citizenship have profoundly reshaped my view of architecture, showing me the true impact our profession can have when we listen, learn, and design in response to the real lives of those we serve. This approach to people-centered design has become a toolset I carry with deep conviction, and one I will draw on for the rest of my professional life.

My study into bamboo as a building material has also opened new doors, giving me opportunities to connect, learn, and communicate ideas to diverse audiences. I leave this project with a strong belief that bamboo may indeed hold promise within South Africa's building environment—a sustainable, versatile material that reflects the same resilience and adaptability I have witnessed here.

In every way, this experience has not only reshaped my career but touched my spirit, reminding me of the transformative power of architecture when it is woven with empathy, respect, and a commitment to honor the wisdom of communities.

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