ARCHITECTURE AND THE PEOPLE

A YOUTH SOCIAL CENTRE FOR CULTURAL EXCHANGE CHITUNGWIZA, ZIMBABWE.

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2020350704

DECLAR ATION

I Omar Muchingami declare original authorship of this thesis

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This dissertation is submitted in partial fullment of the requirements for the degree M.Arch. (Prof) at the University of the Free State.
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I love you and God bless you all.

CONTENTS

ABSTRACT

**If People are social beings and
Architecture is for the People, why then is Architecture
limited in social issue conversations?**

The inaction of idleness is a terminal disease in the lives of young people all over Zimbabwe. This social crisis results mostly from the constantly and radically weakening economy, forcing a lot of people to barely survive on a hand-to-mouth basis. Young adults are mostly affected by this conundrum as the urban population keeps increasing, while job opportunities remain unchanged. The United Nations Youth Association of Zimbabwe (UNYAZ) is a youth-oriented organization that empowers young people to become agents of positive change in their local and global communities. Amongst the social tools that they need to solve the rising social dilemma, UNYAZ needs an innovative architectural space where young people can develop their existing skills and generate an income. The aim of this thesis proposal is to provide a place where this can happen in the form of a Youth Center on a vacant parcel of land on the outskirts of Chitungwiza, Zimbabwe.

The design proposal is based on three theoretical concepts: biophilic design, terrain vague, and vernacular design. Biophilic design along with the use of vernacular construction methods and local materials results in a program that enables interaction opportunities that improve a sense of community and belongingness for its users. Terrain vague is used as a way both to identify the site typology and as a metaphor for the young adults it intends to serve. The environmentally sustainable design combined with vernacular architecture and biophilia/biomimicry is used to unpack the design intentions in terms of providing a place where the youth can develop an identity, purpose, and belongingness through interaction.

part 01

: Introduction

Author's painting collection of illustrations of "The Youth Today", it captures a series of the tragic life that young people find themselses in the declining economy of Zimbabwe (Mangwiro, 2017)

Figure 1: Location of site from Africa : Online, adapted by Author 2020

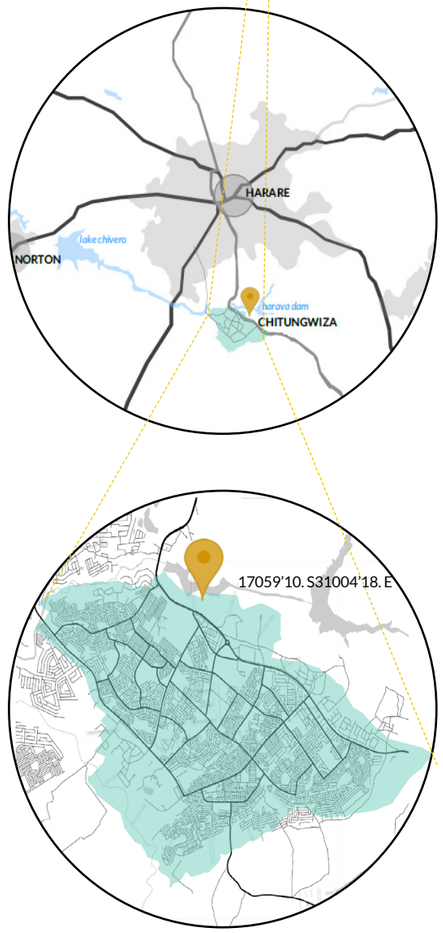


Figure 2: Location map of Chitungwiza from the capital city Harare, Zimbabwe. (ViaMichelin, 2019:adapted by Author)

1.1 BACKGROUND

This thesis is for a proposed Youth Social Centre for Cultural Exchange in Chitungwiza, Zimbabwe (Fig. 2).

Chitungwiza was developed as a dormitory town to Harare in 1978. This was during the colonial era when not much attention was given to social or civil infrastructure development. Since Zimbabwe's independence in 1980, the population of Chitungwiza has skyrocketed from approximately 142 000, to 340 000 in 2020 (Population of Cities, 2021). As a result, such resources have been overloaded and the accompanying economic meltdown in the country has left most of the youth stuck in worsening social conditions. Gumbo (2015) describes Zimbabwe's economic decline in the foregoing decade in terms of a 231 million percent inflation rate and an unemployment rate hovering around 81%. As of 2021, the local economy continues to collapse despite most of the government's attention being focused on stabilizing the runaway inflation.

Arguably, unemployment has become the main reason for crime, drug abuse, and an increased suicide rate among young people. Graduates, even in professional fields such as engineering, medicine, and accounting have been reduced to street scavenging. Instead of working in their field of qualification, they handle dirty dollar bills as "kombi" touts mostly in Zimbabwe's urban areas, where it is not easy to even land such an informal, low-paid, unskilled job (Gumbo 2015). The president of the United Nations Youth Association of Zimbabwe (UNYAZ) describes young Zimbabweans as "simply stuck" (Mapfumo in Gumbo, 2015). The term "ghetto youths" is colloquially used to refer to the unoccupied and unemployed young people trying to survive in the high-density areas of the country by becoming involved in criminal activity and drug abuse.

Even though many of these young people spend their day lounging at street corners doing drugs and becoming involved in crime to survive, there is optimism that the situation can be resolved. Gumbo (2015) for example, refers to James Bayanai, director of the Zimbabwe Youth Development Foundation (ZYDF), who believes that there is a lot of potential in this population group that can be tapped into. Bayanai recognizes the unique dilemma they are facing and is convinced that the situation can be alleviated by innovative ideas. He also believes that this potentially can create further employment opportunities for other young people.

The urgent need to address this situation in the form of an architectural intervention in collaboration with UNYAZ and ZYDF forms the background and motivation behind this thesis proposal.

Figure 3 : A collage of pictures showing the "kombi" touts, an unproductive day at a small business, graduates playing soccer in the streets as a form of strike, ghetto youths having some drugs. (Economy 2020: Online)

> *"For some Zimbabwean youths, 2014 was simply the worst in the past few years due to the rising number of unemployed college graduates and the continued downturn of the local economy. To most of them, these problems are set to continue in 2015 though some believe that there is space for innovative young people in the country."*
> *Tinashe Gumbo 2015*

1.2 PROJECT RATIONALE, AIMS AND CLIENT

The downslide of the economy in Zimbabwe continues to make a negative impact on young people of Chitungwiza of which approximately one in five are gainfully employed, leaving 45 000 unoccupied (Zimbabwe Data Portal, 2015). While many have opted for informal employment to try to survive in the irregular economy, they have not been able to sustain a reliable source of income. There is however a lot of creative culture and skill that has been passed down from previous generations in Chitungwiza.

Figure 4 : Diagram and pie chat showing the youth employment rate in Zimbabwe 2015 (Zimbabwe data portal 2015: Author, 2021)

In a town popular with some of the greatest Zimbabwean musical artists, stone cavers, traditional dressmakers as well as handcrafts experts (Fig. 6), UNYAZ is an organization that seeks to further the objective of the United Nations (UN) by working towards grassroots and youth improvement. Unfortunately they do not have the skills to design the necessary facilities to achieve their goal and requires the services provided by the architectural profession (Fig. 5).

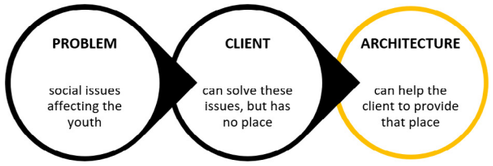


Figure 5 : Diagram showing the relationship between social problems, social development organizations, and the architectural profession

The proposed Youth Social Centre for Cultural Exchange aims to offer an alternative way to get income other than the formal education and employment sector by providing an innovative platform for the young people in Chitungwiza to develop their existing creative talents and skills, to produce commercially viable artefacts, and to exhibit these to potential clients.

The program encompasses a socially interactive performance space where creative skills in the community can be identified, workshops where these can be perfected, and a market space where their products can be exhibited to create income. There are also a tourist information centre where one can get knowledge about the creative skills I the facility, a culinary school that serves the restaurant ,offices to handle administration work, a jetty that allows visitors to experience the water and an indoor outdoor gallery space where different crafts can be displayed.

The overall intended outcomes can be described as a place where the “ghetto youth” of Chitungwiza youth can develop an identity, purpose, and belongingness through interaction and the exchange of ideas in the different crafts development initiatives they will be participating in.

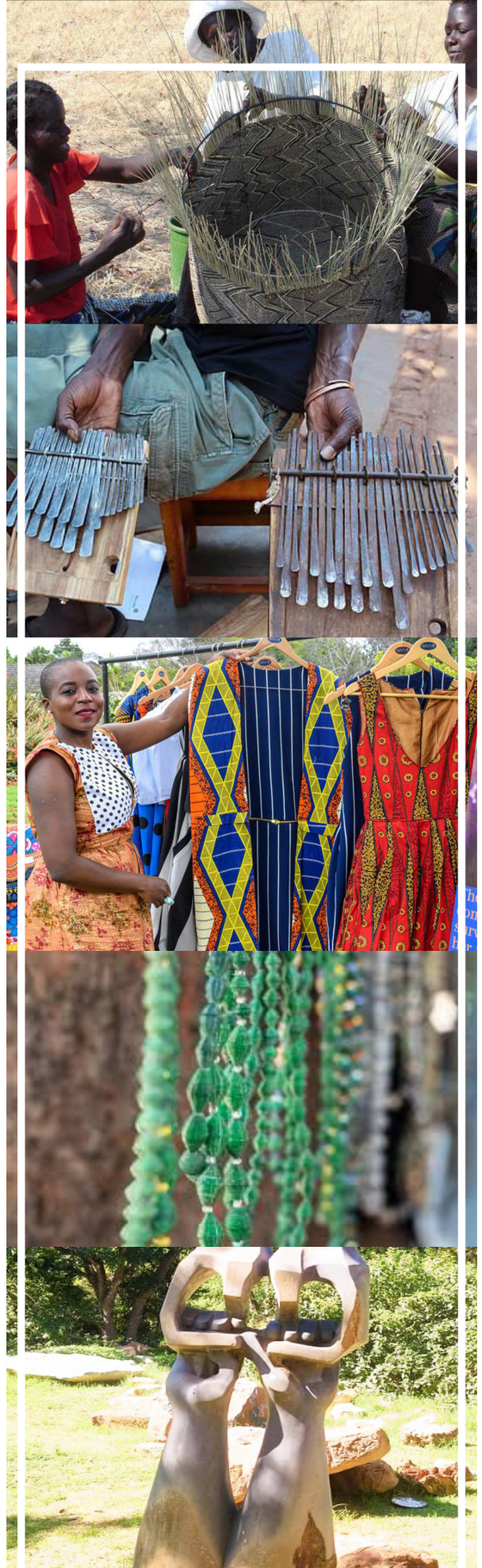


Figure 6: Collage of creative skills in the community of Chitungwiza; basketry, weaving, musical instrument making,tailoring, beading,stone carving (Handcrafts Zimbabwe 2016 :online.)

1.3 RESEARCH QUESTION

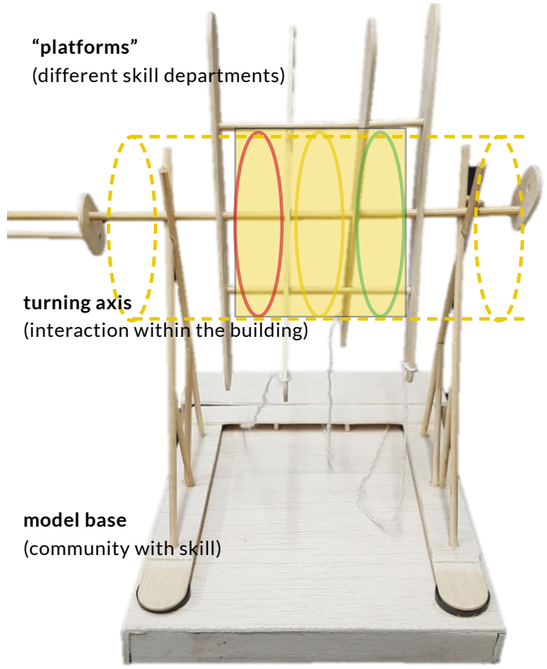
Based on the above preliminary investigation, and the design development process the following research question was established;

> To what extent can architectural design be used to provide spaces that mitigate social issues of unemployment, identification, and innovative income creation for the unemployed youth in Chitungwiza, Zimbabwe?

1.4 TOUCHSTONE

The touchstone expresses an “arranged system” in which by moving around an axis, the building interacts with people giving them a platform to better themselves a possible source of income and skill, cultural identification. Within the system, idea is exchanged for another idea among the different skills and this creates a sub-community of interdependent people. It makes people meet from different parts of the economy as well as cultural backgrounds.

The ones that are soul searching (the tourist) and the producer (the young person with the skill, showing it off). The program becomes an experience of exchange, carrying people through different emotions by understanding the narrative of the art being displayed. The red, green, yellow represents the talent that is coming out of the community into this exchange program and when the colors overlap on the turning axis (the building) it shows the interactive experience that will happen within the building. The results of these interactions create the beautiful social outcomes shown by the organic footprints on the ground.



A touchstone *is* the essence of the project.

Its a testing agent, yardstick, gauge, litmus paper, proving ground of what the project wants to be

Figure 7: Components of the touchstone(Author, 2021)

1.4.1 REFLECTION

The design of a social building extends beyond the physicality of space to more psychological intensions. The young people need a place that does not just give them another place to spend a day but a learning space that improves their mindsets. The idea of having exhibitions for their own work and to add on income along with learning other new skills become a driving force to create an identity and have a place where they belong. In this way, architecture becomes a threshold for social and cultural exchange.

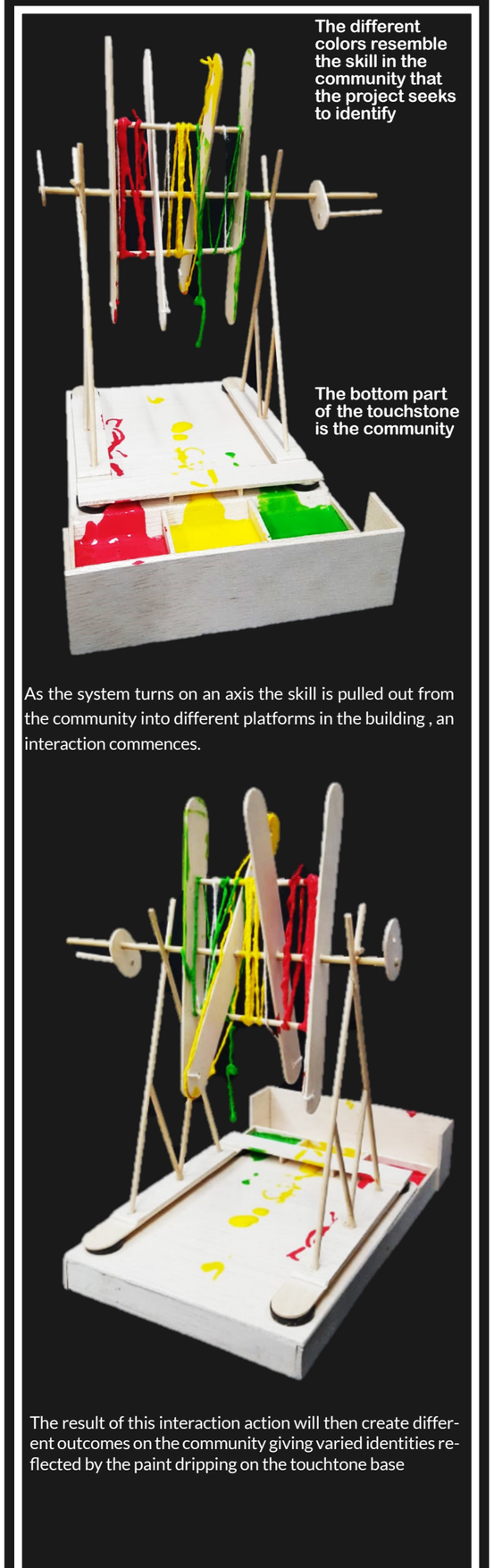


Figure 8: Photographs of elements of the Touchstone and description of the thoughts behind it (Author, 2021)

part 02 : Theoretical Discourse

2.1 INTRODUCTION

A literature review has shown that the importance of theory in discussing architectural practice has been questioned (Baird 2004; Koolhaas 2003). As part of this debate, Baird (2004) proposes that any new architectural approach requires a body of theory to help develop the discourse, and explains that if this is not considered then “new [approaches to] architecture will devolve to the ‘merely’ pragmatic, and decorative, with astonishing speed”.

An important challenge in any theory-based design proposal is to find a balance between for example, “criticality” and alternative architectural theory “being offered up in its place” (Baird 2004). Rem Koolhaas is quoted (ibid.) as saying that “[m]aybe some of our most interesting engagements are [theoretically] uncritical, emphatic engagements, which deal with the sometimes-insane difficulty of an architectural project to deal with the incredible accumulation of economic, cultural, political but also logistical issues”. It can even be argued that architecture itself is seldom a solution to social problems.

This theoretical treatise is grounded in the belief that in the design process, the proposed users of any architectural intervention should be considered as the core to which the design should be anchored. As explained in the introduction, the youth in Zimbabwe have been caught up in a unique economic structure for the past 20 years. The theoretical discourse that follows focuses on how the project aim can be achieved in a community influenced by complex societal issues. As one of the overall toolbox of solutions, architectural interventions have been proven successful as the precedent studies in Title 2.4 show.

There remains room to extend this possibility by further investigating the extent to which the provision of carefully targeted social interventions can alleviate localized issues. The aim of the design investigation that follows is to unpack the architectural design process as one component of such an intervention.

Figure 9: Author’s painting collection of illustrations of “The Youth Today”, it captures a series of the tragic life that young people find themselses in the declining economy of Zimbabwe (Mangwiro, 2017)

2.2 THEORETIC GROUNDING

Architectural design has many facets, and the discourse on people-centered design presented here is established on three theoretical principles: biophilic design/biomimicry, terrain vague, and vernacular design.

In the first part, the author identifies the site as an example of a “terrain vague” and therefore a place full of possibilities. The second theme is an interpretation of the natural topographic features found on site through the lens of biophilia theory. In this theme, the direction of discourse is taken to the origins of biophilia and biomimicry, outlining its benefits, and using the findings as building blocks for a sustainable design solution to the challenges created by the local climate. Finally, vernacular architecture is proposed as a vital tool for engaging the community to form identity and belongingness. At each stage of the research process, more information will be given as to why each principle is considered applicable.

2.2.1 TERRAIN VAGUE

In his article “Unintentional landscapes” Michael Gandy (2016: 435) links what he calls “non-designed elements of urban nature” to the English words ‘edgelands’ and ‘interstitial spaces’ as well as to “the increasingly frequent adoption of the French term ‘terrain vague’”. Gandy explains the meaning of this concept through reference to art, literature, and urban design theory. The first reference to the phrase is found in the painting titled *‘Le café des Ardennes près d’un terrain vague’* by Johan Barthold Jongkind’s (1861) (Fig. 10) which illustrates “the uncultivatable ground in the Ardennes in the late 1860s” (Gandy 2016: 236).

In literature, the term has an uncertain origin but Gandy (ibid.) found an early reference in Isabelle Eberhardt’s 1902 novel ‘Yasmina’ where it is used to describe the location of a mosque on the outskirts of an Algerian city. In 1976, Jean-Michel Palmier (in Jasper 2018: 9) uses the term in his ‘Berliner Requiem’ to describe his “listless” search for traces of the Weimar past in Berlin.

The concept was first formally theorized in the 1990s by Spanish architect Ignasi de Sola-Morales, who described them as spaces that are located outside the city’s productive spaces (Grichting 2014). Barron and Mariani (2013, in Millington 2015: 2326) refer to “[a] collective term for a multitude of subtypes of marginal, leftover land, from ‘derelict land’ and ‘brownfield’ to ‘void’ and ‘dead zone’” and “the ruins of shrinking economies” (Grichting 2014: 71). Jasper (ibid.) similarly points out that these ‘terrains vagues’ “defy easy categorizations and inspire multi-layered meanings and interpretations”. Such places, she continues, “can simultaneously be read as voids or material remnants through which traumatic memories are traced, as spaces of scientific discovery flourishing with life, and as surrogate forms of public space”.

Considering all of the foregoing ‘negative’ descriptions given the ‘ghetto youths’, a metaphor is proposed that just as the terrains vague are spaces of great potential and possibilities, so are these young people.

Following is a detailed discussion of the attributes of the selected site that can categorize it as a “terrain vague”.

Figure 10: ‘Le café des Ardennes près d’un terrain vague’ (Jongkind, 1861). 186 x 249 mm, Guache on board, Musée d’Orsay, Paris (Arts Graphiques 2012: online)

Figure 11: Collage of Damview Lodge immediate site context showing seating benches near the river, open air events, building types and general landscape (Author, 2021)

2.2.2 THE PROPOSED SITE AS TERRAIN VAGUE

In Fig 12, an aerial view of the Chitungwiza environment, the green highlights indicate the residential areas and the yellow the northern edge of the city bordered by the Harava Dam. The main access road to Chitungwiza from Harare is parallel to the dam and separates the formal residential area from the sparsely populated and vegetated Mayambara communal land ('marginal leftover land', 'material remnants') where the site is located. Furthermore, the site forms a porous threshold for the pedestrians who access the Harava Dam via one of the many footpaths.

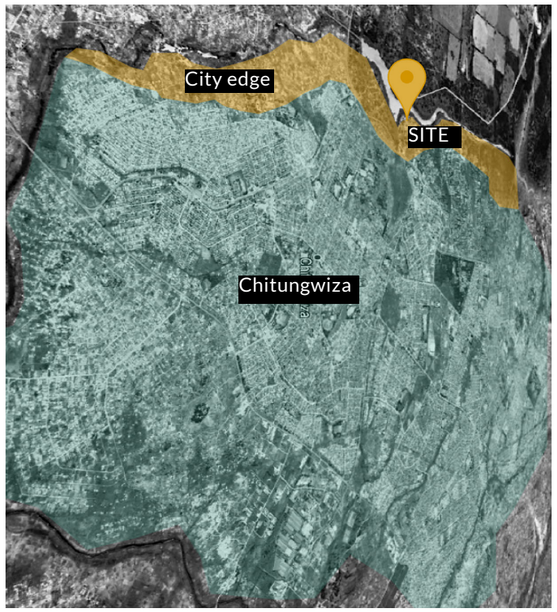


Fig 12: The proposed site as 'terrain vague'. (Google Maps 2021: adapted by author)

Local lore tells that the dam is sacred and that suicides who have drowned there (a common occurrence) were the victims of mermaids living in the water ('probably an escape from mental traumas').

The site is however not completely abandoned: at the time of the site investigation in 2021, the youth were observed using the site as a place for chilling, site viewing, and subsistence fishing as an escape from urban Chitungwiza ('spaces outside the city's productive spaces', the ruins of shrinking economies). The lodge located on an adjacent parcel of land charges a small fee for access to their 'goch goch' (barbeque area) and the open-air musical festivals that are hosted on the shore. This detail is important because open-air events are a big factor in the local urban culture.

The gently sloping land provides a green lung for the urban space and the water forms an important physical feature in biophilic design (Li, Chau & Aye 2020). There are varied species of indigenous trees on the site and the relatively unspoilt natural environment and existing low-level social activities suggest that this site does have the inherent possibilities that make it a suitable site for the proposed Youth Centre.

Figure 13: The Seke road seperate the Chitungwiza residential area to the Mayambara communal land .(Google Maps: adopted by Author, 2021)

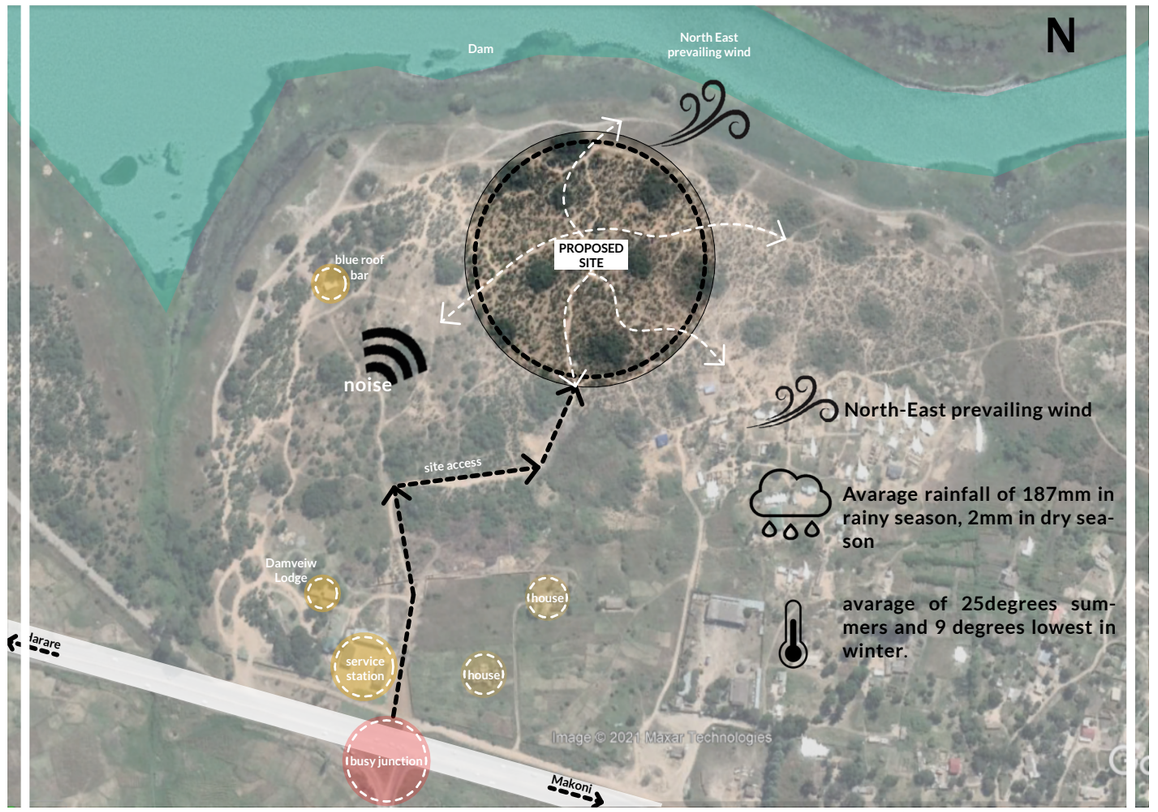


Figure 14: Meso analysis of "terrain Vague" showing immediate context,climatic information and, site access from Seke road (Original map edited from google maps by Author, 2020)

Figure 15: Northern Europe's romantic landscapes. (Christian Norberg-Schulz: Genius loci, p. 49.)

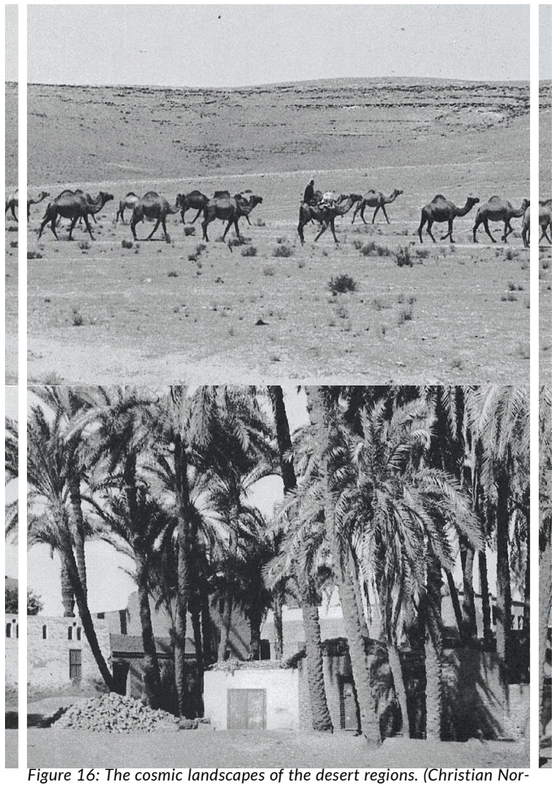


Figure 16: The cosmic landscapes of the desert regions. (Christian Norberg-Schulz: Genius loci, p. 48.)

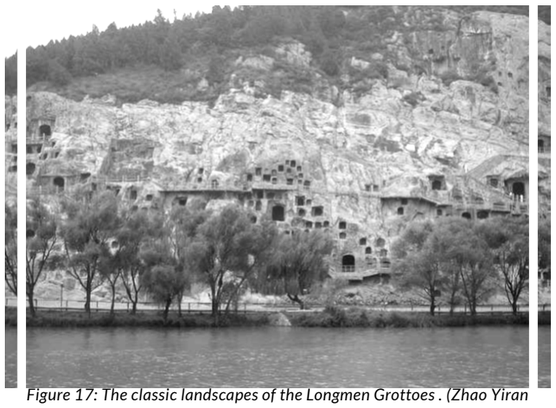


Figure 17: The classic landscapes of the Longmen Grottoes . (Zhao Yiran 2009: online.)

2.3 GENIUS LOCI: ROMANTIC OR CLASSICAL LANDSCAPE?

The architectural theorist Christian Norberg-Schulz (1980:8) reminds us that a place is a "qualitative, 'total' phenomenon, which we cannot reduce to any of its properties, such as spatial relationships, without losing its concrete nature out of sight". As part of his discourse on the Genius loci, or 'spirit of place', Norberg-Schulz identifies three basic types of landscape: romantic, cosmic, and classical. Hadad (2010) explains the important fact, often misunderstood by students of Norberg-Schulz, that these three types of landscape do not simply present what we may look at as abstract and superficial topological conditions, but that social, cultural, and historically determined judgments are also intimately connected to their classification.

A "romantic" landscape is one where dwelling takes the form of refuge in the forest (as represented by the Norwegian landscape) and encourages a relationship with the earth (Fig. 15). A "cosmic" landscape manifests an absolute eternal order as be represented by a desert (Fig. 16). The "classical" landscape represents an in-between condition, a varied yet orderly landscape (Fig. 17)(based by Norberg-Schulz on his interpretation of the Greek landscape) (Hadad 2010).

2.3.1 THE SITE AS A CLASSICAL LANDSCAPE

From the above brief description, it is concluded that in the context of the Zimbabwean landscape, the site can be classified as "classical", based on the following reasons.

The Norwegian landscape described as "romantic" by Norberg-Schulz (Fig. 15) is very different from the Zimbabwean "romantic" landscape (Fig. 18), but the essence of the definition applies: it too encourages an intimate relationship with the earth, and dwelling (certainly in the context of the proposed Youth Centre) provides a refuge in the forest. Norberg-Schulz refers here to "the shaded area under an individual tree" (Fig. 15) which is poignantly illustrated in Fig. 18. The people resident in the communal land (Mayambara area, 'terrain vague') despite their difficult living conditions, has also managed to preserve harmony with their natural environment and nurture its cultural and historical value.

Reviewing Norberg-Schulz's original definitions, the landscape of the site can also be considered to be "classical": varied yet orderly, an in-between landscape where individuals are neither absorbed by an overwhelmingly vast "cosmic" order, nor forced to seek a private hiding place, as in a "romantic" landscape.

Having analyzed the selected site on the Mayambara communal area in terms of its development potential and the type of development that will suit its 'spirit', it was concluded that the proposed Youth Centre would on the one hand strengthen this underdeveloped social node and offer an alternative vocational and educational component that can occupy these youths apart from entertainment, while it will also benefit from the natural environment in which it will be placed.

The foregoing theoretical explorations in terms of 'terrain vague' and 'genius loci', in conjunction with the physical site analysis in terms of topography, climate, context, (Fig. 10) provides clear guide lines in terms of a theoretical grounding for the design process. The next important consideration in terms of design development is to explore how to seize the opportunity on this "space of the possible", and design on this "terrain" without overriding the spirit of the place. This take the conversation to the next part of the treatise which refers to the principles of biophilic design and flowing from that, biophilic design and biomimicry.

2.3.2 BIOPHILIA AND BIOPHILIC DESIGN

The etymology of the word "biophilia" comes from the word "love" (Gr: philia) of "life or living things" (Gr: bio) (Zhong et al 2020). According to Wilson (1886, in Zhong et al 2020:117), biophilia is an innate, hereditary, and possibly even genetic human response to nature, in other words, it is "the urge to affiliate with other forms of life" (Wilson 1986).

The principles of "biophilic design" is based on the theory of biophilia. Zhong et al (2020) describe it as the integration of nature in architecture, which can be from the most superficial - simply including a planted wall in a building lobby - to a much more conceptual incorporation into the theoretical design process. For Wijesooriya and Brambilla (2020), biophilic design is founded on the concept of health and well-being, where the design is the foundation of enhanced human-nature connections, in other words between the building occupants and the environment. Biophilic design clearly has multiple potential benefits to health, and psychological and emotional well-being (Browning, Ryan, & Clancy 2014).

Li, et al (2020), identify three pillars on which biophilic design can be based: place, people, and nature. This three-pillar matrix is a deconstruction of Kellert's (2005) 'six biophilic elements' model (Fig. 19), developed to observe biophilic design features and provide a map or framework to guide biophilic design. "Place" refers to "architectural settlements", grouped into several subdomains: the region, settlement, site, landscape, and built form (ibid). The second pillar, people, has two domains of focus: physical (connection through physical systems), and psychological (connections by interpretation of nature). The final pillar is nature which has three domains: straightforward, direct, and indirect.

In this thesis Wilson's (1984) interpretation of biophilic design, the urge to affiliate with/relate to other forms of life, supports the primary goal: focusing on the wellbeing and needs of users of the Youth Centre, and community-building outcomes of belongingness and identity on the terrain of possibility.

Figure 19: The deconstruction of Kellert's (2005) 'six biophilic elements' model to three pillars of people place and nature by Li, et al 2020.

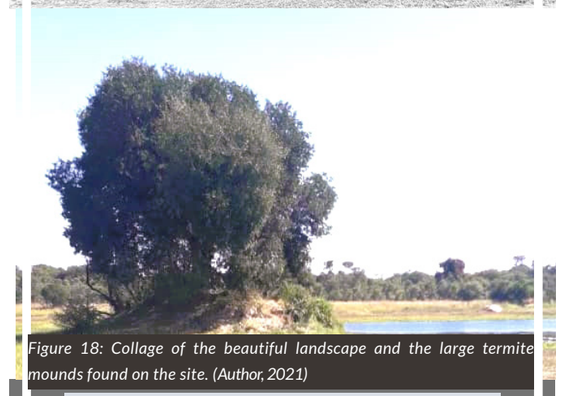


Figure 18: Collage of the beautiful landscape and the large termite mounds found on the site. (Author, 2021)

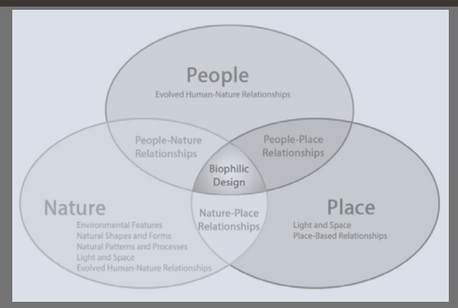


Figure 20: Fungus growing termites (Taman Negara, 2013: Online)

2.3.3 BIOPHILIC DESIGN TO PRESERVE THE CLASSIC LANDSCAPE

One of the primary concerns about this site was to preserve the natural landscape as much as possible. The site, trees, and beautiful views were primary contributors to the initial development of the design concept (Fig. 18). Kellert (2005) believes that the wellbeing and performance of human beings depend on the positive experience of natural systems, processes in buildings, as well as constructed landscapes. These phenomena are already existent on the terrain, encapsulated in large termite communities in their nests (fig. 18).

During the design development cycle, revolving around theoretical principles and the natural terrain, the presence of many giant termite mounds scattering the landscape became more and more obvious. Intrigued by their size, and other even more spectacular insights generated by the terrain, the notion that "this could be a good place to interpret biophilic elements into the proposed design" came to mind. An investigation into the architecture of these termite dwellings included areas of particular interest such as the materials the termites use for their construction, and the orientation of these structures to optimize passive ventilation mechanisms, climatic response, and resistance to weather damage. A lot of the findings were quite informative when dealing with the technical resolution component of the design process (title 2.5).

These insights led to linking the theoretical principles of biophilia, sustainability, and vernacular architecture back to the primary design aims of community identity and belongingness. The theoretical discourse at this point therefore moves on to discussing the overlapping aspects of biophilic design and vernacular architecture. A case study of the Chinese Naxi traditional culture by Li, Chau, Aye, (2020) will be used for further investigation.

2.3.4 INTERLUDE: ENVIRONMENTLLY SUSTAINABLE DESIGN

Biophilic design and vernacular architecture cannot be sensibly discussed without providing a brief background on issues of global warming and energy consumption. A 2018 report by the United Nations Intergovernmental Panel (IPCC) on Climate inspired a renewed global response to mitigate climate change. This followed the projection of uncontrolled climate change causing a global increase in temperature of 1.5^{0}C by 2050 (IPCC, 2018). Critically, in terms of this design process, is that the built environment and the transport sector are the two largest energy consumers and are responsible for the most CO^{2} emissions to the global environment (Fig. 19a). Duarte, Sanchez-Choliz, and Sarasa (2018) point out that the built environment accounts for more than 48% of global energy consumption making them the largest energy consumers when compared to the transport sector at 28% (Fink 2011). The IPCC (2018), however, reports that buildings present three times as much potential for CO^{2} emissions reduction than the transport sector.

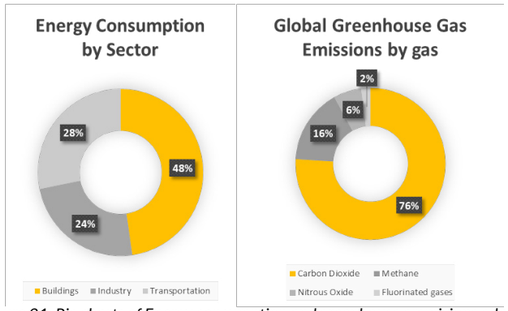


Figure 21: Pie charts of Energy consumption and greenhouse emmisions adapted by Author 2020

In support of this, Hegeneder (2020 in Wijesooriya & Brambilla 2021) concludes that the construction industry is a "sleeping giant", and that one of the most cost-effective ways to fight climate change is the "future-proofing of buildings". This positive viewpoint makes it clear that every attempt to implement environmentally sustainable design (ESD) principles can make a contribution towards reducing the contribution of buildings toward global warming.

Environmentally sustainable design has been one of the most recognized strategies to mitigate the impact of buildings on the environment (Wijesooriya & Brambilla, 2020). These authors define ESD as "focus[ing] on energy conservation and efficiency by improving the thermal performance of buildings and promoting the use of renewable sources" . In recent years, they continue, environmentally sustainable design has faced criticism for its high dependence on technological advancement, so that focus has now shifted to more human-centered methods which have paved the way for biophilic design.

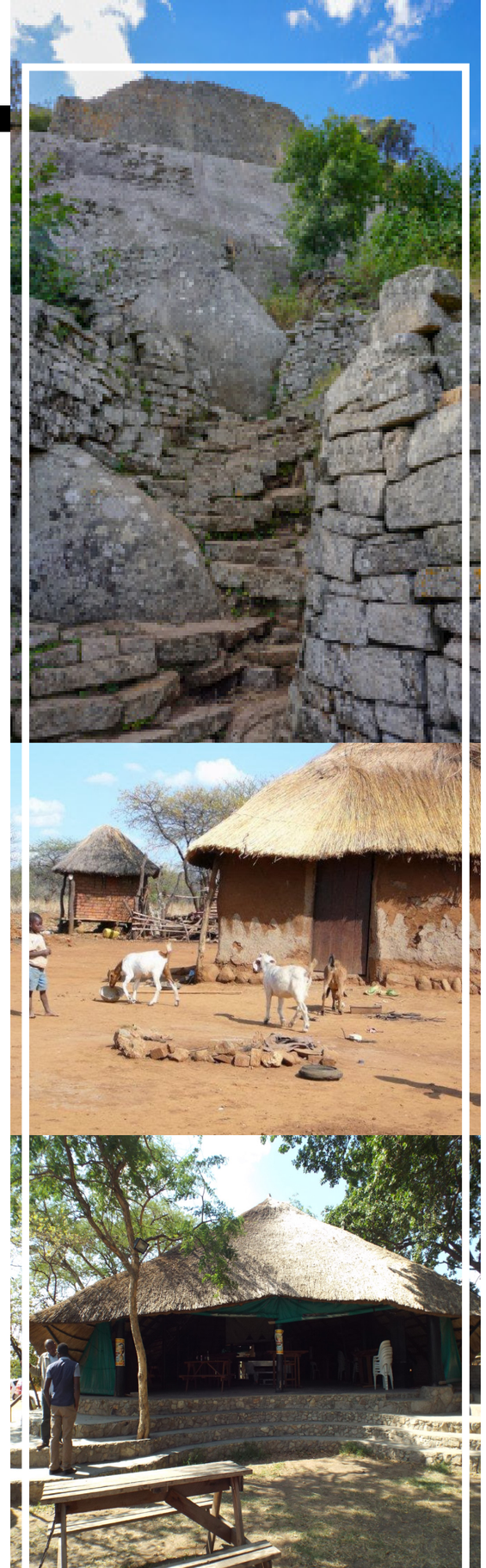
2.3.5VERNACULAR ARCHITECTURE

Vernacular architecture is a very broad field of study and has widely divergent meanings for different people and in different fields of study. It is studied, inter alia, in terms of the building's environment, its specific geographic features, and the influence of its cultural context. Ghisleni (2020) provides a simple description: vernacular architecture is a type of local, regional construction that makes use of traditional materials and resources from the area where the building is located. Teixeira (2017) makes the salient observation that the uniqueness of different places in the world becomes a means of affirming local identity. Teixeira (ibid.) further explains that

> *"all vernacular architecture is intrinsically traditional, that is, the architectural form of a given people arises and develops as a result of a long continuum in time, sometimes during centuries of human history, always the from familiar forms, consecrated by previous generations" [translated from Portuguese].*

Vernacular architecture inherently considers the conditions of the local area, in terms of the geographical context that includes climate, vegetation, and topography. In terms of this theoretical discussion, two major attributes are associated with vernacular architecture: tradition and contextualization.

Figure 22: Rwanda-vernacular architecture (Larsen Payá Archdaily, 2020: Online)



2.3.5...VERNACULAR ARCHITECTURE

Ghisleni (2020) observes that many vernacular buildings have excellent bioclimatic characteristics, providing real examples of architectural sustainability, because they maximize energy efficiency, and have passive noise and thermal control. While most truly vernacular structures develop naturally, modern techniques are continuously incorporated. This means that, apart from the obvious advantage of sustainability, contemporary vernacular architecture can now address many more issues.

The cultural identity of a certain ethnic group can be represented by vernacular architecture and this can become a tool for strengthening the bond between the population and the geographic location where they live (Hall 2006, in Ghisleni 2020). Angolan architectural practice Grupo Banga (in Ghisleni 2020) have found that architectural identity that brings inclusion, identification, and community engagement can be provided by the use of local, cheap, and accessible materials. This observation, showing that vernacular architecture respects and adapts to the physical and technological limitations of its framework and is a genuine result of the environment, the people, and the local history, perfectly sums up this discussion.

Figure 23a,b,c top-down: Collage of the Great Zimbabwe stone walls (Author, 2017), a typical clay-mud, timber communual house (Tsitsi D: Nervous Conditions 2013); Damview recreational space with vernacular materials (Author, 2019.)

2.3.6 REFLECTION OF VERNACULAR ARCHITECTURE IN ZIMBABWE'S CONTEXT

In Zimbabwe, marginal research and documentation have been done to celebrate vernacular architecture. One of the most documented vernacular architectures is the "stone ruins" of the ancient city, Great Zimbabwe, Masvingo (Fig. 21a). From the 15th century to the present era, a lot of changes and adaptations have been made by the local people in material and types of structures. To add on, the use of stone as a building material was most popular in the Masvingo area because it was readily available.

Other communities around Great Zimbabwe used clay-mud constructions, timber, and thatch which mostly define the communal landscape to date (Fig.21b). Most recreational escape spaces in Zimbabwe usually have structures that show vernacular groundings and highlighted features that connect the buildings to the natural landscape. (Fig.21c)

One can say that vernacular architecture exceeds beyond popular local, regional construction, traditional materials, and local resources, climate, geography to "a subconscious nostalgia of a psychological/ inherent "biophilic": 'nature affiliated" place that connects people to each other(communities) and the peace that comes with natural environments.

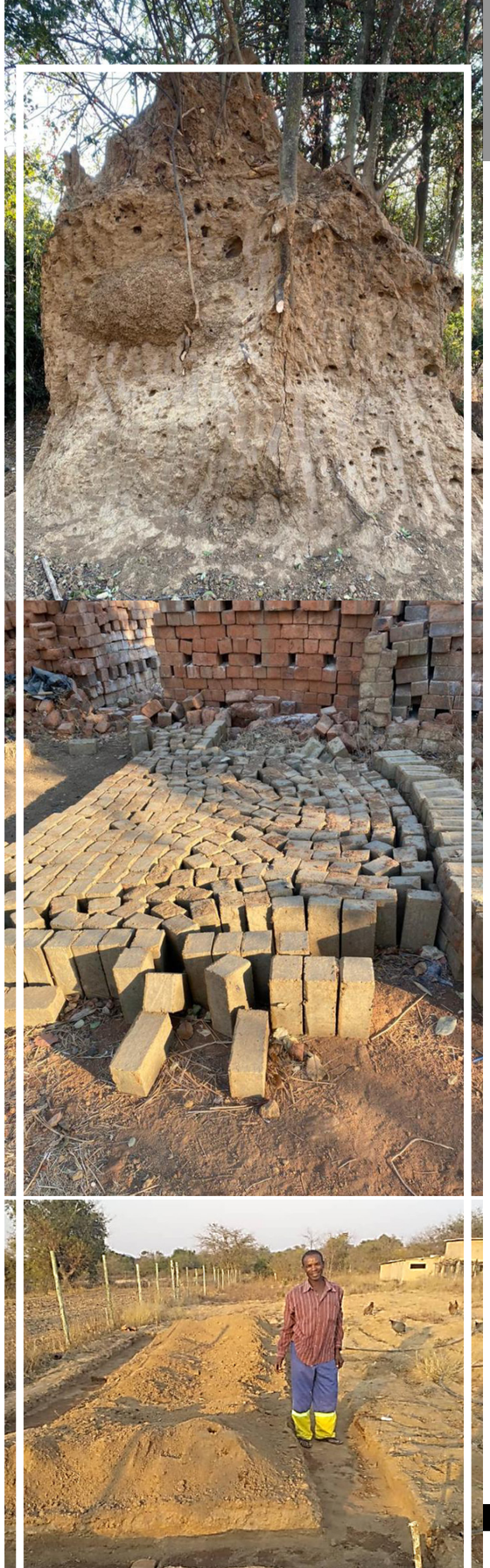


Figure 24: Collage of the local clay bricks and shallow raft foundations for communal house construction (Author, 2020)

2.4 LEARNING FROM THE NAXI SETTLEMENTS IN CHINA ABOUT THE CHITUNGWIZA SITE.

This section aims to investigate, unravel, celebrate, and record Zimbabwean vernacular architecture, and culminate in a design proposal that embodies the project aims for the local community. The investigation serves as a conclusion to the foregoing theoretical study. A case study on the biophilic-vernacular architecture of the Naxi settlements with reference to interrelated characteristics of the Naxi environment such as local topography, culture, and climate (Li et al 2020) serves as a template to analyze the Chitungwiza terrain and vernacular construction methods in Zimbabwe (refer to Table 1 for a summary of the findings).

The historic Chinese town of Dayan, home of the Naxi population, is one of two towns recognized in China in 1997, as a UNESCO World Heritage Site (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2020). The beauty of the region attracts both international tourists and local visitors. The following analysis identifies similar existing attributes of the terrain and Chitungwiza's local culture to influence some thoughts behind the design proposal. To recap, the proposed design in this thesis intends to provide an opportunity to capture the identity of the youth of Chitungwiza, and also attract local and international visitors by exhibiting the local "spirit of place", showcasing the "romantic" landscape of the terrain, local culture, and the vernacular architectural expertise.

Figure 25: Man and woman of the Naxi minority group(Culture trip : Online 2020)

Biophilic features in Naxi settlements in China	Authors interpretation of the Naxi settlements	**Relatable biophilic features on Chitungwiza site and/ context**
	**Culture** The visual and cultural connection was maintained to the natural landscape This gives practical significance and phycological connection to the local belief system	
The settlements are located southern of Yulong Snow Mountain, the mountain of the local deity		The Harava dam is revered as sacred, it is the main attraction to the site along with the romantic landscape
	**Topography and Climate** Topographical elements can be taken advantage of in the orientation of the building to make a microclimate	
The town is located in a basin and surrounded by mountains. The water defines the grids around which the settlements are developed		Prevailing north-east winds blow onto the site from the dam bringing a cool breeze The space among the trees can be used to define the spaces of the buildable spaces
	Landscape An addition of biophilic design features to courtyards fulfilled connection with nature's "natural features".	
Courtyards and patios were full of plants		A structure from the adjacent Damview lodge showing intentional planting of trees to connect to nature
	**Materials** An addition of biophilic design features to courtyards fulfilled connection with nature's "natural features".	
Locally sourced stone was used as construction material		Locally sourced timber poles, thatch, and clay bricks are used

Table 1: A comparative Case study to identify biophilic features that can be celebrated on the proposed site (Images of the Naxi fron Li et al, Images of site: Author 2020)

2.5 DESIGN PRECEDENT 1

The Startup Lions Campus by Fransis Kere. (ArchDaily 2021)

Figure 26: Arial veiw ,Startup Lion Campus (Archdaily Kere Architecture ,2021)

Located on the banks of Lake Turkana is an information and communication technologies (ICT) campus. the Startup Lions Campus. This project is mainly responds to the pressing challenge of youth unemployment faced in the region by giving training and access to international job opportunities. This project gives a place to thrive for young entrepreneurs without leaving their place of origin.

The precedent is outstanding as it celebrates the unique morphology and natural beauty of its site. There are two levels that follow the natural slope of the site and features additional roof terraces where incorporated to offer beautiful views over Lake Turkana. To make it even more pleasant, the roof terraces are shaded by creeping vegetation, providing outdoor meeting spaces and platforms for the informal exchange of ideas.

The building design is inspired by towering mounds built by termite colonies in the region. These towers extract warm air upwards, while introducing fresh air through specially designed low level apertures. A stack effect is created to naturally cool the main working spaces. This system allows the building to withstand high temperatures. Adding on to the tower's functional role, they also create a landmark in the surroundings. Locally sourced quarry stone with a plaster finish Is used as construction material.

The collaboration with the local community also was of aid to the decision making process in vernacular experience and expertise from the locals.

Figure 27: Sketch to show stack effect, warm air is extracted from the tall chimneys on the first floor (Author, 2021).

Figure 28: Arial veiw ,Startup Lion Campus (Archdaily Kere Architecture ,2021)

Figure 29: sketch to show low level windowd drawing air into the building (Author, 2021).

Lessons Learnt

Stale warm air in a building block can passively be replaced by fresh air from the outside. This can be achieved by a special design of low-level apertures and be extracted by a tall shaft at the top of the building structure. Multifunctional spaces can be achieved by a grand stair and the river can be taken advantage of by introduction of a viewing terraces that can double for another formal or informal activity.

2.6 DESIGN PRECEDENT 2

Korea National Arboretum Children's Forest School by Geeumplus (ArchDaily)

Figure 30: Korea National Arboretum Children's Forest School, building among the trees.(Archdaily ,2021)

This precedent is selected to address the biophilic approach of design with nature in a forest environment. The Forest School is an exhibition, educational that informs children about the importance of forests aswell as the environment .

The architectural concept bases a biophilic design in which nature, the ecosystem and architecture are coexistant. The inception point of this project was the harmony between the building and the existing trees. They preserved the trees and arranged the building around them. The layout opens up to a stream on the east side of the site where a beautiful scenery can naturally seen.

The exterior finish is an eco friendly thermo wood channel siding that creates a facade that matches the surrounding trees and a harmonious landscape with the adjacent garden. There are different themes that define each outdoor space, an outdoor stage where visitors can sit and watch performances outdoors, a rain garden that recycles rainwater through the slope of the roof and a kitchen garden that inspires various senses by cultivating plants directly.

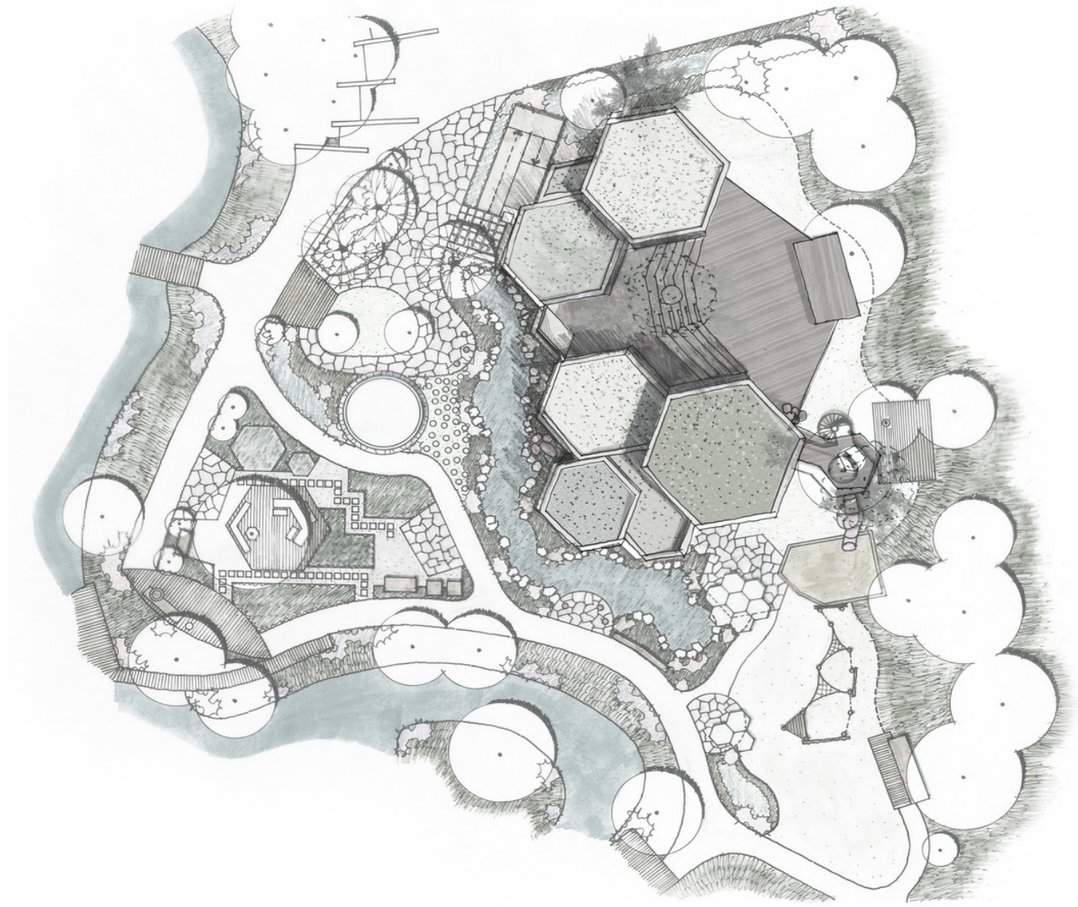


Figure 31: Korea National Arboretum Children's Forest School master plan layout.(Archdaily ,2021) .

Lesson learnt

Working in a natural landscape can be a sensitive architectural task especially in a site filled with indeginous trees. The question becomes how best to develop the landscape without causing much damage to the natural scenery. The precedent offers the possibility of building around the trees which helps preserve the natural beauty of the landscape while at the same time introducing function to the forest.

There is intentional design to open up the building to the stream below offering most indoor space with opportunity to experience the stream. An additional advantage of this precedent is it relates indoor functional space to multifunctional outdoor space. This promotes thereby separates major functions to defined spaces and also offers flexible common spaces of interaction. The Forest school creates an exterior atmosphere that represents various themes of forest making it part of the forest camouflage in choice of material.

2.7 DESIGN PRECEDENT 3

Lycee Schorge Secondary School by Francis Kere (ArchDaily 2021)

Figure 32: Lycee Schorge Secondary street veiw.(Author 2021)

The school is located in the third most populated city in Burkina Faso. It showcases locally-sourced building materials in an innovative and modern way. The design for the floor plans consists of nine modules which house a series of classrooms and administration spaces. In one of the modules there is a dental clinic which provides dental care for the students.

Laterite stone walls are extracted from the earth and cut and shaped into bricks. This material works well as a wall because of its thermal mass capabilities and when combined with wind towers and overhanging roofs, there is lowering of temperature in the interior spaces.

A massive undulating ceiling assists with natural ventilation and illumination of interiors is. The wave like pattern allows the interior space to breathe and expel hot stagnant air from the interior spaces. The ceiling also diffuses indirect daylight by its off-white color providing ample illumination during the day while keeping the interior of the learning space protected from direct solar heat gain.

Vertical wooden screens wrap around the classrooms like a transparent fabric. This is a secondary facade made from local wood.

It is a shading element for the outdoor spaces immediately surrounding the classrooms. These screens do not only function to protect the earthen classrooms from corroding dust and winds, they also help to create informal gathering spaces for the students as they wait to attend their classes.

Local hardwoods and leftover are made furniture inside the classrooms reducing waste and adding additional value to the cost of construction. A radial layout creates an independent village condition with a central public courtyard. This allows privacy from the public domain, and shelters courtyard from wind and dust. Informal gatherings, formal assemblies and celebrations of the community are accommodated in an amphitheater like space at center of the courtyard.

Apart from the sustainable achievement of the design, the school also serves as inspiration for the students, teaching staff and surrounding community members. The architecture not only functions as a marker in the landscape but also a demonstration of how local materials, can be transformed into something significant with lasting effects when combined with creativity and team work.

Figure 33: Lycee Schorge Secondary secondary seating spaces outside.(Author 2021)

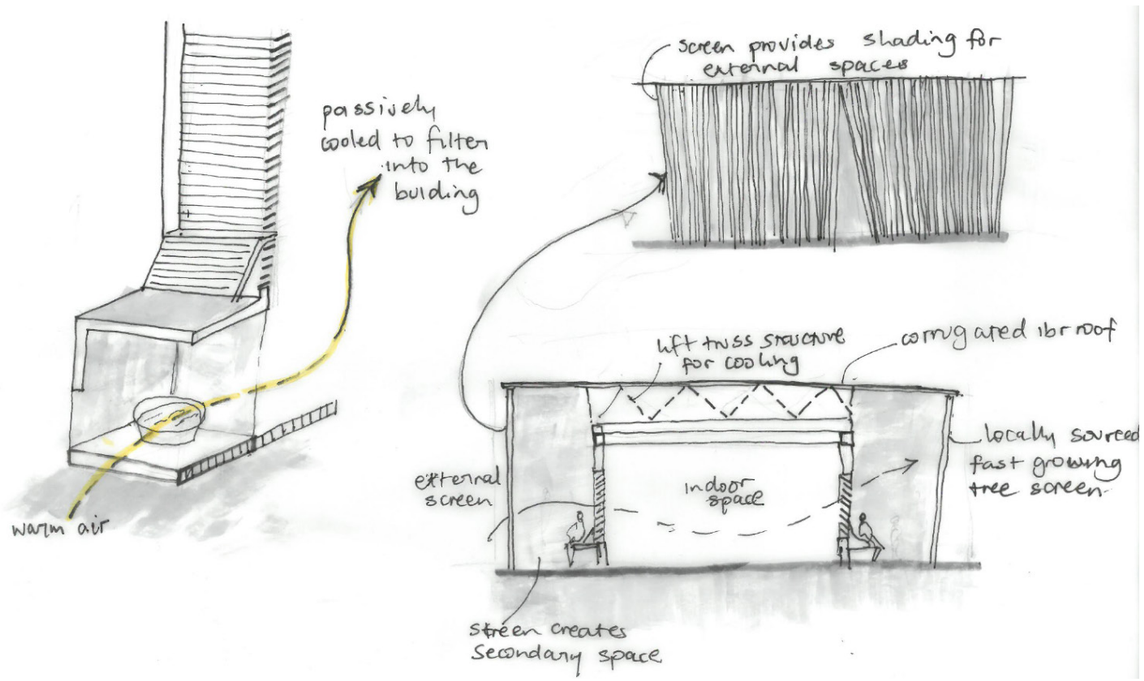
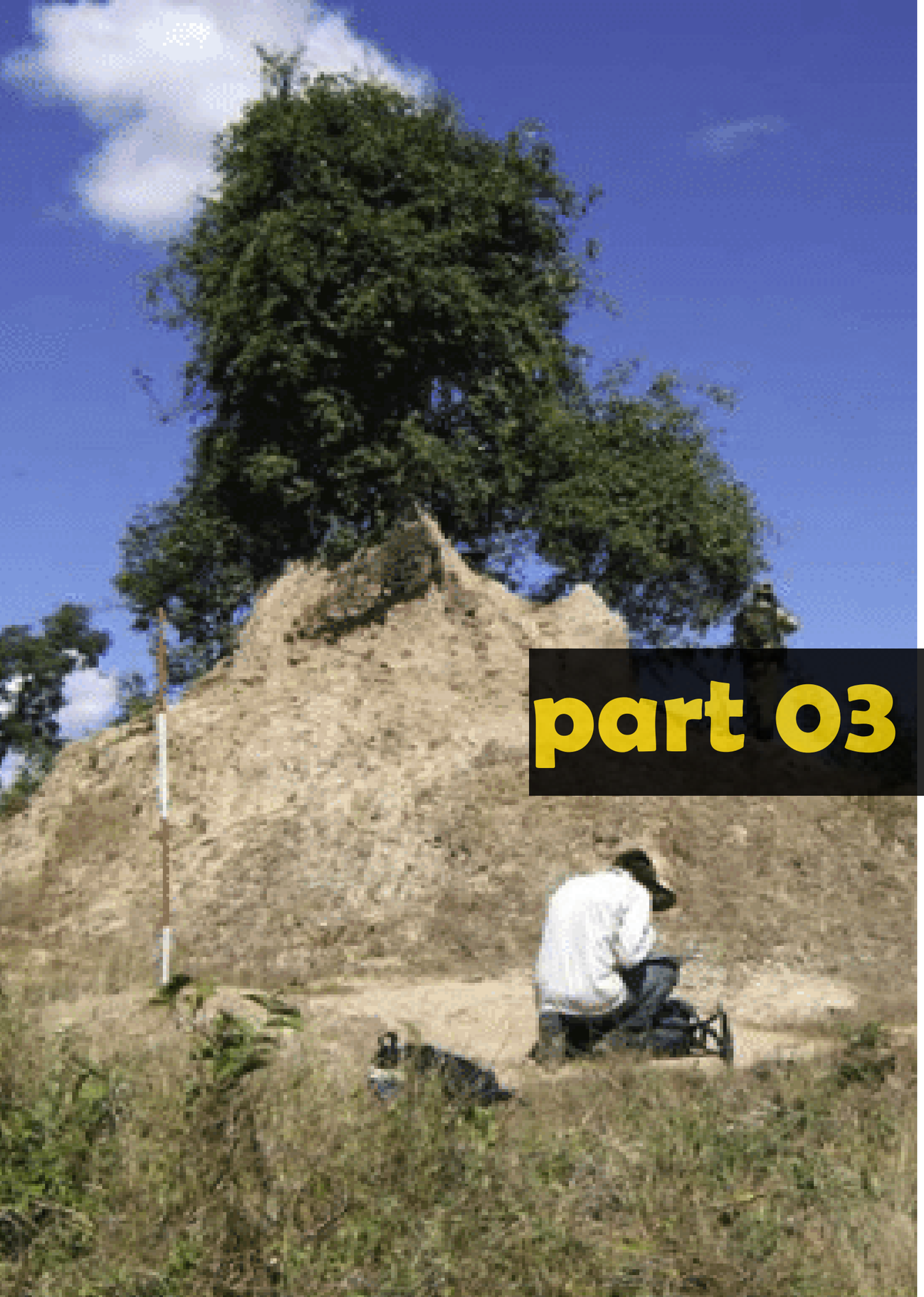


Figure 34: Korea National Arboretum Children's Forest School master plan layout.(Archdaily ,2021) .



part 03

: Design Development

Author's painting collection of illustrations of "The Youth Today", it captures a series of the tragic life that young people find themselses in the declining economy of Zimbabwe (Mangwiro, 2017)

3.1 INSIDE THE TERMITE MOUND (NESTS)

According to (Joseph et al, 2012; Traoré et al., 2008), Macrotermes Falciger (scientific for termites) occurs in miombo savanna woodlands Fig 35 south-central Africa. The mound/ colony of these termites (Macrotermes Falciger) can be large, rising up to 9m high with a base diameter of up to 30m (Malaisse, in Joseph et al, 2012). A colony can be 15-20 years and the mound constitute patches of crusted loam in the sandy matrix of miombo savanna woodlands and supports stands of shrubs and trees which differ in species composition from the surrounding matrix (ibid).

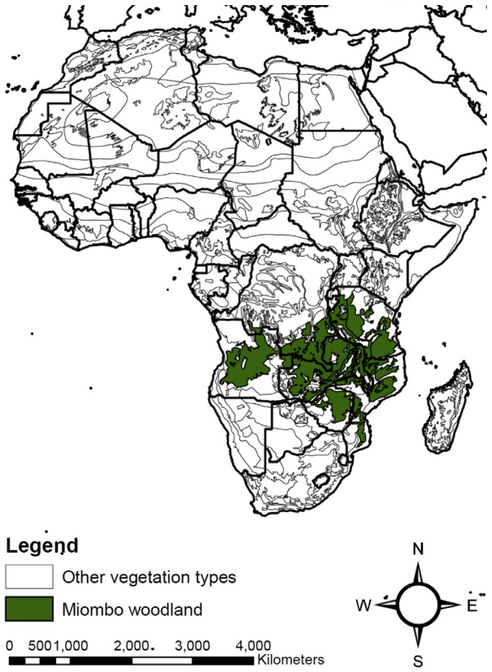


Figure 35: Map showing extent of Miombo savanna woodlands South-central Africa. (Joseph et al, 2012)

For all cases, mounds are mostly constructed from a mixture of clay minerals and quartz particles cemented together with saliva yielding a sturdy material that allows the mounds to endure harsh environments (Fagundes et al 2020). It is commonly agreed that the internal channels of the termite mounds play a big role in their thermoregulation process. Inside the mounds is a complex network of air channels of different sizes says Fagundes et al (2020).

There are different channels that converge at the middle of the structure to create one big vertical passageway which extends through the height of the mound. three distinctive tunnel types can be identified (ibid): a vertical oriented central chimney that extends from the subterranean nest to the top of the mound, surface conduits located under the thin porous covering, and lateral channels connect the surface conduits to the chimney(Fig 36). One of the most important characteristics of the mounds is that they live underground in a spherical nest win an average diameter of 1.5-2m.

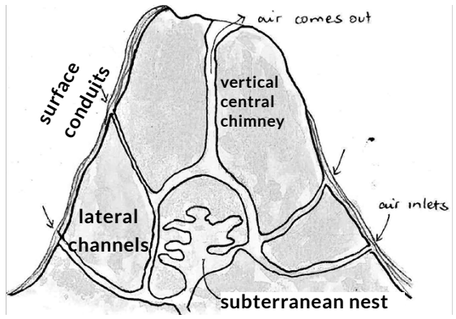


Figure 36: Sketch of the channels forund in a termite mound (Author, 2021)

3.2 THEORETIC AND TECHNICAL PRECEDENT

Eastgate Complex by Mick Pearce (Architecture, Design Biometic Architecture 2012)

The Eastgate Centre in Harare, Zimbabwe is a midrise office and shopping complex with biomimicry principles. Mick Pearce interprets passive cooling and energy-efficient mechanisms of the termite mound to cool residents from the high temperatures outside. In an article, he wrote about this building Pearce (1996), mentions that the climate of Harare requires buildings to be cooled for the whole year. This usually brings direct long-term costs in terms of buying, installing, and maintaining the traditional air conditioning system. This background presented the challenge of the design and the idea was to create a self-regulating ventilation system that would give thermal comfort to the workers and residents.

Pearce (ibid), highlights the misconception that termite nests continually maintain the internal temperature within a narrow range in the face of extreme outside temperature oscillations. In his research, he found out that termite mounds function more like mammalian lungs and act as organs for gas exchange in the underground nests. During the day the changes in the internal nest are less extreme when compared to the changes outside. However overall, the nest temperature when looked at in a year, the nests temperature closely follows the soil surrounding it.

3.2.1 TECHNICAL ASPECTS

From the information given by Fehrenbacher (2012), termites in Zimbabwe build gigantic mounds that farm fungus inside as their primary food source. While the temperatures outside the mound may vary, the fungus must be kept around 31 degrees. To achieve this temperature, the termites constantly open and close heating and cooling vents throughout the mound over the course of the day in a system of carefully adjusted convection currents. From the lower parts of the mound, the air is sucked down into enclosures with muddy walls and is taken up through a channel to the peak of the termite mound. The termites then continually dig new vents and close up old ones in order to regulate the temperature inside the mound.

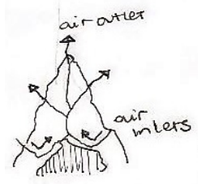


Figure 33: Map showing extent of Miombo savanna woodlands South-central Africa. (Joseph et al, 2012)

In Eastgate, the ventilation system operates in a similar way throughout the whole building. The air outside the building is drawn into the building and is either warmed or cooled by the building mass. Air is then distributed to all building floors by fans before escaping out via chimneys at the top.

The structure consists of two buildings which are built side by side and with an open atrium for natural airflow. Air is then drawn from this open atrium by fans on the first floor and pushed up through vertical ducts that are located in the central spine of each of the two buildings and pushed out of the building through chimneys at the top.

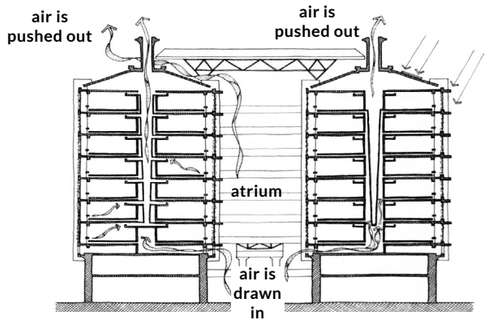


Figure 37: A section of the Eastgate complex showing the biomimicry of termite mounds (Pearce 1996: Adopted by Author, 2020)

Figure 38: Eastgate Complex, Harare, Zimbabwe (Biometic Architecture 2012)

3.2.2 REFLECTION

In my personal experience of the building, I can say his application of this biomimicry concept, was a success. The interior space is of Eastgate is quite cooler than other surrounding buildings in Harare. While the external appearance of the building presents a heavy mass, the choice of high thermal mass concrete blocks does help to regulate the interior temperature. The proposed Youth Centre is not far from the location of Eastgate as mentioned in the site information, Harare is about 30km away. It is a different typology, and concrete might not be the ideal material for the locals, the precedent gives great insight into how to approach the climate.

3.3 CONCEPT 1 : TERMITE MOUND BIO MIMICRY

Ideas : Nature, Biophilia, Climatic response

This is a biophilic inspired concept from termite mounds. The site was noted to have a number of termite mounds and their size provoked in-depth research as to how they function so that a biophilic, mimicry of the termite communities could be applied. At the inception of the design, the idea was to just adopt the passive ventilation mechanisms of the termite mound, but as time progressed an idea to look at the termites like a community of people with different contributions to their space of occupation (the mound) surfaced.

Both floor plan and section of the design inspiration are inspired by the sectional interpretation of the mound. The design is developed into a three-dimensional structure from the theoretical, technical, and practical application of both to create a habitable dwelling. The development then splits into two non-tangible components of the mound which are identified as “space” and “movement”. “Space” considers the tunnels as “void spaces” in the mounds where main activity paths branch out to secondary activities which are the different departments in the building.

The idea behind this is to use the pathways inside the mound and/building to be an orientation device for “movement” throughout the building to the metaphorical hierarchy space: “subterranean fungus”: which is identified on the site by the main attraction, the dam. The building, therefore, weaves through the trees to the dam, leaving room for “biophilic” encounters with the beautiful landscape on the way to the river. Buildable spaces are roughly identified among the trees and climatic response determine the orientation of the buildings for thermal comfort.

The termites use local debris which also informs the choice of using locally sourced materials. In the section of the building, a passive ventilation system is adopted, having low apertures that allow in the prevailing wind into the building and an exit chimney at the top of the structure with extraction fans to promote the stack effect. On the floor plan, the movement from the main tunnel becomes our access point into the building branching out to other subsidiary spaces along the way to the dam.

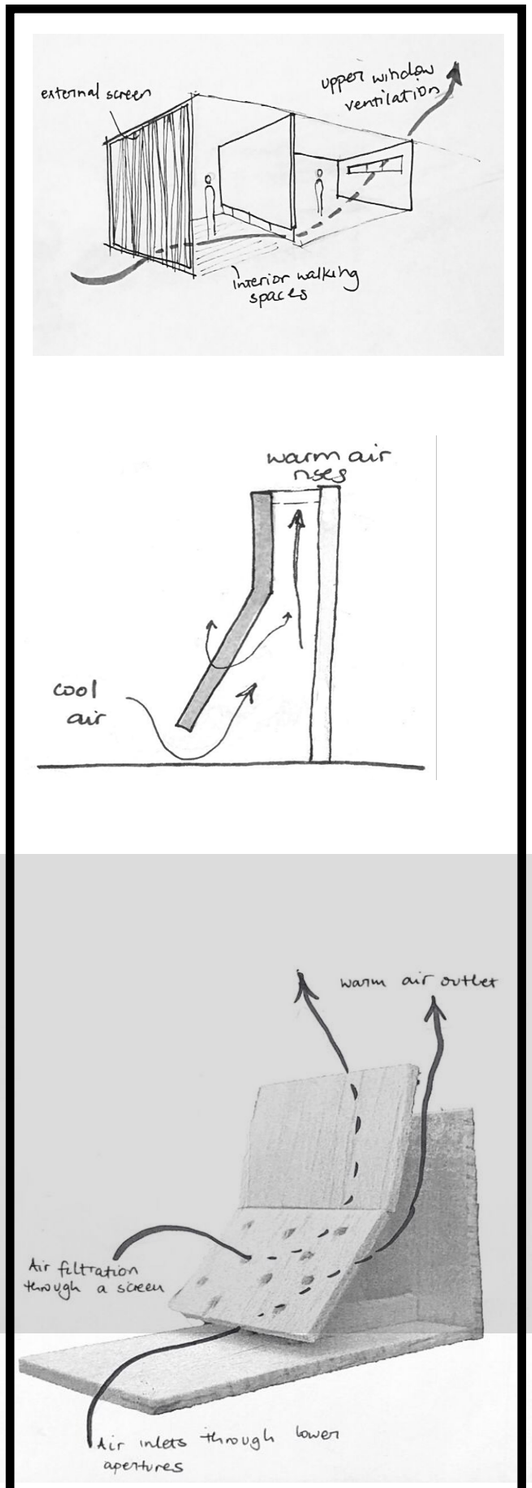


Figure 39: Sketches showing how the stack effect will be applied in the building.(Author, 2021)

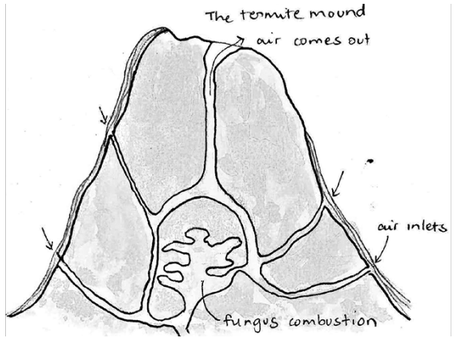


Figure 37: Section of termite mound.(Author 2021)

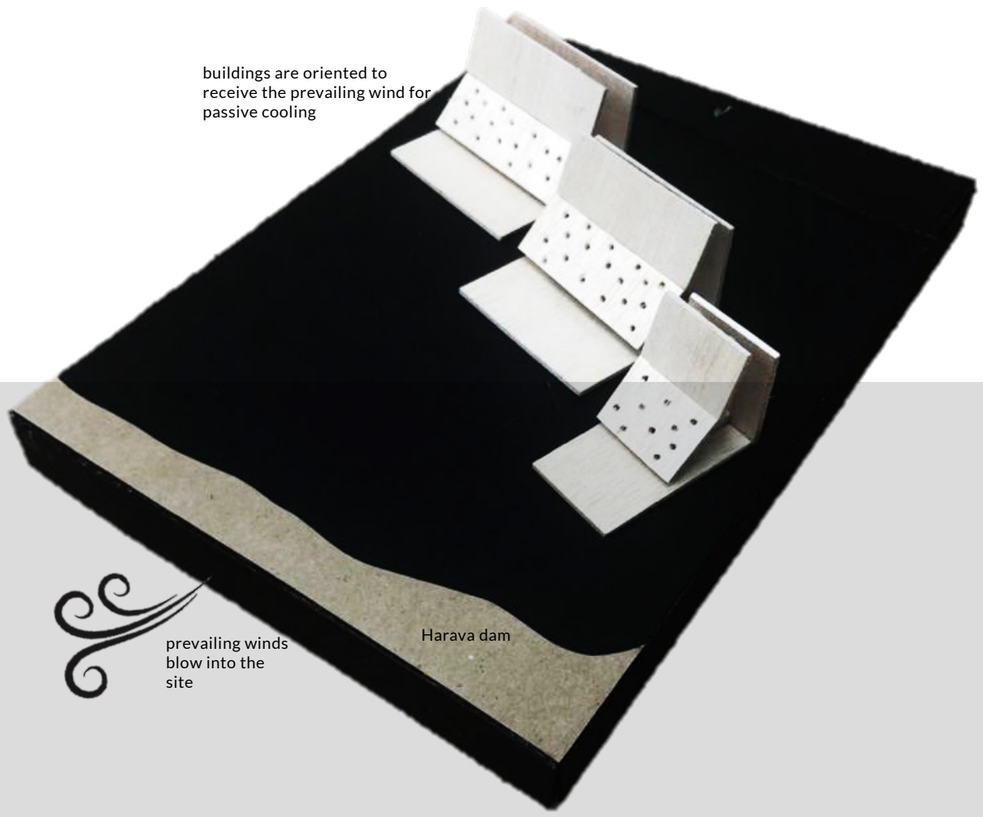


Figure 40: Biomimicry conceptual model showing the Harava Dam at the bottom and the proposal to have low apertures and chimneys for extraction of stale air from the interior spaces.(Author, 2021)

3.3.1 CONCEPT 2: THE ORIENTATION DEVICE

Ideas : Movement, Procession, Loci

The model shows a path of entry into the site using the program as an orientation device from access to exit. The building is a porous threshold that allows the filtering of weather elements and the breeze from the river to other spaces of in the building, the building is thereby a moderator of space. The orientation path is used as the direction to different activities by intentional design elements, features, and interplay of big space-small spaces. The interval use of vistas for drama and nature is part of the user's experience. There is in this proposal a definite direction of movement for the users.

Application to the project

The concept was not strong enough to establish a working design. It was rethought that even though a building must be able to direct people without question, it would have limited the user to have one path of movement from entry to exit this may not have achieved the social interaction that various paths managed to introduce. Nevertheless, the idea of using 'path'/s for orientation was integrated into the design in another way for the development of the final proposal.

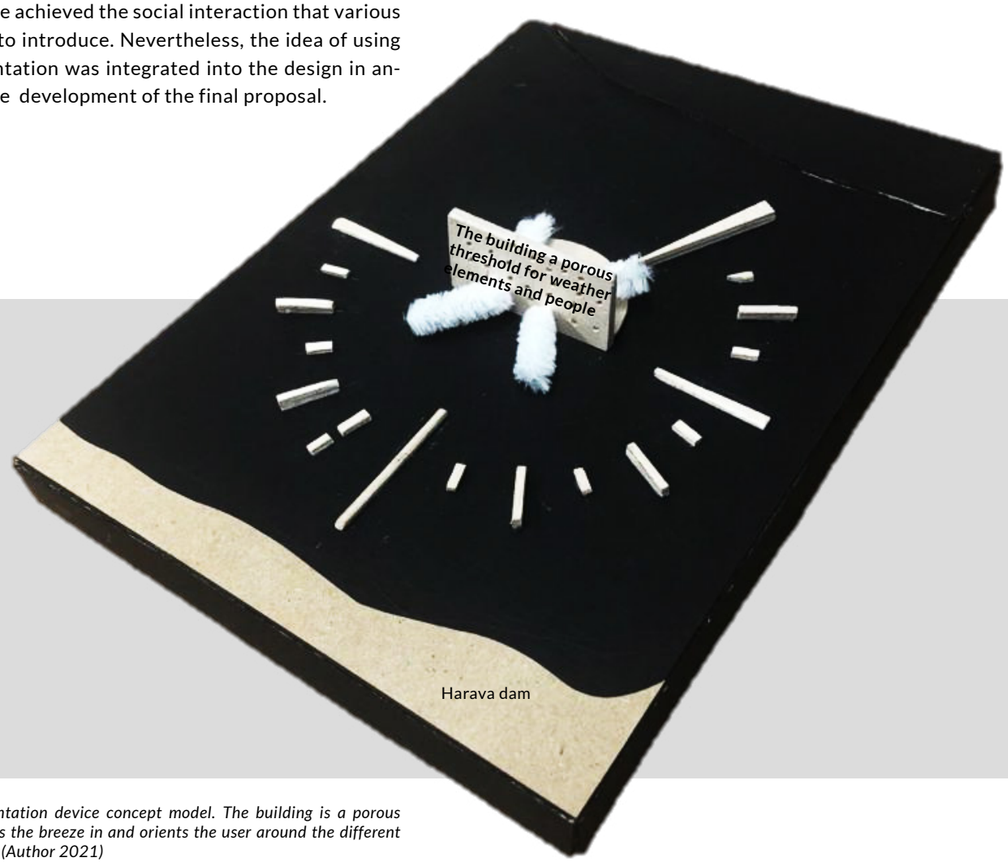


Figure 41: The orientation device concept model. The building is a porous threshold that allows the breeze in and orients the user around the different functions on the site.(Author 2021)

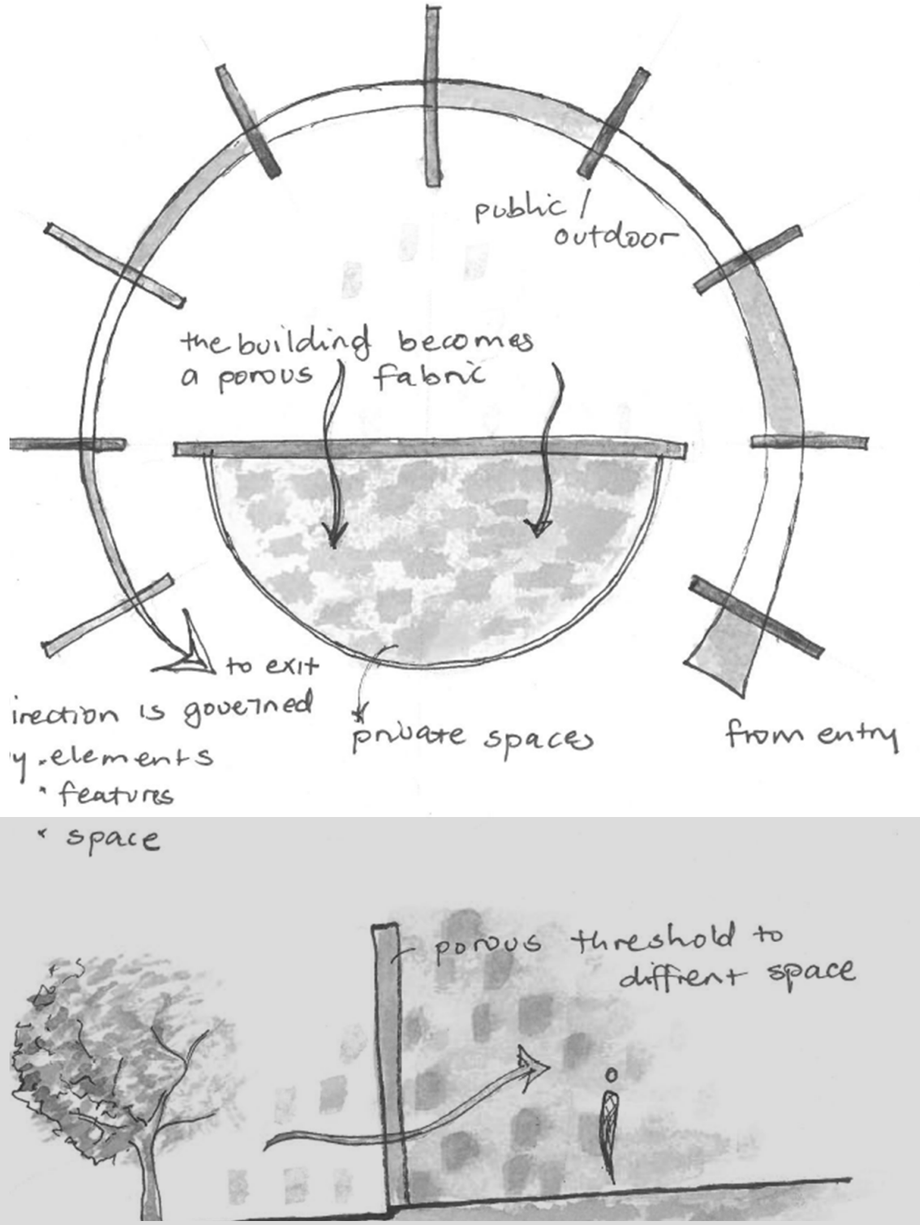


Figure 42: The orientation device coneptual interpretation in sketch.(Author 2021)

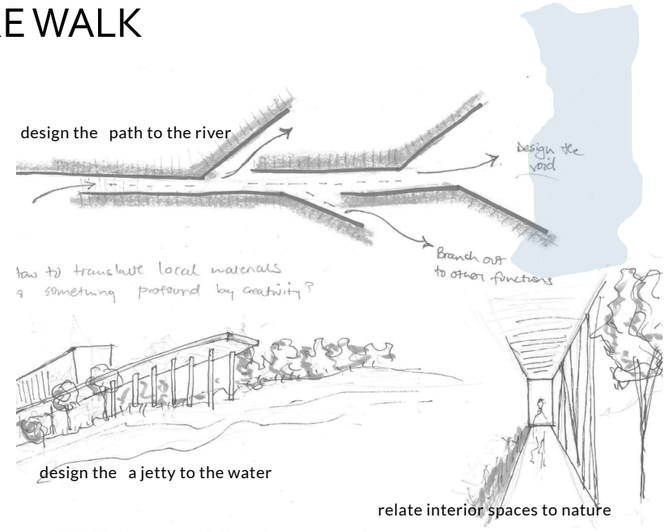
3.3.2 CONCEPT 2: THE NATURE WALK

I deas : Preservation,View, Natural scape

Designing in a forest landscape comes with its own sensitivity especially when dealing with indigenous trees. The idea seeks to maintain the naturalness of the site as well as offer as much dam view as possible fom any spot on the site. This concept seeks to preserve the site 'spirit' by introducing an architectural building that sits well into the natural environment. A design exploration was suggested, to identify open areas among the trees and circle them out for possible development. The building then creates a conversation with an interactive program relating to outdoor activities in order to experience the nature walk and the river.

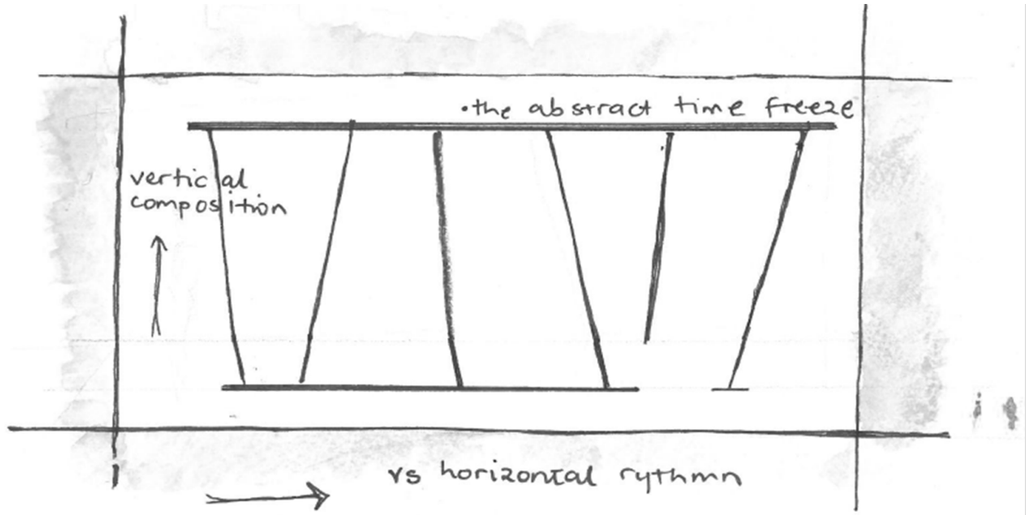
Application to the project

This concept introduces a way to develop a building in a forest-like environment without cutting many trees. Some of the merits of this concept include the deliberate attempt to relate the built environment to the landscape, this is one of the' biophilic' features that were adopted in developing the design



Harava dam:the verticality of the dam on model in this instance seeks to resemble how one should experience it from any part of the site through the trees

Figure 43: The nature walk concept showing trees interconnected by nodes of possible construction areas.Above the model are some sketch ideas to explain the ideas (Author 2021)



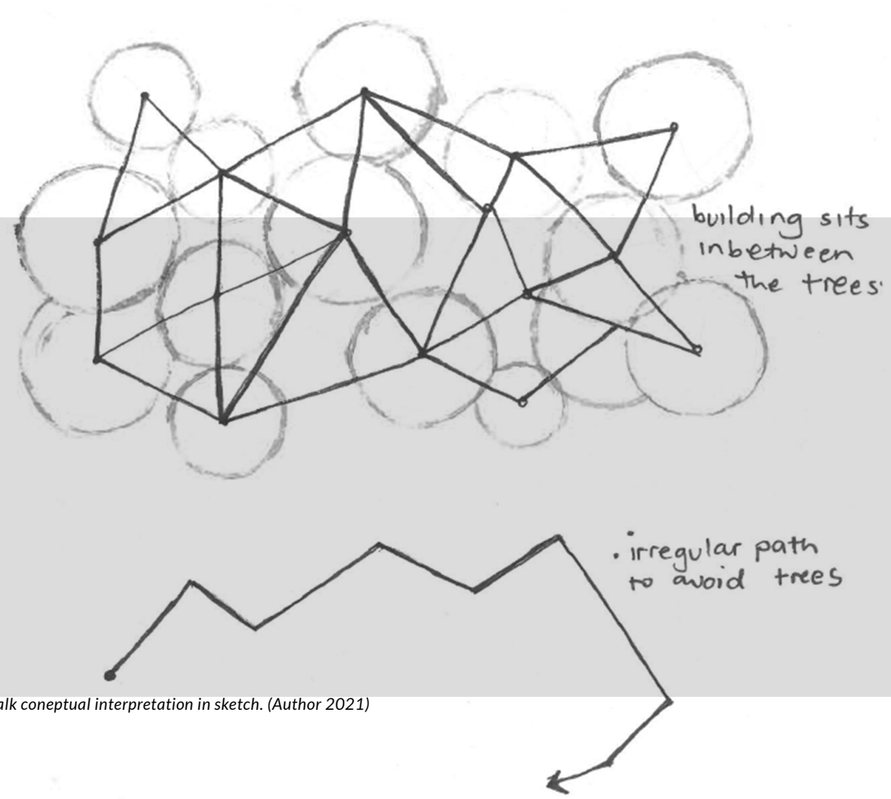


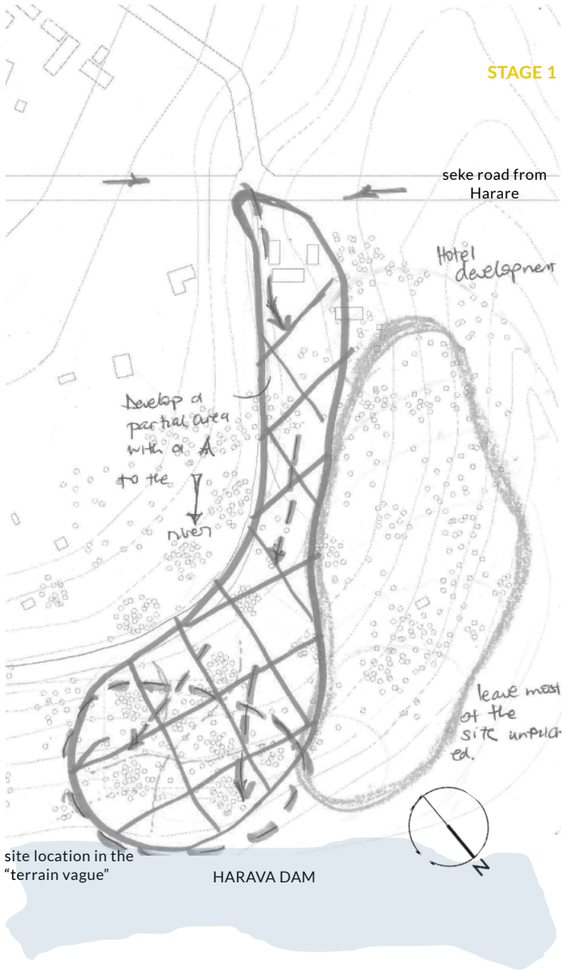
Figure 44: The nature walk coneptual interpretation in sketch. (Author 2021)

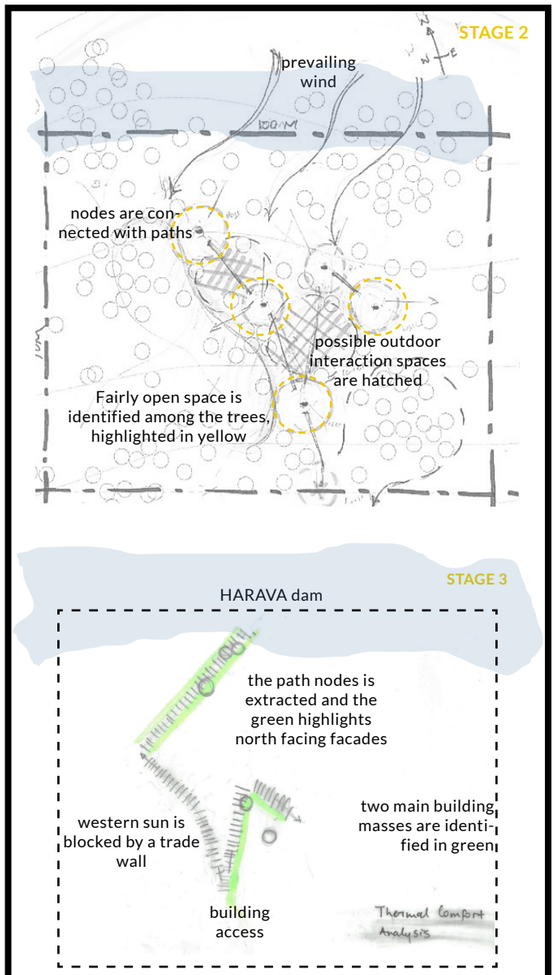
3.3.3 DESIGN DEVELOPMENT 1

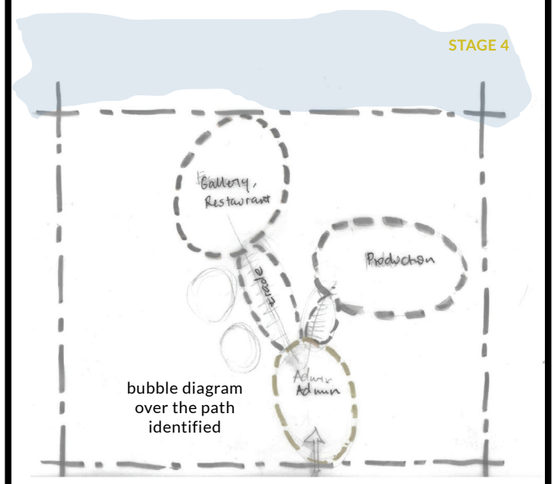
Design Development Background

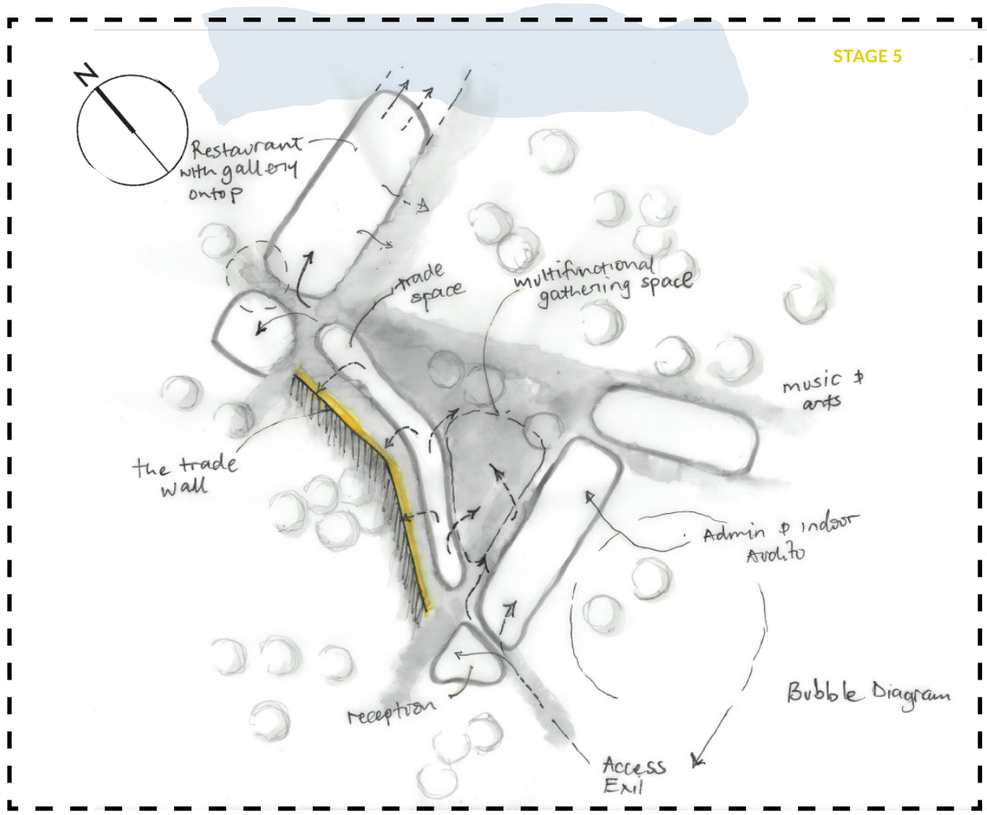
The concept develops onsite scanning the sparsely vegetated portions among trees. the design considers one major access from the open parking, randomly accessed under the trees. This is a mimicry of the major access tunnel into a termite mound, the idea behind this is to have one controlled access int the site. A pattern I traced through the trees and the principle of thermal comfort is considered focusing main building to a north facing orientation. The areas mostly affected by the western sun are considered transition zones with a solid wall to give shade on the trading spaces adjacent to it

In the termite mound the important space is at the end which is the fungus chamber, in the design there is a progression to the river. The concept behind this is to give a nature experience in and outside the building as you go to the river. As identified in the site information (page 9) , the youth come to this dam to enjoy the beautiful scenery. The design then celebrates this fact and intentionally design a path to the river without taking away the interaction of the people with the romantic landscape.









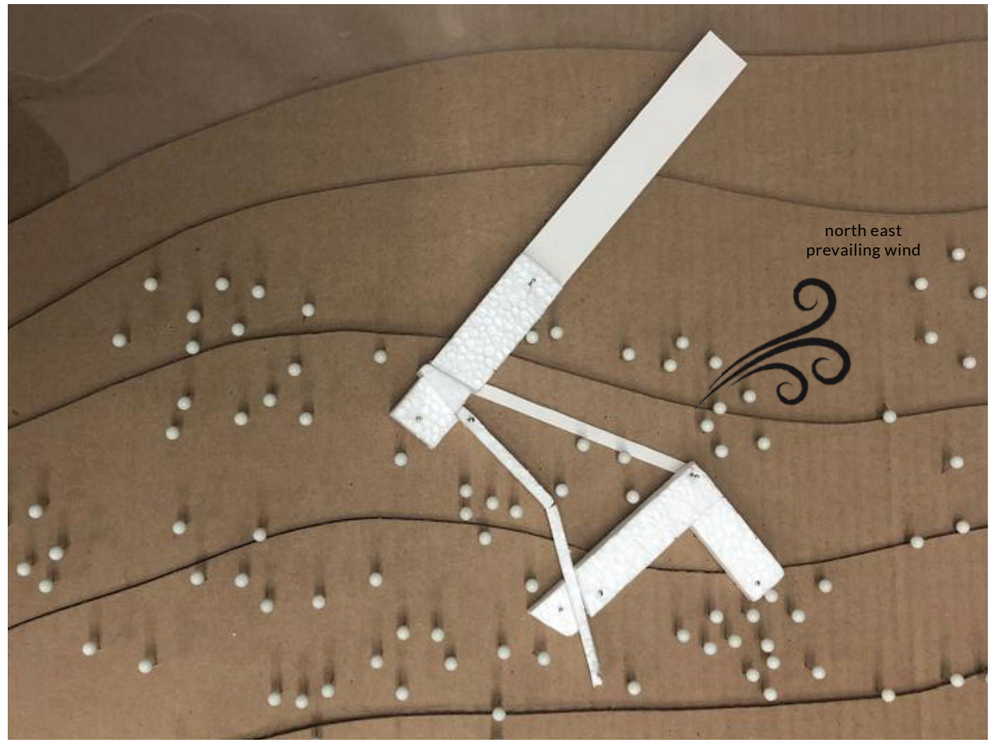
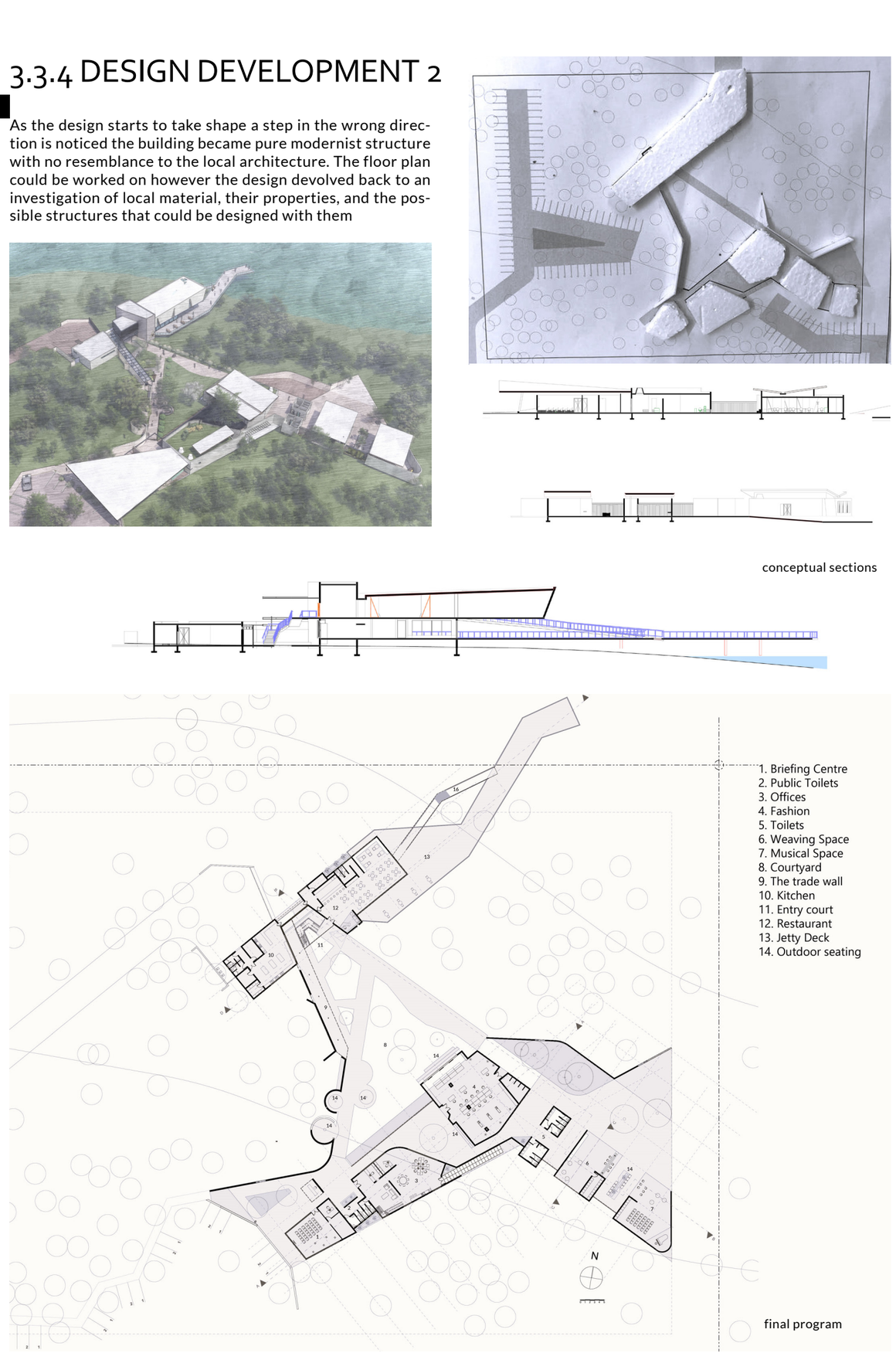


Figure 45: Sketches and models to show design development among the trees (Author, 2021)

3.3.4 DESIGN DEVELOPMENT 2

As the design starts to take shape a step in the wrong direction is noticed the building became pure modernist structure with no resemblance to the local architecture. The floor plan could be worked on however the design devolved back to an investigation of local material, their properties, and the possible structures that could be designed with them

conceptual sections



final program

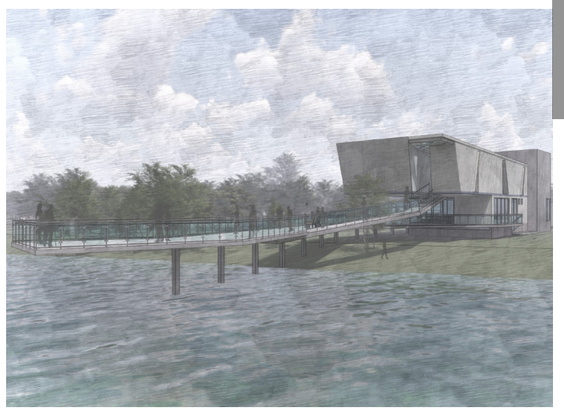
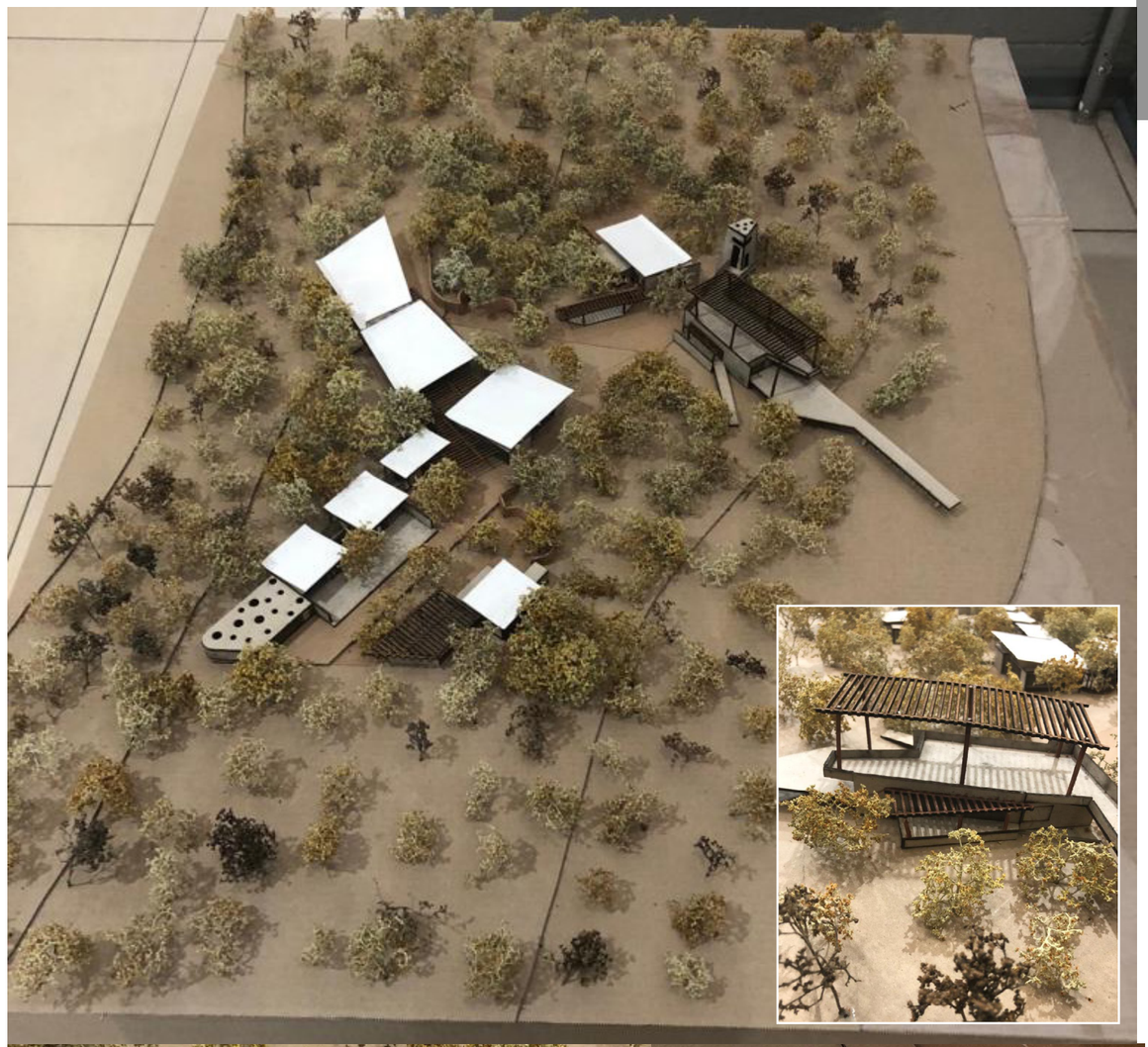
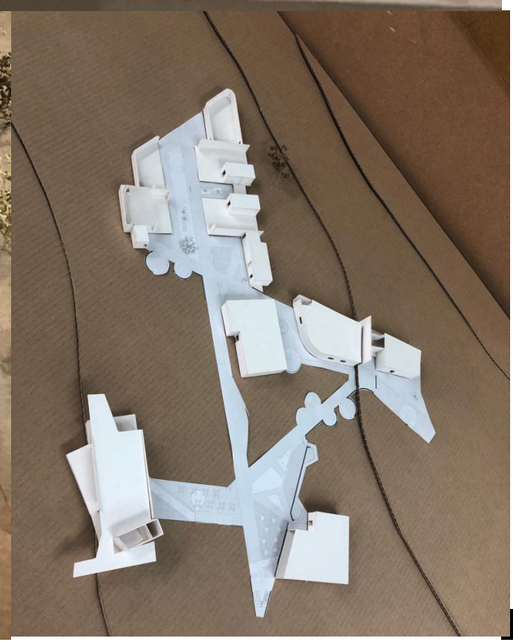


Figure 46: Preliminary renders of development stage 2 (Author, 2021)

3.4 FINAL MODEL





3.4.1 LOCATION PLAN

Figure 47: Veiwing deck behind the restaurant, tappered monoloyhic tower. (Author, 2021)

3.4.2 SITE PLAN, RENDERS

Passive cooling systems are incorporated to avoid mechanical cooling and achieve thermal comfort. The design responds to the prevailing climate having strategic low lying breeze blocks, these filter the air into the building. To avoid insects and creeping animals a mesh is inserted between the brick course leaving the interior to a dramatic light pattern and fresh air. From the study of thermal comfort, a north facing orientation is adopted on the main buildings, offering the other spaces with large roof overhangs to shade from direct sun. Just like the tunnels in a termite mound the building design leads the people to the river down the slope offering a nature experience along the way through the among the tree's placement of the building. The design maintains communication between itself the people and the romantic landscape that it is located.

Figure 48: Collage of the interior spaces and the arial view of the restaurant Building (Author, 2021)

3.4.3FLOOR LAYOUT ,RENDERS

Figure 49: Approach from the open parking lot (Author, 2021)

Turning left from information center there is a trade wall, just like in the Great Zimbabwe trade spaces were put along the travelling routes from one settlement to another. From a climatic response, the wall screens the western sun and offers a cool space that the youth can use to display their craft for selling. Along the way to the restaurant, there is an open-air stage, this doubles as a selling space on specific days where the crafts are exhibited. Behind the stage are partially closed changing spaces and toilets that are used by the public in this space. Spreading into the immediate view of the stage is the restaurants serving space. The restaurant serves the people from a hotel school which is one of the local culinary improvement classes, the restaurant is slightly lift from the ground to avoid moisture from the ground and a timber deck extends into the water giving a more intimate experience with the natural environment as people walk into the jetty .

Turning right from the information center is the production zone. An open plan office helps the employees to run the facility in different departments and a timber shaded pergola directs you to the indoor-outdoor workshop area further into the site. Cladded earth pathways connect the different spaces onsite bringing the floor layout to a triangular precision that celebrates each corner with an important function. A double roof system is adopted. The termite mounds onsite do have a working system for weather resistance however the trees on top of the mound also act a shade to protect the mound below.

Figure 50: Basketry Workshop with seating spaces and reed ceiling from the locals. (Author, 2021)

KEY

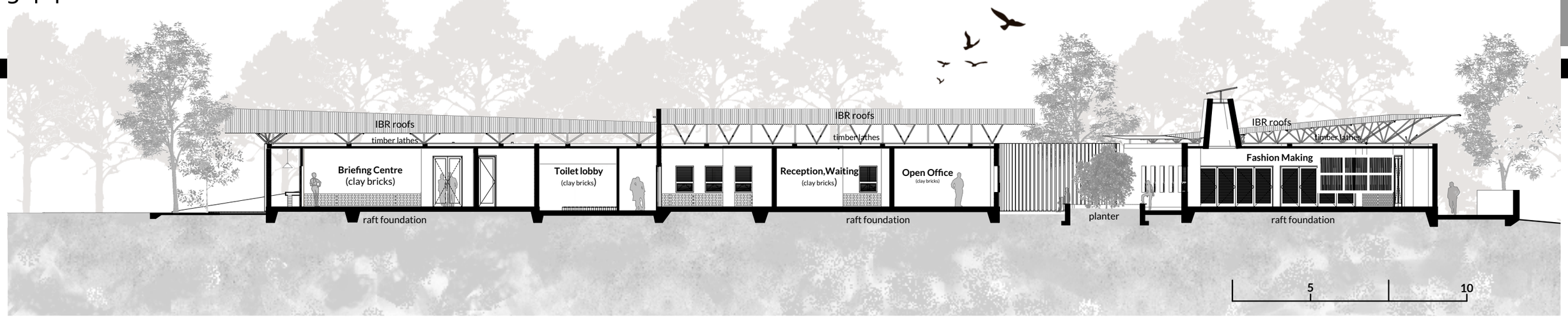
1. BRIEFING CENTRE
2. ABLUTIONS
3. OFFICES
4. FASHION MAKING
5. BASKETRY
6. MUSIC
7. INDOOR HALL
8. CRAFT MAKING
9. TYE & DYE
10. OUTDOOR STAGE
11. OUTDOOR RESTAURANT
12. RESTAURANT
13. KITCHEN
14. SERVICE YARD
15. JETTY

N

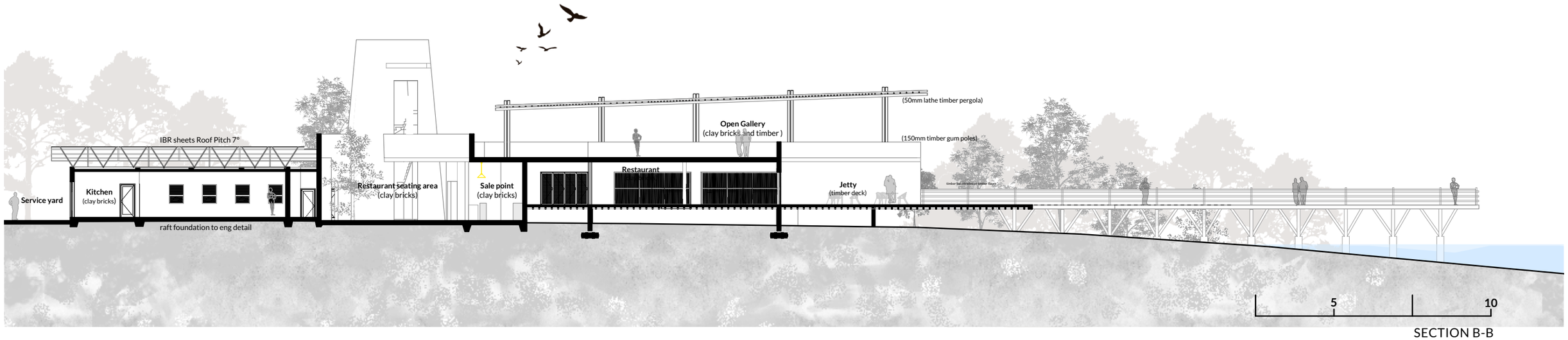
5 10

FLOOR LAYOUT

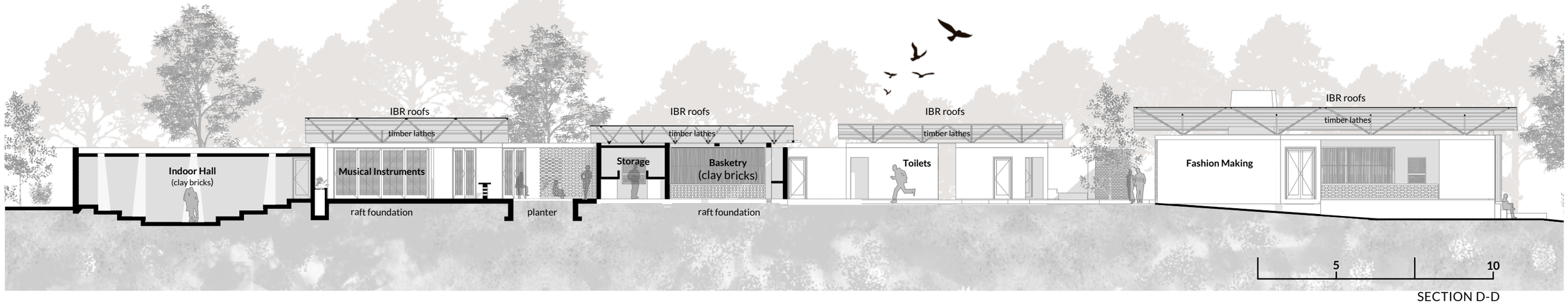
3.4.4 SECTIONS



SECTION A-A



SECTION B-B



SECTION D-D

3.4.5 RENDERS

Figure 51: Celebrating the Zimbabwean Vernacular Architecture (Author, 2021)

Figure 52: An approach elevation of the restaurant (Author, 2021)

3.4.6 INDOOR OUTDOOR SPACES

Figure 54: Interior space renders showing the locally weaved ceiling mats, the timber regulated openings and the breeze block walls at the bottom (Author, 2021).

Figure 55: Outdoor small group gathering and learning spaces (Author, 2021).

Figure 56: Interactive outdoor space showing the crafts workshop and green courtyard (Author, 2021).

Figure 57: Outdoor gallery space ontop of restaurant side, showing the outdoor "goch-goch' on the bottom left (Author, 2021).

Figure 58: The back Elevation of the restaurant showiang the braai area and the multifunctional veiwing terace on the first floor (Author, 2021).

Figure 59: A typical workshop facade,external rammed floor cladded with stone finish (Author, 2021).

Figure 59a: A typical workshop facade,external rammed floor cladded with stone finish (Author, 2021).

part 04 : Technical Report

Author's painting collection of illustrations of "The Youth Today", it captures a series of the tragic life that young people find themselses in the declining economy of Zimbabwe (Mangwiro, 2017)

4.1 TECHNICAL REPORT

Conceptual Structural Development of project

INTRODUCTION

The project seeks to identify creative skills in the community and provide a place where they can be perfected and exhibited in order to get income. One in five youths in Chitungwiza are gainfully employed or occupied positively, this has left most young people to drugs, crime and committing suicide. Looking on the brighter side, these young people have so much talent, the youth culture harbors musical talent, fashion design, art, craft and culinary potential.

This project is thereby a platform to exhibit the local culture, it intends to offer an alternative way to get income other than the formal educational and employment sector. Other outcomes that the design program seeks to bring out is a place where the youth can experience identification, purpose and belongingness by interaction and exchange of ideas in the different crafts they will be participating in. The research questions what extent to which architectural design can be

CLIMATE

According the World Climate guide (2020), there are three main seasons a rainy season which is hot and humid from mid-November to mid-March. This is followed by a period when the rains become rare but the temperatures are still high, from mid-March to mid-May. The second is a cool season dry and sunny from mid-May to mid-August. The last season is a period of intense heat at the end of the dry season, between mid-August and mid-November before the rains in the month of November.

The rains lower the temperature a bit while increasing relative humidity. This climate produces a savannah landscape. Rainfall is an average of 840mm of a year which is 150 mm more than fall from December to February. The sun regularly shines in the dry period, while in the rainy season, the sun alternates with the clouds. The prevailing wind is North East and it blows onto the site with a cool breeze from the water.

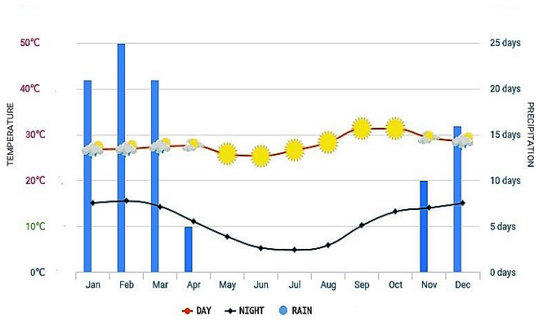


Figure 60: Climatic Data, Online

STRUCTURAL TOUCHSTONE DEVELOPMENT

The design is inspired by the termite mounds on the site, the structural touchstone is a reflection of the essence of the structural system used in the building. The model takes a bio mimicry approach, translating the passive cooling system of the mound into a functional architectural concept. An active mound allows in air from the bottom of the mound to the top of the tunnel through smaller inlets that are controlled by the termites. The mound walls are thereby porous thresholds that regulate the movement of cool air to push the stale air up from the mound.

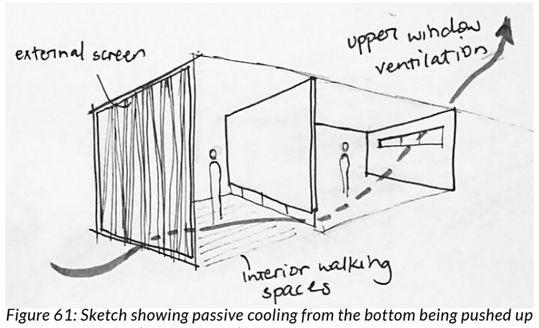


Figure 61: Sketch showing passive cooling from the bottom being pushed up to exits at the top. (Author, 2021)

Likewise, the building incorporates lower apertures that have extraction towers on concrete roofs to allow the rising of warm air as it is pushed by strategic placement of the cold air apertures at the bottom. Screens were used to transition from outside spaces and to lower the wind speed as it blows from the river adjacent. In order to protect the building from possible floods, a timber deck on stilts will be adopted stretching over the jetty. This is an old construction method adopted from the Binga area in Zimbabwe which is highly susceptible to floods. Local skills on vernacular architecture are taken into consideration as image of the local culture and identity through locally sourced materials.

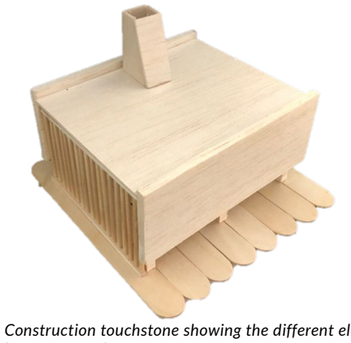


Figure 62: Construction touchstone showing the different elements of construction, (Author, 2021)

The building fabric is mainly stabilized clay bricks, accents of concrete have been also adopted for its load bearing qualities. This can be seen in the double story section of the design. In an interview with Francis Kere (2021) on Gando Primary design, he mentions that the general concept is to give a very protective shoe structure which is the basement. This should be high enough to avoid water from reaching the fragile clay walls, at the end you then put a protective roof so that rain doesn't affect the walls for a long time. This lengthens the life of the clay bricks even without putting cement.

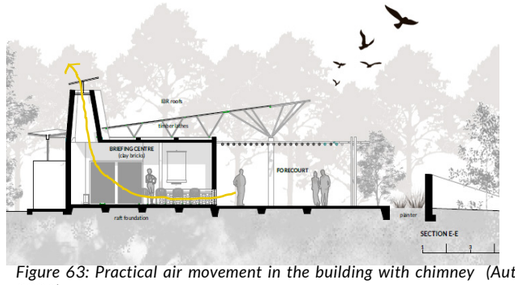


Figure 63: Practical air movement in the building with chimney (Author, 2021)

Figure 64: Concrete accent on the building to span over the wide slabs (Author 2021)

4.2 STRUCTURE AND MATERIALS

STRUCTURE

The structure of the building is a combination of loadbearing and framed construction systems. The site is higher on the southern part, where the parking area is and it slopes down from there to the river. On the reception area which is the immediate approach from the parking, the structure mainly constitutes of load bearing walls. The concept is to have a beam structure on top of the walls to hold the truss system above. The sketch below shows this relationship.

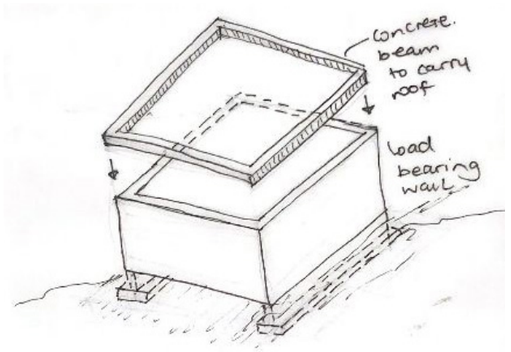


Figure 65: Sketch of load bearing walls and ring beam structure (Author 2021)

Moving further into the northern part of the site where the double story structure is there is an introduction of a framed construction system. Columns are placed at at 6m intervals within the walls and they help to carry the concrete slab on top. The span of the first-floor slab and the timber open pergola informed this decision in preference with continuing with the stabilized earth foundation used everywhere else. Below we see a sketch of how this system works.

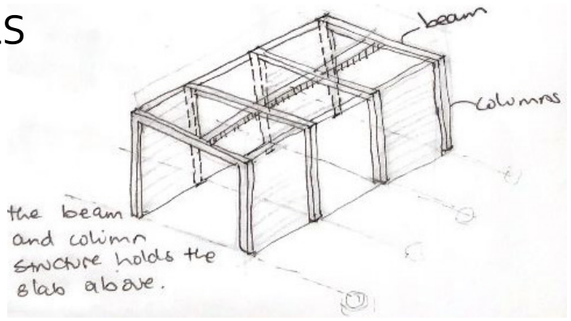


Figure 66: Framed construction system sketch (Author, 2021)

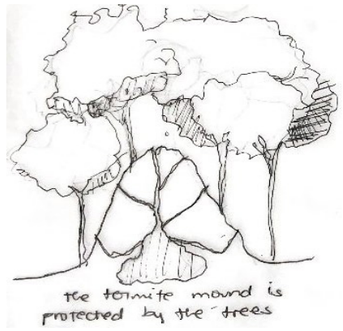


Figure 67: Sketch of a tree canopy on termite mounds protecting the washing away by rain (Author 2021).

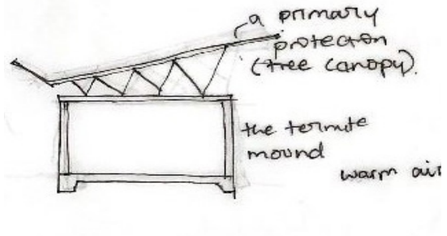


Figure 68: Sketch of the building structure showing a double roof system that mimics the tree canopy with large overhangs to protect the clay walls (Author 2021).

MATERIALITY STUDY

Materials are locally sourced and used in response to the climate. Oven baked clay bricks are the common construction method in the vernacular architecture in Zimbabwe, they are hand compacted by a manual brick machine, burnt in an oven and laid to dry for about 10 days after this process. Structures made of this clay if protected by a roof and plastered can last for more than 20years. To add stability the clay bricks are then stabilized with 25% concrete to increase strength.

Figure 69: Stabilised clay bricks stacked to dry (Author 2021)

The local gum poles are used as the secondary apart from the clay bricks on the superstructure. Musasa and Munondo trees are fast growing trees in the local area. In construction of the normal round huts these trees are used for trusses. Likewise, the screens around the building are used of this material. It filters the wind from the river and allows secondary gathering spaces outside the building.

Figure 70: Structural elements and composition of building architecture (Author 2021)

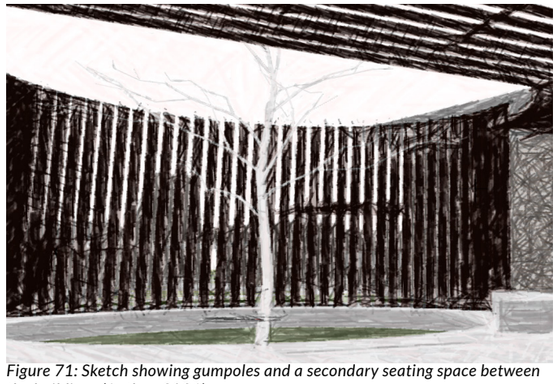
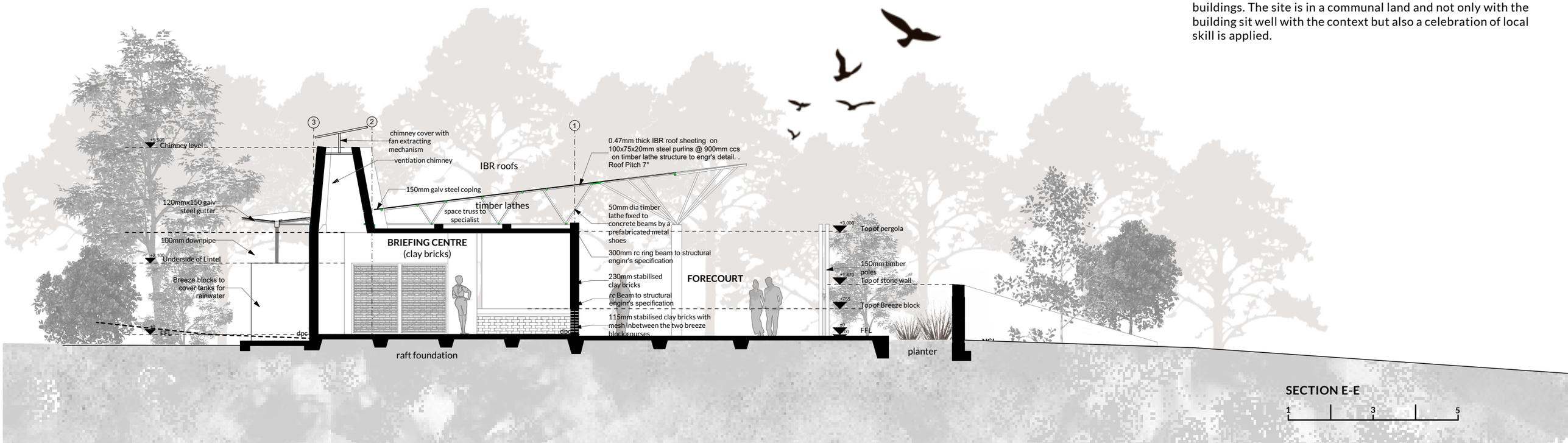
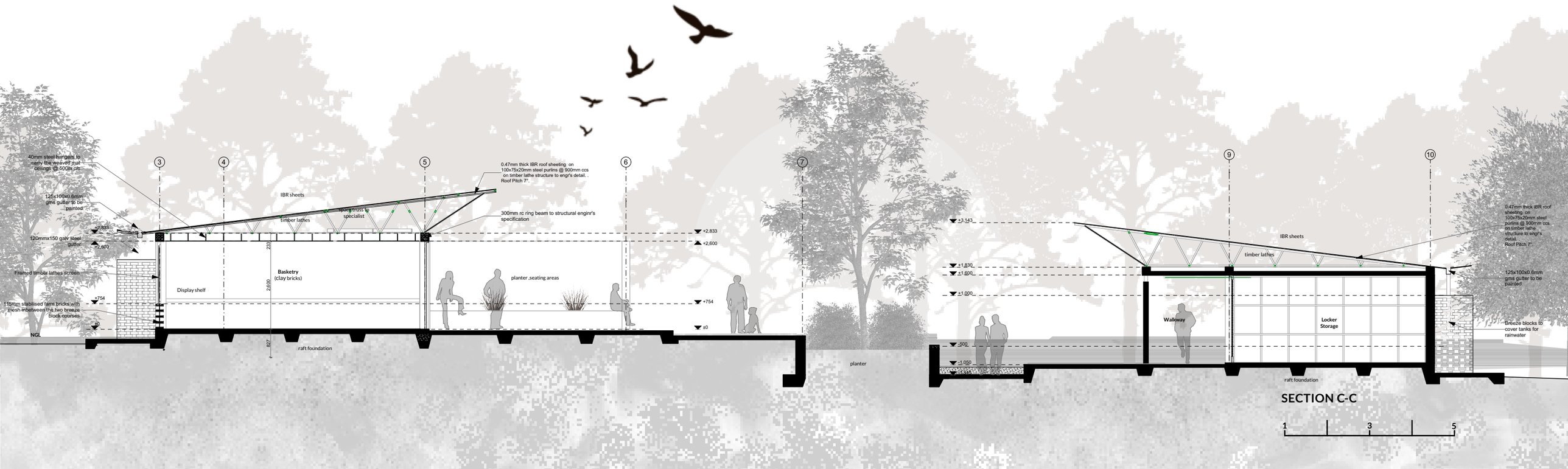


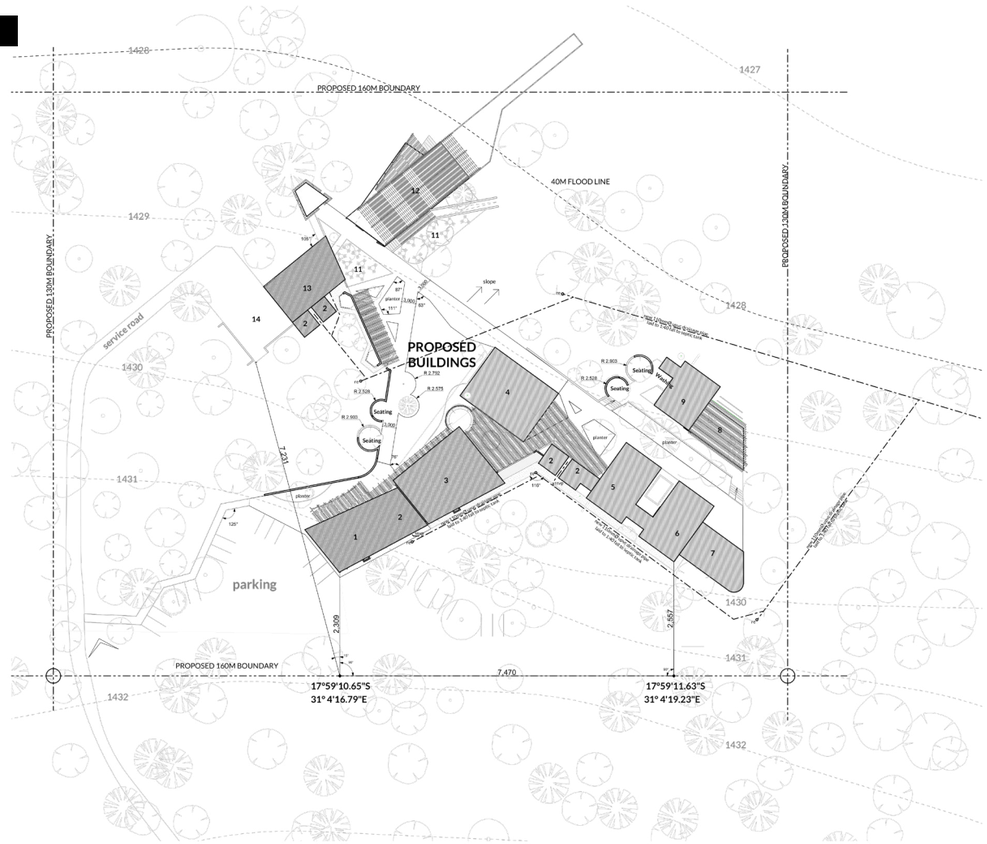
Figure 71: Sketch showing gumpoles and a secondary seating space between the buildings (Author, 2021)

CONSTRUCTION METHODS

The foundation lies on rafted stabilized earth foundation. This involves shallow digging into the top soil and layering of a mixture of earth and concrete consistency. The foundations are then lifted from the ground with 300mm to create a pedestal in which the stabilized clay bricks can be laid. The method is popular among the people as reflected in most communal buildings. The site is in a communal land and not only with the building sit well with the context but also a celebration of local skill is applied.

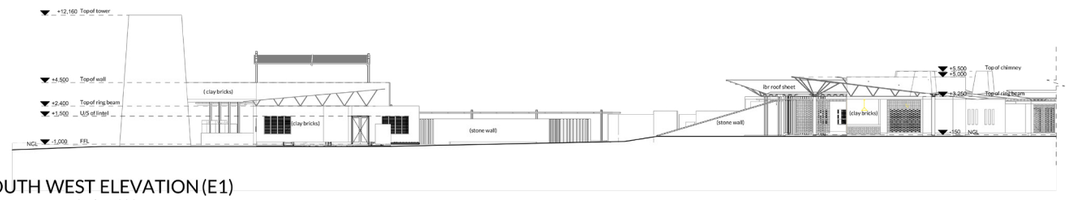



40mm steel hangers to carry the weaved mat ceilings @ 500m cts
125x100x0.6mm gms gutter to be painted
120mmx150 galv steel gutter
Framed timber lathes screen
115mm stabilised farm bricks with mesh inbetween the two breeze block courses
NGL
IBR sheets
timber lathes
space truss to specialist
0.47mm thick IBR roof sheeting on 100x75x20mm steel purlins @ 900mm ccs on timber lathe structure to engr's detail . Roof Pitch 7°.
300mm rc ring beam to structural enginr's specification
Basketry (clay bricks)
Display shelf
planter ,seating areas
raft foundation
planter
+2,833
+2,600
+754
±0
2,600
233
827
3
4
5
6
7
9
10
±3,143
±1,830
±1,600
±1,000
-500
-1,050
-1,315
Walkway
Locker Storage
0.47mm thick IBR roof sheeting on 100x75x20mm steel purlins @ 900mm ccs on timber lathe structure to engr's detail . Roof Pitch 7°.
125x100x0.6mm gms gutter to be painted
Breeze blocks to cover tanks for rainwater
SECTION C-C
1
3
5



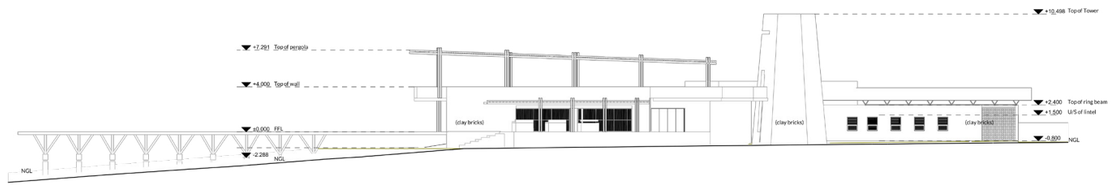
1. BRIEFING CENTRE
2. ABLUTIONS
3. OFFICES
4. FASHION MAKING
5. BASKETRY
6. MUSIC
7. INDOOR HALL
8. CRAFT MAKING
9. TYE & DYE
10. OUTDOOR STAGE
11. OUTDOOR RESTAURANT
12. RESTAURANT
13. KITCHEN
14. SERVICE YARD
15. JETTY
16. TOWER

SITE PLAN
Scale 1:500

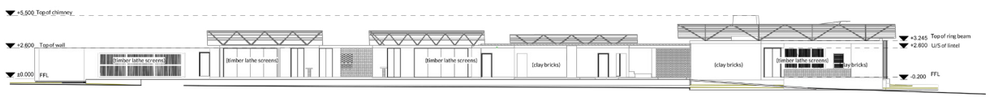


SOUTH WEST ELEVATION (E1)
Scale 1:200

SOUTH WEST ELEVATION (E1)
Scale 1:200



NORTH ELEVATION
Scale 1:200



NORTH ELEVATION ELEVATION
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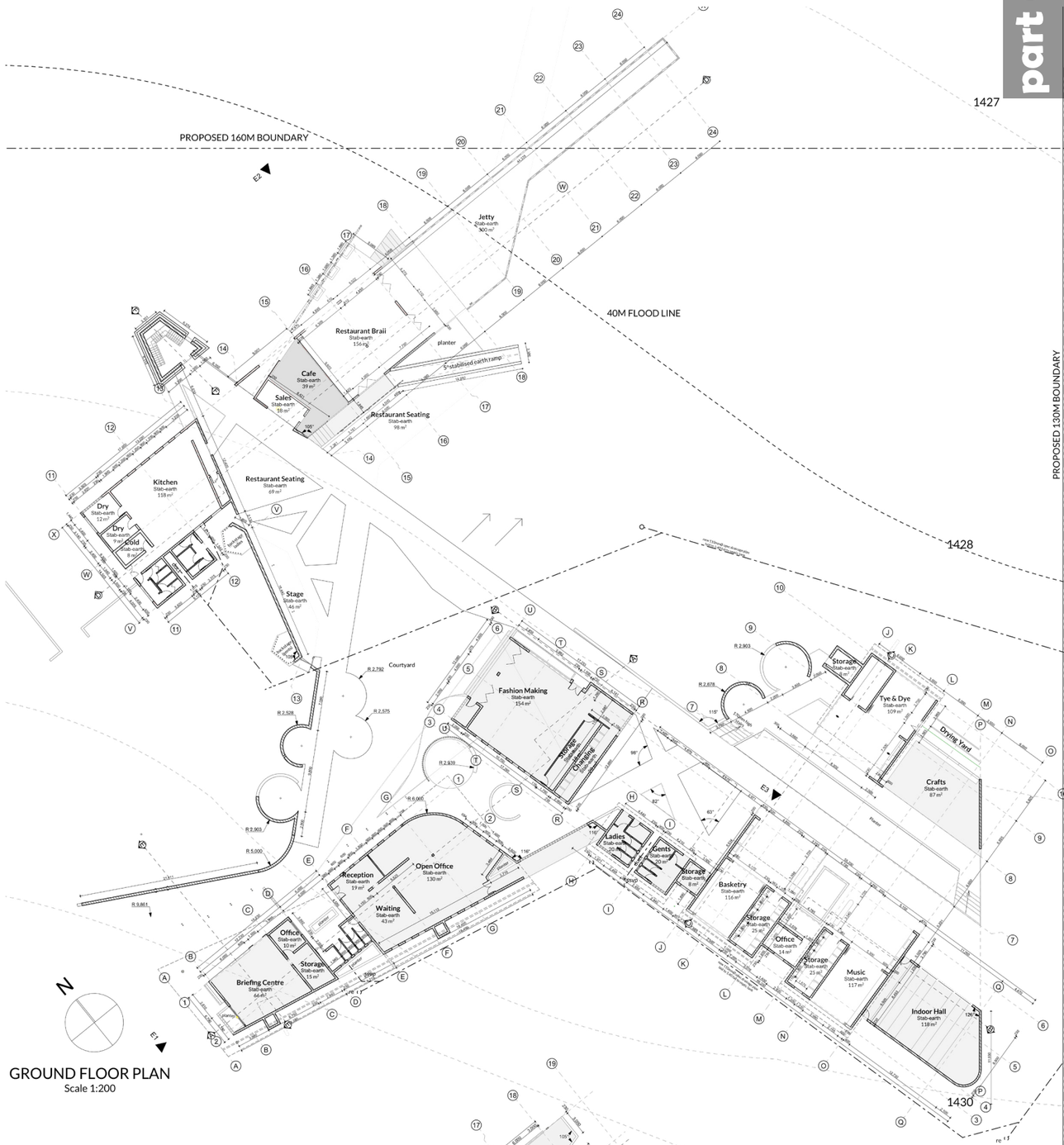
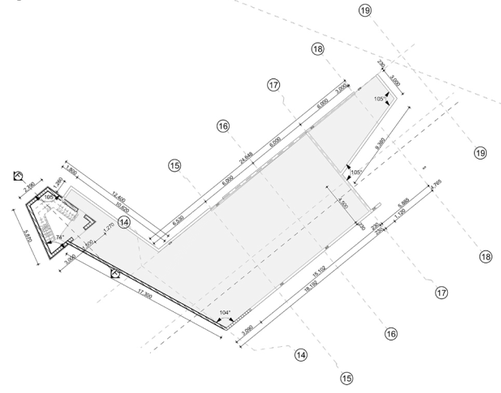
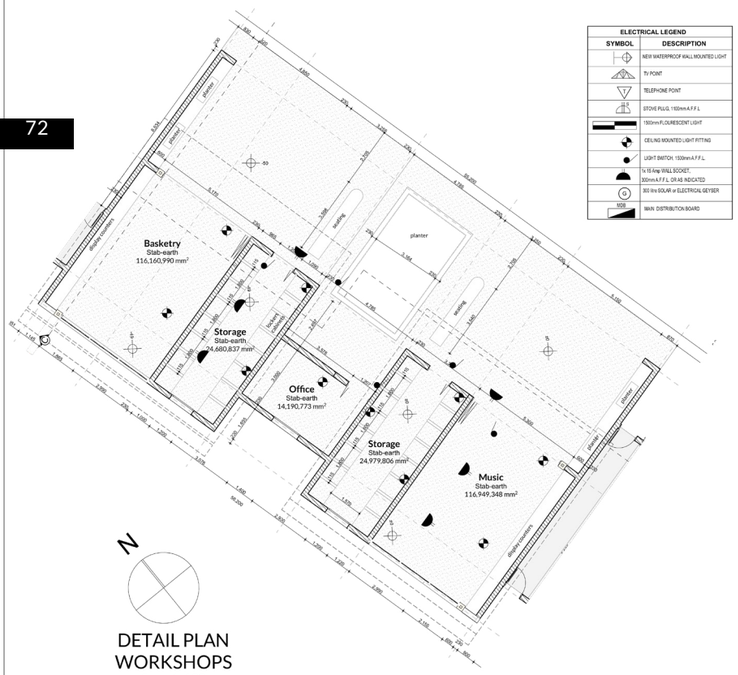


GROUND FLOOR PLAN
Scale 1:200



FIRST FLOOR PLAN
Scale 1:200

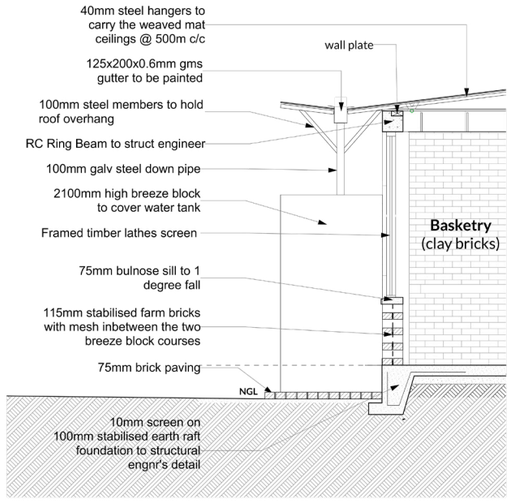
NOT TO SCALE



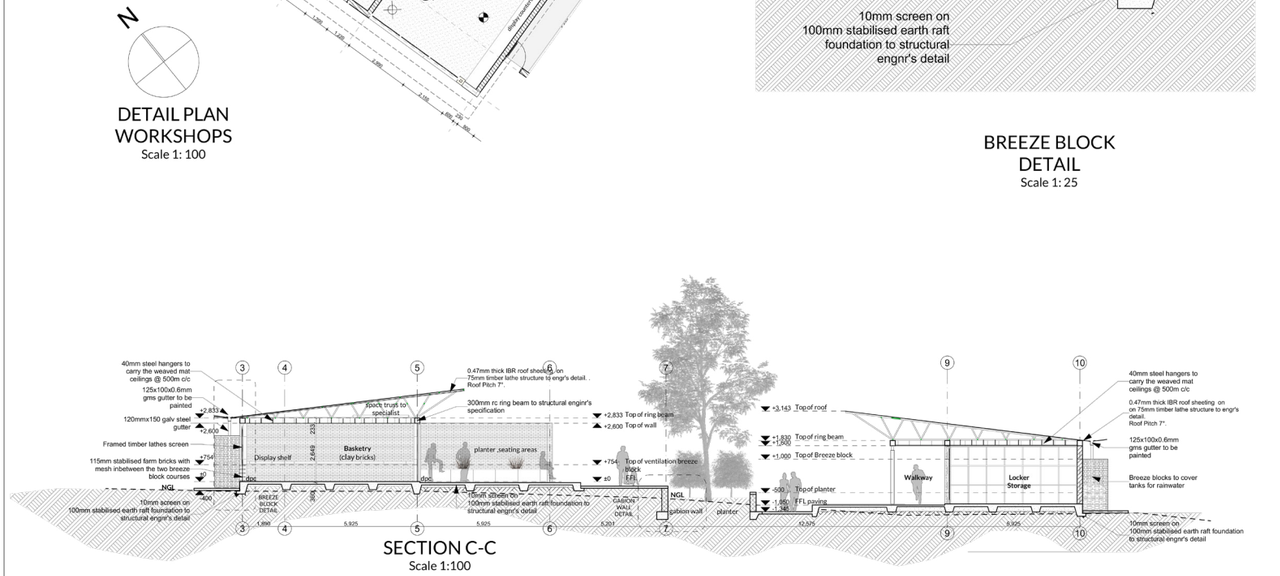
DETAIL PLAN
WORKSHOPS
Scale 1: 100

ELECTRICAL LEGEND

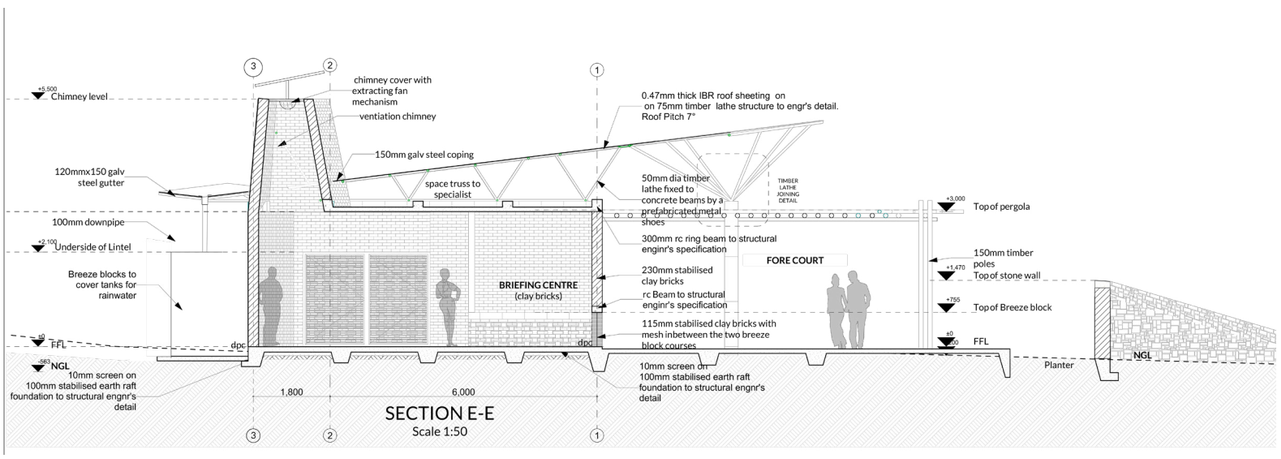
SYMBOL	DESCRIPTION
	NEW WATERPROOF WALL MOUNTED LIGHT
	TV POINT
	TELEPHONE POINT
	STOVE PLUG, 1100mm A.F.F.L
	1500mm FL.OURESCENT LIGHT
	CEILING MOUNTED LIGHT FITTING
	LIGHT SWITCH, 1350mm A.F.F.L
	1x 16 Amp WALL SOCKET, 300mm A.F.F.L, OR AS INDICATED
	800 litre SOLAR or ELECTRICAL GEYSER
MDB	MAIN DISTRIBUTION BOARD



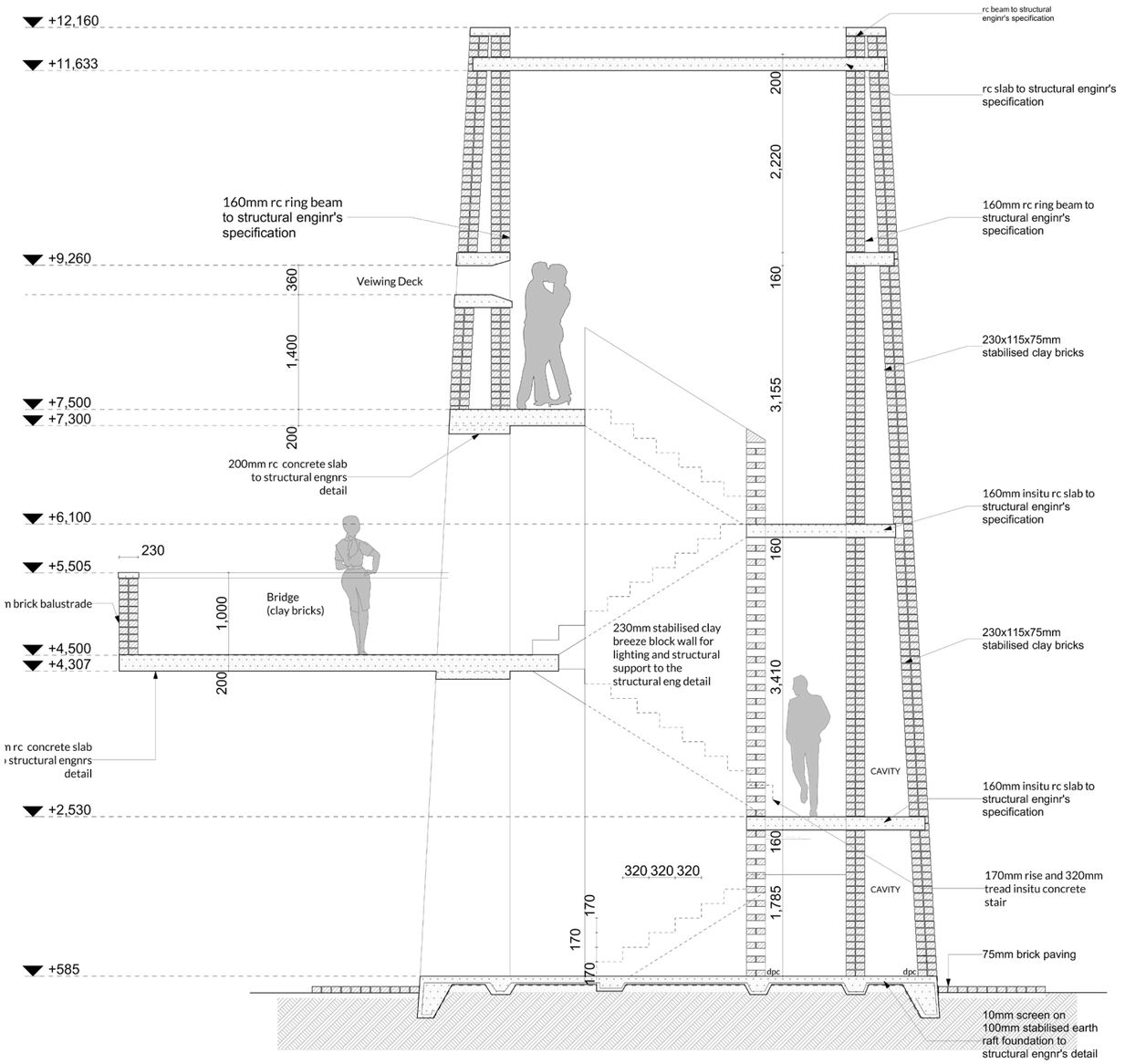
BREEZE BLOCK
DETAIL
Scale 1: 25



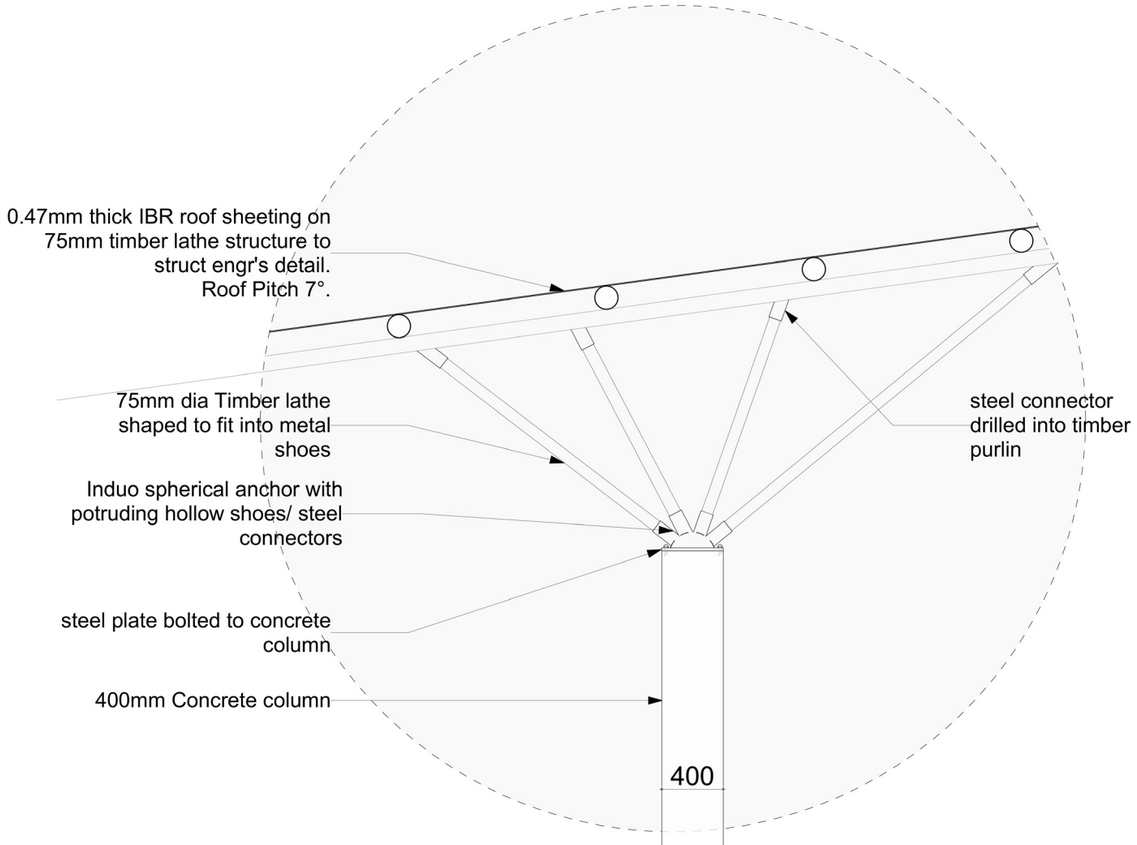
SECTION C-C
Scale 1:100



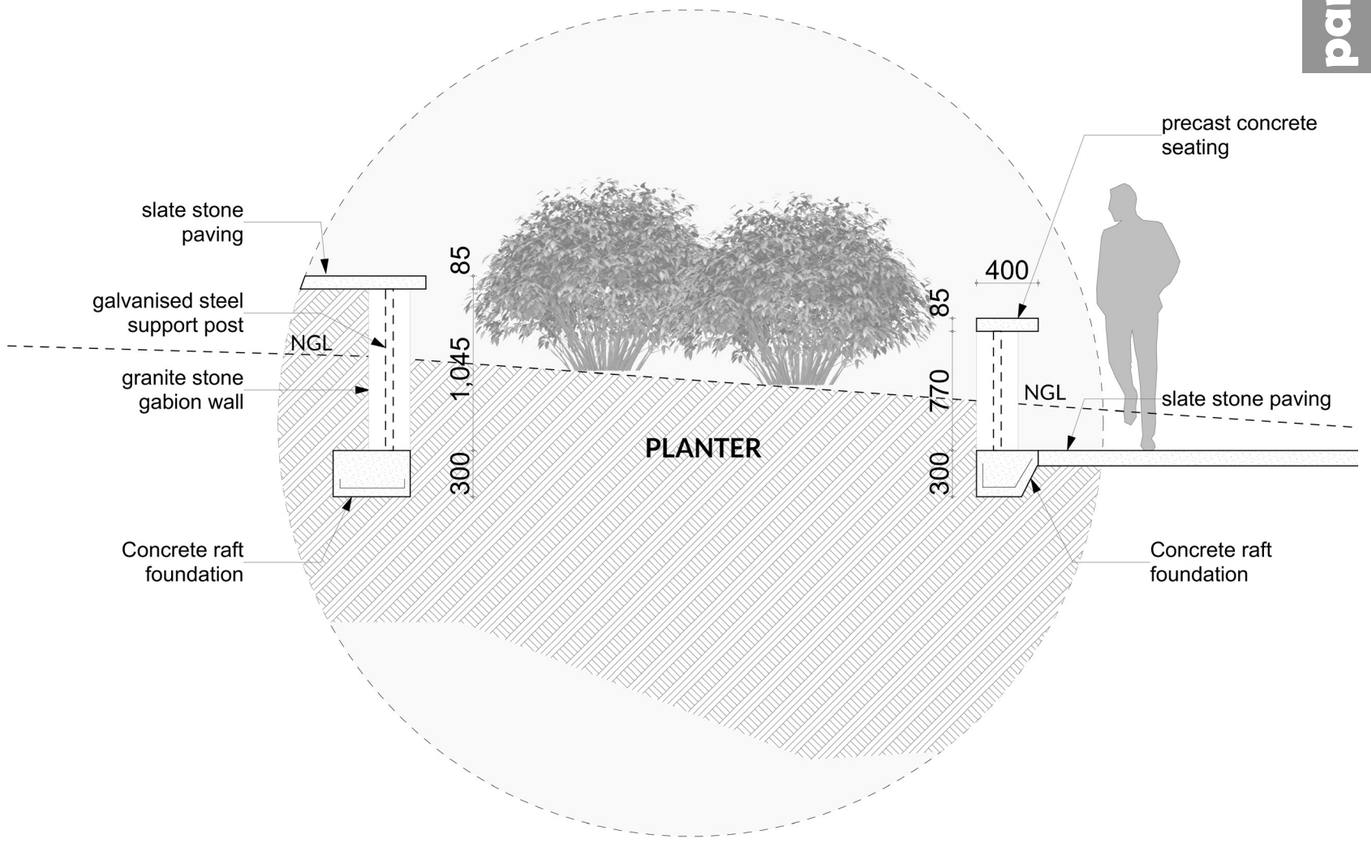
SECTION E-E
Scale 1:50



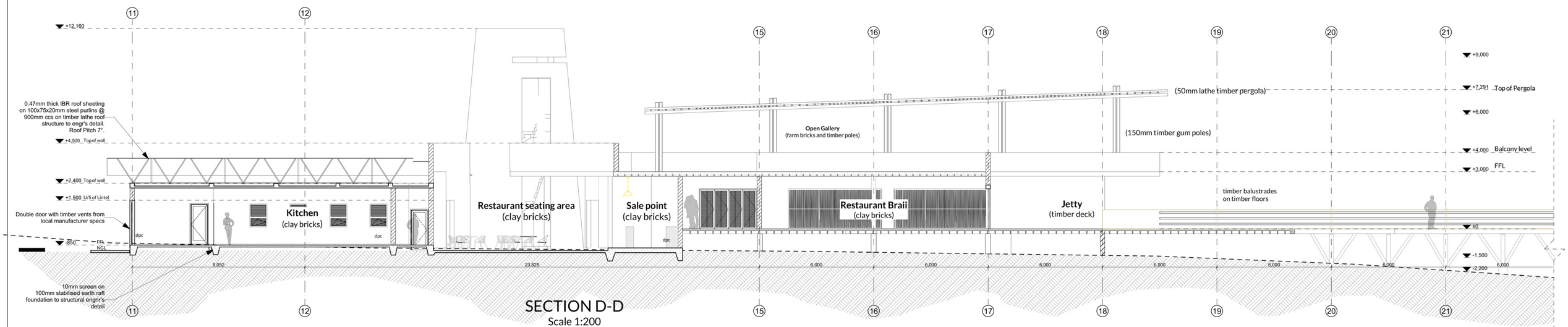
NOT TO SCALE



TIMBER LATHE JOINING DETAIL
Scale 1:20



GABION WALL DETAIL
Scale 1:20



SECTION D-D
Scale 1:200

part 05 : Reflection

CONCLUSION

Societal issues are not direct architectural problems. To meet the client's brief of a social solution by architecture, the theoretical discourse required the discussion to link different theories to produce the desired outcome. The research found issues of biophilia and sustainability being identified in vernacular architecture. Vernacular architecture was found as a grounding component to celebrate the local community and to produce architecture the users can identify with. Its link to cultural identity was realized to form a sense of belongingness in the local groups by bringing out outcomes of pride and celebration of popular local construction methods. The beauty of the landscape on the site and the definite intention to keep the romantic spirit of the place inspired a biophilic-biomimicry response to the climate helping to solve passive ventilation aspects from the topographical elements: termite mounds found on the site.

Another thought realized while looking at the design proposal as social architecture was, "terrain vague" can be suggested to extend to the margins of physical "terrain" to relate to building end-users as "marginal" groups of people with potential and possibilities to achieve other social outcomes than just having a building. This can help focus more on "people-based" responses in architectural solutions by making "people" primary contributors to "architecture": the creation of space, rather than just end-users of designs made for them.

As to answering the question, "To what extent can architectural design be used to provide spaces that mitigate social issues of unemployment, identification, and innovative income creation? ", the thesis can justify a great extent. While issues of the effectiveness of the space become a managerial duty leaving the UNYAZ to a high task, the architectural component of providing an interactive space with opportunities for exhibition, selling, cultural recognition, and local material incorporation was a success.

One of the limitations in the thesis was to define the boundary of specific creative skills that had to be provided in light of the plenty in the community. However, the success of the project gives hope extension to more departments among the trees. The materials used are locally sourced making the architectural product fit seamlessly into the environment, this celebrates the natural colors of the context, and also is a successful reflection for the people's identity in construction skill and vernacular knowledge.

In terms of technical aspects, the decision to source all materials presented a tricky limitation as the average 50mm diameter timber lathes were not feasible to carry steel roof structures. Moreso, the detail of joining of the lathes to the beam system that held the roof structure and the purlins presented a scenario not popular to the vernacular skill. The best solution to this structure would have been welding steel rods that were not locally sourced. This almost suggested the choice of timber as a truss structure to be unrealistic. However there remains room for development in the use of vernacular skill with local material in this modern age, after all, innovative invention gets the "eureka moment"!

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APPENDIX