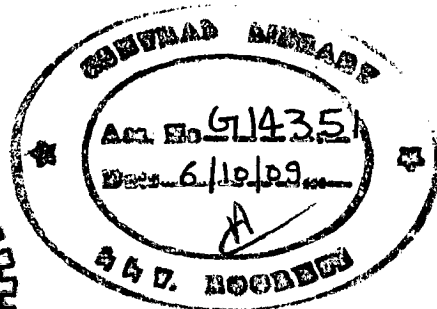# APPRAISAL OF APARTMENT BUILDING ACTIVITY BY PRIVATE SECTOR: NAGPUR

A DISSERTATION

Submitted in partial fulfillment of the
requirements for the award of the degree
of
MASTER OF ARCHITECTURE

By

MRUNAL DEVIDAS GAIKWAD

DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE -247 667 (INDIA)
JUNE, 2009

CERTIFICATE

Certified that this report entitled **"APPRAISAL OF APARTMENT BUILDING ACTIVITY BY PRIVATE SECTOR: CASE NAGPUR"**, which has been submitted by **Mr. MRUNAL D. GAIKWAD**, in partial fulfillment of the requirements for the award of the degree of **MASTER OF ARCHITECTURE**, submitted in the Department of Architecture and Planning, Indian Institute of Technology Roorkee, Roorkee is the student's own work carried out by him under my supervision and guidance. The matter embodied in this dissertation has not been submitted by him for the award of any other degree of this or any other institute.

Date: 29 June

Place: Roorkee

(Prof. Rita Ahuja)

Department of Architecture and Planning,

Indian Institute of Technology Roorkee,
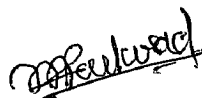
Roorkee - 247667 (INDIA)

CANDIDATE'S DECLARATION

I hereby certify that this report entitled **"APPRAISAL OF APARTMENT BUILDING ACTIVITY BY PRIVATE SECTOR: CASE NAGPUR"**, which has been submitted in partial fulfillment of the requirements for the award of the degree of **MASTER OF ARCHITECTURE** , in the Department of Architecture and Planning, **INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE** is an authentic record of my own work carried out during the period from July 2008 to June 2009, under the supervision and guidance of **PROF. RITA AHUJA**, Department of Architecture and Planning, Indian Institute of Technology Roorkee, Roorkee, India.

The matter embodied in this dissertation has not been submitted by me for the award of any other degree of this or any other Institute.

Date: 29 June

Place: Roorkee

(MRUNAL D. GAIKWAD)

This is to certify that above statement made by the candidate is correct to the best of my knowledge.

Date: 29 June

Place: Roorkee

(Prof. Rita Ahuja)

Department of Architecture and Planning,

Indian Institute of Technology Roorkee,

Roorkee - 247667 (INDIA)

ACKNOWLEDGEMENT

It is my pleasure in acknowledging the contributions of all who helped and supported me during the work reported in thesis.

First, I sincerely wish to express my deep sense of gratitude and thanks from core of heart to my thesis guides **Prof. Rita Ahuja**, Department of Architecture and Planning, Indian Institute of Technology, Roorkee for their able guidance, whole hearted cooperation, critical comments, motivation and encouragement throughout the study and painstaking effort in providing valuable suggestions in giving final shape to this text are gratefully acknowledged.

I am grateful to **Prof. S. Y. Kulkarni**, Head of Department of Architecture and Planning, Indian Institute of Technology, Roorkee.

I would also like to thank all the **faculty members** of the Department of Architecture and Planning, IIT Roorkee for their valuable knowledge and constant encouragement.

I am also thankful to my loving and caring friends who in some way or other have helped me in all the circumstances.

Unconditional love and blessings of my parents (Late) Mrs. Sheela Gaikwad and Mr. Devidas Gaikwad showered all through this journey was a great source of inspiration for me. I would also like to emphasize the affection and constant encouragement received by my loving sister and my loving brothers.

Above all, I express my indebtedness to the **ALMIGHTY** for all his blessings and kindness.

(MRUNAL GAIKWAD)

ABSTRACT

In the context, where major population is concentrating in urban areas, with increase in the urban population the demand for land for residential as well as for other urban uses is continuously increasing for ahead of supply. As a result potential urban land is becoming rare with rapid increase in the price. Rapid and haphazard urbanization has led to urban housing demands, with ever increasing housing deficits in India.

In Nagpur, apartment activity is virtually taking over old housing stock in existing plotted areas through development & redevelopment schemes, irrespective of extra pressure, which is put on existing infrastructure and resources by this redensification.

The present analysis studies the impact of apartment building activity by private sector in Nagpur on the basis of Case study, selected separately at area level & building level. The objective is to identify the problems & potential of apartment building activity by private sector in Nagpur. Lastly, some recommendations are suggested considering both potential and problems to streamline and channelized apartment building activity in Nagpur city

TABLE OF CONTENTS

Chapter 3

PROFILE OF NAGPUR CITY 10

Chapter 4

CASE STUDIES 18

Chapter 5

CONCLUSION AND FINDINGS 44

Chapter 6

RECOMMENDATIONS 50

Bibliography

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS

Abbreviations

NIT - Nagpur Improvement Trust

NMC - Nagpur Municipal Corporation

MHADA - Maharashtra Housing and Area Development

MWSSB - Maharashtra Water Supply and Sewage Board

MSEB - Maharashtra State Electric Board

ECS - Equivalent Car Space

WHC - West High Court Road

FSI - Floor Surface Index

FAR - Floor Area Ratio

1.1 SIGNIFICANCE OF THE STUDY

In the context, where major population is concentrating in urban areas, with increase in the urban population the demand for land for residential as well as for other urban uses is continuously increasing for ahead of supply. As a result potential urban land is becoming rare with rapid increase in the price.

In this context high density development option is emerging as an affordable means of optimizing use of land & infrastructure. This is particularly so, as apartment living is increasingly coming to be accepted as satisfactory way of life in urban areas.

The respective public agencies have failed to fulfill increasing housing need of the city. It is private sector that is investing in housing catering towards the housing demands of the city. The apartment activity can not only be seen as lateral expansion of city through creation of new built form in new areas, but also as a transformation of existing plotted areas.

In Nagpur, apartment activity is virtually taking over old housing stock in existing plotted areas through development & redevelopment schemes, irrespective of extra pressure, which is put on existing infrastructure and resources by this redensification.

This redensification is yet not been seriously identified as different from apartment development in lateral explanation in new premises. The revised Development Plan for Nagpur city (1986-2011) proposes redensification of existing plotted areas, but tool for redensification is not specified

1.2 THE CONCEPT OF "APARTMENT"

The concept of apartment came to be introduced first time in Mumbai, in the form of *chawls* for poor, single migrants, L.I.G industrial workers. The *chalws* were nothing but a number of dwelling units sharing common facilities like staircase, corridor, open space, toilet etc. over the period of time, the concept became popular for optimum use of urban land and affluent class also accepted it.

In "The Maharashtra Apartment Act, 1970" apartment is defined as, " *Part of the property intended for any type of independent use, including one or more or enclosed spaces located on one or more floors or parts thereof in a building(intended to be used for residence, office, practice of any profession, or for carrying on any occupation, trade or business or for any other type of independent use) and with a direct exit to a public street, road or highway or to a common area leading to such street, road or highway*".

Certainly this activity has advantages over houses, since it is affordable and certain factors like land prices, infrastructure, maintenance, variety of common amenities are shared by group of people and not by individual.

1.3 AIMS & OBJECTIVES OF THE STUDY

To study Apartment Building by private sectors in Nagpur , its potential, problems and evolve recommendations for this activity in Nagpur city.

- ➢ To Study spatial evolution & development process of Apartment Building Activity in Nagpur.

- ➢ To Study the Housing Situation of Nagpur City.

- ➢ To Study & analyze the impact of Apartment Building Activity and identify problems & potential of Apartment Building Activity in Nagpur city.

- ➢ To evolve recommendations for Apartment Building Activity in Nagpur City.

1.4   SCOPE & LIMITATION OF WORK

Selection of Nagpur as a Case Study:

Apartment constructed by private sectors are subsystem, which is adding maximum to new housing stock of the city. Out of three metropolitan cities in Maharashtra, apartment building activity in Mumbai & Pune has already reached its peak, but Nagpur it is still in its pace. So Nagpur would be best case study for this dissertation.

> The study is limited to Nagpur Municipal Corporation (N.M.C) limit.

> The study is limited to apartment buildings by private sector.

> The study is limited to area level case studies (3 nos.) & building level case studies (6 nos.)

> The study is based on secondary data and primary survey.

1.5   METHODOLOGY

The overall study is done in four stages:

> The profile of Nagpur city is studied.

> The spatial evolution & development process of apartment building activity is studied.

> The area level case studies and building level case studies are studied and analyzed.

> The identification of problems, issues & potential are studied. And the recommendations are work out.

CHAPTER 2

LITERATURE REVIEW

2.1 APARTMENT BUILDING ACTIVITY IN NAGPUR

The new trend of development followed in recent past in Nagpur is transformation of individual plots in plotted areas to apartment building by redevelopment schemes. The apartment development can be observed in organic development (inner city), in plotted areas and in new premises. Minimum plot size on which Apartments are constructed is 185sq.m.

Fig 2.1 Apartment building along ring road

The plotted areas in South West zone initially observed this activity, because of newly developed areas and comparatively better neighborhoods. Gradually apartment activity spread all over the city.

In new. premises Group Housing schemes developed by Housing Finance institutions & Cooperatives can be seen. But potential of Group Housing schemes over single apartment block is yet not identified, like facilities, amenities, open areas, Parking etc. Hence percentage is very less.

Fig 2.2 Resent trend of Apartment Development in Nagpur

2.2 SPATIAL PROFILE OF NAGPUR

Predominately development in the Nagpur city is divided by railway line as East Nagpur predominantly comprising of inner city, MIG and LIG area with lower land price and west Nagpur predominately comprising with HIG and MIG areas, newly developed areas and higher land prices as compared to east Nagpur.

Development can further be classified within Ring road predominantly plotted areas and inner city.

2.3 EXTEND OF PLOTTED AREAS IN NAGPUR

In Nagpur N.I.T, M.H.A.D.A & private layout has contributed towards plotted areas. In 58 housing accommodation & area expansion schemes N.I.T has contributed towards plotted areas. M.H.A.D.A has developed 24 layouts. But major contribution is of private layout areas in the Nagpur. In west zone there are 320 private layouts, in south zone 160, in north zone 110 & in east zone there are 40 private layouts.

2.4 EVOLUTION OF APARTMENT BUILDING ACTIVITY IN NAGPUR

2.4.1 PHASE I (1968 - 78)

It is initial phase when activity started in 1968 Ar. M.S. Gole identified potential of this activity and himself started as builder. He constructed 12 apartments and all schemes were constructed under self-help concept, as funds for all developments were initially taken before every stage. Concept of shared facilities was not accepted hence separate water tanks, pumps, seer pipes etc. were provided.

2.4.2 PHASE II (1978 - 90)

Gradually, people accepted this new typology of development and numbers of cooperative society's apartment buildings were constructed in this period of time. The reason was stamp duty to be paid by cooperative societies was less. Hence number cooperative societies were formed either by people or with initiation of builder. These schemes are constructed on large plots and have more than 60 apartments.

2.4.3 PHASE III (1990-2008)

Potential of apartment Building typology was accepted at larger level and number of private builders started promoting schemes. Transformation of plots with replacement of old structures with new apartment was started at larger level. Number of large scheme initiated by builder and small schemes on smaller plot initiated by small contractor or one time builder are constructed. Till now this process is in full pace and it is spreading all over the city.

2.5 APARTMENT TYPOLOGIES IN NAGPUR

Predominantly residential apartments in Nagpur are of two types, *purely residential apartments and residential apartments with commercial use.* Only these two typologies can be seen in smaller and larger scale. In detail typologies can be classified as.

2.5.1 INCOME BASE

> **M.I.G apartment:** Unaffordability to detached house because of high property value, this typology became very popular.

> **H.I.G apartment:** This typology caters to very less percentage of population. These are very high priced, luxurious apartments in effluent areas.

2.5.2 LANDUSE BASE

It includes *apartments without commercial use* in purely residential and *apartment with commercial use.* Apartment with commercial use started initially in congested inner city area and on main commercial roads. In this case basement and ground floor is sold for commercial purpose and upper stories for residential purpose.

2.5.3 DEVELOPMENT BASE

It includes apartments in, existing plotted development, apartments in organic development and apartment in newly developed premises. Newly developed premises are *Trimurti nagar, Khamala, Nandanwan, Ambazari hill top etc.*

2.6 EXTENT OF APARTMENT DEVELOPMENT IN NAGPUR

Presently there are 75,640 apartments in the Nagpur, most of which are constructed in plotted areas within ring road. Few new premises are developed exclusively with apartment buildings along the ring road.

Extent of development in the southwest and central direction of the city is more as compared to other areas. But as these area are getting saturated the apartment activity is spreading allover the city, which includes small economical apartments on smaller plots.

2.7 INFERENCES

The rapid increase of the apartment building activity and its acceptance has shown that it can provide housing. In order to achieve optimum use of potential urban land redensification will not only mean increasing the population but other factors should also be considered like land, building use, physical and social infrastructure, socio-economic and market forces, building bye laws, Development plan proposal etc. So that potential of the system is carefully channelized to achieve an overall degree of perfection.

CHAPTER 3
PROFILE OF NAGPUR CITY

3.1 INTRODUCTION

Nagpur, the second capital of Maharashtra, is an administrative, cultural and educational centre of the resources rich Vidharba region. It is one of the major cities of central India and its importance in the country can be traced back to the 18th century when it was under the Maratha rulers. Nagpur was the capital of the central province till 1956 before reorganization of the state. The city provides a rich and balanced life full of opportunities, educational and cultural activities. Nagpur emerges as a city providing easy accessibility to basic amenities at affordable costs to all its residents.
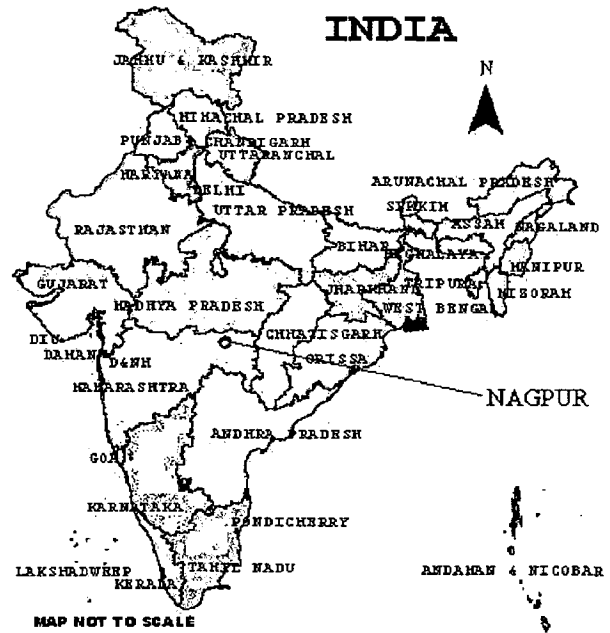
Map 3.1: Location Map

Source: Maps of India
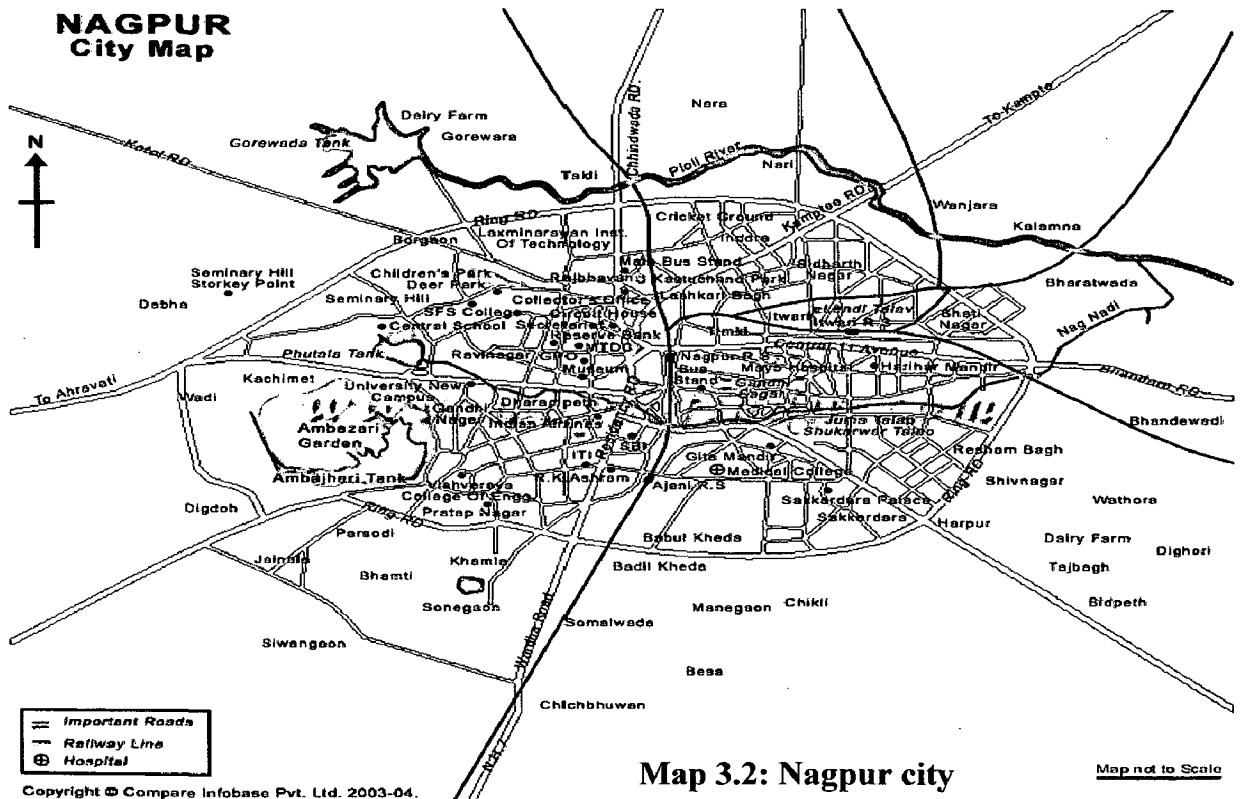
NAGPUR City Map

Map 3.2: Nagpur city

Source: Maps of India

3.2 HISTORY

The city got its name from Nag River or Nag people arid is known from prehistoric times Nagpur and its surrounding region have a mentioned in Vedic and Mauryan scriptures and is known from the prehistoric times.

The history of the city can be broadly classified into three periods.

3.2.1 THE GOND PERIOD (1701 AD. - 1743 AD.)

The political history or Nagpur begins in this period when the Gond king Raja Bakht Bulnd Shah shifted his capital from Haryagarh to Nagpur in 1702 AD, which at that time, was a collection of small hamlets. Chand Sultan, successor of Bakht Buland Shah, constructed a 3 mile long wall around his kingdom by the Nag River.

3.2.2 THE BHONSLE PERIOD (1743 AD. - 1854 AD.)

After the death of the Good king, Chand Sultan, a civil war followed and Nagpur became the capital of Raghoji Rao Bhonsle. The boundaries of the Bhonsle kingdom extended from Narmada in the north, to Godawari in the south, and up to Bengal in the east. The Bhonsle period witnessed peace, cultural and economic prosperity. Cottage and handloom industry started developing during this period.

3.2.3 THE BRITISH PERIOD (1854 AD. – 1947 AD.)

In 1817, in the battle of Sitabuldi the Marathas lost to the British and the city came under the British rule. With the defeat of the Bhonsle's, cultural and economic progress was hit hard. The city started growing around the new nucleus of civil lines (British) and Dhantoli (natives) Nagpur Improvement Trust (N.I.T) was established in 1936 to carry out planned development in the city.

Nagpur was the capital of the former state of Central Province till 1956, after which it became the second capital of Maharashtra State.

3.3 LOCATION & LINKAGES

Nagpur, being the geographical center of India, has excellent road, rail and air linkages. The national highway **NH 6 and NH 7** and the rail route connecting Mumbai- Kolkata and Delhi-Chennai pass through Nagpur. The city's airport spread over an area of 525 ha provides direct air link with Delhi, Mumbai, Chennai, Kolkata and Hyderabad.

3.4 DEMOGRAPHIC PROFILE

The population of Nagpur Municipal Corporation as per the 2001 census is 2.1 million accommodated in 4,27,704 households. This gives an average H/H size of 5.0 persons/Ha.

Table 3.1 Growth of population

Year	Population	Decidal growth rate
1961	6,43,659	43.32
1971	8,66,076	34.56
1981	10,50,000	40.80
1991	16,24,757	33.24
2001	21,00,000	26.30

(Source: Census of India)

Fig 3.1 Growth of population
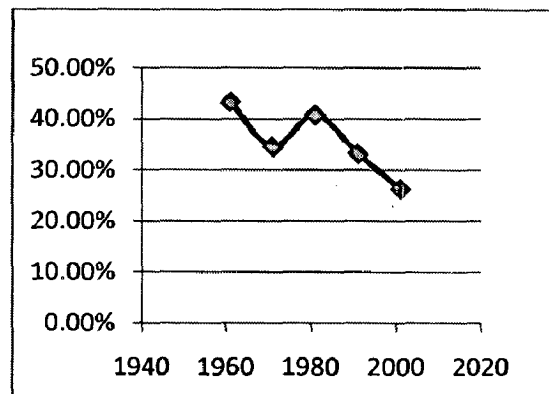
(Source: Census of India)

Since 1961, the decadal growth of population has been excess of 40% except in those two post independence decades of 1961-71 and 1981-91 when population increased by 34.6 and 32.7% repectively. The gradual decrease in rate during 1961-71 is mainly due to decapitalisati of Nagpur ,which reduce the rate of immigration.

The growth of population is both natural increase and immigration. Nagpur joined the group of million cities in 1981 when its population reached 19,19,461. The present population of city according to 2001 census is 2.1 million.

3.5 DENSITY

Distribution and density of population is dense in the old city, it is 600 Persons/Ha. The city is developed radial, hence as a one move away from central distribution of density gradually reduces. The average density of population of the city is 95.00 Persons/Ha. But since 61.66% of the corporation areas is undeveloped & most the whole population is concentrated in 38.35% developed area. Hence net density comes out to be **194.38 Persons/Ha.**

3.6 HOUSING SITUATION

The average household size in 2001 is 5.0 and number of households is 4, 27,704.

Table 3.2 Growth of Households

Year	Occupied residential houses	No. of Household	Household Size
1971	1,34,439	1,61,107	5.37
1981	2,14233	2,22,179	5.48
1991	2,93,386	3,14,091	5.17
2001	3,98,458	4,27,704	5.00

(Source: Census of India)

Table 3.3 Age of Existing Housing Stock -2001

Age(Years)	No. of Houses	% to total houses
0-20	2,15,847	54.17
20-40	1,04,993	26.35
40-60	48,093	12.07
Above -60	29,525	7.41
Total	**3,98,458**	**100**

(Source: Census of India 2001)

Household tenure-The percentage of buildings between 0-20 years is 54.12% rest 45.83 buildings are above 20 years.

Table 3.4 Type of Existing Housing Stock in Nagpur -2001

Type	No. of H.H	% to total houses
Permanent	2,13,971	53.7
Semi permanent	1,70,938	42.9
Temporary	13,549	14.0
Total	3,98,458	100

(Source: Census of India 2001)

Table 3.5 Structural Condition of Existing Housing Stock -2001

Type	No. of H.H	% to total houses
Good	2,26,085	56.74
Average	1,25,593	31.52
Bad	46,780	11.64
Total	3,98,458	100

(Source: Census of India 2001)

Table 3.6 Distribution of Houses and Households in different income groups -2001

Income groups	No. of H.H	% to total H.H	No. of houses	% to total houses
EWS	79,692	20	78,526	18.36
LIG	1,39,460	35	1,38,062	32.28
MIG	1,47,429	37	1,74,161	40.72
HIG	31,577	8	36,955	8.64
	3,98,458	100	4,27,704	100

(Source: Census of India 2001)

Table 3.7 Existing Housing Stock/ supply-2008

System	Sub system	No. of houses in 2008	% of total houses
Public	N.I.T	76,160	15.86
	M.H.A.D.A	14,023	2.92
Private	Plotted	1,21,682	25.34
	Apartment	62,906	13.10
Informal	Slum	1,59,714	33.26
	unauthorised	45,715	9.52
Total		**4,80,200**	**100**

(Source: N.I.T, M.H.A.D.A, N.M.C)

3.7 HOUSING NEED, STOCK & SHORTAGE

The population projected for 2011 is 2.6 million and housing need by 2011 is 5, 10,400 (source: Revised Development Plan of Nagpur)

Hence, conventional housing need is 5, 10,400. Now total housing stock need to be replaced is 46,780.

Total housing need = (conventional Housing need) + (Housing stock to be replaced)

= 5, 10,400 + 46,780 = 5, 57,180

Now potential housing supply by 2008 is 4,80,2009 (source: N.I.T, M.H.A.D.A, and N.M.C) Hence housing supply need by 2011 will be (5, 57,180- 4, 80,200) 76,980

3.8 INFERENCES

The percentage of the building 0-20 years is 54.17% rest 45.83% buildings are above 20 years. Similarly permanent structures are 53.70 and rest 46.30 comes in semi permanent and temporary category. Similarly11.64 houses are structural very bad.

So it can be seen that almost average 45% of housing stock is venerable for replacement. Out of which 46,780 houses are in really bad condition. So potential of apartment building activity is identified, then it can help in replacing the old housing stock to meet the housing need of the city.

3.9   LAND USE

The Nagpur Municipal Corporation today covers an area of 21756 Ha of which only 40% is developed area. Out of the total developed area approximately 42% is under residential use, 3% under industrial, 2.5% under commercial, 24% under public purpose, 7% under road, 5% is coverered by railway and 9% is under open spaces and recreational use.

Land use break up of Nagpur City

Total area under Municipal Corporation = 21756 Ha

Total developed area = 8340 Ha

Table 3.7 Area Analysis of existing land use in Nagpur-2009

Sr. no.	Major land use purpose	Area in hectare	% to developed area
1	Residential	3500	41.996
2	Commercial	185	2.218
3	Industrial	225	2.697
4	Public purpose	2000	23.980
5	Public utilities	100	1.199
6	Roads	555	6.654
7	Railway	440	5.275
8	Airport	525	6.294
9	Garden & play ground	150	1.798
10	Developable vacant land	660	7.919
	Total	8340 Ha	100.00%

(Source: Revised development plan for Nagpur city: 1986 -2011)

CHAPTER 4

CASE STUDY

4.1 SELECTION CRITERIA FOR CASE STUDY

To study the impact of apartment building activity case study are selected separately at area level & building level. Since apartment activity by private builders from the beginning has shown substantial development in central & western Nagpur. Hence area level & building level case studies are selected from western & central Nagpur.

4.1.1 AREA LEVEL CASE STUDY

Areas selected are (as shown in Map 4.1)

1. Dhantoli
2. Laxmi Nagar
3. Trimurti Nagar

4.1.2 FACTORS STUDIED UNDER AREA LEVEL CASE STUDY

➢ Location & linkages
➢ Layout characteristics
➢ Land use
➢ Level of transformation
➢ Redensification
➢ Impact on infrastructure

4.1.3 BUILDING LEVEL CASE STUDY

Apartment buildings selected are:

1. Pramila apartment Dhantoli.
2. Swapnil apartment Dhantoli
3. Poorva apartment Laxmi Nagar
4. Abhirika apartment Laxmi Nagar
5. Sukhsagar apartment, Trimurti Nagar
6. 82 HIG scheme by MAHADA, Trimurti Nagar (Group housing scheme)

4.1.4 FACTORS STUDIED UNDER BUILDING LEVEL CASE STUDY

➤ Location & Linkages
➤ Plot area
➤ Built up area
➤ FAR
➤ Type of apartment
➤ Violation
➤ Infrastructure.

LOCATION OF CASE STUDY AREAS IN NAGPUR
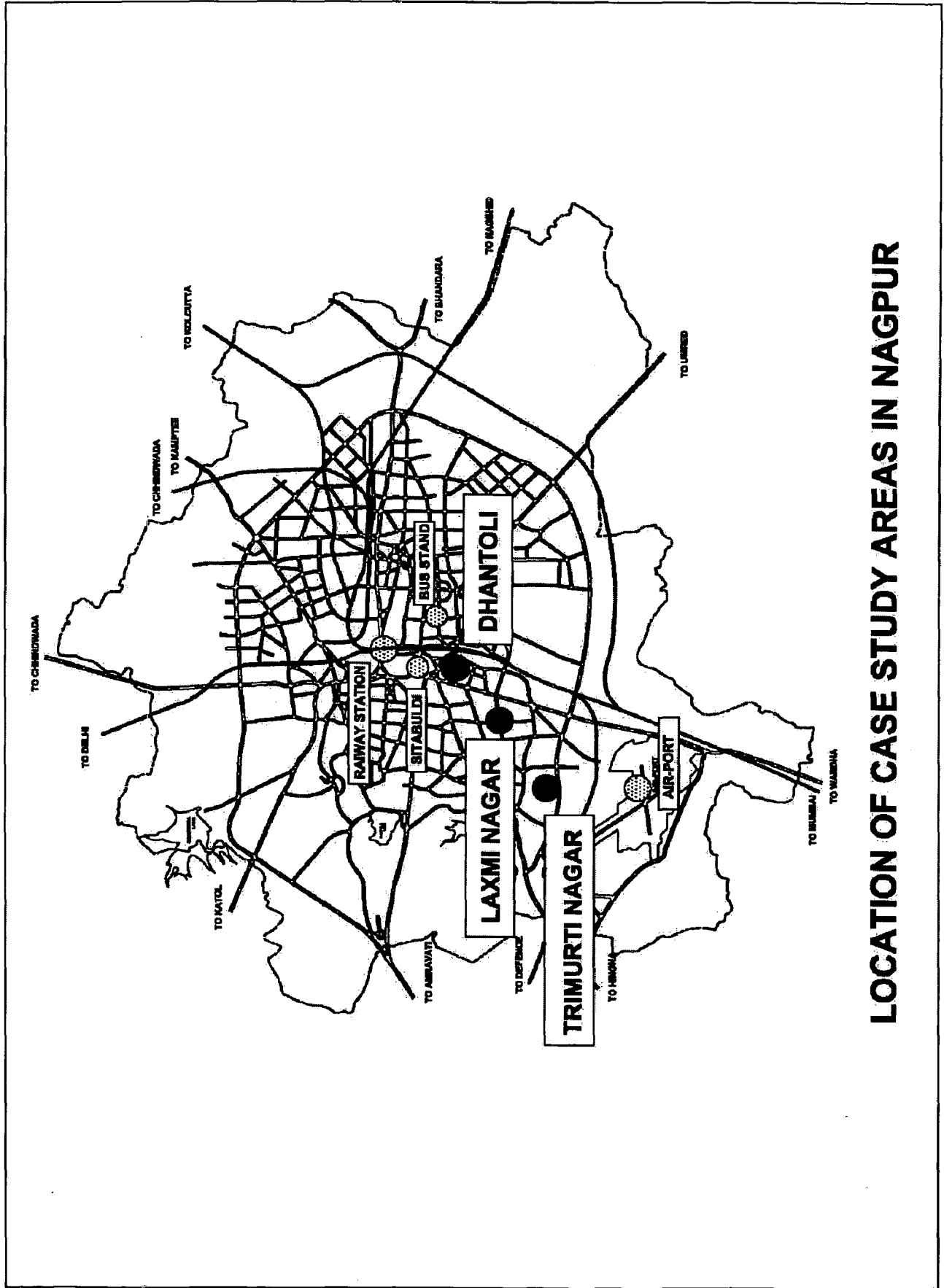
Map 4.1 Location of Case Study areas in Nagpur city.

4.2 AREA LEVEL CASE STUDY I- DHANTOLI

4.2.1 LOCATION & LINKAGES

It is located in central Nagpur adjacent to CBD Sitabuldi. It has very good accessibility to various city nodes like Sadar, Sitabuldi, Dharampeth, Mahal, railway station, airport etc. it is sited along NH-7, Wardha road.

4.2.2 LAYOUT

It is characterized as grid iron street pattern with 30m wide external roads from three sides & 9m, 6m wide internal roads. This pocket of area consists of 234 plots.
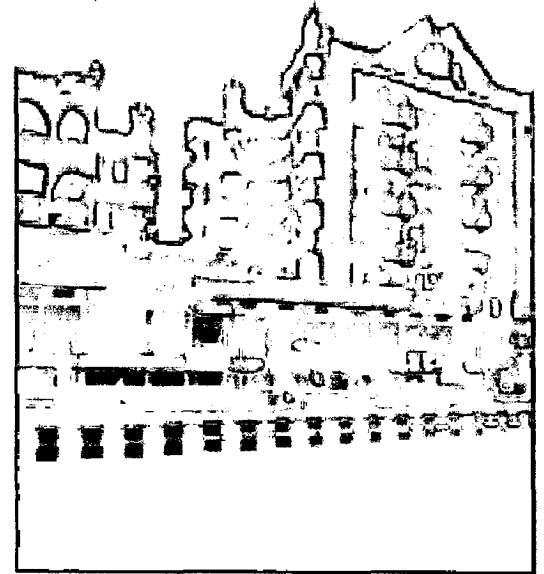
Fig 4.1 Apartments in Dhantoli

Table 4.1: Profile of Plots in Dhantoli

Size	Area	No. of plot
30m x60 m	1800 sq m	18
30 m x30 m	900 sq m	205
Avg.	500 sq m	11
	Total	**234**

(Compile from primary survey)

4.2.3 LAND USE PATTERN

Predominantly residential use which is 59.94% where as the proposed residential use was 66.03%. Basically the phenomenon of transformation of residential Plots to commercial & public/semi public use has resulted in decrease of residential use (as shown in map 4.2)

Table 4.2: Land use in Dhantoli

Sr. No.	Land use	Existing	Proposed
1.	Residential	59.94%	66.03%
2.	Commercial	09.40%	08.30%
3.	Public/ semi public	12.50%	07.51%
4.	Open	05.09%	05.09%
5.	Roads	13.07%	13.07%
		100%	100%

(Compile from primary survey and Development plan of Nagpur 1991-2011)
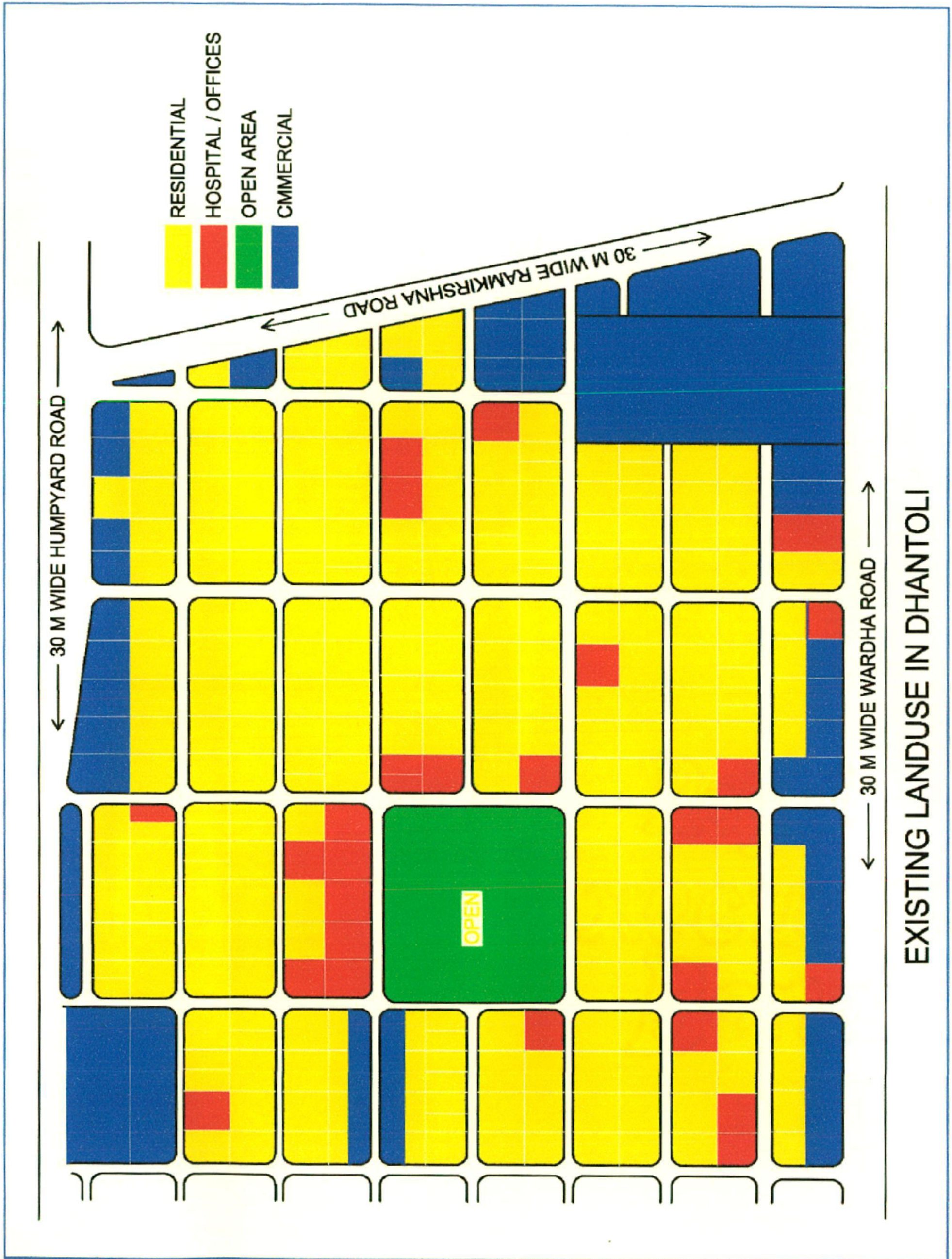
Map 4.2 Existing land use in Dhantoli, Nagpur

LEGEND:
- RESIDENTIAL
- HOSPITAL / OFFICES
- OPEN AREA
- CMMERCIAL

Labels on map: 30 M WIDE HUMPYARD ROAD, 30 M WIDE RAMKRISHNA ROAD, 30 M WIDE WARDHA ROAD, EXISTING LANDUSE IN DHANTOLI, OPEN

4.2.4 TRANSFORMATION

Almost all types of plots like 1800 sq.m, 900sq.m. & 500sq.m are been transformed into the apartments. The main reason for conversion is age of the building, which is more then 50 years for all structures. The percentage of transformation is very high with 1800 Sq.m & 500 Sq.m plots because it is located along the periphery. (as shown in map 4.3)

Table 4.3: Level of transformation in Dhantoli

Sr. no	Area of plot	No. of plot	Plots transformed	% of Plots transformed
1.	1800 sq. m	18	14	78%
2.	900 sq. m	205	93	45%
3.	500 sq. m	11	8	72%
	Total	**234**	**115**	**49%**

(Compile from primary survey)

4.2.5 APARTMENT BUILDING ACTIVITY

It is one of the areas where apartment building activity initially started in 1970's. All the schemes are of redevelopment category developed by private builders. Till now 49% of plots have been converted. Mostly apartments along peripheral roads like Wardha road, Humpyard road, and Ramkrishna roads are with commercial use.

The FSI consumed for residential use is 1.25 & for apartments with commercial use on the Wardha road FSI consumed is 2. The floor area varies from 65 sq. m. to 115 sq. m. which includes apartment with single bedroom, double bedroom or triple bedroom. The current market rate for the apartment varies from RS.6000 to Rs.8000/ sq.ft.

4.2.6 REDENSIFICATION

The existing population is 3.65 times higher than designed one. If same trend of redensification continues then population will be 6.29 times higher than designed one.

Table 4.4: Population changes in Dhantoli   **Table 4.5: Density changes in Dhantoli**

Sr. no	Year	Population
1.	1971	3,769
2.	1991	13,778
3.	2011	23,735

Sr. no	Year	Density (persons/ha)
1.	1971	104.86
2.	1991	386.58
3.	2011	660.40

(Compile from primary survey)   (Compile from primary survey)
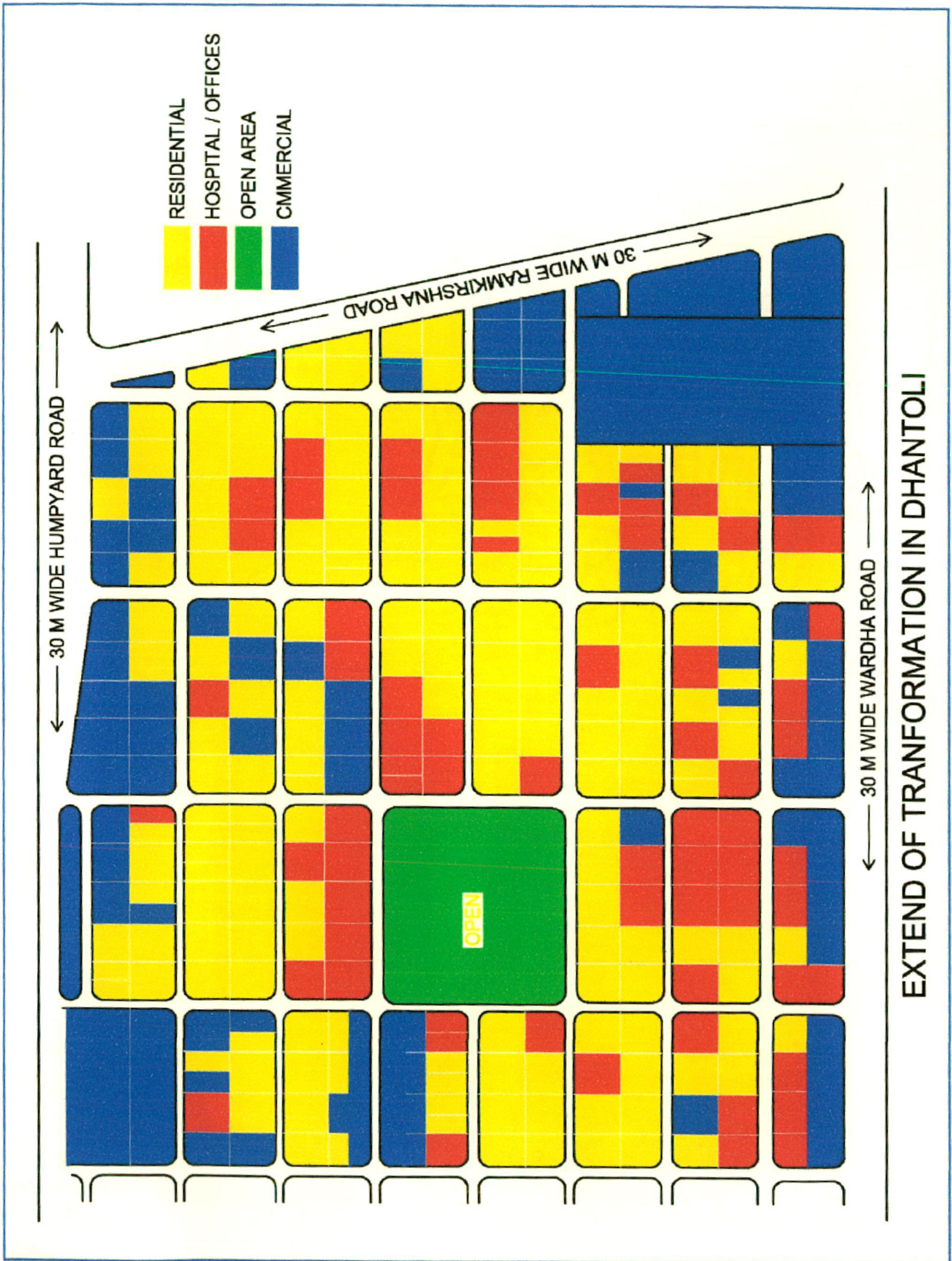
Map 4.3 Extend of Transformation in Dhantoli, Nagpur

Legend:
- RESIDENTIAL (yellow)
- HOSPITAL / OFFICES (red)
- OPEN AREA (green)
- CMMERCIAL (blue)

30 M WIDE HUMPYARD ROAD

30 M WIDE RAMKIRSHNA ROAD

30 M WIDE WARDHA ROAD

EXTEND OF TRANFORMATION IN DHANTOLI

OPEN

4.2.7 IMPACT ON INFRASTRUCTURE

1. Water supply

Presently water supply to the area varies between 1 ½ hour to 6 hours. But average water supply is 130 lit./capita/day. Which is less than NBC standards 135 lit./capita/day.

The total water supply to the area is 1.36 MGD. (Avg. supply x Total population)

In case of 90% transformation, If same quantity of water is supplied, the water supply will be 85 lit./capita/day, which is 40% less than the standards.

2. Traffic

Now the Equivalent Car Space (ECS) per apartment is 8 ECS, hence for 115 apartments the car space generated is 920 ECS. The car space per plotted house is 2 ECS, hence for 119 plotted houses the car space generated is 238 ECS. Hence total car space generated is 1158 E CS.

Assuming parking required in each plot before two decades was 1 ECS, and then the car space generated can be calculated as 234 ECS. Hence car space increased on the road in two decades is 4.95 times.

3. Open area

According to the standard the open space required is 0.1 Ha/1000 persons. So for population of 13,778 the open area required is 1.37 Ha & existing open area is 1.8 Ha. But existing open area is city level open area, there is no' provision of neighborhood level open area.

4. Schools

Number of school required as per standard is also less, as existing primary schools are 2 & secondary schools are 3, whereas required is 4 primary & secondary schools.

4.2.8 BUILDING LEVEL CASE STUDY-I *"PRAMILA APARTMENT"*, DHANTOLI

4.2.8.1 Introduction

It is located in inner part of the layout. The apartment is constructed by retaining part of existing old structure on the rear side of the plot, by consuming remaining FSI of structure retained. It is purely residential apartment in economical category.

4.2.8.2 Project details

Table 4.6: Detail of Pramila Apartment, Dhantoli

Particulars	Details
Plot area	480.06 sq .m
Built up area	433.27sq.m
FSI permissible	1
FSI utilized	0.9
No. of apartment	6 apartment + existing house
Type of apartment	Single house
Built up area of each apartment	51.5sq.m.
Area of each apartment	51.5sq.m.

(Compile from primary survey)

4.2.8.3 Violation

Balcony area is covered & internal layout is changed.

4.2.8.4 Problems

➤ 42% of buyers have problem of parking, 26% have problem of water supply, 16% have problem of maintenance while 16% have problem of cost.

➤ Water from municipal supply doesn't reach above second floor because of low pressure & tapping of water.

➤ There is no proper ventilation to the rooms after the alterations.

➤ Visitors parking in the setback created problems.

4.2.9 Building level Case study - II, *"Swapnil apartment"*, Dhantoli

1. Introduction

It is located on the inner road. The plot is given to the builder to develop the apartment under agreement between owner & builder. Existing structure is totally demolished. It is residential fully apartment. It is semi-luxurious apartment. It was constructed in year 1998.

2. Project details

Table 4.7: Detail of Swapnil Apartment, Dhantoli

Particulars	Details
Plot area	350.06 sq .m
Built up area	700.00 sq .m
FSI permissible	2
FSI utilized	1.97
No. of apartment	6 apartment
Type of apartment	Single bedroom
Built up area of each apartment	68.00sq.m
Area of each apartment	57.45sq.m

(Compile from primary survey)

3. Violation

- Balcony area is covered set backs are not according to bye laws.

4. Problems

➢ 29% had problem of cost while purchasing, 23% of residents have problem of water supply, while 22% have problem of insufficient parking, while 16% have problem with location (located on main road), and while 10% have problem of maintenance.

➢ Visitors parking are not provided.

4.3   AREA LEVEL CASE STUDY - II, LAXMI NAGAR

4.3.1 LOCATION & LINKAGES

It is located in west Nagpur along the West High Court (WHC) Road, which is important arterial road in the west Nagpur. It has very good accessibility to various city nodes like Sadar, Sitabuldi, Dharampeth, railway station, airport etc. it is one of the good neighborhoods.

4.3.2 LAYOUT

25m wide WHC road divides the area "Aath Rasta Square" gives access to various parts of the area. Internal roads are 18m, 12m, & 9m wide. This pocket of area consists of 440 plots.

Fig 4.2 Apartments in Laxmi Nagar

Table 4.8: Profile of plots in Laxmi Nagar

Size	Area	No. of plot
25m x30 m	750 sq m	265
35 m x15 m	450 sq m	79
25m x 18m	450 sq m	54
Avg.	550 sq m	42
Total		**440**

(Compile from primary survey)

4.3.3 LAND USE PATTERN

The total area of pocket in Laxmi Nagar is 36.03 Ha. Predominantly it is residential use of 76.18%, whereas the proposed residential use was 76.57%. Basically the phenomenon of transformation of residential plots to commercial & public/semi public use has resulted in decrease of residential use (as shown map 4.4)

Table 4.9: Land use in Laxmi Nagar

Sr no.	Land use	Existing	Proposed
1.	Residential	76.18%	76.70%
2.	Commercial	2.12%	1.6%
3.	Public/ semi public	4.8%	4.8%
4.	Open	6.1%	6.1%
5.	Roads	10.8%	10.8%
		100%	**100%**

(Compile from primary Survey and Development Plan of Nagpur 1991-2011)

EXISTING LANDUSE
IN LAXMI NAGAR

OFFICE / HOSPITAL
RESIDENTIAL
OPEN AREA
COMMERCIAL

Map 4.4 Existing land use n Laxmi Nagar, Nagpur

4.3.4 TRANSFORMATION

Table 4.10: Level of transformation in Laxmi Nagar

Sr. no	Area of plot	No. of plot	Plots transformed	% of Plots transformed
1.	750 sq. m	265	112	42%
2.	450 sq. m	79	19	24%
3.	450 sq. m	54	10	18%
4.	500 sq. m	42	9	21%
	Total	440	150	34%

(Compile from primary survey)

Almost all types of plots are been transformed into the apartments. The main reason for conversion is age of the building, which is more then 50 years for all structures (as shown in map 4.5)

4.3.5 APARTMENT BUILDING ACTIVITY

It is one of the areas where apartment building activity initially started in 1970's. 92% the schemes are of redevelopment category developed by private builders. Till now 34% of plots have been converted. Mostly apartments along WHC roads are with commercial use.

The FSI consumed for residential use is 1 & for apartments with commercial use in commercial zone road FSI consumed is 2. The floor area varies from 65sq.m to115 sq .m which includes apartment with single bedroom, double bedroom or triple bedroom.

4.3.6 REDENSIFICATION

The existing population is 2.59 times higher than designed one. If same trend of redensification continues then population will be 5.44 times higher than designed one. The proposed density for the area in Revised Development Plan is 600 persons/Ha, but with the trend it will be more than 600 i.e. 714.54 persons/Ha.

Table 4.11: Population change in Laxmi Nagar

Sr. no	Year	Population
1.	1971	4,725
2.	1991	12,252
3.	2011	25,745

(Compile from primary survey)

Table 4.12: Density change in Laxmi Nagar

Sr. no	Year	Density (persons/ha)
1.	1971	131.14
2.	1991	340.04
3.	2011	714.54

(Compile from primary survey)

EXTENT OF TRANSFORMATION IN LAXMI NAGAR

Legend:
- OFFICE / HOSPITAL
- RESIDENTIAL
- OPEN AREA
- COMMERCIAL

WEST HIGH COURT ROAD

WEST HIGH COURT ROAD

Map 4.5 Extended of transformation in Laxmi Nagar, Nagpur

4.3.7 IMPACT ON INFRASTRUCTURE

1. Water supply

Presently water supply to the area varies between 2hour to7hours. But average water supply is 130 lit./capita/day. Which is less than NBC standards 135 lit./capita/day.

The total water supply to the area is 1.59 MGD. (Avg. supply x Total population)

In case of 90% transformation, If same quantity of water is supplied, the water supply will be 62 lit./capita/day, which is 50% less than the standards.

2. Traffic

Now the Equivalent Car Space (ECS) per apartment is 8 ECS, hence for 150 apartments the car space generated is 1220 ECS. The car space per plotted house is 2 ECS, hence for 290 plotted houses the car space generated is 580 ECS. Hence total car space generated is 1780 E CS.

Assuming parking required in each plot before two decades was 1 ECS, then the car space generated can be calculated as 234 ECS. Hence car space increased on the road in two decades is 7.60 times.

3. Open area

According to the standard the open space required is 0.1 Ha/1000 persons. So for population of 12,252 the open area required is 1.22 Ha & existing open area is 2.2 Ha. But existing open area is can't sustain the projected population.

4. Schools

Number of school required as per standard is also less, as existing primary schools are 3 & secondary schools are 3, whereas required is 4 primary & secondary schools.

4.3.8 BUILDING LEVEL CASE STUDY -III, "POORVA APARTMENTS", LAXMI NAGAR

1. Introduction

It is located in inner part of the layout near to "Aath Rasta Square". The plot of 650.84 sq.m. is given to the builder to develop the apartment on remaining plot by retaining existing structure. The apartment is purely residential apartment in economical category. It was constructed in year 1996.

2. Project details

Table 4.13: Details of Poorva Apartments, Laxmi Nagar

Particulars	Details
Plot area	650.84 sq .m
Built up area	580.25 sq .m
FSI permissible	1
FSI utilized	0.86 on apartment + 0.14 for existing house.
No. of apartment	6 apartment + 1 existing house
Type of apartment	Double bedroom
Built up area of each apartment	65.00 sq .m.
Area of each apartment	52.44 sq .m.

(Compile from primary survey)

3. Violation

Balcony area is covered & internal layout is changed.

4. Problems

➢ 50% of residents have problem of water supply, 37% have problem with parking, while 13% have problem with cost.

➢ Water from municipal supply doesn't reach above first floor because of low pressure & tapping of water.

➢ Visitors parking are not provided.

4.3.9 Building level Case study - IV, *"Abhirika Apartment "*, Laxmi Nagar

1. Introduction

It is located on the main WHC road. The plot is given to the builder to develop the apartment under agreement between owner & builder. In return owner received 2 apartments & cash. Existing structure is totally demolished. It is residential apartment with commercial use. It is semi-luxurious apartment. It was constructed in year 2001.

2. Project details

Table 4.14: Details of Abhirika Apartment, Laxmi Nagar

Particulars	Details
Plot area	460.26 sq .m
Built up area	920.50 sq .m
FSI permissible	2
FSI utilized	1.97
No. of apartment	10 apartment + 4 shops
Type of apartment	Double bedroom
Built up area of each apartment	82.0 sq .m
Area of each apartment	72.24sq.m

(Compile from primary survey)

3. Violation

Balcony area is covered & internal layout is changed.

4. Problems

➤ 31% of residents have problem of water supply, 23% had problem of cost while purchasing, while 23% have problem of insufficient parking, while 15% have problem with location (located on main road), and while 8% have problem of maintenance.

➤ Visitors parking are not provided.

4.4   AREA LEVEL CASE STUDY - III, TRIMURTI NAGAR

4.4.1   LOCATION & LINKAGES

It is located in southwest Nagpur along the Ring Road. It located in the fringes & all the city nodes are almost 6km away.

4.4.2   LAYOUT

Layout is typical grid iron pattern. Peripheral roads are 24m wide & 12 m wide & ring road is 30 m wide. Internal roads are very narrow 6m & 9m as compared to the built form. Only open space in the area is 12m x 90m which hardly serves the community.

Fig 4.3 Apartment in Trimurti Nagar

Table 4.15: Profile of plots in Trimurti Nagar

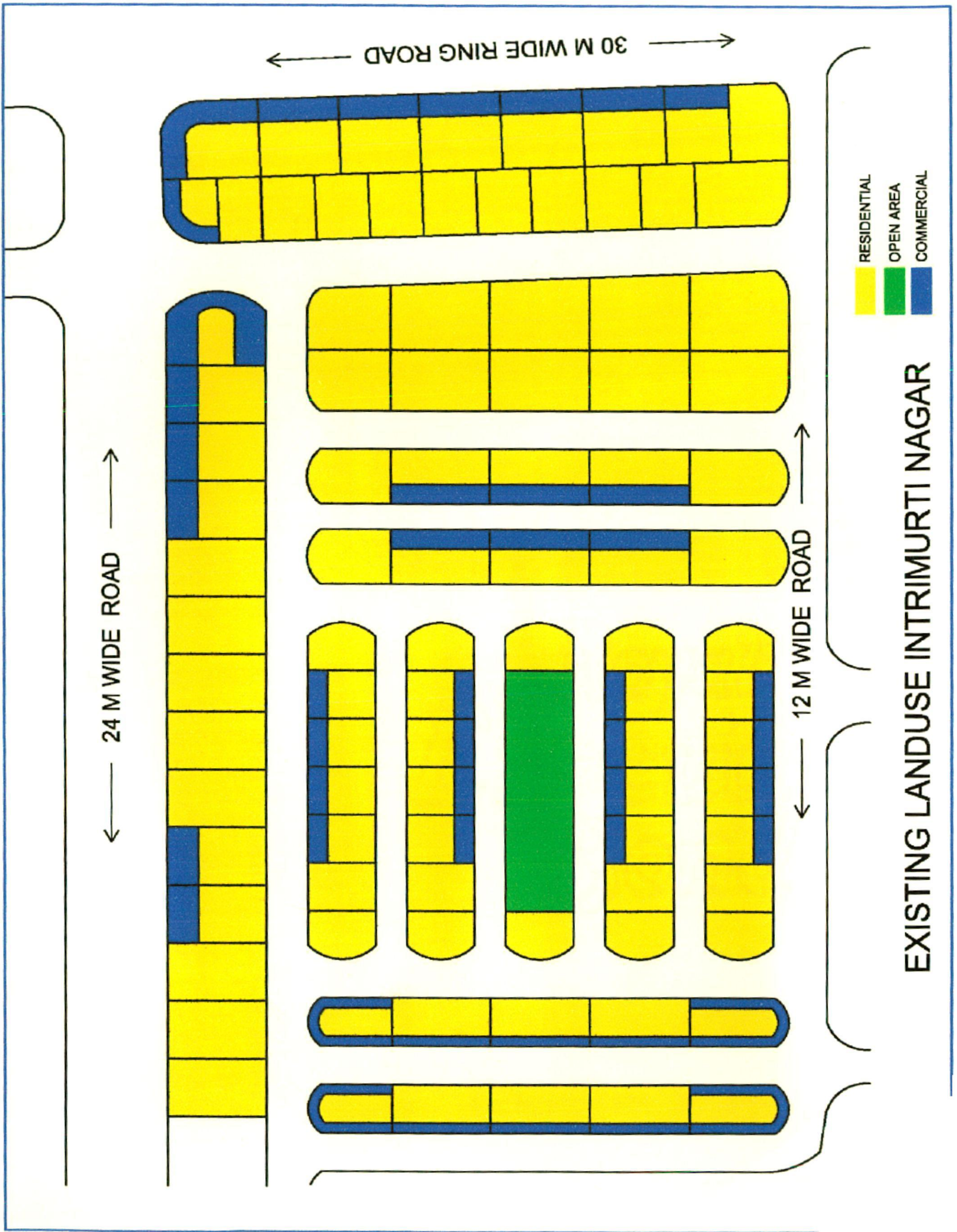| Size	Area	No. of plot
15 m x18 m	270 sq m	28
18 m x18 m	324 sq m	10
18 m x25 m	450 sq m	12
12 m x18 m	216 sq m	27
19 m x27 m	513 sq m	7
Total		**84**

(Compile from primary survey)

4.4.3   LAND USE PATTERN

The total area of pocket in Trimurti Nagar is 3.01 Ha. Predominantly it is residential use of 83% & commercial use is 2% whereas the proposed Commercial use was 85.6%. Because there is no demand of commercial use in the area as it is located in the fringes. (as shown in map 4.6)

Table 4.16: Land use in Trimurti Nagar

Sr. No.	Land use	Existing	Proposed
1.	Residential	83%	--------
2.	Commercial	2.6%	85.6%
3.	Public/ semi public	------	--------
4.	Open	3.3%	3.3%
5.	Roads	10.96%	10.96%
		100%	**100%**

(Compile from primary survey and Development Plan of Nagpur 1991-2011)

Map 4.6 Existing land use in Trimurti Nagar, Nagpur

Legend:
- RESIDENTIAL
- OPEN AREA
- COMMERCIAL

EXISTING LANDUSE INTRIMURTI NAGAR

30 M WIDE RING ROAD

24 M WIDE ROAD

12 M WIDE ROAD

Appraisal of apartment building activity by private sector: Nagpur

Map 4.6 Existing land use in Trimurti Nagar, Nagpur

Legend:
- RESIDENTIAL
- OPEN AREA
- COMMERCIAL

EXISTING LANDUSE INTRIMURTI NAGAR

30 M WIDE RING ROAD

24 M WIDE ROAD

12 M WIDE ROAD
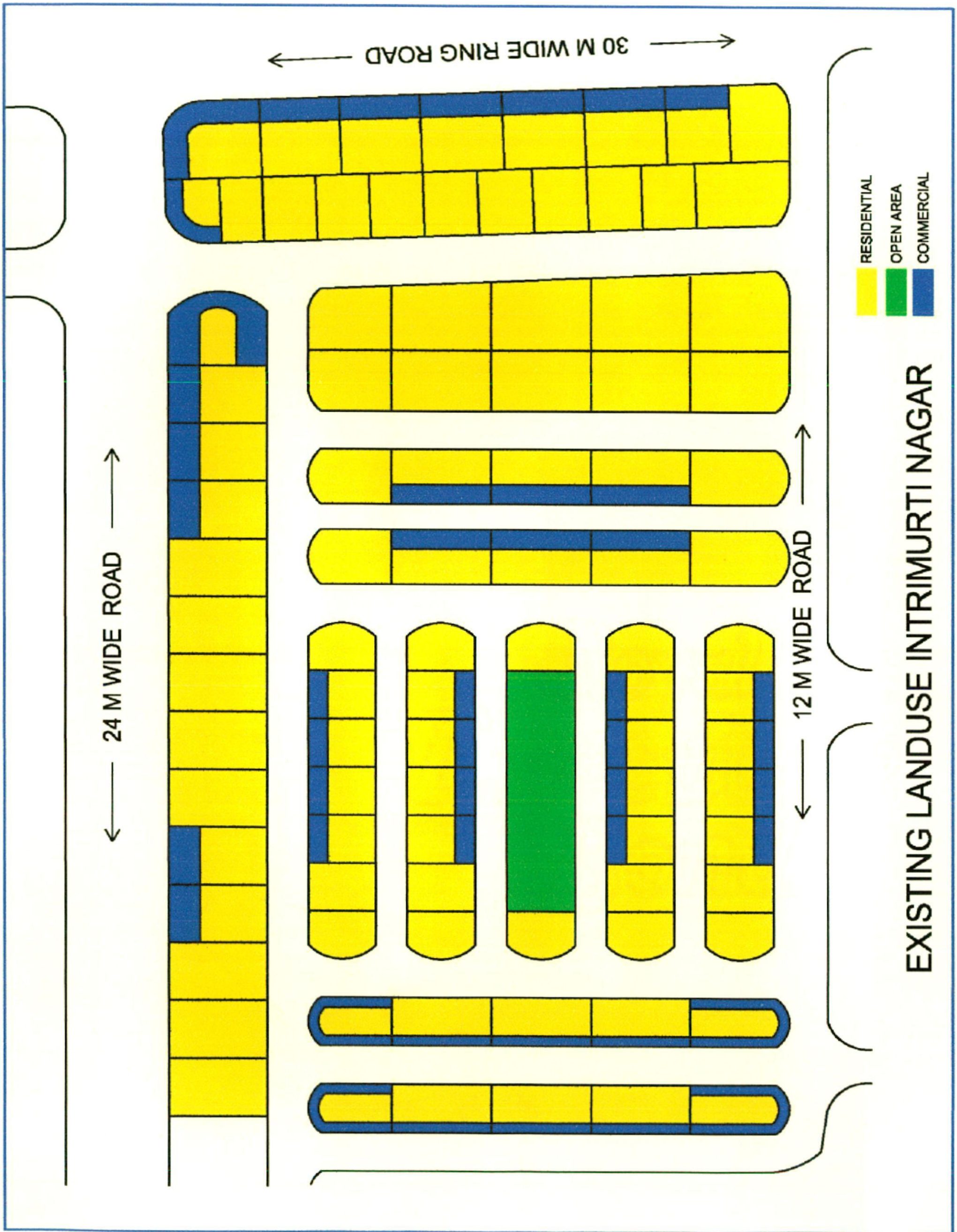
4.4.4 TRANSFORMATION

Since Trimurti Nagar is newly developed area, Transformation is not seen.

4.4.5 APARTMENT BUILDING ACTIVITY

Apartment building activity started in 1983 in the area. All the schemes are developed on the vacant land. Commercial use is already proposed in the area, but since there is no demand for commercial use, apartments have been constructed with shops on the ground floor, most of which still vacant. FSI utilized is 2. Apartment rates varies between Rs. 3500/sq. ft. to Rs.3000/sq. ft

Table 4.17: Apartment supply in Trimurti Nagar

Sr. no	Developer	No. of plots developed
1.	M. H.A.D.A	16
2.	Housing Finance Institution	5
3.	Cooperative Society	26 .
4.	Private Builders	23

(Compile from primary survey)

4.4.6 REDENSIFICATION

Since Trimurti Nagar is newly developed area, redensification is not seen.

4.4.7 IMPACT ON INFRASTRUCTURE

1. Water supply

Presently water supply to the area varies between 1 ½ hour to 5 hours. But average water supply is 130 lit./capita/day. Which is less than NBC standards 135 lit./capita/day.

2. Traffic

Smaller lanes in the area can't sustain the traffic generated by existing density

3. Open area

According to the standard the open space required is 0.1 Ha/1000 persons. So for population of 4,250 the open area required is 0.4 Ha & existing open area is 0.1 Ha. Which is very less & not been properly maintained.

4. Schools

Number of school required as per standard is also less, as existing primary schools are 3 & secondary schools are 3, whereas required is 4 primary & secondary schools.

4.4.8 BUILDING LEVEL CASE STUDY -V, "SUKHSAGAR APARTMENT", TRIMURTI NAGAR

1. Introduction

It is located in the internal layout. The plot is given to the builder to develop the apartment under agreement between owner & builder. In return owner received 1 apartments & cash. It is residential apartment with commercial use. It is semi-luxurious apartment was constructed in year 2003.

2. Project details

Table 4.18: Details of *Sukhsagar* Apartment, Trimurti Nagar

Particulars	Details
Plot area	250.56 sq m
Built up area	500.75 sq m
FSI permissible	2
FSI utilized	1.99
No. of apartment	8 apartment + 2 shops
Type of apartment	Double bedroom + Triple Bedroom
Built up area of each apartment	66.0 sq m. & 68.00 sq m
Area of each apartment	54.25sq m. & 64.35 sq m

(Compile from primary survey)

3. Violation

Sufficient Parking is not provided.

4. Problems

➤ 60% residents have problems of problem of parking, since no parking space is provided. 25% have problem with location which is little away from the city centre. 15% have problem of water supply.

➤ Visitors parking are not provided.

4.4.9 BUILDING LEVEL CASE STUDY -VI, *"82 HIG SCHEME"*,TRIMURTI NAGAR

1. Introduction

It is located in the internal layout. It is developed by MHADA in 1984. Two plots are amalgamated. It is purely residential apartment in Group Housing. It was constructed in year 1997.

2. Project details

Table 4.19: Details of *82 HIG Scheme*, Trimurti Nagar

Particulars	Details
Plot area	3666.94 sq m
Built up area	4547 sq m
FSI permissible	1.25
FSI utilized	1.24
No. of apartment	82 apartment
Type of apartment	Double bedroom
Built up area of each apartment	45.9 sq m.
Area of each apartment	56.17 sq m.

3. Problems

➤ 60% residents have problem with location since located away. 20% have problem of water supply. 20% have problem of cost while purchasing.

4.5 AREA LEVEL CASE STUDY COMPARATIVELY ANALYSIS

CRITERIA	DANTOLI	LAXMI NAGAR	TRIMURTI NAGAR	REMARKS
1. Time of development	Developed in 1912	Developed in 1952	Developed in 1982	➢ In Dhantoli & Laxmi nagar because of **age of building & increased family size**, major transformation is observed.
2. Location	➢ Location in central Nagpur. ➢ Adjacent to C.B.D Buldi. ➢ Very good access to sadar, mahal, dharampeth, railway station, airport etc.	➢ Location in west Nagpur within good neighborhood. ➢ Good access to sadar, dharampeth, railway station, airport etc.	➢ Located along Ring road. ➢ All work centers are away	➢ Dhantoli has a very good accessibility, to all areas, hence **transformation is very high**. It proves very **high demand** for the area. ➢ In Laxmi nagar because of good accessibility & good neighborhood **transformation is high**. It proves high **demand** for the area. ➢ Trimurti nagur is newly developed area along the fringes, hence there is **no transformation & demand** is also low compared to Laxmi nagar & Dhantoli.
3. Transformation	➢ 49% plots transformed to apartments.	➢ 35% plots transformed to apartments.	--- ---	
4. Plot size	➢ 30m x 60 m ➢ 30 m x 30m	➢ 25m x 30 m ➢ 30 m x 15m ➢ 25 m x 18 m	➢ 15m x 18 m ➢ 18 m x 18m ➢ 18 m x 25m ➢ 12m x 18m ➢ 19m x 27m	➢ **Transformation** is happening because of **bigger plot sizes** in the earlier developed areas like Dhantoli & Laxmi nagar are best suited to design apartment of single & double bedroom

Table 4.20 Area Level Case Study Comparative Analysis

Table 4.21 Area Level Case Study Comparative Analysis

CRITERIA	DANTOLI		LAXMI NAGAR		TRIMURTI NAGAR	REMARKS
	Existing	Previous	Existing	Previous		
5. Landuse						➤ Because of central location & nearness to CBD area transformation **to commercial & PSP** use is very high in Dhantoli as compared other areas. ➤ Another reason of conversion to other uses is **higher salable price of commercial** than residential
➤ Residential.	59.94%	66.03%	76.18%	76.70%	83.0%	
➤ Commercial	09.40%	8.30%	2.12%	1.6%	2.6%	
➤ Pub./S.Pub.	12.50%	7.51%	4.8%	4.8%	---	
➤ Open	05.09%	05.09%	6.1%	6.1%	3.3%	
➤ Roads	13.07%	13.07%	10.8%	10.8%	10.96%	
6. Population						➤ Existing population is almost **3.5** times higher than designed one & projected population is almost 6 times higher than design.
➤ 1971	3,769		4,725		-------	
➤ 2000	13,778		12,252		4,250	
➤ projected	23,735		25,745		-------	
7. Density						➤ Existing population is almost **3.5** times higher than designed one & projected population is almost 6 times higher than design.
➤ 1971	104.86 persons / Ha		131.14 persons/Ha		-------	
➤ 2000	386.58 persons / Ha		340.04 persons/Ha		1,412 persons/Ha	
➤ projected	660.40 persons / Ha		714.54 persons/Ha		-------	
8. FSI						➤ Since Trimurti nagar comes under commercial zone, utilizing FSI = 2, density is very high.
In Residential	1.25 & 2		1 & 1.25		-------	
In commercial	2		2		2	
9. Price/Rates	Rs 6000-8000 / sq. ft		Rs 4500-5500 / sq. ft		Rs 3000-3500 / sq. ft	➤ As Trimurti nagar is located on the fringes, the price difference is almost **double** as compared to other areas.

CRITERIA	DANTOLI	LAXMI NAGAR	TRIMURTI NAGAR	REMARKS
10. Infrastructure				
Water supply	➤ Existing water supply is 130 lit./pers./day ➤ In case of 90% conversion it will be 40% less than the std., if same quality of water is supplied.	➤ Existing water supply is 130 lit./pers./day ➤ In case of 90% conversion it will be 50% less than the std., if same quality of water is supplied.	➤ Existing water supply is 130 lit./pers./day	➤ Existing water supply is **4.5% less than the std.**
Traffic	➤ In two decades because of vehicle increased only in the area the equivalent car space (ECS) increased on the road is 4.5 times.	➤ In two decades because of vehicle increased only in the area the equivalent car space (ECS) increased on the road is 3.4 times.		➤ Increased car space on the road is leading to congestion.
Parking	➤ Avg. no. of two wheelers owned per DU is 3.5 ➤ Avg. no. of car owned per apartment building is 2.	➤ Avg. no. of two wheelers owned per DU is 3 ➤ Avg. no. of car owned per apartment building is 1.	➤ Avg. no. of two wheelers owned per DU is 3	➤ If required parking space is compared with the parking provision in the Byelaws, it is **50% less** than the parking space provided. ➤ Parking provided in the **setbacks reduces the open area.** ➤ On street parking creates problem.
Open area	➤ No provision of open areas for future population as per std.	➤ Existing open areas can sustain 75 % transformation.	➤ Existing open areas are less according to std.	

Table 4.22 Area Level Case Study Comparative Analysis

CHAPTER 5

CONCLUSION AND FINDING

5.1 CONCLUSION

In the context where high density development option is emerging as an affordable means of optimizing use of land & infrastructure, the apartment living is increasingly coming to be accepted as satisfactory way of life in urban area.

In Nagpur, Apartment activity is virtually taking over old housing stock in existing potted areas through development & redevelopment schemes, which has lead redensification & transformation guided by market forces, finally resulting rise in property prices.

Various reasons of transformation can be seen at different angles.

1. **Area level:** Location advantages, proximity to work centers & linkages to various city nodes have increased the demand for that area.

2. **Plot level:** Plot sizes in these areas are generally larger, since these areas are developed earlier. Such plot sizes are best suited to redevelop the property & carve out small dwelling units best suited to demand & affordability of the buyers.

3. **Age of building:** Both areas (Dhantoli & Laxmi Nagar) are existing for more than 50 years. Hence old housing stock is in poor condition. So unaffordability to redevelop the property market forces has led owners to develop the property through builders.

4. **Layout characteristic:** Potential of area to support apartment activity depends on level of infrastructure, services, plot sizes & amenities in the vicinity of the area.

5. **Change in the life style:** Preferring smaller & adaptable living accommodation, rather than big bungalows.

5.2 POTENTIALS OF APARTMENT BUILDING ACTIVITY IN NAGPUR

➢ It is totally legal housing supply system with secure tenurship, supported with act & byelaws.

➢ It is potential subsystem, which is providing housing by maximum private cooperation with minimum govt. intervention.

➢ It is helping to replace old housing stock with new one.

➢ It is best tool to achieved objective of redensification in development plan (1986-2011)

➢ It is very affordable & economical alternative as factors like land price, cost of construction & infrastructure, maintenance is shared by group of people & not by individual.

➢ Urban land is intensively utilized.

➢ People can afford to stay in good neighborhood & localities having very good access to city nodes, where they can't afford individual houses.

5.2.1 ADVANTAGES OVER PUBLIC SUPPLY SYSTEM

1. No complicated process involved.

2. Amenities & finishes provided are much better.

3. Speed in process of construction & possession.

4. Flexibility in finance options.

5.3 PROBLEMS OF APARTMENT BUILDING ACTIVITY IN NAGPUR:

Problems are identified separately at different level:

5.3.1 CITY LEVEL PROBLEMS

1. **Redensification:** Centrally located areas having good accessibility to all city nodes have started apartment activity as uncontrolled redensification, which is governed market forces.

2. **Transformation:** Transformation of the plotted areas which has affected the infrastructure & housing market leading to very high property prices compared to areas in the fringes.

3. **Speculation:** In potential areas speculation of land & properties has been increased.

5.3.2 AREA LEVEL PROBLEMS

1. **Redensification:** Old housing stock is getting replaced because of the age of the buildings, leading to redensification & no consideration is given towards the additional pressure on infrastructure facilities like water supply, parking, open areas etc.

2. **Impact on infrastructure:** Water supply in Dhantoli, Laxmi Nagar & Trimurti Nagar is affected as existing it is 4.5 % less than standard & frequency of distribution is not even for the areas.

5.3.3 BUILDING LEVEL PROBLEMS

1. **Violation:** After alteration there is no proper light and ventilation in rooms.

2. **Impact on infrastructure:** Water tapping creates problem to other users in the building. In apartment parking is inadequate & is provided in the setbacks, which has reduced open space per persons per plot. Similarly inadequate visitors parking also creates problem.

3. **Apartment Owner's problem:** In 27% cases promises were not kept regarding specification of material to be used, finishing, furnishing etc.

5.3.4 PROBLEMS FACED BY PRIVATE SECTOR

1. **Problems from landowner:** Maximum demand for potential salable space.

2. **Problems from buyers:** Very high & different demands of individuals for specification & finishes creates problem of finance & management.

5.4 FINDINGS

1. From development plan proposals in 1976 to 2011, the municipal boundary has not been increased, because the increased population has been accommodated by redensification in existing areas only. The apartment activity has major contribution to it.

2. In Nagpur city it can be seen that almost average 45% of housing stock is vulnerable for replacement. So, if potential of apartment activity is identified, then it can help in replacing the old housing stock to meet the housing need for the city.

3. The new trend of development followed in recent past in Nagpur is transformation of individual plots in plotted areas to apartment building by redevelopment schemes. The apartment is development can be observed in organic development (inner city), in plotted areas and in new premises. In new premises the density is very high because of the group housings.

4. In new premises Group Housing schemes developed by Housing Finance institutions & Cooperatives can be seen. But potential of it over single apartment block is yet not identified, like facilities, amenities, open areas. Parking etc. Hence percentage is very less.

5. Procedure included in the process, construction, finance & possession of the apartment by private sector is much efficient than the apartment by public supply like NIT or MHADA.

6. The rapid increase of the apartment activity and its acceptance has shown that it is potentially major sector, which can provide housing. So the potential of the system should be carefully channelized to achieve an overall degree of perfection.

CHAPTER 6

RECOMMENDATIONS

6.1 INTRODUCTION

The entire study has thrown light on various potentials as well as problems involved in the apartment activity by private sector in Nagpur. The recommendations are given considering both potential and problems.

The main objective of recommendation is to streamline and channelize apartment building activity by private sector to achieve an overall degree of perfection, of urban development.

Following are the recommendations to regulate apartment building activity:

Model 1: Cooperative Group Housing should be encouraged in new premises as well as in plotted areas by encouraging existing cooperative housing societies of the area.

This can be achieved in the following different levels:

Plot level

➢ Specifying minimum plot size should encourage amalgamation of the plots.

➢ Minimum plot size to be amalgamated should not be less than 185sq.m. So that if two plots are amalgamated it will be 370sq.m. & if four plots are amalgamated it will be 740sq.m.

➢ In amalgamation of 2 plots minimum setback should not be less than 3m & ground coverage should not be more than 40%. Similarly, in amalgamation of 4 plots minimum setback should not be less than 3m & ground coverage should not be more than 65%.

➢ According to the maximum density proposed by Revised Development Plan i.e.116 D.U/Ha, on 370 Sq.m. plot 4.2 D.U.s can be achieved. But for amalgamation incentive for 6 D.U.s should be given to encourage plot owners. It will also make extra addition to the housing stock.
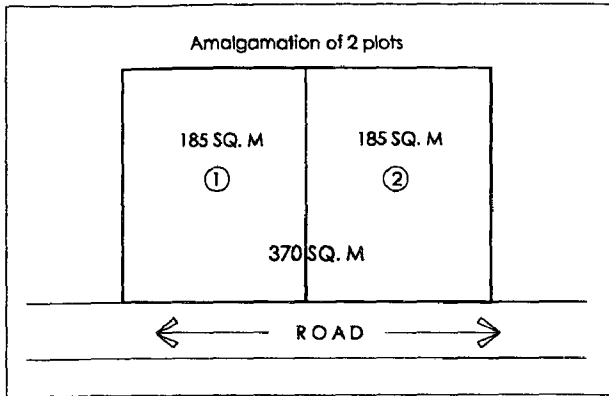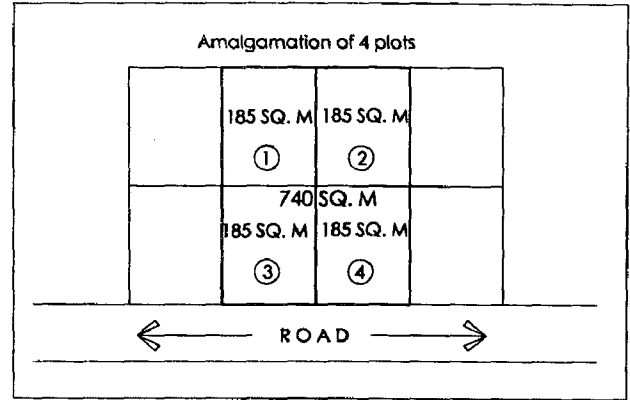
Fig 6.1 Amalgamation of 2 plots

Fig 6.2 Amalgamation of 4 plots

➢ Similarly on 740sq.m plot for amalgamation incentive for 12 D.U.s should be given to encourage plot owners.

➢ For the amalgamation ground floor coverage relaxation should be given. For amalgamation of 2 plots side setback relaxation should be given & for amalgamation of 4 plots rear setback relaxation should be given.

➢ Cooperative housing society should have minimum 4 members who are landowners.

Area level

➢ Cooperative housing should be encouraged on the inner plots in the layout, which can relax extra stress on the main roads.
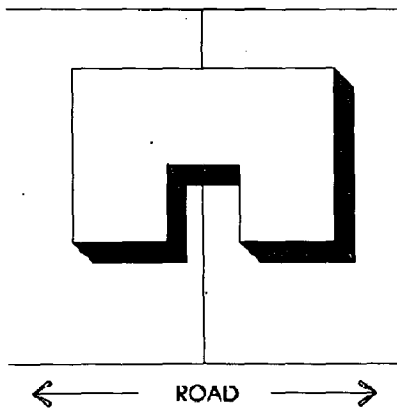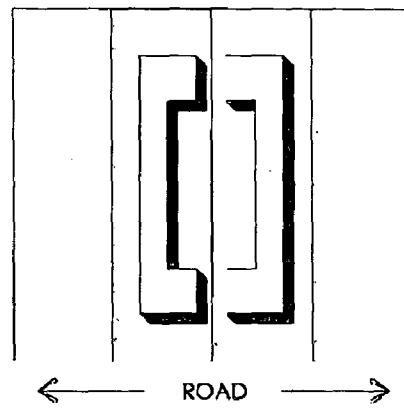

Fig 6.3 Type of Amalgamation plots

Fig 6.4 Type of Amalgamation plots

> On the main roads the commercial use should be permitted in Cooperative housing, which can generate profit to cooperative society.

> In the inner roads public purpose should be permitted in Cooperative housing, which can fulfill deficiency of existing public purpose amenities.

> Single room apartment can be encouraged in Cooperative housing which can generate more rental housing stock & can generate profit to the cooperative society.

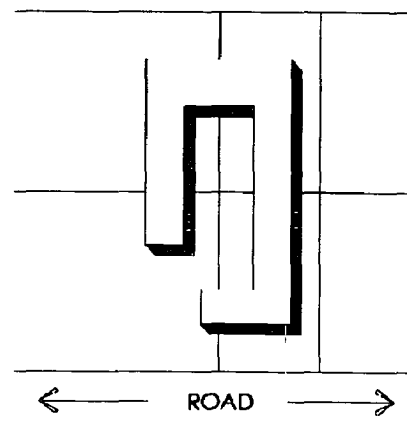> Cooperative housing should achieve better quality living & social mix.

Fig 6.5 Type of Amalgamation plots

Model 2: Public and private partnership should be encouraged to promote apartment building activity

This can be achieved in the following:

> Authority should acquire land & allocate it to the private developer under agreement mentioning reservation of percentage of developed property for public use & for EWS housing.

> Land should be made available to the private developer at minimum lease.

> Various taxes like registration, stamp duty tax should be reduced.

> Extra FSI should be permitted to encourage private developer.

> Loan facilities should be provided through Housing Finance Institutions

Model 3: Promote reconstruction of all old buildings as an integral part of block level renewal.

This can be achieved in the following:

➤ Withdraw the government managed repair and reconstruction programmed in a phased manner over a five-year period.

➤ Rationalize Rent Control Act to promote landlords and tenants to reconstruct buildings – allow market rents or ownership in the reconstructed buildings.

➤ Adopt rationalized FSI pattern in conjunction with impact fees to help augmentation of infrastructure.

Bibliography

Books

Aldrich Brian .C., " Housing in Asia : Problems and perspectives", Rawat Publication, Jaipur, India

Broto, Carles, Au,"New concepts in apartment buildings", Carles Broto Publication, 2005, Barcelona.

Reports

Revised Development plan of Nagpur (1986 – 2011)

Building Byelaws & Development control rules for Nagpur.

Census report of Nagpur city-2001

Maharashtra Apartment Ownership Act, 1970

Jawaharlal Nehru National Urban Renewal Mission, Nagpur

Research papers

Joshi, Swapna Chandrashekhar, 2001."Towards Pro-environmental & Pro-poor Architecture: Understanding the case of Nagpur city." http://www.hdm.lth.se/fileadmin/hdm/alumni/papers/SDD_2007_242b/Swapna_Joshi _India.pdf. Last accessed 18 January 2009.

Journals

International journal of Public Private Partnership, Vol 3, March 2001, pp-187-206

Thesis

D. Shrivastava- Apartment building practices by private builders in Lucknow – thesis report 1998, SPA New Delhi

Rahul Deshpande- Evaluation of apartment building activity by private builders in Nagpur- thesis report 2001, SPA New Delhi

Websites

www.nagpurcity.com

www.nagpuronline.com

www.indiaurbaninfo.com

www.censusindia.gov.in.