

EASTERN EXODUS

Joshua Chauke

Utilizing light industrial typology as a vehicle for economic and urban regeneration in Pretoria West

EASTERN EXODUS

A model for sensitive light industrial development

ABSTRACT

The project set out to investigate the potential of using the light industrial typology as a vehicle for economic and urban regeneration in the western part of Pretoria CBD, which is home to a substantial number of light industrial zoned lots, but has experienced persistent urban blight in recent years. The presence and clustering of light industrial facilities in this part of the city and this urban blight, revealed a correlation between the industrial typology and the persistence of urban blight, owing to a light industrial typology which has become a building block for anonymous and placeless urban environments. The project investigates how these qualities make industrial spaces prone to exclusion from urban developments and create conditions that lead to industrial gentrification - which leads to the loss of industrial jobs, particularly high value manufacturing in the city of Pretoria.

With the high local youth unemployment, the return of local manufacturing, its preservation and further development could aid in alleviating this challenge, hence developing industrial spaces which are sensitive to place is crucial in creating enabling environments for local young manufacturers. The project also explores the potential of connecting manufacturing spaces with spaces of cultural production, to create liveable, inclusive spaces which offer economic opportunities to a demographic that could potentially fall into urban poverty. Place-making, regenerative, and critical regionalist concepts are used to develop an incarnation of the light industrial typology which is tailored to the Pretoria Urban context, but also functions within the global technological and economic scope.

KEY WORDS :

Manufacturing, Youth Unemployment,
Local Production, Urban Decay, Light Industrial

Project Summary

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Gratitude

Dedicated to my mother - Mme Lettie Mmule Mashele

Dedicated to my father - Julius Chauke, Lucas Mashele, My siblings (Jan Makaba, Priscilla Molebatsi, Mpho Glaudina)

Thanks to my friends who have helped me on this journey - Phethego Sibeko, Bulelanin Mokhuma, Katlego Motshegoa, Amogelang Maboi, Lerato Motau, Tamryn, Carmen Songabau, Moabi Dimpe, Thembelani Moyo, Bakithi Mngomezulu, Molebogeng Modise & Alexander Malesa.

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I am eternally grateful to God, and all of you.

In accordance with Regulation 4(c) of the General Regulations (G.57) for dissertations and theses, I declare that this dissertation, which I hereby submit for the degree Master of Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

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

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

Joshua Chauke



Student name and signature



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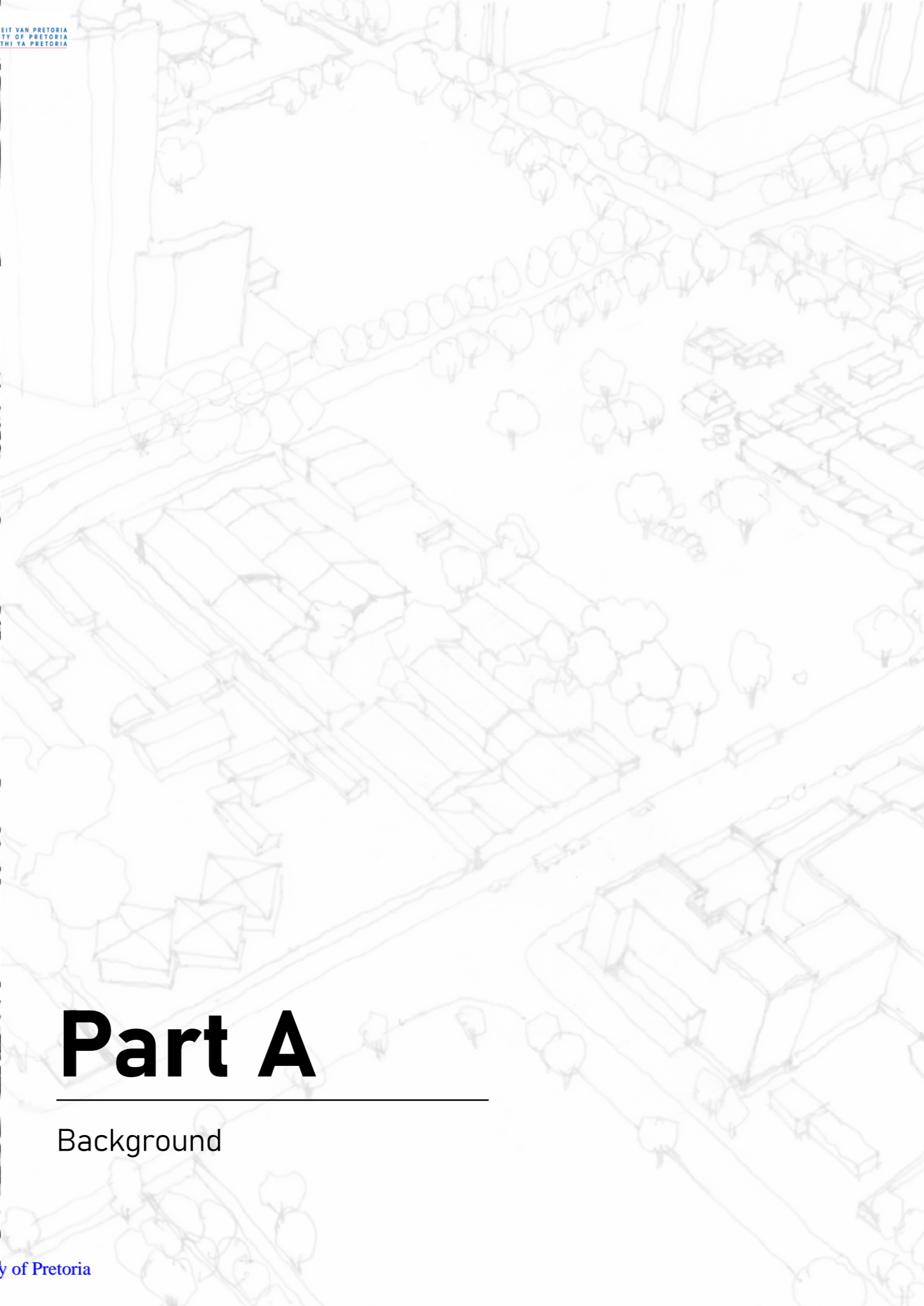
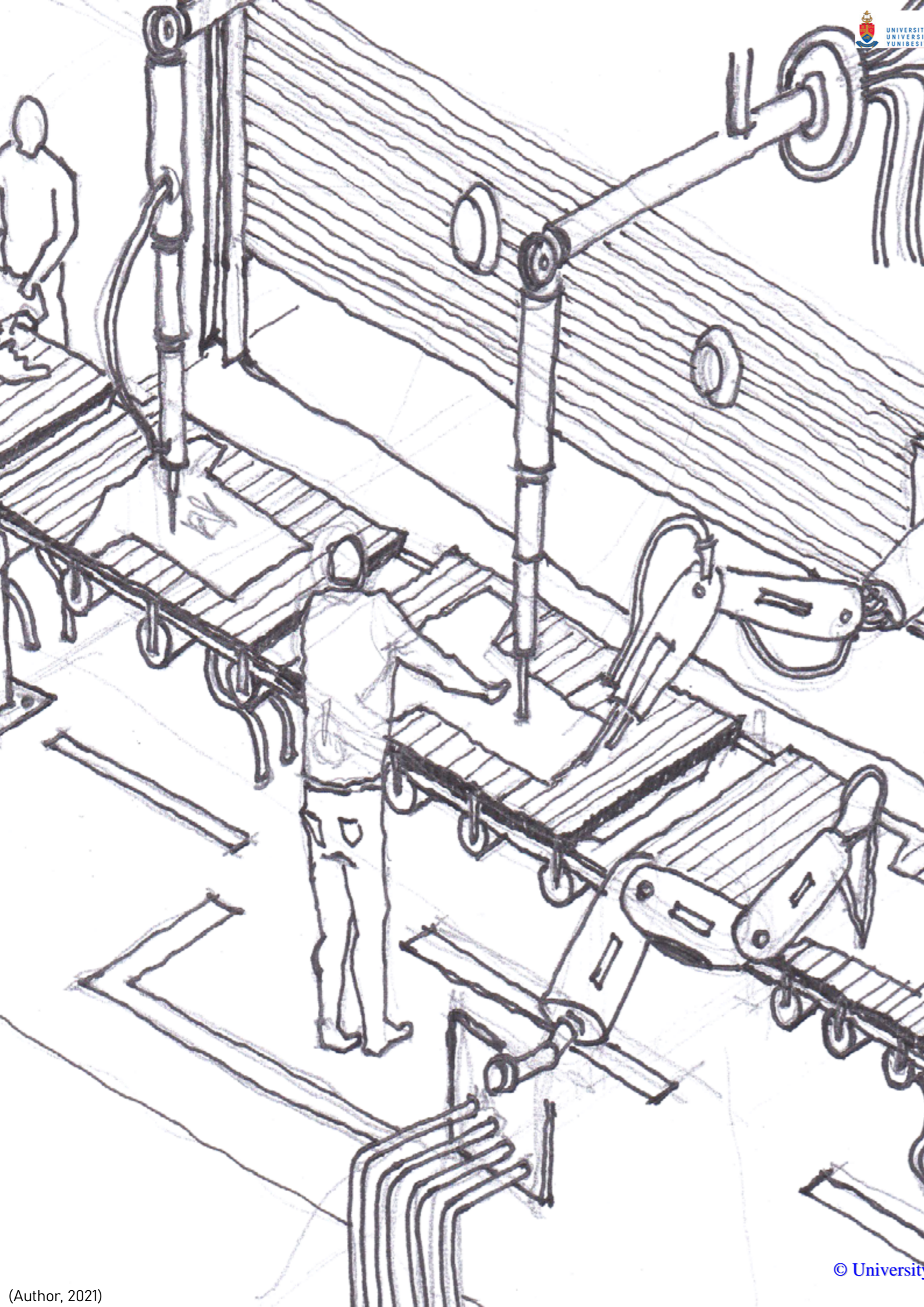
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Part A

Background

1.1 Introduction

South Africa's youth unemployment currently stands at 67% percent, and still occupies pole position on the Gini inequality index with a value of 0.63. The Gini index measures economic inequality in countries with a value between 0 and 1, with 0 being the most equal, and 1 being the most unequal, rendering South Africa as highly unequal. The causes for inequality and unemployment are among many - current and historical political inter-relations, poor education systems, and a relatively weak entrepreneurial culture (Vlok, et al. 2006). The service sector (consulting) has seen steady growth, thanks to the digital economy. The economic regression is most apparent in the manufacturing industry, particularly in the light manufacturing industry, where the decline has been consistent over the past 15 years. Light manufacturing industry can be defined as industries which are less capital and energy intensive such as, food, paper, and textiles manufacturing (**FIGURE 1**), as opposed to heavy industry such as mining, power generation, oil refining, and steel processing (**FIGURE 2**). Light manufacturing is apt for products which are for direct user consumption, thus ready for retail, relative to heavy industry which produces intermediary products which still have to be further processed or incorporated into other products (Stats.SA 2020). The decline of local manufacturing and local brands has a strong correlation with increasing unemployment, and an increase in light manufactured product imports.



Figure 1 - Light manufacturing, (TheCleaner.com, 2020:online)



Figure 2 - Heavy manufacturing, (IM International Mining: Moore, 2021:online)

1.2 Import - Export

Local manufacturing is necessary to enable the country's population to participate more in the value chain and value adding work of product making (Craft,2014), and thus capturing more economic value for themselves. This will also contribute significantly to turning the import/export-deficit, into an import-surplus (exported products exceeding imported products), thus increasing money coming into the country (Vlok, et al. 2006). Statistics South Africa reveals that many of the products such as clothes, bags, watches, shoes which South Africans consume within the textiles market, are imported from European, American, and Asian countries, and this is one of the major causes of the steady decline of South Africa's textile manufacturing industry (**FIGURE 3**) (Vlok, et al. 2006: 233). And this decline has dealt a serious blow - not only jobs, but also to South Africa's GDP, and it is thus important to protect this industry as it has the capacity to contribute significantly to the country's employment and income (Vlok, et al. 2006: 245).

Chapter 1

Background

1.3 Emerging Local Production

One of the main antidotes of unemployment in South Africa, particularly youth and low skill unemployment – which still accounts for a large share of the unemployment, is the emergence and development of local brands and their concomitant light manufacturing capacities which can create jobs by competing in the domestic and international markets. Local youth are heeding the call and seizing these opportunities, as is evident with the emergence of local manufacturing brands, particularly in the textiles and apparel industry, which are a silver lining of self-empowerment in the midst of a country clouded by political tensions, corruption, and inequality. Brands such as Rich Mnisi, Maxhosa, Freedom of Movement, and Filly leather (FIGURE 4), are evidence of the efforts of young South African entrepreneurs who are reviving local textile and apparel manufacturing, thus creating jobs and reducing inequality (Vlok, et al. 2006: 245). The local population, especially the youth, have become aware of the importance of becoming self-reliant and ensuring that they develop their own competencies and skills, so as to be able to participate effectively in the economy (CoT 2015). The growing consciousness and intention among the youth, of using textile and apparel as an instrument of cultural expression (FIGURE 5) and identity projection (Gooden, 2016), has created a gap in the market, which creates opportunities for new, locally produced, and highly customized apparel products.

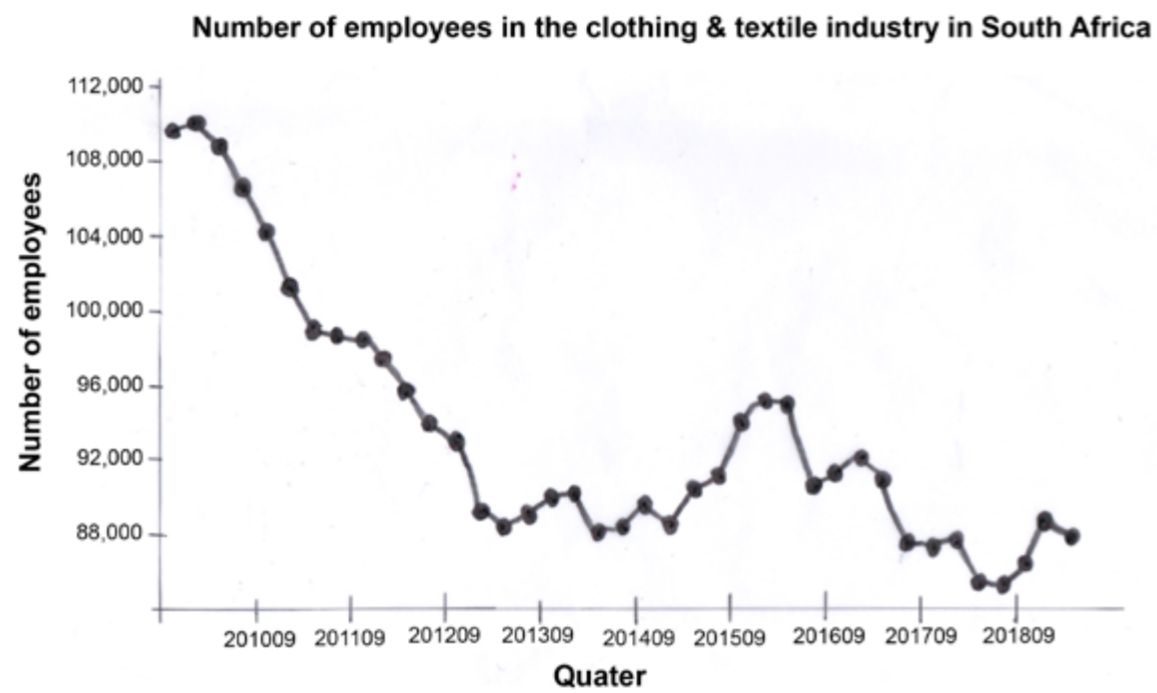
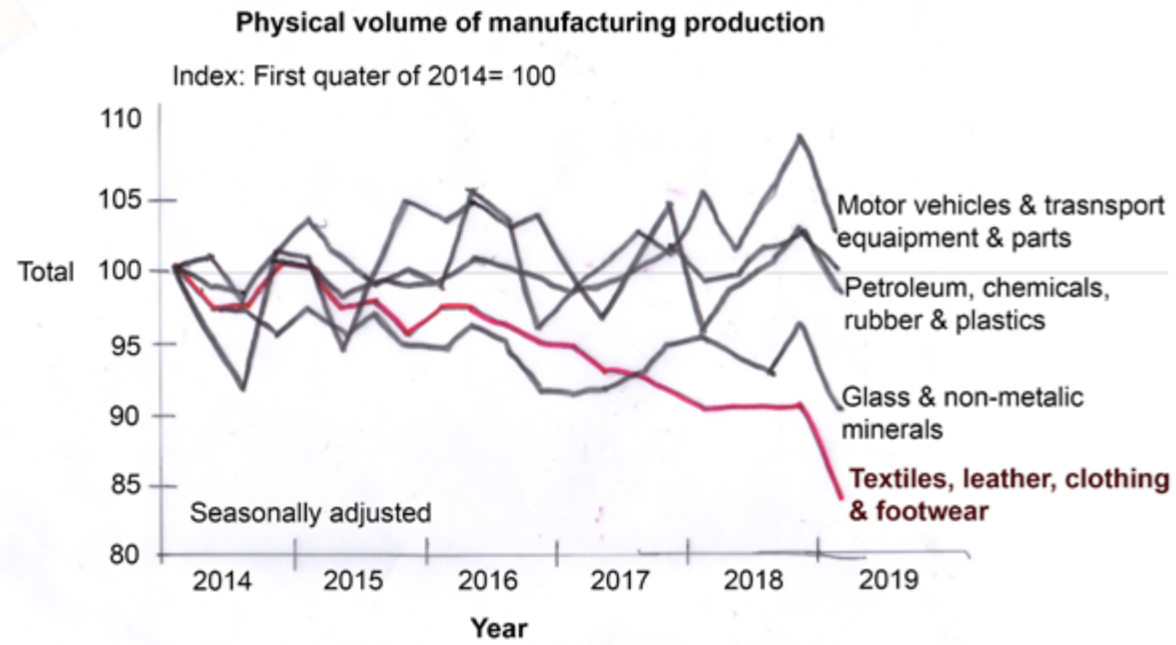


Figure 3 - Decline in Local Manufacturing (StatsSA, 2018)



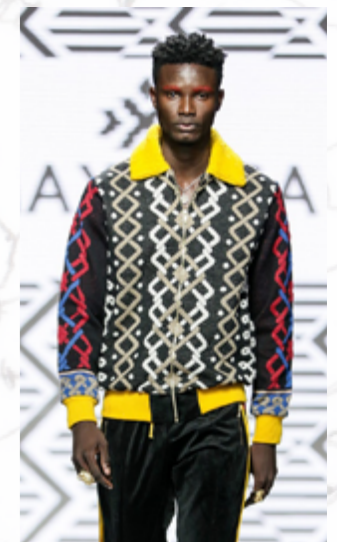
(RichMnisi, 2021)



(Fillyleather, 2020)



(Bavinck-Bender, 2016)



(Maxhosa, 2020)

Figure 4 - Local Apparel Brand Start Ups



Figure 5 - Cultural Production/ Cultural Expression through Apparel
(Mabena, 2020)

1.4 Light Industrial Expansion

The entrepreneurs who fill this gap such as Rich Mnisi – have intentions to expand their brands into domestic and international apparel markets (Vlok, et al. 2006), and their expansion needs to be supported by a light manufacturing and retail infrastructure, i.e. factories, warehouses, and physical and online retail outlets.

The existing light manufacturing infrastructure was developed during a different time in South Africa, and the world, and this is reflected in how, and where it was built. This light manufacturing infrastructure or light industrial buildings are outdated, and do not reflect the ideologies, operations, objectives, and capabilities of today's light manufacturing, and its associated contemporary architectural and urban strategies (**FIGURE 7**). Thus the emergence and growth of local manufacturing presents an opportunity to reimagine light manufacturing spaces and its relationship to the larger built environment, to forge a new trajectory for "light industrial expansion". An expansion which can optimize capital investment into light manufacturing building stock, and make a better contribution to the greater urban, social, and natural environment, as outlined by the cities' urban development objectives (CoT 2015). A revised idea and plan for light manufacturing, which is more ethical to workers working conditions, is spatially just, and environmentally sensitive.



Figure 7 - Old Light Industrial Building (S.Dadlei, 2020)

1.5 Agglomeration

This expansion of local manufacturing is necessary to ensure that young local entrepreneurs can agglomerate, and overcome circumstances that forces them to operate in silos, **(figure 8)** which tends to limit their businesses from expanding and having a substantial impact on local job creation and contribution to the GDP (Vlok, et al. 2006: 229). Giving them the option to produce faster, test ideas quicker, and increase their output rate and capacity, through mass production **(figure 9)**. Mass production has many advantages for manufacturing businesses that are looking to grow, and improve efficiency, though, the light manufacturing architecture associated with mass production, has not evolved and improved since its emergence. Unlike the light industrial developments and buildings of the 20th century, which were the result of rapid development, globalization, internationalism, and thus succumbed to the technocratic leanings of orthodox modernism of the time (Freeman 2018). This incarnation of light industrial development seeks to address and enrich the inherent multiplicity of the built environment, that is - the innovation of global building ideas, local cultural and geographic conditions, the needs and safety of workers, and sensitivity towards natural resources. (Mang, et al. 2016). This project seeks to regenerate existing, outdated, and regressing light industrial areas or developments, and ensuring that the revised incarnations have resilient capacities which can offset these buildings from suffering a similar fate as their antecedents in the future.



Figure 8 - Operating in Silos, (Reuters, 2019)



Figure 9 - Mass Production , (H&M, 2018)

1.6 Problem Statement

The inertia that has kept light industrial buildings from evolving beyond their limited capacity and offering, has perpetuated the development of disconnected, disruptive, and austere production spaces. Light industrial buildings cannot be classified in the same way as heavy industrial buildings, and this means their identity has the potential to participate more positively to urbanization, and the creation of much needed corporeal-productive urban spaces for people.

1.6.1 General Issue

Devolving Light industrial typology, failing to reach its full potential, and negatively impacting low skill light industrial workers, young industrialist and entrepreneurs.

1.6.2 Urban Issue

Industrial gentrification - light industrial buildings do not contribute positively to the liveability in urban environments, thus continuously facing expulsion as they fail to integrate into sustainable and friendly urban frameworks.

1.6.3 Architectural Issue

Building typology has not evolved and developed regional architectural incarnations, that is suited for Pretoria's natural and social contexts, thus not allowing it to properly integrate and contribute to the spatial urban condition, through its interface and engagement of civic public space.

1.7 Research Intentions

This dissertation explores a new typological incarnation for a more integrated light industrial textile development that is sensitive to its surrounding fabric and has a greater connection to its surrounding natural and cultural environments, which can be a Wcatalyst for the regeneration of the western part of Pretoria CBD, and contribute to initiating a culture of light industrial space which foster resilience, liveability, and inclusivity.

1.7.1 Research Questions

How can architecture enable the evolution of light industrial and manufacturing buildings to draw greater value from them in relation to the larger urban and civic space?

1.7.1. Research Sub-Questions

- How can light industrial buildings be more meaningful to the surrounding communities, and be less reclusive space.
- How can light industrial buildings enrich social spaces and cultural production?
- How can light industrial buildings develop a more local, regional identity?
- How can light industrial buildings be more interactive and provide a better sensory experience?
- How can light industrial buildings become more spatially just?
- How can light industrial buildings avoid potentially causing urban decay/blight?
- How can light industrial buildings positively impact the western part of Pretoria's CBD property values?

1.7.3 Project Intention

This dissertation seeks to reimagine the potential of light manufacturing industrial spaces, by reconciling them with the dense city fabric and ensuring that they are places which offer greater value to their surrounding areas, thus securing their place in highly contested areas. Textiles, leather and Clothing manufacturing will be the main focus, and their relation to place, people, culture and nature. Regenerative, place-making and critical regionalist strategies (**figure 10**) form the toolkit used to critique current conditions and propose alternative spatial interventions that can create conducive conditions for fledgling young South African apparel manufacturers.



Figure 10 - Neo-Regional Light Industrial (Hoyle, 2016)

1.7.4 Research Methodology

The research methodology used was a mixed-methods strategy, where both quantitative, and qualitative data and information was collected, as displayed below (**figure 11**). Precedents will also be used to test the validity and efficacy of regional industrial architecture.

MIXED METHODS APPROACH

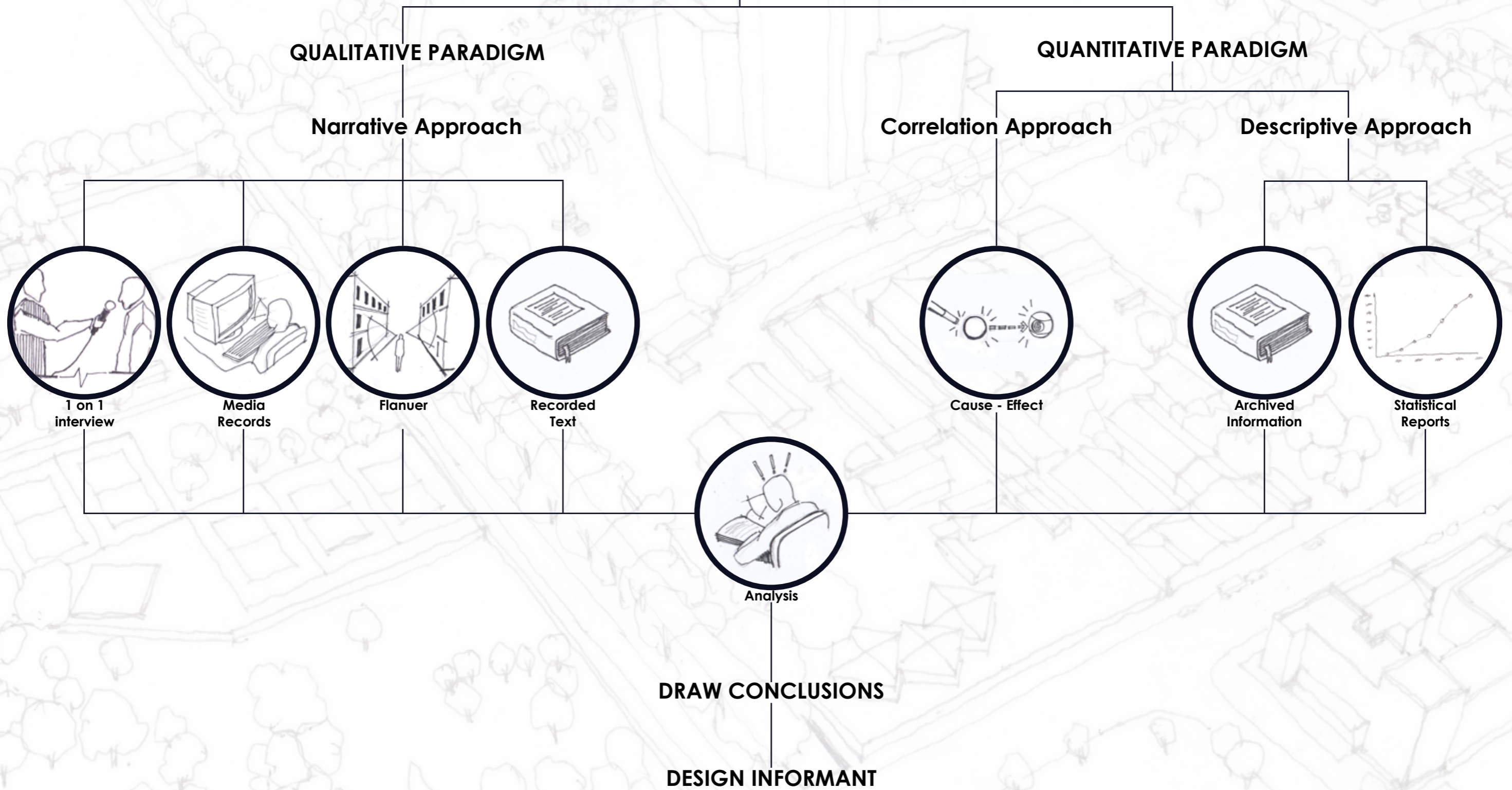


Figure 11 - Research Methodology (Drawn by Author, 2021)

2.1 Site Introduction

The Site is in the western part of Pretoria's CBD (**FIGURE 12**). This part of the city (bounded by Shubart, Visagie, Boom Street, and Es'kia Mphahlele Drive) was one of the first areas to experience a large influx of people of colour after the repeal of the group areas act in 1991 (Clarke & Corten, 2011), mainly due to the fact that it had received little attention and investment from the government at the time. This influx of people induced capital flight in the area, and has left a trail of decay – with abandoned buildings, guerrilla development, and vacant lots being the hallmark of the western part of the city's CBD (Clarke & Corten 2011: 881). This has tainted the image of the western part of the city, hence the disinvestment and lack of appreciation of the value of this precinct, and the architectural artefacts that are still present in this part of Pretoria.

This part of Pretoria is home to many historically significant architectural artefacts, such as Kruger house, the Mari- amman Temple, Gereformeerde Kerk (FIGURE, and Heroes Acre Cemetery. This gives the context high heritage value, and high potential for re-investment (Clarke & Corten 2011: 887) and resurgence as a relevant and place of interest in the city. But due to the fact that light industrial activity and manufacturing is viewed as a low value activity, this potential reinvestment is a threat to light industrial build- ings. These types of reinvestment of regenerating the area through high density residential, and commercial spaces, takes place at the expense of the light industrial activities that call this part of the city home, which is connected to many people's livelihoods. This very potential elicits im- portant questions regarding the value and possible change in nature of the light industrial building, in trying to avoid exclusion and expulsion from valuable spaces in the city.



South Africa - Gauteng
(Drawn by Author, 2021)



Gauteng - Tshwane
(Drawn by Author, 2021)



Tshwane - Pretoria(Asiatic Bazaar)
(Drawn by Author, 2021)



Asiatic Bazaar - Site
(Drawn by Author, 2021)

FIGURE 12 - Location

Chapter 2

Site

2.2 History of Context

The consequential parts of Pretoria's history – as we know it today, dates back to 1855, a date which marks the arrival of the itinerant Afrikaans speaking people from the Cape Colony – now Western/Eastern/Northern Cape (Fisher, et al. 1998). Their arrival in what was to be Pretoria, was apparently met with no resistance as prior conflict in that area, between certain indigenous cultural groups, had left a “vacuum of power” (Clarke & Corten 2011: 883). The Boers settled in this “vacant” area, and set up a village which acted as the capital of the ZAR (Clarke & Corten 2011), and as the settlement grew, an orthogonal plan was designed, which was the foundation for Pretoria's current urban structure.

The discovery of gold in the Witwatersrand caused a huge influx of people into the region (now Gauteng), and this also affected Pretoria (Clarke & Corten 2011: 884), and signalled the start of a new economic force in the southern part of the region (now Johannesburg). Pretoria rapidly transformed from a pasto-

ral-rural area into an urban area, which brought about significant political and economic dynamics (Clarke & Corten 2011: 884). During the time of expansion related to the Gold rush in Johannesburg, Pretoria had physically expanded to the East, as North-South expansion was limited by the mountain ranges (Clarke & Corten, 2011). This expansion developed in a palimpsest manner – respecting the original orthogonal grid, which lead to the long and wide East-West carriage-ways such as WF Nkomo, Pretorius and Francis Baard streets (**Figure 13**). Economic and political dynamics culminated in the two Anglo-Boer wars (1st and 2nd Boer Wars of 1889-1902), and was the precursor to the Union of South Africa after a cease fire, and peace talks. The new Union of South Africa, saw Pretoria become the administrative capital of the country, and this saw fur-

ther expansion and investment into the administrative and civic buildings and spaces of the city (Fisher, et al. 1998). This expansion coincided with the global phenomenon of industrialization and globalization, which saw Pretoria embrace electrification in 1889 (Eskom 2021) (**Figure 14**) and signalled the emergence of several production industries in Pretoria North, Silverton and Pretoria West (**Figure 15**) around the period between 1930-1960 (Verhoef, 1998), hence the light industrial fabric in Pretoria West

The industrial development of the western part of the city, particularly manufacturing, remained relatively smaller (Verhoef, 1998), and the associated warehouses, mills, silos, and workshops remained small as a result (**Figure 16**). This ensured that Pretoria West's industrial parts never developed in a severely monofunctional, separated

manner, but rather in a more traditional, that is to say – integrated, pre-industrial configuration, as can be observed today, with Pretoria West industrial being so close to residential and civic space (**Figure 17 & 18**). The geographical constraints of the city, i.e. Apies River, Magaliesburg mountain range, and the period of development – were the elements of a “perfect storm”, that ensured Pretoria's industrial spaces developed in a more integrated fashion compared to other cities. And this is highly valuable as it is an ideal form of industrial space which can foster diversity, innovation, and steady, integrated growth.



FIGURE 13 - WF Nkomo Street, Pretoria, 1899 (Hilton, 2020)

TIMELINE OF PRETORIA & ITS MANUFACTURING INDUSTRY?

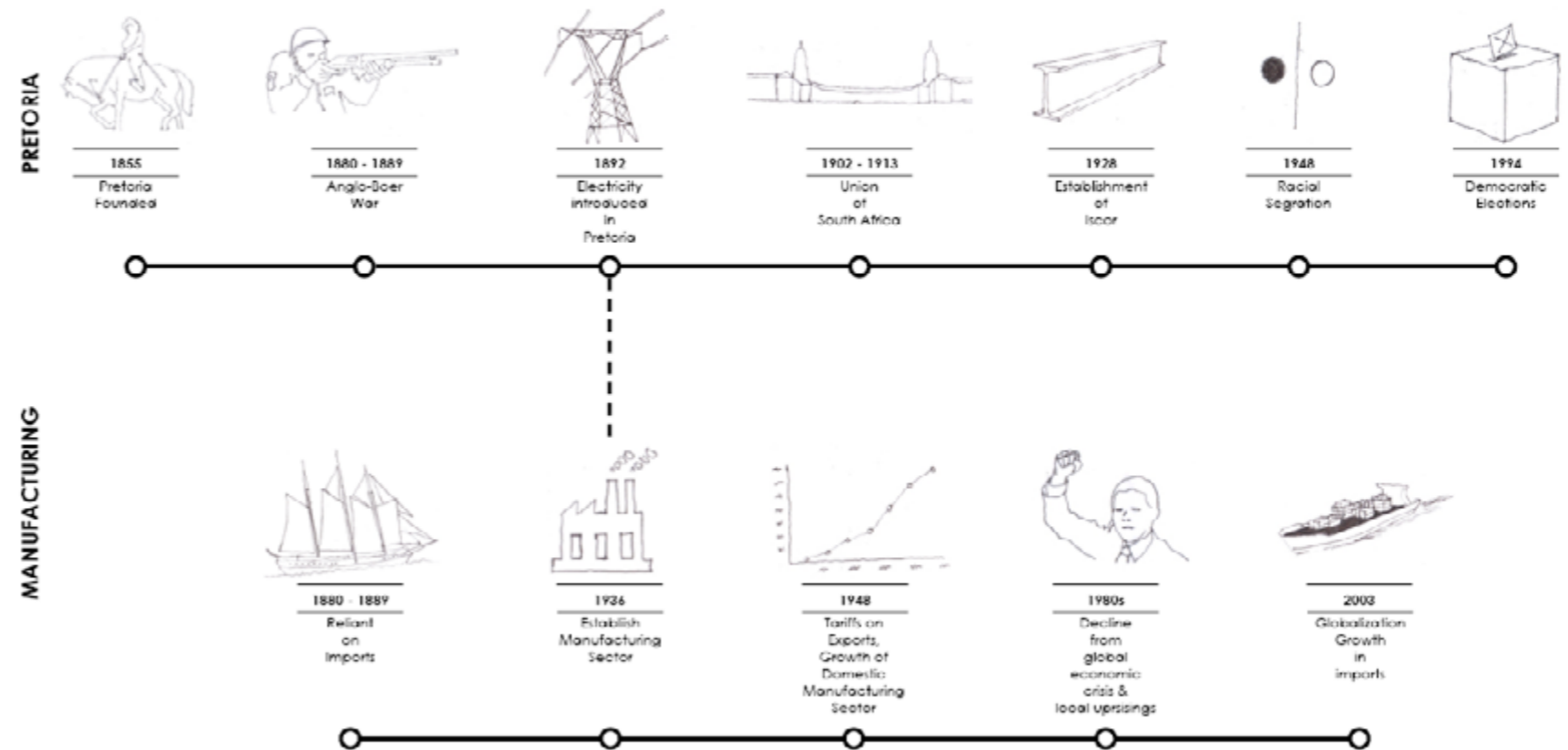
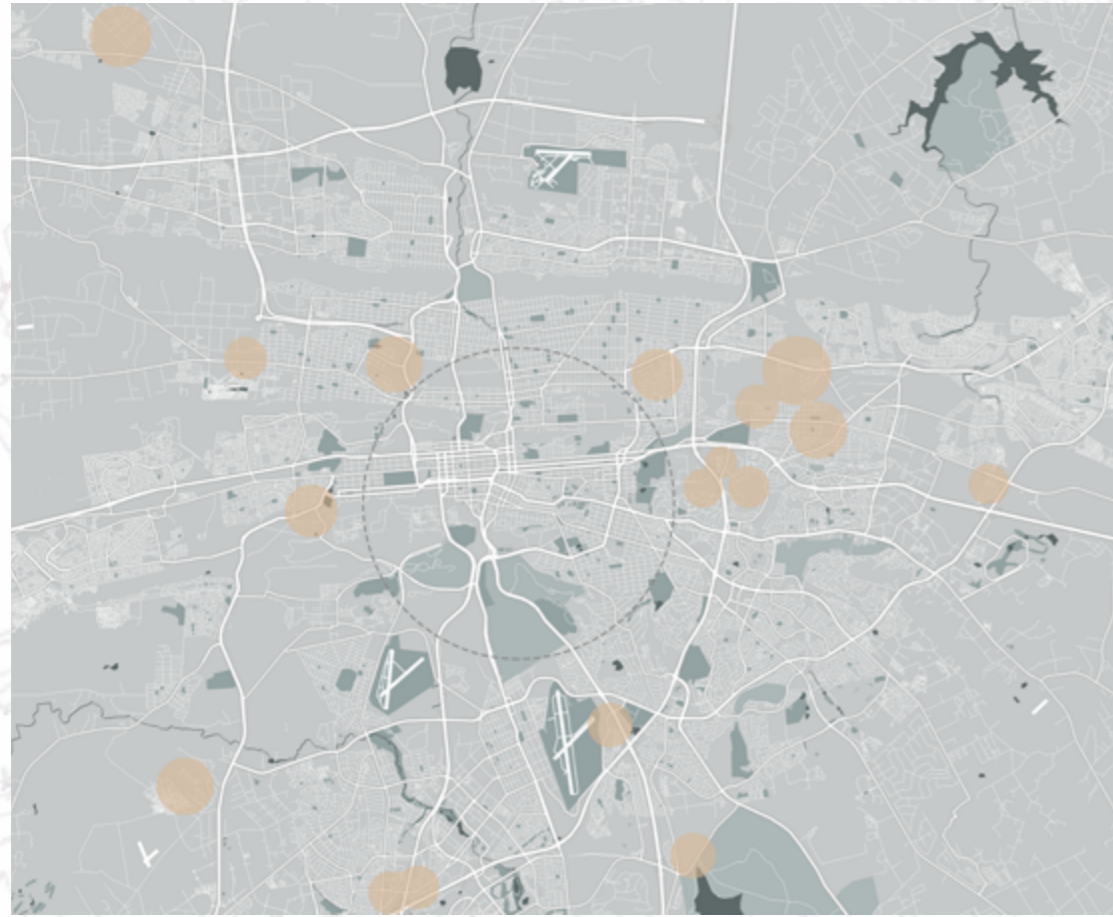


FIGURE 14- Pretoria Industrial Development Timeline (Drawn by Author, 2021)

2.3 Site Analysis

2.3.1 Macro - Site Analysis



Region Located	Industrial Park Name
Region 1	Garankuwa Industrial Parks Automotive Supplier Park(AIDC) Mabopane Industrial Park Soshanguve Industrial Park
Region 2	Babelegi Industrial Park Montana Park Light Industrial Wonderboom Industrial Park
Region 3	Koedoesport Industrial Park Pretoria Industrial Park Hermanstad Industrial Park Kirkney Industrial Park
Region 4	Centurion Aerospace Village Centurion Gateway Industrial Park Sunderland Ridge Industrial Park Route 21 Industrial Park Route 21 Corporate Park Hennospark Industrial Park
Region 6	Silvertondale Industrial Park Persequor Close Industrial Park N4 Gateway Industrial Park Watloo Industrial Park SAMCOR Industrial Park The innovation Hub Scientia Yecho Park CSIR Tannery Industrial Park
Region 7	Ekanosia Industrial Park

FIGURE 15- Light Industrial Areas in Pretoria (teda.org, 2019:online)

2.3.2 Meso - Site Analysis

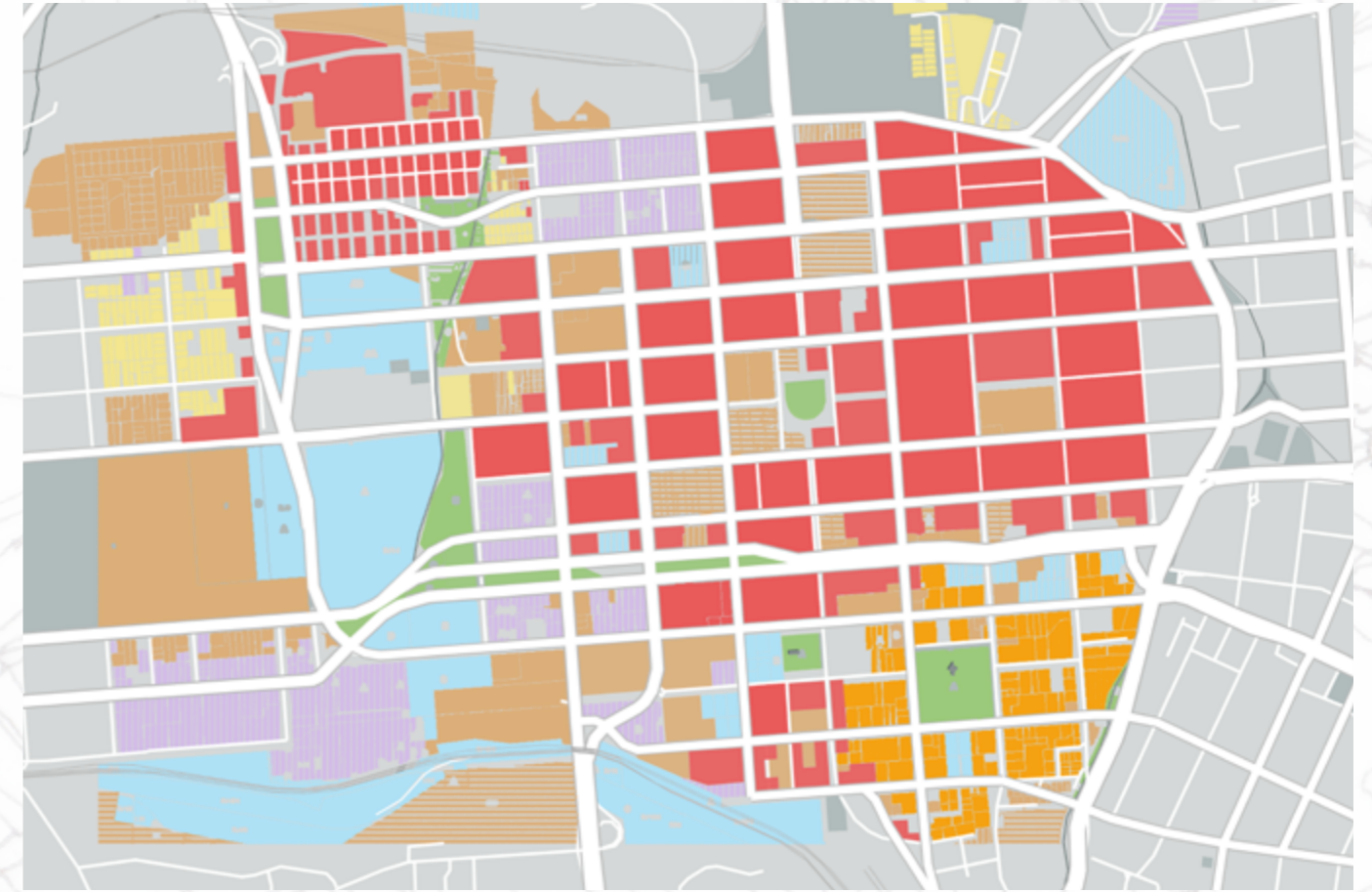


Figure 16 - Pretoria West Zoning
(Drawn by Author, 2021)

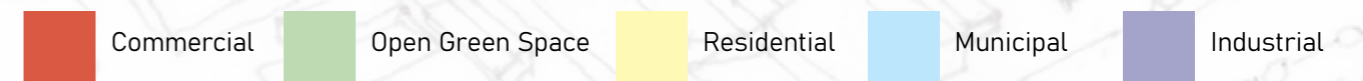


FIGURE 17- Pretoria West Industrial Scale
(GoogleMaps, 2017:online)



FIGURE 18- Industrial Proximity to Residential
(GoogleMaps, 2017:online)

Pretoria Urban Conditions

Pretoria remained the administrative capital post-Apartheid, and this has seen government institutions being the focal point of Tshwane's spatial developmental frameworks (Clarke & Corten, 2011). The inner city's built fabric layering, is evidence of the continuum of political administration that has unfolded within its border, and this has been the root cause of an imbalance of programs within the city, leading to an over-supply of administrative office space and limited complimentary - residential, commercial and leisure spaces (Clarke & Corten, 2011). This type of development has undermined the placemaking qualities of the city and limited its urban diversity (Rensburg & Costa, 2008), and subsequent resilience. This lack of resilience has thus resulted in the city suffering from a large stock of idle office buildings, inactive precincts, urban decay (**Figure 19**), and private disinvestment (CoT, 2015: 41) - for the most part. These challenges are mostly clear in the western part of the city - areas such as Marabastad have suffered the most from the capital flight of the 1990s, and dominance of industrial space (Clarke & Corten, 2011: 887), though this need not be the case - industrial spaces have the potential to animate space.

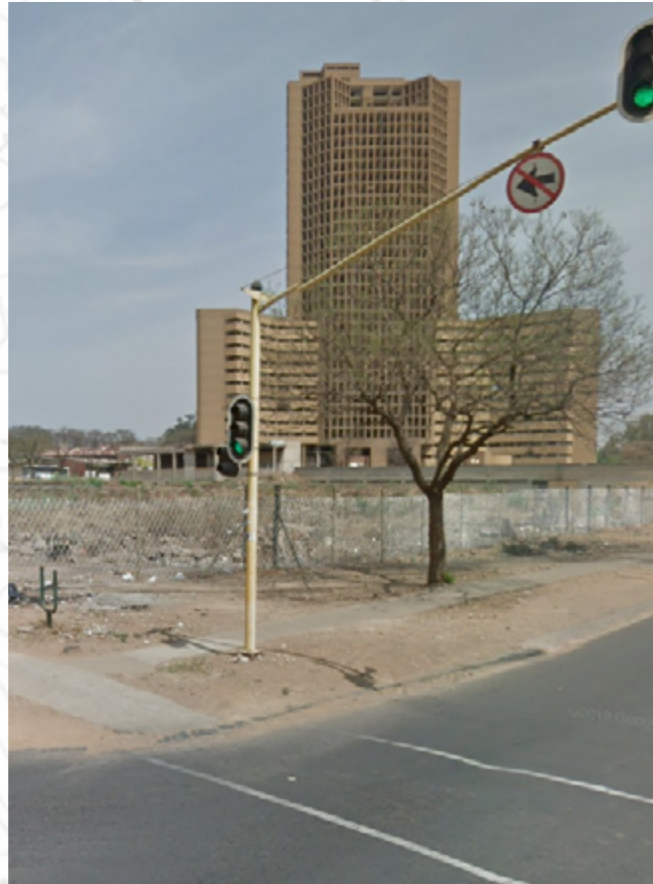


FIGURE 19- Pretoria West Urban Decay
(GoogleMaps, 2017:online)



Figure 20 - Vacant Blocks, Pretoria West
(Drawn by Author, 2021)

2.3.3 Urban Decay in Pretoria West

From its humble beginnings as home to a race horse track (Fisher, et al., 1998), to being home to Forts during the Anglo-Boer wars, to eventually having a high concentration of industrial spaces in the city. Today it is home to the correctional Services, military headquarters, Marabastad and remaining small scale light industrial spaces, with a few residential and commercial developments in between. During the 1970s, the apartheid government started investing into the western part of the city, which gave rise to buildings such as the derelict Kruger Park, Shubert Park (**figure 21**), and many more structures, which stands vacant today.

2.3.4 Industrial Gentrification

In an attempt to revitalize the inner part of the city by the private and public sector, inadvertent challenges emerge such as - gentrification, particularly industrial gentrification (Hamnett, 2008), which has displaced many working class residents of the city. These displacements perpetuate the problematizing and othering of certain people by labelling appropriation of inner city spaces by the urban poor, as rogue and disruptive. These new inhabitants of the city, among others, being young disenfranchised entrepreneurs/industrialist/designers/manufacturers trying to participate in a matured, highly competitive economy.

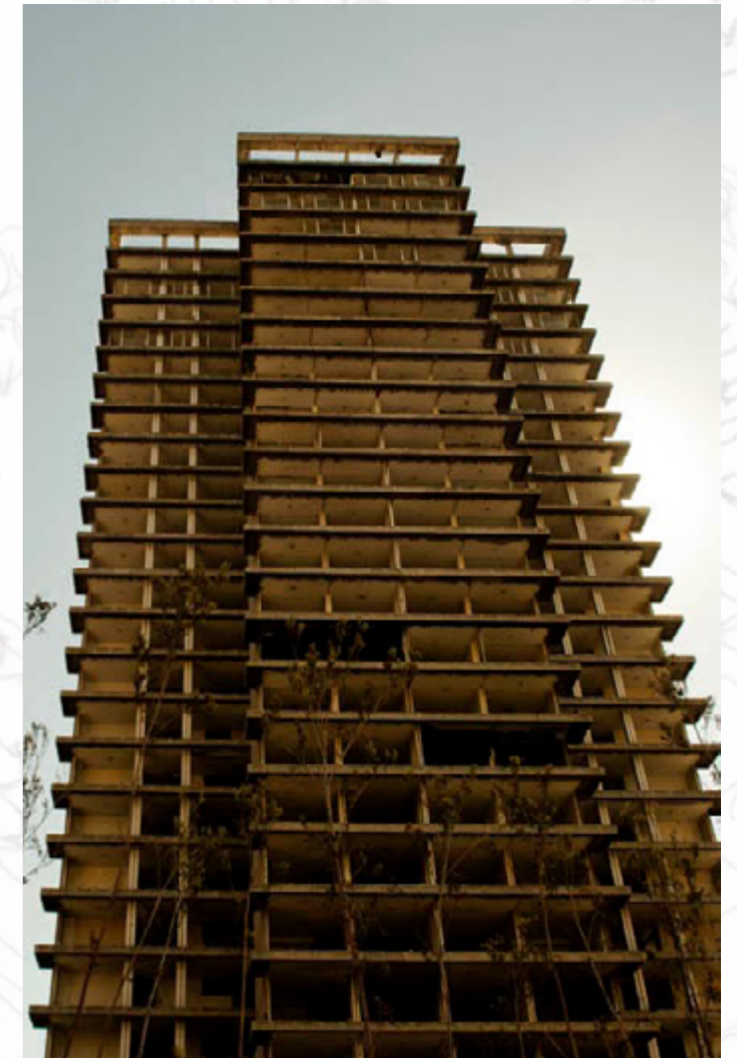


FIGURE 21 - Abandoned Schubert Part Tower, West of Pretoria Central
(PhoenixParanormalSA, 2015:online)

2.3.5 Industrial Induced Decay

Industrialization of the 19th century made the western world an economic powerhouse, and the development of early technology such as steam power allowed for improved efficiency, mobility and productivity (Freeman 2018). These technological advancements saw the western world rapidly move from an agrarian society, into a society of specialized production.

This specialized society saw artisans, seamstresses, etc. move out of their homesteads and into organized working spaces, where productivity was ramped up and this had a profound impact on shaping European society's influence on world trade (Freeman 2018). These specialized working spaces evolved from workshops and mills, and culminated in the appearance of the posterchild of the 20th century - the large scale factory. This rapid industrialization, operating in a neo-liberal economy of the time, saw the emergence of an industrial oligarchy and enabled them to expand and sell to global markets. This created an unprecedented concentration of wealth, and an abuse of the working class population

through low wages, and poor working conditions. These large scale factories were expanded into factory-cities such as Detroit and Manchester (Freeman, 2018). These factory-cities experienced serious urban decay when manufacturing started being outsourced from developing countries, and their surrounding areas shifted from manufacturing to predominantly service industries. These changes showed cracks in the idea the factory-city development, which was predicated on Euclidean zoning (due to rapid industrialization and expansion) - as the USA and England's "steel belts" turn into "Rust belts" (figure 22) (Freeman 2018).

The major issue was a failure to integrate industrial places into diversified networks of old city fabrics (Freeman, 2018). And this was the cause of the post-industrial urban decay. Urban decay or urban blight is the deterioration of an urban area due to a number of factors i.e. abandonment, dilapidated buildings, dysfunctional bulk infrastructure, inactive streets, etc. (Bouwhuijs 2013).



FIGURE 22 - Derelict Light Industrial Building (Diego Sunburns, 2021)

2.3.6 Appropriation

Like many cities, or part of cities experiencing urban decay, Pretoria West has been targeted by its local municipality, i.e. Municipality of Tshwane, in an attempt to revitalize the area (CoT 2015). In the 2030 municipal vision, plans are outlined to deal with the issues that plague Pretoria West. These revitalization plans often morph into plans that constantly threaten to displace many working class people who operate light industrial businesses in the informal sector (Till 2014), e.g. mechanics, warehousing, storage, textile manufacturing, etc. The increase in demand of residential accommodation by students and young professionals, is exacerbating the plight of informal light industrial tradesmen, through industrial gentrification (Zuk, et al. 2017). In order to meet the demand for residential units, public and private investments targets "underutilized" industrial space in the inner city, as prime brownfields for residential development (Zuk, et al., 2017). It thus becomes important for manufacturing and other industrial spaces

to be developed in a more sensitive manner if they are to circumvent this threat.

2.3.7 Urban Industry

Cities have many benefits associated with their structure, compactness, size, location and functioning, i.e. where supply chains can be shorter and less energy intensive. Essentially cities have many advantages for a commercially intensive society, of which Pretoria's population is. Businesses - especially small scale ones, benefit significantly from being located within the city, through easy access to a large labour pool, potential business partnerships, as opposed to being isolated in remote rural areas, disconnected from all associated operations and customer base. Light industrial buildings located in the city are able to transcend their industrial origins, and have an opportunity to be appropriated easily due to their integrated location. This would then render these light industrial buildings a higher usability value, appropriation and multi-functionality value.



FIGURE 27 - TUT FASHION SHOW HOSTED AT 012 CENTRAL, 2016 (012central, 2016:online)

2.3.8 Micro - Site Analysis

The selected precinct which is bounded by Church Street to the South, Kgosi Mampuru street to the East, Johannes Ramokhase Street to the North, and E'skia Mphahlele Drive to West (**figure 23, 24 & 25**). The precinct and the site was selected mainly for its situation between the civic district to the North East, and industrial to the South West (Church Square as a reference point) (**Figure 26**). This is a relationship that has shown signs of disintegration and fragmentation, as there seems to be a disconnect between the civic and industrial space, and a harsh transition between these two parts of the city.

The site was also selected for the latent economic potential embedded in it, via the diversity of the programs, and the history that lies in it. The Site selection criteria is a result of the de-

sign intentions of developing a space for light industrial making, a space that is connected to the melting-pot of potential – Marabastad, low-cost residential development, and a space that can embrace the youth of city, and enable the extraction of value from their cultural expression. 012 central (**Figure 27**) is currently the only space in the CBD that accommodates this youth culture powered micro-economy, which focuses the youthful energy in the city, inadvertently rendering other parts of the city as “ghost towns”. Challenging the identity of the city as an administrative capital that has rendered itself as a static, office dominated space that is slowly losing touch with a human scale connection, thus failing to accommodate young fledgling making and cultural spaces. And this site is an opportunity to develop a manufacturing space that is sensitive to natural and cultural place.

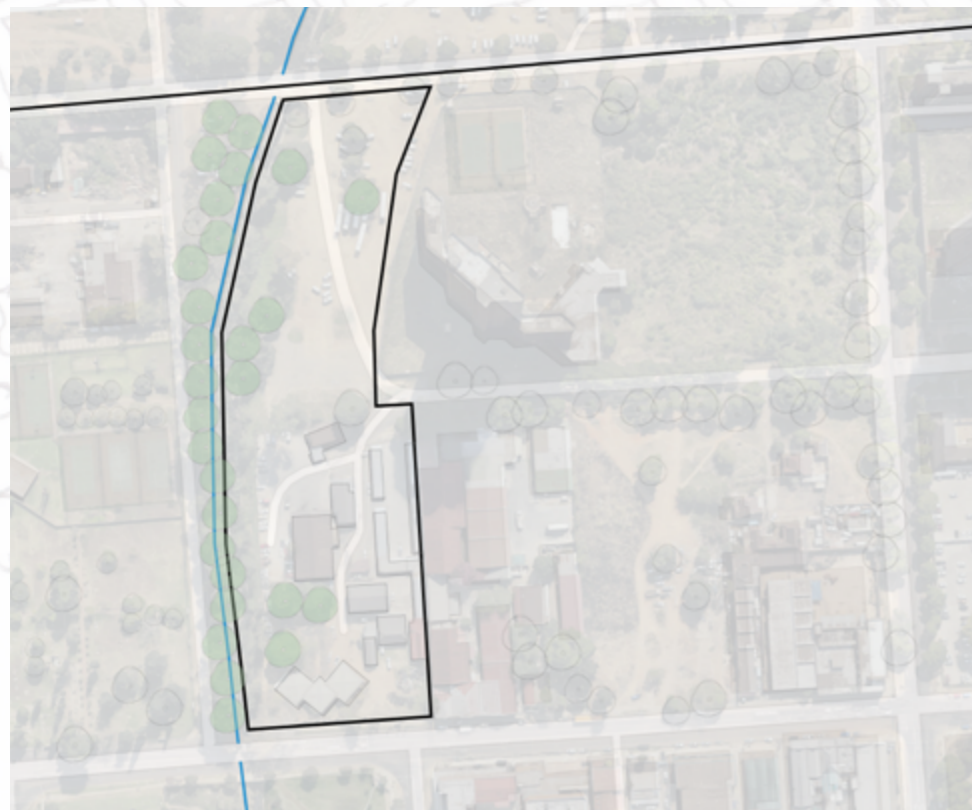


FIGURE 23 - Site (Drawn by Author, 2021)



FIGURE 24 -Meso Site (Drawn by Author, 2021)



FIGURE 25 - Micro Site (Drawn by Author, 2021)

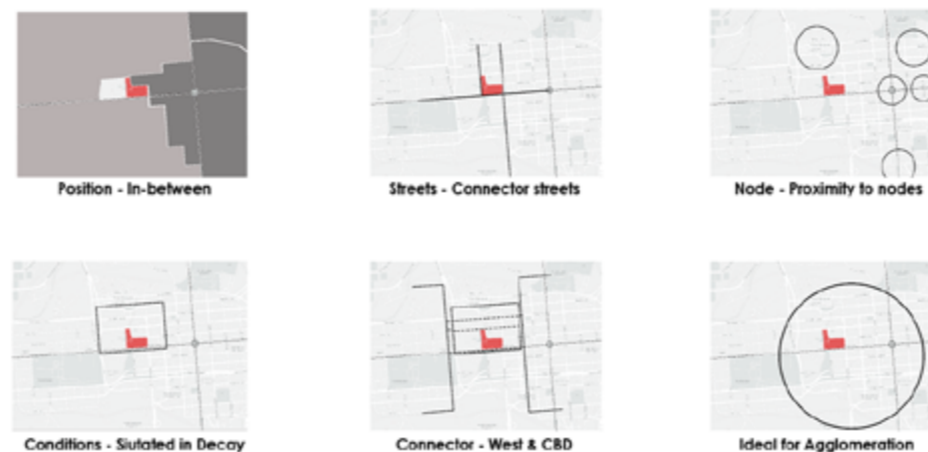


FIGURE 26- Spatial Qualities of Site (Drawn by Author, 2021)

The following digrams and images show the fabric of the surrounding site (**figure 28**), and immediate site conditions (**figure 41**) through a 3 dimensional map , so as to establish a better understanding and feel of the constraints and the type of place that the project is located in. Figure 29 - 40 gives a general indication of the spatial quality of the place, with green coloured words being positive attributes, and red being negative attributes.



1 FIGURE 29 - AD HOC TAXI STOP
(GoogleMaps, 2017)
VACANT SITE



2 FIGURE 30 - OLD HOUSES AROUND SITE
(GoogleMaps, 2017)
DERELICT - DISCONNECTED



3 FIGURE 31 - MULTI STOREY RESIDENTIAL
(GoogleMaps, 2017)
NEW DENSIFICATION



4 FIGURE 32 - VACANT SHUBERT PARK
(GoogleMaps, 2017)
DERELICT - ABANDONED



12 FIGURE 40 - NEW MULTI STORY
RESIDENTIAL (GoogleMaps, 2017)
NEW DENSIFICATION



11 FIGURE 39 - HEROES ACRE CEMETERY
(GoogleMaps, 2017)
INACTIVE - INACCESSIBLE



10 FIGURE 38 - PRINCES' PARK
(GoogleMaps, 2017:online)
NON INTIMATE SPACES - POOR SCALE

38



9 FIGURE 37 - MULTI STOREY RESIDENTIAL
(GoogleMaps, 2017:online)
BLANK FACADES



8 FIGURE 36 - COMMERCIAL STREET
(GoogleMaps, 2017:online)
ACTIVE



7 FIGURE 35 - ONE OF MANY AUTO BODIES
(GoogleMaps, 2017:online)
HARDSCAPE - UNANIMATED

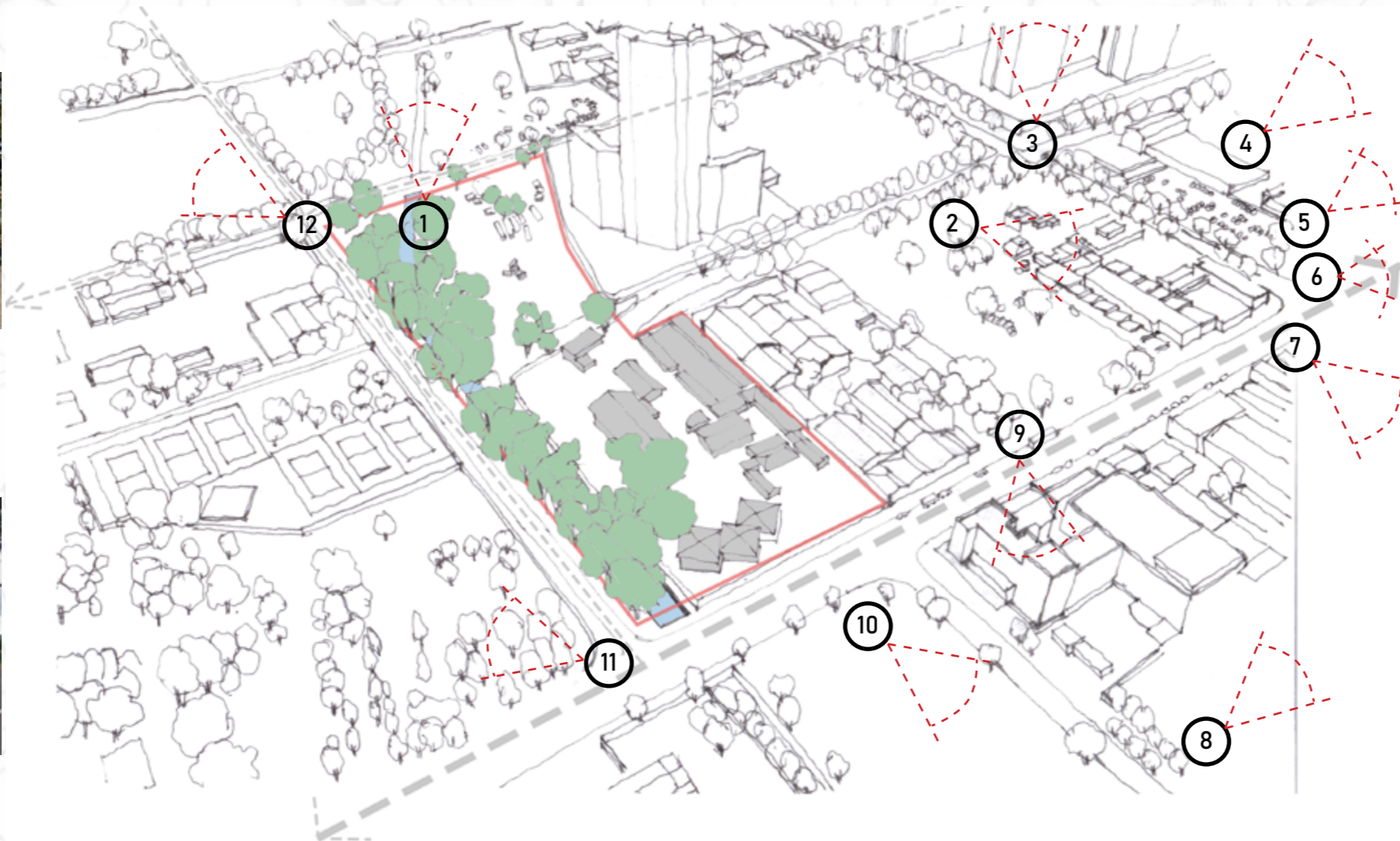


Figure 28 - Fabric around the Site (Drawn by Author, 2021)



5 FIGURE 33 - KRUGER HOUSE
(GoogleMaps, 2017)
DISNEGAGING



6 FIGURE 34 - GEREFORMEERDE KERK
(GoogleMaps, 2017)
INACCESSIBLE



1 FIGURE 42 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)

4 FIGURE 43 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)

5 FIGURE 44 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)



2 FIGURE 45 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)



3 FIGURE 46 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)

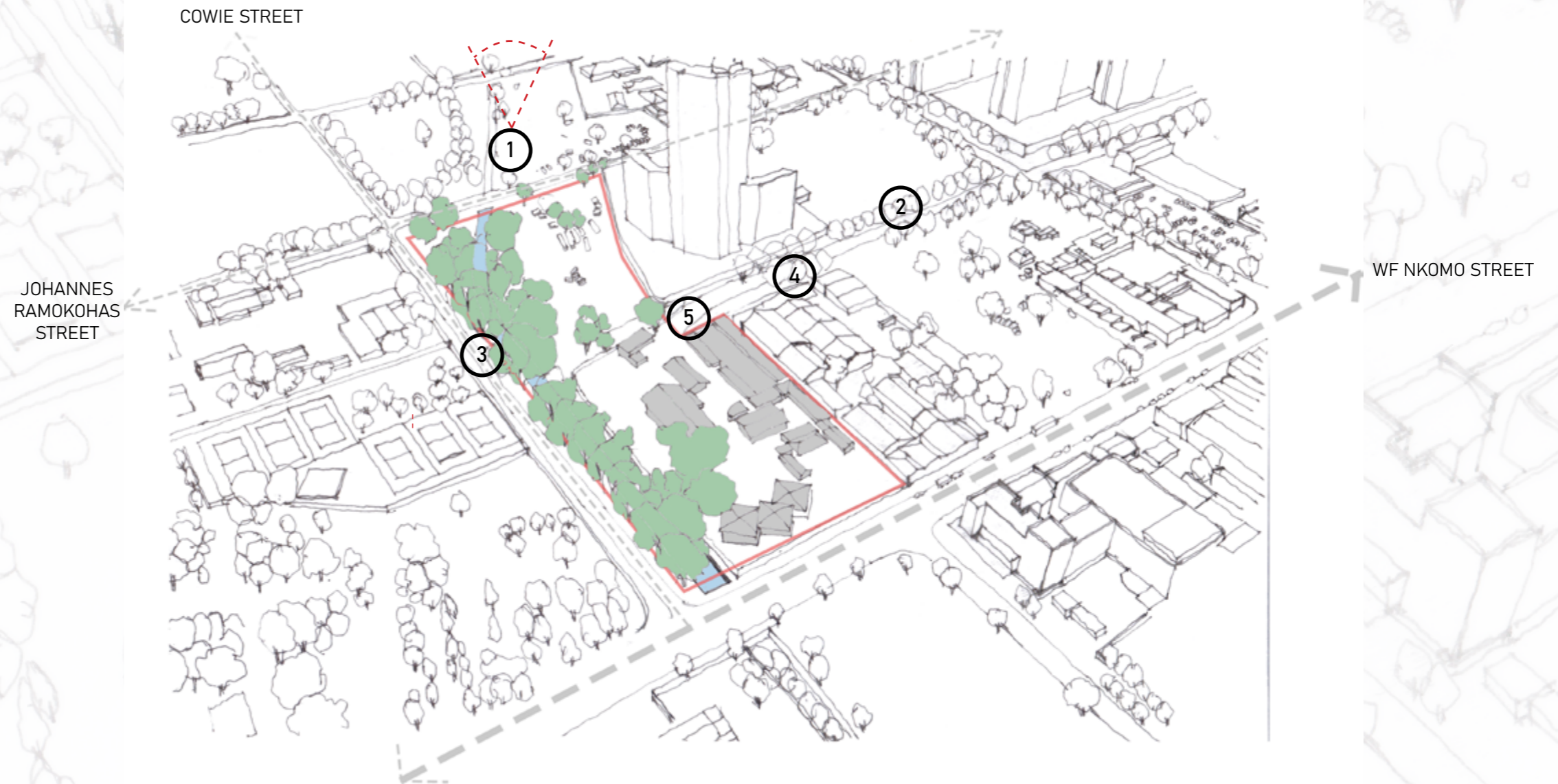


Figure 41 - 3D Micro Site Analysis
(Drawn by Author, 2021)

ANALYSIS OF SPACES IN IMMEDIATE VICINITY

EXISTING



FIGURE 47 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)

- 1 Fabric has poor interface with creek
- 2 No sense of Prospect & Refuge
- 3 Disconnected, Isolated
- 4 Concrete channel disturbs natural system



FIGURE 48 - 3D MICRO SITE ANALYSIS
(googleMpas, 2017:online)

- 1 Buildings in poor condition
- 2 No seating
- 3 Buildings have their backs to street
- 4 Lack of plants or hedges



FIGURE 49 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)

- 1 Domination of hardscape
- 2 No seating
- 3 Surfaces potentially cause high runoff
- 4 No delianation of space (Vehicular/Pedestrian)



FIGURE 50 - 3D MICRO SITE ANALYSIS
(GoogleMaps, 2017:online)

- 1 Abandoned Kruger Park building
- 2 No sense of prospect and refuge
- 3 Surfaces potentially cause high runoff
- 4 Spaces disconncted from creek and street

WEAKNESSES

OPPORTUNITIES



FIGURE 51 - 3D MICRO SITE ANALYSIS
(Drawn by Author, 2021)

- 1 Link spaces on either side of creek to activate creek
- 2 Use materials that allow water infiltration
- 3 Connect spaces using pedestrian bridge
- 4 Establish walkways/promenades along creek



FIGURE 52 - 3D MICRO SITE ANALYSIS
(Drawn by Author, 2021)

- 1 Restore building surfaces
- 2 Mark bike lanes
- 3 Introduce planting or hedges
- 4 Provide seating along pedestrian walkway



FIGURE 53 - 3D MICRO SITE ANALYSIS
(Drawn by Author, 2021)

- 1 Introduce soft landscaping
- 2 Delianate between walkway and road
- 3 Introduce seating elements
- 4 Install lamp posts



FIGURE 54 - 3D MICRO SITE ANALYSIS
(Drawn by Author, 2021)

- 1 De-channelize creek
- 2 Install protective barrier for children
- 3 Introduce seating elements
- 4 Reduce concentration of trees

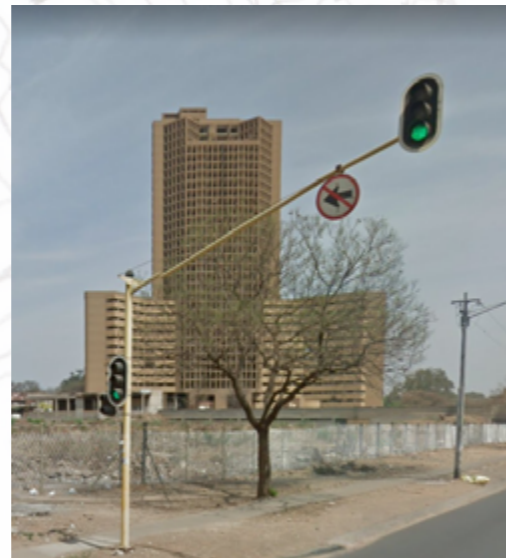


FIGURE 55 - ANALYSIS OF BOUNDING STREETS
(GoogleMaps, 2017:online)



1 FIGURE 56 - WF NKOMO STREET
(GoogleMaps, 2017:online)

Active
Populated
Lively, animated
Feels safe



2 FIGURE 57 - JOHANNES RAMOKHOASE STREET
(GoogleMaps, 2017:online)

Inactive
Only busy during peak hours
No pedestrians
Feels unsafe



2 FIGURE 58 - WF NKOMO STREET
(GoogleMaps, 2017:online)

Active
Populated
Lively, animated
Feels safe



4 FIGURE 59 - Madiba Street

Abandoned
Dead street
No people around
Street not welcoming and feels unsafe

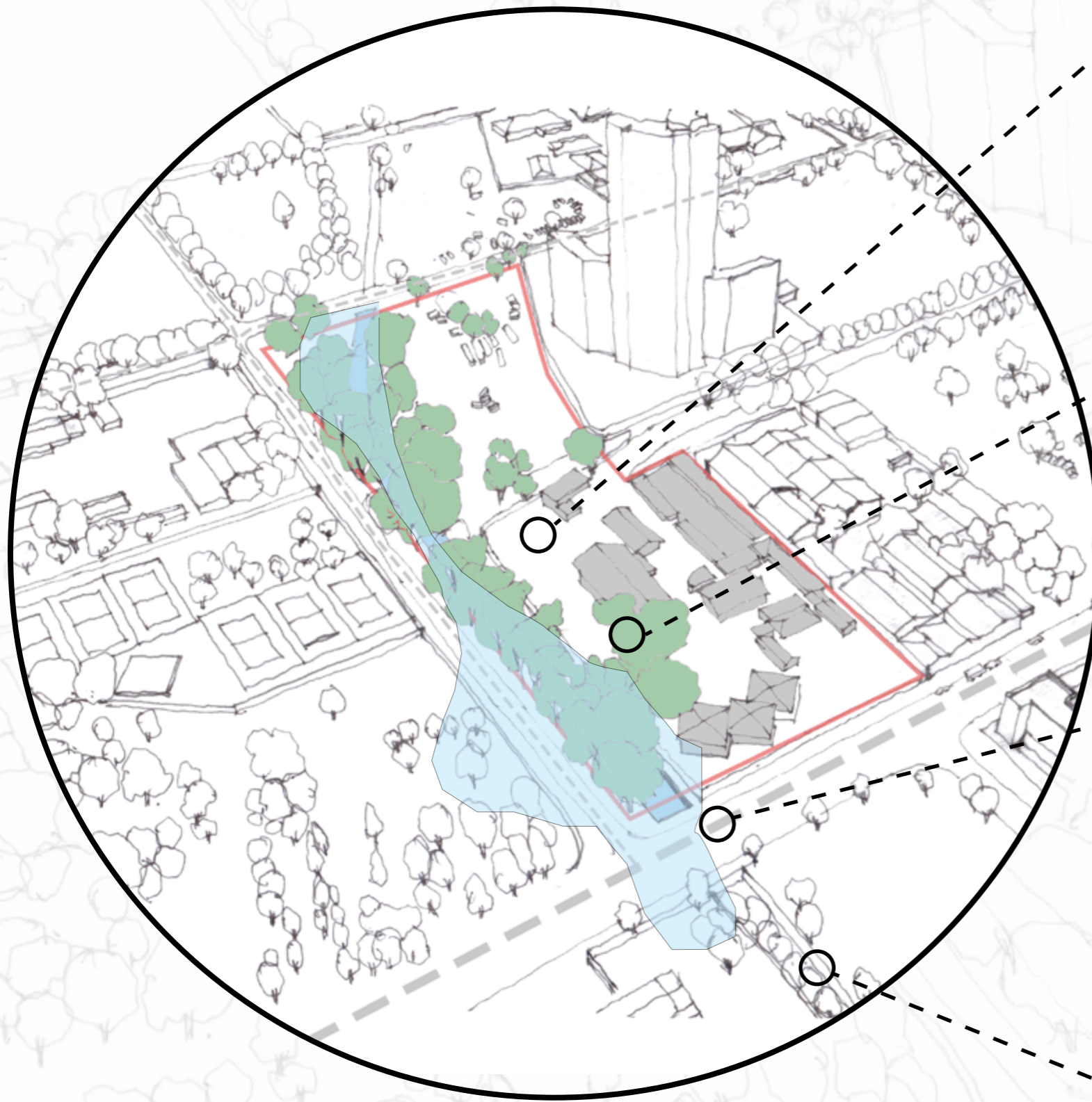


FIGURE 60 - Natural Elements of the Site (Author, 2021)



Clay Soils, With exposed sediment/bedrock on certain portions of creek. Creek banks are very rocky under the concrete channel

FIGURE 61 - Geology - Type of soils (Coglhan, 2019)



The Site is dominated by Evergreen Pine trees, mostly set on the western bank of the creek. Most of the trees look old, and are over 10m tall

FIGURE 62 - Flora - Types of trees (2021)



The Site has a 50 year floodline, which creeps into the site's boundaries

FIGURE 63 - Floodplane (Ready, 2021)



Creek is 2.6m deep at its deepest point, which is under the WF Nkomo bridge. This shallow creek tends to flood during heavy rains, due to the high runoff from surrounding areas, and the sole that falls towards it

FIGURE 64 - Creek

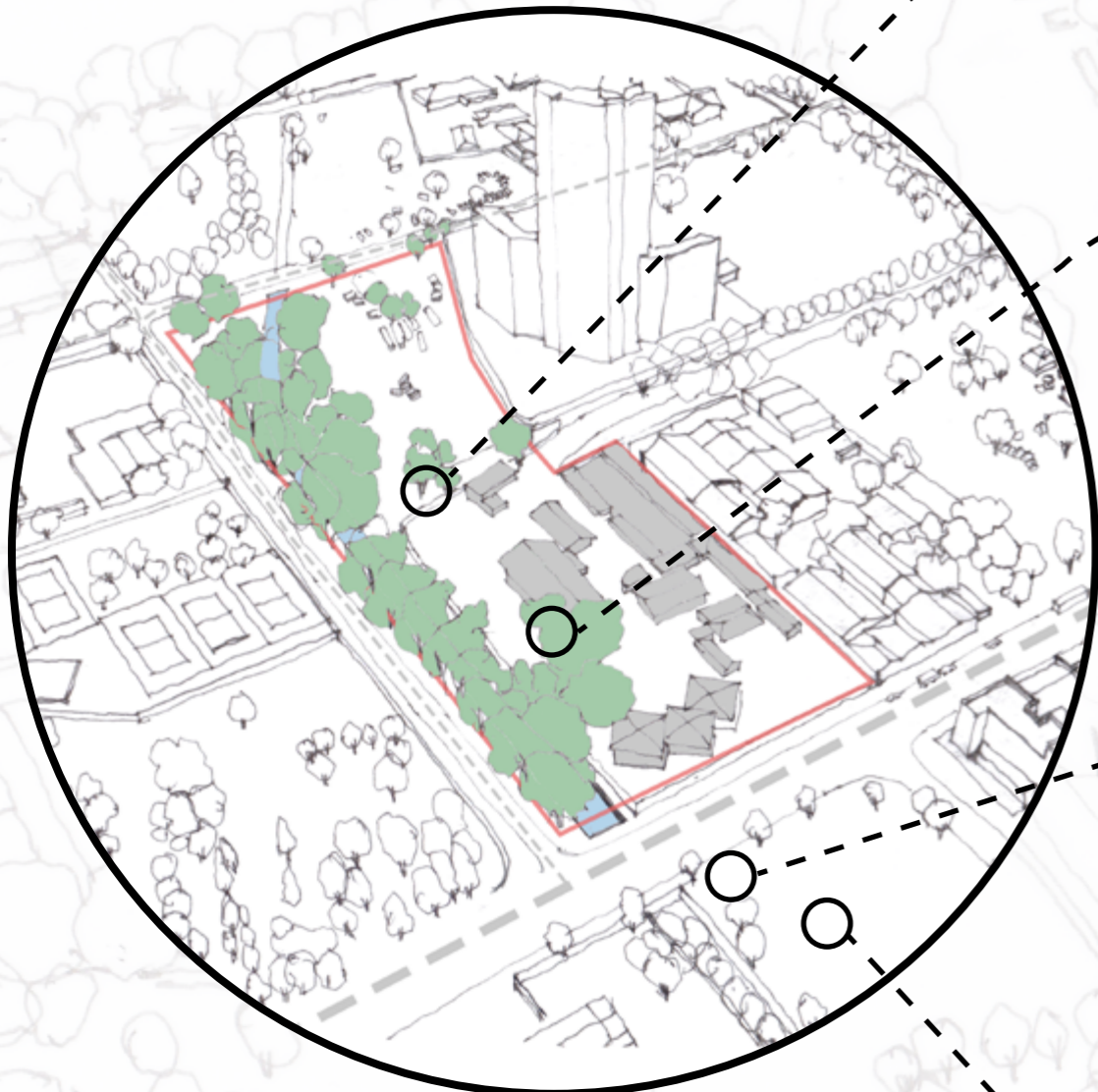


FIGURE 65 - Social Elements of the Site (Drawn by Author, 2021)

FIGURE 66
Demographics

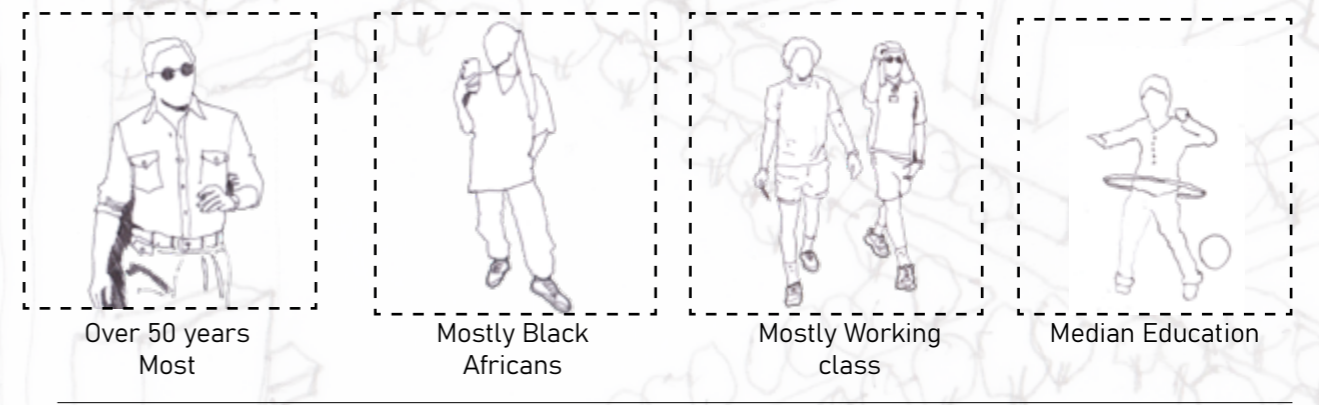


FIGURE 70 -Demographics (Drawn by Author, 2021)

FIGURE 67
Types of Businesses

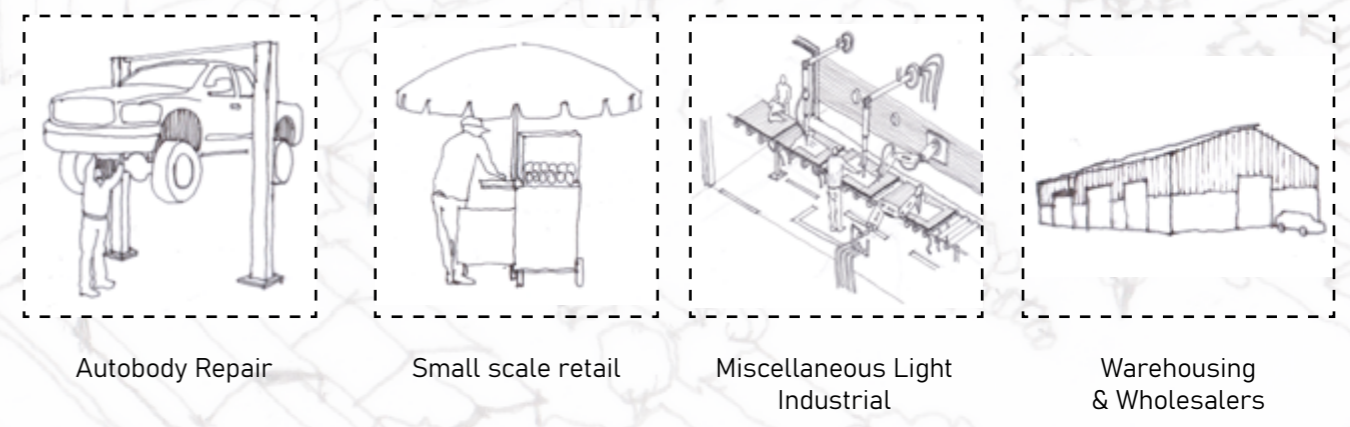


FIGURE 71 - Business Types (Drawn by Author, 2021)

FIGURE 68
Residence

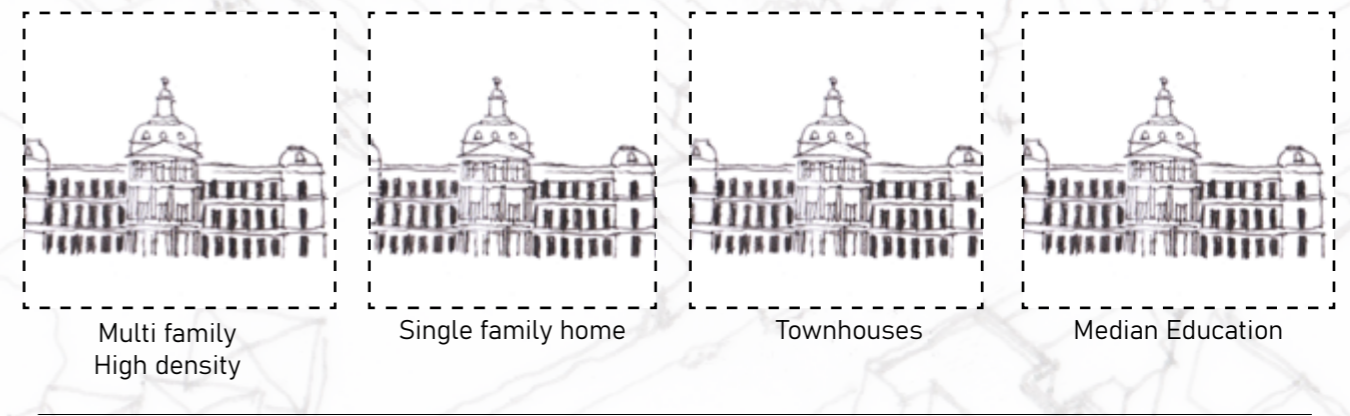


FIGURE 72 - Residences (Drawn by Author, 2021)

FIGURE 69
Entertainment

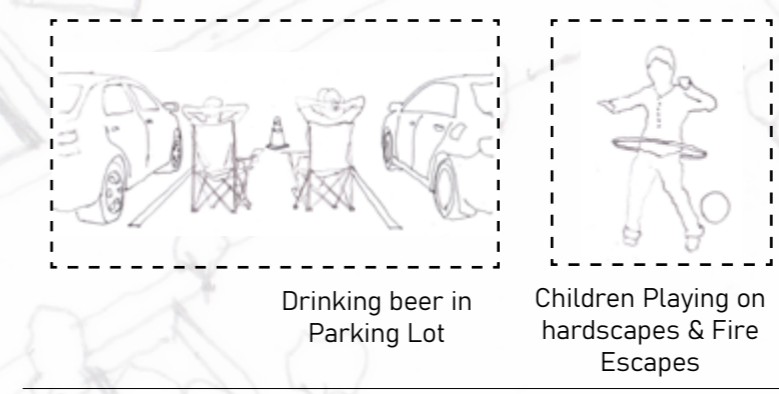
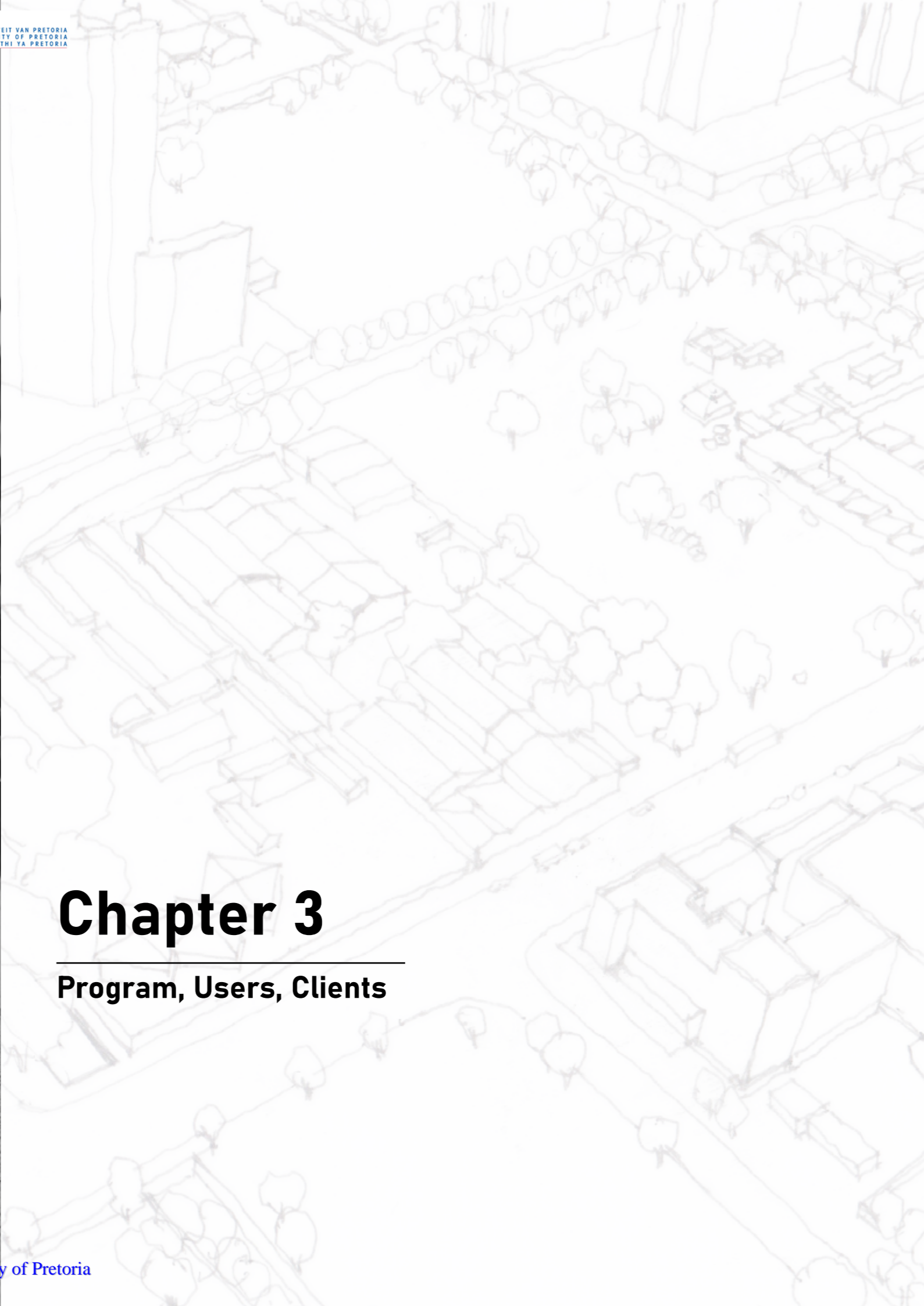


FIGURE 73 - Entertainment (Drawn by Author, 2021)



Chapter 3

Program, Users, Clients

3.1 Users

In an attempt to **1 – create youth employment**, **2 – support the emergence of local apparel brands**, and **3 – rejuvenate and reimagine Pretoria West's industrial fabric**, no one demographic is more ideal as the prime protagonist for the successful realization of this triad. It is thus fitting that the youth (aged 15 – 35) are the focal point of the project, and this means their live, work, and play lifestyles, and culture shall be strong informants in the making of this architecture. And since they are the main producers and consumers of the products that are manufactured in this proposed space, their existing fashion and cultural expression shall define the project. Their energetic presence and ownership of the space will be the drawcard that brings life back into Pretoria West. Due to the connectedness that has been created by social media technology such as Instagram – the young people of Pretoria are part of a global pop-culture, but they are also proponents and celebrators of their own local subcultures. These subcultures are an expression of their perceived identities of self and their immediate context. These Pretoria pop subcultures are expressed through mediums such as music, visual art, social behaviour, colloquial vocabulary, dance and fashion, which inform the development of the programmatic scheme. Fashion being one of the most overt

of these elements, the young people of Pretoria, have endeavoured in self making to ensure an authentic representation of themselves through the manipulation of fabrics. Hence the selection of Bangy Rabothata, a 26 year old designer and apparel manufacturer, as a client. Ideas and designs abundant, fledgling designers and makers such as Bangy, lack the industrial infrastructure that is appropriate for their scale of operation and exploration, which enables them to agglomerate and build financially significant enterprises, while maintaining their quasi-utopian, artistic and cultural expression. Covid-19 lockdowns have created a precedent and incentive to optimize and overlap live, work, and play spaces, thus ensuring places constantly show qualities of city life – presence of people.

3.2 Program

The program is predicated on this new emerging production capacity, and seeks to enhance the experience of making for the maker, and the city dweller – by blending together with its associated and concomitant functions, such as thrift retail, leisure, administration, and exhibition (figure 75). The focal point will be on the production of leather shoes which includes material receiving spaces, sorting,



MANUFACTURING + REPAIRS (Godoy, 2020:online) RETAIL + LEISURE (VISI, 2011:online) DESIGN (JDinstitute, 2021:online) EXHIBITION (Vogue 2020:online)

FIGURE 75 – Program Scheme

cutting, sewing and stitching, and dispatching. The programs seamlessly slot into the existing associated programs in and around the site (figure 20). This also gives an opportunity to use exhibition spaces to bring new, localized experiences to the idea of apparel shopping and shoe customization, couture culture, thrifting, etc. It's a space where market, meets art, meets exhibition, meet events. Alcoholic beverages are an integral part of this culture, and this is an opportunity to foster in-

novation in local production of liquor. The addition of a micro brewery is also an opportunity to expose young people to the production process of alcohol, and the value of learning how to become a producer of what you consume. The intention is to support young minds that could develop their own localized alcoholic beverages. For production spaces that exhibit the inner workings, craft beer making is an ideal choice for this type of production experience.

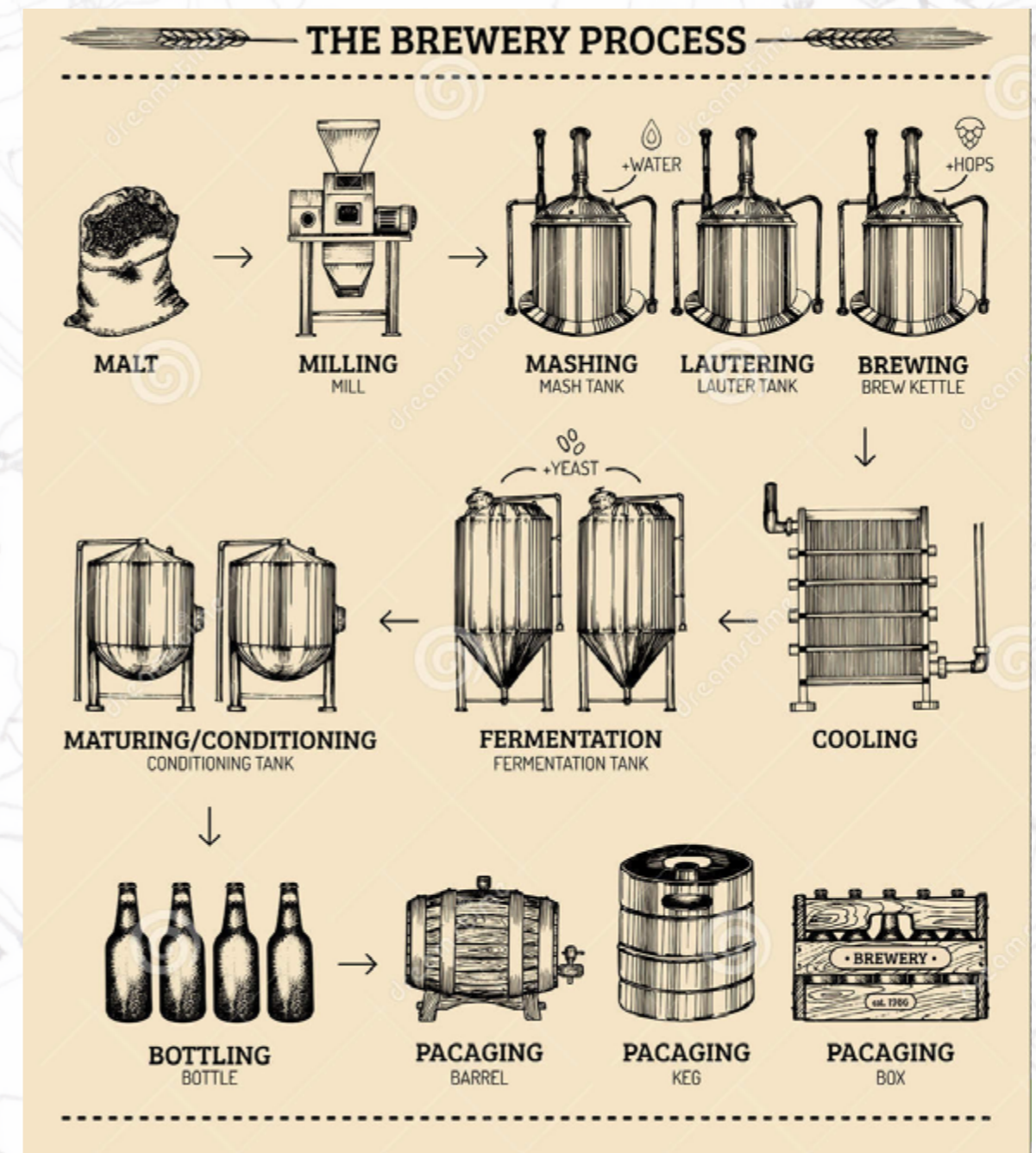


FIGURE 76 – Cider Production (Dreamstime, 2022:online)

3.2.1 Program

Beer Making Process

Wheat is placed is soaked in water, to form enzymes, which converts the wheat into malt



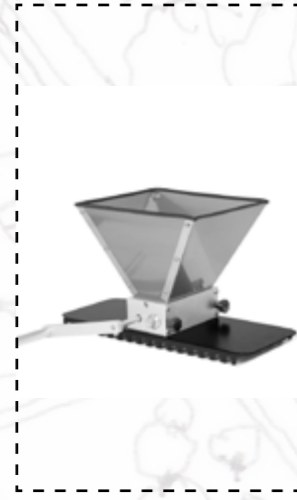
1

Grain Silo
Specification

2260mm diameter
12000mm Height
10000L/Day

(ABMequipment, 2019:online)

Malt is ground in a malt mill to allow enabling the inherent substances to dissolve effectively in during brewing



2

Milling
Specification

(laboutiquedubras-seur, 2021:online)

Fine Malt is mixed with warm water, to allow the malts enzymes to convert starch into sugar during saccharification



3

Mash Tank
Specification

2260mm diameter
4400mm Height
5000L/Day

(IndiaMart, 2021:online)

Mash is purified, separating the liquid from the grain, creating a wort



4

Lauter Tank
Specification

2260mm diameter
4400mm Height
5000L/Day

(Alibaba, 2021:online)

Hops are added to the wort, boiled for up to 2 hours, at 80 degrees celcius



5

Whirlpool Tank
Specification

2260mm diameter
4400mm Height
5000L/Day

(Alibaba, 2021:online)

Yeast is added into the wort in the fermentation tanks, kept at 5 - 20 degrees celcius



6

Fermentation Tanks
Specification

2260mm diameter
4400mm Height
5000L/Day

(Kwipped, 2021:online)

Secondary fermentation remaining sugars are removed, and then the young beer kept here for 3 months, then it is ready for bottling



7

Cooling Tanks

2260mm diameter
4400mm Height
5000L/Day

(Eurolux, 2021:online)

spent grain is used to feed livestock, aiding in increasing milk yielded



FIGURE - Barley



FIGURE - Cooling

FIGURE 77 - Cider Production Process

3.2.2 Program

Leather Shoe Making Process

Patterns from the design are cut from 4m x 8m leather roll sheets

Pieces are stitched together to create an upper shoe

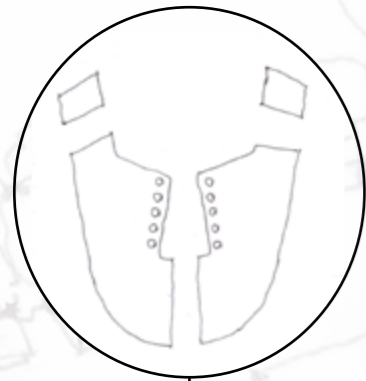
Upper shoe is placed on a last to create the shape of the shoe

The upper shoe is ran through a heat chamber to solidify its shape

Underside of upper shoe is galvanized and prepared for glue

Glue is applied, awaiting the sole of the shoe

Sole is pressed against upper shoe, and stuck together



1

2

3

4

5

6

7



Manual Cutting Machine
(NanoGermanSystem, 2021:online)



Sewing Machines
(NanoGermanSystem, 2021:online)



Last Machine
(NanoGermanSystem, 2021:online)



Heating Oven
(NanoGermanSystem, 2021:online)



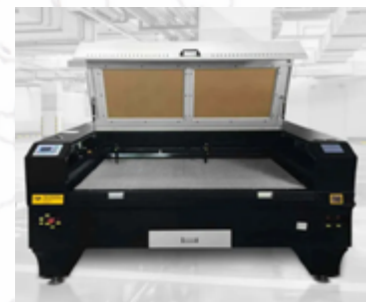
Rough
(NanoGermanSystem, 2021:online)



Glue Machine
(NanoGermanSystem, 2021:online)



Sole Press
(NanoGermanSystem, 2021:online)



Laser Cutting Machine
(NanoGermanSystem, 2021:online)

FIGURE 78 - Shoe Production Process (Drawn by Author, 2021)

3.2.4 Live/Work/Play Mapping



FIGURE 80 -Live/Work/Play Mapping (Drawn by Author, 2021)

Conclusion

The spaces of cultural significance are few and far in between in the western part of the city. And this means the people, especially young people lack the spaces that can

allow for their cultural expression and cultural production. The only outlet for this in Pretoria CBD is 012 central, and it does not have the capacity to accommodate all these people.

3.2.5 Existing Programs

This builds on the thrifting culture of Marabastad – which is two streets up to the north of the site. The supply of textile for apparel production is through the existing suppliers in Marabastad, Pretoria West, and “Metro textile suppliers” on Du Toit, and Madiba Street in Pretoria CBD.

The intention is to attract people to this area, for live – in the low cost multi-storey building, for work – in the production area, and for play – in the market and exhibition spaces. The place-making qualities of the play programmes, in conjunction with everyday, casual programs, have the ability to attract people to what would otherwise be a mundane production space.

Making this place attractive through place-making strategies, will have a profound impact on micro-enterprises in the area, and ultimately create an immense amount of value in Pretoria West, and positively impact many livelihoods, while retaining the light industrial fabric. And this has the potential to create an even stronger cultural production, identity and sensory experiential ties. The emergence of online retail introduces warehousing facilities, and their strong cultural production, identity and sensory experiential ties can change how people interact with them, and how do they negotiate the urban condition, etc. This will allow for online retail companies to set up warehouses in the city, without eroding the social spaces.

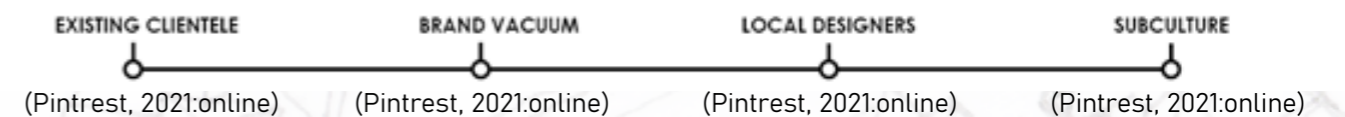


FIGURE 90 - Potential Leverage Points

3.3 Clients

The clients are state organs responsible for small business development (DoSB), DTI and industrial development cooperation (IDC), and organization such as 012 Central which

organize events that celebrate youth culture. This gives 012 Central an opportunity to expand its portfolio of events and venues, which will stretch the recreational energy across the city.

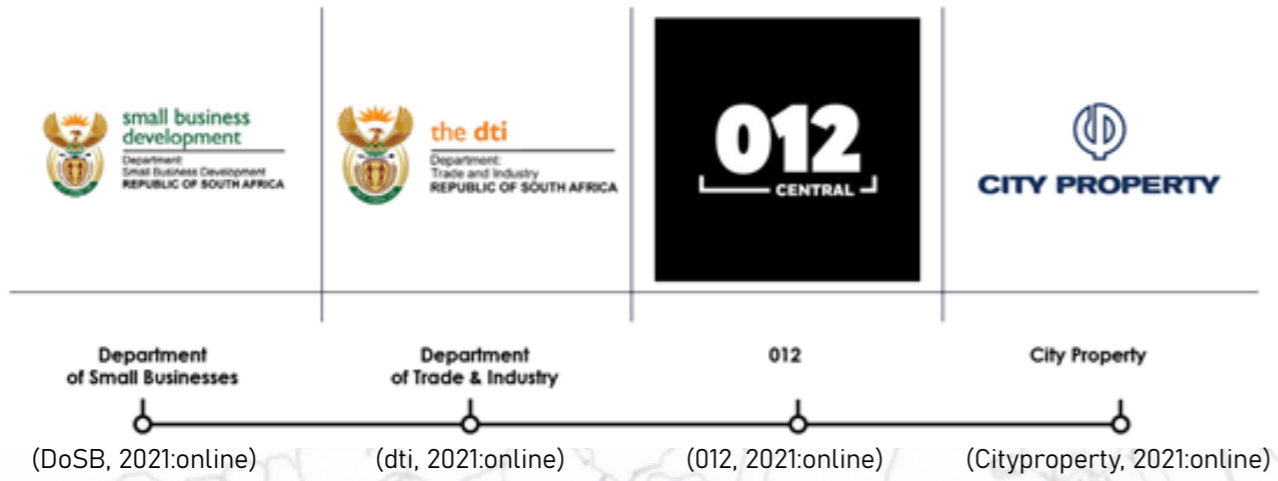
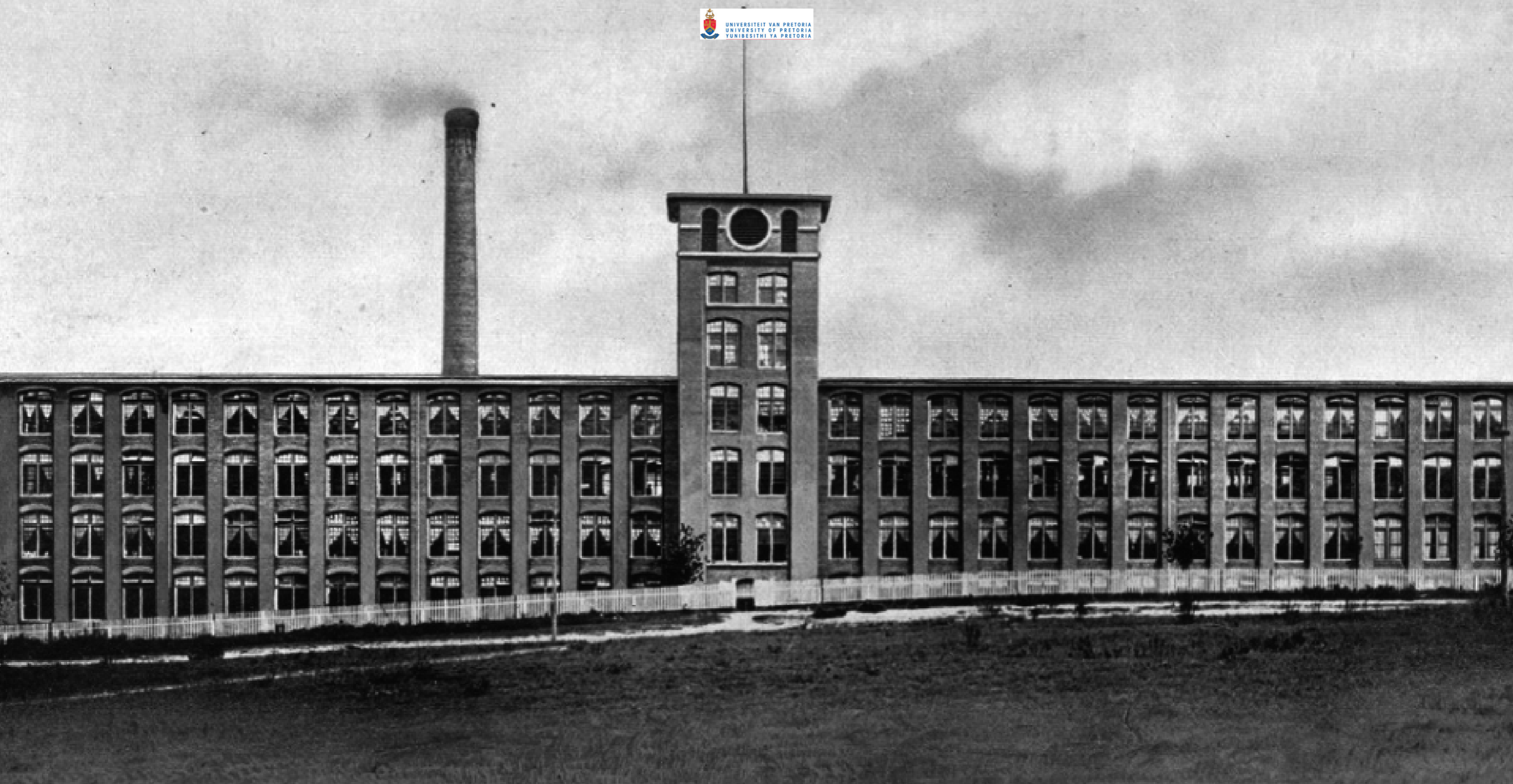


FIGURE 91 - Clients

3.4 Conclusion

Through the research conducted in this dissertation, it has become clear that there is very little attention being given to young people who are active in the city and creating products that add value to not just their lives, but to that of the city. It is clear that there is a lot of potential to create light industrial spaces, which can have a profound impact on youth unemployment and the incubation of high value activity, if the infrastructure, and industrial economic development plans are revised. This elicits a new type of spatial-industrial development that can allow young people of Pretoria to exploit and monetize their own culture – through product making.



Richland Mill(Columbia, 2012)

Part B

Theory + Design

Chapter 4

Theory

4.1 Light Industrial Typology

The evolution of the typology of light industrial spaces, prior to globalization, was closely related and limited to a regional building resource pool and culture (Tzonis & Lefaivre, 2003). This limited artificial technological processes of the time resulted in a highly regional production oriented architecture related to agriculture (figure 92), mining (figure 93), and consumer/domestic products (figure 94). In SouthAfrica, early industrial buildings can be seen in the form of derelict agricultural storage buildings of indigenous cultural groups (figure 95). As well as the early mining camps of the Witwatersrand gold rush (figure 96). The earliest incarnation of mass production building typology, are the river powered mills of Edinburg, England (figure 97). Though this was not the first time products were mass produced in the world, but it was the first artificially powered substantial production space. Since globalization, these spaces succumbed to the ideas of functionalism and modernism (figure 15 & 16) (Tzonis & Lefaivre, 2003), and the light industrial building adopted an international, uniform, a-contextual architectural language (figure 98). This divorcing of regional architectural production processes from buildings has given rise to workshop/small scale production spaces that are spatially, materially, and typologically incompatible with the specific regional characteristics of their surrounding natural, built, social and economic environments.

This fundamental shift in the production methods of light industrial architecture was mainly due to the presiding zeitgeist and paradigm of the time, and in order to change this, it is essential to identify and understand the limits of this typology and how it can be redeveloped to enhance its architectural qualities and redirect its potential impact (Vlok, et al. 2006: 885). Conventional light industrial facilities are limited in their conceptual scope, and their resultant architecture void of any sense of consciousness and place, mainly due to their techno oriented architectural production. In the name of efficiency and frugality - light industrial buildings become austere, and anonymous.



FIGURE 92 - Old German Barn (Unknown)



FIGURE 93- Old Mine (Unknown, 2021)



FIGURE 94 - Old Artisanal Workshop relief, Florence, Italy (Unknown)

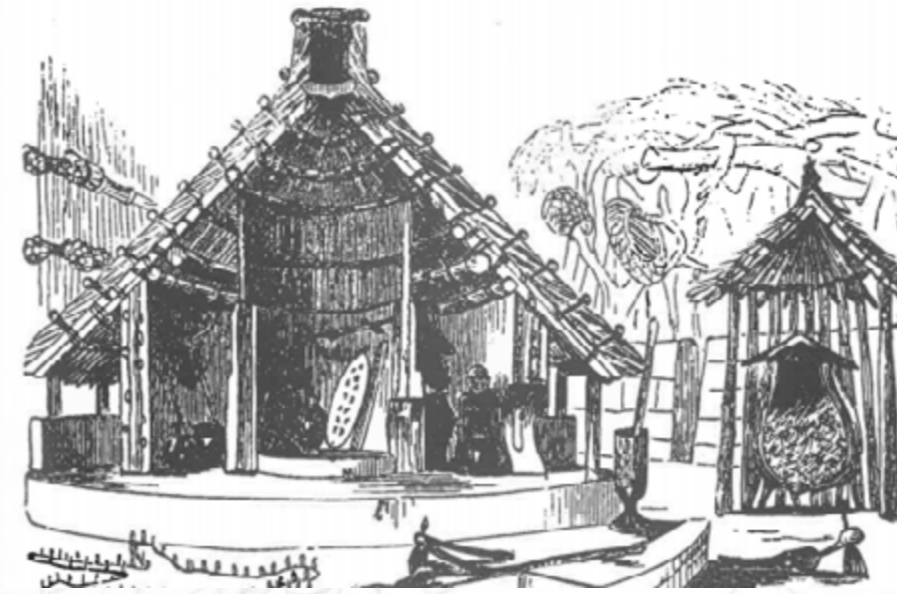


FIGURE 95 - Indigenous Agricultural Storage facility (Fisher, et al., 1998)



FIGURE 96 - Early Mine Camps on the Witwatersrand (Fisher, et al., 1998)



FIGURE 97 - Early Textile Mills, England (Woodtyke, 2011)



FIGURE 98 - Typical Light Industrial Building (Valles, 2021)

4.2 Light Industrial Architectural Qualities

Contemporary Light Industrial buildings dominate the landscapes, and due to their blank walls, they offer very little to the greater context, or immediate street (Gehl, 2010). The fact that they were built purely for production purposes, renders them as static buildings with a limited ability to adapt. Due to poor establishment of spatial relationships with existing fabrics, and the lack of meaning attached to this type industrial building, they are seen as no more than manufacturing sheds, and do not invite stewardship from their surrounding communities (figure 99)(Rensburg & Costa, 2008). For all their indictment in architectural theory, globalization and standardization of building materials and methodologies have - contrary to popular belief - contributed immensely to raising the standard of living in first world

and developing countries alike. But like any element, if architecture becomes a slave to it, it fails to address its inherent multiplicity, and thus falls short of its true potential. Good architecture ought to act as mediator between various related elements, such as geography, time, demographics, culture, and technology, it should not yield to only one of these.

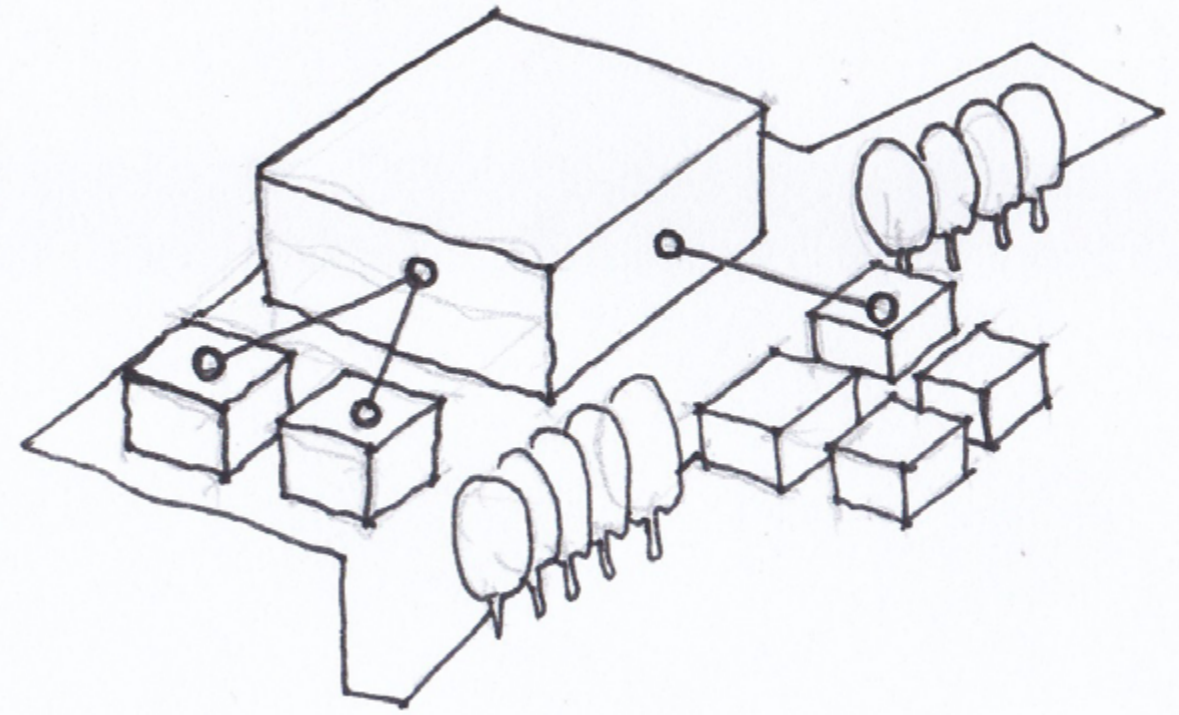


FIGURE 99 - Poor Relationship with existing fabric (Drawn by Author, 2021)

4.3 Inclusive = Identity

Appropriate Architecture ought to be inclusive in order to act as mediator, it has to be able to accommodate opposing, seemingly irreconcilable forces at times. The site is home to a broad demographic, and has sentimental value to other demographics that might not necessarily live there anymore, but identify with the area through heritage. The intention of the project is to create an architecture that embraces and celebrates the multi-cultural nature of the city of Pretoria West, i.e. ethnicity, age, gender, etc. The intention is to ensure that manifesting architecture has a sense of place, drawing it from this multi-cultural identity.

4.4 Generic City

This is to negate the current architectural trajectory of the city, as it has gradually assumed a generic architectural language (Barker, 2020). Dominated by international architecture, Pretoria streets are flanked by pristine glass storefronts displaying the powerful global brands that dominate the local market. The city has been commodified, turned into a place only for buying and selling, it has been rendered placeless (Hes & Du-Plessis, 2014: 34), and only welcoming to patrons. The street is the one the main public spaces left. The street acts as a corridor, rather than a space (Fisher, et al., 1998: 58), meaning this public space is also under threat, a phenomenon that is a stark contrast to the pastoral origins of the city.

4.5 Industrial Identity

The city was born out of a homogeneous, singular cultural influence, which was greatly changed by the influx of émigré into Johannesburg in 1886 (Fisher, et al., 1998). Pretoria's original orthogonal grid still underpins the urban quality of the city today. This model was created for a human, agrarian, non-automobile dependent city, characterised by programmatic diversity, walkable blocks, and a friendly public space condition (Fisher, et al., 1998: 55). This was changed during early 20th century, as Pretoria assumed its new identity as the administrative capital of South Africa, a titled and identity it maintains to this day (Clarke & Corten, 2011: 883). Though Pretoria, particularly Pretoria West has retained its original condition, due to a regressed building development, which was a blessing in disguise - as this is an

opportunity for the building of local light manufacturing to be developed in a place sensitive, even if it is a rapid development (figure 100). And this is also an opportunity to establish its identity as an extension of the local social and economic culture it is embedded in (Hutchinson, et al., 2017: 5), and negotiating this with global architectural ideas as part of this identity. It is mainly about mediating between the global and the local industrial vernacular architectural canons, as the two need not be adversarial, but rather synergize. This is a building that is derived from old antecedents (Barker, 2020: 138) that were created within urban environments developed over a long period of time, and thus possessing resilient capabilities.

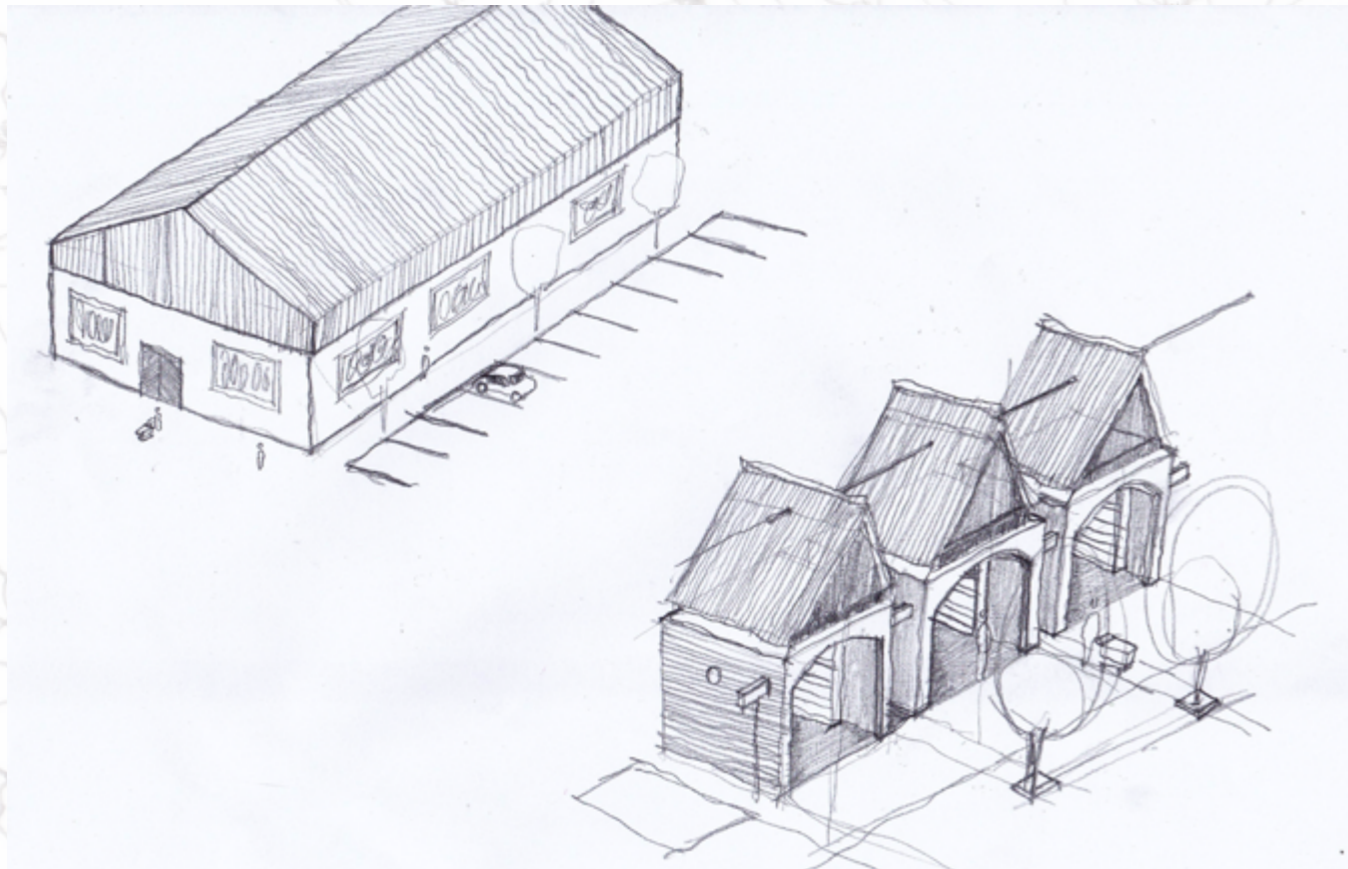


FIGURE 100 - Negotiating between the global and local light industrial architectural languages (Author, 2021)

4.6 Light Industrial Scale

Under light industrial, there is large scale light manufacturing (not to be confused with heavy industry), and small scale light manufacturing, **with both scales producing end user products. The distinction between the two is the scale and capacity of operation. Small scale light industrial mostly produces smaller items such as beverages (figure 101), while large scale light industrial produces larger items such as vehicles (figure 102)** Both large scale light industry and small scale light industry are produced under the auspices of orthodox modernism, and functionalism, both have produced poor

working conditions and banal architecture. The size of light manufacturing facilities is not necessarily the issue with conventional light industrial buildings, but rather the lack of architectural or urban design effort or intent. Though these buildings devolved from industrial buildings that were integrated and woven into their urban and rural fabrics, i.e. mills, workshops, barns, silos, etc. and their architecture was part of place, and contributed positively to the spatial quality they belonged to, and were thus appropriate.



FIGURE 101 - Small scale Light Industrial - Beverage bottling centre (Archdaily, 2021)



FIGURE 102 - Large scale Light Industrial - Ferrari Production campus (Archdaily, 2021)

4.7 Economies of Scale

Economies of scale allowed manufacturers to reduce their price per unit costs, and thus reducing the retail cost of the product, and making the manufacturer competitive. This method and its associated building model was copied across the world, during the 20th century, and this was the primary reason for the emergence of mass production and the need for physical expansion of the light industrial building typology.

Mass production is not primarily responsible for the production of banal, detached architecture, but rather practitioners produced by the presiding architectural canons, design zeitgeist during the expansion of the light industrial architecture at the turn of the 20th century - under the clamour of standardization, are culpable for the lack of conscious architectural effort directed towards these light industrial buildings.

4.8 Precedents

4.8.1 Typical Precedents



-----Disconneted from street

-----Isolated from street

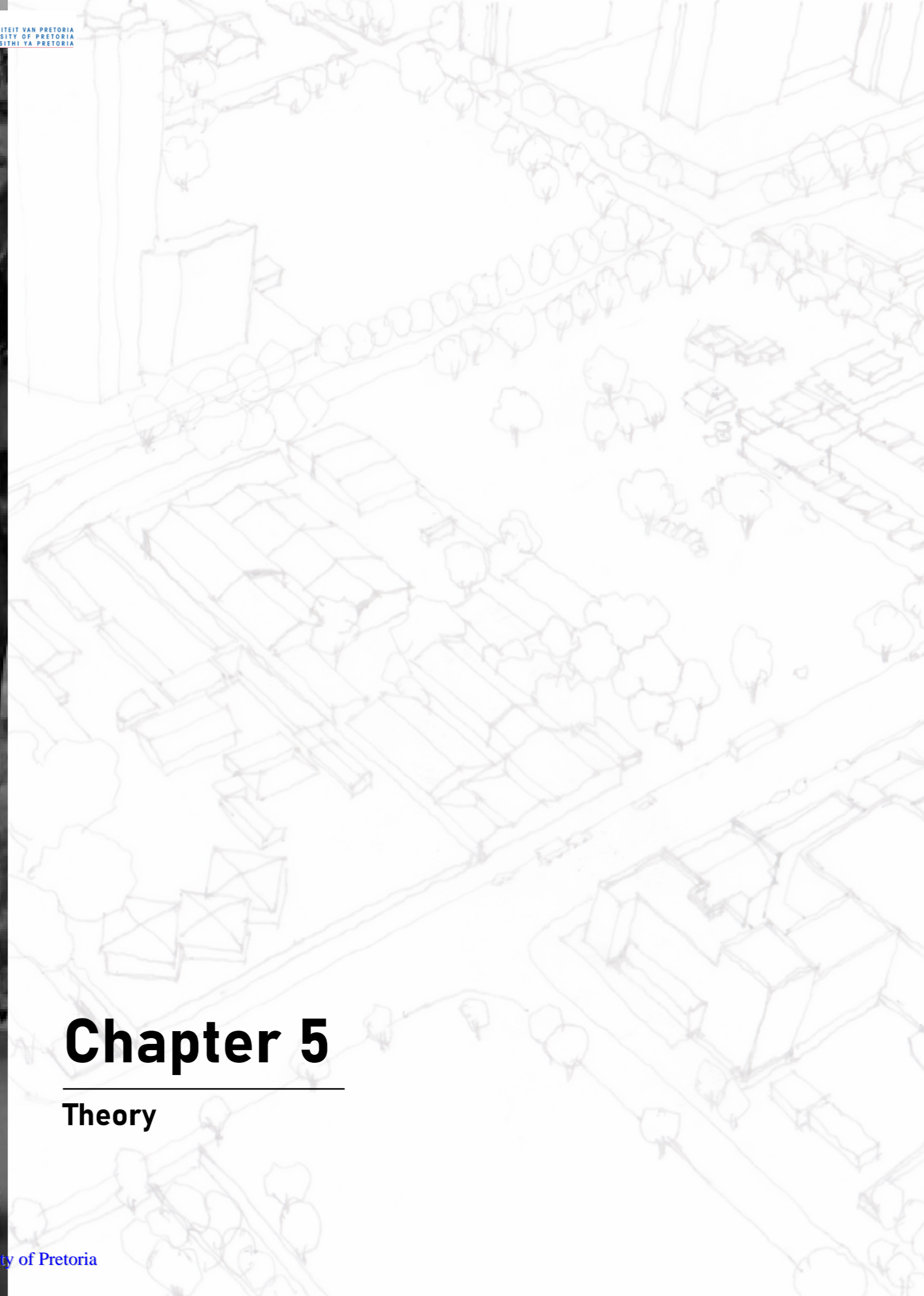
FIGURE 103- Typical light industrial (GoogleMaps, 2017)



-----Disconneted from street

-----Isolated from street

FIGURE 104 - Typical light industrial, South Africa (GoogleMaps, 2017)



Chapter 5

Theory

5.1 Introduction

The need to redress the nature of light Industrial buildings goes without saying, they have evolved and devolved into agents of spatial, and ecological degeneration. Like the rest of the built environment, light industrial buildings have been ecologically destructive, but industrial light industrial buildings are synonymous with spatial disintegration, eroding a sense of place, and general architectural malfeasance. With a changing zeitgeist, from mechanistic worldview to an ecological one – comes changing values in built environment academia and practice, and thus the alteration of the light industrial typology is imminent, and very much warranted. A comprehensive theoretical framework is essential to realising the smooth transformation of the light industrial typology, into an architectural concept that can be regenerative, produce liveable and inclusive spaces. It is thus important to understand the value that light industrial buildings gain from being regenerative, liveable and inclusive, and the positive impacts that could be generated by this.

What is the value of regenerative design – The world has already exceeded a number of operating critical boundaries in the ecosystem (Hes & Du-Plessis, 2014). The services nature provides to humans is in decline (Hes & Du-Plessis, 2014), studies have shown that there are nine critical boundaries that should not be crossed if we are to continue operating safely on the planet. Three of these nine boundaries, have already been crossed, and this puts many resources that humans depend on at risk, such as food security, water, and other life supporting operations in the natural world. The lack of social urgency towards this issue, means the global average temperatures continue to increase, and may go over 2 degrees celcius by 2040, with devastating effects. Though it is challenging when objectives to change human behaviour and habits, to have a more positive impact on ecological systems, is at odds with economic and political systems. This only reinforces the social inertia that is keeping society from breaking away from its ecologically insensitive practices – whose effects are exacerbated by the modernization of developing

countries, which is necessary to improve living conditions. The value of adopting regenerative sustainability, is that we can break away from our conventional “flawed, developmental model” (Hes & Du-Plessis 2014: 16) – and operate in the natural environment, cognisant of its inherent complexity and dynamism, instead of trying to control it, and manage its parts individually.

What is the value of liveable spaces – Physiological, and psychological wellbeing are essential to the good health of human beings. And liveable spaces have a profound impact on humans’ physiological and psychological wellbeing, it is thus important to ensure that the spaces humans live, work, and play in, are of an adequate liveable standard. Industrial buildings have not always provided good environments, that are conducive to liveability, though it has improved. Though good, liveable places are not limited to the spatial quality, but also to the impact these buildings have on the natural environment, which also affects humans, and the larger urban or rural networks, and all the associated parts. It is thus important to be aware of the inseparable relationship between liveable spaces, and regenerative design approaches.

What is the benefit of Inclusivity – in regenerative design, place based solutions are key to unlocking place based potential. And in creating liveable spaces for psychological wellbeing of culturally oriented human people, it is important understand the value of identity, and meaning. Culture, identity and heritage are integral parts of the human experience, and it thus becomes important, given the impact the built environment has on cultural production, and vice versa. Its important to produces spaces that can embrace peoples’ culture, and add value to it, and be conducive to its prosperity, as it is inseparable from their economic, spiritual and social experience. It is important to be inclusive in design, as that can empower, break down barriers, and change society for the good. It is important to be inclusive, as social cohesion is not of a just thing, but it is crucial to the creation establishing the unity needed to challenge outdated degenerative paradigms. It is even more important to establish inclusive identity criteria, in a multicultural, contested, and formerly hostile context.

5.2 Regenerative Design

Regenerative

We live on a dynamic planet, a planet whose natural environment consists of multiple living systems, that in turn consists of multiple living organisms. And these systems and organisms are constantly interacting and in flux and are co-dependent and sustain one another. The built environment that is a result of human action, built of natural resources from these very natural systems – under the mechanistic worldview paradigm, has become a destructive force to the whole (Mang, et al., 2016). In an attempt to create a built environment that is a true extension of its immediate natural and cultural contexts, new design strategies that reflect adaptability, complexity, and dynamism need to be adopted (Mang, et al., 2016: 21). Regenerative sustainability is about mov-

ing from these destructive and degenerative practices, to regenerative ones. This entails building on the sustainability notion of mitigating negative human impact, to initiating positive human impact on the environment. Mang (2016: 21) states that “A regenerative approach shifts from slowing down entropy to building the capability of living communities to evolve towards greater value”. In order to achieve regenerative designs, one has to design for evolution, have an understanding of place, discover collective vocation and establish guilds. Regenerative Processes such as starting from potential, identifying value adding roles and transformational leverage, as well as building developmental work, are necessary elements in the creation of effective regenerative designs.

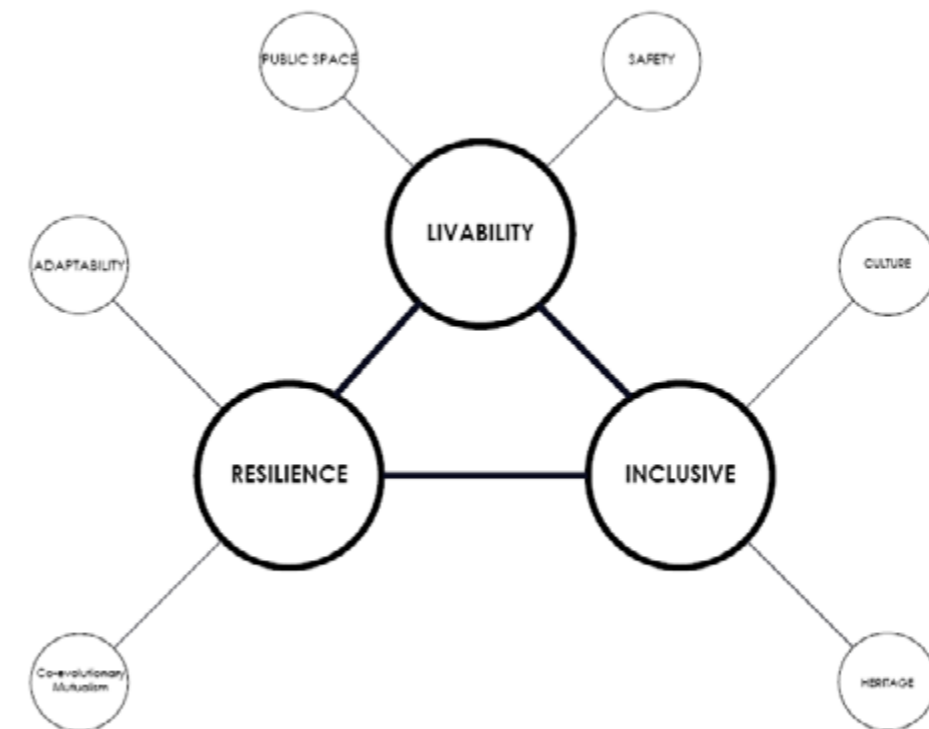


FIGURE 106 – Theoretical Framework (Drawn by Author, 2021)

ARCHITECTURAL-THEORETICAL APPROACHES

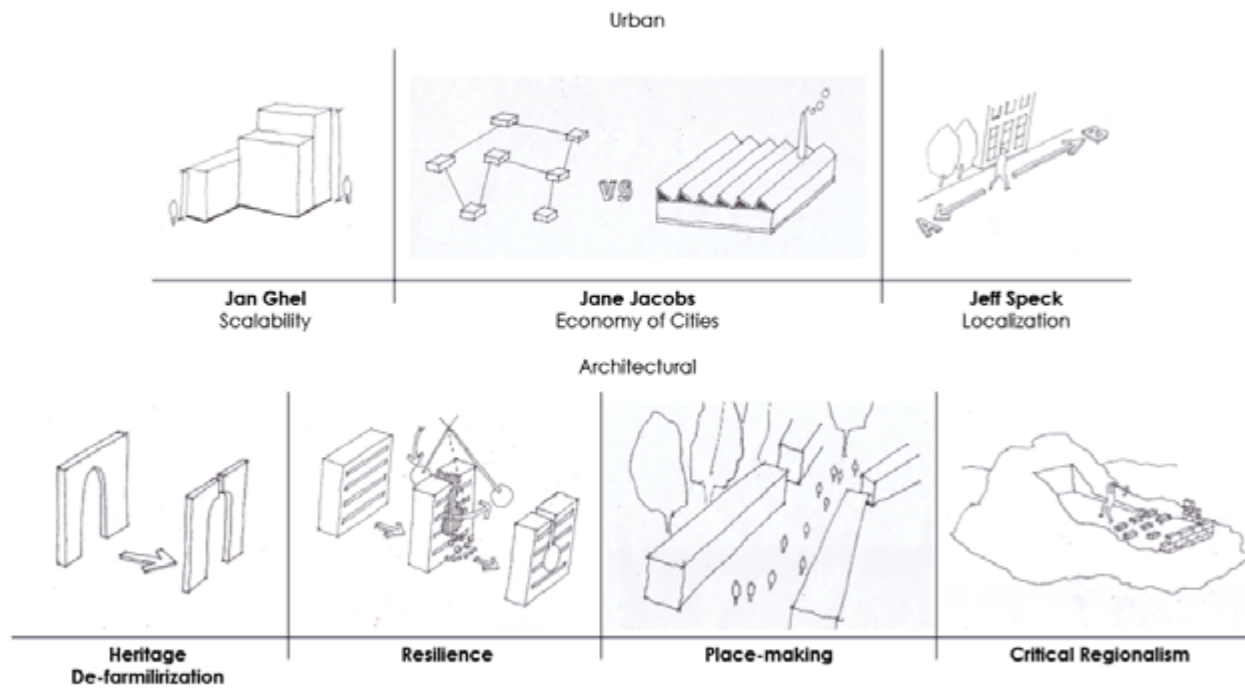


FIGURE 107 -Theoretical Framework (Drawn by Author, 2021)

Designing Regenerative Projects

Design for evolution

Recognizing the inherent inevitability of change, and the potential and challenges that come with this inevitable change, can be a strong informant in designing regenerative and resilient architecture.

Understand Place

Understanding place means looking closely into specific manageable scope of works, and treating them with a certain level of specificity, to make effective decisions that augment the positives of a place, and significantly deal with the negatives

Discover Collective Voctaion

Working towards a common goal is key, as individual buildings are part of a larger interconnected and interdependent network of the built environment, which is part of a larger ecosystem of biotic and abiotic elements. In order for design to be effective, collective effort is crucial.

Establish Guilds

Design should be a catalyst for symbiotic and reciprocal networks and relationships, which are key to creating spaces that foster healthier and mutually beneficial exchanges between people, and places.

Processes for Regenerative Design

Start with Potential

The process of designing, needs to change, and rather focus more on opportunities and potential, instead of the design problem. Without ignoring the problem, designers can produce architectures that facilitate growth and empowers people, and ultimately avoiding its own failure.

Define Value Adding Roles











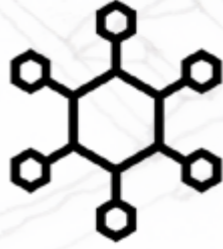



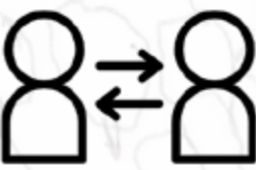

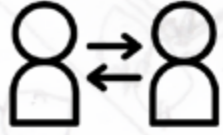
The process of designing, needs to change, and rather focus more on opportunities and potential, instead of the design problem. Without ignoring the problem, designers can produce architectures that facilitate growth and empowers people, and ultimately avoiding its own failure.

Transformational Leverage

Transformational leverage basically questions "how [design] can capitalize on the sustainable, yet insufficient, improvements that have been made to date" (Mang, et al., 2016: 155). This thinking focuses on creating prototypical solutions that recognize the uniqueness of place based solutions, to utilize the creative potential of local people to participate, manage and become stewards of these interventions (Mang, et al., 2016: 155).

Developmental Work

The process of designing, needs to change, and rather focus more on opportunities and potential, instead of the design problem. Without ignoring the problem, designers can produce architectures that facilitate growth and empowers people, and ultimately avoiding its own failure.

Design for evolution Guidelines	Discover Collective Vocation Guidelines	The Guided Age Guidelines	Start from potential Guidelines	Define Value adding roles Guidelines	Identify Transformational leverage Guidelines
<p>Premise One: Every living system has inherent within it the possibility to move to new levels of order, differentiation, and organization.</p>	<p>Premise Three: The sustainability of a living system is tied directly to its beneficial integration into larger system</p>	<p>Premise Four: Projects should be vehicles for catalysing the cooperative enterprises required to enable evolution</p>	<p>Start from potential</p> <p>Premise five : Potential comes from evolving the value-generating capacity of a system to make unique contributions to the evolution of larger systems</p>	<p>Define Value adding roles</p> <p>Premise Six: The continuing health of living systems depends on each member living out its distinctive role</p>	<p>Identify Transformational leverage</p> <p>Premise Seven: Small conscious and conscientious interventions in the right place can create beneficial, system-wide effects.</p>
<p>Principle One: Design for Evolution</p>	<p>Principle Three: Call forth a collective vocation</p>	<p>Principles Four: Actualize stakeholder systems toward co-evolving mutualism</p>	<p>Principle Five : Work from potential, not problems</p>	<p>Principle Six: Find your distinctive, value adding role</p>	<p>Principle Seven: Leverage systemic regeneration by making nodal interventions</p>
<p>Key Guidelines</p>	<p>Key Guidelines</p>	<p>Key Guidelines – Attract a guild of stakeholder investors</p>	<p>Guidelines</p>	<p>Guidelines</p>	<p>Guidelines</p>
<p>1. Barriers for evolution = Zoning, Social Inertia, Value, building codes - Breakthrough</p> 	<p>1. See a trajectory - Growth</p> 	<p>1. Anchor thinking to the future - Time</p> 	<p>1. Stay oriented to potential - Possibilities</p> 	<p>1. See everything in motion - Change is constant</p> 	<p>1. Map the nodes - Nodes</p> 
<p>2. Align with the wisdom of nature – Model the building’s processes like the site’s natural systems - Learn from Nature</p> 	<p>2. Draw on legacies - History</p> 	<p>2. Start general, then go to specifics - Narrow in</p> 	<p>2. Find the right level of potential - Steps</p> 	<p>2. Don't work on the project from the level of the project - Larger System Thinking</p> 	<p>2. Identify the right node for the intervention you want to make - Appropriate Location</p> 
<p>3. Define project by their roles – roles are adapted to respond appropriately - Coordination</p> 	<p>3. Identify Iconic events and people - Landmark/Icon</p> 	<p>3. Map relationships - Relationships</p> 	<p>3. Harness the energy of potential</p>	<p>3. Set goals that address both existence and potential - Calculated Actions</p> 	<p>3. Choose the appropriate relationship with a node - Relationship</p> 

5.2.1 Liveability

Design Approaches and Principles for Liveability

Psychological Wellbeing = Place-making

Use the placemaking attributes, and give the site ratings

Placemaking has a profound impact on the quality of the space, and the experience of the end user. In trying to achieve space that affords users a pleasant spatial experience. The PPS group has broken down important elements to consider when designing a place which has good place-making qualities. Broken into four sections, which have a number of qualitative subsets, which can be translated in quantitative/measurable data (Figure 108). Below, The Site's qualitative aspects have been given a rating founded on empirical research of the site, measured between 0 – not good, to 10 – very good. And the quantitative data has been collected to further support the qualitative ratings.

In conclusion, it can be deduced that the site does not have good place-making qualities.

And the design objectives will be to introduce these elements into the space, and the proposal will also be rated on the possible achievement of these objectives.

Physiological Wellbeing = Biophilic Design

Since buildings have a significant impact on human psychological and physiological wellbeing, to create spaces that connect them with elements that provide comfort and healing. Nature provides these therapeutic qualities, and humans have a strong connection with nature as part of our psycho-evolutionary process, as part of humans' migration from the primitive natural environment, into the built environment. Biophilia (bio – natural, philia – love), provides a good study into how design can be more connected to the natural environment, in order to afford humans an environment that will enhance their wellbeing. Below are biophilic design strategies that inform the incorporation and use of natural elements to enhance the project's spatial experience/quality.

The following is diagrams break provide a comprehensive analysis and measurement of the site's place making qualities. This is to establish where the site lack in terms of creating a space that has place making qualities.

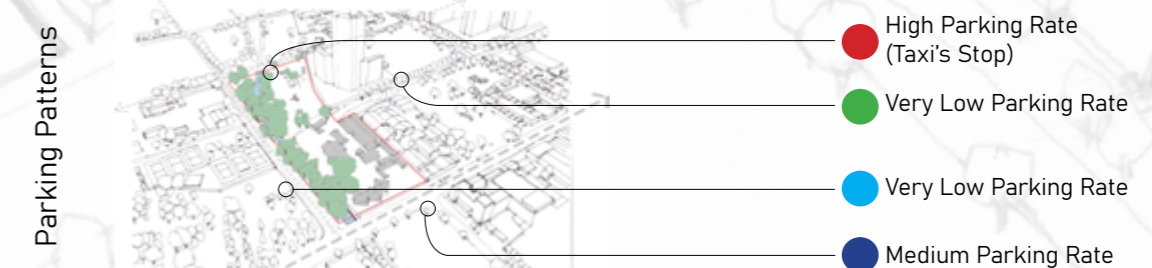
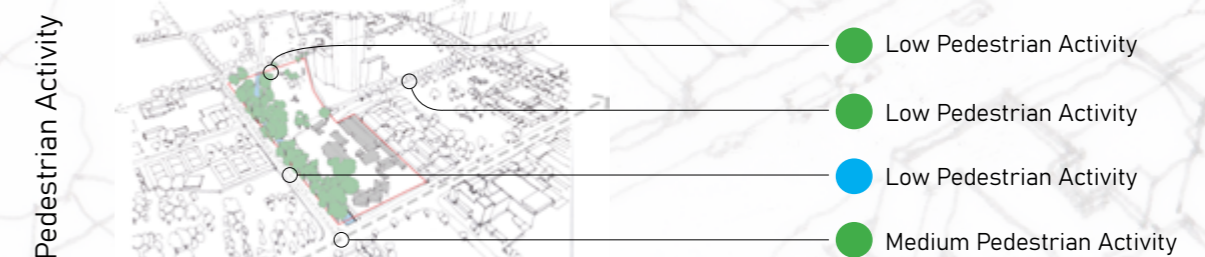
What Makes a Great Place?



Project for Public Spaces

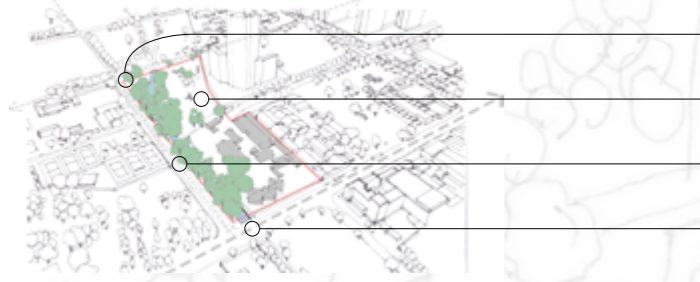
FIGURE 108 - PPS Placemaking Guidelines (pps, 2021)

Access & Linkages



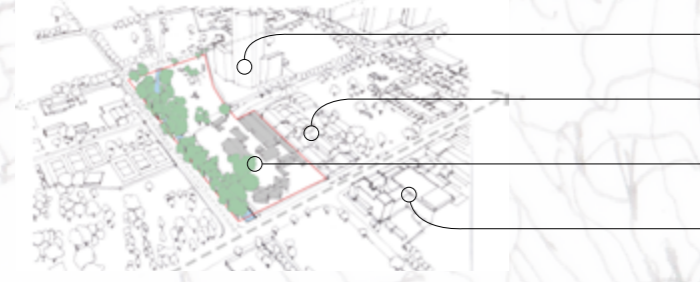
Comfort & Image

Crime Statistics



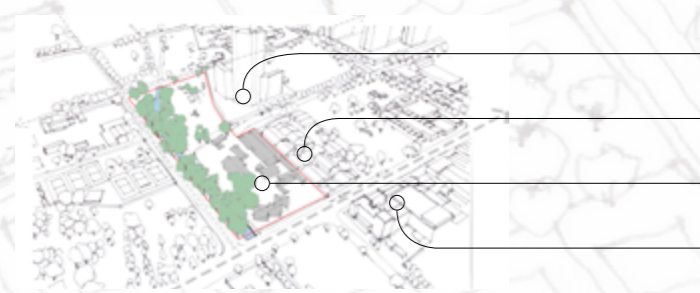
- Very High
- Very High
- Very High
- Very High

Sanitation Rating



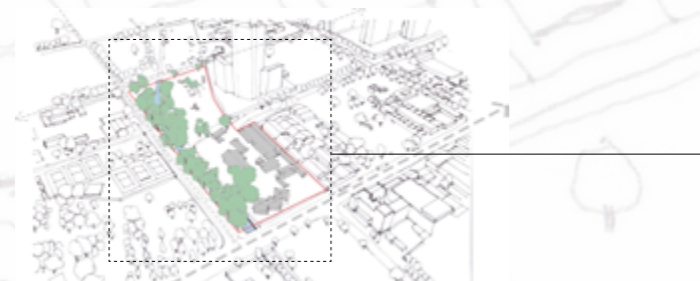
- Poor Sanitation
- Medium Sanitation
- Good Sanitation
- Good Sanitation

Building Conditions



- Poor Condition
- Decent Condition
- Decent Condition
- Good Sanitation

Environmental Data



- Good

Uses & Activities

Retail Sales



- Good
- Good
- Good
- Good

Rent Levels



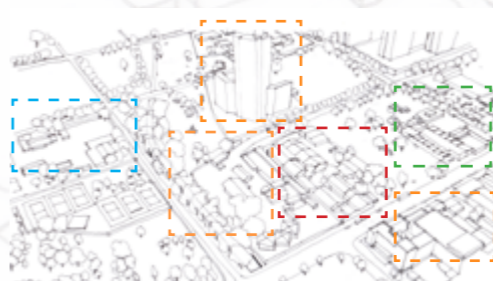
- Vacant Building
- Good
- Good
- Good

Property Values



- Low
- Medium
- Medium
- Medium

Land Use Patterns



- Educational
- Residential
- Municipal
- Business

Local Business Ownership



- N/A
- N/A
- N/A
- N/A

Sociability

Number of women, children and elderly



● Very Low

Social Network



● Taxi Drivers Network

● Mechanics Network

● Spaza's Network

Volunteerism



● N/A

● N/A

● N/A

● N/A

Evening Use



● No Evening Use

Street Life



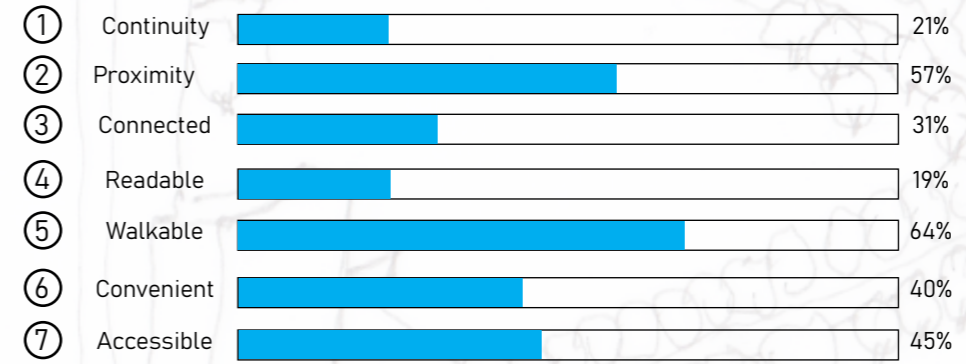
● Busy

● Not Busy

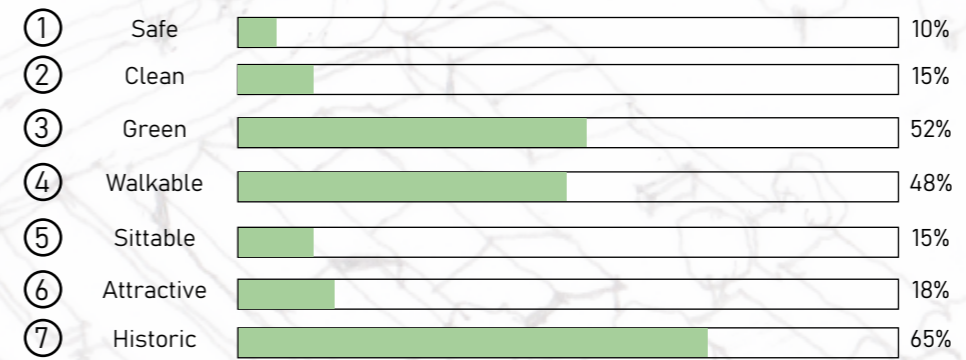
● Not Busy

● Busy

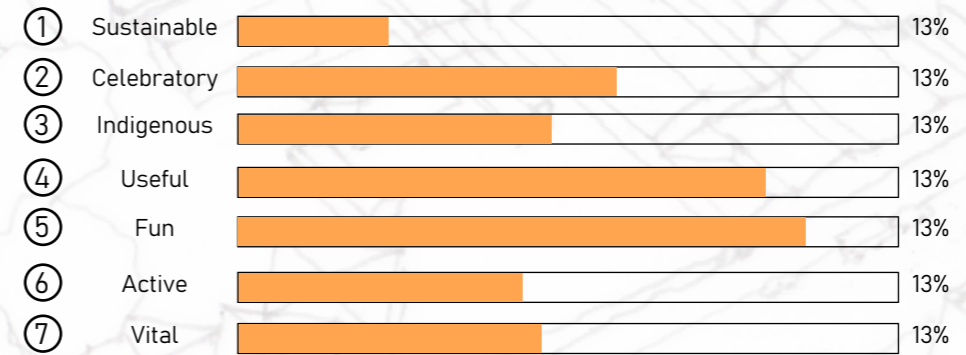
Access & Linkages



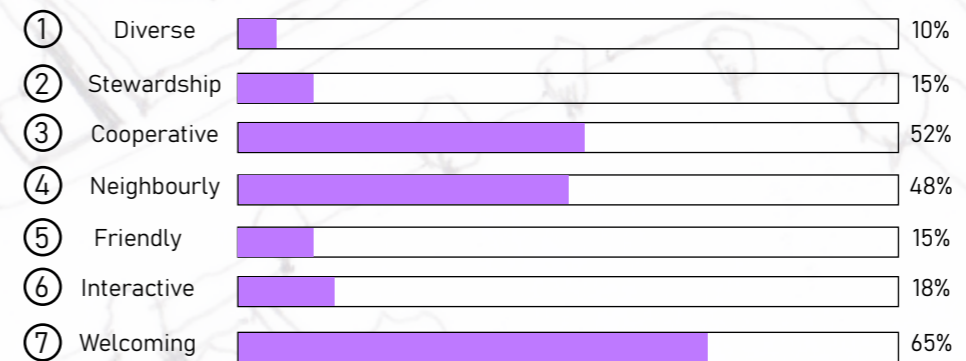
Comfort & Image



Uses & Activities



Sociability



5.3 Biophilia

Perspective	Theory	Description
Biophilia	The Biophilia Hypothesis (Wilson, 1984, 1993)	Biophilia is 'the innately emotional affiliation of human beings to other living organisms.' After human migrated to the built environment, we inherited a need for nature, which evolved into 'thinking about nature'.
	Biophilia Values (Kellert, 1993)	The dependence on nature is 'for survival and personal fulfilment', and the nine biophilia values are: 'utilitarian, naturalistic, scientific, aesthetic, symbolic, humanistic, moralistic, dominionistic, and negativistic'.
Habitat and Dwelling	Prospect-Refuge Theory (Appleton, 1975)	Prospect and refuge occur simultaneously, that is, 'the ability to see without being seen'. Prospect provides 'an unimpeded opportunity to see' (to find and gather sources), and refuge offers 'a shelter to hide' (to be protected from outside threats).
	The Savanna Hypothesis (Orians and Heerwagen, 1992)	The savanna is the mixed woodland and grassland landscape commonly seen in Africa. It affords abundant resources, open views, and climbable trees that are conducive to survival. Today, people still have aesthetic preferences for savanna-like environments.
	The Aesthetics of Survival (Hildebrand, 1999, 2008)	Survival advantageous characteristics are identified to discuss landscape preferences and explain why nature is fascinating in architecture. The five characteristics are: 'prospect and refuge, enticement, peril, and complex order'.
Restoration	Stress Recovery Theory (Ulrich, 1983; Ulrich et al., 1991)	Stress Recovery refers to unthreatened exposure to nature that produces positive emotions and contributes to health and wellbeing. It is supported by some preferred natural features (e.g. vegetations, water, and natural structures, textures, images, and vistas).
	Attention Restoration Theory (Kaplan, 1995; Kaplan and Kaplan, 1989)	Attention Restoration helps relieve mental stress and brain fatigue. Interactions with the natural environment do not require much cognitive work, which is beneficial to restoring exhausted attention.
Place	Place Attachment Theory (Hidalgo and Hernández, 2001; Manzo, 2003)	Place Attachment Theory explores the emotional connection with places and explains the 'sense of place' and 'sense of community'.

FIGURE 109 - Theoretical Basis for Biophilic Design (Zhong, et al., 2021)

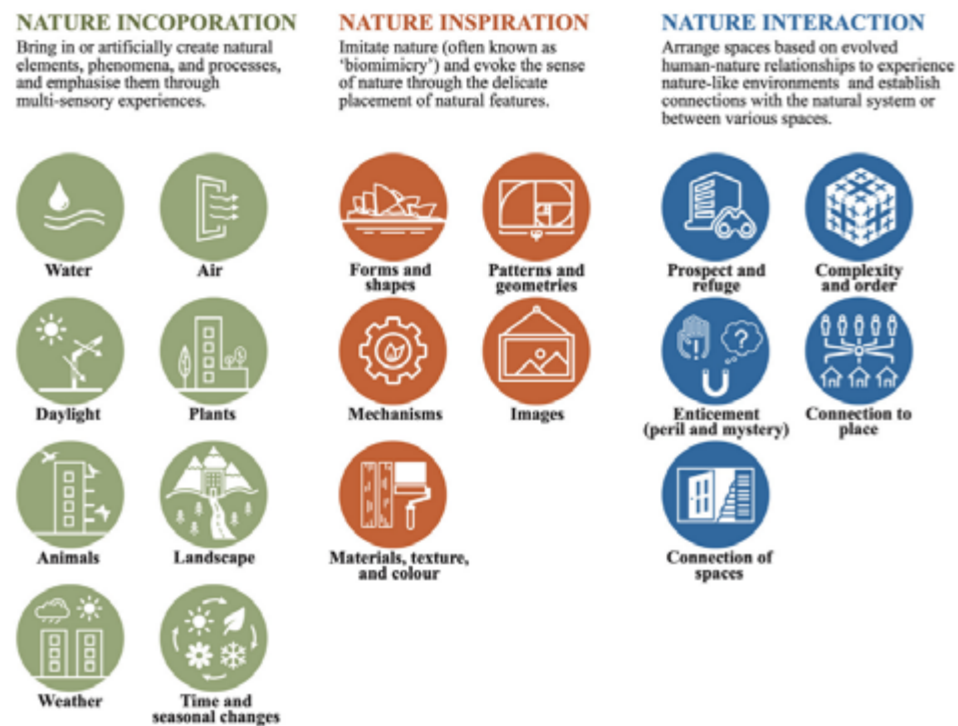


FIGURE 110 - Biophilic Design Guidelines (Zhong, et al., 2021)

5.4 Inclusivity

Design Principles to Inclusivity

Culture – Critical Regionalism

Place is a crucial part of identity, and culture. The emergence of universal culture, through channels such enlightenment, and the erasure of conflict-causing differences, has led to the erosion of local quality of place, particularly developing countries. The erosion of regional culture is not ideal, as is the absolute reign of regionalism. Regionalism has proved to be a powerful tool of repression and chauvism. The negotiation between the universal and the regional is called critical regionalism, and it is valuable, in that it can equally distance itself from the shackles of advanced technology and the ever present tendency to regress into nostalgic historicism.

Design Guidelines

Critical Regionalism Guidelines

- Placemaking over Spacemaking
- Highlight specific elements in context that are being intervened in, i.e. Light, topography (Building the site)
- CR is architectonic rather than scenographic
- No sentimental use of local forms
- Reinterpret local forms to combine assets and resources of contemporary culture with tradition

Conclusion

Placemaking is a common thread between these overlapping, but different spatial theories. They all provide varying observations and guidelines about place and the value of place based solutions, in creating sustainable, regenerative, sensitive, and relatable places. The following table shows the overlap between the different theories, and their design implications.

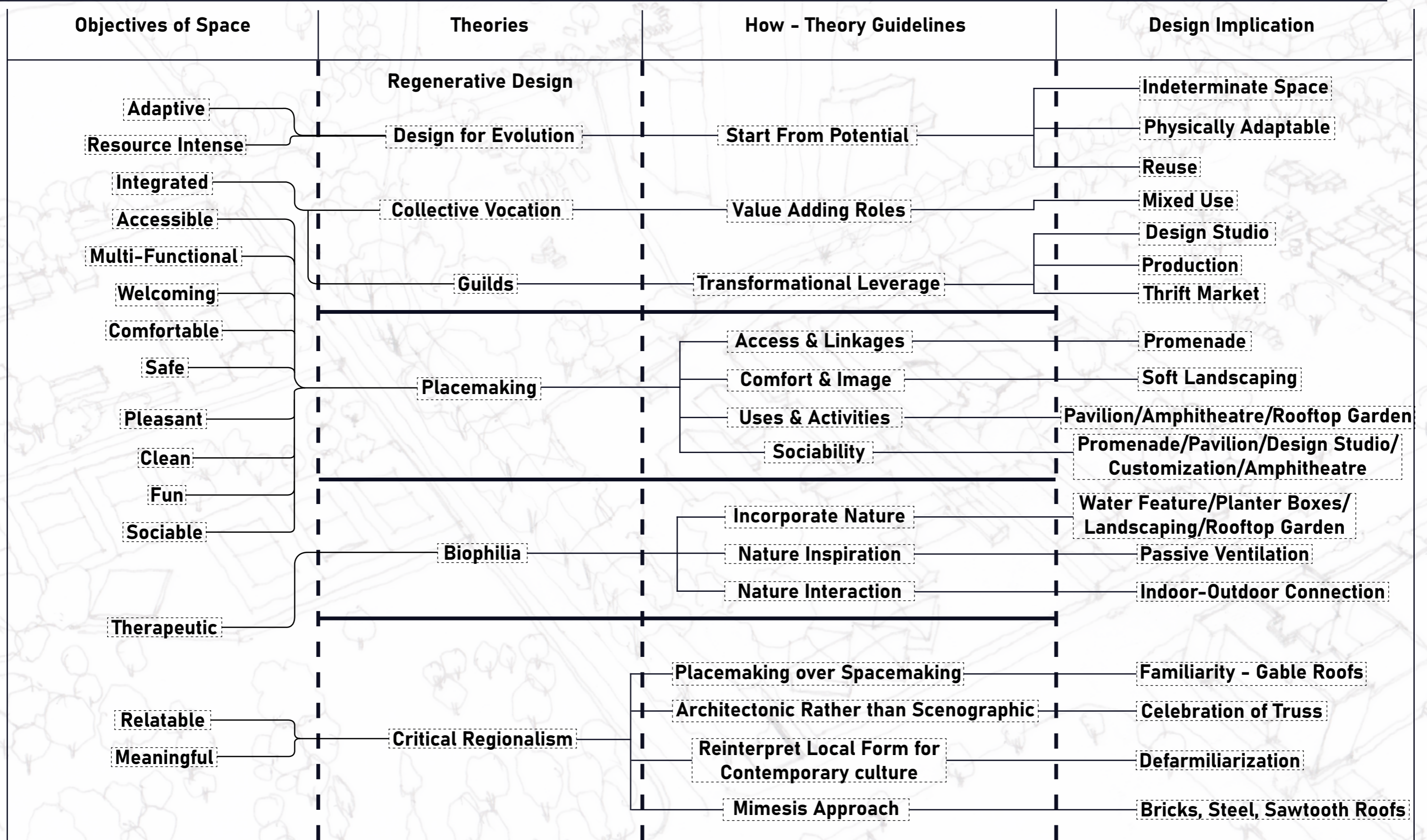
Heritage

Heritage and Memory are crucial elements in the creation of place, and the placing of value toward a certain architectural heritage is consequential in determining what type of architecture is produced. Given the multi-cultural, multi-heritage and contested nature of the site, strategies on how to create space that honours heritage is important.

Heritage Strategy

Approach to heritage means mimesis approach
Defamiliarization

Theory - Design Relationship



5.5 Precedents

5.5.1 Urban Precedents

Name: Salt Mills
Location: Yorkshire, England
Architect:
Year:

Light industrial buildings can nestle into existing urban networks, at various scales, without eroding the quality of the spatial experience and architectural language/continuum of a particular place. Salt Mill displays qualities that are overtly related to the surrounding community

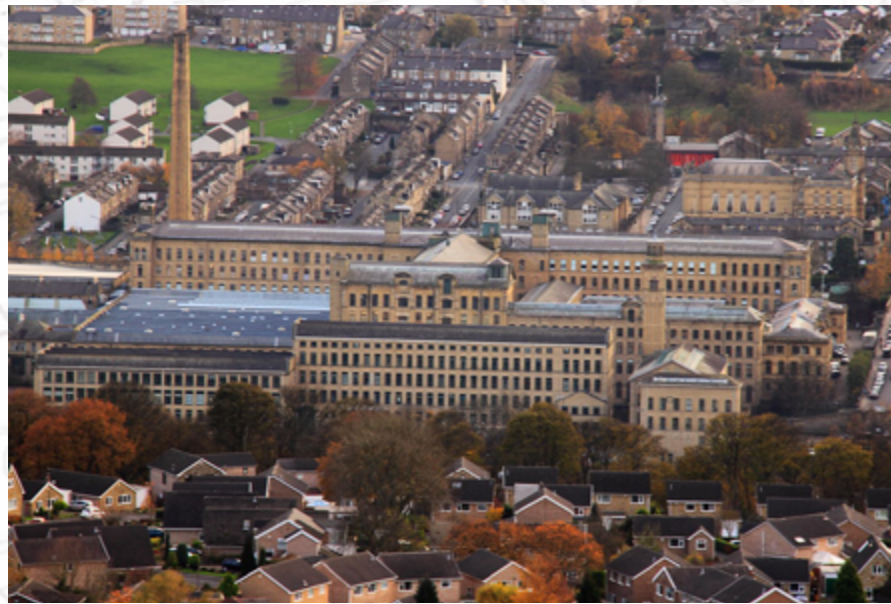


FIGURE 111 - Salt Mills Urban Integration (GoogleMaps, 2019)



Name: Mad Giant
Location: Johannesburg
Architect:
Year

Mad Giant nestles into the heart of Johannesburg, on Fox street, makes great use of a former industrial space.

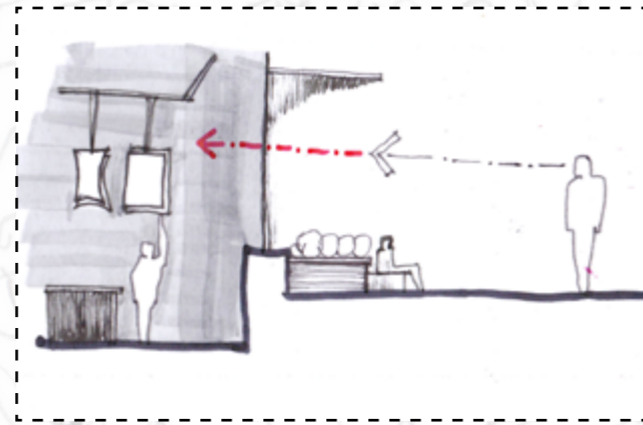


FIGURE 112 - Mad Giant Brewery Urban Integration (GoogleMaps, 2019) (Archdaily, 2019)

5.5.2 Program Precedent

Name: Unknown
Location: Unknown
Architect: Unknown
Year : Unknown

This precedent indicates the relationship between retail, display, and production. And the impact visual access and connectivity between production spaces, management spaces, and customer experience spaces.



Visual Connection

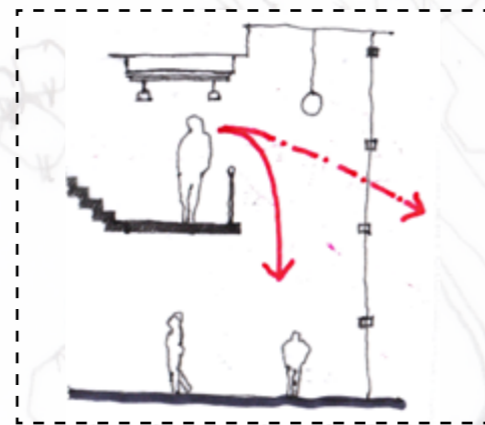
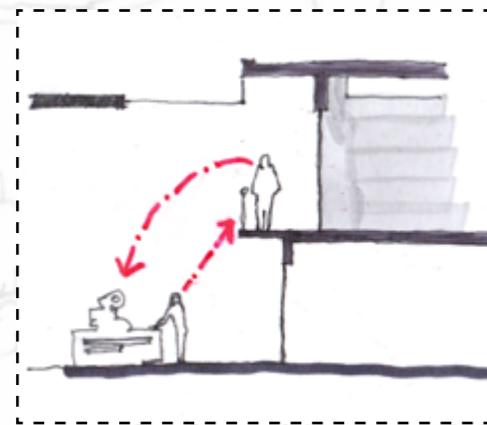
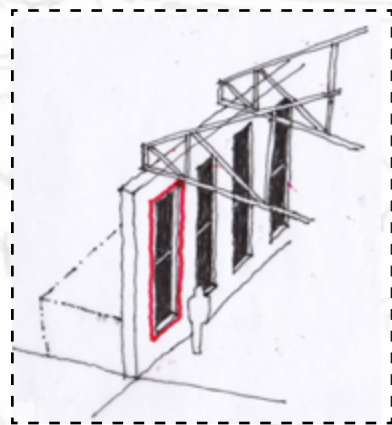
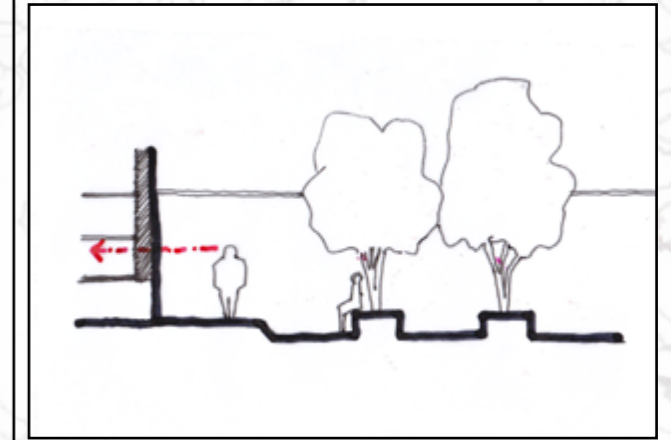


FIGURE 113 - Unknown

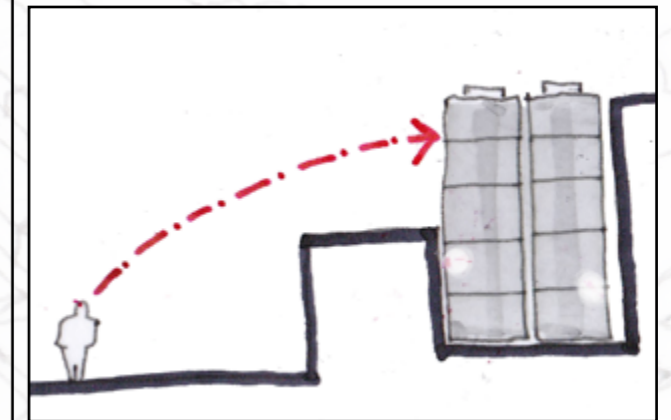
5.5.3 Spatial Precedent

Name: Surly Brewing
Location: United States
Architect: HGA
Year : 2015

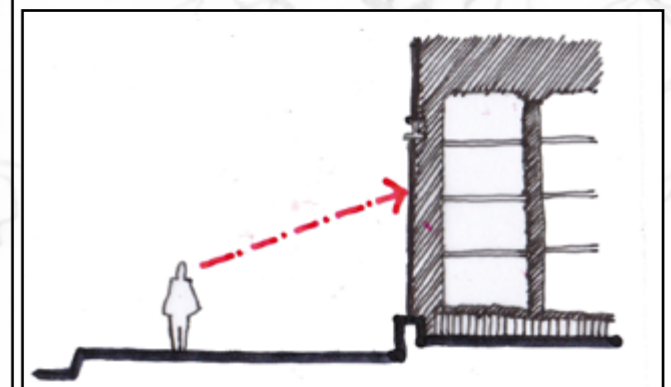
This precedent displays the value of exhibiting production, and using it as a drawcard rather than hiding it as a "untidy" activity. This also extends to its connection to the natural landscape and how it can impact the spatial experience for the end user



Visual Connection



Production - Exhibition

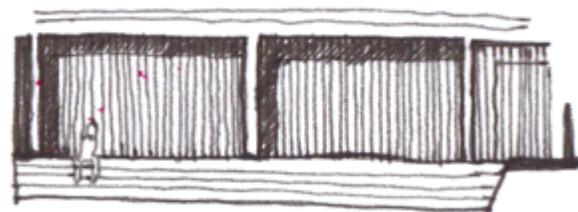
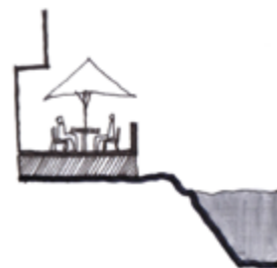
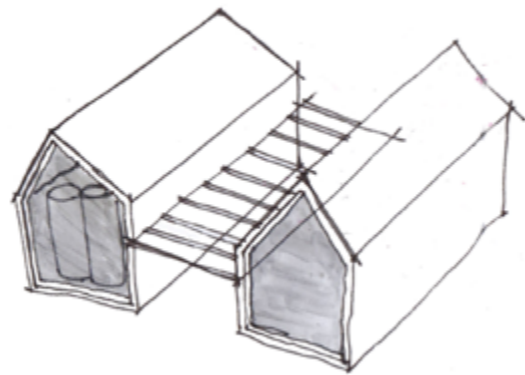
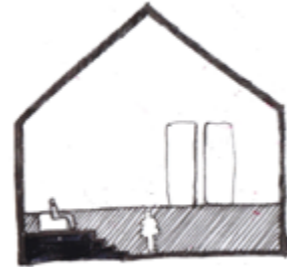


Visual Connection

FIGURE 114 - Surly Brewing (Archdaily, 2015)

5.5.4 Formal Precedent

Name: Shelter Brewery
Location: Australia
Architect: Paul Burnham
Year : 2020



Interpretie
Vignette

FIGURE 115 -Shelter Brewery 9Archdaily, 2020:online)

5.5.5 Formal Precedents

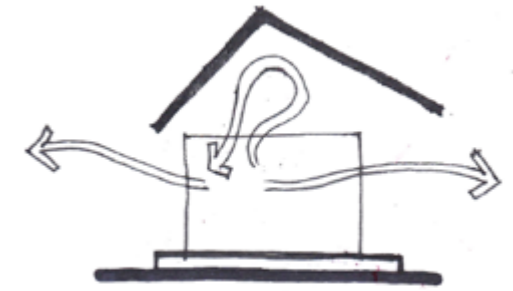


FIGURE 116 - NorthShore Pavilion, Australia (Archdaily, 2020:online)



FIGURE 117 - Edinburgh Workshop, England (Archdaily, 2020:online)

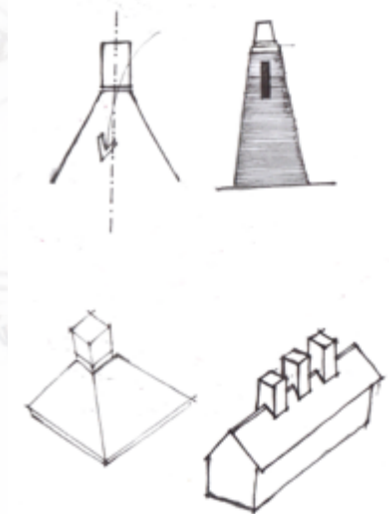


FIGURE 118 - St. Cyrian School (Noeroarchitects, 2016:online)

5.5.6 Contextual Precedents

Name: Tofu Factory
Location: China
Architect: DnA
Year : 2018

Embankment treatment
(Gabion, Retaining Walls)
Riverside Pavilion



FIGURE 119 -Contextual Precedent (Archdaily, 2018)

5.6 Formal Language

5.6.1 Spatial Configuration

The spatial configuration is founded on an itinerary, through the site – that maintains connection with the creek throughout, which follows a datum line that generated an experiential promenade through the site. This itinerary is then framed by boundaries which gradually change in their spatial and material articulation to stimulate a multifaceted sensory experience (PALLASMA). The promenade is flanked by production spaces on the interior of the site, and by pavilions of the edge of the creek, acting as the civic part of the space which ties the spaces together, and animates them. The promenade is meant to foster community building, by slow people down to initiate interaction between them, so as to know thy neighbour, and negate the growing phenomenon of a city with no communities. The impact of lack of community has the potential to perpetuate fear, animosity, prejudice, and hate, which can cause more dire situations in society, and the promenade has great place-making qualities which sets the stage

for people to transcend this. The landscape is articulated to define smaller spaces within larger spaces, which maintain a sense of extensive public space, but provides opportunity for intimate interaction within this. The spaces allow for the mundane, everyday, and casual activities to overlap with the working and enterprise spaces, to imbue a sense of humaneness, belonging, intimacy, reliability, and affection for what would otherwise be an efficient, cold, austere spatial experience of conventional light industrial building. From a regenerative vantage point, the space is configured to establish a better relationship between the surrounding communities and the creek, as well as to enable the multiple and ever evolving possibilities and relationships that form part of these communities. This is to ensure that the project transcends its functions, and can maintain its role, as a valuable and empowering space to the community. Through the lens of critical regionalism, spatial layout is meant to accentuate the

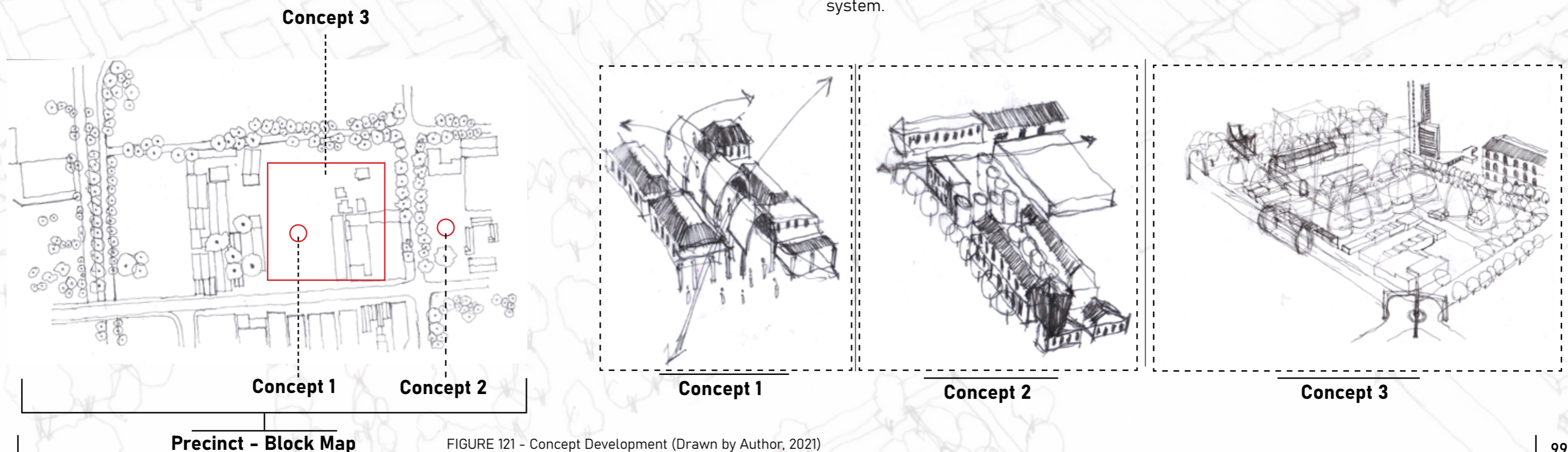
experience of place – that is the site's gradual slope, light quality, large trees, industrial heritage, and the sound and smell of the creek. The site's promenade is meant to reinforce and frame this experience, thus making the user conscious of what they would otherwise take for granted.

5.6.2 Massing

The massing of the building is meant to be low scale, to ensure that connection between the existing fabric, and the civic promenade of ground level is maintained through all floors of the building, so as to reinforce place-making qualities, even inside the buildings. The massing is also meant to ensure a preservation of open public, green space, as opposed to built space, hence the smaller building footprint. Through the lens of critical regionalism, the massing is meant to reinforce place-form, by referencing the massing and scaling of the surrounding context. Through a regenerative design scope, the massing is designed to enable the establishment of guilds – interconnected relationships between stakeholders – such as neighbouring buildings. This massing ensures that the buildings have similar physical qualities to enable an establishment of shared resources, e.g. grey water filtering system.

5.6.3 Formal Language

The intention is to present a quaint and pastoral building that is not disruptive to the site – by avoiding superfluous and avant-garde architectural languages. This building's formal language is intended to continue the quaint, vernacular architectural language, utilizing relatively simple forms such as the gable roof, saw-tooth roofs, and flat roofs. The form of the scheme is more mimetic, than contrasting relative to the existing fabric of the site, hinged on the idea that the urban fabric gives a better, more coherent experience to the user when there is harmonic diversity (gradual differences between buildings) instead of each building trying to outdo the next with novel or fashionable architectural forms (Alan Lipman). The building is meant to be as economic as possible through these simple forms, and ensures that the building ambitions are reasonable and can be met with a limited resource (money and skills) pool. The building's composition is meant to breakthrough barriers which limit the evolution, and value adding potential of the building, relative to changing conditions in the economy, an organization, and community needs.



5.6.4 Concept

The first objective was to identify an ideal site, that could be connected to an ideal street, which could direct people toward the development. Two sites in the precinct were identified, firstly - the parking lot next to Kruger house, and the vacant lot in the middle of the precinct. Both sites were determined to have potential to serve better programmes that were suited for the relationships within the precinct scheme.





Clothing Production(Nikkei, 2016)

Part C

DESIGN

Chapter 6

Design Development

6.1 Design Intention

The intention of the design is to enable industrial buildings to transcend programs, and become more than just industrial sheds, to make them more useful, valuable to its custodians or stewards, and thus resilient. The main reason being that the true form of resilience for a building is when it is useful and meaningful to the communities around them, only then can there be care and stewardship towards it (JEREMY TILL). Another dimension to release light industrial buildings from the confines of the industrial park typology, and enable them to be integrated into urban environments that can provide a much needed industrial infrastructure for young fledgling makers. This is the creation of a new light industrial typology that distinguishes itself from the heavy industrial building typology, and forges a new variation of this typology that supplements production spaces with learning and research

(REFERENCE), to enable the youth of South Africa to have agency and access to economic opportunities in urban areas.

The design intention is to create a space and typology that can enable the youth to collaborate, refine their skills – and learn by doing, to create and extract value for themselves through their own cultural production, centred on the production and consumption of apparel, music, visual art, and all its other concomitant parts. This is a space that celebrates the designing, making, and selling of

ready to wear apparel, and how the production spaces need not be removed from the designing and selling aspects. Essentially, apparel industrial spaces need not be limited to their functions, but can become places of interest, and be places of value, and expand their offering. The resultant space is envisioned as a space that can overlap learning, production and recreation, to have a greater spatial effect that can revive the life of light-industrial spaces, and transcend the limits and divisiveness of Euclidian –modernist city planning. The specific combination of programs, the heritage, natural and built resources in and around the site create a space that transcends

age, culture, ethnicity and class, and realises an intervention that celebrates cultural diversity, public civic recreational space, preservation and care for natural and built assets, and an embrace for the process and spaces of production. The following parts shall firstly break down how the spatial organization, massing, and the formal language see these intentions through, and how the technical resolution, i.e. structure; material selection; technology; and systems physically manifest these design intentions.

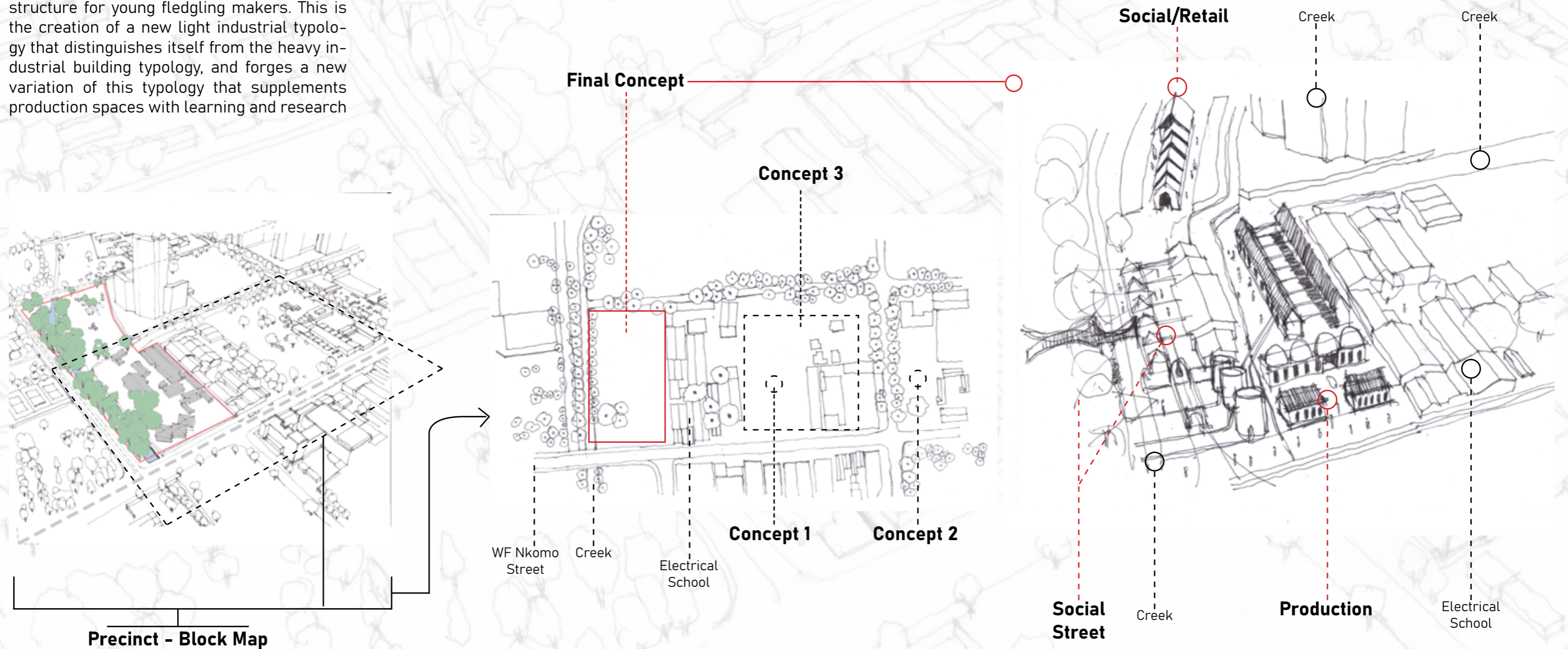


FIGURE 123 - Concept Development (Drawn by Author, 2021)

6.2 Design

6.2.1 Program Organization

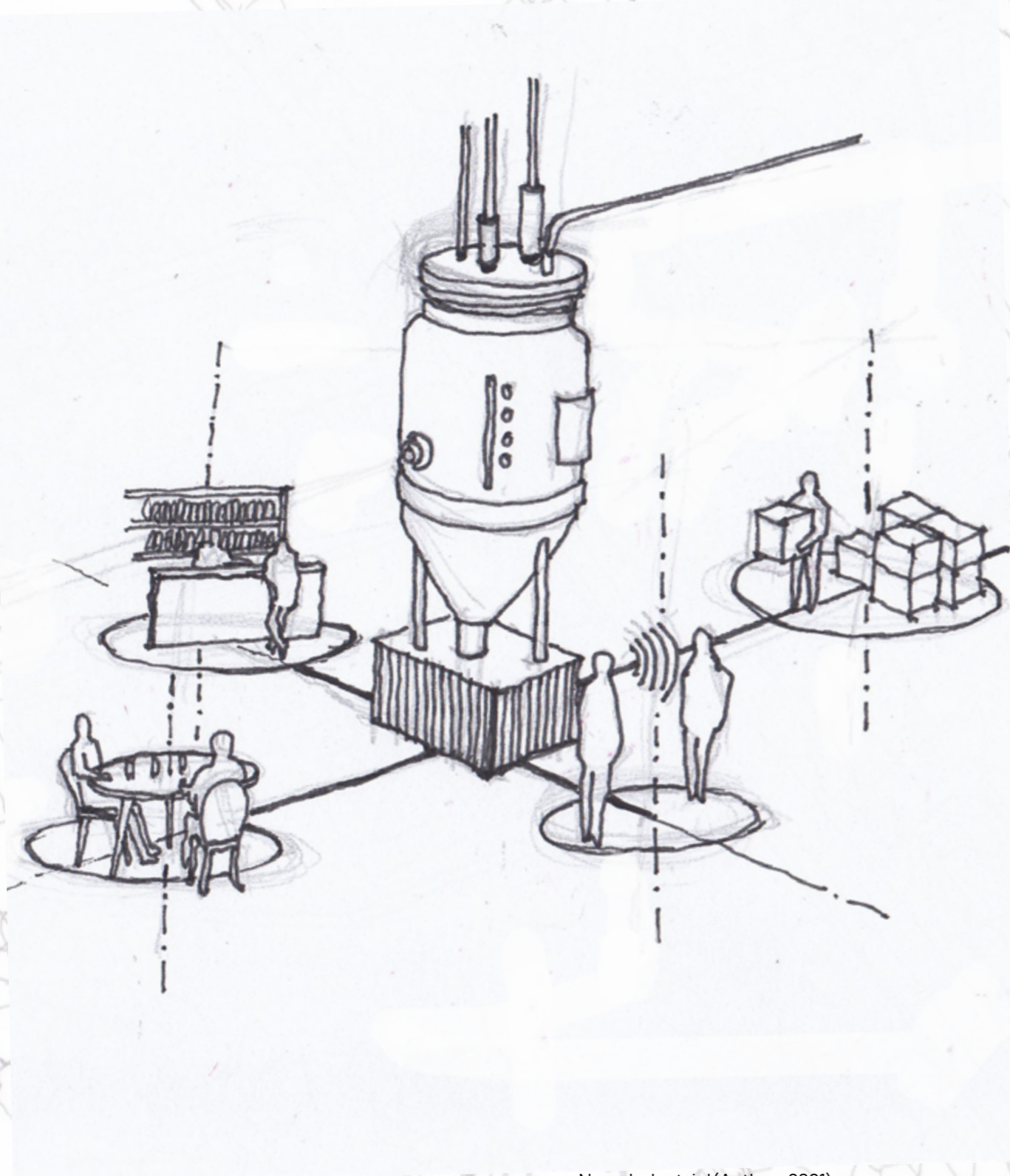
The programme that is to be accommodated on the site includes an industrial space – that comprises of office spaces with its concomitant spaces, such as – storage, production workshop, and warehousing spaces, as well as staff and canteen areas. The space also required a research centre, design and prototyping studio, and a clothing customization centre to accommodate all the parts of the culture of expression through apparel, and cultural production associated with the consumption of apparel. Secondary programmes include a micro-coffee roaster, which can double up as a beverage retail space, and a fresh produce market space and thrifting market space. An art gallery that can accommodate the exhibition of visual art and become a second, supportive/alternative space to O12 central and state theatre as a visual art space in Pretoria, as well

as small “workshop” spaces for tailors, seamstresses and cobblers to serve the surrounding community. The site is split into two parts, the southern part which is primarily for production, and the northern part which is primarily for recreational and retail activities. The reason for this spatial arrangement was a response to the industrial fabric towards the south of the site, and the more residential and retail/transit oriented part to the north. The positioning of the industrial production on the southern part is to create a resource intense relationship with the already existing light-industrial fabric. The presence of heroes’ acre cemetery to the southwestern part of the site elicited a more tranquil response to the southern part of the creek, so as to not encourage intense foot traffic which could potentially cause damage to the heritage site.

6.2.2 Arts Avenue

The northern part acts as a starting point for an arts and craft/fashion avenue, which starts from corner Cowie and Johannes Ramokhoase streets, all the way to Marabastad. This is a street that will be the main thoroughfare for community engagement and the curation of Pretoria’s artistic prowess, and history of Mar-

abastad, and Pretoria West. This “arts/fashion avenue” connects the Marabastad node with this new proposed node on corner Johannes Ramokhoase and WF street, and redistributes the informal economic activity along this spine/thoroughfare, taking advantages of the emerging multi-storey residential stock.



Neo -Industrial(Author, 2021)

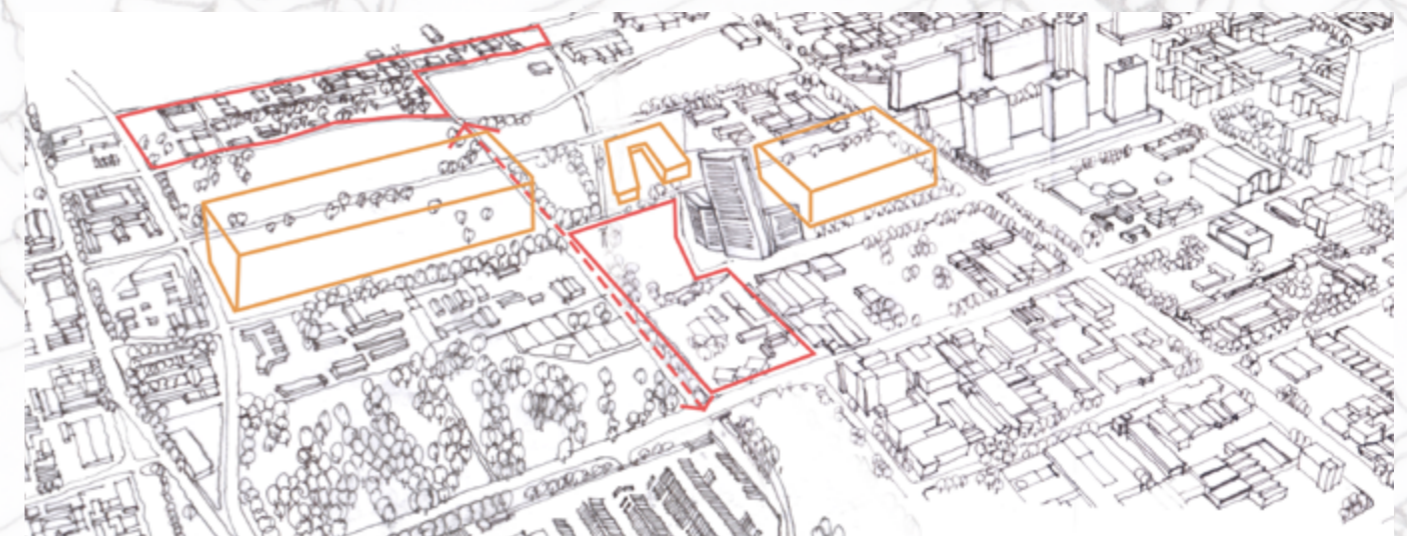


FIGURE 125 - Arts Avenue

6.2.3 Design Site Negotiation

The spatial arrangement of the intervention is firstly predicated on the location, and acknowledgement of the creek on the western edge of the site – called the Steenhoven creek – acting as a spatial ordering boundary. The Steenhoven creek creates a horizontal, North-South axis (Figure 127), and this informs the itinerary of the promenade that allows end users (the general public and workers) to have a visual, sonic and haptic connection to the creek. This promenade is then complemented by a parallel service axis/route on the eastern part of the site – which allows vehicular access through the site, without the vehicles needing to make a 180 degree turn (Figure 128). This will allow trucks to drive straight through and exit on Madiba Street, and along this route – sits the loading bays of the production building. In between the promenade and service axes, is the production and research centre building, which is then confined to a rectangular footprint, attenuated in the north-south direction (Figure 129). This north-south attenuated plan is not an ideal orientation for the building with regards to receiving northern light – but due to the spatial benefits of the promenade and service axes, the use of a skylights in the roof are used to circumvent this non-ideal building orientation (Figure 130). This is the prime reason for the use of a saw-tooth roof structure in the building – to act as “skylights” that wash light into the space. The recreational, exhibition and retail spaces on the northern part of the site actively open up to both the creek to the west and the promenade which cuts through the centre of the site, thus creating spaces that “face” two opposite directions (Figure 131). During the design process, open and airy pavilion structures were identified as the most suitable type of structures, given the heat load that shall be generated by the recreational activities, and the number of people communing in these spaces. The western edge of Kruger Park’s “plinth” is used at the backdrop for the exhibition spaces, amphitheatre, art gallery, and tradesmen workshops – with the intention being to continue the promenade as the spine of the site, flanked and animated by recreational, market, and exhibition spaces on both sides. These spaces set against Kruger Park’s

plinth provide elevation up to the recreational plinth, and thus a seamless connectivity between the promenade and the top of Kruger Park’s “plinth”- which had always served a recreational purpose (Figure). This connectivity can regulated by certain access control points, depending on the private-public relationship between the promande and Kruger Park Plinth.

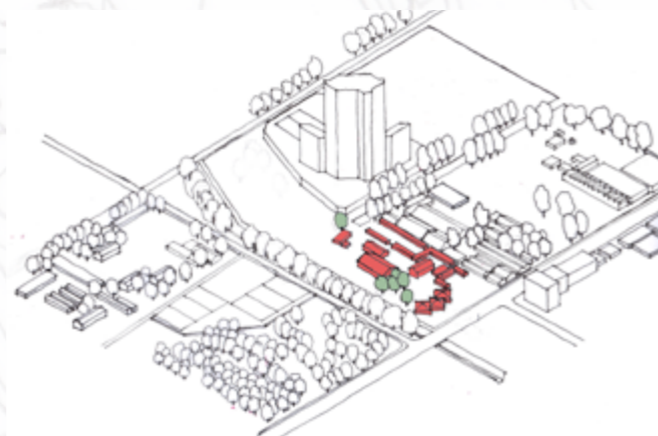


FIGURE 126 -Existing Site (Author, 2021)

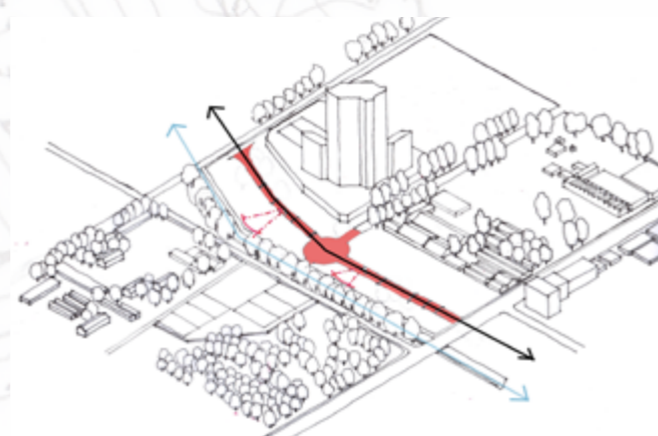


FIGURE 127 - Promenade Axis (Author, 2021)

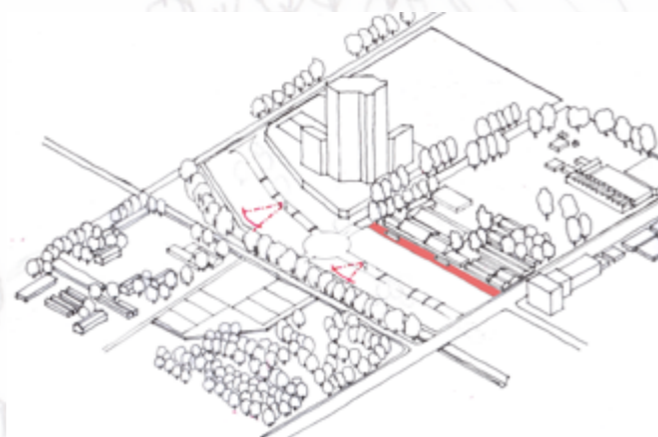


FIGURE 128 -Service Road (Author, 2021)

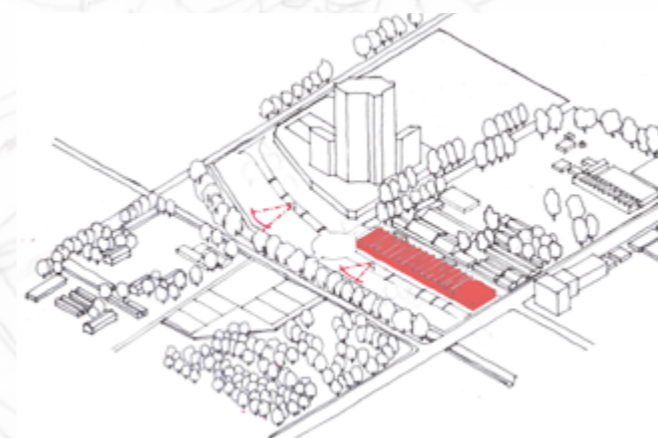


FIGURE 129 - Production Area Massing (Author, 2021)

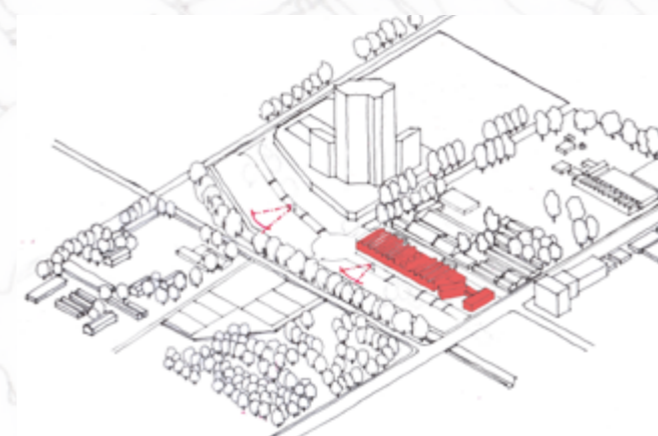


FIGURE 130 - Production Area Massing 9 (Author, 2021)

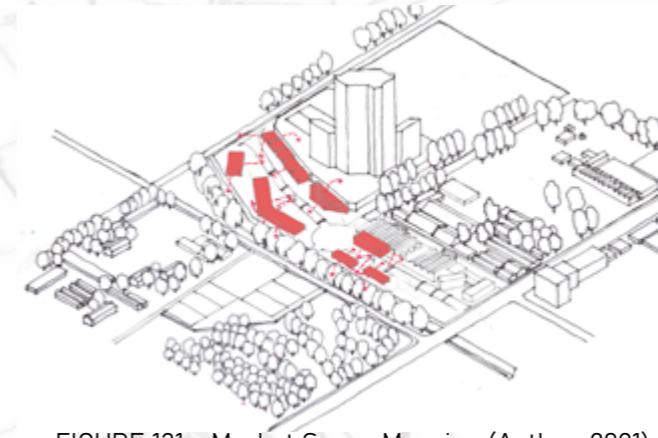


FIGURE 131 - Market Space Massing (Author, 2021)

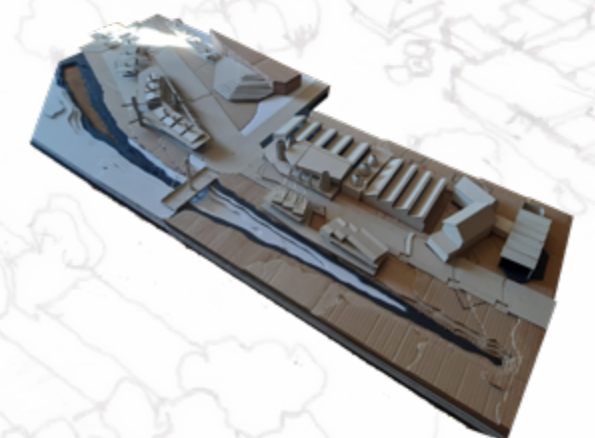


FIGURE 132 - Production Area Massing (Author, 2021)

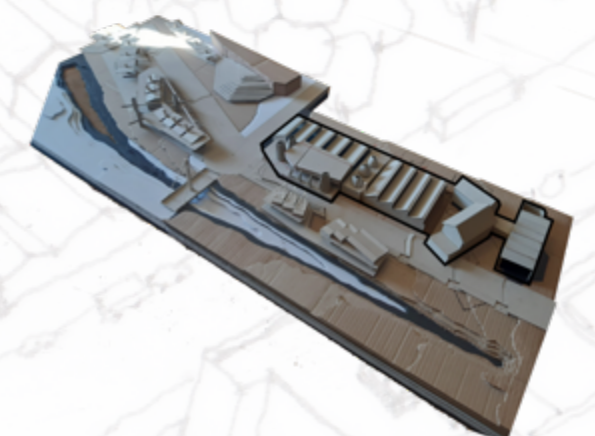


FIGURE 133 -Production Area Massing (Author, 2021)

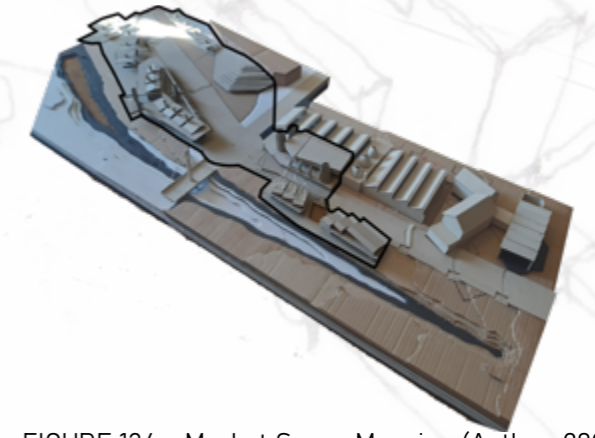
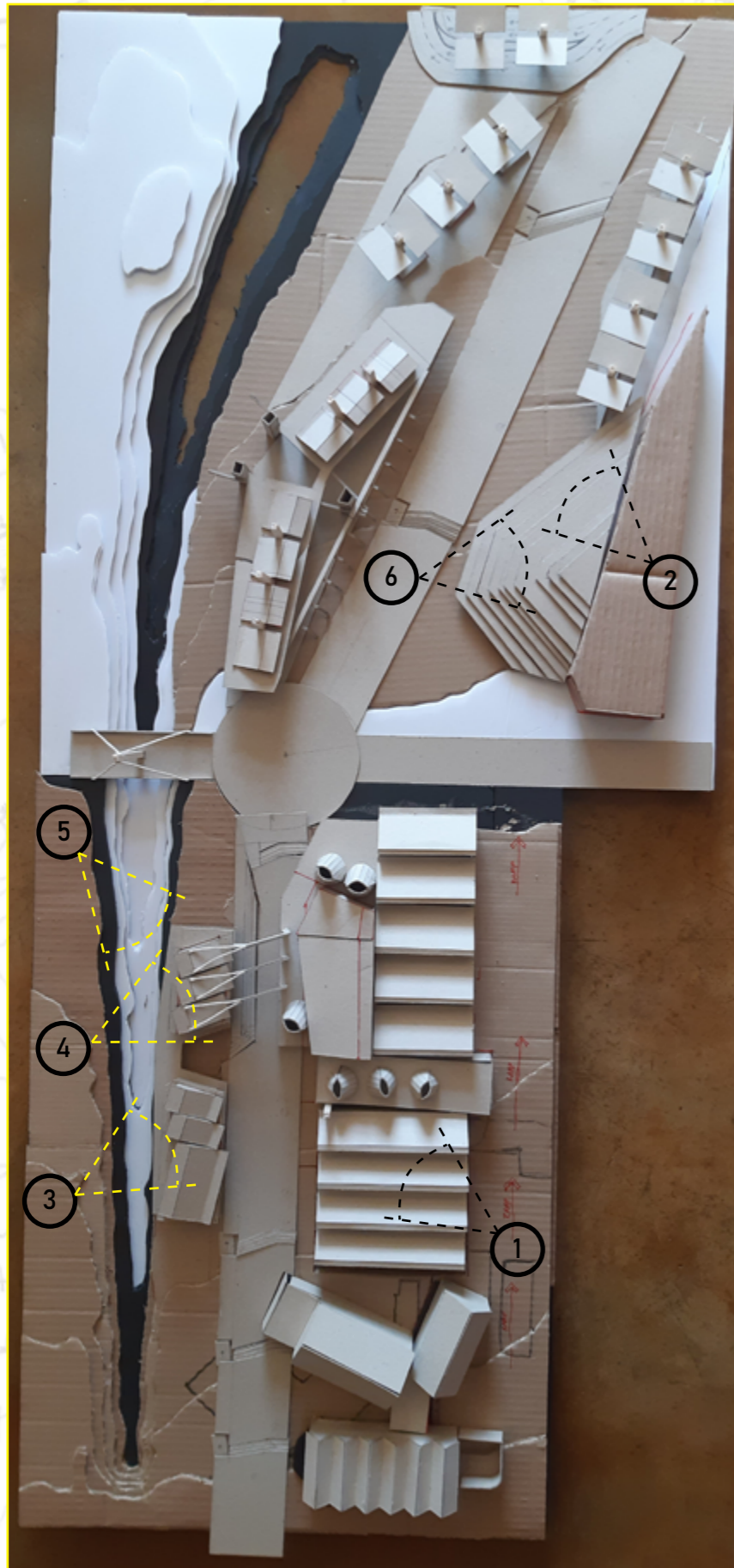


FIGURE 134 - Market Space Massing (Author, 2021)



First Iteration (Author, 2021)



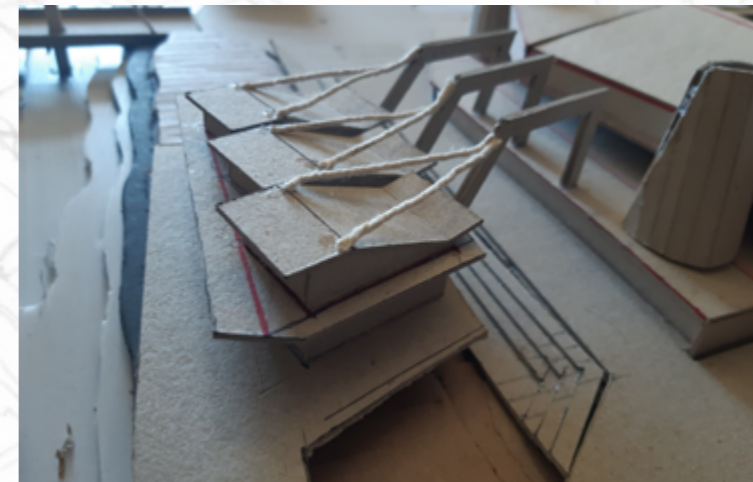
1 Production Area (Author, 2021)



2 Market Space



3 Production Area/Pavilion (Author, 2021)



4 Pavilion (Author, 2021)



5 Pavilion (Author, 2021)



6 Amphitheatre (Author, 2021)

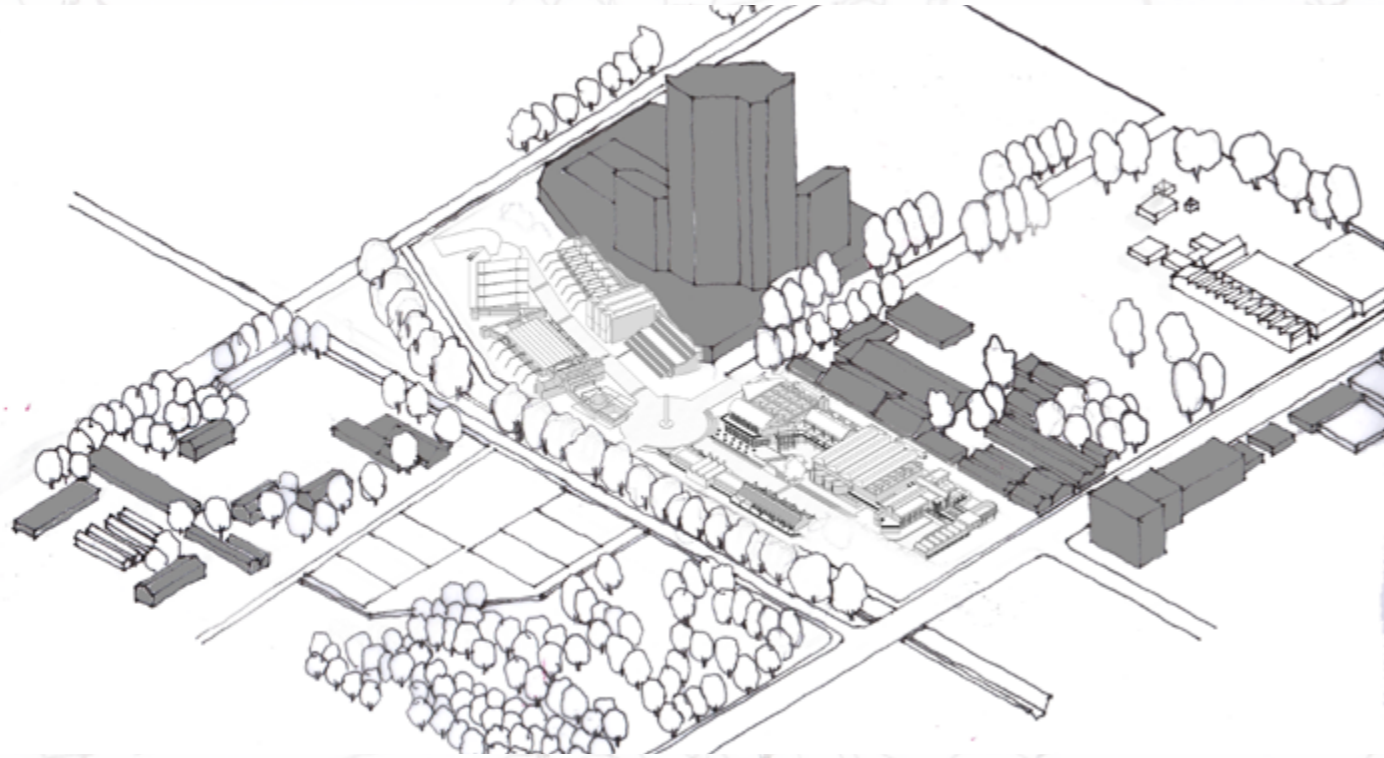


FIGURE 136 - Promenade Axis (Author, 20210)

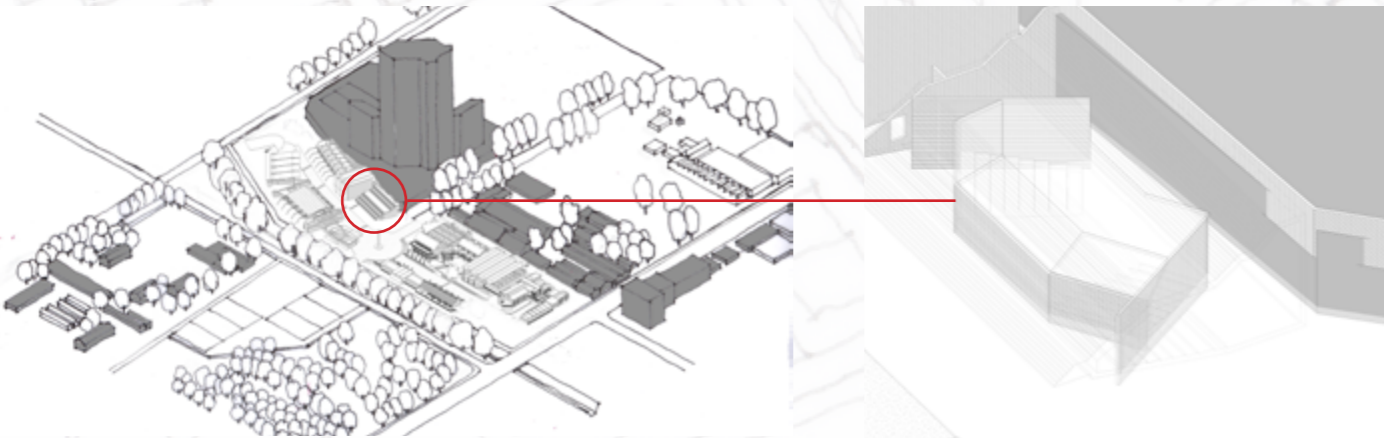


FIGURE 137 - Amphitheatre (Author, 2021)



FIGURE 138 -Amphitheatre (Author, 2021)

6.2.4 Scale Topography

Based on critical regionalist theory – the topos – is one of the main informants of the design, hence the building gradually steps down, mimicking the gradual slope of the site (Figure 139). This was to ensure that the building maintains a relatively low scale massing and height, to avoid imposing on the neighbouring sites, and being disconnected from the cemetery, and neighbouring one storey light industrial buildings on the east (Figure 136). The building had to have a low lying, stretched massing, given the intended connectivity between the production, learning spaces, and civic promenade on ground floor. The design has multiple levels, which are stepped and multiple short ramps allow for seamless universal circulation. The steps are deep, and act as multiple seating in a civic public space, and in conjunction with the

trees, also act as thresholds that define intimate spaces within the larger public space (Figure 138). The design's overall organization is meant to have a constant visual and haptic, and circulation connection with significant natural landmarks such as Princes Park, Heroes Acre cemetery and Steenhoven creek as a key feature for its spatial urban integration and urban experience (Figure 140).

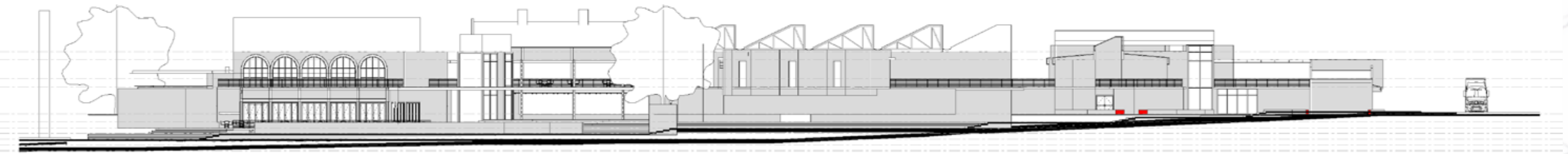


FIGURE 139 - Topography (Author, 2021)

6.2.5 Spatial Continuity

As aforementioned, the intention was to create a visual and haptic connection to significant natural, and built artefacts in and around the site. This is to enable a sense of connection with the surrounding extant fabric, and the architectural and spatial continuum. The space seeks to establish a strong sense of cohesion and place, by utilising axes and datum "lines" that use significant heritage artefacts and spaces as reference points, to create a sym-

biotic, and reciprocal relationship with these heritage sites in terms of engaging, and stimulating the end users. In simple terms, enabling people to enjoy historic places through spatial connection between the existing and new architecture – and thus have a temporal architectural experience when journeying through the site, reinforcing the awareness and relationship of history, heritage and the contemporary architecture.

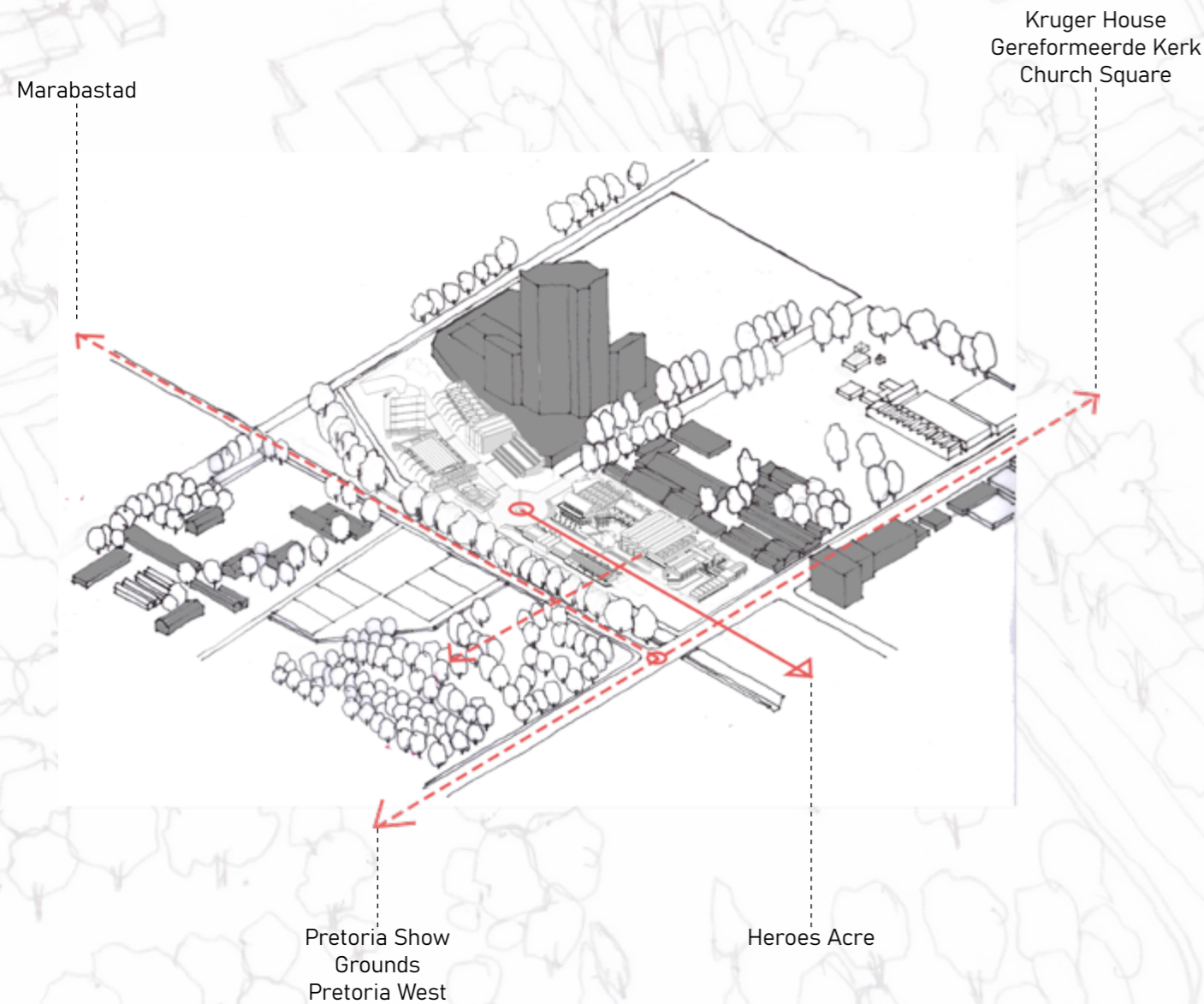


FIGURE 140 –Amphitheatre (Author, 2021)

6.3 Program Layout

6.3.1 Production Layout

The programme of leather production forms the spine of the project, with the movement of product and process (from material receiving to final product) following the longitudinal layout of the site (Figure 142). The attenuated, longitudinal layout of the site is serendipitously ideal for the organization of either a product or process production line layout, as it makes it easy to organize a mass production line. Currently, the building's internal spatial layout is based on a process layout of leather product making. The process entails, firstly, the material receiving office – where the materials are registered and their arrival ratified. The office is positioned close to the loading bays, and has a clear visual connection, this is then followed by the material storage station, requiring deep steel or timber shelves – where the leather sheets are stored before being taken to the cutting tables. The cutting table area is designed to allow ample natural light into the space – as this is the space where the leather sheets are marked and cut. Adjacent to the cutting tables is the laser cutting room, which is defined by a clear curtain walls to allow for easy communication with people in other spaces, and also allow for maximum natural

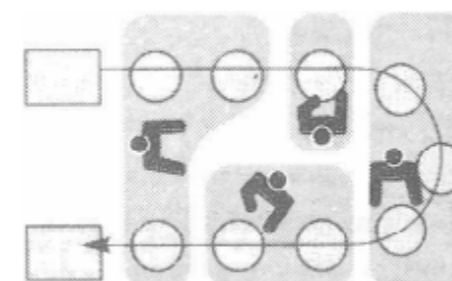
light penetration from all around. The bulk of the space is taken up by the sewing machine stations area, that can accommodate up to one-hundred(100) sewing stations – each taking up 2.5 square meters – that are positioned to follow the process layout – which require a zig-zag layout (Figure 141) which makes communication between different station operators easy as the product moves along the sewing stations. This space is intended to feel least like a factory setting – the intention is to create a space that has a greater visual connection to the soft landscaping outside, thus creating an interior that is experientially more intimate, well lit, comfortable and intimate. A space where the workers do not feel as though they are being watched, which reinforces self-management and collapses toxic power relations between management teams and production workers. The production spaces are wrapped in living walls, where one can smell, see, and even touch the plants and the living walls, which act as a sort of veil that filters ample light into the production floor. This uses biophilic and permaculture principles to improve the spatial experience of the intervention.



(a) Straight line assembly system



Figure 3 – Straight line layout



(b) Cellular assembly system

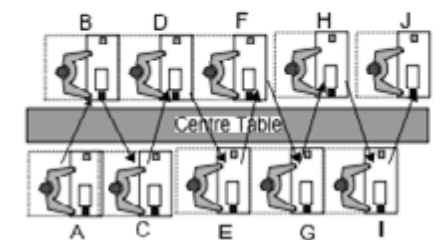


Figure 4 – Zig-Zag layout with the centre table for material handling

FIGURE 141 – Production Layouts (Lanarolle & Ratnayake, 2014)

6.3.2 Types of Production Layouts

Types of Production Layouts. There are a number of possible production layouts that are possible in the production floor.

- ① Stock Entry
- ② Loading Bay
- ③ Storage Shelves
- ④ Cutting Tables & Machines
- ⑤ Sewing Machine Starting Point
- ⑥ Shoe Forming
- ⑦ Shoe Assembly
- ⑧ Quality Control
- ⑨ Packaging
- ⑩ Loading Bay

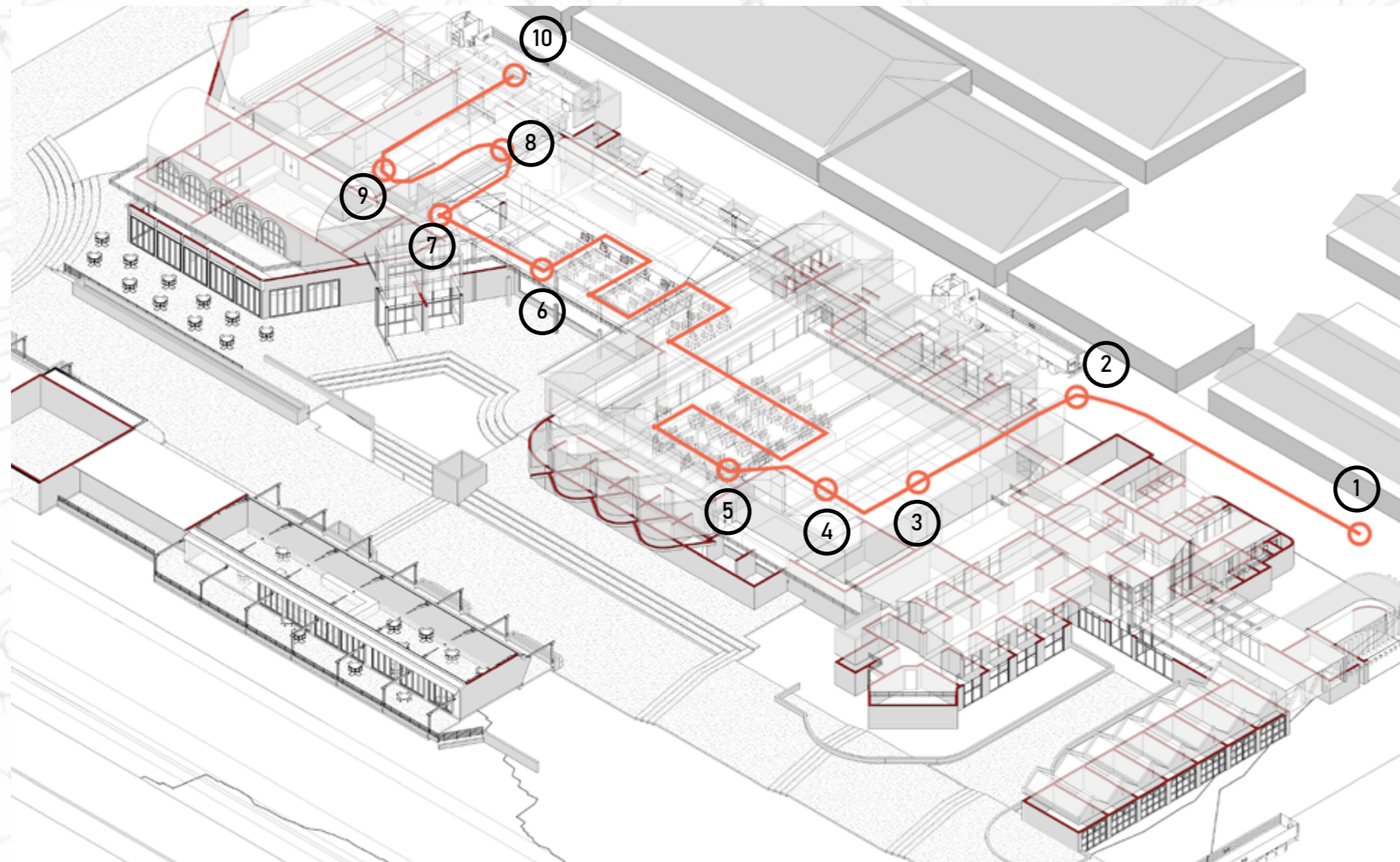


FIGURE 142 - Production Layout in Proposal (Author, 2021)

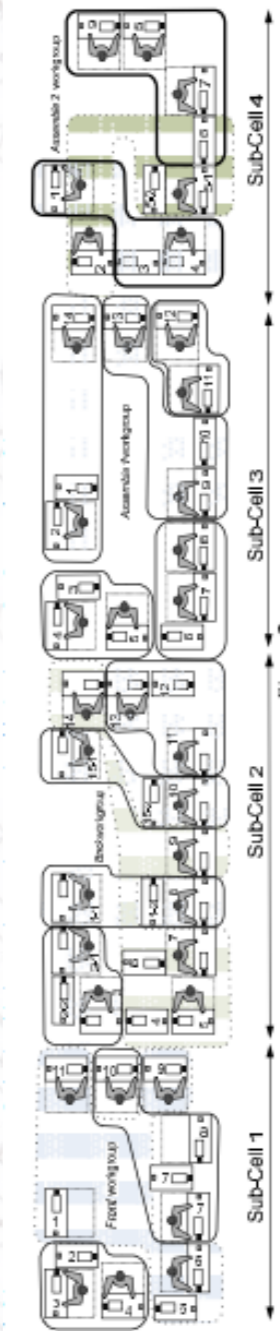


Figure 2

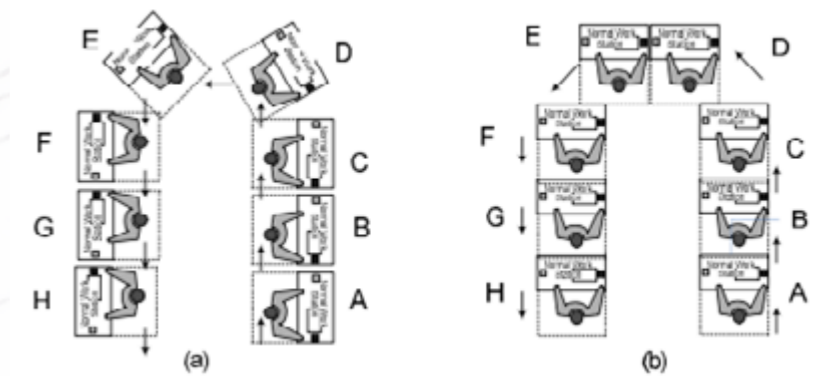
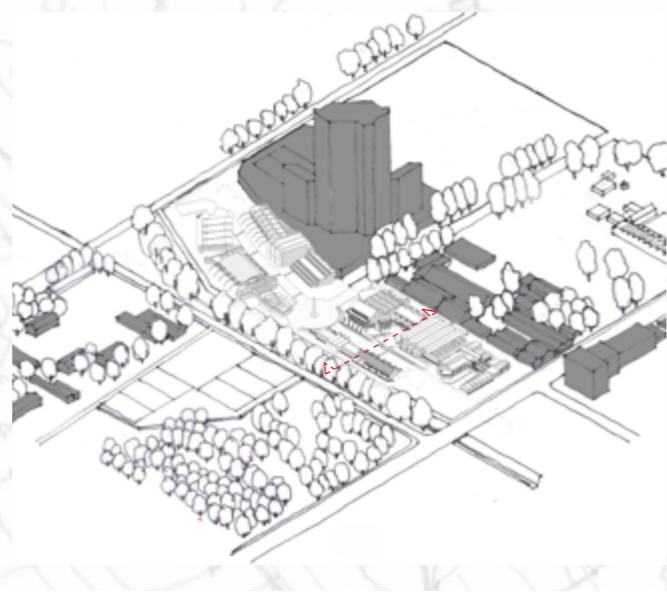


FIGURE 143 - Production Layouts (Lanarolle & Ratnayake, 2014)

6.3.3 Social Pavilion

The staff canteen is placed in close proximity to the promenade, in order to draw and enable an exchange of social energy, and have the two spaces spill-over to a pavilion cantilevered on the eastern bank of the creek (Figure 144) – creating a stronger sense of spatial connection and continuity between the production space, promenade and the creek. Sonic connection between the promenade and the production space is kept to a minimum to ensure that the promenade’s relative busyness does not intrude on the communication inside the production space (Figure 145) (SOUND ABSORBING MATERIALS ARE USED INSIDE AND OUTSIDE/ THE AMBIENT NOISE IS FROM PEOPLE TALKING, CARS, AND PEOPLE TALKING) – meaning openable windows are not placed on the eastern façade of the production building, relegating the passive ventilation to the roof of the building. Pavilion spaces are positioned along the promenade’s eastern edge to create a journey and discovery itinerary – as the user moves along the promenade, moments and space of discovery appear and disappear between the promenade and creek. The spatial organization is intended to enable a youthful culture to liven up the critical points of the promenade – by

distributing related and youth oriented programs such as designing, learning, socializing, and recreation evenly across the site. This ensures that people will constantly populate and animate the site on any given day, given the casual, mundane, and everyday activities such as buying bread, having lunch, grabbing a beer, meeting friends, walking dogs, waiting for the bus, studying, playing, etc. accommodated on the site, which also renders the space pleasant, and safe, with a high level of passive surveillance, which is vital to human physical and psychological wellbeing.



6.3.4 Biophilia

The intention is to allow both the workers in the factory and the general public to be able to enjoy the creek – for its “biophilic” benefits, i.e. the sound of running water, cooling effect, rich biodiversity, etc. This intention is the prime reason why all the social, resting, entertainment, and retail spaces are set close to the river bank (Figure 146), so as to foster a closer relationship with the surrounding community, and ultimately elicit a sense of ownership and stewardship towards the creek – as it is currently severely ill-maintained. This is highly important as the communities around the creek are the custodians whose attitude and intention will affect the creek, whence if recreational spaces are set close to it, this will

initiate an attitude of care towards the creek. The production spaces are set on the interior part of the site, but are intended to feel open, and airy. The introduction of soft landscaping closer to the production space, especially in the courtyard space (Figure 147), allows blue collar workers to have haptic access to a natural environment that softens the hardness/clinical nature of the interior production space. As you move to the northern part of the site, the space opens up to allow for a more lively space that can accommodate a number of “events” of varying sizes, and intensity. The space gives more access to outside space, with the presence of an amphitheatre, auditorium, art gallery, and market space.

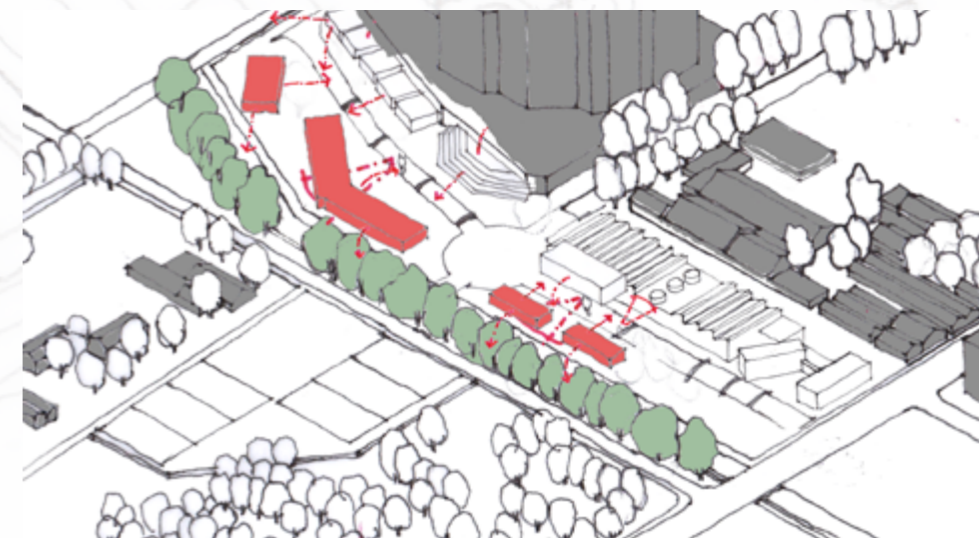


FIGURE 146 - Pavilion - Creek Connection (Author, 2021)

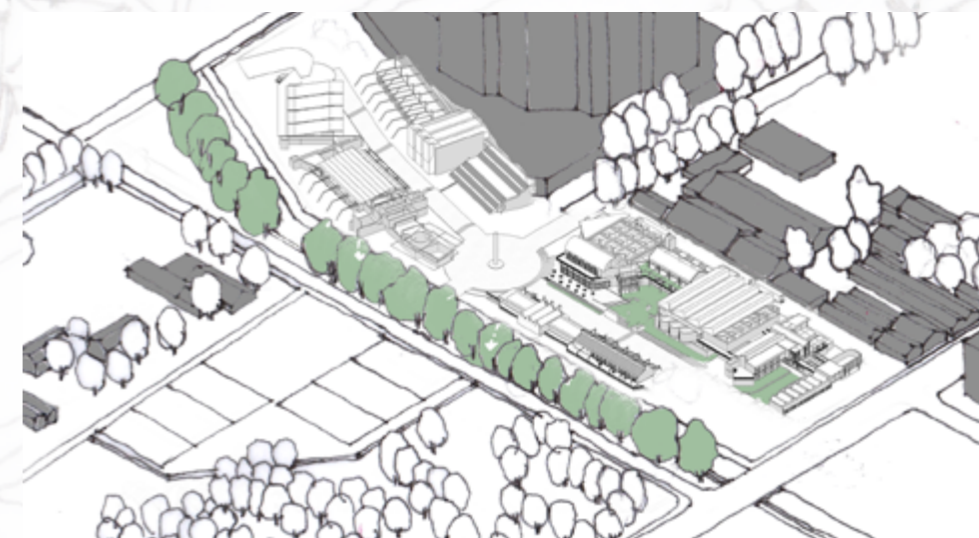


FIGURE 147 - Courtyard Landscaping (Author, 2021)

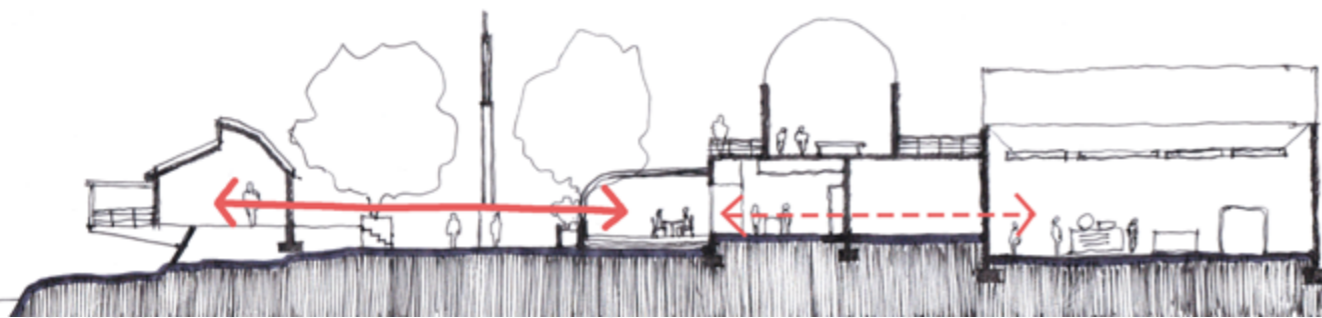


FIGURE 144 - Connectivity between Spaces (Author, 2021)

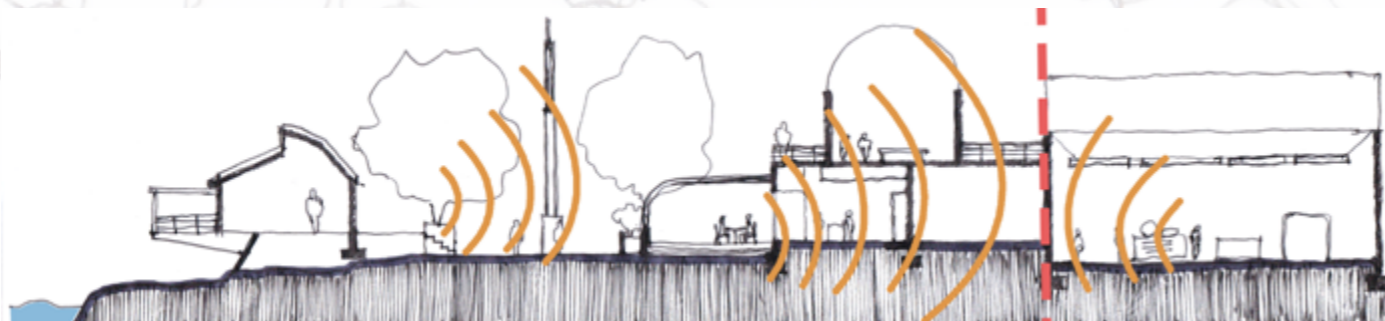


FIGURE 145 - Barriers between Spaces (Author, 2021)

6.3.5 Circulation, Thresholds, Apertures

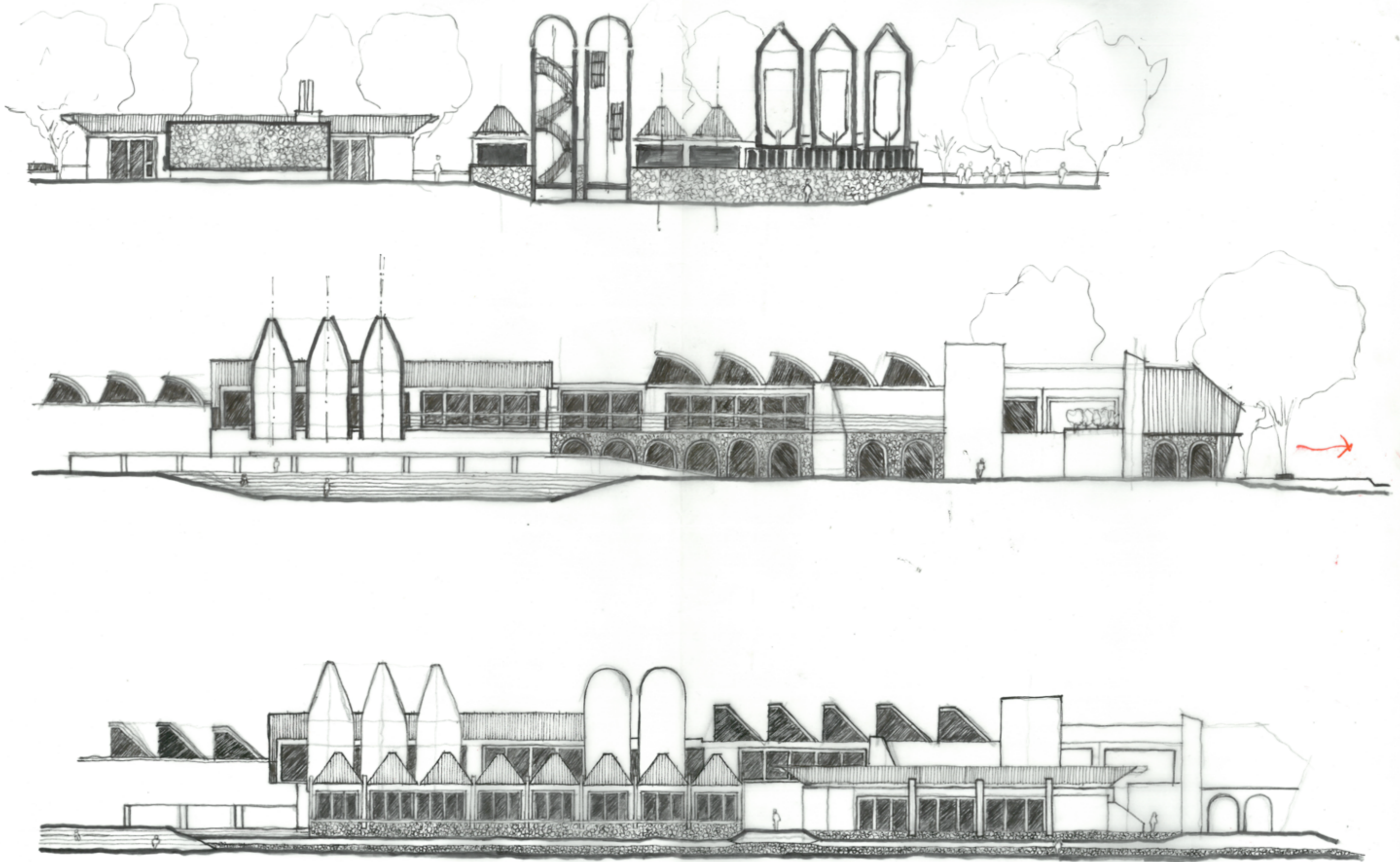


FIGURE 148 - Elevation Development (Author, 2021)

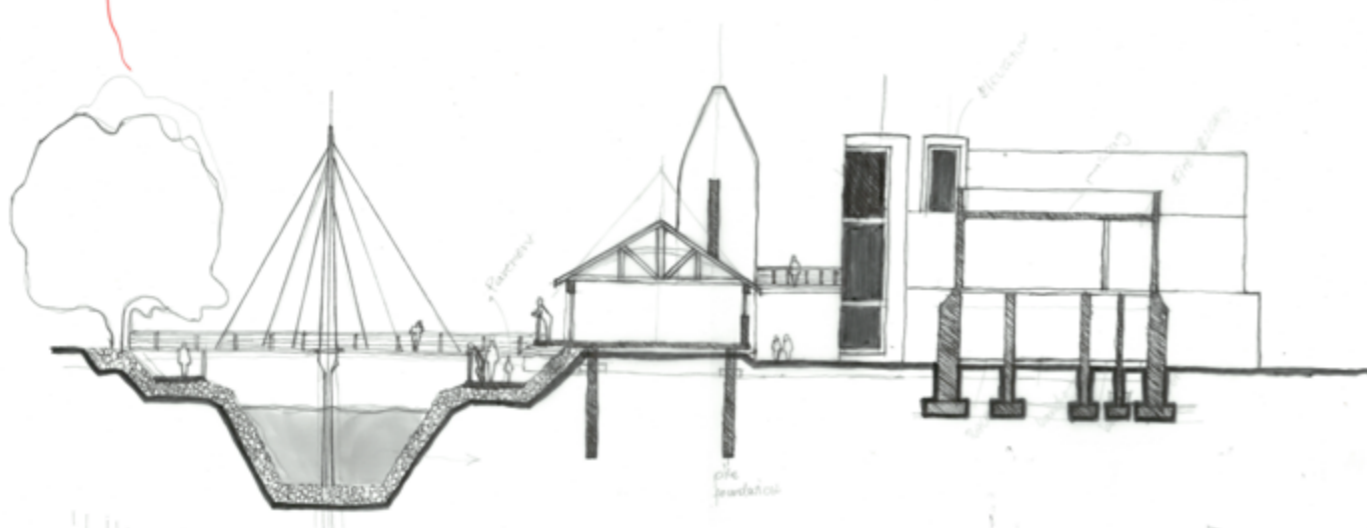


FIGURE 149 - Section Development (Author, 2021)
Exploration of forms derived from indigenous building forms, and vernacular building forms

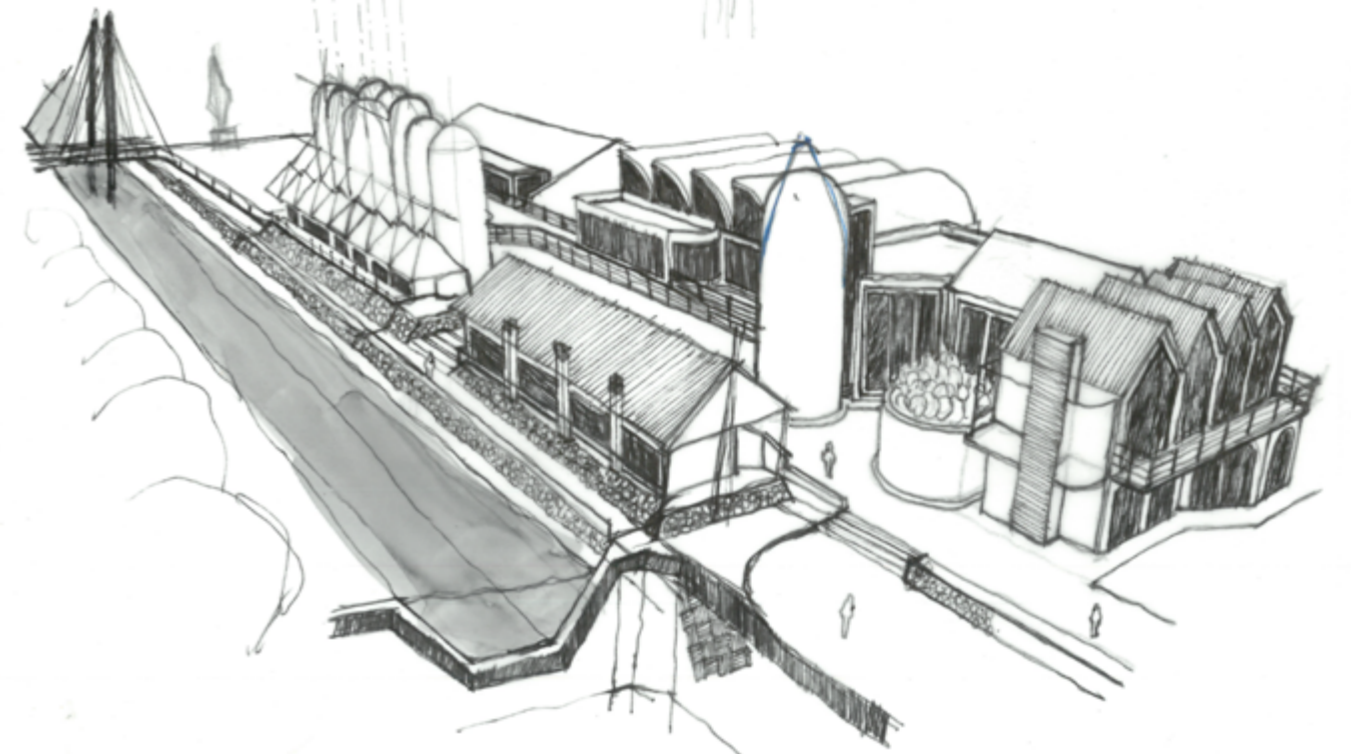


FIGURE 151 - Pedestrian Circulation (Author, 2021)
Developing formal cohesion between different forms in the overall structure

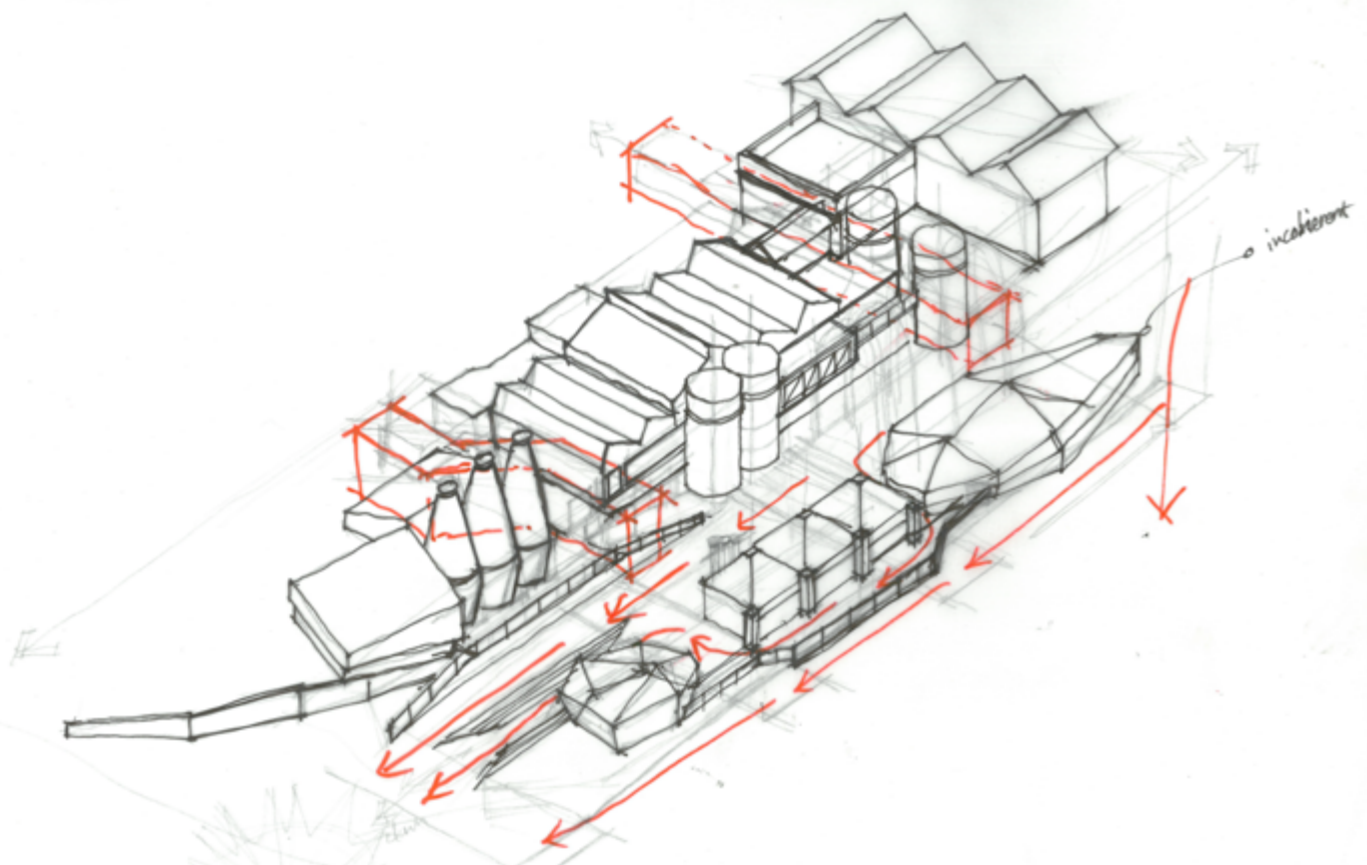


FIGURE 150 - Pedestrian Circulation (Author, 2021)
The way the public can move in and around the building, interacting with certain spaces along its skin

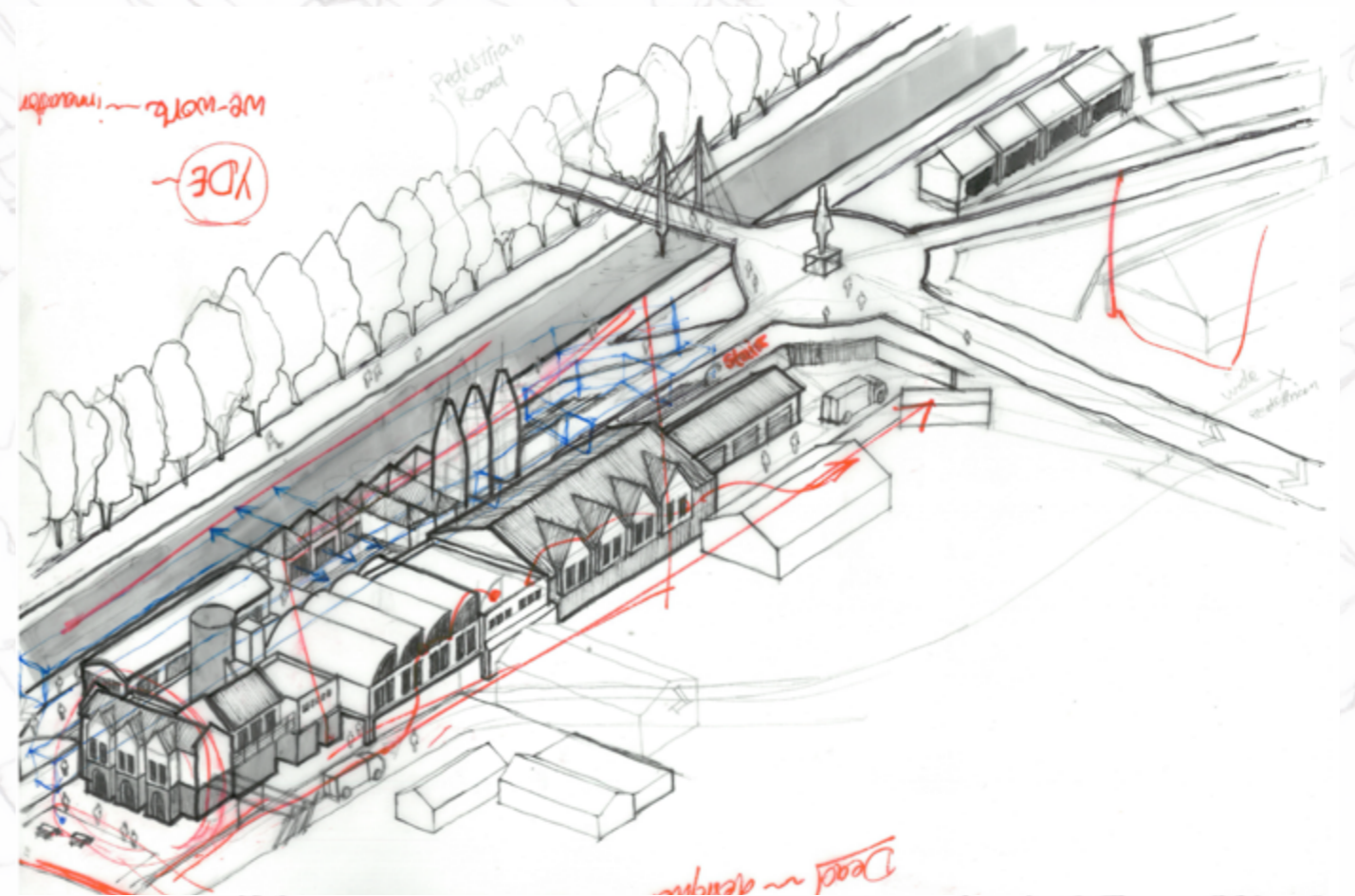
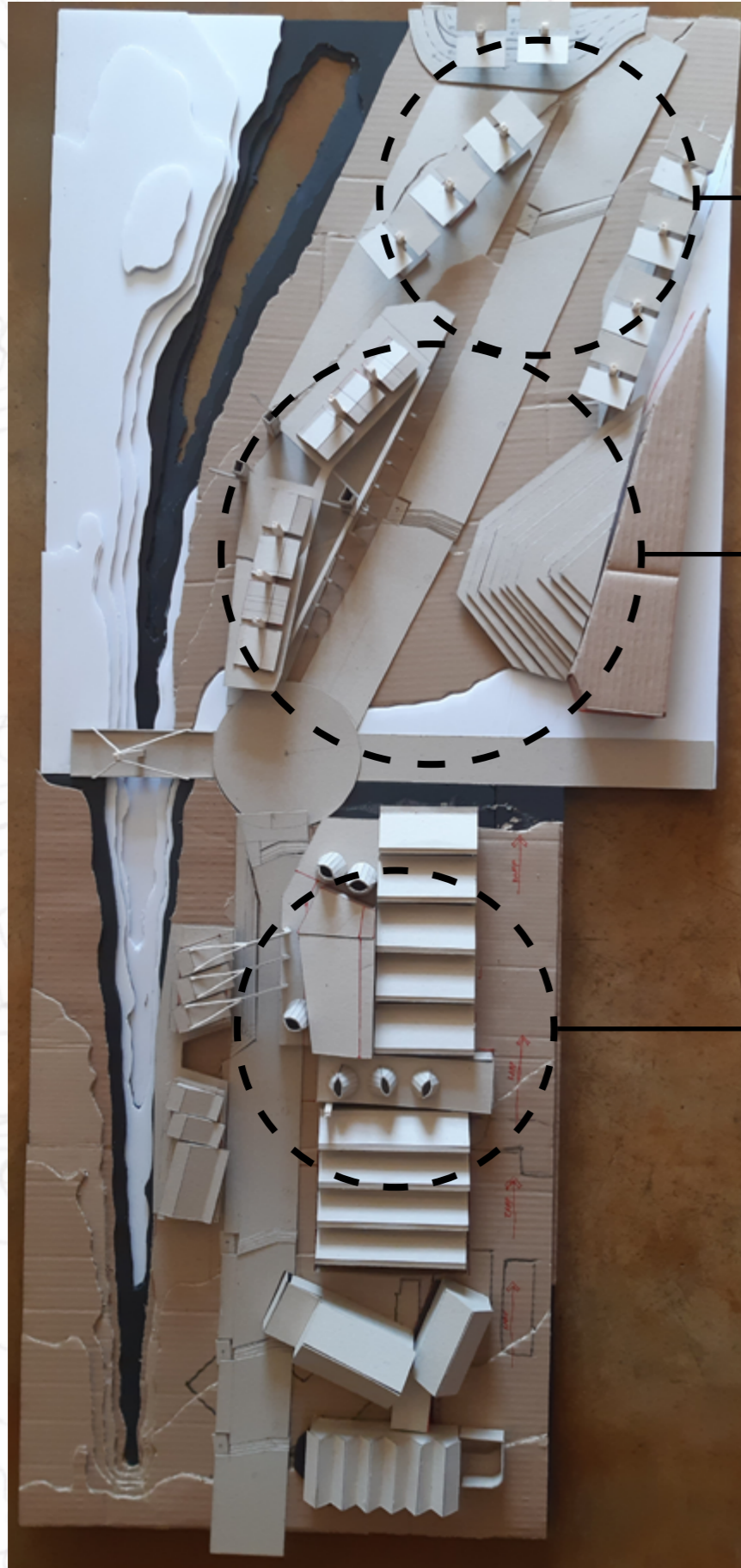


FIGURE 152 - Vehicular Circulation (Author, 2021)
Service Road across the site, indicated in continuous red line



Model - First Iteration

1

Marketspace

The space is order tightly against the promenade, to facilitate a closer, more compact relationship between spaces on both sides of the promenade

2

Brewhouse/Amphitheatre

Amphitheatre is order and tightly packed against promenade, and centred on an axis that connects it visually to the Brewhouse, with a framed vista to the creek

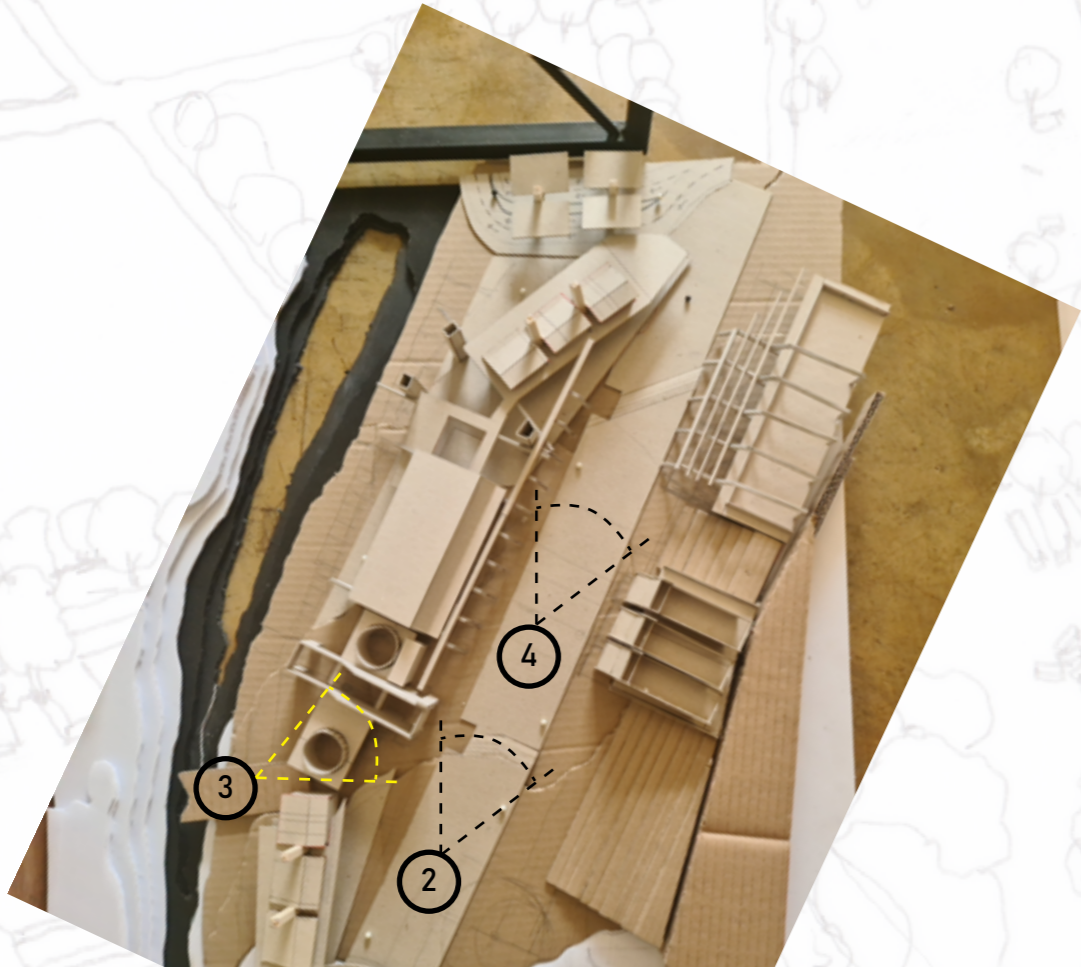
3

Canteen/Courtyard

The building is opened up, to allow for a more breathable spatial configuration, and a smaller footprint, thus defining a courtyard that marks hierarchies space along the promeande better, due to its scale, in relation to other spaces along this side of the promenade



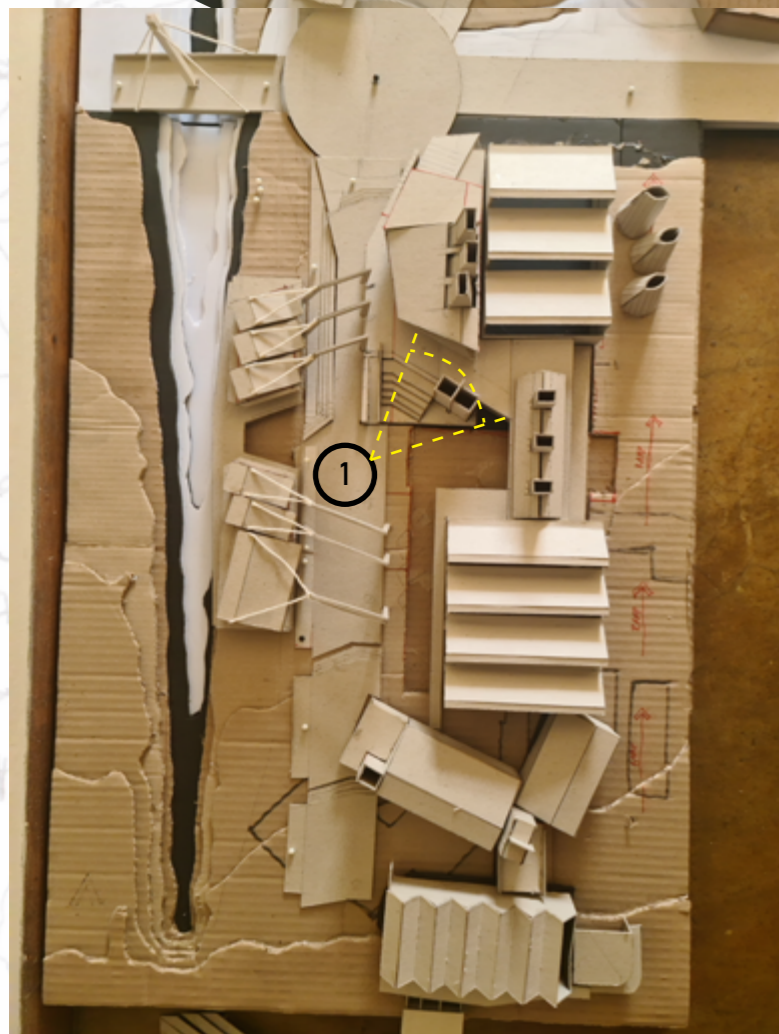
Model - Second Iteration



1 Courtyard



2 Promenade - Market Space



Model - Second Iteration



3 Exhibition Hall/Amphitheatre



4 Marketspace

FIGURE 154 - Physical Models (Design Exploration) (Author, 2021)

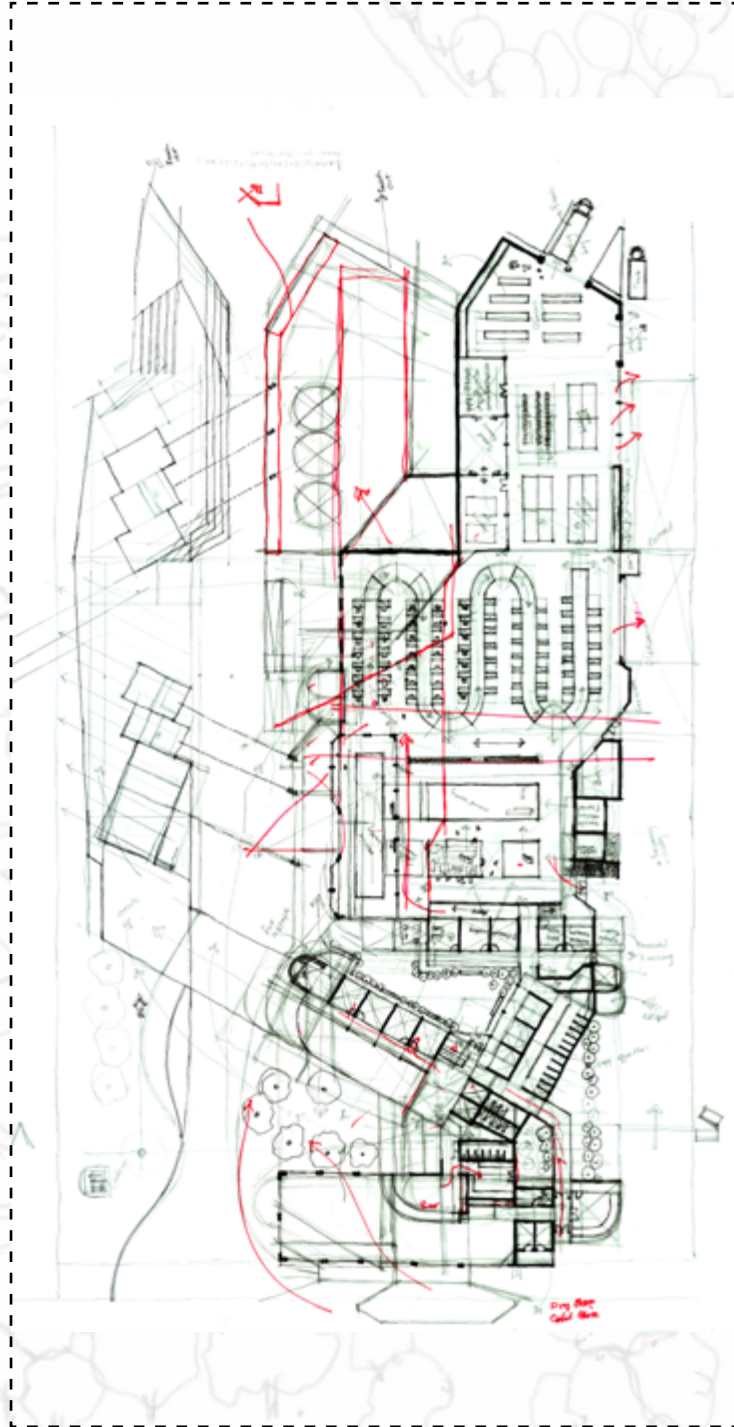


FIGURE 155 - Plan (Design Development) (Author, 2021)

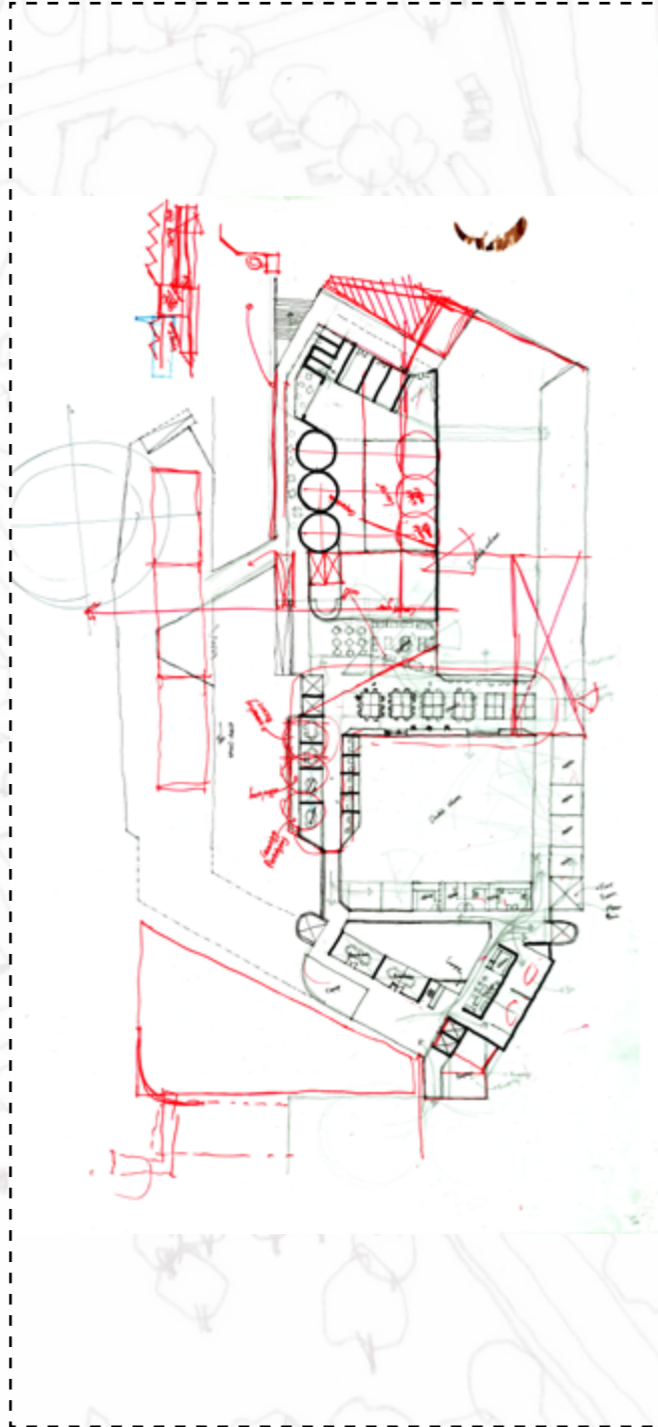


FIGURE 156 -Plan (Design Development) (Author, 2021)

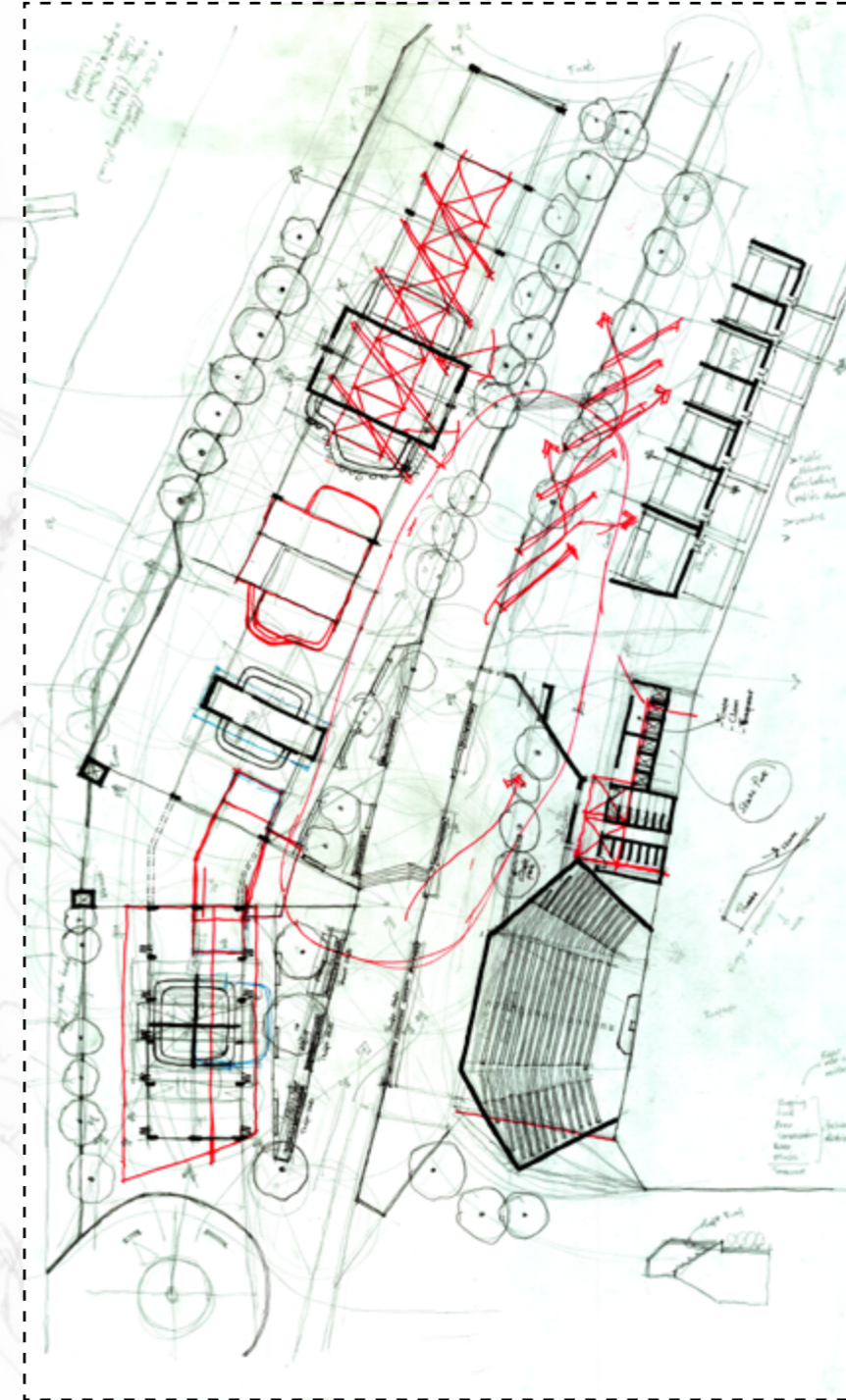


FIGURE 157 - Plan (Design Development) (Author, 2021)

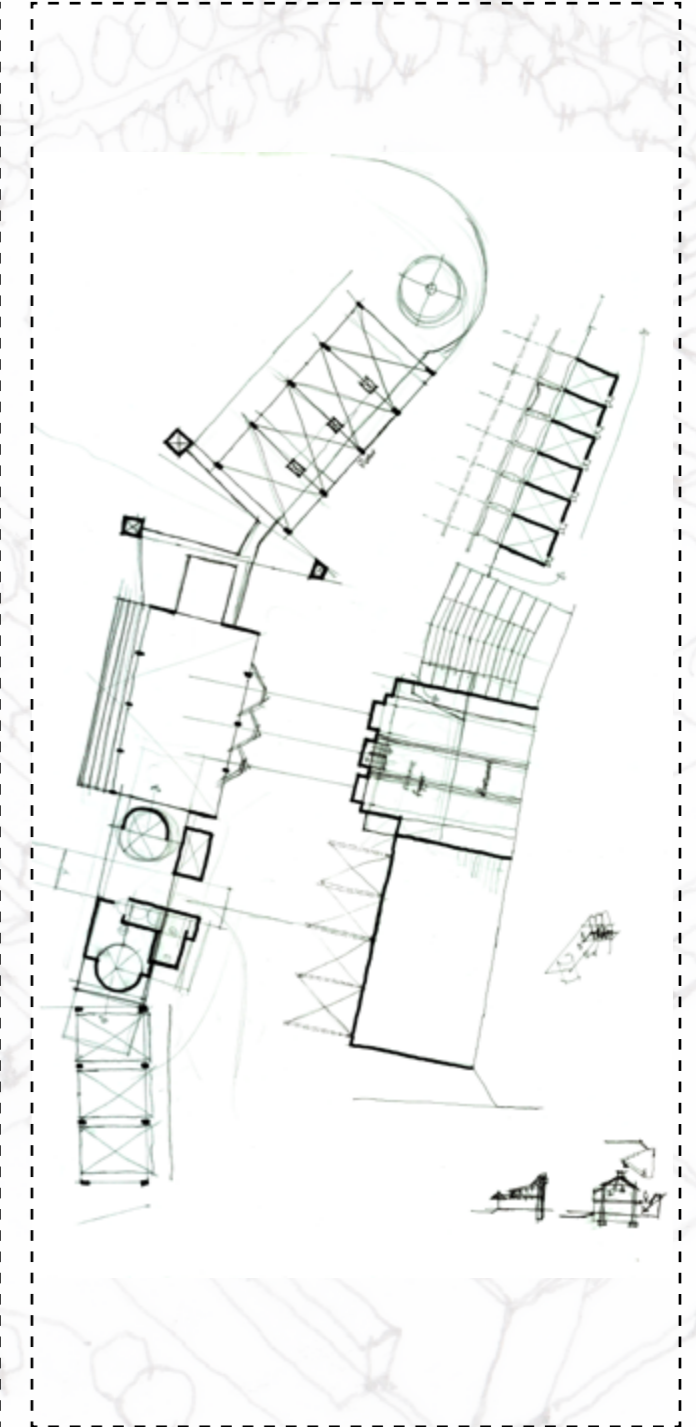
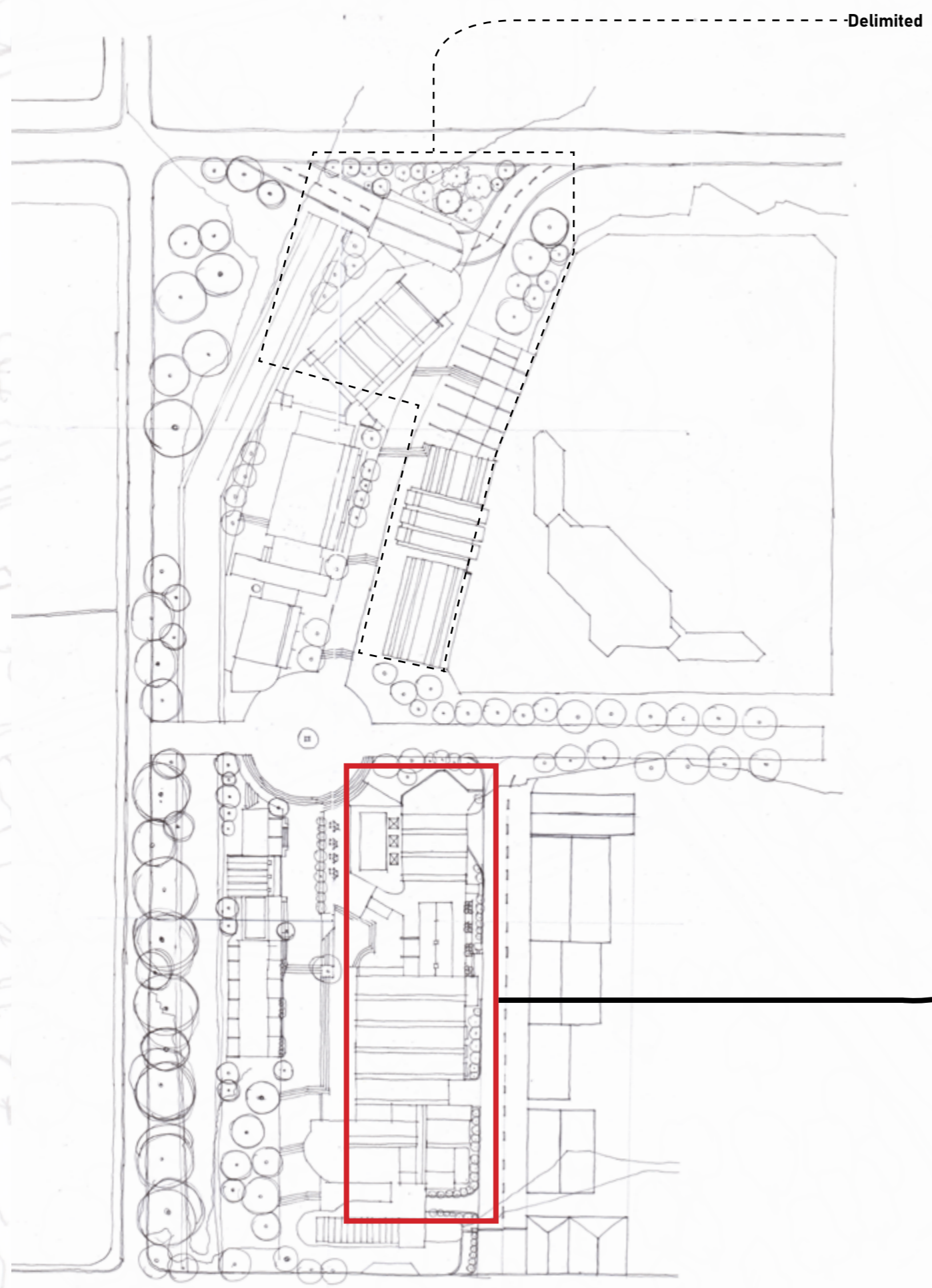
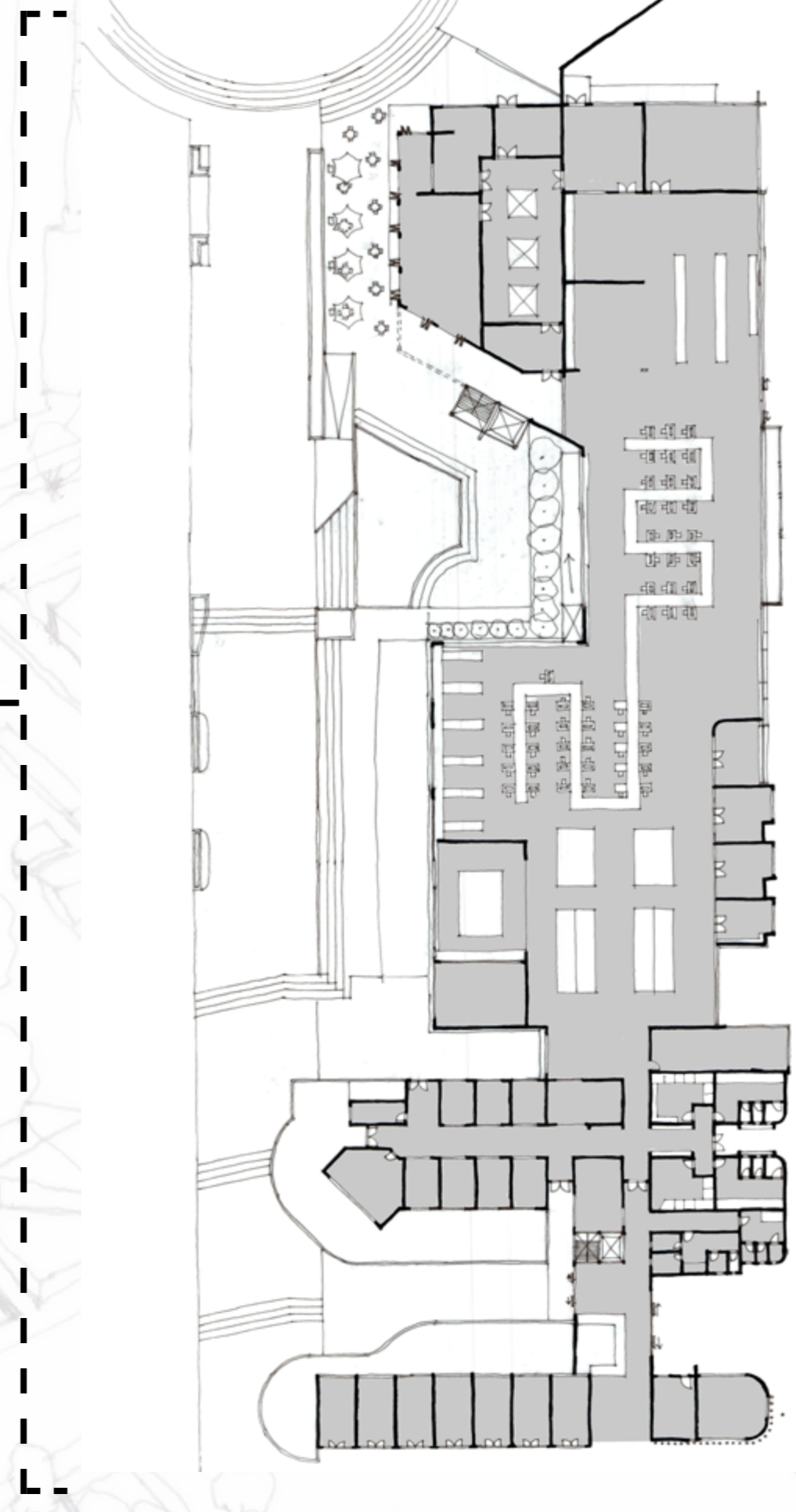


FIGURE 158 - Plan (Design Development) (Author, 2021)

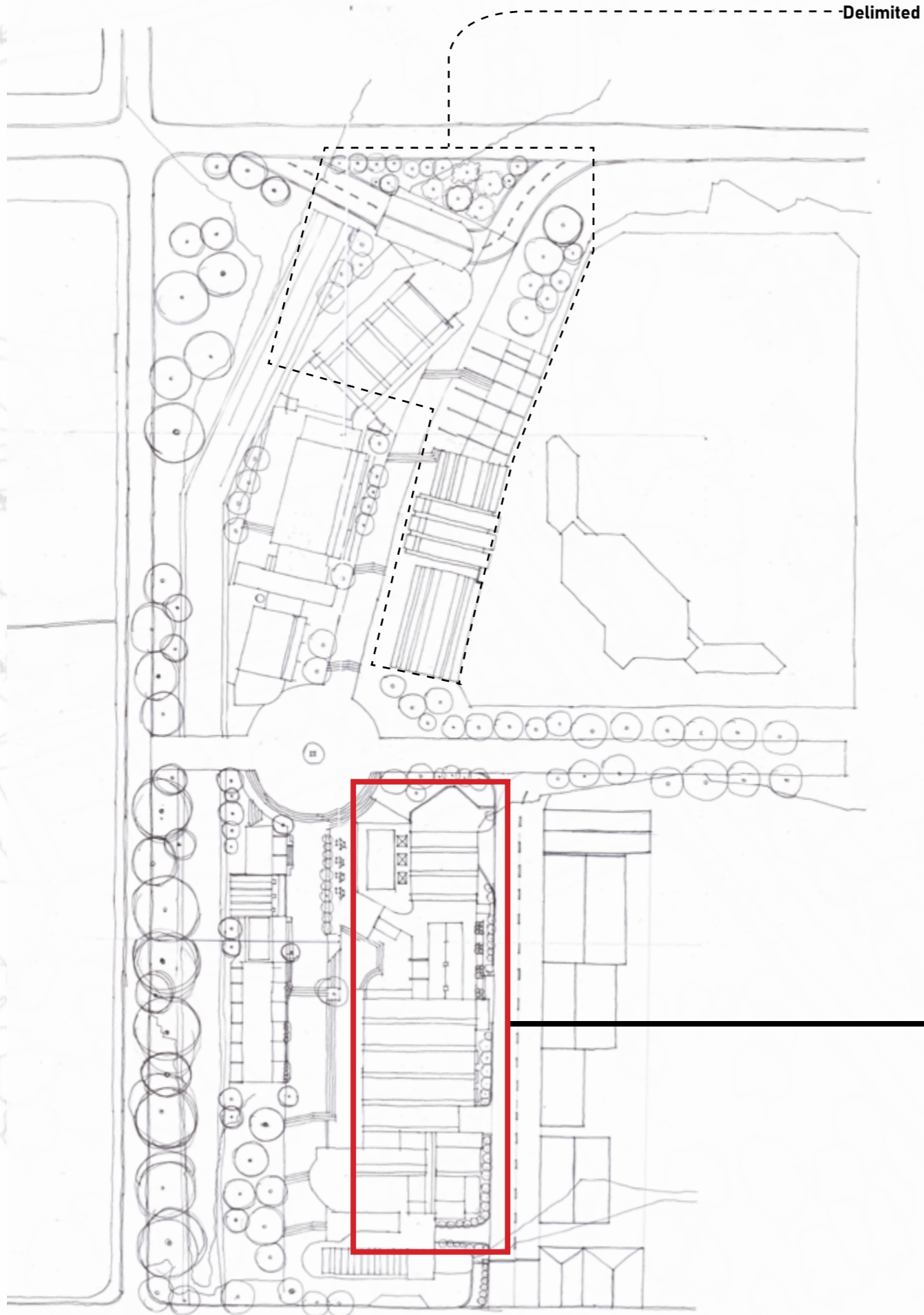
Plan Iterations



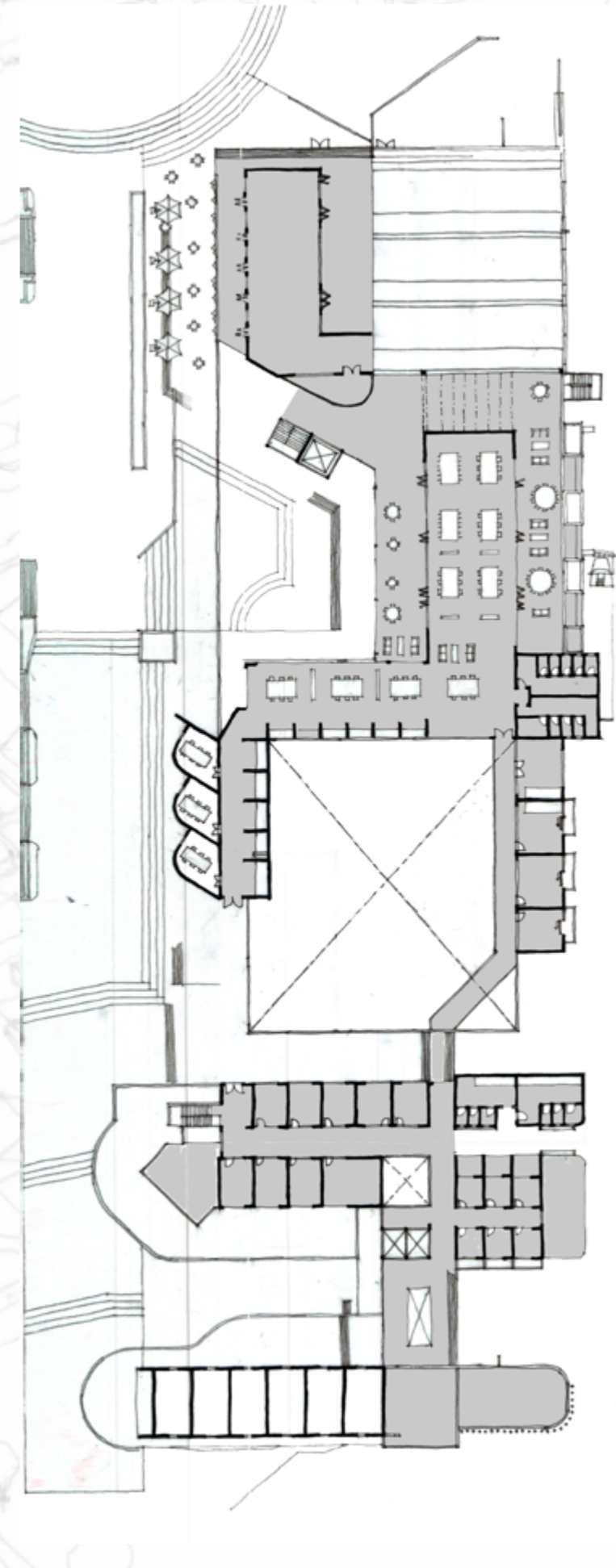
Site Plan



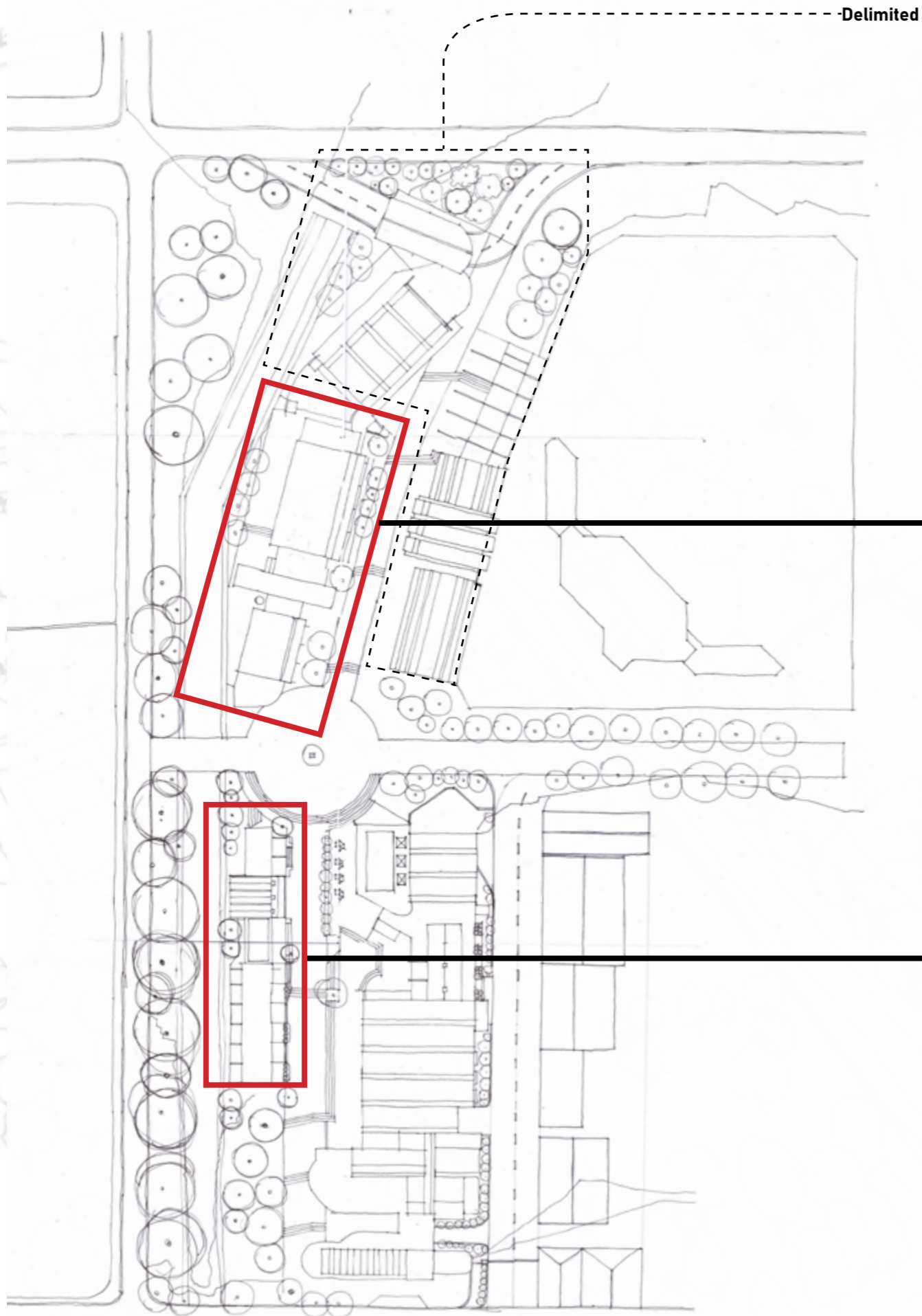
Ground Floor



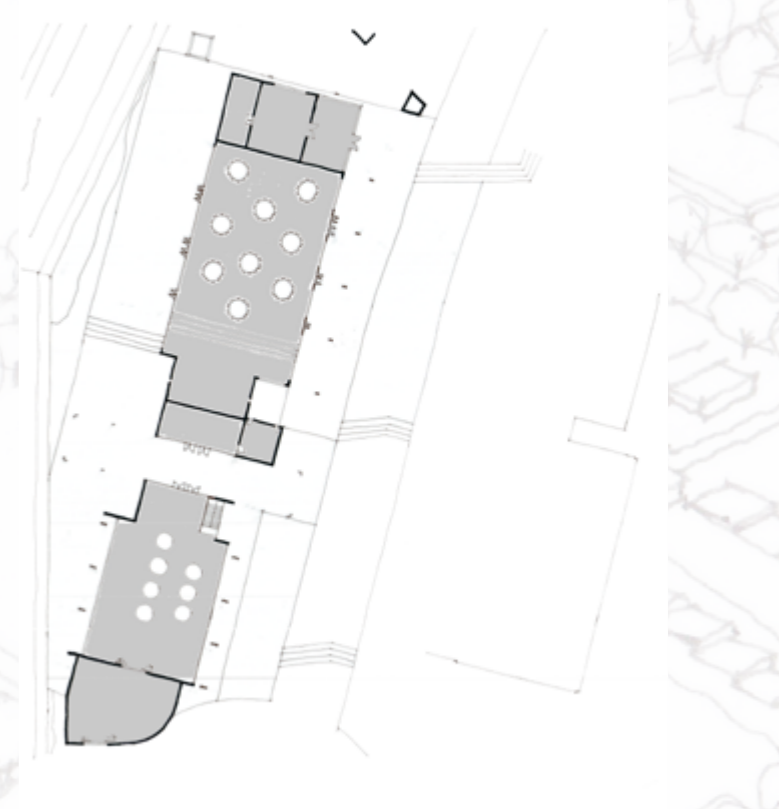
Site Plan (Author, 2021)



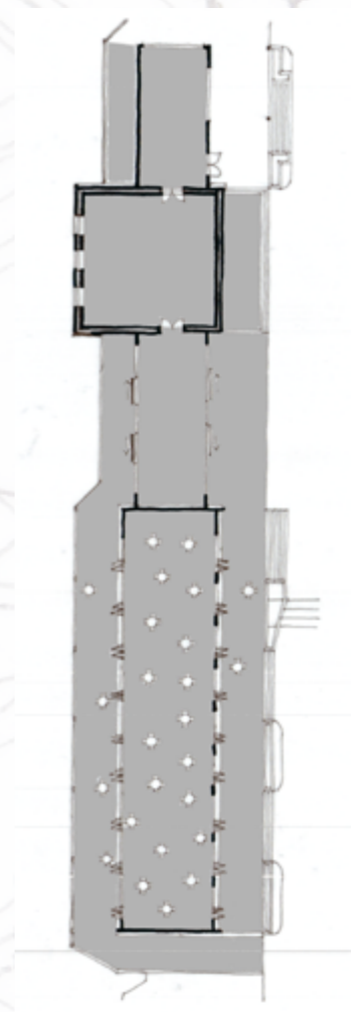
First Floor (Author, 2021)



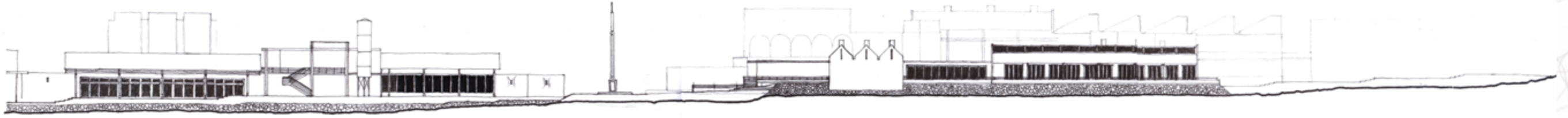
Site Plan (Author, 2021)



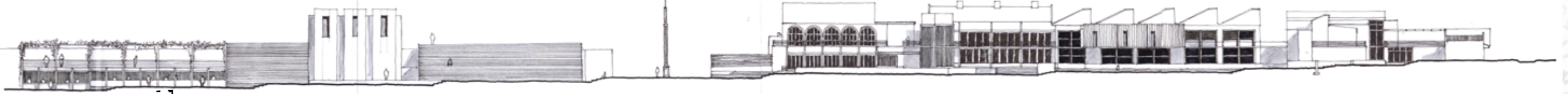
Ground Floor - Brewhouse



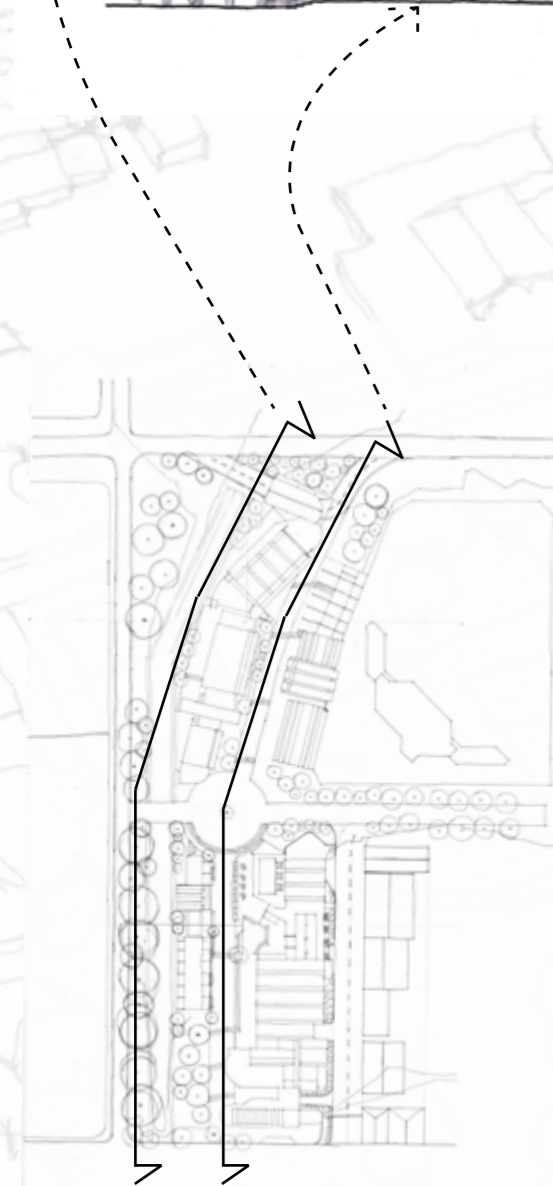
Ground Floor - Pavilion (Author, 2021)



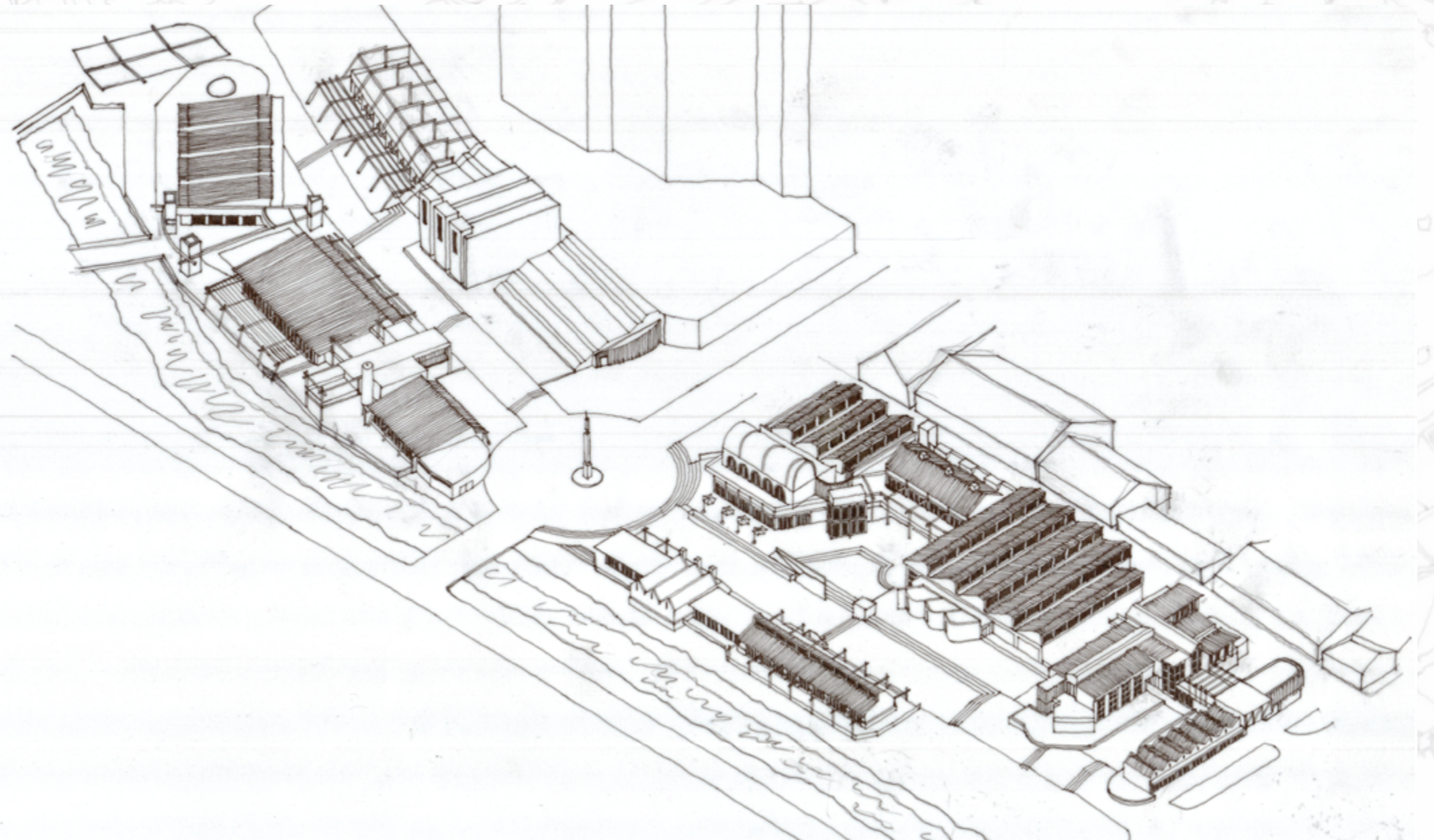
Elevation 1 (Author, 2021)



Elevation 2 (Author, 2021)



Site Plan (Author, 2021)

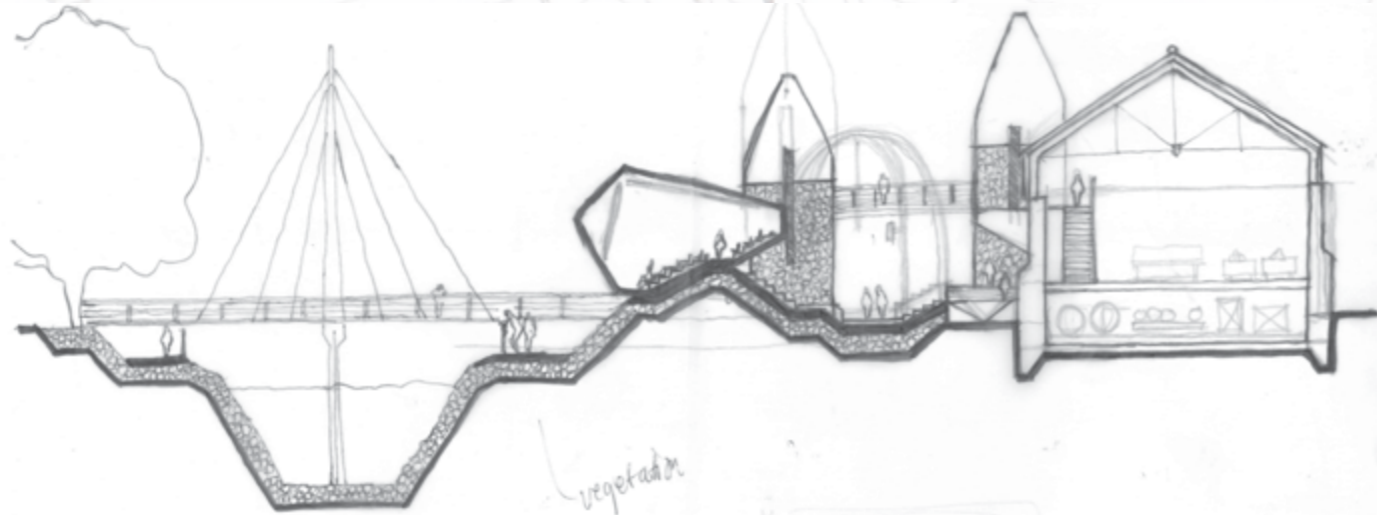


3D Site Plan (Author, 2021)

6.3.6 Climate

The space is designed to minimize overheating of the interior space in the summer, as Pretoria's general climate and the micro climate of the site tend to get to very high temperatures (33 degrees plus). Pretoria sits in an arid biome, which has longer periods of summer than that of winter, and the winters are dry and relatively mild. The interior of the production space has a high volume of six meters, which allows for the vertical dissipation of heat, which is then expelled through the openings in the upright parts of the saw-tooth roofs' fenestration. Using principles of cross ventilation through the use of operable louvres, which can

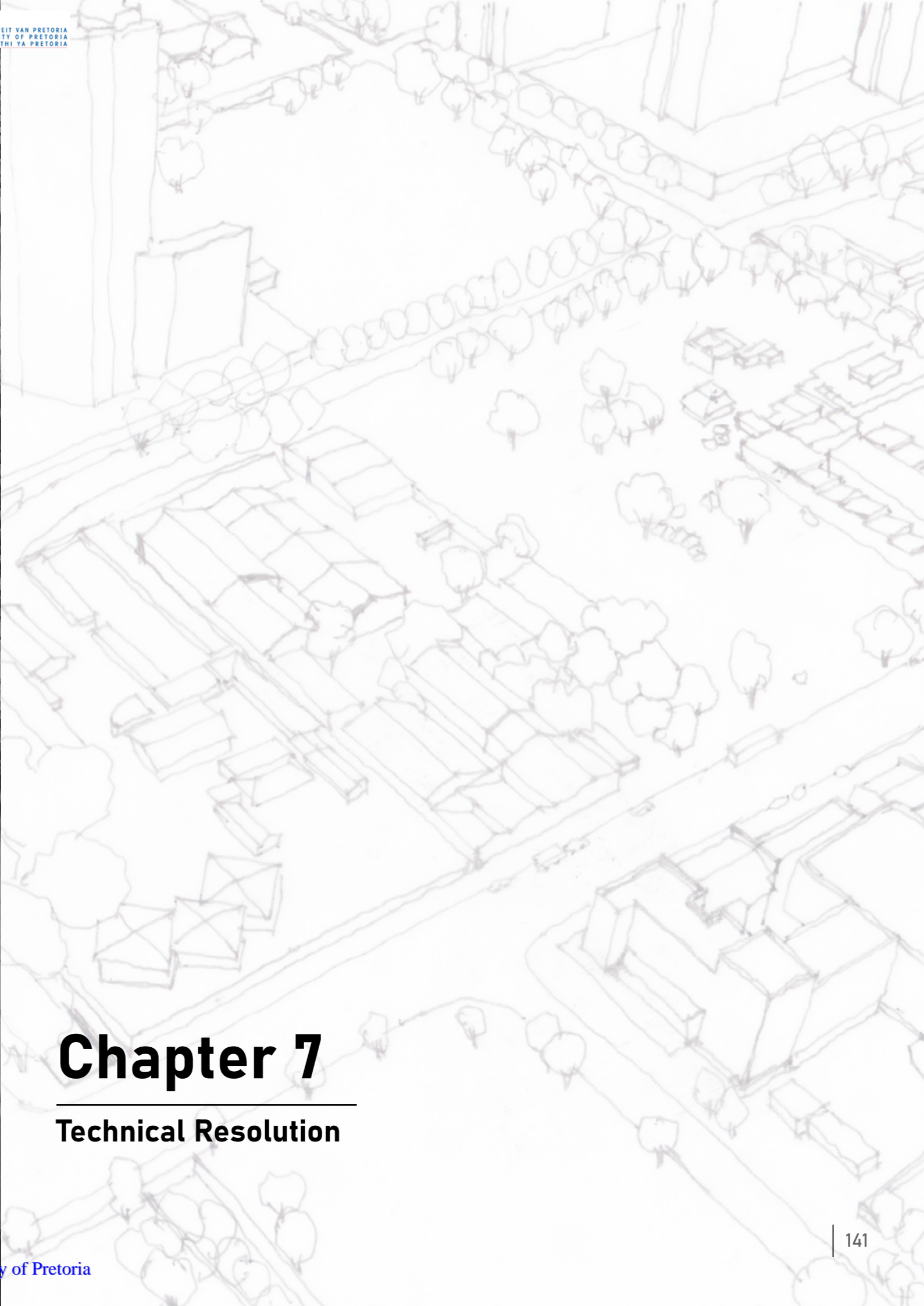
be closed when it is cold or the HVAC system is on. Openable windows on the clerestory part of the saw-tooth roofs allow for cross ventilation and the stack effect to remove the heat (to provide heat load calculations).



6.3.7 Maintenance

The building's forms are intended to enable easy maintenance in the event of damage, that is to say, building parts can be easily found to replace damaged ones. This is to enable the custodians of the building to be able to maintain the building and keep it in good condition, with little need for specialized knowledge that could be costly and illusive. The forms of the building make for relatively easy adaptation of the building, the volumes of the space can accommodate a number of programmes and, es-

pecially multiple industrial programmes that may require floor and wall surfaces that are more robust to abrasion, and those that generate even higher heat loads. The building's volumetric height is sufficient for the most extreme types of light industrial activity. The forms make it easy to construct, and do not require highly special formwork or masonry skills that are beyond the skills found in local tradesmen.



Chapter 7

Technical Resolution

7.1 Introduction

The technical intention of the design is to create a meaningful space that transcends its primary program – which is production, and becomes an architectural space for multiple possibilities. Through its construction, this design is intended to negate the standardized industrial building that is void of architectural intent and meaning, by using relatively low cost, standard building materials that are associated with light industrial buildings, in creative and sophisticated ways. The intention is to construct a light industrial building with a

prototypical approach – even if they are being constructed with standardized materials, so as to ensure that the building is apt for the specific social and ecological systems it shall be negotiating with. The technical intention specifically seeks to add value and celebrate the local vernacular and indigenous building culture, and imbue light industrial buildings with qualities of place, place-making, architectural familiarity, and local identity.

7.1 Technical Precedents

7.1.1 Tectonic Precedent

Name: Unknown
Location: Unknown
Architect: Unknown
Year : Unknown



FIGURE 159 - Truss System (Archdaily, 2021)

FIGURE 160 - Truss System (Archdaily, 2021)

7.1.2 Technology - Materiality Precedents

Name: Angelos Organic Oil Mill
Location: Turkey
Architect: Mirmarla
Year : 2020

Use of Steel, Masonry, & Concrete



FIGURE 161- Landscape Integration (Archdaily, 2020)



FIGURE 162- Landscape Integration (Archdaily, 2020)



FIGURE 163- Steelwork (Archdaily, 2020)

7.2 Production Area

Foundations - The production space is built on raft foundations due to the site's proximity to a creek which has mushy soils.

Primary Super Structure - The building's superstructure is built primarily of a carbon structural steel structure, with brick infill walls, Glass and aluminium curtain walls, with portions of polycarbonate sheeting. The steel structure consists of H columns, which is anchored onto concrete footings, via anchor bolts, which also elevate columns 300mm above ground level, to avoid contact with water, which can cause the steel to corrode. These H columns are braced with steel rods for lateral (sideways support) (IMAGE). lattice steel trusses were selected due to their efficiency, lightweight, and stiffness qualities. This truss system has a high weight to strength ratio, and it spans 34m across the longest span of the production space. The truss has a high load bearing capacity, as it shall support the

gutters, and solar panels. Lattice truss is also a more cost effective solution, compared to a portal frame, as it uses smaller steel sections, subsequently costing less than a portal frame which needs relatively bigger steel section for the required span (REFERENCE).

Secondary Structure - Cold rolled steel lipped channels, act as cross bracing, and support the tertiary steel sheeting materials.

Tertiary Structure - Skin - The skin of the building has two layers, the infill brick and curtain walls, and the metal sheet tectonic walls and shading screens. The shading screens morph into living walls supporting living vines and plants, which are used to filter air that is used as an agent in cross ventilating the production building.

7.3 Pavilion

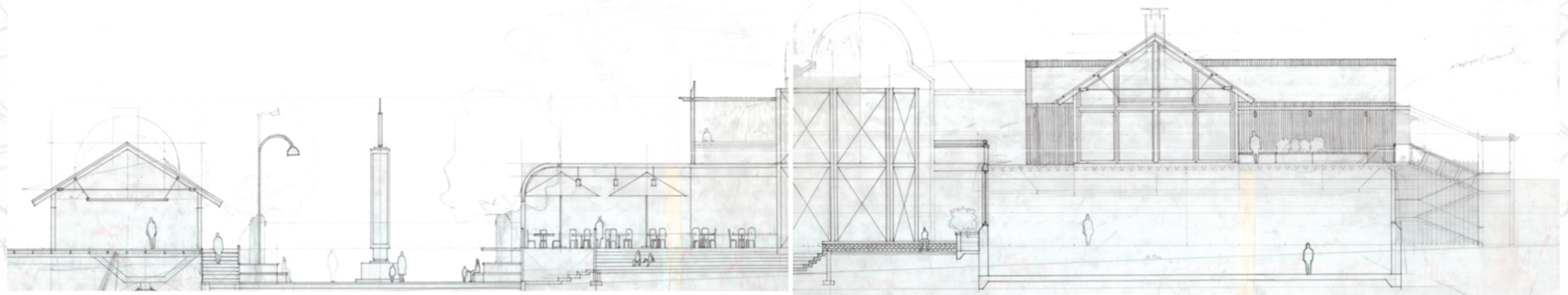
Foundations - The pavilion rests on a concrete raft foundation, which is appropriate for the mushy, clay soils on the banks of the Steenhoven creek. Which is underlain with a damp proof course membrane to deter the penetration of soil ground moisture. This is applied, by first, clearing and levelling the site, then digging the beam trenches at the edges of the floor area, then casting a thin layer of screed as bedding, which then the DPM rests upon, and the concrete is cast on top.

Primary Super Structure - The timber columns are made of laminated timber, and are bolted to steel plates that are welded to intermediary steel plates, which are then bolted to a concrete footing via anchor bolts. This is done to raise the timber truss from any moisture on the ground level, which could possibly discombobulate the adhesive element holding the laminated pieces together. The timber columns are attached to the timber truss above. The timber truss is celebrated and used as a centre-piece in the interior space, to articulate the clerestory above the roof. In the other

parts of the pavilion, the truss is made of thick rafters - depth required for spanning, and is used as an overhead threshold and defining feature of the interior space. Metal sheets are used for the flat roofs.

Secondary Structure - the lipped channels, the battens for the roof sheeting.

Tertiary Structure - metal sheets for the roof, and for wall cladding. Polycarbonate sheeting for wall cladding. Operable louvers are used as part of the walling system.



Pavilion/Promenade

Production Area



7.4 Materiality & Light

7.4.1 Materiality Continuity

The materials are selected for their meaning and value to gradually continuing the material fabric of the existing buildings, and reinforcing a material sense of continuity and coherence, which contributes to reinforcing a sense of place, via the materials' familiarity.

7.4.2 Recycled Materials

Recycled materials are prioritized, to offset the use of virgin materials as far as possible, thereby reducing the embodied energy, though recycling also uses energy, but relatively less than virgin materials, and does not contribute to further usage of non-renewables. Recycled materials such as face-bricks, steel sheeting, steel window frames salvaged from the demolished buildings on site, which are in relatively good conditions are re-used in less intense parts of the building, i.e. low walls. Aged materials are also ideal as they provide an aesthetic that speaks of the contemporary reimagining of aged materials, further

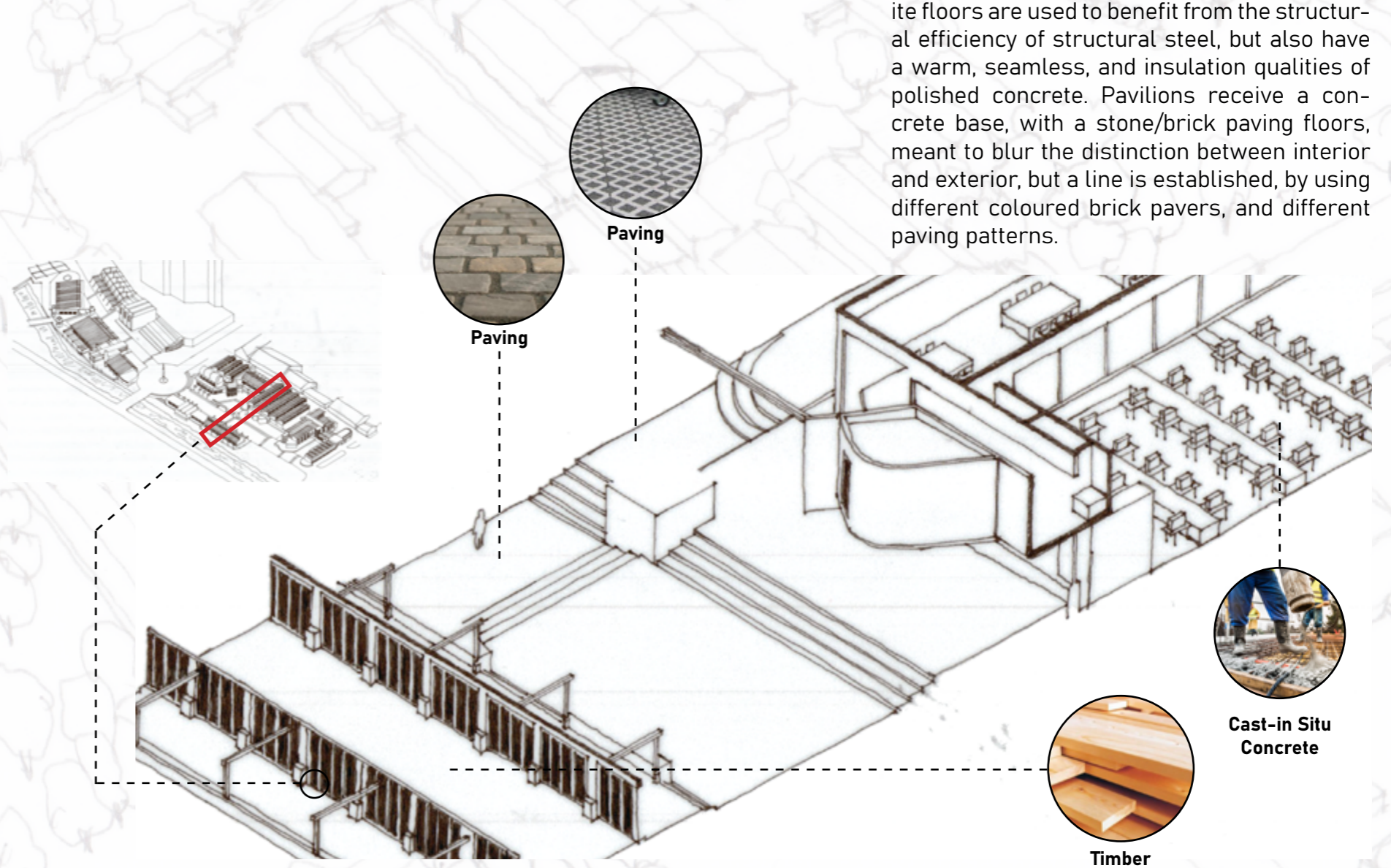
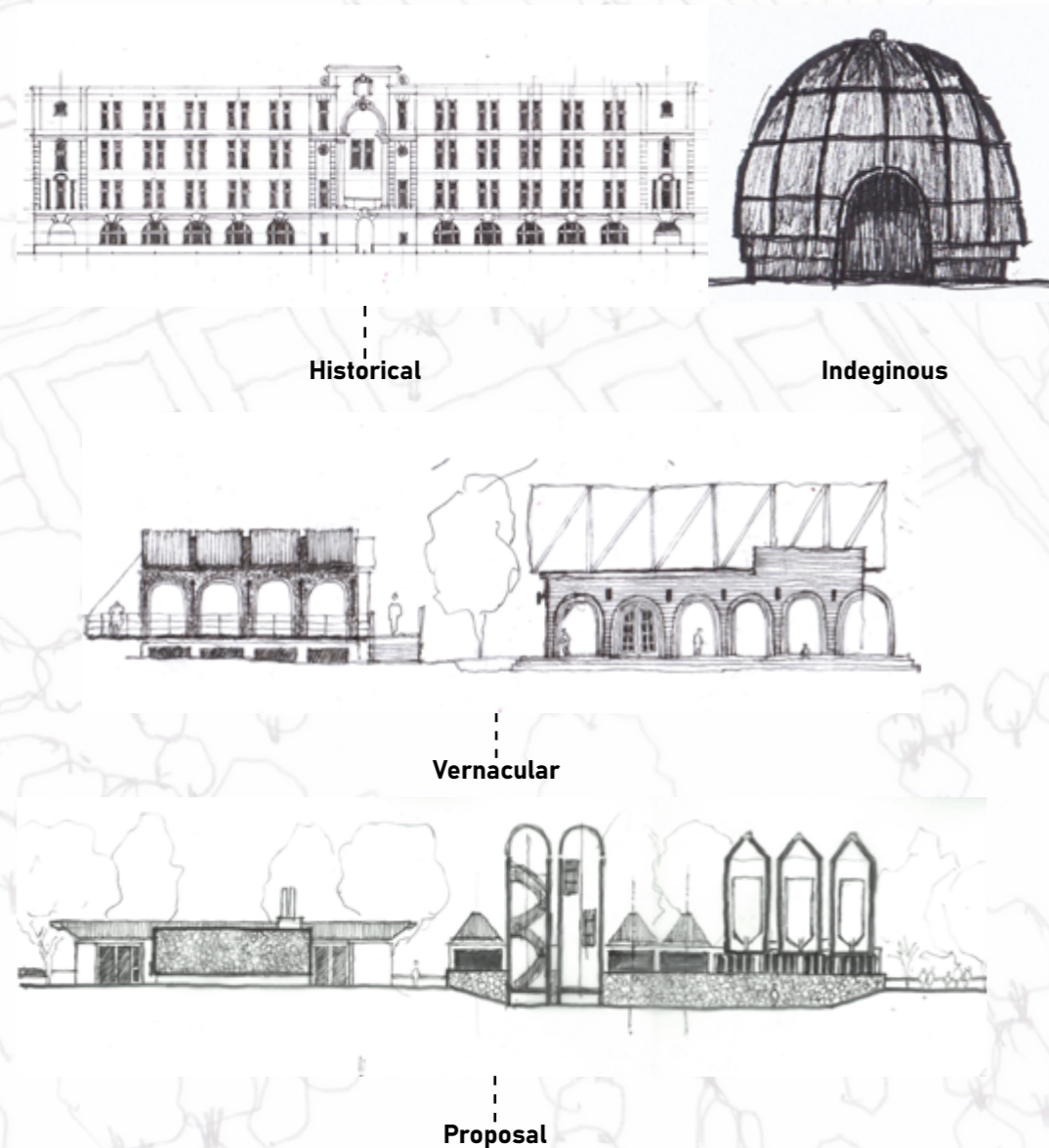
7.4.3 Exterior Floors

reinforcing a sense of belonging and place – as these materials “tell” a story through their very slow deterioration. Bricks are also sustainable, as their constituent materials are easily available, for new production. Bricks are sourced from local manufacturers, who use one hundred percent local materials, equipment and labour to produce the bricks – which benefits the local value chain, and local people around the country. Timber is also sustainable as the type of timber used is sourced through intermediaries who source it from local timber plantations in Limpopo, Mpumalanga, and KZN.

Brick pavers are used, with the paving covering kept to a minimum (PERCENTAGE VS EXPOSED SOIL), to enhance the soil's water catchment area, and reduction of runoff and erosion, to avoid flooding of the creek, with plants also used to reinforce the soil structure. Soil reinforcing concrete elements, such as Loffelstein walls and rock filled gabions, are used to further stabilize the soil, while allowing excess water through.

7.4.4 Interior Floors

Polished Concrete floors in the production area. Composite concrete floor systems for the first floor above the production area. Composite floors are used to benefit from the structural efficiency of structural steel, but also have a warm, seamless, and insulation qualities of polished concrete. Pavilions receive a concrete base, with a stone/brick paving floors, meant to blur the distinction between interior and exterior, but a line is established, by using different coloured brick pavers, and different paving patterns.

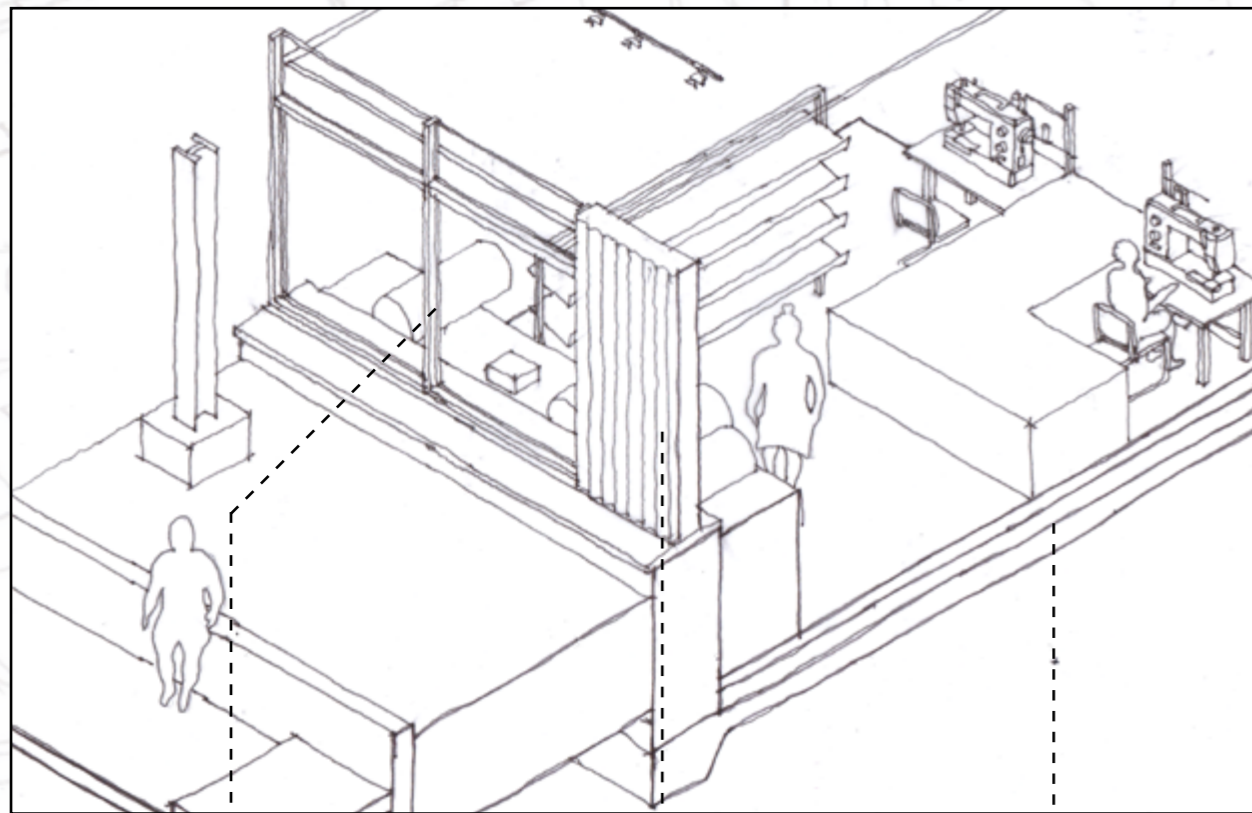


7.4.5 Walls & Roofs

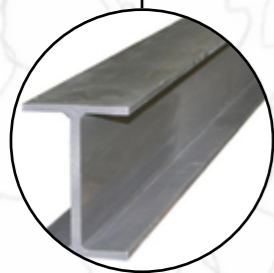
7.4.5.1 Production Area

Brick is used from the foundation, to about 1.5m above the finished floor level, this is done to create a "plinth", referencing the heritage building culture (WHICH CULTURE – local vernacular). A curtain wall is built up to the underside of the roof, and it consists of aluminium frames, and double glazing where the wall panels allow light and visual access. In other areas, on the exterior, the wall consists of s-profile/IBR steel sheeting attached to steel channels attached to the structural H-columns. Steel sheeting is used to cover large areas of the façade/wall, and is more

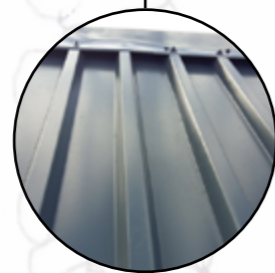
cost effective, per square meter of wall, relative to brick. On the interior, plasterboard/fibre cement boards are used to improve sound absorption and fire retarding capabilities. In between these two skins, foam insulation placed in the cavity between the exterior and interior skin. The low brick wall is made much thicker in width, which creates seating platforms on both the interior and exterior spaces – acting as a civic wall, topped with bullnose edge concrete copings which overhangs and have drip channels underneath.



Production Area(Author, 2021)



Steel



Metal

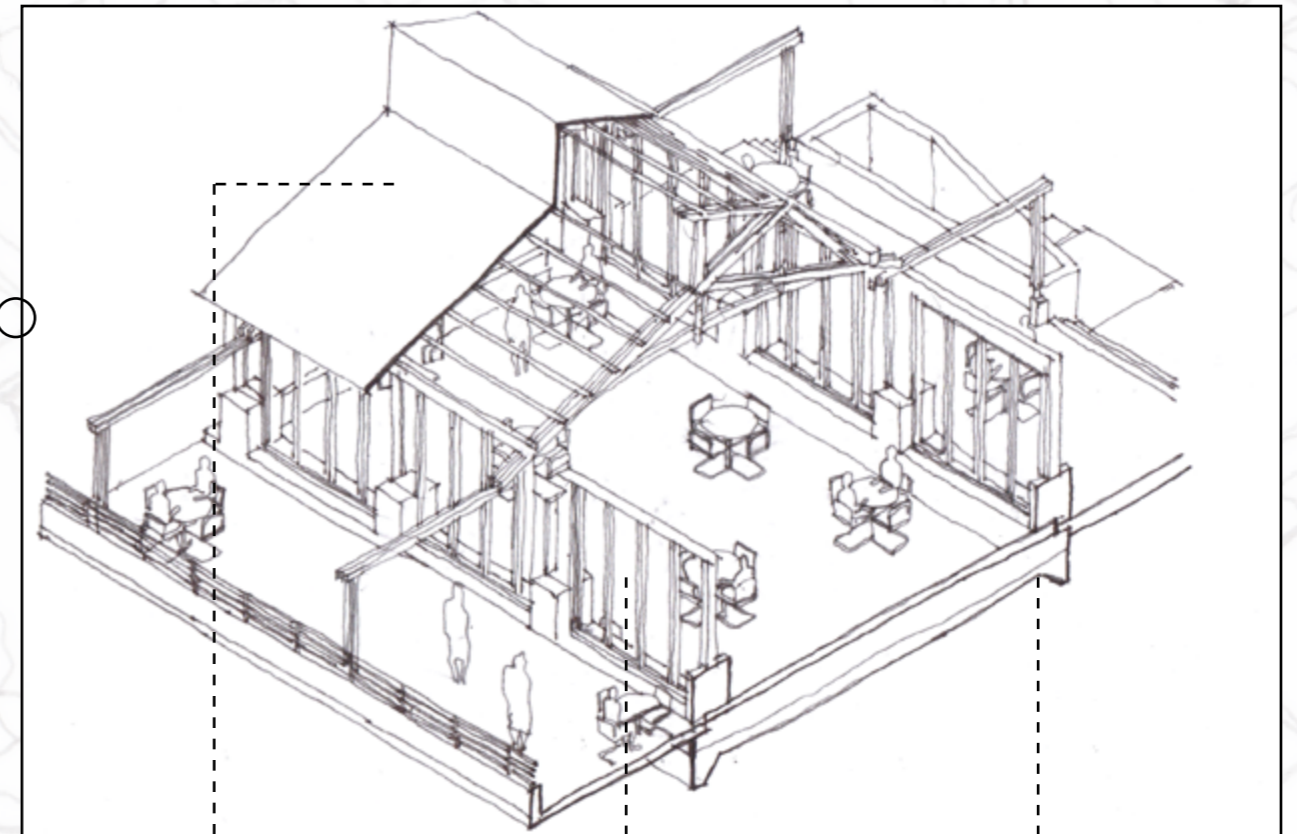


Brick

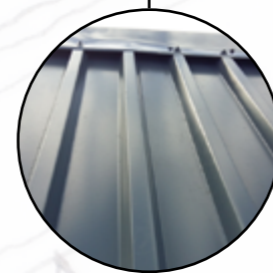
7.4.5.2 Pavilion

The pavilion also consists of a base wall, 1m above finished floor level of the pavilion, built of stone and masonry (WHICH MASONRY BOND). In certain instance the masonry goes all the way up, but in other sections, the steel sheeting acts as the skin/wall, and is clad to laminated eucalyptus timber framing (Sizes), which is then bolted to a steel angle plate that is attached to a concrete footing via steel anchor bolts. The aluminium and double glazing

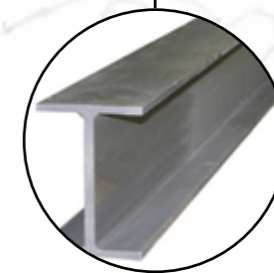
curtain walls – which also host operable aluminium windows, and door, runs in between the timber frames. The aluminium frame goes all the way to the underside of the operable louvres, which are attached and flashed – with a steel plate under the roof steel sheeting. The double glazing acts as insulation in this instance. Another part of the pavilion uses the steel sheeting – H columns – Fibre cement walling systems as used in the production area.



Cafeteria(Author, 2021)



Metal Sheet



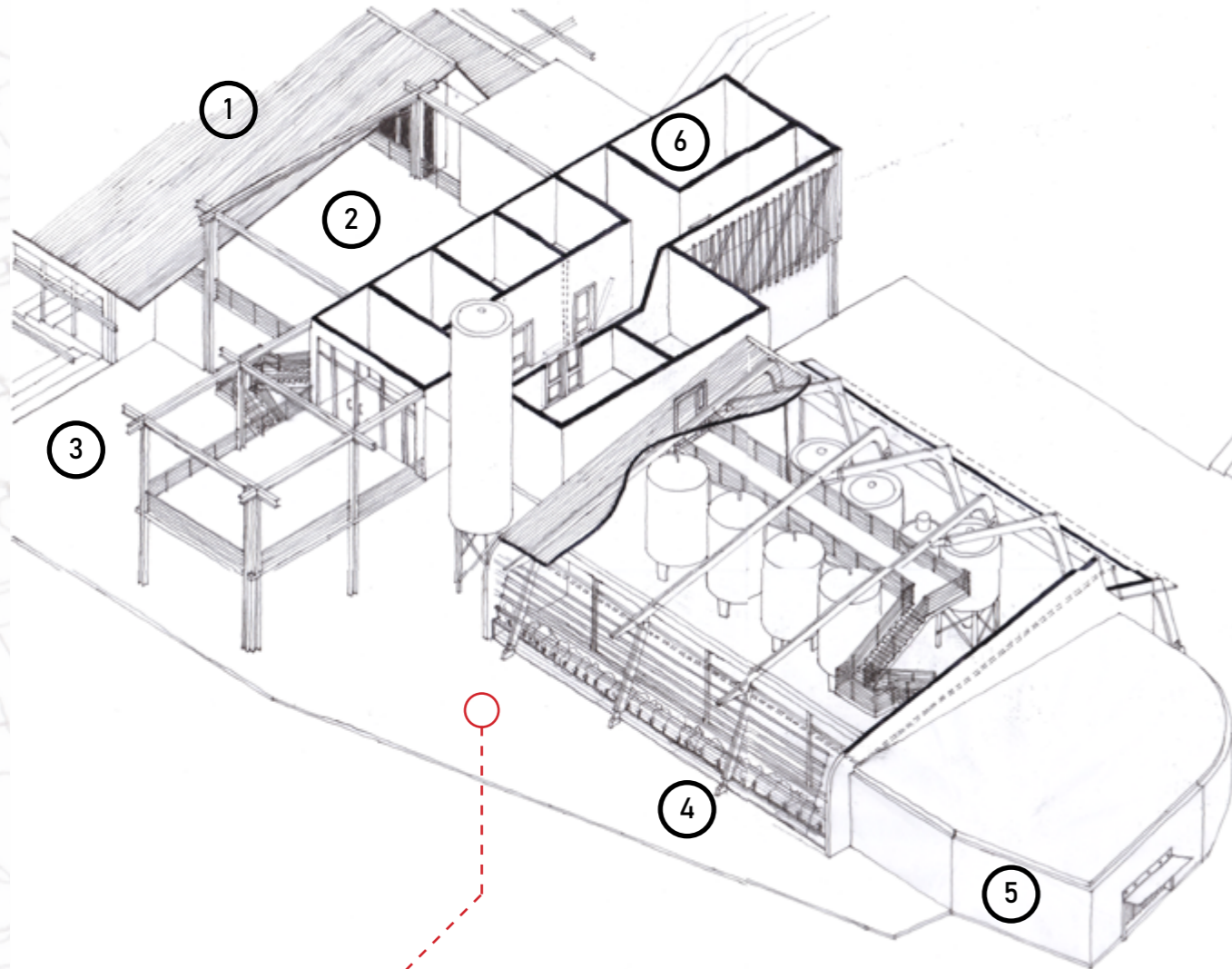
Steel



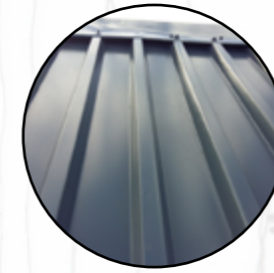
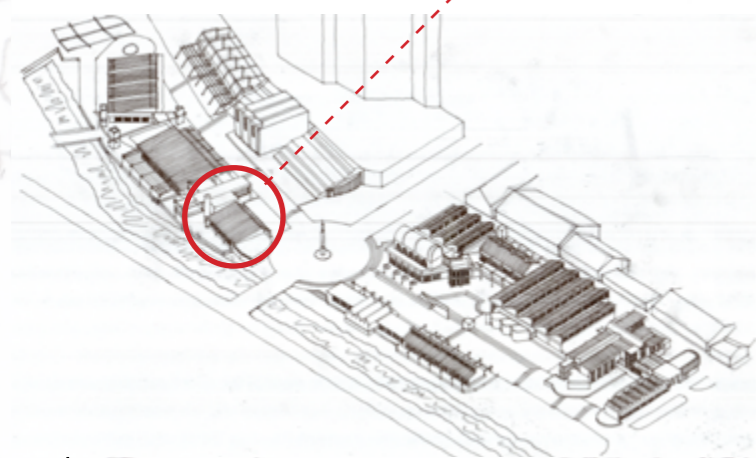
Concrete

7.4.6 Brewhouse

Metal sheeting. Metal sheeting is fixed to a steel truss system with bolts. Polycarbonate sheeting.



Micro Brewery(Author, 2021)



1 Metal Sheet



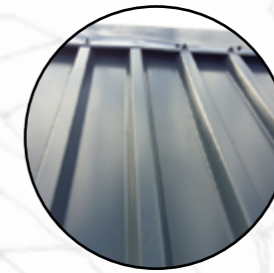
2 Concrete



3 Brick Paving



4 Paving Blocks



5 Metal Wall Cladding



6 Brick Wall

7.4.7 Light

Light Reflective Value of certain materials, their textures and colour. The intension is to create a diffused, warm lighting mood. The materials used on the walls, and roofs, are to lean to lighter colours, to have a high reflectivity value, for the surfaces to remain cool.



Long Section(Author, 2021)

7.6 Thermal Comfort

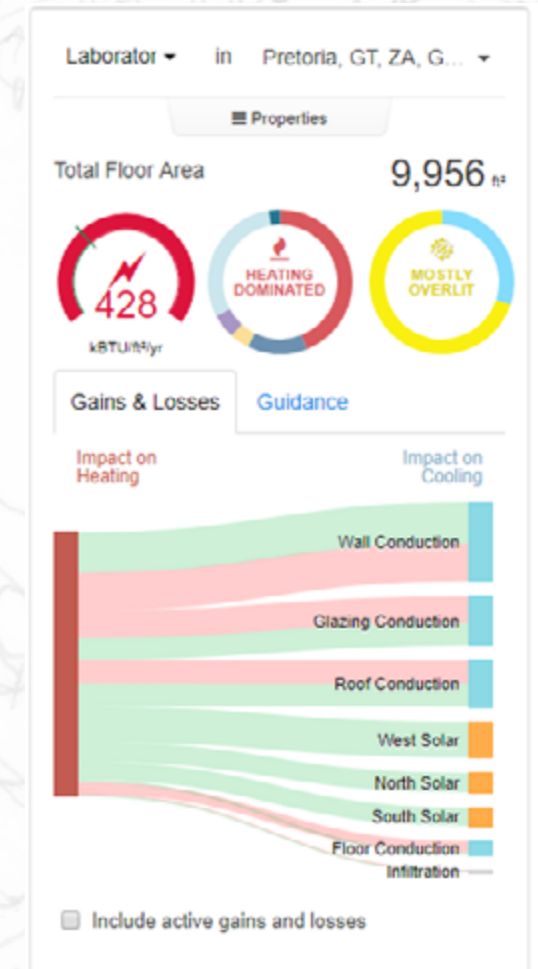
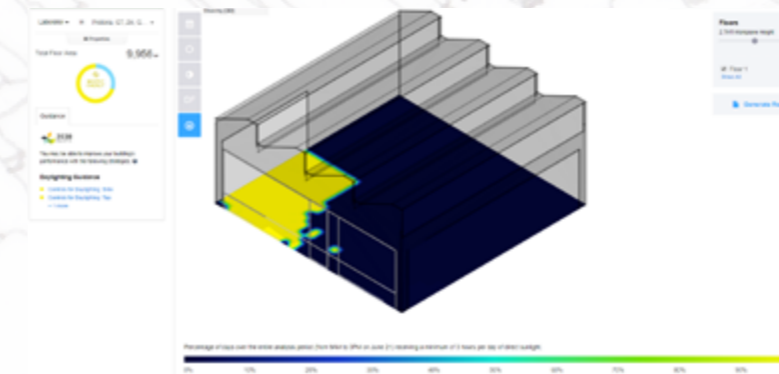
Passive design is a critical design element in the conception of a sustainable design, but recognizing the limits of the efficacy of passive thermal regulation strategies, given the high heat load and deep floor plates of the production area, incentivized the use of a hybrid passive/active ventilation systems. Considering the maximum and minimum temperatures of Pretoria and of the site's micro-climate, in conjunction with the heat load generated by electrical cutting machinery, an active HVAC system is a necessary feature to improve air circulation. The use of an active HVAC system is limited, to ensure a reduction in energy costs, and the building's attenuated plan is maximized wherever possible, to ensure effective cross ventilation through the operable louvers, and openable windows. The building has ample apertures that allow a tonne of natural light in, and maximizes solar gain in the winter time, via retractable and operable shading devices on the eastern and western facades of the building. These shading devices double up as living/green wall

which filter air which is used for cross ventilation, especially in the highly attenuated plan of the pavilion. The building is laid with geothermal pipes underneath which use the earth's relatively stable underground temperature to affect the internal thermal condition of the building. These PVC pipes are supplied with air inlets, which then circulates the air all the way through pipe system, and releases it through the outlets, which expel air with an ideal temperature into the interior, effectively improving the interior's thermal comfort. The PVC pipes also benefits from the water body close by, which improves the cooling rate of the underground pipes and enable the dissipation of even cooler air in the hot summer months. Another cooling method is the Steenhoven creek right next to the buildings. The creeks water content and high concentration of vegetation, which shades the creek throughout the day, maintains a cool environment. The wind then acts as an agent that distributes the cool temperature around the site without any active systems at play. This is supplemented by the addition of artificial water features and

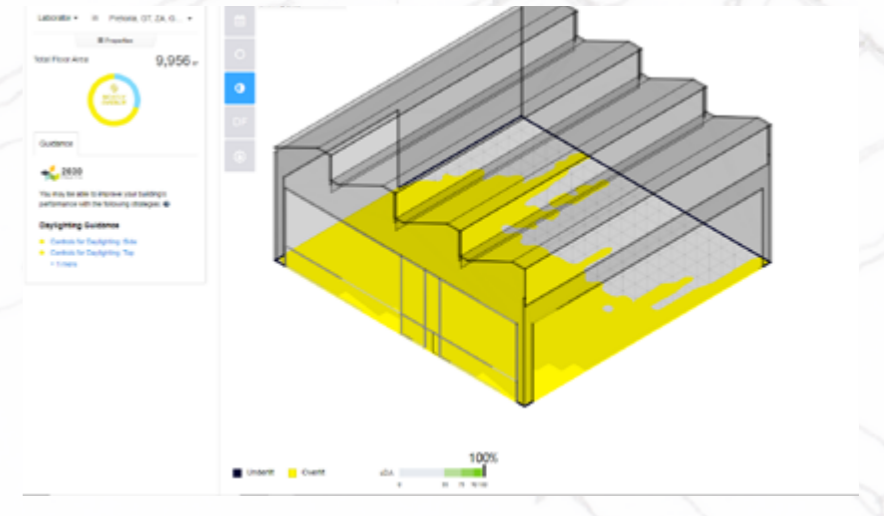
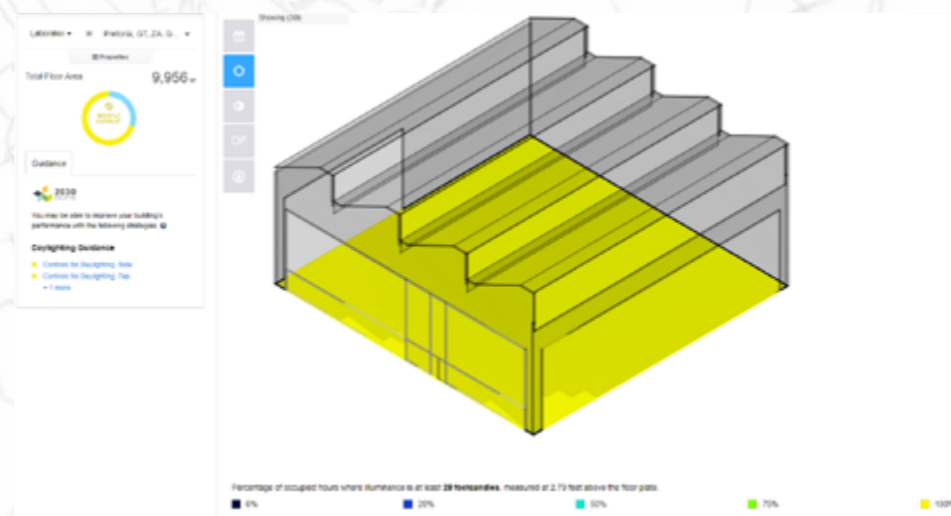
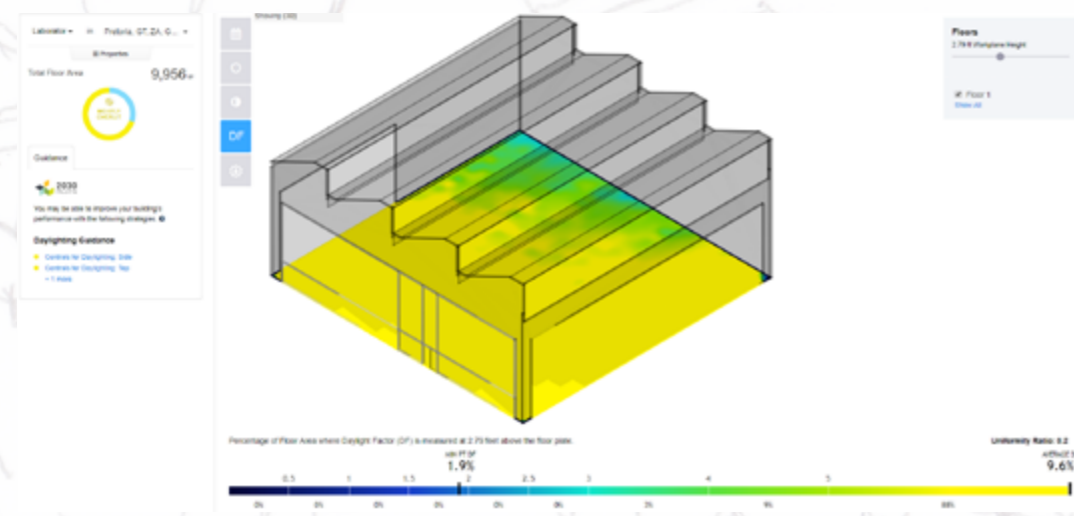
vegetated landscaping that are designed around the site to aid in the distribution of the water and vegetation cooling effect on the site. The site's promenade is lined with flowers and deciduous trees that provide shade in the summer, and allow light through in the winter.

Rooftop gardens and living walls are used to add another layer of cooling devices on to the skin of the building, which in turn affects the temperature of the interior space.

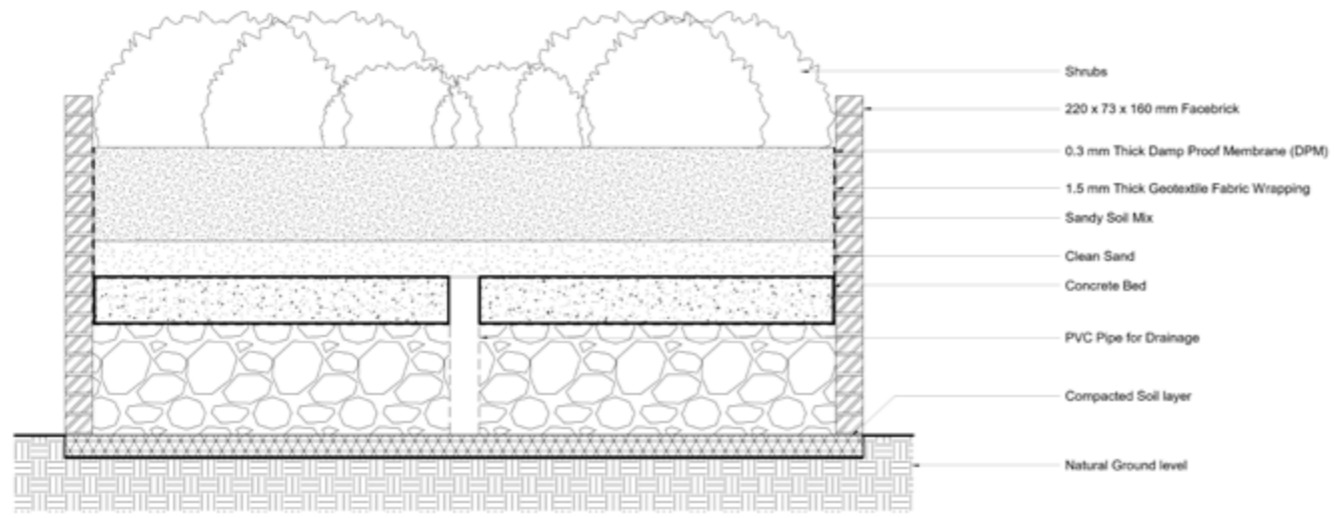
The building's walls are insulated with wool, and provide a high value of thermal inertia, thus maintain a very stable thermal condition in the interior.



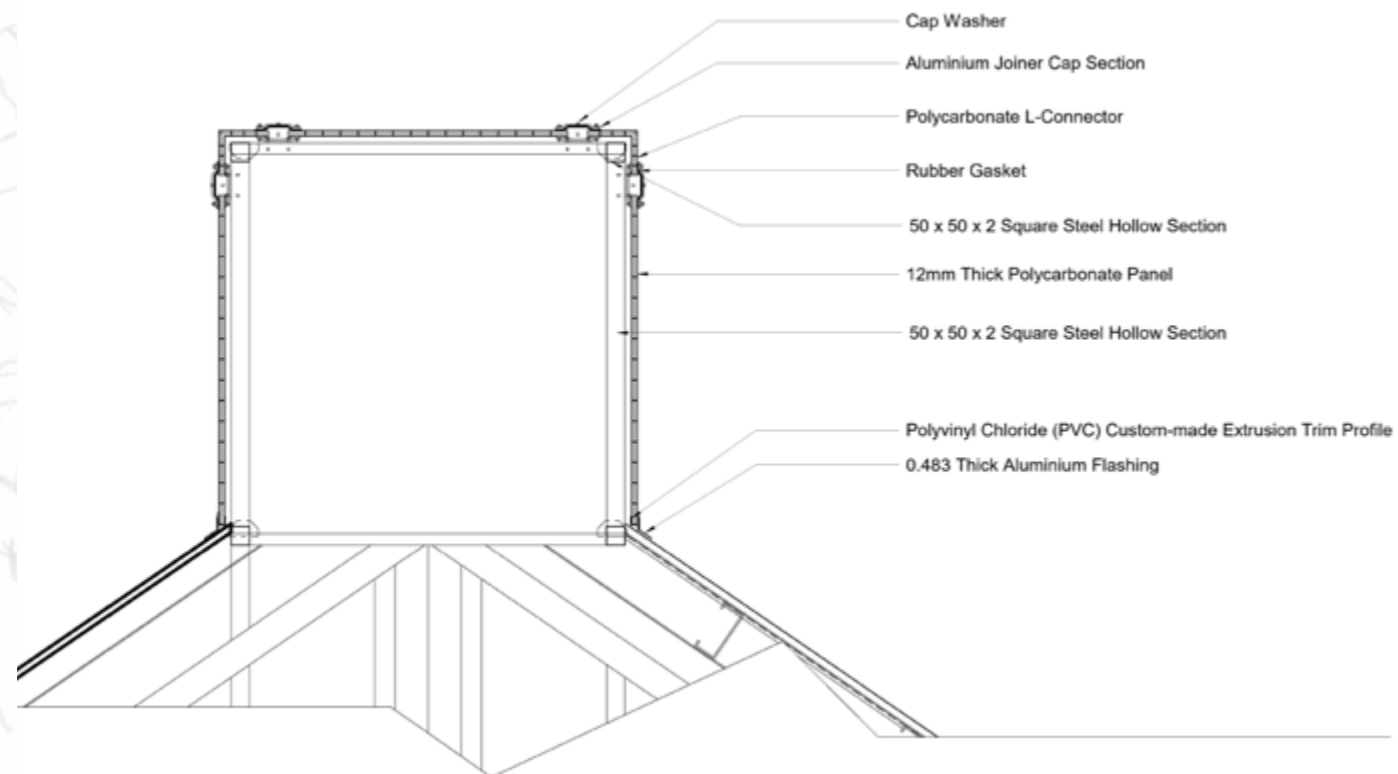
7.6.1 Sefaira



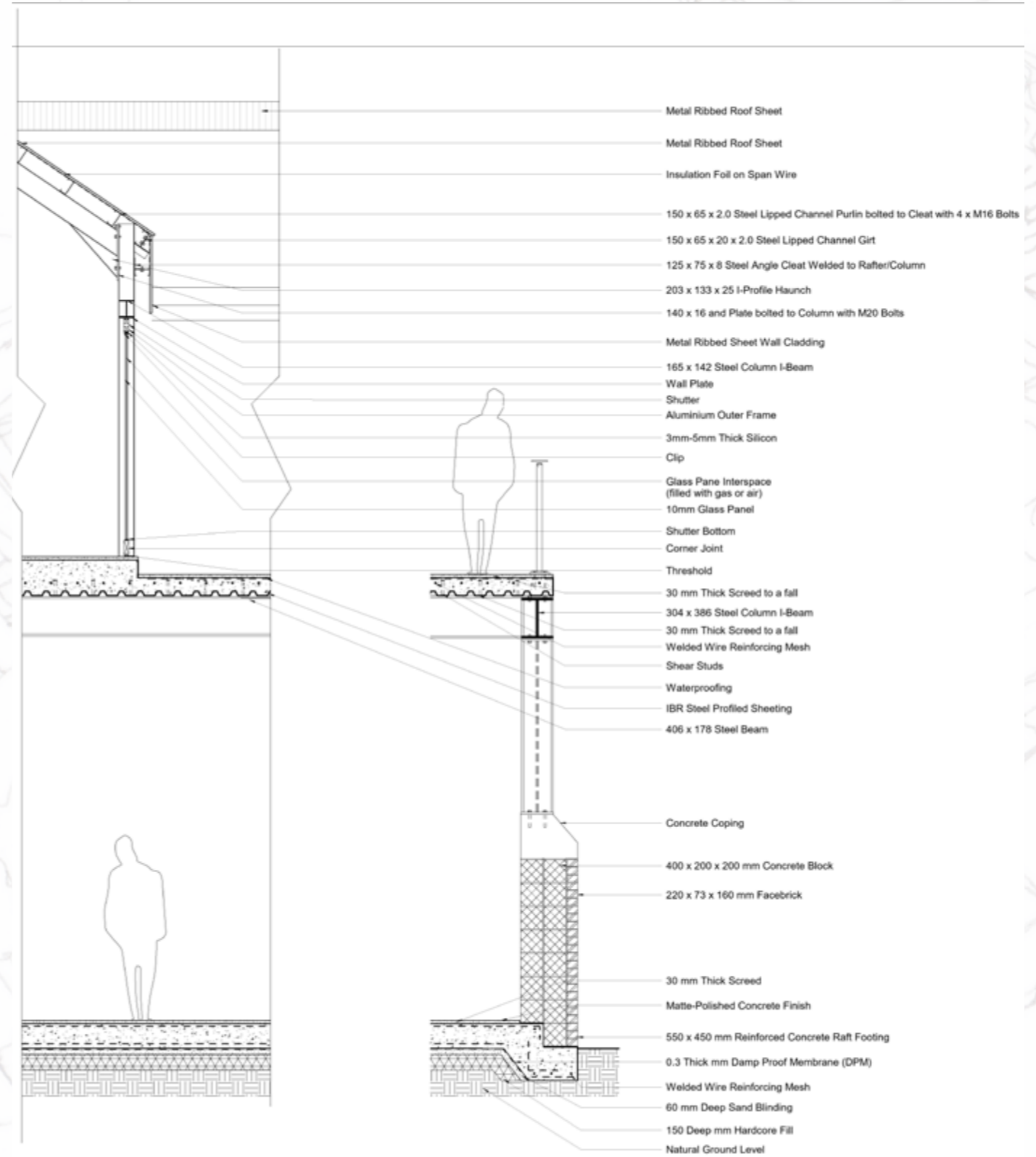
7.7 Details



Detail A



Detail B



Detail C

7.8 Storm water management

Rain water is collected into tanks, and then it is used to distribute the water to filtering systems, which is then used for irrigation, and water closets. The rain water down pipes are designed to turn the collection and dissipation of water into a spectacle, through the use of sprouts, that cascade the water down from the gutters in the roofs of the production area, and animate the western façade of the building during the rainy season.

7.9 System

The system investigated is water/Electricity? The Steenhovenspruit creek which runs the entire length of the western edge, was canalized in the 1920s as flood management strategy, this turned the creek into a storm water channel and significantly disturbed its connection and symbiotic relationship to the surrounding ecology, and thus limiting its offering and value to the surrounding community, especially north of the site, in Marabastad. Essentially, its canalization limited the creek's potential. The intention of the design is to rejuvenate the creek as a living system that is strongly integrated with the surrounding natural and built environment. The strategy to achieve this is to deploy architecture as infrastructure – using architectural elements such as weirs, retention ponds and wetlands to filter waste from the creek, and ensure that it can be a source of clean water that can be used for irrigation. A weir is used to raise the level of the water upstream, so as to use it to generate power through connection with a power wheel used in the summer months when there is generous rainfall. The wheel is a supplementary source of power to the main power from the grid, and also from the solar panels on the roof of the building. An artificial wetland is used to remove “pollutants associated with municipal, industrial wastewater and stormwater” from the creek, so that

people downstream (Marabastad) have access to cleaner water to use for various activities, except drinking. Waste water is connected to the already available municipal sanitation lines that runs through the site. Clean drinking water is supplied by the Rand water through underground water lines close to the site. The building's energy is also connected to municipal energy lines.

7.10 Conclusion

The technical resolution of the design seeks to optimize material use, energy usage, and limit the building's impact on the ecological system through efficient and prudent spatial and structural design. This is intended to ensure that the building transcends its current use and can remain useful and valuable to the surrounding community or any private party, thus ensuring that it will always be in use. The building's ability to engage the productive requirements and casual civic life, will ensure that it remains regenerative and resilient from the care it shall receive from the custodians it serves.



Cultural Production(Hypebeats, 2019)

Part D

Reflection

Chapter 8

Reflection

8.1 Dissertation Foundations

The influx of people into cities brings cities' adaptive capacity into question. Are cities apt to cope with the influx? And are cities able to provide inclusive socio-spatial conditions that are conducive to the economic participation needed to pull many out of abject poverty, and avoid the emergence of an urban poor community. Social cohesion and the realization of healthy and safe city spaces, rests on the efficacy of the economic transformation and development strategies of these cities. Pretoria like many cities in many developing countries, is facing this urban challenge of creating these conditions, which can aid in the economic prosperity of its people, especially the youth demographic, which effectively benefits the city as a whole. The project's aim to aid in the pursuit for these strategies of realizing job creation, the preservation of low skill employment, and regeneration of a decaying Pretoria West. The study of the value of retaining infrastructure that accommodates low-skill livelihoods, such as manufacturing – thus affording numerous people agency to seize opportunities for themselves is a small, but potentially impactful part of these intentions. And it is

in this understanding of taking “small” steps as the building blocks to affecting greater change through architecture, and building on what the local people(youth) are already creating (building apparel brands) to empower themselves allows the spatial interventions to accelerate their contributions and effectiveness.

And a nuanced approach was crucial in understanding the strengths and weaknesses, of their current entrepreneurial operations, such as operating in small, dispersed silos, and how this is good for their creativity, but negative for their balance sheets. The opportunities to build and evolve this to have a greater impact, and the potential threats around how these spaces and facilities can erode good quality urban spaces, and how that then can have a negative impact these enterprises. Recognizing that people are more productive when they work together in a consolidated manner, and are more resource efficient, warrants the value of having collaborative production spaces of substantial size. And denotes why good architecture should not be limited to arts and craft, small scale industrial warehouse typologies.

8.2 Evolution of Light Industrial

The light industrial building, which has its root with the workshops, and mills of pre-industrial society – which were fully integrated into their contexts – mainly due to the limitations of localization, evolved and devolved into a smaller version of heavy industrial buildings, mimicking its efficiency and productivity. This evolution generated a tame typology, which was removed from place, and could not fully its potential a significant and impactful typology to urban spaces and its communities, as it has been limited by how it has been viewed through the lens of its larger antecedent. The value of reimagining the light industrial typology, and its role in the city and society, is

more relevant than ever before, given the potential growth for local light manufacturing, and e-commerce warehousing, which have both initiated a large stock of light industrial building in Pretoria, and other cities.

The reintegrate light industrial spaces into the polis, and redirection to the evolution of light industrial spaces with respect to their contribution to the city. The research identifies and makes a case for the possible spatial and economic impact architecture can have on the reinterpretation of industrial buildings. This can make them more resilient, regenerative, meaningful, and valuable when they are connected to other related programs and

form synergies that optimize space, resources, and enable them offer a better spatial experience to their surrounding communities

8.3 Research Process & Methodology

This research process has revealed how numerous simple, and mundane spatial aspects and qualities, can have a profound impact on economic prosperity, showing the value of paying attention to detail when conducting qualitative and quantitative research, and having a nuanced approach to architectural and urban design.

8.4 Design & Technology

Theories on regenerative, critical regionalism, and vernacular architecture, continuously stress the value of place (Barker, 2015), and how value of using architecture as mediator should avoid a design intervention from yielding to the history of a place in trying to retain a sense of place, and should not yield to technology in trying to solve problems (Guisti, 1996). But rather act as an element that recognizes the co-evolutionary potential between place and people, and leverages it to reinforce a renewed sense of place, and uses innovative technologies to add value to – rather than completely disregarding and eroding – local building culture (Hes & Du-Plessis, 2014).

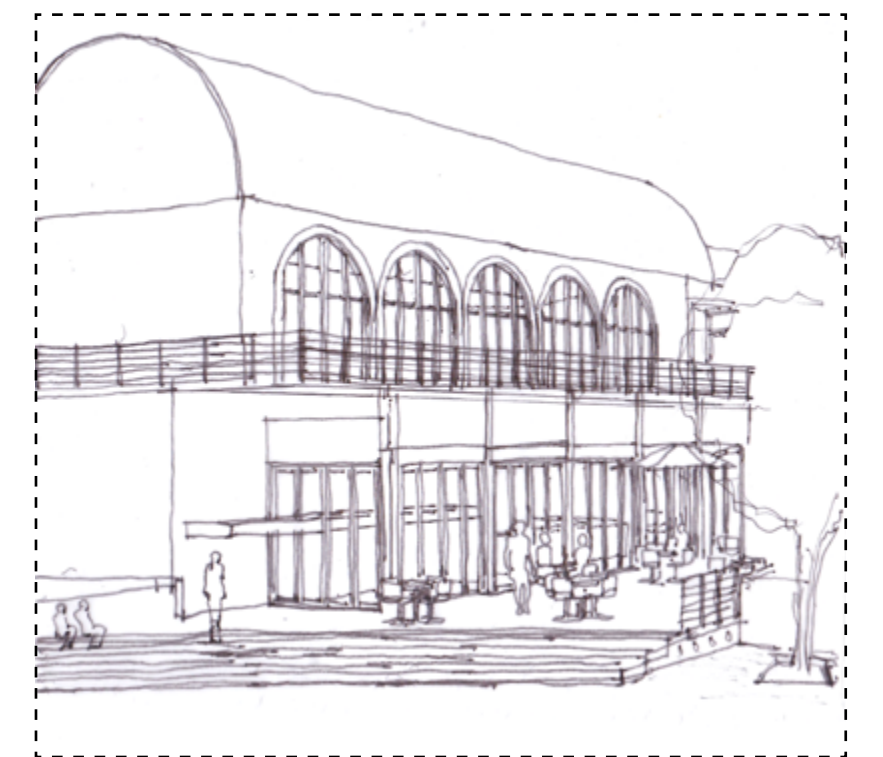
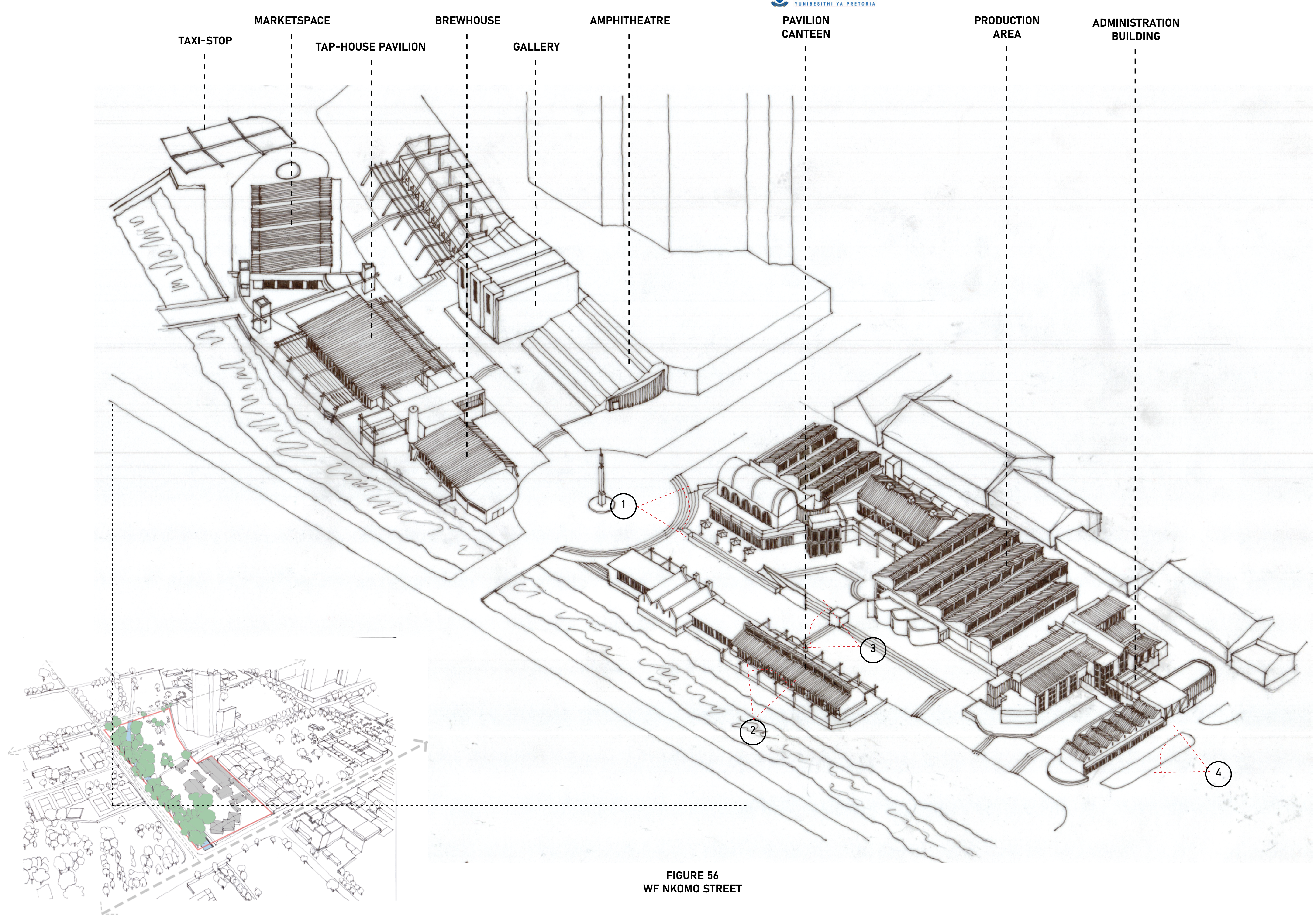
The experience of the project shed light on potential economic impact of place-making on Pretoria, and light industrial enterprises, which is not always obvious. And how light industrial can be a city's economic and spatial affliction by eroding these place-making qualities, and potentially causing urban blight. But also showing the potential outcome of its evolution and reintegration on preserving low skill livelihoods, and enable the quest to achieve economic equality in South Africa. The experience has changed my outlook on globalization, standardization, mass production and how they need not be adversarial to place-making, but rather tools to improve the

qualities, and efficiency of architectural production, if used with a high level of respect, and appreciation of local heritage, and place. A pre-existing place is a strong informant in the design process, but it should not deter innovation and the introduction of new modes of comprehensive architectural production. Understanding the value of heritage, the lessons that are to be learnt from old design and building cultures, and how people have grown to relate to it, ensures that new interventions become extensions of place, so that users have a sense of continuity, instead of abrupt disruption. The prerogative of the designer is quintessential to the production – and it is dependent of the designer's disposition, learnings and normative position. It is thus crucial to ensure that architects develop a more empathetic, sensitive, and dynamic approach to their architectural production methods, in order to produce architecture that can aid in dealing with social ills.

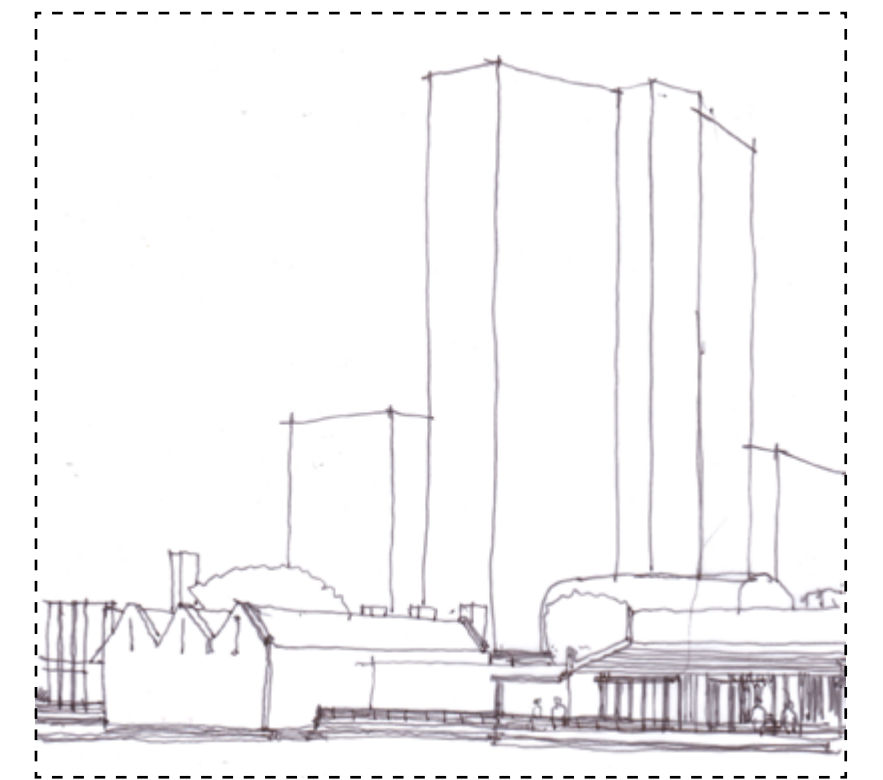
8.5 Contribution

The dissertation seeks to redirect the outlook on the typology of light industrial buildings, their constituency and composition, relating to their immediate natural and social environments, and regionalist, regenerative and place-making theory can inform a refreshed incarnation for the light industrial typology to make it more relevant to specific place.

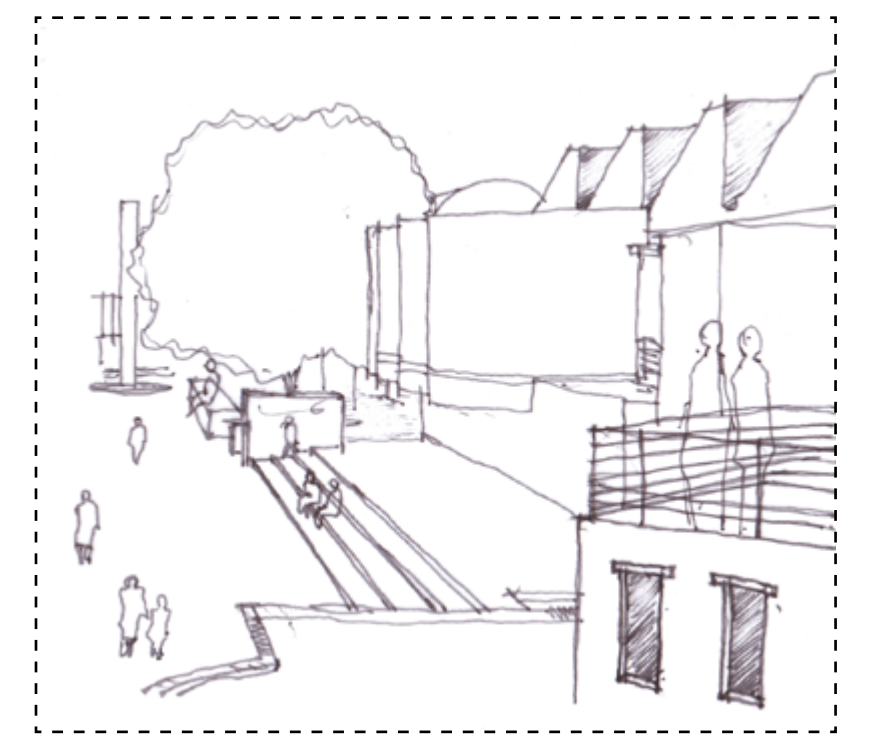
Celebrating production, as a meaningful act that contributes positively to people's lives, and exploring the possibilities of integrating light industrial buildings into mixed use developments in cities. This is to ensure that its ability to provide opportunity to low-skill manufacturing work is preserved, and that mass production spaces are not adversarial to living and play spaces in the city. And this can ensure that all members of the surrounding community have an opportunity to make a living, and that the local apparel manufacturing brands can, utilize cultural production and expression, daily casual life, and recreation to support the growth of their enterprises.



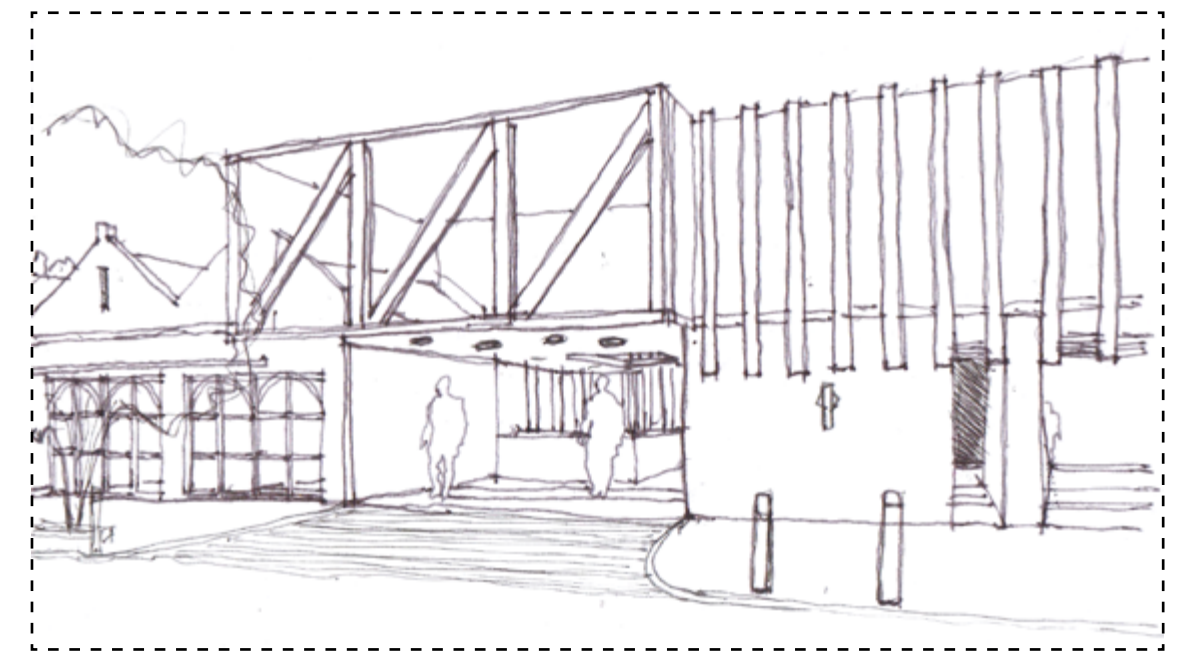
① Customization Shop



② Pavilion



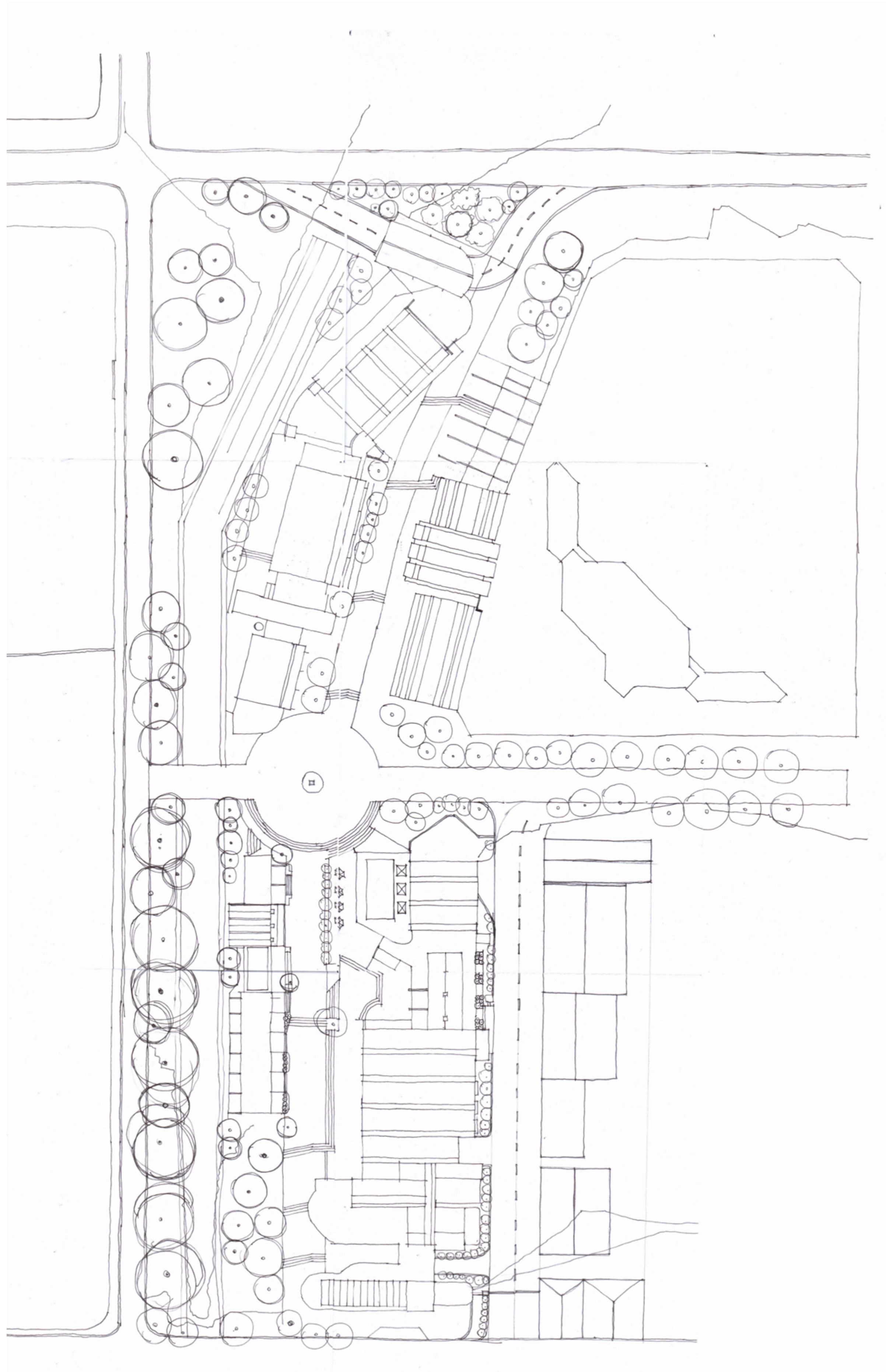
③ Promenade



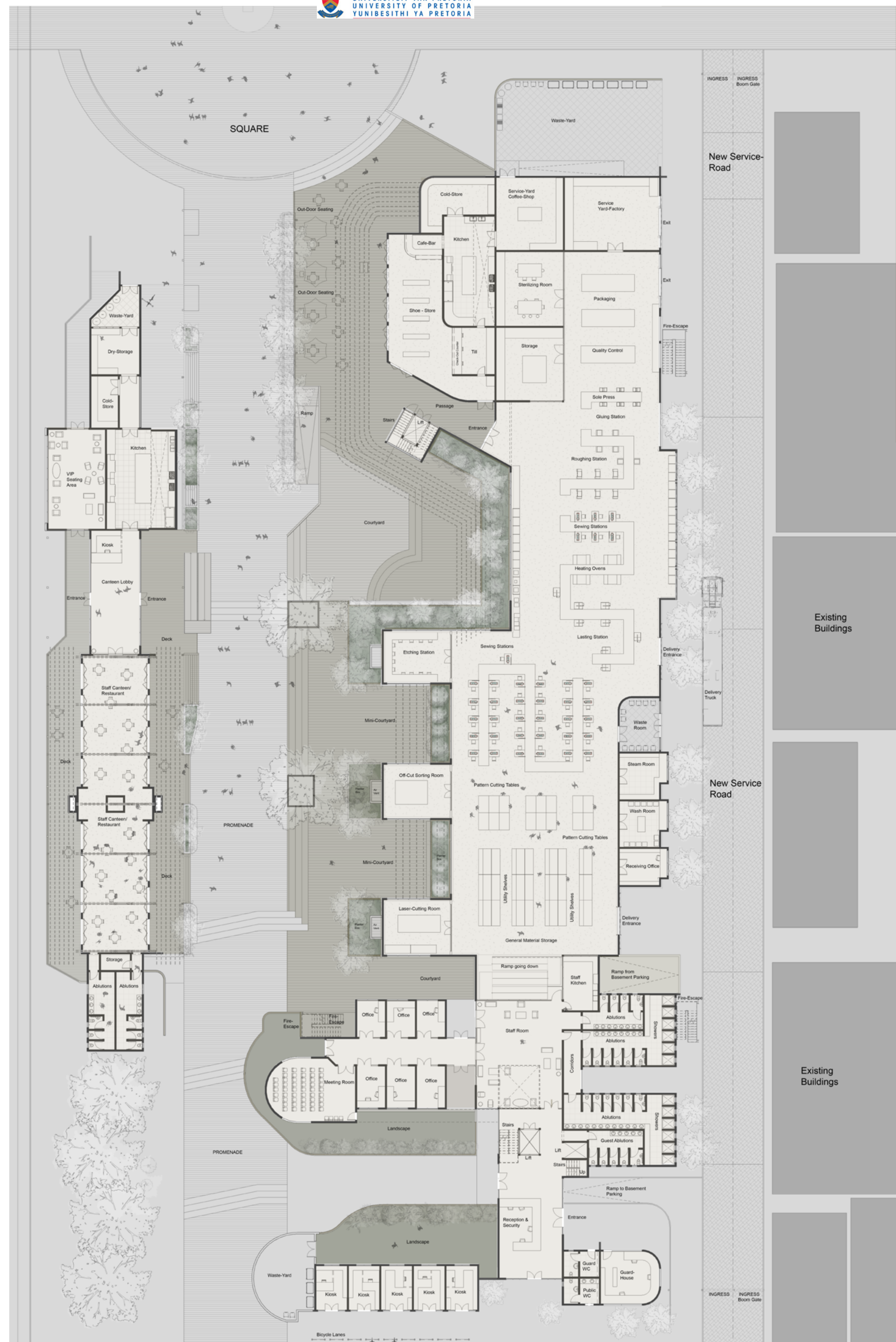
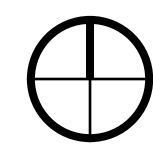
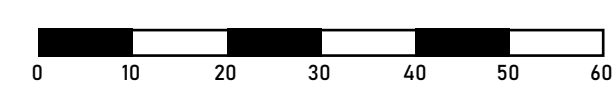
④ Kiosks

FIGURE 56
WF NKOMO STREET

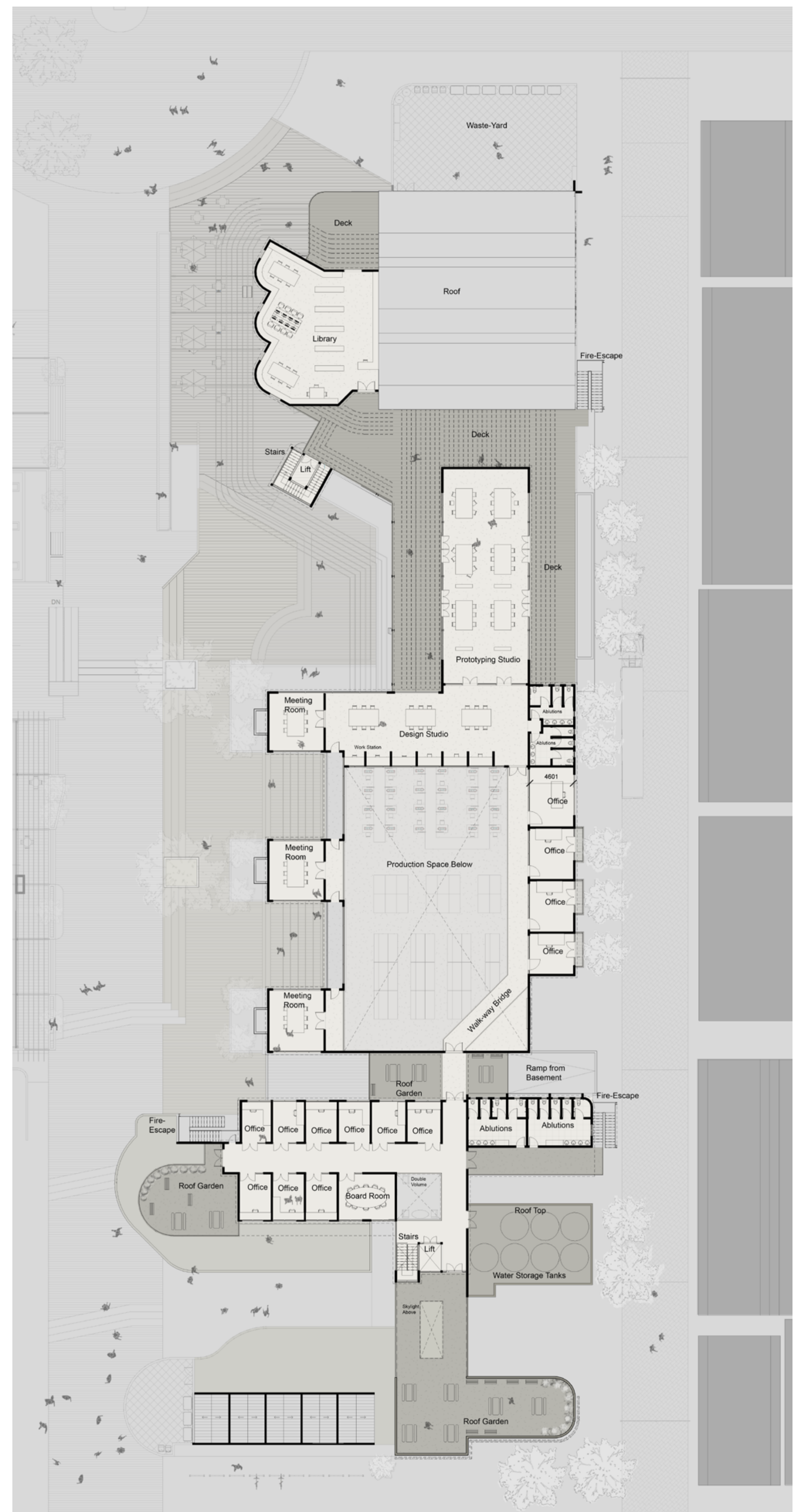
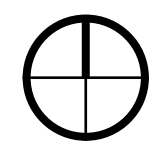
DESIGN



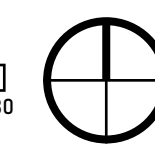
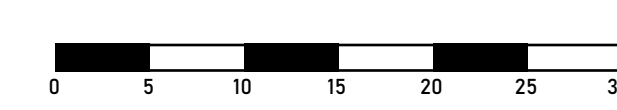
SITE PLAN



GROUND FLOOR PLAN

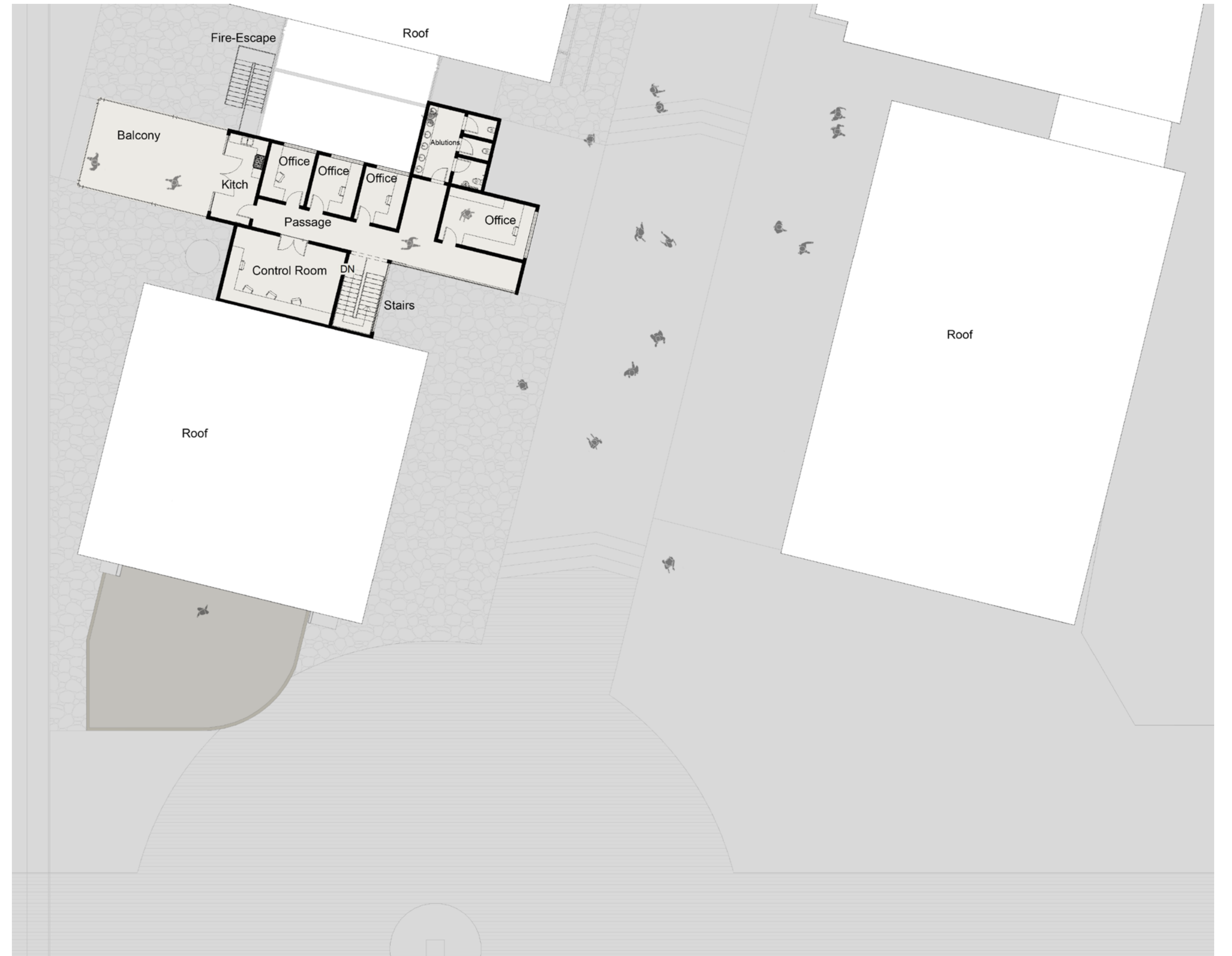
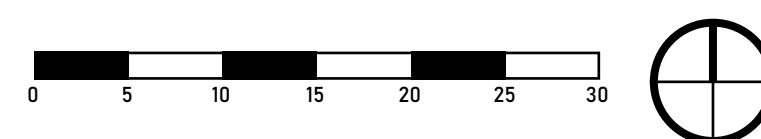


FIRST FLOOR PLAN

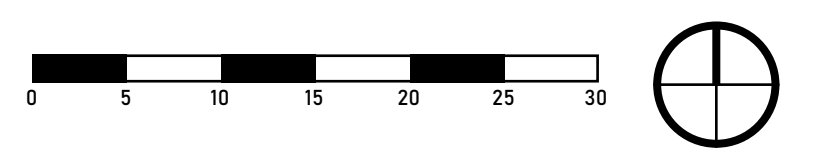




GROUND FLOOR PLAN

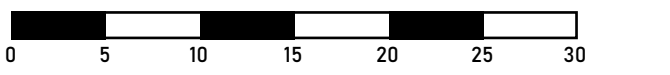


GROUND FLOOR PLAN

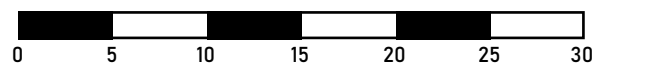




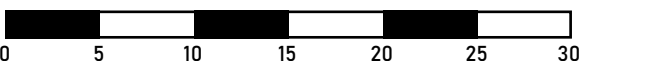
West Elevation - Production

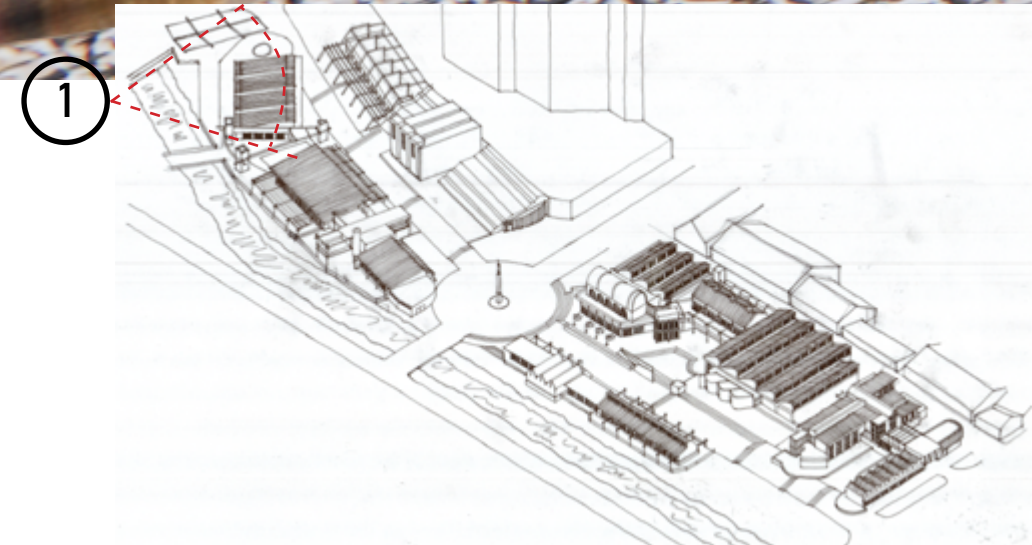


East Elevation - Pavilion



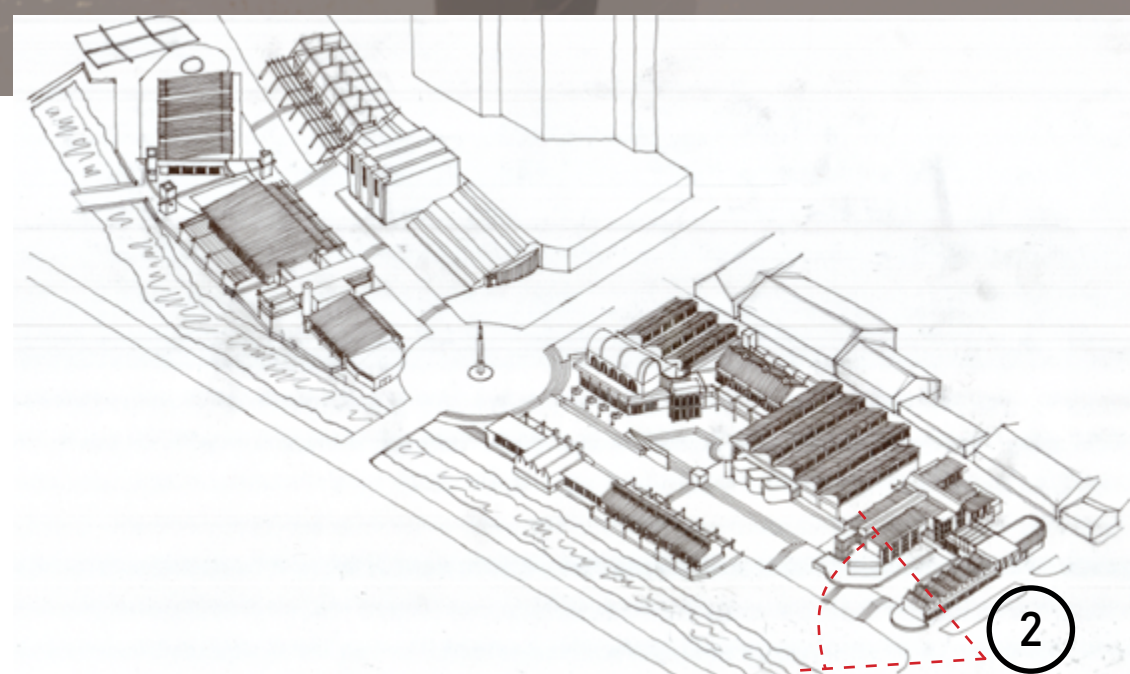
West Elevation - Pavilion





PERSPECTIVE 1

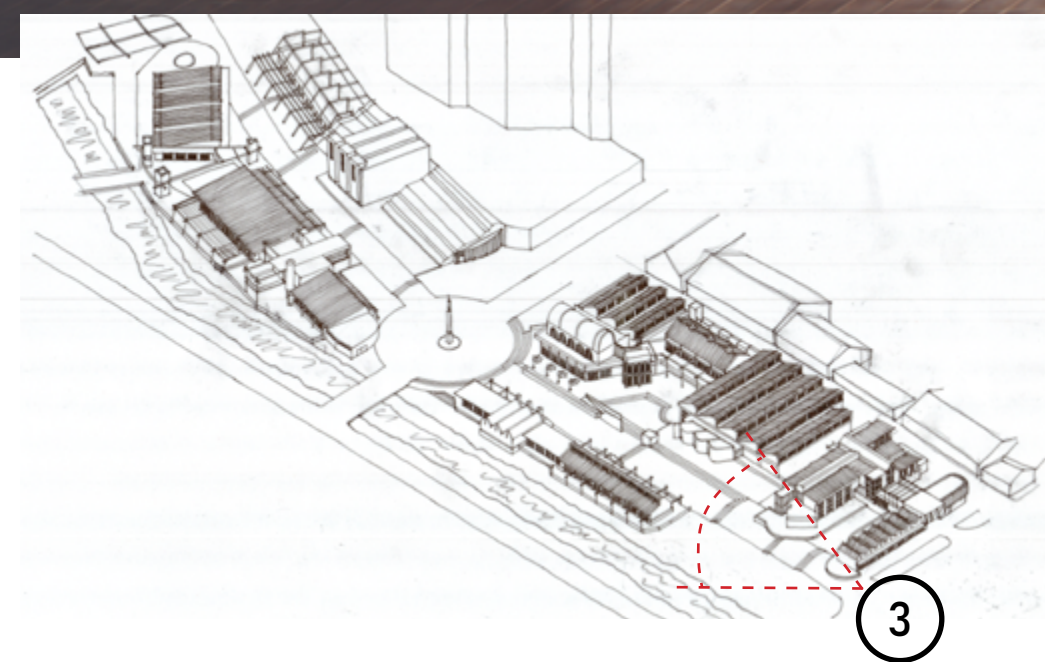
RESOLUTION

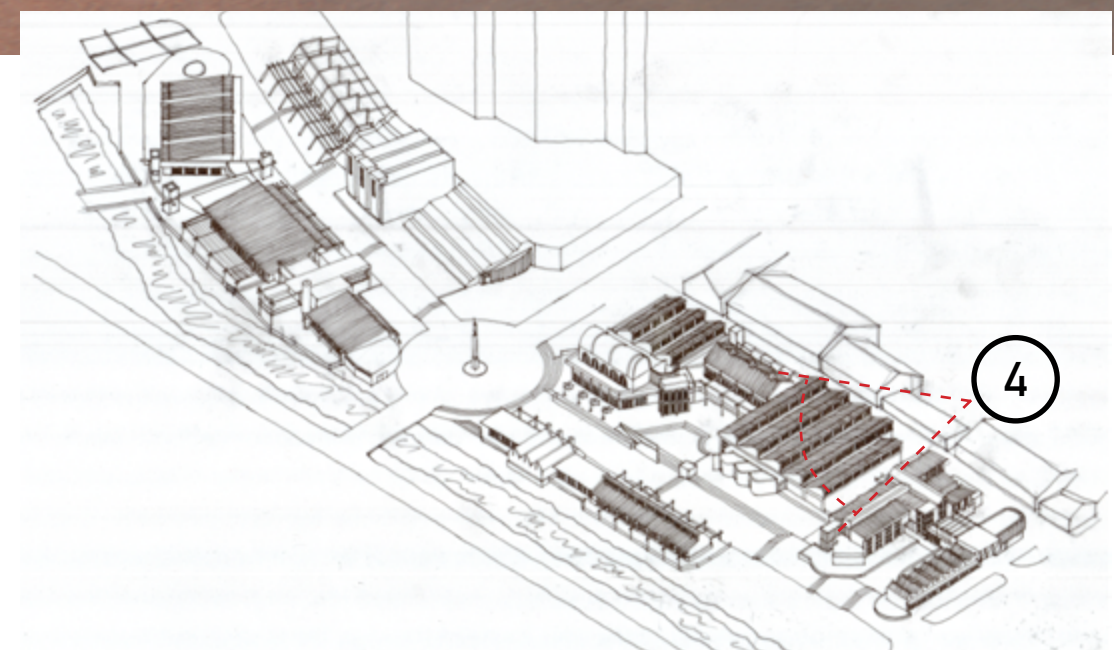


PERSPECTIVE 2



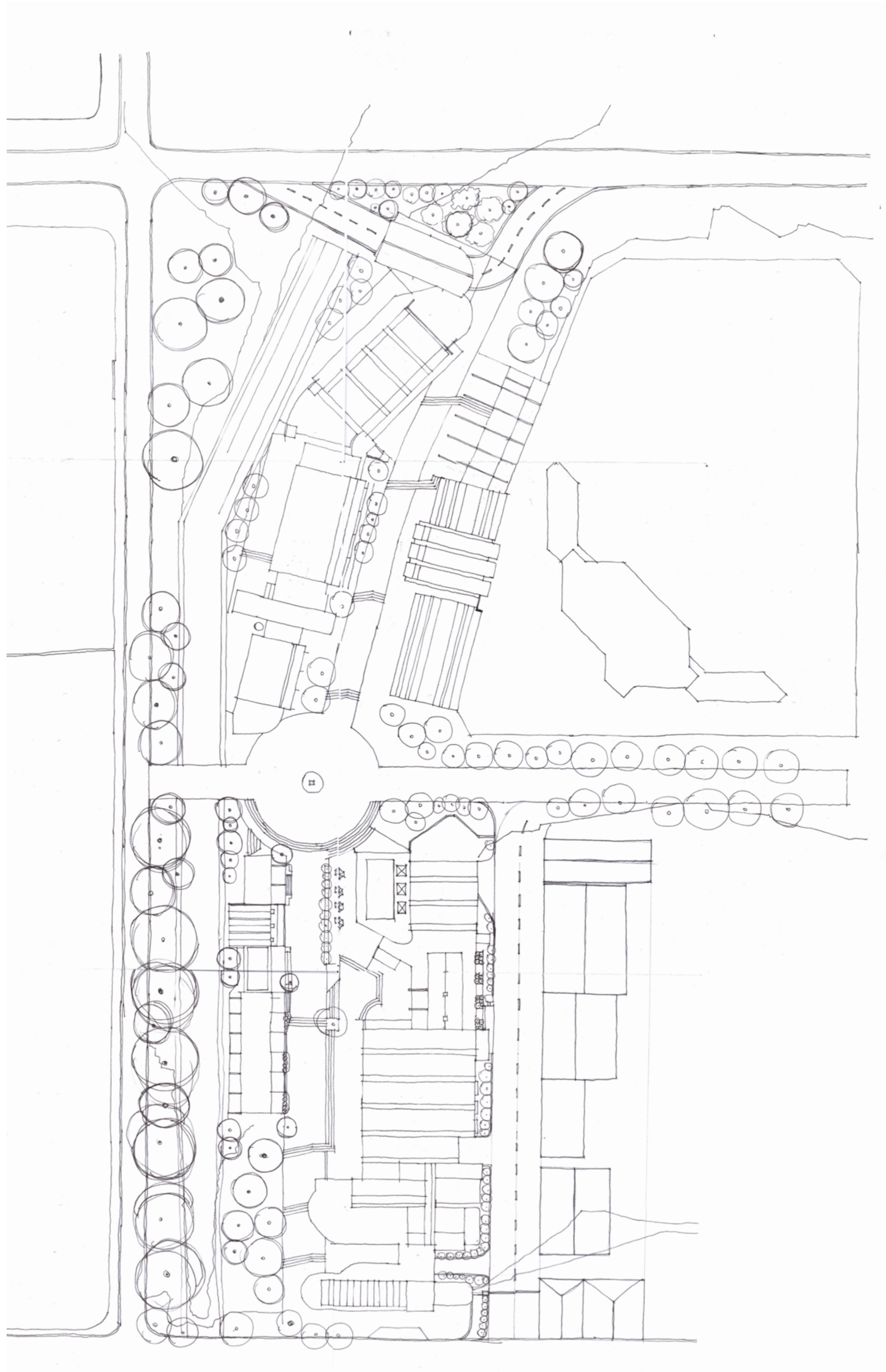
PERSPECTIVE 3



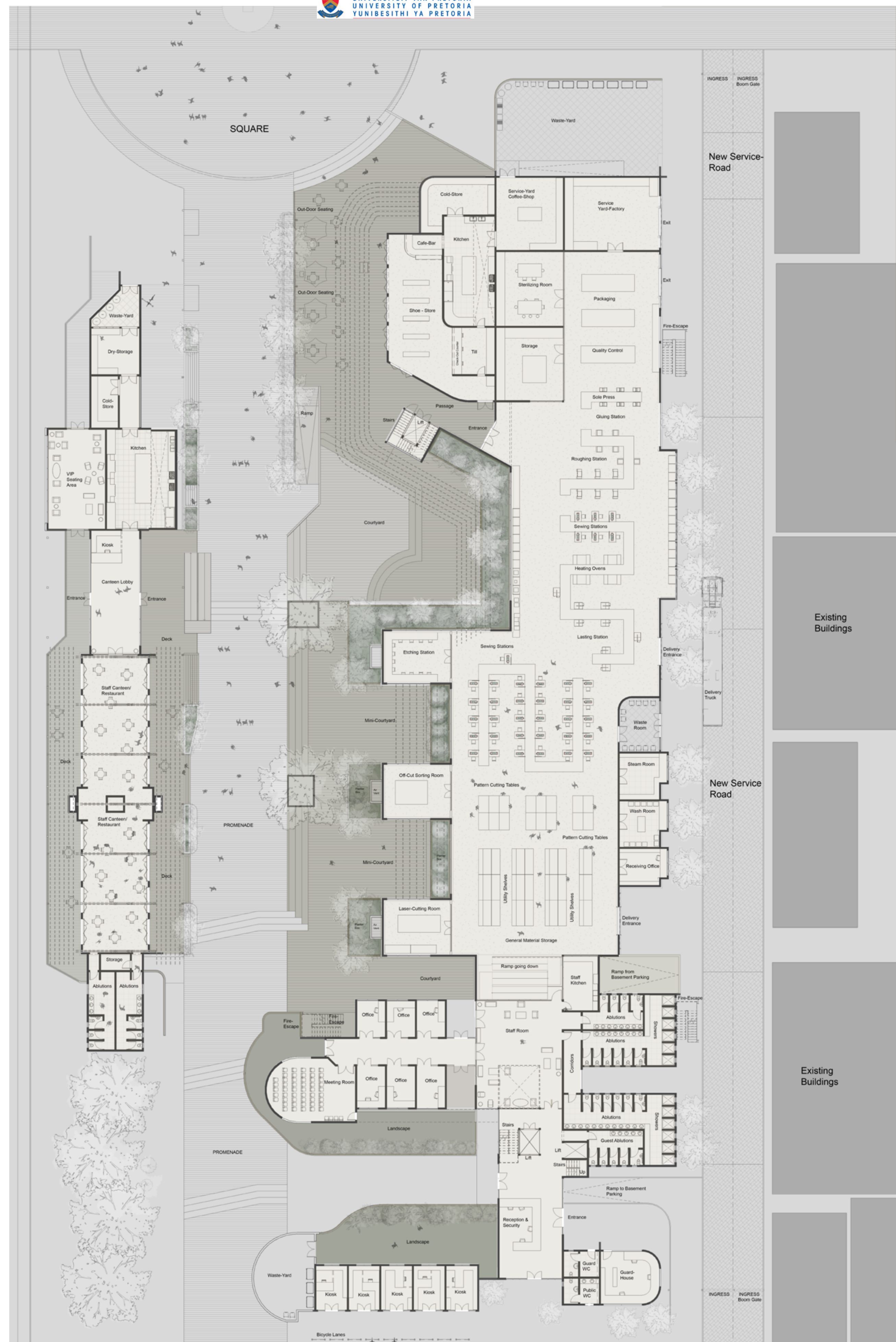
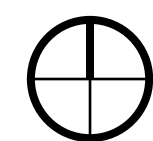
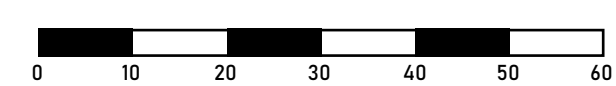


INTERIOR PERSPECTIVE 4

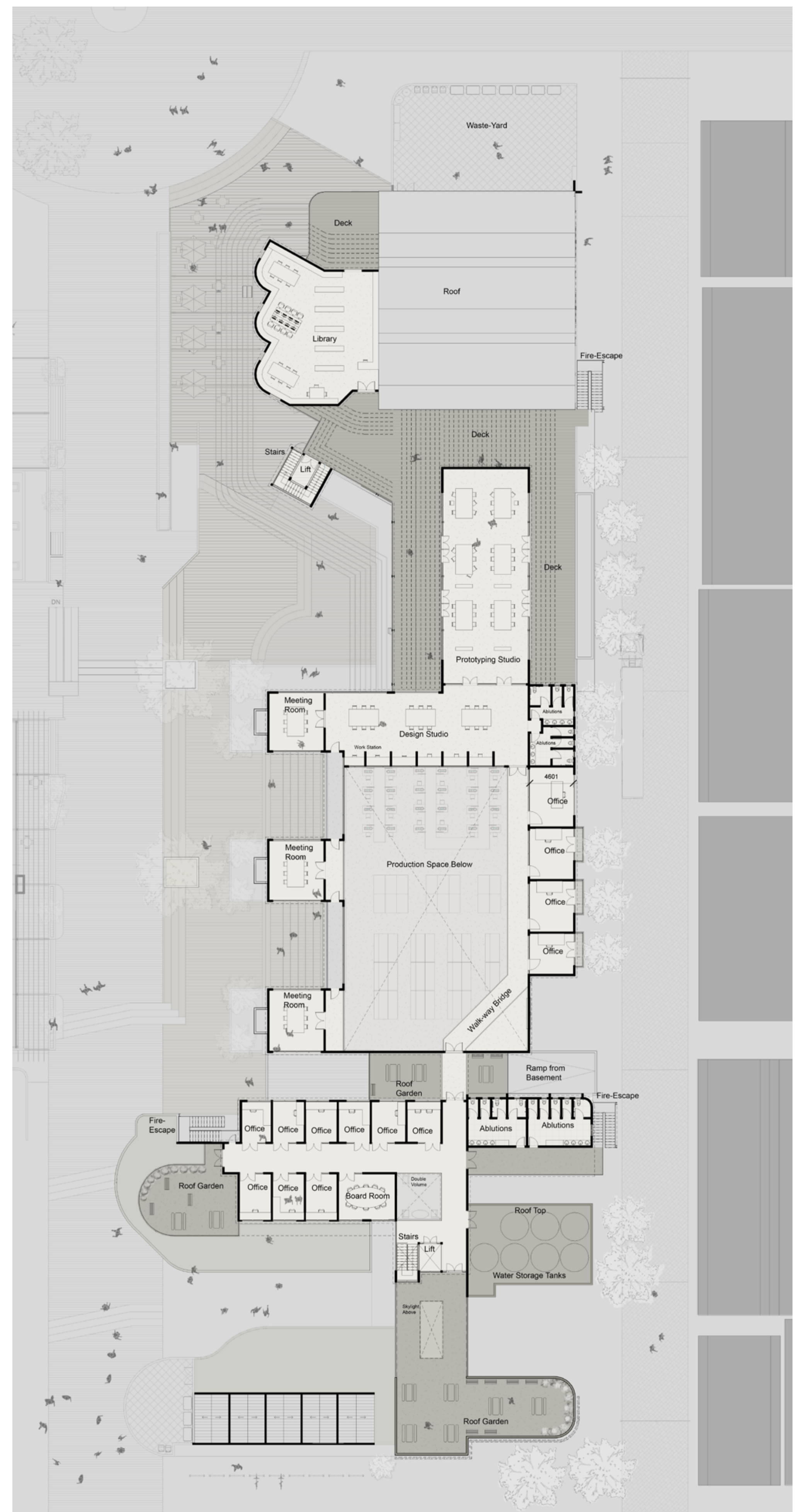
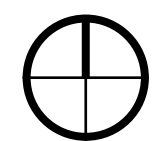
RESOLUTION



SITE PLAN



GROUND FLOOR PLAN

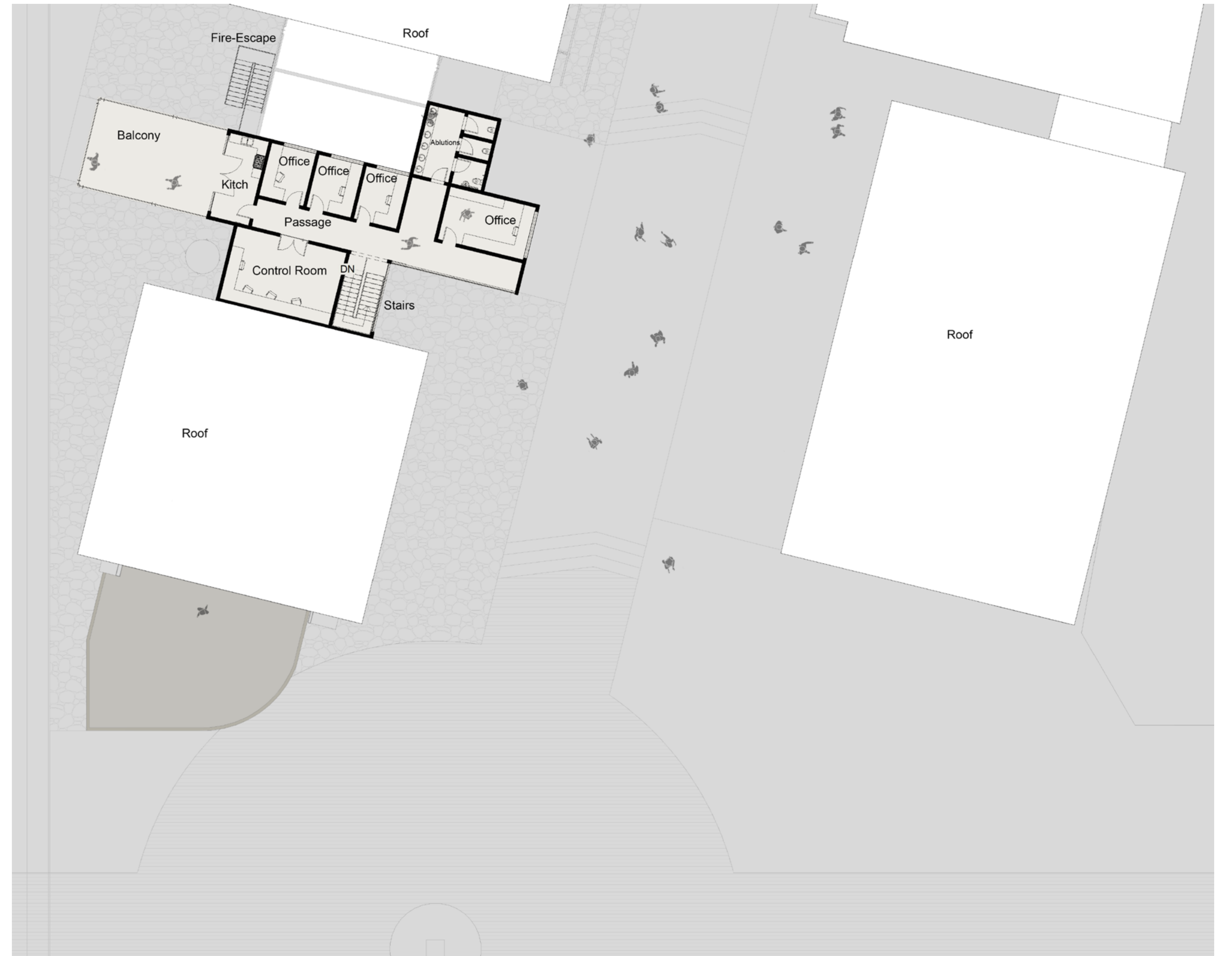
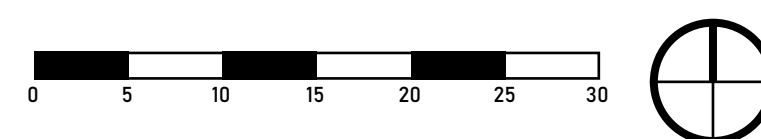


FIRST FLOOR PLAN

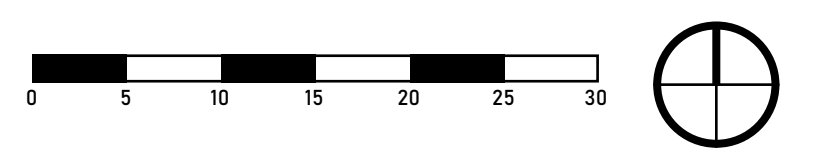




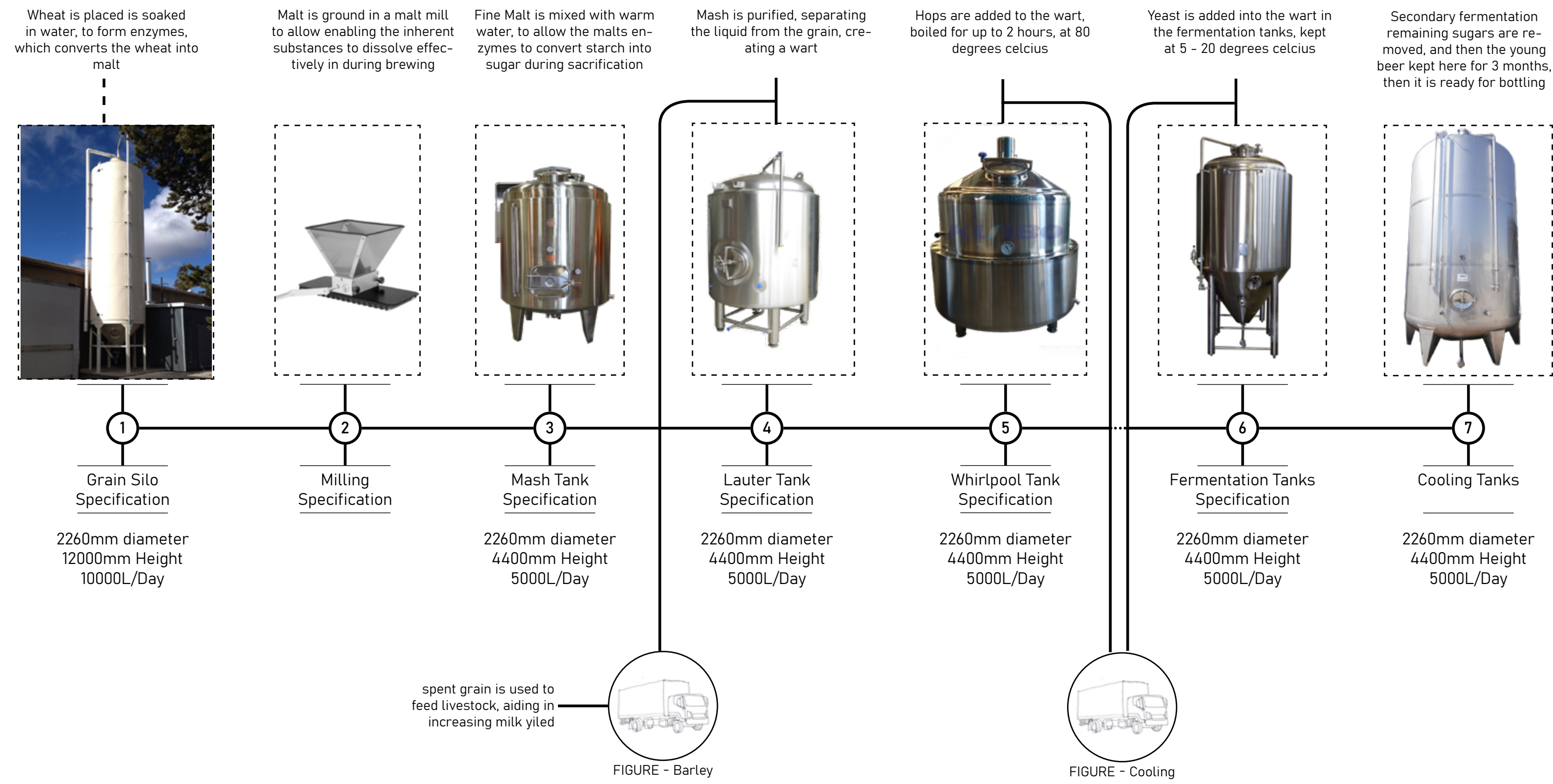
GROUND FLOOR PLAN



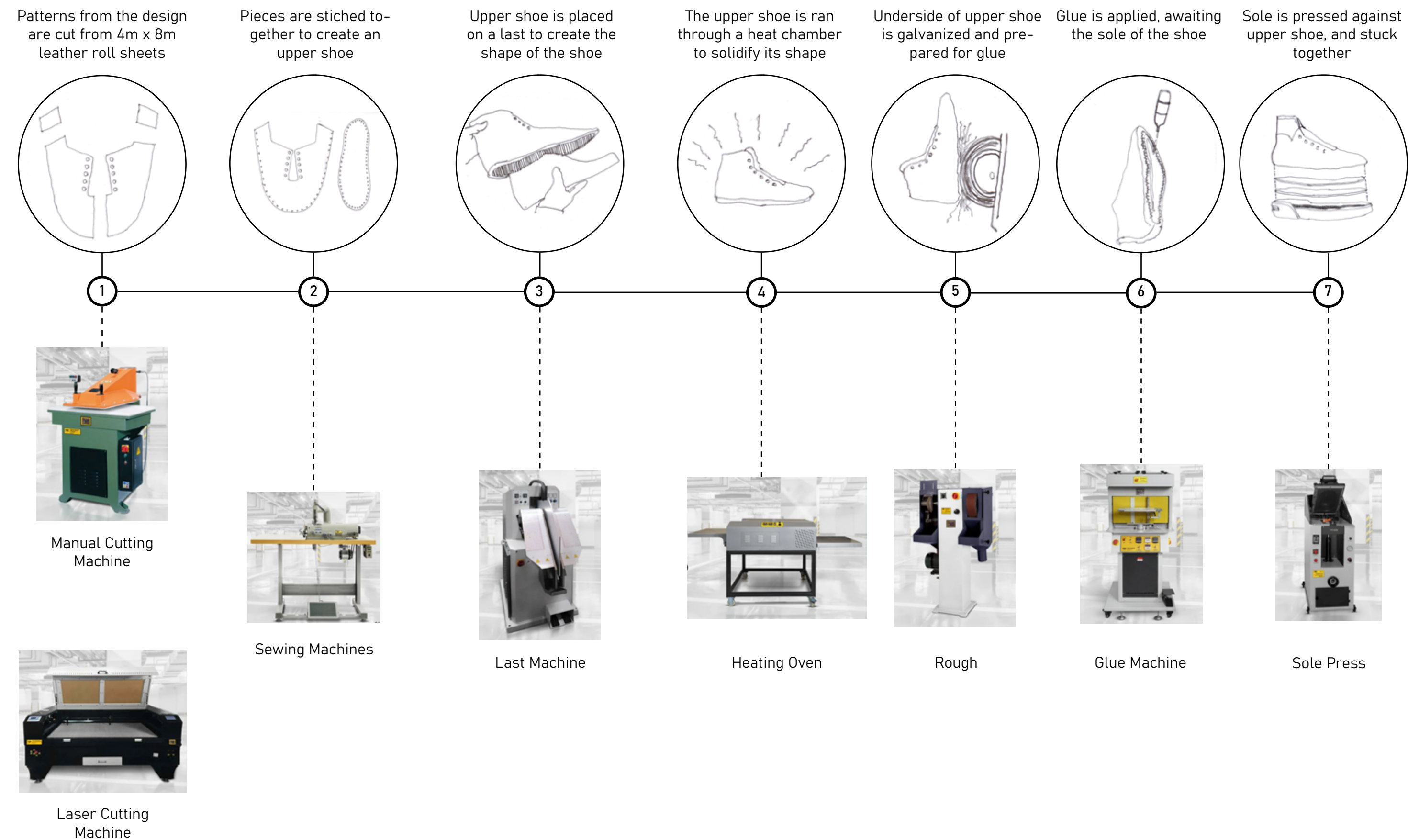
GROUND FLOOR PLAN



Beer Making Process



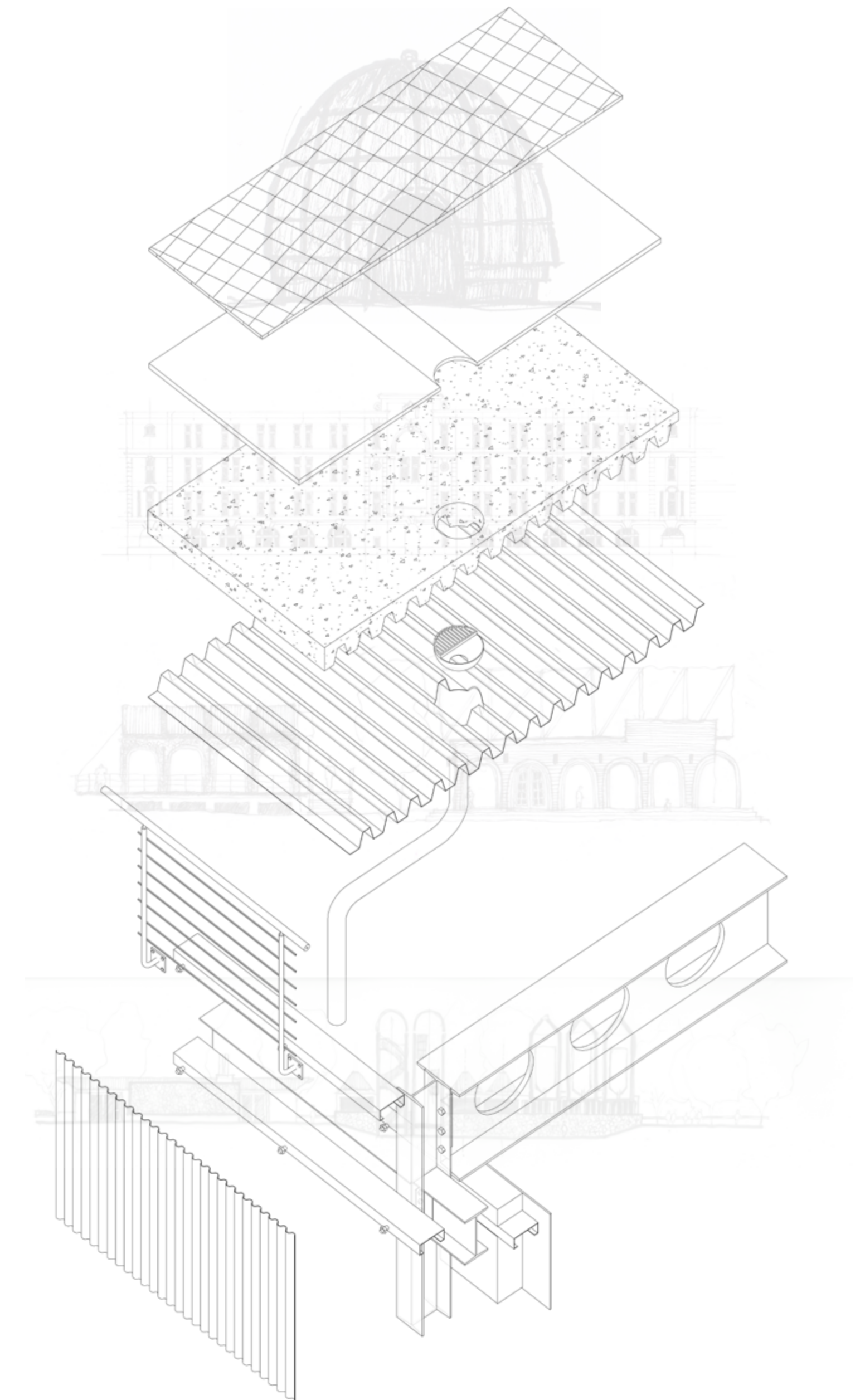
Leather Shoe Making Process



All Programs and required Square meters

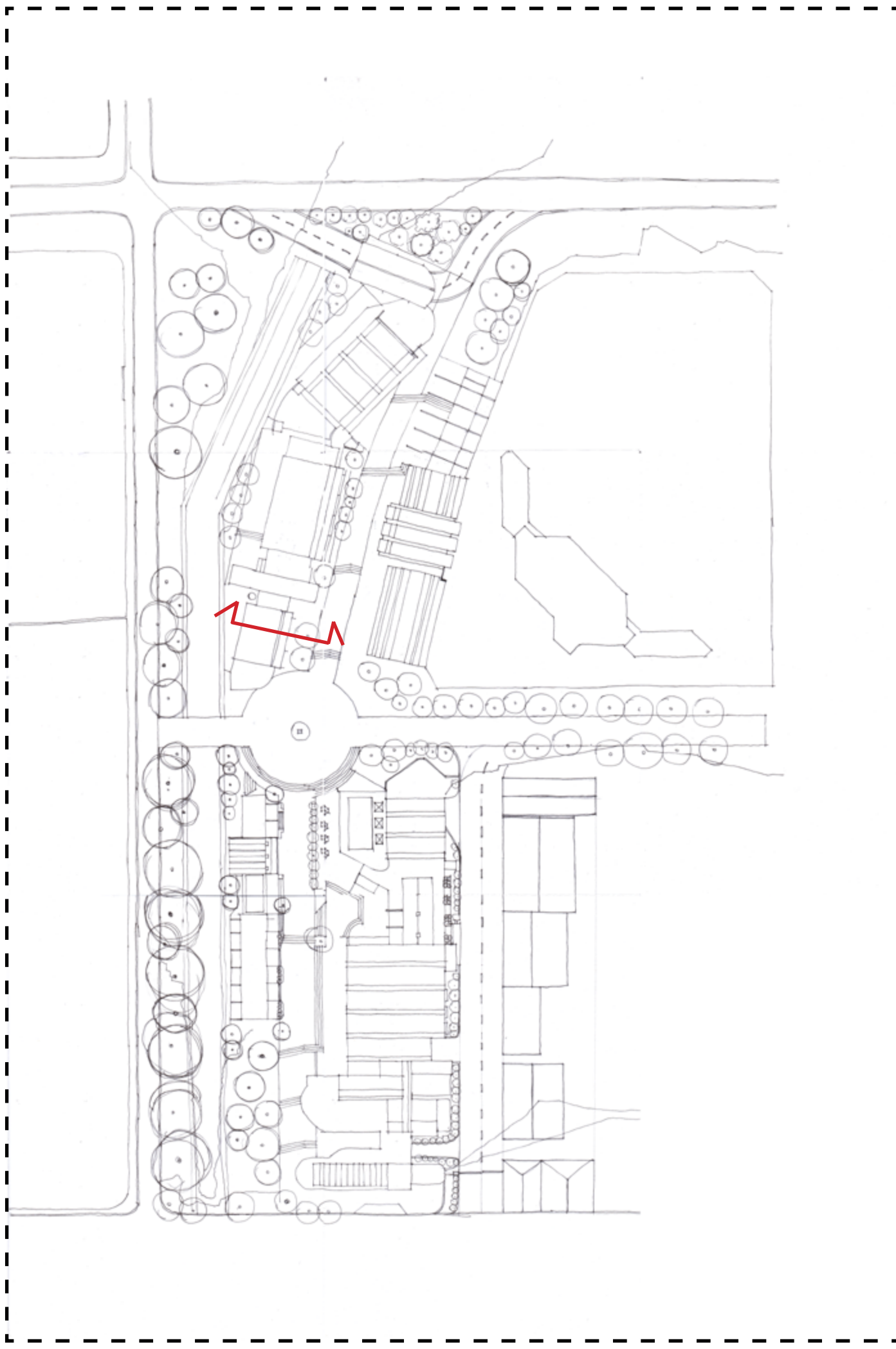
Accommodation Schedule	Area
Office Space	
Offices	320 m ²
Ablutions	184 m ²
Board Rooms	30 m ²
Reception	131 m ²
Lounge	130 m ²
Kitchenette	28 m ²
Production	
Storage	130 m ²
Laser Cutting Room	55 m ²
Storage	80 m ²
Cutting and Lasting Machine Space	142 m ²
Sewing Stations	265 m ²
Gluing Machine Space	80 m ²
Cleaning & Polishing Spaces	40 m ²
Quality control	150 m ²
Boxing Station	130 m ²
Pavilion	
Dry Store	33 m ²
Cold Store	21 m ²
Ablutions	73 m ²
Service Yard	N/A
Waste Yard	21 m ²
Kitchen	96 m ²
Hall	385 m ²
Brewhouse	
Offices	111 m ²
Ablutions	23 m ²
Kitchenette	46 m ²
Dry Store	49 m ²
Production Floor	121 m ²
Storage Tanks Room	304 m ²
Pavilion	
Toilets	
Seating Space	586 m ²
Storage	30 m ²
Cold Store	
First Floor	
Design Library	232 m ²
Meeting Rooms	159 m ²
Design Studio	167 m ²
Prototyping Centre	226 m ²
Balcony / Rooftop Garden	329 m ²

TECHNICAL INTENTION

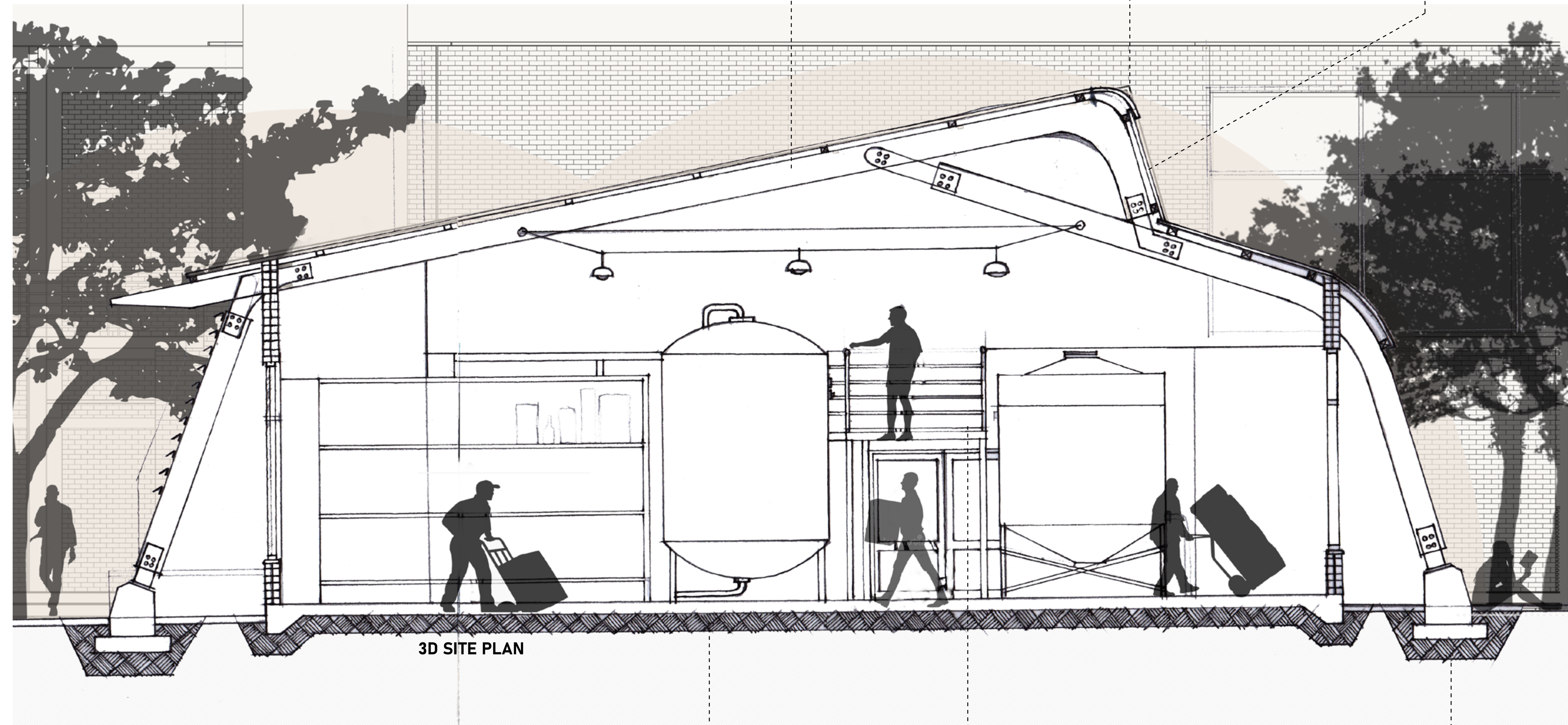


TECHNICAL INTENTION

- INDUSTRIAL REGIONALISM
- STRUCTURAL EFFICIENCY
- ONTOLOGICAL REVELATION
- INDUSTRIAL AESTHETIC



SITE PLAN

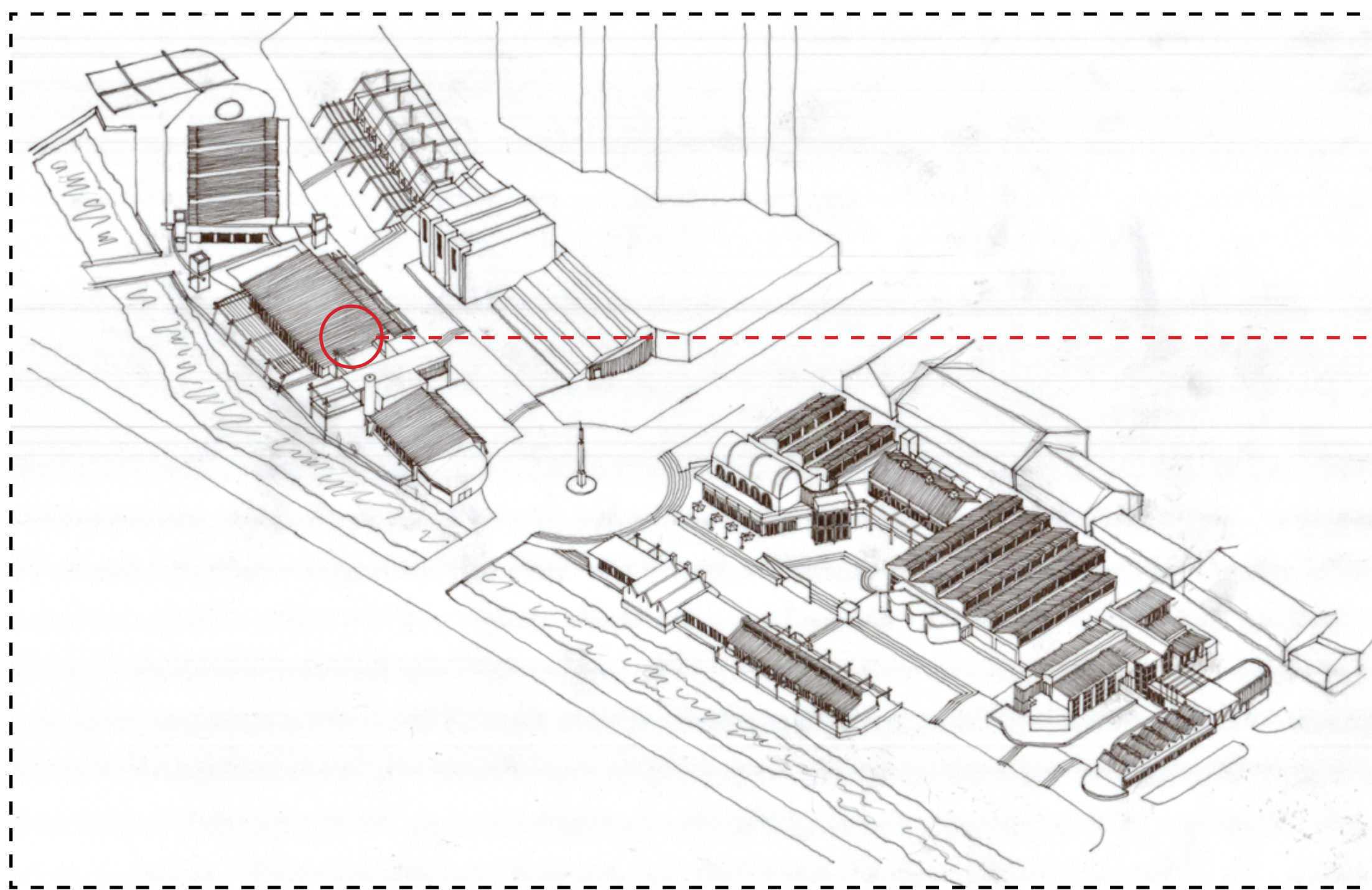


3D SITE PLAN

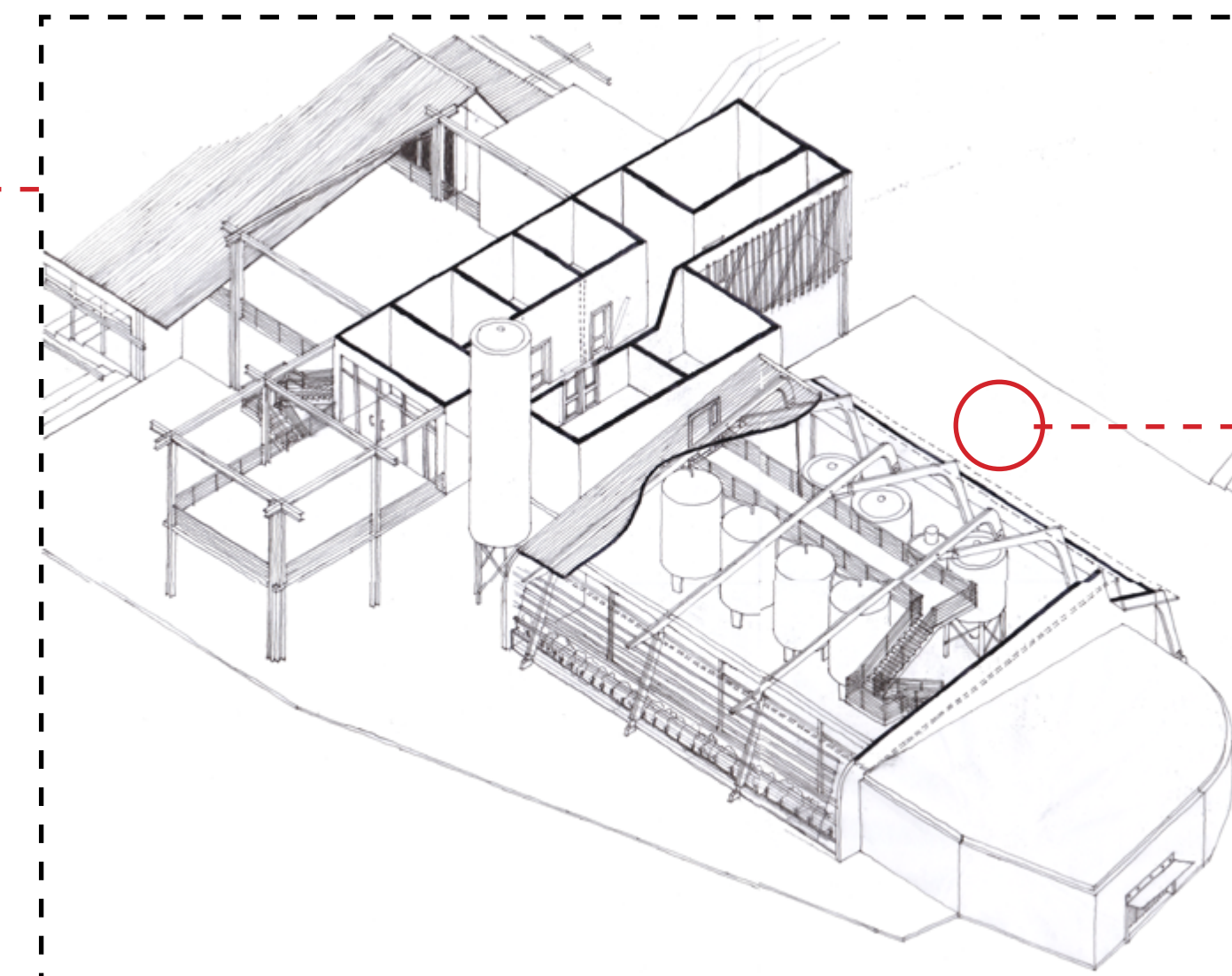
Slab on Edge Reinforced Concrete Foundation

Slab on Edge Reinforced Concrete Foundation

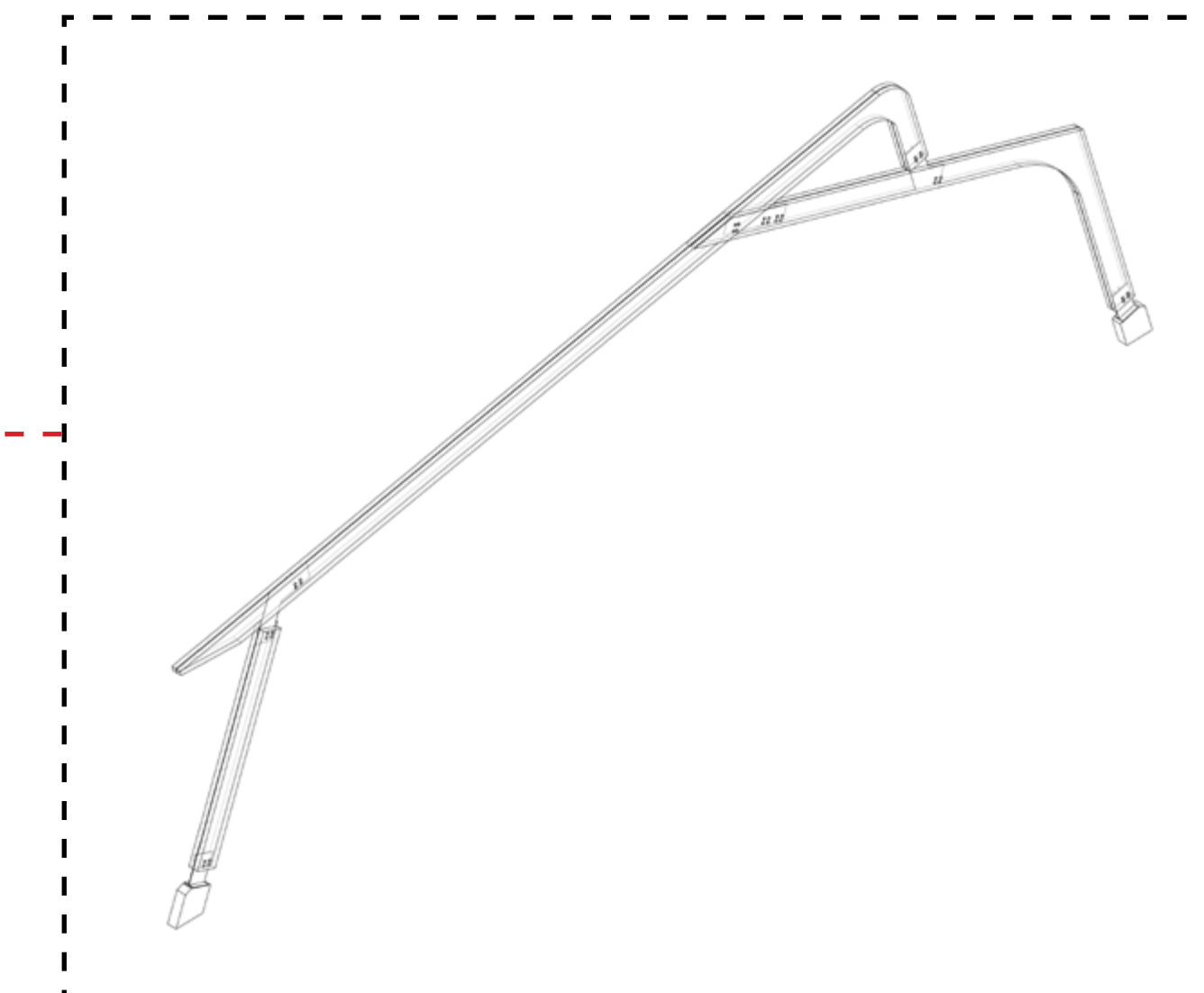
Slab on Edge Reinforced Concrete Foundation



3D SITE PLAN - BREWHOUSE



BREWHOUSE STRUCTURE



BREWHOUSE TRUSS

Steel Tensile Cable

Tap-House/Brewery

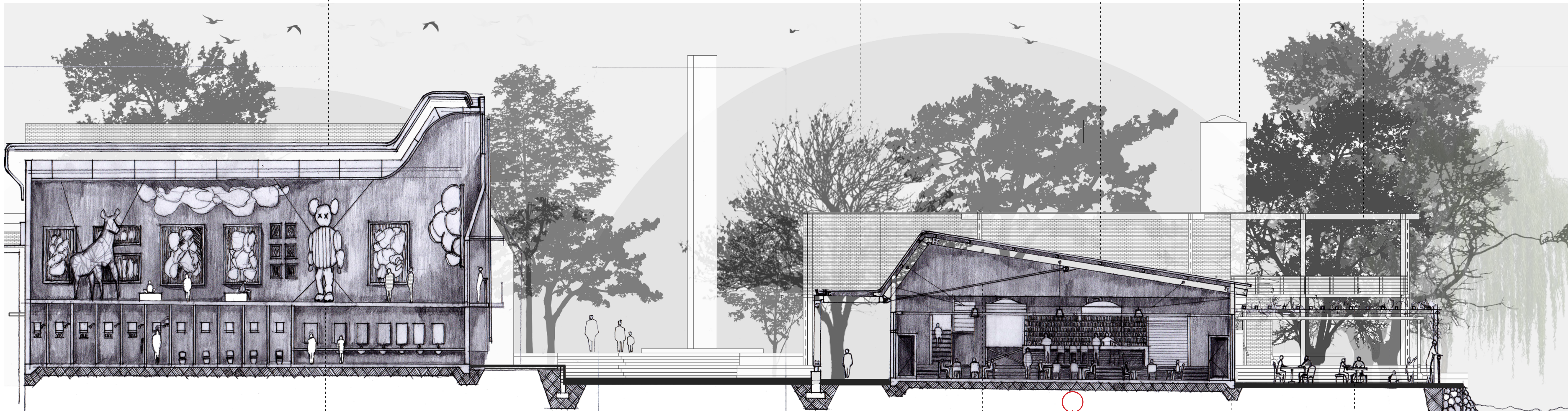
170mm thick Metal-Concrete Roof Decking

Grain Silo

Roof Note: Metal Sheetting Fixed to Steel Lipped Channels Bolted to Timber Rafters

Grain Silo

Structural Steel Frame Balcony



170mm Metal-Concrete Decking Floor Resting on Castillatedl-beams

Slab on Edge Reinforced Concrete Foundation

Pergola Pinned to Concrete Footing

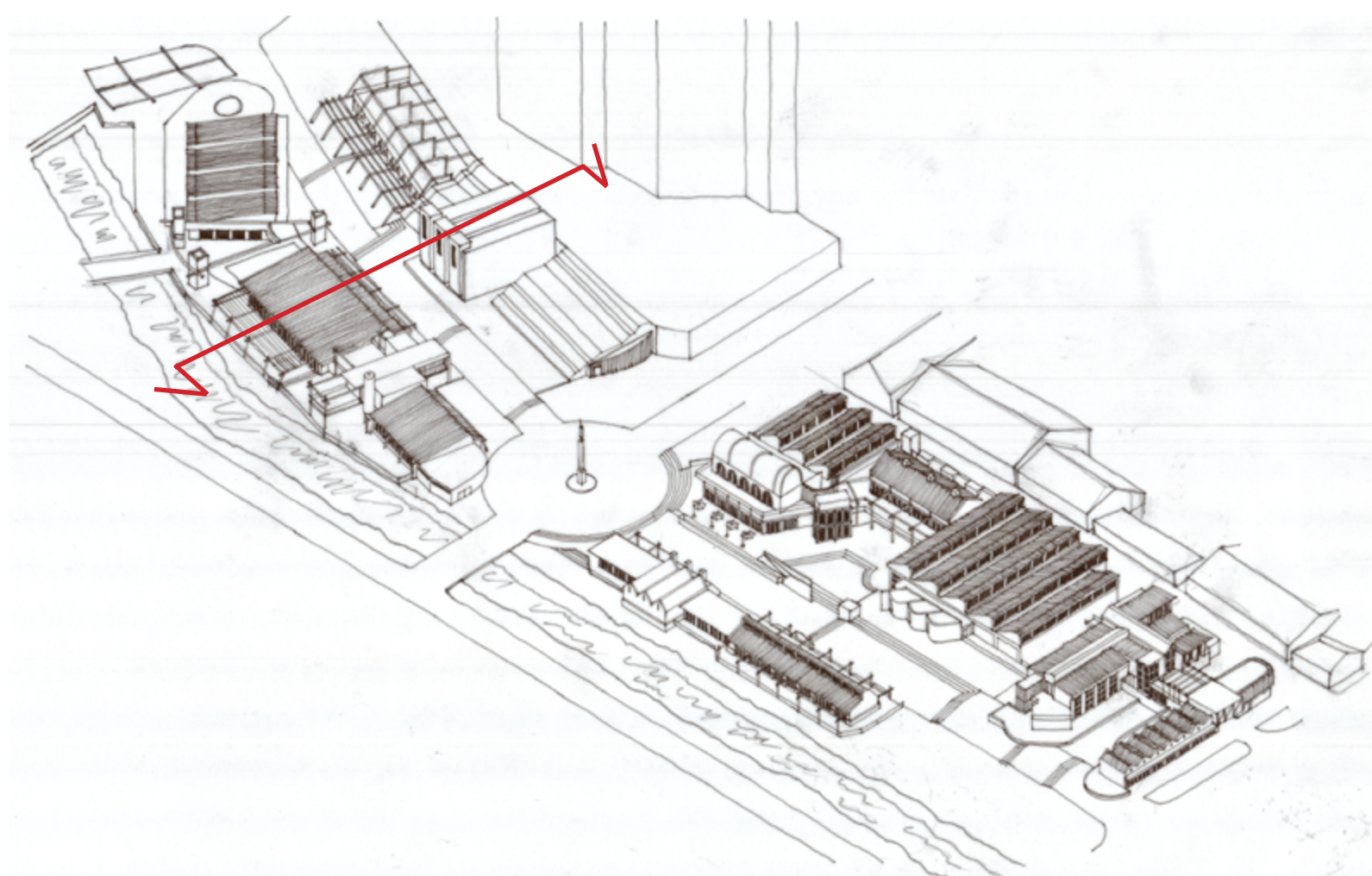
Steel Tensile Cable

Slab on Edge Reinforced Concrete Foundation

Paving Note Brickwork Paving

Gabion Retaining Wall

CREEK



3D SITE PLAN



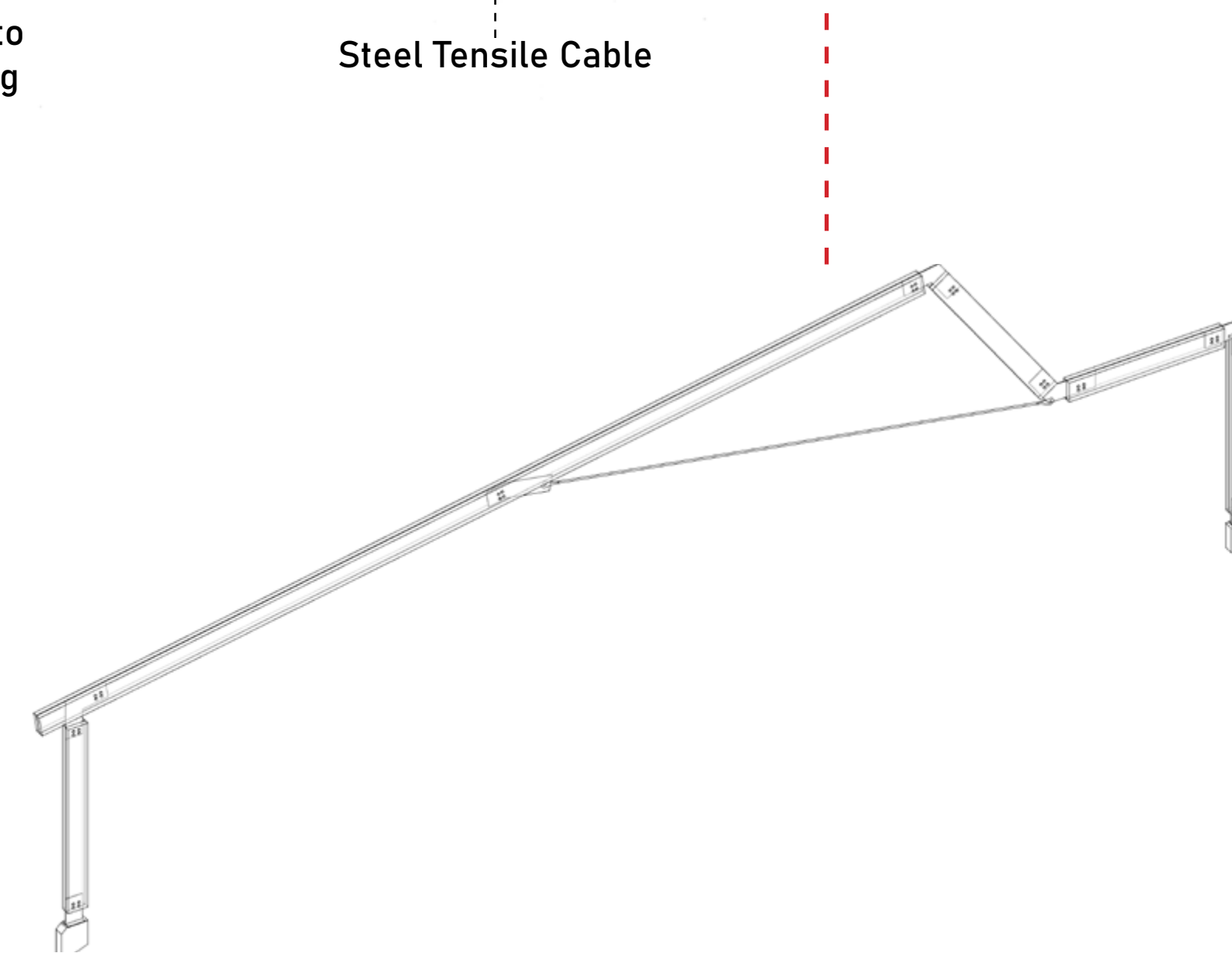
MANUFACTURING + REPAIRS

RETAIL + LEISURE

DESIGN

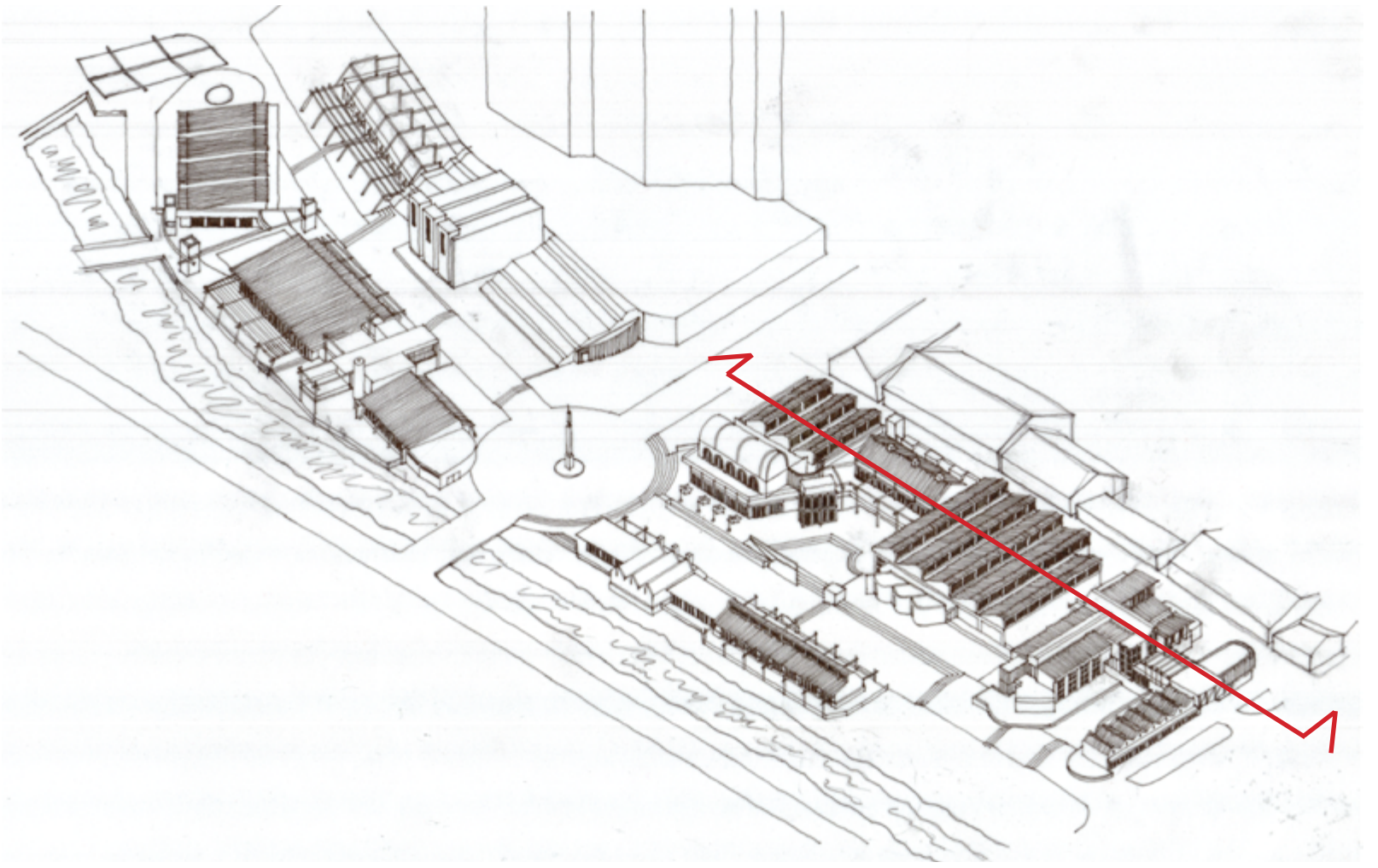
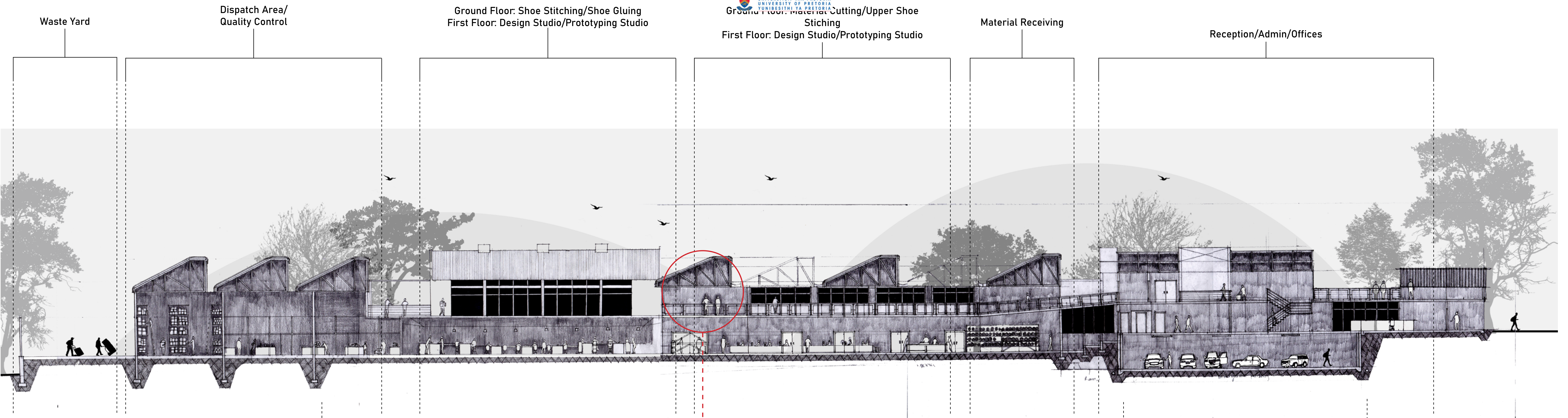
EXHIBITION

PROGRAM SCHEME

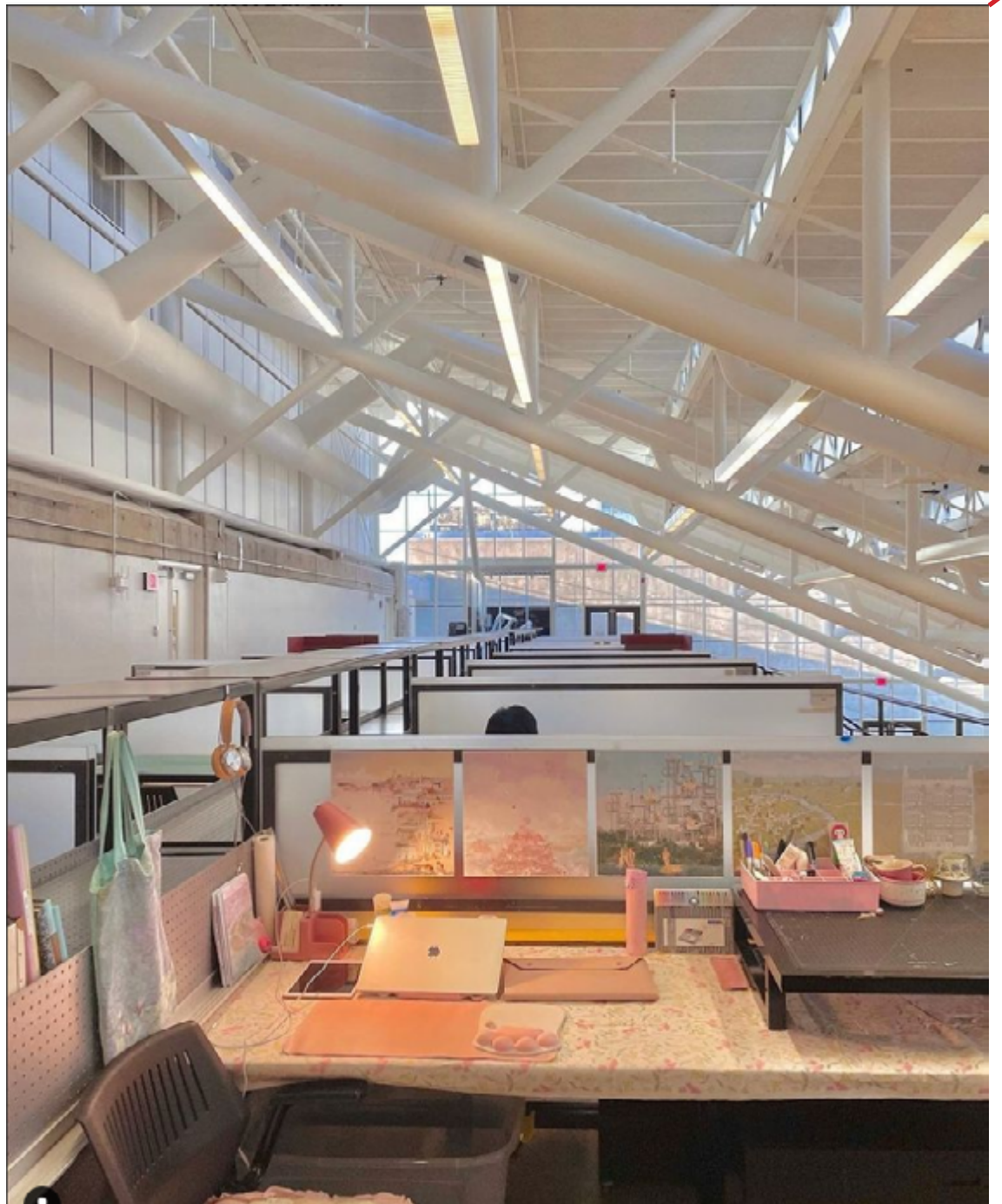


TAP-HOUSE TRUSS

STRUCTURE



3D SITE PLAN



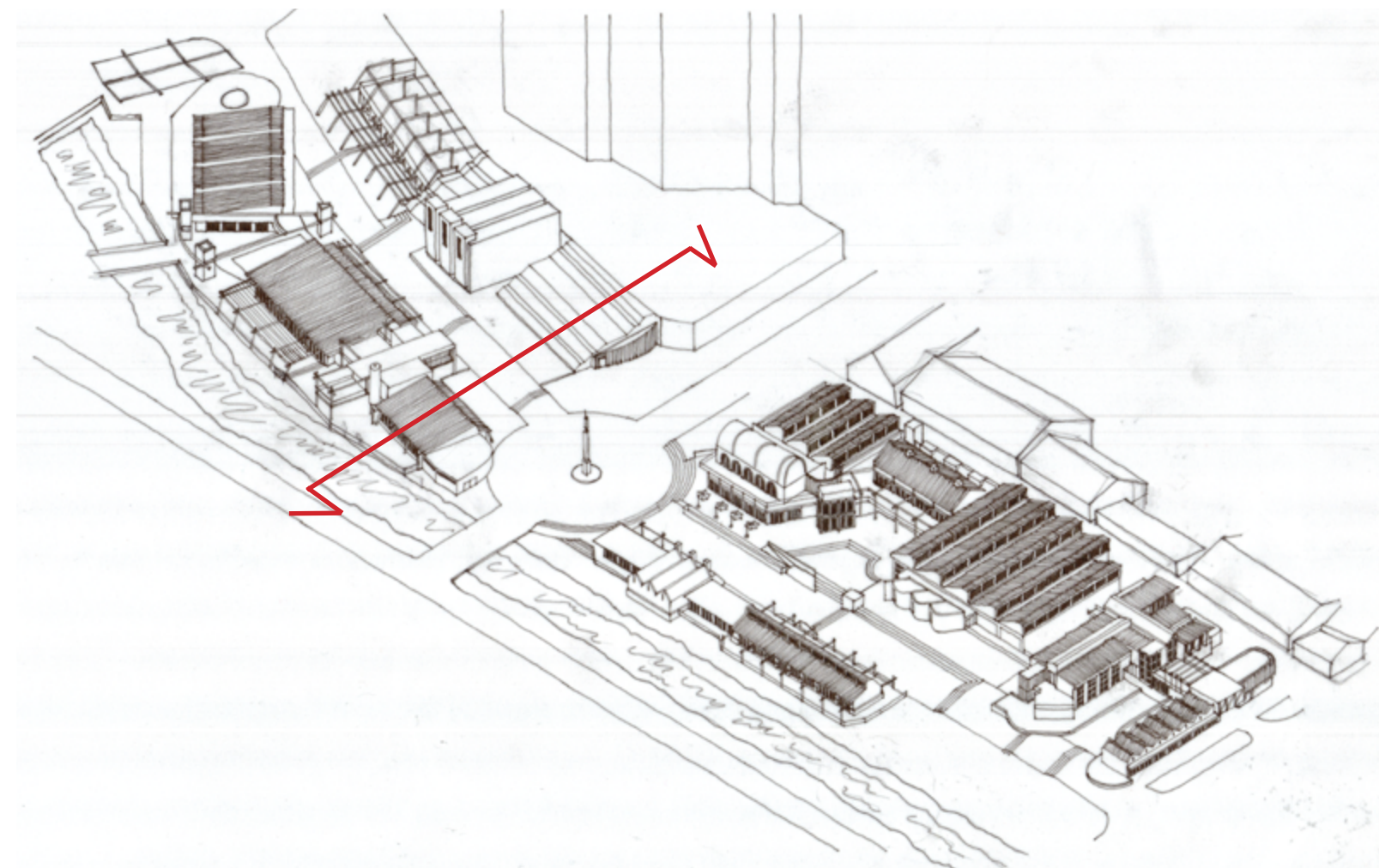
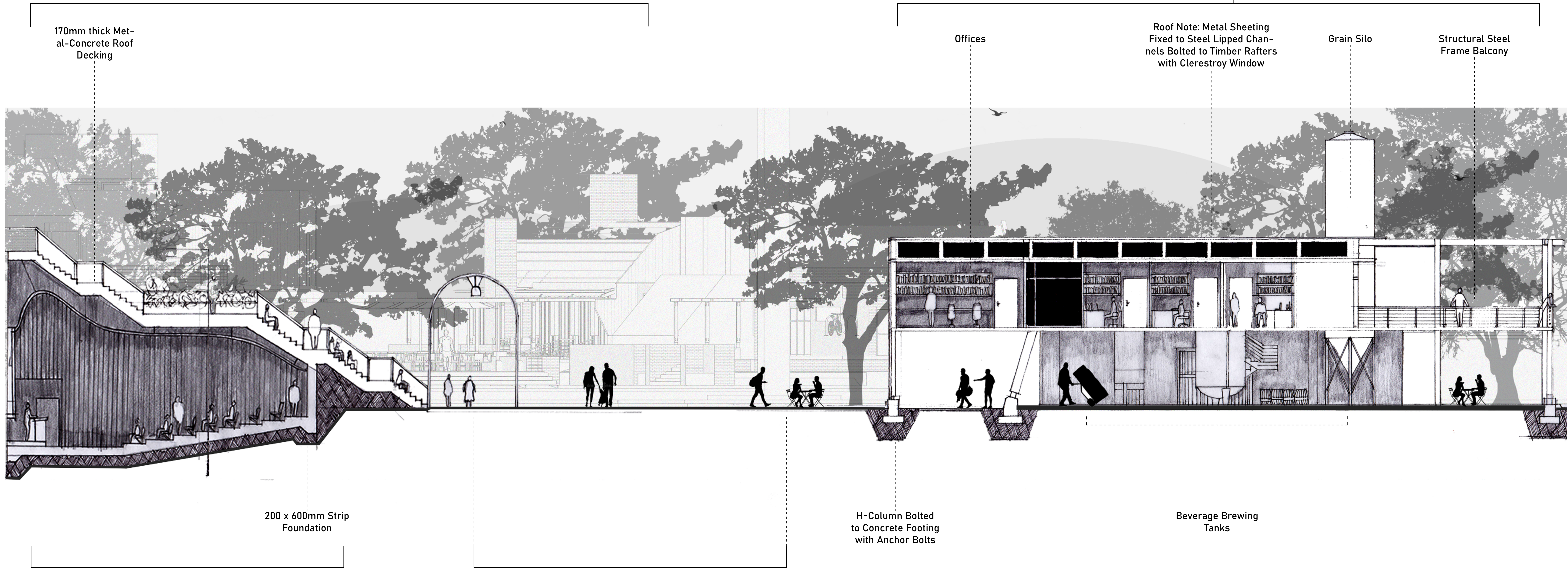
SPATIAL EXAMPLES
© University of Pretoria



MANUFACTURING + REPAIRS RETAIL + LEISURE DESIGN EXHIBITION

PROGRAM SCHEME

STRUCTURE



MANUFACTURING + REPAIRS RETAIL + LEISURE DESIGN EXHIBITION

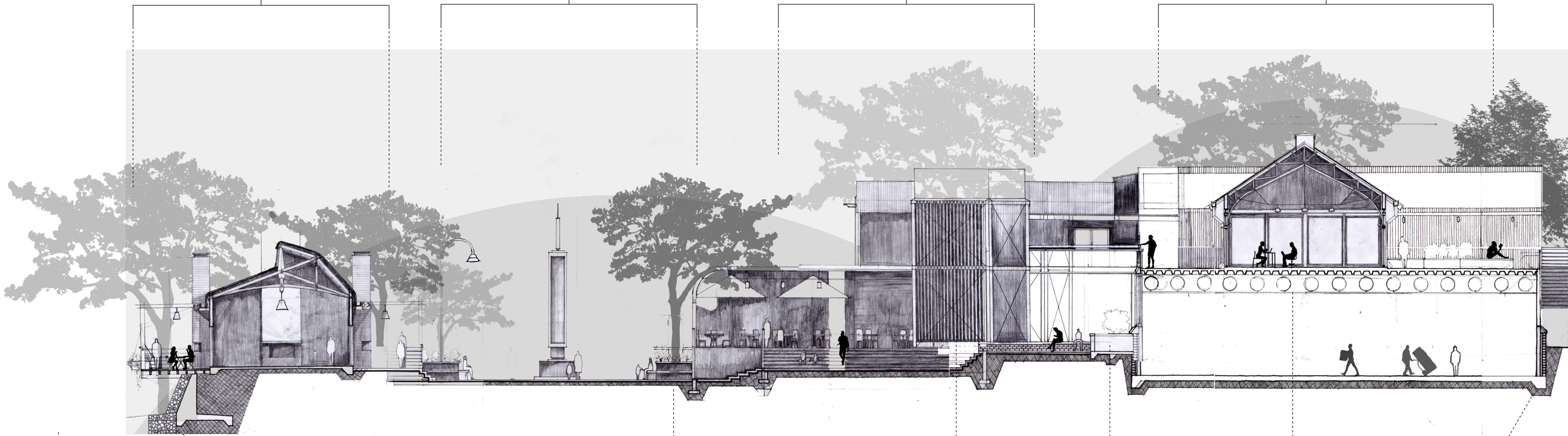
PROGRAM SCHEME

Dispatch Area/
Quality Control

Ground Floor: Shoe Stitching/Shoe Gluing
First Floor: Design Studio/Prototyping Studio

Ground Floor: Shoe Customization Shop
First Floor: Study/Design Library

Ground Floor : Production Area
First Floor : Prototyping Studio



Creek

Gabion Retaining
Wall

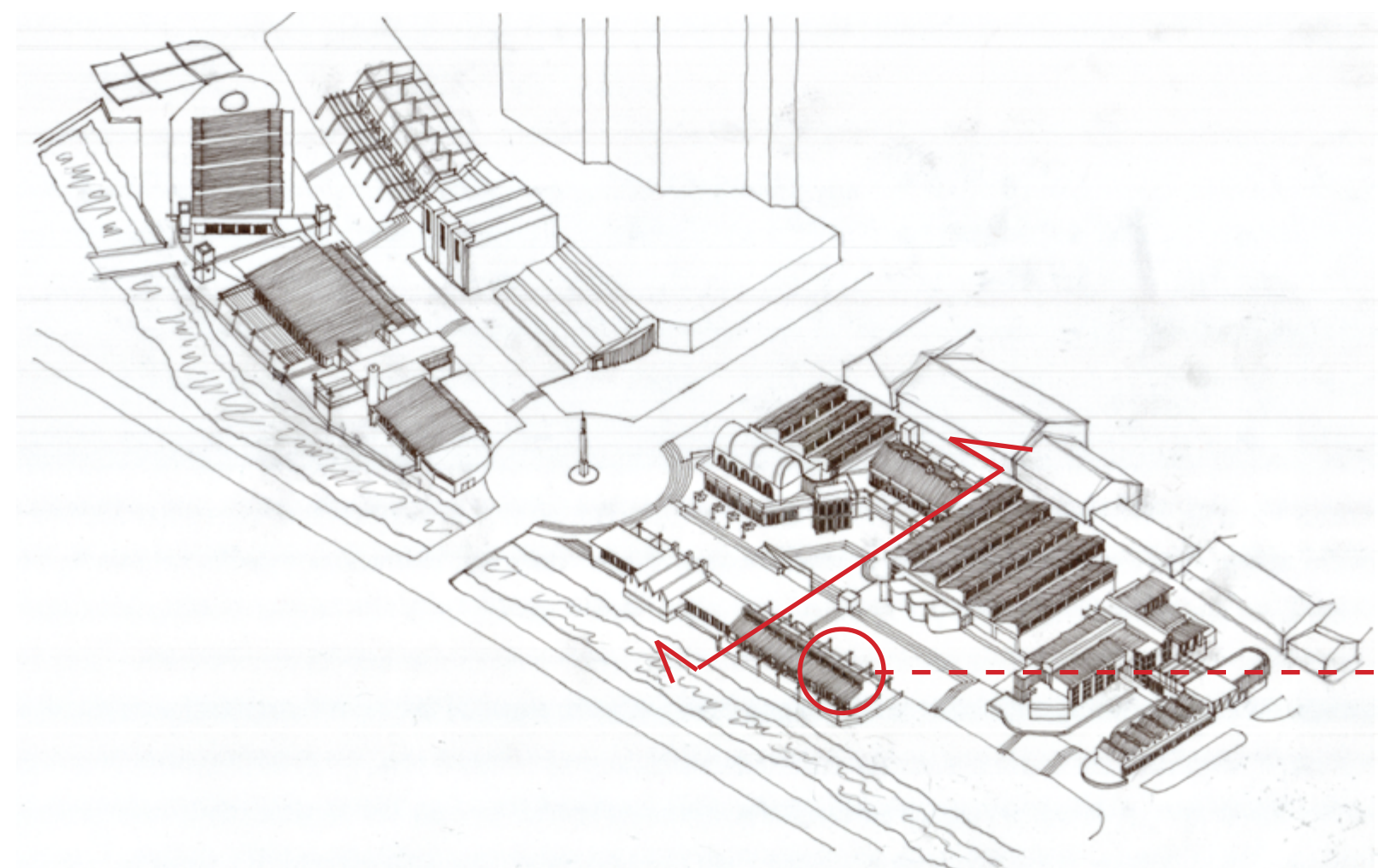
Elevator Wrapped by
Steel Timber Stair-
cases

Steel and Glass El-
evator Wrapped by
Steel Timber Stair-
cases. Steel Struc-
ture clad with Timber
Slats

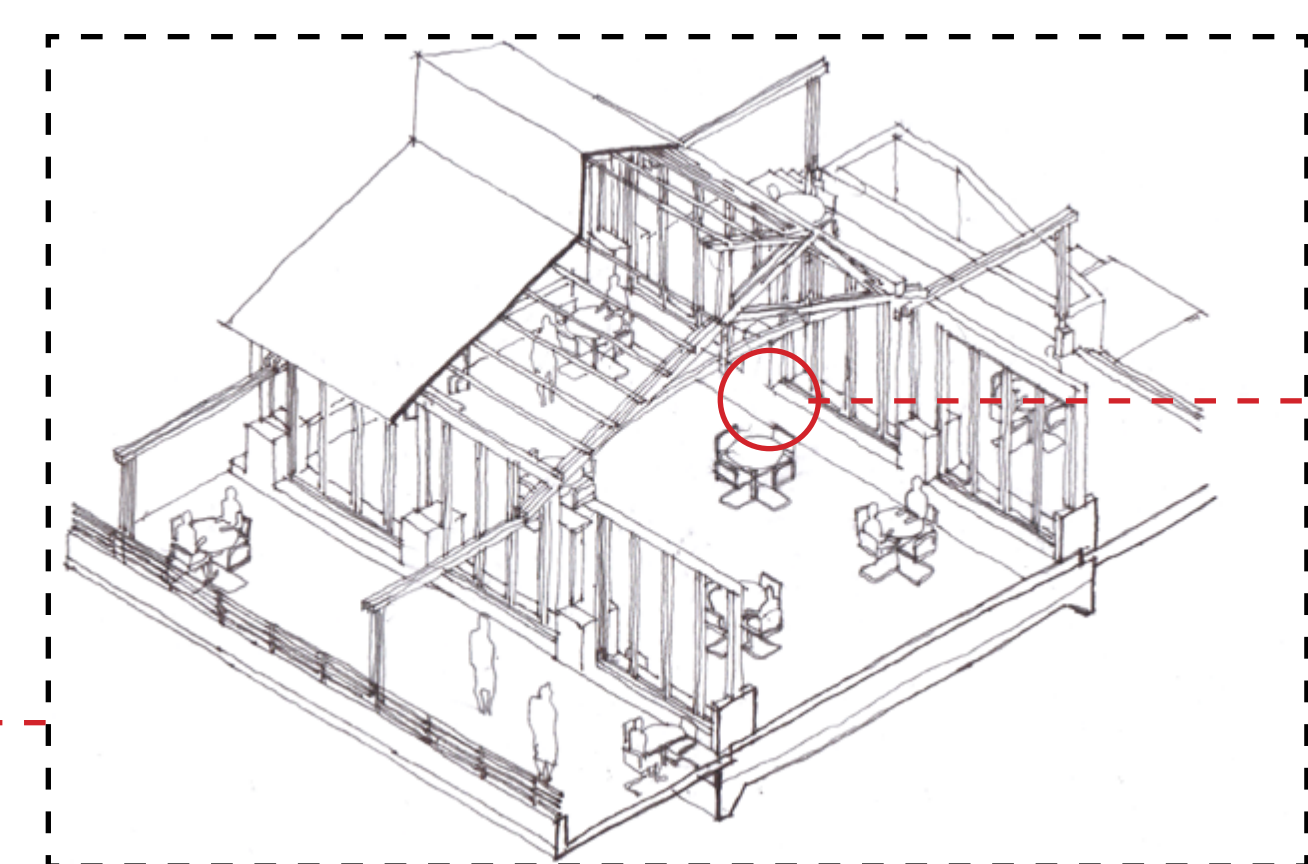
Built-in Planter

Metal-Concrete Floor
Decking Supported
by a Castillated Steel
I-beam

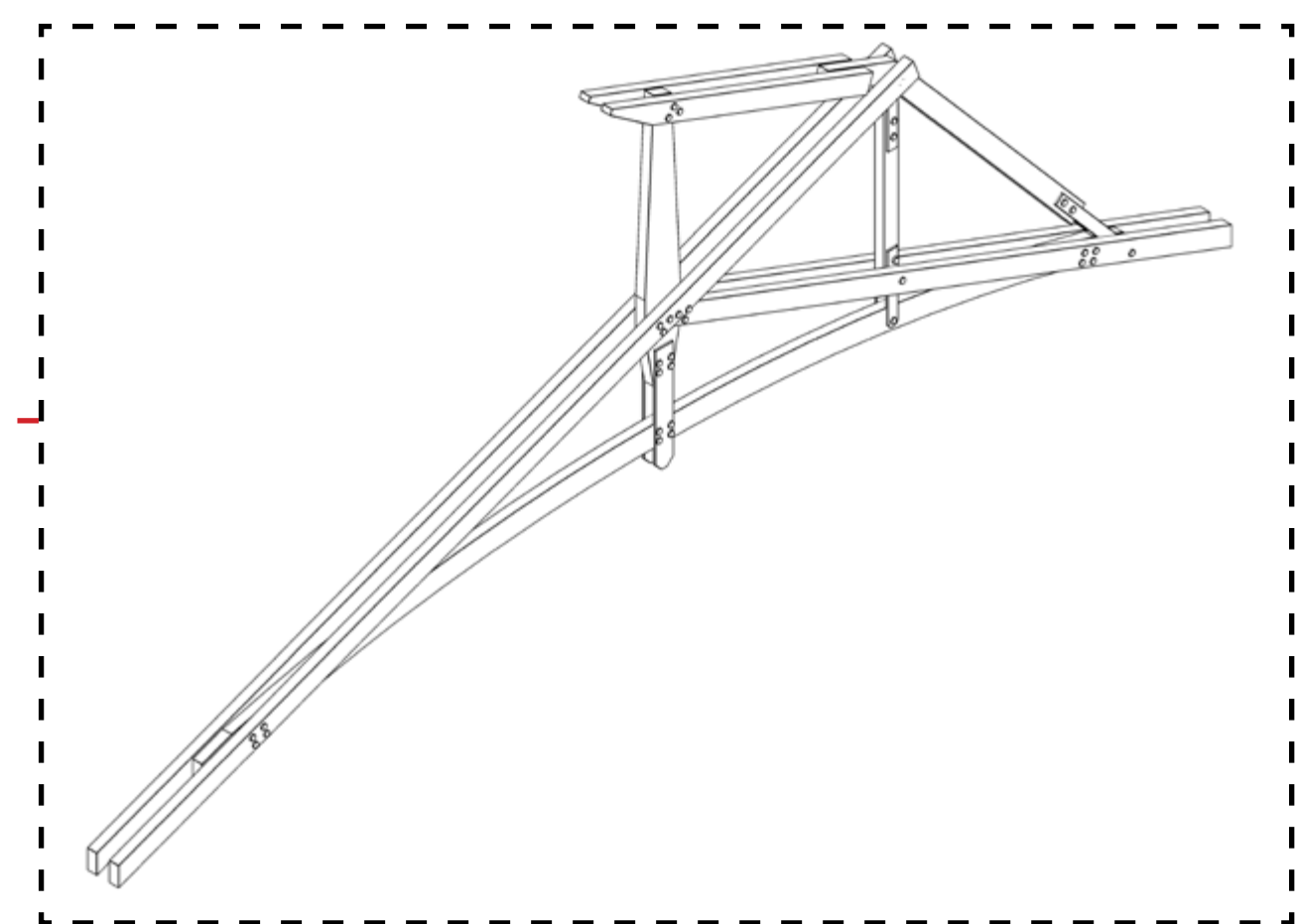
Slab on Edge Re-
inforced Concrete
Foundation



3D SITE PLAN



PAVILION TRUSS



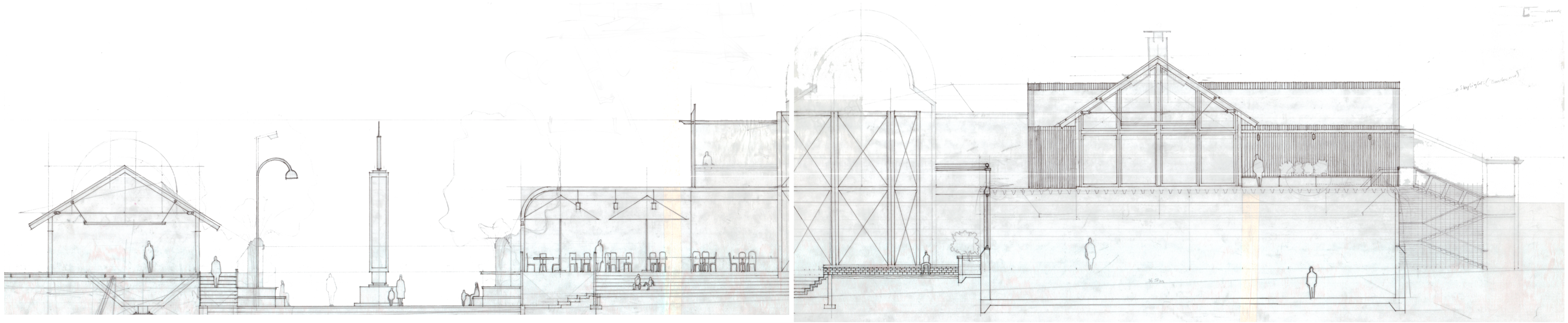
PAVILION TRUSS



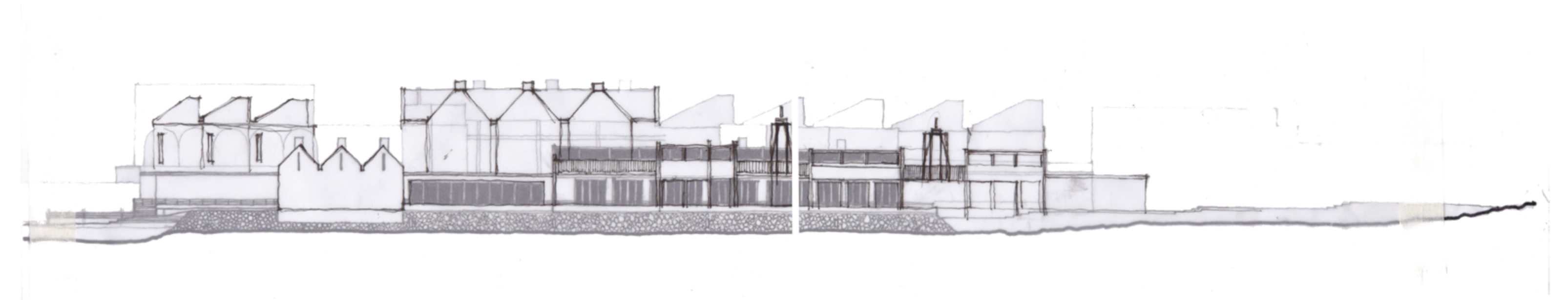
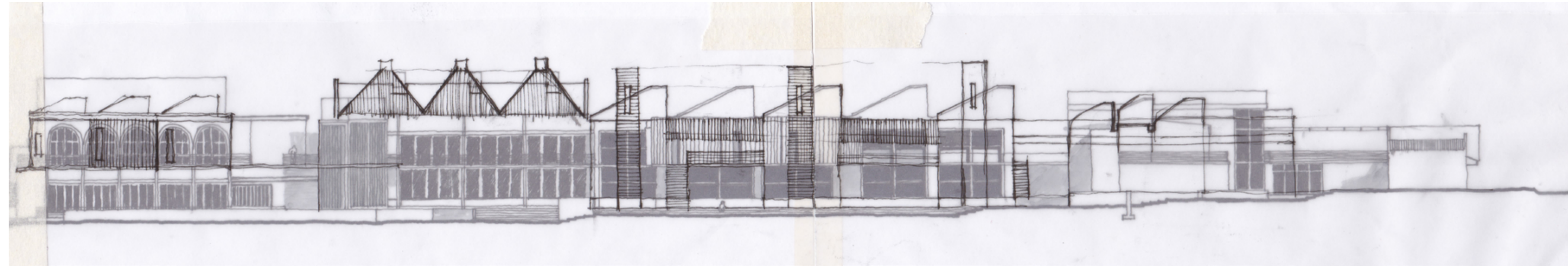
MANUFACTURING + REPAIRS RETAIL + LEISURE DESIGN EXHIBITION

PROGRAM SCHEME

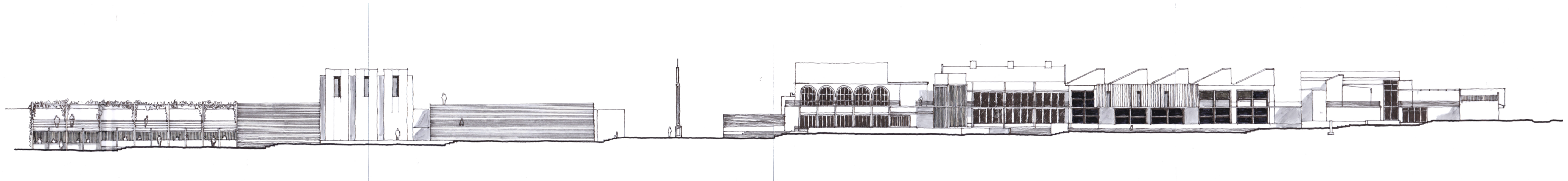
STRUCTURE



SECTION DEVELOPMENT

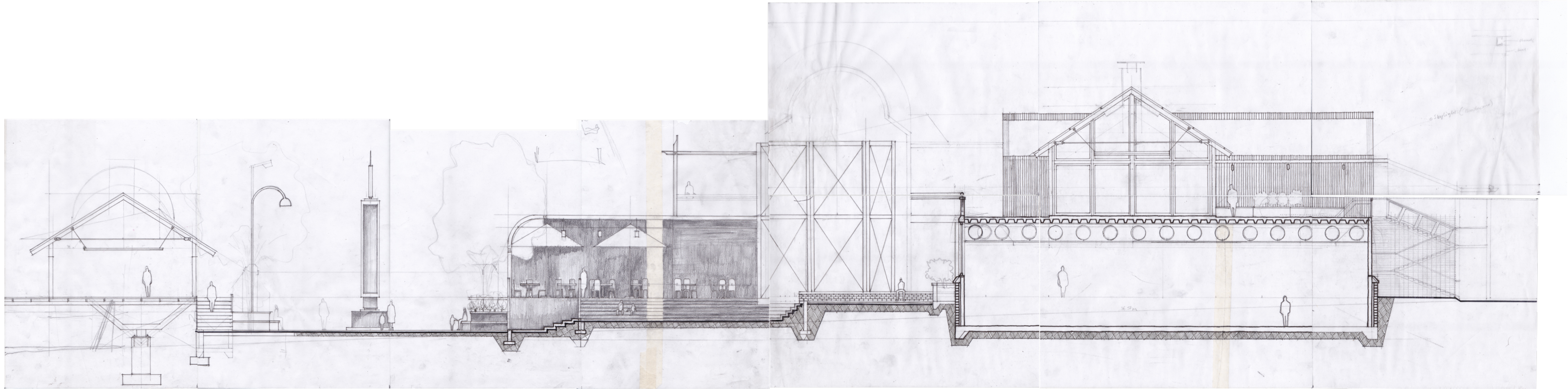


ELEVATION DEVELOPMENT

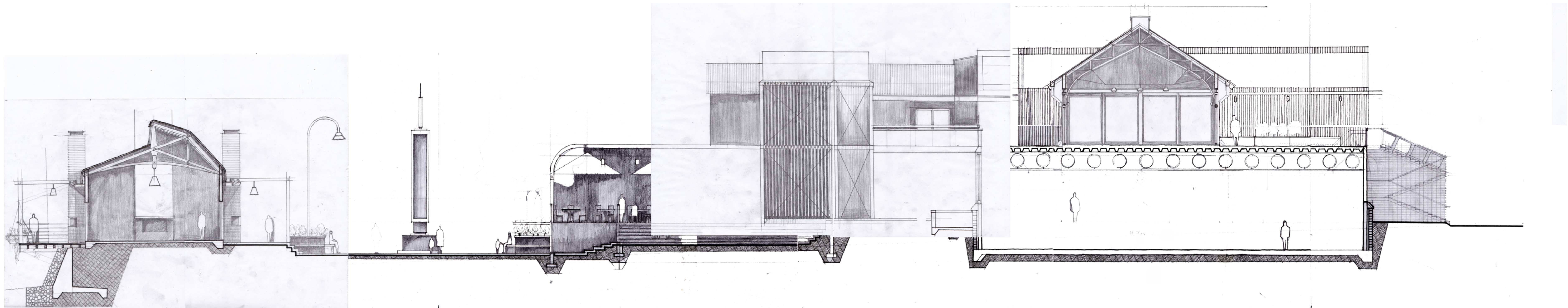


LONG ELEVATION

STRUCTURE



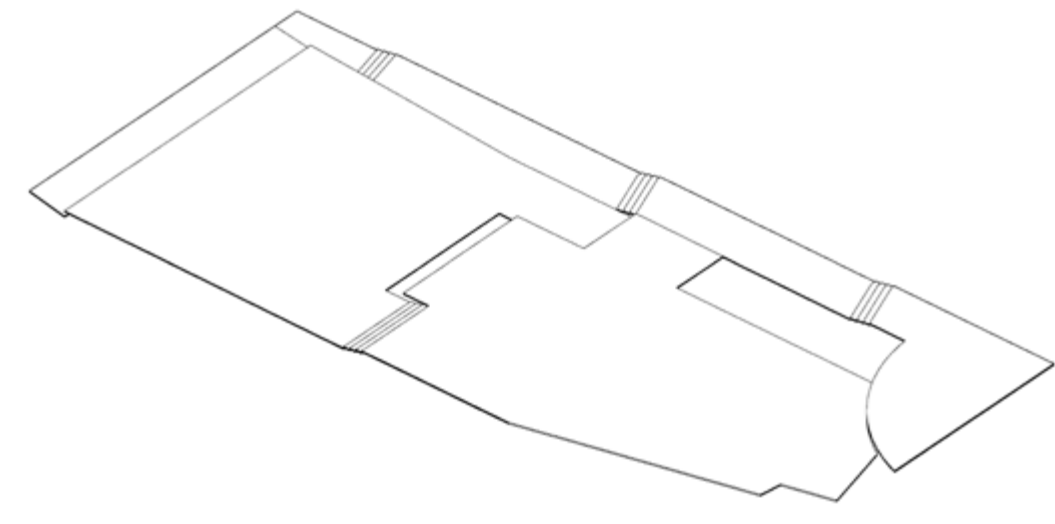
SECTION DEVELOPMENT



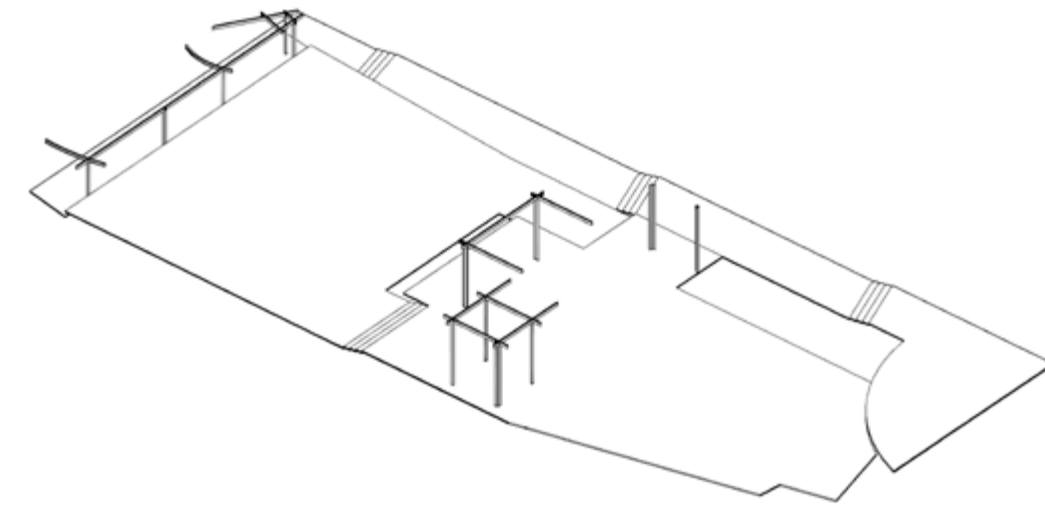
SECTION DEVELOPMENT

STRUCTURE

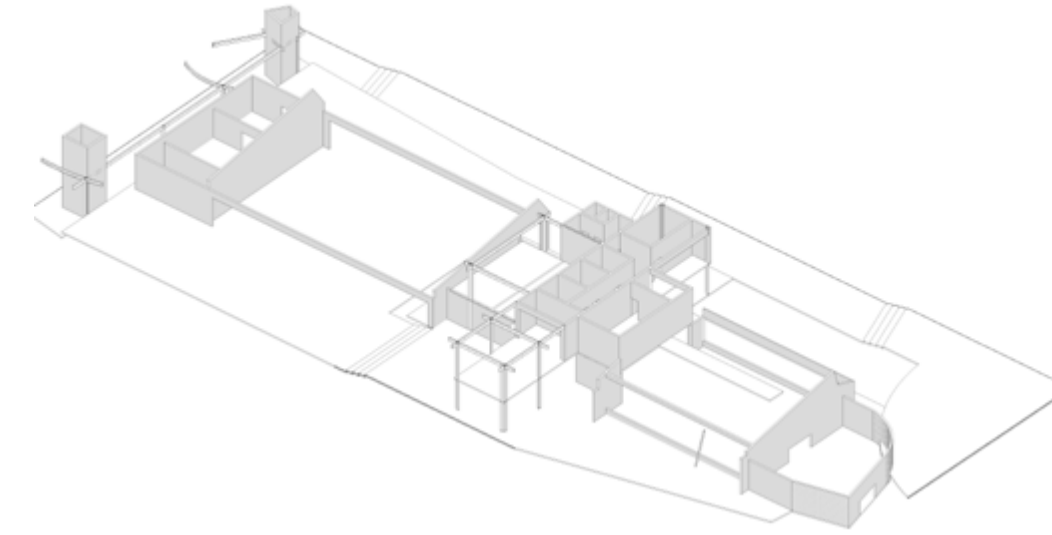
BREWHOUSE



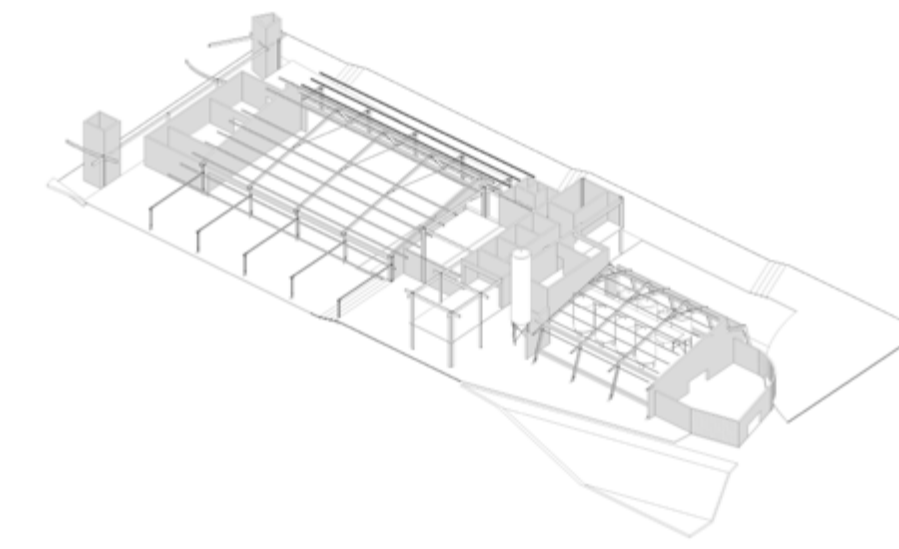
FOUNDATION / FLOOR



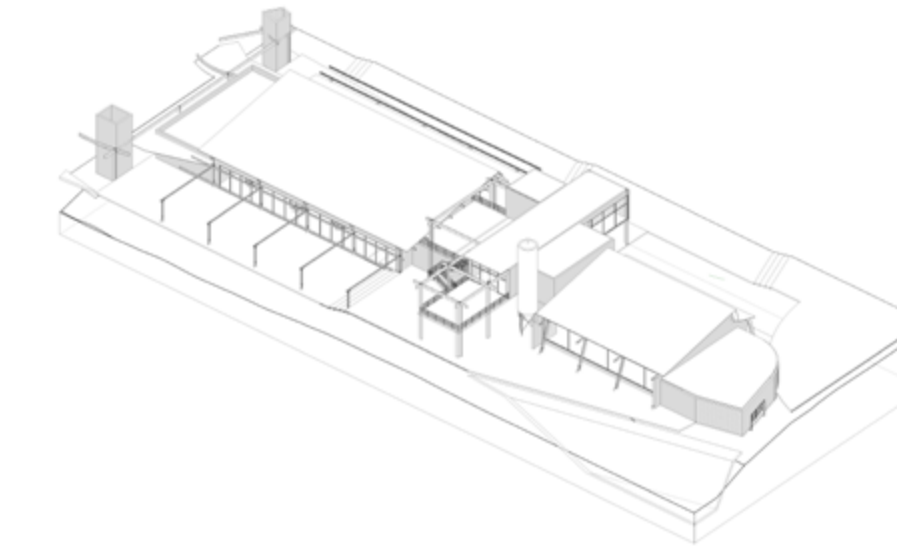
STEEL STRUCTURE



BRICK INFILL

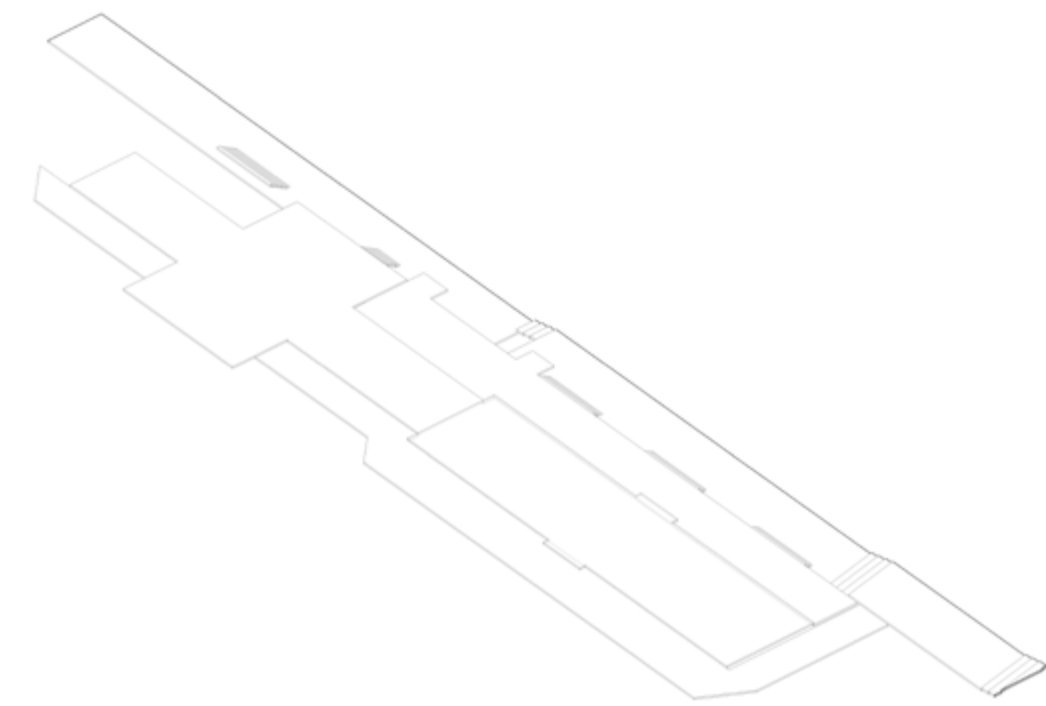


TRUSS SYSTEM

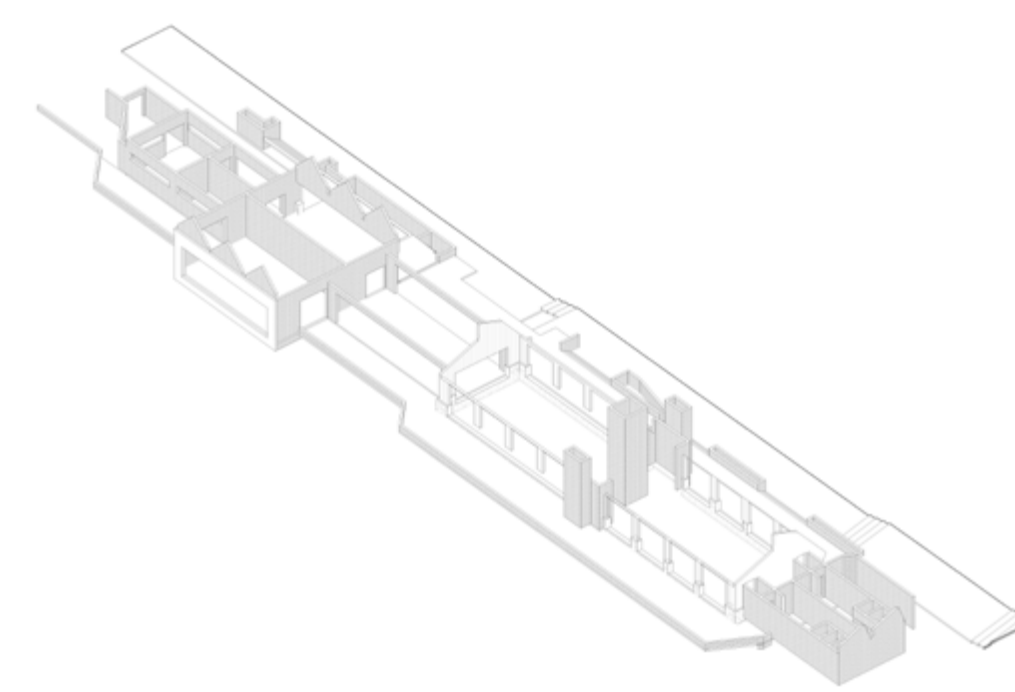


ROOF SHEETING

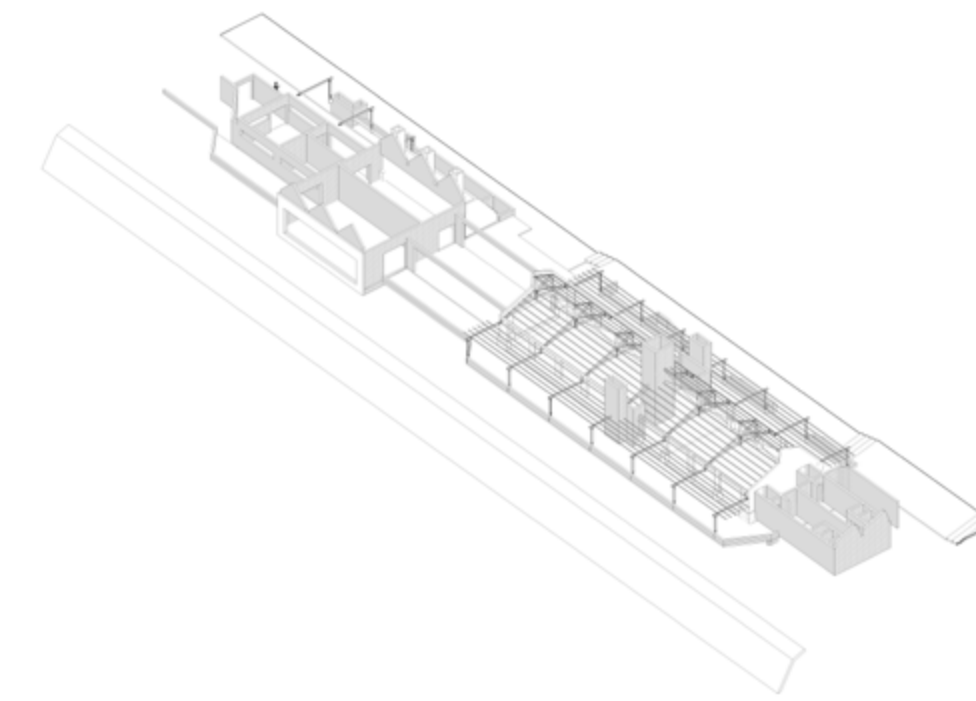
PAVILION



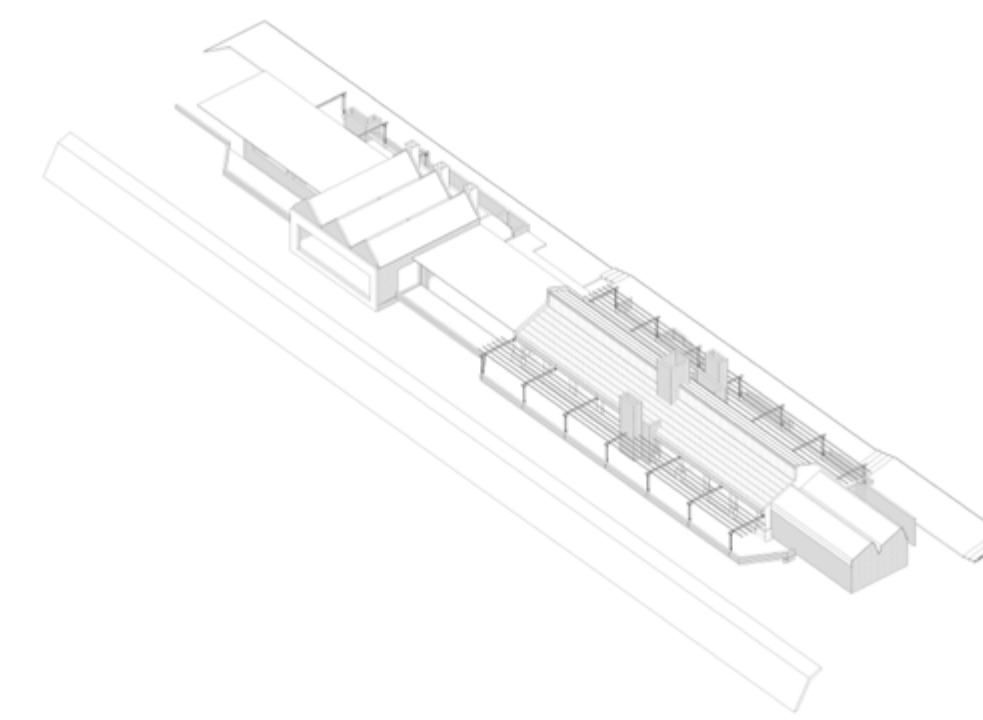
FOUNDATION / FLOOR



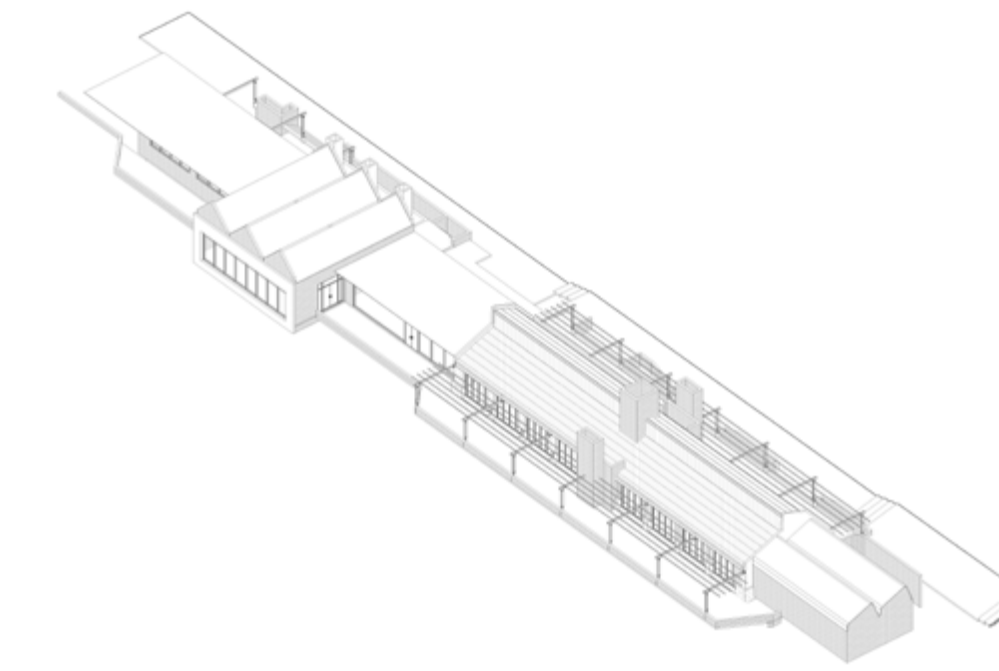
LOAD BEARING WALLS



TRUSS SYSTEM

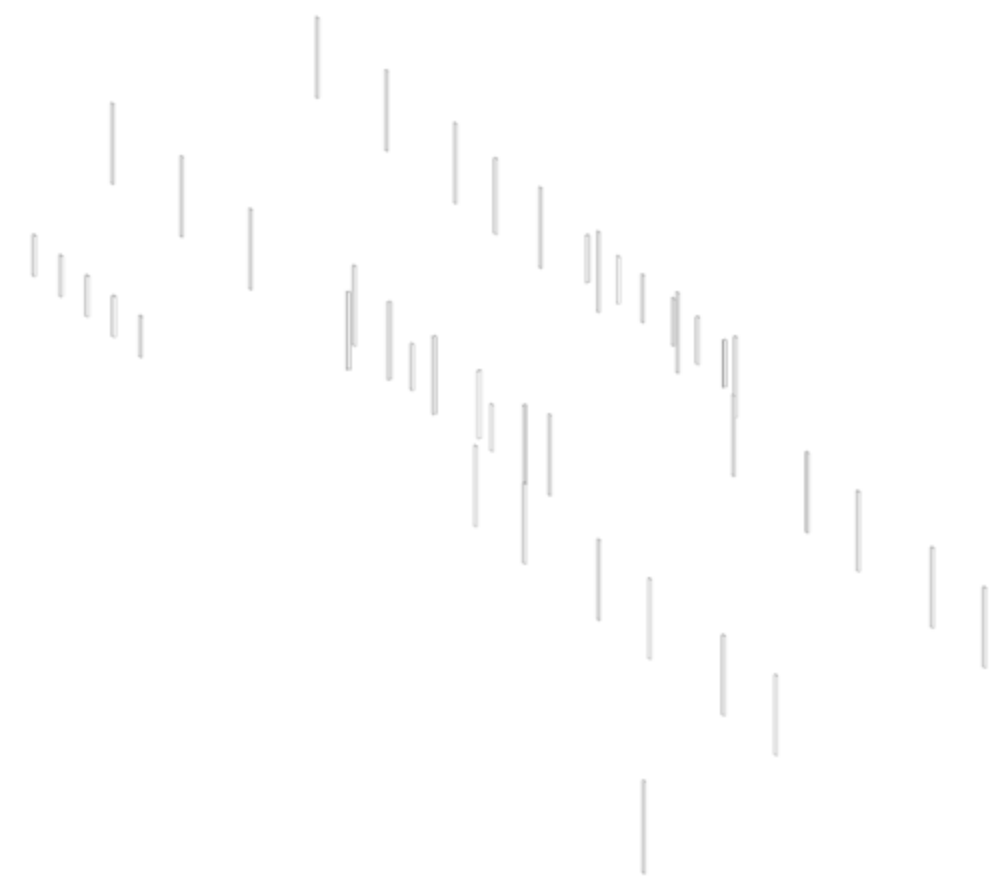


ROOF SHEETING

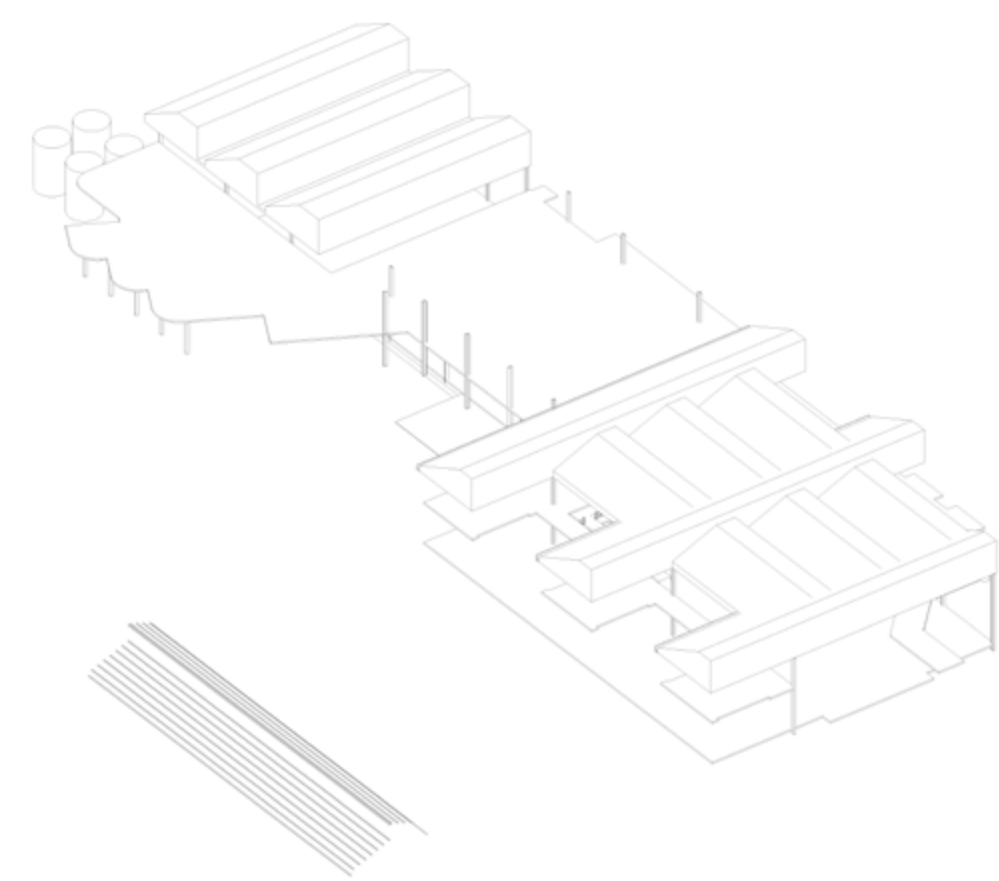


FENESTRATION

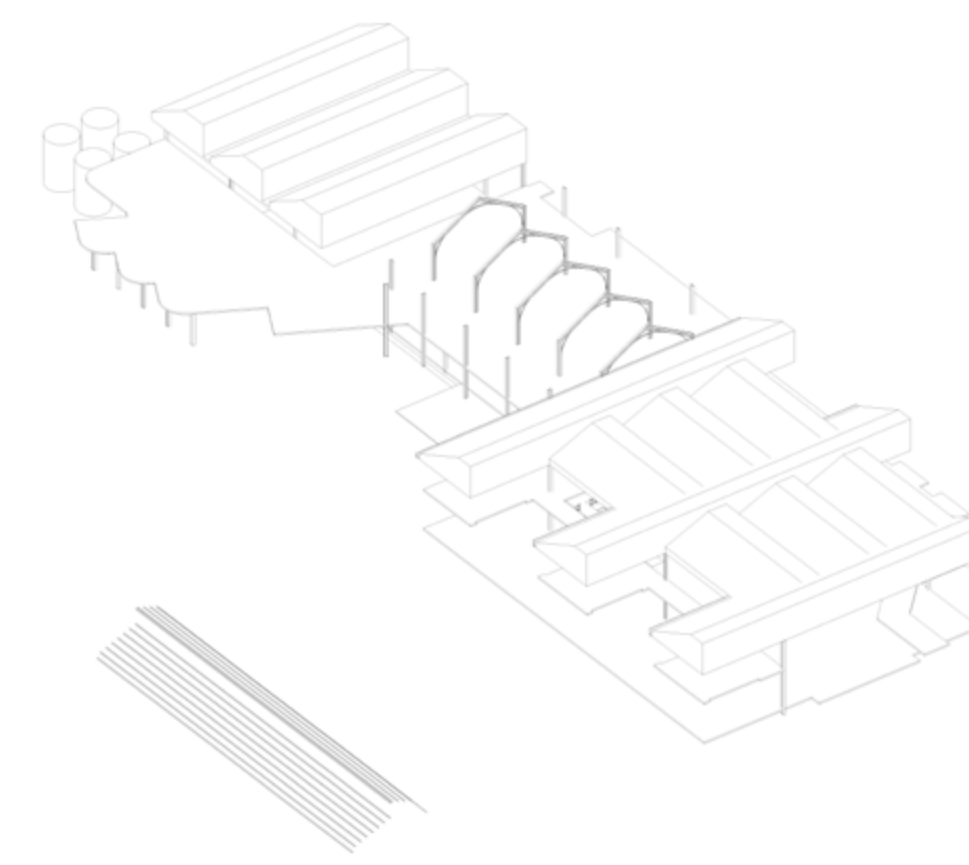
PRODUCTION



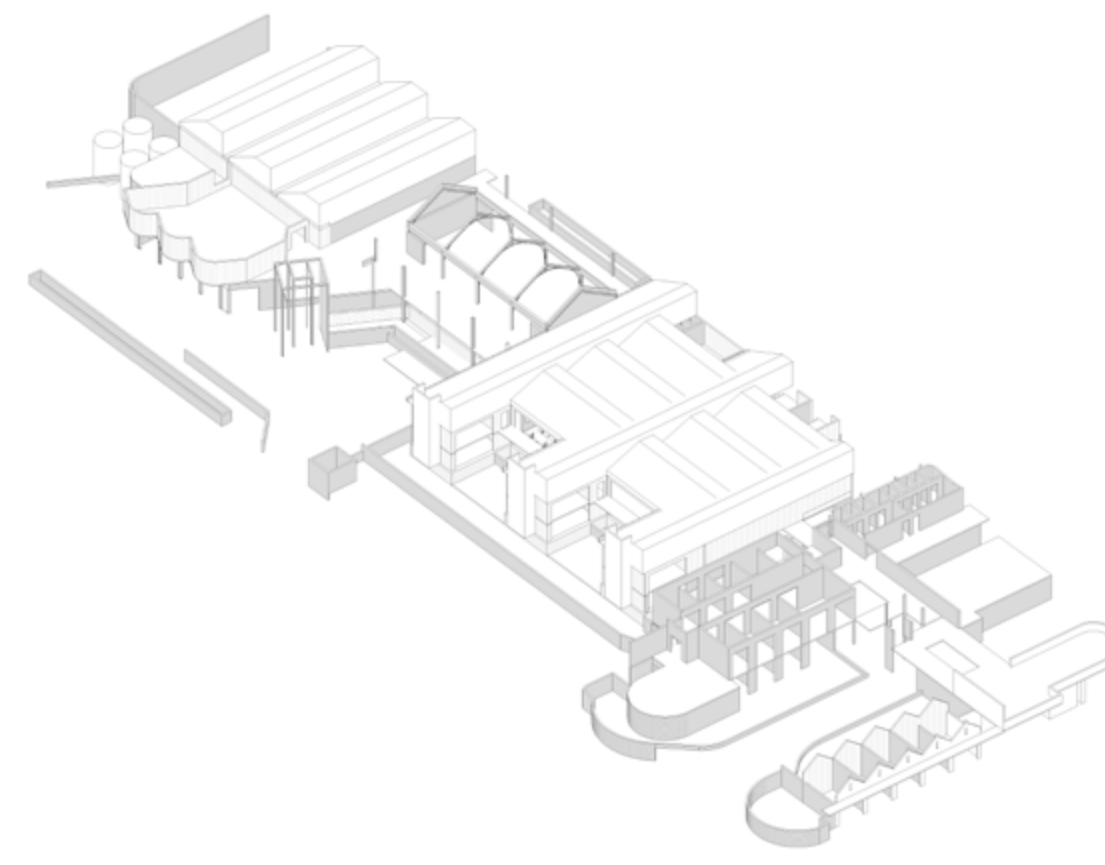
FOUNDATION / FLOOR



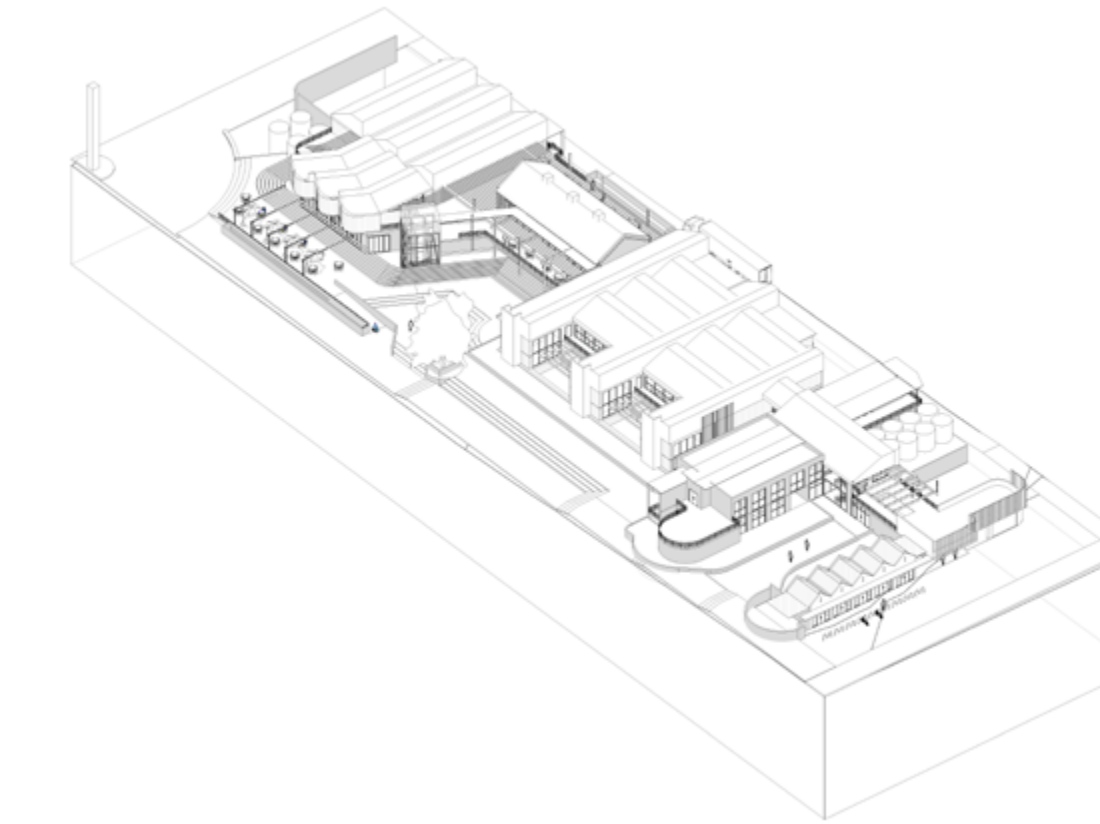
STEEL TRUSS SYSTEM



PORTAL FRAMES



INFILL WALLS



FENESTRATION / PERGOLAS

2.2 SUSTAINABILITY

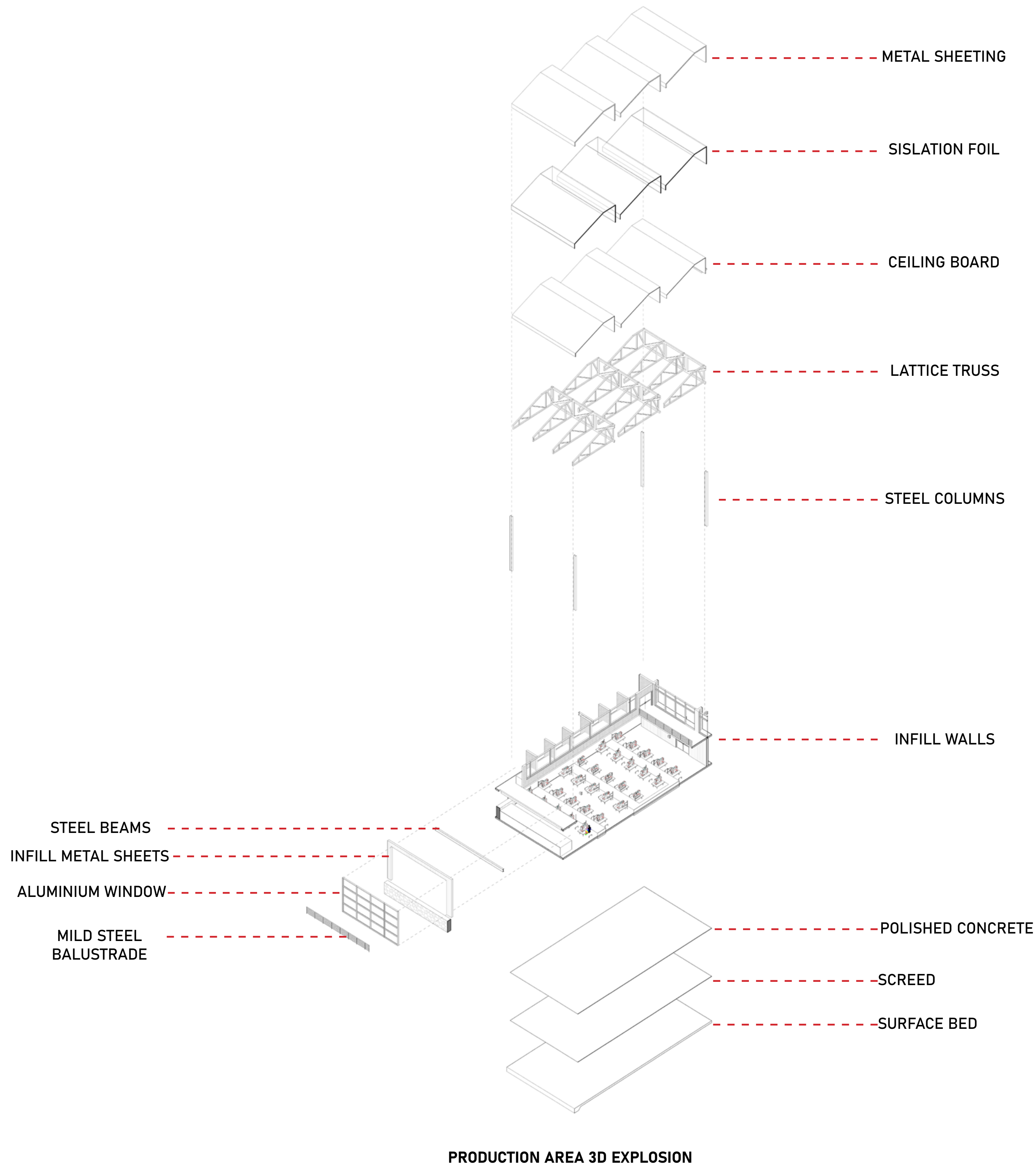
Passive design is a critical design element in the conception of a sustainable design, but recognizing the limits of the efficacy of passive thermal regulation strategies, given the high heat load and deep floor plates of the production area, incentivized the use of a hybrid passive/active ventilation systems. Considering the maximum and minimum temperatures of Pretoria and of the site's micro-climate, in conjunction with the heat load generated by electrical cutting machinery, an active HVAC

system is a necessary feature to improve air circulation. The use of an active HVAC system is limited, to ensure a reduction in energy costs, and the building's attenuated plan is maximized wherever possible, to ensure effective cross ventilation through the operable louvers, and openable windows. The building has ample apertures that allow a tonne of natural light in, and maximizes solar gain in the winter time, via retractable and operable shading devices on the eastern and western facades

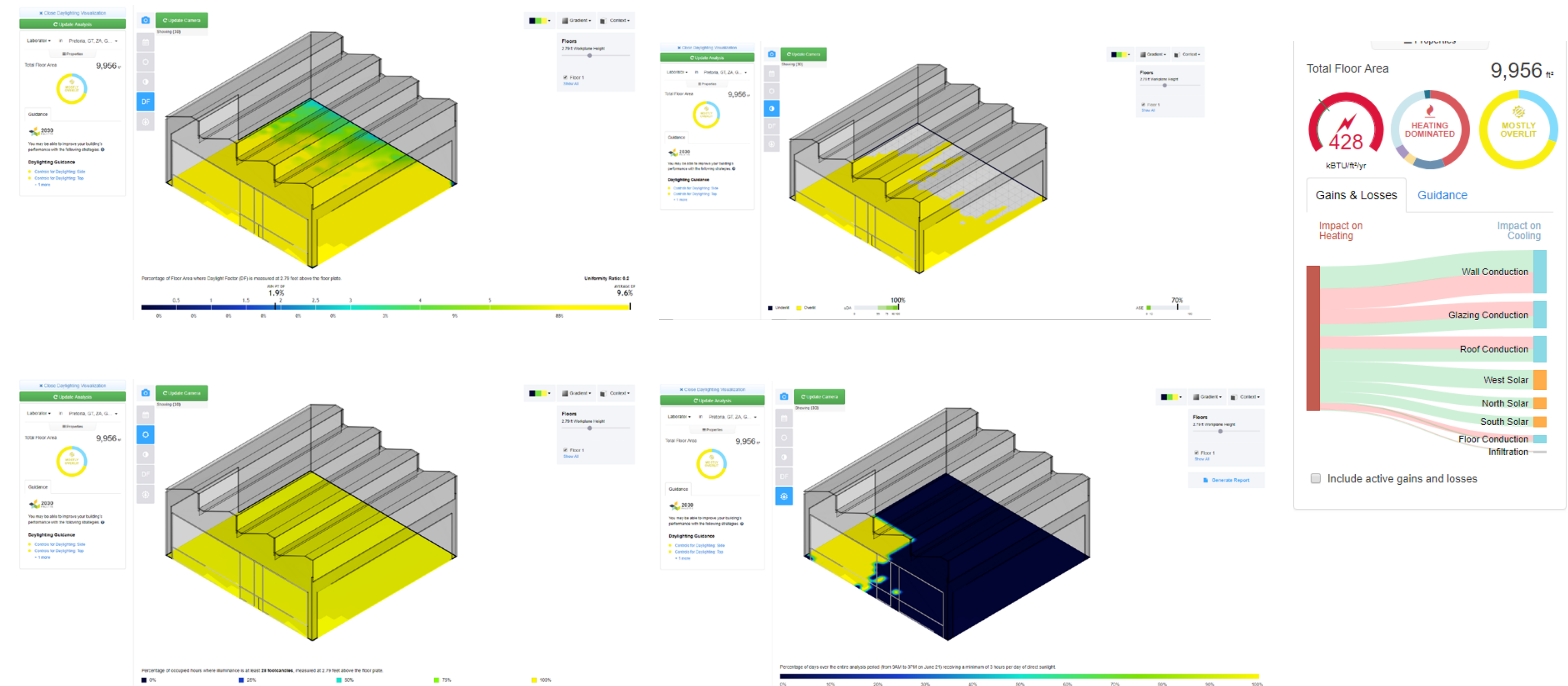
of the building. These shading devices double up as living/green wall which filter air which is used for cross ventilation, especially in the highly attenuated plan of the pavilion. The building is laid with geothermal pipes underneath which use the earth's relatively stable underground temperature to affect the internal thermal condition of the building. These PVC pipes are supplied with air inlets, which then circulates the air all the way through pipe system, and releases it through the outlets, which expel air with an ideal temperature into the interior, effectively

improving the interior's thermal comfort. The PVC pipes also benefits from the water body close by, which improves the cooling rate of the underground pipes and enable the dissipation of even cooler air in the hot summer months. Another cooling method is the Steenhoven creek right next to the buildings. The creek's water content and high concentration of vegetation, which shades the creek throughout the day, maintains a cool environment. The wind then acts as an agent that distributes the cool temperature around the site without any active systems at play. This is supplemented by the addition of artificial water features and vegetated landscaping that

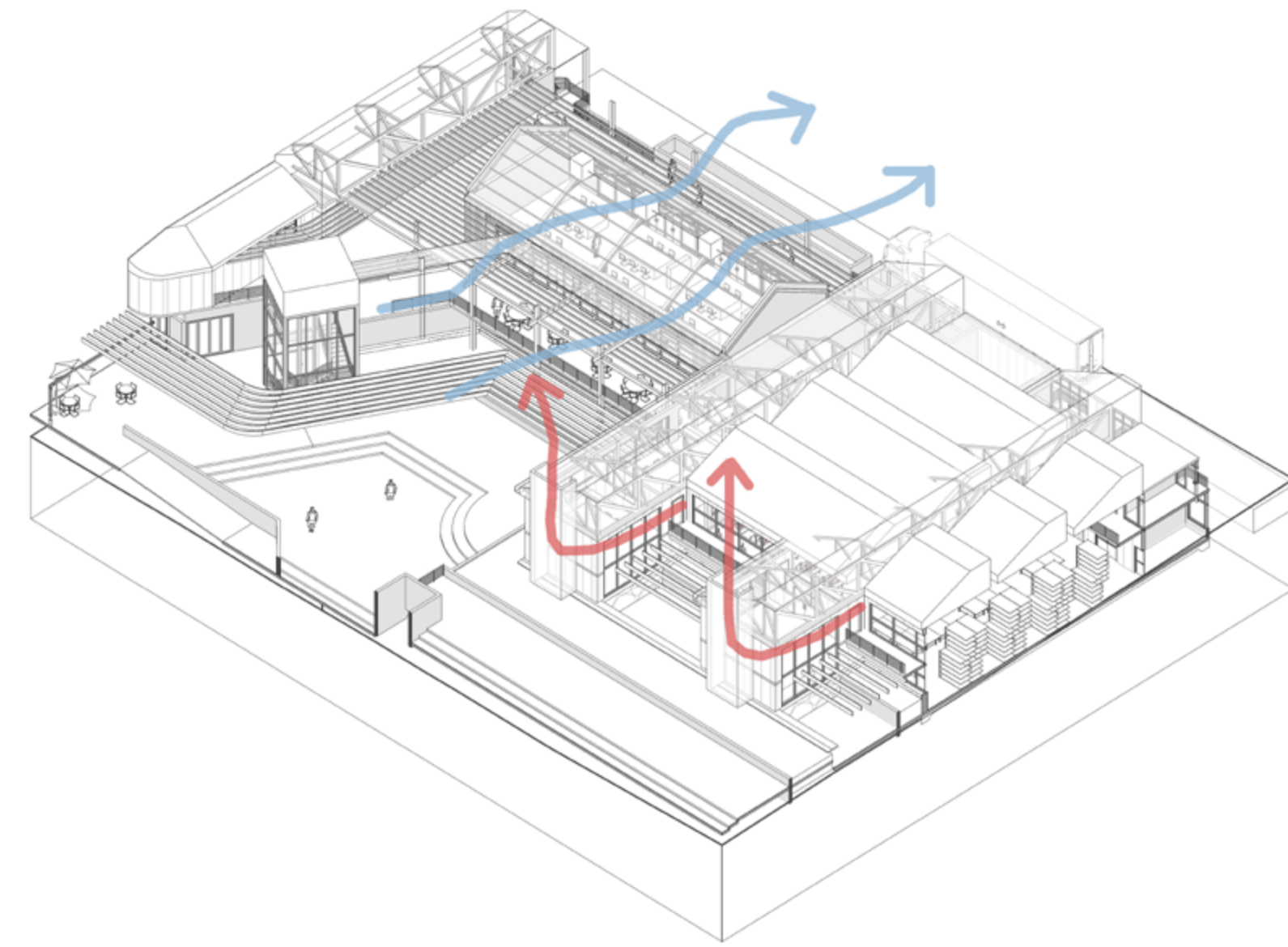
are designed around the site to aid in the distribution of the water and vegetation cooling effect on the site. The site's promenade is lined with flowers and deciduous trees that provide shade in the summer, and allow light through in the winter. Rooftop gardens and living walls are used to add another layer of cooling devices on to the skin of the building, which in turn affects the temperature of the interior space. The building's walls are insulated with wool, and provide a high value of thermal inertia, thus maintain a very stable thermal condition in the interior.



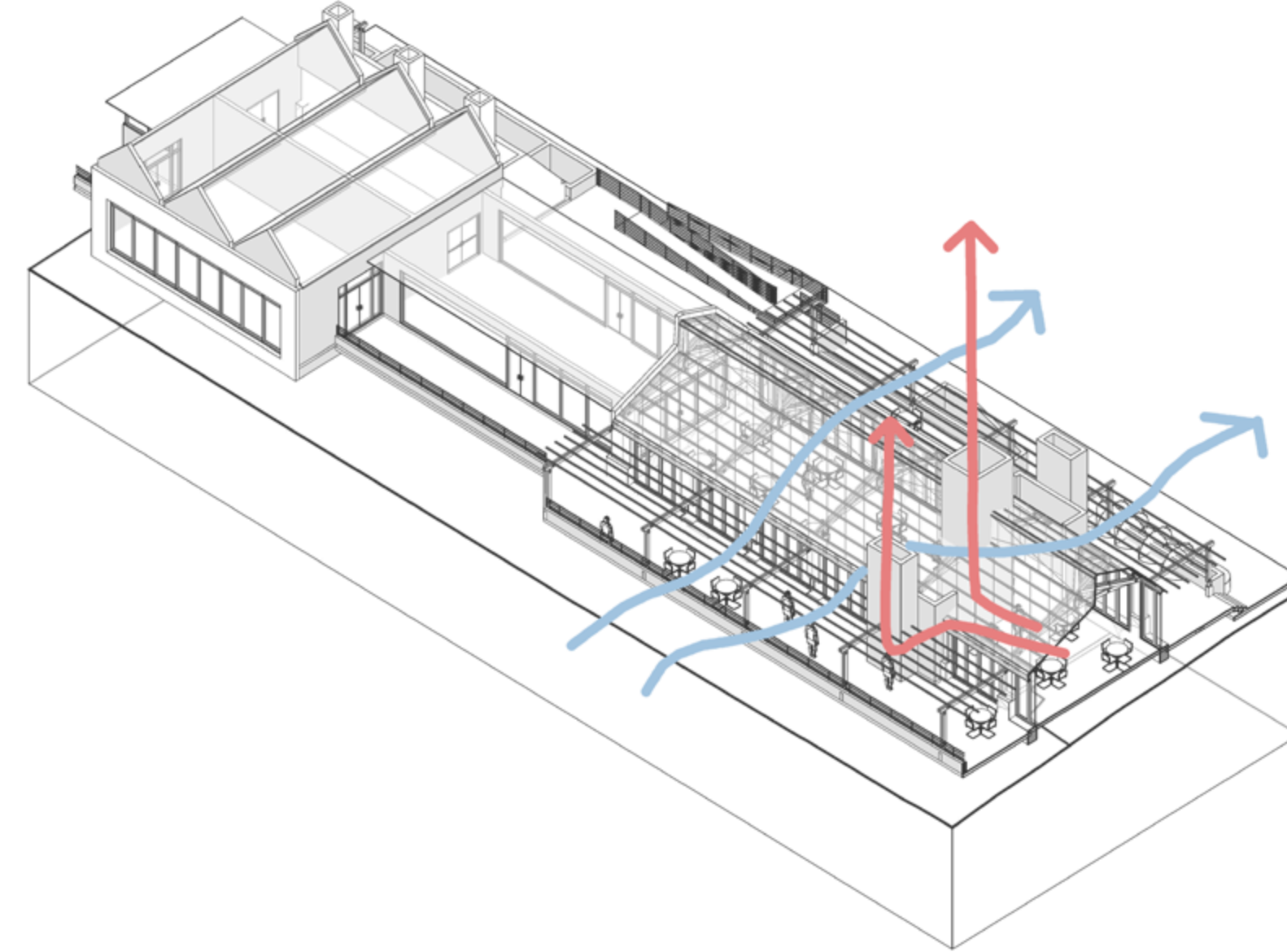
Sefaira



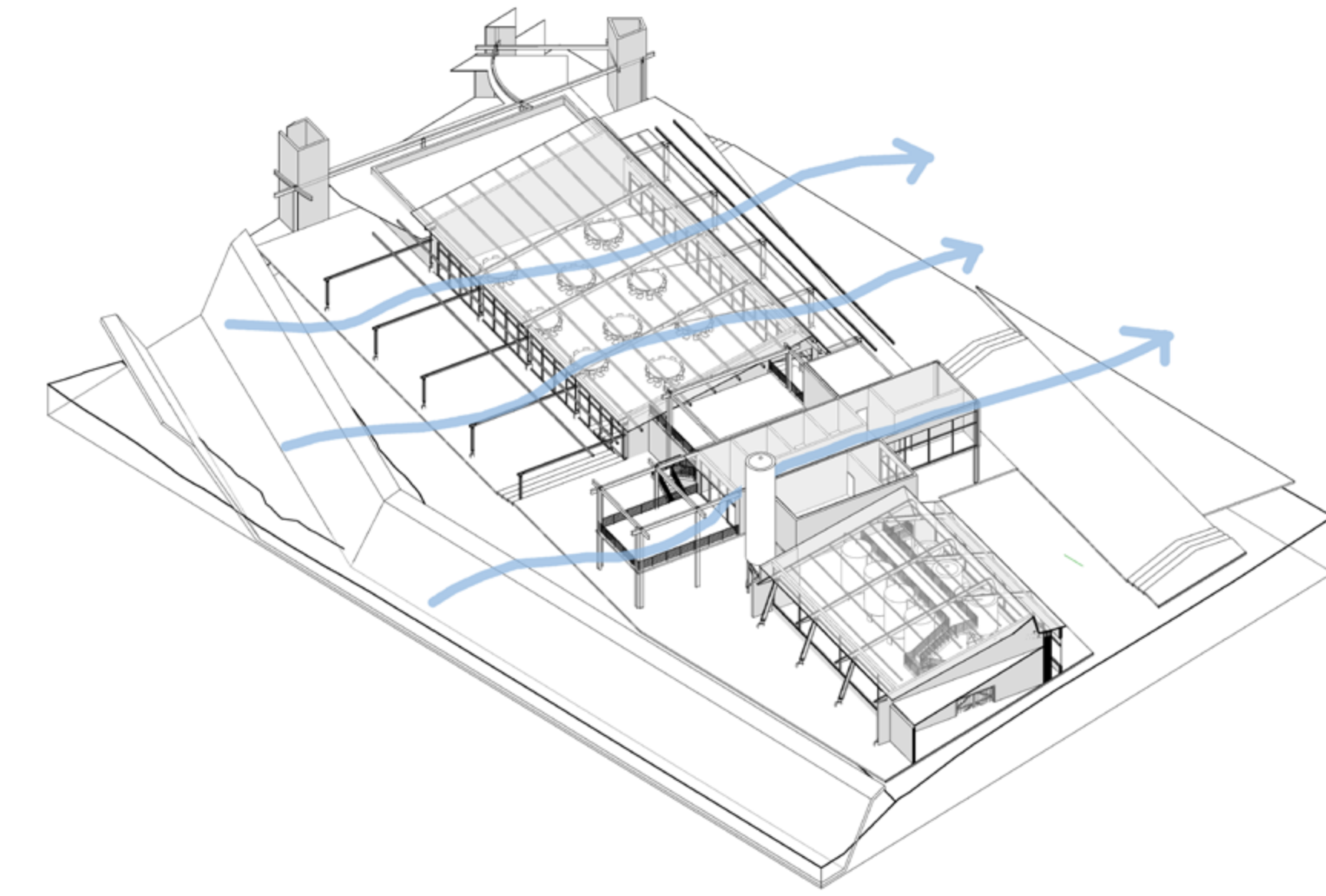
VENTILATION



PRODUCTION AREA VENTILATION
STACK EFFECT
CROSS VENTILATION

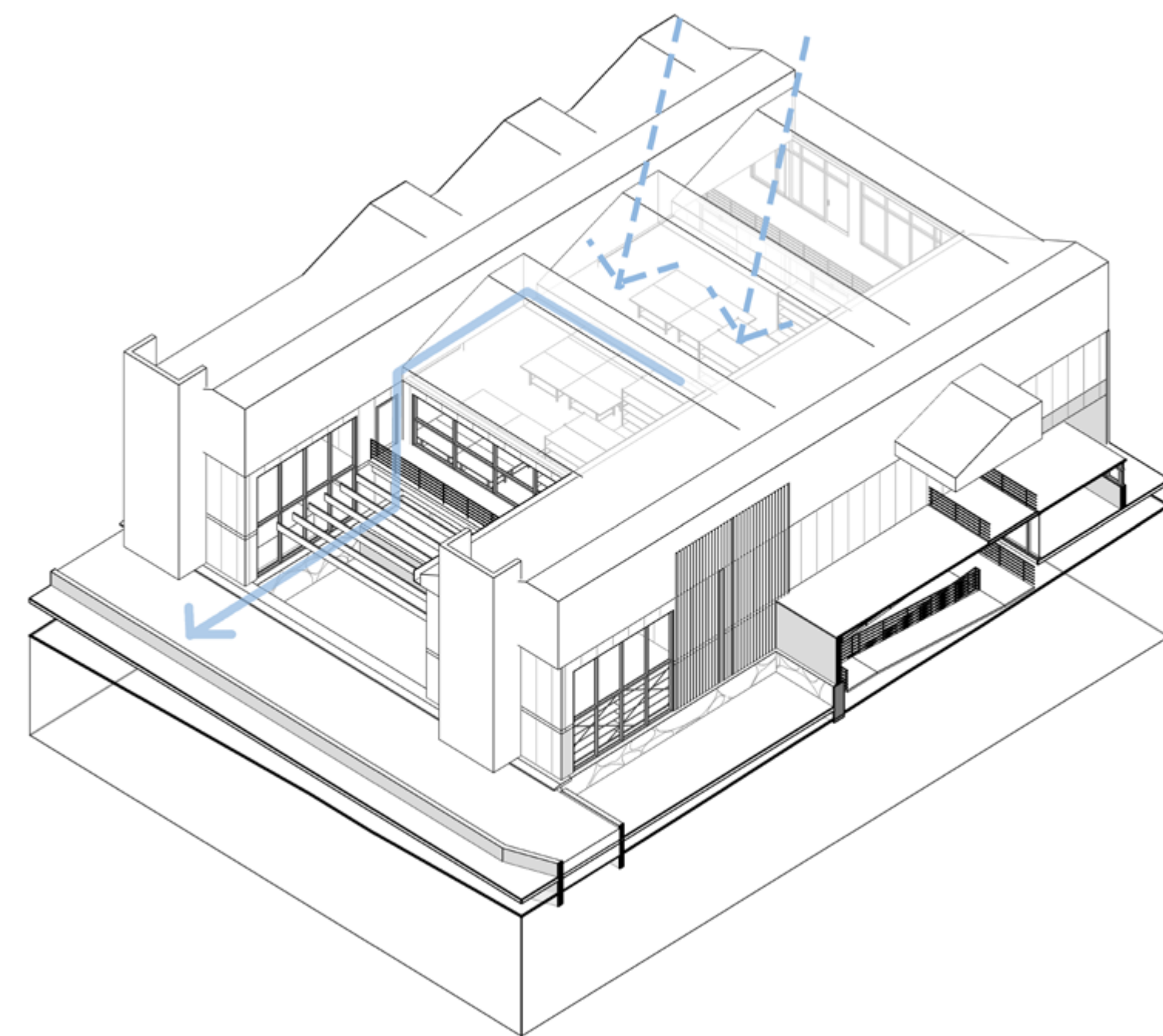


PAVILION VENTILATION
STACK EFFECT
CROSS VENTILATION

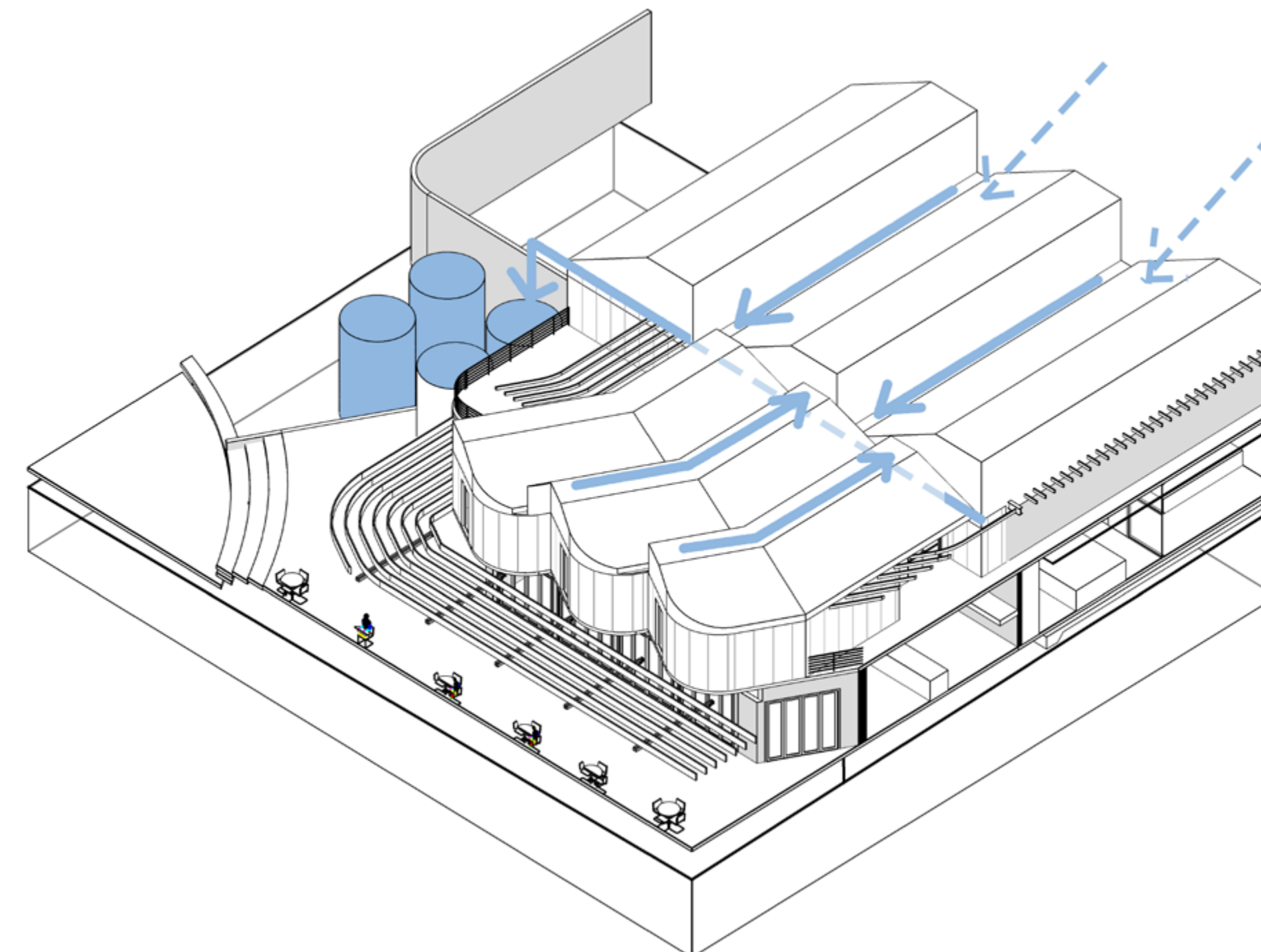


BREWHOUSE VENTILATION
CROSS VENTILATION

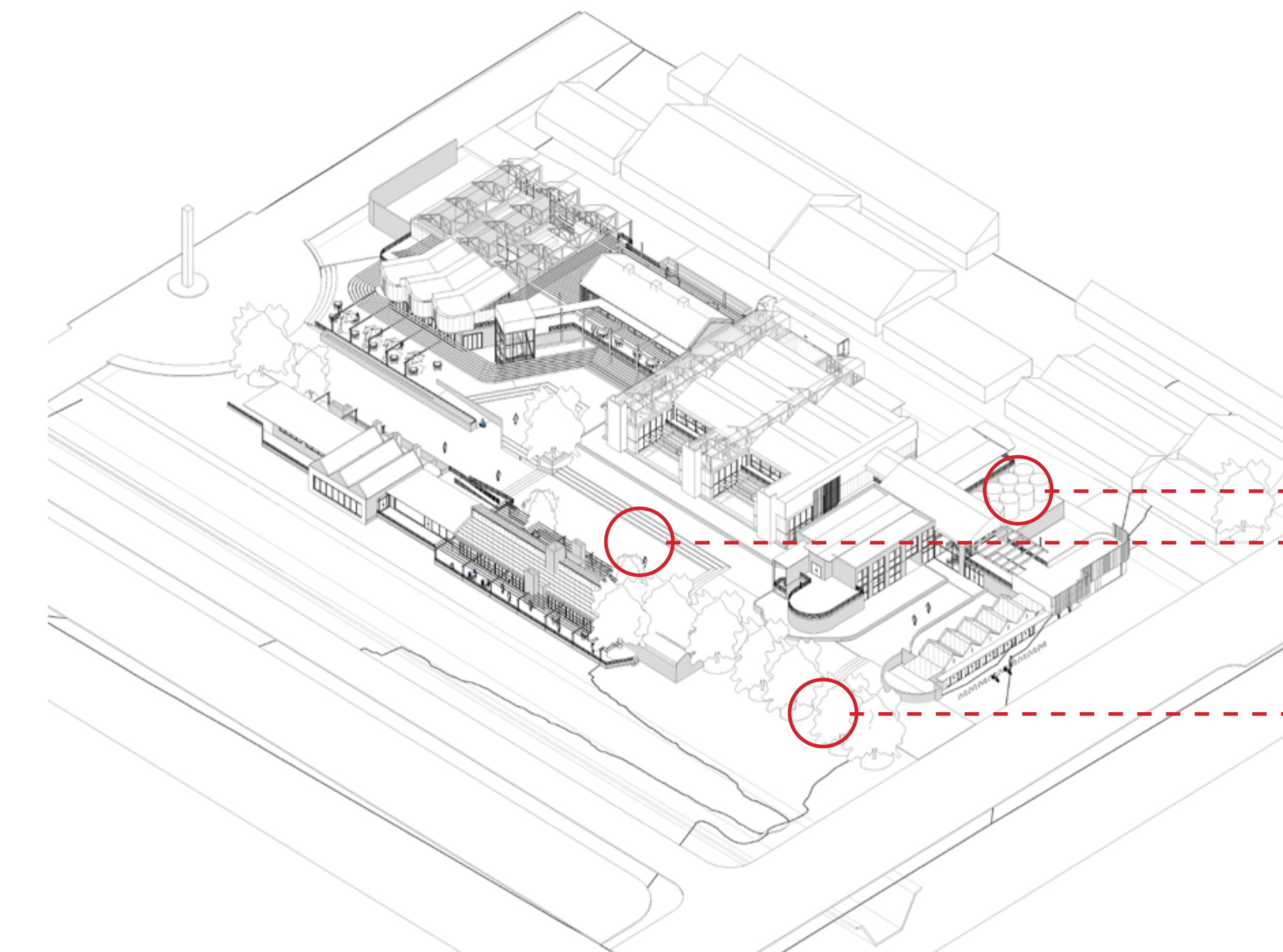
STORMWATER MANAGEMENT



STORMWATER MANAGEMENT
DEPOSIT WATER INTO
CREEK AND ENABLE SOIL
INFILTRATION



STORMWATER MANAGEMENT
DEPOSIT WATER INTO
STORAGE TANKS



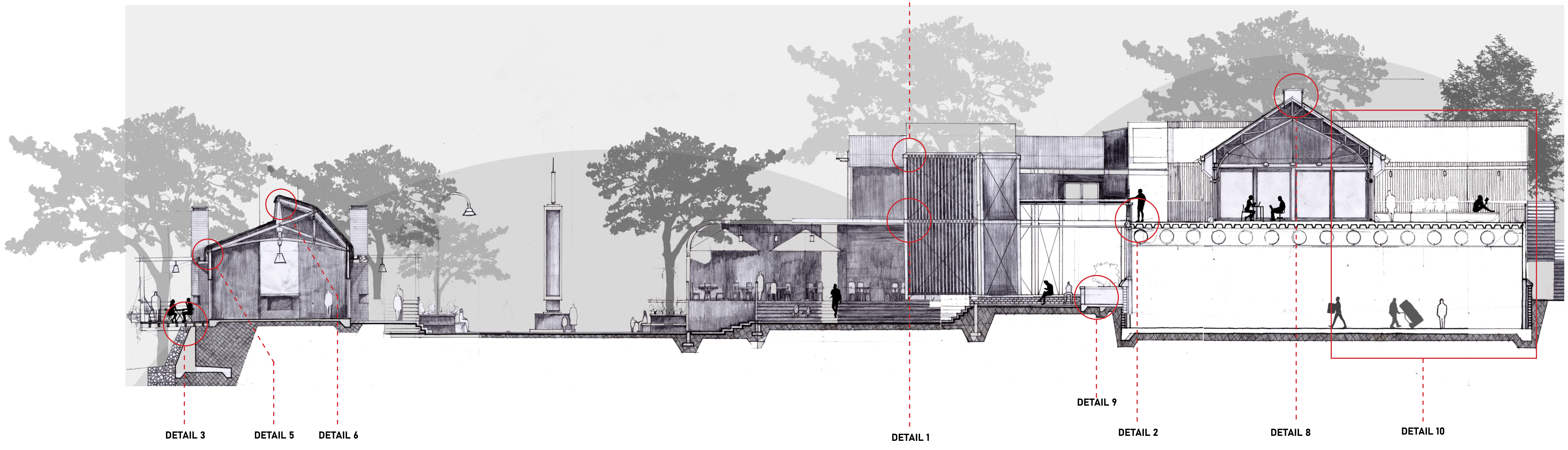
STORMWATER MANAGEMENT
WATER RETENTION STRATEGIES

- PLANTS ABSORPTION
- SOIL/PAVING INFILTRATION
- WATER STORAGE TANKS

- WATER TANKS
- SOIL PERMEABLE PAVING INFILTRATION
- PLANTS ABSORPTION WATER RETENTION

SYSTEM

DETAIL 3



DETAIL 3

DETAIL 5

DETAIL 6

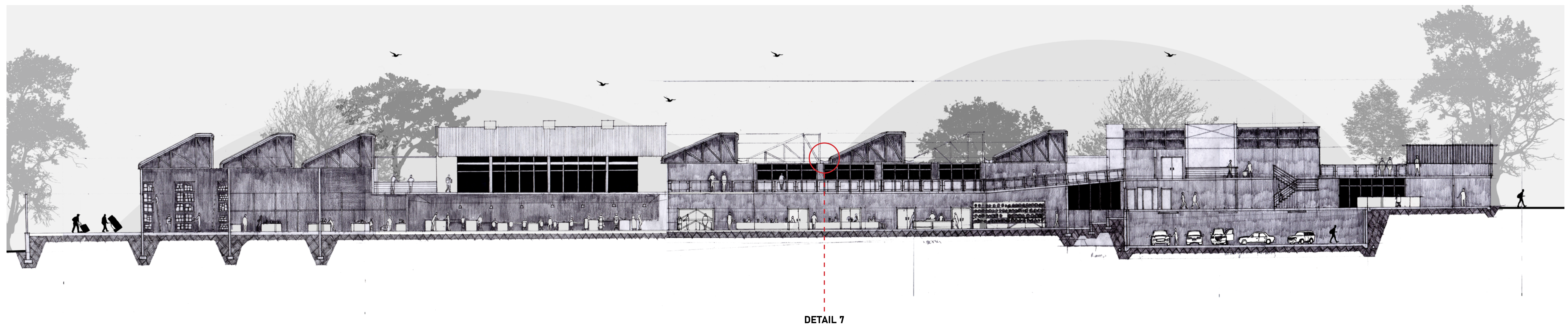
DETAIL 1

DETAIL 9

DETAIL 2

DETAIL 8

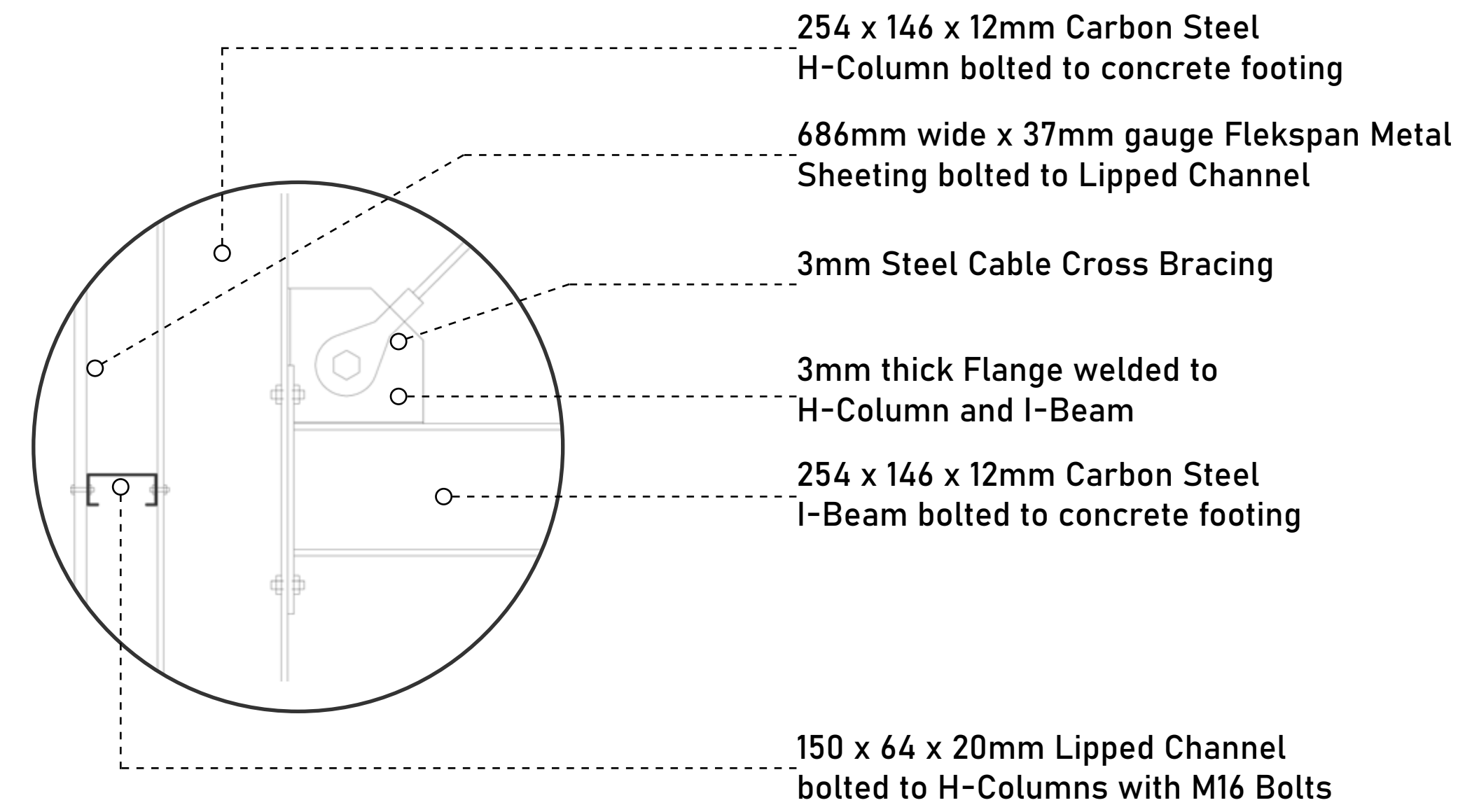
DETAIL 10



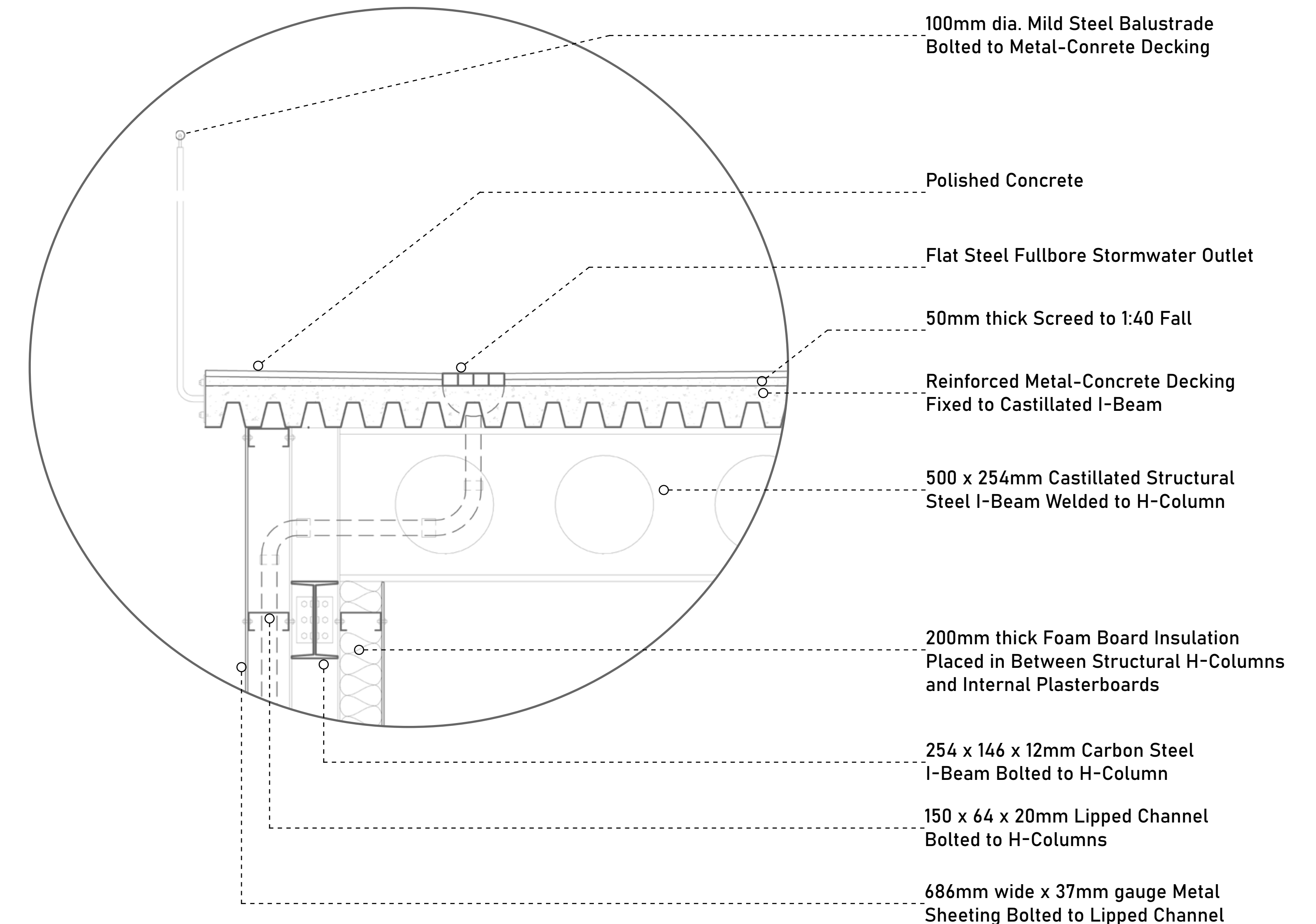
DETAIL 7

TECHNOLOGY

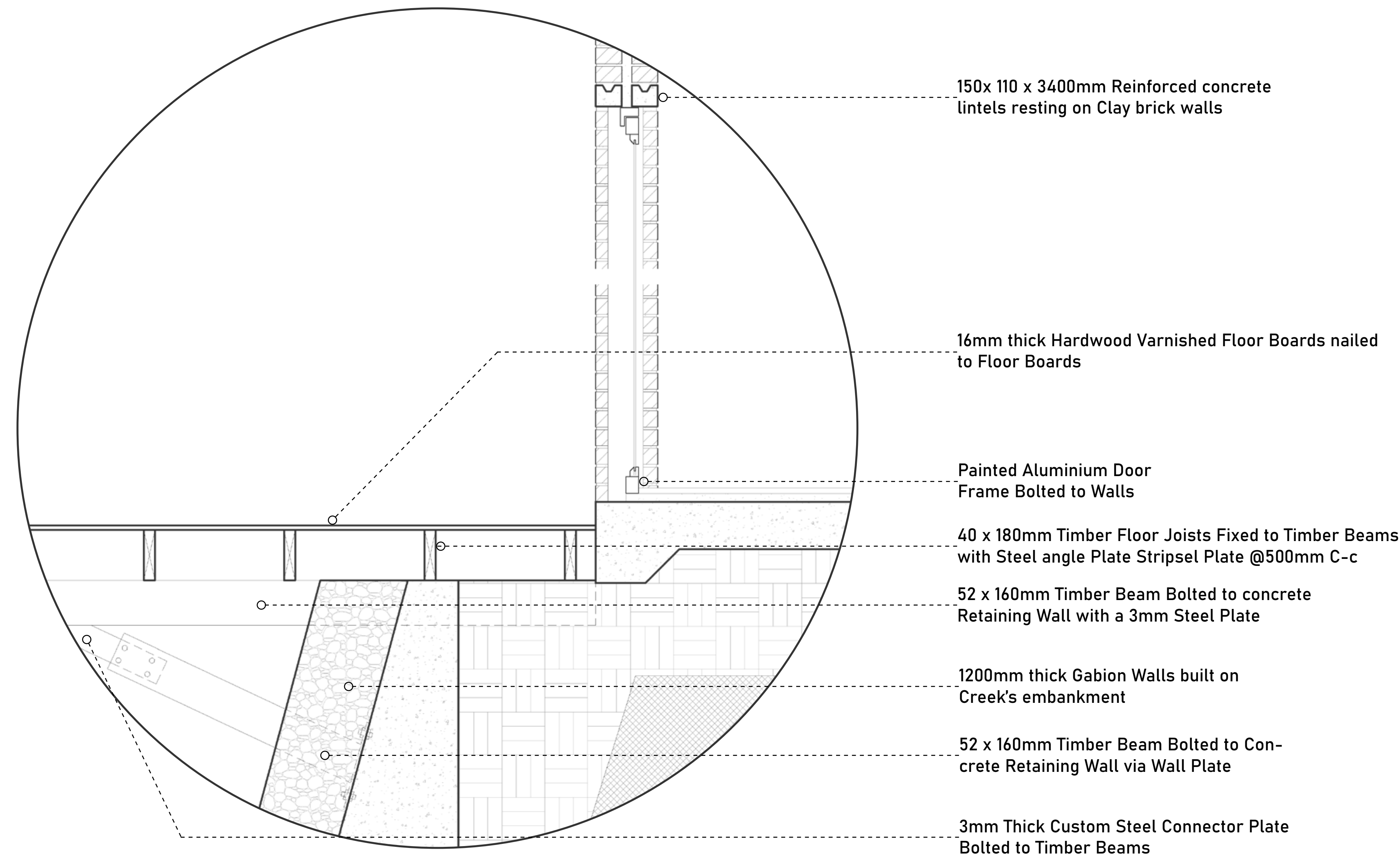
2.2 CONCLUSION



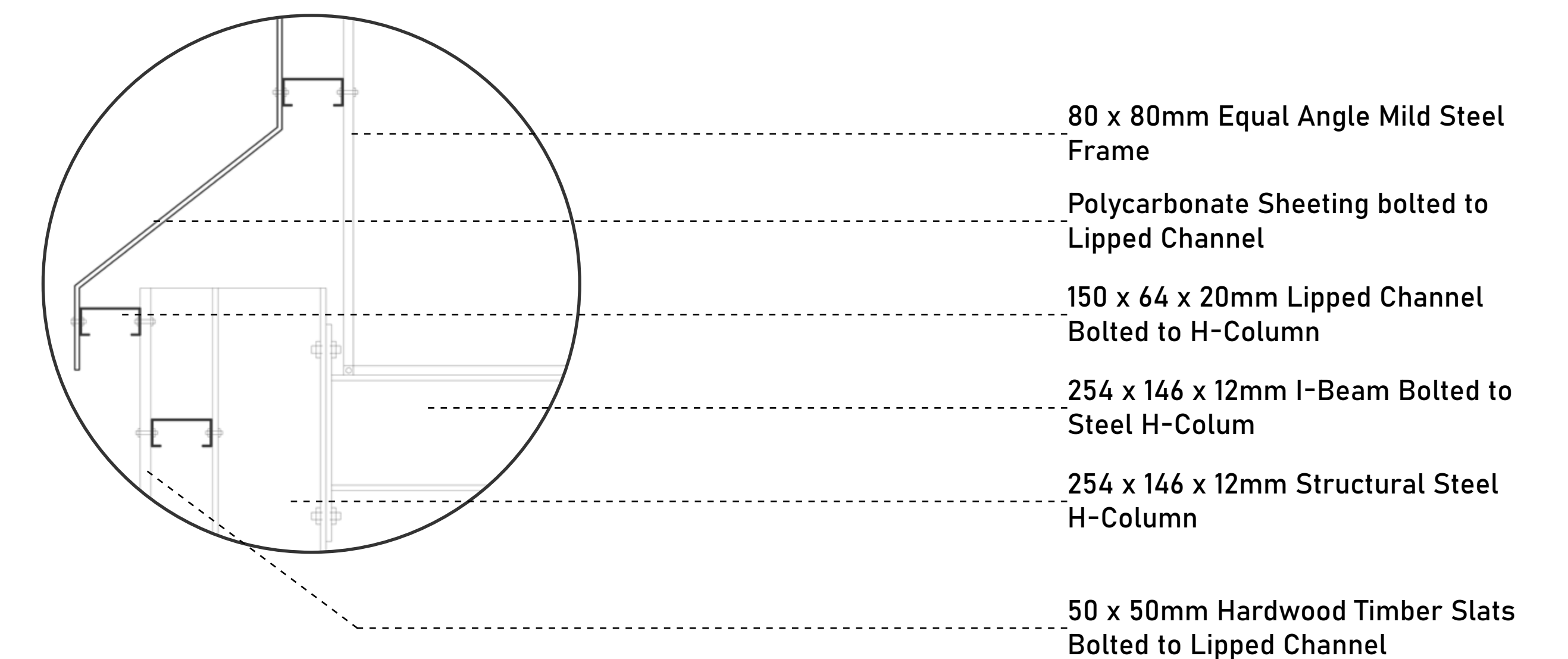
DETAIL 1 - 1:10



DETAIL 2 - 1:10

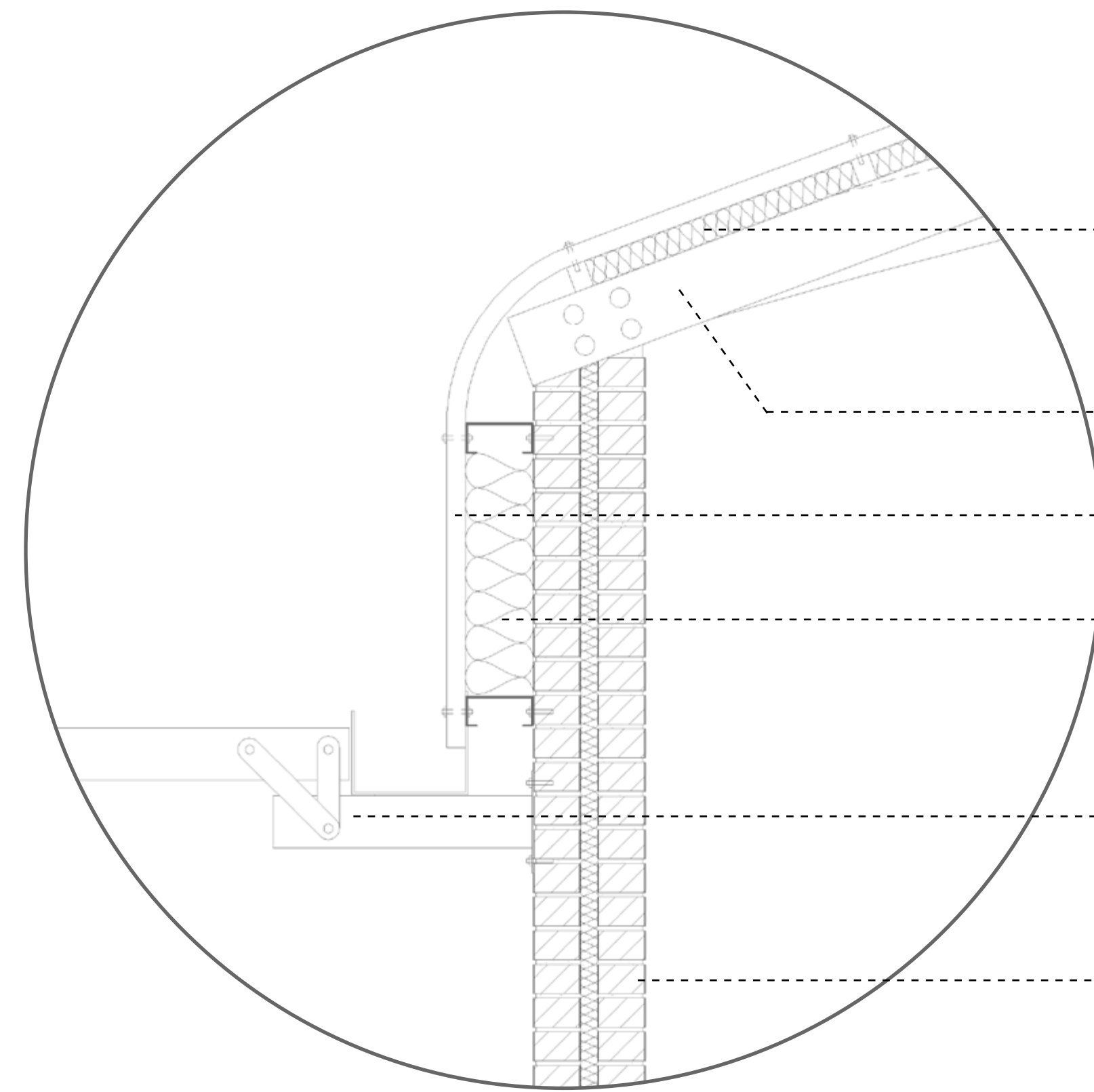


DETAIL 3 - 1:10



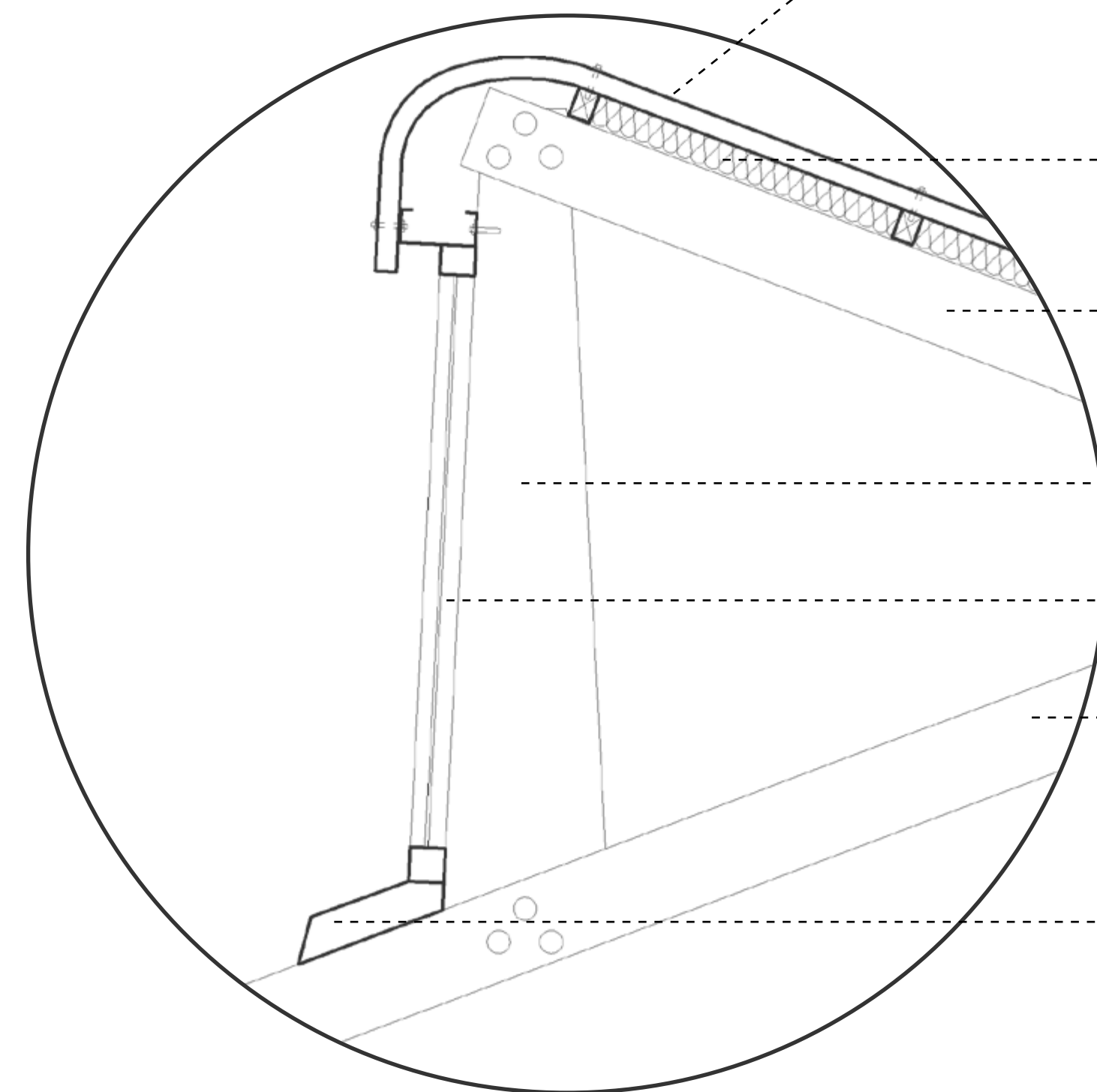
DETAIL 4 - 1:10

TECHNOLOGY



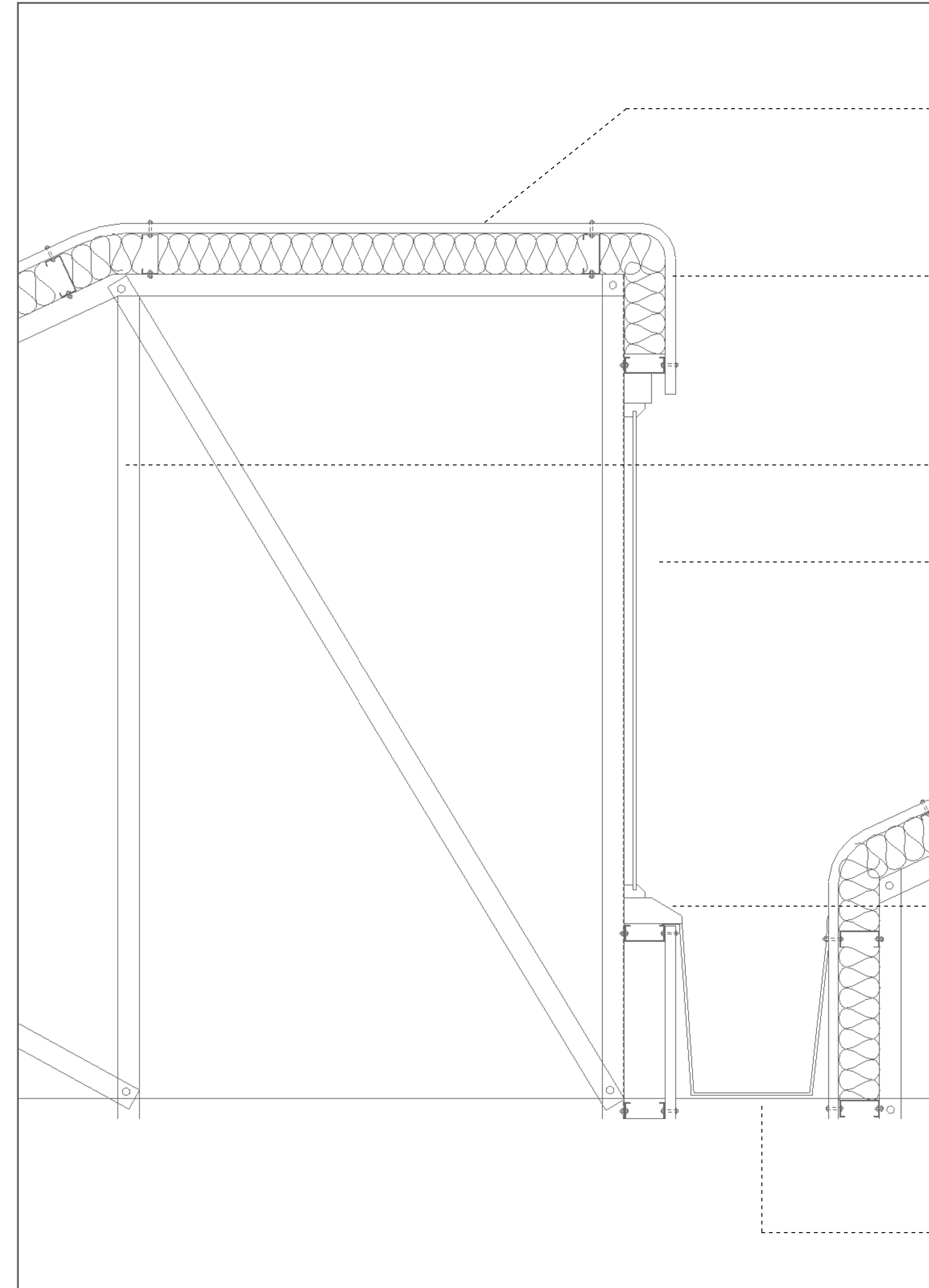
DETAIL 5 - 1:10

- 38mm thick Wool Insulation Resting on Timber Truss Rafters
- Painted SA-Pine Timber Truss @ 750mm c-c Resting on Timber Wall Plate Resting on Brick Wall
- 686mm wide x 37mm gauge Flekspan IBR Standard Bullnose Sheeting
- Foam Board Insulation
- 40 x 160mm Hardwod Timber Pergola Framing bolted with Steel Plates
- 220mm Thick Cavity Clay Brick Wall with English Bond and Recessed Motar



DETAIL 6 - 1:10

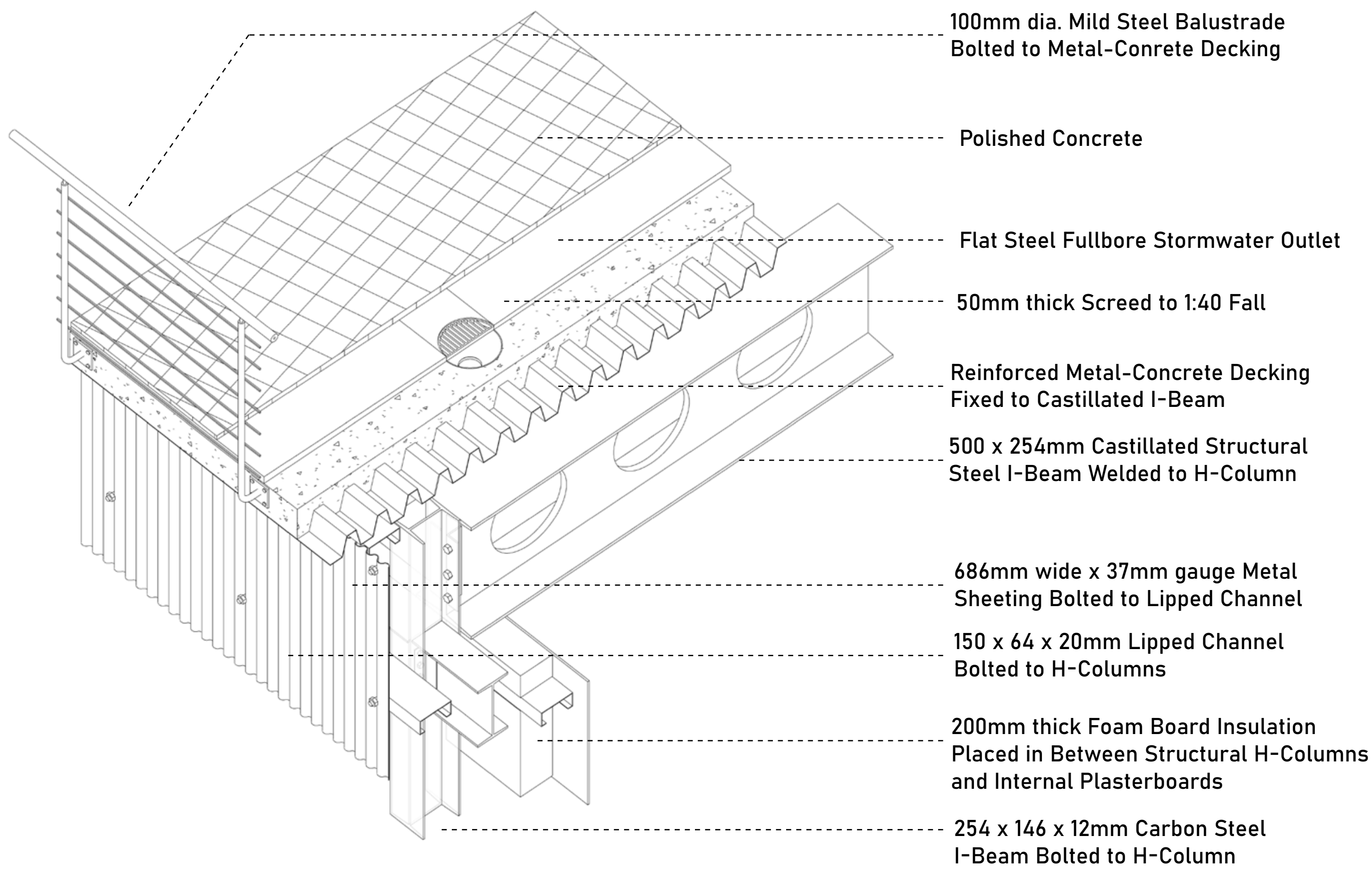
- 686mm wide x 37mm gauge Flakspan IBR Apex Bullnose Metal Sheeting fixed to Timber Battens @ 600mm c-c
- Foam Board Insulation Resting on Timber Truss Rafter
- SA-Pine Timber Custom Truss: Rafter
- SA-Pine Timber Custom Truss
- Openable Aluminium Frame - Double Glazing Window
- SA-Pine Custom Timber Truss
- Aluminium Window Sill



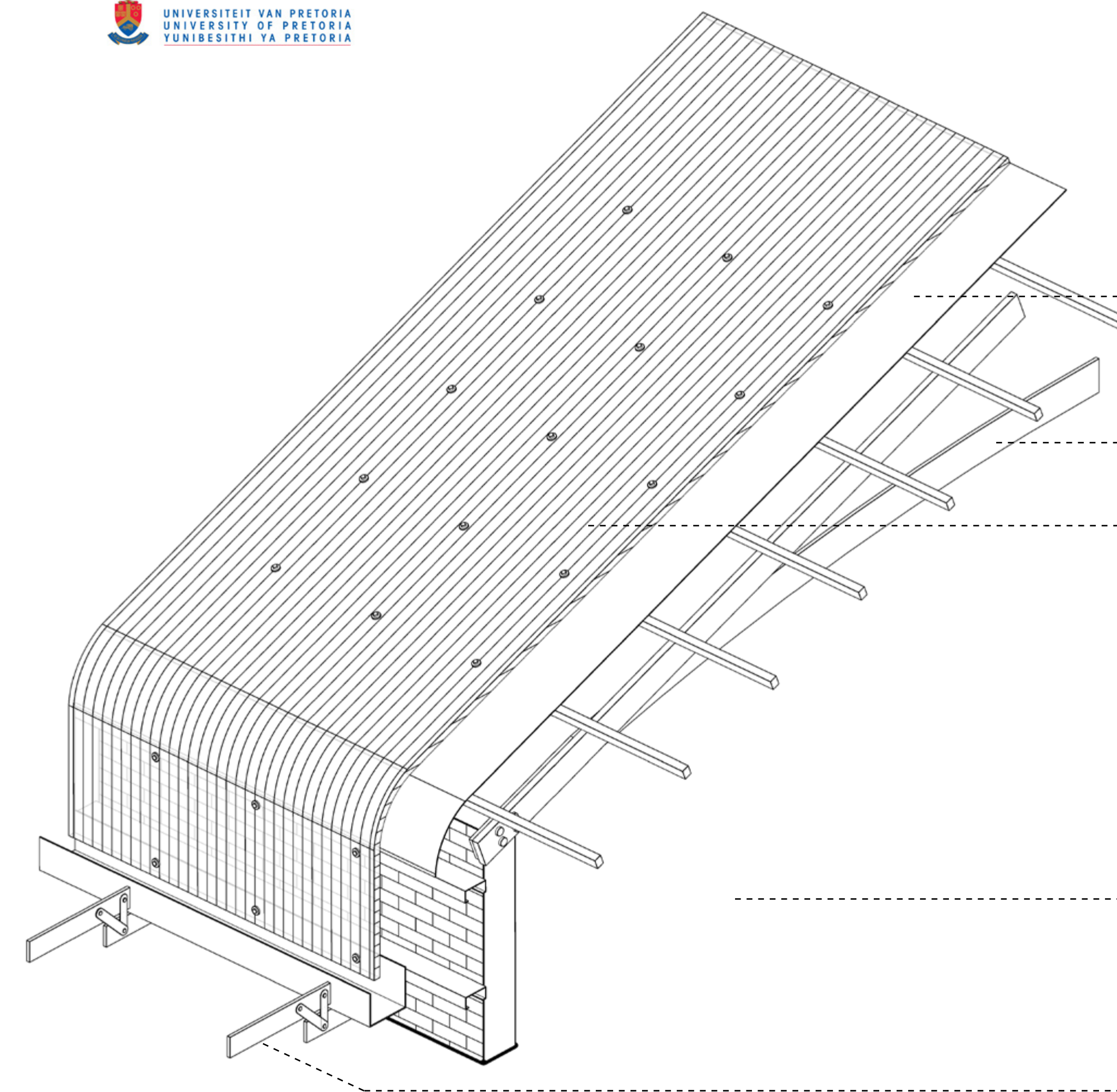
DETAIL 7 - 1:10

- 686mm x 37mm gauge Flakspan IBR Bullnose Metal Sheeting Bolted to 146 X 64 X 20mm Cold Rolled Lipped Channel
- Foam Board Insulation
- 100 x 100mm Equal Angle Mild Steel Lattice Truss
- Openable Top-Hung Aluminium - Double Glazing Window
- Aluminium Window Sill
- 3mm Thick Cold Formed Steel Gutter

TECHNOLOGY



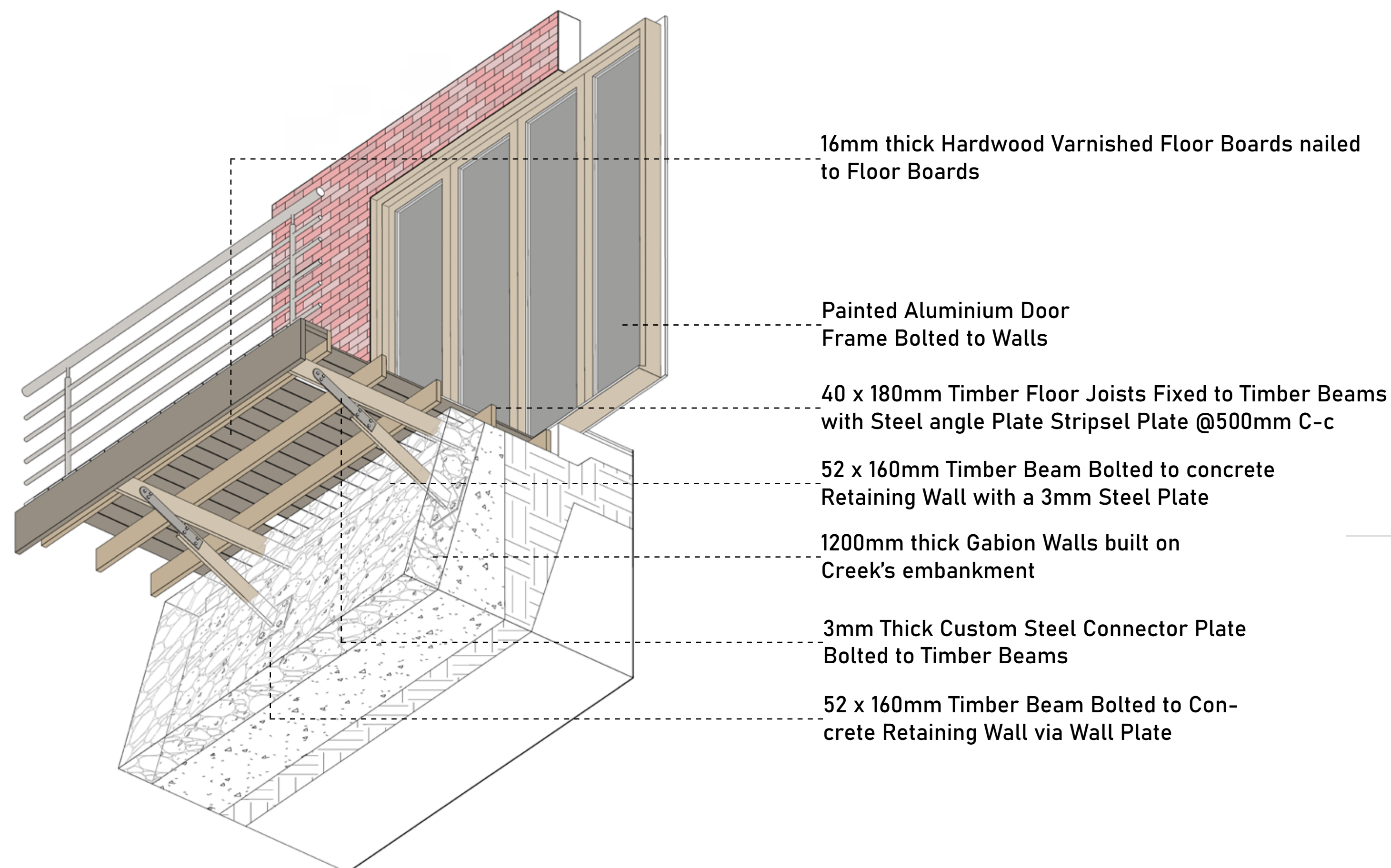
3D DETAIL 2



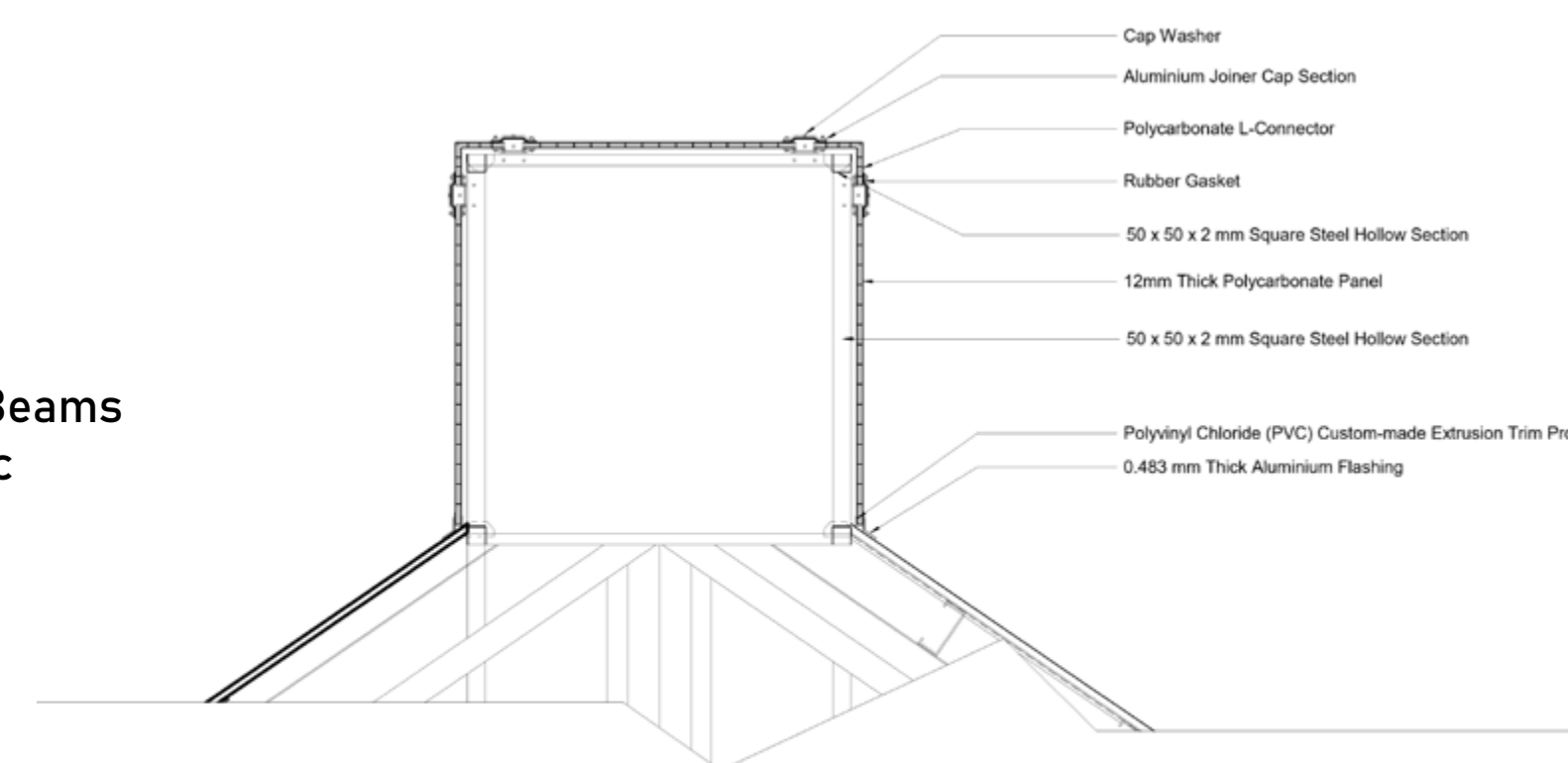
3D DETAIL 5

220mm Thick Cavity Clay Brick Wall with English Bond and Recessed Mortar

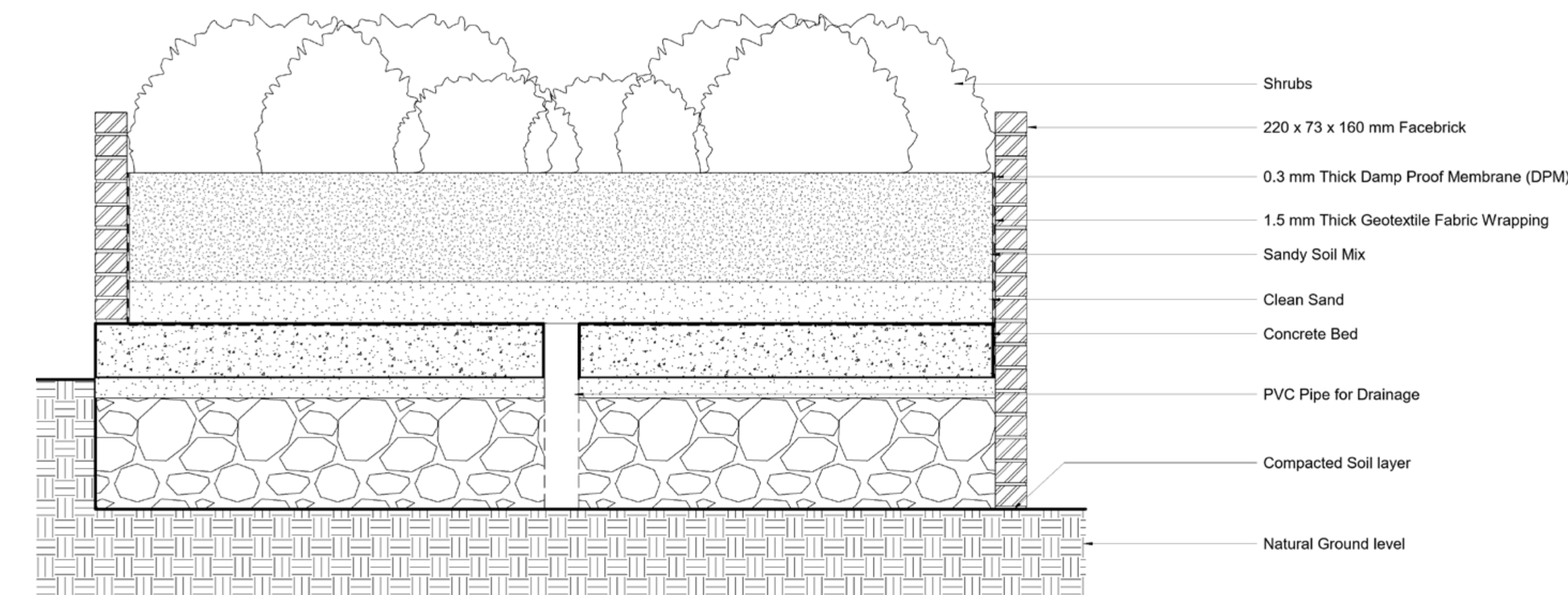
40 x 160mm Hardwod Timber Pergola Framing bolted with Steel Plates



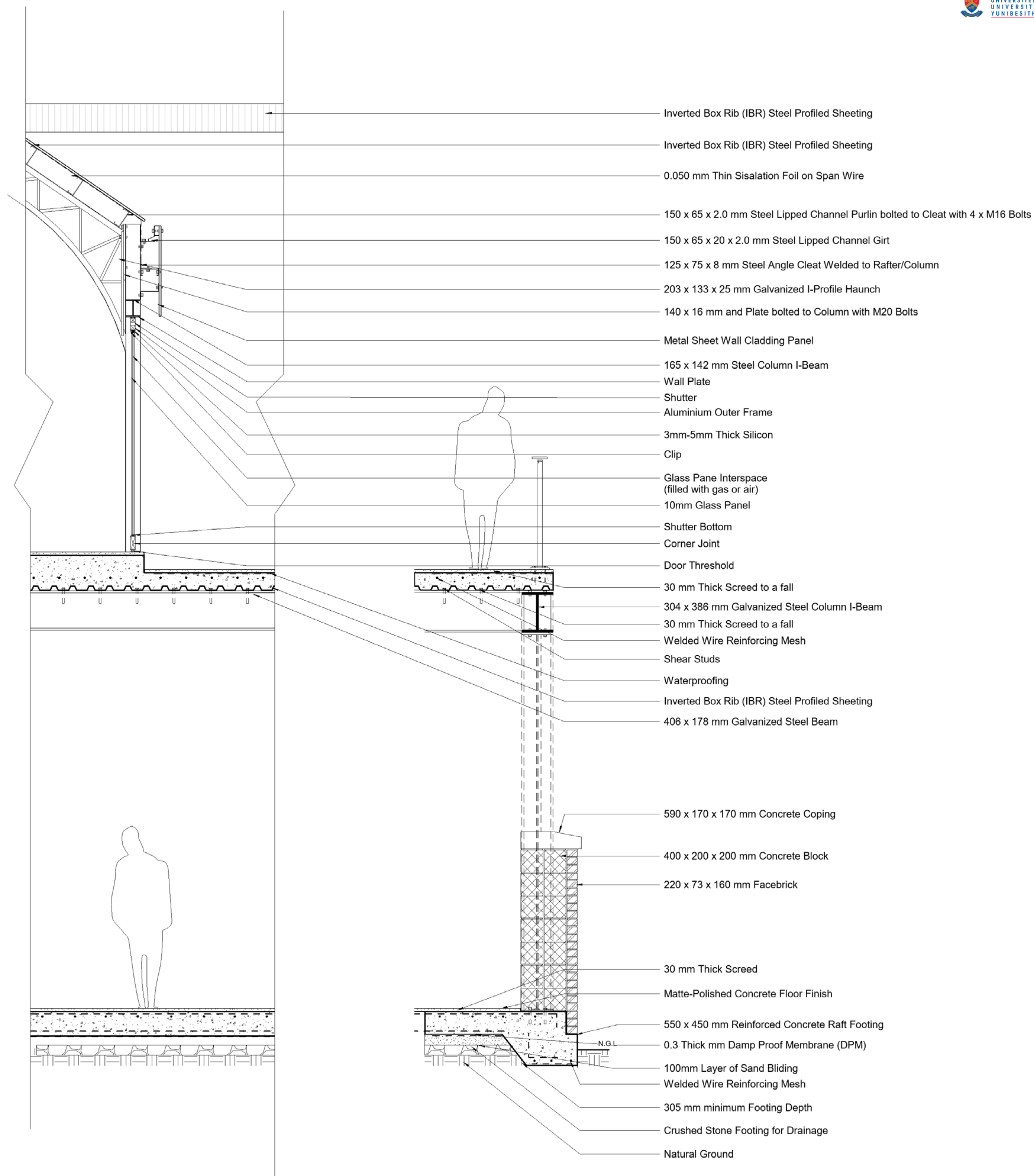
3D DETAIL 3



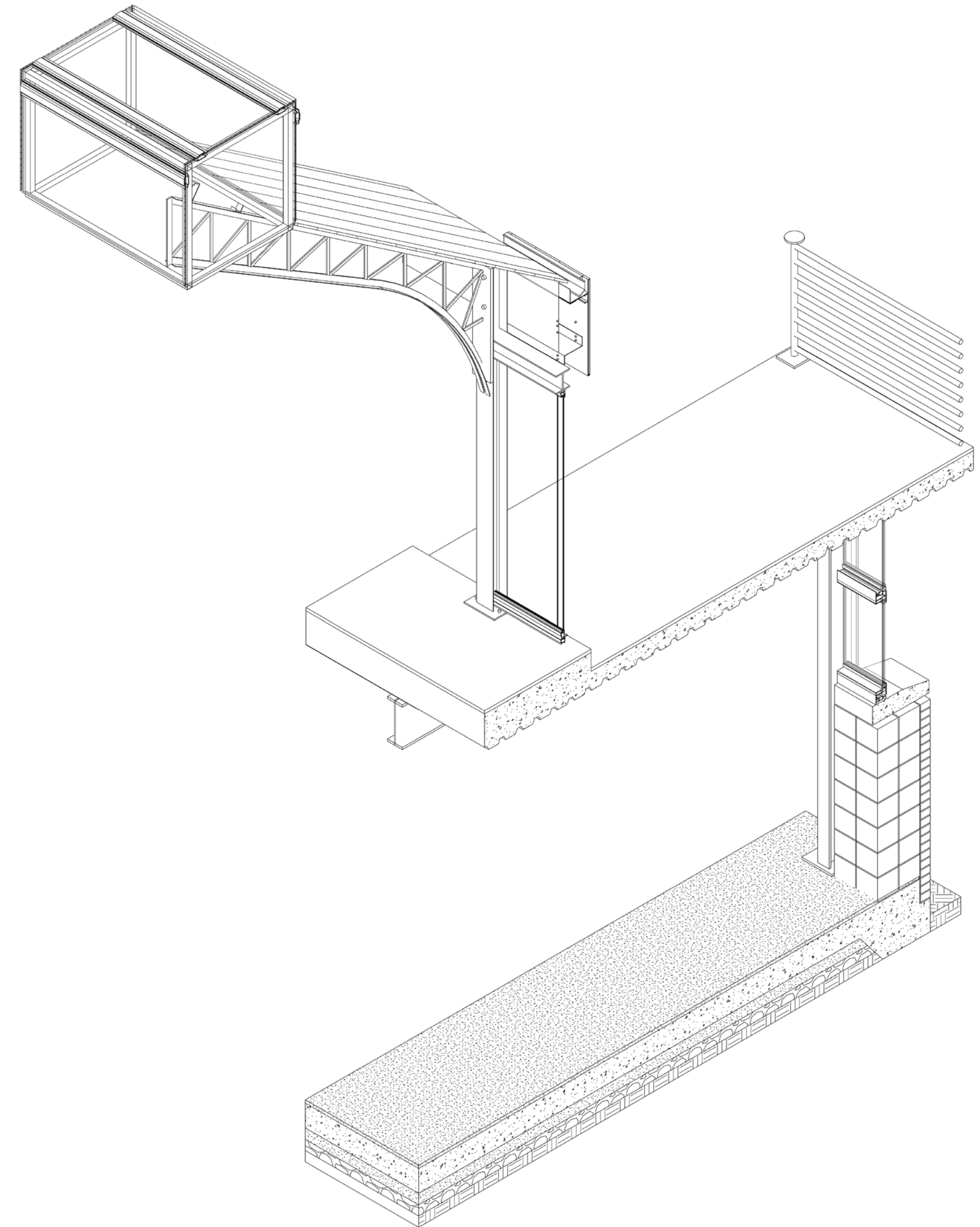
DETAIL 8 - 1:10



DETAIL 9 - 1:10



DETAIL 10



3D DETAIL 10

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