MODULAR HOUSING

By

MOHAMMAD ANSARI TASLIM

A REPORT

Submitted in partial fulfillment of the requirements for the degree of Bachelor of Architecture.

University of Mumbai

2018

AIKTC
SCHOOL OF ARCHITECTURE

CERTIFICATE

This is to certify that the Design Dissertation titled **-DESIGNING A HOUSING MODULE FOR THAKKAR BAPPA COLONY KEEPING THE CONTEXTUAL/CIRCUMSTANTIAL GIST.** is the bonafide work of the student Mohammad Taslim Ansari from Final Year B. Arch of AIKTC School of Architecture and was carried out in college under my guidance.

Sign of the guide:

Name of the guide: Prof. Shraddha Kadam.

Sign of the Dean: _____

Date:

DECLARATION

I hereby declare that this written submission entitled

“DESIGNING A HOUSING MODULE FOR THAKKAR BAPPA COLONY KEEPING THE CONTEXTUAL/CIRCUMSTANTIAL GIST. ”

represents my ideas in my own words and has not been taken from the work of others (as from books, articles, essays, dissertations, other media and online); and where others’ ideas or words have been included, I have adequately cited and referenced the original sources. Direct quotations from books, journal articles, internet sources, other texts, or any other source whatsoever are acknowledged and the source cited are identified in the dissertation references.

No material other than that cited and listed has been used.

I have read and know the meaning of plagiarism and I understand that plagiarism, collusion, and copying are grave and serious offenses in the university and accept the consequences should I engage in plagiarism, collusion or copying.

I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact source in my submission.

This work, or any part of it, has not been previously submitted by me or any other person for assessment on this or any other course of study.

_____

Signature of the Student

Mohammad Ansari Taslim

Roll No: 14AR04

Date: Place: Govandi,Mumbai.

INDEX

ACKNWOLEDGEMENT

First of all I would like to thank my Mom with the initiative and help of whom this thesis research has been possible , I would like to thank my class in charge Prof. Abhisekh Kadam for selecting such topic , Prof. Siddhesh kolambekar for guiding me in all the aspects as my thesis guide , Prof. Punam Mahatre for scheduling the academic thesis panel for better output , Prof. Mandar Dhuri sir for workshops , Prof. Sujit Parab , Vishal Solanki sir, Vishal Shilpi sir for inspiring me and clearing doubts, Pawan sir for research , Mausami maam ,Prajakta maam ,Vinaya Dhage maam , Pooja Maam for discussion , Preeti Pansare maam and Pooja Ugrani maam for finding case studies , Sonam Ambe maam for giving her thesis research done on same topic and My guide Prof. Shraddha Kadam maam for correcting me.

I am greatly Thankful to my younger brother , my friends Suraj Chauhan ,Puman Badgha , Devendar Chorotiya (residence of Thakkar Bappa Colony) for documenting site and collecting data , my junior Sadaf Siddique and my my classmate Azad R. Mulla for helping me in writing book .

ANJUMAN - I - ISLAM'S KALSEKAR
TECHNICAL CAMPUS, NEW PANVEL
ENGINEERING & TECHNOLOGY
ARCHITECTURE
PHARMACY
AKTC
NAVI MUMBAI - INDIA

ABSTRACT

This thesis project attempted to find an appropriate alternative to the current model of informal settlement that is transformed from "chawls" and in reality further slumming the city , by considering a case of Thakkar Bappa colony . Also aims to improve the small scale industrial growth and living condition of community and attempts to preserve the originality of the space keeping its vibrancy intact, where the user and the work culture form the driving forces of reconfiguration**. The thesis also poses a question on the current perspectives of looking at remodelling urban settlements which squeezes out the vibrancy and the cultural context of the place.**

Fig:01 image of current working model of informal settlements

INTRODUCTION

According to the UN, at least one third of the global urban population suffers from inadequate living conditions. Lack of access to basic services (drinking water and/or sanitation, not to mention energy, waste recollection, and transportation), low structural quality of shelters, overcrowding, dangerous locations, and insecure tenure are the main characteristics normally included in the definitions of so-called **"informal settlements".**

In academic and government documents, "informal settlements" is the label typically applied to these areas .An informal settlement AKA: shanty town, fovea, slum, squatter camp or spontaneous settlement, is a settlement in which land is not owned but is built on with whatever resources are available .Informal settlements are groups of people living on land they have no legal claim to or the homes and land don't follow codes and regulations. That those communities are not in compliance with building norms and property and urban planning regulations is often given as the main reason for qualifying them as "informal". Also defined as "irregular", they can easily be called "illegal", and their inhabitants subsequently criminalized, displaced, and persecuted.

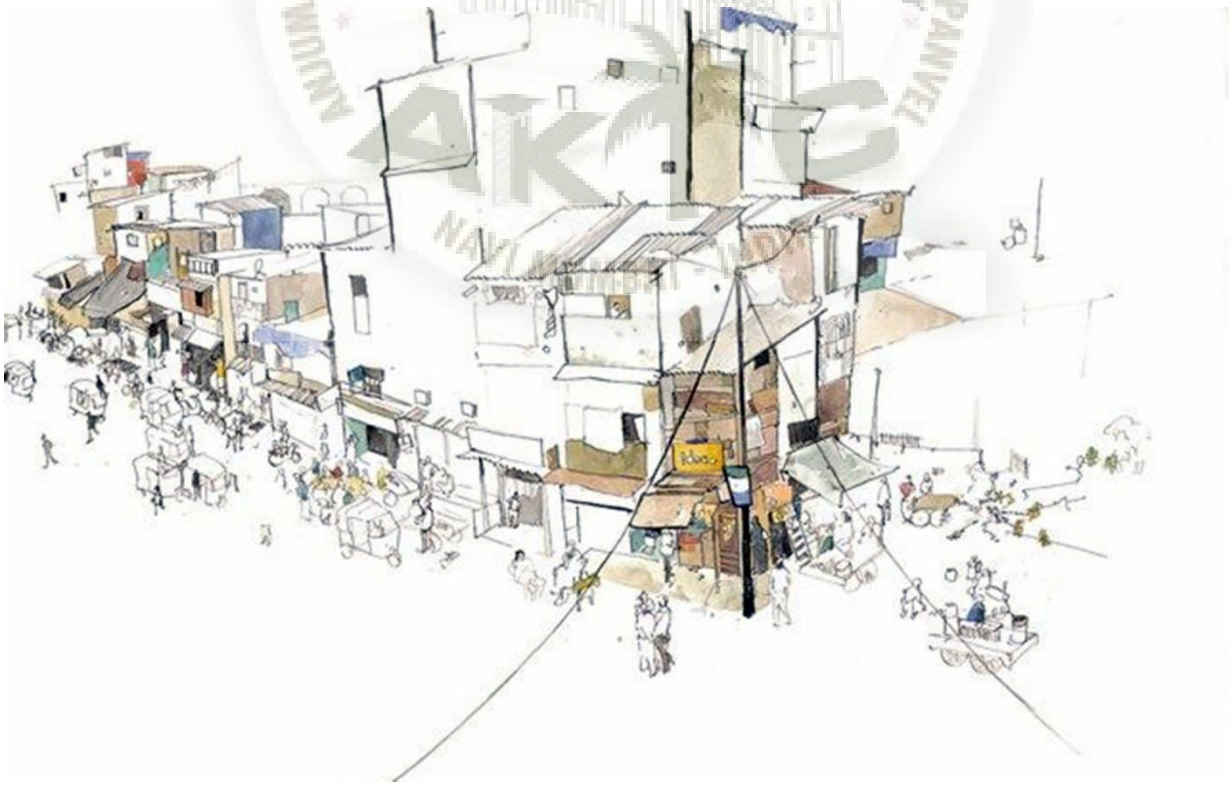


Fig:02 image showing informal settlement and its allied activities.

Informal settlements – are residential areas where..

- Inhabitants have no security of tenure vis-à-vis the land or dwellings they inhabit, with modalities ranging from squatting to informal rental housing.
- The neighbourhoods usually lack, or are cut off from, basic services and city infrastructure and
- The housing may not comply with current planning and building regulations, and is often situated in geographically and environmentally hazardous areas.

Fig:03 images showing conditions of informal settlements.

In addition, informal settlements can be a form of real estate speculation for all income levels of urban residents, affluent and poor. Slums are the most deprived and excluded form of informal settlements characterized by poverty and large agglomerations of dilapidated housing often located in the most hazardous urban land. In addition to tenure insecurity, slum dwellers lack formal supply of basic infrastructure and services, public space and green areas, and are constantly exposed to eviction, disease and violence.

Living in an informal settlement can be dangerous. Drinking water is often dirty and sanitation poor, leading to insect infestation and harmful pathogens. Access to medical facilities and professionals may be limited. Children and pregnant women are especially vulnerable. But the social interaction can be found more as compare to any type of settlements.

Informal settlements are found across the globe, mainly in developing countries in urban areas. These settlements are growing and an estimated 1 billion people live in slums in developing countries. The dwellings are often constructed of random found materials like reclaimed metals. They are make-shift and poorly constructed.

There is symbiotic relation between Mumbai and its migrants which makes Mumbai alive also Its locus of economic activity attracts an influx of global capital as well as migrants drawn from across the country in search of economy. Due to this Mumbai ever faces acute pressure of the land , which resulting over half of the population residing in informal settlements- defining the social , culture and community , since most of the migrants are from nearby villages they represent their culture in the limited space available. **A very initial shelter for migrants in metropolitan city like Mumbai is " Informal Settlements".** That can be found in all over city which is organic development of houses with infinite complication ,whose true solution go beyond the limit of Architecture.

Following a tradition most probably started before the mid-19th century in some English cities undergoing industrialization processes and migration from the countryside, our contemporary media still often depict the inhabitants of informal settlements as the troublemakers, the thieves, and the lazy. It is hard to find positive stories about their daily struggles for better life conditions, rights, and dignity .And In cities around the world, housing for such settlements usually get short shrift. It evolves under the strictest constraints of cost, spaces, materials, and so forth. Yet ironically, this is what generates its singular character, specific to the city and to the time. The housing industry of India is one of the fastest growing sectors. A large population base, rising income level and rapid urbanization leads to growth in this sector. In the Federal structure of the Indian polity, the matters pertaining to the housing and urban development have been assigned by the Constitution of India to the State Governments. However, the Union government is responsible for formulation and implementation of social housing schemes.

It is clear that we urgently need a better approach to naming and framing such areas broadly called “informal settlements”—one that is respectful and sensitive to the people who live there and that could better promote the transformations that our cities and our societies need.

Changing the words means changing the concepts; changing the concepts means changing the way we understand (or not) complex phenomena and are able (or not) to transform them in a positive way.

Neither informal nor irregular, these are, above all, human settlements. Or even better: they are the city produced by the people: the people who claim their rights to live, build, and transform the city.

HISTORY OF INFORMAL SETTLEMENTS IN MUMBAI

Study of house types in Mumbai says that there are seven types landscapes

1.1 agrarian landscape with strategic points for trade and control.

Fig:04 image showing fishing and agriculture.

Initially Mumbai was a set of seven island marked with fishing village, paddy fields and agricultural villages .Villages were made up of small single family houses which were densely packed together. Economy was depend on fishing and agriculture.

1.2. landscapes of trade rout and market place

Fig:05 land development near harbor line.

Mumbai was strengthened by the colonial ruler ,though natural harbor at the south in 15th century. Large amount of goods passed through Mumbai harbor resulting adjoining lands were developed into market. For real estate development farm land is used .Wadis were constructed by land owner and rented .Houses in this wadis set of building and shops in front and the houses behind and higher floor.

https://critmumbai.files.wordpress.com/2011/10/house-types-in-mumbai-final.pdf

1.3.an industrial city

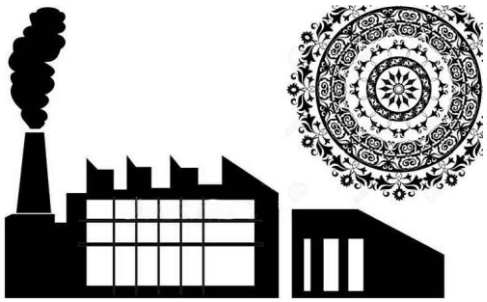


Fig:06 image showing industry and textiles.

The textile supply from America got over after American civil war. Britisher's realized that they need other places to manufacture textile .Thus number of textile mills were set up in Mumbai during second half of 19th century .Mumbai had already became one of the most textile producing center in the world .Thus one of the most famous housing types came into the picture in the form of chawls .Multi tenanted building with shared utilities, building by mill owner for working class people.

1.4.colonial presidency capital

Fig:07 image showing mass housing.

The colonial government was forced to get actively involved in government issues. Organizations and institutes were set up during of 19th century .Mass housing types of department was introduced. Predominant economy of the city was based on industries for its expenditure.

https://critmumbai.files.wordpress.com/2011/10/house-types-in-mumbai-final.pdf

1.5 .state capital

Fig:08 image showing slums.

Mumbai became the capital of Maharashtra state in 60.Apartment, bungalows became predominant housing type. Slum started growing. Came rent control act. Housing delivery was managed by state agencies & cooperative housing society .The building group was born during this time.

1.6 .over going metropolis

Fig:09 image showing migrations.

The rate of migration into the city was very high in 70sThus discussion on slum became intense .Builder and developers group became the most important agents to delivery of housing system.

1.7.base for global capital

The state adopted liberation policies .The city transformed rapidly in 90s.Since 80s the industries of the city started dismantling. Large infrastructure projects, rehabilitation, malls, multiplex luxury township redevelopment came into picture .FSI for slums and redevelopment .Agrarian land got converted into apartment .builders, developers NGO'S state donors builder, slum lords become most important actors in housing delivery system.

https://critmumbai.files.wordpress.com/2011/10/house-types-in-mumbai-final.pdf

AIM:

Designing a housing module for Thakkar Bappa Colony keeping the Contextual/Circumstantial gist.

OBJECTIVES:

- To study the various formal as well as informal applications of clusters in Mumbai City.
- To improve the standard of living, social and economical uplift men of Colony /community.
- To recognize all the existing typologies of the colony-
- To create recreational space for community-
- To prohibit and avoid the formation of consecutive Dharavi-
- To find the appropriate solution of difficulties in various particulars such as-ventilation, drainage, congested gully and hawker menace-

SCOPE:

The life style of people is quite sophisticated in this vicinity, being more specific the order goes as each room including the living area is extremely crowded and small in size. Generalizing the statement with abstract example, could say that there are small rooms with up to 24 people living in it, widening imagination, the bodies cover the entire width of the floor space when laid side by side, with the average family income, say 10 to 15 thousand per month. Meaning, there are mixed categories with fine adjustment ability i.e., although the houses are small people complete their small-scale industry task in the same room where they live, cook, eat, and sleep with the shops being adjacent to their living space either on the same floor or the loft one. Housing typologies in exclusive varieties including materials, functioning and planning can be understood. One of the cons, the houses being congested discern the fact of lack of proper ventilation area leading to stinking and odor issues. As the place is located in a metropolitan area at a central location close to Kurla railway station and the national highway It is easily accessible from all over Mumbai, which in turn is one of the reasons for increasing population of migrated labors and workers towards Thakkar Bappa colony, making it a common issue that can

be put into frame as 'Factors of earning are what is bounded to attract people to come live in Thakkar Bappa Colony'. It is a point of attraction for the shoe business community including the ones living there and the other sole makers. Thus, the number of people increasing per day generates basic living issues to system and its surrounding.

LIMITATIONS:

- Restricted to a single community.
- The designing of the module is specific to site only.
- The module needs to be of a confined height.
- Different views and judgment of present scenario apart from Architectural aspect.

RESEARCH METHODOLOGIES:

→ Site visit to perceive the intent of:

•Users

•Activities

•Spaces

→ Mapping of:

•Roads

•Pathways

•Open spaces

•Religious spaces

•Industries

•Facilities in Locality.

→ Case studies of similar settlements through:

•Books

•Net surfing

•Site Visit

•Relative analysis.

→ Studying all the divergent literature about colony and the surveys to accomplish a Comparative .

analysis.

→ Justifying the site.

→ Case studies on:

•Similar project

•pros and cons

•MAHADA

•SRA

•Proposals

→ Site selection

•Brief introduction about site

•Climate

•Geographical condition

•Space program

•Resolution by comparing their current requirements.

HYPOTHESIS:

SMALL CHANGES PROTRUDING BIG IMPACT …….

The lifestyle of people has changed a lot, they have started new ways of living, which is evolving day by day. The pace of Mumbai is increasing with unstoppable speed, but somewhere in cases of low cost housing, labor community, slums rehabilitation, the time has stopped**. These things are neglected, but these entities are intact to each other and actually complete the puzzle.** And gives birth to new problems. These informal settlements follow a self evolving order of random pattern, which has evolved by its own need.

Thus proposing a housing in a modular manner might be the only solution to control the urban sprawl which is informal settlements , that does not allow Mumbai to become a city like Shanghai .also modular method is easy to be implemented in masses , it takes time to function at its peak that means can be modify as per time , space ,function and user by the users**. The experiment to recuperate social interaction spaces that has lost due to housing by realtors can also be implemented.**

SITE SELECTION AND JUSTIFICATION

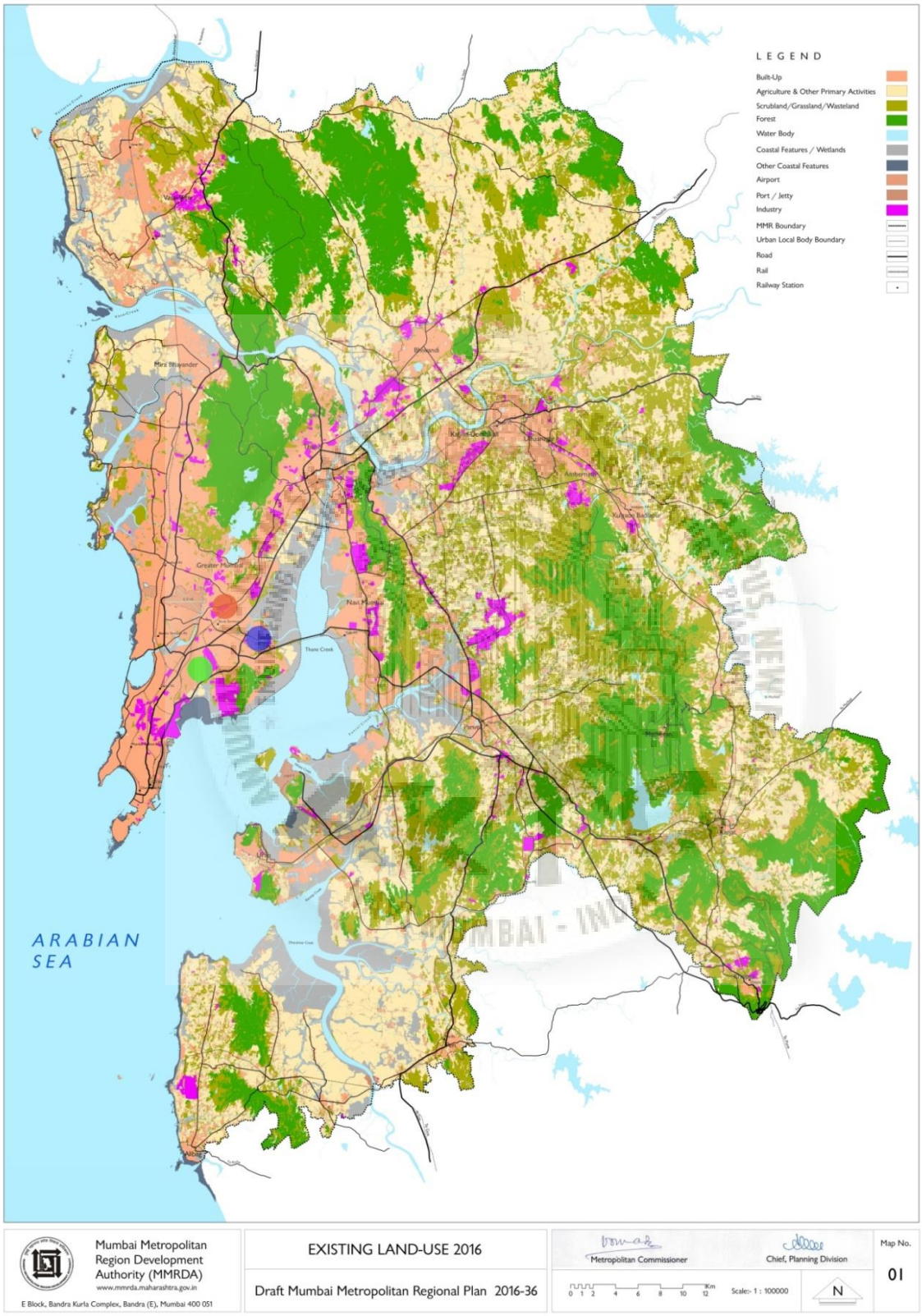
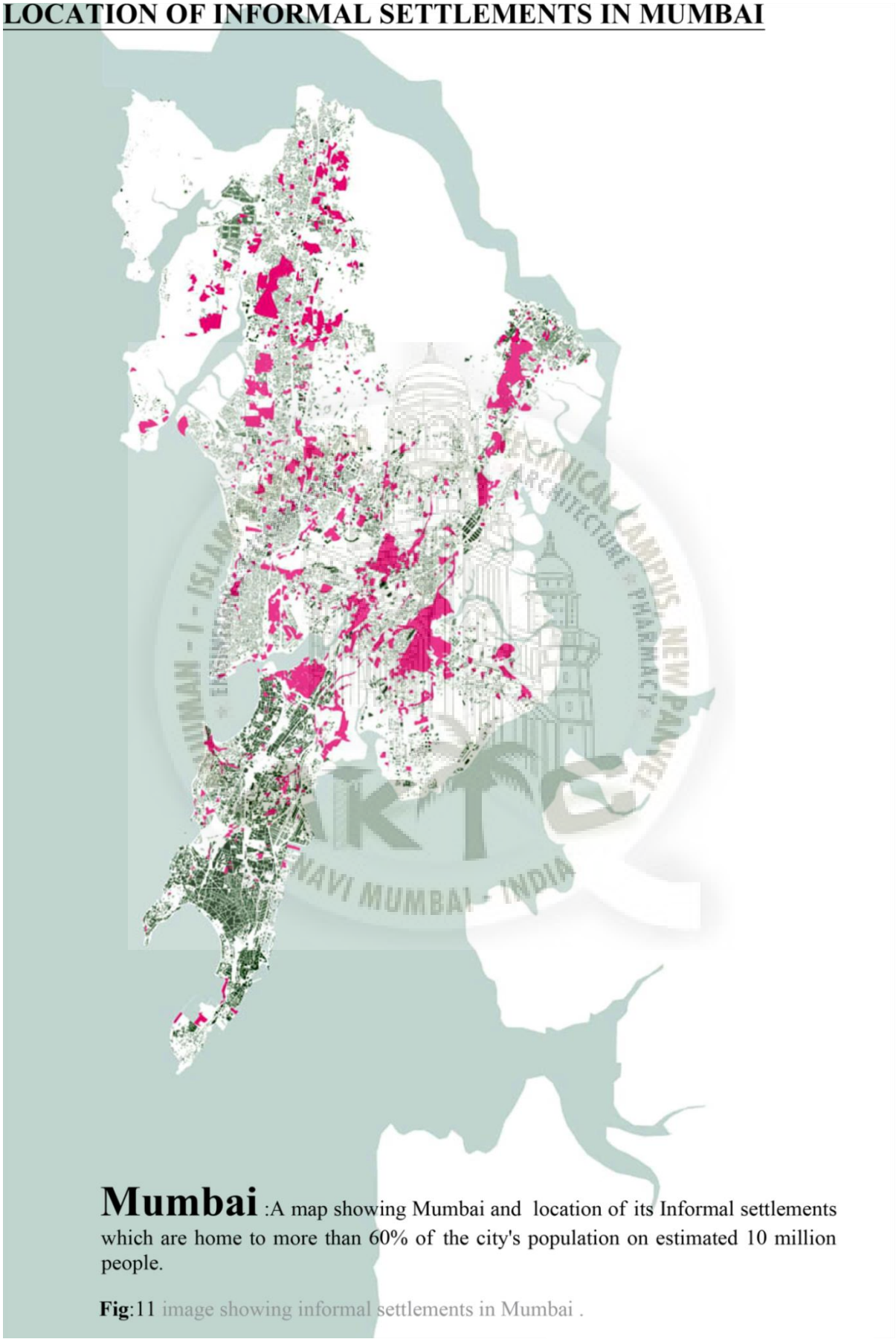


Fig:10 land use map of Maharashtra.

LOCATION OF INFORMAL SETTLEMENTS IN MUMBAI



Mumbai :A map showing Mumbai and location of its Informal settlements which are home to more than 60% of the city's population on estimated 10 million people.

Fig:11 image showing informal settlements in Mumbai .

Three sites were studied with similar attributes as mark on the land use map .The denoted with green dot is Dharavi ,red one is Kurla and blue is Govandi .After doing comparative analysis among these sites one site is selected for design dessertation.The selected site is marked with yellow dot on ward map shown in the figure below.

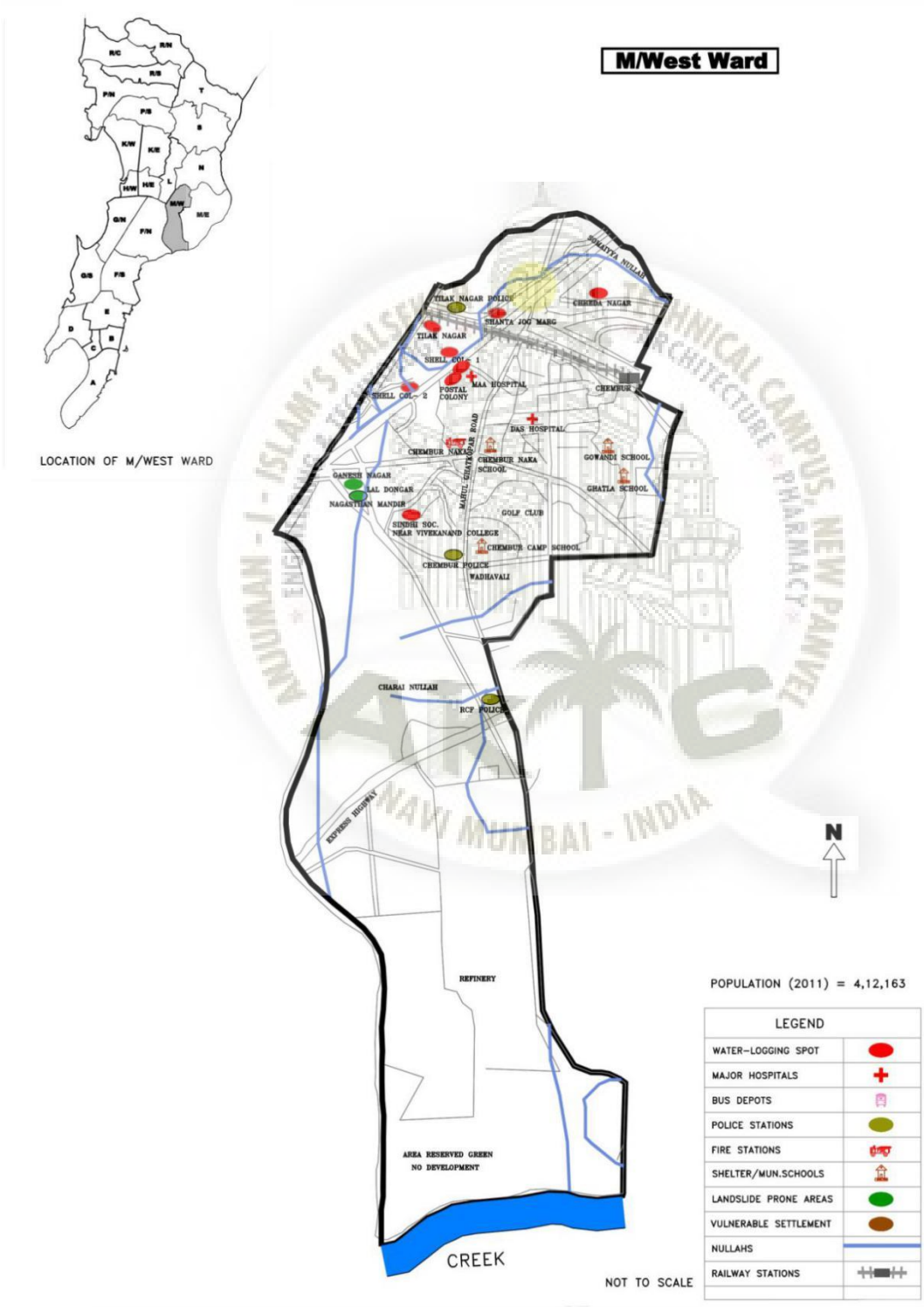


Fig:12 Ward map of Kurla.

SITE STUDY SHIVAJI NAGAR, GOVANDI MUMBAI.

Fig:13 Shivaji Nagar site plan scale 1:1000.

SITE 01 : Shivaji nagar ,Govandi.
AREA : 3250 hectare
POPULATION : 600000 approximately

Shivaji Nagar is located in Govandi (West), a suburb of Mumbai, India. this site has Mumbai's oldest and largest waste dumping ground, divided in plots by crossing roads and gullies.The site is located between Shivaji Nagar No :1 and Mankhurd. Mumbai's largest waste dumping ground is to its north, and to the east is the Thane Creek. This densely populated slum houses many people immigrants from north India mainly from Uttar pardesh, Bihar, West Bengal and Jharkhand . Mumbai is often seen as the land where even illiterates can make a fortune. However, that is not the reality.The site is surrounded by mountains of garbage from the dumping site, which is hazardous to its residents.

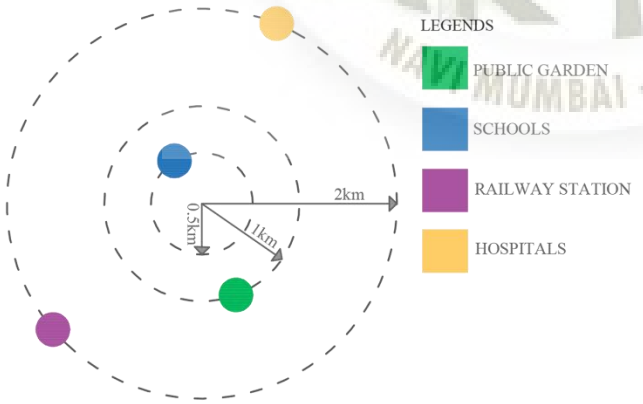
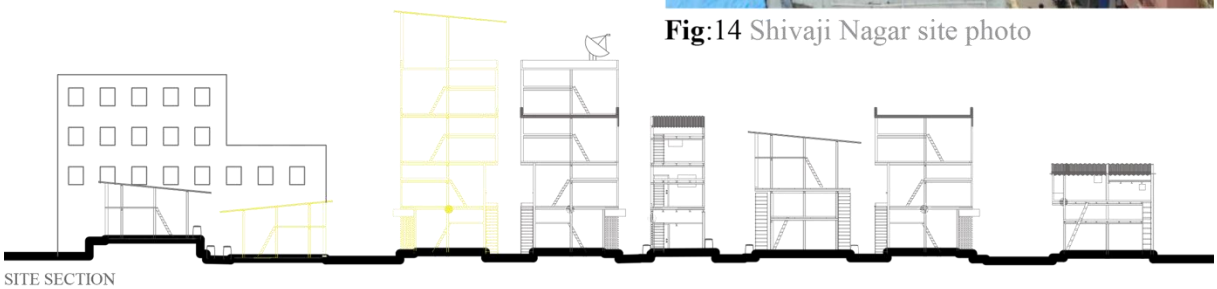


Fig:14 Shivaji Nagar site photo



SITE SECTION

SITE STUDY DHRAVI , MUMBAI.

Fig:15 Dharavi site plan scale 1:1000.

SITE 02 : Dharavi
AREA : 216 hectare
POPULATION : 869,565 approximately

Dharavi is a locality in Mumbai, Maharashtra, India. It is considered one of the largest slums in Asia.This site is famous for its population and trade ,also well connected to nearest transportation hubs.

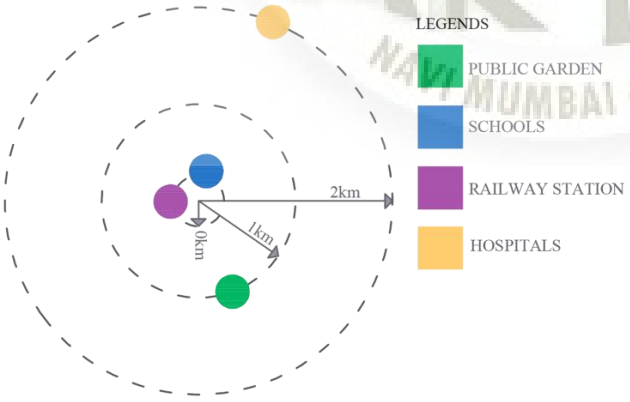
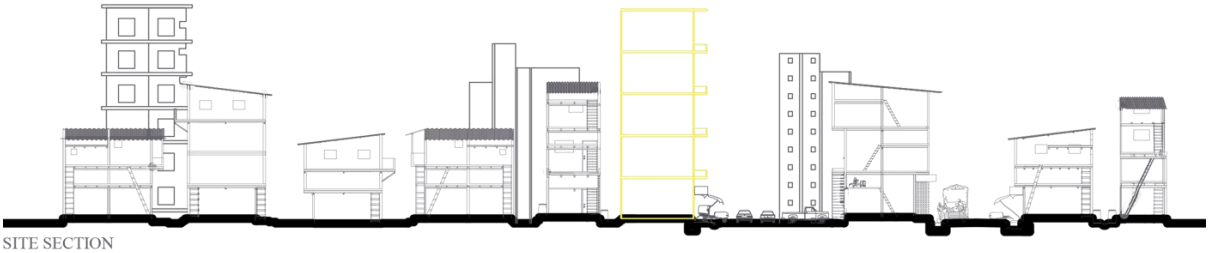


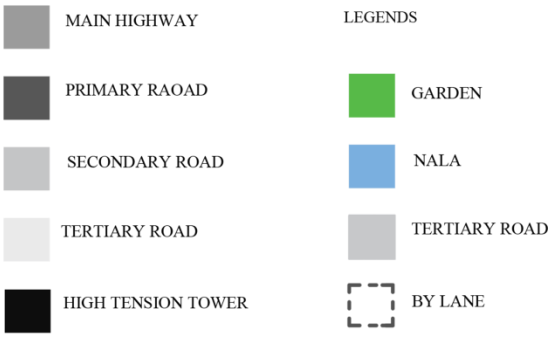
Fig:16 Dharavi photo



SITE SECTION

SITE SUDY THAKKAR BAPPA BAPPA COLONY , KURLA.

Fig:17 Thakkar Bappa colony site plan scale 1:1000.

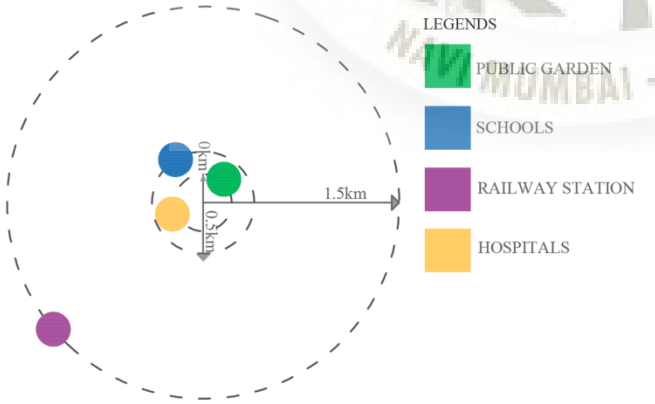


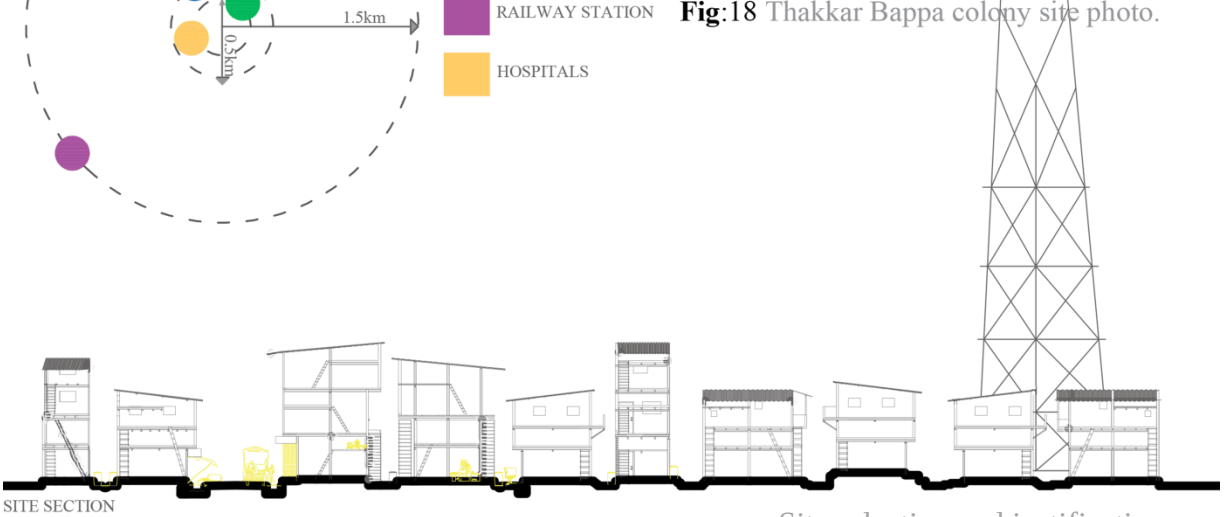
Thakkar Bappa colony originally was a refugee camp for the Kutchi people migrated during the division of India . In the late 1970's there was further migration from the Jeenagar community from the Rajasthan and Punjab. Gradually , Marwadi Chamar settled there and continued their Profession of foot wear making in the area .

Colony is well characterized by its strategic location connecting major areas of Mumbai and satellite city . Initially the shoes were sold to wholesale market in parts of Mumbai but now there are more than 500 shops and trade is reached all over the world.The entire land was marshy and get demystified with time .

SITE 03 : Thakkar Bappa colony , kurla.
AREA : 5.75 hectare
POPULATION : 10,0000 approximately

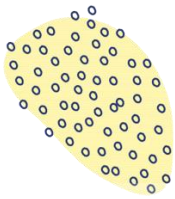
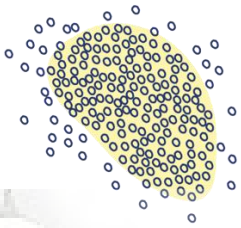
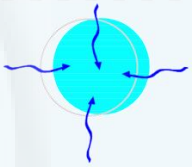
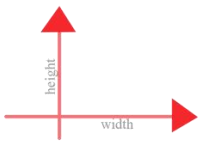
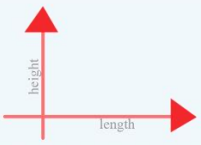
Fig:18 Thakkar Bappa colony site photo.





SITE SECTION

COMPARATIVE ANALYSIS OF SITE STUDIES.

Brief about sites	SITE 01: Shivaji nagar , Govandi. AREA: 3250 hectare POPULATION : 600000 approximately	SITE 02 : Dharavi AREA : 216 hectare POPULATION : 869,565 approximately	SITE 03 : Thakkar Bappa colony , kurla. AREA : 5.75 hectare POPULATION : 10,0000 approximately
Population density p/h			
Mode of Working pattern	Mixed use , small scale industries of different products ,definite commercial, residential and industrial spaces ,proper market .	Mixed use , small scale industries of different products , commercial, residential and industrial spaces are meshed together, import export of the products.	Mixed use , small scale industries of single products , commercial, residential and industrial spaces are meshed together, import export of the products.
Accessibility to the sites			
Climatic effect on the sites	Partially dipped in the rainy season	Partially dipped in the rainy season	Completely dipped in the rainy season
Availability of open spaces	4%	2.5%	1%
Type of property	Single ownership type of the land with the permissible F.S.I of 2.5 ,follows the photo pas system	multi- ownership type of the land with the permissible F.S.I of 6 ,follows the photo pas system.	Single ownership type of the land with the permissible F.S.I of 2.5 ,follows the photo pas system
Growth of the site.			
Inferences	The situation is under control many infrastructure is coming up ,on some of the portions rehabilitation is started ,to control traffic a flyover is on progress on the signal.	A proposal has been give by Lord Norman Foster to control the scenario in Dharavi and at small scale government body is working like proper drainage and waste disposal	The industry has reached at its peak .The only aim to earning family is to go one floor high for better survival at individual level also no one is thinking about better waste management of sole.

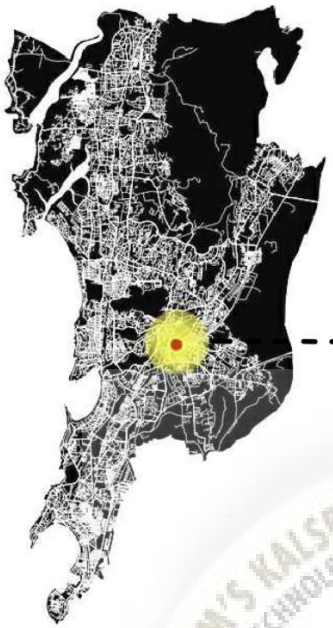
INTODUCTION OF THAKKAR BAPPA COLONY, KRLA.

Thakkar Bappa colony originally was a refugee camp for the Kutchi people migrated during the division of India . In the late 1970's there was further migration from the Jeenagar community from the Rajasthan and Punjab. Gradually Marwadi Chamar settled there and continued their Profession of foot wear making in the area .Colony is well characterized by its strategic location connecting major areas of Mumbai and satellite city . Initially the shoes were sold to wholesale market in parts of Mumbai but now there are more than 500 shops and trade is reached all over the world .

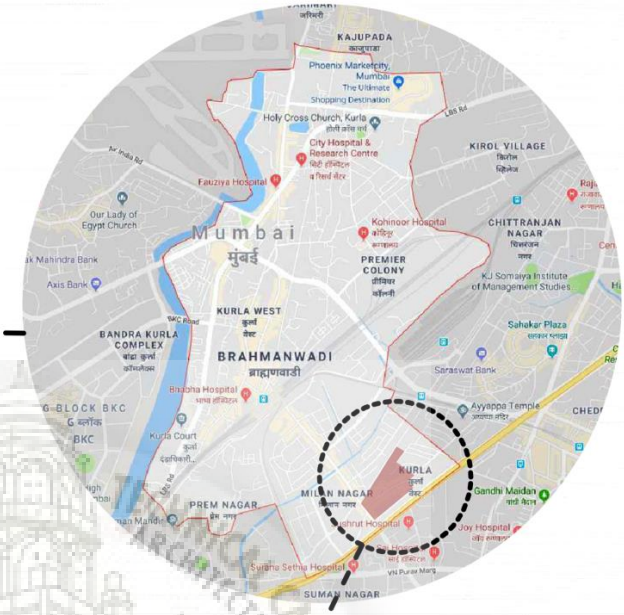
It reflects the radical socioeconomic changes in Mumbai **The fact that it stands unnoticed signify the state of infrastructure and the poor living conditions.** The spatial and the aspects namely the housing and the commercial structures, acute overcrowding, poor ventilation, the inadequate provision lighting, drainage, drinking water apart from the unavailability of basic social services form the static elements of the fabric. It is these static elements which prove the inadequate provision of services and the living conditions.

The settlement today stands as a big game in the footwear market exporting them in India and abroad; with an meticulously worked network both within the settlement and outside in the market . The settlement attracts markets not only from the city but also markets in the country. The settlement also has a large market base with respect to the raw materials such as ethyl flex, light weight sheets and buckles. It exports the material to other retail markets.

SITE - THAKKAR BAPPA COLONY LOCATION



MUMBAI



KURLA

THAKKAR BAPPA COLONY

Fig:19 image showing location maps of site.

SITE - NEIGHBORHOOD CONTEXT AND ACCESSIBILITY

LEGENDS

- HARBOR RAILWAY LINE
  CONNECTING PANVEL AND CST
- SV BARVE MARG
  CONNECTING SITE TO KURLA RL.STN.
- MAIN ROAD
  CONNECTING SITE TO TILAK NAGAR RL.STN.
- MAIN ROAD
  CONNECTING PANVEL AND CST
- EASTERN EXPRESS HIGHWAY
  CONNECTING PANVEL AND CST
- SITE
- TILAK NAGAR RAILWAY ST
  0.8KM
- CHEMBUR MONORAILWAY
  1.5KM
- KURLA RAILWAY STATION
  CONNECTING PANVEL AND CST
- SCLR
  1.5KM
- SUMAN NAGAR JUNCTION

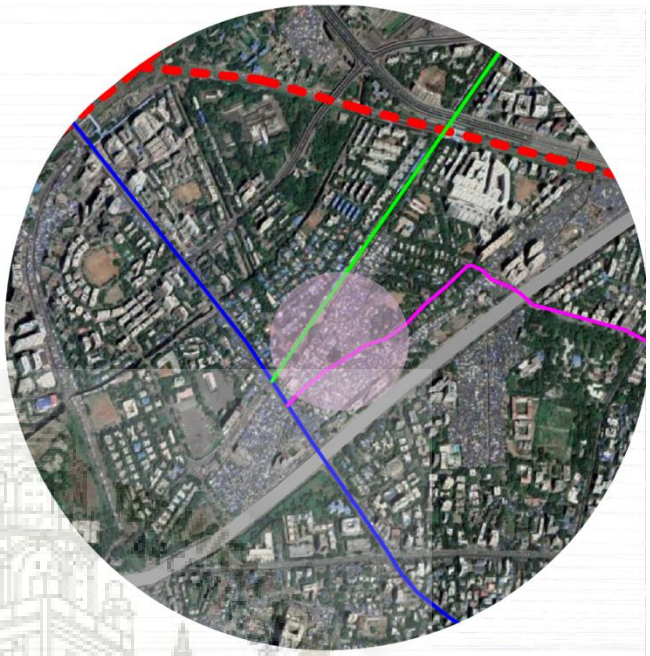
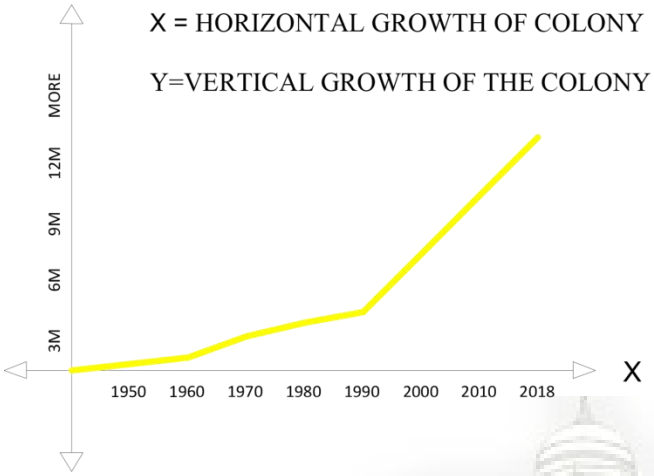


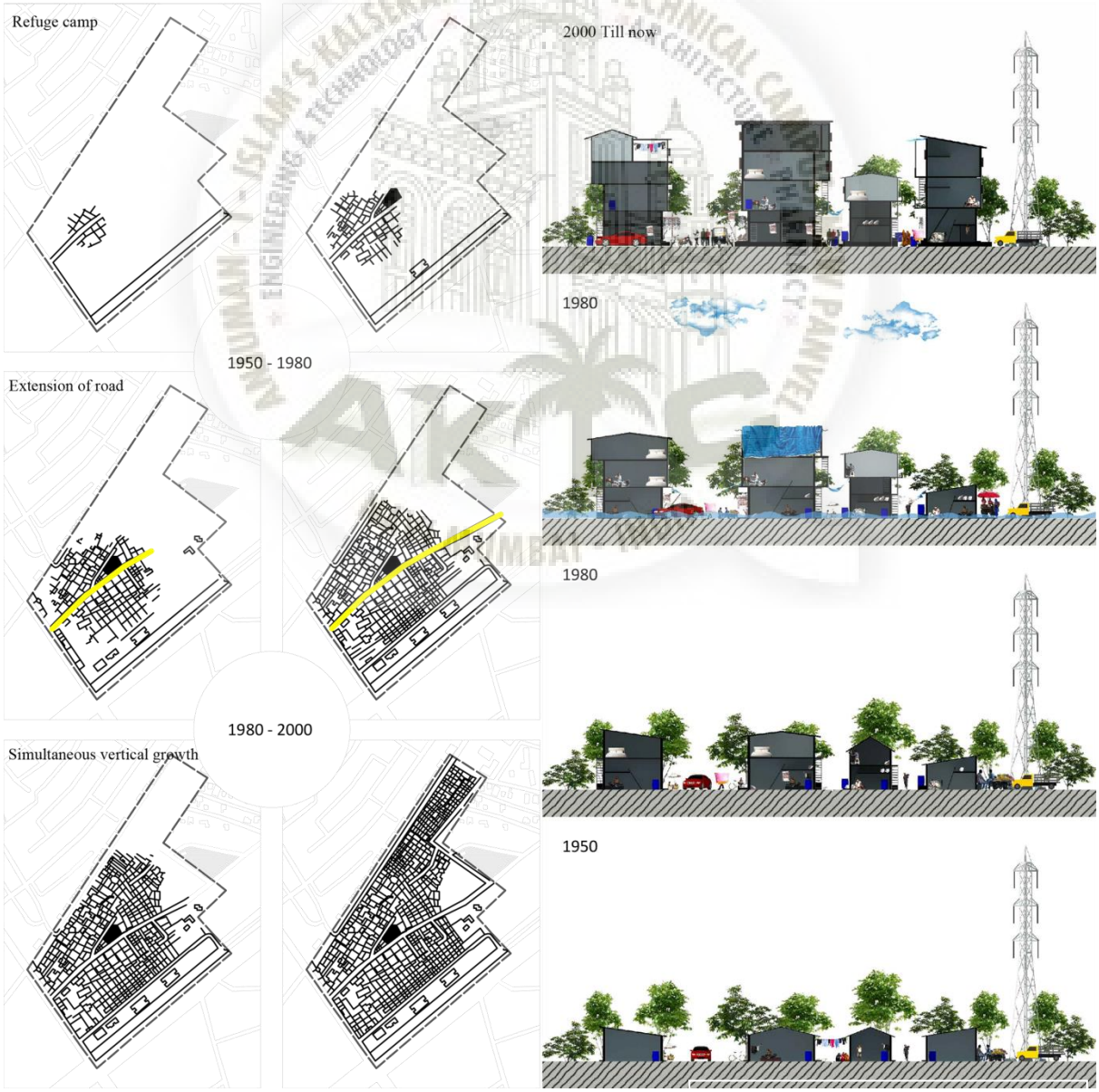
Fig:20 images showing neighborhood context of site

SITE - EVOLUTION



Thakkar Bappa Colony was a refuge camp ,.Gradually Marwadi Chamar settled there and continued their profession of foot wear making in area .The road accessing to the colony was initially till the camp and then extended as the informal settlements increased and road get connected to the eastern express highway.In 1994 the the width of the road has been widened and the settlements which were in road was shifted to Adarsh Nagar . due to its locus of hand made foot wear business in small scale industries , more people migrated there and the settlements starts growing vertical from ground to first to second floor...

Fig:21 images showing site evolutions.



SITE - ROAD NETWORKS

Fig:22 secondary road site.

LEGENDS

MAIN HIGHWAY -15M WIDE

MAIN RAOAD -9M WIDE

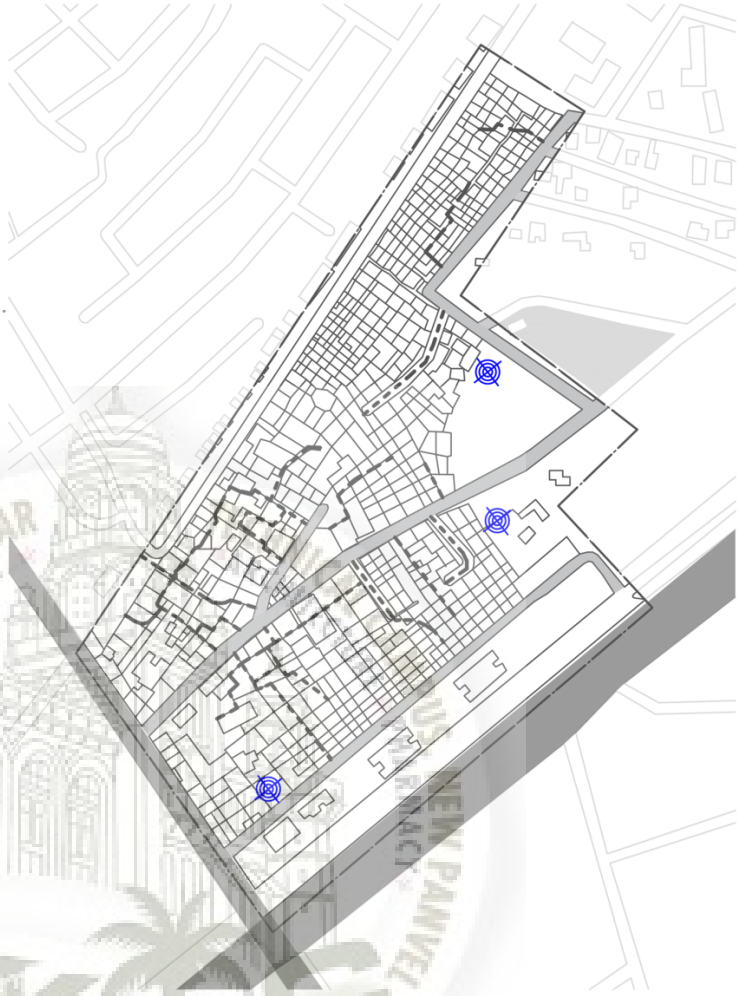
SECONDARY ROAD -7M WIDE

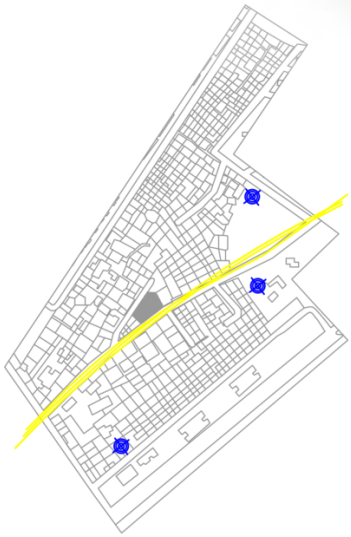
TERTIARY ROAD -7M WIDE

BY LANE - VARIABLE

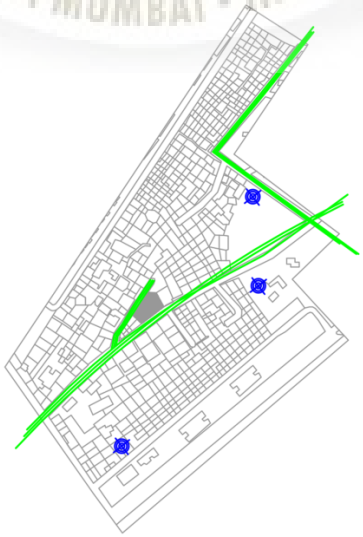
HIGH TENSION TOWER

Fig:23 tertiary road site.

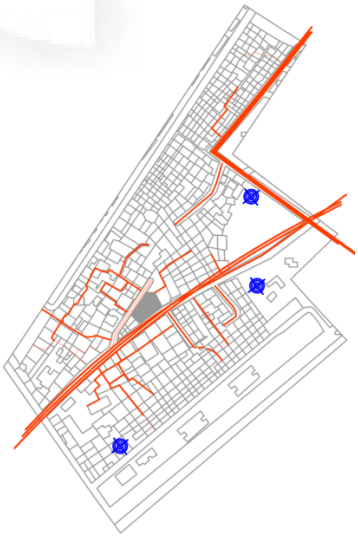




TRUCK ACCESS



CART ACCESS



PEDESTRIAN

SITE - MAPPING PUBLIC FACILITIES

LEGENDS

SCHOOL MARKETS RELIGIOUS SPACE HIGH TENSION TOWER

TOILETS OPEN SPACE HOSPITAL

Fig:24 site mapping public facilities.

SITE - MAPPING

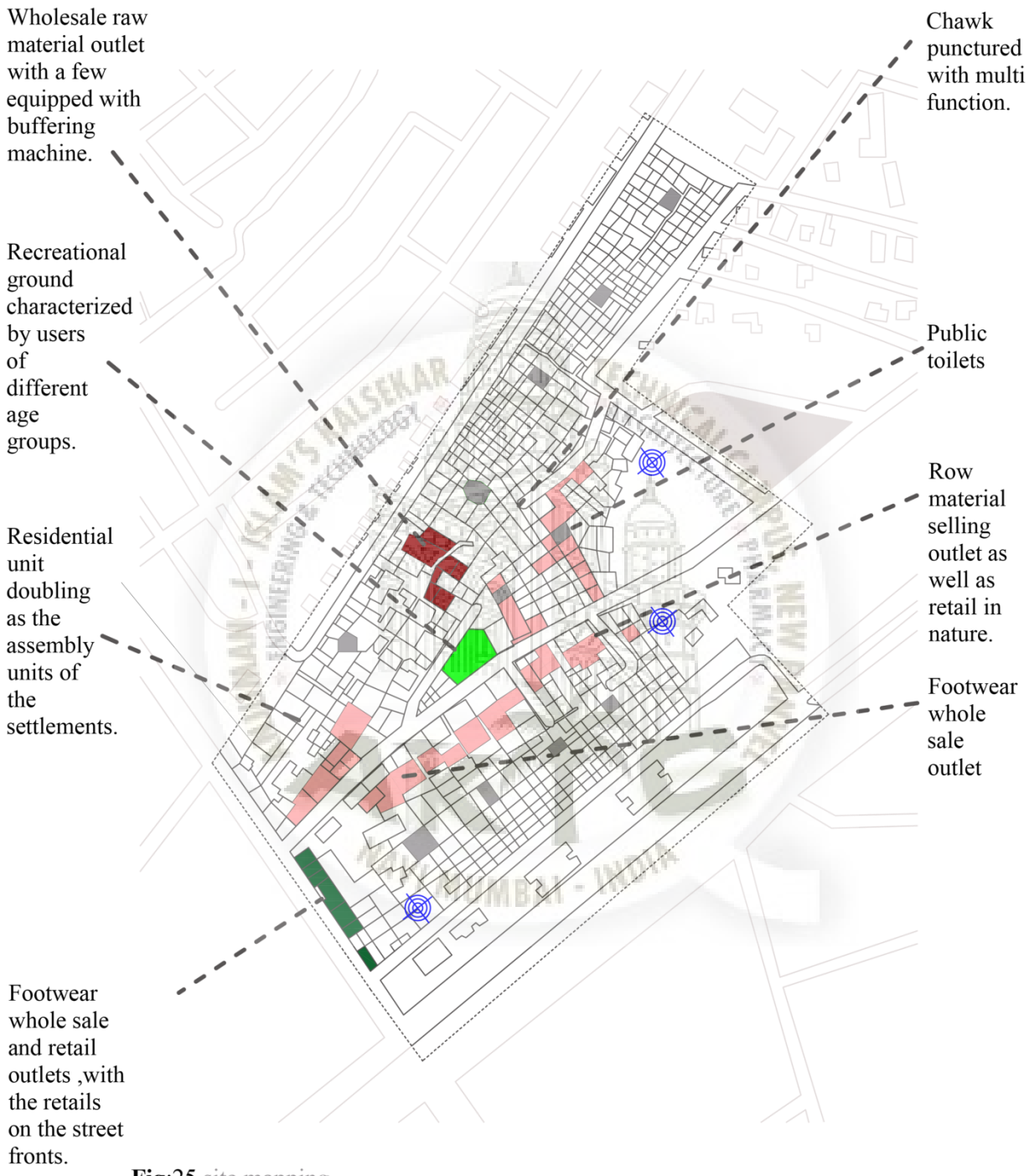
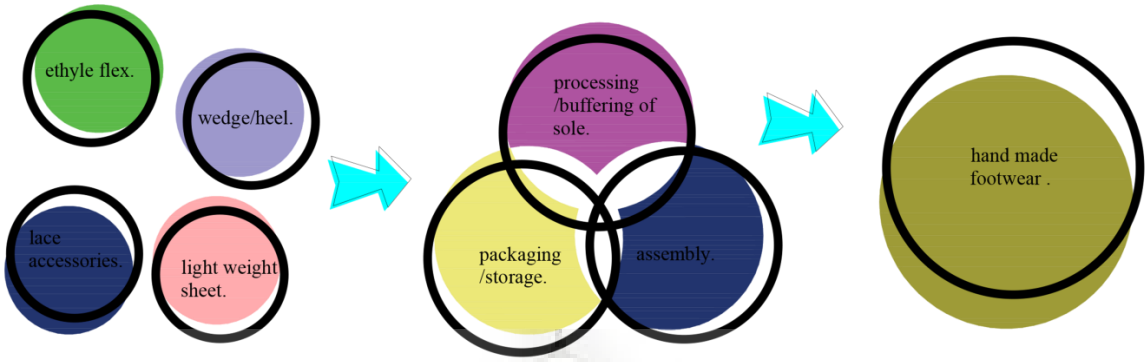


Fig:25 site mapping.

SITE - MAPPING LAND USE

Fig:26 site mapping land use.

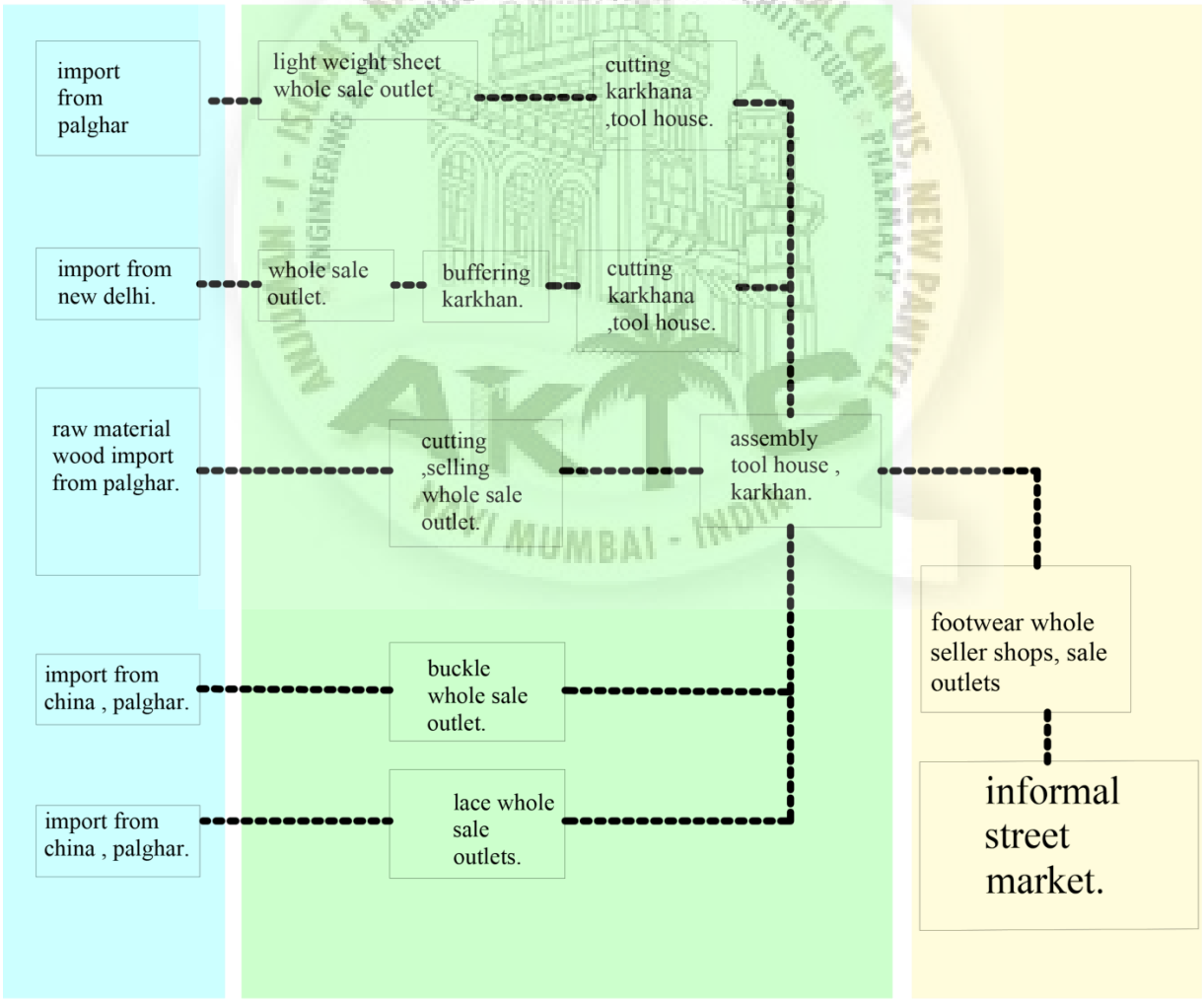
SITE - SMALL SCALE INDUSTRY HUB PROCESS



Raw material brought from different parts of the country and sold in the whole sale market.

Processing of materials and assembly managed by the manufacturer.

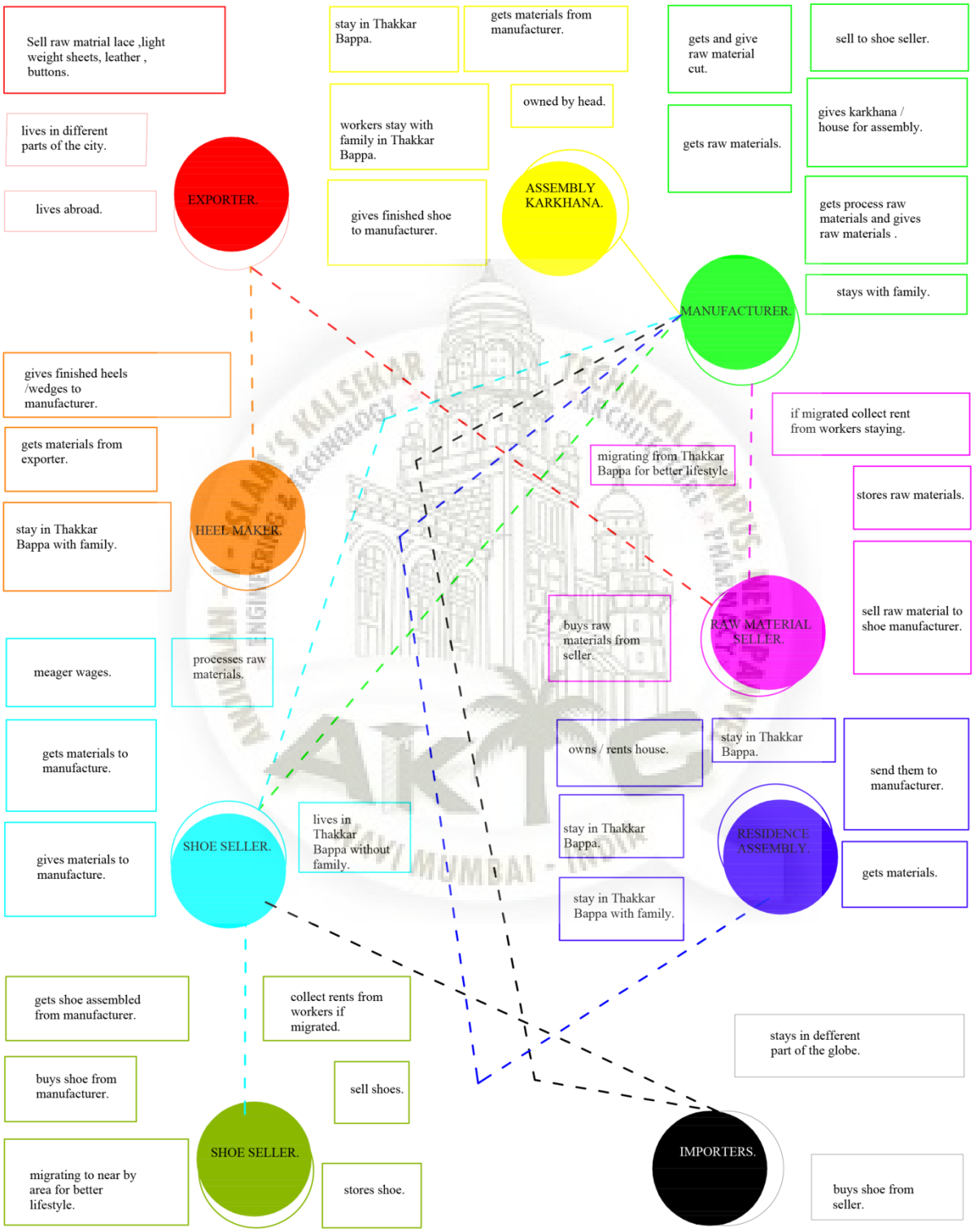
The product is sold in whole sale and retail market to other part of the city.



purchase Processing ,buffering and packaging on the site . Outlets .

https://issuu.com/dhanyap/docs/upgrading_thakkar_bappa_colony_-a_c

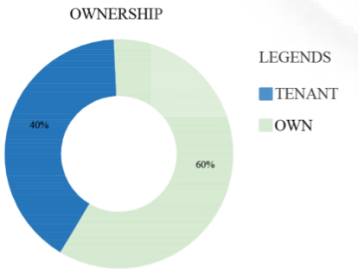
SITE - INTERDEPENDENCY WEB

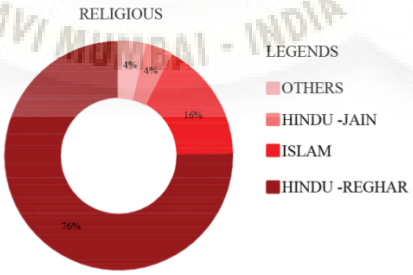


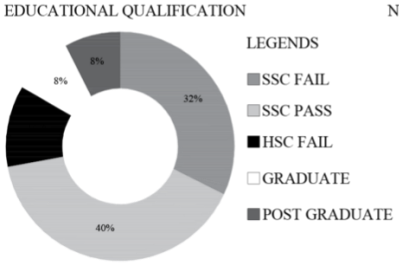
https://issuu.com/dhanyap/docs/upgrading_thakkar_bappa_colony_-a_c

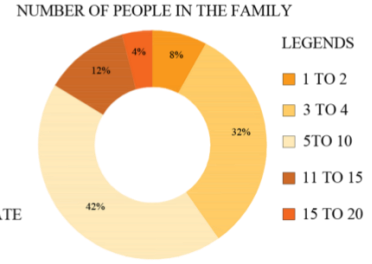
SITE - TYPOLOGY AND DEMOGRAPHY

Name	Thakkar Bappa Colony.
Typology.	Slums
Nature.	Mixed use footwear manufacturingand selling closer to transport facilities .
Object level.	Pakka structure ,ladi by lane , finished roads .
Settlement level.	Formal structure ,informal structure.
Neighbourhood level.	Existing industry work on different level.



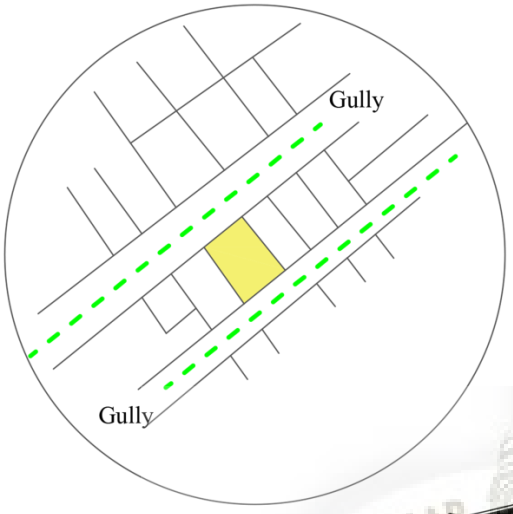






https://issuu.com/dhanyap/docs/upgrading_thakkar_bappa_colony_-a_c

STUDY OF TYPOLOGY AS PER LOCATION TYPE -A



The middle settlement of godown+karkhana +living

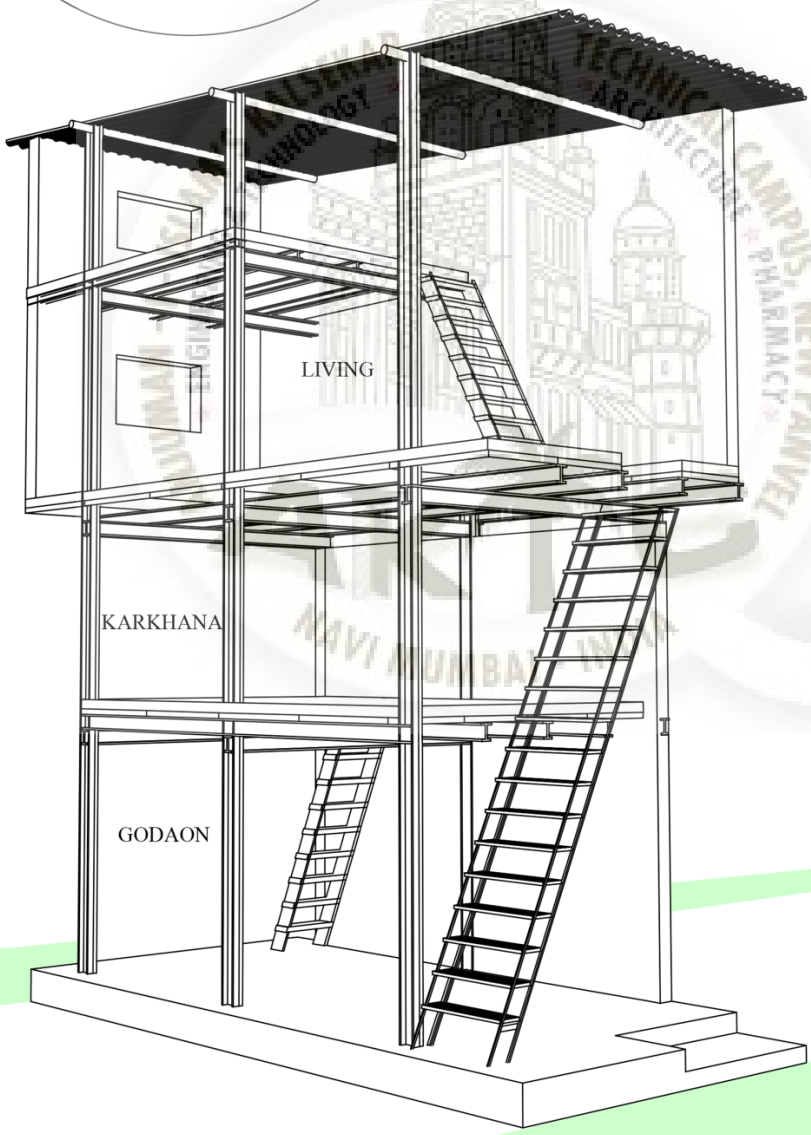


Fig:27 image showing a type settlements.

STUDY OF TYPOLOGY AS PER LOCATION TYPE -B

The corner settlement of shop+storage+living having road frontage.

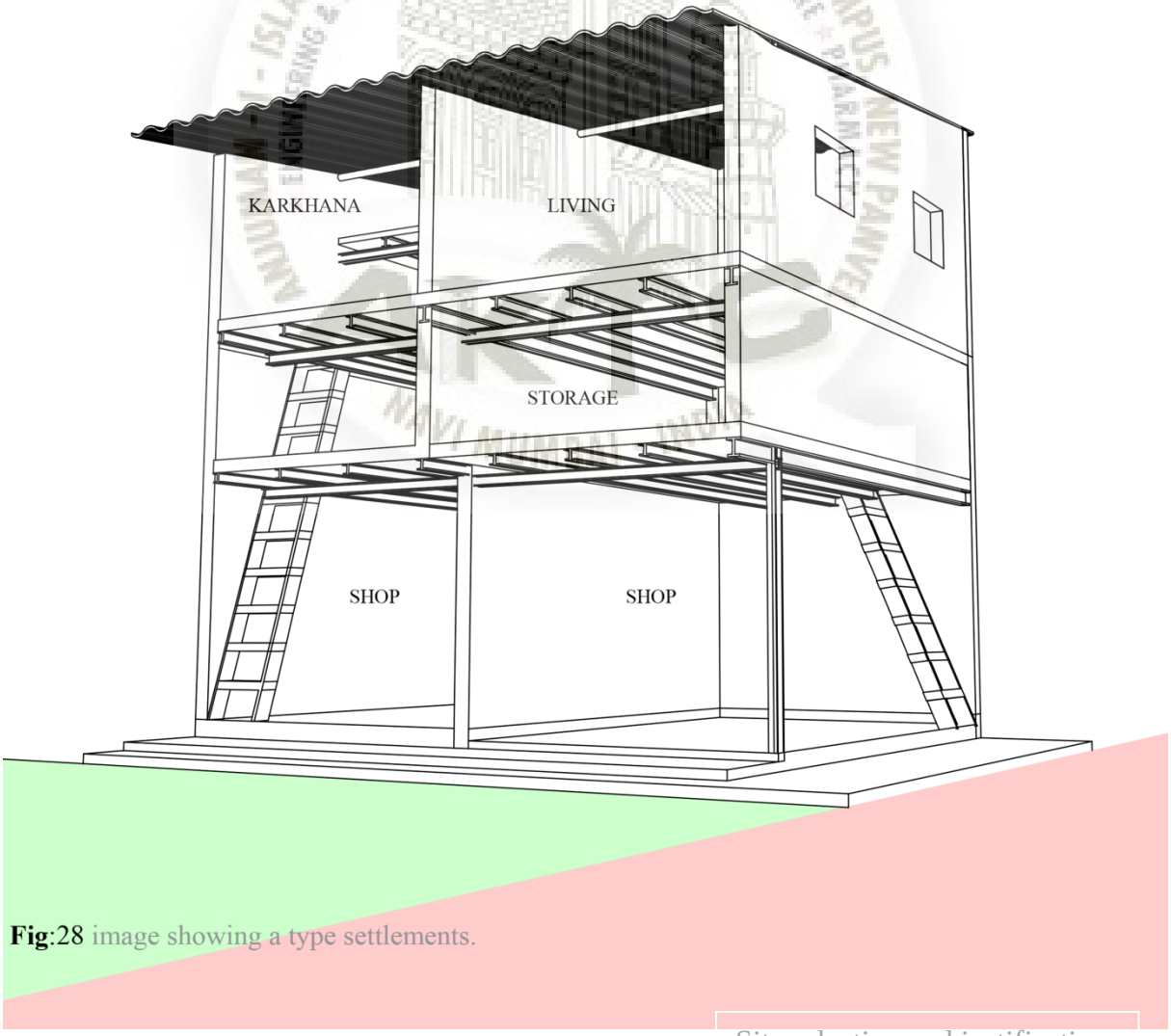


Fig:28 image showing a type settlements.

STUDY OF TYPOLOGY AS PER LOCATION TYPE -C

The central settlement of storage+karkhana+living having road frontage.

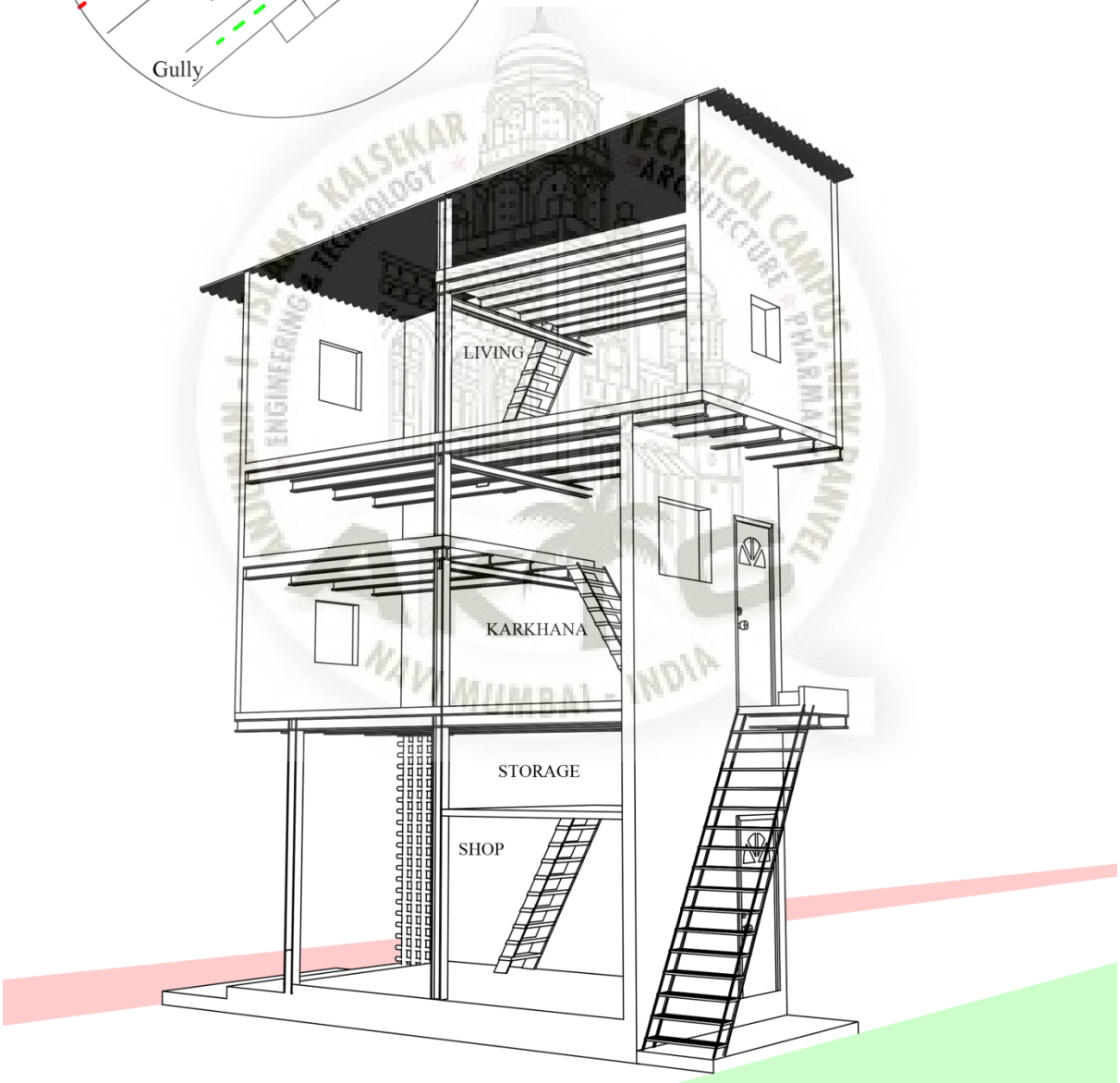


Fig:29 image showing a type settlements.

STUDY OF TYPOLOGY - SHOPS

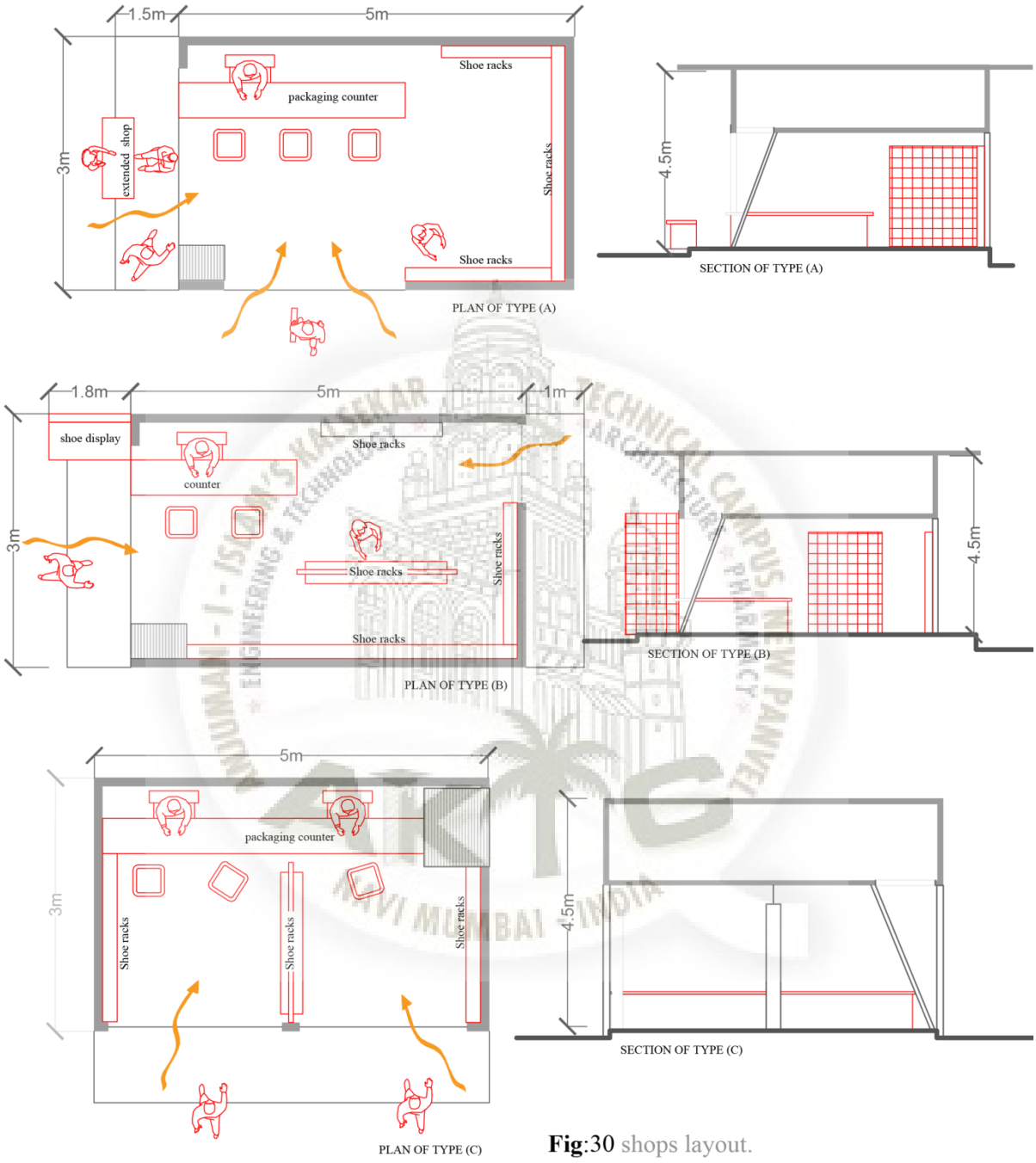


Fig:30 shops layout.

There are three types of arrangement found at the site for shoe shops as mentioned above .The sizes of the shops varies from 2mx4m. to 5mx7m .But the average size found is 3mx5m.Type A-the corner settlement of shops.Type B-middle settlement of shops having backyard and Type C - settlement of sharing shops .All the shops have loft floor for storage of height less than 1.5m and width is equal tc floor area accessed by a very steep slope of ladder either of steel or wood or concrete. During the market period shoe shops extend towards the streets of about 2m.to2.5m.

Type A - is accessible from road as well as gully also price of shop is high as compare to other two.

Type B - is publicly accessible from one side only another access is private for loading / unloading

Type C - has only road side access .

STUDY OF TYPOLOGY - TYPE 01

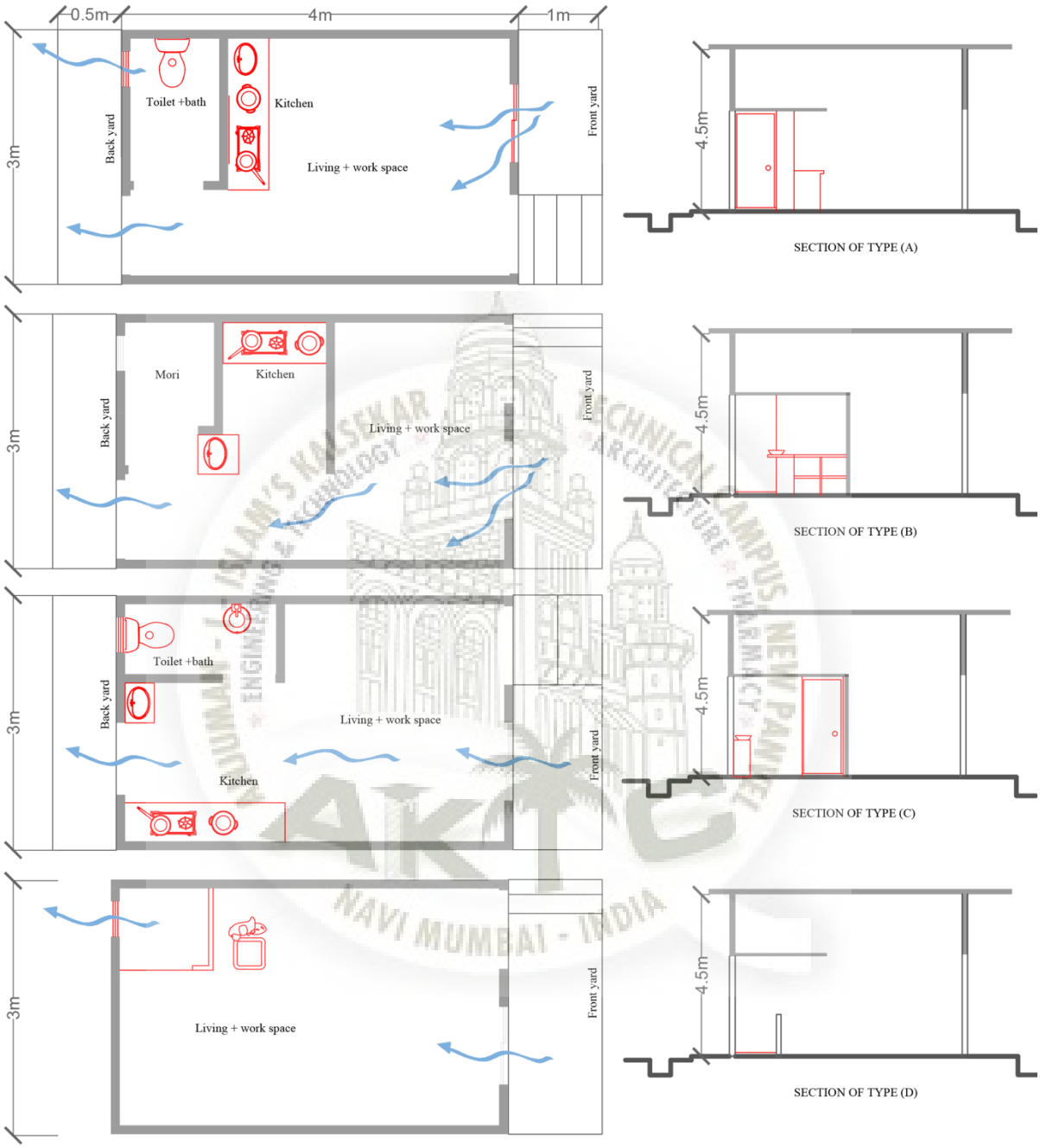
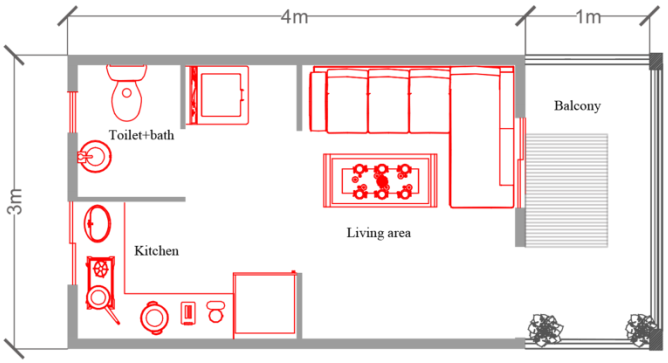


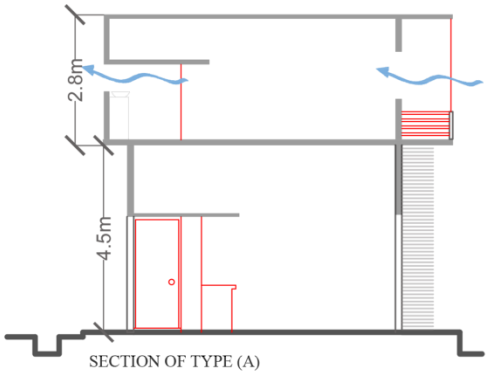
Fig:31 living layouts.

There are three types of arrangement found at the site for living on ground floor of decided height of 4.5m .The sizes of the rooms varies from 2mx2m. to 5mx7m .But the average size found is 3mx4m on ground floor and 3mx5m on first floors.All the rooms have minimum 2 doors and 2 windows wherever it may possible on front and back wall only.Interior arrangement changes as per space use weather it is used for living or for karkhana.A mori is mandatory in all the rooms and toilet +bathroom is also found of sizes 1.1mx1.5m. There are three types of kitchen arrangement is found with the sharing wall of toilet or partition .When the room is permanently used for karkhana ,the entire interior changes, back door is closed and backyard is not used as it is used for cloth washing and water storage in drums .front plinth (VATA)is used for storage mostly for rubber sole.

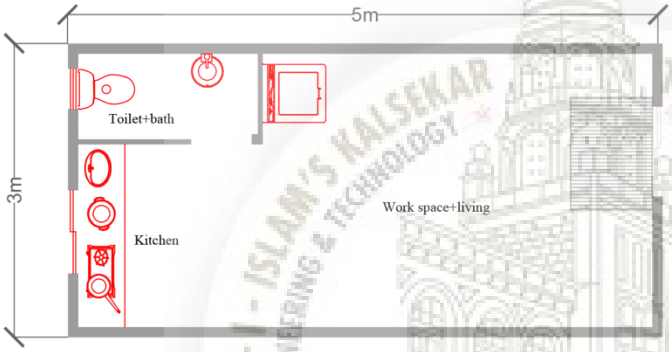
STUDY OF TYPOLOGY - TYPE 02



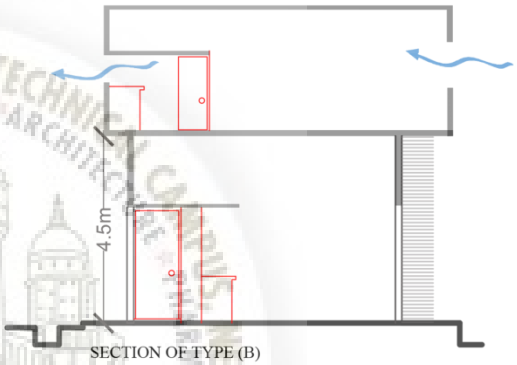
PLAN OF TYPE (A)



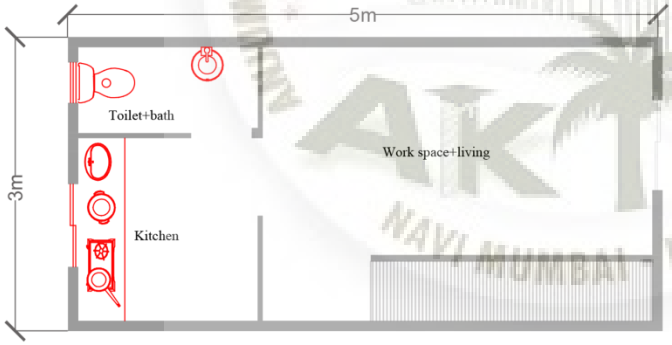
SECTION OF TYPE (A)



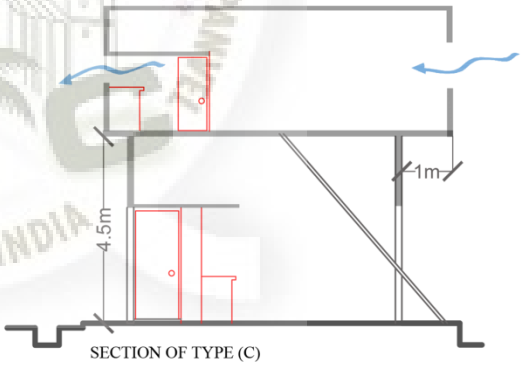
PLAN OF TYPE (B)



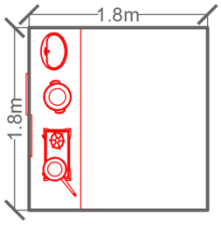
SECTION OF TYPE (B)



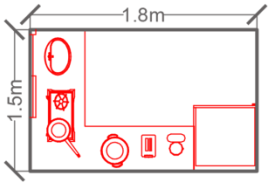
PLAN OF TYPE (C)



SECTION OF TYPE (C)

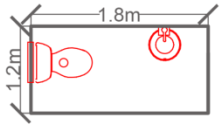


KITCHEN OF TYPE (B)

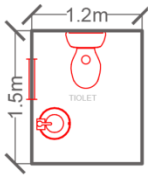


KITCHEN OF TYPE (A)

Fig:32 interior layout of rooms.



TOILET+BATH OF TYPE (B)



TOILET+BATH OF TYPE (A)

Above the mezzanine floor ,due to the different arrangement of ladder there are three types of upper floor layout is found . Upper floor can be extend to 1m in the front yard side and 0.3m to backyard side .All these upper floors are also use for living and karkhana purpose.This floor contains minimum one door and a window. Different arrangement of mori , kitchen and work space is also found on the upper floor.An entire settlement can only have 2 upper floor .and above that there is roof of asbestos sheet on circular iron section.

STUDY OF TYPOLOGY - LIVING +KARKHANA & GODOWN

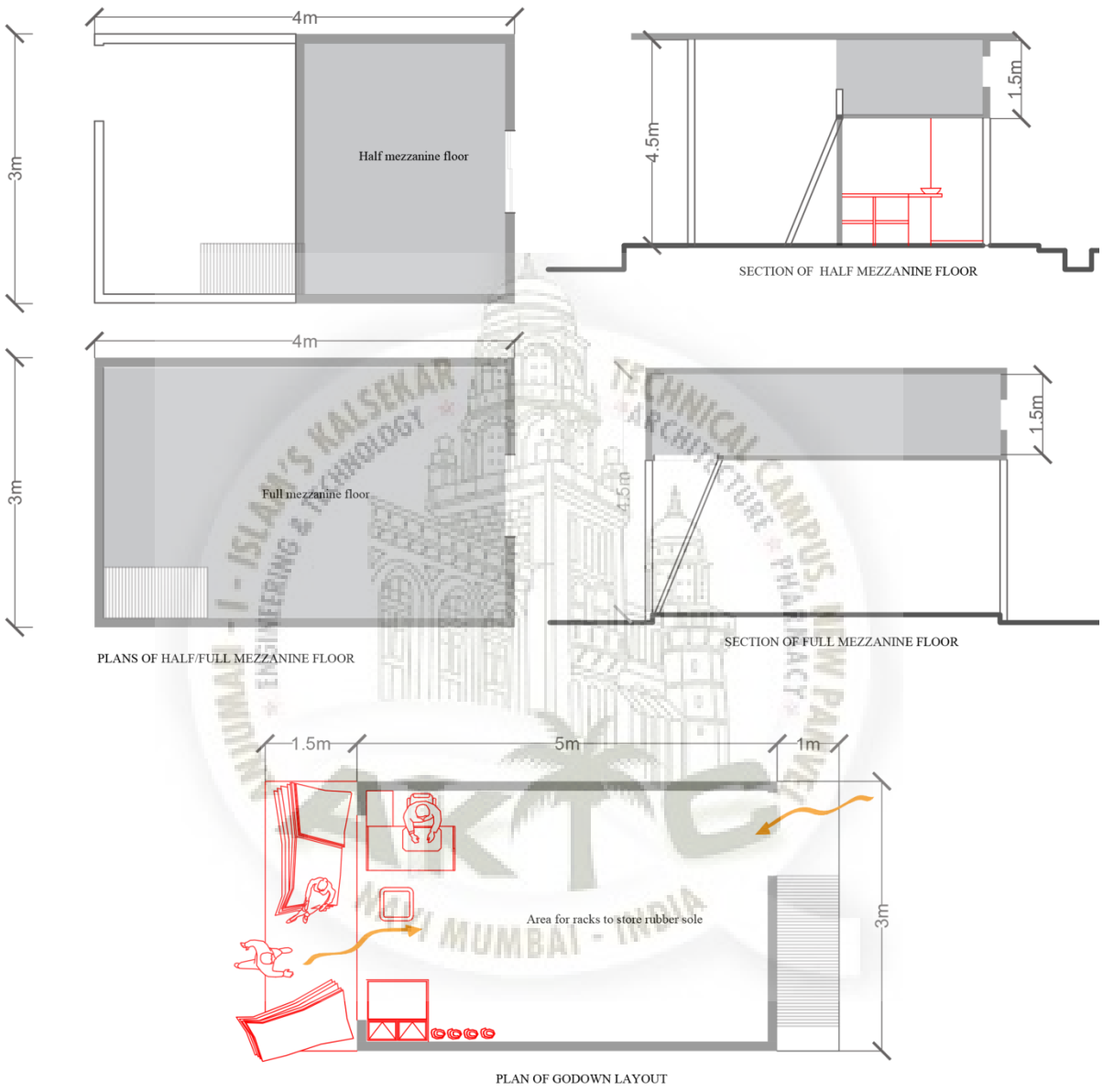
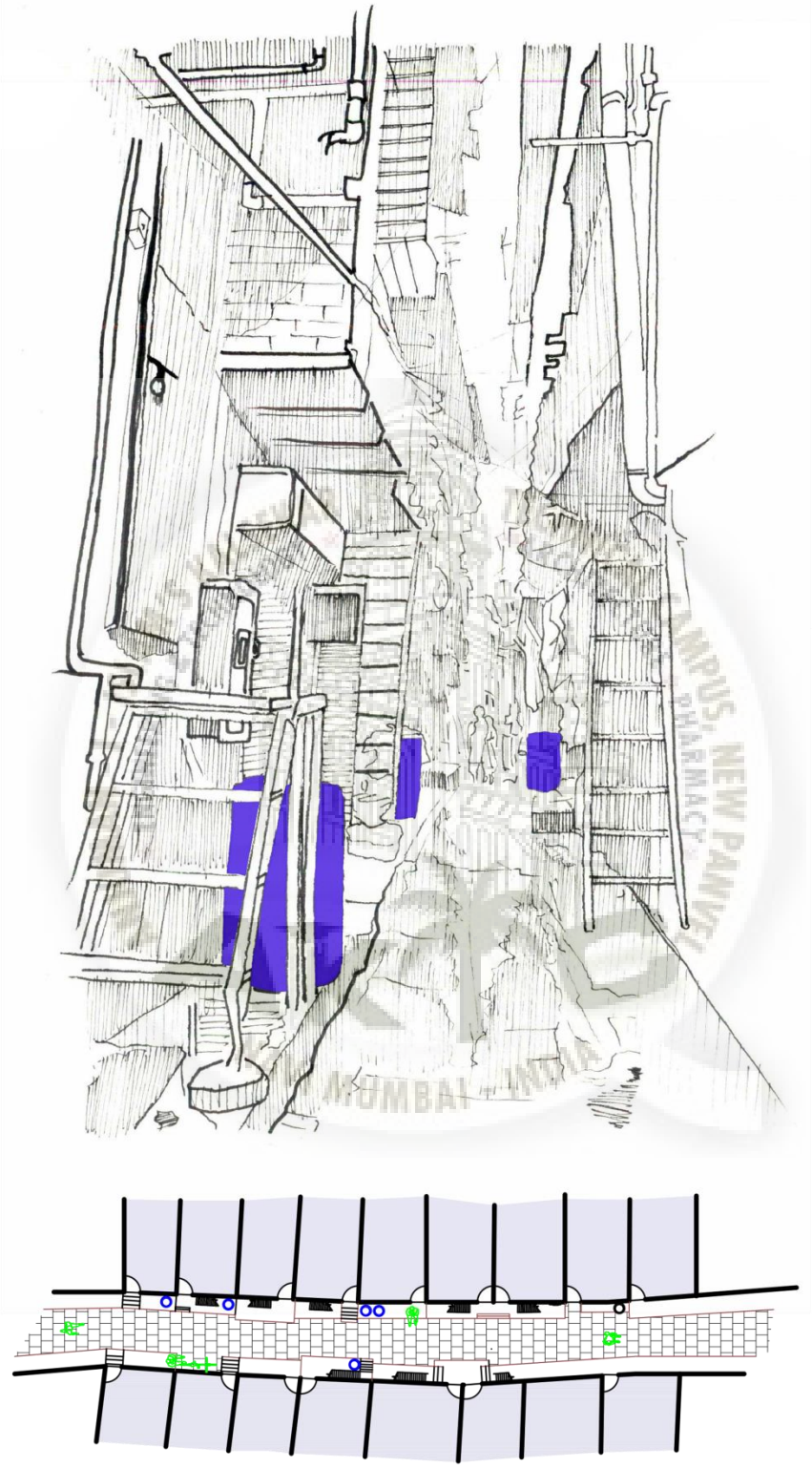


Fig:33 mezzanine and godown layouts.

In case of godown, front 'VATA' is found larger than normal settlement of about 1.5m , which is used for keep the rubber sole as a display area at day time,also loading /unloading of the rubber sole happens at the same plinth of height .3m to .45m.

Under decided 4.5m height of the ground floor a mezzanine floor is found which is of two types full and half of the floor area, this floor contains a window for exhaust fan, also accessible from inside or outside, used for the storage purpose and sleeping area for children. Above this floor ,due to the arrangement of ladder there are three types of upper floor layout is found .
Maximum godowns are found in gully side having mega entrance on front ,this area contains a weighting machine ,rest entire area is free to store rubber sole in racks . Some godowns have backyard also to access the first floor .

UNDERSTANDING USERS ACTIVITIES AND SPACES..



The gully at Thakkar bappa colony is too narrow to walk through it .also the adjacent "vata" is used for plastic drums for water storage .frontyard as well as backyard is used for the same purpose .

Fig:34 users , spaces and activity gully.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

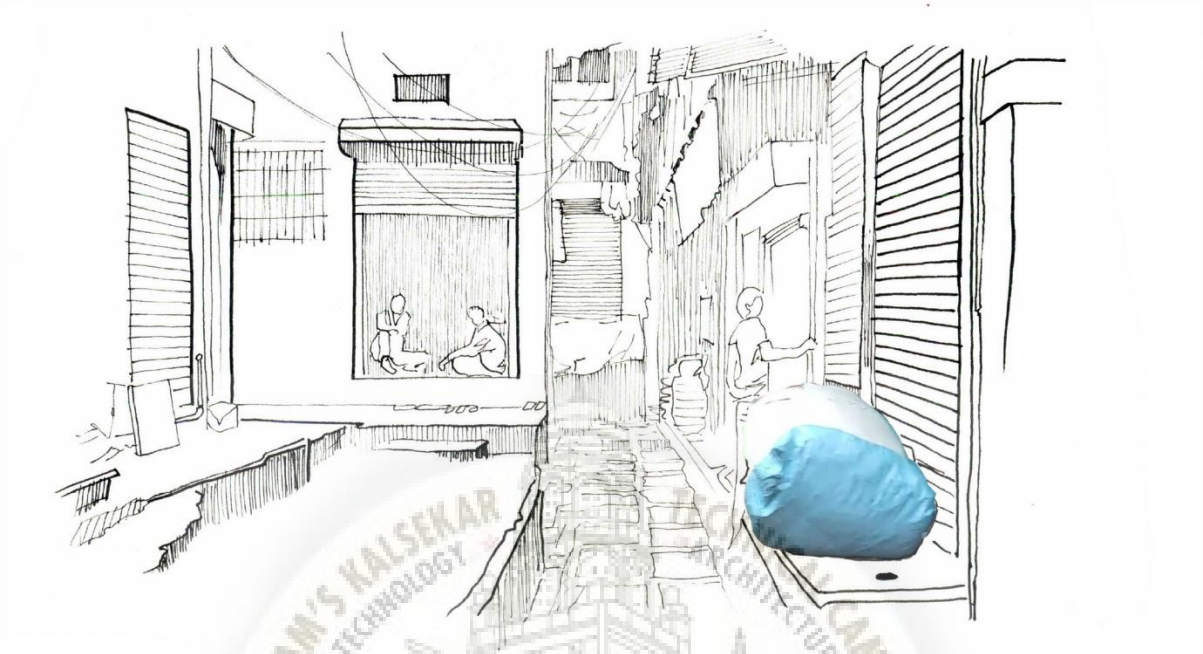


Fig:35users , spaces and activity open storage.

Due to small habitable room or karkhana the surrounding spaces are used for material storage like rubber sole . These puncture provides social gathering for the people of Thakkar bappa colony

Fig:36 users , spaces and activity gathering space.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:37 users , spaces and activity typologies.

The self right of construction of own shelter gives the variety of housing typologies in terms of materials, which are locally available .Ground floor serves as a social gathering space but the sectional height of every building vary and does not monotonous.

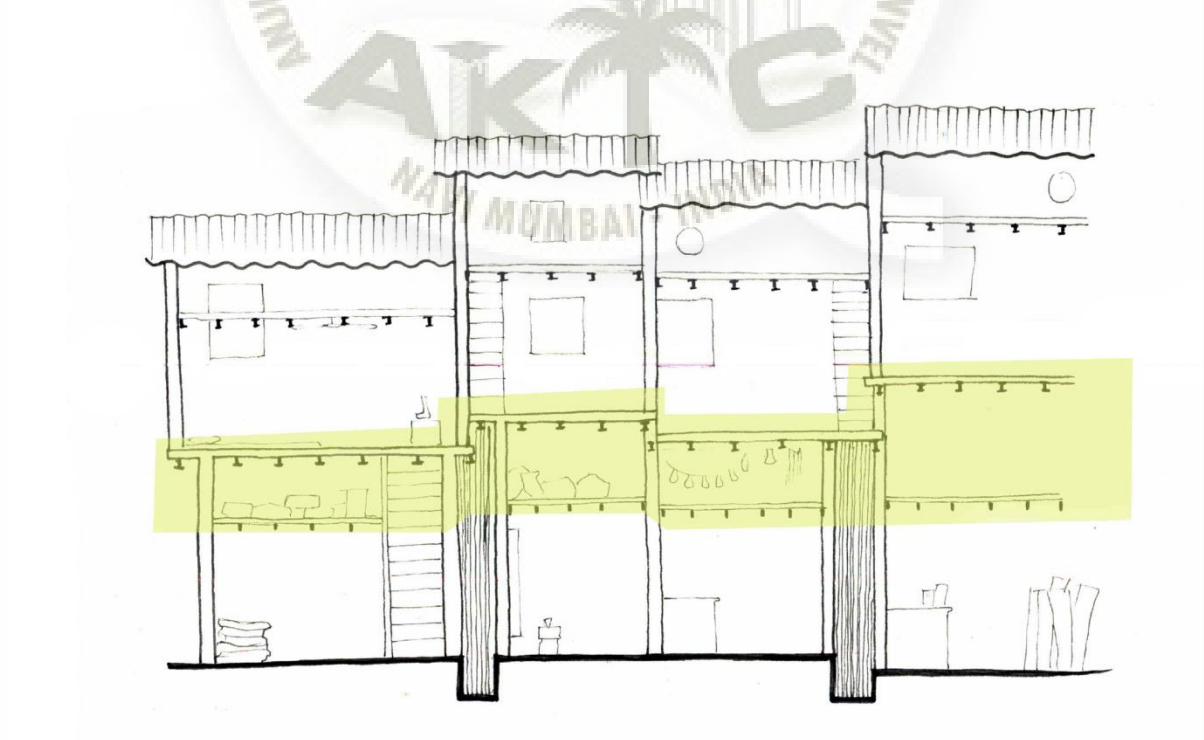


Fig:38 users , spaces and activity shops.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

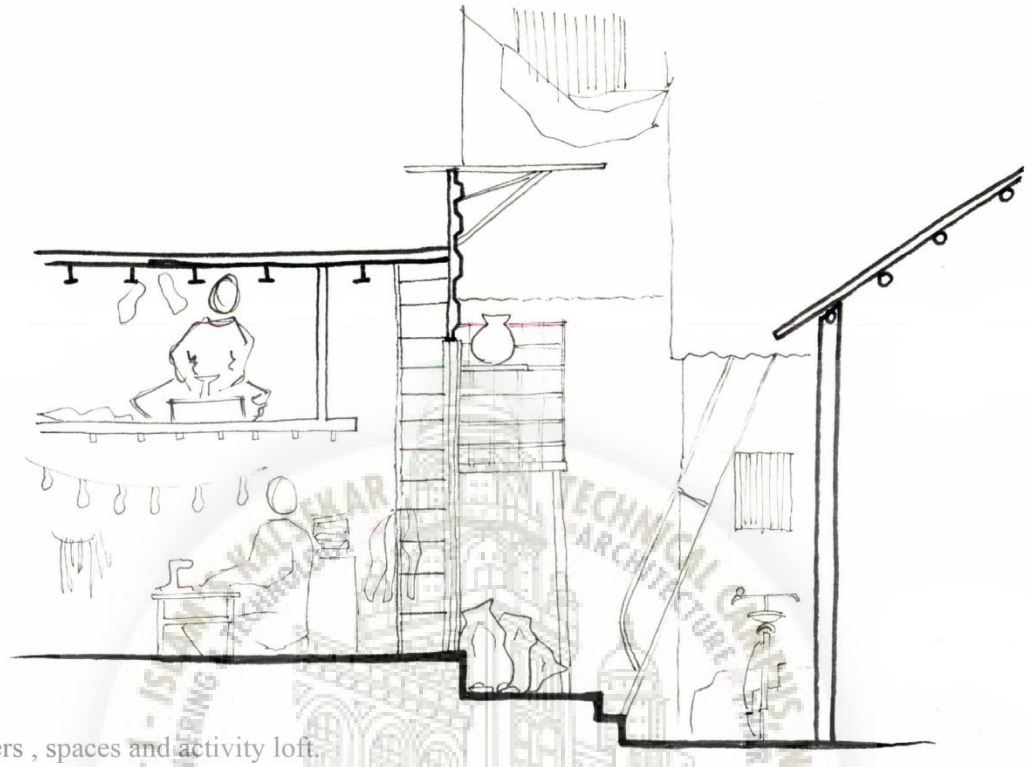


Fig:39 users , spaces and activity loft.

Maximum utilization of space has been done by adding loft spaces.

Fig:40 users , spaces and activity loft.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

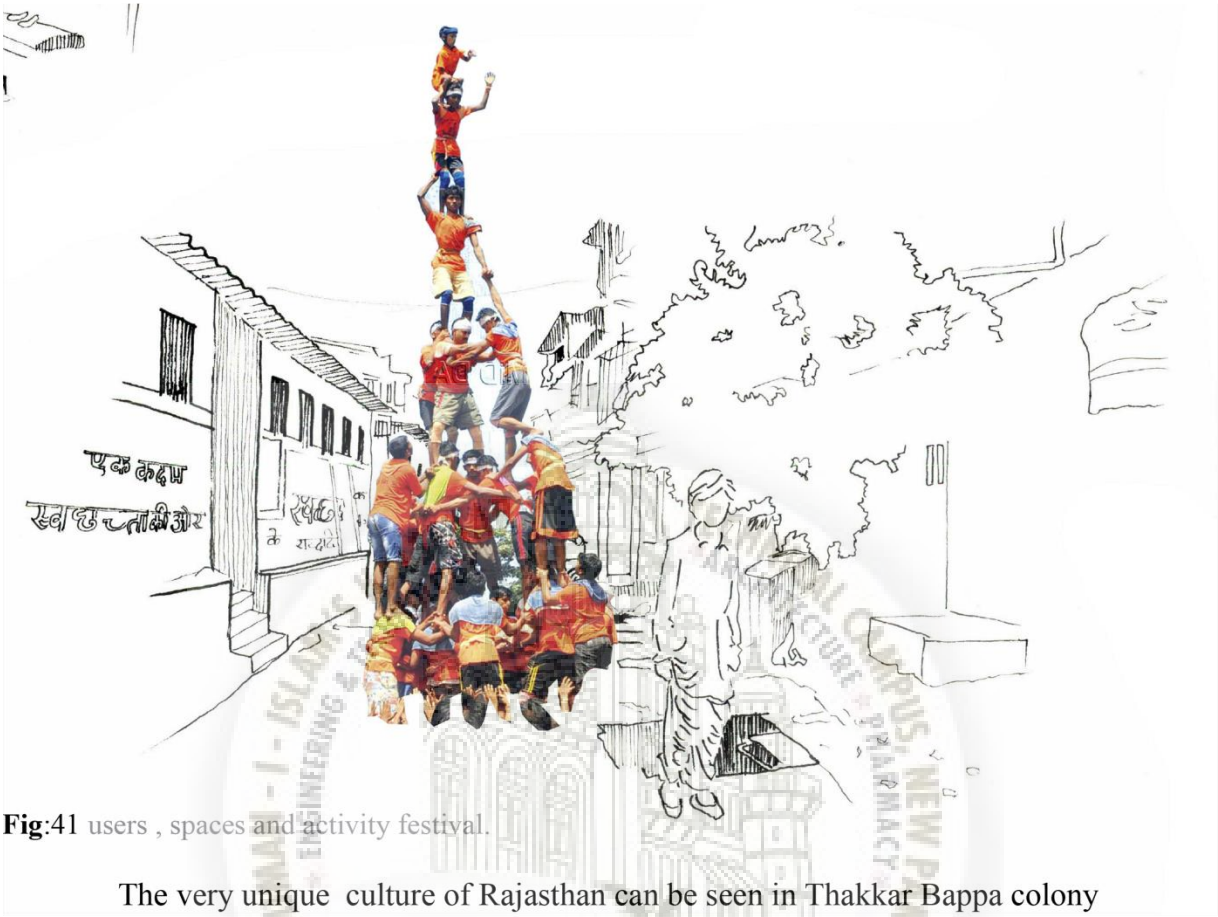


Fig:41 users , spaces and activity festival.

The very unique culture of Rajasthan can be seen in Thakkar Bappa colony on street and as well as inside the gully during the festival .This is the multi functional used for different festivals.

Fig:42 users , spaces and activity community.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

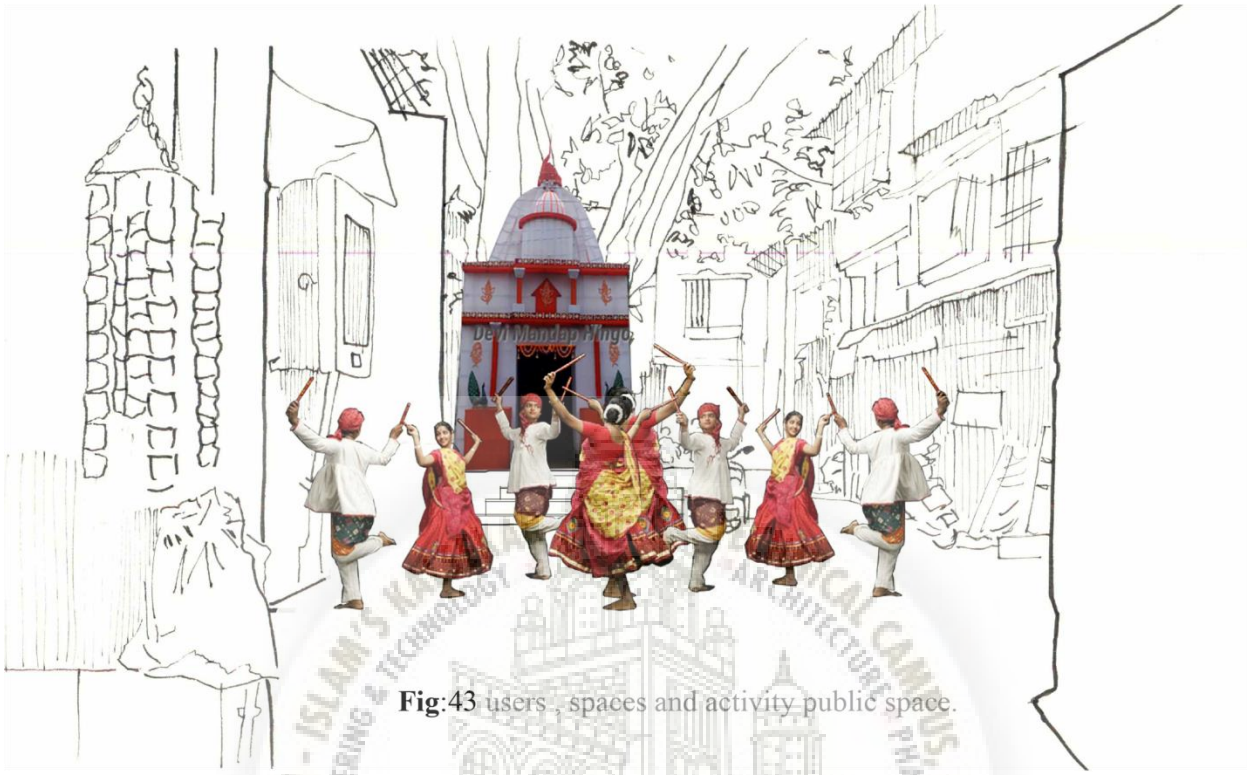


Fig:43 users , spaces and activity public space.

The common courtyard surrounded by the built form is the multifunctional space , which is used for celebrating festivals .Some time it act as a banquet hall for different purpose most of these gatering spaces have small temple by the Rajasthani community living there .

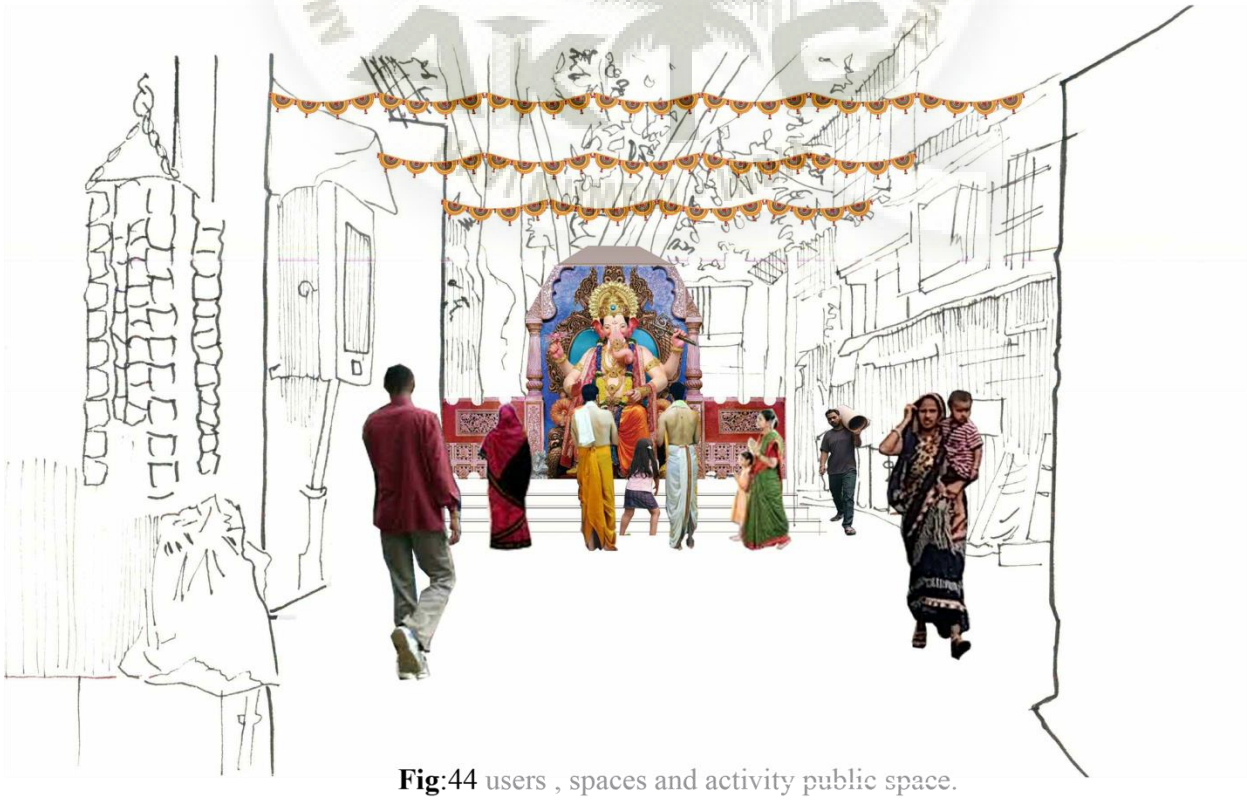


Fig:44 users , spaces and activity public space.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:45 users , spaces and activity shops at gully.

The footwear shops are not limited only at the settlement which has road frontage it has also reached towards the narrow gully as per need .The shops are molded out side the living room with the help of temporary shelter made up of corrugated plastic or iron sheets.

Fig:46users , spaces and activity shops at road.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:47 users , spaces and activity social gatherings.

There are two types of social gathering space one is at Chawk or Nukkad where a tea stall or pan Tapri can be found .And another is surrounded by the settlements in the form of courtyard which are used for the parking purpose.

Fig:48 users , spaces and activity social gathrings.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

The available space below high tension tower cutting through Thakkar Bappa Colony act as a land mark ,due to lack of open space children play there .

KEY PLAN

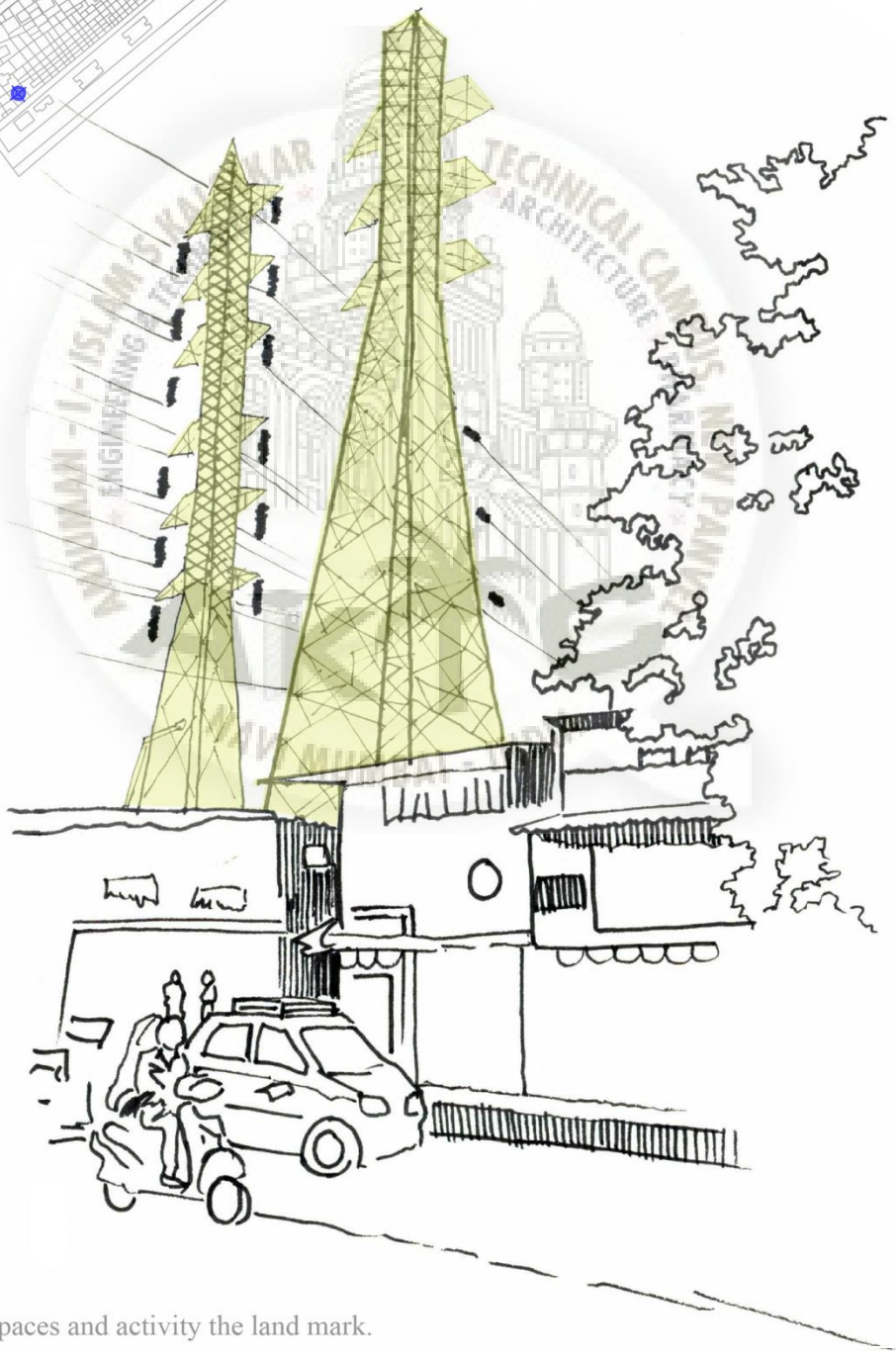
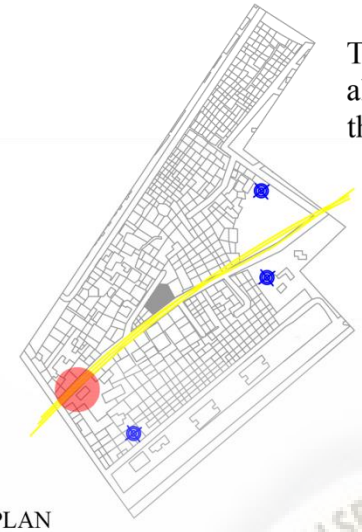


Fig:49 users , spaces and activity the land mark.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

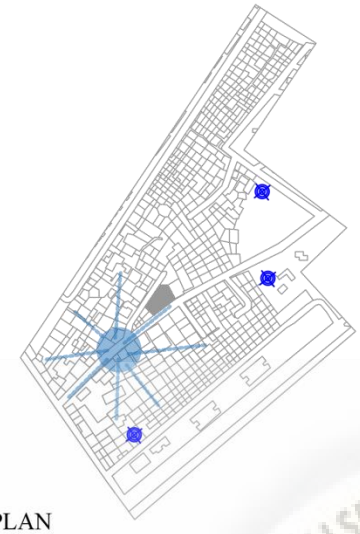


KEY PLAN

The hawkers at the secondary street where the parking is not allowed does not belongs to Thakkar Bappa Colony . They go there to earn due to more public footfall.

Fig:50 users , spaces and activity hawkers.

UNDERSTANDING USERS ACTIVITIES AND SPACES..



KEY PLAN

The loading unloading of the footwear making materials happens at the road, access to the Thakkar Bappa colony and then distributed to different wholesale and retail dealers also other parts of the area.

Fig:51 users , spaces and activity loading unloading.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

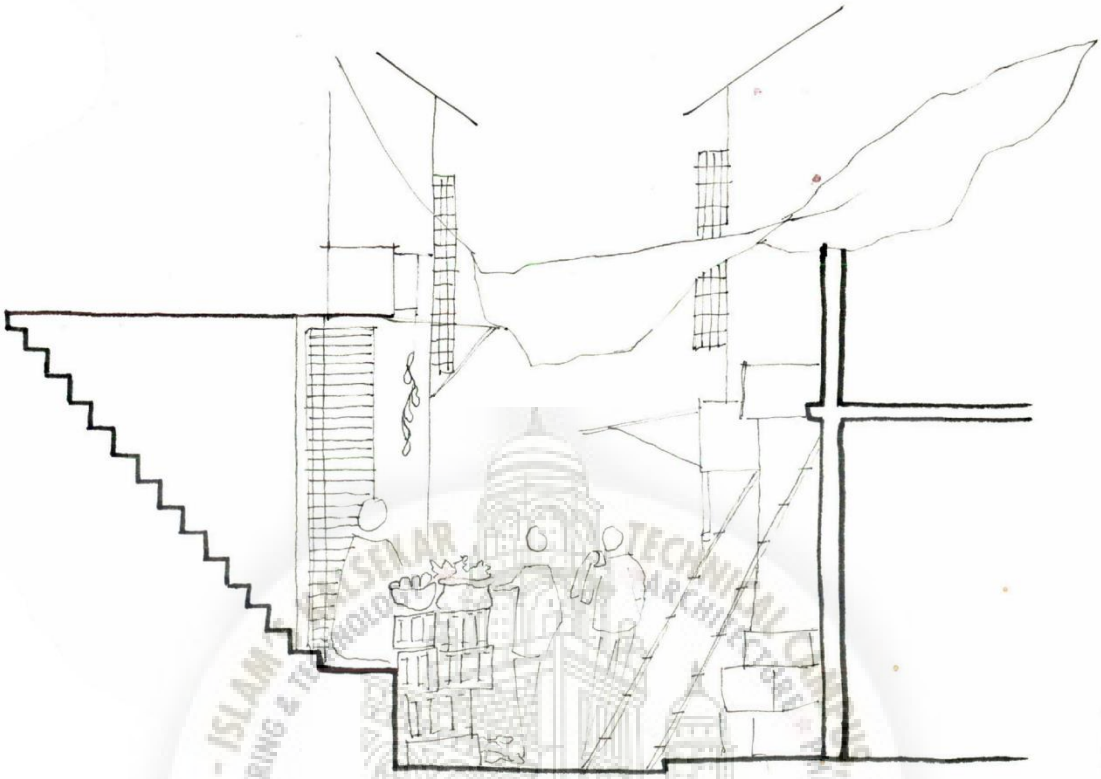


Fig:52 users , spaces and activity vegetable market.

The street is so busy that the vegetable market is shifted towards the gully resulting complication in its function as well as basic circulation to access the rooms.

Fig:53 users , spaces and activity vegetable market.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

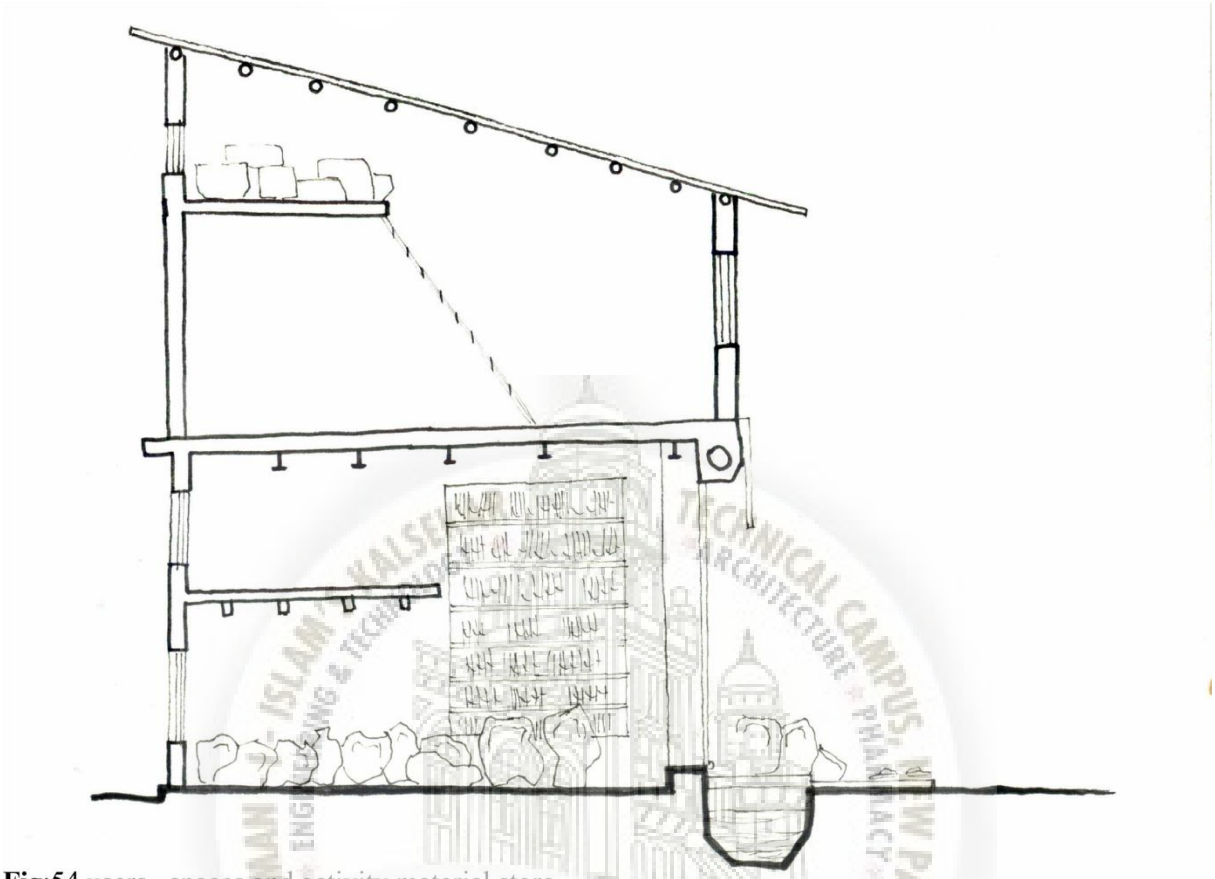


Fig:54 users , spaces and activity material store.

The requirement for shoe making material storage is so high that the internal space becomes un sufficient and it gets spilled out on open space.

Fig:55 users , spaces and activity material store.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:56 users , spaces and activity shoe display.

Outer wall or 'vata' used for display furnished hand made footwear in racks in gully as well as on road side .

Fig:57 users , spaces and activity shoe display.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:58 users , spaces and activity street characteristics.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:59 users , spaces and activity multifunctional space.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

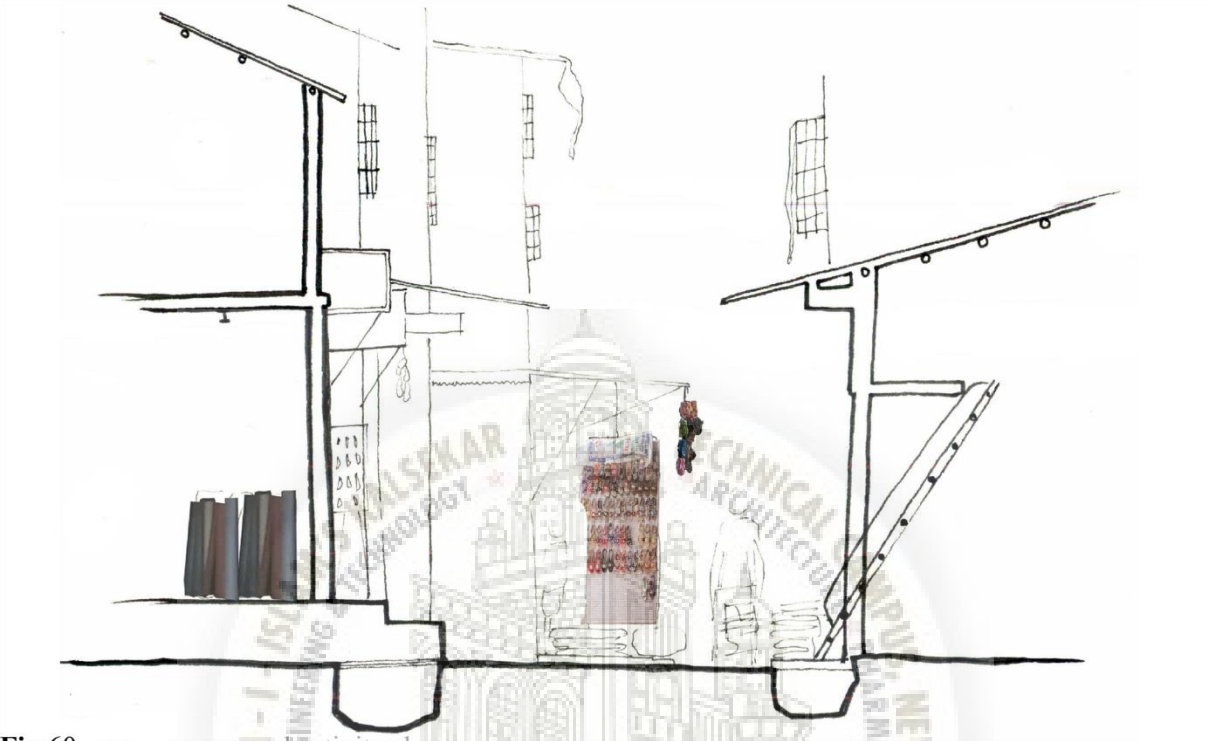


Fig:60 users , spaces and activity shops.

On site survey report says that there are more than 500 shoe shops in entire Thakkar Bappa Colony which has given serial numbers ,some shops are located in gully side combined with material shops.

Fig:61 users , spaces and activity shops.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:62 users , spaces and activity work space.

Each member of the family is engaged in footwear making job to produce quantity ,since there is no separate space for creche ,infant play where their parents work , food ,cook and eat.

Fig:63 users , spaces and activity work space.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:64 users , spaces and activity water storage.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:65 users , spaces and activity workshops.

Fig:66 users , spaces and activity sole cutting.

Fig:67 users , spaces and activity buckle shop.

Fig:68 users , spaces and activity shoe market.

Fig:69 users , spaces and activity shoe shop.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:70 users , spaces and activity street.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:71 users , spaces and activity heel cutting.

Fig:72 users , spaces and activity shoe making.

Fig:73 godowns.

Fig:74 belt making.

Fig:75 die making.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

Fig:76 users , spaces and activity dark space.

Fig:77 users , spaces and activity dark space.

UNDERSTANDING USERS ACTIVITIES AND SPACES..

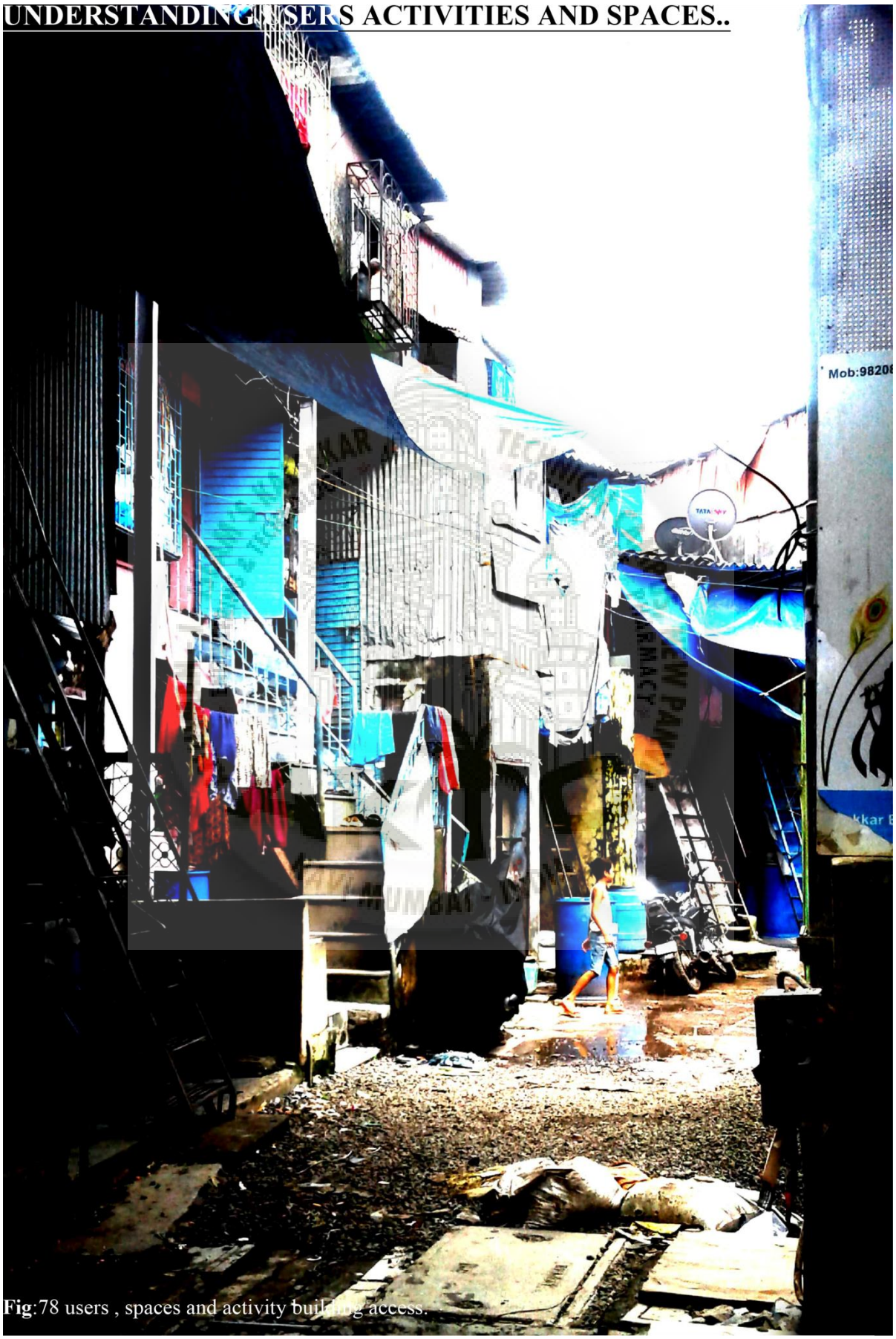


Fig:78 users , spaces and activity building access.

UNDERSTANDING CONSTRUCTION AND MATERIALS.

FOUNDATION

There is no enough space for proper foundation .The depth of the foundation is depends on the the materials which are going to be used for structural system ,the average depth of the foundation found is 0.6m to .09m.

PLINTH

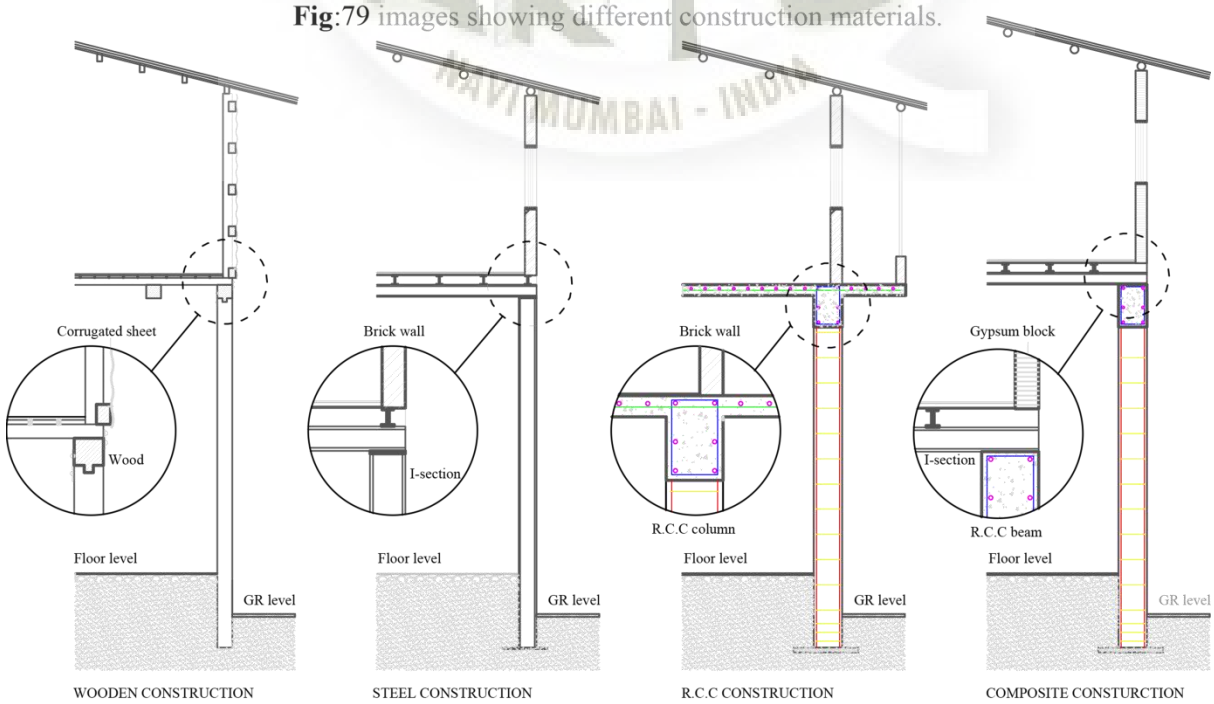
The height of the plinth is depend on road and adjacent gully level, the minimum height is found 0.6m as the level of road and chali increases per 2 to 3 years the built up level goes down and water comes inside the room during rainy season.

CONSTRUCTION MATERIALS

Initially the wood was used as structural system and walls were made up of corrugated iron sheets and to construct roof multiple layers of plastic(Tadpatri) with bamboo or wood were used.Due to the evolution in construction technology basic steel sections came into picture, now with the steel structural system.

walls are constructed with bricks, and Tadpatri is replaced with asbestos sheets for roofing. Now there are 60% structures are in R.C.C and for wall gypsum blocks are also used . To economized the structure , composite type of construction is also used in several locations.

Fig:79 images showing different construction materials.



LITERATURE REVIEWS:

01

THE FREE PRESS JOURNAL SINCE 1928

Mumbai: Asia's biggest footwear market is in unhygienic condition due to BMC negligence

By Sweety Adimulam | Nov 23, 2017 08:21 am

Fig:80 image showing foot wear shop

Mumbai: Thakkar Bappa colony, a residential and commercial area in Chembur, is most famous for its shoe markets, manufactured by the local population. It is also considered as the biggest footwear market in Asia, but unfortunately the Brihanmumbai Municipal Corporation (BMC) has turned a blind eye, due to which it is in an unhygienic state. The narrow, congested lanes occupied by tempos and lorries with open sewerage lines flowing on the roads have become the breeding ground for mosquitoes and other diseases.The colony originally was a refugee camp constructed for people migrating from Pakistan at the time of the partition of India and Pakistan mainly speaking Kutchi language speaking migrants. Later, it saw an influx of other communities, including the Mheshwari Meghwal Samaj people and the other community who migrated from Rajasthan and other parts of India, whose main occupation was shoe manufacturing.
Dharamraj Mourya, resident and businessman of Thakkar Bappa footwear market, claimed that the civic corporation is paying no attention to providing basic facilities. He said, "Regular fogging should be done. Cleanliness should be maintained but we hardly find BMC cleaners and sweepers coming here. The shopkeepers keep their shops clean but nullahs and drains should be cleaned regularly. However, they (BMC) fail to do so and due to this there is always a bad (stinking) smell over here."

He further remarked that maximum families residing in Thakkar Bappa colony are suffering from Tuberculosis (TB) diseases. "Karigaars (workers) are poor, their livelihood is entirely dependent on making leather and other material footwear. Also, as they sit for long hours in the polluted air, making chappals and footwear, it is affecting their health," he added.

The parking menace is another issue. Raw material bought from other places in bulk quantities have no place for storage. Also, there are hundreds of wholesale footwear shops and raw material shops, whose work consists of manufacturing shoes and distributing the same to other parts of Mumbai and India. Initially, shoes were sold to wholesale markets in parts of Mumbai but in the last 20 years some of them have opened their own shoe shops and today Thakkar Bappa Colony boasts of more than a hundred shops where people could buy handmade shoes of hundreds of different varieties and range.

https://www.freepressjournal.in/mumbai/mumbai-asias-biggest-footwear-market-is-in-unhygienic-condition-due-to-bmc-negligence/117508802

POPULARLATESTFEATUREDOBSESSIONSEMAILSEDITIONS

Fig:81 image showing informal settlements at kurla.

REUTERS/PUNIT PARANJPE
Relocating them isn't the ideal solution.

LET 'EM STAY

There's a simple reason why Indians return to the slums after they've been given better housing?

By Mimi KirkJune 12, 2017

According to the UN, the share of urban Indians living in slums is 24%—about 100 million people. India's government, in an attempt to rectify this situation, has made it a policy to give land to slum dwellers—not in the more central areas of cities where the slums tend to be, but on the urban outskirts.

Saudamini Das, a researcher with the Institute of Economic Growth in New Delhi, says this strategy isn't working. "Those who are relocated aren't able to secure jobs outside the city," she

says. "They end up selling the land or giving it to relatives, and returning to more centrally located slums."Das's recent research delves into what slum dwellers value when they choose housing, and has implications for this government policy. Through surveys of slum inhabitants in

four Indian cities—Jaipur, Ludhiana, Mathura, and Ujjain—Das and two co-authors, Arup Mitra and Rajnish Kumar, determined what neighbourhood services slum dwellers would likely be willing to pay the government for, thus giving officials a reason to work with slums, rather than banishing their inhabitants to outer areas. The researchers stress that though no one lives in a slum by choice, those who inhabit these areas make thoughtful decisions about their housing. "Once people are compelled to reside in slums as they cannot afford elsewhere," the researchers write, "[they] still possess the capability to value or optimize on the housing attributes."Das and her colleagues found that slum dwellers are mainly interested in purchasing homes that have particular interior elements. Features such as an attached bath and toilet, concrete roof, brick wall, and the provision of piped water increase a house's desirability and price, whereas the presence of an open drain in the neighbourhood—indicative of the quality of the area's environment—does not appear to matter to prospective buyers. The distance of a home from the city's central business district also raises real estate prices. The authors found that slum dwellers are willing to pay Rs30,000 ($466) more for a house that is closer to downtown. Average house prices in the study ranged from Rs369,452 rupees ($5,739) in Mathura to Rs127,296 rupees ($1,977) in Ujjain. Research conducted in 2013 by an Indian NGO and economic research firm found that 41% of urban slum households earn between Rs5,000 and Rs10,000 a month ($78-$155), while 25.6% of these households earn less than Rs5,000 a month.

Sewage facilities and street lights have a strong effect on housing prices in India's slums.

Das and her co-authors did find two neighbourhood services that drive up the price of slum housing, and for which inhabitants will pay more, despite their poverty: sewage facilities and street lights. "These two services have a strong effect on house prices," says Das. "Some cost recovery for the government is possible."

August 22, 2018Quartz Indiahttps://qz.com/india/1003519/attached-baths-running-water-street-lights-what-indias-slumdwellers-seek-in-a-home/

03

A Mumbai problem: Many vacant houses, many homeless

MUMBAI Updated: Mar 22, 2018 10:39 IST

Smruti Koppikar
Hindustan Times

This must be the biggest conundrum in Mumbai – lakhs of unsold or unoccupied high-end apartments and millions of poorer citizens living in squalid and dehumanised housing. Yet, affordable or inclusionary housing remains a pipe dream in the city that should have perfected a few models by now. With unfailing regularity, international property consultants produce reports that offer an insight into how deep the problem runs. There are now 1.09 lakhs unsold apartments in Mumbai, most in the upper-middle class segments, according to a recent report. Despite discounts and freebies offered by builders and relentless seductive advertising promising unimaginably utopian lives to buyers, the number of unsold apartments has hit its highest mark.

Add to this inventory the lakhs of unoccupied apartments across the city. Most of these, it would be fair to estimate, would be in gated enclaves with exotic – often misspelt – names bought as "investment homes" or second house and so on. Together, these unsold and unoccupied apartments represent the worst side of the city's housing policies and its skewed market.

At the other end, the numbers of Mumbaikers living in squalid slums, informal or decrepit houses, living without a roof over their heads, or migrants sharing a bed by the hour in a single room remain a blot on the city. Slum dwellers comprised nearly 50-53% of the city's population in the last decade; the number has marginally declined since slums were redeveloped. But as resettled slum-dwellers say, their quality of life did not vastly improve whereas the cost of living increased. Many sold their flats and went to other slums.

The 2011 Census Survey showed that Mumbai had the maximum slum population of any metropolitan city in India, nearly three times that of Delhi. This has been variously exploited by agencies, real estate lobby and politicians who targeted migrants as "outsiders". People flock to Mumbai because, above all, it offers work or jobs giving them a chance to improve their lives.

In a jobs-driven city, affordable or inclusionary housing should have been the de facto government policy. A clear government policy should have set the template. Instead, as the city

expanded, the housing sector was left to the wisdom of builders, market principles, and monetisation of land. These favoured the profit-first approach, the anti-thesis of what low-cost or affordable housing required.

Mumbai has had mass affordable housing projects in its history. The chawls for textile mill workers, though not the most benevolent of all, gave the working class a low-cost housing option; chawls or semi-apartments built by the Bombay Improvement Trust and Bombay Development Department in the 20th century as "sanitary dwellings for the poor" in prime areas are examples of planned low-cost housing with government intervention. But when affordability and nature of housing was decided by profits, it was skewed in favour of the high-profits segment. Affordable housing was reduced to a phrase in government documents; successive chief ministers promised it but it meant little on the ground. Now when affordable housing is back in public conversations, it is discussed for its economic potential – capital investment, millions of jobs generated, direct and indirect impact on other sectors, GDP and so on – but key points are still ignored.

Why, for example, can all slum land in Mumbai not be reserved for affordable housing? Despite the slum sprawl, slums occupy less than 10% of the city's land mass. Why is Floor Space Index (FSI) the only parameter by which construction and housing viability is determined? Why can there not be a mandatory and strictly-applied policy that builders undertaking commercial construction must also construct a certain percentage of it as affordable housing to be sold by a state agency? The possibilities are many. Affordable or inclusionary housing should be the default for housing policy in Mumbai. But it will require an audacious chief minister and a bold departure from the existing cosy-for-all paradigm. Till that happens, the contradiction of vacant unsold apartment and un-housed people will persist.

First Published: Mar 22, 2018 00:47 IST

https://www.hindustantimes.com/mumbai-news/a-mumbai-problem-many-vacant-houses-many-homeless/story-Nl7ArLUosMTOTw3uNHkfkI.html

04

These 4 policies can rid Mumbai of its housing problem

Business/Economy **FP Staff**
Dec 20, 2014 15:52:37 IST

Given Mumbai's population density, going vertical is the mantra these days as developers argue that high rises are the sole answer to the island city's housing problem.

Old, dilapidated structures are being pulled down to make way for skyscrapers, mall and glossy office buildings as high rises are seen as the answer to the unplanned, low-rise, hyper dense slum settlements which house at least 60 percent of the city's residents.Unfortunately the high rise has not solved the issue of housing the poor and in return has resulted in a surplus of empty flats along with a multitude of de-housed people.

Their problem was further exasperated by the state's redevelopment model. Private builders make poor quality houses for the poor through incentives from the government. In turn, slum developers more often than not sell these flats because they are in need for liquidity and can't continue their livelihoods in these building.

In an article titled, 'Life between Buildings: The use and abuse of FSI' in the *Economic and Political Weekly*, Shirish B Patel explores four alternative policy changes to address Mumbai's housing needs.

Fig:82 image showing high rise housing.

According to Patel, the main culprit for proliferation of slums is the Rent Control Act in Mumbai which allows nearly two million people to stay in homes almost free of rent. They pay monthly rents as low as Rs 100-500, while the market rates are 1000 times higher.

The Act not only had a negative effect on investment in housing for rental purpose but also withdrew existing housing stock from the rental market.

The Rent Control Act completely protected the already housed people in Mumbai and also denied access to rental housing to the migrants. What migrants paid to get a room in slums was many times greater than the old rental house in chawls and even greater than houses in many middle and upper class localities.

Patel proposes doing away with the Rent Act completely if any formal investment in middle-or low-income housing for rental has to be made.

The second change that Mumbai needs is inclusionary housing for those who earn below the median income. Patel cites the example of developed countries like England, France, Spain and Canada where any construction for commercial or residential purpose requires developers to set aside a portion of the total built space for inclusionary housing. Such a scheme can only work of state agencies and developers act together under a PPP model. The developer constructs the housing. A separate agency collects rent and manages the property, (usually an NGO) and the government provides subsidy on a family-by-family basis. "The family may get a subsidy. But they pay rent or buy outright a flat from the housing agency administering the project. That agency is very carefully and strongly regulated by the government in regard to the rates it can charge," says Patel.

Third, Patel believes in discarding the Floor Space Index as the fountain head of all good things for Mumbai. He instead proposes a new metric called crowding, defined as the number of persons per hectare for a particular urban use, be it amenities, open space crowding, street crowding etc. "Pressing for a major upward improvement in infrastructure, particularly transport facilities to deal with street crowding, is logically indefensible," he says.

And the last is the efficient use of land. Mumbai requires its Trans-Harbour link urgently which will open vast tracts of land on the mainland and make affordability a reality. Rather than investing in fancy infrastructure like the Bandra- Worli Sea link, which provide the city with no

new land, the future of Mumbai rests on this link, and the government should do its very best to expedite the process.

The problem, however, is that Mumbai's skyline is full of spectral constructions waiting to be inhabited by an elusive Indian middle class. Unfortunately, speculative planning has resulted in sharply divided cityscape where overcrowded tenements along with locked-up homes are an everyday sight.

https://www.firstpost.com/business/economy/these-4-policies-can-rid-mumbai-of-its-housing-problem-620971.html05

05

THE RIGHT TO THE CITY, INFORMAL SETTLEMENTS AND MUMBAI.

April 19, 2018

BY LUBNA ANANTAKRISHNAN

Do those who pay no taxes or live informally have a right to the city? And can and should government protect these rights?

Lubna Anantakrishan is a MA student at SAIS DC, concentrating in Energy, Resources and Environment. With a regional focus on South Asia, her main area of interest is urban poverty, vulnerability and informality.

Why argue for such a right if we cannot work towards realizing it?

Housing is the most important asset of the urban poor. Blocking access to housing excludes the poor from public services, targeted subsidies, formal economic activities, political power. Housing can therefore be considered a gateway right in the urbanization process - a channel through which to formalize the 'right to the city'. In this context, I want to explore two questions. First: should there be a defensible right for an illegal activity such as pavement or slum dwelling? And second, how can the spirit of the 'right to the city' be formalized in the context of illegal settlements?

My answer to the first question, in short, is yes. But to support the defence of this extra-legal 'right', I want to elucidate the distinction between rights and laws and propose that when in opposition, rights should trump laws. This should make intuitive sense for rights that are legally established, but the contention arises when the rights being claimed are not established and more importantly, are *against the state*. This leads to the question of how rights become rights.

http://www.saisperspectives.com/2018-issue/2018/4/14/fu7r9l1fuzscz5htetzpm3hm256icw

06

RESEARCH ON INFORMAL SETTLEMENT BY YUE ZHANG

Yue Zhang is an associate professor of political science at the University of Illinois at Chicago, and a 2015–16 Wilson Centre fellow. She received her master's and doctoral degrees from Princeton University and her undergraduate degree from Peking University. Her principal research interest is comparative urban politics and policy with a focus on urban governance, urbanization in developing countries, historic preservation, and globalization. She is currently working on a book project about informal housing and urban governance in China, India, and Brazil.

"When you fly into Mumbai and the plane is landing, the first thing that meets your eyes is a cramped sprawl of corrugated iron–roofed huts. They are right next to the airport runway, quietly yet powerfully reminding you that you are entering a city where nearly half of the population lives in slums. As India's economic capital and most populous city, Mumbai has a total population of 12.44 million — 42 percent of whom live in slums. The percentage of slum dwellers in the city is so high that locals joke that Mumbai should be renamed "Slumbai."

Fig:83 image showing informal settlement of Bandra ,Mumbai.

In Mumbai, a highway divides the “formal city” and the “informal city.”
(Photo by Yue Zhang, January 2016.)

The definition of a slum has two dimensions. From a legal perspective, slums are unauthorized and illegal structures, where inhabitants do not have legal title to the land that they occupy. In terms of living conditions, slums are areas that are short of basic amenities and characterized by the prevalence of insanitary, squalid, overcrowded conditions, and hence become a source of danger to their inhabitants’ health, safety, or convenience.

Fig:84 image of slum housing along the railway track.
(Photo by Yue Zhang, January 2016.)

In the first official survey that Mumbai conducted in 1956, 8 percent of the total population lived in slums. Over the years, the population of the city grew at a high speed and so did the number of slum dwellers. Today, nearly 5.2 million people live in slums, and the number is still increasing.

Nearly one million people live in Dharavi, the largest slum in Mumbai as well as in Asia, where the film *Slumdog Millionaire* was shot. It is home to a large number of micro industries, including pottery, tanning and leatherworking, and plastic recycling. A walk through Dharavi or any other slum would completely change your mind about what slums mean in Mumbai: they are not clusters of temporary shelters, but complex ecological and economic systems, “a city within

a city." Many slum dwellers in Mumbai are not the official poor who live below the poverty line, but are well-educated, middle-class people who are deprived of adequate housing.

Fig:85 image of current working model of informal settlements

Outside a pottery shop in Dharavi, the largest slum in Mumbai and Asia. There are many micro industries in Dharavi ; pottery is among the major ones. A significant proportion of pots in India are made and sold here.

(Photo by Yue Zhang, January 2016.)

Understanding the Prevalence and Persistence of Slums

Large-scale slum proliferation is a complicated issue relevant to a variety of factors. The scarcity of land, dictated by Mumbai's peculiar geography and heightened by the competition from other economic activities, is one factor that has made formal housing unaffordable for most Mumbaikars. However, the expansion and persistence of slums in Mumbai is primarily a function of failed housing policies combined with other political factors.

Government Responses: The History

The Indian government's responses to slums have gone through several changes. In the 1950s and 1960s, the initial government reaction was to clear slums and rehouse slum dwellers in subsidized rental housing. This approach did not succeed owing to the shortage of resources to build and maintain housing stocks and the lack of political will to do so. Meanwhile, it was realized that slum dwellers contribute significantly to the local economy, so the government began to have a more tolerant attitude toward slums.

In the 1970s and 1980s, the government adopted a different approach to improve and upgrade the living conditions in slums. Through various acts and programs, specifically aid from the World Bank, the government provided basic services such as water, toilets, electricity, pathways, street lights, conservancy, and primary health care and education to slum dwellers. At the same time, leasehold tenure of land was transferred to cooperative housing societies of slum dwellers. However, the scale of the programs remained limited and did not prevent slum proliferation.

Problems of the Model

Mumbai is among the first cities in the world that have adopted a market-dominant model to redevelop slums. Given the limited resources of local authorities, the model provides an alternative approach to handling informal settlements, an issue that many developing countries are facing. As innovative as it is, the model demonstrates several problems.

- The operation of the model starts from the direct negotiation between slum dwellers and developers. Although it gives slum dwellers the freedom to choose which developer to work with, it often leads to fights between developers, as they all have the desire to redevelop profitable areas. The unregulated and even vicious competition between developers also creates opportunities for rent-seeking.
- The current model does not provide specific standards on the quality of rehabilitation buildings. Much discretion is left to developers. Some of the rehabilitation buildings are designed and

constructed in a way that compromises the living standards of inhabitants. Some rehabilitation plots do not have sufficient amenities or open space. There is the danger that the rehabilitation buildings will become "vertical slums."

- Because of the cut-off date for eligibility of rehabilitation, the ineligible population is left with no option but to stay in unauthorized manner in slums. Many of them have to settle in a new slum after their previous slum is demolished by the government.
- The current model provides free housing to slum dwellers, and developers have to load the cost of rehabilitation on the saleable component. Therefore, the model does not encourage the construction of housing at various price levels and ultimately leads to the increase of housing prices on the formal market.

Many slum dwellers in Mumbai are not the official poor who live below the poverty line, but are well-educated, middle-class people who are deprived of adequate housing.

Current Model of Slum Redevelopment

After the previous two phases of slum clearance and slum upgrading, in 1995 the government started a new scheme of slum redevelopment. Under the current scheme, private developers can purchase slum land from the government at a relatively low price — 25 percent of the fair market value of the land — and redevelop the land through the incentive floor space index. (Floor space index, a ratio of built-up area to appurtenant land, is a planning and development control tool used to control population density and building design from the point of view of health and safety.)

Policy Recommendations

Based on the problems identified above, the following policy recommendations can be made in order to improve the process and outcomes of slum redevelopment in Mumbai.

Reform the SRA model. The SRA has been functioning merely as an approving authority that scrutinizes the developers' proposals on behalf of slum dwellers and approves or reject them. To

streamline the process and guarantee the quality of rehabilitation buildings, SRA should act as a planner, facilitator, and anchor, not merely as an approving authority. It is important to mobilize the private sector in the slum redevelopment process, but the public sector should play a more active role rather than completely taking a backseat.

Increase the provision of affordable housing. The housing stock being created in the market outside of the rehabilitation component of slum redevelopment is mostly in the luxury or high-cost segment, and is not catering to the demand for affordable houses of the low- and middle-income groups of the population. The government should more systematically create housing stock for low- and middle-income groups.

Promote rental housing. Under the current regressive rent control law, 0.318 million (16%) of the total 1.935 million houses in Mumbai are unoccupied. The government must create an enabling environment to revitalize the Mumbai rental market, both private and public.

The Government of Maharashtra has set a goal to make Mumbai slum-free by 2022. This is an ambitious goal, considering the current pace of slum redevelopment. But perhaps what is more important than the pace of redevelopment is the approach of redevelopment — namely, whether the approach can efficiently provide quality housing to slum dwellers, increase the provision of affordable housing in the city at large, and ultimately contribute to the creation of more livable and inclusive cities.

https://www.sciencedirect.com/science/article/abs/pii/S0264837717301680

07

DHARAVI - A PROPOSAL BY ARCHITECT NORMAN FOSTER

Fig:86 image of proposal by Norman Foster.

Dharavi is one of the world's largest slums, with more than half a million people per square kilometre – more than 10 times higher than the most densely populated area of London. Current standards of sanitation are low, with just one toilet per 1,400 people, and the lack of open space means that children play in cemeteries and on the railway tracks. Following extensive research, site visits and by talking to the community, the design team developed a comprehensive plan to improve the quality of life for all living there. The result is a framework for a prosperous, sustainable and humane development – one that embraces the district as part of the growing prosperity of Mumbai, rather than isolating it as a barrier to the city's progress.

Fig:87 concept to rehabilitate Dharavi.

The strategy meets the basic need for proper sanitation and deals effectively with the problem of flooding, and includes provision for new community facilities, schools, hospitals and parks. Historically, there has been a tendency to build low-rise and occupy most of the available land, thus the streets are defined as the space not occupied by houses, often reduced to the absolute minimum width possible for access. The proposal supplements the dense, detailed sections of the grid with wider access roads – the previously impermeable city-within-a-city will be opened up with new public transport links and clear pedestrian routes. A diagonal street pattern allows prevailing winds to permeate the urban fabric and helps to cool the buildings and public spaces.

Fig:88 image showing innovation in gully.

The study found four main types of dwelling, two of which were combined with light industrial units or small commercial premises – the residents of Dharavi recycle 80 percent of Mumbai's waste. This mixed-use character will be preserved, with double-height spaces that create an intricate vertical landscape and reflect the community's way of life. The proposal would give all families that have been living in the area for a period of time 225 square foot of space – a major improvement on current housing standards. This will be of high construction quality, with one toilet per unit, running water, drains, recycling infrastructure and land tenure security for every resident. Sensitively layering old and new, the project includes a series of taller residential buildings for sale, which occupy a small footprint and are planned to fund the community's infrastructure improvements. Development would also be phased to eliminate the need for transit camps – instead, the project itself would catalyze the rehabilitation of Dharavi from within.

https://www.fosterandpartners.com/projects/dharavi-masterplan/

08

INTERVIEW.

Pyare laal ji chorotiya

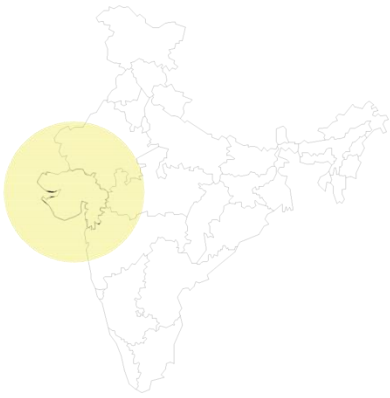
reidence of Thakkar Bappa colony .

from 34 yeras.

He stated that, 'We work at very limited place where we stay ,cook food and eat . we have only privacy when the children are in the school or outside the room . we have three storey building for our use in which three different family member live together. We do not have individual toilets at home we need to use public toilets only which are in pathetic condition . our business is heritage my son will do same of footwear manufacturing .Everyone one earn to built a plus one structure above their existing settlement , nobody cares about the society . The adjacent gali to my home which were used for parking my vehicle is has been narrowed . we are hard workers we work 14 hours to complete the task on time as per market demand . on the occasion of Ganpati and Diwali we kept our shop closed also on death of any ' mochi'.

The occupation of footwear making to which we are connected is the only source of our earning .there are some chemical refining process for rubber sole which happens almost 80% to entire colony resulting the increase case of T.b disease our child get. We are not literate and belongs to worker group . Our business get down after GST . we brought " karigar " from our native place Rajasthan. Half of the colony can find empty at the month of July and August..... '

CONSTRUCTION WORKER HOUSING.

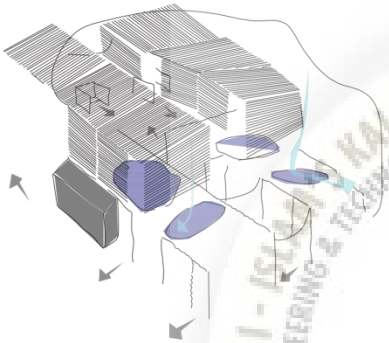


Location in India

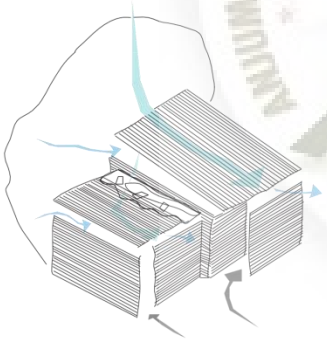
INTRODUCTION

This housing project is designed by Ar.Hannaha Broatch in 2015 . This is a temporary housing for the construction worker in Ahmedabad . For its execution seven sites were studied and successfully executed at three sites .The entire project is constructed with the locally available materials which is reusable and can be used on other site for shelter .The entire idea follows principles of jugaad urbanism from it research to design and implementation on site . spaces which are designed here is children 's playing area, communal living , common gathering , common toilets ,The main aim of this housing was to improve the on site condition of construction workers of Ahmedabad , India .

Location in the globe

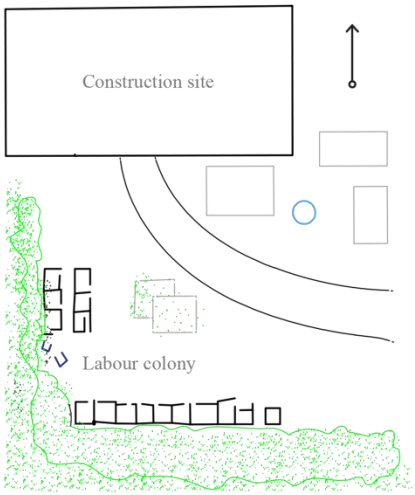


jhuggis on reflection by pacifica's labour colony



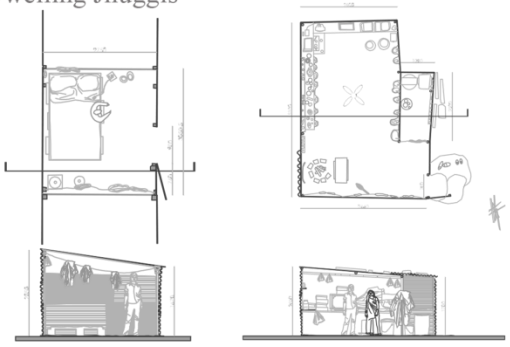
REFLECTIONS BY PACIFICA

On the first documentation , the site accommodated approximately 50 people and at this time, the jhuggis were built up along the south side. Later at the time of the second visit, the labour colony grew to accommodate approximately 280 workers.The south side of the site has more direct access to the construction site and the trees along the south side of the site provide some relief from the harsh light .



CONSTRUCTION WORKER HOUSING.

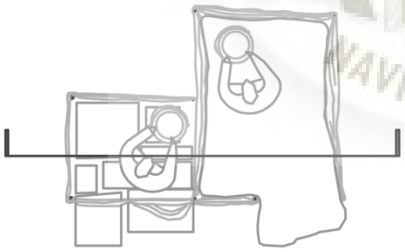
Dwelling Jhuggis

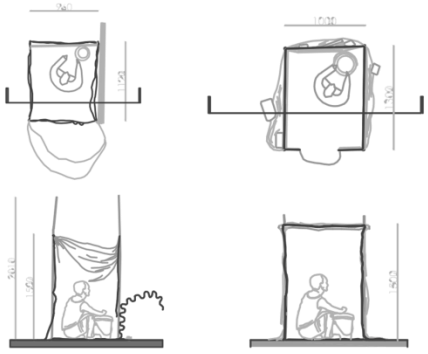


Plan and section of Dwelling Jhuggis which 2 single men share

Plan and section of Dwelling Jhuggis which a family of 5 member sharing.

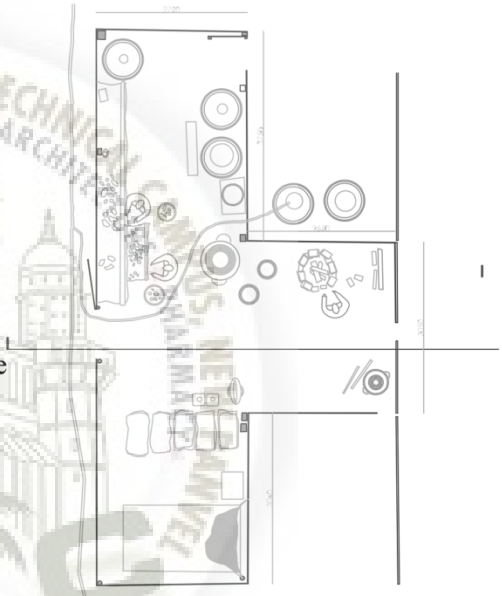
There are two types of one-room dwellings found on the sites; one that accommodates those who come as a family group and a second, which accommodates single men who come alone. The family dwelling was found to house between 3-7 people and generally has areas for bathing attached. The cooking would take place inside or by the front door. Storage is incorporated into the structure; shelves, rope, hooks and nails hold their possessions. The family members sleep on the ground at night, and the bedding is put away every morning to make space for where food is prepared. The majority of the time the dwellings where single men stay accommodated two men per room, but in cases She saw rooms which housed up to 12 men in one room. Men often sleep directly on the ground, but in some of the dwellings She saw, they had made beds from left over pieces of timber placed on top of concrete blocks.



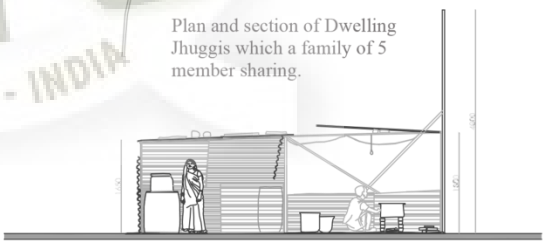


COMMUNAL KITCHEN

A communal cooking area was found on all sites that were studied . Three of the workers on average will cook for approximately 100 workers each day, with the cooking responsibility alternating daily . These cooking dwellings are generally located in the centre of the labour colonies. Grains are stored in one area, vegetables prepared in another and cooking is done over a fire. The fire is placed below ventilation gaps that are made in the roof. Typically the water supply is from a hose that winds through each site, filling a network of large water drums. The water drums are stored both inside and outside.



Plan and section of Dwelling Jhuggis which a family of 5 member sharing.

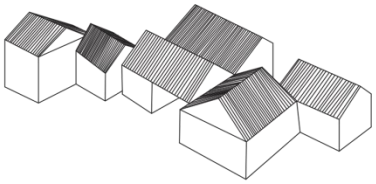


SANITATION - BATHING AND TOILETS

Two bathing typologies were found in the labour colonies where bucket bathing takes place. One is inside small jhuggis made from metal rods pinned into the ground and wrapped in cloth or plastic sheets with a concrete screed. The other bathing space is an open communal bathing area where men would bathe in public. This becomes a social activity for the workers. The open areas are generally situated next to a water tank or tap. Bathing takes place daily, after work the workers will have a short bath and on their day off (Sunday) they will have a more thorough bath. There were no toilets except for on one site, although they were unusable, as the septic pits had never been emptied.

CONSTRUCTION WORKER HOUSING.

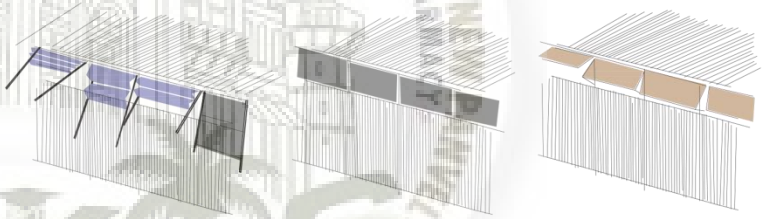
Unit design: Roof



It became clear that in order for surface run off and grey water to not to pool undesirably, there would need to be clearly defined linear drainage flow for the water to run through the sites. She decided that keeping the roof forms to a single pitch could aid in directing the water in a particular direction. The single pitched roof would also mean less joinery and difficult angled connections.Avoiding internal gutters informed how the growth of the site would develop as more inhabitants arrived. Allowing later attachments to existing Units could create an inevitability of complicated roof details; therefore it was necessary to have detached Units with drainage space in-between.

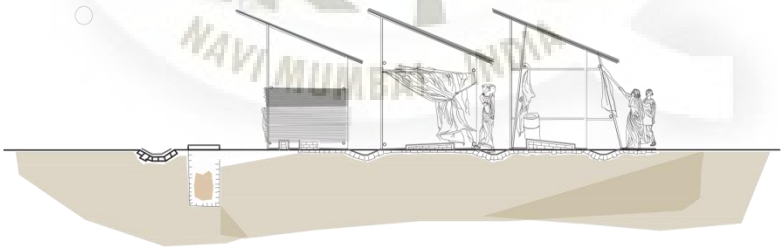
Unit design: Cladding/ Enclosure

In order for the Units to be sufficiently ventilated, I incorporated panels to sit above the steel wall cladding sheets. These panels are designed to open during the summer months, but also to be shut during the monsoon. An initial idea of plywood panels was eliminated because of the unrealistic cost and access to this material. The plywood was replaced by a panel made from a framed plastic tarpaulin that could be raised and lowered, to protect from rain or wind in the Units and also act as shading for the walkways and outdoor spaces. It could also be dropped down to provide another skin to protect the steel sheet from direct sunlight.



Concept sketch for an intergration of a panel into the unit.

Unit design: Ground Plane/ Floor



Concept designs for the Sanitation Units, illustrating how the roofs would be angled to allow sunlight in, to be ventilated through openings at the top and be connected to a two-pit Sulabh style septic tank system.

Designs were explored to distance the Unit's floor level from the ground to limit water from entering. Early designs used brick and lime plaster, but because these materials at this scale are not feasible,She examined different options. Considering surface water entry to be article aspect to mitigate, I then investigated creating a raised level forthe floor of the Units made from steel sheets sitting on a platform, to allow for water to drain underneath. Yet, this was dismissed due to the limitations and instability of the temporary scaffolding structure. The design decision was made to keep the ground/ floor solution as simple and minimal as possible, in the way it is currently done on the site. The final design has a floor that is slightly raised, which is built from broken left over tiles, with rubble in between and above this, an approximately 25mm pour of concrete.The floor of the Sanitation Units would be sloped at a minimum of two degrees to direct water towards the open drainage.

CONSTRUCTION WORKER HOUSING.

Completed modules

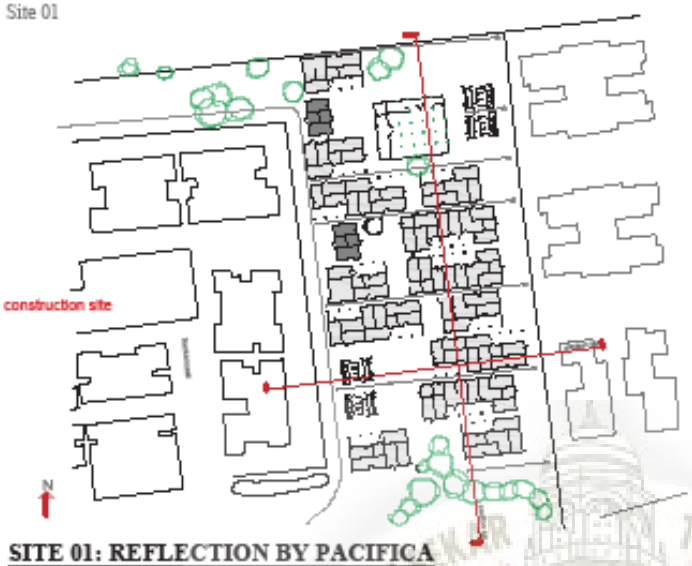
Placement of the design was tested three times before finalising the design. Although all three of the above plans follow the rules and spatial arangement diagrams, once placed on the site they were analysed in terms

Semi-private open spaces are produced through the placement of the four variations of Dwelling Clusters. These open spaces provide opportunity for the construction workers to define the use of the spaces through their own Jugaad Urbanism. Larger open spaces around the shared amenities provide opportunity for more public shared spaces and gatherings to take place. These spaces could be adapted to facilitate activities such as: a chai stand, a small shop or community meetings. The plan takes advantage of the few trees that are on the site with open areas forming around them, providing extra shade. The trees could also act as attachment points for washing lines or children's swings. The Dwelling Clusters were placed onto the site so that their roofs were facing toward drainage pathways directing to the lowest side of the site. Both the Sanitation Units and the Kitchen/ Children's Unit are activated through the open spaces of the Dwelling Clusters facing them.

CONSTRUCTION WORKER HOUSING.

ILLUSTRATION BEFORE DESIGNING

Site 01



SITE 01: REFLECTION BY PACIFICA

The labour colony grew to accommodate approximately 280 workers. The additional workers built their jhuggis on the west side of the site. The south side of the site has more direct access to the construction site and the trees along the south side of the site provide some relief from the harsh sunlight.

Site 02

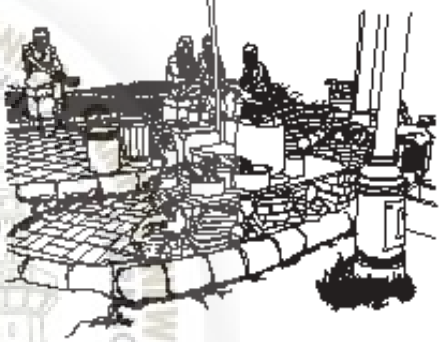
SITE 02: SHANTIGRAM.

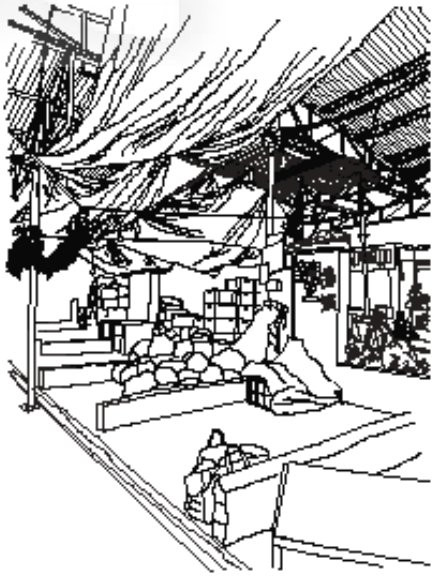
The Sanitation Units and Kitchen/ Children's Units are gathered into three groups. The entrances are at the north end of the site. The main pathways are defined through being slightly wider than the 2m standard in parts. The pathways direct inhabitants through varying sized open spaces to and from the shared amenities. There are 40 soak pits on the site, each being 1.5m X 1.5m X 2.5m.

Site 03

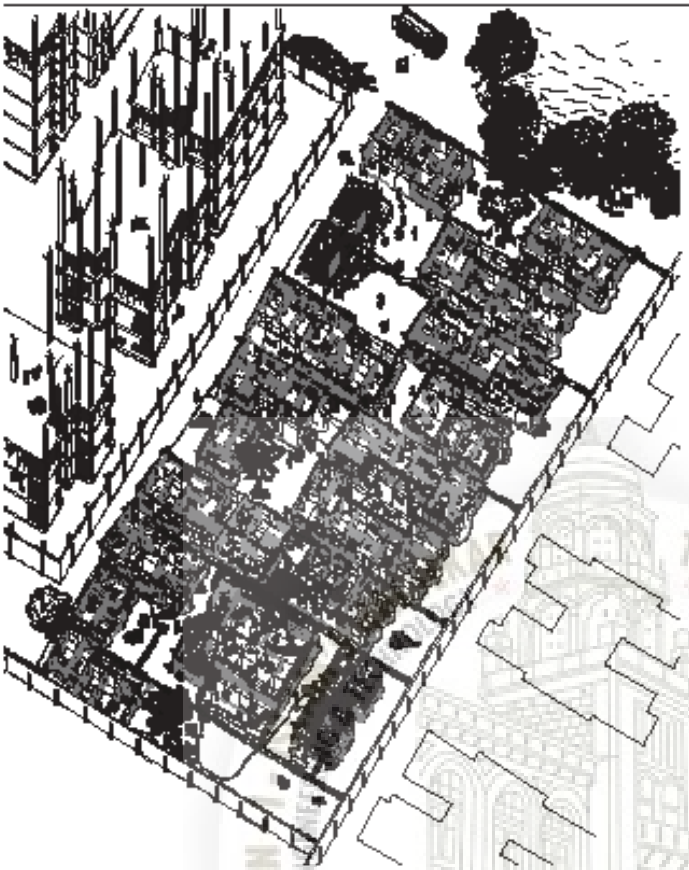
SITE 03: SHALIGRAM LAKEVIEW.

The 'Shaligram Lakeview' units on have been placed away fromthe road to provide some privacy for the inhabitants. The Kitchen/Children's Units roof and the two rectangle Dwelling Clusters roofsslope towards a shared drainage pathway. This drainage pathway is connected one soak pit that is 2.75m cubed.

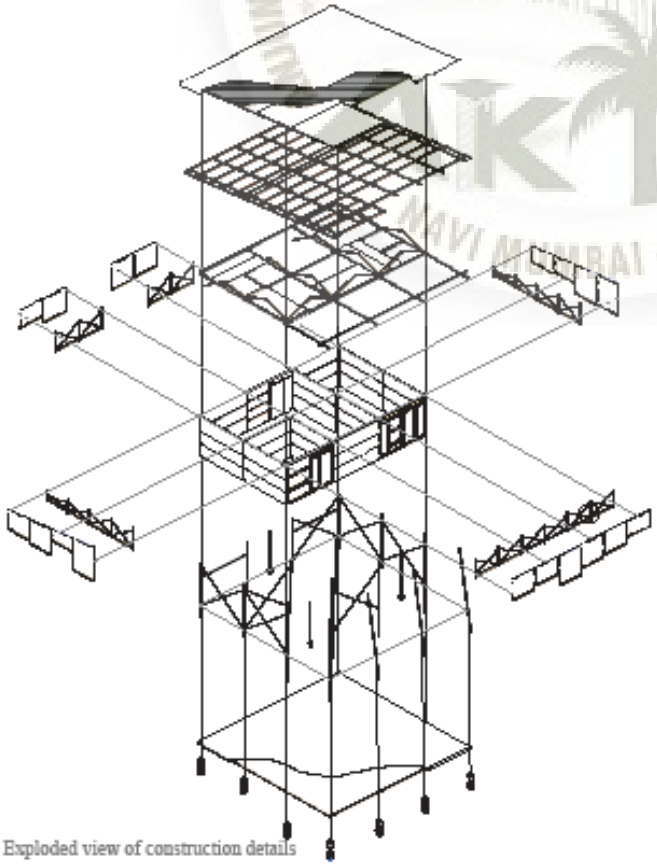




CONSTRUCTION WORKER HOUSING.



EXECUTED DESIGN ON SITE



Exploded view of construction details

ILLUSTRATION AFTER DESIGNING

SWOT ANALYSIS

S. To improve the onsite living condition for construction workers . recycling materials , constant modification though the practice of jugaad urbanism.

W. Its time consuming for the assembly on another site .

O. The realistic way to achieve this by employing local techniques and incremental improvement rather than by imposing a one of technologically advanced solution.

T. Children's playing area is provided at common gathering spaces, by arranging module.

BELAPUR INCREMENTAL HOUSING, ARTIST VILLEGE.

Artist village , sector 8, cbd belapur , navi mumbai. (1983-1986)
A proposal for mass affordable housing in new mumbai .which demonstrated how high densities could be achievedwith low rise courtyard homes built with simple materials at a human scale.
Based on clusters of between 7 and 12 pairs of houses arranges around communal courtyard , the building did not share partly walls -allowing each family to extend and adapt their own house independently.
550 families were planned for in a 6-acre area limitation.

Artist village at 2008

Location map

2018

PRINCIPLES

1. incrementally
2. pluralism
3. equality
4. identity
5. income generation
6. open to sky space

1.WATER SUPPLY

There is no ugt for the project.
each building has its own ohwt.
separate ugt for some bangalows.

2.DRAINAGE

some water is drained into the main nalah .no separate stp.
chaotic drainage system.
waste water is directly drained in to the municipal sewer.

3.ELECTRICITY

chaotic electric connection.
substation and meter room located in condominium 1.no
gas pipe lines .
no rain water harvesting project.

CURRENT SCENARIO

One third of the original homes have been turn down and completely rebuilt by aspiring middle classes . yet the courtyard and the community spaces remains intact , it is the strong piece of city making that has lasted beyond the individual dwellings.

MATERIALS USED FOR CONSTRUCTION.

External walls of brick ,roofs structure covered with wooden singles . plaster of white color concrete.colorful wooden fixtures.
outdoor paving stone blocks.
individual houses rely on simple floor plans and building method , enabling local craftsman and masons to construct them .homes are free standing ,so residents can add to them as their family grow.

Making housing is like bird building its nest .you start with a basic house , but you have to let people change it to their own need.
-CHARLES CORRIEA

BELAPUR INCREMENTAL HOUSING ,ARTIST VILLEGE.

IDEOLOGIES

correa discussed housing and the importance of people to be involved in determining its design and use .
he also emphasized incremental housing as a centerpiece to any solution that was proposed for a place like dharavi.
the foot print of each plan varies little bit in size (45 sqm. to 70 sqm.) ,maintaining equality in the community.
scheme caters wide range fron the lowest budget of rs 20000 ,mig rs 30000-50000 and upper income group180000.

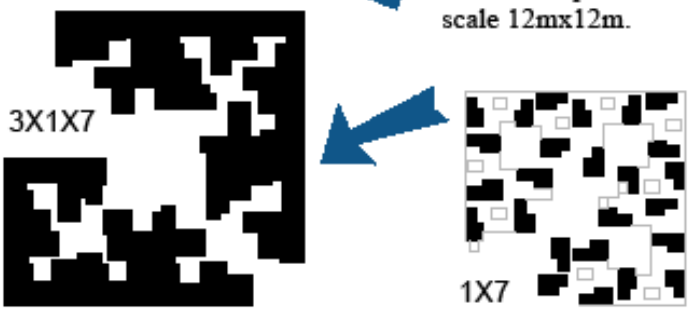
Basic ideology about planning

Section of (C) type of arrangement

arrangement of module

PLANNING SPACE

The project is generated by a hierarchy of space . seven units are grouped to form small courtyard town of about 8mx8m.three of these homes form a module of 21 homes that describes the collective space of the next scale 12mx12m.



SWOT ANALYSIS

S.Even one third of the original homes have been turn down and completely rebuilt by aspiring middle classes.

W.The residents are not happy with the concept of putting toilet outside the house .no parking spaces

O.People can modify their houses freely , whether with a paint brush or mortar or construction.

T.Each cluster permits the emergence of a local community feeling , while integrating each house to the whole settlement at different level .the hierarchy itself is organic .

ELEMENTALS HALF FINISHED HOUSING AT ,CHILE.

Since they first developed the typology for their Quinta Monroy project in Iquique, Chile, the "half - finished home " has become something of a signature for ELEMENTAL they have used the technique in multiple cities in Chile , as well as their Monterrey Housing project in Mexico. The typology began life as a way of dealing with extremely low budgets, allowing governments to provide housing to citizens at incredibly low prices.

INFORMAL HOUSING SECTOR IN CHILE:

Considers several situations…

1.The production of shelter out of the legal framework and public programmes, in parallel with the formal housing production.

2.The production of shelter out of the legal framework and public programmes, in parallel with the formal housing production.

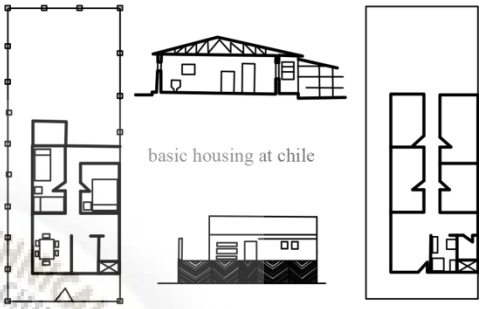
The enlargement and consolidation of the minimum solutions that the housing programmes deliver.

3.The production of shelter out of the legal framework and public programmes, in parallel with the formal housing production.

4.The enlargement and consolidation of the minimum solutions that the housing programmes deliver.

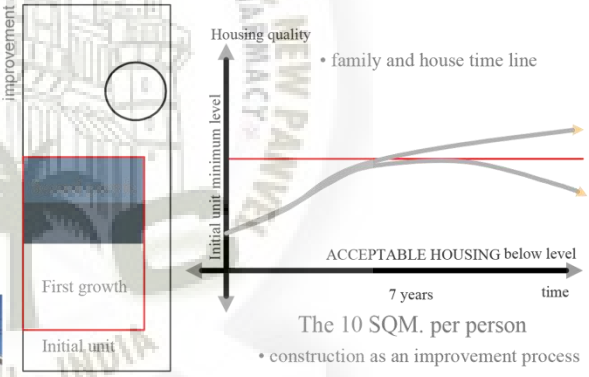
Complements social housing produced by the different governments

5.The production of shelter out of the legal framework and public programmes, in parallel with the formal housing production.



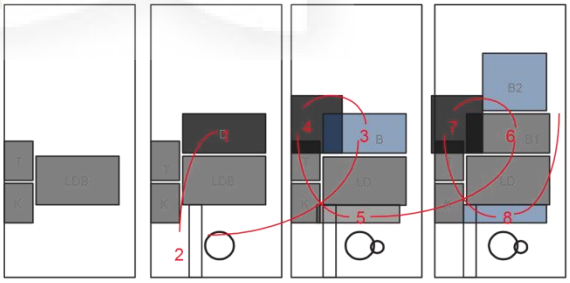
3 ASPECTS OF INCREMENTAL BUILDING:

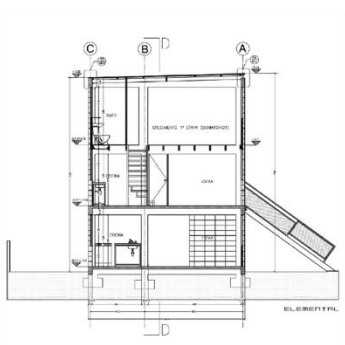
- To reach a minimum space
- Construction as an improvement process
- family and house time line



ongoing construction

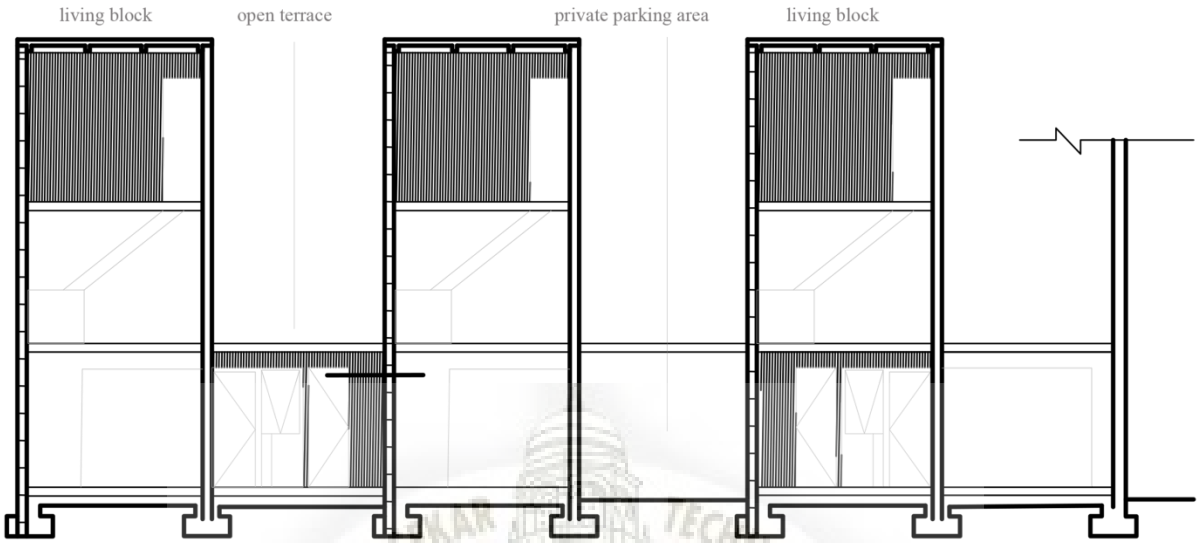
half fished house



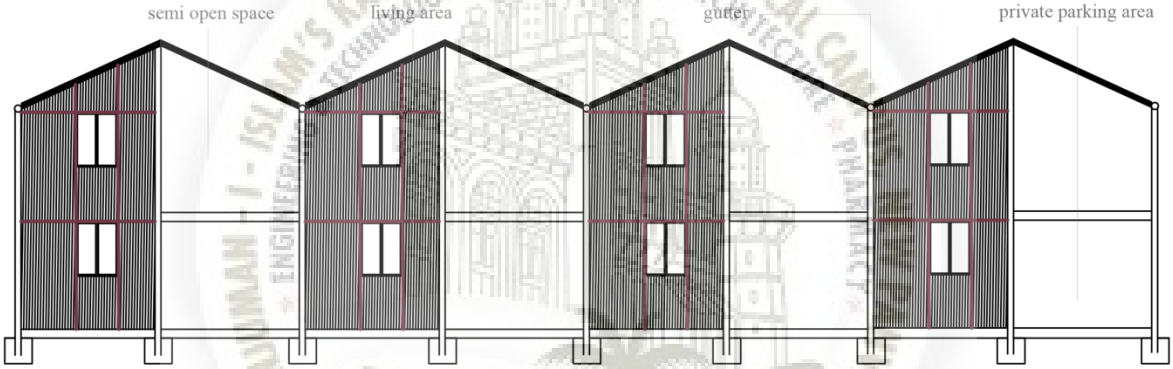


At Villa Verde, ELEMENTAL was able to work with a larger budget than they had previously. Rather than providing housing for the most disadvantaged members of society, they were now designing for people who would make use of the upper bracket of Chile's social housing policy.

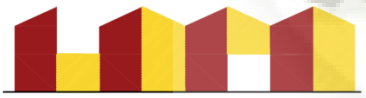
ELEMENTALS HALF FINISHED HOUSING AT ,CHILE.



Section of (B) type of arrangement



Section of (A) type of arrangement



TYPOLOGY (A)

To be designed self

designed module

TYPOLOGY (B)

1.Planned growth to 72 sq.m
2.Ventilated kitchen and toilet.
3.Definitive structure and external walls
4.Crossed ventilation
5.No corridors or shared stairs
6.Modular rooms 3x3 mts
7.Colective space for 20-30 families

MATERIALS USED

STAIRCASE
Wood , concrete , steel is used for staircase which are contextually available.

WALLS
concrete, corrugated sheet , brick ,c-forex block is used for wall .

WINDOWS
wood and glass is used for windows.

DOORS
wood , steel , corrugated sheets are used for doors.

ROOFING
corrugated sheet is used for roofing .

STRUCTURAL MEMBERS
R.C.C or steel or wood and composite materials are used

SWOT ANALYSIS

S.This housing idea is useful to over come on informal settlements .provides opportunity to increase through housing as the family increases.This is low cost and simple in terms of contruction ,material and labour effort.Also user friendly house

W.Staircase required more space for function.

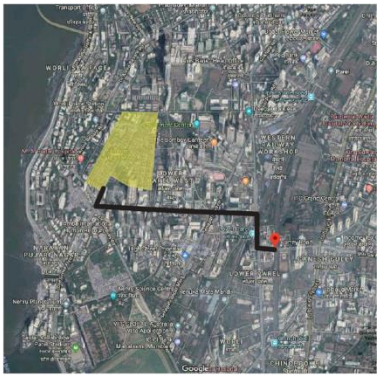
O.Growth is possible when need.

T.The pockets which are kept open plays an important role in ventilation and can be used as open terrace temporary until occupied completely

B.D.D CHAWL ,LOWER PAREL ,MUMBAI.

B.D.D Chawl lower parel ,Mumbai 2018.

Adjacent road at B.D.D



Location map B.D.D Chawl, lower parel.

CONTEXT ,LOCATION ,HISTORY

BDD was established in 1920 These chawls were jails constructed by british. As of year 2016, total 195 BDD Chawls located at Worli, Naigaon and N M Joshi (Parel) cover an area of 86.98 acre, with the Worli BDD chawls occupying the maximum area of 59.69 acre. Out of the 195 chawls, the maximum of 121 chawls are in Worli. In all, there are 16203 tenements of which 2901 tenements have been earmarked for police housing. We can find the mix religions living together. chawl no. 64 to 74 and 21 to 28 is for police. After 2008 people started to extend their room and to construct separate toilets.

High rise building at B.D.D

Common corridor for different purpose while need

Interior arrangement of room

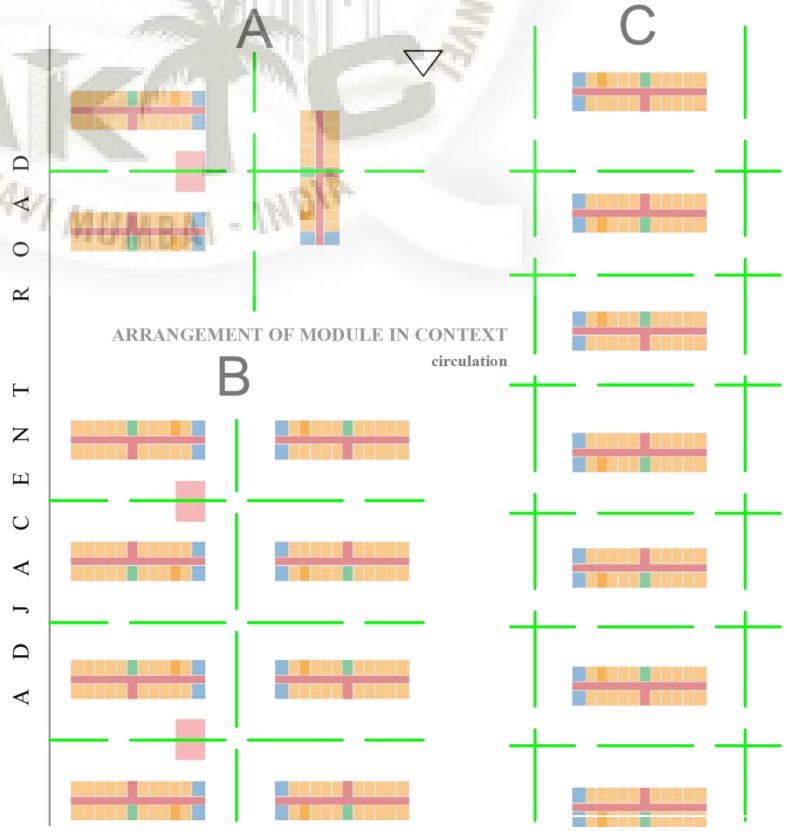
ROOMS
area:160 sqft (10'x16') with a door and window there are 11 rooms at each floor.

COMMON TOILETS
there are 6 no of toilets at each floor for ladies and gents.

MIDDLE ROOM
was provided for maintenance purpose which is get converted into tenement room.

COMMON CORRIDOR
all the room is connected through a corridor width 8' opening at both the sides.

GATHERING SPACE
open space used for parking and for festivals.Molded the space as per society use.



B.D.D CHAWL ,LOWER PAREL ,MUMBAI.

MATERIALS USED FOR

WALL

initially it was made up of concrete but due to extension some walls are of brick and of gypsum boards.

SKELETON

the entire skeleton of structure is in r.c.c and steel in extended portion

STAIRCASE

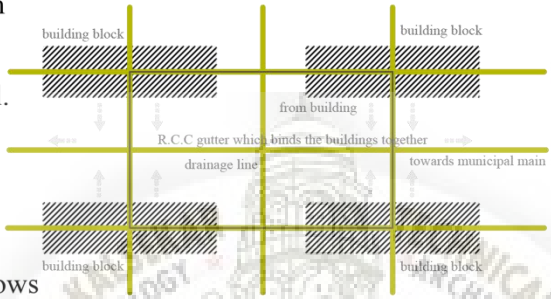
r.c.c staircase in kota finish with iron handrail.

CORRIDOR FLOORING

sabad stone in corridor flooring in some chawls kota is also used.

WINDOWS

iron jali is used in windows



R.C.C skeleton

CONSTRUCTION TECHNOLOGY FOR SERVICES

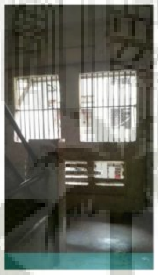
B.D.D CHAWL	No. of tenements	80 SQ.M
Parel mill area	Size / tenements	15 SQ.M
	Ground cover	180 SQ.M
	No. of inhabitants	300 SQ.M

average person living per room is 4.
light for the common spaces is also free.
no need to pay for consumption of water.
a small family can only survive in this type of tiny habitual space.


Public toilets


Main entrance

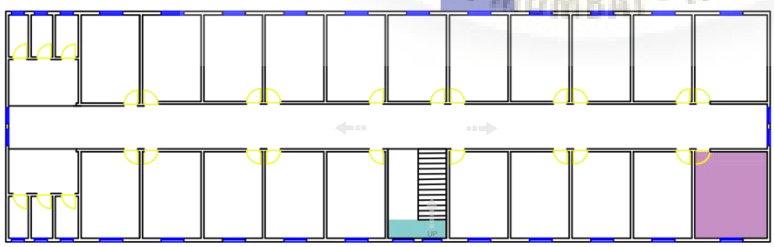

Commomn corridor

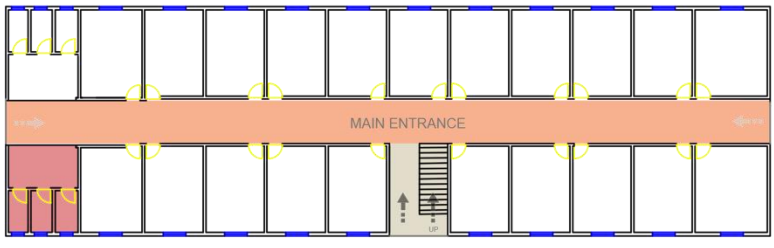

Stair midlanding


Extended bedroom


Public passage


Commercial use


TYPICAL FLOOR PLAN 1,2,3



GROUND FLOOR PLAN

SWOT ANALYSIS

S. Shelter for the huge density, enough social spaces,mixeduse catering,Affordable

W. Bad ventilation , rooms are not habitable ,extension to adjust the toilet and kitchen results in decreasing common passage width.

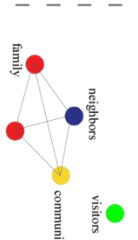
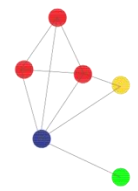
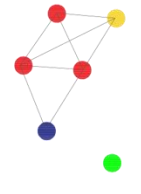
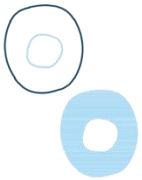
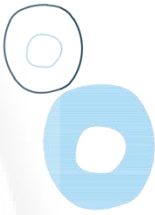
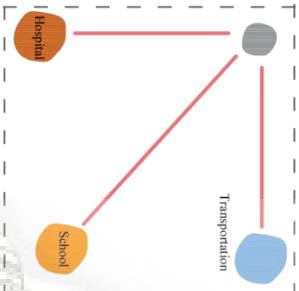
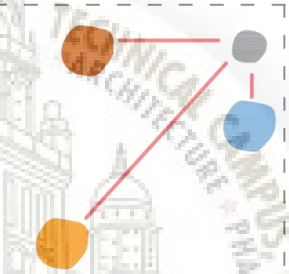
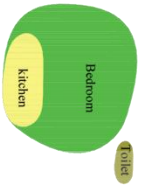
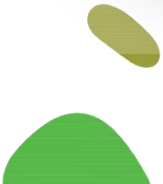
O. Need to think about the future expansion to survive in society. Endless parking spaces.

T. The doors are face to face so for privacy people have to close the door at all the time.People need more spaces as open ,close semi -open for breathing.

COMPARATIVE ANALYSIS OF SITE STUDIES

Name and brief of project	Name:Housing for construction workers . Location:Ahmedabaad. Area: Architect : Hannah broatch Type : Temporary	Name : Artist village. Location:Belapur ,N -Mumbai. Area:6 acres Architect:Charles Correa. Type : Incremental	Name : Elementals Half finished housing. Location:Chile, South America. Area: Architect:Alejandro Aravena. Type : Incremental	Name : B.D.D Chawls. Location:Lower Parel, Mumbai Area:86.98 acres Architect: Type : Community	Name : Thakkar Bappa colony. Location:Kurla , mumbai. Area:14.20 acres Architect: Type : Community Incremental
Relation between living and working distance					
Circulation ,excess and planning of the module.					
Parking spaces	This housing project do not have proper parking space as it is not required.	This housing project do not have definite parking parking space as per growth of vehicle.	This housing project has the parking space provided below each building per tenement.	This housing project has the huge front yard and backyard which is used for parking the vehicles. enough space.	Parking is on street and common gathering space is used for parking ,people park their vehicle wherever they find vacant space.
Density living in area					
Height and Land					
Materials	Plywood panel, steel cladding sheets,palstic tarpaulin, steel sections, wood ,ropes ,clay ,mud ,bamboo.	brick ,roofs structure covered with wooden singles, concrete,wooden fixtures. outdoor paving stone blocks.	Wood , concrete , steel is used for staircase,and for roof corrugated sheet is used, brick ,c-forex block for wall, glass for window,R.C.C .	Concrete ,gypsum board for wall , flooring of kota and sabad stone,wood and iron jalis are used for window ,R.C.C structural system.	Iron sheets,brick,gypsum board for wall , flooring of kota and sabad stone,iron jalis are used for window ,R.C.C +steel structural system,asbestos sheet.

COMPARATIVE ANALYSIS OF SITE STUDIES

Social interaction			
Open and close area.			
Nearest public facilities in the area			
The changes in the building over time			
Bedroom Kitchen Toilet/bath relation			
Inferences	This project aims to improve the onsite living condition for construction workers recycling materials , constant modification though the practice of jugaad urbanism. Children's playing area is provided at common gathering spaces, by arranging module.	Even one third of the original homes have been turn down and completely rebuilt by aspiring middleclasses.The residents are not happy with the concept of putting toilet outside the house .no parking spaces People can modify their houses freely , whether with a paint brush or mortar or construction.	Idea is useful to over come on informal settlements ,to increase through housing as the family increases.This is low cost and simple in terms of construction ,materiality and labour The pockets which are kept open plays an important role in ventilation and can be used as open terrace temporary until occupied completely .	Shelter for the huge density, enough social spaces,mixeduse catering,Affordable Bad ventilation , rooms are not habitable ,extension to adjust the toilet and kitchen results in decreasing common passage width.The doors are face to face so for privacy people have to close the door at all the time.	The shoe making job, which binds the people to stay at Thakkar bappa colony is the only source of income that the family of T.B.C has.The allied business rapidly growing so it is hard to get space on rent at Thakkar Bappa colony. Children play and study on The bundle of rubber sole and get disease of T.B.

ANJUMAN - I - ISLAM'S KALSEKAR
TECHNICAL CAMPUS, NEW PANVEL
ENGINEERING & TECHNOLOGY
ARCHITECTURE
PHARMACY
AKTC
NAVI MUMBAI - INDIA

ANJUMAN - I - ISLAM'S KALSEKAR
TECHNICAL CAMPUS, NEW PANVEL
ENGINEERING & TECHNOLOGY
ARCHITECTURE
PHARMACY
AKTC
NAVI MUMBAI - INDIA

RESEARCH DESIGN

A.1.HOUSING IN INDIA

Housing in India is diverse due to the social, economic and cultural diversity of its population and diverse climatic conditions across India. One of the urbanization challenges in India has been the wide disparities in housing between the affluent, middle-income and low-income segments of the population.

Most of the economically weaker segments of the urban population in India live in slums. A "slum" is typically a heavily populated urban area with substandard housing. They could be vast informal settlements with buildings varying from simple shacks to well-maintained structures. Often, they lack basic services. They are becoming the most visible manifestation of urban poverty in India and the developing world cities. (UN-Habitat, 2007).

Approximately 24% of the total population in Indian cities (million + population) lives in the slums. 10% of the total population in Bangalore, Karnataka, lives in slums and 54% of the total population in Greater Mumbai lives in slums (Source: Census India 2001)

2.HOUSING PROGRAMS FOR THE ECONOMICALLY WEAKER AND LOWER INCOME SEGMENTS

The National and State governments are running programs, some funded by the World Bank, to improve the housing conditions for the economically weaker and lower income segments of the urban population. Some private sector builders have started building housing for these segments. The main goal of all these programs is to provide affordable housing for all and livelihood, shelter and basic services to the economically weaker and lower income segments of the urban population.

Challenges of Providing Housing Programs

Most of the housing programs include an inclusive approach to providing housing and basic services for the lower income and economically weaker sections. Due to the various problems faced by these groups, there is low utilization of existing services and programs available for these groups.

Often there are delays in project implementation and delays in rehabilitating the existing population and convincing the existing population to shift to the new housing. Often, the beneficiaries preferred to rent out the units they were allotted. The allotment of the units depends on the ability to access entitlements from the government. Often, the allotments are not equitable.

3.FLEXIBLE AND SUSTAINABLE DEVELOPMENT STANDARDS

The criteria and best practices for developing these minimum development standards for housing for the economically weaker and lower income groups are included in Appendix III. Flexible and Sustainable Development Standards Report 13

3.1For the Size, Liveability and Sufficiency of the Proposed Units

These standards were developed using criteria for the minimum size of a room so that it is habitable, liveable and sufficient. A habitable room with a cooking area was explored as a minimum requirement and accordingly a minimum size for a dwelling unit with one room and minimum sizes for dwelling units with more than one room were developed.

Standards for a multifamily residential building were developed based on how many units per floor can be supported by one staircase, whether providing a lift is an economical option for housing for the economically weaker and lower income groups, the maximum number of floors for a building without a lift etc. Occupancy standards were developed based on healthy and adequate living environment requirements.

3.2Minimum Requirement for Housing

The minimum requirements for housing shall include at least a habitable room with a cooking area and a provision for common and shared bathroom and toilet facilities.

3..Minimum Sized Dwelling Unit

The minimum size of a dwelling unit shall include a habitable room with a cooking area and a bathroom with either a combined bathroom or a separate bathroom and toilet.

3.4Dwelling Unit with More than One Room

The minimum area of a dwelling unit with more than one room shall include one habitable room, either a combined bathroom or separate bathroom and toilet facilities and one or more additional rooms and a kitchen. The minimum area for each additional room and a separate kitchen shall be used.

3.5Plot

Since land shortage and the high cost of land are major issues in urban areas, housing with individual plots and row housing is not considered for the development standards in this report. It is most economical to provide multi story buildings for housing for the low income and economically weaker sections. Plots and row housing may be provided for housing for the low

income and economically weaker sections in areas where land is less expensive and available like rural areas or outside the limits of the urban areas.

3.6Residential Building Type for Urban Areas

Given the scarce availability of land in urban areas, high density development for housing for the economically weaker and lower income sections is the most economical option to reduce the housing shortage for these income levels. Studies have shown that high density housing have the following advantages:

enhances a community's character

increases affordable housing

spurs economic development Flexible and Sustainable Development Standards Report 14

3.7For the Size, Livability and Sufficiency of the Proposed Units

These standards were developed using criteria for the minimum size of a room so that it is habitable, livable and sufficient. A habitable room with a cooking area was explored as a minimum requirement and accordingly a minimum size for a dwelling unit with one room and minimum sizes for dwelling units with more than one room were developed.

(Source: scanph, 2004)

3.8Open Space, Roads, Street Lighting

These standards were developed based on criteria for a minimum percentage of the plot area that can be used as open space or green space in addition to the proposed setbacks. The open space can be used for providing the required green spaces and/or can be used as a recreational amenity. The standards for roads were developed based on criteria for vehicular and pedestrian access roads to multifamily residential buildings. Criteria for street lighting are based on illumination and safety requirements for night lighting for public areas.

Energy conservation methods for street lighting including solar powered lighting were also developed. Accordingly, adequate areas for open spaces and roads shall be developed for a plot with a multifamily residential building. Appropriate street lighting with energy conservation requirements shall be developed.

4.FOR APPROPRIATE HOUSING DENSITIES

4.1 For the Minimum Size of a Housing Development

Based on the above analysis, the minimum size of a housing development shall include at least a single multifamily residential unit. Therefore, the minimum size of a housing development shall be a plot that can accommodate a multi story residential building. These standards for the area of a housing development shall be developed based on the building area, setbacks, heights, amount of open space and amount of road area required. Ground coverage, FAR, minimum and maximum density shall be calculated based on these requirements.

4.2For the Minimum Size of a Housing Layout

If larger areas are available for providing housing for the economically weaker and lower income sections, facilities for community development, environmental preservation and sustainable development can be provided. Provisions for facilities like schools, shopping centers, clinics, bus stops, transit facilities etc. can be made.

Based on the above, a minimum population of 5,000 is required for providing schools, clinics etc. Therefore, a minimum population of 5,000 shall be considered for providing schools, clinics, shopping centers etc. The standards for the area of a housing layout shall be developed based on the number of multifamily residential developments, amount of open space, amount of road area and amenities required for a population of 5,000. Minimum and maximum density shall be calculated based on these requirements.

For Adequate Amenities and Facilities for Overall Health and Development for a Housing Layout

4.3Open Space

Open space standards based on the minimum amount of open space required per person and the population generated by the housing layout and/or a percentage of the plot that would be adequate as open space were analyzed. The open space can be used for providing the required green spaces and/or can be used as a recreational amenity. Accordingly, adequate areas for open spaces shall be developed for a housing layout.

4.5Roads

A housing layout for the economically weaker and lower income sections must be able to accommodate large vehicles like public transit vehicles, trucks for moving, loading and unloading and emergency vehicles and pedestrian space for access and walkability.

These standards were developed based on minimum road widths that will be able to accommodate the above and the maximum percentage of the area of the development that can be used for the roads. The standards for roads were also developed based on criteria for vehicular and pedestrian access roads to multifamily residential buildings. Accordingly, adequate areas for roads shall be developed for a housing layout.

4.6Street Lighting

Criteria for street lighting are based on illumination and safety requirements for night lighting for public areas and roads. Energy conservation methods for street lighting including solar powered lighting were also developed. Accordingly, adequate and appropriate street lighting with energy conservation requirements shall be developed for a housing layout.

4.7For Community Development and Sustainable Development for a Housing Layout

Adequate spaces for community gathering and recreation contribute to the overall health and development of a community. The proposed open spaces can be used as a multipurpose space for community gathering and recreation when separate spaces for community development cannot be provided. If multi story buildings on stilts are proposed, the stilt area can be utilized for parking and community spaces.

For Environmental Preservation and Growth Management for a Housing Layout

5.Housing Developments and Housing Layout Location

Growth management can be achieved by developing a maximum population density and proposing the required facilities and amenities for the target population. This way compact developments served by public transportation can be developed to avoid sprawl.

The housing developments and housing layouts shall be strategically located along with market rate housing developments whenever feasible. These standards were based on an appropriate percentage of land in market rate housing developments that can be allocated for housing for economically weaker and lower income sections so that the common infrastructure facilities like public transportation etc. can be accessible to all income groups. Underutilized and vacant sites within the urban areas can also be used for these housing developments. Accordingly, criteria for locating these housing developments and layouts shall be developed based on the land available at such suitable locations.

http://cistup.iisc.ac.in/laxmi/pdf/FSD/2.pdf

The criteria and best practices for developing these minimum development standards for housing for the economically weaker and lower income sections are included in Appendix III.

For the Size, Liveability and Sufficiency of the Proposed Units	
Table 01: Minimum area for single family	
Residential Rooms	
Habitable Room	11 square meters
Second Habitable Room	6.5 square meters
Minimum Room Width	2.1 meters
Minimum Room Height	2.3 meters
Cooking area	2.4 square meters; width-1.2 meters
Kitchen	3.3 square meters; width – 1.5 meters
Accessible Bathroom Combined	2.8 square meters
Accessible Bathroom Separate	1.4 square meters each for bathroom and WC
Regular Bathroom Combined	1.8 square meters
Regular Bathroom Separate	1.2 square meters – bathroom; 0.9 square meters WC
Residential Unit, Multifamily Residential Building and Plot	
Minimum Unit Size (Habitable Room + Toilet)	13.1 square meters
Multifamily Development Plot	264 to 594 square meters
Each Floor Square Footage	200 to 500 square meters
Each Floor Number of Units	Maximum 12
Number of stories	Ground + 3 or stilt + 3
Number of units	36 to 48
Number of Staircases	One

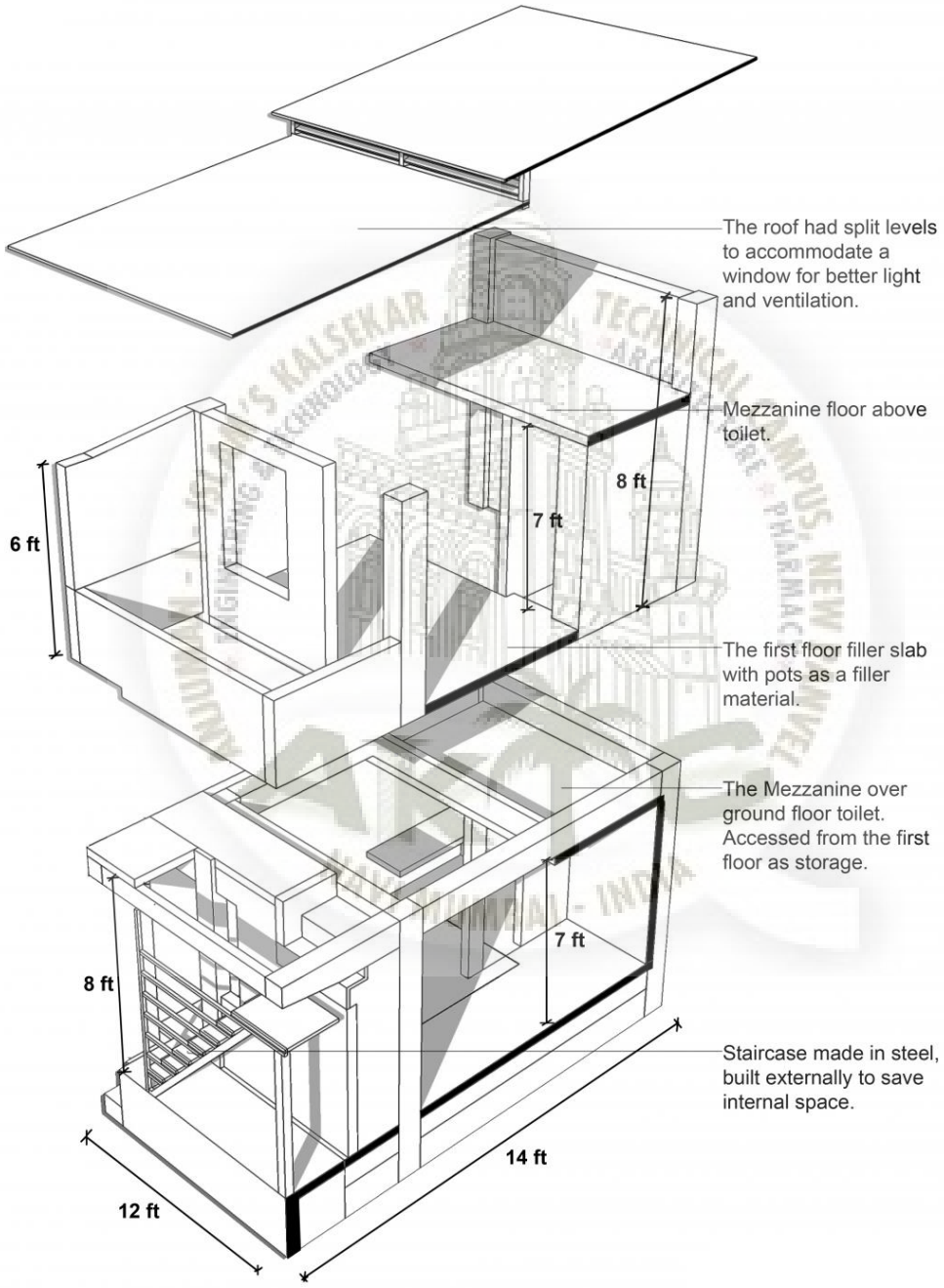
Table 03: Minimum area for multiple family.

Occupancy	4 to 6 persons per unit
Plumbing	Minimum fixtures for cooking area, bathroom, WC
Water Supply	Dual piping for clean water and waste water reuse
Water Conservation	Low capacity fixtures, water harvesting, water recycling
Disposal of Polluted & Unpolluted Water	Separate drains for polluted and non-polluted water
Sewage Disposal	Appropriate facility for 36 to 48 units
Solid waste disposal & management	Appropriate facility for 115 to 239 kgs of waste per day
Energy Conservation	20% from renewable energy; 5% of the 20% from solar
Green Buildings	Appropriate certification level to the extent feasible
Tree Preservation	Tree planting, preservation, native species, low water
Housing Developments Location	Along with market rate units close to infrastructure

Table 03: Minimum services.

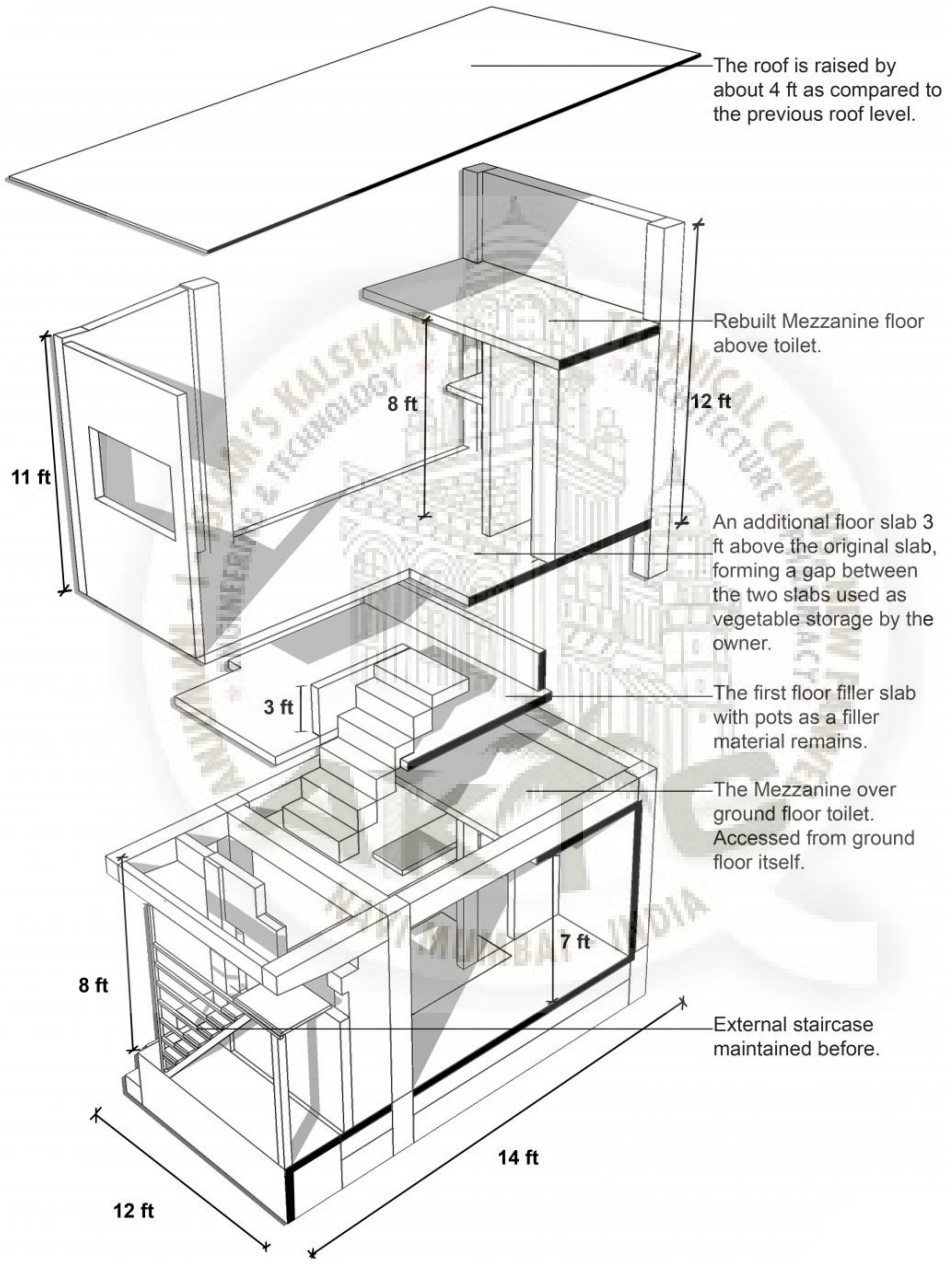
http://cistup.iisc.ac.in/laxmi/pdf/FSD/2.pdf

B.URBZ STANDARD FOR INFORMAL SETTLEMENTS 01



http://www.urbz.net/articles/homegrown-affordable-housing

B.URBZ STANDARD FOR INFORMAL SETTLEMENTS 02



http://www.urbz.net/articles/homegrown-affordable-housing

C. REPORT ON THE STATE OF AFFORDABLE HOUSING IN MUMBAI NOVEMBER 2014.

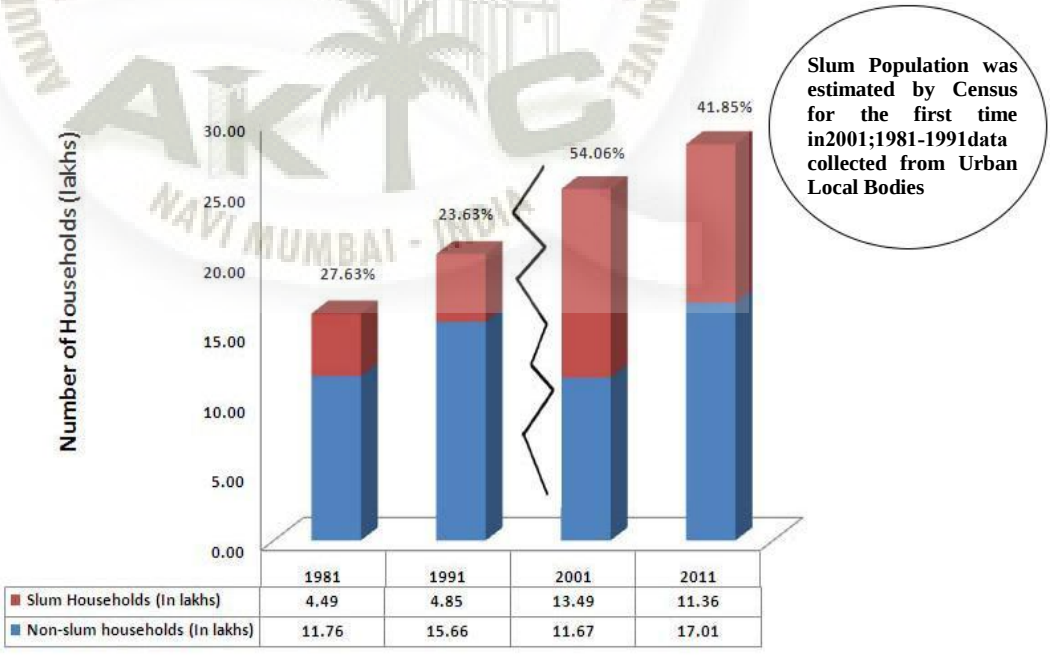
I. Housing Shortage in Mumbai

Highlights

- **41.9% people in Mumbai live in slums**
- **57% households live in one room dwellings**
- **In nine out of 24 wards, more than 50% of population lives in slums**

1.8 Slum Census

Chart 1: Number of slum and non-slum households in Mumbai 1981-2011



https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

For the first time in 2001, slum population in India was estimated on full count basis i.e. through surveys at the household level[3], by the Office of the Registrar General & Census Commissioner of India (RGI). This data was collected for both notified and non-notified slums. Prior to 2001, data on slums in the 1981 and 1991 population census was taken from town directories maintained by the urban local bodies which had data on notified slums only. Non-notified and unrecognised slums were enumerated for the first time in 2001, which could possibly account for the sharp rise in slum population in this period.

1.9 slum city

Chart 1 shows the growth in Mumbai's slum and non-slum households from 1981 to 2011, based on the Census of India data for the respective decades.

- **Of 28.3 lakh households in Greater Mumbai, 11.36 lakh households reside in slums.**
- **Census 2011 data reveals a marked fall in the percentage share of slum population, from 54% in 2001 to 42% in 2011. While the share of slum population may have fallen between 2001 and 2011, 42% households continue to live in 'inhuman' conditions.**
- **In addition to households living in slums, there are 15,274 houseless households in the city, living in the open or roadside, pavements, in humen pipes, under fly-over and staircases, or in open in places of worship, mandaps, railway platforms, etc.**

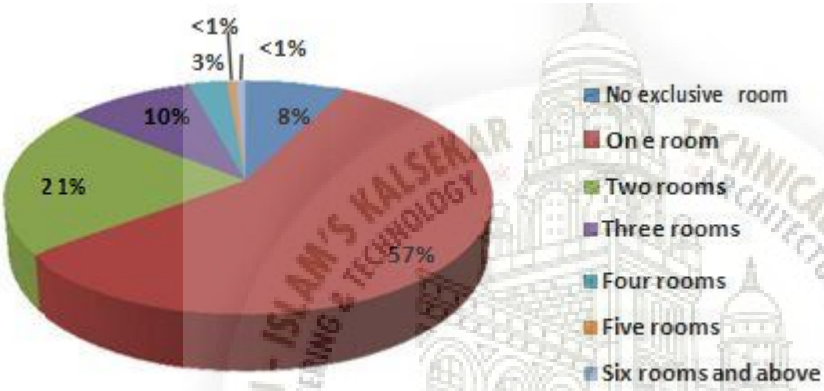
Thus, at least 11.57 lakh formal dwelling units are required in Mumbai to house the existing slum and houseless population. With population expected to touch 1.5 crore[4]in the next 20 years, what is the State Government's plan to address this acute housing shortage for the economically weaker segments?

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

2. Living Conditions in Households

Lack of affordable housing solutions compels families to reside in congested dwellings . Living conditions in households can be gauged through the following indicator the number of habitable dwelling rooms available to a particular household.

Chart 2: Household s by Number of Dwelling Rooms (2011)



- **57% households live in one room dwellings**
- **8% households do not have an exclusive dwelling room i.e. one dwelling room is shared by more than one household**

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

2.1 Ward wise Distribution of Slum Population across Mumbai

Table 04: Ward wise slum population 2011

Region	Ward	Slum Population 2011	% Slum Population 2011
Island City	A	63,400	34.3
	B	14,400	11.3
	C[10]		
	D	33,000	9.5
	E	77,800	19.8
	F/N	308,400	58.3
	F/S	95,200	26.4
	G/N	189,600	31.7
	G/S	78,300	20.7
Western Suburbs	H/E	234,800	42.1
	H/W	118,500	38.5
	K/E	403,800	49.0
	K/W	108,800	14.5
	P/N	504,500	53.6
	P/S	264,000	57.0
	R/C	104,300	18.6
	R/N	221,500	51.4
	R/S	399,200	57.8
	L	490,400	54.4
	M/E	245,300	30.4

	M/W	**217,200**	**52.7**
	N	**385,600**	**61.9**
	S	**537,900**	**72.3**
	T	**111,800**	**32.7**
Greater Mumbai		**52,07,700**	**41.9**

More than 50% of the population in wards F/N, P/N, P/S, R/N, R/S, L, M/W, N, and S lives in slums as of 2011.

II. Public Housing Stock created in Mumbai 1995-2014

Highlights

- **1995 to 2014: Only two lakh dwelling units have been constructed under State and Central Government schemes**
- **Of the 4.6 lakh dwelling units approved for construction by the Slum Rehabilitation Authority, only 33.7% have received Occupation Certificates**
- **No projects have taken off under Rajiv Awas Yojana in Mumbai as of September 2014**

2.2 Initiatives by Government of India

Housing schemes by the Central Government are implemented by the Ministry of Housing & Urban Poverty Alleviation (MHUPA). The policies of urban development and housing in India have come a long way since the 1950s. In the First Five Year Plan (1951-56), emphasis was given on institution building and on construction of houses for Government employees and weaker sections. The National Housing and Habitat Policy unveiled in 1988 aimed at ensuring

"shelter for all" and better quality of life to all citizens by using the unused potential in public, private and household sectors. Subsequent programs include the National Slum Development Program (NSDP), night Shelter for urban shelter less, and Valmiki Ambedkar Awas Yojana (VAMBAY). Currently, the MHUPA is running the following schemes to address urban housing shortages under the aegis of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM):

2.3 Slum Rehabilitation Scheme

In-situ, transit and Project Affected Person (PAP) Schemes for slum rehabilitation undertaken by Slum Rehabilitation Authority, MHADA and MMRDA.

2.4 Affordable Housing in Mumbai Metropolitan Region

MMRDA's rental housing scheme (2008) has been modified into an Affordable Housing scheme in November 2013. The private sector is offered incentive FSI in return for providing self-contained tenements of 160 sq.ft carpet area along with the appurtenant land to MMRDA free of cost which shall be allotted to eligible low income group households.

2.5 Affordable Housing in Partnership

Aims to encourage private sector participation in creation of affordable housing stock, recognizing that mere efforts of the Government would be insufficient to address the housing shortage. It was earlier introduced in 2009 as part of BSUP component of JNNURM and subsequently, Affordable Housing in Partnership was dovetailed with Rajiv Awas Yojana (RAY) in 2011. Central Government has now approved implementation of RAY for the period of 2013-2022. Central government will assist in construction of houses for EWS/LIG as part of group housing schemes of the States/UTs. These housing schemes will be implemented by the States/UTs through partnership with private sector or public sector including Parastatal bodies such as MHADA.

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

Table 05: (Public) Housing stock created in Mumbai since 1995

Agency/Scheme	Completed Units[13]	Units under Construction	Status as on Date
Government of Maharashtra			
MHADA	20,121	19,267	October 2014
SRA	1,57,402	86,069	April 2014
MMRDA (SRA cell)	26,101	3,565	October 2014
Government of India			
Rajiv Awas Yojana	0	0	September 2014
Affordable Housing in Partnership	0	0	September 2014
Total	2,03,624	1,08,901	

995-2014:

- **2.03 lakh dwelling units have been built in all in Mumbai by State Government agencies**
- **Another 1.08 lakh units are currently under construction.**
- **1,57,402 units have been built under SRA's schemes in this period**
- **No projects have taken off in Mumbai under MMRDA's Rental Housing Scheme (2008)**
- **No projects have taken off under the Rajiv Awas Yojana and Affordable Housing in Partnership Schemes of the Government of India, in Mumbai, as of September 2014**

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

2.6 Progress of Slum Rehabilitation Authority's (SRA) Slum Rehabilitation Schemes

Table 06: Summary of all proposals received by SRA since inception till 30.04.2014

Proposals		
Proposals Received	**2,622**	**100%**
Proposals Approved	**1,344**	**51.2%**
Tenements		
Number of Tenements in Approved Proposals	**33.7%**	
Number Of Tenements issued Commencement Certificates	**2, 43,471**	**52%**
Number of tenements issued Occupation Certificates	**1, 57,402**	

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

- **When the Slum Rehabilitation Authority was set up in 1995, there were more than 4.9 lakh households in the city living in slums (Census 1991)**
- **Between 1995-2014, a little over 1.5 lakh households have been built under SRA's schemes, which amounts to less than a third of the number of slum households in 1991**
- **As of April 2014, occupation certificates have been issued for only 33.7% of the total tenements that have received approval for construction**
- **Commencement certificates have been issued for only 52% of the total tenements that have received approval for construction**

III. Affordable Housing: Concepts

Highlights

- **50% of Mumbai's households earn less than Rs.20,000 per month**
- **Starting price of a MHADA dwelling is Rs.14.7 lakhs**
- **A household with median level of income will need 12 years of income to buy a house in Mumbai at the ready reckoned rates.**

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

'Affordability' is a relative concept and has a different meaning for different people. What may be affordable to one section of the population is out of reach for another. Hence, for a large and diverse city like Mumbai, no one size can fit all.

Table 07: Defining Affordability across Income Groups

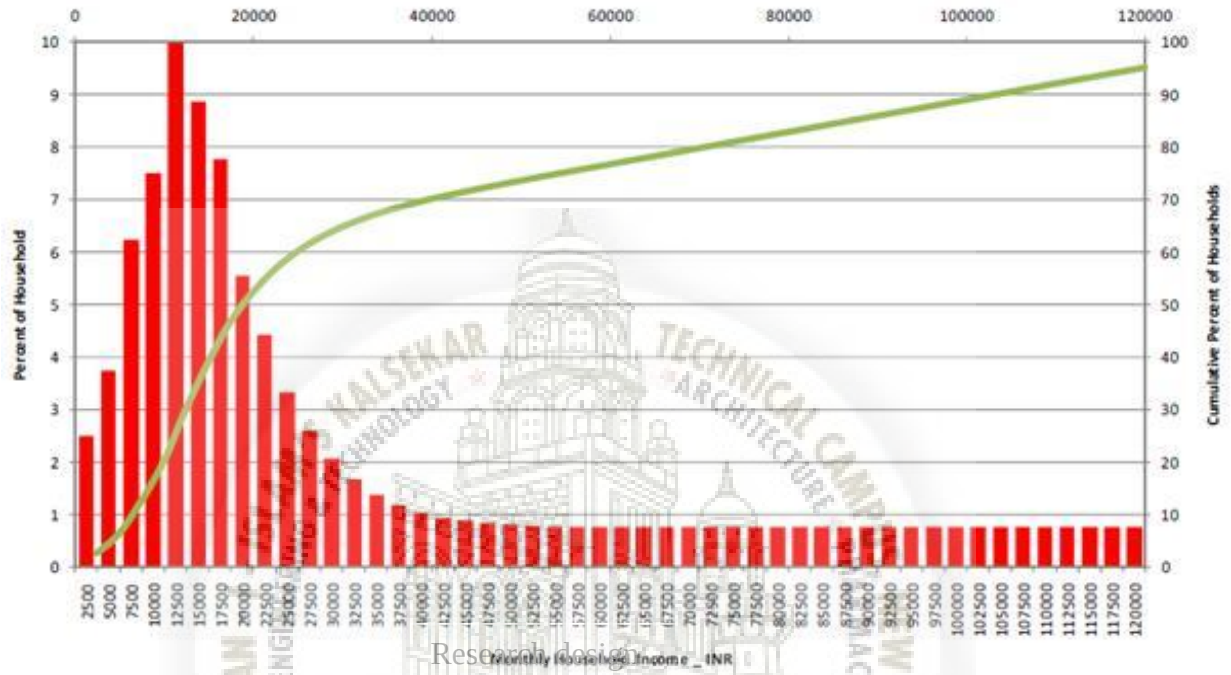
Income Group	Economically Weaker Sections (EWS)/Low-income Group (LIG)	Middle-income Group (MIG)
Size	300-600 sq ft carpet area	Not exceeding 1,200 sq ft carpet area
Cost	Not exceeding 4 times household gross annual income	Not exceeding 5 times household gross annual income
EMI/Rent	Not exceeding 30% of gross monthly income	Not exceeding 40% of gross monthly income

This means that a semi-skilled worker, like a motor car driver, who typically earns Rs.10,000 a month, should be able to rent a place for about Rs.2,500 a month, or buy a house for about Rs.4 lakh.

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

2.7 Income vs. Affordability in Mumbai

Chart 3: Household Income Distribution in Mumbai (2010)



Source: Annez, P. C., Bertaud, A., Patel, B., & V.k., P. (2010). *Working with the Market, Approach toReducing Urban Slums in India*

According to the World Bank Working Paper, *Working with the Market, Approach to Reducing UrbanSlums in India, November (2010):*

- Median Household Income per month in Mumbai: Rs.20,000, i.e. 50% of Mumbai's households earn less than Rs.20,000 per month
- Mean Household Income per month in Mumbai: Rs.41,000, i.e. on an average a household in Mumbai earns Rs.41,000 per month

In the above chart, 95% of households in Mumbai fall within the income range plotted on the horizontal axis, i.e. households earning upto Rs. 1,20,000 per month. The remaining households with monthly income exceeding Rs. 1,20,000 per month have been left out of the analysis.

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

2.8 Ready Reckoned Rates (RR)

Table 08: Ready Reckoned Rates for residential properties in Mumbai, as of 1st January 2014

Area	Minimum Ready Reckoned	Ready Reckoned for 269 sq.ft	Price/income ratio 269 sq. ft
Units	(Rs/sq. ft)	in lakhs	Median RR divided by median annual income
Western Suburbs			
Dahisar	2,703	7.3	3
Kandivali-Borivali	6,652	17.9	7
Malad	5,834	15.7	7
Goregaon	5,556	14.9	6
Andheri West	9,903	26.6	11
Vile Parle West	13,220	35.6	15
Bandra	7,934	21.3	9
Eastern Suburbs			
Kurla	3,670	9.9	4
Powai-Chandivali	12,161	32.7	4
Ghatkopar	4,599	12.4	14
Chembur	4,116	11.1	5
Bhandup	4,181	11.2	5
Mulund West	7,860	21.1	5
Island City			
Dharavi	5,407	14.5	9

Sion Division	**9,876**	**26.6**	**6**
Parel Sewree	**5,277**	**14.2**	**11**
Lower Parel	**11,799**	**31.7**	**6**
Worli	**14,818**	**39.9**	**6**
Girgaum	**13,174**	**35.4**	**13**
Colaba	**17,642**	**47.5**	**17**
Malabar and Cumballa Hill	**26,050**	**70.1**	**15**

FSI of 4: Why it is not workable in Mumbai

Floor Space Index (FSI) in Mumbai is often compared to other cities in India and abroad. The standard argument put forth for solving Mumbai's spatial crunch is that FSI in Manhattan (New York) goes upto 15, and upto 13 in Shanghai. To simplify the concepts of FSI, crowding and densities further and understand the impact of a hike in FSI in Mumbai we look at the case of **FSI 3 and FSI 4** in Mumbai.

The National Building Code of India[28]2005 (NBC) is a national instrument providing guidelines for regulating building construction activities across the country. The NBC 2005 lays down provisions intended to serve as a model for adoption by Public Works Departments and other government construction departments, local bodies and other construction agencies. The Code serves as a useful guideline to establish per capita requirements for different kinds of spaces in cities. E.g. Institutional area, open areas etc.

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

Table 09: Case of FSI 4 with 25 Sq.m and 100 Sq.m apartments

	Case 1: FSI 4 and 25 Sq.m apartments		Case 2: FSI 4 and 100 Sq.m apartments	
Buildable area	1 ha[30]		1 ha	
• **FSI**	4		4	
• **Built-up area**	4 ha	14%	4ha	38%
• **Sq.m/capita**	5		20	
• **Residents**	8,000		2,000	
Institutional area @ 2 Sq. m/capita	1.6 ha	22%	0.4ha	15%
Open Area @ 3 Sq.m/capita	2.4 ha	32%	0.6ha	23%
Street Area @ 3 Sq.m/capita	2.4 ha	32%	0.6ha	23%
Total Area	7.4 ha	100%	2.6ha	100%
Gross density	1,081 p/ha		769 p/ha	

In Tables 8 and 9, the values assumed for Institutional and Open areas per capita are below the norms given in the National Building Code. The value for Street space per capita is below the worst case among Mumbai's existing Wards.

It will be seen from Case 1 that if we give a builder FSI 4 on his one hectare plot, we will need a further 6.4 hectares of area for institutions, open spaces and streets to service the population housed on his one hectare plot. Who is going to provide area which is 6.4 times the area of the developer's plot?

https://www.praja.org/praja_docs/praja_downloads/Report%20on%20The%20State%20of%20Affordable%20Housing%20in%20Mumbai.pdf

D. MUMBAI DP 2034 : BMC'S MASTER PLAN TO TRANSFORM MAXIMUM CITY

The Brihanmumbai Municipal Corporation (BMC) cleared the long-pending revised draft development plan (RDDP) 2034 on Tuesday to boost the development in the city. The Brihanmumbai Municipal Corporation (MCGM) cleared the long-pending Development Plan (DP) 2014-2034 on Tuesday, a 20-year master policy which will oversee development in Mumbai. With 266 amendments suggested to the revised development plan, the plan has been sent to the state government for its approval as per procedure. The DP includes a blueprint of the city's development that includes steps to boost civic amenities, affordable housing, prevent encroachments as well as outline policy on land usage, open spaces management, floor space index (FSI), built-up area (BUA), transportation etc.

Here are the key highlights from the Development Plan 2034:E1

2.9 Affordable housing

The DP aims to facilitate creation of 10 lakh affordable houses, by opening up about 2,000 hectares of land that was earlier reserved for no development, such as salt pans.BJP group leader Manoj Kotak told DNA that opening up of previously undeveloped area, a 500-square-foot home could cost as little as Rs 15 lakh in Mumbai .Affordable housing is one of the central government's action points under its Housing for All by 2022 scheme, which aims at providing low budget houses for people.

3.0 Education, Health and Social Amenities

Under the DP 2034, BMC is aiming to provide basic amenities including water, sanitation, primary health care and schools to slum dwellers till the time they are redeveloped. Since, 41.2 percent of Mumbai’s population lives in slums, which occupies less than 10 percent of Mumbai's land, they lack basic necessities .The population in slums has been on the rise owing to the large inflow of people who come to Mumbai for jobs. According to the 2011 census, the population of the greater Mumbai increased by one and a half million over a decade, thanks to the rising need for the city to provide basic amenities to larger population.

https://www.moneylife.in/article/mumbai-development-plan-2034-deciphering-future-of-the-mega-city/55747.html

3.1 Open Spaces

The new DP looks at removing all encroachments on the reserved open spaces.BMC is planning to earmark 33 percent of spaces as open space and balance the rest 67 percent will be utilized to rehabilitate the people who have encroached such places. As per the draft DP, the total demand for provision of open spaces in 2034 is 5,116 hectares, while the total provision is 3,525 hectares area marked as public open spaces that includes existing and the proposed reservations on the plots .The current 1.28 square meter of public open space per person is likely to increase after the plan is implemented. Thus, the city will have more recreational grounds, parks in public spaces.

3.2 Floor space index (FSI)

Under the DP 2034, BMC has proposed permitting 5 floor space index (FSI) for commercial projects.FSI refers to the ratio between the permissible construction space and the actual space of the construction. Currently, the FSI range for commercial development is 3-3.5.The increased FSI is expected to create millions of new jobs in the city. Also, with less availability of land increasing the FSI seems feasible for the government to keep up its commercial hub status.

First Published on Aug 2, 2017 04:50 pm

https://www.moneylife.in/article/mumbai-development-plan-2034-deciphering-future-of-the-mega-city/55747.html

TENTATIVE ARCHITECTURAL AREA STATEMENTS					
NAME .SR NO.	SUB SPACE	AREA IN	NO.	QUALITY	TYPES
KARKHANA		SQ.M		OF SPCE	OF SPACE
1	sole cutting unit	15	1	Closed	Private
2	Pressing unit	10	1	Closed	Private
3	Heating unit	10	1	Closed	Private
4	Drying area	15	1	Semi open	Private
5	Heel cutting unit	12	1	Closed	Private
6	Leather cutting unit	10	1	Closed	Private
7	Buckle making unit	10	1	Closed	Private
8	Stitching unit	15	1	Closed	Private
9	Assembly area	12	1	Closed	Private
10	Workspace	12	1	Closed	Private
11	Tool house	12	1	Closed	Public
12	Storage	12	1	Closed	Private
13	Allied space	10	1	Closed	Public
14	Toilets	4	1	Closed	Private
	Total	159			
SHOPS					
1	Sale area	9	1	Semi open	Public
2	Office desk	3	1	Closed	Private
3	Storage	6	1	Closed	Private
4	Toilets	1.5	1	Closed	Private
	Total				
HOUSE MODULE					
1	Kitchen	3.5	1	Closed ventilatd	Private
2	Living +bedroom	10	1	Closed ventilatd	Private
3	Sleeping alcove	5	1	Closed	Private
4	Toilets	2.5	1	Closed	Private
	Total	21	1		
GODOWN					
1	Desk area	1	1	Closed	Private
2	Weighing machine area	2.5	1	Closed	Private
3	Storage	10	1	Closed	Private
4	Toilets	3	1	Closed	Private
	Total	16.5			
COMMON SPACES					
1	Parking space		1	Open	Public
2	Playing area for child		1	Open	Public
3	Banquat hall		1	Closed ventilated	Public
4	Space for festivals		1	Semi open	Public
5	Area to manage waste		1	Open	Public
6	Visitor's hospitality		1	Semi open	Public
TENTATIVE AREA PROGRAM FOR A CLUSTER OF 16 HOUSES					
1	Living room	10.5	1	Closed ventilated	Private
2	Kitchen	3.5	1	Closed ventilated	Private
3	Bedroom	9.5	1	Closed ventilated	Private
4	Storage	3	1	Closed	Private
5	Toilet	3	1	Closed ventilated	Private
6	Area for small scale		1	Closed ventilated	Semi public
	industry for karkhana				
	or shop or godown				
	(Any one)	15	1		
	Total	44.5			
	No , of houses =16	44.5x16=712			
7	Common gathering	320	1	Open	Public
8	Maintainance room	16	1	Closed	Private
9	Parking space	6	4	Semi open	
	Total	1056			

Table 10:area statements

DESIGN BRIEF

MODULAR HOUSING FOR THAKKAR BAPPA COLONY

More than 69 %of India's 1.21 billion people live in rural areas, according to the 2011 Census of India, but the country is rapidly urbanizing. The cities of Mumbai, Delhi, and Kolkata are all among the world's top ten most populous urban areas, and India has 25 of the 100 fastest-growing cities worldwide. A significant source of this growth is rural-to-urban migration, as an increasing **number of people do not find sufficient economic opportunities in rural areas and move instead to towns and cities.**

The growth of migration increasing day by day in metro Politian cities as mentioned, which creates n number of problems for the cities. The person who migrates is of labor class and decided to live basically in slums called informal settlements, where they can pay minimum rent. They have only a goal to make some money for survival, they do not care about their life style which increase the density of informal settlements .**The demand for the such shelter is increasing but the delivery of such shelter is still constant.**

We have n numbers of housing types weather it is in the form of high rise , community housing , social housing ,affordable housing , housings for HIG,MIG,LIG,EWS ,sky scrapers and so on which does not have any relation to the social . It is in this 'Vernacular' Mumbai that we see the Chawls – defining the roads, enhancing the street junctions, encircling the Maidan and forming clusters around the courtyards and the Wadis is the housing type which is transformed to condominium style as the time has changed ,and we have lost the social interactions due to the innovation from chawls to wadis , detached house , town house ,semi detached house ,duplex house etc .Then why not a new typology of housing can be intervened ? **Which is already exist in the form of mixed used instead of separating them from the socials .**

The proposed Modular Housing for Thakkar Bappa Colony intends to keep its initial aura intact of the community in the modern way , also organizing its small scale industry with residential unit architecturally **. The construction will be executed in phases in a modular approach.** The generated waste of rubber sole from small scale industry will be managed in construction technology to design pre caste structural members for modules.

LIST OF FIGURES

LIST OF TABLES

BIBLIOGRAPHY

BOOKS:

Chawls of Mumbai -Neera adarkar .

Architecture Without Architects -Bernard Rodofsky.

Dharavi-Urban design research institute.

Elementals-Alejandaro Aravena.

In the name of housing -Sameep Padora

COMMUNITY SURVEY AT THAKKAR BAPPA COLONY

https://mes.ac.in/wp-content/uploads/2017/10/Thakkar-Bappa-Survey-Report.pdf

LITERATURE AND EVIDENCES

https://critmumbai.files.wordpress.com/2011/10/house-types-in-mumbai-final.pdf

https://issuu.com/dhanyap/docs/upgrading_thakkar_bappa_colony_-a_c

https://www.freepressjournal.in/mumbai/mumbai-asias-biggest-footwear-market-is-in-unhygienic-condition-due-to-bmc-negligence/117508802

August 22, 2018Quartz Indiahttps://qz.com/india/1003519/attached-baths-running-water-street-lights-what-indias-slumdwellers-seek-in-a-home/

https://www.hindustantimes.com/mumbai-news/a-mumbai-problem-many-vacant-houses-many-homeless/story-Nl7ArLUosMTOTw3uNHkfkI.html

https://www.firstpost.com/business/economy/these-4-policies-can-rid-mumbai-of-its-housing-problem-620971.html05

http://www.saisperspectives.com/2018-issue/2018/4/14/fu7r9l1fuzscz5htetzpm3hm256icw

https://www.sciencedirect.com/science/article/abs/pii/S0264837717301680

https://www.fosterandpartners.com/projects/dharavi-masterplan/

CASE STUDIES AND STANDARDS

https://unitec.researchbank.ac.nz/handle/10652/2899

https://www.archdaily.com/450958/elemental-s-half-finished-housing-typ circumstances

http://cltnetwork.org/wp-content/uploads/2014/08/Affordable-Housing-Guidelines-and-Standards-Davidson.pdf

http://www.urbz.net/articles/homegrown-affordable-housing

http://cistup.iisc.ac.in/laxmi/pdf/FSD/2.pdf

https://www.moneylife.in/article/mumbai-development-plan-2034-deciphering-future-of-the-mega-city/55747.html