Maker Housing

निर्माता गृहनिर्माण **Nirmata Grihanirman**

Graduation Report

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Introduction

Navi Mumbai

Context

Mumbai is one of indias most heavily populated cities, ranking as the biggest metropolitan region in the country. As a result, Navi Mumbai (formerly known as New Bombay) was introduced, a urban development expanding from the suburbs of Bombay.

The project began in 1971, CIDCO City Industrial Development Corporation was set up by Government of Maharashtra. The project was set to spread over approximately 343.7 sq.kms, containing 95 villages.

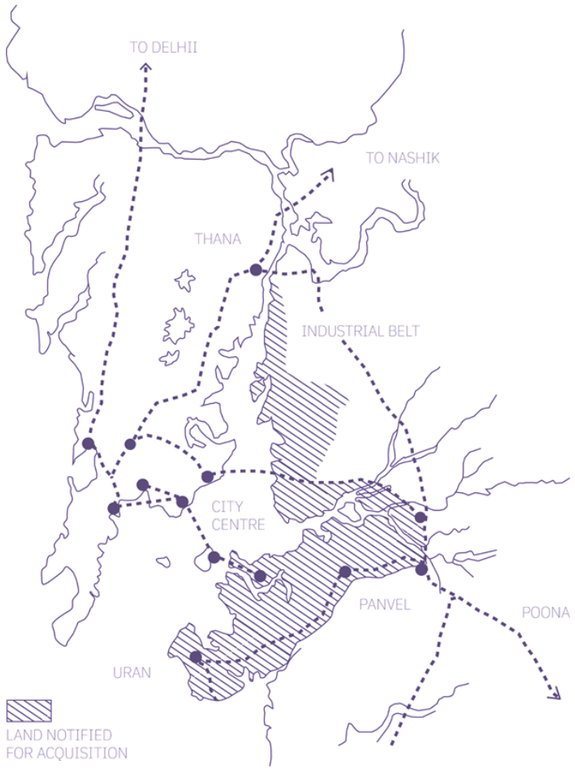


Image 02: Navi Mumbai Master plan

The project was introduced as a coping mechanism for Mumbai's growing population, Navi Mumbai would provide the population to similar amenities without the commute. The initial development consisted of around 16,000 hectares of land to the north-east of Mumbai, divided into 14 nodes.

The draft development plan was approved in August 1979 and came into effect March 1980[1] The city quickly progressed in residential, commercial, and industrial real estate. Making it largest planned city of India with a population of 1,120,547 as per the 2011 provisional census.[2]

The Census 2011 also relieved that there are total 273,626 families residing in Navi Mumbai. The NMMC (Navi Mumbai Munciple Corporation) has total administration over 273,626 houses in which they supply basic amenities such as water and sewerage. The plan depicted one-third of the housing in New Bombay would be sites-and services plots. Meaning individual families would then have to build and design their own homes based around basic services such as roads, water, electricity and sanitation. [3]The Navi Mumbai city is divided into 89 wards for which elections. are held every 5 years.

1 (Shaw, 1999)
2 (Census 2011)

3 (Ananthakrishnan, 1998)

Image 03: Location map of Greater and New Bombay

Population

As per provisional reports of Census India the population of Navi Mumbai consists of 610,060 male and 510,487 females respectively. The report also shows total literates in Navi Mumbai city being 888,117. [4]

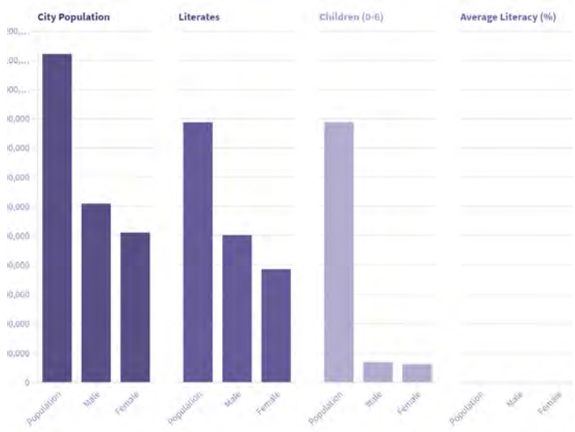


Image 04: Navi Mumbai Population Figures

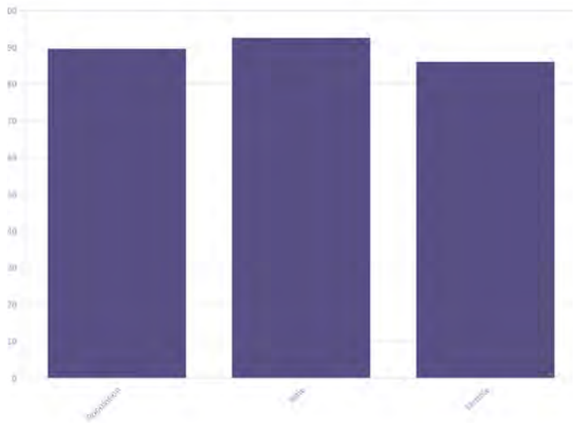


Image 05: Average literacy rate of Navi Mumbai

Politics

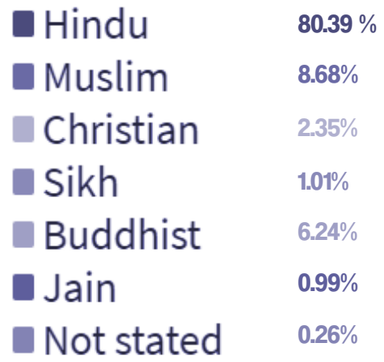
Out of the total 16 nodes of Navi Mumbai 10 are under NMMC control mostly in the Thane district, these districts are foothold of the Nationalist Congress Party. However CIDCO control the other 6 leaving the remaining nodes in the Raigad district to parties like Bharatiya Janata Party, Shiv Sena and Peasants and Workers Party of India.[5]

4 (Census 2011)
5 (Mendonca 2013)

Religion

Almost 80.39 % of Navi Mumbai's population follows hunduism leaving 19.61% of the population following other religions. Almost all districts are Hindu-majority. From the 2011 Census it showed Islam being the second most popular religion in the city and Christianity third. [6]

6 (Census 2011)



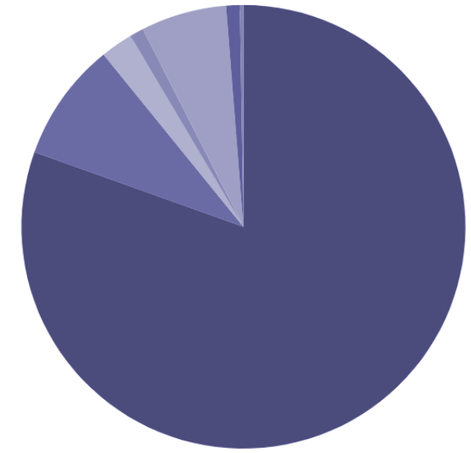


Image 06: Navi Mumbai Religion-wise data on religion

Hinduism is one of the worlds oldest religions, dating back to more than 4000 years ago. India alone represents 94% of the global Hindu population, with almost 966.3 million people identify as Hindu, representing 79.8% of the country's population according to the 2011 Census of India.[7]

7 ("Hinduism" 2017)

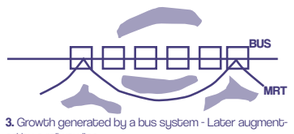
Zones

The population living in Navi Mumbai has increased from 3.18 lakhs in 1991 to 7.04 lakhs in 2001 meaning the overall increase was 82 percent.

The original plan for Navi Mumbai was centered around a node grid. The nodal structure was designed to allow residents living in Navi Mumbai to have efficient access to the larger public transportation system. During Navi Mumbai's conception around 52% of the commuting population used public transport to travel between the home and workplace, therefore it was fundamental to have a complete and robust transport system[8] This node system would have a railway through its core with additional bus lines coiling around to ensure accessibility to everyone in the city.[9]

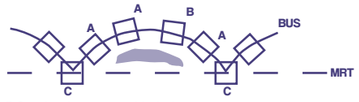
8 (Rao, 2017)
9 (Varma, 2021)

2. A bus system: Linear, therefore efficient - but breaks down as traffic grows

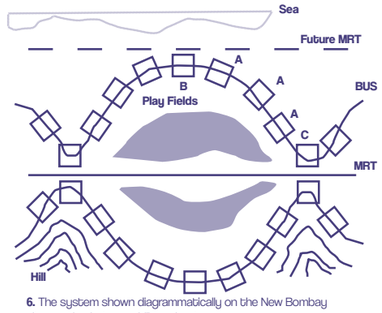


3. Growth generated by a bus system - Later augmented by a railway line

4. Step 3, adjusted for the inherent geometry of a railway line



5. Starting the pattern with the bus system



6. The system shown diagrammatically on the New Bombay site, running between hills and water

Image 07: : Proposed Node structure

The total land of Navi Mumbai was divided into 16 townships, many neighborhoods were self-sufficient and had their own public amenities.

- Zone A - Belapur
- Zone B - Nerul
- Zone C - Vashi
- Zone D - Turbhe
- Zone E - Koparkhairane
- Zone F - Ghansoli
- Zone G - Airoli
- Zone H - Digha
- Zone I - Dahisar

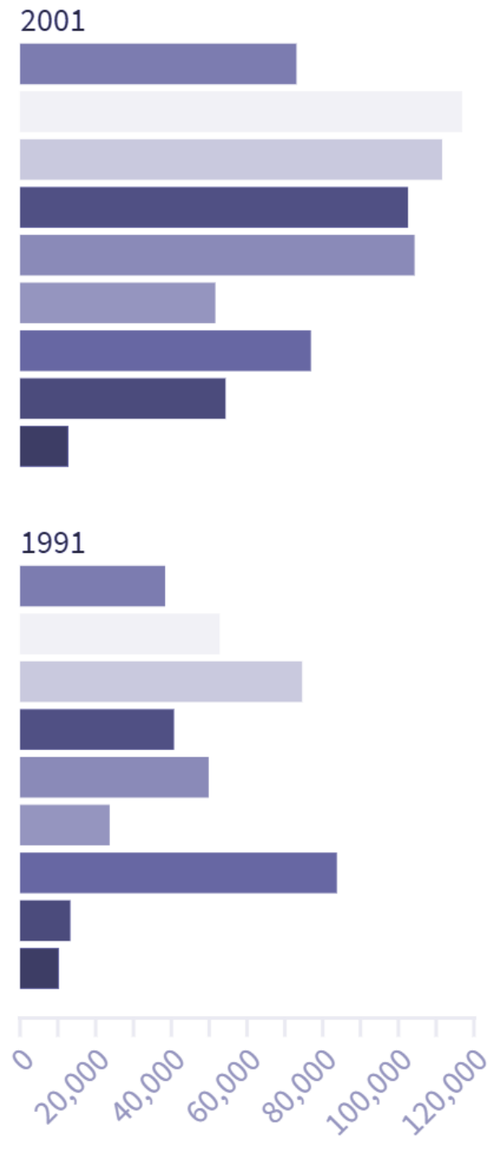


Image 08: Population zone date 1991 + 2001 Census

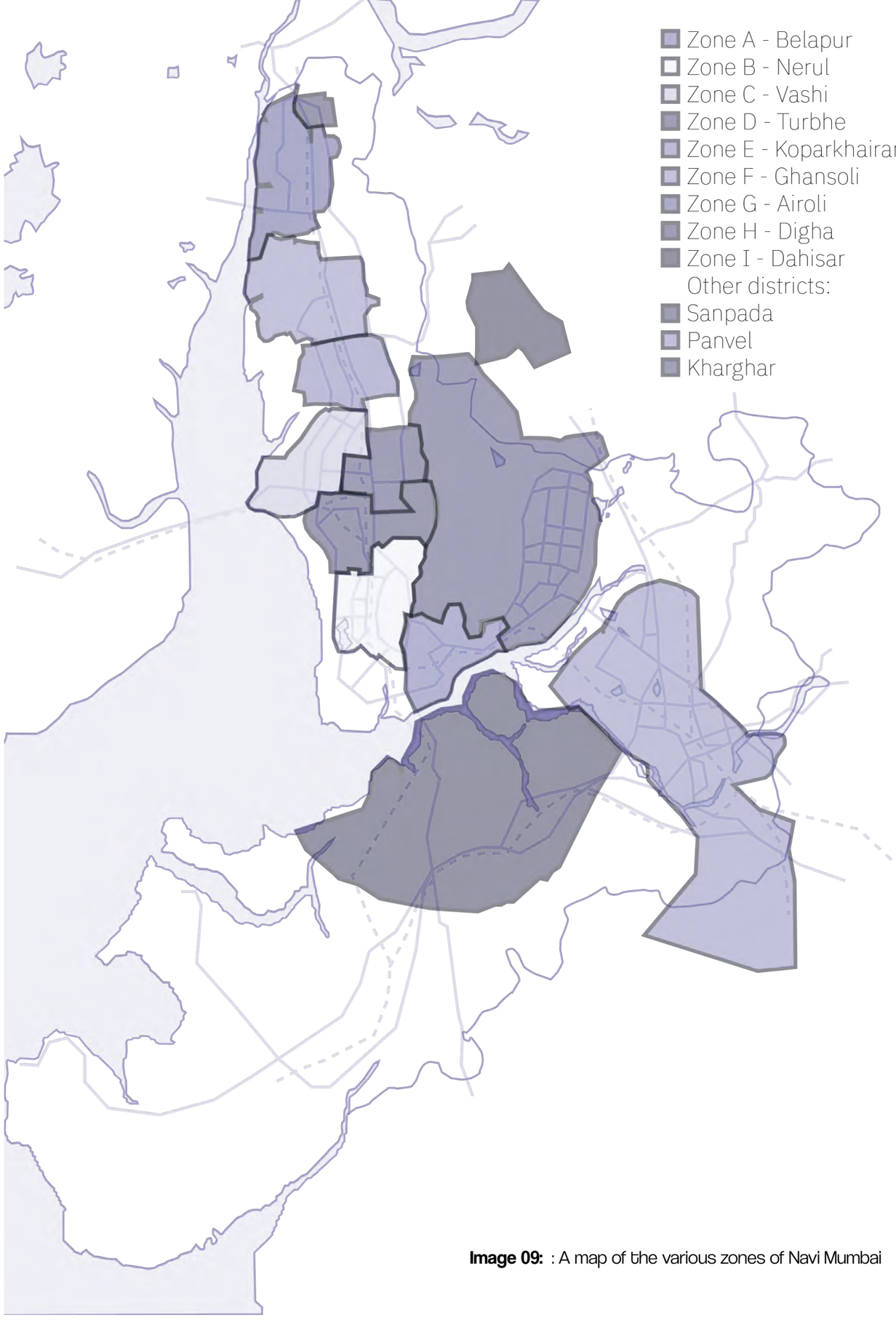


Image 09: : A map of the various zones of Navi Mumbai

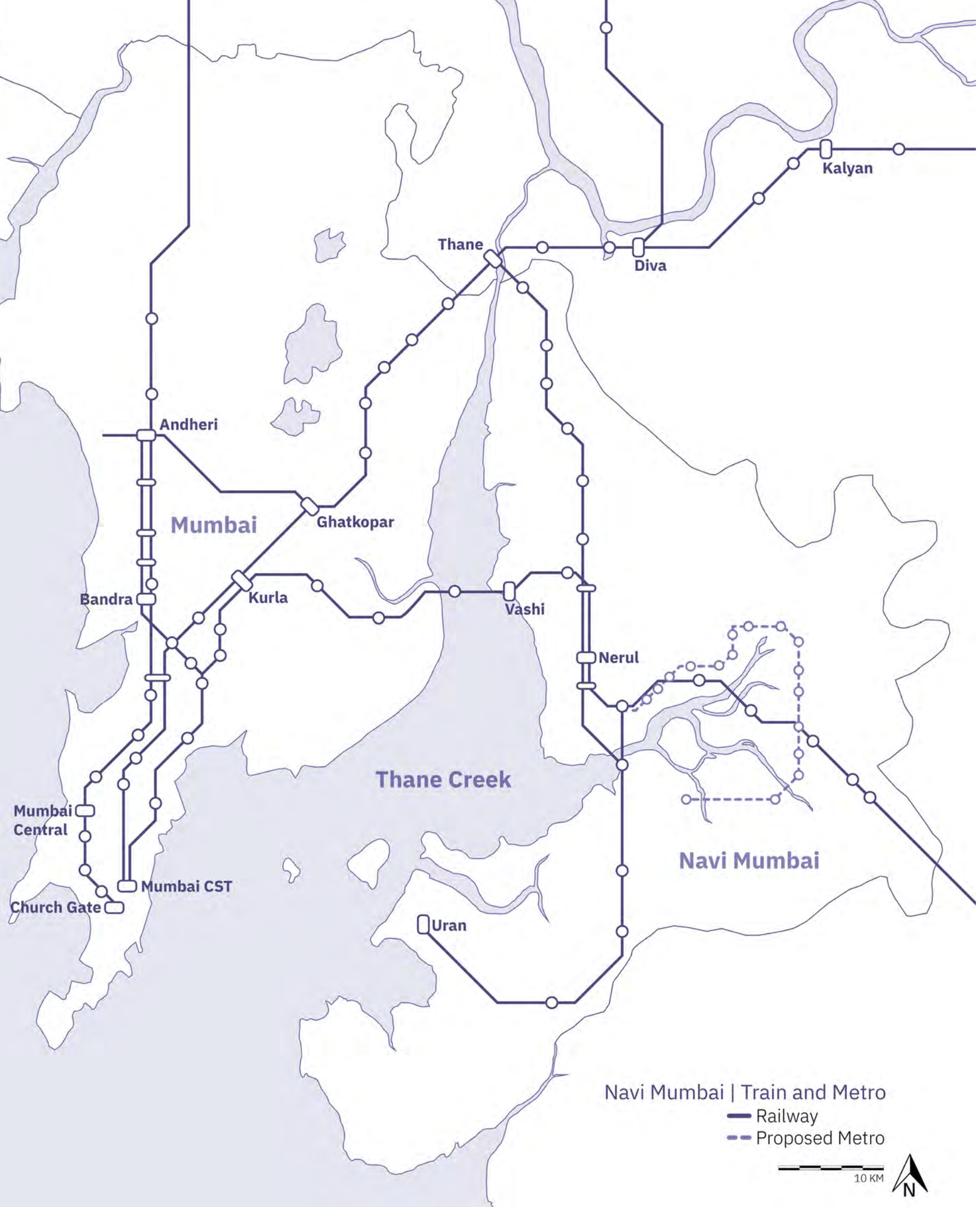


Image 10: : A map showing the train and me

Between Mumbai and Navi Mumbai almost 7.5 million people commute on a daily basis. Peak hours between the morning and in the afternoon cause stations to become some of the busiest in the world. A single trip between Navi Mumbai and Mumbai takes them around 2 to 3 hours.[10]

A metro system is also currently being built by CIDCO connecting the southern sector of Navi Mumbai. This railway is planned to be around 117 km long and was estimated to be completed in 2020, however due of Covid-19 the first section of the metro will be finished in 2022. This metro will connect the International Airport, which is currently still under construction.

10 (Rao, 2017)

CIDCO

CIDCO

The City and Industrial Development Corporation (CIDCO) was established in 1971 with the task of planning and developing Navi Mumbai. The corporation now oversees almost all development of the city creating mass housing blocks to fit the depend of population.

The prominent authors of the Navi Mumbai were Charles Correa, Pravina Mehta and Shirish Patel who presented to the government a proposal in 1964 to construct new growth centers across Bombay harbor on the mainland.[11]

'As of 1989, CIDCO realised 65.068 residential units throughout the city, most of which (53%) focused on housing lower income groups. These early low-cost housing schemes did however offer a low standard of living, with few amenities close to the buildings, and were often criticized for being build without any consideration for privacy and space. This, together with an increase of monotony in the buildings due to a rising amount of repetition in the designs and layouts, led to CIDCO more often actively involve other agencies in building housing in the city.' [12]

11 (Ananthakrishnan, 1998)
12 (Shaw, 1999)

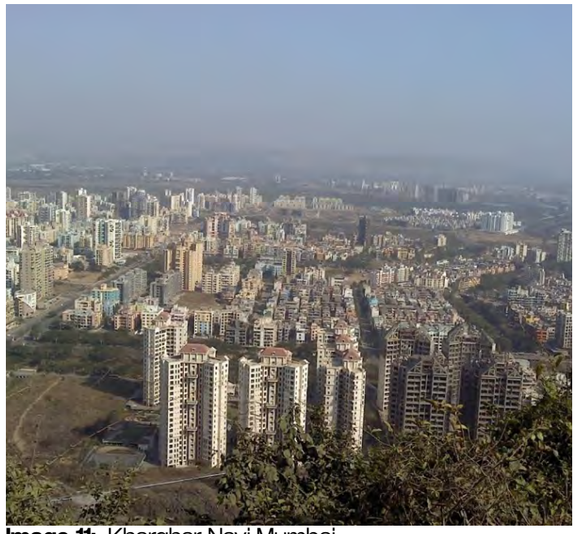


Image 11: Kharghar Navi Mumbai

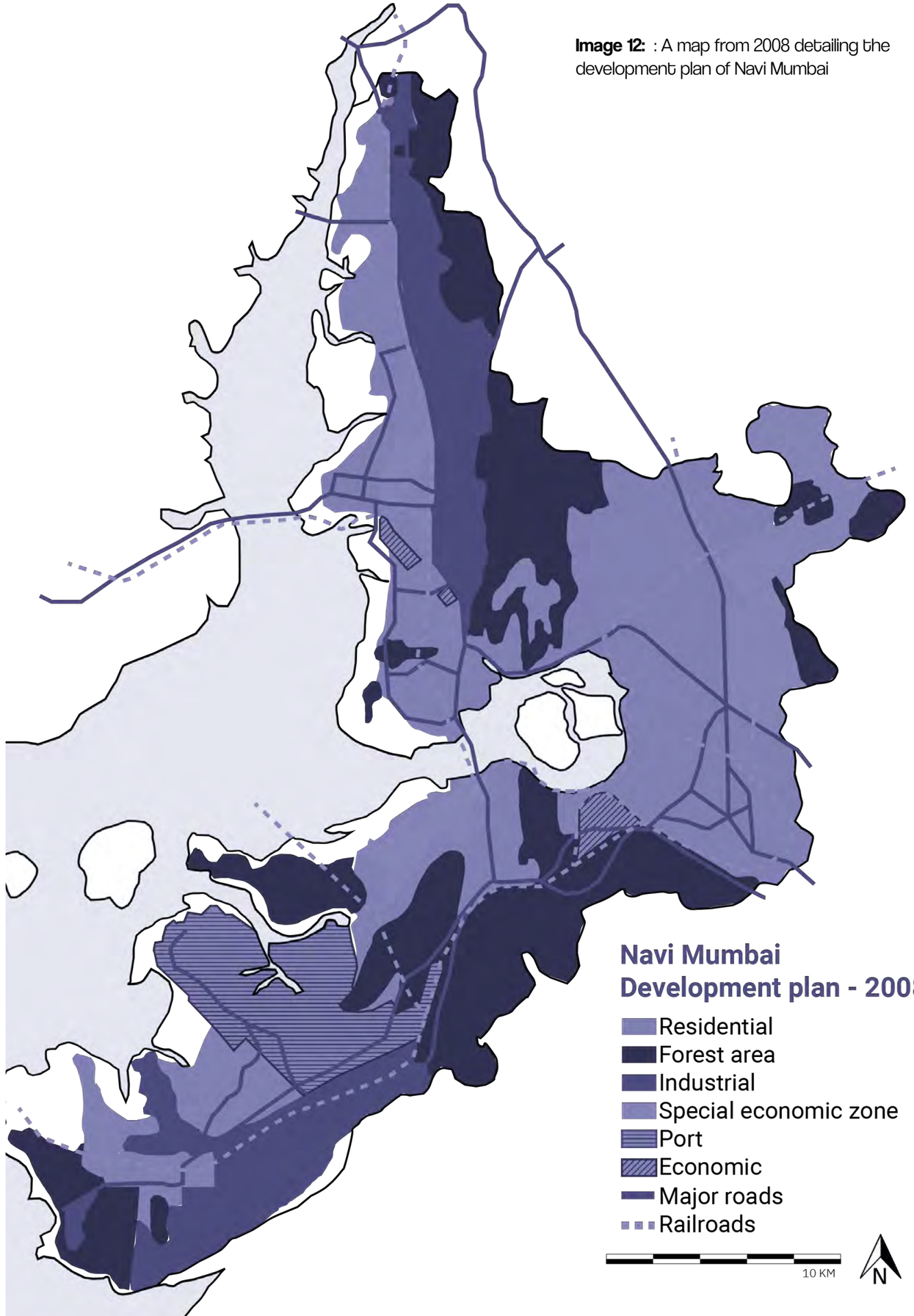
Navi Mumbai is on the edge of development pursuing several infrastructure projects. These projects are with the intensions of further developing the economic market within the city. At present, Navi Mumbai has around 18 million sq, ft of operational Business Space, this is set to increase after new infrastructure is in place. With Navi Mumbai being a newly developed city startup culture is a huge scene, it is estimated around 500 new startups have been growing every month. Due to the developing special economic zones they attract hub of Corporate IT and software companies. Additionally CIDCO plans to expand a industrial company park over 120 hectares in the Kharghar district. More than 70 huge IT and economic corporations will operate there.

Image 11: Navi Mumbai International Airport Due to be designed by Zaha Hadid

"Currently, CIDCO still functions as the main developer of Navi Mumbai. Due to the high demand of people that want to live in Navi Mumbai, CIDCO has started using a lottery system to distribute the housing among the Interested parties. In 2017 CIDCO also started construction on the Navi Mumbai international Airport, with the aims of furthering Navi Mumbai as a global city."[13]

13 (Spoon 2021)

Image 12: : A map from 2008 detailing the development plan of Navi Mumbai



Research Plan

Submitted 18th November 2021

Background

Keywords

Navi Mumbai, Housing, Design, Craft, Making, Art Background

Context

Mumbai is one of India's most heavily populated cities, ranking as the biggest metropolitan region in the country. In reaction to this overwhelming mass of people Navi Mumbai was formed, a dual city urban development that expanded from the suburbs of Bombay. Although having the intentions to control Mumbai's growing population, Navi Mumbai is now situated in a similar position. [1] Due to lower land prices in comparison to Mumbai many migrated to the 'planned city' however the issue of commuting back and forth occurred, leaving Navi Mumbai to reside as a dormitory capital.

Many communities operate in the production and distribution of local goods such as retail vendors, hawkers and street sellers. Trade has an essential presence within public space providing essential services to almost all the population alongside direct employment for the local society. [2] However, a percentage of this trade such as hawkers can also be grouped alongside other informalities like slum dwellings being that there is regulation surrounding them. Trading and production are key factors within Indian culture, many arts and crafts manufacturing has derived from small communities producing sellable goods to produce an income for their family.

Homo faber (Latin for "Man the Maker") is the concept that human beings can monitor their fate and their environment as a result of the use of tools. 'The human being as the maker or creator' (Merriam-Webster Dictionary 2021). India is a nation recognised for its craft and celebration of traditional art, many of these skills and techniques origin from domestic space. Indigenous craft such as Rangoli are key elements to an Indian home, ornate designs are placed as a welcoming entrance to the dwelling and are a part of a daily practice. [3]

This research will focus on mass housing design for low-income groups and how artisan lifestyle can be incorporated and revived within the Indian community.

Image 02: Traditional Rangoli pongal special kolam design drawn with flowers and deepams with 13 dots

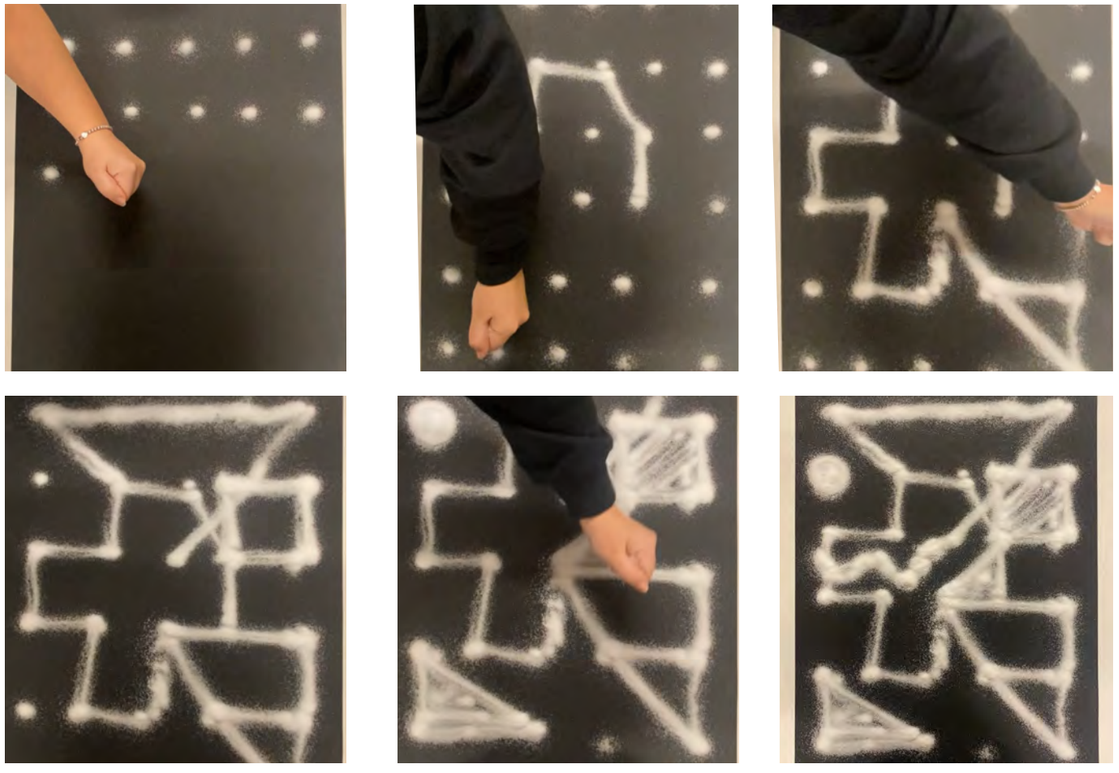


Image 03: Experimentation with salt trying traditional rangoli

Problem Statement

Navi Mumbai was intended to relieve the overpopulation issue in Mumbai and although many residents moved, business did not, leaving a large amount of people to commute daily for work purposes. The original plan for Navi Mumbai designed by CIDCO (City and Industrial Development Corporation) was based around a node structure, designed to allow residents to have easy access to the larger public transportation system.[4] However, working outside of Navi Mumbai is still common practice in comparison to Mumbai where many live and work within the same district.[5]

Since the direct translation of 'Navi' in Marathi is 'New' this gives a similar indication of city's identity, although culture and traditions have continued to relocate, either it be from Mumbai or elsewhere to the area it is very uncommon for an indigenous group or heritage to originate within Navi Mumbai. [6] Habitually it is common within communities to pass on the knowledge of a trade or traditional skill through a family community. This layering of abilities adds to a product, making it simultaneously bonded to the environment it was produced in.

"Different art forms arise from different social and linguistic groups. Each art form has its own cultural significance and history. But gradually, these crafts are dying out with increased modernisation and industrialisation."[7] (*Mandal 2020*)

Although still present, traditional techniques and artisans are a rare to find. The Indian handicrafts that create the colourful image of the country that still exists today once previously collapsed under British colonial rule. The introduction of Machine-made products imposed the concept of mass production within India, therefore forcing Indian craftsmen to sell their goods at a lower market price. In turn, this led to many artisans abandoning their ancestral trade to find a more sustainable income. This further damaged the self-sufficient village economy as the disappearance of traditional industries led to overcrowding in the agrarian sector.[8]

Although Navi Mumbai was built post-independence, it is apparent that its colonial past and urban governmentality is still embedded within Indian culture. The abuse of large corporations paired with corruption from government and developers have led to a proportion of the population to reside in informal/ slum dwellings. Although Navi Mumbai was a planned satellite city *'More than 40,000 families living in slums who constitute 19% of the population in NMMC (Navi Mumbai Municipal Corporation) areas as per 2001 census'*[9] (*Times of India 2018*) Many of the planned housing within Navi Mumbai was aimed at middle and low-income groups, with the initial project was set to spread over approximately 343.7 sq.kms, containing 95 villages, however within this plan now resides 41 slums under the NMMC jurisdiction.

Poor infrastructure of slum communities in Navi Mumbai has a significant impact on other factors that can affect health, issues such as access to clean water and utilities and overcrowding can lead to spread of illness amongst residents. [10] In a bid to house the poorer population alongside gain significant income, large developers will buy profitable land to produce luxury developments in return they have to provide housing for the slum neighbourhood. Although this sounds like a logical solution it is common for the developers to provide the bare minimum required under law and legislation needed for housing. The displacement of people claims to improve the living condition of the poor however the infrastructural development for the lower income group in comparison to the luxury development generates an even wider inequality.

Unfortunately, such radical changes in the community usually result in adverse consequences leaving families disconnected with their urban environment. *'In a relocated place, they face a situation of unemployment, police repression, social breakdown and loss of sense of belonging due to lack of collective identity.'* [11] *(Mezzadra, Reid and Samaddar 2013)*

When facing challenges between a working and living environment, different approaches can be taken. The first is to improve the design of the existing housing infrastructure to facilitate a mode of craft/ work production alongside improving the lifestyles of those who live there. The second is to provide a new alternative to live work housing, using local knowledge and methods to bind the community with their output and surroundings.

'The hard work of 'squatters' in creating homes, their love for their communities, their pride in creation and their struggles with government to gain recognition allow us to conclude that squatters in fact give reality to Henri Lefebvre's concept of the 'right to the city" [12] **(*Neuwirth 2005*)**

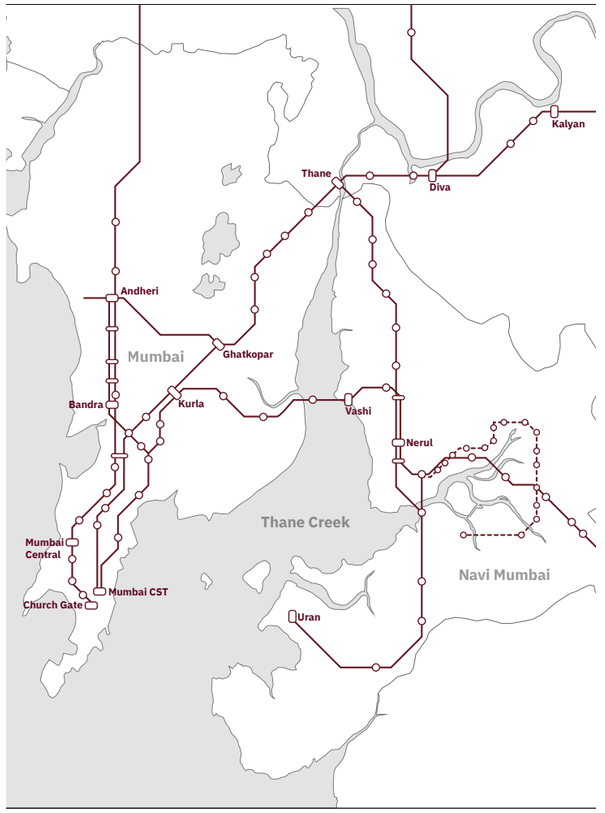


Image 04: A Map showing Metro links between Mumbai and Navi Mumbai

Image 05: Slum Dwelling in Navi Mumbai

Research Question

Continuing the focus on housing within crafting communities, the research question highlights the connection between craftsmen and their immediate environment and how through design its integration can contribute to the urban environment of Navi Mumbai

How can the design of affordable workshop housing contribute to a better integration of artisan rural-urban migrants into Navi Mumbai?

The question can be broken down into several sub questions:

- Firstly, since production within a home is a secondary function to the traditional organisation factors of a home, this question refers to the affordability of adding an additional role to housing. How can a work at home lifestyle be translated into a new and affordable spatial organization?

- Secondly, since Navi Mumbai has played a role in urban rural migration towards Mumbai its effect on the working society has not changed. The population still commuted daily causing infrastructure issues within the city. How can the use of traditional work/live typologies covert rural-urban migrant lifestyles?

- Traditional crafting techniques rely on tools and often a conversion in space to create the work. How can craft communities be improved through spatial design of live work accommodations?

- Lastly concerns the production industry and the dying tradition of artisan crafts. How can the design of affordable housing communities contribute to reinstating the skilled crafting profession?

*Workshop Housing – A dwelling with the space and capacity to create and produce a product.

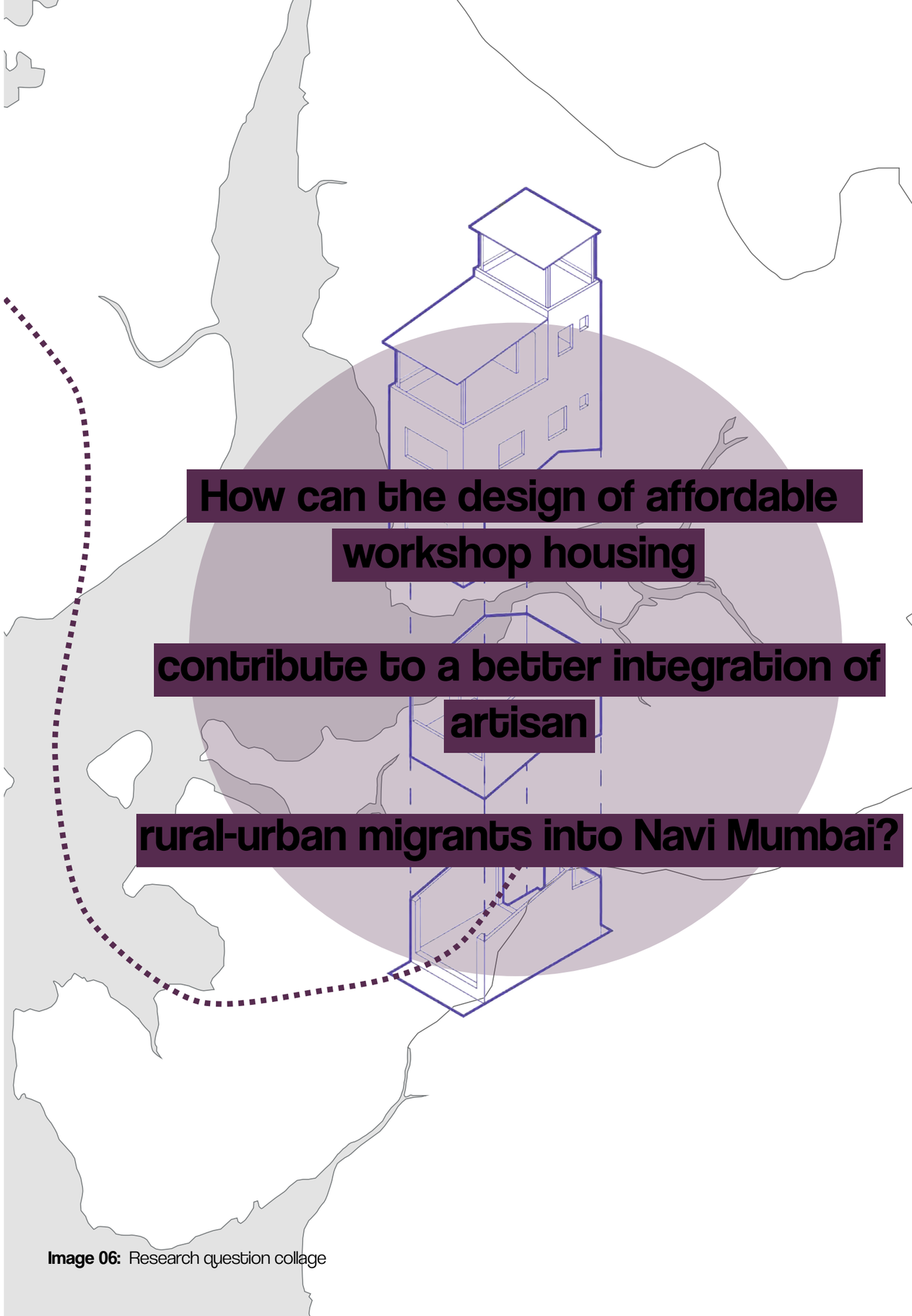


Image 06: Research question collage

Theoretical framework + Methodology

Theoretical Framework

The research builds on existing architecture and literature based on trade, craft, domestic space and architecture within India. The theoretical framework can be categorized into three groups each representing a different aspect of research, Housing, Arts and Crafts and Navi Mumbai. Within these categories are references classified into Architect/ Practice, Literature, Project. All these categories are analyzed over time periods to create a framework of references to evoke the research project.

The first segment of references refers to Arts and Crafts, key literature such as *The arts & crafts of India & Ceylon* by Ananda Coomaraswamy delves into India's rich heritage with creative techniques. Although some references listed in the diagram refer do not specify to a certain location it is important to understand crafts relationship with beings. Richard Sennett's Book *The craftsman* argues that hand labourers are symbols of enlightenment, he declares that *"nearly anyone can become a good craftsman"* [13] (*Sennett 2008*) in turn this enables a person to govern themselves whilst working with others to provide a service to the community. To celebrate India's connection with the arts many architectural projects have been built to either archive or celebrate the practice. Jawahar Kala Kendra is a multi-arts centre designed by Charles Correa, its intentions were to honour and preserve Rajasthani arts and crafts. [14] Charles Correa is one of India's most influential architects, his work ranges from low income group housing to large urban development such as the creation of Navi Mumbai therefore being a critical reference to analyse.

Housing is the second overall arching topic; it is crucial to understand Indian vernacular and methods when relating the project to craftsmanship. Many new social practices are trying to reintegrate the traditional artisan profession back into the architectural landscape. Enterprises such as *Hunnarshala Foundation*, *Windows to vernacular* and *Put your hands together* all endorse creative workshops in order to promote traditional techniques of building as a way of being cost recovery replicable for the lower income groups of society.

The third group of references relate to Navi Mumbai, in order to design a suitable housing scheme it is important to understand the context. Works such as *The making of Navi Mumbai* and *The Planning and Development of New Bombay* by Annapurna Shaw give a factual introduction into the foundations of Navi Mumbai. Researching projects such as Art Village, Karjat give a hybrid connection to all three investigated sectors is a creative space where artists, practitioners educators and more can come *'together to learn, create and share their philosophies and methods of practice'.* [15] *(ArtVillage 2011)* The village houses the community using vernacular typologies of architecture alongside creating a collective campus of buildings to encourage art, nature and architecture to simultaneously exist.

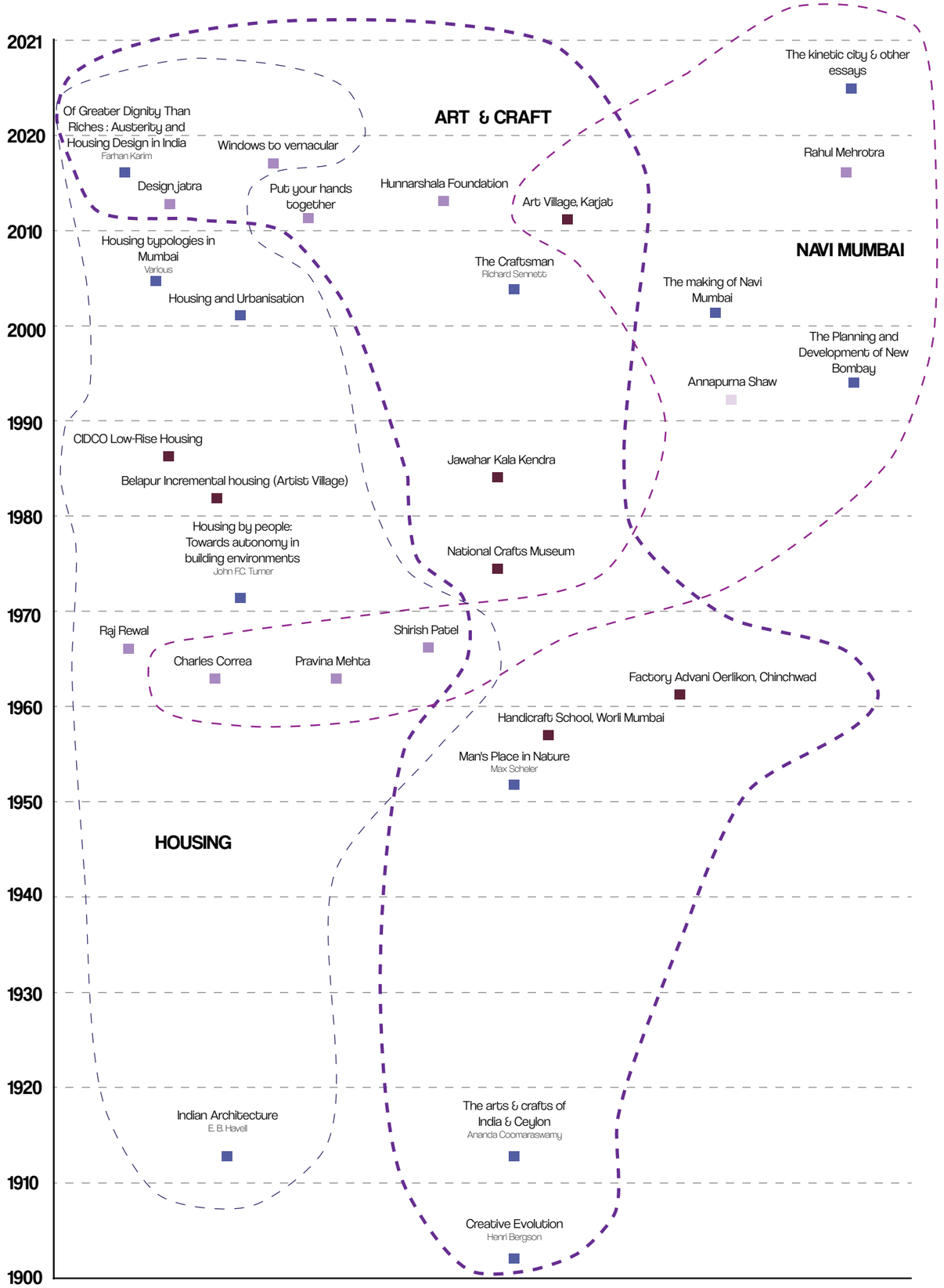


Image 07: Theoretical framework lists

Methodology

The main method that will be employed is research-by-design, this requires the theoretical framework to work in tandem with drawing and modeling. To investigate the possibilities of a working inclusive neighbourhood and how it could contribute to Navi Mumbai, the following research methods will be carried out:

Analysis of precedents: Literature review and case studies – This method of research pertains closely to the theoretical framework of the project; secondary sources of literature will be used to gain knowledge closely connected to craft in the domestic space alongside housing in the Navi Mumbai region. Primary sources will be investigated through interviewing local craftsmen and artists in the area in conjunction with architects and local residents of Navi Mumbai. Furthermore, a literature review will be used to determine the relationship between domestic space and craft manufacture.

Image 08: Analysis of precedents method

Ethnographic research - In order to understand the domestic crafting lifestyle, the research methodology that will be carried out is Ethnography. This will allow for the systematic study of how housing, craft and society operate within Navi Mumbai. Pending on field trip, site analysis will be undertaken in a chosen location together with study of local lifestyles and craft lessons.

Image 09: Bamboo Workshop

Typological analysis + comparative analyses - In conjunction with the ethnographic research method knowledge about live work vernaculars and built construction techniques. This will be gathered through a typological analysis by collecting data on life quality and crafting production to understand how to integrate these topics into housing design. Further, a morpho-typological analysis of housing systems for low income groups in the Global South will be

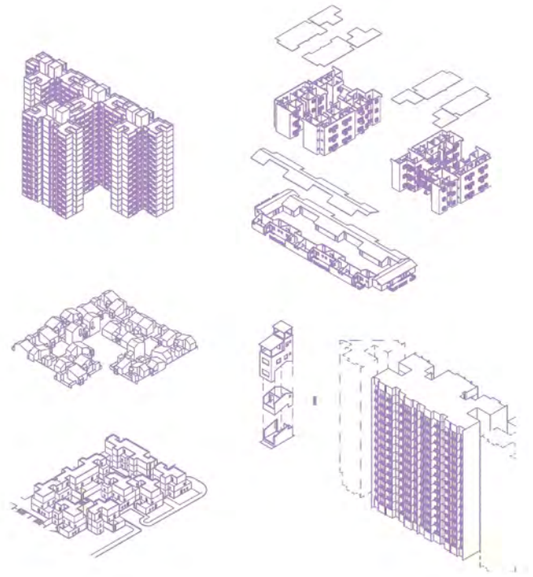


Image 10: Morpho-typological analysis

Image 11: Design Jatra Cob Workshop

Process + Timeplan

The timeplan shows the organization of work and the progression throughout the academic year. How is carried out/or done is depicted in the centre of the diagram

P1 : 2nd December
P2: 18th January
P3: -
P4: -

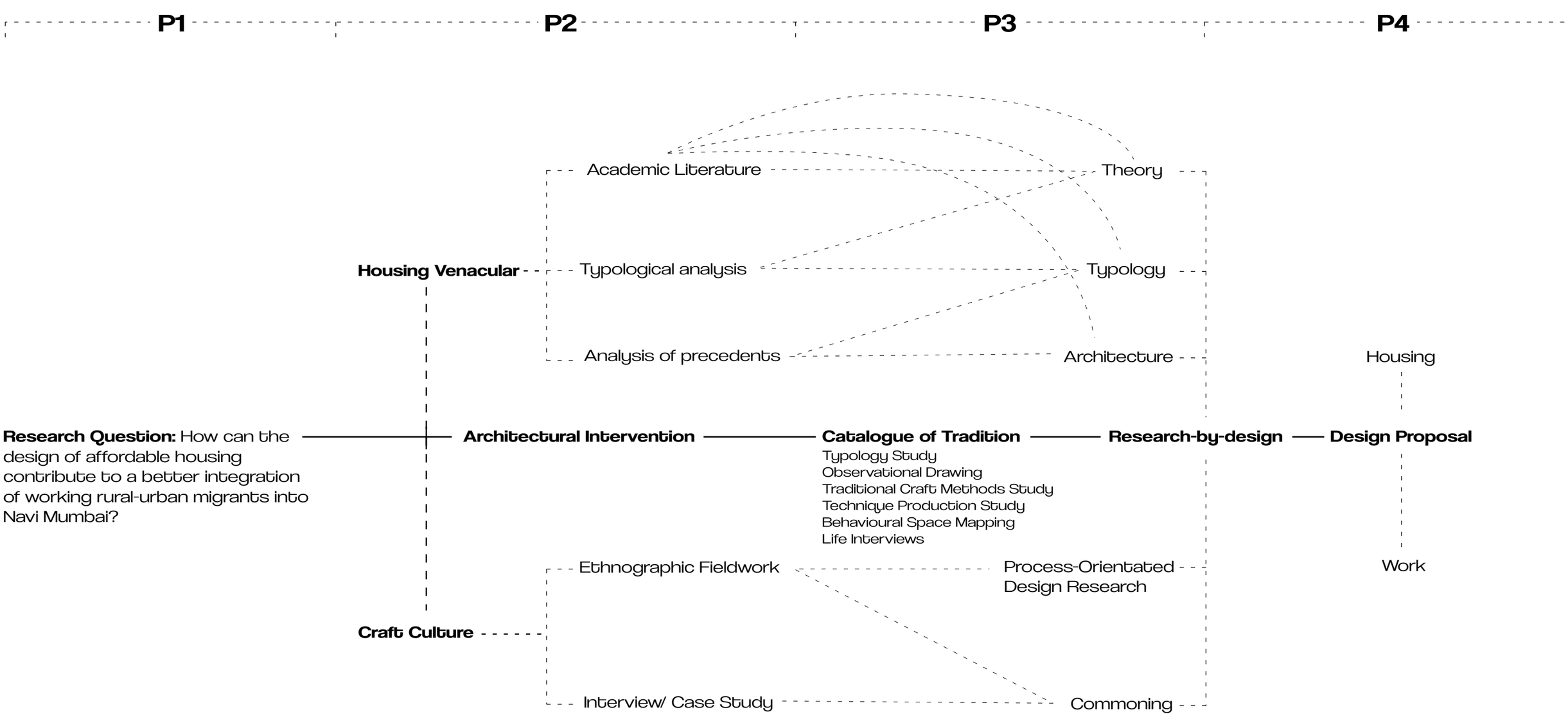


Image 12: Process plan

Relevance

The exponential population growth of Navi Mumbai and the Global South results in urgency for housing, quality of life and resources. The Research question proposes through architectural design and spatial organisation an understanding and support for people in these unique urban contexts. The research will build upon existing studies between labour and dwelling in order to alter the present state of mass housing in Navi Mumbai. By investigating historic design techniques and traditional skillsets this will introduce an additional layer to the existing housing research.

Labour system

Navi Mumbai is becoming home to larger corporations due to land prices in comparison to Mumbai and although this brings jobs to the city it also enforces cheap labour. Mass production is an approach to the design, creation, and marketing of products that emphasizes the current trends of society. These products are produced quickly and sold at a relatively low price which in turn increases recent demand for them. Much like the rest of India Navi Mumbai is now being flooded with these large corporations churning out short life products, contributing to waste, low wages and the abandonment of traditional skills. [16]

Pollution

A portion of pollution in Navi Mumbai is due to incorrect disposal of waste, with the larger number of corporations setting up locations in the region burnt in landfills and construction sites have become a highly influential part of the pollution produced within the city. [17]

Quality of life within Navi Mumbai

The Census of 2001 had shown how Navi Mumbai has a third of its population living in slums, arguably for a planned city not even forty years old, this should not be the case. [18] The research aims to investigate the relationship between Navi Mumbai and methods of affordable housing in order to improve its current condition.

“The hand is the window on to the mind,” Immanuel Kant

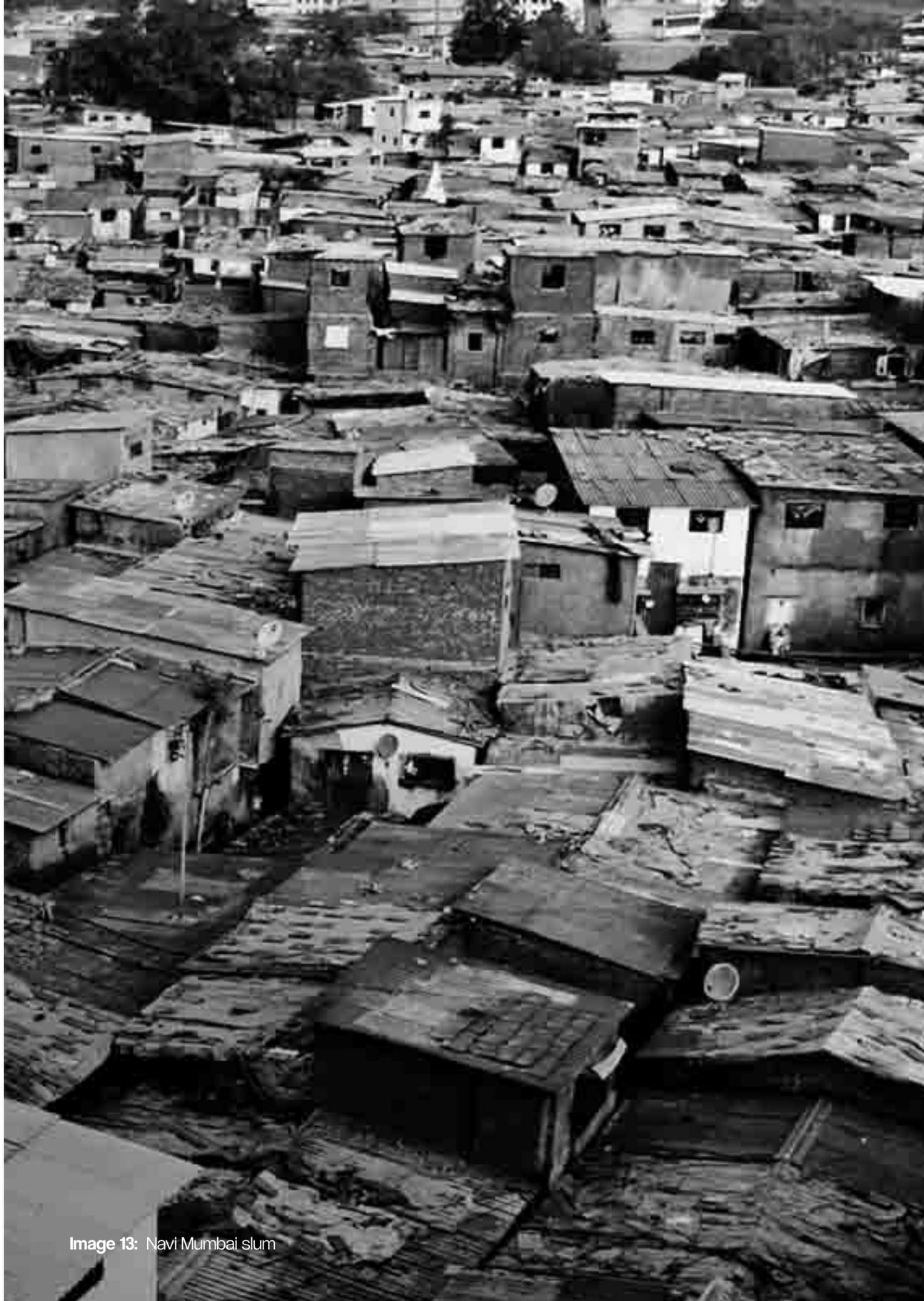


Image 13: Navi Mumbai slum

Collective Research

Housing Case Studies

Case Studies

Housing in India Case studies was a research workshop conducted by Global housing studio, a set of 16 Cases were collected, analyzed and redrawn to give a informative introduction into the context. Each case was redrawn in an exploded axonometric format to show dwellings, landscape and atmosphere.

Dada was collected in order to do a comparative study to compare GSI (Gross Space Index) and FSI (Floor Space Index)of each of the housing schemes.

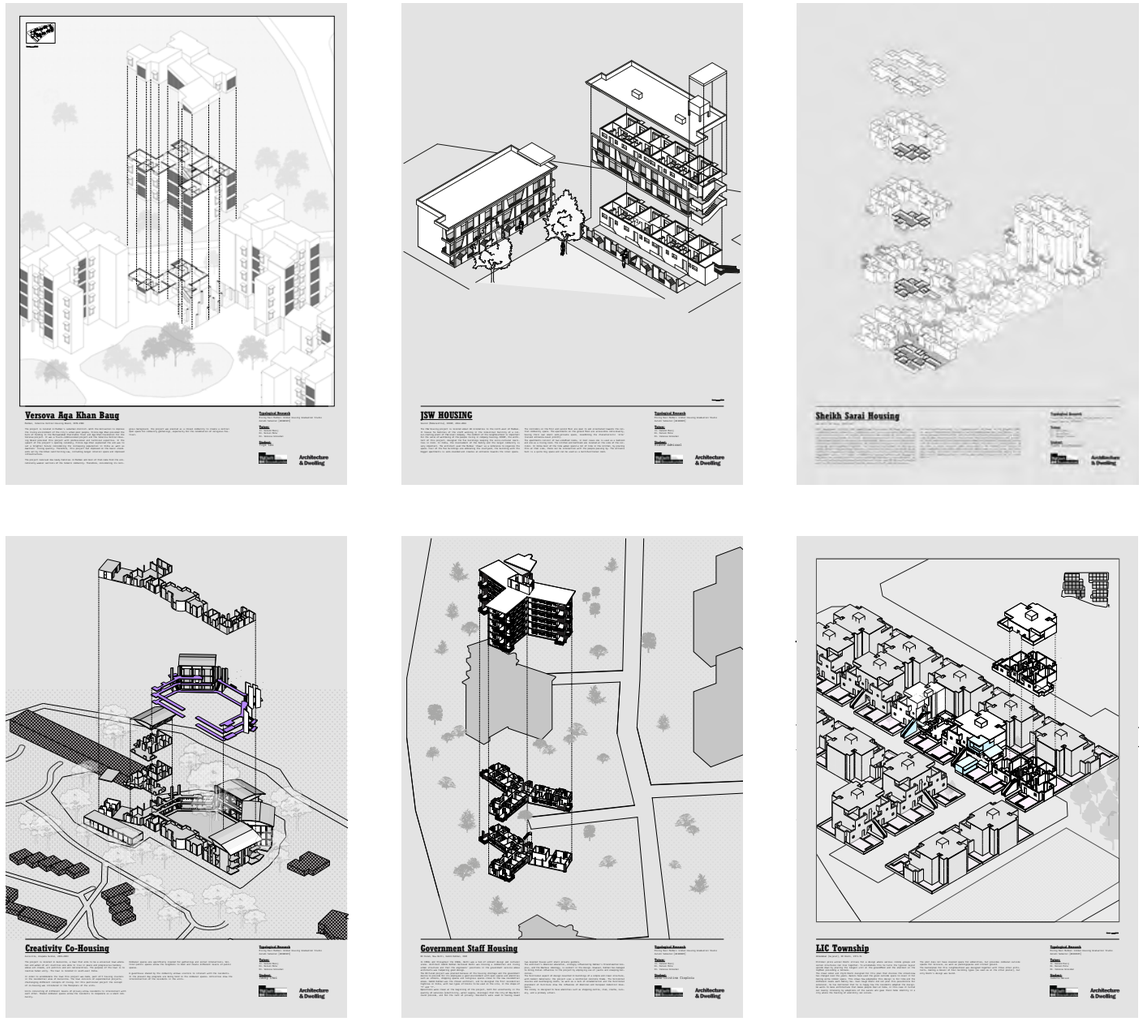


Image 12: : A selection of Case studies drawn by the global housing studio

Usha Niketan Housing

Usha Niketan Housing Complex (1964-1967) -

Usha Niketan is a relatively small housing scheme designed by Kuldip Singh,it was commissioned by the Delhi Development Authority (DDA)for middle-income tenants. Kuldip Singh's residential projects aimed to support the issue of overpopulation in housing. Working with the Delhi Development Authority to face the problem of Delhi's rapidly growing population.

The plot is made up of two building forms, Block A and Block B containing 4 of each type. The blocks create a unified spatial arrangement with usable terraces paired with services formulated around a structural grid. Cross ventilation throughout the grid allows for the building to be evenly situated with clean air. Within the plot is a shared open space that was integrated into the plan to highlight the design of traditional Indian cities.

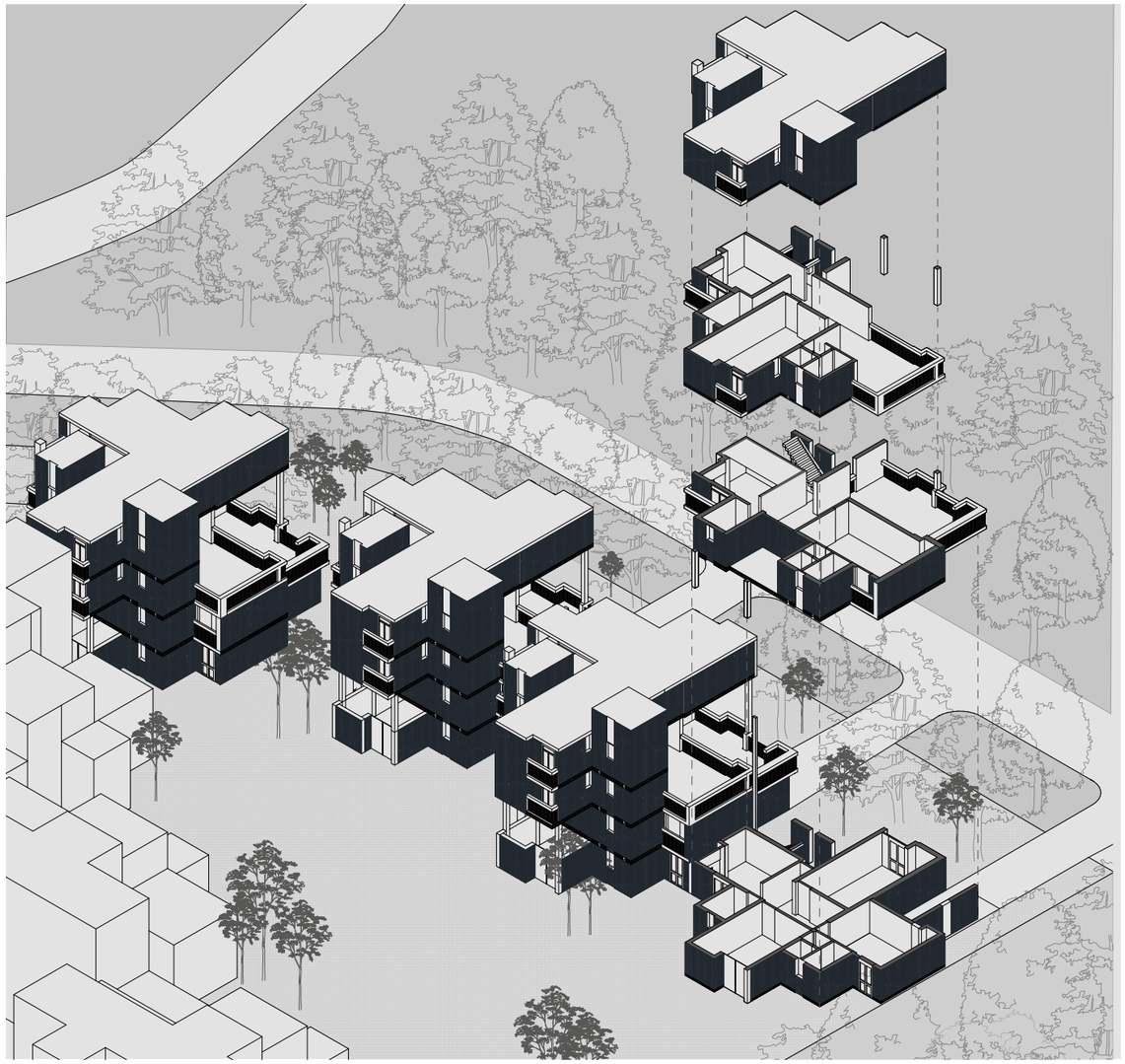
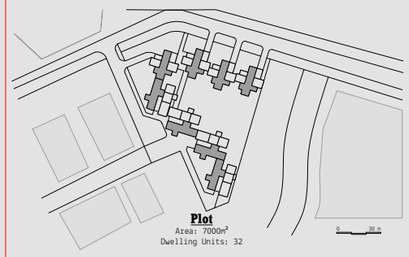
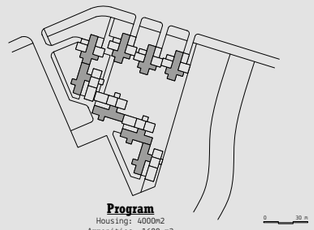


Image 12: : Usha Niketan Housing Complex

Neighbourhood

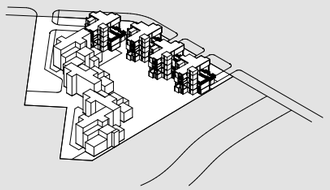


Plot
Area: 7000m²
Dwelling Units: 32

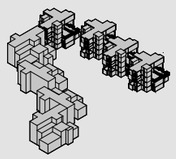


Program
Housing: 4000m2
Ammenities: 1600 m2

FSI/FAR
1.4

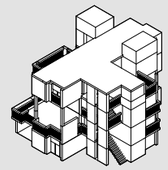


GSI
0.6

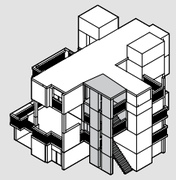


Density
32 dw/ha

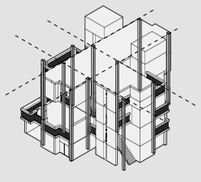
Block



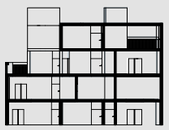
Volume
Ground floor + 3



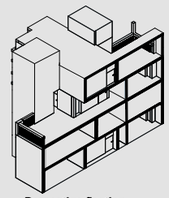
Connectivity
Acess and Circulation System



Structure
6 X 4 structural grid



Section
Dwelling Types



Pespective Section
Dwelling Types

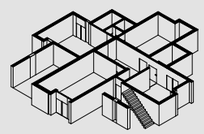
Unit

Ground Floor
Area: 125m2

First Floor
Area: 150m2

Second Floor
Area:97.5m2

Third Floor
Area: 97.5m2



Ground Floor Unit

Usha Niketan Housing

New Delhi, Kuldip Singh, (1964-1967)

Plot Area: 7000sqm
Number of Dwellings: 32
Density: 32 dw/ha
FSI: 1.4
Unit Sizes: 125,150,97.5 sqm
GSI: 0.60
Client: Dheli Development Authority
Scheme: Middle-income housing scheme
Design: Kuldip Singh
Tenure: State housing

Usha Niketan Housing Complex (1964-1967) -

The DDA is responsible for planning, development and construction of Housing Projects, Commercial Lands, Land Management in Dehli.

The spacial configuration is low rise - low density due to the commision from the Dheli Development Authority sanctioning state housing.

Block A contains 4 blocks of housing in which there is 16 units, block B also contains the same density meaning 32 units overall. The units are designed one per floor ranging in sizes due to the outdoor terraces.

The ground floor consists of a garage and a courtyard alongside the usual configuration of unit 2-3 rooms, bathroo, living and kitchen.

The circulation relies on a singular set of stairs to with a small landing for entry to units.

The concept of the structural grid allowed the service, access and spatial system to work in unison around the grid

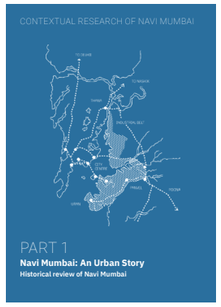
Typological Research
Mixing Navi Mumbai: Global Housing Graduation Studio
Autumn Semester [AR3AD105]

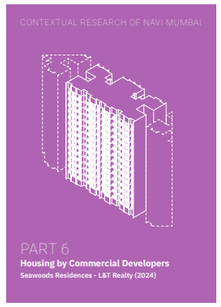
Tutors:
Ir. Harald Mooij
Dr. Nelson Mota
Dr. Vanessa Grossman

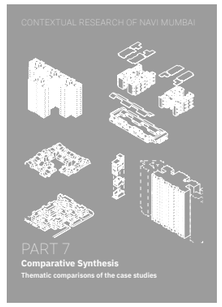
Student:
Olivia Dolan

Image 12: : Usha Niketan Housing Complex

Navi Mumbai Research







Navi Mumbai Booklet

As a collective group the Global housing studio produced a booklet containing a history, case studies and comparative analysis of Navi Mumbai;s housing.

Context

This booklet contained a introduction into Navi Mumbai alongside six case study projects which were critically assessed. The aim of the collective research was to provide a comparative study focusing on Density, Domestic life, Environment and Connectivity. by providing an overview of all of the projects' information along with a timeline a comparison and analysis between themes can be made. The booklet provides key information in regards to Navi Mumbai as a city alongside providing a breakdown per project to show the varying range of housing typologies in the are.

By breaking down each project it allowed us as a collective to form a understanding of the balance between all the factors, therefore in the future we will have a better understanding of designing for the context.

The Case studies range from Densities of 102 Dwellings per Hectare to 410 D/Ha. By analyzing each project it can give an insight into the type of environments that the inhabitants live, the connection with the direct surroundings and how the buildings are used.

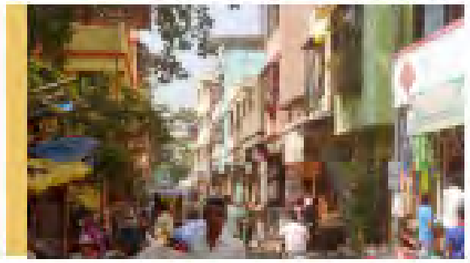
To finalize the booklet a Comparative Synthesis was prepared with a thematic comparisons of the case studies.

Charles Correa's Artist's Village

The aim was to engage a variety of income groups in community living. The project provides an individual plot for each dwelling to allow future expansion.

Raj Rewal CIDCO Housing

This project aimed to create asimple but high-qyality home environment for low-income groups, drawing inspiration from Indian vernacular architecture.



Airoli Sites & Services

The scheme was intended to house the lower-income groups in Navi Mumbai by a system of cross-subsidization setup by CIDCO.

HUDCO & CIDCO Housing

The master plan is clustered in low,middle and high income dwellings with their own typologies, thus managing to house diversity.

CIDCO's "Housing for All"

The design concept of the housing scheme consists of the repetition of one unit, an EWS or LIG single person unit. All together creating a mass housing scheme.

Seawoods Residences

Located in a highly speculative investment area. This whole complex is being developed by L&T Construction, a Mumbai basedcompany.

Image 09: : A map of the analysed case studies

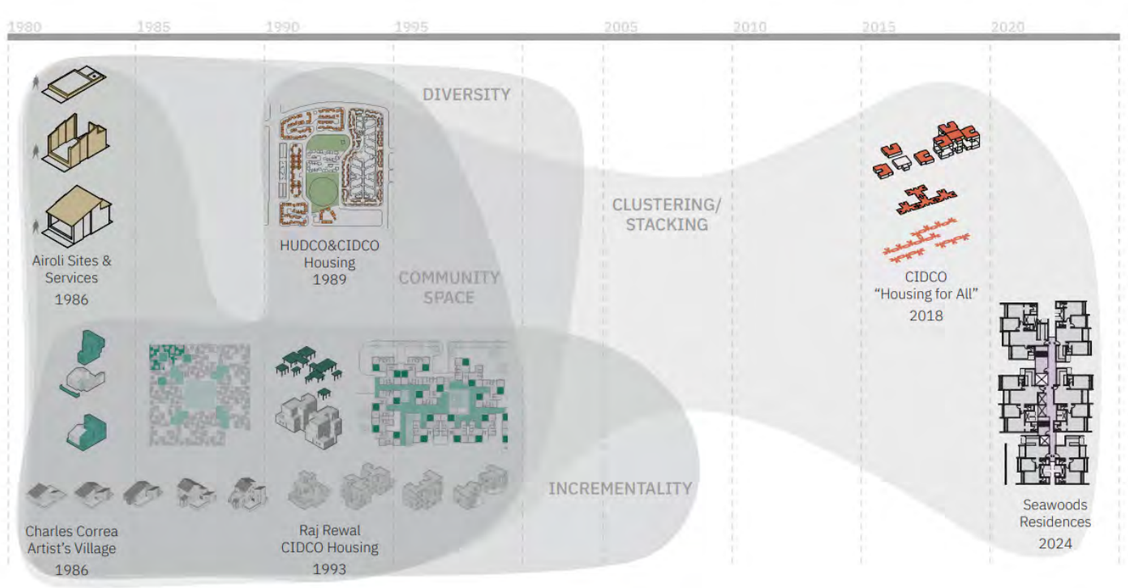
Project information

Each Porject was analyzed in several aspects, hard data was collected in order to form a comparison between facts such as GSI and FSI.

	 Charles Correa Artist's Village	 Raj Rewal CIDCO Housing	 Airoli Sites & Services	 HUDCO&CIDCO Housing Sanpada	 CIDCO "Housing for All"	 Seawoods Residences
Year	1983-1986	1988-1993	1986	1988-1989	2018-current	2024
Design	Charles Correa	Raj Rewal	-	Hema Sankalia	CIDCO	Larsen & Toubro
Client	CIDCO	CIDCO	CIDCO	HUDCO & CIDCO	CIDCO	Larsen & Toubro
Scheme	Low-rise	Low-rise	Sites & Services	Housing diversity	Mas housing	Sites & Services
Tenure	Home ownership	Home ownership	Home ownership	Ownership/ Rental	Home ownership	Home ownership
Target group	EWS, LIG, MIG	EWS, LIG, MIG	EWS, LIG, HIG	LIG, MIG, HIG	EWS, LIG	HIG
Amenities	Yes	Yes	No	Yes	Yes	Yes
No. Dwellings	550	1048	8100	1000	15,080	350
Dwellings/Hect	102	136	189	104	410	175
GSI	0.4	0.3	0.7	0.48	0.14	0.26
FSI	0.6	1.1	2.1	0.16	2.1	2.9
Unit size	15-70m²	19-105m²	14-19m²	15-90m²	26-30m²	57,59,85,93,96m²
Price Rupees	₹0.2 lakh - 1.8 lakh	₹2 lakh- 6 lakh	₹4.957-13.349	₹21,761-1,20,749	₹2,03,8500-2,84,4200	₹2Cr - 3.6Cr
Price Euro	€233 - 2,094	€2,327 - 6,980	€57-152	€251,90-1397.75	€23,500-32,800	€231,705-417,070

Case Study Timeline

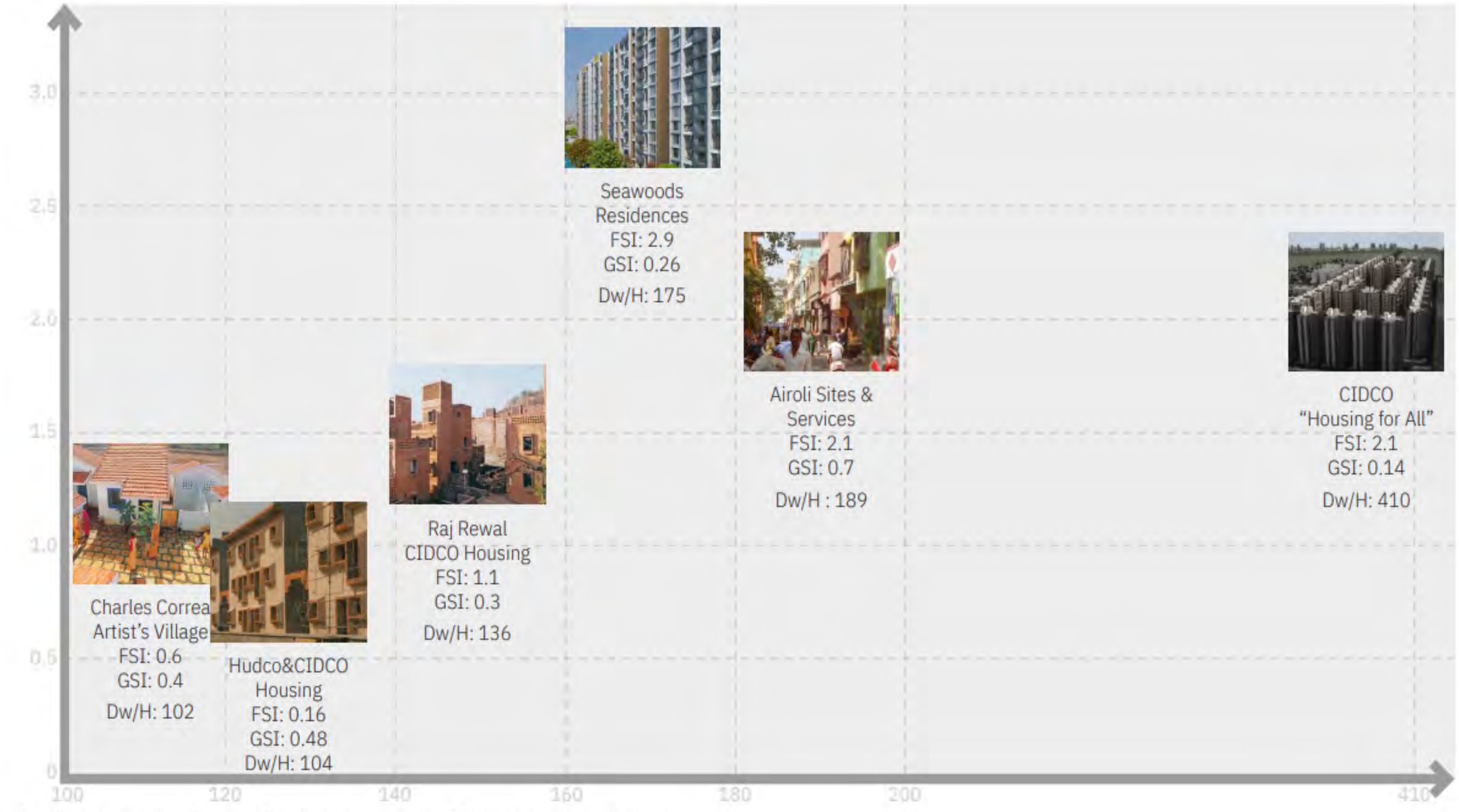
The case studies reflect different themes that can be seen over a period of time in which these housing projects were completed in. These themes include: clustering and stacking, incrementality, community space and diversity.



Overlapping themes of the case studies through time

Case Study Density Comparison

A comparison between density was completed, Data was collected and formulated into a graph to analyse the different GSI (Gross Space Index) and FSI (Floor Space Index)of each of the housing schemes.



Graph showing the density of each case study by FSI over dwellings/hectare

Health and Housing Workshop

Introduction

The health and housing workshop was a ten week hands on workshop investigating the link between dwelling and the health of residents alongside an inspection into Covid 19 in the local environment of Den Haag. As a mixed collective between the Global Housing Studio and medical minor students in Leiden we split into groups of six set about exploring and analyzing two different local environments.
Each group was made up of three architecture students and two medical students, each set with a specific area to investigate.

Both chosen locations were based in Den Haag Firstly, the Neighbourhood Bezuidenhout located centrally. The second location Scheveningen is located towards the seaside. Whilst in these neighbourhood we spoke to local residents asking them a questionnaire relating to their environment and health. After this we took two case study houses and analyzed them internally alongside the questionnaire to the residents living there. Whilst the Global housing studio group took measurements in order to create architectural drawings of the house the medical students took air samples too see the correlation between bacteria and different spacial and architectural factors of the building.

"All six student groups were asked to focus on dwellings in two different neighbourhood which, according to national statistics, show similar scores for livability but different rates of infection on the COVID Radar, a national app for the monitoring of the epidemic developed by the LUMC. The architecture students established various spatial qualities on two scales: the buildings and the neighbourhood"

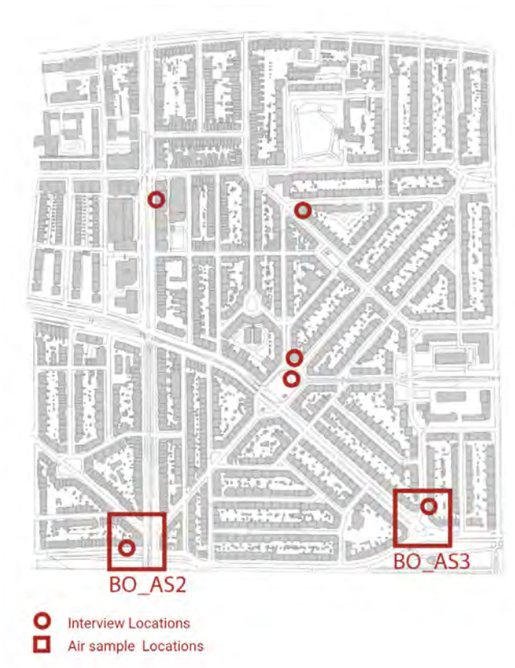
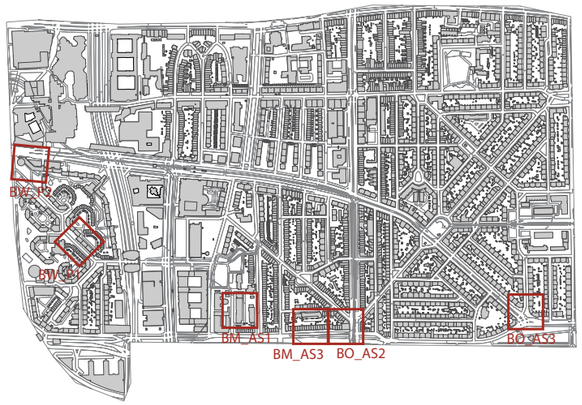
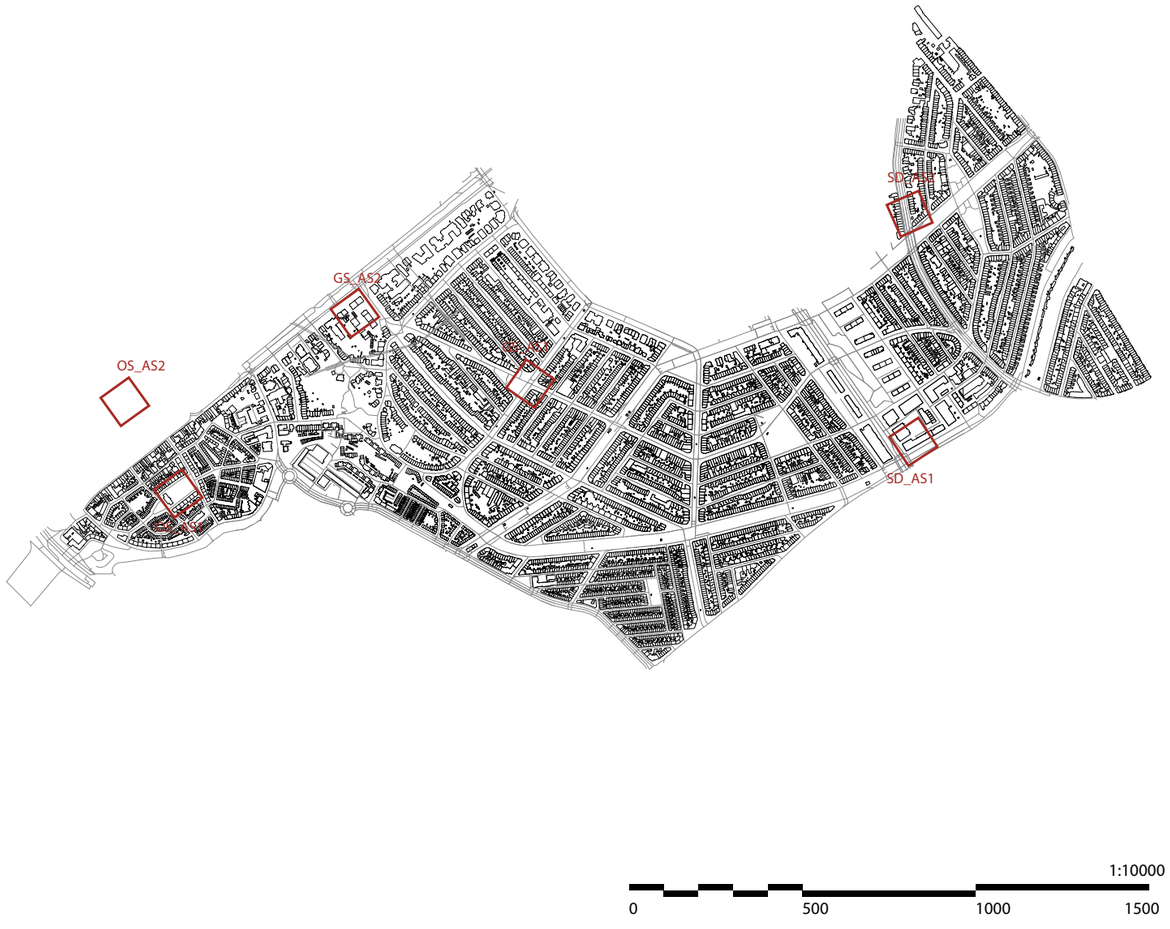


Image 06: Locations of Questionnaires/ Housing Case studies

Case Study Areas

The two different sites contained several locations in which the case study tests were performed

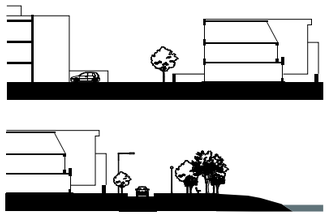




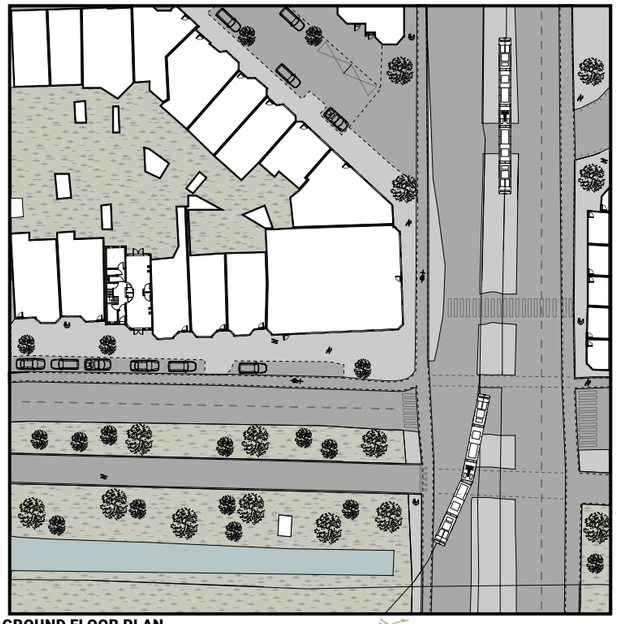
AREA: **BO_AS2**

URBAN

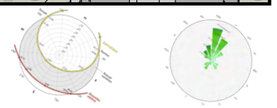
48	**0.38**	**0.25**
DENSITY Dwellings / Hectare	TOTAL SCORE Leefbaarometer *	SERVICES Leefbaarometer
1.25	**0.15**	**0**
FSI Floor Space Index	HOUSES Leefbaarometer	SAFETY Leefbaarometer
0.32	**0.05**	**-0.07**
GSI Ground Space Index	RESIDENTS Leefbaarometer	ENVIRONMENT Leefbaarometer

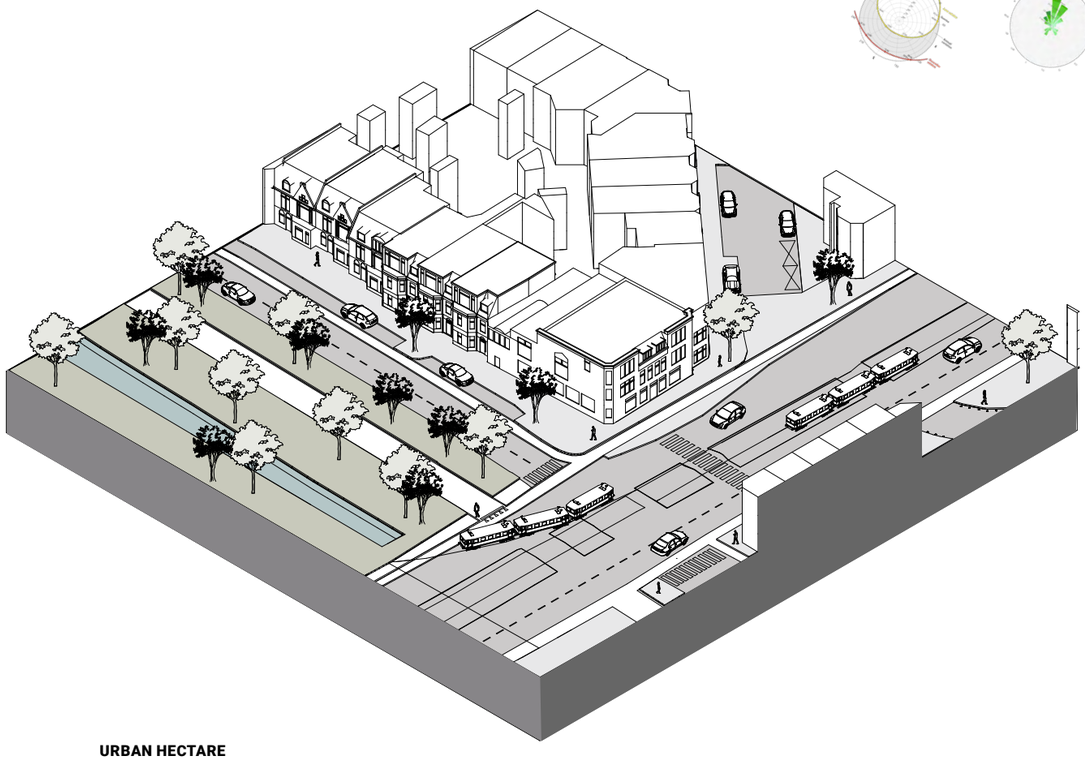


STREET PROFILE



GROUND FLOOR PLAN



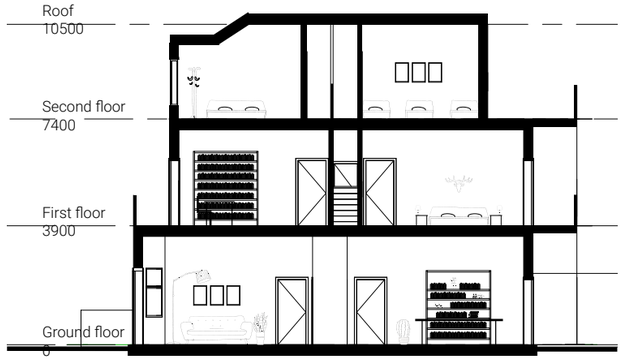


URBAN HECTARE

0 25 50

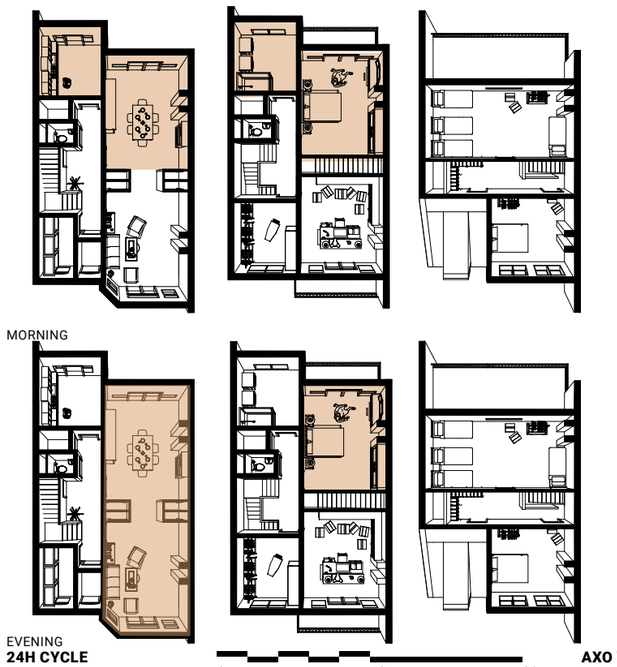
DWELLING

284 | 148	**169**
HOUSE AREA Interior | Exterior m²	FACADE AREA m²
885	**14 | 53**
HOUSE VOLUME m³	WINDOW AREA Fixed | Openable m²
2	**142**
RESIDENTS Number of Residents	RESIDENTS Area per resident m²



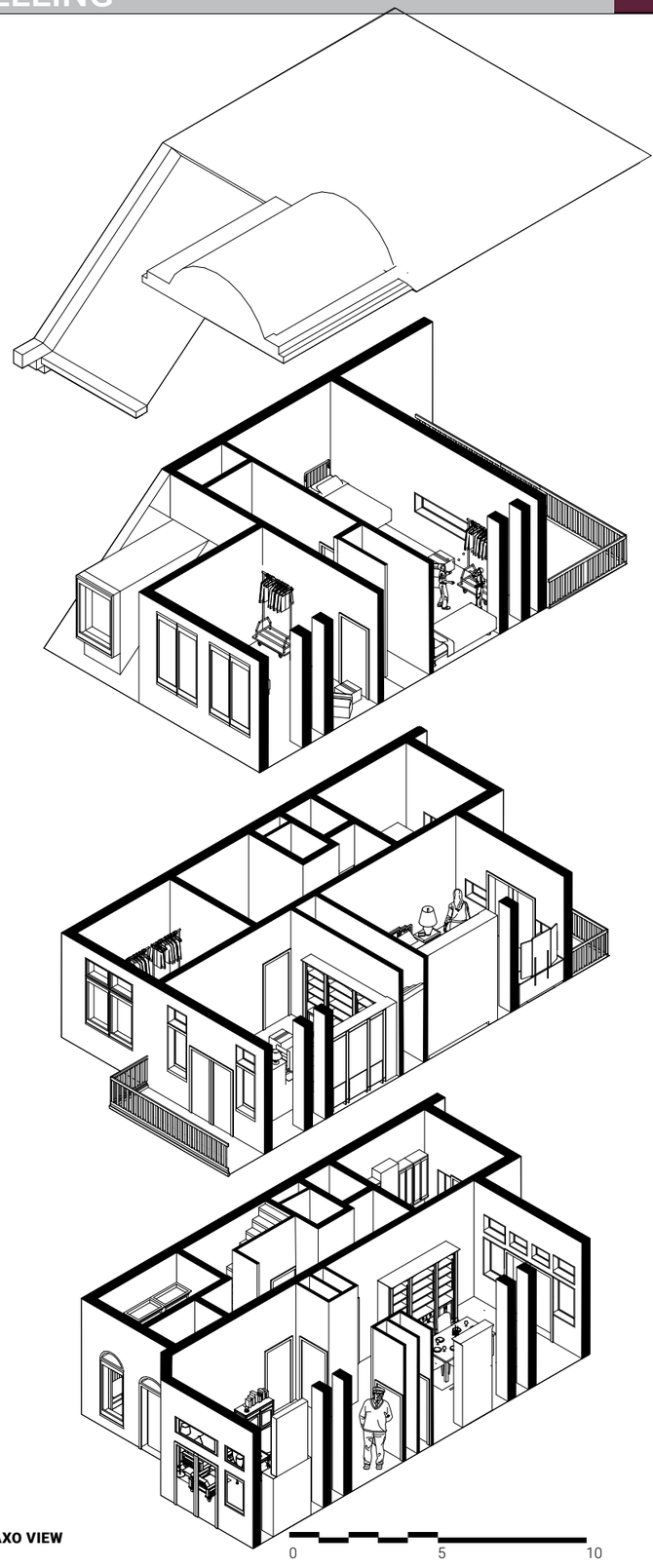
SECTION

0 5 10



24H CYCLE

0 10 20



AXO VIEW

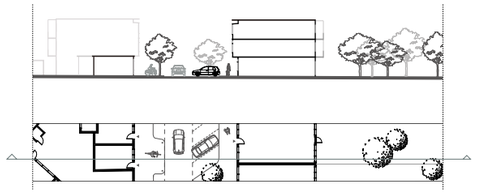
0 5 10

* The Leefbarometer values represent a deviation from the national average for the chosen location in terms of quality of life.

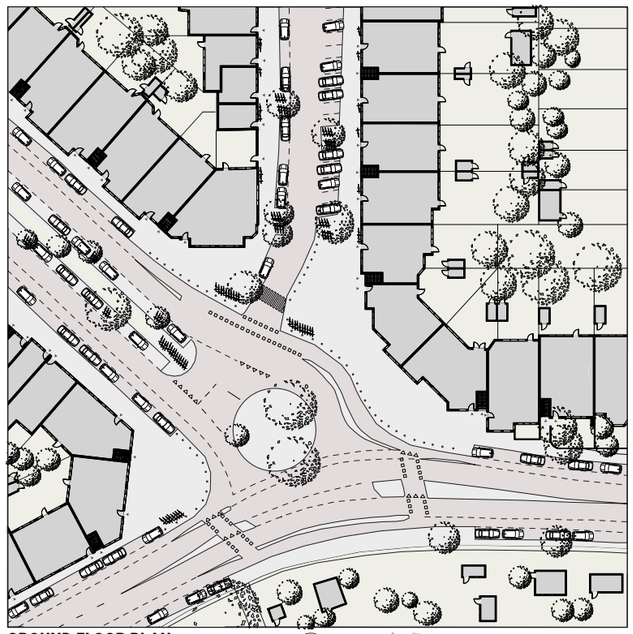
AREA: **BO_AS3**

URBAN

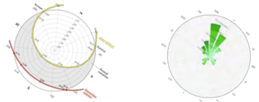
81 DENSITY Dwellings / Hectare	**0.08** TOTAL SCORE Leefbaarometer *	**0.17** SERVICES Leefbaarometer
0.70 FSI Floor Space Index	**0.07** HOUSES Leefbaarometer	**0** SAFETY Leefbaarometer
0.26 GSI Ground Space Index	**0** RESIDENTS Leefbaarometer	**-0.17** ENVIRONMENT Leefbaarometer

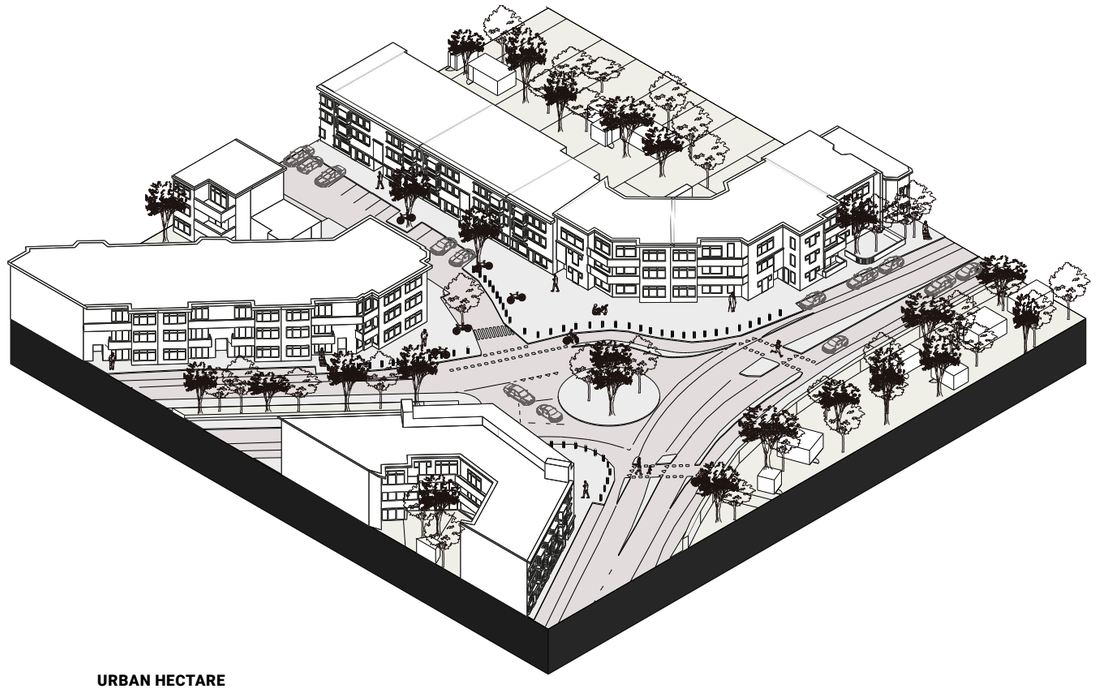


STREET PROFILE



GROUND FLOOR PLAN



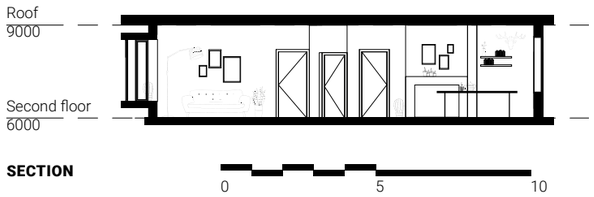


URBAN HECTARE

0 25 50

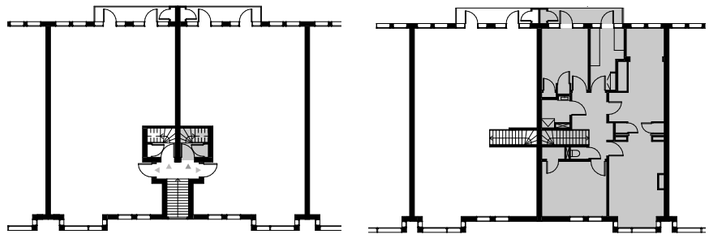
DWELLING

107 | 5 HOUSE AREA Interior | Exterior m²	**48** FACADE AREA m²
229 HOUSE VOLUME m³	**9 |13** WINDOW AREA Fixed | Openable m²
1 RESIDENTS Number of Residents	**107** RESIDENTS Area per resident m²



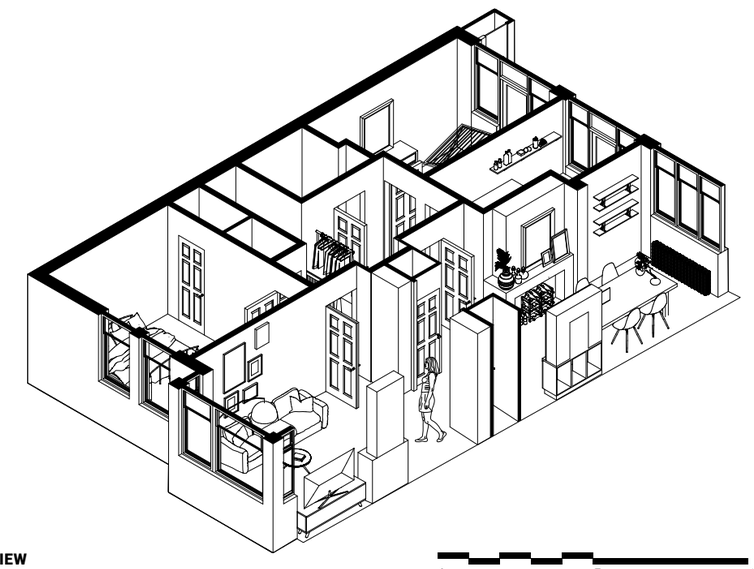
SECTION

0 5 10



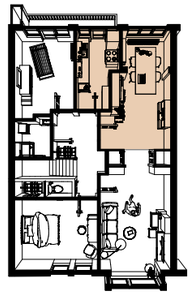
RELATION TO NEIGHBOURING APARTMENTS

0 10 20

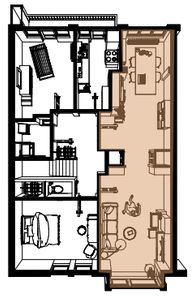


AXO VIEW

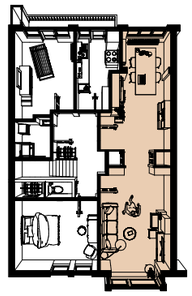
0 5 10



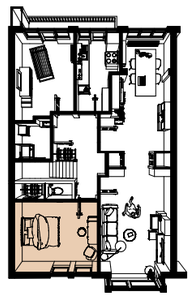
MORNING



AFTERNOON



EVENING



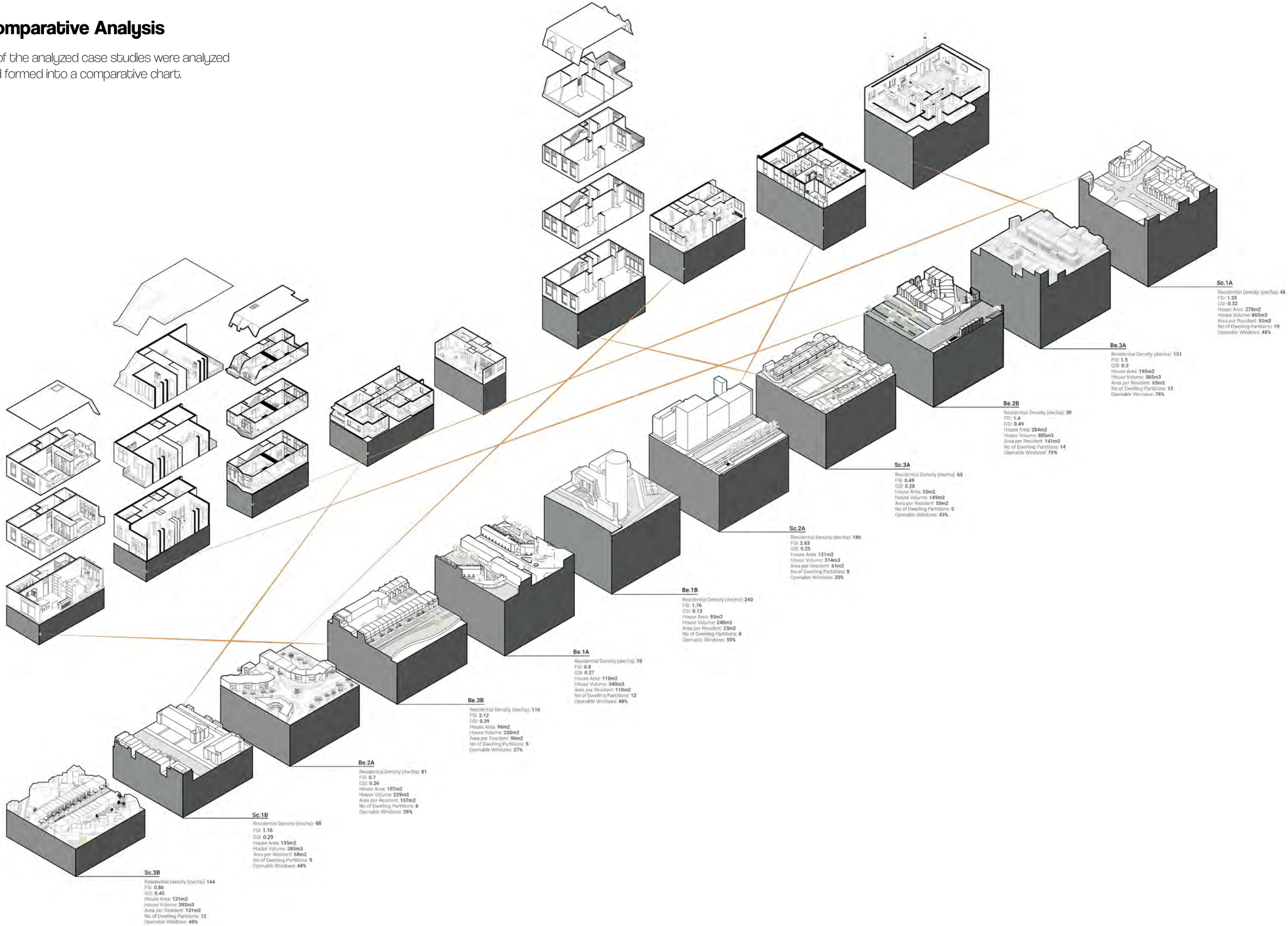
NIGHT

24H CYCLE

0 10 20

Comparative Analysis

All of the analyzed case studies were analyzed and formed into a comparative chart.



Design Research

Navi Mumbai

Navi Mumbai also known as New Bombay is a planned city in India, situated on the west coast of the Indian subcontinent

Mumbai

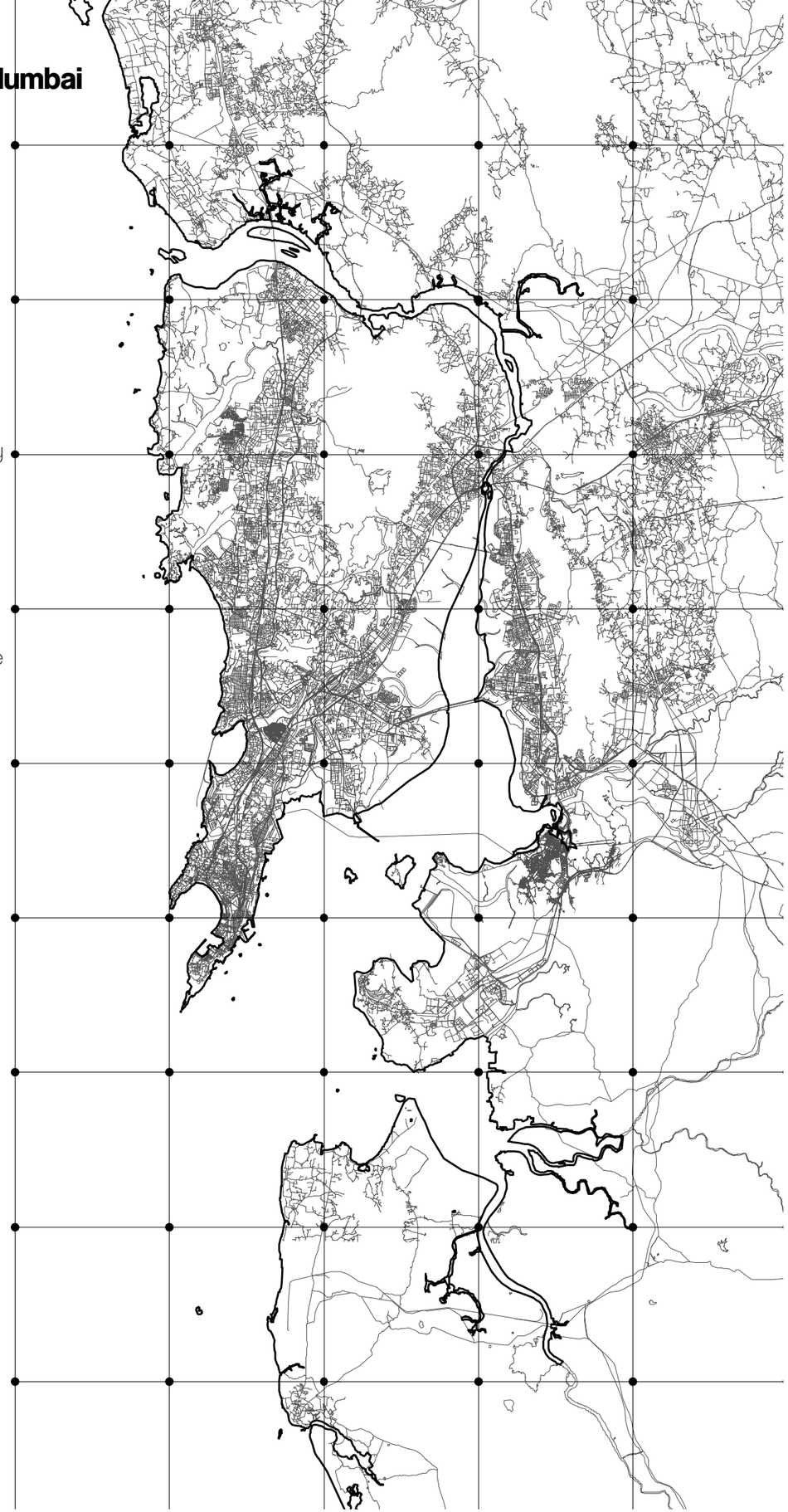
Navi Mumbai

History of Navi Mumbai

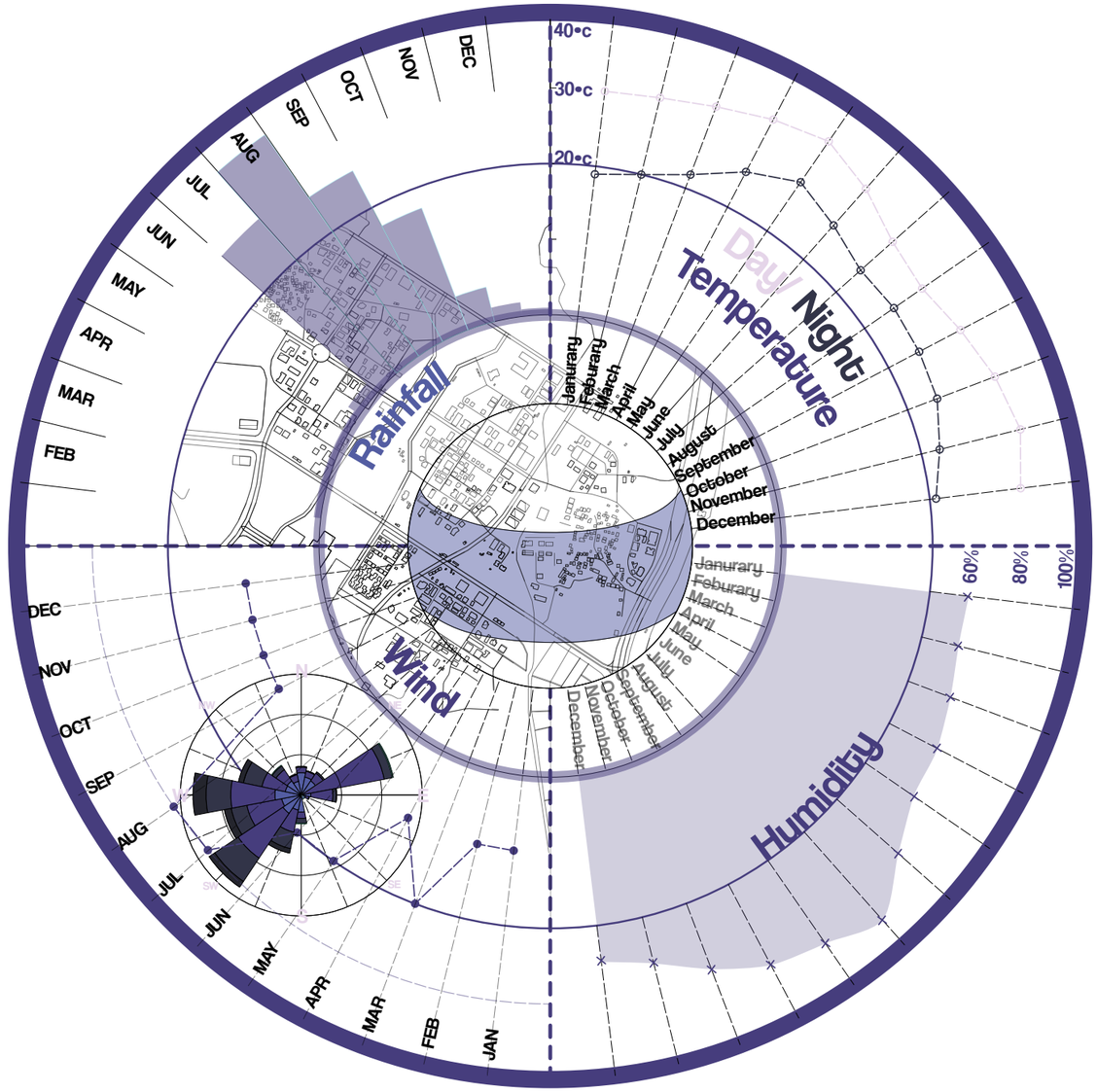
The Navi Mumbai project began in 1971, CIDCO City Industrial Development Corporation was set up by Government of Maharashtra. Set to spread over approximately 343.7 sq.kms, containing 95 villages.

The project was introduced as a coping mechanism for Mumbai's growing population, Navi Mumbai would provide the population to similar amenities without the commute. The initial development consisted of around 16,000 hectares of land to the north-east of Mumbai, divided into 14 nodes.

The city quickly progressed in residential, commercial, and industrial real estate. Making it largest planned city of India with a population of 1,120,547 as per the 2011 provisional census.tus



Climate



Climate

The climate in Navi Mumbai is tropical meaning in winter, there is much less rainfall than in summer. The average annual temperature in Navi Mumbai is 26.6 °C | 79.9 °F with rainfall of around 1915 mm | 75.4 inch per year. The driest months are usually between January and April. Most precipitation falls in July and August, Averaging 627 mm | 24.7 inch.

April has the highest number of daily hours of sunshine is measured in Navi Mumbai on average. On Average there is around 10.45 hours of sunlight a day However, January has lowest number of daily hours averaging at 9.99 hours of sunshine per day.

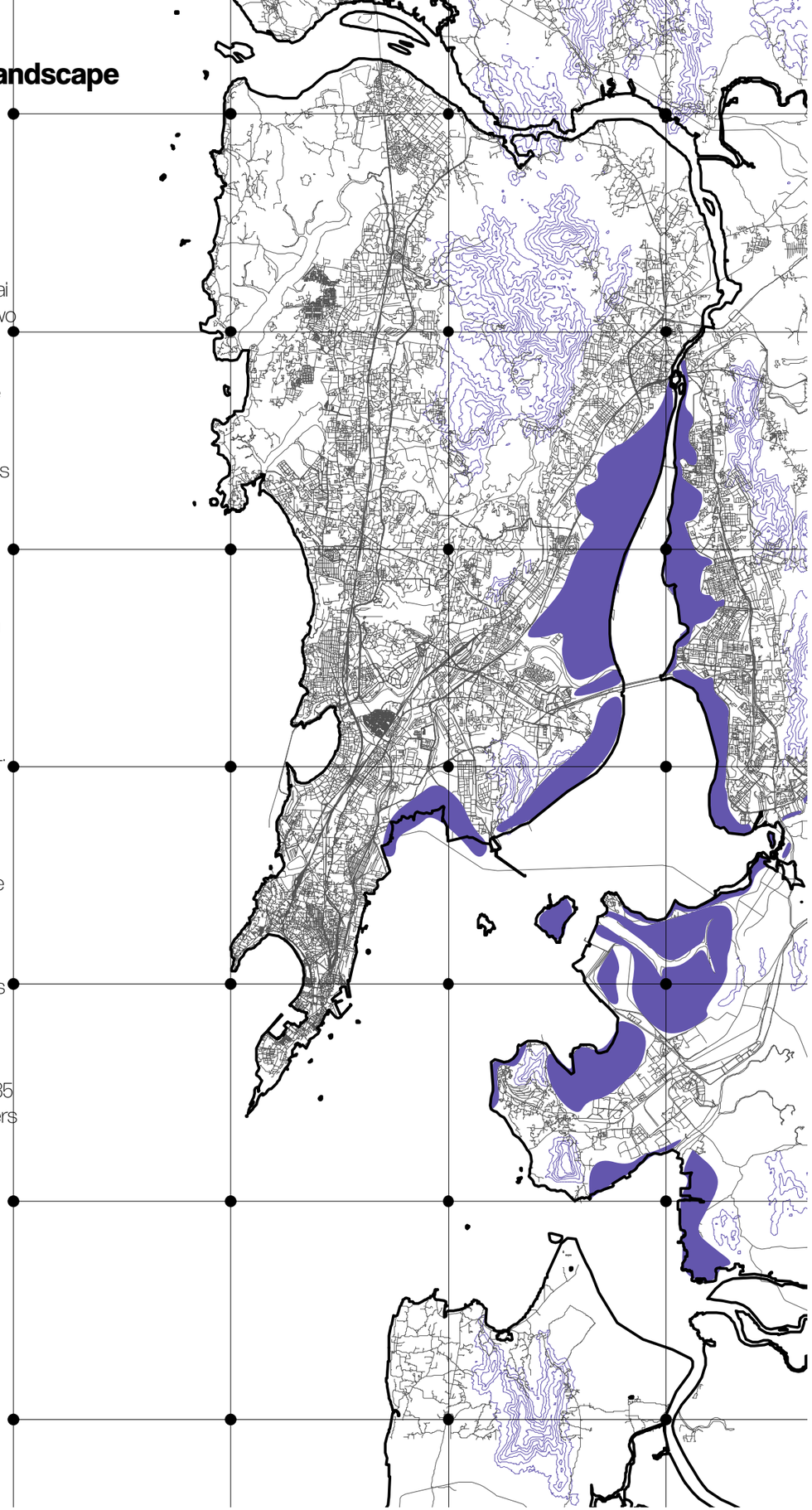
The month with the highest relative humidity is July (88.90 %). The month with the lowest relative humidity is December (56.23 %)[1]

1 (Mumbai et al. 2022)

Navi Mumbai Landscape

Situation - Navi Mumbai is situated between two ecologically important areas, the mountain ranges and a coast line alongside namely hill slopes and creeks, the geographical differences in topography can create uneven landscapes. Elevation ranges, for example between Parsik Hill mountain which has an elevation of 45.00 MRL in the east and Thane creek on the West where the average Ground level is 2.00 MRL.

Ususally defined as Hillocks in india, these are are small hills that catagorise most of the undeveloped land in Navi Mumbai. . Kharghar Hills are some of Navi Mumbai's hightst peaks offering vast scenes of green during monsoon season. Mumbai & Navi Mumbai, has between 35 and 45 square kilometers of mangrove forest. This is all that remains after almost 70% was destroyed in land reclamation projects



Landscape

Geology -'The rock formations in the region are derived mainly from Deccan Basalt and also from granites, gneiss and laterite. The gently sloping coastal low lands are observed in patches and are covered with moderately shallow to deep soils, mostly lateritic in nature, sometimes oxidized to yellow marrum.

The soils of this region are high in saline in the vicinity of creeks with lower saline at other places. They are calcareous, neutral to alkaline in reaction (pH 7.5 to 8.5); often contain clay, with a high amount of bases and high water holding capacity (200 -250 mm/m). The soils located on moderately sloping residual hills are lateritic in natu re and show intensively leached surfaces. They are loamy and slight to moderately acidic (pH 5 -6.5) with moderate base status (< 75%).'

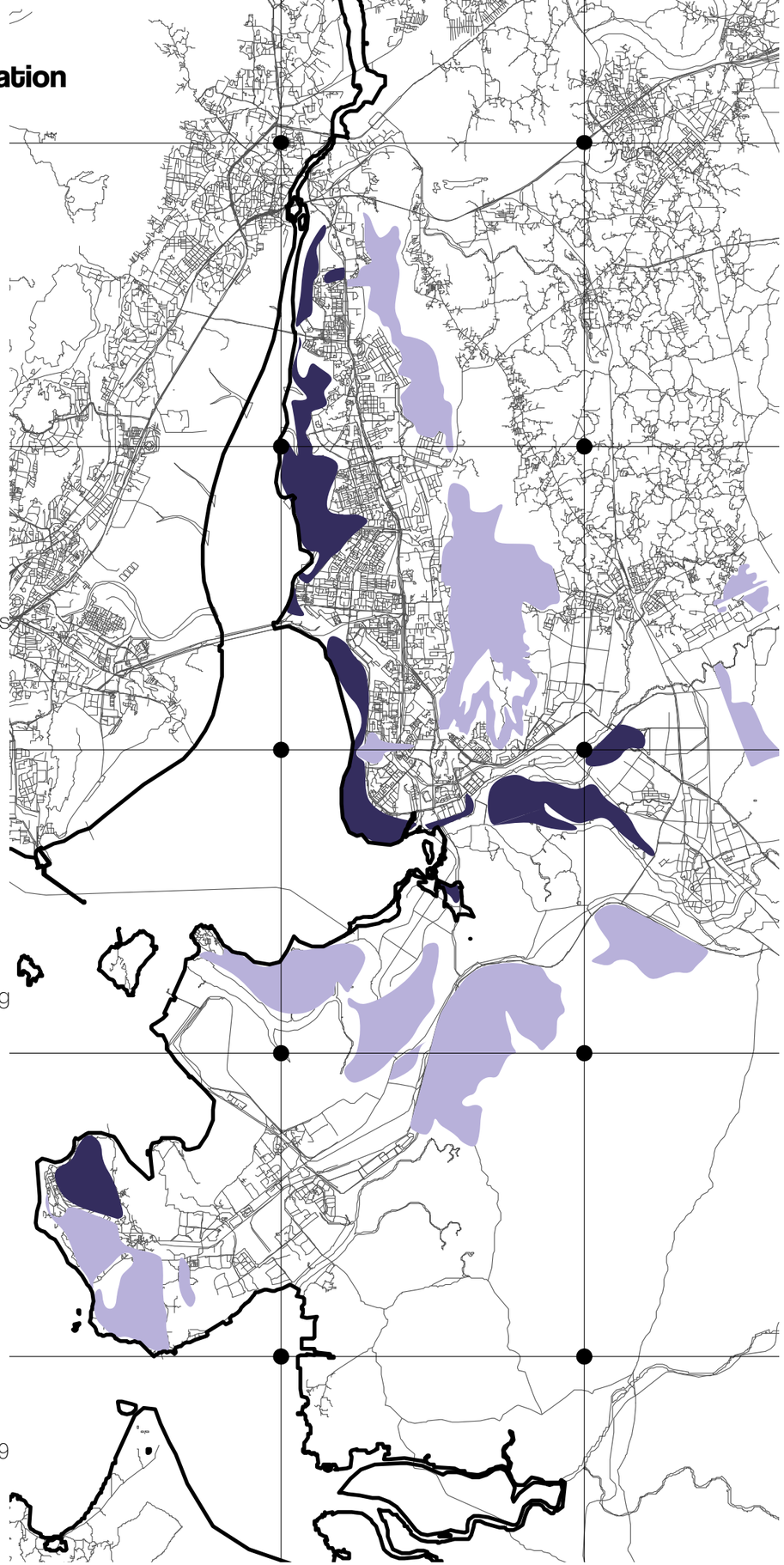
Navi Mumbai Regulation

Regulation -Navi Mumbai also regulates its environment in order to maintain nature within the landscape. Unlike Mumbai the city is sparcely populated allowing areas such as the wetlands to be protected by law.

Regional Park Zones protect such areas as the sloped and creeks from augmentation. Futhermore regulation such as No Development Zone (NDZ) prohibits areas from future development, protecting the landscape and nature.

"Regional Park Zone (RPZ) pockets within Navi Mumbai, kept unacquired to preserve dense tree cover and hill tracts. However, over the years, there is increasing unauthorized development, illegal tree cutting and quarrying due to perpetuating land demand and urban stress."

'Today, Navi Mumbai covers a total area of 343.70 sq.km. Of this, 50 sq.km falls under MIDC, Gaothan and municipal councils. The 154.21 sq.km of this area is divided among the Maharashtra Industrial Development Corporation, the Jawaharlal Nehru Port Trust, no-development zone, regional park zone, and areas for developing port, airports and railways network. The gross developable land is 139.49 sq.km.'



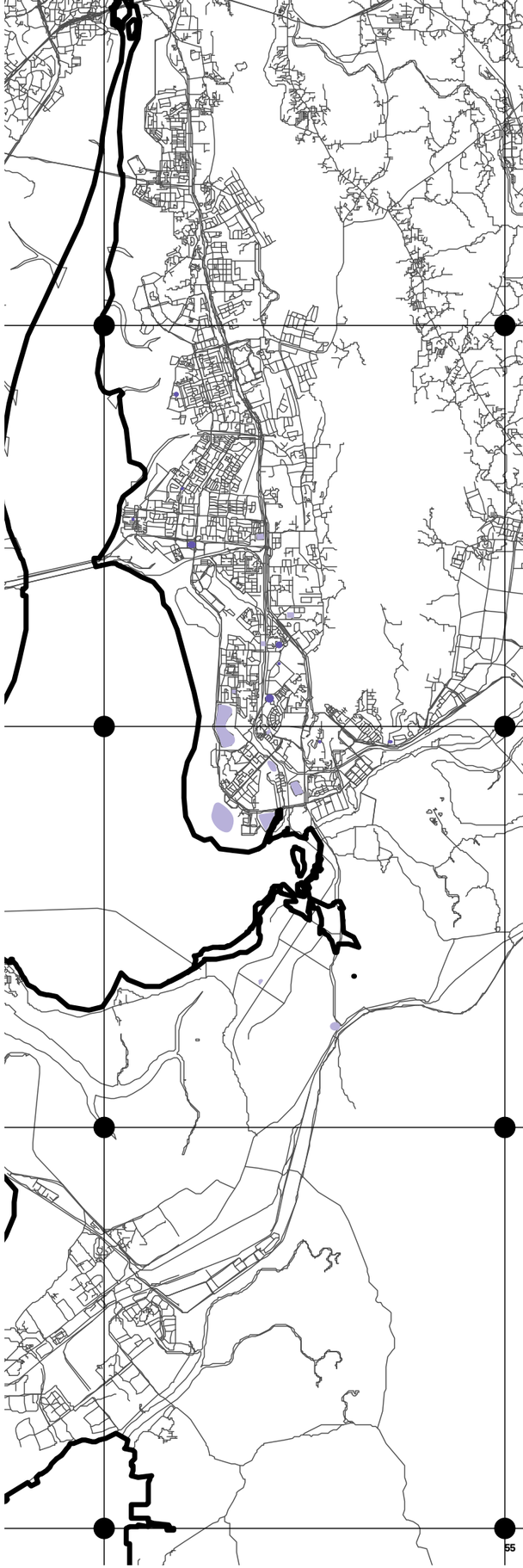
Navi Mumbai Water

Water Management -Water is stored throughout the city through large ponds and transported through a drainage system. At the edges of the ponds there's often a small filtration plant for the water, or underground pipes pump the water from the ponds to filtration plants located outside of the area. These Ponds/Lakes fill up during the monsoon season however in dryer months many places struggle to have a efficient water system.

'It is estimated that around 321.4 MLD water was supplied by NMMC out of which 290.4 MLD was supplied to domestic sector, 25 MLD to the commercial sector and around 6 MLD to gaonthan and slums. The supply of water to about 1,25,732 connections was through the well-developed distribution network of 972 km long facilitated by 132 booster pumps. The NMMC provides max. 24 hours water supply to almost 75 % while in the remaining 25% of the NMMC area water is supplied for about 4 to 8 hours.'

Problems in Water Supply

- Illegal connections;
- Long distance connections;
- Equitable distribution of water in distribution zones;
- Increasing demand, reduced availability of water;
- Low pressure, short supply and tail end problems;
- Choking and over flowing of sewers, seepage from manhole chambers;
- Depleting ground water resources and poor storage of water in Bisalpur Dam;



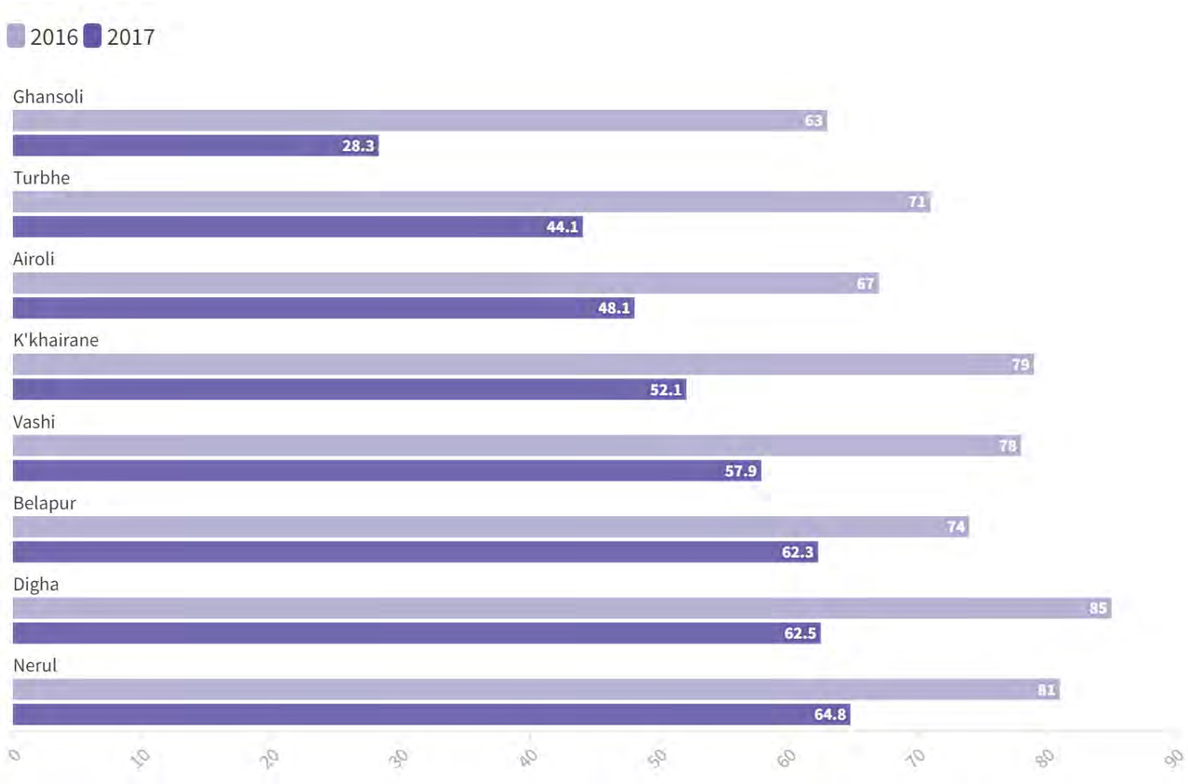
Navi Mumbai Regulation

Waste Management -Solid Waste Management, especially in urban areas of Navi Mumbai is a crucial element in order to sustain a healthy nd livable environemt.

'Solid Waste Collection is carried out for the entire city (108.63 sq.km) covering about 6,343 units of housing societies, around 3,977 units of Industries and 800 units of commercial establishments.

The total number of household covered is estimated to be around 2.99 Lakhs through door to door collection (bell ringing) on daily basis thus ensures almost 100% coverage for solid waste collection. A significant numbers of dustbins are provided in each node of NMMC and at market Secured Techno – Economic Growth of Navi Mumbai

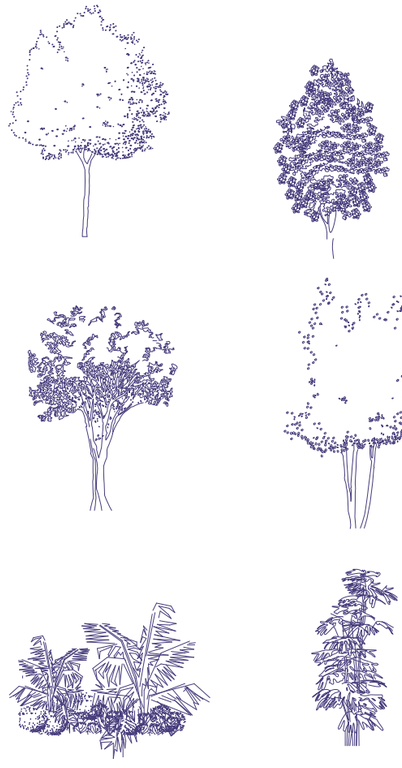
– A National Perspective 143 places. There are total 14,660 bins (80L- 238, 120L-6300, 240L-7525 and 1.1m3 –598) across various nodes of the city.



Navi Mumbai Ecology

Ecology -Ecological resources like air quality, green cover and water in navi mumbai are detariating due to channelization of agriculture into urban jungle.
'NCR is characterized by extension of Aravalli ridge, Forests, wild life and bird sanctuaries, rivers Ganga, Yamuna and Hindon, fertile cultivated land.' Despite such a dynamic rural-urban region of green and built environment the air quality of the region is not imporving.

The plant species found in the region are:
Rain tree,
Ashoka, Neem,
Gulmohur,
Eucalyptus,
Cassia,
Casuarinas,
Bottle Brush,
Spathodia (fountain tree),
Silver Oak, August (Sesbania),
Teak,
Sagar Gota,
Wine Palm,
Beetle nut,
Coconut Fan Palm,
Water Palm Date Palm etc.



Around 50 species of birds could be observed in NMMC area. Some of these birds that have found their perm anent habitat in the nearby Karnala Birds Sanctuary

are frequenting the area.

Housing Typology of Navi Mumbai

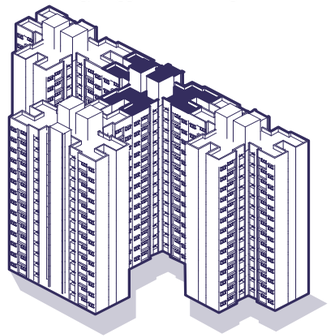
Typology

"Typology is the classification of (usually physical) characteristics commonly found in buildings and urban places, according to their association with different categories"1

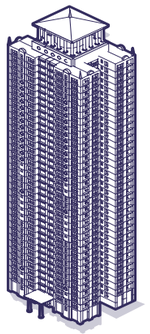
1 ("Typology Urban Planning And Architecture 2022)

Navi Mumbai

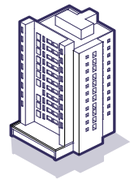
Typically Navi Mumbai is made up of four key typologies, the cidco tower block, Walk up Apartments, Informal Settlements and Chawl Like housing.



CIDCO



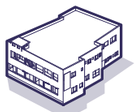
Apartment Tower



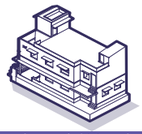
Apartment Block

Chawl

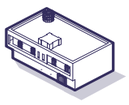
Mercantile Housing



Small Chawl



Redeveloped Attached Plotted Housing



Wadis

Wadis

Walk Up Apartment

Villa

Original Village Detatched Plotted Housing

Wada/ Agrarian Housing

Agrarian Housing

Informal Housing

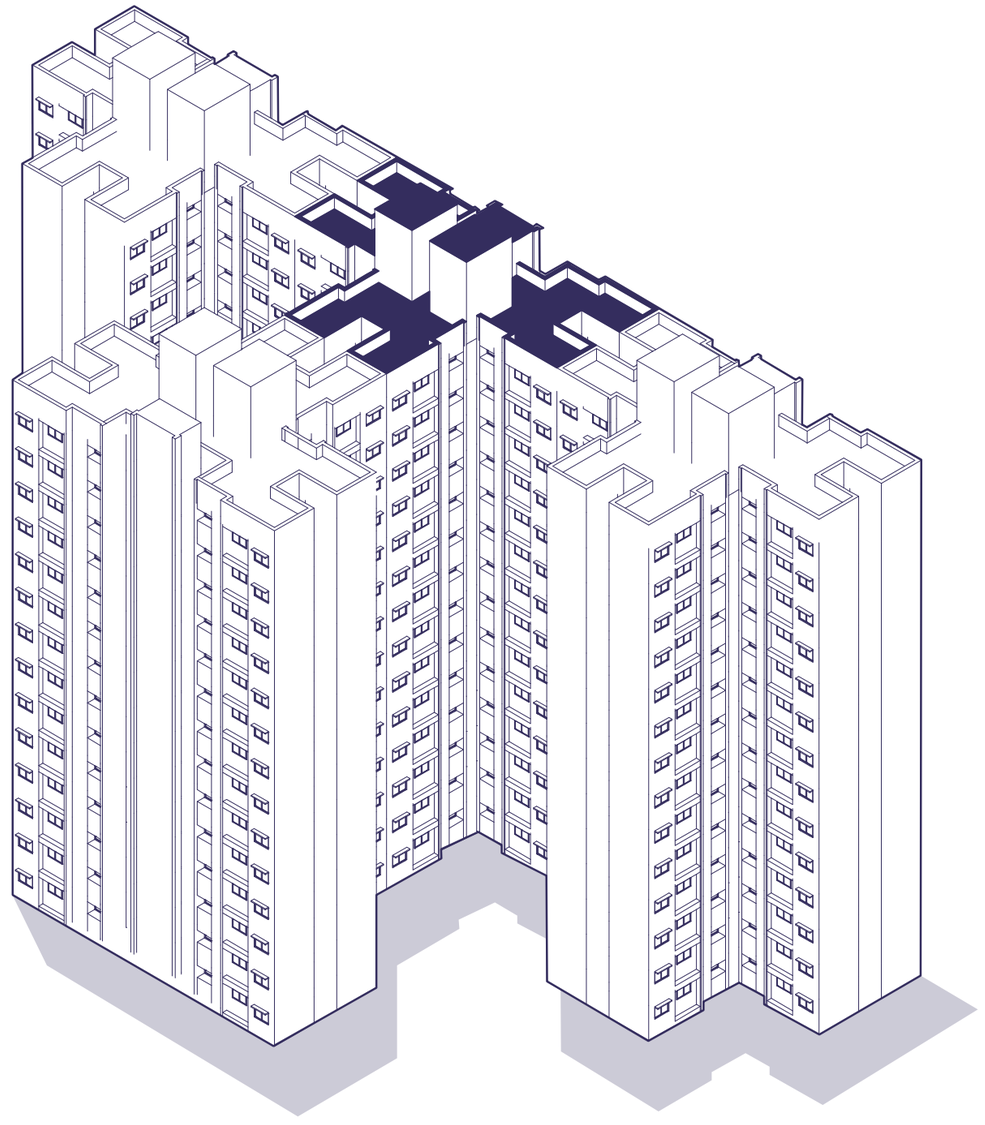
CIDCO Block

CIDCO

CIDCO Apartment Blocks are the most common typology within Navi Mumbai . Typically Concrete construction.

Concrete

Brick



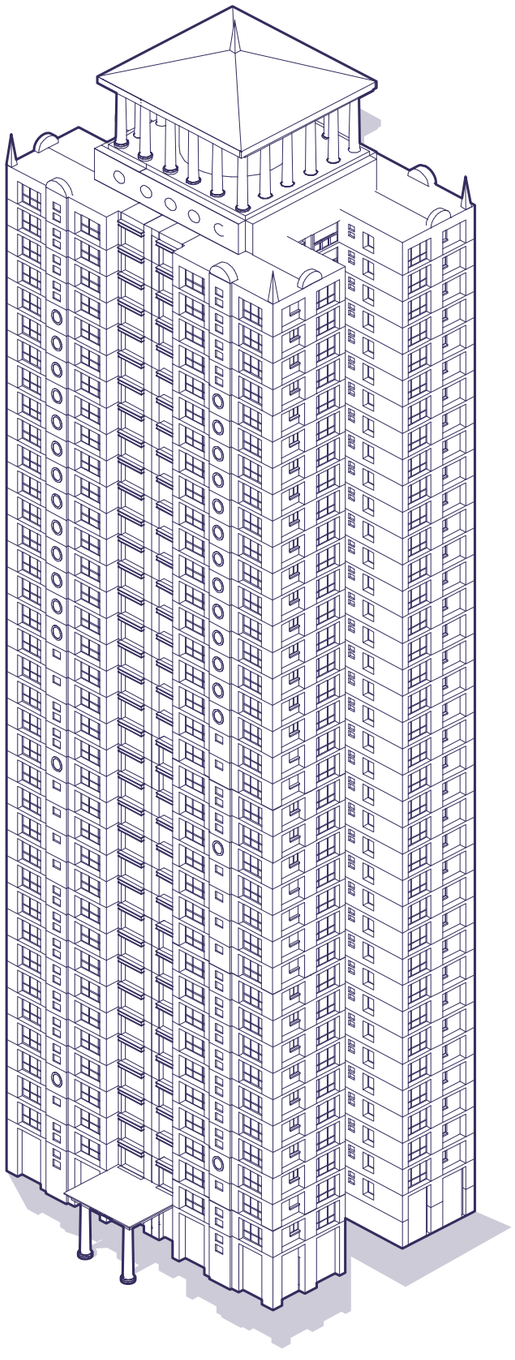
Apartment Tower

Tower

Typically constructed by private developers within Navi Mumbai. Typologically they belong to a self contained townships or a collective of relating buildings which provide luxuries such as clubs, swimming pools, gardens, shopping areas and entertainment centers.

Concrete

Brick



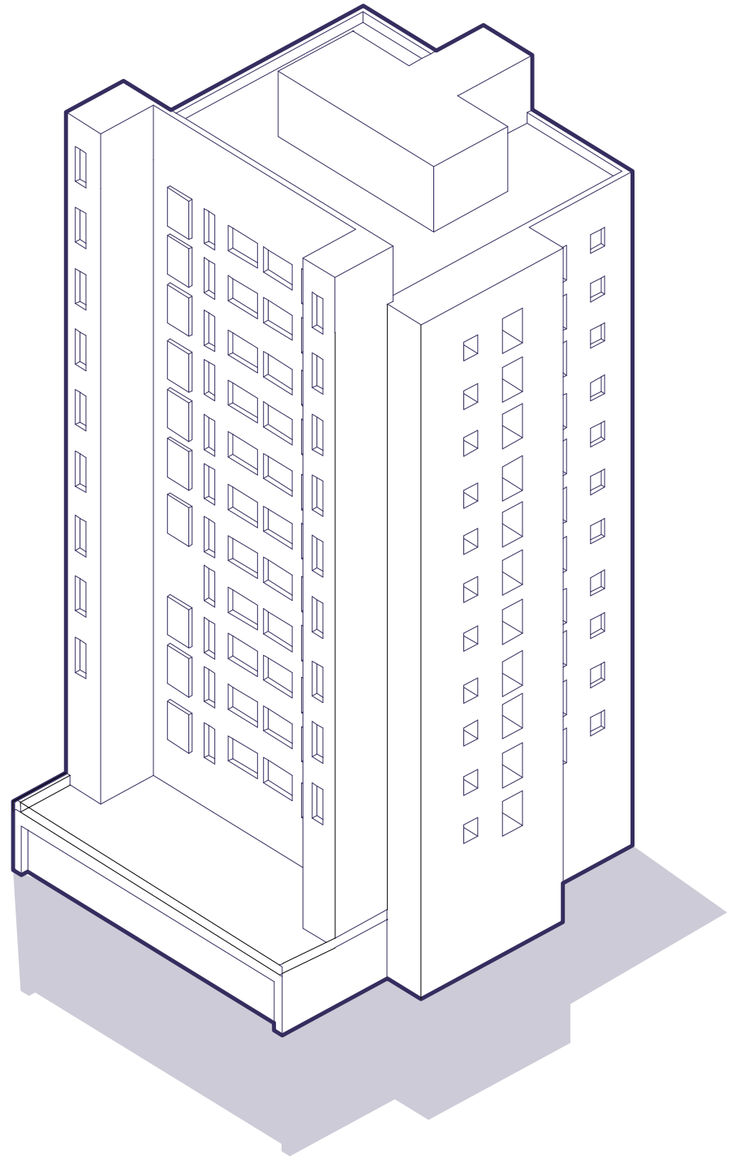
Apartment Block

Block

These mid size apartment blocks are more typical in the original designs from CIDCO and are usually found within town District centers.

Concrete

Brick



Chawl Housing

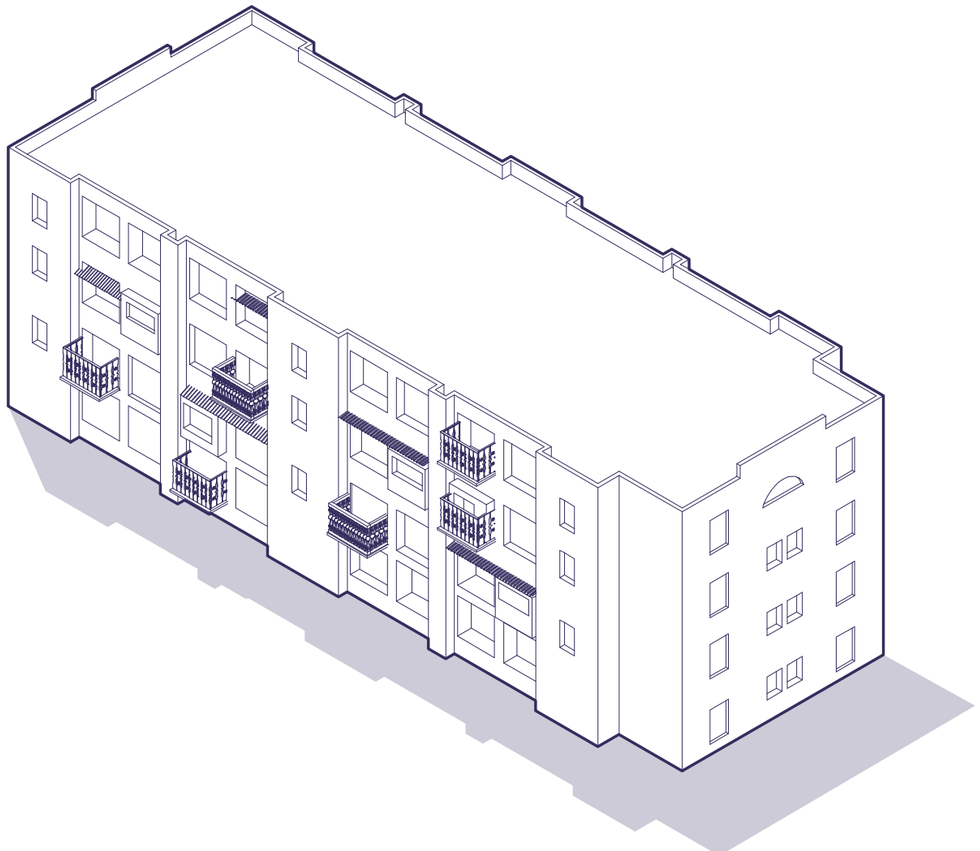
Chawls

Chawls are a common typology through India. Comprised of several single units of a multipurpose space with a kitchen facility and a wash area (more), all strung along one common access corridor also Leading in to the shared toilet.

Concrete

Brick

Wood



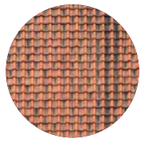
Mercantile Housing

Work Housing

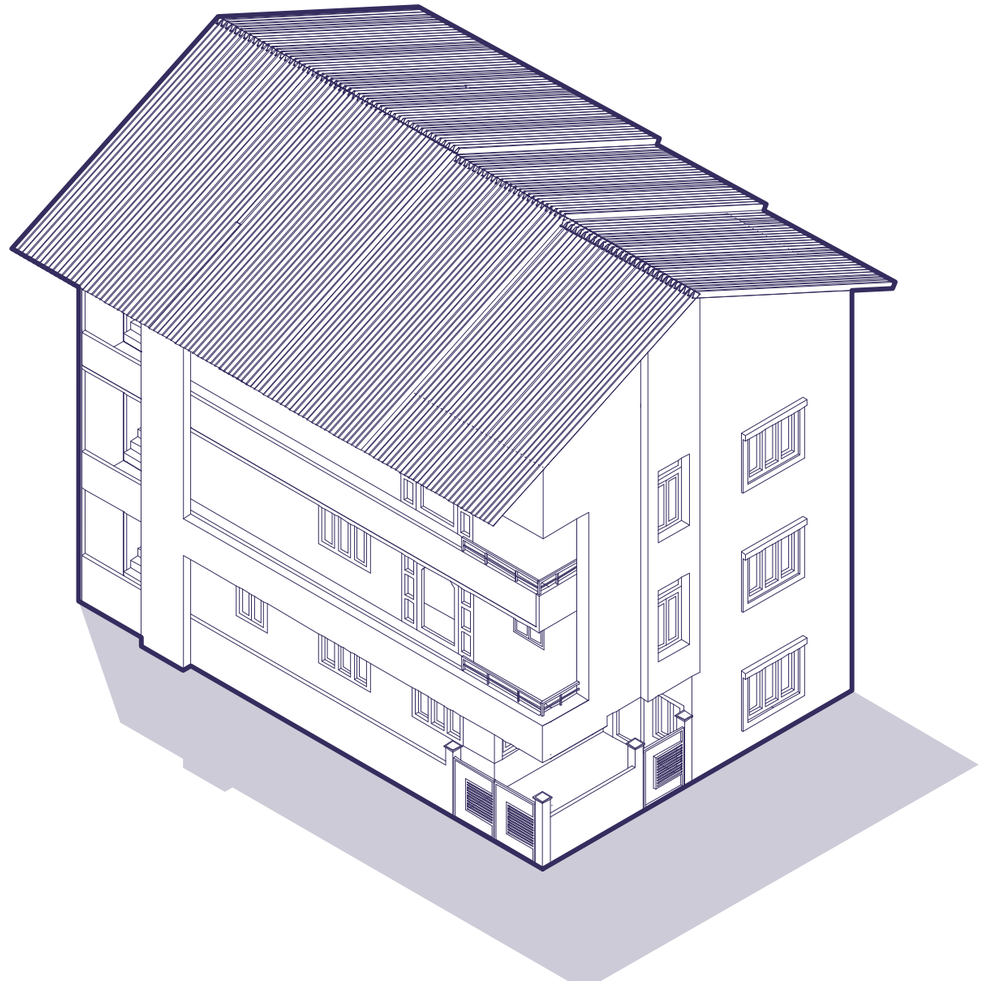
Deriving from Mumbai, these settlements are densely structured, characterized by small openings with buildings around them. The program is usually mixed use with shops on the ground story and residences above.

Concrete

Brick



Roof Tile



Small Chawl

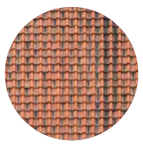
Chawls

Although Chawls are a common typology especially in Mumbai, in Navi Mumbai there tend to be smaller scale chawls. Rather than traditionally being built from wood they are made from concrete construction with additional wooden components.

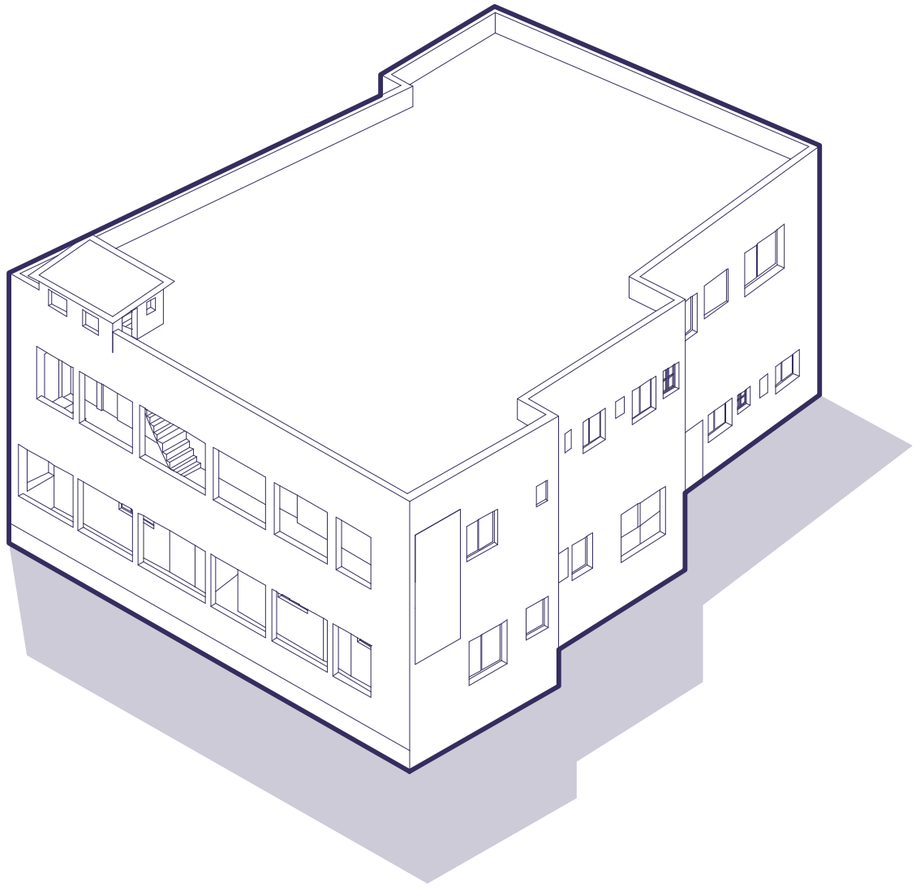
Concrete

Brick

Wood



Roof Tile



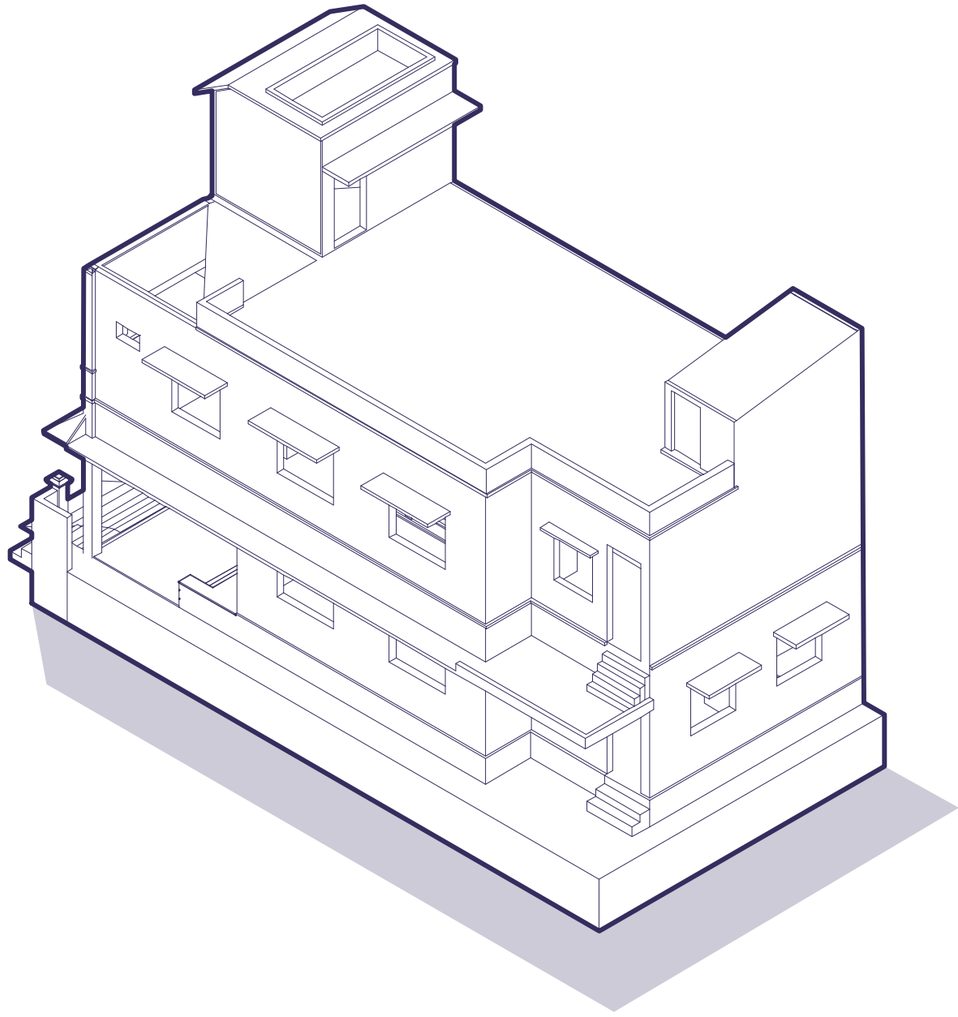
Redeveloped Attached Plotted Housing

Attached Housing

Commonly found in Villages, attached plotted housing consists usually of 2-3 floors of several houses. Some convert the ground space into retail.

Concrete

Brick



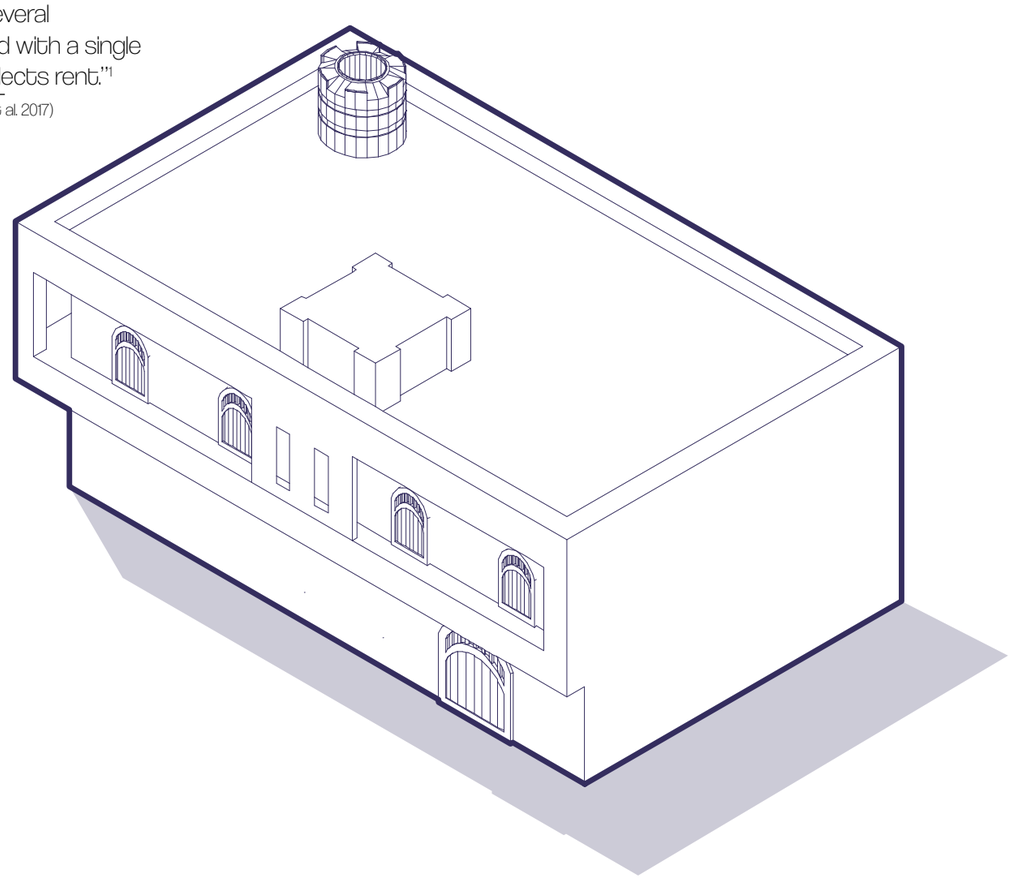
Wadi

'The Wadis is predominant type in original village areas. "A wadi is originally apiece of land. But in later developments the suffix wadi is assigned to an area with a group of buildings occupied by several households and with a single owner, who collects rent."[1]

1 (Shetty et al. 2017)

Concrete

Brick



Wadis

Wadi

'The 'native' settlers brought with them the artisans of the regions they came from and the influence is seen primarily in the intricately carved building skins. A building within a wadi consists of single room tenements with common corridors and shared toilets. These corridors generally overlooked a street or an open space. These buildings are generally two to four storied"[1]

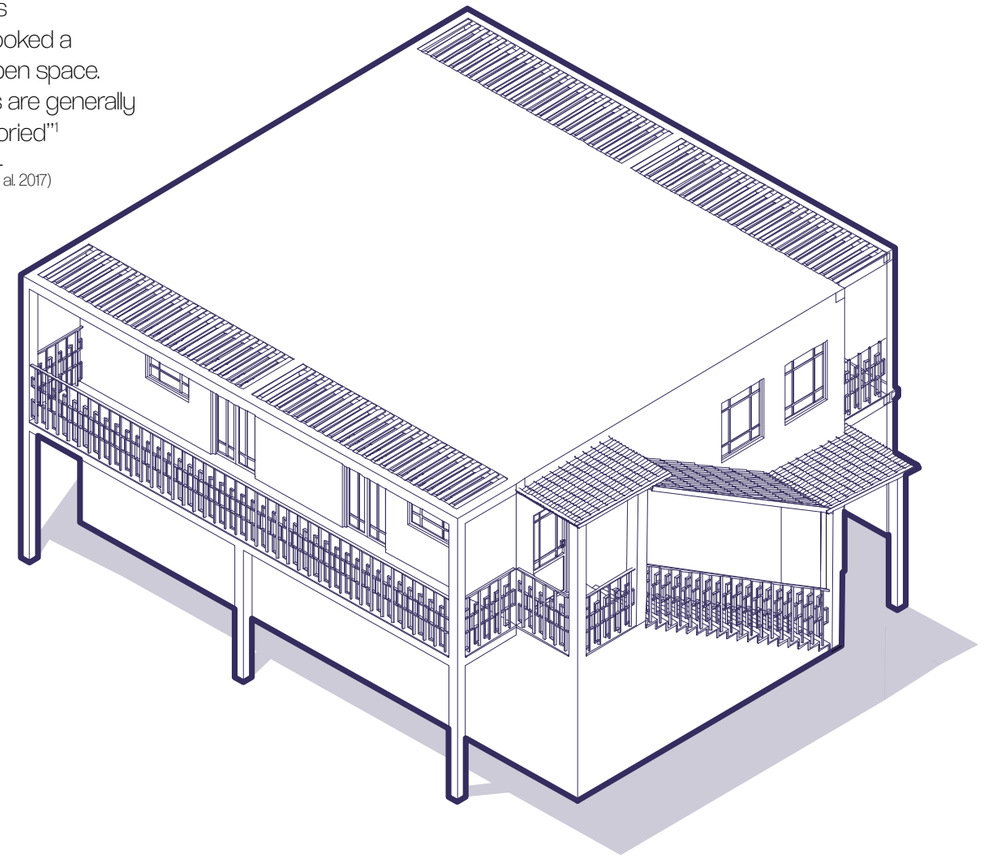
1 (Shetty et al. 2017)

Concrete

Brick

Roof Tile

Wood



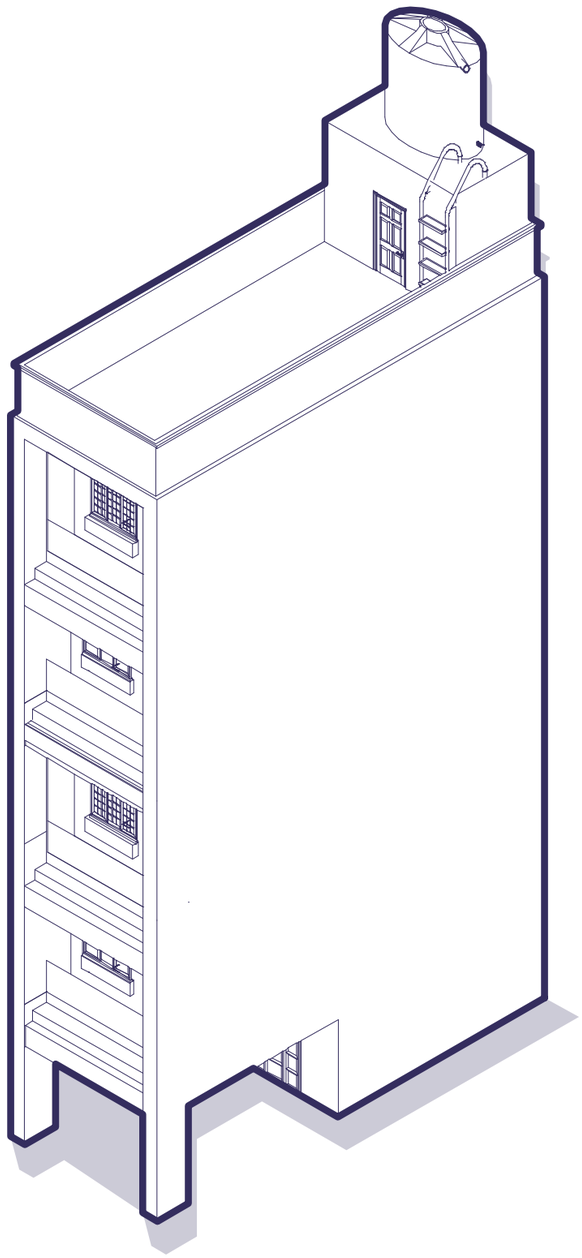
Walk Up Housing

Walk Up Apartments

Typically thin three meters wide and twenty meters deep dwelling in order to maximize the number of shop fronts. Houses are usually located on the rear of the buildings to prevent noise from the road and on higher floors. in Navi Mumbai these buildings are generally two to four storied.

Concrete

Brick



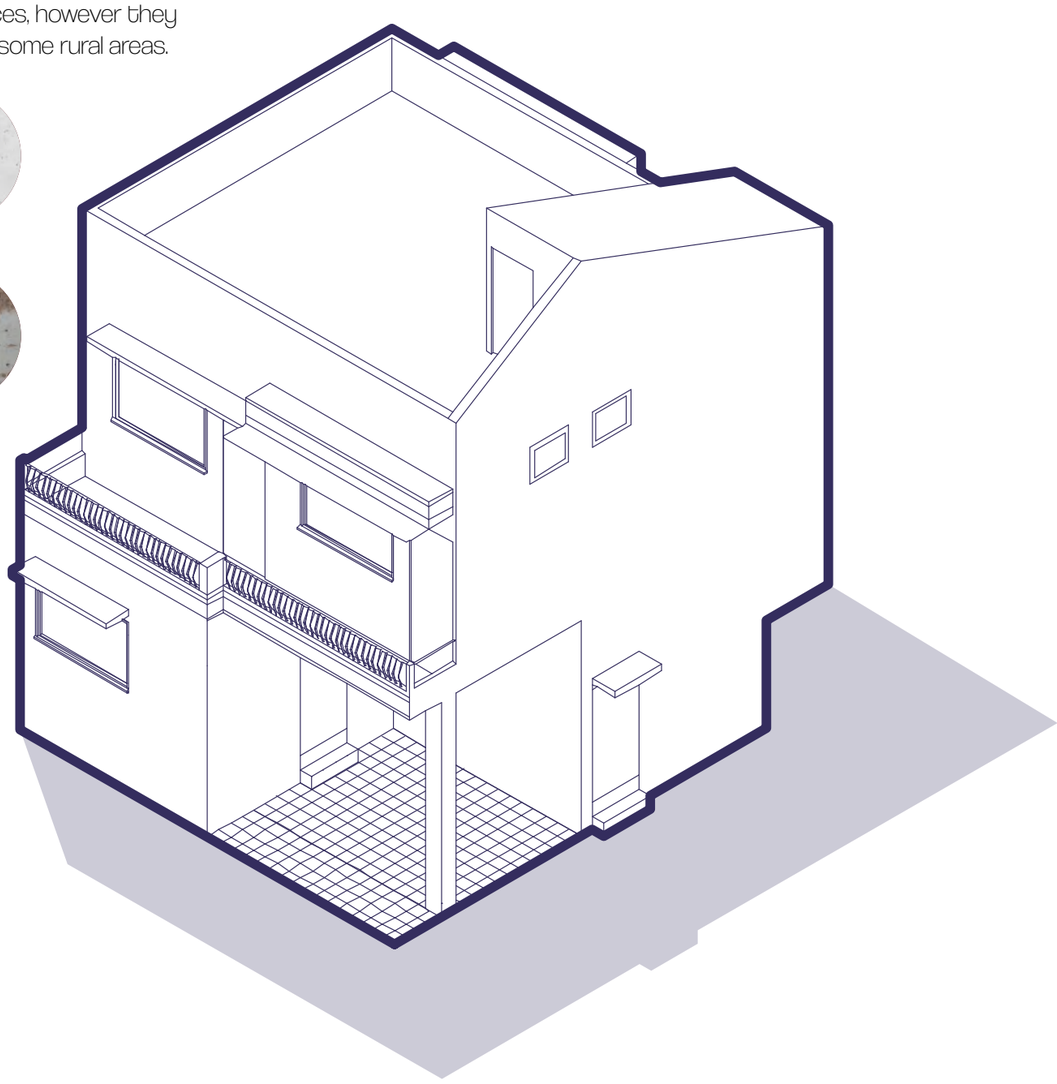
Villa

Bungalow/Villa

The origin of the bungalow derive from the early attempts of British military in the eighteenth century to standardize design. It is uncommon in Navi Mumbai to own a villa/bungalow due to land prices, however they do exist in some rural areas.

Concrete

Brick



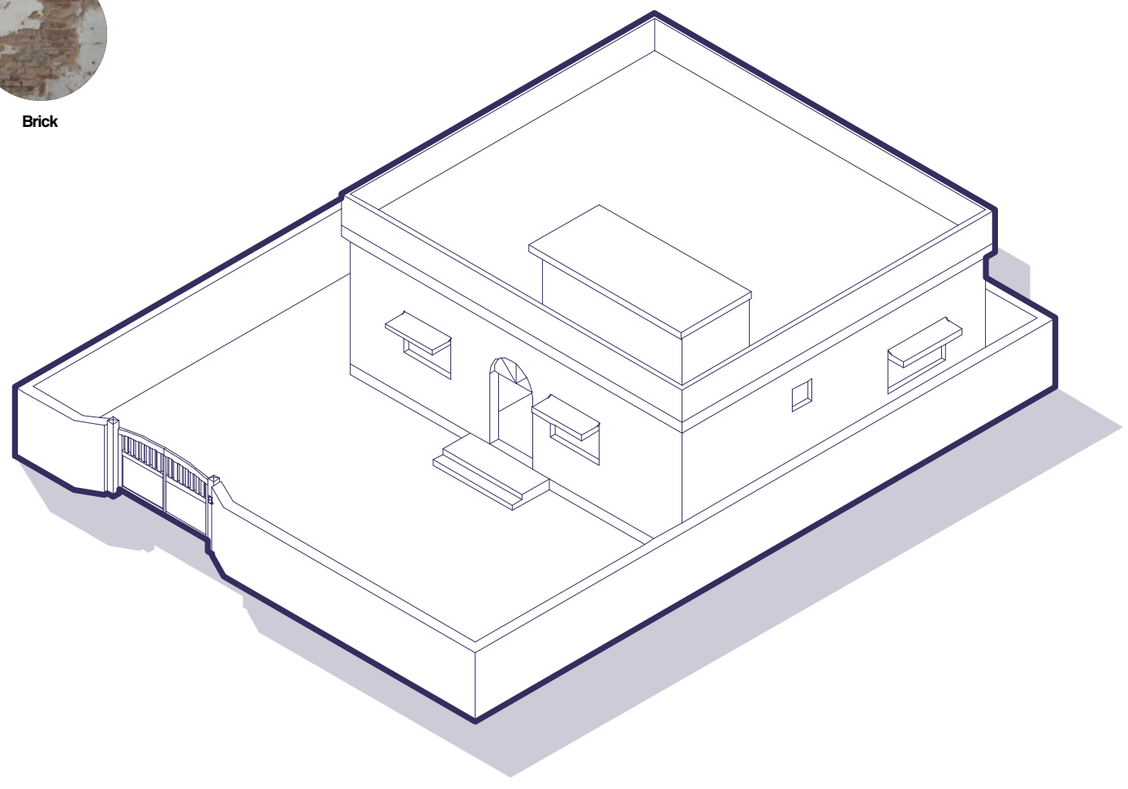
Original Village Detatched Plotted Housing

Detatched Housing

Typically pertaining one family, these remain as one stories buildings, rare in Navi Mumbai and slowly being edged out due to the high FSI

Concrete

Brick



Wada/ Agrarian Housing

Fishing or Algerian House

'A typical house in such a settlement consists of a large multi functional living space, several small rooms, a tiny kitchen and a toilet. The verandas outside the house becomes a very important element.
It is used for various purposes"[1] Typically in Navi Mumbai roofing is made from steel sheets to protect from Monsoon season.

1 (Shetty et al. 2017)

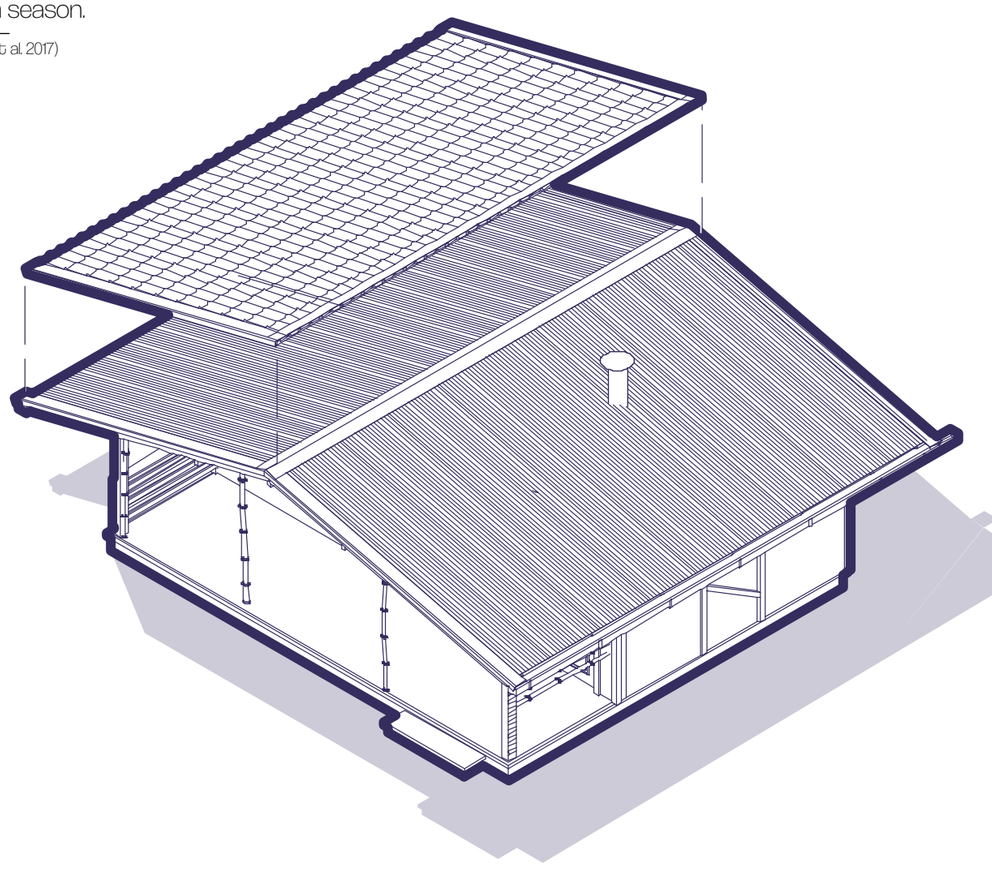
Concrete

Brick

Roof Tile

Wood

Steel



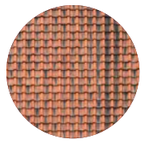
Market Housing

Market Apartments

Typically found in villages, these detatched houses usually consist of a shop on the ground floor and residency on the second. Many back yards are used as workshops to produce a product sold at the front of the house.

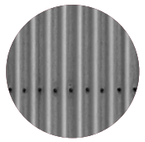
Concrete

Brick

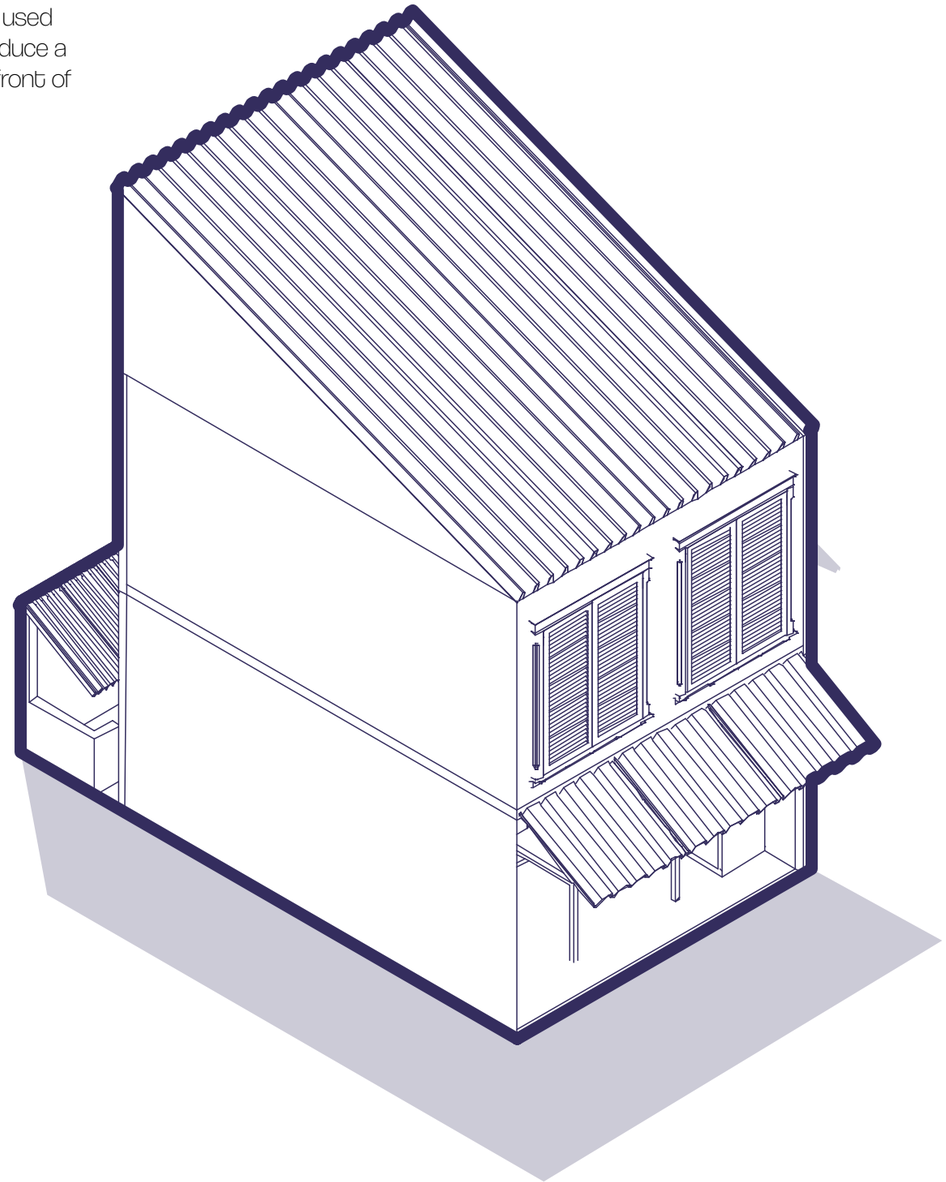


Roof Tile

Wood



Steel



Informal Housing

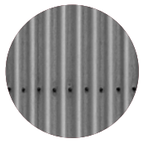
Slum Dwellings

'The construction type varies from wood to plastic to asbestos construction and to double storey brick and concrete structures. There are slums that have a concentration of ethnic communities, of work based communities, and other such associations. There are slums that come up on construction sites and move on to other construction sites after the work gets completed. Houses in a slum are generally very small (about 100 sq.ft.). But there are instances where large houses of about 1000 – 2000 sq.ft could be found."[1]

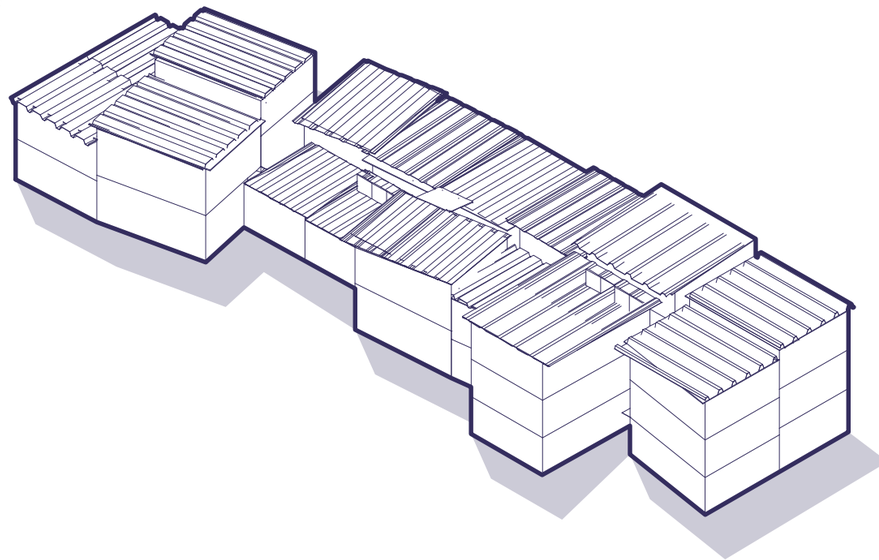
1 (Shetty et al. 2017)

Brick

Wood



Steel



Current situation of Navi Mumbai

Navi Mumbai is on the edge of Development perusing several Infrastructure projects. These Projects are with the intensions of further developing the economic market within the city. A metro system is also currently being built by CIDCO in Navi Mumbai. This railway is planned to be around 117 km long. This metro will connect the International Airport, which is also under construction. Currently CIDCO still functions as the main developer of Navi Mumbai. Due to the high demand of people that want to live in the city.

Although Navi Mumbai was a planned satellite city "More than 40,000 families living in slums who constitute 19% of the population in NMMC (Navi Mumbai Municipal Corporation) areas as per 2001 census"[9] (Times of India 2018)

Current situation of Navi Mumbai

Although still present, traditional techniqyes and artisans are a rare to find. The Indian handicrafts that create the colourful image of the country that still exists today once previously collapsed under British colonial rule.

The introduction of Machine-made products imposed the concept of mass production within India, therefore forcing Indian craftsmen to sell their goods at a lower market price.

In turn, this led to many artisans abandoning their ancestral trade to find a more sustainable income. This further damaged the self-sufficient village economy as the disappearance of traditional industries led to overcrowding in the agrarian sector

Home » Mumbai

Mumbai: Will the gaothans survive development?

As election day approaches, local problems are raised as candidates canvas for votes.

Author: DNA WEB TEAM | Edited By: Fleur D'Souza |Updated: Apr 11, 2019, 03:15 PM IST

Development shouldn't dwarf urban villages

MUSTANSIR DALVI

FEBRUARY 07, 2016 08:19 IST
UPDATED: NOVEMBER 17, 2021 06:18 IST

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Koliwadas and gaothans in Mumbai are on the road to oblivion, thanks to monolithic Development Control rules and building by-laws

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MUMBAI NEWS

No end to dispute over redevelopment rights for gaothans

Navi Mumbai's gaothan areas a major challenge for fire brigade officials

Reported By: DNA WEB TEAM | Edited By: Rahul M Tawade |Source: DNA |Updated: Nov 29, 2013, 05:02 AM IST

THIS STORY IS FROM SEPTEMBER 24, 2016

Gaothan residents resist govt survey

TNN / Sep 24, 2016, 00:41 IST

ARTICLES

Gaothan residents resist govt survey

"CIDCO and the state government has failed to implement the gaothan expansion scheme in such areas. This has led to the unauthorised construction, giving rise to problems such as narrow roads and footpaths, lack of any kind of ventilation, social amenities, parking facilities or open spaces. During emergencies, fire brigade or ambulances find it difficult to enter these areas," said Fadnavis.

Gaothans

गाँव थान

The word 'Gaothan' is a Marathi word which is derived from the words 'Gaon' (which means 'village') and 'Than' (which means 'site'). As the name suggests, the word 'Gaothan' is used to denote sites in and around the old rural or village areas of Maharashtra.[1]

1 ("Gaothan Property And All You Need To Know About It," 2022)

Village Survival

सिडको *CIDCO (City and Industrial Development Corporation)*

CIDCO Urban Renewal In 2014, the Maharashtra State Government proposed a resolution for Urban Renewal Schemes for gaothans and surrounding areas in the Navi Mumbai Notified Area to regulate unplanned and haphazard development. The scheme relies heavily on voluntary and participatory involvement of eligible inhabitants of gaothans and surrounding areas. [1]

1 ("Redevelopment Of Urban Villages – Cidco Smartcity," 2022)

Number of Revenue Villages

95

Number of Gaothans

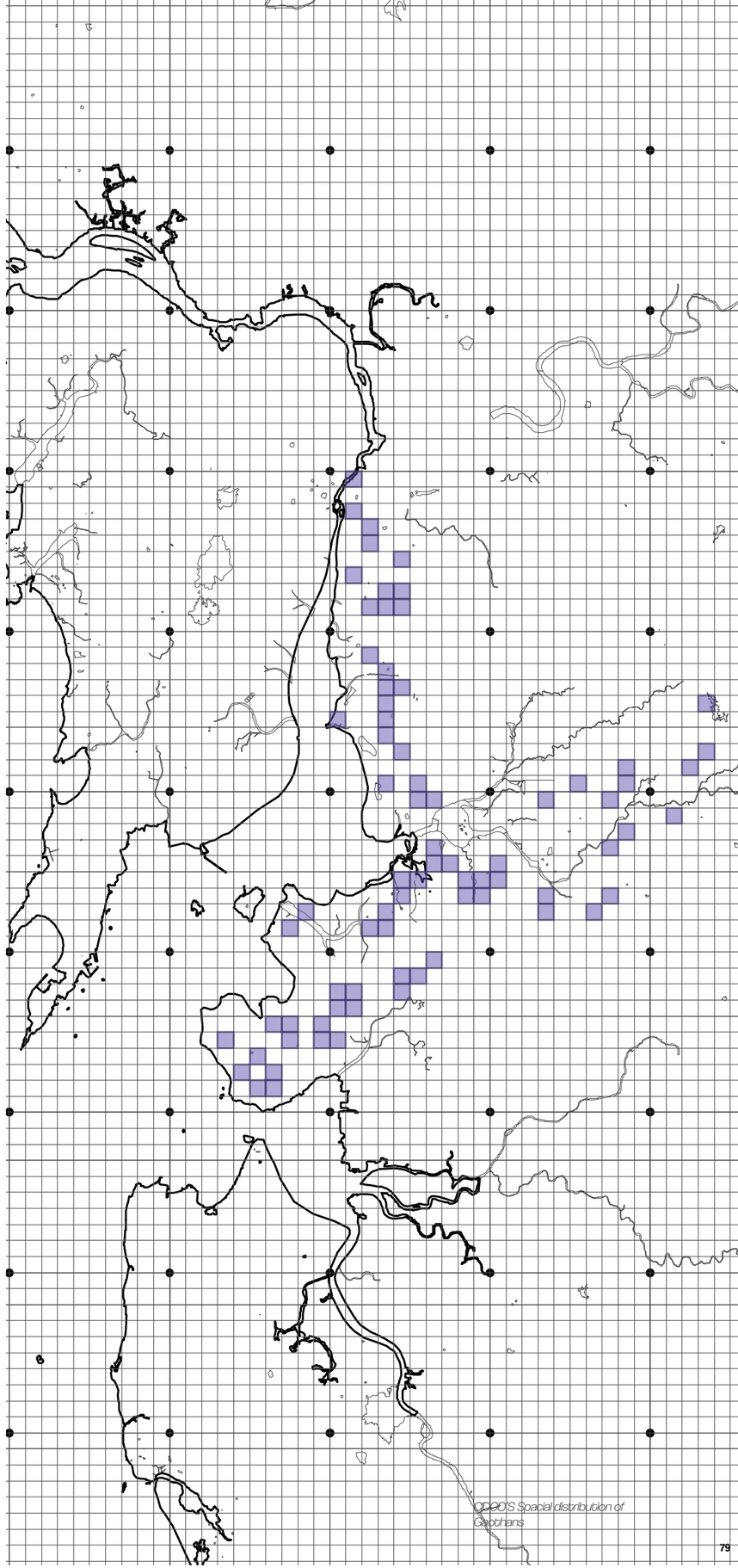
101

Total Gaothan area* (In hectare)

255

Existing population of Gaothans

3,49,916



CIDCO Spacial distribution of Gaothans

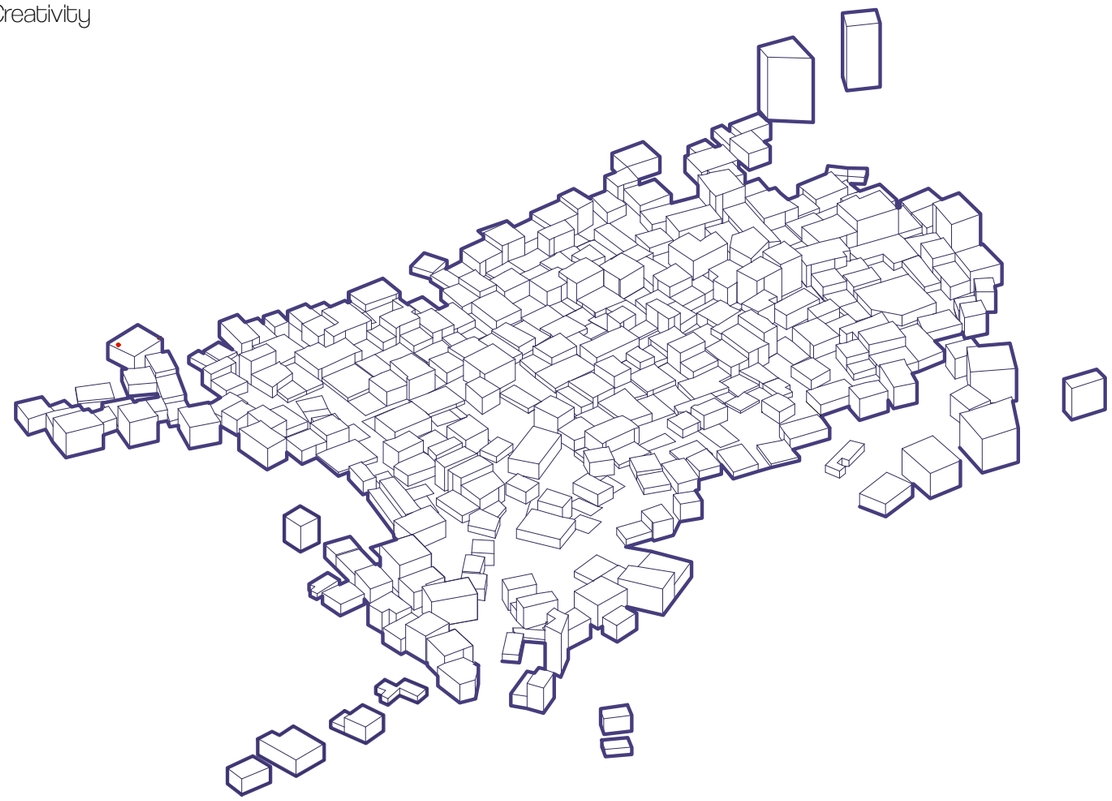
Threat + Potential of Villages

Threats to Villages:

Connectivity
Urban renewal?
CIDCO
Health
Social Amenities

The potential of Villages:

Self sufficiency
Skill Learning
Heritage
Creativity



Artisan Village

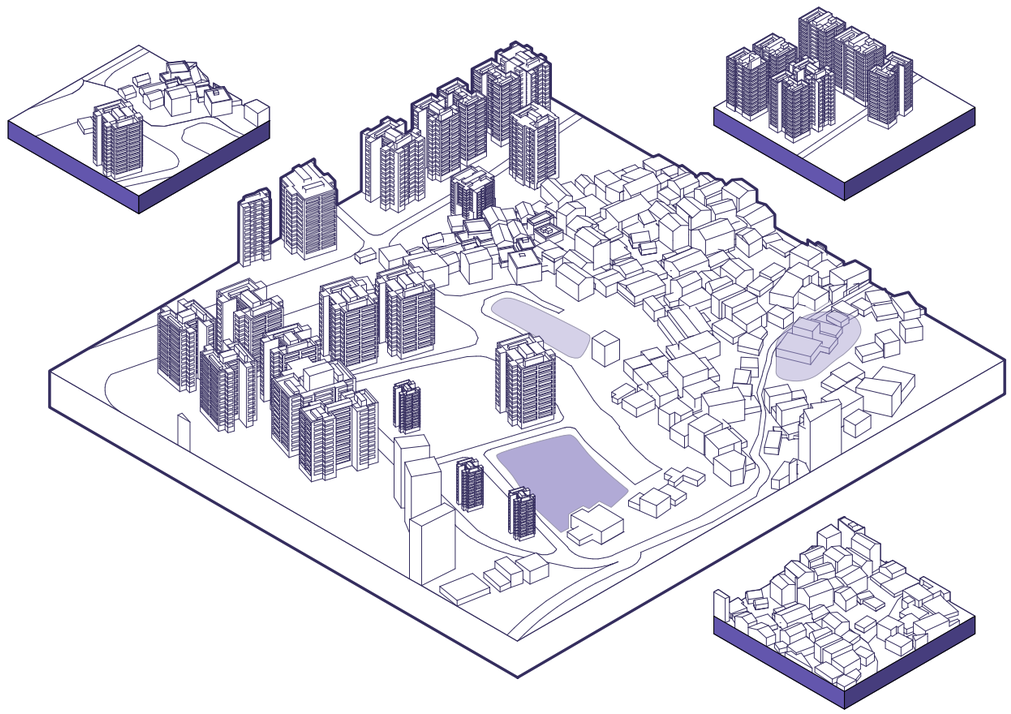
Habitually it is common
Within communities to pass
on the knowledge of a trade
or traditional skill through a
family community. This layering
of abilities adds to a product,
making it simultaneously bonded
to the environment it was
produced in.

Problems, Challenges and Potential of Urban Villages

Problems
- Lack of social amenities
- Power consumption leading to power cuts
- Overall apperance of dwellings, run down image of village
- Educational and job oppertunities
- Accessibility to services
- Reputation of Village

Challenges
- Old Services, Modernization
- Patterns of routine interupted
- Venacularity
- Access to materials
- Keeping 'essence' in tact

Potential
- Village expansion
- Health improvements
- Safety increase
- Wider connection
- Spred of artizan craft



Problem Statement

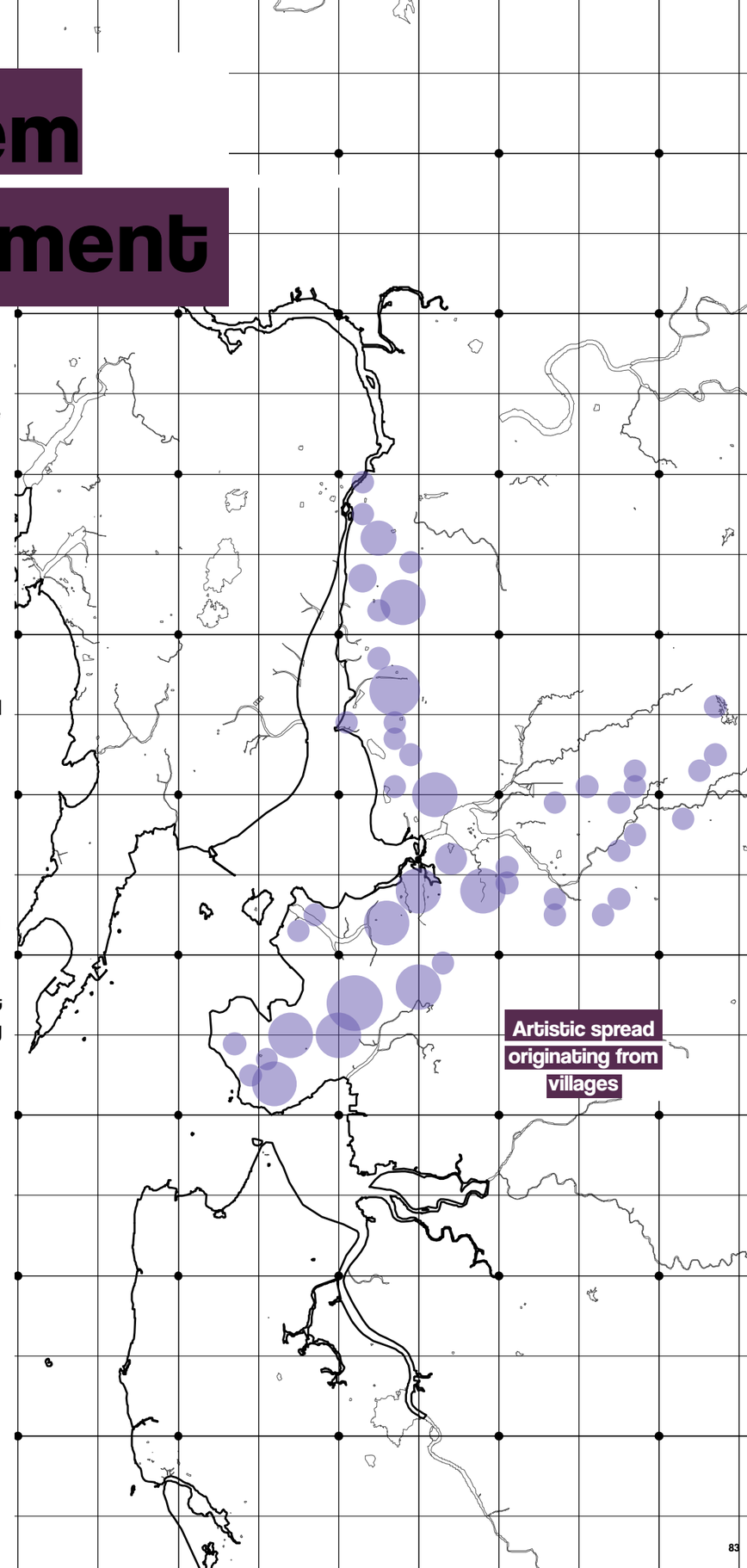
Many artisans abandoned their ancestral trade to find a more sustainable income. This damaged the self-sufficient village economy, poor infrastructure of village and slum communities in Navi Mumbai have a significant impact on health, economy and characteristics of the area.

"CIDCO and the state government has failed to implement the gaothan expansion scheme in such areas. This has led to the unauthorized construction, giving rise to problems such as narrow roads and footpaths, lack of any kind of ventilation, social amenities, parking facilities or open spaces."

Most villagers have constructed illegal structures in gaothans and rented them out. Once redevelopment takes place, that so that source of income will dry up and villagers are unlikely to support any scheme that will affect their income.

https://indianexpress.com/article/cities/mumbai/cluster-redevelopment-scheme-with-fsi-4-to-be-extended-to-navi-mumbais-gaothans/

https://timesofindia.indiatimes.com/city/navi-mumbai/4-FSI-to-usher-planned-development-for-gaothans/articleshow/31186298.cms



Case Studies

Dharavi

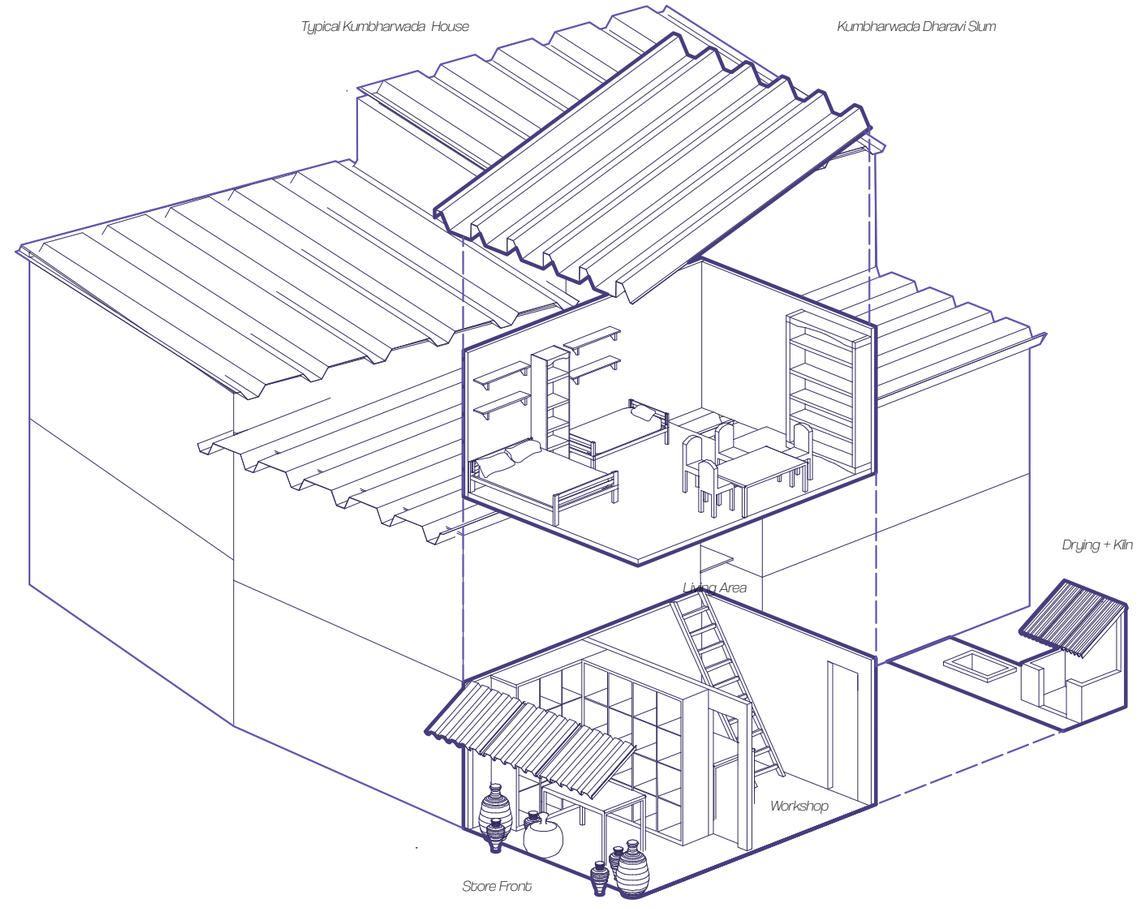
Dharavi is a locality in Mumbai, Maharashtra, India, considered to be one of Asia's largest slums. Dharavi has an area of just over 2.1 square kilometers and a population of about 1,000,000. With a population density of over 277,136/km^2, Dharavi is one of the most densely populated areas in the world.

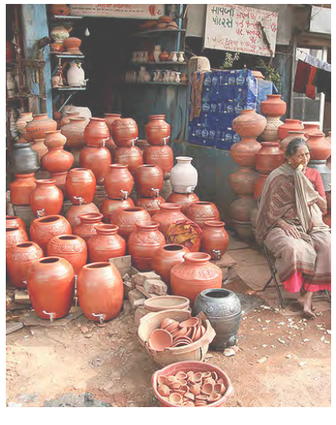
Source: *https://www.architectural-review.com/essays/investigating-the-redevelopment-of-indias-most-famous-informal-settlement-dharavi*

Case study:

Dharavi

Kumbharwada in Dharavi is an establishment of potters almost 100 years old. It is the largest community of potters in Mumbai. They are originally from Saurashtra, Gujarat. Khumbars means potter and Wada means colony. Hence the name Kumbharwada – colony of potters. It occupies 22 acres of land that houses around 1400-1500 families, 700–800 of whom still practice pottery today.

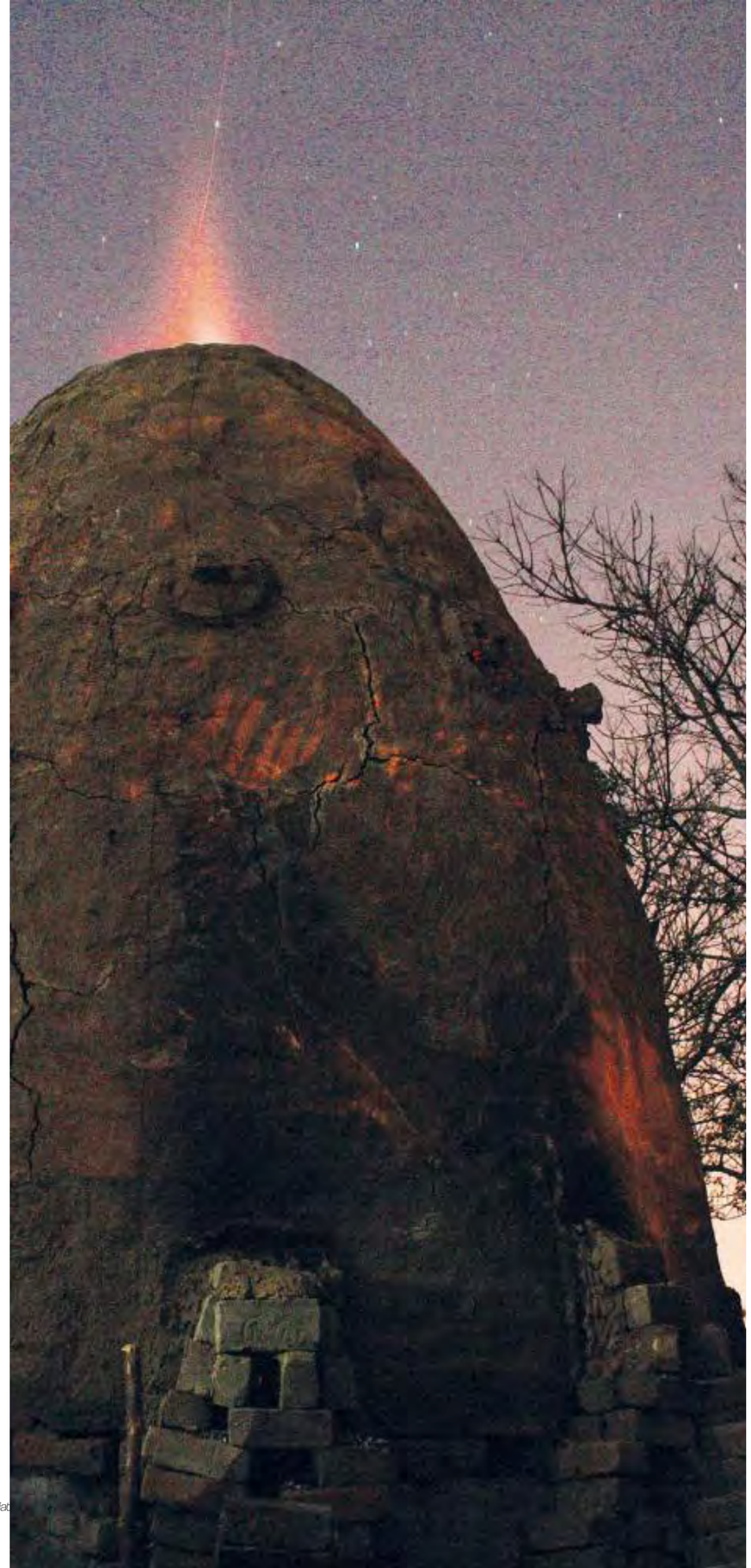




Case study: Anupama Kundoo

Eagerness of efficiency

Anupama Kundoo (born in Pune in 1967) is an indian architect. In 2013 she received an honourable mention in the ArcVision International Prize for Women in Architecture for her dedication when approaching the problem of afford-ability of construction and sustainability in all aspects. Kundoo s internationally recognized and award-winning architecture practice started in 1990 and demonstrates a strong focus on material research and experimentation towards an architecture that has low environmental impact and is appropri-



Volontariat

Case study: Anupama Kundoo

Volontariat Home : Home for Homeless Children

Design: *Anupama Kundoo with technical support from Ray Meeker*
Location: *Pondicherry, India*
Client: *Volontariat NGO*
Technical Consultant: *Ray Meeker*
Contractor: *M. Vinayagam*

The project aims to achieve low-cost low-impact housing solutions and to test the prototype which was built to serve as a home for homeless children as part of the activity of Volontariat, an NGO in Pondicherry.

The interior space of the structure is filled with other mud bricks or other ceramic products, such as tiles, and used like a kiln. Typically, kiln walls absorb about 40% of the heat generated. In this technology, the house is the kiln, and the 'heat loss' is directed towards firing the house and stabilizing it from water damage. The fuel cost is largely accountable to the products inside. The strength of brick in principle would be achieved for the mud pieces. Further, the cement in the mortar mix would become unnecessary.

Plan and section

Construction

Case study: Auroville, India

A Spiritual Township

A place where men can live away from all national rivalries, social conventions, self-contradictory moralities and contending religions; a place where human beings, freed from all slavery to the past, can devote themselves wholly to the discovery and practice of the Divine Consciousness that is seeking to manifest. Auroville wants to be this place and offers itself to all who aspire to live the Truth of tomorrow. Here we do not have religion. We replace religion by the spiritual life, which is truer, deeper and higher at the same time, that is to say, closer to the Divine.

The approach of its Master Plan is to establish that the economic and human intellectual resources, which normally gravitate to urban areas, can be effectively used to spread development more evenly, and to create an equitable and economically sound society. This is, more often than not, presently not the case in regard to the way cities are planned, developed and are functioning.

Volontariat

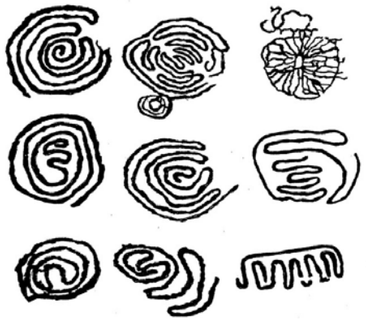
Case study: Auroville, India

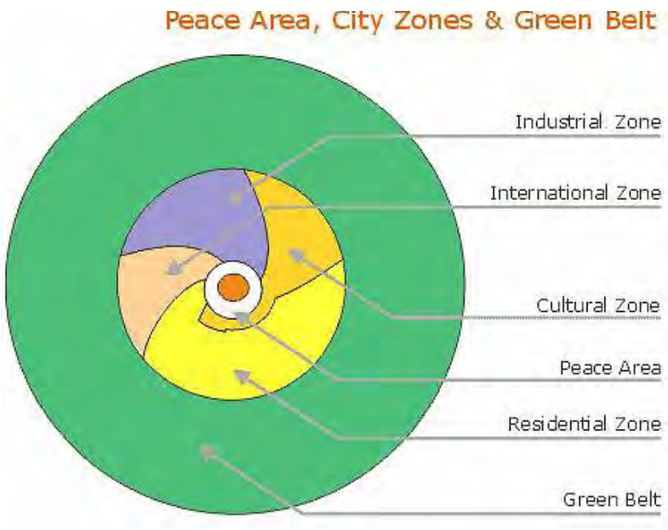
A Spiritual Township

It is common knowledge that expanding urban areas encroach not only on valuable agricultural land, but also tend to surround village settlements in such a way that they become islands of poverty, with scarce infrastructure, in neighborhoods which are otherwise well served with infrastructure. It is also seen that village settlements, even at a stone's throw from the limits of a city, have no semblance of improved quality in housing, sanitation or quality of life.

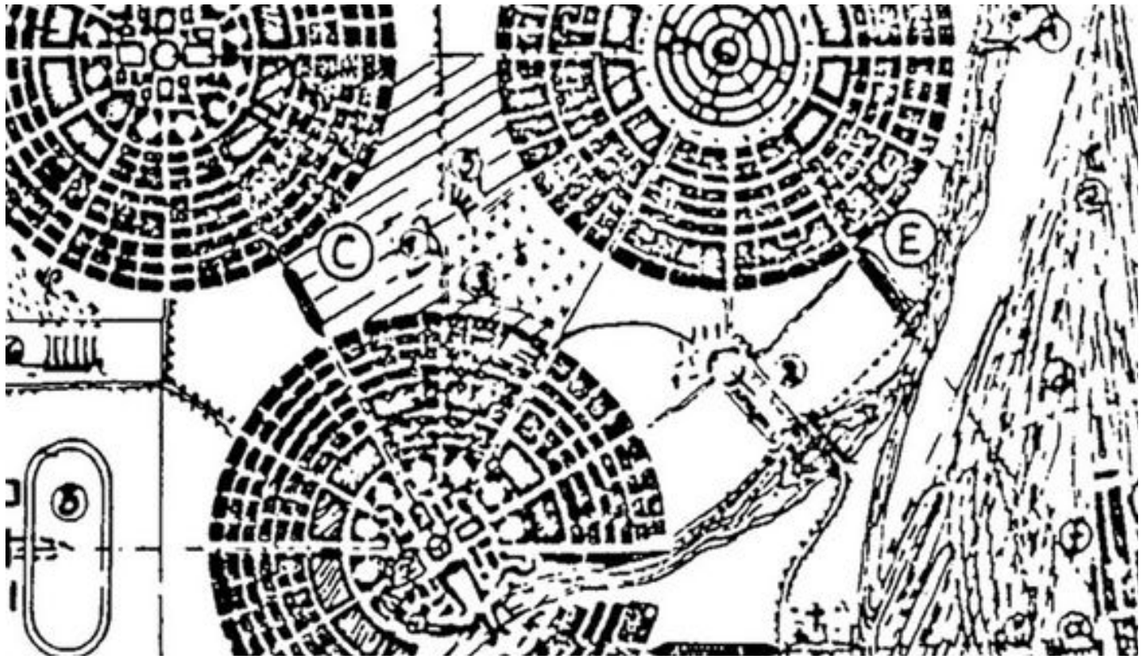
Ernst Gloeden's Nuclear Town concept (1923) for groups of stable yet interdependent towns sharing formal strategies

The circular/radial model??





Auroville Plan
https://auroville.org/contents/695



German architect Ernst Gloeden, 1923.

Case study:

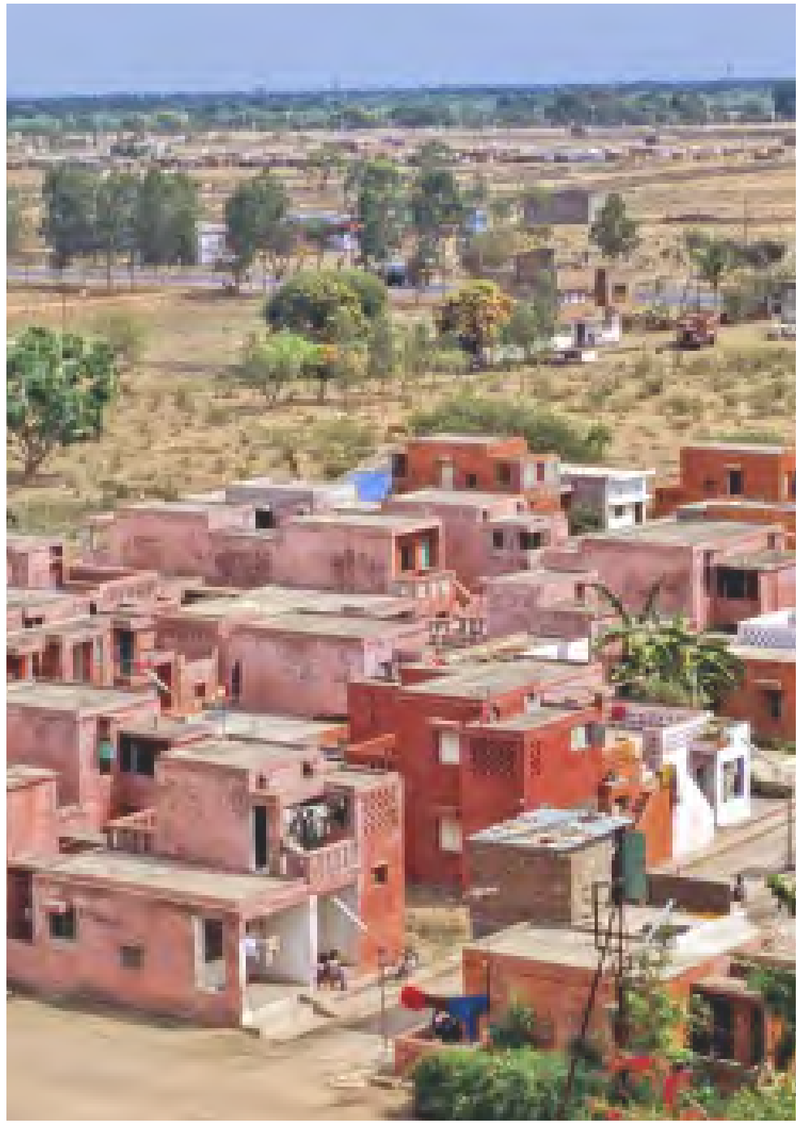
Aranya

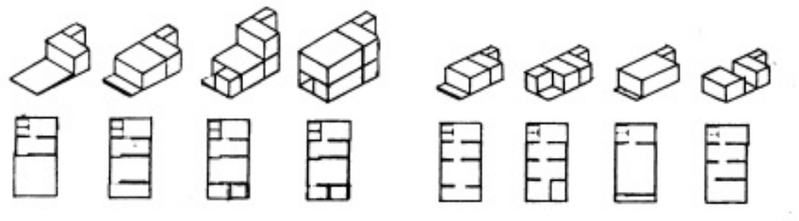
'Building homes is about creating a sense of belonging, about participatory involvement and about the expression of aspirations, relationships and desires'. Doshi

Project name: *Aranya Housing Project*
Description: *Incremental Housing* **Project,** *Low-income housing*
Design: *Vaastu-Shilpa Foundation*
Building status: *in use*
Location: *Indore, India*

Demonstration houses were slowly decorated and altered by residents

Aranya Low-Cost Housing is made up of core houses comprised by a plinth and service spaces (bath and kitchen). In the project, Doshi utilized the core housing concept to create affordable housing for low-income families in the region. As a result, the inclusion of core housing, user participation took place. Doshi prepared different housing options concerning single houses and diversified incremental growth scenarios and flexible layouts. Even two samples belonging to the same housing option could be varied and customized differently by users. However, in Aranya Low-Cost Housing, user participation helped to accomplish greater typological variety.





Housing Typology

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Image List

Image 01:. https://en.wikipedia.org/wiki/Navi_Mumbai#/media/File:Navi_Mumbai_Skyline.jpg
Image 02:https://www.census2011.co.in/census/city/368-navi-mumbai.html
Image 03: https://realtynxt.com/2018/10/04/navi-mumbai-slum-residents-to-get-40000-homes/

Image 02: https://mycrafts.com/diy/13-dots-sankranthi-muggulu-for-2018-pongal-kolam-designs-with-dots-easy-and-simple-rangoli/

Image 03: By author 2021

Image 04: By author + Scott Spoon 2021

Image 05: https://www.firstpost.com/mumbai/slum-the-city-how-planned-navi-mumbai-lost-the-plot-825695.html

Image 06: By author 2021

Image 07: By author 2021

Image 08: By author 2021

Image 09: By author 2021 + https://pyht.org/workshops/2018/1/24/6oqmlym8ed17dktghtp6o9il86ss1k

Image 10: Global housing students 2021

Image 11: https://designjatra.org/cob-workshop/

Image 12: By author 2021

Image 13: https://realtynxt.com/2018/10/04/navi-mumbai-slum-residents-to-get-40000-homes/

Location

Location

Vahal Village is located in the southern part of Navi Mumbai, the development of the area shows a clear distinction between village and cidco developments. The area is soon to become the home for displaced people affected by the construction of the new airport.

Vahal Village 2009

Vahal Village 2011

Vahal Village 2012

Vahal Village 2013

Vahal Village 2015

Vahal Village 2017

Vahal Village 2019

Vahal Village 2021

Current Situation

Current Statistics

Vahal Gaothan is a in Navi Mumbai City in Maharashtra State, India. It belongs to Konkan region.

Latitude
18.976° or 18° 58' 33.7" north
Longitude
73.0341° or 73° 2' 2.7" eas

Population (2020)
1100

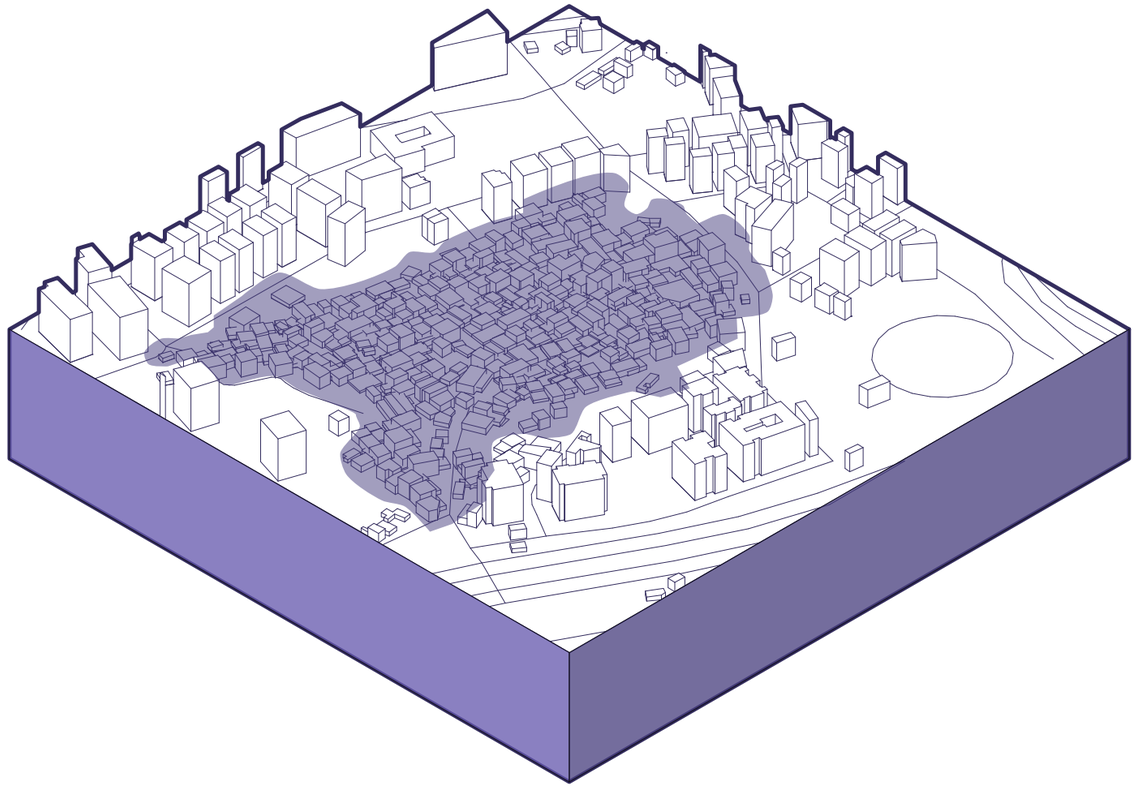
Population Density
15463 people per km²

Male Population
582

Female Population
518

Nearest airport & distance
Chhatrapati Shivaji International Airport, 16.85 km

Nearest Railway Station & Distance
Panvel, 7.31 km



data: https://geoiq.io/places/Vahal-Gaothan-Ulwe/3BRbwqSCe7

Built Space

Typology types:

CIDCO: Concrete apartment blocks

Chawl: Typically wood with additional informal interventions

Informal: Clay/Steel paneling

Open Space

Typology types:

Private Garden: Gardens belonging to private owners, no access
Public Park: Maintained Green area for public use
Land: Unmaintained green area

Connectivity

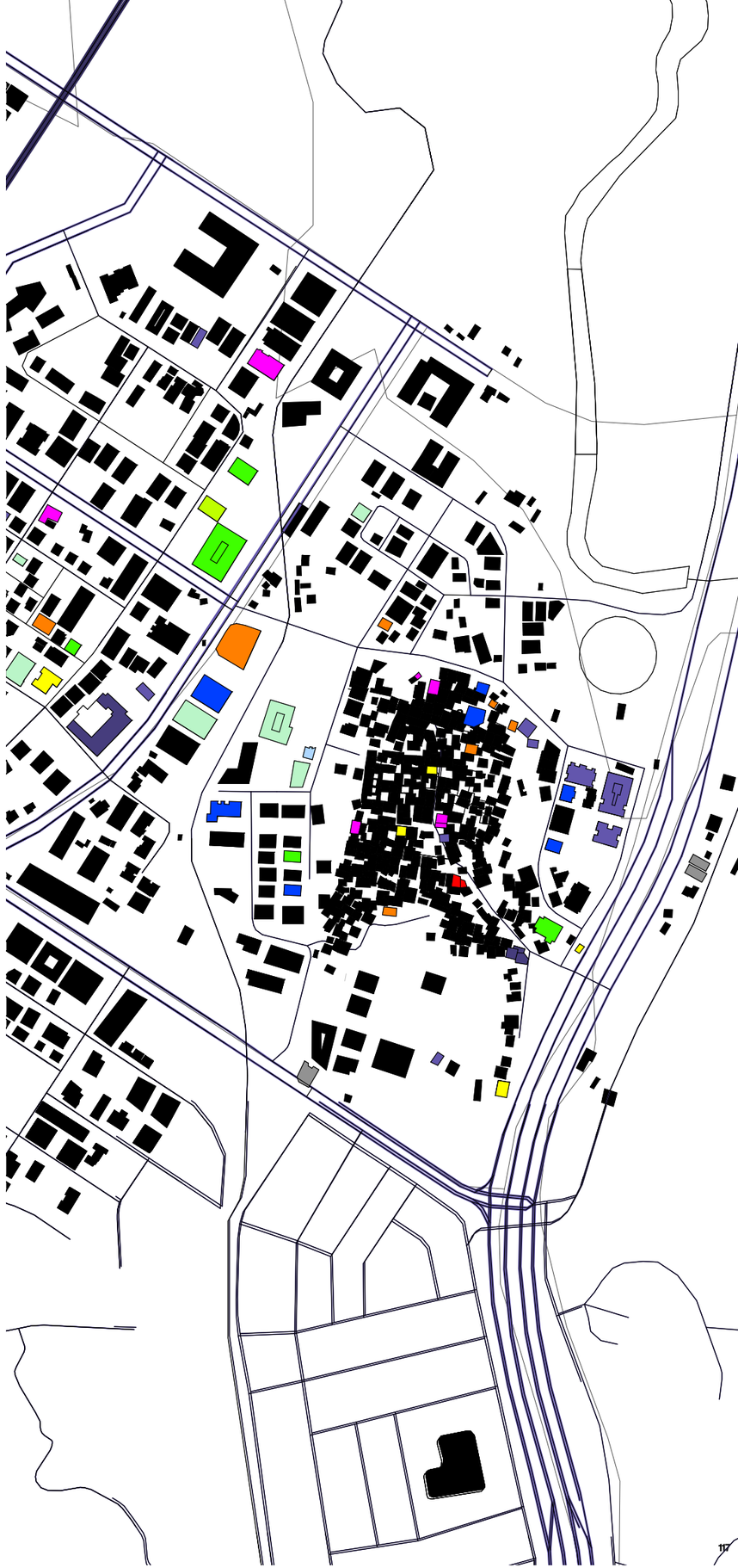
Legend:

Railway
Car Access
Path Access

Public Amenities

Legend:

Services
Store
Grocery
Restaurants
Medical
Health
Post Office
Religious
Office



Vahal Typology

Typology types:

CIDCO: Concrete apartment blocks

Chawl: Typically wood with additional informal interventions

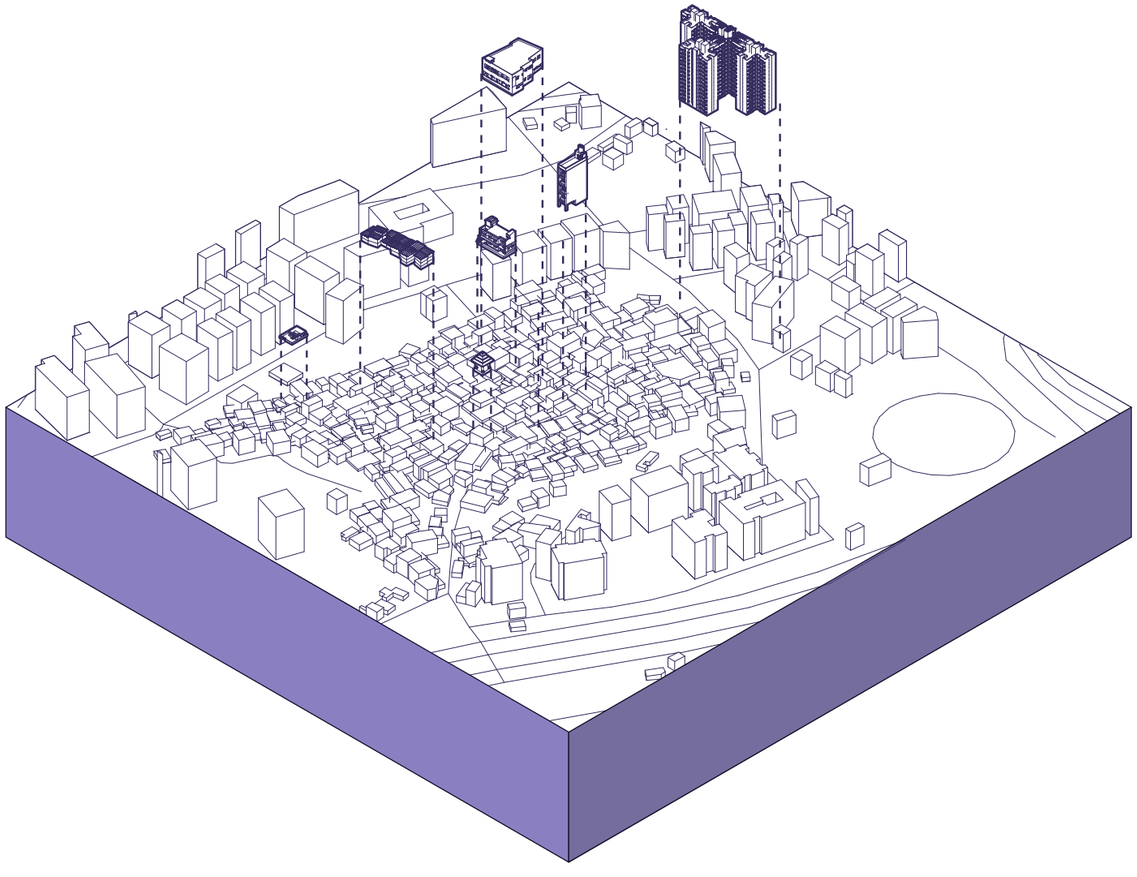
Informal: Clay/Steel paneling

Original Village Detatched Plotted Housing

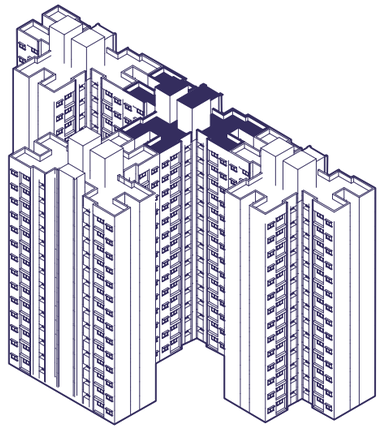
Original Village Detatched Plotted Housing

Walk Up Apartments

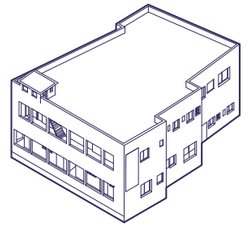
Chawls



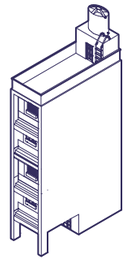
Vahal Typology



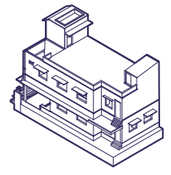
CIDCO Developments



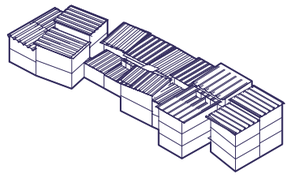
Chawl



Walk Up Apartments



Redeveloped Attached Plotted Housing

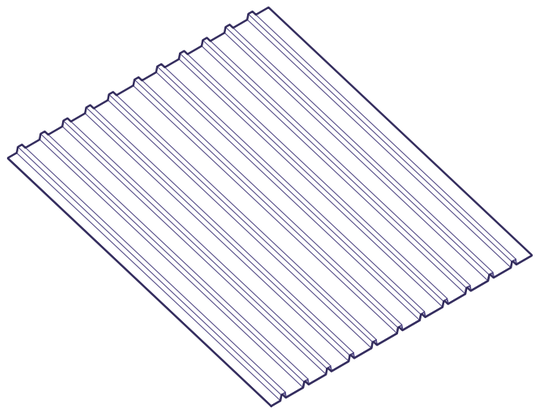


Informal Housing

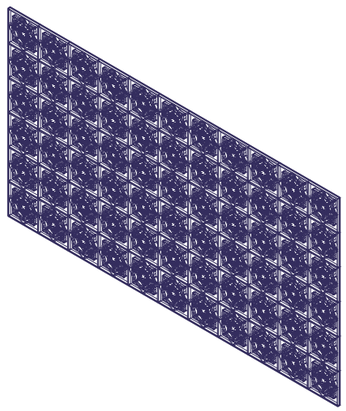
Original Village Detatched Plotted Housing

Common Forms

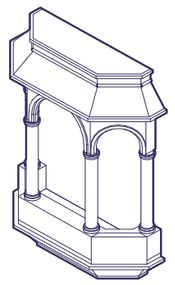
Catalog of village
characteristics



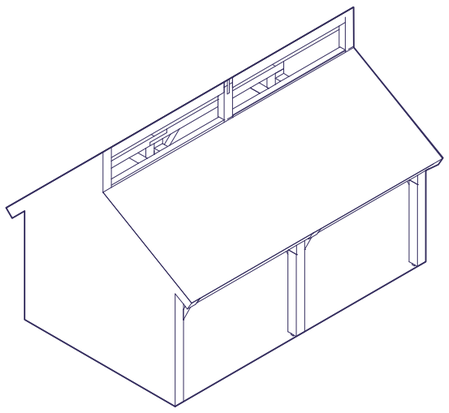
Sloping Roof



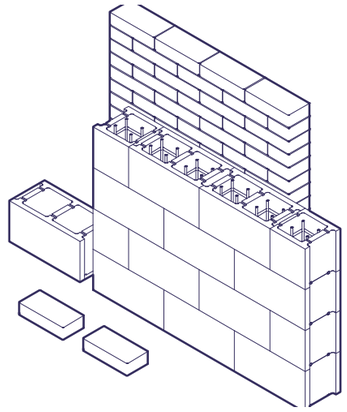
Jaali Pattern



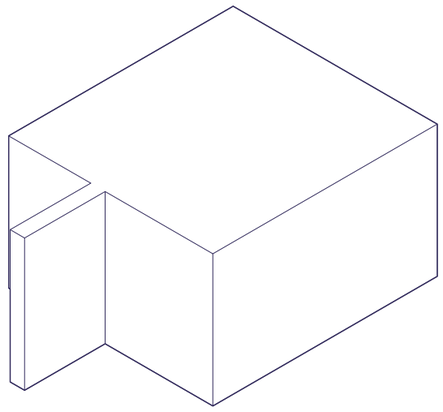
Jharokha
Balcony



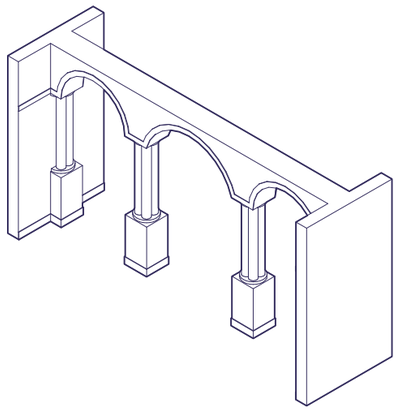
Clear Story
Windows



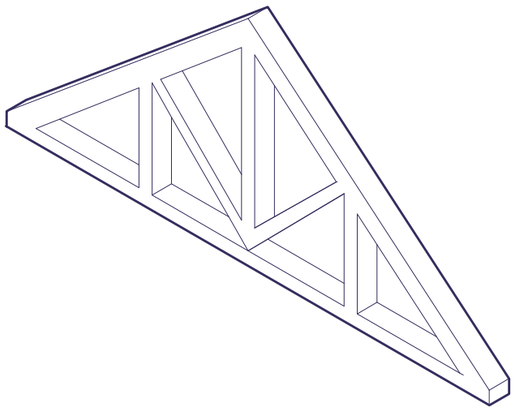
Brick Filter
walls



Baffle Wall



Arched
Entrance



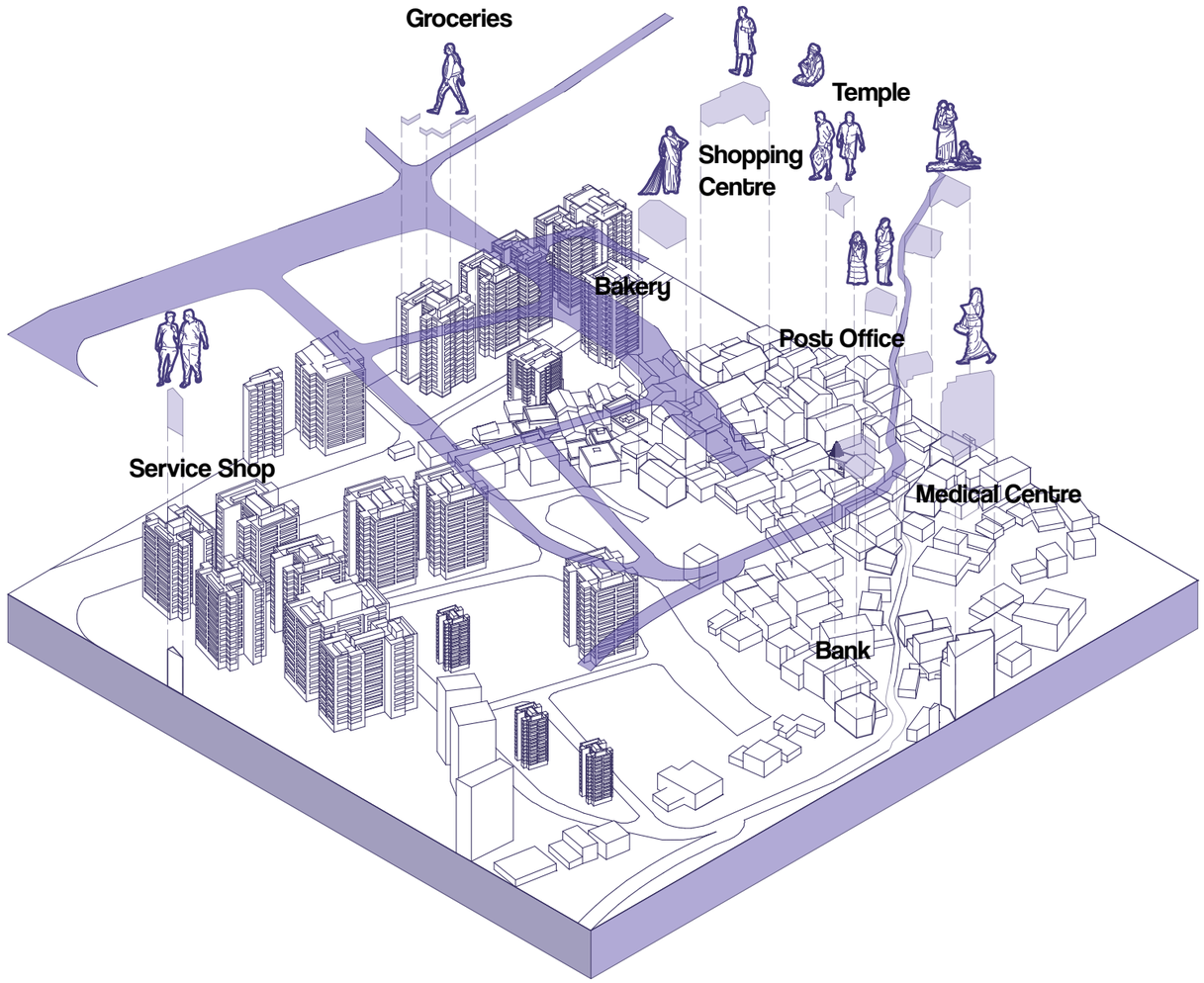
Wood
Truss

Stakeholders

Social Amenities

Social Amenities

The main routes of the village provide a structure to the village. The central backbone provides a list of amenities and jobs for the surrounding area.



Social Situations

Roadside

Temple

Play field

River

Balconies

Shop

Income Groups

User Group -Village Residents EWS

Below Poverty Line (BPL) - People who are struggling from starvation, income is low at around 50000 INR per annum with no Net Worth. To be able to apply for EWS housing, you must meet the following criteria set by the Government of India:
•The annual income of your household should not be more than Rs. 3 lakhs.
•You or anyone from your family should not own a pucca house in any part of the country.

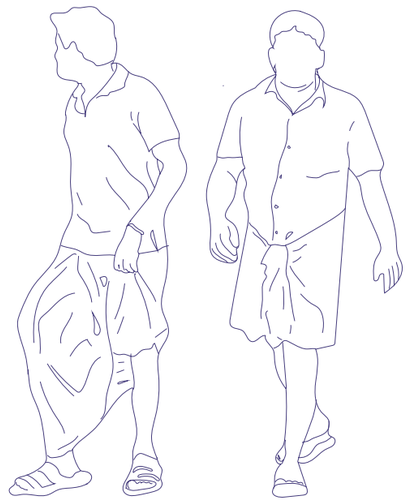
Income - Annual income between upto 50000 - 3,00,000.
Monthly: ₹2500-₹6500 per month

Work - xxxx

Required Space - 25sqm Max 30sqm

Usage of Public Space -

Way of Living



User Group -Village Residents LIG

Lower Income Group - In this class a family of four (4) work hard and manage to buy an entry level hatchback. Usually earn a maximum upto 2.5 lakhs INR per annum and their Net Worth is around 10-25 Lakhs INR.

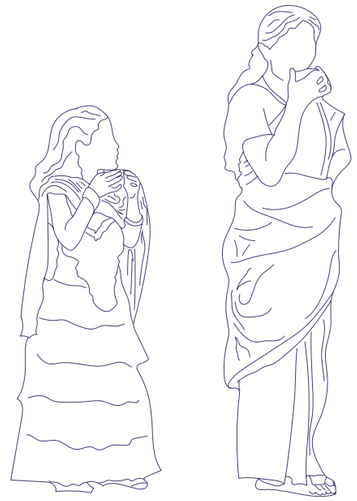
Income - Annual income between 1lakhs pa - 3.5 lakhs
Monthly: ₹6500-₹15000 per month

Work - xxxx

Required Space - 25sqm +

Usage of Public Space -

Way of Living



User Group -Village Residents MIG

Middle Income Group - About more than 50 % of Indian's Belongs to this social group, with an income of more than 6-8 Lakhs rupees per year ie. 50,000 rupees per month and a total Net Worth of rupees 50 Lakhs to 1 Crore

Income -₹15000-₹100000 per month

Work - xxxx

Required Space - 60 sqm

Usage of Public Space -

Way of Living

What do they need? -
- More social spaces

User Group -Village Residents HIG

In this class you are called a (Crore Pati) "A Millionaire" (according to google & Indian Govt. If a person have a net worth (Not Salary) of more than 1 Crore then he/she is called a Millionaire in India). This is the class from where you can afford whatever you want and believe me or else google it, only 1 % Indian's Belongs to this group means about 1.5 crore people out of 130 crores people

Income -₹100000-₹350000 per month

Work - xxxx

Required Space - 70 sqm

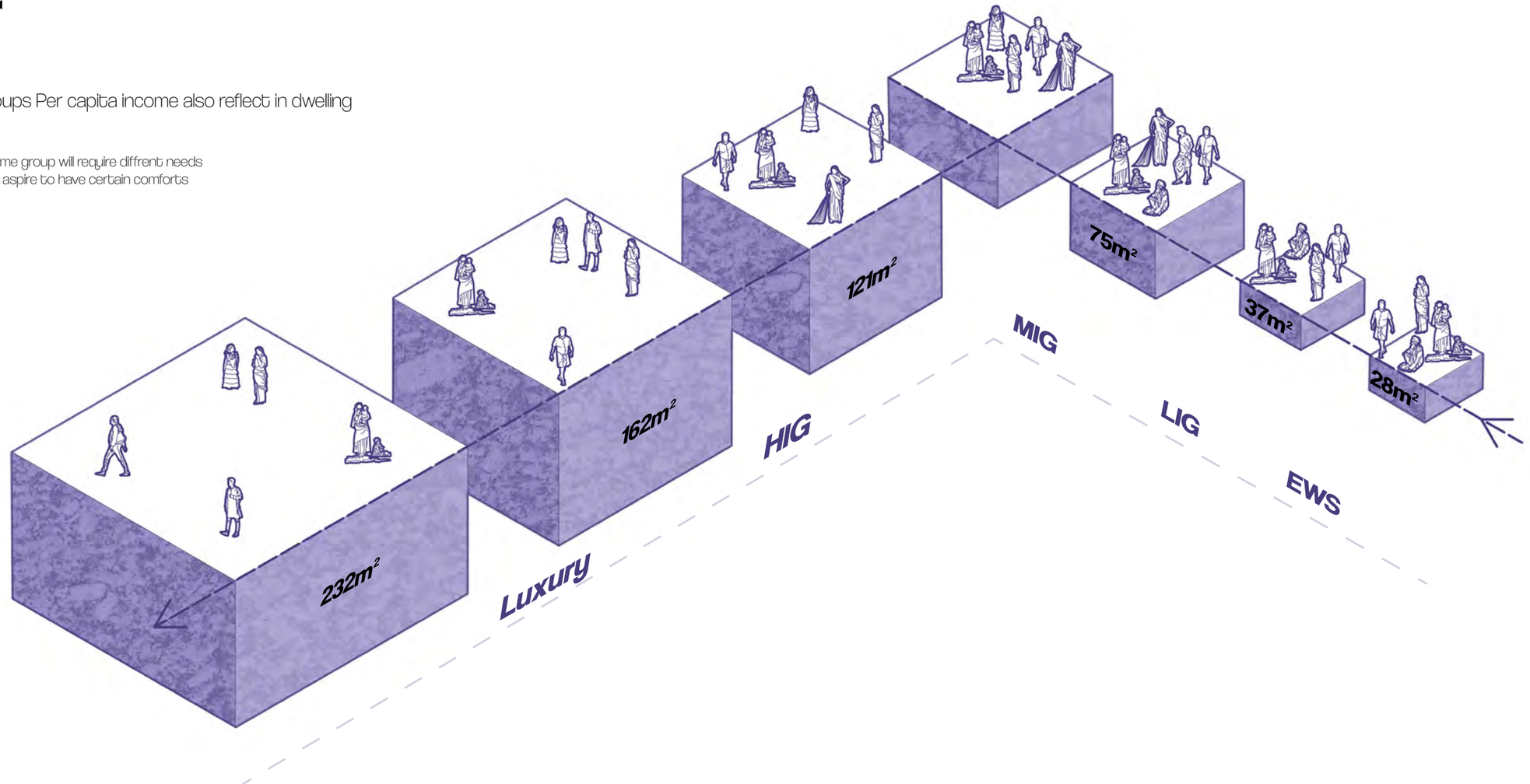
Usage of Public Space -

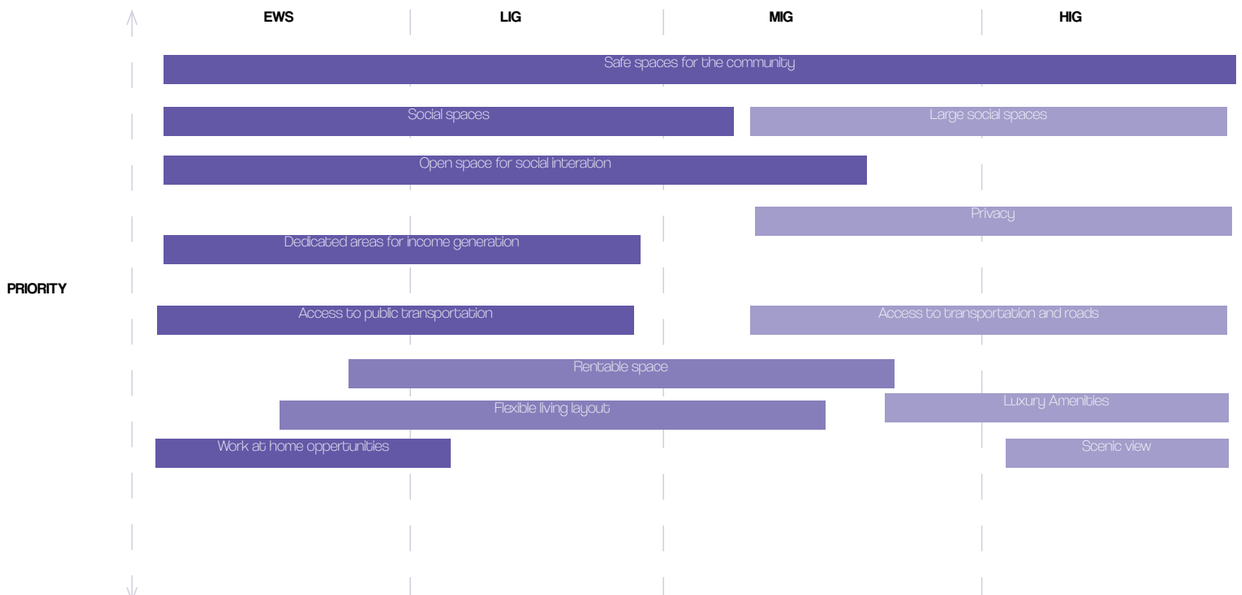
Way of Living

Income Group Cl

Dwelling size - Income groups Per capita income also reflect in dwelling size.

Needs and Aspirations - Each income group will require diffrent needs in order for survival. Equally they will aspire to have certain comforts and living conditions.

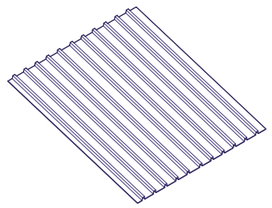




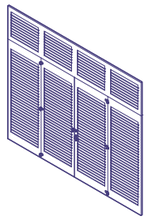
Qualities in each scale

EWS **LIG** **MIG** **HIG**

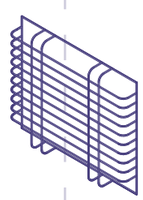
S

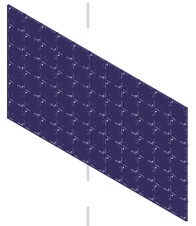


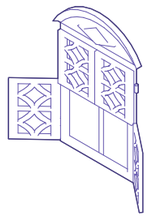
Earth
Bricks

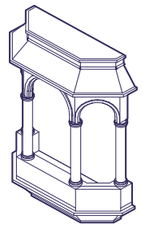


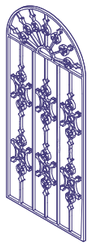
Bamboo











Wood

Corugated
Steel

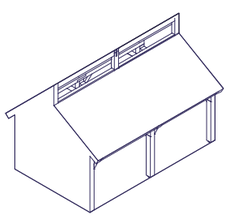
Plaster

M

Tiles

Concrete

L



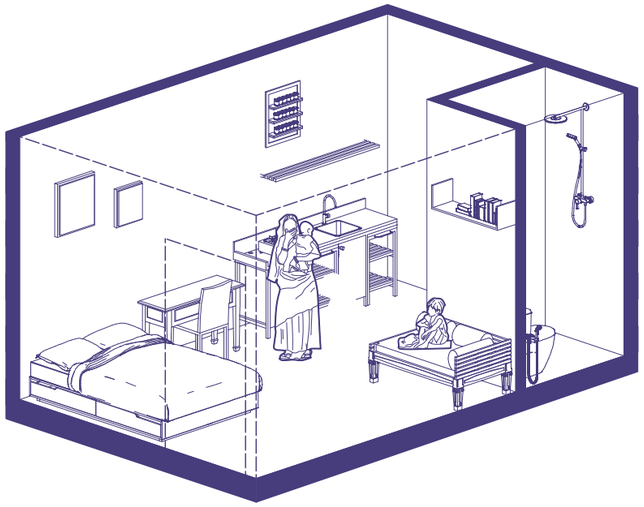
Glass Steel

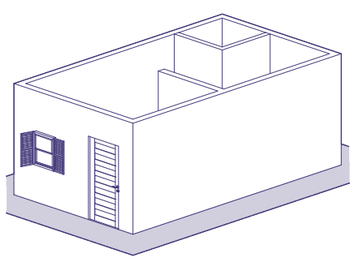
Group Aspirations - EWS Dwelling

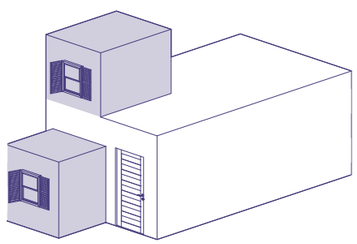
EWS Group - Typical dwelling consists of 25 sqm, inclusive of independent toilet facilities. EWS group primary aim is to replace informal dwellings with concrete/pucca ones. To live in dwellings that function correctly and provide a stable living environment.

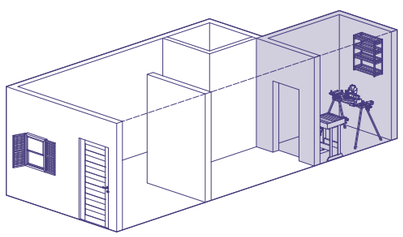
Needs
- 25sqm minimum
- Pacca Housing
- Functioning Toilet/Wash Facilities

Aspirations
- Larger living space
- Include a work/ production space
- Possibility for extension







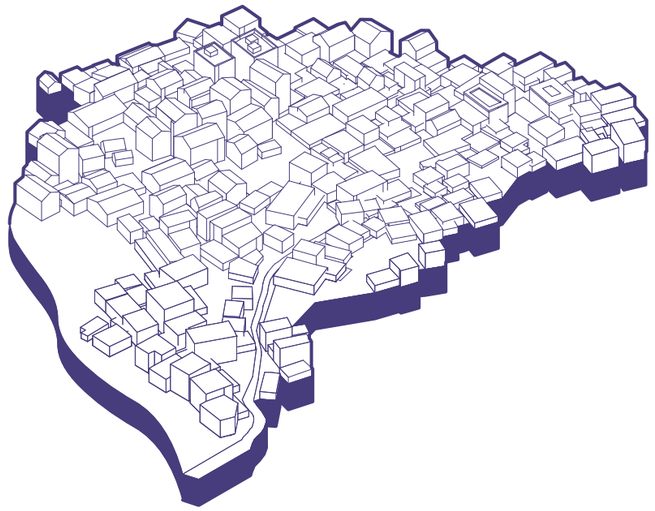


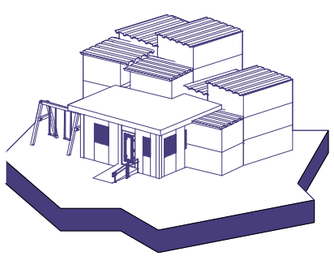
Group Aspirations - EWS Urban

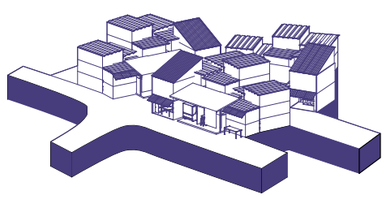
EWS Group - By providing stable pacca dwellings this will help slum residents pick urban settlements over residential localities and use land that has lost its value over the years due to its environment.

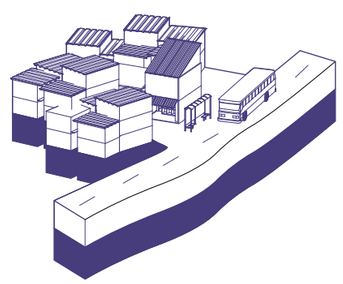
Needs
- Access to public space to earn a living
- Sufficient access to local facilities

Aspirations
- Accesibility to local facilities such as groceries/education
- Access to green spaces
- Local work oppertunities
- Childcare options
- Accesibility to public transport







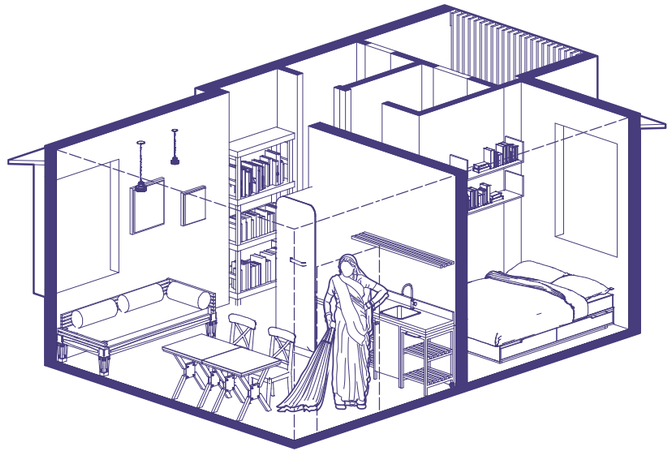


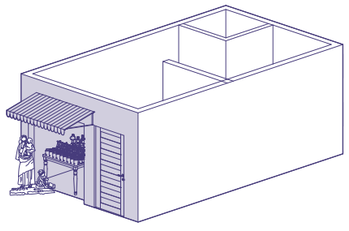
Group Aspirations - LIG Dwelling

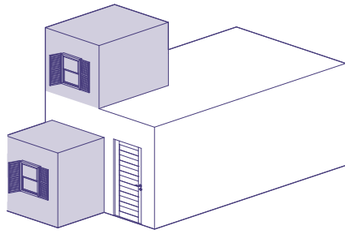
LIG Group - Typical dwelling consists of between 28 sqm to 37 sqm , inclusive of independent toilet facilities. LIG group primary aim is to be able to afford a suitable living space for typicvally 2-6 poeple. To live in dwellings that function correctly and provide a stable living environment for a growing family.

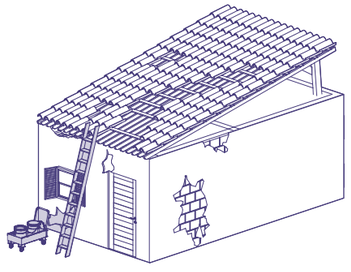
Needs
- 28sqm minimum
- Pacca Housing
- Functioning Toilet/Wash Facilities
- Space for a growing family

Aspirations
- Larger living space
- Include a work/ production space
- Repair scheme for existing dwellings
- Possibility for extension
- Flexible living space
- Possibility for renting options







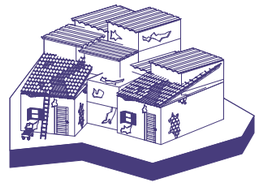


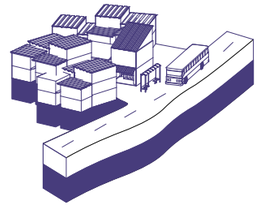
Group Aspirations - LIG Urban

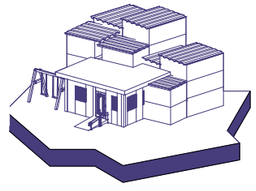
LIG Group - Further than dwellings the LIG group needs sufficient urban space to function and provide income.

Needs
- Access to publlic space to earn a living
- Sufficient access to local facilities
- Communal Space

Aspirations
- Accesibility to local facilities such as groceries/education
- Accesibility to public transport
- Repair to existing local amenities
- Access to green spaces
- Local work opperturnities
- Childcare options





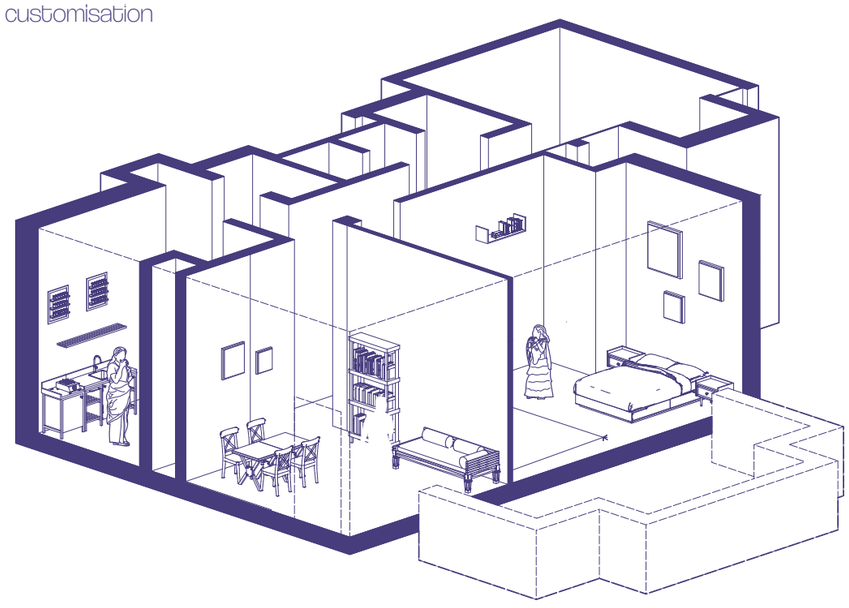


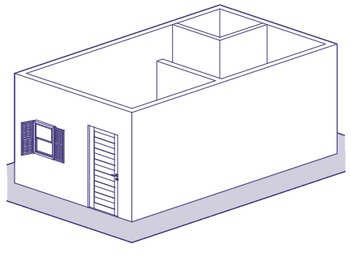
Group Aspirations - MIG Dwelling

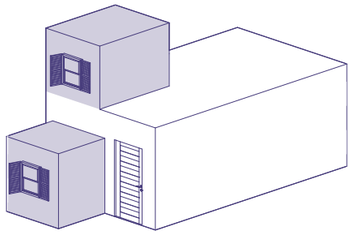
MIG Group - Typical dwelling consists of between 37 sqm to 75 sqm, inclusive of independent toilet facilities. MIG group primary aim is to afford a comfortable living space.

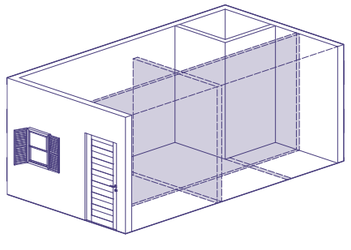
Needs
- 37 sqm minimum
- Pacca Housing
- Functioning Toilet/Wash Facilities
- Extra space for personal activities

Aspirations
- Larger living space
- Possibility for extension/ customisation
- Flexible living space
- Storage + Amenities







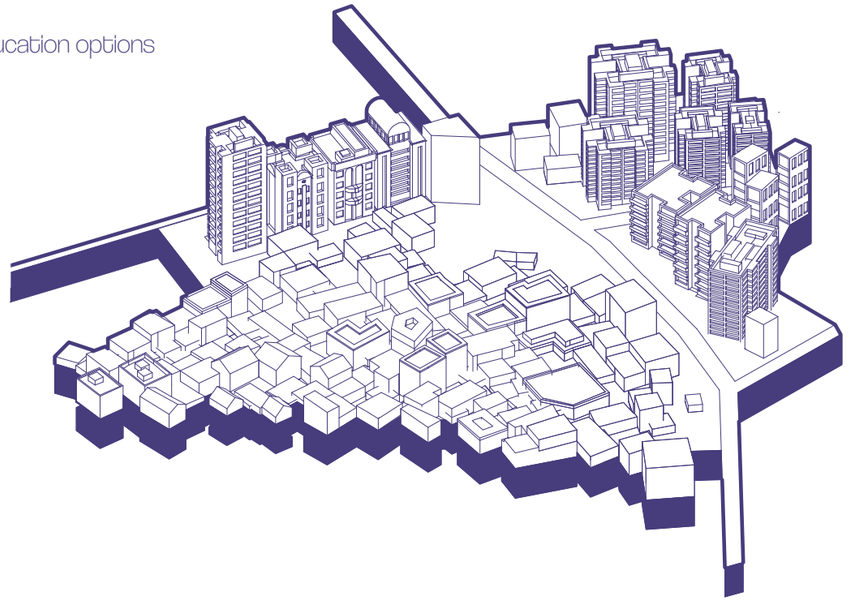


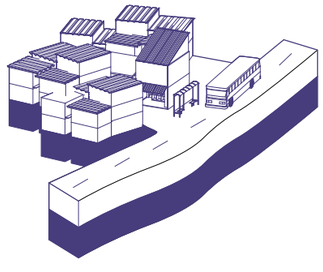
Group Aspirations - MIG Urban

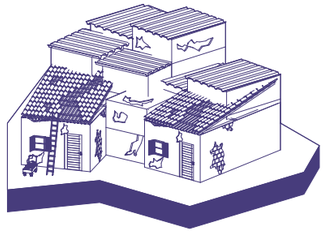
LIG Group - MIG Groups need sufficenet access to urban space and transport options. Accesibility into and out of the village is important for work and daily life.

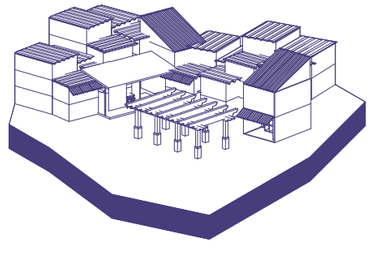
Needs
- Accesibility to local facilities such as groceries/education
- Accesibility to public transport
- Sufficient access to communal Space
- Access to green spaces

Aspirations
- Repair to existing local amenities
- Local work oppertunities
- Local and childcare and education options
- Extra village amenities







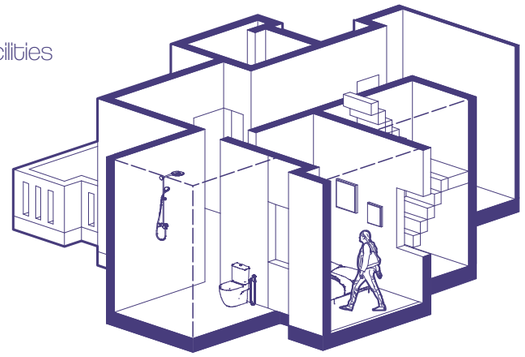


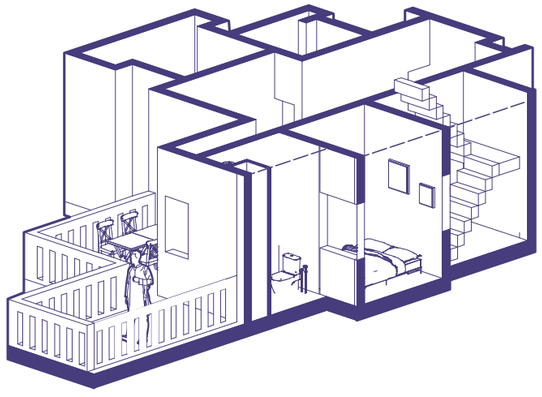
Group Aspirations - HIG Dwelling

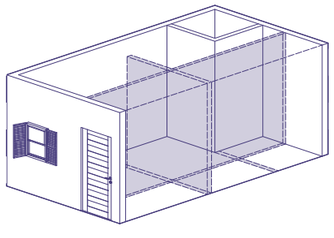
HIG Group - Typical dwelling consists of between 80 sqm to 160 + sqm , inclusive of independent toilet facilities. The Higher income group aim to live in a comfortable andr luxurious mode of dwelling..

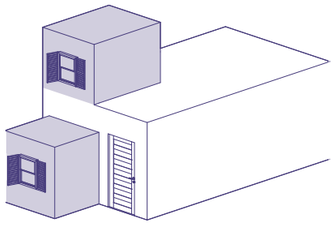
Needs
- 80 sqm minimum
- Pacca Housing
- More than one functioning Toilet/Wash Facilities
- Extra space for personal activities
- Extra space for hosting

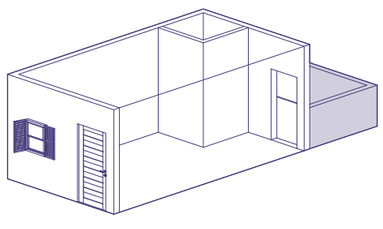
Aspirations
- Possibility for customisation
- Flexible living space
- Storage + Amenities
- Private amenities
- Ensuites









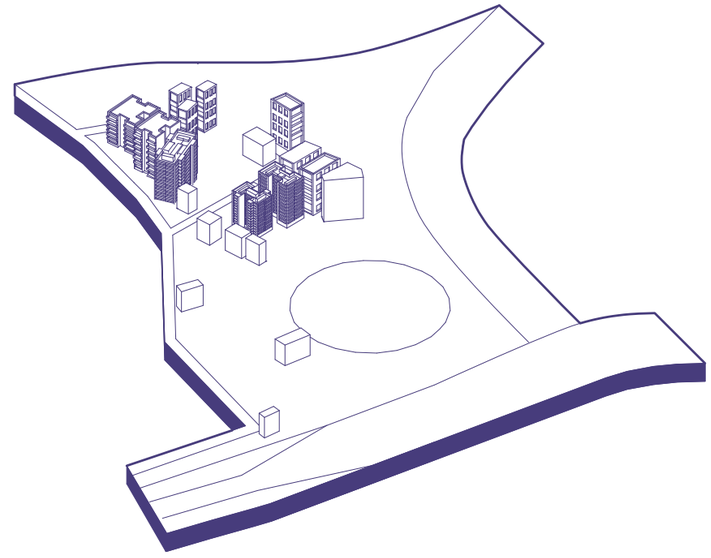


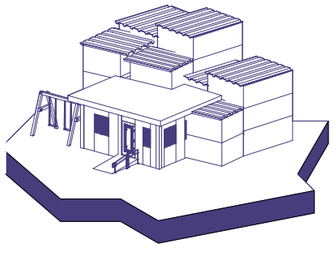
Group Aspirations - HIG Urban

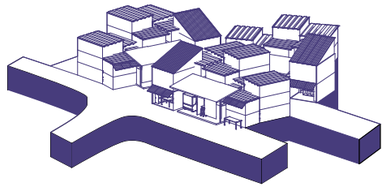
HIG Group - HIG ususally have the luxury of vehicles therefore need extra access to road infrastructure and parking within the village. HIG groups need sufficenet access to urban space and accesibility into and out of the village.

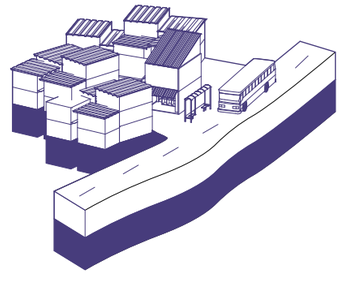
Needs
- Accesibility to local facilities such as groceries/education
- Accesibility to Road infrastructure + public transport
- Parking facilities
- Sufficient access to private amenity space
- Access to private green spaces

Aspirations
- Repair to existing local amenities
- Private childcare and education options
- Extra Private amenities









Stakeholders

User Group -Village Residents

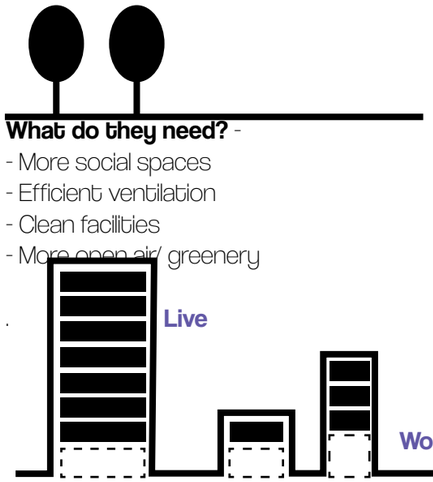
Residents of the village are ususally family based with additional renters.

Average Age Range - 25-80

Required Space - 25sqm

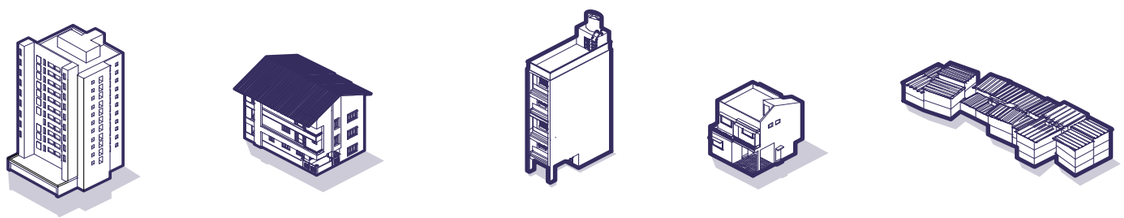
Usage of Public Space -

Way of Living



What do they need? -
- More social spaces
- Efficient ventilation
- Clean facilities
- More open air/ greenery

Typical Typloogy



Stakeholders

User Group -CIDCO Residents

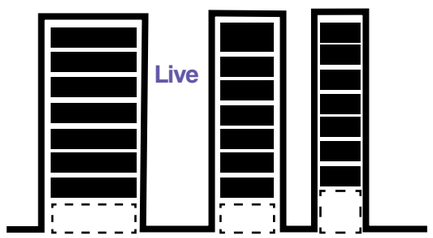
CIDCO Residents usually belong to the Middle income group of society.

Average Age Range - 25-80

Required Space - 25 - 40sqm

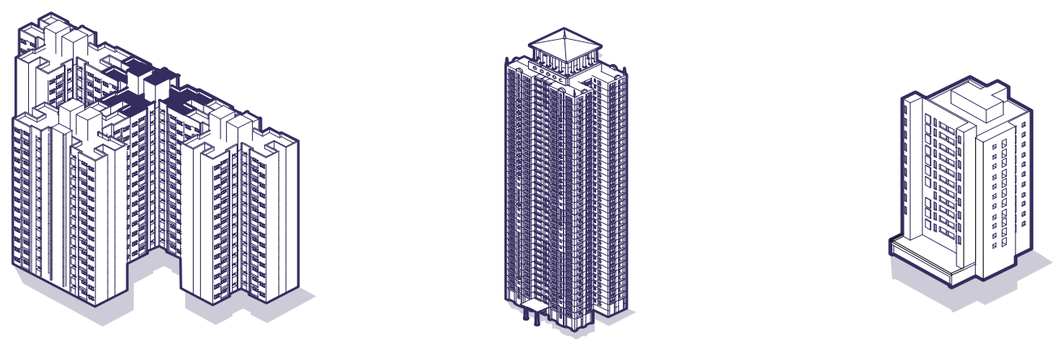
Usage of Public Space -

Way of Living



What do they need? -
- More social spaces
- additional emenities
- Surroundings landscaped

Typical Typloogy



Stakeholders

User Group -Illiegal Renters

Illegal construction in the village usually consists of existing owners wanting to extend to holt illigal renters.

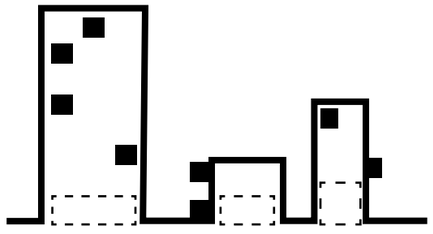
Average Age Range - 25-45

Required Space - 10-20sqm

Usage of Public Space -

Way of Living

What do they need? -
- Authorised rent control
- Appropriate living quarters
- Social spaces



Typical Typloogy

Stakeholders

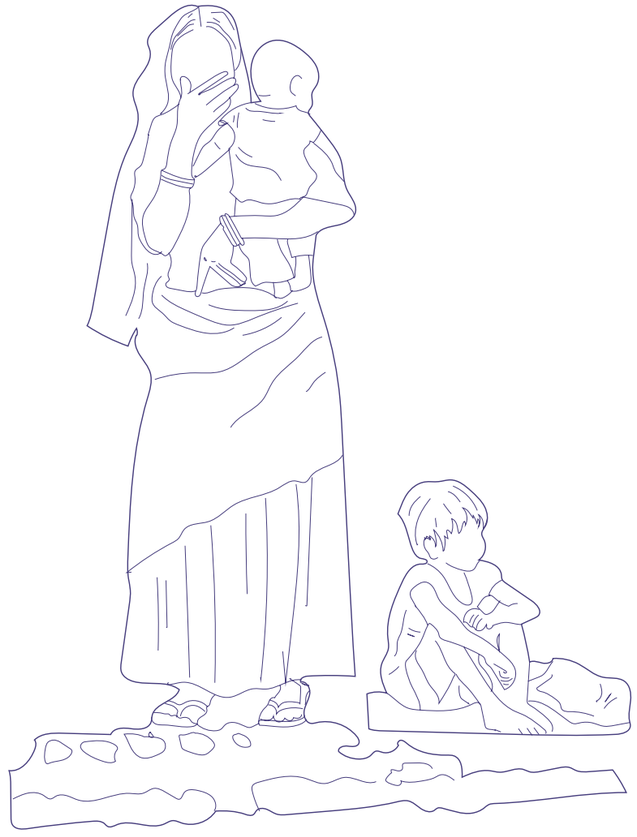
User Group -Workers

Working members of the community usually work within the village however a small percentage leave to commute to work.

Average Age Range - 16-70

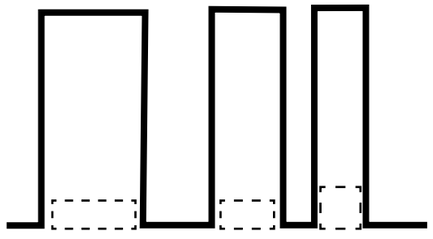
Required Space - 25sqm

Usage of Public Space -

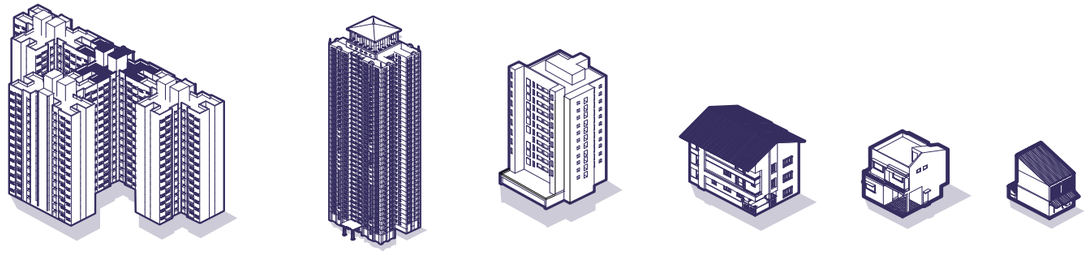


Way of Living

What do they need? -
- Suitable and safe working spaces
- Accesibility to transport
- Marketable spaces



Typical Typloogy



Stakeholders

User Group -Visitors

This includes tourists and short term visitors to the area

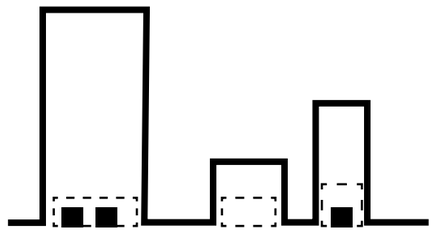
Average Age Range - 19-60

Required Space - 25sqm

Usage of Public Space -

Way of Living

What do they need? -
- Clear Accesibility
- Safe environment



Typical Typloogy

Stakeholders

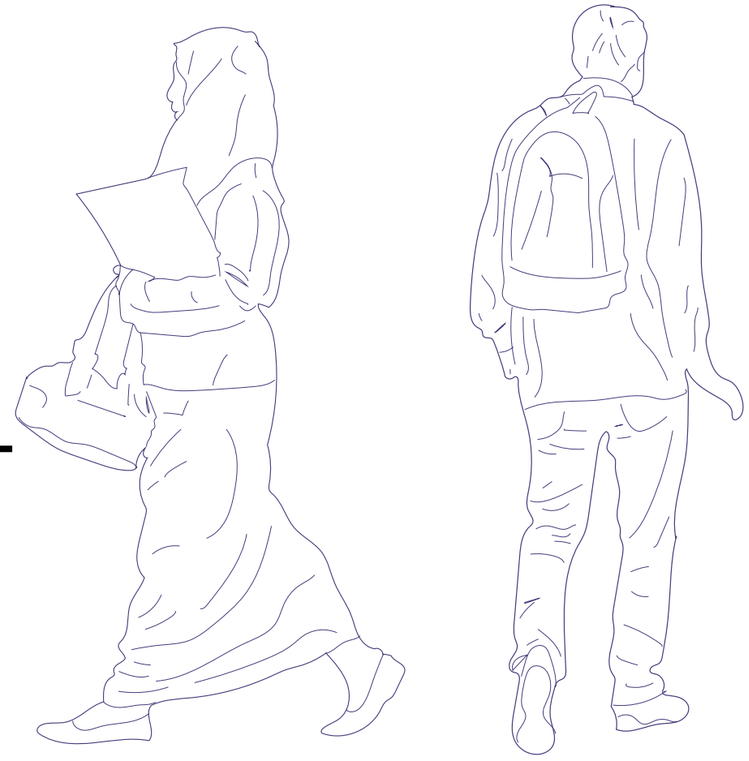
User Group -Students

School childern and full time students in the village

Average Age Range - 25-80

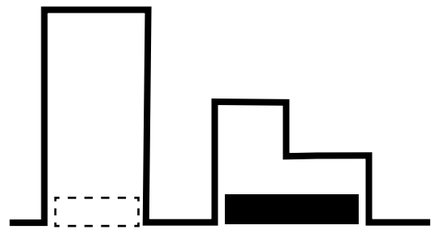
Required Space - 25sqm

Usage of Public Space -

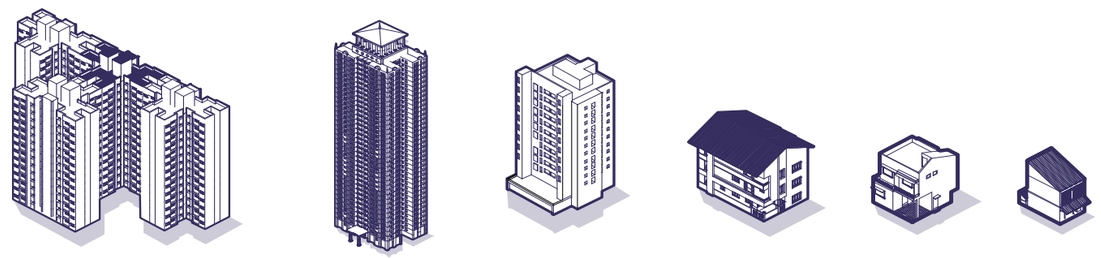


Way of Living

What do they need? -
- More social spaces
- Access to transportation
- innovative/ inspiring environemnts
- More clean air/green accesibility



Typical Typloogy

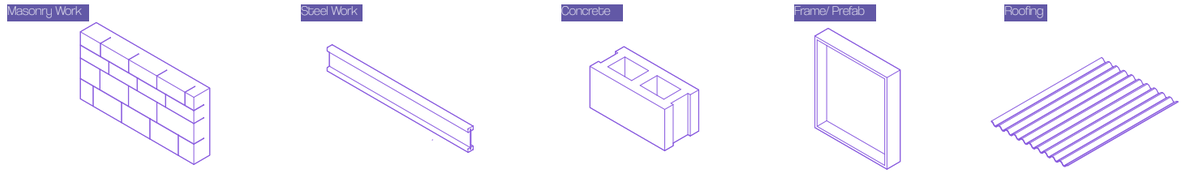


Stakeholders

User Group -CIDCO Appointed Contractors

CIDCO give out jobs on on a tender system to contractors for road, drainage, sewage, filling, and other housing projects.

Typical Trade Skills

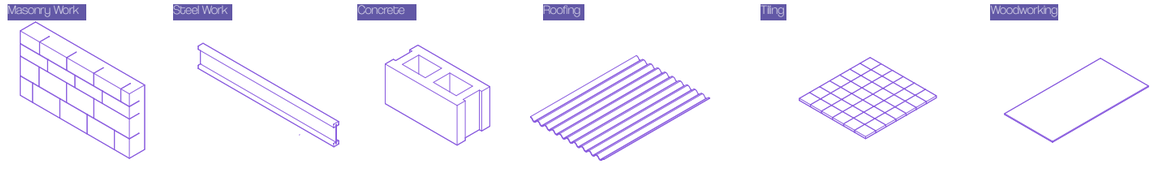


Stakeholders

User Group -Local Private Contractors

Private contractors in the area have access to local materials and other traditional methods of construction.

Typical Trade Skills



Stakeholders

User Group Council NMMC

Council input on public sites being used for development

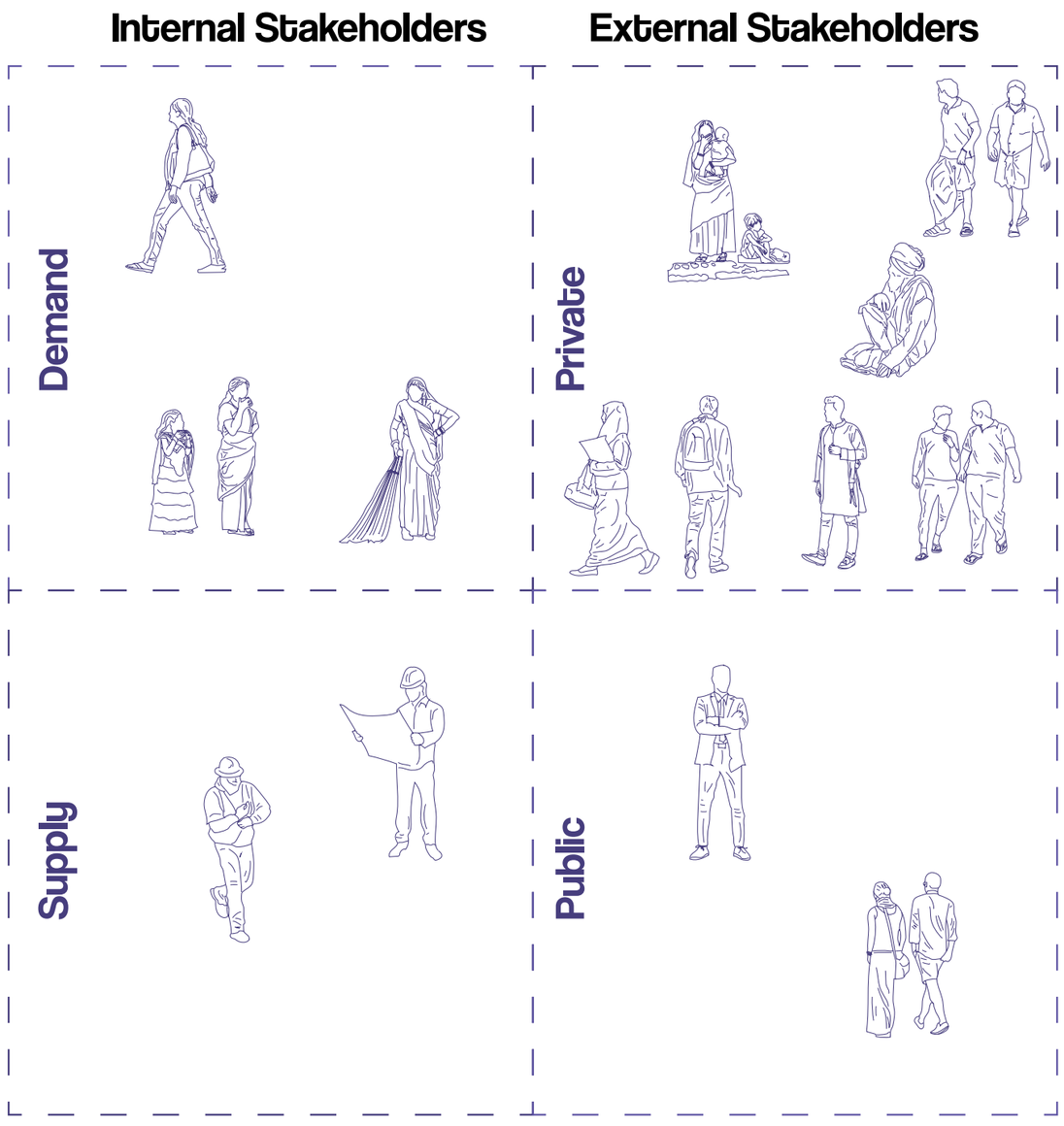
Typical Trade Skills

Social Engage-

Stakeholder Mapping

Internal and External Stakeholders

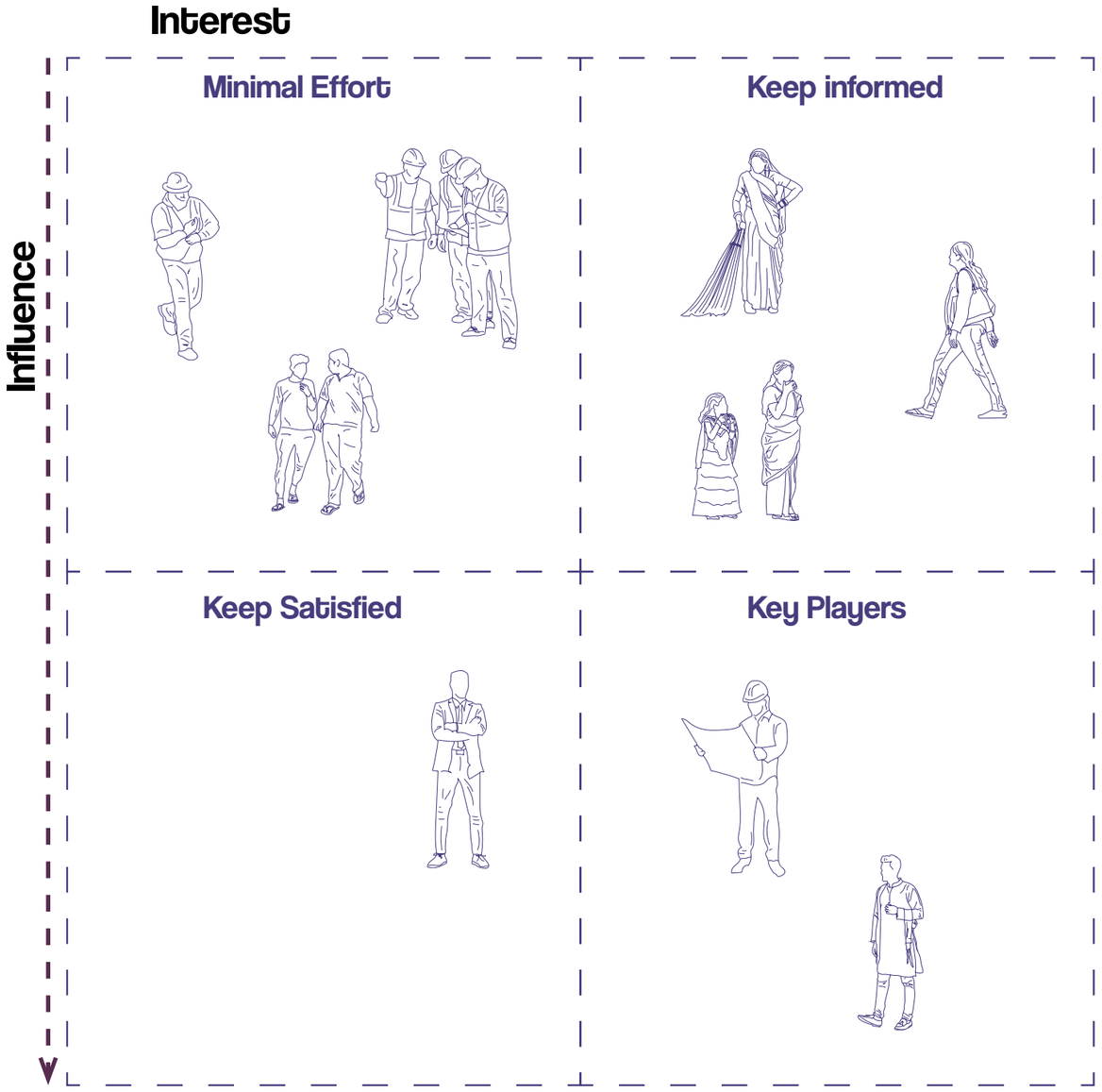
Supply, Demand, Private, Public



Stakeholder Mapping

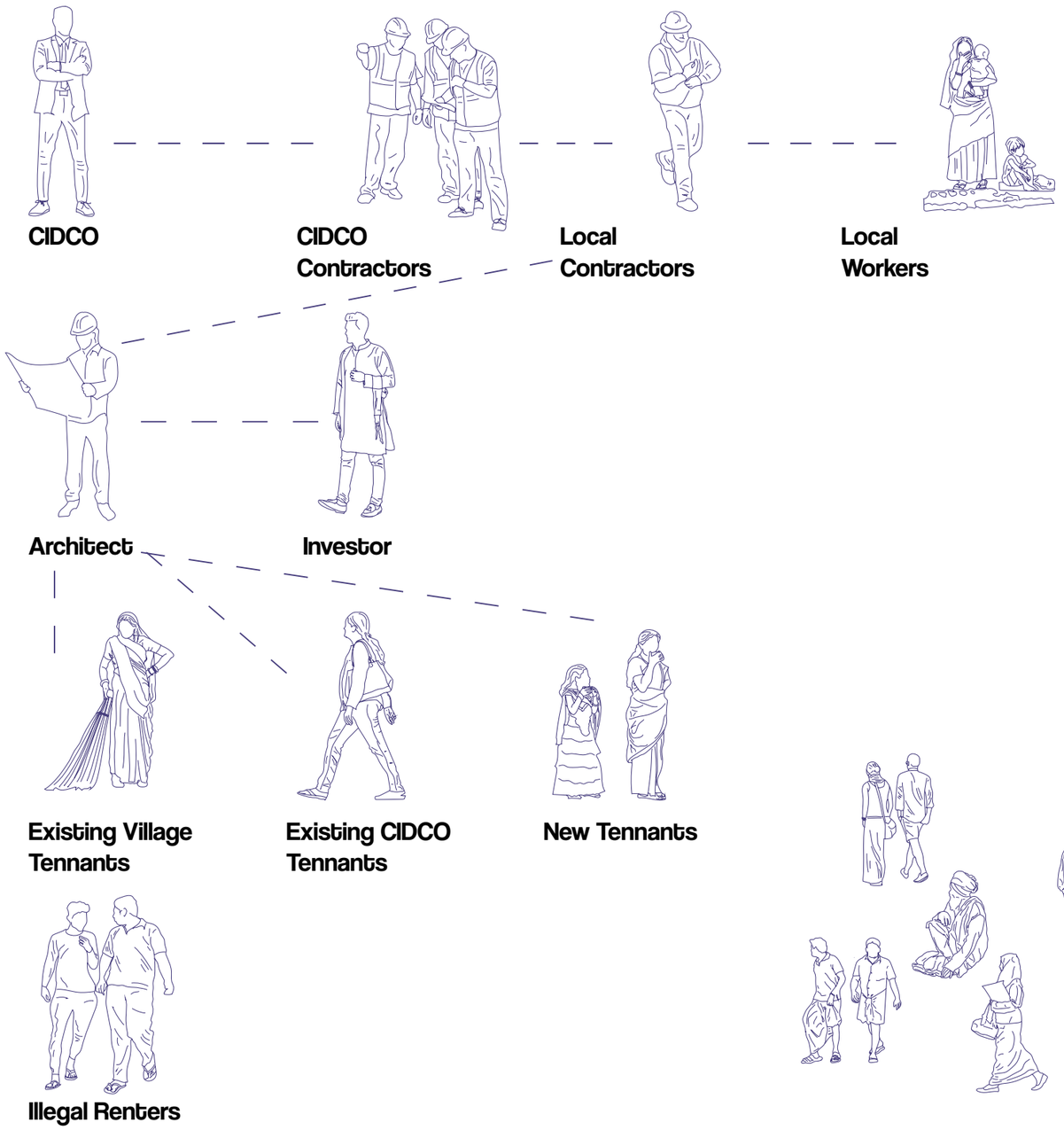
Influence + Intrest Groups

Minimum and maximum effort and the influence their opinnion has.



Interconnections

Stakeholder Connections



Design Considerations

Design Considerations

Factors to consider when designing for Navi Mumbai

01 SITE -

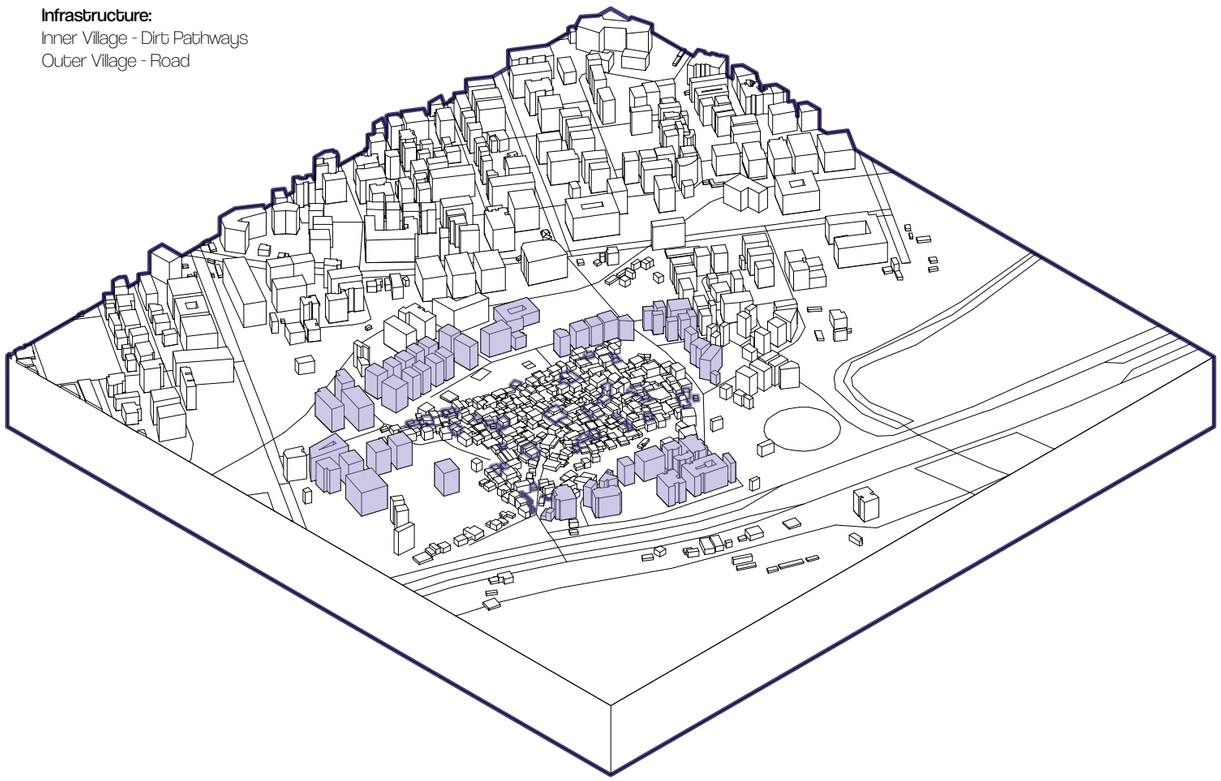
Key constraints: informal housing

Characteristics : mixture of informal, Managed and Cidco properties

Surrounding context : Majority cidco developments surrounding the village

Ground Type: Dirt Earth

Infrastructure:
Inner Village - Dirt Pathways
Outer Village - Road



Design Considerations

Factors to consider when designing for Navi Mumbai

02 DESIGN BRIEF -

Building type: Mixed housing

Target group: 50% LIG 30% MIG 20% HI
Village- 70% LIG 30% MIG
Outer Village 40% LIG 30% MIG 30% HIG

Target Density: 100 Dwelling/Ha

Current FSI: Unknown
Current GSI: Unknown
Target FSI: xxxx
Target GSI: xxxxx

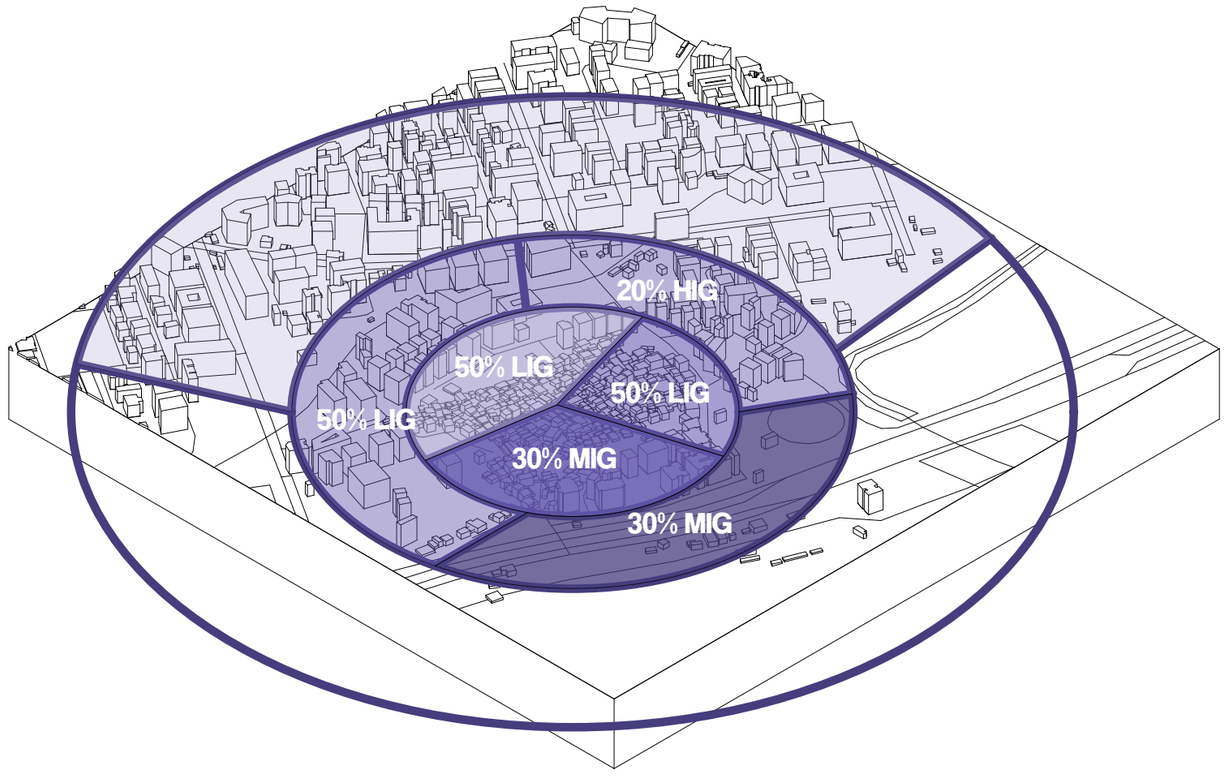
Budget: (Not determined $$$) Focus on Sustainable and low cost housing
Culture: Craftsmanship

Agenda: to use vernacular construction materials and methods to promote sustainable architecture and traditional craftsmanship in order to sustain the village.

Organization: radial planning

Program:
Housing
Public Space
Commercial
Education

03 Buildings Typology -
Typology: Wada Housing/ Chawl
Purpose: Housing/ Social Amenities



Design Considerations

Factors to consider when designing for Navi Mumbai

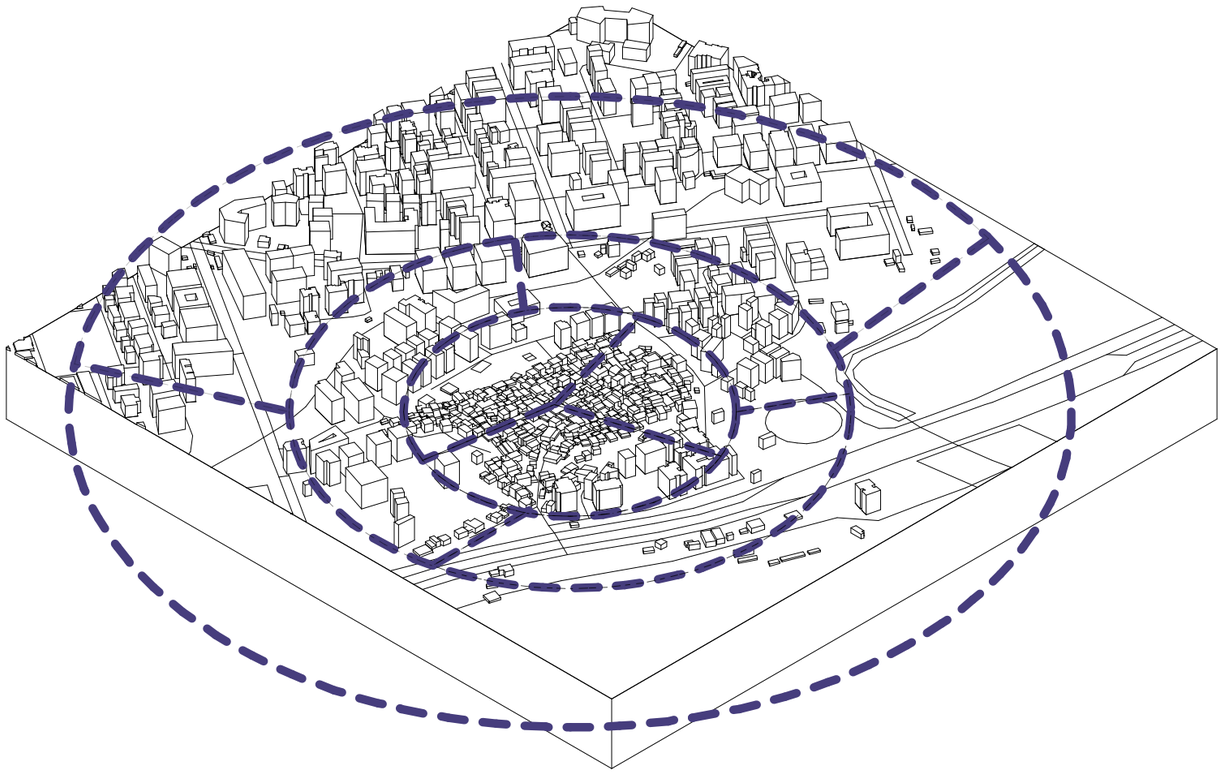
03 BUILDING TYPOLOGY -

Typology:
Public - Detailed/ Artistic approach to construction vernacular (Maybe different traditional method for different building typologies?)
Private - Mixed modular typologies

Purpose: To provide sufficient affordable housing for Low and Mid income groups

Services : Sanitation, Bath and Kitchen, Clean water facilities

How: Provide a core for services that is accessible and manageable for the local community



Design Considerations

Factors to consider when designing for Navi Mumbai

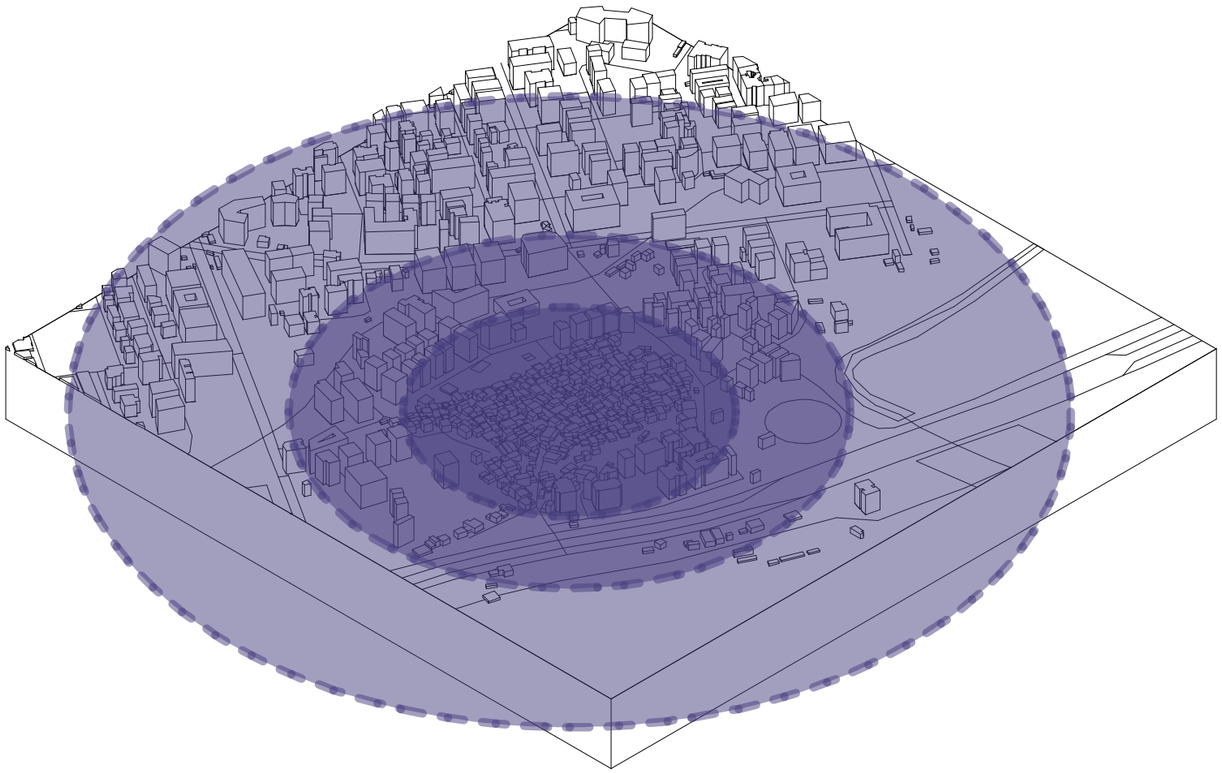
04 COMMUNITY -

People: Construction Participation of the community
• Provides Jobs to the area
• Knowledge of a specific trade or skill is learn
• Brings a sense of belonging to the building/ area
• Strengthens the community

Evolution:

Incremental housing - Housing to develop with the owner either is be family or business.

Construction Participation - Allows for Knowledge to be passed on in the traditional practice of learning by hand

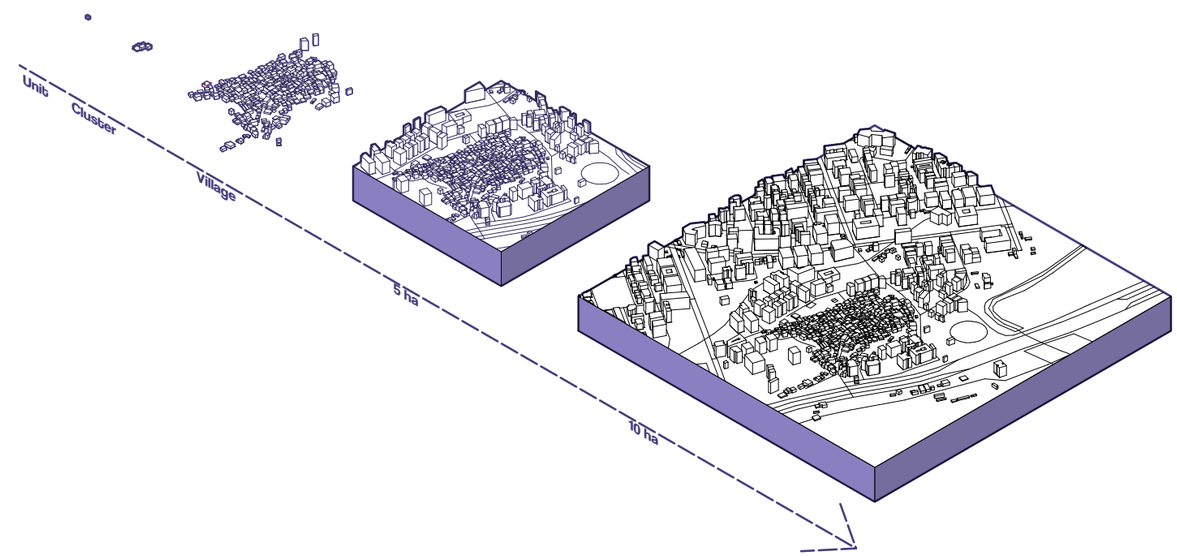


Design Hypothesis

Approach

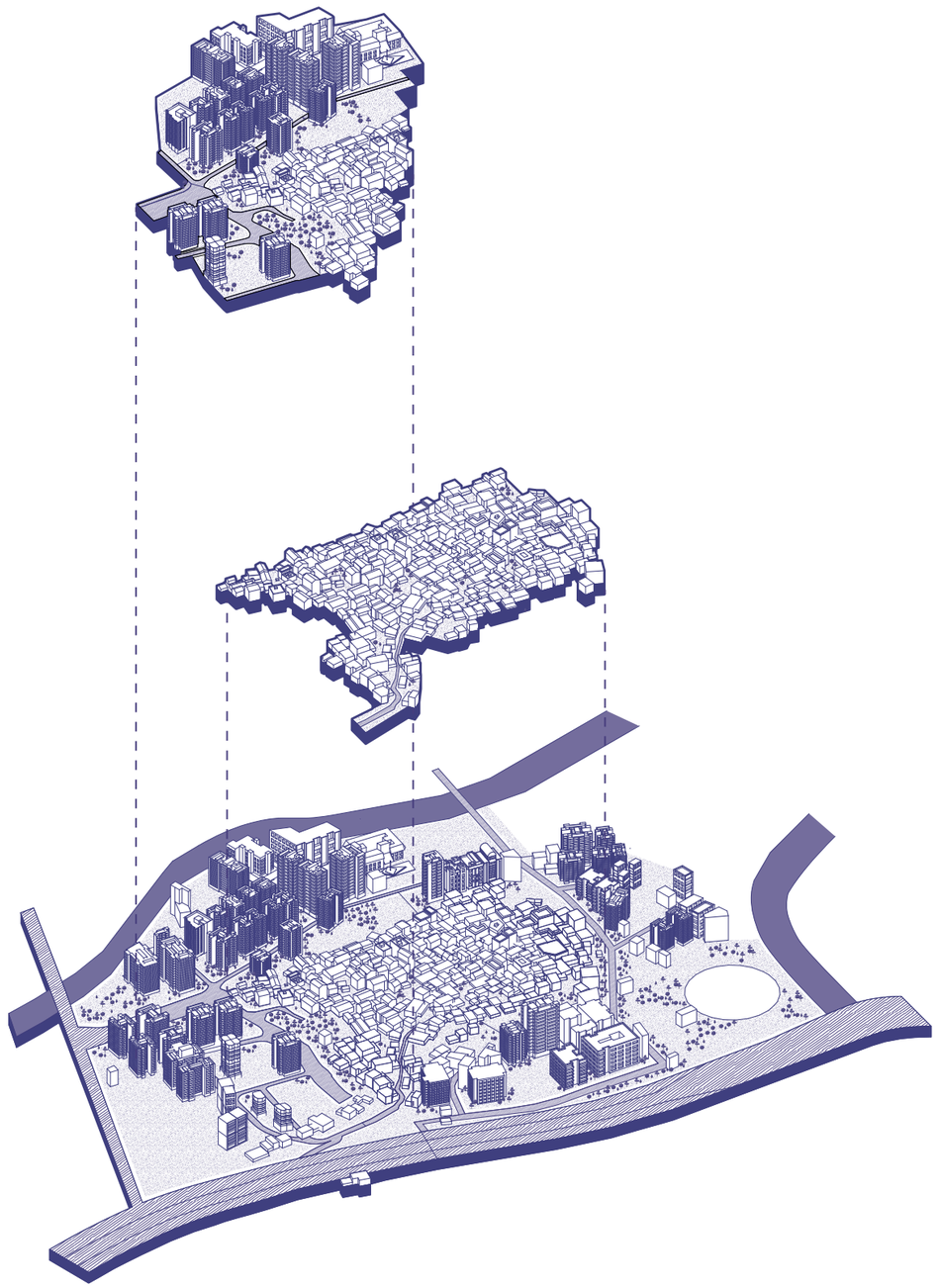
Vernacular of Scales

Interdependence of scales



Urban Conditions

Urban Conditions - Vahal village consisits of several urban conditions, the main two being the inner village and the CIDCO Developments



Urban Conditions Characteristics

CIDCO Boundry

Pros
- Communal Entry
- Collective Point of Communication
- Higher Ground Views

Cons
- One point of entry/exit
- Services
- Maintenance
- Surrounding Landscape
- Tall Buildings/Wind?

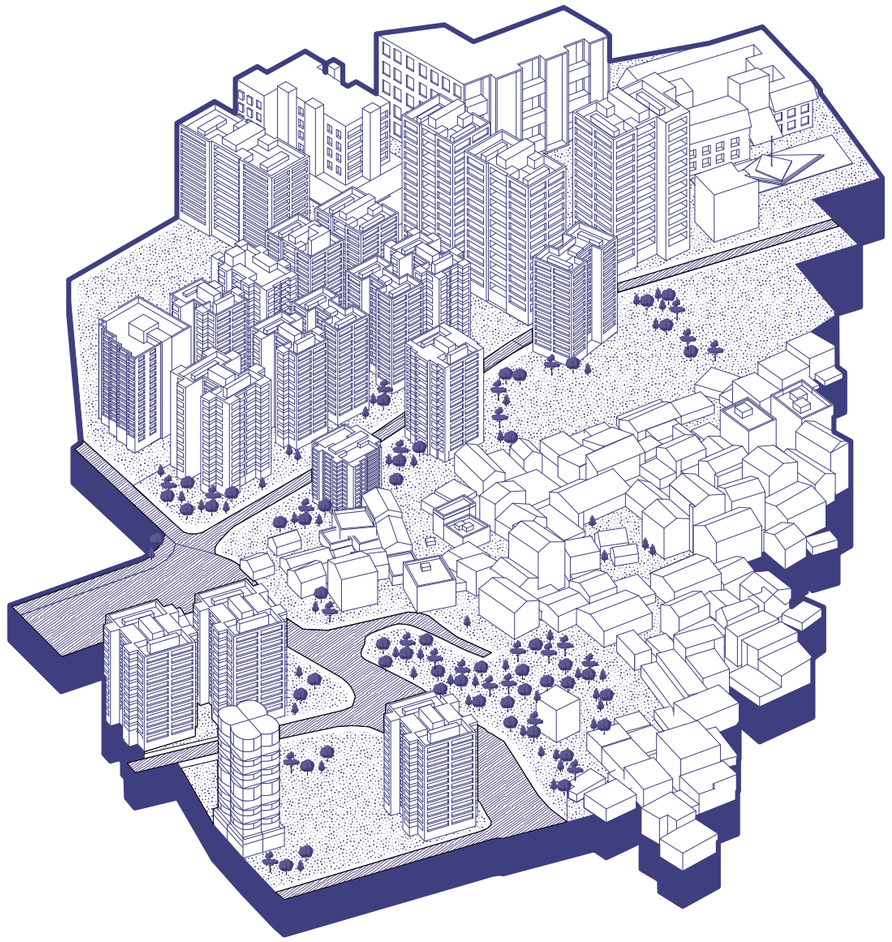
Maker Housing Principles

• To provide a quantity of dwellings in the surrounding boundry area

• To bring social amenities to area

• To make the surrounding land more attractive and aporachable

• To create a community atmosphere outside of the village.



Urban Conditions Characteristics

Inner Village

Pros
- Collective Community
- Access to services
- Network

Cons
- Connectivity to outside
- Access to Public/Private Space
- Maintenance
- Safety

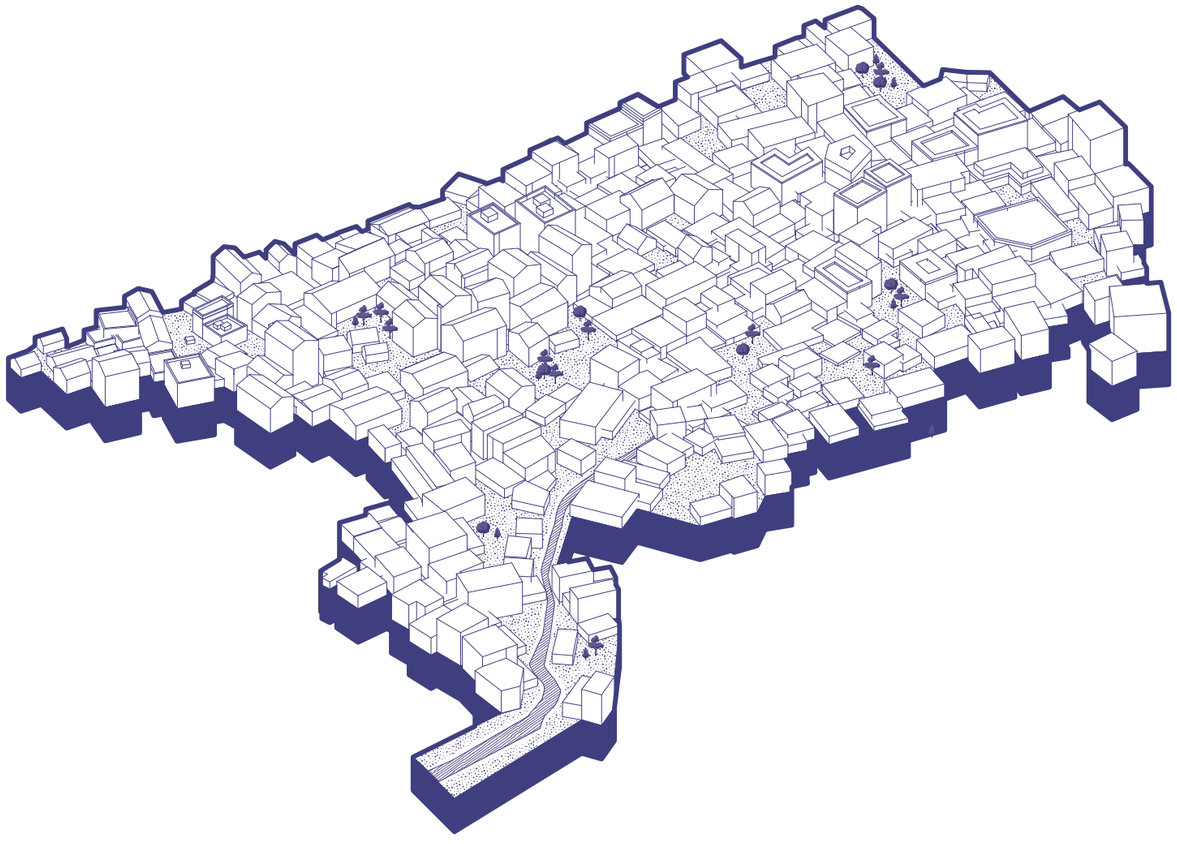
Maker Housing Principles

• To provide replacement dwellings in the village

• To repair social amenities to area

• To make the village more accessible/ safe and to disperse density pressure

• To solidify community beyond extents of village

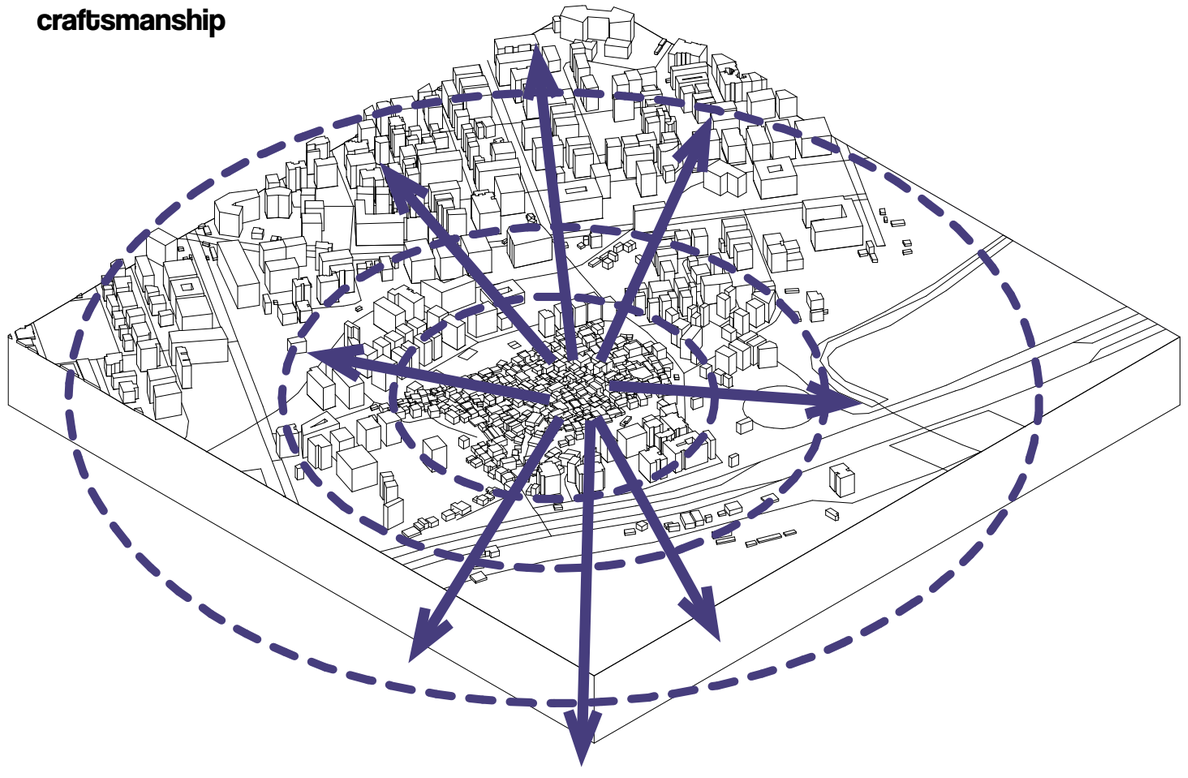


Aim

Problem Statement - Artisan techniques are being edged out of traditional society due to the mass production industry, therefore forcing Indian craftsmen to sell their goods at a lower market price. In turn, this led to many artisans abandoning their ancestral trade to find a more sustainable income, this further damaged the self-sufficient village economy as the disappearance of traditional industries led to overcrowding in the agrarian sector.

Design Hypothesis - To reintegrate traditional artisans back into the village economy meanwhile providing sufficient space and housing criteria for both living and working.

Using vernacular construction materials and methods to promote sustainable architecture and traditional craftsmanship



Using a radial approach with the village as a central node

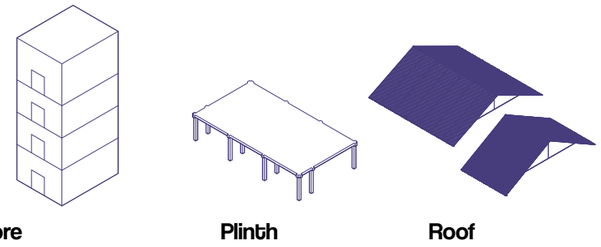
Research Question

How can the design of affordable community-built housing contribute to a better integration of Urban renewal and craftsmanship back into Navi Mumbai Gaothans?

Approach

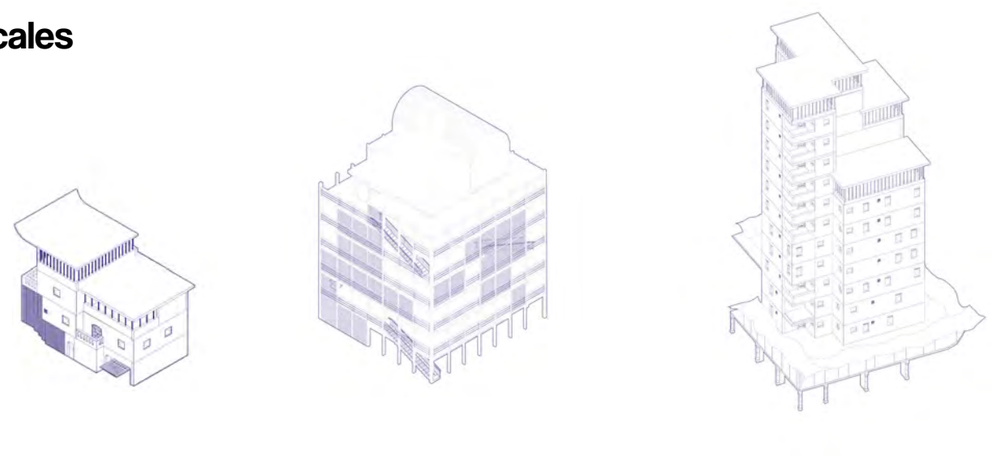
Design Toolkit

X 3 Key Elements



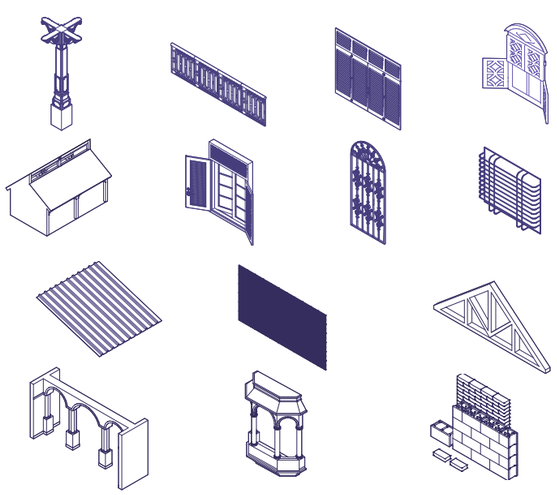
Core Plinth Roof

X 3 Scales

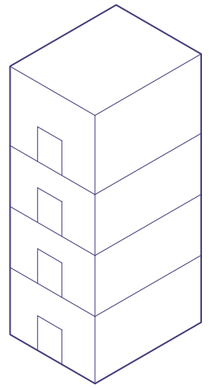


X ... Components

- Venacular elements specific to village

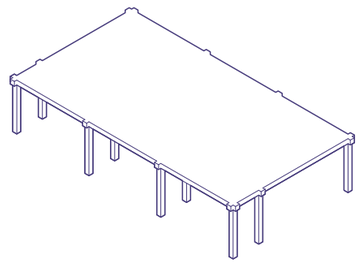


Elements



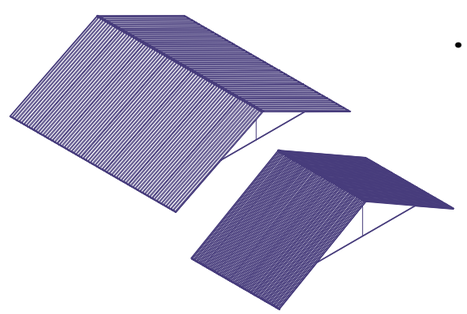
Core
A Core will provide a stable base for construction

• Connection space between dwellings, additional social area



Plinth
A plinth will provide social amenities available for the community and residents

• Provide a income for residents
• Creative space
• Areas can become specific
• Public area

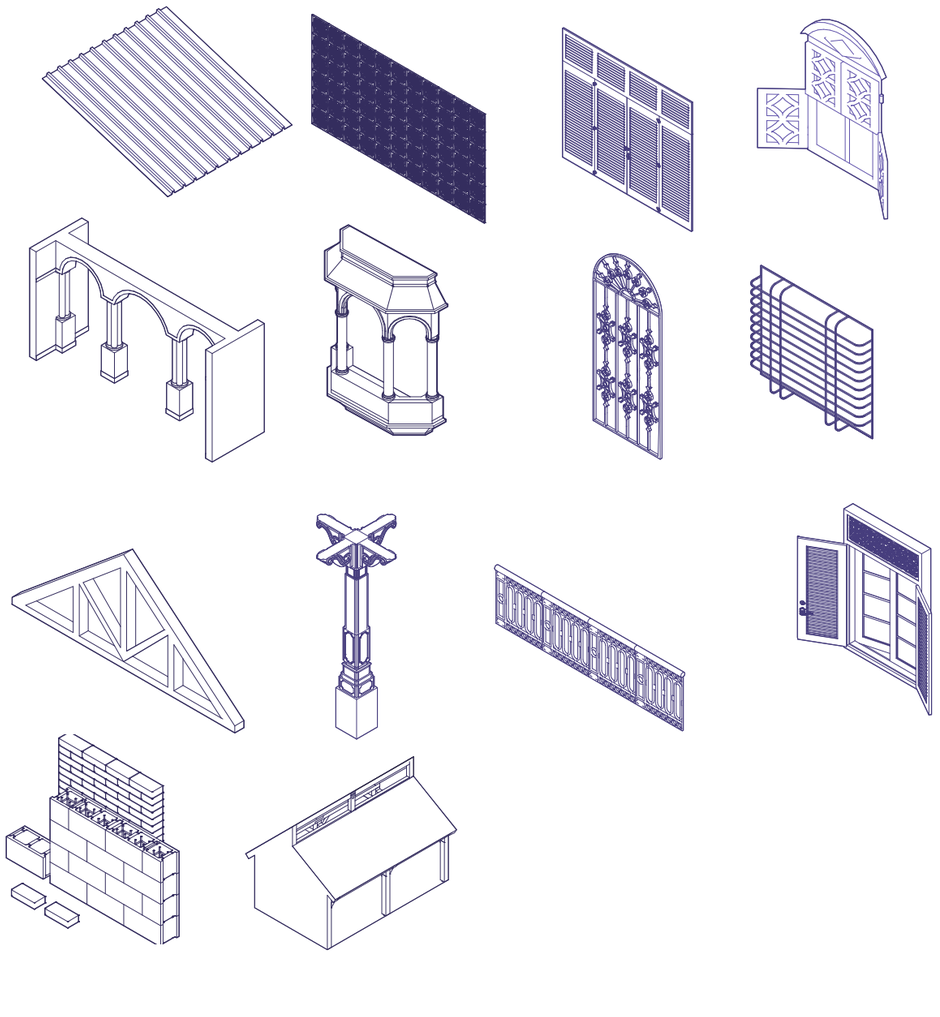


Roof/Terrace
By utalising the roof space it will allow tennants to have essential energy,water but also a added social amenity

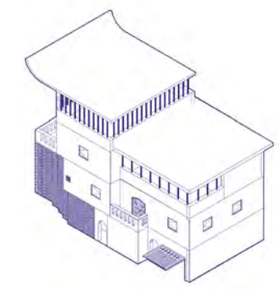
• Community space for private residence

Components

Venacular - Elements specific to context to intertwine new and existing

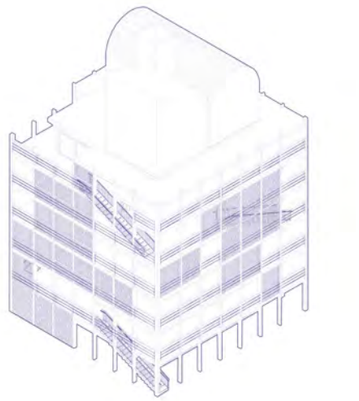


Scales



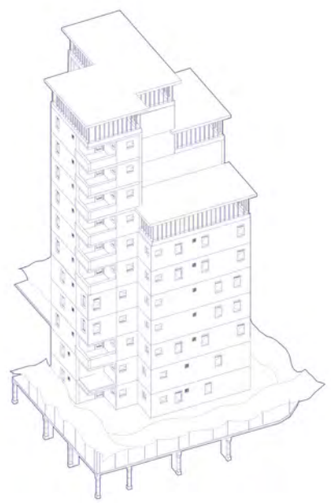
Small

•To provide a individual dwelling
•ncrementalitiy process
•Ownership
•Essence of place



Medium

•To provide a community based set of dwellings
•Add a social dynamic
•Create venacular typologies
•Keep moderate scale to village



Large

•To provide a large quantity of dwellings
•Add a wider range of amenities
•Fit to density
•Bring larger clientele to village

Scale role

	S	M	L
URBAN Strategy	To intervine into the village context	To intervine into the removed context	To intervine into CIDCO boundry
Tyoological Strategy	To integrate with existing typological architecture	To mediate between scales	Accomidate a larger number of dwellings wilst providing a good quality of life
Managerial Strategy	To accomidate both lower and higher income groups with a commercial front	To accomidate both lower and higher income groups with a commercial front	To accomidate both lower and higher income groups with a commercial front

Managerial Approach

Village Renewal Scheme

Urban Village Shareholding
Through shareholding reform and subsequent corporatisation, the village as a collective can be preserved and reconsolidated through the renewal and revitalisation of its origin

1. Collective economic organizations do not simply seek the maximization of profit.

2. The shareholding cooperative system adopted by village collectives helps villagers resist external threats such as land loss.

3. Managing of common property contributes to maintaining the identity of the collective.

Urban Village shareholding

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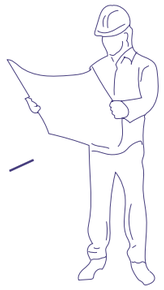
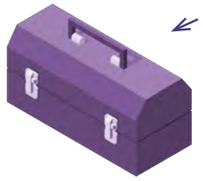
Cidco Urban renewal Scheme

Operational Model

Managerial Strategy



Architect



Toolbox Design
To lower capital investment

EWS
LIG
MIG
HIG

Social Mix Design
Design with social mix and commercial space

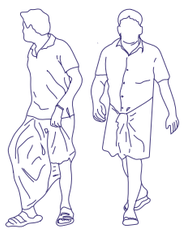
Cross Subsidisation

Commercial Investors

Commercial

Local Workers

EWS



LIG

MIG

HIG

Sell
Immediate return

Rent
Gradual Return

CIDCO

Existing Village Tennants

Local Contractors

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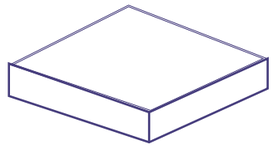

Plot

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€

Capital Investors

Large Scale development

Medium and Small Scale development

Urban cooperative

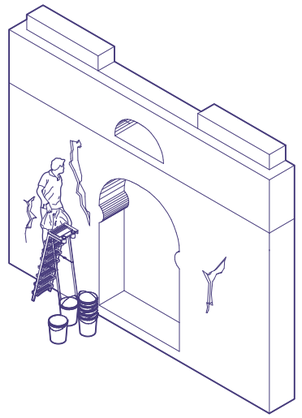
How will the village benefit from the Cooperative?

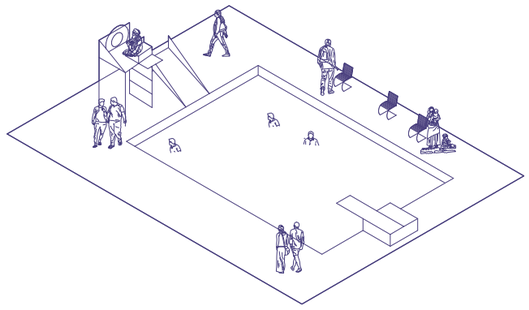
Maintenence
A individual typically takes care of what he/she owns, meaning if the residents own a percentage of the village amenities they are more inclined to maintaine public resources.

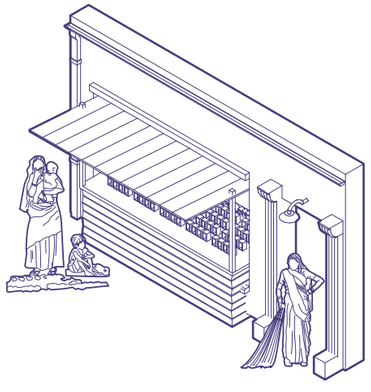
Value
Many public resources can even become more valuable when more people use them. By adding a emenity to the land it gives the land value pending on its asset.

Income
By renting a diversity of small firms rather than allowing a city to be dominated by a larger companies. The villagers also have priority for the jobs provided by collectively owned enterprises

Compensation for leasing land, the village the income and invest in upgrading buildings built on collectively owned land and lease these buildings to obtain profits.



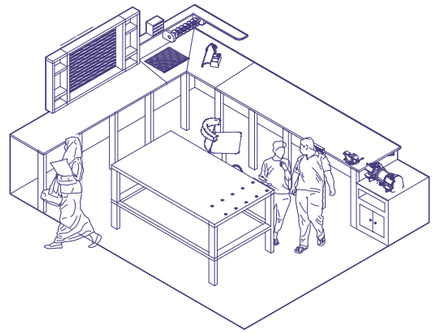


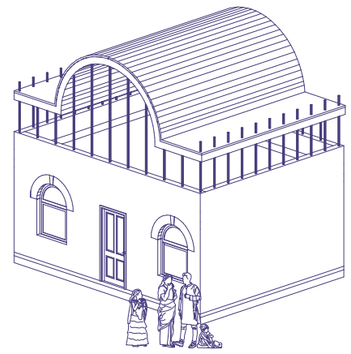


Skill
By providing more public amenities for edication it provides a start point into building up knowlege and skill within the village.

Ownership
By having a cooperative council dedicated to organising the village =it will allow EWS and LIG to progress in owning property breaking the cycle of one family being stuck to an income group. regarding income groups no matter how many shares the villager has, her/his vote only counts as one vote, even though the distribution of profits is based on the number of shares. All groups will be limited to a certain amount of shares based on income group and amount of time spent in village.

Collective memory
The cooperative reinforces the collectivity of the village because it ensures the interests of villagers as stakeholders alongside maintaining its identity as a gaothan.

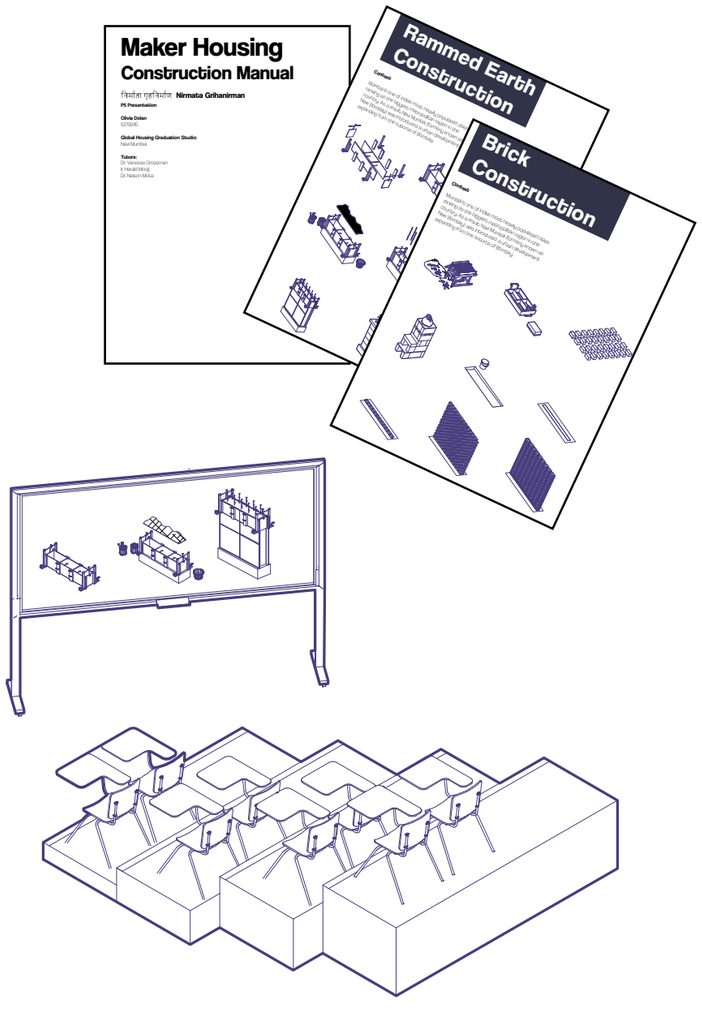




Makers cooperative

Learn

By providing local amenities for educational purposes it allows the villages to gain knowledge in a trade.

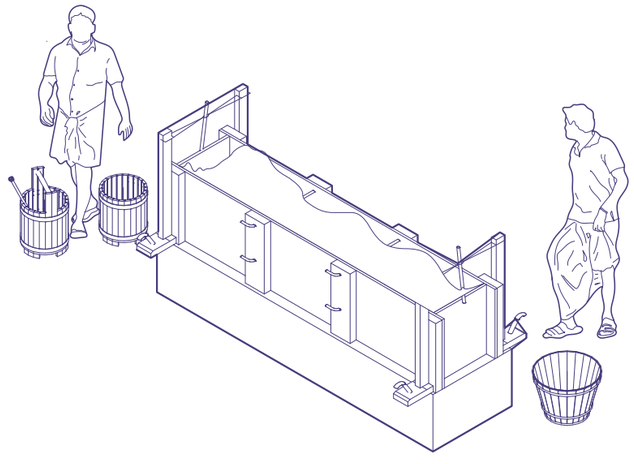


Craft as a Building technique

Educational institutions on local techniques example. rammed earth construction.

Make

To reinstate craftsmanship within the village. Residents will be encourged to make local crafts and building techniqyes to provide income.

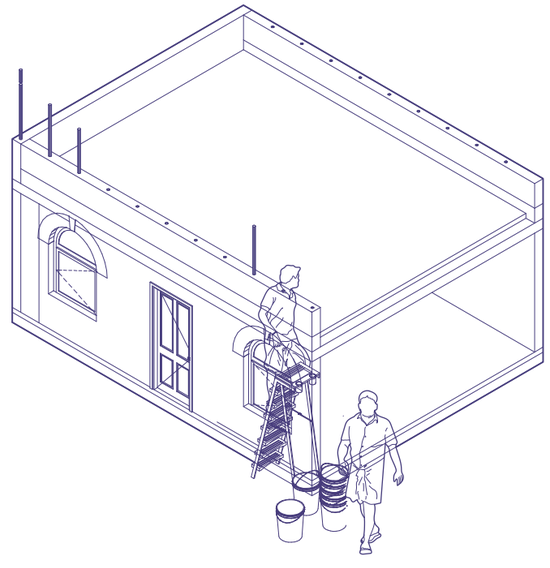


Craft as a Building technique

Skilled villages can earn a wage participating in community building example. rammed earth construction.

Sell

By introducing community entiprises these products can be sold with a percentage of the profits being reinstated into the repair and mainenece of the village. Meanwhile skillfull persons can be hired for building purposes.



Craft as a Building technique

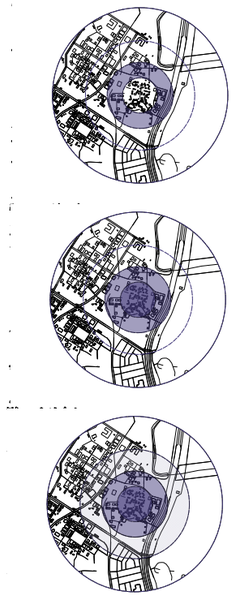
Community built projects can be rented or sold to new stakeholders in the village

example. rammed earth construction.

Urban Strategy

Situated Approach + Replicable strat

Urban Strategy:
Radial approach in phases, situated around gaothans. This Approach to urban renewal of villages can be replicated not only in Navi Mumbai but in other similar contexts.



The research question will be approached through a set of design principles that can be altered and reproduced to fit the surrounding context appropriately.

01: Create a vernacular toolkit typology with set of principles/ rules for the urban area.

02: Implement the constructions in incremental phases

03: Reproduce principles in other villages in need of urban renewal

Situated Approach + Replicable strategy

Housing Strategy:
By using three diffrent scales the project interacts with the diffrent urban consitions of the village

Repair: Intervine and repair existing buildings

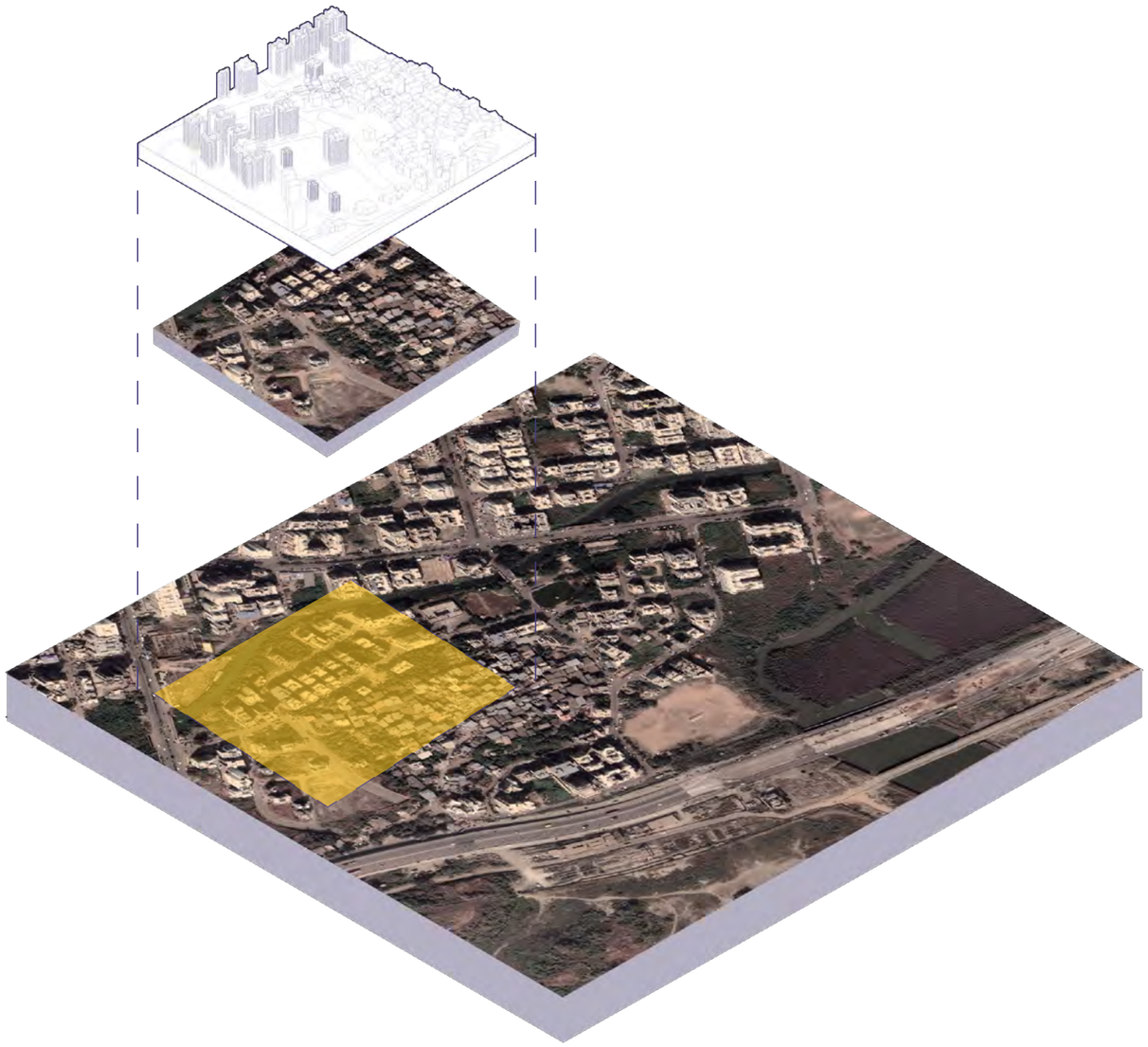
Small: 1-2 individual dwellings

Medium: A cluster of dwellings

Large: A stack of Dwellings

Income groups are not defined by typology but by Life-style

Phasing

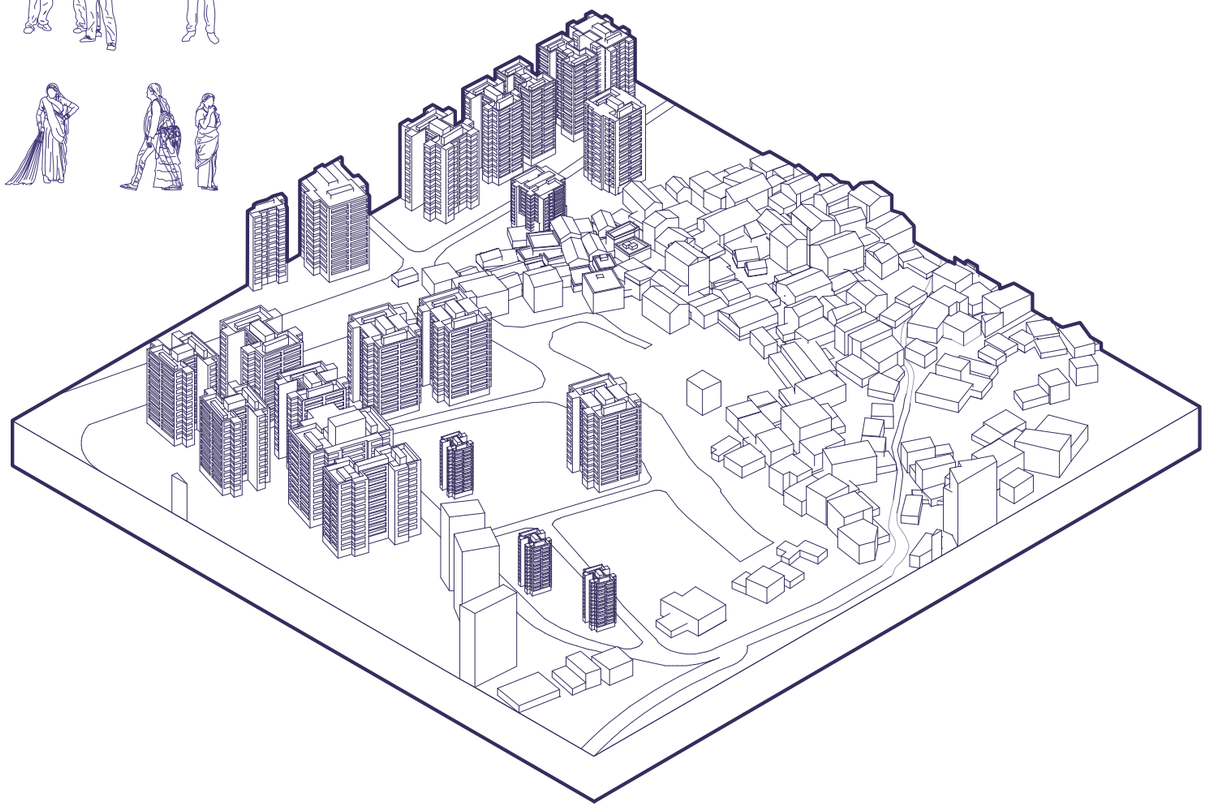


Existing Context

Existing

The Village is clearly seperated from the CIDCO Developments

Stakeholders Included

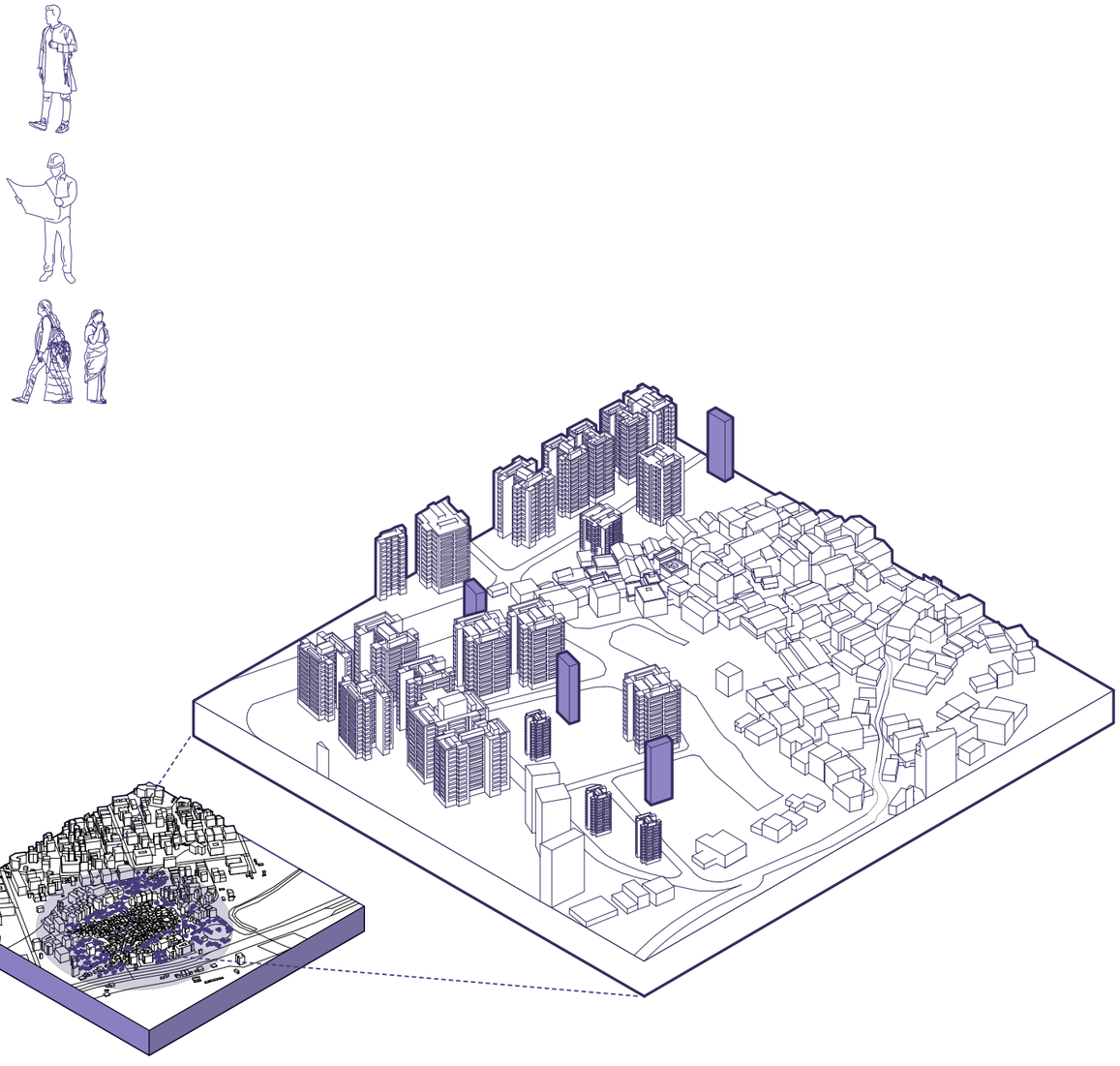


Phase 01

Core Phasing

Cores will start in construction around the border of the village.

Stakeholders Included

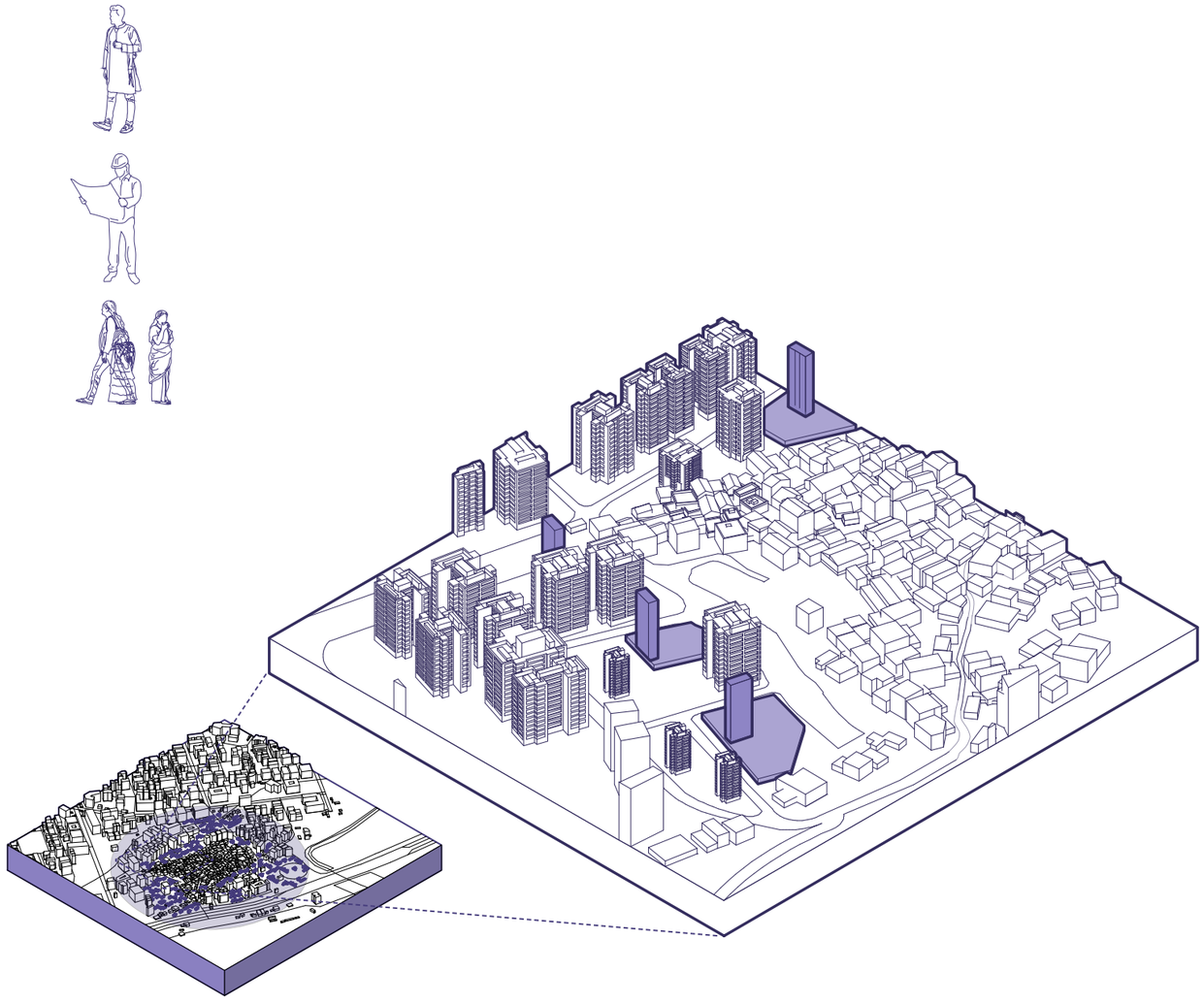


Phase 02

Plinth Additions

Plinths for commercial use will start to attrat attention and bring value to the land

Stakeholders Included

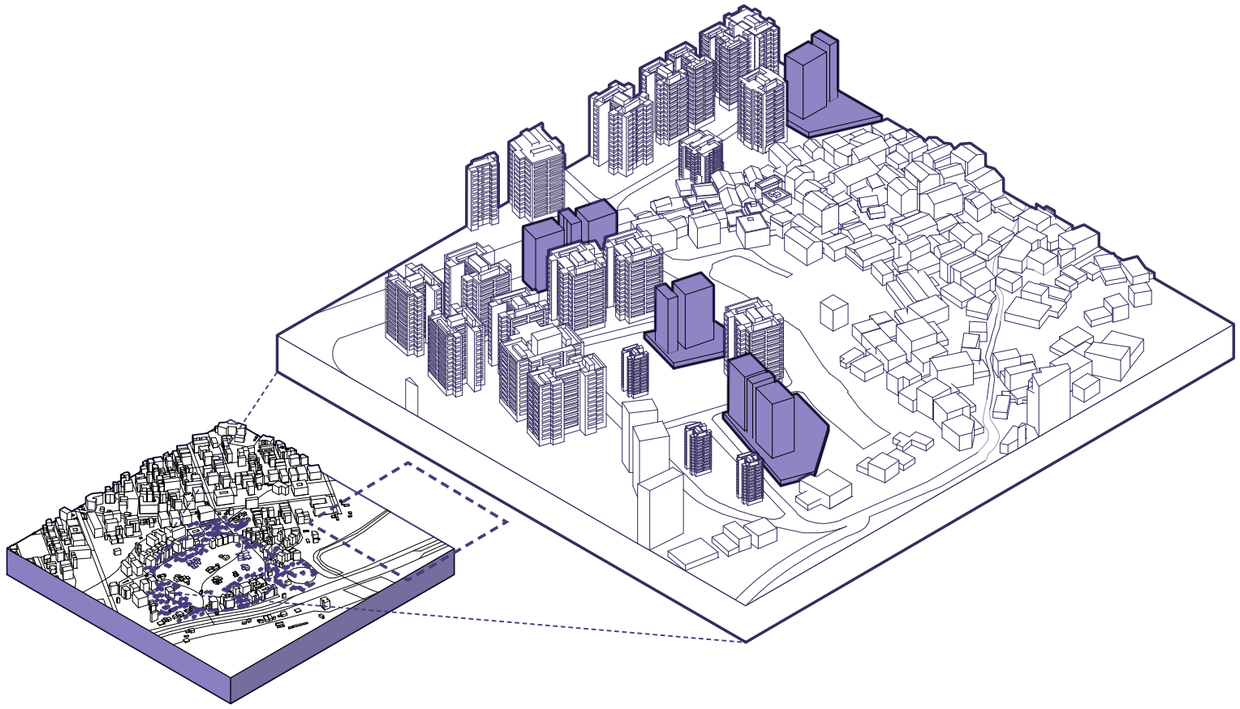


Phase 03

Large typology

Large developments will be built on top of the plinths

Stakeholders Included

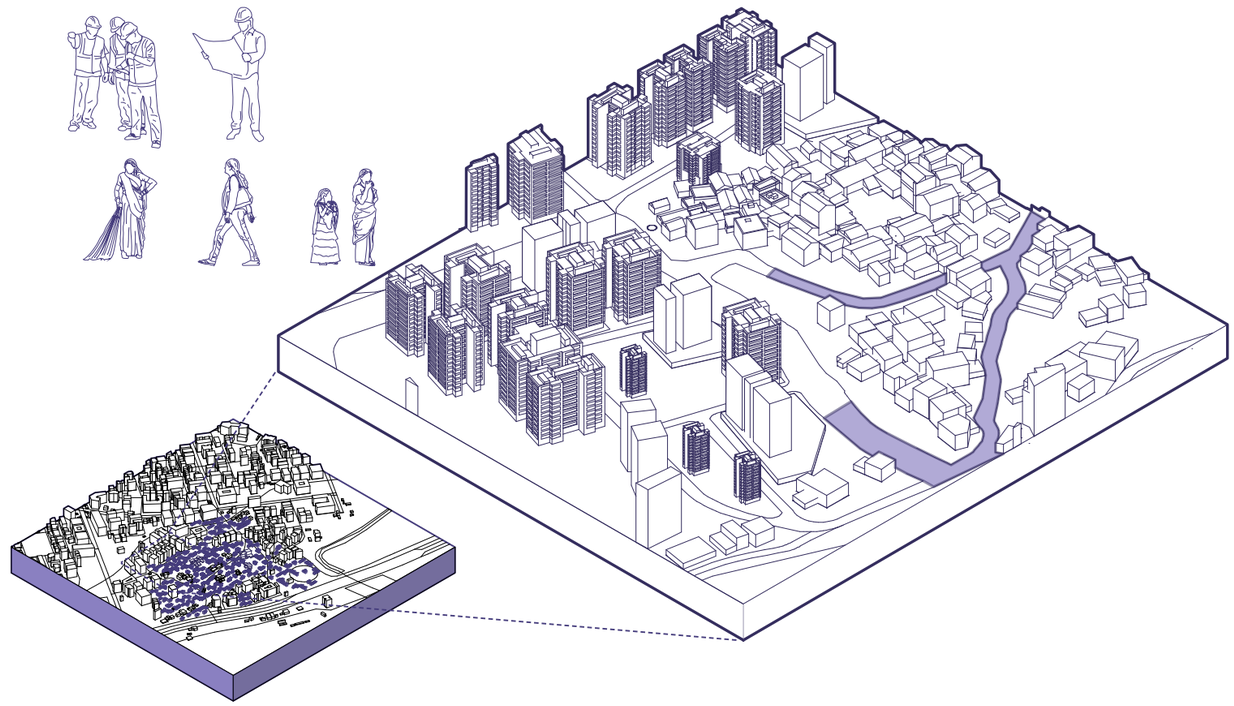


Phase 04

Road Infrastructure

Problem areas will be removed via demolition whilst residents are moved to the outskirts of the village in the new developments. A new urban road is developed

Stakeholders Included

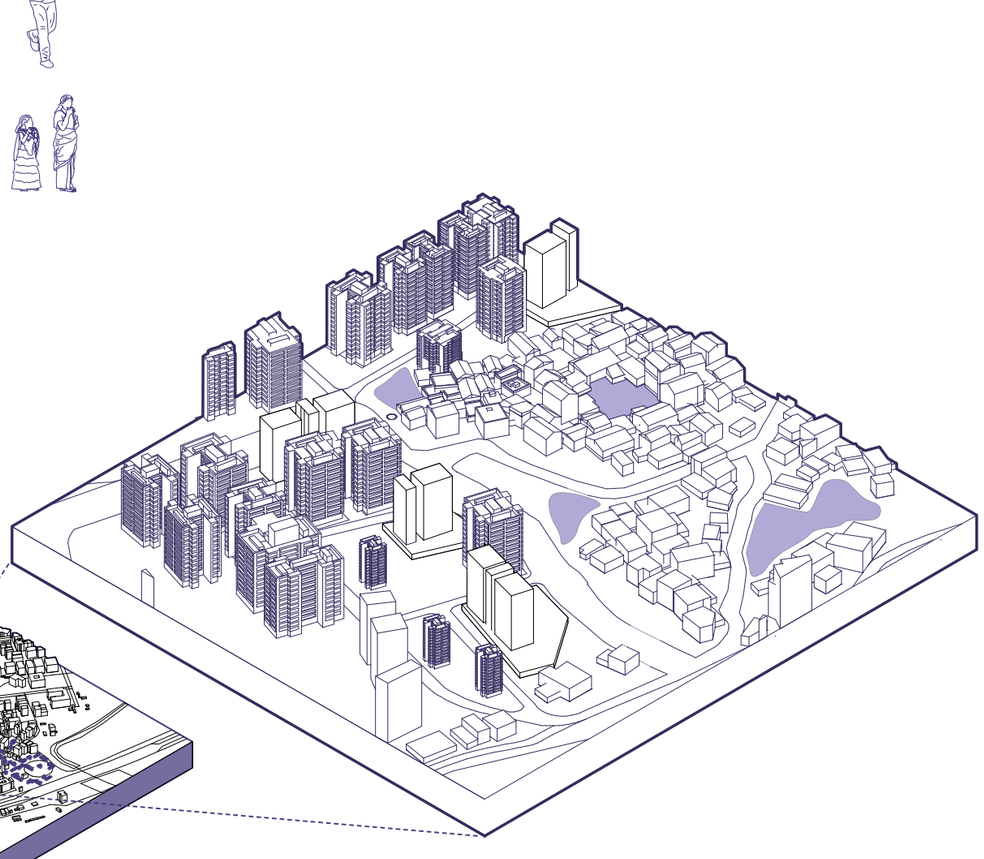


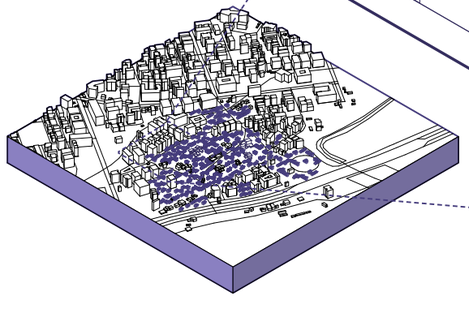
Phase 05

Spacing

Demolition will occur in needed areas opening up the village

Stakeholders Included



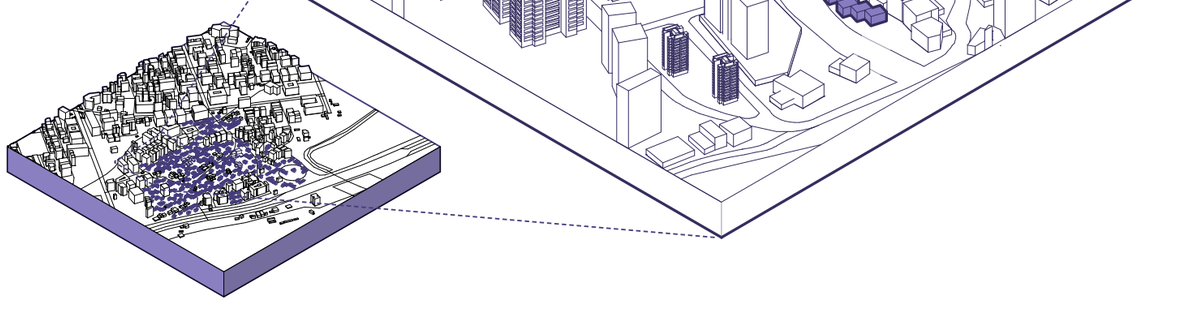


Phase 06

Phase 02

Small Dwellings will start to fill in the gaps, this will mainly occur alongside the new road infrastructure through the village

Stakeholders Included

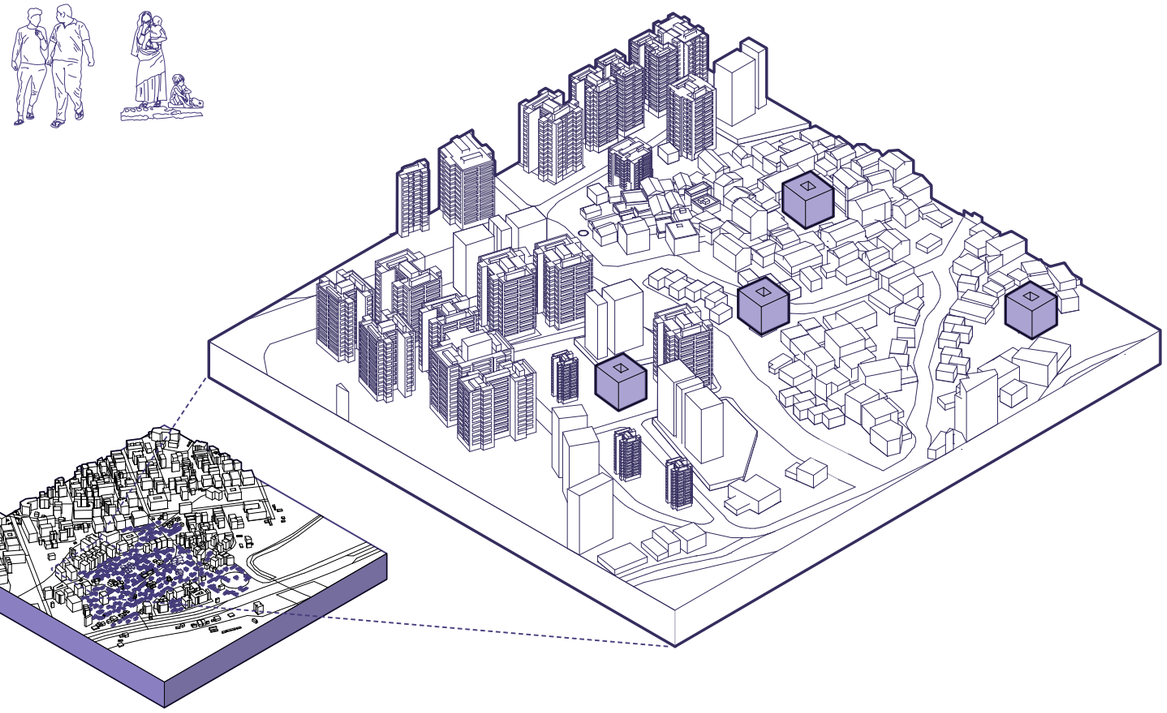


Phase 07

Medium Dwellings

Medium typologies will be implimented in larger openings in the village.

Stakeholders Included

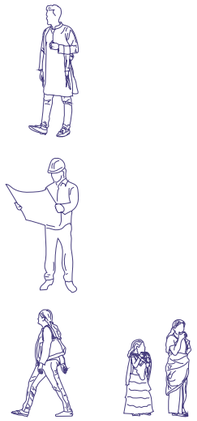


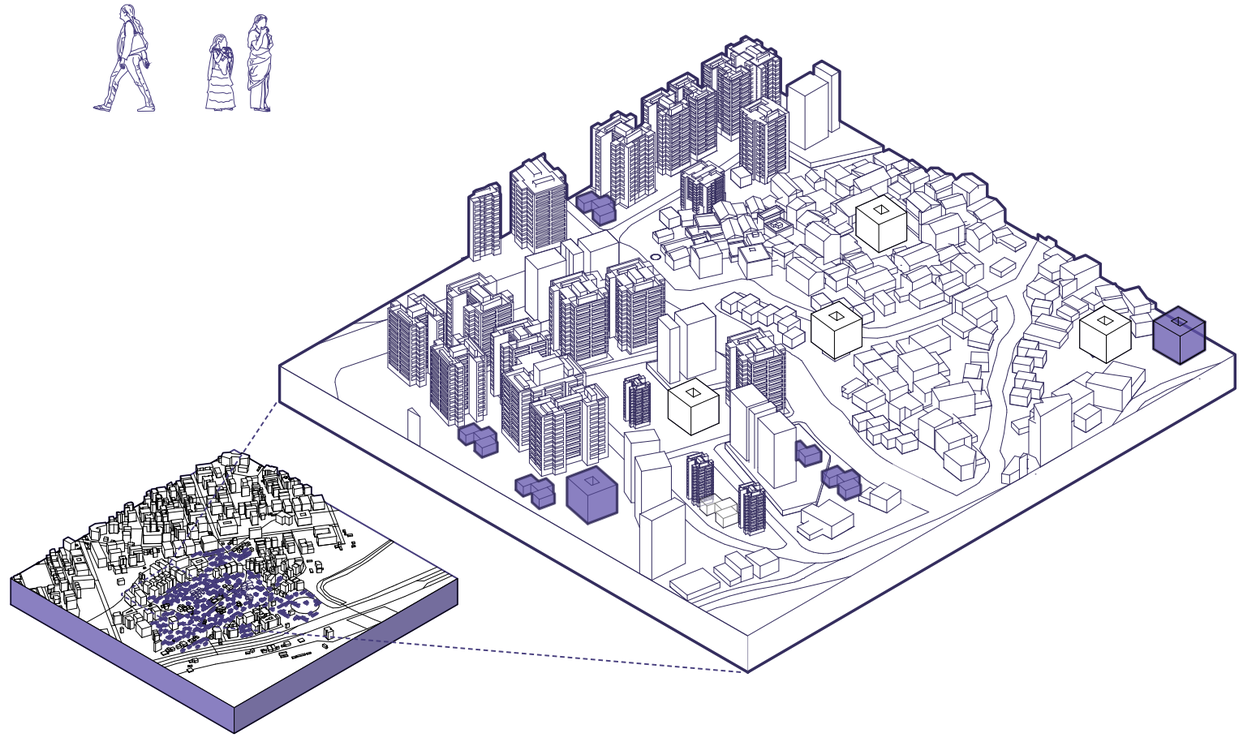
Phase 08

Extra Phasing

Additional dwellings will occur when needed and placed where suited

Stakeholders Included



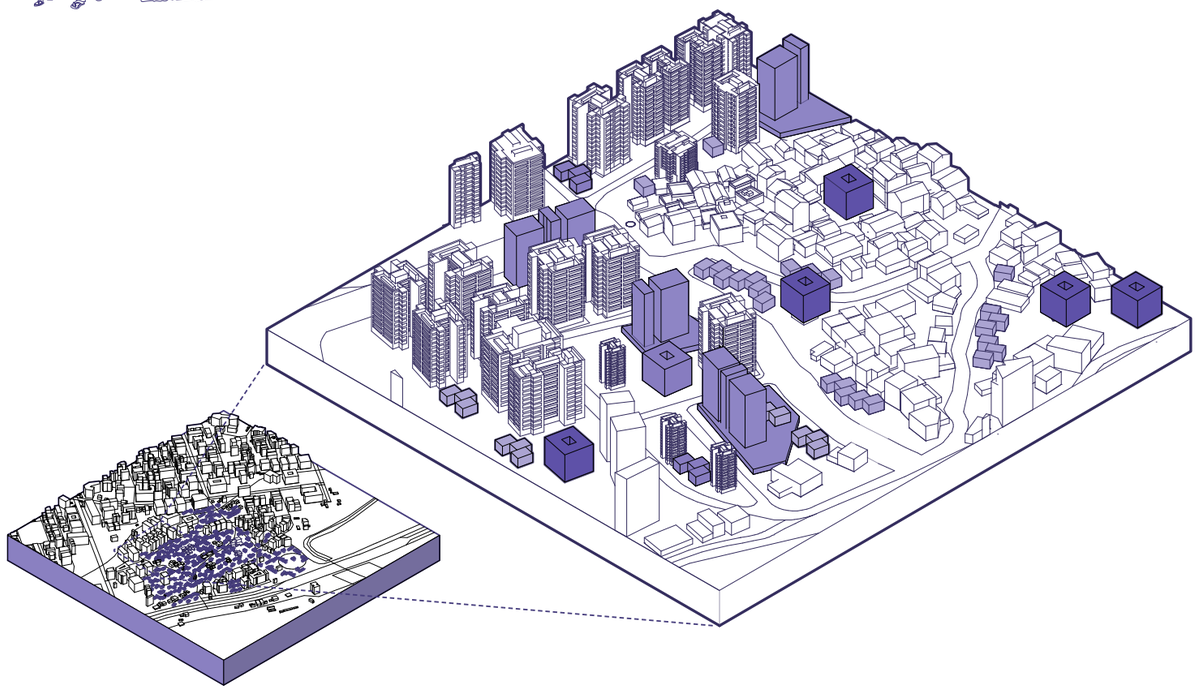


Complete

Phasing Complete

Village and boundry phasing complete

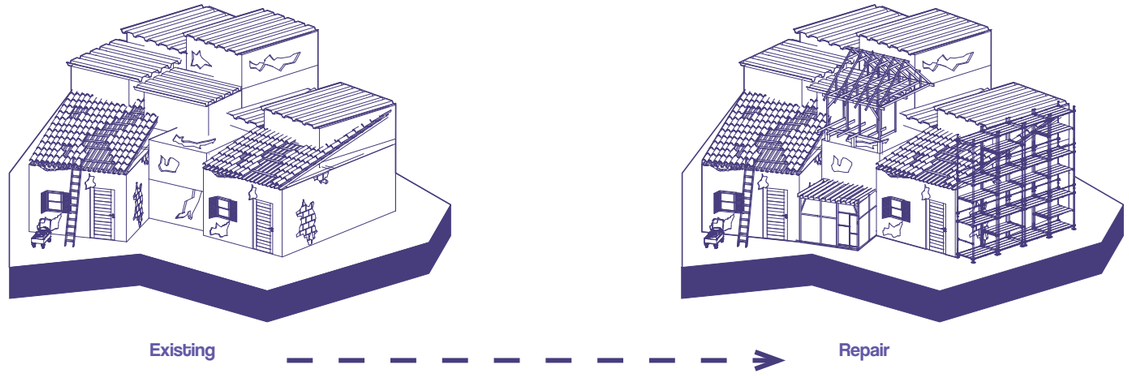
Stakeholders Included



Process of Demolition and Rebuild

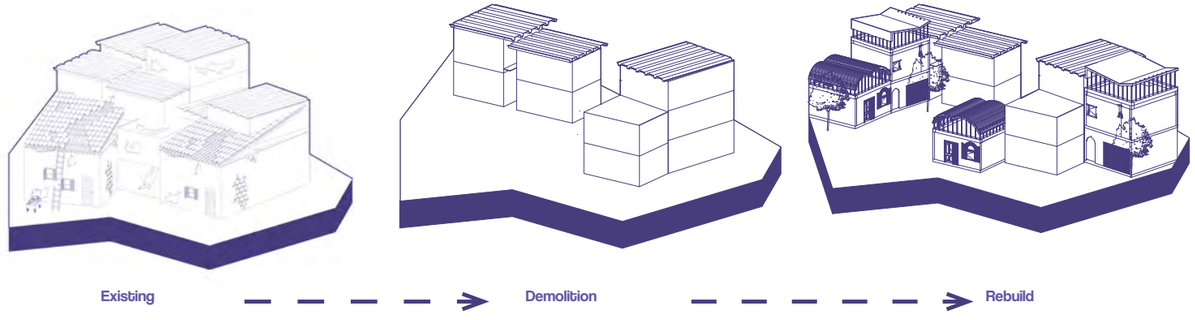
Repair

A analysis of the village will determin which buildings are safe to repair.
The repairs to the homes will be done in a venacular construction



Demolition and Rebuild

If deemed structurally unsavable the buildings will be demolished and rebuilt with either S,M,L scale pending on urban conditions.



Program

Existing Road Infrastructure

Existing Roads- Poor existing road conditions and access to the village

1:2000

New Road Infrastructure

New Roads- By introducing new roads it reintegrates the spine of the village. Only pedestrian except for emergency vehicles.

1:2000

Existing Amenities

Existing Amenities- The village lacks a range of social emenities leaving villagers to go elsewhere to seek them.

Amenities Disrupted

Distupted facilities- When constructing the new road , dwellings and amenities will be interupted.

Legend:

Services
Store
Grocery
Restaurants
Medical
Health
Post Office
Religious
Office

1:2000

Amenities Added

New Amenities- New Amenities added in the Large and Medium dwellings in the Plinth segment of the buildings.

1:2000

Existing Housing

Existing Housing - This village is comprised of several typologies clustered into highly dence areas

1:2000

Interupted Dwellings

New Housing Large - Whilst inputting new road infrastructure dwellings will either be repired or demolished.

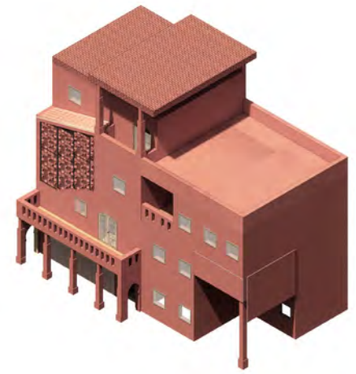
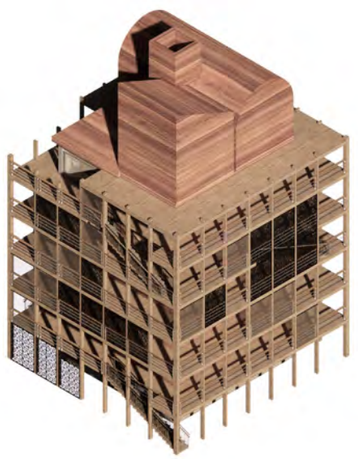
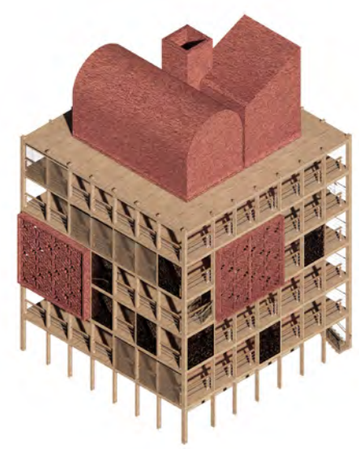
Housing Added

Legend:

- Services
- Store
- Grocery
- Restaurants
- Medical
- Health
- Post Office
- Religious
- Office

1:2000

Housing Matrix

	EWS/LIG	LIG/MIG	MIG/HIG
S			
M			
L			

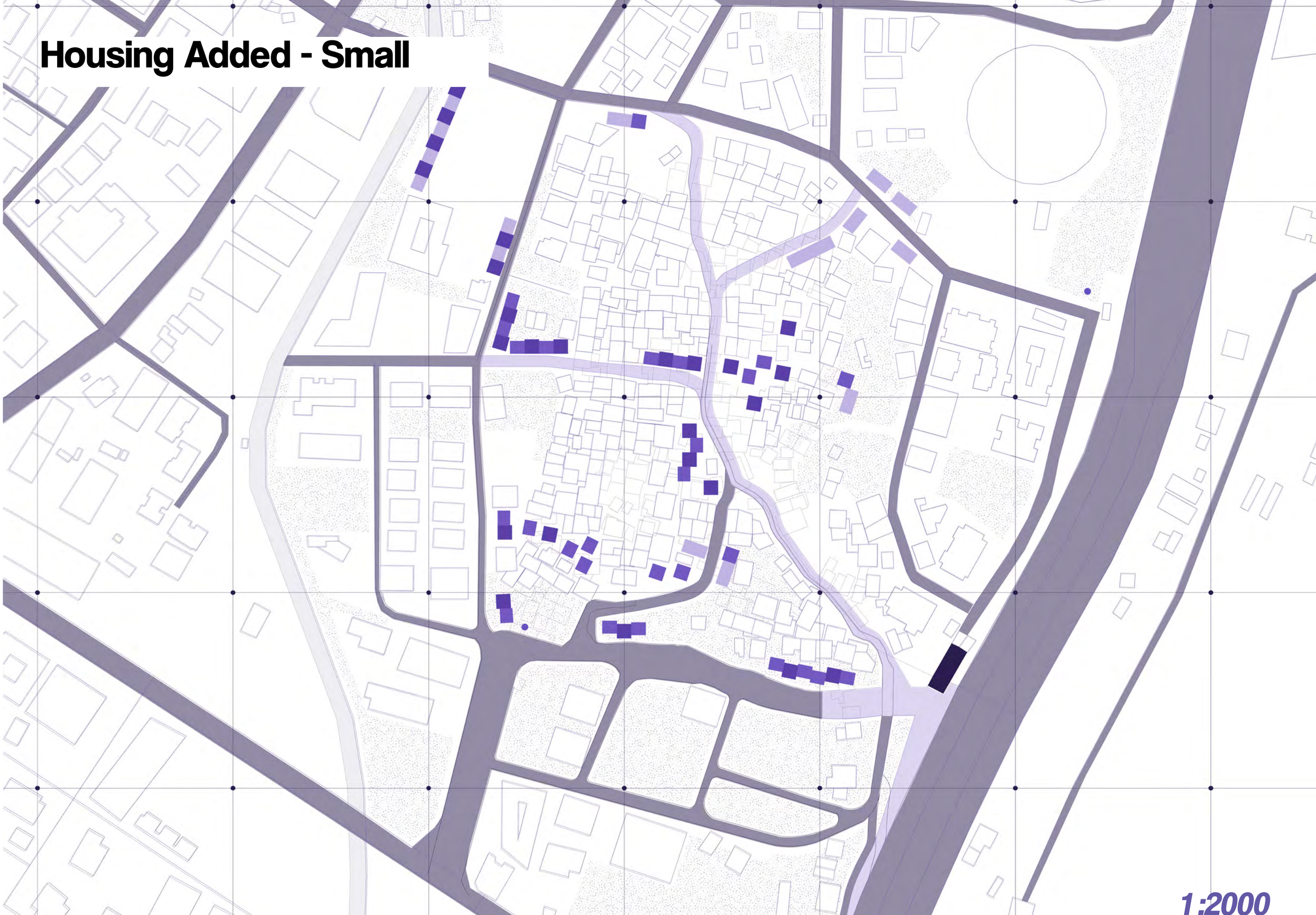
Housing Added - Large

New Housing Large - The first implimentation of housing will be the larger scale dwellings, placed on the perifery of the village.

1:2000

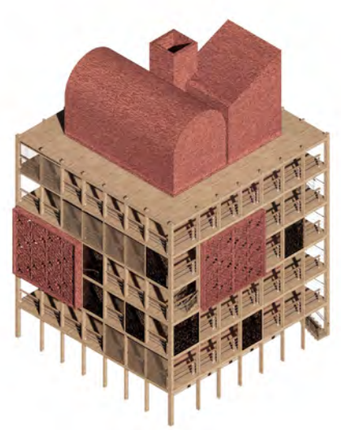
Housing Added - Medium

Housing Added - Small



1:2000

Housing Matrix

	EWS/LIG	LIG/MIG	MIG/HIG
S			
M			
L			

Small

Small

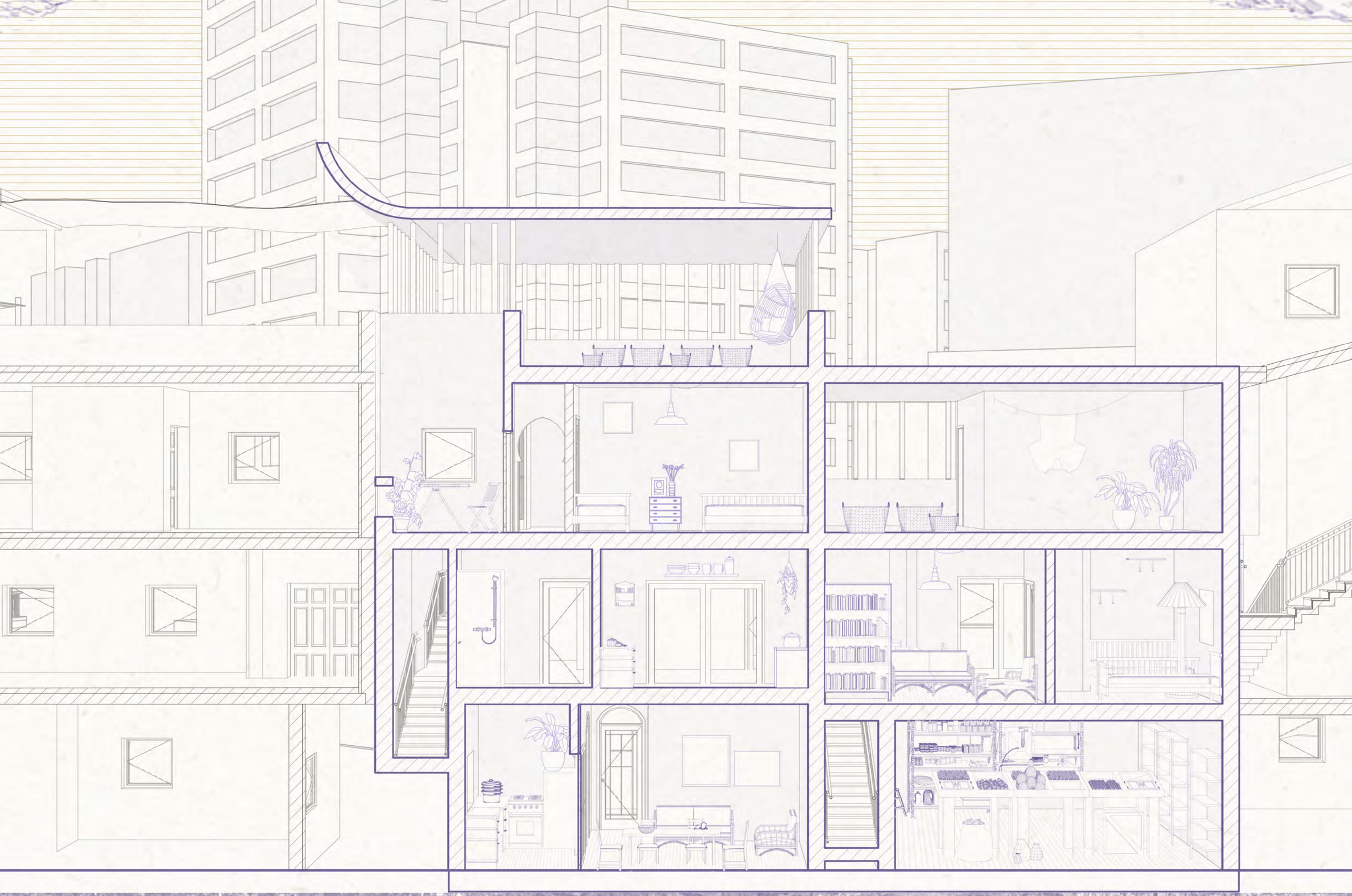
1:500 Plan

GSI - 0.5
FSI - 0.8
DENSITY- 50

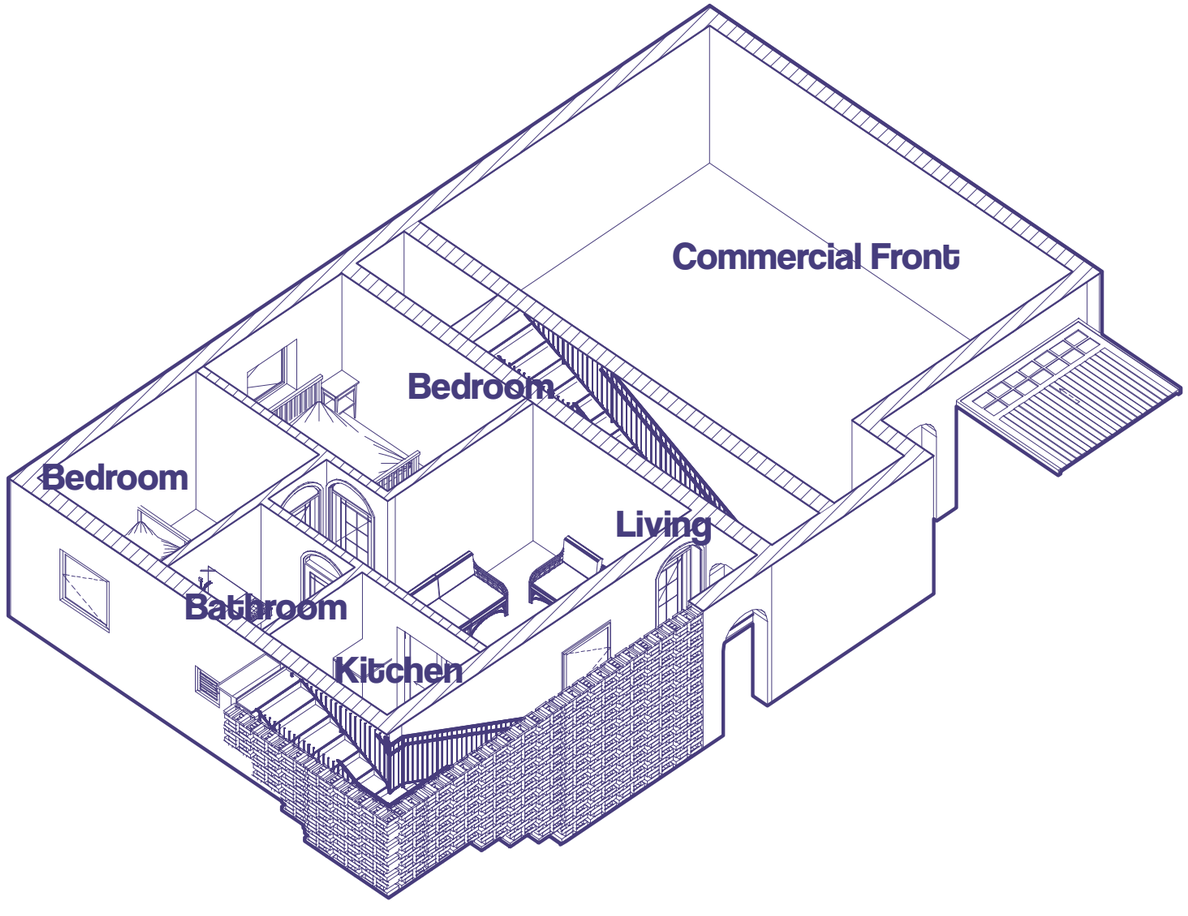
1:250 Plan

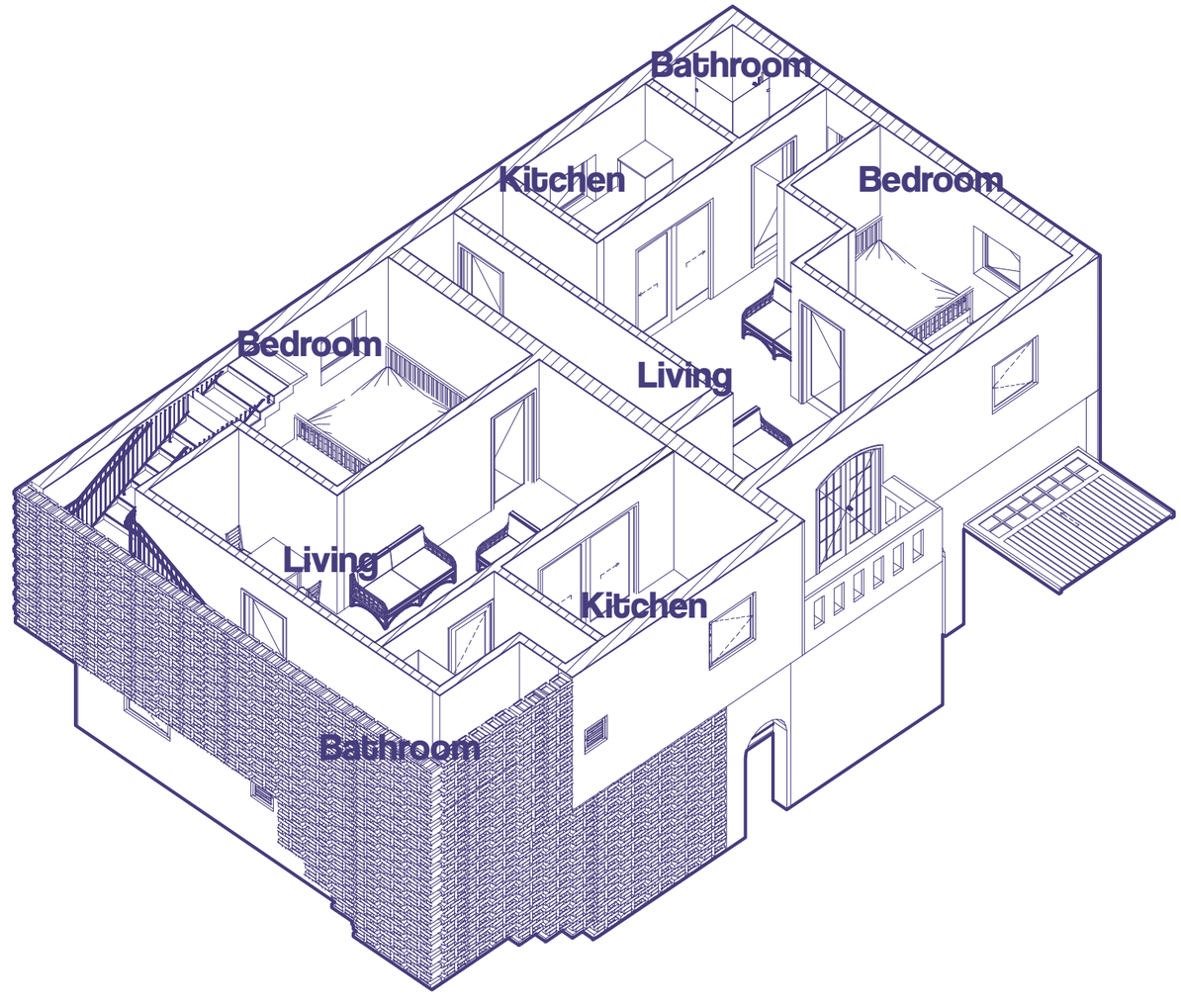
GSI - 0.5
FSI - 0.8
DENSITY- 50

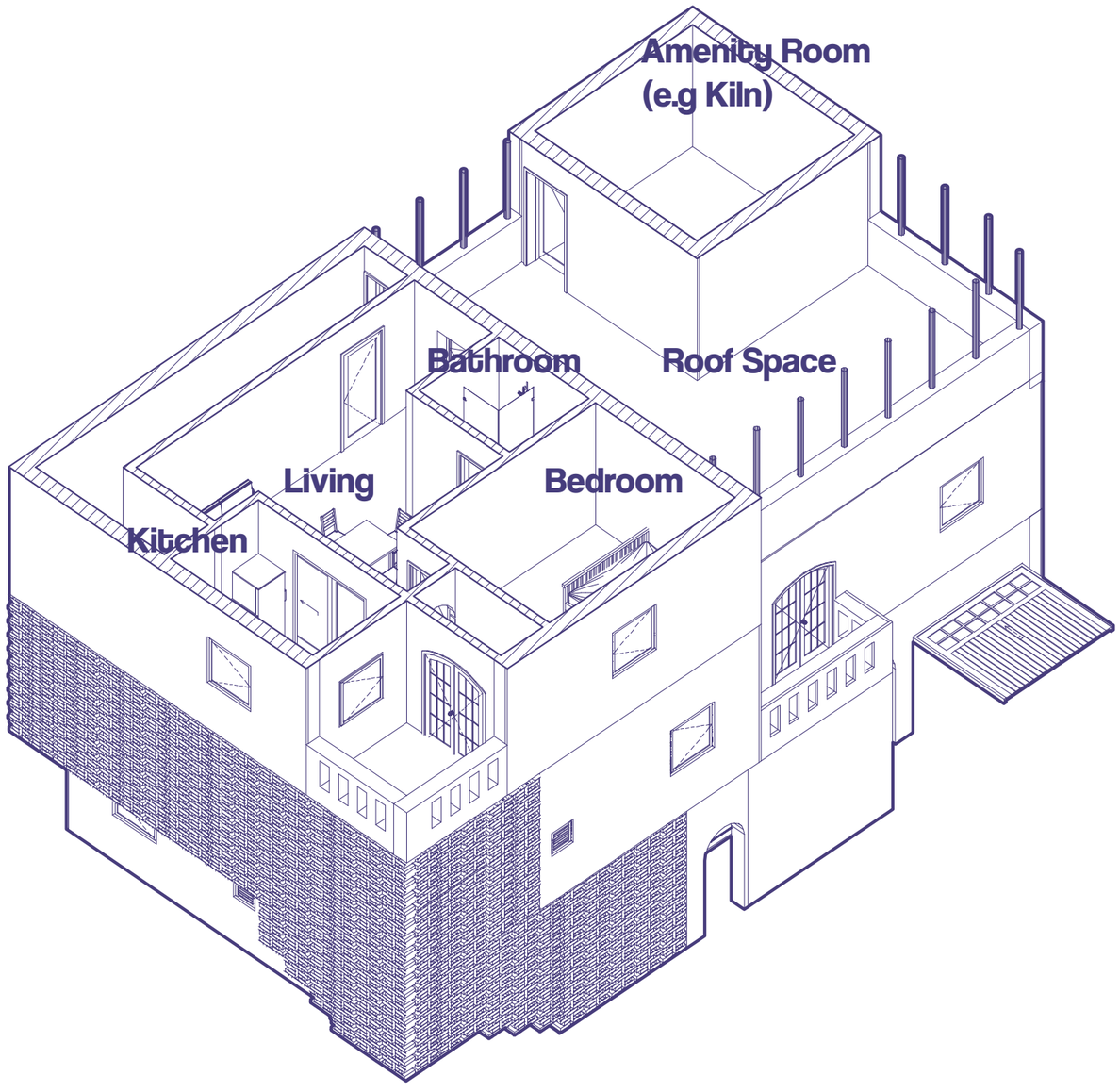
1:100 Section

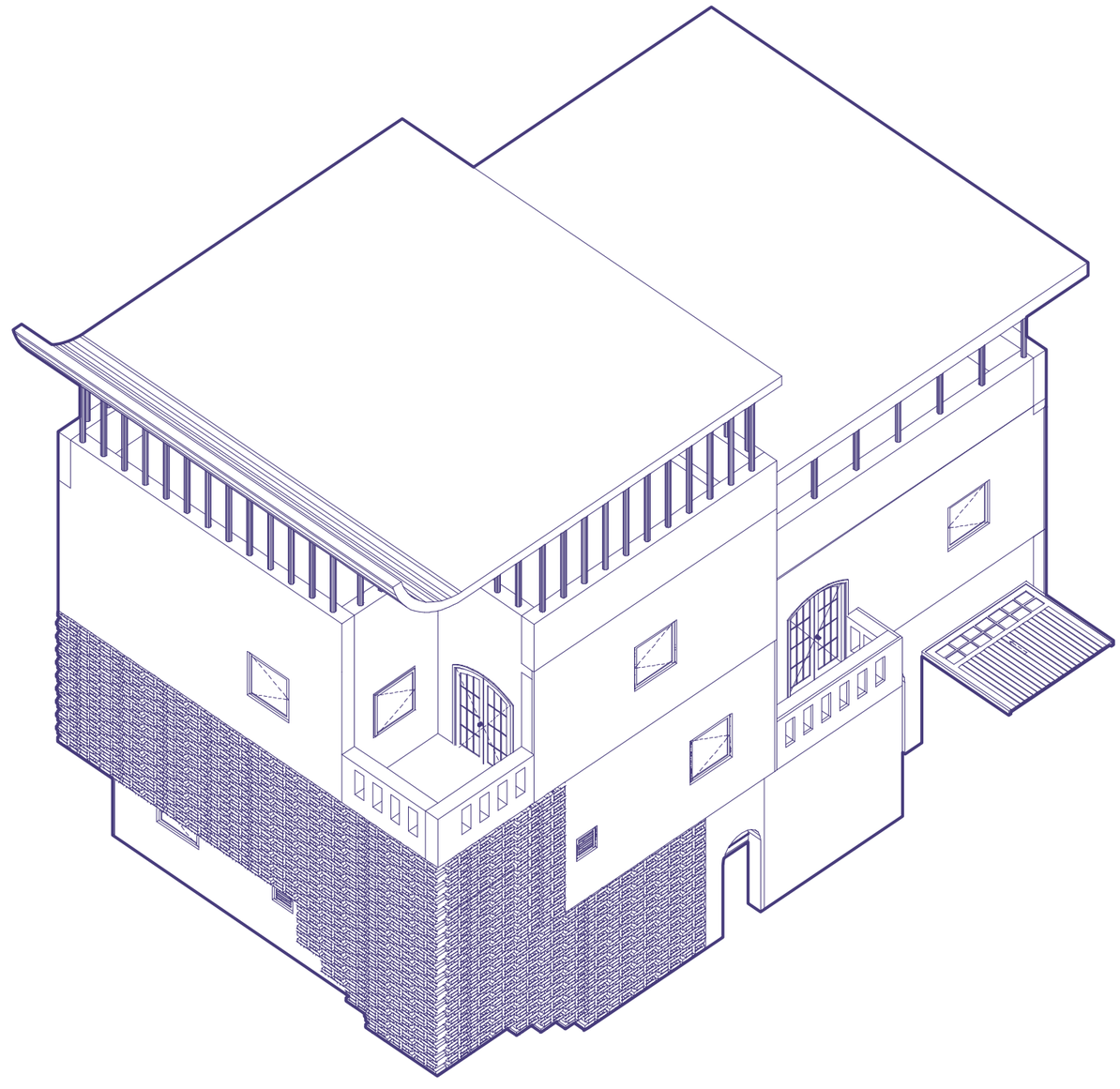


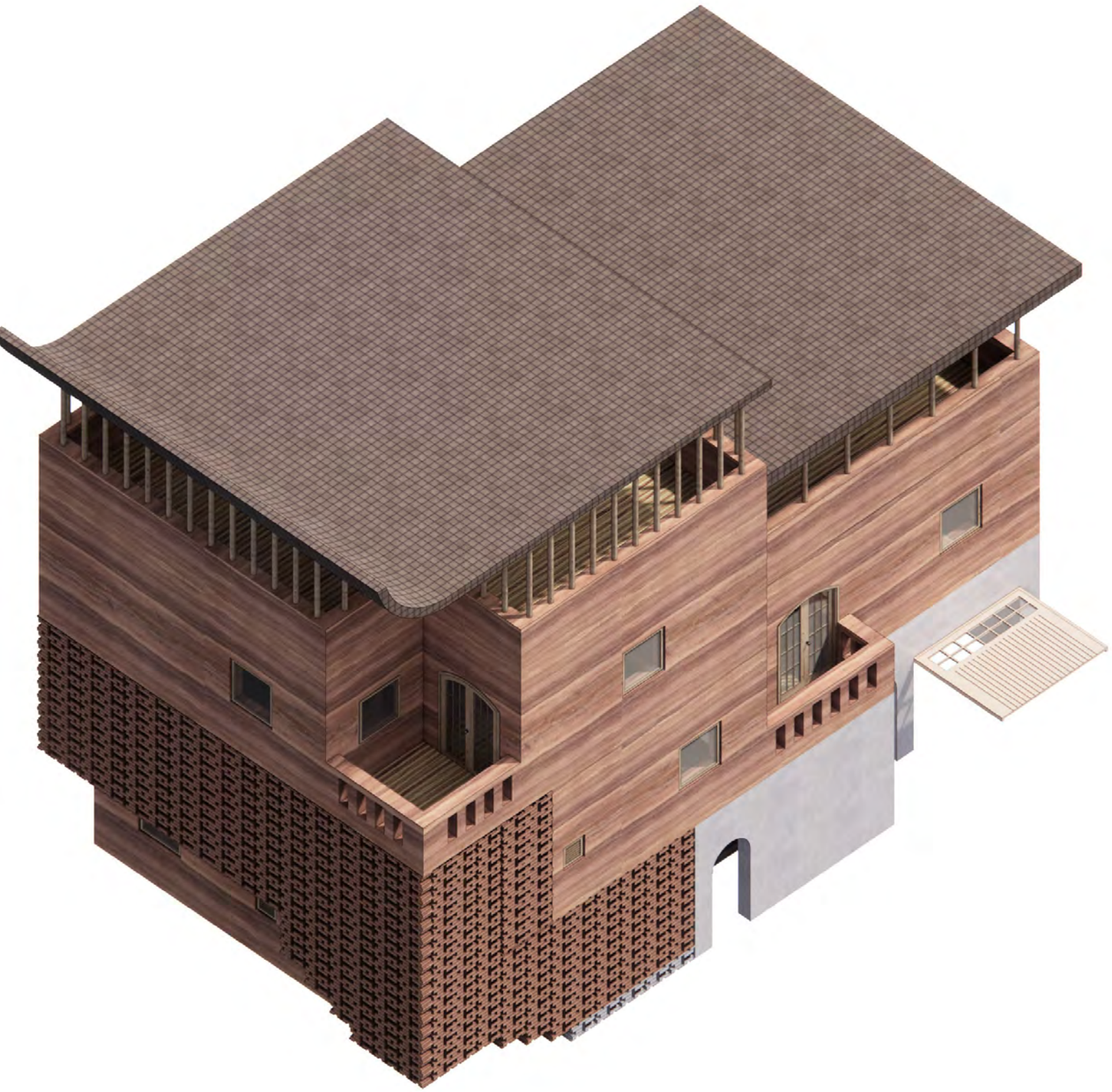
Exploded Isometric - Small






Amenity Room
(e.g Kiln)
Bathroom
Roof Space
Living
Bedroom
Kitchen



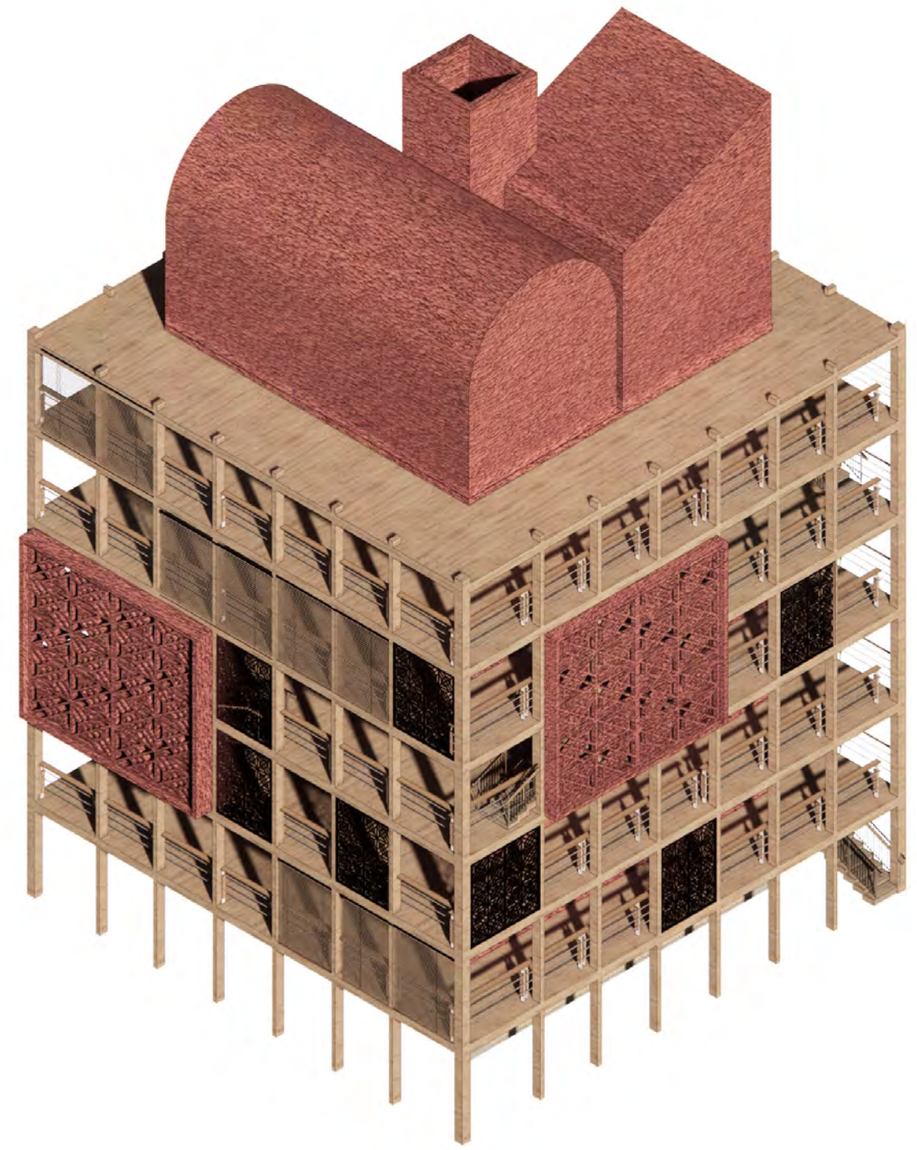


Current Situation

Future Situation

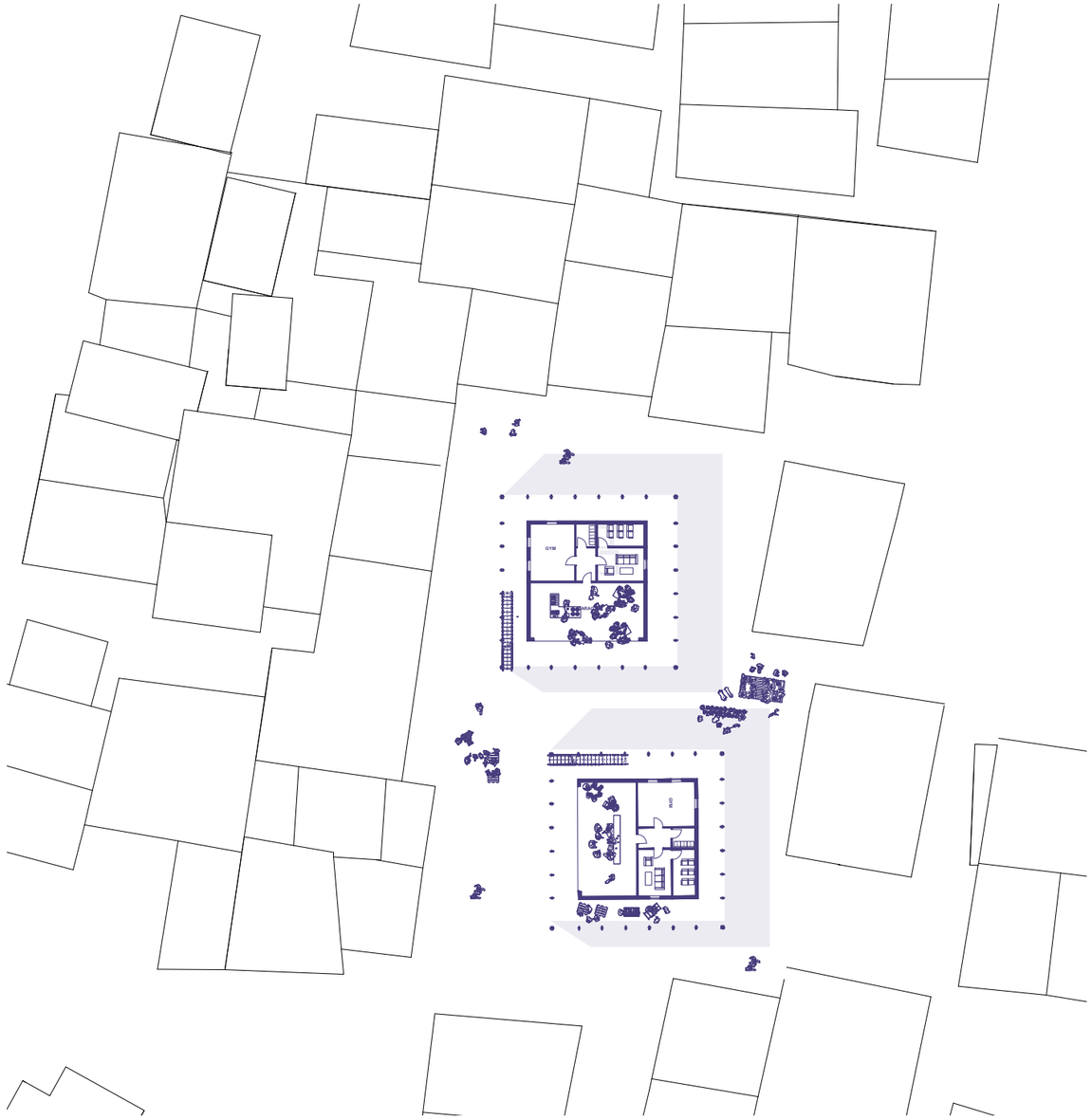
Maker Housing Proposal

Medium



1:500 Plan

GSI - 0.3
FSI - 0.4
DENSITY- 8

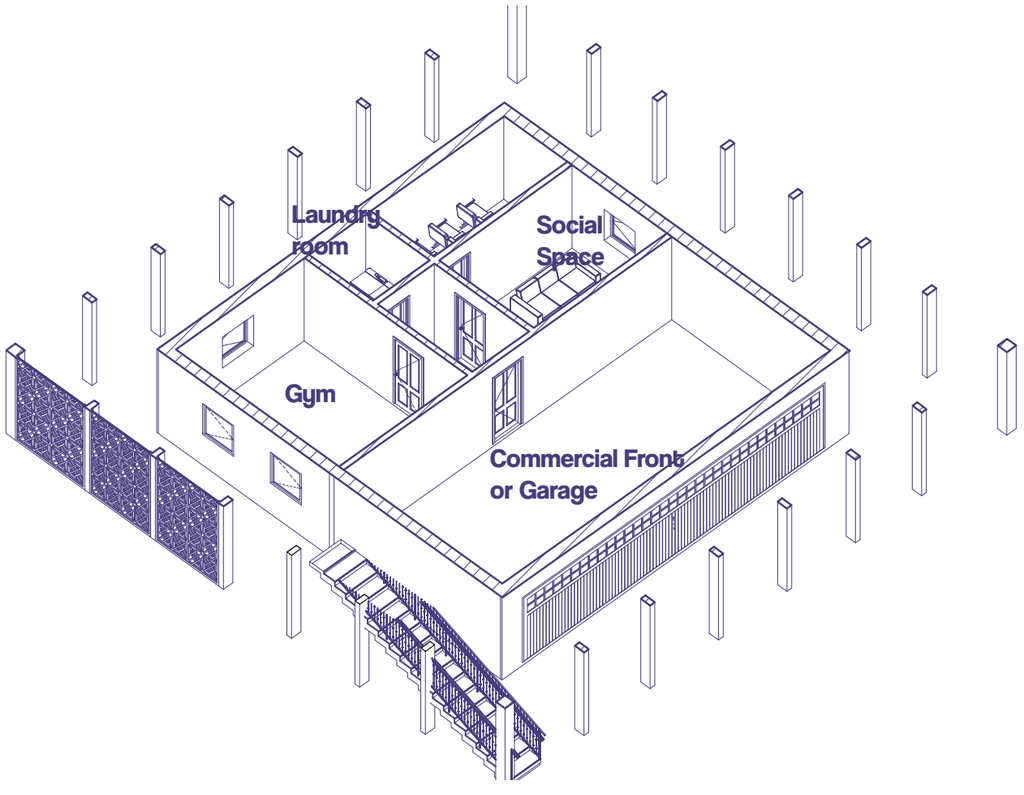


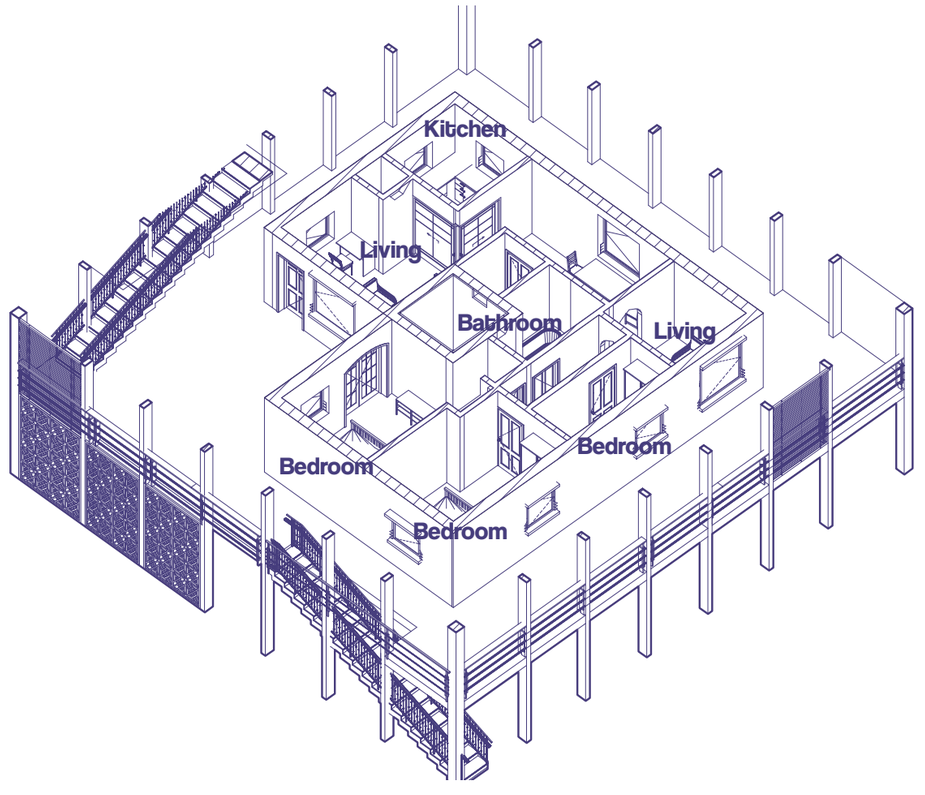
1:250 Plan

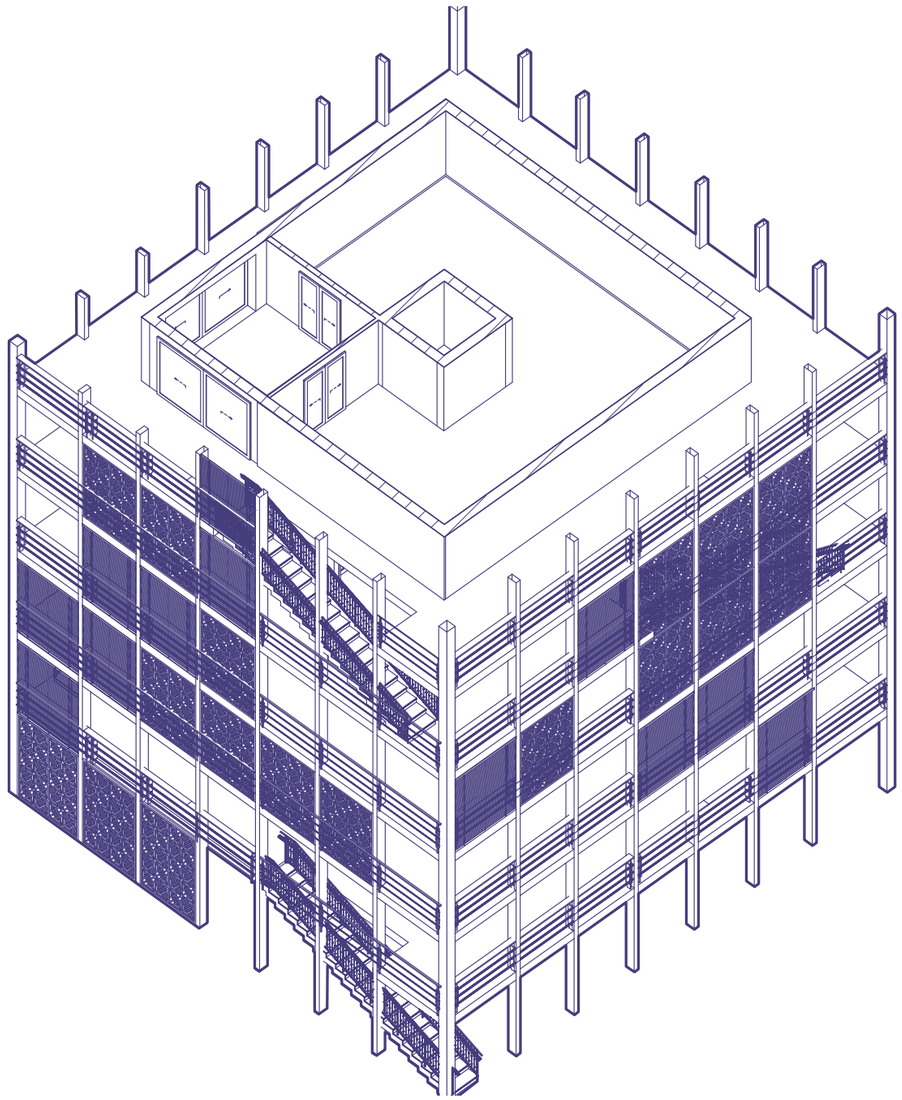
GSI - 0.3
FSI - 0.4
DENSITY- 8

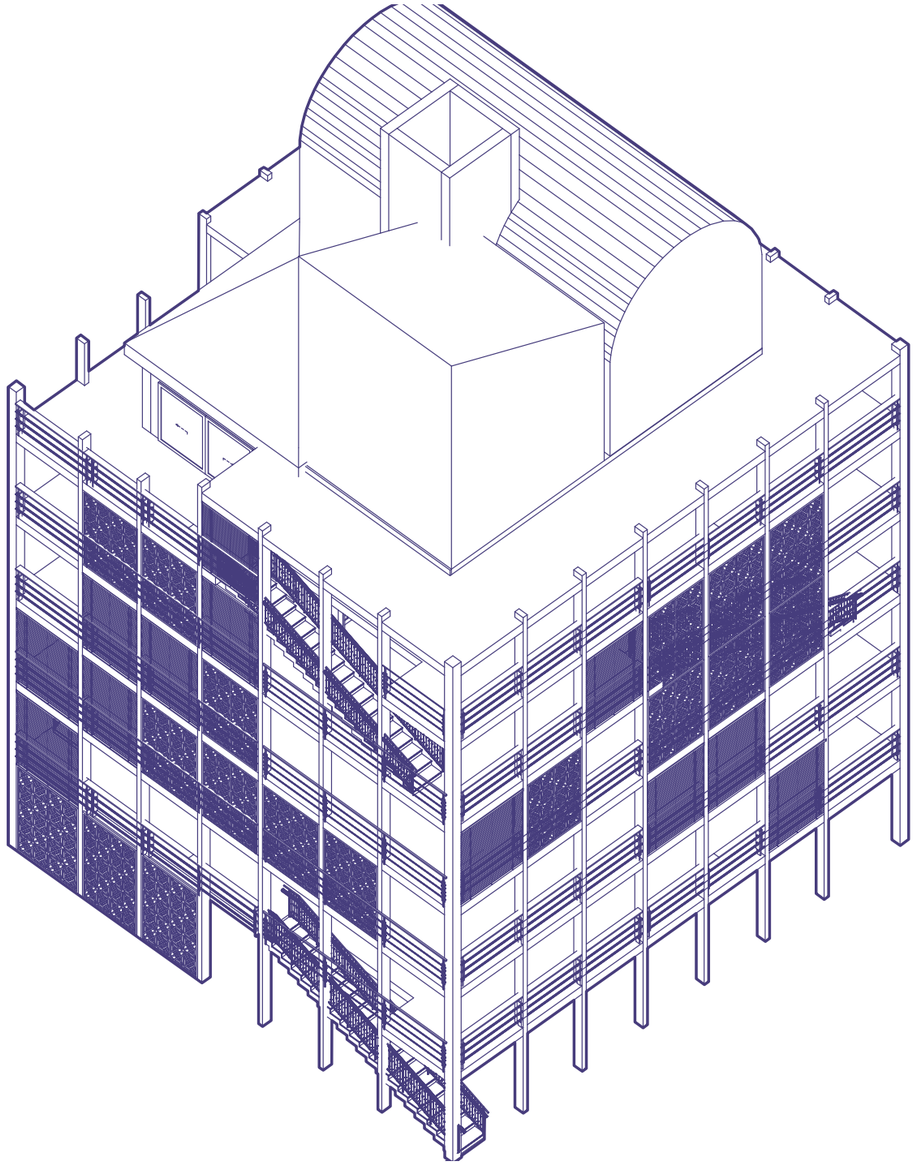
1:100 Section

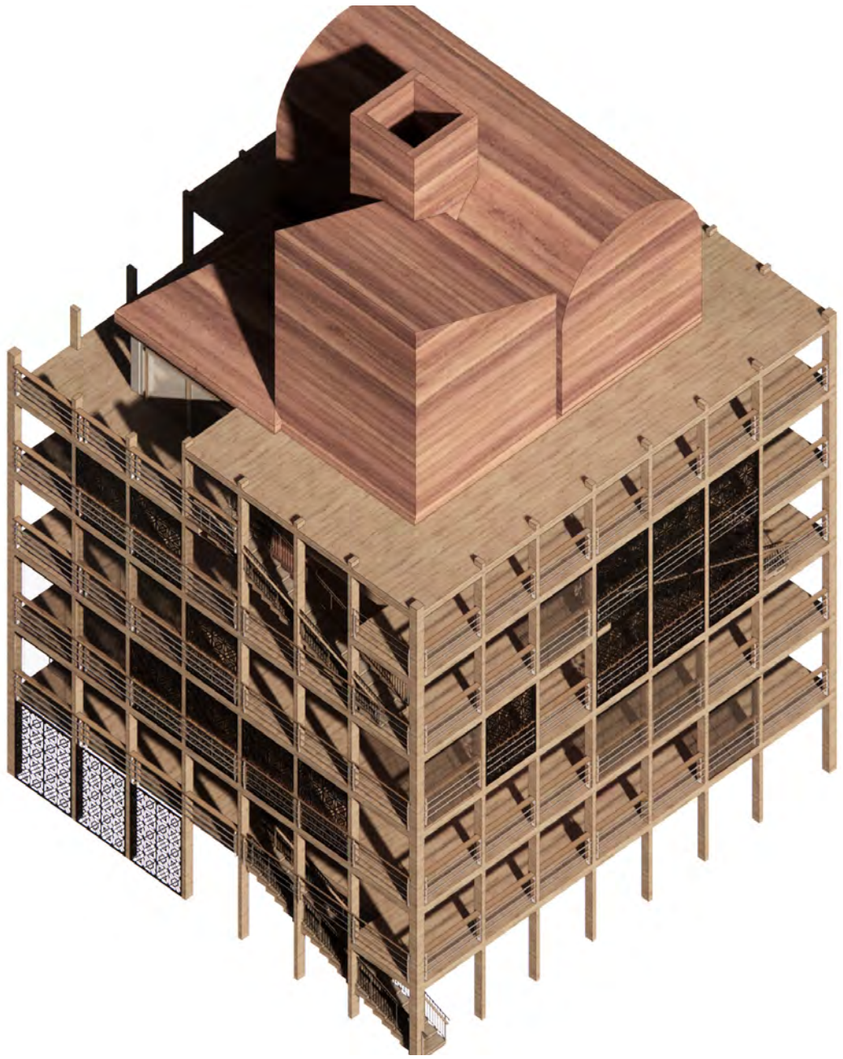
Exploded Isometric - Medium











Current Situation

Future Situation

Maker Housing Proposal

Large

1:500 Plan

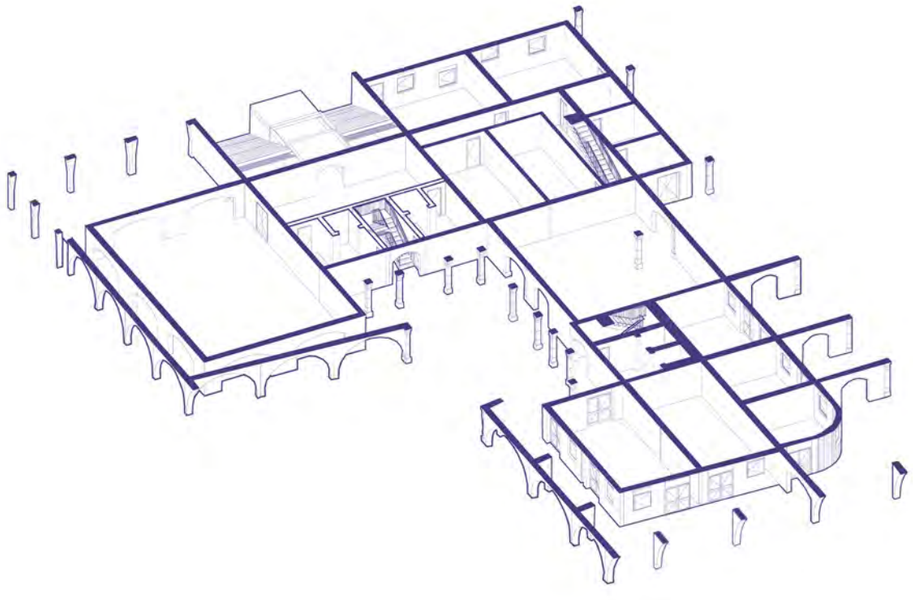
GSI - 0.5
FSI - 0.8
DENSITY- 108

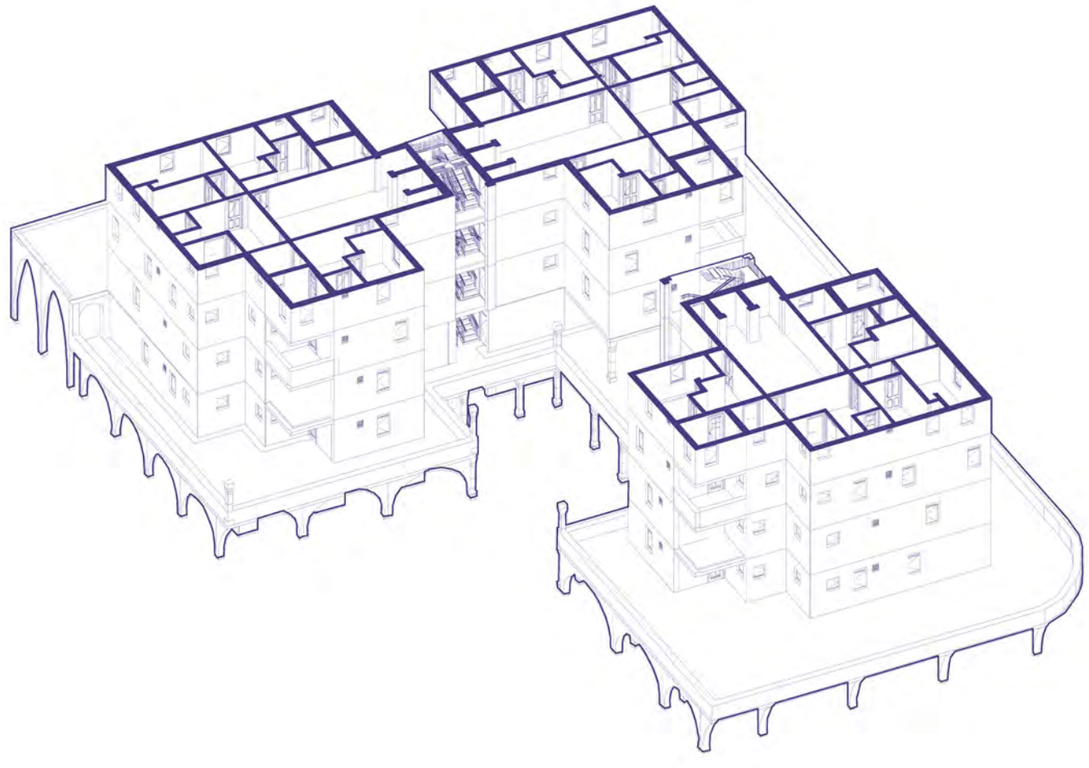
1:250 Plan

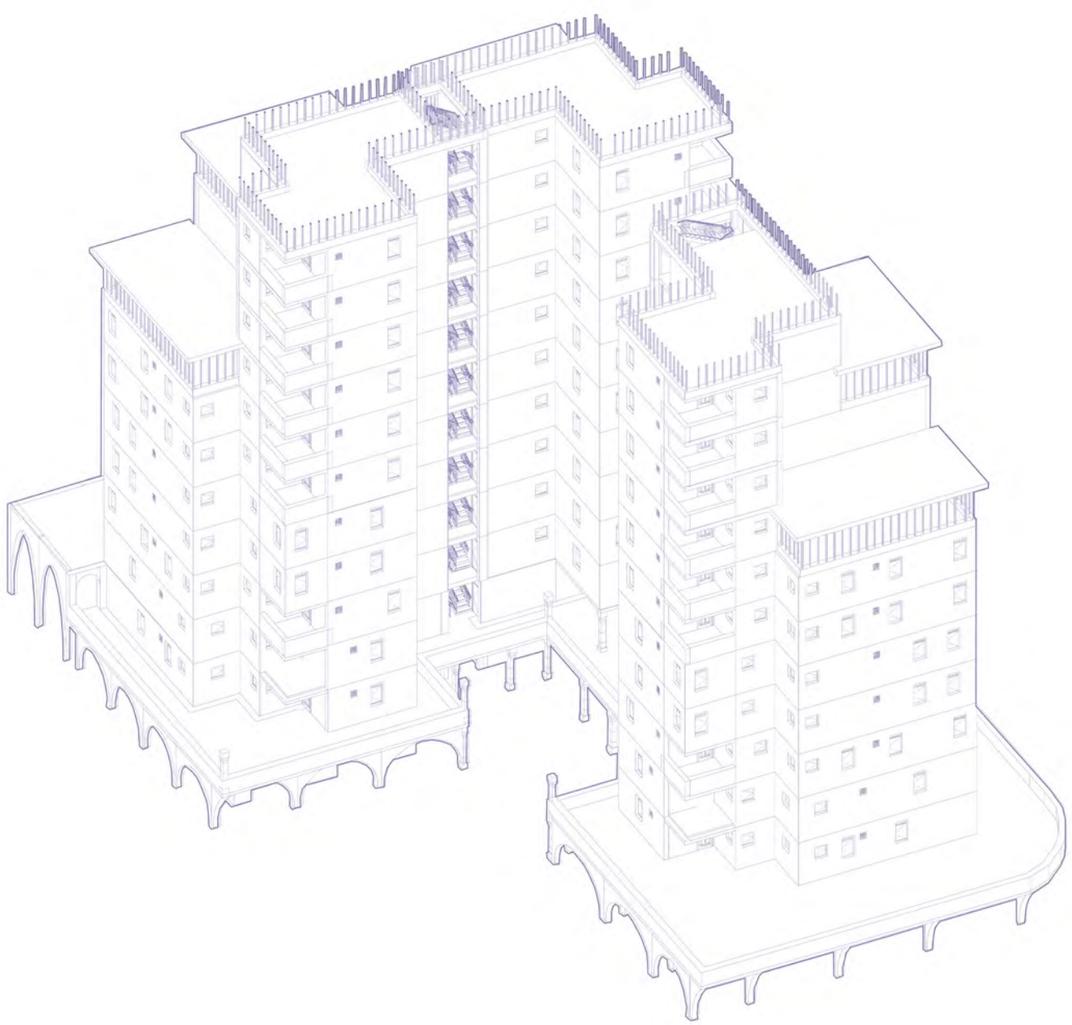
GSI - 0.5
FSI - 0.8
DENSITY- 108

1:100 Section

Exploded Isometric - Large







Current Situation

Future Situation

Maker Housing Proposal

Visualisations

7am - Wake up

8am - Take kids to school

8:30am - Grab Breakfast

9am - Work at Construction Site

3pm - Coffee Break

7pm - Home

Maker Housing
Construction Manual

निर्माता गृहनिर्माण Nirmata Grihanirman

P5 Presentation

Olivia Dolan
5379245

Global Housing Graduation Studio:
Navi Mumbai

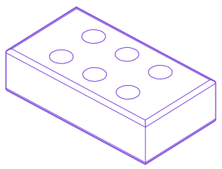
Tutors:
Main mentor: Dr. Nelson Mota
Second mentor: Ir. Stephan Verkuijlen
Third mentor: Dr. Vanessa Grossman
Additional mentor: Ir. Harald Mooij

Materials

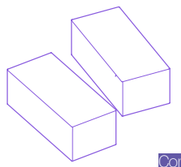
Materials

Local Materials - Environmentally friendly building materials that can be used in affordable housing schemes..

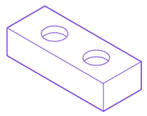
Availability - Vahal has various Building supply stores on the outer edge of the village alongside a Brick and sand and stone quarry to the East.



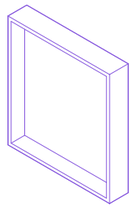
Fly Ash Brick



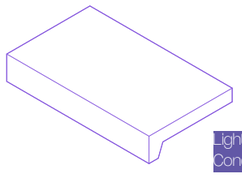
Compressed Earth Brick



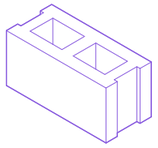
Clay Flyash Burnt Brick



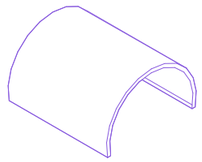
Ferrocement Wall Panels



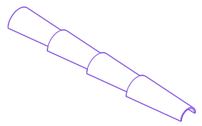
Lightweight Concrete



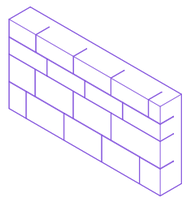
Concrete Blocks



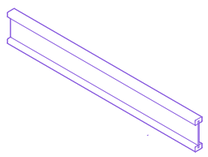
Ferrocement Roof Channel



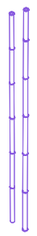
Micro Concrete Tiles



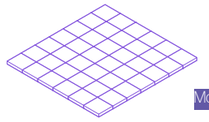
Reinforced Brick Panel



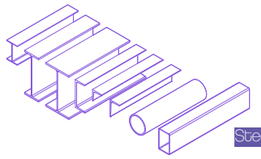
Planks and Joists



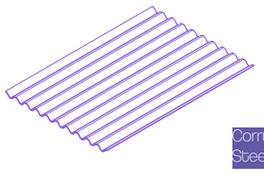
Bamboo



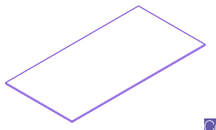
Mosaic Tiles



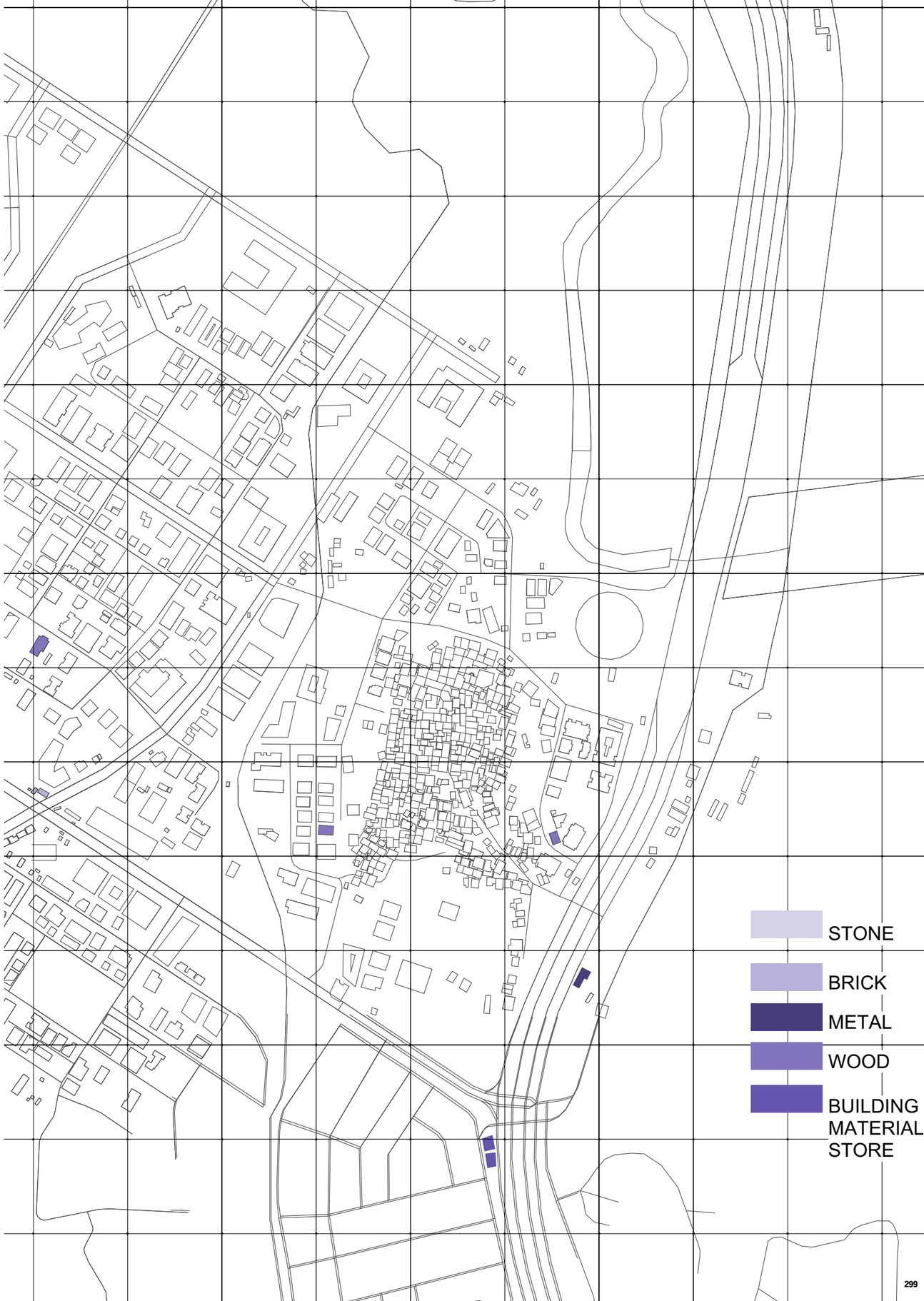
Steel Beams



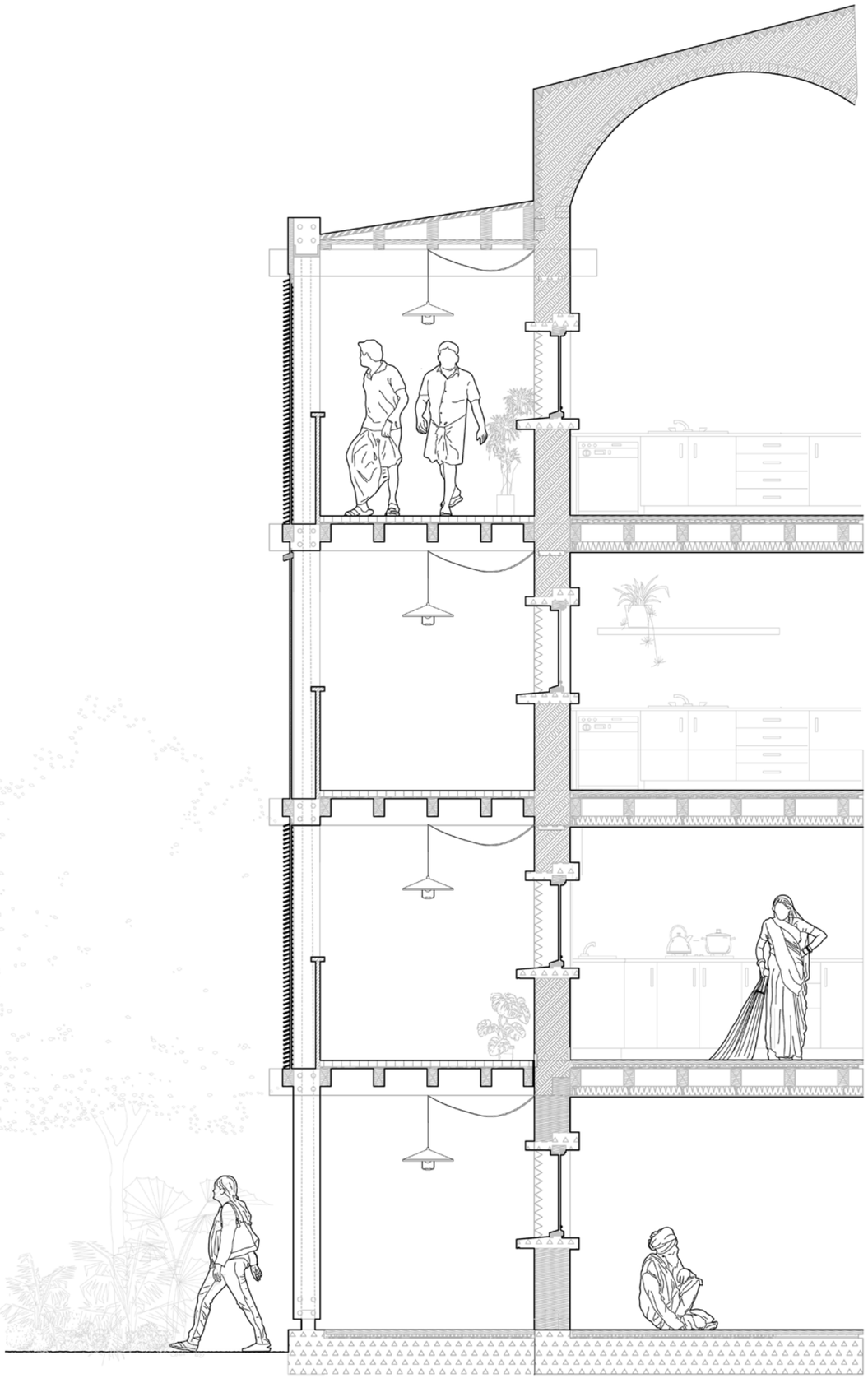
Corrugated Steel



Composite Boards



1:50 Detail Section + Elevation



1:20 Detail

Ground Floor

Timber Sun-shading

Timber Handrail

Cast Iron Railing

Upper Floors Build Up
Timber Flooring
Wooden Plank
Timber Joists

40mm Timber
Beam

Upper Floors Build Up
60mm Wooden Floor
25mm Insulation
25mm Wood Plank
Timber Beams
50mm sound insulation
25mm Hung ceiling
5mm Plaster

400mm Rammed Earth

400mm Timber Beam

Glass window with
wooden frame

Concrete Lintel

400mm Timber Beam

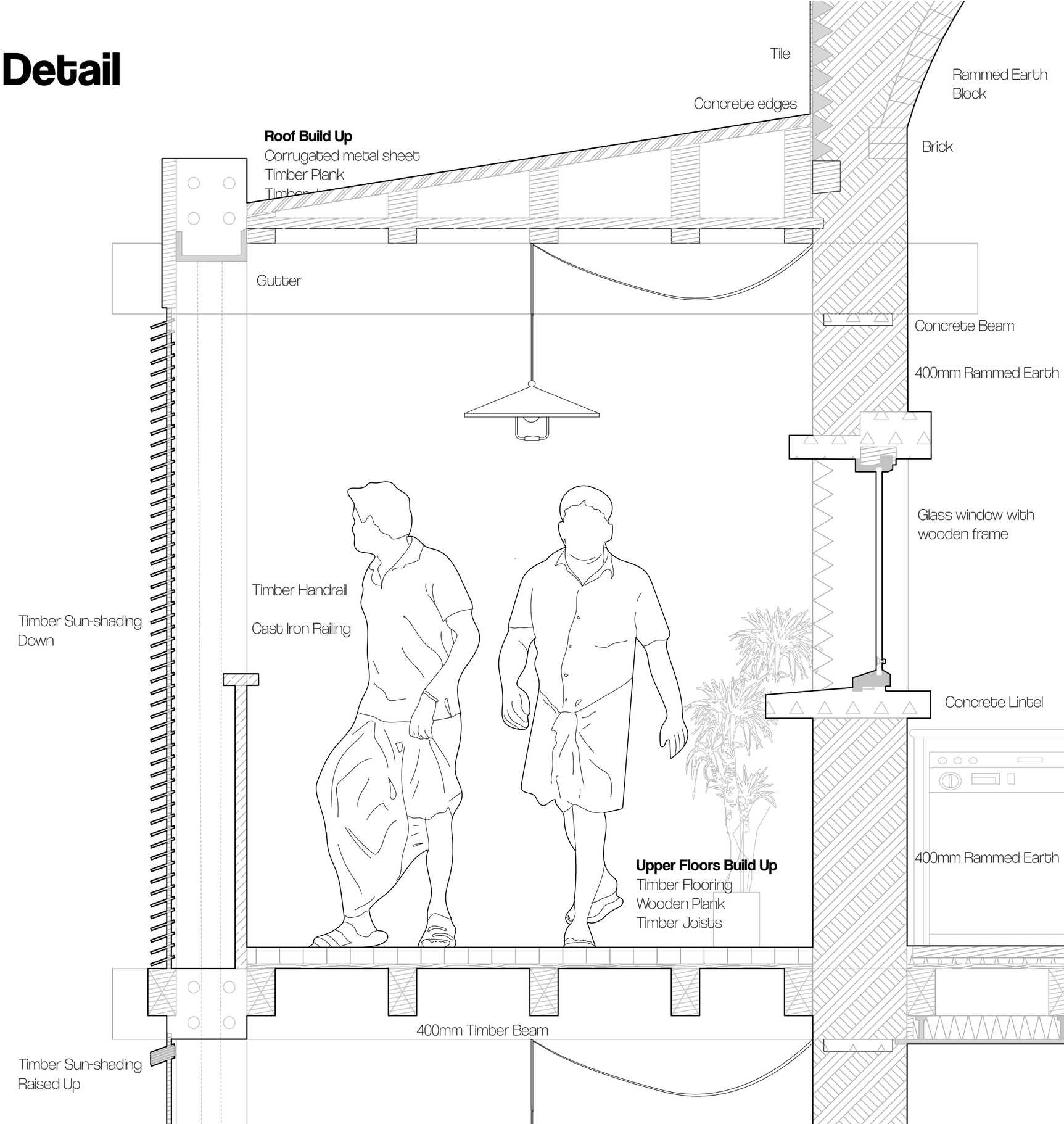
Steel Base

Concrete
Base

Ground Floor Build Up
60mm Wooden Floor
25mm Insulation
25mm Wood Plank
600mm Reinforced Concrete base

1:20 Detail

Roof

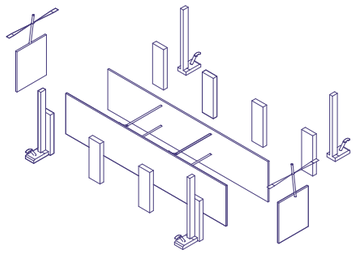


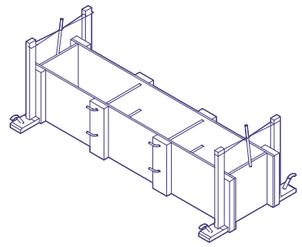
Structural Construction

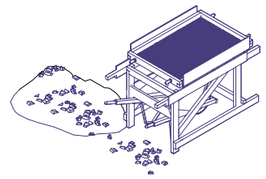
Rammed Earth Construction

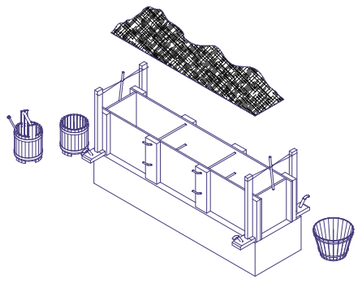
Process

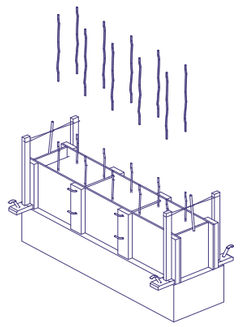
The process of the rammed earth wall begins with building the formwork, which is filled with sifted sand and earth. Reinforcements are then added to the walls, and then the earth is stamped down to form the final rammed earth wall.

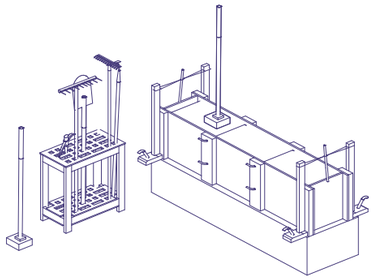


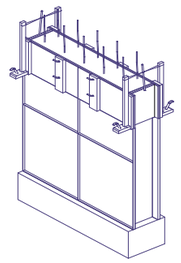


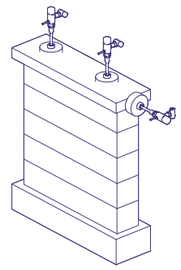


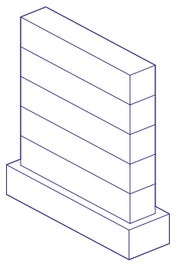








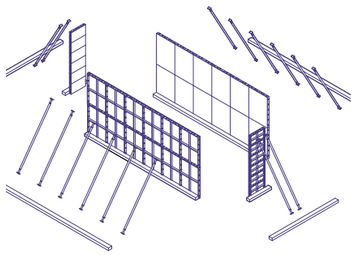
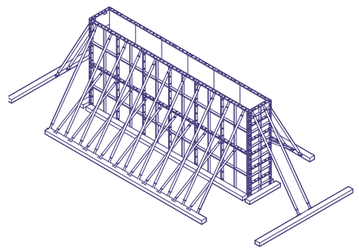
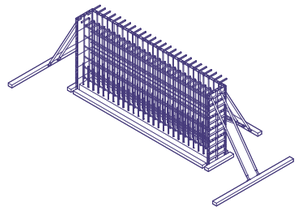
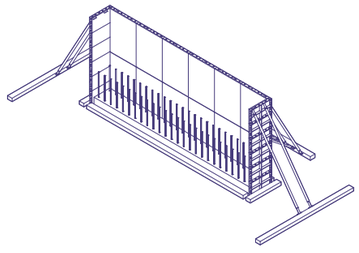
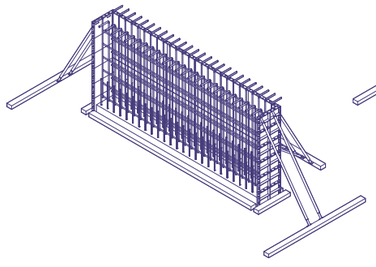
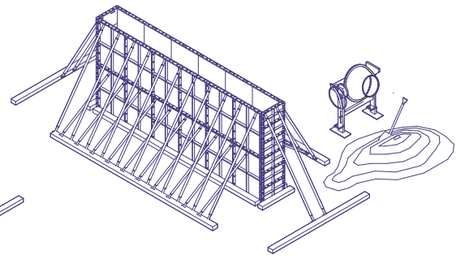
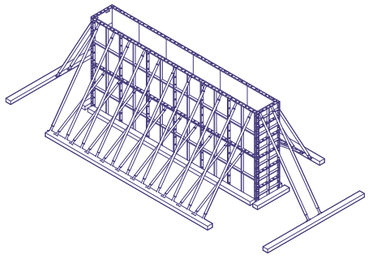
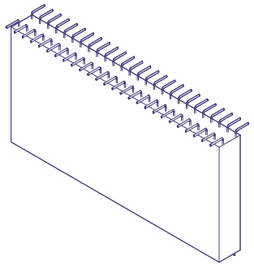




Concrete Construction

Process

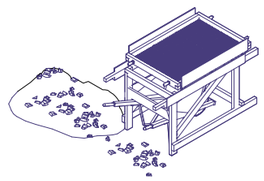
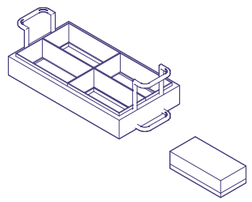
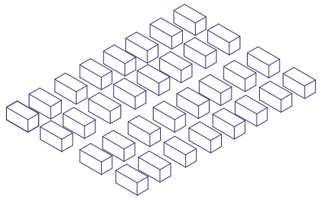
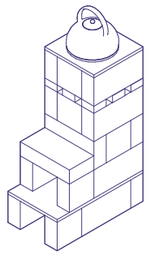
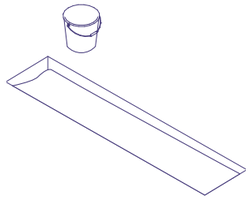
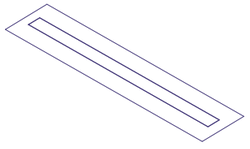
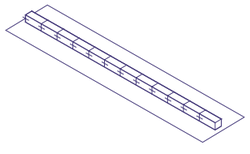
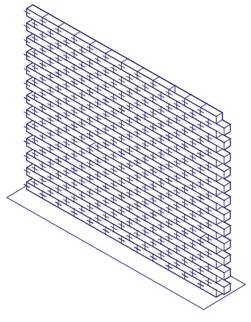
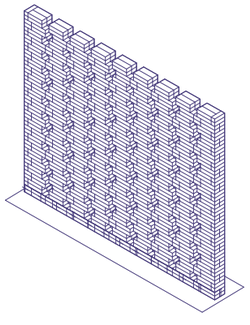
In situ concrete walls are formed by constructing the formwork on site, and adding steel reinforcement to counteract the tensile stresses within concrete. The concrete is mixed and poured to form the structural concrete wall.

Brick Construction

Process

The brick walls are constructed using local tools, and manual brick forming and laying techniques. Firstly, the natural materials are sifted and poured into brick molds, following this the bricks are left to dry and placed in a kiln. Foundations are dug and then the final bricks are built into the wall.

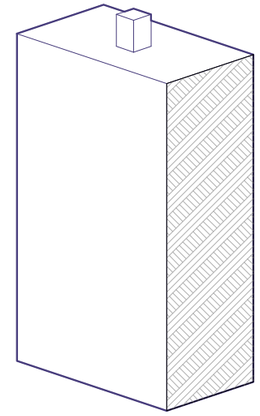










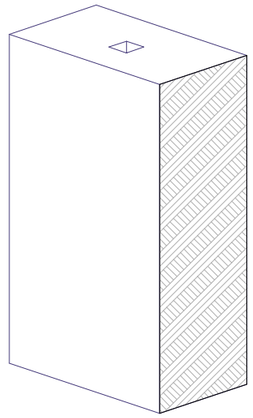
Roof Construction

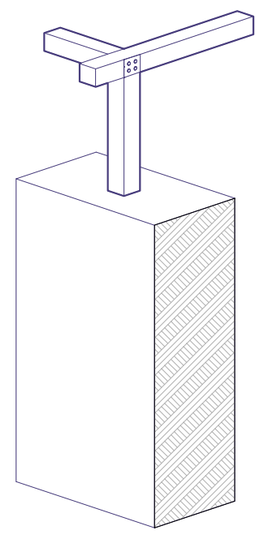
Timber Roofing

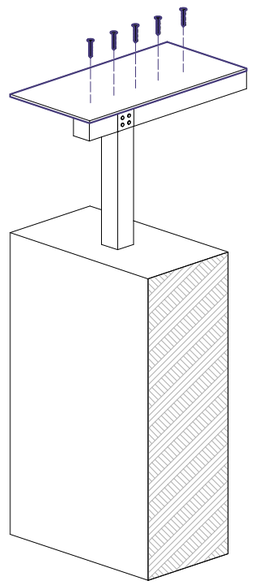
Process

During the rammed earth wall construction, a timber block will be placed to act as formwork. Once the rammed earth wall has dried, the timber block is removed which leaves a hole that is filled by the timber column of the timber roof element. This is then capped with a timber panel which is secured with screws.





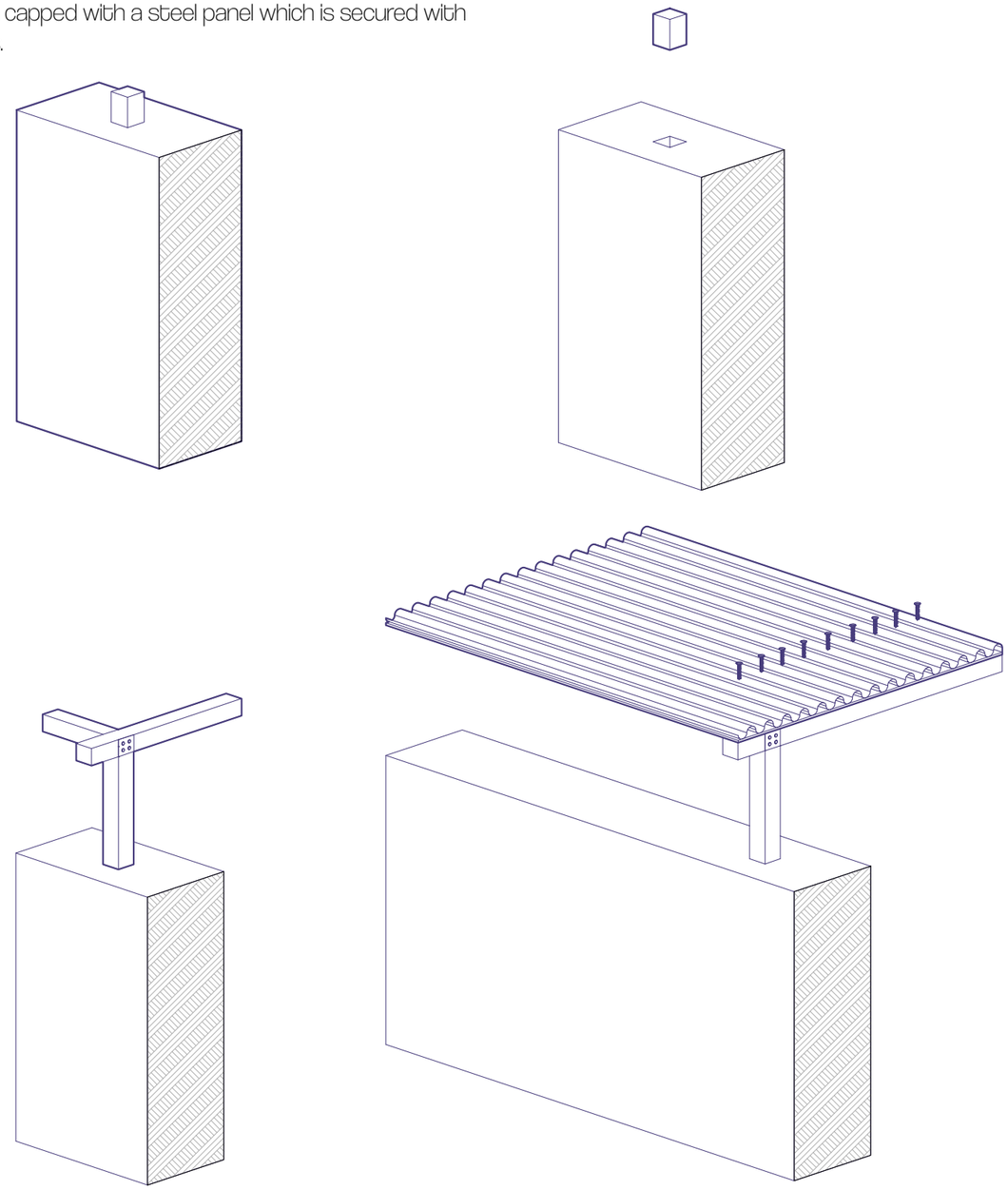




Steel Paneling

Process

Similarly to the timber wall construction, a timber block placed in the rammed earth wall construction will be removed, and the timber roof element will be added. This is then capped with a steel panel which is secured with screws.

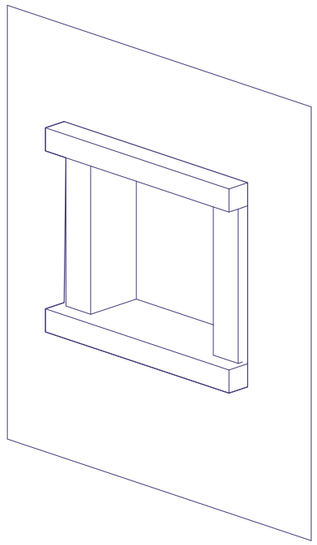


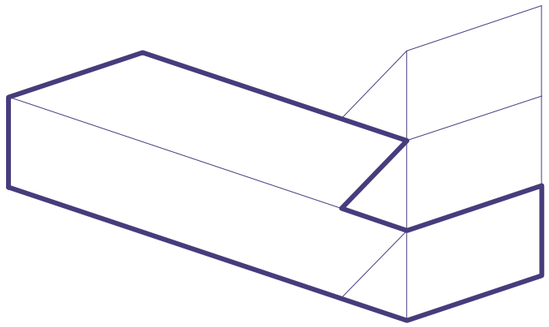
Detailing

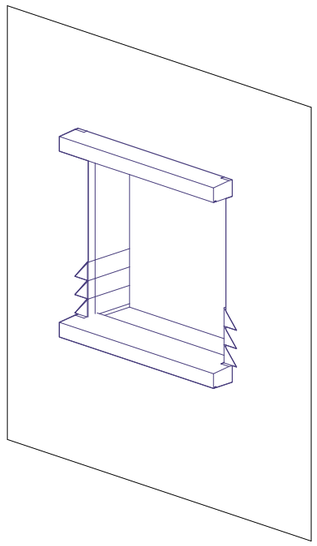
Windows

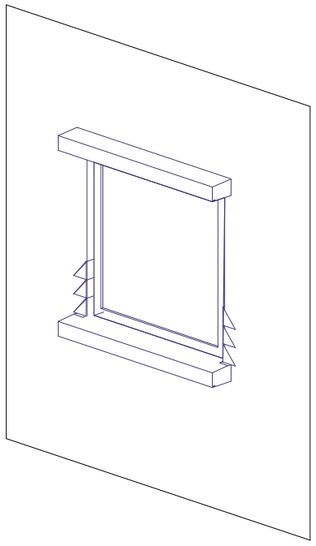
Process

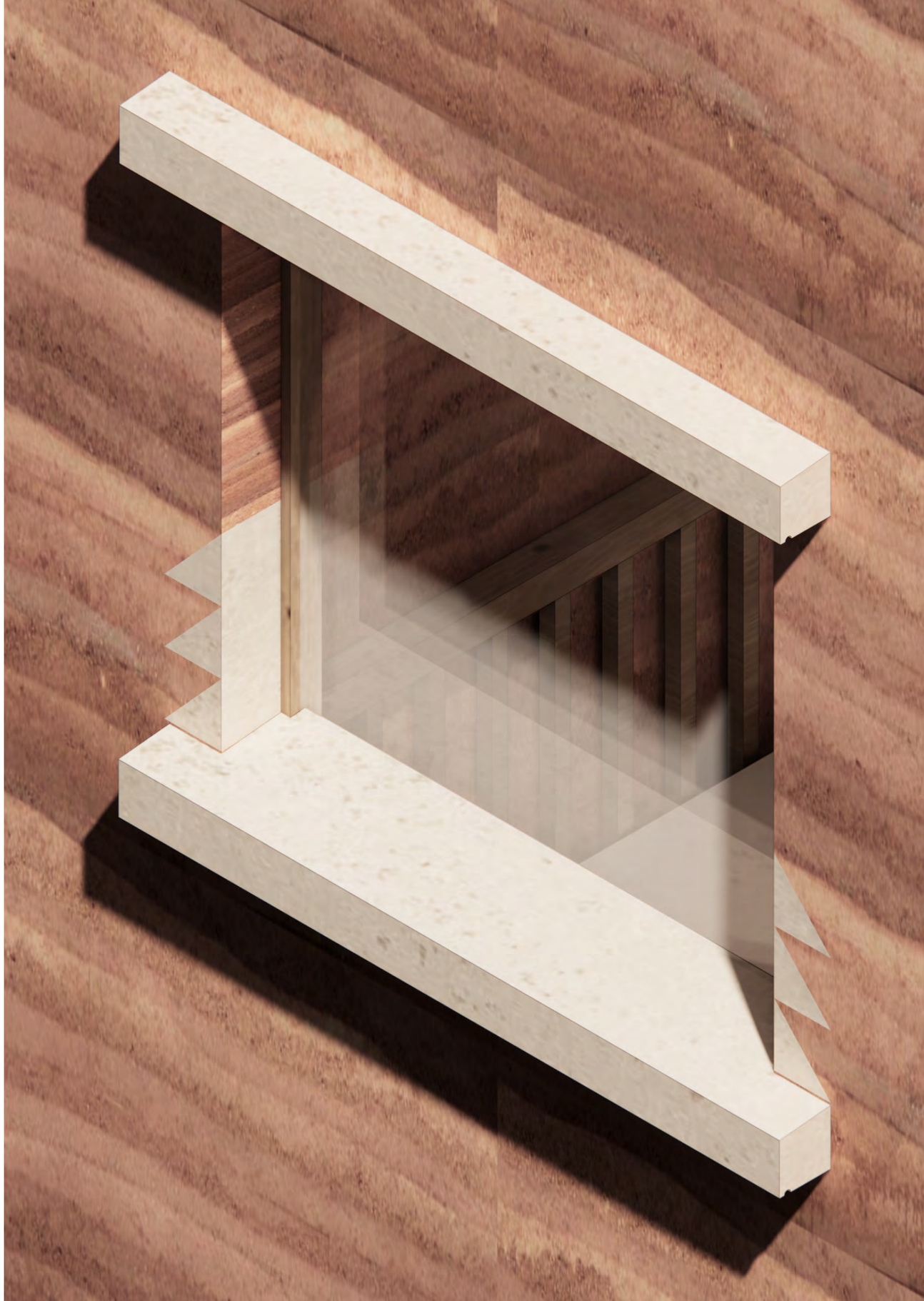
The windows are constructed by adding timber elements during the rammed earth wall build up to create the window void. Following this, concrete edges are added to stabilize the rammed earth wall and support the window structure.





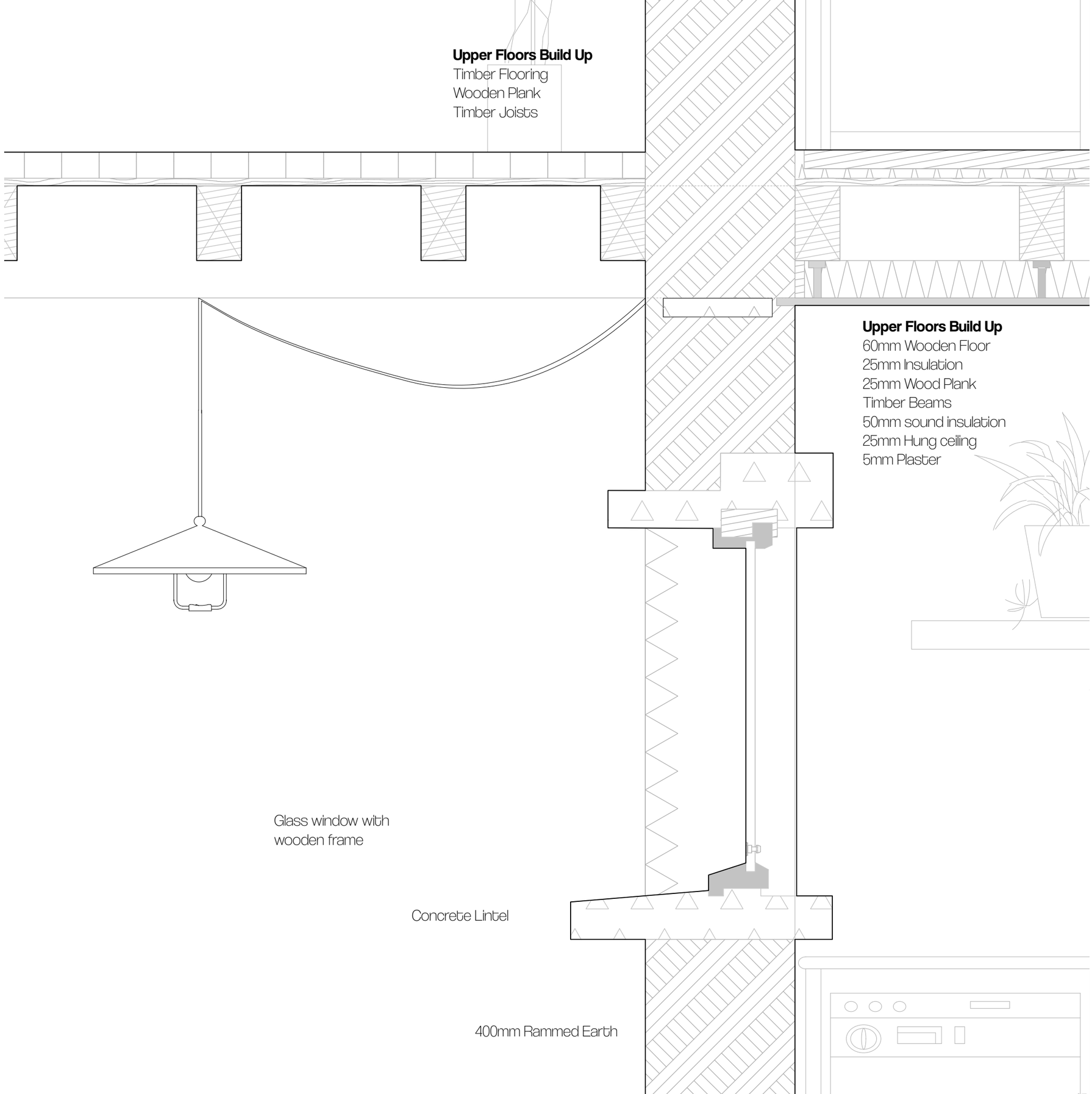






1:10 Detail

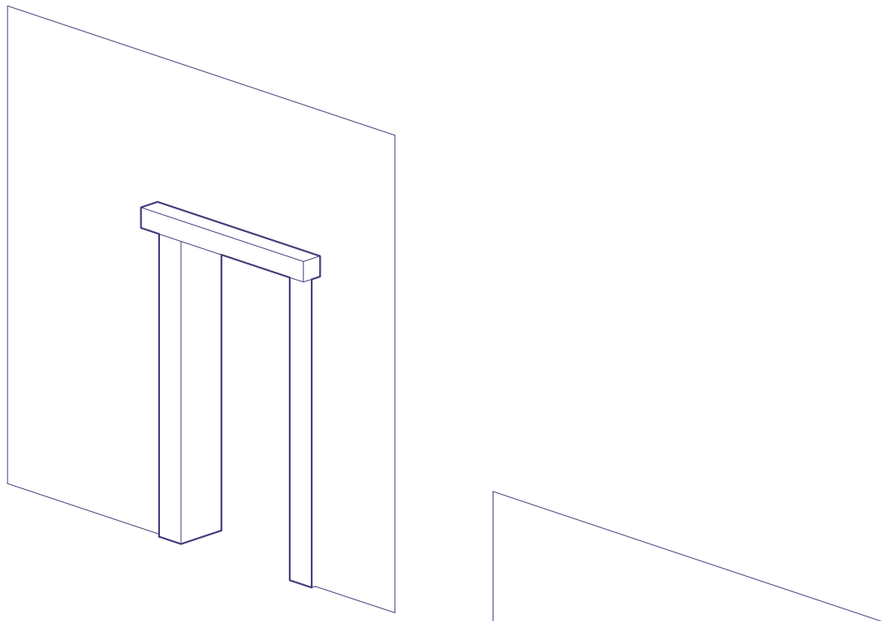
Window Detail

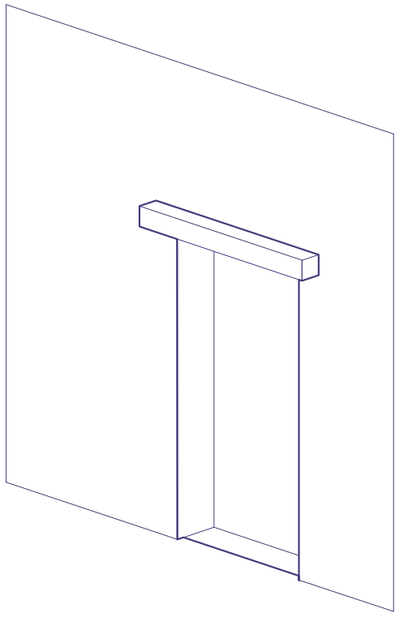


Doors

Process

Similarly to the process of the window construction, the doors are formed by adding timber elements during the rammed earth wall construction to create a void in the wall. This is reinforced with timber and concrete elements to stabilize the rammed earth wall and the structure of the door.

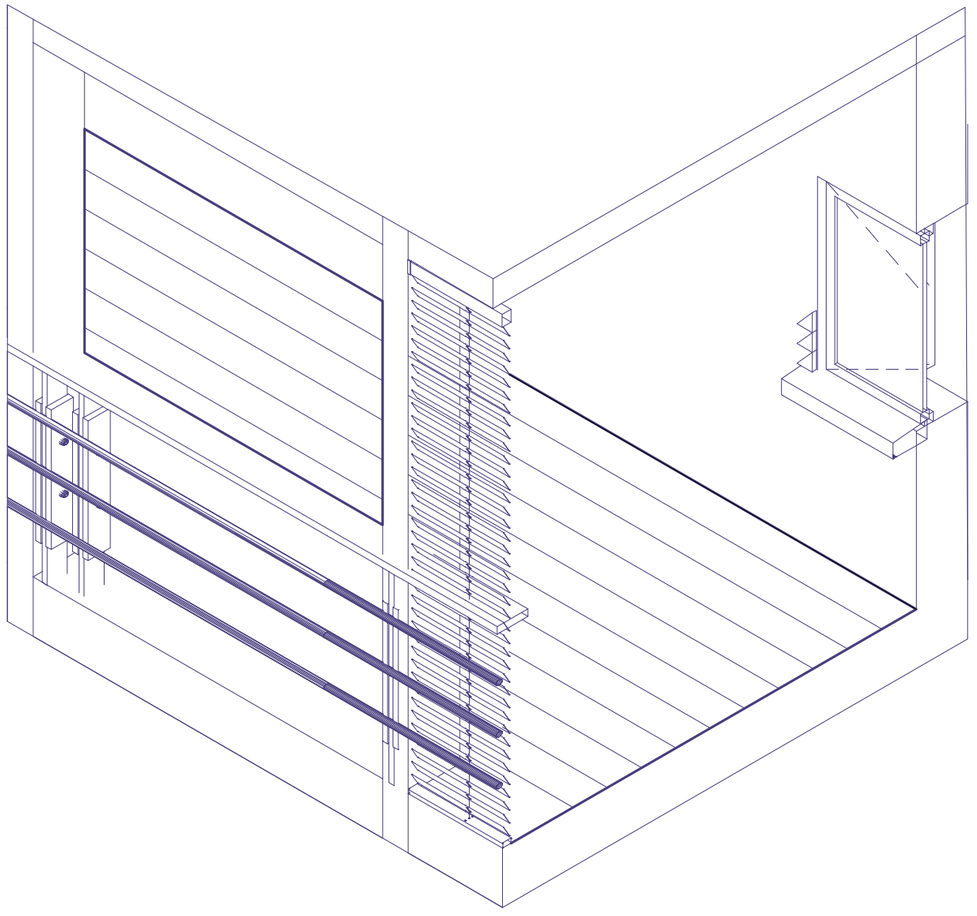




Verandas

Process

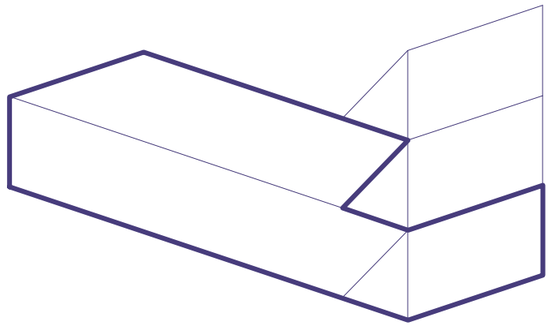
The veranda is built with a timber structure, and solar shading elements built in.

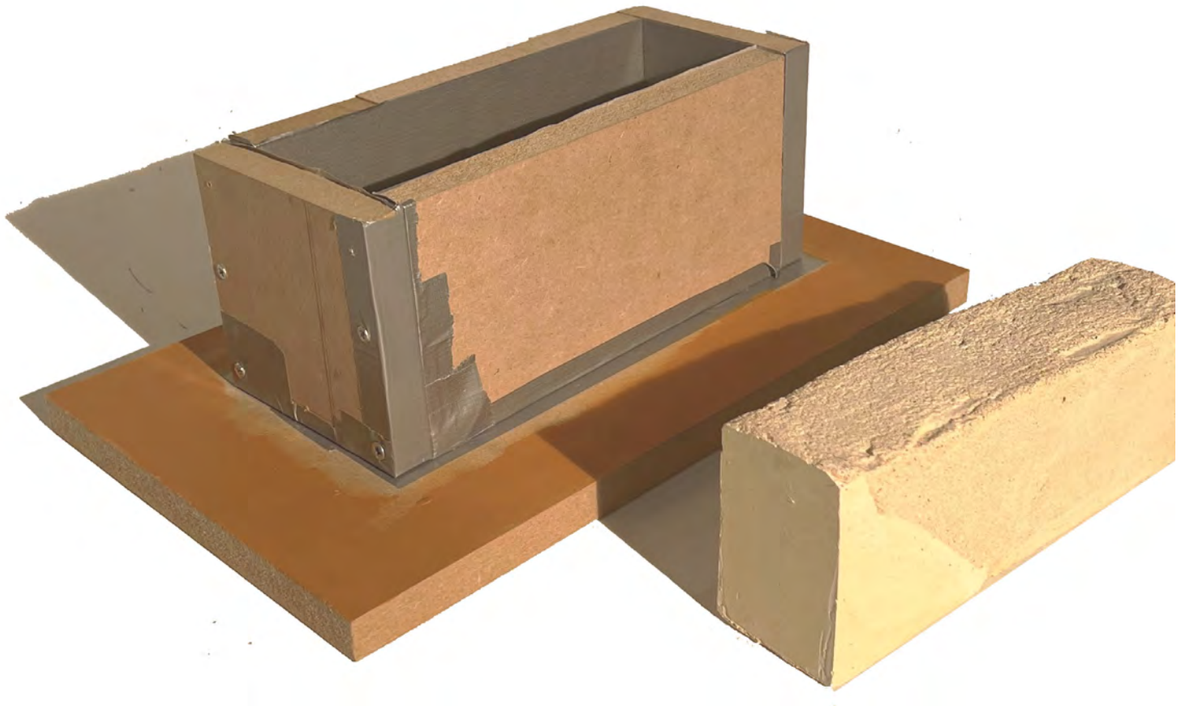


Earth + Concrete

Process

The rammed earth is done in layering, first the concrete corner then the process of ramming begins.





Real Life example

Nursery School at Rochers de Condrieu / Brenas
Dolocan Architectes

1:5 Detail

Rammed Earth Benefits

Upper Floors Build Up
Timber Flooring
Wooden Plank
Timber Joists

Upper Floors Build Up
60mm Wooden Floor
25mm Insulation
25mm Wood Plank
Timber Beams
50mm sound insulation
25mm Hung ceiling
5mm Plaster

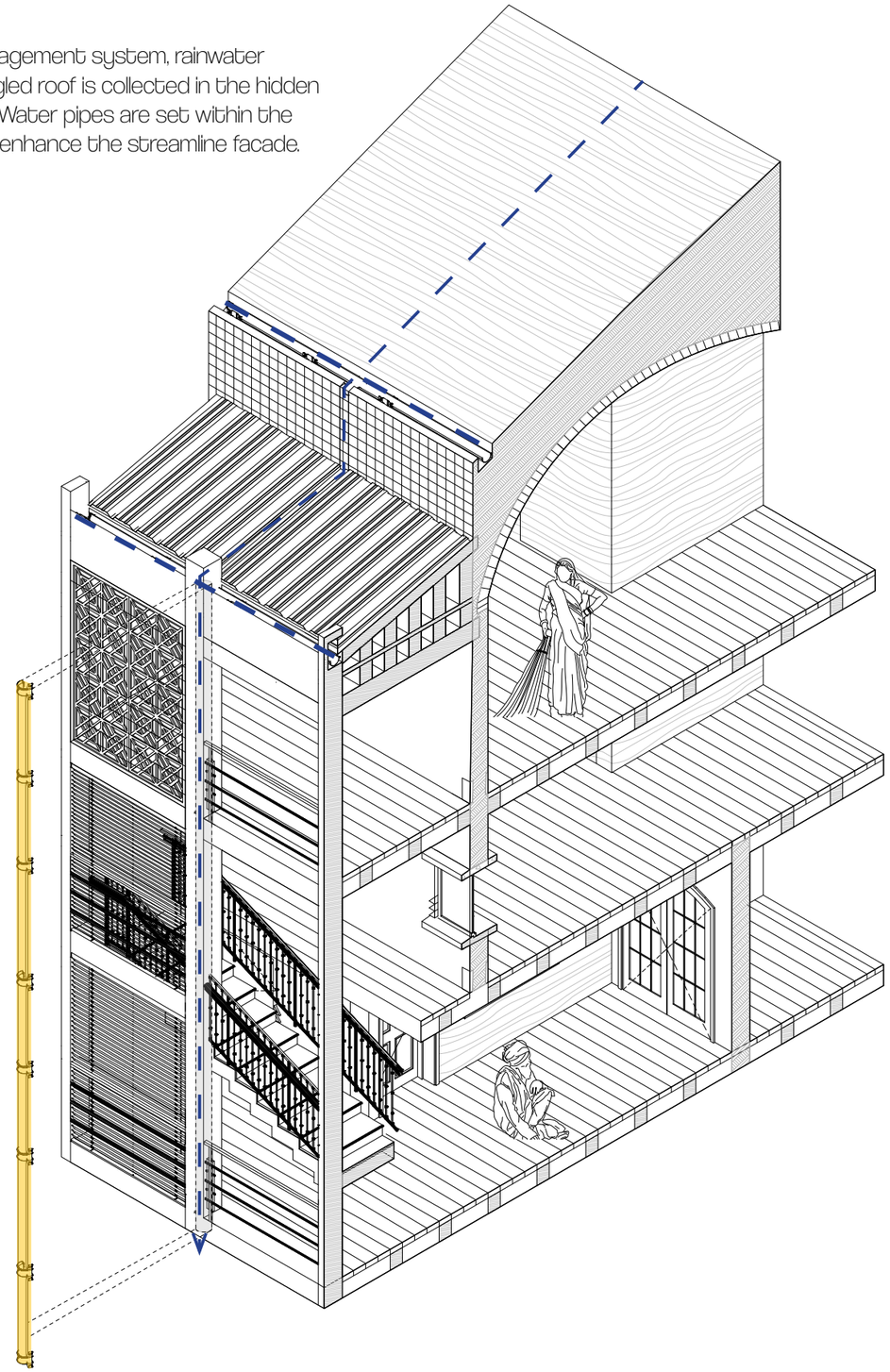
Concrete Lintel

Climate Management

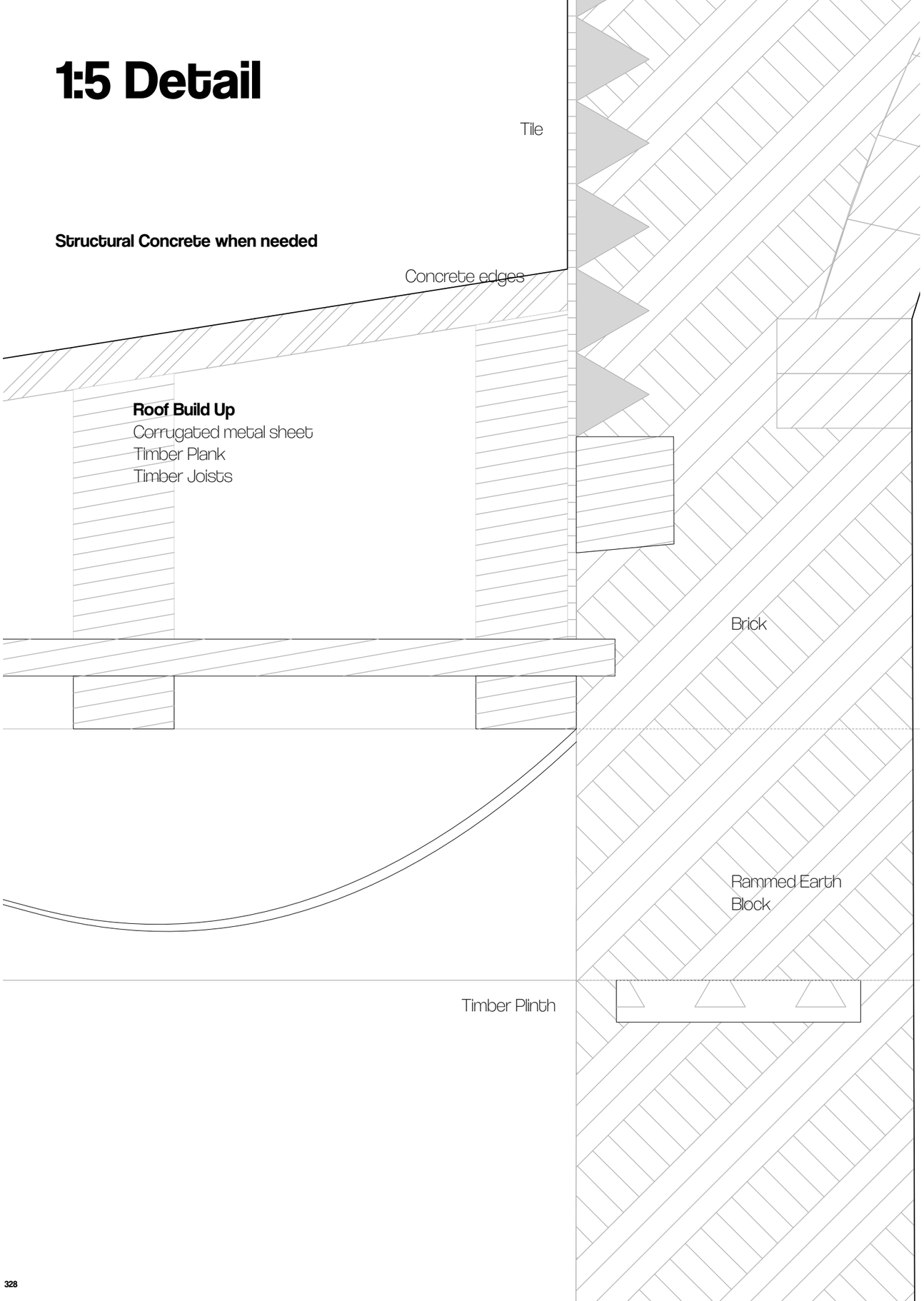
Water Management

Water

For the water management system, rainwater runoff from the angled roof is collected in the hidden guttering system. Water pipes are set within the timber columns to enhance the streamline facade.



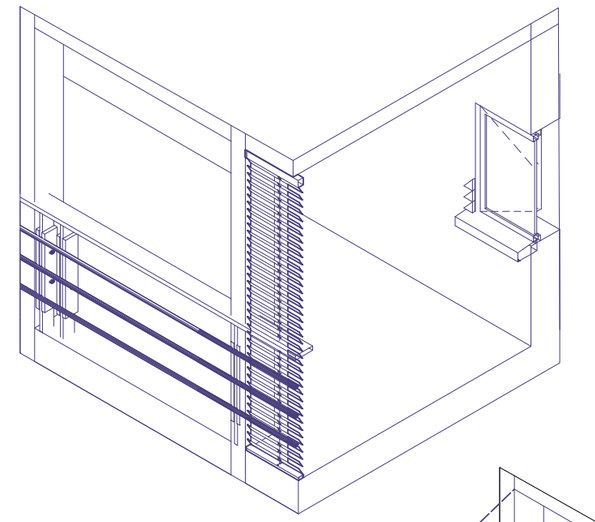
1:5 Detail

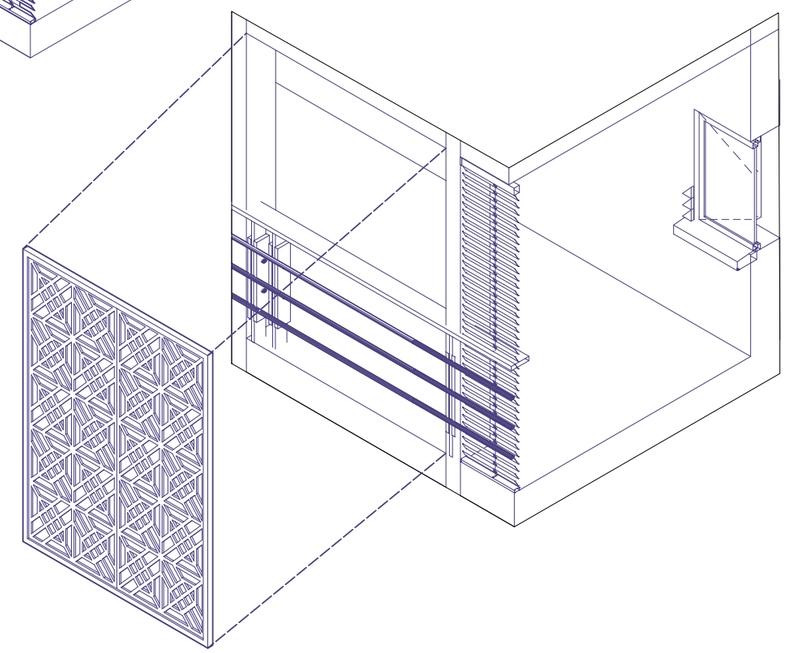


Sun Shading

Options

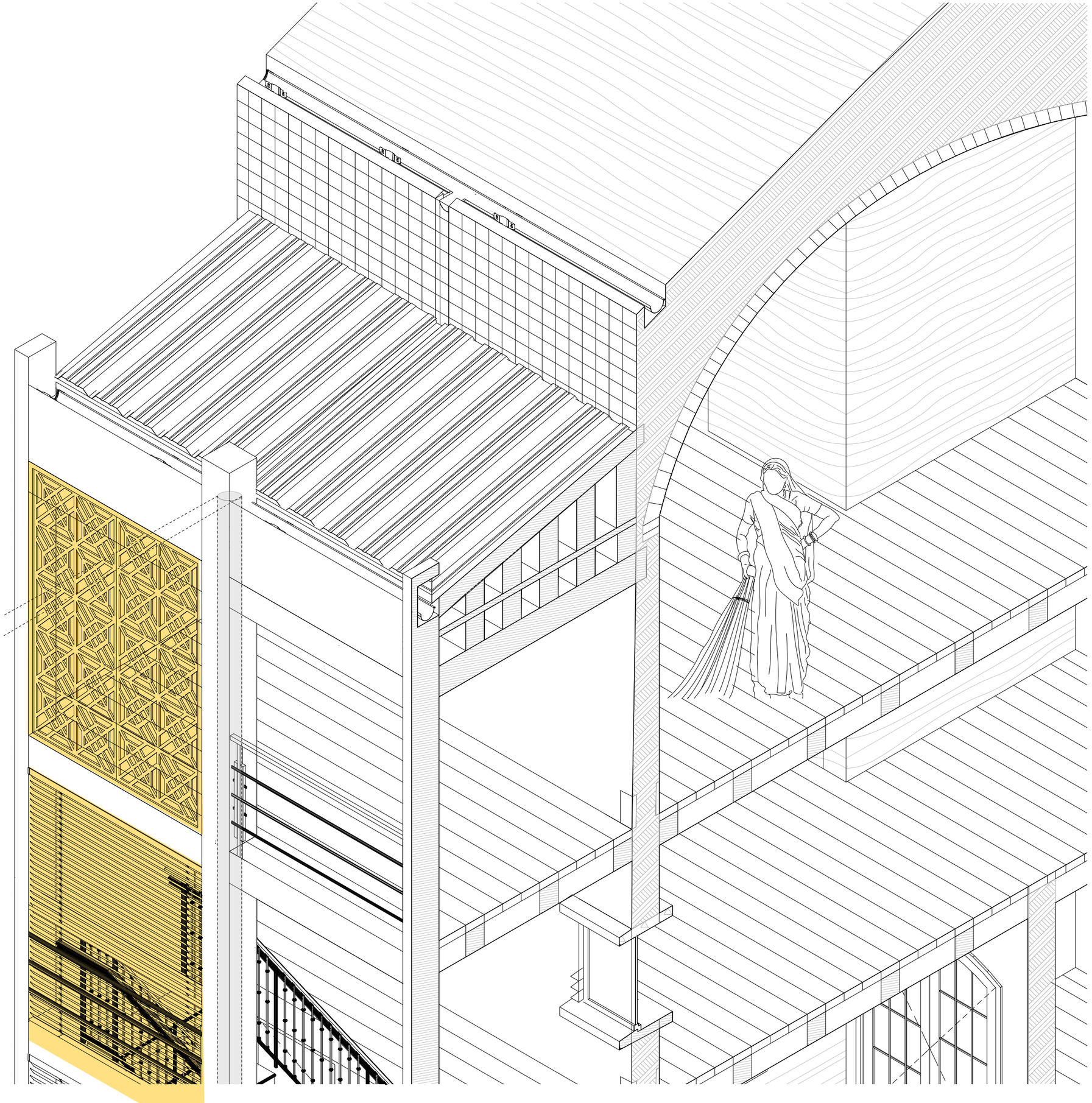
Two forms of solar shading have been used.
Firstly, the use of vertical blinds which can be manually adjusted. Secondly, the jaali ornamental pattern is incorporated into a screen for shading.





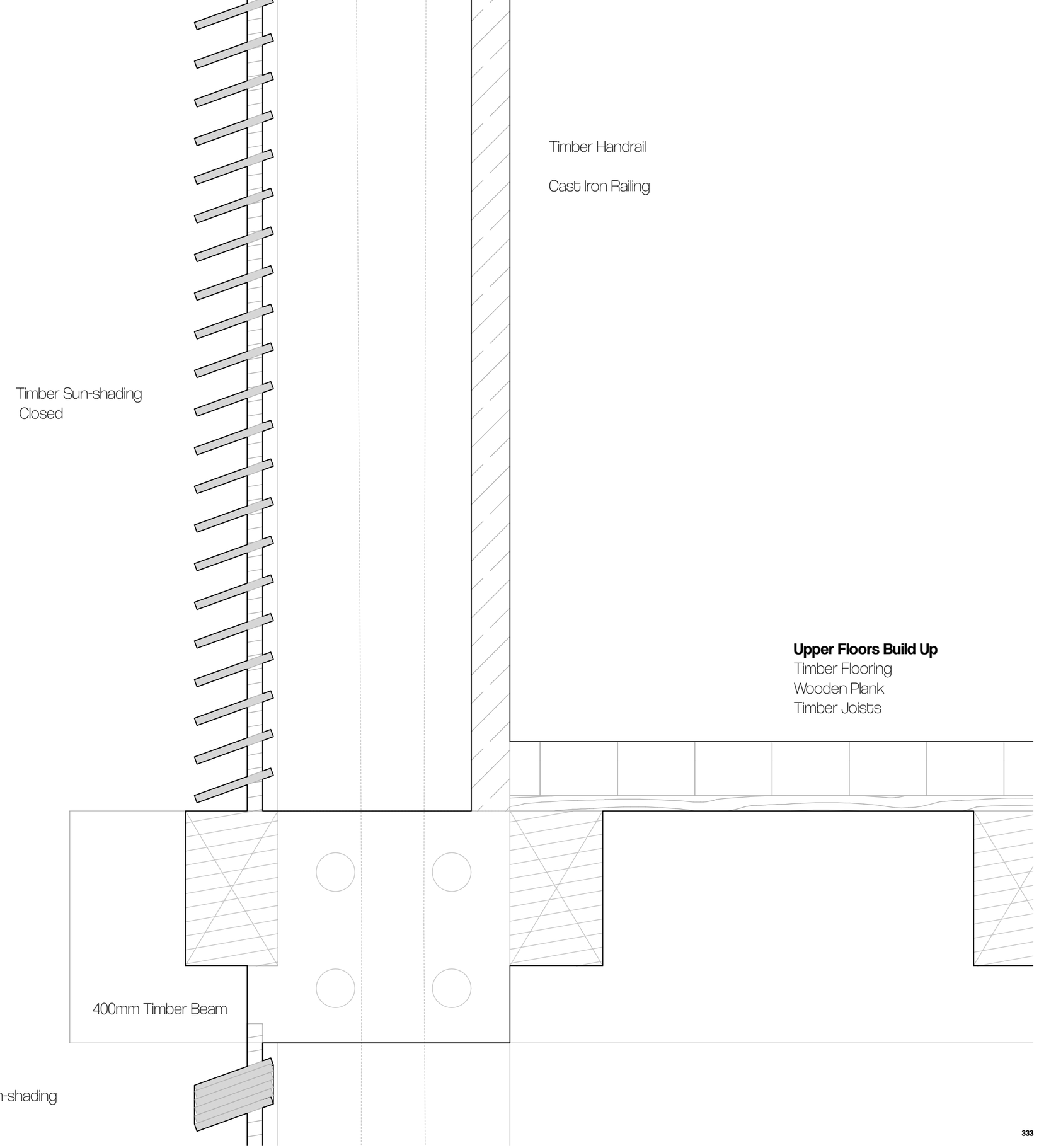
1:20 Sun-shading

Structural Concrete when needed



1:5 Detail

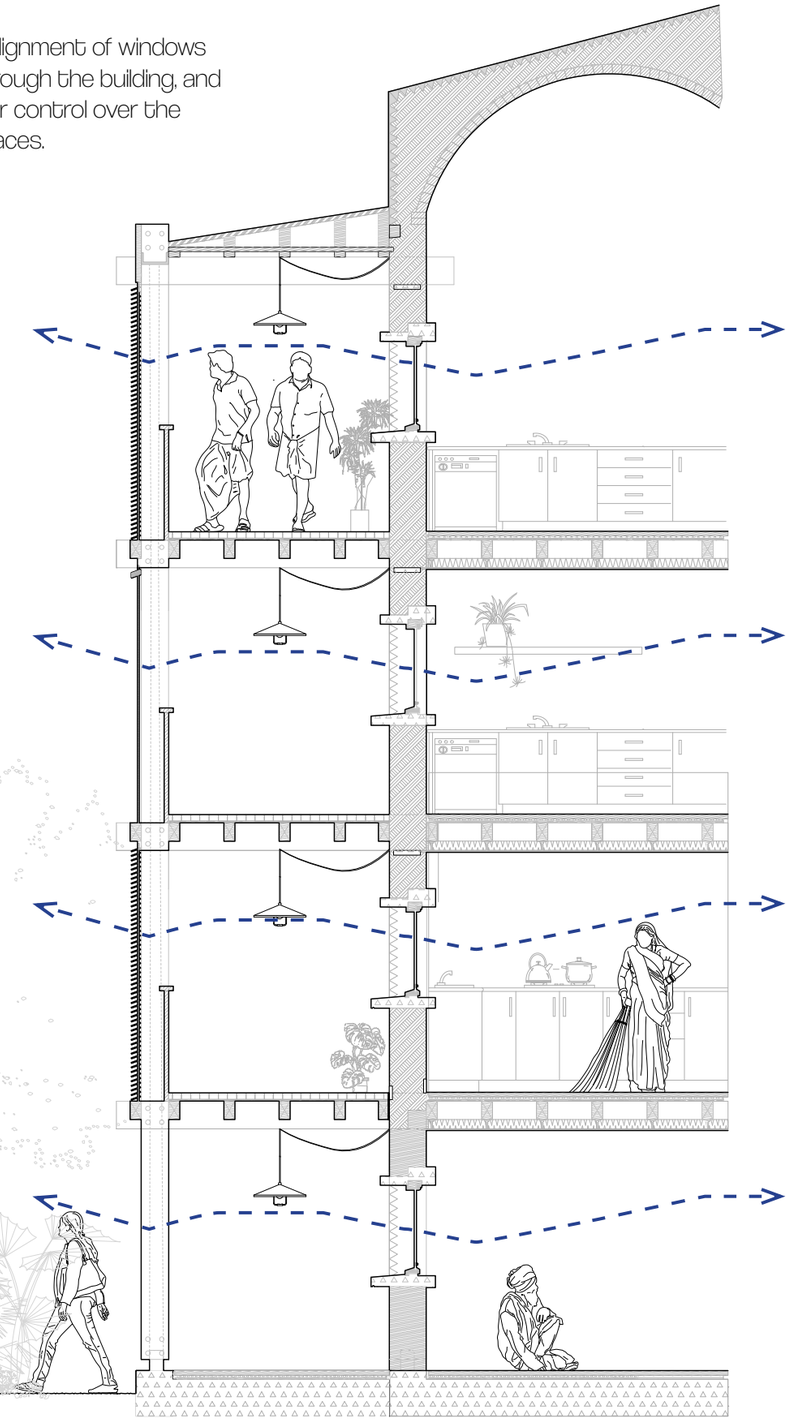
Sun-shading



Ventilating

Air

The use of verandas and the alignment of windows creates passive ventilation through the building, and operable windows allow for user control over the ventilation of some interior spaces.



Air

A secondary passive ventilation system is a solar chimney. The vertical shaft enables hot air to rise and is emitted from the roof of the building, this in turn draws cooler air in the building, generating stack ventilation.