

BLUEPRINT FOR THE NEW CAPITAL TOWN "GREATER RANCHI - 2030"

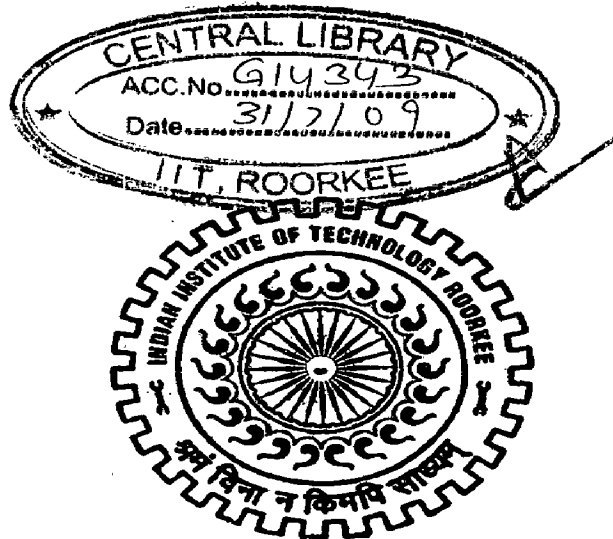
A DISSERTATION

*Submitted in partial fulfillment of the
requirements for the award of the degree
of*

MASTER OF URBAN AND RURAL PLANNING

By

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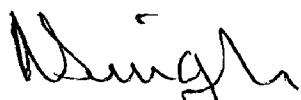
JUNE, 2008

CERTIFICATE

Certified that this report entitled **BLUE PRINT FOR THE NEW CAPITAL TOWN "GREATER RANCHI – 2030"**, which has been submitted by Miss. **SEEPIKA CHANDRA**, in partial fulfillment of the requirements for the award of the **MASTERS OF URBAN AND RURAL PLANNING**, submitted in the Department of Architecture and Planning, **INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE** is the student's own work carried out by her under our supervision and guidance. The matter presented in this thesis has not been submitted by me for the award of any other degree of this or any other Institute.

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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled – **BLUE PRINT FOR THE NEW CAPITAL TOWN “GREATER RANCHI – 2030”**, in partial fulfillment of the requirements for the award of the **MASTERS OF URBAN AND RURAL PLANNING**, submitted in the Department of Architecture and Planning, **INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE** is an authentic record of my own work carried out for a period of about one year from July 2007 to June 2008, under the supervision of **DR. NALINI SINGH**, and **DR. ASHUTOSH JOSHI**, Department of Architecture and Planning, **INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE, INDIA**.

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

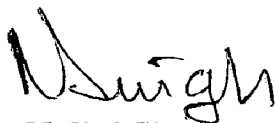
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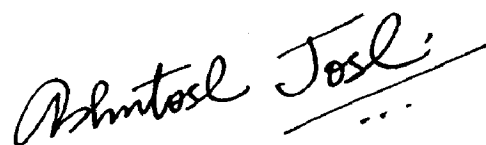
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(SEEPIKA CHANDRA)

ABSTRACT

Growth and development are continuous process, which alters the original shape of a city. Today we are living in the third world, an aftermath of many growth, development and decay process or in a single word “A big transformed world”.

The rapid growth of population leading to rapid urbanization further leading to enforcing cities to change their function and leading to birth of many new cities.

Most of the growth takes place around the existing centers, because these centers are already developed and planning the new settlement around these will be less costly than the creation of an entire new center.

The problem is even more complex when we have to plan for the development of newly selected capital city, and a growing metropolis, as it will require development approach over a long period of time and a large no. of diverse range of variables.

This Thesis describes the transformation that the Ranchi city has witnessed from being the summer Capital of Bihar state to becoming the state Capital of Jharkhand state. The Thesis also explores the various factors which influenced its development and the outcome in the form of present structure of the city and future growth potentials.

After the study of current scenario and growth trends, the need of a new Capital city “Greater Ranchi” is justified for the further growth and development of this region. A comprehensive land use plan and the development control policies have been proposed for the new capital town.

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1

INTRODUCTION

1.1 INTRODUCTION

Growth and development are continuous process. The rapid growth of population leading to rapid urbanization further leading to enforcing cities to change their function and leading to birth of many new cities.

Most of the growth takes place around the existing centers, because these centers are already developed and planning the new settlement around these will be less costly than the creation of an entire new center.

On 2nd August 2000 the bill to create a separate state of Jharkhand to be carved out of Bihar was passed in Loksabha and the new state of Jharkhand came into existence on 15th Nov. 2000 as 28th state of India. Comprising 32% of Bihar's population and covering an area of 79,714sq.km. The Ranchi town which used to be the summer capital of undivided Bihar state became the Capital of new state.

The problem is even more complex when we have to plan for the development of newly selected capital city, and a growing metropolis, as it will require development approach over a long period of time and a large no. of diverse range of variables.

1.2 ISSUES [1]

Due to the city becoming the state administration capital and the head quarter, with numerous administrative functions, the city is expected to grow at higher rate as evident in the previous years.

1.2.1 GROWTH CONSTRAINTS

- i) Tribal lands inside the city area are in abundance, which is non transferable outside the tribal community to any non-Tribal agency.
- ii) The vertical growth of city can not be ignored in the near future, as the land transfer, acquisition are in progress, thus resulting in a few high rise buildings.
- iii) The constraints to the vertical growth are the poor infrastructure conditions, as the roads are narrow and overcrowded with the present population itself.
- iv) The cantonment area in the vicinity, on the north-east and east-south-east edge of the city restricts the city growth beyond its limits by pushing it physiologically to a far off place from the heart of the city. Any growth beyond these bounds is likely to be treated as sub-city.

1.3 NEED FOR THE NEW CAPITAL TOWN

The present city infrastructure status in the subsequent section is considerably low compared to the desired conditions, which dictates a need of new area to be developed as sub-city with the existing town.

- i) As per satellite imagery more than 70% of the total municipal area is seen occupied for various usages. About 30% which is seen vacant as of now is predominantly agricultural and tribal land.



*Plate 1.1: map showing the growth of Ranchi city.
Source: City development plan of Ranchi - 2007.*

- ii) The city needs to expand to provide shelters to the inhabitants, whereas at present there is a deficiency of 35,213 houses.
- iii) The city needs to expand to provide enough Economic Opportunities to the growing population.
- iv) Thus the city needs to cater for the present and future requirements and come up to the expectations of the Jharkhand state as an ideal capital city.

1.4 TOPIC SELECTION

As it is a rare opportunity when one can work on the planning of a city which has been assigned the function of a state capital. This important planning opportunity has motivated me to initiate my dissertation for Ranchi, the capital city which has been identified as a priority area for development by the Jharkhand govt.

1.5 AIM OF THE STUDY

This thesis aims at identifying the future development potential of the capital city, suggest the future structure of the capital city and give development guide lines for the area such that a world class urban habitat is developed that enables its residents to strive for excellence in every sphere of life while at the same time preserving the sensitive natural and cultural heritage of land.

1.6 OBJECTIVES OF THE STUDY

1. To study the setting up of new towns in western and Indian context, as has been done in cities of Washington D.C., Brasilia, Chandigarh, and Gandhinagar.
2. To study existing condition of Ranchi city to identify the: Growth trends and its implications, Growth direction and Growth constraints.
3. Based on the city level study, project the demographic quantum & quality of resident population for the future township.
4. To frame conceptual byelaws & space norms for the new township.
5. To evolve an overall framework & suggest development control policies for orderly and phase wise execution of the plan for the capital township.
6. To prepare a land use map of the future township based on the inferences.

1.7 SCOPE AND LIMITATION OF WORK

1. While studying the plan of capital town's procurement, location of land of the capital towns are not taken into account.
2. While specifying the planning norms for a new town study is limited only to land use planning and because of limited time frame few planning standards and building byelaws are framed for the new towns.

1.8 METHODOLOGY

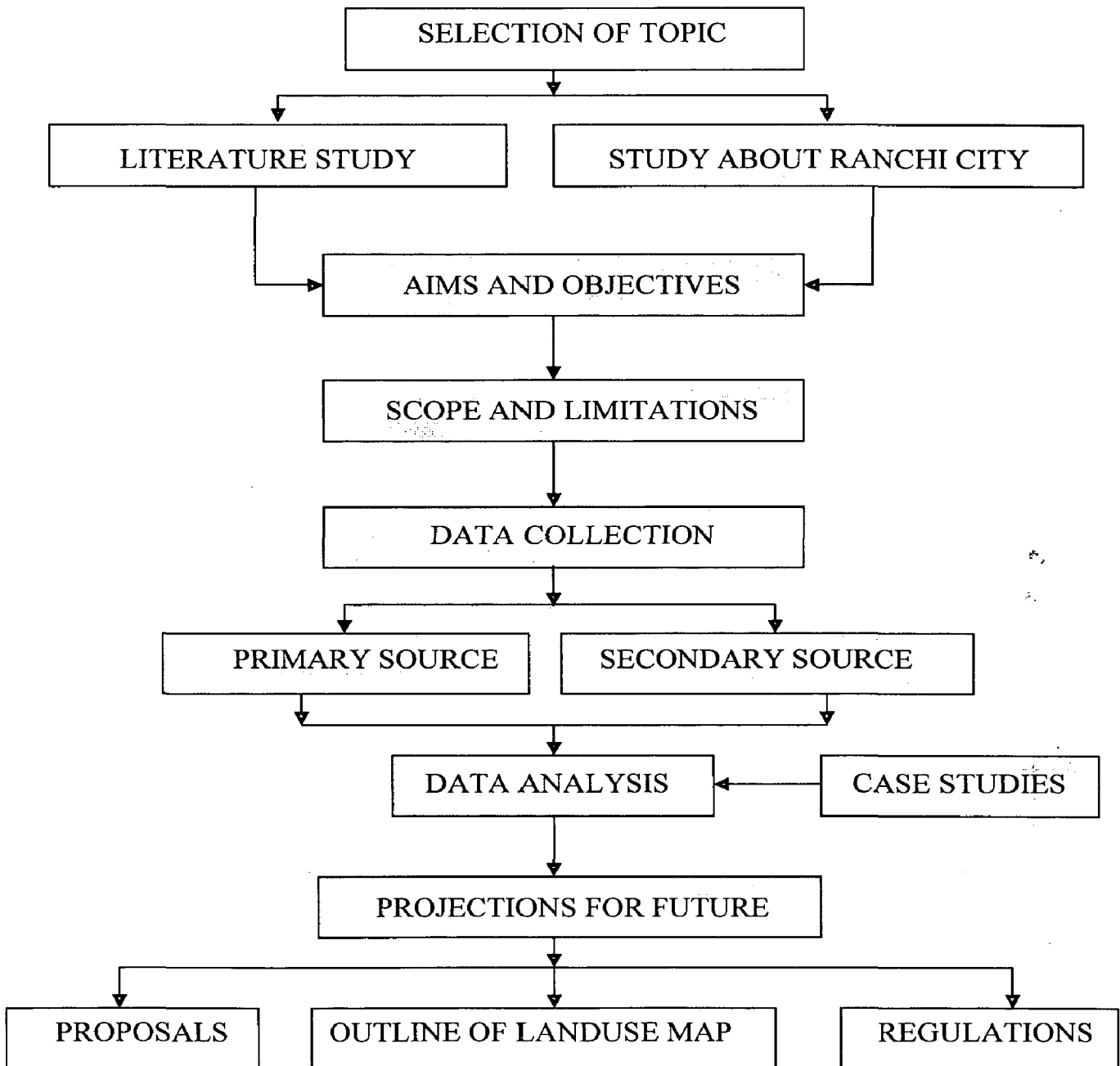


Fig. 1.1: Fig. showing the methodology adopted in the thesis.

1.9 ORGANIZATION OF THE THESIS

Chapter 1

This is an introduction to the study outlining the background of the dissertation, its objectives, scope, limitation and the methodology adopted.

Chapter 2

This chapter deals with the theoretical study of different approaches and concepts attempted over times as a part of strategy in the planning of new Capital cities. Some case studies on planning strategy adopted for capital cities and new townships, to review the planning strategy and norms and standards adopted for such areas.

Chapter 3

In this chapter the city is studied in its regional and local perspective, to understand its future role as a Capital city of the newly formed State of Jharkhand.

Chapter 4

In this chapter analysis for the selection of proposed site for the Greater Ranchi is done based on various factors to see the feasibility of setting up the new town on proposed site.

Chapter 5

In this chapter projection of population, various infrastructure facilities and the area needed for various activities, which is needed to support the new city been has done and the conceptual planning approach is discussed.

Chapter 6

This chapter suggests the structure plan for the capital township. It also discusses the plan proposals in various services.

2.1 INTRODUCTION

There was an increased level in urbanization in the India during 1980's and a great stress was there on the physical and social infrastructure of prominent urban centers. India saw a great change during this period and need for new towns, development of sub cities which would ease the pressure from main city was justified.

2.2 NEW TOWNS – AN INDIAN EXPERIENCE [2]

2.2.1 BACKGROUND OF THE NEW TOWN CONCEPT

The idea of new towns is not new to India. From the early historic times, a planning tradition exists in this country, which is reflected in the towns such as:

- a. Mohenjdaro, Harrappa, during the Indus Valley Civilization
- b. Patliputra, Varanasi, Nalanda, Taxila, etc., in the later periods,
- c. Agra, Golconda etc. In the Moghul period,
- d. New Delhi, In 20th century,
- e. Bhuwaneshwar prior to independence
- f. Chandigarh after independence.

2.2.2 NEW TOWNS – INDIAN SCENARIO

A number of new towns have been built in India during the last four decades, many of which have been conceived as company towns for major industrial projects undertaken in the public sector.

Prominent among these are the steel cities of Rourkela, Bhilai and Durgapur. The capital cities of Chandigarh, Bhubaneswar and Gandhinagar are classic examples of modern architecture and contemporary town design. New Delhi was built as capital city for India by British. Development of New Delhi and Chandigarh had a tremendous impact on new developments in India.

A number of new towns have been planned as extensions to existing cities like Bhilai or Sindri within Dhanbadurban agglomeration. HMT and HAL townships near Bangalore, Pimpri - Chinchwad near Pune, New- Nasik, New Aurangabad, New Nanded as planned large scale extensions of these towns in Maharashtra.

There are many other independent new towns such as Neyveli in Tamilnadu, Nagal in Punjab, Paradip in Orissa, etc. New Bombay, the largest new city near Bombay and Pimpri - Chinchwad, new town near Pune.

FINDINGS & RECOMMENDATIONS

By studying the past and present trends of new towns, their functions, growth pattern and concept, it will be very helpful in analyzing the present needs and demands in the new Capital town, and hence will further help in the planning process.

2.3 CITY IMAGES & CONCEPTS OF PLANNING NEW TOWN [3]

2.3.1 GARDEN CITY

CONCEPT

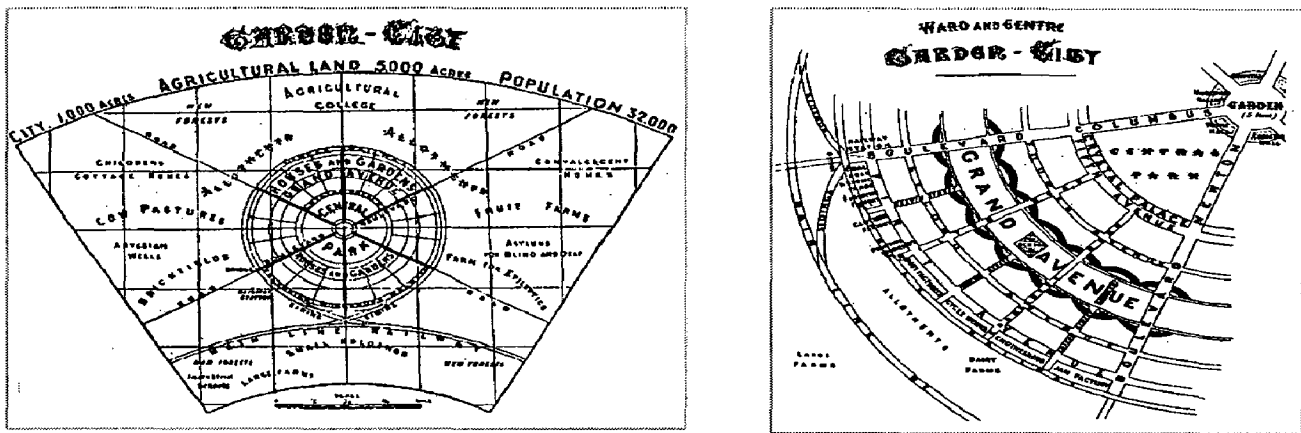


Plate 2.1, 2.2: Plan showing the garden city concept.
Source: *Garden cities of tomorrow*, Gallion Arthur B. & Eisner Simon

The garden city movement is an approach to urban planning that was founded in 1898 by Ebenezer Howard in England. Garden cities were to be planned, self-contained communities surrounded by greenbelts, and containing carefully balanced areas of residences, industry, and agriculture.

Inspired by the Utopian novel *Looking Backward*, Howard published *To-morrow: a Peaceful Path to Real Reform* in 1898 (reissued in 1902 as *Garden Cities of To-morrow*), organized the Garden City Association in 1899, and founded two cities in England: Letchworth Garden City in 1903, and Welwyn Garden City in 1920.

OBJECTIVES

The main components of Howard's Garden city idea were:

1. Planned dispersal of population and industry in towns of sufficient size.
2. Limitation of town size

3. Amenities like gardens, playgrounds, parks woven into town pattern.
4. Planning control for the whole town framework, road schemes and functional zoning
5. Division into neighborhoods and wards of preferably 1/6th of the town for each unit
6. Center of the town is a central park
7. Prescribed density is 25 people per acre.
8. The private ownership of land for the benefit of individuals would be replaced by collective ownership for the benefit of the community

Garden City was able to influence capital city planning in two ways: It could introduce landscape flair to the comprehensive composition, as in the case of Griffin's Canberra plan; and it could become one component in an overall capital city plan.

FINDINGS & RECOMMENDATIONS

This concept should be adopted in the planning of new towns of present day as well, as we are lacking in the availability of open breathing spaces within and around the cities, due to rapid urbanization and growth.

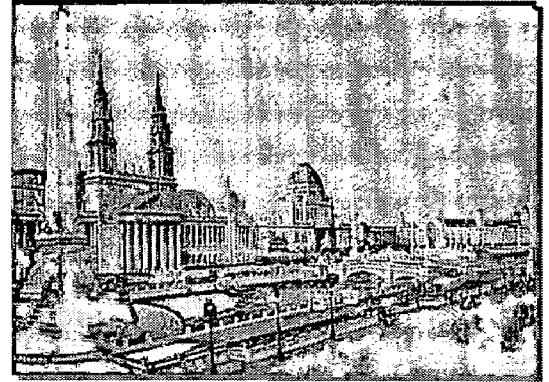
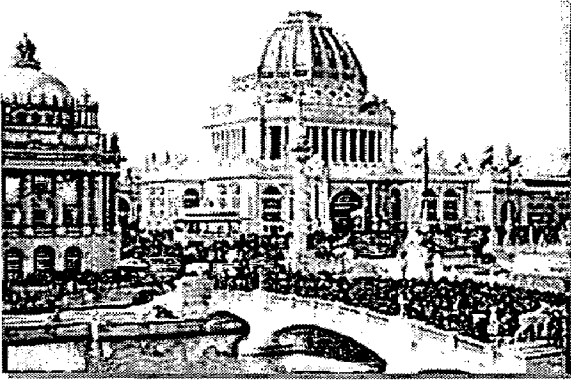
2.3.2 CITY BEAUTIFUL MOVEMENT

CONCEPT

The movement arose in the United States in response to the perceived wretched conditions of inner-city poverty in crowded tenement districts, itself a product of increased immigration and consolidation of rural populations into cities.

The movement flourished only for several decades, but in addition to the classicizing monuments it left, it also achieved great influence in urban planning that extended throughout the 20th century.

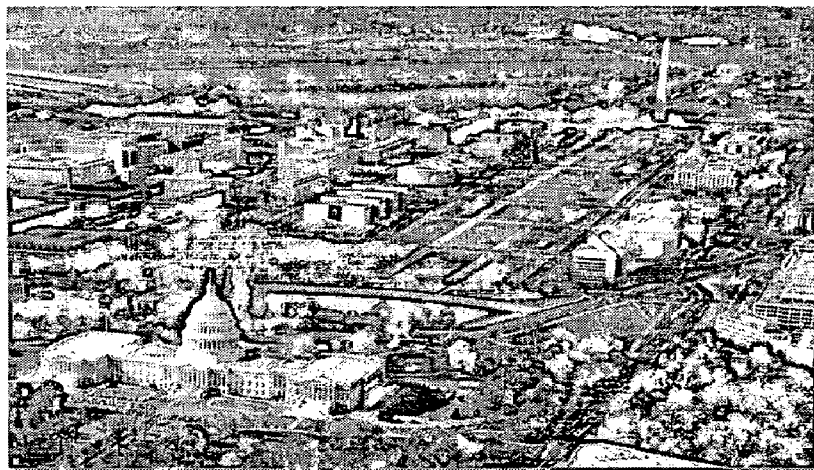
The first large-scale elaboration of the City Beautiful is considered to have been the "White City" Daniel Burnham's design for the 1893 World's Columbian Exposition embodied his vision of an ideal city, with a well-defined ceremonial centre and overall unity of design.



*Plate 2.3, 2.4: Fig. showing a part of white city.
Source: www.wikipedia.com.*

-4

The first attempt to use City Beautiful ideal for a city plan with intent of creating social order through beautification was the McMillan Plan, which arose from the Senate Park Commission's redesign of the monumental core of Washington, D.C.



*Plate2.5: fig showing the grand vista in front of Capitol, Washington D.C.
Source: www.wikipedia.com.*

DECLINE

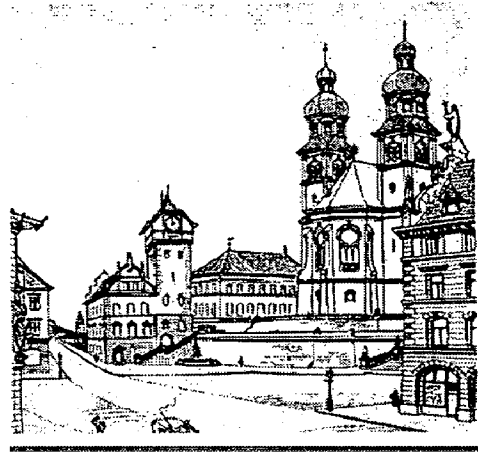
The movement waned after World War I when it came under assault from planners and critics who disliked its expensive, impractical, and allegedly elitist and superficial characteristics.

FINDINGS & RECOMMENDATIONS

This concept can be adopted for planning some of the zones, or some specific buildings like the Capitol, to give emphasis, but beautifying the whole city may not be a wise idea, as it will lead to excessive budget.

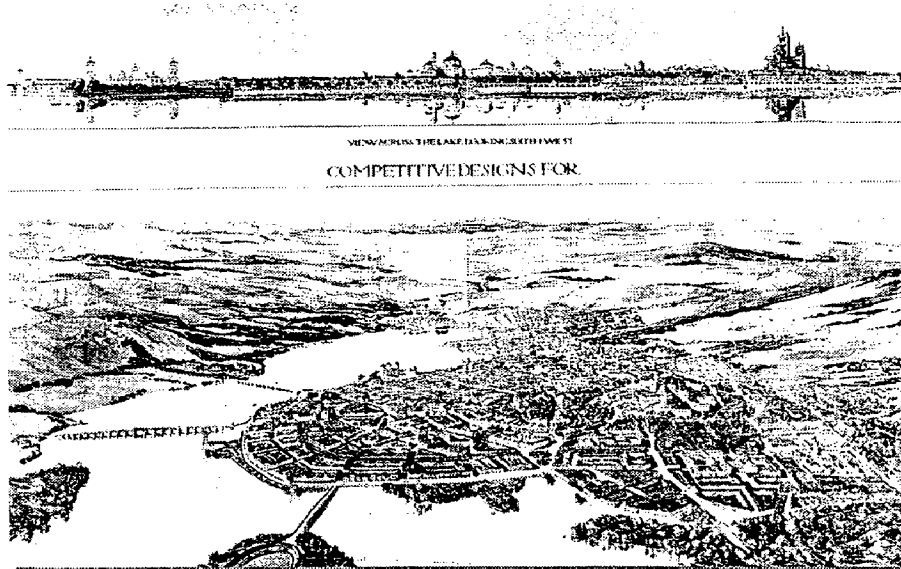
2.3.3 THE PICTURESQUE CITY**CONCEPT**

The picturesque city represented another option for creating an urban image. The traditional small town was the model for the picturesque city. It did not matter whether it was Italian or German, medieval or modern: the scale had to be manageable. The eye and the sense had to be satisfied by fittingly large and diverse public spaces, and the streetscapes needed to offer varied aspects at regular intervals. They could be curved or linear, as long as the straight sections were not too long and did not become lost in infinity. Buildings had to reflect regional and traditional styles. Aside from Sitte's own plans, the most rigorous implementation of this ideal was found in Henrici's plan for Munich.



*Plate 2.6: fig showing the conceptual sketch of Munich city, by Friedrich Putzer.
Source: Representing the State, Wolfgang Sonne*

For capital city planning, the picturesque city played a subordinate role. The view that its small-scale properties were poorly suited to expressing stately grandeur was widely held. Gimson's plan for Canberra was perhaps the most convincing translation of the picturesque ideal into a capital city format.



*Plate 2.7: fig showing the conceptual plan of Canberra, by E.W.Gimson.
Source: Representing the State, Wolfgang Sonne*

FINDINGS & RECOMMENDATIONS

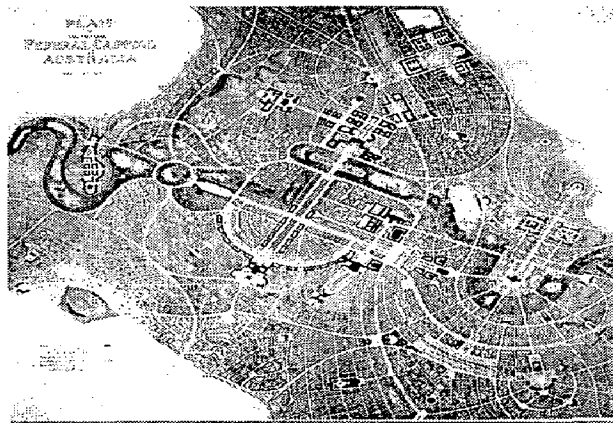
This concept can be adopted in the designing of important buildings, which represents the state or city. Incorporate the local and traditional architecture in these buildings to reflect the regional setting.

2.3.4 THE METROPOLIS

CONCEPT

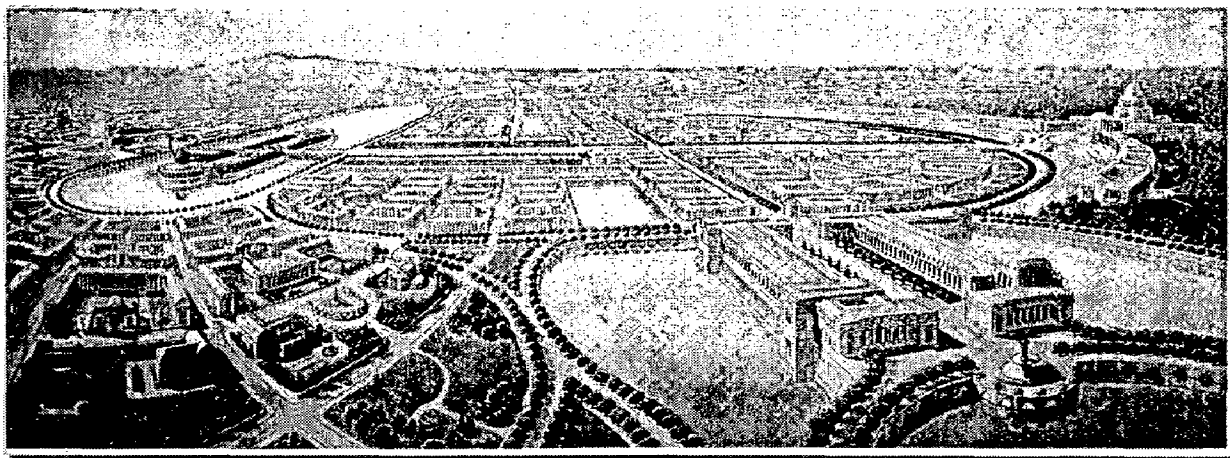
The image of this modern metropolis was above all uniform, homogenous or harmonious, to reprise the vocabulary of the era. It consisted of a sea of uniform housing blocks, all identical in height and with understated facades, which formed a coherent urban fabric. Public buildings were integrated into the uniform appearance, although they could stand out from the mass of housing developments by virtue of site and design.

The network of roads was generally laid out in a grid, not so much schematic as rather pragmatically adapted to the individual conditions: the streets might follow straight or curved lines, but they all were imposing in scale. They tended to continue into infinity, or, at least, without a meaningful point that would have curtailed the ideological limitlessness of the metropolis. The metropolis derived its monumentality primarily from repetition.



*Plate 2.8: fig showing the conceptual plan of Canberra, by Eliel Saarinen.
Source: Representing the State, Wolfgang Sonne*

The metropolitan city ideal was applied to several capital city plans for democratic states. The most impressive image, perhaps, was that created by Saarinen in his design for Canberra.



*Plate 2.9: fig showing the conceptual view of Canberra, by Eliel Saarinen.
Source: Representing the State, Wolfgang Sonne*

FINDINGS & RECOMMENDATIONS

Uniform and homogenous or harmonious planning always catches attraction. Planning the zones in prototype arrangement may be good idea, but there should be some variations in the height and the texture of buildings to develop an interesting skyline of the city and to break the monotony.

2.3.5 THE SKYSCRAPER CITY

CONCEPT

Another emerging aesthetic city type was the skyscraper city. Initially propelled by private business interests and ambitions in North America, it soon became a factor in comprehensive city plans.

The ideal of the skyscraper city was the product of laissez-faire capitalism and unbridled enthusiasm for technology. To begin with, its appearance was accordingly varied and unstructured: completely different high-rise towers of varying heights combined into a chaotic urban image, whose aesthetic appeal lay as much in the gigantic disparateness as in the vertiginous scale and never before seen perspectives.

In Europe, Henard led the enthusiasm for technology. With the ring-shaped arrangement of high-rises in his futuristic city, he created a first schematic model of order for the skyscraper city.



Plate 2.10: fig showing the view of present day skyscraper
Source: www.wikipedia.com.

The political statement of the skyscraper city was negligible. Initially it had been a consequence of private entrepreneurial interests and was accordingly seen as an expression of increasingly prosperous capitalism. The aesthetic transformations that followed continued to pay homage to progress in technology; this was not a typology to address social issues.



Plate 2.11: fig showing the view of present day skyscraper
Source: www.wikipedia.com.

The ideal of the skyscraper city was still too much in its infancy and too linked to private interests in the minds of the contemporaries to become a feasible choice for capital city solutions. It was necessary to introduce height limits for capital cities.

Hence skyscraper city and capital city tended to remain antipodes, exemplified by Washington, the only North American metropolis without skyscrapers.

FINDINGS & RECOMMENDATIONS

Looking at the present scenario and the trend, the skyscraper is the best suitable concept, as there is a scarcity of land, so going vertical is the only option for the new upcoming towns.

2.3.6 NEIGHBORHOOD PLANNING [4]

CONCEPT

One of the important contributions derived from the Garden City is the neighborhood concept. **Clarence A. Perry** was the first to give some consideration to the physical form of the neighborhood unit. He described the unit as that populated area:

1. That would require and support an elementary school with an enrolment of between 1000-1200 pupils.
2. This would mean a population of 10 families per acre.
3. The neighborhood unit would occupy about 160 acres and
4. Have a shape which would render it unnecessary for any child to walk a distance more than one and half mile to school
5. About 10% of the area would be allocated to recreation and open spaces.
6. Through traffic would be confined to the peripheral streets.
7. The Internal streets should be limited to service access for residents of the neighborhood.
8. Shops would be located at road Intersections.

It was **Clarence Stein and Henry Wright** who determined the proper size of the neighborhood unit.

1. He made an elementary school the center of the unit and within half-mile radius of all residents in the neighborhood.
2. A small shopping center for daily needs is to be located near the school.
3. Most of the residential streets are suggested as cul-de-sac or dead end.
4. Streets to eliminate through traffic and park space flows through the neighborhood.
5. Three neighborhoods are grouped and served by a high school and one or two major commercial centers.
6. The radius of walking to these facilities being at the maximum of 1 mile.

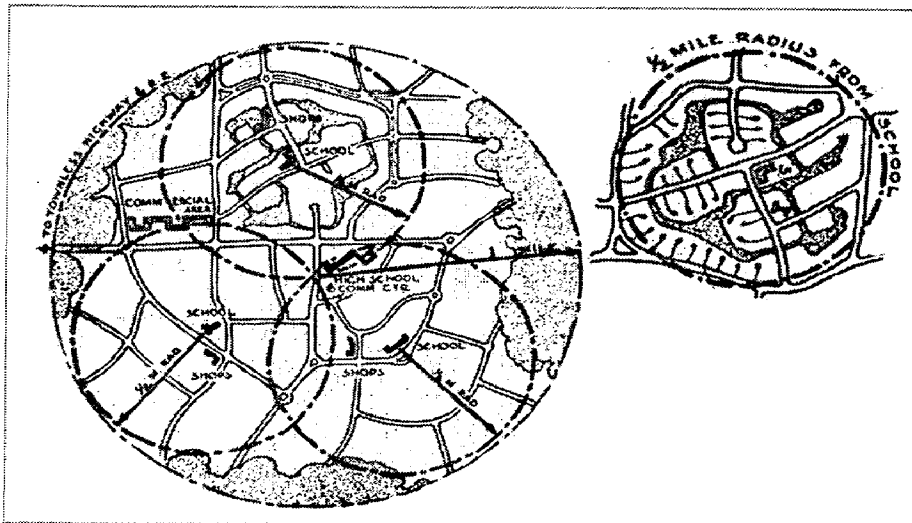


Plate 2.12: fig showing the conceptual plan of neighborhood planning.
Source: *Urban pattern*, Gallion Arthur B. & Eisner Simon

N.L. Englehardt, Jr. has presented a comprehensive pattern of the neighborhood as a component of the successfully larger segments in a City structure.

1. The neighborhood unit includes the elementary school, a small shopping district and a playground.
2. The facilities are grouped near the center of the unit so that walking distance between them and the home does not exceed on half mile.
3. An elementary school with a standard enrollment of between 600- 800 pupils will represent a population of about 1700 families in the neighborhood unit.

4. Two such units (3400 families) will support a Junior high school with a recreation center at the conjunction.
5. Four such units will require a senior high school and a commercial center.
6. It will also be appropriate sizes for a major park and recreation area.
7. This forms a community with a population of about 24000 people.
8. The population range of the unit differs from country to country in the Indian context it could be taken as 3500-5000 persons.
9. The neighborhood unit is made the smallest unit for new town planning to stimulate community life.
10. This form a part of the next larger unit called a sector.
11. Several such sectors from a town.
12. The facilities at each level are provided depending upon the threshold population and the accessibility.
13. The segregation of the pedestrian and vehicular traffic is another important aspect to be considered for planning a new town.

FINDINGS & RECOMMENDATIONS:

Neighborhood concept is the best concept for community planning; it should be adopted in each and every city to make the various parts of the city, and the city as a whole self sufficient in catering to the needs of people living there.

2.4 URBAN STRUCTURE OF SETTLEMENTS IN CITIES [5]

Urban structure is the arrangement of land use in urban areas. Sociologists, economists, and geographers have developed several models, explaining where different types of people and businesses tend to exist within the urban setting. Three models are described below:

2.4.1 CONCENTRIC ZONE MODEL

This model was the first to explain distribution of social groups within urban areas. It was created by sociologist Ernest Burgess in 1923.

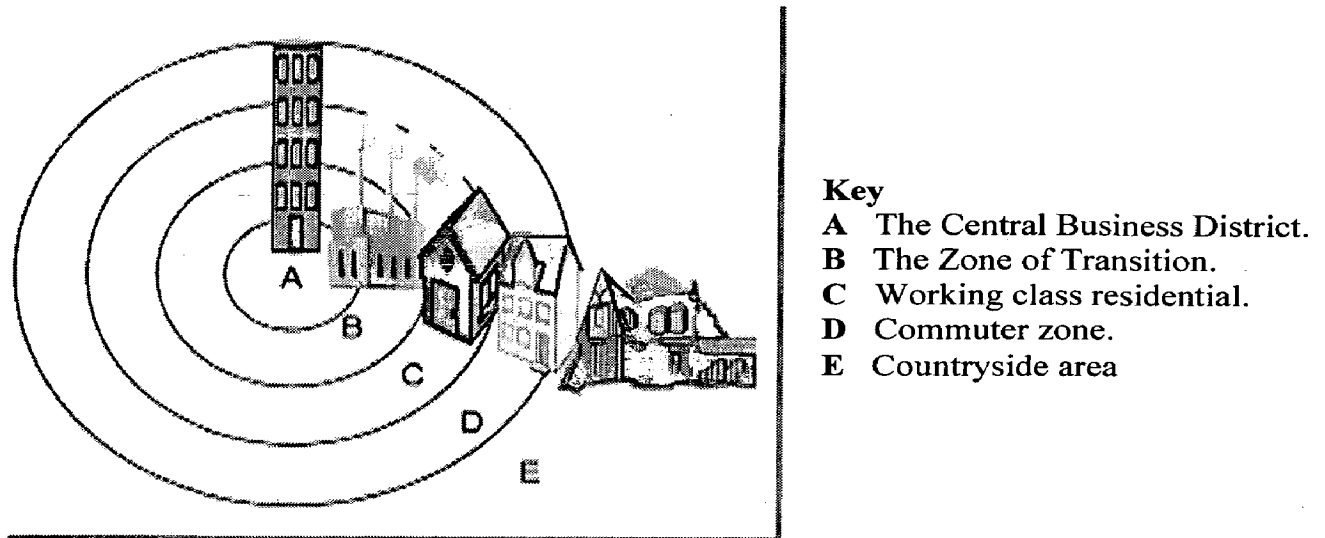


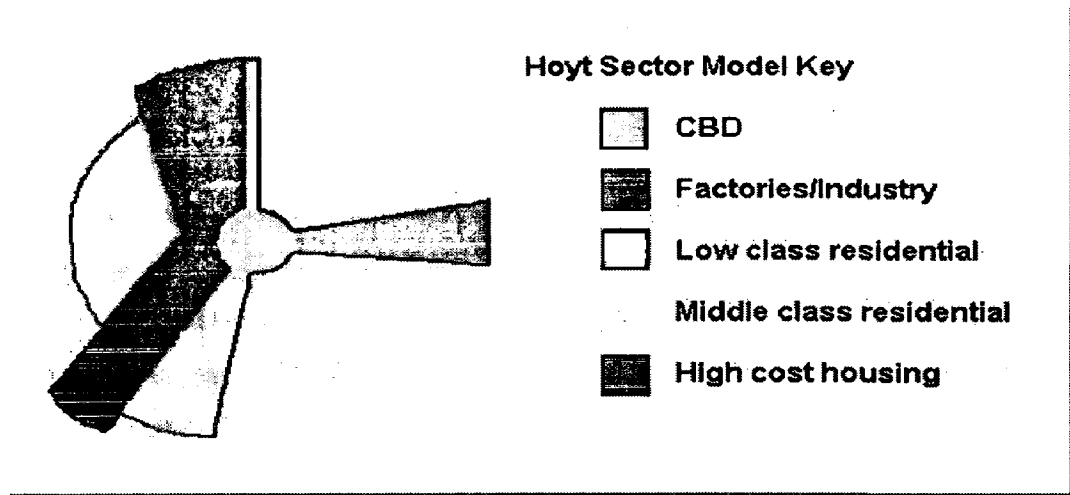
Plate 2.13: fig showing the concentric zone model of urban structure.
Source: www.wikipedia.com.

According to this model, a city grows outward from a central point in a series of rings. The innermost ring represents the central business district. It is surrounded by a second ring, the zone of transition, which contains industry and poorer-quality housing. The third ring contains housing for the working-class and is called the zone of independent workers' homes. The fourth ring has newer and larger houses usually occupied by the middle-class. This ring is called the zone of better residences. The outermost ring is called the commuter's zone. This zone represents people who choose to live in residential suburbs and take a daily commute into the CBD to work.

2.4.2 SECTOR MODEL

A second theory of urban structure was proposed in 1939 by an economist named Homer Hoyt. His model, the sector model, proposed that a city develops in sectors instead of rings. Certain areas of a city are more attractive for various activities, whether by chance or geographic and environmental reasons. As the city grows and

these activities flourish and expand outward, they do so in a wedge and become a sector of the city.

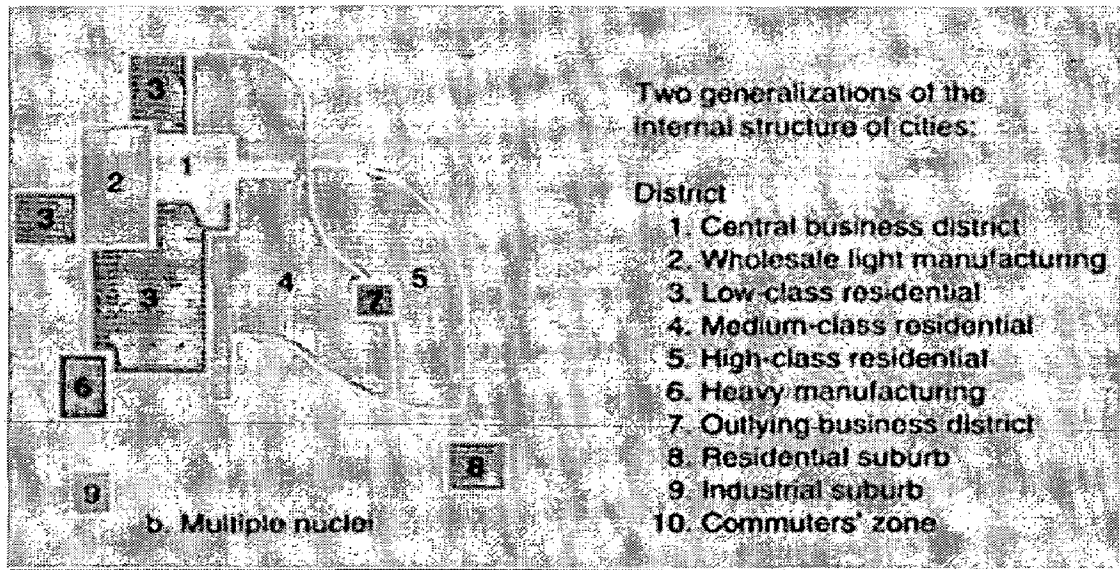


*Plate 2.14: fig showing the sector model of urban structure.
Source: www.wikipedia.com.*

Hoyt theorized that cities tended to grow in wedge-shaped patterns -- or sectors -- emanating from the central business district and centered on major transportation routes. Higher levels of access meant higher land values, thus, many commercial functions would remain in the CBD but manufacturing functions would develop in a wedge surrounding transportation routes. Residential functions would grow in wedge-shaped patterns with a sector of low-income housing bordering manufacturing/industrial sectors (traffic, noise, and pollution makes these areas the least desirable) while sectors of middle- and high-income households were located furthest away from these functions.

2.4.3 MULTIPLE NUCLEI MODEL

Geographers C.D. Harris and E. L. Ullman developed the multiple nuclei model in 1945. According to this model, a city contains more than one center around which activities revolve. Some activities are attracted to particular nodes while others try to avoid them. Incompatible land use activities will avoid clustering in the same area, explaining why heavy industry and high-income housing rarely exist in the same neighborhood.



*Plate 2.15: fig showing the multi nuclei model of urban structure.
Source: www.wikipedia.com.*

FINDINGS & RECOMMENDATIONS

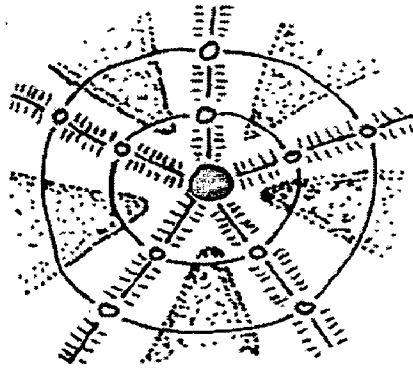
These models are helpful in understanding the settlement structure in cities, and help accordingly in planning. As we understand by these models that what are the trends and priorities people are following in a city for their home – work – recreation.

2.5 URBAN MODELS FOR THE GENERAL PATTERN OF CITIES [6]

Urban growth is a very complex phenomenon, several models based on the general pattern of the cities, which often play a very important role in deciding the growth pattern and the direction of growth in towns and cities have been discussed below:

2.5.1 THE STAR

According to this view, the best possible form for any city is a radial star or “asterisk”. There should be a single dominant center, of high density and mixed use, from which four to eight major transportation lines radiate outwards.



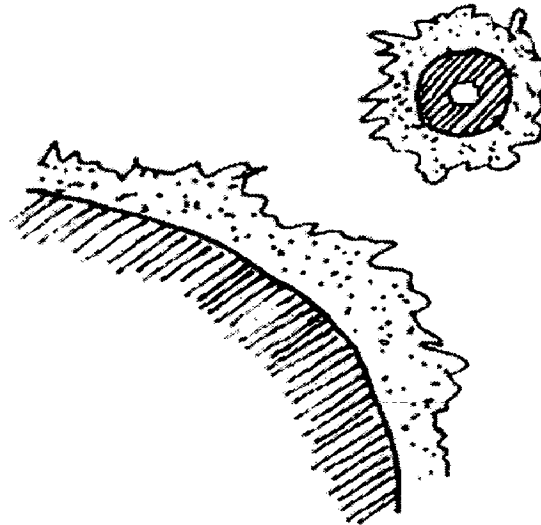
*Plate 2.16: fig showing the star pattern of city form.
Source: A theory of good city form, Lynch Kevin*

These lines would contain mass transit systems, as well as the main highways. Secondary centers are disposed at intervals along these lines. Less intensive uses occupy bands farther back from the main radials, and open green wedges take up the remaining space between the fingers of development.

The most systematic exposition of this idea can be found in Hans Blumenfeld's "theory of city form, past and present." It was the basis for a plan of Washington, and also for a famous plan for Copenhagen. The general plan of Moscow is also based on this.

2.5.2 SATELLITE CITIES

Not unrelated to the star is the concept of satellites: the idea that a central city should be surrounded, at some distance, by a set of satellite communities of limited size. The limitation of the settlement size is basic to the idea: cities which grow beyond a certain size are presumed to be less efficient, and also of poorer quality. The central city should be held to its present size, and the satellites should be designed to contain some optimum population. Satellites are separated from mother city by broad stretches of rural land, and are themselves surrounded by greenbelts.



*Plate 2.17: fig showing the satellite pattern of city form.
Source: A theory of good city form, Lynch Kevin*

The classic exposition of this idea was in Ebenezer Howard’s “Garden cities of tomorrow”, in 1898. But the idea has been transmitted to all over the world, and has been a basis of famous new town program of the Great Britain.

2.5.3 THE LINEAR CITY

The concept of a linear city has repeatedly unfortunate as a new theoretical idea, but has rarely been applied. The form is based on a continuous transport line, along which front all the intensive uses of production residence, commerce and service. Less intensive uses occupy parallel bands of space to the rear. Moving away from the line, one soon reaches rural open space. Such linear settlements can extend from one old city to another, over great distances, according to the terrain.

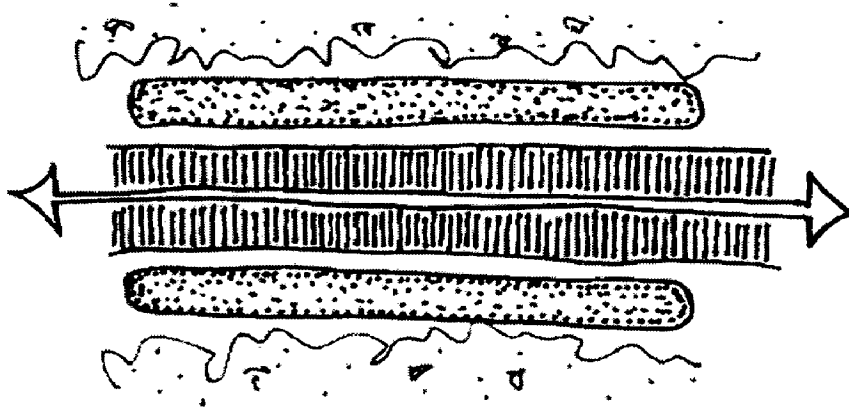


Plate 2.18: fig showing the linear pattern of city form.
Source: *A theory of good city form*, Lynch Kevin

It was first proposed by Arturo Soria y Mata in 1882 in Madrid, later this concept was adopted by Le Corbusier in France, and Frank Lloyd Wright's Broad acre city is fundamentally a linear organization.

2.5.4 THE RECTANGULAR GRID CITY

The essential idea is quite simple: a rectangular net of roads divides the urban terrain into identical blocks, and can be extended in any direction. Ideally, the form has no necessary boundaries and no central points. Any use can occur anywhere, since all points are equally accessible, and all plots have the same shape. The grid has been favored for two contradictory purposes: either to insure central control and express magical perfection, or to support an individualistic, egalitarian society.

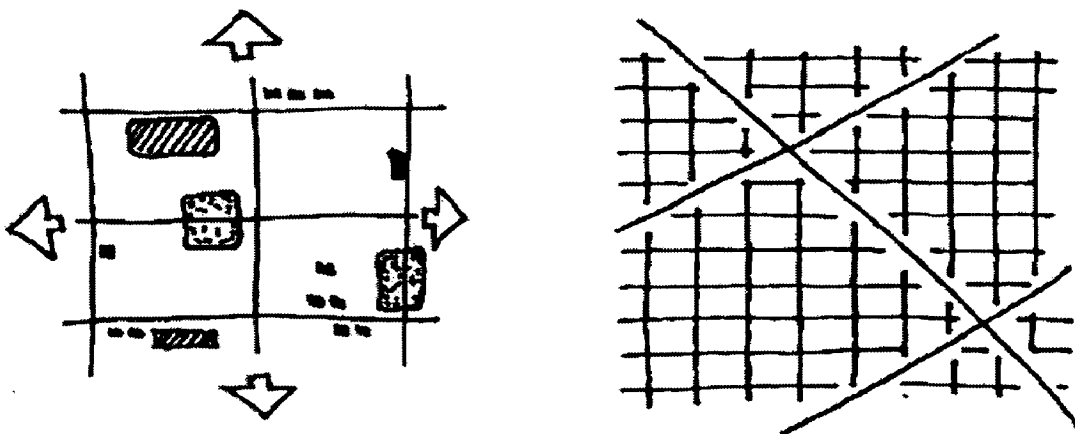
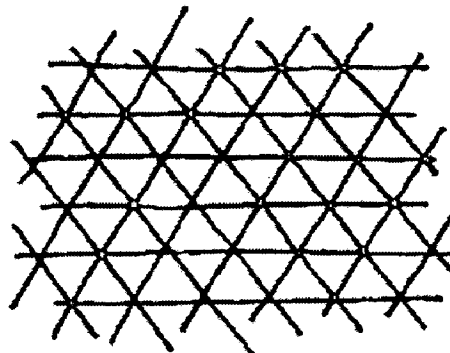


Plate 2.19: fig showing the rectangular grid pattern of city form.
Source: *A theory of good city form*, Lynch Kevin

The grid form has been used since antiquity both in magical, cosmic cities, such as in China and Japan, and in more pragmatic colonial foundations, as in Greece, medieval Europe, and Spanish America. The grid layout guided the planning of the latest of the English new towns: Milton Keynes.

2.5.5 OTHER GRID FORMS

Non-rectangular grids are theoretically important, if of less practical value. The triangular grid has been proposed because it is a regular lattice which adds two more directions of through movement to the four afforded by the rectangular lattice. This is at times modified to give a hexagonal network. However intriguing as a geometrical concept, this nonrectangular lattices produce awkward intersections and awkward building plots. They have only rarely been applied. The layout of New Delhi is one example.



*Plate 2.20: fig showing the irregular grid pattern of city form.
Source: A theory of good city form, Lynch Kevin*

FINDINGS & RECOMMENDATIONS

As in this case we know the greater Ranchi is an extension of the existing town, so the concept of satellite town will be best suitable. But for further details in planning of the city center and roads a mixture of all the above concepts can be taken. Placing the city center at the center and all the roads emerging from there n going into different parts. For the planning of roads, grid iron pattern is the best suitable. But ultimately overall framework of the city will depend on the availability of land, because it is one of the major constraints in deciding the overall form of the city.

2.6 URBAN GROWTH PATTERNS IN CITIES [7]

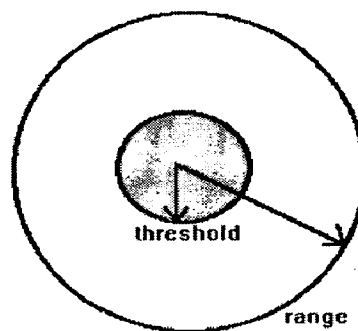
Urban growth is a very complex phenomenon, and economics plays a very important role in deciding the growth pattern and the direction of growth in towns and cities. Knowledge regarding its nature and various other aspects has been taken from the various disciplines. Some of the points are discussed here –

2.6.1 CENTRAL PLACE THEORY BY WALTER CHRISTALLER

Central Place Theory (CPT) is an attempt to explain the spatial arrangement, size, and number of settlements. The theory was originally published in 1933 by a German geographer Walter Christaller. By examining and defining the functions of the settlement structure and the size of the hinterland he found it possible to model the pattern of settlement locations using geometric shapes.

The theory consists of two basic concepts:

Threshold -- the minimum population that is required to bring about the provision of certain good or services.



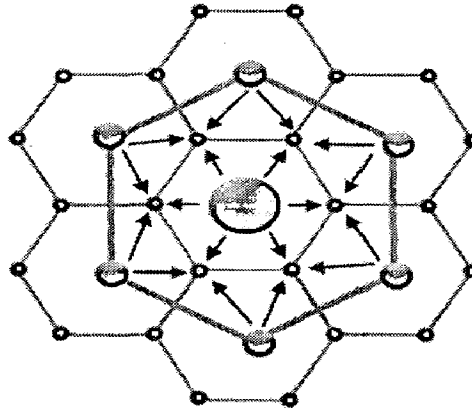
*Plate 2.21: fig showing the range of a settlement.
Source: www.wikipedia.com.*

Range of good or services -- the average maximum distance people will travel to purchase goods and services. From these two concepts the lower and upper limits of goods or services can be found. With the upper and the lower limits, it is possible to see how the central places are arranged in an imaginary area.

The three principles in the arrangement of the central places

1. The marketing principle (K=3 system)

The different orders of settlements arrange themselves in a hierarchy. Generally speaking lower is the order; larger is the number of settlements and higher the order, greater is the area served.



*Plate 2.22: fig showing the k3 model of central place.
Source: www.wikipedia.com.*

One high order central place is serving three (including itself) of the next lower order central places. The relationship of the market area between a lower order center and the centers of the higher level can also be indicated by the value 3.

2. The transportation principle (K=4 system)

The traffic principles states that the distribution of central places is most favorable when as many important places as possible lie on one traffic route between two important towns, the route being established as straightly and as cheap as possible. The more unimportant places may be left aside. According to the transport principle, the central places would thus be lined up on straight traffic routes which fan out from the central point.

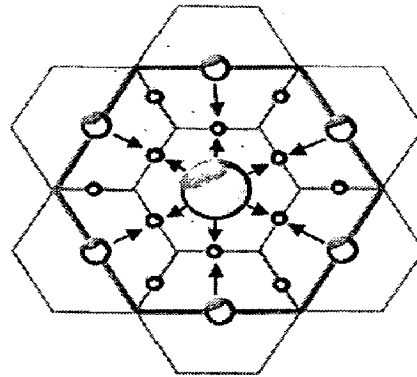


Plate 2.23: fig showing the k_4 model of central place.
Source: www.wikipedia.com.

When Central places are arranged according to the traffic principle, the lower order centers are located at the midpoint of each side of the hexagon rather than at the corner. Thus the transport principle produces a hierarch organized in a $k=4$ arrangement in which central places are nested according to the rule of four.

3. The administrative principle (K=7 system)

Christaller's other suggested organizing principle was based upon the realization that from a political or administrative viewpoint centers it was unrealistic for centers to be 'shared'. Any pattern of control which cuts through functional units is potentially problematical. Christaller suggested that an arrangement whereby lower order centers were entirely within the hexagon of the higher order center would obviate such problems. Such a pattern is shown in the following diagram:

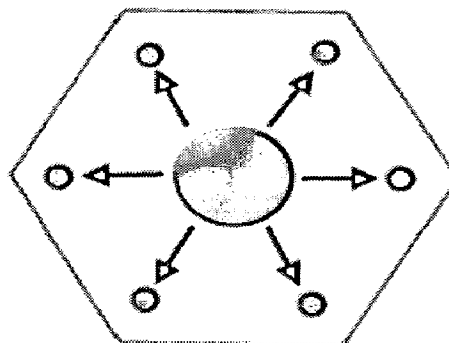


Plate 2.24: fig showing the k_7 model of central place.
Source: www.wikipedia.com.

All the six lower order centers are fully subordinate to the higher order center which, therefore, dominates the equivalent of seven market areas at the next lowest level.

FINDINGS & RECOMMENDATIONS

The theory helps in understanding the various levels of central places and their functions, further it will help in planning the city in regional level, by connecting it to some of the major central places for overall growth and development.

2.7 PLANNING AND DESIGN PARAMETERS FOR NEW TOWN [8]

2.7.1 FACTORS AFFECTING THE SIZE OF NEW TOWN

- i) Residential areas has to be within walking distance or cycling distance from the work places such as Industrial area, town centre with shopping and other facilities. This will minimize the need of local transport.
- ii) Contact with country-side is essential.
- iii) The new town should stand out from the country-side and yet be complimentary to it. A compact linear town with major open spaces peripheral to it creates its own green belt and achieve contrast between harder urban landscape and softer landscape of countryside.
- iv) Physical characteristics of the region and the existing land-use will often the limit, the extent of the land area and hence the size.

2.7.2 PHYSICAL FEATURE AFFECTING THE CHOICE OF SITE

- i) There must be water supply that does not have to be brought from a long distance at great expenses and that will yield enough water for ultimate needs of the town throughout year.

- ii) Site must be capable of being drained and sewered at reasonable cost. Avoid flood areas, water logged or undrainable land, particularly within the building areas.
- iii) Subsoil and water level must be favorable to healthy living conditions and should not involve excessive cost in building or laying underground services.
- iv) A site must not be selected which would sterilize a large part of catchment area and interfere with the regional water-supply.
- v) Slightly undulating sites are preferable than flat, frequently enabling beauty and interest to develop in a more individual way Excessive hilliness makes for inconvenient road gradients and uneconomical cuts and fills.
- vi) Avoid first class agricultural land. Hilly sites which are poor for farming may be satisfactory for gardening if well rammed.
- vii) Maintain areas of great natural beauty and historic interest near the town.
- viii) Avoid setting of new town near surface working, excessive dust and smoke or smell.
- ix) Avoid land bearing important mineral deposits and land liable to subsidence and marshy land.
- x) Site on a through railway line is preferable.
- xi) The new town must be linked up with the regional and with national arterial road system. These roads should skirt the town in green belt.

2.7.3 DISTANCE FROM EXISTING TOWN

- i) The optimum distance depends entirely on the individual case and its position in the regional pattern. Generally the distance of 15km to 25 km is recommended.
- ii) With good rail and road communications 50 to 60 km is reasonable.
- iii) The distance from the metropolitan city should not be so great that the new town lose the advantages of metropolitan city's variety of specialized facilities (employment, educational, recreational).
- iv) Nor the new town has to be so close so as to encourage daily travelling for employment or residence.

2.7.4 TOWN CENTRE

- i) A linear form has to be adopted for the town centre to allow maximum number of pedestrians and vehicles to be accessible than radial concept.
- ii) It is the centre of administration, business, entertainment and culture. It should be planned on the basis of series of precincts of various zones such as entertainment, public buildings, government buildings, business zone and residential zone with local shopping together with continuous regional shopping and dominated by network of pedestrian circulation.

2.7.5 HOUSING

- i) The residential area to be planned in the form of concentric rings increasing in high density between two to five storey and concentration of buildings towards centre.
- ii) Provision of local shopping with primary school, social and cultural buildings with multi-functional activity space to form nucleus of the high density residential areas.
- iii) A cluster of 50 to 100 dwellings has to be arranged to facilitate face to face contacts among the residents and to foster the social life.
- iv) Several such clusters together with local shopping with primary school, health centre, social and cultural buildings with common multifunctional activity space for different age groups are to be provided.
- v) The areas away from the work places, in selected areas close to the town's natural beauty, etc can be planned for the communities of high income groups at low density.
- vi) In the residential area there is a need to plan housing requirements of different size of households for different income groups based on the initial immigrants and their growth.
- vii) The Radburn principal should be adopted in designing of super-block (sector). In essence this consists of a number of culde- sacs access housing groups

linked by a central pedestrian way to local shops, primary school, social buildings and defined by major road forming super-block.

- viii) The size of 0.8 km x 0.4 km including the spaces for social functions can facilitate easy walking distance for children.

2.7.6 ROAD SYSTEM

Classified according to the primary function:

- i) National roads: These are motorways for medium and long journeys. These roads to be connected to the town in green belt in the manner to by pass all through traffic.
- ii) Regional roads: State roads - These are primarily for journeys between neighboring settlements to provide link between the town and the motorways.
- iii) Internal roads: These are for internal circulation within the town. They consist of town roads (major arteries within the town) distributor roads (in residential areas, industrial areas and the central area) and the service roads (for access to the properties).
- iv) The main roads within the town for mixed traffic to be oriented
 - a. To encourage breeze directions
 - b. To avoid afternoon sun while commuting.
- v) The linear shape of the town is excellent for the public transport as it leaves no pockets unserved which is uncommon in radial shape. The distance need public transport not to be more than 5 minutes walk.

2.7.7 OTHER SERVICES

- i) New town is to be planned to provide for alleconomic, educational and cultural, social activities for the city and the surrounding region.
- ii) The necessary service infrastructure needs to be laid according to the physical layout so as to serve the town in efficient way and also to facilitate maintenance without disturbing city's normal life.

- iii) Use of built form to suit the climatic conditions including clear identification of public spaces, semi-public space and private spaces to reduce the maintenance and also increase social surveillance.

FINDINGS & RECOMMENDATIONS

These guidelines and parameters for designing the city give a basic framework, depending upon the situation and with some alterations can be adopted for designing the new towns.

2.8 CAPITAL CITIES - GROWTH CENTERS IN INDIA [9]

2.8.1 INTRODUCTION

Capital cities are said to be like a pivot of the state, where both the processes of convergence and divergence takes place in terms of political, administrative, judicial, executive, social and cultural functions.

Being the center of gravity the capital cities are also preferred in terms of resource allocation under various central and state sector schemes. The functional characteristics of capital city reveal another dimension of their growth pattern. Due to economy of scale and conglomeration of activities and services, the corporate sector, multinationals and the private sector also prefer capital cities from investment and business point of view. Generally the capital cities are considered administrative and service towns. The functional classification of capital towns as per 1991 Census indicates that slowly and steadily non-capital functions are making greater strides in the capital cities often imparting it a metropolitan character.

2.8.2 CLASSIFICATION OF CAPITAL CITIES IN INDIA

Capital cities in our country could be divided into three categories depending upon a variety of consideration:

1. **Category 1:** State capitals which have state or nation wide significance such as Mumbai, Calcutta. Delhi, Chennai, Bangalore, Hyderabad, Jaipur, Guwahati.
2. **Category 2:** State capitals which have equally large and powerful Industrial, metro centers within their states. Such as Gandhinagar-Ahmedabad, Bhopal, Trivandrum, Lucknow, Patna.
3. **Category 3:** Capital of north eastern states except Guwahati. Seat of power of smaller union territories, Chandigarh, Panaji, Shimla, Srinagar-Jammu, Gangtok.

2.8.3 POSSIBILITIES OF SETTING OF A CAPITAL

Taking the example of India, Delhi is the administrative capital of the country but the financial capital continues to be Mumbai Similarly, Washington DC is the administrative capital and New York being the commercial centre of United States of America. Sometimes it is even possible that all three functions legislative, executive and Judiciary may not be in the same capital location. As in Netherlands the head of Ottawa, Canberra and Ankara are of much less economic Importance than other cities in their respective countries. (Dwivedi R.L: 1993)

The state capital for a state In general is a principal city of the state both in Importance and in influence. The state capital should attempt to reflect at the highest level the culture of land. The process of synthesizing and portraying effectively the cultural heritage of the land requires a number of institutions, both public and private, which would need to be encouraged, supported and promoted by the state.

Further, the location of the capital should be such as to offer no constraints to the synthesizing and integrating processes mentioned above and in total way, the state

capital location should personify the people of the land who should be able to identify themselves wholly with their state capital in all respects (TCPO report: 1980)

There could be three possibilities of setting of new Capital in the state:

- i) Existing major towns/settlements
- ii) Adjacent to an existing important town
- iii) Virgin site

The capital could be sited within an existing town that fulfills the criteria. For example the capital of Himachal Pradesh, was located in existing city of Simla, in case of Bhubaneswar also the existing town was selected for the capital.

In many cases, the capital has been sited adjacent to an important town, fulfilling the criteria. This is most feasible solution considered nowadays by the planners because has several advantages of both an existing town as well as a virgin site. Such a solution is merely an expansion of the original town. The new site can even retain the name of the adjacent town. An example of this could be New Delhi as the national capital.

In the solution of a virgin site, a completely new site fulfilling the criteria is chosen, when the existing settlements fail to give a feasible solution. This has been done in case of Chandigarh and Gandhinagar.

2.8.4 ADVANTAGES AND DISADVANTAGES OF EXPANSION OF EXISTING TOWN OVER A VIRGIN SITE

There are several advantages of expanding an existing town to serve as the capital. The town would have come into existing over a period of time, and would have developed amenities and facilities. The existence of such facilities would make it easy for expansion or supplementing them to take care of new functions and additional population, which the location of state capital would bring in.

The town so selected must be having certain surplus facilities and amenities to serve as a capital but on the other hand, if the town does not have potential in terms of surplus and is already overloaded, suffering from shortages, the addition of capital functions and additional population to the town, would make the situation worse and prove to be advantageous (TCPO report, 1980).

Another argument to this could be that a small town could be expanded to house the capital functions and thereby serve as the capital location but a small would not have a surplus in terms of facilities that could be exploited for a capital location. It would be as good as providing these facilities afresh like that of a virgin town.

The choice depends on the potential of existing town the region in question and the trade off between preferences and cost. It will vary and needs appropriate judgment by the planner to access the situation in future.

2.8.5 FUNCTIONAL REQUIREMENTS OF A STATE CAPITAL

The application of the above mentioned criteria would be more useful in the light of the Capital requirement. A state capital has to provide appropriately for the legislative, executive and the Judicial functions of the state. Along with these functions, the residential quarters for the legislature, the ministers, the secretariat staff, the departmental heads and the entire government machinery has to be found together with adequate amenities (TCPO; 1980)

A capital with only one type of employment like government employment is not economically viable as it will be largely a spending unit. Therefore it will be necessary to incorporate supporting functions like commerce and industries as the productive sectors. The extent and the intensity to which these must be permitted in a region are entirely dependent on the type of development envisaged Heavy industries are not normally desirable in a State capital and account of environmental pollution that such industries cause. This would help to assure not only a degree of economic stability but also a more desirable and balanced social structure with one type of employment not being too dominant.

2.8.6 FUNCTIONAL CHARACTERISTICS OF STATE CAPITAL

Functional characteristics of state capitals reveal another dimension of their growth pattern. Capital Cities are considered as administrative and service towns, but experience shows that merely on the basis of service functions these cities cannot sustain, and have to have some basic economic functions Chandigarh and Gandhinagar are glaring examples.

The functional classification of capital towns as per 1991 Census Indicates that slowly and steadily noncapital functions are making greater strides in the capital Cities.

- i) The smaller capital towns of the eastern states were basically service towns but industrial and commercial activities are following very closely. The capitals Cities of Patna, Lucknow, and the newly built capital of Chandigarh. Gandhinagar and Bhubaneshwar are categorized as service towns but in these capitals, Industrial activities have of great importance.
- ii) The capital cities of Mumbai and Bangalore have been classified predominantly as Industrial Cities.
- iii) Some capital Cities are bi-functional towns having service as well as other important functions for instance Delhi, Bhopal, Guwahati and Pondicherry fall in the group service-cum-industrial. Service functions are more important.
- iv) While Hyderabad, Jaipur and Chennai are Industrial-cum-service towns. Industrial functions being more dominant.

2.8.7 GROWTH DYNAMICS OF CAPITAL CITIES

- i) Capital cities of India numbering 33 vary in size and functional characteristics.
- ii) There are 10 metropolitan cities which are functioning as capital Cities and few more capitals will soon achieve this status, e.g. Thiruvananthapuram and Srinagar.
- iii) The growth of population in some of the older metropolitan capitals such as Calcutta, Mumbai and Chennai, is lower than those metropolitan capital Cities which were assigned the capital functions after the formation of the states like Bangalore, Lucknow, Jaipur etc.
- iv) Other metropolitan capital cities of Delhi, Hyderabad and Bhopal have been experiencing a fairly higher growth.
- v) In the newly built capital cities of Chandigarh, Gandhinagar and Bhubaneswar, the growth of population was very spectacular and fast however in the last decades the rate growth has declined, still it was higher than national average.
- vi) The other capitals that of the north eastern states and the Union territories have lower growth rate than the national average and the state average.
- vii) It may infer from the growth pattern of the capital cities that large mega Cities functioning as state capitals have reached a state of saturation.
- viii) In other metropolitan capitals more growth is taking place and in the rest capitals having a population more than 5 lakhs, like Guwahati, Thiruvananthapuram and Srinagar, the growth curve may still rise upwards before stabilizing. In the smaller capital cities with a few exceptions the prevailing trends of urban growth may likely to continue in the years to come providing a pointer to the emerging development pattern in the future.

2.8.8 PROBLEMS OF THE CAPITAL CITIES:

In spite of capital cities being pampered cities they face numerous problems the problem varies from large mega capital cities to small capitals:

- i) Inadequacy of basic infrastructure, specialized services and facilities. Provision of both physical and social infrastructure has not kept pace with the ever-growing population of capital cities. Calcutta's growth has choked its arteries, Mumbai's expansion is making into the sea, and planned city of Chandigarh is showing signs of disorder. Chennai on the sea coast is facing acute shortage of portable water
- ii) In most historic capitals, the main capital functions have gone to sideline and other activities are booming and zooming.
- iii) The excessive congestion like proliferation of slum and squatter areas, inadequacy of basic services like water sanitation, health, social and cultural facilities and inefficient urban transport services are some of the problems these capital Cities are facing today
- iv) Talking of newly built capital cities the spurt of activities has taken over the place of basic infrastructure thereby creating a feeling of disorder and mismanagement. Originally these cities were developed as the executive cities, but later on when Industrial and other functions were added, they lost the planned semblance and continuity in development thereby giving a feeling of substandard development.
- v) In smaller state capitals where the capital functions and its related Infrastructure have yet to be established fully, are facing peculiar problems of adopting equitable space standards as prevalent in other major state capitals.
- vi) Lack of social responsibility, unemployment, and under employment, imposition of western concepts of design and planning in the indigenous setting of various regions, non-embedding of old and new urban form are some of the other common problems generally being faced in the capital cities.

2.8.9 DEVELOPMENT STRATEGIES FOR CAPITAL CITIES

A common strategy for the development of all the state capital is neither feasible nor practical. Some of the strategies adopted in India:

- i)** For large and mega capitals some of the capital functions are shifted to other Cities or new townships could be developed slowly for capital functions. Such trends are visible in many states where new townships have been developed adjacent to the historic cities or some of the state level functions have been partially shifted to other important towns. CIDCO township in Mumbai, Salk lake city in Calcutta. Noida near Delhi, Panchkula and Mohali along Chandigarh, Gandhinagar in close proximity to Ahmedabad are some of the examples which are sharing partially or fully the capital functions of the respective states.
- ii)** Another approach could be developing counter-magnets in the secondary cities for certain state level functions. Such an approach could be helpful in the balanced development of the respective region of the state
- iii)** Decentralization of capital functions particularly of metropolitan capital cities would be in line with the provision of the 74th constitution amendment act. A well articulated hierarchy of urban system needed to be developed in each state so that functions at various levels could be assigned to each human settlement, instead of directing all the efforts towards capital cities.
- iv)** In the newly built capital cities, the priority should be to enhance their image and serenity as per the plan stipulation. These capitals have a spectacular growth, which need to be given special attention, to check the fast impinging disorder. They should be treated as models of urban planning in their perspective region so as to draw meaningful lessons.
- v)** For development of state capitals regional approach by taking city-region into consideration need to be adopted. Action for delineating the city region for all the state capitals except some smaller capitals should be initiated in the right earnest.

- vi) For the augmentation of infrastructure facilities, resources available under various central and state sector schemes need to be pooled to follow a coordinated approach in development.
- vii) Multiplicity of agencies, generally overlapping in their operational Jurisdiction is responsible for the provision and maintenance of various facilities and services in these capital cities, often lacking in coordination.

There is a need to gear them towards developing as coordinating agencies. All such impediments need to be reviewed in the right earnest, so that capital cities could be managed in a rational manner.

FINDINGS & RECOMMENDATIONS:

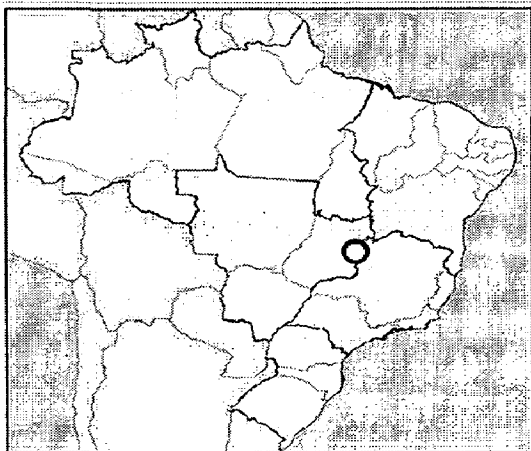
Before planning a capital town it is very important to understand the various functions and responsibilities that are assigned to the town, and then plan accordingly catering to the various needs. Because without studying these aspects the overall development of the town in an integrated manner will not be possible.

2.9 PLANNING STRATEGIES ADOPTED IN CAPITAL CITIES – “WESTERN CONTEXT”

To understand the planning strategies adopted for the development and planning of new metropolitan centers and capital cities, it would be essential to study the literature on some case examples of western countries that would help for further work.

2.9.1 BRASILIA [10]

a) INTRODUCTION



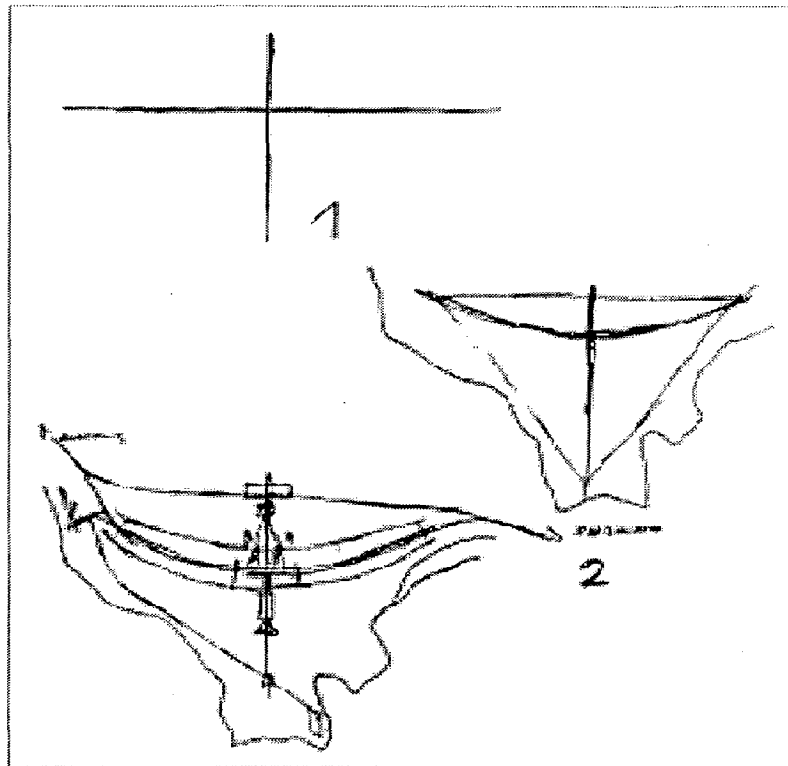
Town planner : Lucio Costa
 Area : 5802 Km²
 Population : 2 337 078 (2006)
 Population density: 407 /km²

*Plate 2.25: Map showing the location of Brasilia.
 Source: www.wikipedia.com.*

Brasilia was built to be Brazil's new capital city. Brazil had two capital cities before that: Rio de Janeiro and Salvador da Bahia. By transferring the capital city to the interior, the government intended to help populate that area of the country. President Juscelino Kubitschek ordered the construction of Brasília, fulfilling an article of the country's constitution stating that the capital should be moved from Rio de Janeiro to a place close to the center of the country. Lucio Costa won a contest and was the main urban planner. Oscar Niemeyer, a close friend of Lucio, was the chief architect of most public buildings and Roberto Burle Marx was the landscape designer. Brasília was built in 41 months, from 1956 to April 21, 1960 when it was officially inaugurated.

b) PHILOSOPHY OF TOWN

The Master Plan, initially in the shape of a cross, finally developed into a composite human form. The Plaza of three powers formed the head. A six - lane, limited - Access Boulevard, crossing the main monumental axis at right angles, the two arms accommodating residential super blocks. The torso is formed by the cultural and recreational areas which have theatres, cinemas, club, and restaurants. This area is for the leisure functions of the city and acts as the nucleus of the entire composition. It demanded a new space movement for pedestrians and this was provided through big plazas, paved walkways and parks enabling leisurely movement free from the din and pace of fast moving traffic.

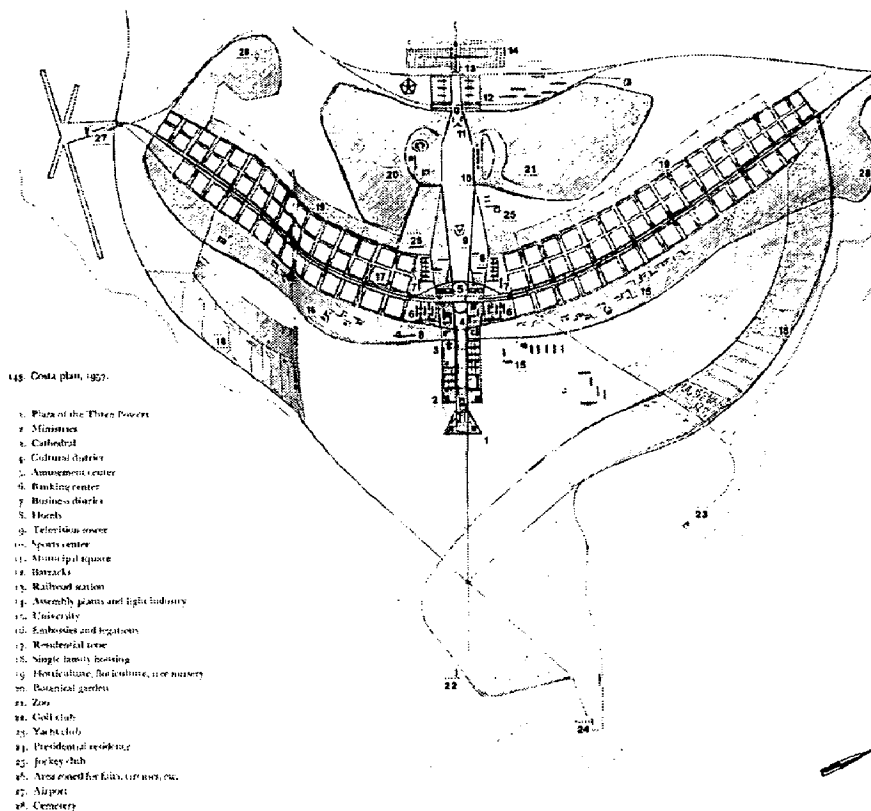


*Plate 2.26: Map showing the conceptual planning of Brasilia.
Source: Two Brazilian capitals, Evenson Norma*

c) PLANNING POLICY

- i) The Brasilia was designed for half million population with a series of satellite towns.
- ii) At present 2, 337, 078 (2006 data) people are living in Brasilia and many peoples are living in satellite towns.
- iii) Selection of site for new capital was political decision like other major capitals of the world.
- iv) The noticeable thing about this city was speed with which it was built in 3½ years, on a plateau at a height of 5,500 ft. No city in the world compares to this in terms of pace of construction.
- v) Around 2,600 sq. miles of land was acquired and 60,000 workers moved in on the building operation, round the clock.

MASTER PLAN OF BRASILIA



*Plate 2.27: Map showing the City plan of Brasilia.
Source: Two Brazilian capitals, Evenson Norma*

d) THE CAPITOL COMPLEX

Three Powers Square:

The seats of Legislative, Executive and Judiciary Powers are located around the square, making a nearly equilateral triangle.

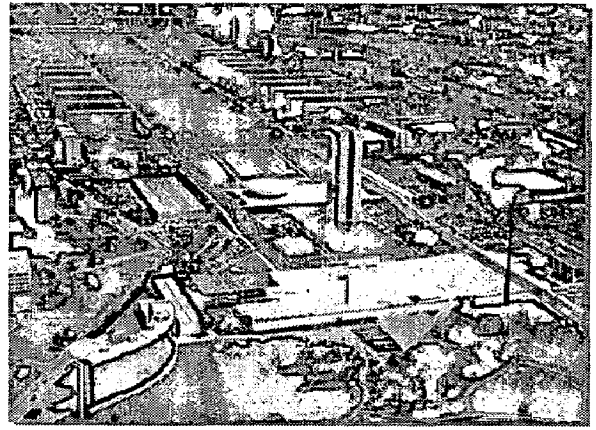
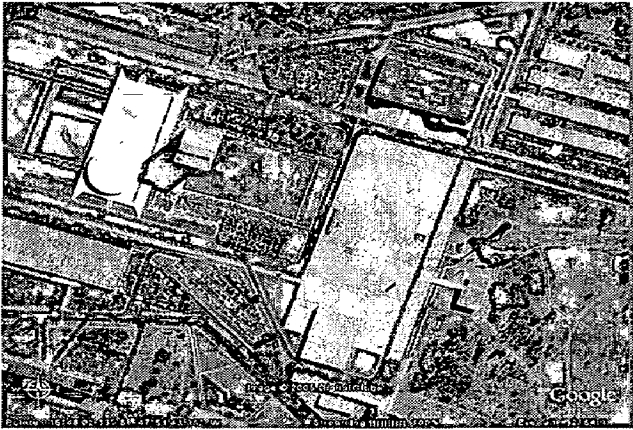


Plate 2.28, 2.29: Views of Capitol complex of Brasilia.
Source: www.wikipedia.com.

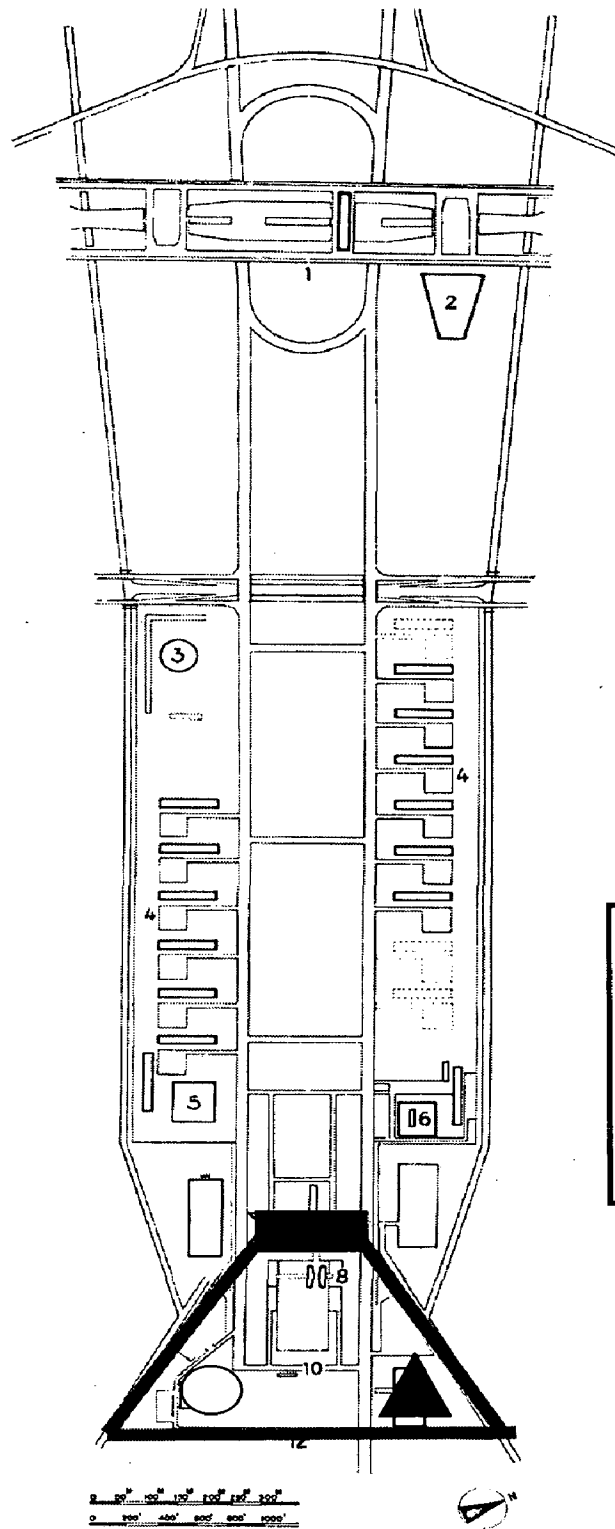
The two tall buildings in the middle of the photo are part of the Brazilian Congress. The visible white half sphere is voting chamber of the Deputies Chamber. There is also another half sphere (hidden behind the tall buildings) which is the voting chamber of the Brazilian Senate.

The flat building at the right border of the photo is the *Palácio do Planalto*, seat of the Executive Power. The President of the Republic and direct advisors work here; the residence of the President is in another Palace.

The flat building at the left side is the Supreme Court.

The two avenues lined with buildings are the two ways of the Monumental Axis. Each of the buildings is a Ministry. This sector of the Monumental Axis is called *Esplanada dos Ministérios*.

THE CAPITOL COMPLEX



212. Plan of the monumental axis.

- 1. Interchange
- 2. National Theater
- 3. Cathedral
- 4. Ministries
- 5. Itamarity Palace (Foreign Office)
- 6. Treasury
- 7. National Legislature
- 8. Secretariat
- 9. Supreme Court
- 10. Museum
- 11. Palace of the Planalto
- 12. Plaza of the Three Powers

Legend

- Brazilian congress
- Supreme Court
- Presidential building

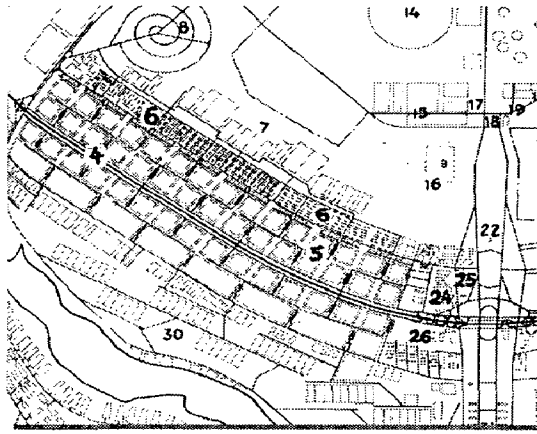
THE MONUMENTAL AXIS

*Plate 2.30: Map showing the Capitol complex of Brasilia.
Source: Two Brazilian capitals, Evenson Norma*

“Blue print for the New Capital Town – “Greater Ranchi - 2030”

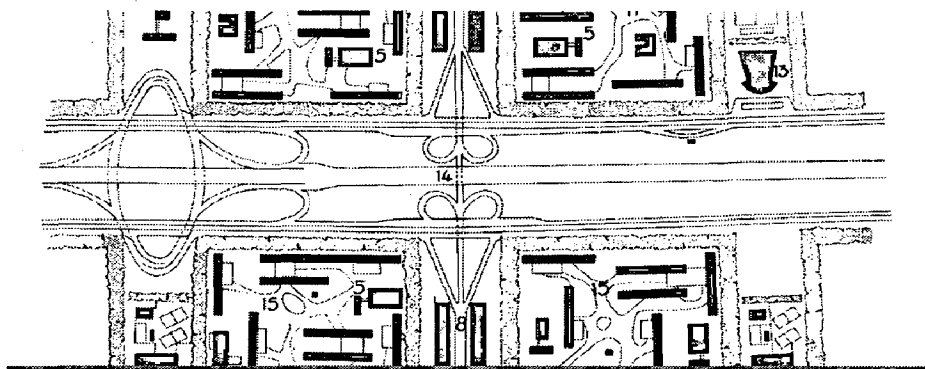
d) THE TRANSPORTATION NETWORK

- i) Two major axis crossing at right angles, the sign of cross itself.
- ii) Principles of modern road building techniques – including the elimination of intersections.



*Plate 2.31: Map showing the road pattern of Brasilia.
Source: Two Brazilian capitals, Evenson Norma*

- iii) Traffic going through to other sectors passes along the lower ground level under the platform in one-way lanes.
- iv) With the introduction of three separate clover-leaf turnoffs from each land of the highway axis and same no. of lower level crossing, automobiles and buses circulate both in central and residential sectors without any intersection.



*Plate 2.32: Map showing the road network of Brasilia.
Source: Two Brazilian capitals, Evenson Norma*

- v) Along with the general network of motorized traffic the separate areas are linked together to form a harmonious system.
- vi) An independent grid of safe transit footpaths for pedestrian was also provided.

“Blue print for the New Capital Town – “Greater Ranchi - 2030”

f) THE URBAN NETWORK

Emphasis on the other urban networks apart from the transport was not given much emphasis and has not been discussed in detail; some of the design considerations for these factors are as follows:

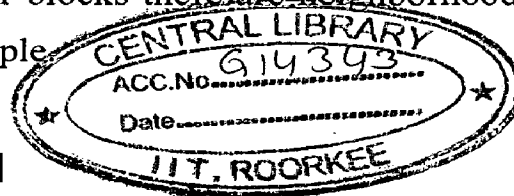
- i) It was stated that when the city will reach its final planned population of 5,00,000 then 500 liters of water a day will be available to each citizen.
- ii) For the commercial needs a chain of super-markets were planned in the city in American style, neighboring the residential areas.
- iii) For medical facilities very liberal standards were used, a central hospital with 470 beds for all specialists and district hospitals with 260 beds in each zone were provided.
- iv) Educational facilities were also provided in planned manner with due consideration.
- v) In planning the city ecological parameters were not given due consideration.

g) LAND USE - ZONING

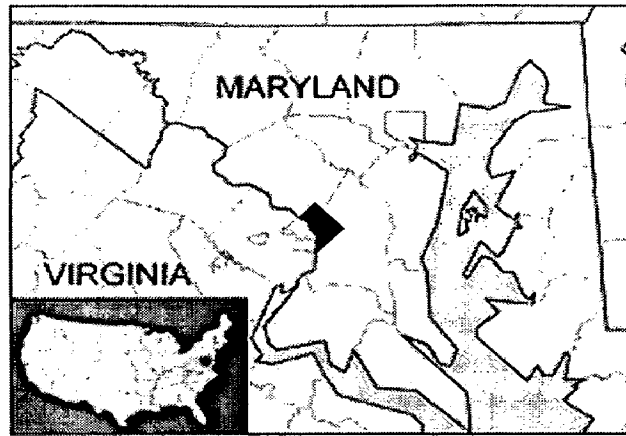
- i) Basically the whole city is divided in 2 major axis and all the areas are planned along these two major axis.
- ii) Along the main axis (vertical) starting from the one end all the government buildings, Supreme Court, ministries, embassies, and at the another end recreational spaces like theaters, cinemas, clubs and restaurants etc facilities have been provided.
- iii) These two different functions are separated with a huge green and open space in between.
- iv) Along the second major axis (horizontal), mainly residential zone has been provided ranging from the high density to low density as we move away from the horizontal axis.
- v) Residential area has been divided into different super blocks and each such block has its own school, bank, church, clinic, shops etc.

h) HOUSING

- i) The housing pattern of Brasilia was developed to provide for separate groupings of identical housing types, rather than for building mixtures.
- ii) In the plan of Brasilia it was decided that all sections of society should be live in super blocks, and these should be developed at various standards to cater for all classes.
- iii) The layout of the apartments within a super block was rectilinear placed at right angles to one another. Ranging from six stories high to two stories high, depending upon the class of people.
- iv) The climate of Brasilia seems to have no influence on the design of housing. Flats were oriented in any direction, without regard for sun.
- v) The major problem in this regard was the internal heat and glare due to extensive use of glass in the building facade.
- vi) Many of the residential blocks were lacking in natural ventilation. Balconies and terraces were seldom provided.
- vii) Except for the housing, the only buildings placed directly within the residential super blocks were elementary school and kindergartens.
- viii) Adjacent to the super blocks there are neighborhood shopping streets for the daily needs of the people.

**2.9.2 WASHINGTON D.C. [11]****a) INTRODUCTION**

Town planner : Pierre Charles L'Enfant
 Area : 177.0 Km²
 Population : 550,521 (2006)
 Population density : 3,597.3/km²



*Plate 2.33: Map showing the location of Washington D.C.
Source: www.wikipedia.com.*

Washington D.C. was designed as the capital town of America in 1790. The plan of Washington D.C. was given by Pierre Charles L'Enfant, a French architect. Attention was given to the choice of site, and was finalized under the influence of Gorge Washington; the location by the Potomac River was finally accepted. The planner's task was to design not only the largest of the American cities, but also present it in its form of development as an idealistic expression of governmental, cultural and civic distinction.

b) PHILOSOPHY OF TOWN

The philosophy behind the planning of Washington D.C. was a central controlling axis, to give the emphasis to capitol and president's residence. This idea came from the planning of Versailles. There are two major factors by which the design was influence and they are: the town and domain of Versailles and plan for rebuilding of London made by John Evelyn after the fire of 1666. L'Enfant drew up a basic plan for Washington, D.C. in 1791; the city layout owed much to the Baroque style, which was the dominant style in many North American and European planned cities of the day. The plan incorporated broad avenues and major streets which radiate out from traffic circles, providing vistas towards important landmarks and monuments. In Washington like Versailles the basic triangle is clearly marked. Pennsylvania Avenue being the hypotenuse, the mall being one of the legs and three corners are at the capitol, the white house and Washington monument.

c) PLANNING POLICY

- i) Attention was given to the choice of site, and was finalized under the influence of George Washington; the location by the Potomac River was finally accepted.
- ii) Influenced by the designs of several European cities and 18th century gardens such as France's Palace of Versailles, the plan of Washington, DC was symbolic and innovative for the new nation.
- iii) Only limited changes were made to the historic city-bounded by Florida Avenue on the north and the waterways on the east, west and south-until after the Civil War.
- iv) In the 19th century, and was codified in 1901 when the McMillan Commission directed urban improvements that resulted in the most elegant example of City Beautiful tenets in the nation.
- v) L'Enfant's plan was magnified and expanded during the early decades of the 20th century with the reclamation of land for waterfront parks, parkways, an improved Mall and new monuments and vistas.

MASTER PLAN OF WASHINGTON D.C.

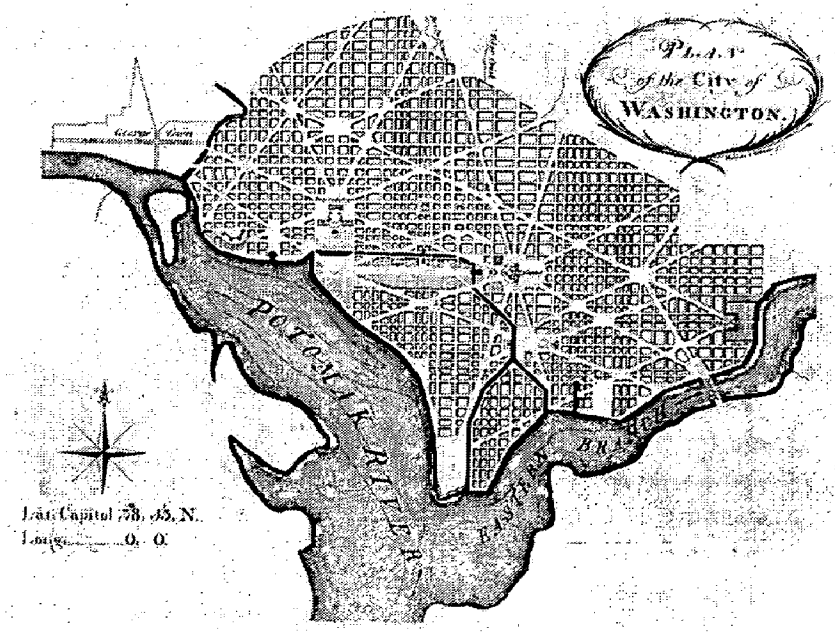


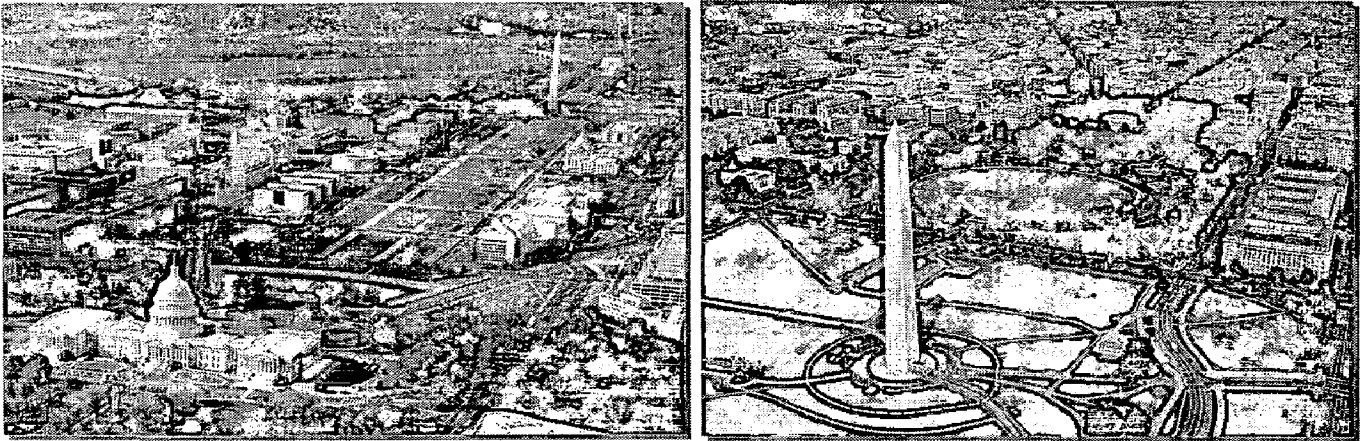
Plate 2.34: Map showing the city plan of Washington D.C.
Source: www.wikipedia.com.

“Blue print for the New Capital Town – “Greater Ranchi - 2030”

d) THE CAPITOL COMPLEX

The seats of Legislative, Executive and Judiciary Powers are located around the central axis, making a triangle.

The basic triangle which occupied the predominant position in L’Enfant design was situated on a relatively elevated flat ground. The position itself shows its importance of predominance.

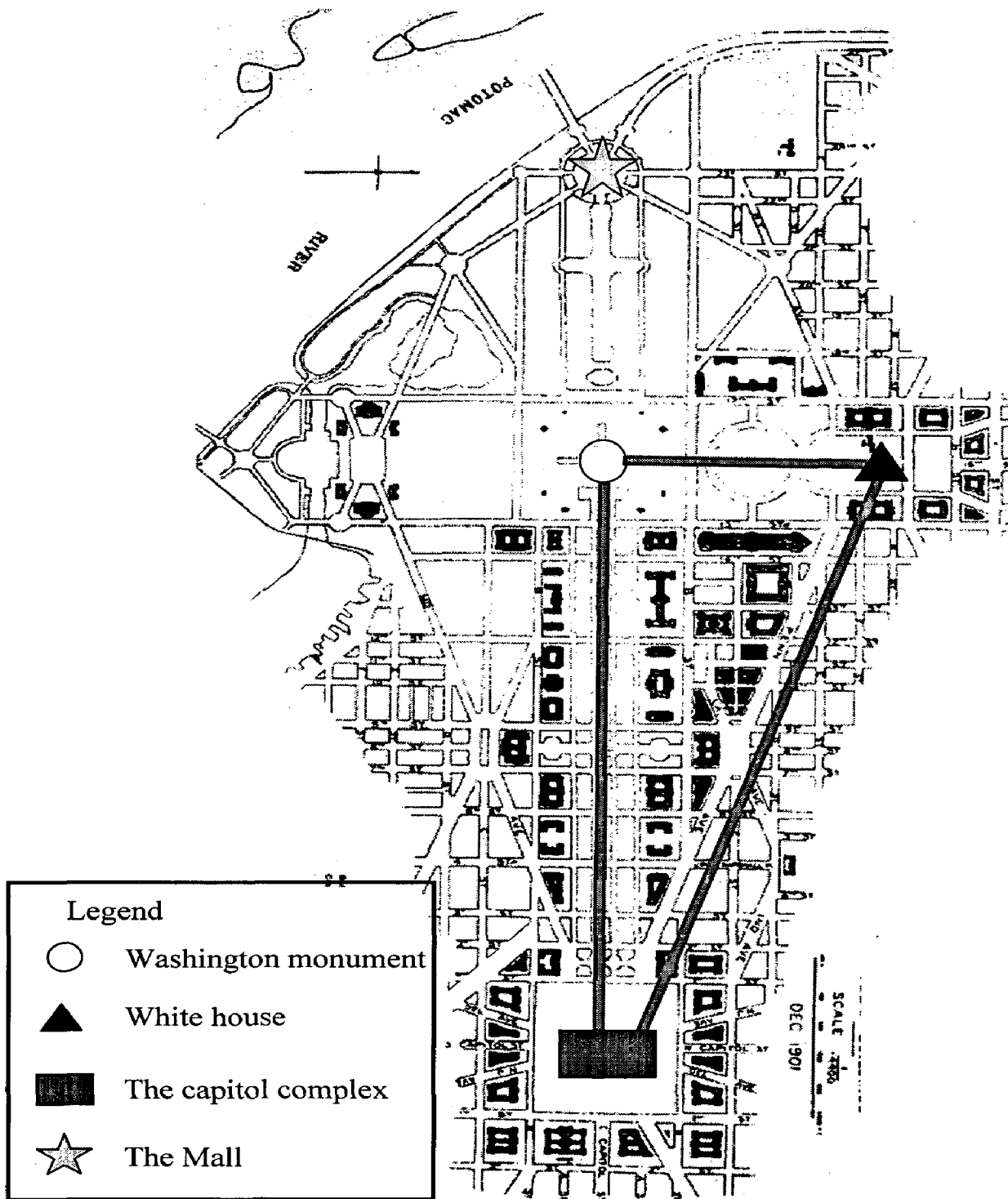


*Plate 2.35, 2.36: Views of the Capitol complex, Washington D.C.
Source: www.wikipedia.com.*

Pennsylvania Avenue being the hypotenuse, the mall being one of the legs and three corners are at the capital, the white house and Washington monument.

The huge avenue between the Washington monument and Capitol complex shows the monumental scale and a huge avenue connecting the Capitol and the white house is called Pennsylvania Avenue.

THE CAPITOL COMPLEX

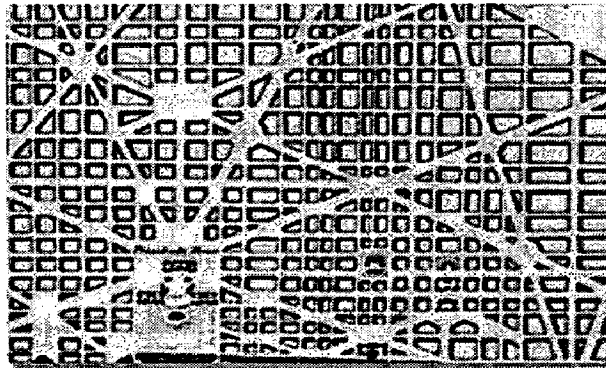


*Plate 2.37: plan showing the Capitol complex area, Washington D.C.
Source: Representing the states, Evenson Norma*

“Blue print for the New Capital Town – “Greater Ranchi - 2030”

e) THE TRANSPORTATION NETWORK

- i) The street pattern of Washington D.C. is diagonal and radial streets and superimposed on the chessboard type gridiron layout.
- ii) This plan by L'Enfant provided for an extended grid system of parallel and right-angled streets that divide the area into square and rectangular building plots.
- iii) The pattern so formed was crossed into varying directions by diagonals, the intersections of which were the opportunity for spatial extensions.
- iv) The other advantage of this type of street pattern is that it allows latitudes for local adjustments and ultimate extensions of the city, if needed.



*Plate 2.38: plan showing the road pattern of Washington D.C.
Source: www.wikipedia.com.*

- v) The practical disadvantages with this type of street pattern are the many inconveniently shaped plots, the dangerous traffic functions and the greater cost and maintenance.
- vi) An independent grid of safe transit footpaths for pedestrian was also provided.

f) THE URBAN NETWORK

- i) Washington was built as a canal city and also to make it one of the busiest ports and commerce cities of the world.
- ii) A series of market places were planned closely integrated with the canal.
- iii) Civic center was detached from the environment of the national government, and planned at the south of the Capitol.

g) LAND USE - ZONING

- i) The total area of the city was approximately 6,111 acres.
- ii) 3,606 acres (almost 59%) were used for streets
- iii) 541 acres were given for the public use.
- iv) Around 982 acres represented the plots sold by the government.

h) HOUSING

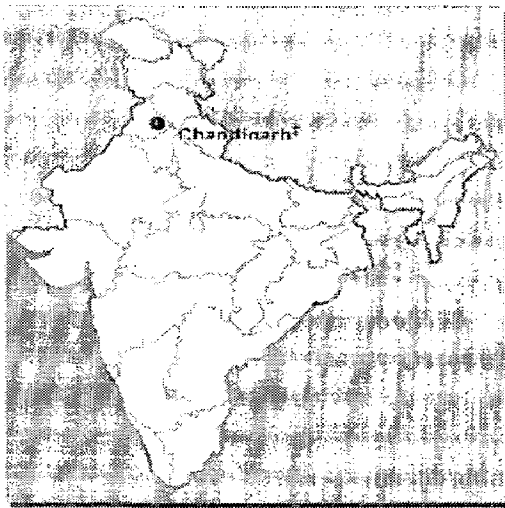
- i) The houses in Washington D.C. are in uniform rows in accord with the spirit of French civic art.
- ii) With respect to design of houses, Washington was quieter than present cities, its tempo was slower and in color and form it was better controlled.
- iii) The private buildings were low and the monumental buildings stood out in better contrast.

2.10 PLANNING STRATEGIES ADOPTED IN CAPITAL CITIES – “INDIAN CONTEXT”

To understand the planning strategies adopted for the development and planning of new metropolitan centers and capital cities, it would be essential to study the literature on some case examples of India as well that would help for further work.

2.10.1 CHANDIGARH [12]

a) INTRODUCTION



Town planner : Le Corbusier
 Area : 114 Km²
 Population : 900,635 (2001)
 Population density: 7900 /km²

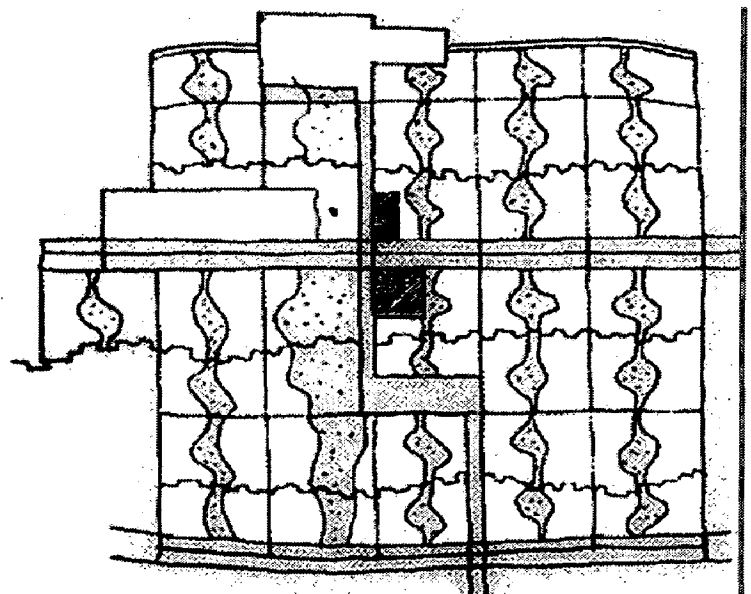
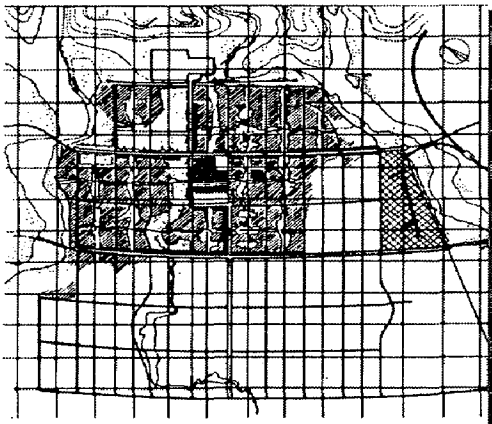
*Plate 2.39: fig. showing the location of Chandigarh.
 Source: www.wikipedia.com.*

In 1947, when India gained its independence, the western part of the Punjab, with its provincial capital Lahore was turned over to Pakistan. The eastern Punjab, in India, became a state without a capital. The immediate task was to provide shelter to those displaced from west Punjab within a permanent Capital. The idea of relocating the functions of a new capital in an existing town on a permanent basis was rejected. The main purpose of Chandigarh' was to establish a new capital for Punjab after the partition, designed by Le Corbusier in 1951. The town has been planned with an objective to accommodate the people, the administrative function, university function and industries with initial stage of plan for a population of 1,50,000 and final stage 5,00,000 population occupying 3.600 Ha of land situated at the foot of hill.

b) PHILOSOPHY OF TOWN

Le Corbusier introduced a biological element to the layout of the city. He regarded the plan as being similar to the human body. He had come across the figure of the Parushi of the Brahmins. The Capitol was to be the head of the body, the commercial center its heart, the industrial area its hand, and the intellectual center the parkland, the location of museums, university and library.

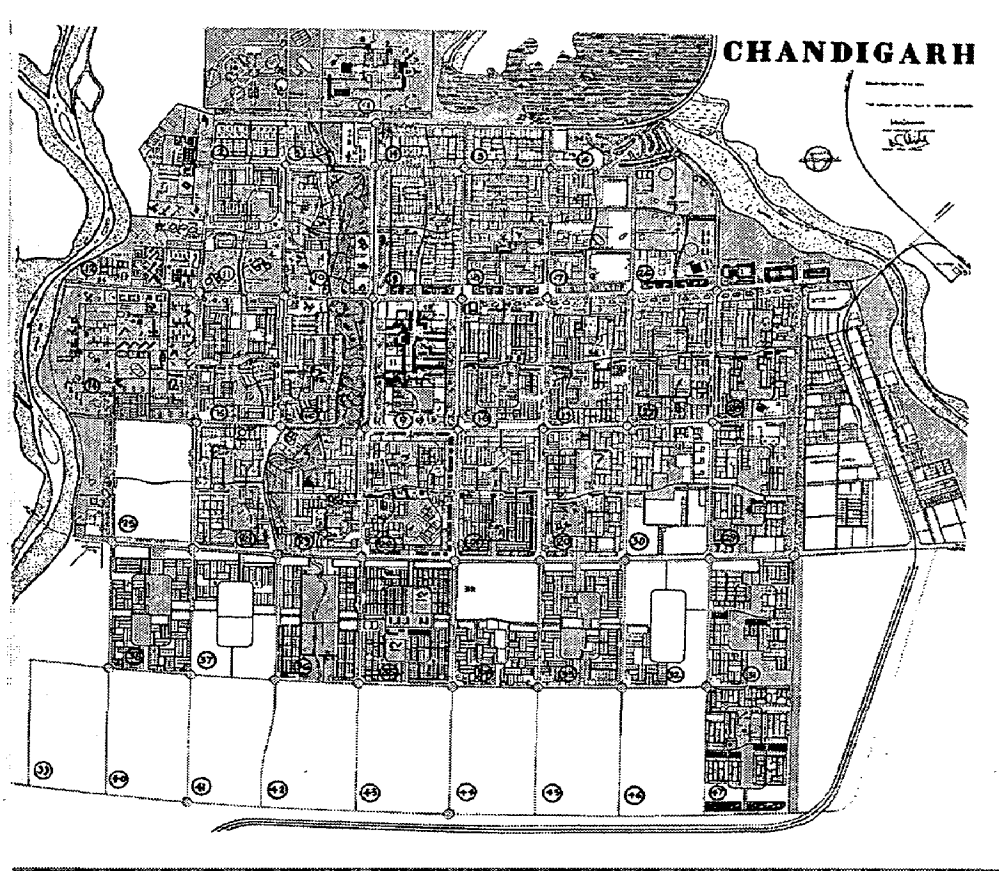
The plan is a huge grid-iron of major roads dividing city into 48 (neighborhoods) sectors each being 0.8 km x 1.2 km. Most of these sectors are designed on the principles of neighborhood unit with schools and central bazaar street within walking distance. These sectors are linked with continuous open space finally terminating to the capital complex.



*Plate 2.40, 2.41: plans showing the conceptual city plans of Chandigarh.
Source: Chandigarh's Le Corbusier, Prakash Vikramaditya*

c) PLANNING POLICY

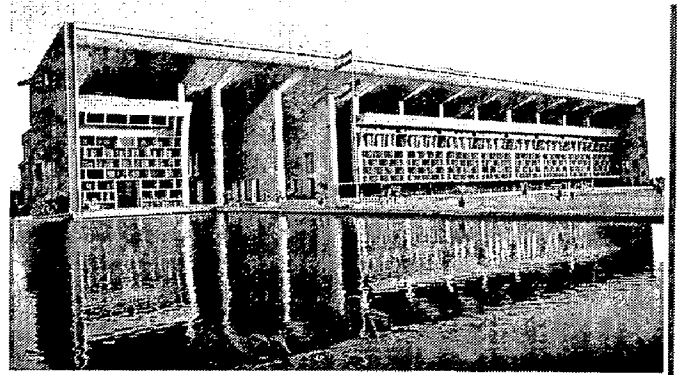
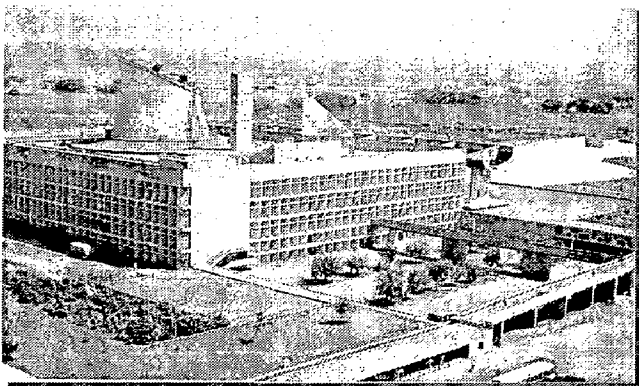
- i) The new capital required a secure and central location, easily accessible from all parts of the state.
- ii) The site had to accommodate an initial population of 150,000 (ultimately 500,000).
- iii) It had to be away from existing towns, with an adequate supply of water, easy drainage, and a suitable climate.
- iv) The flat and gently sloping site is located between two seasonal rivers, Patialiki Rao and Sukhna Choe, some 8 km apart, with sufficient altitude to cope with the worst summer heat.
- v) The urban form of Chandigarh is a tidy checker board pattern, adapted to the particular attributes of the site, resulting in a distinctive distribution of functions and a hierarchy of roads.
- vi) The primary module of city's design is a Sector, a neighborhood unit of size 800 meters x 1200 meters.
- vii) It is a self-sufficient unit having shops, school, health centers and places of recreations and worship.
- viii) The population of a sector varies between 3000 and 20000 depending upon the sizes of plots and the topography of the area.
- ix) The shops are located along the V4 street (shopping street), which runs North-West to South-East across the sector. Every sector is introvert in character and permits only 4 vehicular entries into its interior.

MASTER PLAN OF CHANDIGARH

*Plate 2.42: Map showing the city plan of Chandigarh.
Source: Chandigarh's Le Corbusier, Prakash Vikramaditya*

d) THE CAPITOL COMPLEX

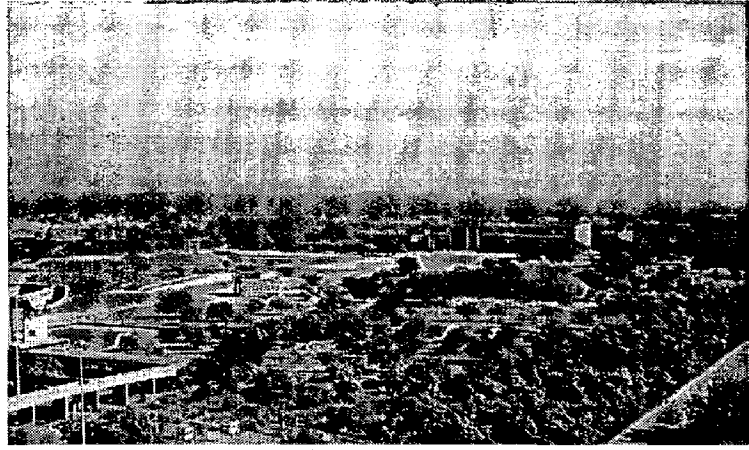
The Capital complex comprises three architectural masterpieces: the "Secretariat", the "High Court" and the "Legislative Assembly", separated by large piazzas.



*Plate 2.43, 2.44: Views of the Assembly and high court, Chandigarh.
Source: Chandigarh's Le Corbusier, Prakash Vikramaditya*

“Blue print for the New Capital Town – “Greater Ranchi - 2030”

In the heart of the Capital Complex stands the giant metallic sculpture of The Open Hand, the official emblem of Chandigarh, signifying the city's credo of "open to given, open to receive".



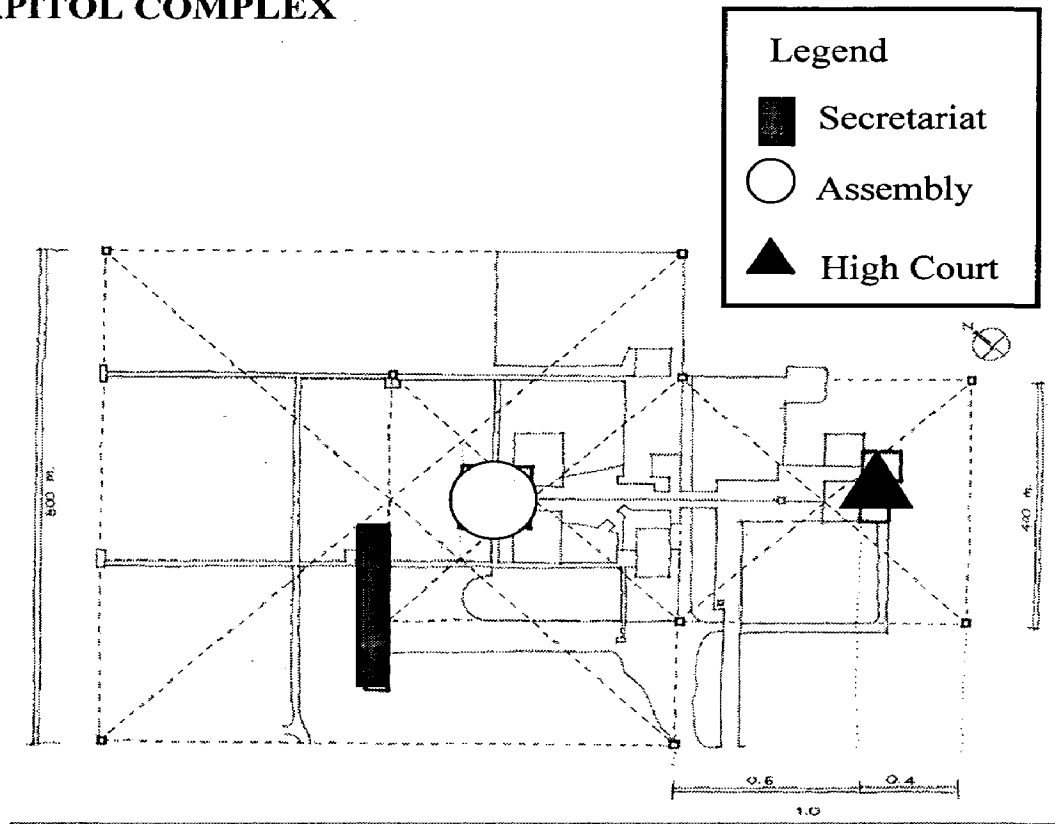
*Plate 2.45, 2.46: Views of open hand monument and the Capitol complex, Chandigarh.
Source: Chandigarh's Le Corbusier, Prakash Vikramaditya*

The Capitol area was designed as a great pedestrian plaza with motorized traffic confined to sunken trenches. The complex is planned on a cross axis wherein rigid symmetry has been avoided in placement of various buildings.

While the linear facade of the Secretariat marks the edges of the Complex on the left side, the Assembly and the High Court are placed on the opposite ends of the Cross axis, facing each other across a 450 meters.

All the dimensions of the Chandigarh Capitol were derived from the Modular; Le Corbusier described it as the only "luxury" that was used to design Chandigarh.

If one traces a golden section arc through the 400-meter square on the right, one can locate the position of the high court. If one looks further, one could find a whole series of similar underlying "harmonic" relationships, as if the whole composition were something of a symphony.

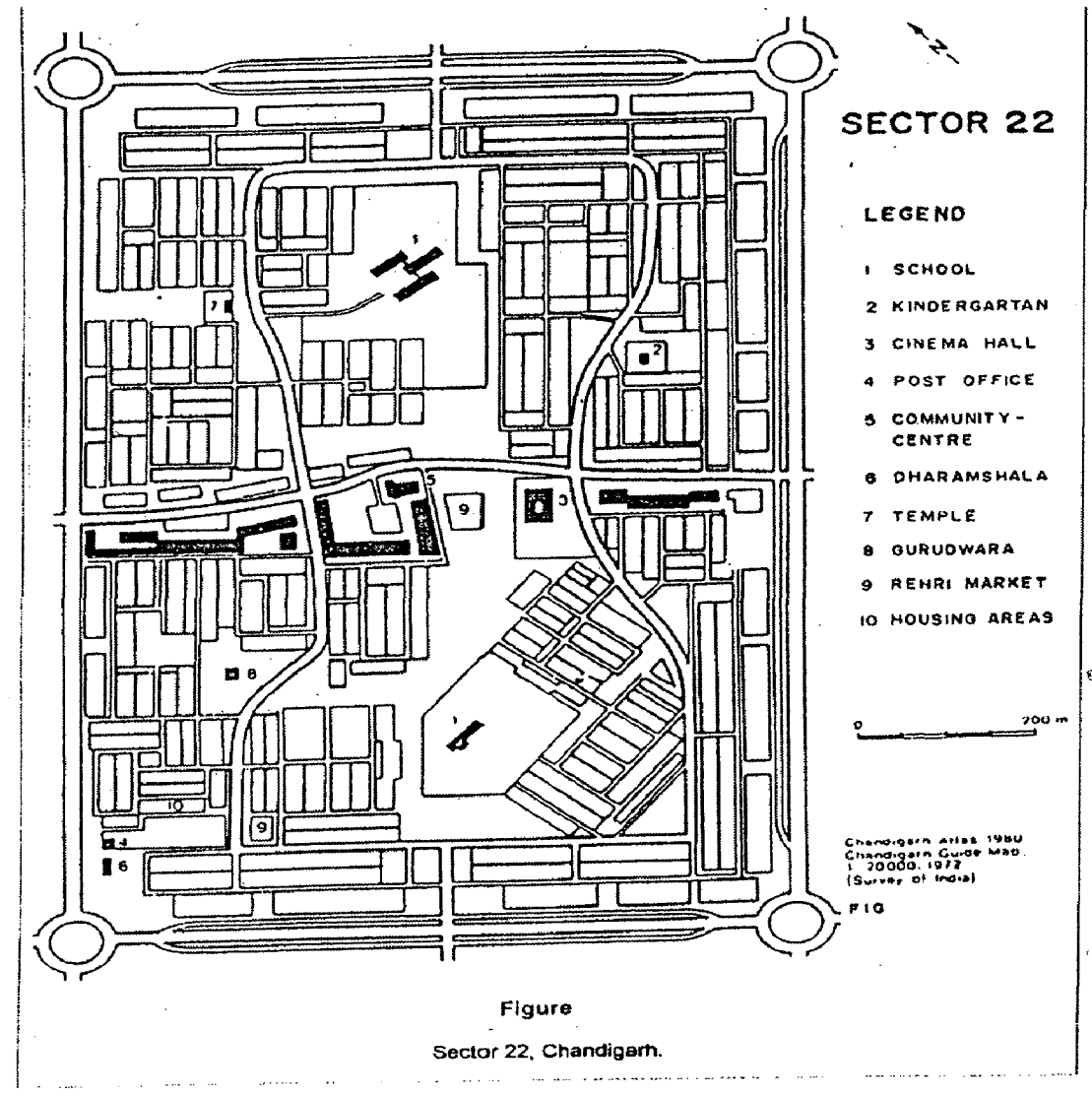
THE CAPITOL COMPLEX

*Plate 2.47: Plan of the Capitol complex, Chandigarh.
Source: Chandigarh's Le Corbusier, Prakash Vikramaditya*

e) THE TRANSPORTATION NETWORK

- i) Le Corbusier's traffic system followed Mayer's lines but was more elaborate; he called it Les Sept Voies de Circulation, or Seven Vs.
- ii) A graded system of circulation, from crossing continents to walking to the front door. [As Le Corbusier put it] The 7 Vs act in the town plan as the bloodstream, the lymph system and the respiratory system act in biology.
- iii) The 7Vs establishes a hierarchy of traffic circulation ranging from : arterial roads (V1), major boulevards (V2) sector definers (V3), shopping streets (V4), neighborhood streets (V5), access lanes (V6) and pedestrian paths and cycle tracks (V7s and V8s). The essence of his plan for Chandigarh rests on preserving intact the true functions of these seven types of roads.
- iv) The entrance of cars into the sectors, which are exclusively reserved to family life, can take place on four points only; in the middle of the 1,200 meters; in

the middle of the 800 meters. All stoppage of circulation shall be prohibited at the four circuses, at the angles of the sectors.



*Plate 2.48: Plan of a sector, Chandigarh.
Source: Concepts of new towns.*

- v) The bus stops are provided each time at 200 meters from the circus so as to serve the four pedestrian entrances into a sector. Thus the transit traffic takes place out of the sectors; the sectors being surrounded by four wall-bound car roads without openings (the V3s).
- vi) The road system was so designed that "never a door will open on the surrounding V3s: precisely the four surrounding V3s must be separated from the sector by a blind wall all along.

f) THE URBAN NETWORK

- i) Chandigarh was planned for a population of half-a-million. In Phase I, 36 sq km of land was acquired by the city administration for construction of 30 sectors.
- ii) Land for seventeen additional sectors (Sector 31 to 47) was acquired and developed during the second phase to cater for a population of 350,000.
- iii) The predominance of $\frac{3}{4}$ storey apartments in the second phase provide for higher population dimension. However, Chandigarh has now grown beyond its planned capacity. Hence, development in the third phase has started in sectors 48 and beyond.
- iv) Demographic data indicate that between 1961 and 1971, the population increased by 144.59 percent, one of the highest for urban areas in India.
- v) Although Le Corbusier took courageous risks at all levels of design, neither the city nor the buildings have been a practical success.
- vi) He did not master the climate in terms of hot breezes, the monsoon and un-insulated concrete; similarly, at city scale, the isolation of the routes and avenues, together with zoning regulations do not encourage intense urban activity to take place.
- vii) The city's own rigid character, lacking urbanity, is an image of a vast series of metropolitan hamlets.

g) LAND USE - ZONING

- i) The concept of the city is based on four major functions: Living, working, care of the body and spirit and circulation. Residential sectors constitute the living part whereas the Capitol Complex, City Centre, Educational Zone (Post Graduate Institute, Punjab Engineering College, and Punjab University) and the Industrial Area constitute the working part.
- ii) The Leisure Valley, Gardens, Sector Greens and Open Courtyards etc. are for the care of body and spirit.

- iii) The circulation system comprises of 7 different types of roads known as 7Vs. Later on, pathways for cyclists called V8 were added to this circulation system.
- iv) Each sector is meant to be self sufficient, with shopping & community facilities within reasonable walking distance.
- v) Though educational, cultural & medical facilities are spread all over city, however, major institutions are located in sector 10, 11, 12, 14 & 26.
- vi) The city center (sector 17) is the heart of city's activities. It comprises the inter-state bus terminus, parade ground, district courts etc.

h) HOUSING

The functions of living occupies primary place. Keeping in view the habits of the peoples, Le Corbusier planned that every dwelling should have three elements of Sun, Space and greenery. The housing in the city can be sub-divided into two parts- Government housing and Private Housing.

i) Government Housing

- a. The Govt. housing in the city was divided into 13 categories, ranging from the house for the Chief Minister to the two-room house complete with sanitary facilities, a kitchen, a verandah and a courtyard for the lowest paid employee.
- b. The socio economic conditions of the city restricted the height of most of the residential buildings to two to three storied structures.

ii) Private House-Controlled Development

- a. In view of the needs of various economic classes, plots of areas ranging from 114sq. meters. To 4500 sq. meters were planned.
- b. The living habits of the people are of outdoor type because of hot summers and hot and humid rainy seasons comprising most part of the year.

- c. Keeping this factor in view, Corbusier conceived a series of Architectural Controls / frame controls/ zoning regulations for each and every category of houses in which it was mandatory to provide open to sky courtyard both at the front and rear side of every house.
- d. These courts provided light and ventilation to houses besides serving as private open-to-sky spaces.
- e. A series of such houses were planned around community level open space which served the purpose of holding social and religious functions and outdoor activities and games by children.

i) PRESENT SCENARIO/GROWTH TRENDS

- i) Chandigarh was planned for a population of half-a-million. In Phase I, 36 sq km of land was acquired by the city administration for construction of 30 sectors.
- ii) Land for seventeen additional sectors (Sector 31 to 47) was acquired and developed during the second phase to cater for a population of 350,000.
- iii) The predominance of $\frac{3}{4}$ storey apartments in the second phase provide for higher population dimension. However, Chandigarh has now grown beyond its planned capacity.
- iv) Hence, development in the third phase has started in sectors 48 and beyond.
- v) Demographic data indicate that between 1961 and 1971, the population increased by 144.59 percent, one of the highest for urban areas in India.
- vi) According to 1981 census, it grew by another 75.55 percent, followed by 42.16 percent in 1991 and by 40.33 per cent in 2001 (with a total population of 9, 00,635).
- vii) By 2021 the population of Chandigarh is projected to be around 19.5 lacks (at current rate of growth) almost four times for which it was originally built.

j) PROBLEMS

As the city is outgrown its original size and capacity, the people here are now experiencing some problems in terms of the provision of services, from which some of the point are discussed below:

- i) Passing of through traffic along NH – 21 through the city, needs to be directed.
- ii) Links with surrounding region needs to be strengthened.
- iii) Use mixed land-use instead of compartmentalization of human activities.
- iv) The city needs service sector, the lack of provision leads to unauthorized construction, encroachment and growth of slums etc.
- v) There is need to plan for the continuous growth of the city. The growth is infinite.
- vi) Need to plan the city in the context of the region.
- vii) Growth of commercial slums due to land disposal policy for auction adopted for commercial sites, lack of small shops.

k) FUTURE PLANNING TRENDS

- a. **Need For Small Houses:** Realizing its social obligation to provide economical housing to all strata of the society, the administration decided to provide multistoried housing/flats in the city. During this phase, housing clusters were created depending on the income levels of its citizens, viz. Lower Income Group (LIG), Middle Income Group (MIG), and so on. This move enabled the Planners to attain desired results; namely, denser development of strong community based living.
- b. **Separate Land-use Pattern:** The layout & the Architectural character of commercial spaces in the new sectors are very different from that of the initial phase shopping centers. The 'Market Square' concept was introduced for the first time and the facades had more glass in place of vernacular elements such as louvers & brick jails. The concept of Shop-cum-Office (S.C.O.) was born in the new phase and provided relief to corporate magnates who favored to locate

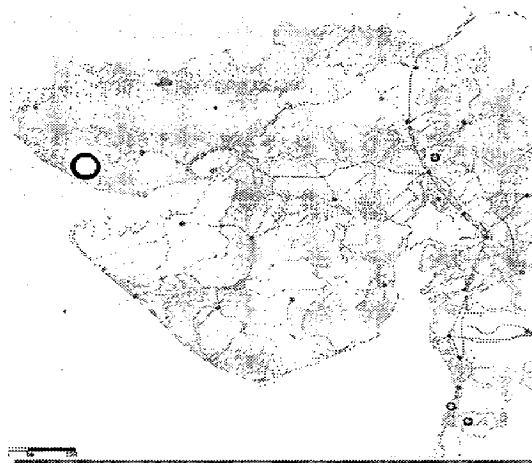
their regional head offices in this city due to a high degree of livability and high quality of urban infrastructure.

- c. **Social and Economic Changes:** If the 1st phase can be called a period of controlled growth and economic austerity due to its emphasis on creating Govt. infrastructure and housing, the new phase could easily be termed as a period of affluence, consolidation and prosperity. The size of the dwelling unit may have come down due to scarcity of land; the area under commercial usage grew leaps & bounds, with special emphasis on service industries such as hotels, banks, private nursing homes & shopping centers in the new sectors.

2.10.2 GANDHINAGAR [13]

a) INTRODUCTION

Town planner : H. K. Mewada and Prakash M. Apte
Area : 57 Km²



*Plate 2.49: fig. showing the location of Gandhinagar.
Source: www.wikipedia.com.*

In 1960, the old Bombay state was split into Maharashtra and Gujarat, with Ahmedabad as the first capital of Gujarat. Gandhinagar was planned to be the new capital of Gujarat, and the capital was moved there in 1970.

The capital of Gujarat, Gandhinagar is a planned city. Situated on the banks of the Sabaramati River, this city is designed by two Indian architects: H. K. Mewada and Prakash M. Apte.

This new city has been planned is for a population of 3 lakhs, occupying 2,000 Ha of land. Gandhinagar is almost a replica of Chandigarh master plan in its structure and road layout.

b) PHILOSOPHY OF TOWN

Conceptually, the city has been planned in such a way that the major work areas are provided in the centre and the other work areas are well distributed along the major town roads to ensure even distribution of traffic in peak hours. Industrial areas for small scale and light industries are located at the lee-ward side of the city. Capital complex is in the central sector of the city and this with a railway station located at one end defines the central axis of the city. The plan has been evolved for balanced and healthy community life. The living areas and work areas have been so interrelated that the time spent in journey to work and back would be minimum.

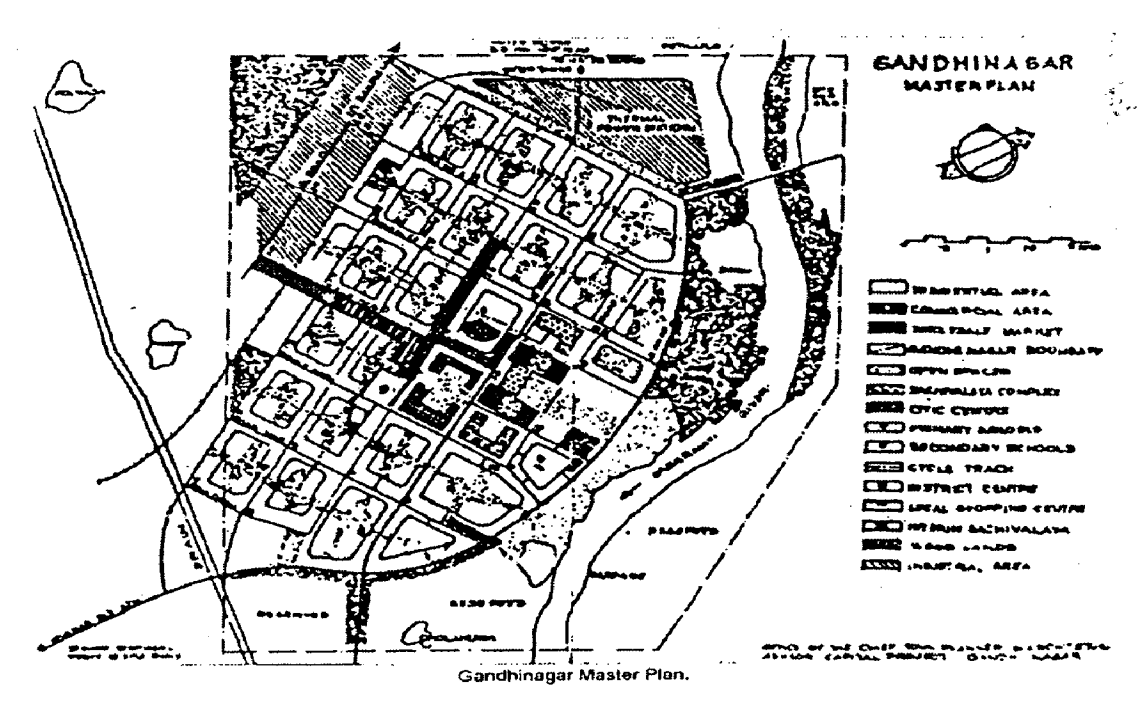


Plate 2.50: Conceptual city plan of Gandhinagar.
Source: Design of human settlement, Hankare S.S.

c) PLANNING POLICY

- i) It was anticipated that the development of a new Capital will be to reduce the housing and employment pressure on Ahmadabad.
- ii) Establishment of Govt. offices, industries and commerce will be a measure to attract the population in initial stage.
- iii) The industrial areas, having small scale and light industrial estate to serve the city needs, are located at the leeward side of the city.
- iv) Grid-iron pattern system of roads was developed in such a way that the houses get maximum natural light and wind, the houses are optimum oriented.
- v) In order to achieve economy in development and more social integration, units are planned in compact form by providing self sufficient sectors.

MASTER PLAN OF GANDHINAGAR

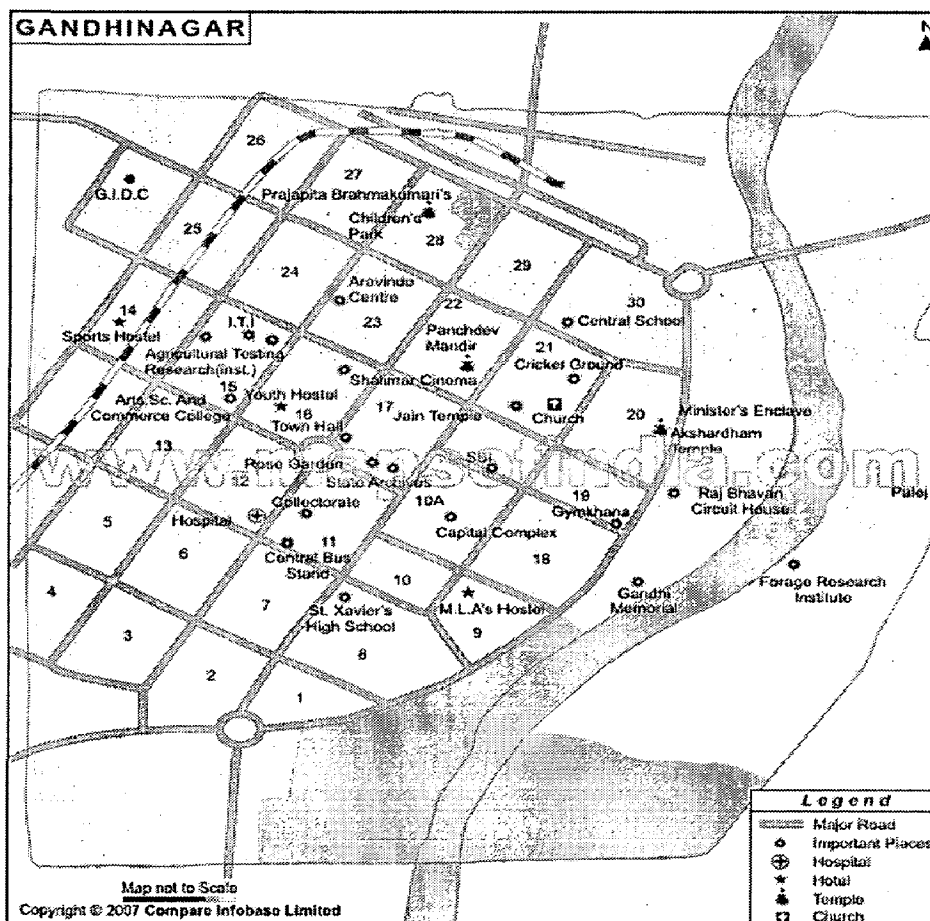


Plate 2.51: Master plan of Gandhinagar.

Source: www.wikipedia.com.

“Blue print for the New Capital Town – “Greater Ranchi - 2030”

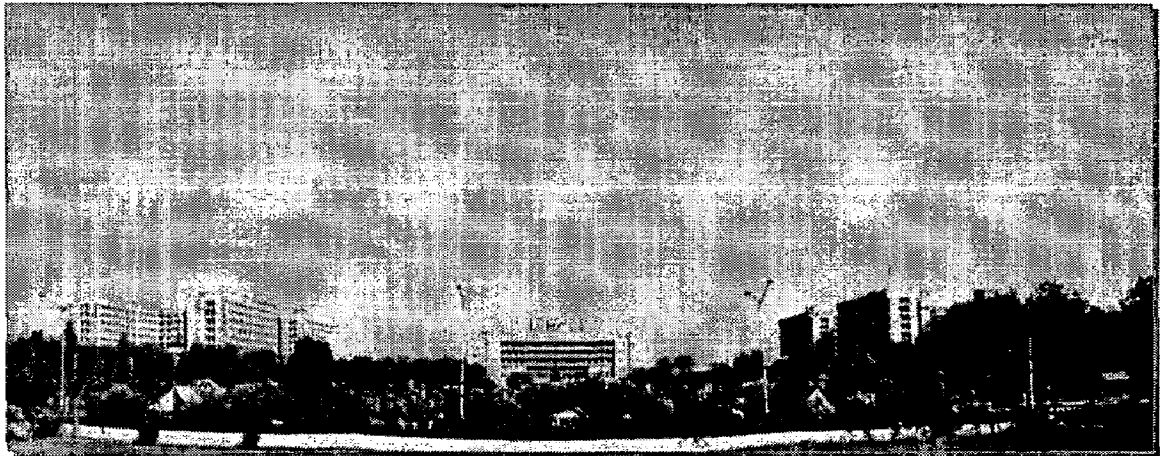
d) THE CAPITOL COMPLEX

This is the most important part of the town and it includes buildings of secretariat, legislative assembly, high court, heads of various departments, etc.

The entire complex is located in such a way that it can be easily reached from residences of most of the government employees.

The Sachivalaya Complex with the State Assembly building named after late Mr. Vithalbhai Patel and with two administrative wings - the Sardar Bhavan (the Sachivalaya) and the Narmada Bhavan (housing directors and allied offices) are located in the heart of township.

The State Assembly building is set up in the midst of a circular pond with flower gardens surrounding it. It exhibits one of the finest specimens of the Indian Architecture.



*Plate 2.52: View of the capitol complex, Gandhinagar.
Source: www.wikipedia.com.*

e) THE TRANSPORTATION NETWORK

- i) The roads are oriented to run 30° north of west and 60° north of east. Such an orientation helps in avoiding direct facing of morning and evening sun.
- ii) The pattern of main roads of the town is usually rectangular and such a pattern divides the town into more or less rectangular sectors. All the main roads are provided with road side trees of different varieties, the total length being about 275 km.
- iii) The important centers generating traffic are placed in the town plan in such a way that the total volume of traffic is well distributed within the town with a balanced pressure on traffic routes.
- iv) The cycle-ways and motor roads are segregated with grade separations at their intersections.
- v) The roads leading to government offices and the approach roads are 100 m wide. The peripheral roads and roads giving access to the town centre are 65 m wide. The rest of the town roads are 45 m in width.
- vi) Gandhinagar has "letter roads" (CH, CHH, and JA) and "number roads" (1, 2, 3). The letter roads run parallel across the city perpendicular to the number roads. The number and letter roads intersect each other forming a grid; each block or square in the grid is given a sector number. Each intersection is marked by signal names such as CH1, CH2, CH3 or JA1, JA2.

f) THE URBAN NETWORK

The town plan is designed to accommodate about 150000, to 175000 persons with possible physical expansion on west side, if found necessary in future. The population at present is around 80000.

- i) Drainage: The complete sewage treatment plant consisting of grit chamber, clarifiers, sludge digesters, drying beds, etc. is located at a distance of about 18 km towards south-west of the town. The permanent storm water drains are not provided except in secretariat area.

- ii) Electric supply: The Gujarat Electricity Board supplies the electricity to the town. All the electric lines within the town are laid with underground cables.
- iii) Water supply: The supply of water is from river Sabarmati and the treatment plant including filters is located at a distance of about 4 km in the north of town. The average rate of demand of water works out to about 270 liters per head per day.
- iv) Shopping centre: The shopping centre and godowns are suitably provided so as not to cause any hindrance to traffic of the town. An area of about 500 m² per 1000 population is provided for retail shopping.
- v) Parks and playgrounds: The average standard adopted for the open spaces is about 1.50 to 2.00 hectares per 1000 population, excluding school playgrounds and town level parks, etc.

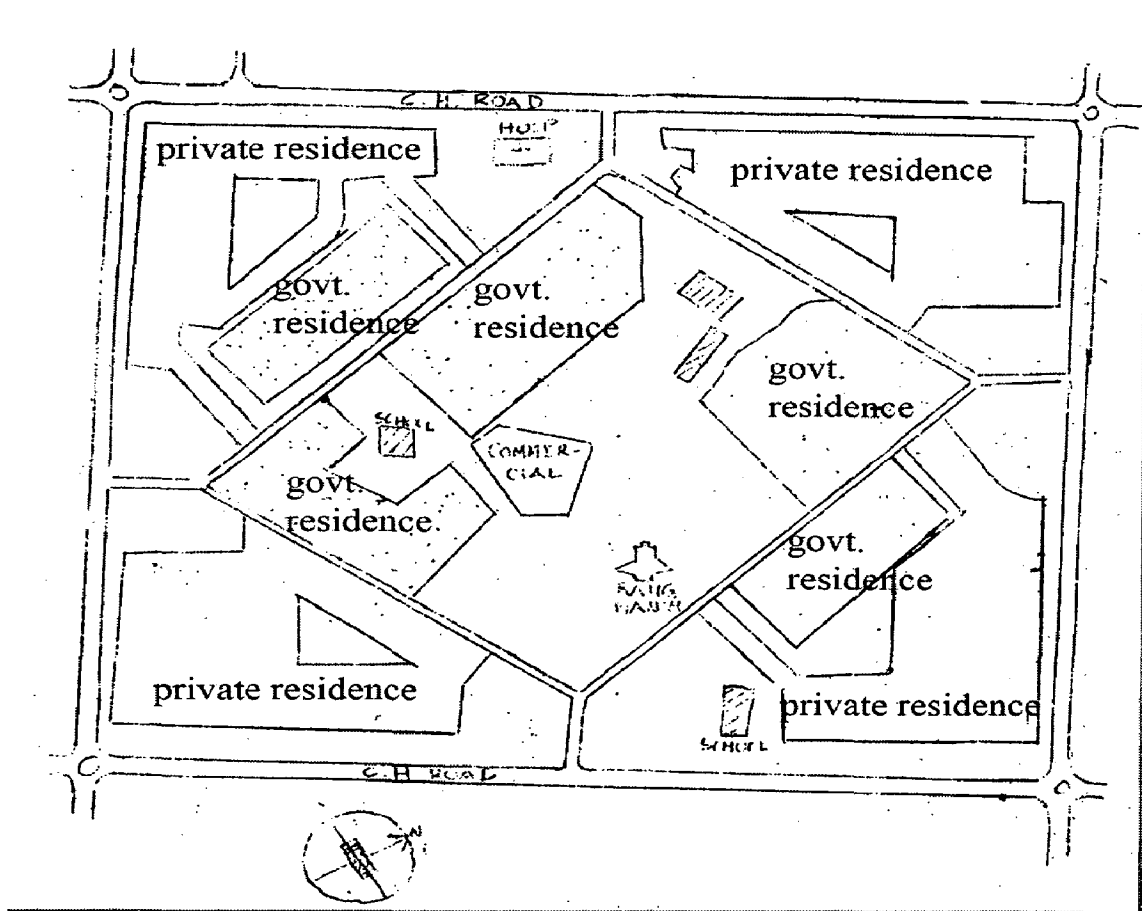
g) LAND USE - ZONING

- i) The town is planned on the principle of sectors, each measuring about 1.00 km in length and 0.75 km in width. The sectors are numbered from one to thirty and they are formed by seven roads running in each direction and cutting each other perpendicularly. Most of these sectors are residential and they are planned on the neighborhood concept.
- ii) For every four to five sectors, a zonal centre is provided and it includes cinema, dispensary, bank, post office, police station, shop of selective nature, etc. The zonal centers also serve the population of adjoining villages.

h) HOUSING

- i) The residential units are planned in a compact form with the necessary facilities such as schools, parks, playgrounds, etc. The government employees are accommodated in different categories of houses which are constructed by the government.

- ii) The neighborhood, called a sector, is a residential unit with minimum facilities such as local shopping, health centers, at least one primary school, garden for recreation etc.
- iii) The population of each sector varies between 7000 to 17000 persons depending upon the density decided.
- iv) Each sector has government housing in the center and private plots along with the periphery.



*Plate 2.53: Plan of a sector, Gandhinagar.
Source: Concepts of new towns, Hankare S.S.*

2.10.3 BHUBANESWAR [14]**a) INTRODUCTION**

Town planner : Dr. KOIENGSBERGER

Area : 135 Km²

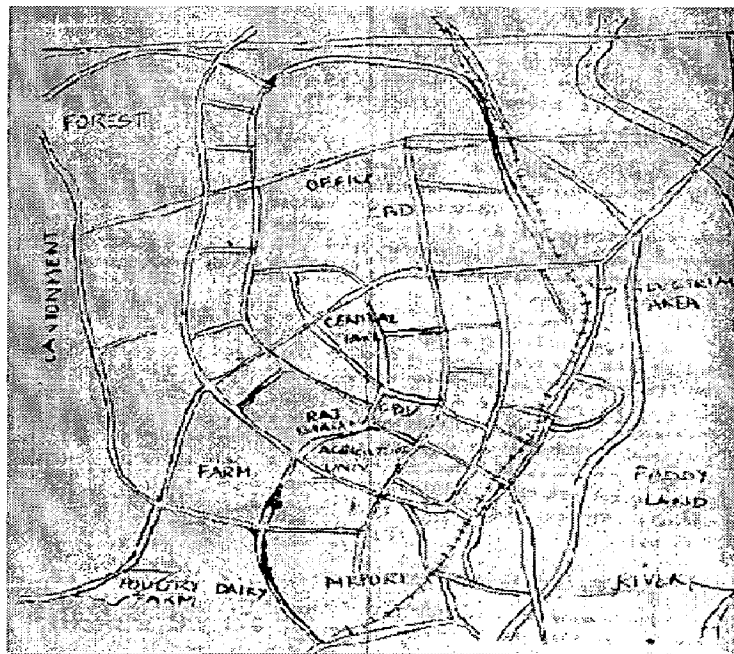


*Plate 2.54: fig. showing the location of Bhubaneswar.
Source: www.wikipedia.com.*

A need of shifting a capital function from Cuttack to Bhubaneswar was felt, because Cuttack location is unsuitable for its growth, being located between the rivers and railway line. Major portion of the land at Cuttack is in private free possession. Housing condition at Cuttack is very bad. The advantages of Bhubaneswar were that major portion of land is in government possession. The old town is full of historical monuments to reflect the tradition and culture of Orissa at different periods. The existence of, air port was another advantage.

b) PHILOSOPHY OF TOWN

Philosophy of Dr. KOIENGSBERGER behind Bhubaneswar plan was to grow the town in linear direction, towards the north and all the neighborhoods should develop around a single main artery. There should be a horizontal development for both private as well as government buildings. He suggested growth on north side because of availability of large quantity of land with high bearing Capacity. He did not suggested growth on southern side due to presence of physical barrier as air port and on eastern side by low lying agricultural land which is prone to floods. He has suggested provision of green belt to check up tendency of unlimited expansion.



*Plate 2.55: Conceptual city plan of Bhubaneswar.
Source: Design of human settlement, Hankare S.S.*

c) PLANNING POLICY

- i) He planned for the mono- nuclei town, of which the secretariat is the focus.
- ii) Two major work centers have been proposed one in old town and other in the proposed extension part of the town.
- iii) Location of the industry on the extreme north-east corner near railway line justified considering the south west wind.

d) THE TRANSPORTATION NETWORK

The road system consists of seven types of traffic systems according to their function:

<u>7 v road system</u>	<u>R.O.W.</u>
1. National highway	300'
2. State highway	250'
3. Peripheral road	200'
4. Arterial road	180'
5. Major unit road	150'
6. Major housing street	100'
7. Minor housing street	40'

e) HOUSING

DR. KOIENGSBERGER advocated a decentralized town divided into several neighborhood of 4500 to 5000 population. Primary school is taken as a focus of this neighborhood, have low population size. The basic principal of planning the neighborhood:

- i) Every child should live within one quarter or one third of a mile from primary school.
- ii) Every housewife should live within half mile from a civic center where she finds a bazaar, a co-operative store, a dispensary, and other services.
- iii) Distance from residence to workplace should not be excessive, but it can be larger than the distance to schools and civic centers. The residential areas occupied by government officials lay within two miles.

3

STUDY AREA PROFILE: RANCHI

3.1 STUDY OF RANCHI CITY IN ITS REGIONAL AND LOCAL PERSPECTIVE

To understand the role the Capital will play, it is necessary to study the city's region at the macro and micro level. Therefore the macro level study will cover the whole of Jharkhand state and Ranchi district, and at micro level the Ranchi urban area.

3.2 JHARKHAND [15]

3.2.1 INTRODUCTION

One of the oldest demands for a separate state was fulfilled when the Parliament passed the Bihar Reorganization Bill on August. 2. 2000 to create the state of Jharkhand. The State's total geographical area is 79.7 lakh hectares Out of this the cultivable land is 38 lakh hectares and the present net sown area is 18.04 lakh hectares. The net irrigated area is only 1.57 lakh hectares which is 8 per cent of the net sown area. More than 29 per cent land is covered by forest area 25 percent of its land is covered as sown areas.

3.2.2 LOCATION

Geographically, the state of Jharkhand is located in the eastern part of India extending from 21° 58' to 25 ° 18' N Latitude and from 83° 22' to 87° 57' E Longitude bordering the states of Bihar, West Bengal, Orissa, and Chhattisgarh.

The maximum length from east to west IS 457 km. and width from north to south is 310 km. The Tropic of Cancer passes through Kanke.

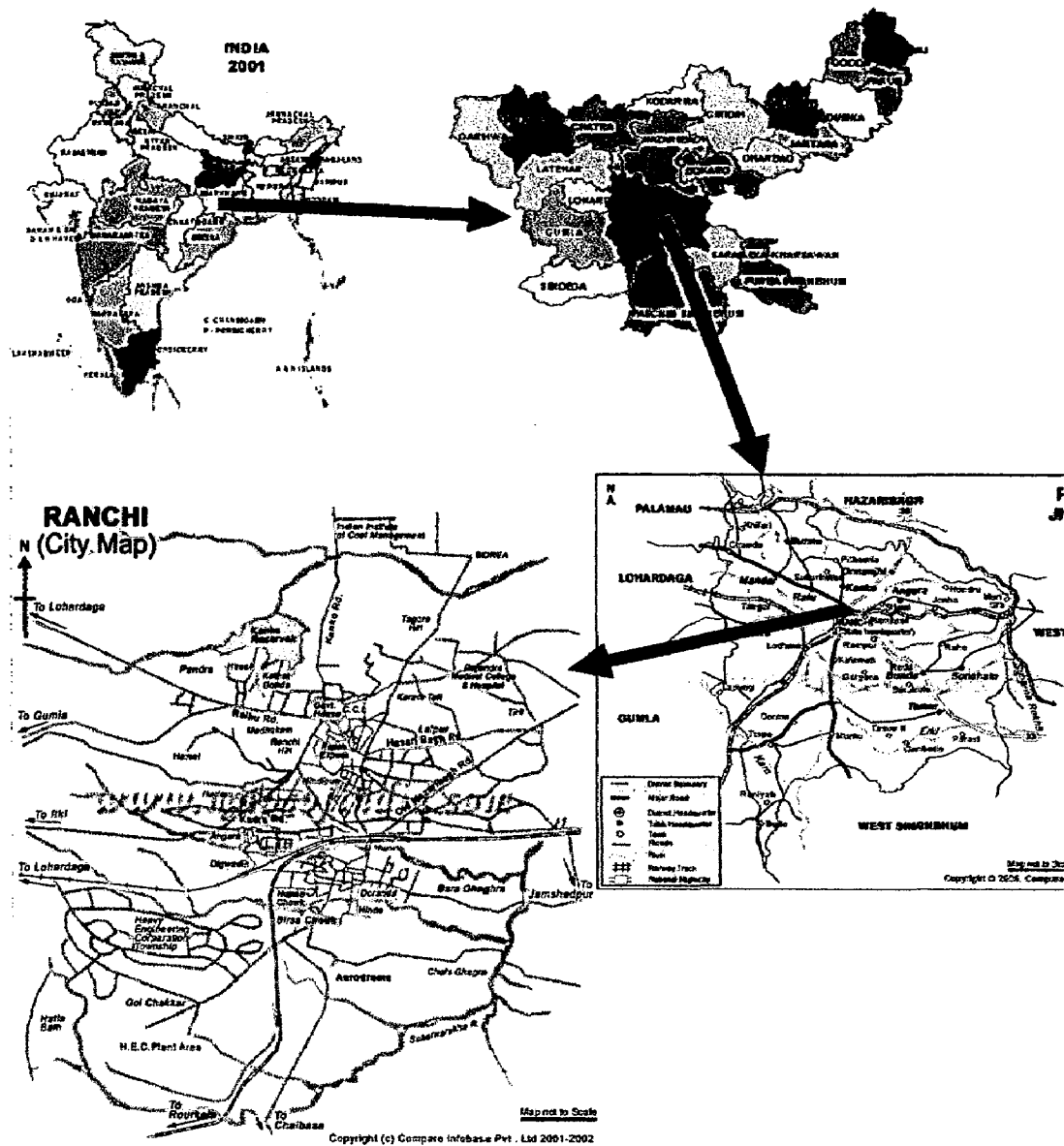


Plate 3.1: map showing the location of Ranchi.
 Source: www.mapsofindia.com.

3.2.3 ADMINISTRATIVE SETUP

The state comprises of twenty two districts of erstwhile Bihar (eighteen at the time of bifurcation). There are 211 Blocks, 3744 Gram Panchayats and 33315 Villages.

3.2.4 PHYSICAL FEATURES

In comparison to Bihar most part of the Jharkhand region is part of Chotanagpur plateau which also extends to some parts of West Bengal, Chhattisgarh, and Orissa. This region is made up of ancient stone Arkiyan Granite Tatanis and the topography is quite undulating. As regards to the geographical structure the whole state can be divided into 15 parts.

3.2.5 CLIMATE

Climate of the state in general is tropical with mainly three season hot summers, wet monsoons and cold winters. There are regional variations and some parts of the state like: Ranchi, Netarhat and Parasnath have pleasant climate even during the summers. Maximum rainfall takes place during the months from July to September that accounts for more than 90% of total rainfall in the state.

3.2.6 FLORA AND FAUNA

Jharkhand possesses rich floral and faunal heritage, a result of its being part of Chotanagpur plateau. It houses two national parks, Betla and Hazaribagh. Main vegetation in this region comprises moist deciduous and dry deciduous forests. The vegetation includes saal and bamboo as the major components. Important faunal species of the state are wolves, hares, chital, nilgai, monkey, langur, elephants, gaur, leopard, and sambar.

3.2.7 SOCIO-ECONOMIC PROFILE

Demographic characteristics: The population of Jharkhand according to 2001 census is 2,69,09,428 of which 78% live in rural areas. The population growth rate for the decade 1991-2001 is 23.19%, almost equivalent to that of India (23.86%). The population density is 338 as against 324 of the country. The state has a sex ratio of 941 as against 933 of the country. The state has a low literacy rate of 54.13% as

compared to the national average of 65.38%. One of the most remarkable feature regarding its demography is the percentage of the tribal population. There are thirty tribes residing in this state of which the: Oraon and Munda are the most prominent.

Economic characteristic: Although Jharkhand is endowed with vast and rich natural resources, mainly minerals and forest, 80 percent of its population residing in 32620 Villages depend mainly on agriculture and allied activities for their livelihood.

3.2.8 TRANSPORTATION NETWORK

Road network is developed in the state; NH 2, 23, 31 and 33 form part of the state transport system. State highways have also been developed, however they need to be developed still further. Rail network is dominant only in some towns of the state. No rail network penetrates the state into the interiors. Airport as faster means of transportation is located at two places, Ranchi and Jamshedpur, in the state. Transport pattern has to be improved to give a boost to physical development in the state.

3.3 RANCHI DISTRICT [16]

Ranchi district is one of the oldest districts of erstwhile Bihar. With the formation of new Jharkhand State it has assumed greater importance as the state capital.

3.3.1 PHYSIOGRAPHY

The entire district can be divided into 3 sub-micro regions based on drainage, geology, soil, climate and natural vegetations.

The Ranchi plateau has an average height of about 2000 ft. This plateau is undulating and intersected by numerous streams and rivers and characterized by low rocks, hills and isolated peaks.

3.3.2 SOIL

The soil of the district is mostly laterite and unfertile. In the low lands there is a large admixture of clay but the soil of the up lands consists mainly of sand and gravel and only thinly covers the rock beneath. The soil is rich in potash but very deficient in lime and phosphates.

3.3.3 DRAINAGE

The streams and rivers in this region are ephemeral in nature as they are dependent on the monsoons. They mostly follow the sinus course due to the undulation of the land.

The important rivers of the district are Subarnrekha, South-Koel, Sankhand North-Koel. These four rives joined in the way by numerous small streams from the hills effectively drain the whole district and are sufficient to carry off even the heaviest rainfall.

3.3.4 CLIMATE

The climate of the entire district is tropical in character The Tropic of cancer passes through the district. But the Ranchi Plateau itself has a climate which is of cool and pleasant disposition due to the general elevation being 2000 Ft above sea level.

3.3.5 NATURAL VEGETATION

The forests of this district are of the tropical type. The good species of sal forest can be seen around sarnas, the other important species are asan, gambhar, kend, sial, mahua, karam , kusum , bamboo, mangoes, jamun, karanja, tetar, bael, jackfruit, peepal are important species that are grown in the villages.

3.3.6 SOCIAL PROFILE

Population growth: Population of the district as recorded in 2001 census is 27,83,577 which is 10.34% of the state's total population. Of which 65% live in the rural areas. The population of Ranchi has grown since 1951 from 18,45,812 to 27,83,577 in 2001.

Population density: The average density of population in this district in 1971 was 143 persons per sq km as compared to the 324 of the then State of Bihar Today the population density as recorded by 2001 census is 362 person:, per sq km.

Rural-urban population: According to the 1971 Census Ranchi district had an urban population of 3.6 lakhs which was 13.81 % of the total population of the district and according to 2001 census; the urban population is 9.8 lakh which is 35% of the total population of the district. This when compared to the State percentage of urban population which is only 22.3% of the total population of the State, Ranchi district appears more urbanized.

Literacy rate: Ranchi ranked third among the rest of the districts of the state in terms of its literacy level. According to 2001 census, the districts literacy rate has been recorded as 65.69%. The registered increase is almost 10 percent more than the last decade.

Sex ratio: In terms of absolute figures the no. of female per thousand male as recorded during 1991Census was 921 which increased to 938 in 2001, showing there is a considerable improvement in the sex-ratio of the district, however this is still very less when compared to the Jharkhand State which is 944 and 933 of national average.

3.3.7 ECONOMIC PROFILE

Economic activities like production, consumption and distribution of products determine the level of development. It is the availability of natural resource, man power, level of technology, income, expenditure, savings which together are responsible for economic development.

Occupational structure: The economic base of the Ranchi District is primarily based on agriculture. Though there has lately been a shift in the occupational structure from the primary sector to the secondary and tertiary sectors.

Land use pattern: The total geographical area of district is 7,59,250 ha. Area under crop is 5%; the forest cover has come down from 56% to 18 %. Mono cropping is the main stay due to inadequate development of irrigation.

Industrialization: The District industries Center was set up in 1978 and the Ranchi industrial Area development authority (RIADA) in 1983 RIADA has given a thrust for establishment of infrastructure facilities and provides a single window for assisting the entrepreneurs. The district has three industrial estates namely Getalsude, Tupudana and Kokar.

3.3.8 ORDER OF CENTRAL PLACES IN THE DISTRICT

- 1. Ranchi:** In 1834 Ranchi started as a small tribal town. This is Purana or Old Ranchi today it is the district headquarters and the capital of the Jharkhand State. Even before it attained the status of the state capital this city was a first order settlement in its region because of its functional characteristics and opportunity.
- 2. Muri:** Muri is the town which has grown because of the location of an aluminum factory. It is connected to Ranchi by the Ranchi-Purulia Road, Ranchi-Calcutta Road, and the Ranchi-Calcutta rail route. The existing industries in Muri are mainly agro-based.

3. **Khelari:** It is a mining town connected by the Tangu Khelari road and the railway to Daltonganj. Measures have been taken recently to set up factories for manufacturing chalk, crayon, agro Implements, building hardware, bleaching powder, cement, asbestos sheet.
4. **Bundu:** It is a trade centre having strong inter-actions, with Ranchi. Important transport links to Bundu are NH-33, the Tamar-Khunti Road, Bundu-Sonahatu Road, and the Bundu-Silli Road. Industries to manufacture the following products are proposed to be set up: nail polish. Shellac and shellac products, soap, cosmetic, aluminum utensils.
5. **Khunti:** This is a trade centre in the Khunti Block connected by the Ranchi-Chaibasa road the Karra-Khunti road and the Khunti-Tamar road. Industries to produce cane and bamboo baskets, furniture packing boxes, building hardware, agricultural implements and tooth-paste are proposed to be set up.

3.4 RANCHI CITY [17]

3.4.1 RANCHI – A BRIEF HISTORICAL CONTEXT

The name Ranchi is after the name of Purani Ranchi, a small hamlet on the foot of a hillock popularly known as Ranchi Hill. The old administrative core of Ranchi derived its name from Wilkinson, the first agent of the governor-general in the province of Bengal; the name finally got changed to Purani Ranchi after the name of a small village “**Arachi**”.

There has been two distinct phases in the development of Ranchi from a small village into a big urban agglomeration.

The first phase, which roughly covers the period from its inception as a civil and military headquarters in 1834 to the Indian independence in 1947, comprised of its

steady development as a growing center of administration. It became the administrative headquarter of Ranchi district (1843), Chotanagpur division (1856) and then Summer Capital of Bihar State (1912). The natural factor to contribute to this development was a very excellent and healthy round of the year climate. Several historical factors such as the coming of Christian missionaries in 1845, establishment of the Eastern Command Headquarters during the Second World War, etc. also boosted up the development of Ranchi. The city was linked with motorways and roadways with major cities and big commercial centers, which provided a great boost to trading activities of the city.

The second phase of development of Ranchi which set in after independence was due to its tremendous potentialities for development as an industrial and commercial center. Ranchi strategically located on the Chhotanagpur plateau is in the heart of India's richest steel-coal belt. This consideration amongst others, prompted the Government of India first to establish offices of the National coal development corporation at Ranchi (now known as C.C.L.) and then Hindustan steel limited, and then a manufacturing plant and township of heavy Engineering Corporation Ltd. on its southern outskirts.

Ranchi is neither a new township nor an ancient town which has deep roots in the past. Ranchi is completely a new place and its importance before its industrial metamorphosis lay in its lovely landscape, virgin forests and glades, cascades, hills and torrents and its excellent climate.

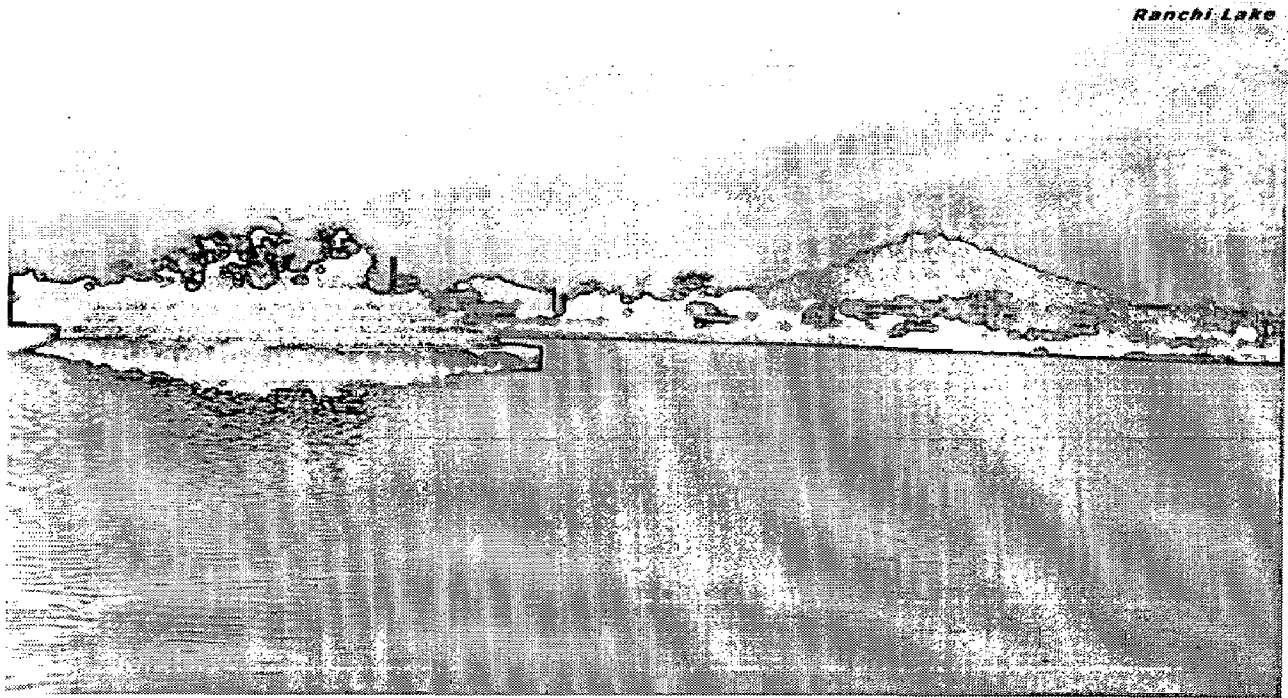


Plate 3.2: View of Ranchi Lake.
Source: www.jharkhandonline.gov.in.

3.4.2 PRESENT DAY RANCHI

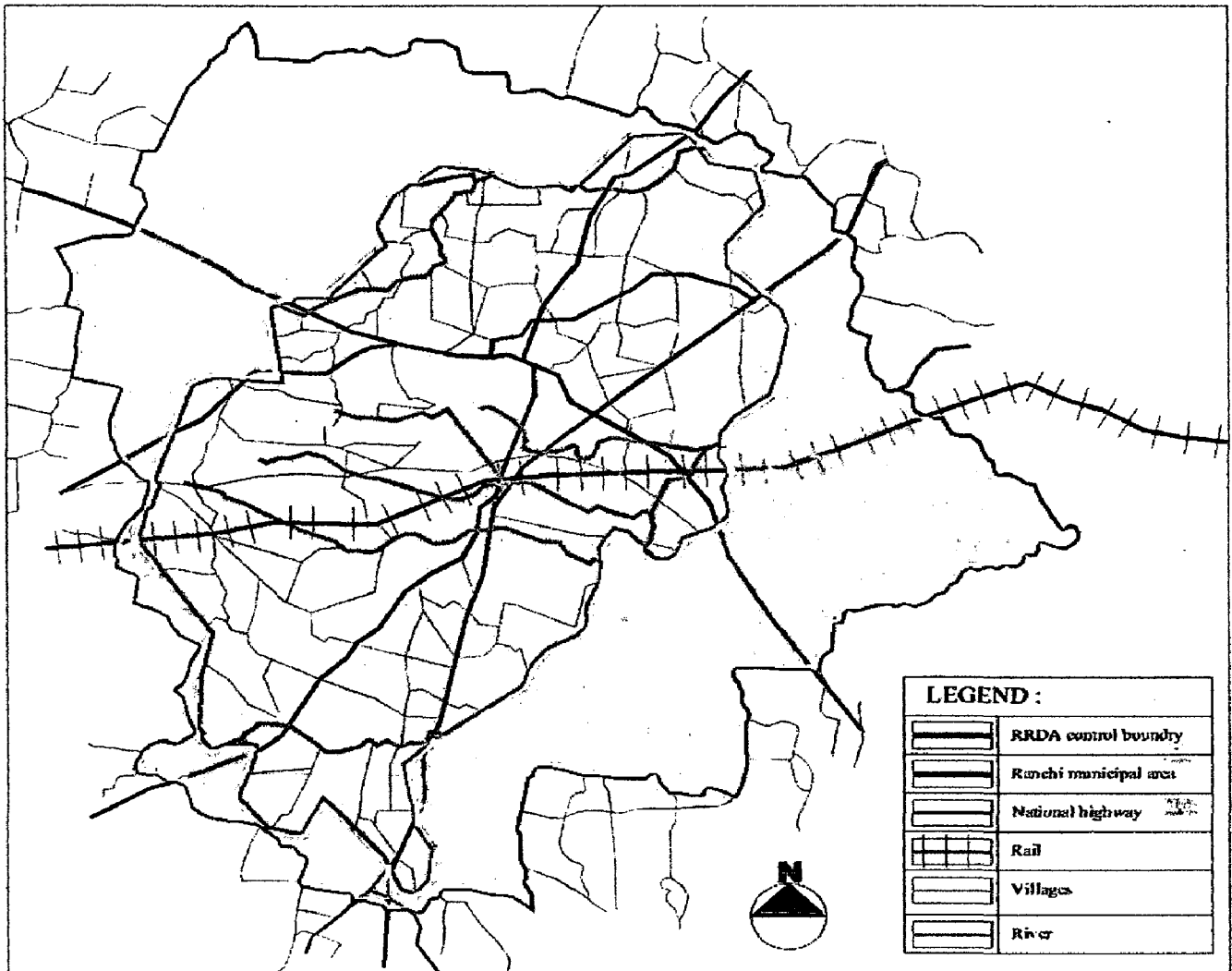
On 2nd August 2000 the bill to create a separate state of Jharkhand to be carved out of Bihar was passed in Loksabha and the new state of Jharkhand came into existence on 15th Nov. 2000 as 28th state of India. Comprising 32% of Bihar's population and covering an area of 79,714sq.km. The Ranchi town which used to be the summer capital of undivided Bihar state became the Capital of new state. Today Ranchi is an urban agglomeration comprising of 129 urban villages and five urban centers, namely Ranchi, Doranda, Jagannathpur, Namkum and Kanke.

3.4.3 LOCATION

Situated on the Chotanagpur Plateau located at 23°23' N latitudes & 85 ° 23 E longitudes. Lies 2140 ft. (avg. 645m) above MSL.

3.4.4 AREA

Area of the Ranchi district is 7574.17sq.Km. Which is 10.14 % of the total area of the state. Area under Ranchi Municipal Corporation: 173sq.km.



*Map 3.1: Regional setup of Ranchi city
Source: Compiled from various sources*

3.4.5 CLIMATE

City has a moderate climate (where the summer temperature ranges from 20 to 37degree and from 2.8 to 23 degree during winters. Average annual rainfall recorded is 1530mm.

3.4.6 POPULATION

10.20 Lac at present (2006)

Sex ratio: 938 females for every 1000 males.

Density of population in the city: 362 persons per sq. km.

3.4.7 CONNECTIVITY

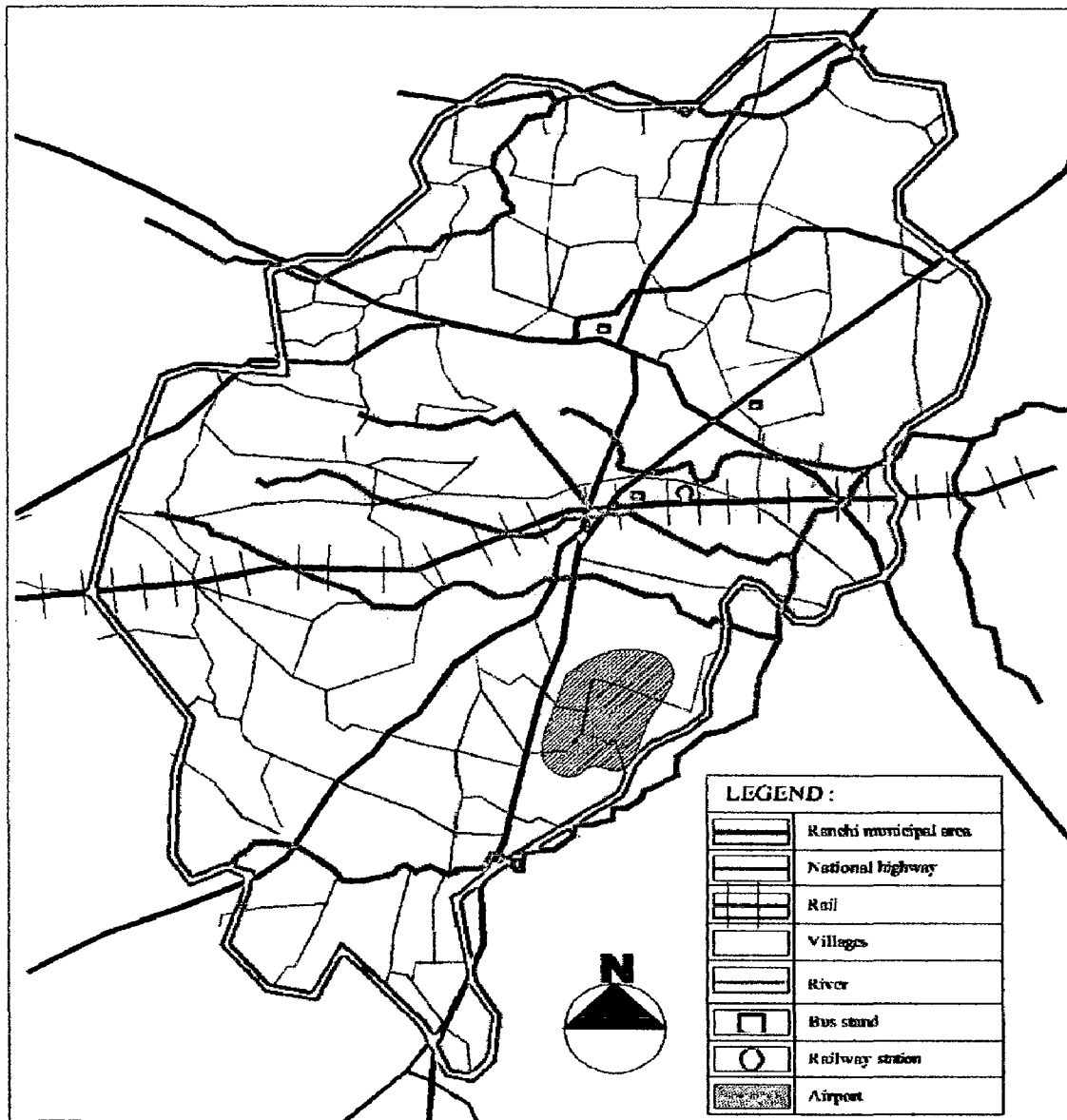
- i) By road: Ranchi is situated on National Highway No.23 & 33 and there are nets of good roads around it. Ranchi is directly connected by regular bus services with all the main places in the state and also outside the state.
- ii) By rail: Ranchi is on the South Eastern Railway and is directly connected with Calcutta, Patna, Rourkela, Delhi etc.
- iii) By air: Ranchi is connected by regular Indian Airlines services with Calcutta, Patna, Mumbai, Lucknow and New Delhi.

3.4.8 URBAN STRUCTURE OF THE CITY

No particular urban structural pattern can be clearly brought out but we may say that Ranchi has a radial and concentric pattern.

Five main highways converge into the city

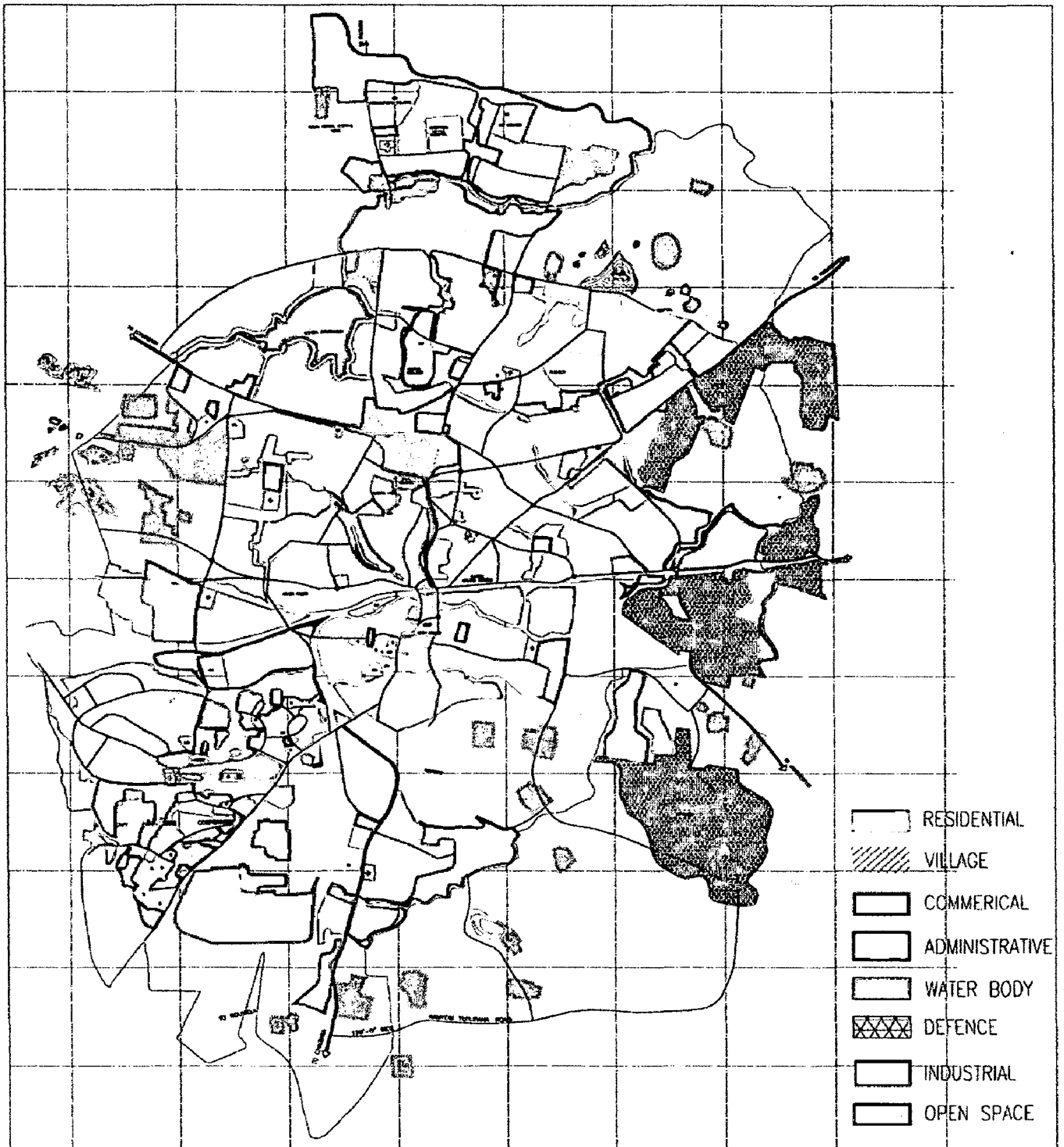
- a. The Patna Hazaribagh Ranchi Road
- b. The Jamshedpur Ranchi Road
- c. The Purulia Ranchi Road and
- d. The Lohardaga-Ranchi Road



Map 3.2: Transportation network of Ranchi city
Source: Compiled from various sources

3.4.9 LAND USE

The Ranchi Municipal Corporation today covers an area of 177.19 sq km of which only 52% is developed area. Out of the total developed area approximately 48.3% is under residential use, 3.11% under industrial, 1.62% under Trade and Commerce 18.28% under Public and Semi-public use, 17.95 % under roads, 3.35% is covered by railway and 7.39 % is under open spaces and recreational use.



Map 3.3: Master plan of Ranchi city
Source: City development plan

Table 3.1: Landuse break up of Ranchi city.

s.n.	land use	area (ha)	%
1	municipal area	17719	
2	development area	9213	100
3	residential	4449.8	48.3
4	Trade and commerce	149	1.62
5	industrial	286	3.11
6	public and semi public uses	1684	18.28
7	open spaces	680.8	7.39
8	roads	1653	17.95
9	railways	308.63	3.35

Source: City development plan

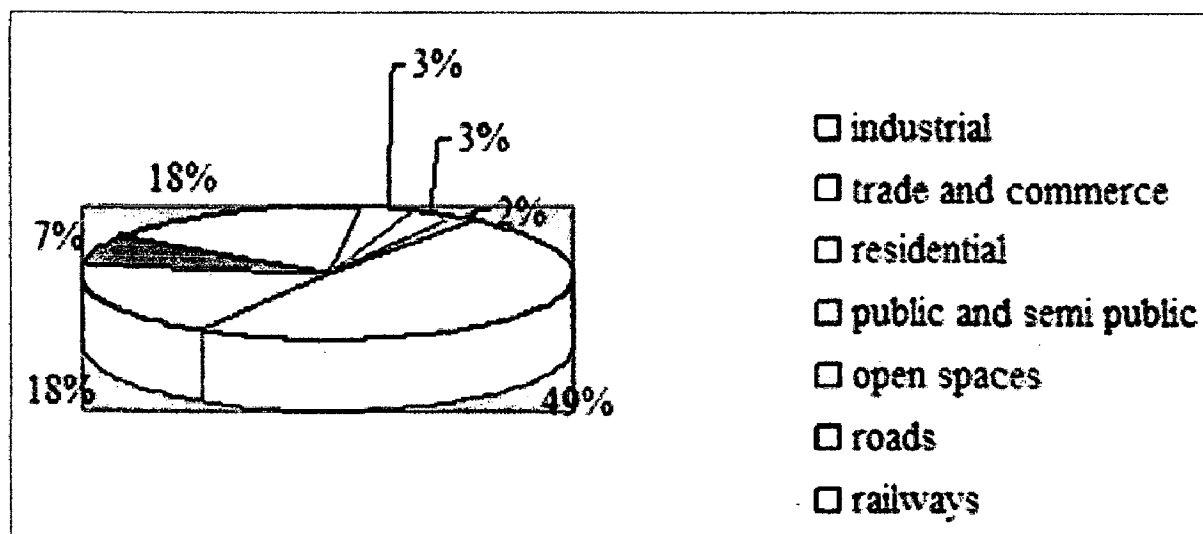


Fig 3.1: Land use break up of Ranchi city

Source: City development plan

There is no bye-pass or ring road. Nor there are through roads connecting one end of the city with another without passing through the Main Road. The development of Ranchi has been as it seems to be, ribbon type along the roads and highways.

3.4.10 EXISTING LAND USE PATTERN OF THE CITY

The Ranchi Municipal area has been divided into 17 wards of different sizes and there is a marked difference in the pattern of development in the different wards. The town at present is formed of the following dominant sectors:

- i) Civil area: It comprises of Burdwan Compound, Pipe Road. P. N. Bose Compound, Circular Road, Booty Road and a part of Nagratoli including Deputy Para.
- ii) General area: It comprises of the entire area of Upper Bazar including the business area, Church road, Lohardaga road. Hazaribagh road, Kake road, Purulia road.
- iii) Business area: It comprises of a part of upper Bazar, Market road, Main road, Church road and Doranda Market The whole sale market.
- iv) Village type settlement area: These localities are Karamtoli, Nagratoli, Hatlia, Kathutoli, Kumbartoli.

3.4.11 DENSITY PATTERN

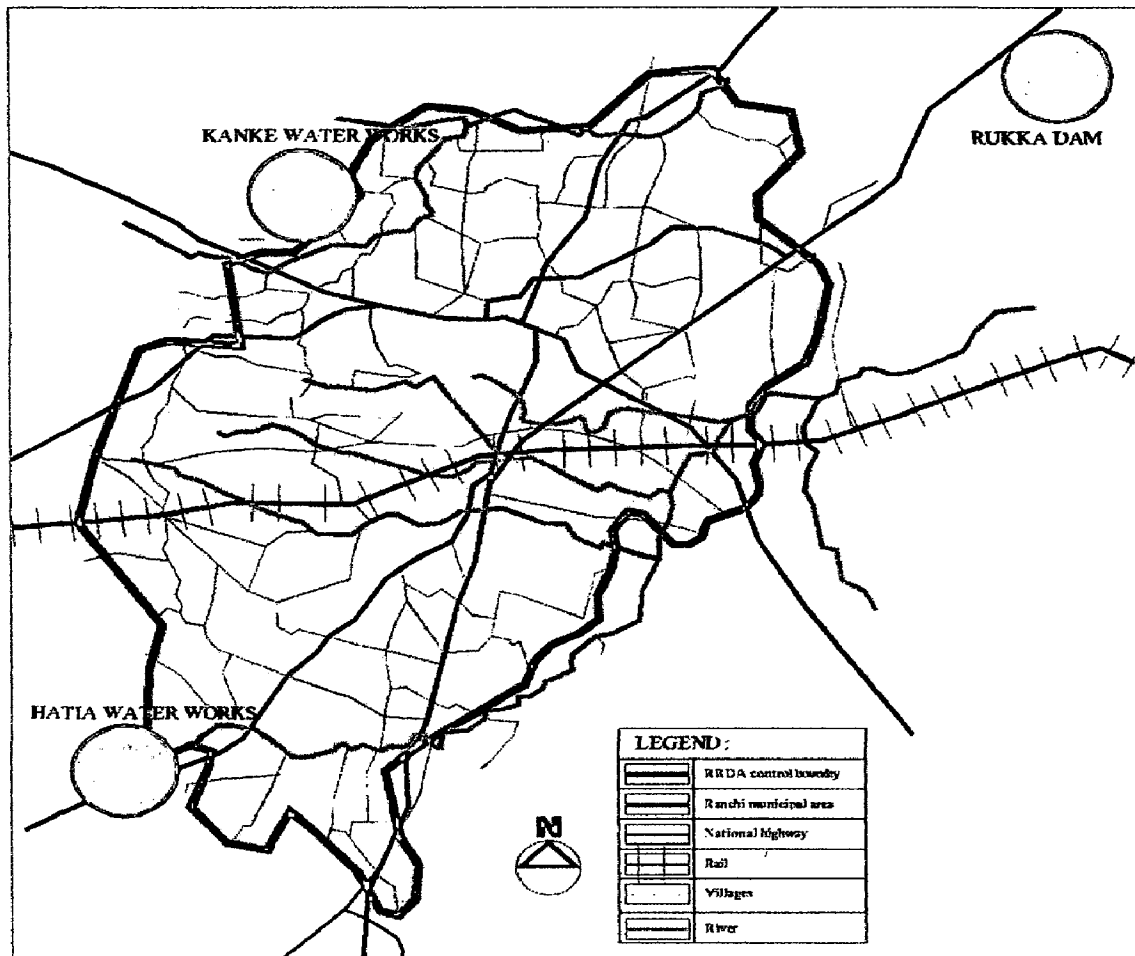
The overall density of the city as in 2001 was 4776.68 persons per sq km. Earlier in 1981 and 1991 It recorded a density of 2763.28 and 3382.85 persons per sq km.

3.4.12 PHYSICAL INFRASTRUCTURE

1. WATER SUPPLY

- a. The present Ranchi is served by 3 water works, Getalsud water works Kakne water works and Hatia water works.
- b. Present capacity of water works is 246 MLD.
- c. Present supply is only @ 100 Lpcd, which is less than the CPHEEO norms of 150 Lpcd.

- d. Due to inefficient “Distribution Network” city is facing problems like corroded & choked water pipelines Leakage and Unauthorized connection.
- e. The non-revenue water (NRW) is substantially high

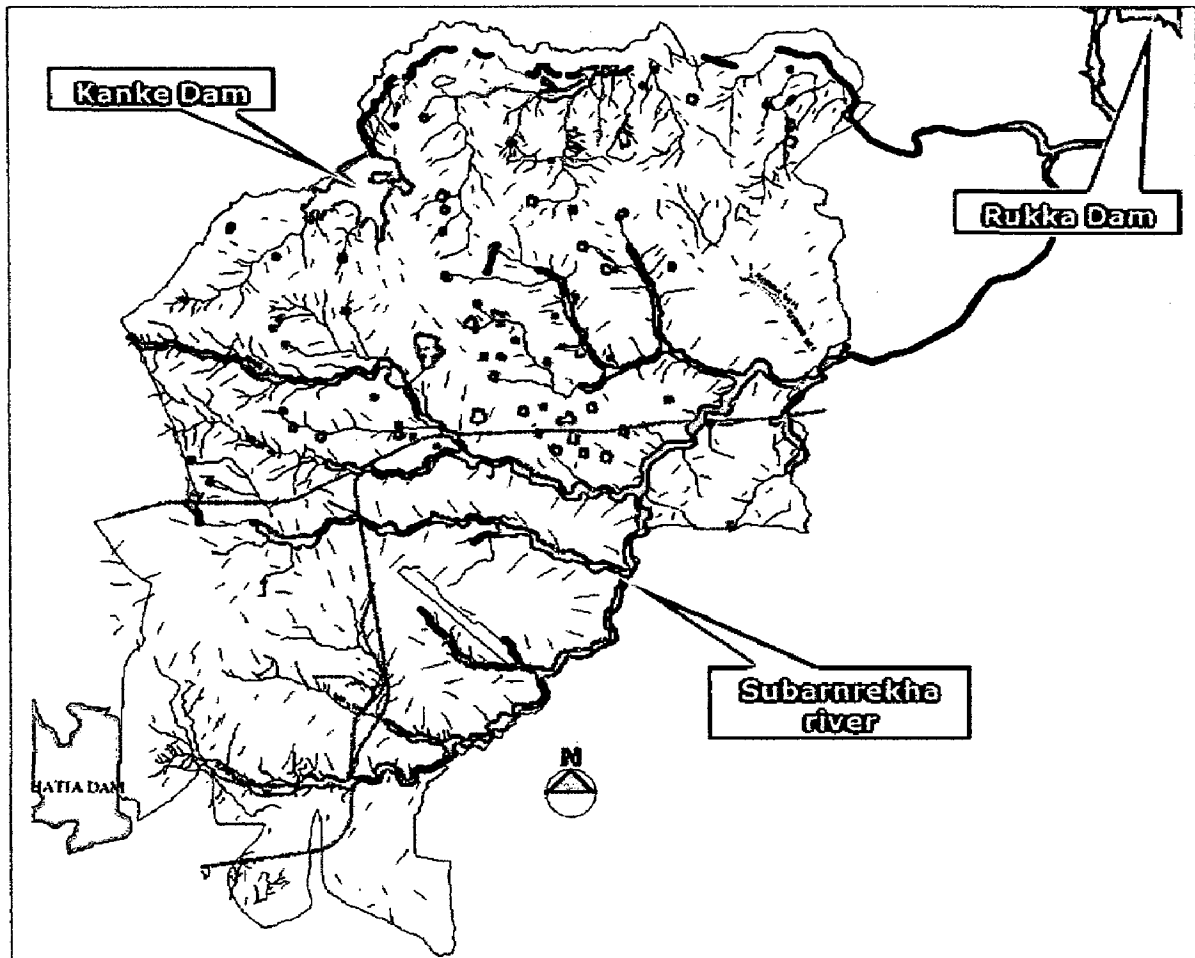


Map 3.4: Water supply sources of Ranchi city
Source: Compiled from various sources

2. DRAINAGE AND SANITATION

- a. Ranchi has undulating topography, sloping in 3 directions.
- b. The total city's drains ultimately leads to the Rukka Dam.
- c. The major drinking water for the city is drawn from the Rukka Dam.
- d. Due to No comprehensive drainage system & contamination of drains with sewage raises serious concern over raw water quality.
- e. Only 50% of roads have drains (60% Pucca & 40% Kuccha drains).
- f. Mostly drains are open even in thickly populated & commercial areas.

- g. Contamination of water & Choking of drains by Sewage, Solid Wastes, grass and mud.
- h. No proper method of maintenance & cleaning of drains.

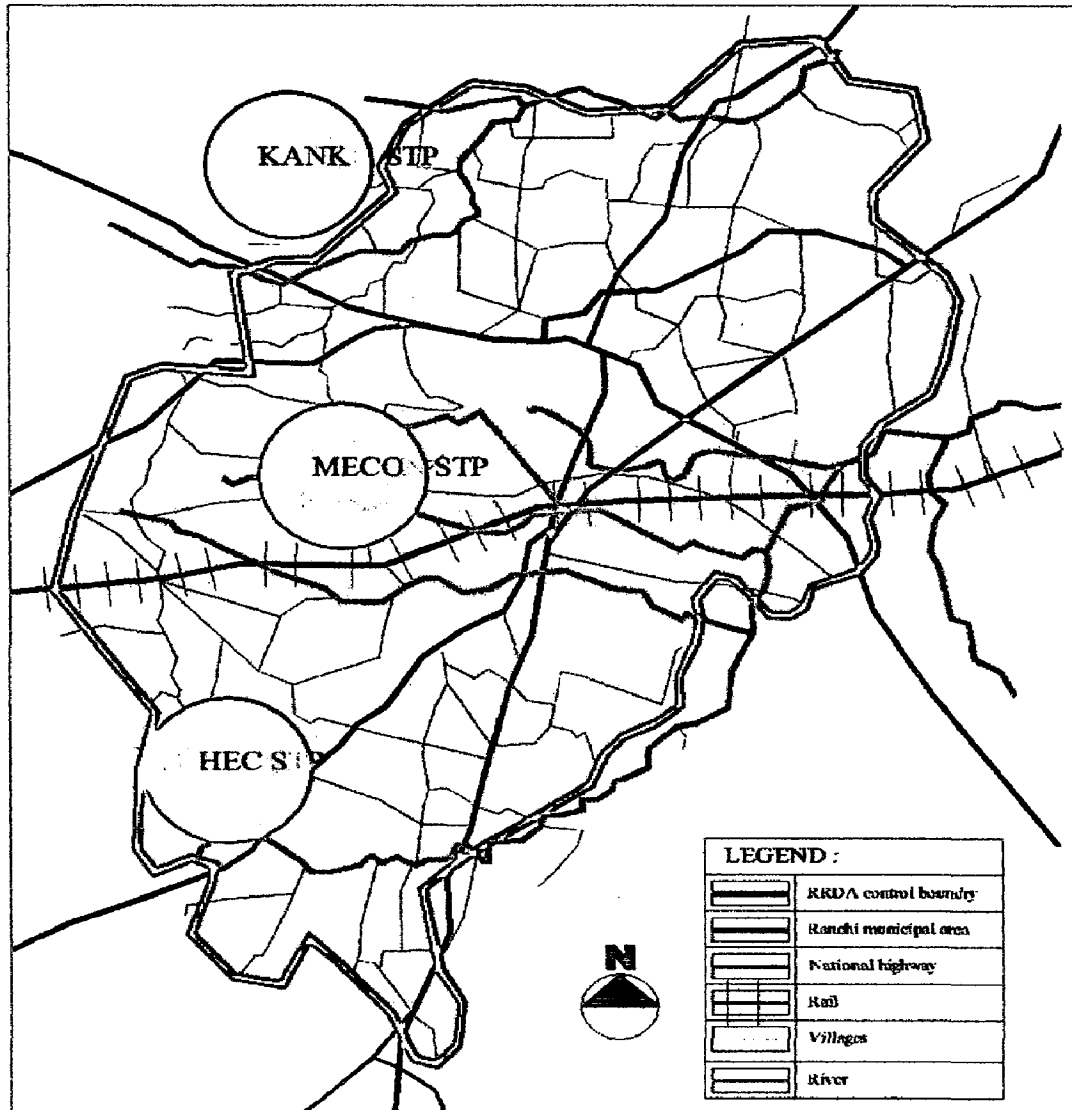


Map 3.5: Drainage network of Ranchi city
Source: Compiled from various sources

3. SOLID WASTE MANAGEMENT

- a. Primitive and inefficient Solid Waste Management system is being used.
- b. Only 18.75% population residing in 10 Wards out of 37 is being served by an NGO for door-to-door collection
- c. Inadequate number of bins
- d. Only 100 containers by RMC in public places
- e. Only one site being identified for Solid Waste disposal and processing

- f. Need of at least 3 more sites in all directions as shown to avoid thoroughfare of waste in the city.



Map 3.6: Location of STP in Ranchi city
Source: Compiled from various sources

3.4.13 DEMOGRAPHY

The population according to the 200 I census is 8,62,850 and that In 1991 was 5,99,306, average sex-ratio (1991) was 858 and the total number of households in 1991 were 1,00,624.

a) POPULATION GROWTH

The city has witnessed a phenomenal rise of population from 12,086 in 1871 to 8,62,850 in 2001, the average rate of growth being 43.8 %. The highest growth rate that could be measured is 70.70 % during the year 1951-61 because of development activities initiated by industrial and trade and commerce.

Table 3.2: Population growth trend in Ranchi

year	Total pop.	increase	decadal growth rate
1901	25970		
1911	32994	7024	27.05%
1921	44159	11165	33.83%
1931	57228	13069	29.61%
1941	62562	5334	-7.55%
1951	106849	44287	70.79%
1961	139437	32588	30.50%
1971	272298	132861	95.28%
1981	402771	130473	47.21%
1991	614454	211683	52.56%
2001	862850	248396	40.43%

Source: Census of India

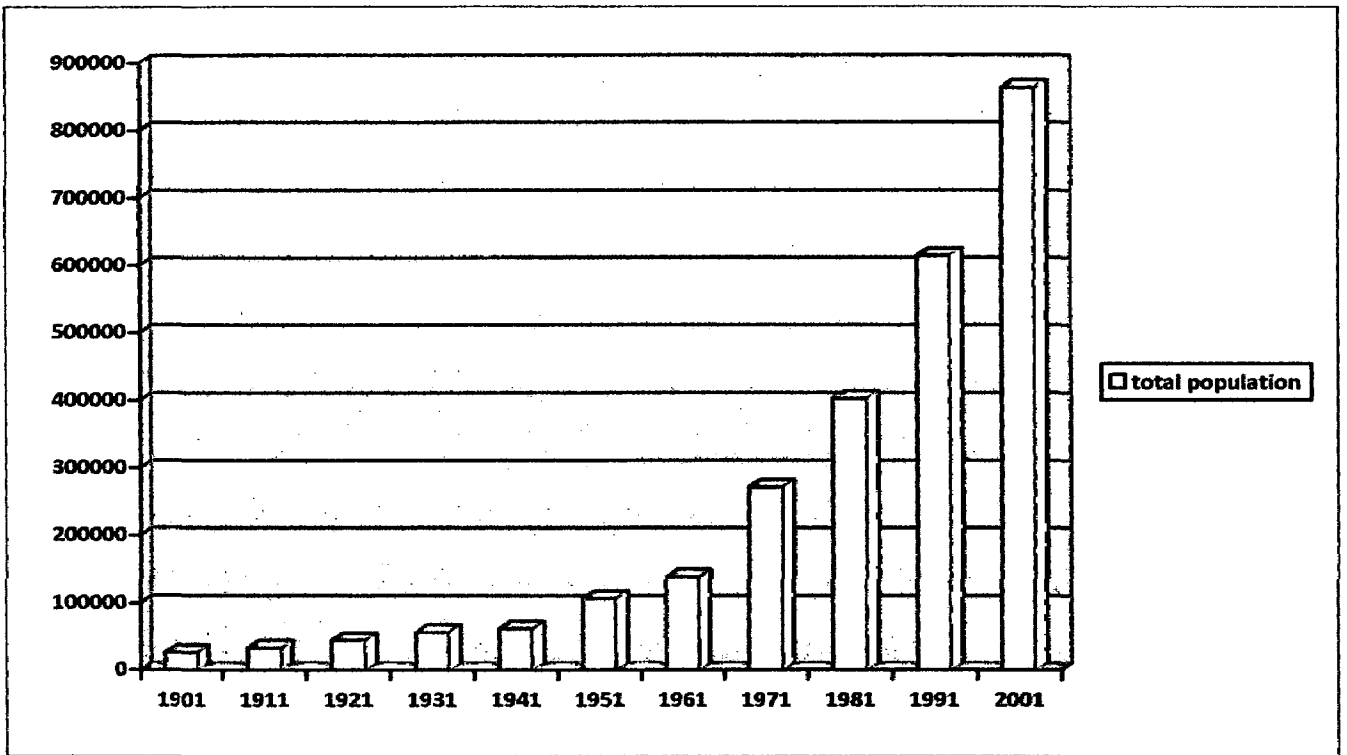


Fig 3.2: Population growth trend in Ranchi city
Source: Census of India

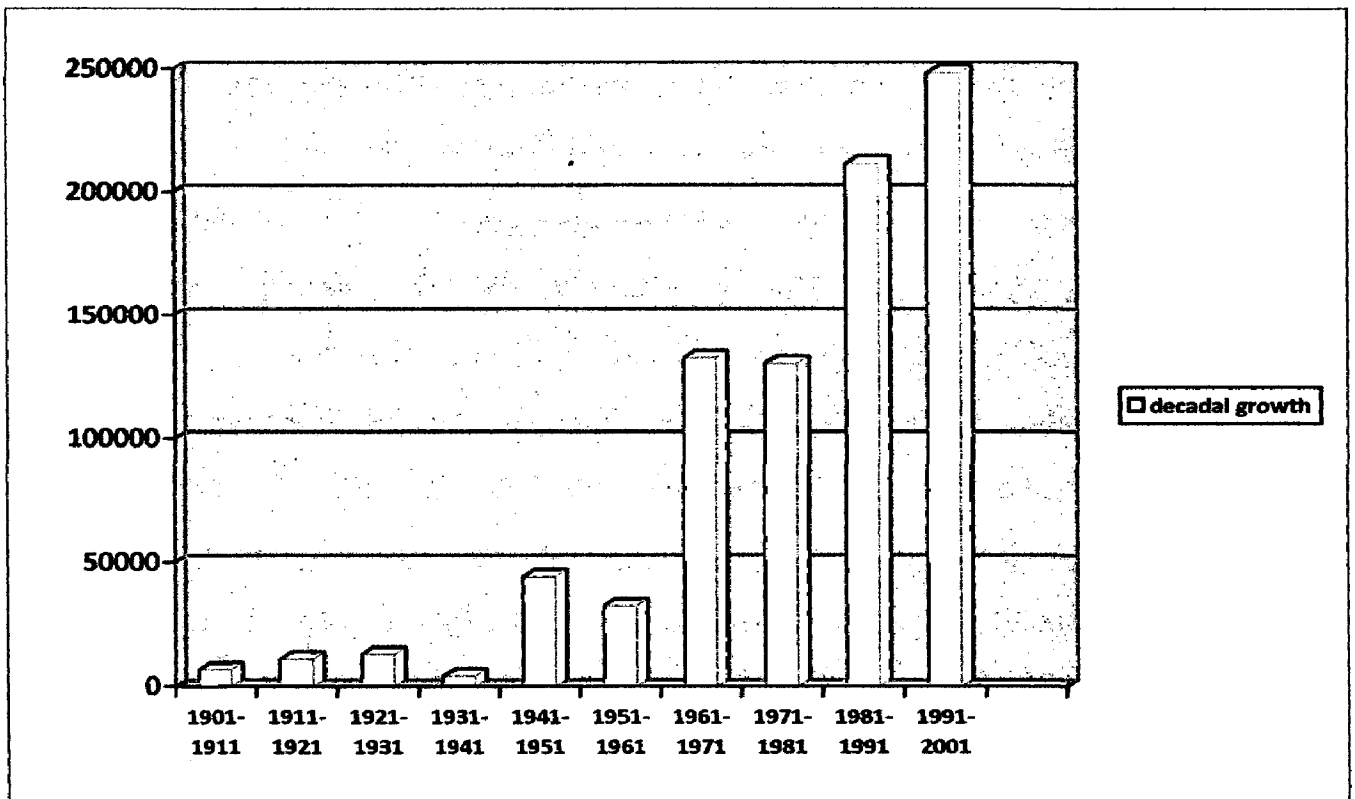


Fig 3.3: Decadal growth of population in Ranchi city
Source: Census of India

b) SEX RATIO

As per the 1991 census the sex ratio of the city was 858 and of 2001 is 859.

Table 3.3: Sex ration in Ranchi

year	Ranchi	Ranchi dist.	Jharkhand	India
2001	859	938	938	933
1991	858	921	922	926
1981	832			
1971	822			

Source: Census of India

c) LITERACY RATE

According to 1991 census the literacy rate of Ranchi was 82.49%. A comparative study of literacy rate of Ranchi city, Ranchi dist, Jharkhand and India is shown below:

Table 3.3: Literacy rate in Ranchi

Place	total	male	female
Ranchi	82.49%	71.97%	51.10%
Ranchi dist.	65.69%	77.76%	52.77%
Jahrkhand	54.13%	67.10%	39.30%
India	52.20%	64.10%	39.30%

Source: Census of India

d) POPULATION COMPOSITION

One of the main characteristic about the population of Ranchi is its composition. As the city lies in the tribal belt, 20% of the populations are tribal people.

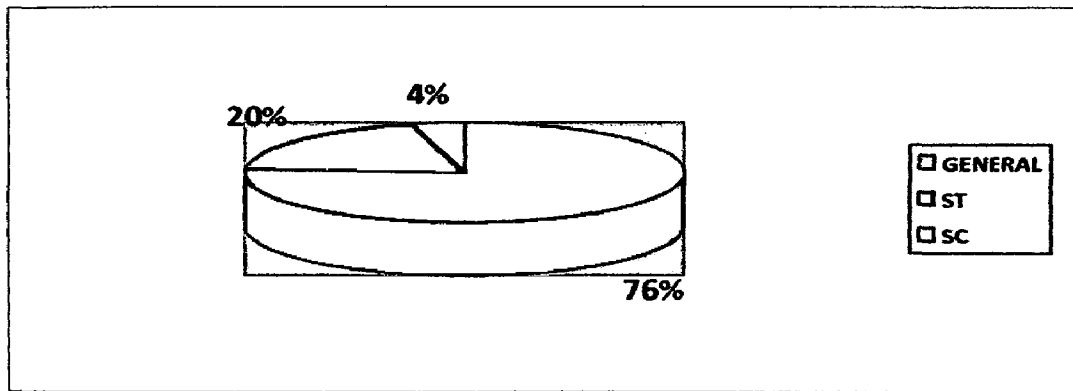


Fig 3.4: Population composition in Ranchi city
Source: Census of India

e) EMPLOYMENT PATTERN:

Work population rate as according to 1991 census is 24.67%. Out of the total working population 9% are in the primary sector, 10% in the secondary sector, and 81% in the tertiary sector.

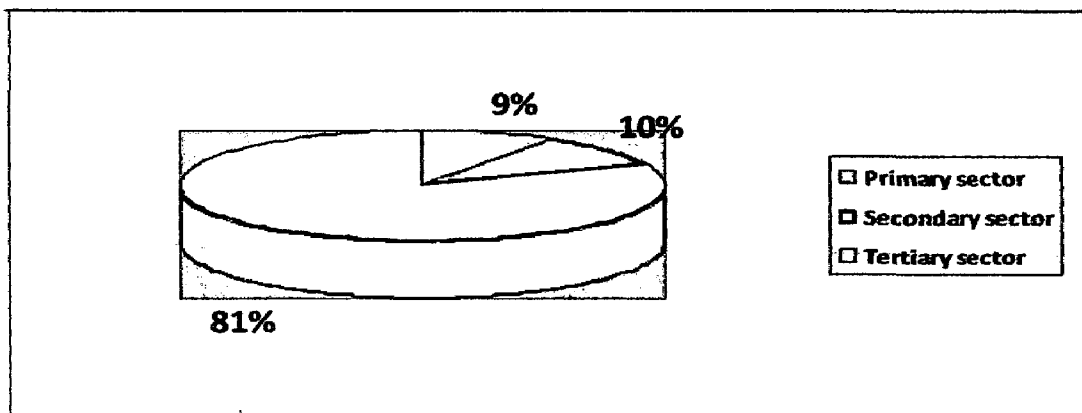


Fig 3.5: Employment pattern in Ranchi city
Source: www.jharkhandonline.gov.in

CONCLUSION

Thus this chapter tries to study the different aspects of the Ranchi city, to understand the direction of its growth and the current development pattern which the city is following, to understand the role the city will play at different level, enabling us to predict the growth trend and the direction for the Capital city.

4

ANALYSIS OF PROPOSED SITE FOR NEW TOWN

4.1 BACKGROUND

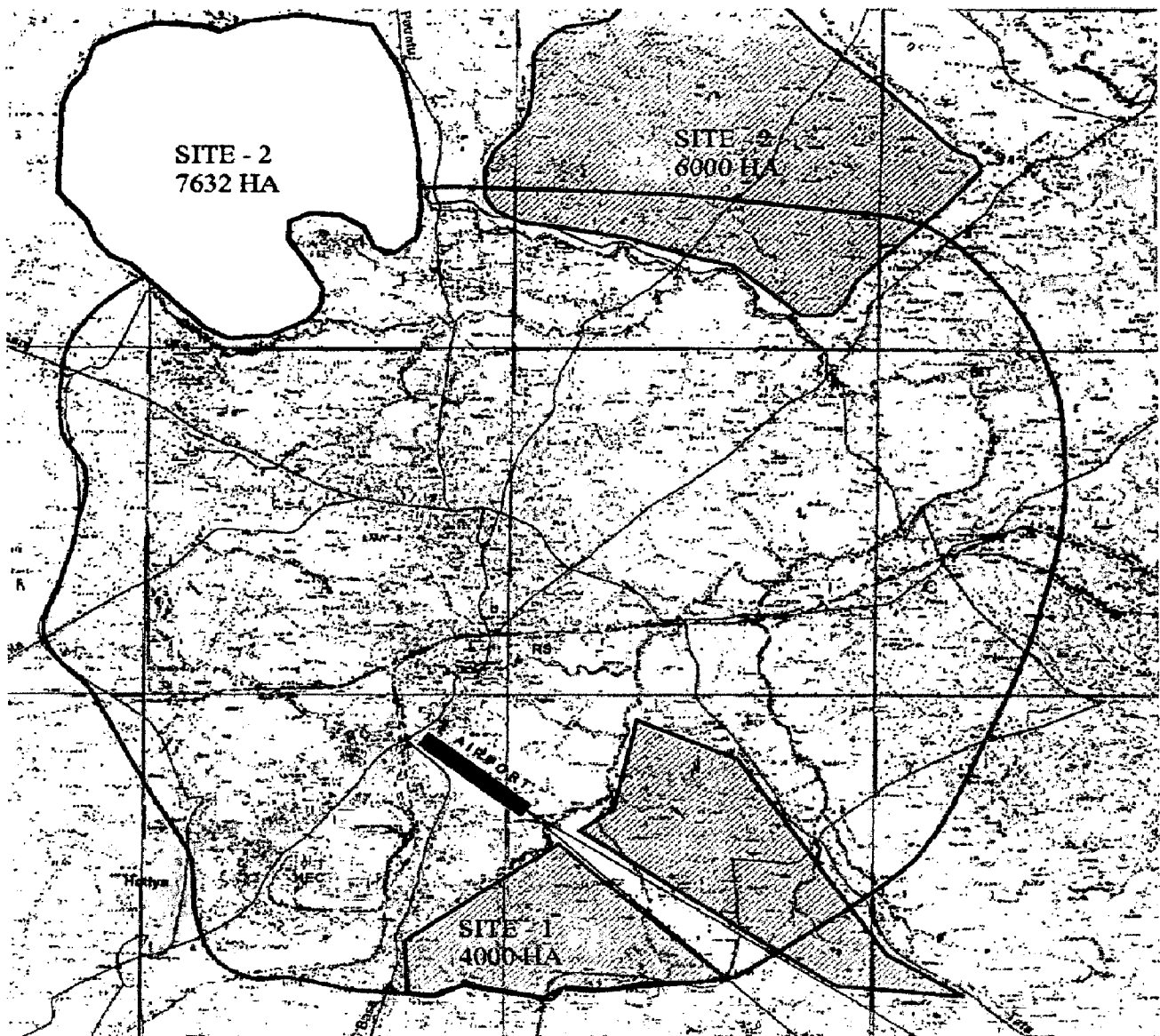
The creation of the new state of Jharkhand in the year 2000 has necessitated provision of appropriate buildings and infrastructure for proper governance and creating a city worthy to be capital of a resource rich and emerging state. At present these activities are carried out from premises located at different parts of the parent city (Ranchi) viz. State Assembly and a few departments of administration and development at HEC complex, de-facto secretariat and the High Court at Doranda, Governor and Chief Minister's residences at Kanke, other minister and MLAs residences scattered all over the city - some of them within the congested developed city core area, residences of administrative staff all around the city - grossly inadequate in supply etc. Some of the inherent problems associated with such an arrangement are:

1. Difficulty in co-ordination within and among the departments
2. Confusion and difficulty faced by the public in getting good governance
3. Chaos in commutation due to frequent VIP movement within congested area
4. Problems of security

4.2 SITE SELECTION

The greater Ranchi area covers the following:

1. Area falling within the proposed new capital complex
2. Area within jurisdiction of Ranchi Regional Development Authority (RRDA)
3. Additional area outside the existing RRDA area that may be required to accommodate further growth of Ranchi City.



*Map 4.1: Fig showing the location of the greater Ranchi site.
Source: City development plan.*

Three sites named, Site-1, Site-2 and Site-3 located on the fringe of Ranchi city apparently free of significant human habitat areas and population were identified through rapid reconnaissance survey.

The methodology adopted in selection of sites for location of the New Capital complex is given in the Site Selection Matrix below.

Table 4.1: Site selection through multi criteria analysis

s.n.	Parameter	Group	Score	Weight	Site 1	Site 2	Site 3
1	Distance from existing city	< 15 km	3	5	15	15	15
		15 - 50 km	2				
		> 50 km	1				
2	Terrain	Plain	3	5	10	5	15
		Rilling	2				
		Hilly	1				
		Not flood prone	2		10	10	5
		flood prone	1				
3	Connectivity	Road -					
		NH	2	8	16	8	16
		SH	1				
		On existing linkage	2		16	8	8
		On proposed linkage	1				
		Railhead					
		Existing Node	4	8	32	16	16
		< 5 km	3				
		5 - 10 km	2				
		> 10 km	1				
		Airport					
		< 5 km	3	5	15	5	5
		5 - 10 km	2				
> 10 km	1						
4	Power & telecommunication	Available	2	10	20	20	20
		Not available	1				
5	infrastructure dev. Suitability	Water					
		Source < 5 km	3	10	20	10	20

		source 5-10 km	2				
		source > 10 km	1				
		aquifer yield > 5 lt/sec	2		20	10	20
		aquifer yield < 5 lt/sec	1				
		Drainage					
		Natural slope	2	10	10	20	20
		Flat/ plain land	1				
		Waste disposal					
		Suitable	2	5	5	10	10
		Not suitable	1				
6	Land and physical dev. At site	least developed	3	7	14	14	21
		moderately developed	2				
		densly developed	1				
		population displacement					
		least	3	10	20	30	10
		medium	2				
		high	1				
		fallow land	3	10	20	30	10
		poor agri. Land	2				
		agri. Land	1				
		govt. land	2	10	10	20	10
		private land	1				
		On flight path	2	8	8	16	16
		not on flight path	1				
		good for contiguous dev.	3	8	8	16	24
		mod. Suitable for con. Dev	2				
		poor for con. Dev	1				

7	natural barrier/encroachment	good	3	5	10	10	15
		mod.	2				
		poor	1				
		future expan. Possibilities					
		good	3	8	8	24	16
		mod.	2				
		poor	1				
8	environment / ecology	exist. Lvl of pollution					
		low	2	10	20	20	20
		high	1				
		not on mineral diposite	2	10	20	20	20
		on mineral diposite	1				
		not on forest land	2	10	10	20	20
		forest land	1				
		9	security	preffered	2	10	10
		not preffered	1				
10	cost of development	least cost intensive	3	10	20	10	30
		moderatly cost intensive	2				
		cost intensive	1				
Cumulative score					367	387	392
Rank					3	2	1

Source: City development plan

Various factors influencing the choice of location were classified under ten broad parameters influencing choice. Each parameter was further broken down to its basic characteristic that affects choice, such as, location with respect to underground and mineral deposits, resident population number, connectivity with rail, road and airport facilities, availability of power and telecom facilities, type of land (fallow, agricultural

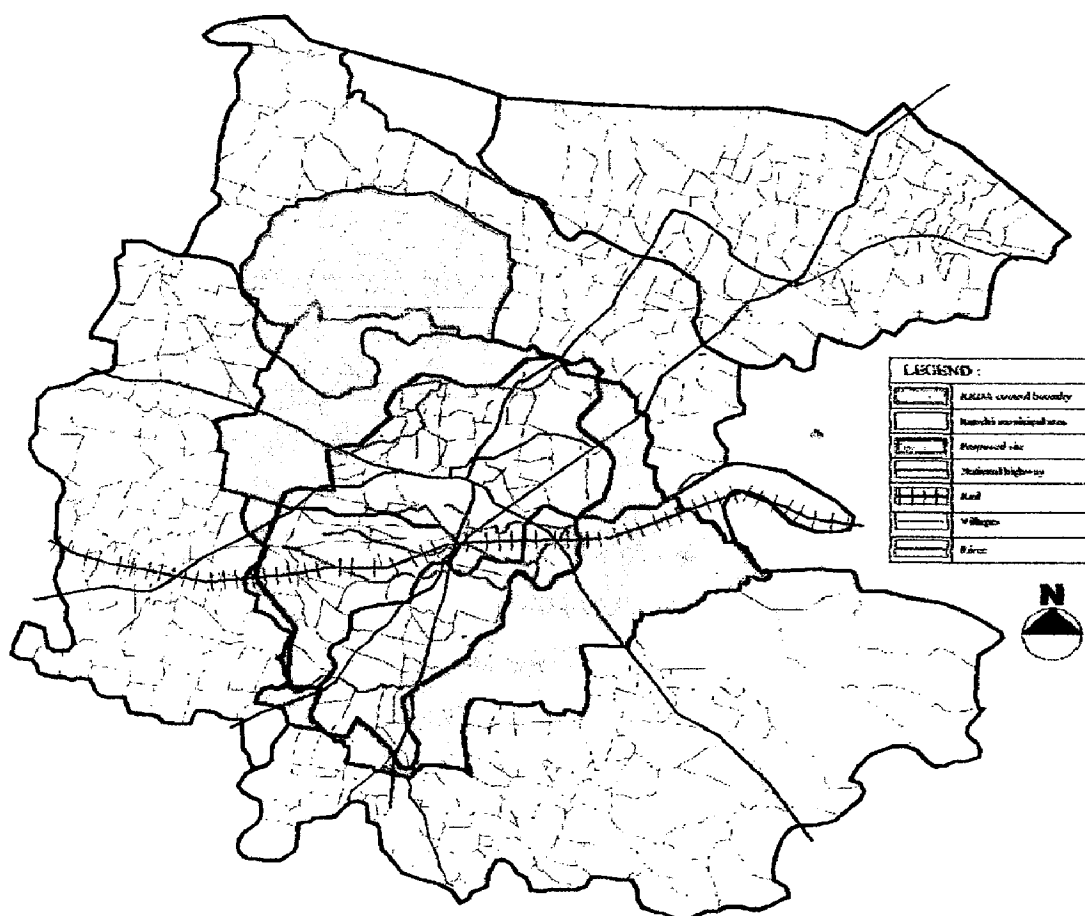
waste land, cultivable wastes land) etc. Weights were assigned to each of these factors depending on their relative merit and demerit.

Site 2 has certain distinct advantages over Site 3 for locating the core capitol buildings e.g.

1. Scenic beauty
2. Elevation and backdrop of rocky outcrops signifying strength and prominence
3. Ready availability of non-agricultural land under government possession
4. Least displacement of population, which could be avoided to a great extent by integrating them in-situ with the proposed developments.

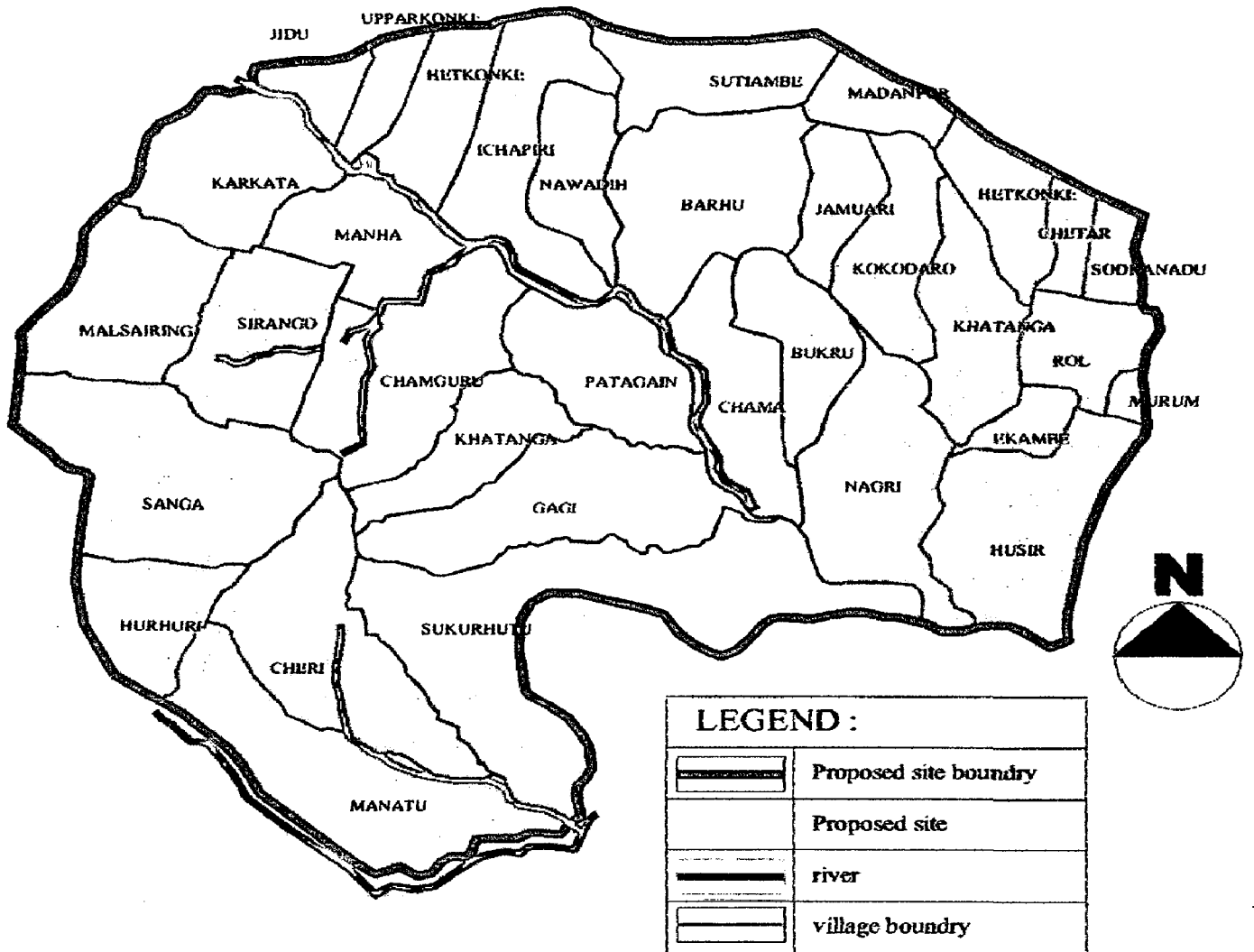
4.3 SITE AND SURROUNDING

4.3.1 LOCATION



*Map 4.2: Regional setup of Greater Ranchi
Source: Compiled from various sources*

4.3.2 SITE PLAN



Map 4.3: Fig showing the area falling within greater Ranchi site.
 Source: Compiled from various sources

4.3.3 BASE MAP



LEGEND:

	ROAD
	RIVER/NALA
	POWER LINE
	HABITATION
	CONTOURS
	ROCKY KNOBS
	TEMPLE
	MOSQUE
	IDGAH
	HOSPITAL
	OVERHEAD TANK
	TREE
	PROPOSED RING ROAD
	RRDA BOUNDARY
	PROPOSED RESERVOIR

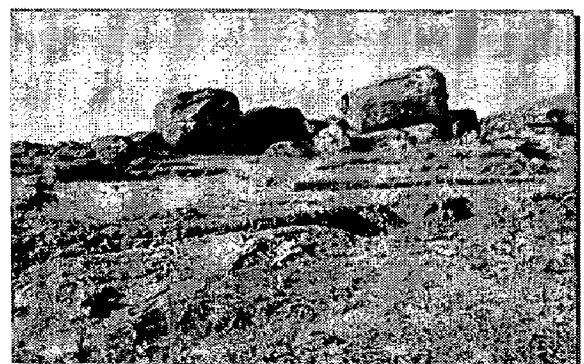
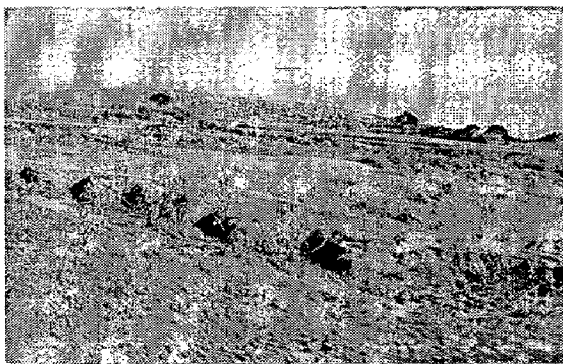
Map 4.4: Base map of greater Ranchi site.
Source: City development plan.

4.3.4 PHYSIOGRAPHY

The site selected for the new Capital Complex and its complementing activities viz. housing and other ancillary requirement of various types including its support population could also accommodate certain share of pressure created out of population growth in the parent city (Ranchi). Distinct and prominent natural features as well as clear physical boundaries like roads and watercourses etc. bound the site. The road bordering the northern boundary of the site stretches East-West from Thakurgaon to Hazaribagh Road through Pithauria. The proposed Ring Road and a prominent village called Sukurhutu fence the southern and south-eastern side. Two natural water channels, Sanga Nala and Potpoto Nadi, flow along the western and the southern most peripheries. The village boundaries of Husir, Murum and Batta form the eastern boundary of the site. The site is about 20 kms from the core area of Ranchi city

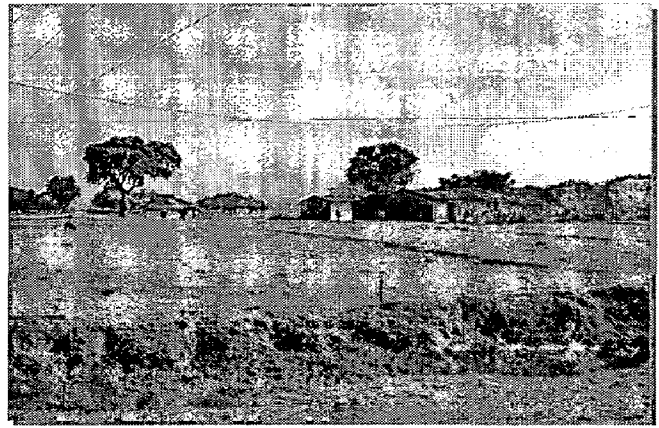
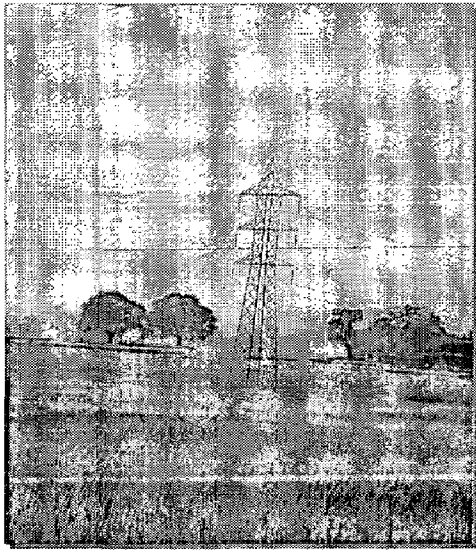
4.3.5 PLANNING AND DEVELOPMENT CONSTRAINTS

1. In general the site is marred by a number of rain cuts which flow in to the Potpoto in south or Jumar basin in the north. The site has natural gradient flowing mostly in the west to east direction. The central ridgeline (in Site 2) acts as the watershed where the streams take a general north-south or south-north slope to flow into the Potpototo or Jumar Nadi respectively. At some places such gradients are quite steep;



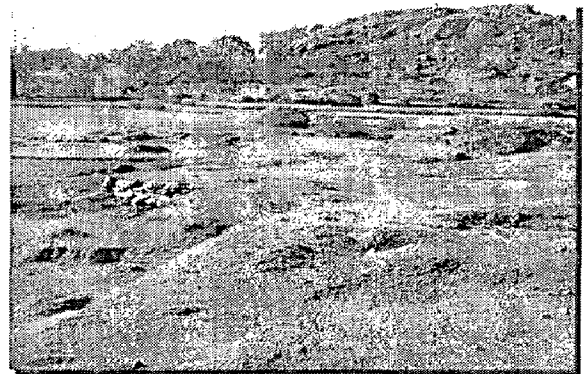
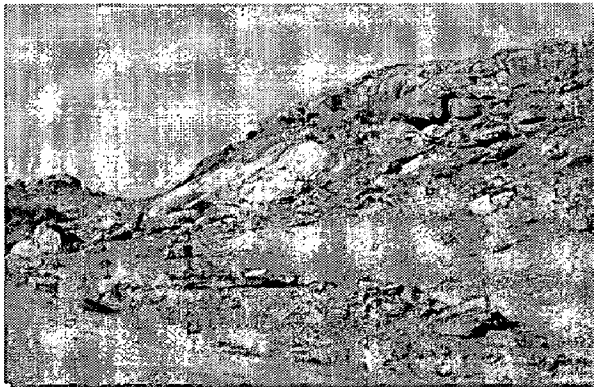
*Plate 4.1, 4.2: Topography of the site
Source: By author*

2. Two high tension lines run north-south through the middle of the site and create hindrance for contiguous development;



*Plate 4.3, 4.4: High tension electricity line passing through site
Source: By author*

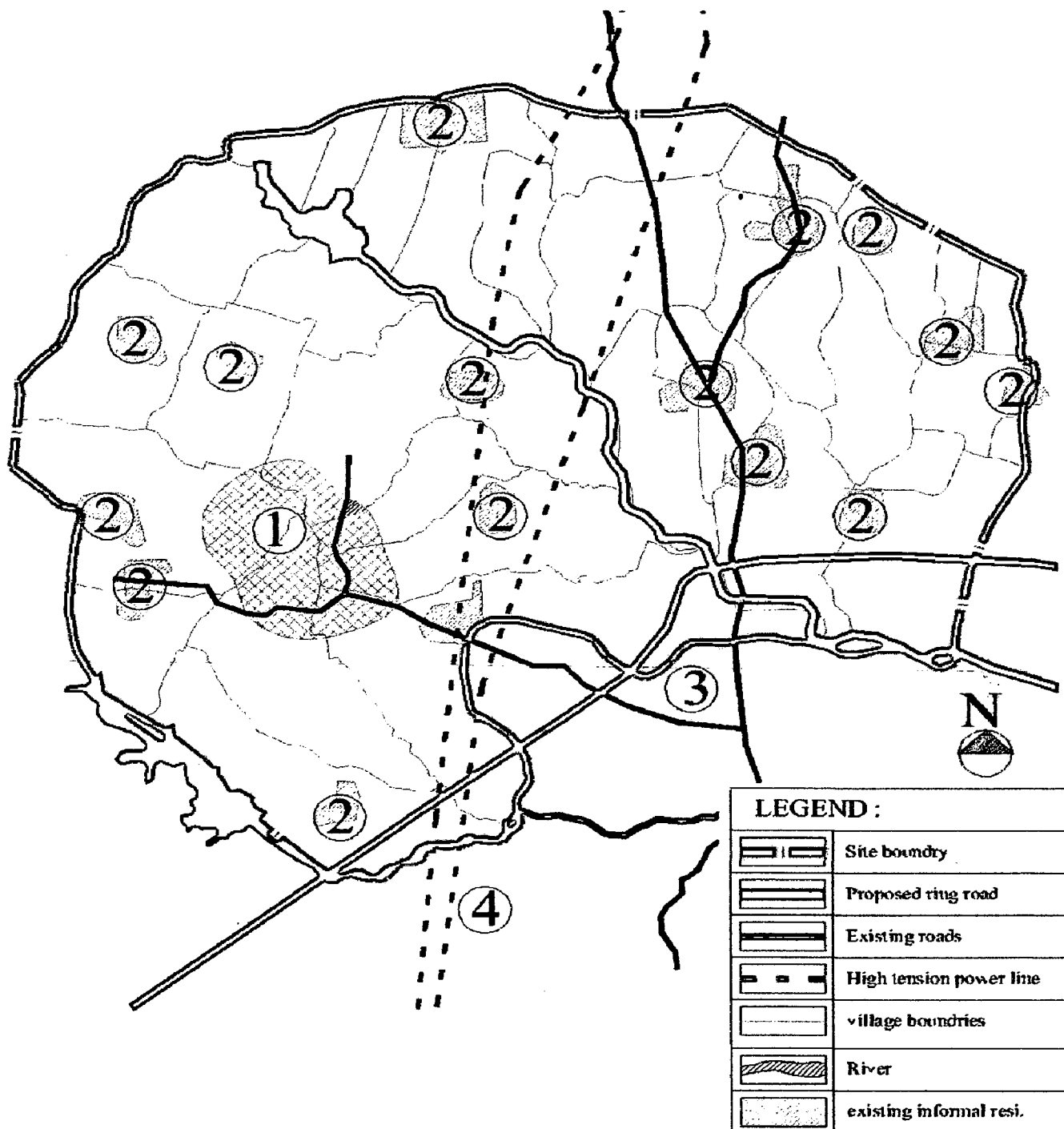
3. Hillocks and Rocky outcrops spread over large areas within the site are not conducive for any major construction activity in a contiguous manner;



*Plate 4.5, 4.6: steep slopes and hillocks at the proposed site
Source: By author*

4.3.6 PLANNING AND DEVELOPMENT POTENTIAL

Despite the constraints mentioned above, the site offers a number of opportunities to plan and develop a core administrative complex in a serene and pristine set up. Some of these are listed below:



*Map 4.5: map showing the existing features within the proposed site
Source: Analysis by author*

1. Hillocks interspersed with rocky knobs, which if treated carefully could offer a unique ecological zone for identity and prominent pedestal for locating core capital functions.

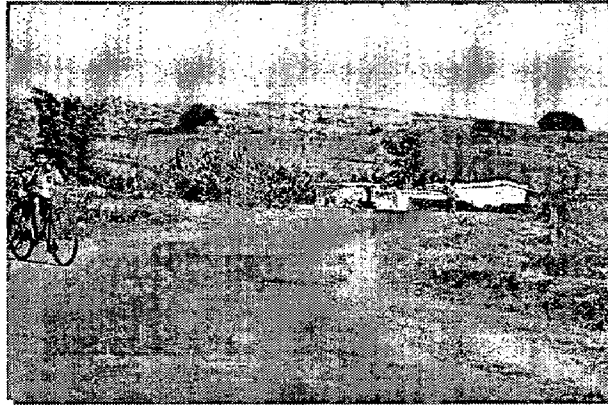


Plate 4.7: steep slopes and hillocks at the proposed site
Source: By author



Plate 4.8: Gentle slope at the proposed site
Source: By author

2. A sparsely habited area needing very little displacement of population for land development.



Plate 4.9, 4.10: Existing settlements with in the site
Source: By author

3. The proposed ring road integrates the site veil with the transport nodes viz. railway terminal, airport etc.
4. Two high tension lines passing through the site require a green belt on either side to run along and to be maintained as 'no construction zone', This offers opportunity for development of two continuously flowing green belts which otherwise would be difficult to retain in the long run;

4.3.7 MORPHOLOGY

The site is physically divided into three parts by the natural features like rivers and hillocks. The hillocks towards the Western periphery create beautiful gorges, which are the major originating sources for the two rivers - Jhumar & Potpoto. Besides the two rivers there are a number of tributaries, which flow through the site.

There are a few hamlets (tolas) mainly occupied by labors working in the stone quarries and thinly populated villages surrounded by agricultural fields (not of very good quality) scattered around the site. As a whole, the natural setting offers an excellent environment to bring about a balance between the natural green and man made developments.



Plate 4.11, 4.12: Congested approach road through the villages

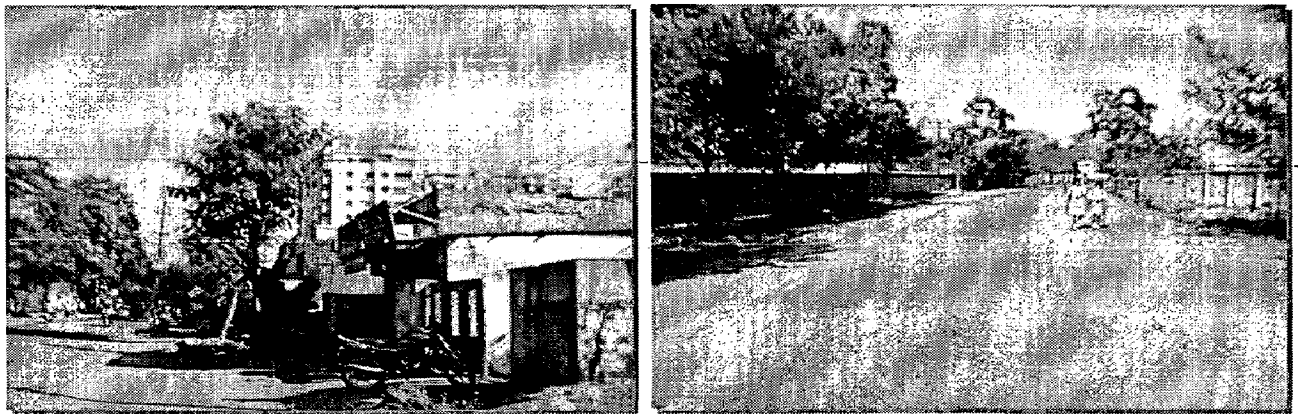
Source: By author



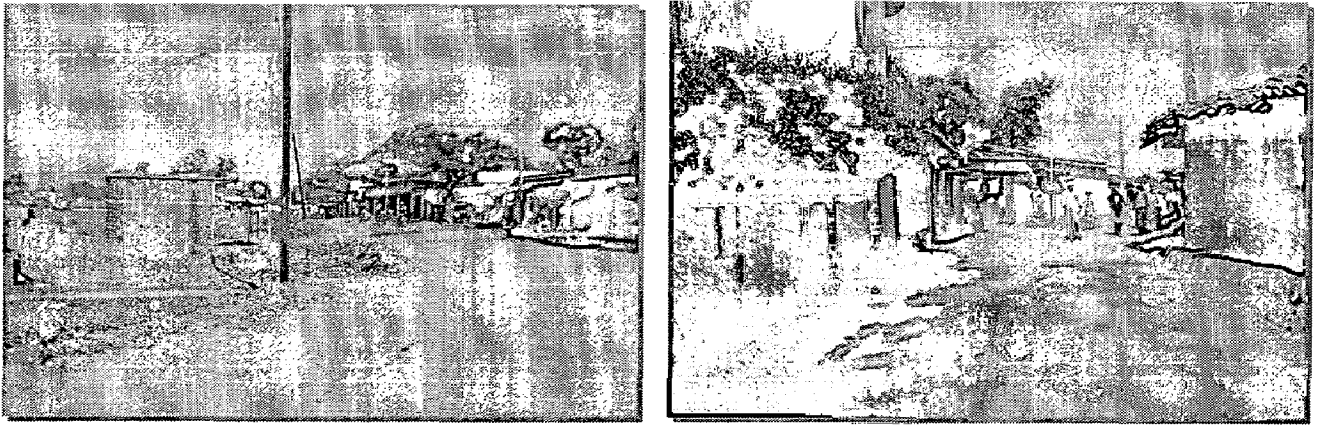
*Plate 4.13, 4.14: Agricultural land falling within the proposed site
Source: By author*

4.3.8 LINKAGES AND APPROACH TO THE SITE

The present access to the site is by the road passing Sukurhutu Village that takes off from Patratu Road at Kanke. It is a narrow road mostly used by the village traffic. However, the stretch of road passing through the densely developed Sukurhutu village is a bottleneck for widening and use by heavy traffic.



*Plate 4.15, 4.16: The main road connecting the site through the city
Source: By author*



*Plate 4.17, 4.18: approach roads through villages to the proposed site
Source: By author*

Another approach to the site is from Rantu side (Ranchi- Daltonganj road), which is a narrow and Kuchha road. The distance from Ranchi to the site through this road is much longer than Sukurhutu road and is not used that frequently. The Jumar Nadi in the north and the Potpoto River in the south act as natural barriers for any permanent access to the site.

INFERENCES

Analyzing the site – 2 from the selected 3 sites for the capital city, it is concluded that the site has all the potentials and recourses to be developed as Capital town. In the next chapter the planning projections are discussed.

5

PROJECTIONS AND PLANNING APPROACH

5.1 BACKGROUND

Capital cities throughout the ages have always been conceived as status symbols of the civilization of their time and physical expression of the social, cultural, and economic advancement of the region in its setting. Thus, Greater Ranchi as per the scheme of development, keeping in mind the role the city played and will play in near future, is essentially conceived as a multifunctional city. As a capital city it should serve its region and provide its inhabitant with a-

1. Good environmental quality
2. Up-gradation of existing Ranchi to meet the deficiency in physical and social infrastructure
3. Development of the appropriate core capital facilities for the governance of the state

The new state of Jharkhand would require planning and development of government offices for its capital including the executive legislative and judicial function of the state, together with the allied aspects of housing, transportation and civic infrastructure.

5.2 SIZE OF THE CITY

For any capital city to function efficiently it would require 10,000 populations to be employed in the main capital function. The distribution is as shown below:

Table 5.1: work force for the Capitol complex.

s.n.	Function	no. of workers
1	Secretariate	5000
2	Assembly Building	1050-1200
	Legislative council	800
	Legislative assembly	250
3	High- court	1000-1200
4	Governer's house	225-250
5	Total	10,000 (approx)

Source: Compiled from various sources.

Projecting the population of the town for the year 2011 –

Assuming the size of 5 persons / family

$10,000 \times 5$ (workforce for capital function) + 16444×5 (the current housing shortage in the Ranchi city) = $50,000 + 82,220 = 1, 32,220$ persons.

Some % of the population would also be engaged in service sector, so assuming the size of the capital city in the year 2011 will be approximately 1, 50,000 persons.

Assuming the population growth trend of the capital city will be same as that of the Ranchi city (41.2 % decadal growth rate), projecting the population for future –

Table 5.2: population projection for greater Ranchi

year	population
2011	1,50,000
2021	2,11,800
2031	3, 00,000 app.

Source: By author

5.3 PROJECTING THE SERVICES

5.3.1 PHYSICAL INFRASTRUCTURE

a. WATER SUPPLY

Table5.3: Projected physical infrastructure (water supply).

Phase	Year	Population	Req. (@ 160 lpcd)
Phase 1	2011	1,50,000	2,40,00,000 lpd
Phase 2	2011 - 2021	2,11,800	3,38,88,000 lpd
Phase 3	2021 - 2031	3,00,000	4,80,00,000 lpd

Source: Analysis by Author

b. SEWERAGE

Table5.4: Projected physical infrastructure (Sewerage).

Phase	Year	Population	w.s. (@ 160 lpcd)	Sewerage (80% of w.s.)
Phase 1	2011	1,50,000	2,40,00,000 lpd	19200000 lpd
Phase 2	2011 - 2021	2,11,800	3,38,88,000 lpd	27110400 lpd
Phase 3	2021 - 2031	3,00,000	4,80,00,000 lpd	38400000 lpd

Source: Analysis by Author

c. ELECTRICITY

Table5.5: Projected physical infrastructure (Electricity).

Phase	Year	Population	electricity @ 11kv subs /15000 ppl
Phase 1	2011	1,50,000	10
Phase 2	2011 - 2021	2,11,800	14
Phase 3	2021 - 2031	3,00,000	20

Source: Analysis by Author

d. SOLID WASTE*Table5.6: Projected physical infrastructure (Solid waste).*

Phase	Year	Population	solid waste(@ ¼ th kg per capita/day)
Phase 1	2011	1,50,000	37500 kg/day
Phase 2	2011 - 2021	2,11,800	52950 kg/day
Phase 3	2021 - 2031	3,00,000	75000 kg/day

*Source: Analysis by Author***5.3.2 SOCIAL INFRASTRUCTURE****a. COMMERCIAL AREA***Table5.7: Projected social infrastructure (Commercial area).*

facility	2011	2021	2031
cluster center /(4000)	37	53	75
sector center / (20,000)	7	11	15
community center / (50,000)	3	4	6
district center	1	1	1

*Source: Analysis by Author***b. EDUCATIONAL FACILITY***Table5.8: Projected social infrastructure (Educational).*

facility	2011	2021	2031
nursery school / 2500	60	85	120
primary school / 4000	37	53	74
secondary school / 7500	20	28	40
integrated school / 1,00,000	1	2	3
school for handicapped / 50,000	3	4	6
college	1	1	1

Source: Analysis by Author

c. HEALTH FACILITY*Table5.9: Projected social infrastructure (Health facility).*

facility	2011	2021	2031
general hospital / 2,50,000	1	1	2
intermediate hospital / 1,00,000	1	2	3
poly clinic / 1,00,000	1	2	3
nursing home / 1,00,000	1	2	3
dispensary / 15,000	10	14	20

*Source: Analysis by Author***d. SOCIO-CULTURAL FACILITY***Table5.10: Projected social infrastructure (Socio cultural).*

facility	2011	2021	2031
community room / 5000	30	42	60
community hall / 15,000	10	14	20
recreational club / 1,00,000	1	2	3
music, drama center / 1,00,000	1	2	3
meditation and spiritual / 1,00,000	1	2	3

*Source: Analysis by Author***e. OTHER FACILITY***Table5.11: Projected social infrastructure (Other facility).*

Facility	2011	2021	2031
petrol / service station / 25,000	6	8	12
milk booth / 5000	30	42	60
LPG godowns / 50,000	3	4	6
police station / 1,00,000	1	2	3
fire station / 1,00,000	1	2	3
electric substation / 25,000	6	8	12
post office / 40,000	4	5	7
telephone exchange / 1,00,000	1	2	3

Source: Analysis by Author

5.4 AREA ANALYSIS

Table 5.12: Area analysis for the projected physical / social infrastructure

s.n.	area allotment	2011	2021	2031
1	residential area			
	no. of sectors / 20,000 ppl	8	11	15
	area/ sector (gross density 100 ppa)	200x8 = 1600 acres	200x11 = 2200 acres	200x15 = 3000 acres
	net residential area (net density 150 ppa)	133x8 = 1064 acres	133x11 = 1463 acres	133x15 = 1995 acres
2	commercial area			
	cluster centre	37x0.01 ha = 0.37 ha	53x0.01 ha = 0.53 ha	75x0.01 ha = 0.75 ha
	sector center	7x0.6 ha = 4.2 ha	11x0.6 ha = 6.6 ha	15x0.6 ha = 9 ha
	community center	3x2.5 ha = 7.5 ha	4x2.5 ha = 10 ha	6x2.5 ha = 12.5 ha
	district center	1x17.6 ha = 17.6 ha	1x17.6 ha = 17.6 ha	1x17.6 ha = 17.6 ha
	total	29.67 ha = 73.31 acres	34.73 ha = 85.81 acres	39.85 ha = 98.47 acres
3	capita functions	500 acres		
4	office space	150 acres		
5	educational			
	nursery school	60x0.08 ha = 4.8 ha	85x0.08 ha = 6.8 ha	120x0.08 ha = 9.6 ha
	primary school	37x0.4 ha = 14.8 ha	53x0.4 ha = 21.2 ha	74x0.4 ha = 29.6 ha
	senior secondary	20x1.6 ha = 32 ha	28x1.6 ha = 44.8 ha	40x1.6 ha = 64 ha
	integrated school	1x3.5 ha = 3.5 ha	2x3.5 ha = 7 ha	3x3.5 ha = 10.5 ha
	school for handicapped	3x0.5 ha = 1.5 ha	4x0.5 ha = 2 ha	6x0.5 = 3 ha
	higher education	1x1.8 ha = 1.8 ha	1x1.8 ha = 1.8 ha	1x1.8 ha = 1.8 ha
	total	58.4 ha = 144.30 acres	83.6 ha = 206.58 acres	118.5 ha = 292.8 acres

6	health care			
	general hospital	1x4 ha = 4 ha	1x4 ha = 4 ha	2x4 ha = 8 ha
	intermediate hospital	1x2.7 ha = 2.7 ha	2x2.7 ha = 5.4 ha	3x2.7 ha = 8.1 ha
	polyclinic	1x0.3 ha = 0.3 ha	2x0.3 ha = 0.6 ha	3x0.3 ha = 0.9 ha
	nursing home	1x0.3 ha = 0.3 ha	2x0.3 ha = 0.6 ha	3x0.3 ha = 0.9 ha
	dispensary	10x0.08 ha = 0.8 ha	14x0.08 ha = 1.12 ha	20x0.08 ha = 1.6 ha
	total	8.1 ha = 20.01 acres	11.72 ha = 28.96 acres	19.5 ha = 48.18 acres
7	socio-cultural facilities			
	community room	30x0.06 ha = 1.8 ha	42x0.06 ha = 2.52 ha	60x0.06 ha = 3.6 ha
	community hall	10x0.2 ha = 2 ha	14x0.2 ha = 2.8 ha	20x0.2 ha = 4 ha
	recreational club	1x1 ha = 1 ha	2x1 ha = 2 ha	3x1 ha = 3 ha
	music, dance center	1x0.1 ha = 0.1 ha	2x0.2 ha = 0.4 ha	2x0.3 ha = 0.6 ha
	meditation and spiritual center	1x0.5 ha = 0.5 ha	2x0.5 ha = 1 ha	3x0.5 ha = 1.5 ha
	total	5.4 ha = 13.34 acres	8.72 ha = 21.54 acres	12.7 ha = 31.38 acres
8	other services			
	petrol / service station / 25,000	6x0.1 ha = 0.6 ha	8x0.1 ha = 0.8 ha	12x0.1 ha = 1.2 ha
	milk booth / 5000	30x0.01 ha = 0.3 ha	42x0.01 ha = 0.42 ha	60x0.01 ha = 0.6 ha
	LPG godowns / 50,000	3x0.45 ha = 1.35 ha	4x0.45 ha = 1.8 ha	6x0.45 ha = 2.7 ha
	police station / 1,00,000	1x1.5 ha = 1.5 ha	2x1.5 ha = 3 ha	3x1.5 ha = 4.5 ha
	total	3.75 ha = 9.26 acres	6.02 ha = 14.87 acres	9 ha = 22.23 acres
	fire station / 1,00,000	1x1.2 ac = 1.2 ac	2x1.2 ac = 2.4 ac	3x1.2 ac = 3.6 ac
	electric substation / 25,000	6x4 ac = 24 ac	8x4 ac = 32 ac	12x4 ac = 48 ac
	post office / 40,000	4x0.125 ac = 0.5 ac	5x0.125 ac = 0.62 ac	7x0.125 ac = 0.87 ac
	telephone exchange / 1,00,000	1x0.25 ac = 0.25 ac	2x0.25 ac = 0.5 ac	3x0.25 ac = .75 ac

	total	25.95 acres	35.52 acres	53.22 acres
9	recreational facility			
	parks - 4 acres / 1000 ppl	600 acres	847 acres	1200 acres
10	grand total	3136.17 acree	3440 acres	4746.38 acres

Source: Analysis by Author

5.5 PLANNING APPROACH

The natural configuration & features and the existing access to the site have been considered as the main guiding factors in formulating a broad Concept Plan and land use distribution.

5.5.1 ACCESS TO THE SITE AND USE OF PROPOSED RING ROAD

Major access to the site, till the proposed Ring Road is built, shall be by the two roads originating from Kanke. One is heading towards West through the village Sukurhutu and the other towards North, Patratu Road. Once the Ring Road is constructed - that will become the major access to the township by passing the crowded roads of the existing city.

5.5.2 PROPOSED ROAD NETWORK

- a. Follow the natural contour lines as far as possible to cause minimum environmental disturbance.
- b. The basic road network is planned to compliment the functional hierarchy of different activities, and therefore a hierarchy of road linkages are proposed to connect the different part of the road.
- c. Pedestrian and personal transport or vehicular access to all parts of neighborhood through an internal network of roads.

5.5.3 USE OF NATURAL CONTOURS

After clearly demarcating the eco-sensitive area, relatively higher locations offering important areas have been chosen for locating the core capital buildings

5.5.4 LAND UTILIZATION CONCEPT

- a. Segregation of major uses - administrative and others
- b. Spine development for the core capital complex

5.5.5 PROPOSED CITY STRUCTURE

- a. Central Eco-zone
- b. Core administrative area

5.5.6 DEVELOPMENT OF THE CAPITOL COMPLEX

The following considerations have been taken into account while developing the structure and the land use pattern in the core capital complex.

a. ACCESS CONTROL

1. Close to Ring Road
2. VIP movement will not create any delays to general traffic
3. Immediate adjoining road can be closed for security reasons (if necessary)

b. SITE

1. Relatively less steep but developable
2. Hillock at the background creates a backdrop

c. SECURITY

1. On the West - hillock
2. On the East - H.T.Lines -permanent green strip of about ½ km width
3. Ring Road (limited access) on the South

INFRENCES

As discussed above the physical parameters and social aspects are mentioned and certain important factors to be highlighted and on that basis land use planning is being taken up for the Capital town. The chapter 6 would cover the final proposals.

6

PROPOSALS AND RECOMMENDATIONS

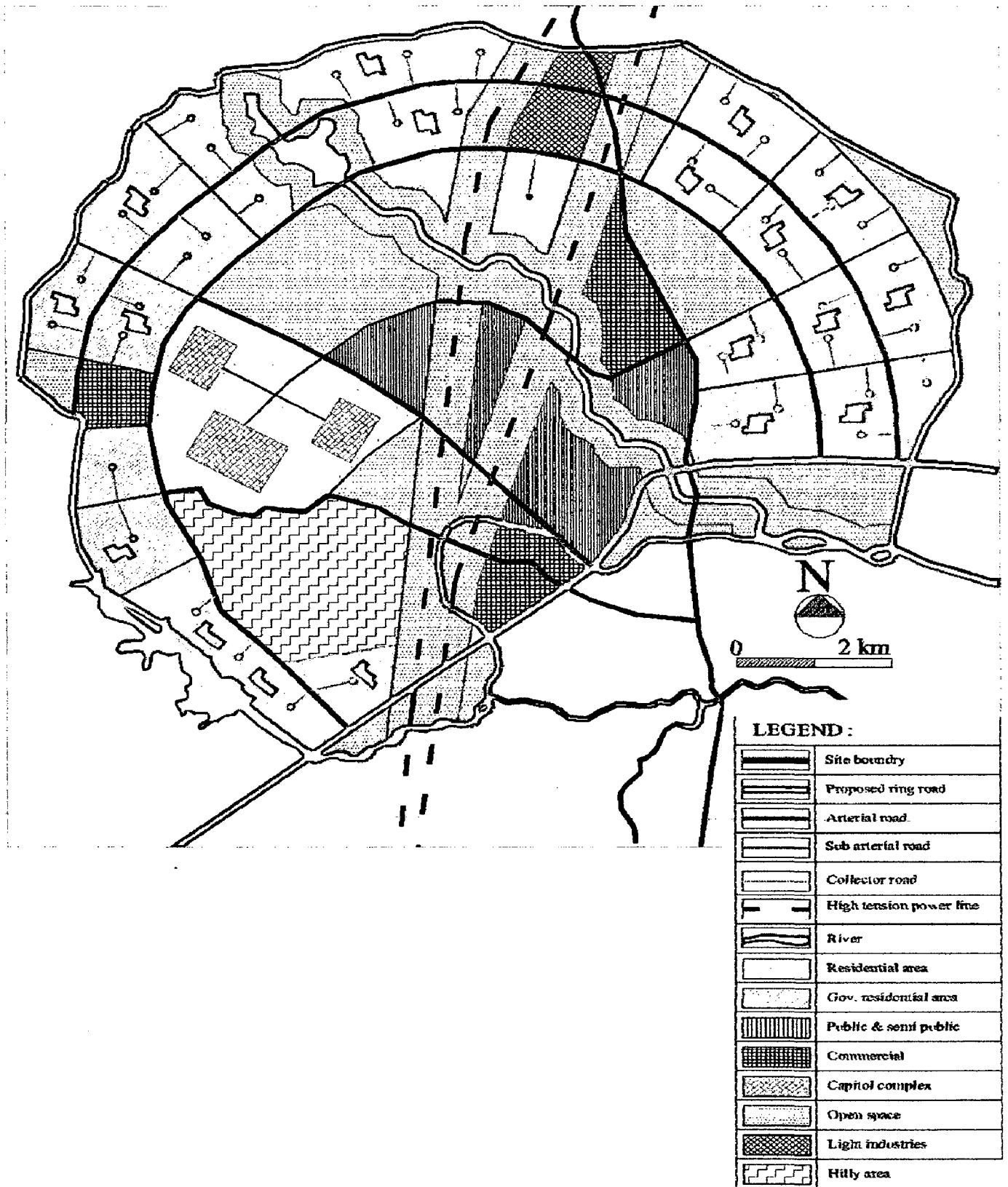
6.1 THE PLAN

The physical elements of a city can be divided into three categories – networks, buildings and open spaces. Many alternative arrangements of these components have been tried throughout these past years, but no ideal city form has ever been agreed upon.

Therefore based on the plan objectives and the guidelines determined for the capital township, the structure plan is evolved, considering and selecting over various alternative solutions. The final concept is shown in the *Map 6.1*.

6.1.1 SALIENT DESIGN FEATURES

1. The township is proposed to be developed in such a way that it maintains its identity as a capital head of the city and at the same time complements the existing development.
2. The area required for this township has been worked out is 1920.79 ha. (4746.38) acres but keeping in mind the future expansion the total area considered for this township by the government is 7632 ha.
3. Therefore it is proposed to have a green belt on all sides which will segregate this capital township and provide it with different settings and at the same time serve as a buffer against the hazards the abutting roads pose for the township.
4. The river and the two high tension electrical lines passing through the site physically divide the site in 2 parts. The 1st part on the left side basically holds all the administrative functions, the capitol complex, govt. offices and residences. And the 2nd part on the right side holds all the residential, commercial and public services required to support the city.



Map 6.1: Proposed structure plan of greater Ranchi
 Source: Compiled by author from analysis

“Blue print for the New Capital Town – “Greater Ranchi - 2030”

Table 6.1: Proposed land use break up for Capital Township.

s.n.	land use	area (acres)	%
1	Total area	18859	
2	development area	4746	100
3	residential	1995	42
4	Trade and commerce	190	4
5	industrial	46	1.33
6	public and semi public uses	447	9.41
7	open spaces	1200	25.2
8	roads	850	17.9

Source: Compiled by author from analysis

6.1.2 BUILT FORM

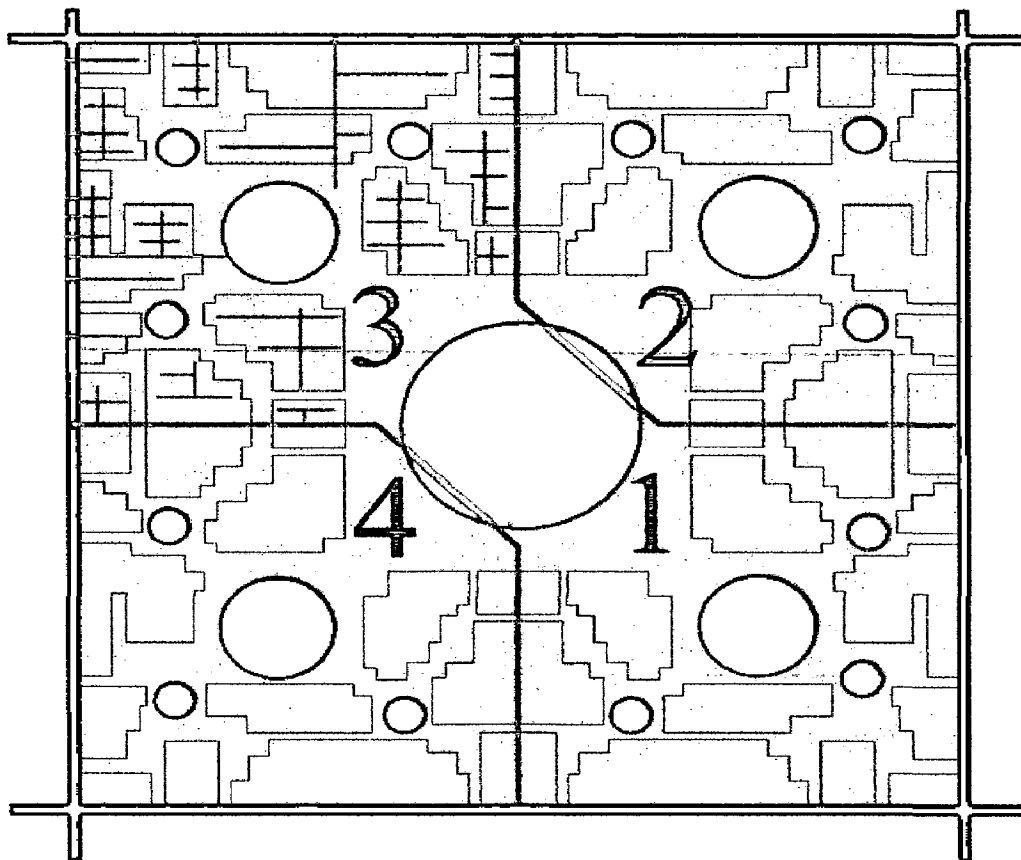
The built form and the scale of development would not be overwhelming and thus would be in harmony. This would be reflected by the relatively ‘human-scale’ of development in the backdrop of natural elements – hillocks, green belts, water bodies etc. The landscaped fore-court between the buildings could be designed to accommodate public forums and gatherings at appropriate locations for special ceremonial addresses.

6.1.3 CAPITOL COMPLEX

Capital cities of the past were located at places which had advantage in terms of being at a higher level, to highlight its importance. Keeping this in mind and looking into the topography of the site, it is proposed to locate the Capitol complex, having an area of 500 acres, in the middle along the major loop road. The Capitol complex will house the Secretariat building, Assembly building, the governor’s house and the high court.

6.1.4 RESIDENTIAL FACILITIES

To provide residential facilities for the 3, 00,000 populations it is proposed to develop residential pockets based on the neighborhood concept, with a sector having a population of approximately 20,000. The total area falling under residential sector is about 1995 acres. The residential facilities for the govt. officials and ministers have been placed in the close proximity of Capitol complex and are totally segregated from rest of the residential areas. Other residential sectors have mixed occupancy of HIG, MIG, and LIG housing. Complete segregation of pedestrian and vehicular traffic has been done in the residential sectors. Through traffic completely eliminated from residential as well as central facilities. No direct access within sector from the periphery major roads has been allowed.



*Map 6.2: Conceptual sketch showing the proposed type of sector development.
Source: Compiled by author from analysis*

6.1.5 COMMERCIAL FACILITIES

The township is proposed to have its own central commercial center apart from other local commercial centers at sector and cluster levels, in order to reduce the pressure on the parent city and to make it self sufficient. This commercial center is proposed at the central part of the right site, near the residential sectors. The total area coming under commercial zone is proposed to be about 98.47 acres.

6.1.6 INSTITUTIONAL, CULTURAL AND RECREATIONAL FACILITIES

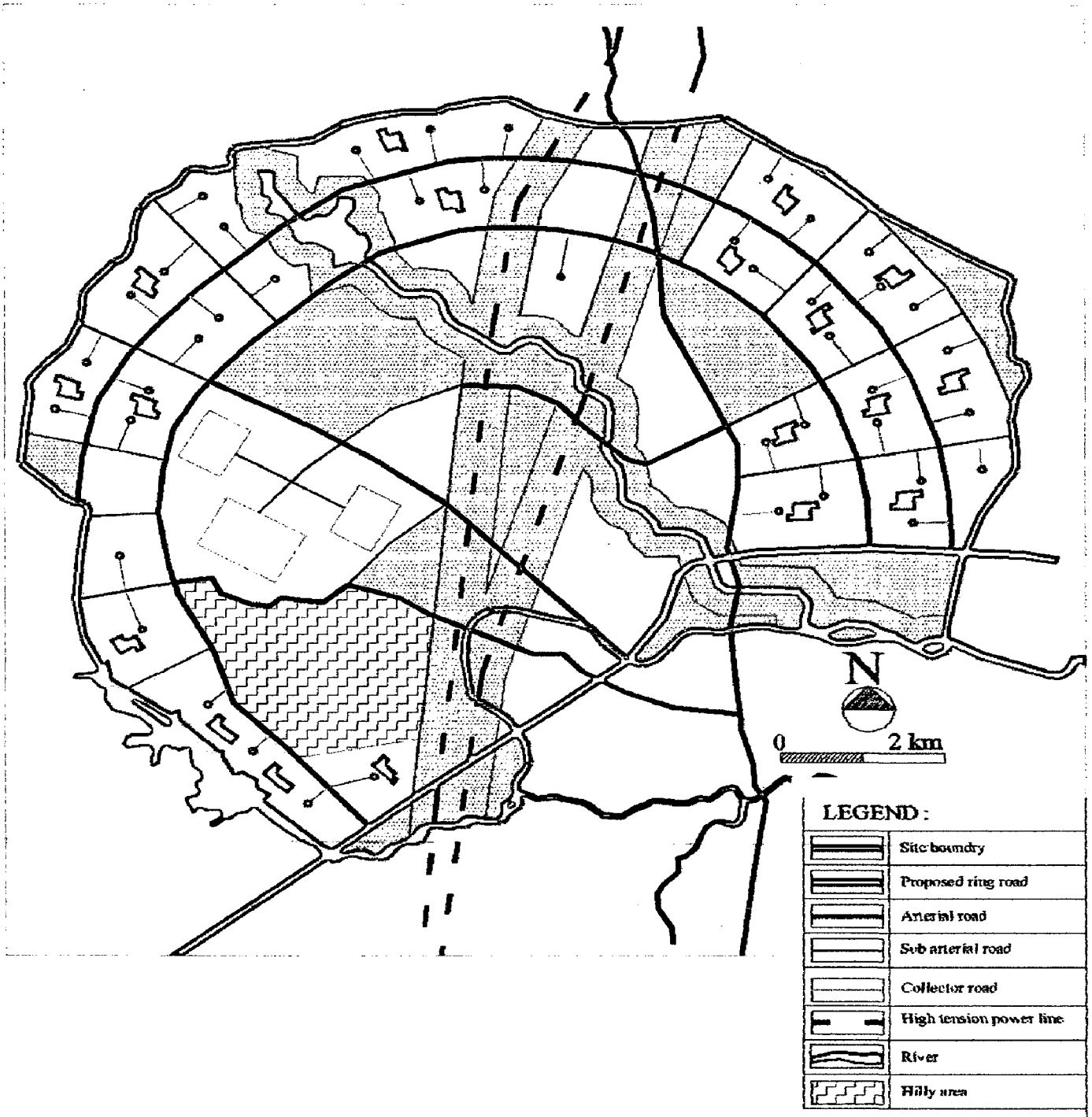
In terms of higher order facilities this township will depend on the parent city however some health, educational and cultural facilities are proposed to be distributed so that they can be accessed easily by all. Some higher level cultural facilities are placed adjacent to the central commercial zone.

6.1.7 OPEN SPACE

Open space are an integral part of a healthy urban environment. They enhance the quality of life by providing visual relief and opportunities for recreation and leisure. Therefore belts of open spaces are provided all along the area, as well as a system of local open spaces between the built forms.

6.1.8 ROAD PATTERN

The basic road network is planned to complement the functional hierarchy of different activities, and therefore a hierarchy of road linkages are proposed to connect the different parts of the township. Proposal of ring road through the site makes the communication easy. Pedestrian and personal transport or vehicular access to all parts of the neighborhood through an internal network of roads has also been considered.



6.3: Map showing the proposed road pattern of the capital city
 Source: Compiled by author from analysis

6.1.9 INFRASTRUCTURE**1. Water supply**

Considering population trend the estimated requirement for the year 2030 is 4, 80, 00,000 lpcd.

2. Sewerage

Considering population trend the estimated requirement for the year 2030 is 3, 84, 00,000 lpcd.

3. Electricity

Considering population trend the estimated requirement for the year 2030 is 20 no. of 11 kv power substations for uninterrupted supply of electricity.

4. Solid waste

Considering population trend the estimated solid waste which will need collection a disposal for the year 2030 is 75000 kg / day.

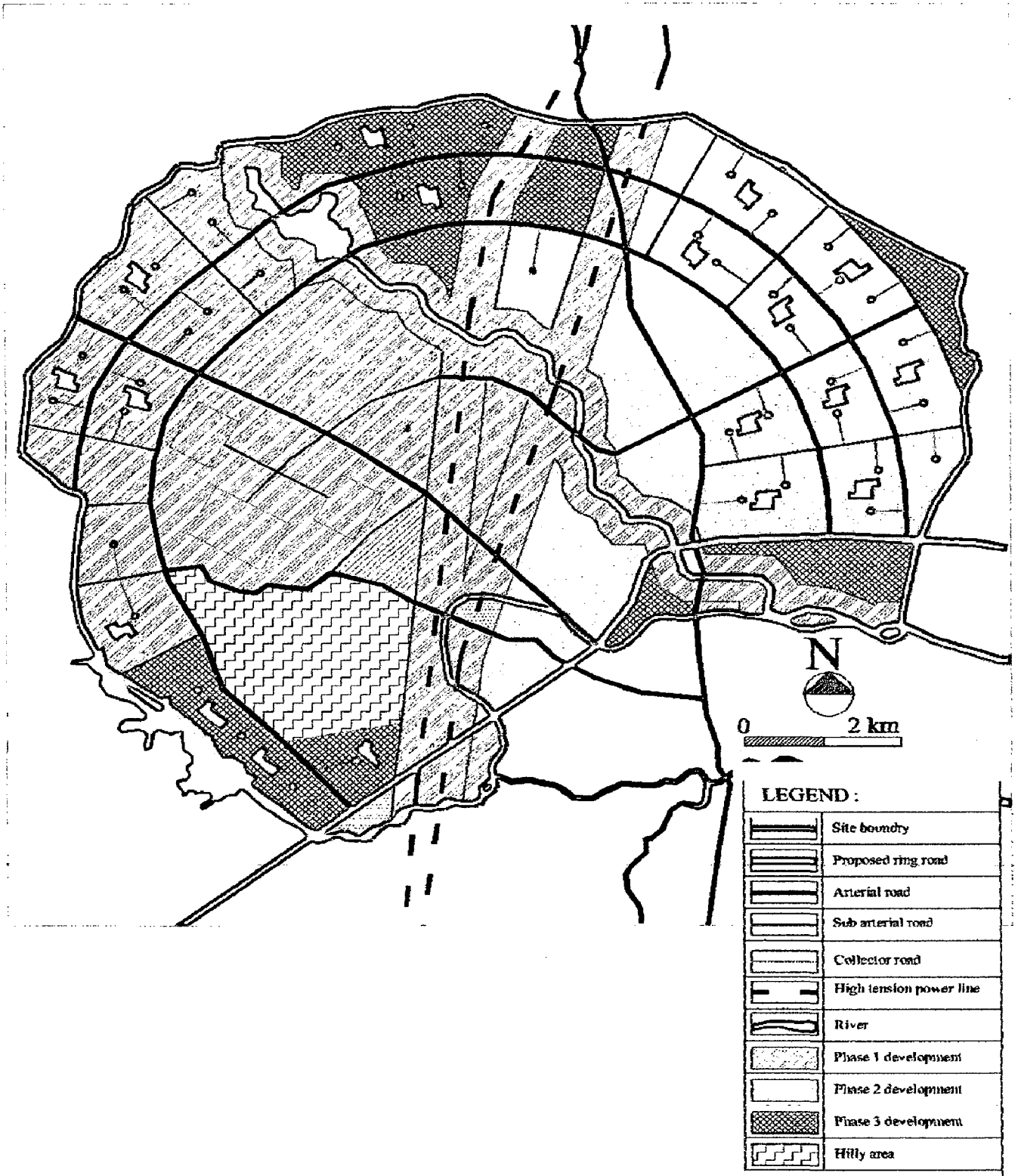
6.1.10 PHASE WISE DEVELOPMENT

Providing the right amount of development at the right time is the key factor for the success or failure of the plan. The Capital Township is also divided in three phases for the optimum development.

Phase 1 contains the Capitol complex and the govt. offices and residences of govt. employees and ministers along with some of the commercial and recreational facility.

Phase 2 contains the residential sectors for the general public and the commercial and recreational facilities.

Phase 3 contains the densification of the existing residential areas and development of few new pockets along with the commercial and recreational facilities.



6.4: Map showing the proposed phase wise development plan of the capital city
 Source: Compiled by author from analysis

CONCLUSION

An effort has been made to understand the development potential of the Capital city in terms of the current growth pattern and the growth direction and to suggest the future structure plan for the Capital Township. The capital township has been developed to have a aesthetically and functionally rich urban environment.

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