

Genesis Metropolis

জেনেসিস মেট্রোপলিস

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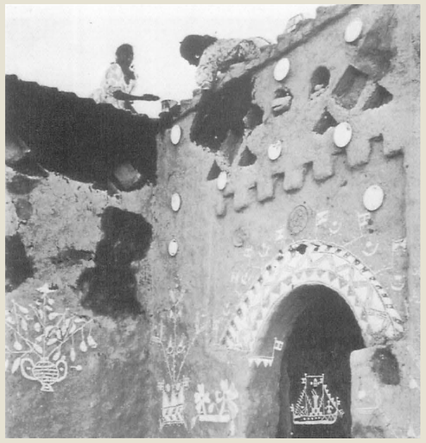
Photo by Joëlle Steendam

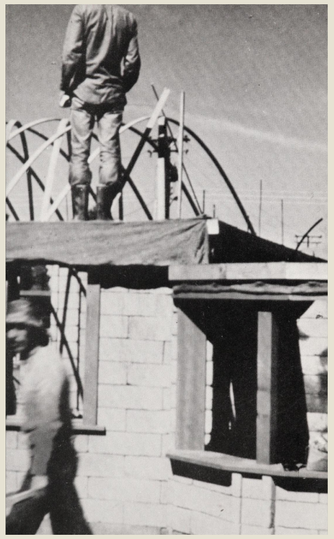
More even than the work of great
architects, I loved buildings that
had grown silently with the centuries,
catching the best of each generation,
while time curbed the artist's pride
and the philistines vulgarity, and
repaired the clumsiness of the
dull workman.

- from "Brideshead Revisited" by Evelyn Waugh





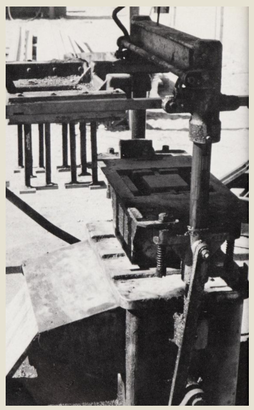




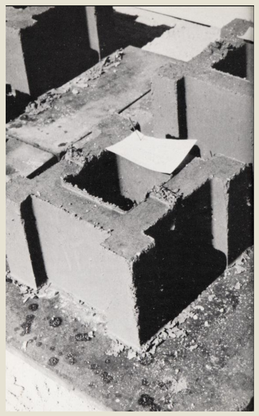

Prestone


সুরমা নার্সিং কলেজ
আখালিয়া, সিলেট। মোবাইল: ০১৮৭৫৫৬৩৬৮

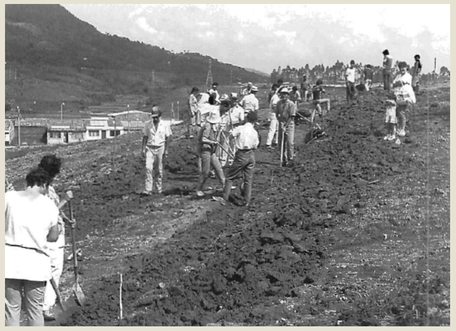










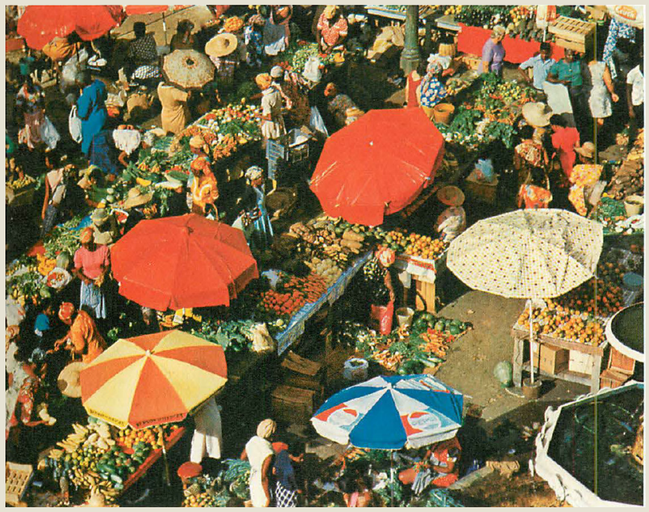


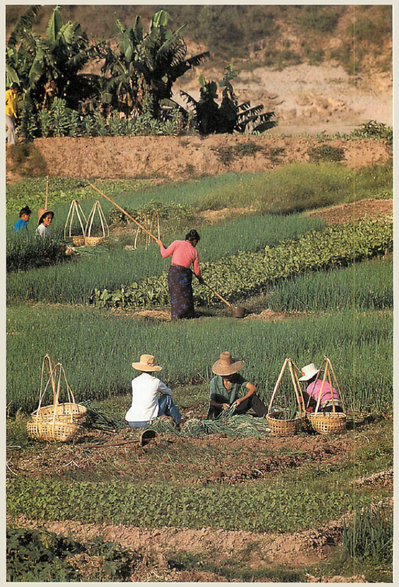






















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Sylhet


Nepal
Bhutan
India
Sylhet
Dhaka
India
Chittagong
Myanmar
Bay of Bengal

Sylhet



Population 659.138 people
Area 26,50 km²

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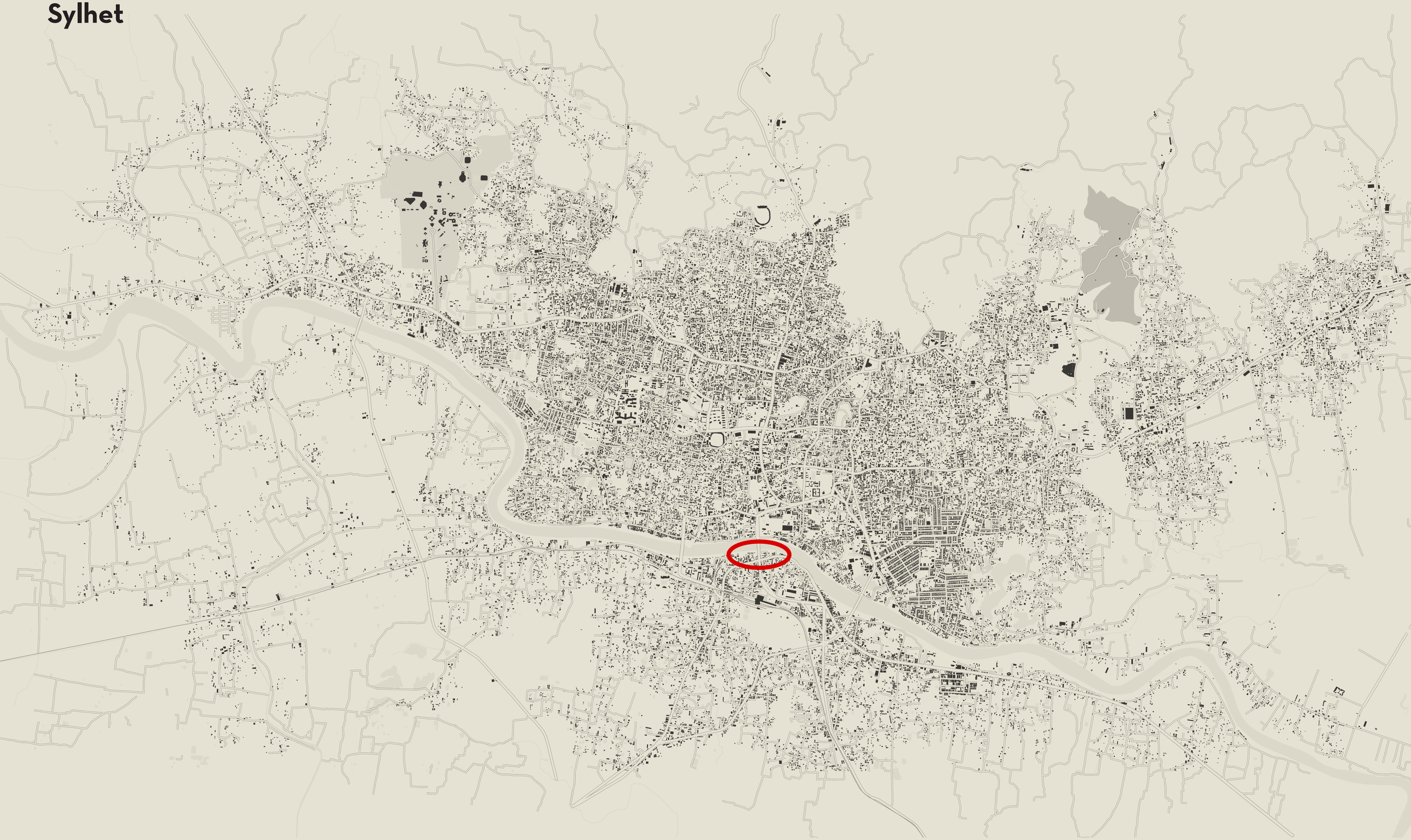
Sylhet



Population 659.138 people
Area 26,50 km²

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Selfie Bridge
Keane Bridge
Site

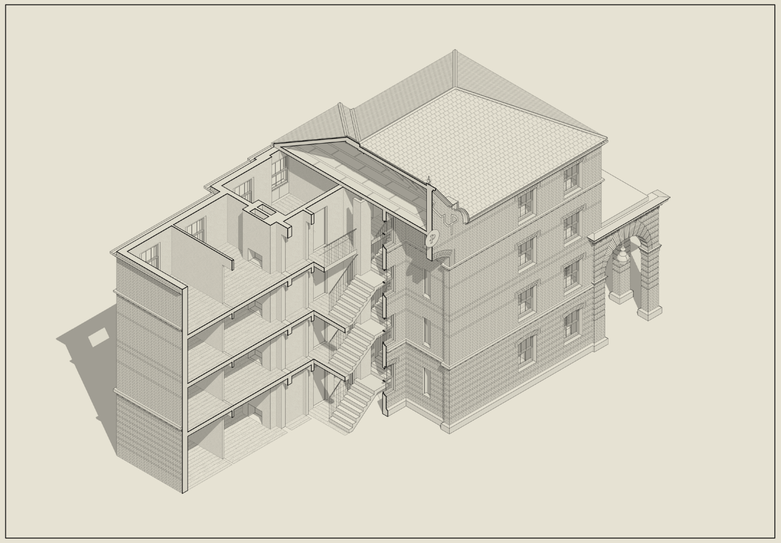


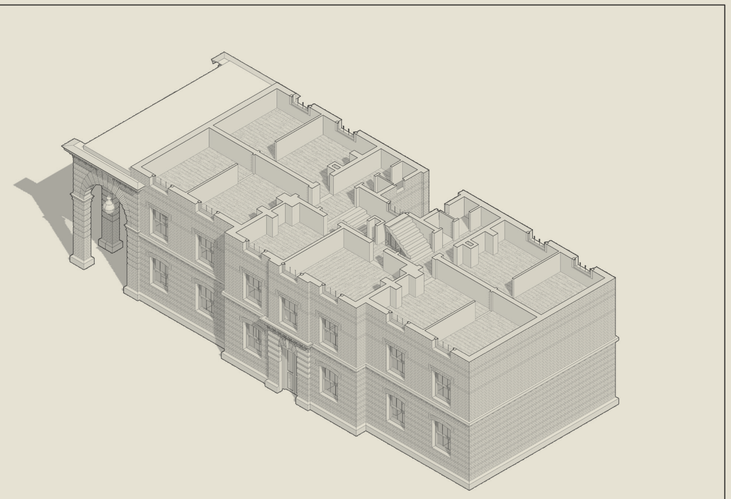
Pilot Projects

Peabody Square, Blackfriars

Designed by: Henry A. Darbishire
Location: London
Completed: 1871







Peabody Square in Blackfriars was completed in 1871 for the Peabody Trust. It consisted of sixteen blocks of buildings, enclosing two quadrangles connected to one another.

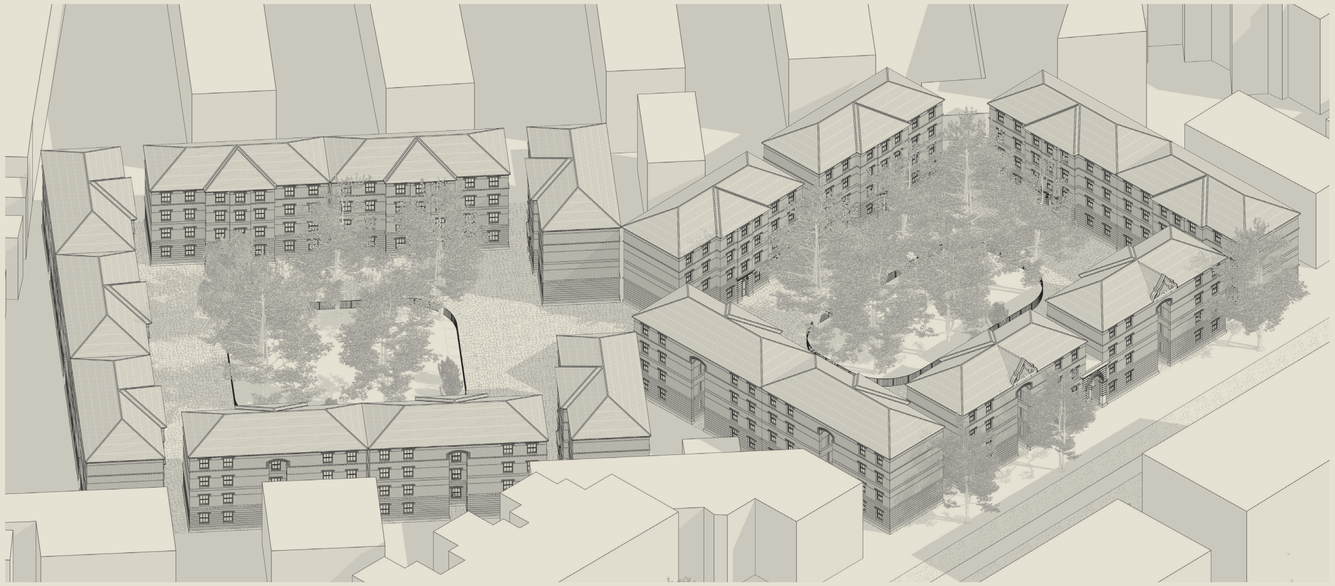
The Peabody Trust was founded in 1862 by George Peabody (1795-1869), a London-based American investment banker. His affection for London led him to donate a sum of £150,000 to benefit 'the poor and needy of this great city, and to promote their comfort and happiness'. This was an almost unheard of sum at the time (and grew to £500,000 by the time of his death).

The design of this estate was created by Henry Astley Darbishire (1825-1899) who built around 20 of the Peabody estates between 1863 and 1885. In this time he evolved the iconic block type that is commonly associated with Peabody housing. This particular scheme was the first to do away with the shared internal corridors that were part of earlier designs. All residences and shared facilities could be accessed directly from the stair landings. This created a more efficient layout that was little changed in subsequent schemes.

At the time Darbishire's estates were decried as too monotonous. Nikolaus Pevsner, for instance, described them as 'gloomy and barrack-like' and 'ever repeated design...at its worst and in all too familiar form'. However this standardisation helped keep down costs and could be understood as an early example of rationalism.

The scheme refelcted the Victorian attitude that physical and moral degradation were directly linked and thus that moving the poor out of unsanitary slums into clean, solid new dwellings would improve their wellbeing and character.

Peabody Square, Blackfriars





Learning Outcomes

Henry Darbyshire's approach to affordable housing focused on designing standardised building blocks, the essential design of which could be reused in many different contexts.

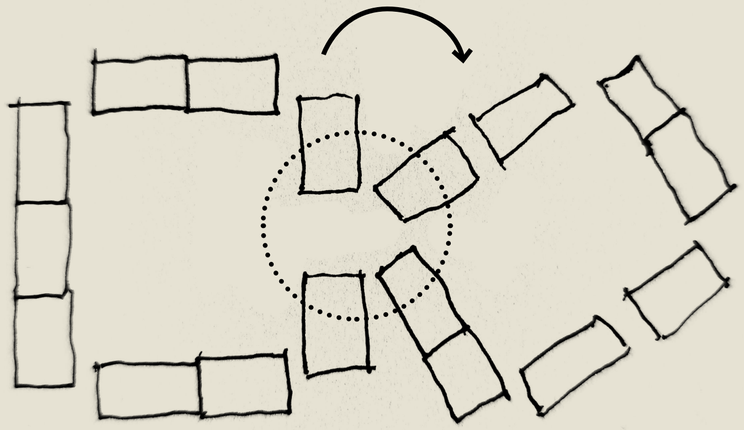
In order not to have to adapt the blocks to different site conditions, Darbyshire focused on careful arrangement in the masterplan, with blocks either being separate or connected in a line. By abandoning overly rigid or symmetrical configuration where necessary, Darbyshire could fit his masterplans even within in awkward site outlines. By not connecting blocks at corners, he could pivot to any desired angle, without it affecting the internal layout of the blocks. This can be seen in the Blackfriars scheme, where two rectangular courtyards meet at a skewed angle.

At the same time the open corners provide smaller transition spaces in the public realm which can help to activate streets and courtyards.

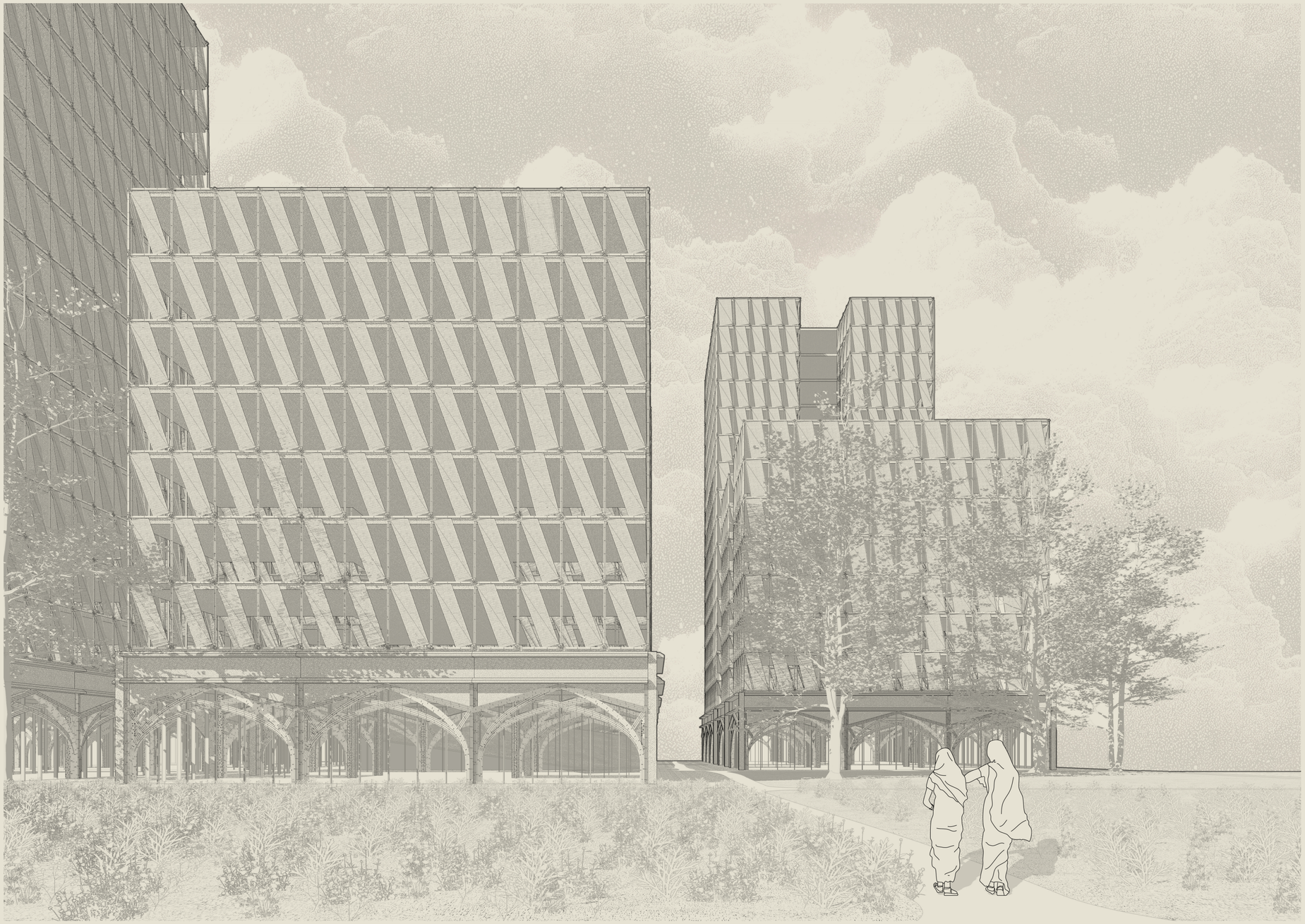
1. Standardisation

2. Flexibility in the masterplan facilitated by open corners

3. Durable construction with common materials

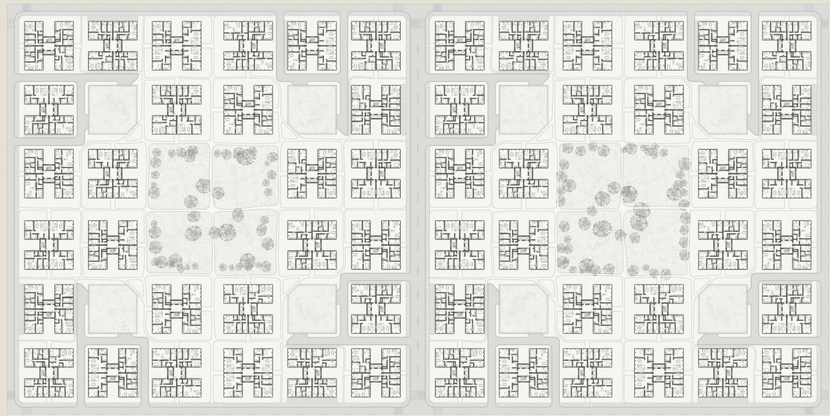


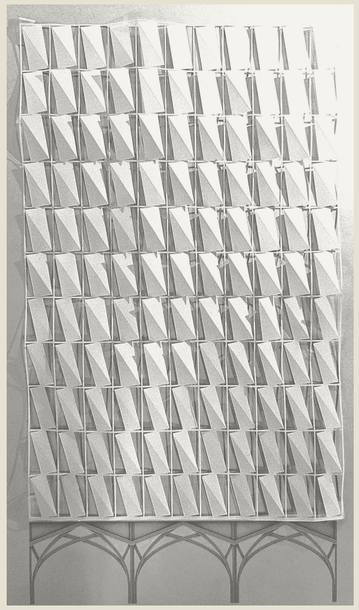
Density Challenge

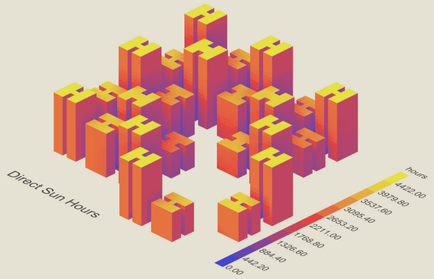


Density Challenge









Learning Outcomes

The density challenge provided an opportunity to explore the use of standardised blocks but at a much higher density than the Peabody scheme.

By designing a hireachy of open spaces it was possible to create a high density while also ensuring well defined and appropraite open spaces. From the smallest defined by the building footrprints to the intermediate defined by a cluster of buildings and the largest, created in the space between clusters. The gradient in scale also reflected a gradient in publicness

Arranging the building heights in an alternating pattern with a gradient down towards the main public space created better access to light and views for all apartments. To mitigate the resultant solar gain risk, the facade panels were designed and arranged to have a solid-to-glazed ratio based on the total sun hours on each part of the facade,

1. Standardisation

2. Hierachy of open spaces

3. Responsive solar shading

Project Research



Figure 3

Number of architects/k population compared with number of architecture schools/M population.

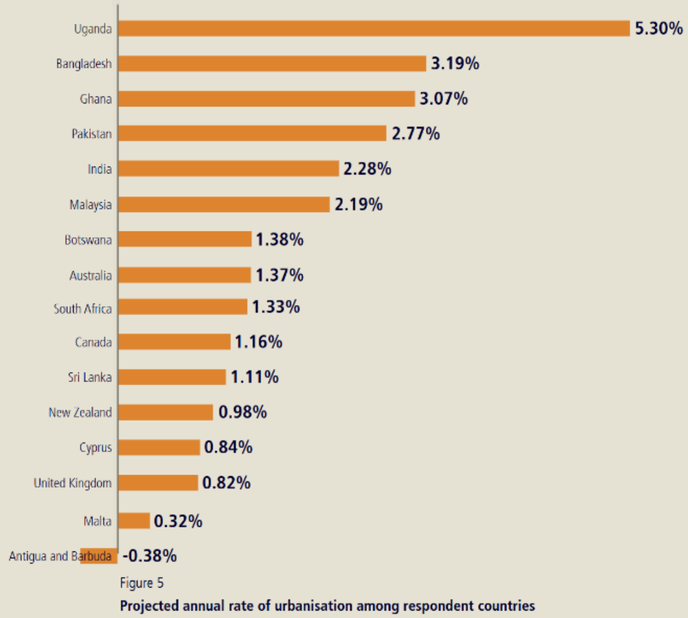


Figure 5

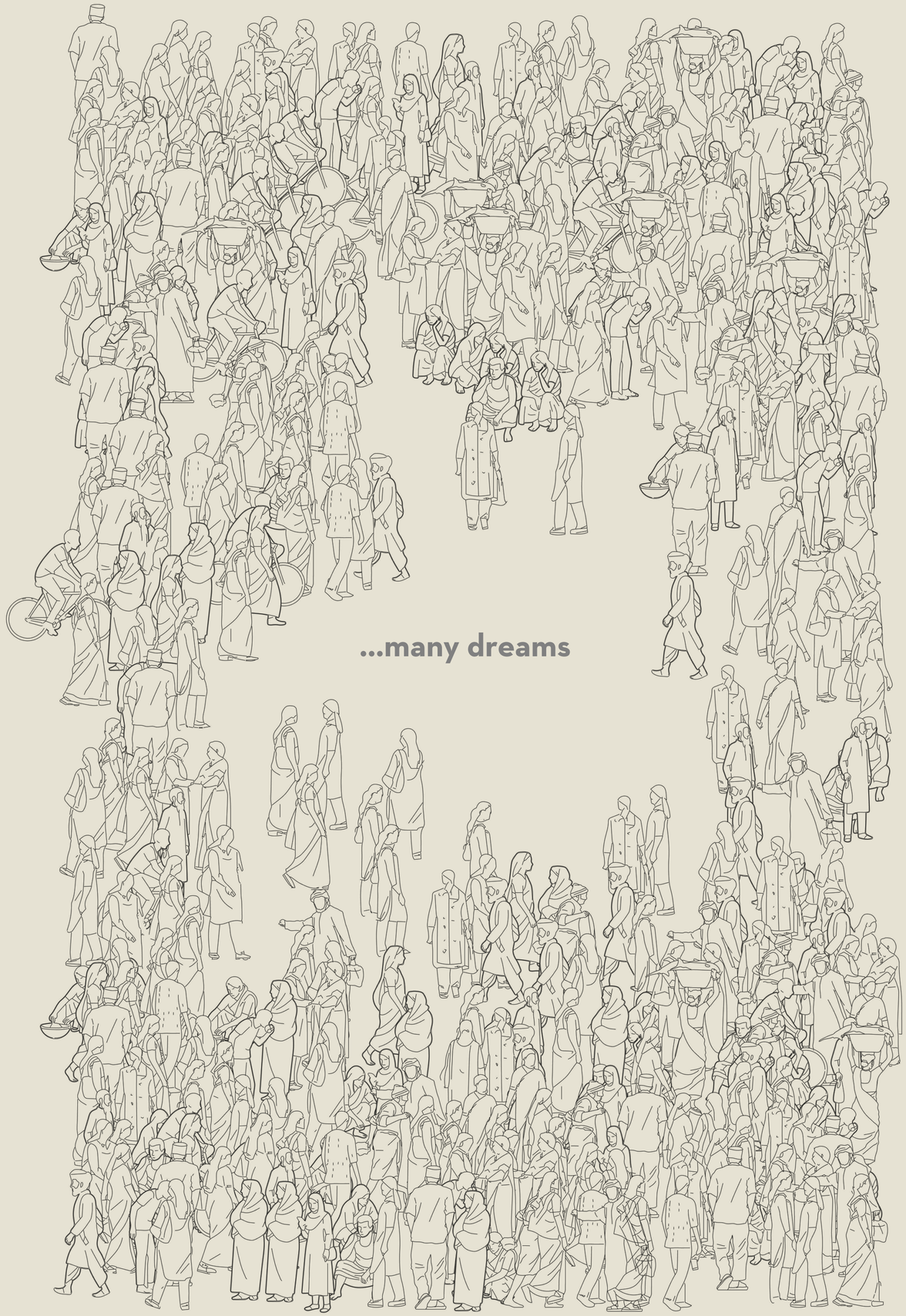
Projected annual rate of urbanisation among respondent countries

1 architect per 50,000 population





Many people...



...many dreams

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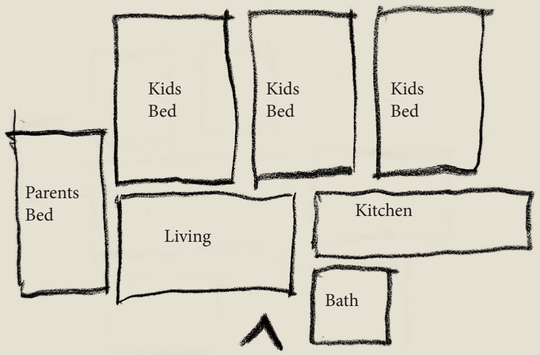
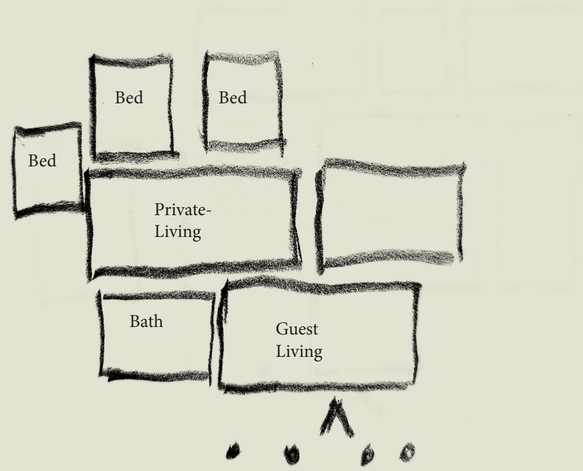
Children



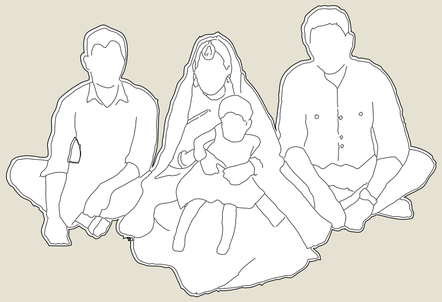


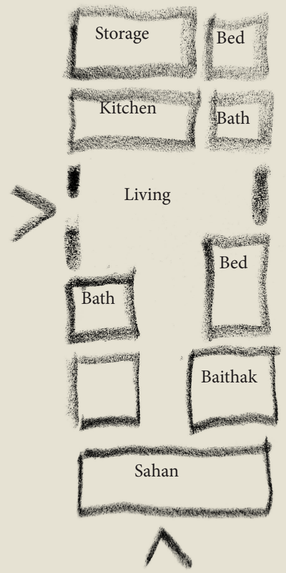
Privacy





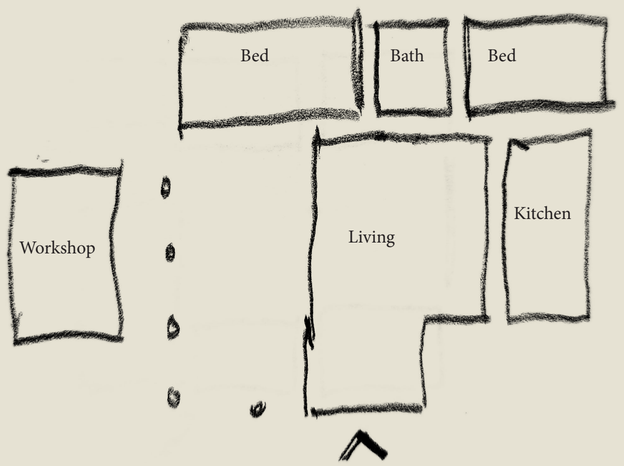
Purdah



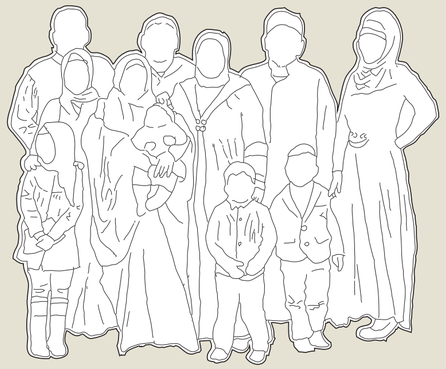


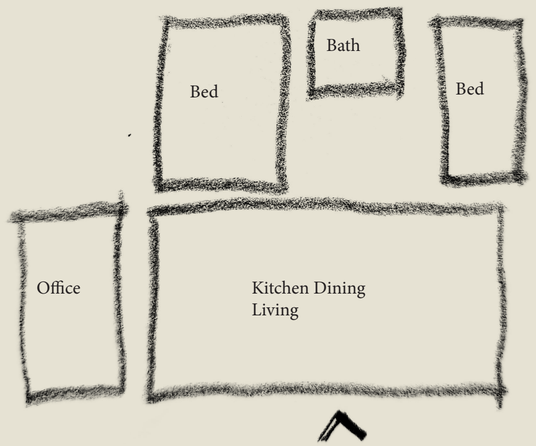
Workshop



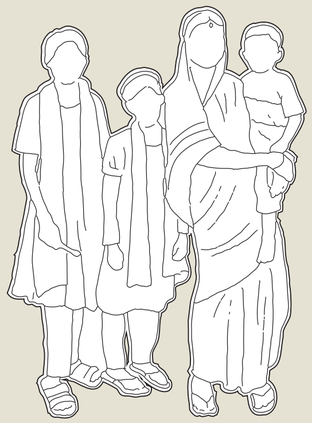


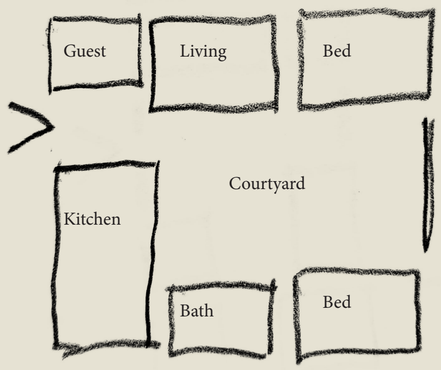
Kitchen

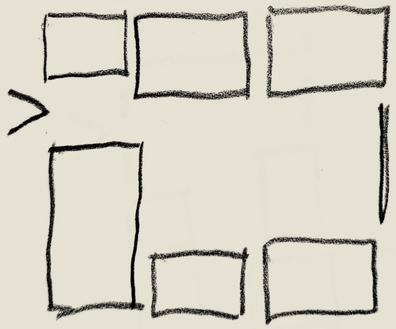


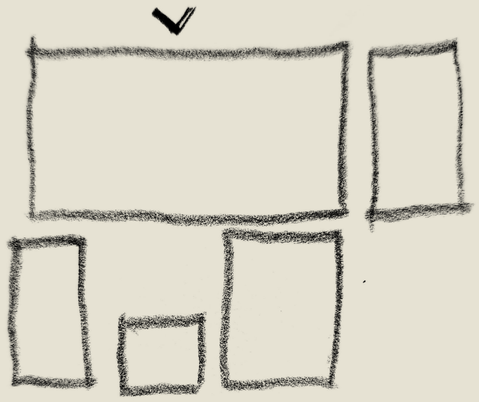


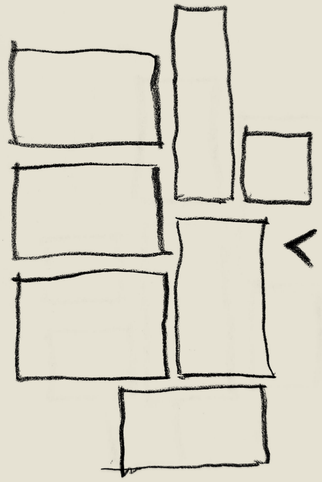
Courtyard











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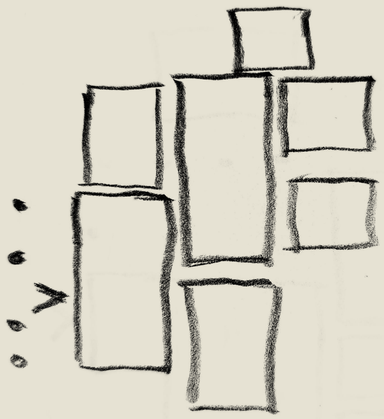

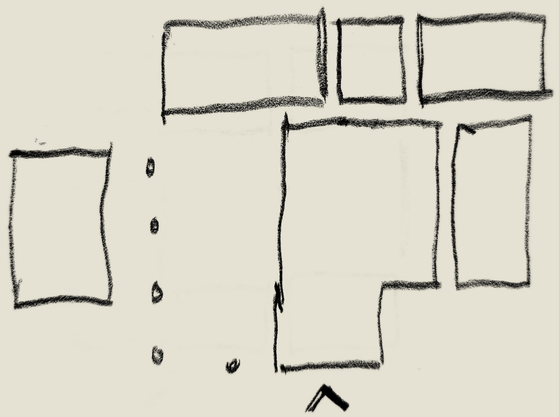

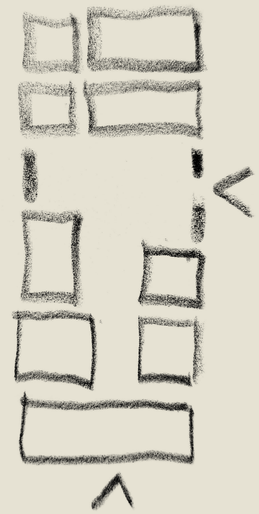

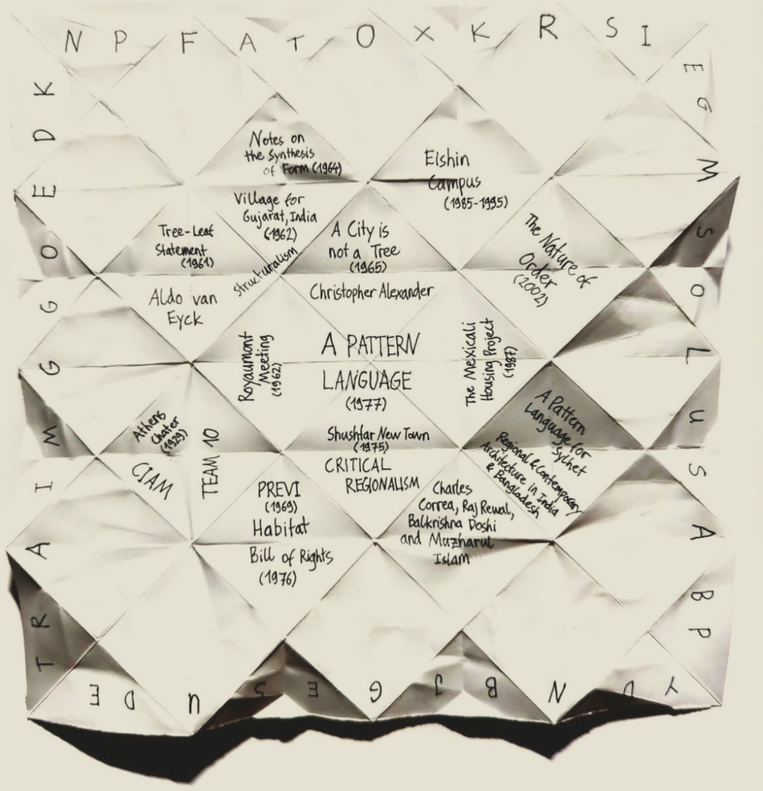
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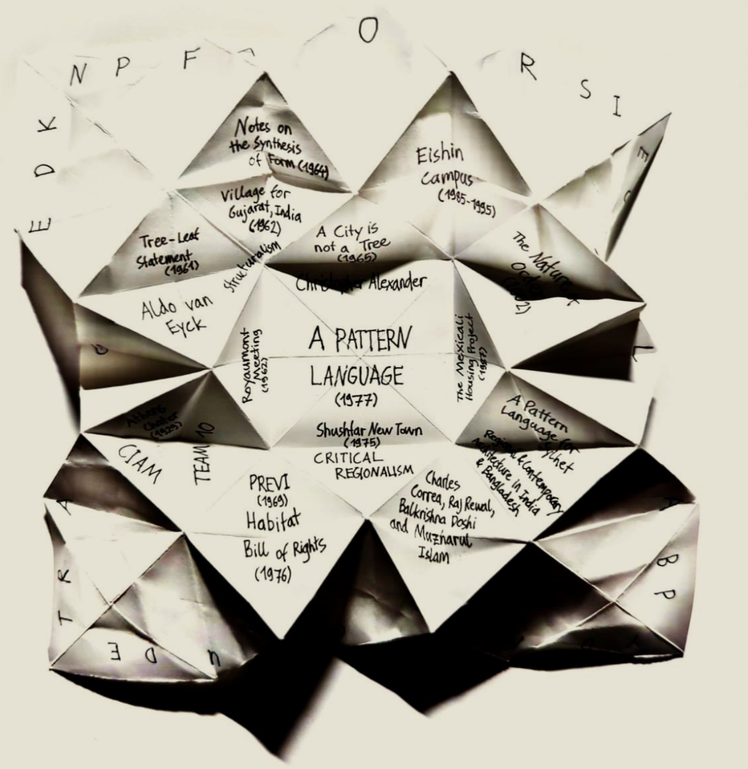
Tree-Leaf Statement (1961)
Structuralism
A City is not a Tree (1965)
Christopher Alexander
Aldo van Eyck
Eishin Campus (1985-1995)
The Nature of Order (2002)
Royaumont Meeting (1962)
A PATTERN LANGUAGE (1977)
The Mexicali Housing Project (1987)
A Pattern Language for Sylhet
Regional & Contemporary Architecture in India & Bangladesh
Athens Charter (1933)
Shushtar New Town (1975)
CRITICAL REGIONALISM
CIAM
TEAM 10
PREVI (1969)
Habitat
Bill of Rights (1976)
Charles Correa, Raj Rewal, Balkrishna Doshi and Muzharul Islam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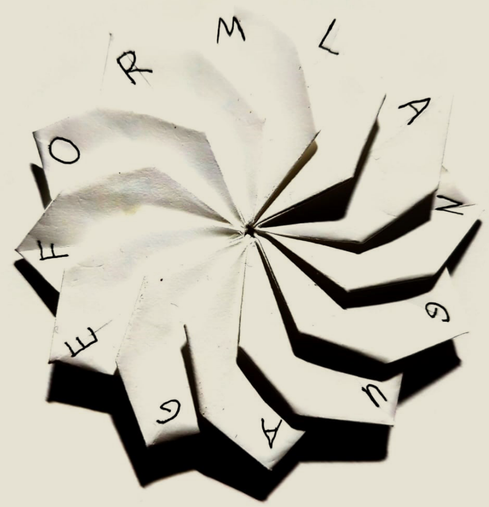

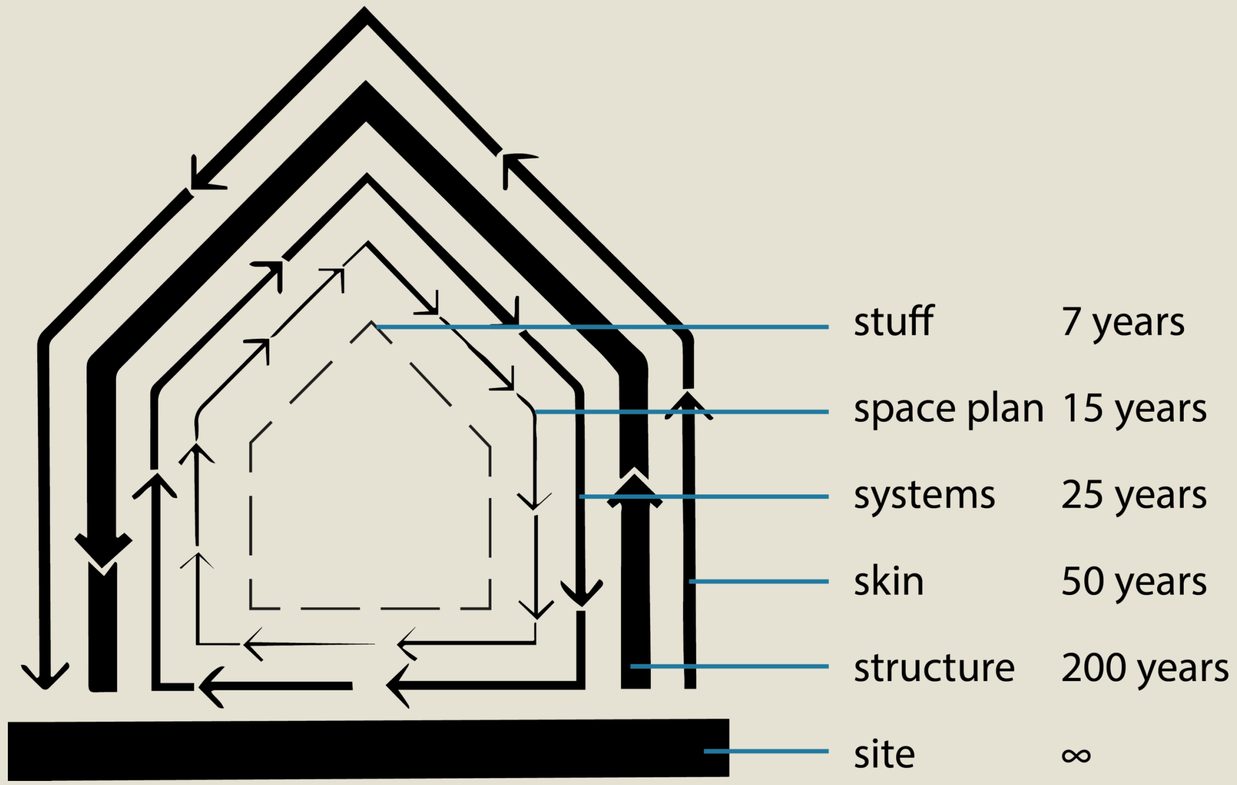

Stewart Brand's "Shearing Layers of Change"

BANGLA BATON

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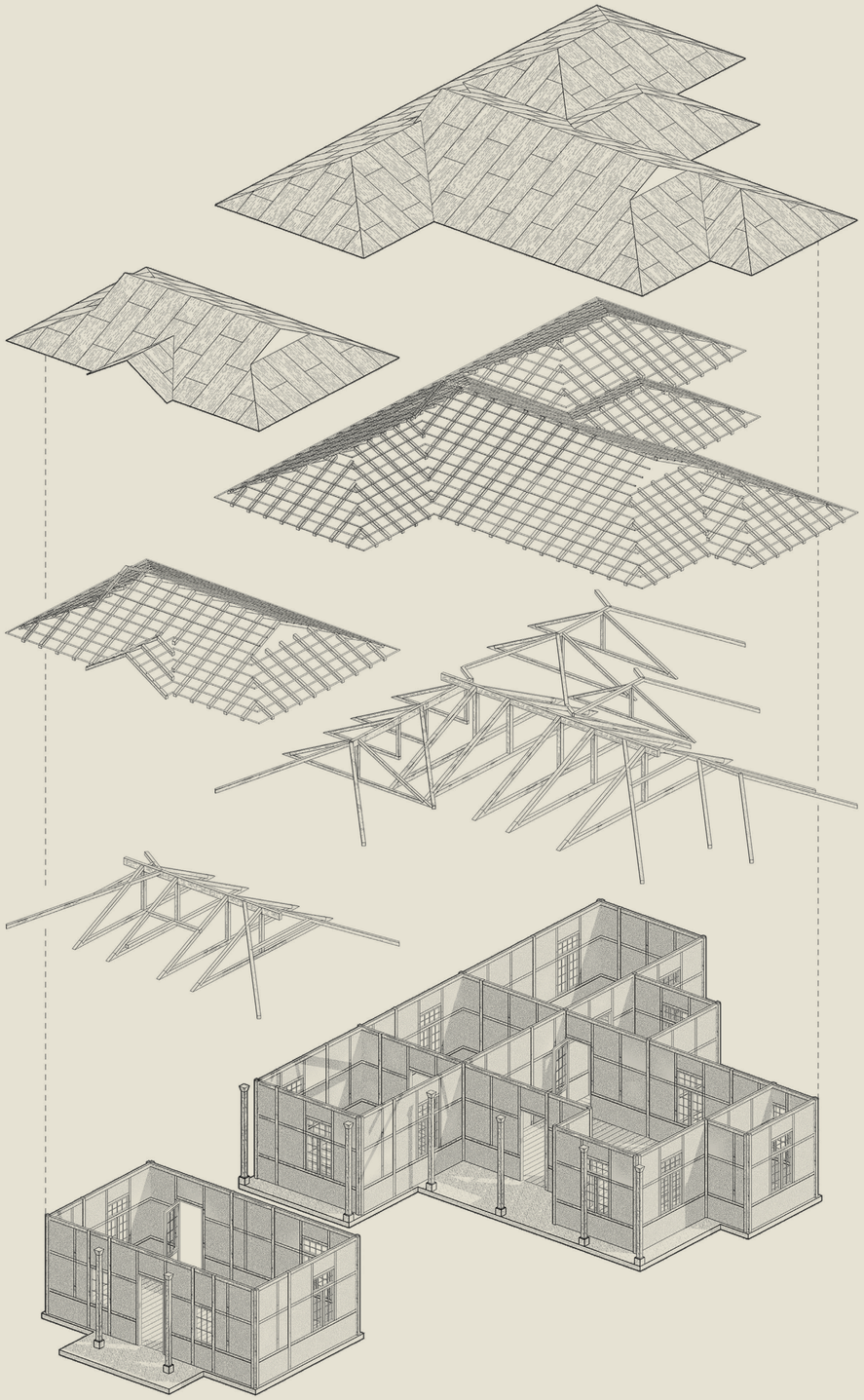

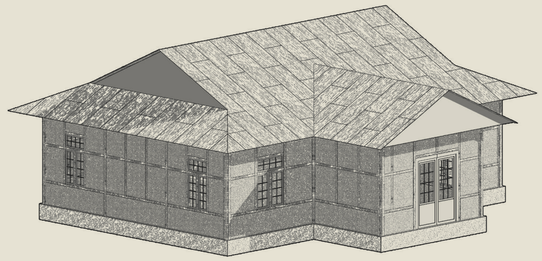

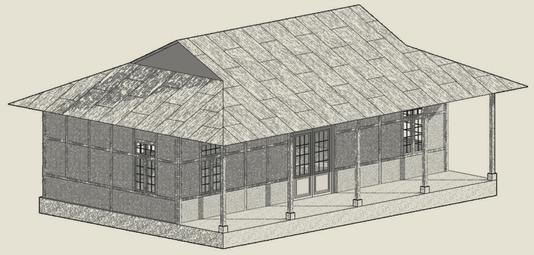

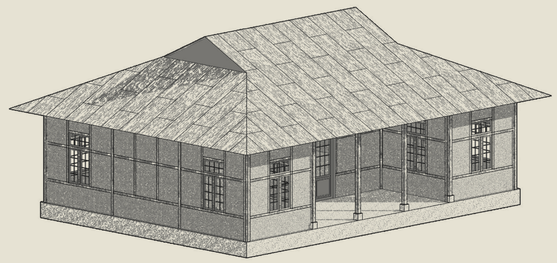

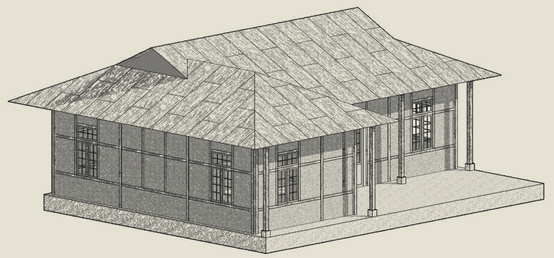

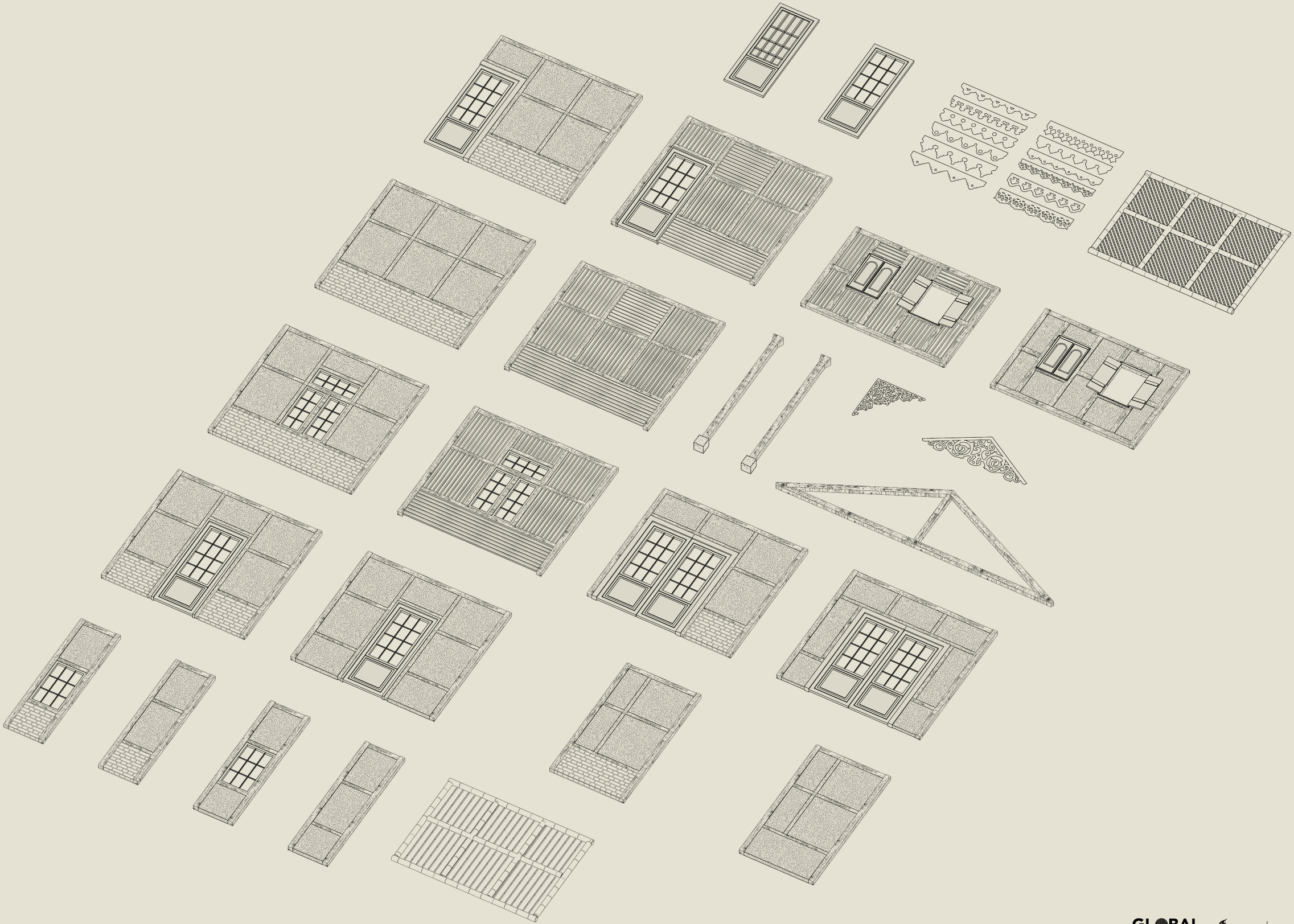

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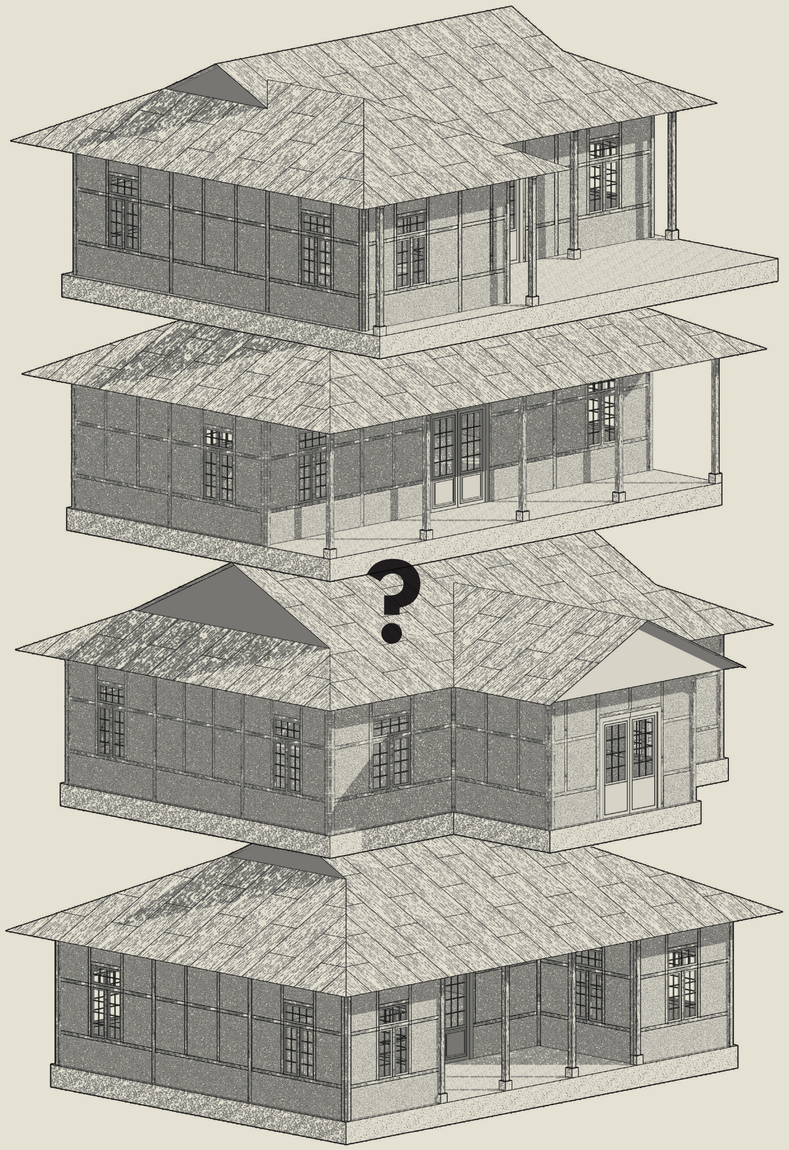
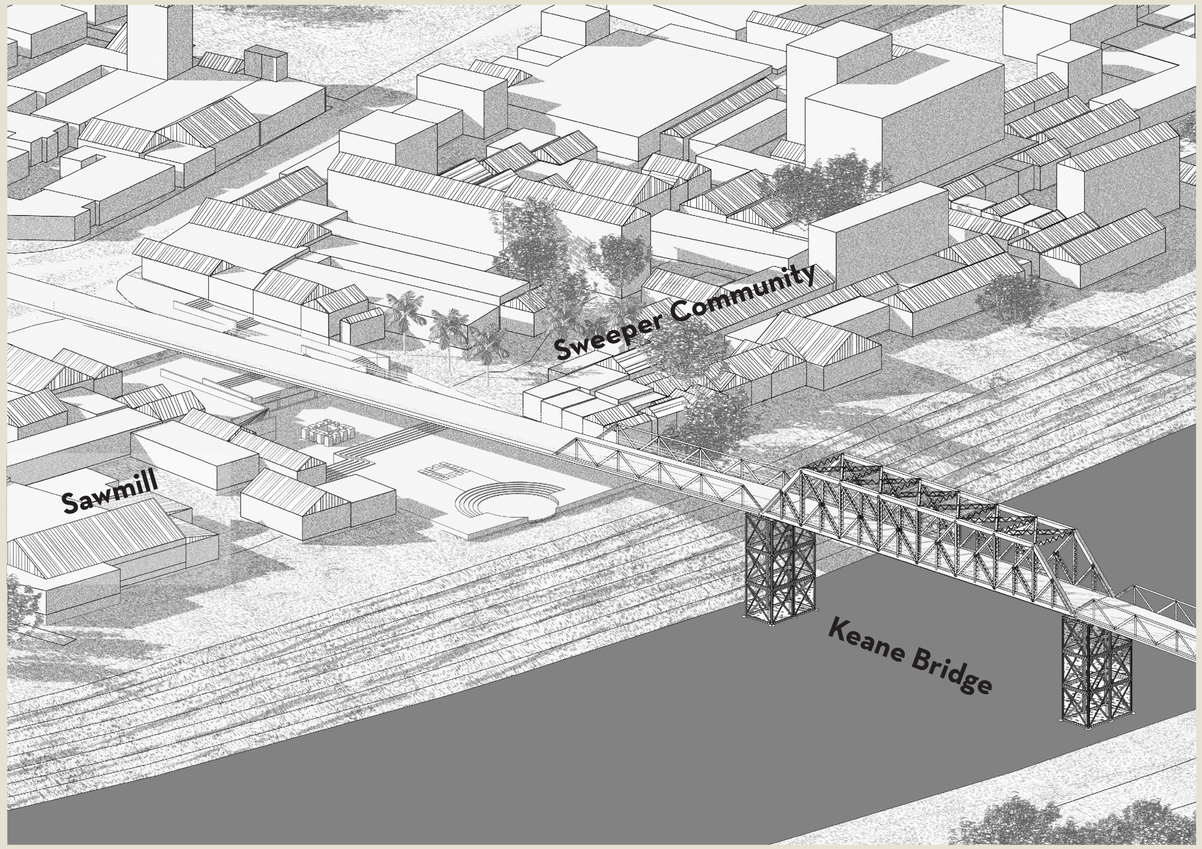


The Site




Sweeper Community
Sawmill
Keane Bridge

The Keane Bridge





Photo by Joëlle Steendam



Photo by Joëlle Steendam



Photo by Joëlle Steendam

The Sweeper Community





Photo by Joëlle Steendam



Photo by Joëlle Steendam



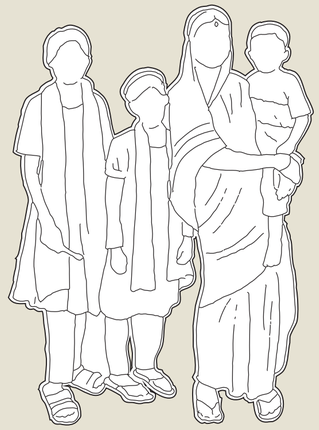
The Hindu Shrine



PROGRAM

Currently On Site

25 *Hindu "Sweeper" Families*



40 *Muslim Families*



Funding and Stakeholders

The construction cost per square meter is estimated at BDT 30,128 or $250. This is significantly lower than an equivalent single storey building due to economies of scale and given that much of the cost goes towards the foundation construction. This is because of the alluvial soil condition which has a low bearing capacity. Loans will be provided to low-income families by Grameen bank which specialises is small loans without requiring collateral, something which no other major bank was prepared to provide and won it the nobel peace prize in 2006. Profit from the medium and higher income families will help to carry the costs of the low income families. Government subsidy will be provided in return for developing the riverbank, rehousing the sweepers and giving the area near the iconic Keane bridge a more 'metropolitan' character. A portion of the smaller units of the scheme can also secure revenue as student housing, of which there is a shortage in Sylhet, for local universities such as Shahjalal University of Science and Technology and Sylhet Agricultural University.

Stakeholders

The stakeholders are to include the existing occupants of the site who should have a significant say in determining the design of their future dwellings. The project will seek to attract further low- and middle-income families for the clusters and the riverbank development. High-income families will move into the apartments in the towers and their fincancial contribution will support the overall project. It is envisaged that the local government will also invest in the scheme, having an active interest in the development of a site central to the city and adjacent to the iconic Keane Bridge. Their support is contingent upon development of flood protections as part of the scheme. The project also requires collabration with the Bangladesh Railway Company and the local highway authority who are responsible for the upkeep and maintenance of the Keane Bridge.

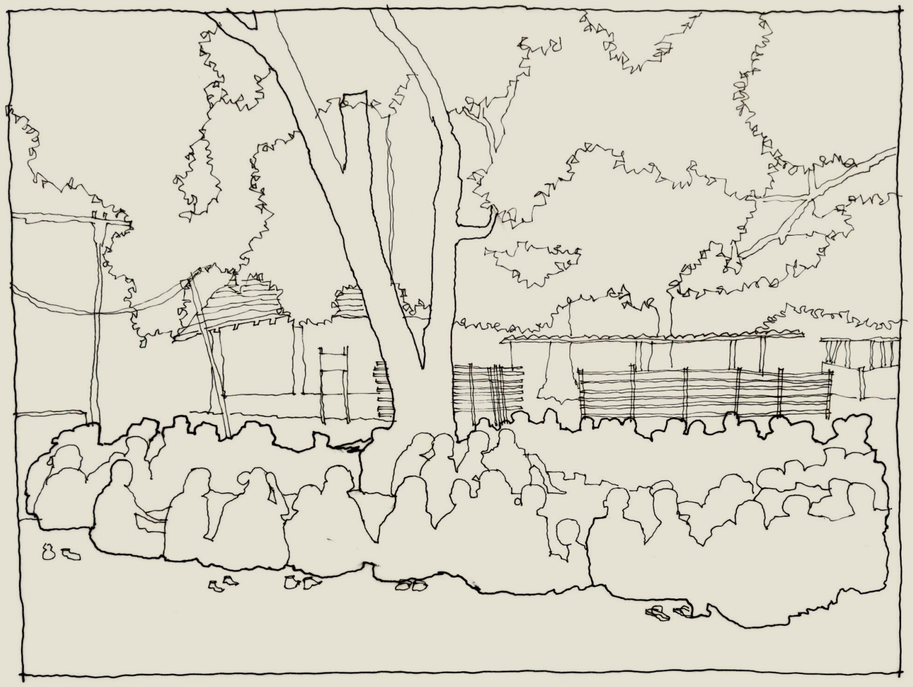
GSI and FSI

40 sqm per 'single' unit
804 units => 32160 sqm
Ground Floor and Mezzanine 32 sqm per 'single' unit
160 units => 5120 sqm
Total: 37280 sqm

Site Area: 22500 sqm

FSI = 1.67

GSI = 0.13



সালিস **Shalish and Uhtan** (69, 115, 126, 168, 171)



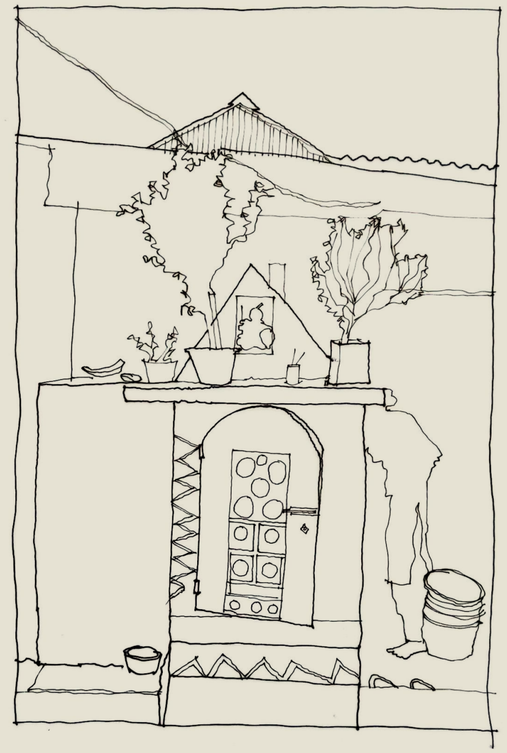
Self-Governing Workshops (41, 80, 83, 146, 157)



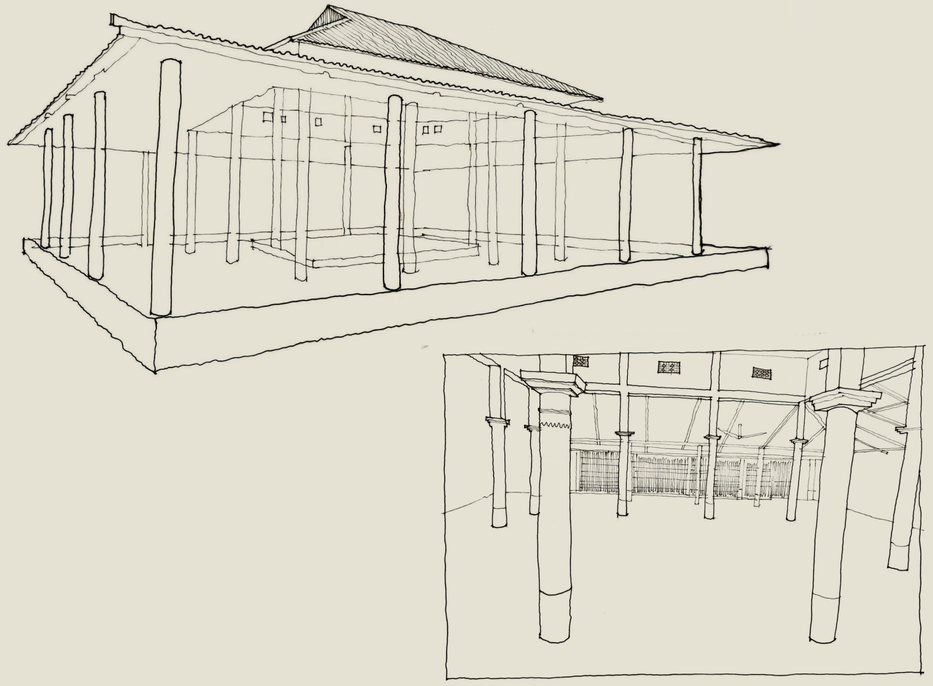
Children's Realm (18, 57, 68, 86, 137)



Quiet Backs (36, 37, 38, 59, 69, 100)



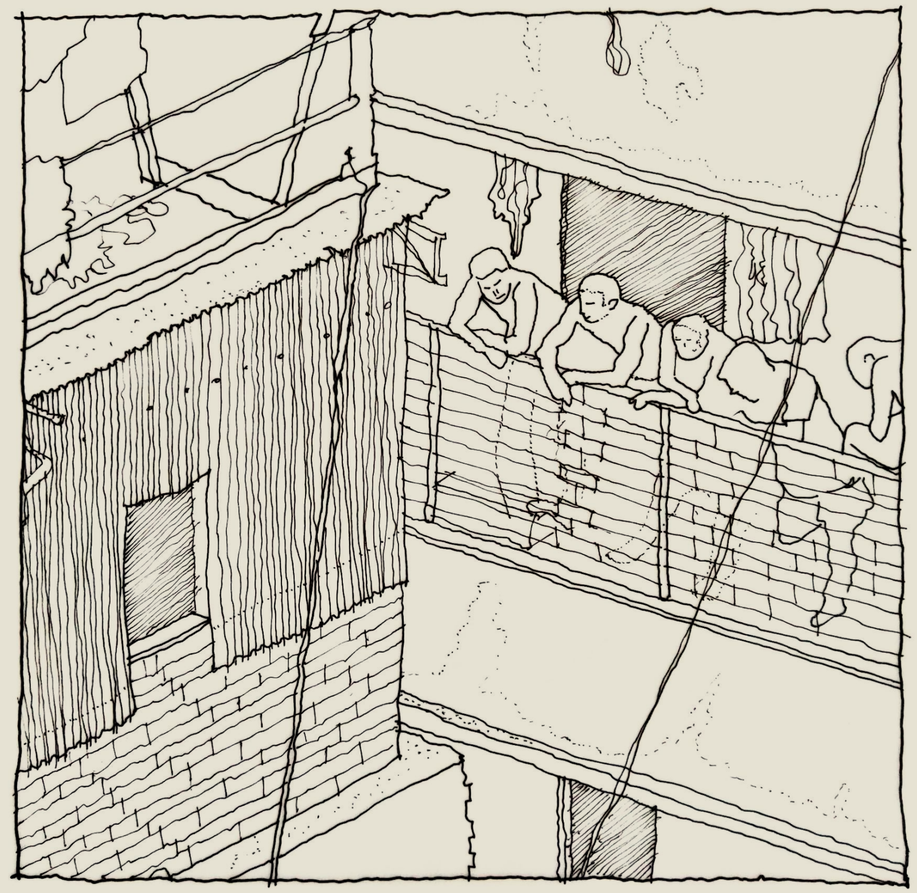
Sacred Place (24, 59, 66, 67)



Outdoor Room (67, 95, 108, 115, 126, 129, 163)



Open Staircases ()



Balconies ()



Access to Water ()

Principles

সালিস Shalish and Uhtan

The by creating successful courtyards (uhtans) the pattern of the Shalish can take place, it is supported by these patterns:

a. Roughly square shape

- This facilitates gatherings which tend towards a circle or semi-circle in shape
- In the rural context, the threshing of grain also often occurs in the uhtan where cows are made to walk in a circle on top of crops to separate grain from straw
- Square and rectangular courtyards are easier to work with when agglomerating buildings into clusters

b. Open corners

- Open corners improve ventilation through the courtyard which is crucial in the hot climate
- They can be hinge points allowing the angles of the courtyard corners to adjust without this directily altering the buildings
- A degree of openess is beneficial to the life of a courtyard, as it allows glimpses of the world beyond (see APL 115 Courtyards which Live)

c. Verandah or Arcade

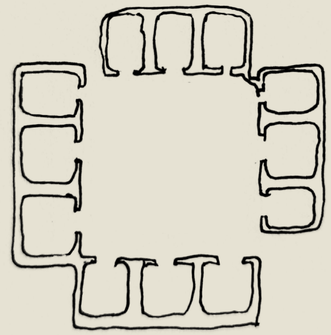
- Verandahs and arcades provide useful outdoor spaces for work and circulation that mediates between the interior and exterior of buildings. By being covered, they are shielded from extreme weather and by being open to the air, they benefit from natural light and ventilation. Connected to a home, they can become a kind of extended living room for inhabitants. Connected to a building cluster, they can activate commerce and facilitate circulation.
- Arcades help to connect buildings with each other so that it is easier and more pleasant to circulate between them (see APL 119 Arcades and 166 Gallery Surround)

d. Shops andWorkshops

- The shops and workshops in the community can benefit from the courtyard and vice versa. Workshop activities can spill into the courtyard giving them more usable space while increasing opportunities for interaction with members of the commnity which can result in trade, innovation and skillsharing simply better communication. Shop and workshop owners can also use the privacy of the courtyards for rest and recuperation
- The shops and workshops act as 'activity pockets' for the courtyard (see APL 124 Activity Pockets)

e. Focal point

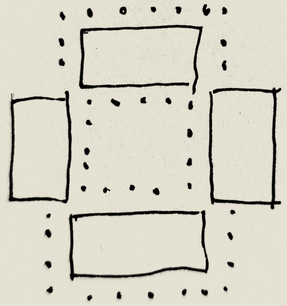
- The a shalish is typically held in the open under a large Banyan or Lychee tree, this provides shade and acts as a beautiful fulcrum to the gathering. A tree can serve this purpose, or a fountain, covered structure, or statue
- This object does not have to be exactly in the middle of the courtyard, rather it should be placed where lines of sight and circulation converge (see APL 126 Something Roughly in the Middle)



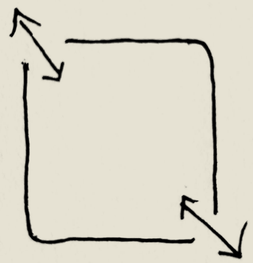
Activity Pockets



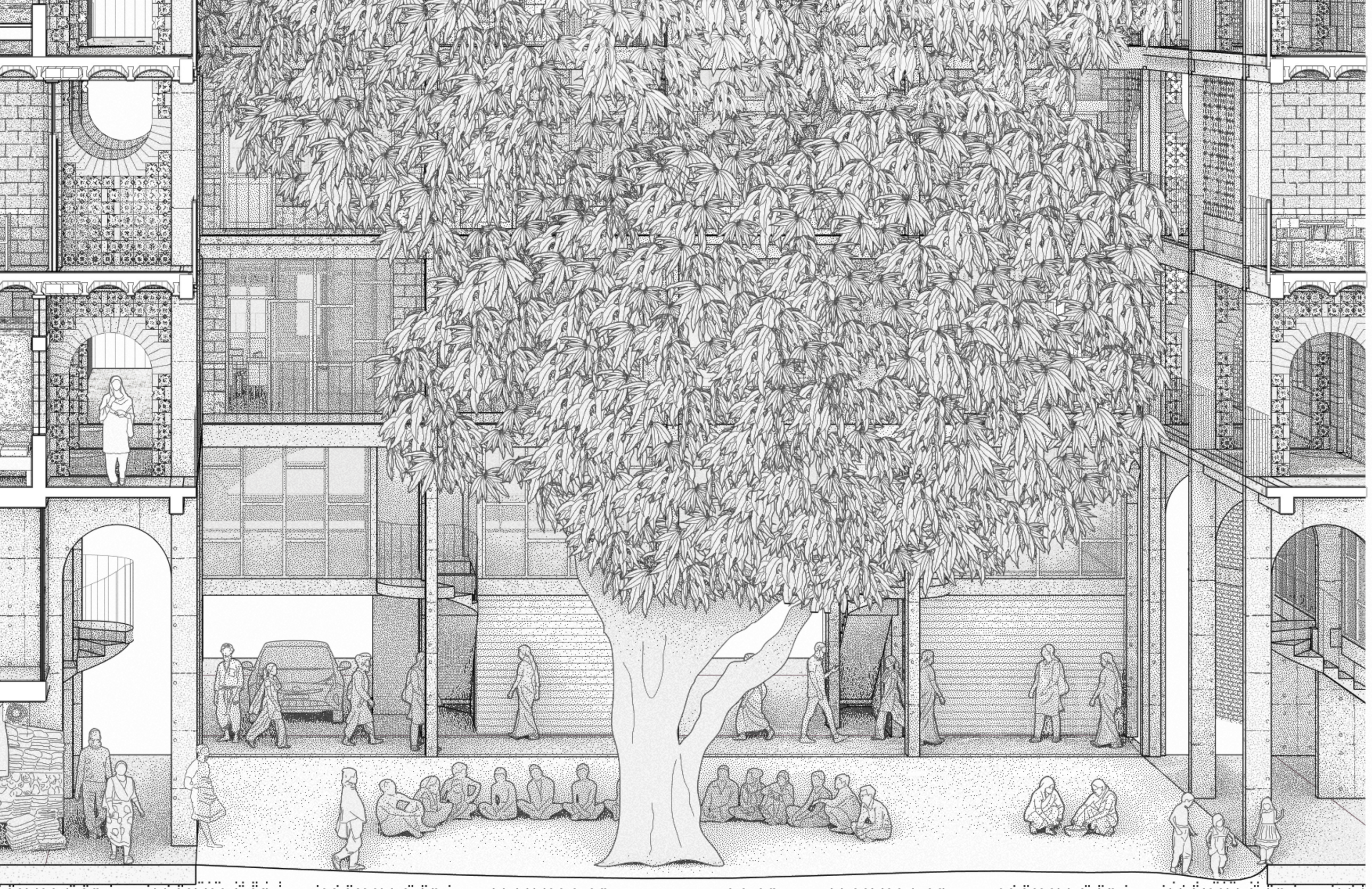
Focal point



Arcades



Open corners



Self-Governing Workshops

Creating a successful network of self-governing workshops in the community is supported by these patterns:

a. Working community

- Independent workshops benfit from clustering together into small communities of 10 or 20 at most, since if you are spending 8 hours or more at work, you want it to be as much of a community as home. These can be strengthend with the courtyard layout. (See APL 41 Work Community)

b. Courtyards and Arcades

- (see Shalish and Uhtan)

c. Self-Governing

- People can take pride in their work when they are responsible for the quality of the whole and understand it. Too often job opportunities in large organisations treat individuals like cogs in a machine. In Bangladesh for instance, the fabric and garment industry, while is in many ways outstanding, has a dark underbelly of mass-production and exploitation. Self-governing work stand against these dangers. Futhermore small self-governed work communites can adapt to changing circumstances quickly or make decisions that are out of the individual's hands in large organisations.

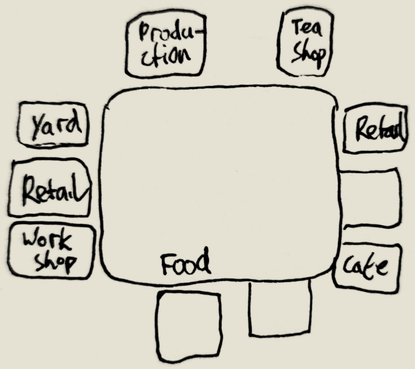
- Workshops within the community are also a great opportunity for younger members to see and learn about the trades of adults. This in turn facilitates master apprentice relationships which are a key way in which important traditional skills and knowledge can be kept alive

d. Close to home

- Work located close to home gives the worker more freedom and flexibilty over his time, especially in dense urban areas with traffic congestion.

e. Access to the street

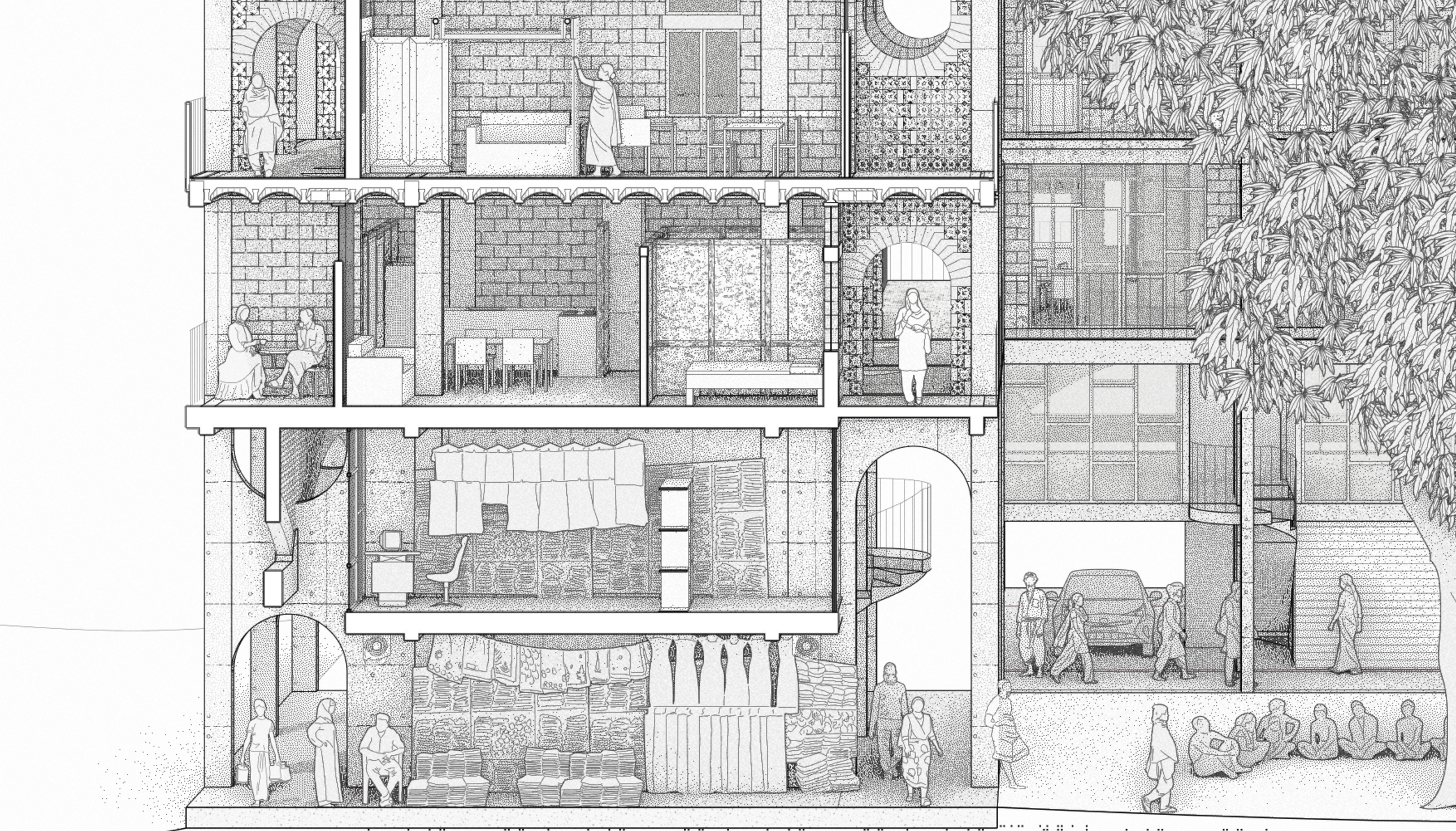
- Having a direct link to the street is important to facilitate commerce



Working community



Working community



Children's Realm

Creating a successful children's realm in the community is supported by these patterns:

a. Learning in the community

- Young people do not only learn in school. In fact the school setting can reinforce a passive mindset where the child is being taught without actively choosing to learn. By distributing learning opportinites in the community children can be more creative and active in learning. This is facilitated by *Self-Governing Workshops* in the community.

- Without being able to explore the world of adults, children cannot become adults, as such linking the childrens realm with the community and the wider city is important (see APL 57 Children in the City).

b. Neighbourhood watch

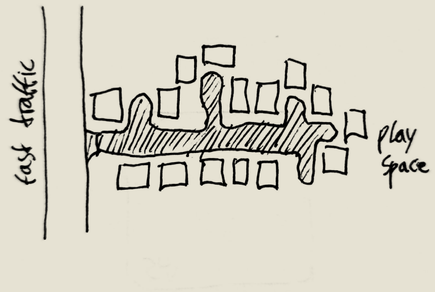
- To facilitate learning in the community, children must be able to move through it safely, yet their parents cannot accompany them at all times (and even if they could this would hamper their ability to develop independence). Therfore design of the community must involve plenty of opportunities for passive surveillance, so children are never without adult supervision. This can be facilitated by *Quiet Backs* and well defined *Uhtans.*

c. Connected web

- To futher enhance childrens ability to explore safely it is advisable to connect multiple homes by areas of common land, gardens, paths etc. that do not cross busy traffic routes



Neighbourhood watch



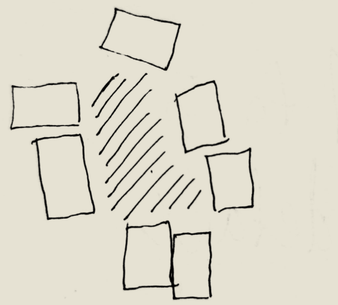
Connected web

Quiet Backs

Creating quiet backs where community members can feel at home, is facilitated by these patterns:

a. Clustering

- Having privacy in one's own home is one thing, but to feel truly comfortable most people desire to be able to control their immediate surroundings with neighbours who they know and trust. In a survey by Herbert Gans in *The Levittowners* (New York: Pantheon 1967), he found that in a typical neighbourhood block, all participants engaged in some pattern of visiting their neighbours and 93 percent of the visits were within the immediate cluster of the five closest dwellings. They survey appears to confirm not only the strong desire for neighbouly ties but also the markedly spatial nature of these social links. The immediate circle of dwellings is by far the most important when it comes to neighbourly ties. Therfore arranging dwellings into clusters of no more than 12 around shared spaces accessible to all helps to foster community. This clustering can be facilitated by well designed *Uhtans*. In the existing sweeper colony, the narrow alleyways serve this function. (See also APL 37 House Cluster).



Clustering

b. Galleries

- In high rise buildings the connection to the ground is not immediate enough for it to facilitate clustering as described above. But shared circulation spaces can serve this function similar to the alleyways in the sweeper community. The galleries benefit from similar design principles as the *Arcade*. They should be wider than what is necessary for circulation alone, providing seating and room for work and social activities to spill out of the home.

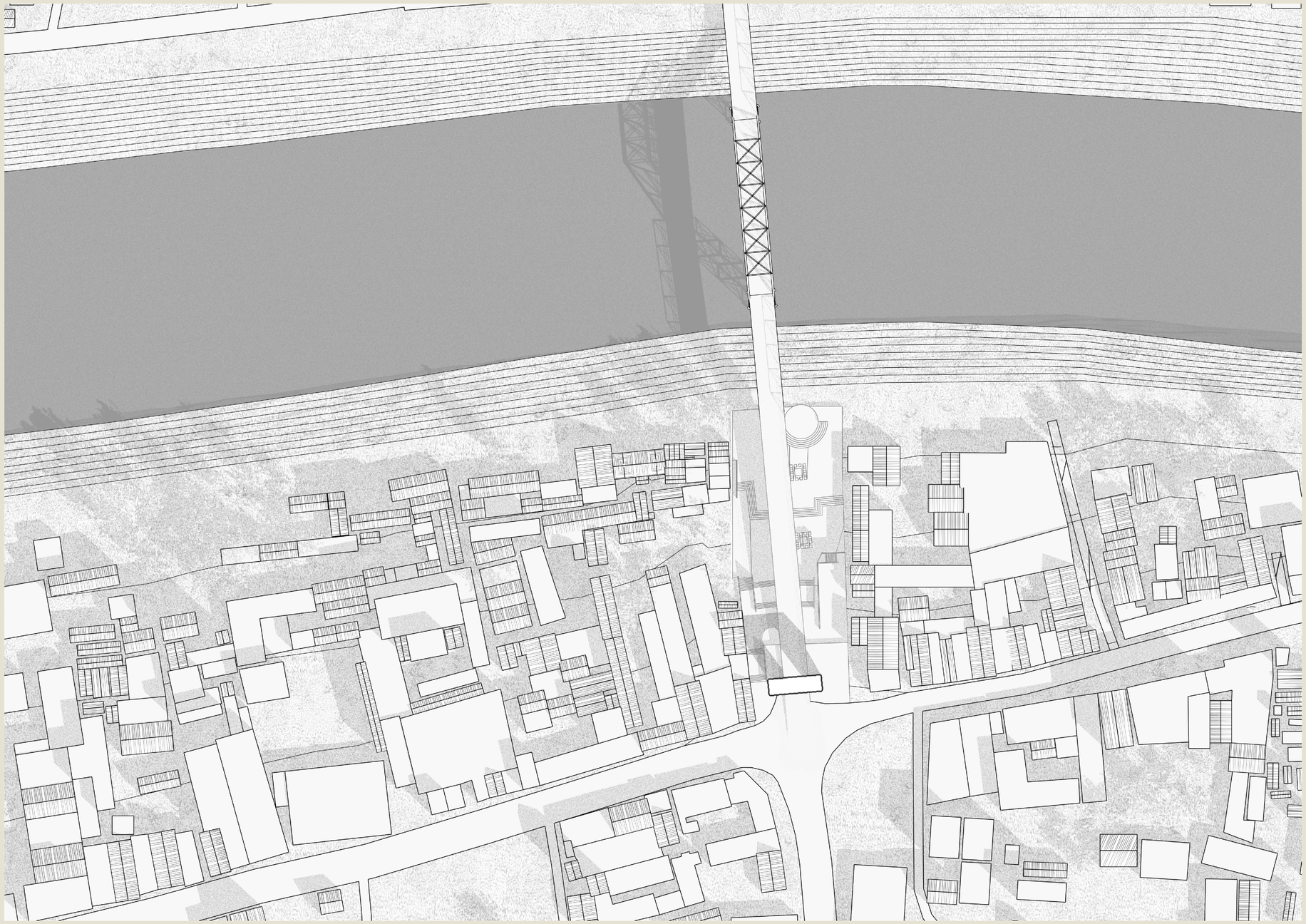


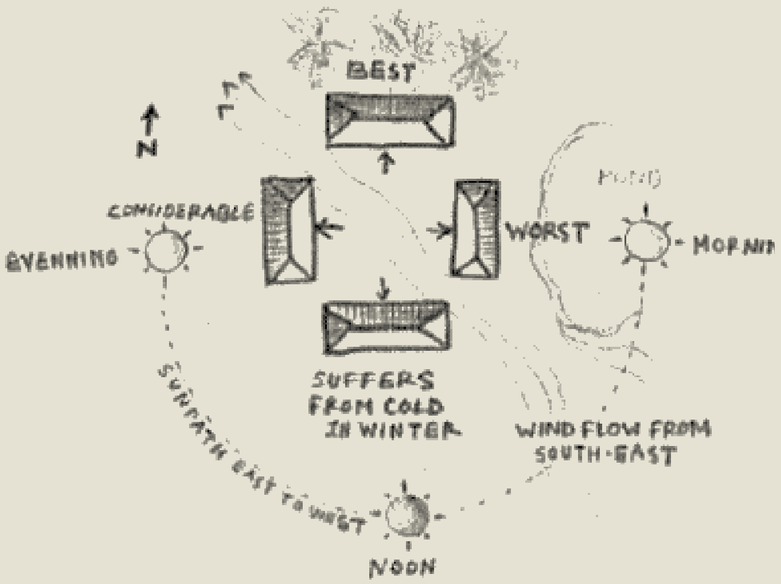
Galleries

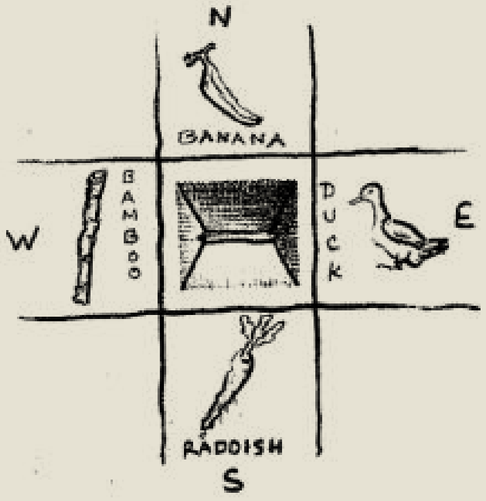
c. Shielding and privacy gradient

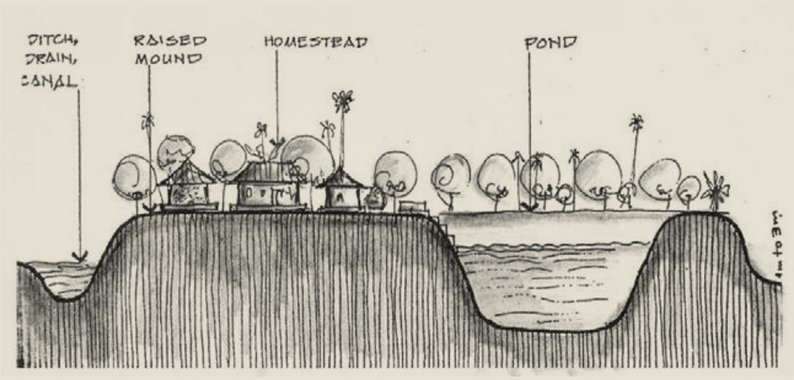
- To create communal areas where the inhabitants feel at home, they should be shielded from the noise and hustle and bustle of busy streets. Then they can serve as places of rest for workers or busy family members. The *Uhtans* can serve this function. Furthermore the design of the *Connected Web* which helps children to explore the community can also serve as *Quiet Back* spaces for the community.

- By creating a privacy gradient between the interior of the home, the galleries, the inner courtyards, the side alleyways and the roads and the open squares, the outer and inner worlds of the community can peacefully coexist.



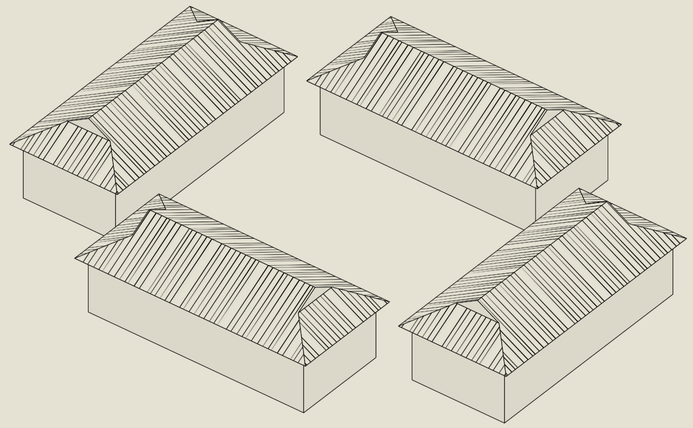


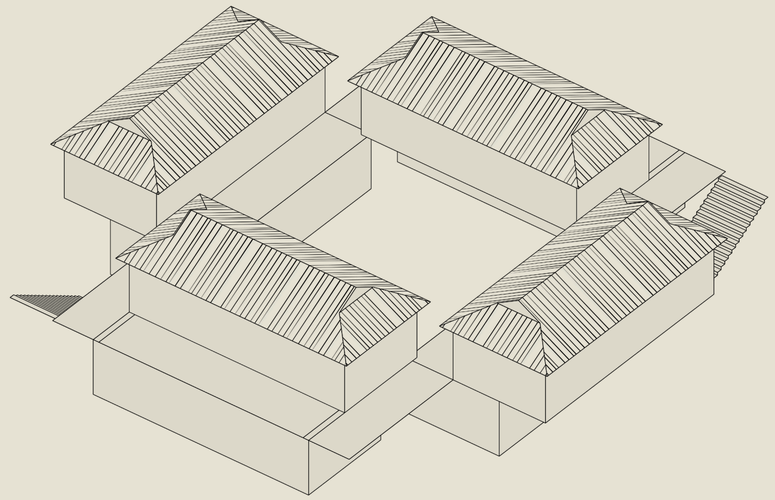


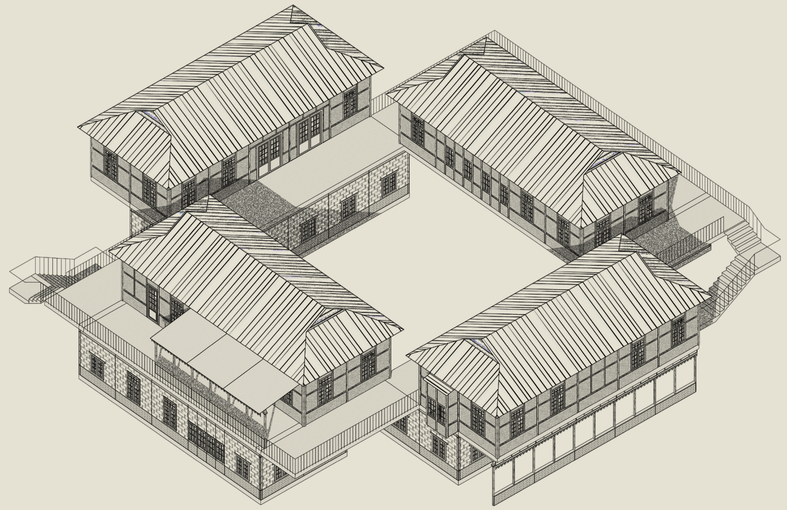


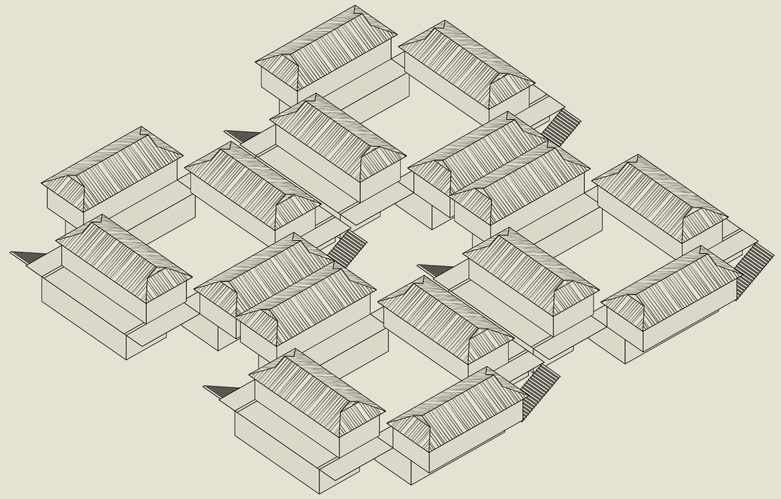
[দক্ষনি দুয়ারী স্বর্গ বাস
উত্তর দুয়ারী সবগনাশ
পূর্বগ হাঁস
পক্ষরি্ বাাঁশ
পূর্ব হাঁস, পক্ষরি্ বাাঁশ
উত্তর্র ববর্ (কলা),
দক্ষরি্ বর্ে,
ঘর কর্র্া বপাতা জুর্ ।।].

Duck in the East,
Bamboo in the West,
Banana in the North,
Left empty in the South









Hindu Shrine
and Mature Tree

Lumberyard

Varthokhola Square

Local Mosque

Site Axes

Rigid Grid

Views to River Obstructed

Third cluster too close to mosque

Cannot define a strong facade to the street. Quality of this space undermined by noise and traffic

Cannot fit full cluster between bridge and Lumberyard

Cannot fit two full clusters beside Keane Bridge

Adjusted Grid

Views and breeze from
South unobstructed

Room for parking
near mosque

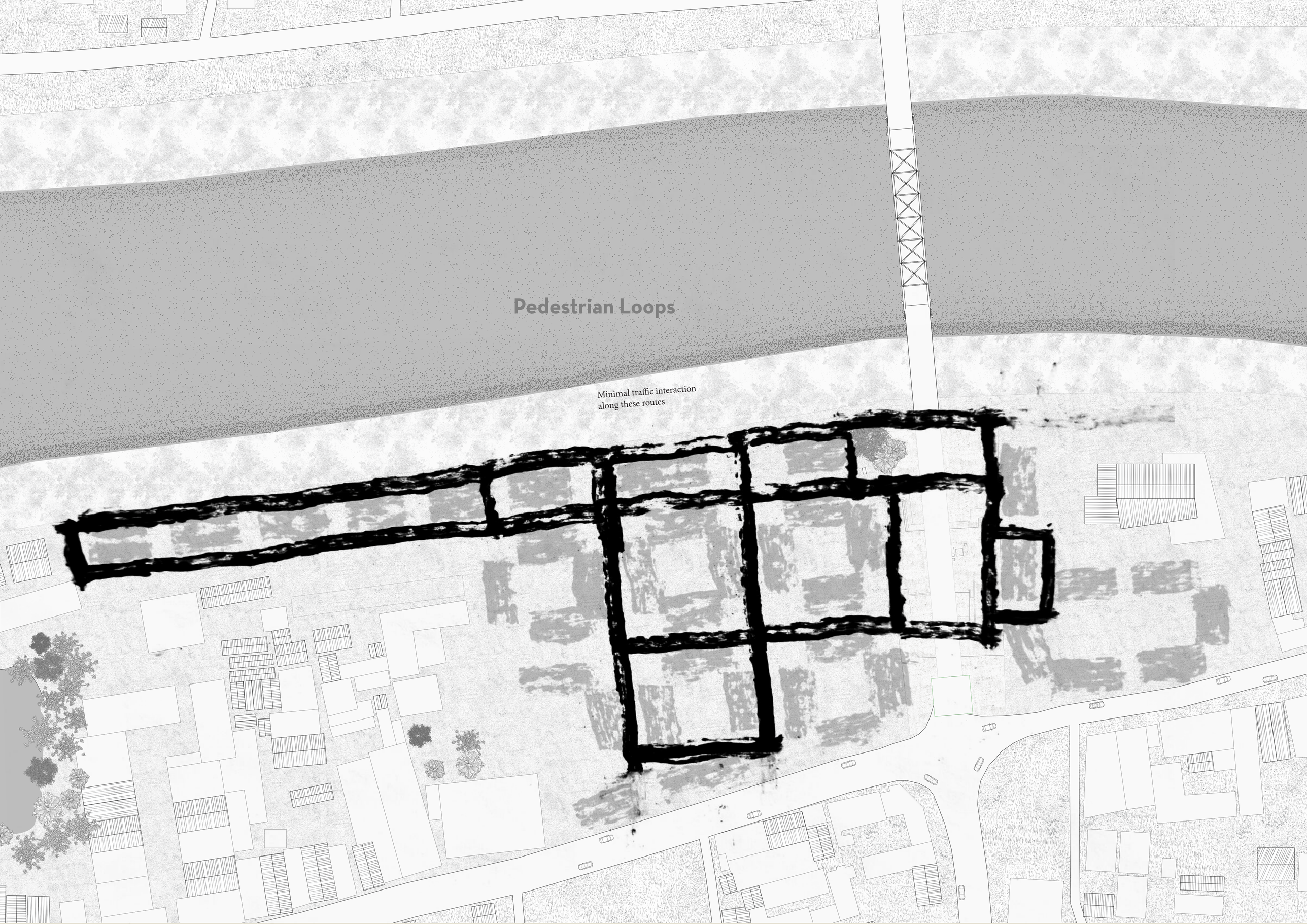
Adjusted angle allows for
better definition of street
facade w/o setbacks

Wider area beside
bridge at intersection

Vehicular Access

Access beyond this
line to the East only
on market days

Parking zones

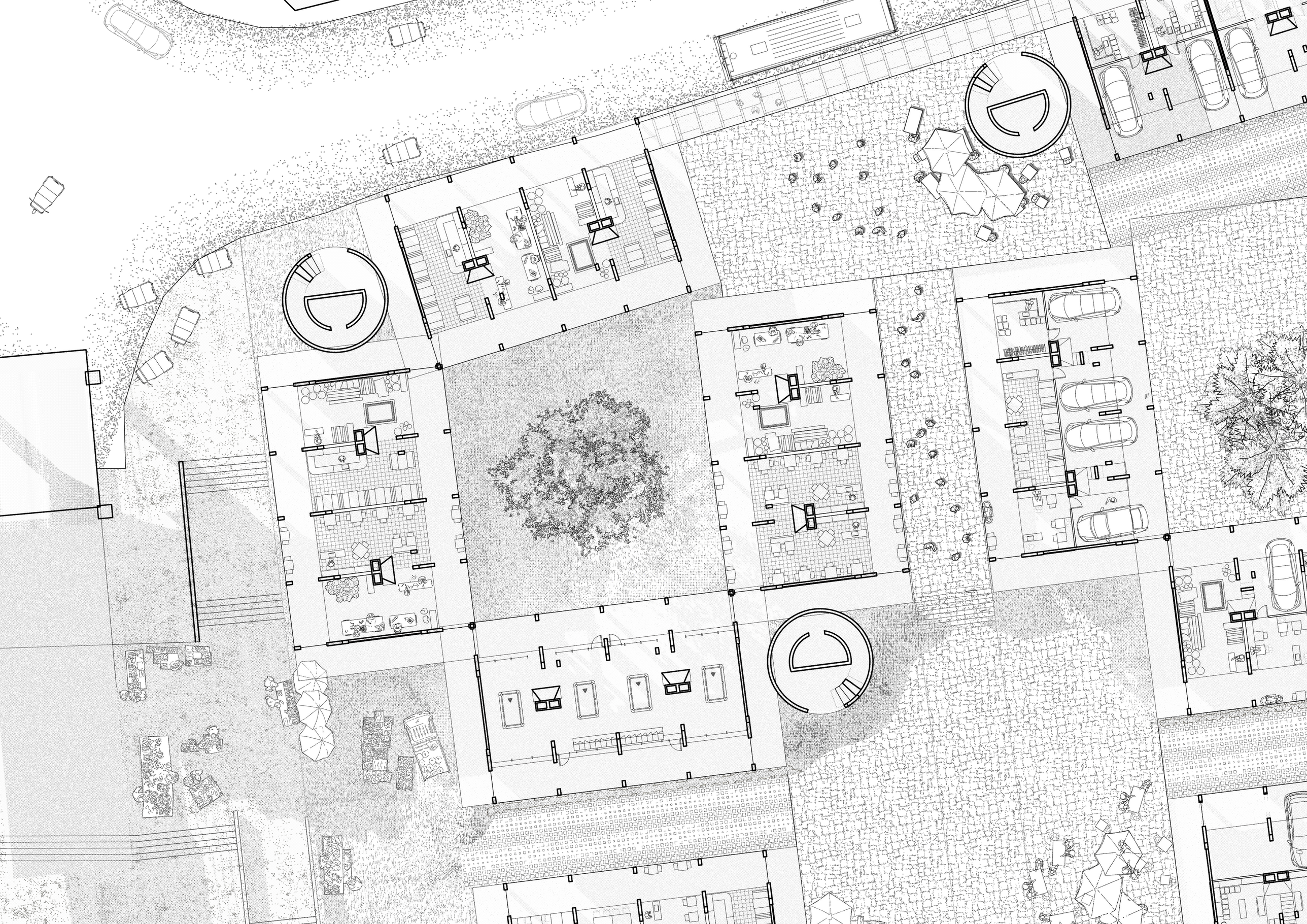

Pedestrian Loops
Minimal traffic interaction
along these routes

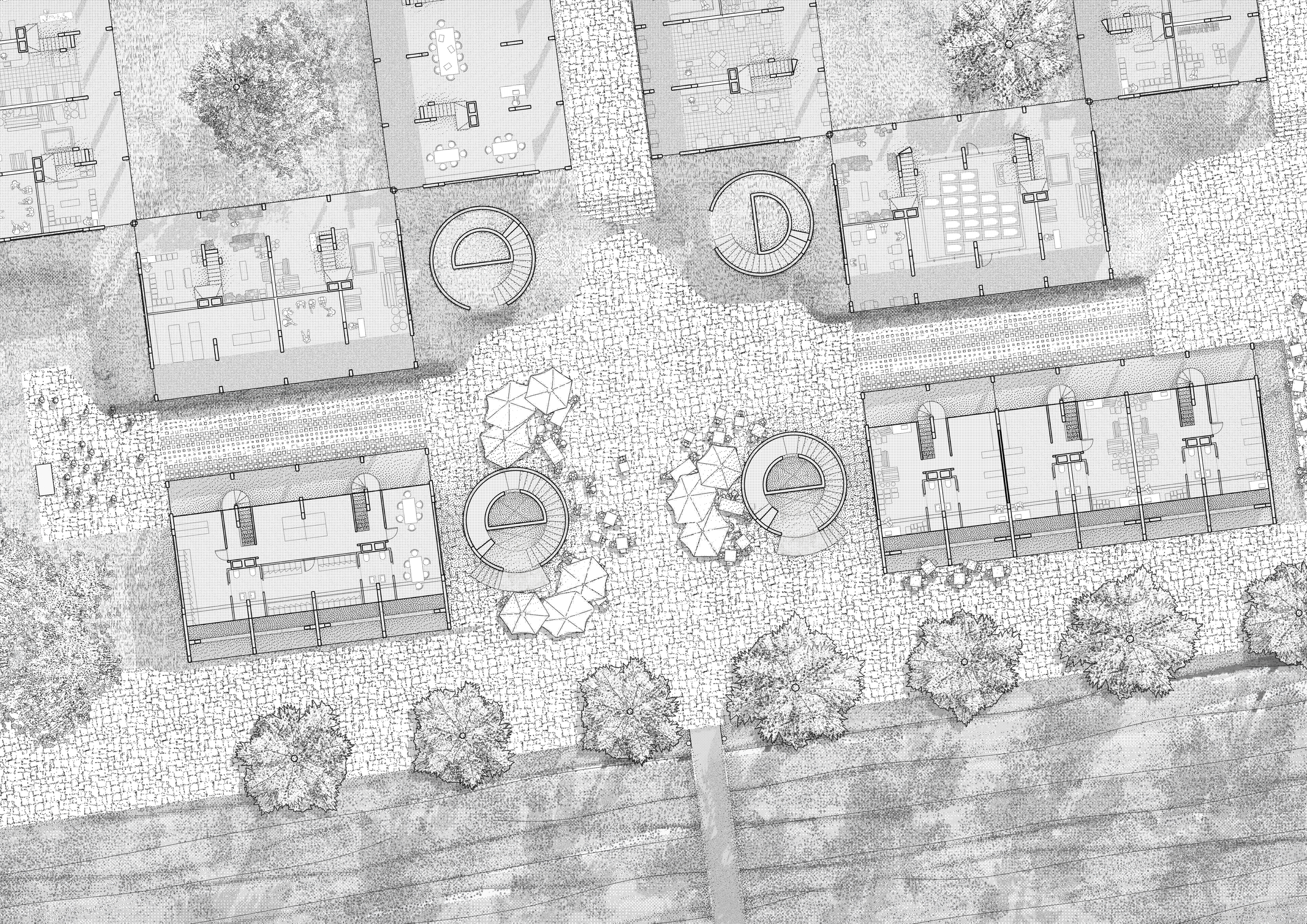


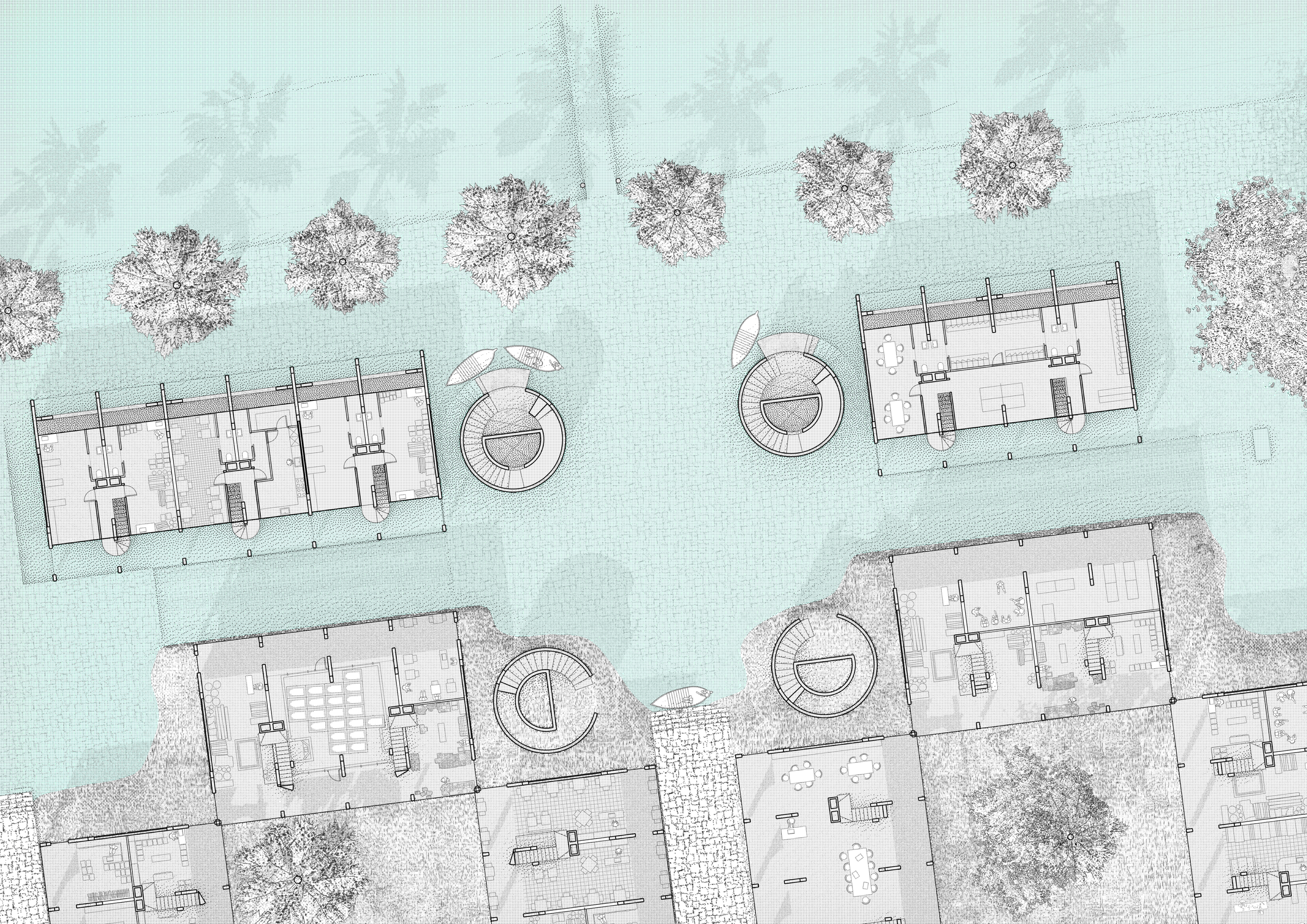


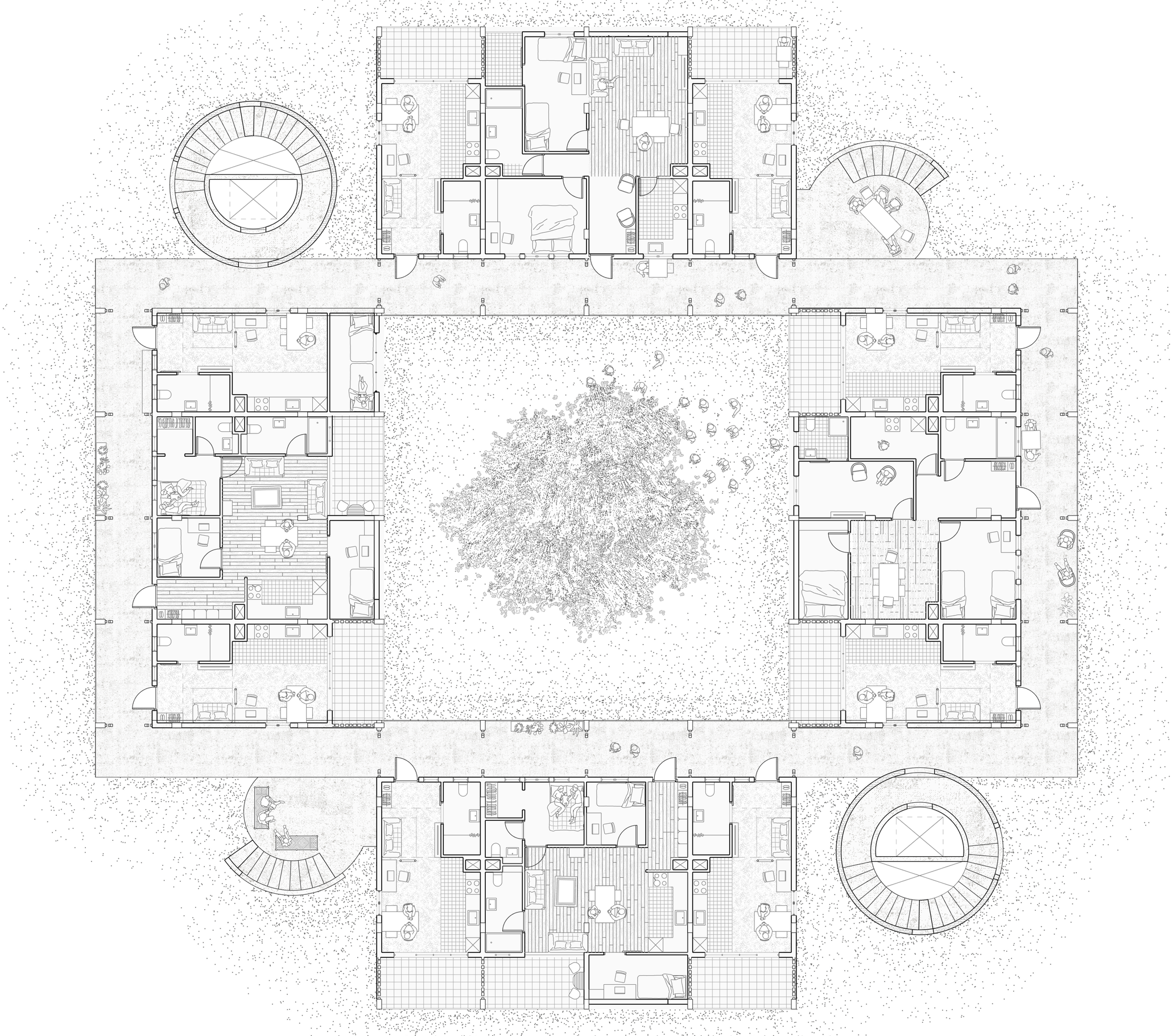


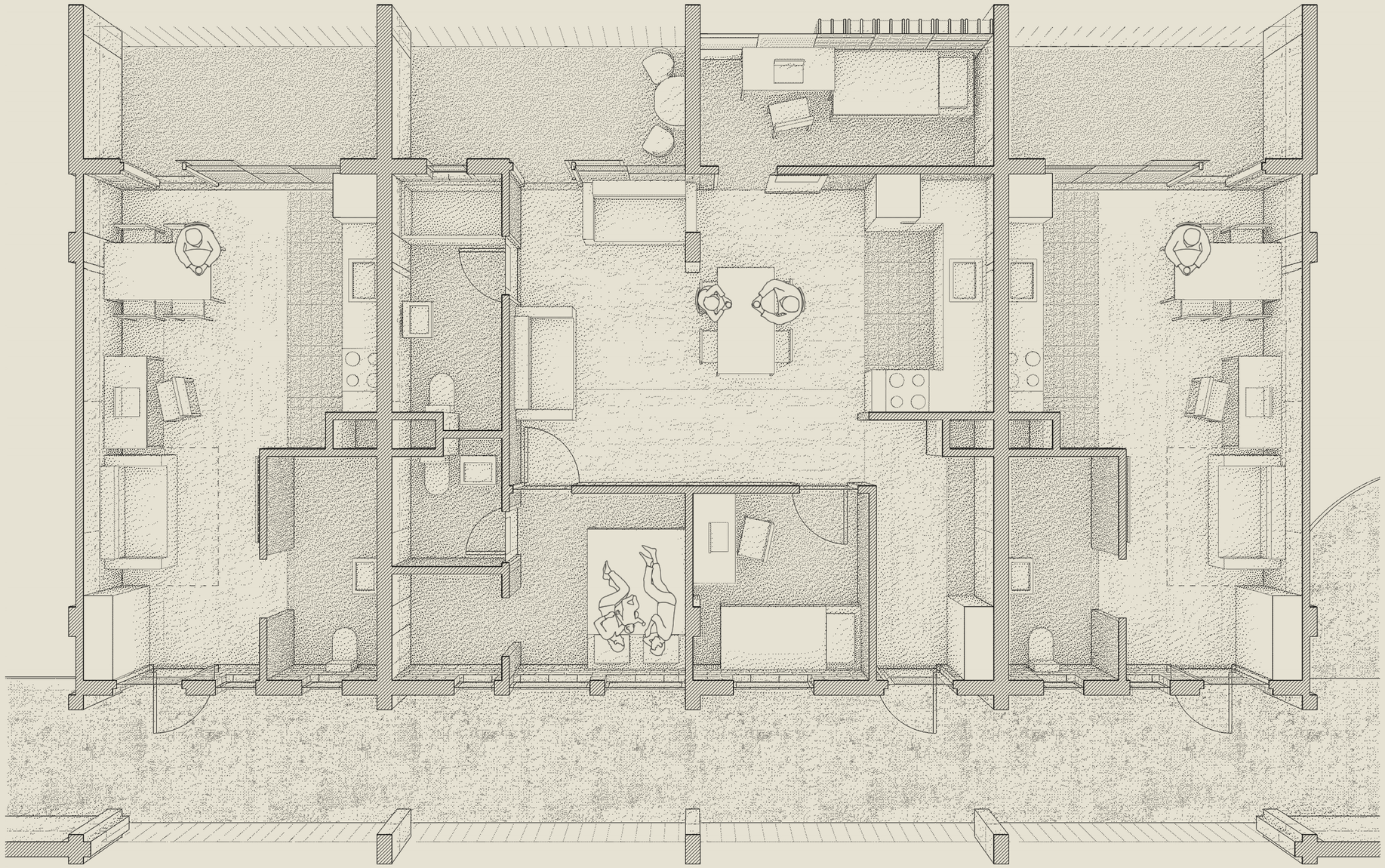


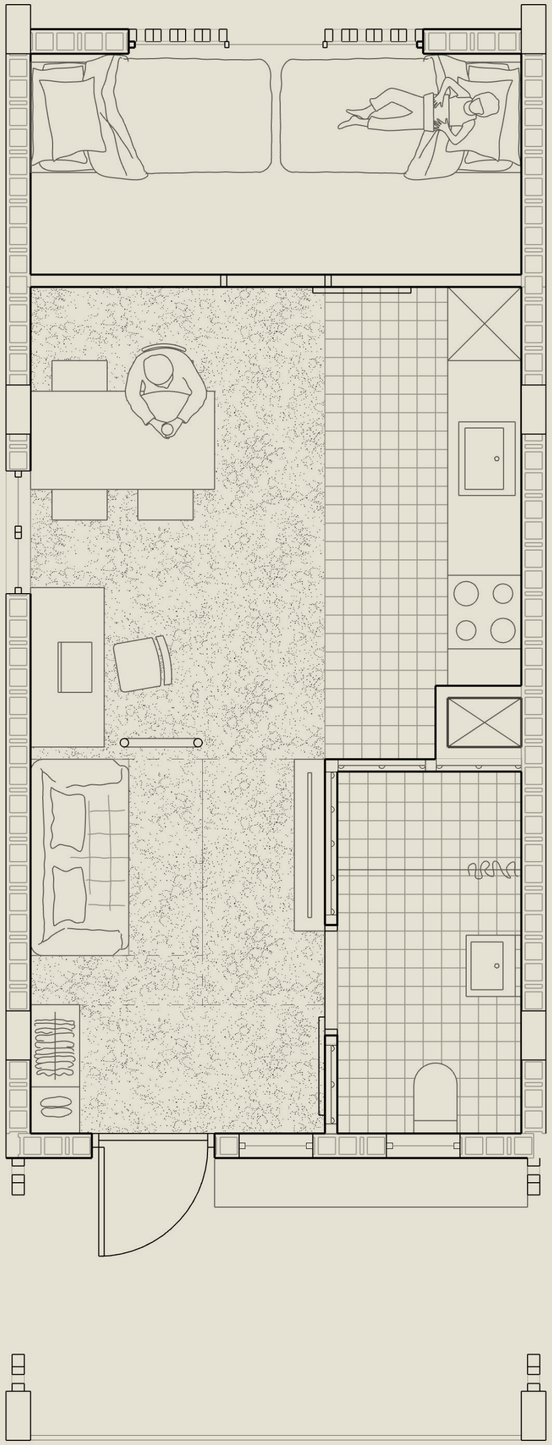


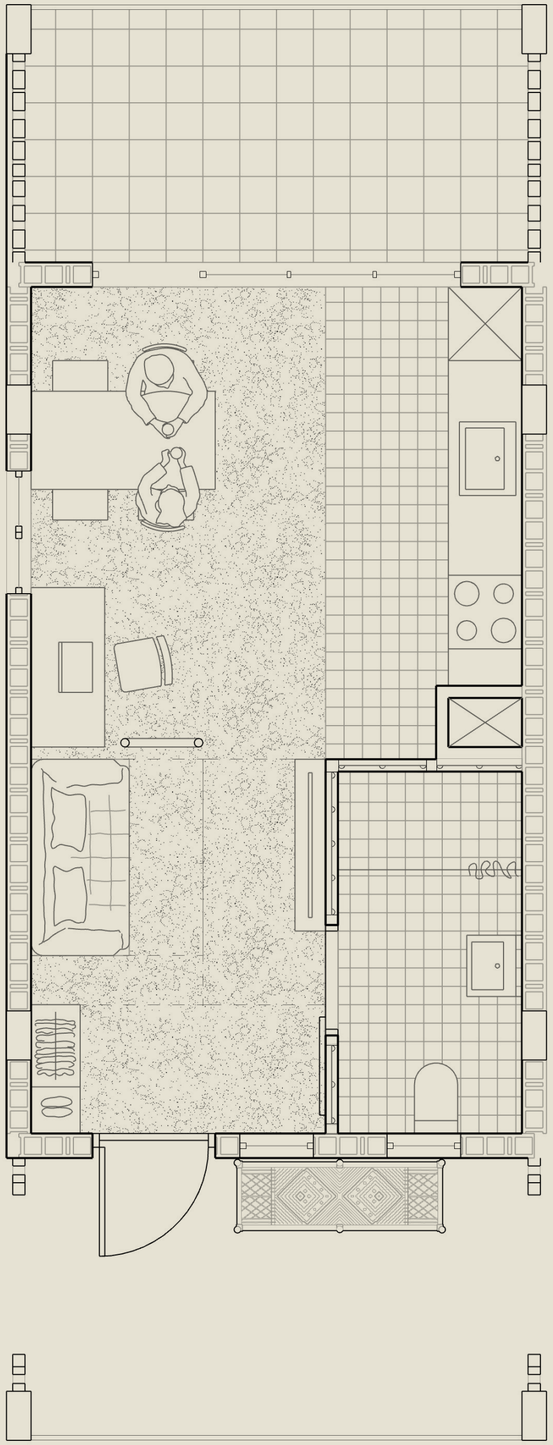






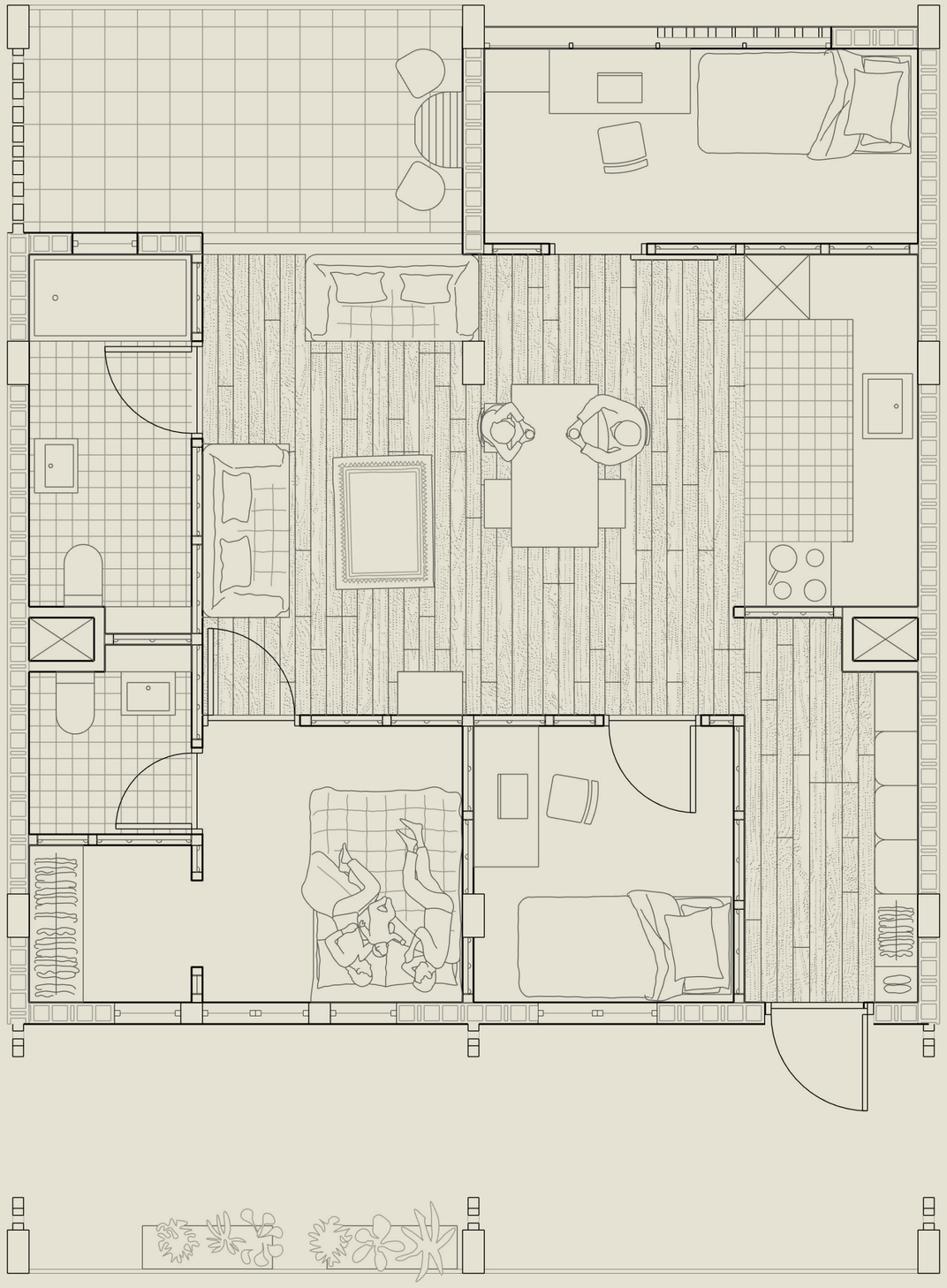






GLOBAL HOUSING

TUDelft | Architecture and the Built Environment



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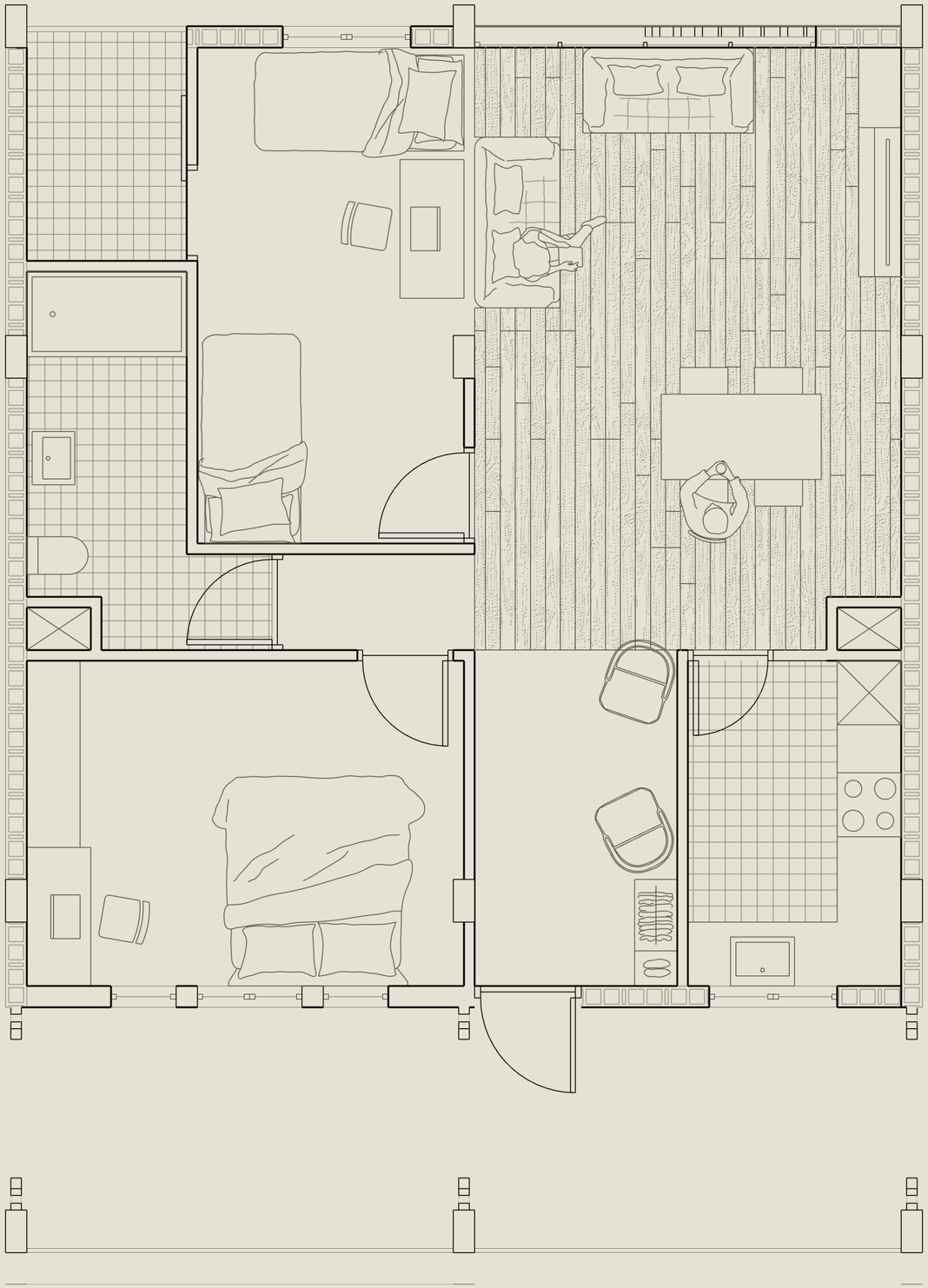
TUDelft | Architecture and the Built Environment



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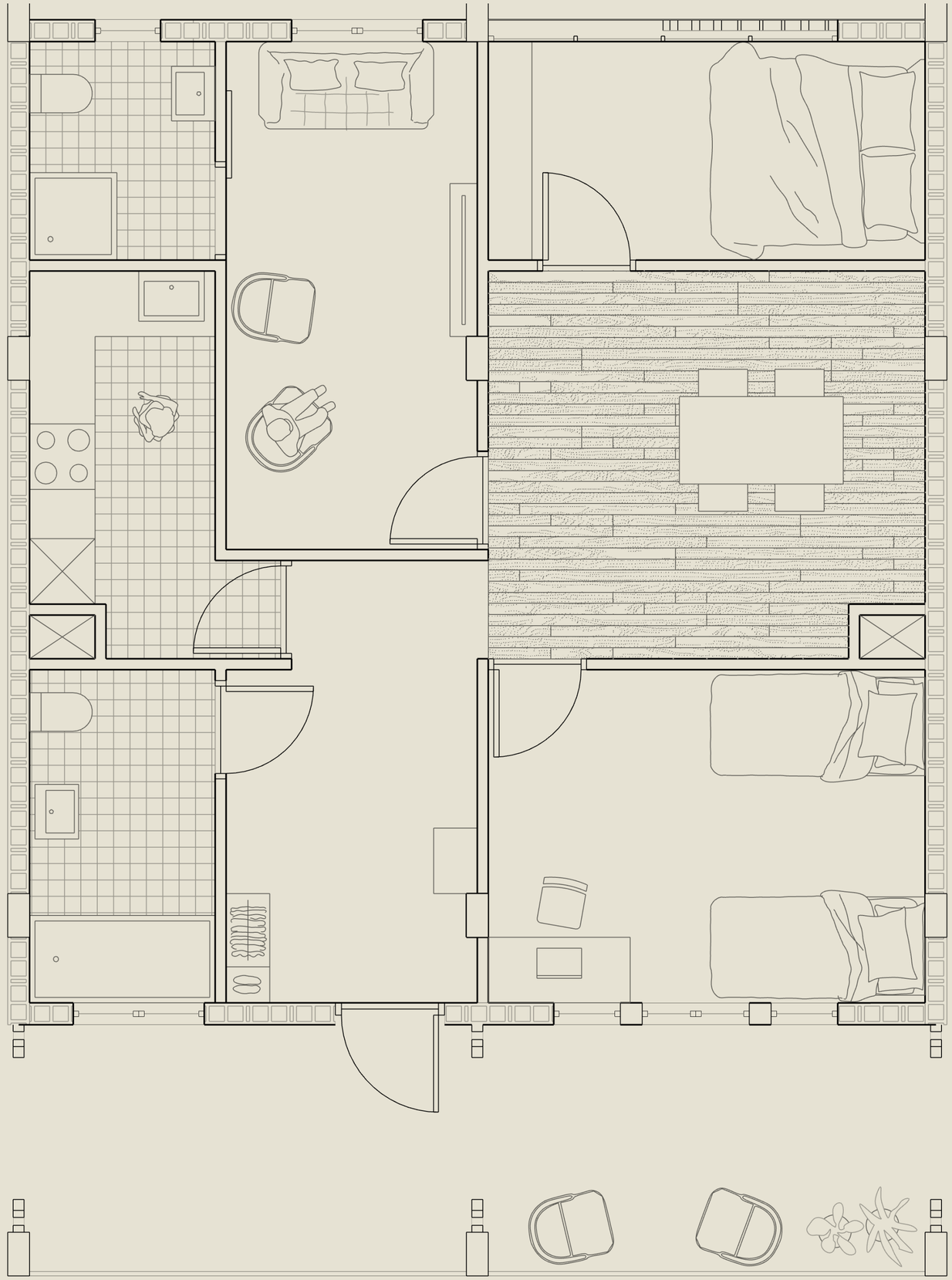

GLOBAL HOUSING

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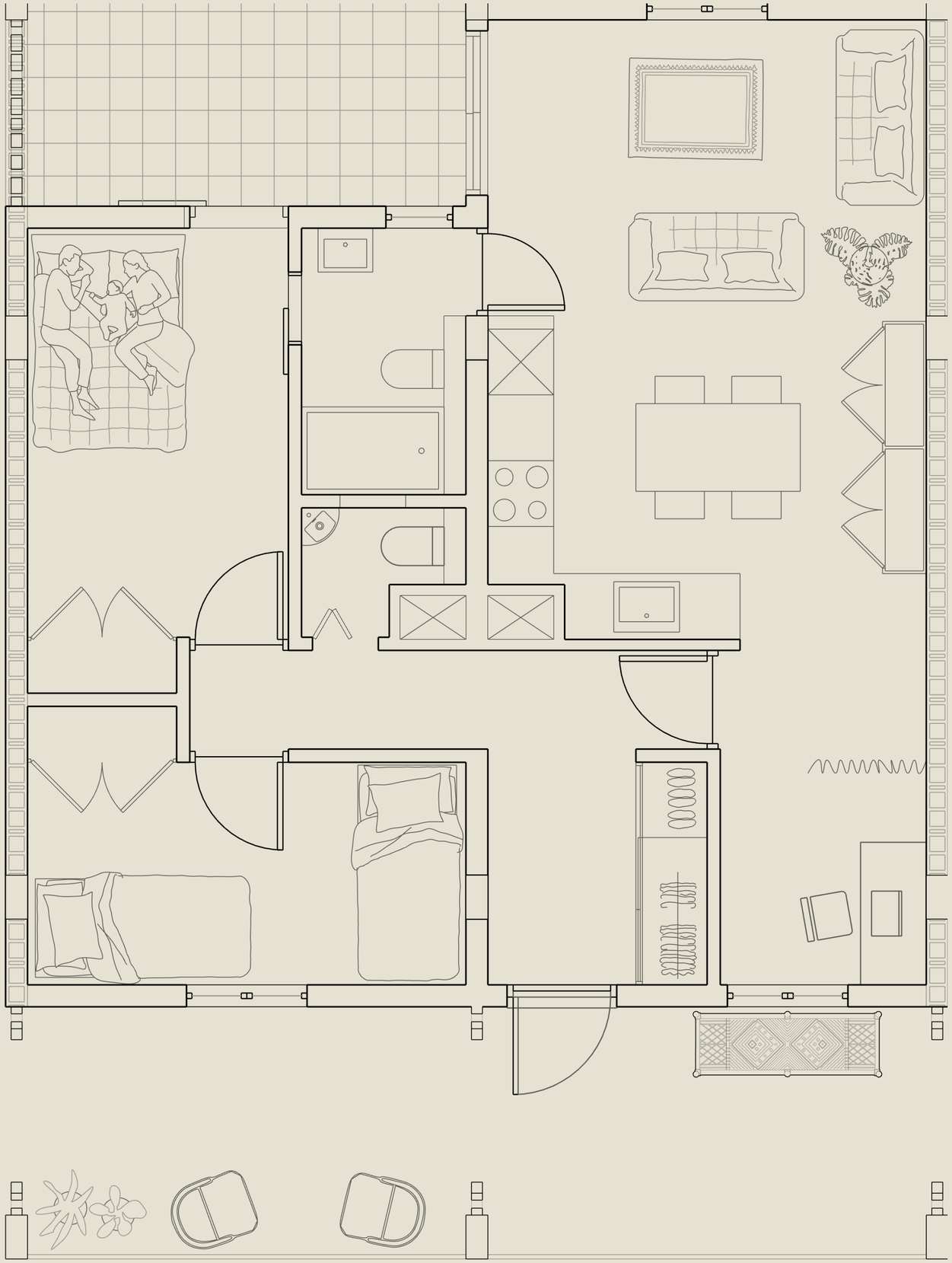

GLOBAL HOUSING

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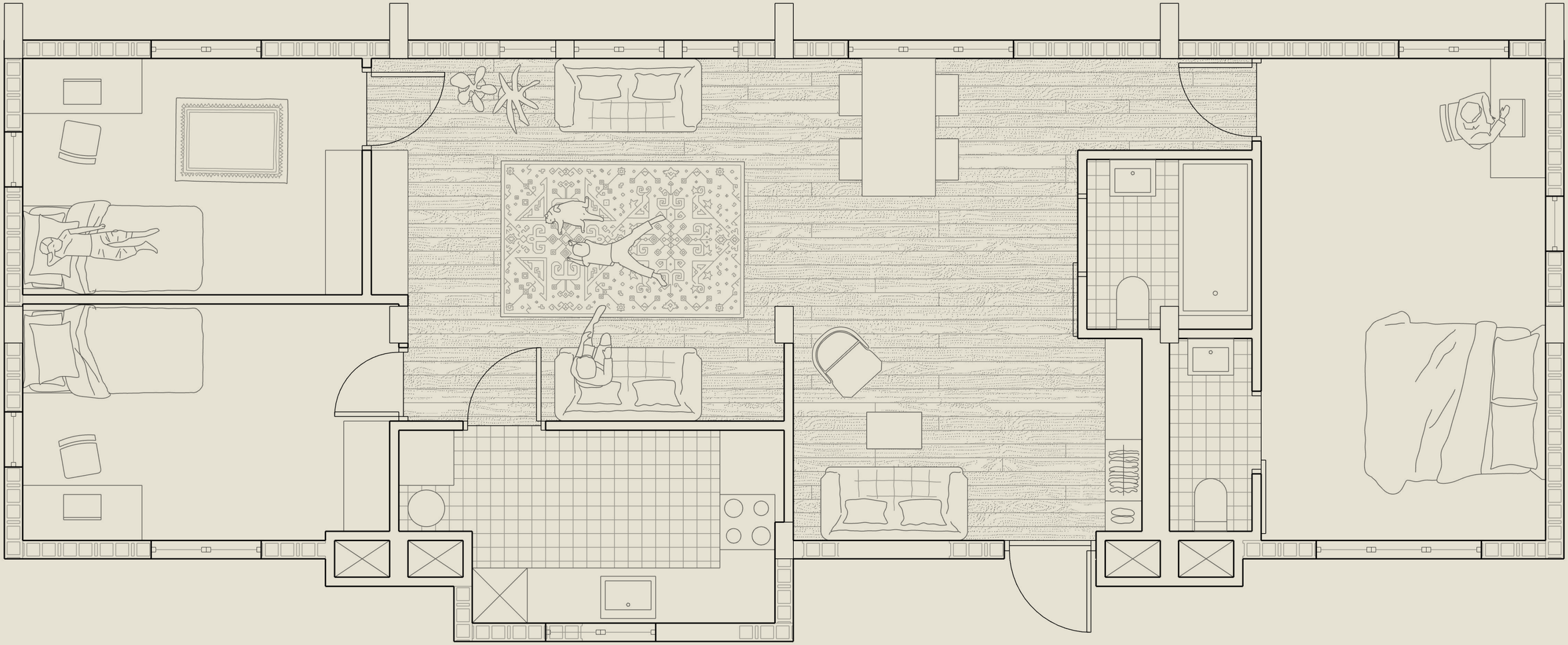

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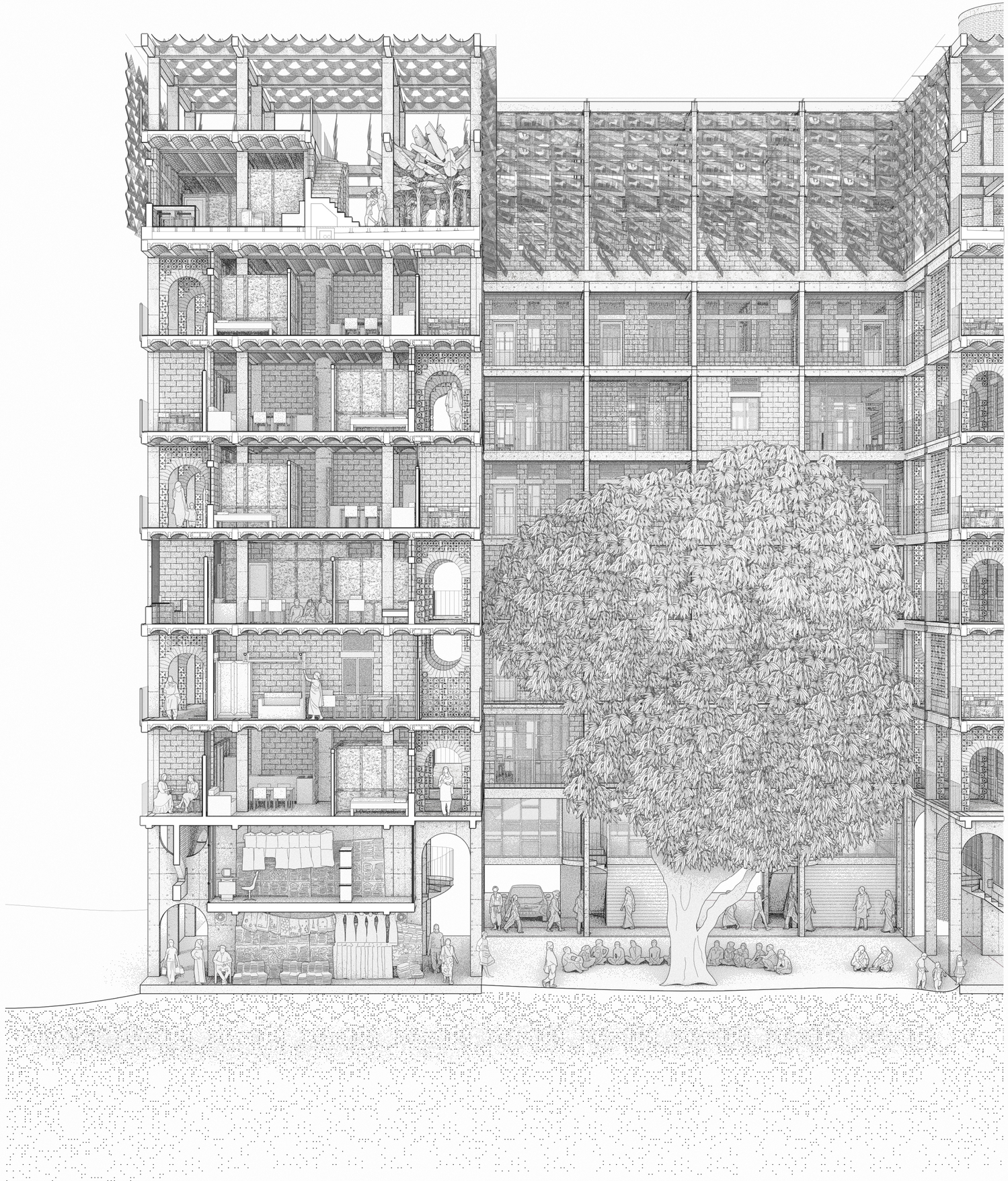
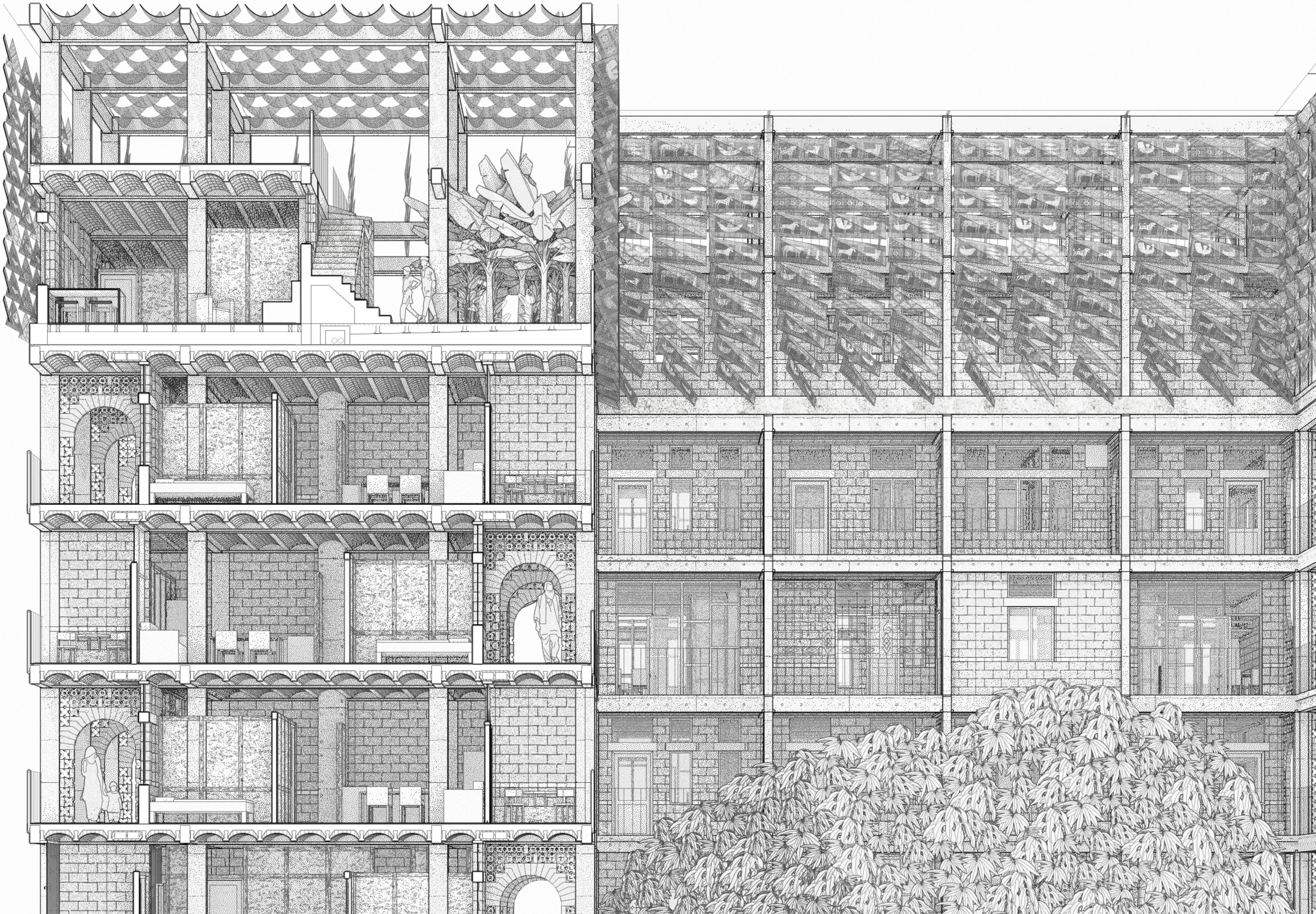
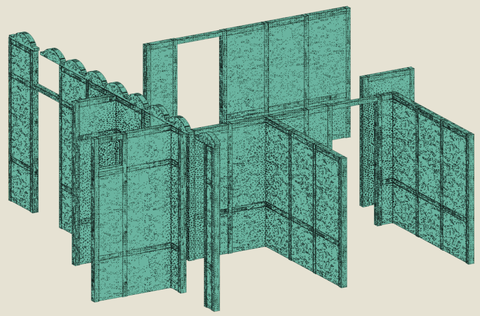


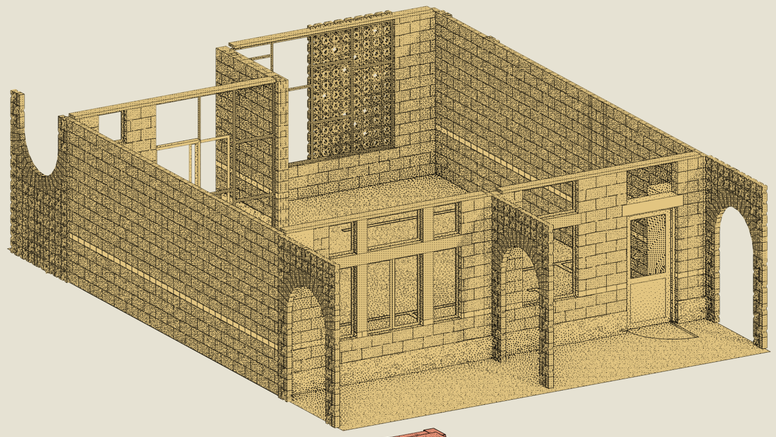


Material Strategy

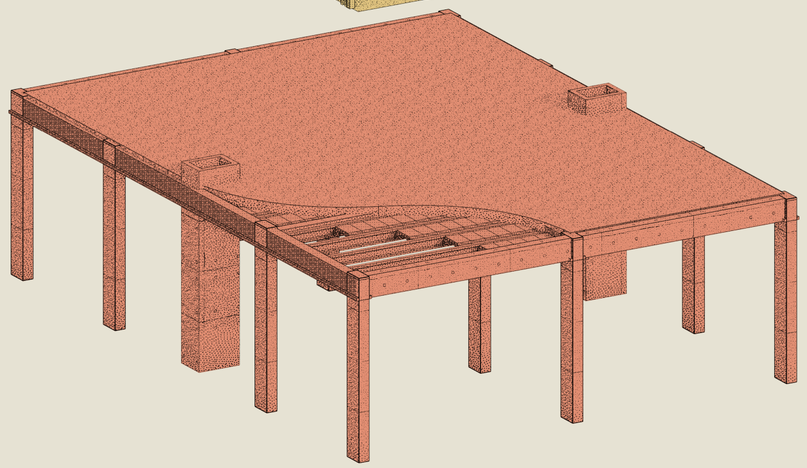
Half-Timbered

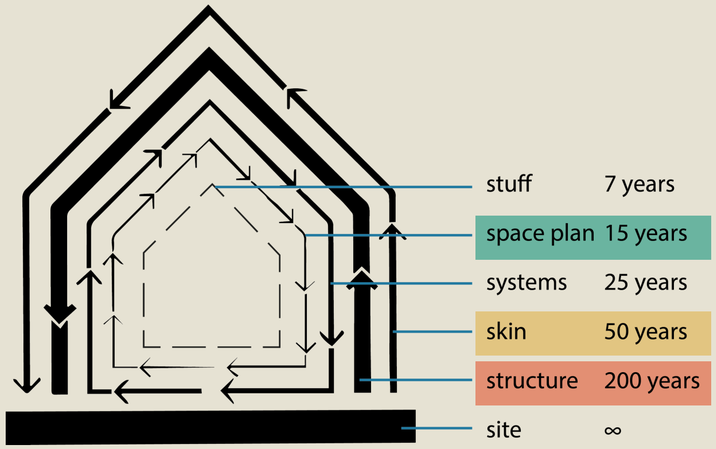


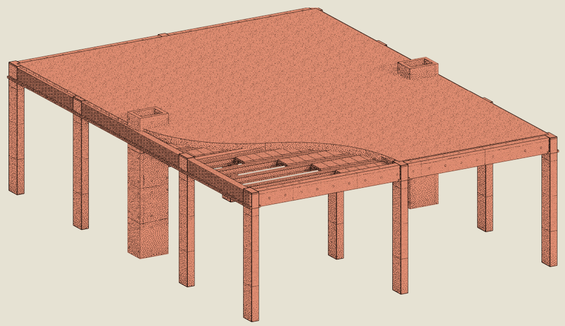
Hollow Blocks



Concrete & Brick

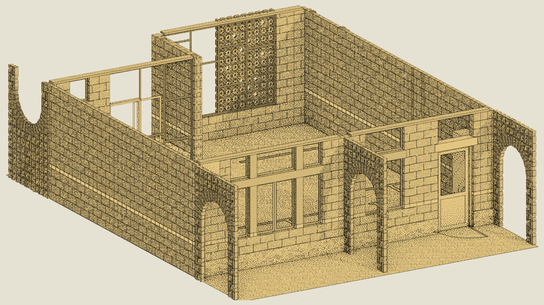






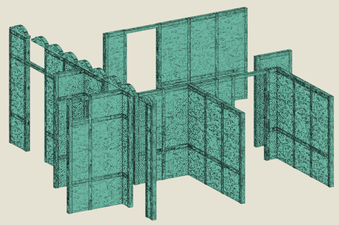
Concrete & Brick

Density: High
Durability: High
Embodied Carbon: High
Whole-life carbon (WLC): Low only across a long lifespan



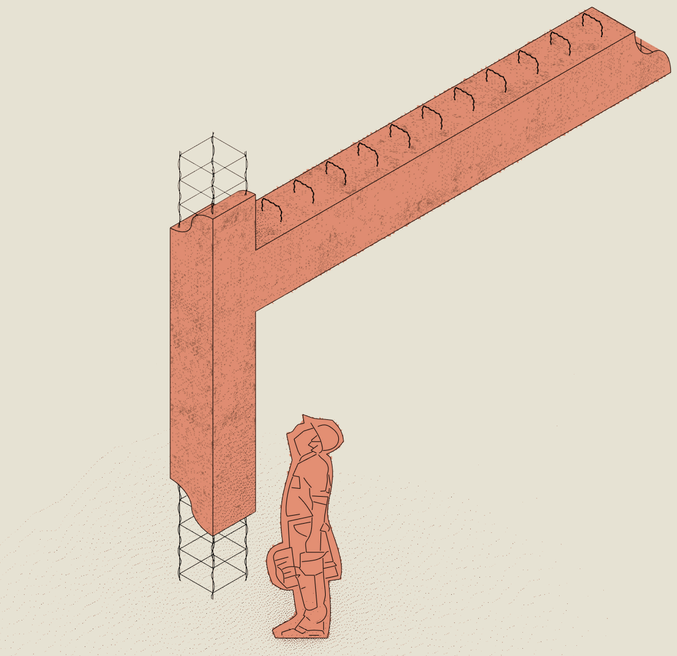
Hollow Blocks

Density: Medium
Durability: Medium
Embodied Carbon: Medium
Whole-life carbon (WLC): Low across a medium lifespan



Half-Timbered

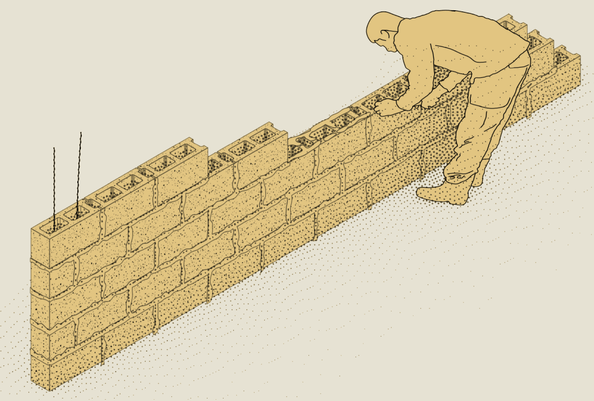
Density: Medium
Durability: Medium
Embodied Carbon: Medium
Whole-life carbon (WLC): Low even across a short lifespan



Concrete & Brick

While concrete is a heavy material with high embodied carbon, a well desinged concrete stucture can last almost indefinitely. As such, a building with a concrete structure can still achive a low whole-life carbon value. Concrete is the most commonly used structural material for large buildings in Bangladesh and therefore benefits from widespread availability and construction expertise. This means it is cost effective, reliable and comparativley easy to work with. Similarly brick is extremely prevalent in Bangladesh and commonly used in both loadbearing and non-loadbearing capacities. It also benefits from widespread availability, expertise and high durability.

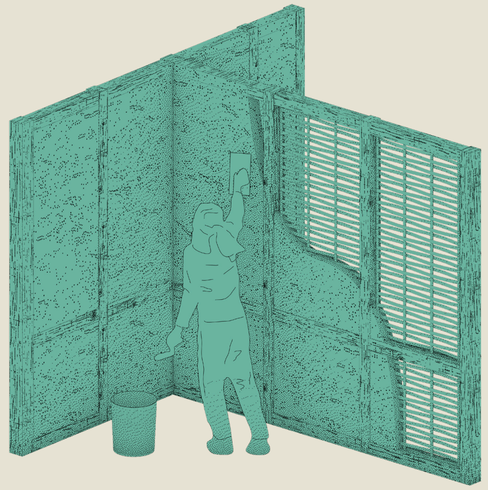
These factors influenced the choice of these materials for the most permanent elements of the construction.



Hollow Blocks

Hollow blocks come in various forms with concrete hollow blocks being the most commonly used in construction. Hollow blocks benefit from being easy to work with without requiring specialist skills, due to the hollow chambers reducing density they are easy to handle on site and can be readily cut or reconfigured to suit different layouts. The material composition of the blocks can also be easily varied from high-strength high-cement content mixes all the way through to unfired stabilised earth blocks with a very low cement content. Additionally, for standard wall constructions, rebar is used in the hollow chambers to add tensile strength and the proportion can be easily adjusted to meet desired parameters. For high rise construction in an earthquake prone region like Sylhet, standardised concrete blocks with modular dimensions (e.g. 190x190x390mm) are the most cost effective and suitable in strength. While customised blocks and material mixes are easy to make, standardised blocks benefit vastly from economies of scale and as such are better suited for standard wall constructions.

However, for non-loadbearing walls with aesthetic functions, such as for Jali walls, non-standard blocks are suitable. Furthermore they can be made of clay or other natural materials, with low embodied carbon.



Half-Timbered

Half-timbered construction is traditionally used in rural dwellings in Bangladesh, particularly in Bangla Baton houses. Walls are framed in timber of relatively slender sizes (such as 75x75mm and 100x100mm) with wattle and daub infill. The wattle is usually made of a bamboo lattice or a combination of bamboo and Ikra reed. Ikra reed is less susceptible to insect attack than bamboo. The bamboo should be treated to improve resistance to water and pests. This can be done in various ways but a traditional method common in Bangladesh is to use Gaab fruit. In the past, the daub was frequently made of a mix of mud, cow dung and straw (or other fibrous material). Today cement plaster is also often used, out of convenience and due to the preception of concrete as a superior material. However due to lack of breathability and ductility, use of cement plaster can result in poor humidity regulation, movement cracking and poor acoustic absorption. Use of a clay plaster, with clay already being used for hollow blocks in the project, was considered optimal. A thickness of clay plaster between 25-75mm is considered optimal for humidity regulation. A rough finish will also produce good sound absorption charateristics. Where necessary, a lime plaster finish can be used to improve water resistance.

The lumberyard adjacent to the site can be a good source of timber for the wall panels, they can even be pre-assembled at the yard and then craned into place, as they are lightweight. The lumberyard sources predominantly Lohakath Ironwood, which is very common in the hilly forest areas of greater Sylhet.

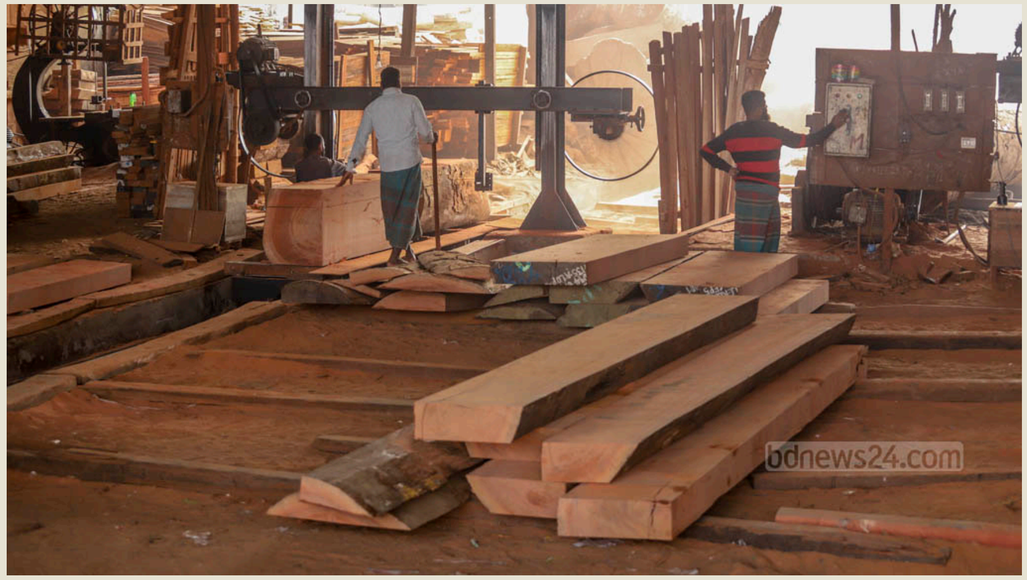
Lohakath Ironwood

The lumberyard adjacent to the site can be a good source of timber for the wall panels, the lightweight frames can even be pre-assembled at the yard and craned into the building. The lumberyard sources predominantly Lohakath Ironwood, which is very common in the hilly forest areas of greater Sylhet.

The heartwood is a reddish colour and naturally resistant to insects due to the resisns in the wood. It is a dense hardwood that is very suitable for construction, though less so for carving or intricate joinery. Besides use for building construction, it is also used to make bridges, railway sleepers and boats.

While this wood is still readily availble in Sylhet at affordable prices, the quality and desirablity of this hardwood, as well the sustainablity of current forestry pracitces may lead to to sharp price increases in the future. If this is the case, the primary framing material for the internal partition walls in the project could also easily switch to bamboo. However the continued sustainable use of this wood, along with the associated knoweldge and carpentry skills, are deemed as broadly valuable to the heritage of Sylhet and more specifically to local craftsmen or even as a source of practial skills and employment for low-income families moving to the project site.

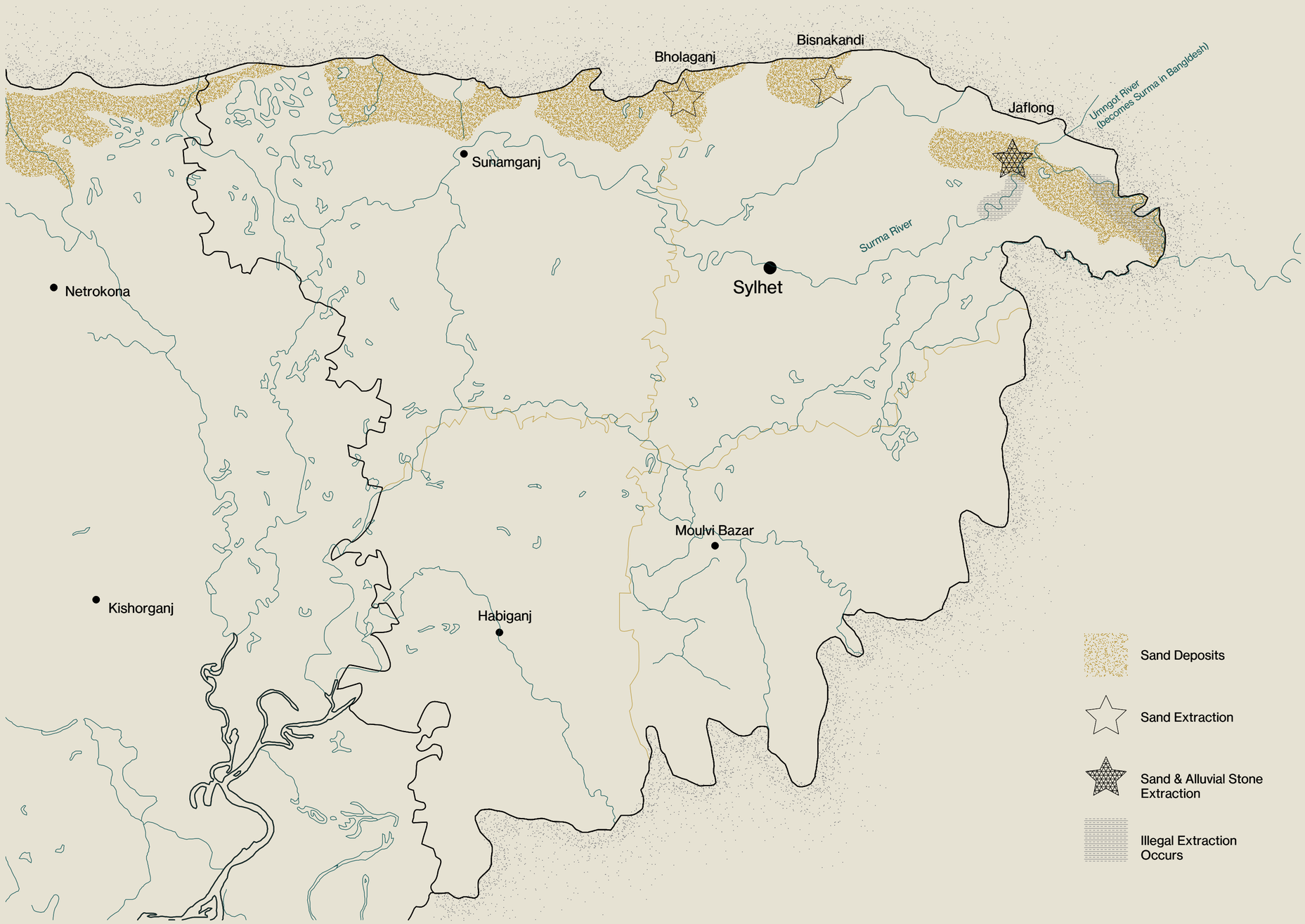


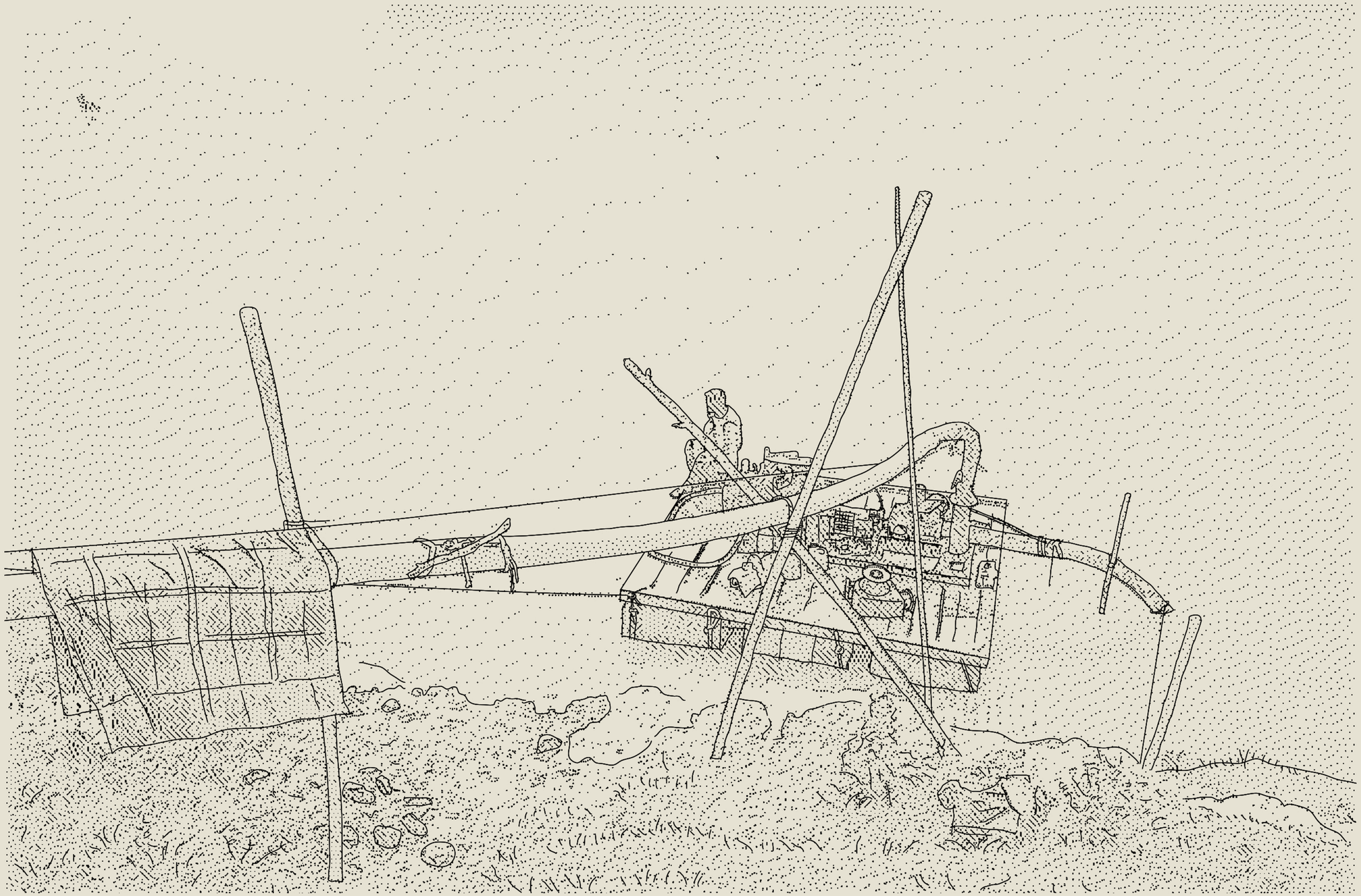




Clay and Sand

A half of Bangladesh's landmass is actively deltaic and many major rivers flow through the country. As such, alluvial soil deposits are abundant including many sources of high quality clay and sand. Sylhet in particular has sand deposits of a fine quality at its northern border with key extraction sites at Bholaganj, Bisnakandi and Jaflong. The Umgat river flows from India into Bangladesh at Jaflong, in Bangladesh it is known as the Surma river and flows directly through Sylhet, therefore providing a good transportation route by river.





Climate Strategy

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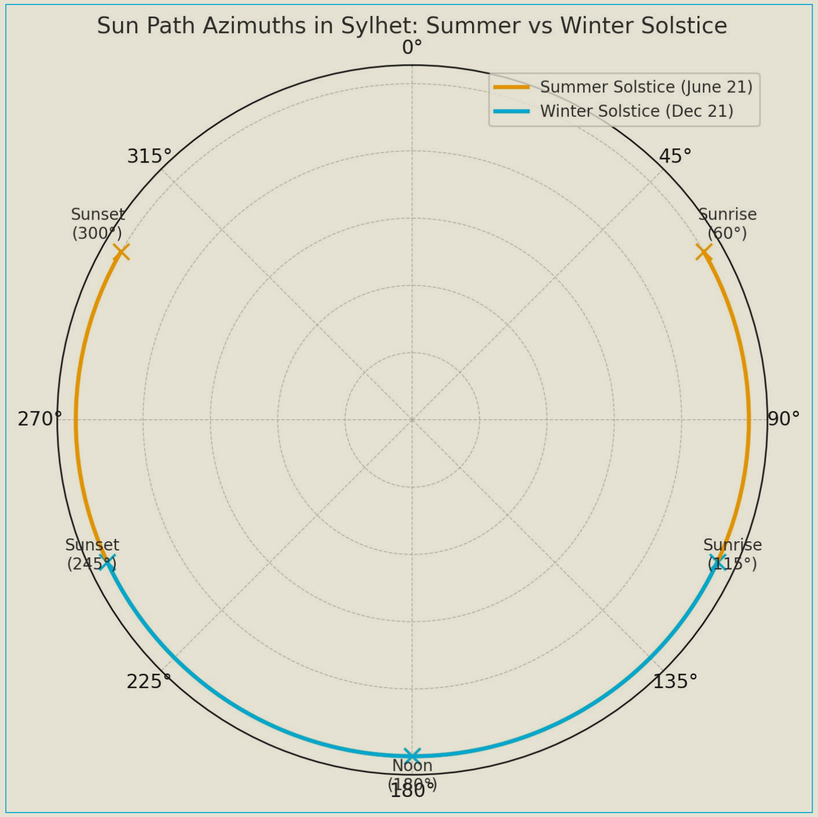
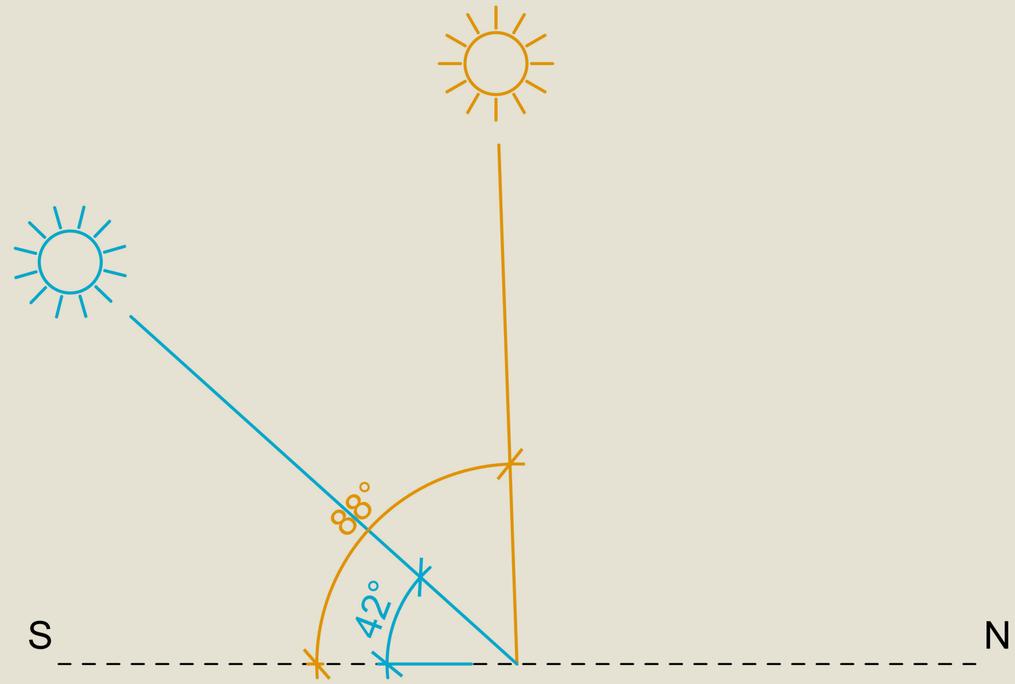
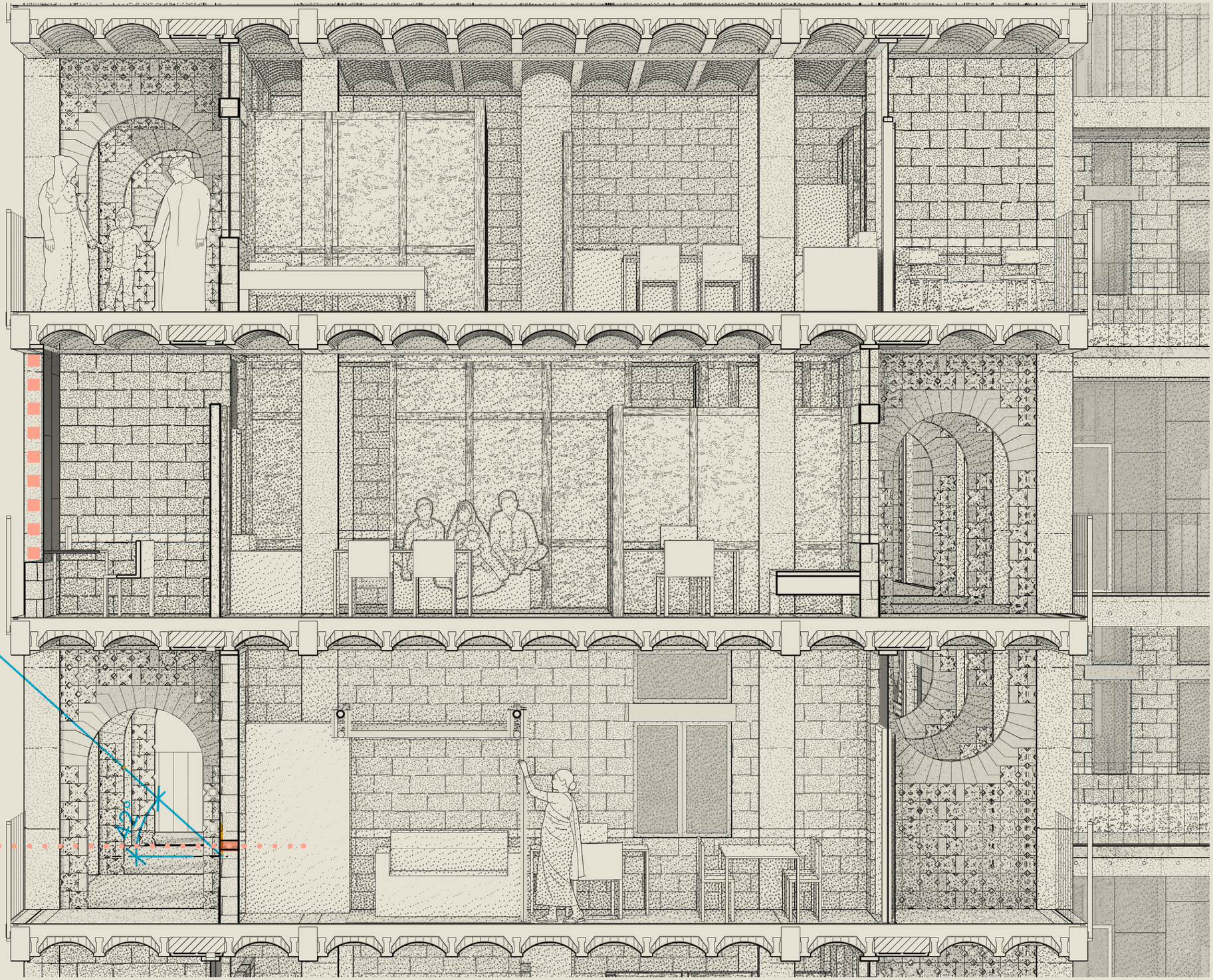

Sun Path Azimuths in Sylhet: Summer vs Winter Solstice
Summer Solstice (June 21)
Winter Solstice (Dec 21)
0°
45°
90°
135°
180°
225°
270°
315°
Sunrise
(60°)
Sunset
(300°)
Sunrise
(115°)
Sunset
(245°)
Noon
(180°)


88°
42°
S
N

Shading through hollow block Jali wall



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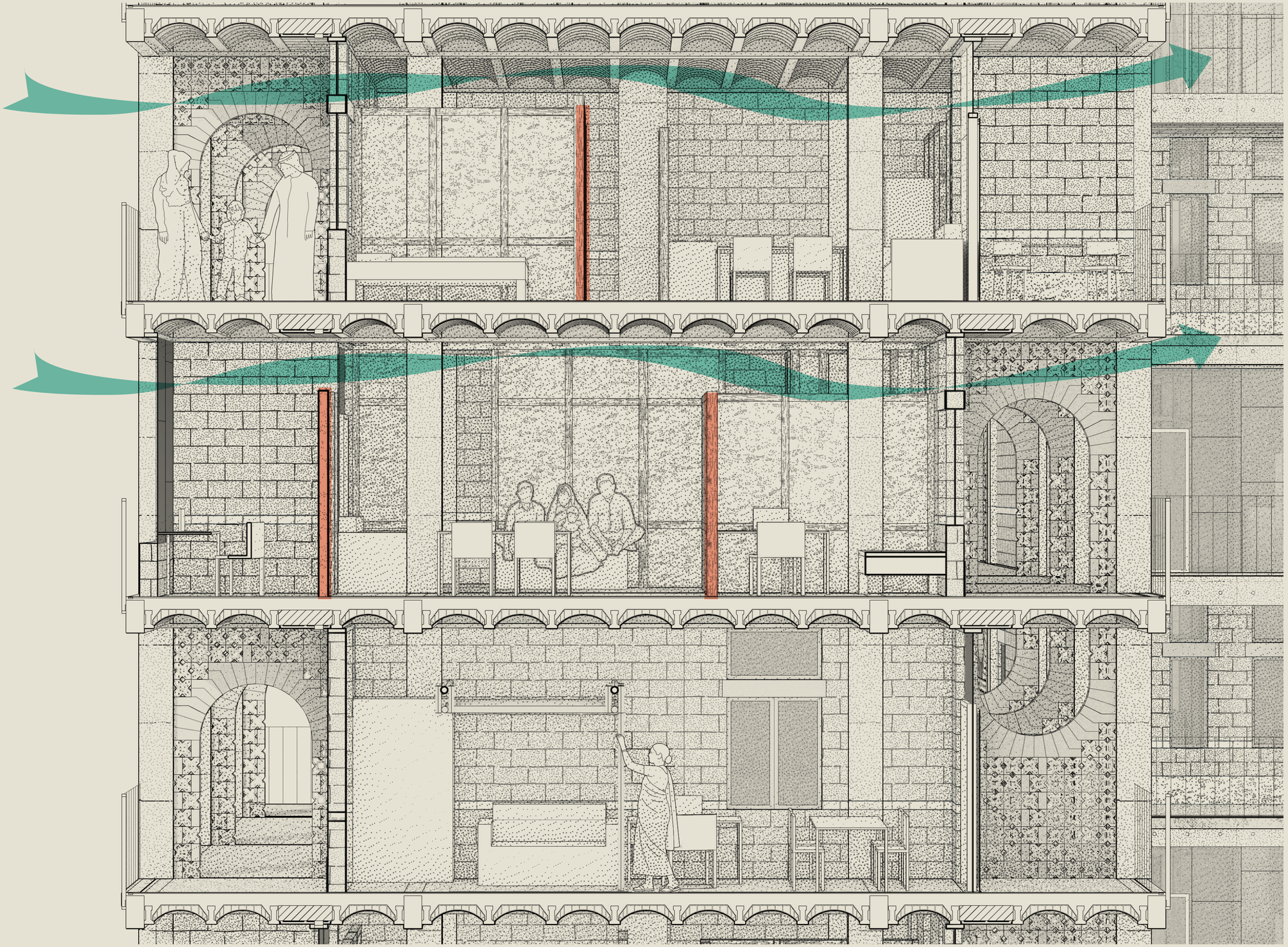
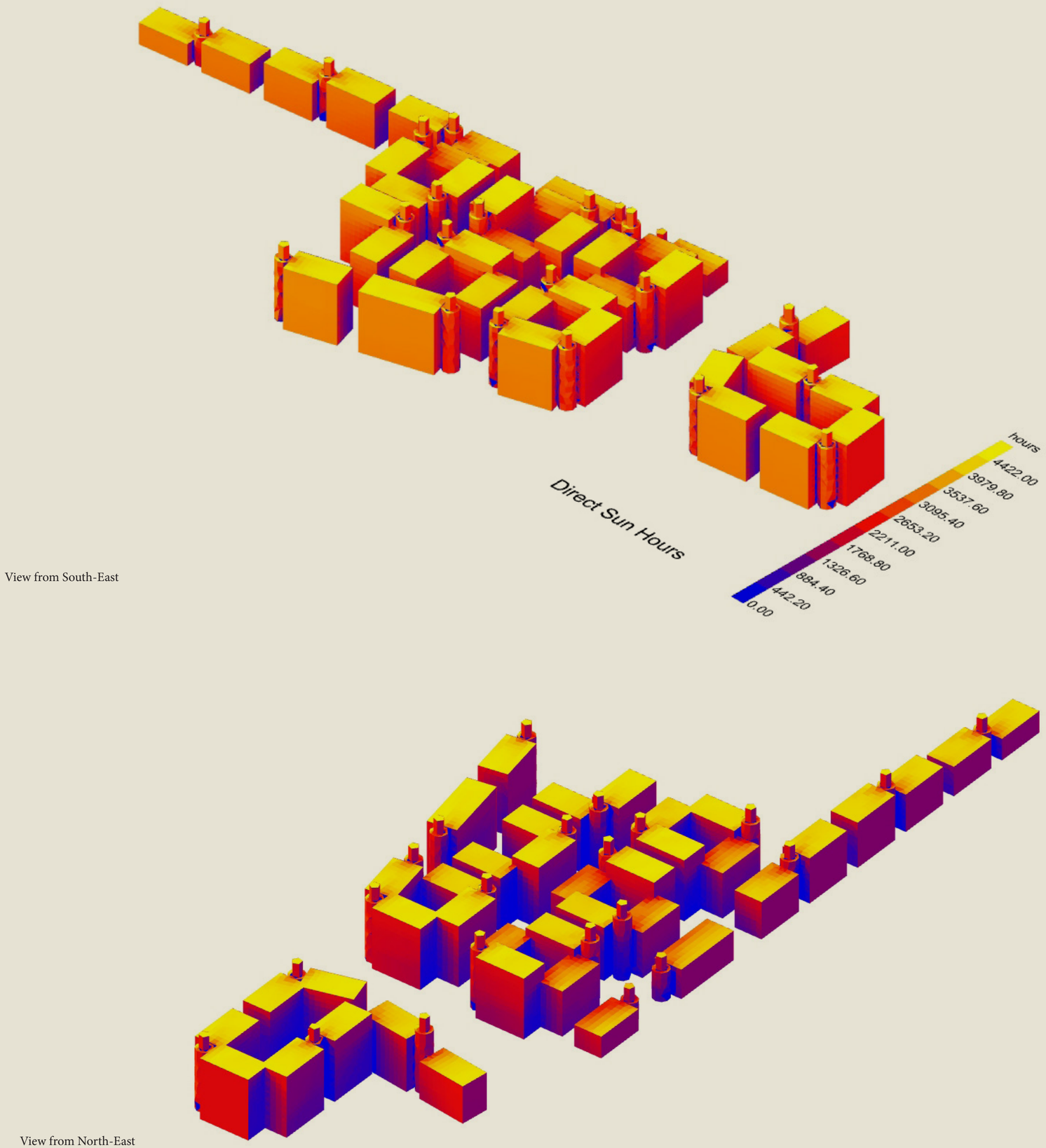
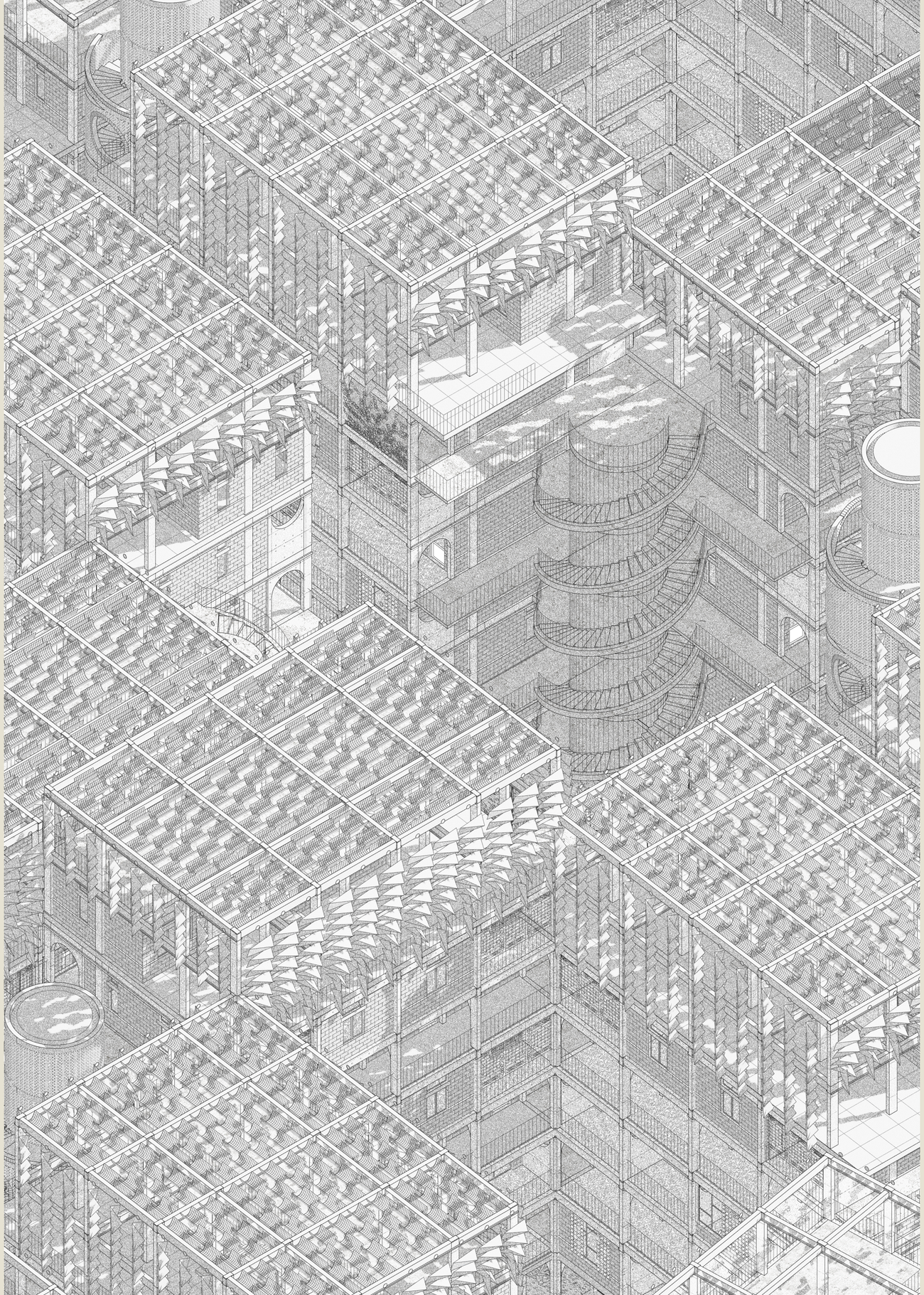




View from South-East

View from North-East



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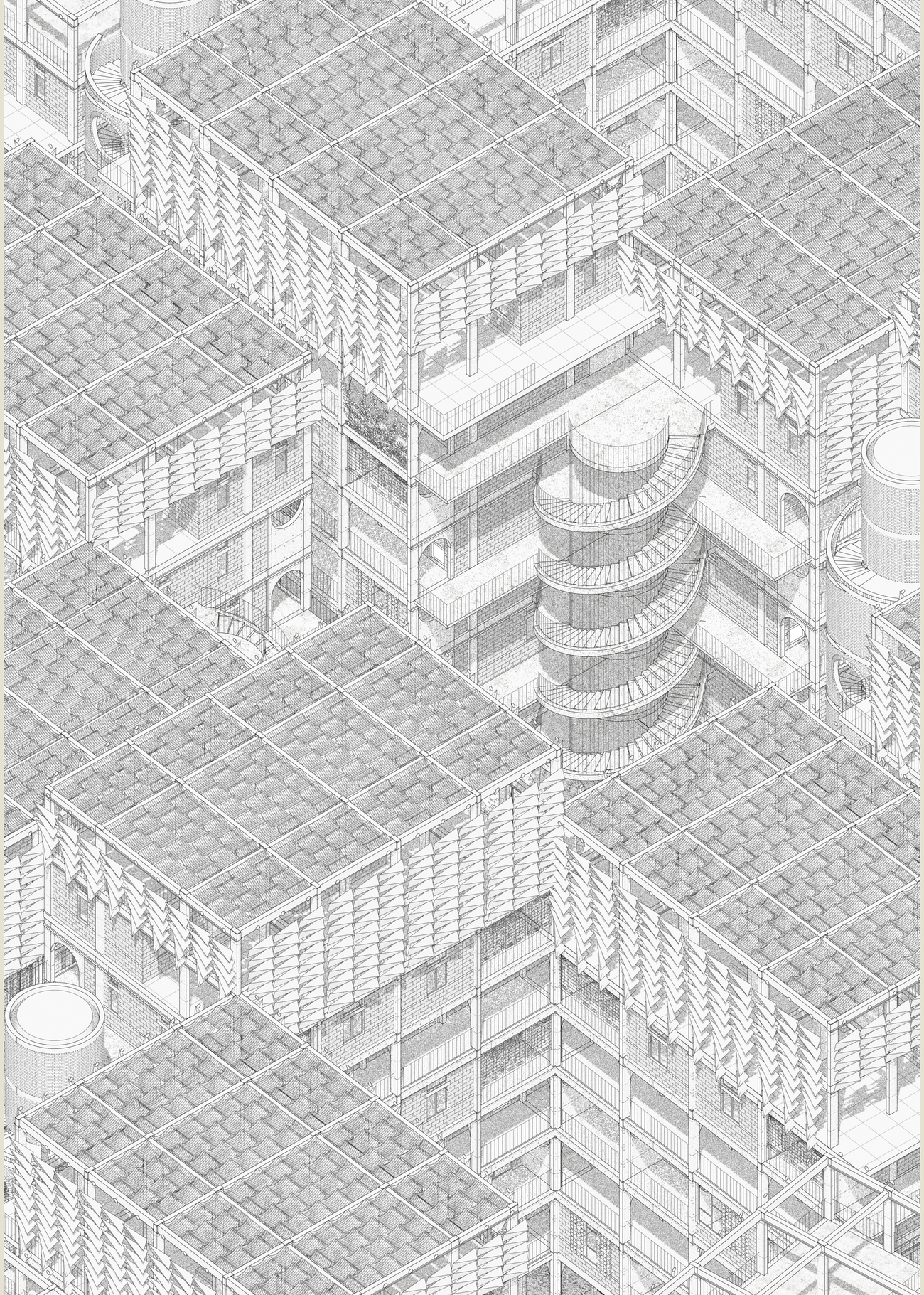

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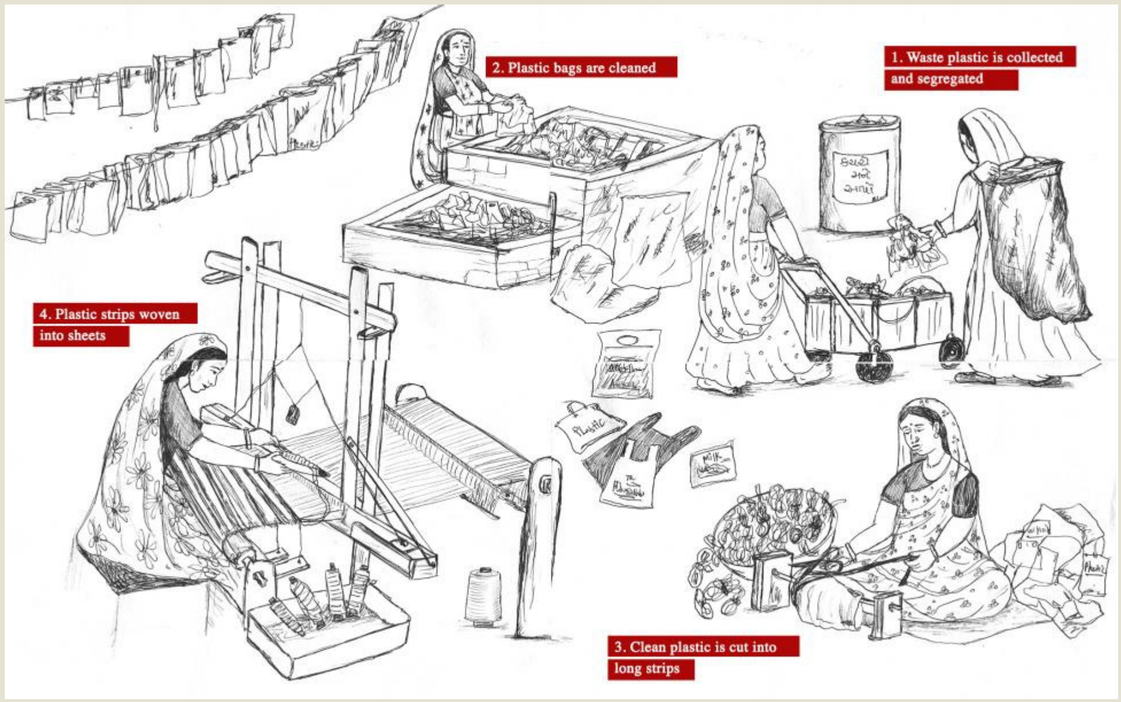
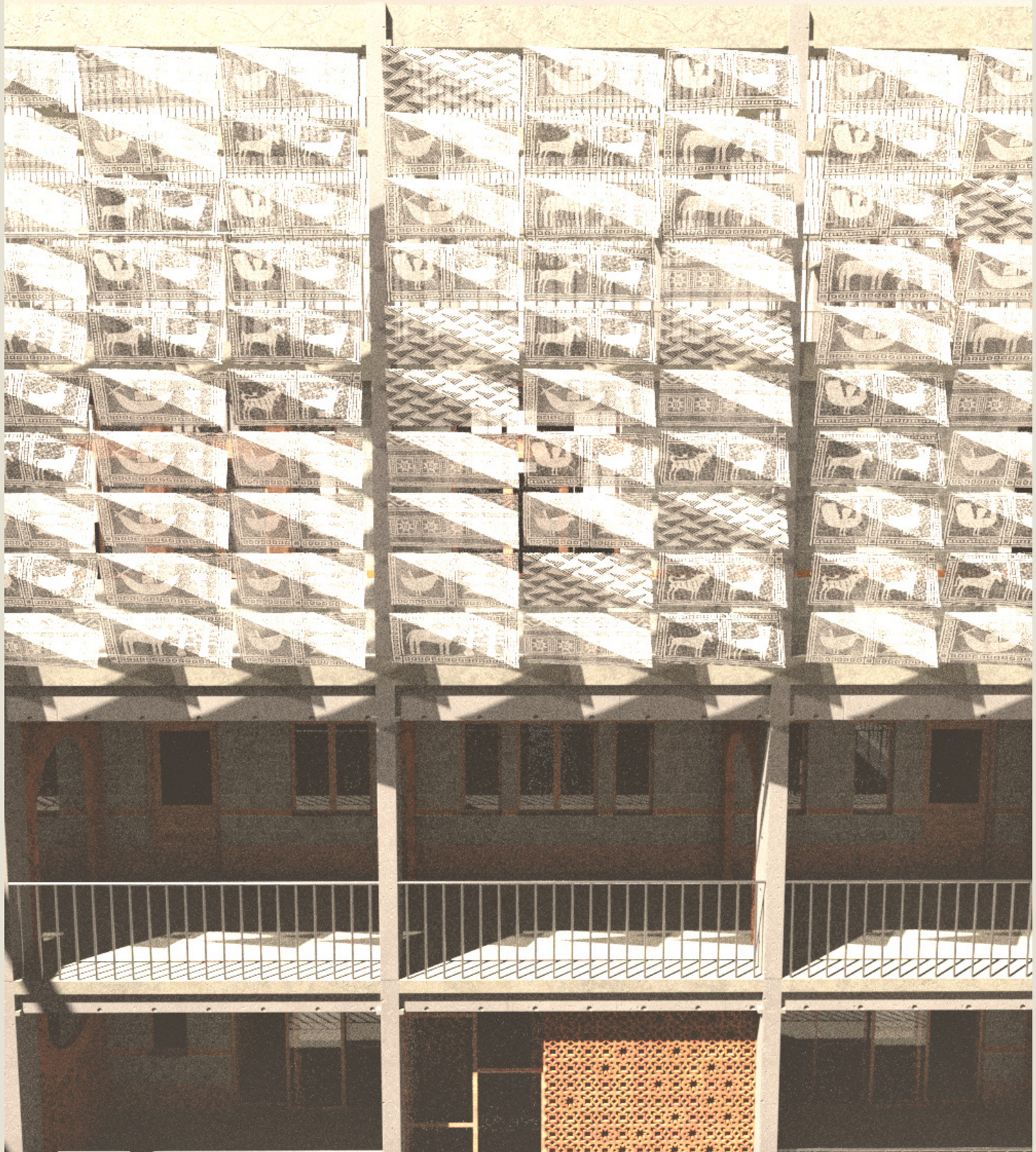
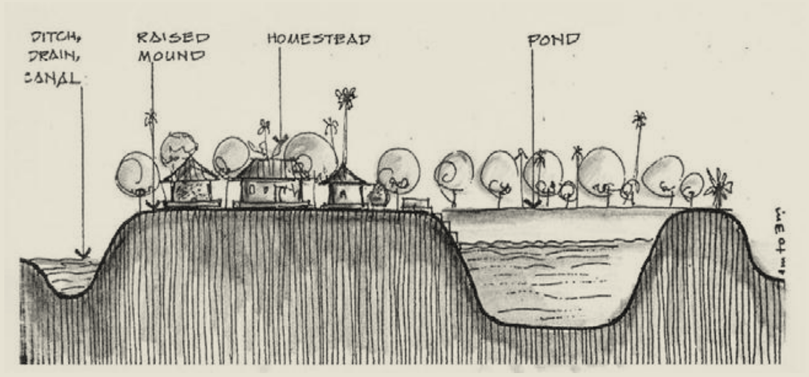

2. Plastic bags are cleaned
1. Waste plastic is collected and segregated
4. Plastic strips woven into sheets
3. Clean plastic is cut into long strips







Water Mangagement


DITCH,
DRAIN,
CANAL
RAISED
MOUND
HOMESTEAD
POND



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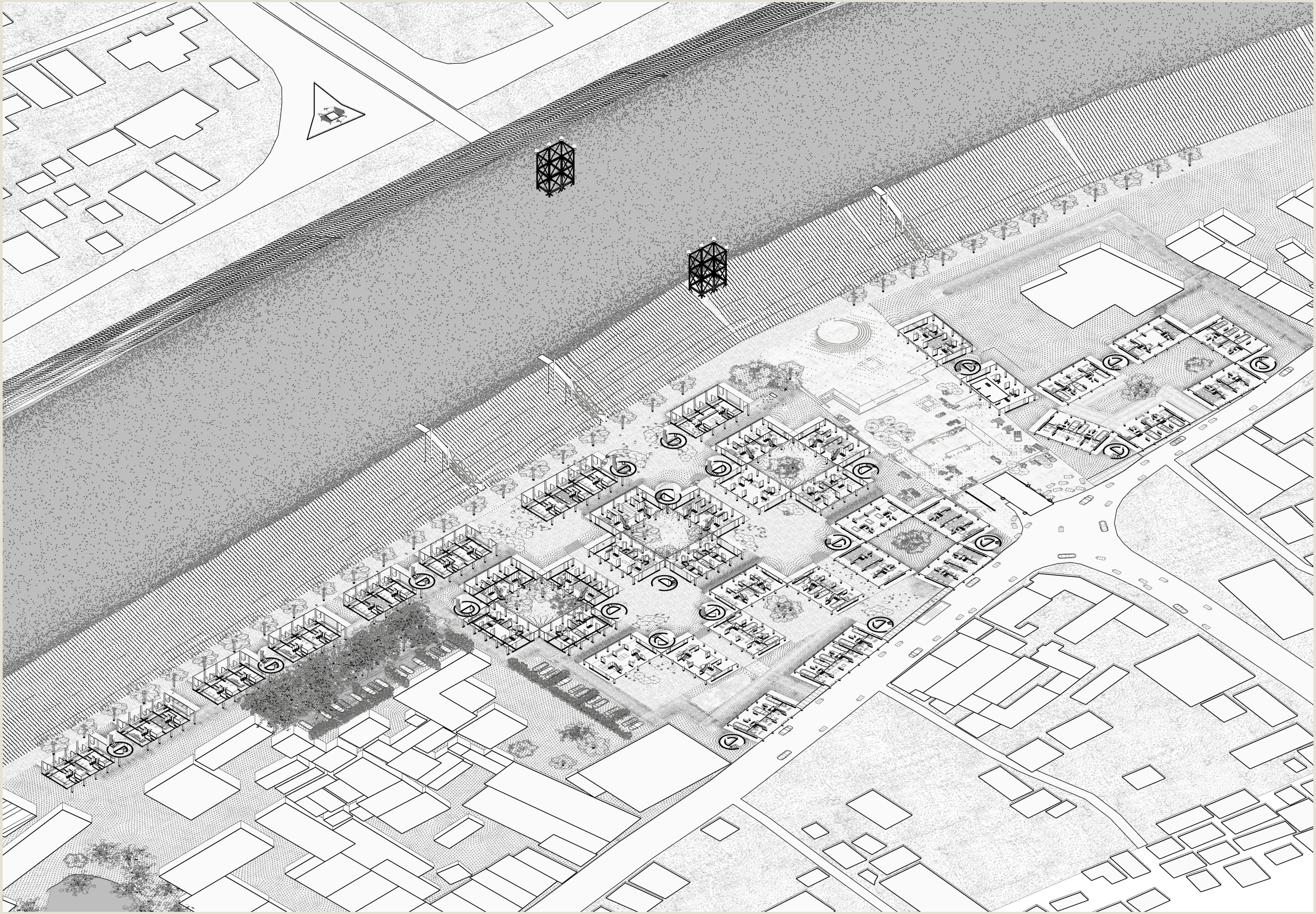

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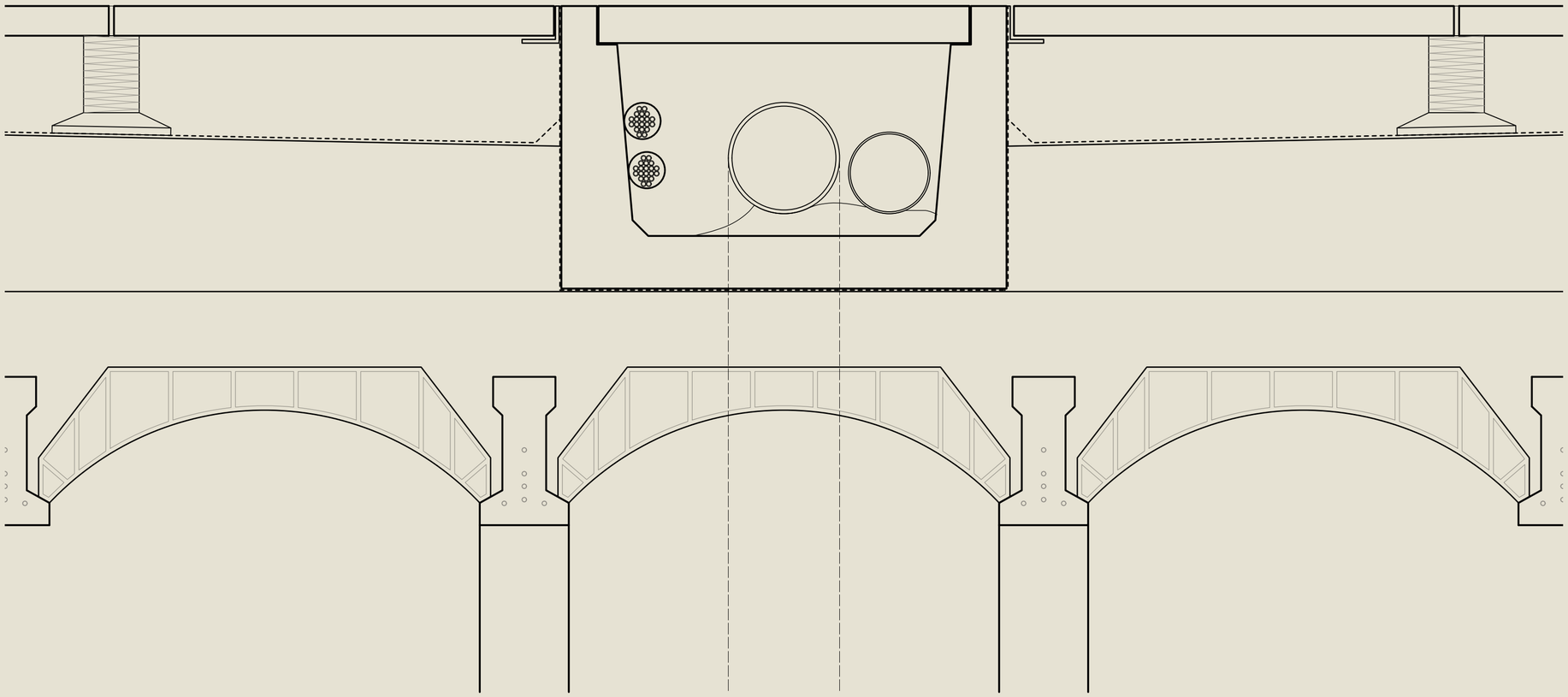

Street Profiles

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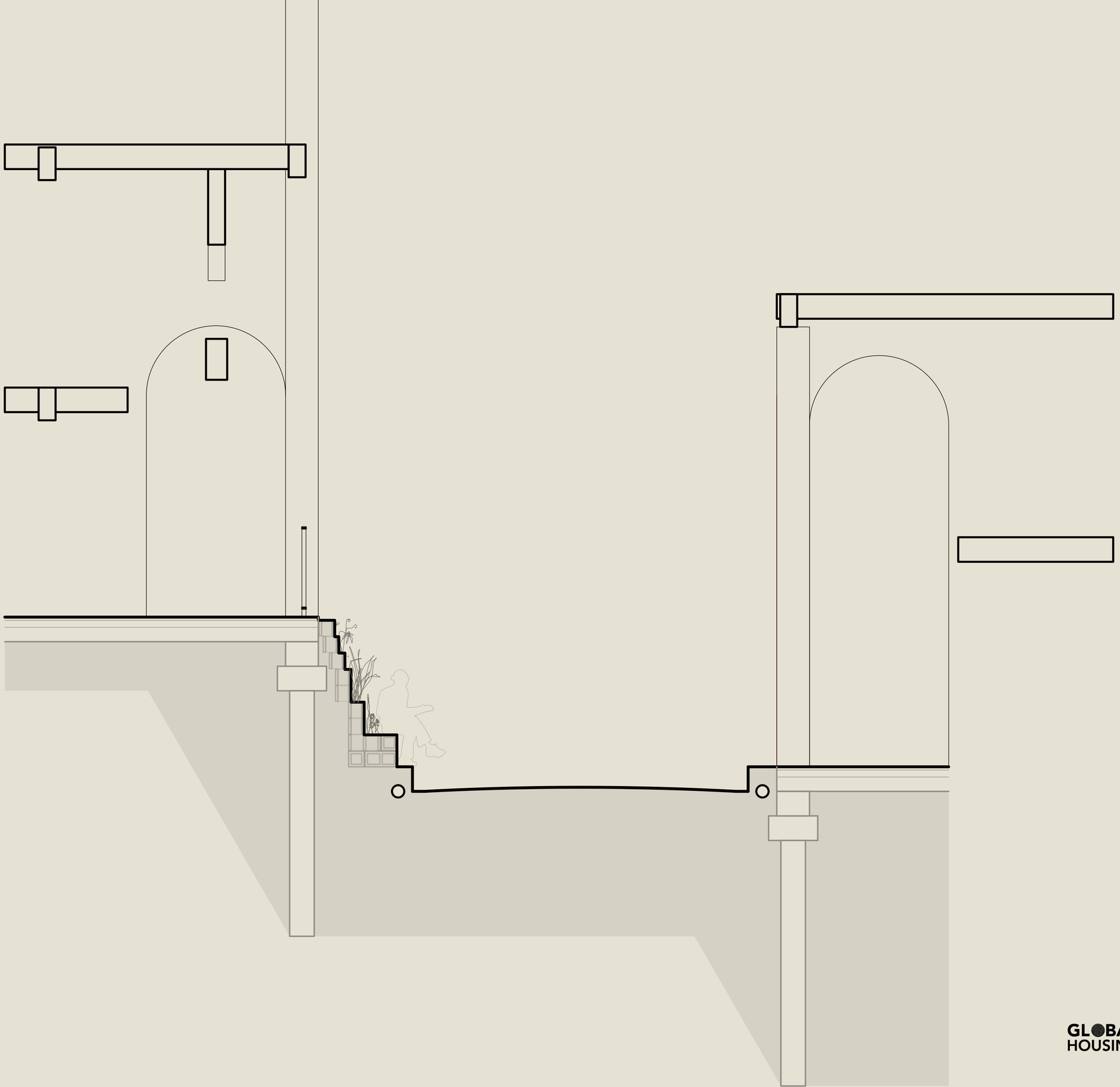

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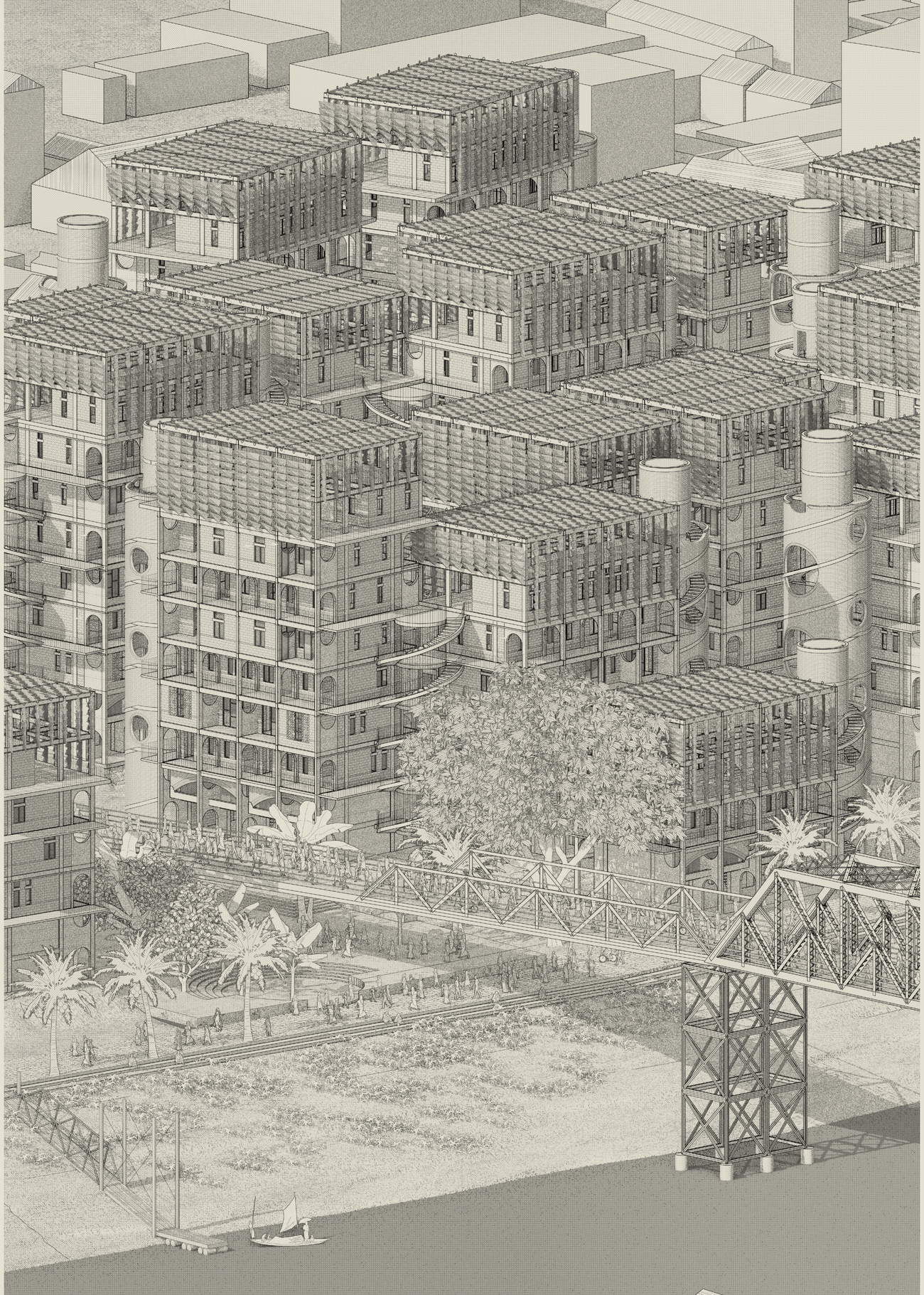
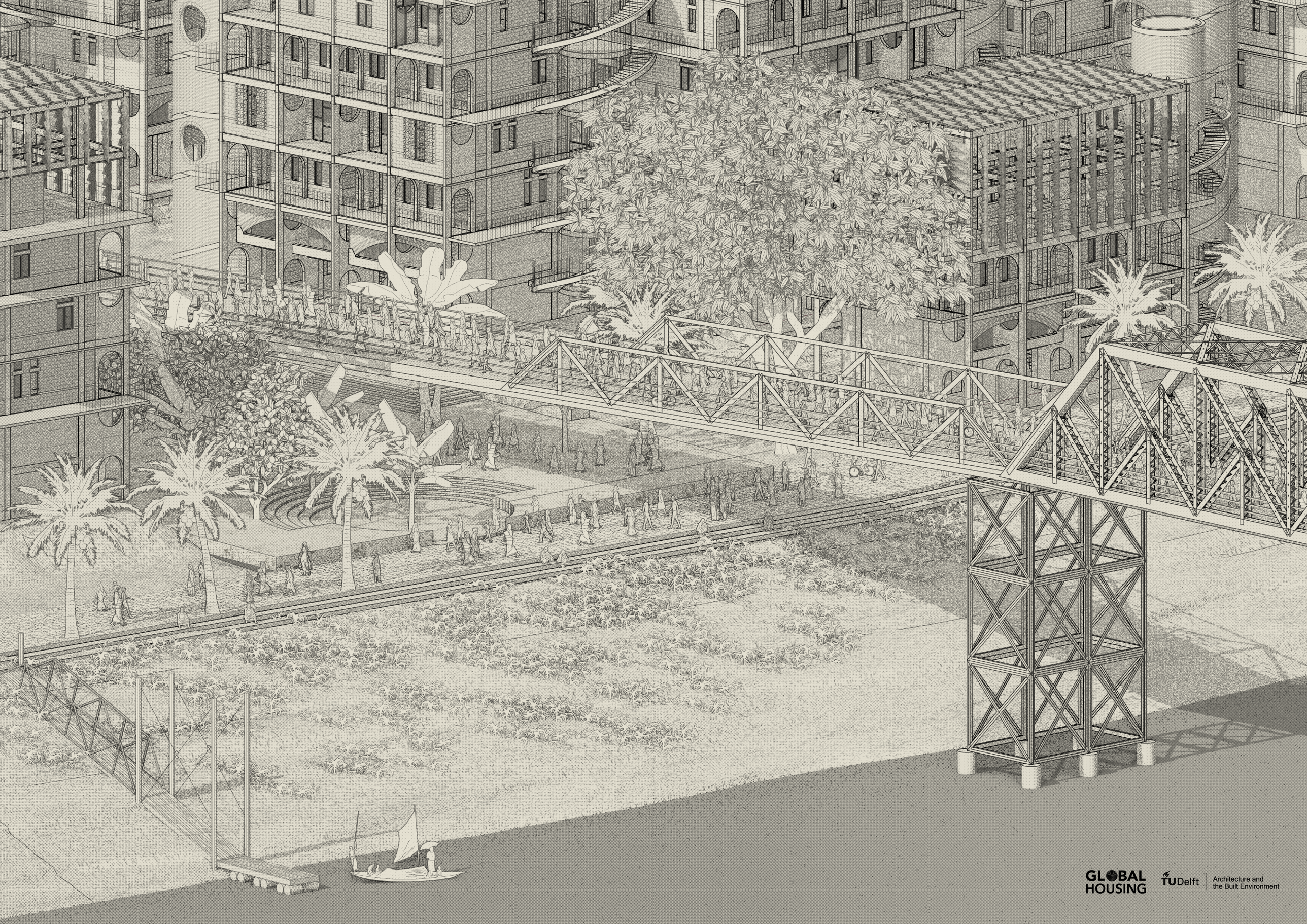
KEBAB GARDEN
Restaurant
Trust Jeans











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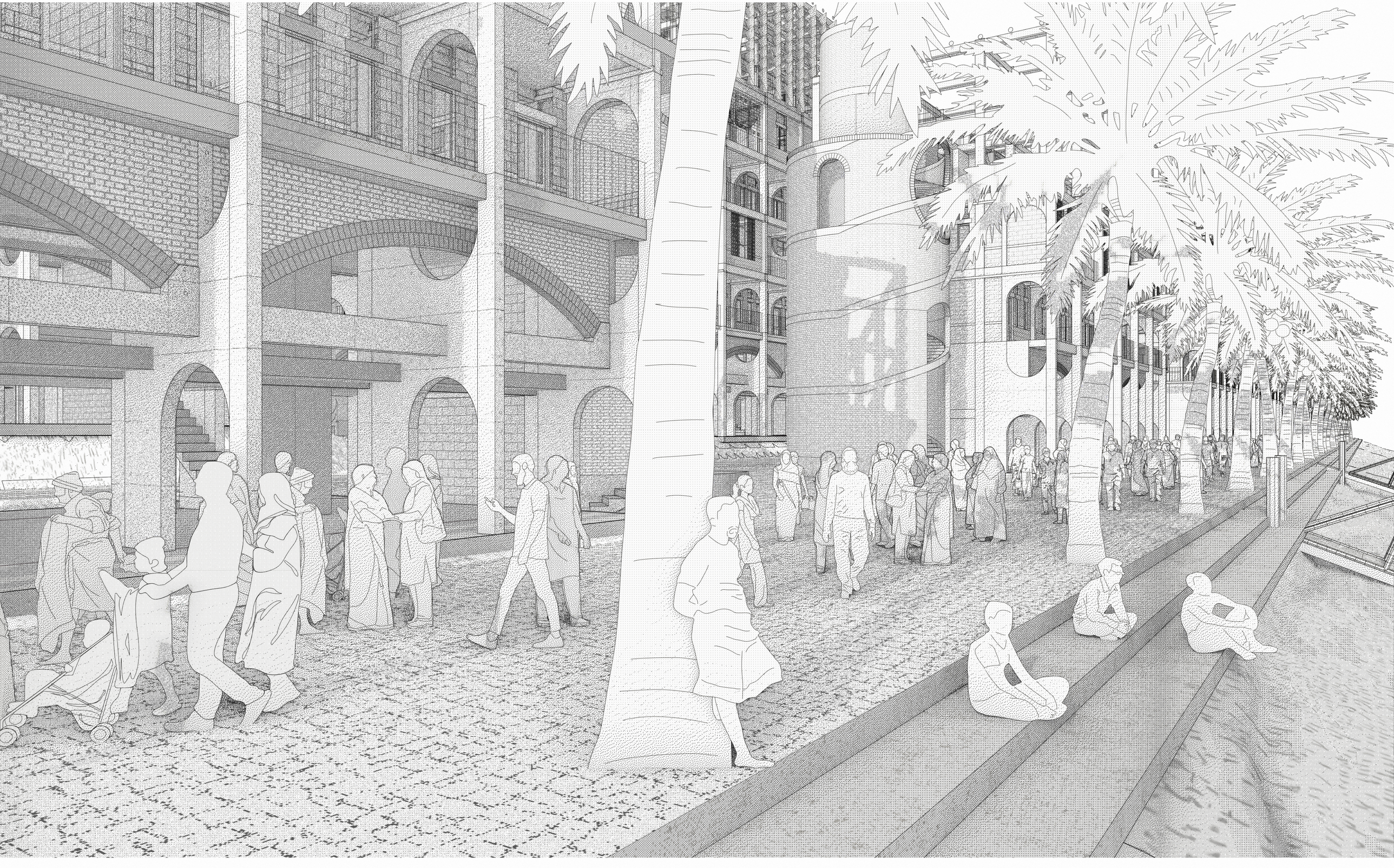
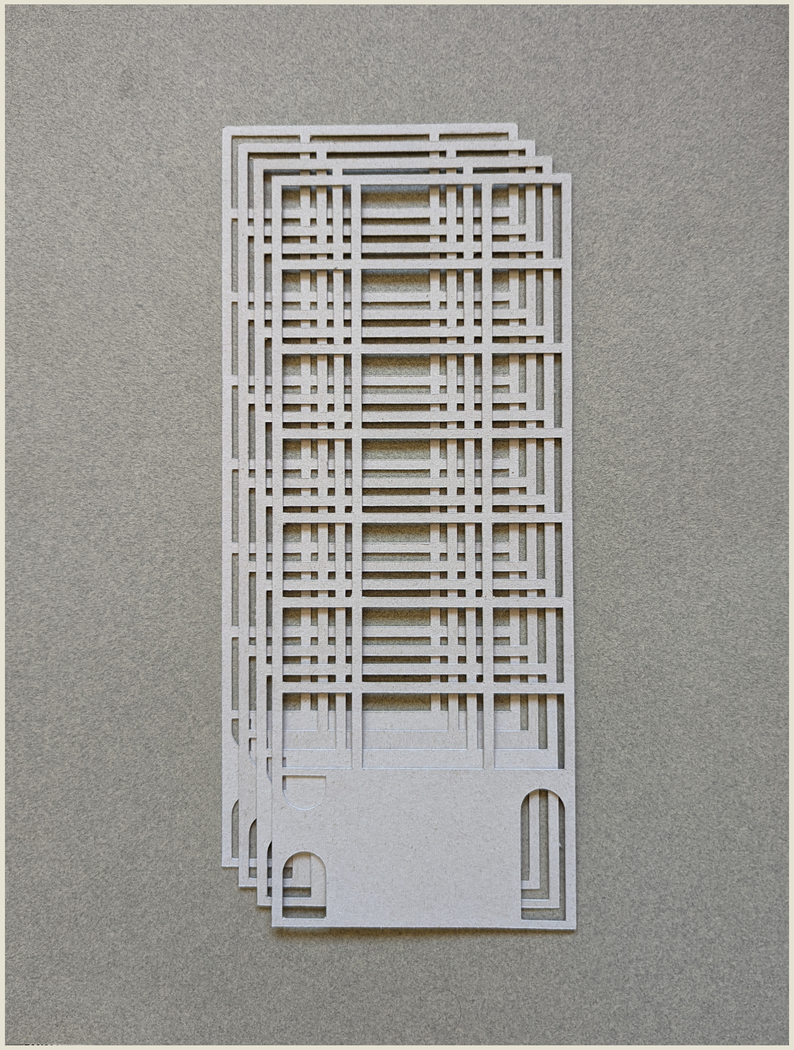
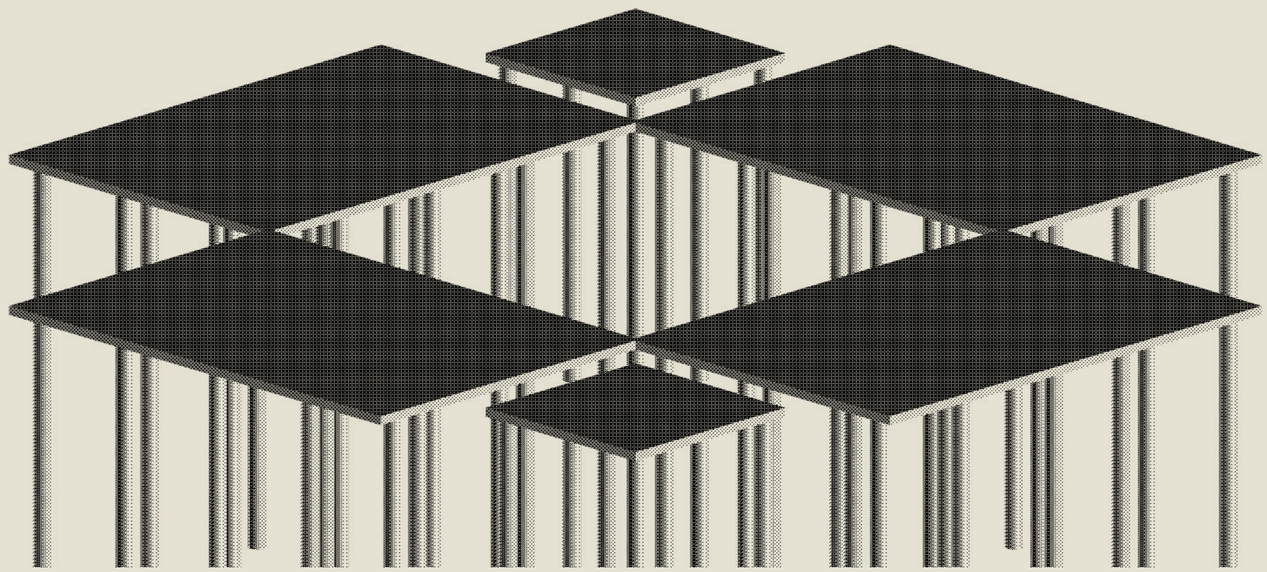




Construction Sequence



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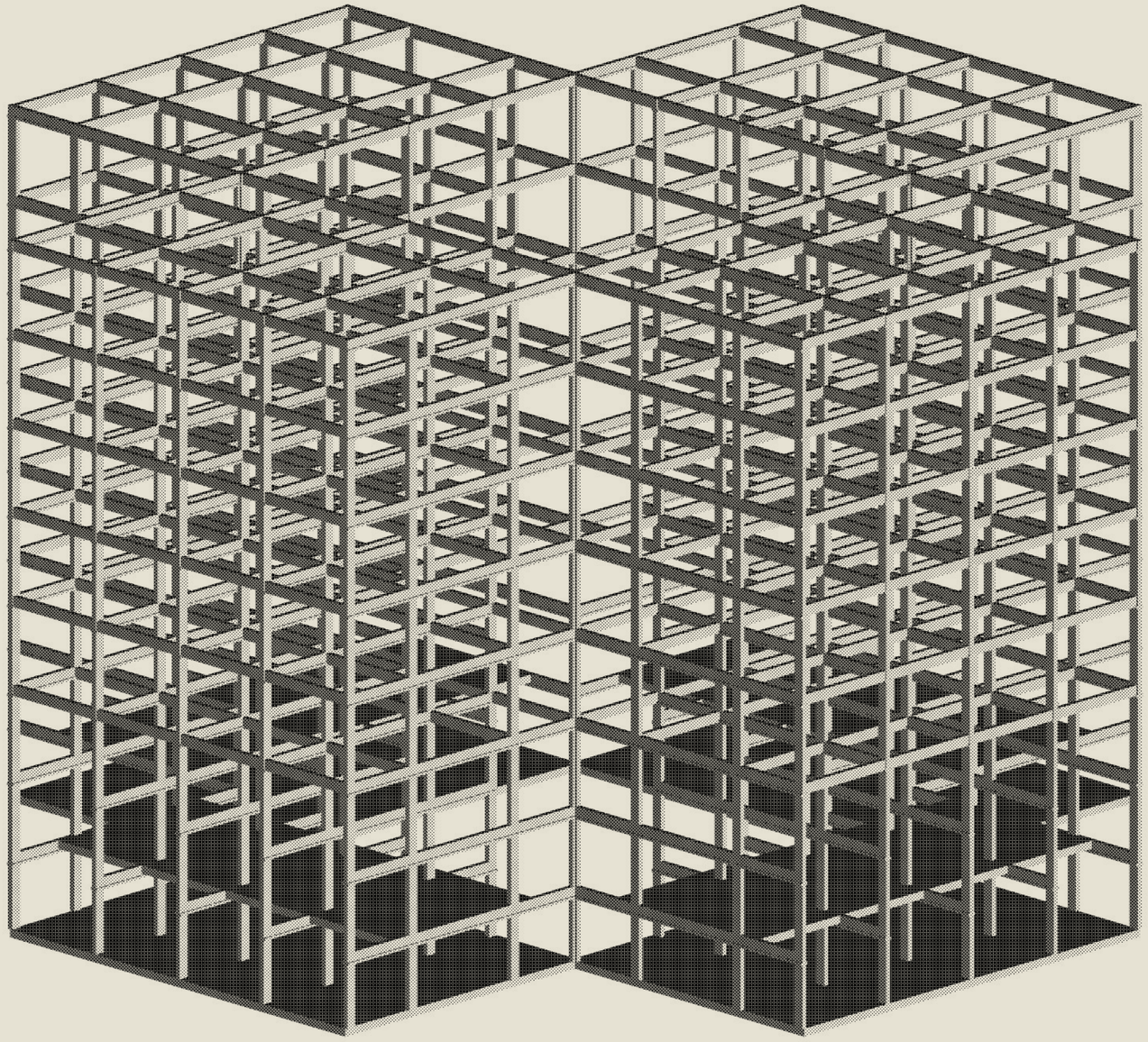

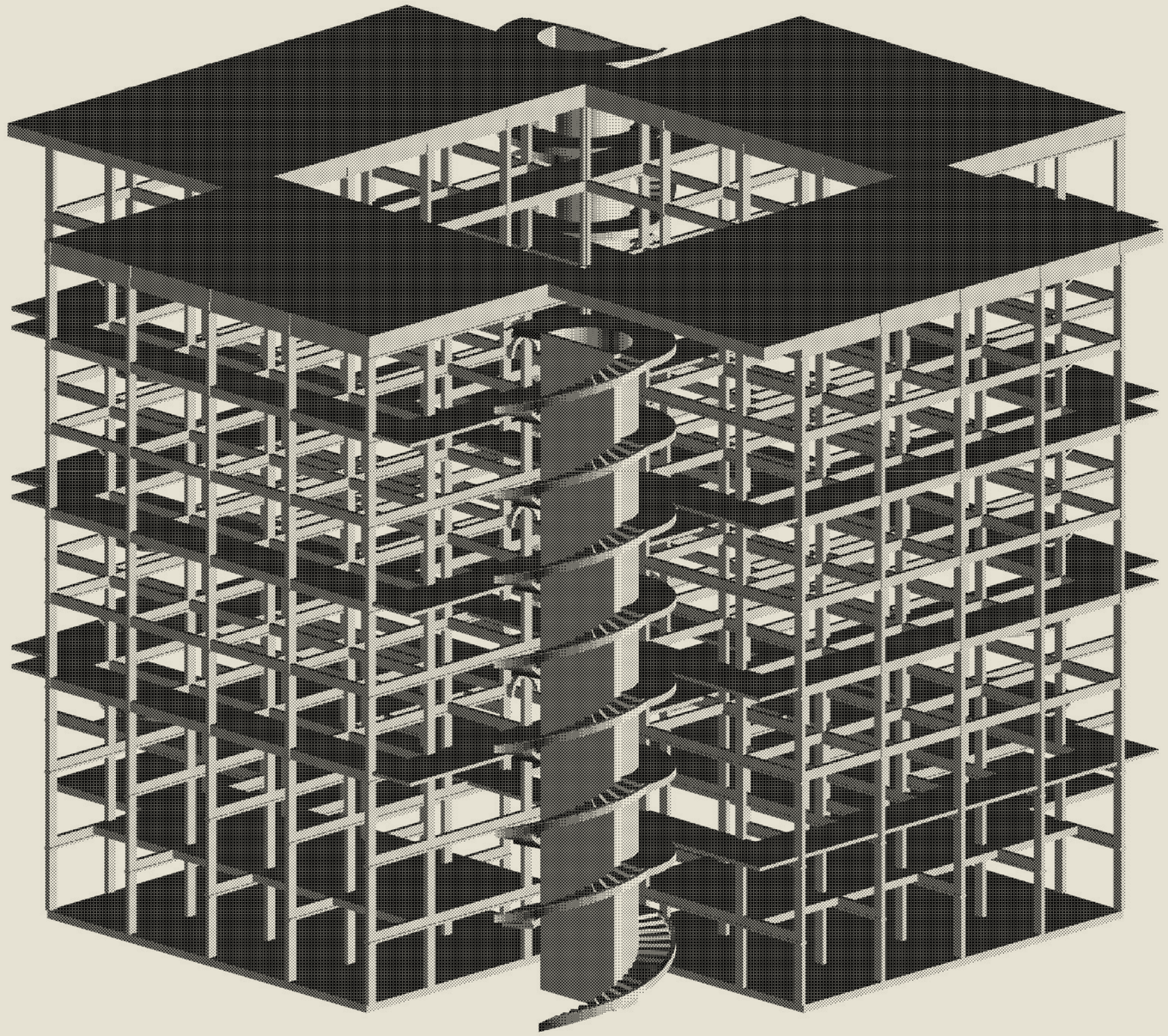

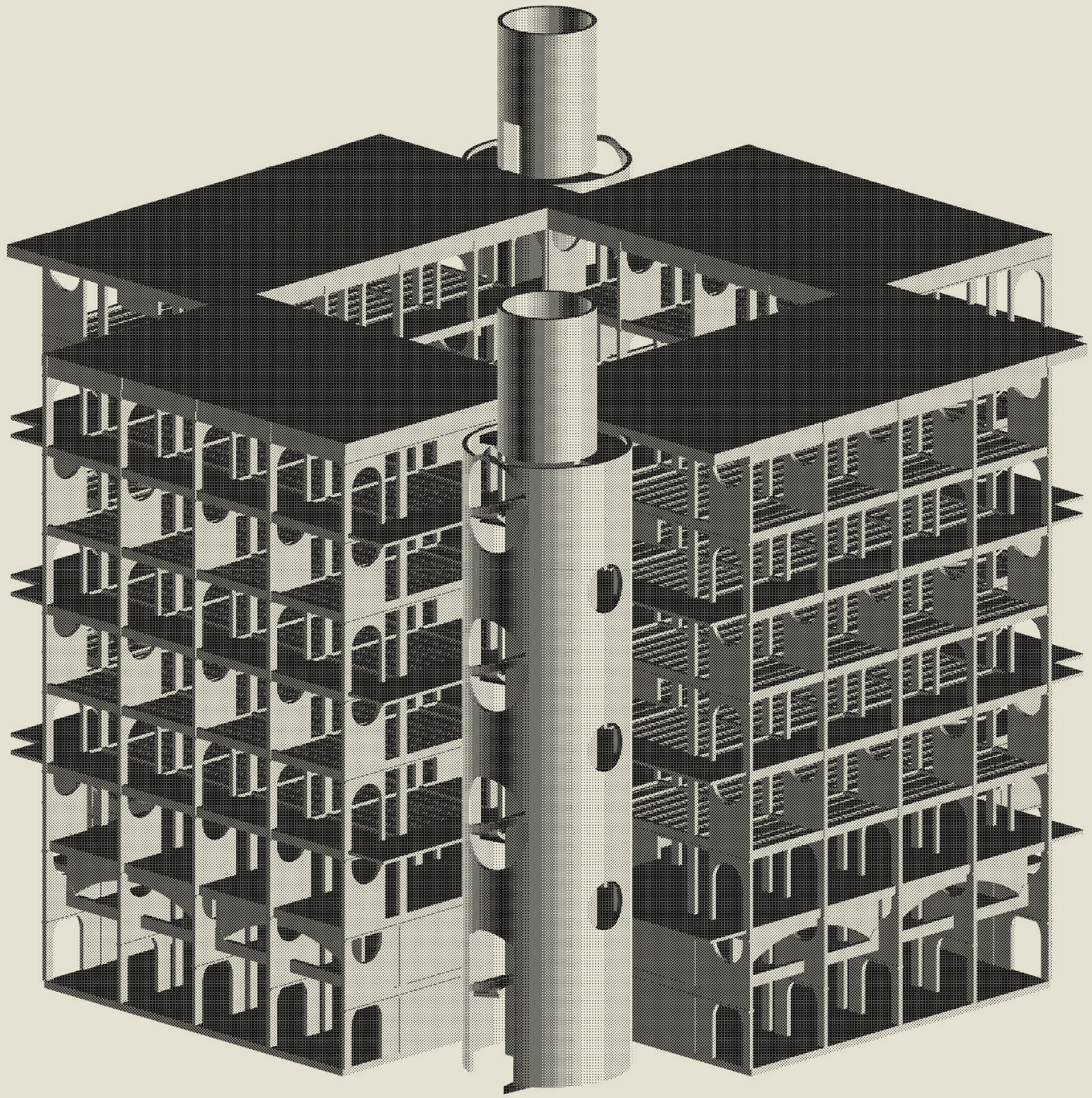

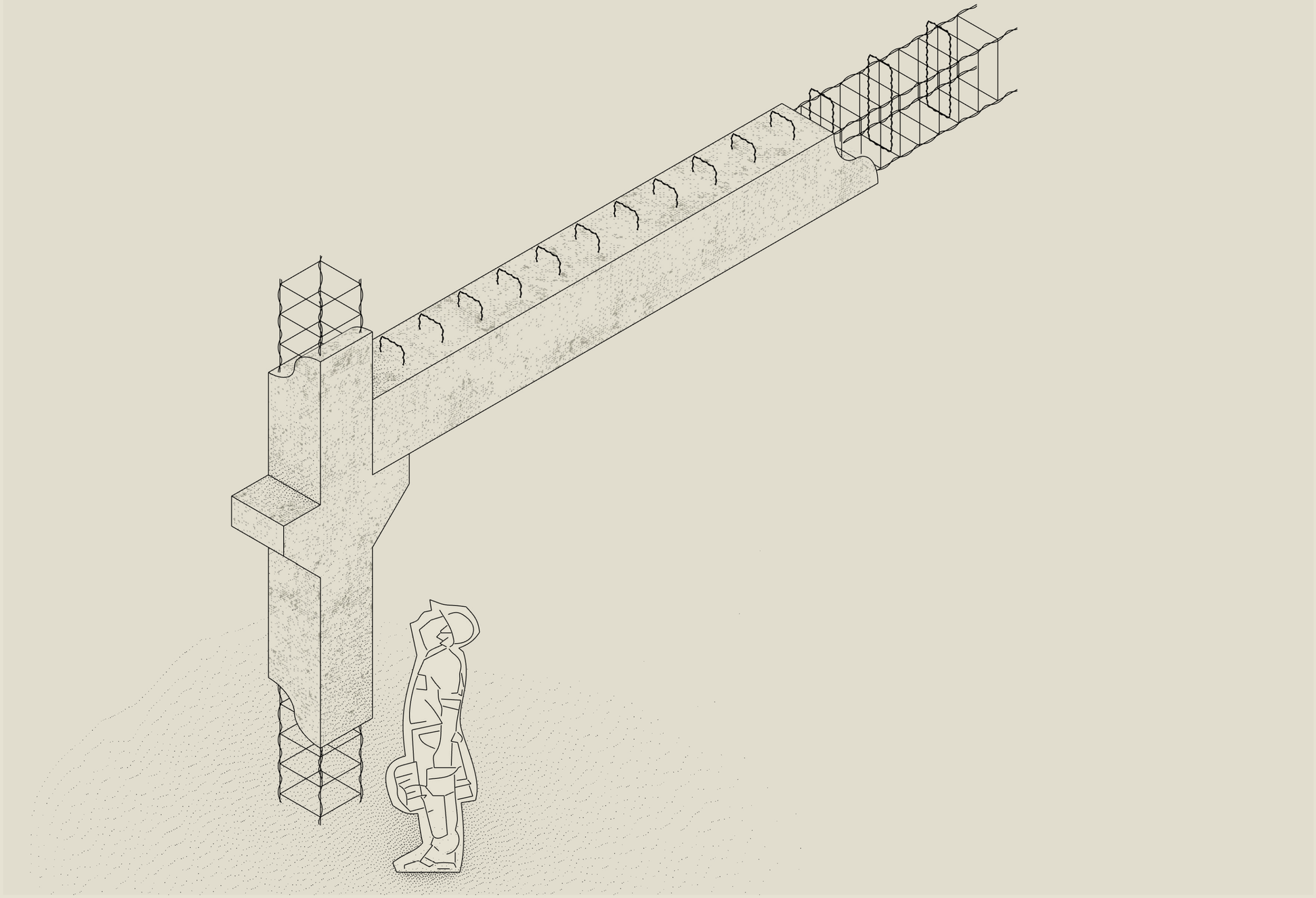

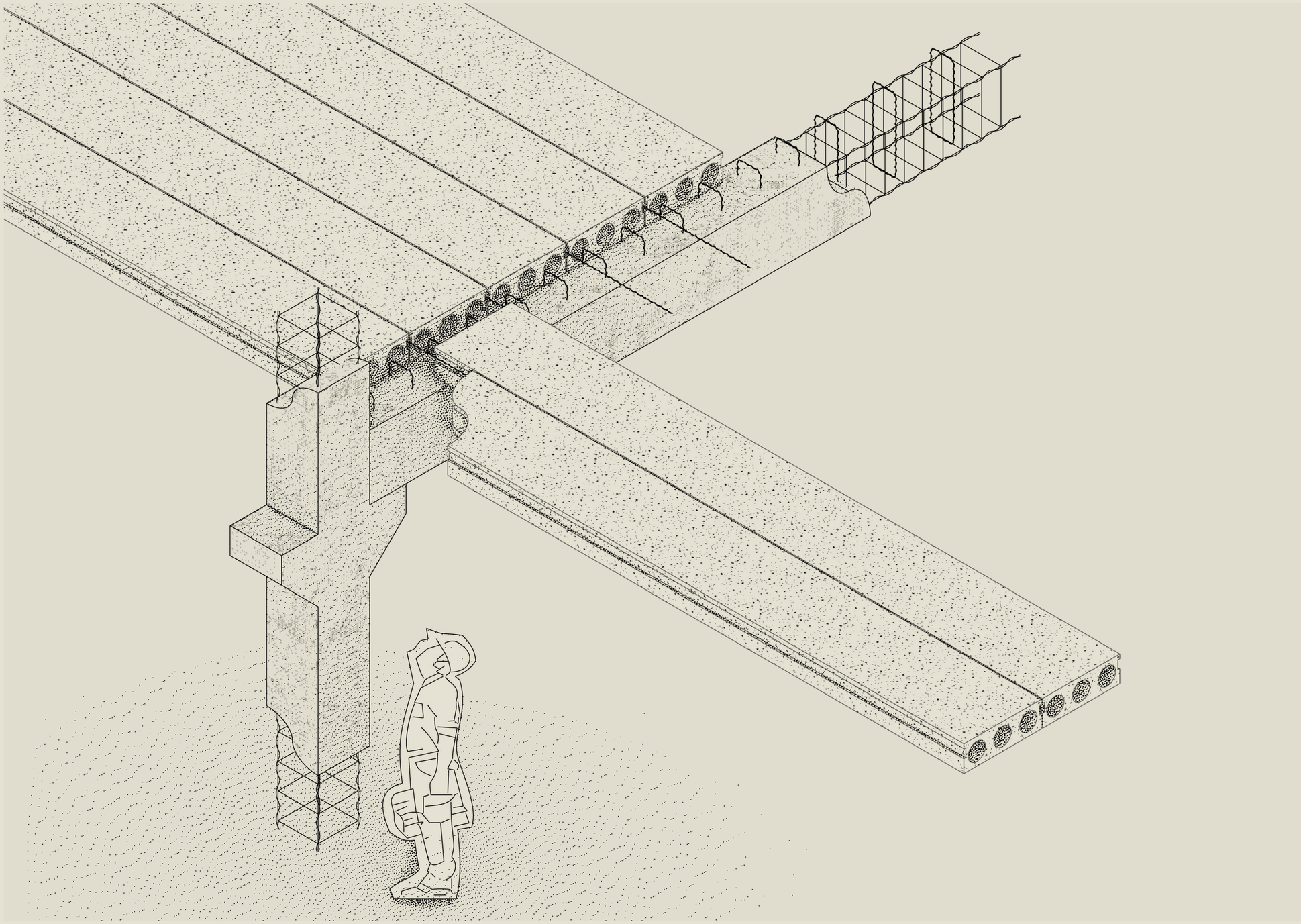

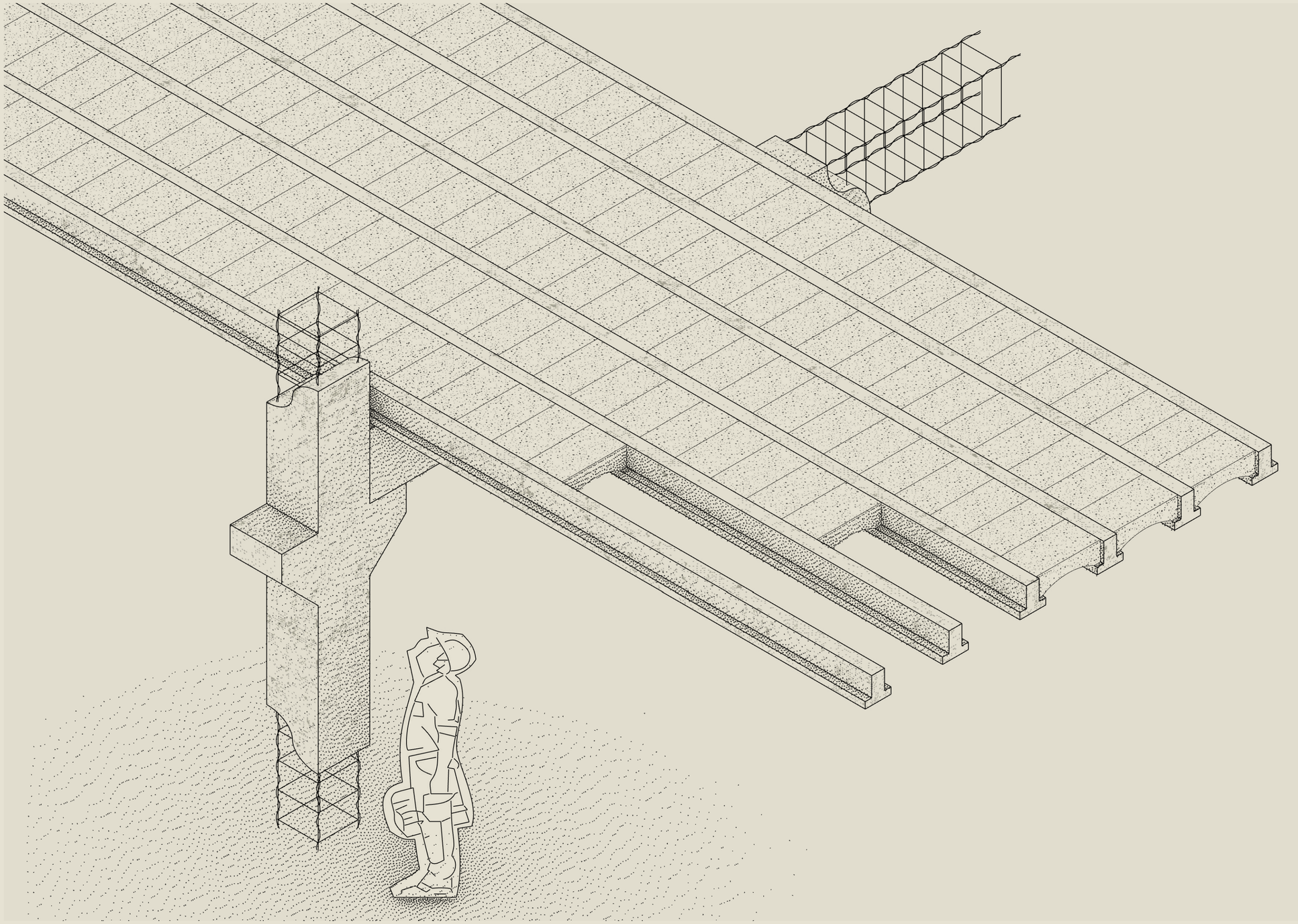

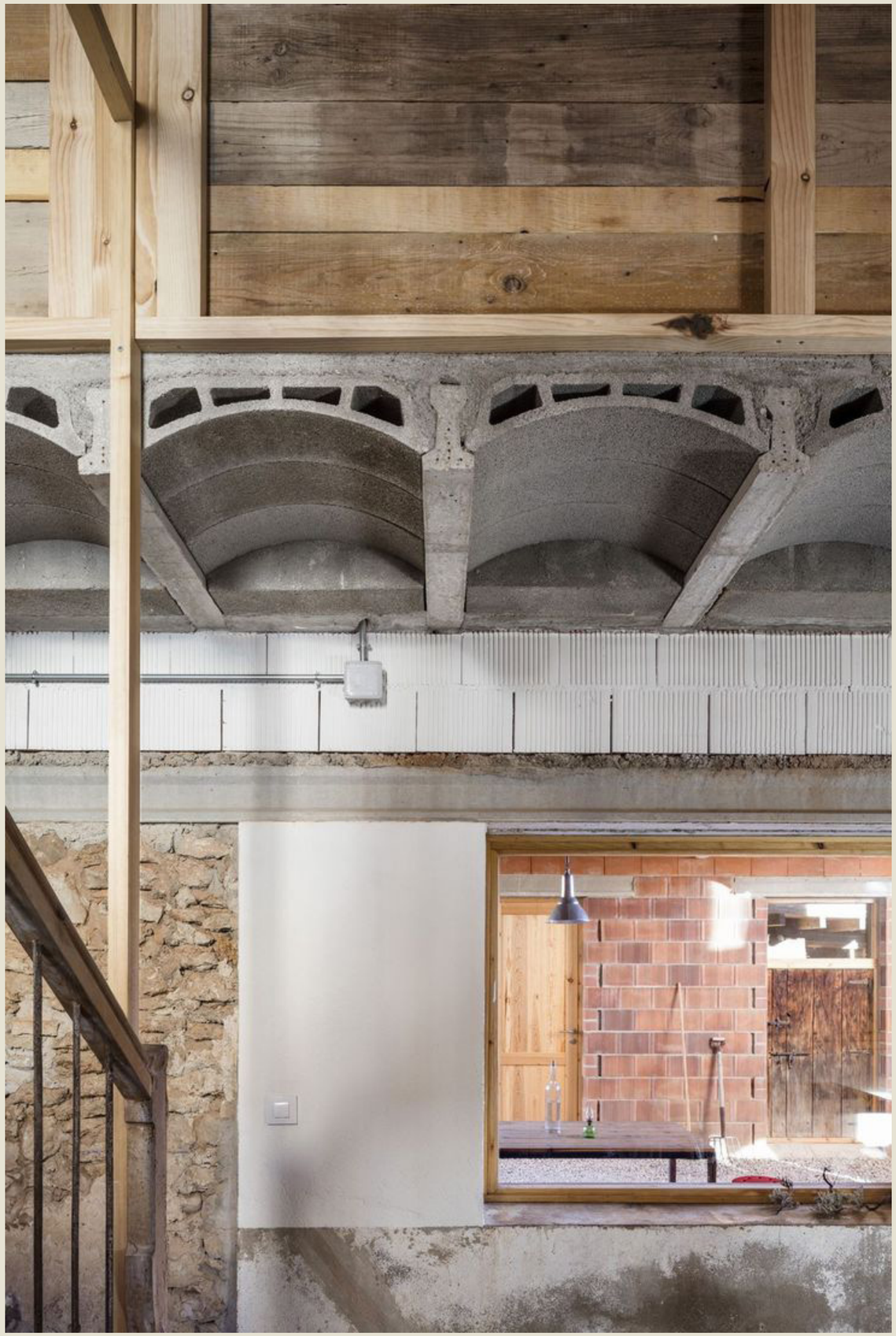





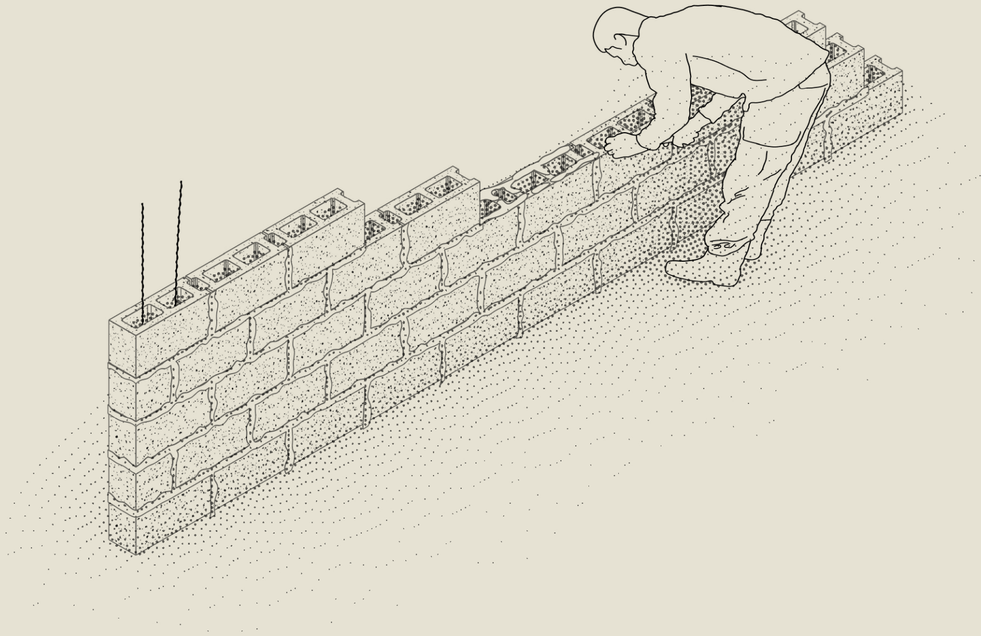

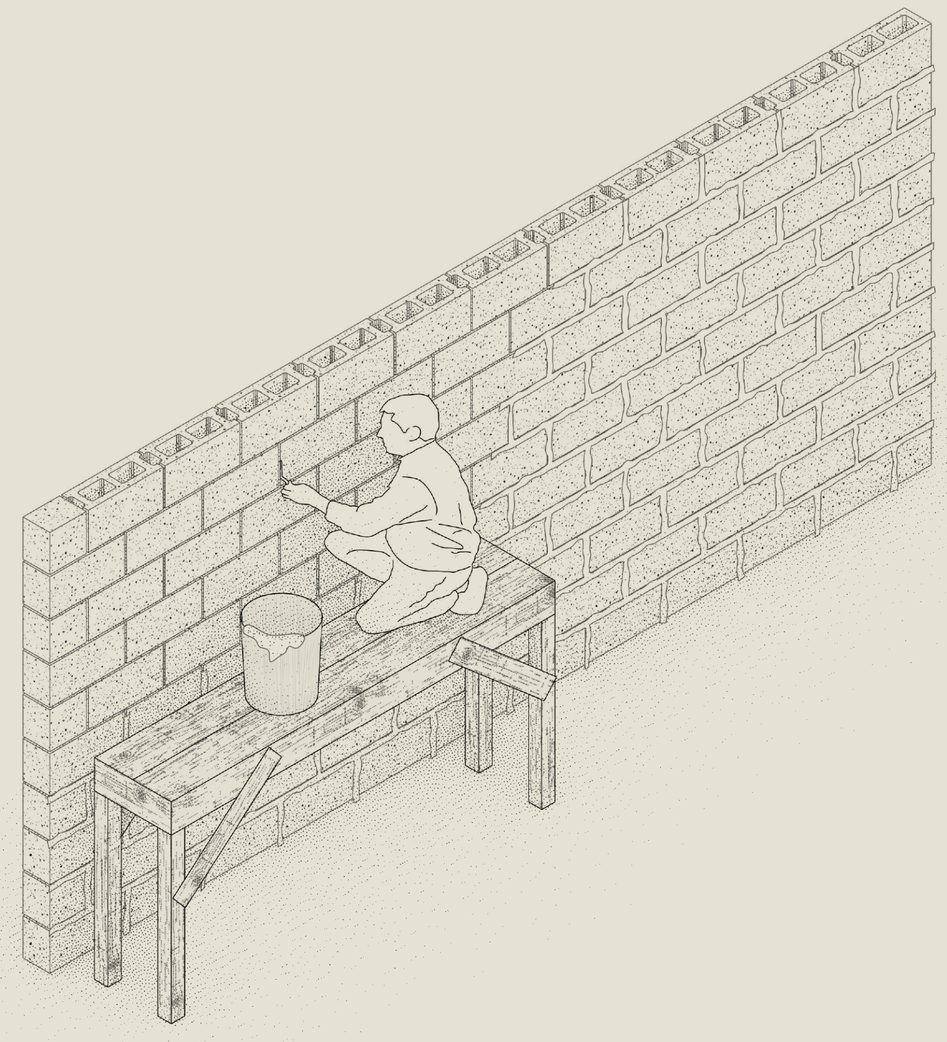

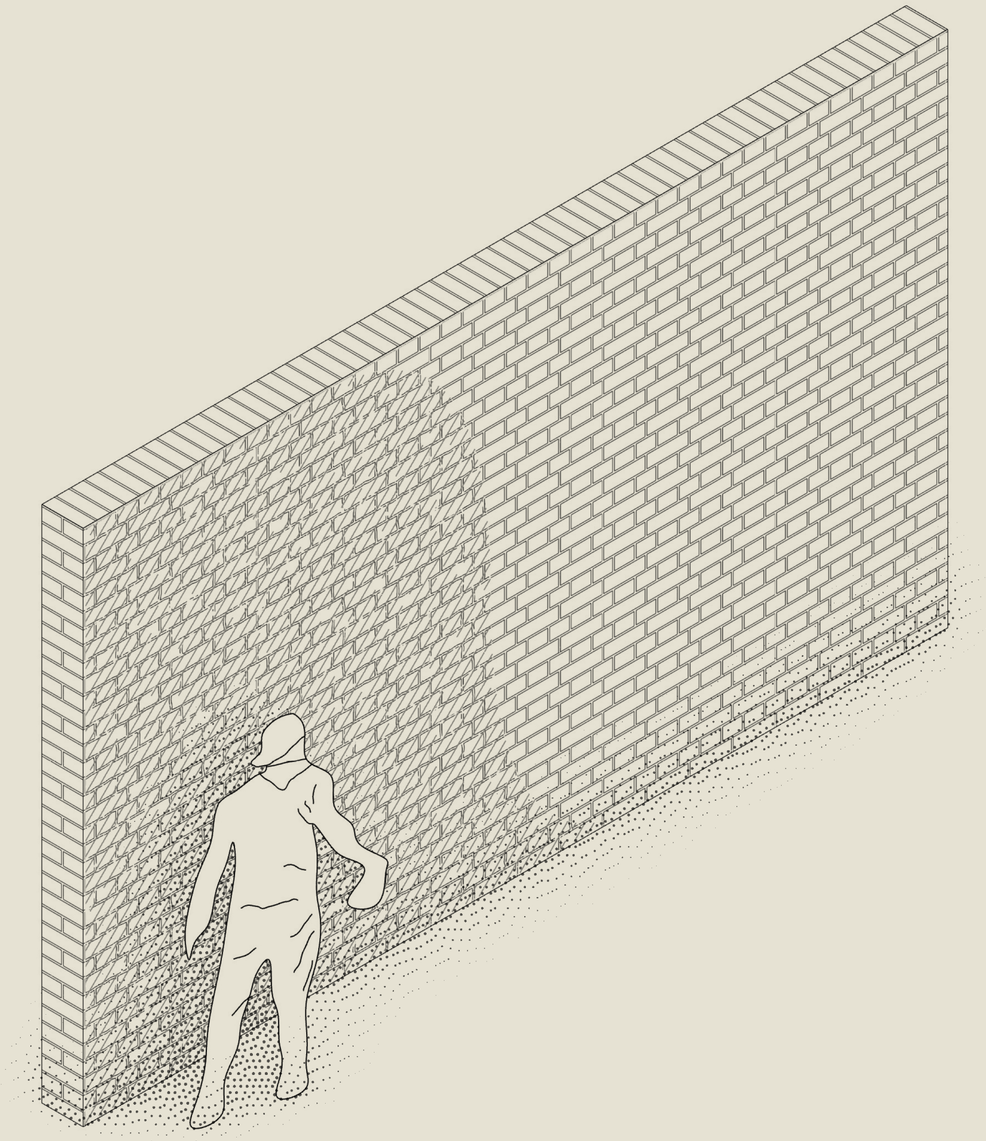

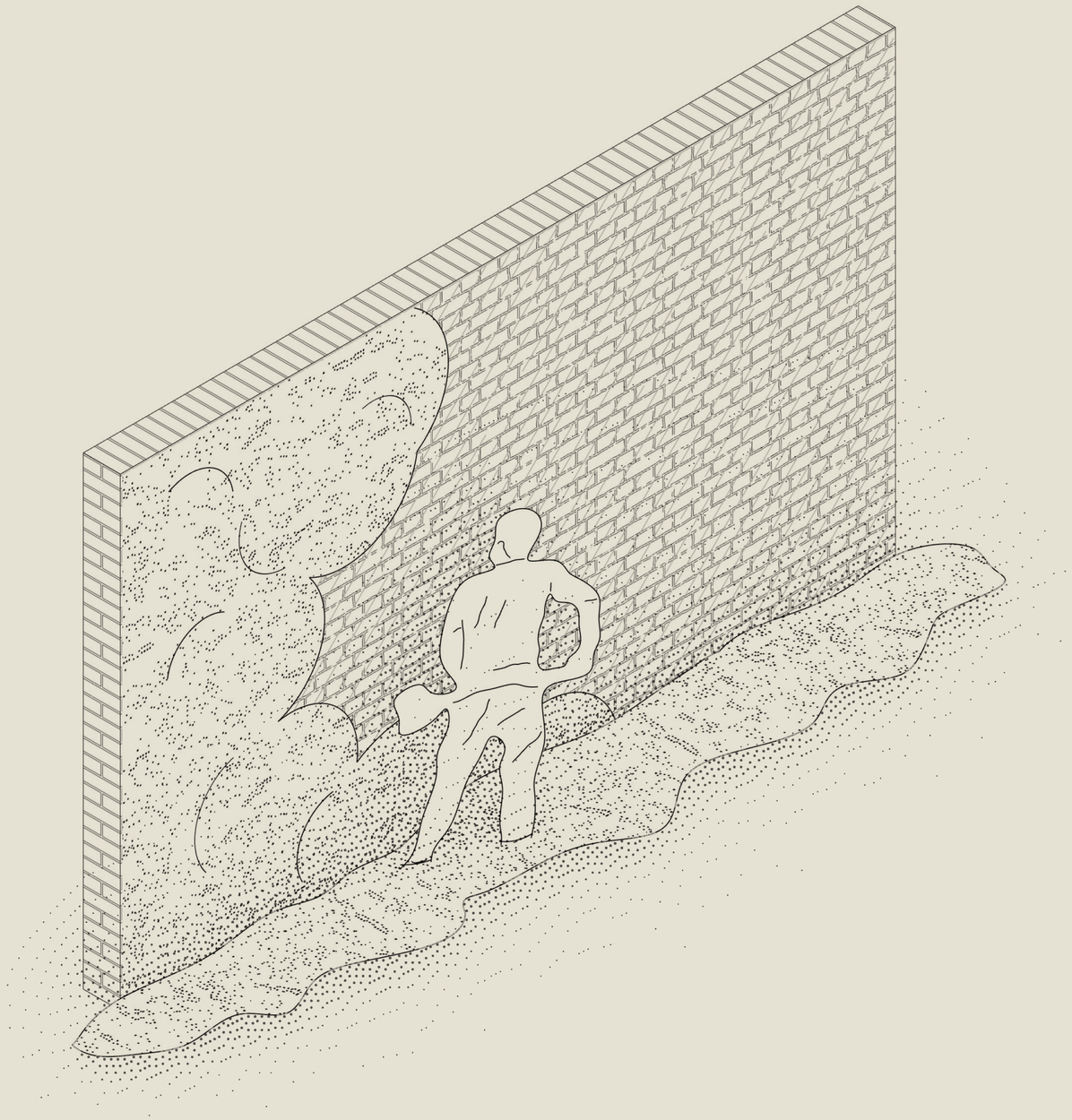

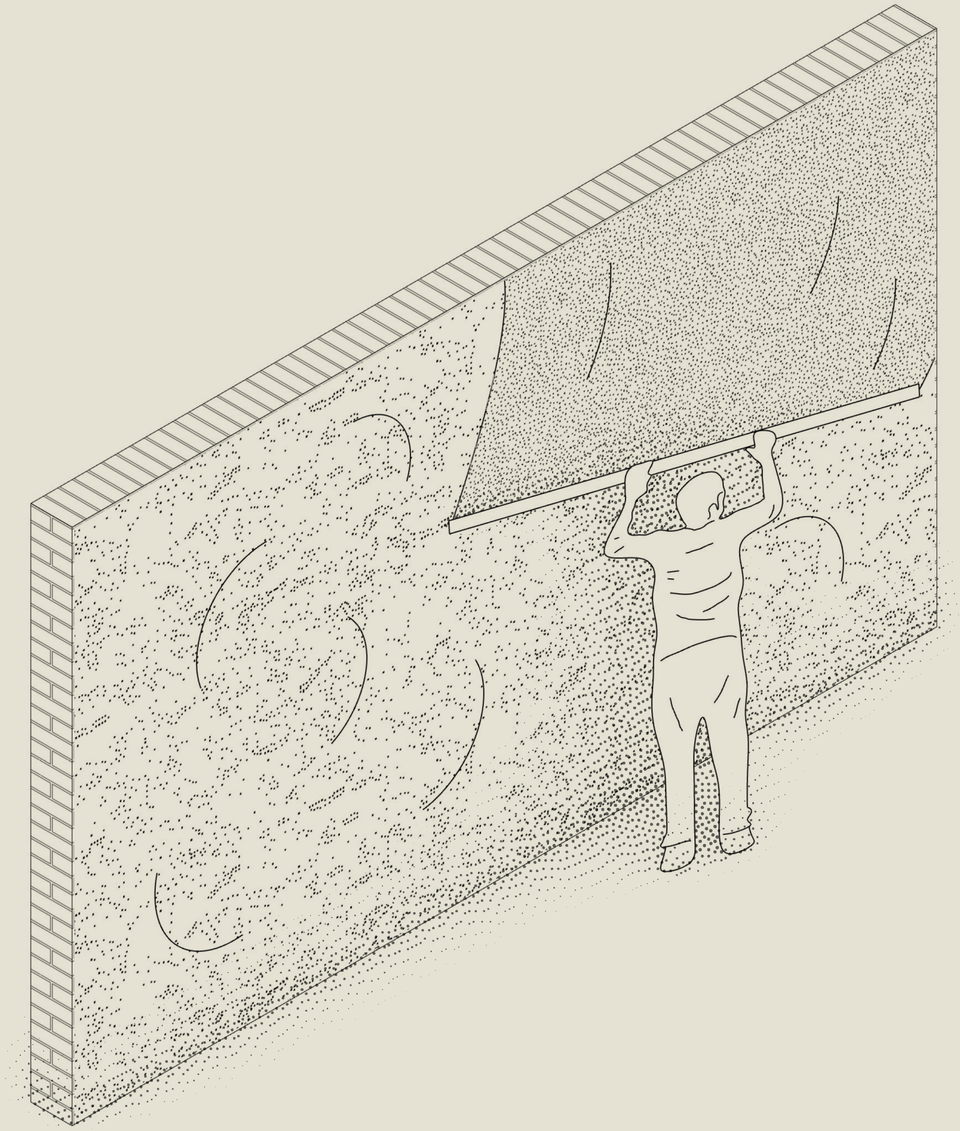

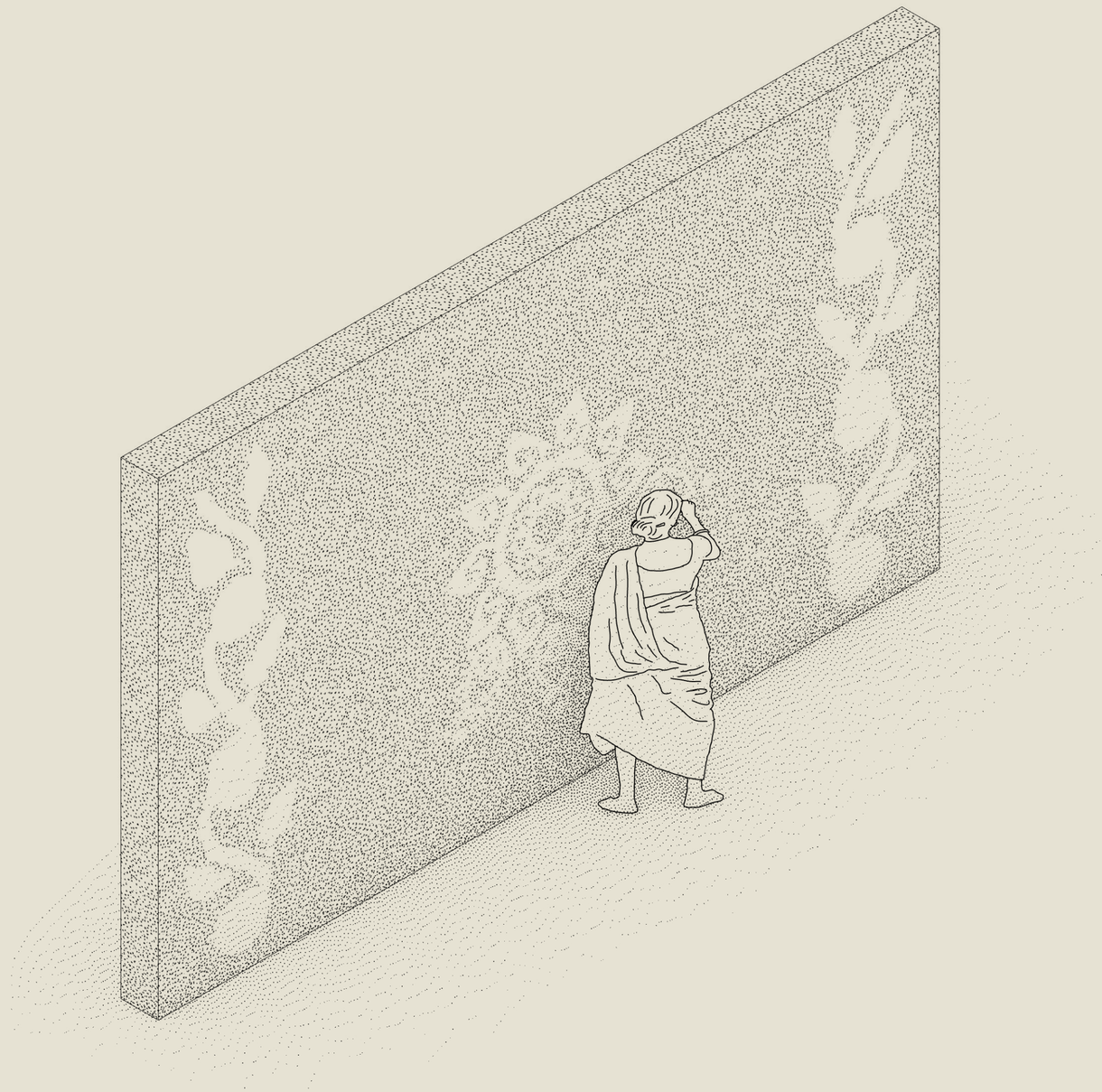



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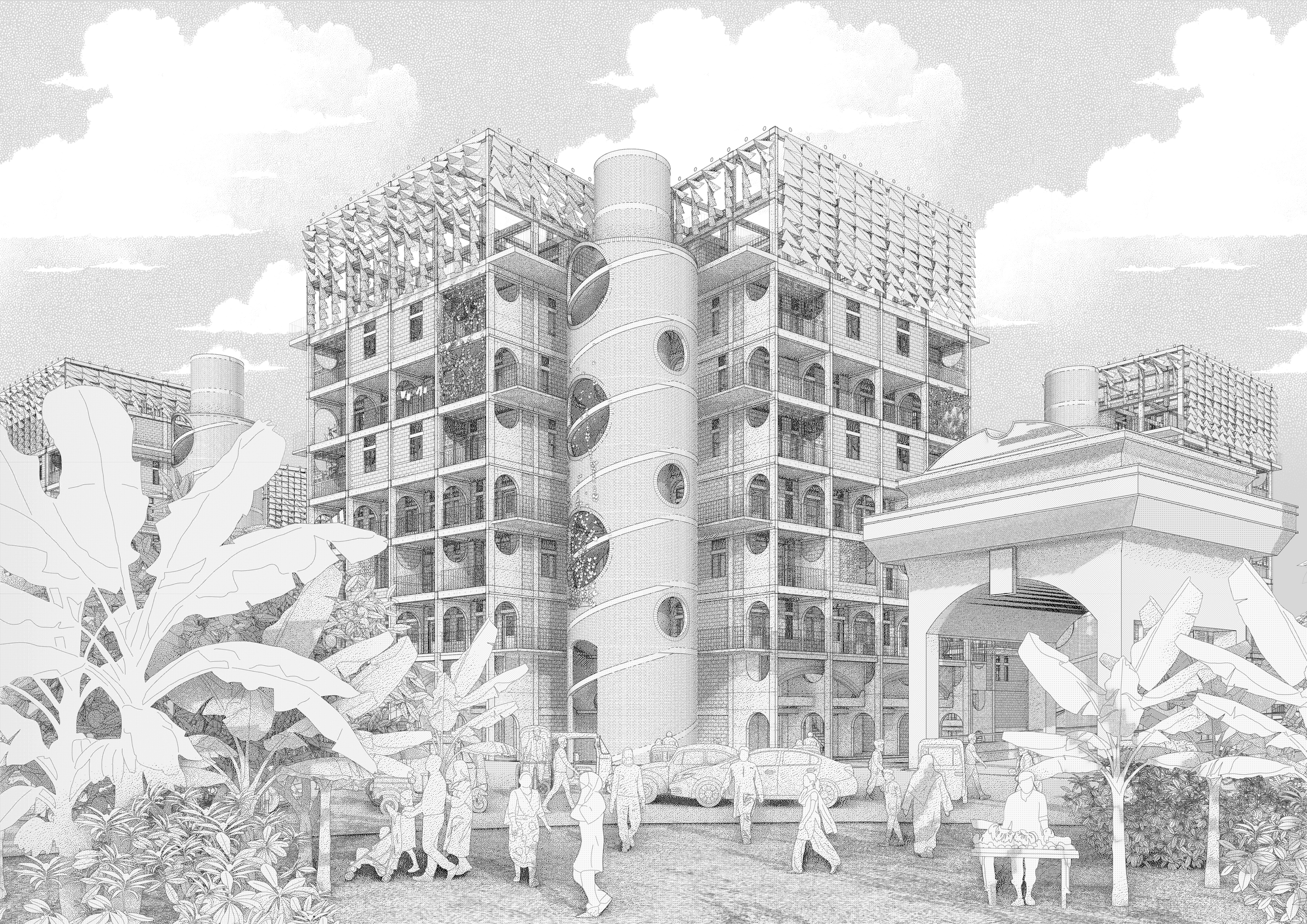
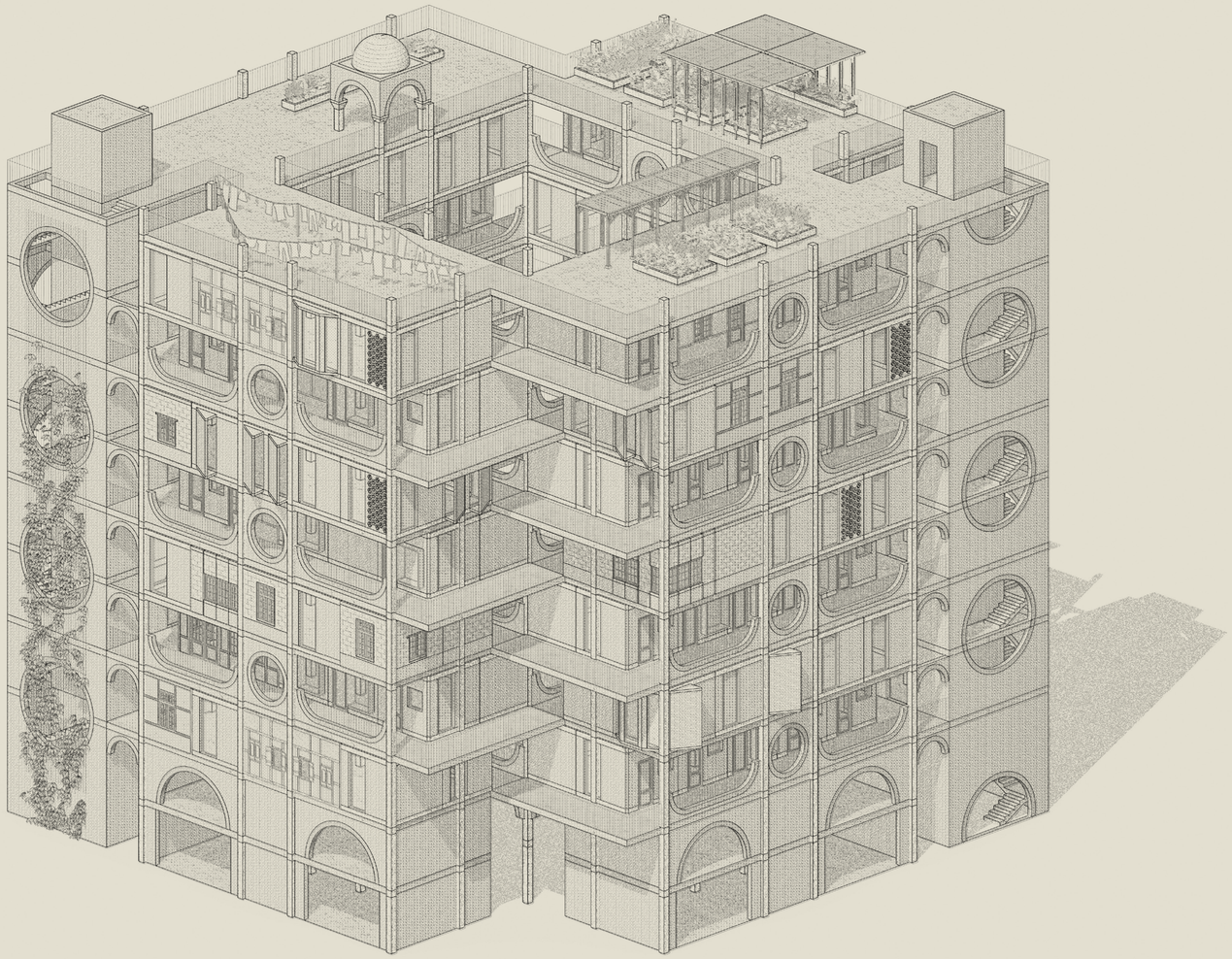
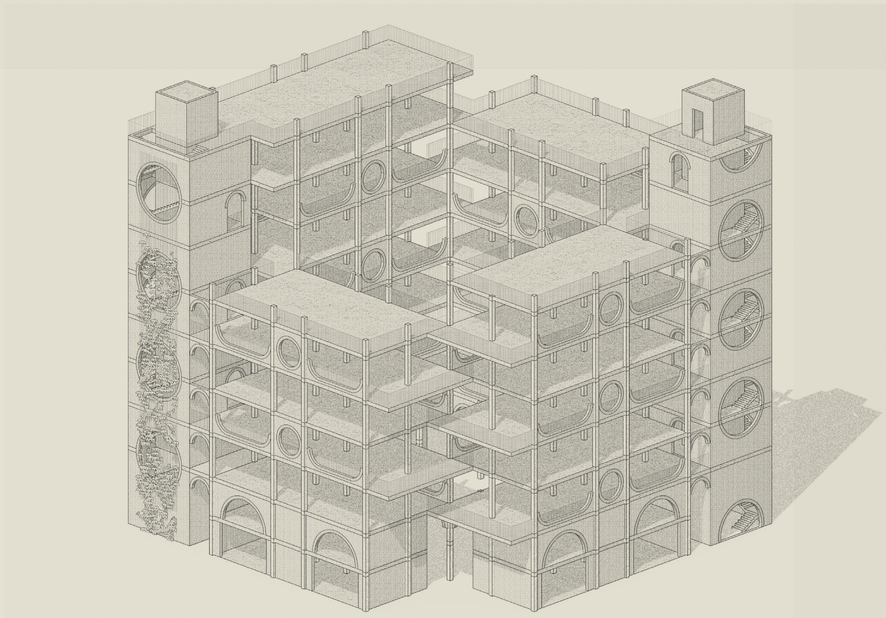
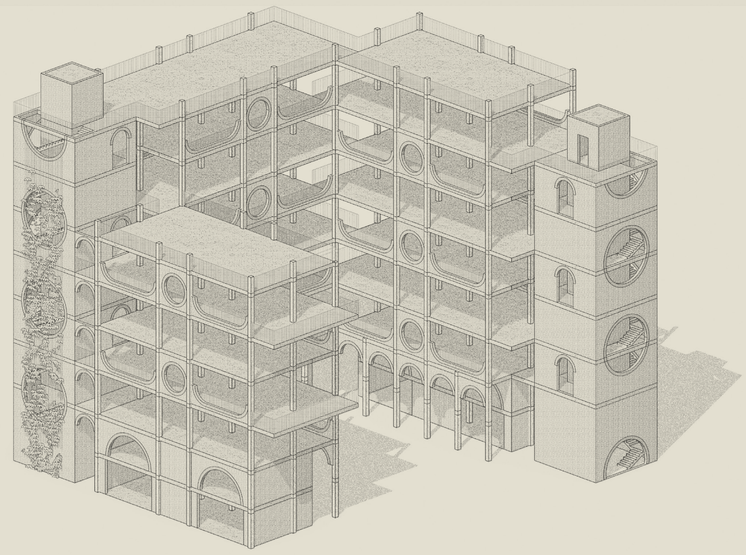



VAN BBQ VAN BBQ







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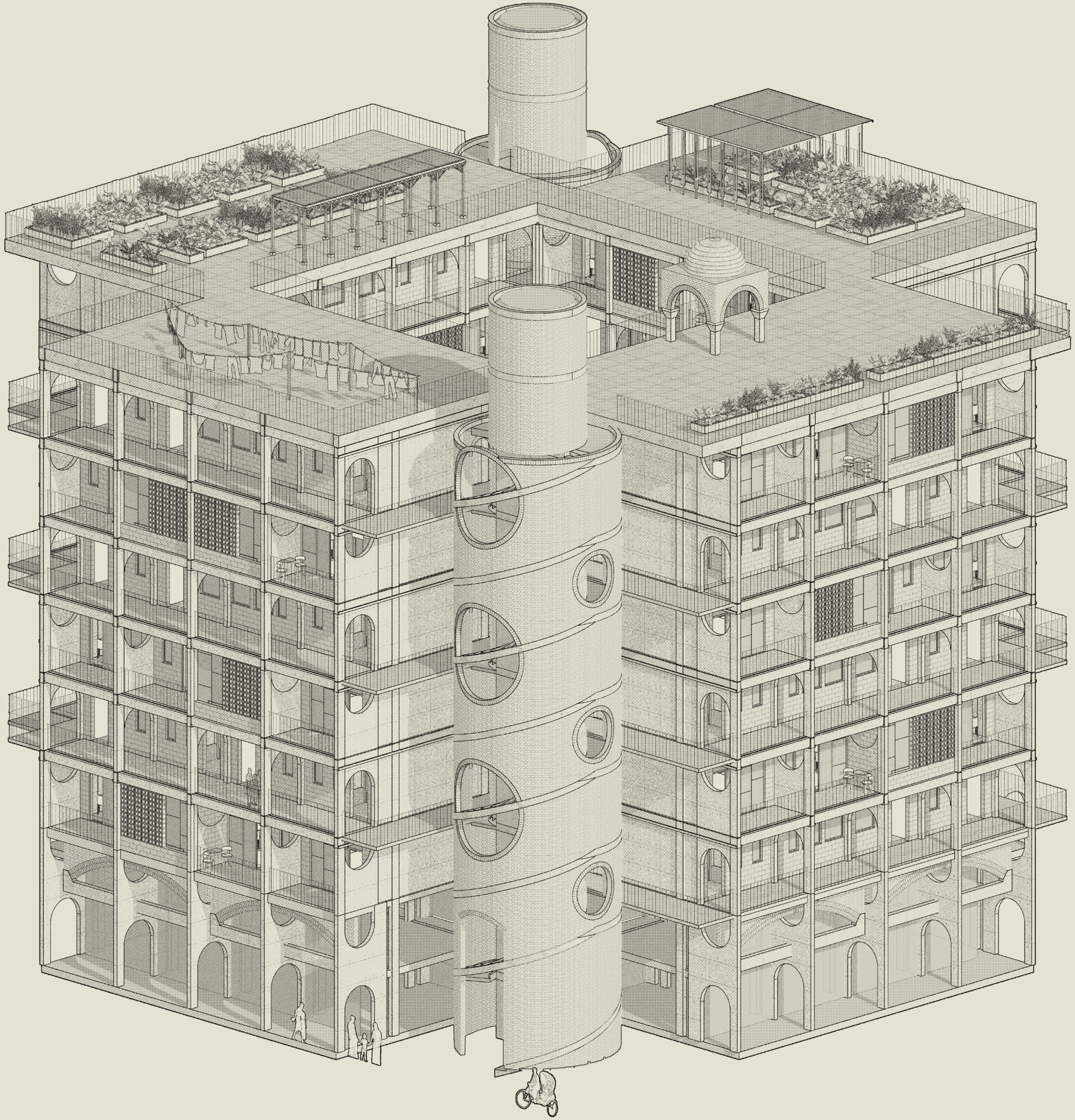



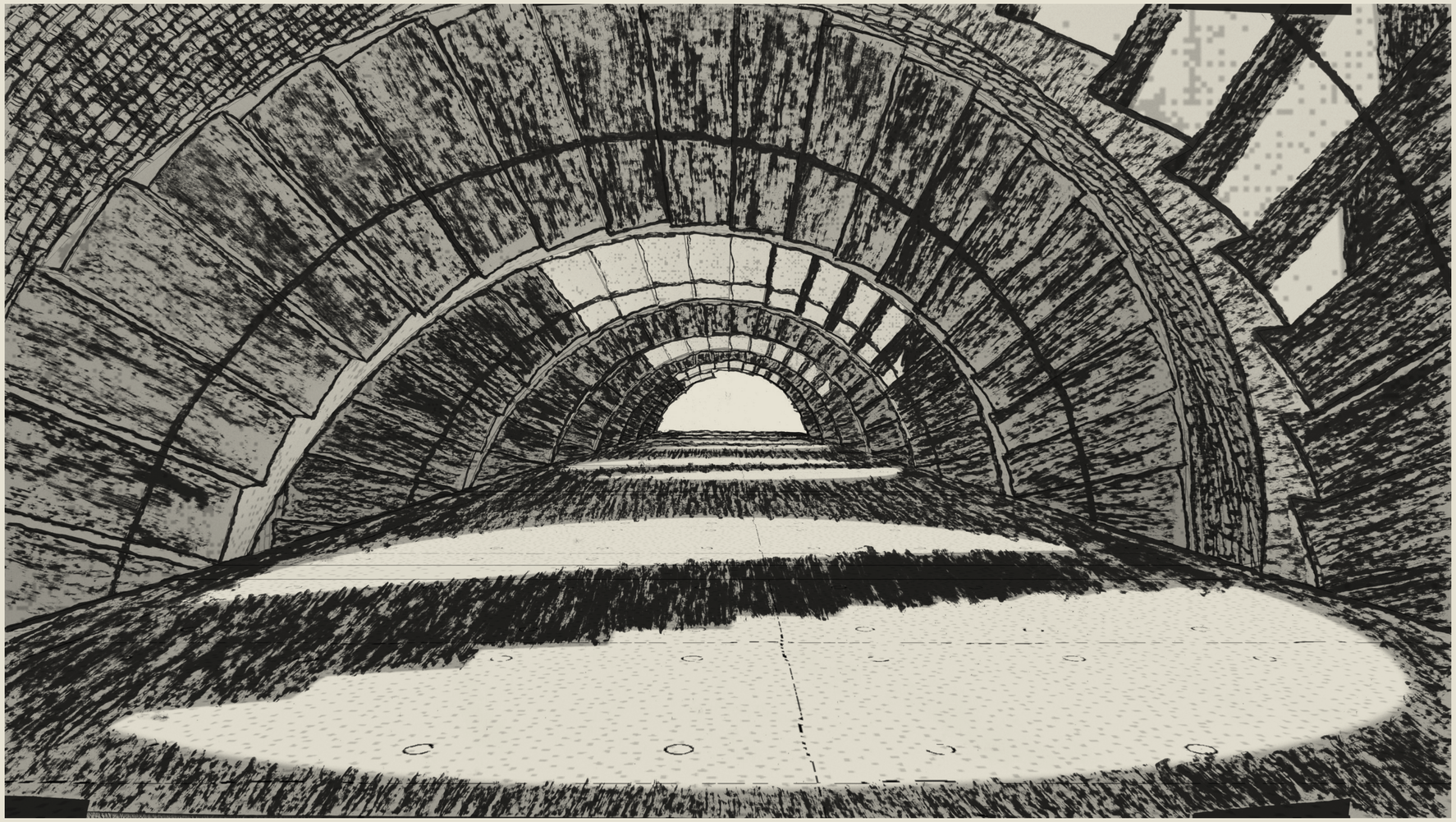

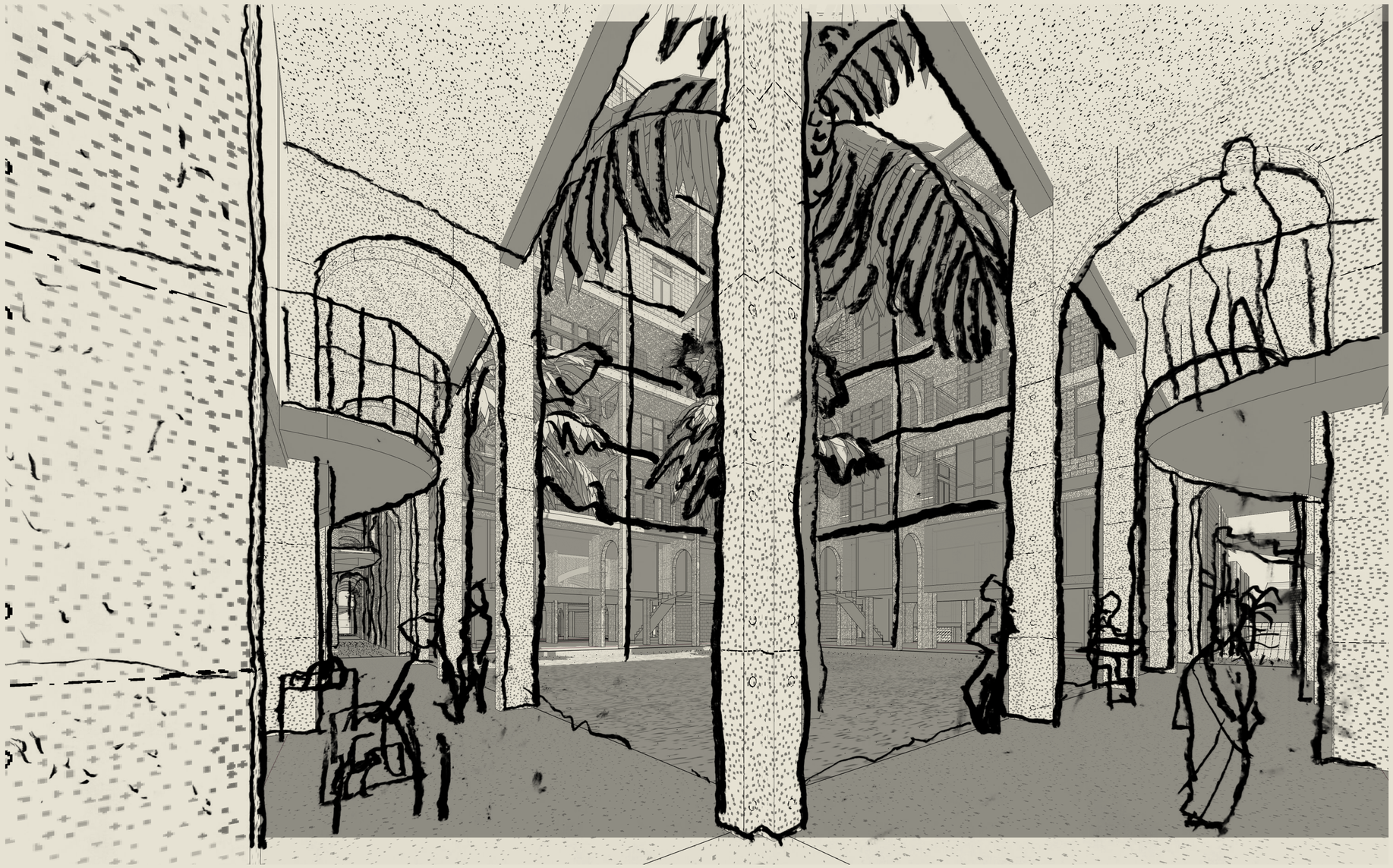





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Thank You

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