A response to the increasing spatial and social polarization within the city of Mumbai

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A response to the increasing spatial and social polarization within the city of Mumbai
“Were people to mingle only with those of like mind, every man would be an insulate being.”

- Thomas Jefferson
BACKGROUND
Birth of a city 1500-1850

Between 1500 and 1850, Mumbai (Bombay) can be characterised by steady progress marred by plague, fire and threat of invasion. Bombay begins as a trading post to the British by the marriage treaty between Charles II and Infanta of Portugal. Optimism reigns in Bombay until it eventually gave way to the Western Indian plague. The population decreased from 60,000 to 16,000. This left a legacy of pessimism. Bombay recovered and the period between 1718 and 1744 was regarded as one of steady growth. After the second Maratha war and the advent of the company as a military power in Western India. Bombay fort started to look more like a British City.

Industrialization 1850-1920

This is a period characterized by its shift towards industrialization as well as the creation of more centralized bodies. The crucial shift in fortunes for the city of Mumbai, and India as a whole, was the beginning of the American civil war in the United States. This saw the British shift their sourcing of cotton trade from the complicated context of the war to India as it was already a part of the British empire. As a result, this period is characterised by critical, large scale infrastructural and political projects. The rapid expansion and of the city and its port infrastructure brought great change to the form of the city.

Transition to Modernity 1920-1950

After the industrialization period, Mumbai entered in a period of transition towards modernity: transportation and infrastructure developed rapidly. The economic sphere was punctuated by important strikes. Political movement for independence became more and more influential. Mumbai’s economy was mainly focused on the industry and trade which led to the infrastructural development in order to facilitate transport and trade. The Population increased by 20% during this period with an increase in literacy levels and in immigration diversity. However, the general wage per person decreased.
Post Independence 1950-1970

In April 1950, the Bombay City and Bombay Suburbs merged to form the Greater Bombay District. Economic growth in India was relatively strong. Increased employment in Bombay was particularly good, as the city’s manufacturing sector diversified. From the late 1950’s, policies were introduced to curb the expansion of mills and to encourage increased production from the hand-loom and power-loom sectors, due to their employment generating capacities.

Emergence of a Megalopolis 1970-1990

In the post independence era the metropolitan cities in India have consistently experienced rapid growth of population as well as the expansion of their statutory limits. The spilling of metropolitan area growth was evident in Mumbai Metropolitan Region (MMR), the largest metropolitan region in India. One of the successful urban developments in this era is the establishment of Navi Mumbai which began in the early 70’s. Many government and corporate offices have been shifted to Navi Mumbai, along with middle class as well as service class people due to job opportunities in Navi Mumbai.

The Global City 1990-Now

The liberalisation of the Indian economy in 1991 marked a significant shift in the urban geography of the city. The dominant form of urbanisation which manifested in accordance with neoliberal principles of free trade and deregulation prompted the development of new spaces for global economic integration and elite consumption. This new form of urbanisation was outlined in the ‘Vision Mumbai’. The era can be characterised by the expansion of the city towards the urban periphery where the implementation of infrastructure and services are severely lacking. This ongoing organic growth is a typical of rapid global urbanisation and contributes to conditions of urban sprawl.
1500 - 1850

The archipelago of seven islands is unified through the reclamation of land, characterised its strategic value to the systems of global trade driven by European Colonialists, and the local paddy farmers, fishermen, and palm juice distillers.

1850-1920

Mumbai expanded through new infrastructure as a centre for industry and culture. This period saw the booming of the cotton industry in Mumbai as the British shift their sourcing of cotton trade from the United States to India.

1920-1950

Following the industrialization, transportation and infrastructure were developed rapidly to facilitate the trade. The population has increased by 20% in 1920-1940, with an increase in migration diversity, which made Mumbai a polyglot city.

1950-1970

After the Partition of India over 100,000 Sindhi refugees from the newly created Pakistan were relocated in the Maharashtra Region, and Bombay witnessed the emergence of migrants. In April 1950, the Greater Bombay District came into existence with the merger of the city with the suburbs.

1970-1990

Rapid growth of population and new economic model of de-industrialization leads to expansion of the cities’ limits. This growth made the MMR the largest metropolitan region in India.

1990-2010

The liberalization of the economy in 1991 also meant a transformation of the geography of the city. The Real estate market was stimulated by a surge demand for luxurious housing and commercial establishments while the working classes in the city faced a shortage in the affordable housing market.
The population density of Mumbai has grown significantly in the past 350 years. Since the industrialization there has been an greater influx of migrants coming into the city which has led to this increase. Mumbai is expected to have 42 million inhabitants by 2050.
<table>
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<th>Year</th>
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<tr>
<td>1991</td>
<td>8,227,382</td>
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<tr>
<td>2015</td>
<td>23,413,134</td>
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India:
The Population density in India is above average, tanking it amongst the top 20 most dense countries. The density has gone up from 325 persons per square kilometre up to 382 persons per square kilometre in 2011. Even though the density in India has increased every year, the rate of increase has slowed down in the last decade.

MMR:
Mumbai’s Metropolitan Region is in the top 5 of the most dense cities in the world. This is partly a consequence of the fact that more than 50% of the inhabitants of Mumbai live in slums. Its most infamous slum, Dharavi, has a population density of over 340,000 persons per square kilometer.

Vasai-Virar:
The density is lower than that of MMR however it is still very dense compared to other cities around the world.

Nalasopara:
The density in Nalasopara is astonishingly high, with around 30% of the population of Vasai-Virar living in an area which makes up only 11% of the whole of Vasai-Virar.
MUMBAI METROPOLITAN REGION
Density: 4793 p/km²

NALASOPARA
Density: 10,700 p/km²

VASAI - VIRAR
Density: 3200 p/km²

Population Density
Population Census 2011 reveals that the population of Maharashtra has increased by 16% in this decade, compared to the past decade. The denser districts/sub-districts in the state are areas closer to Mumbai City, including Pune, Thane, and Vasai-Virar.

Mumbai City is the most dense area in the MMR with about 30,000 people per square kilometre. The density reduces when going further away from Mumbai City with the lowest density being found in the east of the MMR which is around 1000 people per square kilometre. Even though Mumbai city is the most attractive destination for people seeking a job, the migration seems to be shifting from Mumbai City, to the north, to the places like Nalasopara where properties are more affordable and development has started on fresh grounds.
(RE)CONNECTING MUMBAI

BACKGROUND

Population Density

- Mumbai city: 29650 p/km²
- Panvel Tehsil: 15300 p/km
- Vasai-Virar: 3200 p/km²
- Alibagh Tehsil: 1010 p/km
- Pen: 3855 p/km
- Bhiwandi Tehsil: 1000 p/km
- Thane District: 1130 p/km

[Map showing population density across different regions of Mumbai]
Demography

**Sex Ratio**

The major cause for the imbalanced sex ratio between males and females is considered to be the violent treatments of female children at the time of birth. The sex ratio in India has increased from slightly from 933 females per 1000 male in 2011 to 940 females per 1000 males in 2011.

**Literacy**

The literacy rate in the MMR has risen from 86% in 2001 to 89% in 2011 and is very much above the Indian average. This shows a positive growth in terms of overall literacy. When looking at the literacy rate based on sex there is a significant growth in the literacy rate of females.
Demography

Age

India
The largest concentration of people is between 20-29 years old, with the expectation that by 2020 the average age of people in India will be 29 years.

Mumbai's Metropolitan Region
The age pyramid is the same as that of India with the greatest number of the population being between 20 and 30 years old.

Vasai-Virar
The age pyramid resembles almost the same data as the age pyramids for India and Mumbai metropolitan Region, with most people being between 20 and 30 years old.
India is seeing a lot more emigration as opposed to immigration across its borders. The main source of immigrants are those from neighbouring countries such as Pakistan, Nepal, Bangladesh, Myanmar and Sri Lanka. A number of these immigrants are workers or move across borders seasonally.

For example, those from Bangladesh tend to be employed in the low-skilled sectors due to the irregular status as immigrants however the open borders between India and Nepal allow free and seasonal migration to occur. Indians, however, primarily choose to move to the United States of America or the United Arab Emirates, likely due to better quality of life and employment prospects.

Another important set of migrants are the migrant workers who temporarily move to neighbouring countries to find work and return once work is done. In 2015, there were 781,146 workers who left the country with emigration check required (ECR) passports. These passports are issued to people who have not completed secondary school and have not lived overseas for more than three years.

Usually these are low-skilled workers looking for construction jobs, of which there are many in Saudi Arabia, the UAE, Kuwait, Oman, Qatar and Bahrain. The majority of workers going abroad with ECR passports come from the Northernmost states of Uttar Pradesh and Bihar, joined with Southern counterparts from Tamil Nadu, Kerala and Andhra Pradesh.
Perhaps a much more interesting phenomenon happening within India is the Rural-Urban migration and seasonal internal migration. India as a whole is about 30% urbanized, while Maharashtra is 45% urbanized. There is a very clear trend of Southward migration, where people from the less affluent Northern states make their way to more affluent states.

The majority of these internal migrants come from rural areas often looking for jobs in the larger cities. Some are part of the group of seasonal migrants who look for work in cities and return to harvest crops in the village, later in the year, while others hope to make the move to the city a longer term decision.

These seasonal workers usually work in construction, hotels, textiles and manufacturing, transport and domestic work, to name a few examples, but the lack of provision of dwellings forces them to often live in rented rooms, open spaces, slums, pavements and even their work sites.

Zooming into Maharashtra, the overwhelming majority of migrants moving to the big cities are people from within the state, usually living in rural areas. The other 30% are migrants from other parts of the country.
There has been a notable rise in India’s performance at the World’s Gross Domestic Product (GDP) Rankings throughout the past decade. In 2013, India was ranked 7th with a total GDP of 2.102 trillion USD, and was ranked the 6th in 2017, with a total GDP of 2.611 trillion USD.

India’s economy hasn’t had a down year in this century and has been growing at around 7% per year ever since Prime Minister Narendra Modi took office in 2014. In 2018, India’s economy will be one-third bigger than when Modi took office.

In a report by PricewaterhouseCoopers (PwC) titled “the world in 2050”, they projected that the emerging markets will continue to be the growth engine of the global economy. By 2050, China could be the largest economy in the world, accounting for around 20% of world GDP in 2050, with India in second place and Indonesia in fourth place.
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Out of total 228.4 million households of the country at the end of 2009-10, 47.6 million were high income households (20.44 per cent), 140.7 million (61.6 per cent) were middle income households and 41.0 million (17.96 per cent) were low income households. Middle Income households are the largest income group in modern India, as well as the largest consumer group for housing. On the other hand, affordable housing sector is the fastest growing segment in India, and there is a paradigm shift of affordable housing tailored to the aspirations of the middle class living style. The huge disparity of income gap in India results in a wide range of differences in terms of square meters per household, ranging from 232m² for most luxurious households to 28m² per household in the EWS.
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Background

Affordability

Income Levels

- 0.1 mil
- 0.2 mil
- 0.4 mil
- 0.8 mil
- 1.7 mil
- +20 mil

Areas:

- 0.1 mil: 75m²
- 0.2 mil: 37m²
- 0.4 mil: 93m²
- 0.8 mil: 121m²
- 1.7 mil: 28m²
- +20 mil: 37m²

Income Levels:

- 0.1 mil
- 0.2 mil
- 0.4 mil
- 0.8 mil
- 1.7 mil
- +20 mil

Areas:

- HIG
- MIG
- LIG
- EWS

Floor Areas:

- HIG: 162m²
- MIG: 121m²
- LIG: 93m²
- EWS: 75m²

Floor Plans:

- LUXURY: 232m²
- HIG: 162m²
- MIG: 121m²
- LIG: 93m²
- EWS: 75m²

(RE)CONNECTING MUMBAI
Housing since 1947

There were two housing strategies: Sites and services and Public Housing. Sites & Strategies is pro poor in concept, but it relied excessively on neo-liberal principles of affordability, cost recovery and repeatability to succeed. The principle of progressive development ran contrary to local building codes and regulations. Therefore Public Housing aimed at income-eligible households at highly subsidised rent became popular. However, the low overall output, allocation discrepancy and high maintenance costs makes the economic case for moving away from this strategy. In 1970-2000, the public housing production on average was 1 unit per 5,000 people. Typical design for affordable housing is to compress a home into a single room with basic provision. In 1987 National Housing Policy announced with government role to provide for the poorest and facilitate the other income groups.

Housing after 1991

The country-wide economic reform affected trade, industry, finance and housing. By embracing privatization, it realizes regulatory barriers and allows 100% foreign direct investment. It has also increased the GDP significantly. On the other hand, despite financial crisis, housing prices remained stable. This economic reform however brought huge changes to the housing situation in India.
Housing Boom in 2000’s

Following the economic reform, the rapid appreciation of property lead to dramatic rise in house prices. Housing prices in 2009 were above 2007 levels in Kolkata by 85 per cent, in Mumbai by 26 percent, and in Delhi by 13 per cent after prices rose by 30 per cent in 2008.

There was also a dramatic rise of Middle Class, which became the largest group of consumers, and as a consequence of globalisation, the lifestyle and consumption pattern of this group defines housing aspirations and attitudes.

The rise of middle class is equated with the rise in affordability levels, while prices of homes has gone up, the median income of average households has trebled. Metropolitan cities have a higher median household income and higher population living in slum condition compared to secondary cities. This housing boom is accompanied by the widening of income gap the and decline in housing affordability for the lowest segment.

Affordable Housing Today

The affordability levels today are decided based on income groups, ignoring factors like household size, location, quality (amenities), commuting costs, utility costs and maintenance costs. “Space Squeeze” is a common strategy to lower cost, and spaces designed for the Middle Income Group and Higher Income Group are replicated at a fraction of the cost for the poor due to rising aspirations towards a middle class lifestyle. These housing might include middle income aspirations such as gyms, playgrounds, security systems etc.
Problem Statement
Together with other metropolitan areas such as Dehli, Calcutta, and Madras, Mumbai is one of the main employment magnets in India. Due to this economic success, Mumbai has attracted many migrants with varying backgrounds.

Due to the influx many new migrant workers have to move into informal settlements and right now two thirds of the population of Mumbai live on only 5 % of the land of the city.

Metropolitans like Mumbai experience excess migration and supply of labour leading to unemployment of immigrants. Illiteracy and lack of skills cause incompatibility between the migrants and the recipient city. This incompatibility perpetuates a vicious circle leading not only to unemployment but ghetto type, socially polarized, spatially segregated neighbourhoods.
Problem Statement
This only resulted in disintegrating social and physical structures. Extreme polarities between urban and rural areas in a country trigger patterns of rural-urban migration into developed cities, in search of a better standard of living and employment. This trend of migration contributes to elevated levels of poverty, illiteracy, and crime.

An example of another city in the world is Sao Paulo. The rich are building gated condominiums for them to live in while the poor live in favelas which are located directly next to them. To make this duality even more visible.

Johannesburg in South Africa is also experiencing social polarization all due to the increasing migration. But also due to de-industrialization and the pattern of social polarization, this city is becoming more and more unequal.
Problem Statement
If this trend of social polarization combined with the spatial segregation continues by the rate these cities are growing, all of these cities in the global south will develop to be a so-called city of walls. A city where every community or social group is segregated from the one right next to it, in every way possible. Physically by walls around the neighbourhood and as well as socially.

This Social and spatial segregation is a main issue and due to the rapid urbanization and migration into the city this segregation will only increase the inequality of its inhabitants to a point where it is no longer humane. All the inhabitants need each other to create and sustain a well-functioning city.
Problem Statement
Almost half of the world’s wealth is owned by 1% of the population, the spatial and physical effects of this inequality are becoming more pronounced. In Mumbai two thirds of the population live on 5% of the land.
Problem Statement

**Background**

- Limited Upward Mobility
- Segmentation of Labour market
- Limitation of Political & Social participation
- Isolation of Public Space
Related Problems

- Education
- Water supply
- City Connections
- Security
Problem Statement

Psychological disorders

Social Disparities

Health Disparities

Violence
Problem Statement
Bringing this back to the location of Nalasopara we can also see an increase in migration. Mainly in the informal sector. In the past few years there has been a significant increase in informal settlements on the east side of Nalasopara while in the West there are mainly projects for the middle and high income groups (with the exception of the old village when you go closer to the coast).

Infrastructure plays a big part in spatial and thus social polarization, In Nalasopara it is the railway track, which brings many people daily to the city centre of Mumbai for their work, that acts as a border between these two parts of the area.

While on the west we can see many high rise buildings for the MIG and HIG on the east the informal settlements continue to grow while there are some projects containing apartments for the MIG. Though these projects directly show one of the problems where they wall of the area from the chawls and the informal settlements.
The increasing **social polarization** and **widening income gap** leads to **spatial and social inequality** in Nalasopara and Mumbai.

This contributes to unfairness between the rich and poor, unfairness in **upward mobility**, **harsh borders** between high and low income groups, **different accessibility to public place**, **ghettoization** of lower income groups.

Which as a result in a disconnect between the **City** and its **Inhabitants**
The project aims to design and create a framework where all income groups have access to **accessible urban spaces & affordable housing**.

While also soften the boundaries between the income groups but maintaining the **qualities, individuality and opportunities** for each income group.

Which in turn all encourage diversity within this framework to **Re-connect** the people with the city and each other.
How can a mixed-use, mixed-income housing development in Nalasopara stimulate the development of socially depolarized sustainable urban settlements?

Sub-questions:
What are the needs and aspirations of each income group?

Which urban & housing configurations are suitable to create a sustainable social connection & interaction between different income groups.

How can a mixed-income housing project connect different income groups?
Social polarization is a relevant topic not only in India but also the global south as a whole. It is even a topic relevant to the western world. It is a topic that is apparent everywhere in the world.

The notion of improving the living conditions in the global south is worldwide. The united Nations have set specific goals which relate to this topic. Due to the ever-increasing population of cities in the global south there is a big shortage of housing. Affordable housing is needed and as can be seen by the housing vacancy in Mumbai (and India in general), not every dwelling is affordable for the groups for which it is designed.

Amongst other things social values are neglected by developers who are only looking to maintain a profit. This results in inhumane conditions for the low-income people to live in.

My goals is to develop a strategy that will incorporate all the different income levels into one project. But als to develop a framework which can be used in different conditions. To provide a flexible, affordable dwellings to the people. The research and outcome of this project will develop a way to achieve a new way of housing design while using local materials and building methods.

It is the hope that this model would begin to alter the view on mixed-income housing design and the perception of gated communities which disrupt the urban fabric. By combining either all or some of the different income groups could positively affect the lower income groups. A sense of upward mobility and better amenities to use while the higher income live in a more societal diverse location where they can benefit from the economic opportunities.

The flexible nature of the buildings/dwelling will allow for changes made by each dweller to achieve a certain individualism in the bigger city. They can alter their dwelling to their own needs.

With the ever increasing urbanisation. People need to be seen as people with their own needs, patterns, and rights. Achieving a equilibrium of urban settlements.
The focus of this global housing studio is to understand the existing built environment. Therefore an understanding of the location and its context is essential to achieve this understanding. Besides the initial research into the city of Mumbai and how it evolved over time from the 1500’s up until now and the typological & morphological analysis of certain case studies, a field study was done to provide an opportunity to learn more about the socio-economics of the area. Together with a book of patterns which catalogues the spatial and social patterns of the area.

The subject of flexible housing for a mixed-income urban settlement brings forth a couple of issues. Which are typology and income group driven scenario planning. These will allow me to tackle the research question effectively. Precedents will be used to analyse the housing types in India as well as international areas to develop a flexible optimum in the design of dwelling units.
RECONNECTING MUMBAI LOCATION
Patterns of Inhabitation

During our field trip research we investigated different patterns of inhabitation in Mumbai, in particular Nalasopara East. These patterns include:

Social Activities
Domestic Activities
Borders
Income Generation
Amenities
Building Techniques
Amenities are a large part of the urban fabric. These amenities can be divided into different aspects like religious, educational and medical buildings.

These amenities are, most of the time, organised in clusters throughout the area. A bigger hospital means more smaller clinics located nearby.
Amenities

- Tutoring
- Small private temple
- Public school
- Tree temple
Many borders can be found in Nalasopara East. Ranging from direct borders such as security gates as well as borders which are more sociological. Some borders also act more as a marker that the actual boundary.

Patterns of Inhabitation

Plinth, objects, and facade materials to identify individual units.

Curtains to separate private and communal spaces.
Borders

Gate at rear end of the cluster

Flexible street border

Claiming space with decorated entrances

Woman cooking for the family
Although different sizes of project are being built in Nalasopara, local materials are widely used as well as the methods to create these buildings.
Building Techniques

- Brick infill
- Jalis
- Sloped steel roofs
- Tiling the walls
Generation of income can be seen through the whole area. Every opportunity to earn money is used. This ranges from people working at home to create things to sell all the way to people selling their wares from stalls, shops or markets.
Income Generation

Groceries at the night market

Commercial extensions

Females work at home

Intimate working and living
Social spaces in Nalasopara have a wide variety. With a sense of hierarchical spaces. Small steps are used for social gathering as well as large open spaces. Most public areas also cater different social activities instead of only one.
Social Space

Alley of intimacy

Waiting plinth

Gossip corner

Lunch in the shade
Domestically it is shown that people need external places, an outside area to clean or to let your clothes dry. The dwelling also acts as a flexible space which can be used for working during the day and a place to live/sleep during the night.
Domestic Space

Woman cooking for the family

Woman cooking for the family

Woman cooking for the family

Woman cooking for the family
(RE)CONNECTING MUMBAI

Needs & Aspirations

LOCATION

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EWS

LIG

Alley of intimacy

Waiting Plinth

Flexible open spaces

Social Corridor

Well defined amenities

PRIVATE open spaces
RECONNECTING MUMBAI

EWS

LIG

Needs & Aspirations

Preparing food outside together

Washing/Drying Clothing

Daytime working
Needs & Aspirations

**Lower MIG**
- Renting out extra spaces

**Upper MIG**
- Large Balconies

**HIG**
- Hire Domestic Servants
- Panoramic View
Needs & Aspirations

EWS

Plinth, objects, facade materials to identify

Window Grill

LIG

Curtains in front of main entrance
Needs & Aspirations

Lower MIG  Upper MIG  HIG

Decorating entrances

Walled compound for extra privacy
Needs & Aspirations

EWS

- Safe spaces for women and children
- Open Spaces for social interaction
- Space for income generation
- Live near workspace
- Work/live units
- Flexible apartment Layout
- Income generation options at home for women
- Family / relatives / community nearby

LIG
Summary

Lower MIG
- Nearby Main Roads
- Safe private open spaces
- More privacy
- Apartment space to rent out
- Safe spaces for women and children
- More privacy
- Unit with a panoramic view
- Near amenities
- Open Spaces for social interaction

Upper MIG
- Nearby Main Roads
- Safe private open spaces
- More privacy
- Apartment space to rent out
- Safe spaces for women and children
- More privacy
- Unit with a panoramic view
- Near amenities
- Open Spaces for social interaction

HIG
- Nearby Main Roads
- Safe private open spaces
- More privacy
- Apartment space to rent out
- Safe spaces for women and children
- More privacy
- Unit with a panoramic view
- Near amenities
- Open Spaces for social interaction
The Baithi Chawls, Handshake chawls, and Gated Communities are all inward facing. They create an intimate communal space, but also neglects the edge resulting in leftover unused back lanes. Projects like Sri Prastha and the MHADA Housing Proposal on the other hand, are outward facing which have been designed for more privacy and security.

In this new development I want to combine these different configurations and connect them on the ground floor. Also whereby the units faces the outside without losing the internal intimacy in the communal space.
Clustering Strategy

**Fully Segregated**
- Clear Separation
- No social Connections

**Fully Mixed**
- Hard to attract MIG/HIG
- Income groups rather live near people of the same group

**Clustered**
- Clustering of groups.
- Zones of exchange between groups

A scheme where the people are completely separated is not right for the city as it would lead to exclusion and it would increase the social polarization. Fully mixed would be problematic and unrealistic as well as these income groups tend to live together and they have different aspirations. Therefore, this project aims for a clustered configuration where zones of exchange will be created where people could encounter one another and encourage the different income groups to be socially integrated.
The Baithi Chawls, Handshake chawls, and Gated Communities are all inward facing. They create an intimate communal space, but also neglects the edge resulting in leftover unused back lanes. Projects like Sri Prastha and the MHADA Housing Proposal on the other hand, are outward facing which have been designed for more privacy and security.

In this new development I want to combine these different configurations and connect them on the ground floor. Also whereby the units faces the outside without losing the internal intimacy in the communal space.
Precedents | Aranya
Incremental housing in Belapur, or also known as Artists’ Village is a proposal for mass affordable housing in Sector 8, Navi Mumbai by the chief architect Charles Correa. Belapur is one of the nodes of township situated in the city center of Navi Mumbai, set in a picturesque valley formed by the surrounding hills.

Belapur is another mixed income development where there is a slight change in gridsize between different income groups. Which you can’t really see at first, another pro is the incrementality to show the individuality of the owner which creates diversity within a system.
Sangharsh Nagar is a plan by PK Das. It creates affordable housing for the lower income group while maintaining a sense of community within the block. This sense of community extends outside of this block as well.

Each dwelling has a room kitchen and bathroom with a small balcony. While small it provides everything needed.
Density is a particular subject that is used when projects are being built in India. For private companies the higher the FSI the more the profit, which is better for them. But higher FSI doesn’t mean it is better for the people living in these places. Their community or interaction with the street could fade away.

As seen to the right are the different density models that are present in Nalasopara (east and west). Each with their own ‘quality of life’

On the next page a diagram shows how one density can be used in three different designs. This is to show the balance between FSI and form.
Handshake Chawls
Mid-rise

Sri Prastha
Mid-rise

MHADA
High-rise
Density

High rise – low coverage
75 units/ha

Low rise – high coverage
75 units/ha

Medium rise – medium coverage
75 units/ha
Housing for the poor must provide them with empowering support. This can have many different aspects, such as environmental, socio-economic, financial aspects.

A holistic approach is needed to design for the poor where housing is used as a tool for poverty reduction. Housing clusters should not only be a place to eat, sleep and stay but it should also provide open space for nature/green but also as community place as well as transport and utilitarian aspects. (Jain 2016)

Furthermore, inclusive housing does not try to equalize everyone and bring them to the same socio-economic level but accepts and respects their differences. Large pockets of poorer areas lead to the creation of ghettos, increase in crime and other social issues. Therefore a certain balance has to be maintained in the design proposal.
Hierarchy of open space is something which is essential while designing an area for mixed-income housing. Charles Correa defines this in his book, ‘The New Landscape’, as well.

In Rural India poverty has a different expression because they are not being dehumanized as much as they would in the city. In a rural village there is always a place to meet and talk, to cook and to wash clothes. This is not the case in urban settlements. Living in an urban settlement involves much more than just the place where you live.

Correa calls it a hierarchical system. Ranging from the space needs by the family for private use, to the intimate contact of a front doorstep. To neighbourhood meeting places where they become part of a community and finally the urban area which can be used by the whole city. (Correa 1989)
Design of open space is essential when designing for mixed-income developments.

Within mixed-income developments it is hard to create a space for low-income directly next to high-income. People do not mix so easily and they would rather create a community with the people that are on the same level, people they know.

The public space is the only place where multiple income levels connect.

These spaces are essential for interaction, offer recreational opportunities for all economic groups and markets/commercial areas offer employment to LIG and EWS groups.
Open Space
According to the Project for Public Spaces, successful places can be used by all inhabitants of an area as well as people who randomly appear (tourists et cetera).

To be a successful city or neighbourhood you need destinations. Destinations that give an identity and image to their communities. These identities can help attract new residents, businesses, and investment. But strong community destinations are also needed.

What each destination successful is that it has multiple places within it. The same as a square needs 10 places like a café, restaurant, play area et cetera. Each place should have at least 10 things to do. (Project for Public Space, 2018)
According to Jan Bredenoord (2014) the modern urban world is, just as natural ecosystems, characterized by constant improvements in system efficiency. However when there is too much efficiency, brittlenes and little diversity will appear.

This results in crashes and destruction, whereas too much resilience is characterized by too much diversity and a lack of coherence and purpose to growth. Which will eventually lead to a tiny amount of efficiency and stagnation.

Too much efficiency leads to fragility which is tied together with too little diversity and connectivity. Too much resilience causes stagnation paired with too much diversity and connectivity.

There is a certain trade-off between efficiency and resilience within the project. Once this trade-off is in the window of viability the project becomes a project which is adaptable to future scenarios.
Design Hypothesis

- Efficiency
  - Simple Module
  - Similar Design

- Resilience
  - Different Typologies
  - Flexibility
  - Social Mix

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Design Hypothesis

3.6 m
Design Hypothesis

Low-rise

Mid-rise

High-rise
Design Hypothesis

Local Materials

Concrete

Fly ash Bricks

Corrugated sheets

Bamboo
Design Hypothesis

Local Methods

- Raised Plinth
- Corrugated Roof
- Concrete Frame/Brick infill
- Tiled Surfaces
Key Takeaways

Flexibility

Efficiency

Community
Key Takeaways

Social Mix
Space for Income Generation
Adaptability
This project is located in Nalasopara. Nalasopara is a suburban area within the region of Vasai-Virar. Which in turn is a northern expansion of Mumbai. The main connection between the Mumbai and Nalasopara is the railway system which is the main divider in the area.

Nalasopara is an arrival city for migrants from all corners of India and other countries. It can be seen as the first step in making a living for somebody in Mumbai.

As stated before, the railway creates a East West divide in Nalasopara. The eastern part tends to be more of the arrival part of this region as the influx of migrants can be seen by the amount of informal settlements in this area. These settlements keep growing and as such is a growing concern. ‘Handshake chawls’ have replaced the baithi chawls with the same footprint leaving minimal distance between each building. This results in inhumane housing solutions.

On the west side however one can find apartment blocks and high-rise towers aimed for the middle and high income groups.
The chosen site is located in Nalasopara West. On an empty plot of land. This site is chosen because of the fact that we incorporate different income groups into this project. The higher income groups are very specific on the location of where they live. As Nalasopara West is the place for middle and high income groups at the moment this is an opportune place to create affordable housing for them as well as the lower income groups.
Chosen Site

The site borders to main areas in this region. The urban settlement of Nalasopara West as well as the koliwada village. These urban situations differ drastically. Most of Nalasopara West is placed (partially) in a grid. While the village tends to be more organic and it grows with its context.
Chosen Site
The site is surrounded by large infrastructural components. Two primary roads cross each other at the edge of the site. The main road through the village is nearby as well and these roads now lead to a MHADA development to the north. We can assume that the whole area to the north of the site will be built environment within the next 20 years. The railroad is still nearby as well as the station so this is an ideal placement for people who want to live near a transport hub but far enough to not have the negative aspects in their immediate vicinity.
Current Issues
Current Issues

The area of Sri Prastha and Nalasopara west have quite a few issues at hand. These range from high vacancy rates, buildings falling apart on top of its residents. A reluctant attitude to maintenance. Other issues involve the lack of opportunities for income generation as well as the lack of hierarchy and diversity in open spaces.

Above all the future is uncertain as we know they will develop this area into gated communities with 20 story buildings. These buildings will be even worse for the connection with the ground floor but also the sense of community for lower income groups and in the end it will only add polarization in the region.

However this site does have its opportunities and strengths. Such as the existing grid structure, porous urban fabric, mixed religious communities, an existing connection with Nalasopara East. And the opportunity to connect different areas (village and city) in this region.
Today the site is an empty field where non current trend of development has happened yet. We can speculate that if nothing will be done with this area, it is likely going to be part of a development with similar patterns as the current trends in Nalasopara.
The first scenario in this area which is likely is that the village starts to expand towards the urban areas of Nalasopara East. This organic way of building will encroach on empty field leaving a very visible boundary between the village and the urban fabric which is already in place.
The second scenario could include the development of higher end apartment blocks/towers for the middle to high income groups. Some towers of at least 24 storeys are to replace Sri Prastha and we can assume that this will happen with this land as well. These (isolated) developments fail to connect with the existing context and will keep being built until the whole land is used up. Different examples from Nalasopara have been used to illustrate this scenario.
Primary roads that connect to the existing infrastructure near the chosen area are proposed according to the movement through this site today and predicting future movement. This also includes public transport and it is proposed to be made of impermeable asphalt.
The secondary roads, the next level in this hierarchy act as a connection between different primary roads as well as the different areas surrounding this site. The secondary roads are placed along the morphological aspects of the site, the forest to the west and the grid of Sri Prastha as well as the grid of the empty fields. These roads are also made of impermeable asphalt.
The Tertiary roads further connect the different roads and can accommodate cars as well as rickshaws while trying to reduce the amount of traffic on these roads. These roads are made to be permeable by using bricks.
Local roads are a connection made between different building blocks and are rather narrow to only allow single sided vehicular traffic and rickshaw access as well as pedestrian access.
Larger amenities like schools, hospitals and larger religious temples are places along the amenity spine in this new development. These amenities are one of the main connecting factors between the different income groups.
Plots for development are shaped by the different infrastructures and the existing context.
The tower and slab typology are prominently placed at the edge near other urban areas and the primary roads.
The tower and slab typology are prominently placed at the edge near other urban areas and the primary roads.
The courtyard typology is the intermediate typology between urban and rural and is placed next to the tower and slab blocks gradually shifting into the sites and services typology.
The sites and services typology is placed near the edge of the development to create a gradual connection between this area and the village.
The project proposes the use of courtyard blocks and typologies in order to provide a balance between buildings and open space. To increase the quality of life and the quality of the former green open field as well as to keep a large part of permeable surfaces, open and green spaces have been included in the urban plan as well as the community spine. Also the different courtyards and open spaces are left as green and permeable spaces.
DESIGN
Different Typologies

Sites & Services

Courtyard
Different Typologies

Slab

Tower
Urban Design

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0 mm
The sites and services typology is unique in this scheme as it has many options for incremental growth. Each dwelling starts with a room, kitchen and bathroom and can expand one module towards the street (if nothing is done, this place will serve the same function as an otla would). But these dwelling units can expand vertically as well. Up to 2 extra stories.
The sites and services typology is unique in this scheme as it has many options for incremental growth. Each dwelling starts with a room, kitchen and bathroom and can expand one module towards the street (if nothing is done, this place will serve the same function as an otla would). But these dwelling units can expand vertically as well. Up to 2 extra stories.
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Design

Courtyard
Urban Section

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DESIGN

169
Facade
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East
Unit Variations

Residential / Residential

Residential / Restaurant
Unit Variations

Residential / Retail

Production / Retail
Slab
Ground Floor

[Diagram of Ground Floor layout]
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Section

DESIGN

199
Facade South
Tower
Urban Design

(RE)CONNECTING MUMBAI DESIGN

0 mm
Urban Design
Typical Floor (2)
Sites & Services

- No elevator
- Flexible Floor plan
- Extendable horizontal/vertical
- Shared courtyards per 6 units

Courtyard

- No elevator
- Shared courtyard on ground floor
- Flexible work-live units on GF
- ‘Social hubs’ per 3 units - an extension of their home.
- Elevator
- Shared courtyard with tower typology
- Quiet entrance through courtyard
- Opportunities to rent out certain part of dwelling
- Amenities/ other functions on ground floor

- Elevator
- Own private entrance
- Large Balconies
- Panoramic views
- Shared courtyard with slab typology
- Amenities on GF
- Private communal amenities on first floor
Sites & Services

Unit sizes: 20 - 52m²
FSI: 0.7 - 1.4
Stories: 1-2
Target Groups: EWS/LIG/Lower MIG

Courtyard

Unit sizes: 22 - 54m²
FSI: 2.0 - 2.5
Stories: 5
Target Groups: EWS/LIG/Lower MIG
Summary

Slab

Unit sizes: 65 - 97m²
FSI: 3.3
Stories: 6-9
Target Groups: Middle/Upper MIG

Tower

Unit sizes: 100 - 135m²
FSI: 3.9
Stories: 10-15
Target Groups: Upper MIG/HIG
From March till May the average amount of sunlight in India is the highest, which correlates with the maximum temperatures which are reached around May. The maximum temperature can reach 41 degrees Celsius, and the minimum temperature can be around 16 degrees Celsius. This however differs from region to region, since India covers a large area resulting in different climates between north and south.

Precipitation in India causes many problems during July and August especially with the maximum precipitation at around 200mm. Global warming also enhances this effect with the Indian sea level rising about 1.3mm per year and precipitation increasing with about 6-8% by 2030. There are many areas in Mumbai that are considered as Low elevation zones, which are prone to flooding. This results in India being highly vulnerable to climate hazards and the people living in slums and low lying areas often the most. (Group Research, 2019)
**Corrugated Plastic sheet**
A roofing material made out of recycled plastic which is a sustainable alternative for galvanized metal which could leach zinc into the rainwater. If the plastic is too expensive other alternatives like bamboo could be used.

**Fly Ash Brick**
A light weight, high strength material compared to normal clay bricks. It is more sustainable as it does not need to be fired. It has low water absorption and works well as a thermal insulator.

By placing the bricks in a rat trap bond for external walls is an economical and aesthetic choice as 40% less bricks are used and less mortar is needed. Because of the cavities in the wall it has better insulating properties.

**Terracotta Tiling**
To keep the floors well insulated with the traditional methods, terracotta tiling is used to keep the floors cool in the summer and warm in the winter.

**Bamboo Roof Structure**
Bamboo is a material of which India is the second largest producer of. Traditional housing uses Bamboo as well. Nowadays it is seen as a ‘poor’ man material. It is nevertheless used in the roofing structure as it is very light and it is easier to make a slanted roof for rainwater collection.

**Filler slab floor with Clay Pots**
Using clay pots is a traditional and conventional way of building in India. By using clay pots as filler in concrete floor 32% less concrete is needed compared to the conventional concrete floor slab. The weight is reduced without compromising any of its strength.

**Bamboo Reinforced Concrete**
Bamboo is a good alternative for steel in concrete beams, floors and columns. For a beam of similar size either 1.5% steel or 8% bamboo is used as reinforcement. By using bamboo less concrete has to be used to achieve the same strength of the building.

**AAC Blocks**
AAC blocks are used as structural shear walls. These bricks have the same compressive strength as normal concrete but have ranging from 1/6 to 1/3 of the density as normal concrete.
Construction & Materiality
The fly ash brick wall will be made with a rat trap bond. This bond has cavities within this wall which serve as a thermal insulator. This bond will also use less mortar as well as less bricks while achieving the same strength as a normal clay brick wall.
<table>
<thead>
<tr>
<th></th>
<th>Compressive Strength</th>
<th>Porosity</th>
<th>Dry Density</th>
<th>Thermal Conductivity</th>
<th>Mortar Consumption</th>
<th>Environmental Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay Brick</td>
<td>30-35 kg/m³</td>
<td>More porous</td>
<td>1600-1700 kg/m³</td>
<td>0.6-1 W/mK</td>
<td>More</td>
<td>Due to firing, more CO₂ and energy used</td>
</tr>
<tr>
<td>Fly Ash Brick</td>
<td>90-100 kg/m²</td>
<td>Less Porous</td>
<td>1700-1800 kg/m³</td>
<td>0.3-0.4 W/mK</td>
<td>Less</td>
<td>Uses waste material. Curing reduces energy use. Low CO₂ emissions</td>
</tr>
<tr>
<td>AAC Block</td>
<td>100-110 kg/m²</td>
<td>Less Porous</td>
<td>1600-1920 kg/m³</td>
<td>0.21-0.40 W/mK</td>
<td>Less</td>
<td>Recycles waste material, Low CO₂ emissions</td>
</tr>
</tbody>
</table>

As seen in the table above, fly ash brick and AAC blocks are suitable alternatives for regular fired clay bricks with each their own advantages.

The fly ash bricks will be used for the exterior to create a more pleasing look while the AAC blocks will make up the walls between dwellings, and they will serve as shear walls.
The floors are built with clay pots as filler in the slab. This reduces the amount of concrete needed and creates a aesthetically different ceiling for lower income groups.

Different pots are used as these pots are hand made. Near the embedded beams the pots get slightly smaller to create a better connection between the beam and the slab. This results in a stronger floor.
The fly ash bricks wall are grey when placed. Therefore it needs to be painted to avoid a concrete jungle. To create a sense of individuality for each dwelling, different colour options are used throughout the project. Each housing block starts with an overall colour with slight differences in shade of that colour.

Different colours for these housing blocks are, red, green, yellow

After some time, people can change their paint colour as they choose according to some guidelines established by the communal group.
Bamboo truss
Galvanised steel connector
Waterproof coating
Steel anchor

Drip edge
Bamboo reinforced concrete floor with embedded beam
Bamboo reinforcement
Fly ash bricks in rattrap bond (70x110x230)
Plaster

80mm
300mm
30mm
(RE)CONNECTING MUMBAI

BUILDING TECHNOLOGY

2% slope to drainage pipe
Waterproof coating
Concrete gutter
Embedded beam with bamboo reinforcement
Laminated bamboo doorframe
Bamboo ventilation louvres
Clay pot filler slab
Single Pane glass
Laminated bamboo window frame
Recycled plastic frame

Paint
Fly ash bricks (rattrap bond)
Plaster

200mm

Ceramic Tiles
Screed
Clay pot filler slab
Typical Floor

Concrete Otla
Wooden door
Bamboo laminated door frame
Ceramic Tiles
Screed
Clay pot filler slab
Paint
Fly Ash Brick (rattrap bond)
Plaster
Ceramic Tiles
Screed
Bamboo Reinforced
Floor slab

Modular Water Tank
India is the second largest bamboo producer worldwide. Bamboo is also used as one of the main building materials used in indigenous construction. Due to its rapid growth cycle and the variety of areas in which it has the ability to grow, bamboo is very cheap. Combined with the ability to absorb large quantities of CO2, it can be seen as a very sustainable material.

Although nowadays bamboo is seen as a poor man material and most people don’t want to have it as the main material for their dwelling.

In trials of tensile strength, bamboo has been tested to outperform most other materials including reinforcement steel. Therefore, this design uses bamboo as reinforcement in all the concrete beams, columns, and floors. Small stems will be used in the beams and columns while the floors will use netted strips of bamboo as reinforcement.

Other uses will be laminated bamboo, which is used for the window frames. Although extra work is needed for it to get bamboo laminated, it is still cheaper and much more accessible than normal wood.
A couple of years ago, the whole of Juhu beach was completely covered with plastic waste. The people of Mumbai organized a clean-up which worked really well. The beach is now clean.

But plastic is still a problem in India and the rest of the world. Therefore we need to find smart ways to use this plastic in our designs for buildings and the city.

This project aims to use plastic sheets as roofing material and for the extended window frames. Another possibility is to create smaller blocks and use this as pavement.

To create plastic sheets plastic is gathered and separated. Then it will be crushed into small pieces. After this the plastic bits will be heated up to 190 degrees Celsius until it can be pressed into a mould. In the case of this building only a couple of moulds are needed for the corrugated roofing plates as well as the plates for the extended window frames.

To create pavement bricks only a bituminous material or stone dust is added and then pressed in the mould of the bricks.
Recycled Plastic
Every housing unit is open to the outside area on two sides. This will allow each dwelling to cross ventilate.

Every bathroom and toilet are located near an external facade which allows for direct natural ventilation. Therefore no unwanted smells are near the galleries.

Jali patterns are introduced in bathrooms and other rooms that require more privacy. These jali patterns also ventilate these rooms throughout the whole day.
The building has several buffer zones that help maintain the thermal comfort inside each of the units. Elements such as jalis, brick cavity walls, overhangs and extended window frames are used to keep most of the direct sunlight out of the buildings.
During the monsoon season rainwater can be collected in every building. This collection of rainwater will yield a large quantity of grey water which can be used to flush toilets and other uses such as irrigation.

The shape of the roof acts as a large gutter collecting the water before it is transported down to the water tanks located under the building.

In the case where the drainage pipes are blocked, the water in the roof-gutters will be redirected into the courtyard by overflows added in the roof.

Gutters on each balcony and gallery also collect which leads it to the storage below the building.

Generally each courtyard block can store up to 1,541,410L of water which can be used to supply water to the families for 192 days outside of the monsoon season.
OPERATIONAL MODEL
In “Housing by People”, John Turner introduces this diagram to highlight different roles that sponsors and users can have in citizen participation. This quickly became the main driving factor on which a quick study into different operational models and became the main influence on choosing a certain model.

John Turner concluded that the most effective form of participation is the form where central authorities’ participation in local housing development where local access to resources is ensured. Also where the Citizens participation depends on central authorities.

Still it is very important that the chosen form of participation is appropriate and that the right control system is chosen.

Concluding, in the context of India, I believe that the form where Users decide and Sponsors provide is the most suited. With the current form of ‘stamp’ like buildings the individuality of the people is lost. To accommodate this problem it is essential that people can decide certain aspects in the design process. Also with the problem of dilapidated buildings and a severe maintenance problem, this form could improve on this situation.
Participatory Design

(Re)Connecting Mumbai

Who Provides

Sponsors

1. Sponsors decide and Sponsors provide

Users

2. Users decide and Users provide

3. Users decide and Sponsors provide

Who Decides

Sponsors

Users
Affordable Housing in Partnership is a private public partnership scheme. But there are certain aspects which make it suitable for this area.

This scheme is an underlying scheme for the development as certain conditions which can be set by the government or a main authority to include the lower income groups into a new development. These developments should have at least 100 dwellings of which 35% needs to be suited for the EWS. Additionally more conditions are set for the private party and the whole scheme needs to be highly transparent.

Certain incentives are maintained to keep the developer interested in these kinds of developments where lower income groups have a place for affordable housing as well.
Affordable Housing in Partnership is a supply side intervention. The Mission will provide financial assistance to EWS houses being built with different partnerships by States/UTs/Cities. Affordable housing projects are the projects where at least 35% of houses are constructed for EWS category.

• To increase availability of houses for EWS category at an affordable rate, States/UTs, either through its agencies or in partnership with private sector including industries, can plan affordable housing projects.

• Central Assistance at the rate of Rs. 1.5 Lakh per EWS house would be available for all EWS houses in such projects.

• The States/UTs would decide on an upper ceiling on the sale price of EWS houses in rupees per square meter of carpet area in such projects with an objective to make them affordable and accessible to the intended beneficiaries. For that purpose, States/UTs and cities may extend other concessions such as their State subsidy, land at affordable cost, stamp duty exemption etc.

• The sale prices may be fixed either on the project basis or city basis using following principles:

An Affordable Housing Project (AHP) can be a mix of houses for different categories but it will be eligible for central assistance, only if at least 35% of the houses in the project are for EWS category and a single project has at least 250 EWS houses. CSMC at GOI level, however, can reduce the requirement of minimum number of houses in one project on the request of State Government.

• Allotment of houses to identified eligible beneficiaries in AHP projects should be made following a transparent procedure as approved by SLSMC and the beneficiaries selected should be part of HFAPoA.

• Preference in allotment may be given to Physically Handicapped Persons, Senior Citizens, Scheduled Castes, Scheduled Tribes, Other Backward Classes, Minority, Single Women, Trans-gender and Other Weaker and Vulnerable Sections of the Society.

• While making the allotment, the families with person with disability and senior citizens may be allotted house preferably on the ground floor or lower floors.

• Detailed Project Report (DPR) of such projects prepared by concerned implementing agencies should be approved by SLSMC. Coverage

• All statutory towns as per Census 2011 and towns notified subsequently would be eligible for coverage under the Mission.

• The Mission will support construction of houses upto 30 square meter carpet area with basic civic infrastructure.

• States/UTs will have flexibility in terms of determining the size of house and other facilities at the State/UT level in consultation with the Ministry but without any enhanced financial assistance from Centre.

• Affordable Housing Projects in partnership should have basic civic infrastructure like water, sanitation, sewerage, road, electricity etc.

• The minimum size of houses constructed under the Mission under each component must conform to the standards provided in National Building Code (NBC). (Ministry of Housing and Urban Poverty Alleviation Government of India, 2017)
Community Land Trusts

How does a community land trust work?

Various sources of public and philanthropic capital...

...are used by community land trusts...

...to acquire homes in a geographic focus area.

Community land trusts tweak the normal process of homebuying...

A new resident buys their house outright...

...but leases the land underneath from the CLT.

...and the CLT retains permanent ownership of the land.

Why CLTs Matter

A community land trust is a democratically managed non-profit organization that develops, owns and manages land, affordable housing, community gardens, commercial spaces and other community assets on behalf of a community. It can also be used to manage the maintenance in the whole area.

The land owned by the CLT is removed from the private real estate market and is community owned, making the housing built on the land always more affordable.

People who lived here can use the equity gained to move to market driven properties after a certain amount of years.
## Financing Model

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Rent paid to CLT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Price</td>
<td>Rs 2.100 / ft²</td>
<td>Rs 300 / ft²</td>
</tr>
<tr>
<td>Construction Cost</td>
<td>Rs 2.000 / ft²</td>
<td>Rs 2.000 / ft²</td>
</tr>
<tr>
<td>Total Cost</td>
<td>Rs 4.100 / ft²</td>
<td>Rs 2.300 / ft²</td>
</tr>
<tr>
<td>Sale Price</td>
<td>Rs 5700 / ft²</td>
<td>20% HIG - Rs 8400 / ft²</td>
</tr>
<tr>
<td></td>
<td>(Nalasopara West Market Price)</td>
<td>25% MIG - Rs 6200 / ft²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25% LIG - Rs 100 / ft²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30% EWS - Rs 50 / ft²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average: - Rs 3315 / ft²</td>
</tr>
<tr>
<td>Profit Margin</td>
<td>39 %</td>
<td>44.1 %</td>
</tr>
</tbody>
</table>

If this plot were to be developed and sold at the market rate. The developer would earn a reasonable 39% profit. This is good for the developer but it will not benefit the lower income groups as they will not be able to buy a house.

Through the combined effort of the CLT, the AHP, and the public private partnership cross subsidization model, the developer is able to make a larger profit. On top of being able to build with a higher FSI. The government will subsidize in form of either land or other incentives to build for the lower income groups.

The difference in income groups gives a difference in sale prices. The prices given are averages for each income group. Prices vary depending on the size of the dwelling. The profit margin for the developer is slightly higher which makes it interesting for this party to cooperate in this scheme.
Phase 1

The first phase of this development will be to create different communities where different income groups come together. The first development will be done at the chosen site.

This development acts as an example for how the development in nearby areas could be done. Especially the empty plots of land to the north connecting different urban areas in Nalasopara.
Phase 1
Phase 1

1. New Dwellers start a Community Land trust.

2. The CLT gets land gifted or buys the land.

3. Architect designs according to wishes and needs of CLT and according to conditions set by the Authority.

4. Local contractor builds the different typologies which are cross subsidized.

5. Dwellings are given and sold to the chawl communities and MIG/HIG families.

6. Individual owners can adapt their dwelling (if necessary a loan can be provided by a bank.)
Phase 1

**Operational Model**

- **Architect**
- **Local Contractor**

**Sites & Services**
- Courtyard Typology
- Slab Typology
- Tower Typology

**Community Land Trust**
- Set up
- Convey Wishes
- Mediate

**Government**
- Provide Land
- With conditions set according to the AHP

**Private Party**
- Set up

**Individual Users**
- Adapt

**MIG/HIG Families**

**EWS/LIG Communities**

**Bank**
- Secure Loan

**Cross Subsidize**

**Design & Build**

**Assign to**

**Sold according to market price**

**Bank**

**Courtyard Typology**

**Slab Typology**

**Tower Typology**

**Set up**

**Provide Land**

**Convey Wishes**

**Mediate**
The second phase is that different parts of the plan could be implemented in areas with built mass. These areas could be dilapidated or they could have inhumane options for living and need to be improved, for example rahmat nagar in east Nalasopara.

During this phase a community in either a single building or area could decide that they want something similar as in the developed area. They will be able to choose what they want to build, how many units more to upgrade and update their community. These buildings don’t have to be the same as used in the first development but would have a similar approach.
Phase 2


2. With a community fund and loans they can start the redevelopment.

3. Current Dwellers decide on which typology/typologies they want.

4. Dwellers convey their wishes to the architect and contractor who build the new building(s)

5. New building is handed over to the Current Dwellers

6. New units are sold to new families. Profit is used to repay loans and put into community fund.
RECONNECTING MUMBAI

OPERATIONAL MODEL

Phase 2

[Diagram showing the process flow:]
- **Community fund**
- **Loans**
- **Community Land Trust**
- **Current Dwellers**
- **New Building(s)**
- **New families**
- **Set up**
- **Convey Wishes**
- **Design & Build**
- **Extra Units Sold to**
- **Profit Used to Repay**

Key steps:
- **Set up / Secure**
- **Decide**
- **Sites & Services**
- **Tower Typology**
- **Courtyard Typology**
- **Slab Typology**
- **Architect**
- **Local Contractor**
IMPRESSIONS
ATMOSPHERIC IMPRESSIONS
IMPRESSIONS

Secure Open Space

"Claiming Space"

Waiting Plinth

Alley of Intimacy

Flexible Open Spaces

Social Corridor

(RE)CONNECTING MUMBAI
(RE)CONNECTING MUMBAI

IMPRESSIONS
(RE)CONNECTING MUMBAI
IMPRESSIONS

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Reflection
Reflection

First Impressions

For a student to go to India (or Asia) for the first time in my life it was quite the shock at first. Even after researching how Mumbai has grown over the centuries and researching how the people live there, it was really interesting to see such a different approach to living compared to the western world. Nevertheless there were some similarities to be found. Especially in the way we make our home our own.

The first impression I had of Mumbai (and Nallasopara) was the great divide between areas in the city. India is known for its caste system in which there are different caste where you are born into. Someone from the lowest caste won’t ever make it to a higher standard as they will always be seen as a lower caste member. This divide is striking and very visible after only one hour of walking through the city. Large skyscrapers tower next to low to the ground, cramped buildings.

I realized that it is not just a spatial disparity but a social one as well. A social polarization is happening in the city which is bad for the functioning of the city and its inhabitants. Not only is there this polarization but another aspect of this city is its buildings which are just ‘copied and pasted’. They are so similar but still everybody tries to make it their own place.

Something should and can be done to reduce the amount of social and spatial polarization.
Nalasopara East is can be viewed as an area with two kinds of dwelling types. The single story Baithi Chawls as well as the “handshake” chawls that have replaced some of them.

These handshake chawls have the same footprint which in turn make the buildings close to each other. Some less than 30 cm away from each other. Rarely do you see well ventilated ‘open to sky’ spaces which can be found a lot in gated communities on the other side of the railway track. In Nalasopara West you can find more dwellings for the MIG and HIG income groups. But only people who live there can enjoy these spaces. A little boy or girl from the baithi chawls will never have the same chances as a child from Nalasopara West.

In Nalasopara, many of the original single-storey Baithi chawls were replaced by four to five storey “handshake chawls” on the exact same footprint, and the distance between buildings are minimized, in some extreme cases, to less than 10 cm. This creates dark, long, and poorly Gated communities and the ghettoization of the marginalized people creates rigid borders, harsh contrasts and unfairness on many facets.

The increasing social polarization and with it the widening income gap leads to social and spatial inequalities in Mumbai, Nalasopara and other parts of the Global South.

This creates unfairness between the different income groups whereby the lower income groups are the ones who can’t make use of the city as they should. Other problems that arise are ghettoization, hard boundaries between groups/areas, unfairness in use of amenities and limited to no upward mobility.

The project therefore aims to create as system of buildings where the identity of the area can be seen as a whole but whereby every income group still can have their own qualities of life, their way of life isn’t what they want to have. It also should provide affordable housing for all groups, provide opportunities for income generation, opportunities for participation, opportunities to show individuality in this concrete jungle while maintaining appropriate borders which will be activated by the design. All the while encouraging diversity and reducing the amount of segregation while maintaining a certain balance to reconnect the city.

By using an empty plot of land in Nalasopara West as a starting point I want to propose a new development with an overarching architectural expression while creating a sense of diversity within the development. By creating four different typologies for four different income groups each group gets to have their own qualities which support their way of life. This projects aims to
be an example from which people in other parts of the city could choose which typologies they would like to use in their area.

In the end, the project hopes to propose an alternative development, which should show that other possibilities are at hand to rethink the current situation of social polarization and exclusion of the poor. Creating borders instead of boundaries where these different groups could interact as zones of exchange, while still having their own place in the city.
Research Methods and Approaches

The research done for this project consisted of three types. A background study was conducted with the whole group before we visited the site. During our field trip this study was followed by a micro ethnography study and after the trip extra literary study was conducted individually.

Background Study
During the first few weeks before visiting the site we conducted a background study with the entire group. This study would give us insights into Mumbai and India from the 1500’s to the current city. This study included a typological and morphological analysis. But it also included hard and soft data such as the number of inhabitants, demography, climate, economy et cetera. But we also studied the spatial information of different projects that have been built in Mumbai and the surrounding area. This research was compiled into a collective research booklet. The books “Arrival City” and “Building and Dwelling” were important to understand how these cities act as a whole and which areas are important to look at. These books made me curious about the social struggles and the social developments inside the city.

Site Survey
The site survey was done in a combination of writing and visual ethnography. By being in the place we observed, identified, experienced and recorded our experiences and findings. This research was made into the patterns of inhabitation. These patterns are key points of how these people live, work, interact and make use of their space. All these different patterns make up our Book of patterns. Together with an essay in which we compared these patterns to the patterns of the Netherlands I reflected upon the different patterns and I could identify similarities such as the individualising of your home. We have to have mass housing but people just want their own place. This was something which I was really intrigued by because you need to design for this individuality of people.

Literary Study
After the site survey I kept reading on the problems of social polarization in India and the problems which come from this polarization. Together these different stages compliment each other very well. I got to experience the life of an average Indian which I used in my design process while the bigger overall study helped me whenever I got stuck. This brings together an approach which makes sure that the problems and issues are addressed from every angle.
Research & Design

When we arrived back in the Netherlands we had to formulate our own problem statement and with that a research question. My main research question was:

How can a mixed-use, mixed-income housing development in Nalasopara stimulate the development of socially depolarized sustainable urban settlements?

Throughout the design process my sub-questions changed as sometimes they didn’t quite fit the main problem anymore or they were going off track. But the main research question can be divided into these sub-questions.

What are the needs and aspirations of each different income group?

What are the dwelling qualities for each income group and which housing configuration fits these needs.

What are the strategies for mixed income housing?

What operational model could be used?

In what way do the Authority, sponsor and end-user participate in this scheme?

The research formed the knowledge needed to answer these questions. These questions formed my requirements for the design. Especially the needs and aspirations of the different income groups was essential to designing the different typologies which are in the new development. This did take me a long time to come to the right design solution. Parts of this were to my lack of knowledge other parts were due to other personal circumstances which inhibited me from continuing with my research and my design process. But whenever I got stuck in my design process I would get back to my research. This would help me in the design while the design sometimes helped with the research as well as a random intuitive design example would question or strengthen my research.
The global housing studio was a fresh new way of looking at how people live. I have always been used to designing projects for Dutch people and you don’t really consider anything else. To design something in Mumbai, a place where I have never been, was really challenging. There are many aspects to take into consideration. Not just the typological and morphological but also the way they design and build in this part of the world as well as certain issues considering density and affordability. The studio required me to address many different problems which were quite new to me.

The patterns of inhabitation was an example of aspects of the studio of which I never really thought about. Especially with the patterns of Dutch housing you would expect that you know them but it was very interesting once you really get into them and see how we live and what we do to make our homes our own. To be able to compare this to the Indian patterns was really interesting. It really makes you look at who you are designing for a little different. A new fresh look which only adds more to your design. It is this perspective of the way people live that I think is very important in designing (mass)housing. It isn’t just a building that people use but a dwelling is something where people spend a large part of their life in. I think this changed my perspective as an architect.

To achieve this large project I had to keep zooming in and out on various scales. It was odd but also very refreshing to design on a much smaller scale for the building technology early on in the process. It offers a new way of thinking. Instead of designing something and figuring out how you are going to build it you start to think about the way they build before most of the design was thought out.

I think that this studio requires a discussion on how we as architects design for the ever changing need of people. Our lives today are radically different from how they would have been had we lived 100 years ago. As an architect you need to find the right balance between top down and bottom up approaches to keep your design relevant. The idea that I have brought up is a system, a framework, which is very efficient. The more you go down to the level of the end-user you start to see more bottom up approaches where the architect can give an idea of how you would design/build but not necessarily the way it has to be. It is not harshly defined. It is open for change. This discussion has to be ongoing for ever. Otherwise you end up with building projects which get demolished 30 years after because they don’t comply to the current rules and guidelines.
Ethical Issues and Dilemmas

As stated before, it was the first time for me to be in a country in Asia. Although I have been to Tunisia which is not western I still had to adapt. For the Indian people it was different to see us as well. Just some people (students) who ‘invade’ their homes for the sake of their journey towards their degree. That might be something that could have effected our research on site.

We only had a short amount of time on site to take pictures, talk to people and record and observe everything going on in our area. Sometimes it seemed as we just barged into a home and left as soon as we had our information. Though it never felt that way. Most of the people we talked to were very welcoming and open to our questions. Even though, It might have been better for me to go back to Mumbai at least once to discuss my findings with them and to see if they are correct as they would see. For example the aspirations and needs is something I have observed in a small period of time.

Another ethical issue was the quality of living. For me it was quite shocking to see how many people lived in a dwelling of only 22 square meters. In the Netherlands we think 38 square meters for 2 people is already quite small. At some point you have to question if you need to use these Dutch perspectives in your design but at the same time, these ideas/design might now work because their society is so drastically different. It was really interesting to with a different view to these problems.

One of the main issues I had during this design process was the year 2019 in itself as well as my mental health. A lot has happened this year which took my mind off of my design and I can see that I never fully recovered. Although I think I could have done better if all those awful things did not happen, I do think I delivered a graduation project to be proud of.


Govindarajan, V. (Nitin Sharma). *$300 house* - India. The Tuck School of Business.


