

Thesis Report

Master of Architecture in Sustainability



Master of Science Program in
Architecture for the Sustainability Design
February 2025

Revitalisation of the Industrial Heritage

Transforming Historic Sites Honoring Historical Functions
with Sustainable Design Concepts for Adaptive Reuse.

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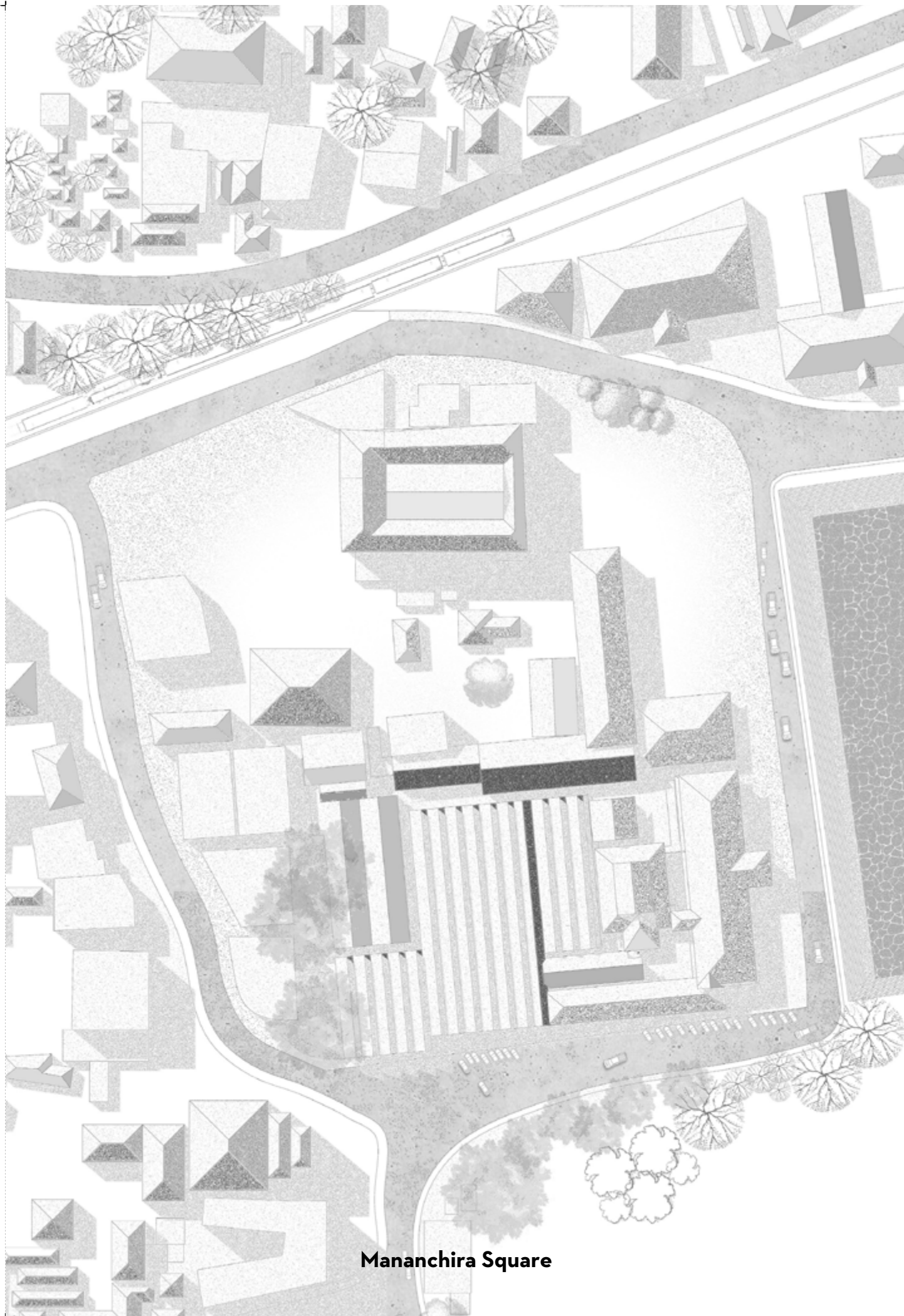
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“Retrofitting”

Upgrading existing buildings with modern, sustainable
solutions while preserving their historical and architec-
tural integrity.

**Mananchira Square**

Acknowledgement

The completion of this graduation project would not have been possible without the assistance and participation of a large number of people, the names of whom may not be mentioned all. Their contributions are immensely valued and recognized.

However, we would like to take this opportunity to thank our tutors, LORENZO SAVIO, MARZI TANJA and CANELLA GENTUCCA , for their ongoing discussions and critical examination of our themes, as well as their views and constructive comments in advising throughout the thesis course work.

In addition ,we would like to appreciate the assistance provided by the other academic associates with the course work.We are also grateful to our parents and friends for their faith in our abilities to finish our thesis project

Abstract

This study examines “Industrial Heritage as a Driver for Sustainable Development.” As the need to preserve architectural heritage with historical and cultural significance grows, it is also essential to ensure the dynamic development of urban environments. The research focuses on revitalization, a method that preserves and restores historic landmarks by assigning them new functions, allowing these buildings to meet modern needs. This is especially relevant for industrial heritage, which plays a key role in shaping urban identity, economic potential, and cultural continuity.

Urban expansion often threatens the integrity of historic centers, as development typically accelerates in city peripheries, leaving the core areas neglected. Derelict industrial buildings, once central to a city’s growth, now sit idle on valuable land. Revitalizing these spaces offers both economic and cultural benefits, allowing for the preservation of historical identity while reintegrating these areas into the urban fabric. Revitalization just not only preserves architectural history but also enhances economic value, attracting tourism, and creating opportunities for commerce and trade.

This study explores the challenges of revitalizing historic urban cores, using the Comtrust Textile Mills as a case study. Once a thriving industrial site, the mills now stand abandoned. However, through strategic revitalization, they can become important components in the sustainable development of the city. Revitalization refers to giving new face for urban spaces, making them economically productive while sustaining the historical importance.

The research highlights how industrial heritage can promote sustainable urban development. Reusing these structures helps reduce urban sprawl, lowers the environmental impact of new construction, and preserves a city’s cultural identity. The case of the Comtrust Textile Mills demonstrates how industrial heritage can be changed to balance historical preservation with modern urban needs, driving sustainable and economically vibrant urban growth.

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1. Introduction

1. Research Background / Study motivation

1.1 Architectural heritage and sustainable development

The diverse needs of modern society, along with a growing awareness of the immense value of architectural heritage, highlight the significance of revitalization as both a method of preservation and a tool for sustainable development.

In recent years, the importance of urban sustainability has risen due to rapid urbanization, increasing pollution, climate change, and resource depletion. Cities are at the forefront of this issue, accounting for 70% of global greenhouse gas emissions, 60% of global energy consumption, and 70% of global waste [Routledge, 2013].

These challenges are particularly pressing for historic cities, where sustainability goals must align with efforts to preserve urban heritage. Although historic urban areas represent only a small fraction of the world’s urban landscape, they play a major role in moulding local identity,

1.2 Mananchira, calicut

Mananchira serves as the central landmark of Kozhikode (Calicut), located in northern Kerala, the southernmost state of India. It houses the oldest structure built by the Samoothiris, which remains intact today. Encircling the Mananchira tank are several historical buildings that showcase the influence of various rulers who governed the city over time. Key examples include Pattala Palli, established by Tipu Sultan (Kerala Tourism, 2025), the ‘Town Hall’ and ‘Imperial Bank’ constructed during British rule, and the ‘CSI Church’ and ‘Mission Hospital’ founded by the Basel Mission. Additionally, the Comtrust weaving factory—originally founded by the Basel Mission and later managed by the British—stands as a significant reminder of Kozhikode’s urban legacy, despite years of neglect (Ali Ahsan, 2018). Although no longer functional, the factory occupies a prime location in the center of the city.

Chapter 1

The Study



Figure 1: Axonometric view of Mananchira
[source : [https://www.architectpcnesan.com/work/urban-bricolage/.](https://www.architectpcnesan.com/work/urban-bricolage/)]

1.3 Research question

How can urban conservation embrace sustainability while safeguarding both tangible and intangible heritage?

What policies and strategies are being adopted to achieve this balance?

Can the revitalization of the comtrust textile mills lead to the sustainable development of Calicut city?

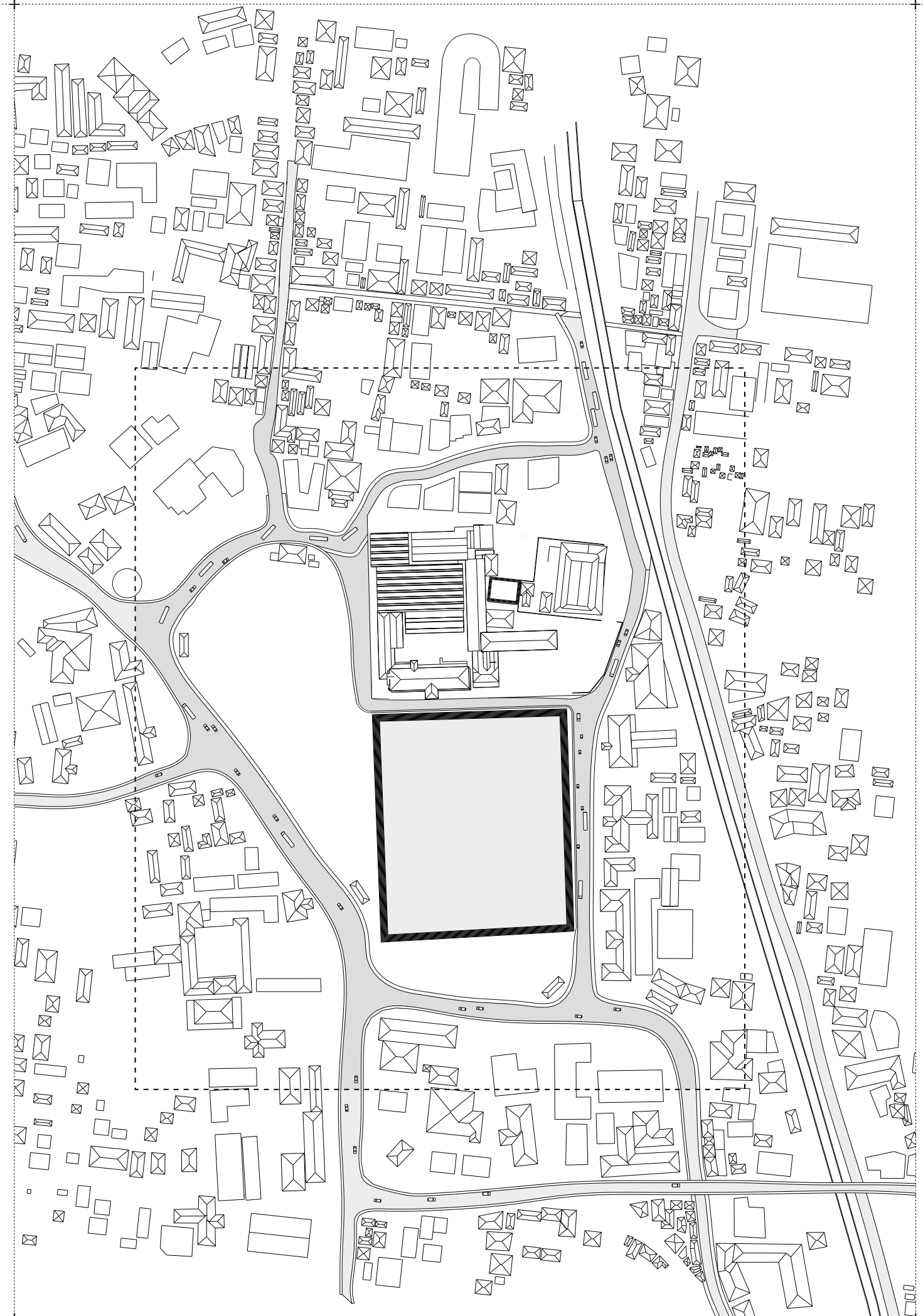
1.4 Aim

This paper aims To propose a general methodology for revitalization in historic settings based on shared understanding of the issues

To establish the significance of comtrust textile mills and potential of its revitalization for the development of Calicut city.

To evaluate the historical, social, and architectural significance of Comtrust Mill and explore viable transformation strategies that preserve its heritage while addressing community needs and future development opportunities.

Figure 2: Existing view of the Mananchira site and its surroundings
[Source: Created by Author]



1.5 Objective

To understand the implementation strategies of revitalization from similar case studies.

To study the relevance of Calicut city and Comtrust textile mills which makes it a case that requires interventions.

To research on the natural, built, socio-political and economic factors, the current problems and structural conditions associated with the building.

To understand and examine the transformational capacity of adaptive reuse in neglected urban spaces and its broader impact on society.

To understand and assess the potential sustainable measures for revitalizing the Comtrust project, transforming it from dormant to vibrant, while preserving its historic and cultural significance.

To evolve revitalization strategies in general that could be used to address the current needs of the city and applicable to similar buildings.

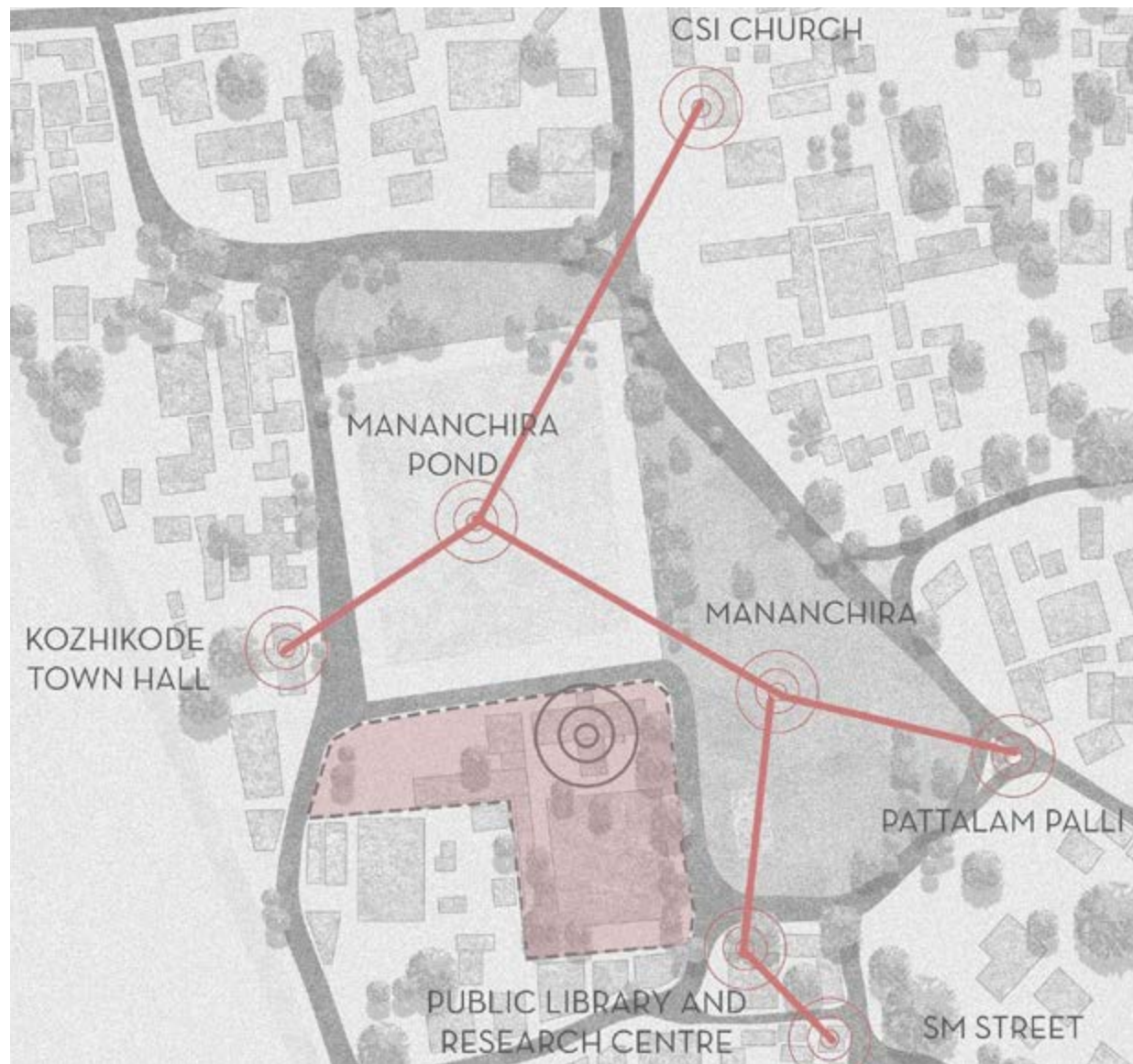


Figure 3: Image showing historic buildings around mananchira [source : drawn by author.]

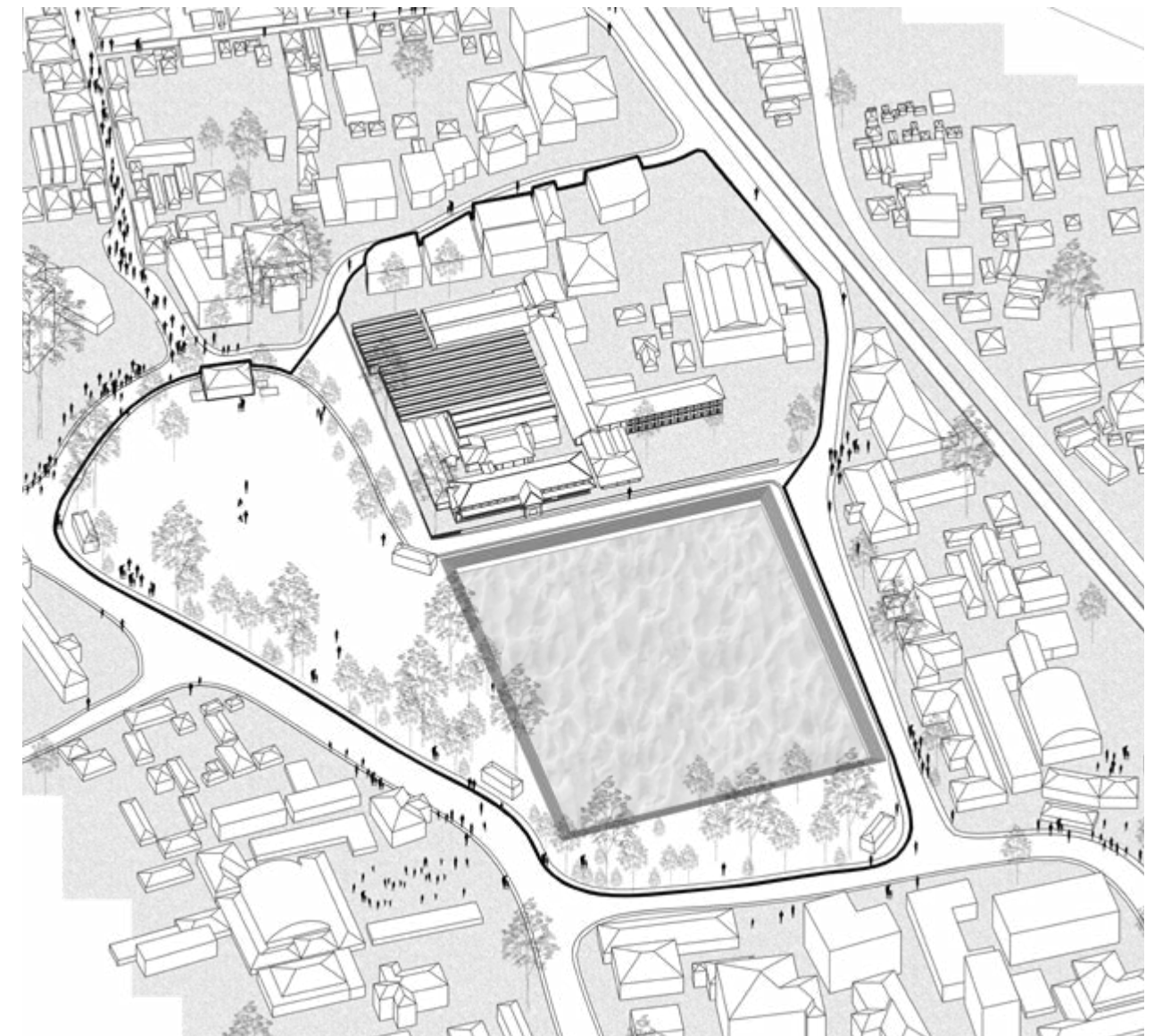


Figure 4: Map of the Mananchira site in Axonometry [source : drawn by author.]



Figure 5: Images of historic buildings around mananchira [source : created by the author.]

1.6 Scope and limitations

1.6.1 Scope

Several articles and news reports have focused on the ongoing negotiations regarding the redevelopment of Comtrust Textile Mills, yet despite this attention, no significant action has been taken. This study seeks to analyze the challenges and issues surrounding the mill's future in detail. By reviewing similar cases where historic or heritage structures were successfully repurposed for modern urban development, the study will aim to identify strategies that could serve as models for Comtrust. These strategies will focus on creating developmental prototypes that can benefit not just the mill but also the broader growth and needs of Calicut city. The research will also study the specific requirements of the city, ensuring that any proposed solutions align with its current and future needs. Additionally, the study will look at the "Revival" competition arranged by the Indian Association of Architects (IIA) in 2022, analyzing the goals of the competition and evaluating the top entries to gain valuable insights. This analysis will help inform the development of innovative and practical strategies for transforming Comtrust Mill into a project that preserves its heritage while providing to the city's development.

1.6.2 Limitations

Not all historic industrial areas in Calicut will be studied, since it is time consuming. Documents regarding the government proposal in the site was not available



Figure 6: Reweave Kozhikode Reimagining the Comtrust Precinct

[Source:<https://architecture.live/reweave-kozhikode/>]

1.7 Research Methodology

The study will be conducted in three key stages, each addressing different aspects of the Comtrust Textile Mills and its broader historical and industrial significance.

i. In the first stage, a background study will focus on the history of Calicut, emphasizing its socio-economic development and the establishment of the Comtrust Textile Mills. This phase will explore the mill's history, cultural and industrial significance, and the rationale behind selecting it for this study. Key concepts such as industrial heritage, revitalization, and sustainable development will be thoroughly examined to provide a theoretical framework for understanding the importance of preserving and reusing industrial sites. This stage will establish a historical and conceptual foundation that will inform the subsequent stages.

ii. The second stage will involve a comprehensive site study that is specifically focused on the current condition of the Comtrust Textile Mills. This will include detailed condition mapping, visual and physical surveys of the mill's infrastructure, and interviews with stakeholders such as former workers, local historians, and community members. These surveys and interviews will offer insights into the current state of the site and its potential for revitalization. This phase will be highly site-specific, aiming to develop a deep understanding of the mill's physical structure, its state of preservation, and its relevance to the community today.

iii. The third and final stage will be the design phase, where the collected data and insights will be analyzed to develop case-specific policies and strategies for the revitalization of the Comtrust Textile Mills. These strategies will address the unique characteristics and challenges of the site, with the aim in transforming it into a sustainable and functional part of Calicut's industrial heritage. In addition to site-specific plans, general strategies will be formulated to connect Comtrust with other similar industrial heritage sites. These strategies could form the basis for an industrial heritage network, creating opportunities for collaboration and the promotion of sustainable development across multiple heritage sites.

Background Study

2. How Calicut emerged as a city

2.1. Establishment of Calicut

Calicut (Kozhikode), situated on Kerala's Malabar Coast, evolved from a modest settlement into a prominent city under the Zamorins in the 4th century. Initially rulers of the inland Ernad region, the Zamorins capitalized on Calicut's strategic coastal location to expand their influence. They successfully defeated neighboring chieftains, formed alliances, and safeguarded traders, turning Calicut into a major spice trading hub. This transformation brought prosperity and cultural diversity, establishing Calicut as a key center of commerce and politics.

The city's growth began with the construction of a fort at Velapuram. A Tamil merchant returning from Mecca, with his ship laden with gold, sought the Zamorin's assistance to store it safely.

The Zamorin's integrity impressed the merchant, leading him to offer half the gold, which the Zamorin graciously declined. The merchant then requested permission to trade in Calicut, which was granted by the chief minister, Mannattacan. He brought carpenters to lay out the city, building streets, houses, and commercial facilities, and settling foreign merchants. This foundation helped Calicut flourish as a renowned hub for import-export trade.

2.2. Calicut as a port town

The rise of Calicut (Kozhikode) as a major global trade center began with the establishment of its port, which played a pivotal role in shaping the city's economic and social infrastructure. The strategic location of Calicut on the Malabar Coast, along with the construction of streets, houses, and commercial facilities, transformed it into a thriving hub for international trade. By the late medieval period, the port became central to the lucrative spice trade, connecting the Indian subcontinent with Arab merchants and later European traders. Calicut quickly gained prominence as one of the major trading centers in the world. Arab traders had long been active in the Indian Ocean, and they found Calicut's

port to be an ideal location for trade. Spices such as black pepper, cardamom, and cinnamon were in high demand globally, and these, along with other goods like silk, were transported via the Silk Route and maritime routes, linking Calicut to major markets in the Middle East, Africa, and Europe.

When Vasco da Gama arrived in 1498, his landing in Calicut marked the beginning of European involvement in Indian trade. However, Vasco da Gama initially misallocated the primary port location, leading to the establishment of a new trading post in the northern part of the city. This, along with later British intervention, further fragmented the trade operations, as multiple trading posts were established in different locations over time, including a British trading post. Over time, this division destroyed the significance of the original port. Moreover, a devastating tsunami struck the region, significantly damaging the main port and reducing its functionality. After this event, the port never fully regained its former prominence, and its position as a global trade hub gradually diminished. Nonetheless, the legacy of Calicut's once-thriving port remains a testament to the city's central role in the spice trade and global commerce during its peak.



Figure 7: Vasco De Gama arrives at the shores of Calicut beach

[Source-Image: National Library of Portugal]



Figure 8: Vasco De Gama introduces him to the ruler of Calicut

[Source-Image: National Library of Portugal]

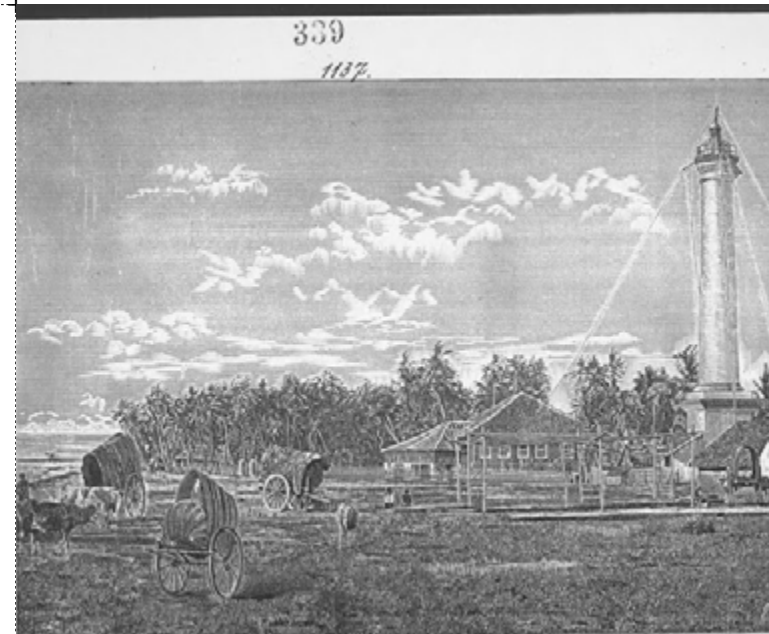


Figure 9: Calicut old port and lighthouse

[Source Image: <http://kallivalli.blogspot.com/2013/08/the-calicut-3-sea-bridge-pier-light.html?m=1>]



Figure 10: Calicut old port and old pier

[Source Image: <http://kallivalli.blogspot.com/2013/08/the-calicut-3-sea-bridge-pier-light.html?m=1>]



Figure 11: destroyed port and pier

[Source Image: <http://kallivalli.blogspot.com/2013/08/the-calicut-3-sea-bridge-pier-light.html?m=1>]

Trade Map

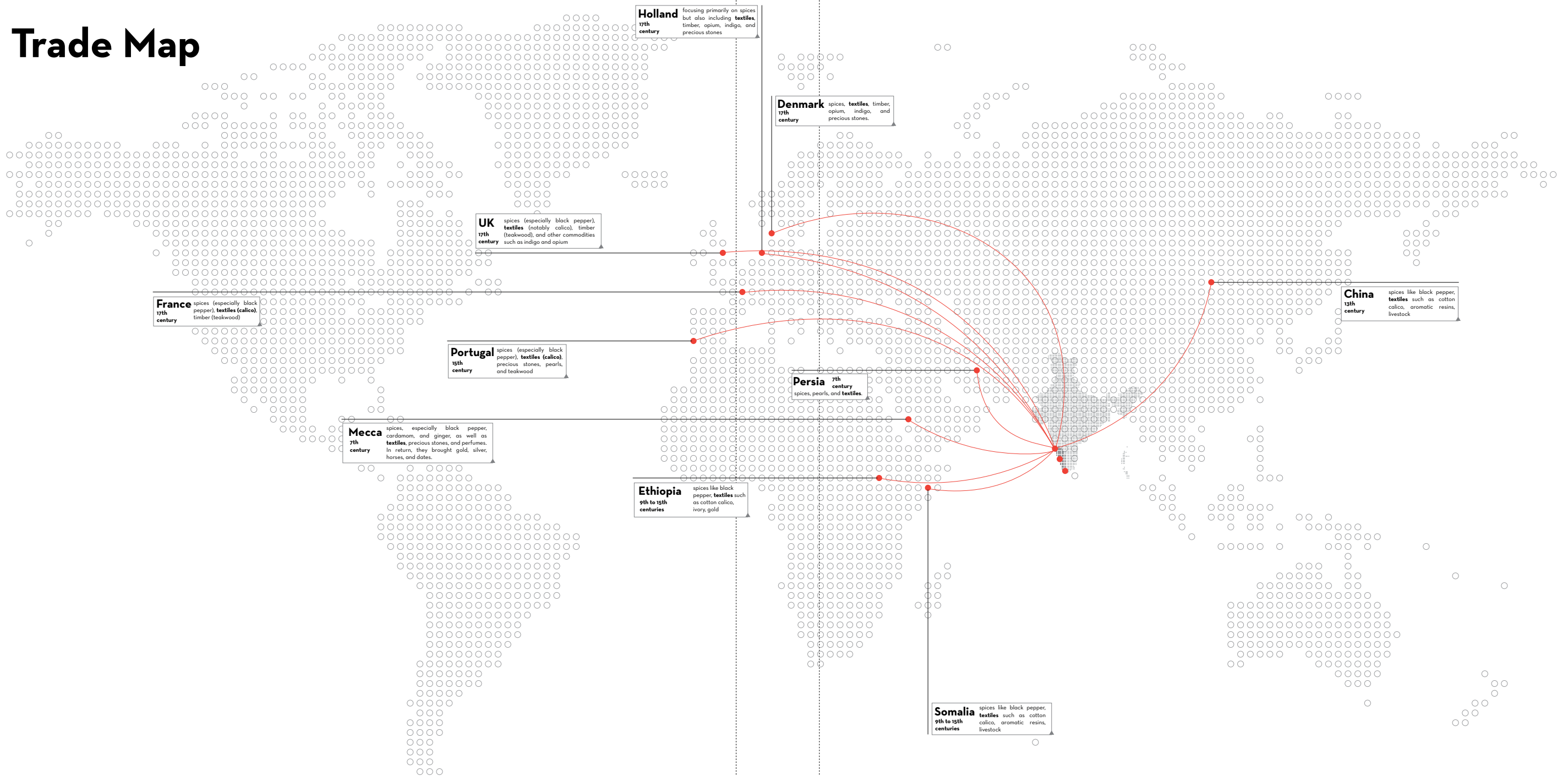


Figure 12: Trade map depicting countries engaged in commerce with Calicut
[source : created by the author]

2.3. Trade history of calicut

Kozhikode's trading history can be traced back to the 7th century when Arab merchants established commercial links with the region (Kozhikode District Website, 2024). The city gained prominence on the global map when Vasco da Gama, a Portuguese explorer, arrived in 1498, forging a direct trade route between Europe and the Malabar Coast (Britannica, 2024). Between 1511 and 1525, the Portuguese established a trad-

factory and fort in the city (Kozhikode District Website, 2024). Subsequent European powers also made their mark, with the English setting up trading in 1665, the French arriving in 1698, and the Dutch establishing themselves in 1752 (Kozhikode District Website, 2024). In 1765, Mysore forces captured Kozhikode, adding a new chapter to its history (Tyndis Travel, 2024).

The city is known by various names, including "Kozhikode" in Malayalam, "Qaliqut" among Arab traders, "Kallikkottai" in Tamil, and "Kalifo" in Chinese. Additionally, the term "calico," which refers to fine cotton fabric, derives from "Calicut" (Kozhikode District Website, 2024).

Throughout its history, Kozhikode thrived as a hub for spice trade, particularly in black pep-

pper and cardamom, drawing merchants from regions as diverse as Arabia, China, Phoenicia, and the Jewish diaspora (Ask Kerala, 2024). The city's stability and strategic location made it a favored port for traders from Arabia and China (Tyndis Travel, 2024). Before European arrival, Kozhikode was under the rule of the Polanad kingdom until it was conquered by the Nedyirippu Eradis (Kozhikode District Website, 2024).

3. History of comtrust textile mills

3.1. industrialization of calicut

Calicut's industrial progression is closely linked to its long-standing role as a trading center, spanning ancient times, colonial periods, and into the modern era. By the 7th century, Arab merchants had established robust trade connections with the region, solidifying Calicut's position as a critical hub in maritime trade networks (Kozhikode District Website, 2024). This significance was further cemented on May 20, 1498, with the arrival of Portuguese explorer 'Vasco da Gama', who inaugurated a direct sea route between Europe and the Malabar Coast (Ask Kerala, 2024). Between 1511 and 1525, the Portuguese established a fort and a trading factory in the city, marking the onset of European colonial influence and the adoption of novel trading techniques and systems (Epoch Magazine, 2023).

Other European powers, such as the English, French, and Dutch, followed the Portuguese in establishing a presence in Calicut. The English arrived in 1615 and constructed a trading post in 1665, while the French established operations in 1698 and the Dutch followed in 1752 (Kozhikode District Website, 2024). These colonial powers played a pivotal role in Calicut's industrial evolution, introducing advanced goods, systems, and technologies that shaped its economic landscape (Mathew, 2006). Significant changes occurred during "The second industrial revolution, spanning the late 19th and early 20th centuries". Infrastructure advancements, such as railways and bridges, greatly improved the efficiency of transporting goods, thereby fostering industrial growth (ISVS e-journal, 2024). During this period, industries like textiles, coir production, and food processing flourished, demonstrating Calicut's ability to adapt to modern industrial trends while maintaining its historical trade advantages (Epoch Magazine, 2023).

Nevertheless, many traditional industries in Calicut are now in decline. This decline highlights the importance of recognizing their historical and cultural value and exploring sustainable methods to revive and modernize them (ISVS e-journal, 2024). Efforts to preserve these industries could provide a foundation for future economic growth, integrating cultural heritage with modern industrial practices (Kozhikode District Website, 2024)..

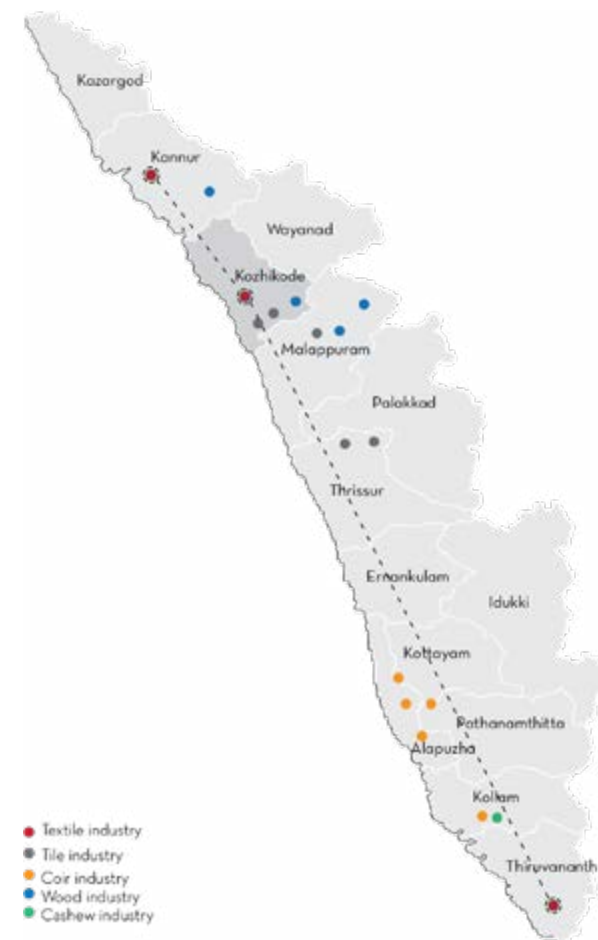


Figure 13: Map of Kerala illustrating the existing industries in the 19th century
[source : created by the author.]

3.2. Role of BEM missionaries

The Basel Evangelical Mission played a major role to bring social change in 19th century Malabar. The Basel Evangelical Missionary Society landed at Calicut on 13th October 1844. At the time when the Basel missions arrived in Calicut, the social systems of Malabar were enriched with caste hierarchy and differentiation. BEM's approach towards people attracted many lower caste people and converted into Christianity which made them independent. They brought social change through education. The mission started setting up industries. The organization's industrial activities were marked by a high level of decentralization. The Mission tried to implement modernization through the establishment of factories. Through this they aimed to train the people as independent artisans.

The Basel Mission's industrial establishments rehabilitated the converts and increased the social and economic status of the depressed castes. "The industries started by the Mission led various low castes like Thiyyas and Dalits to achieve a process of social mobility and seek an existence outside their caste based occupations". The Mission industries destroyed the caste barriers that existed in the society. The people belonging to different castes lived and worked together in the caste stratified environment of Malabar society.

3.3. Basel Mission industries in north Kerala

The Basel Mission, established by German and Swiss missionaries in the 19th century, significantly impacted the socio-economic development of Malabar (now Kerala) and South Canara (now Karnataka). Originally focused on spreading Christianity, the mission expanded its efforts to social reform and industrialization, aiming to uplift marginalized communities and provide them with economic opportunities. One of their key contributions was the establishment of industries, particularly weaving and tile manufacturing. The Basel Mission's weaving factories modernized traditional textile techniques, producing high-quality fabrics such as the well-known "Kha-ki" cloth, which gained popularity across India. The mission also introduced the Mangalore tile, made from local red clay, which became a widely used roofing material due to its durability and

In addition to these industries, the Basel Mission established printing presses, which played a crucial role in promoting education. They translated and printed texts in local languages like Malayalam and Kannada, facilitating wider access to education and information. Importantly, the mission's efforts were deeply rooted in social reform. They provided vocational training to the lower castes and marginalized groups, offering them opportunities in industries like weaving, carpentry, printing, and masonry—fields that were traditionally dominated by higher castes.

Despite facing resistance from conservative elites who opposed these social changes, the Basel Mission persisted in its mission to promote equality and improve living standards. Their industries not only contributed to the region's economic growth but also fostered a sense of dignity and self-reliance among the communities they served. The legacy of the Basel Mission is still visible today in the continuing influence of the industries they established, such as the Mangalore tile industry, which remains iconic.



Figure 14: Image showing basel mission tile factory in calicut
[Source Image: <https://architexturez.net/doc/az-cf-193722>]



Figure 15: Stacks of dried tiles in the common wealth tile factory
[Source Image: <https://architexturez.net/doc/az-cf-193722>]



Figure 16: Basel Mission Industries and The Balmata Printing Press
[Source Image: <https://architexturez.net/doc/az-cf-193722>]



Figure 17: Image basel mission school in Tellicherry
[Source Image: <http://kallivalli.blogspot.com/2013/03/basel-mission-school-tellicherry.html>]

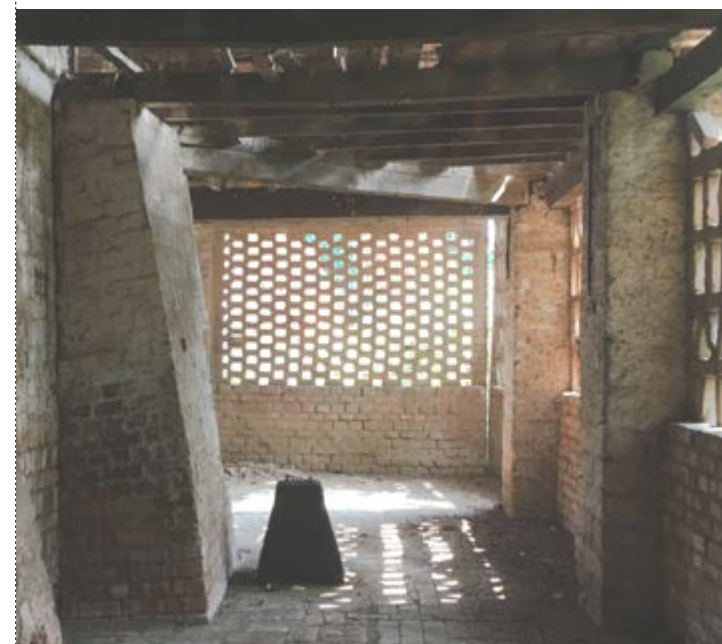


Figure 18: Image showing basel mission tile factory in manglore
[Source Image: <https://architexturez.net/doc/az-cf-193722>]



Figure 19: Image showing basel mission tile factory in manglore
[Source Image: <https://architexturez.net/doc/az-cf-193722>]

3.4. Establishment of comtrust textile mill

The Comtrust Weaving Factory, founded in 1844 by the Basel Evangelical Missionary Society, played a pivotal role in the industrial and social development of Calicut (now known as Kozhikode) (Upper Crust India, 2024). The factory primarily employed the Chaliya community, migrant workers from the Tamil Nadu regions of Nagercoil and Tirunelveli, who were historically marginalized. For these workers, the factory provided a source of employment and empowerment (The News Minute, 2020). The missionaries who established the factory introduced modern looms, which enhanced production efficiency and turned the factory into a significant hub for manufacturing textiles targeted for international markets (Syam Sreesylam on Comtrust Weaving Factory, 2022).

By 1913, the factory had expanded substantially, employing up to 630 workers, which underscores the scale and significance of the enterprise (Upper Crust India, 2024). The factory produced a variety of cloths for export, establishing its role as a crucial player in global trade (The New Indian Express, 2015). The weaving and tile industries initiated by the Basel Mission are often credited as key contributors to social change in Kerala (Upper Crust India, 2024).

These industries not only provided employment opportunities but also improved working conditions and enhanced the livelihoods of communities that had historically faced caste-based discrimination (Syam Sreesylam on Comtrust Weaving Factory, 2022). The factory came to symbolize not only industrial growth but also social progress by integrating migrant laborers and offering them a reliable income (The News Minute, 2020).

However, following World War I, the factory's ownership shifted, and it was taken over by the British Commonwealth Group (Upper Crust India, 2024). This change marked the transition from missionary-led operations to a British commercial enterprise. In 1977, the factory was registered as the Commonwealth Trust, and it is now an Indian-owned company (The New Indian Express, 2015). This transition reflects the broader shift in India's economic institutions post-independence, with control moving from foreign to

local management. Comtrust's historical importance extends beyond its production capacity; it played a critical role as a social and economic institution that contributed to the transformation of the working class in Kerala, promoting social upliftment through industrial labor (Upper Crust India, 2024).

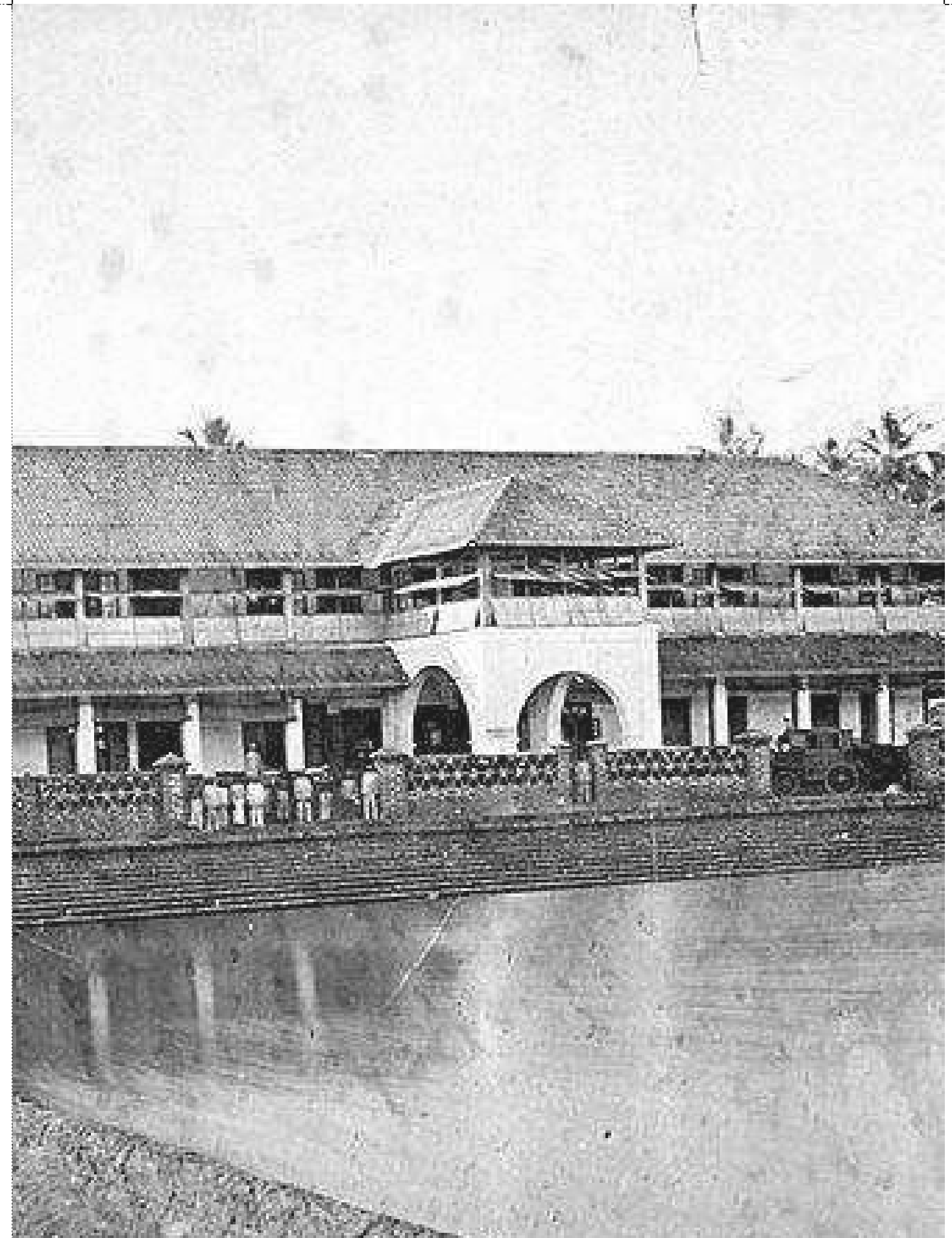


Figure 20: Image of comtrust mill in the 1900 's

[Source Image: https://www.skyscrapercity.com/threads/calicut-history-and-heritage.1081955/page-12?post_id=100954101#post-100954101]

4. Significance of comtrust textile mills

4.1. Social significance

The Comtrust Mill in Calicut stands as a monumental symbol of the city's industrial and social history, deeply intertwined with its colonial past and subsequent transformation. Established under British rule, the mill was more than just a textile production center; it was a major force shaping the local economy and social landscape for generations.

It provided employment to many, serving as a lifeline for numerous families who depended on the income and stability it offered.

The Comtrust Mill had a profound social impact, fostering a sense of community among workers from diverse castes.

It created a more egalitarian environment, where shared labor and living conditions gradually eroded caste-based prejudices. This marked a significant departure from the rigid caste divisions that dominated life in Kerala and India at the time.

The Comtrust Mill brought a significant shift for women, offering rare opportunities for employment, independence, and empowerment in a patriarchal society. It allowed women to earn their own income, engage in public life, and challenge traditional gender norms. This newfound independence enabled women to take on roles typically reserved for men, making the mill a space of social liberation and breaking away from established gender roles.

The Comtrust Mill, a cultural landmark in Calicut, symbolizes the city's industrial heritage and the progressive changes it once fostered, including social unity and gender equality.

Revitalizing the mill could reconnect the community with its historical roots while adapting the site for modern needs, promoting both social and economic growth. Preserving this historical site would allow the community to honor its legacy while leveraging its potential for future development.



Figure 21: Image depicting lower-caste women working at the Comtrust Mill, breaking social barriers.
[Source Image: <https://www.aanavandi.com/blog/nostalgic-memories-old-photos-from-malabar-kerala/>]

4.2. Architectural significance

The architectural significance of the Comtrust Mill in Calicut lies in its distinctive blend of traditional Indian architectural principles and colonial influences, offering both functionality and aesthetic appeal.

4.2.1. Integration of Vastu Shastra Principles

The design of the mill adheres to Vastu Shastra, an ancient Indian system that focuses on creating harmony between the structure and its environment, which is believed to influence the well-being of its occupants. This traditional influence ensures that the mill is not just an industrial space but also one that promotes a positive atmosphere through balanced spatial organization and design.

4.2.2. Effective Use of Natural Light

One of the mill's key features is its efficient use of natural daylight, a hallmark of both traditional and colonial industrial architecture. The large glass windows at the front are oriented to provide ample light throughout the day, offering a natural, soft glow to the interior. This design consideration reduces the need for artificial lighting and lowers the internal temperature, maintaining comfort for workers.

Round windows near the roof pivot horizontally, enhancing light and ventilation, crucial for maintaining a healthy and productive workspace in a tropical climate. Gabled roofs with glass panes and special north-facing roof trusses are designed to admit softer, consistent daylight from the north, balancing illumination without harsh sunlight.

4.2.3. Ventilation and Cooling

The mill's design incorporates natural cooling techniques essential for the tropical climate of Kerala. The strategic placement of windows and the use of high ceilings facilitate cross-ventilation, keeping the interiors cooler and more comfortable. The use of traditional building materials, such as laterite stone and wooden flooring, adds to the insulation properties, further contributing to a cooler indoor environment.

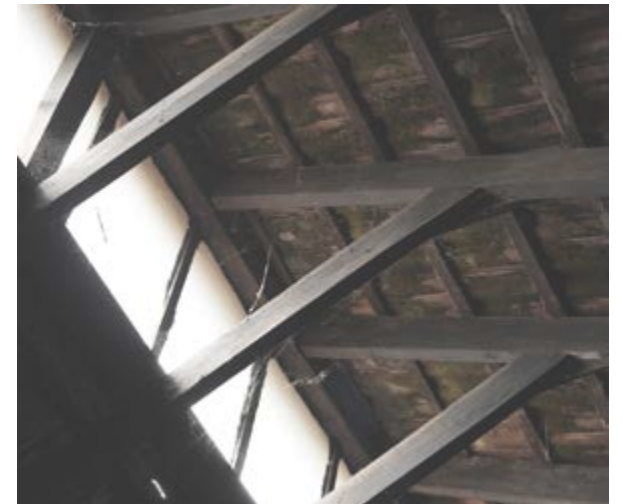


Figure 22: Image depicting clerestory windows designed to enhance natural lighting and ventilation..
[Source Image: photographs taken by the author]



Figure 23: Image depicting the vernacular architecture details.
[Source Image: photographs taken by the author]



Figure 24: Image highlighting colonial-influenced architectural details.
[Source Image: photographs taken by the author]

4.2.4. Traditional and Local Building Materials

The construction features locally sourced laterite stone, a reddish material known for its durability and thermal properties. It is bound with lime and surkhi mortar, a traditional mixture, which provides strength and breathability to the structure. The use of wooden flooring not only adds an aesthetic value but also serves as a functional material that is durable and well-suited to industrial needs.

4.2.5. Connection with Surroundings

A key architectural feature is how the mill's design fosters a connection with its surroundings. The front windows offer views of Mananchira pond, integrating a sense of place and context. The visibility of natural elements like the pond enhances the connection between the workers and the surrounding environment, aligning with the Vastu Shastra focus on balance.

4.2.6. Colonial Influence

The influence of colonial architecture is apparent in the mill's utilitarian yet elegant design. The use of large windows, pitched roofs, and roof trusses reflects the colonial industrial architectural style, which emphasized practicality, ventilation, and light management for large workspaces.

4.3. Decline of textile mills

The decline of Comtrust Mill began when its ownership transferred from its original founders, the Basel Missionaries, to the Commonwealth Trust. Under the new management, the mill did not keep up with advancements in machinery and production methods, unlike other textile factories that upgraded to stay competitive. This failure to innovate caused the mill to gradually lose ground in the market, ultimately leading to its closure in 2008. Since then, the land has become highly valuable, drawing interest from speculators and land sharks who aim to profit from its sale. Today, only a small part of the building is used for administrative purposes, while the rest has been left abandoned. The years of neglect, lack of maintenance, and exposure to weather have led to the deterioration of the structure, eroding its past industrial importance and its architectural appeal.

4.4. Fire outbreak at Comtrust factory in Kozhikode

On March 14, 2024, a significant fire broke out at the abandoned Comtrust Weaving Factory in Kozhikode. The fire began around 9 p.m., causing extensive damage, including the collapse of the roof. Firefighters extinguished the blaze by 11:30 p.m., but their efforts were initially delayed due to mud blocking the factory's main gate, which hindered vehicle access (The News Minute, 2020). As a precautionary measure, power to nearby buildings was cut off. The factory, which has been closed since 2009 because of financial difficulties, had become a site for anti-social activities such as drug use and theft (Upper Crust India, 2024).

The reason of the fire is still on investigation, though suspicions have arisen about intentional arson by anti-social groups, potentially linked to land speculators aiming to exploit the property for business purposes (The News Minute, 2020). Former employees of the factory, present at the scene, expressed doubts about the fire's origins, pointing to the high value of the land as a motive (Syam Sreesylam on Comtrust Weaving Factory, 2022).

Historically, the factory holds significant value, having been established in the 19th century by German Basel Missionaries (Upper Crust India, 2024). Renowned for producing branded textiles, it underwent various phases of ownership.

Following World War I, the British took over its management before transferring it to Indian ownership in 1976 (The New Indian Express, 2015). Attempts to sell the property for commercial purposes were blocked by laborers, while government plans to acquire the facility were hindered by technical challenges. Many former workers continue to protest, demanding the re-opening of the factory and the payment of outstanding wages (The News Minute, 2020).



Figure 25: Image depicting the destruction caused by a fire outbreak.

[Source Image: <https://www.thehindu.com/news/national/kerala/landsharks-suspected-to-be-behind-fire-outbreak-at-old-comtrust-factory-building-in-kozhikode/article67953613.ece>]

4.5. Current scenario

Comtrust Mill in Calicut, once an architectural and historical landmark, played a crucial role in shaping the local community by breaking caste barriers and offering hope and livelihood to many. Its social, material, and architectural significance made it a valuable asset to the region. However, the mill has fallen into neglect, with severe damage to its structure, parts completely destroyed, and valuable materials like wood and copper stolen over time. The abandoned site has also become a hub for illegal activities at night. Any efforts to restore or repurpose the mill now involve a conflict between three key groups: the Commonwealth Trust, which owns the high-value land and seeks to sell it for real estate development; the former factory workers, who have long demanded that the government take over and revive the factory; and the government itself, which has proposed turning the mill into a museum to create employment opportunities for the displaced workers.



Figure 26: Image depicting the current condition of the comtrust mill.
[Source Image:photographs taken by the author]

Figure 27: Image depicting the current condition of the comtrust mill.
[Source Image:photographs taken by the author]

Figure 28: Image depicting the current condition of the comtrust mill.
[Source Image:photographs taken by the author]

Figure 29: Image depicting the current condition of the comtrust mill.
[Source Image:photographs taken by the author]

Figure 30: Image depicting the current condition of the comtrust mill.
[Source Image:photographs taken by the author]

Figure 31: Image depicting the current condition of the comtrust mill.
[Source Image:photographs taken by the author]





Figure 32: Image of a worker demonstrating the loom weaving method.
[Source Image:photographs taken from google]



Figure 33: picture of the members of the last management of the mill.

[Source Image:<https://architecture.live/it-is-difficult-to-think-that-the-area-once-provided-people-hope-and-life-syam-sreesylam-on-the-comtrust-weaving-factory/>]

4.6. Government's Proposal

Even though the government took over the building and proposed to make it a living museum, there were no further actions taken. There are attempts to demolish the building during the night. When we look into the decision, it is clear that the government made it from the pressure from the strike. There were no studies done before allocating such a function. It was purely for the reemployment possibilities for the workers in the museum. Even the government will not have much profit from this proposal. It is solely for the benefit of the old employees that this function is proposed. The machinery there is in very poor condition and there is very little chance of protecting it for the museum. Also, the cost for the conservation and rebuilding will be high which will be a great loss for the government. This might be the reason that the proposal is still in papers.

4.7. Comtrust and the People



The memory of comtrust in people's minds varies from person to person. The community of workers have placed the structure in their memory as it once marked a point in their timeline. They are emotionally attached to the structure which makes them fight against its demolition.

From the perspective of antisocialists it is a safe place for antisocial activities. The building offers a covered private space in the city center. For The merchants around the place, it is a landlocked plot which, if developed, would improve their livelihood.

So is the site for real estate developers. If not for the workers community, most people value the plot more than the buildings or its memory and history.

Competition Entry Analysis

Selected entries from the “Revive Calicut” architecture competition, organized by the IIA and YAAF Calicut, have been closely examined to understand their design strategies, functions, and overall approach.

Entries	Ideas and Concepts		Key spaces and Functions	Goals and Strategies
<div><div>1</div></div>	<p>Transform Comtrust precinct and Mananchira area into vital public spaces amidst urban growth.</p> <p>Create a unified urban block by removing barriers and integrating open spaces.</p> <p>Repurpose Comtrust complex into a diverse hub of activities (bricolage).</p> <p>Figure 33: Reweave Kozhikode Reimagining the Comtrust Precinct Entry 1 [Source:https://architecture.live/re-weave-kozhikode/]</p>		<p>Establish pedestrian-friendly promenade linking public buildings and Mananchira pond.</p> <p>Designate areas for vendors, urban seating, and safe crossings.</p> <p>Convert Comtrust factory into spaces like food hall, co-working areas, maker workshops, and industrial museum.</p> <p>Develop outdoor event spaces such as courtyards and urban plaza.</p>	<p>Preserve Kozhikode’s industrial heritage. Stimulate economic activity through diverse programs and events.</p> <p>Use reversible and permanent interventions to adapt factory buildings while preserving historical integrity.</p> <p>Employ light strategies (e.g., dry construction) and permanent changes (e.g., solar tiles).</p> <p>Implement projects by zone to attract varied investors and ensure financial sustainability.</p>
<div><div>2</div></div>	<p>Revive fragmented urban connections through sensitive urban design.</p> <p>Foster public participation and integrate city activities.</p> <p>Incorporate green courtyards within the weaving area for visual continuity.</p> <p>Figure 34: Reweave Kozhikode Reimagining the Comtrust Precinct Entry 2 [Source:https://architecture.live/re-weave-kozhikode/]</p>		<p>Create a stepped court linking office buildings to Mananchira Park.</p> <p>Introduce landscape mounds around the park for inclusivity and openness.</p> <p>Repurpose historic factory buildings for amenities and a museum.</p> <p>Transform the weaving area into a large verandah with pavilion-like structures.</p> <p>Incorporate green courtyards within the weaving area for visual continuity.</p> <p>Establish a vibrant bazaar street as an extension of SM street.</p>	<p>Transition the precinct into a pedestrian-friendly zone.</p> <p>Restrict vehicular traffic to the precinct periphery.</p> <p>Collaborate with local authorities for community infrastructure development.</p> <p>Develop architectural details inspired by local imagery.</p>



Metaphorical view of the site as a fabric needing reintegration into the city.

Focus on revitalizing the historical Comtrust weaving factory.

Aim to create a self-sustaining community hub.

Figure 35: Reweave Kozhikode Reimagining the Comtrust Precinct Entry 3
[Source:<https://architecture.live/re-weave-kozhikode/>]

Multi-functional building with integrated streets and public spaces.

Includes markets, food courts, manufacturing units, and maker spaces.

Emphasis on economic activity, skill development, and community engagement.

Restore cultural and economic significance to Kozhikode.

Promote diversity and stability through sustainable urban development.

Preserve and showcase local heritage and craftsmanship.

Establish a training center and small-scale manufacturing units.

Feature exhibition spaces and retail outlets to support local artisans.

Enhance urban public spaces around



Revitalization Vision: Transform the abandoned Comtrust weaving factory into a dynamic urban hub.

Concept of Urban Living Room: Reconnect the Mananchira complex with the city, fostering diverse activities and community engagement.

Figure 36: Reweave Kozhikode Reimagining the Comtrust Precinct Entry 4
[Source:<https://architecture.live/re-weave-kozhikode/>]

Craft and Atelier: Establish craft studios, workshops, and a weaving museum to revive traditional textile craftsmanship.

Space for Demonstration and Connections: Create a central courtyard for exhibitions, theater, and community gatherings.

Play and Health: Develop a recreation hub with indoor games, fitness activities, and outdoor sports facilities.

Activation and People-Centric Design: Enhance connectivity through plazas and pedestrian-friendly streets.

Enhanced Urban Experience: Improve legibility with clear signage and wayfinding.

Community Engagement: Foster interaction through flexible programming and public art installations.

Architecture as a Platform: Utilize the factory and park symbiotically for cultural expression and community participation.



Revitalization Focus: Enhance quality of life and public welfare through revitalization efforts.

Inclusive Approach: Create flexible spaces that integrate with Kozhikode's socio-cultural fabric.

Figure 37: Reweave Kozhikode Reimagining the Comtrust Precinct Entry 5
[Source:<https://architecture.live/re-weave-kozhikode/>]

Functional Diversity: Blocks reimagined for commercial spaces, heritage museum, restaurant and gallery, amphitheater, plaza, and gallery extension.

Public Engagement: Spaces designed for retail, amenities, cultural events, street busking, markets, and exhibitions.

Park and Pond Integration: Redefining Mananchira park and pond edges with seating, walkways, and user-sensitive elements.

Community Enhancement: Enhance social networks, cultural enrichment, livelihood improvement, and connectivity.

Adaptability and Flexibility: Create a dynamic urban node responsive to seasonal, cultural, and economic needs.

Urban Integration: Establish a central axis linking streets and parks to encourage pedestrian movement and community interaction.

Cultural and Economic Integration: Introduce diverse functions (commercial, educational, cultural, recreational) to enrich urban life.

2. Site Study

Chapter 2

Grounding

2. Regional Context

Kozhikode, formerly known as Calicut, Positioned on Kerala’s Malabar Coast, India, is a city shaped by its vibrant history, diverse culture, and significant strategic locationas a major trade hub

2.1. Geography and Climate

Kozhikode is located in the southwestern coast of India located on the Malabar Coast in Kerala, bounded by the Arabian Sea on the west. The city is well known for its green planation and rivers; The Chaliyar river play a crucial rule to the geography of the city because of its Closeness to the Western Ghats, its climate and beauty; Being one of the western coastal cities of Kerala, Kozhikode follows a tropical monsoon type of climate with huge amount of rain during the monsoon season between June and September, hot and humid summers followed by mild winters.

2.2. Historical Significance

Kozhikode’s prominence in history is rooted in its “key role in the global spice trade, particularly during the medieval period when it attracted traders from Arabia, China, and Europe, eager for its rich spice production, especially black pepper” (Upper Crust India, 2024). The city’s global importance when Vasco da Gama landed at Kappad Beach in 1498, initiating the era of European colonial exploitation of the subcontinent (Confident Group, 2023). Ruled by the Zamorins, Kozhikode thrived as a trading hub under their leadership, while later influences from the Portuguese, Dutch, and British shaped its culture and

2.3. Economic Context

Kozhikode’s legacy as a trading city still persists today. In its past, the city was renowned for its bustling spice markets, but it has since diversified into other industries (CalicutNet, 2022). It was home to the famous Comtrust Mill (Calicut Common Weaving Factory), established in 1884, which played a significant role in India’s textile industry during the British period (Upper Crust India, 2024). Although the mill has since closed,

it is a symbol of Kozhikode’s industrial history. Today, the city’s economy thrives on a mixture of agriculture, commerce, and a growing IT sector, with new developments like Cyberpark serving as hubs for technology companies (Wikipedia contributors, 2024). Kozhikode’s agricultural economy is still supported by products like coconut, rubber, and coffee (Indiastat, 2024), but trade, education, and tourism also form key parts of its economic foundation (DCMSME, 2024).

2.4. Cultural Significance

Kozhikode’s cultural fabric is a vibrant blend of influences brought by centuries of interaction with traders and settlers from diffrent parts of the world (Upper Crust India, 2024). The city’s cuisine, particularly its Malabar biryani, halwa, and seafood, is a reflection of the Arab, Portuguese, and Indian influences that have shaped the region. Kozhikode is also known for its rich tradition of Mappila songs, a form of Muslim folk music, as well as classical dance forms like Mohiniyattam, which highlight Kerala’s traditional arts (CalicutNet, 2022). Festivals such as Onam and Vishu are joyously celebrated, along with the Malabar Mahotsavam, a cultural event that presents the city’s artistic heritage (Indiastat, 2024).

2.5. Architecture

Kozhikode's urban landscape is a mix of traditional Kerala architecture, colonial influences, and modern structures. Traditional homes, known as "Nalukettu" houses, are characterized by their sloping tiled roofs, wooden pillars, and central courtyards, reflecting Kerala's indigenous architectural styles designed to suit the tropical climate. Colonial buildings, especially those built during the British period, add another layer to the city's architectural diversity, with structures that feature European styles such as neoclassical and Gothic revival elements (JSTOR, 2024). Churches, mosques, and temples throughout the city also reflect the syncretic religious and cultural history of the region (Upper Crust India, 2024). The Mishkal Mosque, built as early as 14th century, is one such example, with its distinctive Indo-Islamic style blending local traditions with Arab influences.



Figure 38: Map of Kozhikode District
[Source: <https://stock.adobe.com/it/images/kozhikode-minimal-city-map-india-asia-black-white-vector-illustration/664838100>]

2.6. Connectivity

Kozhikode is well-connected by an extensive network of road, rail, and air, making it a crucial transportation hub in Kerala. Kozhikode International Airport, Situated around 28 kilometers from the city, it provides both domestic and international flight services, particularly to the Middle East, serving the large expatriate community. The city is linked by a well-developed rail network and National Highway 66, which facilitates efficient movement to other parts of Kerala and major Indian cities. Strategically located on the Coast of Malabar region, Kozhikode serves as a gateway to stunning attractions, including the picturesque Wayanad hills, renowned for their wildlife sanctuaries and tea plantations, as well as nearby beaches like Kappad Beach, where Vasco da Gama first landed, and Beypore, famous for its traditional shipbuilding.



Figure 39: Map of Trades Kozhikode District
[Source: Created By Author]

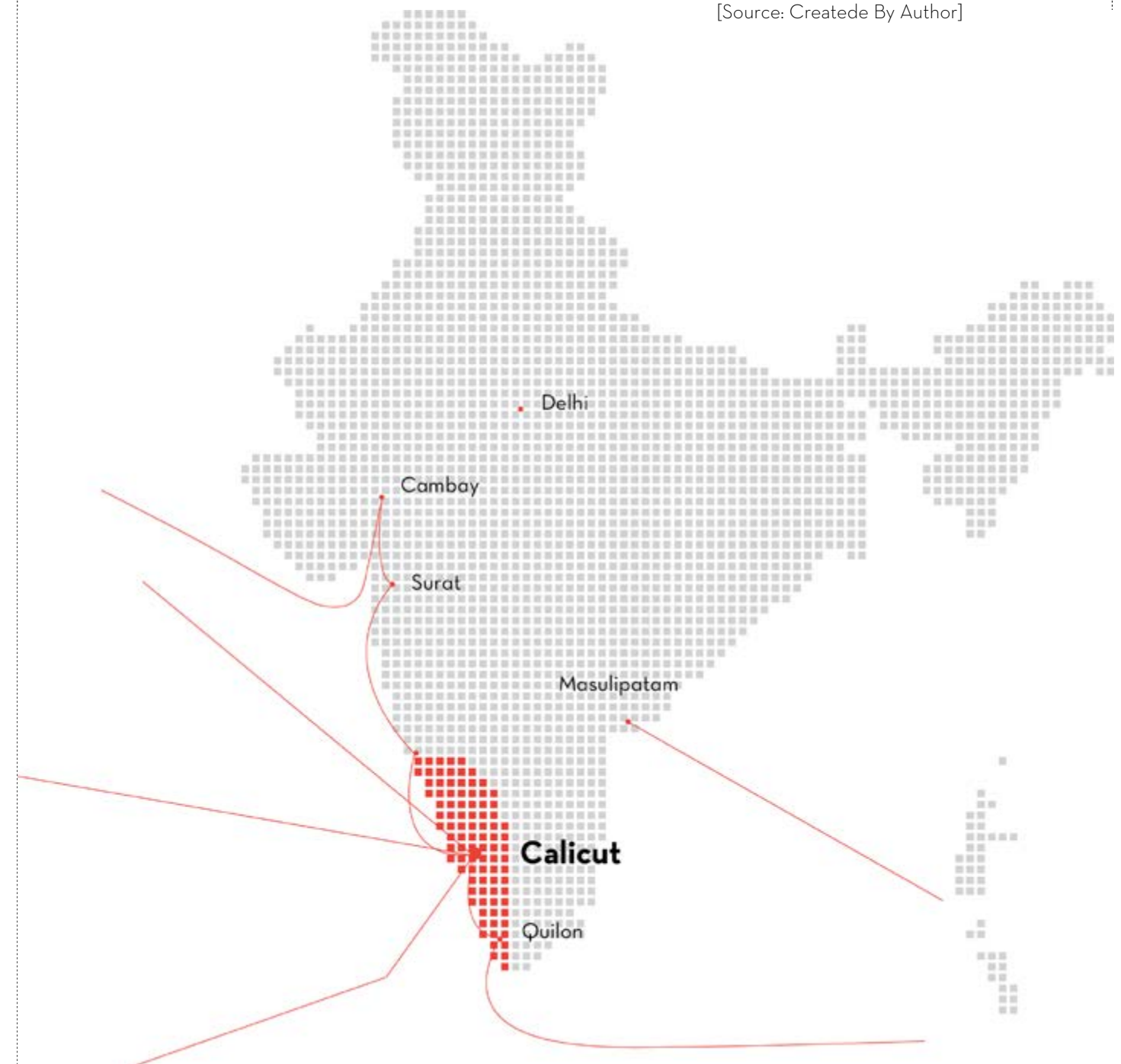




Figure 40: Kozhikode Kerala Backwaters & Village, Old Photo 1945
[Source: <https://www.past-india.com/photos-items/kerala-backwaters-village-old-photo-1945/>]

2.7. Transformation

World trade to Calicut (Kozhikode) in India, particularly focusing on textiles and other commodities, was significant during various historical periods, especially during the medieval and early modern eras.

Calicut (Kozhikode) was a pivotal trading hub on India's Malabar Coast:

Medieval and Early Modern Trade: Known for spices like black pepper, textiles (cotton), and aromatics traded with the Middle East, East Africa, and Europe via maritime routes.

European Influence: Vasco da Gama's arrival in 1498 led to Portuguese dominance, followed by the Dutch and British, who controlled spice routes and influenced trade dynamics.

Legacy: Despite decline, Calicut's historical role in global trade and cultural exchange persists. Today, it remains active in global commerce, focusing on textiles, spices, and IT services, reflecting its enduring economic significance.

FROM A PORT TOWN TO COMMERCIAL HUB

Character shift during city growth

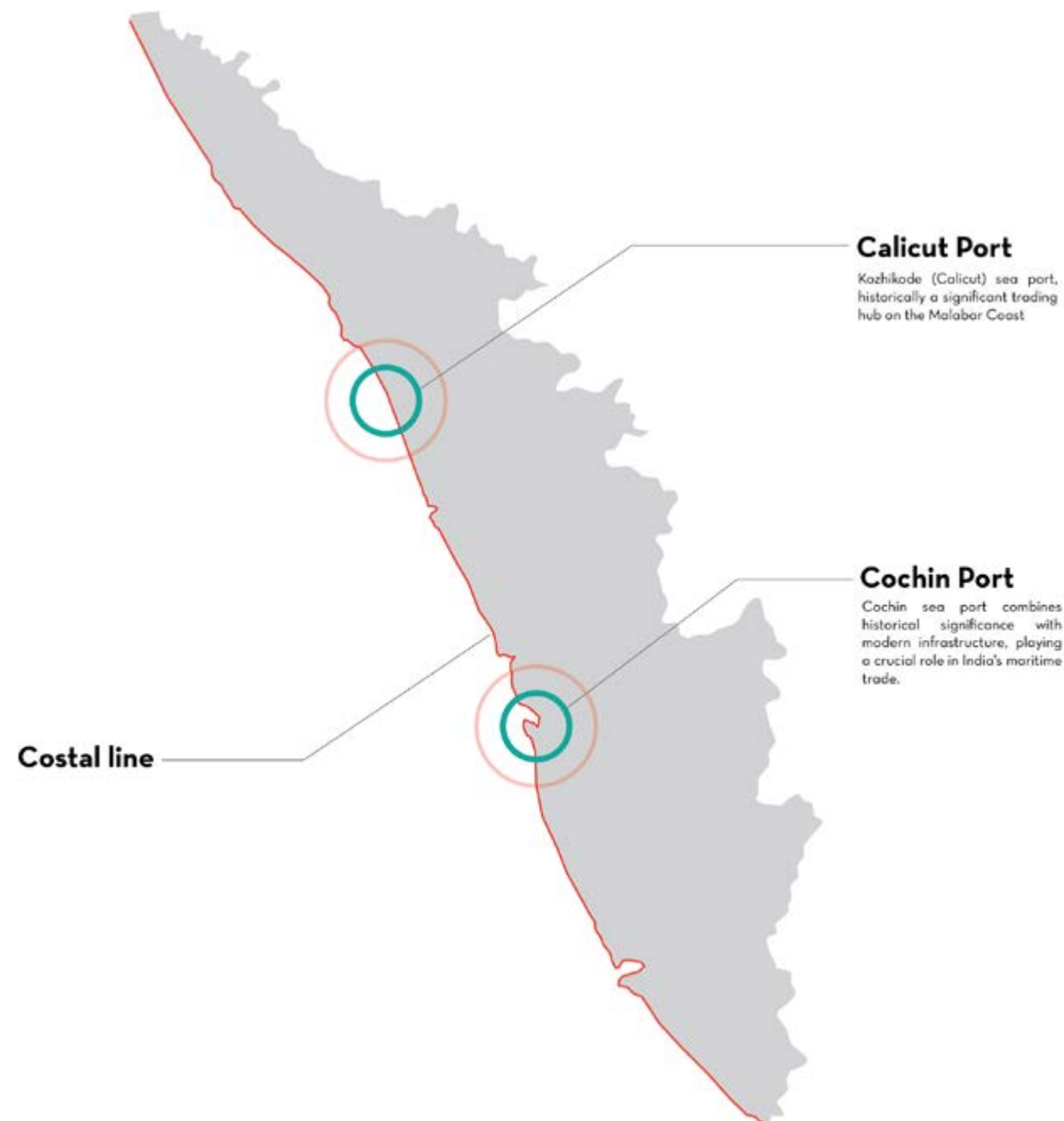
The city used to be famous for its trade relations with other parts of the world, but the 20th century witnessed a character shift from a port town to a commercial hub with really high levels of urbanisation and urban population.



Figure 41: Kozhikode Kerala Backwaters & Village, Old Photo 1945
[Source: <https://io.wp.com/www.thiruvananthapuramfirst.in/wp-content/uploads/2014/08/KeralapicsKERALAO4aug2014.jpg>]



Figure 42: Kozhikode Hi-Lite Mall
[Source: Taken By Author]



2.8. Population

Today, Kozhikode is home to a population of around 3.2 million people (as of 2021), making it one of the most populous cities in Kerala (Census 2011, 2024). It has a high literacy rate, supported by educational institutions like Calicut University and the prestigious “Indian Institute of Management Kozhikode (IIMK)”, which contribute to the city’s role as an educational hub. The city’s social fabric is known for its progressive values, reflected in its history of labor movements and political activism, particularly during the rise of the Communist movement in Kerala (Indiastat, 2024).

Figure 43: Prominent Ports and Costal Line is Kozhikode
[Source: Created By Author]

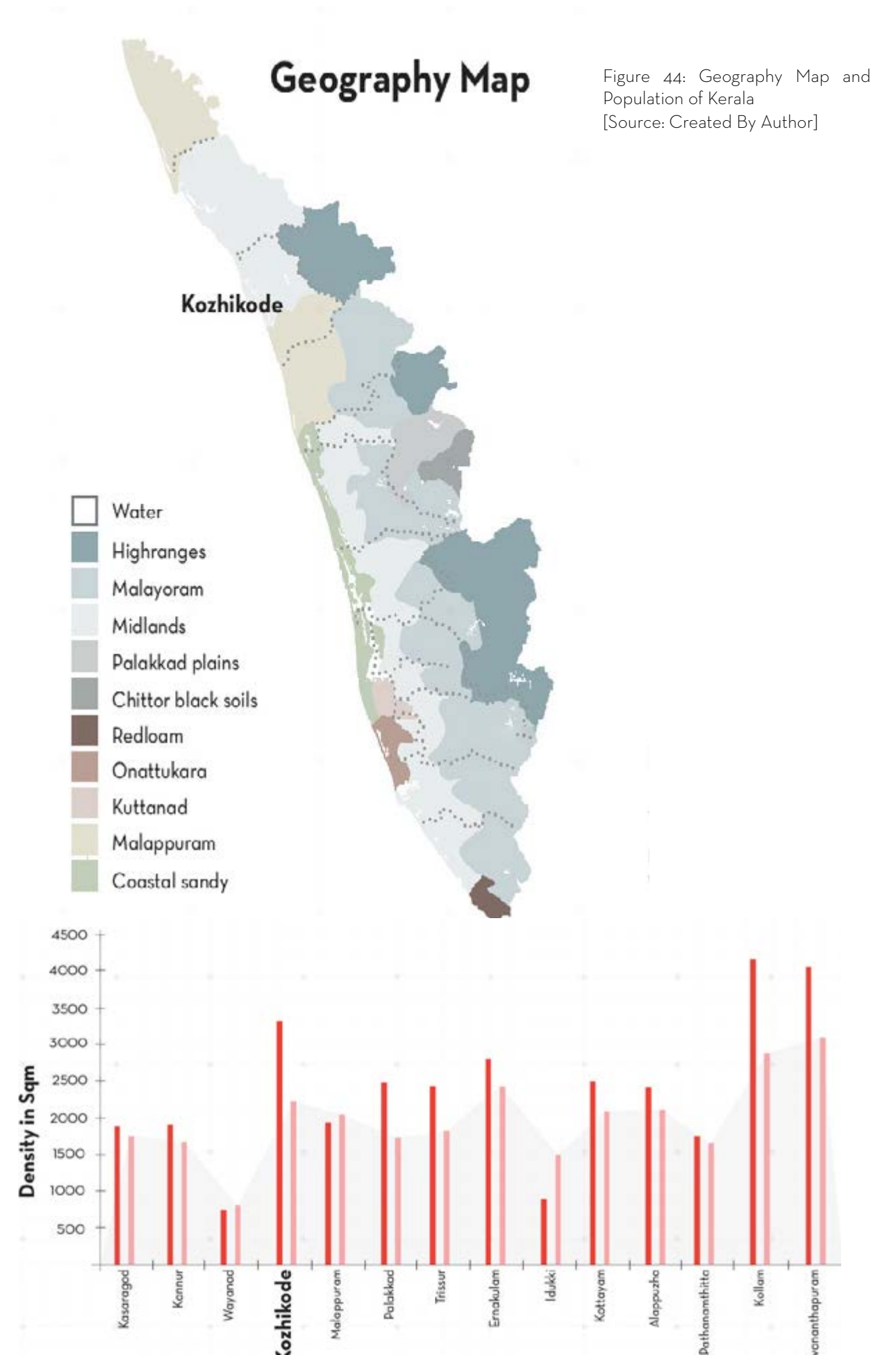


Figure 44: Geography Map and Population of Kerala
[Source: Created By Author]

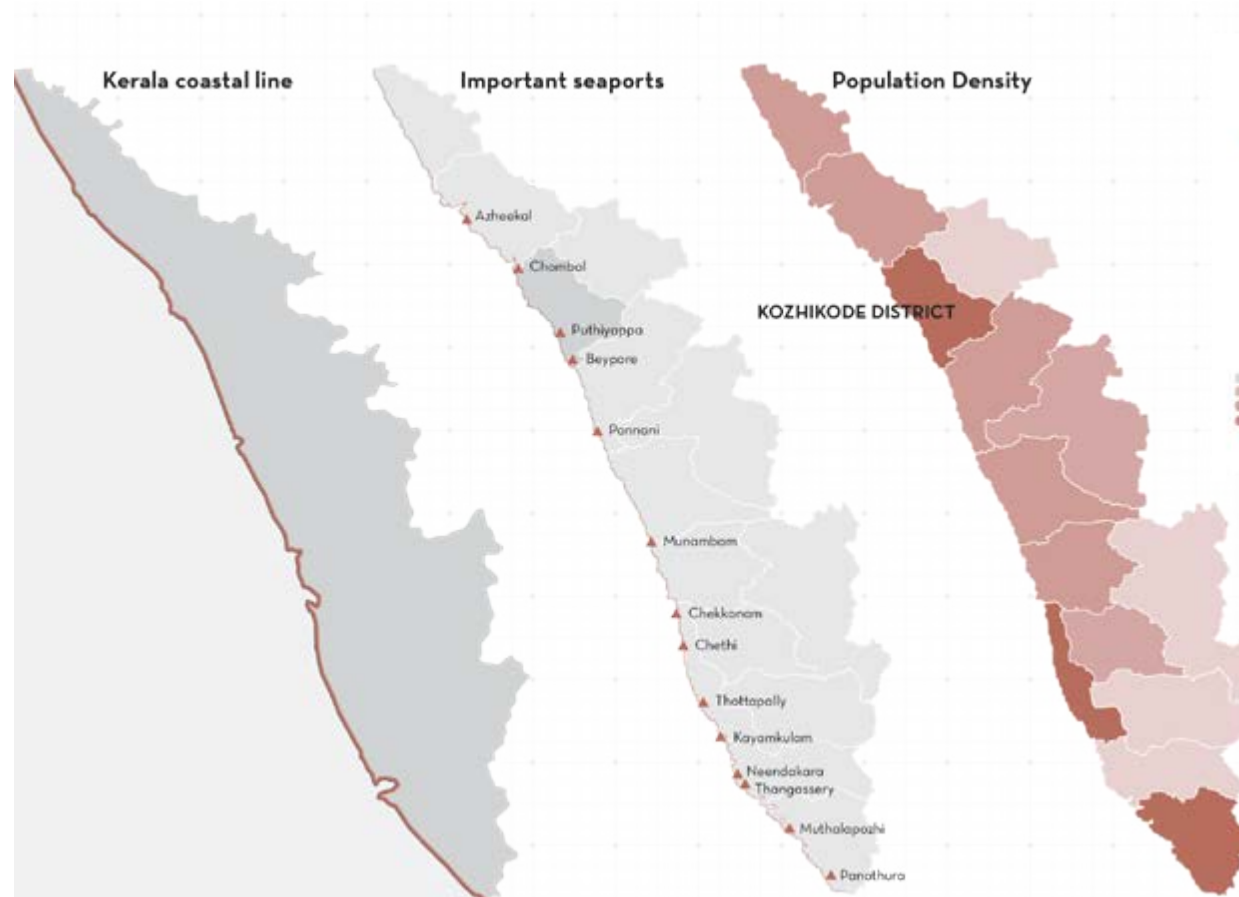
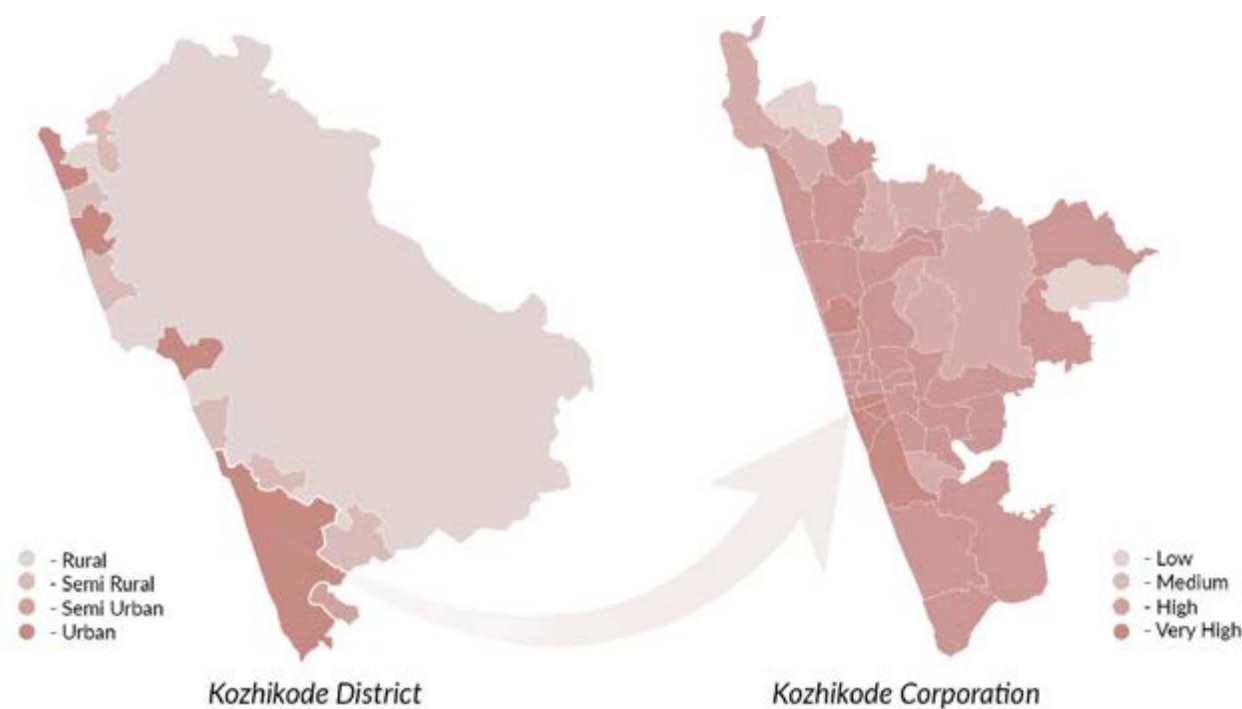


Figure 45: Costal Line, ilmportant Seaports, Population Density and Regional Characters [Source: Created By Author]

Functional Character

Density Distribution in LSGDs



2.9. Major Ports in Kerala

Calicut (Kozhikode) Port: Historically, Calicut was a crucial trade hub, often referred to “City of Spices.” It drew merchants from the Middle East, China, and Europe due to its booming spice trade. The port gained worldwide fame when Vasco da Gama arrived in 1498, establishing the first direct sea route between Europe and India. This marked the start of European colonial interest in India and global spice trade expansion. Calicut’s historical wealth contributed to the Zamorin ruler’s power, with cultural and economic impacts lasting to this day.

Kochi (Cochin) Port: Currently the largest and busiest port in Kerala, it is essential for trade, especially in petroleum products and containerized goods. Kochi hosts the Vallarpadam International Container Transshipment Terminal, supporting global trade routes.

Vizhinjam Port: Situated near Thiruvananthapuram, Vizhinjam is under development as a deep-water port for container transshipment, strategically positioned on international shipping lanes.

Beypore Port: Near Calicut, Beypore is known for its traditional boat-building industry and serves local trade, including links with the Lakshadweep Islands.

Azhikkal Port: Located in Kannur, it’s a minor port focused on local trade and fishing, with expansion plans to boost regional trade.

Neendakara Port: Primarily a fishing port in Kollam, it is vital to Kerala’s seafood industry and hosts an Indo-Norwegian Fisheries Project.

lined with commercial, residential, and institutional developments.

Limited Vertical Growth: Due to environmental policies, land availability, and local building codes, cities in Kerala, including Kozhikode, have traditionally had less vertical growth compared to other Indian cities

Suburbanization and Fringe Development: As urban populations grow, suburban areas around cities like Kozhikode are expanding. Areas once predominantly agricultural or rural are transforming into residential and commercial zones, leading to the development of peri-urban regions like Feroke, Kunnammangalam, and Ramannattukara.

Housing and Infrastructure Demand: With rising populations, there’s high demand for housing, roads, and utilities, putting pressure on the infrastructure in Kozhikode and nearby towns. Urban sprawl has led to challenges in waste management, water supply, and transportation, especially as areas beyond city limits often have limited infrastructure.

Integrated Development: Kerala’s government has taken steps toward integrated urban-rural planning to balance development with environmental conservation. Kozhikode’s urban planning strategies now focus more on sustainable growth, which includes encouraging mixed land use, eco-sensitive zoning, and expanding public transportation.

2.10. Urban Growth in Calicut

Urban sprawl in Kerala, including Kozhikode, is distinct due to the state’s unique geography and settlement patterns. Kerala has a highly urbanized but scattered population with a dense network of villages, towns, and small cities along its coast, rivers, and hill regions, creating a continuous urban-rural landscape. This is unlike the typical concentrated urban sprawl seen in other parts of India.

Linear and Ribbon Development: Kerala’s urban sprawl often extends along roads and railways, creating “ribbon” or linear development. This pattern is noticeable in Kozhikode and other districts, where highways and arterial roads are

3. Territorial Context



Figure 46: Images showing the urban sprawl happened in the kozhikode city from the old port to the center
[Source: Created By Author]

3.1. Geography and Climate

3.1.1. Shifting city centre

Kozhikode, originally centered near the coast due to its trade-driven economy, began shifting its core eastward in the 20th century. This transition established Mananchira Square as the new focal point of the city. Once a quieter area, Mananchira evolved into a vibrant center, promoting commercial, cultural, and administrative development. Today, it symbolizes Kozhikode's transformation from a bustling port city to a more diversified urban landscape, reflecting both its history and modern growth.

Mananchira, a defining landmark in the heart of Calicut, holds significant value in the city's territorial layout. Originally a royal reservoir for the Zamorin's palace, it now functions as a public green space, anchoring the spatial organization of Calicut. Surrounding Mananchira are key neighborhoods, commercial areas, and cultural institutions, which use its central location as a point of orientation. This arrangement highlights Mananchira's symbolic and practical importance within Calicut's territorial fabric.

3.1.2. Urban sprawl

As urbanization increased, the area experienced significant urban sprawl, leading to developments expanding beyond the main city center, primarily toward the northeast.

This growth pattern reflects the shifting dynamics of the region, with new residential and commercial projects emerging in previously rural areas, contributing to the overall transformation of the urban landscape and accommodating the rising population and their needs.

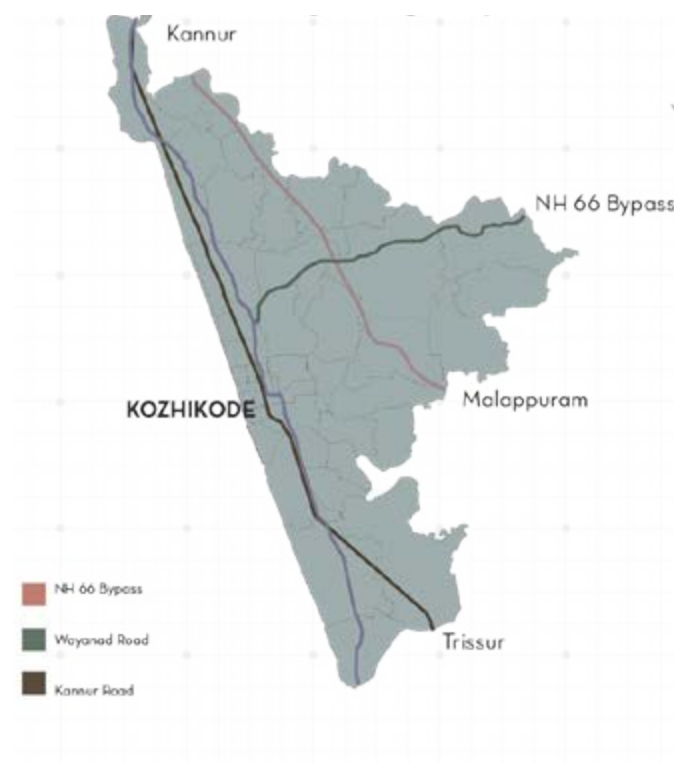
3.2. Mananchira's Central Role in Urban Organization

Mananchira, a defining landmark in the heart of Calicut, holds significant value in the city's territorial layout. Originally a royal reservoir for the Zamorin's palace, it now functions as a public green space, anchoring the spatial organization of Calicut. Surrounding Mananchira are key neighborhoods, commercial areas, and cultural institutions, which use its central location as a point of orientation. This arrangement highlights Mananchira's symbolic and practical importance within Calicut's territorial fabric.

3.3. Key Landmarks and Nodes Connected by Mananchira

Mananchira, a defining landmark in the heart of Calicut, holds significant value in the city's territorial layout. Originally a royal reservoir for the Zamorin's palace, it now functions as a public green space, anchoring the spatial organiza-

Major Highways



National Highway Connectivity



3.4. Territorial Road Networks



Figure 47: Important Landmarks and their connection with National Highways [Source: Created By Author]

3.5. Prime industries in Kozhikode

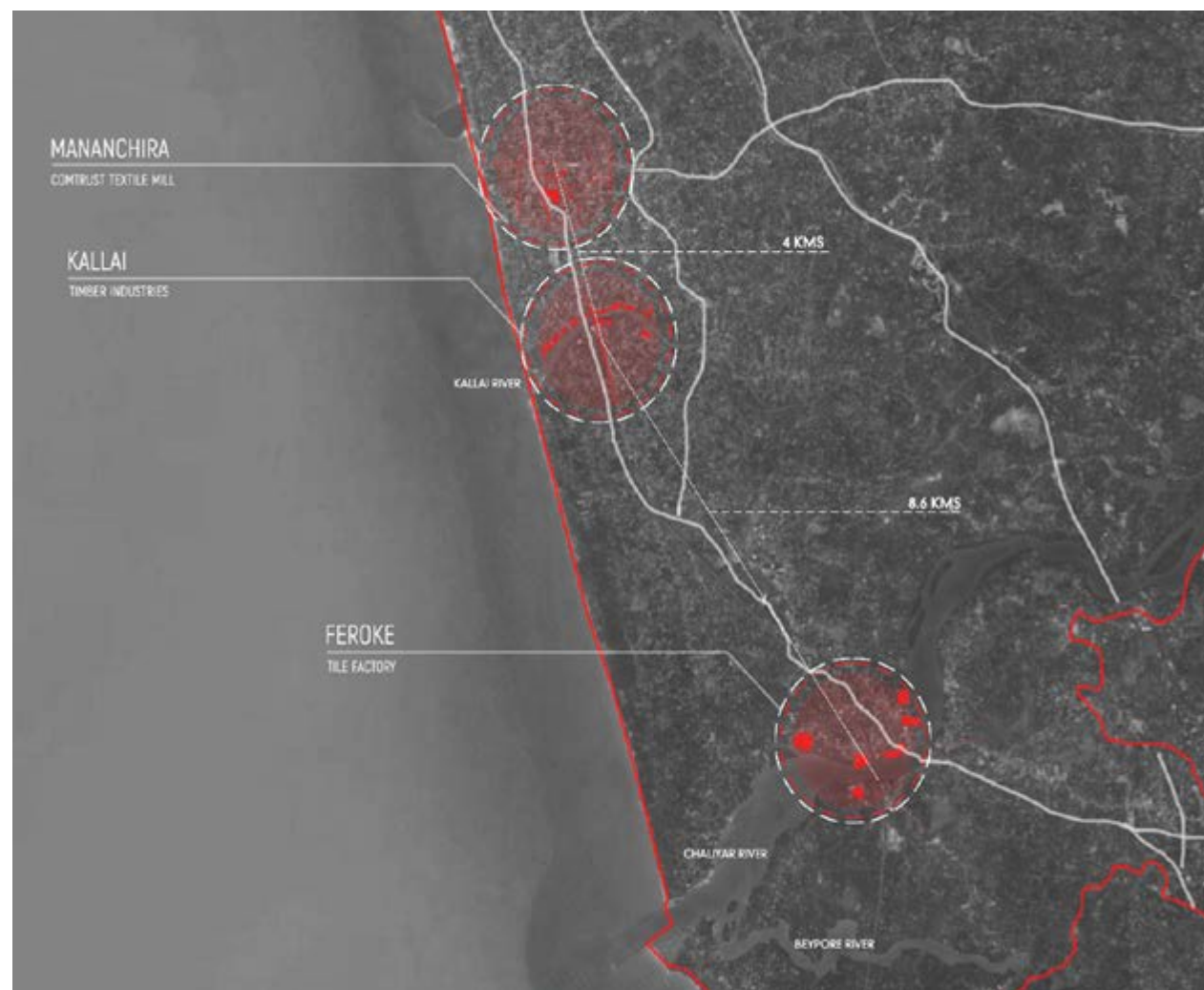


Figure 48: Important Industries and their locations in the Calicut City [Source: Created By Author]

3.5.1. Prime industries in Detail Map

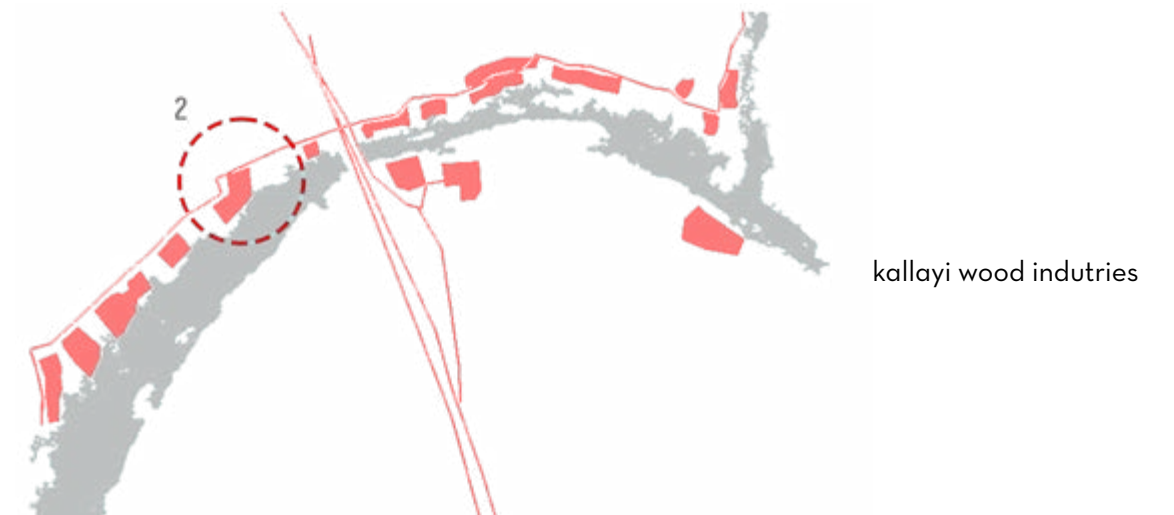


Figure 49: Important Industries and their Detailed Maps in the Calicut City [Source: Created By Author]

3.5.2. BEM Tile Works

Founded by the Basel Evangelical Mission, this historic factory is one of India's earliest mechanized tile manufacturers, renowned for its iconic red clay tiles. It represents a significant industrial milestone while holding deep architectural and cultural importance. The site reflects Calicut's pivotal role in shaping traditional Kerala architecture, showcasing a blend of innovation and heritage. By preserving craftsmanship and local traditions, the factory stands as a icon to the region's rich history and its enduring influence on Kerala's architectural identity.

Figure 50: Image of BEM Tile Factory in the Calicut City
[Source: <https://www.onmanorama.com/news/kerala/2019/12/27/kerala-roof-tile-company-shuts-down-after-141-years.amp.html>]



3.5.3. Kallai Timber Yard

Kallai Timber Yard, once renowned as the largest in Asia, was a cornerstone of Calicut's thriving timber trade. Strategically located along the Kallai River, it served as a hub for processing high-quality wood from the Western Ghats, facilitating export to global markets. This historic site played a major role in Calicut's maritime commerce, symbolizing the city's economic vitality and cultural importance. Beyond its industrial significance, the yard reflects the craftsmanship and entrepreneurial spirit that defined the region's timber industry. Today, it stands as a icon to Calicut's rich heritage in trade, reinforcing its historical prominence in regional and international commerce.

Figure 51: Image of Kallai Timber Yard in the Calicut City
[Source: https://www.tripadvisor.com/LocationPhotoDirectLink-g297635-i17172040-Kozhikode_Kozhikode_District_Kerala.html]



3.5.4. Comtrust Weaving Factory

Founded in the 19th century, this historic textile mill emerged as a prominent center for handloom production, playing a vital role in Calicut's industrial heritage. Renowned for its craftsmanship, the mill contributed significantly to the region's economy and cultural identity. Its well-preserved architectural features reflect the industrial aesthetics of its time, offering a tangible link to the past. By integrating modern functions while preserving its legacy, the mill can serve contemporary needs, fostering innovation and sustainability while honoring Calicut's enduring tradition of handloom craftsmanship.

Figure 52: Image of Comtrust Weaving Factory in the Calicut City
[Source: <https://www.onmanorama.com/news/kerala/2019/12/27/kerala-roof-tile-company-shuts-down-after-141-years.amp.html>]



3. Site Context - Mananchira

3.1. Site and Surrounding

Mananchira Square is a vital urban space in Calicut, Kerala, India, featuring the serene Mananchira tank, surrounded by gardens and pathways, serving as a recreational hub for locals and tourists. The tank, once the main water source for the palace complex, now provides a tranquil setting for leisure activities. Adjacent to the square stands the Comtrust Weaving Factory, established in 1844, which played a pivotal role in Calicut's industrial history, introducing modern weaving techniques and promoting social integration.

Despite ceasing operations in 2009 due to financial losses, the factory's abandoned buildings stand as a reminder of its industrial legacy, awaiting adaptive reuse.

Both Mananchira Square and the Comtrust Weaving Factory symbolize different aspects of Calicut's heritage, highlighting the need for their preservation and revitalization to maintain the city's cultural richness and identity.

3.2. Mananchira Square as a Landmark

Mananchira Square was historically important due to the Mananchira Tank, which was originally built as a freshwater reservoir by the Zamorins, the rulers of Kozhikode. The Zamorins, who reigned over the region from the 12th century, made Kozhikode a major trading hub, attracting merchants from across the world. The Mananchira Tank, which served as a water source, became associated with the heritage of these rulers and their connection to the city's prosperity.

In the 20th century, the tank and its surrounding area were transformed into Mananchira Square, a public park designed with lush gardens, fountains, and walkways, which added aesthetic and recreational value. As the city urbanized, the square stood out as an oasis of green, where the public could gather and participate in various social, cultural, and religious events. This transformation marked it as a space where modern Kozhikode could connect with its past.

3.3. Site and Surrounding

1.Colonial and Industrial Legacy:

The Comtrust building reflects Kozhikode's role as a center of the textile industry, with the structure's colonial style marking it as a relic of British rule.

2.Architectural Distinctiveness:

The building's design, a blend of colonial industrial architecture and local craftsmanship, set it apart in Kozhikode's urban landscape. This architectural distinctiveness made it recognizable and admired.

3.Cultural Connection to Handloom:

Even after independence, the building remained active in textile production, a significant craft in Kerala's cultural heritage. Its products gained recognition, and the building became symbolic of the region's sustainable textile practices and craftsmanship.

4.Community Affection and Recognition: Over the years, the building has become valued by locals for its historical associations and enduring contribution to the handloom industry, cementing it as a beloved heritage site.

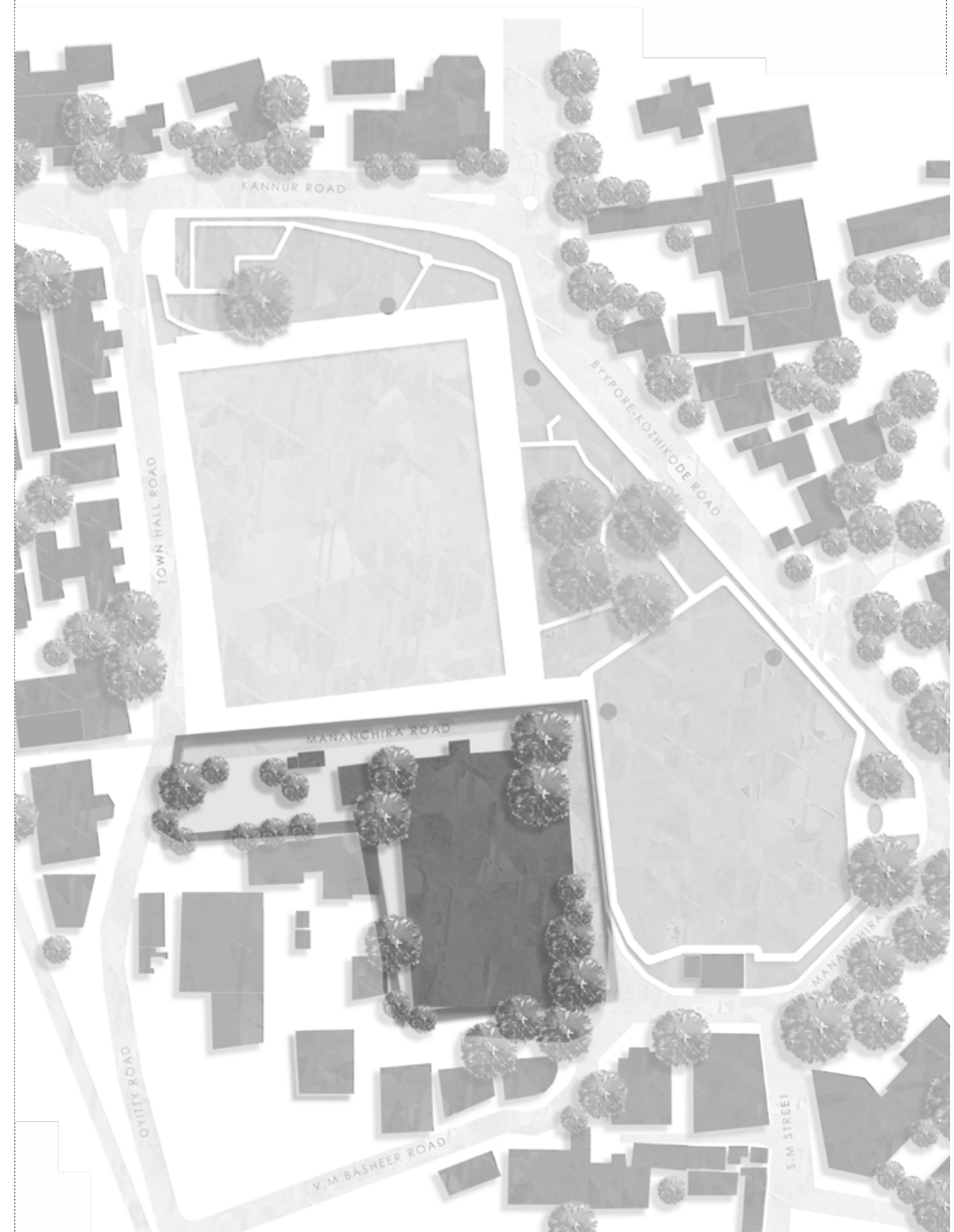
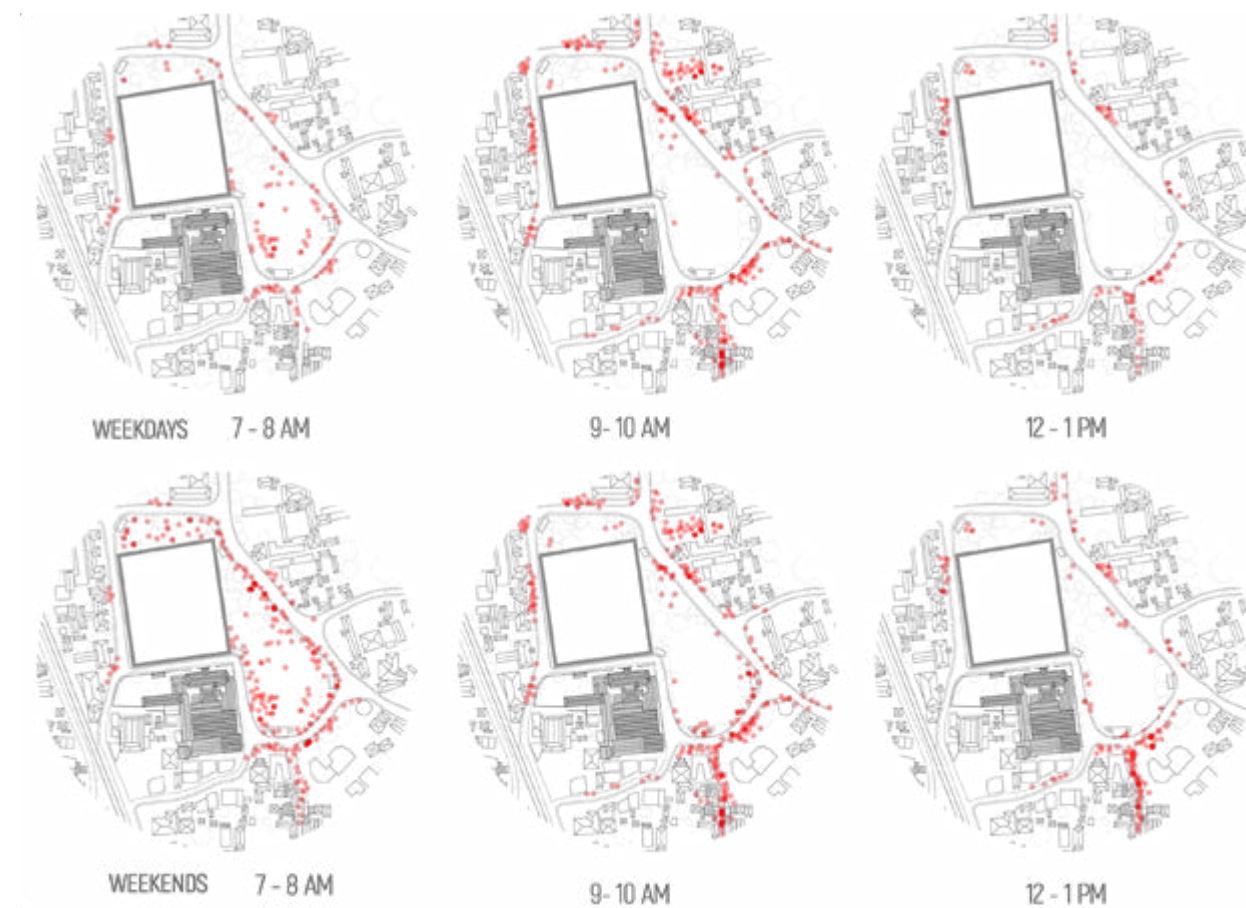


Figure 53: Illustration Map of the Mananchira Site
[Source: Created By Author]

3.4. Density Mapping



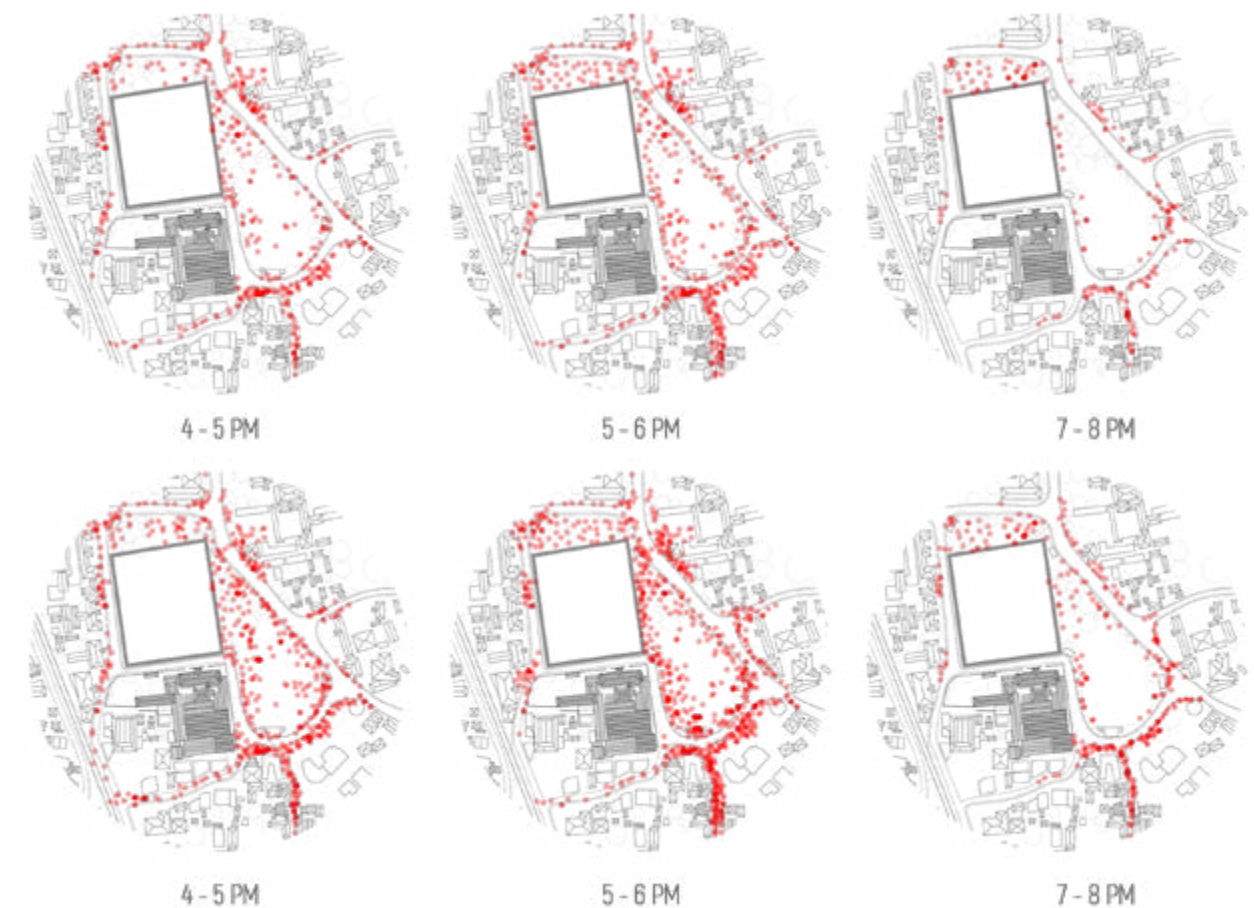
3.4.1. Week Days Footprint Density

During weekdays, the movement of people in this area near Mananchira is concentrated in specific zones, reflecting its diverse user groups and the presence of important historical buildings. Mananchira Ground and SM Street are the primary hotspots for activity.

In the morning, the Mananchira Ground sees a high density of visitors, drawn by the pleasant sunlight and the open space, making it a popular spot for walks and relaxation. However, by noon, the area becomes significantly less crowded due to the intense afternoon heat, leading to a noticeable drop in foot traffic.

In the evening, activity levels rise dramatically as the area becomes a hub for various user groups. Visitors gather for events, socializing, and leisure activities, adding vibrancy to the space. This dynamic pattern of usage highlights the area's role as a cultural and social focal point, evolving with the time of day and the needs of its visitors.

Figure 54: Maps Showing the people density in Weekdays and Weekends in the Mananchira site
[Source: Created By Author]



3.4.2. Weekend Footprint Density

On weekends, the area near Mananchira sees a significant increase in footfall, with its historical buildings and cultural significance attracting diverse groups. The bustling activity centers around Mananchira Ground and SM Street.

In the morning, the ground is filled with people enjoying the pleasant sunlight, taking walks, or relaxing in the open space. The atmosphere is vibrant yet calm, making it a popular spot to start the day. By noon, despite the afternoon heat, foot traffic remains steady as visitors seek shade or explore other attractions nearby.

In the evening, footfall surges dramatically as crowds gather for events, shopping, and social gatherings. This surge transforms the area into a lively, cultural hotspot, underscoring its role as a key weekend destination where people gather for leisure, social interaction, and cultural activities.

3.4. Traffic Mapping

3.4.1. Road Type Mapping

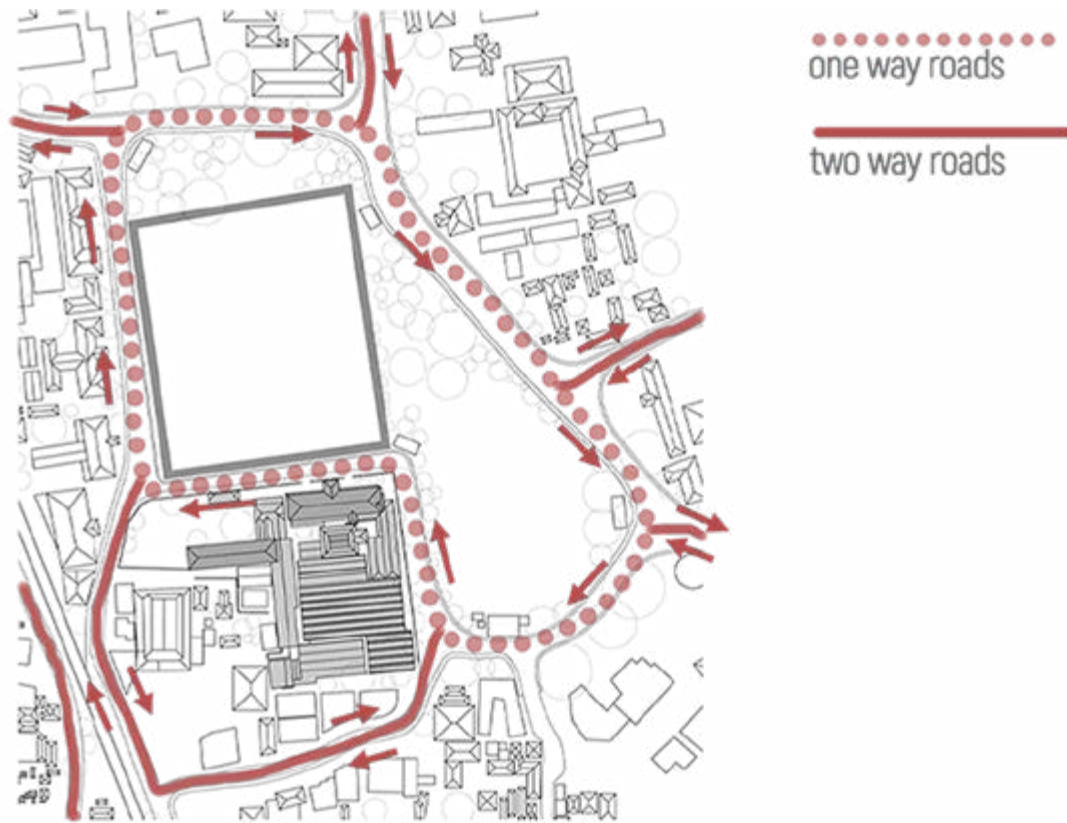


Figure 54: Maps Showing the road type in the Mananchira site
[Source: Created By Author]

The roads surrounding the Mananchira site are primarily designed as one-way streets to optimize traffic circulation. However, the connecting roads leading to this area are two-way streets, which feed into the one-way system. This layout has contributed to a somewhat chaotic traffic flow. One major issue is the lack of well-maintained pedestrian pathways, forcing pedestrians to spill onto the roads, further complicating the situation.

Additionally, the presence of several bus stations around the site exacerbates the traffic congestion. The absence of proper, designated waiting areas for passengers increases the disorder, with people waiting in unsafe locations.

Together, these factors contribute to a disorganized traffic environment, with both vehicles and pedestrians facing challenges in navigating the area. Proper infrastructure improvements, such as better pedestrian pathways and more organized bus stations, are needed to alleviate the congestion and ensure safety for all users.

3.4.2. Public Transport Stations

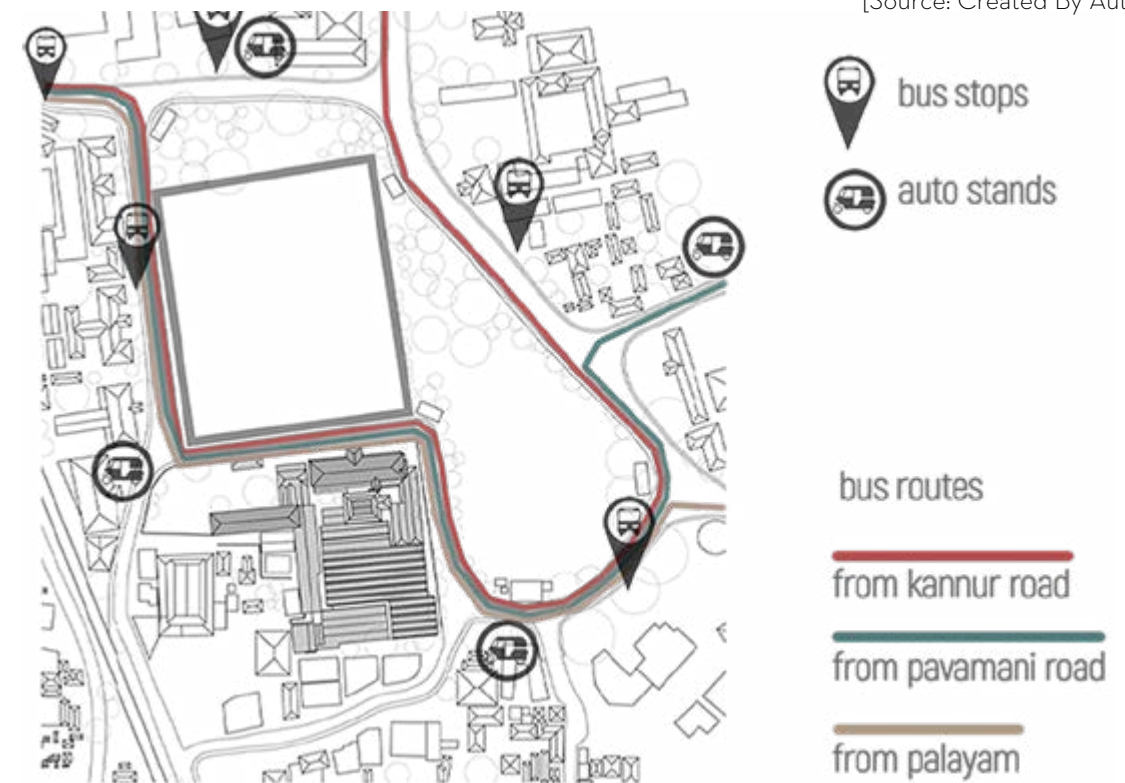


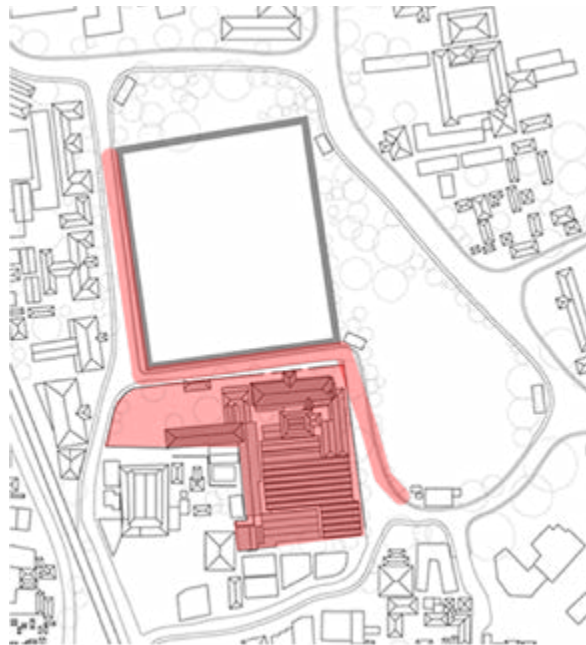
Figure 55: Maps Showing the public transportation stations in the Mananchira site
[Source: Created By Author]

3.4.3. Pedestrian Routes



Figure 56: Maps Showing the pedestrian routes in the Mananchira site
[Source: Created By Author]

3.5. Spatial Organisation of the Site



3.5.1. Dead Spaces

The western and southern edges of the pond are underutilized, primarily due to the lack of amenities that would otherwise attract visitors. This absence of features, such as seating or pathways, makes these areas less appealing for recreational use. Compounding this issue, the nearby roads are heavily trafficked, making the environment less conducive to pedestrian access or leisurely activities.

Access to the edges of the pond is also limited by both the surrounding roadways and the adjacent park, which restrict pedestrian movement. The heavy traffic exacerbates this problem, creating not only physical barriers but also psychological ones, deterring people from walking to and around the pond. The high compound walls surrounding the Comtrust property and the pond further reinforce these divisions, blocking sightlines and diminishing the potential for connection between the pond and the surrounding urban spaces.

Movement across the different plots surrounding the pond is difficult, which isolates the area and reduces its integration with the broader urban landscape. The constant flow of traffic



3.5.2. Accessibility

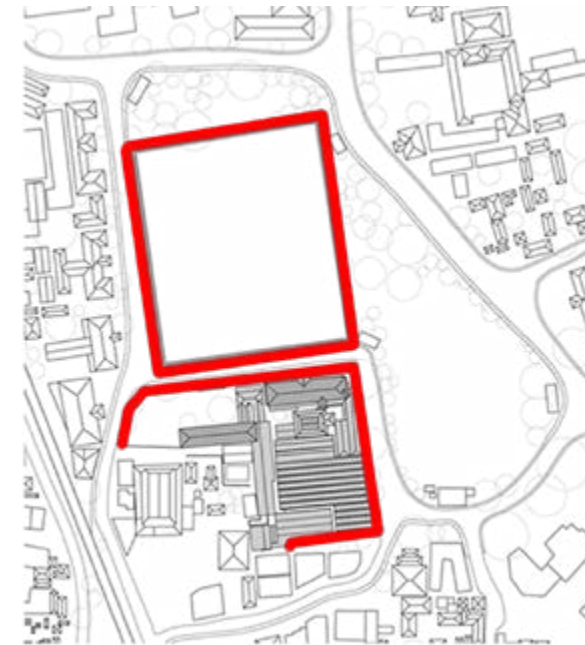
Movement across the different plots surrounding the pond is difficult, which isolates the area and reduces its integration with the broader urban landscape.

The constant flow of traffic disrupts the flow of pedestrians, making it challenging for the community to engage with the site. This lack of connectivity further alienates the pond from the rest of the neighborhood, limiting its potential as a public space.

The spatial dynamics around the pond are uneven, with certain areas remaining inactive and underused, while others become congested during peak hours, particularly near bus stops.

This imbalance in activity distribution highlights the need for better planning to ensure more equitable access and use of the space across different times of day.

Figure 57: Maps Showing the spatial organisation of the Mananchira site
[Source: Created By Author]

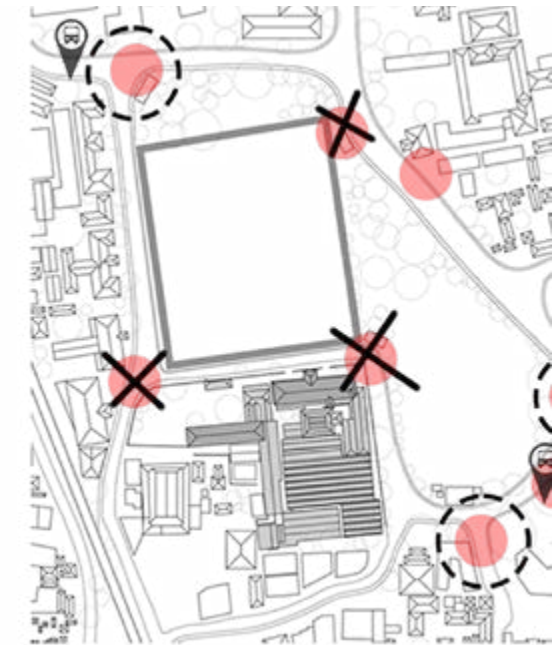


3.5.3. Barriers

A comprehensive analysis of Calicut's urban fabric, its historical layers, and present-day challenges has formed the basis of this project. By examining the city's growth trajectory and the urban dynamics at play, this study identifies how these factors intersect with the derelict Comtrust mill lands. The project seeks to address significant urban issues, such as underutilized spaces and the loss of cultural heritage, while preserving and celebrating the mill's historical importance in the city.

The primary objective of the project is to revitalize the abandoned Comtrust textile mill, breathing new life into the historic structure while ensuring its cultural relevance in an evolving urban landscape. The mill, once a center for handloom production and an iconic part of Calicut's industrial history, occupies a prime location that has the potential to drive urban transformation. The surrounding area, which has suffered from a lack of vibrant public spaces, stands to benefit from a well-planned redevelopment that could bring new energy to the neighborhood.

The project envisions a careful, sensitive redevelopment approach that respects the archi-



3.5.4. Nodes

The project envisions a careful, sensitive redevelopment approach that respects the architectural and historical integrity of the mill while integrating modern urban functions. By reimagining the space as a dynamic hub for cultural, social, and economic activities, the project seeks to provide a meaningful connection between Calicut's past and its future.

The redevelopment will aim to create an active community space that attracts visitors and fosters engagement, ensuring the mill's legacy continues to thrive.

Ultimately, the project aims to integrate the Comtrust site into the broader urban landscape, helping regenerate the surrounding area. The revitalized mill will not only preserve its industrial heritage but will also offer a modern, functional space that meets the needs of Calicut's evolving urban context.

Through this sensitive approach, the mill can become an enduring symbol of the city's commitment to sustainable development and cultural preservation.

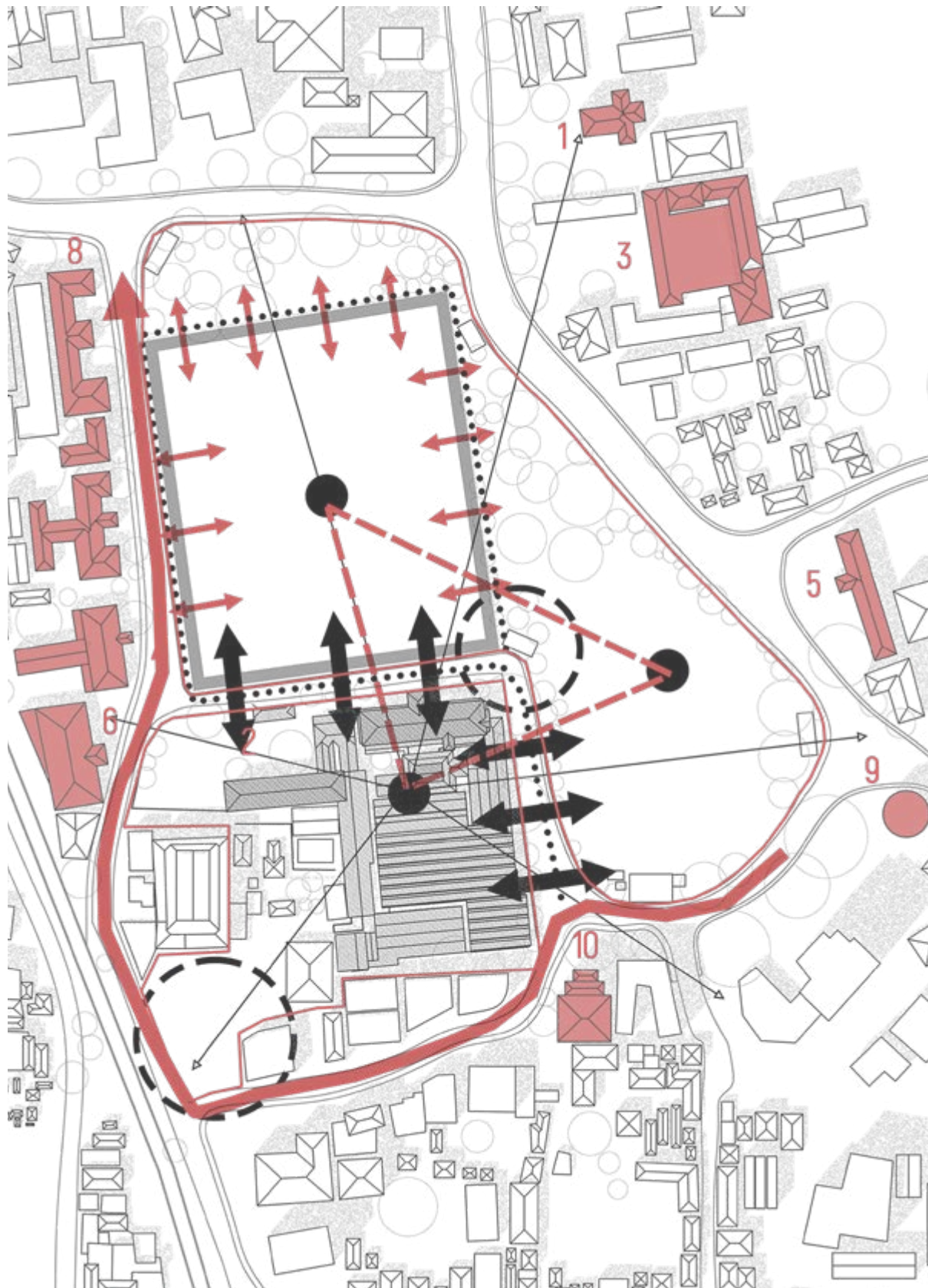
3.6. Historical Landmarks of the Surrounding Site



Figure 58: Images showing the historical landmarks in Kozhikode city
[Source: Created By Author]

3.6.1. Map Showing Historical Landmarks and Surrounding Roads

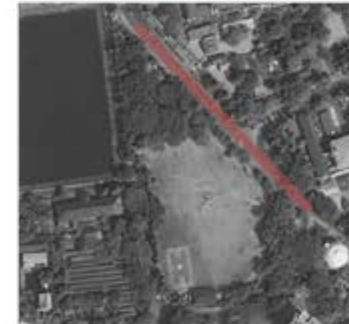
Figure 59: Map Showing the historical landmarks and their link
[Source: Created By Author]



ZONE



SBI road



Beypore road



V M Basheer road



Oyitty road

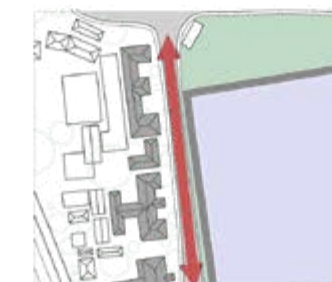


S M street

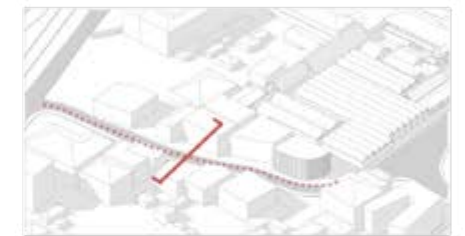


Town hall road

BUILT - OPEN



MASSING



4. Comtrust Weaving Factory

4.1. Introduction

The Commonwealth Trust (Comtrust) in Kozhikode holds significant historical and cultural value as one of Kerala's oldest textile manufacturing institutions. Established in 1844 by German missionaries from the Basel Evangelical Mission, Comtrust pioneered the textile industry in Kerala, focusing on handloom weaving and dyeing. This industry not only promoted local craftsmanship but also generated substantial employment for the region.

4.2. Historical Importance

Comtrust played a key role in introducing advanced textile techniques, strengthening Kerala's early industrial base. During British rule, it gained prominence for producing high-quality, competitively priced textiles that challenged imported British goods. After India's independence, Comtrust continued to support Kerala's handloom industry, known for fair labor practices and worker welfare, ensuring fair wages and job security, which remain integral to its legacy.

4.3. Architectural Significance

The Comtrust building exemplifies colonial industrial architecture, featuring spacious, ventilated workspaces, high ceilings, and a robust brick structure to withstand coastal conditions. Its design combines European architectural elements with adaptations for Kerala's tropical climate, offering both functionality and aesthetic value rarely seen in similar industrial structures of its era.

4.4. Legace and Cultural Impact

Beyond its industrial contributions, Comtrust shaped Kozhikode's cultural and economic landscape. As a heritage landmark, it symbolizes the city's transition from a port-centered economy to an industrial hub. Even today, Comtrust's handwoven textiles are celebrated for their quality, preserving Kozhikode's artisanal heritage and connecting the city to its historic roots in craftsmanship.

Figure 60: Front image of the Comtrust building taken from the park
[Source: <https://www.architectpcnesan.com/work/urban-bricolage/>]



4.5. Political Scenario

Currently, the Commonwealth Trust (Comtrust) in Kozhikode is at a crossroads, facing significant political and administrative challenges that impact its future. After decades of producing textiles and handloom goods, the factory has struggled due to financial difficulties, reduced demand, and competition. This decline has prompted both government and local community interest in preserving the factory as a cultural and historical landmark.

4.5.1. Key Political Issues and Stakeholders

Government Intervention: Given Comtrust's historical and cultural importance, there have been calls for government intervention to prevent its closure. Politicians and public representatives, recognizing the factory's heritage value and its role in local employment, have advocated for initiatives to revive Comtrust. This has included discussions of government funding, management restructuring, and, in some cases, potential public-private partnerships.

4.5.2. Heritage Conservation Concerns:

Local political groups and activists emphasize Comtrust's architectural and cultural significance, urging authorities to preserve the site as a heritage landmark. Conservationists and citizens often push for Comtrust to be transformed into a heritage museum or cultural center, which would allow it to retain its historical identity while promoting local tourism.

4.5.3. Worker Rights and Welfare:

The issue of worker welfare is a major political and social concern, as many employees depend on the factory for their livelihoods. Trade unions and workers' associations have called for sustained government support to ensure fair wages and job security, aiming to prevent layoffs or closures due to the financial strains the factory faces.

4.5.4. Public Interest and Community Involvement:

There's significant public interest in Comtrust's future, as the factory is a landmark deeply rooted in Kozhikode's history. Community leaders, ac-

There's significant public interest in Comtrust's future, as the factory is a landmark deeply rooted in Kozhikode's history. Community leaders, activists, and historians have lobbied for solutions that protect both the workforce and the cultural heritage embodied by Comtrust.

4.6. Present Scenario

The existing building condition of Comtrust Textile Mill in Mananchira, Calicut, reflects its long and storied history, but also shows signs of neglect and decay after years of disuse.

Once a thriving industrial facility, the mill's structure now stands largely abandoned since its closure in the late 20th century. Many of the original buildings, which date back to the late 1800s, exhibit wear and tear, with crumbling walls, broken windows, and overgrown vegetation.

While the core architectural elements, including the brickwork and industrial design typical of the period, remain intact, much of the infrastructure is in need of restoration.

There have been calls for the preservation and adaptive reuse of the mill due to its historical and cultural significance, particularly given its proximity to Mananchira Square, a central landmark in Calicut.

However, the future of the Comtrust Textile Mill remains uncertain, as efforts to repurpose or redevelop the site have yet to materialize. Its deteriorating condition reflects both the passage of time and the challenges of preserving industrial heritage in an evolving urban landscape.



Figure 61: Front image of the Comtrust building
main block entrance
[Source: <http://kallivalli.blogspot.com/2013/01/?m=1>]

4.7. Masterplan of Mananchira Compound

The master plan of Mananchira Square and its surroundings has transformed it into a cultural hub, blending green spaces, public areas, and architectural heritage. Key elements of the master plan include:

4.7.1. Central Waterbody (Mananchira Tank):

The original Mananchira Tank, built by the Zamorin rulers as a freshwater reservoir, remains the focal point. The tank's preservation maintains the historical connection and provides an open water space, cooling the area and enhancing the visual appeal.

4.7.2. Green Landscaped Areas:

Mananchira Square is extensively landscaped with lawns, gardens, and shaded walkways. This greenery provides a refreshing contrast to the surrounding urban environment, offering shade and relaxing spaces for visitors.

4.7.3. Pathways and Seating Areas:

Well-laid pathways encircle the compound, allowing people to stroll and view the landscape and water body. Benches and shaded seating areas are placed strategically to accommodate rest and relaxation while enhancing accessibility across the square.

4.7.4. Fountains and Water Features:

Modern fountains add an aesthetic touch, complementing the historical water tank. The presence of these water features creates a tranquil ambiance and reinforces the site's original purpose as a water source.

4.7.5. Recreational and Cultural Zones:

Dedicated areas are used for cultural performances, exhibitions, and local festivals. This allows Mananchira Square to host a variety of community events, making it an active cultural venue in Kozhikode.

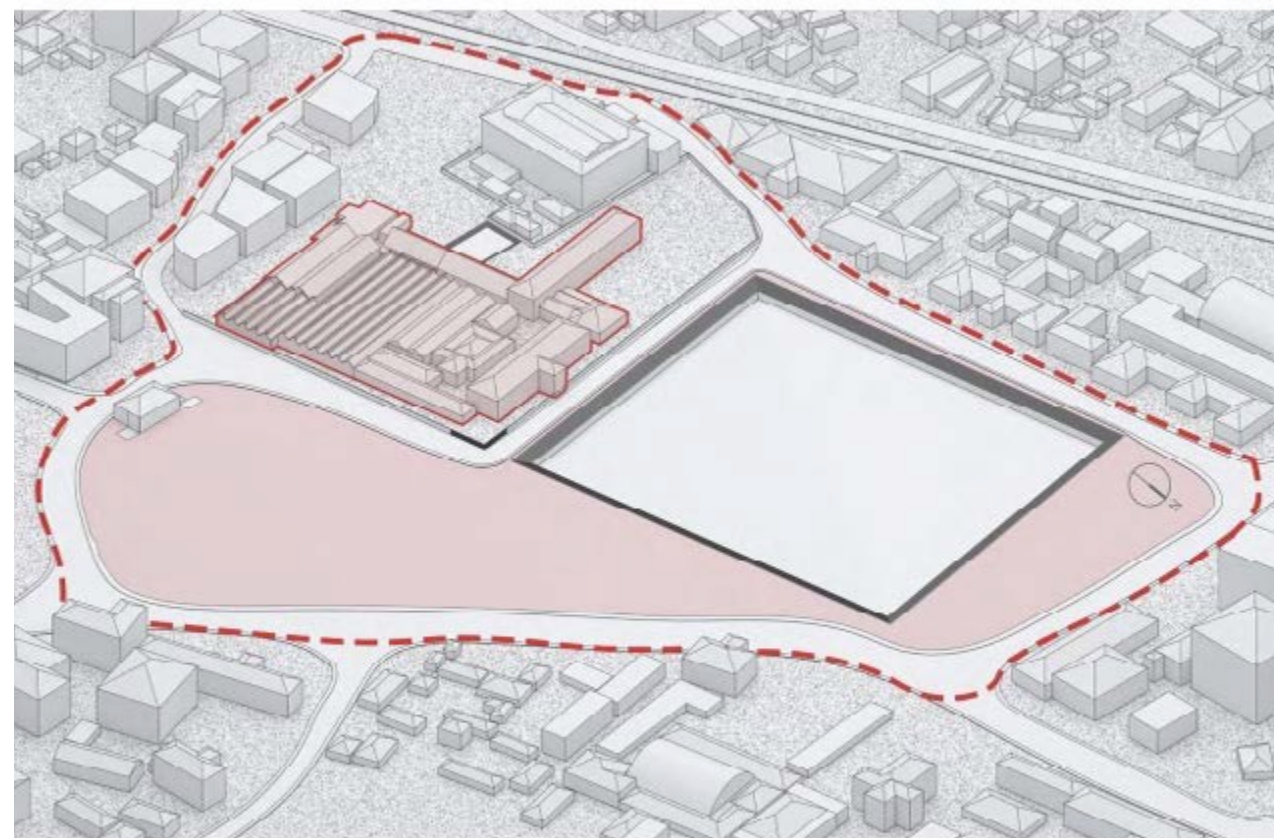


Figure 62: Map Showing the Mananchira compound in illustration
[Source: Created By Author]

4.8. Building Materials

The Comtrust Building in Mananchira, Kerala, is a remarkable example of architectural ingenuity, showcasing a harmonious blend of traditional craftsmanship and industrial innovation. The selection of materials reflects a deep understanding of the region's tropical climate, combining durability, practicality, and aesthetic appeal. These materials ensure the building remains resilient against Kerala's challenging weather conditions, including heavy monsoons and intense heat, while preserving its structural and architectural integrity.

Locally sourced materials play a pivotal role in the building's construction. Brick masonry is used for walls, offering thermal insulation, moisture resistance, and strength. The earthy tones of the bricks complement the natural surroundings, enhancing the building's traditional appeal. Mangalore tiles, made from terracotta, cover the pitched roof, providing excellent protection during monsoons and insulation against heat.

Timber, another vital material, is used extensively in roof trusses, beams, flooring, and joinery. Hardwoods like teak and rosewood are prized for their strength, durability, and termite resistance, and they also contribute to the building's vernacular charm with intricate carvings and ornamental features.

In the industrial sections, modern materials like steel are integrated to meet functional demands. Steel beams and purlins are used to support large spans, ensuring stability and adaptability for large-scale operations. This thoughtful combination of traditional and industrial materials underscores the building's dual purpose as a workspace and cultural landmark.

The Comtrust Building exemplifies sustainable architectural practices, blending tradition with innovation to create a resilient structure that continues to inspire and engage with its community.



Figure 63: Image showing the ruined roof of the comtrust building
[Source: Taken By Author]

4.8.1. Brick Masonry

The primary structural material of the Comtrust Building is brick masonry, skillfully utilized for constructing walls and load-bearing elements. Locally sourced bricks were chosen for their exceptional thermal insulation properties, ensuring that the interiors remain cool even in Kerala's humid and tropical climate.

These bricks offer remarkable durability and resistance to moisture, effectively shielding the structure from the region's intense heat and heavy monsoons. Beyond their functional benefits, the natural earthy tones of the bricks enhance the building's aesthetic charm, harmonizing with the lush surroundings and reflecting the vernacular architectural style.

This thoughtful material selection not only ensures long-term structural integrity but also embodies a sustainable approach by incorporating locally available resources, fostering a deep connection to the cultural and environmental context of Kerala.

Figure 64: Image showing the ruined wall with brick masonry
[Source: Taken By Author]



Figure 65: Wooden staircase railing made of teak wood
[Source: Taken By Author]

4.8.2. Timber

Timber is extensively employed throughout the Comtrust Building, serving both structural and decorative purposes. It is prominently used in roof trusses, beams, windows, doors, and flooring, showcasing its versatility. Local hardwoods such as teak, rosewood, and jackfruit wood are preferred for their remarkable strength, resistance to termites, and longevity, ensuring durability in Kerala's challenging tropical climate.

Timber is also integral to the building's aesthetic appeal, featuring intricately carved brackets, balustrades, and other ornamental details that reflect traditional craftsmanship. This careful integration of timber enhances the building's vernacular character, blending functionality with artistry while respecting the region's architectural heritage and materials.



4.8.3. Mangalore Tiles

The pitched roof of the Comtrust Building is covered with Mangalore tiles, carefully laid over a framework of wooden purlins. Made from terracotta, these tiles are lightweight, durable, and ideally suited to Kerala's tropical climate. Their unique design effectively channels rainwater, offering excellent protection during the region's heavy monsoons.

Additionally, Mangalore tiles are known for their thermal insulation properties, helping to maintain cool interior temperatures during the hot summer months. The use of these tiles not only ensures a comfortable indoor environment but also aligns with traditional architectural practices, reflecting a blend of functionality and cultural heritage. The earthy tones of terracotta add aesthetic warmth, harmonizing with the building's overall design. This sustainable roofing solution showcases durability, efficiency, and a deep connection to Kerala's vernacular architecture, making it a defining feature of the building's structure.

Figure 66: Roof with Mangalore tiles laid on wooden frames
[Source: Taken By Author]



Figure 67: Addition made to some areas with steel
[Source: Taken By Author]

4.8.4. Steel

Steel plays a significant role in areas of the Comtrust Building where long spans and industrial durability are essential. Structural steel beams are prominently used in weaving blocks and other industrial sections, providing robust support for roofs and facilitating open, unobstructed spaces needed for large-scale operations.

Steel purlins and I-beams are strategically integrated, complementing the traditional materials by enhancing the building's overall strength and stability. This combination allows for modern architectural interventions without compromising the structure's historical integrity. The use of steel underscores a thoughtful balance between tradition and innovation, ensuring functionality, durability, and adaptability in the building's industrial design.



4.8.5. Kurudi (Hollow) Blocks

Hollow clay blocks, also known as kurudi blocks, play a crucial role in the ceiling systems of the Comtrust Building, offering multiple benefits in terms of weight reduction, thermal insulation, and overall efficiency. These blocks are widely used in both heritage and industrial buildings across Kerala due to their ability to maintain indoor comfort, especially in the region's hot and humid climate. The hollow cavities within the blocks serve as excellent insulators, reducing heat transfer and keeping the interiors cooler in the sweltering heat. Additionally, these blocks are lightweight, which eases the load on the structural framework and contributes to overall building stability. Kurudi blocks also offer good soundproofing qualities, making them ideal for spaces requiring quiet, such as office environments or production areas. Their cost-effectiveness and sustainability further align with the building's commitment to environmentally conscious design, while their use

Figure 68: Ceiling constructed with Kurudi Blocks
[Source: Taken By Author]



Figure 69: Natural stones are used for pillar base foundation
[Source: Taken By Author]

4.8.6. Stone

Stone is a vital material in the foundations and basement walls of the Comtrust Building, chosen for its durability and resistance to ground moisture. The use of locally sourced stone enhances the building's connection to the regional architectural language while providing a robust and stable foundation for the structure. Stone's natural resistance to water helps prevent moisture penetration into the masonry, ensuring long-term structural integrity. Additionally, the weight and strength of stone contribute to the overall stability of the building, supporting the brick masonry walls above. This use of stone underscores the building's commitment to both traditional craftsmanship and lasting functionality.



4.8. Building Architecture



Figure 70: Colonial style roofing system used in the looming area
[Source: Taken By Author]

4.8.1. Industrial Colonial Style:

The factory buildings feature an industrial colonial style, with long, rectangular structures typical of the functional requirements of textile production facilities.

The architecture prioritizes large open spaces for machinery and processing, with high ceilings and wide spans supported by steel beams.



Figure 71: Brick and lime mortar is used for the basic wall construction
[Source: Taken By Author]

4.8.3. Large Windows and Ventilation:

Large, arched windows were designed to ensure natural light and ventilation, which were critical for the health of workers and the smooth running of textile machinery. Tall, narrow windows and large doorways are typical, allowing airflow to regulate the temperature within the factory, given the hot and humid climate of Kerala.



Figure 72: Large windows with wooden frames are used for ventilation
[Source: Taken By Author]

4.8.2. Brick and Lime Construction:

The use of red brick and lime mortar is characteristic of early 20th-century industrial buildings. This material choice provided durability, essential for factory environments. Exposed brickwork, a common feature in colonial industrial architecture, is visible in much of the original structure.



Figure 73: Wooden trusses are used for the whole roofing system
[Source: Taken By Author]

4.8.4. Pitched Roofs with Wooden Trusses:

The factory's roofs are often pitched, supported by wooden trusses, and covered with tiles. This was a practical solution to deal with Kerala's heavy monsoon rains. The roof design also helps maintain a cooler internal environment, essential for maintaining the quality of textiles and comfort for workers.



4.8.5. Warehouse and Administrative Buildings:

In addition to production units, the compound included administrative offices, designed with colonial-era elegance, featuring verandahs, colonnades, and high ceilings. The administrative buildings tend to have more detailed architectural elements compared to the utilitarian factory spaces, often incorporating colonial architectural flourishes such as ornamental arches and cornices.

Figure 74: Image of a corridor in the Comtrust building office block
[Source: Taken By Author]



4.8.6. Heritage and Conservation:

Today, the factory's architecture stands as a testament to the industrial heritage of Kozhikode, though much of the original structure has faced wear and tear over time. Efforts have been made in some cases to preserve parts of the building as a heritage site, though challenges related to modernization and industrial decline persist.

Figure 75: Image of an old land phone used in the comtrust building office
[Source: Taken By Author]



Figure 76: Image of the roof of looming area
[Source: Taken By Author]

4.9. Building Function

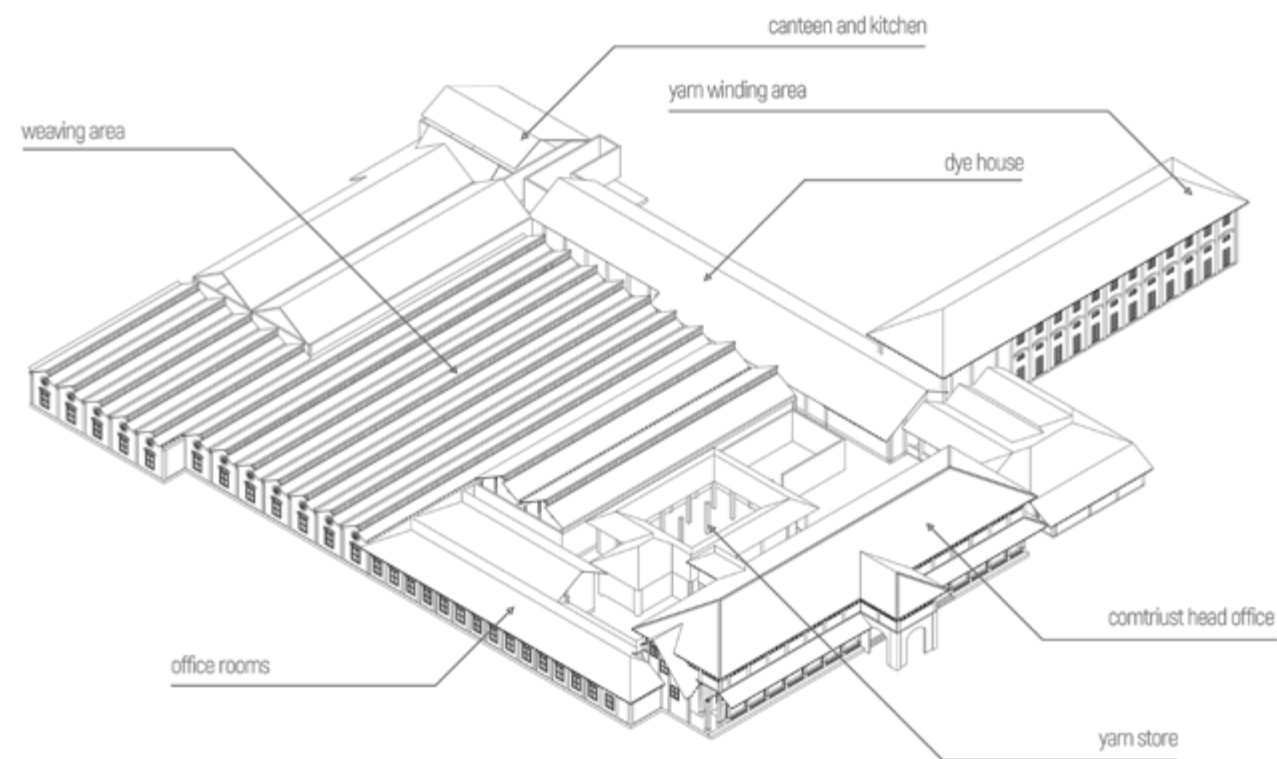


Figure 77: Axonometrical view of the COMTRUST building blocks
[Source: Created By Author]

4.9.1. Weaving Area

The core of the textile production process, where skilled artisans operated traditional handlooms and power looms to create various fabrics. This space housed numerous looms, each used for weaving different textiles, from fine cotton and silk to coarser materials for products like saris, dhotis, and home textiles. The area was organized to ensure smooth workflow, with workers carefully controlling loom settings, managing yarn tension, and coordinating colors and patterns to produce high-quality textiles. Today, the weaving area could be repurposed as a heritage craft center, where traditional weaving techniques are taught, or as an exhibition space to display vintage textiles from COMTRUST. It could also serve as a hub for craftsmanship workshops, allowing modern artisans to collaborate and preserve sustainable, traditional weaving methods. Repurposing the space would not only honor its historical significance but also provide educational and cultural opportunities for the community.

4.9.2. Yarn Store

It was used for the storage and management of raw materials, particularly yarns of various types and colors, which were essential for weaving operations. This space ensured a steady supply of high-quality yarn to the factory, enabling uninterrupted production.

The yarn store likely included sections for organizing different yarn varieties based on material (cotton, silk, wool), thickness, or dye type. It may have also housed equipment for sorting and preparing yarns for weaving. Proper storage conditions were maintained to protect yarns from moisture, pests, or damage.

4.9.3. Dye House

Raw materials like yarns and fabrics were dyed using both natural and synthetic dyes. Equipped with large vats and dyeing machines, it ensured that textiles were colored to meet specific quality and design standards. Skilled workers managed the intricate process, con-

trolling temperatures, timing, and chemical mixtures to achieve the desired hues without damaging the fabrics. The dye house also required proper ventilation and waste management systems to handle the chemicals and by-products, ensuring safety and environmental compliance. Today, it could be repurposed as a cultural and educational center, offering workshops on traditional dyeing techniques, or as a heritage museum showcasing the history of dyeing in Kerala's textile industry. Additionally, a modern, eco-friendly dyeing facility could be established, focusing on sustainable practices, preserving the space's historical significance while engaging the community and promoting sustainability.

4.9.4. Office Rooms

These rooms housed the managerial and clerical staff responsible for overseeing day-to-day activities, such as production scheduling and inter-departmental coordination. They were also crucial for financial operations, including accounting, payroll, and managing transactions related to raw materials and sales. Human resources functions, like recruitment, employee records, and welfare, were handled here to ensure compliance with labor laws. The office rooms also facilitated communication and correspondence with suppliers, clients, and retail outlets. Marketing and sales planning took place in these spaces, ensuring effective product promotion and distribution. If repurposed, the office rooms could serve as co-working spaces, heritage offices, or exhibition areas displaying historical records and artifacts from COMTRUST's legacy, preserving their historical significance while adapting to modern uses.

4.9.5. Yarn Winding Area

Raw yarns were wound onto smaller spools or bobbins, making them suitable for weaving. This space ensured that yarns were evenly wound to prevent tension issues during the weaving process, which could compromise fabric quality. Equipped with winding machines, the area automated much of the work, though skilled workers were still needed to monitor the quality and ensure smooth operation. Today, the yarn winding area could be repurposed for educational workshops to demonstrate traditional

yarn preparation methods, as an exhibition space showcasing tools and techniques used in the process, or as a community craft hub for artisans to collaborate and teach yarn-based crafts. Repurposing this space would preserve its historical significance while offering opportunities for cultural engagement and education.

4.9.6. Canteen / Kitchen Area

role in supporting the workforce, providing meals and refreshments for workers, staff, and visitors. It ensured that employees had access to affordable, nutritious meals during their shifts, fostering a sense of community and well-being among the workers. The kitchen was equipped to prepare large quantities of food, while the canteen space served as a social area for workers to take breaks and interact.

Today, if repurposed, the canteen and kitchen could serve as a community café or food hub, offering locally sourced dishes, a cultural venue for events and exhibitions, or a heritage space to preserve the culinary history of the workforce. Repurposing the space would honor its historical significance while providing opportunities for community engagement and cultural exploration.

4.9.7. Courtyards and Open Spaces

provided open spaces for ventilation, natural light, and social interaction. Essential to Kerala's architecture, they offered comfort and coolness in the hot climate. Today, they could be repurposed as community spaces for events, gardens for relaxation, or exhibitions celebrating the region's heritage.

5.0. Condition Mapping

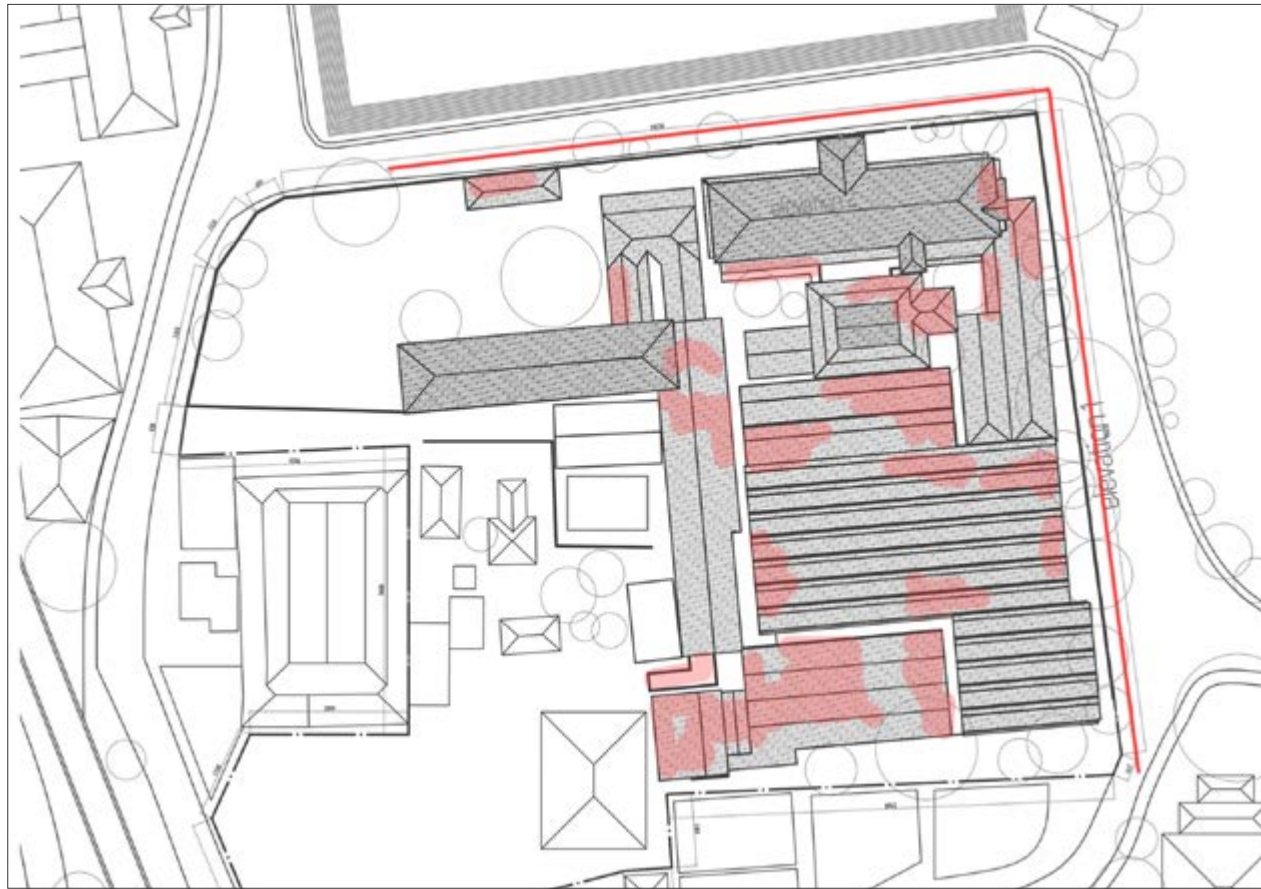


Figure 78: Plan of comtrust building showing the exterior damages
[Source: Created By Author]

The exterior defects and decay of the Comtrust building in Mananchira have likely developed due to environmental factors, aging, and moisture exposure. Over time, exterior plaster and paint can begin to crack and peel, particularly in areas exposed to rain, humidity, and temperature fluctuations.

This peeling and cracking allow moisture to penetrate the surface, which can lead to further deterioration of the materials and structural weakening.

Another significant issue is water infiltration, which occurs when the roof or walls fail to provide proper sealing, allowing rainwater to seep into the building. This moisture can cause the plaster to deteriorate, lead to rusting of metal components, and weaken the structural integrity of the building. Left unchecked, water infiltration can lead to more severe damage, including structural compromise.

Efflorescence is commonly seen on the exterior walls as well. This is the appearance of white, powdery salt deposits that result from moisture evaporating through the surface, carrying salts from inside the structure. It serves as an indicator of ongoing water intrusion and can further degrade the exterior over time. If not treated, it can cause the surface to weaken and discolor.

Additionally, rusting of metal elements like window grills, railings, and frames can occur due to long term exposure to moisture. Over time, steel or iron components corrode, causing aesthetic issues and potential safety concerns. Similarly, fungal growth in damp areas and the deterioration of stone or brickwork can contribute to the overall decay. These issues, including crumbling facades and staining from mold or mildew, require regular maintenance and restoration efforts to preserve the building's structural and aesthetic integrity.



Figure 79: Image taken from the interior of the comtrust building showing the ruins
[Source: Created By Author]

5.O.1. Water Seepage

Water consistently flows down the gutter situated between the roof slopes, creating conditions that promote algal growth. This occurs because the gutters remain damp for extended periods, particularly in areas where water stagnates or does not drain efficiently.

Provide proper drainage gutter in each points and repaint the walls.

Figure 80: Image of water seepage damage

[Source: Created By Author]



5.O.2. Tile Damages

Tiles have accumulated soil and vegetation due to debris and moisture, creating conditions for plant growth. This can lead to cracked tiles, water infiltration, and added weight. Regular cleaning, protective coatings, and improved drainage are essential for preventing damage.

Replace or fix the tiles and remove the soil and growth of vegetation.

Figure 81: Image showing the tile damages

[Source: Created By Author]



5.O.3. Wooden Flooring

The wooden flooring shows termite damage and gaps, compromising its integrity and appearance. Termites hollow the wood, while gaps result from pest activity or wear. Immediate extermination, repairs, and protective treatments are essential to prevent further damage and deterioration.

All the gaps to be sealed. Flooring must be painted with termite proof coating.

Figure 82: Image of the damage on the wooden flooring

[Source: Created By Author]



5.O.4. Structural Damage

Building shows structural damages, including cracked walls, weakened foundations, decayed wooden elements, and rusted metal parts. These issues stem from aging, moisture infiltration, and lack of maintenance, requiring urgent restoration to preserve the building's structural integrity.

Structure has to be rebuilt reusing the demolished residues after treatment

Figure 83: Image of structural damages

[Source: Created By Author]



5.O.5. Algae

Building shows algae growth due to moisture and limited sunlight. This discolors surfaces, traps moisture, and weakens plaster or paint. Regular cleaning, improved drainage, and anti-algal treatments are essential for preservation.

All the exterior surfaces has to be repainted except the surfaces with other finishes such as brick or natural stones

Figure 84: Image showing the algae growth over the exterior walls

[Source: Created By Author]



5.O.6. Window Damages

Show signs of damage, including broken frames, cracked glass, and rusted metal components. These issues are likely caused by prolonged exposure to moisture, inadequate maintenance, and aging, requiring repairs or replacements to restore functionality and aesthetics.

Windows has to be repainted. Hinges and glasses has to be fixed or replaced

Figure 85: Image of the damage on the windows

[Source: Created By Author]



5.0.7. Roof Tile Damage

The roof tiles show signs of damage, including cracks, missing tiles, and weathering. These issues are likely caused by age, exposure to harsh weather, and inadequate maintenance, compromising the roof's functionality and requiring timely repairs.

Whole roof tiles has to be replaced. The timber frames has to be fixed

Figure 86: Image showing the roof tile damages
[Source: Created By Author]

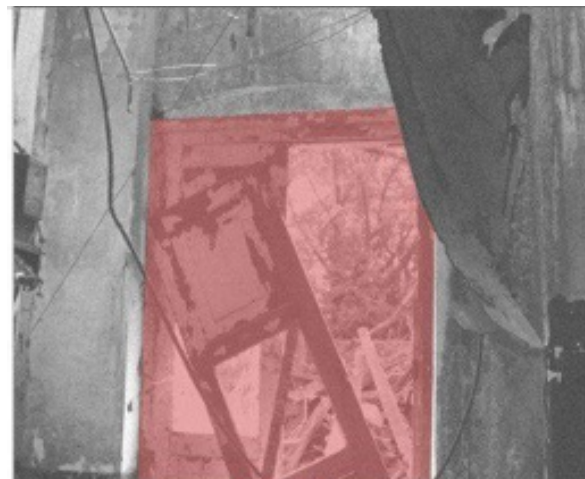


5.0.8. Broken Doors

The doors are damaged, with broken frames, hinges, and deteriorating surfaces. These issues likely result from wear and tear, moisture exposure, and lack of maintenance, compromising security and functionality, requiring prompt repairs or replacements.

Doors and windows has to be fixed or replaced and the repainted

Figure 87: Image showing damages on the doors
[Source: Created By Author]

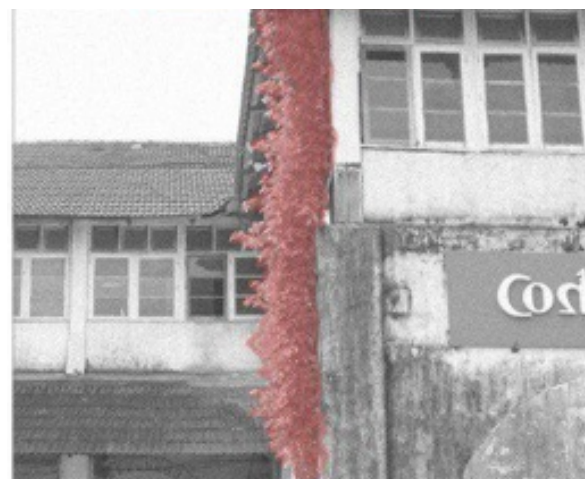


5.0.9. Climbers

The walls are affected by wall climbers, such as vines and plants, which have caused surface damage. Their roots penetrate the plaster, leading to cracks and weakened structural integrity, necessitating removal and repair to prevent further deterioration.

Vegetation growth in the whole site has to be managed and maintained

Figure 88: Image showing the growth of climber plants over the exterior wall
[Source: Created By Author]



5.0.10. Wall Damage

The walls show significant damage, including cracks, peeling plaster, and moisture infiltration. These issues are caused by aging, humidity, and poor maintenance, compromising the building's structural integrity and aesthetics, requiring immediate repair and restoration efforts.

Exposed defects of the walls has to be fixed by replastering.

Figure 89: Image showing the damages on the wall
[Source: Created By Author]



General Maintainance

General maintenance solutions for Comtrust Mananchira include regular inspections, addressing moisture infiltration, repairing structural damages, cleaning exterior surfaces, treating wood for termites, and ensuring proper drainage to prevent further deterioration. Exposed defects of the walls has to be fixed by replastering.

5.1. Material Defects and Decay

The Comtrust building in Kozhikode, being over a century old and originally constructed during the colonial period, exhibits signs of material defects and decay typical of heritage structures that have endured varied climatic conditions and limited modern interventions. Understanding these issues is crucial for conservation efforts, as they affect both the structural stability and the visual appeal of the building. Here are some common types of material defects and decay that likely affect the Comtrust building:

5.1.1. Brickwork Erosion and Crumbling

The Comtrust building's red-brick façade is central to its historical character. Over time, exposure to rain, wind, and humidity in Kerala's tropical climate can cause the bricks to erode, leading to crumbling and flaking. Salt crystallization, common in coastal areas, can also accelerate the decay of brick surfaces.

Causes: High humidity, salt deposits, temperature fluctuations, and biological growth.
Visible Effects: Discoloration, flaking, and weakening of brick surfaces.

5.1.2. Mortar Deterioration

The lime-based mortar traditionally used in colonial-era buildings can deteriorate over time due to moisture infiltration, resulting in weakened joints between bricks.

Causes: Moisture infiltration, chemical reactions with pollutants, and natural lime degradation.
Visible Effects: Cracks in mortar joints, powdery residue (efflorescence), and gaps between bricks.

5.1.3. Rising Damp and Efflorescence

Rising damp, where ground moisture seeps upward through the building's porous brick walls, is a common problem in older buildings. This can lead to efflorescence, where salts dissolve in the moisture and crystallize on the surface as the water evaporates.

Causes: High water table, insufficient damp-proofing, and porous construction materials.
Visible Effects: White, powdery salt deposits on walls, peeling paint, and structural weakening near the base of walls.

5.1.4. Wood Decay in Structural and Decorative Elements

Wooden beams, doors, windows, and roofing structures are susceptible to decay, particularly in Kerala's humid climate. Over time, wood can warp, rot, or be infested by termites and other wood-boring insects.

Causes: High humidity, termite infestations, and lack of protective treatments.

Visible Effects: Warping, splintering, fungal growth, and hollowed-out wood.

5.1.5. Corrosion of Metal Components

Any metal elements, such as railings, window grills, or structural reinforcements, are prone to rust and corrosion due to the high moisture content in the air, especially given Kozhikode's coastal proximity.

Causes: High humidity, exposure to sea breeze, and lack of anti-corrosion treatment.

Visible Effects: Rust, discoloration, and weakening of metal fixtures.

5.1.6. Fungal and Algal Growth on Walls

Tropical climates like Kozhikode's encourage the growth of algae, fungi, and moss on exterior walls, particularly in shaded or damp areas. This not only affects the appearance but also causes moisture retention, further contributing to material degradation.

Causes: High humidity, rain exposure, and inadequate sunlight on certain facades.

Visible Effects: Green or black stains, slimy surfaces, and potential for moisture retention in walls.

5.1.7. Cracks in Walls and Structural Settling

Differential settling of foundations over time, combined with natural weathering, can lead to cracks in walls and floors. Heritage structures like the Comtrust building are especially vulnerable due to aged materials and potential shifts in the ground over a long period.

Causes: Structural settling, material fatigue, seismic activity, and expansion/contraction cycles.

Visible Effects: Vertical or diagonal cracks in walls, particularly near windows, doors, or building corners.

5.1.8. Roof Leakages and Water Infiltration

The roofing, if not adequately maintained, can lead to water infiltration issues, causing damage to the interior as well as the structural elements of the building. Leaks often lead to further decay in wooden beams, ceiling plaster, and internal walls.

Causes: Aging roof materials, damaged tiles or shingles, and inadequate drainage.

Visible Effects: Damp patches on ceilings, water stains, mold growth, and weakened wooden beams.

5.1.9. Interior Plaster Deterioration and Peeling Paint

Interior plaster surfaces are prone to deterioration over time, especially when exposed to moisture infiltration from walls or roofs. This can lead to peeling, cracking, and powdering of the plaster, while paint layers may peel, discolor, or develop blisters due to prolonged damp conditions. Common causes of these issues include rising damp, high humidity, the use of poor-quality materials, and inadequate or irregular maintenance. The visible effects often include cracking, flaking, or peeling plaster and paint, with possible efflorescence (white, powdery deposits). These signs indicate moisture problems that need to be addressed to prevent further damage and preserve the building's integrity.

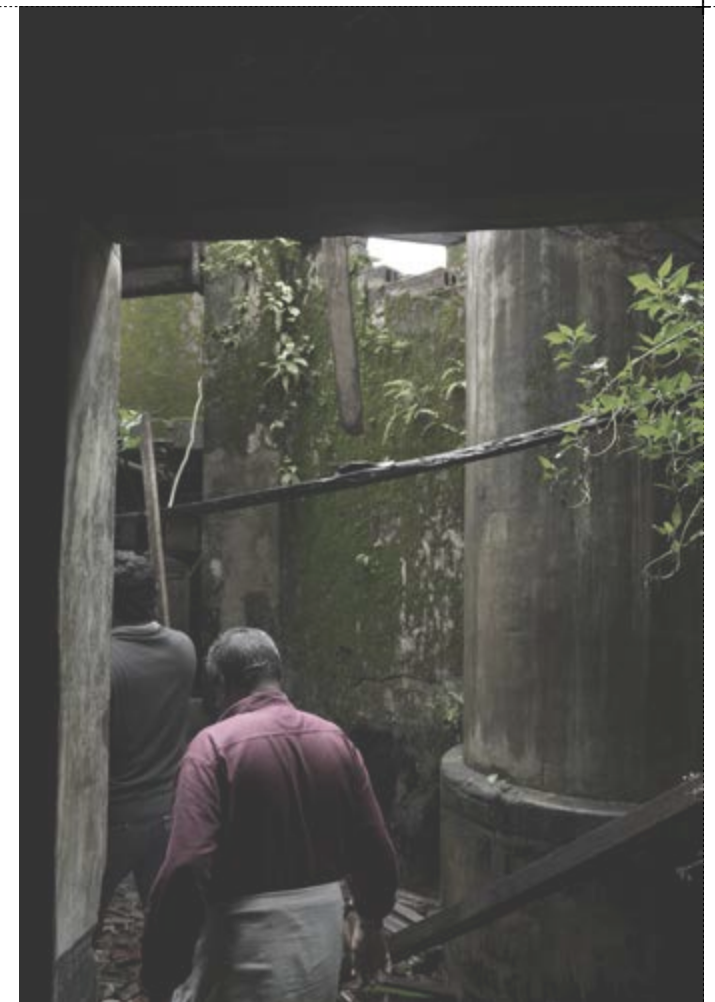
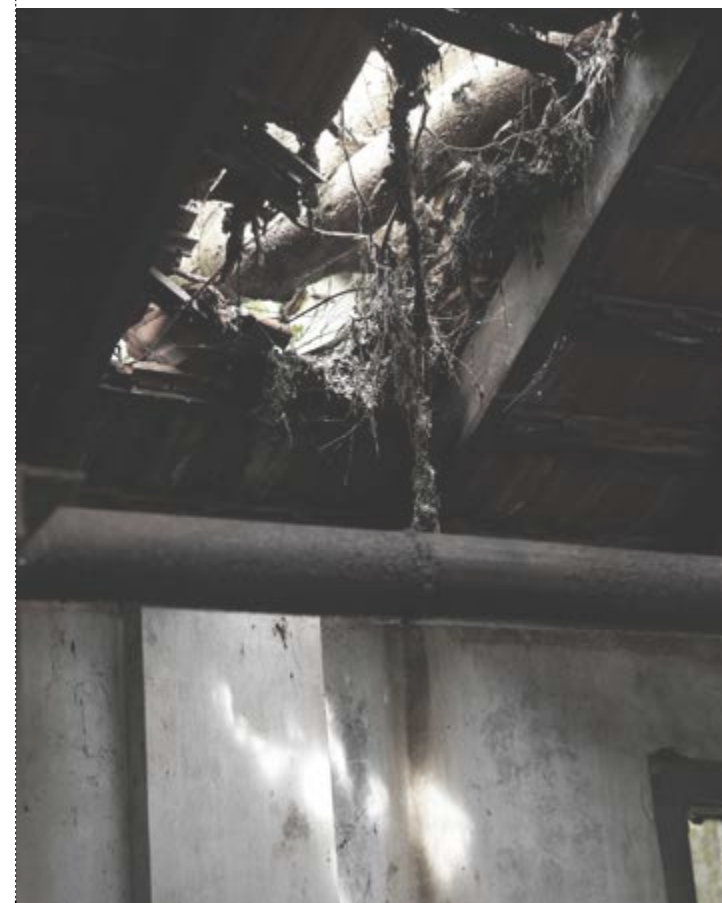


Figure 90: Images showing the serious damages happened to the comtrust building
[Source: Created By Author]



3. Building Technology

1. Introduction

1.1. Architecture

The building technology of Comtrust Mananchira reflects a blend of traditional Kerala architecture and industrial-era adaptations. The structure is primarily composed of load-bearing masonry, where thick walls of brick or stone bear the weight of the building. This type of construction, typical in Kerala, provides natural insulation against the tropical heat. Over time, however, moisture infiltration and lack of maintenance can lead to the deterioration of these masonry walls. Additionally, reinforced concrete may have been incorporated into the building for strength, particularly in areas such as beams and columns, to support the industrial load of the building.

The roof of Comtrust Mananchira likely features terracotta tiles, a common roofing material in Kerala. Terracotta is an excellent insulator, keeping the interior cool despite the tropical climate. The roof design would have been sloped to facilitate rainwater runoff, critical in a region with heavy monsoon rains. However, over the years, tiles may crack or dislodge due to age and weather conditions, leading to potential water infiltration. Gutter systems would have been designed to channel rainwater away from the building’s foundation, but these systems could become clogged or damaged, leading to further moisture issues if not regularly maintained.

Ventilation and natural cooling are key aspects of the building’s design. Open courtyards and large windows are typical features of traditional Kerala architecture, which helps improve air-flow and reduce humidity inside the building. The courtyards serve as central spaces, drawing in fresh air and allowing for natural light to penetrate deep into the structure. These features would have been particularly effective in maintaining a comfortable indoor temperature without the need for mechanical cooling. Additionally, timber elements such as window frames, doors, and beams would have been used for both structural support and aesthetic appeal, though these components are vulnerable to termites and decay over time.

Moisture management is crucial in maintaining the integrity of Comtrust Mananchira. The build-

ing may have been constructed with lime plaster or cement-based plaster, which was traditionally used to protect walls from the dampness of the region. Over time, however, this plaster can deteriorate if exposed to continuous moisture, leading to issues like efflorescence—white, powdery salt deposits on the surface. Waterproofing systems would have been applied to prevent moisture from seeping into the walls and damaging the interior. Yet, without regular upkeep, water can infiltrate through cracks or leaks, leading to structural weakening.

The building’s flooring would likely consist of stone (such as granite or laterite) and concrete, with stone floors offering natural cooling properties, ideal for the hot and humid climate. Wooden flooring may be found in some areas, particularly in office spaces, providing comfort and a warm aesthetic. However, wooden flooring is vulnerable to moisture, termites, and wear, necessitating frequent maintenance to prevent deterioration. The overall flooring design emphasizes durability and climate adaptation but requires attention to ensure longevity.

Windows and doors in the building are likely made from wooden frames. These elements serve both functional and decorative purposes, allowing for ample light and ventilation while maintaining the traditional architectural style of Kerala. However, wooden frames can warp, rot, or be damaged by termites, especially in areas exposed to high humidity or direct rainfall. Metal components, such as iron or steel window grills, might also be used but are susceptible to rust and corrosion over time, particularly in a coastal, humid environment.

In terms of modern systems, electrical wiring and plumbing would have been updated to meet current standards, especially as the building has likely undergone several phases of renovation. The original wiring might have been rudimentary, requiring upgrading to avoid fire hazards and ensure the building’s safety. Similarly, plumbing systems would need to be maintained to prevent leaks, corrosion, and water damage, which could worsen the building’s overall structural integrity.

Chapter 3

Building Technology



Figure 91: Image of the clearstorey glass windows enveloped with the sawtooth roof
[Source: Taken By Author]

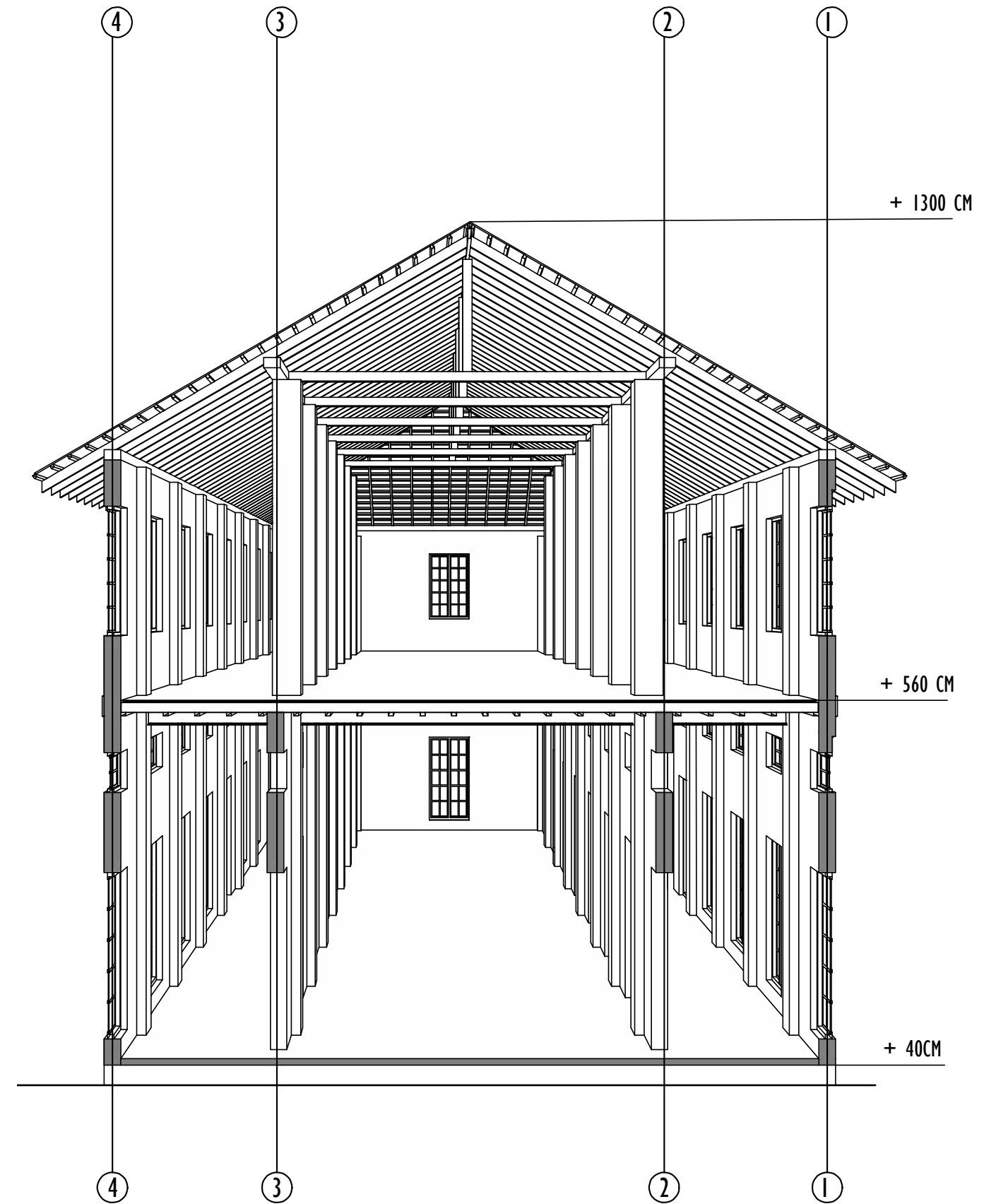


Figure 92: Comtrust building detail
[Source: Created By Author]

1.2. Building Architecture Influences

1.2.1. Traditional Kerala Architecture

The building incorporates several key features of Kerala's vernacular architectural style, which emphasize climate responsiveness and cultural aesthetics. These include:

a. Sloping Roofs with Terracotta Tiles

The building features sloping roofs, a hallmark of Kerala architecture, designed to handle the region's heavy monsoon rains effectively by allowing water to run off quickly.

Terracotta roof tiles, commonly used in Kerala, provide excellent thermal insulation, keeping interiors cooler during hot and humid seasons.

Overhangs or eaves are likely extended to shield the walls from rain, further protecting the structure from moisture-related damage.

b. Open Courtyards

Traditional Kerala architecture often includes central courtyards, which enhance airflow and allow natural light to enter the building.

In Comtrust Mananchira, courtyards likely serve dual purposes—ventilation for the workspaces and a cooling effect on the overall building environment.

c. Natural Ventilation and High Ceilings

The building employs large windows and high ceilings, crucial for maximizing cross-ventilation and ensuring air circulation, reducing the reliance on artificial cooling.

This passive cooling approach aligns with Kerala's architectural emphasis on environmental adaptability and human comfort.

d. Use of Local Materials

The structure likely incorporates laterite stone, a locally available material valued for its durability and thermal insulation.

Timber is used extensively in window frames, doorways, and possibly structural elements like beams, reflecting the region's traditional construction practices.

Lime plaster is used for finishing surfaces, a breathable material that prevents moisture retention and helps regulate indoor humidity levels.

1.2.2. Colonial Industrial Design

As a building constructed during the colonial era and designed for industrial purposes, COMTRUST Mananchira incorporates elements of functionality, strength, and simplicity typical of colonial industrial architecture. These include:

a. Functional Layout

The design prioritizes utility, with expansive rooms for textile manufacturing, yarn storage, weaving, and administrative offices.

The layout ensures efficient workflow, accommodating large equipment and ample space for production processes while providing separate areas for management and worker facilities.

b. Exposed Structural Elements

The building likely features thick masonry walls, reinforced with cast-iron or steel columns and beams, characteristic of industrial construction. These materials provide the necessary strength to support heavy machinery and withstand constant use.

Exposed beams and trusses in the roofing system may be present, reflecting the industrial aesthetic of functionality over ornamentation.

c. Simple, Symmetrical Facades

The exterior design is likely symmetrical and minimalist, with uniform proportions, reflecting colonial influences.

Large openings for windows and doors enhance natural light and ventilation, maintaining a balance between aesthetics and utility.

d. Metal Components

Iron and steel are used for structural reinforcements, window grills, and possibly staircases, enhancing the building's durability.

These materials are designed for long-term use but require regular maintenance to prevent corrosion in Kozhikode's humid climate.

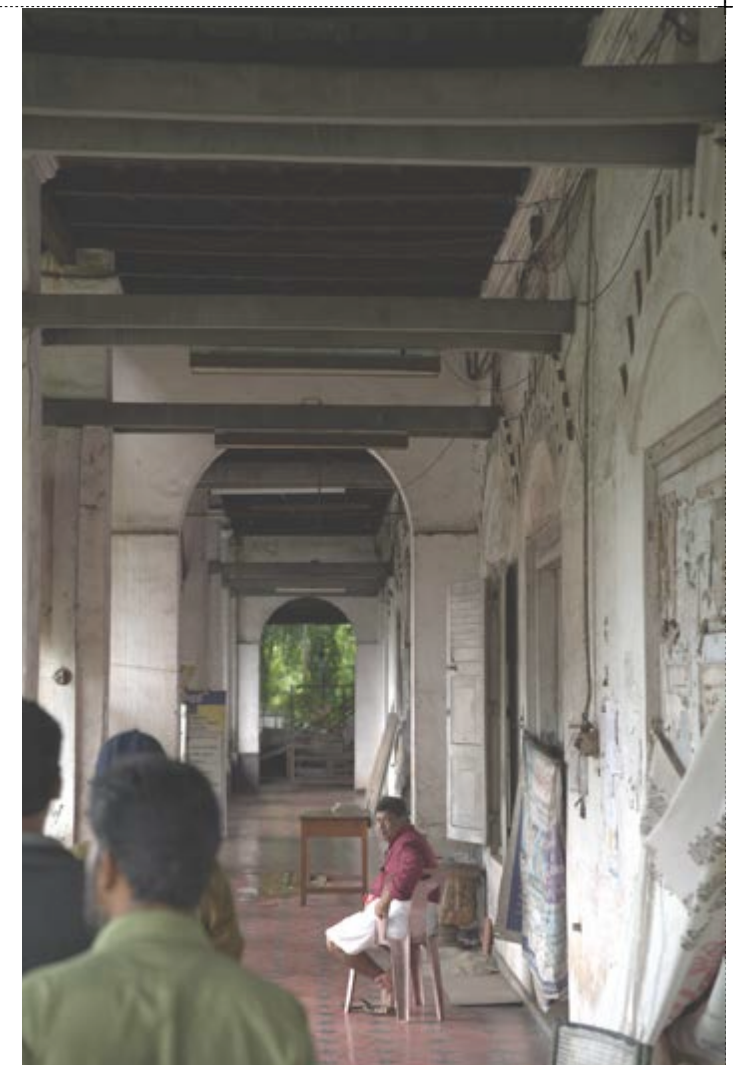


Figure 93: Images of some architectural elements and details of the building
[Source: Taken By Author]



1.2.3. Fusion of Vernacular and Industrial Design

Comtrust Mananchira exemplifies a hybrid style that combines the cultural and climatic responsiveness of Kerala's architecture with the pragmatic, utilitarian approach of colonial industrial design.

a. Adaptation to the Tropical Climate

The integration of rainwater management systems, such as sloped roofs and gutters, demonstrates the building's response to heavy monsoons. Openings, courtyards, and high ceilings help mitigate the effects of humidity and heat, ensuring a comfortable working environment.

b. Balance of Functionality and Aesthetics

While the structure is predominantly utilitarian to support industrial activities, it retains the graceful simplicity of Kerala's architectural traditions. The use of locally sourced materials and traditional craftsmanship blends seamlessly with industrial design elements, preserving the building's heritage.

1.2.4. Contemporary Modifications

Over time, the building may have undergone modern interventions to adapt to changing needs and ensure its longevity. These updates include:

a. Electrical and Plumbing Systems

The original systems may have been upgraded to meet modern safety and functional standards, including the addition of concealed wiring and improved water supply infrastructure.

b. Roofing and Waterproofing

Repairs to damaged terracotta tiles and the installation of waterproof membranes are likely implemented to combat wear and moisture infiltration.

c. Sustainability Enhancements

Features such as rainwater harvesting and energy-efficient lighting may have been added to align with contemporary sustainability goals, complementing the building's existing passive cooling strategies.

The architectural style of Comtrust Mananchira reflects a thoughtful integration of traditional Kerala vernacular techniques with colonial industrial principles.

Its sloping roofs, open courtyards, and natural ventilation underscore its responsiveness to the tropical climate, while its functional layout and structural reinforcements highlight its industrial purpose.

This blend of styles not only ensures the building's efficiency and durability but also preserves its cultural and historical significance.



Figure 93: Images of some architectural elements and details of the building
[Source: Taken By Author]



1.3. Building Functional Analysis

Weaving area

Core section of Comtrust Mill,

Block 5 Contains 600 handloom machines made from durable teak timber. Dedicated to producing high-quality cotton textiles.

Office rooms

Administrative hub supporting mill operations.

Block 4 Oversaw day-to-day activities and order management. Managed payroll and maintained operational records.

Dye house

Area where textiles dyed to desired colors.

Block 2 Equipped with dyeing vats, chemical treatments, and drying spaces. Preparing fabrics for weaving and finishing.

Head office

Central administrative hub

Block 1 Coordinated with production, sales, and logistics departments. Managed relationships with suppliers, clients, and stakeholders.

Yarn winding

Area for raw yarns were wound to spools or bobbins.

Block 3 Equipped with winding machines for even distribution of yarn. Crucial for smooth and efficient weaving, ensuring textile quality.

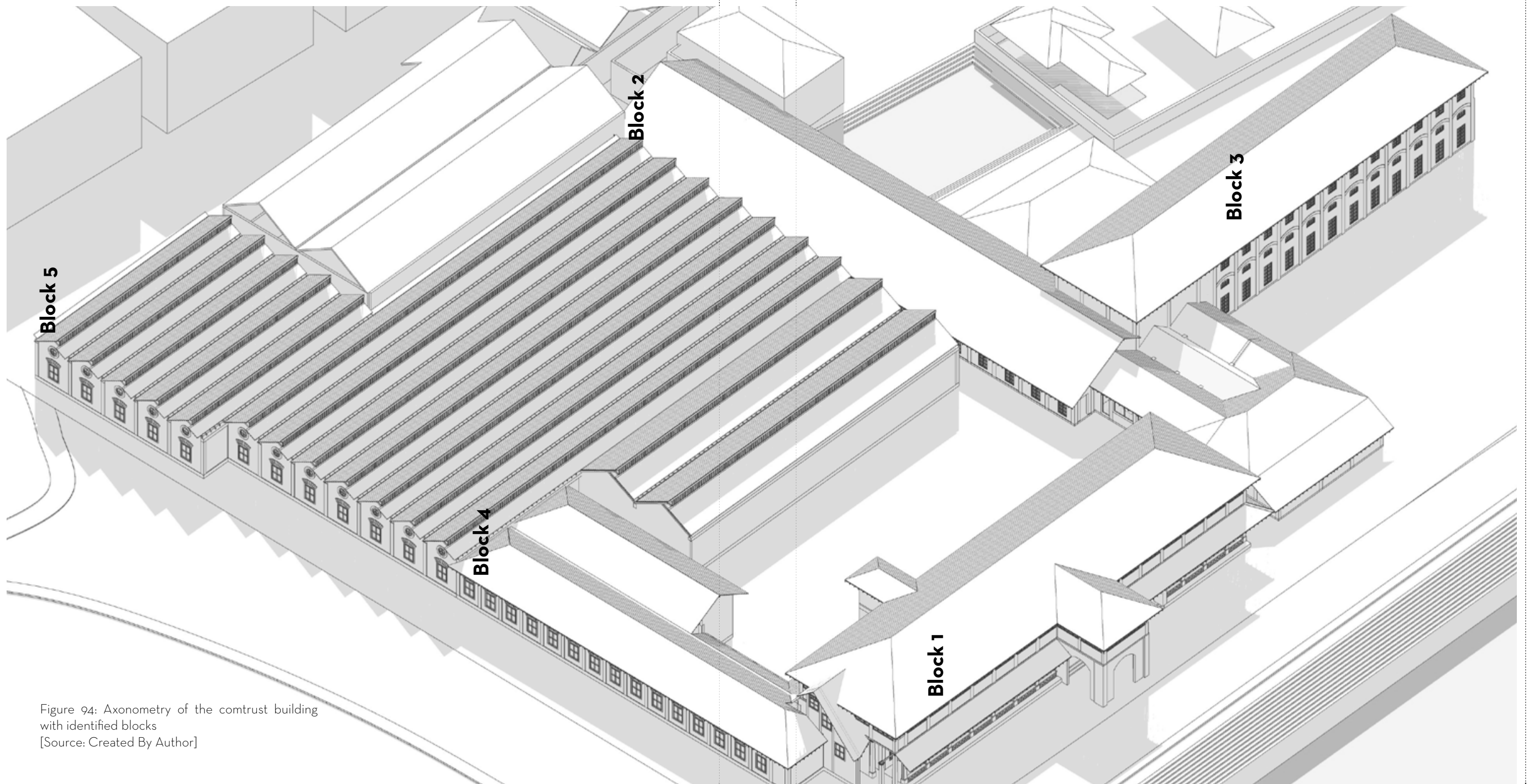


Figure 94: Axonometry of the comtrust building with identified blocks
[Source: Created By Author]



Figure 95: Key plan of block 1
[Source: Created By Author]

Key plan



Figure 96: Images of the structural arches in the building
[Source: Taken By Author]

Structural Arches

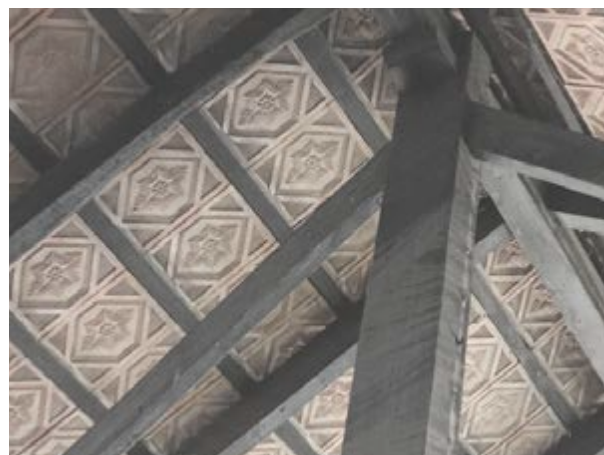


Figure 97: Image showing the vernacular roof architecture
[Source: Taken By Author]

Vernacular roof system

1.3.1. Block 1

Structural Arches

The structural arches are significant architectural features that serve both functional and aesthetic purposes. These arches are designed to distribute weight efficiently, transferring loads from above to the vertical supports such as walls or columns.

This ensures structural stability and longevity, which are particularly vital in an industrial setting. Constructed using durable materials like brick or laterite stone, common in Kerala, the arches are resilient to the region's humid climate.

Additionally, their lime-based mortar provides flexibility, reducing the risk of cracks due to temperature variations. The arches also enhance the building's aesthetic appeal, adding a rhythmic elegance to entryways, windows, and partitions, while allowing for natural ventilation and light.

Vernacular Roof Systems

The vernacular roof system reflects traditional Kerala architecture, optimized for the tropical climate and industrial needs of the building. The roof features steep slopes designed to quickly drain heavy monsoon rains, preventing water stagnation and structural damage.

Overhanging eaves shield the walls from rain, adding another layer of protection. The roofing material, terracotta tiles, offers excellent thermal insulation, maintaining a cooler indoor environment. Supported by a timber framework crafted from durable local hardwoods, the roof is lightweight yet strong, capable of spanning large areas required for textile production.

Additionally, ventilation openings under the eaves and at the ridge allow hot air to escape, promoting natural cooling within the workspace.

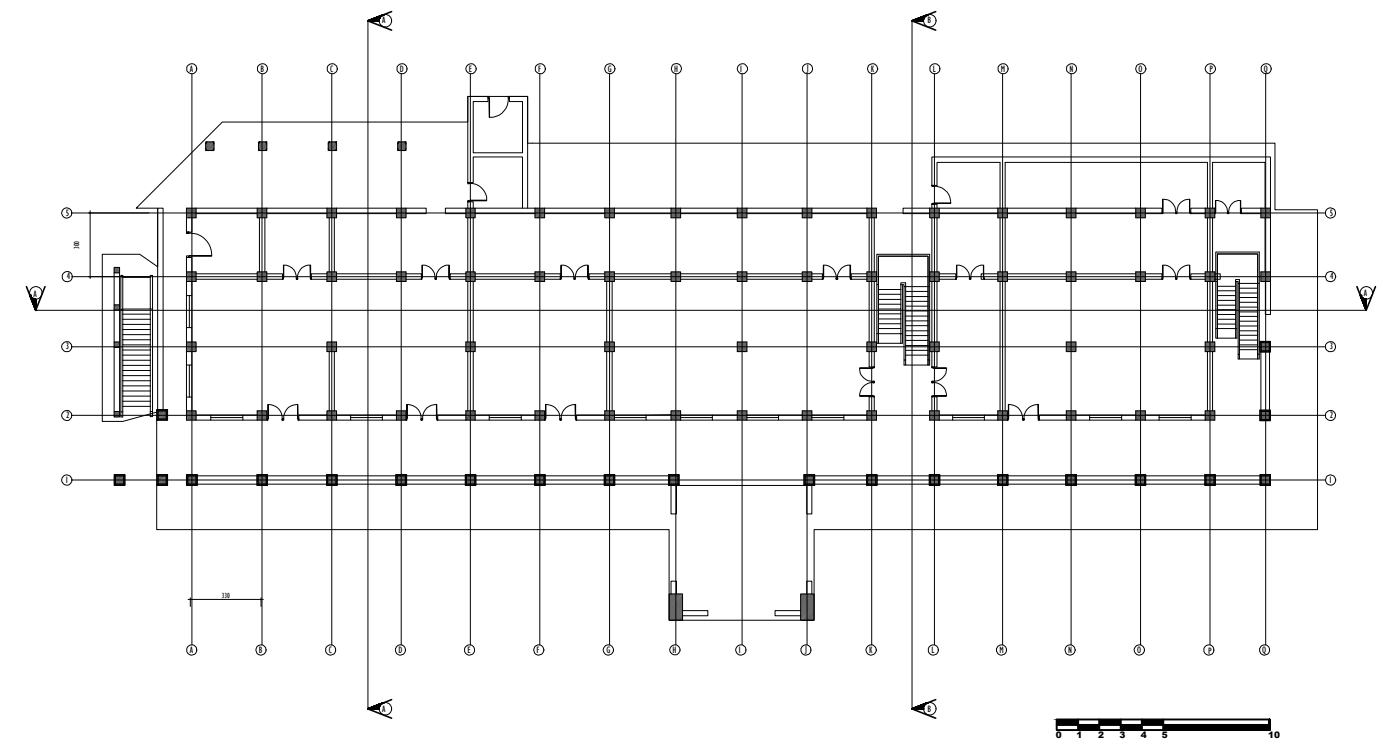


Figure 98: Ground floor plan of block 1
[Source: Created By Author]

Ground floor plan

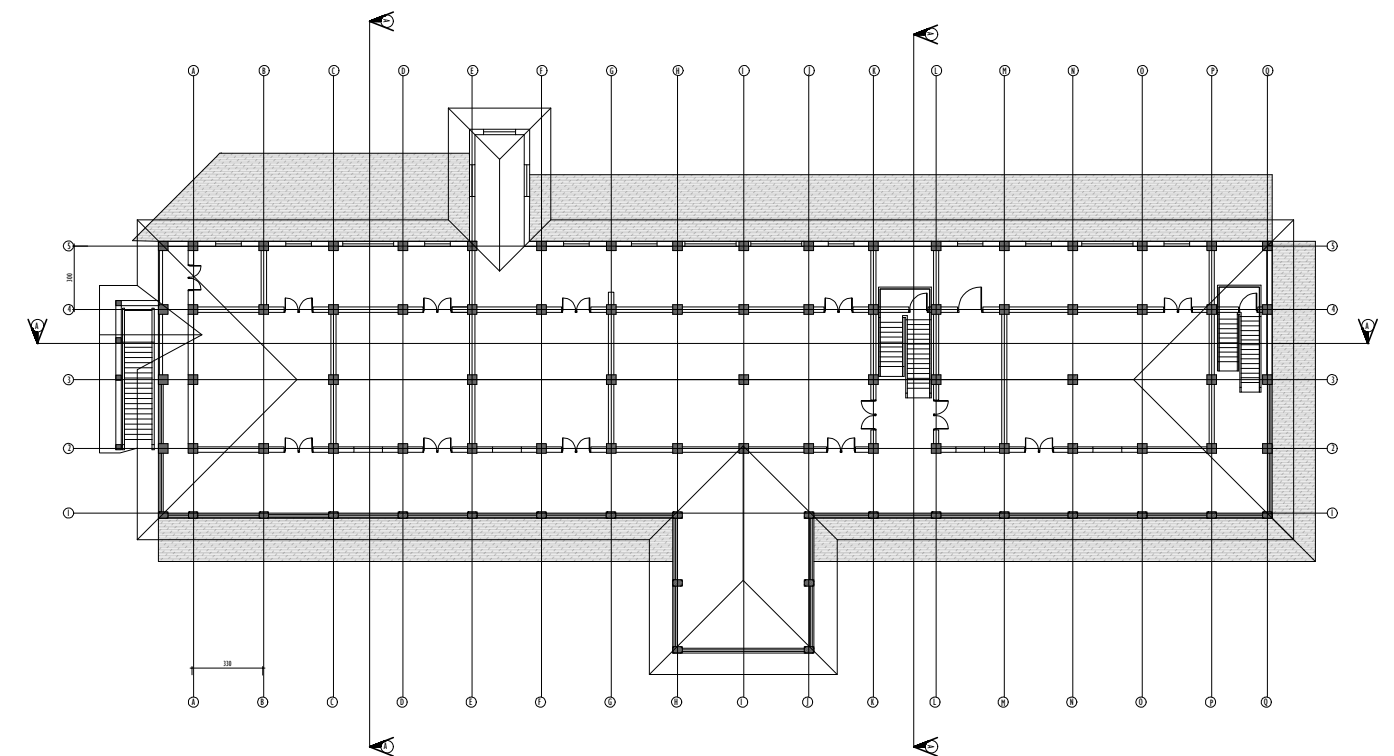


Figure 99: First floor plan of block 1
[Source: Created By Author]

First floor plan



Figure 100: Image showing the clearstorey windows
[Source: Taken By Author]

Clearstory windows



Figure 101: Image showing the wooden flooring
[Source: Taken By Author]

Wooden flooring

The structure features a spacious layout with thick laterite stone walls, ensuring both durability and thermal insulation. High ceilings and large clerestory windows provide natural ventilation and light, creating a comfortable and energy-efficient working environment. The sloping terracotta-tiled roof, supported by timber trusses, efficiently handles heavy monsoon rains while adding to the building's aesthetic appeal. Overhanging eaves further protect the walls from moisture. The use of locally sourced materials like laterite, terracotta, and timber highlights its cultural significance,

Clearstory Windows

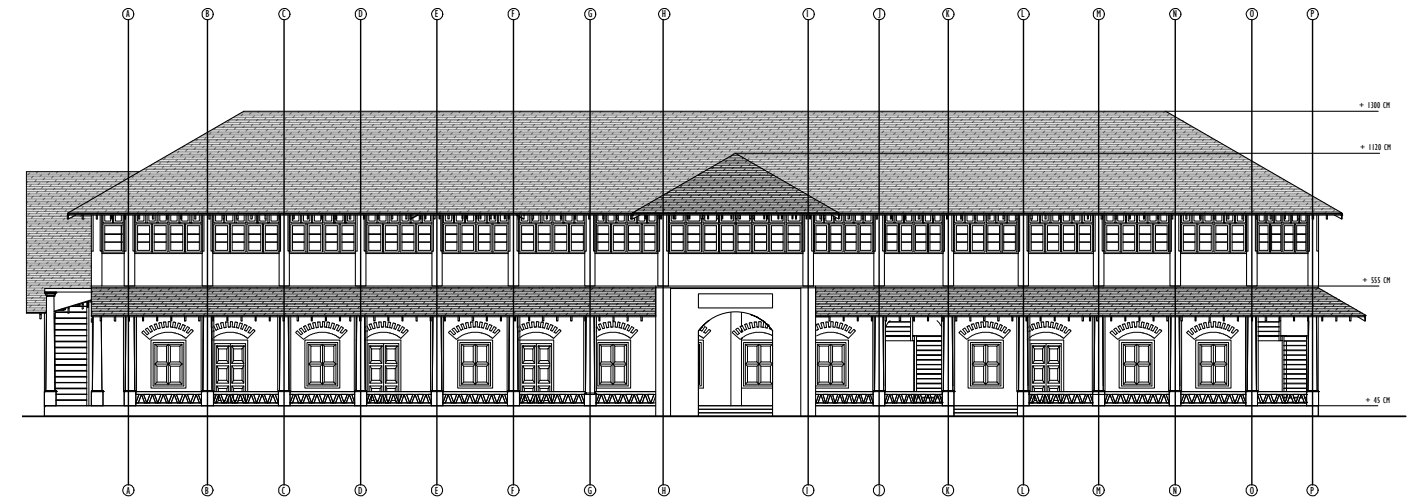
Positioned high on the walls, they allow natural light to illuminate large interior spaces while facilitating ventilation through a stack effect, where warm air escapes upward and cooler air circulates below. This passive cooling system is particularly effective in Kerala's tropical climate, reducing the need for artificial lighting and ventilation. Constructed with durable timber or metal frames and glass panes, these windows enhance the building's aesthetic appeal with their rhythmic alignment and symmetry, reflecting the blend of traditional and colonial industrial architectural styles.

Wooden Flooring

Crafted from durable local hardwoods, it provides a sturdy surface capable of withstanding industrial use, such as heavy foot traffic and equipment movement during textile production. The flooring also offers natural insulation, helping regulate indoor temperatures in Kerala's tropical climate. Beyond functionality, it enhances the building's aesthetic charm with its warm and textured appearance, complementing the colonial-industrial architectural style. However, in the humid environment, the flooring is vulnerable to issues like termite damage and wear, requiring regular maintenance to preserve its integrity and historical significance.

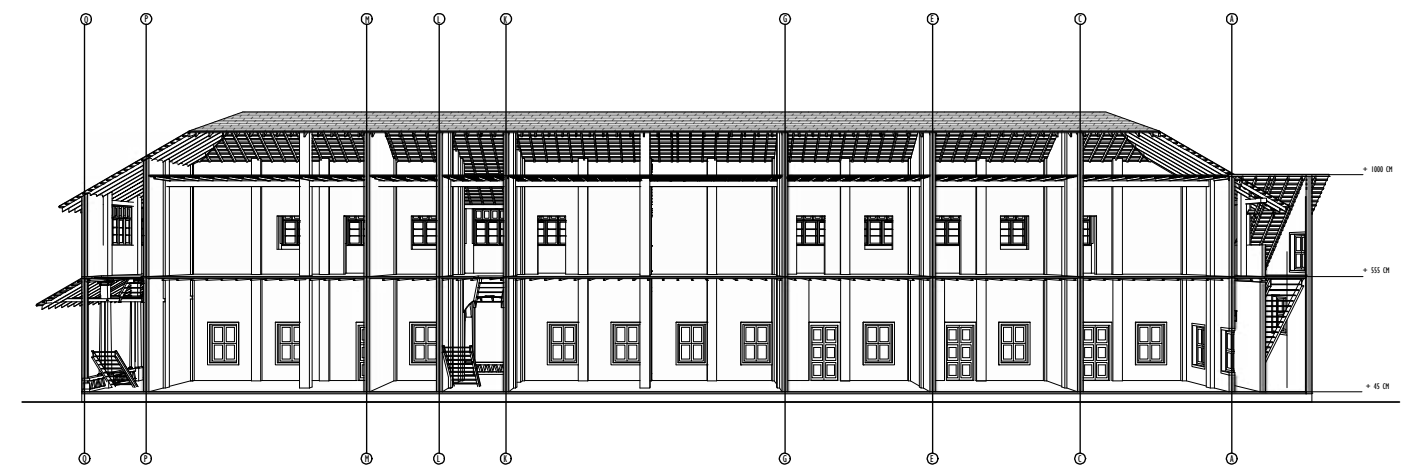
the building's aesthetic appeal. Overhanging moisture. The use of locally sourced materials like laterite, terracotta, and timber highlights its cultural significance, while colonial design elements, such as symmetrical facades, structural arches, and reinforced frameworks, reflect its industrial purpose.

This thoughtful integration of styles ensures the building remains both functional and architecturally significant.



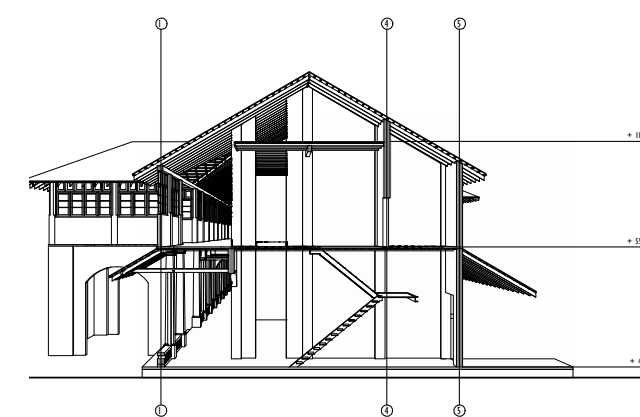
Elevation

Figure 102: Elevation 1 schematics of block 1
[Source: Created By Author]



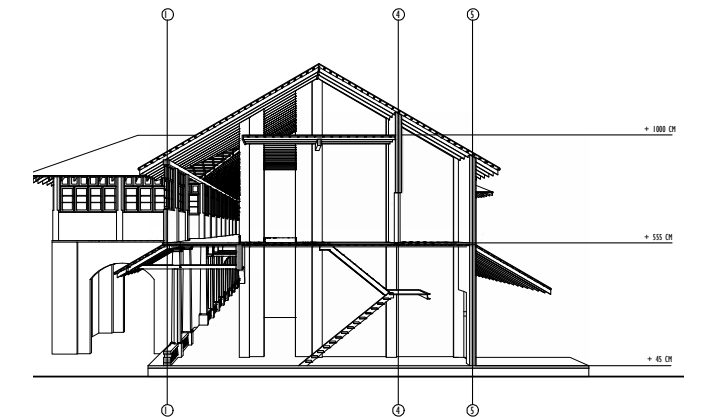
Section 1

Figure 103: Section 1 schematics of block 1
[Source: Created By Author]



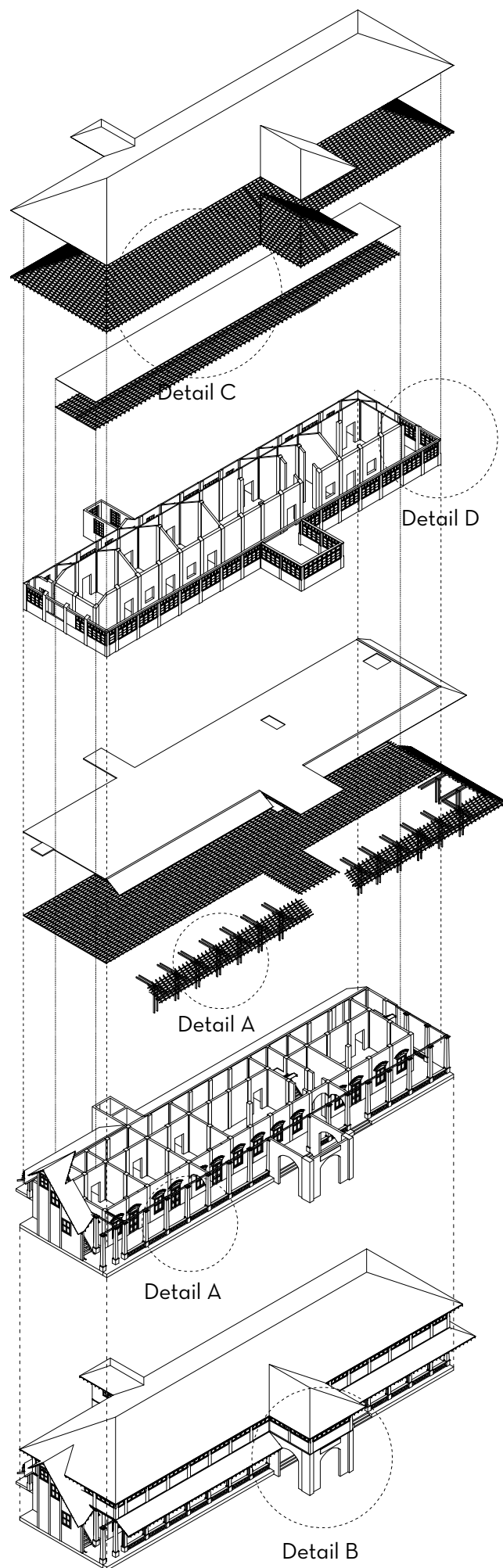
Section 2

Figure 104: Section 2 schematics of block 1
[Source: Created By Author]



Section 3

Figure 105: Section 3 schematics of block 1
[Source: Created By Author]



The structure's foundation and walls are built from thick laterite stone, a locally sourced material known for its strength and thermal insulation properties. This ensures the building can support the heavy loads associated with industrial use while maintaining a comfortable indoor environment in Kerala's tropical climate. The use of lime mortar enhances flexibility, reducing the risk of cracks and ensuring the building's longevity.

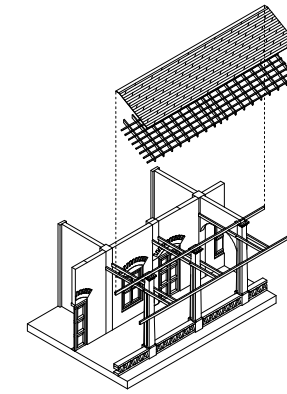
A key feature of the main block is its sloping roof, designed to manage Kerala's heavy monsoon rains effectively. The roof is supported by a framework of durable timber trusses, intricately crafted to span large areas without compromising stability. Covered with terracotta tiles, the roof offers excellent thermal insulation and efficiently channels rainwater away, while overhanging eaves protect the walls from direct exposure to rain and sunlight, prolonging the structure's lifespan.

The design incorporates large arches and wide doorways, which serve both functional and aesthetic purposes. These features ensure efficient movement of materials and equipment while contributing to the building's architectural grandeur. The arches also support high ceilings, which, in combination with clerestory windows, enhance natural ventilation and lighting. This climate-responsive design reduces dependency on artificial lighting and cooling systems, aligning with traditional sustainable building practices.

Colonial influences are evident in the incorporation of symmetrical facades and reinforced frameworks, such as cast iron or steel supports in critical areas. These elements add structural integrity and reflect the industrial purpose of the building. The thoughtful integration of traditional and colonial architectural features makes the main block not only a functional industrial space but also a significant cultural and architectural landmark in Kerala.

Main block having its frontage to the mananchira. Presently used as the headquarters of the commonwealth trust. Good conditions with minor non structural defects.

Figure 106: Exploded structural schematics of block 1
[Source: Created By Author]



Detail A
Wooden reinforcement around the frontline pillars to support the roof

Detail B
Exploded view of the front block showing the structural and material details

Detail D
View showing the horizontally pivoted windows on the first floor opening the view into mananchira pond

Detail C
Exploded view of the first floor showing the roofing and false ceiling details

Wooden reinforcements around the frontline pillars to support its extended roof overhang. Made from durable local hardwoods, these reinforcements help distribute the roof's weight, stabilize the eaves, and protect the walls from rain, humidity, and sunlight, essential in Kerala's climate. This structural solution blends practical functionality with aesthetic appeal, complementing the building's vernacular and colonial architectural style, and enhancing both its durability and visual charm.

Building uses laterite stone for walls, providing thermal insulation and durability. The timber trussed sloping roof, covered with terracotta tiles, ensures efficient water runoff and thermal comfort. Wooden flooring and horizontally pivoted windows enhance aesthetics, while reinforced concrete and steel provide structural integrity throughout.

Horizontally pivoted windows on the first floor, strategically positioned to offer a panoramic view of the Mananchira Pond. These windows, which open horizontally rather than vertically, provide unobstructed sightlines, allowing natural ventilation and enhancing the connection between the interior spaces and the picturesque surroundings. The design of these pivoted windows is both functional and aesthetically pleasing, offering a unique solution to ventilation while framing a beautiful view of the pond. This feature complements the building's architectural style, creating an inviting, light-filled environment that connects the indoors with the natural beauty of the area.

Sloping roof with timber trusses and terracotta tiles, designed to efficiently channel rainwater and provide thermal insulation. The overhanging eaves protect the walls from rain, minimizing moisture damage. The false ceiling is made from gypsum board, concealing utilities while offering thermal comfort, improved air quality, and integrated lighting. This combination of traditional and modern design ensures both functionality and aesthetic appeal in the building.

Figure 107: Exploded structural details of block 1
[Source: Created By Author]

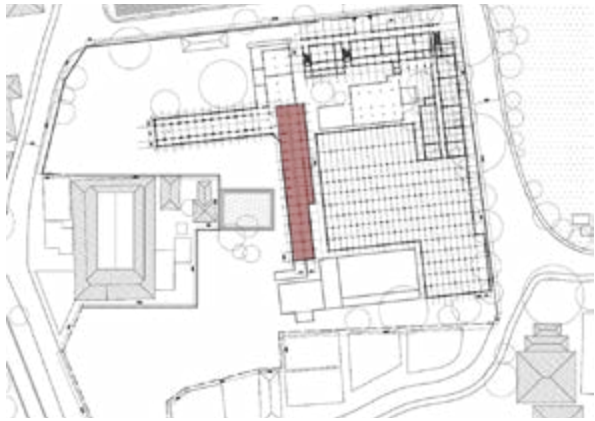


Figure 108: Key plan of block 2
[Source: Created By Author]

Key plan



Figure 109: Image of block 2 building
[Source: Taken By Author]

Vernacular architecture



Figure 110: Image of the covered verandha of block 2 building
[Source: Taken By Author]

Coverd verandha

1.3.2. Block 2

Vernacular Architecture.

Building skillfully blends traditional Kerala design elements with modern industrial needs. The building features laterite stone walls, a locally sourced material known for its excellent thermal insulation, which helps regulate indoor temperatures in Kerala's tropical climate. The roof, a key feature of Kerala's vernacular architecture, is sloping and supported by timber trusses, offering structural strength and allowing for efficient water runoff during monsoons. The roof is covered with terracotta tiles, providing natural cooling and durability. Horizontally pivoted windows enhance ventilation and natural light, while the large overhanging eaves protect the walls from moisture and sunlight, preventing weather damage. The incorporation of local materials like timber, stone, and open courtyards creates a harmonious connection to the local environment, blending sustainability with modern functionality.

The Idea of Veranda

This space is strategically placed at the front of the building, providing a transition between the outdoor environment and the interior. The veranda is characterized by a roofed structure supported by pillars or columns, offering protection from the elements while maintaining an open, airy feel. The use of local timber and stone columns in the veranda's construction is typical of Kerala's vernacular architecture, ensuring durability while blending seamlessly with the natural surroundings. The roof overhang provides shade, helping to keep the interior cooler by blocking direct sunlight. This feature also offers shelter from rain, essential in Kerala's monsoon-heavy climate. The veranda functions as an outdoor space for relaxation and social interaction, creating a connection between the building's interior and the surrounding environment, enhancing both aesthetic appeal and functional utility.

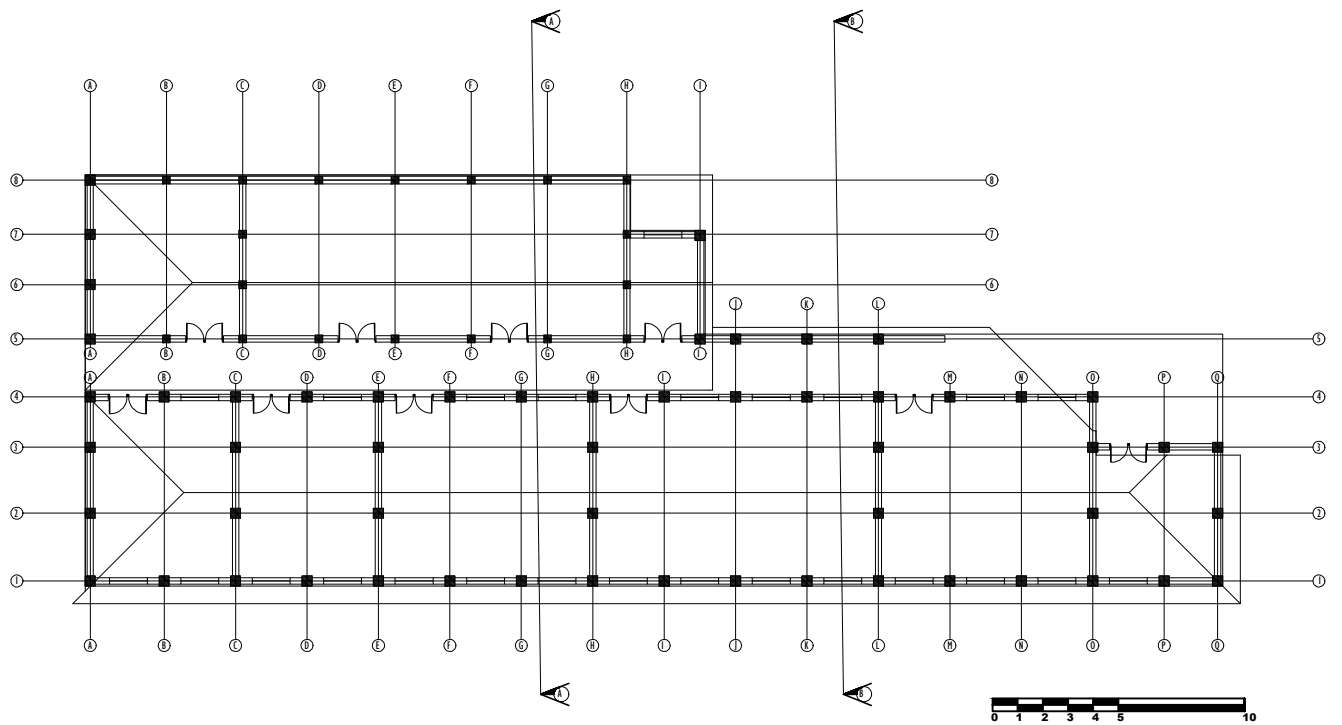


Figure 111: Ground floor plan of block 2
[Source: Created By Author]

Floor plan

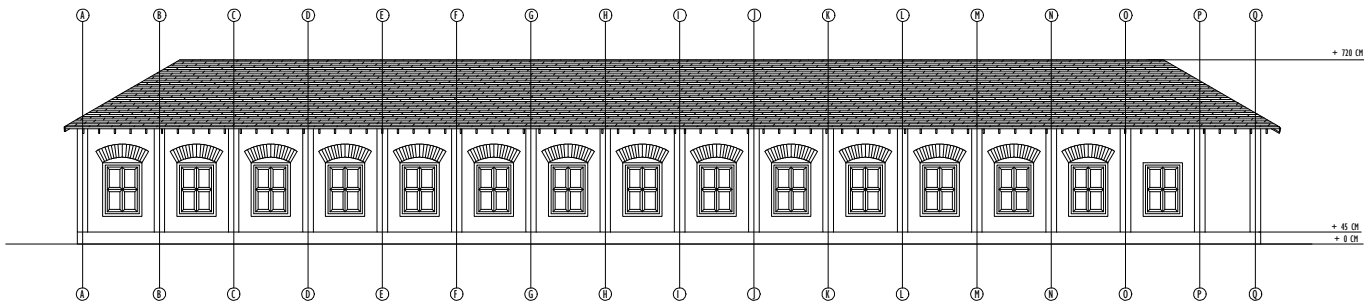


Figure 112: Elevation of block 2
[Source: Created By Author]

Elevation

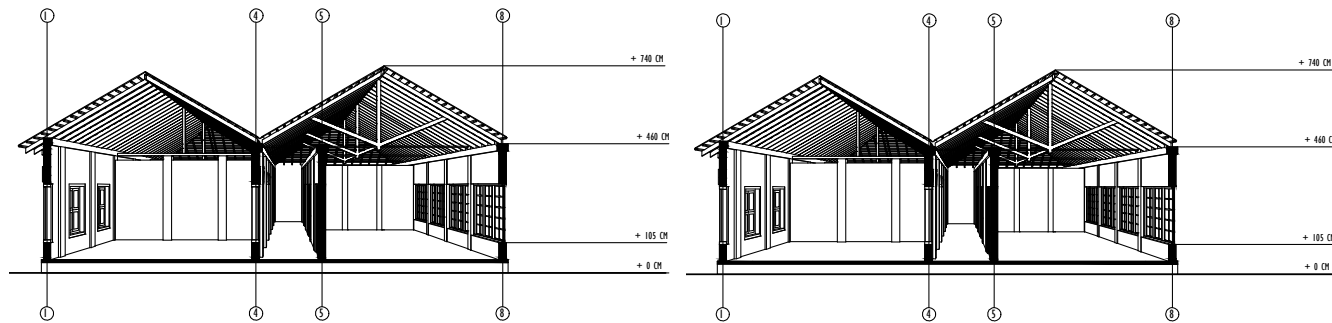


Figure 113: Section 1 of block 2
[Source: Created By Author]

Section A

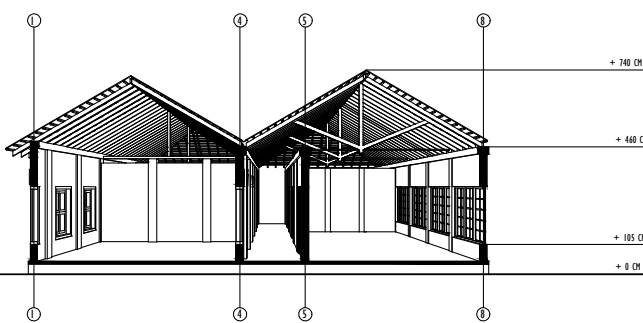


Figure 114: Section 2 of block 2
[Source: Created By Author]

Section B



Figure 115: Image of a sample clothing brochures
[Source: Taken By Author]

Sample brochures



Figure 116: Image showing roof damages of block 2
[Source: Taken By Author]

Damaged roof



Figure 117: Image of the pitched roof of block 2
[Source: Taken By Author]

Pitched roof

The remaining clothing sample brochures at the building are stored in areas such as office rooms, showrooms, or storage spaces for easy access and reference. These brochures provide detailed information on the company's textile products, including fabric types, styles, and designs. Outdated brochures may be found in storage, particularly near the yarn store or weaving area, where they might be kept for historical reference or quality control purposes. These materials may require recycling or updating to ensure they reflect the company's latest product offerings and branding strategies.

The damaged roof of the building likely results from factors such as weathering, moisture infiltration, or age-related wear and tear, especially considering Kerala's heavy monsoon rains. Common issues may include broken or displaced tiles, water leakage, and damaged trusses. The terracotta tiles may crack or displace over time, allowing rainwater to seep through and damage the underlying structure. The timber trusses could suffer from termite infestations or decay, weakening the roof's support. These roof damages may lead to moisture buildup in the building, affecting internal spaces and causing damage to walls and ceilings. Regular maintenance and timely repairs are essential to preserve the roof's integrity and prevent further damage.

The pitched roof of the building is designed to efficiently handle heavy monsoon rains. Supported by timber trusses, the roof is covered with durable terracotta tiles that facilitate water runoff. The sloping design not only ensures effective drainage but also promotes natural ventilation, allowing hot air to escape. Additionally, overhanging eaves protect the walls from direct rain and sunlight, enhancing the roof's durability and protecting the building from weather damage.

Ground floor roof

Grand floor

Building axonometry

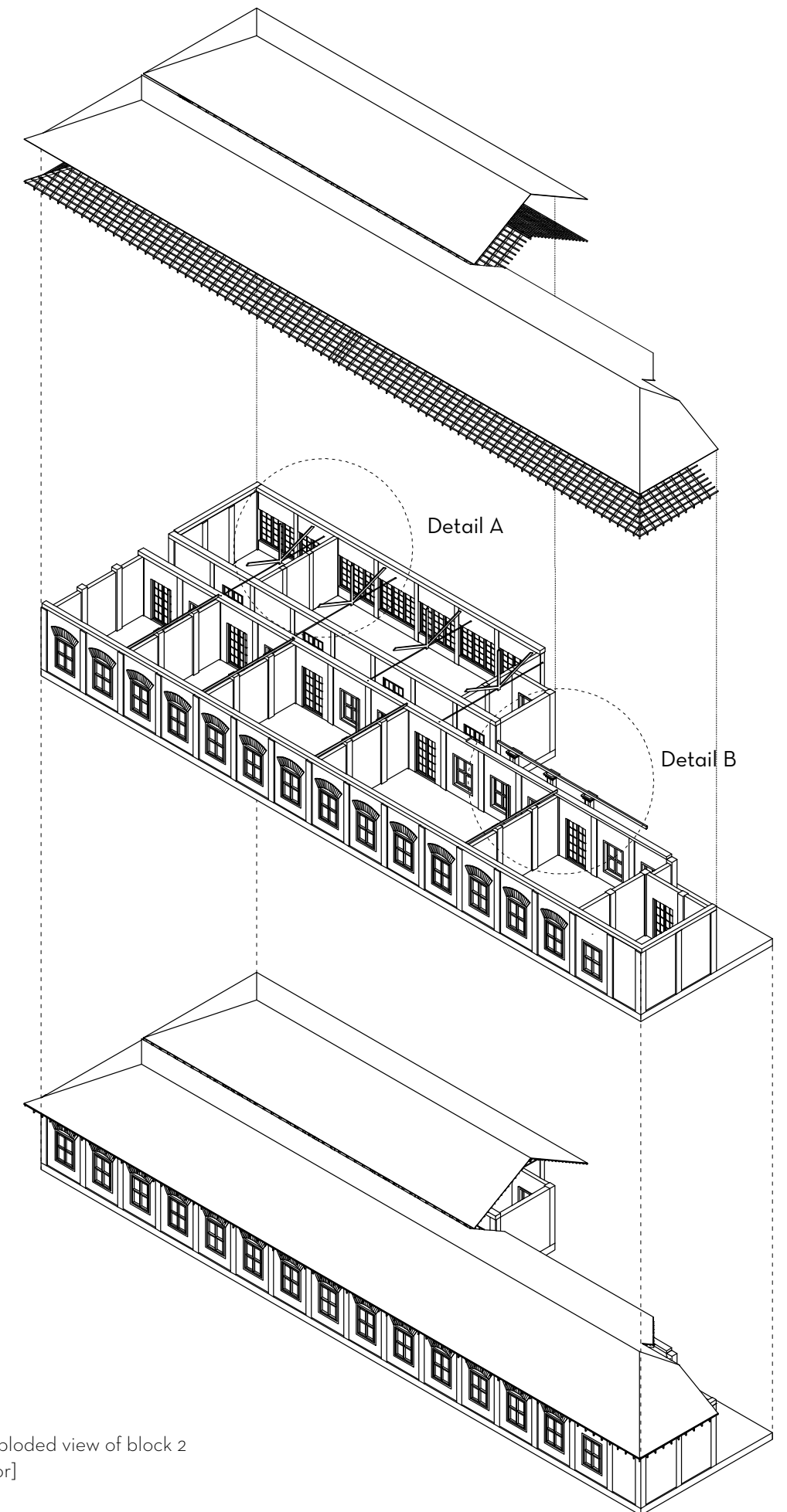
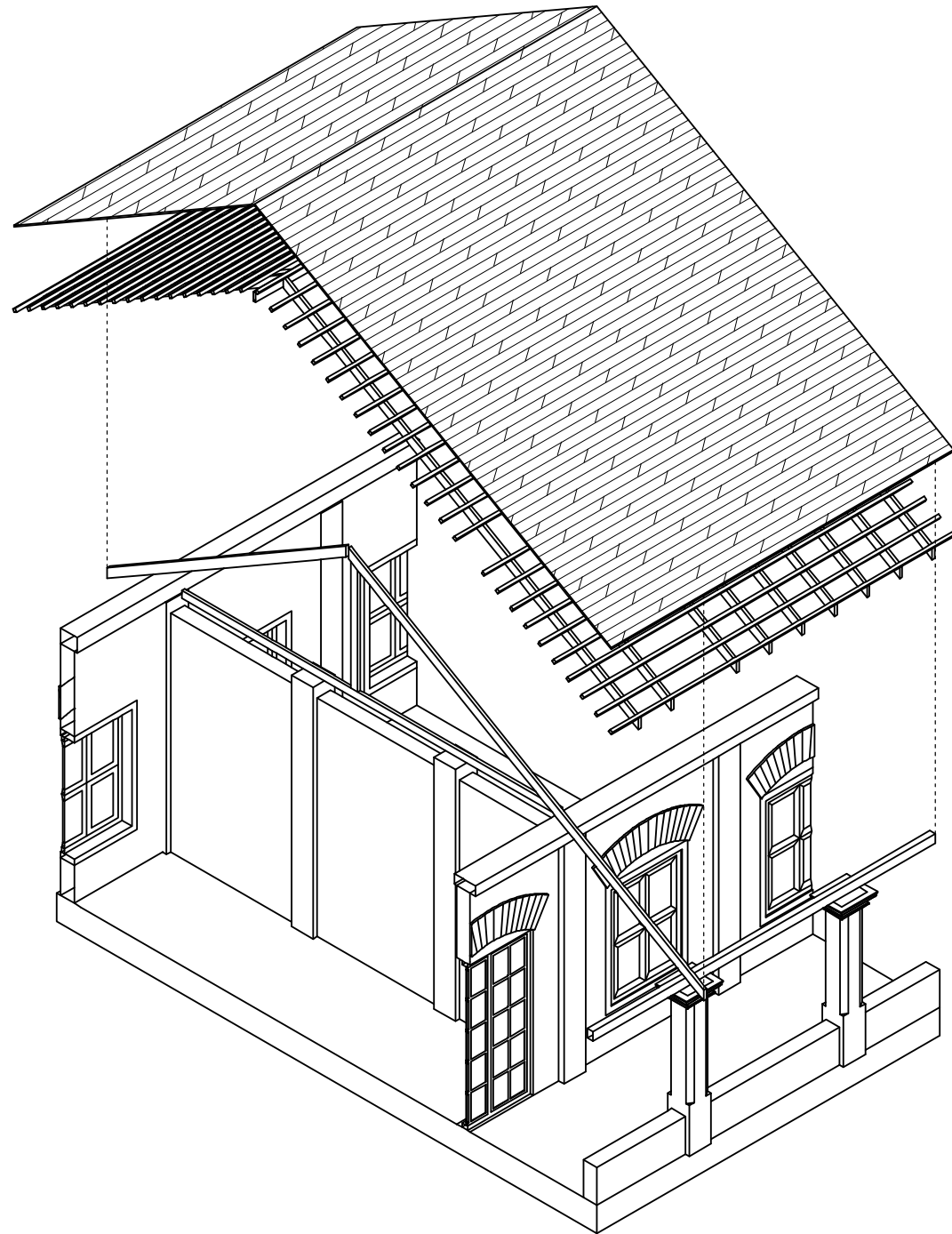


Figure 118: Axonometric exploded view of block 2
[Source: Created By Author]

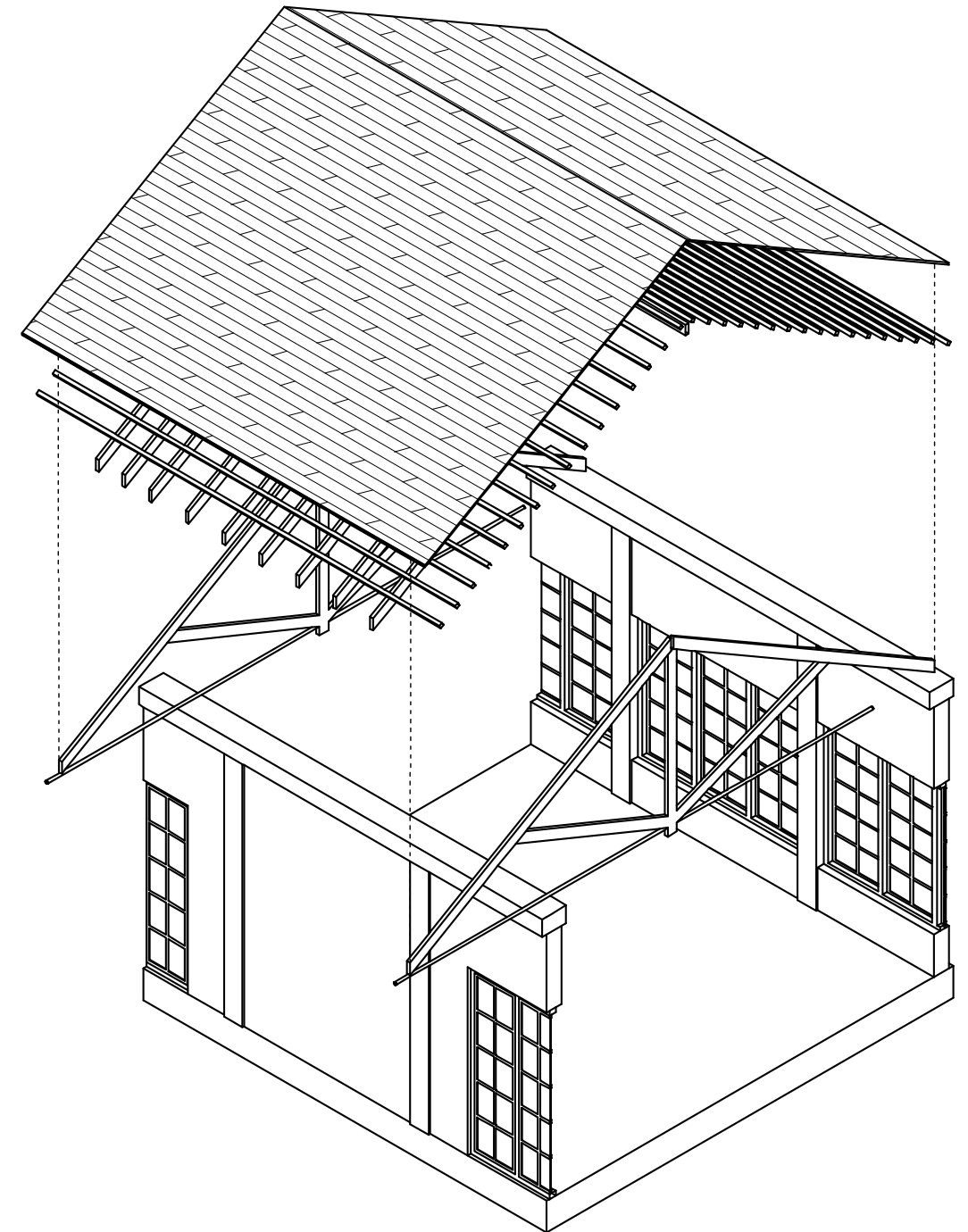


Detail A

Pitched roof with 30 degree slope with wooden truss framework. Roof frames are supported on wooden beams supported by pillars. manglore tiles laid over wooden purlins

A design element tailored to efficiently shed rainwater, a crucial consideration in Kerala's monsoon-heavy climate. This moderate slope ensures that rainwater flows off quickly, reducing the risk of water accumulation or leaks. The roof structure is supported by a wooden truss framework, providing both strength and flexibility. These trusses are reinforced with wooden beams, which distribute the load evenly across the structure.

Figure 119: Axonometric exploded detail of block 2
[Source: Created By Author]



Detail B

Pitched roof with 30 degree slope with wooden truss framework. Roof frames are supported on wooden beams supported by pillars. manglore tiles laid over wooden purlins. Raftors extended to pillars over the outer verandah

Building has a 30-degree slope supported by a strong wooden truss framework. The roof frames rest on wooden beams, which are supported by pillars, providing structural stability. Mangalore tiles are laid over wooden purlins for durability and effective water drainage. The rafters extend to cover the outer verandah, offering additional shelter and protection, while enhancing the building's overall aesthetic and functionality.

Figure 120: Axonometric exploded detail of block 2
[Source: Created By Author]

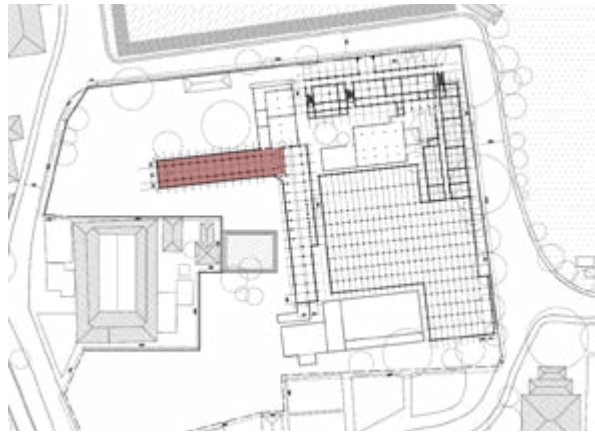


Figure 121: key plan of block 3
[Source: Created By Author]

Key plan



Figure 122: Image of the ceiling kurudi blocks
[Source: Taken By Author]

kurudi (Hollow Brick) block ceiling



Figure 123: Wooden staircase in block 2
[Source: Taken By Author]

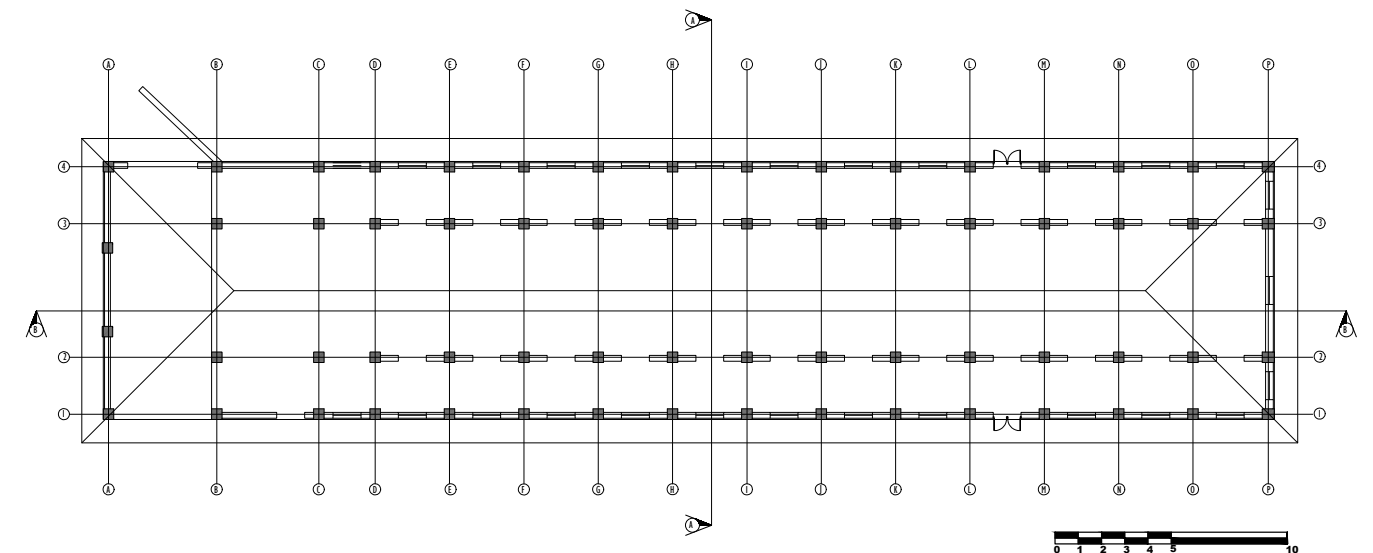
Wooden staircase

1.3.3. Block 3

The hollow brick ceiling or kurudi block ceiling used in the building is a traditional and effective construction technique commonly seen in Kerala. These blocks, made from a mixture of clay and air pockets, provide excellent thermal insulation and soundproofing properties, which are essential for maintaining comfort in tropical climates. The hollow bricks are lightweight, making them easier to handle and install, while still offering sufficient structural strength to support the load of the building.

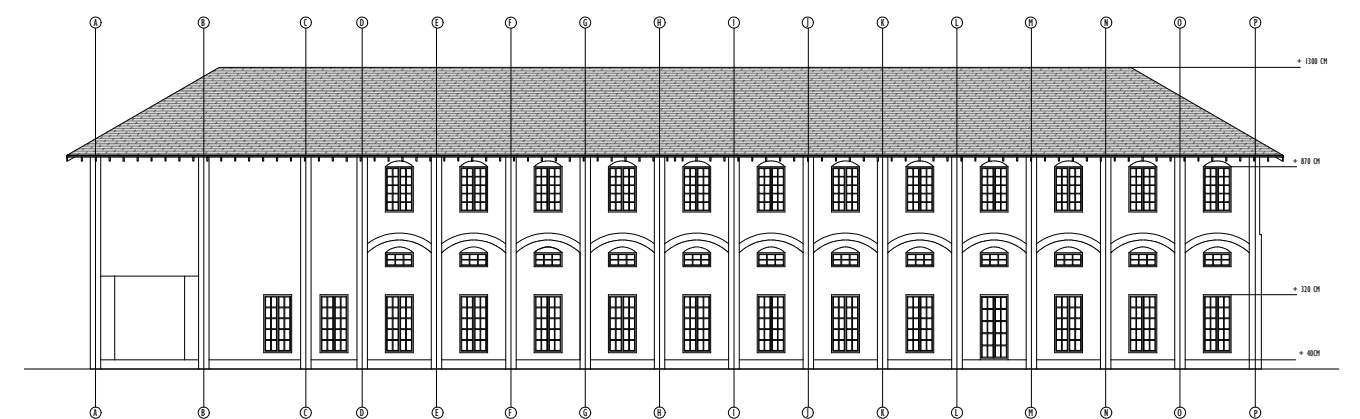
The kurudi blocks are laid in layers across the ceiling, with the hollow spaces between the blocks reducing the overall weight of the structure, thus contributing to a lighter load on the building's frame. These blocks also enhance ventilation and air circulation, helping to keep indoor spaces cooler and preventing heat build-up. The use of hollow brick ceilings is in line with the building's integration of local materials and vernacular construction techniques, ensuring a balance between functionality and sustainability in the building's design.

The wooden staircase in the building combines traditional craftsmanship with functional design. Constructed using high-quality timber, the staircase features smooth, polished treads for durability and comfort. The railing, often intricately carved, showcases skilled woodworking techniques typical of Kerala's vernacular architecture. The design likely includes open risers, allowing for better natural light flow and a sense of openness. As a primary circulation element between floors, the wooden staircase not only provides practical access but also enhances the building's overall aesthetic. It seamlessly integrates with the structure's use of local materials, contributing to the building's warmth and acoustic comfort.



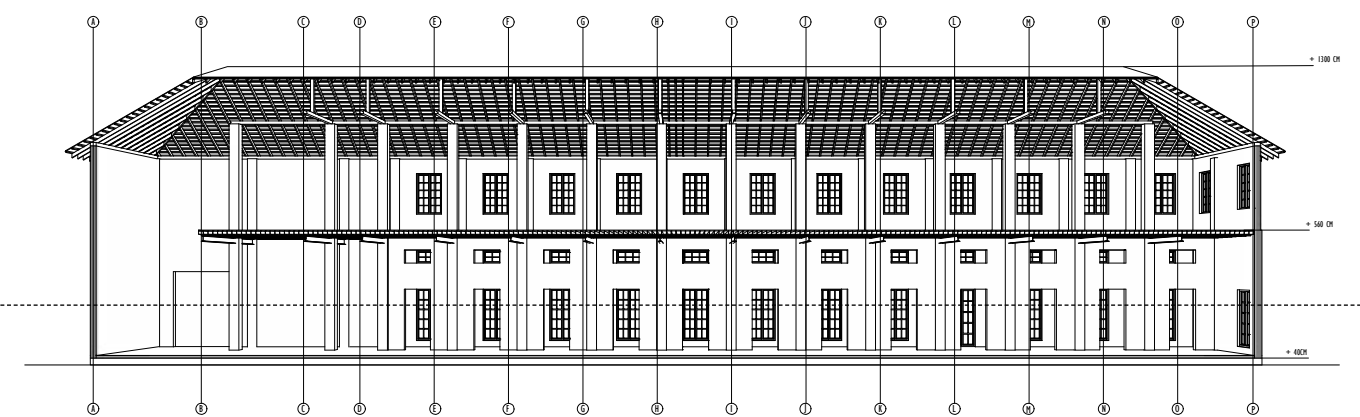
Floor plan

Figure 124: Ground floor plan of block 3
[Source: Created By Author]



Elevation

Figure 125: Elevation of block 3
[Source: Created By Author]



Section BB

Figure 126: Section of block 3
[Source: Created By Author]



Figure 127: Image of the wall openings in block 3
[Source: Taken By Author]

Wall openings



Figure 128: Image of the structural steel beams
[Source: Taken By Author]

Structural steel beams

The wall openings in the building are designed to enhance ventilation and natural lighting, crucial for Kerala's humid tropical climate. Large wooden-framed windows, often vertically pivoted or with horizontal louvers, allow ample light and air-flow while maintaining privacy. The use of arched doorways adds a traditional touch, characteristic of Kerala's vernacular architecture. Small ventilation slots near the ceiling are strategically placed to promote air circulation, preventing heat and moisture buildup. These well-designed openings contribute to the building's energy efficiency, ensuring a comfortable, naturally lit interior while preserving its aesthetic appeal and cultural heritage.

Steel is chosen for its high load-bearing capacity, durability, and resistance to environmental factors, such as moisture and termites, which can affect wood. These beams work in conjunction with wooden trusses and reinforced concrete to ensure overall structural stability. The integration of steel into the design allows for larger openings in walls and open floor plans, blending modern materials with traditional Kerala architecture for a sustainable and functional building structure.

Structural steel beams in the building were strategically placed in areas requiring additional strength and support, especially where large spans and heavy roof loads were necessary. These beams were used in the roof structure, where wide spans required steel's superior strength-to-weight ratio to support the roof without the need for excessive columns or intermediate supports. Steel beams were also incorporated in areas designed for open floor plans, enabling larger openings in the walls while reducing the need for load-bearing walls. This allowed for more spacious interiors with better natural light and ventilation. Additionally, steel was used in areas with high ceilings or larger floor areas, where traditional materials might not suffice to bear the load. The use of steel in these areas ensured structural stability and allowed the building to achieve a balance between modern engineering and the vernacular architecture of Kerala, integrating traditional materials like wood and brick with modern steel construction.

Roof

First floor slab

Section AA

Building axonometry

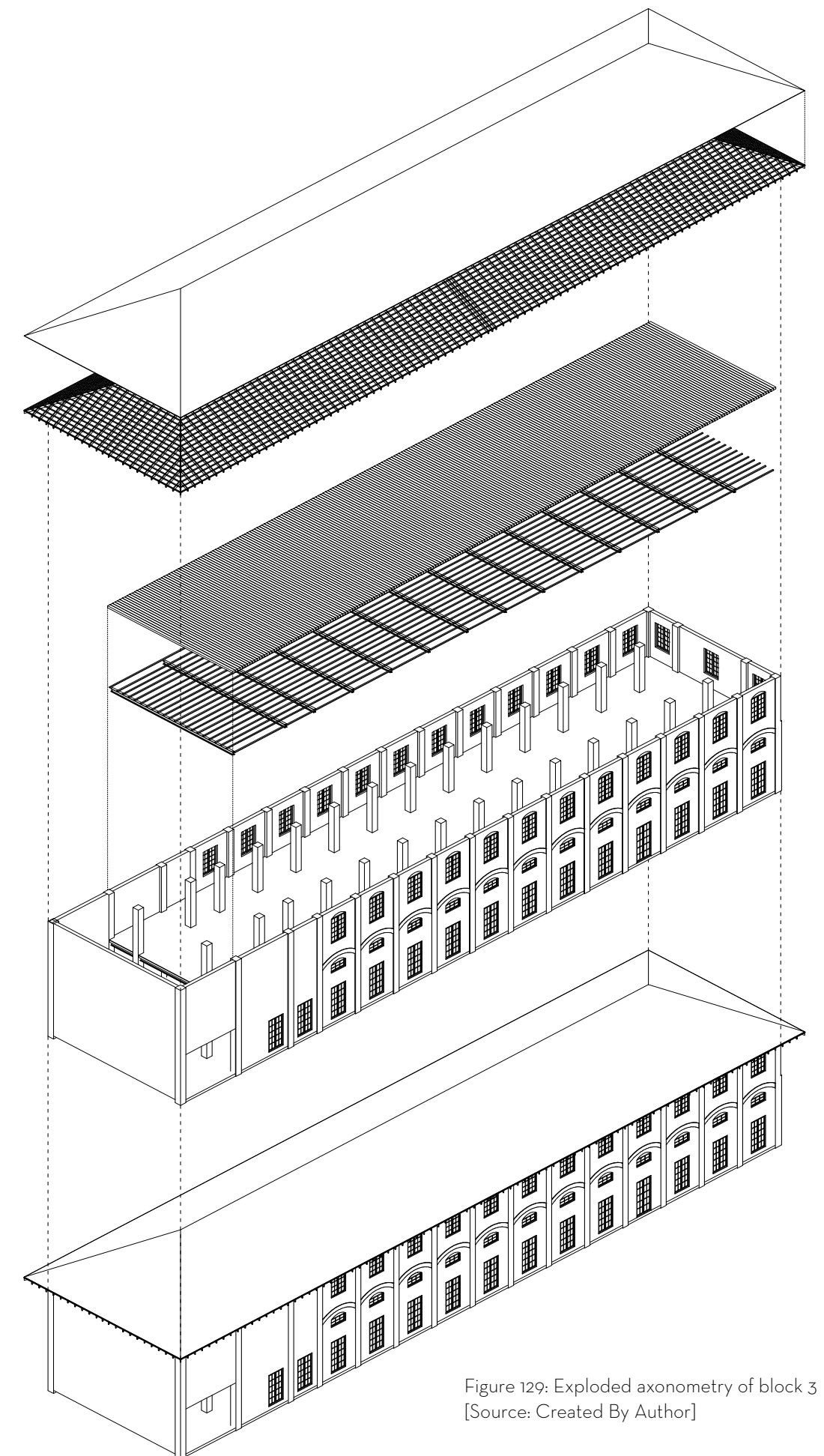


Figure 129: Exploded axonometry of block 3
[Source: Created By Author]

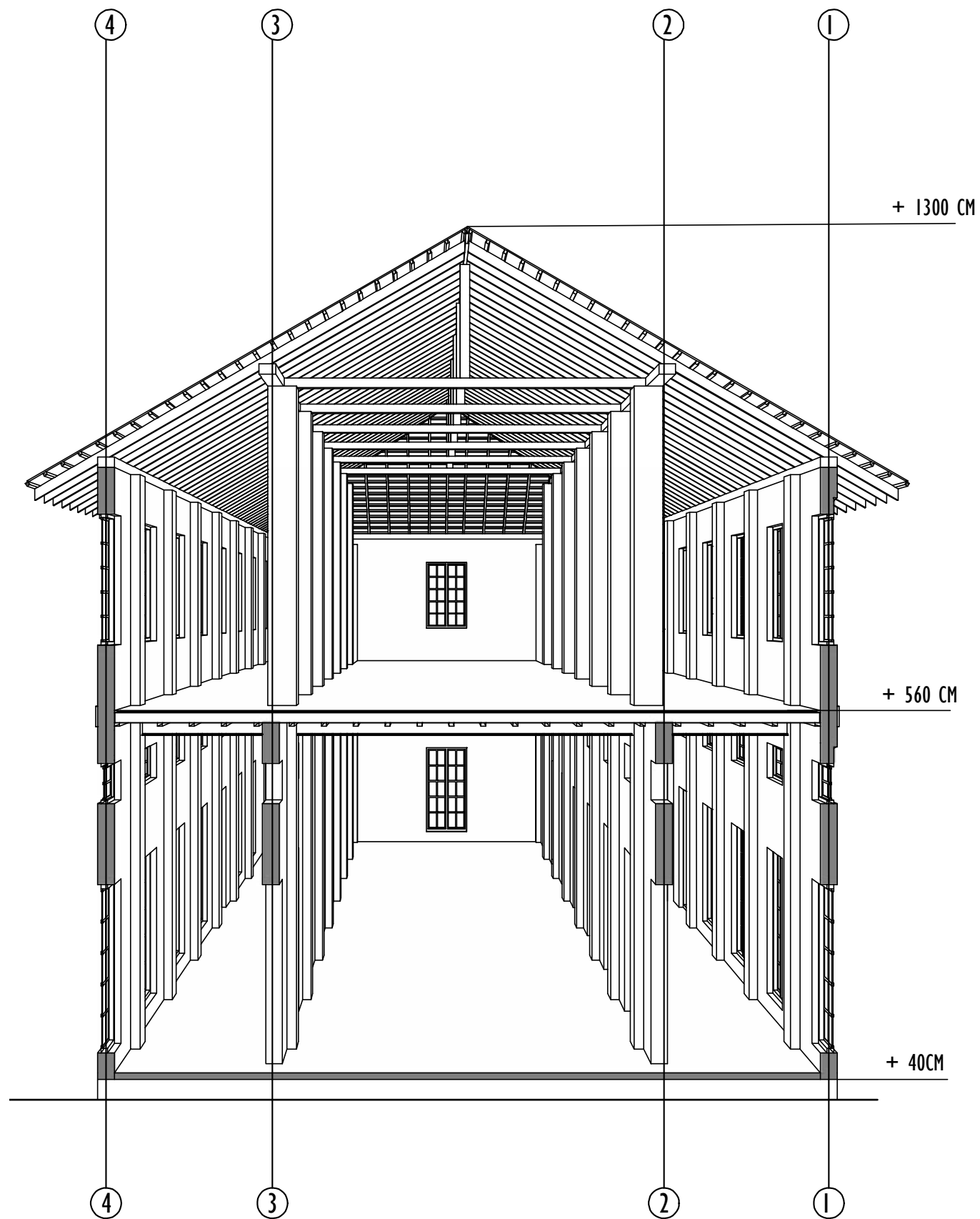


Figure 130: Perspective section of block 3
[Source: Created By Author]

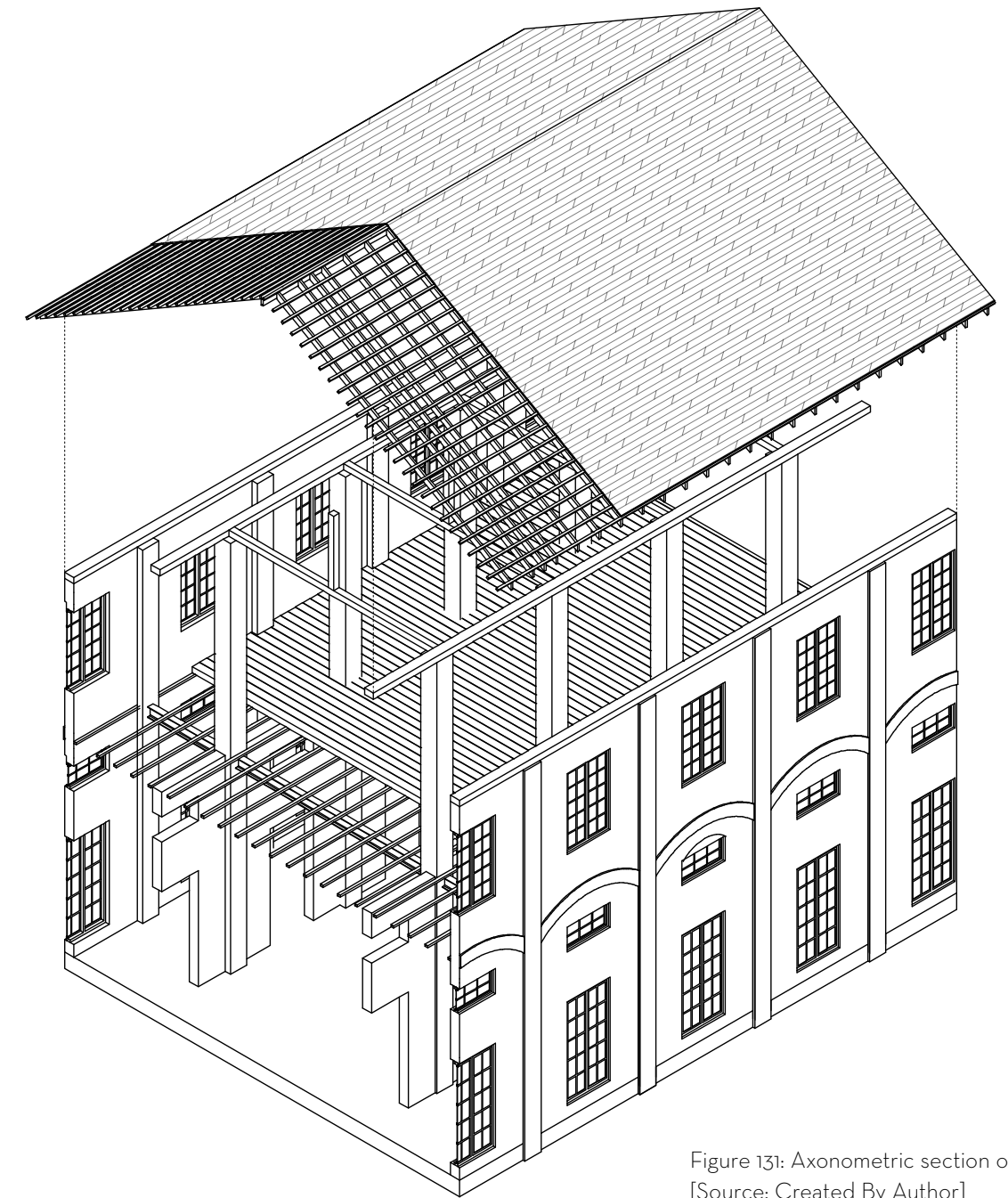


Figure 131: Axonometric section of block 3
[Source: Created By Author]

Mananchira building features I-beams resting on brick columns, providing the necessary support for the upper levels. These steel beams form the core framework that holds the entire load-bearing system in place. Running along the I-beams are steel purlins, which serve as horizontal supports for the next layer of construction. Bricks are carefully laid on the purlins to create a solid slab for the first floor, offering both structural strength and stability.

Above this, the building is capped with a hip roof, designed with a pitch of 30 degrees. The roof is supported by a wooden truss framework, which provides the necessary strength to bear the roof load. The wooden trusses also enhance the aesthetic of the building, complementing the overall architectural style. This combination of steel and timber elements allows for a balance of modern engineering with traditional craftsmanship, creating a structurally sound and visually appealing design.

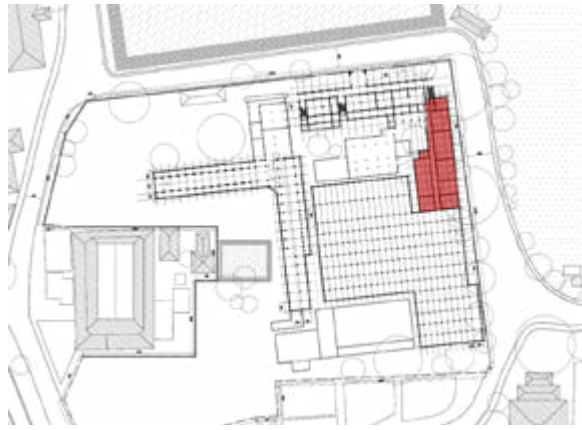


Figure 132: key plan of block 4
[Source: Created By Author]

Key plan



Figure 133: Image of the wall and roof connection
[Source: Taken By Author]



Figure 134: Image of king post truss roof frame
[Source: Taken By Author]

King post truss

1.3.4. Block 4

The office room block in the Comtrust building showcases a blend of functional design and traditional architectural elements. This block is characterized by its rectangular layout, efficiently divided into smaller rooms to accommodate administrative functions and workspaces. The walls are constructed using brick masonry, ensuring durability and insulation, while the high ceilings enhance ventilation and natural cooling, typical of vernacular architecture.

Roof System

The roof of the building is a remarkable example of traditional architecture, supported by a wooden truss system that reflects structural ingenuity and aesthetic appeal. The trusses are carefully crafted to distribute the weight of the roof evenly, ensuring durability and stability. Covered with Mangalore tiles, the roof provides effective insulation against the tropical climate by reducing heat absorption and allowing rainwater to flow efficiently. This roofing material, combined with the truss framework, is a hallmark of vernacular architecture, demonstrating an understanding of local climatic conditions.

Enhancing the roof's functionality and elegance are ornamental brackets and projected eaves, which provide structural support while adding decorative elements to the building's facade. These features not only protect the walls from rainwater but also contribute to the architectural character of the structure. Ventilators integrated into the roof design improve airflow, promoting natural cooling and ventilation within the interior spaces.

The thoughtful integration of traditional materials like wood and tiles with practical construction techniques underscores the building's historical significance and timeless appeal. The design seamlessly blends functionality with artistic detailing, creating a roof system that is not only structurally robust but also an essential part of the building's architectural identity.

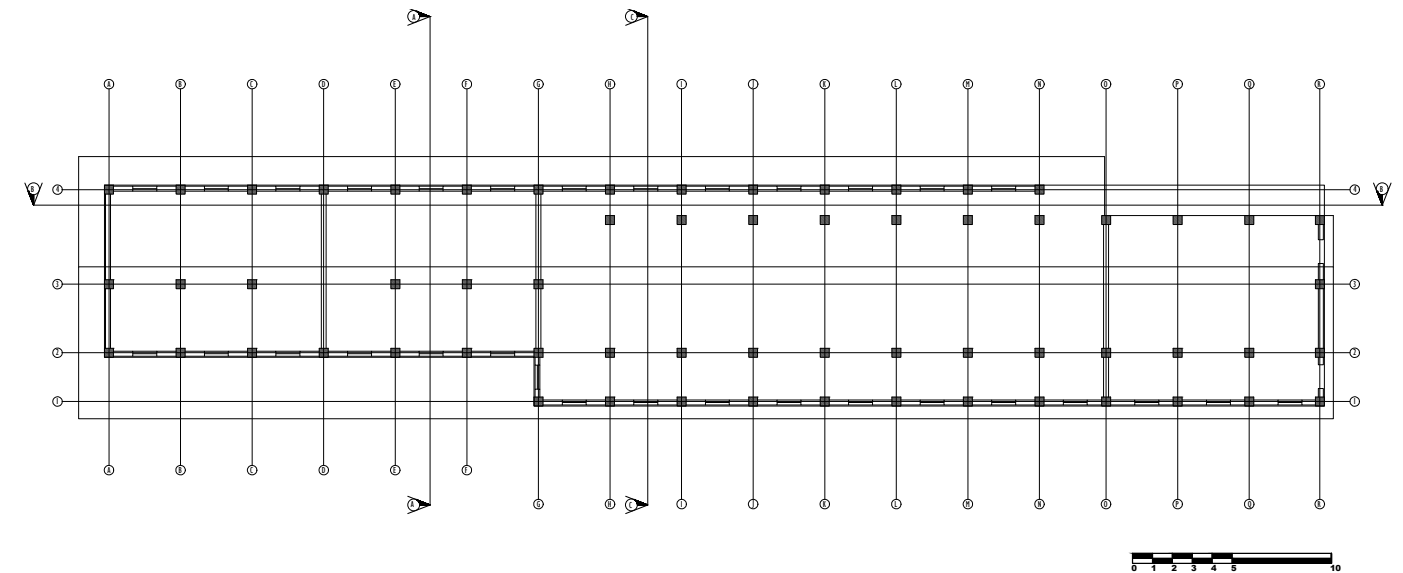


Figure 135: Ground floor plan of block 4
[Source: Created By Author]

Floor plan

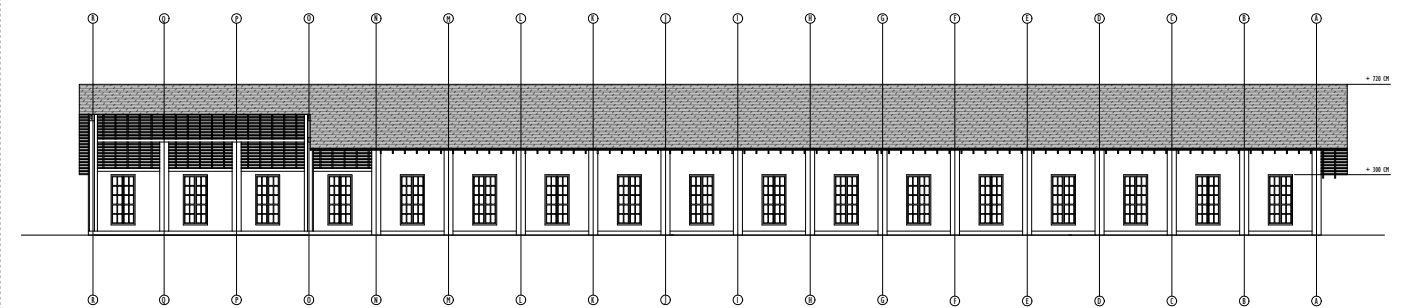


Figure 136: Elevation of block 4
[Source: Created By Author]

Elevation

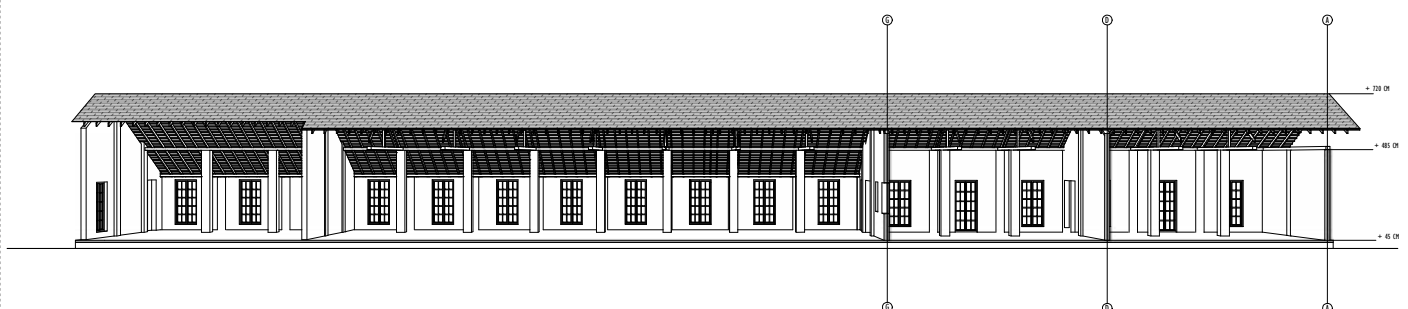


Figure 137: Section of block 4
[Source: Created By Author]

Section B



Figure 138: Image of an opening in block 4
[Source: Taken By Author]



Figure 139: Image of a window in block 4
[Source: Taken By Author]



Figure 140: Schematics of window frames in block 4
[Source: Created By Author]

less appeal. The design seamlessly blends functionality with artistic detailing, creating a roof system that is not only structurally robust but also an essential part of the building's architectural identity.

Windows

The office room block in the building exemplifies a well-thought-out architectural design, combining functionality and aesthetic appeal. The windows in this block are predominantly large, horizontally pivoted designs, carefully placed to maximize natural light and promote cross-ventilation. This creates a comfortable, airy working environment suitable for the tropical climate. These windows are framed with timber, a material chosen not only for its durability and resistance to wear but also for its ability to enhance the building's aesthetic charm. The shutters, also made of timber, are designed to complement the overall style while ensuring long-lasting performance.

The flooring is another notable feature, crafted from a combination of wood and stone. This selection reflects a utilitarian approach, offering both robustness and ease of maintenance while maintaining a timeless elegance. The use of stone ensures durability in high-traffic areas, while wood adds warmth and a traditional touch, aligning with the building's architectural style.

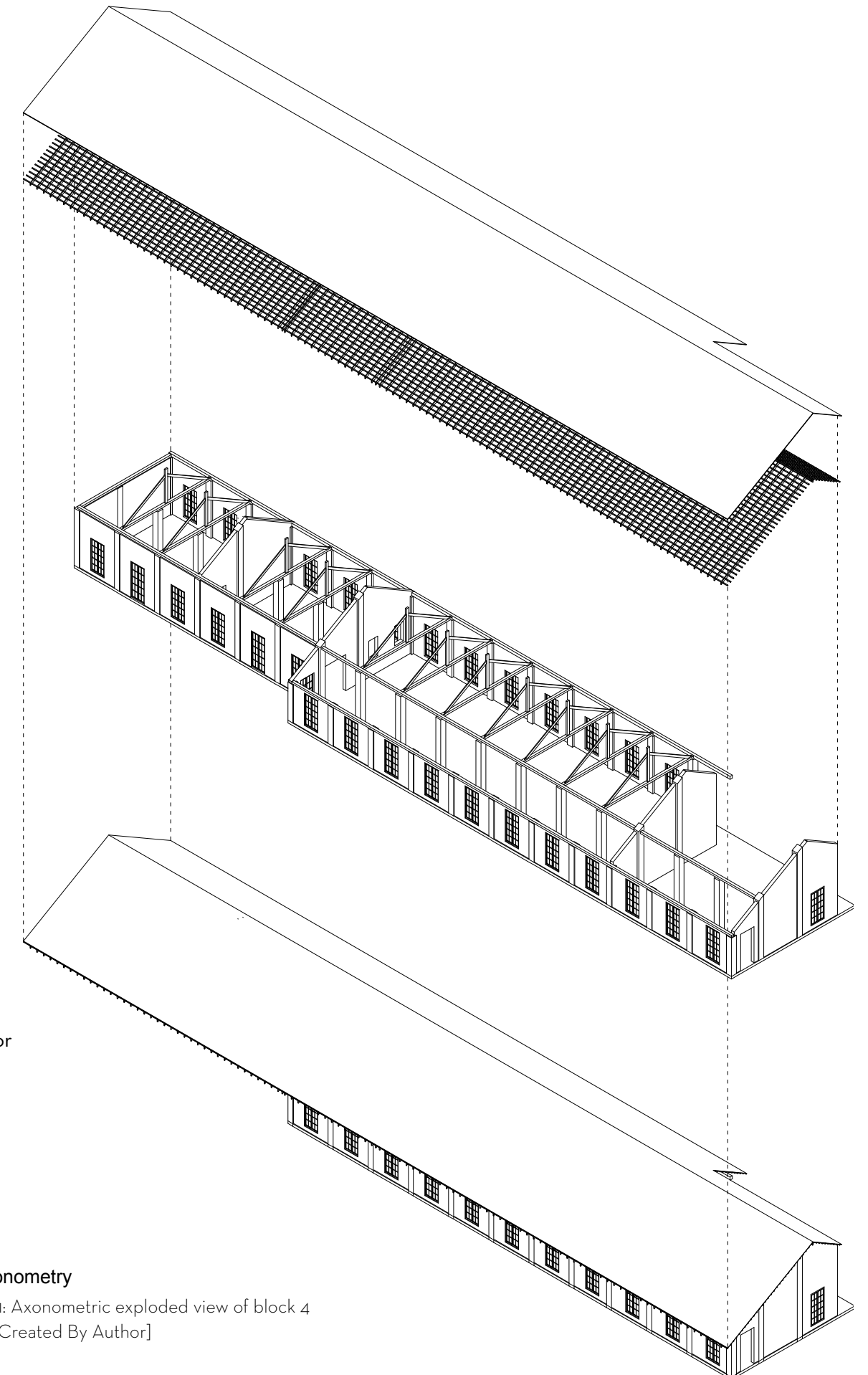
The design seamlessly integrates traditional materials like timber and stone with practical architectural principles, emphasizing functionality while preserving historical significance. This balance between practicality and beauty highlights the thoughtful planning and craftsmanship that define the building, ensuring its continued relevance and appeal as a functional workspace with timeless charm.

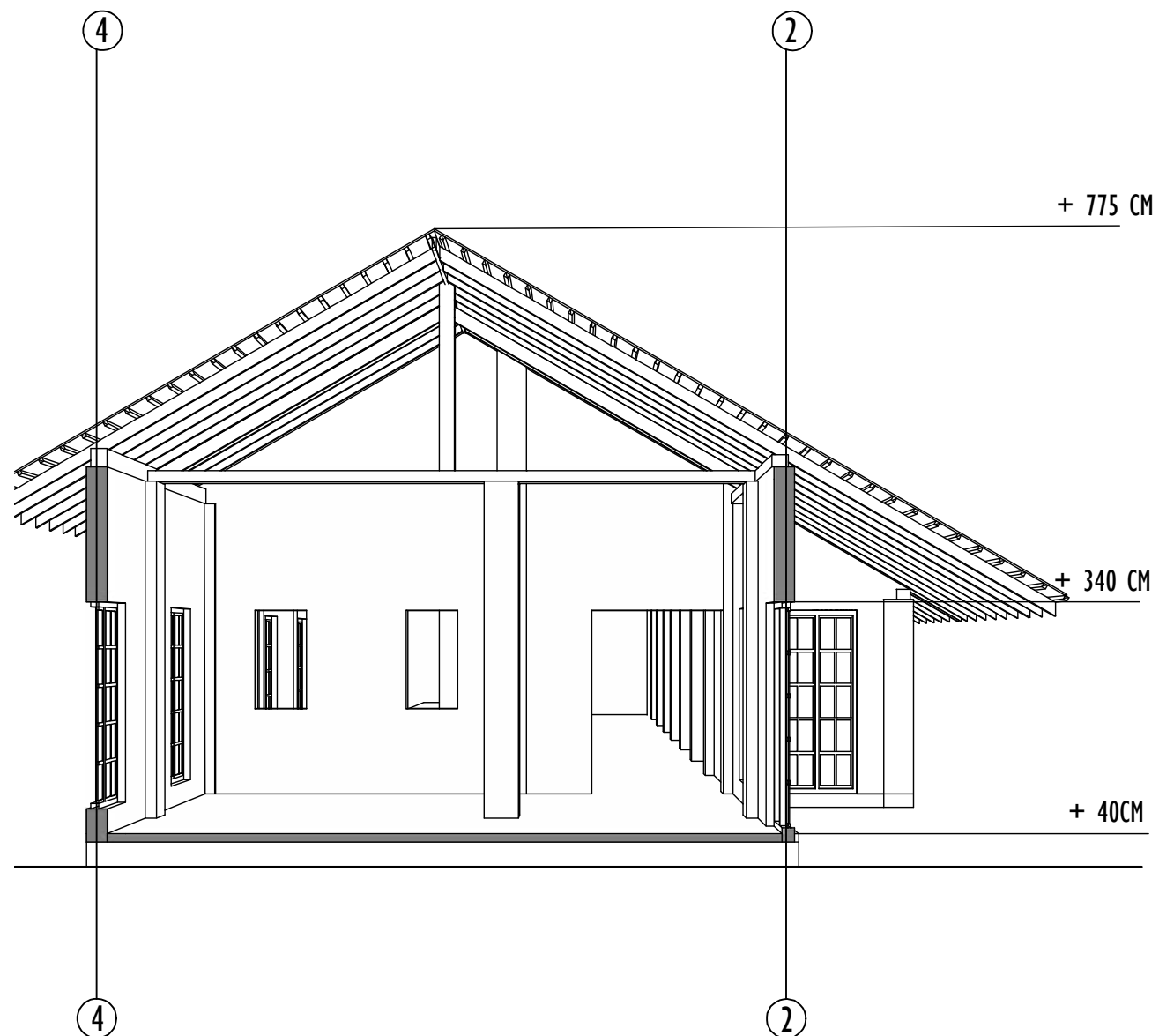
Roof

Ground floor

Building axonometry

Figure 141: Axonometric exploded view of block 4
[Source: Created By Author]





Section A

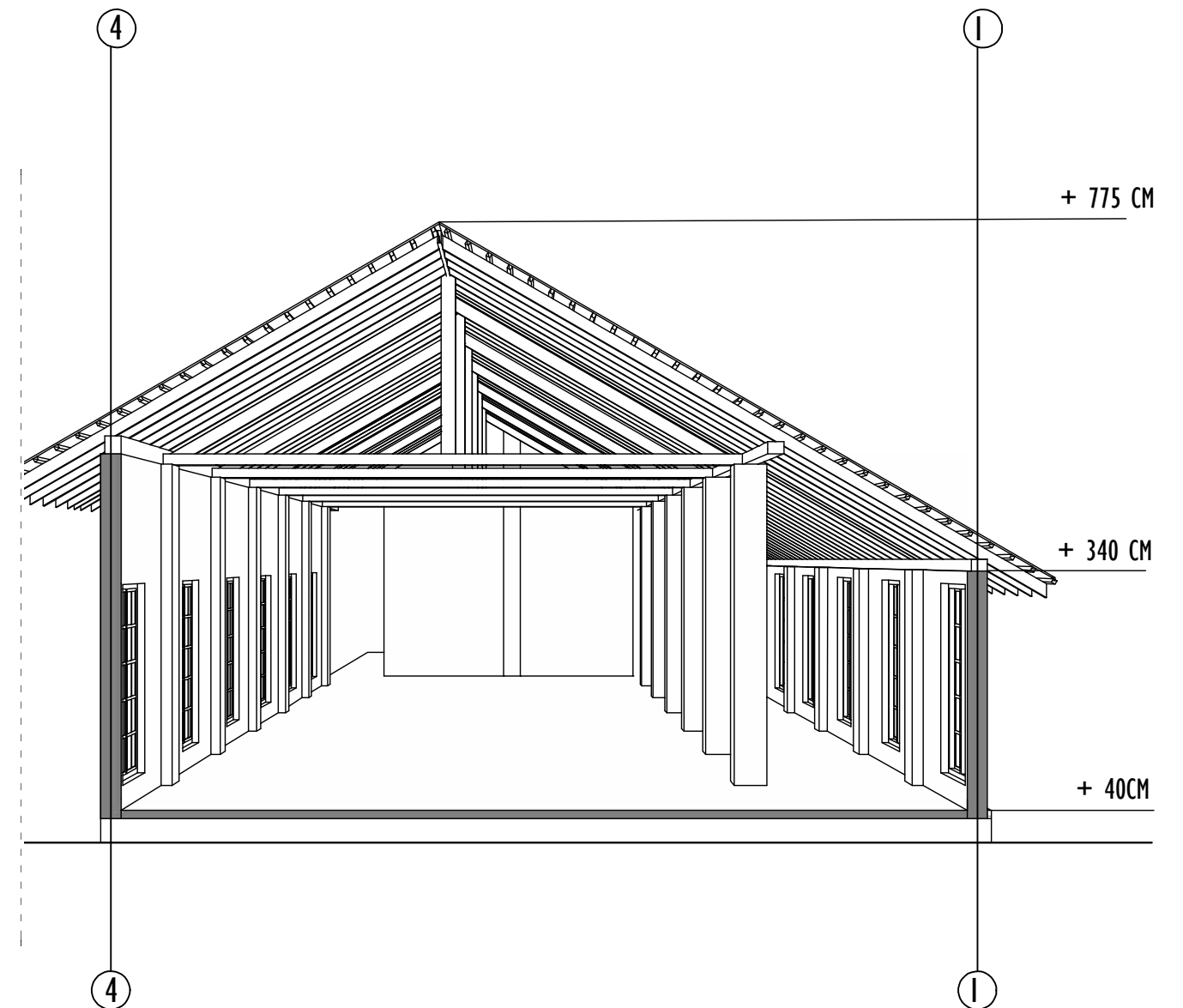
The walls of the office room block in the building are constructed using brick masonry, a material choice that ensures structural stability, durability, and effective insulation. Bricks not only enhance the building's functional performance but also align with its traditional architectural aesthetic, blending seamlessly into the overall design. Their resistance to heat and moisture makes them particularly suited to the tropical climate, offering long-lasting protection against environmental elements.

Inside the block, timber partitions play a key role in defining the interior spaces. These partitions add warmth and natural elegance to the rooms, while their inherent flexibility allows for easy reconfiguration of the layout. This adaptability en-

elegance to the rooms, while their inherent flexibility allows for easy reconfiguration of the layout. This adaptability ensures the space can meet a variety of functional needs over time, whether for administrative purposes or other uses.

The integration of brick masonry and timber elements showcases the thoughtful use of materials and design, combining practicality, adaptability, and aesthetic appeal in a harmonious architectural solution.

Figure 142: Perspective section of block 4
[Source: Created By Author]



Section C

The office room block of the building is designed with verandas and overhangs that enhance both functionality and aesthetics. These architectural elements provide shaded spaces that reduce direct exposure to rain and sun, ensuring the longevity of the walls, windows, and overall structure. By preventing weather-induced wear and tear, the verandas and overhangs improve the building's durability and contribute to a more comfortable indoor environment. Furthermore, they serve as transitional spaces that blend the indoor and outdoor areas, adding to the visual appeal and creating welcoming zones for social interaction or relaxation.

The roof system is another significant feature, supported by wooden trusses and covered with Mangalore tiles. This combination not only complements the block's traditional architectural style but also provides practical benefits. The roof ensures effective insulation, keeping the interiors cool in the tropical climate, and facilitates efficient rainwater drainage, preventing water accumulation. The wooden trusses showcase skilled craftsmanship, adding structural strength and elegance to the roof's design.

Figure 143: Perspective section of block 4
[Source: Created By Author]

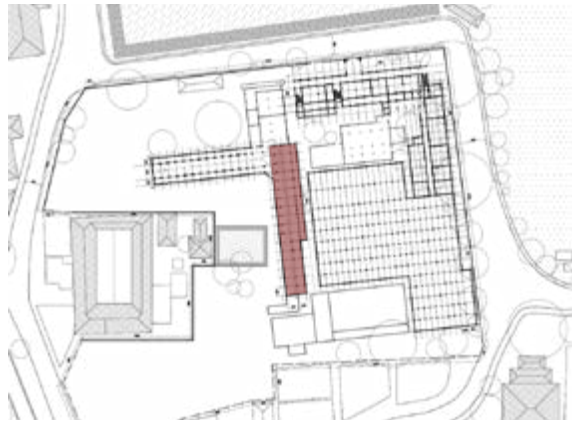


Figure 144: key plan of block 5
[Source: Created By Author]

Key plan



Figure 145: Image of the circular windows
[Source: Taken By Author]

Round clerestory window



Figure 146: Image of the column base
[Source: Taken By Author]

Coloumn detail

1.3.5. Block 5

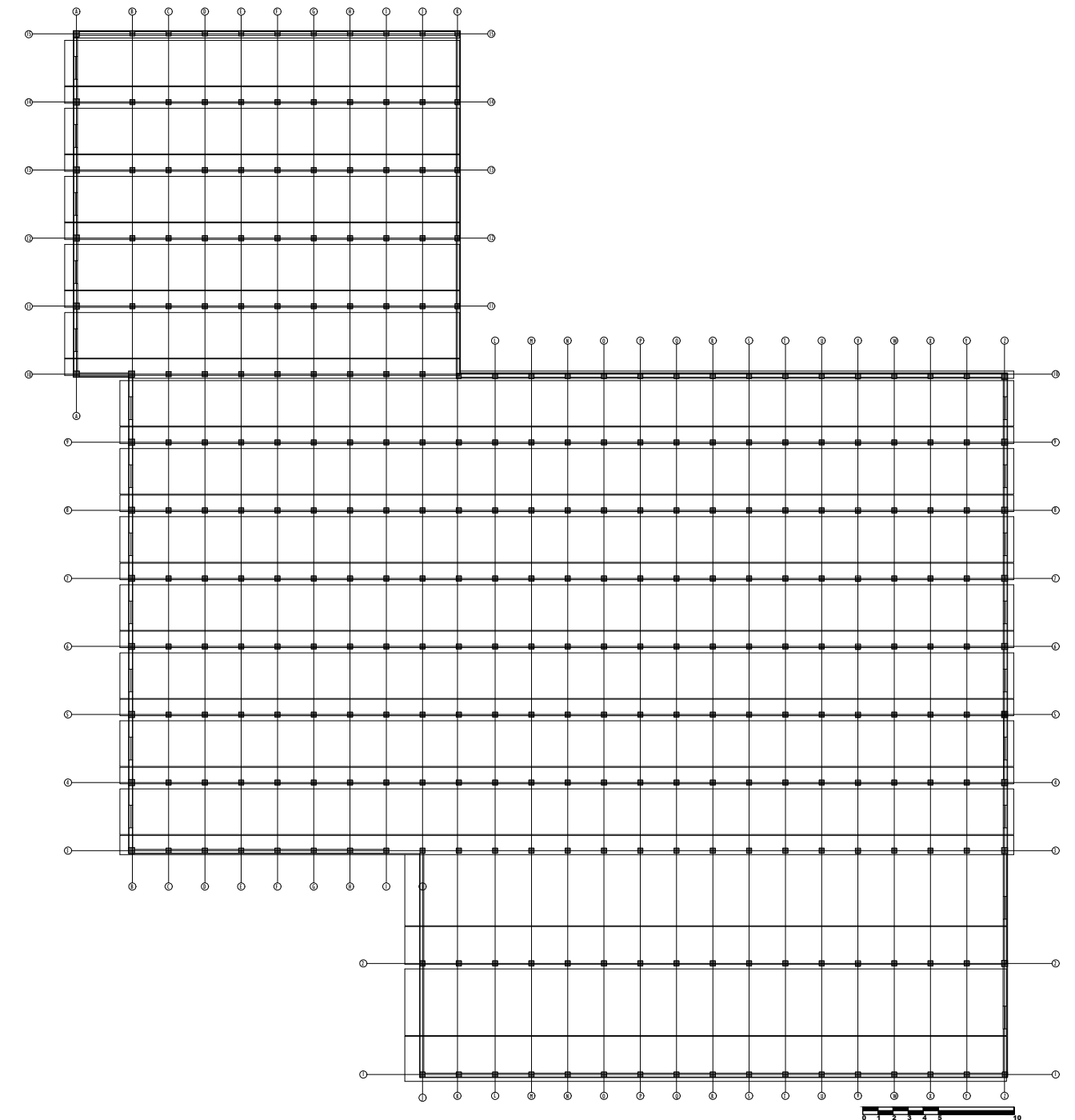
The weaving block of the building incorporates several distinct architectural features that balance both functionality and aesthetic appeal. The open floor plan is designed to accommodate large spaces essential for the weaving process. This layout allows for easy movement of equipment, workers, and materials, optimizing the workflow within the block and ensuring efficiency in the production process.

Round clerestory window

The circular pivoted windows in the building are a unique architectural feature that combines both function and aesthetic appeal. Designed with a pivot mechanism, they rotate around a central axis for easy opening and closing, allowing for controlled airflow and cross-ventilation, which is vital in the tropical climate. Their circular shape adds visual distinction to the building, while the timber frames enhance the window's durability and traditional charm. These windows provide natural light, reducing the need for artificial lighting, and contribute to energy efficiency by allowing sunlight to penetrate deeply into interior spaces. The glass panes maximize daylight while maintaining the building's overall aesthetic appeal.

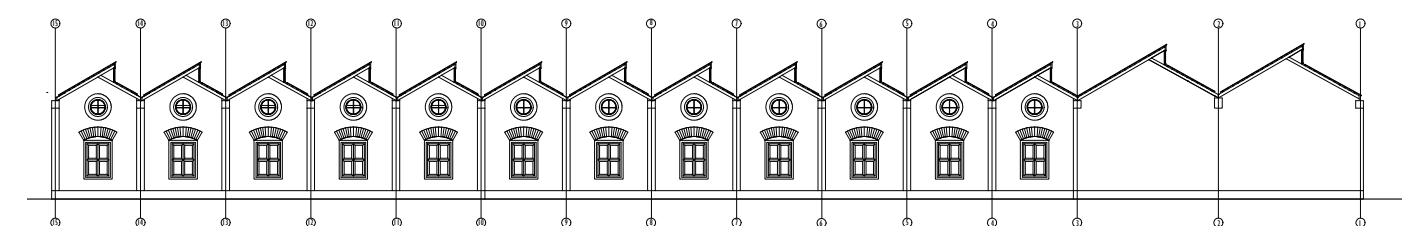
Coloumn detail

The columns in the building are constructed using brick masonry or a combination of brick and timber, ensuring structural stability and durability. They support the roof and upper floors, transferring loads to the foundation. Some columns feature decorative capitals, adding aesthetic value while maintaining functionality. This combination of strength and design enhances the building's architectural integrity.



Floor plan

Figure 147: Floor plan of block 5
[Source: Created By Author]



Elevation

Figure 148: Elevation of block 5
[Source: Created By Author]



Figure 149: Image of the saw tooth roof
[Source: Taken By Author]

Saw Tooth Roof detail

The sawtooth roof in the building is an exemplary architectural feature that integrates both functionality and aesthetics. Characterized by a series of angled sections, this roof design allows for the strategic placement of north-light windows, ensuring the building receives abundant natural light throughout the day. This design maximizes daylight while minimizing direct sunlight exposure, which could cause glare or overheating. By relying on natural light, the building reduces its dependency on artificial lighting, promoting energy efficiency and creating a comfortable, well-lit environment.

In addition to providing ample daylight, the sawtooth roof excels in promoting ventilation. The sloped, angled design allows hot air to rise and naturally escape through the upper sections of the roof, while cooler air is drawn into the lower parts. This creates a passive airflow system that enhances indoor air quality and maintains a comfortable indoor climate. The passive cooling system reduces the need for mechanical air conditioning, which is particularly beneficial in the tropical climate where the building is located. This sustainable approach minimizes energy consumption and lowers operational costs.

The roof's structural integrity is also an essential aspect of its design. Supported by either wooden trusses or steel framing, depending on the specific needs of the building, the sawtooth roof ensures durability and stability. These structural

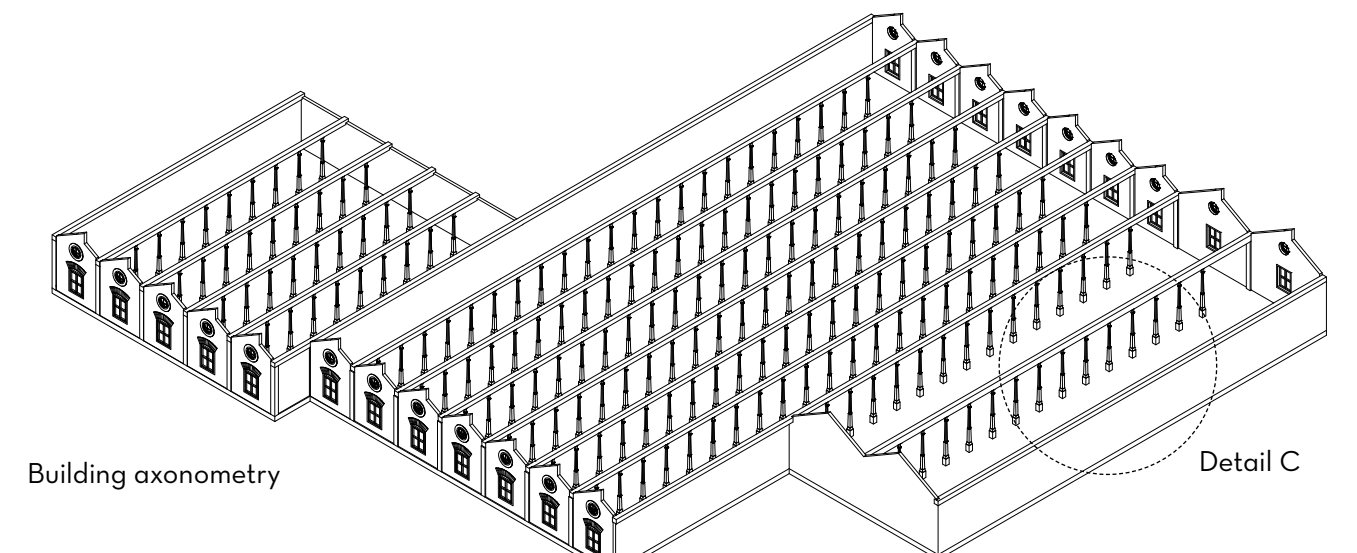
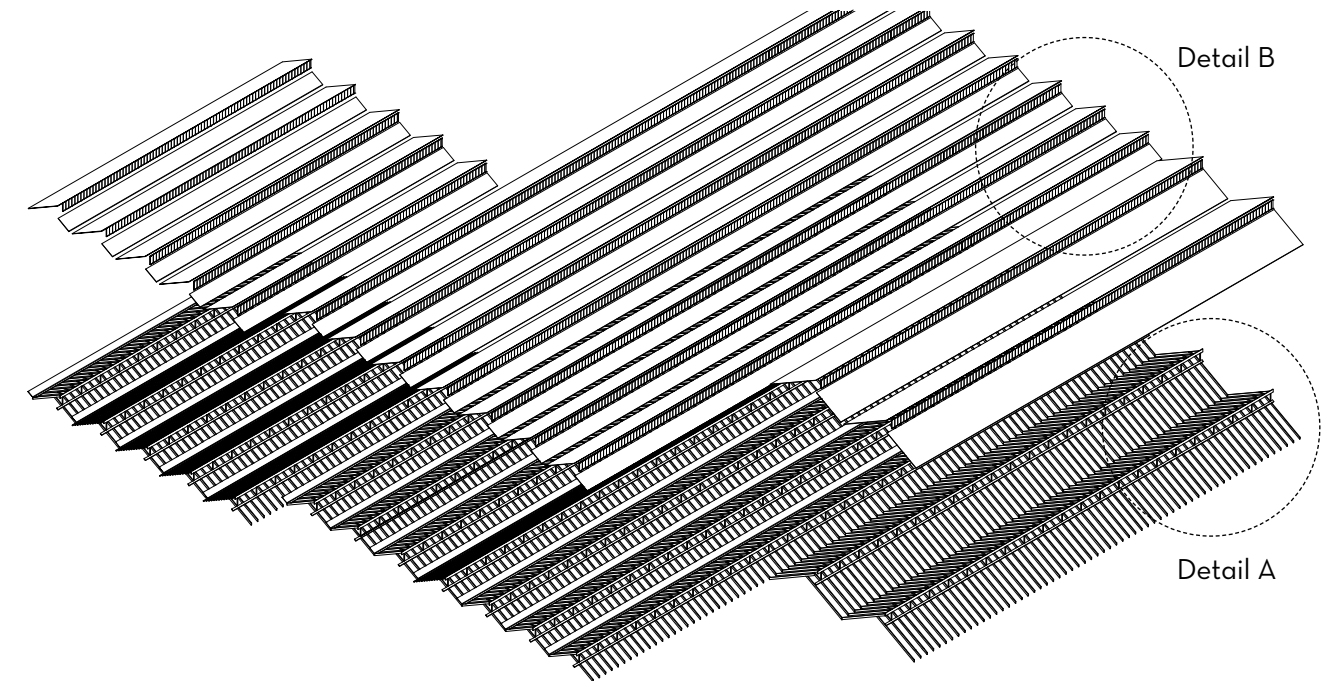
The roof's structural integrity is also an essential aspect of its design. Supported by either wooden trusses or steel framing, depending on the specific needs of the building, the sawtooth roof ensures durability and stability. These structural elements provide the necessary support for the roof's design, while also contributing to the building's aesthetic. The use of steel purlins across the structure adds to the strength and resilience of the roof, ensuring that it can withstand environmental stresses such as heavy rainfall and strong winds, common in the region.

The roofing material itself, Mangalore tiles, plays a vital role in the functionality and sustainability of the building. Known for their durability and ability to withstand the elements, Mangalore tiles provide excellent weather resistance, protecting the building from both rain and intense sunlight.

Their thermal insulation properties help regulate the building's internal temperature, ensuring comfort while reducing the need for mechanical cooling. The use of traditional materials like Mangalore tiles adds to the cultural relevance of the building, merging contemporary design with vernacular architectural practices.

Aesthetically, the sawtooth roof adds a dynamic visual quality to the building. The angular form of the roof creates a striking silhouette that contrasts with the more traditional, horizontal lines of the surrounding buildings.

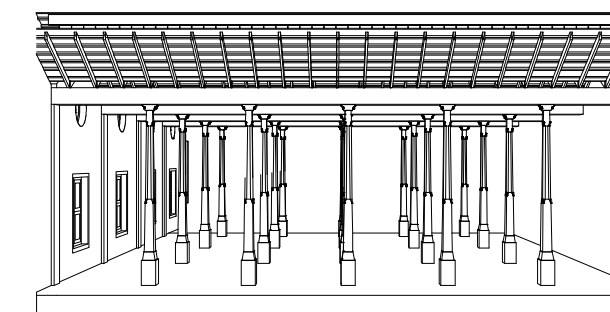
The repetition of the angled sections introduces rhythm and harmony to the overall architectural composition, giving the building a unique character. The geometric form of the sawtooth roof is both functional and expressive, contributing to the building's identity and standing out as a significant architectural feature in the urban landscape.



Building axonometry

Detail C

Figure 150: Exploded axonometry of block 5
[Source: Created By Author]



Section 1

Figure 151: Section 1 of block 5
[Source: Created By Author]



Section 2

Figure 152: Section 2 of block 5
[Source: Created By Author]

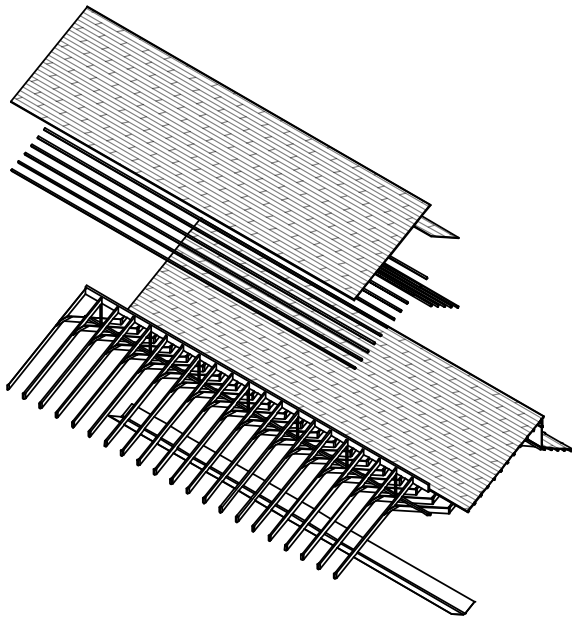


Figure 153: Detail 1 of block 5
[Source: Created By Author]

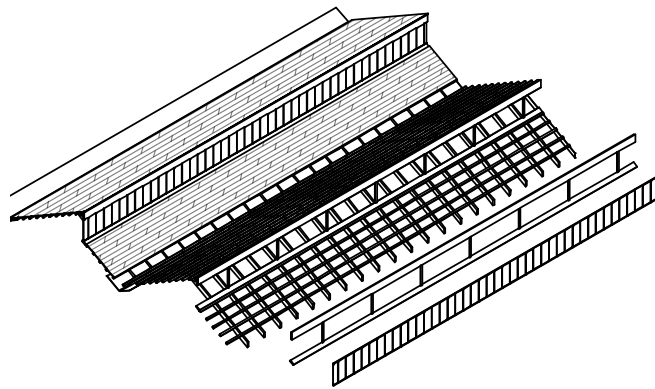


Figure 154: Detail 2 of block 5
[Source: Created By Author]

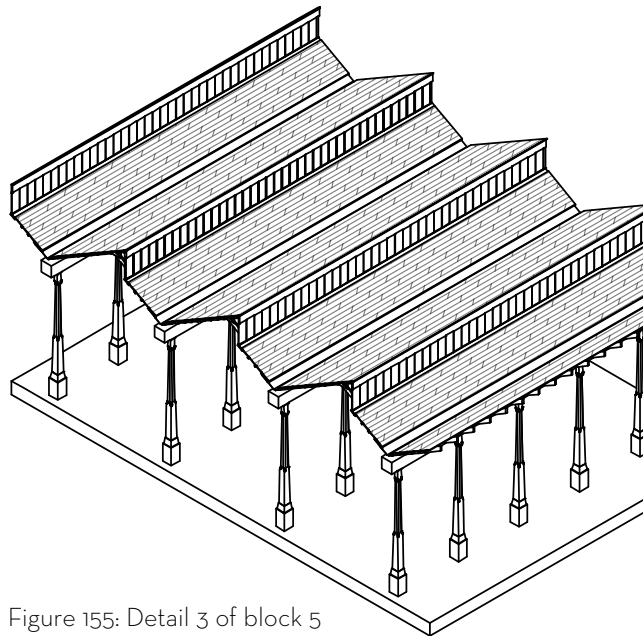


Figure 155: Detail 3 of block 5
[Source: Created By Author]

Detail A - The north light roof of the COMTRUST Mananchira building features a unique truss design, with each truss carefully engineered to provide structural support for the roof while allowing ample natural light to enter. At the junction where two trusses meet, a metal plate is installed at the bottom. This plate serves a critical function by facilitating the drainage of rainwater, directing it away from the truss joints to prevent water accumulation that could lead to structural damage over time.

The metal plate is strategically positioned to ensure efficient water flow and to protect the integrity of the roof structure. This design choice not only enhances the roof's durability but also ensures that the trusses remain free from moisture-related damage, which could affect their strength and longevity. The integration of this

Detail B - The North light truss system in the building's roof design integrates glazed windows fixed onto a strong steel framework. The steel trusses are strategically placed to support the roof while ensuring structural stability, while the glazed windows allow natural light to filter into the interior. These windows are securely mounted within the steel framework, promoting durability and energy efficiency. Additionally, a metal plate is incorporated at the joint of two trusses, directing rainwater away to prevent accumulation and protect the roof's integrity. This design combines modern engineering with aesthetic

Detail C - The building features composite columns, which combine wood and a brick base to create a strong, efficient support system for the structure. These columns are designed to carry significant loads, particularly for the long spans of wooden beams that form the framework of the roof and upper floors. The brick base provides a sturdy, stable foundation, ensuring the column's ability to withstand vertical and lateral loads. The use of wood in the upper portion of the columns complements the traditional aesthetic of the building while maintaining the necessary strength for the beam supports. The wooden columns are carefully engineered to interact with the brick base, creating a balanced structure that integrates both materials. This combination of wood and brick not only enhances the building's structural integrity but also ties



Figure 156: Image of the looming machines used in the comtrust building
[Source: Taken By Author]

Chapter 4

Design Development

4. Design Development

1. Introduction

1.1. Design Approach

The central idea driving the development of this design was to demonstrate how adaptive reuse can transform a historically significant building into a vibrant and meaningful part of society. The goal was to showcase how breathing new life into such structures, while respecting their historical importance, can lead to a positive societal impact. By repurposing the building, the project serves as a model for preserving industrial heritage, inspiring similar initiatives, and encouraging communities to value and protect their shared history. The proposal not only benefits the immediate stakeholders but also enhances the well-being of the local community, fostering broader societal benefits.

The primary aim was to restore and preserve the essence of the Comtrust building while seamlessly integrating modern design interventions to address the needs of today. This approach ensures that the building retains its historical identity while being functional and accessible for contemporary uses. Sustainability, functionality, and community engagement were the three main guiding principles throughout the design process.

To address these intentions, the project has been carefully planned with strategic space allocation. A significant portion of the building is dedicated to functioning as a textile recycling and production unit. This facility collects raw materials, such as discarded fabrics, from nearby areas and transforms them into new products through upcycling and recycling processes. This not only promotes sustainable practices but also supports the local economy and reduces environmental impact. Additionally, spaces like green product outlets have been incorporated into the design to showcase and sell eco-friendly products, making sustainability a visible and integral part of the project.

Public engagement and interaction were prioritized through the inclusion of gathering spaces and open areas, which are distributed throughout the project. These areas are designed to enhance visibility and accessibility while fostering a

sense of community involvement. The integration of such spaces ensures that the project becomes a dynamic hub for social interaction and collaboration.

Another vital aspect of the project is the museum, which plays a key role in preserving and showcasing the historical significance of not only the Comtrust building but also the surrounding city. This space serves as a bridge between the past and present, offering visitors a chance to reconnect with their forgotten industrial heritage. The museum provides an educational experience that raises awareness about the building's history and the broader importance of preserving industrial heritage.

Given the complexity and scale of implementing such ideas, the project has been structured into a phased development plan to ensure practical execution.

Phase 1 focuses on establishing the textile recycling and production unit, laying the foundation for the project's sustainable operations.

Phase 2 introduces the museum and public areas, creating a platform for cultural and community engagement while building awareness about the project's objectives.

Phase 3 involves opening the entire building for public access, allowing visitors to explore and interact with the project in its entirety. This phase ensures that public access is integrated without disrupting the building's core functions, offering an immersive and comprehensive understanding of the project's purpose. This phased approach allows the project to evolve systematically while addressing immediate priorities and gradually building momentum. By preserving the historical character of the Comtrust building and integrating modern sustainable practices, the project exemplifies how adaptive reuse can create meaningful change, connect communities with their heritage, and meet the needs of the present and future.






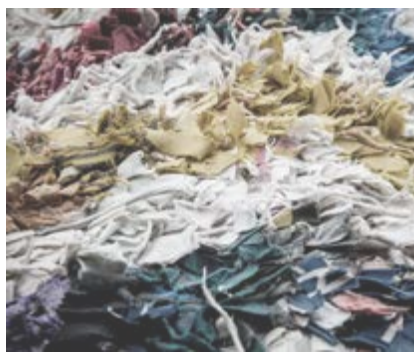



1.2. Proposal Structure

1.2.1. Revitalization of industrial heritage :
Adaptive refit for urban change

This project is designed to celebrate the historical significance of the Comtrust Mill, foster community engagement, and promote sustainability through thoughtful and adaptive reuse. At its heart is a small production unit dedicated to crafting designer clothes and accessories from recycled fabrics, embodying sustainable practices. To strengthen community ties, the design integrates versatile event spaces, co-working areas, and exhibition zones that encourage

collaboration and creativity. Local artisans are honored with dedicated galleries where they can display their skills and sell their products, while a museum preserves and narrates the mill's rich history, connecting visitors to its cultural and industrial legacy.

Spaces		
Historic significance	Community engagment	Sustainability
Textile Muesum	Event areas	Sustainable wear
Exhibition spaces	Co working areas	Up cycling
Workshop Areas	Leasure areas	Eco craft market
Knowledge hub	Artist galleries	

Collection	Colloboration	Recycling and upcycling	Exhibition and supply
<div><p>Figure 157: Kudumbashree ladies [Source: https://tinyurl.com/4yy6ja98]</p></div> <div><p>Figure 158: Textile wastes [Source: https://tinyurl.com/y4vykwpe]</p></div> <div><p>Figure 159: Textile factory units [Source: https://tinyurl.com/mr4md9es]</p></div> <div><p>The Kudumbashree women's community in Calicut, with its 314 tailoring units and strong local network, serves as a key source of fabric scraps and discarded textiles. Their reach within the community makes them ideal collection points for raw materials, supporting upcycling and recycling initiatives.</p><p>Textile waste from landfills can be a valuable raw material source, as Calicut's growing fashion industry generates significant fabric waste. Kerala, as a state, produces approximately 11,000 tons of textile waste annually, highlighting the need for sustainable waste management solutions.</p><p>The Tirupur clothing industry, one of South India's largest textile hubs, generates substantial textile waste from its vast garment production. Known as the "Knits Capital of India," it produces fabric offcuts and unused materials, which can be recycled and upcycled to provide sustainable raw materials for your project.</p></div>	<div><p>Figure 160: NIFT Exhibition [Source: https://tinyurl.com/yc6pwwhu]</p></div> <div><p>Figure 161: Local artisans [Source: https://tinyurl.com/492rxbkv]</p></div> <div><p>NIFT and other fashion institutes in Calicut, such as INIFD Calicut and Vogue Institute of Fashion Designing, with their talented young designers, offer the opportunity to collaborate with experienced artisans from calicut in producing designer clothing.</p></div>	<div><p>Figure 162: Textile recycling [Source: https://tinyurl.com/436ba5kz]</p><p>Recycling transforms old fabrics into new materials, reducing waste and conserving resources.</p></div> <div><p>Figure 163: Textile upcycling [Source: https://tinyurl.com/mvmk3tdr]</p><p>Upcycling repurposes old fabrics into new, higher-value items, reducing waste creatively.</p></div>	<div><p>Figure 164: Upcycled extile exhibition [Source: https://tinyurl.com/3rfzxmyz]</p><p>Exhibiting upcycled and recycled products raises awareness of sustainable fashion and eco-friendly practices.</p></div> <div><p>Figure 165: Clothing on market [Source: https://tinyurl.com/5585fec8]</p><p>These products can be supplied to retail and international markets, promoting sustainable fashion globally.</p></div>

1.2.2. Functional Workflow

Processing

Museum

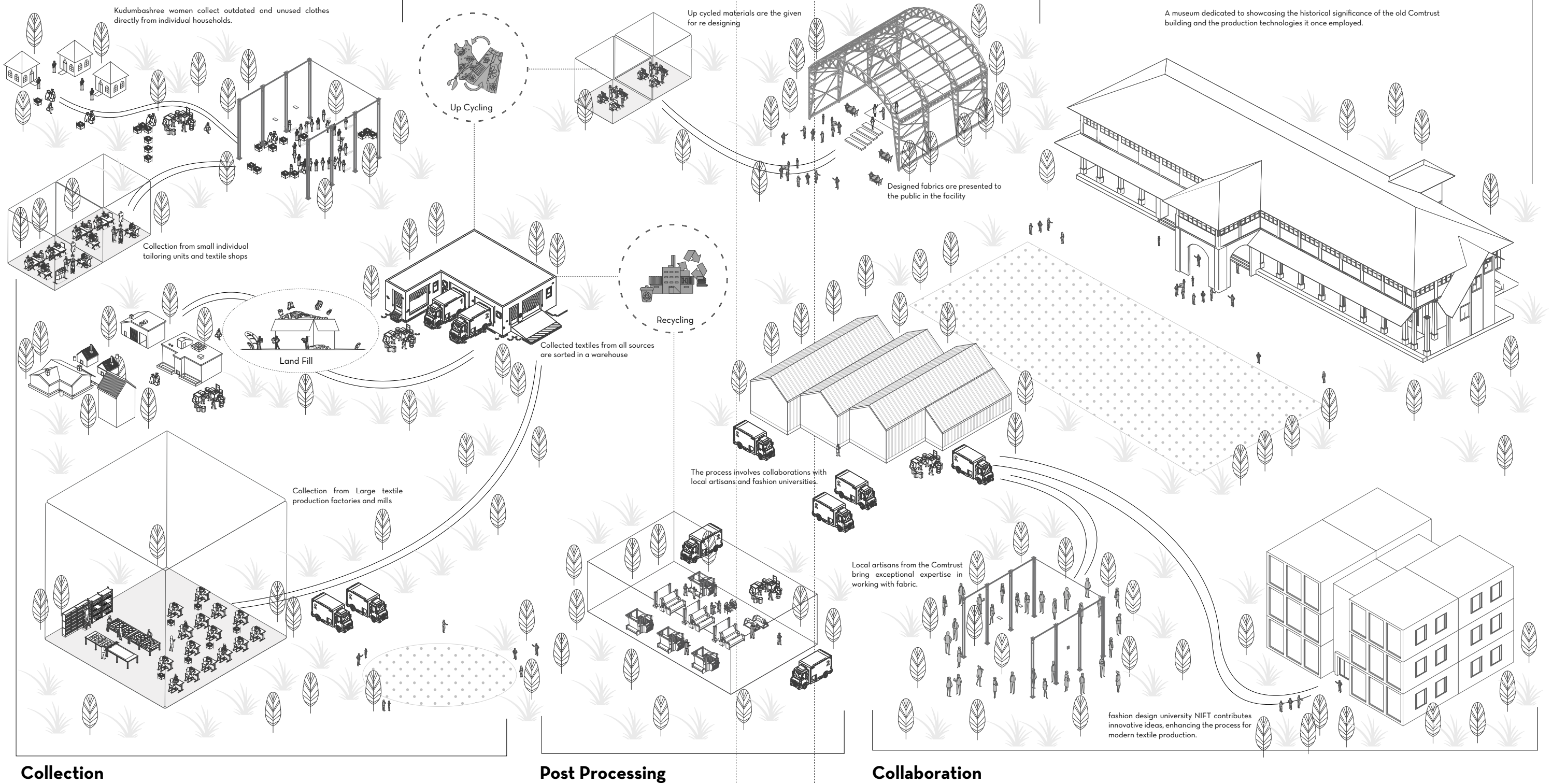


Figure 166: Figure showing the functional workflow of the concept
[Source: Created by Author]

1.3. Site Zoning

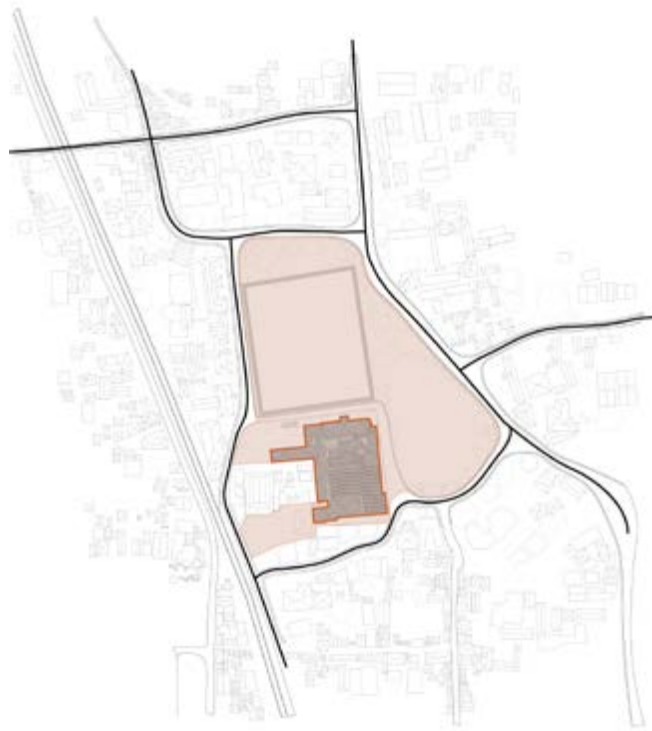
1.3.1. Transformation of Roadfront into Pedestrian-Friendly Landscape



To accommodate the existing traffic conditions, modifications have been implemented to enhance accessibility and aesthetics. The road in front of the Comtrust Mananchira building has been transformed into a pedestrian-only zone, designed as a landscaped front yard. This change prioritizes pedestrian movement, creating a safe and inviting environment for visitors while reducing vehicle congestion in the area. The newly designed space integrates greenery, pathways, and seating areas, promoting a sense of community and connection with the historical architecture of the building. By converting the road into a pedestrian-friendly landscape, the area encourages foot traffic, fosters social interaction, and highlights the building's cultural and architectural significance.

Figure 167: Figure showing the transformation of a road to a completely pedestrian walkway
[Source: Created by Author]

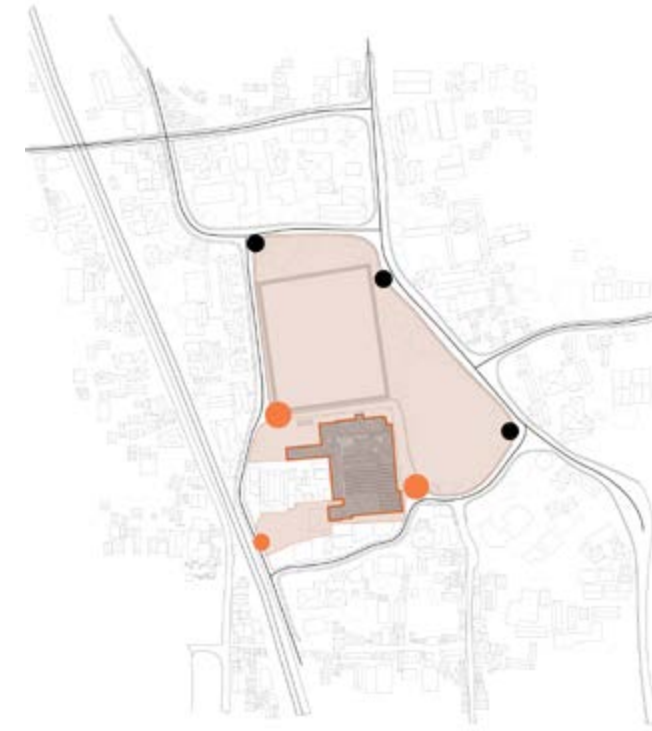
1.3.2. Integrating Two Fenced Sites into a Unified Space



The proposal envisions merging two currently fenced sites into a unified space, removing physical barriers to create a seamless connection. This integration allows visitors to experience the area as one cohesive environment, blending the Comtrust building with its surrounding garden. By transforming the site into an open, interconnected landscape, the design highlights the building as the focal point while encouraging exploration and interaction. This approach enhances accessibility, fosters a sense of openness, and strengthens the connection between the architecture and its natural surroundings. The unified layout promotes sustainability, aesthetic harmony, and integrates the site into the larger urban green fabric.

Figure 168: Figure showing the integration of two fenced sites to a single open compound
[Source: Created by Author]

1.3.3. Enhancing Accessibility with New Entrances

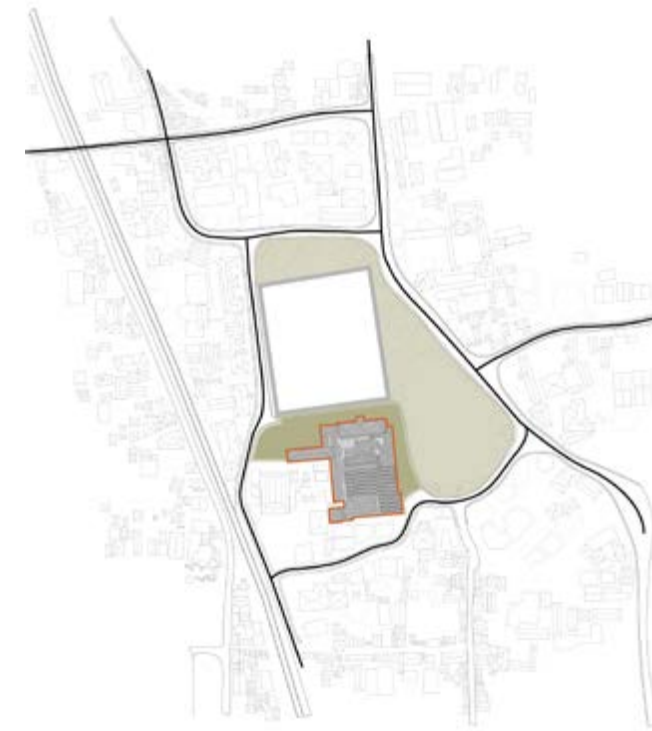


Three new entrances are proposed for the integrated Mananchira Park and Comtrust building site, in addition to the existing ones, to improve accessibility and connectivity. These new access points are strategically located at key urban nodes, facilitating seamless entry from important areas.

By enhancing pedestrian flow and inviting the public to engage with the space, the new entrances foster inclusivity and strengthen the site's connection to its urban context. This intervention not only makes the site more accessible but also highlights the cultural and recreational value of the area, promoting a unified urban green space for the community.

Figure 169: Figure showing the new proposed entrance
[Source: Created by Author]

1.3.4. Extending Mananchira Park Landscaping to Comtrust Building

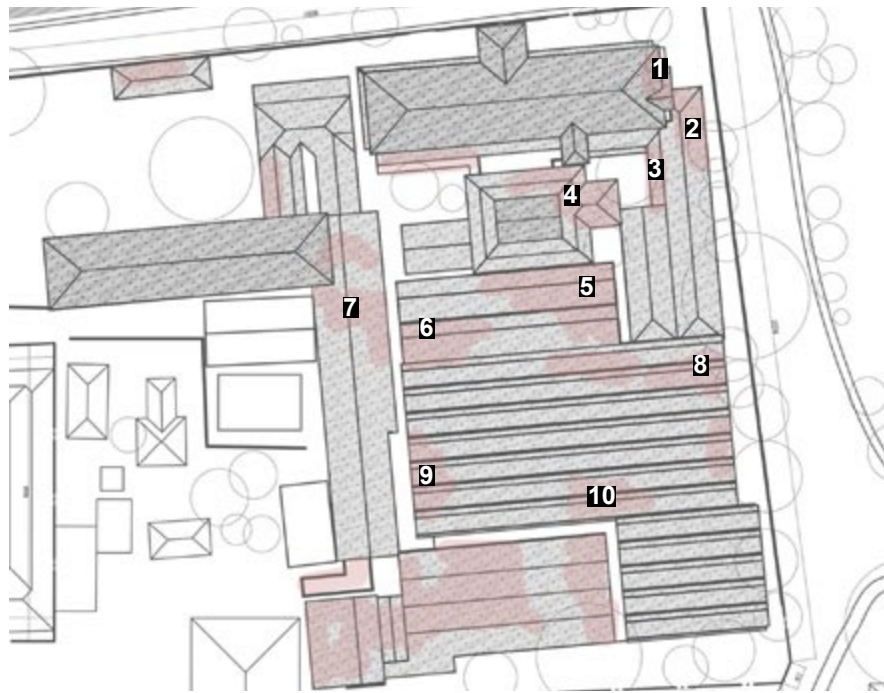


The existing Mananchira Park landscaping is proposed to be extended to the Comtrust building site, creating a seamless connection between the two areas. This integrated design allows people to move freely across both sites, enjoying the landscape as a unified urban green space.

By linking these two iconic locations, the extension enhances accessibility, fosters community interaction, and strengthens their inclusion within the urban green fabric. This cohesive approach not only highlights the historical and architectural significance of both sites but also contributes to a sustainable and pedestrian-friendly urban environment.

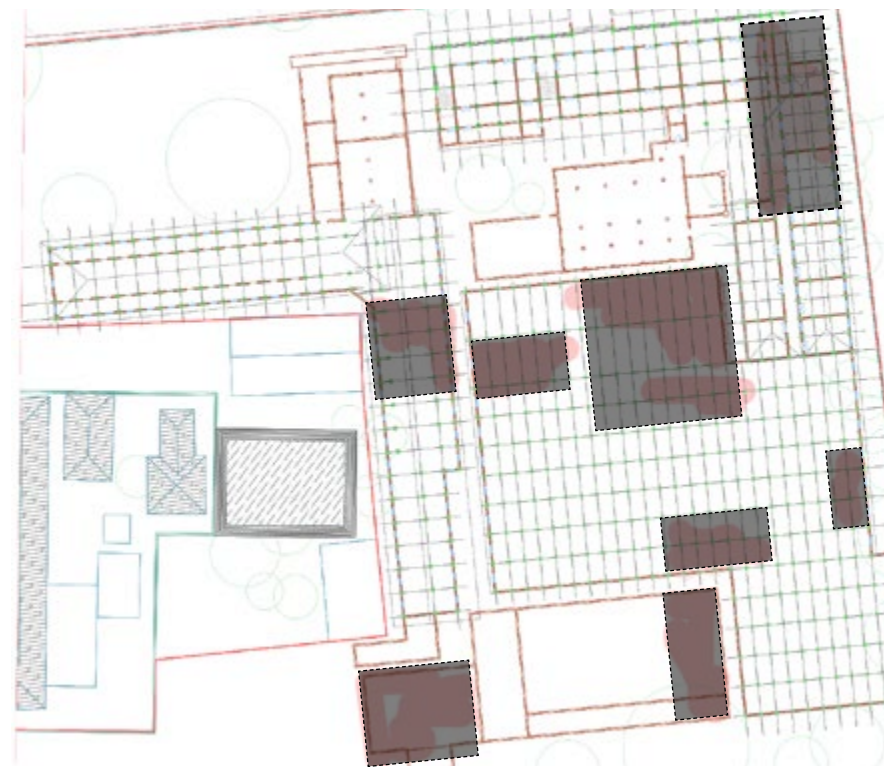
Figure 170: Figure showing the extension of the mananchira park in to the comtrust site
[Source: Created by Author]

1.4. Exterior Condition Analysis



The deterioration of the building's structural integrity, particularly the roof area, resulting from prolonged neglect.

Figure 171: Figure showing the structural damages on the comtrust building
[Source: Created by Author]



Photographs showing the material degradation and destruction caused to the structure

Figure 172: Figure showing the identified spaces for potential renovation
[Source: Created by Author]



1

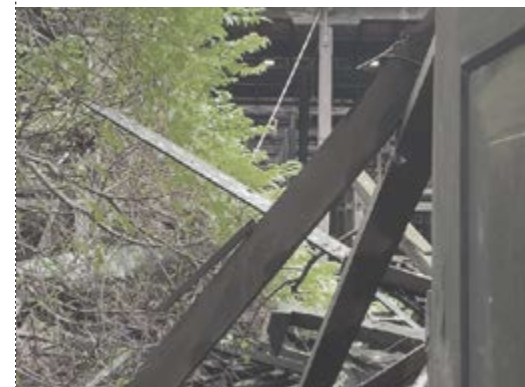
2

Area where permanent damage has compromised the integrity of the main structure.



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4



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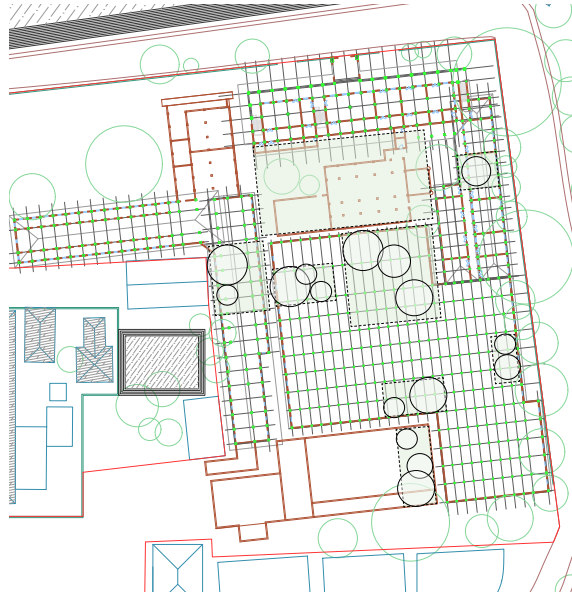
9

10

Figure 173: Images showing the identified spaces for potential renovation
[Source: Taken by Author]



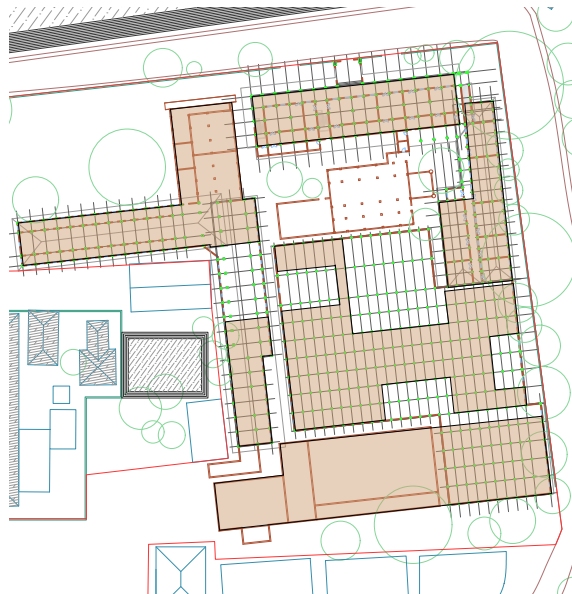
1.5. Zonal Mapping



1.5.1. Designated Areas for Greenery

Severely damaged spaces are revitalized into flourishing green areas through the integration of plants, trees, and landscaped features to enhance environmental health and visual appeal. These green transformations can include outdoor gardens, indoor vertical greenery, and biophilic interior designs. The objective is to restore these areas to support biodiversity, improve air quality, and create functional, attractive spaces for communities, promoting sustainability and environmental well-being.

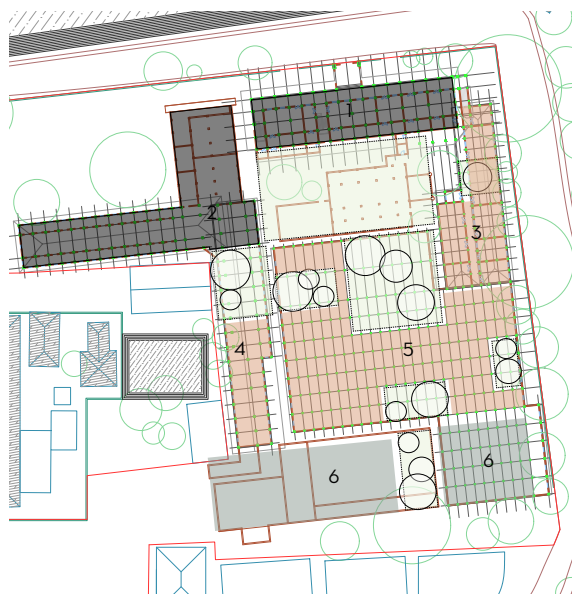
Figure 174: Figure showing the areas for greenery
[Source: Created by Author]



1.5.2. Identified Areas for Functional Use

The building is divided into distinct blocks for public, private, and specialized functions, optimizing usability and flow. Public areas, like lobbies and cafes, are welcoming and accessible, while private zones, such as offices, ensure privacy and security. Specialized spaces, like production units, are purpose-built for efficiency. This separation enhances functionality and minimizes conflicts between activities.

Figure 175: Figure showing the areas for functional use
[Source: Created by Author]



1.5.3. Blending Greeneries with Usable Space

The building is organized into six clearly defined zones, each designated for a specific purpose to ensure efficient use of space and functionality. These zones are carefully planned to meet the needs of their intended functions, with spaces within each zone tailored to support particular activities. The allocation of spaces within these zones is strategically designed to enhance workflow, improve accessibility, and create a well-organized environment where each function operates smoothly without interfering with others.

Figure 176: Figure showing the integration of functional spaces and greenery
[Source: Created by Author]

ZONE 1

Textile Museum

Exhibition spaces
Knowledge hub
Artist galleries
Service areas

ZONE 2

Display areas

Event spaces
Retail spaces
Co working
Recreational spaces

ZONE 3

Administration

Office spaces
Meeting space
Service areas
Utility

ZONE 4

Designer Atelier

Workshops
Meeting space
Prototype studios
Utility

ZONE 5

Core production

Workshops
Meeting space
Prototype studios
Utility

ZONE 6

Recycling and upcycling

Collection and sorting
Cleaning and washing
Processing space
Storage

1.6. Master Plan

The masterplan is thoughtfully designed to transform the existing space into a vibrant and accessible public hub, breaking down boundaries and fostering inclusivity. By opening the site to the public, it encourages a seamless connection between the community and the facility, promoting public engagement and active participation. The main structure is strategically planned to allow visitors to explore nearly all areas of the building, creating an immersive experience that offers insights into the facility’s operations. Informative displays and guided routes further enhance the understanding of the space’s purpose and functionality, making the visit educational and meaningful.

Green spill-out spaces are integrated throughout the design, serving as multifunctional zones that encourage informal interactions between visitors and workers. These spaces act as natural extensions of the built environment, blending functionality with aesthetics to create areas that invite relaxation, collaboration, and social exchange.

A significant urban intervention includes the transformation of the road in front of the Comtrust Mill into a pedestrian-friendly zone, prioritizing soft mobility and creating a safe and welcoming environment for foot traffic. This change promotes sustainable urban practices while offering an uninterrupted pedestrian connection to the site. To maintain vehicular access, an alternate route has been organized, ensuring smooth traffic flow without compromising the pedestrian-friendly character of the area. The previously enclosed complex has been reimagined as an open and integrated space, uniting Comtrust Mill with the adjacent Manachira Square. This integration creates a cohesive public realm where people can gather, learn, and spend quality time with their loved ones. The design fosters an environment of knowledge-sharing, cultural exchange, and recreation. To enhance the visual and functional appeal, an observatory tower has been introduced as a prominent focal point. The tower not only acts as a landmark, guiding visitors towards the Comtrust Mill but also offers panoramic views of the surrounding area, enriching the visitor experience and adding a unique element to the urban landscape. This revitalized space is envisioned as a dynamic hub that balances history, culture, and modern public needs.

Legends

- 1. Entrance 1 (Main Block)
- 2. Garden Entrance
- 3. Museum Entrance
- 4. Service Entrance
- 5. Main Block
- 6. Exhibition / Museum Block
- 7. Recycling Block
- 8. Workshops
- 9. Service Block
- 10. Administration Block
- 11. Watch Tower
- 12. Exhibition Pavillion
- 13. Green Spillout Interactive Zones 1
- 14. Green Spillout Interactive Zones 2
- 15. Green Spillout Interactive Zones 3
- 16. Observatory Tower
- 17. Courtyard
- 18. Square Entrance 1 (Proposed)
- 19. Square Garden (Main)
- 20. Pond Walkway
- 21. Bridge Entrance
- 22. Decks
- 23. Garden
- 24. Site Entrance
- 25. Bridge
- 26. Pond
- 27. Garden
- 28. Garden Entrance 1 (Existing)
- 29. Garden Entrance 2 (Existing)
- 30. Building Bridges
- 31. Service Parking
- 32. Service Site Entrance



Figure 177: Master plan
[Source: Created by Author]

1.7. Ground Floor Plan

The allocation of all major spaces and functions is guided by the identification of six distinct zones, determined through careful consideration of factors such as functionality, privacy, and accessibility. Zones 1 and 2, being the most public, include areas such as the museum and public display spaces, strategically placed at the front of the building to ensure easy access for visitors. These zones act as the primary interface between the facility and the public, fostering engagement and learning.

Zones 3 and 5, designated for administration and production, strike a balance between accessibility and operational efficiency. While these areas are primarily functional, they are made partially accessible to the public through the introduction of an elevated bridgeway that connects the main museum building with the factory. This innovative design element allows visitors to observe the production process from above without disrupting the activities in the production area. It creates an interactive yet non-intrusive way for the public to engage with the facility's operations.

Zones 4 and 6, housing the design atelier and recycling plant, are positioned in more private areas to ensure the necessary level of exclusivity. These zones are restricted to employees, maintaining a focused and secure environment for specialized activities.

The overall arrangement ensures that public access is thoughtfully managed, either through direct entry into the structure or via the external periphery, enabling visitors to gain a comprehensive understanding of how the various functions of the facility work together. This zoning strategy promotes an intuitive flow while preserving the integrity of private and production areas, offering an engaging and seamless experience for all.

Legends

1. Entrance 1 (Main Block)
2. Foyer
3. Atrium
4. Courtyard Entrance 1
5. Stair Case
6. Historical Gallery
7. Cafe
8. Pavillion Entrance
9. Event Pavillion
10. Courtyard Entrance 2
11. Pavillion Entrance 2
12. Multifunctional Hall
13. Administration Room 1
14. Administration Room 2
15. Main Courtyard
16. Material / Art / Installation Gallery
17. Multi purpose Workshop Area
18. Exhibition Stall and Retail
19. Event Rooms
20. Service Corridor
21. Toilets
22. Material Dyeing / Drying Area
23. Weaving / Knitting Area
24. Shredding Area
25. Treatment Area
26. Collection / Segregation Area
27. Service Entrance
28. Administration Office
29. Toilets
30. Green Spillout Interactive Zones 1
31. Green Spillout Interactive Zones 2
32. Green Spillout Interactive Zones 3
33. Observatory Tower
34. Open Yard
35. Administration Rooms
36. Resurgence Yard
37. Blinding / Respinning Area

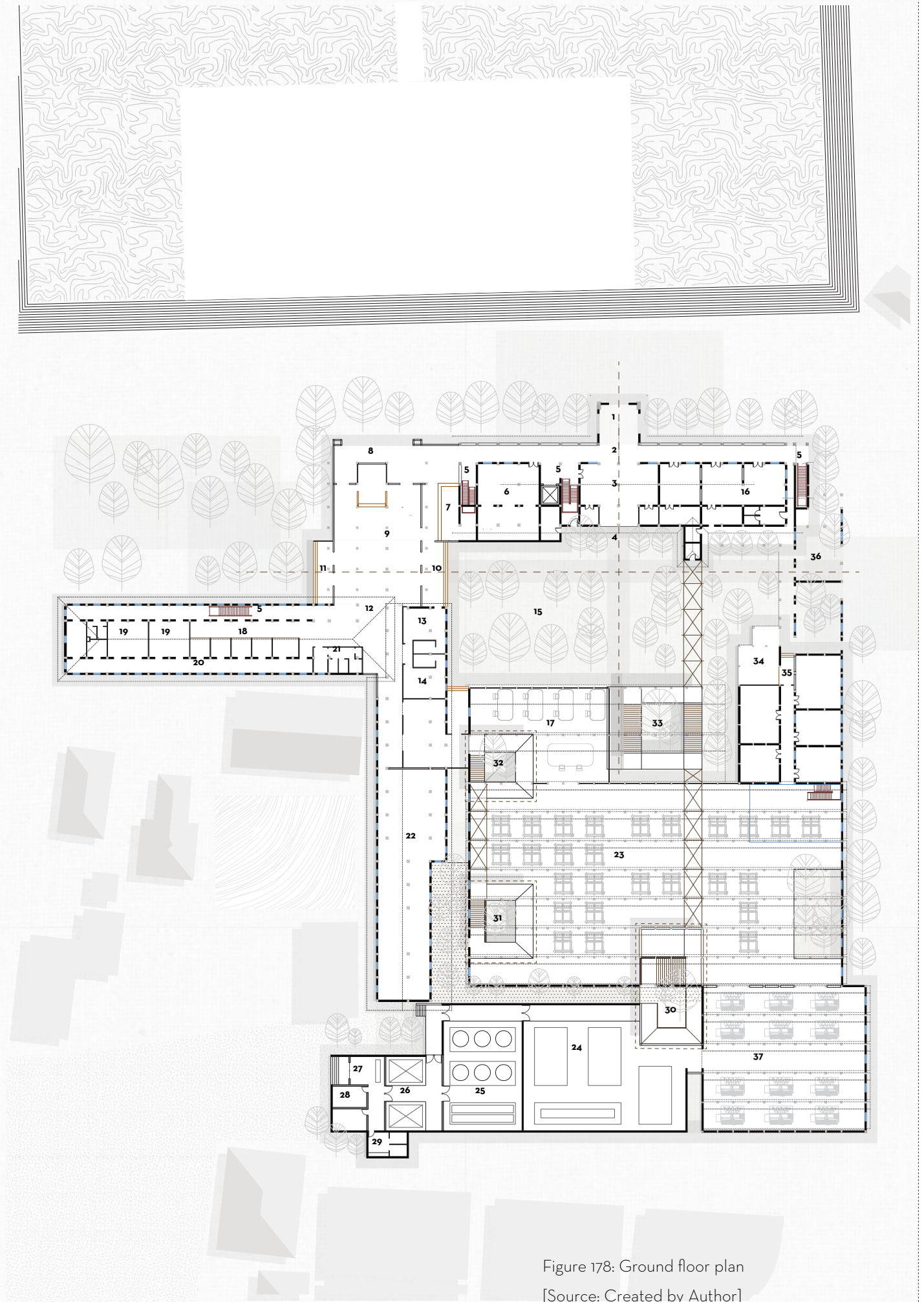


Figure 178: Ground floor plan
[Source: Created by Author]

1.8. First Floor Plan

The first floor of the structure is limited to the museum building, public activity spaces, and administrative areas. The layout of the first floor is carefully planned to accommodate the specific functions designated for each zone. An elevated bridge originates from the first floor of the museum building and extends to the mezzanine level of the factory building, providing a seamless connection between the two.

The spaces on the first floor are designed to maximize the use of natural light and ventilation, promoting energy efficiency and sustainability. Green spill-out areas integrated into the design function as pocket gardens, serving dual purposes as interaction zones and light wells, enhancing the environmental quality of the structure.

Efforts have been made to preserve the building’s natural character wherever possible. In areas that were extensively damaged, new interventions have been introduced. These new elements are designed to align with the architectural heritage of the original structure, maintaining visual coherence while offering a refreshed and functional appearance.

Legends

- 1. Front Balcony
- 2. Atrium
- 3. Contemporary / Modern Gallery
- 4. Design / Pattern Gallery
- 5. Staircase
- 6. Process / Technique Gallery
- 7. Service Area 1
- 8. Service Area 2
- 9. Bridge Entrance
- 10. Building Bridge Walkways
- 11. Observatory Tower
- 12. Green Spillout Interactive Zones 1
- 13. Green Spillout Interactive Zones 2
- 14. Green Spillout Interactive Zones 3
- 15. Administration Rooms
- 16. Balcony
- 17. Design Atelier / Prototype Studio
- 18. Service / Washroom
- 19. Toilets

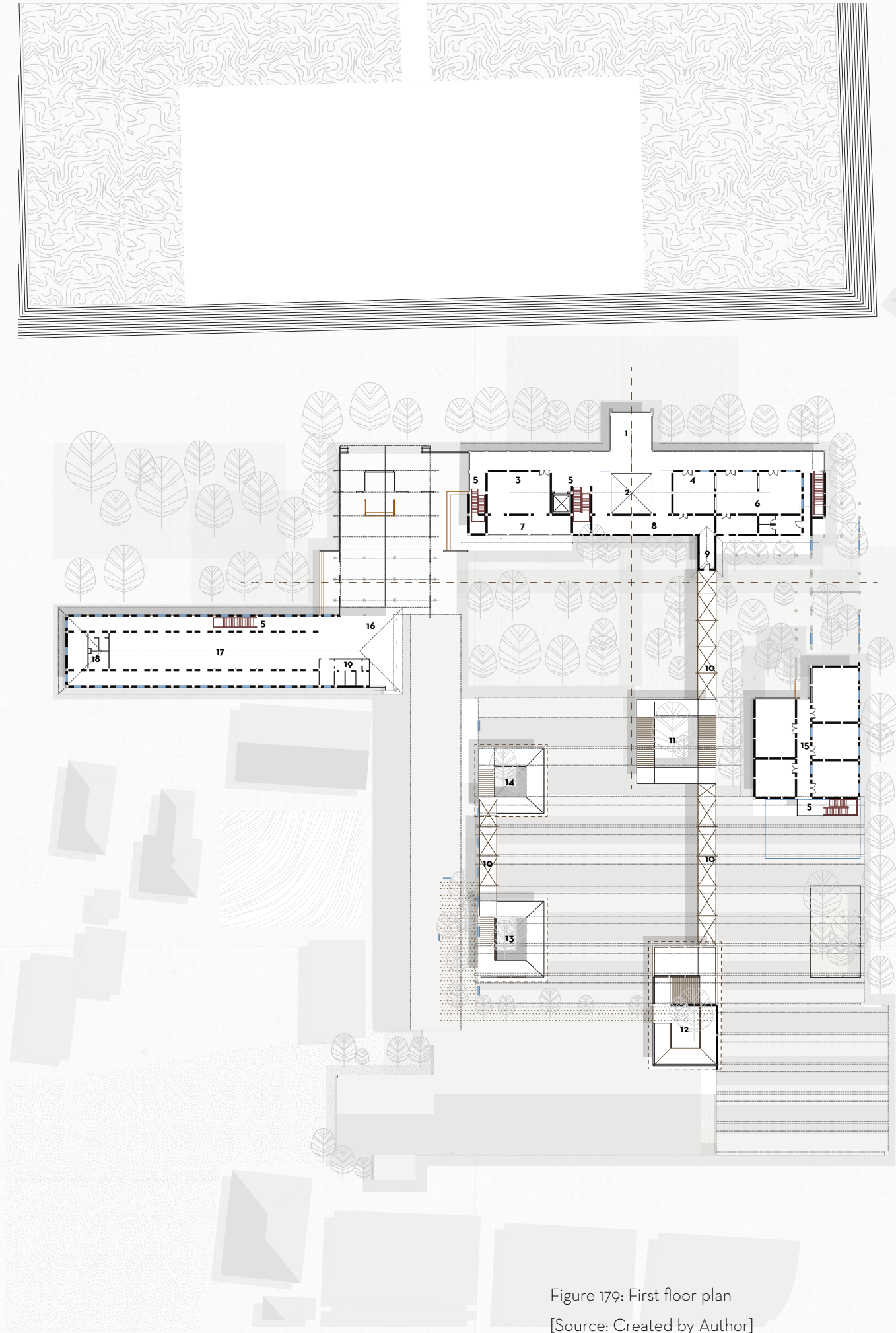
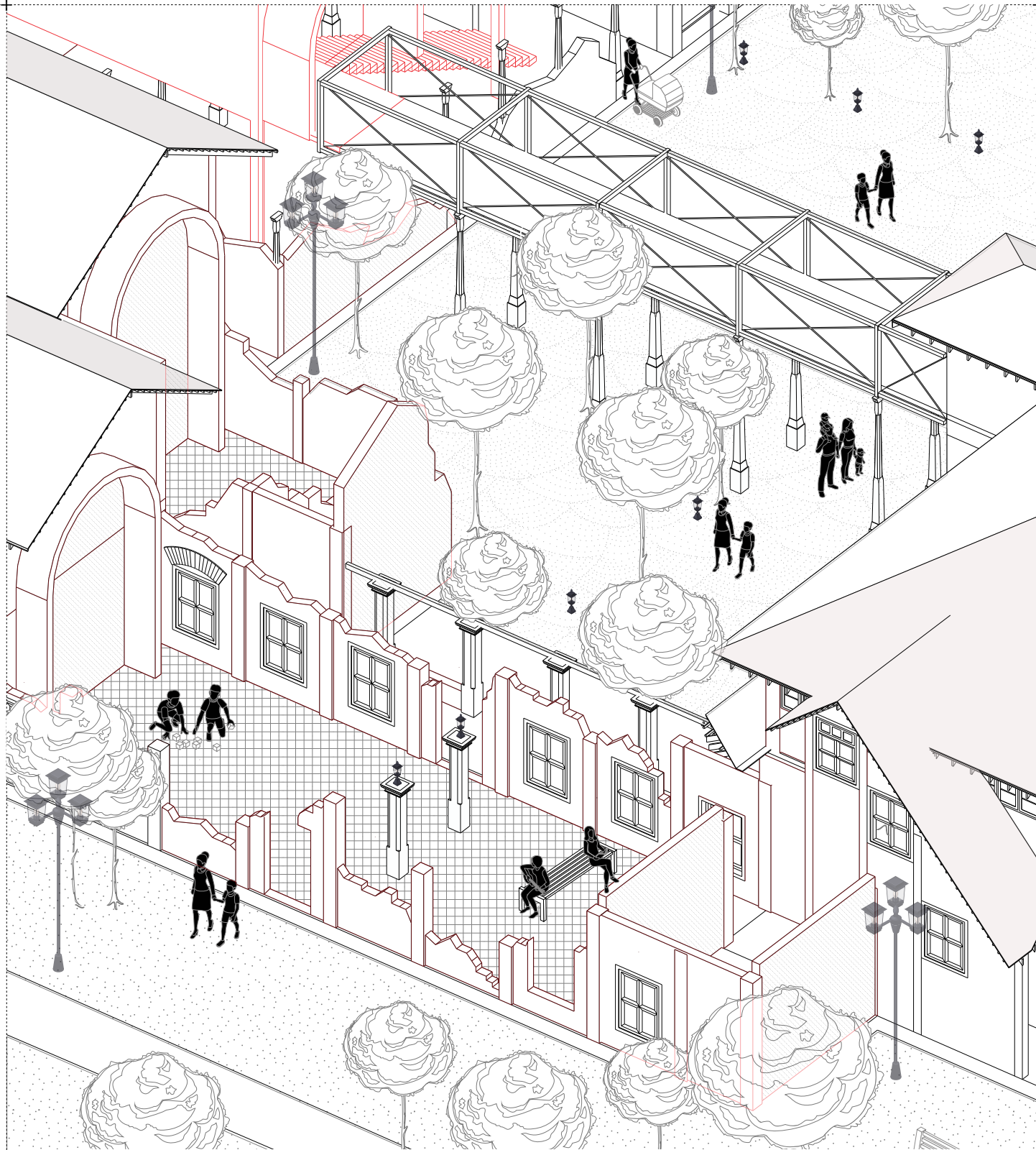


Figure 179: First floor plan
[Source: Created by Author]

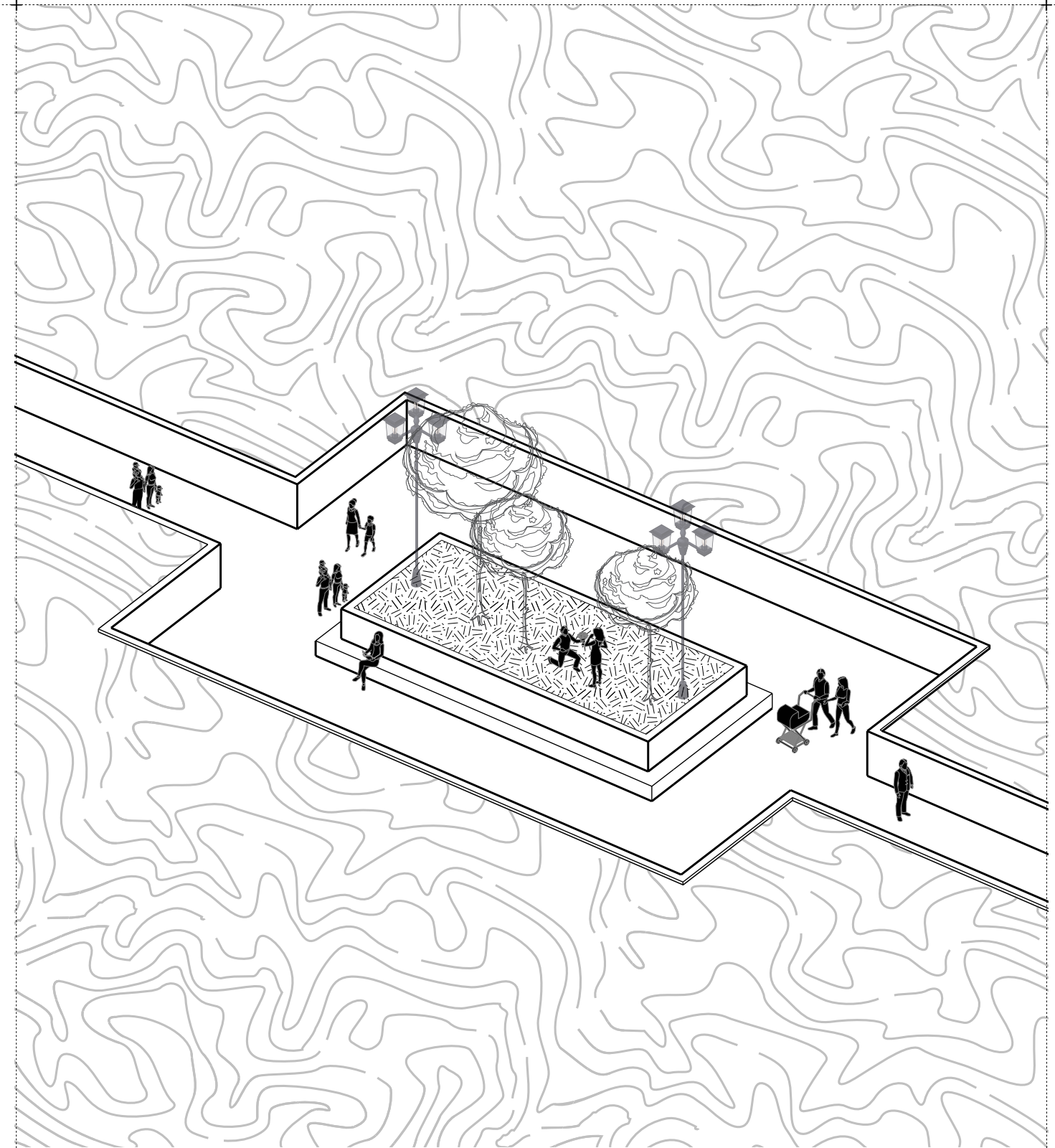


1.9. Resurgence Yard

The Resurgence Yard is a site that endured a devastating catastrophe—a fire that completely destroyed that section. The intervention was designed to highlight the damage as a reminder of how neglect can threaten a historically significant building. The space has since been transformed into a vibrant, green open area for the public, featuring resting spots and play zones.

Figure 180: Resurgence yard showing how the ruined areas are integrated in design

[Source: Created by Author]



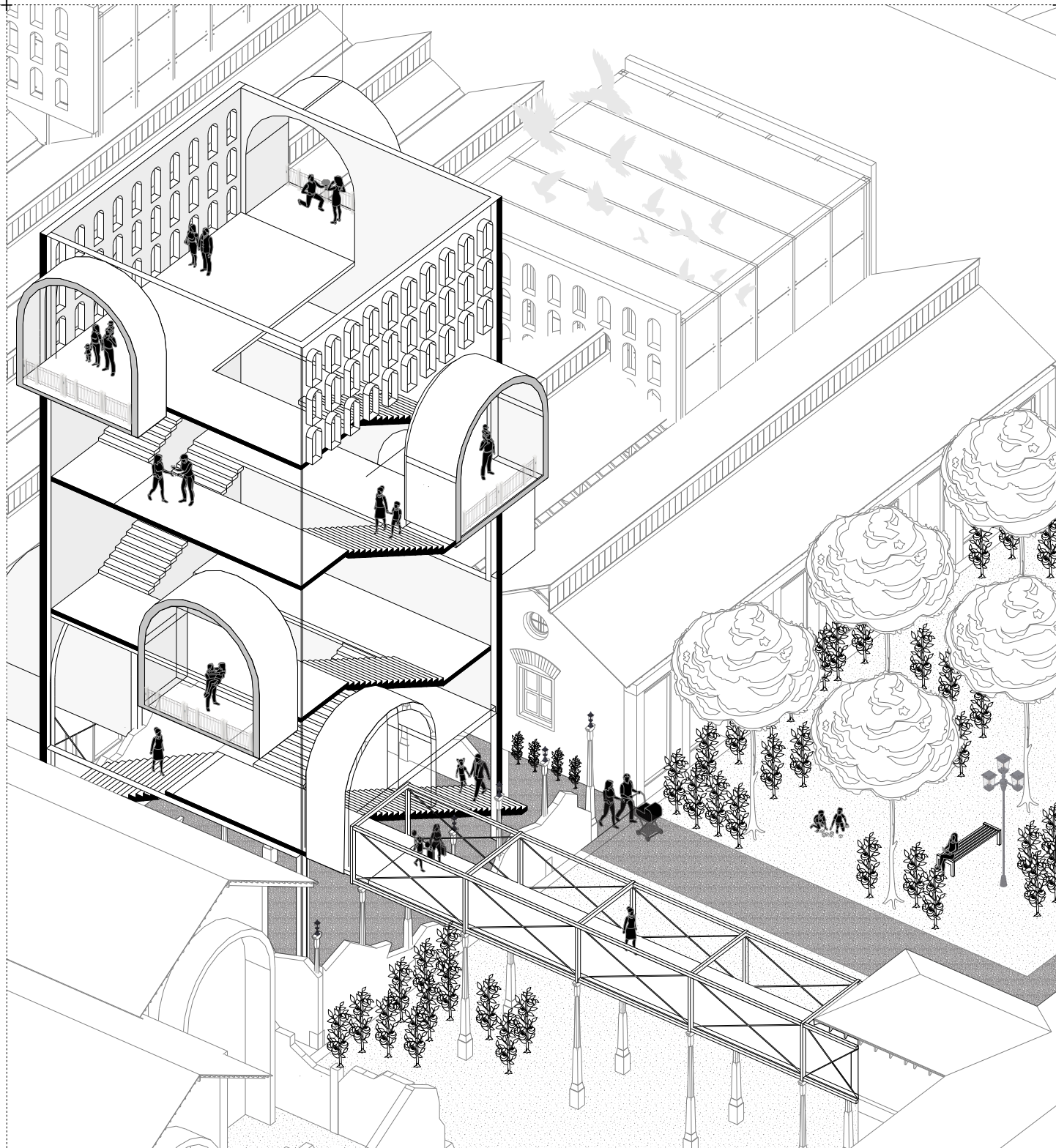
1.10. Mananchira Pond

The Mananchira pond, previously a closed space for the public, has now been made accessible through the introduction of a sunken pathway that runs through the center of the tank. This allows users to experience the site both visually and physically. The steps surrounding the tank serve as a leisure and resting area for visitors. Necessary safety measures, such as fencing,

have been implemented to prevent any potential hazards without compromising the overall user experience.

Figure 181: Figure of the sunken walk way in the Mananchira pond

[Source: Created by Author]



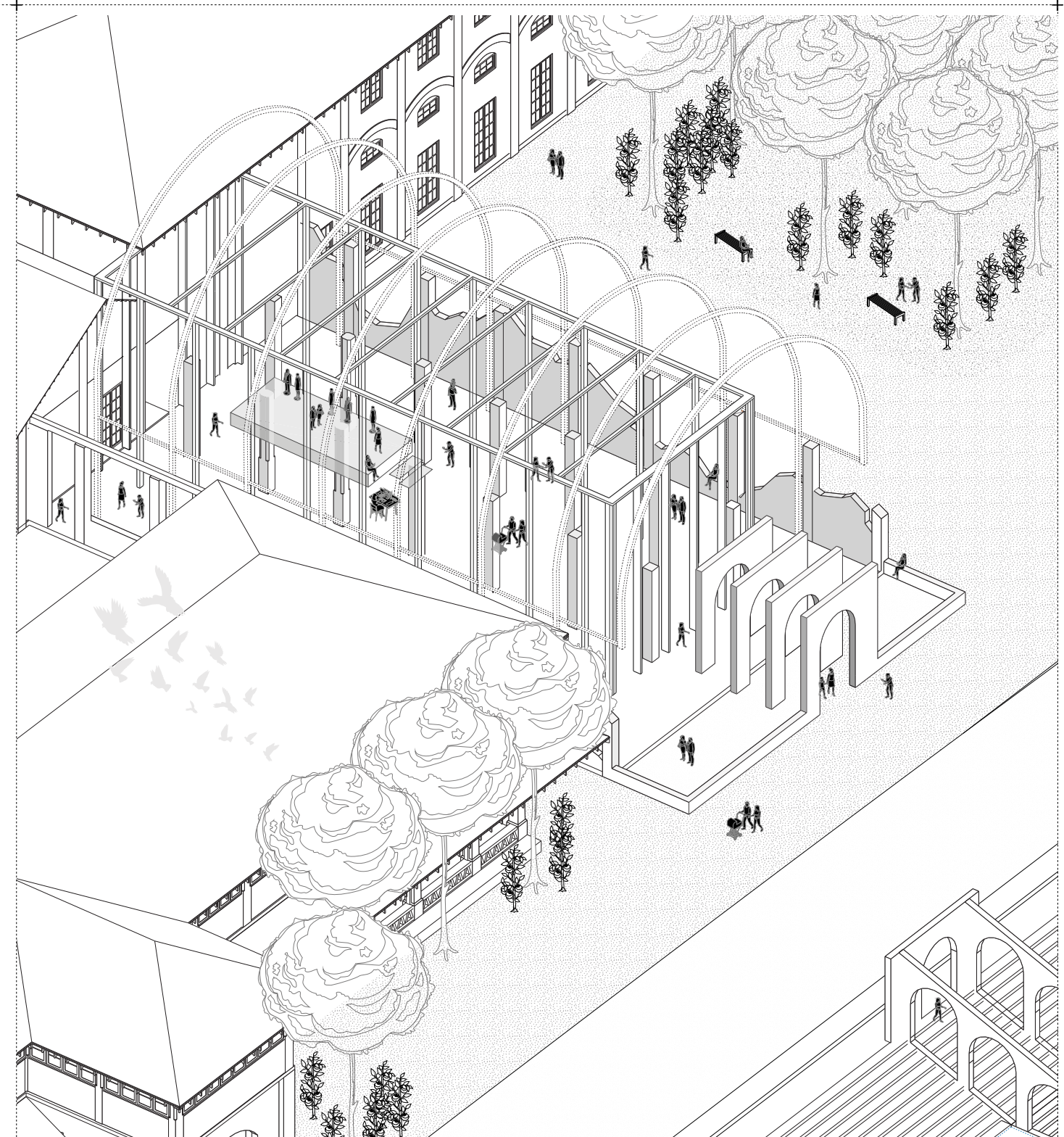
1.11. Observatory Tower

The “Observatory Tower” is a prominent structure planned to replace the ruins of an old building. Designed as a watchtower, it offers visitors breathtaking views of Mananchira and its surroundings. The tower’s arched windows not only enhance its architectural charm but also provide picturesque frames for photography, allowing visitors to capture the beauty of the landscape from within. Serving as both a functional and

aesthetic addition to the site, this tower is envisioned as a potential landmark, symbolizing the blend of history and modernity while revitalizing the area as a hub for appreciation and exploration of the locale’s scenic beauty.

Figure 182: Figure of the observatory tower and the connecting bridge

[Source: Created by Author]



1.12. Multifunctional Pavillion

This area suffered significant damage due to the building’s neglect. It has now been designated as the main entry point to the structure and designed to convey a sense of modernity while respecting the existing architectural style. The space effectively highlights a clear distinction between the damaged sections and the new intervention. Additionally, the main entry doubles

as a ramp walk and serves as a display or exhibition area when needed, making it a multifunctional space.

Figure 183: Figure of the multifunctional pavillion and its surroundings

[Source: Created by Author]

1.13. Master Axonometrical View of the site

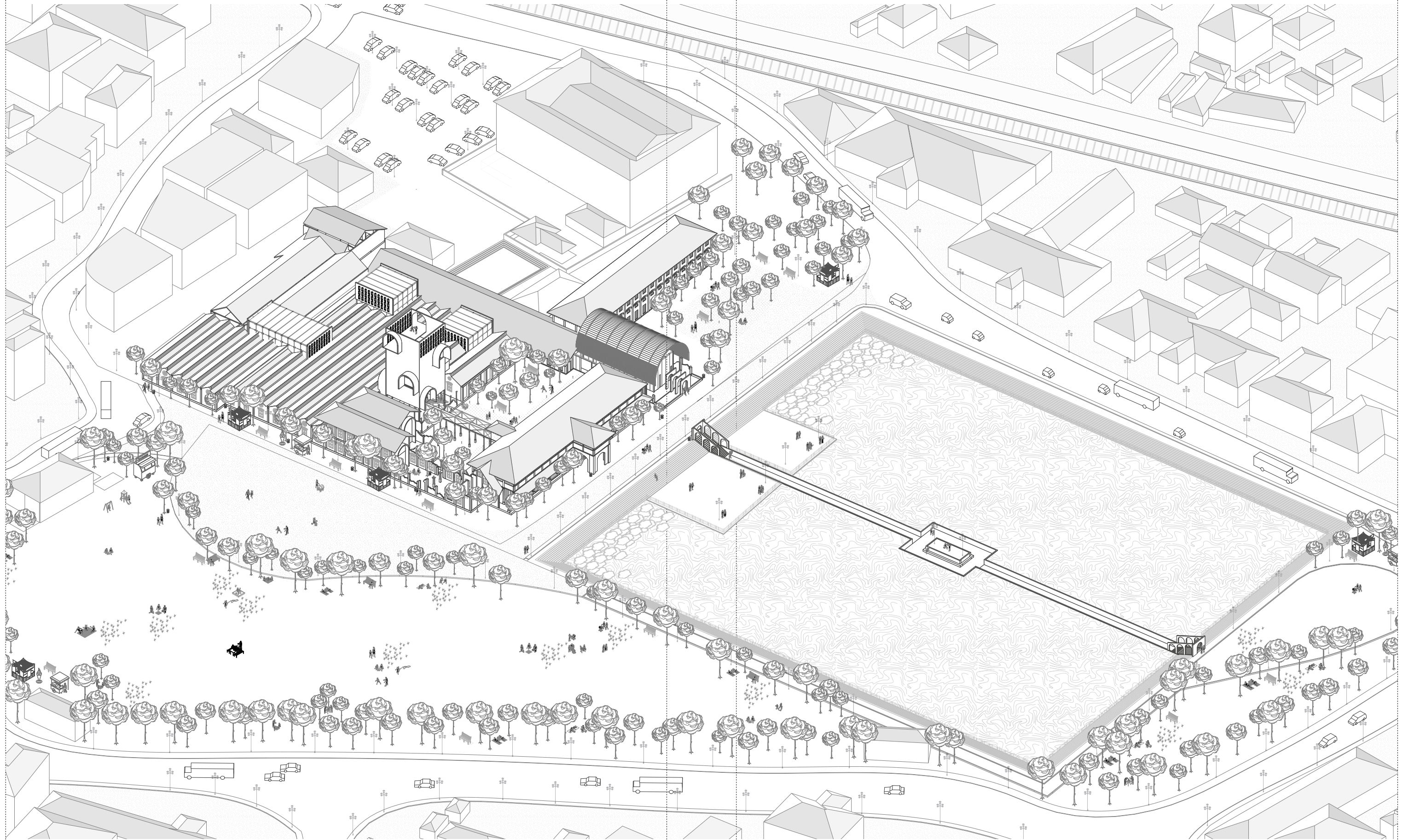


Figure 184: Axonometrical view of the proposed Mananchira site and its compound
[Source: Created by Author]

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Conclusion

The notion of sustainable development, able to meet the needs of the present without compromising the ability of future generations to meet their own, has evolved over time into a more complex and holistic concept, which clearly recognizes cultural heritage as a driver of sustainability. In historic urban contexts, the key factor for the conservation of historic cities as dynamic and living organisms is the integration of protection and sustainability aims, policies, actors and tools.

When we look at the contrast from the perspective of an architecture student, integration of the commercial activities around the building is an economically and culturally sustainable solution of conservation and revitalization. Former production space, thus, have particular appeal not only in terms its location, but also because of their specific characteristics, providing freedom and flexibility for experimentations- a quality that is crucial for any artistic expression. As a result, these spaces can be epicenters of alternative social dynamics, generating vitality in the often derelict and abandoned spaces. However, this progression is not without consequences.

The cultural upgrade often takes place on account of the artists and creative being the driving force of a positive change. These spaces can be upgraded and made appealing by establishing a cultural milieu. In doing so, they generate attention to those sites, accelerating additional interest which usually results in further development. The emerging vitality and exciting atmosphere are attractive features that eventually foster people from a different social status to move in, which mostly results in the increase of the rents and removal of those unable to pay them. Looking at this sequence, one can certainly speculate about the future of such spaces. At the same time, industrial heritage adapted to new uses represents an entity where the past and the present are linked. This characteristic mutually contributes to the revitalization of the industrial built structure, and creates its "Unique Selling Proposition."