Global Housing

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HOME AS A WORKPLACE

RETHINKING HOUSING FOR WOMEN HOME-BASED WORKERS IN AHMEDABAD



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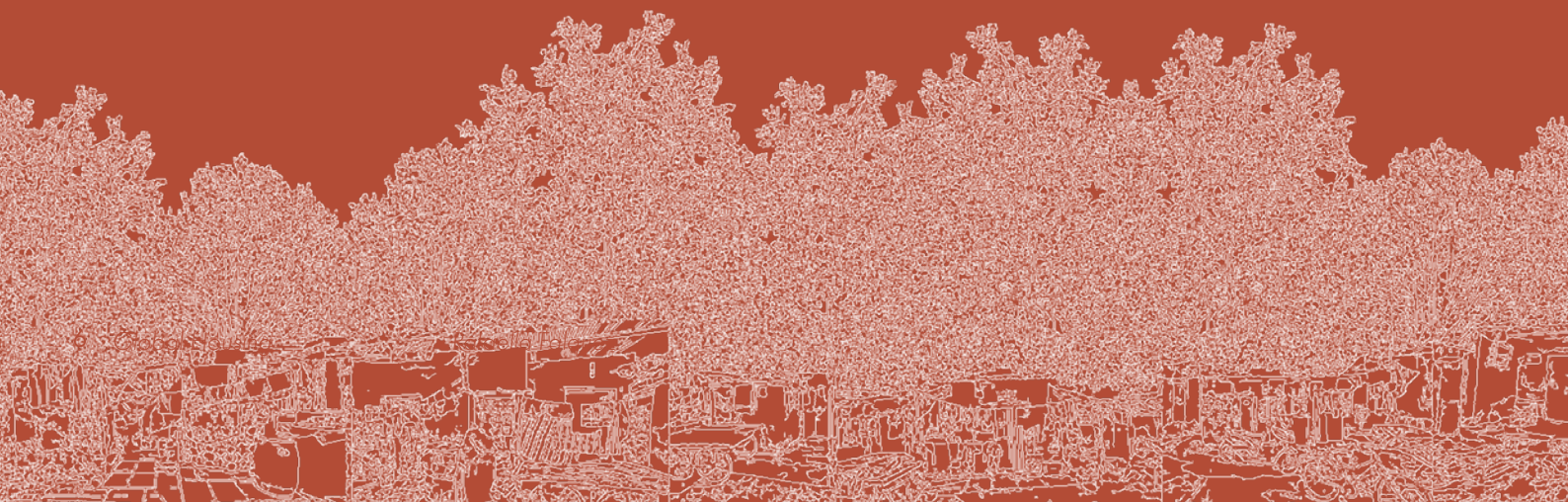
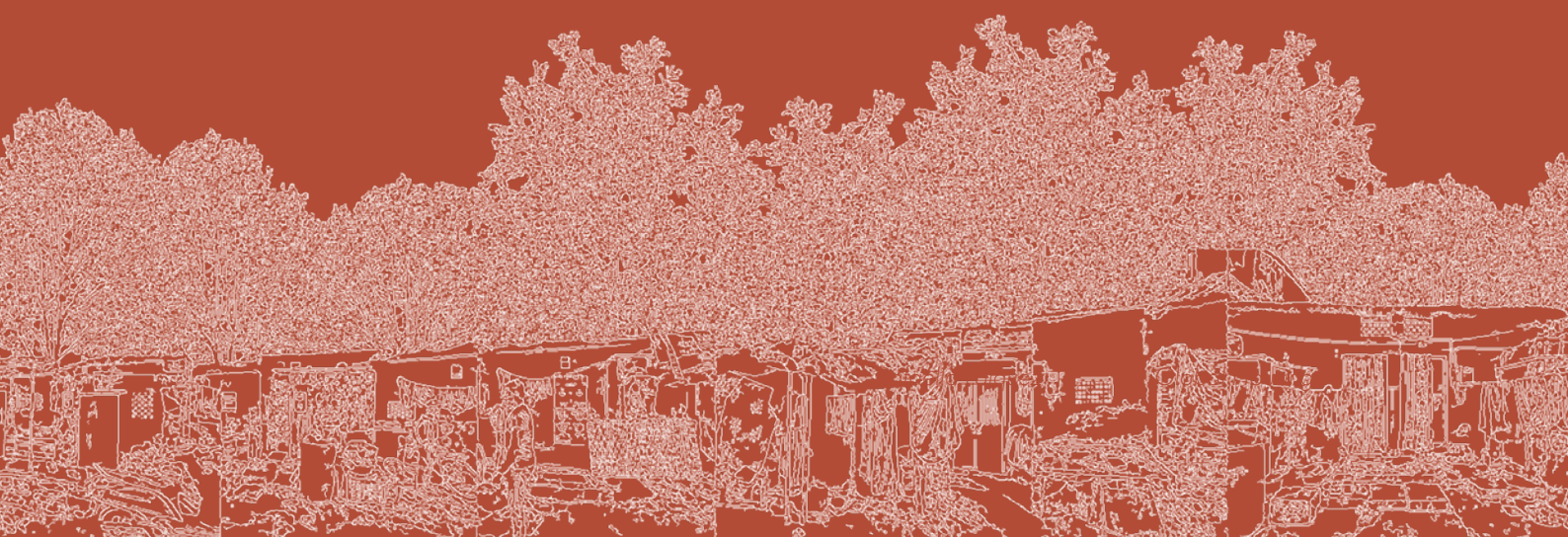


INTRODUCTION

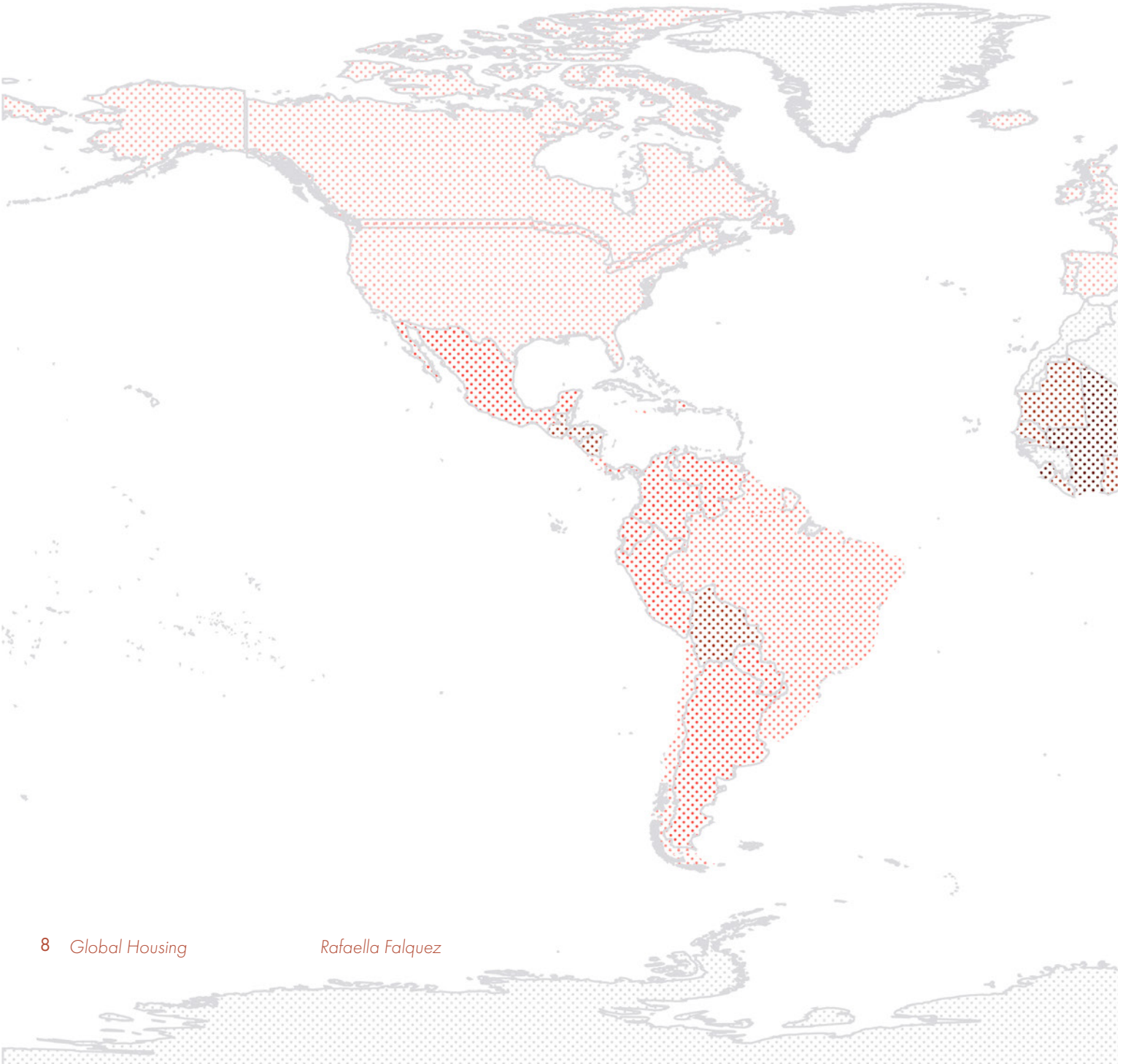
CONTEXT, PROBLEM DEFINITION, AND RESEARCH FOCUS



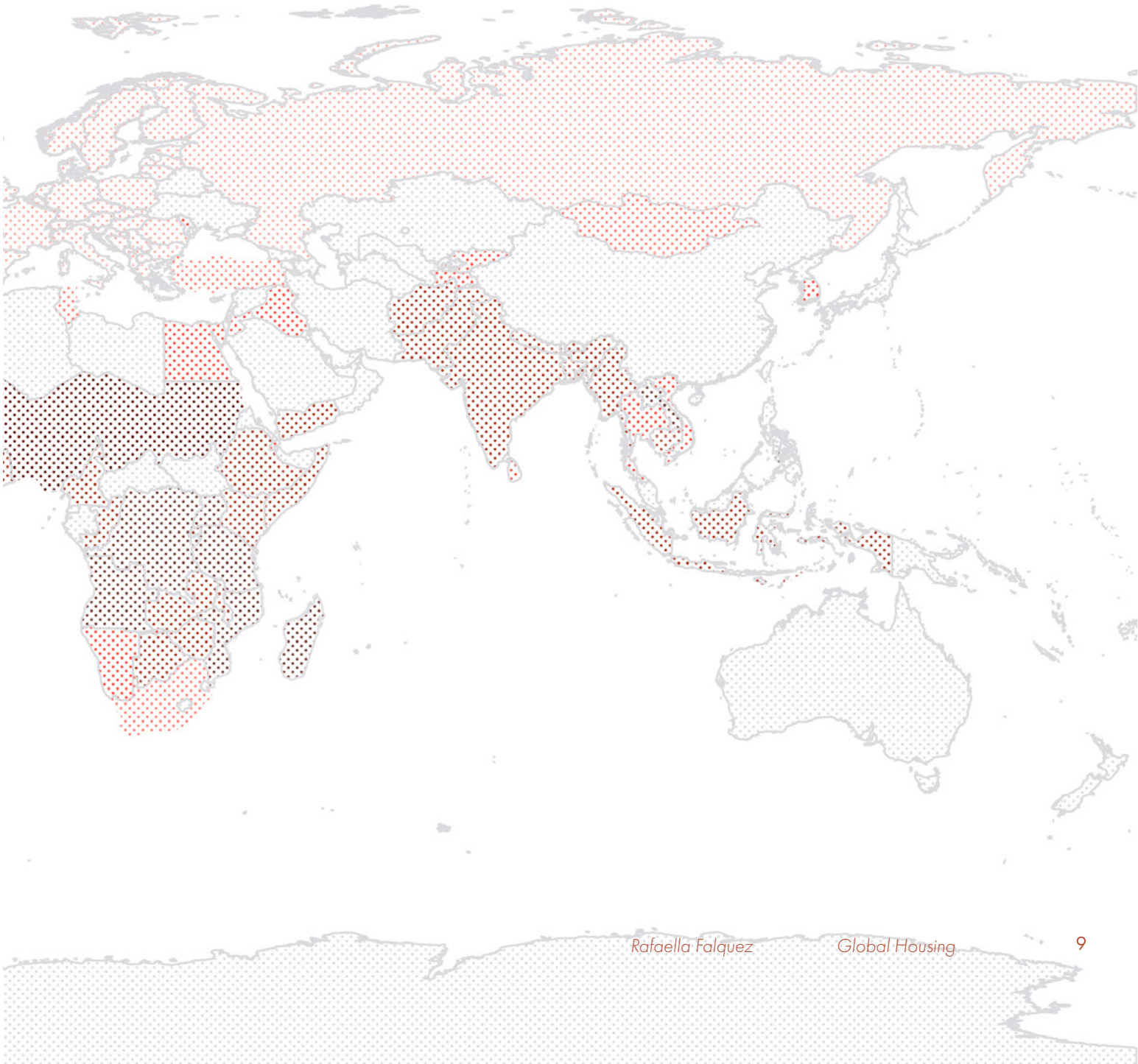
GLOBAL CONTEXT: INFORMAL ECONOMIES AND HOME-BASED WORK

Across cities in the Global South, informal economies account for a large share of employment and are a primary source of income for many low-income households. The International Labour Organisation (2022) estimates that 2 billion people worldwide work in the informal economy, representing around 60% of the global workforce, with the highest concentrations in these regions (Figure 1).

Within these contexts, women face disproportionate economic and social barriers, especially when their labour is home-based and therefore often invisible. Despite their major



contribution to household economies and the wider workforce, home-based women workers remain largely unprotected and unrecognised in labour rights, urban policy, and housing programmes (SEWA, 2025; UN Women, 2017; WIEGO, 2012). As a result, housing across the Global South is often treated solely as a residential space, overlooking the everyday income-generating activities that take place within the home.



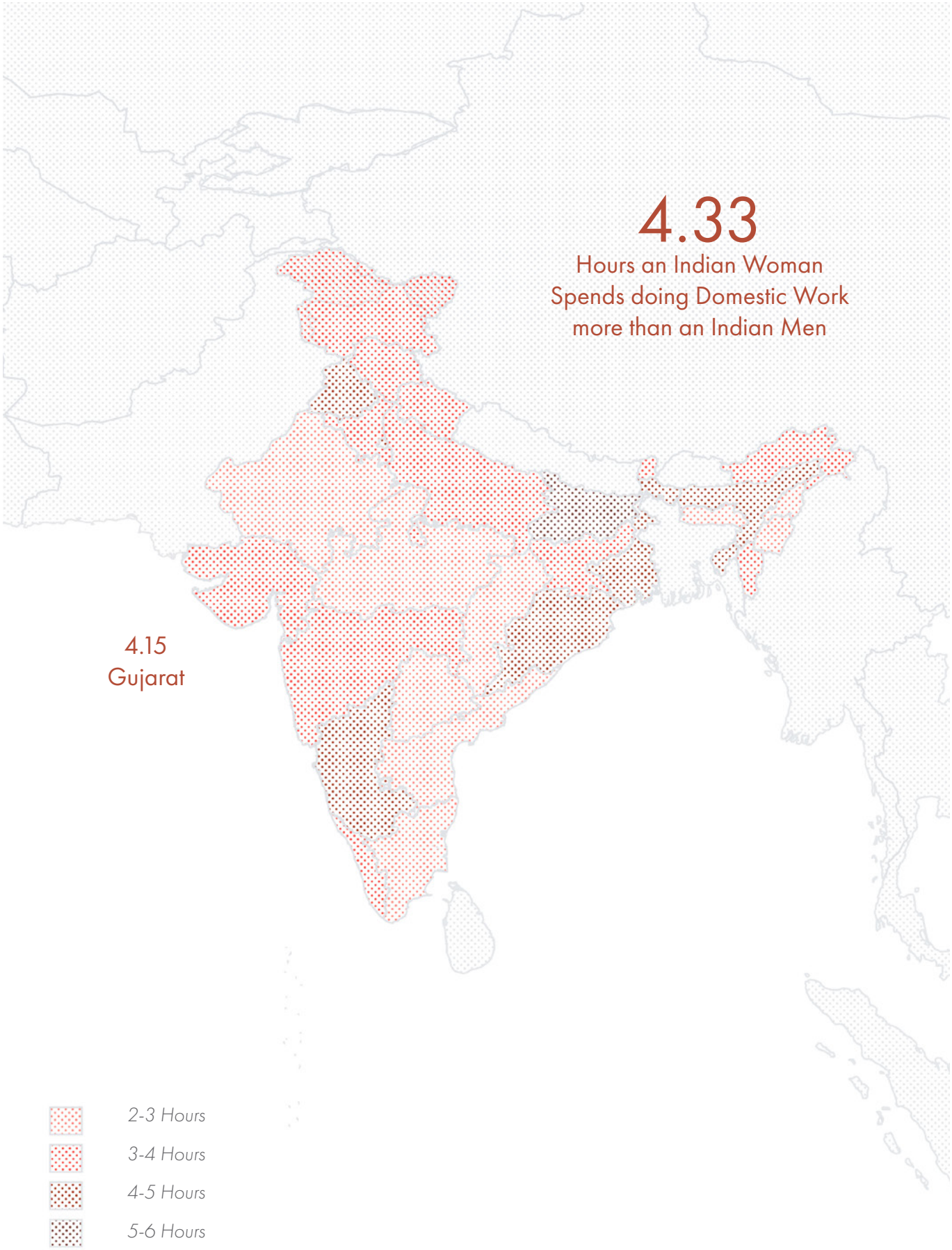
HOME-BASED WORK AND GENDER INEQUALITY IN INDIA

India exemplifies this condition. Home-based work is deeply embedded in everyday urban life and accounts for a significant share of employment. Between 2017 and 2018, an estimated 41.85 million people in India engaged in home-based work, including approximately 17.9 million women (Raveendran, 2020). Although men make up a larger share of home-based workers, women often face more restrictive conditions because paid work is carried out alongside unpaid domestic labour and care responsibilities in the same space (Sarfraz et al., 2025). This dual burden shapes both women's economic participation and their experience of domestic space.

Time-use data in India show that women spend an average of 4.33 more hours per day on domestic work than men. In Gujarat, the gap is 4.15 hours (National Statistical Office, 2019, as cited in India in Pixels, 2021). This creates a constant negotiation between productive and reproductive labour within the home and places significant pressure on the organisation of domestic space.

This overlap between paid and unpaid labour creates spatial tension that is especially visible in rapidly growing cities. In Ahmedabad, dense housing conditions and informal settlement patterns intensify this pressure, as home-based work is often carried out in already constrained spaces (MHT & WIEGO, 2021).

Figure 2. Average additional daily time spent by women on domestic work compared with men in India, by state. Source: Adapted from India in Pixels (2021), based on National Statistical Office (2019) data.


4.33
Hours an Indian Woman
Spends doing Domestic Work
more than an Indian Men
4.15
Gujarat
2-3 Hours
3-4 Hours
4-5 Hours
5-6 Hours

AHMEDABAD: INFORMALISATION AND DOMESTIC PRODUCTION

These tensions are particularly evident in Ahmedabad, where rapid urban growth, post-industrial decline, and dense informal settlements intersect. Ahmedabad, the largest city in Gujarat, underwent a major economic shift after the closure of its textile mills in the late twentieth century. The collapse of the mill economy caused significant job losses and pushed many low-income households into informal and subcontracted forms of employment (Unni & Rani, 2007; Mahadevia et al., 2018).

As a result, informalisation and subcontracting have increasingly shifted production into homes, particularly in informal settlements (MHT & WIEGO, 2021). In this context, women engaged in home-based work participate in a wide range of activities, including garment production, embroidery, incense stick (agarbatti) rolling, food processing, and other small-scale economic activities (Chen & Vryenhoek, 2013).

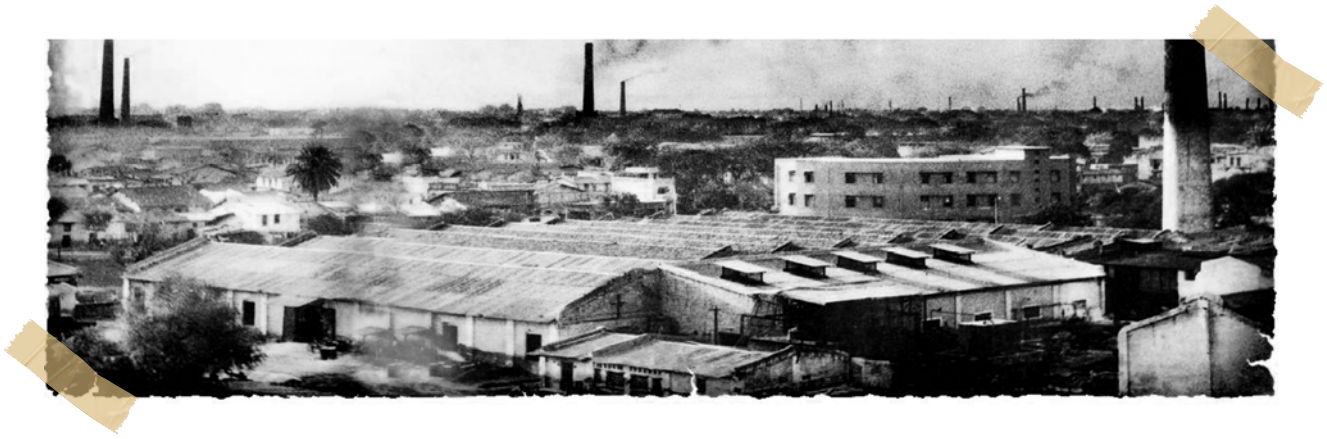


Figure 3. Figure 3a. Historic view of Ahmedabad's textile mills, illustrating the scale of the city's former industrial production. Source: Panchal (2017).



Figure 4a
Women still employed in spinning departments, later replaced by young men after retirement.
Source: Shah, in Breman and Shah (2004), reproduced in Vats (2021).



Figure 4b
Former mill workers searching for other work after the decline of Ahmedabad's textile industry.
Source: Shah, in Breman and Shah (2004), reproduced in Vats (2021).



Figure 4c. Lilaben, whose husband lost his job at the mill. Her family struggles to cover daily expenses and find treatment for her health problems.
Source: Photograph by Parthiv Shah, in Breman and Shah (2004), reproduced in Vats (2021)



Figure 4d
Relief camp for victims of the 2002 communal riots.
Source: Shah, in Breman and Shah (2004), reproduced in Vats (2021).



Figure 4e. A peacock perching above looms that have been silent for years, symbolising the abandonment of Ahmedabad's textile mills. Source: Photograph by Parthiv Shah, in Breman and Shah (2004), reproduced in Vats (2021).



Figure 4f. Interior of a former textile mill, showing the emptied industrial spaces left by Ahmedabad's textile decline. Source: Photograph by Parthiv Shah, in Breman and Shah (2004), reproduced in Vats (2021).

Drawing on existing surveys, Figure 4 maps the spatial distribution of these activities across Ahmedabad and their embeddedness in residential neighbourhoods, reflecting the dispersed and domestic nature of home-based work. These activities are generally low-paid. For example, women earn 110 to 125 rupees for every 1,000 kite pieces, illustrating the unstable economic conditions under which this work takes place. Given these constraints, investing in home improvements or relocating is often unrealistic. These spatial limitations are therefore not only matters of design, but are also closely tied to economic conditions. Any architectural response must be grounded in these realities.



Figure 5. Distribution and types of home-based work in Ahmedabad.

Redrawn based on primary survey data (2022–23), via IndiaSpend (2023).



SPATIAL CONSTRAINTS OF HOME-BASED WORK

Housing plays a key role in sustaining home-based livelihoods for women in Ahmedabad; however, existing dwellings in informal settlements are not designed to support everyday work and living activities (WIEGO, 2012; MHT, 2021; Mahadevia et al., 2014). Multiple studies identify housing as a major spatial constraint for home-based women workers, particularly in relation to space, infrastructure, and comfort (WIEGO, 2012; Wagemann et al., 2024; IIHS & WIEGO, 2021; MHT, 2021; Mahadevia et al., 2014). For many women, housing is self-built or incrementally adapted over time under conditions of limited space, scarce resources, and inadequate infrastructure. As a result, dwellings must accommodate overlapping domestic and work-related activities in constrained conditions, often at the expense of comfort, health, and long-term sustainability. Environmental conditions worsen these challenge, extreme summer heat regularly interrupts work, poor ventilation affects health, and water leakage and seasonal flooding damage materials and finished good

The relationship between home-based work and space is not only physical but also temporal. IIHS and WIEGO (2021) show that home-based women workers must constantly negotiate the boundary between work and home throughout the day. To balance domestic responsibilities and production demands, they often improvise by repositioning furniture, using thresholds and semi-outdoor areas, and working in shifts. This reveals how conventional housing typologies fail to support the multiple functions and changing needs that unfold within the home over the course of a single day.

These spatial conditions limit women's economic opportunities. Lack of storage, limited space to display goods, and the absence of spaces for exchange restrict women's ability to increase income and pursue more autonomous forms of production. Many work for subcontractors who control raw material prices and the value of finished goods, leaving little room to negotiate fairer terms or build economic independence. At the urban scale, additional challenges arise when women must travel long distances to collect materials or deliver products. Low earnings then make it extremely difficult to improve their homes, trapping them in a cycle of spatial and economic precarity (Boeri, 2015; Sarfraz et al., 2025). Beyond the individual dwelling, the lack of shared productive spaces where women can learn new skills, store goods, or organise collectively also isolates them from one another and from wider market networks. SEWA (2025) shows that where collective organisations exist, shared resources can significantly improve working conditions and economic outcomes.

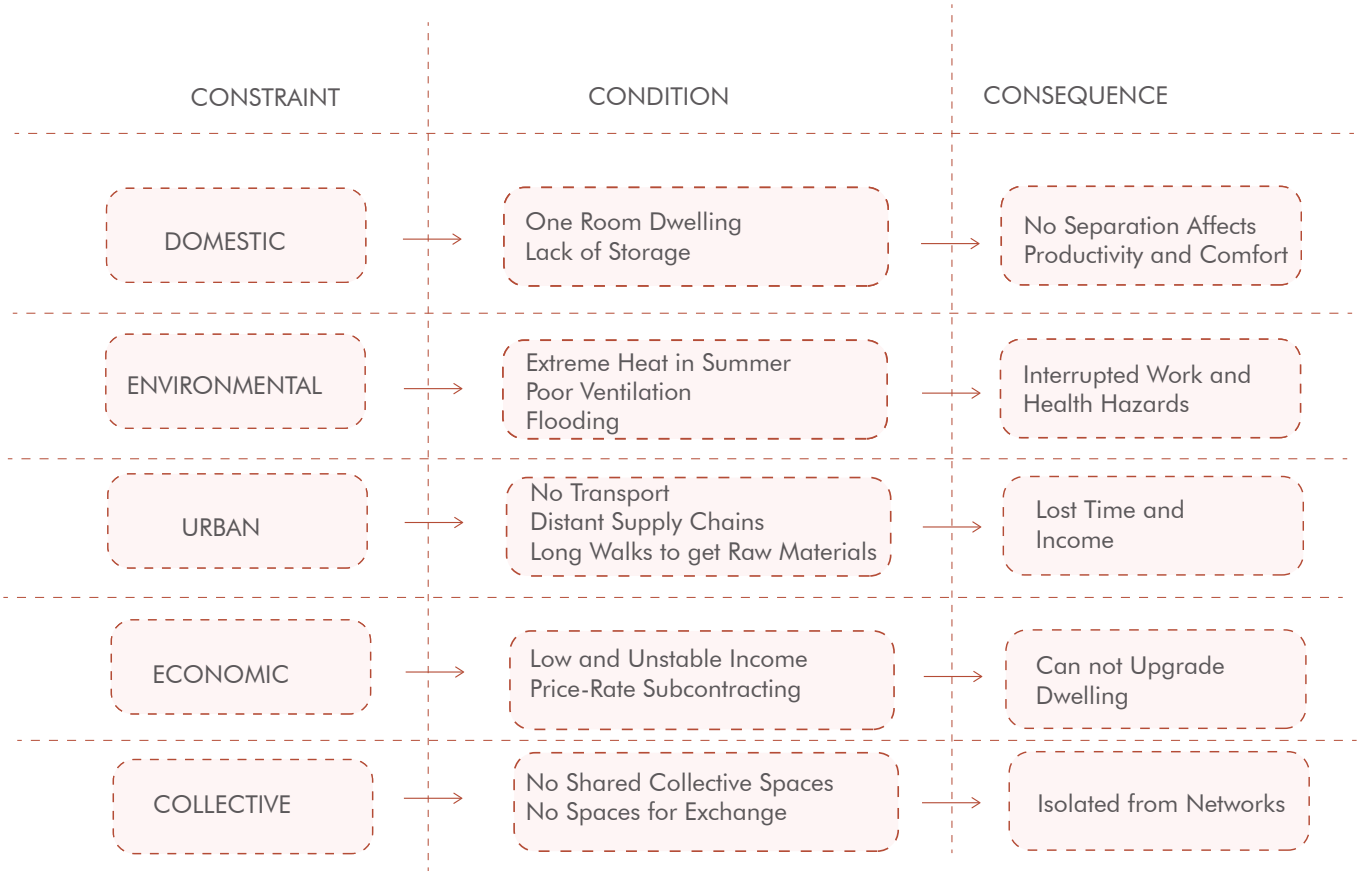


Figure 6. Multi-scalar challenges faced by home-based women workers in Ahmedabad, illustrating how constraints emerge across domestic, environmental, urban, and economic conditions.

Together, these issues reveal the limitations of housing design in informal settlements for home-based women workers, where living and working conditions are deeply intertwined. This gap calls for new architectural approaches and adaptive systems that respond more effectively to everyday practices and livelihoods. With this in mind, the study addresses the following research question:

"HOW CAN HOUSING ADDRESS THE SPATIAL, ENVIRONMENTAL, AND SOCIO-ECONOMIC NEEDS OF HOME-BASED WOMEN WORKERS IN AHMEDABAD WITHIN RAPIDLY DENSIFYING URBAN CONTEXTS?"

The project also addresses the following subquestions through three specific lenses:

1. SPATIAL LENS

How do existing dwelling layouts, everyday routines, and cultural practices shape the way home-based work is integrated within informal housing?

2. ENVIRONMENTAL LENS

How can housing improve the comfort and everyday usability of home-based workspaces in response to heat, ventilation, daylight, and seasonal conditions?

3. SOCIO-ECONOMIC LENS

How can shared productive spaces at the dwelling, cluster, and neighbourhood scale support collective microeconomies, reduce subcontractor dependency, and strengthen women's economic agency?

OBJECTIVE & MOTIVATION

This research investigates how housing can better function as both a living and working environment for home-based women workers in Ahmedabad. It examines this question from the scale of the dwelling to that of the city through a multi-scalar approach that also considers the cluster, neighbourhood and urban scale. To do so, the project uses low-rise, high-density housing as a framework for testing architectural strategies such as spatial flexibility and incrementality.

Beyond its architectural focus, this research is also shaped by personal conviction. Growing up in Ecuador, I saw how women's economic contributions in low-income communities are often undervalued, not only in labour systems but also in the spaces they inhabit. As in India, the home in Ecuador is often a place of work for women, where inadequate infrastructure, rapid urbanisation, and informal economies shape daily life. This burden is intensified by expectations stating that women should also care for their families, creating financial, social, and spatial pressures that housing design rarely acknowledges. This project is driven by the belief that better spatial conditions should not be a luxury, but a foundation for women to build independence, strengthen collective networks, and improve their living conditions.

Although this research focuses on Ahmedabad, the condition it examines is not unique to India. It is repeated across cities of the Global South and deserves serious architectural attention. The project is guided by the belief that design can play a meaningful role in supporting women who often remain invisible in both policy and the built environment.

RELEVANCE

This research addresses a gap in contemporary housing design, where architectural typologies are usually conceived only as residential environments and often fail to integrate income-generating activities within domestic space. By examining the spatial needs and everyday practices of home-based women workers, the project develops architectural strategies that challenge standard housing layouts and respond to the home's dual role as both living and working space. It contributes to research on spatial flexibility in domestic environments, adaptable housing, and incremental housing approaches.

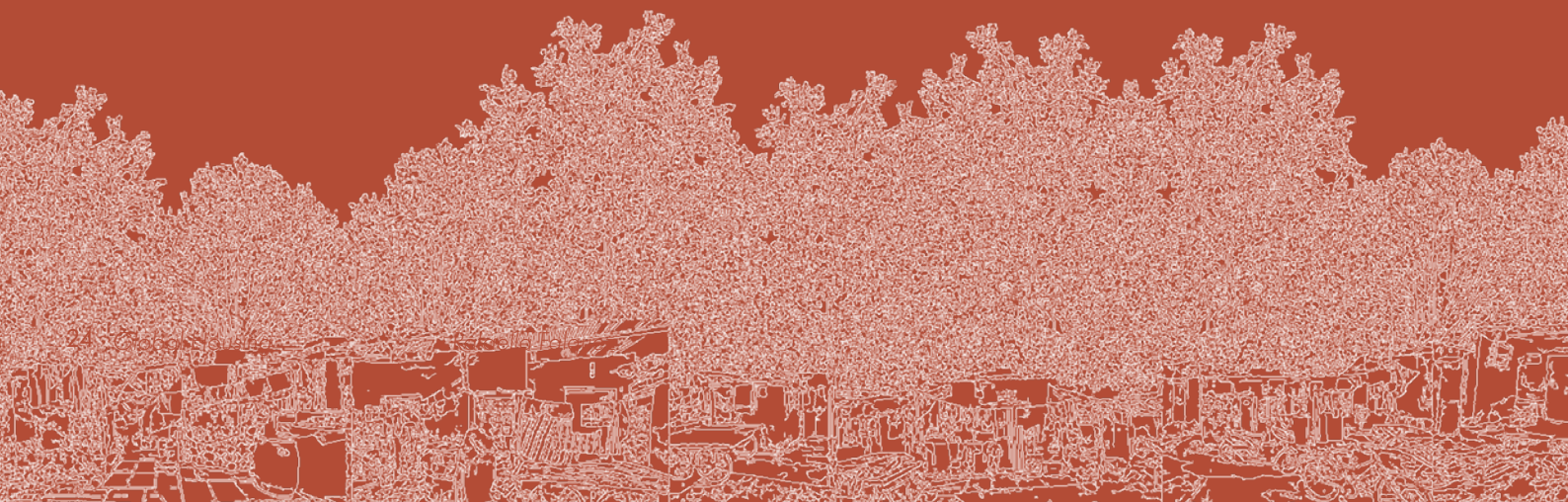
It also contributes to ongoing discussions about gendered spatial conditions in architectural practice, where women's everyday experiences and needs remain underrepresented and where design decisions must respond to women's needs across multiple scales. More broadly, it adds to debates on spatial justice, economic agency, and well-being in rapidly urbanising cities of the Global South.

Although the study focuses on home-based women workers in Ahmedabad, its findings speak to broader patterns of home-based work across cities of the Global South. These insights can inform more inclusive and adaptive housing approaches and support discussions among architects, urban planners, NGOs, community organisations, and policy makers working to align housing strategies with the lived realities of home-based women workers.

SCOPE

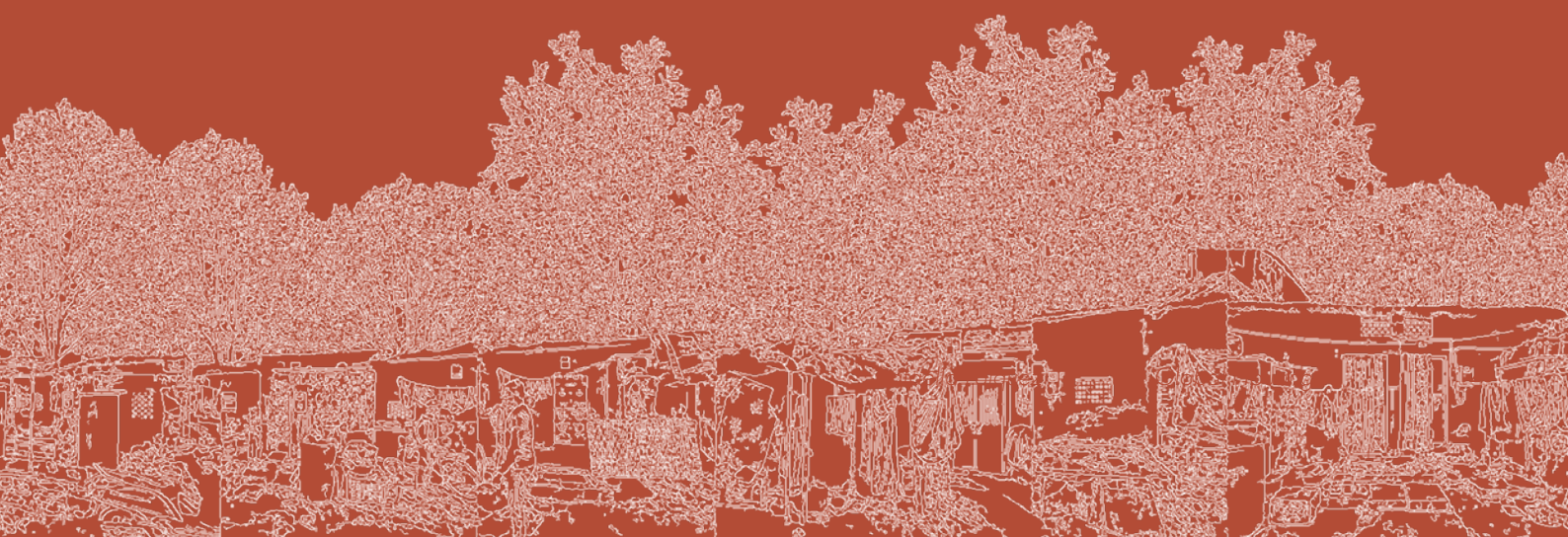
The project is located in the Calico Mills area of Ahmedabad, a post-industrial district characterised by informal settlements where informal economies and home-based livelihoods are deeply embedded. The initial study area housed around 5,000 residents in 1,200 informal dwellings. Following site analysis, the project was relocated to an adjacent empty plot facing the Sabarmati riverfront within the broader Calico Mills context.

The research addresses the spatial, environmental, and socio-economic challenges faced by home-based women workers and explores low-rise, high-density housing strategies across multiple scales. A mixed-income strategy introduces mid- to high-rise housing to support density and cross-subsidise affordable units.



APPROACH

RESEARCH AND DESIGN METHODOLOGY



THEORETICAL FRAMEWORK

This project is grounded in two interconnected theoretical lenses, feminist critiques of gendered domestic spaces and theories of urban informality and incremental housing approaches. Both frameworks position housing as gendered, a livelihood space, and an evolving ecosystem, all of which reinforce or challenge the existing conditions of women home-based workers in Ahmedabad.

The first theoretical lens is informed by feminist critiques of domestic space, beginning with Dolores Hayden's essay What Would a Non-Sexist City Be Like? Hayden questions traditional housing and urban models that place the burden of care and domestic work on women, yet fail to acknowledge that women also work, and that housing should be designed to support both. She argues for "a new paradigm of the home, the neighbourhood, and the city" that would "support, rather than restrict, the activities of employed women and their families" (Hayden, 2000, p. 266). For this project, Hayden's arguments provide the foundational critique of what happens to home-based women workers in Ahmedabad: housing was never planned with their specific routines in mind. The separation between home and work in traditional housing schemes, and the lack of supporting amenities in the city for working women, are what the project seeks to challenge.

Matrix Feminist Design Co-operative extends this critique into architectural practice. In Making Space: Women and the Man-Made Environment (1984), Matrix argues that architecture and urban design are not neutral, and that every decision about a threshold, street, corridor, window, or courtyard reflects assumptions about who uses the space and how. Their work is important for this project because it shifts attention from women as generic residents to women as specific users of housing, streets, services, thresholds, and collective spaces, and asks whether women feel visible, supported, and safe at every design scale. For home-based women workers in Ahmedabad, this means that visibility, safe movement, semi-private shared spaces, and access to neighbourhood resources are not secondary concerns but core architectural responsibilities. In addition, Visakha (2021) extends these theories and grounds it in the Indian urban specific context, stating that cities in India are designed around male mobility patterns, ignoring women's complex movements through the city, and the importance of designing proximate, safe shared infrastructure that safeguards women. Together, Hayden, Matrix and Visakha inform the spatial programmatic basis for the design. In this case, housing can be redesigned to make women's work more visible, supported, and spatially integrated across all scales.

The second lens looks into theories of urban informality and incremental housing. Ananya Roy, in Transnational Trespassings: The Geopolitics of Urban Informality (2004), argues that informality should not be understood only as poverty, illegality, or disorder, nor romanticised as self-help or entrepreneurship. She writes that "the political economy of urban informality is thus also the politics of representation" (Roy, 2004, p. 149). This idea is critical to the research, as the housing design for women workers should not be evaluated solely on aesthetic or formal grounds. In fact, it must consider their livelihoods and practices, such as care work, storage, comfort and spaces for local exchange. If not, the design risks improving the building while leaving the existing problems for home-based women workers unchanged.

In addition, John Turner's Housing by People (1976) complements Roy's ideas on being

cautious in user design. He argues that housing should not be seen as a fixed product but rather as an evolving process, in which the user has the freedom to build, adapt, and expand it over time in response to changes and available resources. This is essential for the project, as when women have agency over their spaces, they can transform their homes into environments that genuinely support their unique needs. This would be explored in the design through incrementality, allowing them to upgrade their space over time based on their wants, rather than delivering a fully finished product that imposes a single solution from the outside, rather than what the user might want.

All four of these theorists come together to form a framework for this project. Hayden notes that conventional housing schemes ignore women's work. Matrix Feminist Design Co-operative demonstrates that space is gendered and should be designed to centre women as the primary actors. Roy helps us understand that we should not design blindly for people but be aware of socio-economic realities. Finally, Turner provides an incremental framework in which the user has control over their space. This framework will directly inform the three main lenses of the research across its multiscale strategy.

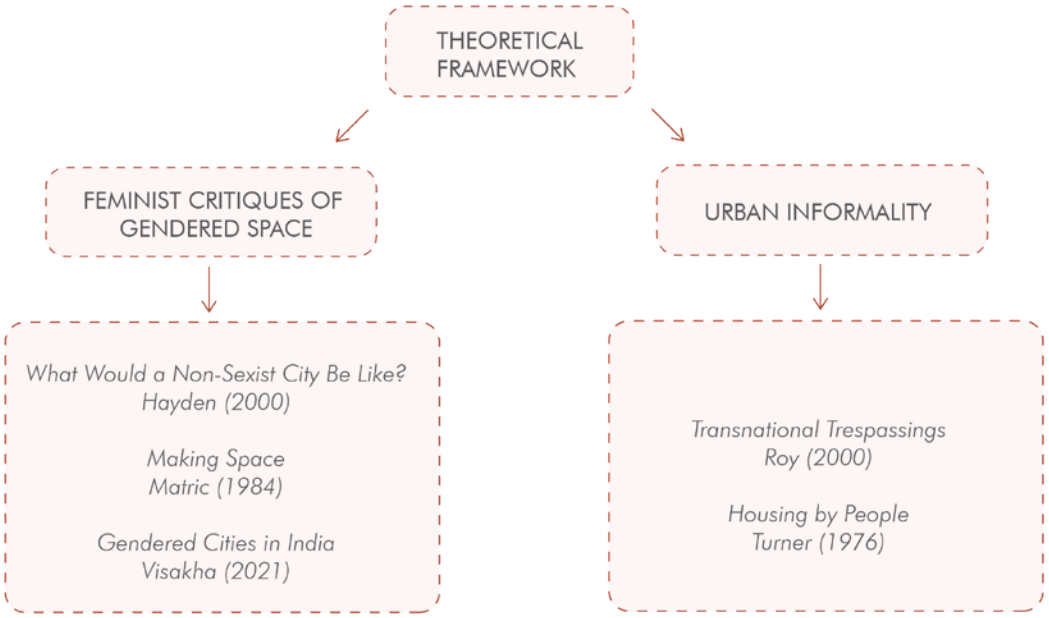


Figure 7. Theoretical Framework Feminist Critiques of Space and Urban Informality Theories

METHODOLOGY

This project uses a range of qualitative methods, supported by quantitative data whenever it's relevant, to inform architectural design decisions for housing that better support home-based women workers.

1. RESEARCH BY DESIGN

As the primary methodological approach, research by design has been applied throughout the project. Architectural design has been used as an investigative tool to analyse existing spatial problems in housing for home-based women workers and to explore alternative spatial configurations. To do this, a series of drawings, diagrams, models, and iterative designs has been produced and tested to examine how domestic space can be better designed to accommodate overlapping live and work practices. These iterative explorations have continually informed design decisions with research findings on related themes, such as gendered spatial design, climate responsiveness, and incrementality. This has ensured that the outcome has emerged from a process of testing rather than a predetermined solution.

2. FIELDWORK

Fieldwork was conducted to better understand the current spatial, social, and environmental conditions of the study area. A two-week site visit to Ahmedabad was undertaken to observe the city's urban structure, cultural context, and everyday spatial practices. During this period, multiple visits were made to the Calico Mills area to better understand the surrounding communities, settlement patterns, and local conditions.

While visiting the site, interviews with home-based women workers were conducted to gain first-hand insight into their everyday routines, housing conditions, and the spatial challenges they face when combining domestic responsibilities with paid work. Visits to the interiors of their homes provided further understanding of how living spaces are adapted to accommodate work-related activities, storage, and circulation. The ethnographic approach used to document women's home-based workspaces was informed and inspired by the research work How the Other Half Builds (Rybczynski et al., 1984), which demonstrates how observational drawing and mapping of people's routines can reveal spatial practices hidden in conventional architectural survey drawings.

In addition, an interview was conducted in collaboration with a fellow student with representatives from a women's organisation supporting home-based workers in Ahmedabad, which provided insight into current initiatives, the main challenges faced by home-based women workers, and the spatial factors affecting their housing and working conditions.

3. MAPPING AND SPATIAL ANALYSIS

Mapping has been used as a key tool to visualise and synthesise spatial information across multiple scales, from urban structure to domestic interiors. Urban analysis has documented different circulation patterns currently used on site, historic landmarks, and public-private gradients, while routine-based and ethnographic mapping has recorded how domestic space is used over time. As part of a collaborative fieldwork exercise with CEPT University, a

series of hand-drawn and diagrammatic maps was produced to record existing site conditions, including built form, open spaces, circulation paths, and informal adaptations. Drawings, diagrams, photographs, and three-dimensional models have been used to examine internal layouts, areas of spatial conflict, and live-work practices. This has helped translate qualitative observations of lived experiences into spatial insights that directly inform architectural decisions.

4. RESEARCH AND CASE STUDIES

Desk research has been used to complement on-site observations and provide broader contextual understanding. Academic journal articles, books, policy documents, and reports by organisations such as WIEGO and MHT have been studied to analyse home-based work, gendered domestic space, and housing conditions in informal urban contexts. Feminist spatial theory has been used to critically analyse how conventional housing layouts often fail to support women's everyday practices and to identify alternative spatial approaches. In addition, urban informality and incrementality frameworks have been studied to better understand how design can translate the real needs of women home-based workers.

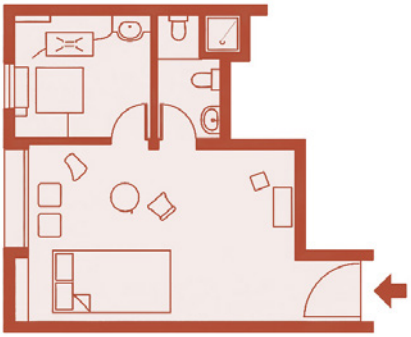
Three architectural precedents have been examined and selected for their relevance to the spatial, environmental, and socio-economic challenges identified in this research. All case studies provide lessons that inform the multi-scalar approach of dwelling, cluster, neighbourhood, and urban scale. The selected case studies are Pol House, Atmaram Chawl and MHADA Housing by Charles Correa.

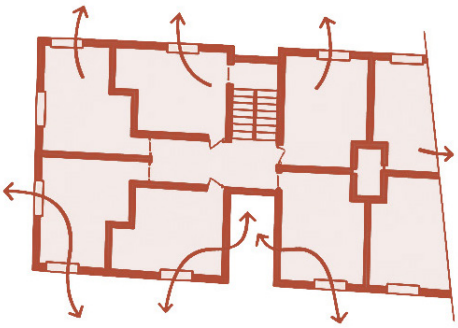
CASE STUDY MHADA HOUSING BY CHARLES CORREA

MHADA Housing (Correa, 1999) explores high-density housing for low-income communities in Mumbai, with a strong emphasis on creating affordable housing that incorporates social spaces for interaction.

The project serves as inspiration for organising dwellings into small clusters of four units, each with dual façades to improve ventilation. These clusters are arranged linearly next to each other, and on certain floors, units are removed to create common terraces that extend the domestic space. This approach directly informs the design, outlining strategies for better incorporating threshold spaces that support not only social interaction among women but also flexibility within their working spaces. Also, it allows consideration of ways in which women can engage collectively without leaving their residential clusters, fostering women's support and agency.

In addition, the dual-façade configuration enables effective cross-ventilation strategies throughout the cluster, improving thermal comfort throughout the dwelling. This is relevant for home-based women workers, as many currently face health problems or have their work interrupted during the hot, dry season due to inadequate ventilation in their spaces.
This case study primarily contributes to the research lens of environment and spatial organisation, clearly demonstrating how clustering and effective ventilation strategies can improve women's livelihoods and comfort within the space.





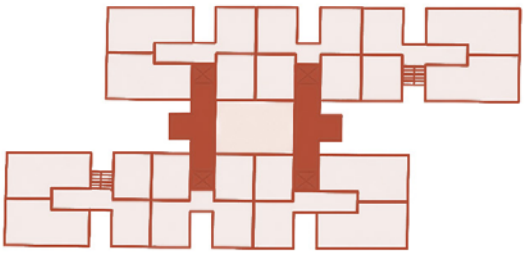


Figure 8. MHADA Dweling Unit, Cross Ventilation and Cornered Units, Typical Flooplan. Source: Author

CASE STUDY ATMRAM CHAWL

The Atmaram Chawl was built by the Chowgules in 1866 (Martin & Baxi, 2011), originally for the Parsi community, reflecting their living patterns, and was later inhabited by Christian communities. The form consists of two clearly differentiated rectilinear blocks, with the main living spaces facing the street and the kitchen separated by a shared circulation corridor. Two circulation corridors within the structure improve ventilation and daylight access, while also allowing for common use by residents.

The project demonstrates how circulation spaces, such as common galleries, can function as semi-private social environments rather than just transitional zones. This is relevant for the socio-economic lens as these in-between spaces offer women opportunities for informal exchange and socialising, as well as visibility and collective organisation without expensive infrastructure. Additionally, introducing voids in corridors allows for natural daylight and cross-ventilation, improving environmental comfort in high-density conditions.

The chawl also illustrates the principle of incremental adaptability over time, as residents converted kitchen units into additional dwellings to rent out and generate income, demonstrating how housing is constantly evolving in response to users' needs. This directly informs the use of incrementality as a design strategy, so that women can gradually expand their homes over time rather than receiving a fixed finished product.

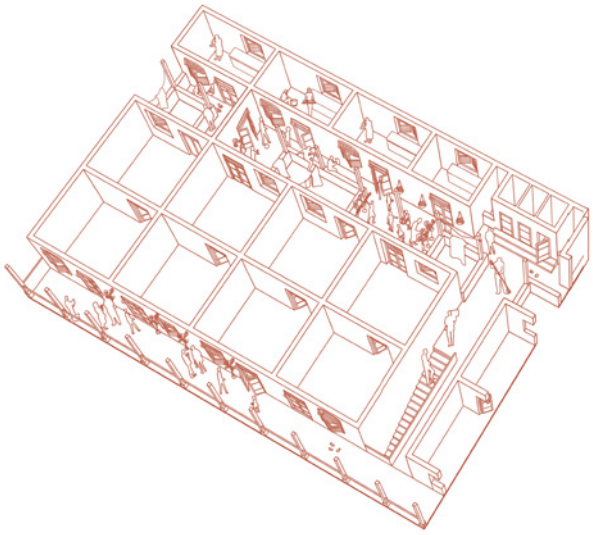


Figure 9. Axonometric drawing of Atmaram Chawl, Mumbai, showing the two rectilinear blocks separated by a shared circulation corridor, with voids allowing for natural daylight and cross-ventilation throughout the high-density structure. Adapted from Martin, R. & Baxi, C. (2011). Recoloured by author.



Figure 10. The shared gallery of Atmaram Chawl, Mumbai, functioning as a semi-private social zone where residents engage in daily activities, illustrating how circulation space transcends its transitional role to become a site of informal exchange and community life. Photo: Kunal Bhatia / The Hindu (2016)

THE POL HOUSE

The Pol house is a traditional housing typology located in the old city of Ahmedabad, where dwellings are arranged in rows between shared internal streets and semi-private thresholds. The cluster organisation in the pol creates a strong sense of community among residents, making it relevant to the research as a model for community organisation among home-based women workers. Also, these semi-private thresholds foster a sense of privacy and security for the residents of the pol, which is taken into consideration when designing for women and children who would reside within the cluster.

Environmentally, the pol housing demonstrates effective use of cooling strategies developed in response to Ahmedabad's extremely hot and dry climate. Narrow and angled streets limit direct solar exposure for residents, while windows with shutters regulate airflow throughout the day. Cross-ventilation is achieved through the strategic positioning of openings across opposing façades, allowing hot air to be exhausted without relying on a private internal courtyard, a strategy directly applicable to the proposed design, where ventilation is achieved through dual-aspect units and shared communal spaces rather than individual courtyards. This is especially relevant for the design as climate conditions constantly affect women's work.

Also, the roof terrace of the pol house can accommodate flexible functions, including sleeping, drying, storage, and even social gatherings. In addition, over the years, some pol houses have also increased in height, removing their sloped roofs and adding floors as they require more space. This is clearly linked to the research, as incrementality should be explored for design. The Pol House contributes to all three research lenses, environmentally through its passive cooling strategies, spatially through its threshold gradients and roof terrace typology, and socio-economically through its clustered community organisation and incremental growth as a lived practice.

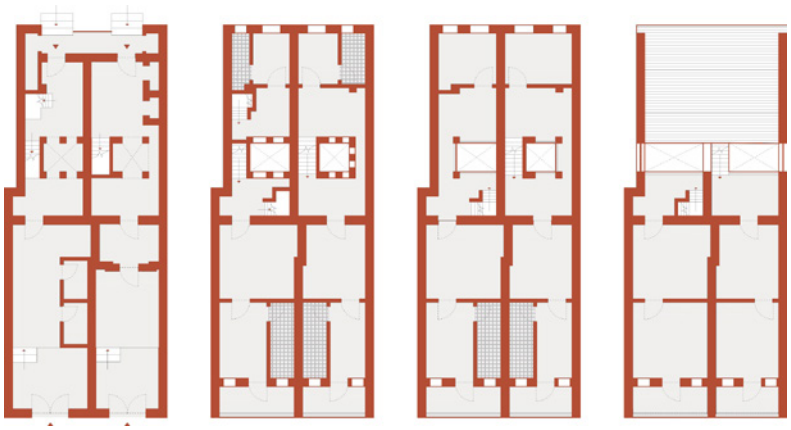


Figure 11. Pol House Typical Floorplans. Source: Author, 2025.

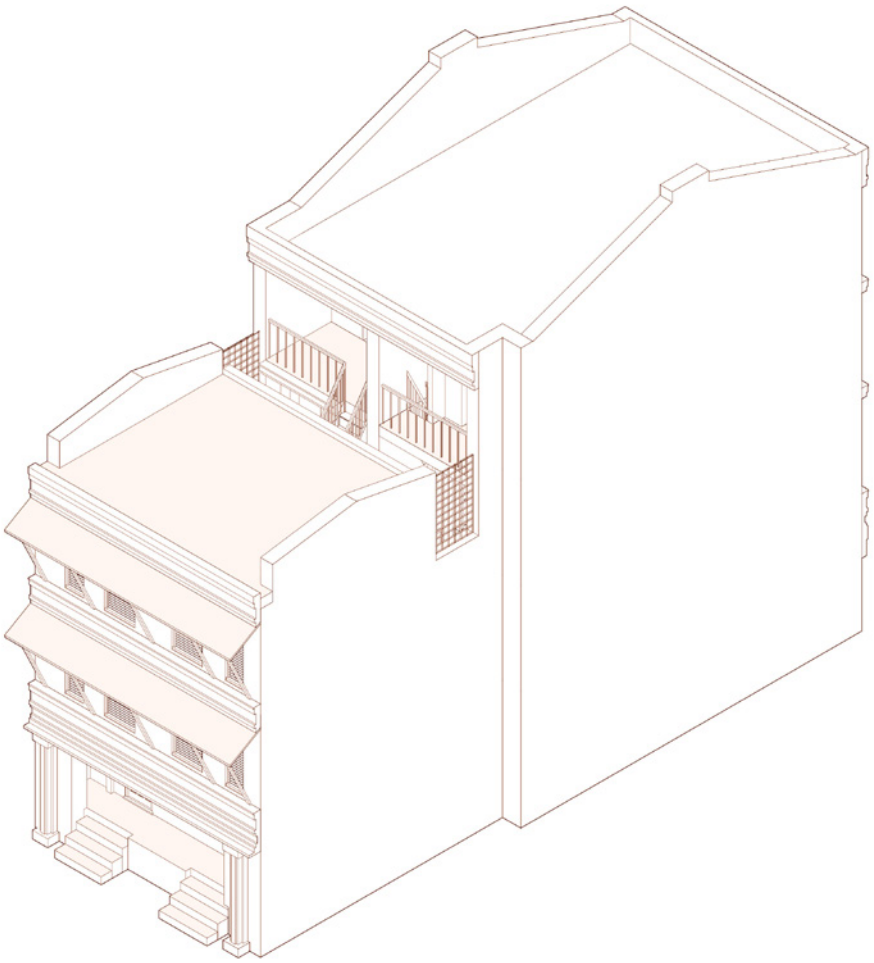


Figure 12. Pol House 3D Axonometric, showcasing opening for courtayrd and louvres in facade. Source: Author, 2025.

RESEARCH PLAN

The project began with a literature review, which helped formulate the theoretical framework, drawing on feminist spatial theory, urban informality, and incremental housing approaches. This was complemented by desk research into existing studies on home-based women workers, the challenges they face, and how these could potentially be addressed through design.

The second phase included a site visit to Ahmedabad, where work was conducted in collaboration with CEPT University to examine low-rise, high-density housing as a dwelling typology that could address the issues identified in the research. During this period, various

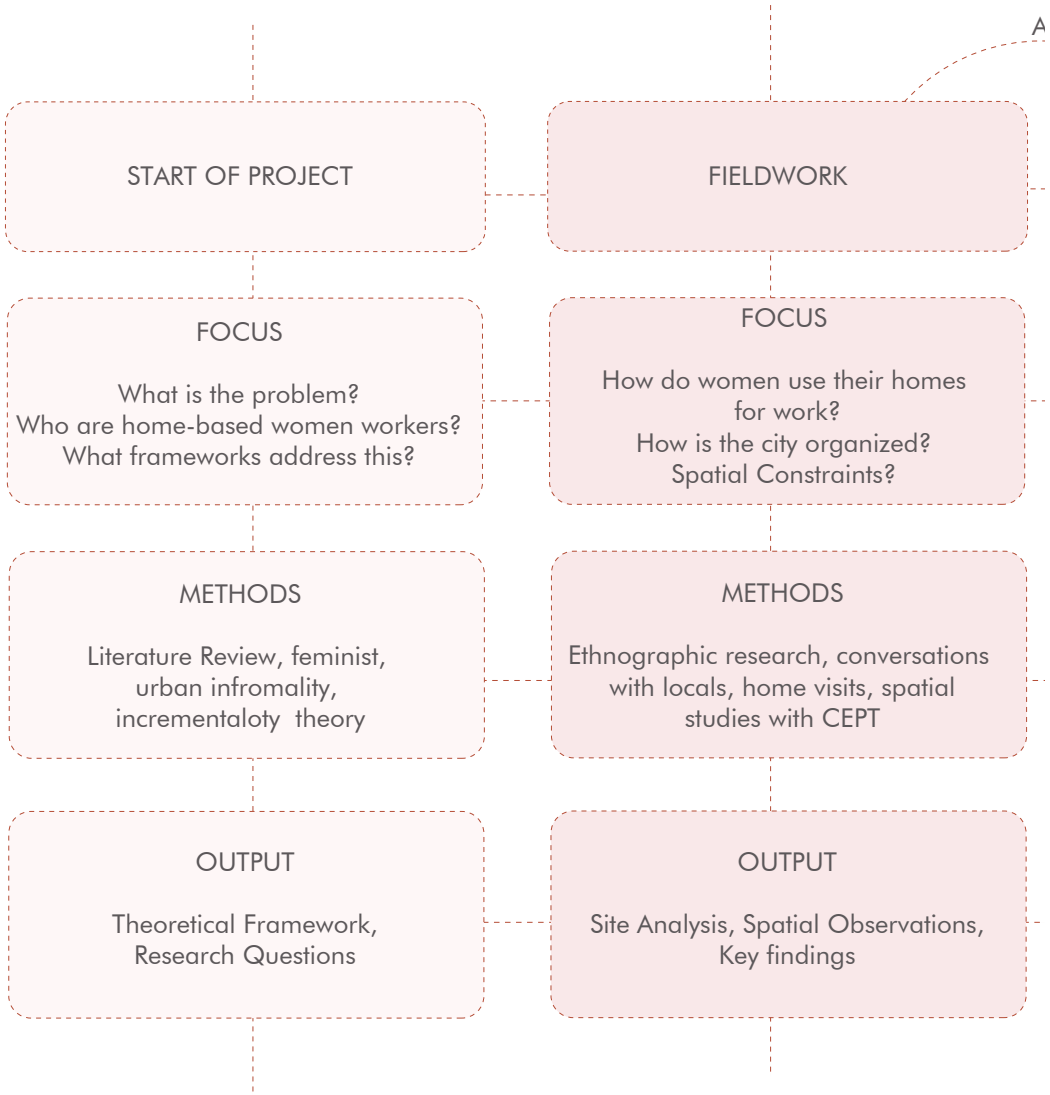
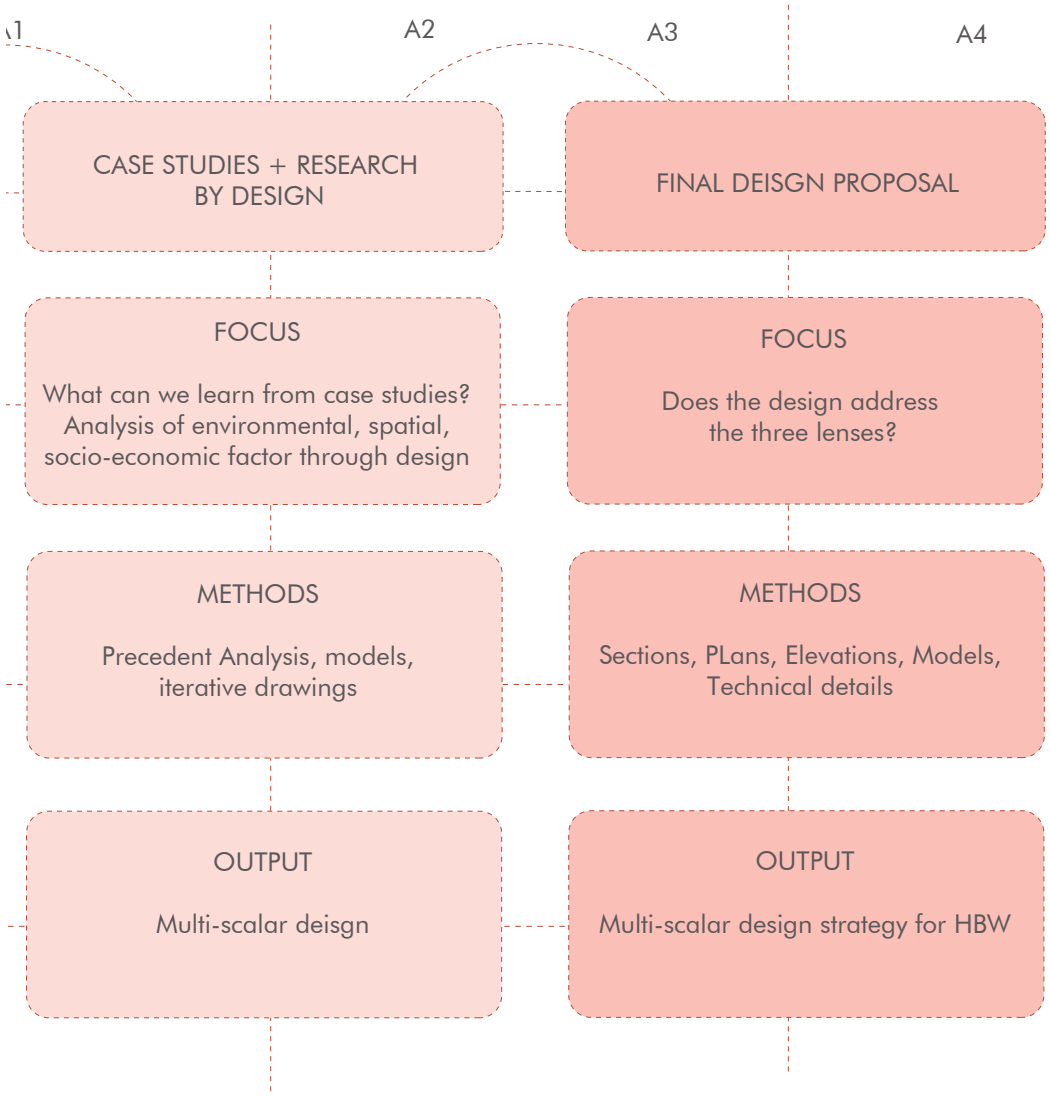
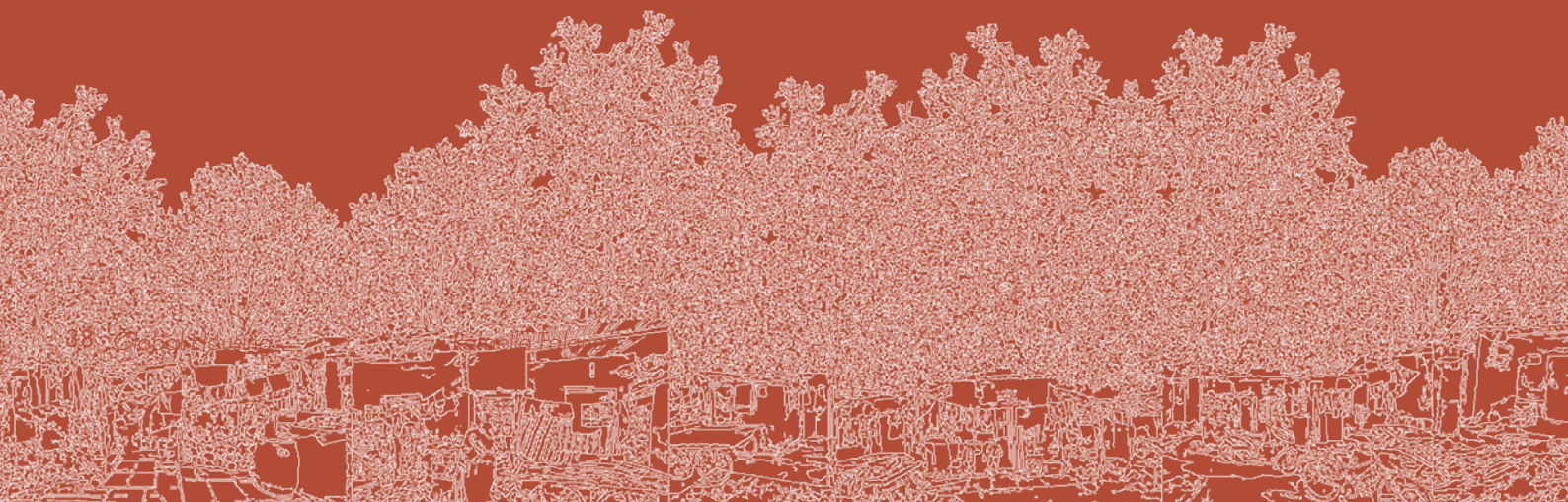


Figure 13. Research Plan Diagram. Source: Author, 2025.

sites were visited, and the final plot was selected based on prior research findings. Further visits were then made to conduct ethnographic research and map the site, which later informed the design findings across all scales.

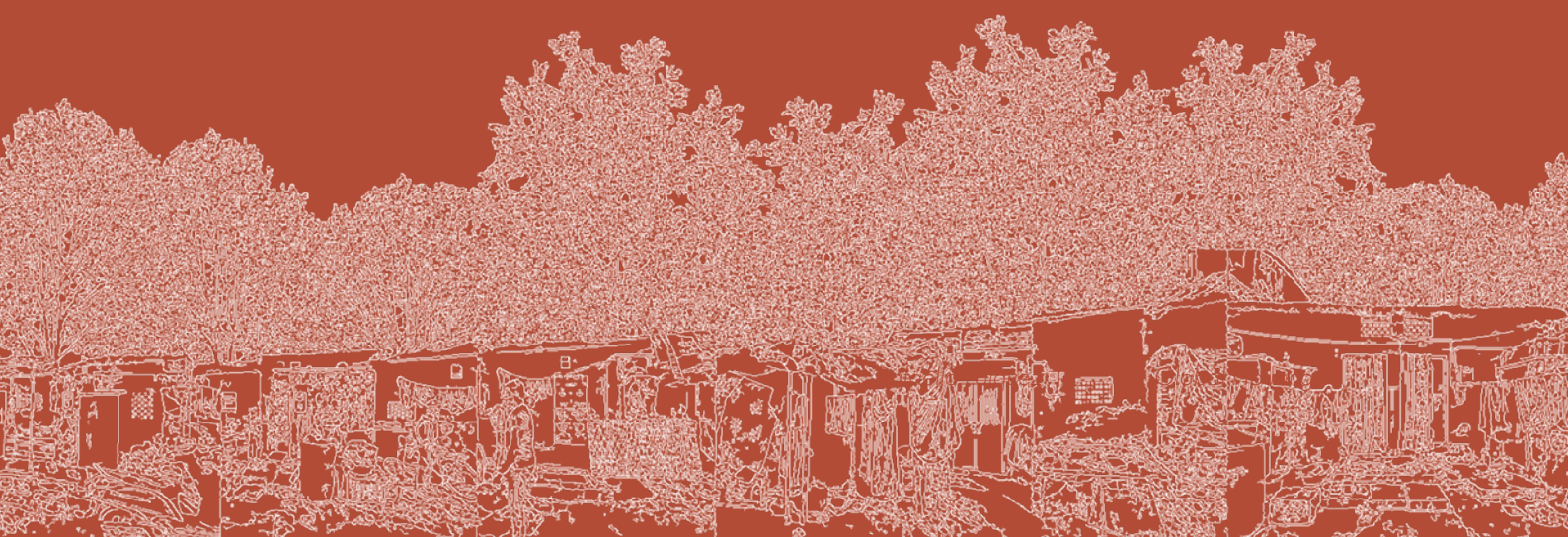
After the trip, research continued through the development of case studies to inform the design, while research-by-design strategies were simultaneously explored, producing multiple design iterations to identify the best ways to create better housing for home-based women workers in Ahmedabad. These iterative explorations consolidated into the final design proposal, driven by a multi-scalar strategy that responds to the spatial, environmental, and socio-economic needs of women home-based workers in Ahmedabad.





FIELDWORK

SITE ANALYSIS, ETHNOGRAPHIC RESEARCH,
INTERVIEWS, MAPPING



AHMEDABAD'S COMMERCIAL URBAN FABRIC

Ahmedabad is characterised by its strong economic character, where the city supports a close integration of living and working. Housing units extend to productive plinths, creating spaces for exchange and social interaction. Streets are characterised by multiple economic corridors, full of garment shops, spice counters, and food markets, among others. However, the economic functions do not end there; rather, it is easy to observe a blurred boundary between what is private, semi-public, and commercial in these spaces. High pedestrian activity within the space supports informal economies. Proximity to markets plays a crucial role in enabling small-scale production by women home-based workers, as it allows them to access raw materials, clients, and economic networks. As a result, Ahmedabad cannot be described as a city where residential units are the only thing present; instead, commercial spaces are always embedded within the urban fabric.



Fig 14. Food stalls withing the residential streets of Ahmedabad's old city. Source: Author, 2025

Figure 15. Blurred boundary between storage, retail and circulation in Ahmedaba's old city .Source: Author, 2025.





Fig 16. Mobile garment cart in Ahmedaba's Old city reflecting the dispersed nature of informal retail. Source: Author, 2025


MINORITY
(HAJJ CELL)
TOURS & TRAVELS
ZIYARAT
NER



Figure 17. A sugarcane juice cart occupying the street in Ahmedabad's old city, illustrating the informal food economy embedded within the urban fabric. Source: Author, 2025.

Figure 18. A street vendor selling dry sweets and packaged snacks from a mobile cart in Ahmedabad's old city, reflecting the street-level informal economy characteristic of the city. Source: Author, 2025.


॥ શ્રી ગોતમસ્વામીને નમઃ ॥
હીમોગ્લોબીન
કેલ્શીયમ
બાળકોમાં પ્રોટીન વધારવા
મીઠાઈ તથા લાડુ બનાવવા
ખજૂર પાક બનાવવા
ઈમ્યુન સિસ્ટમ વધારવા
સુગર ફ્રી ડેટ્સ
300
250


FIXED RATE



Figure 19. A small fabric and haberdashery stall in Ahmedabad's old city, typical of the garment supply network that home-based women workers in Calico Mills depend on for raw materials. Source: Author, 2025.

Figure 20. A textile vendor working from the threshold of her unit in the old city, where the interior of the shop extends directly onto the street. Source: Author, 2025.



Fig 21. High Pedesitrian Activity around Ahmedabad's Old city , with vendors occupying street edge. Source: Author, 2025


LION BRAND
PARCO
RAJSHREE

THE IMPORTANCE OF INCREMNETALITY

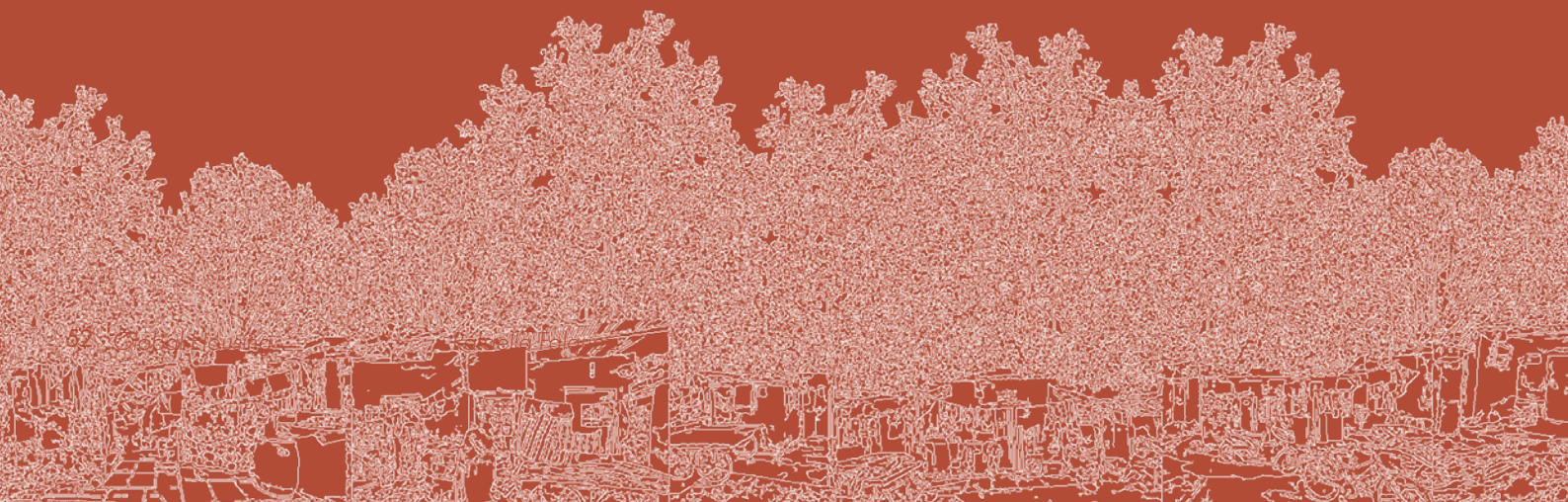
The city is also characterised by constant incremental growth in dwelling units. Over time, the dwelling tends to grow as users' needs and resource availability change. The incremental housing extension reflects changes within the family that inhabit it, for instance, the need for more space as the family becomes bigger, the need for a dedicated workspace, or simply the accumulation of more belongings. As shown in Figures 22 and 23, this process results in irregular façade forms. For instance, the house would leave exposed concrete columns, with the intention of building upwards, while additional floors sit unevenly on top of each other. As this occurs, the materials' finish varies by the face of the construction. For instance, the right-hand side image showcases a room that has been added to the dwelling on the last floor but has not yet been fully finished, with laundry hanging from the balcony and small plants in the recessed opening, suggesting that the space is already inhabited. Also, the left-hand side shows an image of a new staircase on the side of the housing, creating new access to the roof terrace. In most cases, incrementality within the city occurs in a self-built manner, with a lack of structure or planning, leading to irregular façade forms but responsive layouts that meet users' needs. However, some cases show that incremental additions to housing often lack adequate ventilation or daylight, thereby compromising living standards. The proposed housing design should allow for adaptation without sacrificing spatial and environmental performance.



Figure 22. Self-built incremental housing in Ahmedabad, showing exposed concrete columns and unfinished upper floors indicating planned future vertical expansion, as well as new staircases added to side facades. Source: Author, 2025.

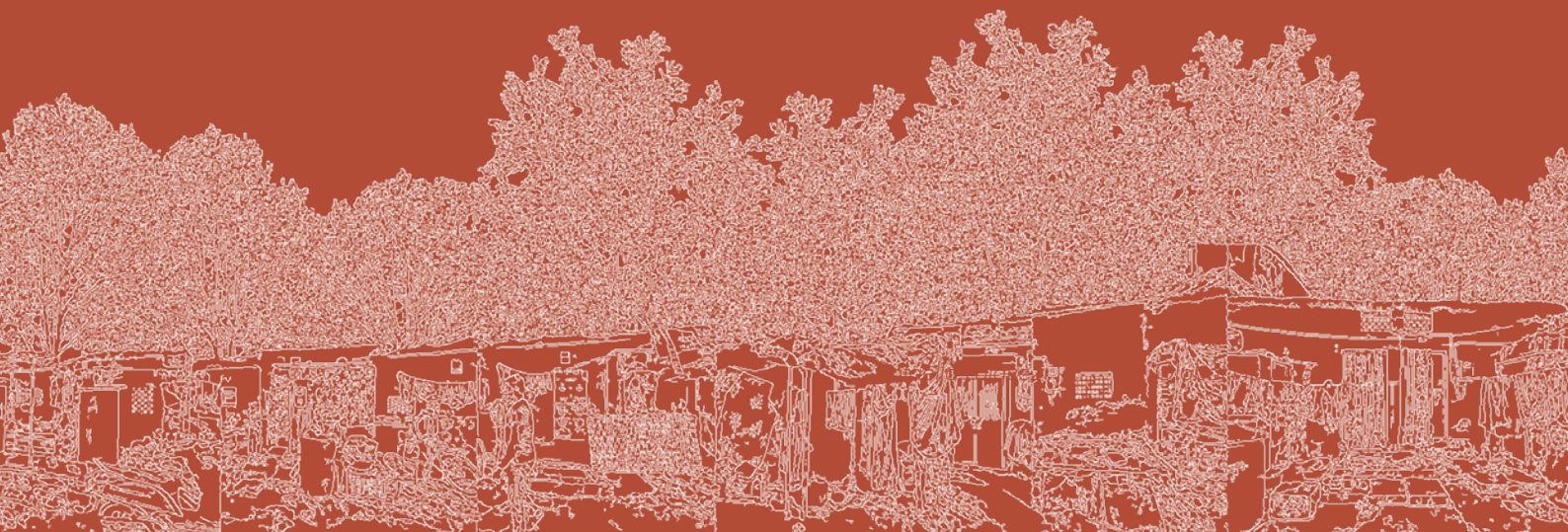
Figure 23. An incrementally extended dwelling in Ahmedabad, with an added upper storey rising above the existing roofline. The unfinished opening and hanging laundry suggest the space is in active use despite incomplete construction. Source: Author, 2025.





CALICO MILLS

SITE CONTEXT



SITE CONTEXT: CALICO MILLS

The project is located in Calico Mills on the eastern side of Ahmedabad, a former textile mill district characterised by post-industrial decline and the emergence of informal settlements. Due to the closure of the textile mill industry, the area has undergone significant socio-economic transformation, forcing individuals to shift towards informal economies and home-based work.

The site is currently bordered by the city's major flower market and vegetable market to the north, the Sabarmati River to the west, the former textile mill site to the east within a dense forest area, and a dense informal settlement to the south. The location places the site in an area with strong economic infrastructure, reinforcing the presence of informal economies within the city.

The studied settlement contains approximately 5000 to 6000 residents living in approximately 1,200 informal housing units bordering a single linear road. The area is also characterised by having a mixed religious community and a strong integration of work environments within the dwellings.



Figure 24. Everyday life within the Calico Mills informal settlement, showing the dense concentration of dwellings and street activity along the single linear road within the site. Source: Author, 2025.



Site Analyzed



Figure 25. Everyday life within the Calico Mills informal settlement, houses are clustered linearly around main road. Source: Author, 2025.


CENTRE FOR SIGHT



Figure 26. Residents gathering at the threshold of a dwelling within the Calico Mills settlement, where the step and plinth function as an extension of domestic space into the street. Source: Author, 2025.

Figure 27. A street vendor and residents congregating along the main linear road of the Calico Mills settlement, illustrating the integration of small-scale economic activity within the residential fabric. Source: Author, 2025.



BORDERS

The site is defined by a series of active edges that shape the city's economic and spatial relationships. To the north, the flower and vegetable market attracts thousands of pedestrians daily, making it a hub for informal economic networks. The proximity of the site to these places creates constant opportunities for small-scale production and sales, especially for women home-based workers in the area. As seen in the photographs, the flower and vegetable market to the north attracts a high volume of pedestrians, with vendors occupying the street edge and creating a dense, active economic corridor directly accessible from the site. To the South, the dense settlement of Calico is known for its many textile and garment hubs, making it a key place for home-based women workers, many of whom work in the garment industry and must walk there to collect raw materials or deliver finished goods to contractors. However, the existing connection is currently poor, increasing travel distances for women approaching the site. The Sabarmati Riverfront lies to the west of the site, forming a strong visual and hard-edge boundary for Calico's residents. While it offers a great view and benefits such as continuous airflow from the river's breeze, it's currently disconnected, segregating the existing community from the urban fabric. Finally, to the east, the former Calico Chimney Mill stands, showcasing the area's historic industrial history. Nevertheless, as a dense forest has grown in that area, it is difficult for the community or visitors to access the historic landmark.



Figure 28. Flower vendors sorting and selling at the market to the north of the Calico Mills site. Source: Author, 2025.

Figure 29. A woman vendor selling vegetables at the market bordering the northern edge of the Calico Mills site. Source: Author, 2025.


Asha Fish



Figure 30. A garment hub to the south of the Calico Mills site, where finished bags and textile goods are displayed across the dwelling. Women home-based workers in the area walk to hubs such as this to collect raw materials and deliver finished goods to contractors. Source: Author, 2025.





Figure 31. View to Sabaramti River, River Front Road and Calico Mills historic textile chimney from Sadar Patel Bridge. Source: Author, 2025.





Figure 32. The Sabarmati Riverfront promenade bordering the western edge of the Calico Mills site. Despite offereing open views the raised wall separating it form the roverfront road creates a hard boundary that currently disconnects the settlement from the river. Source: Author, 2025.



MATERIALS AND CLIMATE RESPONSE

Dwellings within the site demonstrate a range of crafted climate-responsive strategies developed by residents. Openings such as windows and doors are often covered with bed sheets or temporary materials to reduce solar heat gain and protect interior spaces from direct sunlight. As shown in the image below, corrugated steel roof overhangs serve to reduce direct sunlight on dwellings, while permeable bricks enhance ventilation within the space. These openings are designed to remain permeable, allowing for continuous airflow and natural ventilation within the dwelling. The photograph on the right shows typical materials used on site: corrugated steel roofing, brick, and plastic sheet overhangs layered over the roof to prevent water leakage and heat gain. Despite these adaptations, the use of low-cost materials such as concrete blocks, brick and metal roofing can lead to high thermal mass and increased heat absorption, often resulting in uncomfortable indoor conditions during extreme heat, when not adequately ventilated. Also, when it rains, water leaking from roofs can damage interior spaces and users' belongings.



Figure 33. House at Calico Mills site showcasting crafted climate responsive strategies. Source: Author, 2025.

Figure 34. Mixed material construction used in Calico Mills. Source: Author, 2025.



THE OTLA

Most of the houses in Calico had a Veranda or Otla in front of them. This architectural threshold creates a semi-private space between the home and the street, used for sitting, working, social interaction, or even resting. As visible in the left photograph, women gather around the otla, some to cook, some to socialise, demonstrating how the space can accommodate overlapping domestic activities. In addition, the right-hand-side photograph showcases cooking utensils, confirming that food preparation sometimes must take place in the otla, as there might not be enough storage or space inside the home. The domestic space extends into the public realm without being intrusive on the urban fabric. The integration of this space within the unit is critical, as it allows users to maintain visibility while remaining private, especially when working.



Figure 35. Women socializinga nd cooking around otla. Source: Author, 2025.

Figure 36. Cooking utensiles palced on otla showcasting alck of storage space within the unit. Source: Author, 2025.



DRAWING CONCLUSIONS WITH CEPT

After visiting the site, a collaborative drawing was produced in conjunction with CEPT University students during fieldwork. Together, we brought observations from across the site into a single spatial document. The objective of the drawing was to capture the essence of Calico Mills, its main linear road, the Sabarmati Riverfront, the surrounding markets, and the existing Calico Chimney, among others. The exercise helped understand the site beyond a technical lens, and to capture the everyday activities that occur within it: the noises, the smells, the major landmarks such as the large mosque, but also the smaller temples, the busier and quieter edges, thresholds, entrances, and even the cemetery and crematorium to the north.

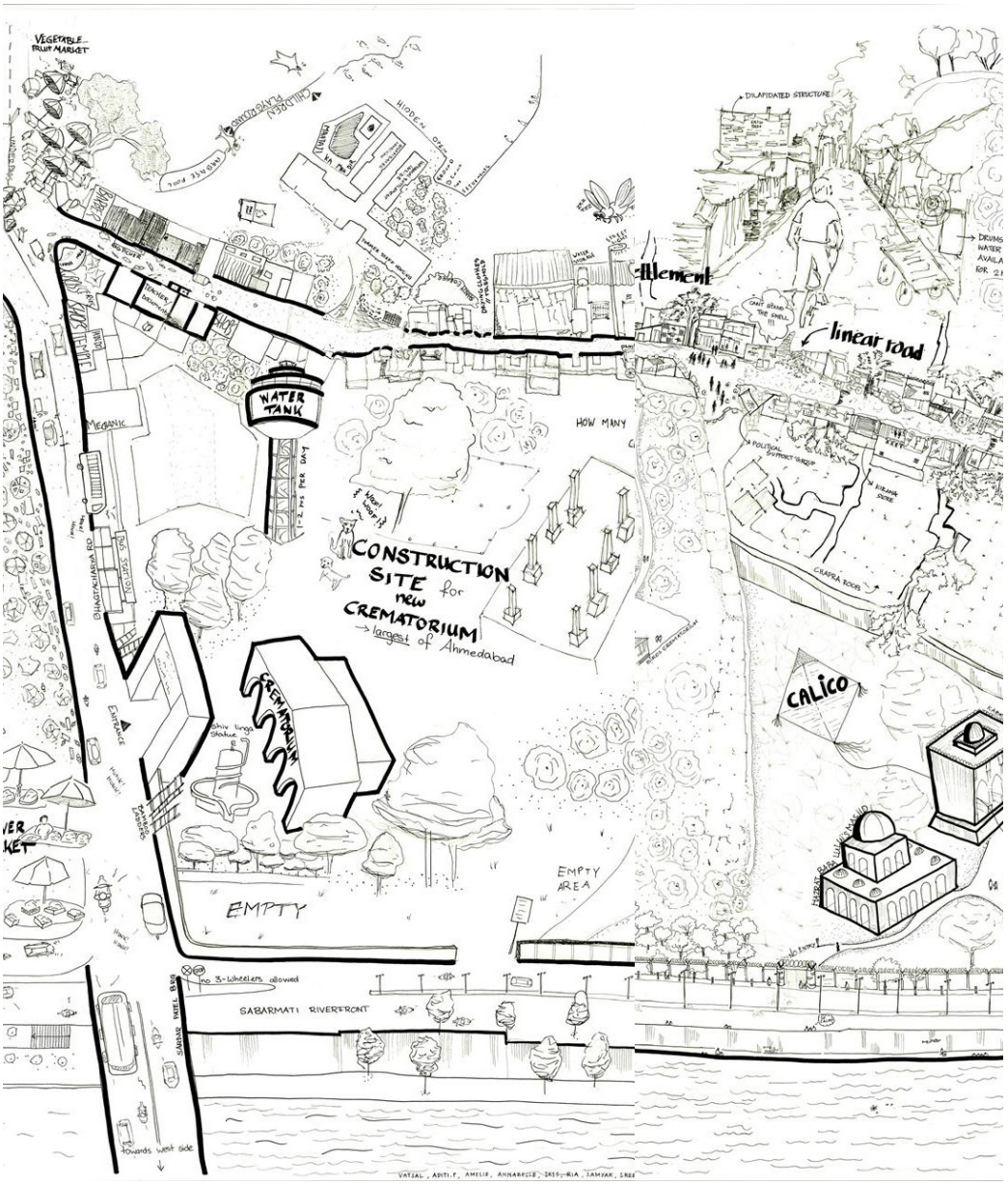
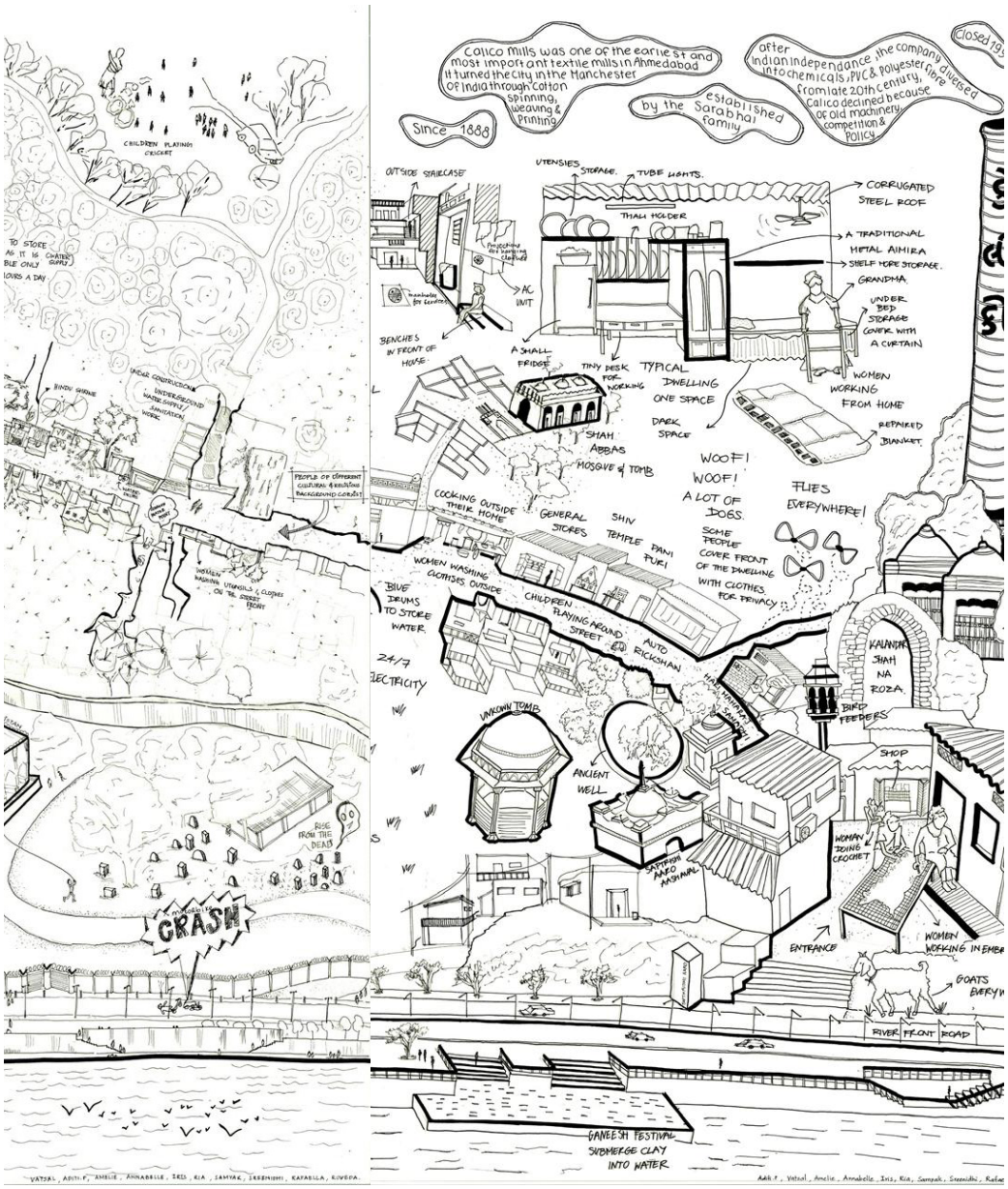
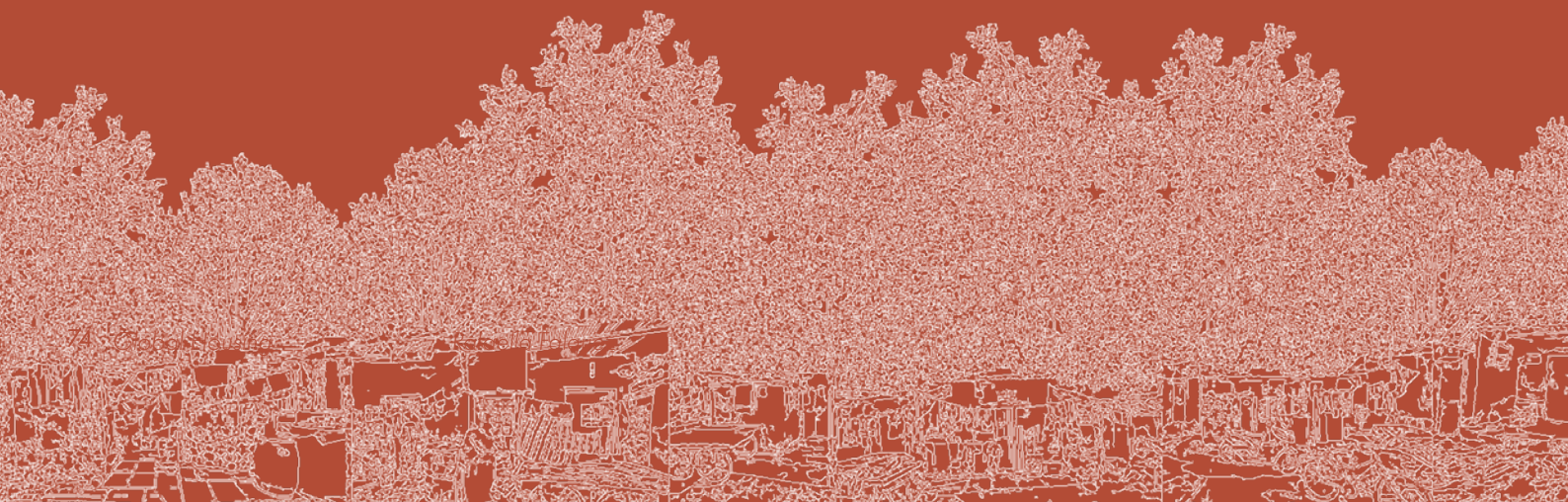


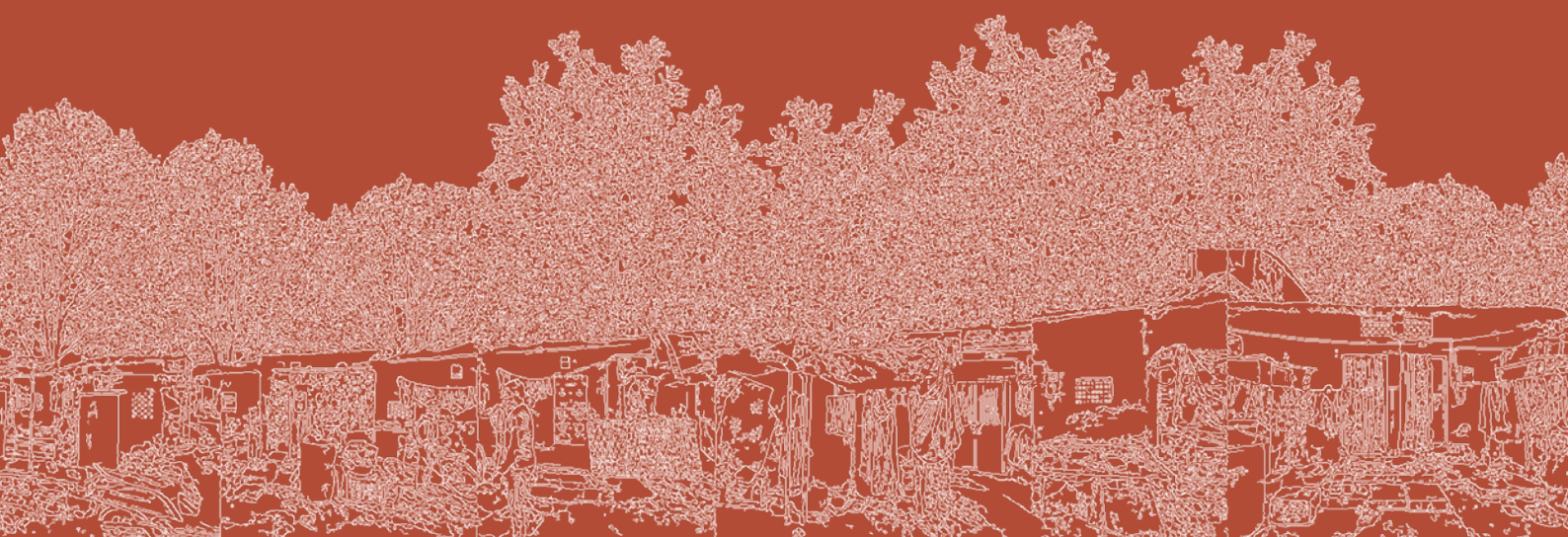
Figure 37. Collaborative observational drawing of the Calico Mills site produced with students from CEPT University during fieldwork, Ahmedabad, 2025. Source: Author and CEPT University students, 2025.


Calico Mills was one of the earliest and most important textile mills in Ahmedabad
It turned the city in the Manchester Of India through Cotton Spinning, Weaving & Printing
Since 1888
established by the Sarabhai family
after Indian independance, the company diversified into chemicals, PVC & Polyester, in the from late 20th century, Calico declined because of old machinery, competition & Policy
Closed 19
CHILDREN PLAYING CRICKET
OUTSIDE STAIRCASE
UTENSILS
STORAGE
TUBE LIGHTS
CORRUGATED STEEL ROOF
THALI HOLDER
A TRADITIONAL METAL AIMIRA
SHELF FOR STORAGE
GRANDMA
UNDER BED STORAGE COVER WITH A CURTAIN
AC UNIT
BENCHES IN FRONT OF HOUSE
A SMALL FRIDGE
TINY DESK FOR WORKING
TYPICAL DWELLING ONE SPACE
DARK SPACE
WOMEN WORKING FROM HOME
REPAIRED BLANKET
SHAH ABBAS MOSQUE & TOMB
WOOF! WOOF! A LOT OF DOGS.
FLIES EVERYWHERE!
COOKING OUTSIDE THEIR HOME
GENERAL STORES
SHIV TEMPLE
PANI PURI
SOME PEOPLE COVER FRONT OF THE DWELLING WITH CLOTHES FOR PRIVACY
WOMEN WASHING CLOTHES OUTSIDE
CHILDREN PLAYING AROUND STREET
AUTO RICKSHAW
BLUE DRUMS TO STORE WATER
24/7 ELECTRICITY
KALANDAR SHAH NA ROZA
BIRD FEEDERS
SHOP
UNKOWN TOMB
ANCIENT WELL
WOMAN DOING CROCHET
ENTRANCE
WOMEN WORKING IN EMBR
GOATS EVERYW
RIVER FRONT ROAD
GANESH FESTIVAL SUBMERGE CLAY INTO WATER
BUGS FROM THE DEAD
CRASH



WOMEN HOME-BASED WORKERS

THE USER



HOME-BASED WOMEN WORKERS INTERVIEWS

This section focuses on a micro-scale analysis of three existing dwellings in Calico Mills belonging to home-based women workers. In-person visits were conducted to document the realities of women inhabiting these spaces. Semi-structured interviews were conducted to better understand their daily routines, work patterns, and household dynamics, including questions about working hours, household size, and how they integrate live-work activities into their spaces.

The interviews were conducted in Gujarati by a fellow student from CEPT University, and later translated into English. Even though effective communication with participants was achieved, it is important to acknowledge that certain meanings may have been altered or lost in translation. Despite this, the collected data provides valuable insights into the lives and spatial realities of home-based women workers in Calico Mills. As the photographs show, home-based work is not confined to the interior of the dwelling; they tend to work outside, in shared outdoor spaces and on the streets, making it clear that conventional housing design fails to accommodate the need for flexible spaces.



Figure 38. A home-based woman worker carrying out garment embroidery work along the Sabarmati River-front, Ahmedabad. Source: Author, 2025.

Figure 39. A woman sitting in the doorway threshold of her dwelling in the Calico Mills settlement, working from the otla. Source: Author, 2025.



HOME-BASED WOMEN WORKER 1

The first resident is a garment worker living in a joint-family household consisting of 12 people across three families. Work is carried out collectively within the domestic space, adjacent to an open kitchen, where cooking and production constantly overlap. Although a small area has been designated for two sewing machines, she reports limited storage, water leakage, and inadequate spatial separation between living and working areas.

She also manages a small garment network involving other women in the neighbourhood. However, in recent months, the amount of work provided by contractors has declined due to increasing competition from larger textile manufacturers outside the city. As a result, women in Calico have experienced a reduction in available work, negatively affecting their economic stability.

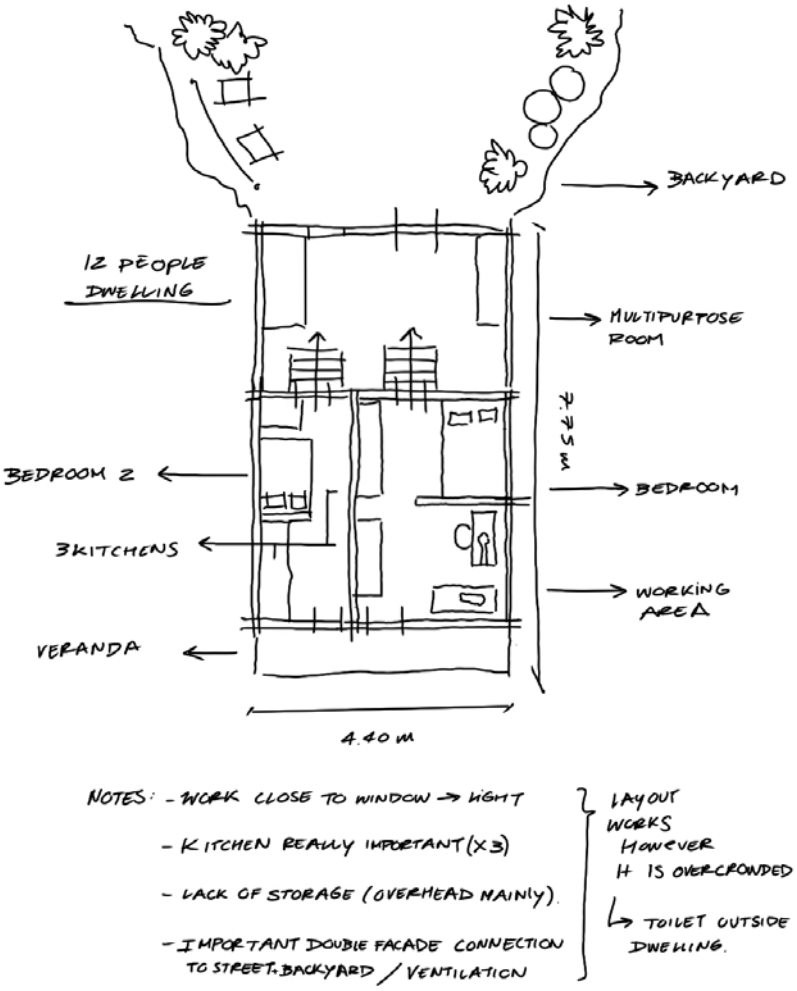


Figure 40. On-site sketches of Home-Based Women Worker 1. Orthographic plan (left) and 3D drawing (right) of the joint-family dwelling shared by 12 people across three families, documenting the overlap of domestic life and garment production. Source: Author, 2025.

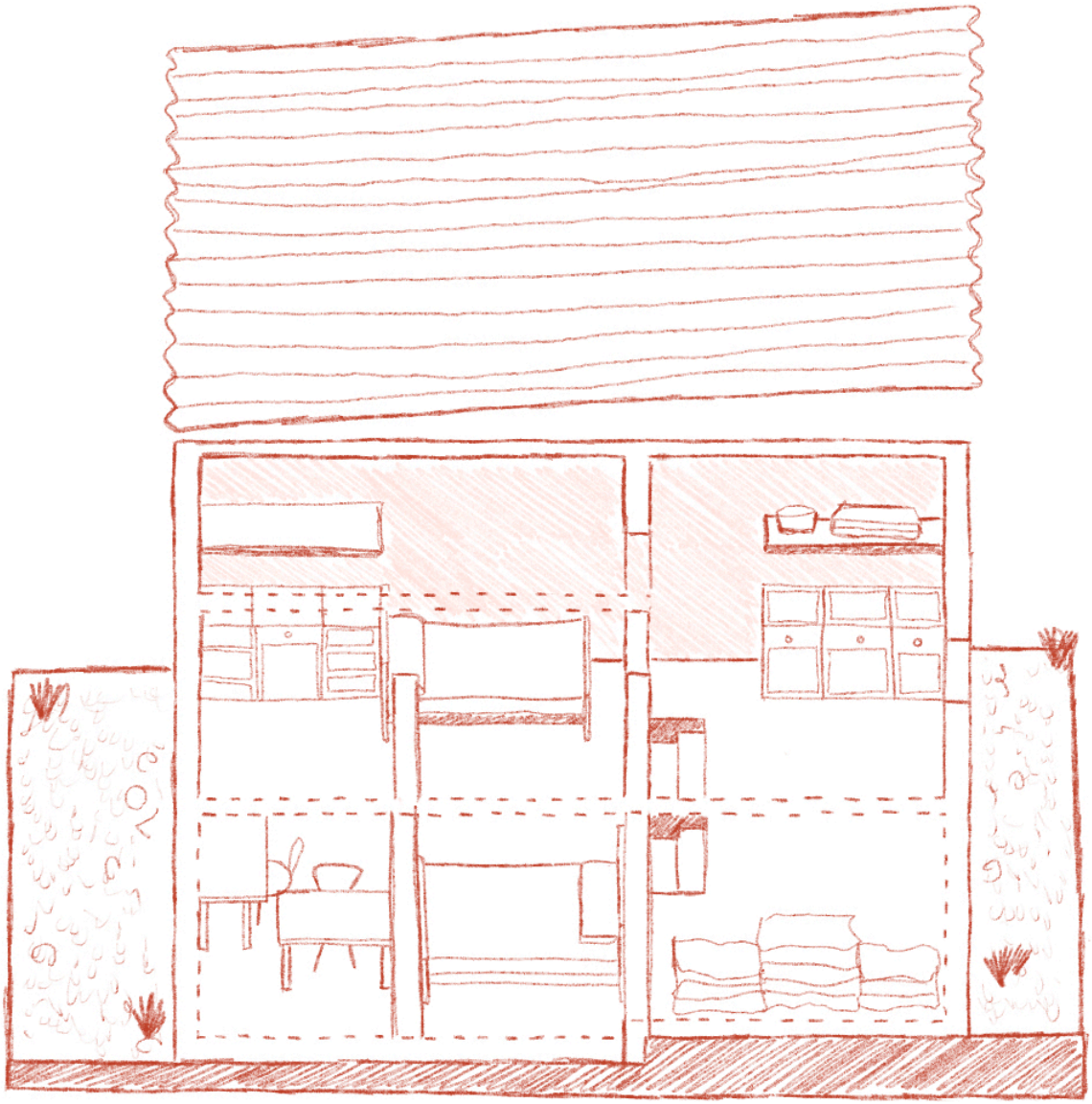








Figure 41. Interior photographs of Sapna's dwelling, Calico Mills, showing the two-sewing-machine working room, fabric stored on overhead shelves and above doorframes, corrugated metal roof, fabric screens used to regulate solar gain, the backyard used for drying laundry, and the exterior façade. Source: Author, 2025.













HOME-BASED WOMEN WORKER 2

The second resident we interviewed is a garment worker living in Calico Mills who produces bags for a local contractor in the southern part of the area. She lives with her husband and three children in a rented house, having migrated from Uttar Pradesh in search of work. Her husband assists with production; however, he often needs to travel long distances to the Old City to collect raw materials, which adds financial strain to the household.

In addition to her work, she is responsible for domestic tasks, waking up at 6 a.m. to prepare breakfast and interrupting her work routine to cook lunch and dinner for her family. This overlap between living and working activities extends her working hours, often requiring her to continue production until midnight with little time for rest. The dwelling experiences extreme heat during the summer due to inadequate ventilation, and spaces for sleeping, cooking, and storing goods frequently overlap. She also expressed concern about potential government relocation, which discourages her from investing in improvements to the house.

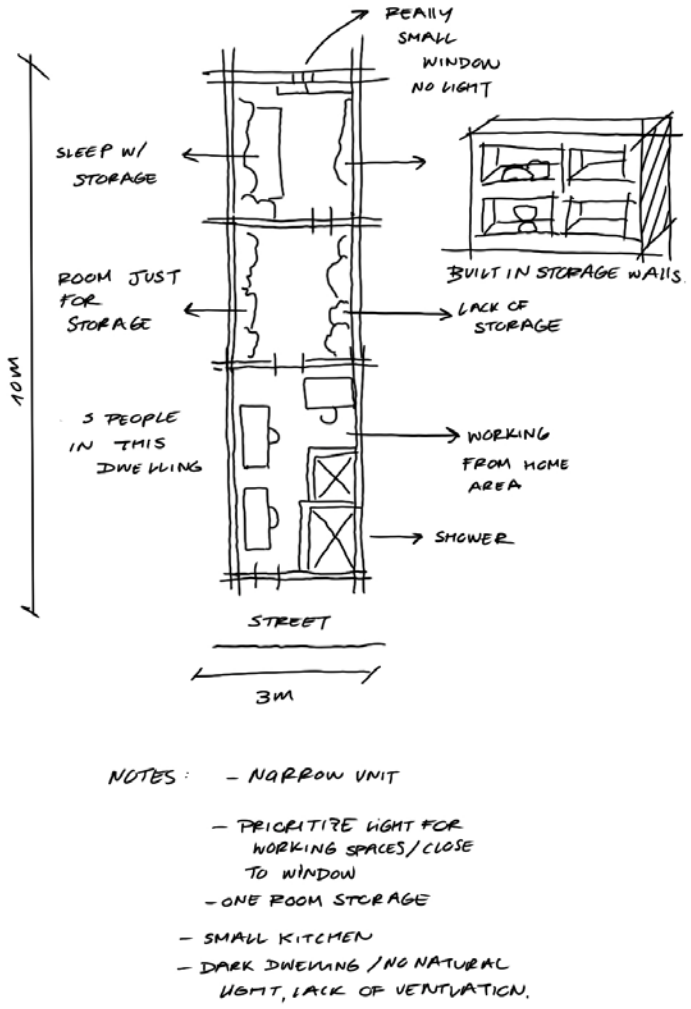


Figure 42. On-site sketches of Home-Based Women Worker 2. Orthographic plan (left) and 3D drawing (right) of the narrow rented dwelling shared by five people, documenting the overlap of living and working space and the lack of ventilation. Source: Author, 2025.

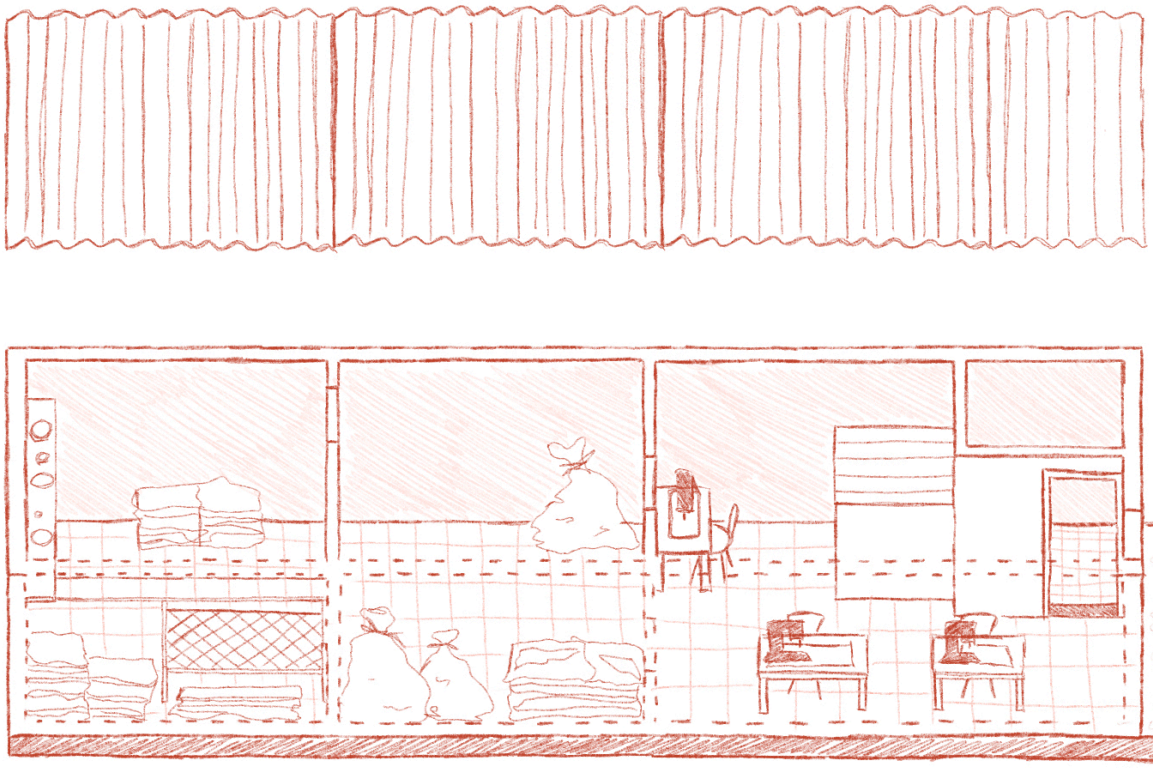




Figure 43. Interior photographs of dwelling at Calico Mills, showing three sewing machines in the working area, large piles of cut black fabric stored on the floor due to lack of dedicated storage, kitchen shelving, the ornate blue entrance door opening directly onto the main working room, and raw materials stacked throughout the domestic space. Source: Author, 2025






ECOMAX

HOME-BASED WOMEN WORKER 3

The third resident we interviewed lives in a shared household that has undergone spatial changes due to disputes between family members. Originally, the dwelling functioned as a single open space accommodating multiple occupants. Following these disputes, a wall was constructed to divide the space, resulting in increased spatial fragmentation.

She also works within the garment industry. She mentioned that she previously received work from the first resident we interviewed; however, it has been several months since she last received requests, negatively affecting her family's financial situation. In addition, she noted that the house experiences extreme heat during the summer months and has irregular access to water, which is only available for approximately two hours per day and must be stored. She also expressed concerns about potential relocation.

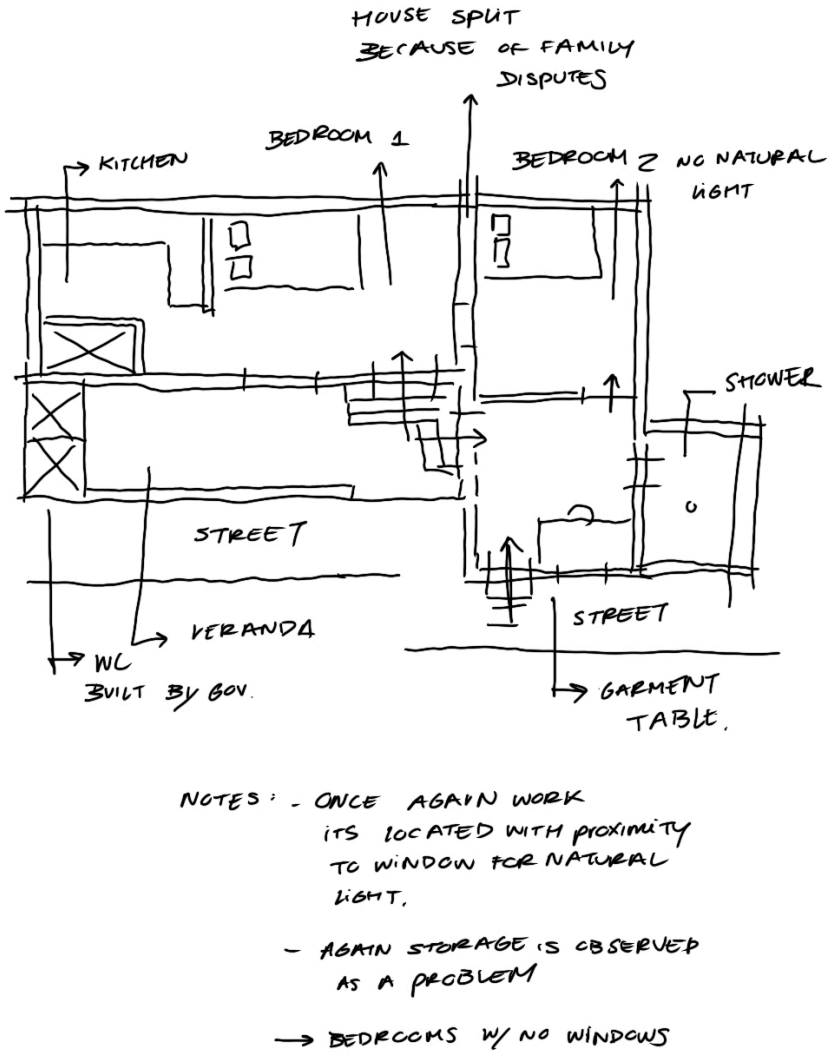


Figure 44. On-site sketches of Home-Based Women Worker 3. Orthographic plan (left) and 3D drawing (right) of the shared dwelling, documenting the spatial fragmentation caused by a dividing wall changing house layout over years. Source: Author, 2025





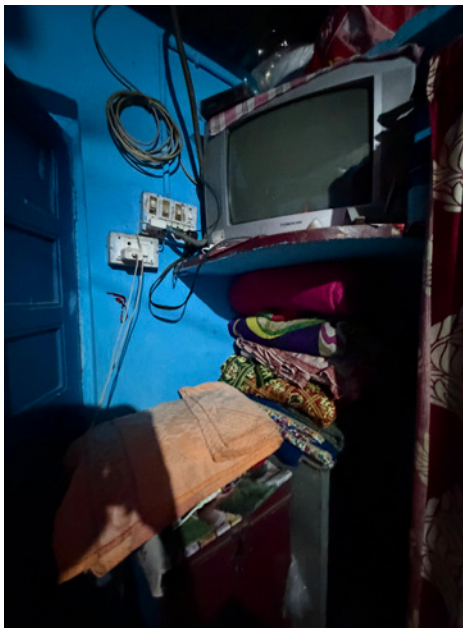




Figure 45. Interior photographs of Komal's dwelling, Calico Mills, showing the sewing machine positioned directly beside the window for natural light, the sleeping area, the bedroom with curtain partition, the exterior façade, the cramped kitchen, and household goods competing for surfaces throughout the unit. Source: Author 2025.









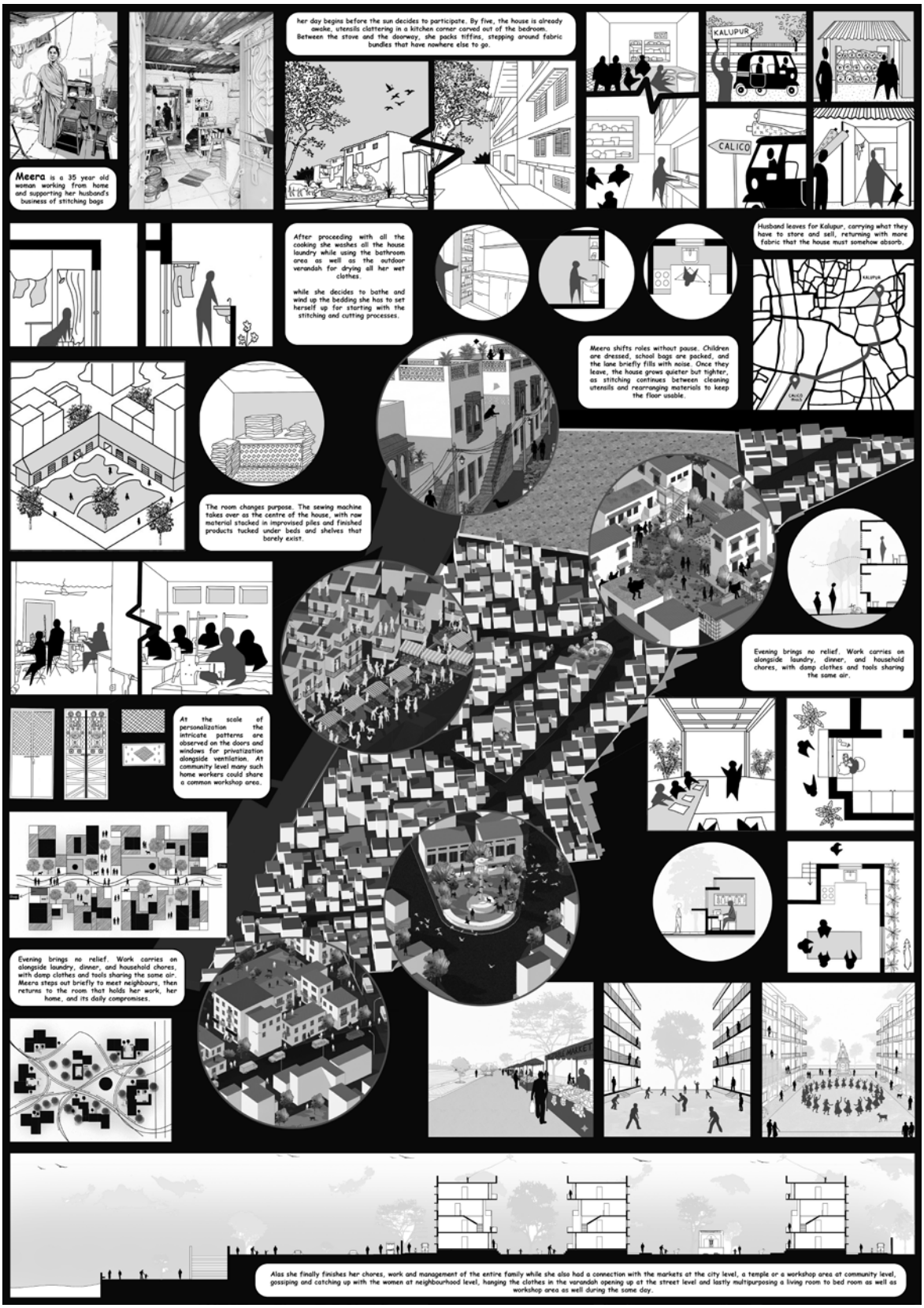




A DAY IN A HOME-BASED WORKER LIFE

A storyboard was produced in collaboration with CEPT University students following a series of site visits. Drawing on one of the previous interviews, the storyboard seeks to map and translate the spatial routines of the home-based women workers throughout their day. The drawing reveals that the routine of home-based women workers is affected by 4 different scales: the dwelling, the cluster, the neighbourhood street, and the city's market network. Rather than analysing these conditions in isolation, the drawing, as previously investigated, captures how the space of home-based women workers is not only spatial but also temporal, changing throughout their day.

Figure 46. Illustration developed in collaboration with CEPT students during site visit to Ahmedabad (CEPT (2025).


Meera is a 35 year old woman working from home and supporting her husband's business of stitching bags
her day begins before the sun decides to participate. By five, the house is already awake, utensils clattering in a kitchen corner carved out of the bedroom. Between the stove and the doorway, she packs tiffins, stepping around fabric bundles that have nowhere else to go.
KALUPUR
CALICO
After proceeding with all the cooking she washes all the house laundry while using the bathroom area as well as the outdoor verandah for drying all her wet clothes.
while she decides to bathe and wind up the bedding she has to set herself up for starting with the stitching and cutting processes.
Husband leaves for Kalupur, carrying what they have to store and sell, returning with more fabric that the house must somehow absorb.
Meera shifts roles without pause. Children are dressed, school bags are packed, and the lane briefly fills with noise. Once they leave, the house grows quieter but tighter, as stitching continues between cleaning utensils and rearranging materials to keep the floor usable.
The room changes purpose. The sewing machine takes over as the centre of the house, with raw material stacked in improvised piles and finished products tucked under beds and shelves that barely exist.
Evening brings no relief. Work carries on alongside laundry, dinner, and household chores, with damp clothes and tools sharing the same air.
At the scale of personalization the intricate patterns are observed on the doors and windows for privatization alongside ventilation. At community level many such home workers could share a common workshop area.
Evening brings no relief. Work carries on alongside laundry, dinner, and household chores, with damp clothes and tools sharing the same air. Meera steps out briefly to meet neighbours, then returns to the room that holds her work, her home, and its daily compromises.
Alas she finally finishes her chores, work and management of the entire family while she also had a connection with the markets at the city level, a temple or a workshop area at community level, gossiping and catching up with the women at neighbourhood level, hanging the clothes in the varandah opening up at the street level and lastly multipurposing a living room to bed room as well as workshop area as well during the some day.

HOW THE OTHER HALF BUILDS AHMEDABAD

Informed by the methodology of How the Other Half Builds (Rybczynski et al., 1984), the following drawings document the spatial realities of home-based women workers in Calico Mills through direct observation and measurement. Rather than conventional architectural survey drawings, these sketches record how domestic space is actually used across different home-based activities, for intance, garment production, embroidery, agarbatti rolling, food processing, among others. This captures the ergonomic conditions, spatial constraints, and live-work overlaps that women navigate every day. These observations directly informed the spatial principles applied across the design.

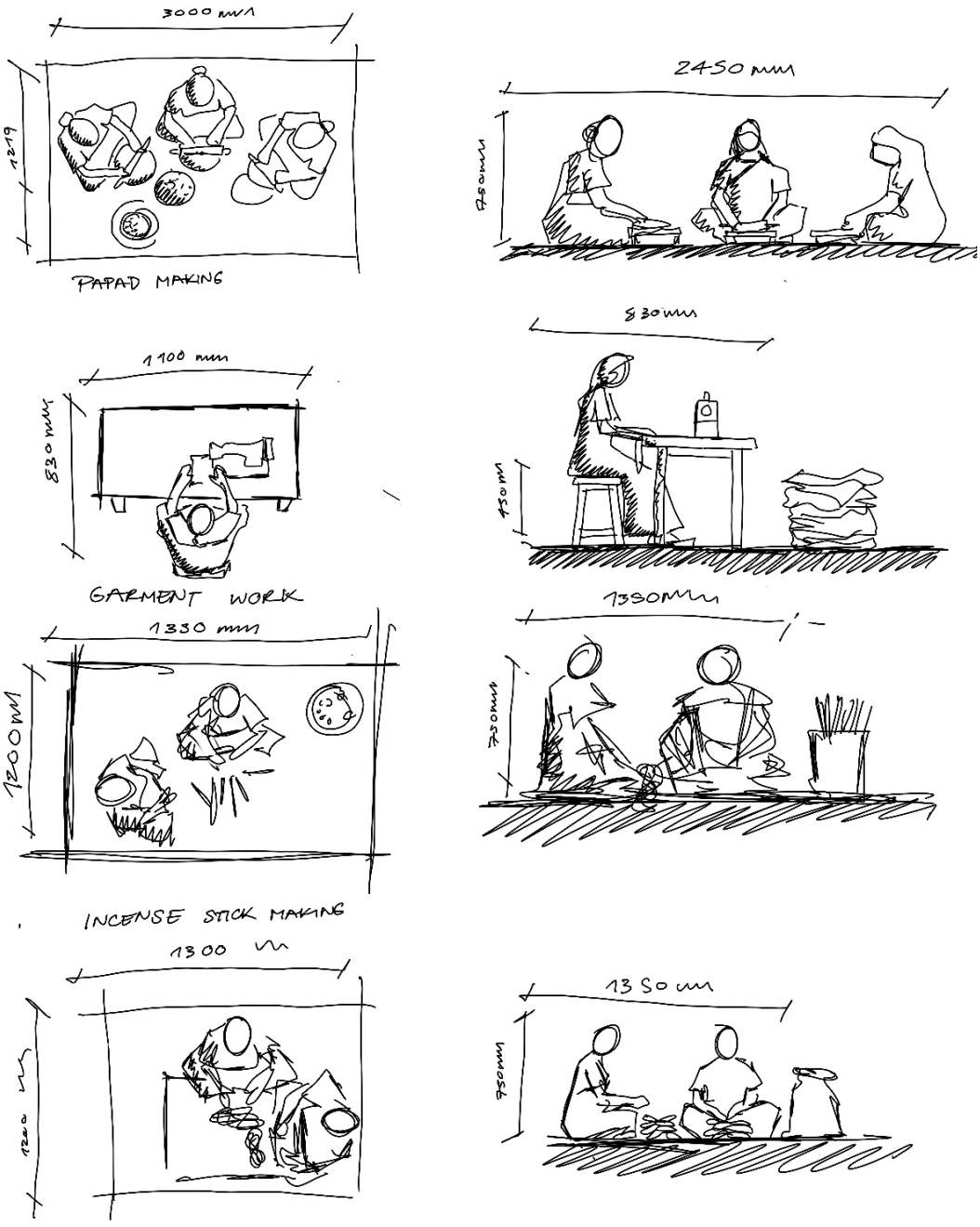
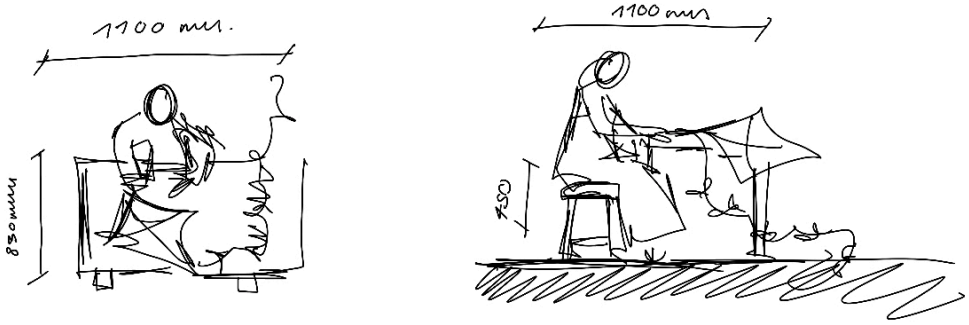
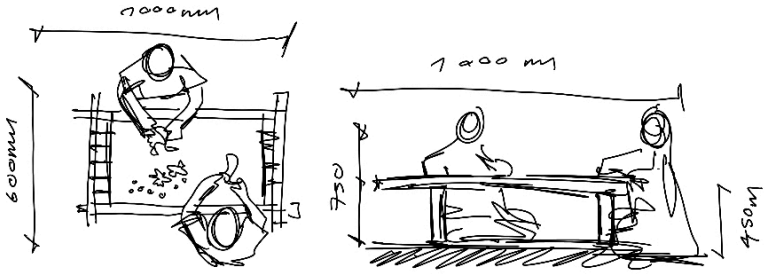


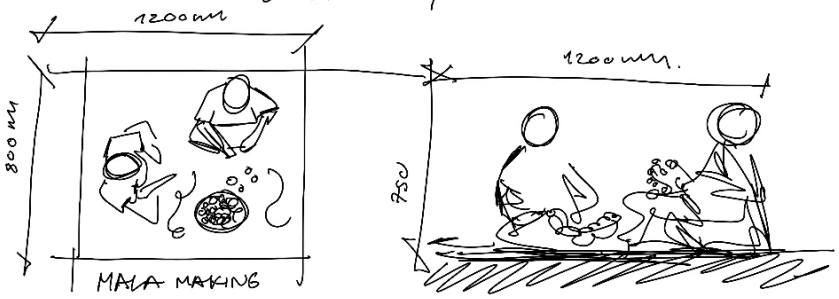
Figure 47. Ergonomic studies of home-based work in plan and elevation, documenting the space, working heights, and postures each activity require. Source: Author 2025.

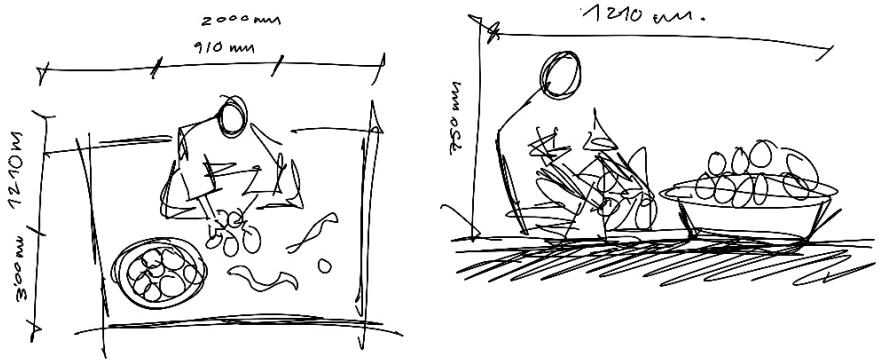


KITE MAKING



EMBROIDERY





POTATO PEELING "PANIPURI"

WOMEN'S TRADE UNION ORGANISATION INTERVIEW

The fieldwork was complemented by an interview with representatives from a local trade union organisation in Ahmedabad, founded in 1972, that supports women working in the informal economy.

The interview provided insight into how home-based workers often operate within fragmented and, in many cases, exploitative supply chains, where contractors control access to materials, wages, and market networks. As a result, women remain dependent on intermediaries for work opportunities, with limited financial security and little legal protection. At the same time, domestic responsibilities and cultural constraints restrict their ability to work outside the home, reinforcing the dwelling as the primary site of production.

From an architectural perspective, these systemic conditions directly shape the domestic environment. Limited and unstable income reduces the capacity for spatial improvement, resulting in overcrowded, multifunctional spaces with inadequate ventilation, lighting, and storage. In addition, good ergonomic design was another aspect mentioned that should be tackled when designing, as a large number of women experience health hazards due to bad posture when working from home, while not having adequate space to do so. These conditions negatively affect both living quality and productivity of their work.

The organisation demonstrates how collective organisation at the W scale can begin to address some of these challenges. By providing shared workspaces, access to training, and support networks, such initiatives can reduce dependency on contractors and improve both economic resilience and spatial conditions for women.

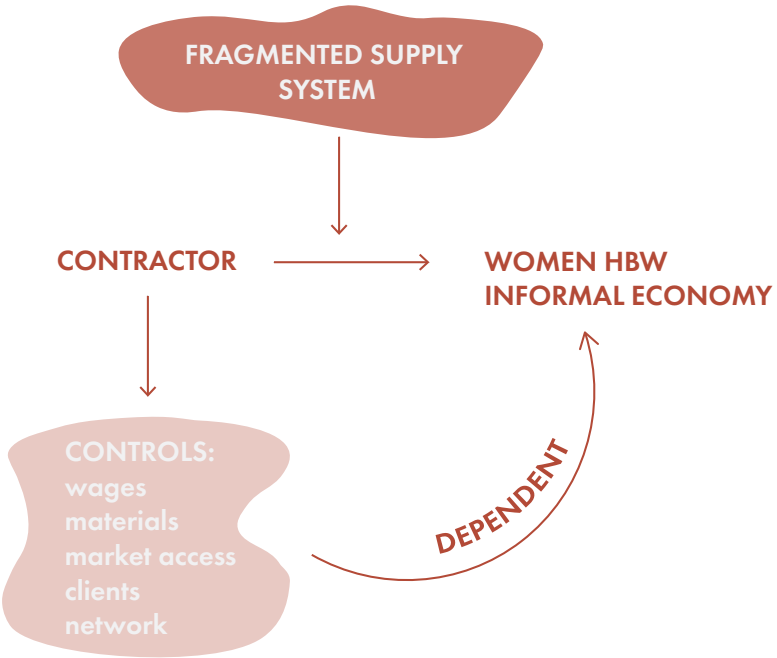


Figure 48. Diagram illustrating the fragmented supply chain within which home-based women workers operate. Source: Author, 2025.

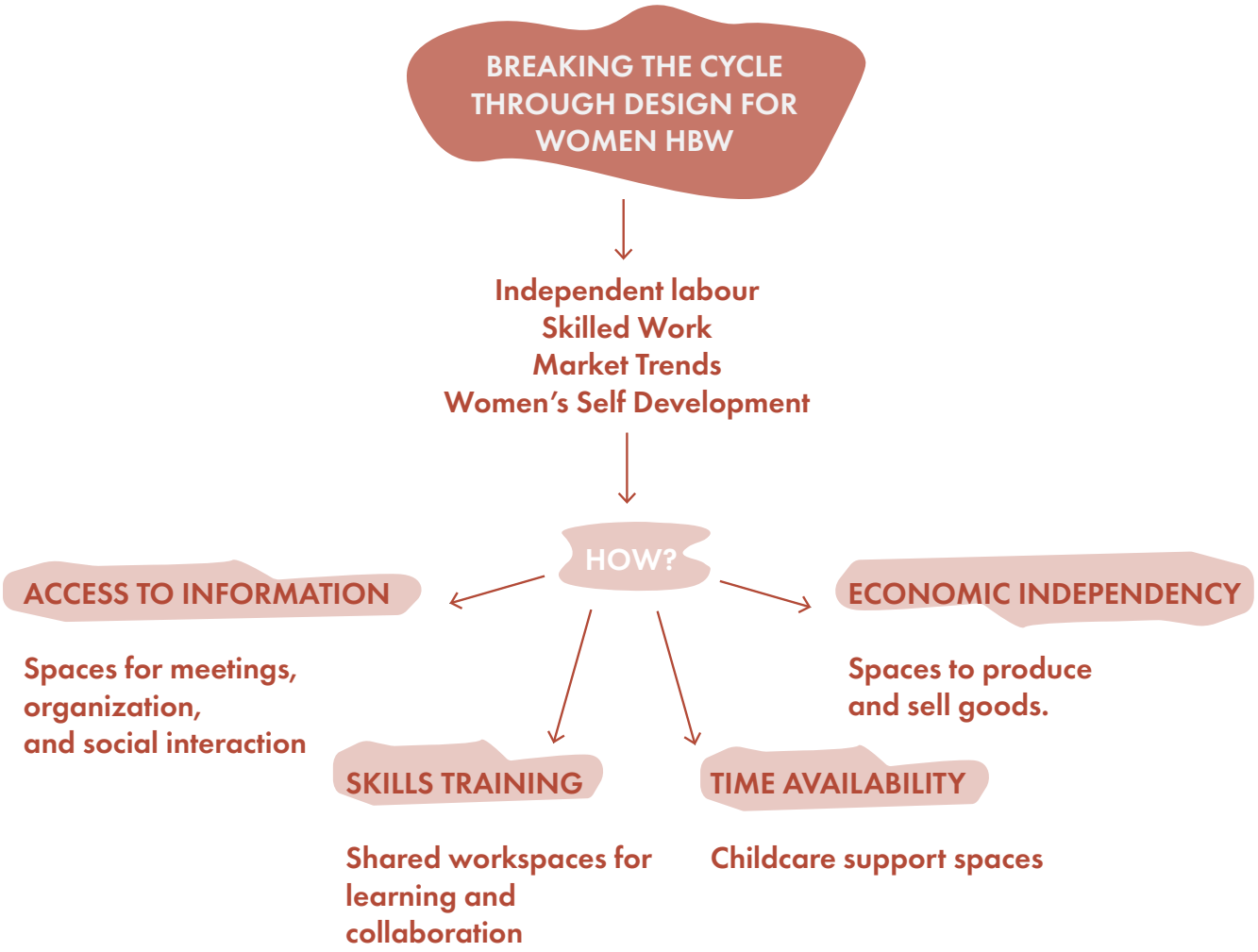


Figure 49. Spatial and programmatic design responses proposed to break the cycle of contractor dependency. Source: Author, 2025

FIELDWORK SYNTHESIS AND KEY DESIGN DRIVERS

The fieldwork conducted in Calico Mills revealed a consistent set of spatial, environmental, and socio-economic conditions that directly inform the design response, confirming existing research on housing and work environments for home-based women workers in Ahmedabad (MHT, 2022; MHT, 2021). A multi-scalar design strategy is used to address these findings across the urban, neighbourhood, cluster, and dwelling scales. Each scale is analysed through three lenses that address the main research question and its subquestions.

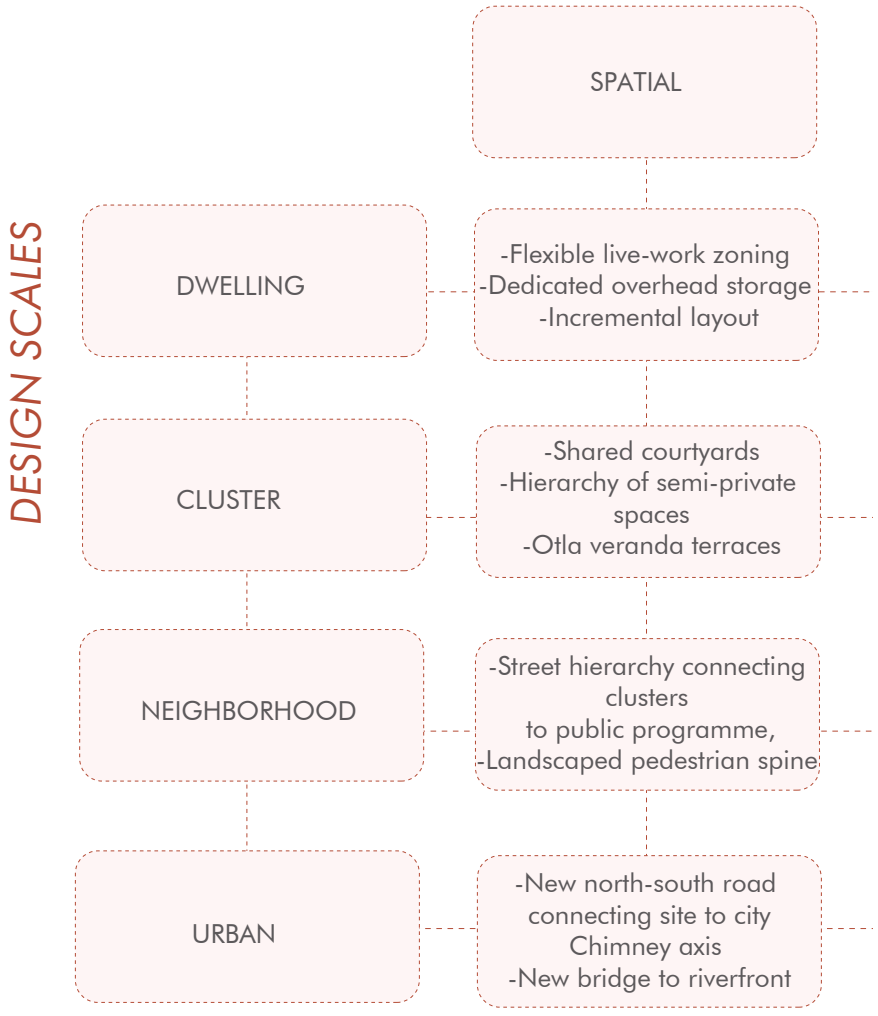
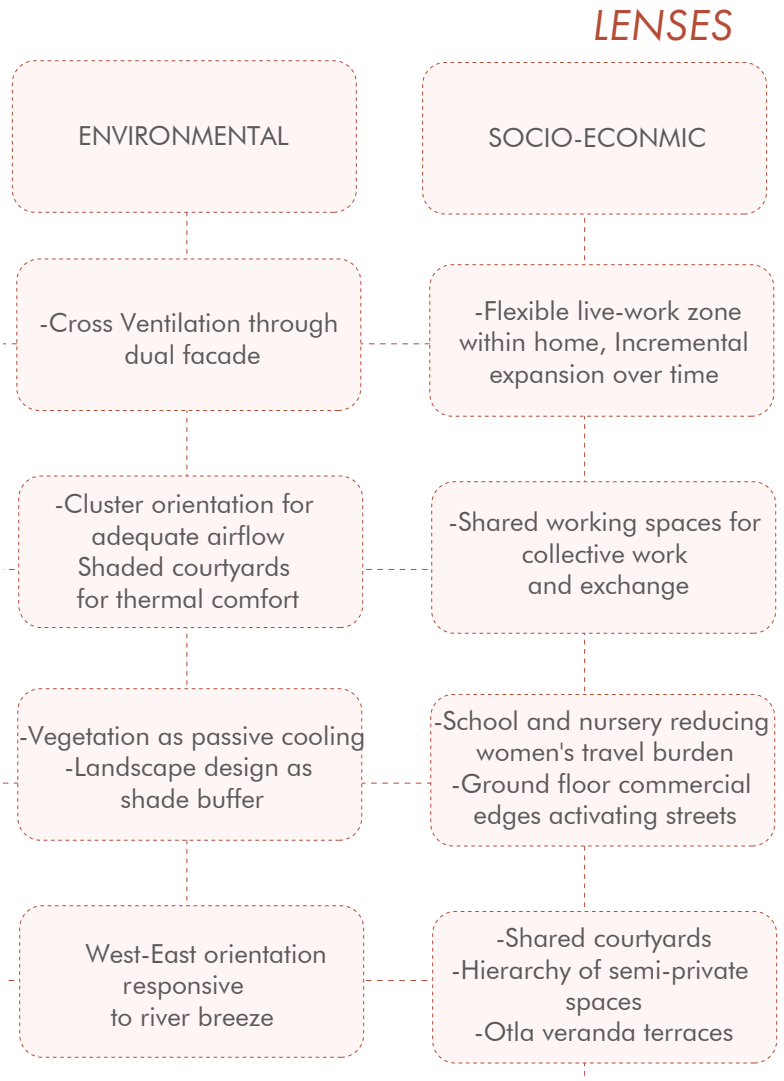
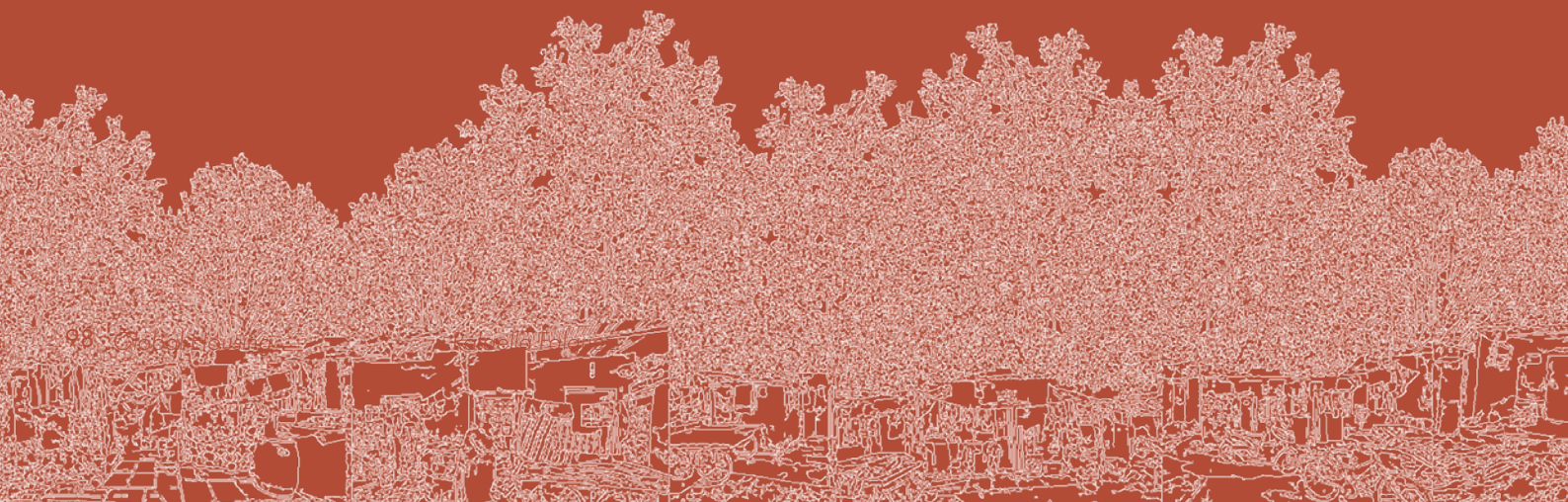


Figure 50. Design Matrix.
Source: Author, 2025

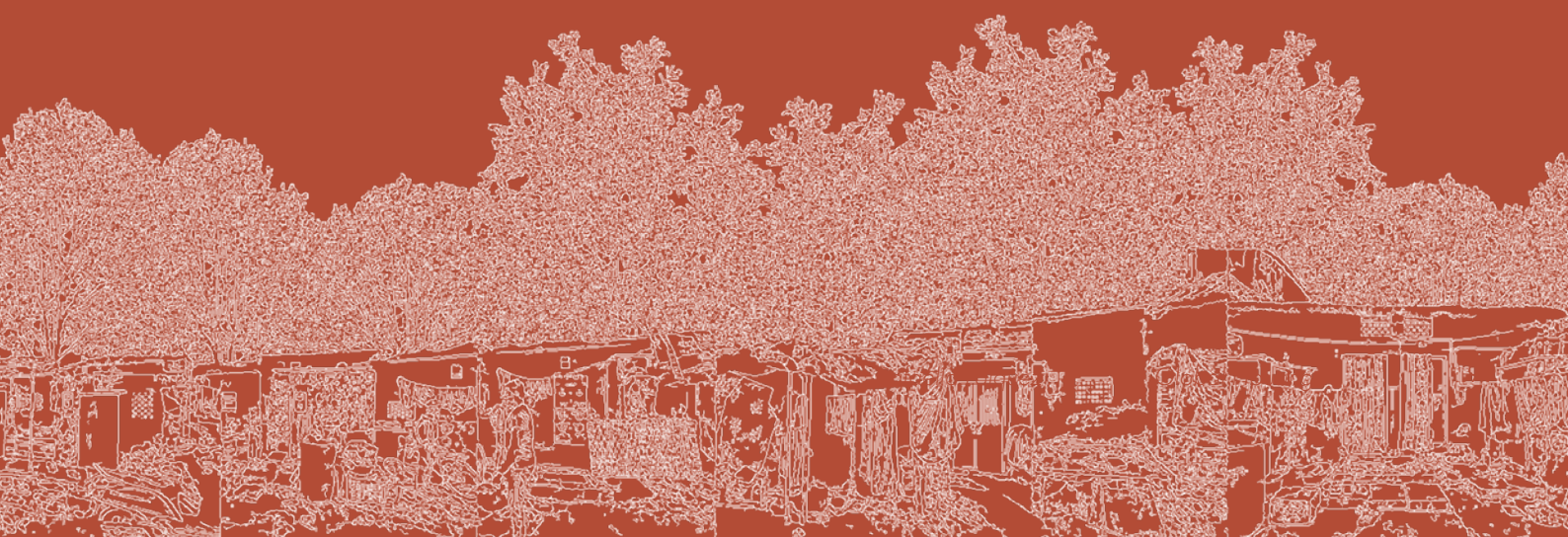
DESIGN MATRIX





RESULTS

DESIGN PROPOSAL



RESULTS

The following section will present the design findings across four scales: urban, neighbourhood, cluster and dwelling scale. Each scale is examined through the three lenses that structure this research, spatial, socio-economic, and environmental, as summarised in the previous fieldwork conclusion. The design decisions presented here are merely translations of what was researched, observed and documented previously and during the fieldwork in Calico Mills. Every strategy has a corresponding problem identified on-site. These results should therefore be read as a series of responses to the lived realities of home-based women workers in Ahmedabad.

MANIFESTO

INVISIBLE LABOUR VISIBLE SPACE

"Within the home,
boundaries blur.

Spaces of care become spaces of making.
Daily life becomes livelihood.

Often seen, rarely recognized.

Women's work sustains the city.
Housing must support it.

Design is not neutral".


INVISBLE LABOR
VISIBLE SPACE
Within the home,
boundaries blur.
Spaces of care become spaces of making.
Daily life becomes livelihood.
Often seen, rarely recognized.
Women's work sustains the city.
Housing must support it.
Design is not neutral.

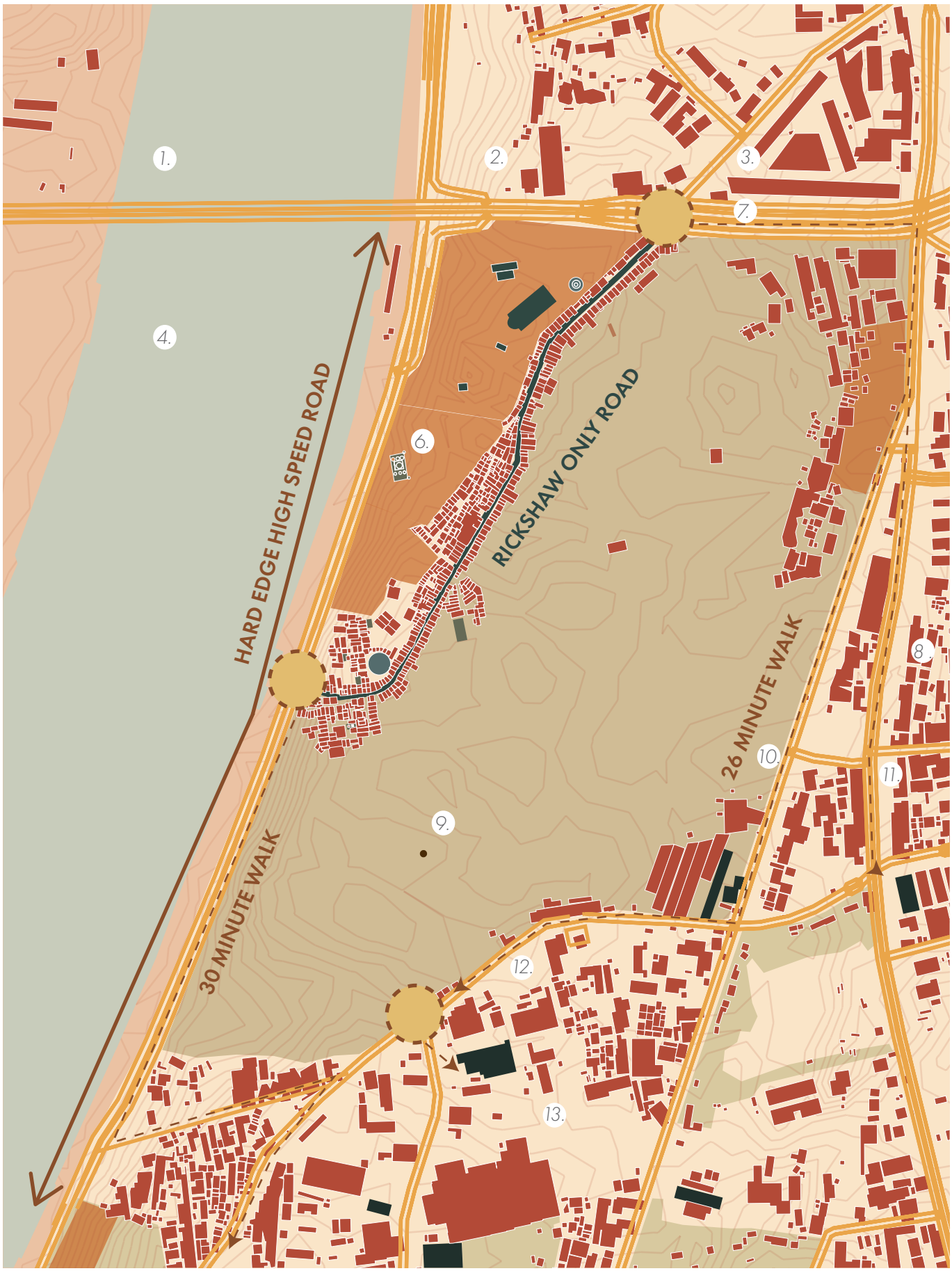
EXISTING URBAN PLAN & KEY CHALLENGES

The project site is in Calico Mills area in Ahmedabad. Analysing the site revealed a consistent set of urban challenges. Spatially, many women, particularly those involved in the garment industry, are required to walk long distances to access raw materials or deliver finished goods. Due to the lack of direct routes, especially towards the southern Calico area, movement becomes inefficient. Also, socio-economically, the settlement remains relatively segregated from the rest of the city, contributing to the invisibility of home-based workers and limiting their opportunities to engage with wider economic networks or operate more independently.

EXISTING SITE PLAN LEGEND

1. Patel Bridge
2. Jamalpur Flower Market
3. Jamalpur Vegetable Market
4. Sabarmati River
5. River Front Rd.
6. Mosque Hazrat Baba Lului's Masjid Jamalpur
7. Bhagtacharya Rd.
8. Behrampura
9. Calico Mill's Chimeny
10.Piplaj-Pirana Rd.
11. Narol Rd.
12. Khodiyar Nagar Rd.
13. Calico Mills South

Existing Buildings
River
Roads
Cemeteries Areas
Landmarks
Vegetation
Garments Hubs
Connection Nodes
Calico Mills Exploratory Boundary Extent

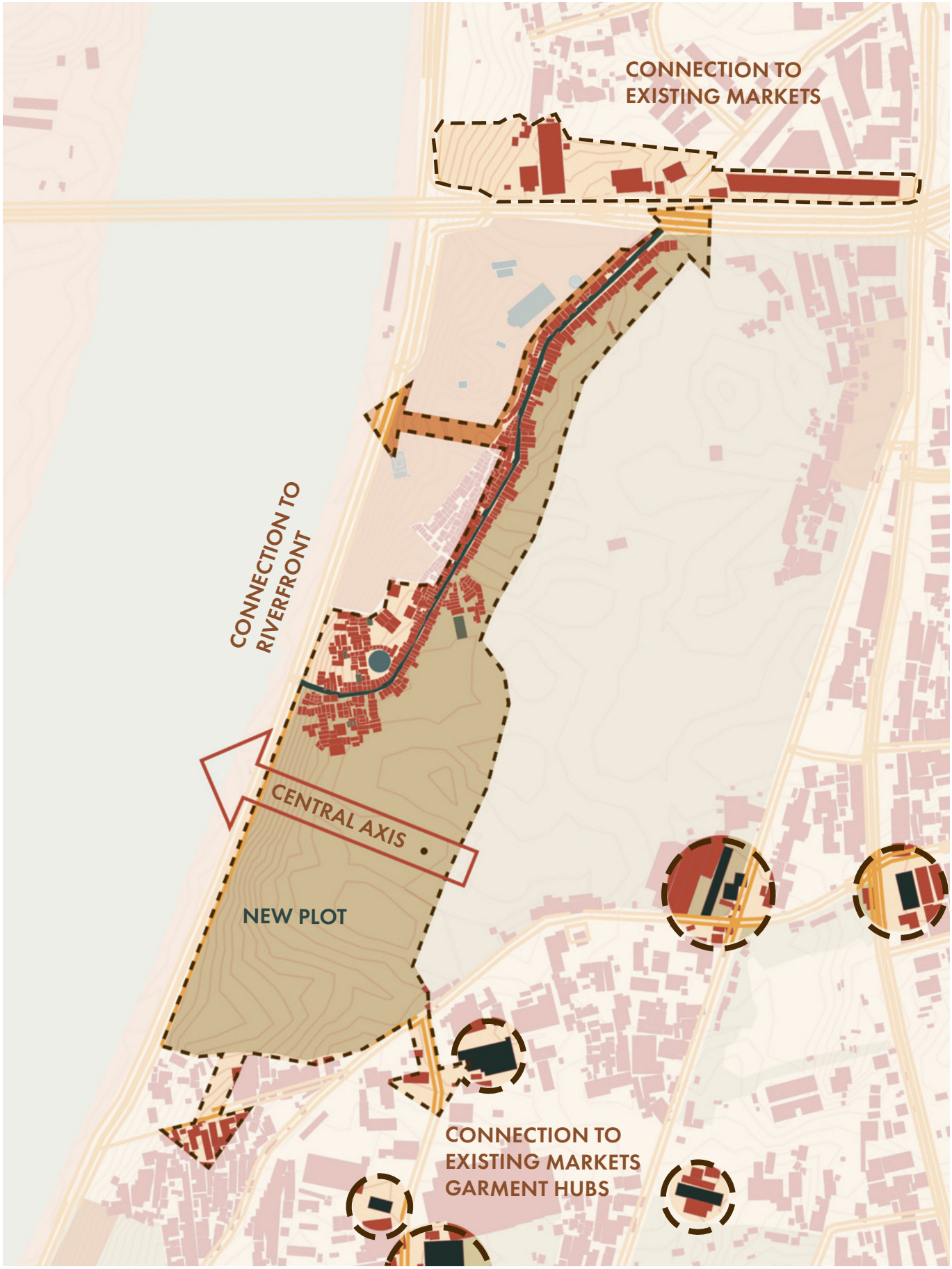


1:5000 0 50m 100m

URBAN STRATEGY

In response, an alternative plot was identified within the broader Calico Mills Context. The initial settlement was constrained by a Muslim cemetery and crematorium occupying approximately 30% of its northern edge, making redevelopment culturally and religiously not suitable. In response to this the empty plot facing the riverfront was selected. Currently, this area contains mainly a dense forest surrounding the existing Calico mill chimney and it was selected for its distinctive capacity to solve the challenges identified.

Spatially, a new road is proposed connecting the northern part of the site, where the flower and vegetable markets are located, to the southern part, where garment hubs are concentrated. This connection directly responds to the long distances women currently walk to collect raw materials and deliver finished goods. In addition, the Calico mill chimney is reactivated as a second organisational axis perpendicular to the new main road. This move brings back to life an urban landmark that had been lost within the city's dense forest, restoring it as a legible reference point for the community. Environmentally, this site location opens to continuous airflow from the Sabarmati Riverfront, which is critical for the cross-ventilation strategies needed within the housing units. Furthermore, socio-economically, the proximity to the riverfront positions the project within a more visible and accessible urban setting, attracting potential investors and consumers when markets are held on site for women home-based workers.



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PROPOSED URBAN PLAN

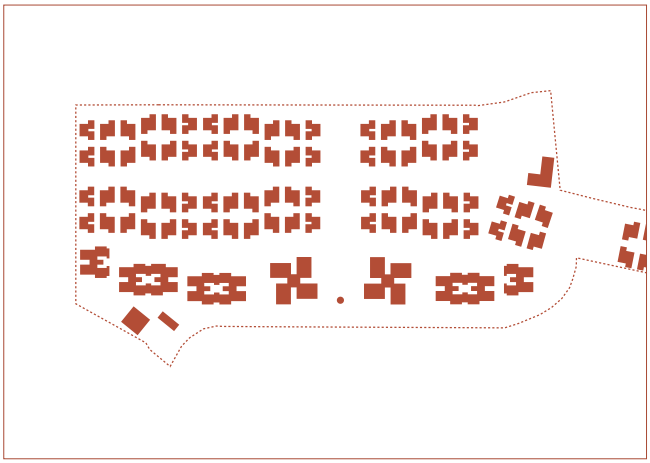
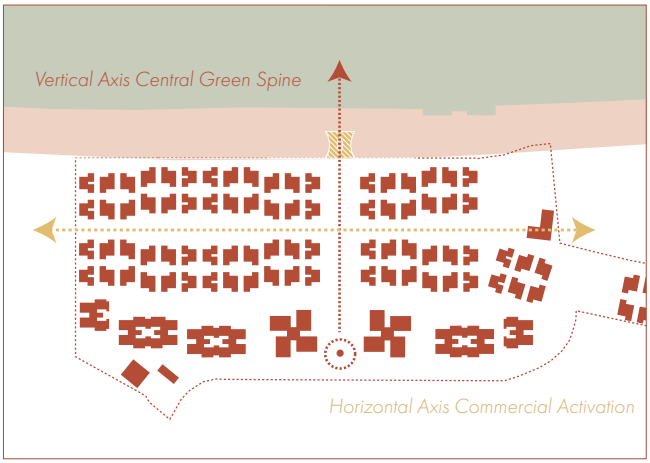


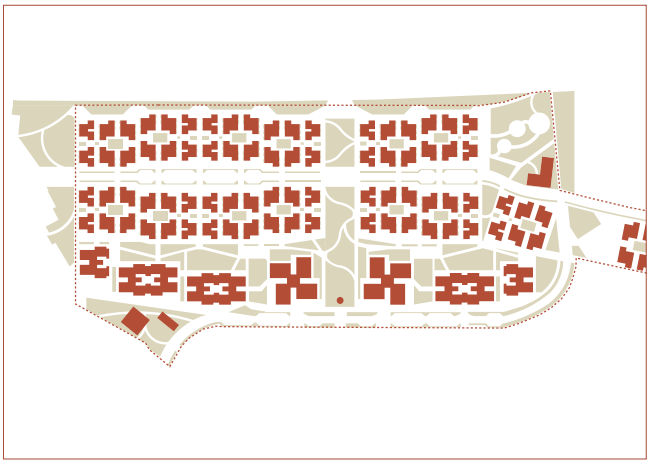
Figure Ground Analysis



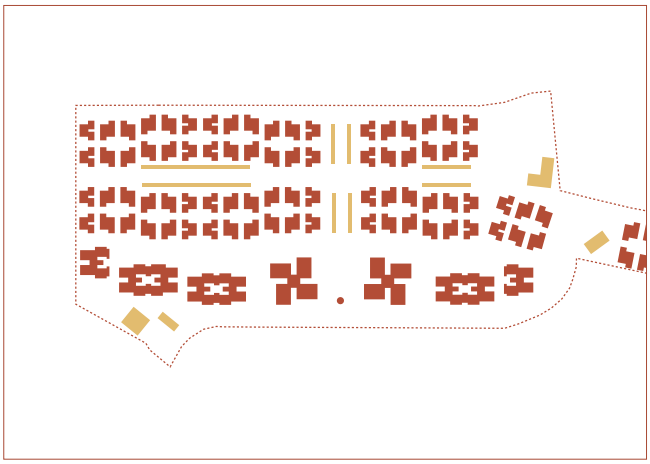
Spatial Axes & Urban Structure



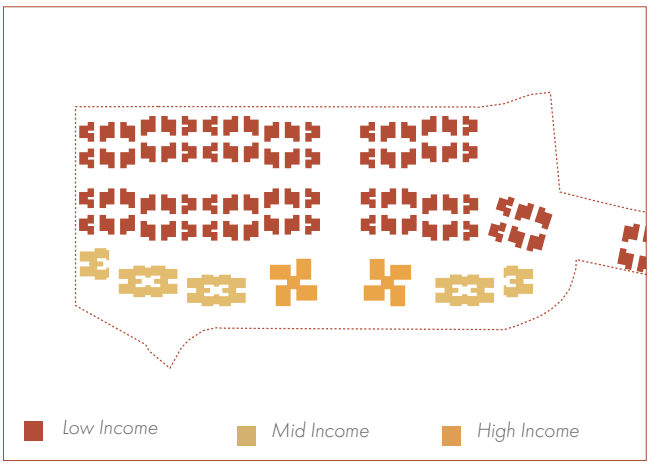
Vehicular Connectivity Network



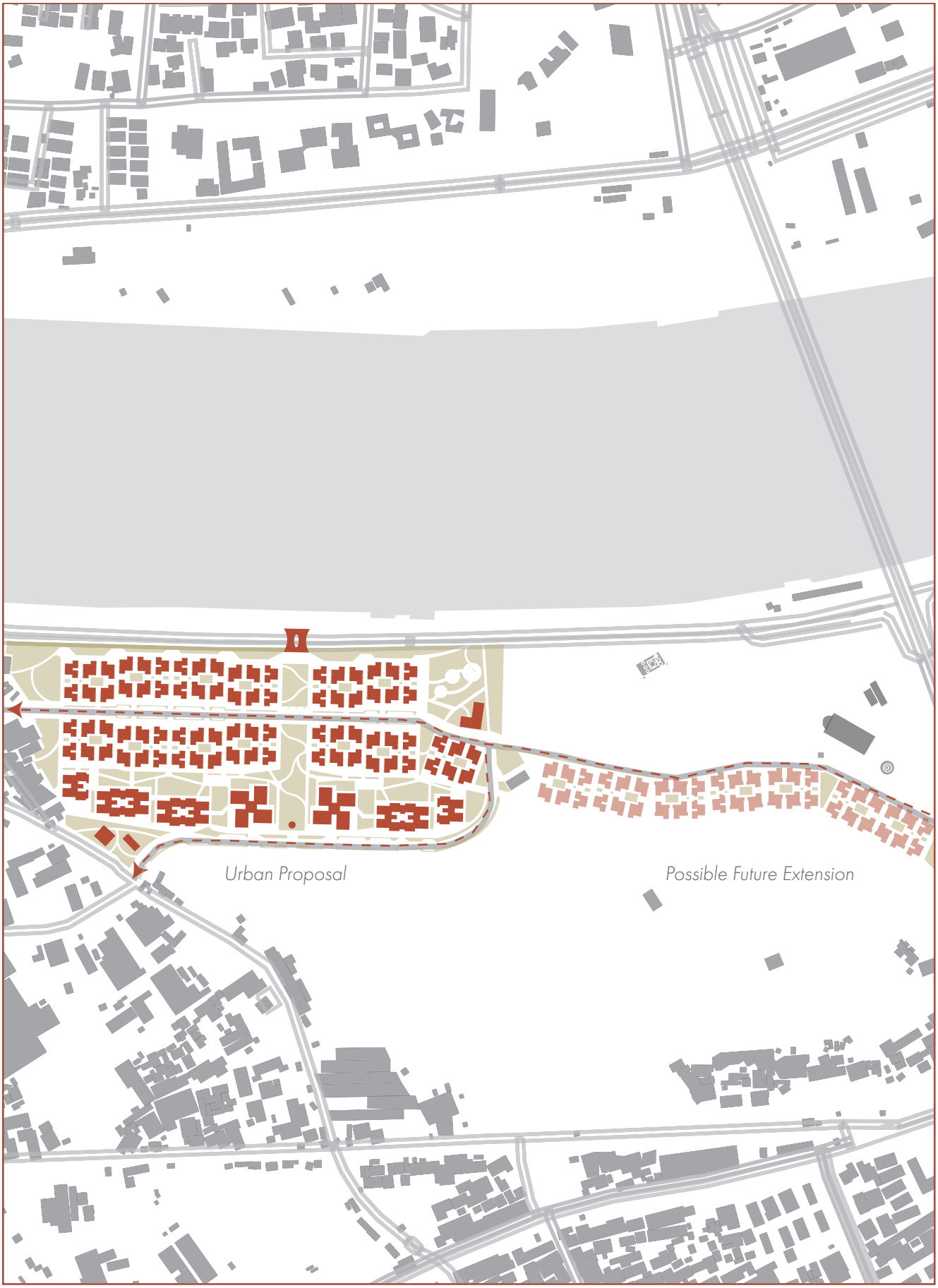
Landscape Strategy Informing Pedestrian Routes



Community and Economic Nodes



Socioeconomic Distribution



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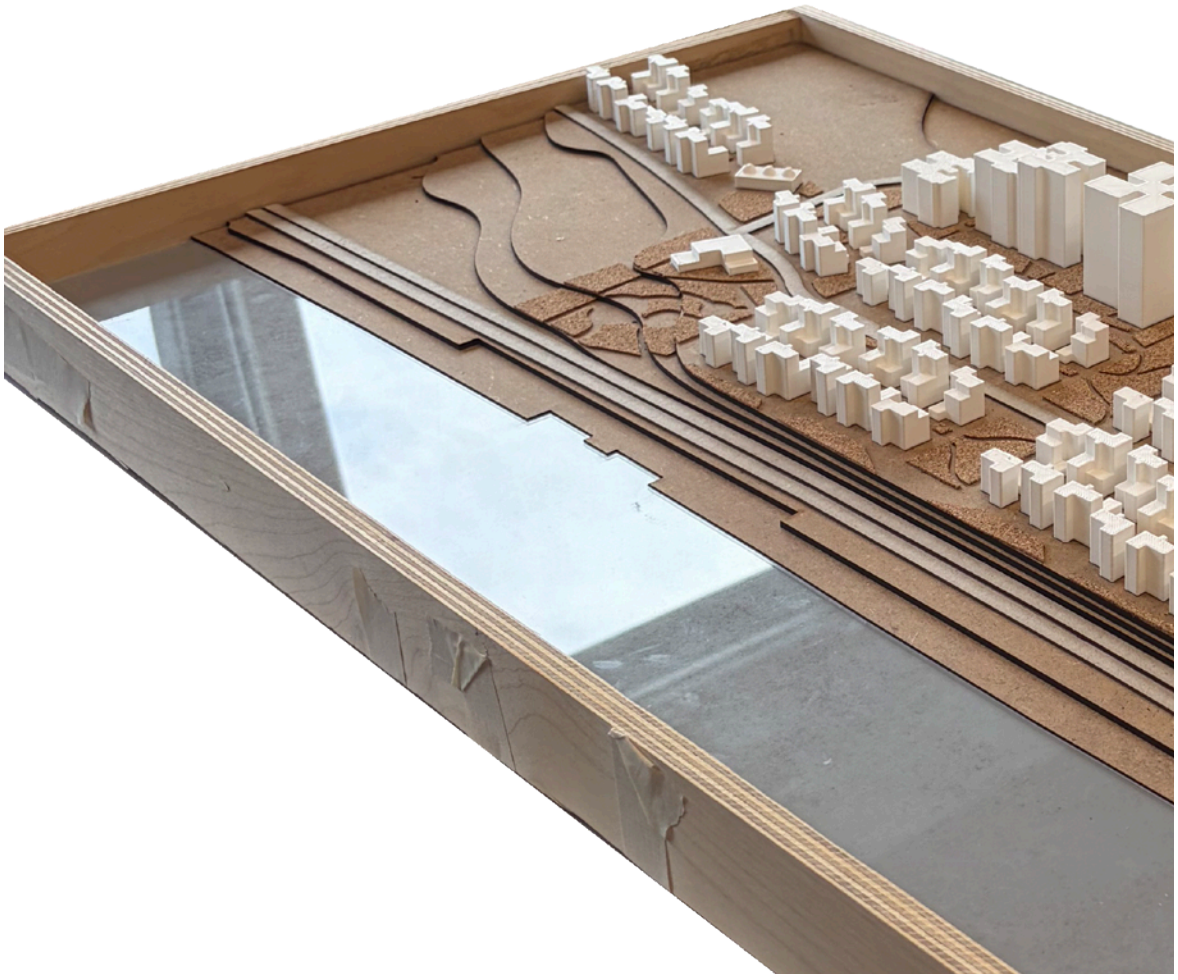
NEIGHBOURHOOD STRATEGY

The neighbourhood masterplan is organised around two axes, a north spine connecting the flower and vegetable markets to the garment hubs, and an east-west axis along the Calico Chimney opening the site to the Sabarmati riverfront. Together these two axes organise movement, programme, and airflow across the entire development.

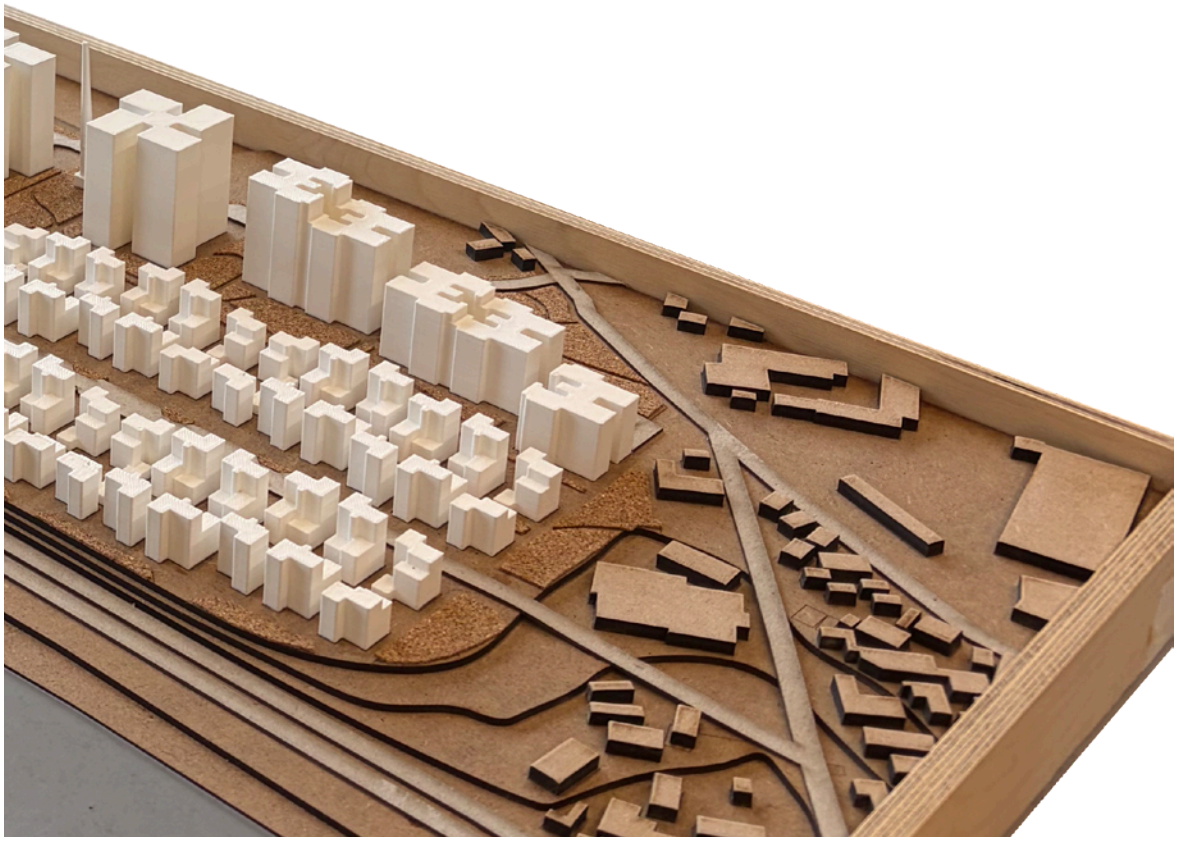
Spatially, two parallel rows of low-income residential clusters face the riverfront, each arranged around a shared internal courtyard acting as a semi-private threshold between dwelling and street. Low, mid, and high-income households are placed into the same street fabric rather than segregated into separate zones, ensuring the development remains socially integrated.

Environmentally, a landscaped pedestrian spine lined with trees provides shade and passive cooling along the main movement route, a direct response to the extreme heat documented during fieldwork. No building exceeds the height of the Calico Chimney at



53 metres, which acts as the visual landmark for the entire development. A new pedestrian bridge to the west connects the site to riverfront, opening the plot with a big central part where breeze from the river can tunnel in.

Socio-economically, community and economic nodes are positioned at the intersection of the two axes where foot traffic is highest, creating opportunities for women to sell goods and engage with wider market networks directly from the neighbourhood. The school and nursery are positioned at opposite corners of the site, serving both new and existing residents. This responds directly to the feminist frameworks studied, where Visakha and Hayden argue that cities must provide proximate safe shared infrastructure so that women can leave their children close to home and return to productive work without losing hours to long journeys.



1:1000 Scale Urban Model

PROPOSED MASTERPLAN



Key

1. Low Income Housing
2. Mid Income Housing
3. High Income Housing
4. Nursery
5. School
6. New Market Street Rd



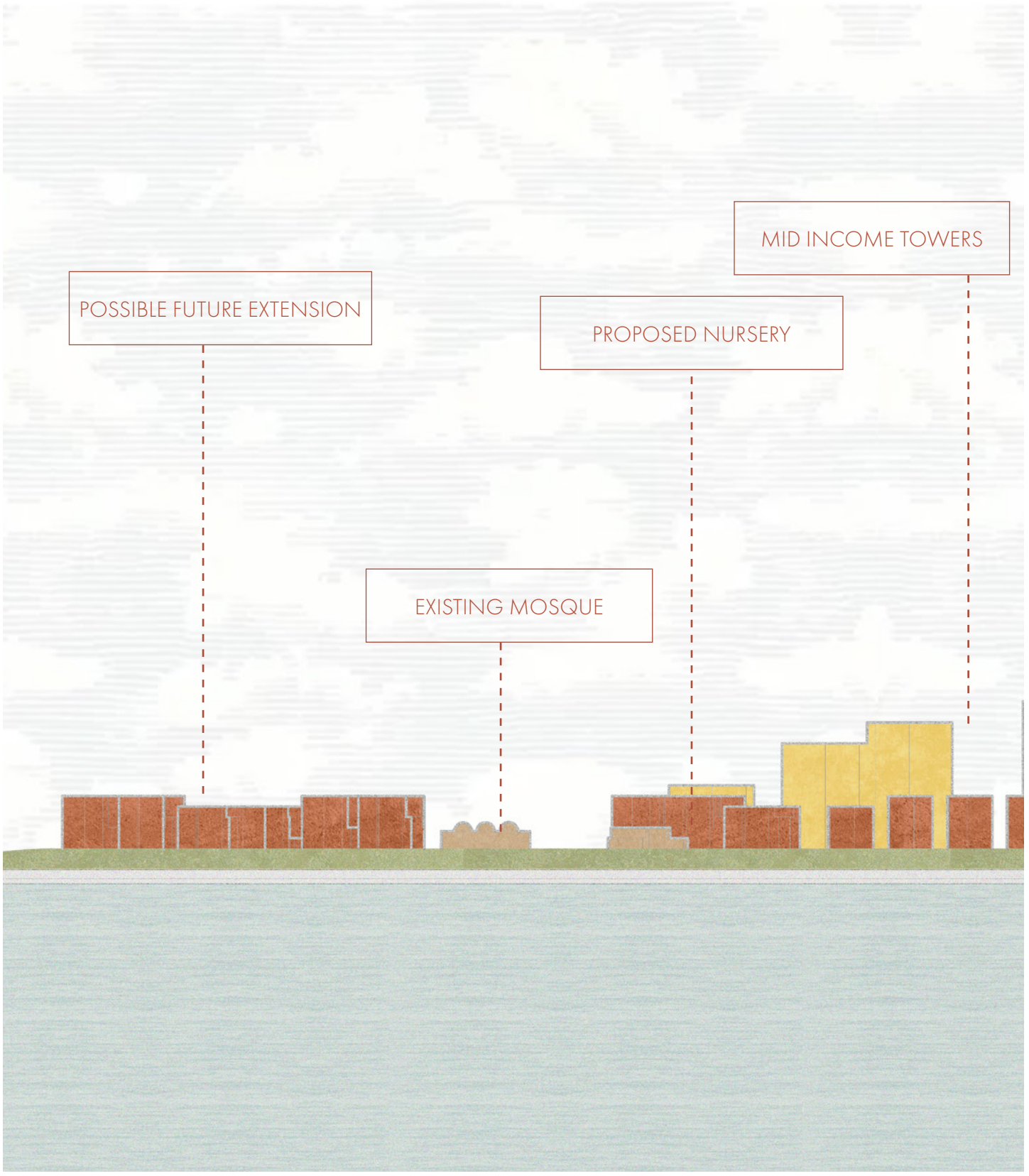
7. Secondary Rd
8. New Bridge
9. Central Park
10. Chimney
11. Playground
12. Mosque

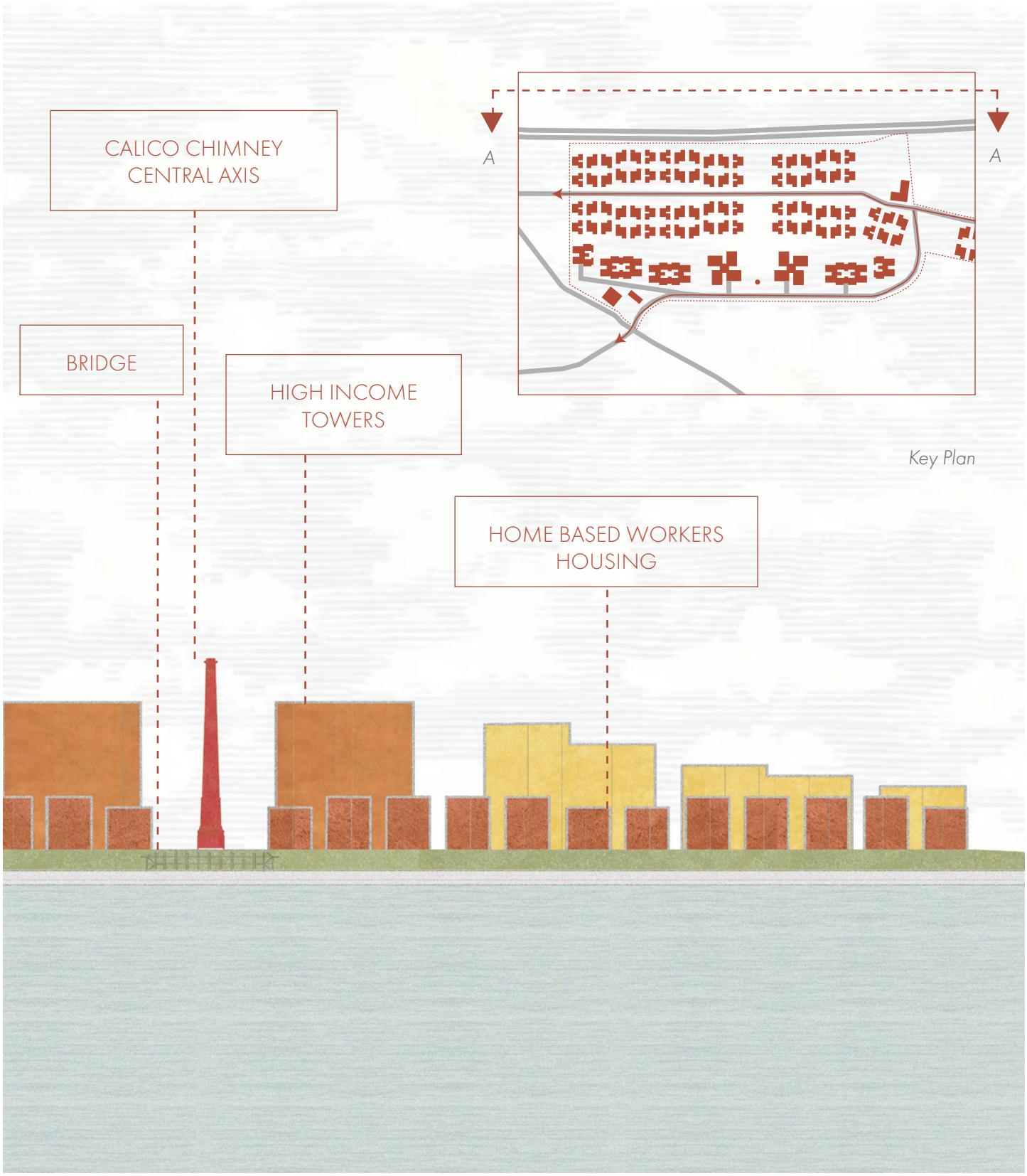
1:1000 at A2
(scale bar only)

0 10m 20m

Rafaella Falquez Global Housing

WEST SITE ELEVATION A





1:1000 at A2
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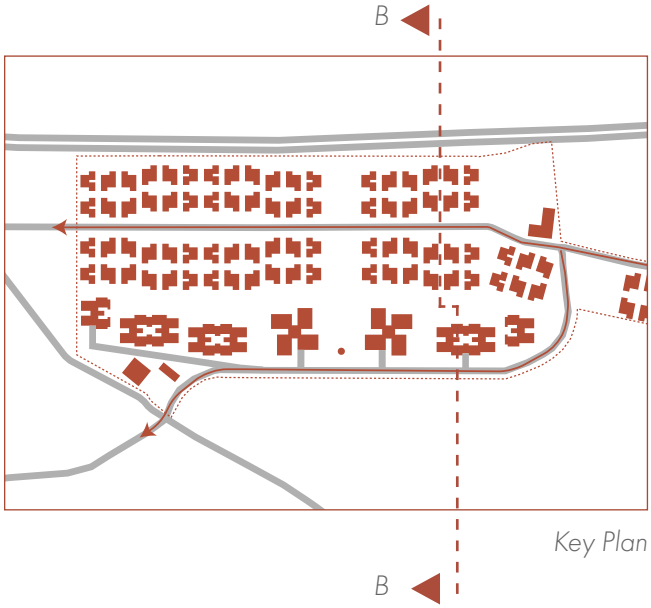
0 10m 20m

SITE SECTION B-B



Secondary Road | Mid Income Tower | Communal Greenway | Cluster



Key Plan

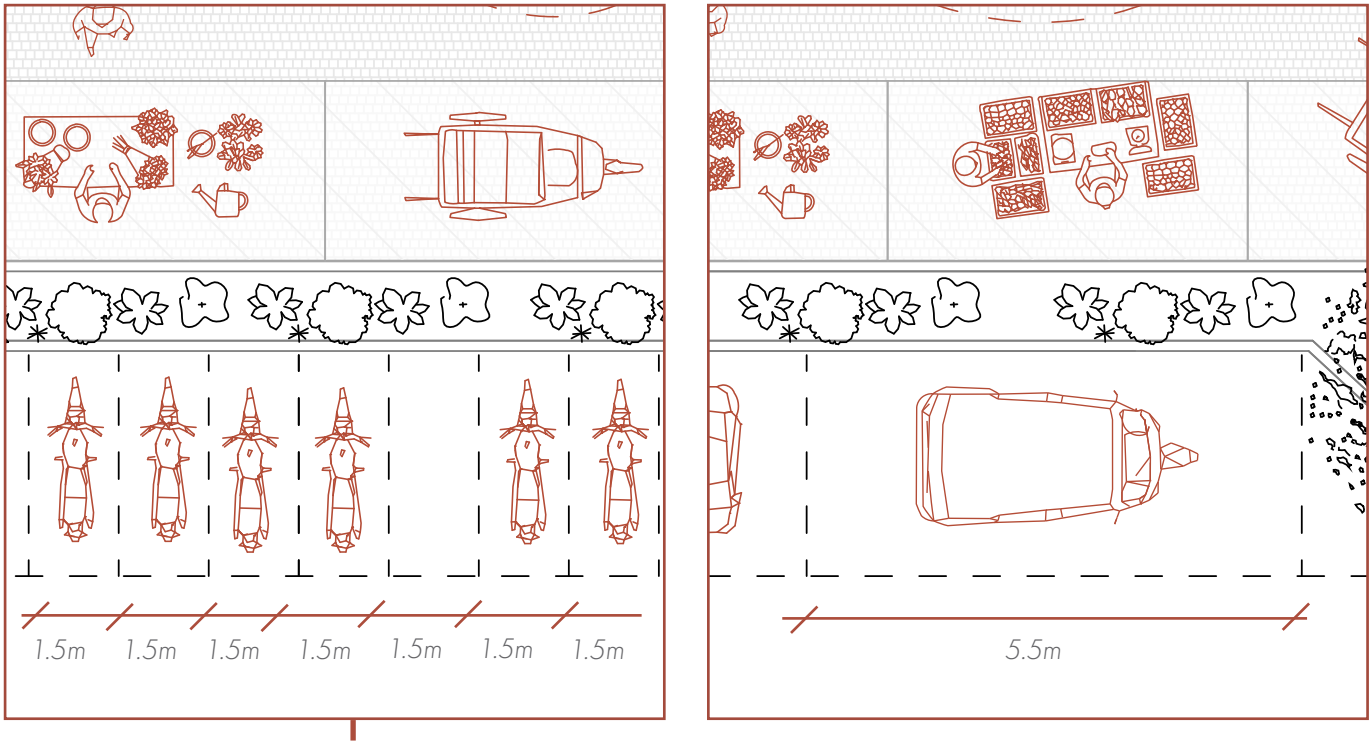


Main Commercial Road | Cluster | Riverfront promenade | Riverfront Rd.

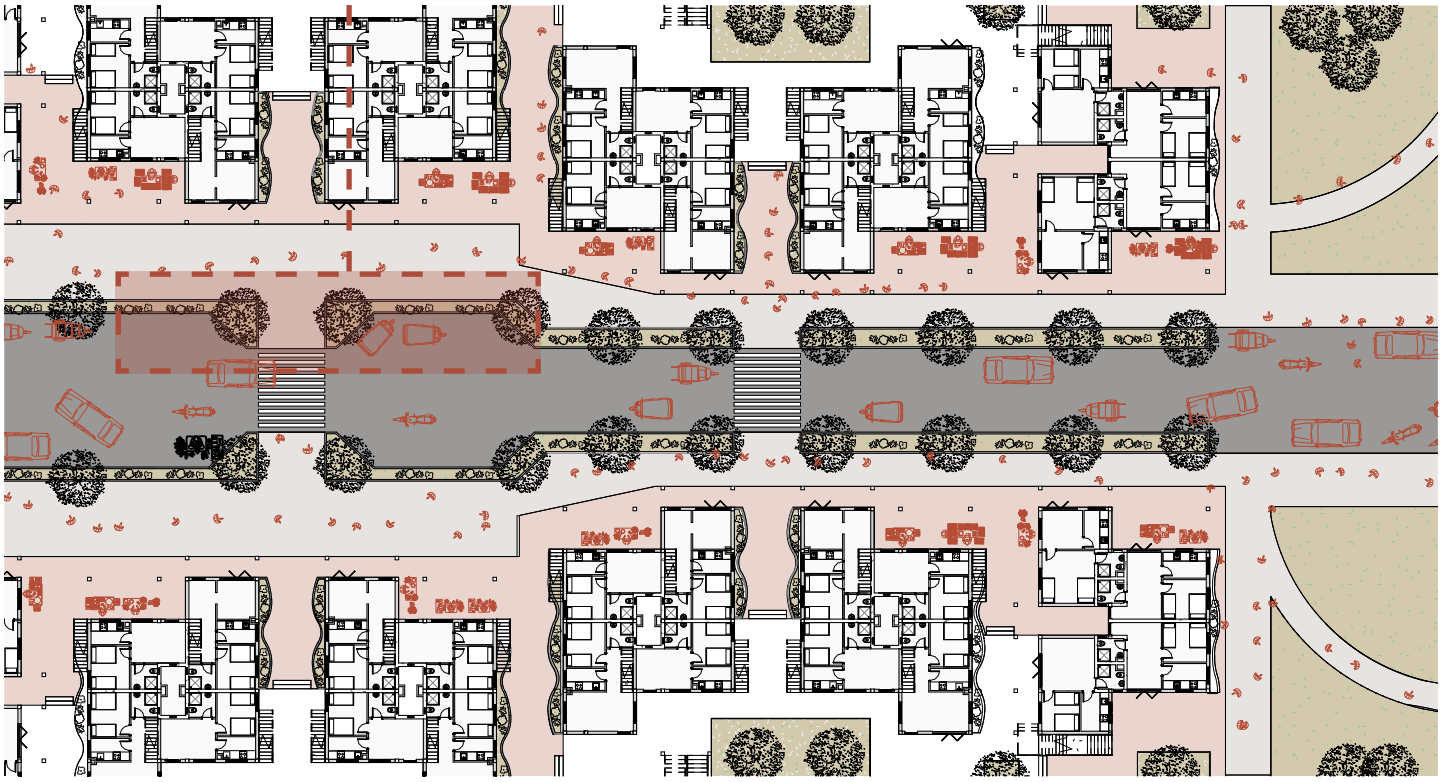
1:500

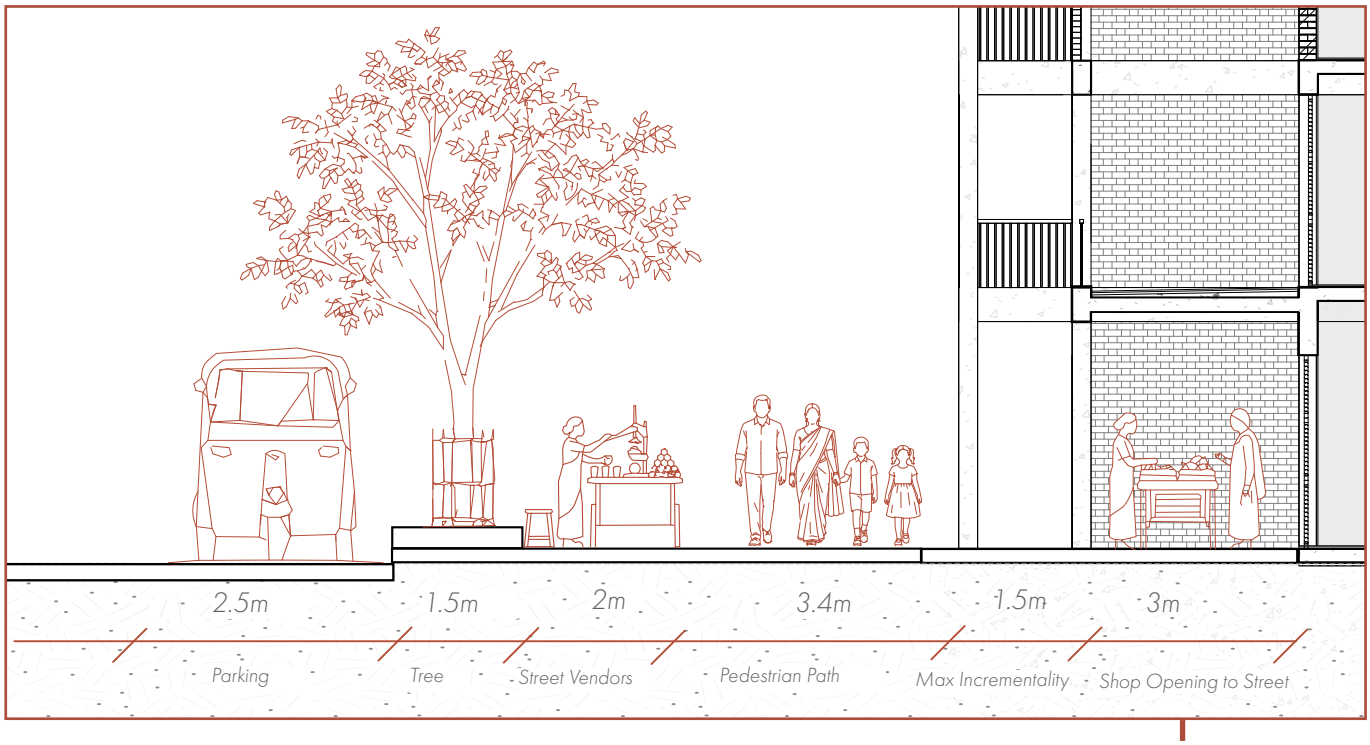
0 10m 20m

PUBLIC REALM & MARKET STREET STATEGY

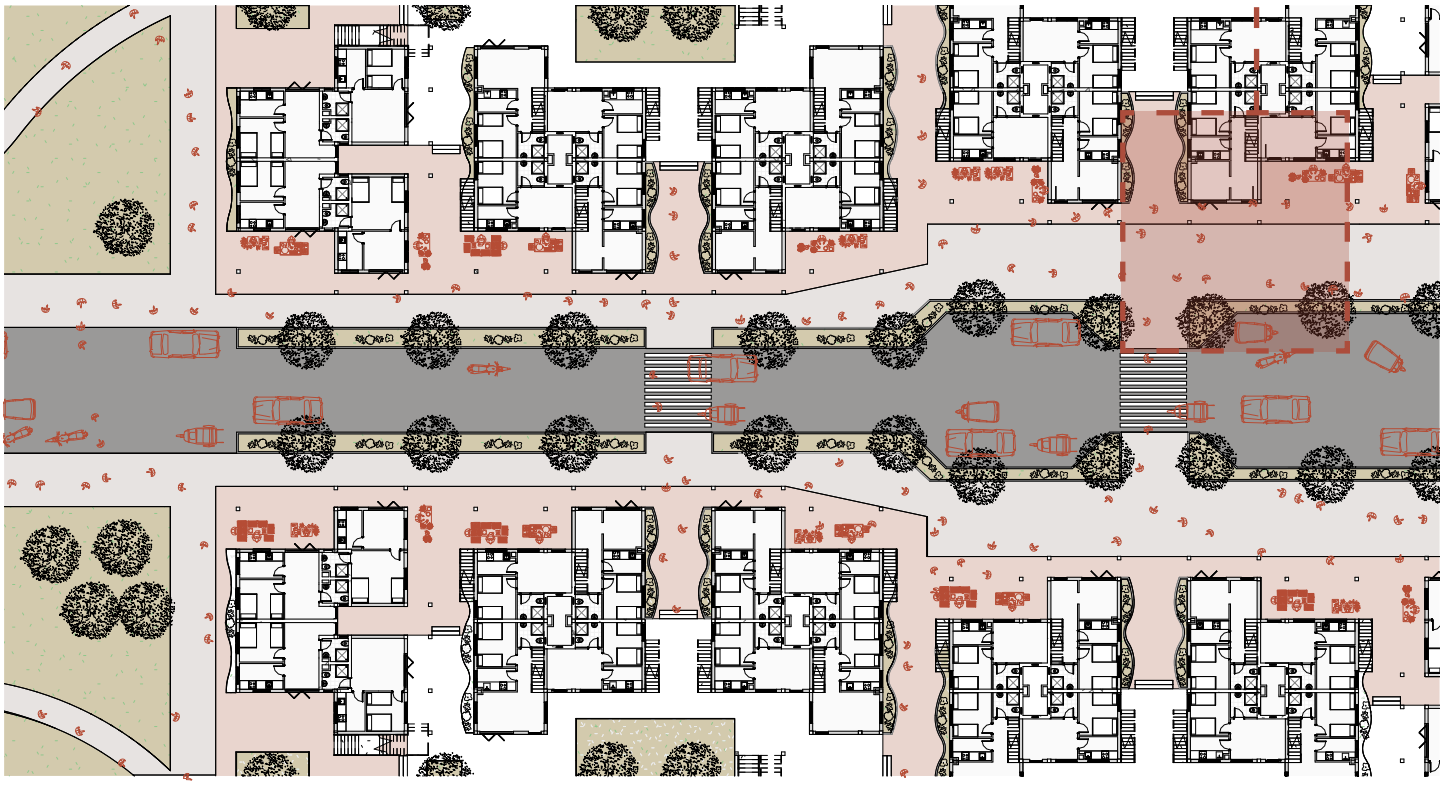


PARKING





COMMERCIAL ACTVITIES POCKETS



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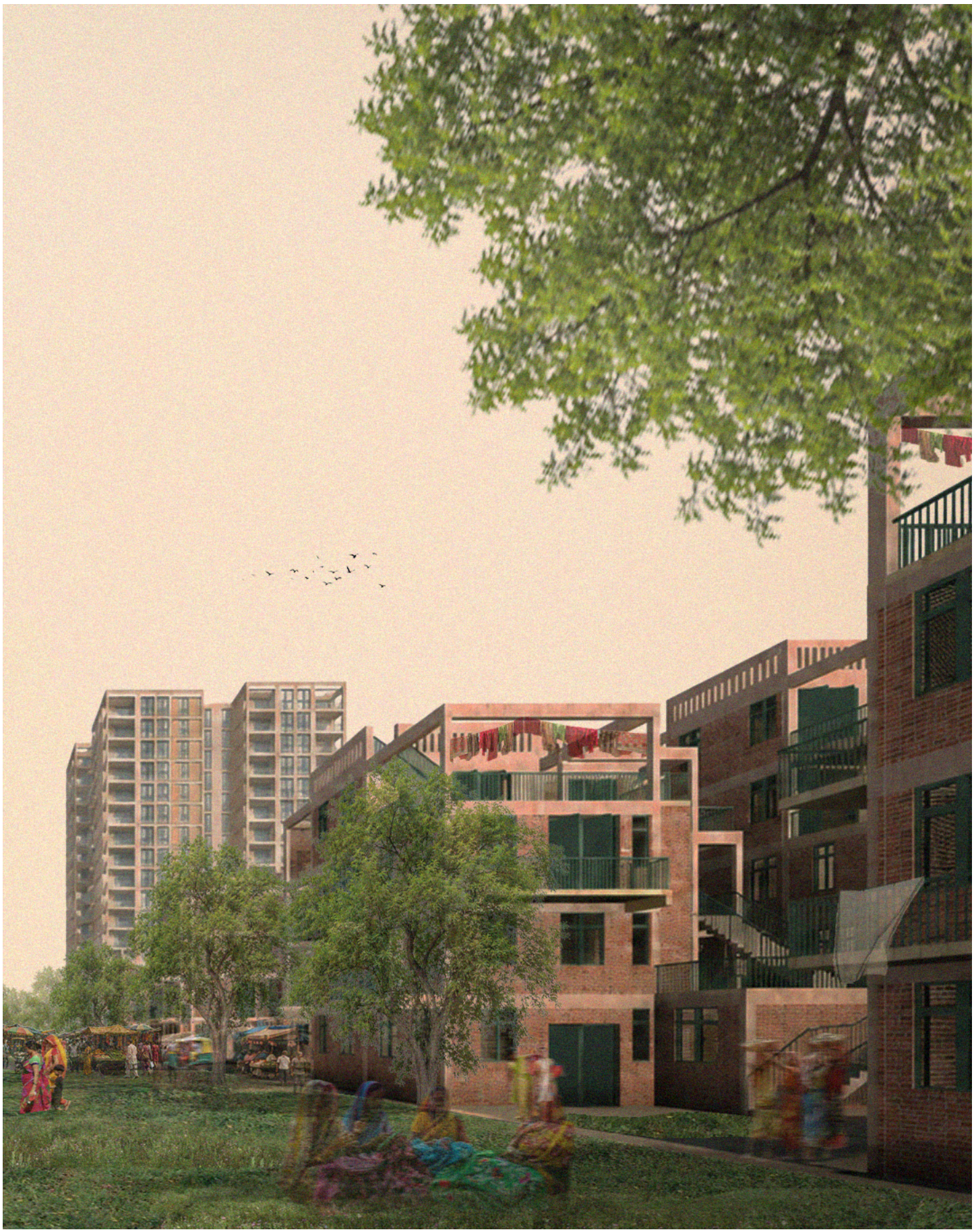
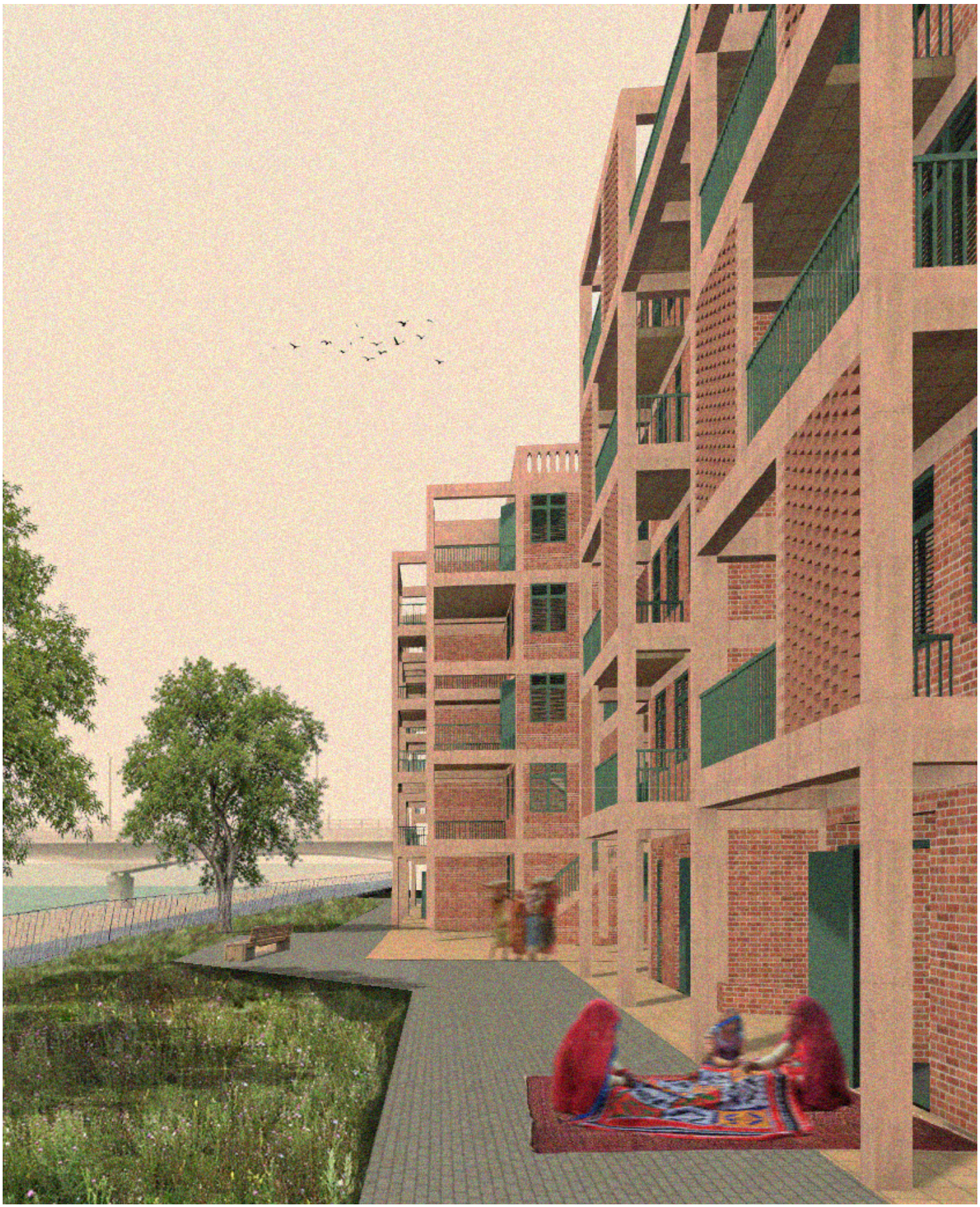
0 10m 20m


CALICO MILLS



CENTRAL PAR PERSPECTIVE





RIVERFRONT PROMENADE PERSPECTIVE

CLUSTERING STRATEGY

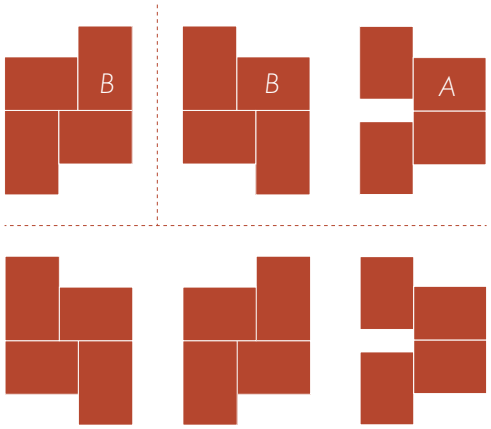
Dwellings are grouped into clusters of four units, allowing each unit to function as a corner dwelling with openings on two opposing façades, a direct response to the inadequate ventilation and extreme heat documented during fieldwork, where women reported interrupting work every summer.

Spatially, Type A clusters sit at the site edges with a height of GF+3, connecting gently to the surrounding neighbourhood scale. Type B clusters occupy the interior reaching GF+4. Both types mirror each other to form a semi-private shared courtyard between them. The courtyard is surrounded by a 450mm built platform around it, which resembles the otla threshold observed across Calico Mills and Ahmedabad's streets. A clear hierarchy moves from public street to semi-private courtyard to private dwelling. The inward-facing layout creates a safe and controlled environment, particularly important for women and children, reflecting Matrix and Visakha's argument that semi-private shared spaces are core architectural responsibilities for women's visibility and safety. At the ground floor, duplex units and individual external staircases create varied access conditions, while a central staircase at the courtyard edge provides shared access to upper floors.

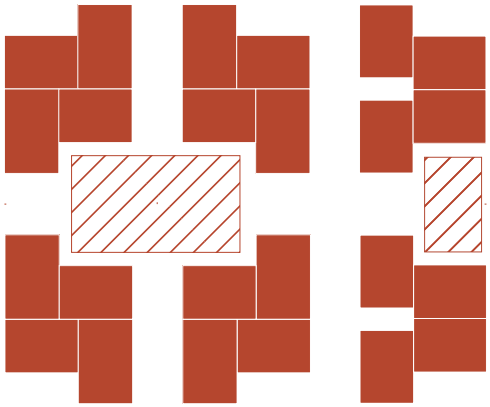
Environmentally, clusters are oriented along the west-east axis responding to prevailing south-westerly winds from the riverfront. The five-metre gaps between clusters allow airflow through at ground level. In Type B, the shared courtyard functions as a thermal chimney, exhausting hot air upward and cooling the surrounding dwellings.

Socio-economically, ground floor units facing the street incorporate flexible thresholds that can accommodate small commercial functions, enabling women to sell directly and reduce dependence on subcontractors. On upper floors, selected units are removed to create shared terraces that translate the spatial logic of the otla, vertically through the section of the building. Where the otla connects dwelling to street, these collective terraces connect dwelling to sky, extending the same live-work threshold from ground to roof.

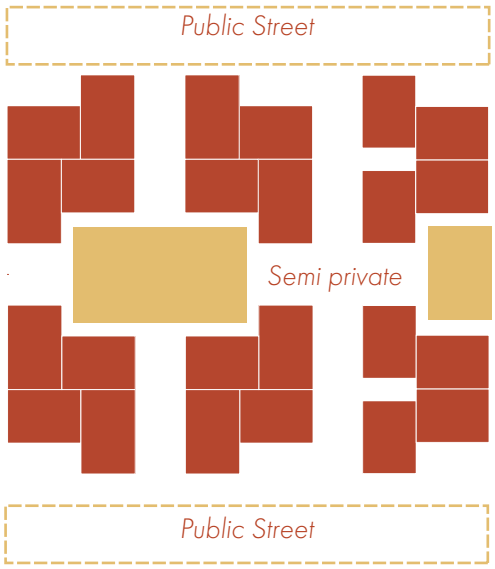
Folding doors open directly onto these terraces, formalising the spatial intelligence observed during fieldwork where women instinctively worked near thresholds and semi-outdoor spaces. These terraces accommodate informal production, skill-sharing, childcare, and community gatherings, the shared infrastructure that SEWA (2025) identifies as essential to reducing women's isolation and strengthening economic networks.



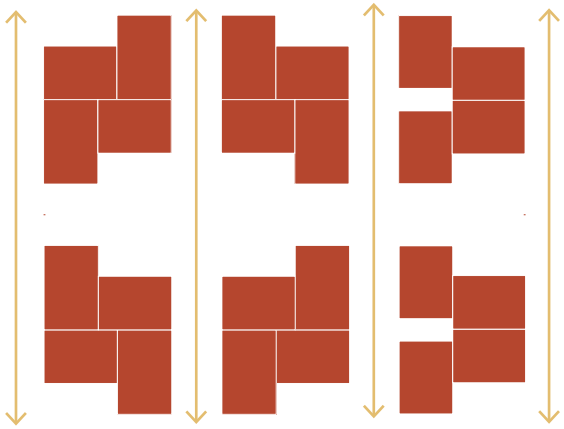
Mirroring Strategy creates Courtyard



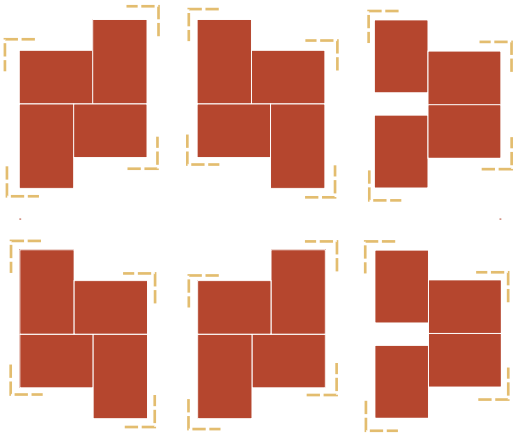
Shared Otla Ground Floor



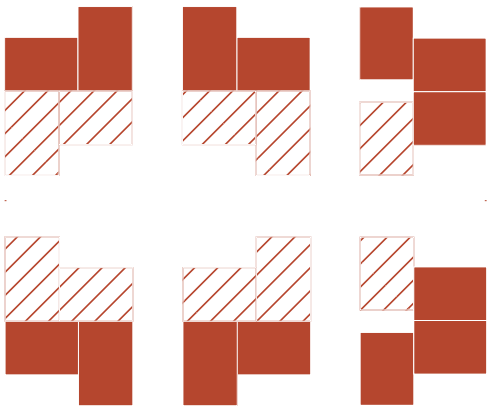
Public vs Semi-Private Women's safety



5m Gap Circulation and Ventilation Tunnels

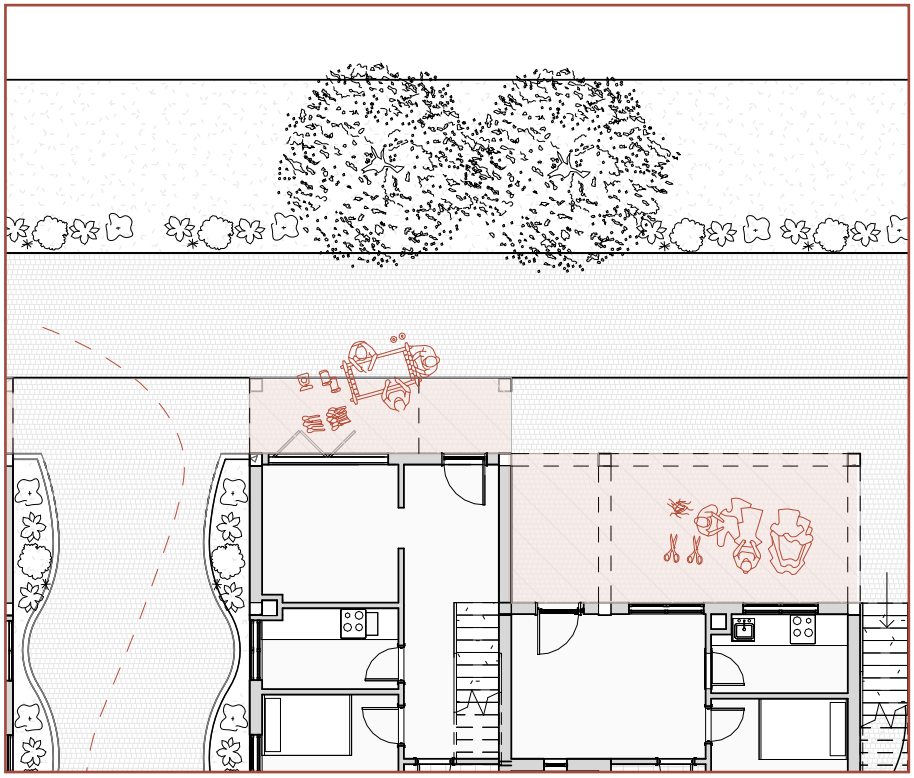


All units acting as corner units

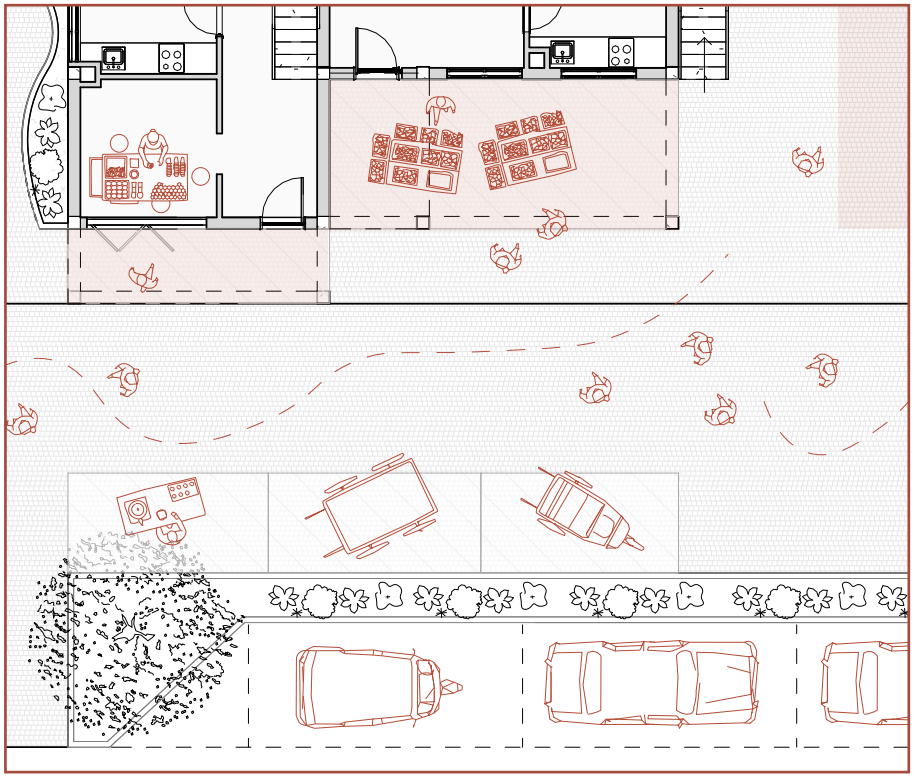


Dwellings Removed for Shared Terraces

CLUSTER GROUND FLOOR PLAN



HBW DWELLINGS OPENING TO STREET

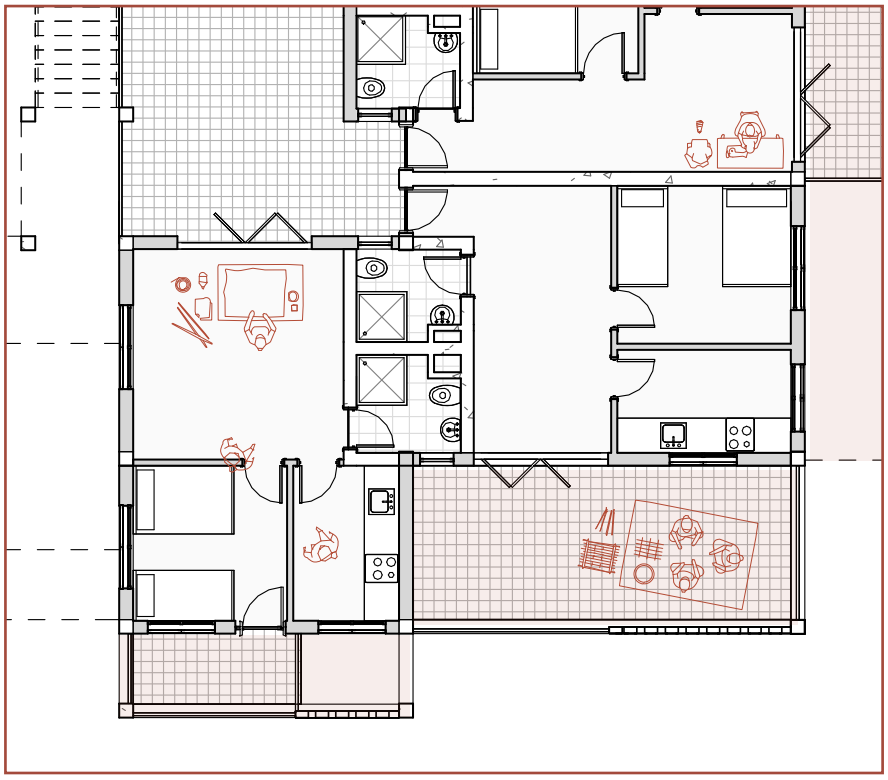


DWELLINGS WITH SHOPFRONT FACADES

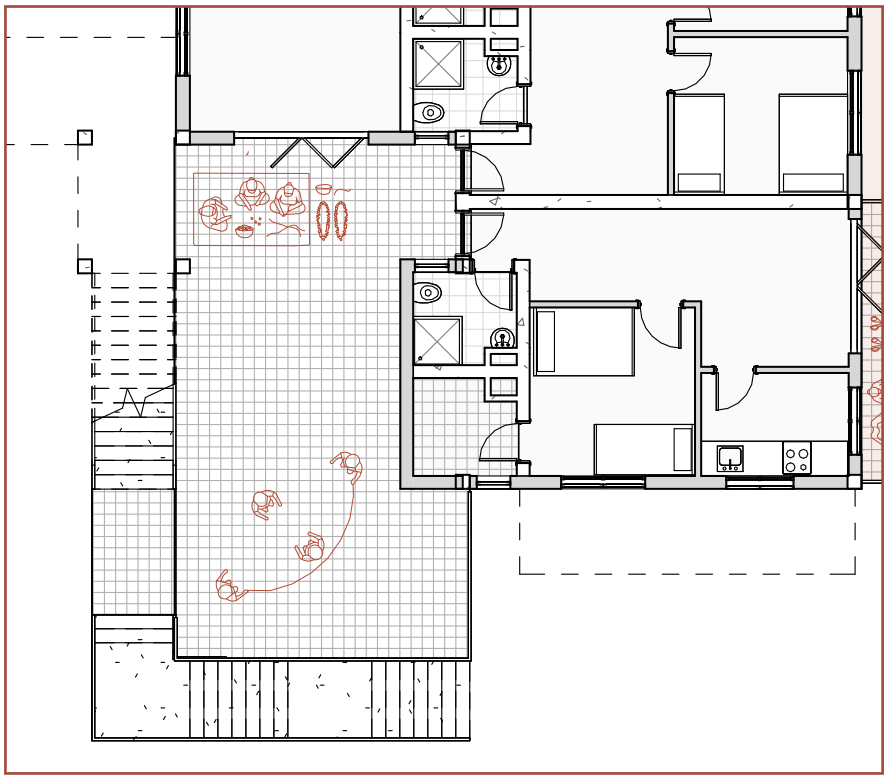
INCREMENTALITY


1:200
0
5m
10m

CLUSTER 1 FLOOR FLOOR PLAN



BALCONIES WITH JALIS CREATE PRIAVATE POCKETS FOR HBW



HBW WORKING WHILE OBSERVING CHILDREN

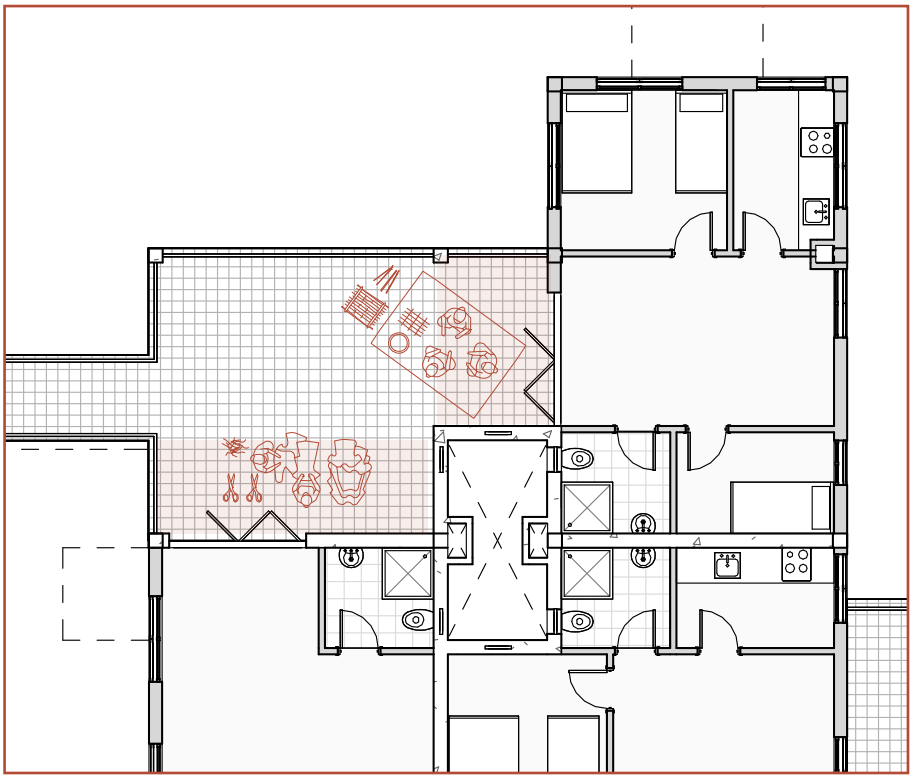
INCREMENTALITY



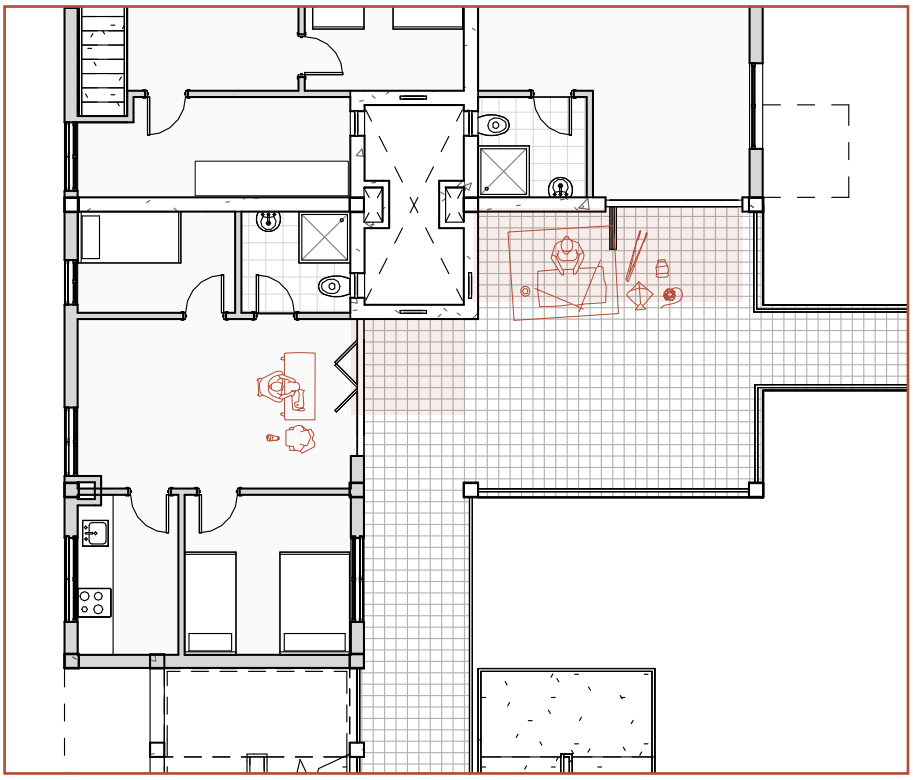
1:200

0 5m 10m

CLUSTER 2 FLOOR 1:200

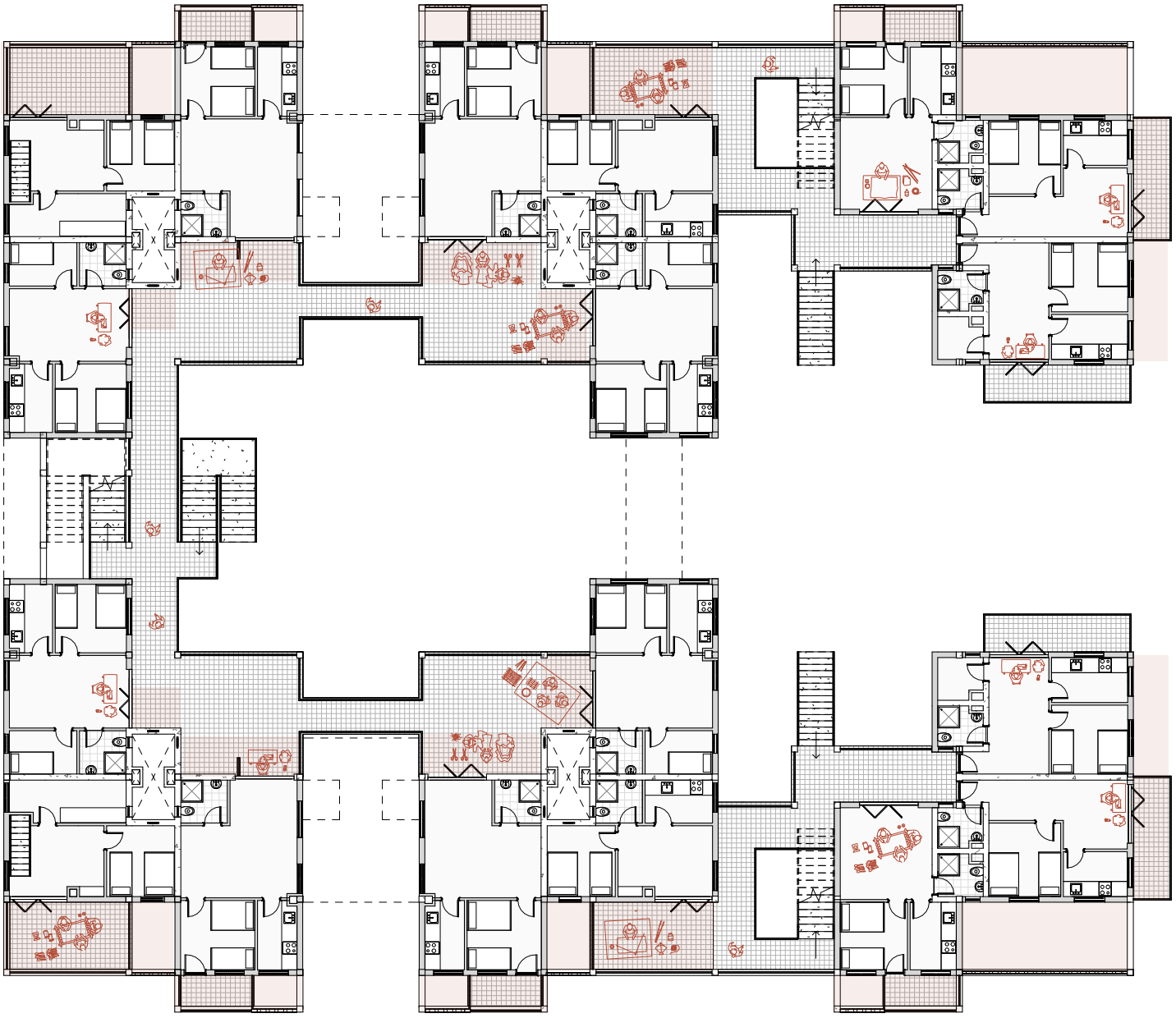


COLLECTIVE TERRACE FOR HBW



FOLDING DOORS OPENING EXTENS
INTERIOR TO TERRACE

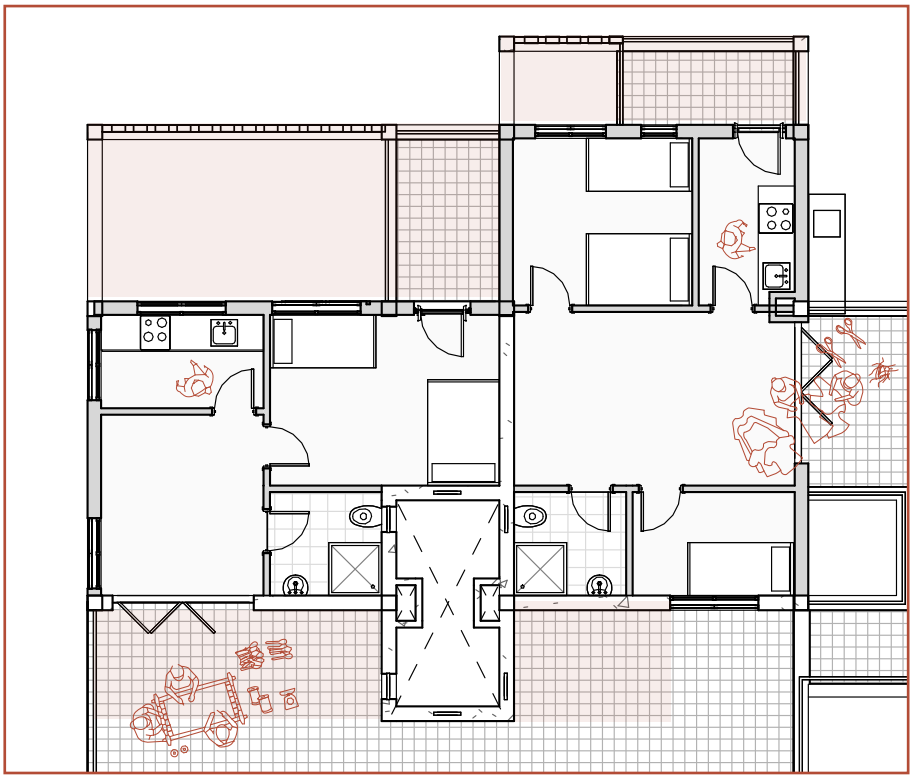
INCREMENTALITY



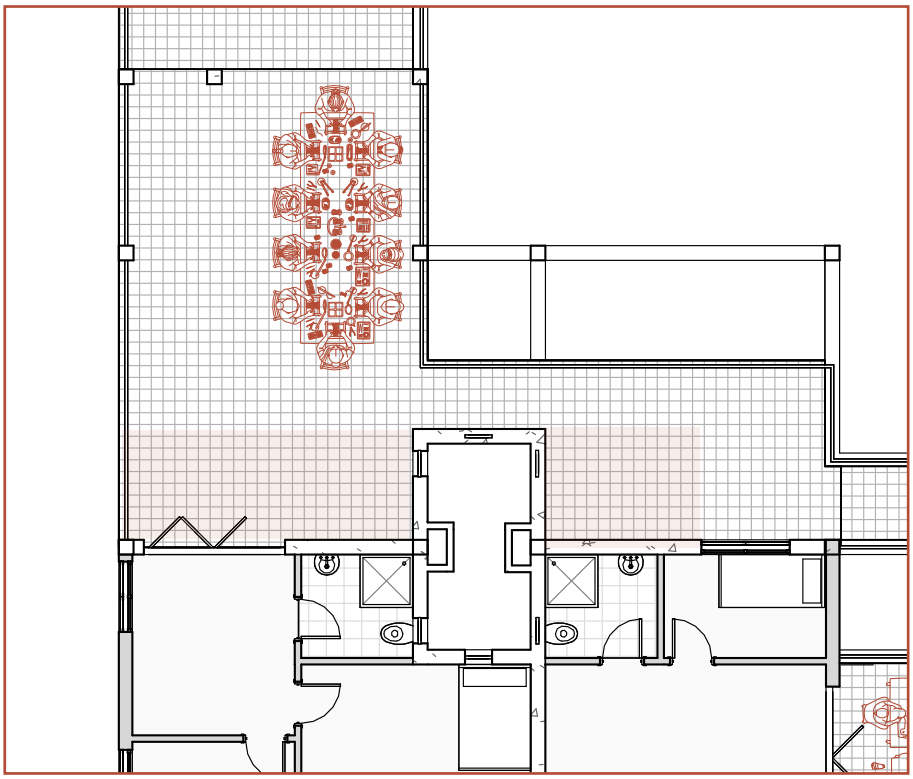
1:200

0 5m 10m

CLUSTER 3 FLOOR 1:200

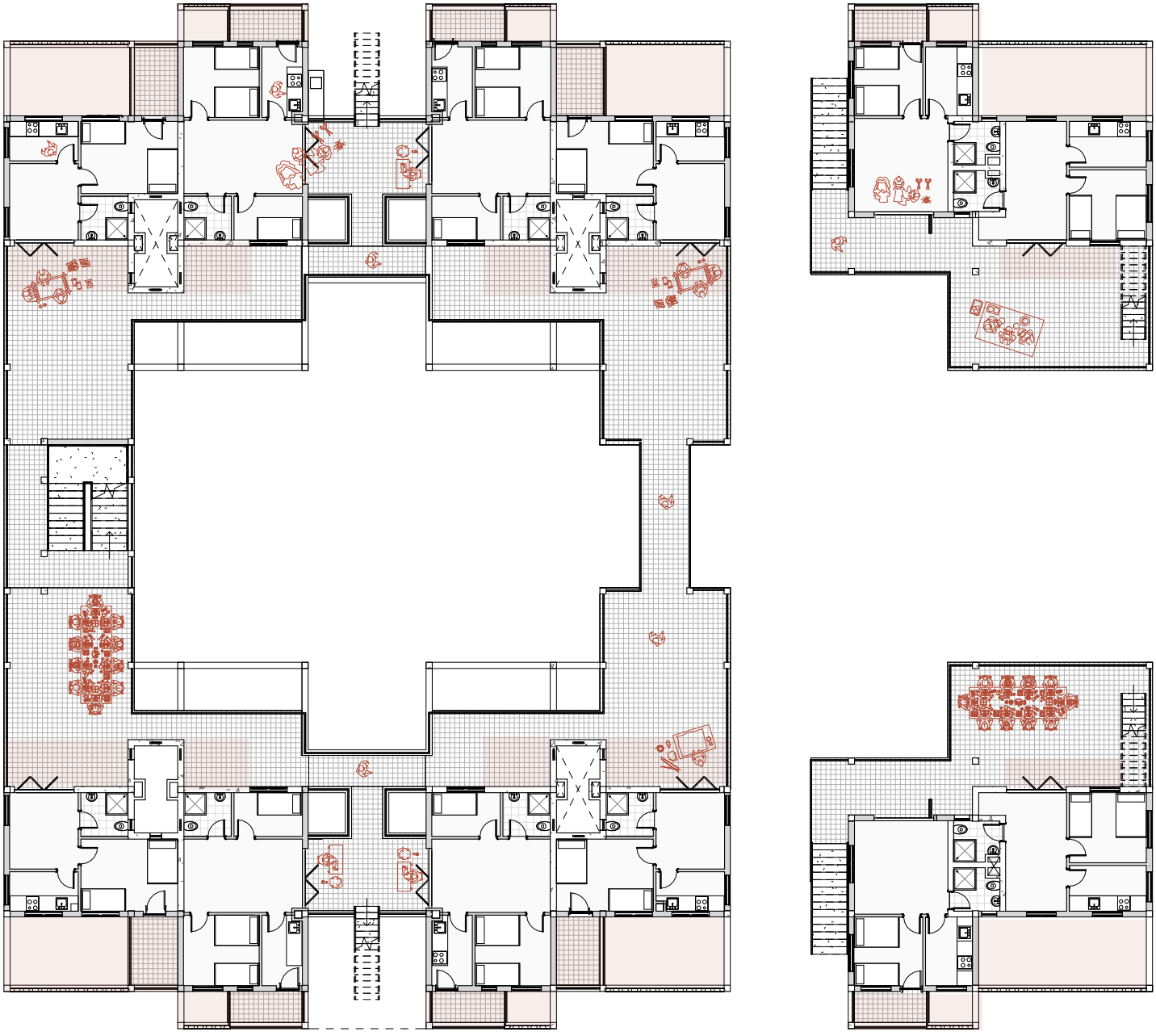


ALL KITCHENS ARE CLOSED KICTHENS



HBW HAVING SKILLS WORKSHOP IN TERRACE

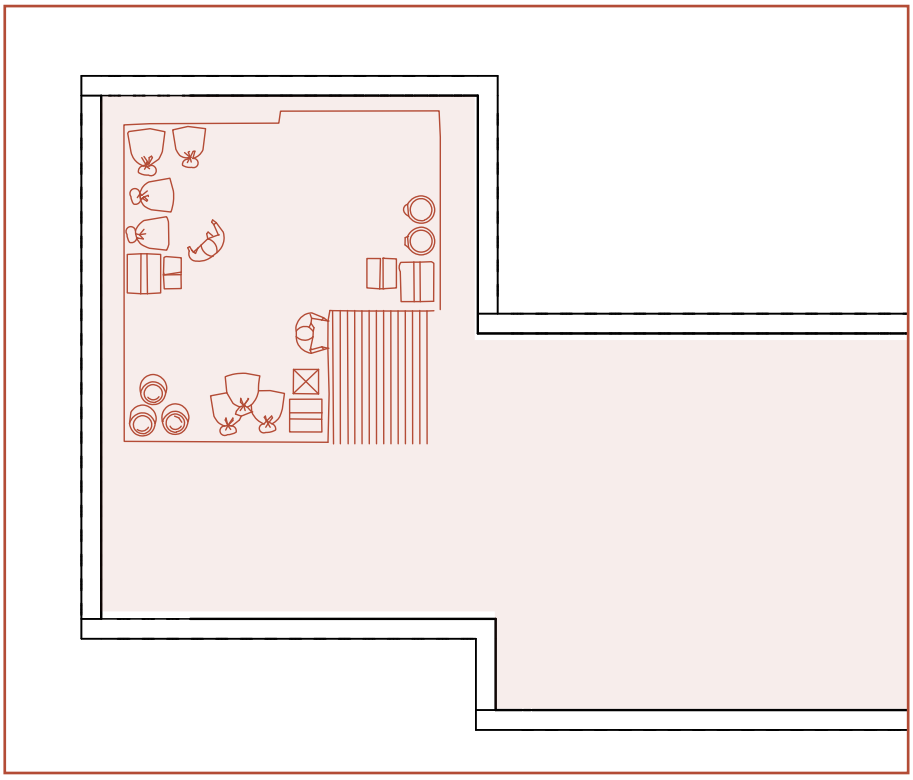
INCREMENTALITY



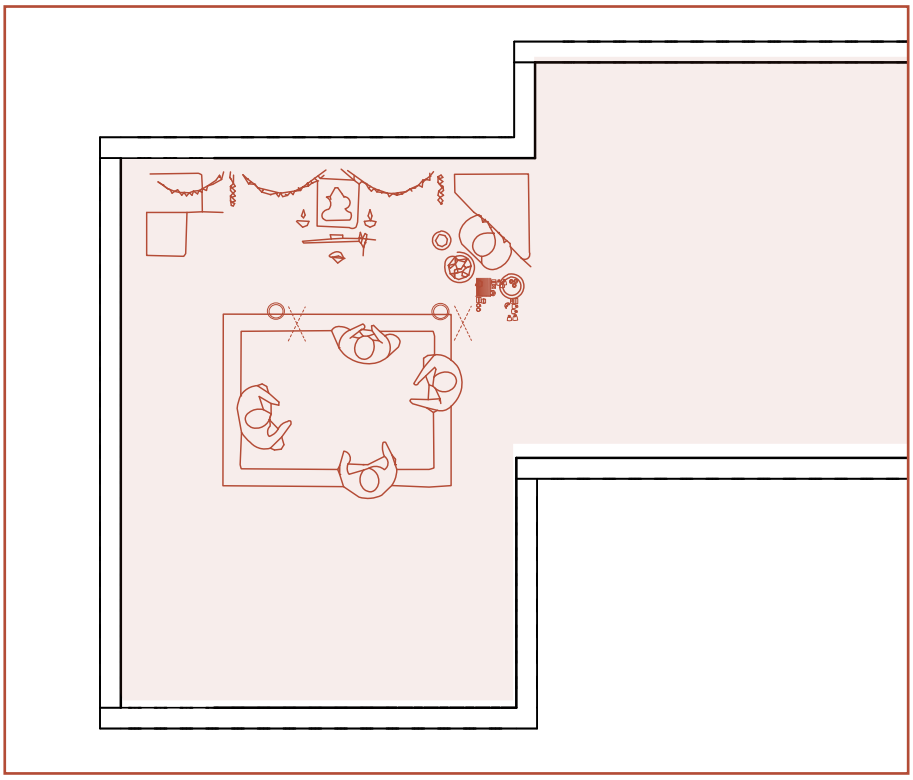
1:200

0 5m 10m

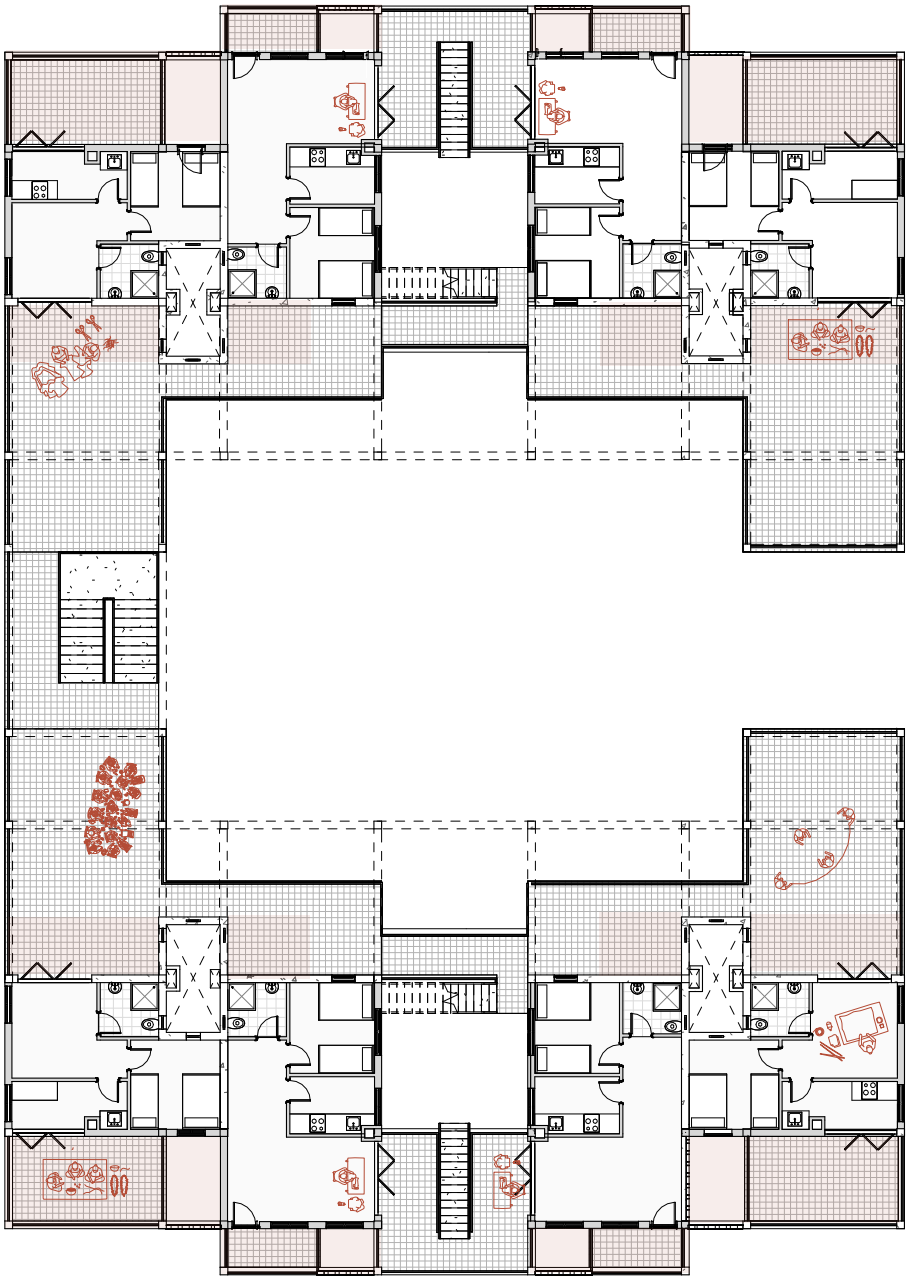
CLUSTER 4 FLOOR 1:200

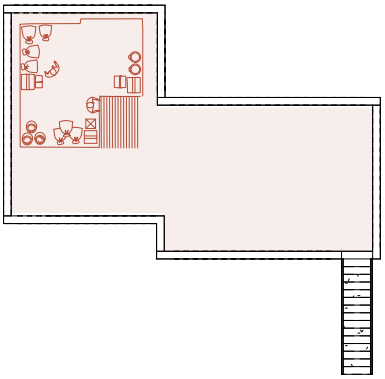


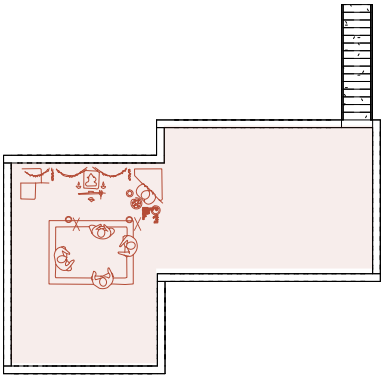
ROOF TERRACE AS POTENTIAL STORAGE



ROOF TERRACE USED FOR RELIGIOUS FESTIVITIES



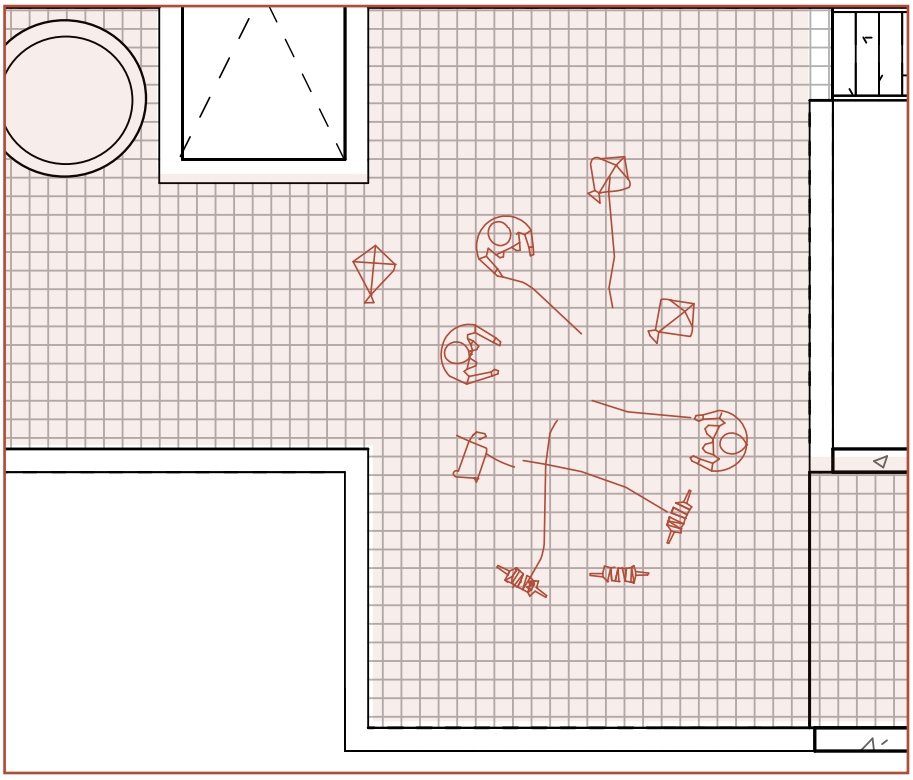




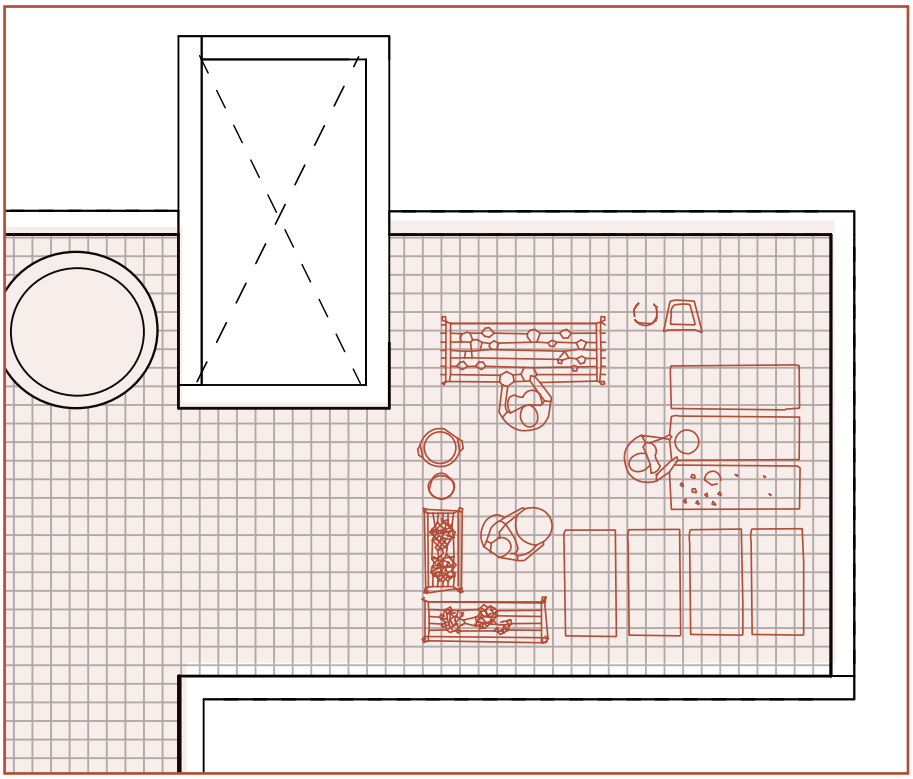
1:200

0 5m 10m

CLUSTER 5 FLOOR 1:200

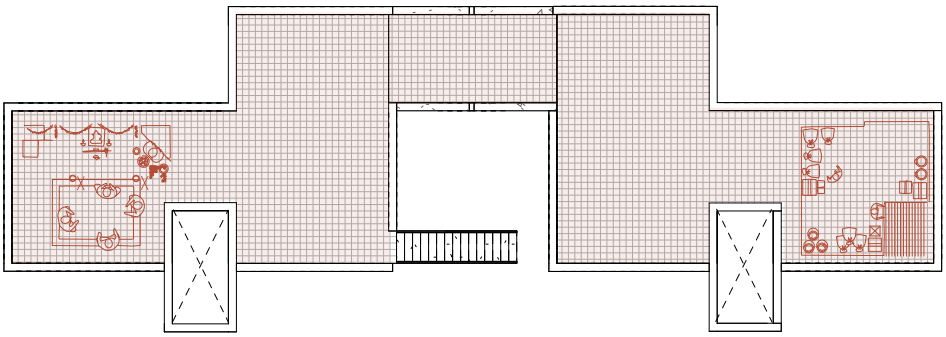


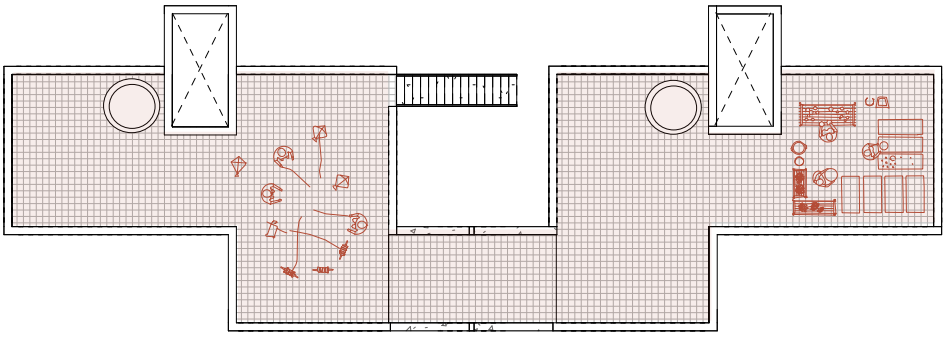
ROOF USED FOR KITE FLLYING



ROOF USED FOR DRYING GOODS

INCREMENTALITY





1:200

0 5m 10m

EAST ELEVATION C





1:100 at A2
(scale bar only)

0 1m 2m

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SOUTH ELEVATION D





1:100 at A2
(scale bar only)

0 1m 2m

WEST ELEVATION E





1:100 at A2
(scale bar only)

0 1m 2m

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SOUTH ELEVATION F





1:100 at A2
(scale bar only)

0 1m 2m

Rafaella Falquez *Global Housing*





PERSPECTIVE INTERIOR COURTYARD

DWELLING SCALE

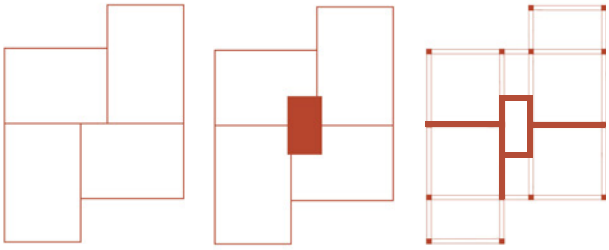
Five dwelling-unit types are proposed, ranging from 35 to 86 sqm, to accommodate the varying household sizes and economic configurations of home-based women workers documented during fieldwork. All units are organised around three shared principles derived directly from fieldwork observations: a flexible live-work zone integrated within the dwelling, adequate storage for raw materials and finished goods, and an otla threshold connecting the dwelling to the shared courtyard. The structural form of each unit type remains consistent across floors. However, variations occur in the placement and configuration of openings, which respond to the position of shared terraces at different level.

Spatially, each unit is organised as a corner dwelling with openings on two opposing façades. Overhead storage has been integrated within each unit in response to the lack of storage documented during fieldwork, reflecting the improvised solutions residents already use. As households expand their units incrementally over time, it is expected that some will be able to dedicate a full room to storage or workspace. Partition walls are built at 115mm, allowing spatial reconfiguration over time as households adapt their units. The structural frame is left exposed so residents can confidently identify load-bearing elements and expand incrementally, following Turner's (1976) argument that housing should function as an evolving framework rather than a fixed product.

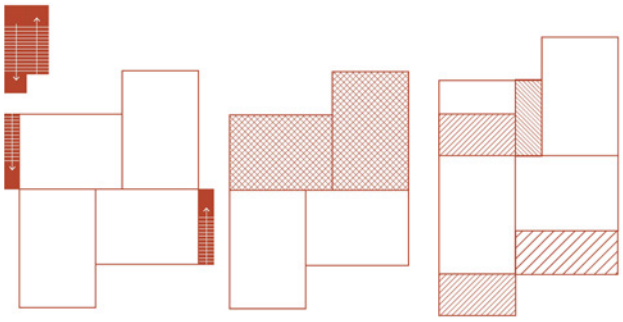
Environmentally, the dual-façade configuration enables cross-ventilation in every unit without mechanical systems. Steel louvre shutters regulate airflow and solar gain throughout the day. A second layer of glazing behind the louvres allows households to install fans or air conditioning in the future as their incomes grow, without requiring structural changes.

Socio-economically, the incremental structural system allows households to expand their unit area over time, potentially dedicating a full room to workspace or storage as needs and resources grow. Ground-floor units incorporate wider threshold openings that can accommodate small commercial functions, thereby reducing dependence on subcontractors and supporting more autonomous forms of production. Also, smaller units of 35–43 sqm are designed for nuclear households, while larger units of up to 86 sqm are designed for joint-family arrangements. It was observed during the fieldwork that in Calico Mills, some households could house up to 12 people, indicating that some households collectively earn higher incomes. This demonstrates that larger units are not unrealistic for low-income residents and are possible when costs are shared across an extended household.

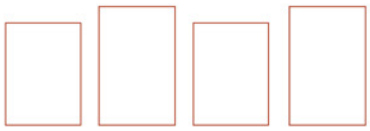
CLUSTERING STRATEGY TYPE B



CLUSTERING VENTILATION STRUCTURE



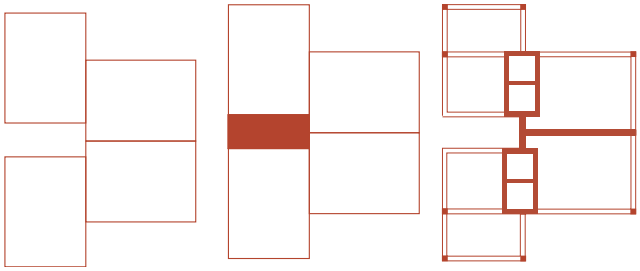
CIRCULATION LIVE-WORK SPACES INCREMENTALITY



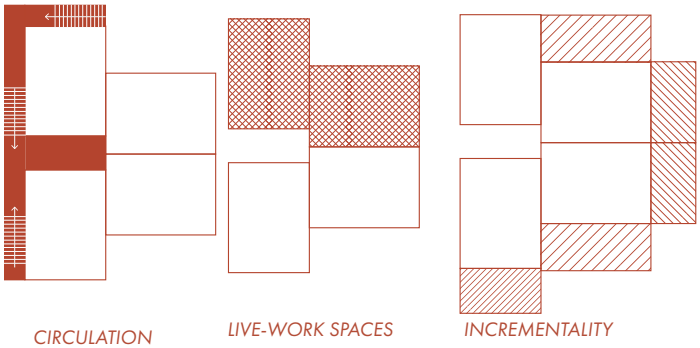
CLUSTERING 4 UNITS

5m x 7m (x2)
5m x8m (x2)

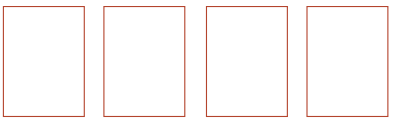
CLUSTERING STRATEGY TYPE A



VENTILATION STRUCTURE



CIRCULATION LIVE-WORK SPACES INCREMENTALITY



CLUSTERING 4 UNITS

5m x 7m

DWELLING TYPE A & B GF

TYPE A

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 1A: 48 sqm

TYPE 2A: 58 sqm

TYPE B

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 1B: 43 sqm

TYPE 2B: 64 sqm

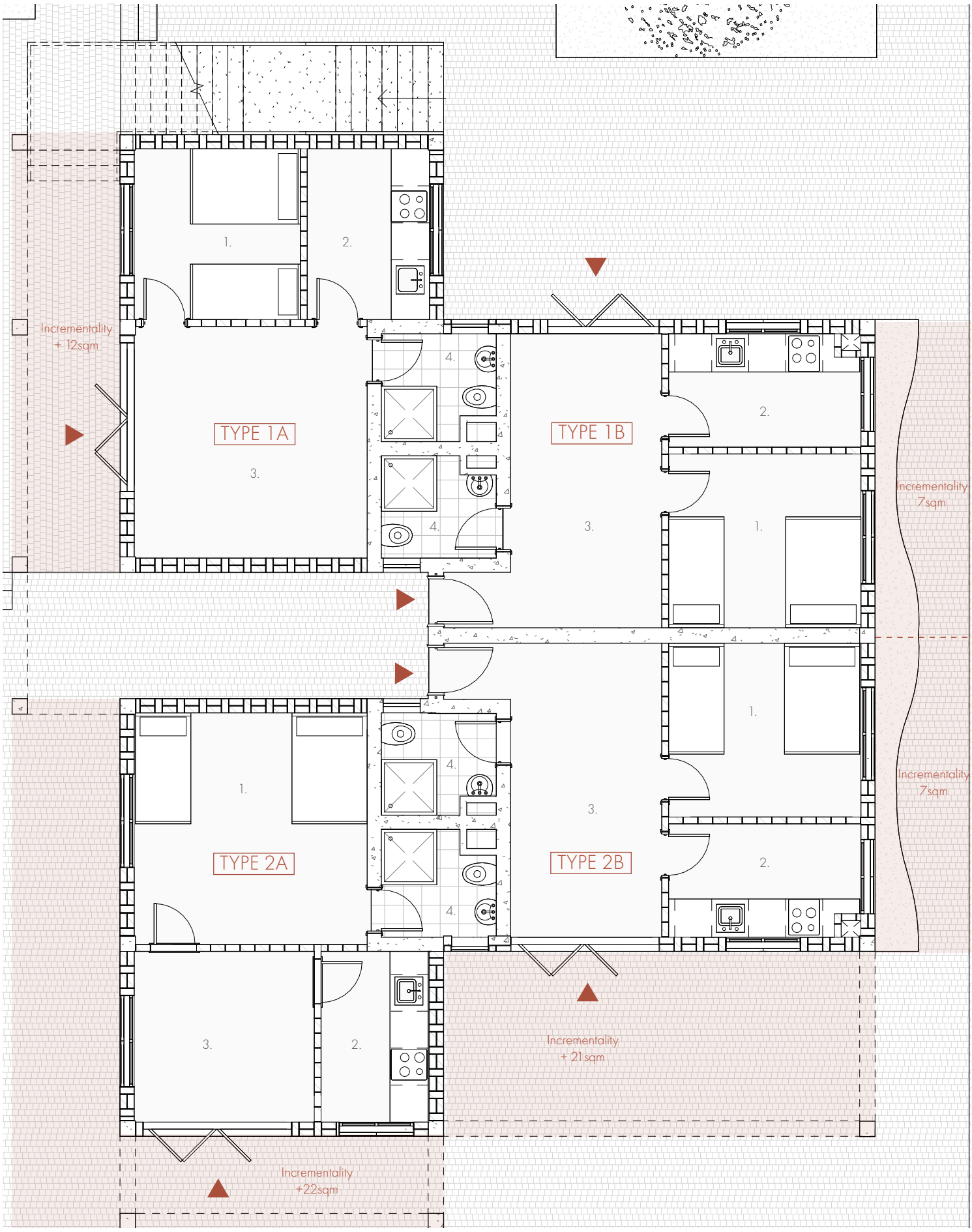
KEY

1. BEDROOM

2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET


TYPE 1A
TYPE 1B
TYPE 2A
TYPE 2B
Incrementality
+ 12sqm
Incrementality
7sqm
Incrementality
7sqm
Incrementality
+ 21sqm
Incrementality
+22sqm
1:50
0
1m
5m

DWELLING TYPE A & B 1F

TYPE A

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 3A: 44 sqm

TYPE B

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 3B: 43 sqm

TYPE 4B: 64 sqm

KEY

1. BEDROOM

2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET

5. BALCONY/TERRACE

6. STORAGE


TYPE 3B
TYPE 3A
TYPE 4B
Incrementality
7sqm
Incrementality
7sqm
Incrementality
+ 21 sqm
Incrementality
+8sqm
1.
2.
3.
4.
5.
6.

1:50

0 1m 5m

DWELLING TYPE A & B 2F

TYPE A

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 4A: 44 sqm

TYPE B

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 5B: 43 sqm

TYPE 6B: 64 sqm

KEY

1. BEDROOM

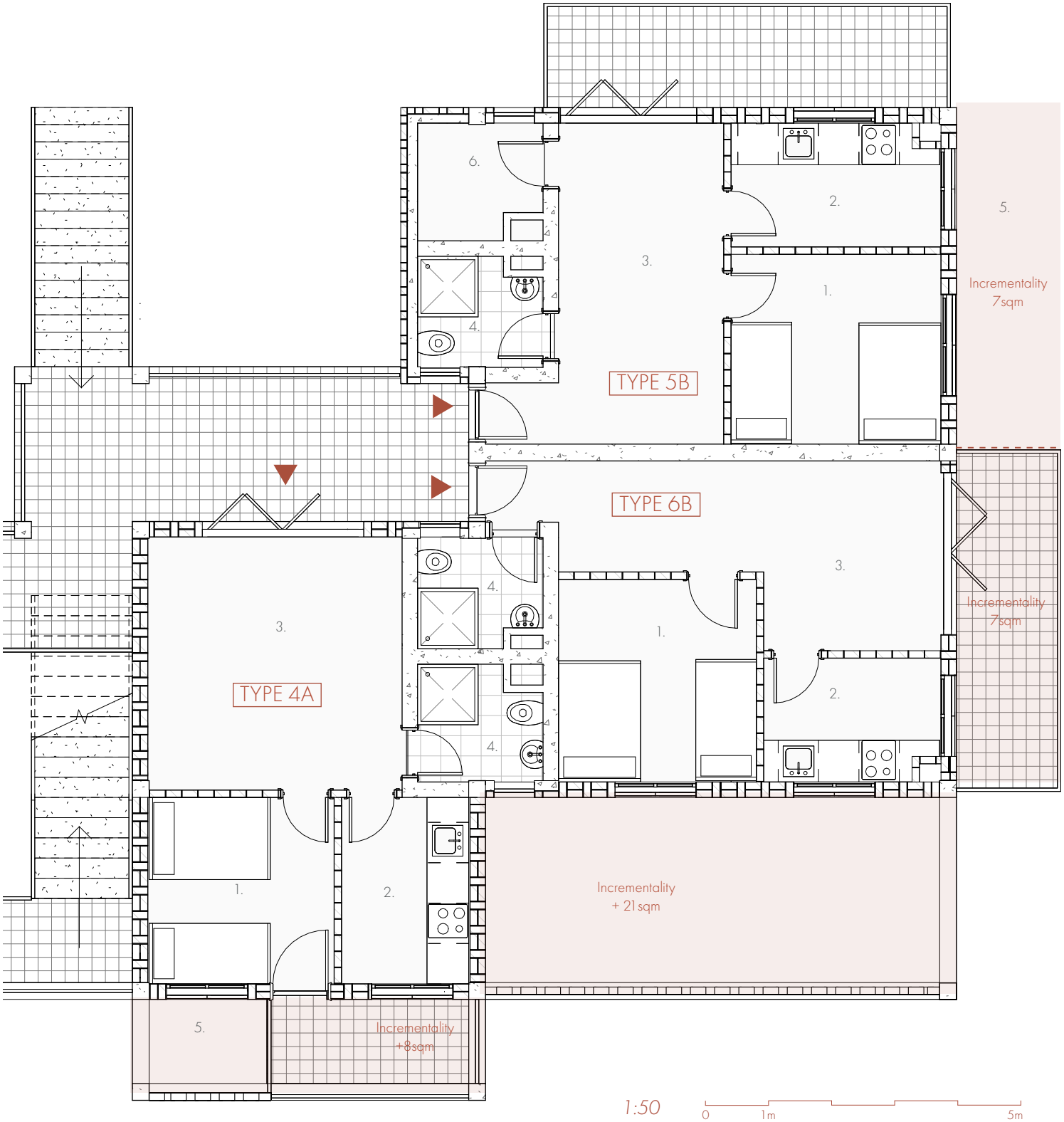
2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET

5. BALCONY/TERRACE

6. STORAGE


TYPE 5B
TYPE 6B
TYPE 4A
Incrementality
7sqm
Incrementality
7sqm
Incrementality
+ 21 sqm
Incrementality
+8sqm

1:50

0 1m 5m

DWELLING TYPE A & B 3F

TYPE A

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 3A: 44 sqm

TYPE B

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 7B: 64 sqm

KEY

1. BEDROOM

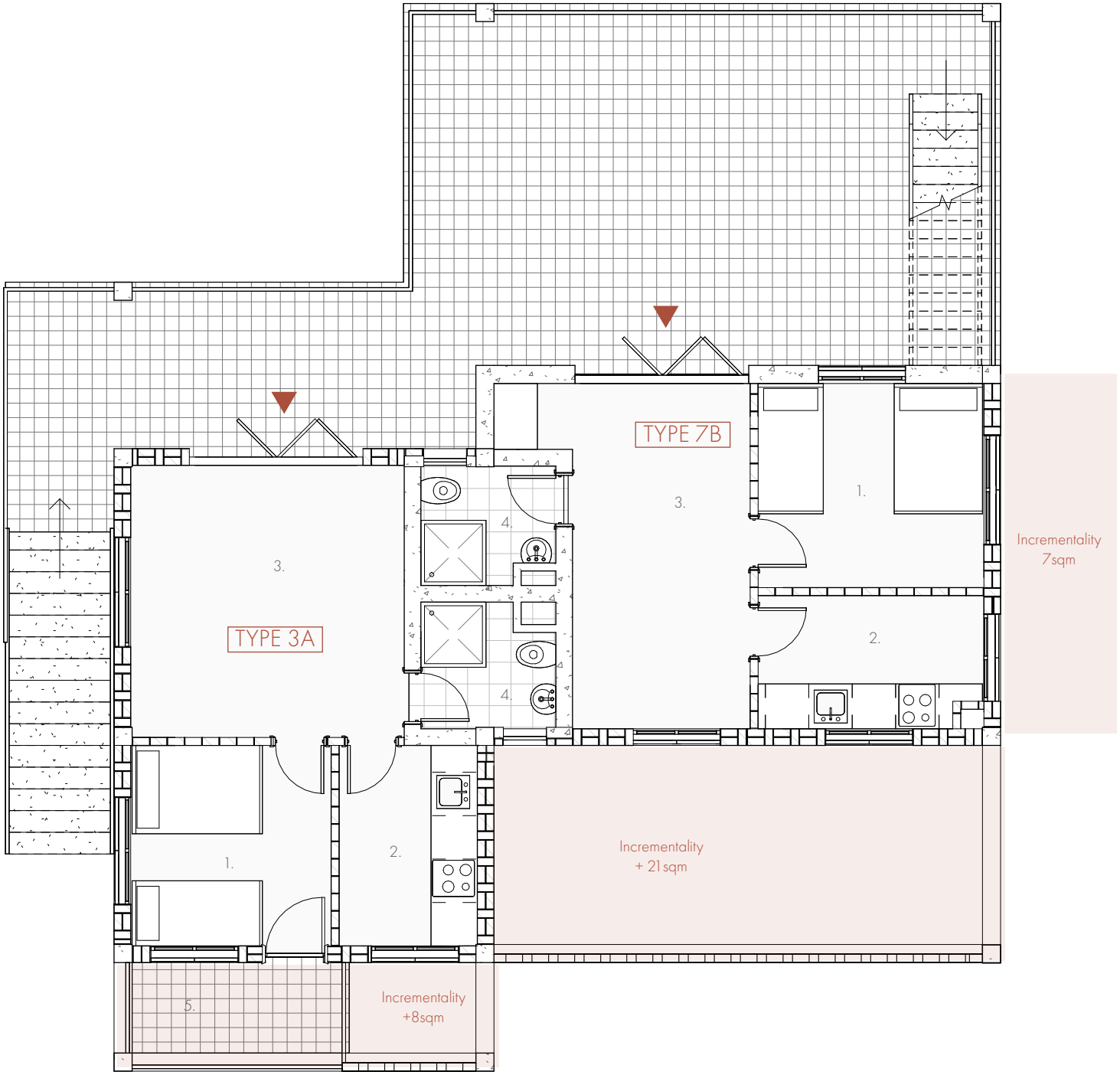
2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET

5. BALCONY/TERRACE

6. STORAGE



1:50

0 1m 5m

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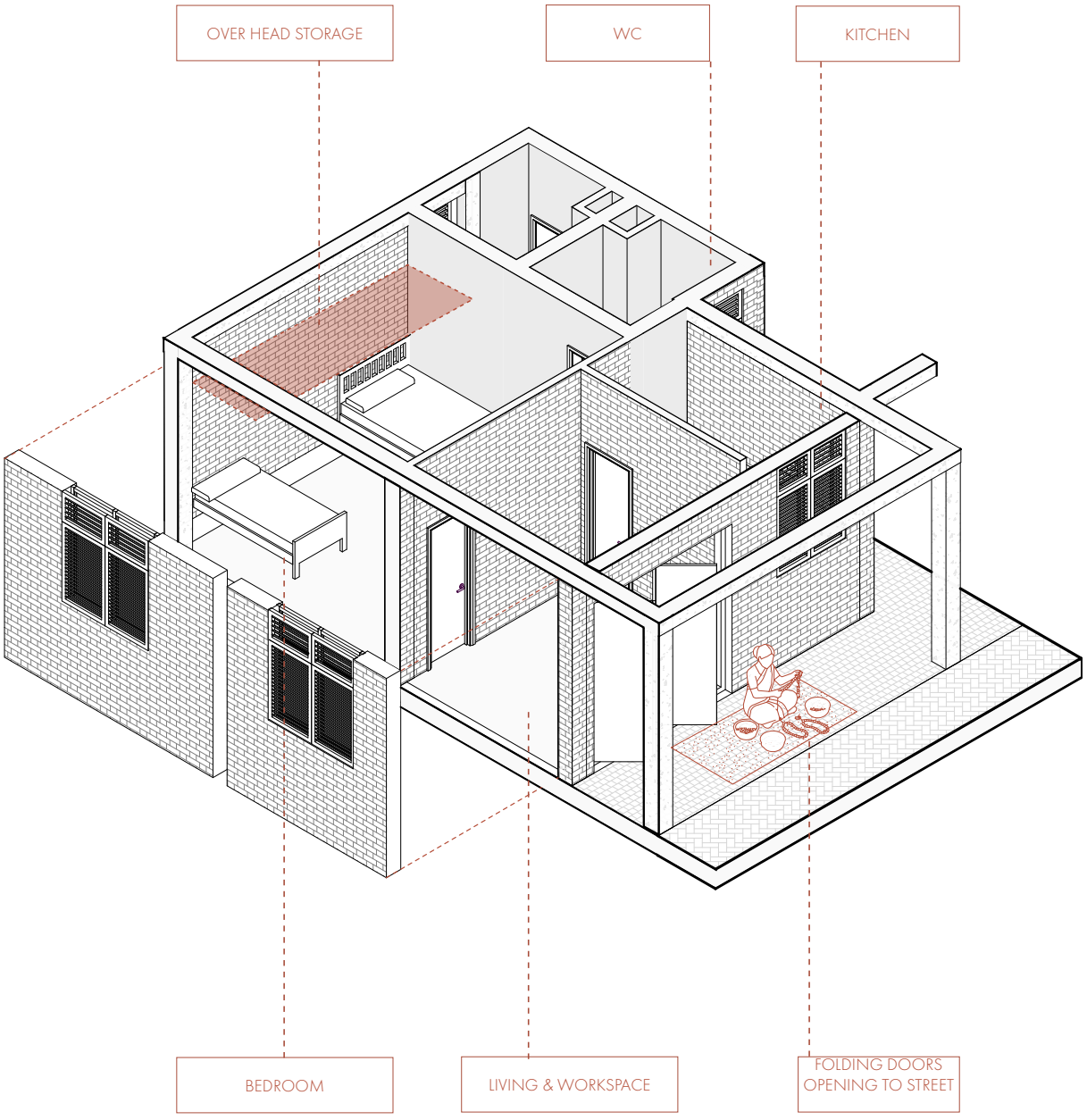
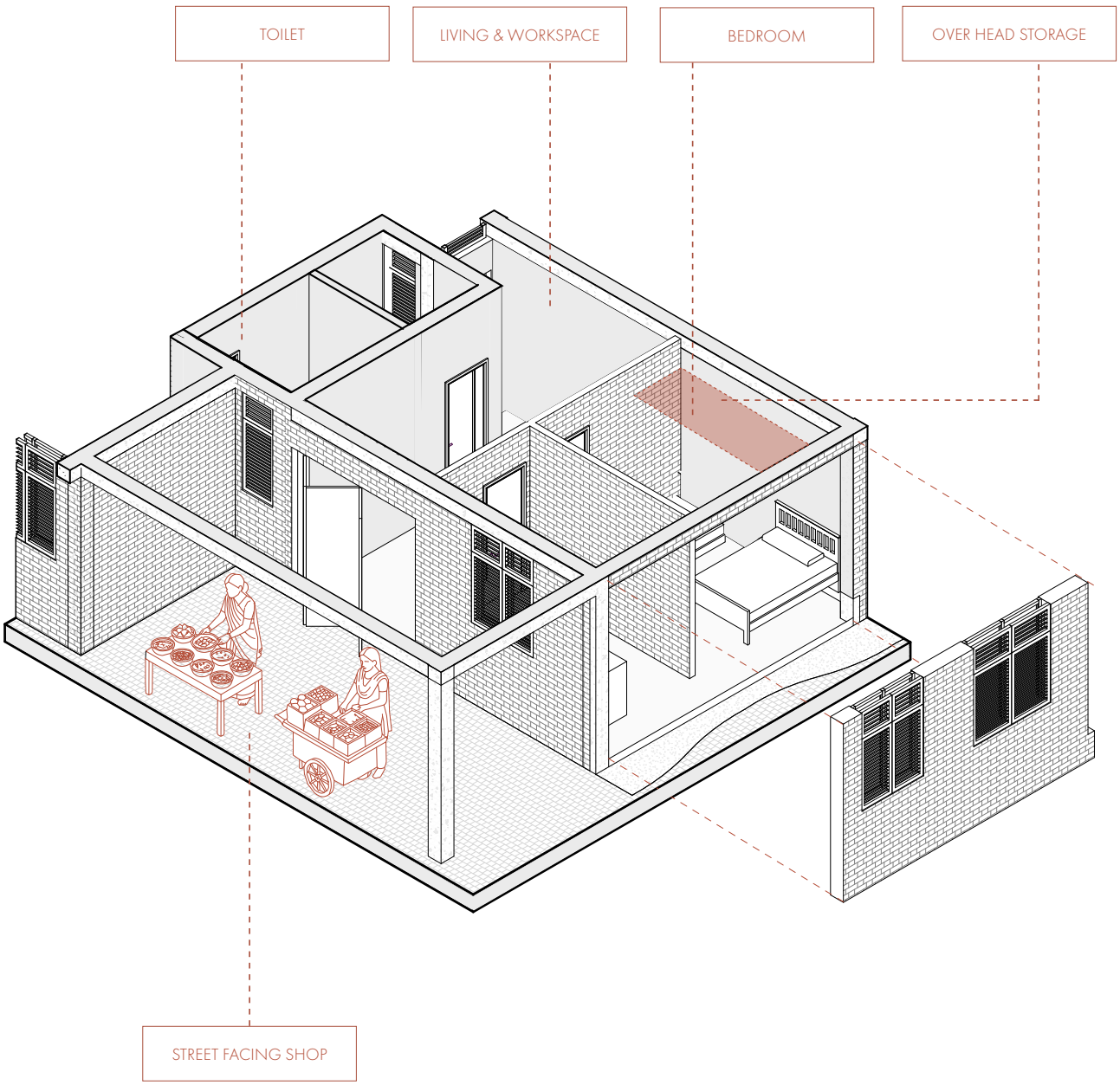
DWELLING TYPE A & B AXONOMETRIC




TOILET
LIVING & WORKSPACE
BEDROOM
OVER HEAD STORAGE
STREET FACING SHOP

DWELLING TYPE C & D GF

TYPE C

GFA: 86 sqm

OF PEOPLE HOUSEHOLD: 10-12

INCREMENTAL GROWTH:

TYPE 1C: 102 sqm

TYPE 2C: 94 sqm

TYPE D

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 1D: -

TYPE 2D: 57 sqm

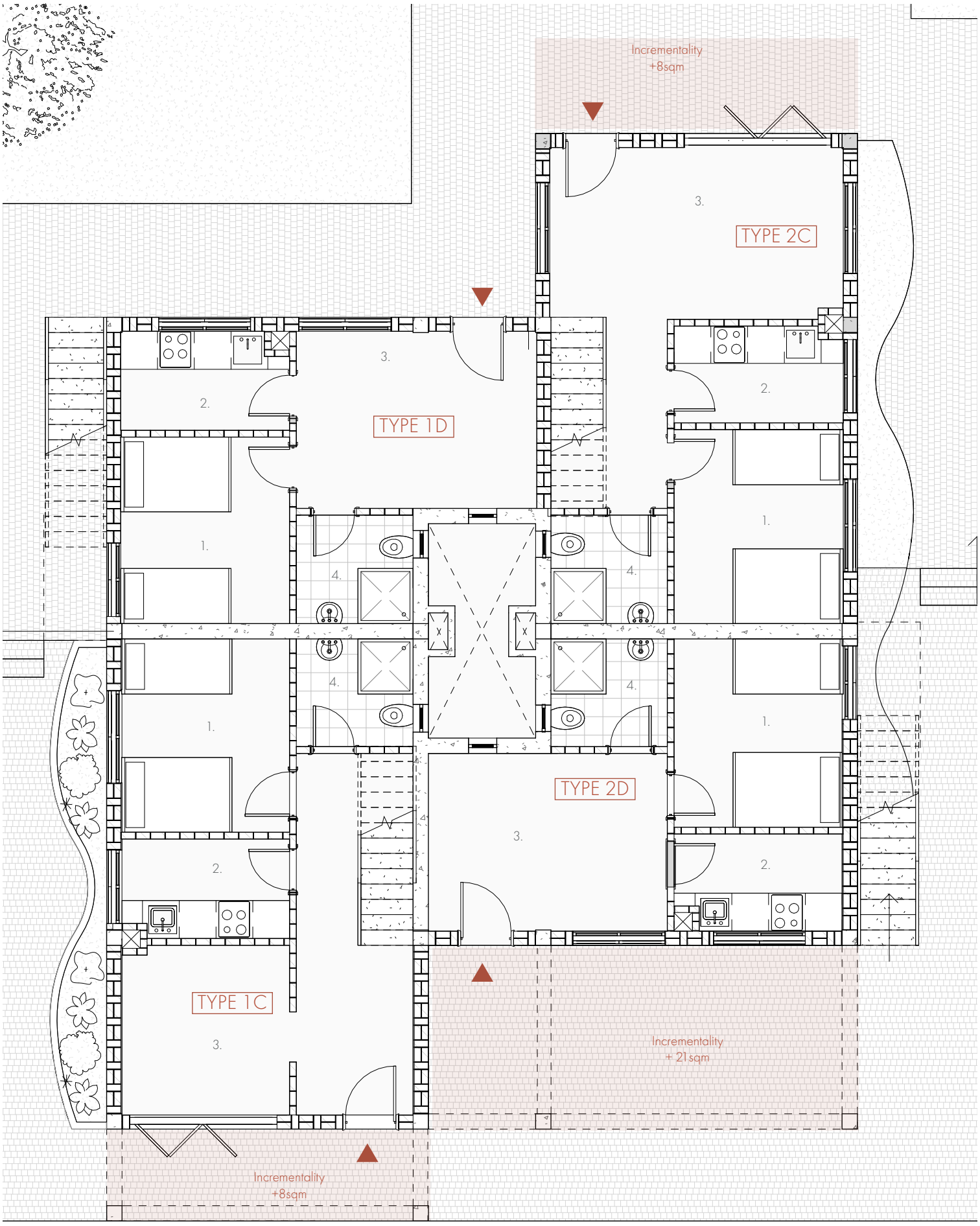
KEY

1. BEDROOM

2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET



1:50

0 1m 5m

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DWELLING TYPE C & D 1F

TYPE C

GFA: 86 sqm

OF PEOPLE HOUSEHOLD: 10-12

INCREMENTAL GROWTH:

TYPE 1C: 102 sqm

TYPE 2C: 102 sqm

TYPE D

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 3D: 36 sqm

TYPE 4D: 57 sqm

KEY

1. BEDROOM

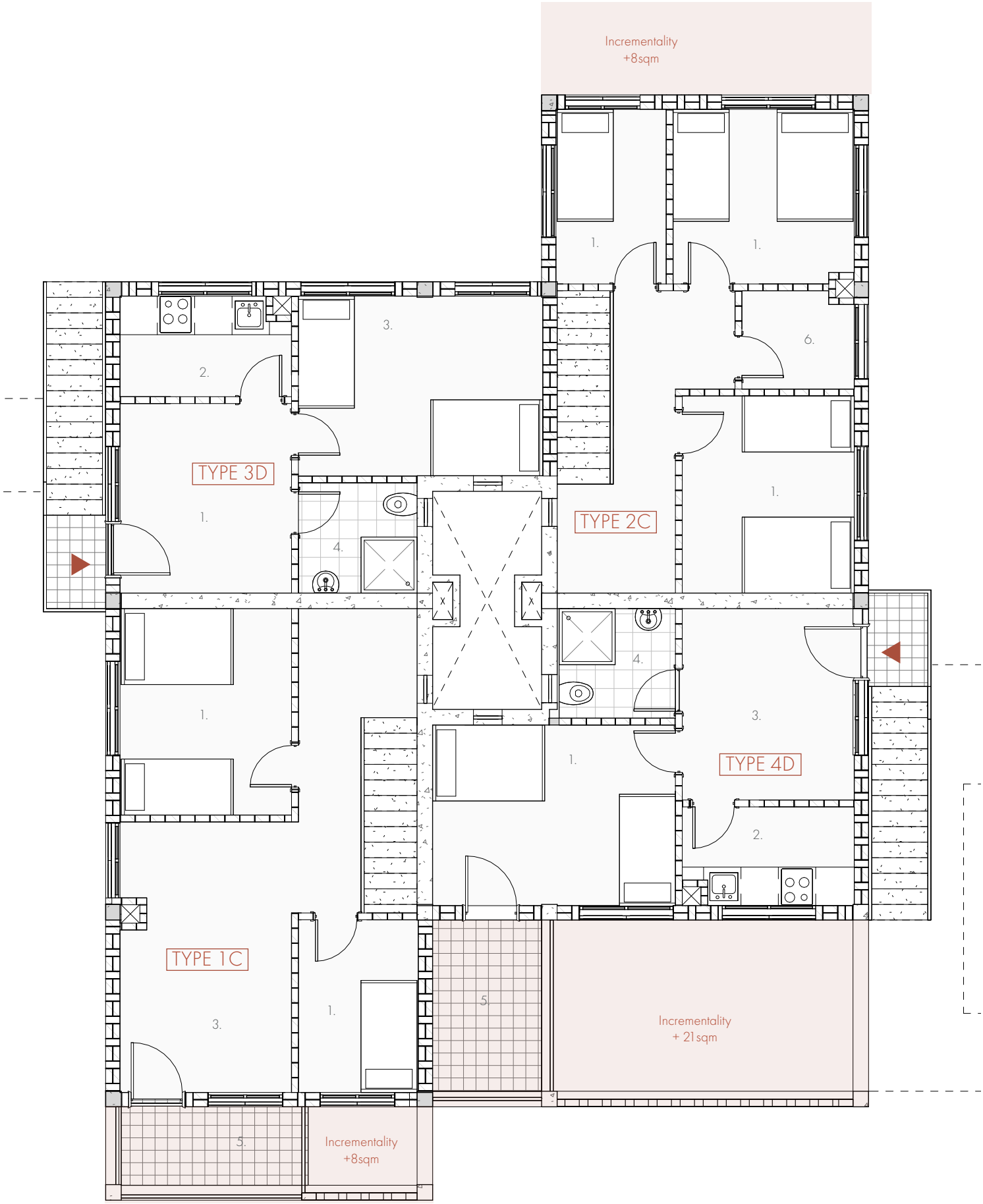
2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET

5. BALCONY/TERRACE

6. STORAGE


Incrementality
+8sqm
TYPE 3D
TYPE 2C
TYPE 4D
TYPE 1C
Incrementality
+ 21sqm
Incrementality
+8sqm
1.
2.
3.
4.
5.
6.
X

1:50

0 1m 5m

DWELLING TYPE D & E 2F

TYPE D

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4-5

INCREMENTAL GROWTH:

TYPE 5D: 57 sqm

TYPE E

GFA: 43 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 1E: 49 sqm

TYPE 2E: 61 sqm

KEY

1. BEDROOM

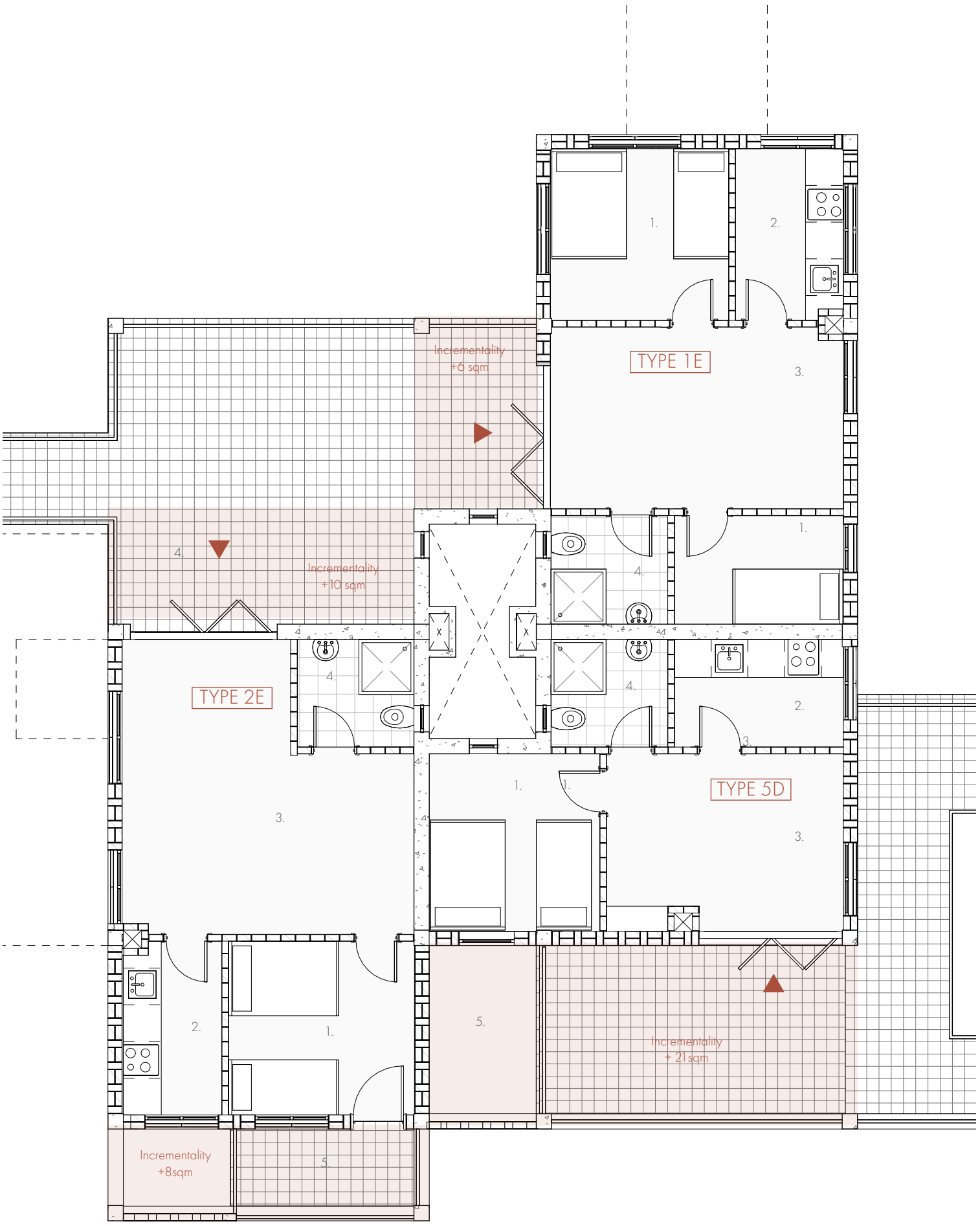
2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET

5. BALCONY/TERRACE

6. STORAGE



1:50

0 1m 5m

Rafaella Falquez Global Housing

DWELLING TYPE D & E 3F

TYPE D

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4-5

INCREMENTAL GROWTH:

TYPE 5D: 57 sqm

TYPE E

GFA: 43 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 3E : 51 sqm

KEY

1. BEDROOM

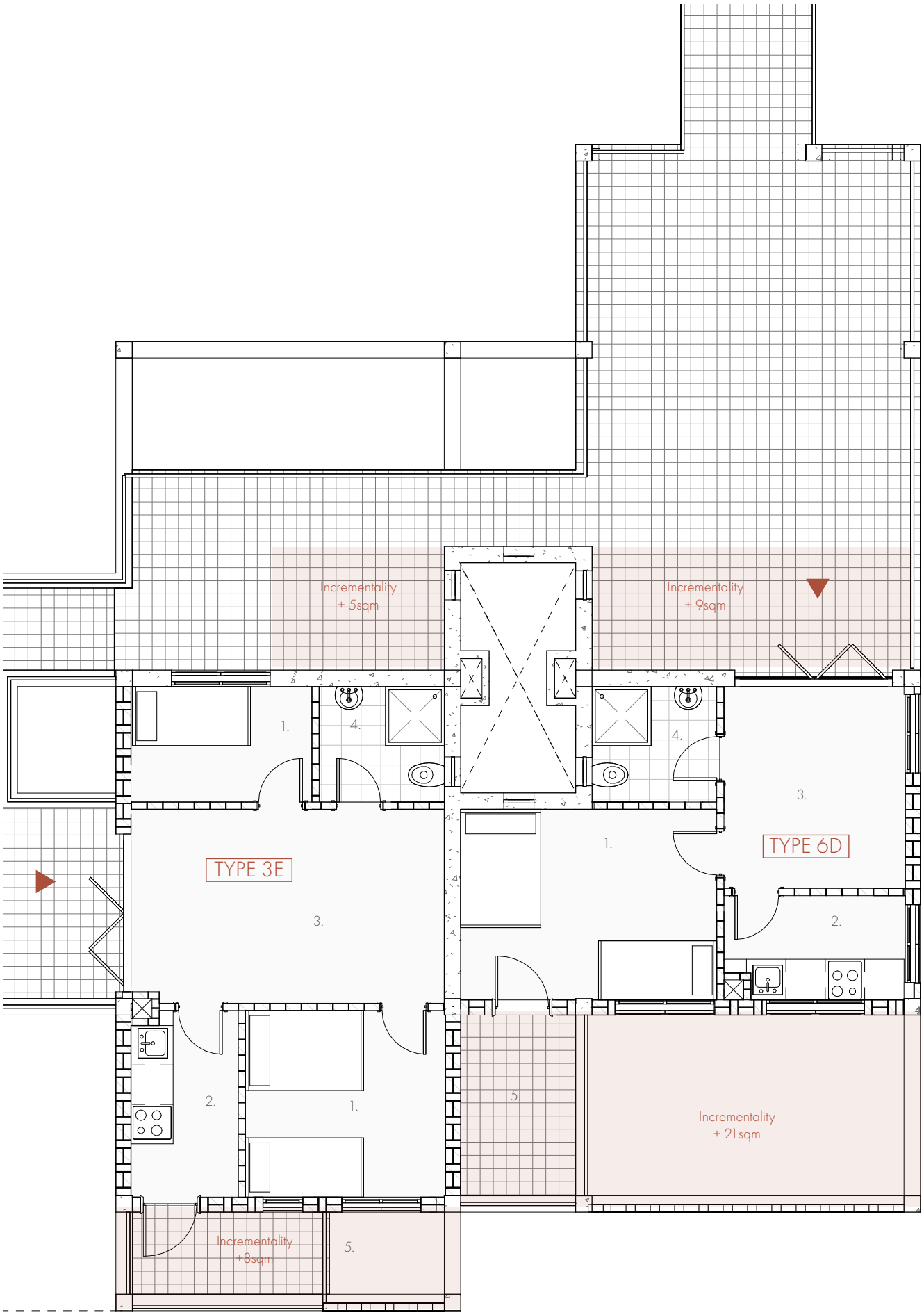
2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET

5. BALCONY/TERRACE

6. STORAGE



1:50

0 1m 5m

Rafaella Falquez

Global Housing

DWELLING TYPE D & E 4F

TYPE D

GFA: 36 sqm

OF PEOPLE HOUSEHOLD: 4-5

INCREMENTAL GROWTH:

TYPE 5D: 57 sqm

TYPE E

GFA: 43 sqm

OF PEOPLE HOUSEHOLD: 4- 5

INCREMENTAL GROWTH:

TYPE 3F : 51 sqm

KEY

1. BEDROOM

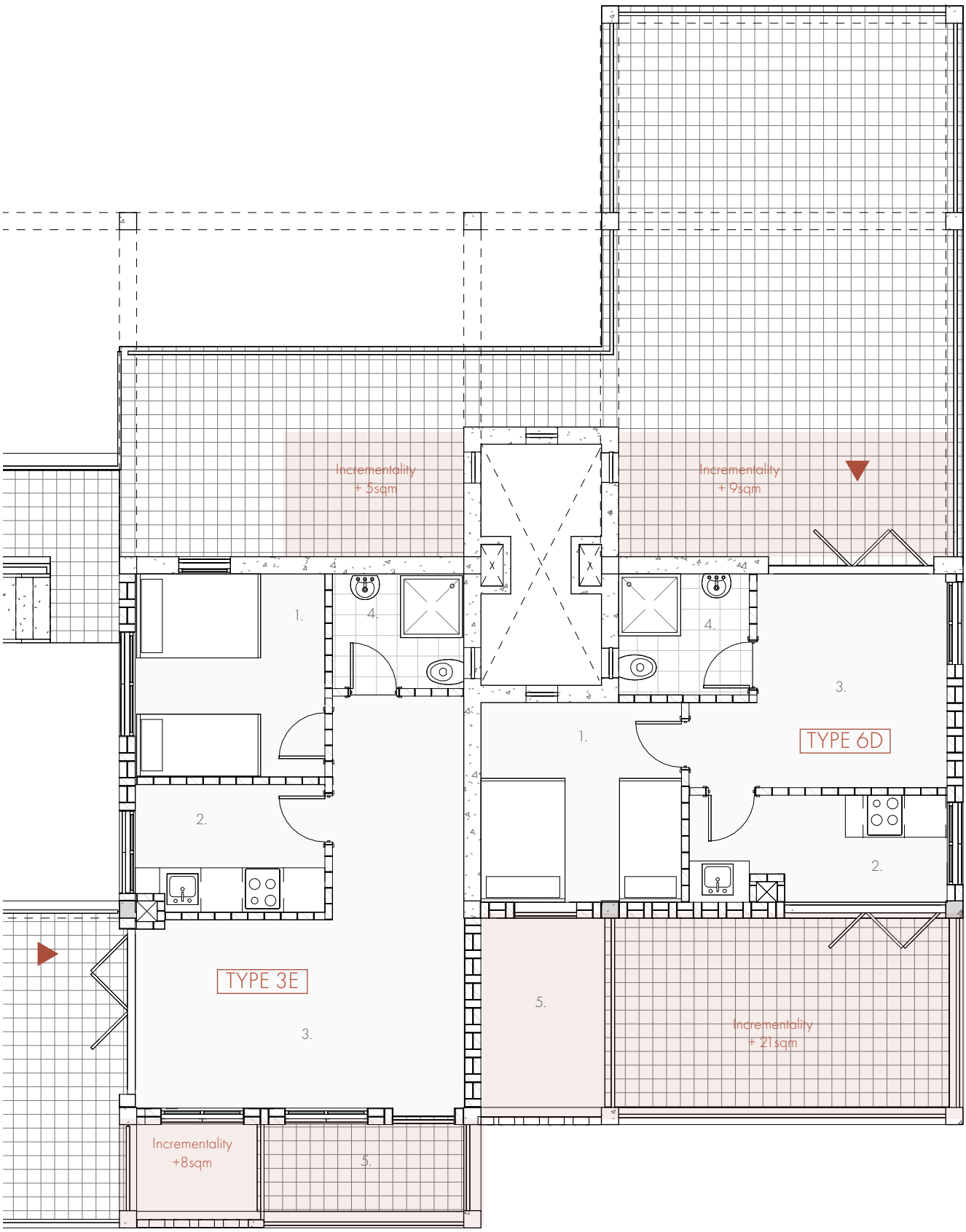
2. KITCHEN

3. FLEXIBLE LIVE-WORKSPACE

4. TOILET

5. BALCONY/TERRACE

6. STORAGE

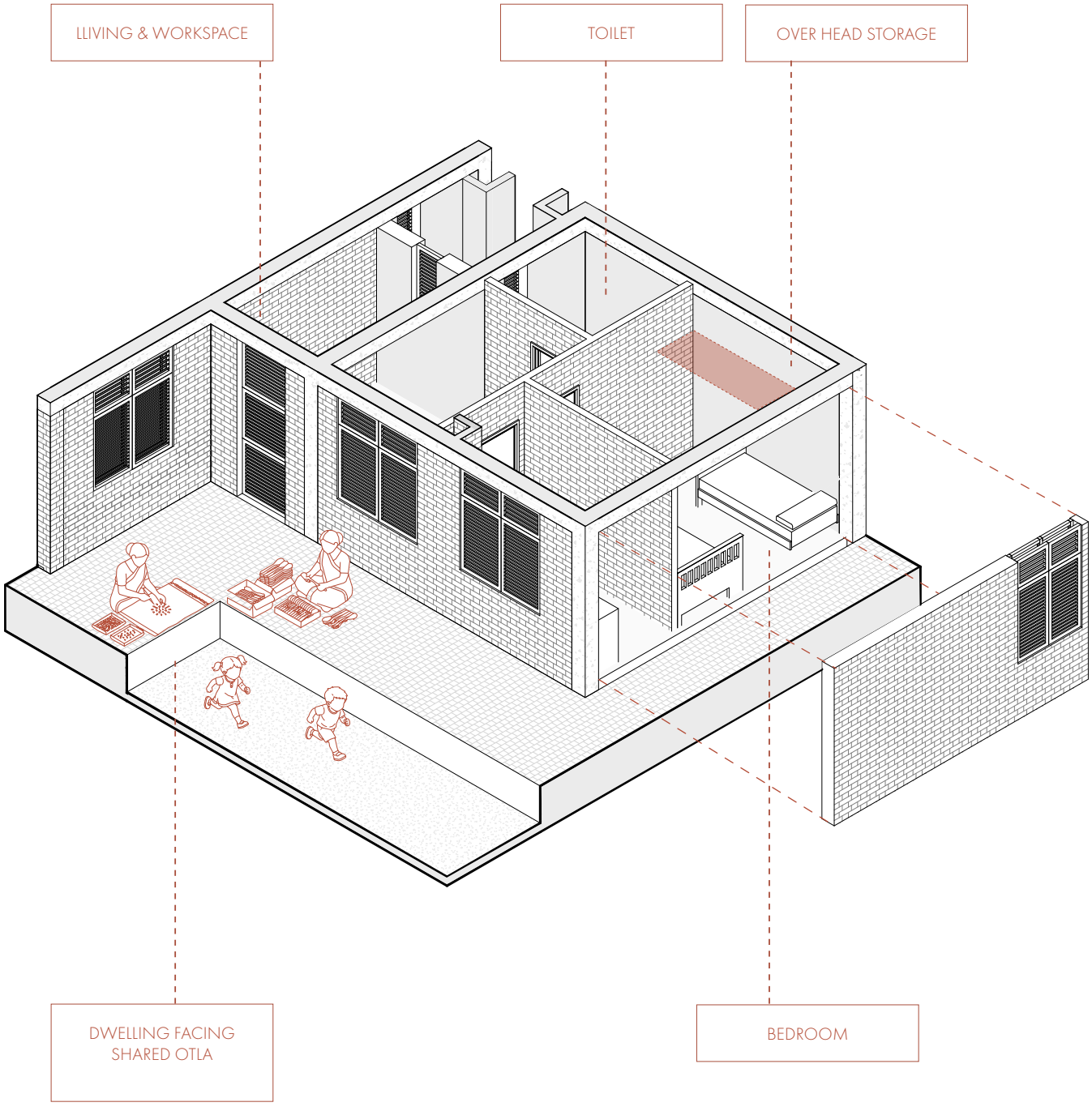


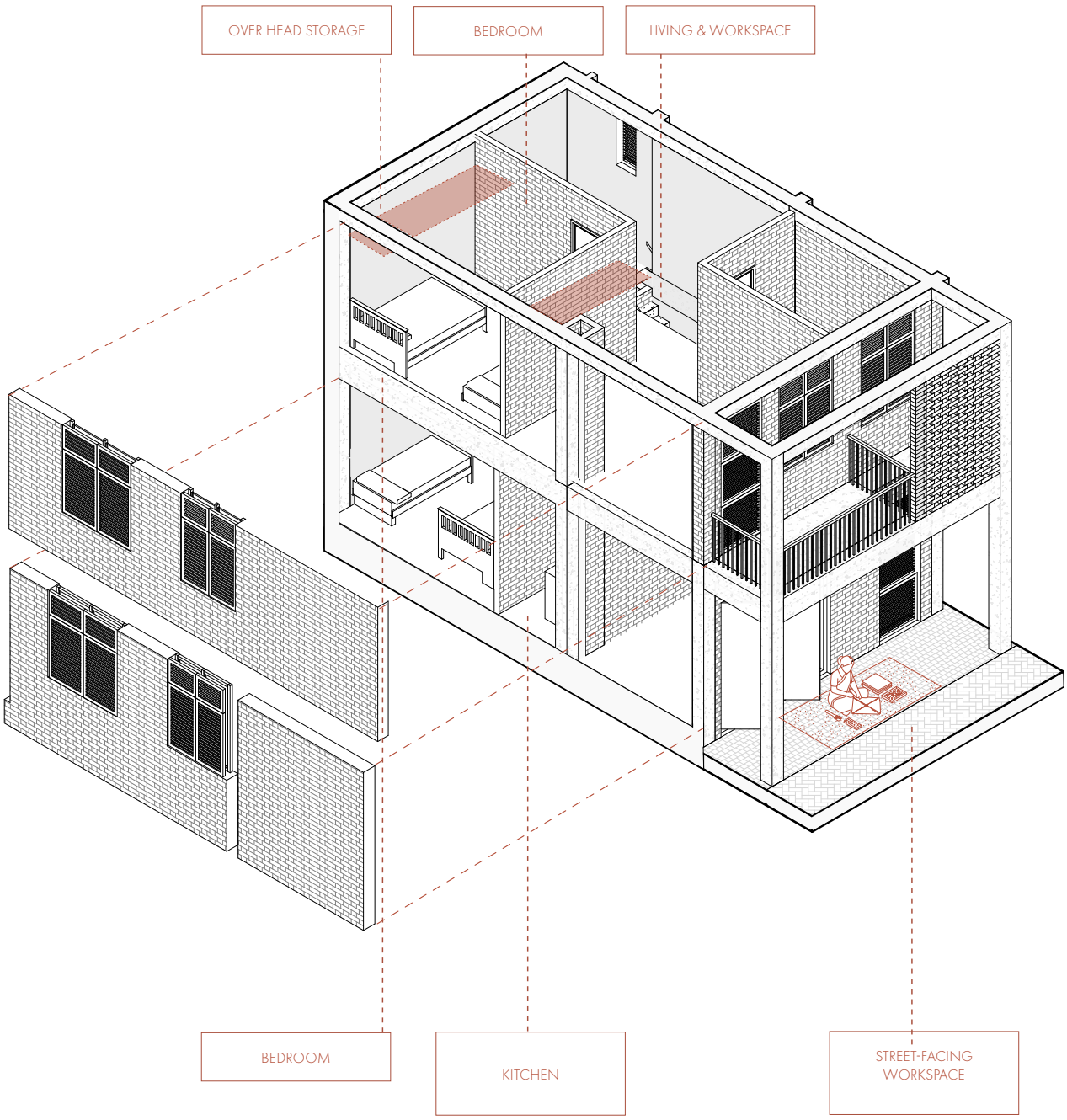
1:50

0 1m 5m

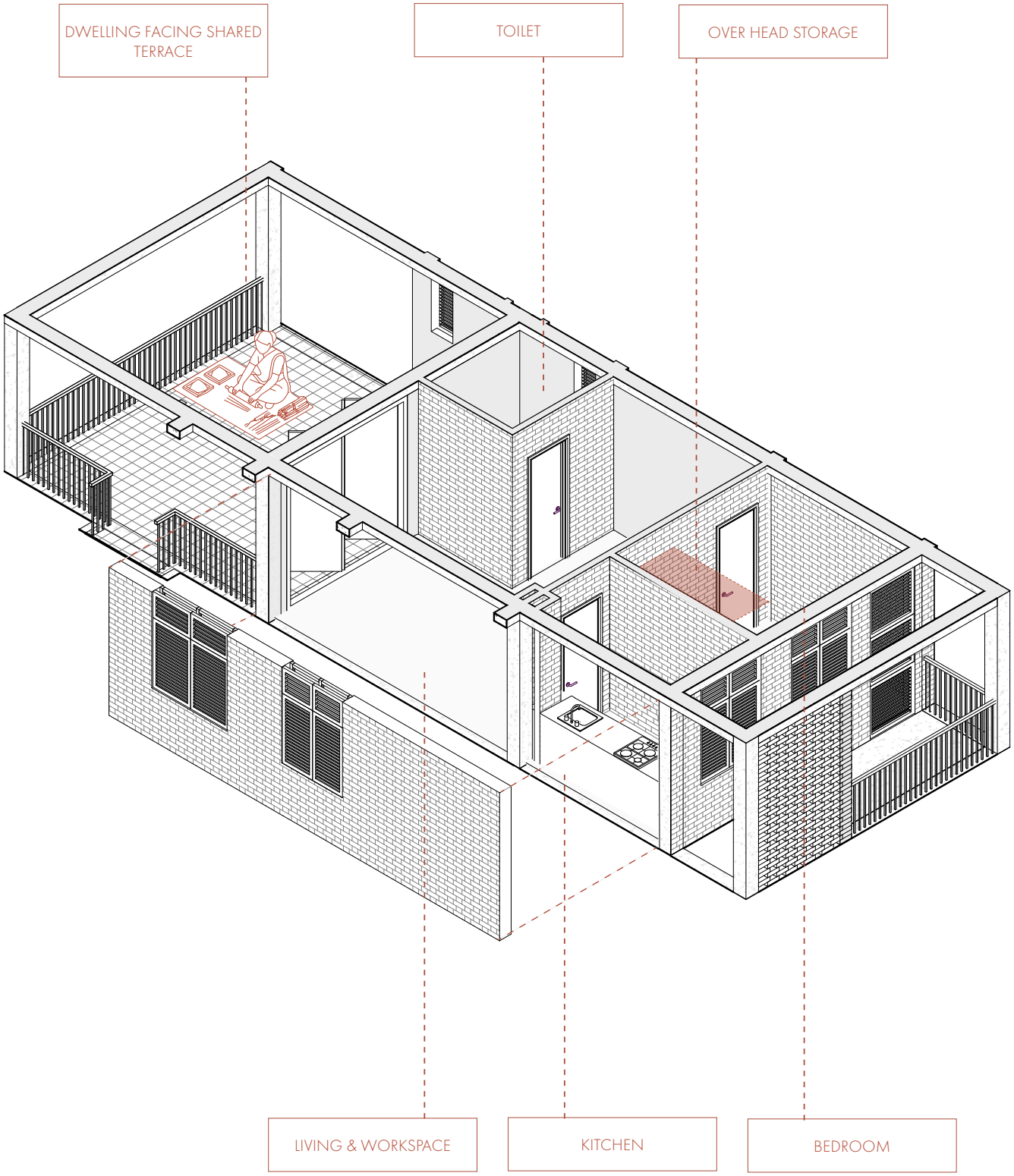
Rafaella Falquez Global Housing

DWELLING TYPE C & D AXONOMETRIC




OVER HEAD STORAGE
BEDROOM
LIVING & WORKSPACE
BEDROOM
KITCHEN
STREET-FACING WORKSPACE

DWELLING TYPE E AXONOMETRIC





PERSPECTIVE INTERIOR



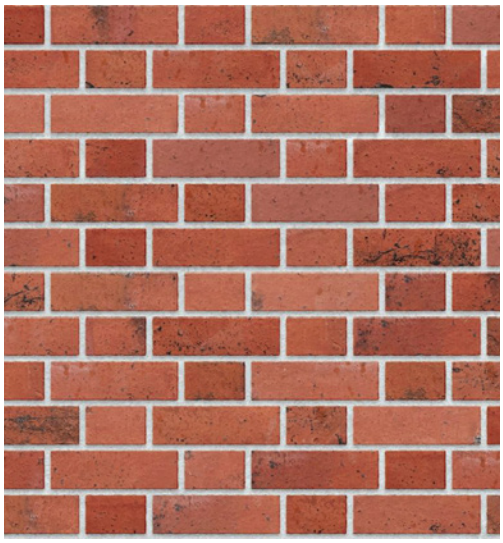
COMMON TERRACE



CLUSTER TYPE A

MATERIALITY

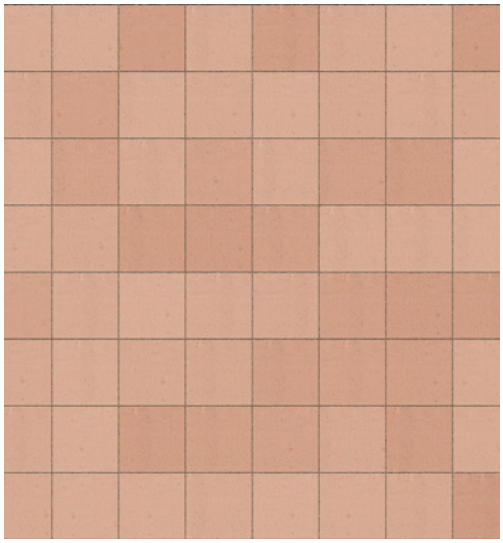
The four main materials used throughout this project, brick, concrete, limestone, and steel, were not selected for aesthetic reasons. Each responds directly to the environmental and socio-economic conditions identified during fieldwork: the need for passive climate performance, local availability and affordability, and compatibility with incremental self-building by low-income households. A collaborative material booklet developed with fellow students as part of the Global Housing course provided the foundational research under these selections (GH10 Material Research, 2026).



BRICK



CONCRETE



MANGALORE TILES OVER LIMESTONE



STEEL

BRICK

In Ahmedabad, brick remains one of the preferred and most prominent materials used for residential construction. Almost half of the houses in the city are made from brick thanks to Gujarat's clay-rich soils supporting local kiln production in districts such as Mehsana and Anand, making the material locally accessible and eliminating the need for long-distance transportation (Landi et al., 2020; Joseph, 2025; ICAR–NBSS & LUP et al., 2024).

The project uses the standard 230×115×75 mm burnt clay brick throughout, left fully exposed on both faces with no applied finish. Leaving the brick exposed eliminates render and plaster costs, reduces long-term maintenance, and keeps the structural logic legible for future incremental modifications. Three configurations are employed. External walls are constructed at 230 mm thickness in Flemish bond, which produces a denser and more interlocked wall, improving lateral resistance, critical in Gujarat's high seismic zones III–V (Iyer et al., 2011; Engineer, 2012). Internal partition walls are built as a single 115 mm leaf, allowing spatial reconfiguration over time as households adapt their units. Jali panels at east and west balconies use perforated terracotta facing bricks assembled dry, with a steel tension rod threaded through the perforations in place of mortar.

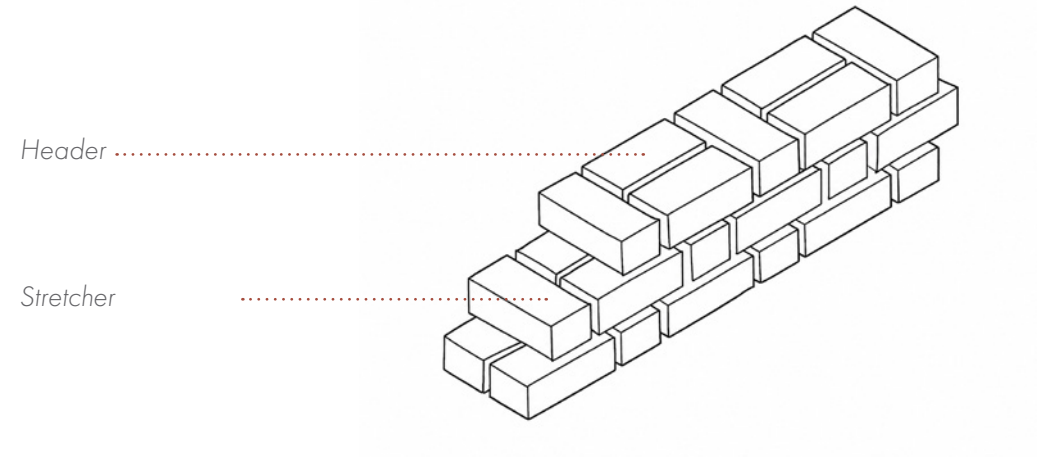


Figure 51. Flemish Bond Illustartion and description Source: GH10 Material Research, (2026).

CONCRETE

In the design, concrete forms the primary structural system, with columns, beams, slabs, and structural walls providing the load-bearing frame within which brick infill panels are later cast. Gujarat is one of India's most important cement-producing states, with significant capacity driven by its industrial infrastructure and abundant limestone deposits, making ready-mixed concrete locally accessible (IBEF, 2025).

Column and beam frames are cast with surkhi, powdered crushed brick, mixed directly into the structural pour to achieve a warm salmon-reddish tone. Surkhi is a traditional Indian pozzolanic material made by grinding fired brick waste, whose iron oxide content produces a natural terracotta pigment when added to concrete (Thannal Natural Building, n.d.; Rath et al., 2025). In this project, surkhi is sourced from the demolition of existing structures during the phased construction process, making the material loop circular and keeping costs low. Beyond its colour, surkhi improves compressive strength and iron oxide pigments are established as weather-resistant and lightfast in concrete (Concrete Decor, 2004; Rath et al., 2025). Leaving the concrete frame exposed also makes it easier for residents to identify structural elements and confidently expand their homes over time (Turner, 1976).

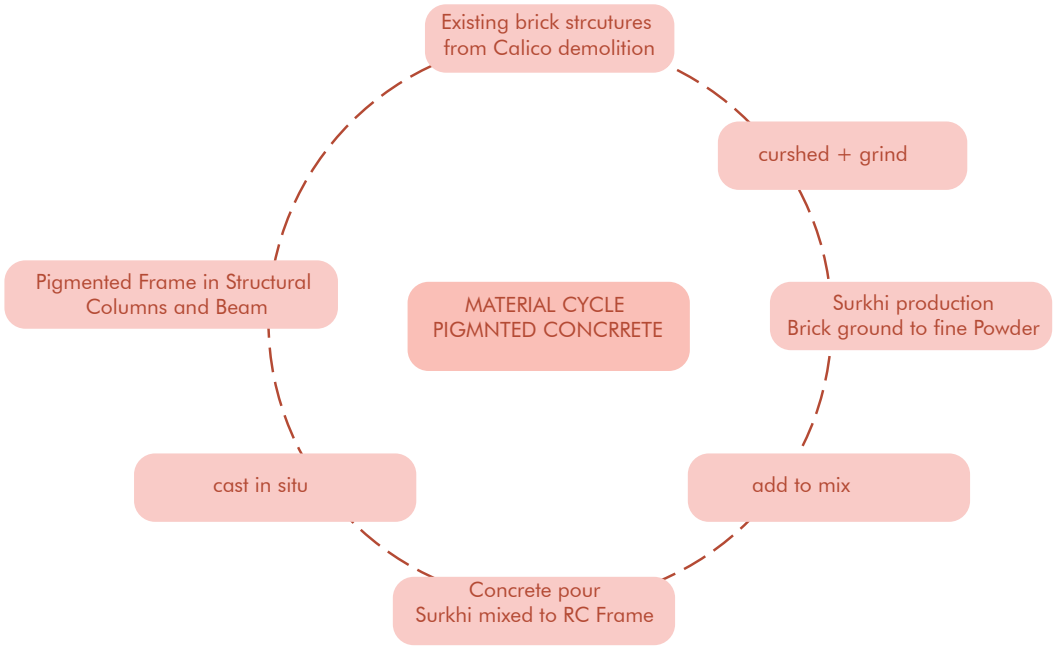


Figure 51 . Pigmented concrete material cycle. Source: Author, (2026).

LIMESTONE

Limestone is used throughout the project as the base material for the lime concrete roof buildup and Kota stone flooring in toilet wet areas. It is one of the most abundant sedimentary rocks on earth, composed primarily of calcium carbonate (CaCO3) formed from marine sediments (Sarda & Virmani, 2020). India has approximately 93 billion tonnes of limestone reserves, with Gujarat among the primary producing regions, making it locally sourced and widely available in Ahmedabad (Indian Bureau of Mines, 2023). Its compressive strength varies significantly with porosity and mineral composition, and its high thermal mass makes it well-suited to hot climates such as Ahmedabad (Wong, 2015; Anjum et al., 2020). Compared to cement, limestone requires low processing energy, producing approximately 0.04–0.09 kg CO_2/kg, the lowest embodied carbon of any material in the project's palette (ICE Database, n.d.). In this project, limestone will be used in two forms: as Kota stone flooring for wet areas, due to its water resistance properties and durability, and as the binding agent in the lime concrete roof build-up.

LIME MORTAR TRADITIONAL PREPARATION

1. Gathering and Measuring Ingridients
2. Spreading the dry materials
3. Forming a mixing crater
4. Adding lime to the mix
5. Initial blending with tools
6.Adding water and starting wet mixing
7. Treading and kneading the mortar
8. Final homogenization of the mortar

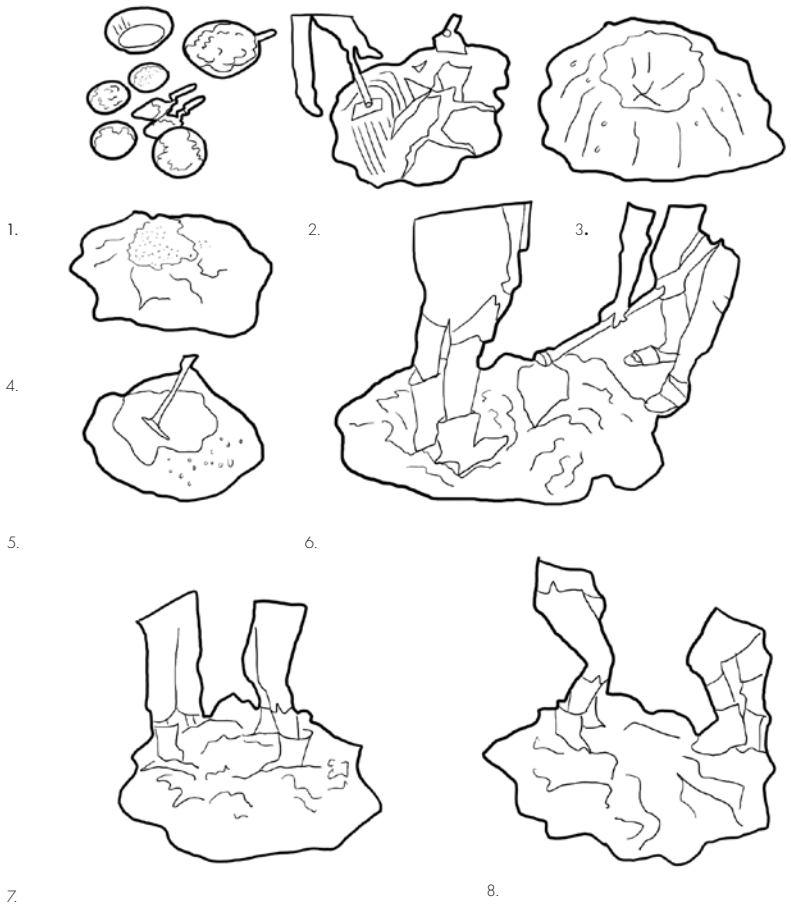
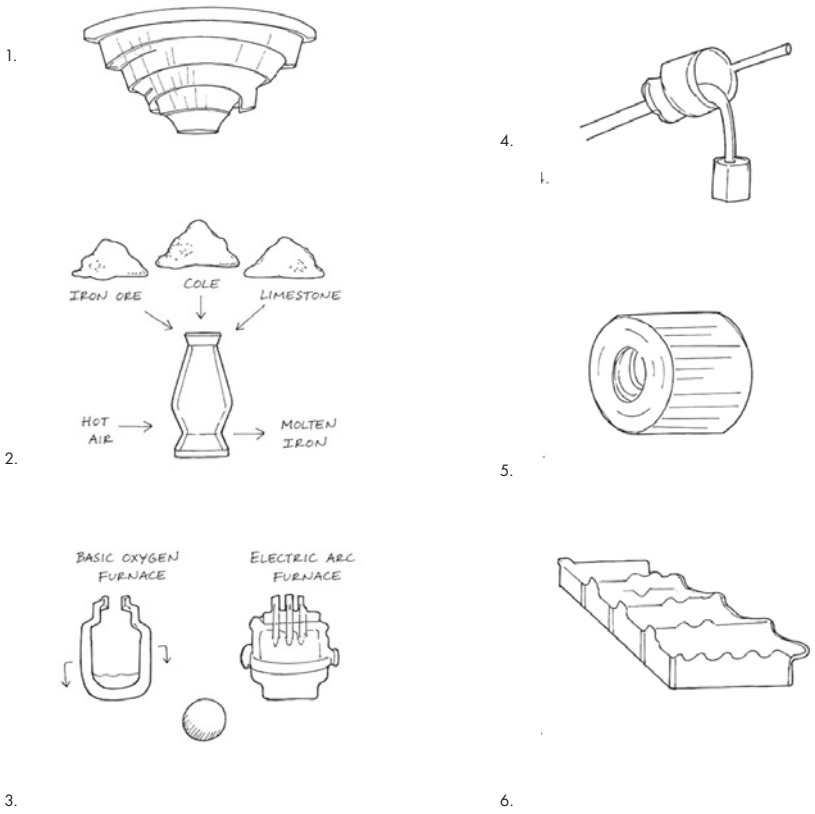


Figure 52. Live Mortar traditional preparation.GH10 Material Research, (2026).

STEEL

Steel will be mainly used in the project for window, door frames, windows with louvred shutters and balustrades. India is a major global steel producer, thanks to the domestic availability of iron ore in the country (IBEF, 2026). Iron ore extraction is concentrated in eastern and central states, including Odisha, Jharkhand, and Chhattisgarh, which together account for over 80% of India's total iron ore production (IBEF, 2025), and is then refined and shaped into structural components in integrated steel plants. Even though steel production is mostly concentrated in eastern India, fabrication into frames and louvres is carried out by local workshops, making it accessible to Ahmedabad's context. Steel is the highest-embodied-carbon material in the project's palette; however, it is considerably more affordable than wooden frame doors and windows, making it a better material for low-income units. Its low maintenance and durability also make it suitable, allowing the building to have a longer lifespan.



STEEL MANUFATCURING PROCESS

1. Mining Ore

2. Making the Iron

3. Primary Steel Making

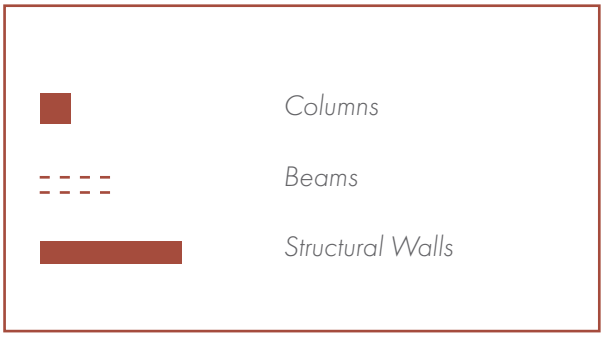
4. Casting

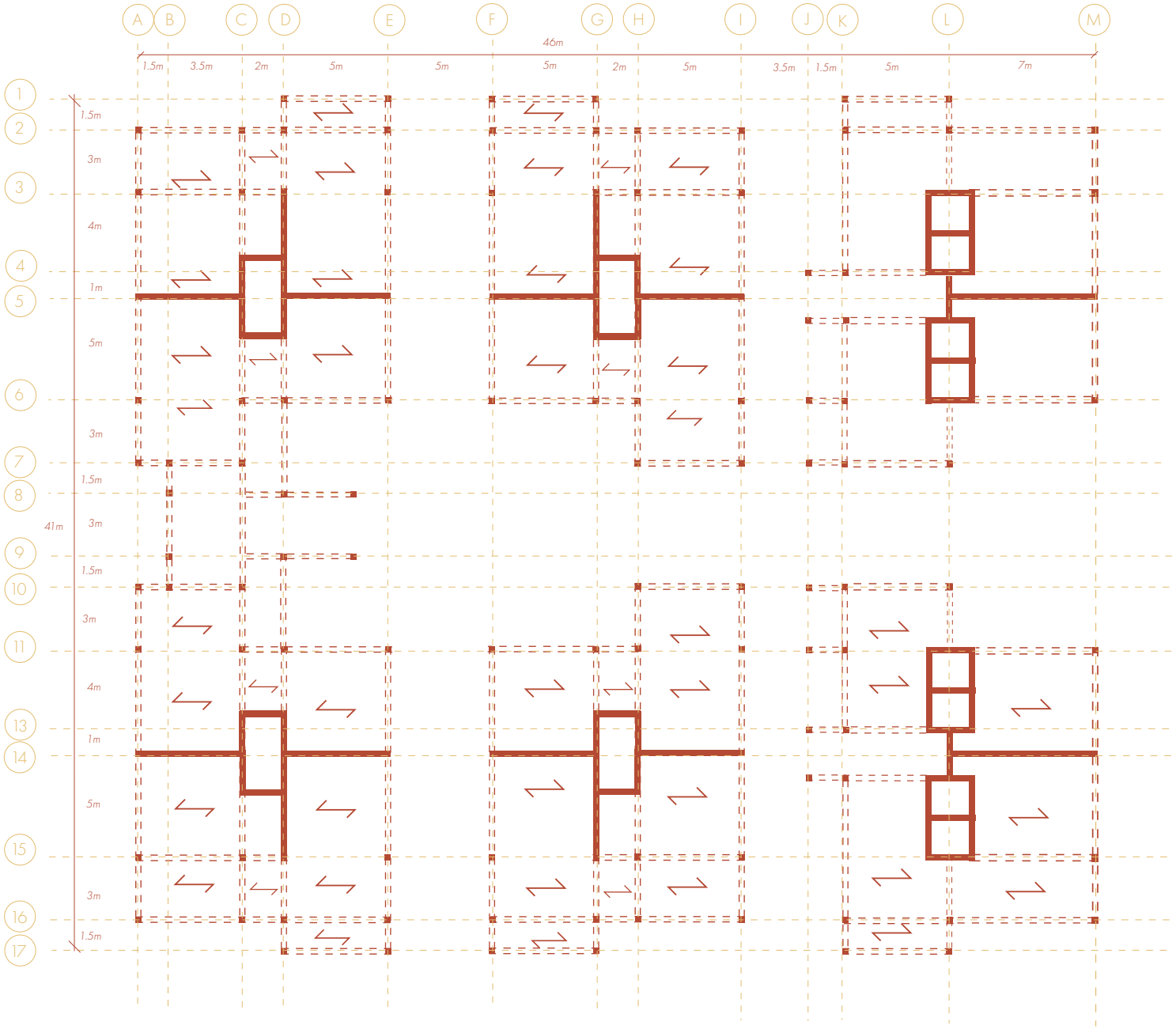
5. Primary Forming

6. Secondary Forming

Figure 53. Steel manufat-curing process. Source: (GH10 Material Research, 2026).

STRUCTURAL PLAN

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5m
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1:200

0 5m 10m

MATERIAL SPECIFICS & STRCUTURAL GRID DIAGRAM

KEY

1. Concrete Slab, IPS Floor finish, manglore tiles balcony and terrace and kota stone toilet

2. Concrete Beams

3. Concrete Columns

4. Concrete Structural Walls

5. Steel frame louvres and doors

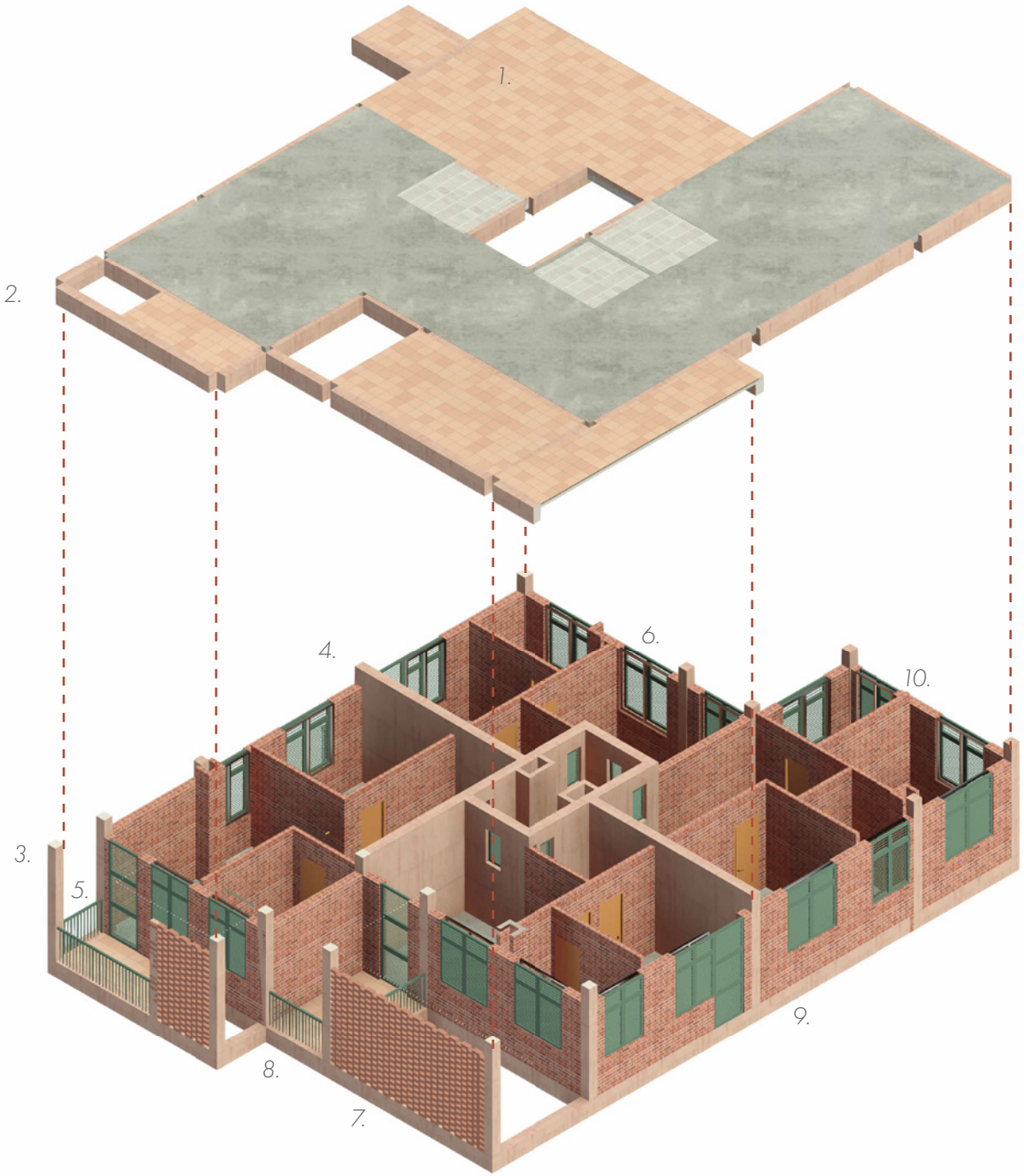
6. SIngle plane Glaizng

7. Jali Wall

8. Balustrade

9. Infill brick wall with flemish bond

10. Brick walls interior wall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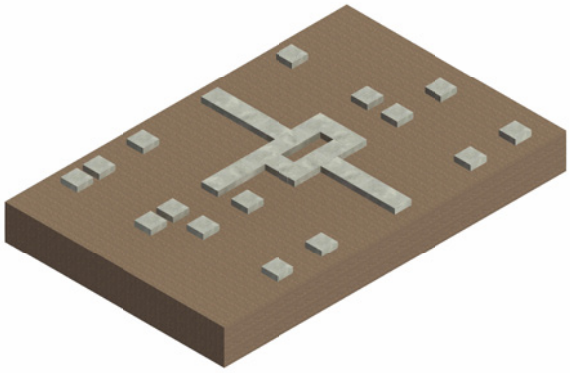
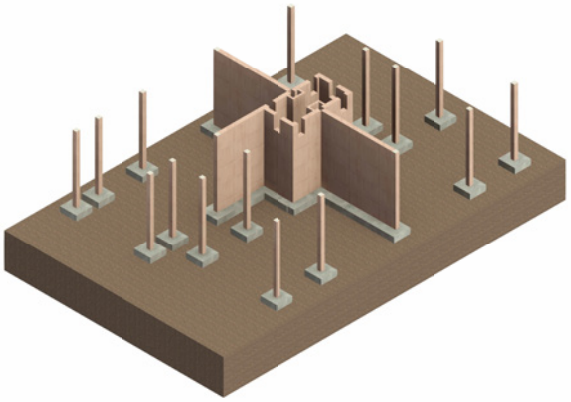
CONSTRUCTION SEQUENCE

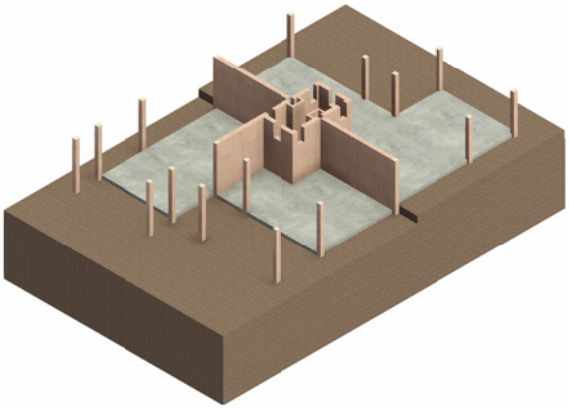
The following construction sequence diagrams use Cluster Type B as an illustrative example. The structural system, material specification, and construction process are consistent across all cluster types and are equally applicable to Cluster Type A.



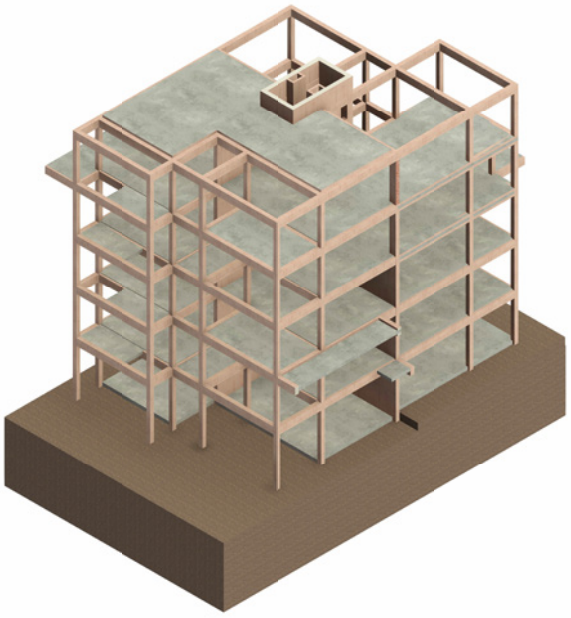
1. Excavate gorund, RC strip foundations and pad foundation.



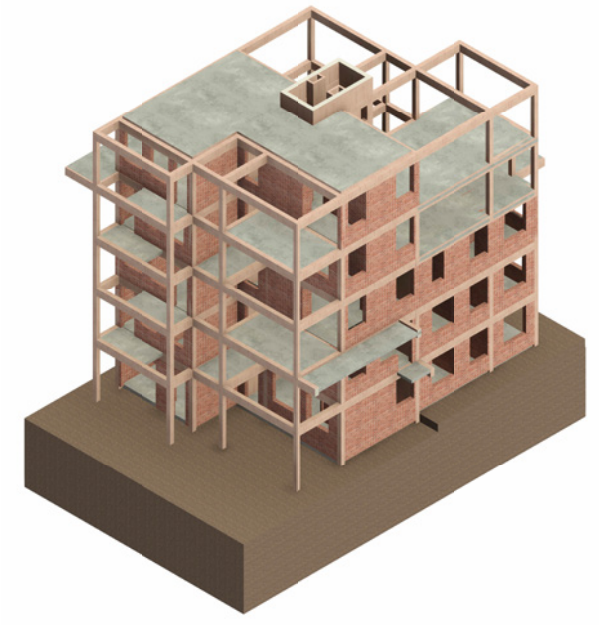
2. Ground floor structural walls and columns cast in.



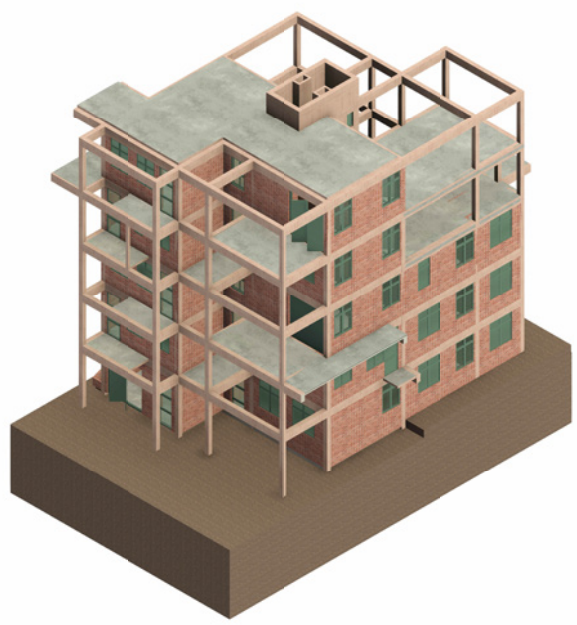
3. Soil infill is finished and ground rc slab is casted.



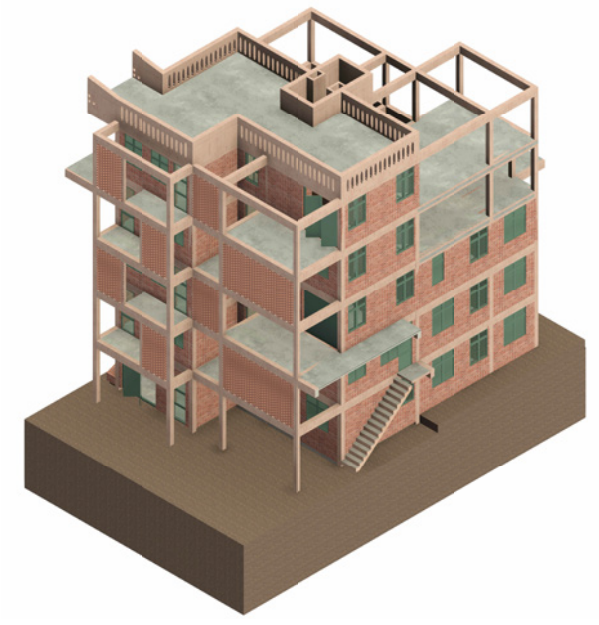
4. Full concrete frame completed floor by floor insitu columns, beams and slabs are casted



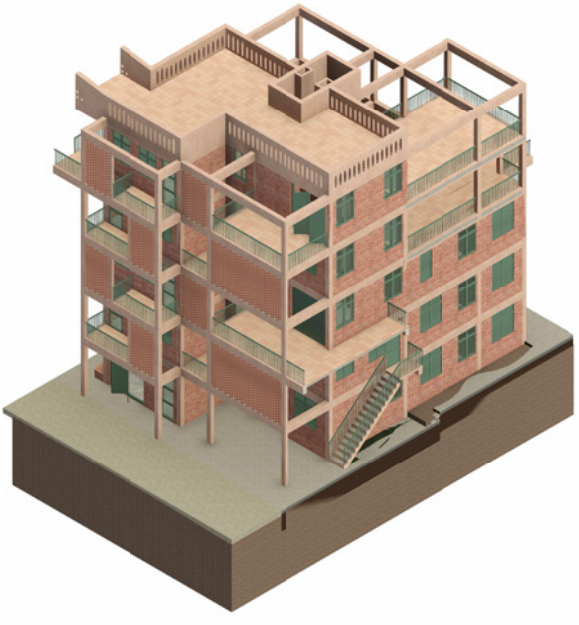
5. Brick infill walls added between concrete frame, leaving openings for windows, doors



6. Steel Windows and Steel Louvres are installed.



3. Jali wall and staircase are installed. Parapet with detail is casted in.



4. Floor roof finsihes are placed. Steel balustrades are installed.

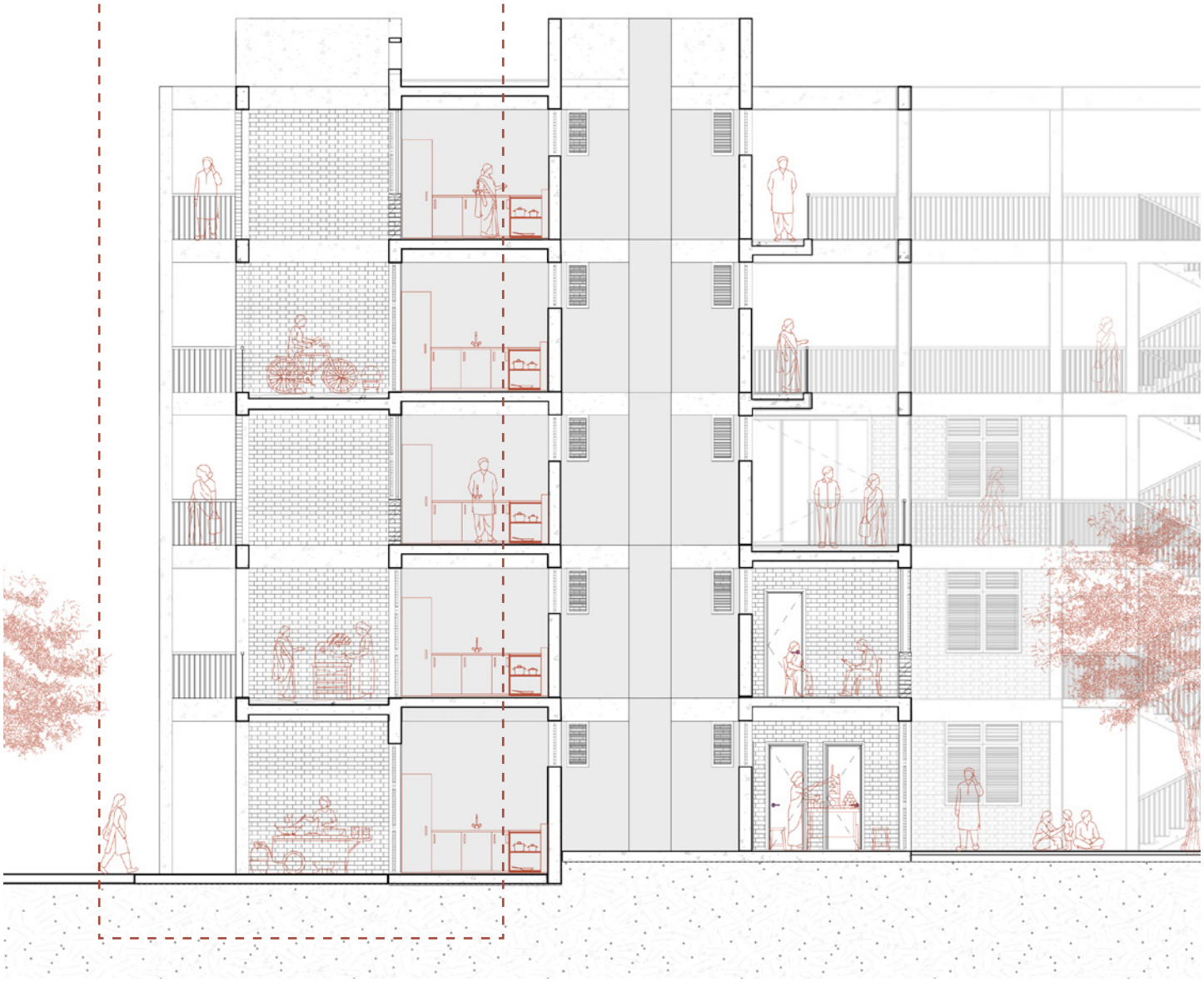
ELEVATION 1:100 SCALE

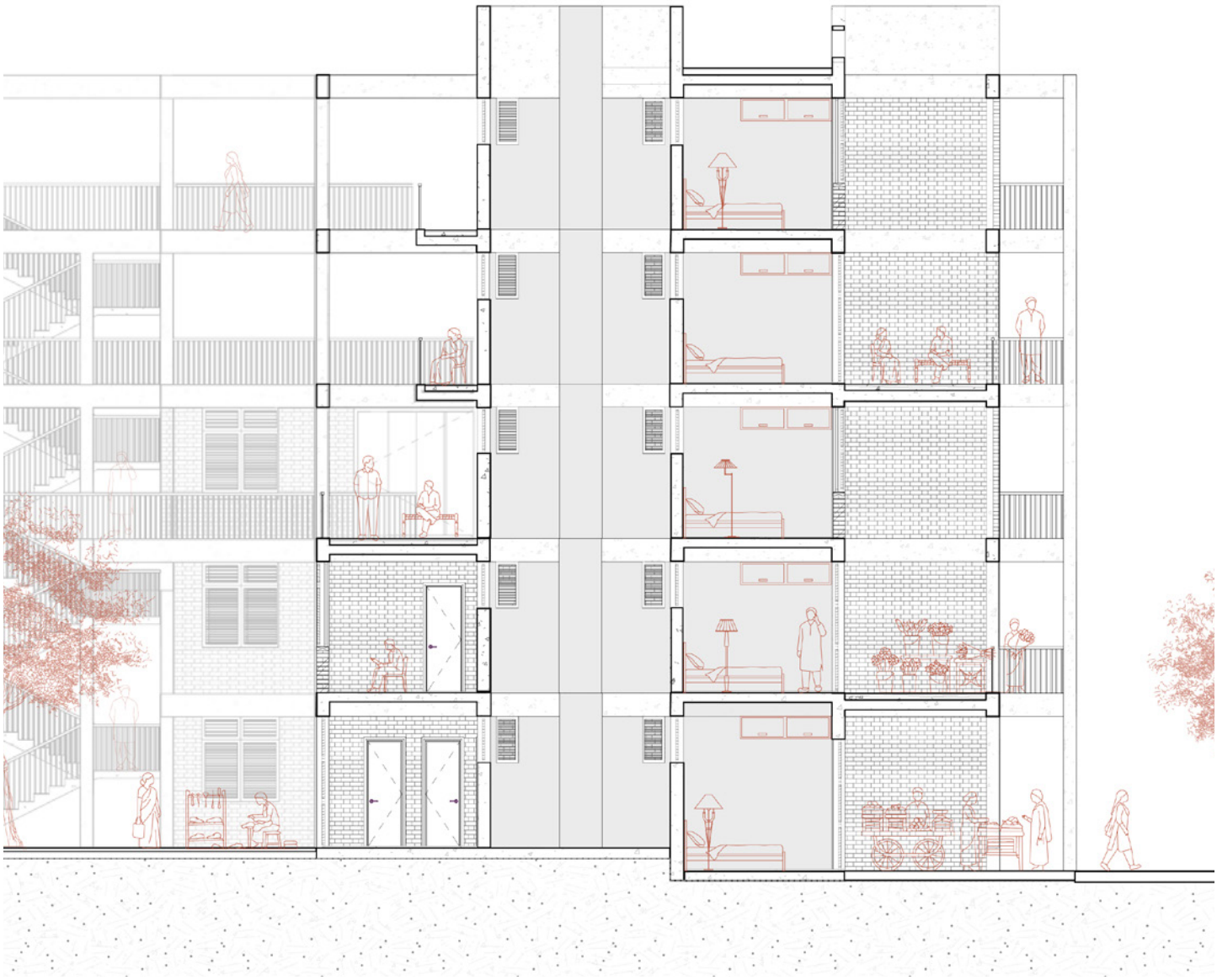



DETAIL 1:20
BANARASI PATIALA
1:100
0
1m
2m

DETAIL SECTION 1:100 SCALE

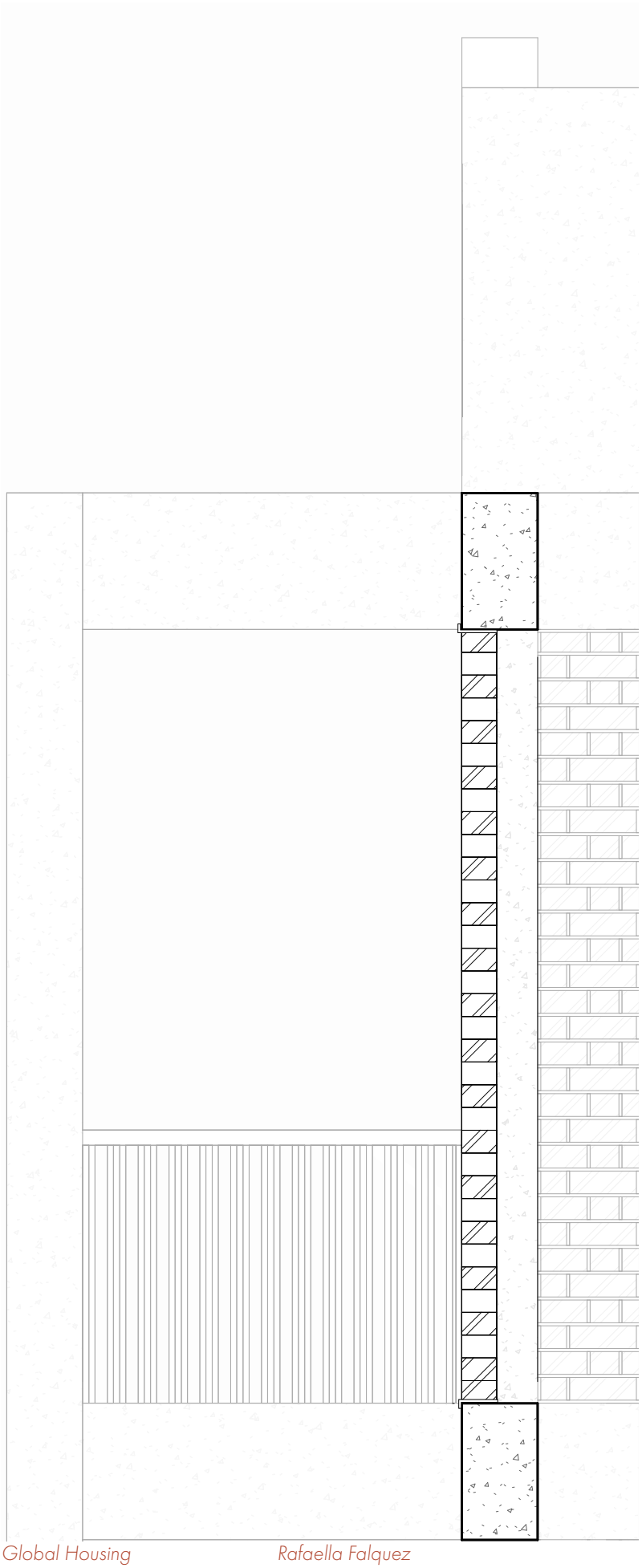
DETAIL 1:20

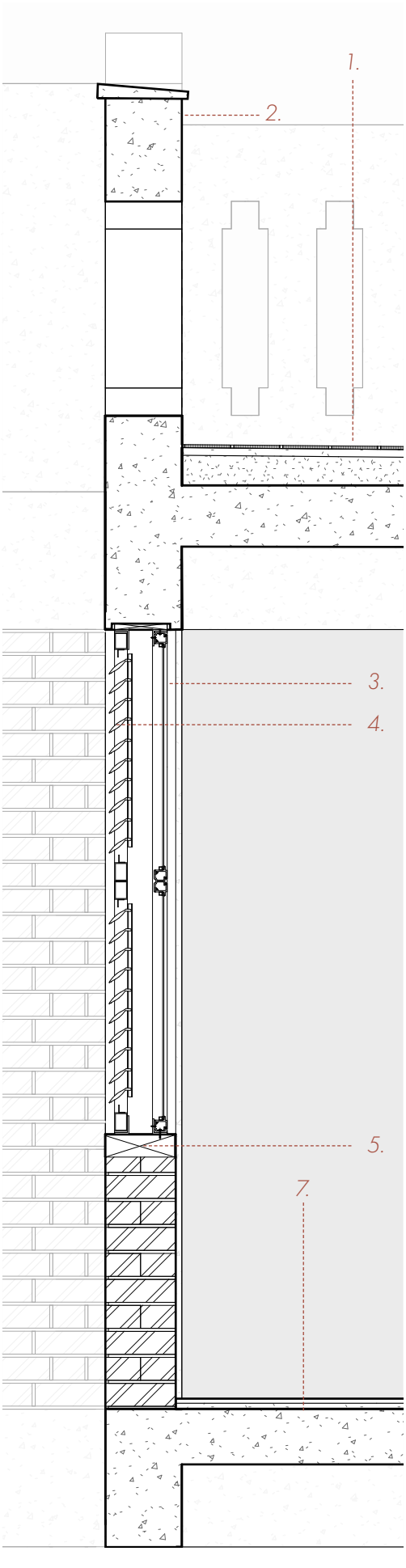




1:100 at A2
(scale bar only)

0 1m 2m





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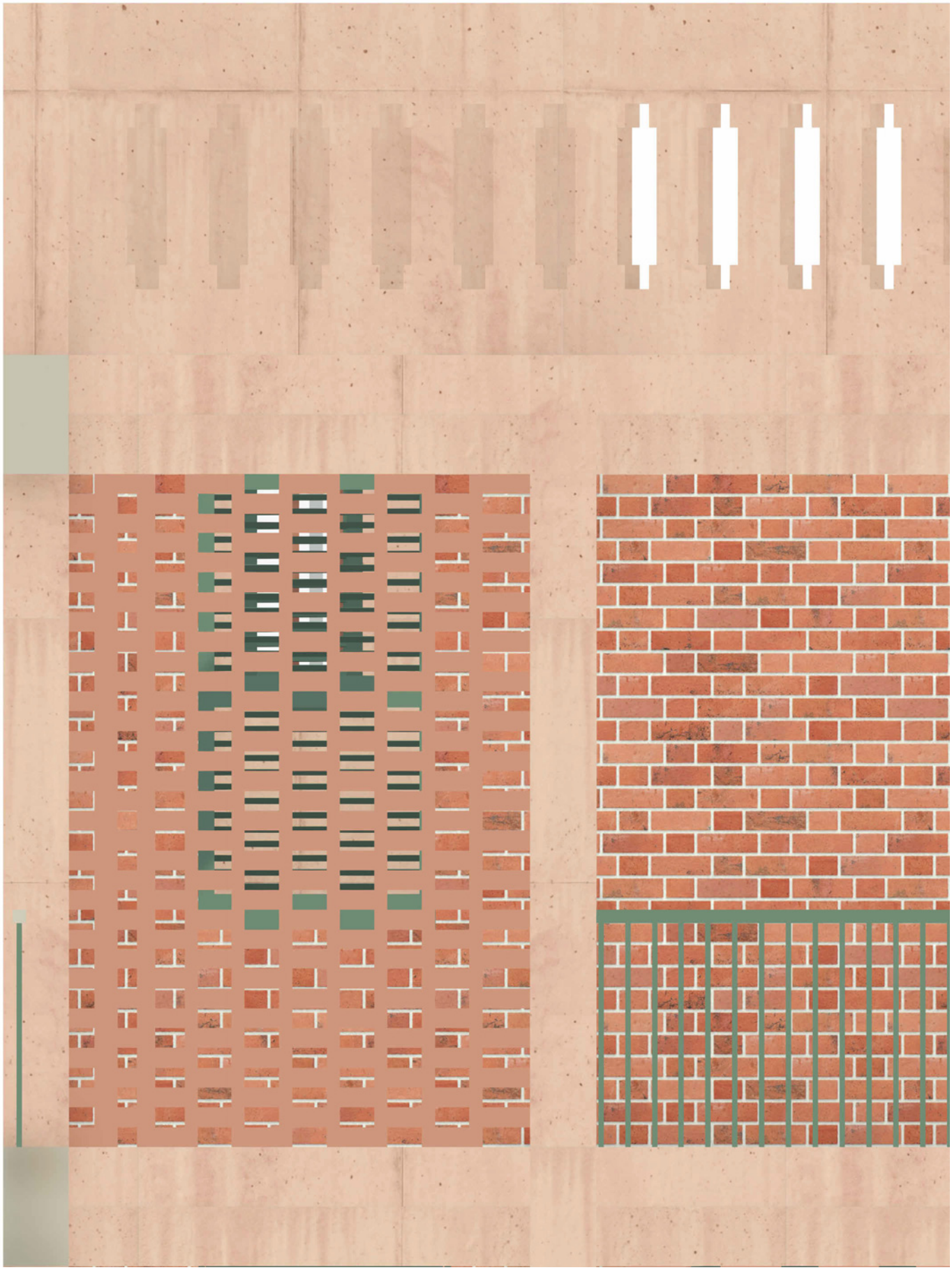
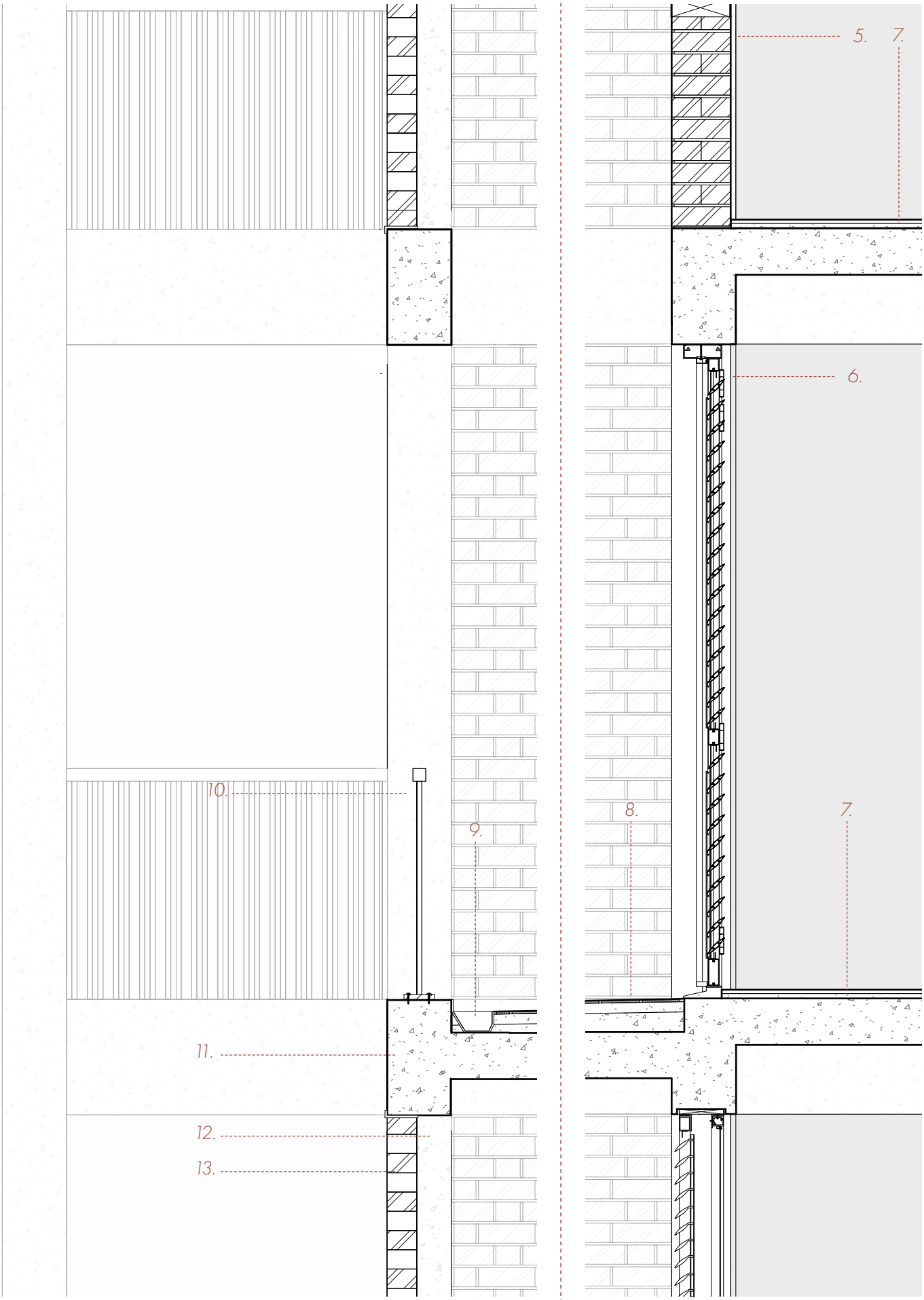


ELEVATION 1:20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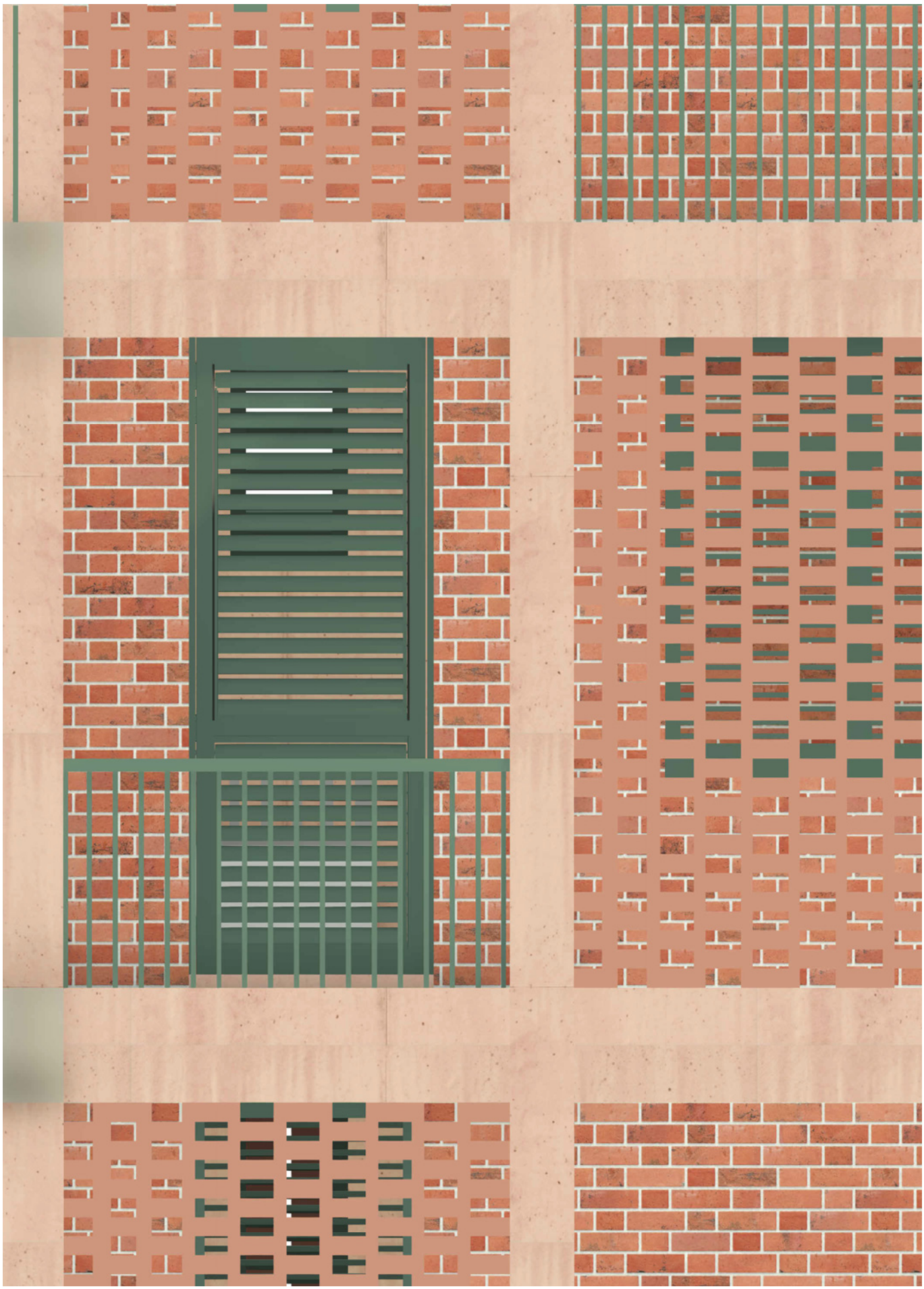
1m
0
DETAIL 1:20



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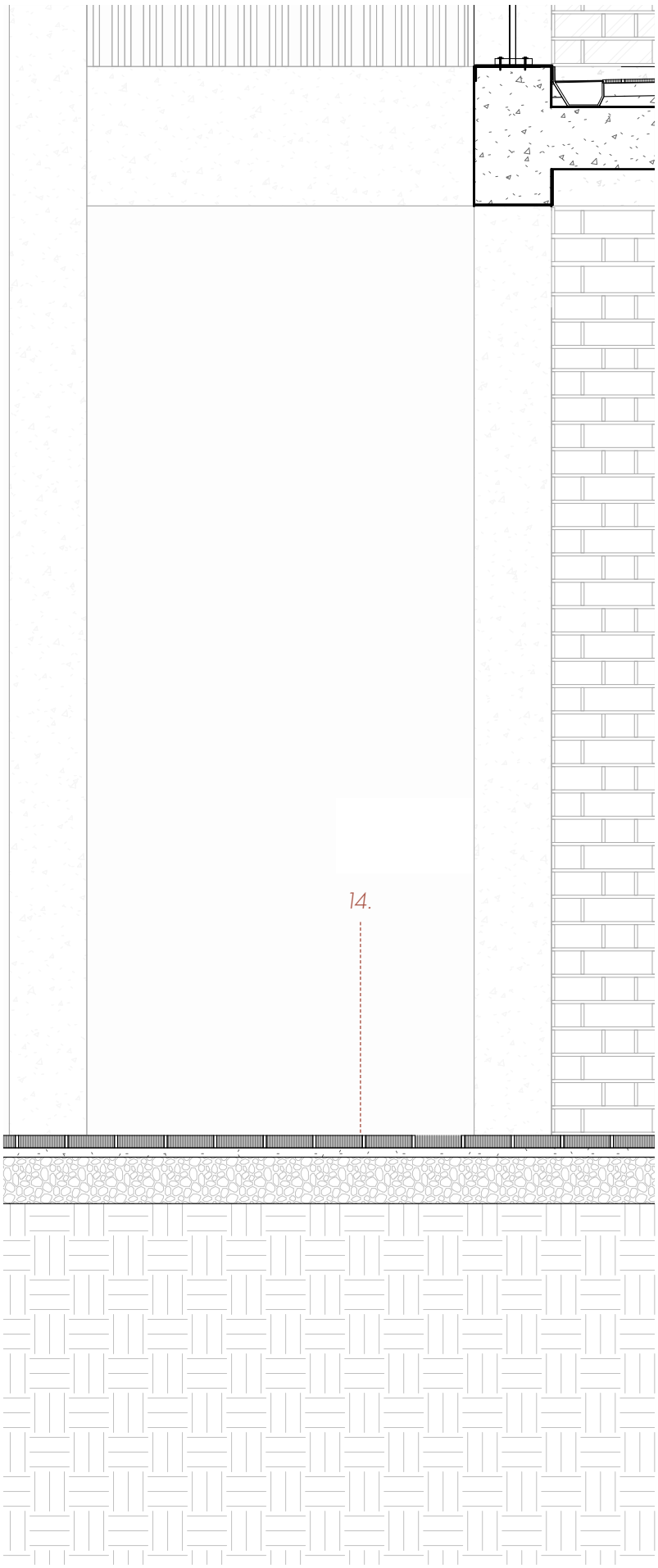
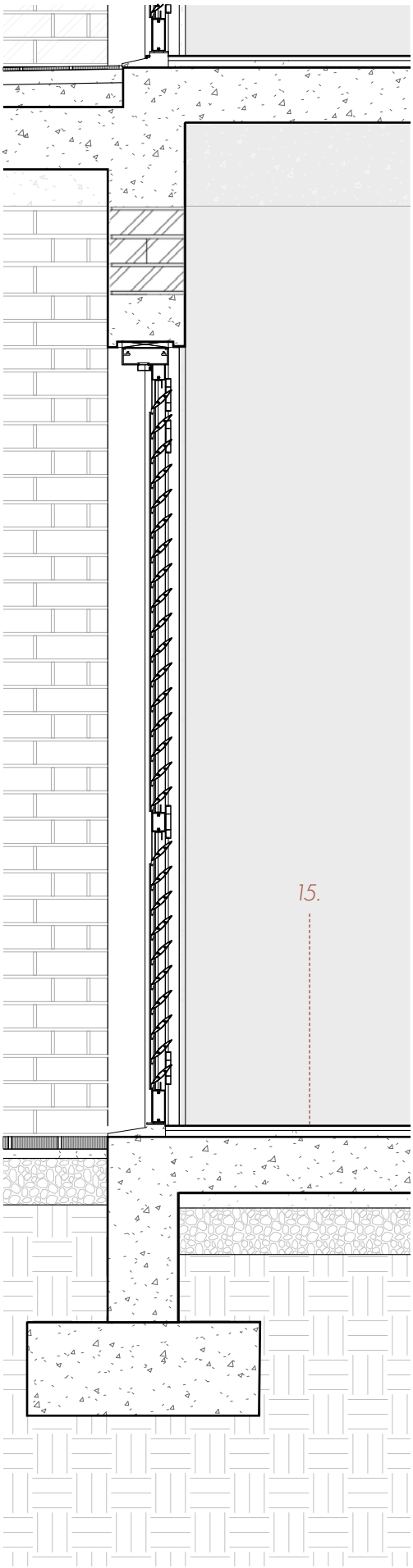


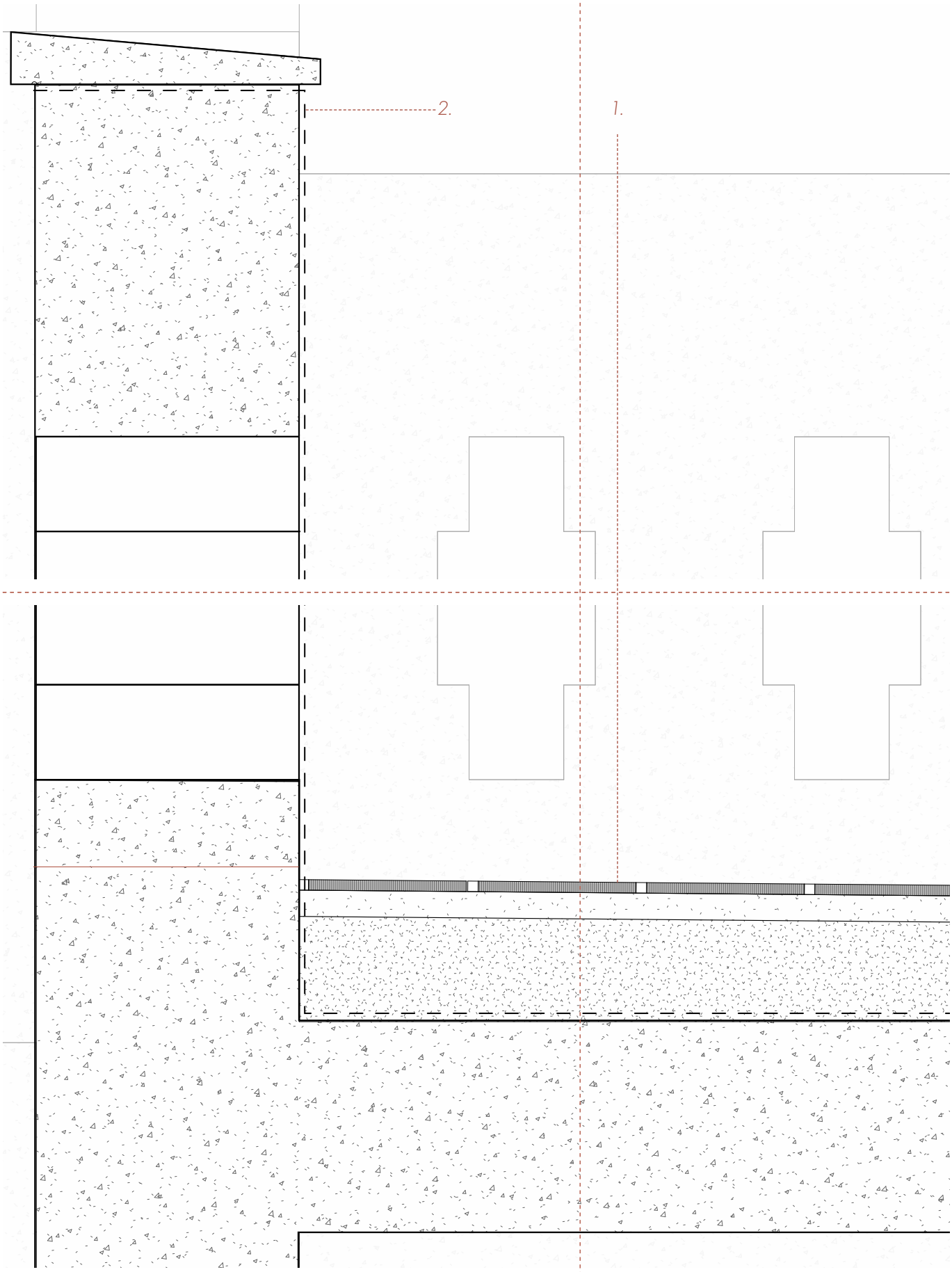


2m
1m
0

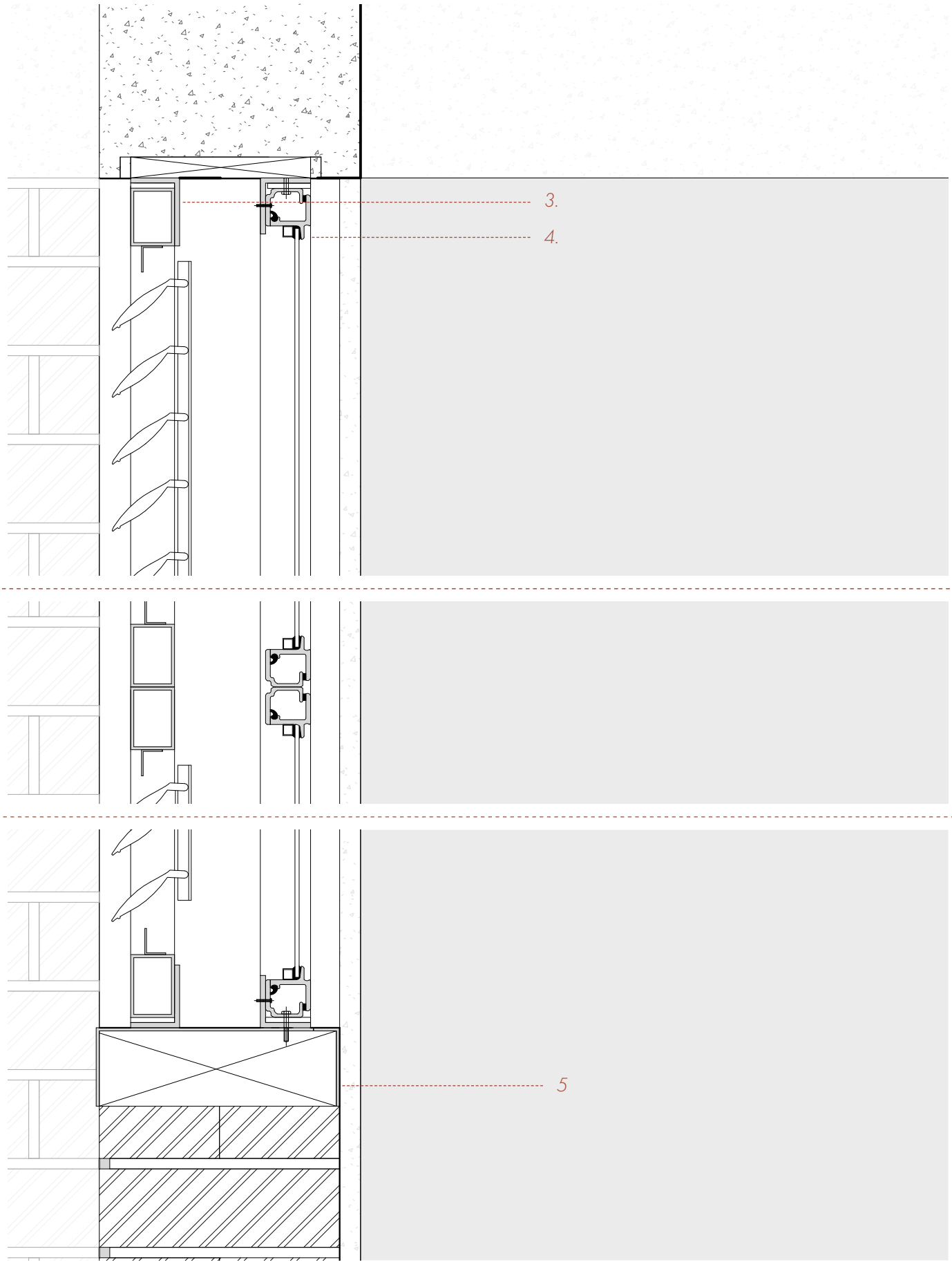
DETAIL 1:20



ELEVATION 1:20



DETAIL 1:5



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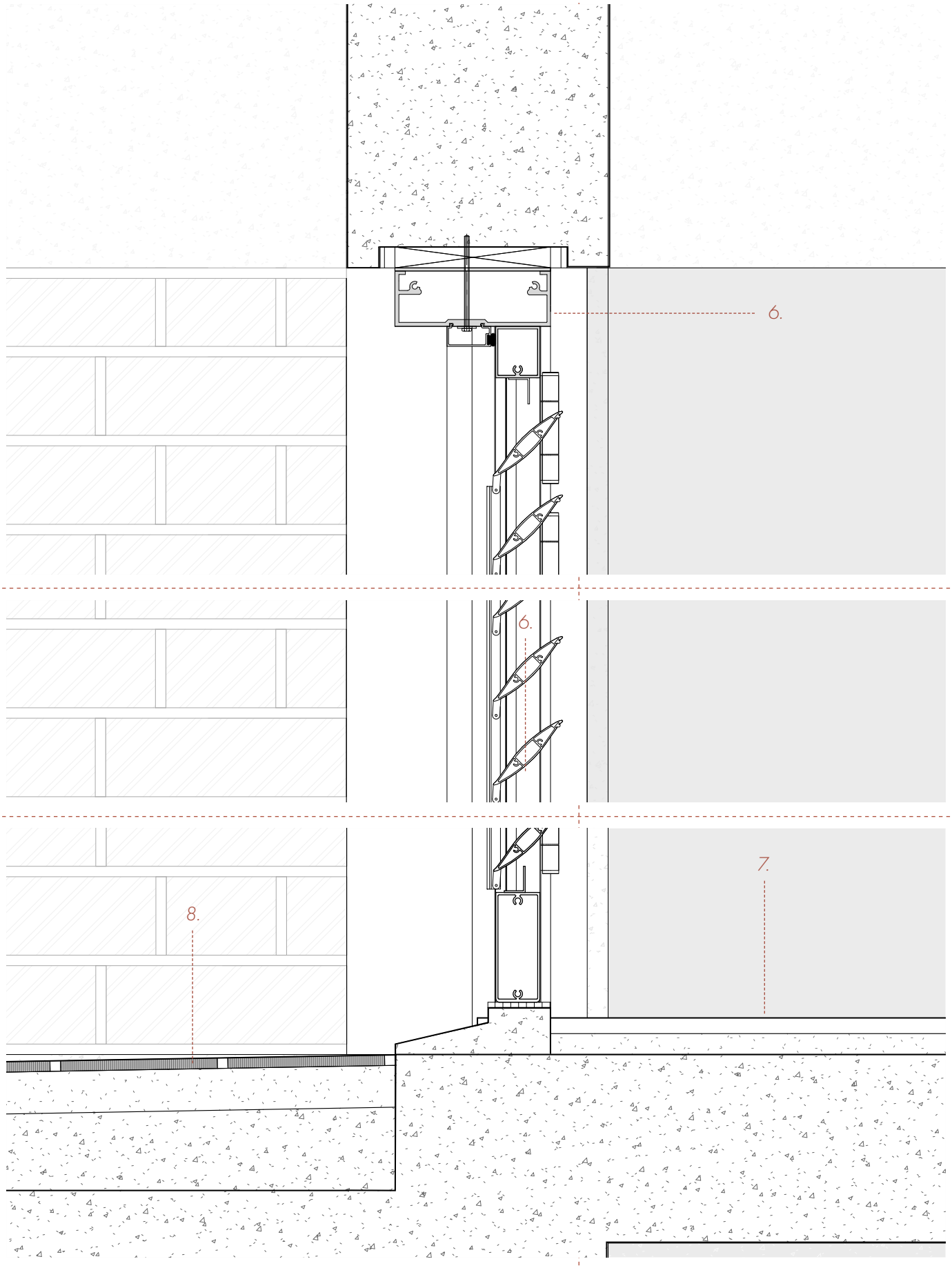

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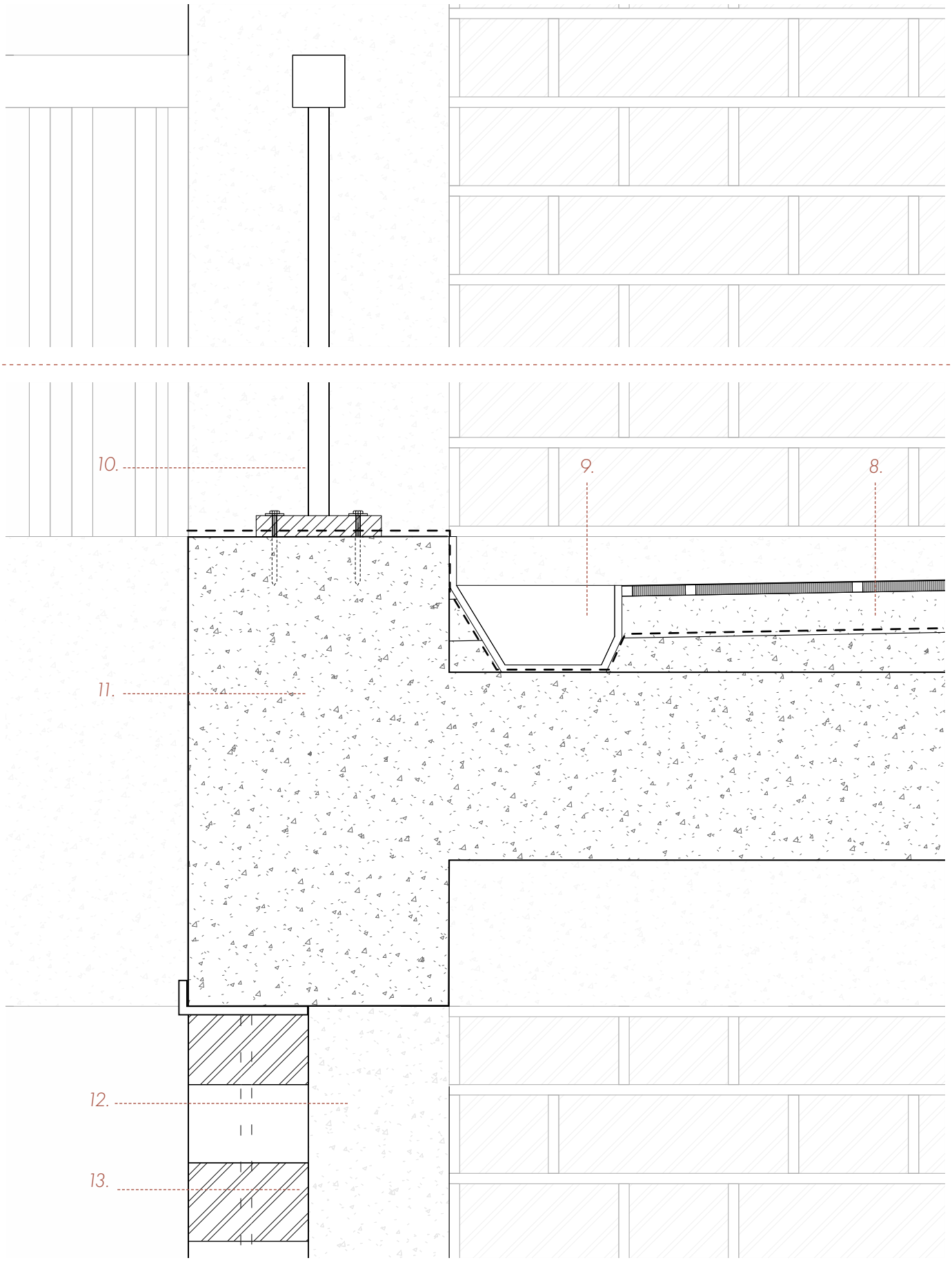
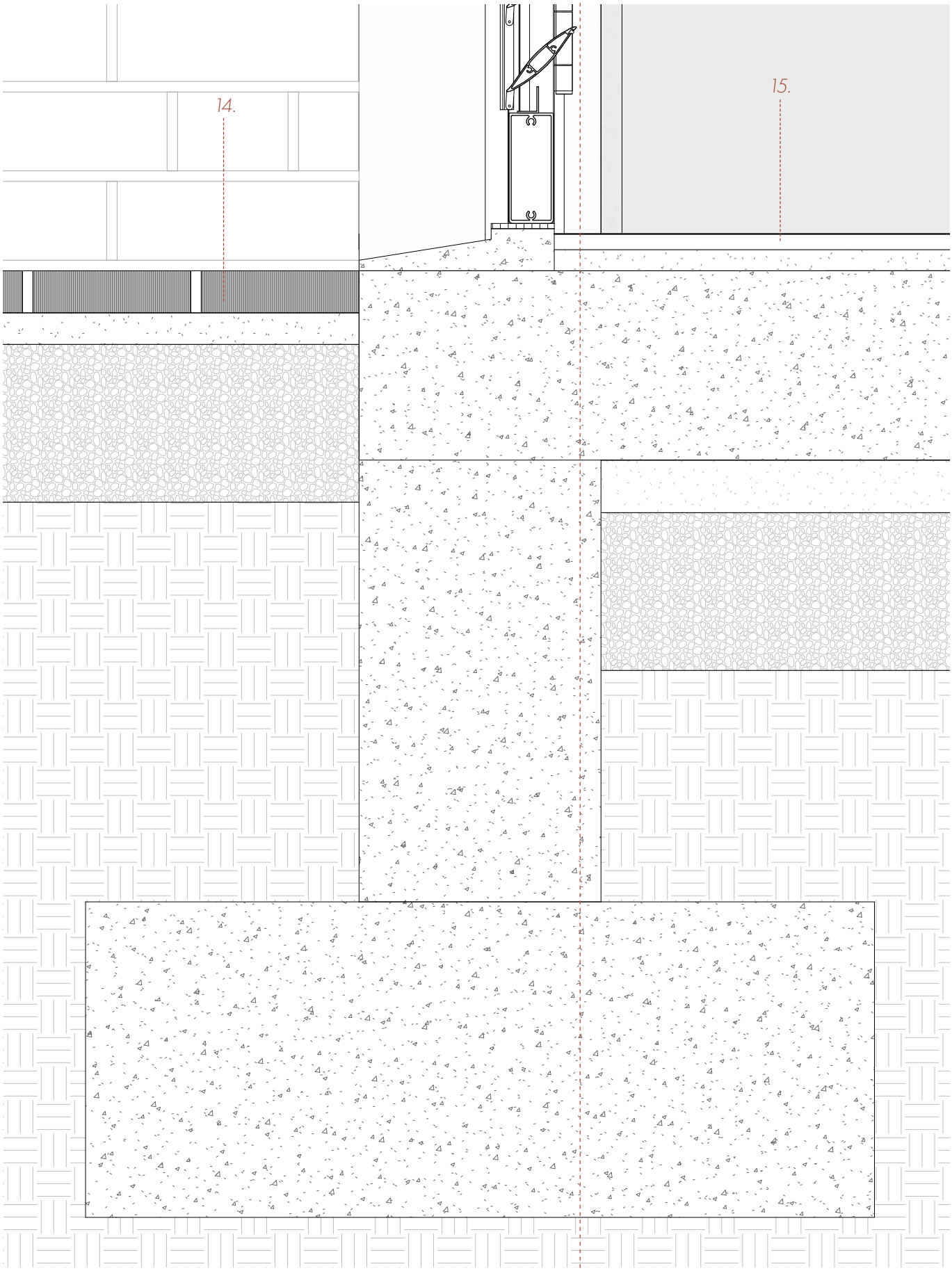


DETAIL 1:5



DETAIL 1:5

DETAILS

ROOF:

1. -10mm Mangalore Tiles
-25mm Cement Mortar
-100mm Lime Concrete
-Water proof Membrane
-180mm Concrete Slab

2. -Stone Coping
-1200 mm parapet

WALL:

3. -Operable Steel Louvre Window

4. -Single Pane 50mm Steel Frame Window Powder Coated Green

5. -Steel Plate Window Sill over Precast Concrete Sill

-Flemish Bond Brickwork, 230mm x 115mm x 75mm Brick with Mortar Joints

6. -Operable Steel Louvre Door, Powder Coated Green

FLOOR:

7. -15mm IPS
-20mm Screed
-180mm Concrete Floor

BALCONY:

8. -10mm Mangalore Tile
-40mm Screed laid to fall
-Waterproof Membrane
-180 Concrete Slab

9. -Balcony Drain

10. -90mm Steel Balustrade

11. -250mm x 450 Concrete Beam

12. -250mm x 250mm Concrete Column

13. -Open-jointed Jali Brickwork, Stainless Steel Ties, 230mm x 115mm x 75mm Brick attached to L profile

GROUND FLOOR:

14. -40mm Stone Paving
-30mm Cement Mortar
-150mm crushed Rock
-Site Earth

15. -15mm IPS Flooring
-20mm Screed
-180mm Comcrete Slab
-50mm Cement Blinding
-150mm Crushed Rock
-Site Earth
-Reinforced Concrete Pad Foundation

CLIMATE STRATEGY

Ahmedabad is characterised by three distinct seasons: a hot, dry season from March to June, a monsoon season from July to September, and a mild winter from October to February. Summer temperatures can peak at 40°C in April and May, with relative humidity as low as 42%, making direct solar radiation, rather than humidity, the primary source of discomfort (Climate Consultant 6.0, ISHRAE 426470). The monsoon rains average 291mm to 266mm in July and August for an Average of 10 days before conditions dry in September (Weather & Climate, 2026). Also, prevailing southwestern winds blow directly from the Sabarmati River between March and September. Climate analysis identifies 49% of annual hours as thermally uncomfortable without intervention, which is why an effective climate design strategy has been incorporated to better meet the needs of home-based women workers and building users.

VENTILATION

The dwellings are clustered so that all units are corner units with openings on two opposite facades, enabling cross-ventilation within the building. The steel louvre shutters on the façade are positioned to maintain airflow in the interior space during peak sun hours. In addition, glazing has been placed in windows as a second layer behind the louvre, not only to prevent dusty air coming in, but also to take into consideration that home-based women workers can increase their earnings throughout the years, leading to the possibility of implementing either a fan or AC units in the house, giving the possibility to make the space airtight in the future. In addition, at the cluster scale, the shared courtyard created by cluster type B acts as a thermal chimney, making the space within the building cooler.

SHADING STRATEGY

Shading is the most impactful passive strategy for Ahmedabad, targeting 30.8% of uncomfortable hours experienced by users (Climate Consultant 6.0, ISHRAE 426470). The steel louvres on all openings provide adjustable shading throughout the day. In addition, on the west and east facades, jali walls have been incorporated to create a second layer of shading, especially effective at low morning and afternoon angles. In terms of balconies and verandas on the upper floors, they are placed in such a way that they provide shade to the dwellings on the lower floors, acting as overhangs. However, on the upper-floor terraces and balconies, operable fabric canopies are proposed along the pergola, so that exterior space can be used during peak sun hours, providing shade for home-based women workers when they are socialising, working, or simply enjoying the afternoon.

COOL ROOF

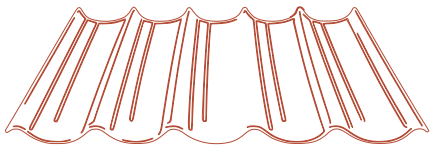
Dwellings on the upper floors experience greater heat exposure, which is why a cool roof strategy has been implemented. Lime concrete, made with hydrated lime, sand, and broken chips, topped with Mangalore clay tiles, can reduce indoor temperatures by 2–3°C compared to an untreated reinforced concrete slab (Rajasekar et al., 2015). This will help home-based women workers avoid stopping their work during the hot summer season,

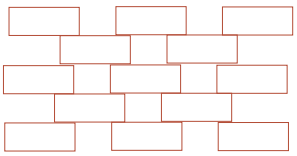
which is one of the major problems reported during the fieldwork.

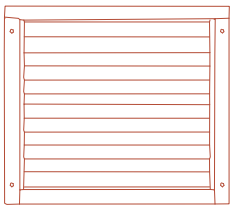
WATER MANAGEMENT

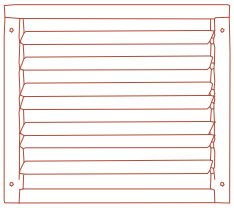
Even though the monsoon does not affect Ahmedabad as much as other cities in India, it can still experience some rainy days each month, and a water management plan should be considered. Louvre shutters act as permeable systems for rainwater during these seasons. The courtyard surface is designed to be permeable, allowing for rainwater to drain and providing evaporative cooling.

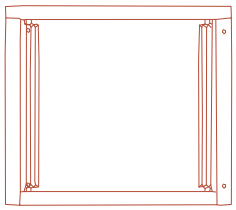
One of the main problems faced by women and their families in the settlement is that water is available for only about 2 hours per day. To solve this, a shed rooftop storage tank is proposed per cluster and fed to all units. Greywater from sinks and laundry will be filtered for reuse to irrigate the central courtyard and other vegetation within the scheme. Finally, the blackwater will be evacuated by connecting the pipes to municipal drainage networks.

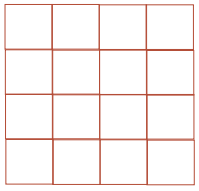




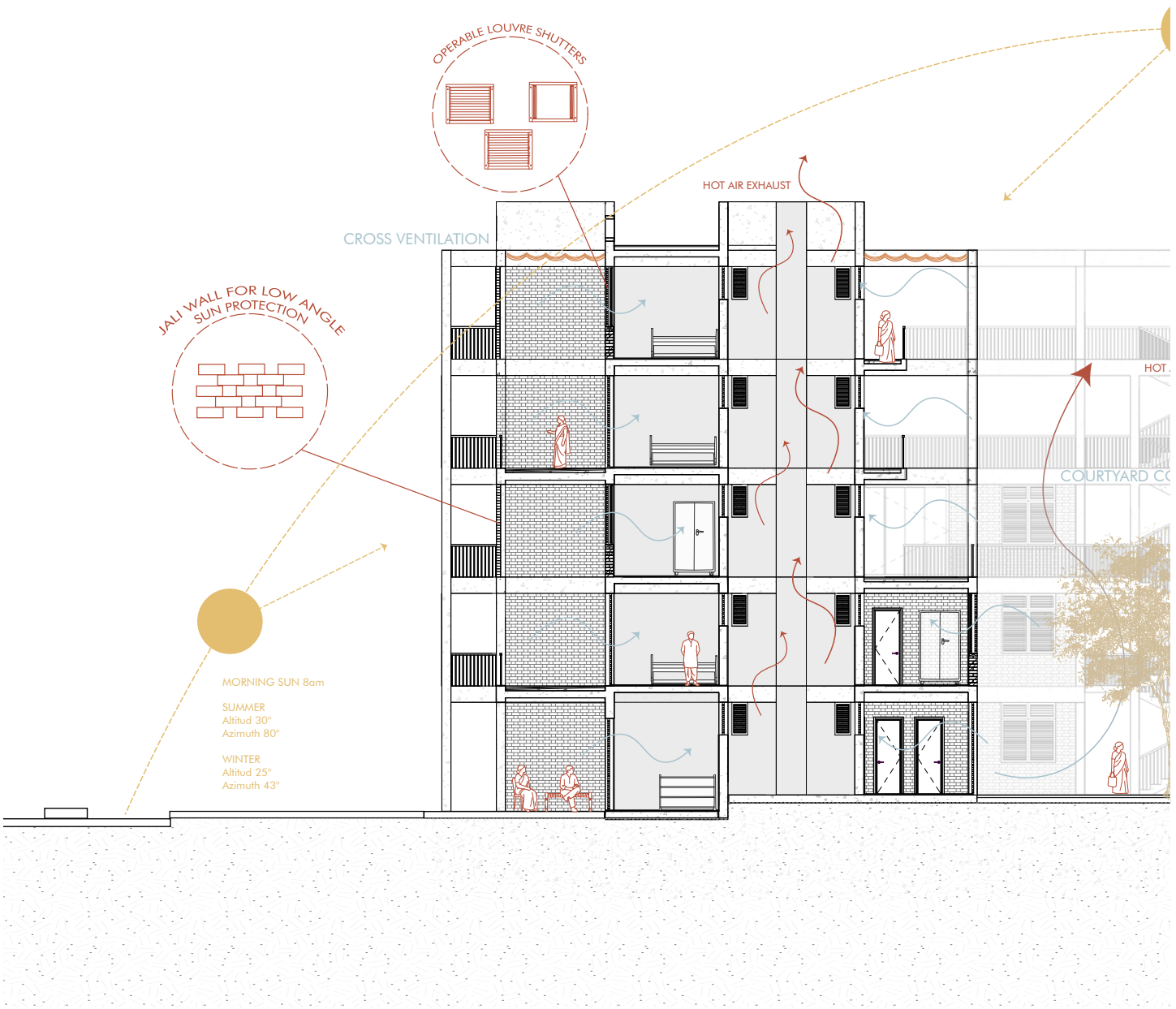


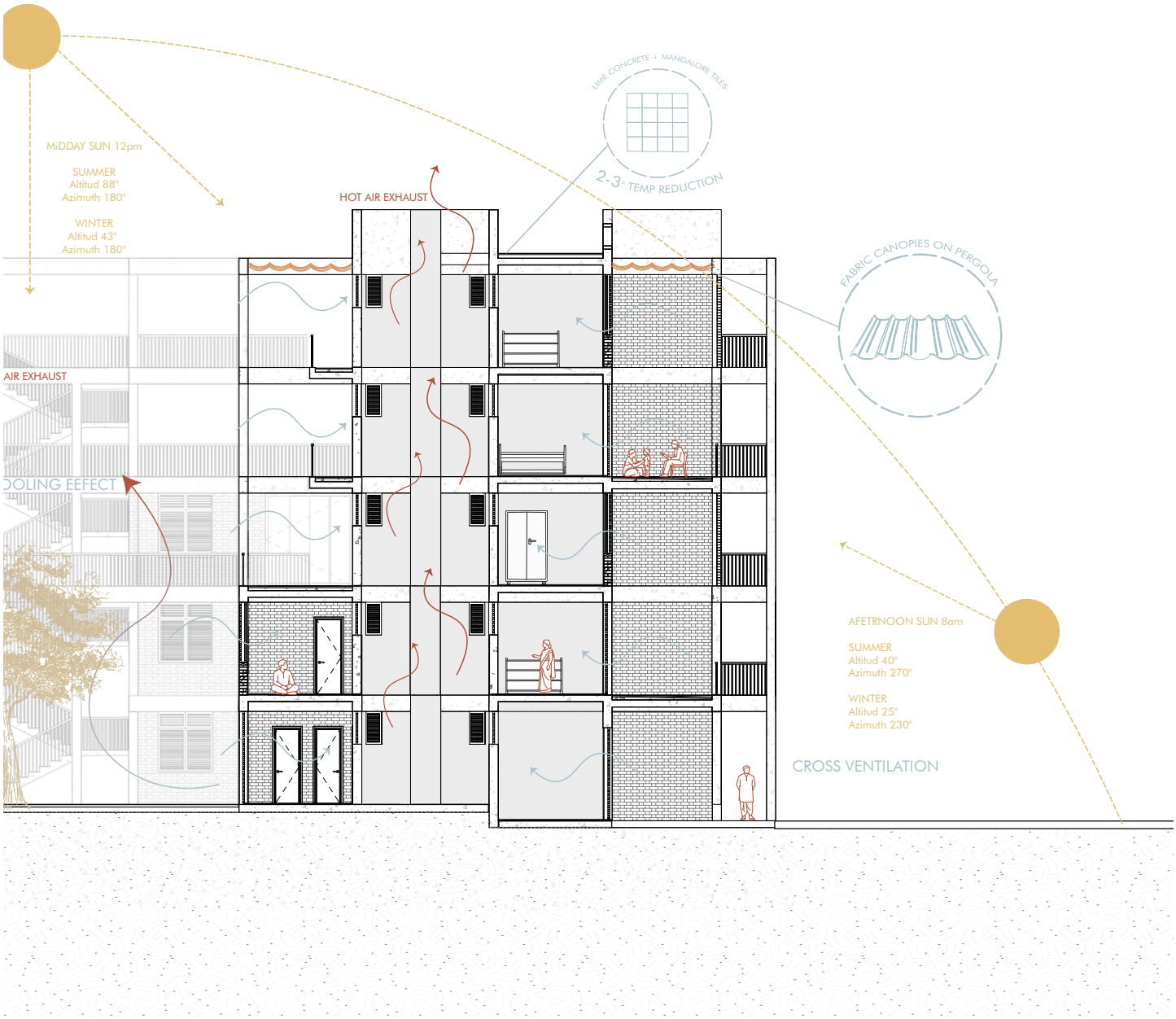




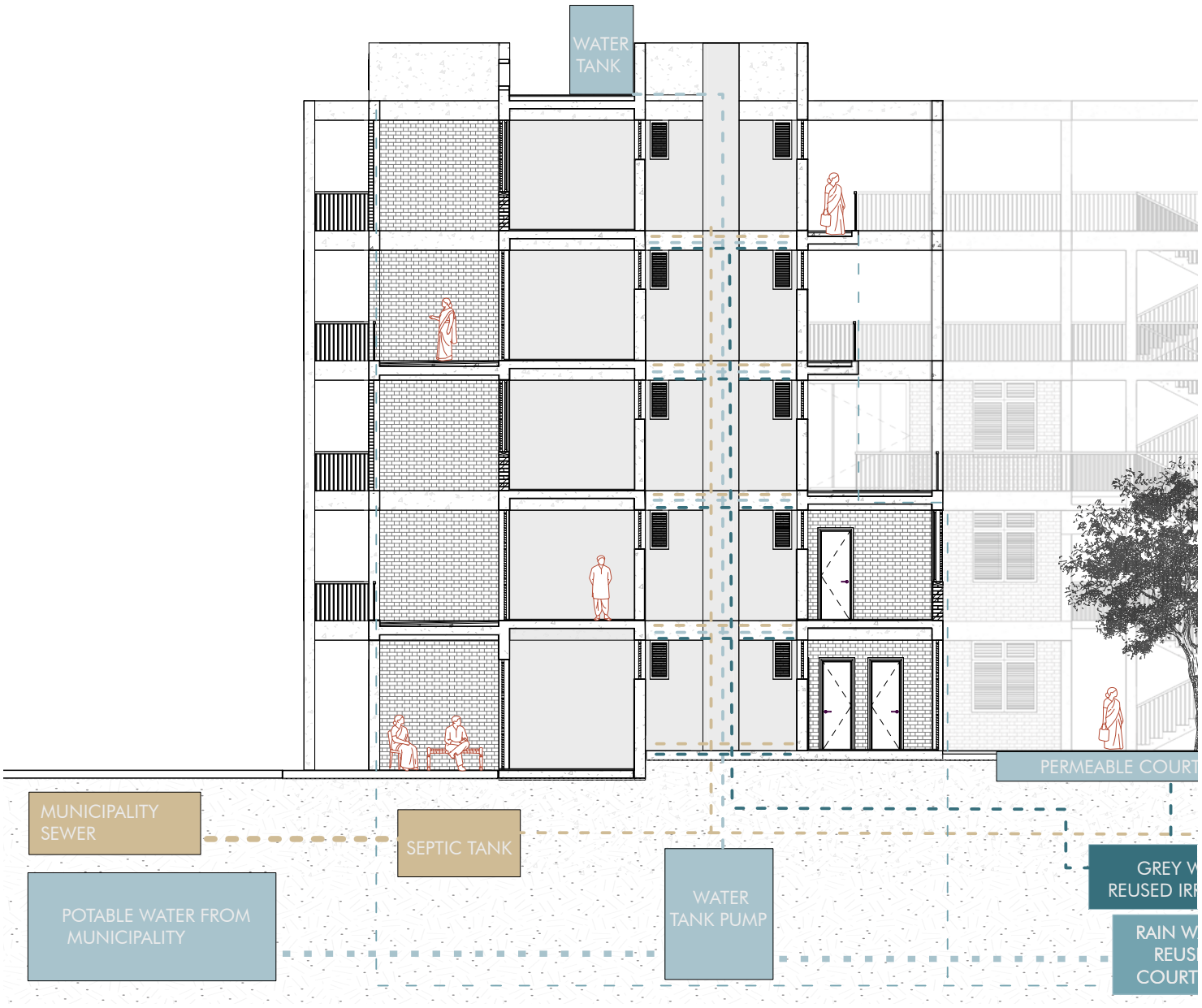


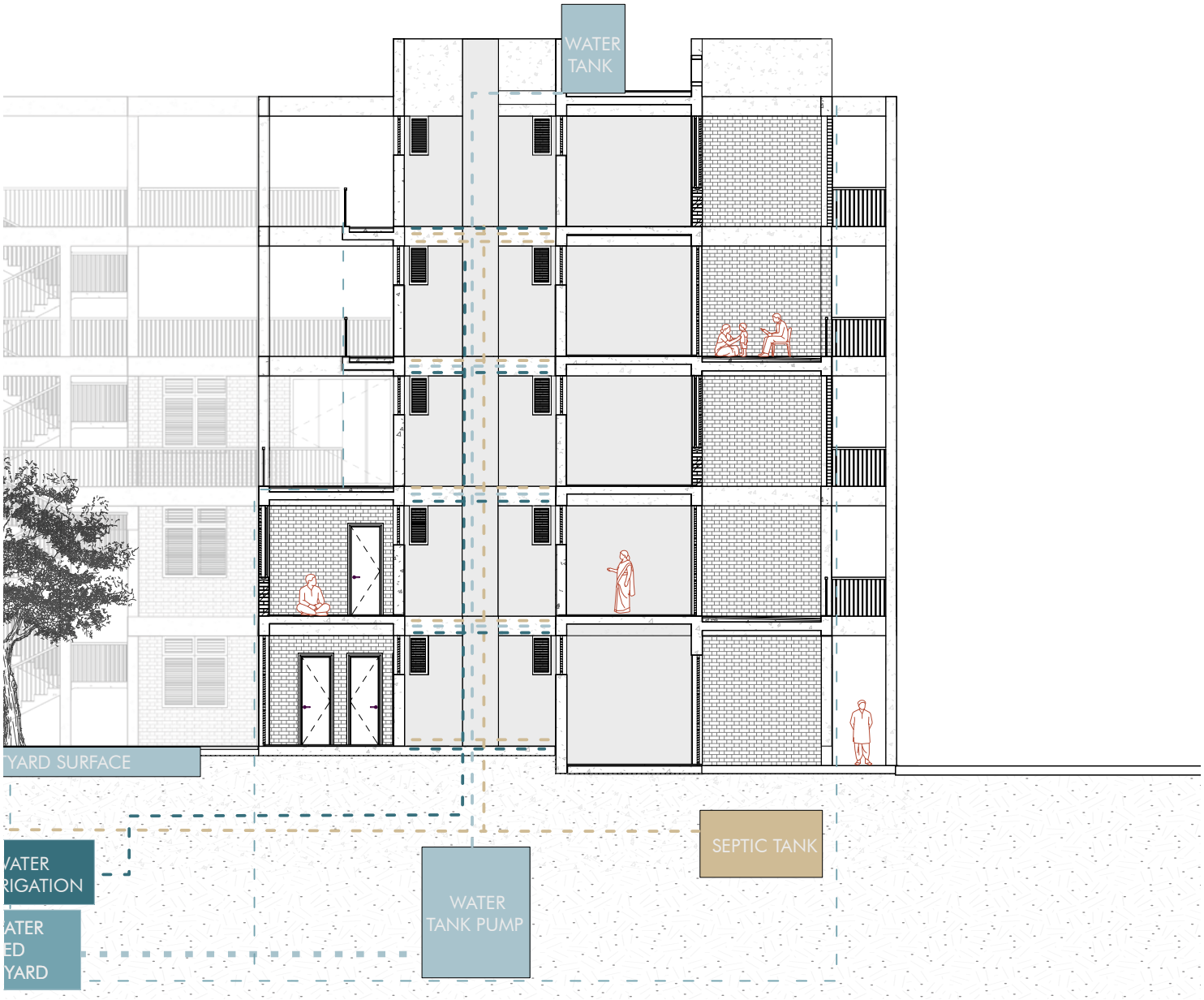
CLIMATE STRATEGY




MiDDAY SUN 12pm
SUMMER
Altitud 88°
Azimuth 180°
WINTER
Altitud 43°
Azimuth 180°
HOT AIR EXHAUST
LIME CONCRETE + MANGALORE TILES
2-3° TEMP REDUCTION
FABRIC CANOPIES ON PERGOLA
AIR EXHAUST
OLING EEFECT
AFETRNOON SUN 8am
SUMMER
Altitud 40°
Azimuth 270°
WINTER
Altitud 25°
Azimuth 230°
CROSS VENTILATION

WATER MANAGEMENT STRATEGY




WATER
TANK
YARD SURFACE
SEPTIC TANK
WATER
TANK PUMP

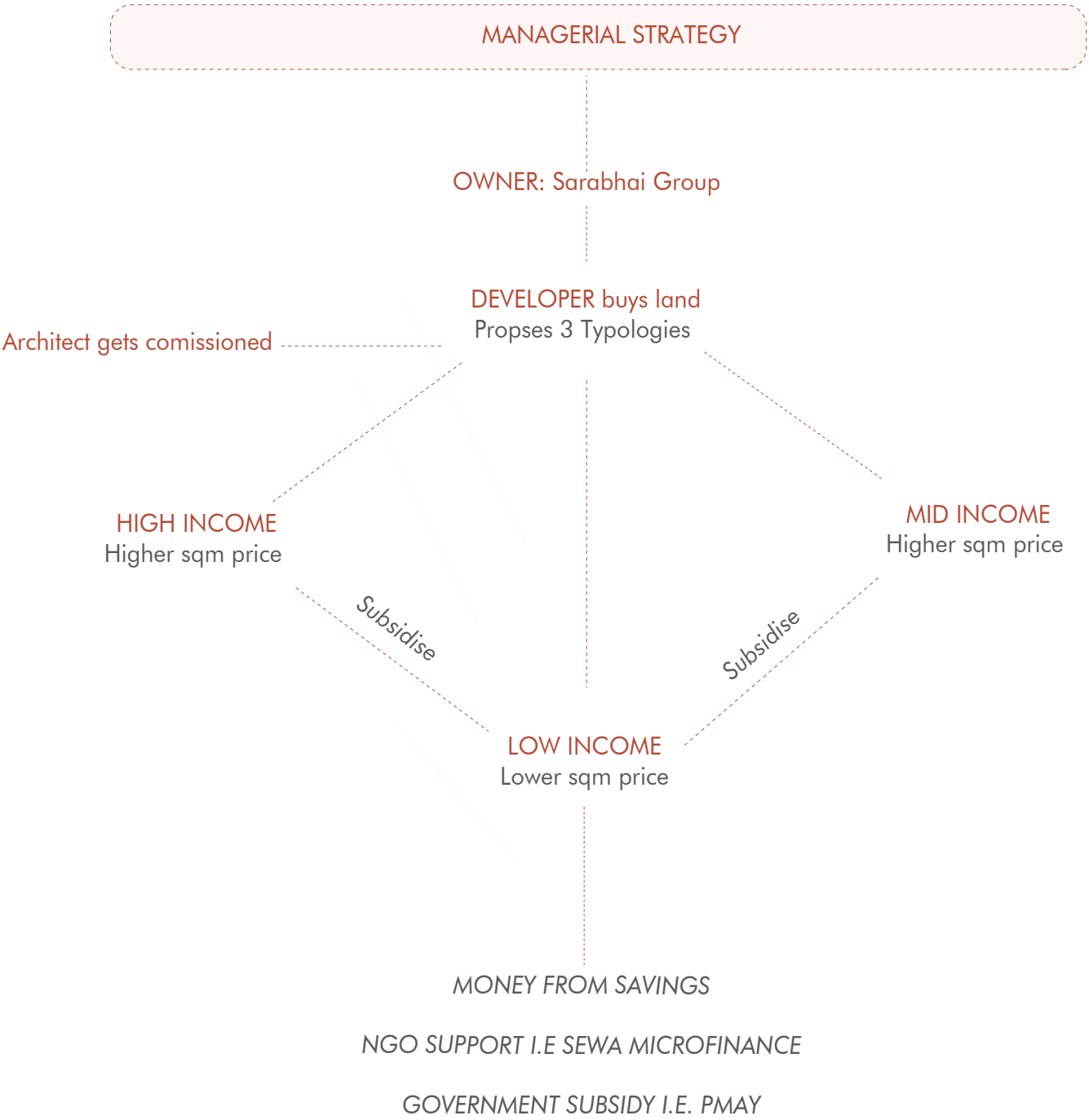
MANAGERIAL STRATEGY

The project proposes a mixed-income housing strategy to finance the project through cross-subsidisation, making the provision of affordable housing for home-based women workers financially viable.

The site would be purchased by a private developer from the Sarabhai Group, the current owners of the former Calico Mills plot. The developer would commission an architect to carry out the design and proposed three different housing typologies across a 5.8-hectare plot. Low-income units will comprise 71% of units, mid-income 21%, and high-income 8%. Mid- and high-income units' price per sqm would be sufficient to cover construction costs. In this way, a surplus can be generated to subsidise lower sqm prices for low-income units, as well as shared infrastructure, such as roads, parks, and communal facilities.

Low-income residents, primarily home-based women workers and their households, would be able to purchase the unit at a lower price. This could be financed through a subsidy under PMAY 2.0 (Government of India, 2024), microfinance support from organisations such as SEWA (2025), and their own savings.

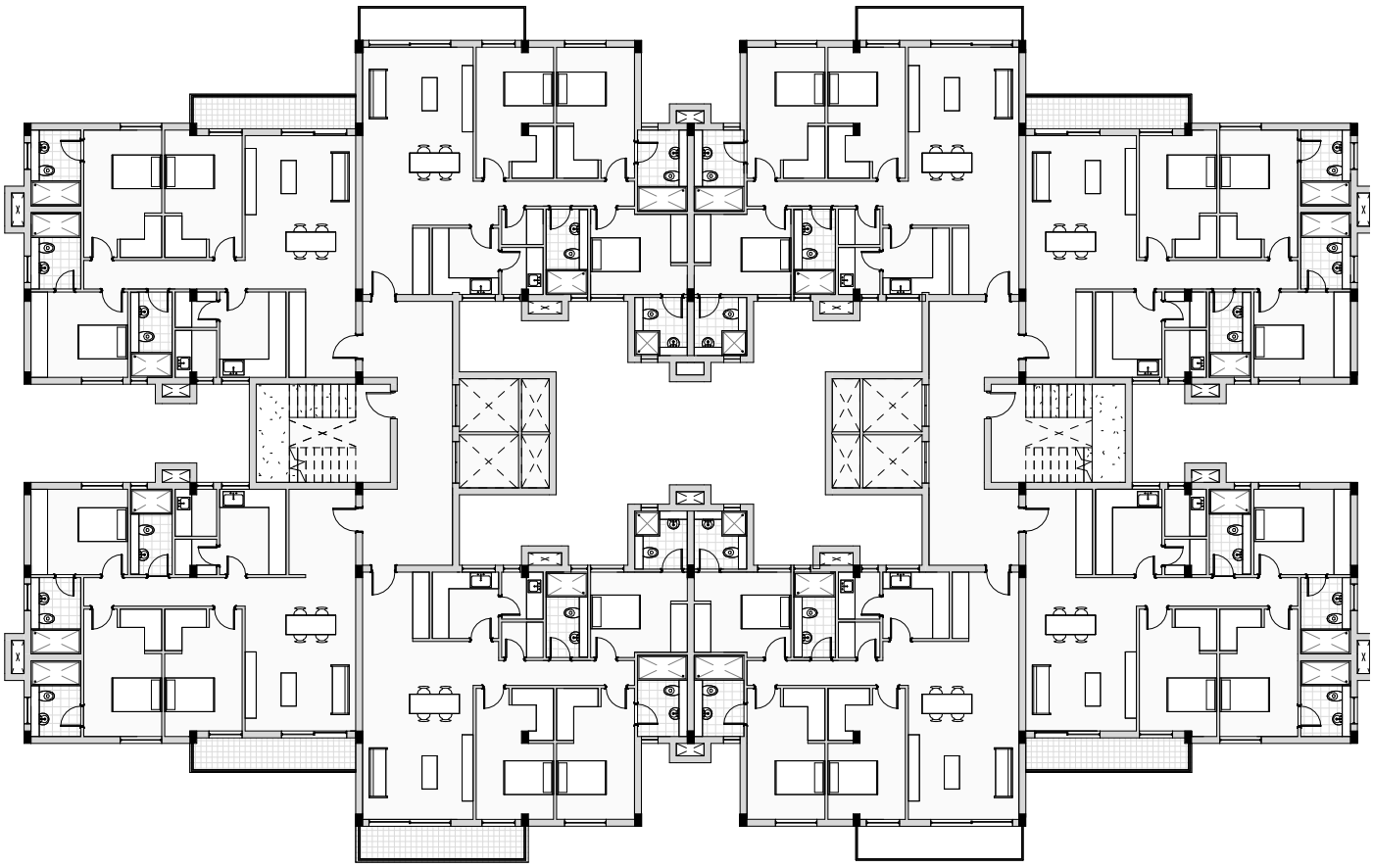
The current proposal covers the main 5.8-hectare plot. The northern parcel is identified as a future expansion phase, replicable using the same model once the primary scheme is established and potentially led by a public authority building on the demonstrated success of the first phase.


MANAGERIAL STRATEGY
OWNER: Sarabhai Group
DEVELOPER buys land
Propses 3 Typologies
Architect gets comissioned
HIGH INCOME
Higher sqm price
MID INCOME
Higher sqm price
Subsidise
Subsidise
LOW INCOME
Lower sqm price
MONEY FROM SAVINGS
NGO SUPPORT I.E SEWA MICROFINANCE
GOVERNMENT SUBSIDY I.E. PMAY

MID INCOME TYPOLOGY

Two mid-income unit types are proposed, ranging from 6 to 12 floors. Units of 115 sqm are sold at market rate, generating surplus revenue that directly cross-subsidises the affordable low-income units.





1:200 (scale bar only)

0 5m 10m

HIGH INCOME TYPOLOGY

High-income units of 226 sqm are sold above cost, contributing the largest share of cross-subsidisation surplus. Located directly adjacent to the Calico Chimney, the towers reach GF+13, acting as the tallest element of the development while remaining below the chimney's height height of 53 metres.





1:200 (scale bar only)

0 5m 10m

PHASING STRATEGY

The proposed north-south road connecting the northern part of the Calico Mills site to the southern garment hubs requires the partial demolition of existing informal settlements, making a relocation strategy for current residents a precondition for construction. To address this, the Southern residential clusters are built first alongside the initial section of the new road. During this period, a temporary change of traffic direction along existing lanes is required to maintain site access until the full road spine is operational.

From the outset, low-income clusters are built simultaneously with mid- and high-income units, ensuring that cross-subsidisation revenue is generated from the earliest phase and the project remains financially self-sustaining throughout construction. Each subsequent phase follows the same logic, extending the development northward and completing the road spine incrementally until the full north-south connection is established, creating a new access axis that integrates the site into the wider city.

The final phase delivers the shared communal infrastructure, school, nursery, community spaces, and a new pedestrian bridge connecting the site to the Sabarmati riverfront. These are deliberately held until last, funded by the accumulated surplus of the completed cross-subsidisation model. In addition, a plot to the north is left prepared for future expansion: IF the first phase prove successful, a public authority or community organisation can take charge of replicating the masterplan, extending the model without requiring a new financial or design framework.



PHASE 1: Start building Southern Clusters first, temporary change of traffic direction for accessibility. Mid Income towers built for cross subsidiation strategy.



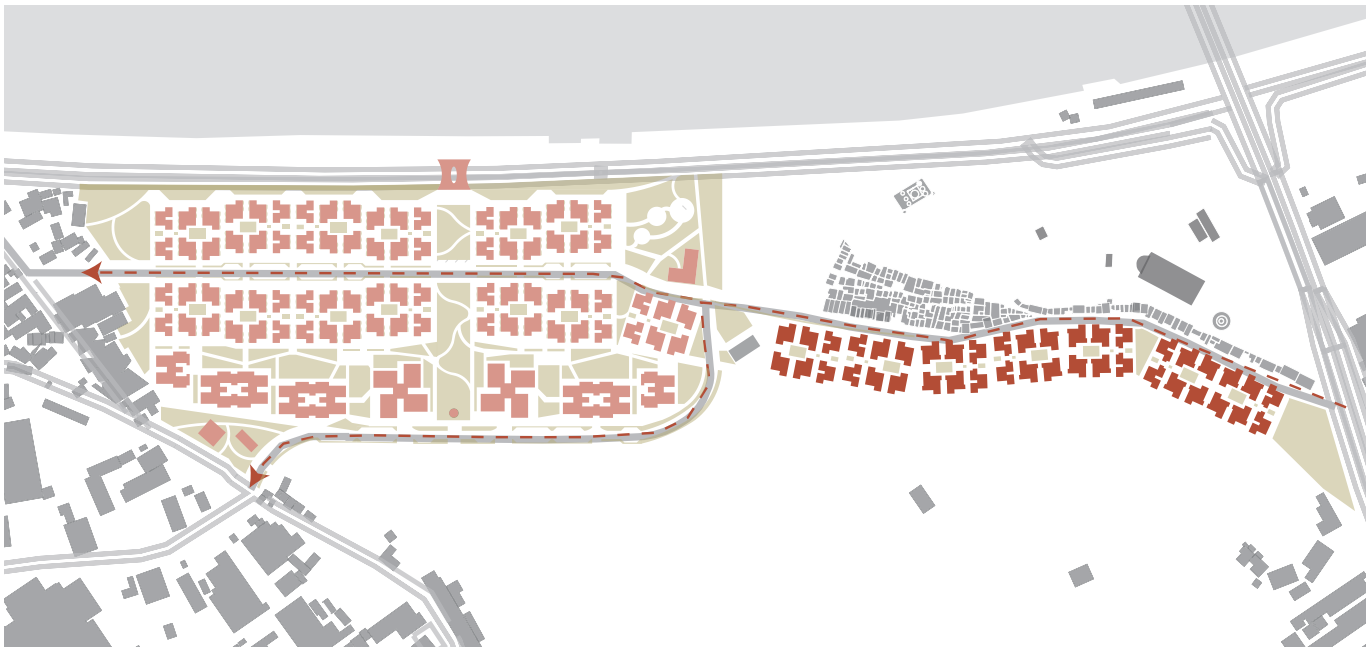
PHASE 2: Start demolition and relocation of a part of existing settlement to already built clusters. New clusters are built and new access road connecting North and South Calico gets build. High Income tower gets built for cross subsidiation stategy.



PHASE 3: Start demolition and relocation of second part of existing settlement to alreayd built clusters. Road is finalized and Mid and High income clusters get built.



PHASE 4: Pedestrian Bridge gets built as well as Nursey and School.



PHASE 5: Proposed strategy for governamnetal authorities. If first part of schem is successfull, low income cluster could potentially expand to the north of site to finish housing the existing settlements.

PROJECT ABACUS

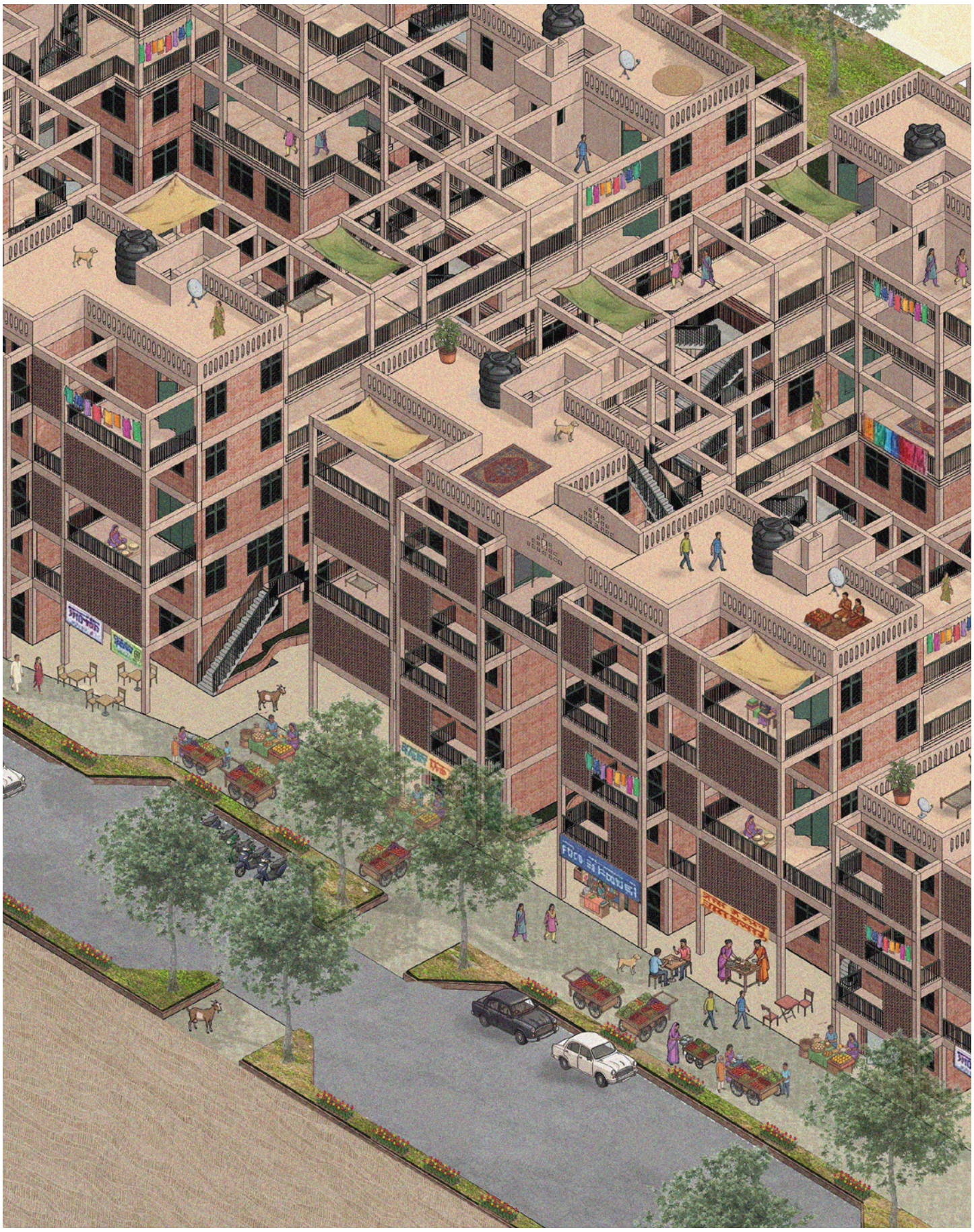
PROJECT ABACUS		
Plot Area	5.8	ha
Total Built Area	99,832	sqm
Total Ground Footprint	17,864	sqm
FSI	1,72	-
GSI	0.31	-
Total Units	1384	units
Dwelling Density	239	units/ha
Low Income Units	988	units
Mid Income Units	284	units
High Income Units	114	units

DWELLING TYPES

GROUP	TYPE	UNIT SIZE	PER CLUSTER	TOTAL UNITS
Low	Type A	36 sqm	10	130
Low	Type B	36 sqm	14	182
Low	Type C	36 sqm	28	364
Low	Type D	43 sqm	16	208
Low	Type E	86 sqm	8	104
Mid	Type A+B	115 sqm	4/floor	284
High	Type A+B	226 sqm	4/floor	112

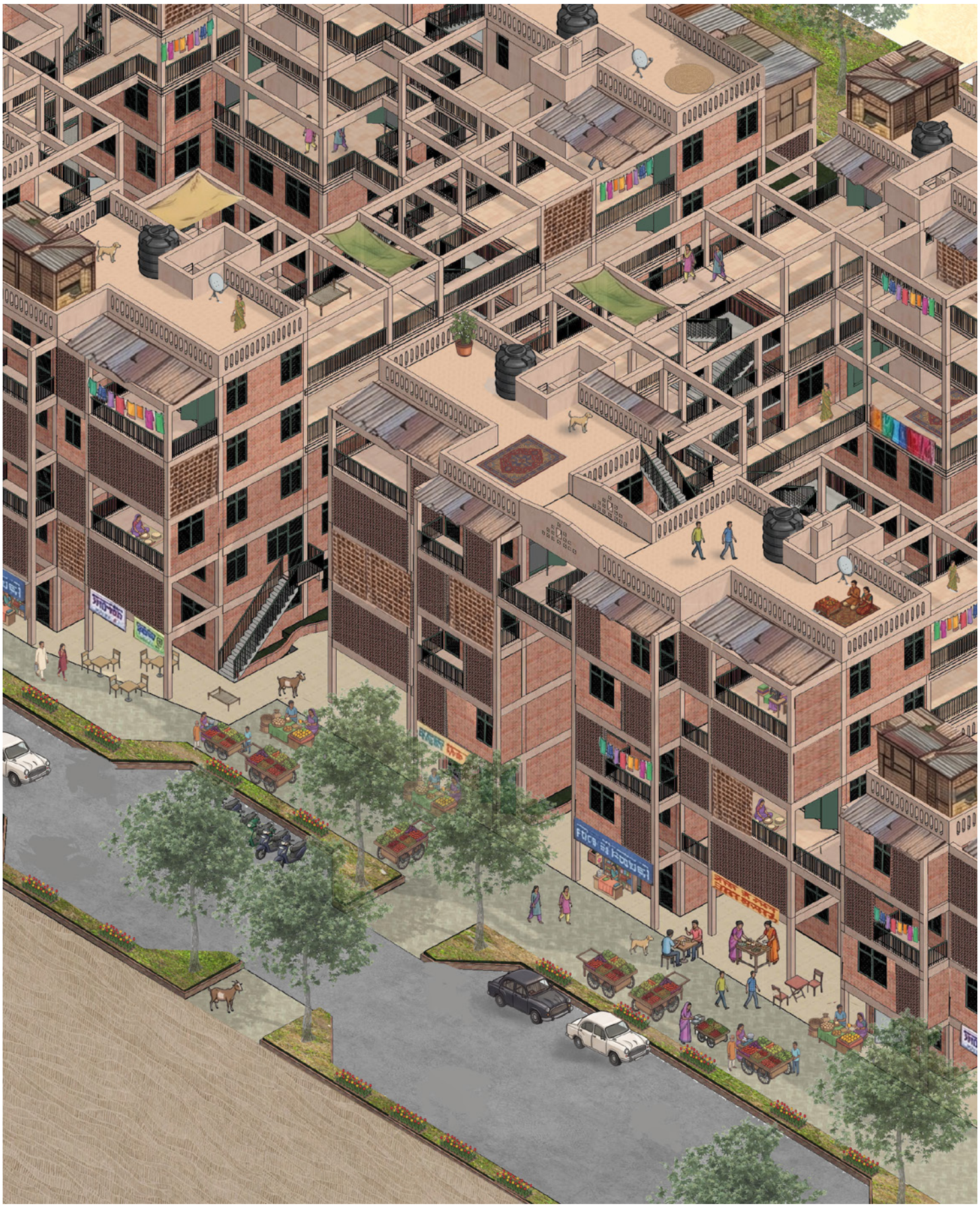
If all households incrementally expand to their maximum permitted capacity, the FSI would increase from 1.72 to 2.07. This figure is indicative, as expansion remains subject to individual household resources, needs, and timing

FSI AFTER FULL INCREMENTAL GROWTH: 2.07



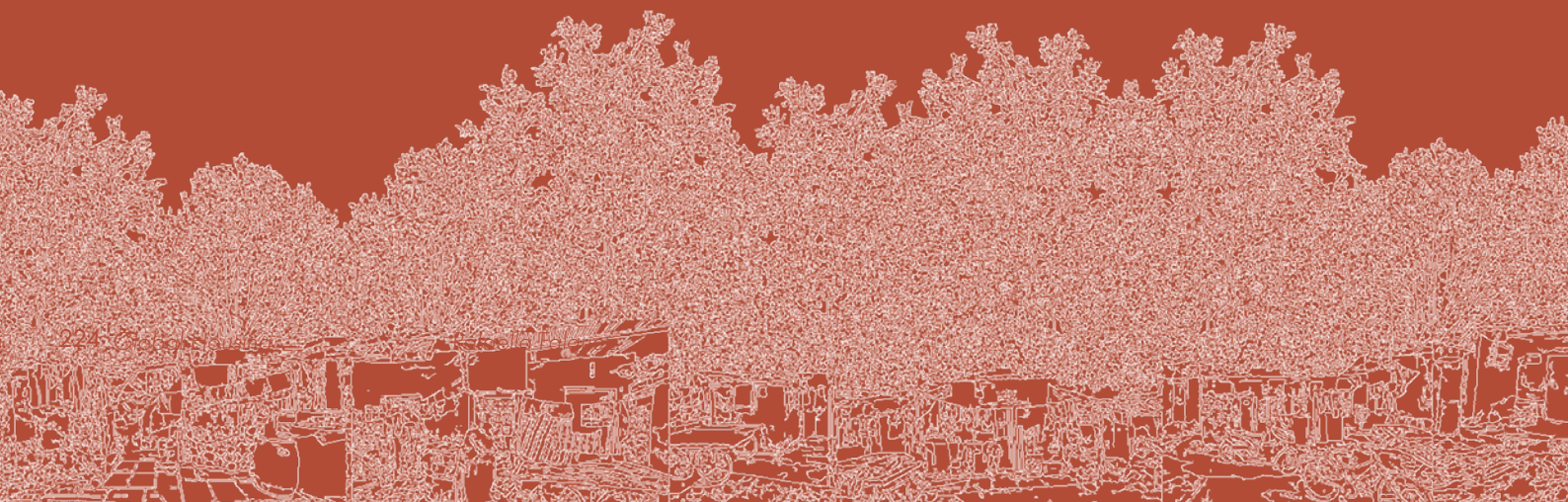


AXONOMETRIC CLUSTER PRESENT



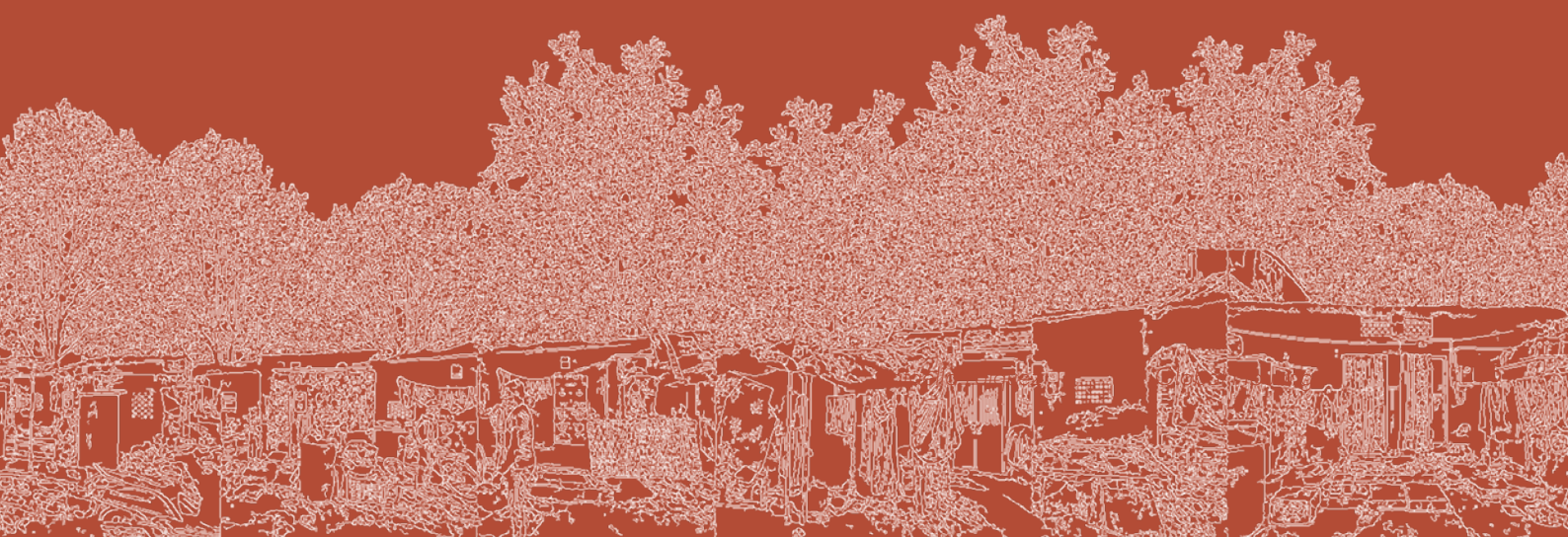


AXONOMETRIC CLUSTER FUTURE



CONCLUSION

IMPLICATIONS, RECOMMENDATIONS &
REFLECTION



CONCLUSION & DISCUSSION

The aim of this research is to answer the question, "How can housing address the spatial, environmental, and socio-economic needs of home-based women workers in Ahmedabad within rapidly densifying urban contexts?" To answer this, it became evident that creating better housing for home-based women workers, looking through spatial, socio-economic, and environmental lenses, cannot be done by analysing the dwelling scale in isolation. Strategies must be developed simultaneously across the cluster, neighbourhood, and urban scales as well.

Design ambitions were not formulated randomly but emerged as a direct response to what was observed during fieldwork in Ahmedabad when visiting Calico Mills. It was seen how many women work in extremely constrained spaces, in some cases houses barely had windows, also they had to sleep next to the goods they produced, among many other conditions discussed earlier in this report. These problems are the spatial consequence of a housing model that, even though built by the people who inhabit it, does not fully accommodate women's dual burden of paid labour and care, largely due to the lack of resources available to invest in better infrastructure. The core argument of this thesis is that this should change, and that if studied carefully, it is possible.

HOW DO EXISTING DWELLING LAYOUTS, EVERYDAY ROUTINES, AND CULTURAL PRACTICES SHAPE THE WAY HOME-BASED WORK IS INTEGRATED WITHIN INFORMAL HOUSING?

Spatially, visiting and interviewing home-based women workers on site revealed more than just problems, it uncovered an instinctive spatial intelligence. Women already move fluidly from interior to threshold to courtyard to street, adapting their workspace throughout the day in response to light, heat, and domestic demands. The design does not invent a new spatial logic. Instead, by proposing folding doors that open onto otlas, verandas, and the street, it formalises and supports the system women have already developed, ensuring it happens in spaces that are comfortable, efficient, and safe. In response to the lack of storage documented during fieldwork, overhead storage has been integrated into the dwelling units, reflecting what residents already improvise. Through incremental layouts, it is also expected that over time households will be able to expand their unit area, potentially dedicating a full room to storage or workspace as their needs and resources grow. At the cluster scale, shared verandas and courtyards extend this spatial logic outward, creating a hierarchy of semi-private spaces, from dwelling to threshold to courtyard to street, where women can work, socialise, and share skills, as highlighted by SEWA as essential to collective economic organisation.

HOW CAN HOUSING IMPROVE THE COMFORT AND EVERYDAY USABILITY OF HOME-BASED WORKSPACES IN RESPONSE TO HEAT, VENTILATION, DAYLIGHT, AND SEASONAL CONDITIONS?

Environmentally, one of the main issues affecting women's work identified during fieldwork and site visits is thermal discomfort, as production is constantly interrupted by extreme indoor heat. This goes beyond a comfort issue and becomes an economic one. The design

addresses this through passive solar and ventilation strategies applied across every scale. At the dwelling scale, all units are organised as corner units with openings on at least two opposing façades, enabling cross-ventilation without mechanical systems. Adjustable steel louvre shutters regulate airflow and solar gain throughout the day, while jali brick panels on east and west façades address the low sun angles that cause the greatest discomfort during early morning and late afternoon. At the cluster scale, the shared courtyard in Type B clusters functions as a thermal chimney, exhausting hot air upward and cooling the surrounding dwellings. Mangalore clay tiles on roofs and verandas reduce indoor temperatures compared to untreated concrete slabs. Finally, at the neighbourhood and urban scale, careful landscape design and the deliberate orientation of clusters in relation to the prevailing south-westerly winds from the Sabarmati riverfront work together to create comfortable outdoor conditions throughout the whole scheme.

HOW CAN SHARED PRODUCTIVE SPACES AT THE DWELLING, CLUSTER, AND NEIGHBOURHOOD SCALES SUPPORT COLLECTIVE MICROECONOMIES, REDUCE DEPENDENCE ON SUBCONTRACTORS, AND STRENGTHEN WOMEN'S ECONOMIC AGENCY?

Socio-economically, the isolation of home-based women workers in Calico Mills was identified as both a structural and spatial problem. Women operate under fragmented supply chains where contractors hold most of the control over access to materials, wages, and market networks, leaving women with limited bargaining power. At the same time, limited income reduces their capacity to improve their homes, trapping them in a cycle of spatial and economic precarity. The design responds to this across all scales. At the dwelling scale, ground-floor units facing the main street can accommodate small shops, while the wide pavement alongside allows women to extend onto the street and turn it into an informal market, directly reflecting the behavioural patterns observed in Ahmedabad's old city informal economy. At the cluster scale, shared terraces and galleries provide collective production spaces where women can work alongside each other, share skills, and begin to organise, the kind of shared infrastructure that SEWA identifies as essential to economic resilience. At the neighbourhood scale, the introduction of a school and nursery within the masterplan directly supports women by providing a place to leave their children during working hours, responding to the feminist critiques studied in the theoretical framework. At the urban scale, the new north-south axis is a direct spatial response to the isolation women previously experienced, having to walk long distances to collect materials and deliver goods. The new street connects the garment hubs to the north and south in a continuous, legible route. Finally, the mixed-income cross-subsidisation model makes the entire scheme financially feasible, working towards more affordable housing for home-based women workers without depending solely on public subsidy.

Together, the thesis confirms that in order to improve the housing needs of home-based women workers in Ahmedabad, dwellings cannot be studied in isolation or through a single strategy, but they should be analysed through multiple lenses and scales to actually generate a positive outcome.

IMPLICATIONS AND RECOMMENDATIONS

The significance of this research for architectural practice lies in the methodology used to carry it out. Elements such as the otla threshold, the folding doors making spaces flexible, the collective terraces, and the incremental structural framing system were not architectural elements placed randomly. Their value comes from the fact that they were derived from careful observation of how home-based women workers use space, before any design decisions were made. The lesson from this research is that in order to design for users within informal or invisible labour systems, whether in housing or any other architectural programme, the methodology should start by looking first, understanding second, and drawing third.

This approach is replicable. Architects working across the Global South, in Guayaquil, Nairobi, Lima, or any city where informal economies are embedded in the structure of domestic space, face similar conditions. The multi-scalar framework tested here, reading spatial, environmental, and socio-economic needs simultaneously across the dwelling, cluster, neighbourhood, and urban scales, offers a model for how to approach housing design when the people being designed for have been systematically overlooked.

Beyond architecture, urban planners and policymakers also carry significant responsibility. Programmes such as PMAY in India already demonstrate that affordable housing initiatives are achievable within city planning schemes. What this research contributes is a set of ideas on how productive space can be better integrated with shared infrastructure and gendered spatial needs from the outset, rather than treating informal live-work activities as something to be addressed only after the fact.

REFLECTION

Reflecting on this project, I must begin with what could not be fully resolved. A mixed-income strategy was proposed to enable cross-subsidisation, however the design details of the mid- and high-income towers could not be fully completed and were intended to be resolved given more time. Beyond the design, the financial model itself remains hypothetical, while there are references to cross-subsidisation as a successful managerial strategy in comparable projects, the actual numbers have not been fully tested. Whether the scheme can be financed in this way depends on factors that go beyond architecture, such as market conditions, planning regulations, and developer appetite. A more rigorous financial study involving specialists, economists, and organisations with on-the-ground knowledge would be necessary to determine what is actually required for the model to be feasible.

Even though the fieldwork in Ahmedabad provided valuable insight, in hindsight it did not feel like enough. The site was only visited three times, which was not sufficient to fully understand the patterns women have in relation to the wider settlement or to grasp the full complexity of their daily routines. The interviews conducted with CEPT students were invaluable, however they were carried out in Gujarati and later translated into English, often summarised in just a few short sentences while conversations with residents lasted much longer. A lot of information likely got lost in translation, limiting the depth of the study. I wish there had been more time with the women , long enough to understand how their practices change across seasons, which would have produced a richer analysis. I also have

to acknowledge that many things are difficult to fully grasp when designing for another culture, where different customs and ways of living take place.

It should also be recognised that the scope of the project may be somewhat niche. In reality, not all residents of the scheme will be home-based women workers, and the whole development cannot be designed exclusively through a feminist lens, other members of the community, including men, children, and women who work outside the home, are equally important. A fully dedicated home-based women workers' village may not be entirely realistic within a mixed community.

Finally, while the design proposes incremental strategies and spatial frameworks, it does not fully resolve the question of agency, who decides how shared terraces are used, who has access to collective spaces, and how disputes over space and incrementality are handled over time. As architects we can define certain things and imagine how they might unfold, but as Turner argues, these processes should ultimately be controlled by the people who inhabit them. That requires time, organisation, and trust within the community, things that exceed what an architectural framework alone can provide.

What this project shows, with conviction, is that the spatial conditions of home-based women workers are not an inevitable consequence of poverty. They are partly the consequence of inadequate resources, infrastructure, and institutional support that prevent women from fully realising the spatial needs they already understand intimately. This can be addressed, to an extent, through the careful collaboration of architects, urban planners, and policy frameworks. It requires architects willing to look carefully at how women already live and work, to design across scales rather than stopping at the unit, and to treat spatial justice not as an optional layer but as the starting point. I genuinely hope this research inspires more people to keep exploring architecture around women's agency and rights, and around informal economy frameworks, because there is still so much work to be done and things to be discovered.





A DAY IN THE LIFE OF HOME-BASED WOMEN'S NEIGHBOURHOOD

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