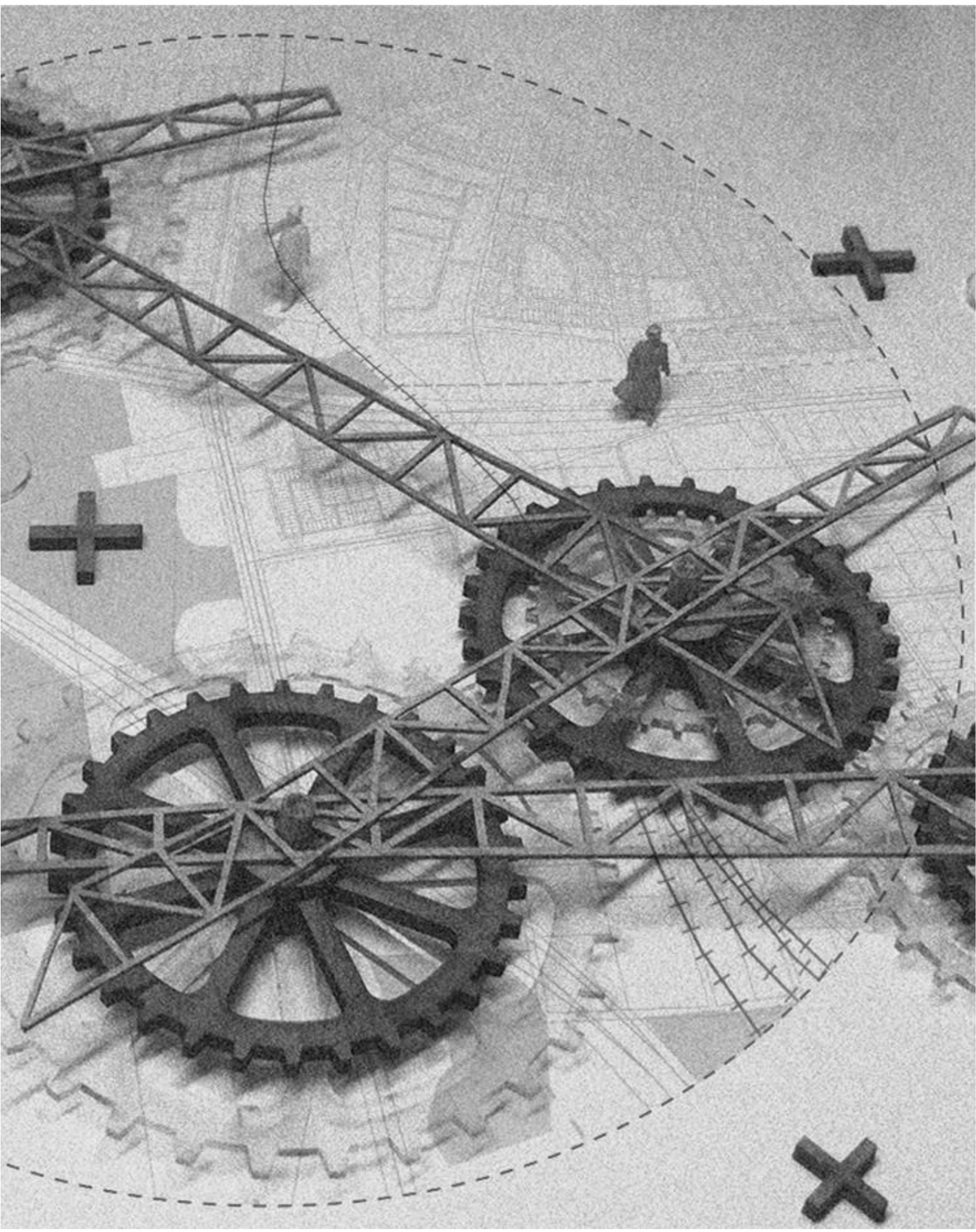
Re-crafting Architecture in Philippi + the everyday

Developing the urban potentials and sites of production in the Cape Flats



Student Name: Travors Van Breda | VBRTRA001

Supervisor Name: Alta Steenkamp

Design Dissertation | M-Arch (Prof) 2021 | University of Cape Town

Dissertation Title: Re-Crafting Architecture in Philippi + the everyday
Student Name: Travors Van Breda
Supervisor Name: Alta Steenkamp

This dissertation is presented as part fulfillment of the degree of Master of Architecture (Professional) in the School of Architecture, Planning and Geomatics, University of Cape Town.

Date: September 2021

"I hereby:

a. grant the University free license to reproduce the above dissertation in whole or in part, for the purpose of research.

b. Declare that:

(i) The above dissertation is my own unaided work, both in conception and execution, and that apart from the normal guidance of my supervisors, I have received no assistance apart from that stated below: Alta Steenkamp.

(ii) Except as stated below, neither the substance or any part of the dissertation has been submitted for a degree in the University or any other university.

(iii) I am now presenting the dissertation for examination for the degree of Master of Architecture (Professional)"

Plagiarism Declaration:

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the Chicago / Harvard convention for citation and referencing. Each contribution to, and quotation in, this report from the work(s) of other people has been attributed and has been cited and referenced.
3. This report is my own work.
4. I have not allowed and will not allow anyone to copy my work with the intention of passing it off as his or her own work.

Signature: Signed by candidate

Date: September 2021

Acknowledgements

Firstly, I would like to dedicate this design dissertation to my family and mentors throughout my architectural scholar journey, who all have been patient and understanding of me. Secondly, the student funding of NSFAS who have been of an immense emotional & financial support in my honors and master's year. A special mention to Alta Steenkamp my supervisor, who has shown great support and provided a good foundation in the grounding of my work. Finally, a big thanks to my classmates Mpho, Gareth & Dane for sharing, inspiring and building solid friendships over the past 6 years.

Preface

I proceed with the task in understanding the wisdom of a place and lived experience of others while being fully aware of my own personal experiences and circumstances that will shape and define my thoughts and work. For this acknowledgement of prejudices holds me accountable, it informs my intuition that gives meaning to my ontology, driving the ways in which I have learnt to see and do. I grew up and spent most of my childhood in Portlands, an area considered as a borderline rough part of the Cape Flats. Situated in the heart of Mitchell's Plain, bordered by Westridge to the East, a newly established suburban area in which I currently reside. My mother, a bookkeeper and my father, a semi-skilled carpenter and project manager by trade. In many ways I lived comfortably but not voided from the everyday sights of alcohol and drug abuse which led to crime and the notorious associations to gangster-ism.

Furthermore, the neighborhood never shied away from a sense of mutual dependency on others, one that engendered common shared knowledge and skills that afford my family and others a sense of socio-economic benefit. This created a true perception of 'place', founded on the foundations circulated community through offerings from others and acquired skills within the community. It was with a site visit during my second year of architectural studies in 2017 that the design brief introduced me to the township of Imizamo Yethu. While fully engaged with the project at the time in the construction of a water platform, that I began to contemplate and render the plausible parallels of my childhood and the vibrant urban culture of the informal city. The parallels in a society derived from common interests and interdependence, the similarities between cooperation and communality. The dependence on others presupposes equality. It is from this moment where the study begins to find gravitas in the presumption of equality.

Abstract

The dissertation aims to surface relevant ongoing development of the informal economies and micro-industries shaping Philippi. This provides valuable information aiding in the understanding of the existing conditions of Philippi. The focus area of the Philippi Industrial Precinct sits on the eastern periphery of Cape Town, it is a township well located in the greater city metropolitan. It is a severely under-resourced area with a rich potential for a site of production and vibrant urban culture.

The scope of work aims to establish a more nuanced comprehension of informality, its connection to the wider formal networks, and what opportunity it represents to a new architectural culture. The understanding of these aspects and conditions frames a propositional question to how we as architects should make use of alternative practices, one that is ethically engaged with on the ground knowledge by supporting the initiatives of the collective majority in the production of space and future development.

The program is meant stand as an infrastructure in alignment and informed by the existing practices of craftsmen, the use of new technologies (open-source architecture) provides a platform for emerging manufacturers to be educated in the form of accredited vocational training and cultural exchange. This form of architecture is viable in South Africa due to existing socio-economic condition with willing workforce seeking work opportunities and the established systems of thinking. The architectural project seeks to create micro-systems of manufacturing and designing a building as a social catalyst.

Table of Contents

Keywords

Material object: A thing made or consisting of matter, a physical object.

Artefact: An object made by a human being, typically an item of cultural or historical interest.

Technology: The application of scientific knowledge for practical purposes, especially in industry.

ANT [Actor Network Theory]: a theoretical approach to social theory where everything in the social and natural worlds exists in constantly shifting chains of association and networks by mutual relationship."

CNC [Computerized Numerical Control]: It is a computerized manufacturing process in which pre-programmed software and code controls the movement of production equipment."

CAM [Computer-Aided Manufacturing]: commonly refers to the use of numerical control (NC) computer software applications to create detailed instructions (G-code) that drive computer numerical control (CNC) machine tools for manufacturing parts.

CAD [Computer-Aided Design]: is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design.

All definitions obtained by: In Merriam-Webster.com.

SECTION 1 | Introduction

Introduction

Architecture as a discipline, is built on a set of rules and principles. A system of ideas and ideals. These systems of design have increasingly become more separated from the dynamics of human existence and its ever-changing urban environments. With the adoption of the modern movement the effects of architecture on the built environment have prevailed in the reconstruction of urban rationality and order both in political and social ways. As a result, architecture has therefore been narrowed down into designing for the wealthiest two percent in the world and acknowledging that this market will always be there. The discussion therefore goes towards the other 98 percent, where a sizeable amount of potential lies in undeveloped and unimagined solutions.

As architecture progresses further into the digital world, better known as the era of "Digital Architecture" and due to its interdisciplinary nature so too does the overall design process and construction of buildings follow suit. This is evident with regards to technologies continual progression in the fourth industrial revolution and ways in which it has automated certain traditional or manual processes of making and the overall design thinking in architecture. It is this premise that the inquiry provokes an interest in what the role of architecture might facilitate in merging more digital technologies with the neglected 98 percent of society to provide solutions to the undeveloped and unimagined architecture.

Therefore, the role of architecture must appeal for conscientious craftsmanship. Always focused on architecture as a craft where architecture can recraft itself again and again (Sennett, R 2008).

The series of studies foregrounded both through theory and technical analysis begins to ask questions on what architectures overall position is, in relation to sociocultural development or societal phenomena, the changes affecting the traditional position in the design and production of buildings, "how should the architect design in today's working and production conditions, as his/her role is transformed by the division of labour, and is he/her still capable of producing a relevant design" (Sennett, R 2008).

Parts of these studies explore the future of designing and making, speculations on how the value chain of craft with its potential to be reintegrated into mainstream economics and adapted to demands of society. And how local craftsmanship can be synthesized into design processes, can promote agency in architecture.

The concluding study speculates on how small-scaled interventions within an urban framework and appropriate use of technology might engage with craftspeople and their work, which is often characterized as quiet practices that engender social change. This sense of agency through craftsmanship would be enacted through the architectural design to test the hunch of the theory in practice. Finally, the series of ideas critically discussed only represents a small portion in the existing body of knowledge and hopefully it finds meaningful ways in which contributes toward the architectural design for the dissertation.

SECTION 2 | Theoretical Discourse

On the Wisdom of a Place

Acknowledgement towards a sense of place and situated knowledge

For the beginning of a series of studies, this study takes an interest in the knowledge of a place. It provokes an interest in the seemingly mundane, the daily odyssey, the sometimes ordinary and finally culminates into the notions of the everyday. As to architecture, its truest form of adjudication is embedded in our inhabitations of the daily routines and its connections to the built environment. Building on that thought, architecture seeks to establish connections and forms of reconciliation and in the same way it is still able to manifest blurred versions of systemic violence. In a post-apartheid society, architecture has displayed an apparent disconnect between the patterns of culture, daily routines, and the built environment itself, one that's removed from the networks of the everyday people and situated knowledges on the ground. As our eyes are set on the above with higher order thinking situated in privileged knowledge, we tend to overlook the ground and wisdom of a place entirely.

This section is rooted in literature by Deborah Berke's final chapter called "thoughts on the everyday" and Jeremy Till's book called Architecture Depends, this literature and subsequent studies seeks to explore the need for the democratization of architectural knowledge and production, one that opens its boundaries to the people of the everyday. In many ways this inaugurates a shift in the architectural paradigm of which the architect acts as the interpreter, allowing the profession to leapfrog from the specialized to one that acknowledges the everyday and vice versa. For this can a mutual reliance on intellectual and economic exchange be established?

In the following section titled, "On Building Cultures for an Architectural Identity", I start with a piece by architect Jose Forjaz. In that section on building cultures, Forjaz, in some sort of monologue - where he contemplates on wisdom and knowledge in an archaic way. Forjaz argues that urban society has set demands onto the modern schools of which now have reverted away from teaching manual skills, one that connects us with nature and the natural world. In that piece I explored how the architect is reminiscent towards thoughts of a forgotten society, more peasant like, in tune with the natural world and shaped by the shepherd, farmer and the builder.

In this analysis of the wisdom of a place, it explores the varying scales within societies family structure and community, how they could build well for themselves and where they saw necessary - the homes and social spaces alike. For an African Village to be defined - the establishment of material culture and intimate situated knowledge of the natural world is built on those manual skills of the everyday people and their cultural practices (Forjaz, 2000). In modern society this is known as the days before the architects.

The same sentiment is shared within my readings of Jeremy Till and Deborah Berke. In a profound way they allude to thoughts of society seeing better days before the architect (Till, 2013). They both argue a more engaged sentiment towards the context of the day-to-day events, where the eyes are casted to the ground looking for clues of ingenuity and creativity instead of subjugated knowledge displayed from a disconnected realm (Till, 2013).

Zygmunt Bauman, a Polish sociologist and philosopher, summarized a distinction between the so-called interpreters and legislators, Till shares the same sentiment and attempts to convey a new way of thinking required for architecture to gaze or refocus their attention towards the ground. The legislator as characterized by Bauman exercises superior knowledge that's unbiased to that of views on the world at large - the ordered totality or objective modern (Bauman, 1987, p. 3). Till on the other hand proclaims that the interpreter seeks to accept the world with all its contingency and uncertainty - comparatively the objectification of context in the legislator's detached realm speculates that the loci of the work is to rather be situated from within and on the ground (Till, 2013).

In that sense the interpreter is in harmony with visions or goals of others through their negotiations, interpretations, and collaborations with the applications of their practice. Till begins to ask that the everyday is to be reflected and contextualized in the production of architectural knowledge, meaning it should be embedded within the associated networks of the everyday and the wisdom of that place. Till prompted that our profession of architecture and specialized knowledge can be blurred by this modern project paradigm and was never disconnected from the pursuit of the dreams of others and their everyday networks (Till, 2013). It is with this reading of discourse and speculative knowledge within a post-apartheid era. I strongly believe that the South African government has neglected its majority groups and failed to recognize the African knowledge of a place and its cultural manifestations in their pursuit of the modern project by adopting a Western democracy. It hypothesizes on whose values systems are not being recognized - this abandoning the cultural knowledge and the wisdom on the ground immersed within the lived experience that now begins to define many township citizens lives.

As previously mentioned in the abstract and pretext with my intention to the focus area situated in Philippi and historically known to be a majority Xhosa community on the periphery of the PHA (Philippi Horticultural Area) (Change by Design Cape Town, 2015). According to the Change by Design Cape Town document in a section where they conducted interviews with dwellers from a settlement called Egoli, Philippi - with their analysis the resultant of common practice in the Xhosa culture was the passing of knowledge. This passing of knowledge is often represented from generation to generation and within the existing family structures.

The word "intsomi" is used to describe this cultural act - an act of storytelling from the wise old to the young of today. This generous undertaking of the old generation begins to define what the younger generation does in the making and thinking of place in the world. The greatest threat to the complete abandonment of the traditional knowledge system is the loss of culture due to assimilation with Western traditions.

Can this common practice of storytelling signal a new architectural identity? Does architecture support the regeneration of African knowledge systems - one that helps define African values in African cities driven by a new urban culture? It is with this wisdom of place in transformation and situated knowledge on the ground that the design dissertation attempts to find inspiration.

On Building Cultures for an Architectural Identity

A lexicon on culture for an architectural identity.

"The peasant did not need the architect to produce architecture that he required and that he built, so often, with exceptional quality. The African village is a model of adequacy and fit in the environment. The sophistication of its material use cannot be understood by those that do not know how to see or to listen to other cultural manifestations" — (Forjaz, 2000, p. 20).

Informed by reading on building culture by architect Jose Forjaz, and Heidegger's critique of modern technology, the study aims to emphasize the elements that fabricate the cultural manifestations and the ontological effects that technology has in the shaping of the recent urban margins within South African townships, particularly Philippi. In many ways the aspects highlighted through the theory of sociology specifically of the marginalized and the ways in which technology constitutes our ontology, as Heidegger states, it becomes our way of being in the world. Social ontology, one of which is technology, enframes an architectural identity and this is critically analyzed through the theory of Actor-Network Theory (ANT) and relational materiality, of which is studying 'technology in the making'. As argued by Torabi and Brahman, here:

"It is an important element to identify in architecture. Architecture serves as a certificate and from the identity perspective, represents the thoughts of its own people, thereby creating distinctive architecture in various periods and locations" (Torabi & Brahman, 2013, p. 106).

Therefore, to imagine a new cultural expression one of which architecture becomes the antidote to its past apartheid histories of systemic violence, must be driven by the cultural majority group where the collective identity and architectural expression defines a new direction for the cities of tomorrow, as proclaimed by anti-apartheid activist and African socialist Steve Biko, here:

"For one cannot escape the fact that the culture shared by the majority group in any given society must ultimately determine the broad direction taken by the joint culture of that society. . . a country in Africa, in which the majority of the people are African must inevitably exhibit African values and be truly African in style" (Biko, 1978, p. 24).

Cultures of everyday practices in the making are responsible for the sustainability and consistency of our built environment. Apartheid spatial planning of the South African city has created a tale of two cities, one that's formal and informal, including the city itself and the periphery. On the one hand, you have the formal, this is where the sprawl of a gated community model presides within minority private capital. It isolates itself from the immediate context in the absence of segregation mechanisms of defense. As argued by Bayat, on the other hand, you have the informal, where the cultural majority exists in urban periphery fragments, it's here where a new autonomous urban model is defined as an act of resistance and formed by the actors' capabilities (Bayat, 1997) (See, Figure 1).

Furthermore, Bayat examines the dynamics of the 'informal people' - the societal politics that characterizes free-form activism of the disenfranchised. "I want to show how these ordinary and often quiet practices by ordinary and often silent people engender significant social changes" (Bayat, 1997 p. 56). The statement holds significance in my investigations for which locates a study of the informal city and highlighting potential urban sites of production through provided relevance in the significant incentives of engendered quiet practices. In Building Culture, Forjaz advocates for a new urban architectural culture reflecting the reality of the city with which it forms a whole (Forjaz, 2000). Forjaz suggests that this new architectural identity will perhaps emerge in our marginalized townships. As mentioned above when looking at the formal city's architectural future, one of which has become anti-social and created a society that is segmented.

It's through this refocusing of formal to informal in the attempt to establish sites of potential and production in the Cape Flats, not to be misinterpreted with regards to searching for an architectural form but rather to understand and grasp lessons learned to advance the informal city's potential through cultural manifestations and sociability towards a new architectural identity. More on the quote by Forjaz about the peasant, which he describes as being an agriculturalist, a shepherd, and a self-taught builder. This further emphasizes the important elements that characterize the informal city and how the ability of a community can build skillfully for themselves in deprived conditions, their built environment is a clear representation of technology in the making as to where they saw fit and necessary to practice. The varying layers of the community and expert citizens in many ways enable them to perform within an associated informal network and therefore maintain a sense of cultural consistency across time.

"How through this culture of building a material, ecological and cosmogonic culture gave rise to the African village as a model of adequacy and fit in the environment" (Forjaz, 2000, p. 20). "Could meaningful and patient research of cultural and social manifestations of the informal give rise to a new architectural identity that expresses the objective (measurable) and subjective (emotional) value of its cultures and pieces of knowledge?" (Forjaz, 2000, p. 20).

This complex surface grain level of informality, the nuances within cultural expression and its everyday practices starts to question what this built architectural identity might be and also begins an exercise of enlightenment that may seed into the design dissertation through an appropriate tectonic articulation and architectural expression to be inspired by on the ground fieldwork whereby highlighting existing cultural and building practices in the attempt to reflect the vibrant culture of the informal city.

Figure 1 - Unequal Scenes: Apartheid's legacy. (Source: Unequal Scenes: Apartheid's legacy, 2021).

On Craft + the everyday

A lexicon on Craft: Use, Function & Reassessed tradition.

"Craft and its tools are not sentimental trinkets - it is the obsessive honing and learning of solutions to material problems" — (Salter, 2017, p. 1).

This study on craft aims to investigate the understanding of craft and its everyday reality. With a simple google search of 'cape town craft' and making use of the 'google maps' feature, one begins to see the result of my interest in craft and the necessity of a more cohesive lexicon of craft in the contemporary world and mainstream economies (See, Figure 2). With the search for 'craft' begins a discussion on society's warped definition of craft, one that's voided from its true meaning and tradition. As argued by Hallaj were left at the mercy of a society, craft has become commodified and conditioned to a luxury standard.

He continues to emphasize that it is in our informal settings of society that a more successful model of craft has begun to find a well-integrated system for supply and demand value chain (Hallaj, 2013, p. 84).

Furthermore, craft must therefore be understood as a tradition of iterative and innovative making. The dexterity and creative systems that drive craft allows it not to be defined by a singular term of tradition or innovation but rather conceptualized into 'tradition as innovation'. These traditions are inherently crafted and are inseparable from the generous acts of shared knowledge. Tradition as innovation, therefore, facilitates dialogue and negotiation whereby creative solutions can emerge to existing material problems, this is understood to be craft.

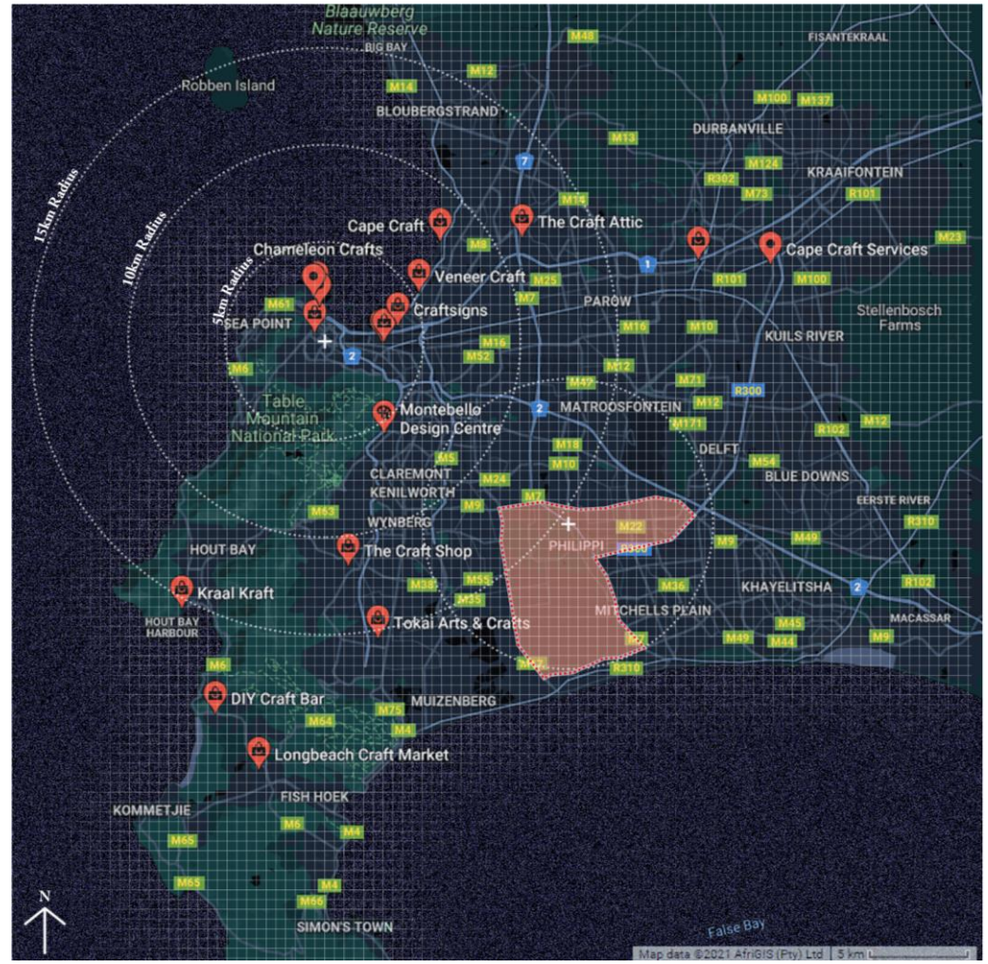


Figure 2 - Google Maps screenshot 'Cape Town Craft' search. (Source: Google Maps, 2021).

In Architecture for Life, Omar Abdulaziz Hallaj outlines three areas of exploration for the understanding of how craft might find validation in mainstream economies "beyond the nostalgia of heritage preservation" (Hallaj, 2013, p. 84).

1. Understanding the value chain within which craft is situated and associated mainstream networks.
2. Re-introduction of craftspeople in accreditation systems offering them accountability to break the aesthetic demand chain craft is bound by today.
3. Craft is understood and defined by its ability to be innovative.

As mentioned before in the section on 'building cultures for an architectural identity, ANT theory examines the actions and collective motivations of a group of actors, linked associations, and the diverse aligned interests within a network. Exploring these areas of craft in mainstream economies in relation to key features of the ANT theory states that the actors in a network are both human and nonhuman (such as technological artefacts) (Latour 2005). The core ideas of theory and literature outline the reassessment of craft across time (Kien 2009, p. 28).

Kien argues that ANT is based on a particular network of actors by association and the performance of the culture, therefore, in other words, the maintenance of cultural consistency across time is dependent on the performance of actors (humans) and the objects (non-humans) (Kien 2009, p. 30). Hallaj reiterates this manifestation of cultural consistency in "Building Crafts in the Modern World", he argues crafts validity should be contextualized and understood through its economic rationale for survival, a performance based on the upholding of a particular technique and characterized as the dialogue between the expert supervisor and craftsman through the negotiation of past practices, funds available and the need for quality.

In essence, this understanding of the methods of ANT theory and discourse on building craft reassessed in the modern world is essential, voided from its nostalgic ways enabling new development in creating sustainable repeatable building craft techniques in conjunction with the mainstream economies value chain. A new paradigm of craft closely aligns with the narratives of a craftsman in the informal city and echoes the everyday building practices serviced by the micro-industries which has the potential to build cultures for an emerging architectural identity within the informal city.

With a thoughtful approach on tradition as an innovation that reflects the emerging craft culture, the craftsperson as an actor within an associated network and their reliance on a medium or set tools to produce a particular output (artefact), allows for creative solutions to existing material problems in low income contextually constrained areas, therefore the performance of this mutual relationship (actor and object or human and nonhuman) enables cultural consistency by inscribing of technology in the making of objects.

It is with this understanding and lenses to which craft in Philippi will be investigated through the design dissertation. As discussed in the section titled "On Building Cultures for an Architectural Identity", an expanded catalog of knowledge around culture, craft and the built environment will facilitate a better understanding of how to document craft. From the manner outlined above, it potentially enables one to speculate on the supply and demand value chain of craft, the affordability within the current context, the inclination for mainstream markets to fund the service/product, the quality of the service/product, the way these services/products are negotiated or priced, what the craftsperson's level of accountability is, what is the appropriate level of invention, how to service/product has evolved or changed over time and the multitude of competition within established craft networks.

These questions aid in the development of a nuanced interpretation of craft, to better speculate as to a designer who follows the very same principles and notions of craft and how it might find validation with a reassessment of craft tradition in the attempt to play a significant part in building economies again, one of which is establishing a new architectural identity that reflects the vibrant emerging culture in the informal African city. (See, Figure 2)

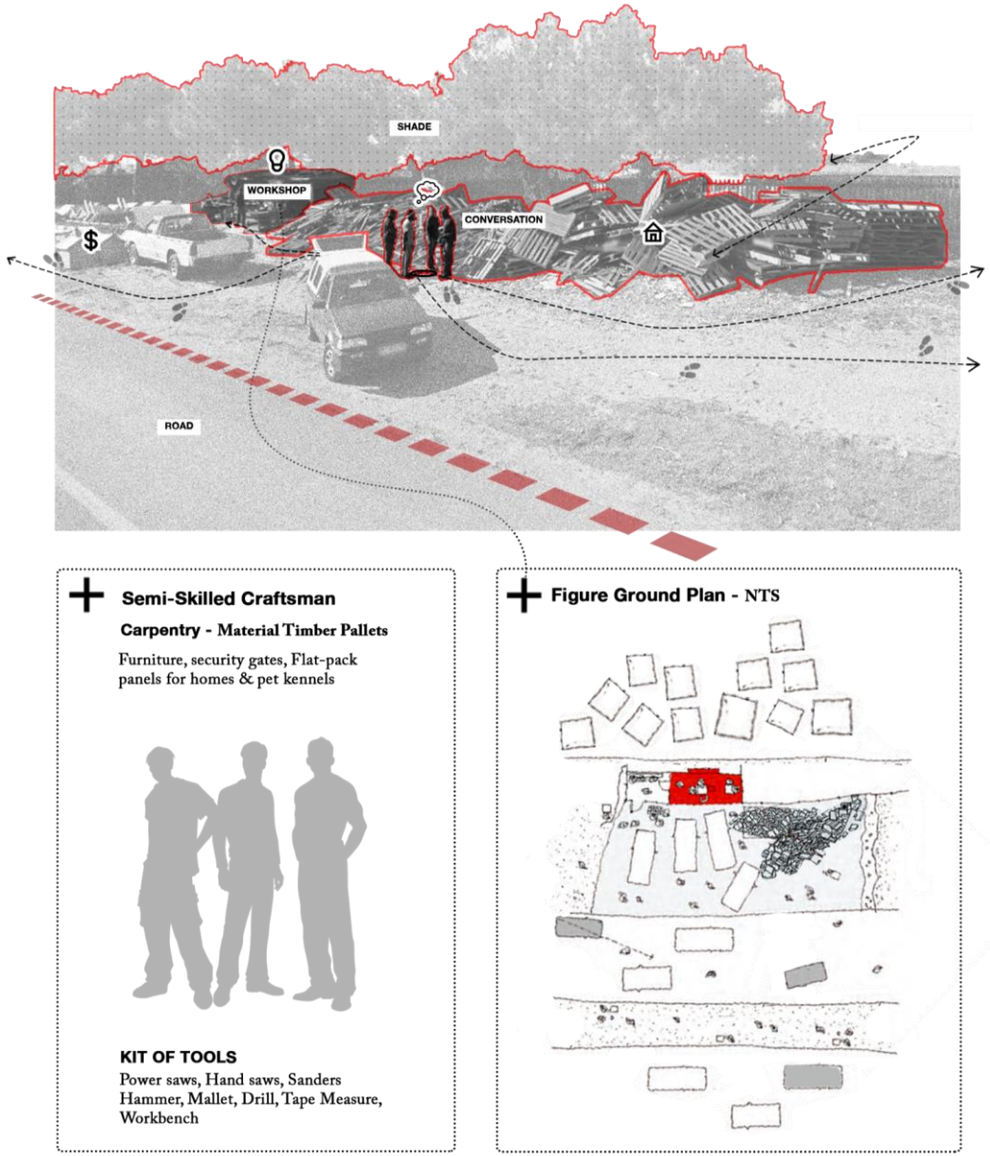


Figure 3 - INFORMAL ECONOMY - Micro Industries - Local craftsman establishing micro-industries in the re-purposing, adapting, transforming of materials through local traditions and techniques - e.g., timber pallets to create flatpack panels for homes. (Source: By Author)

On a Reformed Ethics

Social responsibility and accountability in ethical architecture.

"The architect at his best must make forms enabling people as individuals and as groups to express themselves by changing their situations. In this manner, he becomes like the lover for whom the fulfillment of the beloved's life plan is part of his own life project. He lives out his transformative vocation by assisting someone else's. Then, we can forgive him for his signature on his buildings. We can forgive him because he makes pieces of stone serve hearts of flesh" — (Unger, 1991, p. 36).

For this study on imperfect ethics in need of another, this section draws lessons learned from Forjaz, Hallaj, Latour, Kien, Berke, Unger, Bayat, Bauman to broaden my own interpretation and understanding of ethics in architecture, the accountability, and social responsibility of the practice (Forjaz et al., 2000). In the final chapter of Architecture of the Everyday, "Thoughts on the everyday", Berke offers manifesto on her revaluation and extension of her thought process on the everyday from a political and ethical perspective and as a response directed to the profession itself, "What should architects do instead?... How can one account for such daily practices? … What values can one attach to such exercises?... How do we explain the politics of these everyday lives?"

To which Berke responded here:

"Acknowledge the needs of the many; address diversity of class, race, culture and gender; design without allegiance to a priori architectural styles and formulas, and with concern for program and construction…" (Harris & Berke, 1997).

In an opening lecture at the Yale School of Architecture titled "Everyday 2020", presented during the ongoing pandemic that affected everyone alike from physical well-being to an economic crisis and various industries of which one is architecture. It was a moment for everyday one to pause and retrospectively reflect on the current realities and the professional large. Berke wanted students to be empathic of the responsibility in the way they practice as an architect and to be aware of the repercussions of their practices. Berke goes on to proclaim that through the revaluation of her thoughts saying that the true nature of accountability and responsibility of the builder/designer is mortared in through the ethical conduct however not at the trade-off of any formal synthesis in technical intricacy of which is explicitly evident in the built environment. In many ways the broader impact of this knowledge on ethics is a critique on the profession in relation to the practice and built environment, it conveys a host of issues around the lack of diversity and under representation of women within the field as well. With that said every individual in terms of effort and their education is only one step before the building gets built.

Forjaz shares the same sentiment where he argues only when the "illusion that colonial barriers were the only discriminatory barriers" becomes subdued, loss of hope will manifest itself through suffering (Forjaz, 2000, p. 8). Beyond the realms of the profession, their larger societal issue at play particularly within the South African margins but also throughout the world is one of social justice.

In the same vein, Architect Jeremy Till offers the reader clues in the book "Architecture Depends" on how the architects might be a sign of hope "as an agent of hope" in the adoption of a reformed ethics as studied in this section (Till, 2013). It's with this lens on ethics in which the stories of others might find a sense of responsibility, accountability and therefore the design dissertation will find its gravitas in the stories of others.

SECTION 3 | Technical Discourse

On CAD & CAM

A crafted dialogue between man, nature, machine, and design.

"The computer can only calculate what is already conceptually inside of it; you can only find what you look for in computers. Nevertheless, you can find what you haven't searched for with free experimentation" — (Otto, 2010, p. 17).

The purpose of this study is to explore the ways in which computer-aided design (CAD) and computer-aided manufacturing (CAM) might coexist with traditional techniques or crafted practices in a mutually beneficial relationship. In this section on CAD & CAM, the case study of the Design and Make programme is used to explore its technological critique with regards to the systems and methods of making. The programme offered by the (AA) Architectural Association, in England, will be outlined from the beginnings of the programme to the core agenda established around fabrication and advanced building methods. From this outline and established agenda, the systems and methods of making are inspired and motivated through CAD & CAM technologies. This study therefore begins to emphasize the existing knowledge and suppressed practices in the focus area of Philippi, and how the design dissertation might find meaningful ways in answering questions revolving around the future of architectural design, tools and production paradigms that aids a society in transformation. How can universal CAD/CAM practices be made relevant to current craft and traditional building methods? Can an emerging building culture be inspired and contribute meaningfully with analogue methods? How can these universal CAD/CAM practices and analogue methods respond to a 'technology as a social'? . . . Maybe a source of vitamins for the situated knowledge and robots alike.

Frei Otto, architect, and structural engineer, most notable for his innovative work and use of light structures such as tensile systems and membrane structures. Frei Otto approached in 1987 became one the first architects and co-designers on the first built refectory projects on the AA Hooke Park woodland campus. A prototype project that demonstrated an unconventional use of timber - using structural systems of tension for the roof. These fabrication methods used for the roof trusses were orchestrated by a team that consisted of both students from the Design & Make programme and volunteers from the AA's Summer Build programme.

The woodland satellite campus, Hooke Park now home to the postgraduate programme of AA's Design & Make, of which the programme core aim is in developing advanced critical understanding of practice and processes of material experimentation. Otto later described that experimentation and computers were two separate systems. Contrary to that statement the current Hooke Park and postgraduate programme developed by students and staff consists of a hybrid of the two systems. The programme and research focused on the realization of design intent through full scale 1:1 fabrication - the buildings built by students. These complex gymnastics orchestrated by staff and students are built on site and becomes "a vehicle for design research" (AA Design + Make, 2021), one that speculates and experiments with Advanced Building Technologies (ABT). Due to its woodland context and informed by a connection to timber - the programme is developed around the combination of craft techniques and emerging digital fabrication technologies.

It includes classes and workshops that build the foundation skill sets in six focus areas: analogue making; digital modelling; 3D scanning; CAD/CAM; robotic fabrication; and filmmaking for research documentation (AA Design + Make, 2021).

The core aims engendered through the research, design and making of systems that influence reinvention of traditional fabrication methods while introducing "innovative and appropriate processes for architecture" (AA Design + Make, 2021). It is with these foundations that my interest and study into CAD & CAM might find value in its application within the design dissertation and more importantly re-establishing the connections between the designer, maker, and artefact.

A hypothesis that increasingly obscures the modern paradigm which separates the processes of design and production (Carpo, 2005).

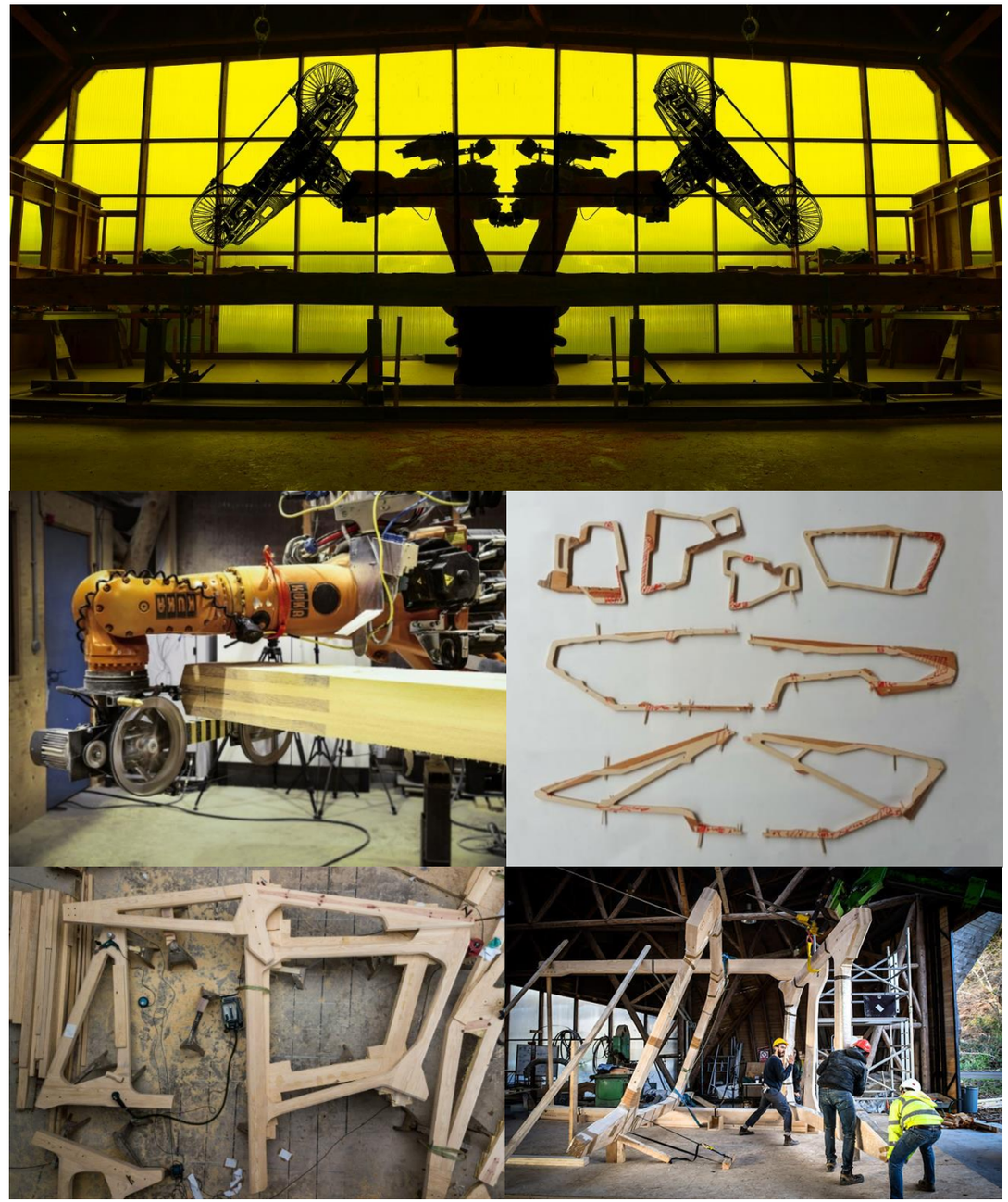


Figure 4 - Design & Make Program - Wakeford Library skeleton structure | formal synthesis of 3D scanning, CAD & CAM systems. (AA Desigh + Make, 2021)

On CNC Crafted into Contemporary Architecture

The combination of high-level design processes with local skills.

"Psychologists (and software experts) often employ the term "affordances" to describe the workable capacities of a medium. This reflects the truism that opportunities shape outlook: "how we see the world depends on what we can do with it" — (J. Gibson, 1977).

As a follow up study to the piece titled, "On Digital Fabrication shift in Architecture" and "On CAD & CAM". This piece is interested in the current use of CNC technology and its affordances within architectural design and everyday practices. As one of the oldest digital manufacturing tools and systems, CNC history (see, Figure 5), began its life in the 1950's with punch cards which eventually evolved into an advanced computerized programming language called G-code. This foundation of code is used as a set of instructions in combination with coordinates to operate a CNC machine.

How might programmable CNC machines that offer highly precise work fit into the architectural design process? Can this shift to CNC technology provide vitamins of digital fabrication be grafted into the craft network of Philippi? Could the self-made builder and micro-industries benefit from CNC technology, in a context where construction methods and building culture have become so reliant on brick and mortar?

Furthermore, these questions on CNC use fall into two main categories when it comes to architecture. These categories consist of Modeling or Machining. Firstly, "Modeling" refers to the use of CAD programs in the conceptualization of prototype models. A technique that is embedded into educational programmes such as the AA Design & Make and current design processes.

Modeling enables the designer to generate machining toolpaths from CAD lines which are converted into G-code, allowing the CNC machine to cut the desired pieces for the envisaged prototype models (Bianconi & Filippucci 2019, p. 1193). Secondly, "Machining" refers to a category where architecture has flourished especially through the efficiency of CNC routing. In a more industrial context, it refers to the manufacturing process in the control of factory tools and machinery. This control of machinery from lathes, grinders and mills through computer programs allows for a more diverse use within the architecture discipline in the making of complex buildings. What does the CNC workflows look like in architecture design and making? (See, Figure 5)

Here is a list of 6 steps outlined below:

1. Design - This refers to the architect's initial ideas not yet fully formed and the beginning stages of the broader scope of the project.
2. CAD - With the solid idea sketched out, the architect proceeds by utilizing CAD programs to render and explore all aspects of the design in 3D
3. CAM - The use of CAM assists the designer in the translation of 3D models into machine language such as G-code.
4. Input/Tool Path - G-code the most universally used machine language allows for the control of toolpaths with detailed instructions to be operated by the CNC machine.
5. Execution - The final stage where the CNC machine creates the model or part required. Also, a stage in which requires the least human involvement other than general troubleshooting.

The result of the steps in the CNC workflow doesn't always produces the final product. Instead, the workflow aids in conceptualization and fabrication, necessary for any architectural undertaking. If CNC technology is implemented correctly in the construction of an architectural project, it will enable the reduction in labour costs effectively allowing unskilled individuals to readily create their own structures or buildings from a kit of parts. In conclusion the outcome of highly precise designs of the architect represents a better understanding for builders and designers alike.

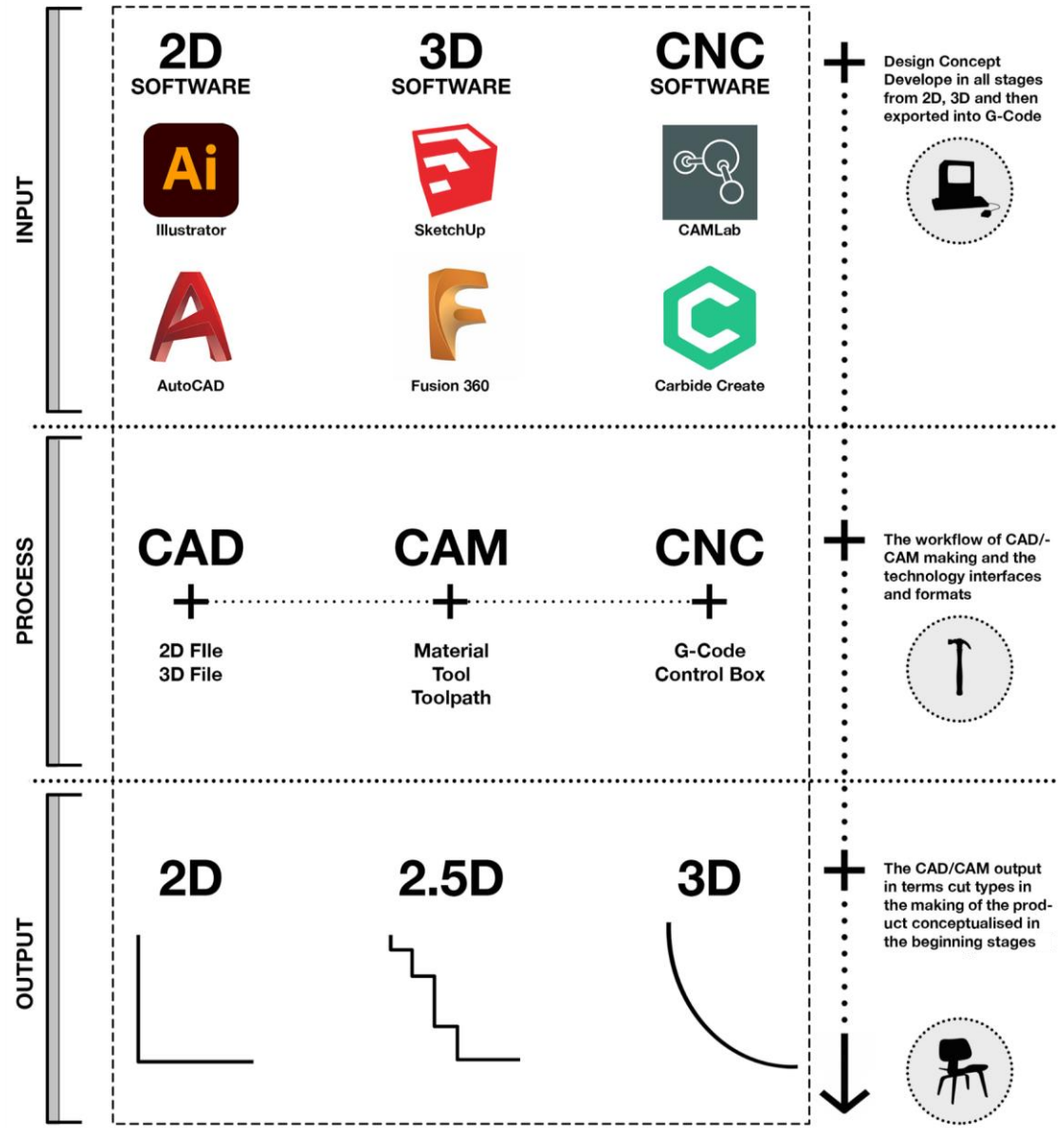


Figure 5 - Workflows for CNC modeling & machining.
INPUT, PROCESS & OUTPUT. (Source: By Author)

Case Study: Woodland Cabin by AA Design + Make

At the time of writing the Woodland Cabin is one of the most recent projects done through the Design & Make programme during 2019 - 2020 and located in area 11. (See, Figure 6) This case study also draws lineage from a previous project called the Wood Chip Barn done in 2015 - 2016 by means of workflows and spatial logic.

However, the study is interested in the innovation of traditional fabrication processes that stimulates a mutual relationship between design and making, synthesized into iterative experiments that generate unique artefacts. The Cabin, small and made from timber framed structures, begins to challenge the unification of organic and milled geometries, reversible joinery for demount ability and the inherent use of timber properties. The project consists of four timber structural columns of which were designed and developed through physical iterative small-scaled prototype models. These prototype models then reproduced in CAD software eventually informed an evolution of the design through back-and-forth manipulation for a suitable structure with the timber selection process. A process that followed (c) 'Interactive Robotic-based Design Process' (See, Figure 7). Once the desirable skeletal structure was achieved, informants for the composition of organic branching components were met, phase one of construction commenced.

To create such complexity in componentry and geometry, it needed to combine the use of robot fabrication and novel techniques in roundwood carpentry to articulate a series of timber-to-timber connections that fit digitally fabricated joints with those crafted by hand (AA Design + Make, 2021).

Figure 6 - Woodland Cabin. In the Hooke Park the site is situated within the Architectural Association's campus in compartment 11. The forest occupies a total of 150 hectares. (Source: Wyatt Armstrong, 2021).

Robotic fabrication was used to establish multiple datums along a complex form, allowing the organic geometry to act as the primary locator for the envelope. The envelope consists of a floor and four panels. The floor acts as a rigid diaphragm, transferring lateral loads to the vertical columns. The panels interlock with each other and the floor through joints along their seams, located globally by joints on the primary structure (AA Design + Make, 2021) (See, Figure 8).The most important thing to note from this case study project is that the design and development process reinvented traditional techniques but still made use of the analogue methods of hand-crafted elements and craftsmanship in roundwood carpentry which was key throughout the overall construction process (See, Figure 9). This case study displays a comprehensive formal synthesis of technical elaboration and material production - one that poetically is etched through origins of craft and encapsulates technical strategies of robotic fabrication, roundwood carpentry and timber framing.

This study into CAD & CAM of which acts as inspiration for the design dissertation in the hypothesis of craft in architecture - the engendered approach of craft in 'tradition as innovation'. These creative applications of which the AA Design + Make programme is founded gives rise towards a crafted architecture by use of design tools that enable new technologies to emerge and the coordination between the hand, machine, organic and digital. Can a formal synthesis of these digital techniques and craft be envisioned through the networks of Philippi? Could the digital age afford the integration of traditional methods for which new technologies can emerge? These questions begin to emphasize what the design dissertation aims to explore architecturally.

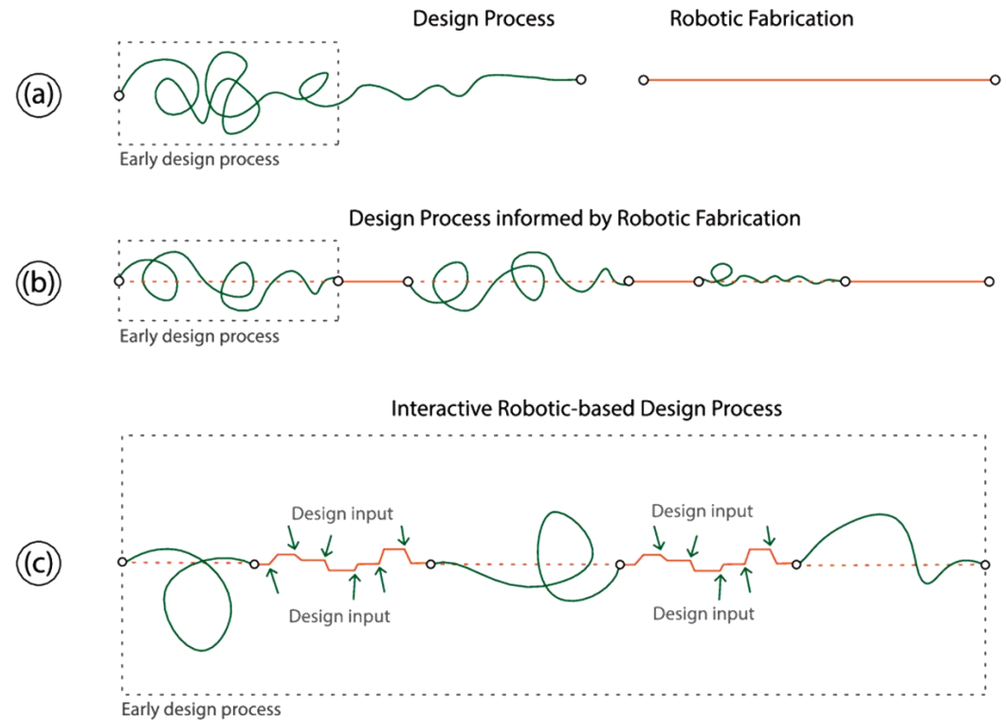


Figure 7 - Three approaches for integrating design processes with robotic fabrication.

a) No integration, the non-deterministic design process is carried out, and the final design is fabricated using a deterministic robotic-based process.
b) Periods of linear/deterministic robotic fabrication (prototyping) are the informing periods of non-linear design processes.
c) Periods of non-linear/indeterministic interactive robotic fabrication are the informing non-linear design processes.

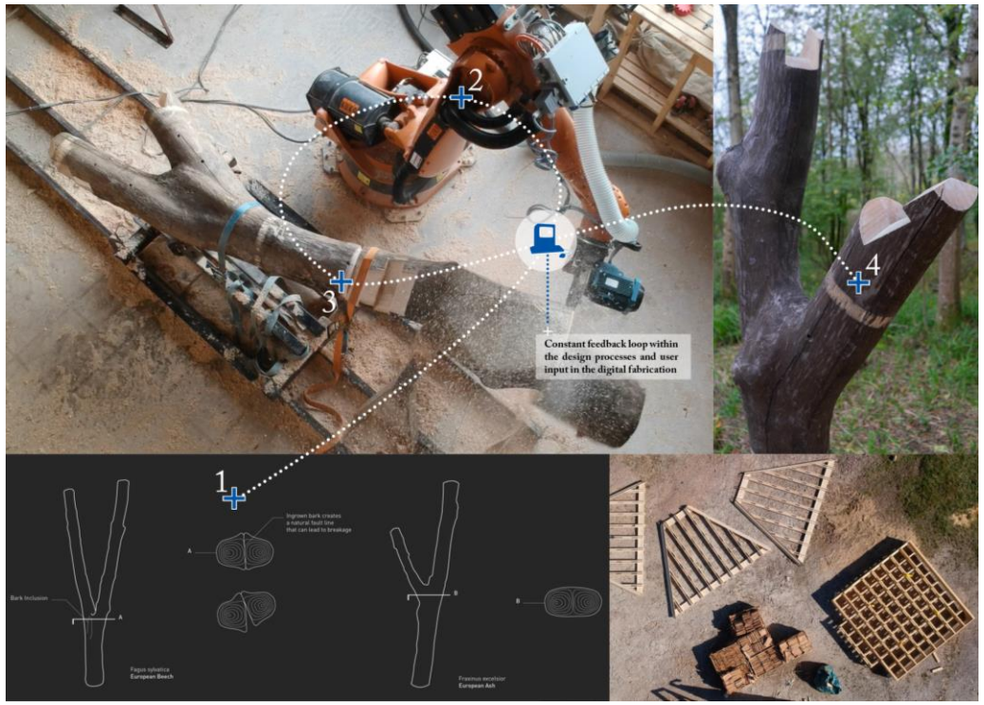


Figure 8 - The design and development processes, reinventing traditional technique by merging digital robotic fabrication with analogue roundwood carpentry craftmanship skills. (Source: Wyatt Armstrong, 2021)

Figure 9 - Series of Axonometric Diagrams. All the elements in a series based on the response to site and changes made to parameter to defined datums. (Source: Wyatt Armstrong, 2021)

Figure 10 - Woodlands Cabin core ideas: The project is a dialogue between the hand, the digital, the machined and the organic. Our individual research is broad, covering the topics of peripheral vision, movement, communal agency, framed views, and haptic interaction. The cabin is where these research trajectories meet. Our larger ambitions for the course involved the technical strategies of roundwood carpentry, robotic fabrication, and timber framing. (Source: Wyatt Armstrong, 2021)

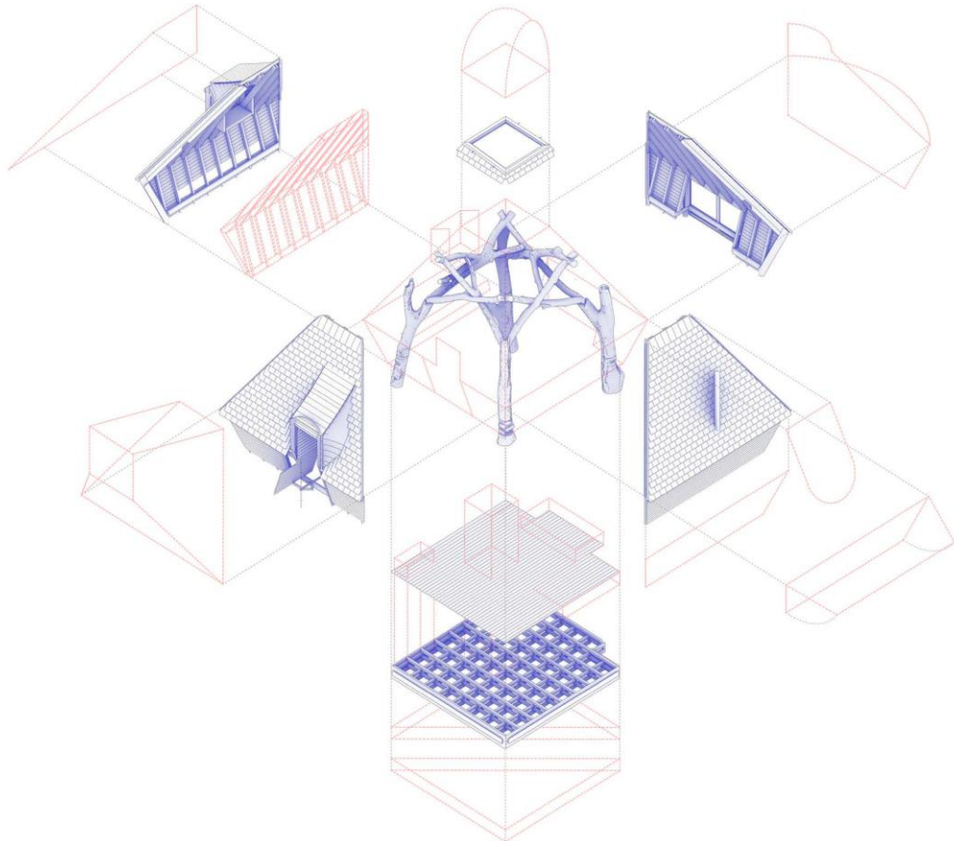


Figure 11 - Final Assembly: The panels were cladded in cedar board and the final element of building is the placement of a large roof skylight. (Source: Wyatt Armstrong, 2021)

Case Study: Future Africa Campus Dining Hall by Earthworld Architects

"Future Africa is not only about place (locality, meaning) nor space (building), but also about the contribution a building can make to the ecology within which it is developed", (Eksteen, A. 2019).

The case study project looks at a dining hall called the "HUB" completed in 2018, by Earthworld Architects. It showcases the formal synthesis of CNC technology for innovative construction techniques through creative application of materials like plywood for structural elements supplied by WISA plywood. The philosophy of the firm aligned well with the project brief, as a result pioneering use of CNC technology was well received especially in a South African building industry dominated by steel, brick, and mortar. (See, Figure 12)

Open building systems, Structural logic & Adaptability

The tectonics and systems of the buildings were intentionally separated. As a result, allowing for outsourced off-site manufacturing of digital converted 3D models into puzzle pieces and on-site assembly with unskilled labour. This complex assembly process was made possible with manual lamination, complex cuts performed by the CNC machines, hand assembled and bolted together on site. Open building as an approach into adaptability allowed for the reuse and recycling of materials, it also provided an inclusive contracting during the construction process. Effectively opening the industry and production of design to smaller players or unskilled labour. One important aspect was in the designing of components to the human scale allowing it to be handled easily on-site. Finally, carefully detailed steel connectors were designed with weight restrictions in mind allowing for more readily assembly without large machinery on site. (See, Figure 13 & 14)

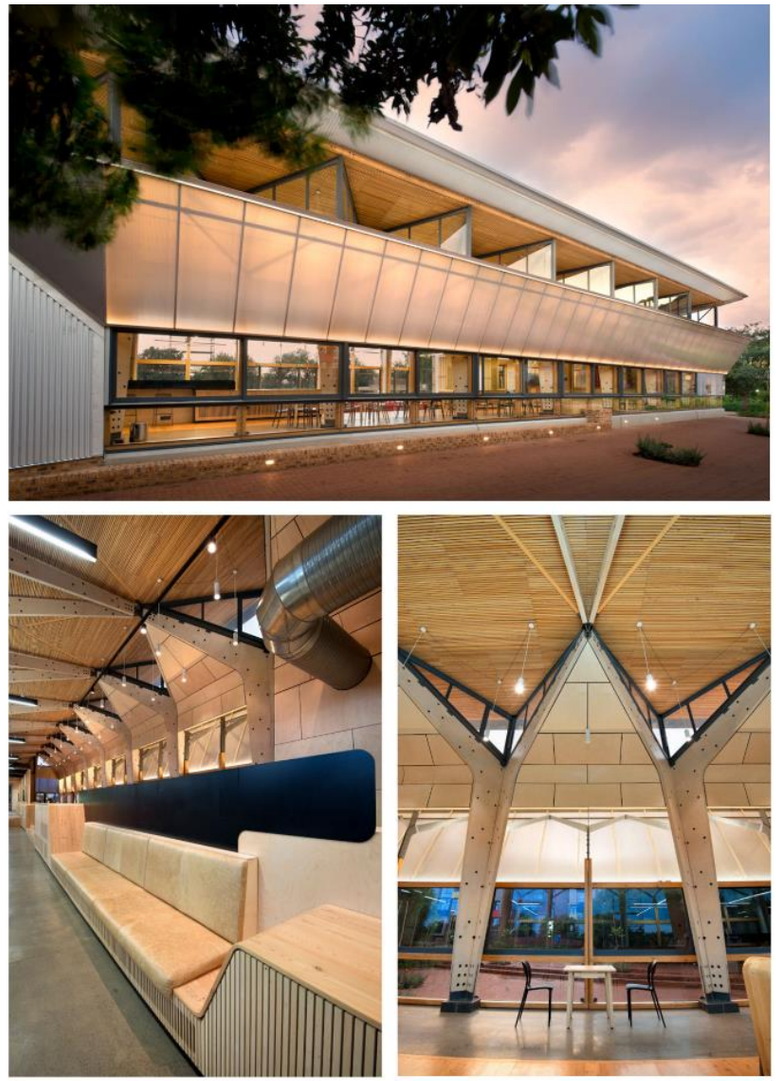
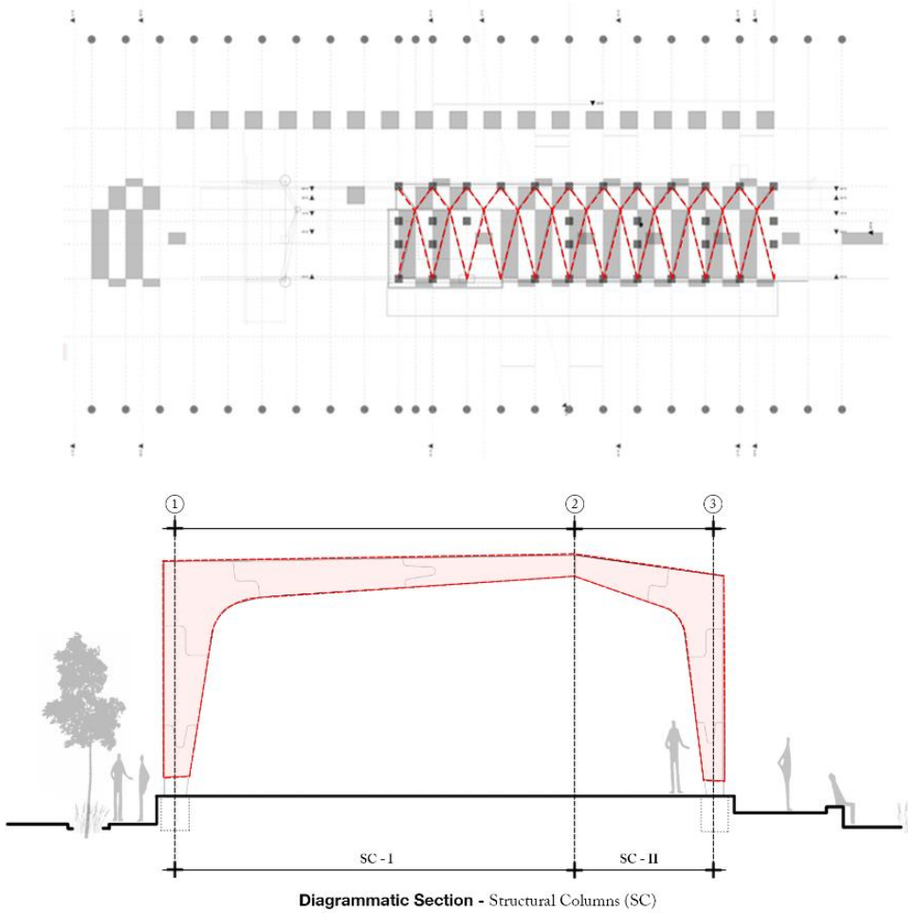


Figure 12 – Exterior & Interior views. (Source: Future Africa Innovation Campus – Dining Hall, Earthworld Architects)



Diagrammatic Section - Structural Columns (SC)

Exploded Axonometric

The primary structure of the dining hall can be divided into two section of asymmetrical structural plywood columns joined together by a steel connector at the internal framing apex.

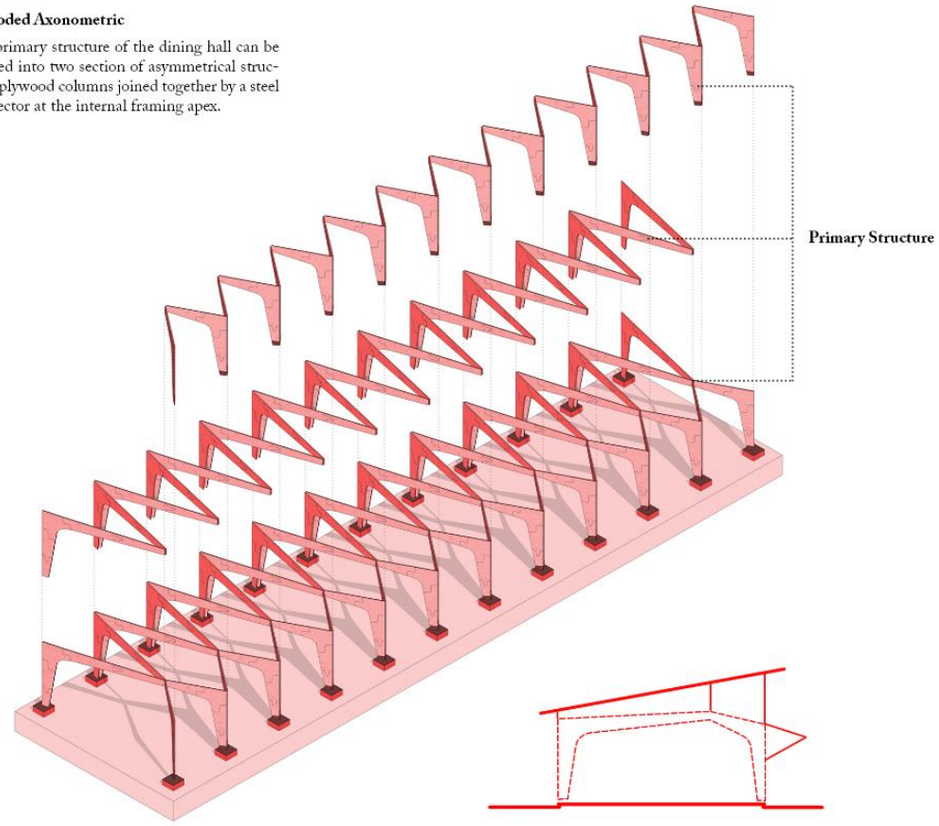


Figure 13 – Future Africa Dining Hall (The HUB). Structural Assembly. (Source: By Author)

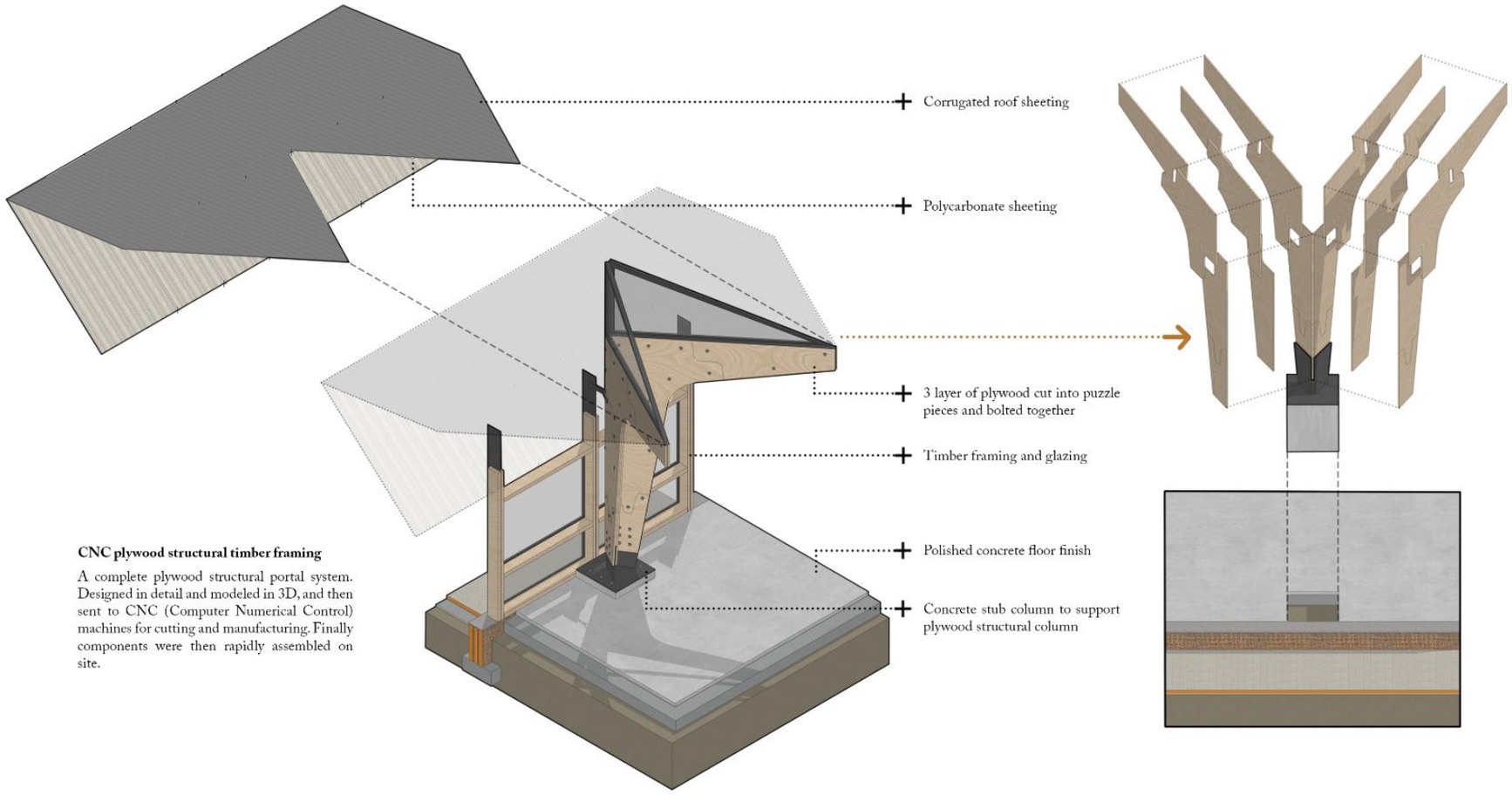


Figure 14 – Future Africa Dining Hall (The HUB). Plywood Structural Column. (Source: By Author)

Regenerative Design & Democratization of the building

Breaking the mold of current architectural and construction processes offered the potential democratization of the building in the outsourcing of manufacturing work to micro-enterprises. The process displayed through work done in the digital realm by architects and the assembly done by unskilled labour on-site. This act of inclusion in regenerative design mobilized various micro-enterprises and demonstrated highly impactful work especially in an economy with high rates of unemployment.

Therefore, key drivers for the project were opening the building industry to these micro-enterprises in the participation of large-scale developments. The final completion of the project resulted in immense pride for the small contractors, a sense of place and accomplishment - these traits that have become silent due to the industrial revolution in the reduced commodification of labour.

"Informal systems in the developing communities already exist; if these can be augmented with quality control and moderation a whole new sphere of democratized industrialization can be established", (Eksteen, A. 2019).

Might this be a source of vitamins for small scale architectural interventions that provide facilities to re-skill individuals in the operation of CNC machines. This to be discussed in the final case study example.

Parallel vs Linear supply/value chains

The use of local skills was prioritized over highly specialized building systems, therefore allowing for all locally sourced materials and processing done in a close 20km radius to the site. The integrated production process eliminated the need for a linear value chain as materials were handled only a few times before installation during the manual processes of lamination and sorting. (See, Figure 15)

Conclusion

In conclusion, the project meets the demands of the brief in fostering participation, democracy, ownership, and communality towards a sense of place. The re-imagination of a typology such as a dinning, one that needed to be central and centered around cultural diversity and the sharing of thoughts to facilitate friendship, cultural interaction, and collaborations on the campus.

However, the project can coin the term "AFRI-TECH", well considered in the combination of high-level design processes with local resources and skills - Can this formal synthesis of design processes and technology be integrated into the urban spatial production and craft networks of Philippi? Can it begin to address the re-establishment of micro-enterprises into mainstream economies? These questions as food for thought might seed into the design dissertation.

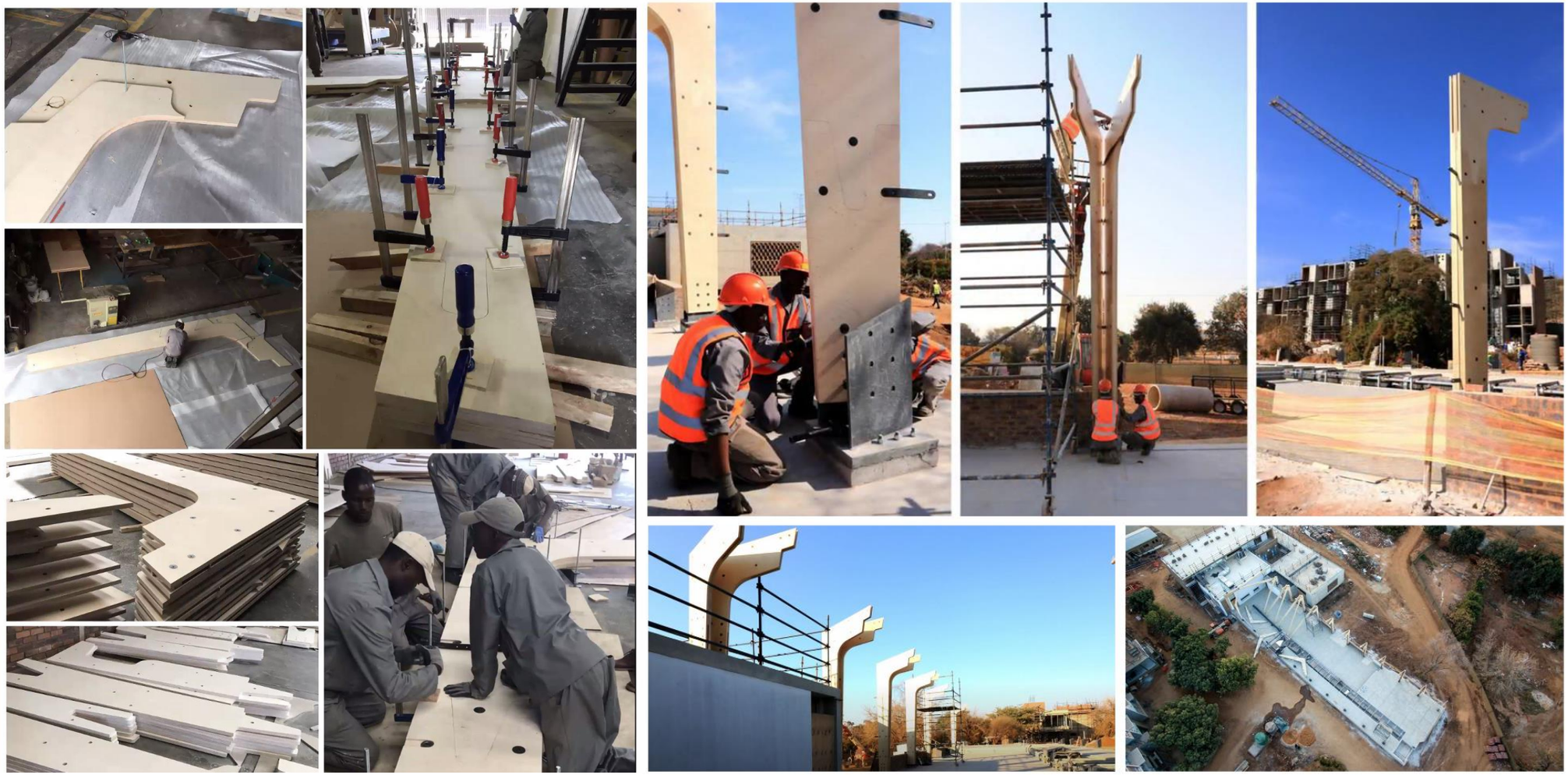


Figure 15 – Future Africa Dining Hall (The HUB). Under construction. (Source: Future Africa Innovation Campus – Dining Hall, Earthworld Architects)

Case Study: CNC machine by MASLOW

"It's easier to teach someone how to operate a CNC machine than to train a master carpenter", (Eksteen, A. 2019).

This product offered by Maslow plays into the questions and ideas on appropriate use technology aiding in potential success of small-scale architectural interventions. The CNC machine by Maslow is based on basic principles and driven by a community in the use of open-source technology. The vertical design has a cutting area of (2,4m x 1,2m) and mimics a hanging plotter. The CNC does not replace traditional gantry style machines but rather offers an affordable, small scale and hobbyist style CNC machine. It is built on a unique system using a traditional router machine and relies on gravity that works against two top mounted motors connected by chains to position the router sled when cutting material. (See, Figure 16)

The overall setup is simple and allows for easily assembly for the CNC default frame/ vertical work bed and the computer software that comes along with your purchase. As like any other intervention it does have its limitations with regards to time of cut work, a tolerance of ±0.4mm and the requirement of an additional motor to cut on the Z axis which allows for 3D cut types. (See, Figure 17) Although its technical limitation might be seen as a setback, it might be an opportunity in a place like Philippi where craftspeople can still be engaged in the making of their designs. Furthermore, the online community continues to grow, and constant improvements are made to each generation over time. In conclusion the Maslow CNC machine was designed around affordability, cost efficiency with regards to shipping and finally ease of use. (See, Figure 18) Could this affordable and appropriate technology be used by the local craftsmen to streamline their manufacturing workflows?

Figure 16 – CNC Machine by Maslow in operation. (Source: Maslow CNC)

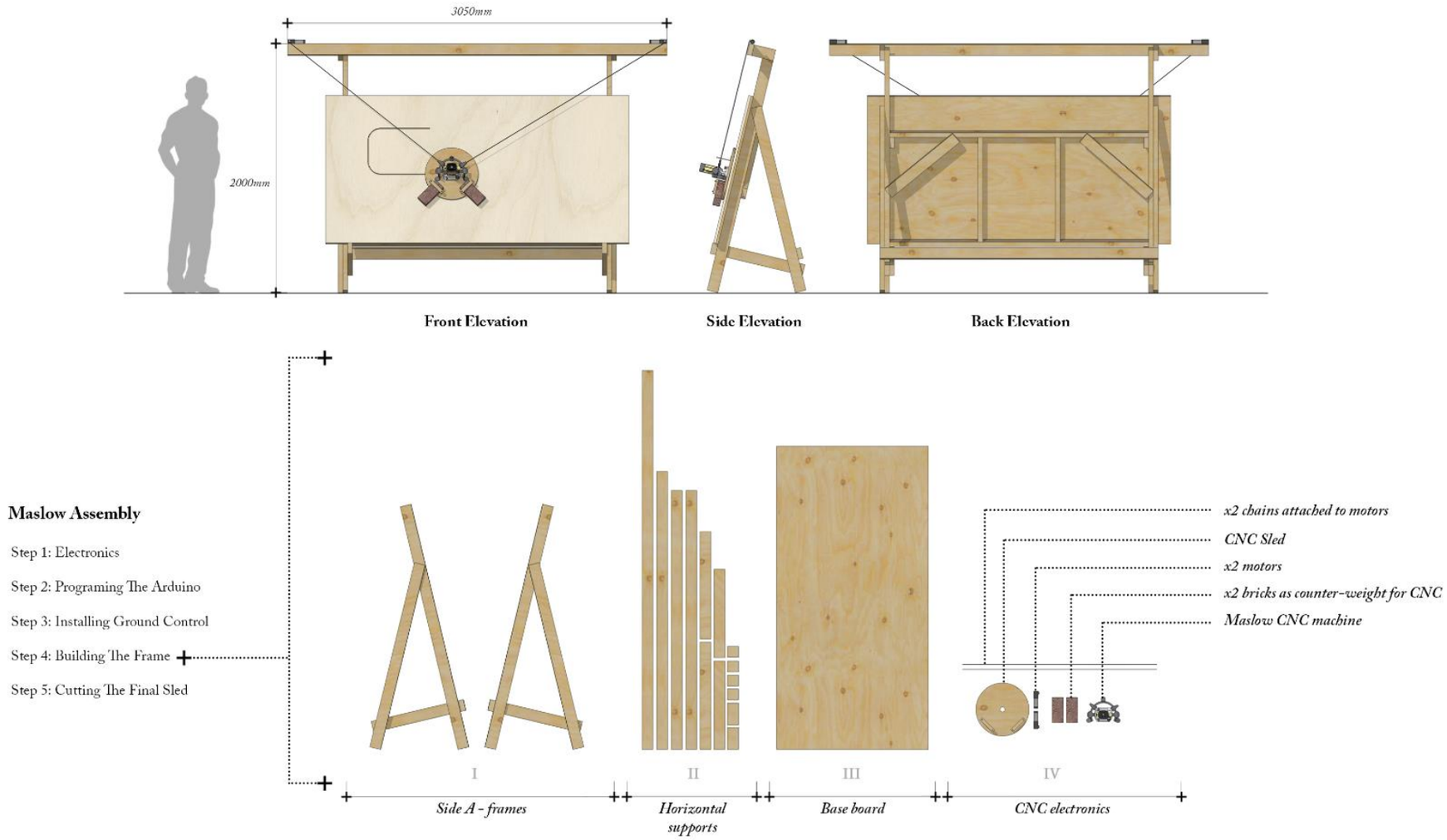


Figure 17 – CNC Machine by Maslow. Components + Assembly Guide. (Source: By Author)

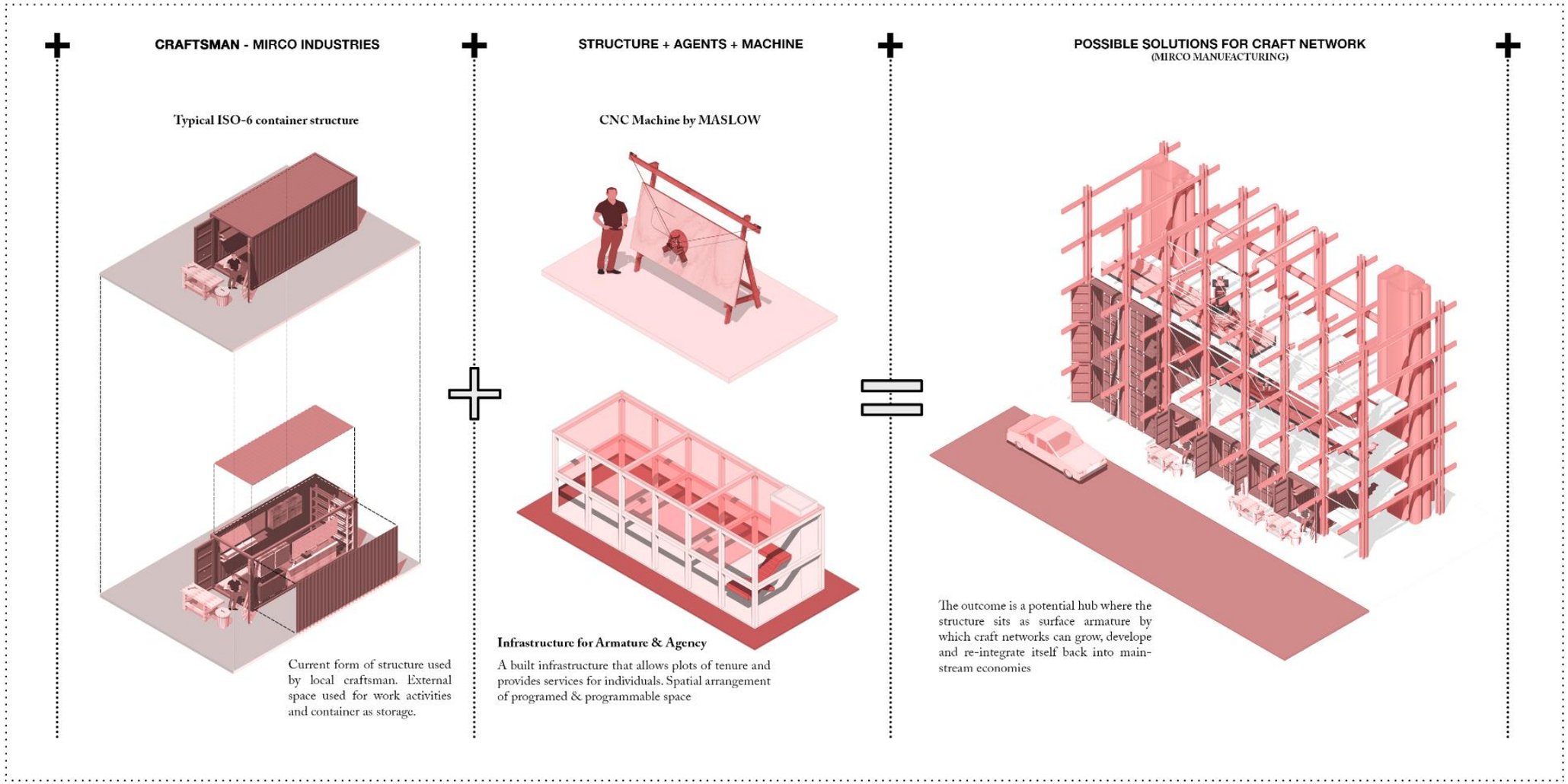


Figure 18 – Spatial Exploration. Urban armature and Infrastructure. (Source: By Author)

Concluding thoughts, Findings & Themes

To conclude the theoretical framework on theory and technology in practice, where certain themes might fall away, and others might be investigated further to act as the vehicle for the architectural project and design. The happenings of digital fabrication for architecture are inspiring in a sense as investigated and explored in the examples mentioned previously - this not acting as a catalyst for design but also bring about more questions on the future of the architecture profession.

Firstly, the question on education comes to mind whereby institutions are molding a new generation of architects that can design and think in a digital way.

Secondly, in clearly understanding the case study examples of digital techniques in the making of contemporary architecture has cemented itself in an indispensable way within the architectural design practice - this enables architecture as a profession to adapt to present conditions and to other future technologies.

These case studies investigated along with theory explored speculates on how the design dissertation might graft the possible synthesis of craft and digital fabrication techniques as the primary design informant, its socio-technological aspects in potential sites for production with an emphasis on context, a place of high unemployment, and need for construction methods that facilitate conditions for job creations, education, and knowledge sharing through labour and existing artisanal networks in Philippi. (See, Figure 19)

Finally, the last question that emerged was," What is the definition of the architectural profession in the contemporary world?". I assume answers to this question will be conveyed in a completely digitized manner that comes from professions other than architecture. Therefore, it's inevitable that the rules, materials, and education of the professional needs to be able to rebuild itself repeatedly.

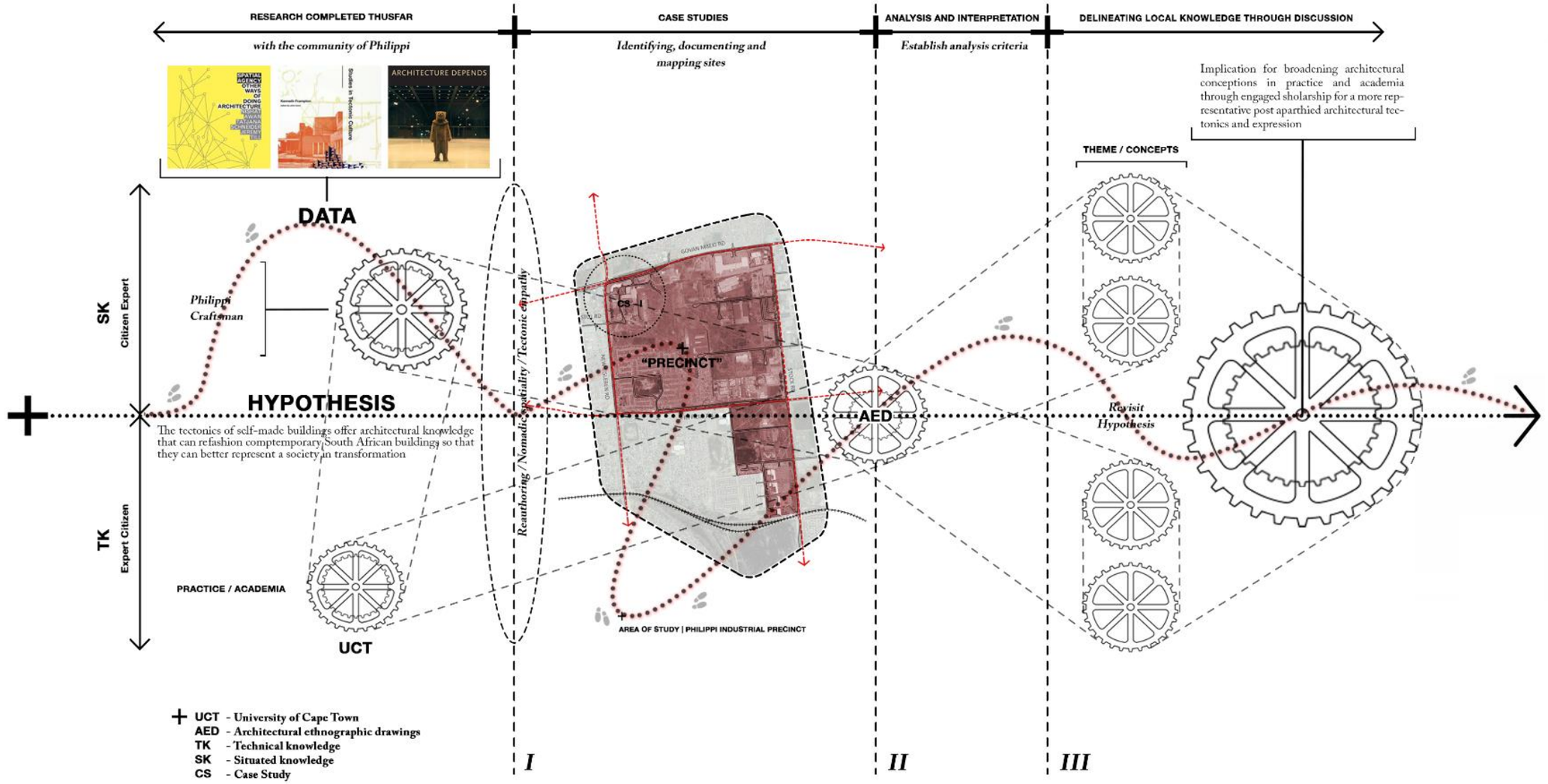


Figure 19 – Explorative mind map of 'Theory + Technology' discourse. (Source: By Author)

SECTION 4 | Siting + Contextual Analysis

Background: Finding Site

Philippi East – Establishing the theoretical framework.

Spatial Context | Identifying Philippi Industrial Precinct as a site of urban potential, resilience, and manufacturing production.

The dissertation sets forth to locate the architectural project within urban periphery supported in the theory of the wisdom of a place. This provides the contextual landscape to investigate the untapped population which represents a potential source of creativity in providing a basis for the designer to act as a mediator between the undeveloped context, and the formal systems that brings architecture into being, traditionally protects the ingenuity of the architect. The grounds of the Cape Flats compiled by fragmentation in the spatial organization is evident in the separation of economic opportunity and residential/ low-density urban sprawl. This is visible in the location of the Philippi east precinct. (See, Figure 20)

Part of the architectural proposition embedded in the wisdom of the place is to refocus the attention on developing new urban potentials within city's periphery. One that provides inclusivity spatial re-generation and increases the socio-economic landscape. Therefore, the acts craft as innovation foregrounds the attempt to develop the context through a social transformation lens whereby seeking to find ways for small-scaled interventions and appropriate use of technology to engage with craftspeople and their work. As a result, the physical and social reorganization of the informal city requires more synergy between urban growth and mobility through densification and the provision of high-quality public transportation.

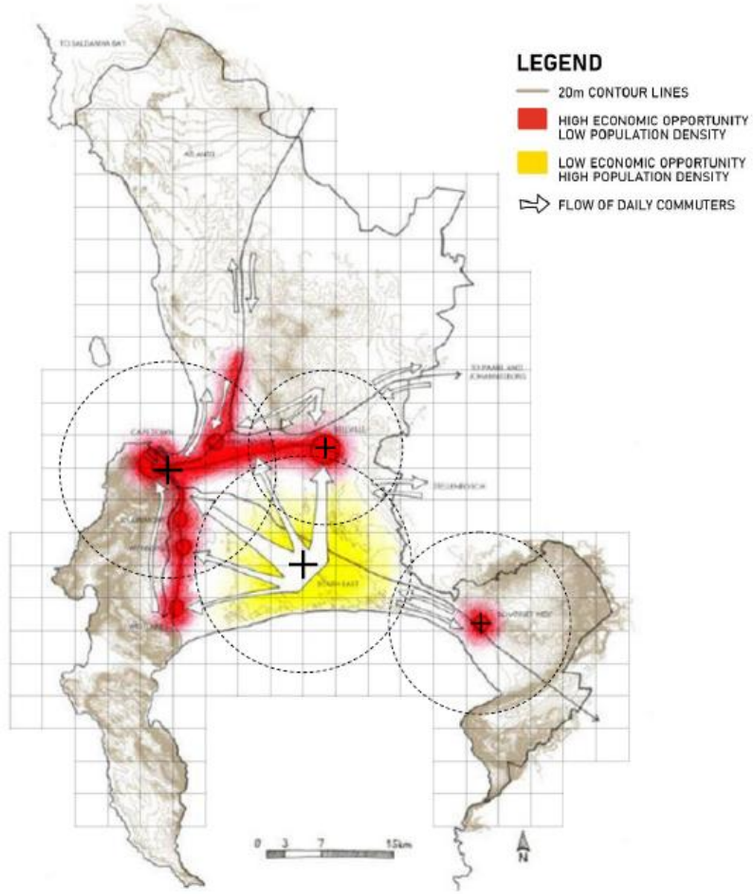


Figure 20 – A map depicting the land of opportunity that the rest of Cape Town commutes towards.

With the investigation into the envisaged proposal by the city the architectural project is to sit in alignment with the planners of the precinct and surrounding areas, where it was agreed that economic development should happen simultaneously with the spatial development, or else it would fail. Lessons of this investigation provide clues to the architectural programmes that addresses a triad spectrum of economic opportunity, social development, and the environment. Community education and upliftment spaces would be needed to create community ownership of investment in infrastructure and business.

Philippi is located 25km's from the well-established CBD of Cape Town and established in the early 1980's as a mixed-race township during the apartheid era. (See, Figure 21) Philippi has also been identified as an important economic growth hub inside the city. The area's central location, inexpensive and available empty land, closeness to the Cape Town International Airport, and substantial road infrastructure via the N2 and R300 all contribute to Philippi's growth and development. Finally, Philippi echoes resilience in a survivalist way and possesses a vibrant urban culture all assembled by the everyday happenings of micro-enterprises shaping the built environment of the marginalized.

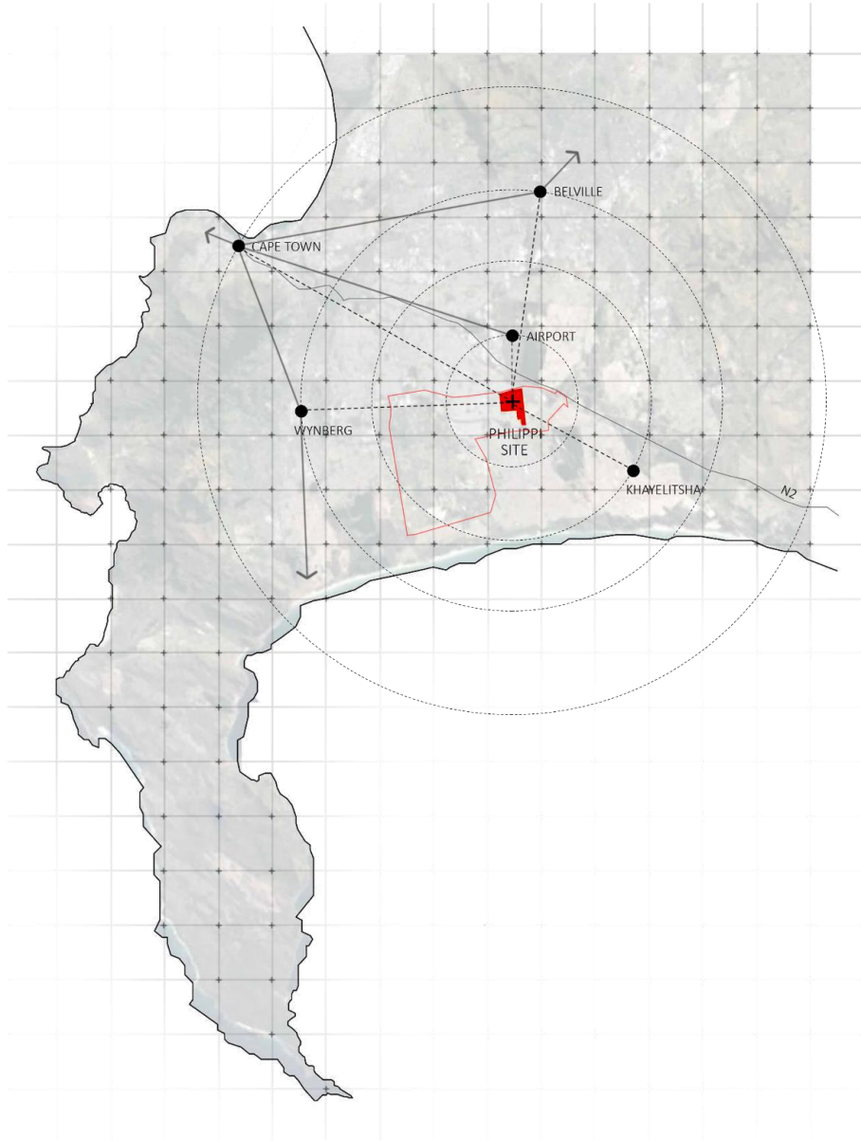
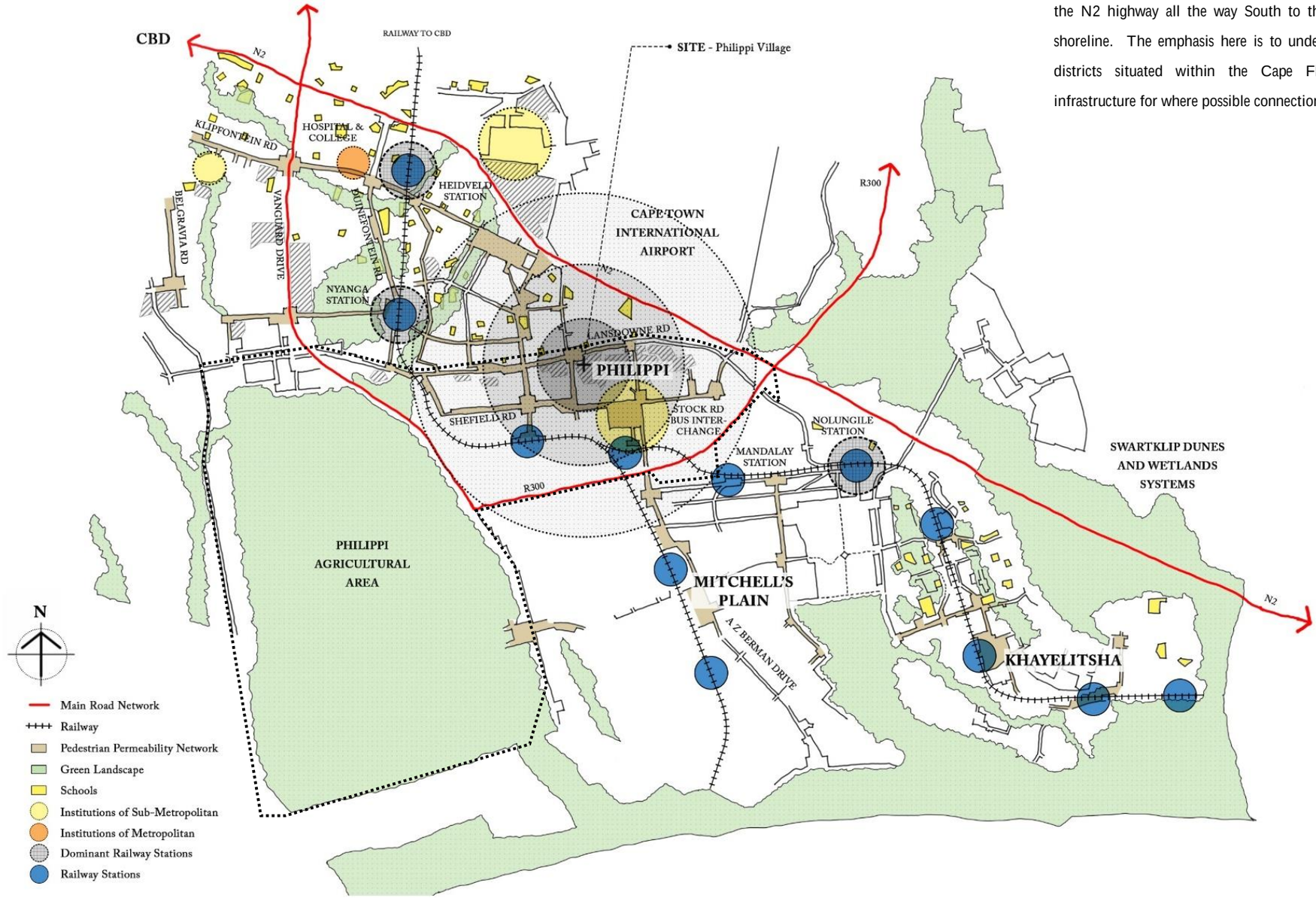


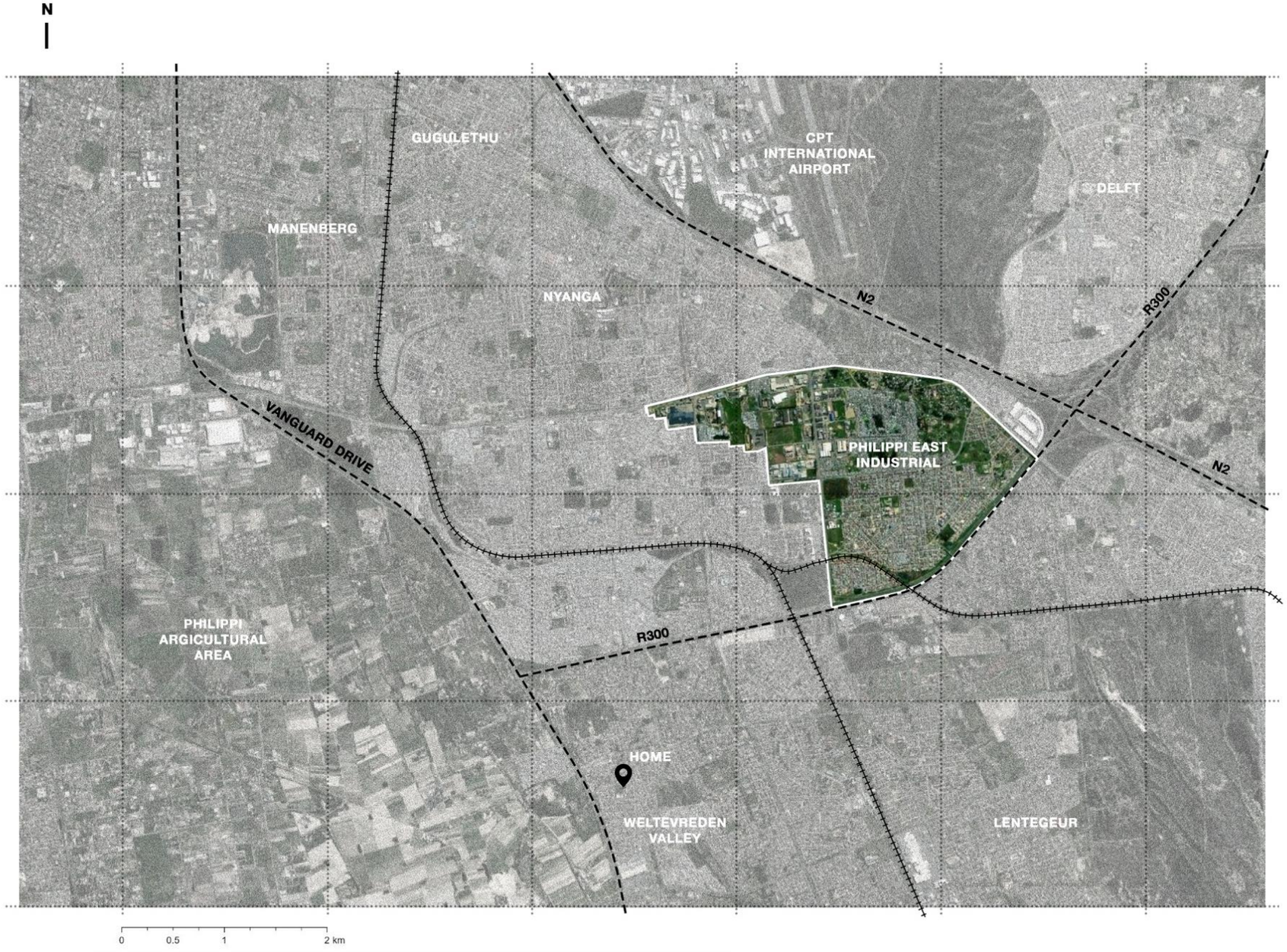
Figure 21 – City of Cape Town. Metropolitan map vs location of Philippi. (Source: By Author)

Macro Analysis – Urban Corridors

Institutional landscape, Landscape, Railway stations + Main Road network.

+ Contextual mapping of the broader Philippi area that stretches from the N2 highway all the way South to the Standfontein on the shoreline. The emphasis here is to understand the surrounding districts situated within the Cape Flats and the existing infrastructure for where possible connection could be made.



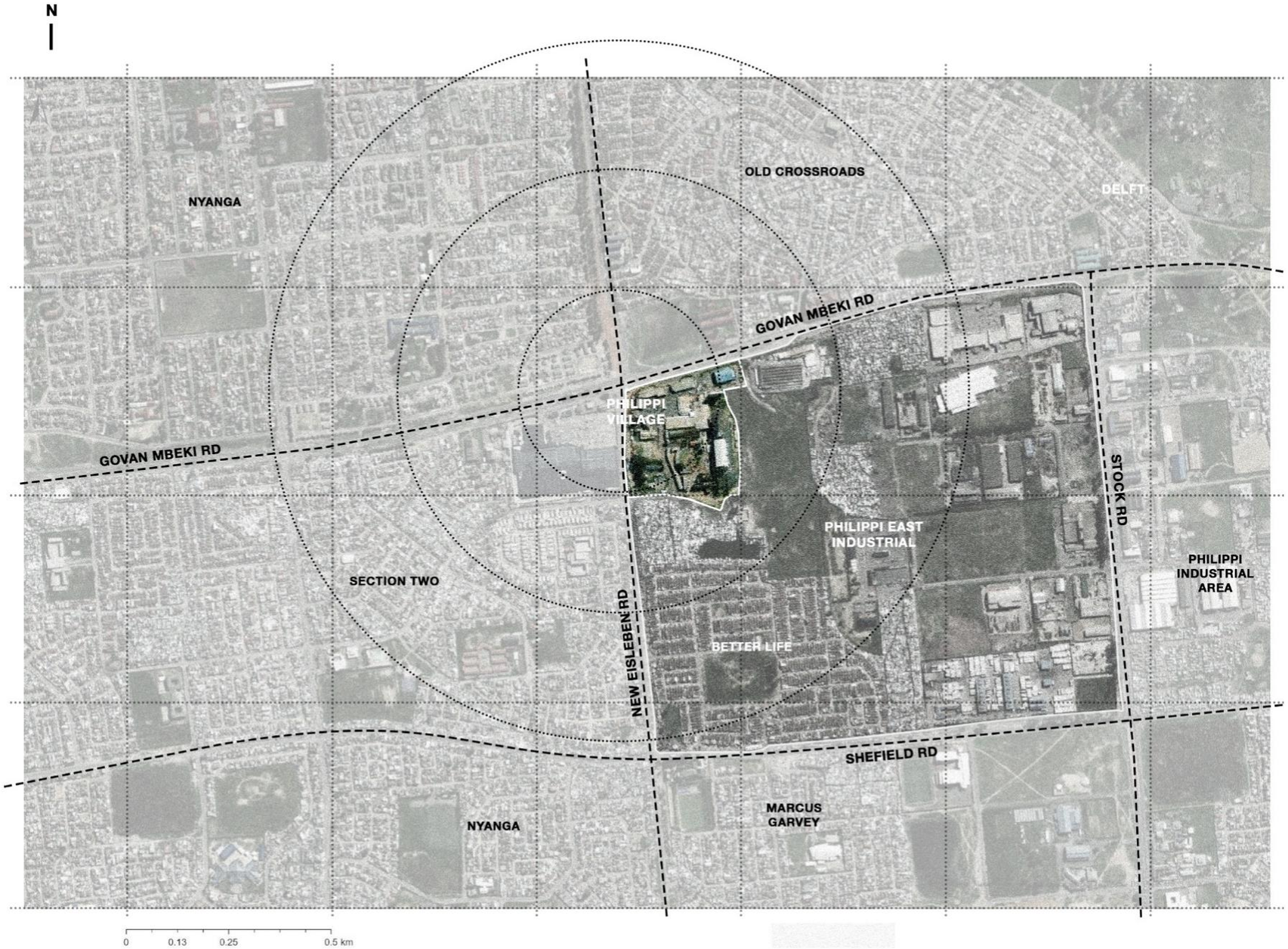


Philippi Village location – East Industrial Precinct (Source: By Author)

Macro Analysis

Industry, Urban Sprawl, Pedestrian Permeability + Main Road network.

Contextual mapping with emphasis on formal industry, urban sprawl, and main road network. This analysis informed the following investigation into main nodes of activity in the Philippi East area. The primary location selected for the dissertation was the Philippi Industrial Precinct.



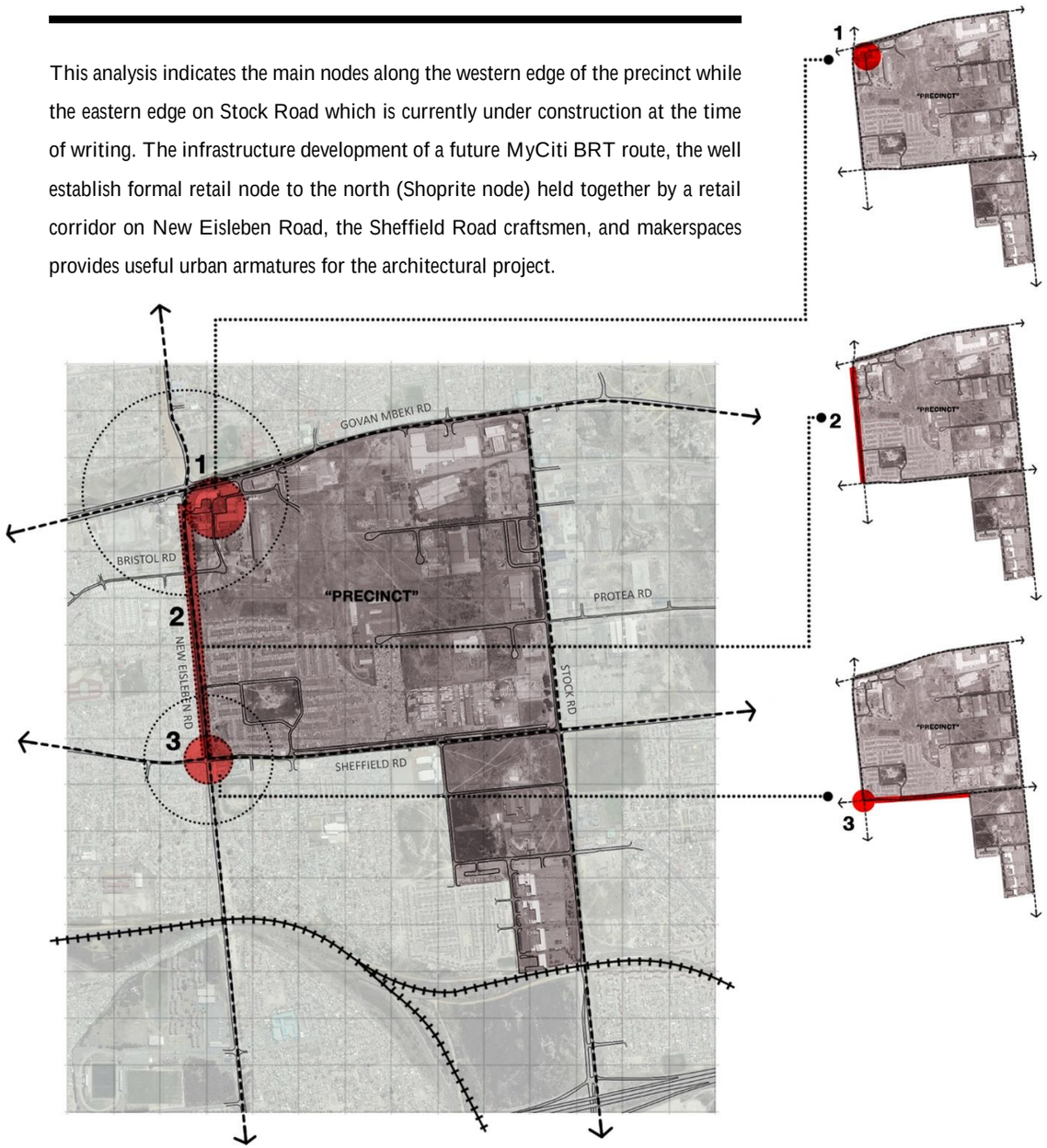
Philippi Village location – East Industrial Precinct (Source: By Author)

Figure 22 - Aerial view taken in 2014 of Philippi Village. (Source: By PEDI)

Node Analysis

Philippi Industrial Precinct – Site of trade and commerce.

This analysis indicates the main nodes along the western edge of the precinct while the eastern edge on Stock Road which is currently under construction at the time of writing. The infrastructure development of a future MyCiti BRT route, the well establish formal retail node to the north (Shoprite node) held together by a retail corridor on New Eisleben Road, the Sheffield Road craftsmen, and makerspaces provides useful urban armatures for the architectural project.



1-Shoprite Node

Trading here is activated by the Shoprite shopping centre as well the transport node of the amaphela (taxi's) which pedestrians use to commute to and from the shopping centre. The node is divided into two areas: the Shoprite parking lot and an empty plot next to the Magistrate court which is used by second-hand clothing sellers. Traders in this area will not be directly affected by the BRT construction

2-New Eisleben Road

Trading is activated by pedestrain movement from the adjacent communities walking to and from the Shoprite node. This retail corridor can be catergorized into North (mechanics), middle (food vendors) and the most dominant micro enterprises found on the South (building services, furniture and hardware). These traders will be directly affected by the BRT route construction as they occupy an enlarged side walk located on the inside perimeter of the precinct

3-Sheffield Road

Another busy retail corridor activated by the surrounding residential areas as well as pedestrian and vehicle traffic. Trading is concentrated on the center islands between roads and is dominated by hair salons, furniture, food and churches. This road will be affected by the BRT route construction

Figure 23 – Conditions of existing informal trade at retail nodes. (Source: By Author)

Self-Build Culture

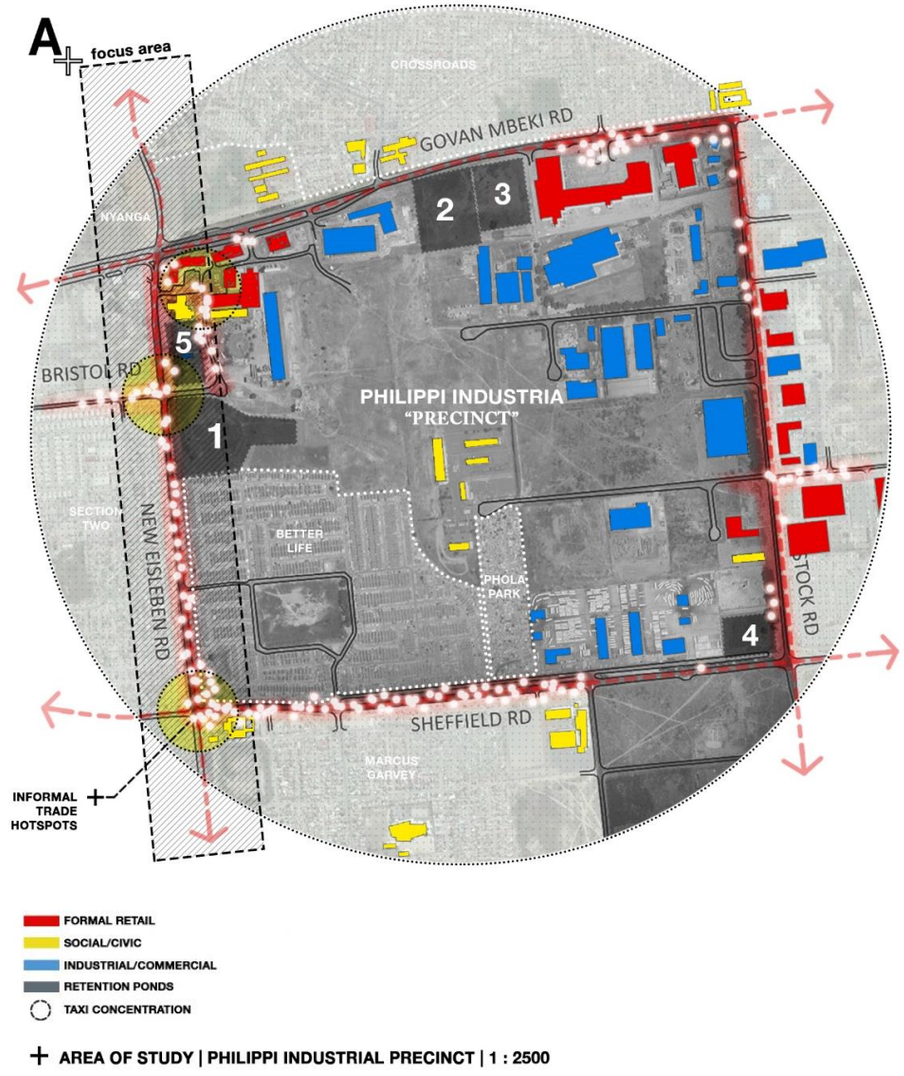
Understanding the quiet practices that engender social change.

Furthermore, the self-build industry has emerged on the perimeter roads of the precinct and predominantly exists along New Eisleben Road. The precinct analysis indicates the formalized retail/ industry in contrast to the informal micro-enterprises. These existing building practices have stood the test of time in the rapid growth of Philippi, hence the importance the craft, understood and defined by its ability to be innovative.

As a result of the analysis, one of the most prominent local micro enterprises within Philippi is the food traders sustaining the public life and more importantly the building trade industry that shapes the built environment along these corridors. Additionally, hardware stores cater to shanty town dwellers with building materials and offer general artisan skills in the form of labour. A sense of circulated community.

These act as a source of vitamins for the architectural project underpinning the conceptual design in the development of a nuanced interpretation of craft through the everyday conditions, the situated knowledge, and local ways of making.

Figure 24 – Local manufacturing and workshop, Philippi. (Source: By Author)



Township Economies

A lexicon on micro-enterprises and informal traders.

The precinct analysis indicates the formalized retail/ industry in contrast to the informal micro-enterprises. These existing building practices have stood the test of time in the rapid growth of Philippi, hence the importance the craft, understood and defined by its ability to be innovative. Therefore, the project proposes a critical component with regards to the user groups to occupy the site and the necessary infrastructure required for sustainable township economies.

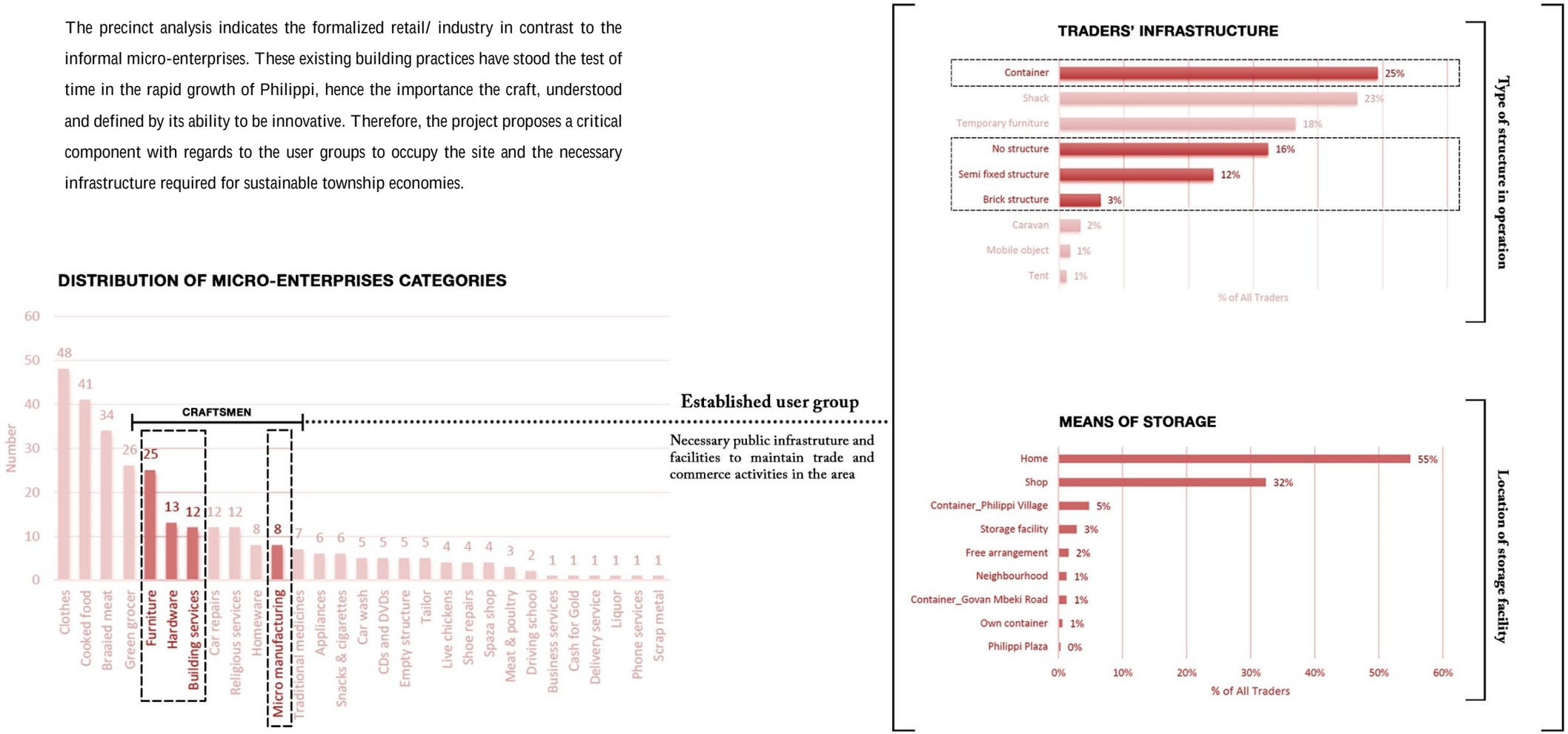


Figure 25- Distribution of Micro-Enterprises | A development vision for informal micro-enterprises in Philippi East Industrial area (Source: By PEDI)

TOWNSHIP ECOMOMIES

MICRO-ENTERPRISES & INFORMAL TRADERS

ISO 6 - METAL FABRICTOR

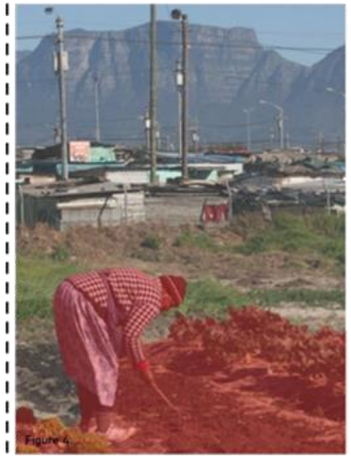
Shipping container often used for commercial, 'high street', activity in the informal economy

ISO 6 - SALON/BARBER

Beauty salons/ barbers can be found on the high streets and at almost every second corner of the neighbourhoods of Philippi

ISO 6 - TUCK SHOP

A compact shop type that is made up of a front counter as a point-of-sale to customers and a back storage area



URBAN FARMING

Agrarian cultures and rural knowledges have found continuation amongst the chaotic urban environment of the township

STREET VENDOR

Street vending varies from portable and fixed types. It is a popular commercial system, often beginning as a temporary use of space on a pavement, but eventually assuming a more formal and permanent claim to the spot. *Fisher, et al., 2018*

LOCAL CRAFTSMAN

The ISO 6 container - is a 6 metre long, 2.4 metre wide and 2.6 metre high shipping container

METAL FABRICATORS

Fabricating gates, framework for windows and doors, etc

BUILDERS

Constructing flatpack homes, small scale residential homes, etc

CARPENTERS

Manufacture furniture items, security gates, dog kennels, etc

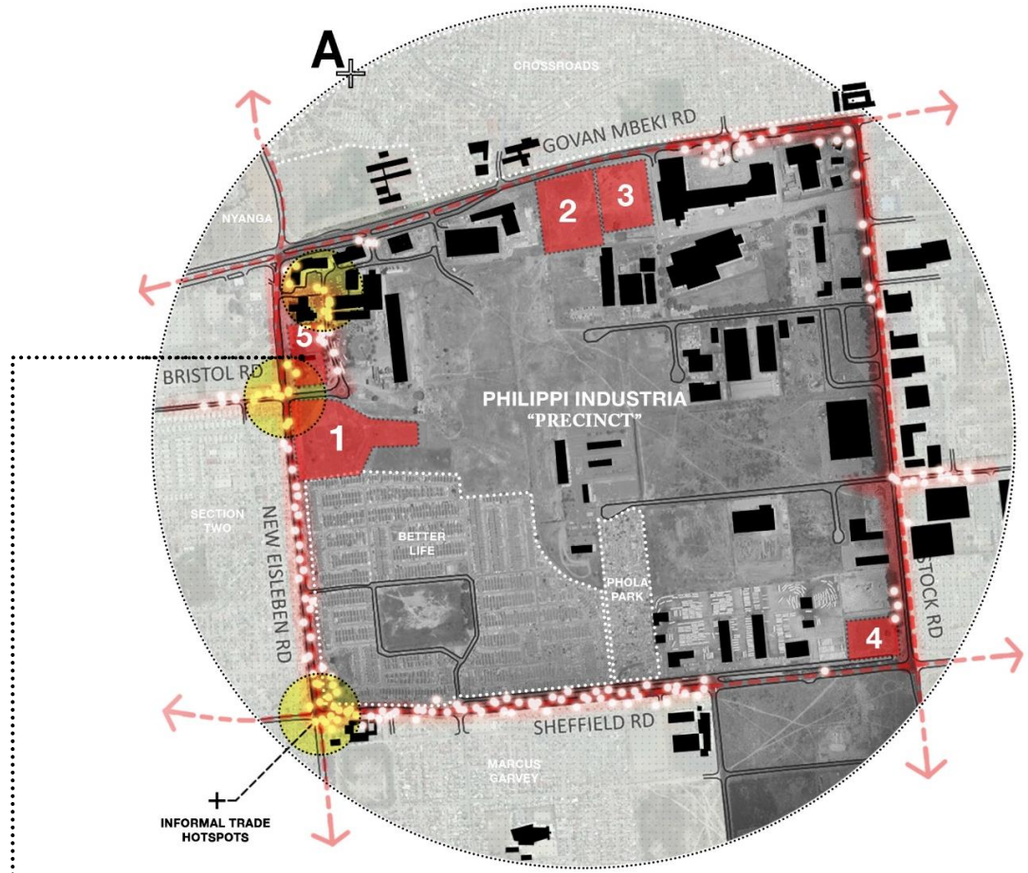
Figure 26 - Observed on the ground township economies (Source: By Author)

Site Selection

With the early focus on the wisdom of a place and the embedded local knowledge in the theoretical discourse of dissertation formed the medium of negotiating encounters between the community, craftspeople, and the various everyday practices, therefore the process of selecting a was informed by these existing conditions and practices. Part of the selection was done by analyzing strategically located and underutilized land in the Philippi Industrial Precinct. (See, Figure) Various options was presented in this mapping analysis and site 5 was chosen for the testing of the architectural intervention.

The decision was informed by the major retail node found at the intersection of Govan Mbeki Rd and New Eisleben Rd, an informal retail corridor on New Eisleben Rd adjacent to the site, proximity the existing container walk and Philippi Village Hub offering retail tenure and entrepreneurial opportunities which would benefit collaboration and upskilling of the community in the dominant cultural practices.

The site also takes advantage of being a mediator between north and south nodes on New Eisleben Rd. The proposed road widening will have a positive and negative effect on established micro-enterprises that utilize the street frontages. Firstly, it provides better accessibility with quality transport connectivity where a constant influx people traveling to and from the formal/ informal retail nodes. Secondly, the site would need to maintain the essence of high street interface and provide space for the everyday conditions to informal traders who would need to relocate along New Eisleben Rd.



DETAILS OF STRATEGICALLY LOCATED UNDERUTILISED LAND

ERF 12718	1	**New Eisleben Road** Oasis Cresent Land Developers Pty Ltd	Vacant - recently occupied	General Industrial 1	21923m²
ERF 20193	2	**Govan Mbeki Road** Golden Falls Trading 337 Pty Ltd	Vacant - recently occupied	General Business 1	15947m²
ERF 66	3	**Govan Mbeki Road** -	Vacant - recently occupied	General Business 1	9067m²
ERF 20197	4	**Sheffield & Stock Road** Hollyberry Props 12 Pty Ltd	Golden Arrow bus holding	General Industrial 1	7900m²
ERF 11663	5	**New Eisleben Road** Philippi Magistrate's Court	Half of the plot is - Vacant	General Industrial 1	3204m²

Built Environment & Industrial Fabric

The built environment of the Philippi East Industrial Precinct is marked by the old cement factory now currently occupied. The site is to take advantage of the additional parking, public amenties such as a library and amphitheatre, and formalize trading space of which relationships could be built with retail tenture offered by the container walk. The site sits in proximity to shops, services, and temporary employment.

Futuremore, the site is to take advantage of the existing trees, with additional landscaping, and hardscaping required to formalized the public space and form connections to the existing ones. With one shared boundary adjacent to the magistrate court the site offers interesting and yet challenging edge conditions of which to be considered. These include the trade/transport connects on New Eisleben, the public interface with the container walk, and the informal settlement to the south.

As a result, the missing elements of the surrounding buildings occupation lacks in places or services of formalized manufactining, where production activities can exist while leveraging on the building practices by craftsmen around the site, and to make use of the earmarked zoning of light industrial use. Therefore, the proposed project will be of the before mentioned conditions.

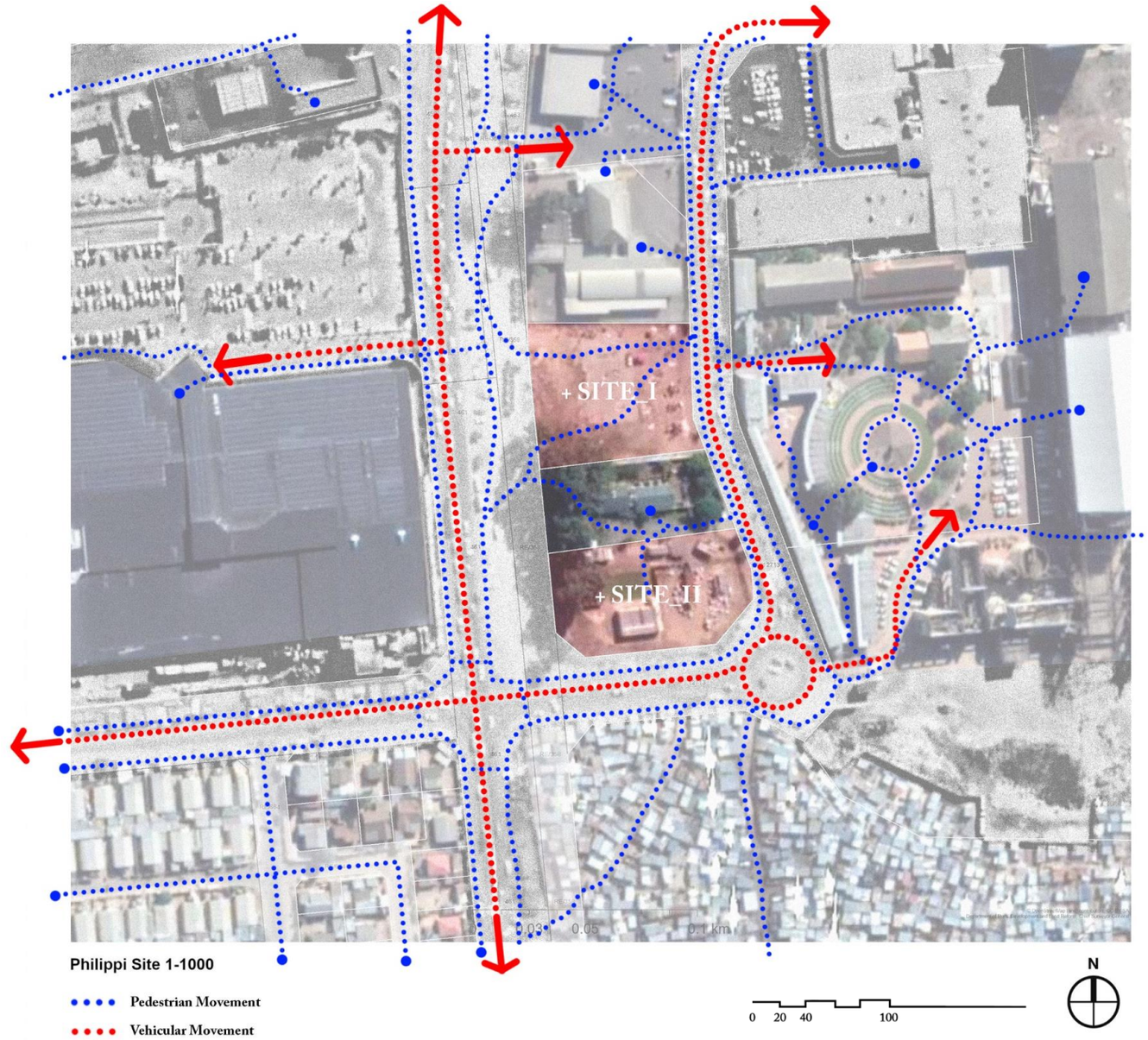
Figure 27 - Built Environment of Philippi Village (Photos by Author)

Micro Analysis

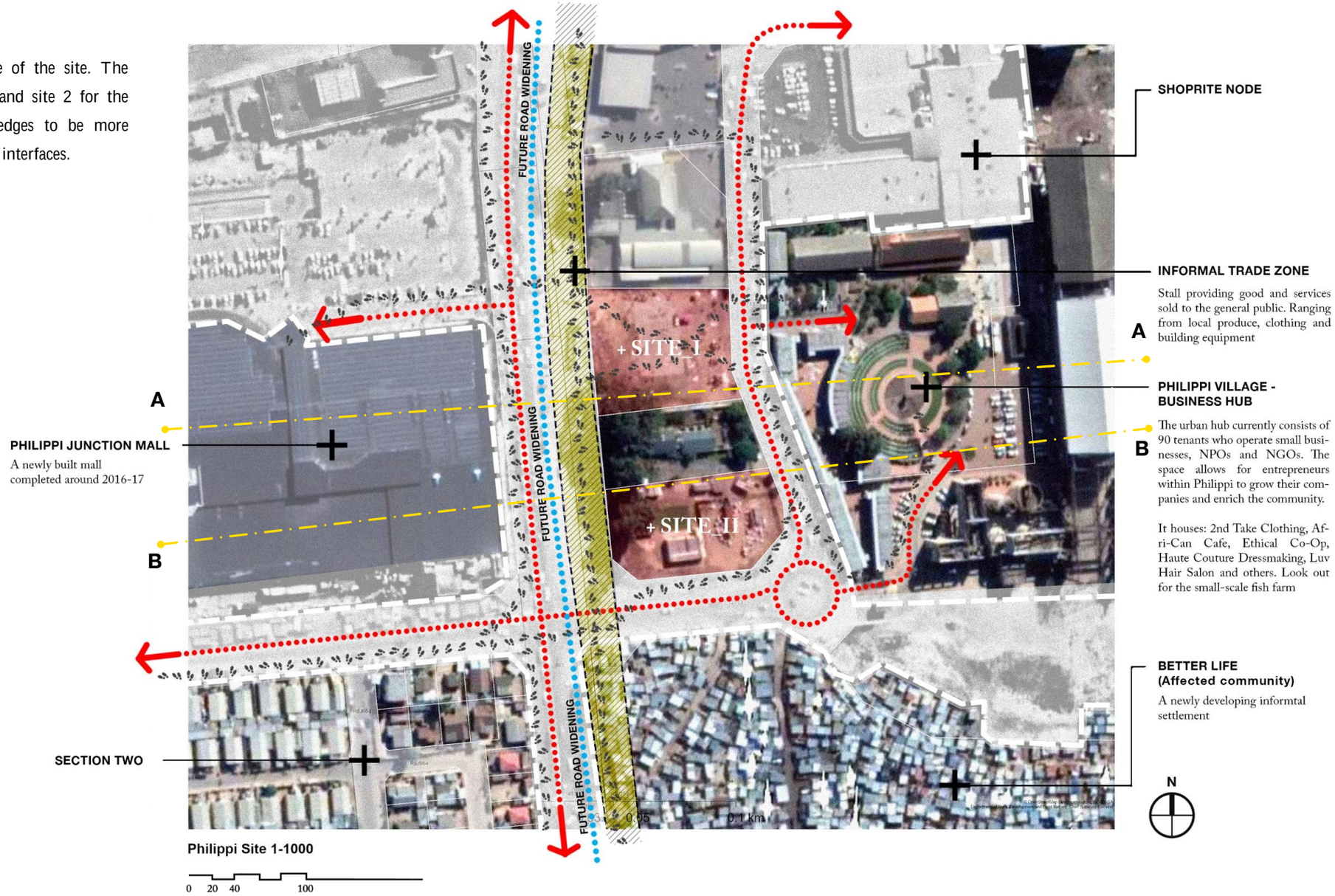
Activities and Movements around the Site

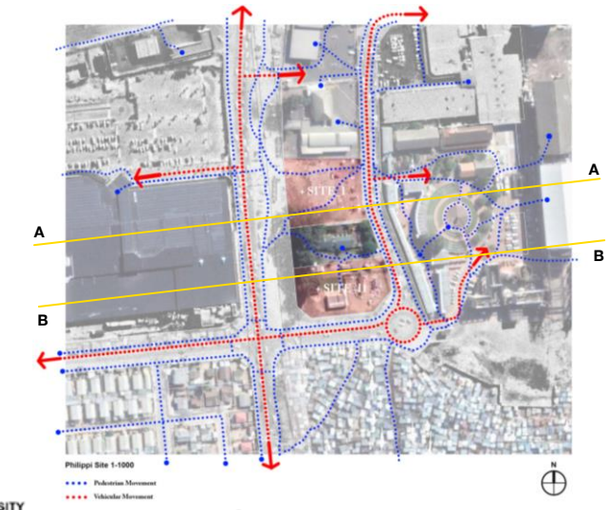
This analysis indicates existing pedestrian desire lines cross the site towards the Shoprite centre and vehicle routes on the main roads. Along New Eisleben Road MyCiti public transport lanes will be constructed, this presents an opportunity to introduce a new public transport node along that edge that would connect the pedestrian movement from the surrounding communities who move across the site to get to the shopping centre. Other activities on site 2 is the exisiting organizations under on hub partner called House of Smiles with varies NGO's providing a space of support and counselling for community members in the area.

As the site selection and proposed program being of a trade market and vocational training factility as a response to the exisitng conditions around the site. The decision here is to relocated some of these activities to a safer site and establish formal relationship with schools or civic buildings in the area to facilitate the occupation of certain organizations. The exisitng recyclying facility south-east on site 2, youth network and hub partner offices will be integrated into the program as a response to facilitate a program of training and shared resources for the youth and the craftsmen alike.

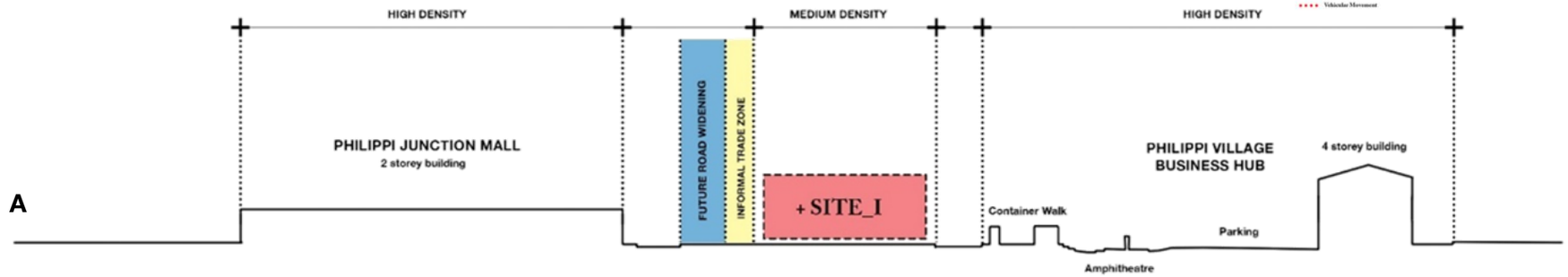


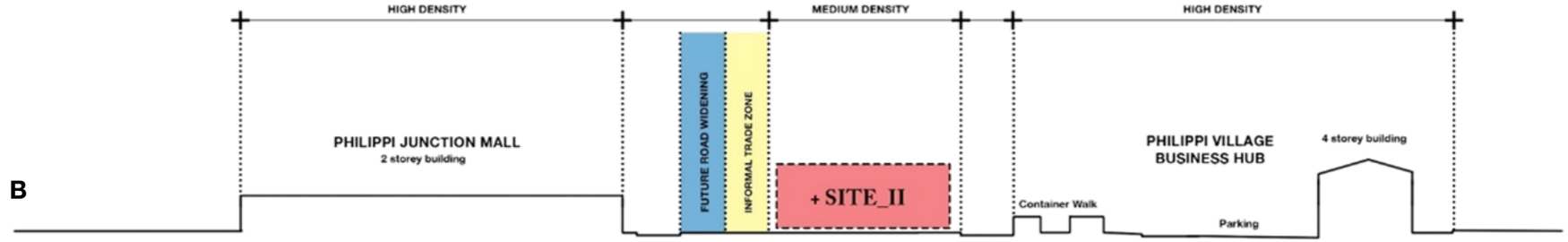
+ This map indicates the current state of the site. The emphasis here is to combine site 1 and site 2 for the architectural proposal allowing for edges to be more defined and to response to the existing interfaces.



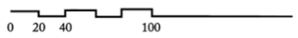


The contextual sections indicate the various building heights and its major edge conditions of the container walk and shopping mall.



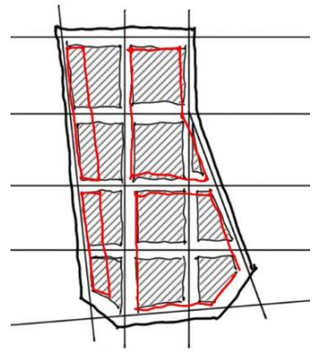


CONTEXTUAL SECTIONS | 1:1000

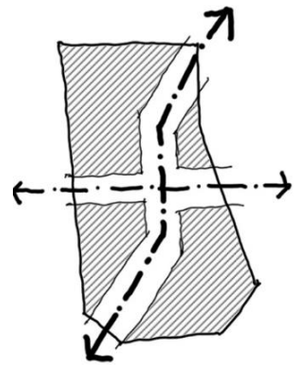


Urban Framework

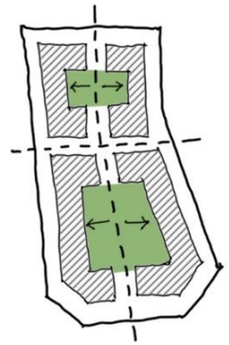
As part of the urban framework and proposal attempts to bring activity to the site in terms of production or manufacturing. Additionally, the proposed program will repsond to the existing public amenities in the form of vocational training and a cultural hub facility which would act a catalyst in mobilising the everyday condition and exsiting self-build practices. The existing amenities has informed the positioning a training facility with core focus on the micro-manufacturing and fabrication as a response to the industrial built environment.



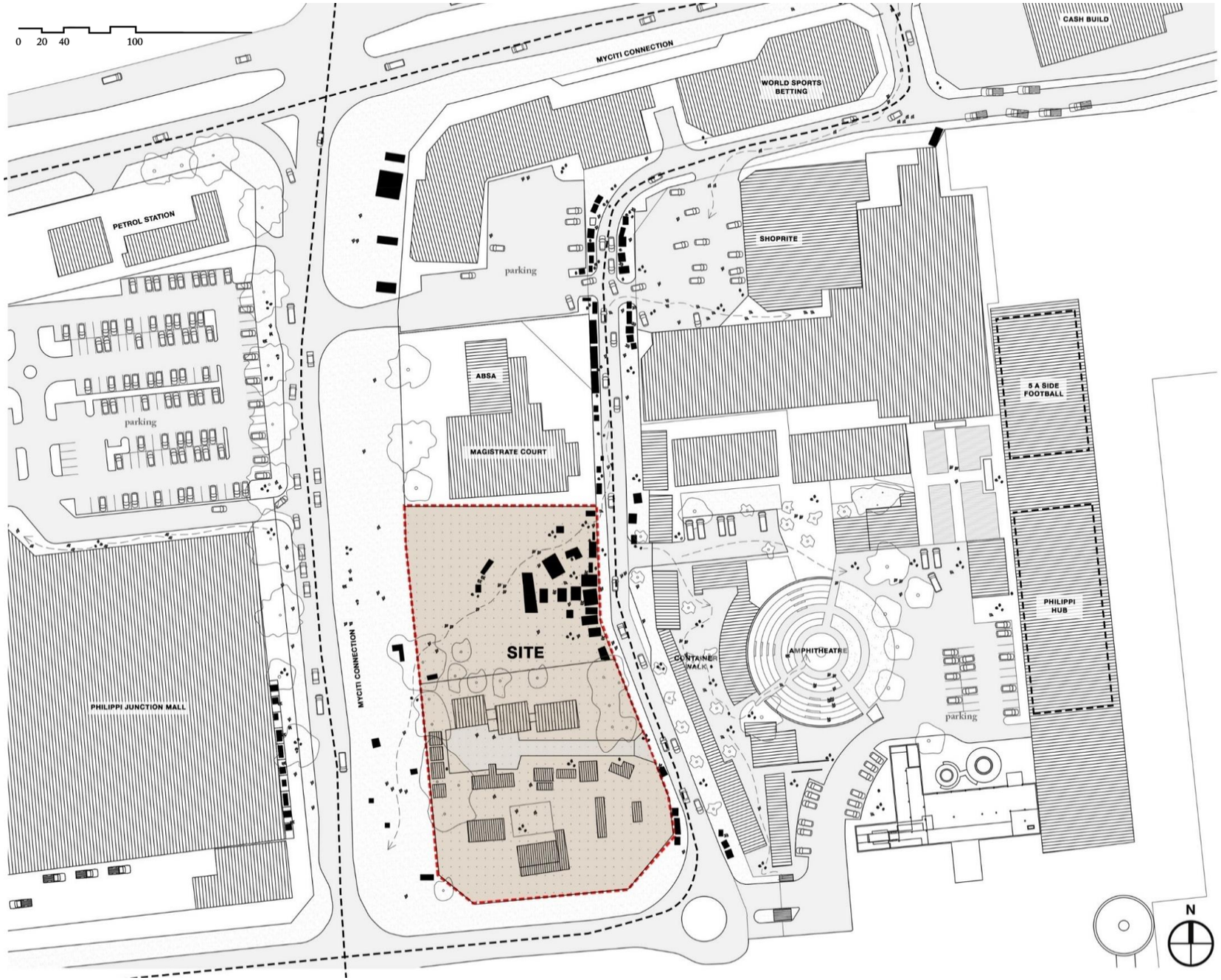
Grid rational



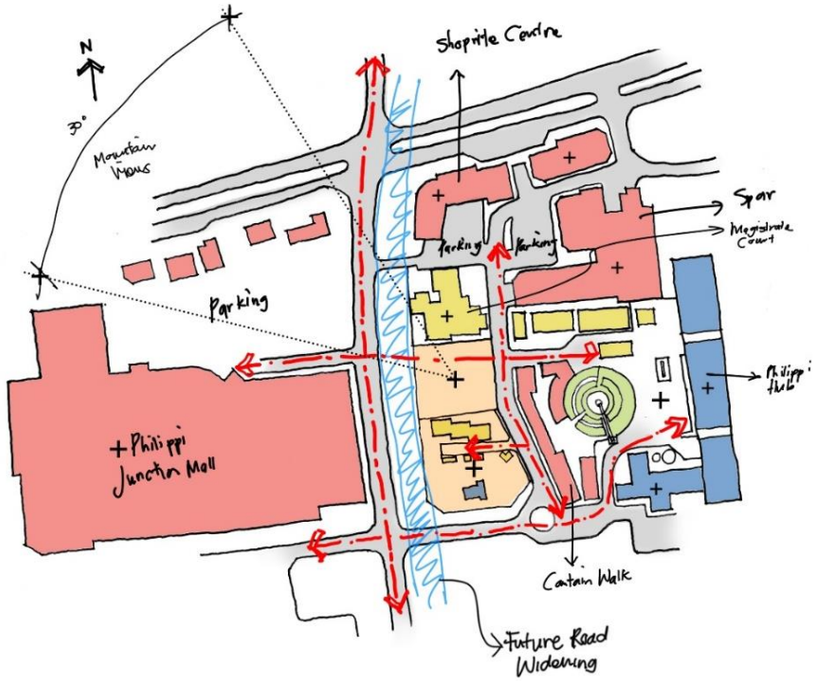
Thoroughfare - desire lines

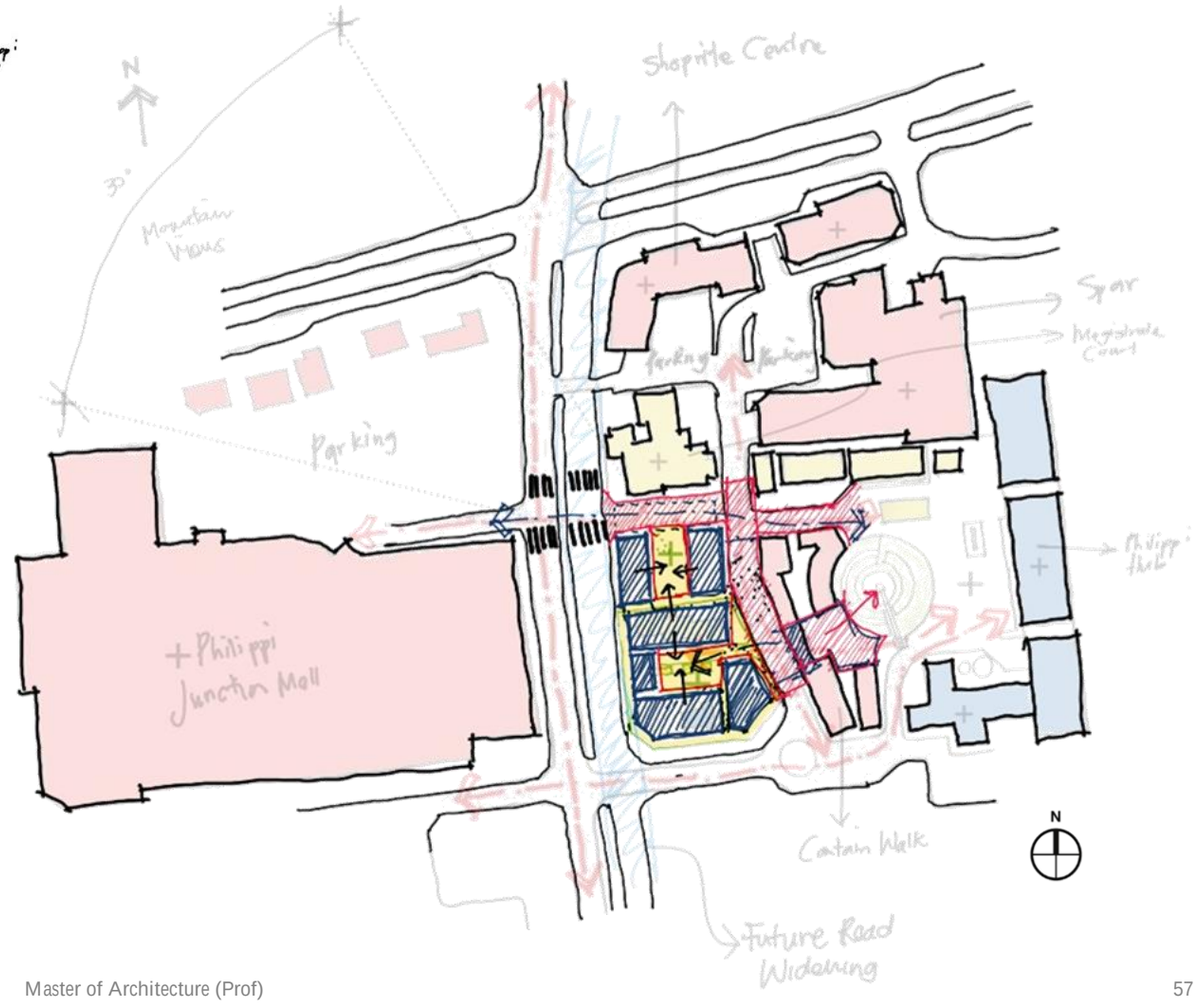


Public Courtyard



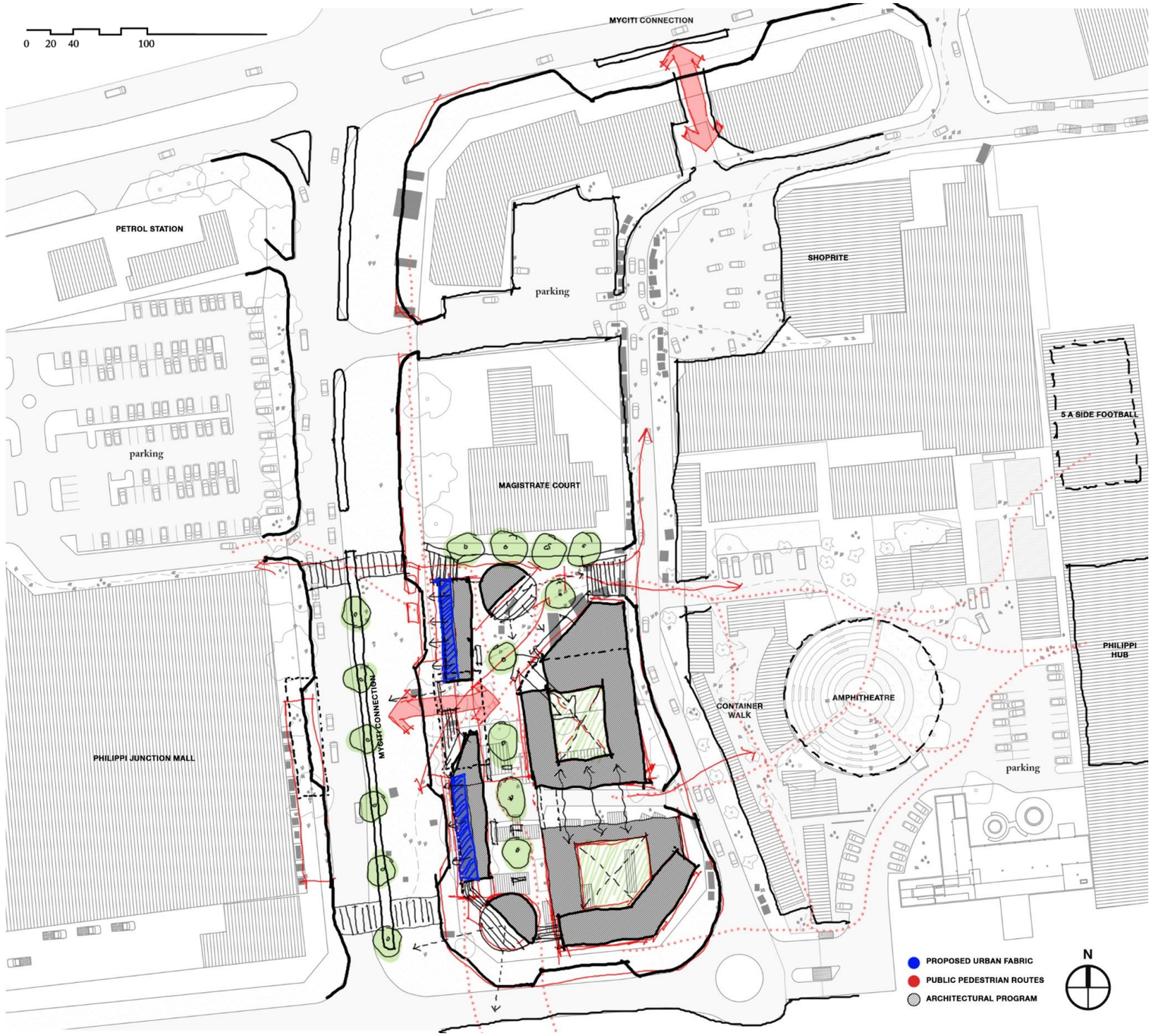
+ This map indicates the existing urban conditions and public amenities around the site.



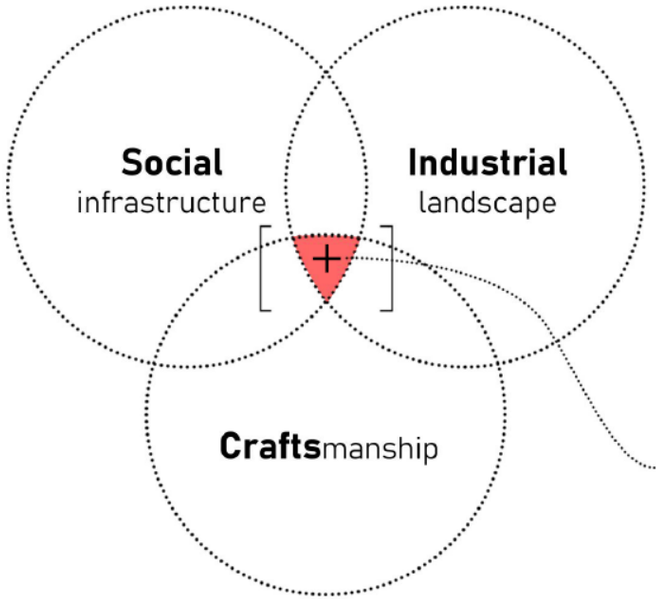


+ The site offers two street conditions on the main road and internal street. The initial attempt is to reinforce and maintain the retail corridor of the emerging high street on New Eisleben Road by defining the street edge interface to New Eisleben. The secondary internal road however will be of a different nature in the making of edges and threshold open public space which lead to the Shoprite node.

+ The site informants of public access through existing desire lines are to be maintained with a public thoroughfare linking the existing public amenities, formal retail, and informal trade. Therefore, the thoroughfare forms part of the spatial ordering in the urban framework. The figure ground of the architectural proposal is loose in the making and informed by the existing access road on the lower portion of the site and the number of additional routes across the site.

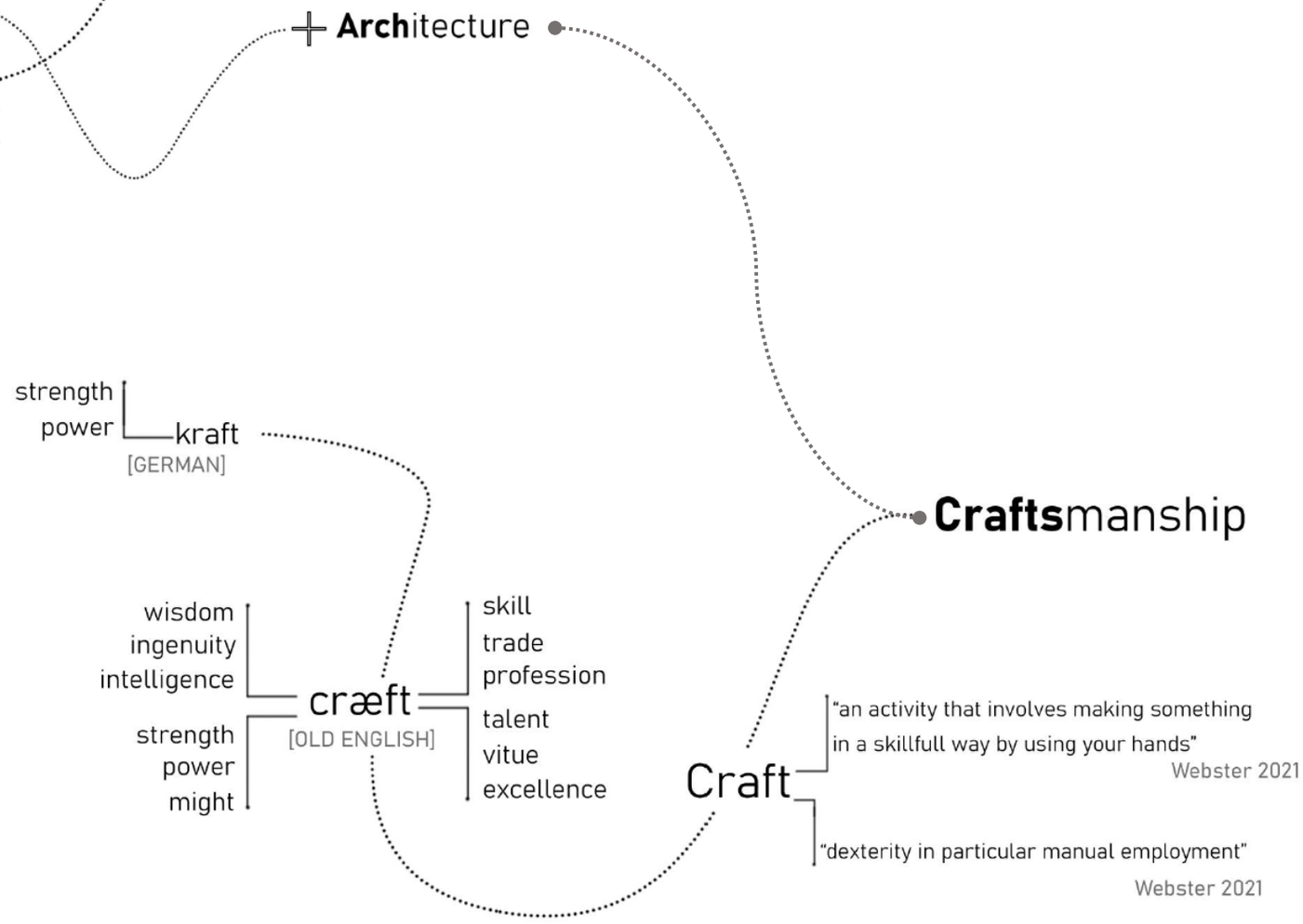


SECTION 5 | Conceptual Design

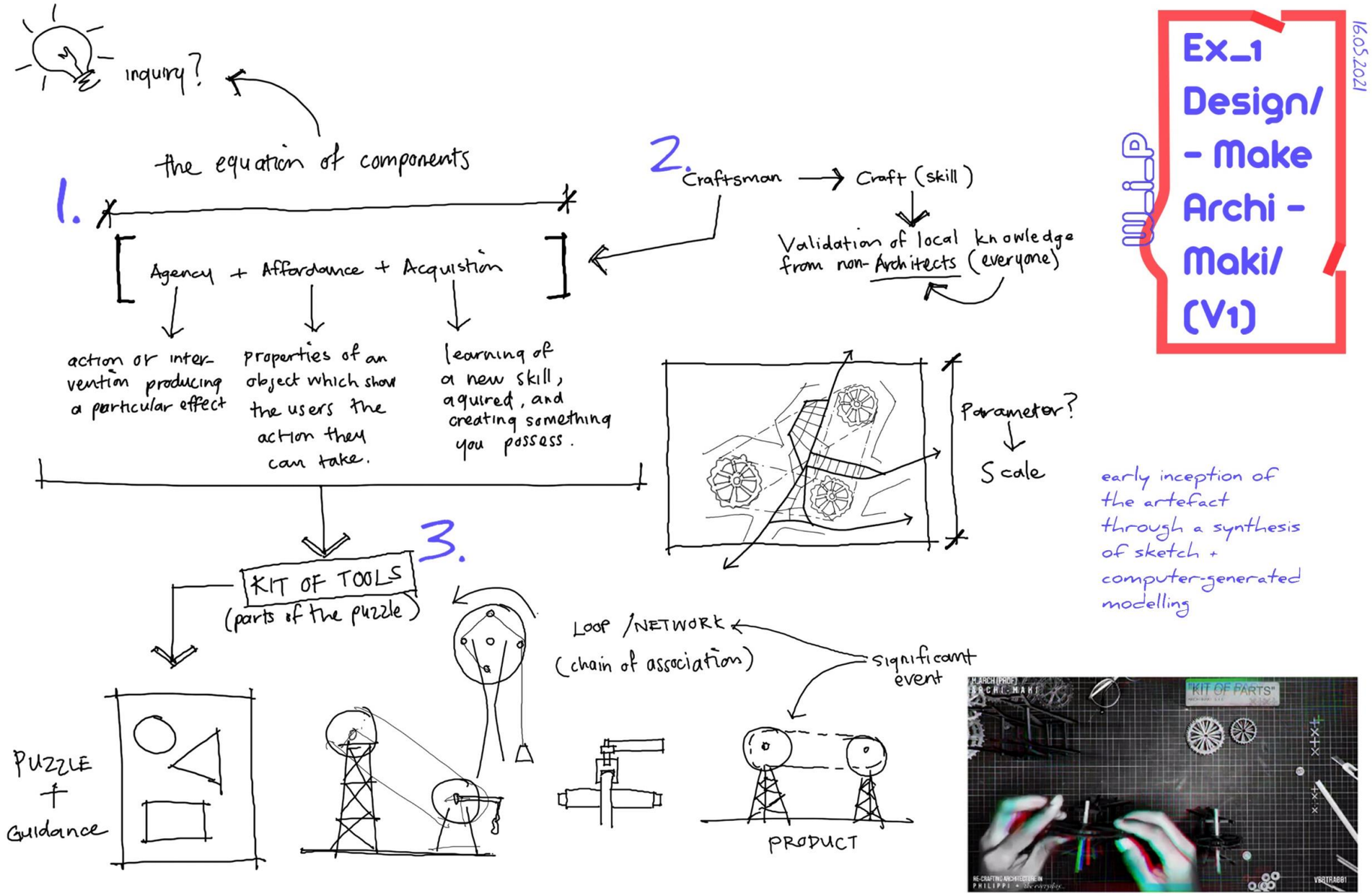


+ As to the conceptual unpinning of the architecture design the initial inquiry was driven by the following overlapping fields of interest: the social, the industrial landscape and the craftsman. Therefore, the inquiry seeks to explore the possibilities and opportunities through the architecture that forms the basis or catalyst for these diverse fields of interest.

+ The conceptual design process is taking into two main model making exercises to test the inquiry. Each model forms part of a sequence in abstracting ideas which consolidated into lessons learnt from each version into the final collage. The final version will inform the design brief in the making of the architectural project, the deriving of a hybrid the program and typology.

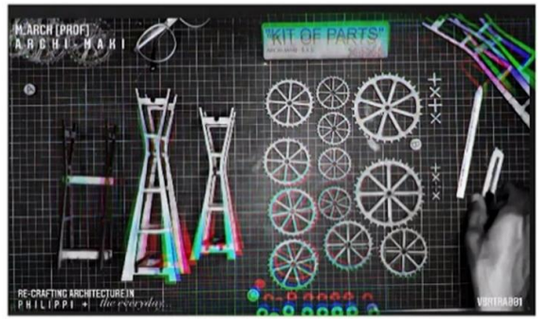


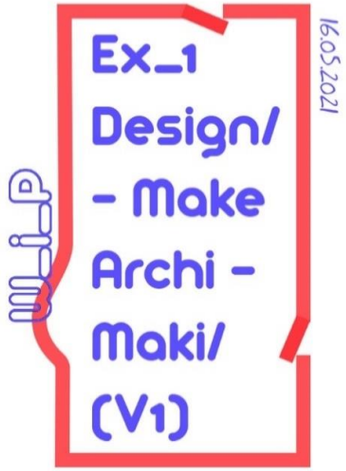
Archi-Maki | Version 1

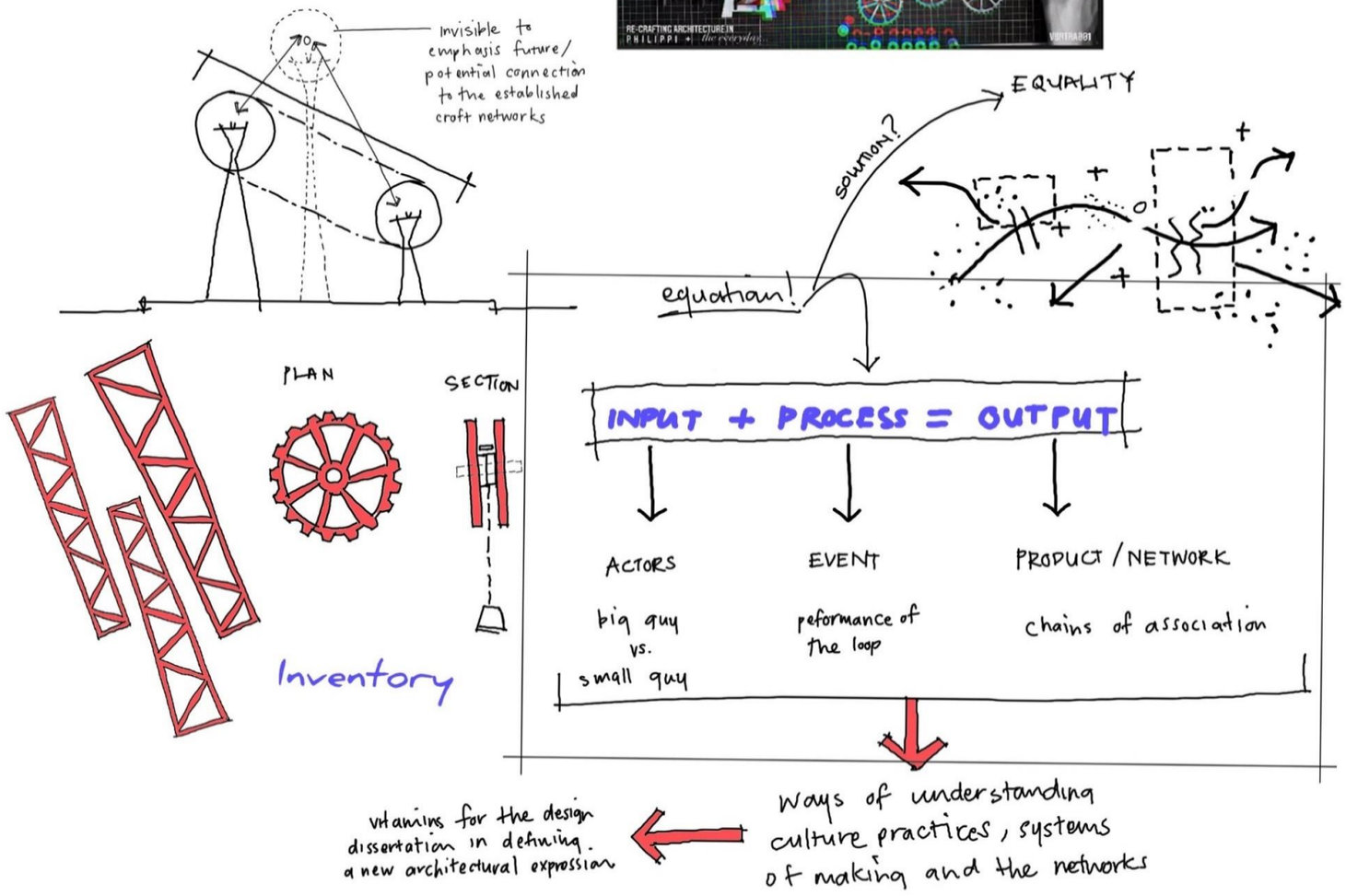


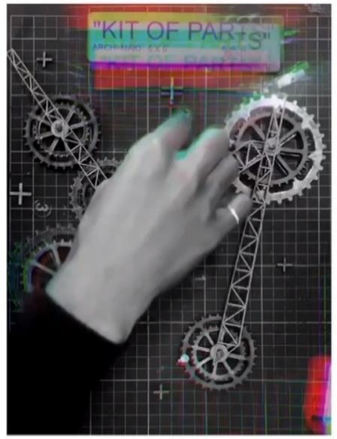
Archi-Maki | Version 1 continued

+ The initial stages of the early concept design process and work in progress of the artefact as an abstraction and lessons learnt from the theoretical discourse.

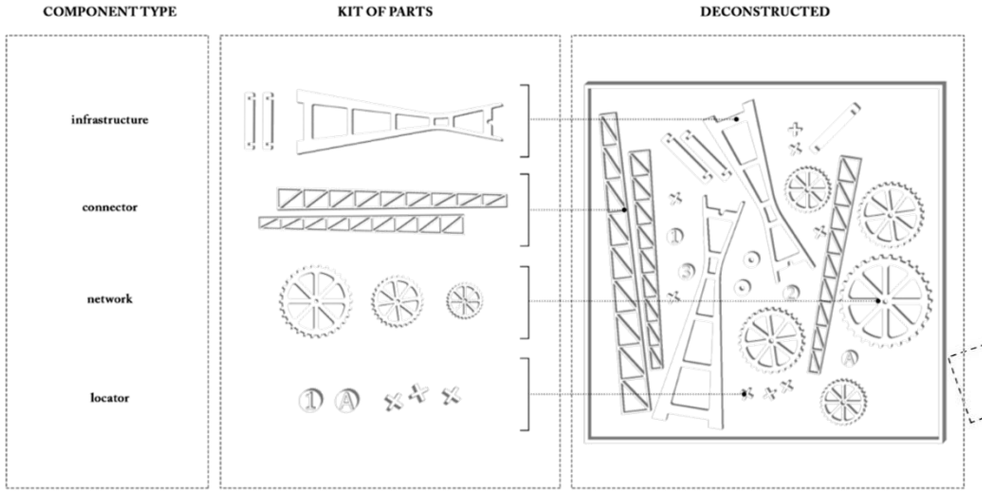


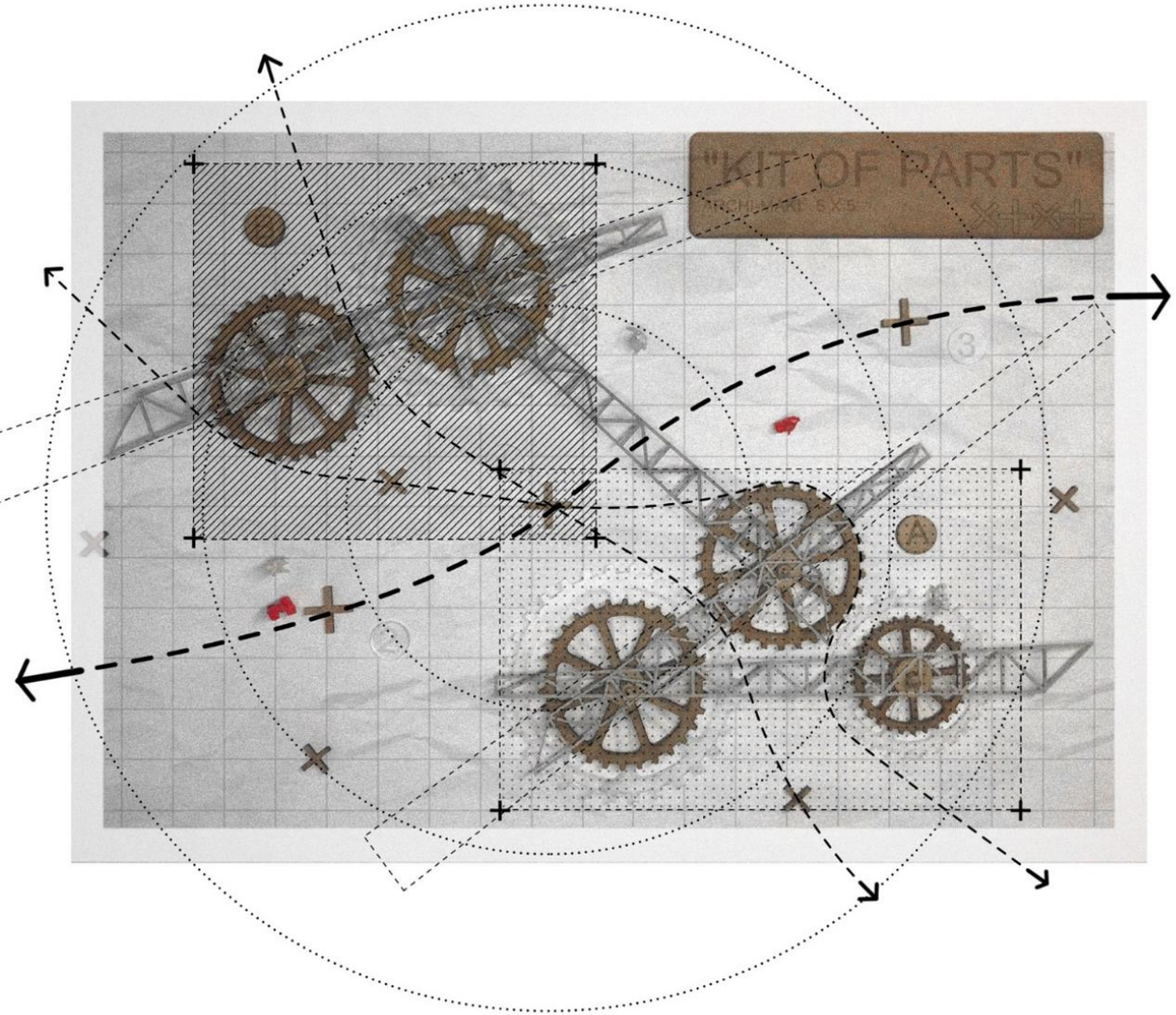






Archi-Maki | Version 1 continued

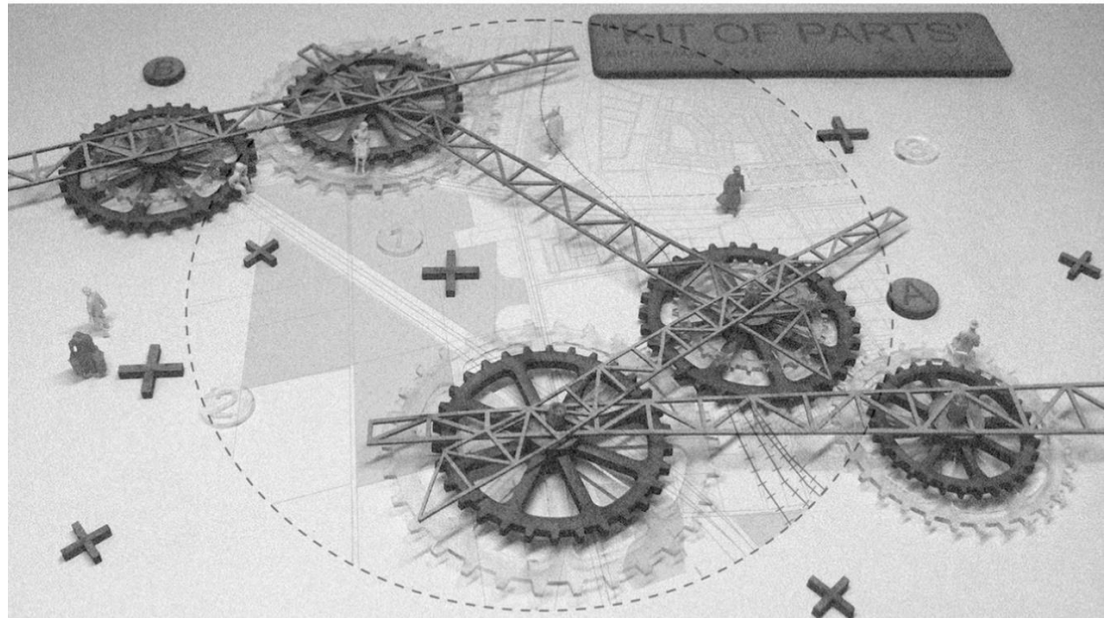




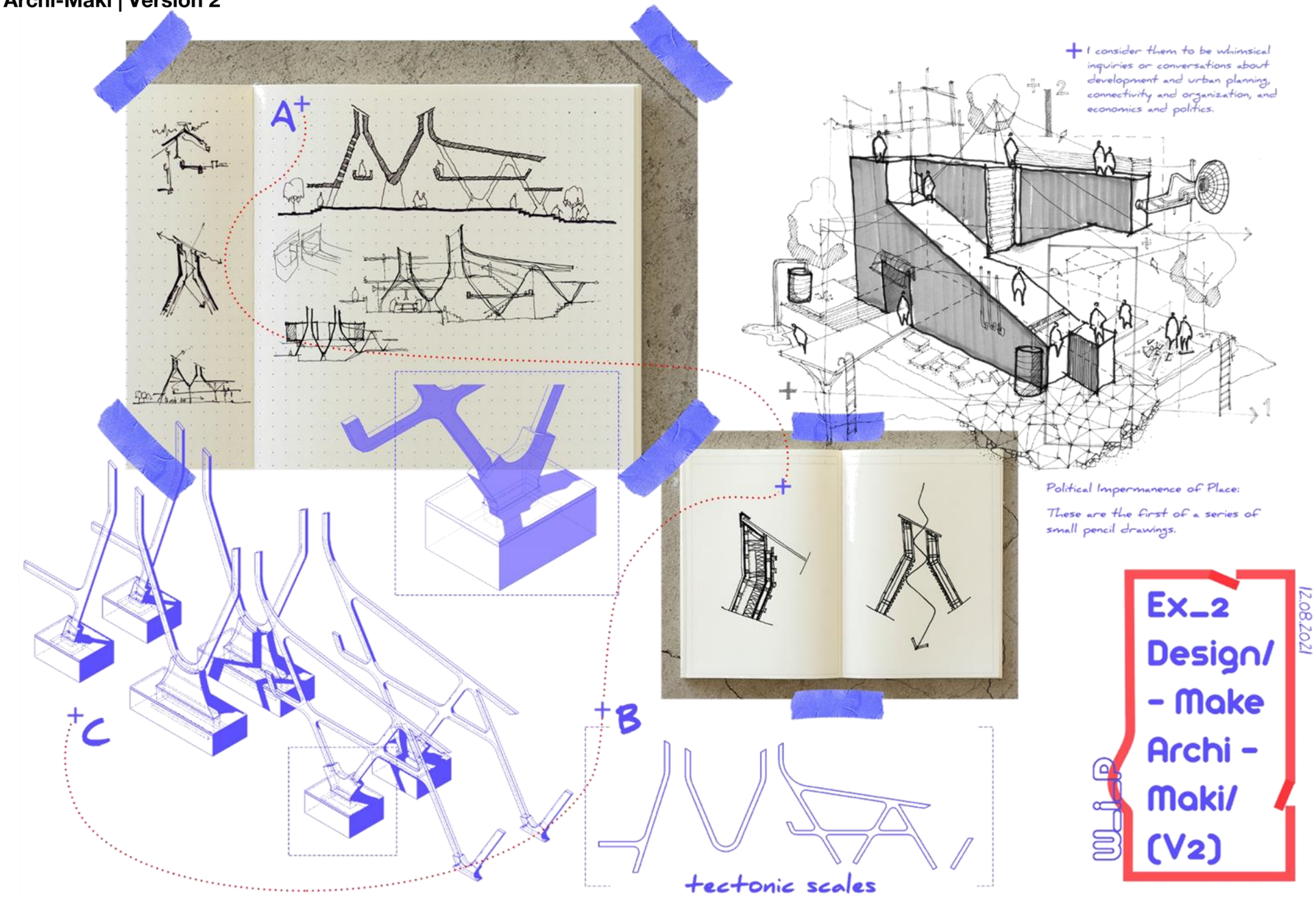
+ The componentry made in CAD software are sketched ideas and laser cut. The template was set as a kit of parts before assembled into 2D and 3D configurations.

Archi-Maki | Version 1 continued

+ Archi-Maki version one forms part of the first synthesis of conceptual design for the architectural project. This model is an abstraction of the existing craft, networks, and ways of making. The ideas employed in the model making process was to emphasis the use of laser cutting (CAD + CAM) for its accuracy and assembly of a kit of parts, much like the tectonics discussed in the precedent studies. The layering application was a way to investigate through modeling of the existing network of makers, fabricators and where new formal links could be established through the architectural project.

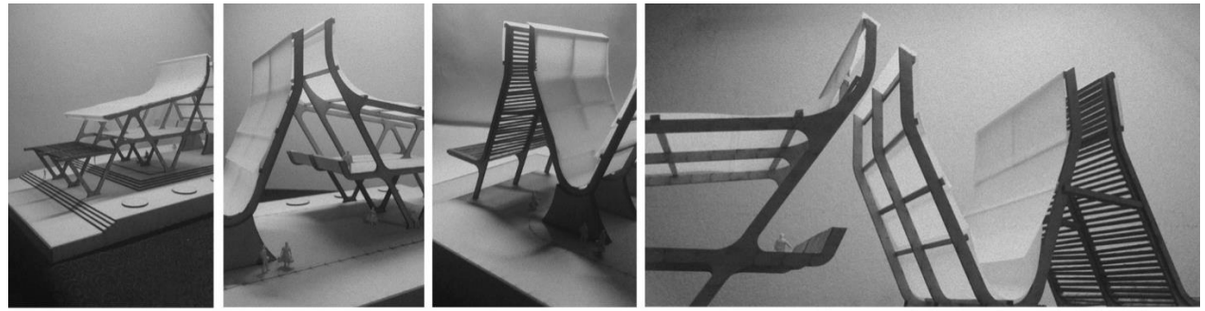


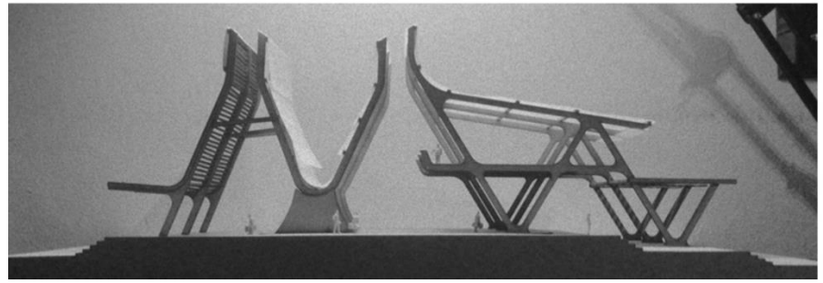
Archi-Maki | Version 2

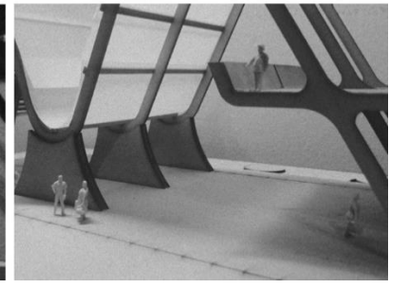


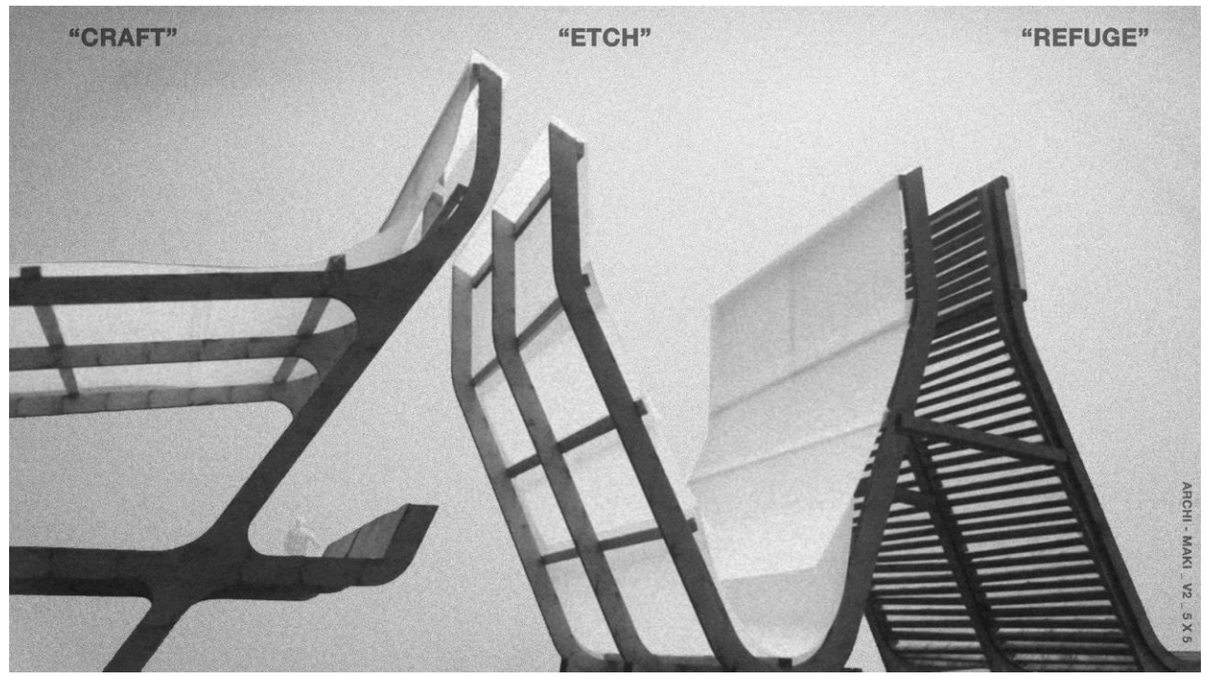
Archi-Maki | Version 2 continued

Archi-Maki version two explores ideas in section. It emphasizes the building of a section showing the spatial and tectonic characteristics of a key part of the architectural project. I found that traditional systems of architectural design thinking and drawings to be limiting and I was searching for new means of representation. By employing the same method of version one with the primary interest in emerging technologies of the 4th Industrial Revolution, it allowed me to develop a method and abstraction as an investigative principle. A principle that enables the model making to work in response to place and space in a productive way - abstracting the composition of local ways of making as stereotomic and digital architecture as tectonics. This layering process is conveyed through depth, shapes, colour and the constant manipulation of the 2D and 3D space. The final conceptual abstraction is illustrated through lessons learnt and the making of each iteration.



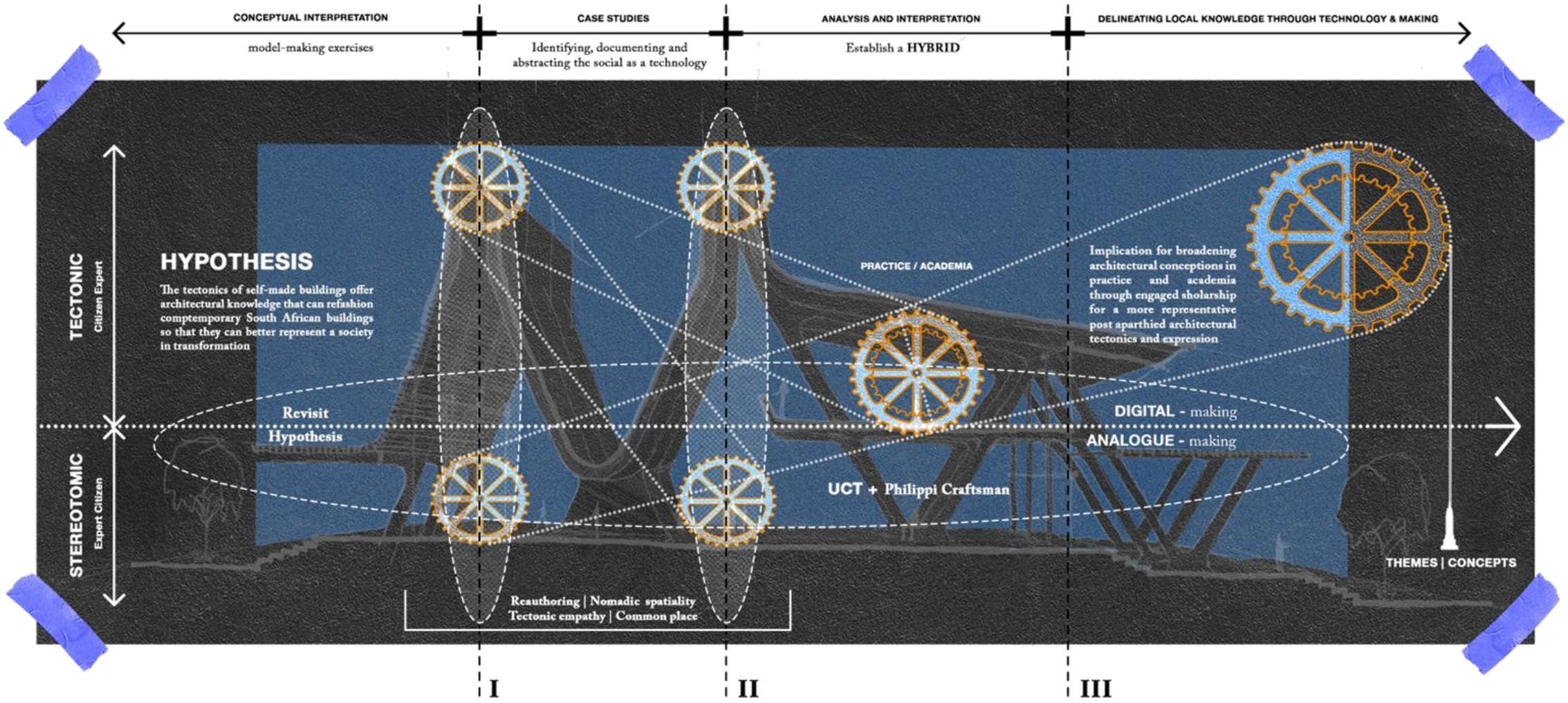






Archi-Maki | Version 3

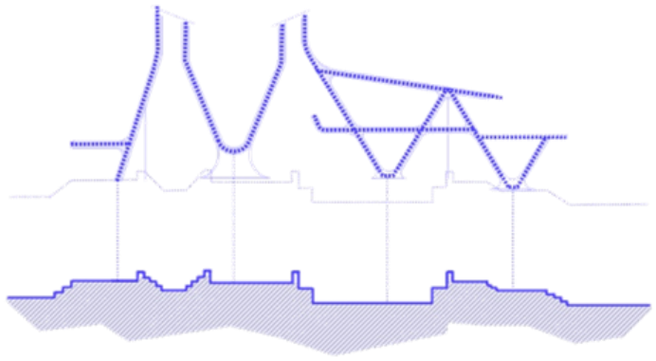
Lessons & Abstractions - Stereotomic + Tectonic | Digital + Analogue | Layering



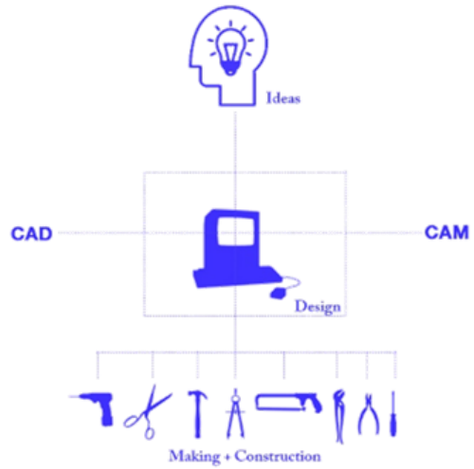
+ Final model collage and abstraction. Vitamins for the design development. (By Author)

Archi-Maki | Version 3 continued

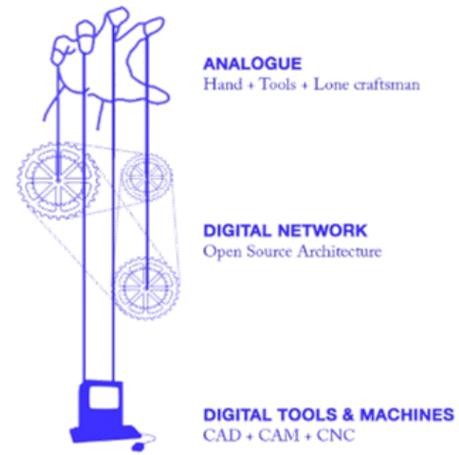
abstractions



Tectonic vs Stereotomic



Digital vs Analogue



Layering

+ Consolidated conceptual abstraction. Vitamins for the design development. (By Author)

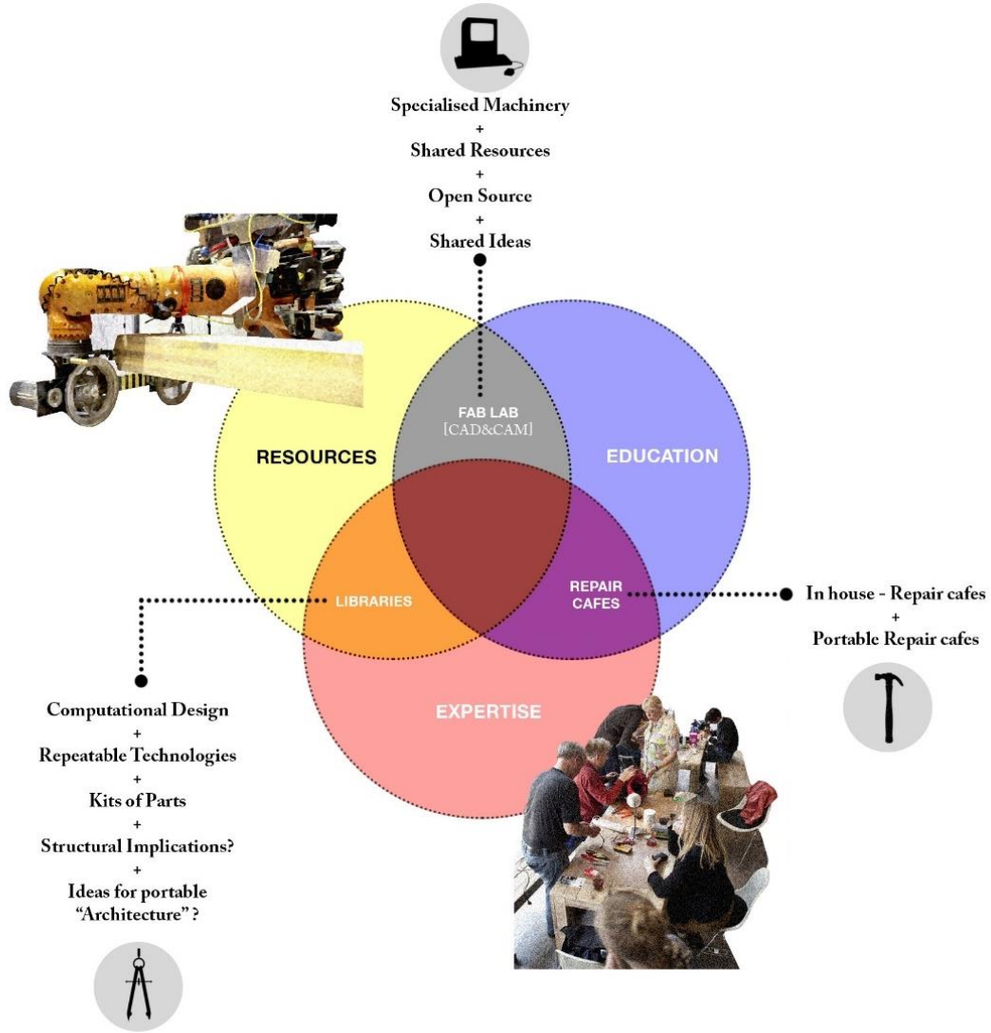
Design Brief

Located in the Philippi East, Cape Town, the design dissertation proposes a Local Tech HUB for building craft, training, and makerspaces. The trading market and workshop/fabrication space are the nexus facilities of the projects. The project and scheme takes inspiration from the Future Africa Dinning Hall by Earthworld Architect for its richness in regenerative and open building system.

The projects seeks a simple narartive in democratizing the design process and acknowledging parallel craft value chains within the Philippi makers network. In addition the building seeks to provide a place for micro systems of manufacturing, accreditation through vocational training and the potential for the building to exist as a social catalyst on an urban scale.

Program

- Resource centre [library + seminar rooms + offices]
- Public courtyard + Campus road [Public amenities + Ablutions]
- Vocational education
- Trading market
- Workshop + Fabrication + Workyard
- On site House of Smiles [Hub partners + NGO's]



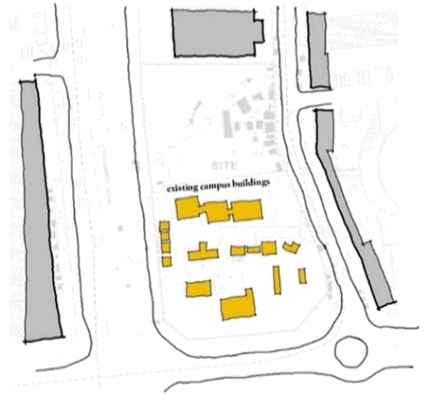
Early program schematic diagram. (By Author)

Program Development

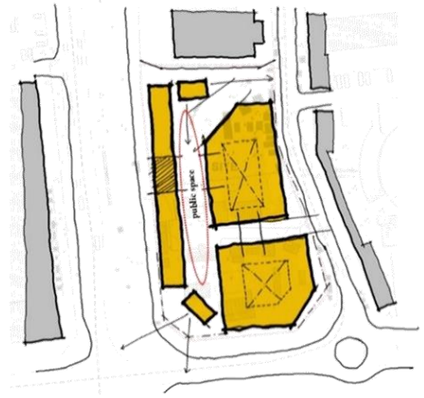
The explorations thusfar of exisitng networks such as self-build industry, cultural practices and micro-enterprises, set to establish the program with the focus on these main role players.

The hub partner and qualified craftsmen will oversee the adminstration and establish an institutional and civic link. This indivdual will be the first point of contact with the built form of the program and the auxliary facilities will be designated to other provincial officials, educational bodies and stakeholders from the community. As part of the proposed eduational compontent, it seeks to connect the craft and digital paradigms, the misconceptions of emerging technologies and exisitng urban everyday practices. The campus and urban yard will facilitate for on site construction and fabrication by the craftsmen and the resource centre to be accessed by both the craftsmmen and community members, these auxillary spaces will provide a space of exchange and production of knowledge in micro-manufacturing systems and other technologies.

Informal traders will have the opportunity to trade along the designated market edge facing the upgraded road. With a constant influx of people moving from there homes to shopping centers located at the main northern intersection. The market will provide a place to serve the community in the everyday condition as a sheltered meeting point where individuals can socialize, consume refreshments and a place to pause where locals can wait for a bus or informal taxi (amaphela). The establishment of this hydrid program is to bring together exisitng practices while retaining an acceptable amount of autonomy for the role players involved.

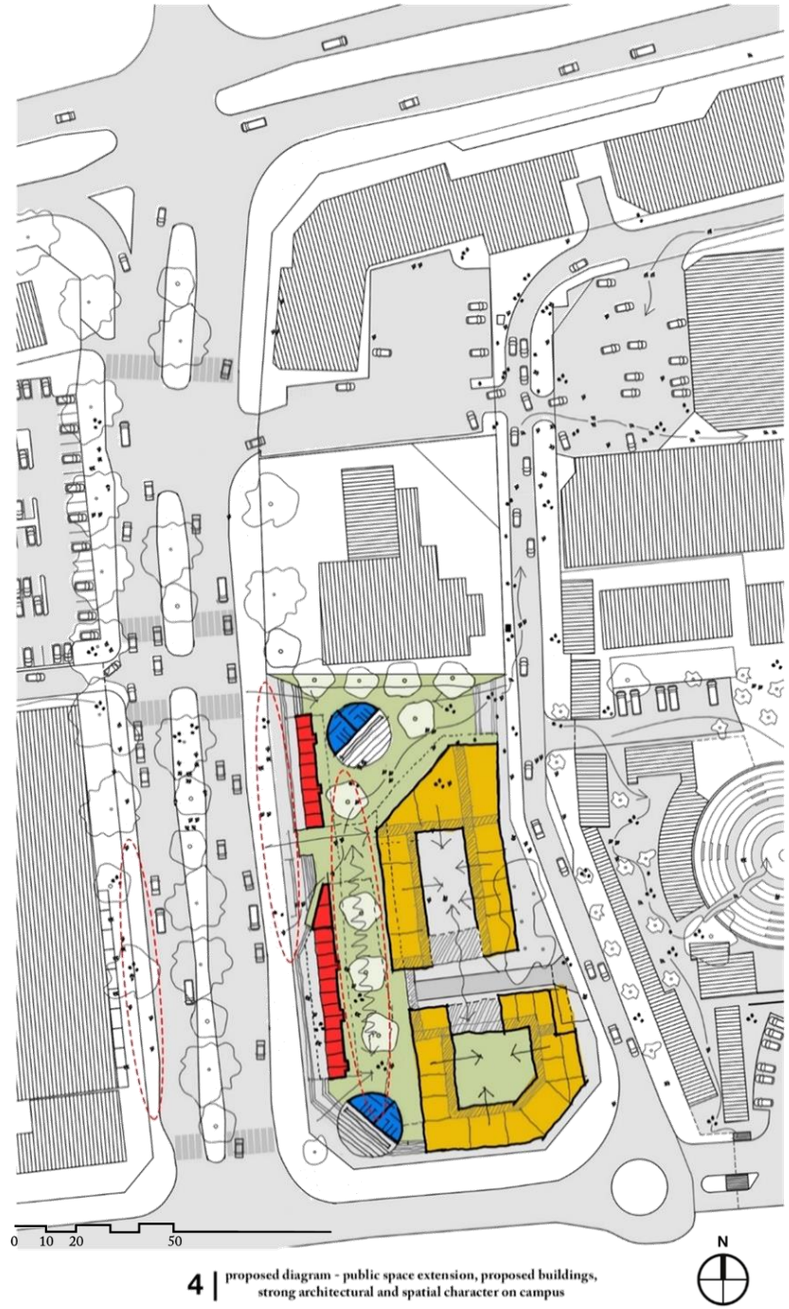


1 | existing condition



2 | proposed diagram

3 | proposed program vs existing



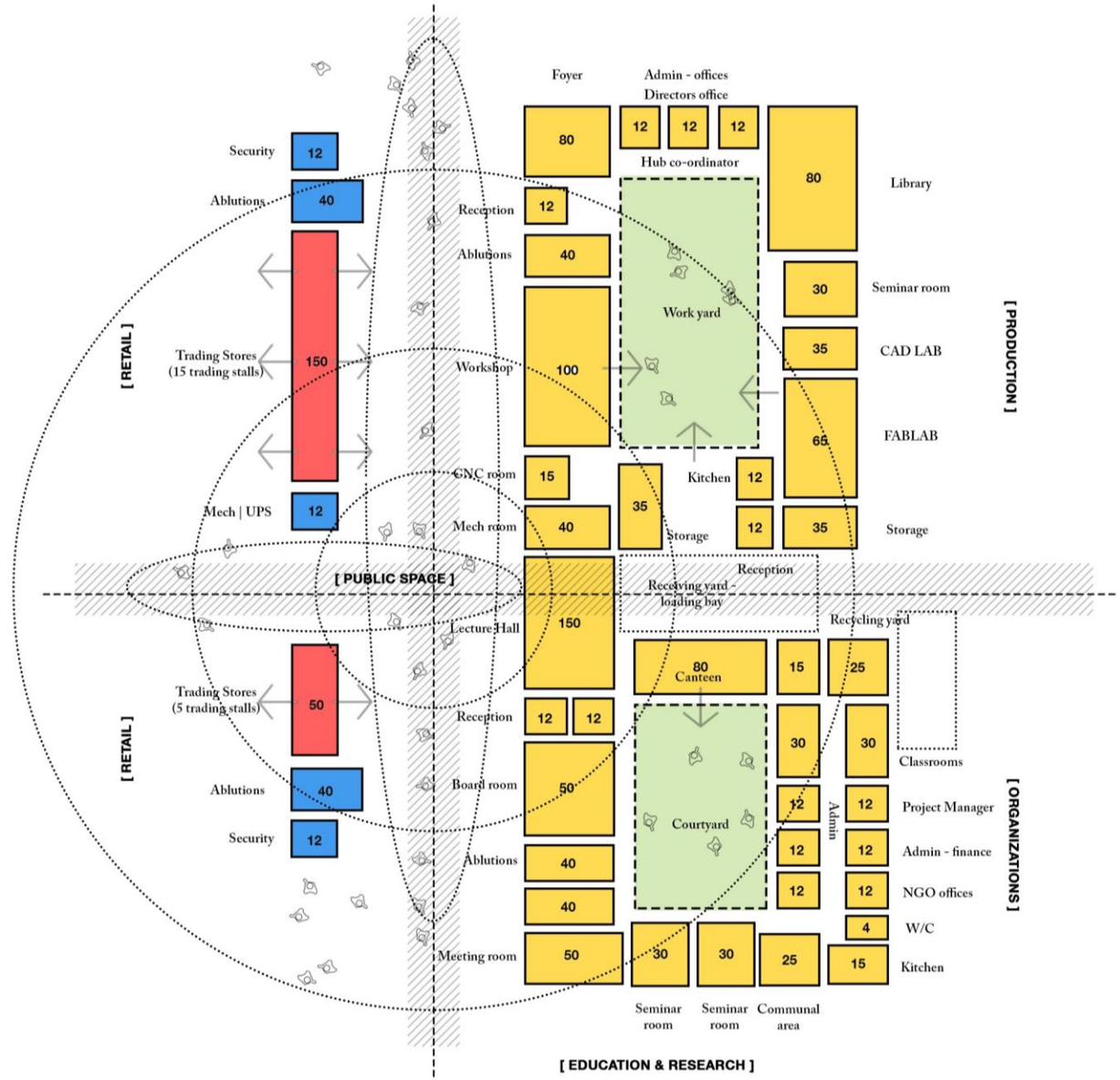
4 | proposed diagram - public space extension, proposed buildings, strong architectural and spatial character on campus

[Red - retail, Blue - public amenities, Yellow - Local Tech Hub]

Accommodation Schedule

The existing container walk, and shopping node provides the immediate response to the site furthermore the Philippi Service Station maintains a 24/7 life of activity and in response to this the vocational/ educational facility is set up as a series of public and private courtyards. These courtyards mediate between the more public thoroughfare/ market area and the proposed program.

These diagrams indicated various quadrants as the ordering principle for programs such as production, training/ education, retail activity and open public space. Materials will be supplied from the local Cash Build outlet adjacent to the Shoprite centre as see in previous contextual analysis mapping. The overall arrangement of the quadrants forms the urban campus programmatical response of urban yards, public amenities, and institutional space.

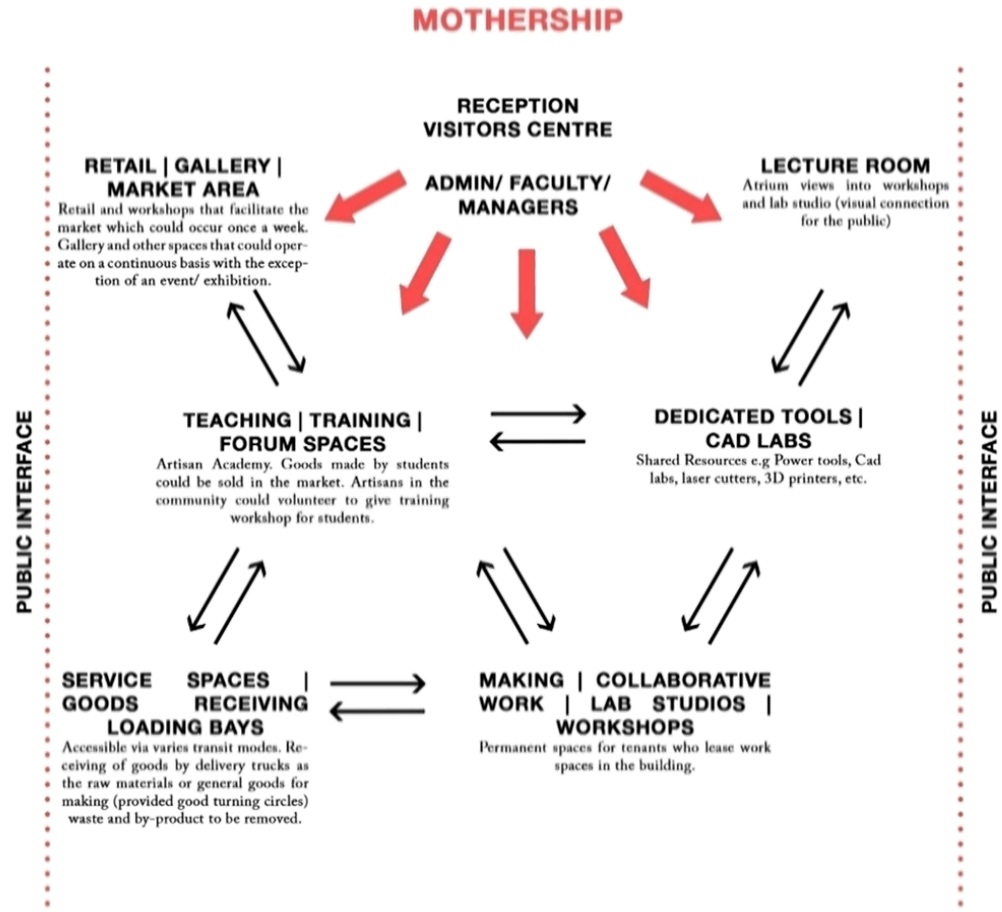


Consolidated program & accommodations schedule. (By Author)

The Mothership

As the headquarters of the project is focused on a work/ play space and a partnership with the organizations on site. A space where they would be able to learn from one another and develop systems or prototypes with emerging technologies that they were interested in. The building users would have private areas, workshop spaces, and everyone would share the use of specialized equipment. These areas of shared resources would become communal areas where idea sharing could occur.

However, sharing of knowledge would not only be limited to those with existing experience. There would also be opportunities for the public to walk into the building and engage with these collaborative spaces. The Mothership would be a place that provoked the curiosity of the public and local community. A space where people with varying degrees of knowledge could interact and learn from one another.



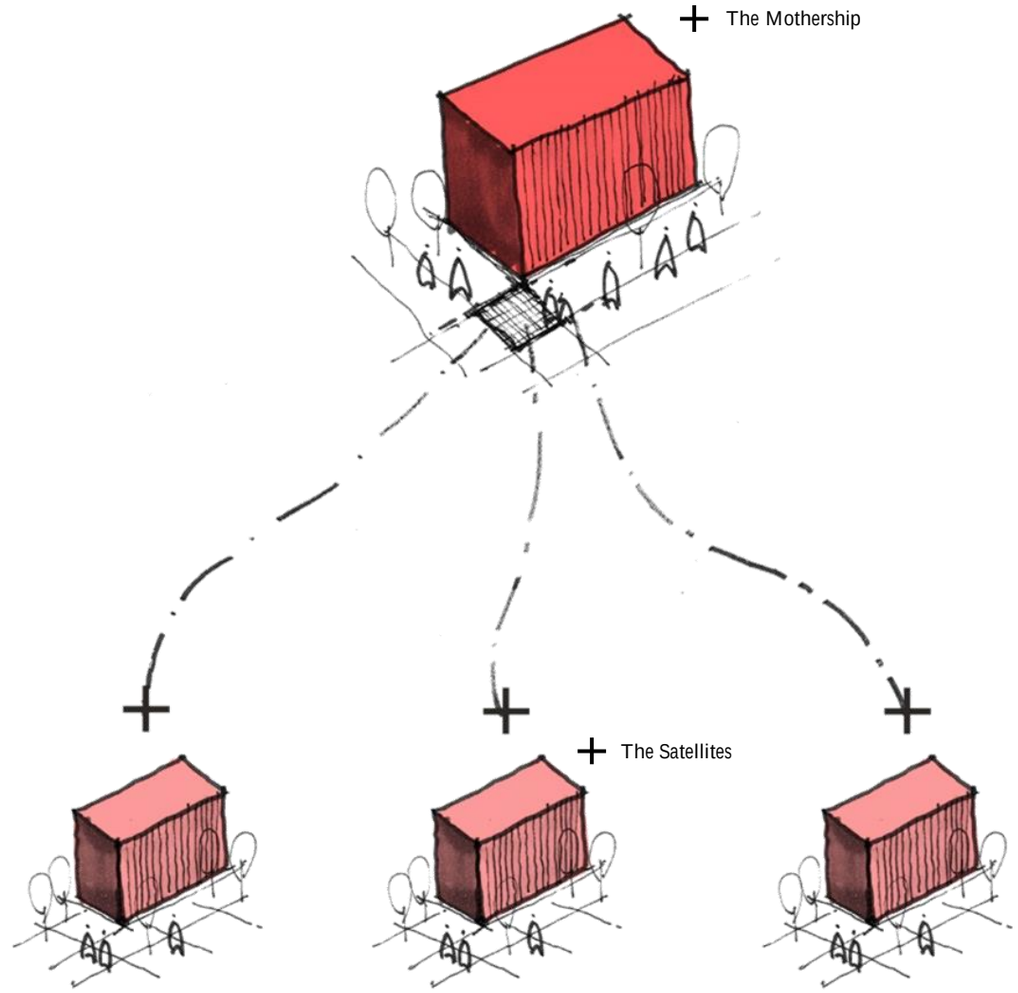
The Mothership | User experience. (By Author)

The Satellites

The Satellites would share the spirit or DNA of the Mothership in many ways. It would however use shorter term 'events' to propagate the education of technology in areas which the building could not reach. These Satellites could act as teaching resources, providing workshop space, equipment and machinery to towns that might not have access to these tools.

The Satellite sites have not been defined in terms of location. However, it provides an outlook to further the reach and potential for development of public infrastruction in minor areas. The satellites could initiate the partnership with local high schools, and provide equipment for specialised classes.

The relationship between the Mothership and Satellites could also create possibilities for interconnectivity between the two. For instance special events and presentations which occurred in the Headquarters could also be broadcast in the Satellites, or vice versa.



The Satellites | Urban extensions of the building + program. (By Author)

SECTION 6 | Design Development

Architectural Strategies

The making and development of the architecture

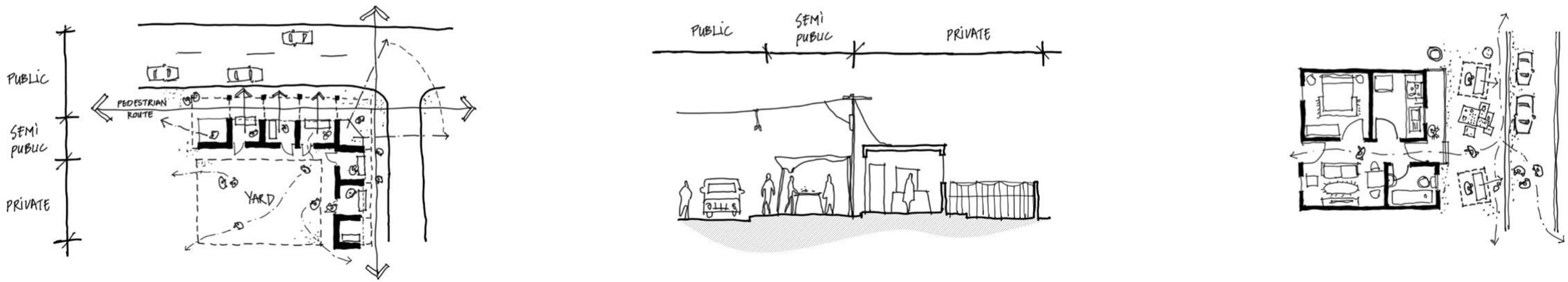
The architectural strategies form the basis for the design development, it provides the testing ground for the conceptual framework and sets out three main design principles informing the architectural moves.

These three components consist of:

- Assembling edges of exchange
- Assembling the thoroughfare
- Assembling the urban yard

Assembling edges of exchange

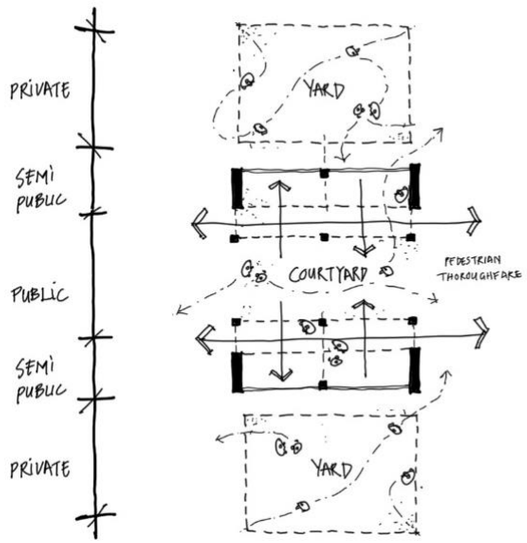
This architectural design approach highlights the overlap between private and public space. These conditions found in the formal residential areas of Philippi it indicates the notions of negotiated space and use of infrastructure across private and public spaces. The architectural project will therefore make use of these edges of exchange to construct the market retail edge. The ideas explored within the overall scheme is the defining and making of edges as a spatial response, providing conditions for activities to occur and maintaining the public life on the street interfaces.

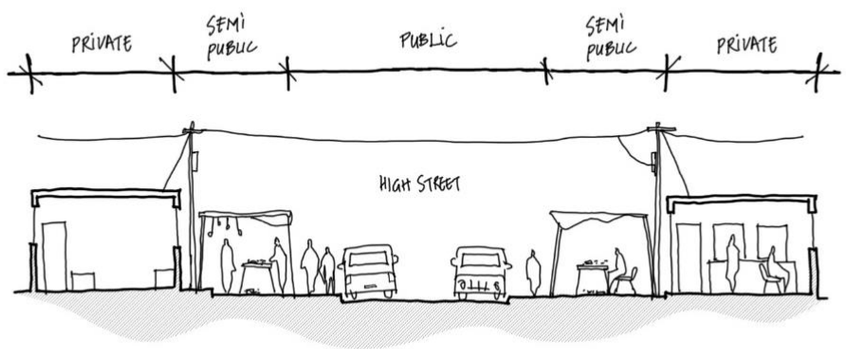


Assembling edges of exchange. (By Author)

Assembling the thoroughfare

As part of the spatial ordering the edge of exchange provides a platform of retail activities, and the thoroughfare (common street) creates a moment of pause from the busy street and provides a link to the formal retail or civic buildings. This design approach much like the urban 'high street' is a positive response constructed by the micro-enterprises within Philippi suggests a retail corridor. However, the articulation in the architectural project is to provide an internal high street hybrid of makerspaces, retail, and public space (courtyard).

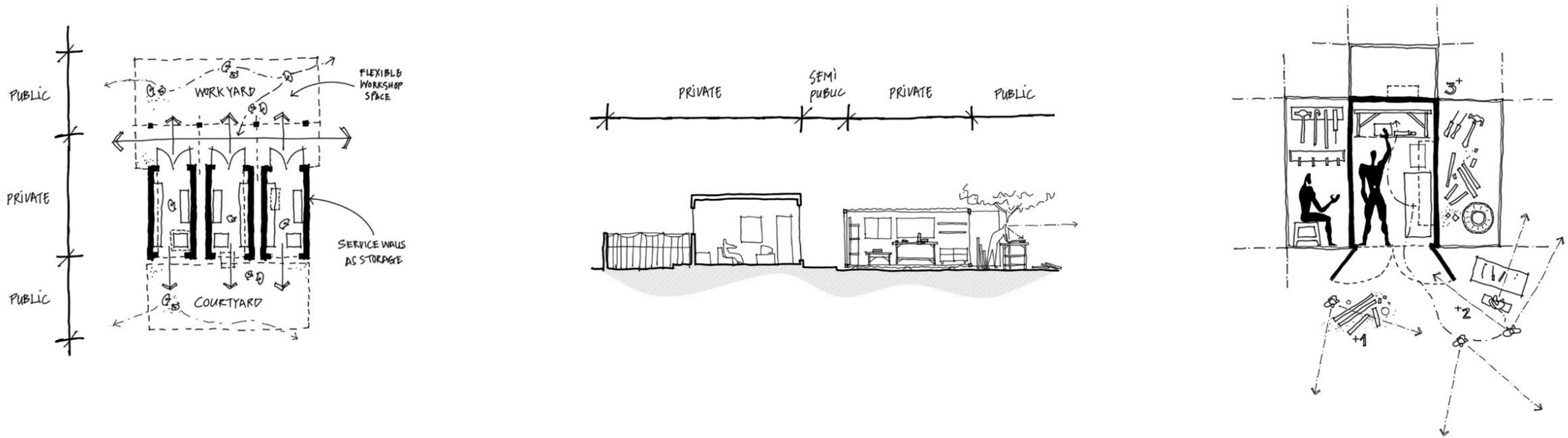




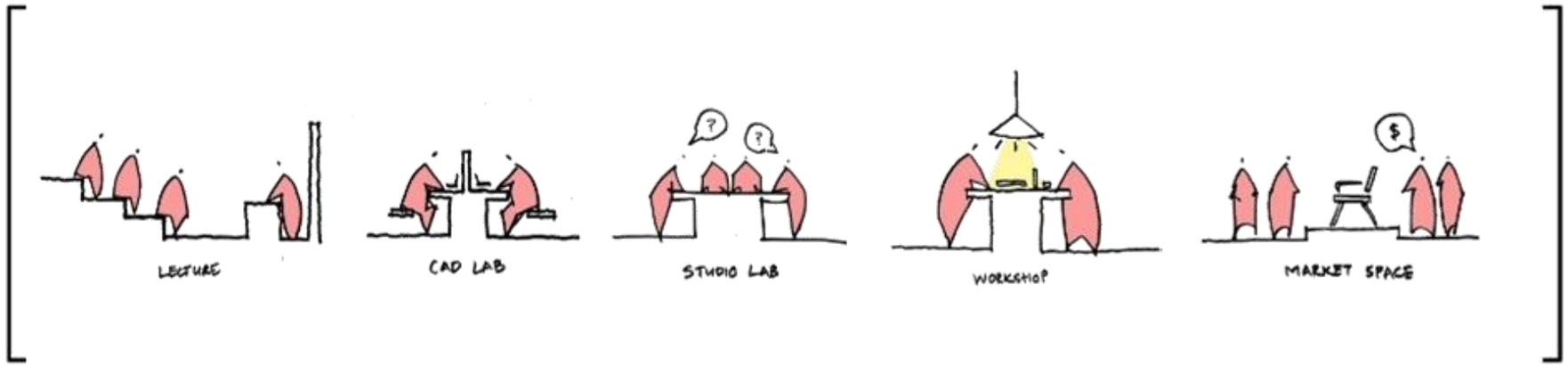
Assembling the thoroughfare. (By Author)

Assembling the Urban yard

An important establishment from the program development suggests an urban yard, a 'work yard' didactic in its making provides a shared space between the analogue makers and digital fabricators. The merging of these technology methods provides negotiations and a dialogue between the two users within the urban yard. This design approach provides an adequate space and place for making. The qualities suggest a flexible programmable space with the formalized programed spaces constructed by large openings facing the communal yard.



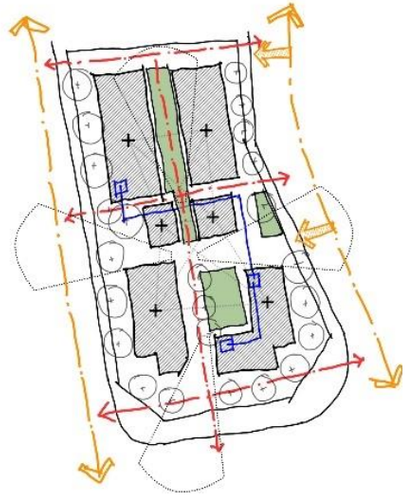
Assembling the Urban yard. (By Author)

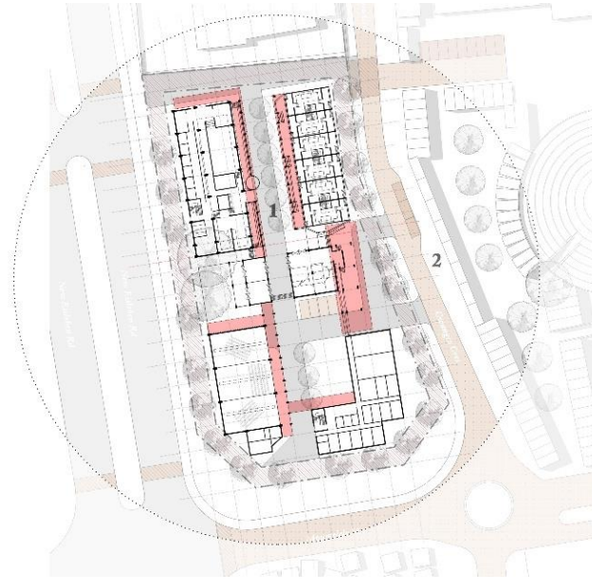


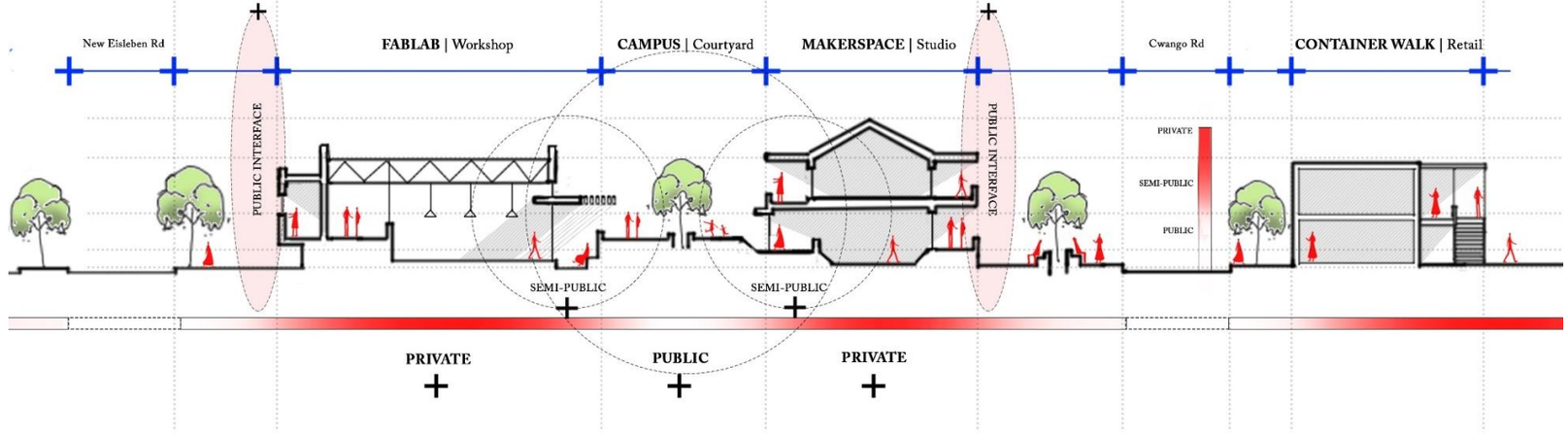
Program sequencing of CRAFT. (By Author)

+ The diagram indicates the programming of craft in a sequence of spaces. The consolidation of the architectural strategies sets up the conditions for the making and sequencing in the building.

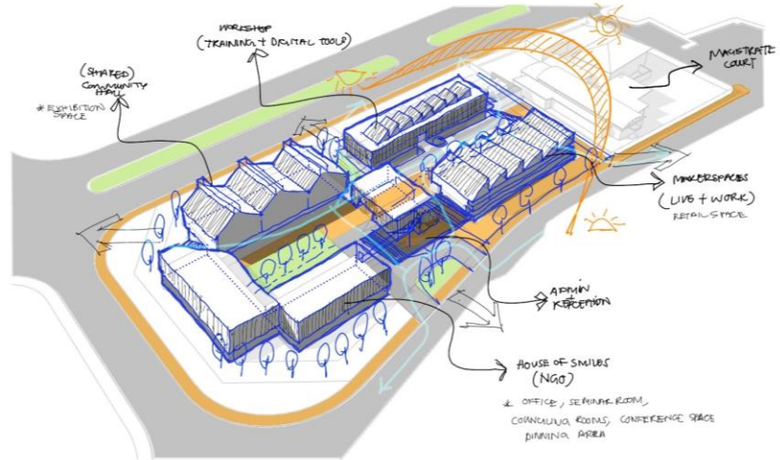
Philippi | Local Tech HUB

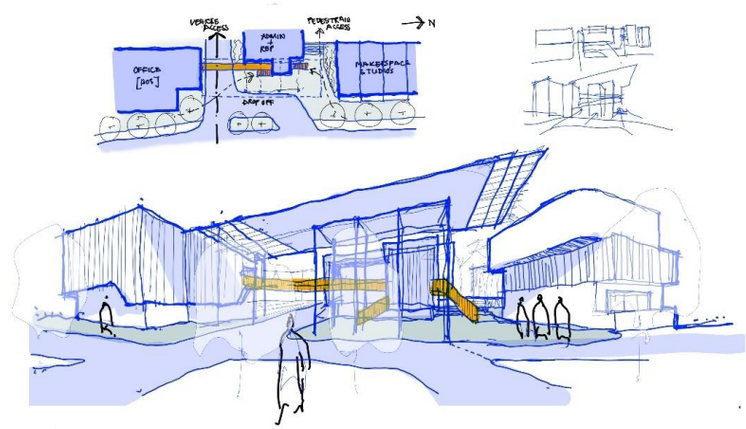


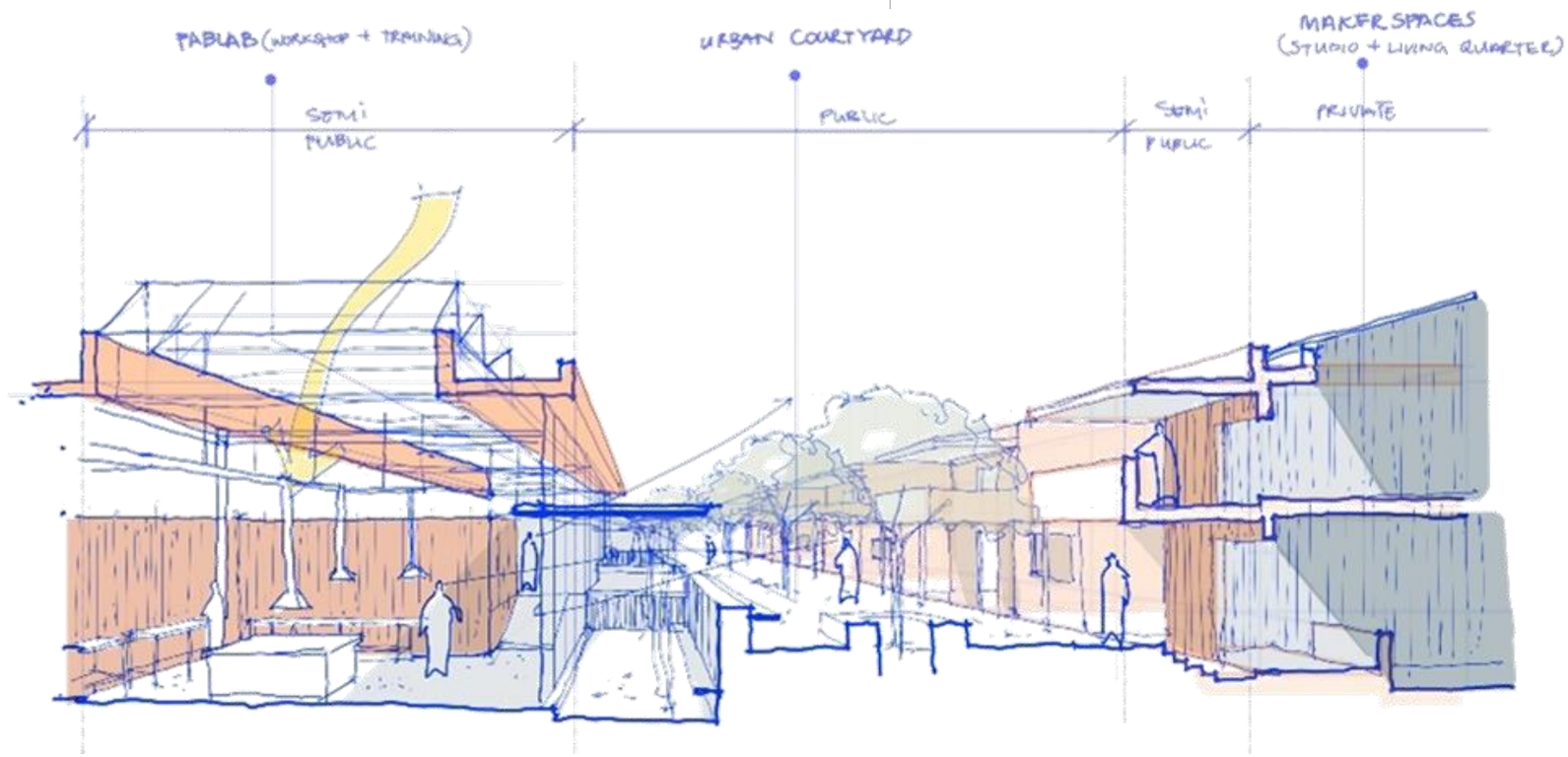




+ The first iteration of the design tested the architectural strategies in the hierarchy of public and private spaces in section and in conjunction to the main programs. Here the idea was to test how the individual programs response to the production of social spaces. (Technology as the social catalyst)

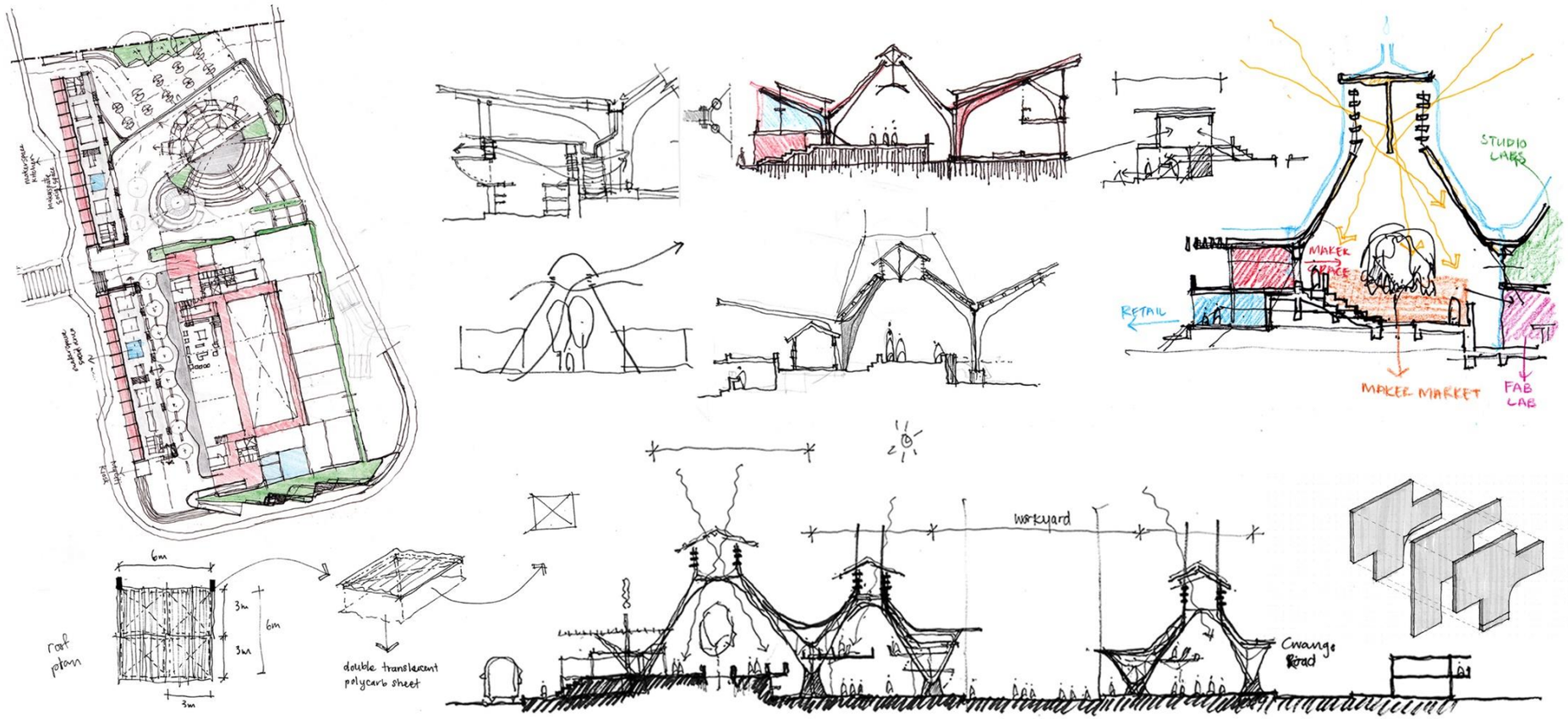




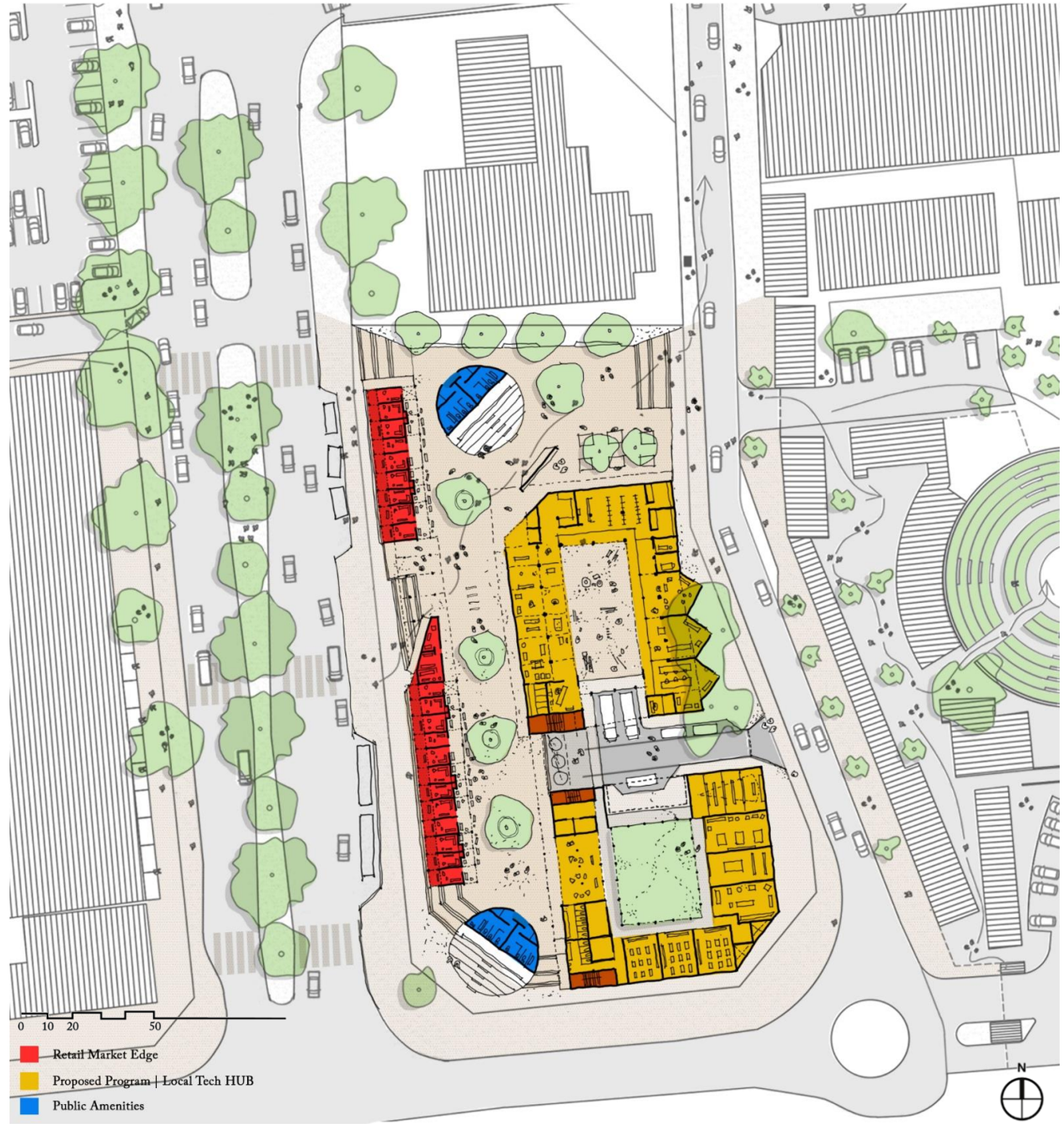


+ Key elements moving forward from the first design iteration is the to emphasis the local ways of making in the topography – stereotomics (wet works) and to celebrate the digitized craft in the primary structure - tectonics (dry works). Here the design sketches also tested level changes as a medium to order public routes on a raised plinth providing visibility into the fabrication spaces (ways of seeing the local ways of making) and creates a defensible space from street level activities.

+ DERIVING OF FORM
Spatial ordering and tectonics

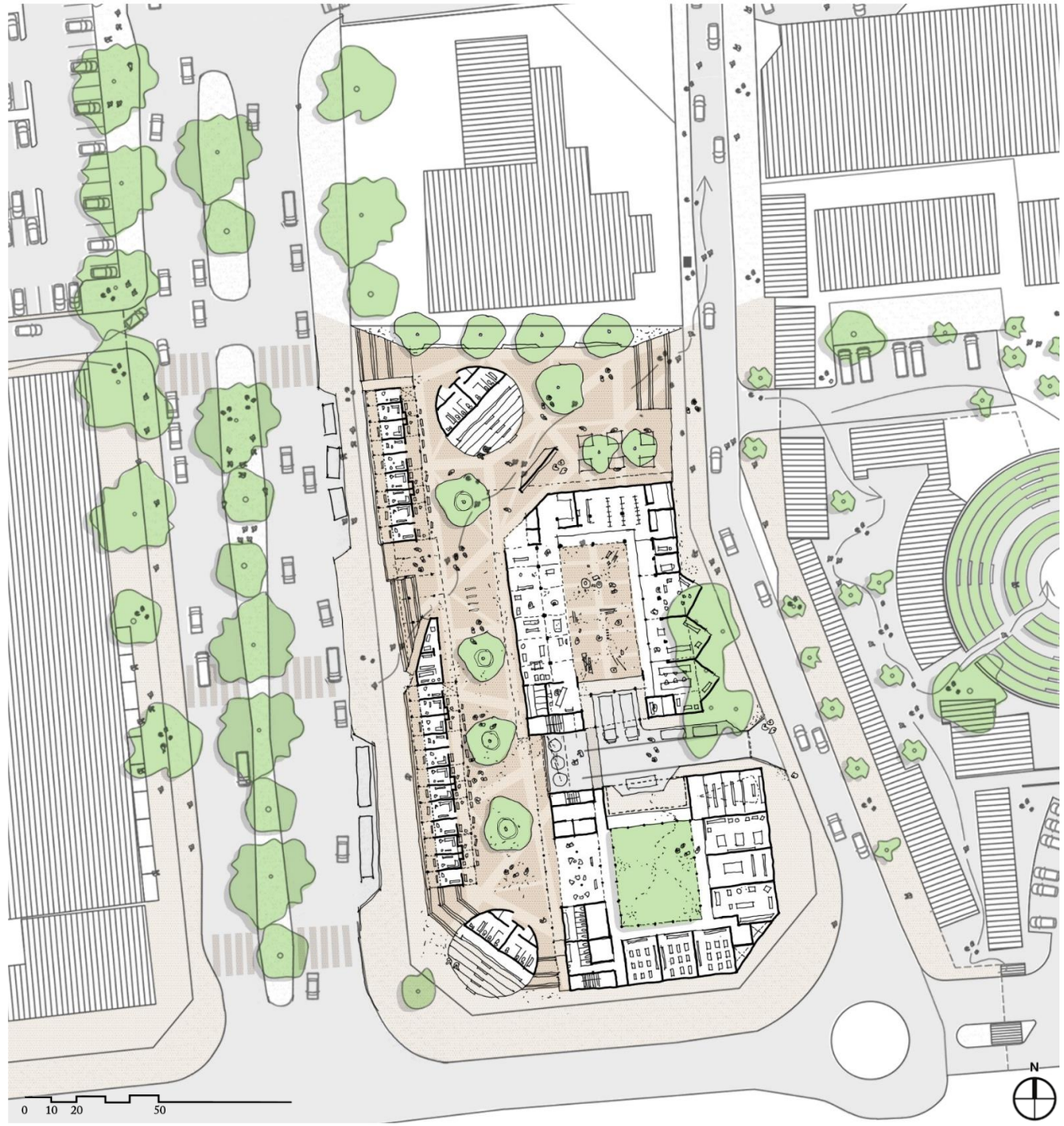


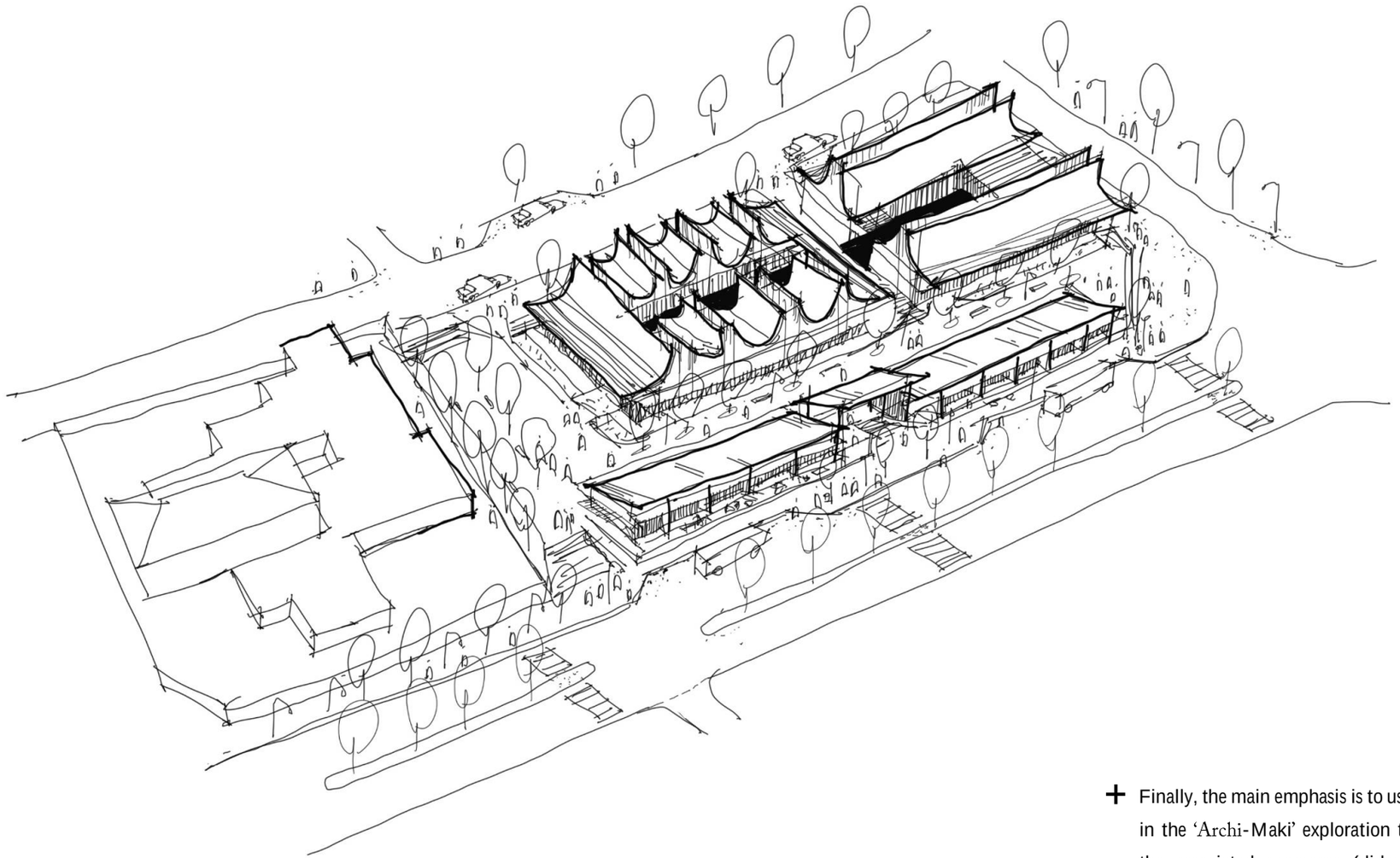
+ The second iteration of the design tested the overall figure ground and individual forms of the buildings in conjunction to the making of the thoroughfare. This establishes new routes and links to public infrastructure. With simple design decisions to house services and amenities into pods, the design layout seeks to integrate doubled functions to these public amenities by creating an urban porch as a welcoming point or act as a meeting space for commuters.



Landscaping

The landscaping of the project is defined by the making of the thoroughfare which consists of public and semi-public courtyards within the developed area. The open space and structural landscaping will be assembled by trees and seated areas. The thoroughfare (communal route) will function as the intermediate space providing better connectivity and accessibility with shaded areas, a resting point, or meeting point throughout the day. The hardscaping is defined in the making of the topography, street edges and public forecourt. It will be expressed through various surface treatments defining a sense of place within the thoroughfare acting as a green lung and work yard adjacent to it. Furthermore, the value of these environmental sustainability components on the site and within its immediate context will provide better security, health and well-being for others or users of the development.





+ Finally, the main emphasis is to uses the roof forms abstracted in the 'Archi-Maki' exploration to guide the relationship of the associated programs (didactic in the making). This symbolic nature of the roofs seeks to create a landmark in the industrial typology of Philippi Village and to celebrate the formal synthesis of local craft and digital tools.


Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
N
SITE PLAN | Roof Plan
Philippi Tech HUB
Cash Build
MyCiti
Parking
Parking
Post Office
Shoprite
Philippi Magistrate Court
Parking
Parking
Philippi Village The HUB
MyCiti
Container Walk
Philippi Junction Mall
Section Two
Better Life
34


Re-crafting Architecture in Phil | Developing the urban potentials and sites of production in the Cape Flats
Magistrate Court
Container Walk
CWANGO CRES
Delivery + Drop Off
Work Yard
NEW EISLEBEN RD
NEW EISLEBEN RD
MyCiti
MyCiti
Philippi Junction Mall
Street Vendors
GROUND FLOOR
MPUMELELO ST
BETTER LIFE SETTLE.
KEY
1 Offices
2 Workshop
3 Urban porch
4 Thoroughfare
5 Courtyard
6 FABLAB
7 Makerspaces
8 Ablutions
9 Amphitheatre
10 Street Vendor
11 Resource Center
12 CADLAB
13 Seminar room
14 Storage
15 Reception
35

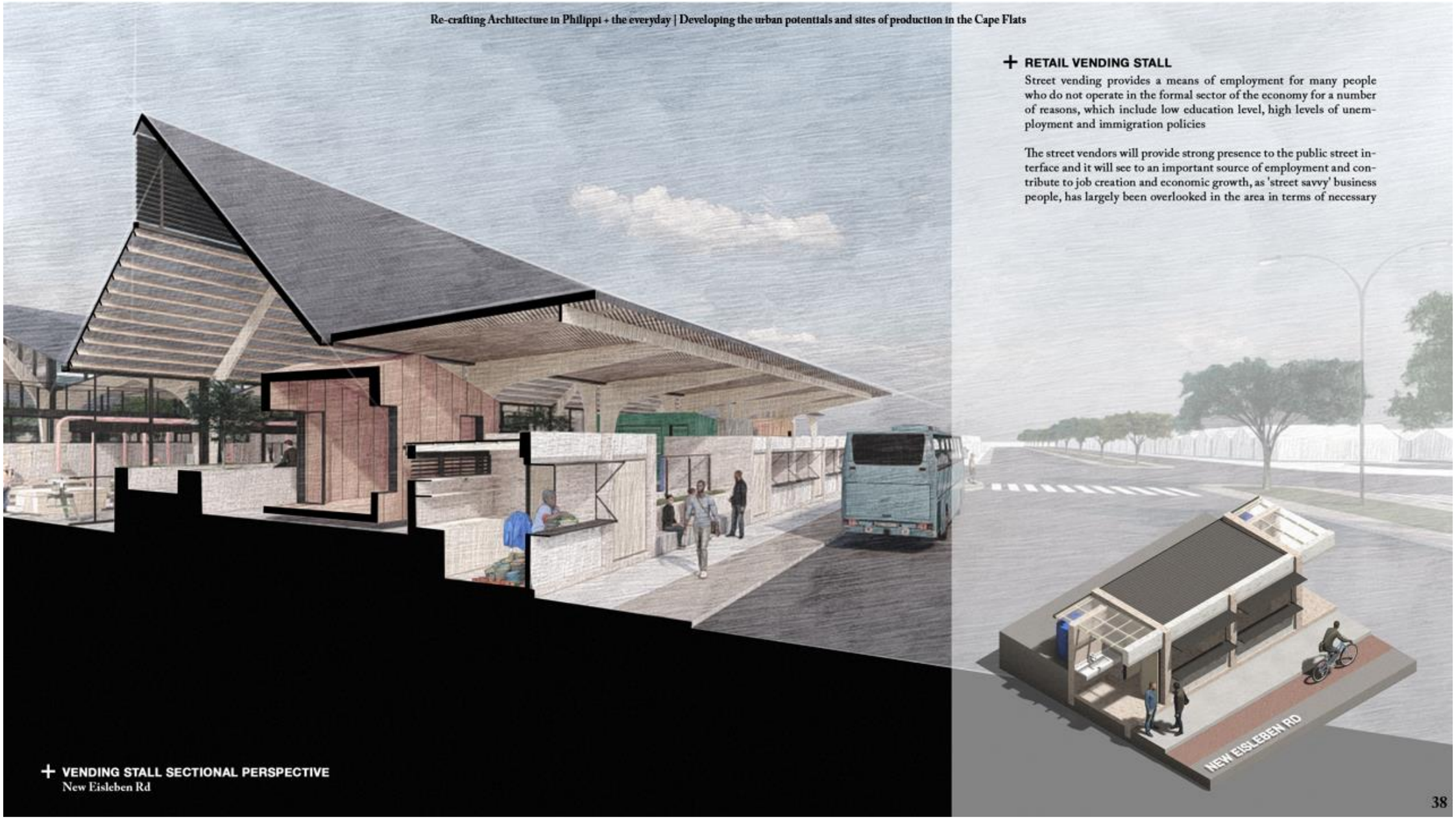

Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
Lobby
Reception
Offices
CADLAB
Workshop
Work yard
Storage
Thoroughfare
CNC
Seminar room
Unit
Unit
Stall
Stall
Breakout Space
Breakout Space
FABLAB
Offices
Unit
Unit
Thoroughfare
Cred: Stangroom, G. (Workshop components)


Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
+ SOUTH AERIAL PERSPECTIVE | Public Street Interface
New Eisleben Rd
37

+ RETAIL VENDING STALL

Street vending provides a means of employment for many people who do not operate in the formal sector of the economy for a number of reasons, which include low education level, high levels of unemployment and immigration policies

The street vendors will provide strong presence to the public street interface and it will see to an important source of employment and contribute to job creation and economic growth, as 'street savvy' business people, has largely been overlooked in the area in terms of necessary



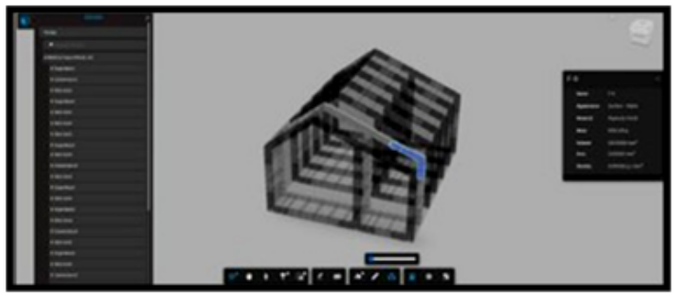
+ VENDING STALL SECTIONAL PERSPECTIVE
New Eisleben Rd

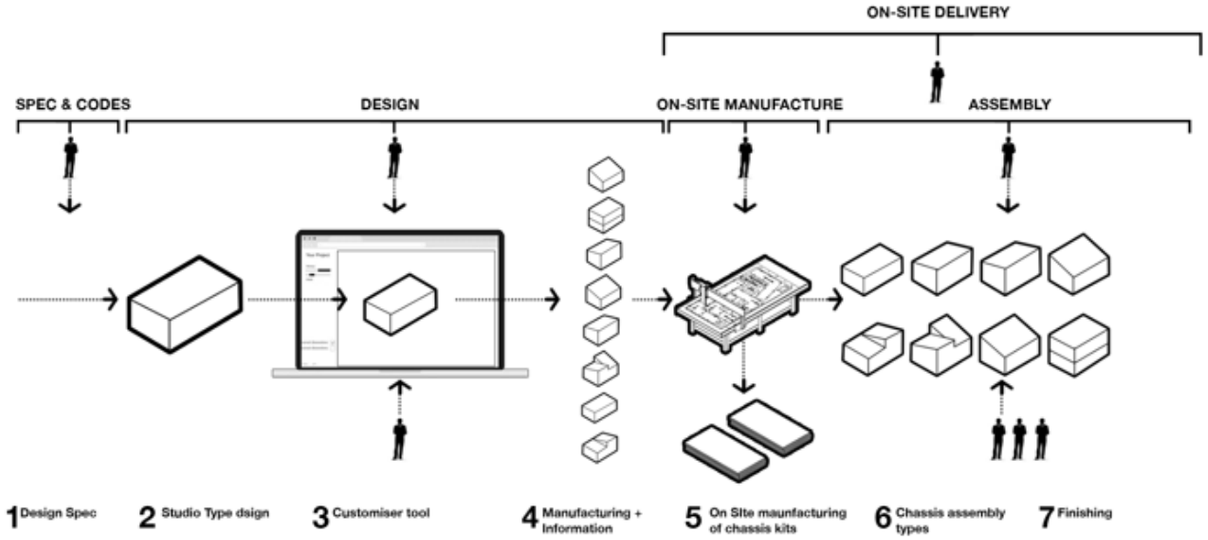

Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
+ PUBLIC STREET INTERFACE | Retail stalls
New Eisleben Rd
39

+ PARAMETRIC MODELING TO ALLOW FOR ITERATIVE PROTOTYPE UNITS

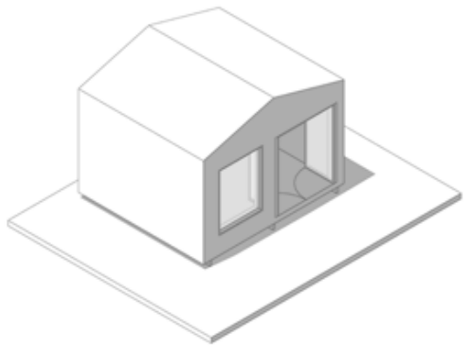
Open source software allows for accessible design and generates cutting files for CNC machining along with the instructions specfic to the build - 'wikihouse' plugins went offline in 2017 but the future still looks promising. Personal scriptsmay need to be re-created from existing templates

+ SOFTWAR INTERFACE

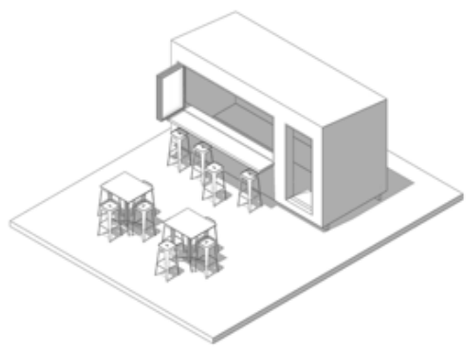




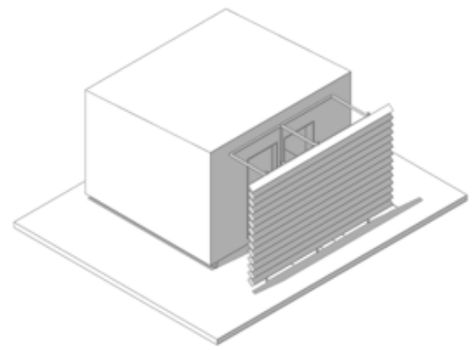
+ STUDIO



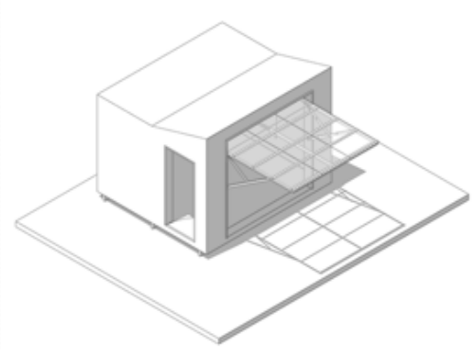
+ CAFE/BAR



+ ABLUTIONS



+ STORAGE



+ TEXTILE | TAILORING

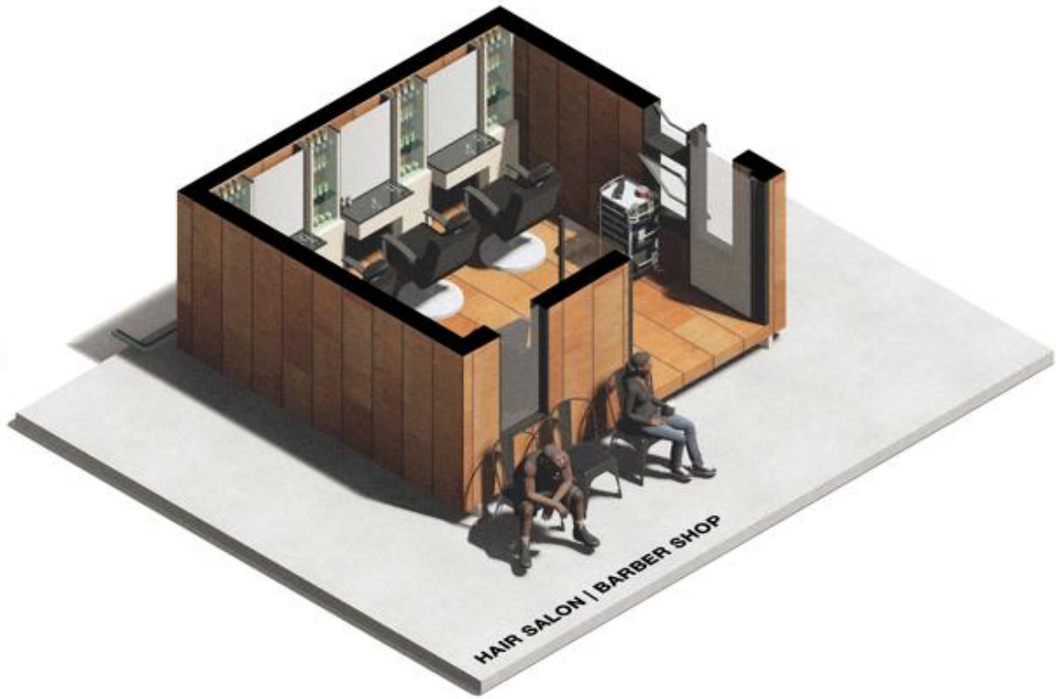
A staple activtiy of craftspeople and artisans. An underrated skill - the prototyping space would allow access to resources and spaces to produce textiles, tailoring or any other similar creations

Plugging into the makers network brings business to the operators of the space, they also gain access to all the resources of the fabrication spaces which could be used to create looms or the packing of fabric. Visitors to the site have bespoke and artisan textiles that can buy - while other users might use the textiles for their own projects such as upholstering furniture

+ HAIR SALON | BARBER SHOP

A staple activtiy of South African township economies. The barbershops & salons reveals the culture, history, and soul of a country through its haircuts

The peculiar cultural and social hubs of South African salons and barbershops, which too transcend their mere function as places to get your hair cut and serve as pivotal places for the local community to gather, gossip, and exchange ideas



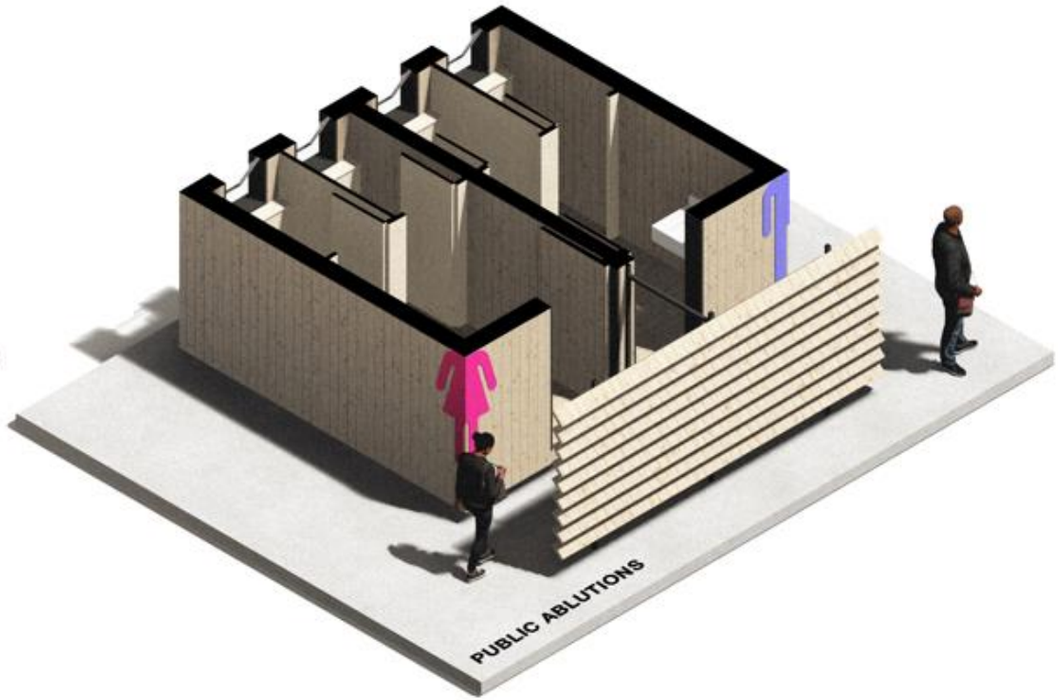
+ ARTiSAN CAFE

Plots to be reserved as breakout - spill out space (public space) away from the through-fare. This spaces provide services such as cafes or bars to attract foreigners into the spaces and existing tentants with consumables

These spaces allow for the entire armature space to attract external visitors - enabling commercial activity to and from the users to visitors

+ PUBLIC ABLUTIONS

Access to sufficient water and decent sanitation is a basic human right, which should be universally enjoyed in South Africa. The project provides stand-alone ablution blocks for all users and will remain as a primary amenity within the public realm of the project



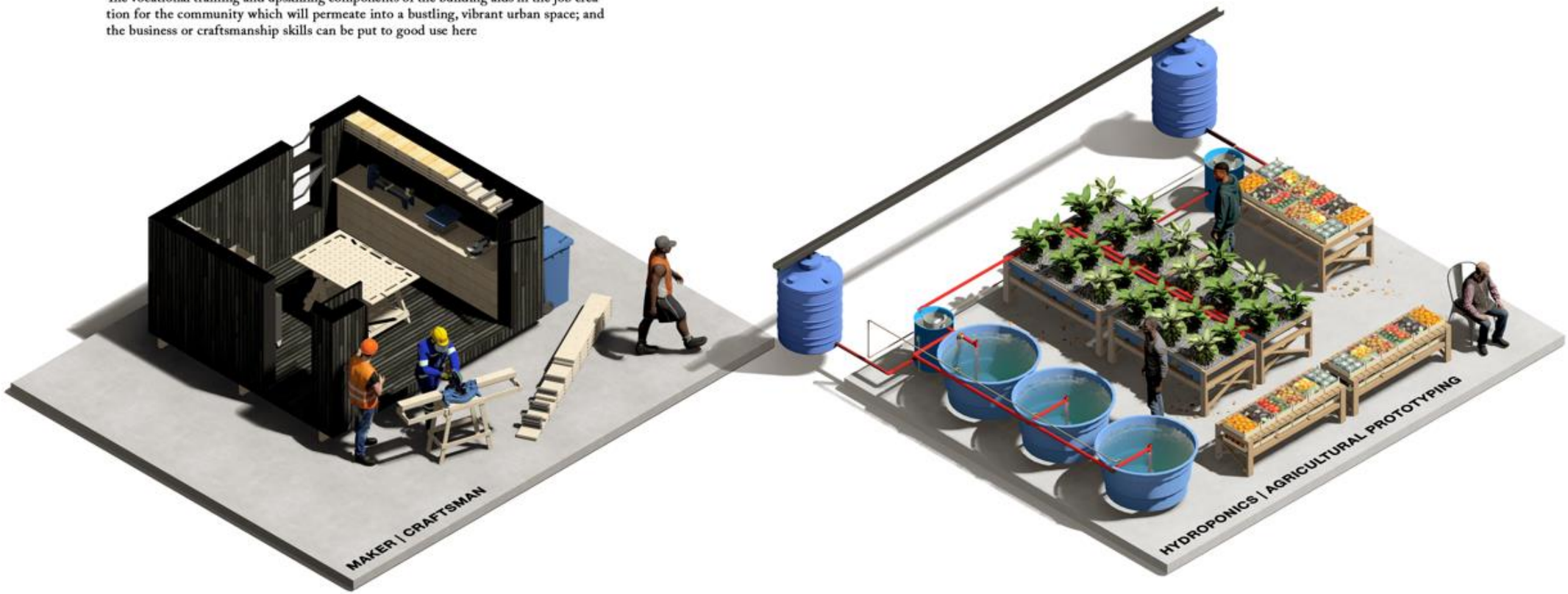
+ MAKER | CRAFTSMAN

Whether making furniture or creating artworks from salvaged materials. These spaces act as incubators for emerging craftsman and makers who are looking to expand their micro-industries into a fully fitted workshops. This establishes them a primary users and they plug directy into the FabLab facility enabling them to engage with new technologies to create objects or other tooling for projects

The vocational training and upskilling components of the building aids in the job creation for the community which will permeate into a bustling, vibrant urban space; and the business or craftsmanship skills can be put to good use here

+ HYDROPONICS | AGRICULTURAL PROTOTYPING

The area of Philippi known for its agrian culture and farming land in the city metropole. These space share a similar reservation as public space within overall project armature. The successful methods argicultural practices can be adopted in the form of hydroponic farming and sustain a common practice in a new prototyping forms




Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
+ ASSEMBLING THE THOROUGHFARE
Internal communal route
44

SECTIONAL PERSPECTIVE

Spatial ordering is assembled by the thoroughfare, the public routes is raised on a plinth providing visib ility into the fabrication spaces | ways of seeing the local ways of making

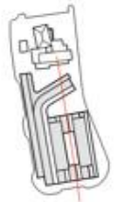
KEY

A - Training classrooms
B - Workyard | Prototyping area
C - Workshop + FABLAB
D - Thoroughfare + Makerstudios

45

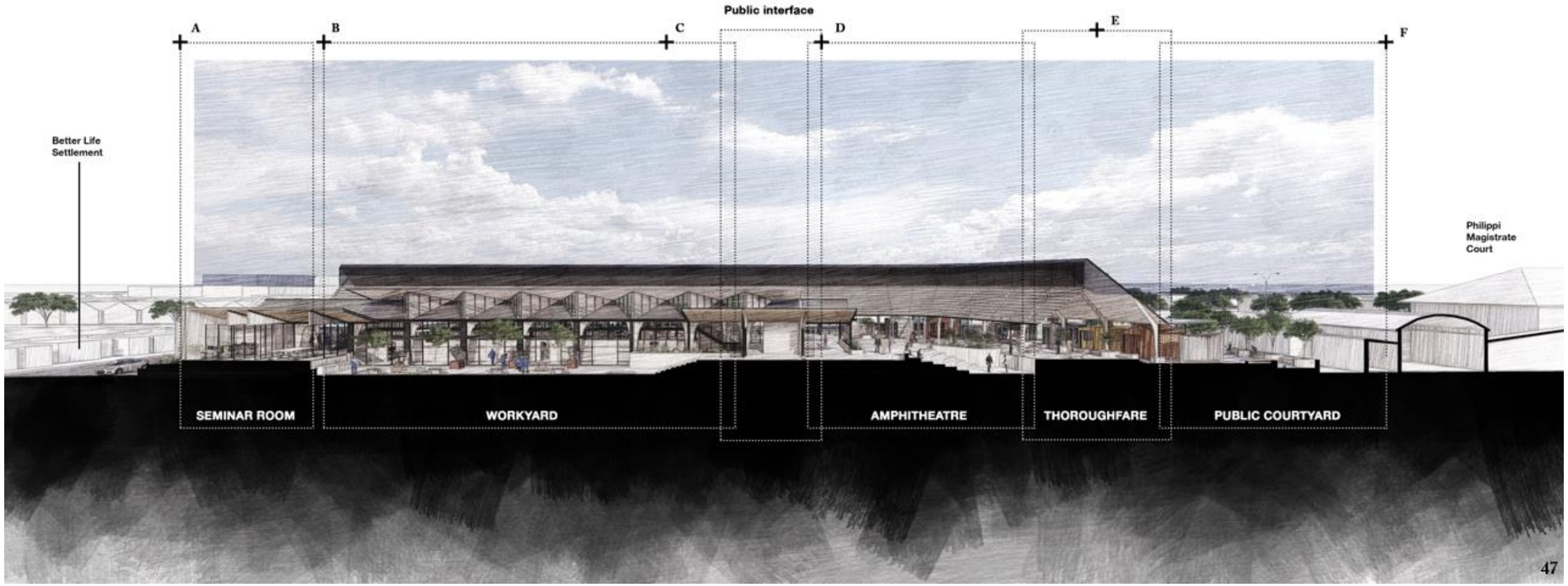

Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
+ ASSEMBLING THE URBAN YARD
Workyard + Courtyard
46

WORKYARD SECTIONAL PERSPECTIVE
Urban yard activities of prototying and fabrication



KEY

A - Seminar Rooms
B - Workyard | Prototyping area
C - PUBLIC INTERFACE
D - Amphitheatre
E - Thoroughfare + Makerstudios
F- Public Courtyard



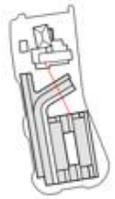
47


Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
+ PUBLIC AMPHITHEATRE | Social gathering space
Internal communal route
48

Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats

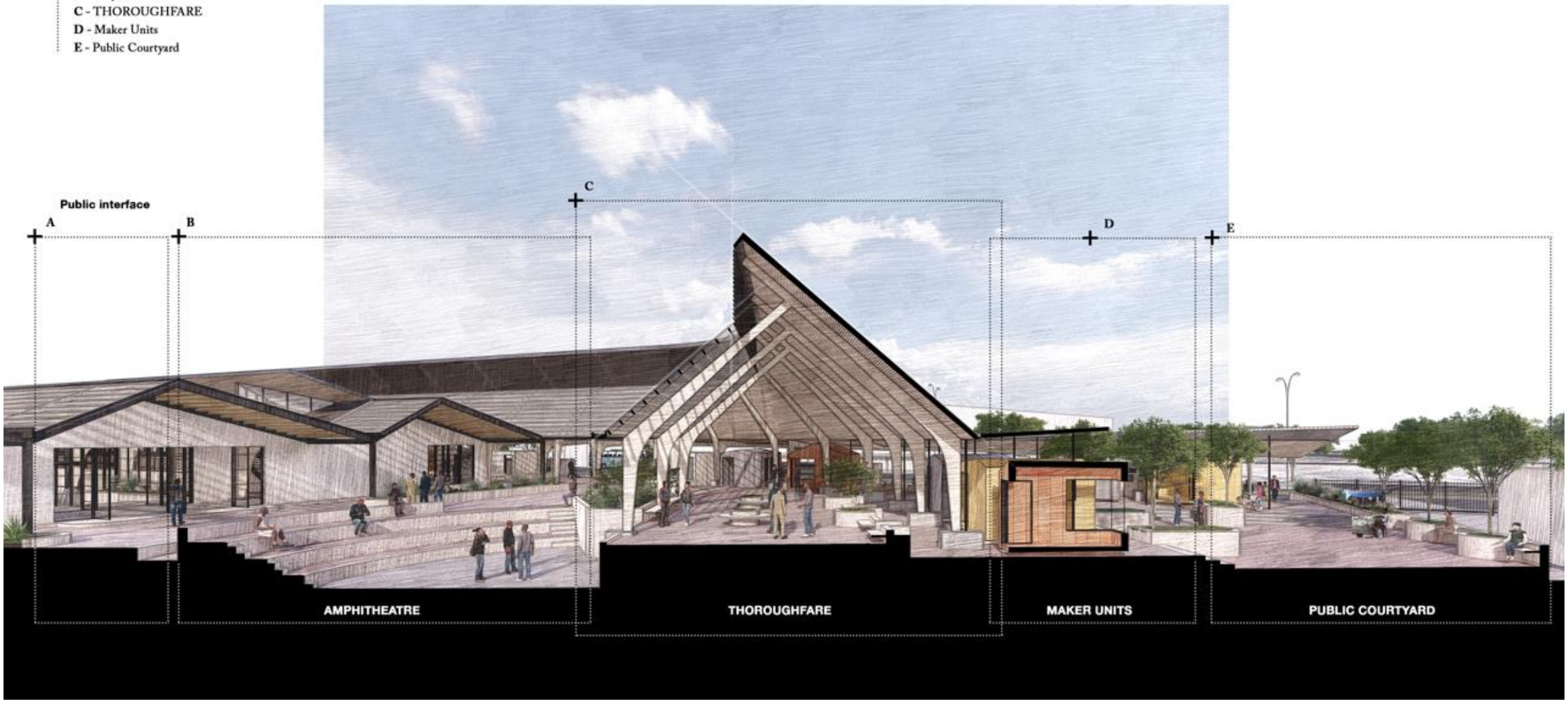
AMPHITHEATRE SECTIONAL PERSPECTIVE

Public realm amenities | Social gathering spaces



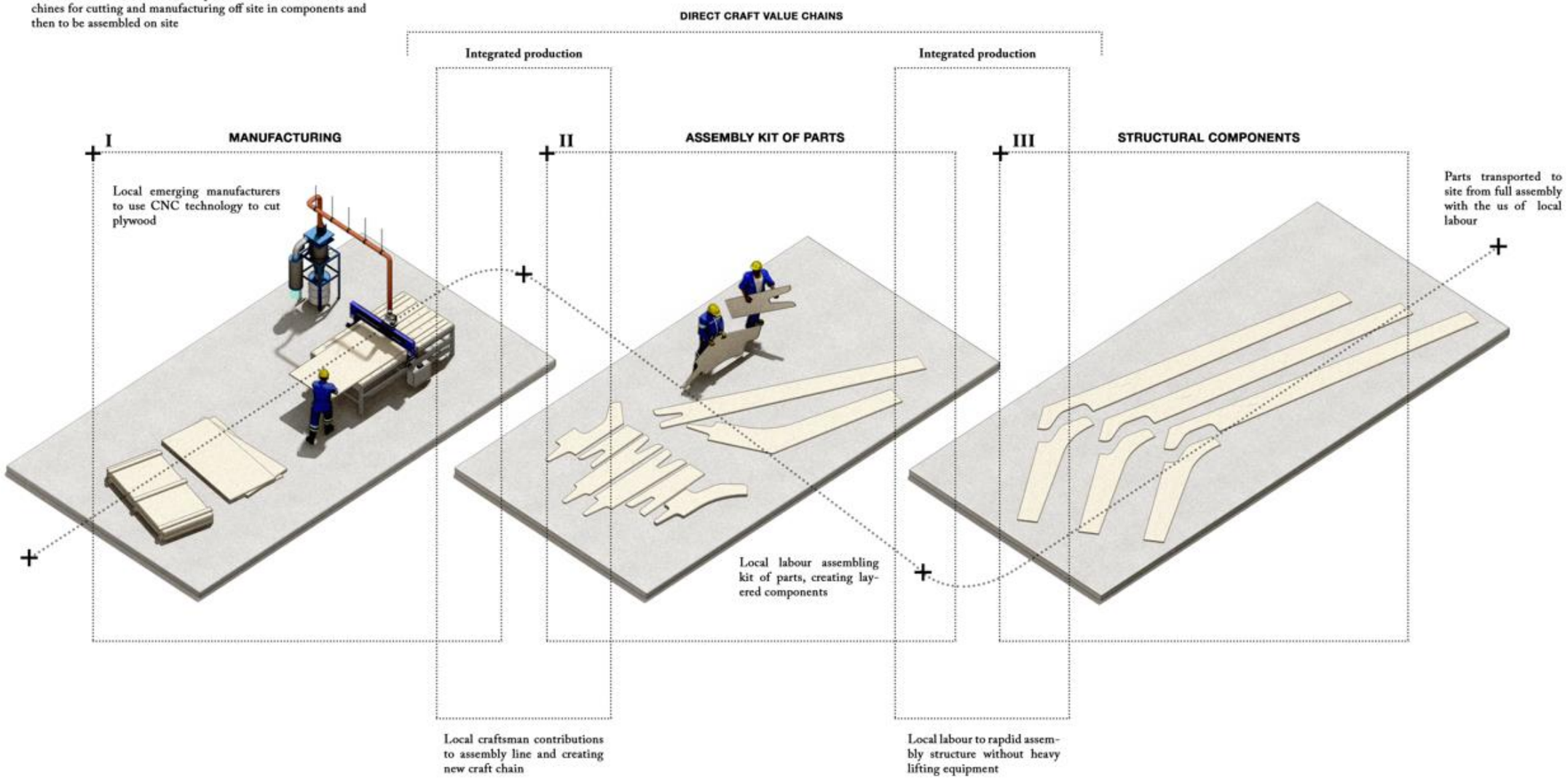
KEY

- **A** - Public Interface
- **B** - Amphitheatre
- **C** - THOROUGHFARE
- **D** - Maker Units
- **E** - Public Courtyard



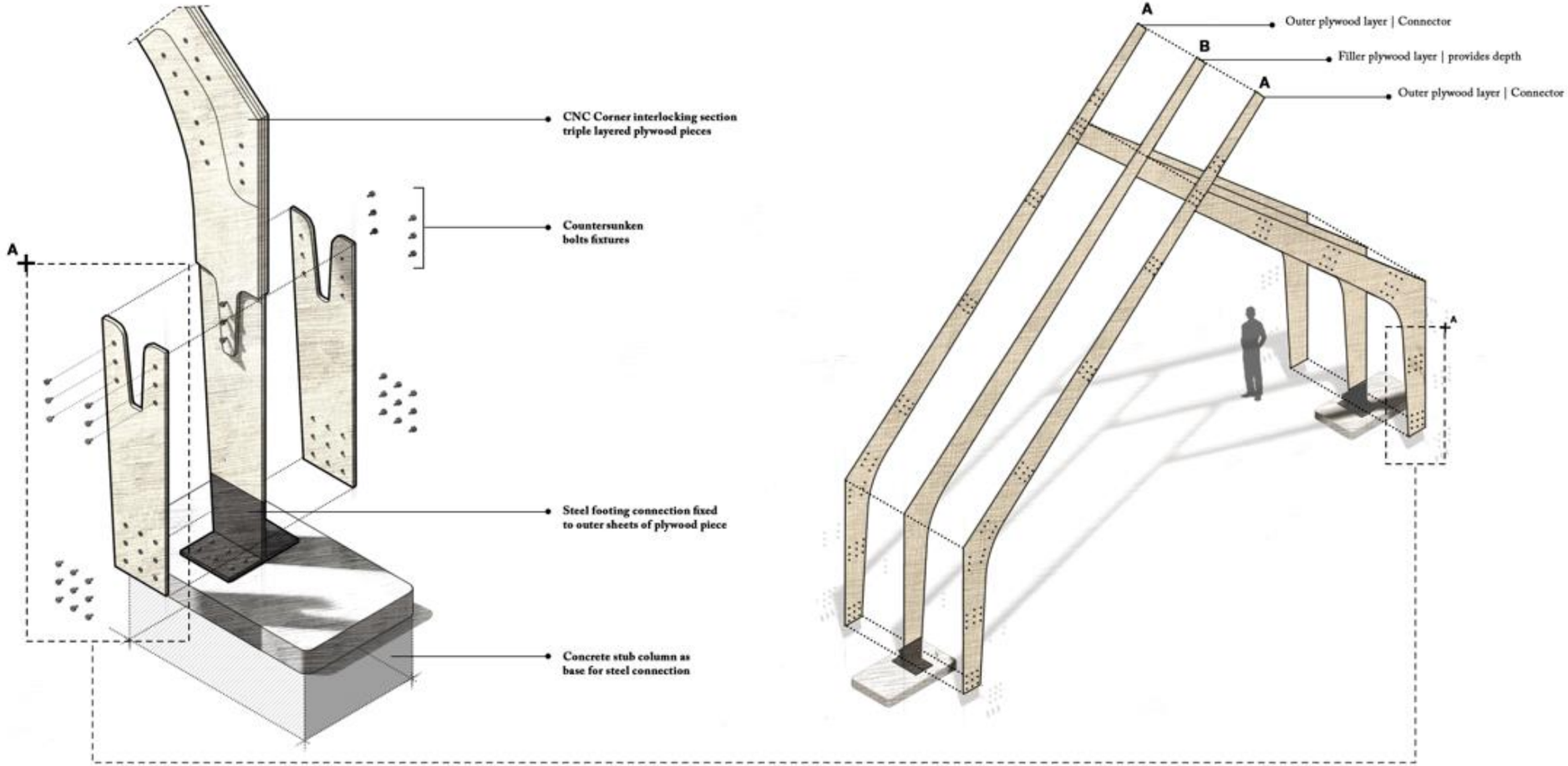
+ MANUFACTURING PROCCESS FOR THE PLYWOOD STRUCTURE

A complete plywood structural portal system - Designed in detail and modeled in 3D. CNC (Computer Numerical Control) Machines for cutting and manufacturing off site in components and then to be assembled on site

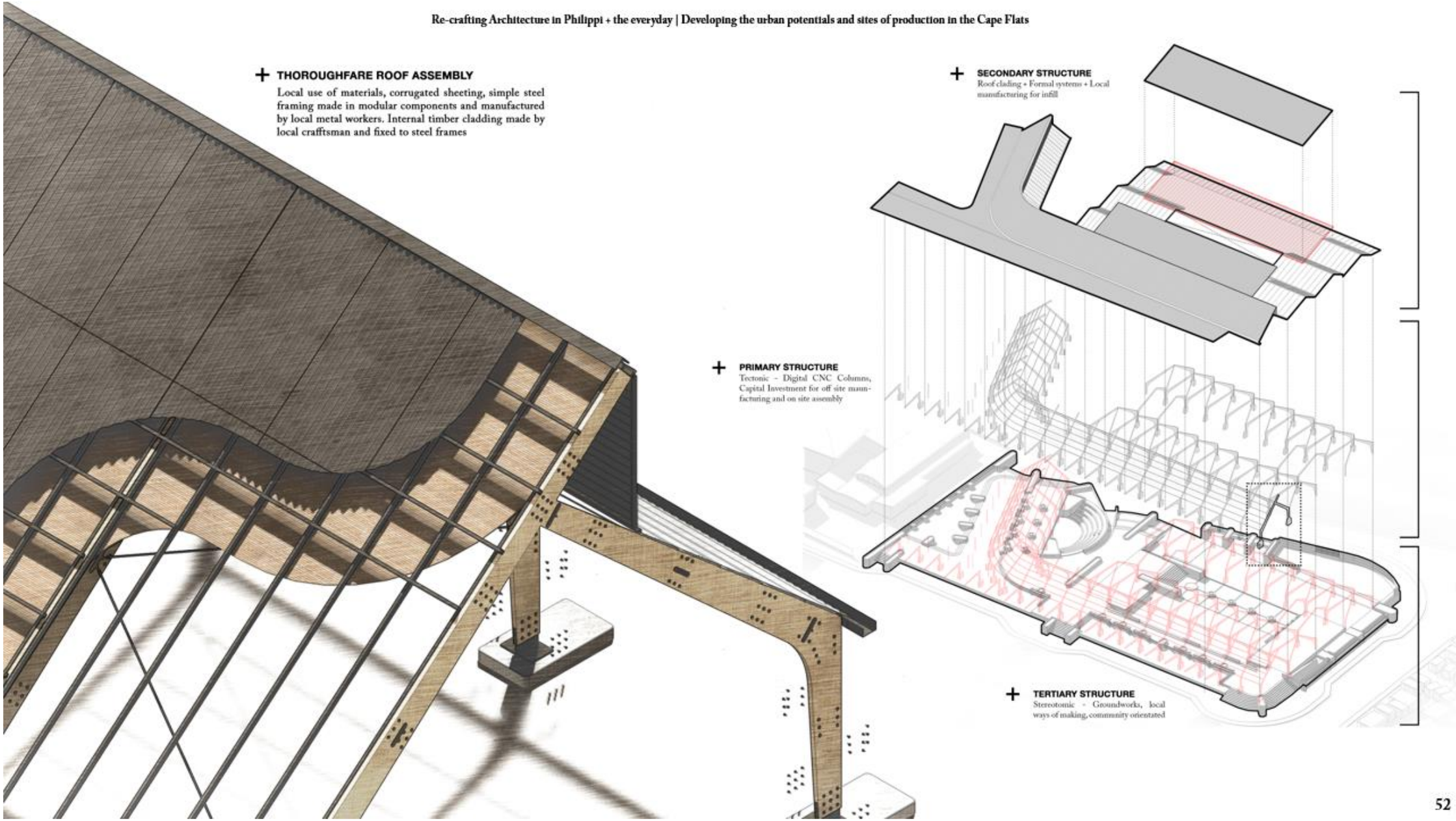


+ EXPLODED AXONOMETRIC COLUMN DETAIL

A complete plywood structural portal system - Designed in detail and modeled in 3D. CNC machines for cutting and manufacturing off site in puzzle components (kit of parts) and assembled on site by local craftsmen



Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats



52


Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
+ NORTH THOROUGHFARE ENTRANCE | Public forecourt
Cwango Rd
53


Re-crafting Architecture in Philippi + the everyday | Developing the urban potentials and sites of production in the Cape Flats
+ NORTH AERIAL PERSPECTIVE VIEW
Cwange Rd
55

Bibliography

Theory Resources:

- Bauman, Z. (2004). Wasted Lives: Modernity and Its Outcasts. Cambridge: Polity Press.
- Bayat, A. (1997). Un-civil society: The politics of the 'informal people'. Third World Quarterly, 18(1), pp. 53-72.
- Biko, S. (1978). I Write What I Like: Steve Biko. A selection of his writings. London: Bowerdean Press.
- Change by Design Cape Town (2015). Available at: https://issuu.com/asf-uk/docs/cbd2015_cape_town (Accessed: 2 July 2021).
- Forjaz, J. (2000). Building Culture. Cape Town, Archicad Solution Centre.
- Hallaj, O. A. (2013). Building Crafts in the Modern World. In: M. Mostafavi, ed. Architecture Is Life: AGA Khan Award for Architecture. Zurich, Switzerland: Lars Muller Publishers, pp. 83-87.
- Harman, G. (2007) 'The Importance of Bruno Latour for Philosophy', Cultural Studies Review, (13)1: 31-49.
- Jashari-Kajtazi, Teuta, & Arta Jakupi. (2017). "Interpretation Of Architectural Identity Through Landmark Architecture: The Case Of Prishtina, Kosovo From The 1970S To The 1980S". Frontiers Of Architectural Research, vol 6, no. 4, 2017, pp. 480-486.
- Kien, Grant. (2009). "Actor-Network Theory: Translation as Material Culture." 28-43
- Latour B (2005) Reassembling the Social: An Introduction to Actor-Network-Theory. Oxford: Oxford University Press. .
- Ross, K. (1991). Introduction to Jacques Rancière. In: K. Ross, ed. The Ignorant Schoolmaster: Five Lessons in Intellectual Emancipation. 1st ed. Stanford: Stanford University Press, pp. Vii-xxiii.
- Sennett, R. (2008). The craftsman, New Haven, Yale University Press.
- Shotter, J. (1993). Cultural Politics of Everyday Life: Social Constructionism, Rhetoric and Knowing of the Third Kind. Buckingham: Open University Press.
- Till, J. (2013). Architecture Depends. 1st ed. Cambridge, Massachusetts: MIT Press.
- Township Economy People, Spaces and Practices – The Human Sciences Research Council (HSRC) (2021). Available at: https://www.hsrcpress.ac.za/books/township-economy-people-spaces-and-practices (Accessed: 5 July 2021).
- Unger, R.M. (1991). The Better Futures of Architecture. In: C. Davidson, ed. Anyone. New York: Rizzoli, p. 36.

Technical Resources:

- AA Design + Make. (2021). Available at: https://designandmake.aaschool.ac.uk/ (Accessed: 4 July 2021).
- Albright, D. et al. (2017). "Sim[PLY]: Sustainable Construction with Prefabricated Plywood Componentry", Procedia Environmental Sciences, 38, pp. 760-764. DOI: 10.1016/j.proenv.2017.03.159.
- Barker, A (2019). earthworld architects and interiors (2000-2018) 21st century makers.
- Carpo, M. (2005). Tempest in a Teapot. Log, 6(Fall 2005), pp. 99-106.
- Carpo, M. (2009). Some New Technologies in Search of an Author. Log, 15(Winter 2009), pp. 49-54.
- Carpo, M. (2012). Digital Darwinism: Mass Collaboration, Form-Finding, and the Dissolution of Authorship. Log, 26(Fall 2012), pp. 97-105.
- Dunn, N. (2012). Digital fabrication in architecture, London: Laurence King Publishing Limited.
- Experiments in Timber Space Frame Design: Fabrication, Construction and Structural Performance (2021). Available at: https://www.researchgate.net/publication/332567655_Experiments_in_Timber_Space_Frame_Design_Fabrication_Construction_and_Structural_Performance (Accessed: 17 June 2021).
- Bianconi, F,. & Filippucci, M. (2019). Digital Wood Design: Innovative Techniques of Representation in Architectural Design. 1st ed. Springer International Publishing.
- Future Africa Innovation Campus part II (2021). Available at: https://www.wisaplywood.com/news-and-stories/references/future-africa-innovation-campus-part-two/ (Accessed: 7 July 2021).
- Future Africa Campus - World Buildings Directory | Architecture Search Engine (2021). Available at: https://www.worldbuildingsdirectory.com/entries/future-africa-campus/ (Accessed: 8 July 2021).
- Gibson, I., Kvan, T. & Wai Ming, L. (2002). Rapid prototyping for architectural models. Rapid Prototyping Journal, [online] 8(2), pp.91-95. Available at: [Accessed 6 July 2020]
- Iwamoto, L. (2009). Digital fabrications architectural and material techniques, New York: Princeton Architectural Press.

Technical Resources:

- Kumsal, Asena & Şen Bayram, Asena. (2021). DIGITAL FABRICATION SHIFT IN ARCHITECTURE.
- McCullough, M. (1996). Abstracting Craft - The Practiced Digital Hand. 1st ed. London, United Kingdom: The MIT Press, pp.1-29
- Mitchell, W. J., & McCullough, M. (1995). Digital design media. John Wiley & Sons.
- Otto, F. (2010). A Conversation with Frei Otto. In: J. M. Songel, ed. Conversations. New York: Princeton Architectural Press, pp. 17-86.
- PrototypeHouse. (2021). Available at: http://hookepark.aaschool.ac.uk/prototypehouse/ (Accessed: 4 July 2021).
- Salter, P. (2017). Peter Salter on Craftsmanship: 'The iterative process whereby one learns from others the way of the road'.
- Schaefer, H. (1958). The Metamorphosis of the Craftsman. College Art Journal, 17(3), pp. 266-276.
- Tedeschi, A., Andreani, S. (2014). AAD Algorithms-aided Design: Parametric Strategies Using Grasshopper. Brienza, Italy: Le Penseur Publisher.
- Witpress.com. (2021) Available at: https://www.witpress.com/Secure/ejournals/papers/CMEM050412f.pdf (Accessed: 17 June 2021)

List of figures

Application for Approval of Ethics in Research (EiR) Projects
Faculty of Engineering and the Built Environment, University of Cape Town

APPLICATION FORM

Please Note:
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data. The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook** (available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/ebe/research/ethics1

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		Travors Van Breda
Department		Architecture, Planning & Geomatics
Preferred email address of applicant:		vbrtra001@myuct.ac.za
If Student	Your Degree: e.g., MSc, PhD, etc.	Master of Architecture (Prof)
	Credit Value of Research: e.g., 60/120/180/360 etc.	120
	Name of Supervisor (if supervised):	Alta Steenkamp
If this is a researchcontract, indicate the source of funding/sponsorship		N/A
Project Title		Re-crafting Architecture in Philippi + the everyday

I hereby undertake to carry out my research in such a way that:

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	Travors Van Breda	**SIGNED**	**02 Aug 2021**

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	AssProf Alta Steenkamp	**SIGNED**	**03 Aug 2021**
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduateresearch (Including Honours).	Click here to enter text.		Click here to enter a date.
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.	Prof. H. von Blottnitz	**SIGNED**	12/09/2021