LANDUSE PLANNING FOR INTERNATIONAL FINANCIAL TECH. CITY USING GIS AND REMOTE SENSING: A CASESTUDY OF VISAKHAPATNAM

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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CERTIFICATE

This is to certify that the thesis titled **"LANDUSE PLANNING FOR INTERNATIONAL FINANCIAL TECH CITY USING GIS AND REMOTE SENSING: A CASESTUDY OF VISAKHAPATNAM"**, has been submitted by **Ms. JAYA SRIVASTAVA** towards partial fulfillment of the requirements for the award of **MASTERS OF URBAN AND RURAL PLANNING,** submitted in the department of Architecture and Planning, **INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE** is a bonafide work of the student carried out under our supervision and guidance. The matter presented in this thesis has not been submitted by me to any other university for award of any Degree/Diploma.

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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the dissertation entitled, **"LANDUSE PLANNING FOR INTERNATIONAL FINANCIAL TECH CITY USING GIS AND REMOTE SENSING: A CASESTUDY OF VISAKHAPATNAM"**, in partial fulfillment of the requirements for the award of **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 work carried out for a period of about one year from July 2009 to June 2010, under the supervision of Dr. Nalini Singh, Department of Architecture and Planning and Dr. Manoj K. Arora, Department of Civil Engineering, INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE, INDIA.

The matter presented in this thesis has not been submitted by me to any other university for award of any Degree/Diploma.

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But if you're in the eye of storm; Just think of the lonely dove
The experience of survival is the key; To the gravity of love. - *Enigma*

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ABSTRACT

Globalization which relates to the international economic integration and strength of real-sector and financial sector linkages among national economies, is sweeping across nations. As a result, the total Indian diasporas was estimated to be 25 million in 2005. India has also been a victim of 'brain drain' to developed countries like USA and UK for decades. Today, India is the fourth largest economy at 9% growth rate and is being viewed as a key business destination primarily for its abundant, cost effective and talented workforce. But due to ill governance, this momentum of the growth is not being managed properly. Further, India has not been able to realize its vast potential as most of the cities in India lack the required infrastructure, or International Financial Services is not in proper condition.

It is therefore vital for the financial system, particularly the domestic financial institutions, to be resilient and efficient if India has to ensure that its financial sector remains effective and responsive in the face of a more globalized, liberalized and a more complex domestic economy. Existing cities do not match up to the expectations of skilled people in respect of working culture and standard of living. Developing the existing cities or satellite towns around old cities in India may not be desirable due to following limitations:

- Growth centers are thriven
- Difficult to replicate the economic opportunity of old cities
- Will not be able to take the complete urbanization pressure

The aim of this dissertation is to provide an overview of International financial tech city and to study factors affecting for its development. As a case study, a land use plan for new International financial tech city in Vizag shall be proposed, which will be India's hub of e-commerce supported by sound financial management, robust infrastructure, state-of-the-art communication, skilled manpower and traditional entrepreneurial spirit. From data analysis to site selection and from site analysis to final proposal all work has been carried out with the help of GIS and Remote Sensing tools.

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1.1.1 Back ground:

In India, we are used to the idea that markets like steel or cars are global - where Indian firms have to either compete with the best in the world or exit the business. But the notion of global competition in finance is as new in India as the idea of global competition in manufacturing was in 1990. At that time Indian financial firms were not the part of global finance, and an open or competitive financial industry was an inevitable destination. India started to liberalize its capital account regulations in the early 1990s. Since 1991, India has grown rapidly with increasing considerably its direct foreign investments as well as portfolio investments and its economy has globalised. That happens through the increased share of trade and foreign investment in economic activities. Evidence of that lies in two way cross-border flows. Current and capital account flows invariably necessitate purchases of International Financial Services for example; current account transactions involve payment services, credit enhancement, currency risk management, etc. Within few years, every financial firm in India got deeply engaged with global competition, global suppliers and global customers. These developments will induce deeper globalization of the Indian economy in the coming decade.

Globalization refers to the broadest scope of the process. It is intended to include increasing market integration, the expansion of world governance and global society, and increased mobility of peoples and information. According to the UNESCO Institute for Statistics, the absolute number of Indian students abroad tripled from about 51,000 to over 153,000 and workers quadrupled from about 160,000 to 777,000 during 1999 to 2007. This upswing of emigration occurs due to better opportunities, work culture, appreciation, salary and standard of living available abroad.

Globalization is related to international economic integration that refers to the extent and strength of real-sector and financial sector linkages among national economies. Real sector linkages occur through the international transactions in goods and services while the financial sector linkages occur through international transactions in financial assets. Thus,

post liberalization era has ushered in significant changes in the economic investment environment in the country which depends on market forces driven by the investment flows across industrial sectors, geographical location and scale of investment. Rapid growth, even more rapid integration with the rest of the world, and the high consequent growth rate of two-way cross-border financial flows now being seen, all serve to make India a large and growing customer for International financial services (IFS). This has led to presently lots of thrust on economic and spatial development.

"Now we are working towards being India's hub of e-commerce supported by sound financial management, robust infrastructure, state-of-the-art communication, skilled manpower and our traditional entrepreneurial spirit," Modi said in chaste English.

1.1.2 Need

In this increasingly globalized world, the financial sector may generate about 10 million jobs and a GDP contribution of USD 350 to 400 billion by 2020. With sustained growth and rapid development in technology and infrastructure, an increasing share of financial services may get centralized. McKinsey market assessment report estimates potential of about 6 million centralized jobs across multiple services. Several developed countries have successfully established high-tech financial hubs, which over time have evolved as international financial service centers. These centers provide suitable regulatory regimes and create business environment to promote talent and increase capital flow. As they develop, they create significant economic value for their domestic economies; London and New York account for 10% of the GDP and about 5% of jobs. Emerging financial service centers like Singapore and Hong Kong have achieved similar levels of concentration of economic activity in a short period of time.

While opportunities have emerged in this new environment, threats of the global marketplace are becoming more intensive, as global players and technology advancements are having an unprecedented impact on the approach of banking and financial businesses. Against this background, it is vital for the financial system, particularly the domestic financial institutions to be resilient and efficient if India is to ensure that its financial sector remains effective and responsive in the face of a more globalized, liberalized and a more complex domestic economy. But India is unable to realize its vast potential because most of

the cities in India do not have the required infrastructure, IFS or not in proper condition. Existing cities do not match up to the expectations in respect of working and living lifestyle. For which India need:

- To tap its Financial Services Potential.
- To have globally benchmarked Financial Services Hub, this includes global markets for goods and services, foreign exchange market, international capital or money market, banking and investment, etc.
- To design such a centre leading to global competitiveness.
- To capitalize on the existing strengths of the region.
- To meet the booming demand in Financial, MNCs, BPO and IT Services.
- To meet the lack of any IFC methodically planned.
- To developed world class high tech city with better infrastructure supporting the activities of IFC.
- To have high secure system for proper and legal international transaction.
- To create a magnetic environment for talented people.
- To develop a partnership with all key stakeholders for the implementation of the strategy with performance management framework; and
- To establish a communication and collaboration environment for the development and delivery of the strategy.

Therefore, it is established to create an environment for growth, progress and economic development in India and the wider region by providing the needed legal and business as well as physical infrastructure benchmarked with international standards. Furthermore, for a city to facilitate the development of IFC, the city-state should concentrate on improving the quality of immigration, tertiary education, entertainment facilities and global linkages.

"If India builds an International financial center, with suitable rules and regulations the earnings out of financial sector exports will surpass that of IT" – Percy Mistry, (Fmr) World Bank.

One of such initiatives in India is the Gujarat International Financial Tech City which includes a special economic zone (SEZ), international education zone, integrated townships, an entertainment zone, hotels, a convention center, an international techno park, Software Technology Parks of India (STPI) units, shopping malls, stock exchanges and

service units. GIFT city was introduced to create strong economic base with globally competitive environment, to overcome the above mentioned problems, and state of art the infrastructure to activate local commerce, enhance foreign investments and attain sustainable development. This leads to a curiosity to study more about this economy driven city and proposing or re-establishing such city in India for sustainable growth of the city and improving the standard of IFS provided.

1.1.3 Scope

A survey of the available literature on IFCs suggests that almost all successful financial centers have used the strength of their domestic financial sector as a base to be leveraged first for expansion regionally, and thereafter internationally. Looking ahead, India's engagement with the world will intensify in three ways:

(a) Reduction in barriers such as customs duties and capital controls;

(b) Improvements in infrastructure; and

(c) Greater participation by MNCs (Indian and foreign) in the Indian economy.

With the increase in global markets, immigration, international finance, talent demand, etc. more and more IFCs will be developed in the major cities of a country.

1.1.4 Weakness

Rapid global capital mobility in the decades of the eighties and nineties has been accompanied by an increased frequency of financial crises in both the developed and developing countries. The advocates of the financial liberalization have admitted the fact that there is a positive correlation with international financial liberalization and financial crises. Since India's financial markets were not opened up until the early 1990s, the country was able to insulate itself from many of these international currency and financial crises. But, now the chances of being affected by the developments in the world markets have increased significantly because what happens all over the world markets, affects the Indian markets. Further, when financial markets crash, worldwide panic takes over and economic fundamentals (even if these are strong) are ignored. The recent financial crises have exposed the dangers of capital account liberalization and underscored the necessity for effective, constructive and well-coordinated regulation of financial markets by the state and its agencies. The point is that once you have an IFC operating in both the domestic economy and offshore, there may be negative consequence from a sudden reversal of capital; obviously regulation would need to mitigate these risks. Second, in a small country like ours, there is always the risk that the IFC increases competition for the scarce technical and managerial resources, draining the domestic financial center; we do not yet have an IFC and already there is aggressive competition for talent in the financial sector. So that's something that we should be mindful of – the need for accelerated training.

1.2 Research Question

1. What is International Financial Tech City? Its Indian scenario
2. What are the planning strategies followed for IFTC?
3. Can IFT city be developed in Andhra Pradesh?
4. What are the factors responsible for landuse planning for IFTC in Andhra Pradesh?

1.3 Aim and Objectives

1.3.1 Aim:

To study the features of International Financial Tech (GIFT) City and to propose a landuse plan for it in Andhra Pradesh which aspires to catalyze India's financial services potential by offering global and local financial services firms with world class infrastructure to attract top talent.

1.3.2 Objectives:

1. To study the concept and elements of International Financial Tech City (IFTC).
2. To study some examples of IFTC or IFC and issues related to it.
3. To study Andhra Pradesh as potential state for the development of IFTC on basis of factors like economic (market), education (talent search), connectivity, infrastructure, and environment.
4. To study the requirements of IFTC for India.
5. To study factors determining land-use patterns for planning IFTC.
6. Selection of suitable site for IFTC in Vizag.
7. Suggesting a landuse plan for IFTC.

1.4. Scope and Limitation

1.4.1 Scope:

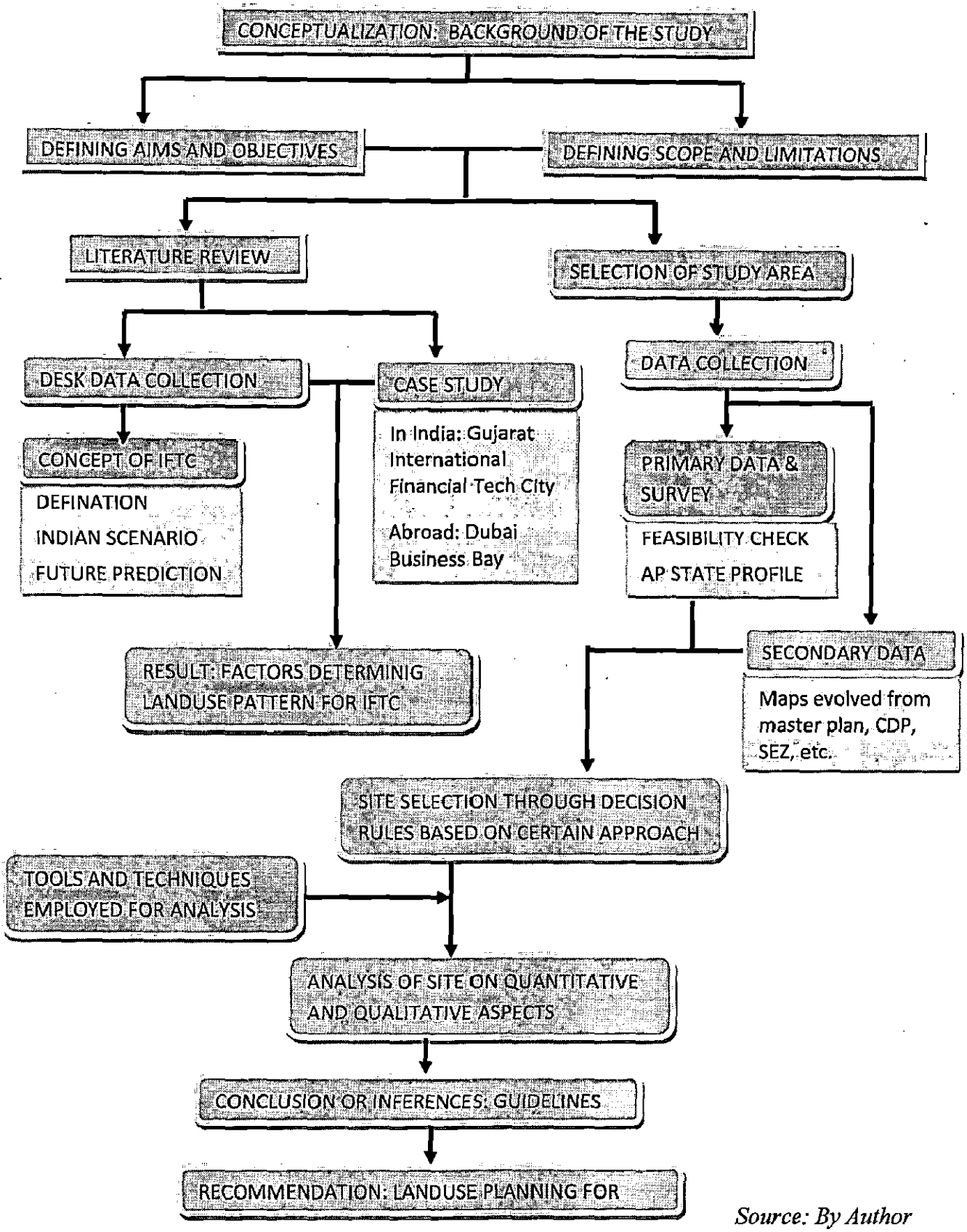
1. To understand the mechanism of international financial centers and services provided by them.
2. To explore the criteria for selecting a place to develop an IFTC.
3. Study of Andhra Pradesh for developing IFTC.
4. Site selection from Visakhapatnam SEZ area.
5. Landuse plan and control parameters are main concern.

1.4.2 Limitation:

1. This project finds relevance in the present scenario of India when the IT industries are in boom and more and more MNCs were developing. This trend is expected in future also.
2. There is only one example of IFTC i.e. GIFT in India that also is in the initial stage.
3. The proposed plan depends on the accuracy of the primary and secondary data collected.
4. Time limit confines me to plan only the landuse and no detail plans.

1.4 Overall structure of the dissertation

Fig. 1.1: Overall structure of the dissertation



Source: By Author

Chapter 2. LITERATURE SURVEY

2.1 International Financial Tech City

2.1.1 Definition

The term international financial center in its broadest sense usually means a locus where foreign and external intermediation takes place, and which serves a region extending beyond the national boundaries of the host country. As Choi (1984) points out the terms international financial center has five different non- exclusive meanings. These five meanings are:

1. A source of global financial influence
2. The apex of a hierarchy in financial central places.
3. A market with peculiar sets of regulations
4. A geographic area for financial activities
5. An external currency market

According to Sudhir Mankad (2008), the marketing strategy of IFT city has three key elements.

1. It provides a base in the state for investors.
2. It seeks to make city/state a destination for financial tourism and a base to export financial services to non-resident Indias (NRI) and overseas clients/institutions.
3. It focuses on technology infrastructure for financial markets and technology services providers.

A well-diversified and competitive financial system is vital for the long-term economic growth and development of a forward looking country. Such ensures that risks in the economy are well distributed among the various sub-sectors. In this increasingly globalized world, the future of the financial system lies in its ability to create a dynamic set of financial players, which are able to provide the needed support to the domestic economy.

2.1.2 Characteristics of an International Financial Centre

(Referred from a PowerPoint presentation on 'Building an International Financial Centre', by Tayo Fakiyesi)

1. A centre from which international financial business can be conducted profitably, easily and efficiently.
2. A centre with skilled management and intellectual talent covering Business, Finance and inter-dependent services such as legal and accounting, to provide multi-disciplined teams that facilitate large cross borders transactions in the shortest possible time frame.
3. A centre with deep liquid and sophisticated capital market and world competitive tax and regulatory regimes with foreign investment and offshore business flow.
4. A centre that can add significant value to financial services provided from it, through a workforce that can respond promptly and in an innovative manner.
5. A centre with the World's best telecommunications and IT capacity and imbued with plentiful, well educated, multilingual workforce.
6. A centre where all facets of financial services: CEOs; senior traders, regional headquarters, treasury operations, data processing, support functions and call centers, can be located efficiently.
7. A centre with convivial and alluring environment for business

2.1.3 Categories of International Financial Centre

(Referred from a PowerPoint presentation on 'Building an International Financial Centre', by Tayo Fakiyesi)

Global (GFCs): These are centers that genuinely serve clients from all over the world in the provision of the widest possible array of IFS; for eg. London, New York, etc.

Regional (RFCs): they serve their regional rather than their national economies examples of such Dubai, Hong Kong;

Non-global and non-regional, ordinary international IFCs: These are centers like Paris, Frankfurt, Tokyo and Sydney that provide a wide range of IFS but cater mainly to the needs of their national economies rather than their regions or the world.

Offshore (OFCs): These are centers that are primarily tax havens for wealth management and global tax management rather than providing the full array of IFS. For examples Bermuda, Jersey, Singapore, Luxembourg, Cayman Islands, etc.

2.1.4 Objectives of IFC

(Referred from a PowerPoint presentation on 'Building an International Financial Centre', by Tayo Fakiyesi)

2.1.4a. Efficiency:

The range of financial products and services should be offered at the lowest cost to both institutional and individual consumers, namely, borrowers, investors, depositors and risk managers. In this regard, improvement in productivity and higher returns on assets for the financial institutions will have to be realized through greater penetration of efficient and low cost delivery channels, access to scale advantages in processing, procurement and other back-office functions, and leveraging on world-class skills. This operational efficiency can be achieved through greater investment in technology and skill enhancements.

2.1.4b Effectiveness:

The availability of a broad range of products and services is essential to meet the needs of customers that can be expected to be increasingly more demanding and sophisticated. The degree of innovation of the financial institutions will determine the range of products and delivery channels offered. While most of the institutions do offer basic banking and insurance products, there is significant room for advancement in meeting the new requirements of the new economy, in particular, highly differentiated financial products which are tailored to meet specific demands of the consumers and the corporate sector. In an increasingly competitive market, innovation and improved services will be introduced through the existence of innovative players and a more conducive operational environment.

2.1.4c Stability

A safe, sound and stable financial system should be able to withstand sudden adverse economic and financial shocks that emanate from within and outside the system without significantly disrupting the intermediary function and the functioning of the economy. To have a stable system, there must be efficient, effective and robust financial institutions, strong prudential regulations and supervision, and efficient and reliable infrastructure. Robust financial institutions that would have strong risk management capabilities and credit skills as well as sound corporate governance. Improvements in credit skills and risk management among financial institutions would be demonstrated among others by the greater use of financial models and application of risk management framework that is more comprehensive. Corporate governance could be enhanced through improving the quality and accountability of the board of directors and management of financial institutions.

2.1.4d Prudential regulations

While the foundation of a strong financial system is the implementation of effective prudential regulations and supervision, this needs to be balanced with the need to provide an environment which is conducive to the development of an efficient and innovative financial system. A major issue in existing IFC has centered on prudential regulations and effective supervision.

2.1.4e Infrastructure

The availability of strong infrastructure is crucial to ensure overall stability of the financial system, with a core of strong domestic institutions and an efficient and stable payments system forming the backbone of the financial system. This is to ensure domestic institutions will continue to have a prominent role in the financial system. This will be achieved through institutional development and capacity building, increasing the competitive environment, the continuous improvement in the existing payments and financial markets infrastructure, and instituting a more market-driven consumer protection framework.

2.1.5 Elements

(Referred from GIFT presentation available on www.giftgujarat.in)

As a financial hub, the city will target international financial services, which include offshore banking units, international financial services firms and back office processing centers. In the domestic segment, the city plans to work in tandem with financial institutions, capital and commodity market players, investor organizations and associates and regulatory bodies.

1. Banking Services: investment banking, corporate banking and private banking
2. Capital markets: equity, debt instruments, derivatives and commodity trading
3. Asset management and fund registration: fund registration, fund administration and fund management
4. Reinsurance
5. Finance and back office operations: It will also have a fully-integrated data centre, data landing gateway and environment-friendly energy conservation measures including use of solar and wind energy, cooling systems and mass transport services.
6. The International Financial Services: It will have offshore banking units and global financial firms whereas the domestic part will have capital and commodity market players and investors' organizations.
7. The Technology Park: offers information technology-enabled services, business process outsourcing, security solutions and educational services.

The city would function as an integrated city-centre with extensive residential, commercial and public spaces. Instead of dealing with cross-border finances, it would look at outsourcing finances and local trade.

It will have a special economic zone (SEZ), international education zone, integrated townships, an entertainment zone, hotels, a convention center, an international techno park, Software Technology Parks of India (STPI) units, shopping malls, domestic tariff area Domestic Tariff Area (DTA) , stock exchanges and service units. The DTA part of IFT city will have the domestic financial district, domestic techno park, fin/tech services

(export oriented undertakings) park, domestic markets zone, and domestic utilities. The SEZ part of the project is to be further divided into two parts - the processing areas and the non-processing areas.

The processing areas of the SEZ would include international financial service centre, international techno park, Software Technology Parks of India units, international market zone, exchanges, service units, international education zone.

The non-processing areas of the SEZ would have the following: utilities, integrated townships, entertainment zone, hotel/convention centre, shopping malls, health services and schooling.

2.1.6 Factors to be consider while designing IFTC

1. A well-developed legal system and an independent judiciary hierarchy
2. A freely exchangeable and stable currency
3. A clean and efficient government
4. Availability of skilled personnel: availability of skilled talents and the flexibility of the labour market; An abundant supply of quality workers
5. Regulatory environment: number of regulatory bodies, the philosophy, intensity and complexity of regulation; A well-established regulatory system with proper standards
6. Access to international financial markets: geographical proximity and business clusters;
7. Availability of business infrastructure: telecommunications, IT (information technology) infrastructure and transport links;
8. Access to customers
9. A fair and just business environment: legal system, personal trustworthiness and temptations to break rules;
10. Government responsiveness: the level of support for financial services and government responsiveness to the concern of the industry;
11. Corporate tax regime;
12. Operational costs: cost of employment, travel time, travel expenses, etc;
13. Access to suppliers of professional services: for example accountants and lawyers;

14. Quality of life: good work and life balance between work and life, leisure facilities and culture, healthcare. A conducive working and living environment
15. Facilities, school and colleges, transport system and residential property; recreational, public and non-public spaces.
16. Cultural and language: culture, cosmopolitan and accepting of people from other countries; rich social and cultural amenities
17. Quality and availability of commercial property: suitability of properties as offices; and
18. Personal tax regime: the personal tax rate. A simple personal and corporate tax regime, featuring with low tax rates
19. Economic globalization and modern telecommunications: based on cross-border networks as well as strategic locations with vast concentrations of competitive resources.
20. Regional headquarters of large non-financial corporations, especially those of MNCs,
21. Localized spillovers of technology and information

A global city that provides a full spectrum of high-end services, as financial services cannot be independent on other specialized services. While a financial center can be seen as the pivot of financial network, a global city is the strategic control point in the organization of the world economy and in a multinational corporate network.

2.1.6 Recent issues

1. It appears to be a more pragmatic approach to a sector that will always be bedeviled by the creaking dispute resolution machinery India has.
2. The reluctance of the government to appoint more judges and to help clear the backlog of cases has hobbled growth and pushed up the cost of doing business in the country.
3. It has also severely restricted the growth or development of financial services in the country. After all, how can financial services blossom if creditors cannot even take recourse to attaching mortgaged goods in the event of a default in repayments?
4. Unable to realize its potential in financial services.
5. No planned Financial Services Hub which includes global markets for goods and services, foreign exchange market, international capital or money market, banking and investment, etc. at global level.
6. Lack in global competitiveness in the matter of IFS.
7. Lack of any IFC methodically planned.
8. Lack of world class high tech city with better infrastructure supporting the activities of IFC.
9. Need to have high secure system for proper and legal international transaction.
10. Need to create a magnetic environment for talented people.

Policies related issues: Policy Measures under NEP Affecting Land-Use

1. Land Acquisition

Relaxation of restrictions is given on acquisition of land and other immovable property in India by NRI'S and FERA companies. The NRIs and foreign companies with income levels hundred times (or more) as compared to the levels of income of the Indian nationals can capture the prime lands anywhere in India. The Multi-nationals are free to grab and mine, pollute, destroy land and water resources. The Government of India is powerless, the Government is not in a position to intervene and regulate the land-use, keeping in view the long term interest of conservation and sustainable use of

land, water, forest and marine resources of the country, so long as it is governed by the IMF conditionality's and WTO.

Removal of controls on location of industries and special concession to industry if located in backward districts is considered. This means proliferation of industries in a haphazard manner in rural districts dislocating peasant agriculture, polluting land, water and air, leading to environmental damage over extensive areas.

2. Conversion of Agriculture Land and forcibly acquired SEZ

Relaxation of restrictions on conversion of agricultural lands to non-agricultural uses, and ceiling on agricultural land holdings is considered. This is resulting in a large-scale transfer of lands for speculative purpose, distorting the land market and viability of agriculture.

3. Invasion of Coastal Lands / Attack on Hills and Mountains

The MNCS and large industries are particularly interested in coastal locations since the facilities of port are crucial for many MNCS depend on import-export.

4. Sky Rocketing Land Prices

With the removal of restrictions on land purchases by foreigners and NRI's and on land transfers and land use, the prices of land in Mumbai -the financial centre of

India skyrocketed, recording a four or five times increase between 1992 to 1994. Black money is flowing even in the remote areas for speculative land hoarding by the land speculators, builders and politicians. Land sales are being forced through manipulation of land records and even by resorting to threats depriving peasant of their means of livelihood.

2.2 Landuse planning

2.2.1 Introduction of landuse planning

Landuse constitutes a fundamental mechanism for development. Landuse planning can therefore serve as a guiding tool to direct development efforts towards prosperity and sustainability. Landuse planning provides the prerequisites for achieving a sustainable form of land use which is acceptable as far as the social and environmental contexts are concerned and is desired by the society while making sound economic sense. Landuse does not consider production only, but also land functions such as protected areas, land recreation, road-building, waste disposal sides and use restricted areas such as buffer zones for exhaust gases, areas for regenerating groundwater, buffer zones for traffic noise pollution, etc. The following are elements of a planning system:

1. Different types of planning

   In principle, a differentiation is made between sectoral and technical planning (e.g. transportation planning or the planning of water resources) and planning which overlaps sectors or is partially integrative. The nature of the planning process differs depending on its specific task.

2. Overall Goals of Planning

   These cover the central idea of planning, such as participation, conservation of land resources or balancing of regional disparities. In a democratic system, the overall goals of planning correspond to the fundamental principles and values in a society.

3. Definition of responsibilities

   Planning assignments are mandated to certain administrative levels (national, regional, district, community) and authorities (sectoral and territorial, Department of Agriculture and community).

4. Regulating the relationship between the various types of planning

The nature of relationships between the various types of planning is usually stipulated. This results in a vertical linkages being made between the planning levels and a horizontal linkages between the various technical and partially integrative processes.

5. Rules

The set of rules for the participation of those people affected by planning and their representation at higher levels of planning are manifested.

2.2.2 Conventional methods of landuse planning for IFTC

Manual survey to prepare the existing land-use map has been the traditional way. The most common method of data creation is digitization, where a hard copy map or survey plan is transferred into a digital medium through the use of a computer-aided design (CAD) program, and geo-referencing capabilities.

The first step for landuse planning of IFTC was to build a theoretical premise. This was done through an extensive literature review focusing primarily on understanding the concept and process of International Financial Tech City. The entire process of IFTC has been discussed in great detail stressing on why it is necessary and what is the role of the local government in the process. The next step was to examine the application of this concept to the Indian context and discuss the economic reform process post-liberalization and its impacts, and current efforts at International Financial development in Indian cities or abroad. From this, a set of viable opportunities and initiatives has been extracted which would need to translate into strategies an later into implementable plans and programs. Finally the study sums up the entire discussion reinstating the need for IFTC to take up the development of IFC as a crucial function in order to improve their competitiveness in this era of globalization. The next step is to apply this process in a Strengths, Weakness, Opportunities; Threats (SWOT) analysis for Andhra Pradesh focusing on its economic aspects and development of IFTC.

In order to do this, first it was necessary to analyze Andhra Pradesh in detail to draw out inferences regarding the trends and prospects of the state. The technique used for the survey was of manual type. The next step was to understand the institutional and legislation framework in Andhra Pradesh in terms of the various agencies involved - their roles and functions, stressing the glaring absence of lack of economic development as a function of any single agency. Then base maps are prepared and site was selected either manually or using computer software like AutoCAD. Site selection was done on the basis of various factors which were collected through sampling survey - a long time process. Next step is Site analysis which was done by visiting on site and drafting each and every features of it on paper at specific scale. Then through decision rules and regulating parameters followed in the area nearby landuse plan is suggested. This very first step in formulating the Plan takes considerable time and efforts, monitoring changes and time series analysis is quite difficult with traditional method of surveying particularly, for metropolitan cities and large towns.

2.2.3 Modern methods of land use planning- Remote sensing and GIS

(Referred from "Guide to GIS and Image processing", volume 1 by Idrisi and "Introduction to Geographic Information Systems" Kang-Tsang Chang 4th edition)

2.2.3a Introduction to remote sensing:

Remote sensing can be defined as any process whereby information is gathered about an object, area or phenomenon without being in contact with it. Given this rather general definition, the term has come to be associated more specifically with the gauging of interactions between earth surface materials and electromagnetic energy. ("Guide to GIS and Image processing", volume 1 by Idrisi).

Remote sensing provides a tool for producing accurate and efficient land use classification on a regional basis. Remote sensing can be described as the acquisition of information about a portion of the earth's surface by using sensing devices operated from a remote location (Hoffer, 1971).

Remote sensing instruments basically measure electromagnetic solar energy reflected or emitted by earth surfaces.

2.2.3b Advantages of Remote Sensing

Remote sensing applications read specialized file formats that contain sensor image data, geo-referencing information, and sensor metadata. Remote sensing involves many tasks for a number of applications. These tasks include:

1. Change Detection — Determine surface changes from images taken at different times of the same area
2. Orthorectification — Warp an image to its location on the earth.
3. Spectral Analysis — Using non-visible parts of the electromagnetic spectrum to determine if a forest is healthy.
4. Image Classification — Categorization of pixels based on reflectance into different land cover classes (e.g Supervised classification, Unsupervised classification and Object Orientated Classification)

2.2.3c Introduction to GIS

Geographic information system is an organized collection of computer hardware and software designed to efficiently create, manipulate, analyze and display all types of geographically or spatial referenced data. A GIS allows complex spatial operations that are very difficult to do manually. GIS can efficiently be utilized for delineation of physically and environmentally similar areas. Because GIS technology, when combined with Database Management System(DBMS) technology and with various data gathering techniques, makes it much easier to create and maintain comprehensive information about the region.

Arnoff (1989) defines GIS as, "a computer based system that provides four sets of capabilities to handle geo-referenced data:

1. Data input
2. Data management (data storage and retrieval)
3. Manipulation and analysis

4. Data output

Hence, GIS is looked upon as a tool to assist in decision-making and management of attributes that needs to be analyzed spatially. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems and make it valuable to a wide range of public and private enterprises for explaining events, predicting outcomes, and planning strategies. The meaning to represent digitally is to convert analog (smooth line) into a digital form.

"Every object present on the Earth can be geo-referenced", is the fundamental key of associating any database to GIS Here, term 'database' is a collection of information about things and their relationship to each other, and 'geo-referencing' refers to the location of a layer or coverage in space defined by the co-ordinate referencing system.

2.2.3d Philosophy of GIS

The proliferation of GIS may be explained by its unique ability to assimilate data from widely divergent sources, to analyze trends over time, and to spatially evaluate impacts caused by development. For an experienced analyst, GIS is an extension of one's own analytical thinking. The system has no in-built solutions for any spatial problems; it depends upon the analyst. GIS involves complete understanding about patterns, space, and processes or methodology needed to approach a problem. Its applicability is realized when the user fully understands the overall spatial concept under which a particular. GIS is established and analyses his specific application in the light of those established parameters. Since the effectiveness and efficiency (i.e. benefit against cost) of the GIS will depend largely on the quality of initial field data captured.

2.2.3e Component of GIS

GIS constitutes of five key elements: Hardware, Data, People, Method and Software

2.2.3f Advantages of GIS

GIS is a digital database management system particularly designed to support both spatial and non-spatial attributes and to combine purely representational techniques with analytical techniques. It is ideal for preliminary site studios, because it effectively stores retrieves, analyses and displays information according to user specified specifications. However, GIS can be limited by lack of available up-to-date data.

Secondly, GIS eliminates the tedious process of paper mapping of facilities in many cases, the cost of such mapping alone can justify a GIS implementation. Since, the manual integration and correlation of the information related to the factors to be considered is very tedious and complex.

Thirdly, it is easy to integrate the data of various natures. Remote sensing data product can be effectively used in GIS: Geo-coded satellite imagery can be directly used for onscreen digitization, for preparation of different thematic maps as land use, geology, stream, network map etc.

The Geographic Information System has been an effective tool for implementation and monitoring of municipal infrastructure. The use of GIS has been in vogue primarily due to the advantage mentioned below:

Planning of Project:

The advantage of GIS is often found in detailed planning of project having a large spatial component, where analysis of the problem is a pre requisite at the start of the project. Thematic maps generation is possible on one or more than one base maps, example: the generation of a land use map on the basis of a soil composition, vegetation and topography. The unique combination of certain features facilitates the creation of such thematic maps. With the various modules within GIS, it is possible to calculate surface, length, width and distance.

Making Decisions:

The saying "better information leads to better decisions" is as true for GIS as it is for other information systems. A GIS, however, is not an automated decision

making system but a tool to query, analyze, and map data in support of the decision making process. GIS technology has been used to assist in tasks such as presenting information at planning inquiries, helping resolve territorial disputes, and silting pylons in such a way as to minimize visual intrusion.

Visual Analysis:

Digital Terrain Modeling (DIM) is an important utility of GIS. Using DTM/3D modeling, landscape can be better visualized, leading to a better understanding of certain relations in the landscape. Many relevant calculations, such as (potential) lakes and water volumes, soil erosion volume, a quantity of earth to be moved and hydrological modeling becomes easier.

Improving Organizational Integration:

Many organizations that have implemented a GIS have found that one of its main benefits is improved management of their own organization and resources. Because GIS has the ability to link data sets together by geography, it facilitates interdepartmental information sharing and communication. By creating a shared database, one department can benefit from the work of another data can be collected once and used many times. As communication increases among individuals and departments, redundancy is reduced, productivity is enhanced, and overall organizational efficiency is improved.

2.2.3g Questions a GIS Can Answer

We can distinguish a GIS from other computer drafting systems by listing the types of questions it can (or should be able to) answer. If we stand back far enough from a particular application, we can see that there are five generic questions that a sophisticated GIS can answer.

Location: What is at....?

The first of these questions seeks to find out what exists at a particular location. A location can be described in many ways using, for example, place name, postal or ZIP code, or geographic references such as latitude and longitude.

Condition: Where is it....?

The second question is the converse of the first and requires spatial analysis to answer. Instead of identifying what exists at a given location, we want to find a location where certain conditions are satisfied (e.g., an unforested section of land at least 20,000 square meters in size, within 100 meters of a road, and with soils suitable for supporting buildings).

Trends: What has changed since...?

It involves both of the first two and seeks to find differences within area overtime.

Patterns: What spatial patterns exist?

Someone might want to know how many anomalies there are, that do not fit the pattern and where they are located like someone might ask this question to determine whether cancer is a major cause of death among residents near a nuclear power station.

Modeling: What if....?

"What if...." questions are posed to determine what happens, for example, if a new road is added to network or if a toxic substance seeps into the local groundwater supply? Answering this type of question requires both geographic and other information (and possibly even scientific laws).

Aspatial Questions

"What's the average number of people working with CIS in each location?" is an aspatial question - the answer to which does not require the stored value of latitude and longitude; nor does it describe where the places are in relation with each other.

Spatial Questions

"How many people work with GIS in the major centre's of Delhi?" OR "Which centre's lie within 10 kms. of each other? ", OR "What is the shortest route

passing through these entire centre's?" These are spatial questions that can only be answered using latitude and longitude data and other information such as the radius of earth.

2.2.3h Application of Remote Sensing and GIS in Land use planning:

Digitization of features from various maps and layout plans with a facility of updating base maps wherever changes have taken place in terms of land development etc. can be done. Remote sensing techniques are extremely useful for change detection analysis. Since remote sensing may not provide all the information needed for a full-fledged assessment, many other spatial attributes from various sources are needed to be integrated with remote sensing data. This integration of spatial data and their combined analysis is performed through GIS technique. Correlating various layers of information about a feature from satellite imagery, planning maps and revenue maps is feasible with the help of image processing software like ERDAS Imagine, ENVI and PCI Geomatica, ILWIS but superimposition of two or more digital maps which are on two same scales is feasible only in GIS software like Map info, Geomedia, Arc View, Auto CAD Map and Arc GIS and provide base maps which gives valuable information for planning, implementing and management in urban areas.

It is a computer assisted system for capture, storage, retrieval, analysis and display of spatial data and non-spatial attribute data. The data can be derived from alternative sources such as survey data, geographical/topographical/aerial maps or archived data. Data can be in the form of locational data (such as latitudes/longitudes) or tabular (attribute) data. GIS techniques are playing an increasing role in facilitating integration of multi-layer spatial information with statistical attribute data to arrive at alternate developmental scenarios. GIS is a promising tool for selecting and examining site, identifying suitable landuse as well as generating best circulation network in land use planning. Decision support system for land use planning can be evolved using GIS.

Remote sensing and GIS is useful in my study are as follows:

1. Extraction of existing landuse map from satellite images in ERDAS Imagine.
2. Preparation of thematic database by bringing all the images and maps in same projection system.
3. Generation of spatial framework in GIS environment for site selection.
4. Site selection by integration of thematic data layers pertaining to the causative factors.
5. Land suitability analysis based on physical, environmental, institutional, economic, and social parameters to guide the selection process for opening the land for IFTC development.
6. Integration of various suitability maps helps in generating landuse plan and its controlling parameters.

2.2.4 Factors determining landuse patterns

Landuse pattern refers to distribution of land among different uses like housing, industrial, transportation, commercial, traffic, public and semi public use, public utilities, agricultural and water bodies'. Varying physical factors have effect on landuse, so do climate conditions, past and present social and religious customs, legislation and legal decisions, demand for goods and services and policy of the local and Central government in the supply of public utilities and social services. Within the frameworks decided by the factors and subject to the imperfections in the market, forces of demand and supply provide the means by which land is developed up to its highest use and best use. Therefore, landuse planning must designed to ensure that public and private decision-makers act in such a way that the external effects produce the largest net social benefit to the community. Factors determining land use patterns for IFTC are as follows:

1. Bio-physical factors
    a. Infrastructure: social, physical and economic
    b. Elevation
    c. Protected Areas and Forest Reserves
    d. Climate
    e. Land parcel

f. Availability of resources like land, water, power, energy, etc.

2. Demographic factors

The study of demographic factors in the local planning area reveals its growth patterns, migration trends, labor force and occupational pattern.

a. Population and its growth- Natural growth and Migration
b. Population to be served
c. Working population
d. Trends of inward and outward migration (permanent or seasonal)
e. Housing

3. Socio-economic factors

a. Constraints
b. Land tenure systems
c. Land rights
d. Markets
e. Real estate and land speculative activities: Land speculation occurs when the demand for land, at the present time or in the near future, outstrips the supply of land.
f. Forms of incentive and taxation
g. Aspiration and felt needs of the different groups of land users
h. Costs of inputs
i. Current sale prices for outputs
j. Off-farm or off-region labour income
k. Extension services

4. Adaptability of technology
5. Government policies

2.3 Summary

To maximize our potential as an International Financial Centre which is major part of IFTC, it is important to address the following constraints.

1. Strong commitment by Federal and state Governments to promoting IFC.
2. A multilingual professional financial services workforce that can flexibly respond to changing business conditions and independently add value to services;
3. Low cost and efficient communication and information system;
4. Political and economic stability;
5. Well established international stock exchange, futures exchange and clearing houses;
6. A very sophisticated and deregulated domestic and international banking system;
7. Competitive cost, including general living expenses, commercial rents and a high quality social infrastructure;
8. A commitment to business tax reform, with an internationally responsive corporate tax rate and capital gains tax initiatives;
9. A strong, stable and transparent legal and regulatory system
10. The Government must place itself in a position to respond quickly and flexibly to emerging opportunities and threats.
11. The Government should formulate specific policies to promote the efficient functioning of the financial system in the following manner –
    a. Policies concerning financial infrastructure should aim to mitigate risks, increase efficiency and enhance market transparency and liquidity, thus supporting the safety and soundness of the financial system.
    b. Policies concerning financial intermediation should aim to promote the stability, integrity, diversity and efficiency of the financial system.
    c. Policies concerning the regulatory regime should aim to provide a regulatory framework that promotes the stability of the financial system, provides an appropriate measure of protection to users of financial services and facilitates competition, and is consistent with the standards and practices of major international financial centers.
    d. Policies concerning the development of international financial tech city in major cities as per the issues as listed in section 2.1.6.

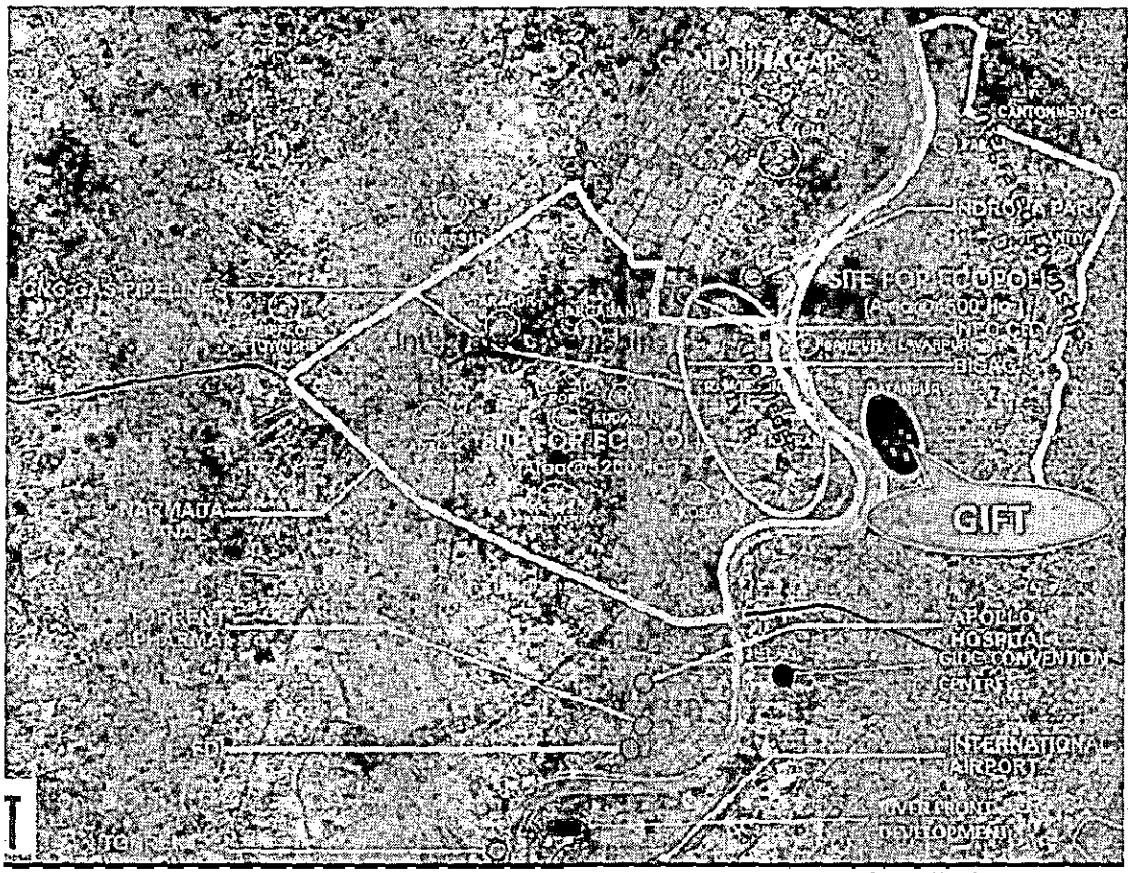
Chapter 3. CASE STUDIES

3.1 Gujarat International Financial Tech City (GIFT):

3.1.1 Introduction

The huge international financial center i.e. GIFT planned on India's west coast will ultimately become a large model city with numerous educated workers. GIFT is an initiative by the state government to capture the financial market potential that will be generated as a result of the rapid industrialization in the state. With huge investments being committed to Gujarat, several banks and financial institutions are keen to set up base. For this purpose, a part of the region between the commercial capital, Ahmedabad and the administrative capital, Gandhinagar as shown in fig. 3.1, has been earmarked for the development of a

Plate 3.1: Location plan of GIFT



Source: http://giftgujarat.in

Central Finance and Business District (CFBD) - GIFT, institutional areas, knowledge parks and integrated townships. It will have state-of-the-art IT infrastructure such as a fully integrated technology backbone, data centre, shared IT services, WiFi and WiMax. The city will have well-planned residential housing projects with walk-to-work layouts and high quality entertainment malls.

The Gujarat Urban Development Co Ltd. (GUDC), in partnership with Infrastructure Leasing & Financial Services Ltd (IL&FS), is promoting the project on a Public-Private Partnership (PPP) model through a joint venture company Gujarat International Finance Tec-City Development Company Limited (GIFTCL) with a Share Capital is Rs. 5 Cr. The PDF of Rs. 40 Cr. Management includes

4 Directors nominated by IL&FS

4 Directors nominated by GOG.

4 Independent Directors

The contract for the city's master planning has been assigned to ECADI (East China Architectural Design Institute), set up in 1952. An Indian entity, Fairwood Consultants Pvt. Ltd., assist ECADI in this work. The project is expected to be completed by 2010. At present, MoUs for 11 million sq ft of occupancy in GIFT have already been signed by global financial companies such as Kotak Mahindra (India), Chescor Capital (UK), Orix (Tokyo), Fairwood Associates and Sembawang Engineers and Constructors Pvt Ltd (Singapore). GIFT is still a plan, though much of the groundwork has been done, and most of the required clearances are already in place.

Nasscom McKinsey: "Vision for Gujarat International Financial Tech City is to create strong economic base with globally competitive environment and state of art infrastructure to activate local commerce, enhance foreign investments and attain sustainable development."

3.1.2 Why Gujarat for IFTC

India has experienced continued economic growth after globalization, so expert conclude that the financial sector may generate about 10 million jobs and a GDP contribution of USD 350 to 400 billion by 2020 if an increasing share of financial services get centralized with sustained growth and rapid development in technology and infrastructure. McKinsey market assessment report estimates potential of about 6 million centralized jobs across multiple services. In regard to this IFTC in Gujarat, a new concept introduced for the first time in India. Gujarat was chosen for developing a Central Finance and Business District consists of IFTC because of the following features:

1. Gujarat has proved itself to be one of the fastest growing states in the country with more than 10% average GDP growth during the past six years.
2. Gujarat has the advantage of rich natural reserves of oil and natural gas.
3. Presently, almost 38 per cent of the state's population resides in urban areas vis-à-vis the national average of 29 per cent.
4. Currently, with 55 approved SEZs, Gujarat has among the highest SEZs in the country and the highest geographical area (over 27125 hectares) under development for establishing SEZs.
5. It is gateway to the rich land-locked northern and central hinterland.
6. It has access to all major ports based countries like UK, Australia, China, Japan, Korea and Gulf countries, etc. and has longest coastline of 1600km.
7. Infrastructure: 137617 km road network, 5283 km of rail network, 2200km of gas grid, 13 airports and 23 power plants.
8. Gujarat ranks first in the country in terms of total values of IEMs filed in the last 15 yrs and in proposed investment of INR 73170 crore in 86 projects showing its economic status.
9. Its GSDP growth rate was 10.4% from 2002 to 2007 and electricity consumption growth rate is 8.2% from 2006 to 2007.
10. Its industrial growth rate is 12.5%, export 21% of India.
11. Gujarat is home to 800 large industries and more than 320000 micro, small & medium industries. It has strong industrial base and pioneer in PPP.

12. 180 estates are developed here and still in functional stage. 72 are under planning.
13. Gujarat contributes 30% to the Stock Market Capitalization, and 16%to country's total output.
14. Gujarat has much improved administration, a clearer focus on promoting employment-oriented projects and the laying down of clearly defined rules for projects. Gujarat tops among states in project investment approved by financial institutions in 2007-08.
15. Gujarat achieved highest scores in both socio economic and infrastructure factor.
16. More than 90 projects across sectors have been taken up under PPP mode with an investment of over INR 62165 crore.
17. The state ranks first in cargo throughput 147 MMT in 2007-08.
18. With 4.4% of total employment exchanges, Gujarat contributed 56% to total jobs in the country.
19. Provides talented people as it's consist of various famous institutes and colleges.

Recent studies show that Ahmedabad and Gandhinagar cities are the favored destinations to migrate in India because of good urban infrastructure, business friendly environment and good living conditions.

3.1.3 Overall state competitiveness

Plate 3.2: Overall state competitiveness

Parameter	Gujarat
Opportunities in Type of Industry	
Tourism	
Information Technology	
Food Processing Industry	
Crude Oil and Natural Gas	
Petrochemicals	
Pharmaceuticals & Biotechnology	
High Medium Low	
Opportunities in Type of Industry	
Agriculture Food & Agro Processing Industry	
Mineral Based Industry	
Engineering Industry	
Chemicals Industry	
Apparel & Textile	
Retail	
High Medium Low	
Industrial Infrastructure - Existing and Propose	
IIDC	
Industrial Growth Centre	
High Medium Low	

Parameter	Gujarat
Opportunities in Type of Industry	
Electronic Hardware	
Gems & Jewellery	
High Medium Low	
Doing Business	
Fiscal and Non-Fiscal Incentives	
Cost of doing business	
Availability of Labour	
Ease of Setting up and Carrying out Business	
High Medium Low	
Industrial Infrastructure - Existing and Propose	
Power	
Connectivity	
Industrial Estates/Areas	
STP	
EPIP	
EPZ	
High Medium Low	

Source: www.ibef.org

3.1.4 Objectives

(Directly taken from the GIFT presentation given on the site www.giftgujarat.in)

1. Building a destination conducive to globally oriented business that offers world class infrastructure, services and multi – modal connectivity.
2. Generate opportunities for employment across various sectors and upgrade human skills to international standards and help poverty reduction.
3. Its Target Business Segments are:

Table 3.1: Target Business Segments

Business	Nature of Opportunity
Financial Services Operations	Back-office of banking, Insurance and Asset Management Companies
Financial Services Corporate Center	Corporate roles in financial services companies. E.g. Accounting, HR, Admin, IT
Select Product Market	Private banking, Product development, microfinance etc.
Capital Market and Trading	Includes DCM, ECM, M&A, Commodity trading, Private Equity, Hedge Funds and Institutional brokerage
IT services	Software Application development and maintenance for BFSI and other verticals
ITeS/BPO Services	Captive BPOs of large global financial services companies, 3rd party BPO service providers, KPOs etc.

Source: www.giftgujarat.in

GIFT target business entities are operations generating international finance therefore includes International Financial Services for IT companies, ITES/ BPO, MNCs, agencies dealing with capital marketing, product marketing, trading, corporate center and international service provider. Table 3.1 shows the various businesses GIFT city will consist of and the nature of opportunity it will provide.

4. An integrated design of city with more focus on employment, infrastructure, connectivity and transportation mode.
5. Generation of an attractive pricing strategy in order to ensure that it is a fraction of the cost that is ordinarily incurred in other Indian and global finance cities.

The objectives reflect that Gujarat is trying to develop a financial city with fully advanced infrastructure for collecting the foreigner interest to invest or work and to get hold of the talented people within or outside the country to increase the GDP. It also shows that for a global finance city the basic needs are user friendly services, infrastructure, connectivity, education (talent) and international level business segments. In terms of scale and sheer physical scope, GIFT is being designed to be at or above par with presently acknowledged Globally Benchmarked International Financial Centers (IFCs). Create leading-edge infrastructure, services and platforms and offer financial services enterprises a significant competitive advantage to operate regionally and globally.

3.1.5 Elements

(Directly taken from the GIFT presentation given on the site www.giftgujarat.in)

Domestic Tariff Area (DTA) 250 Acres

1. Domestic Financial District
2. Domestic Techno Park
3. Fin/Tech Services EoU Park
4. Domestic Markets Zone
5. Domestic Education Zone
6. Domestic Utilities

Processing Areas (SEZ) 125 acre

1. International Financial Service Center (IFSC)
2. International Techno Park
3. STPI Units - Technology
4. International Market Zone
5. Exchanges, Service Units
6. Inter. Education Zone

Non-Processing Areas (SEZ) 125 acre

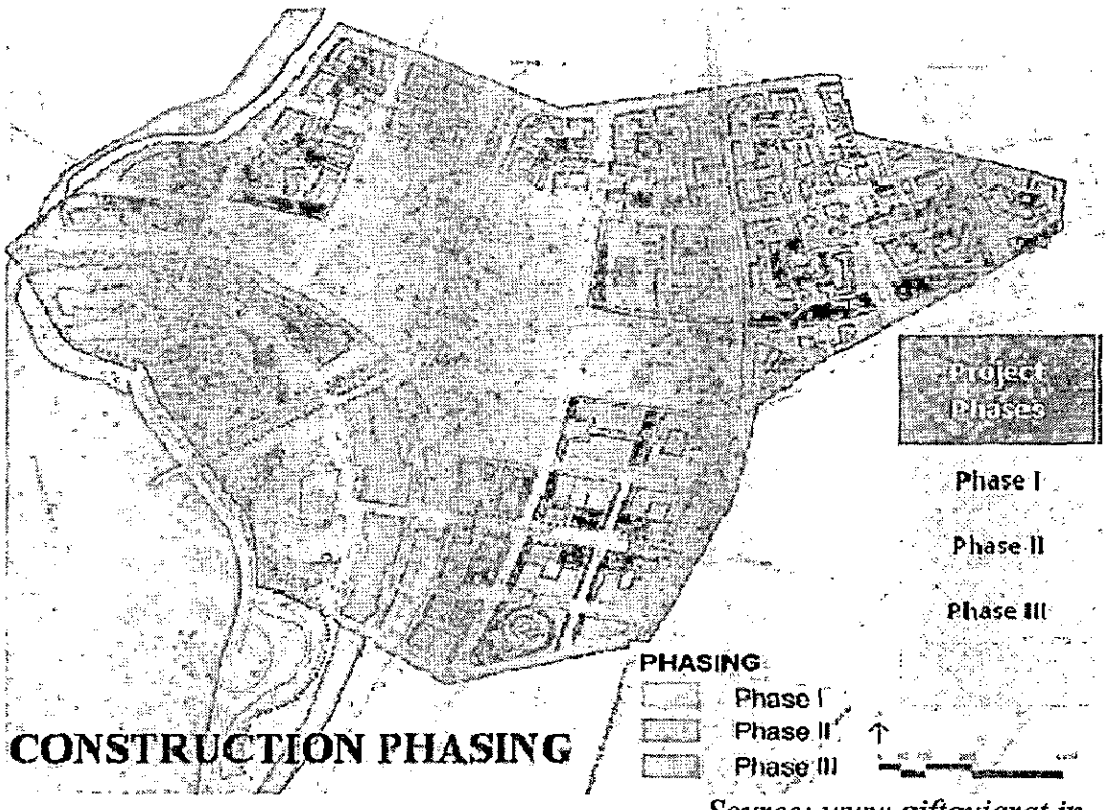
1. Utilities
2. Integrated Townships
3. Entertainment zone
4. Hotel/Convention Centre
5. Health services
6. Schooling
7. Shopping malls

An International Financial City is developed on the combination of both domestic tariff zone and special economic zone so that the investors can get tax benefit of it. An IFC consists of processing areas - a finance sector for generating capital and non-processing areas – an entertaining and residential sector for supporting processing areas. DTA is only for domestic investors to develop their financial center where they can have exchange of money, credit, debit, loan etc., whereas processing unit of SEZ areas is for foreign investors. The non- processing areas consist of services only for the person who work in the DTA or in processing unit of SEZ.

3.1.6 Project Phases

From fig 3.3, its clear that construction started from center and ended to the periphery as natural city emerges. It is planned in such a way that first phase is self sufficient and other two stages may or may not be depended on the phases completed. The first phase includes 40% of commercial, 20% of mixed use and 20% recreational spaces along with well developed transport network. Second phase covers 70% of total city planned.

Plate 3.3: Construction phasing



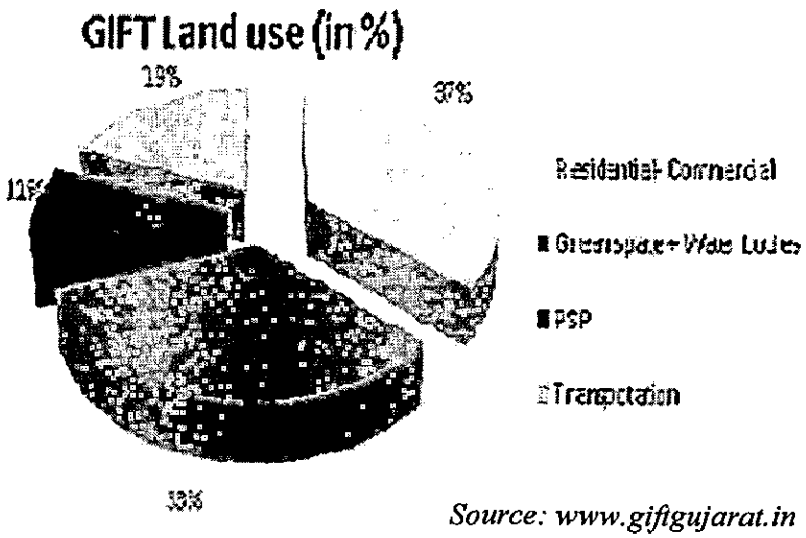
Source: www.giftgujarat.in

- First Phase: As of now, proposed GIFT city's land leveling work is underway. Soon GIFT city will start constructing a temporary housing facility for some 40000+ workers.
- Second Phase: The second phase of planned period for construction is 2010-2013.
- Third Phase: Planned period for construction and commencement is 2013- 2017.

3.1.7 Landuse plan

Being a financial city, major activity is related to generating economic and employment, hence the major portion i.e. 60% is devoted to commercial as shown in fig. 3 & 4. No industrial zone. The supporting/ supplementary activities (non processing areas) like residential, retail, recreational, public buildings, etc. comprise rest 40% where residential is on main lead. Green spaces and buildings contribute approx. equal proportion whereas transportation and other services constitute 30%. From fig 5 it can be seen that all the high rise commercial spaces are located in the centre near the Sabarmati from where the city expands.

Plate 3.4: Landuse breakup in percentage of GIFT

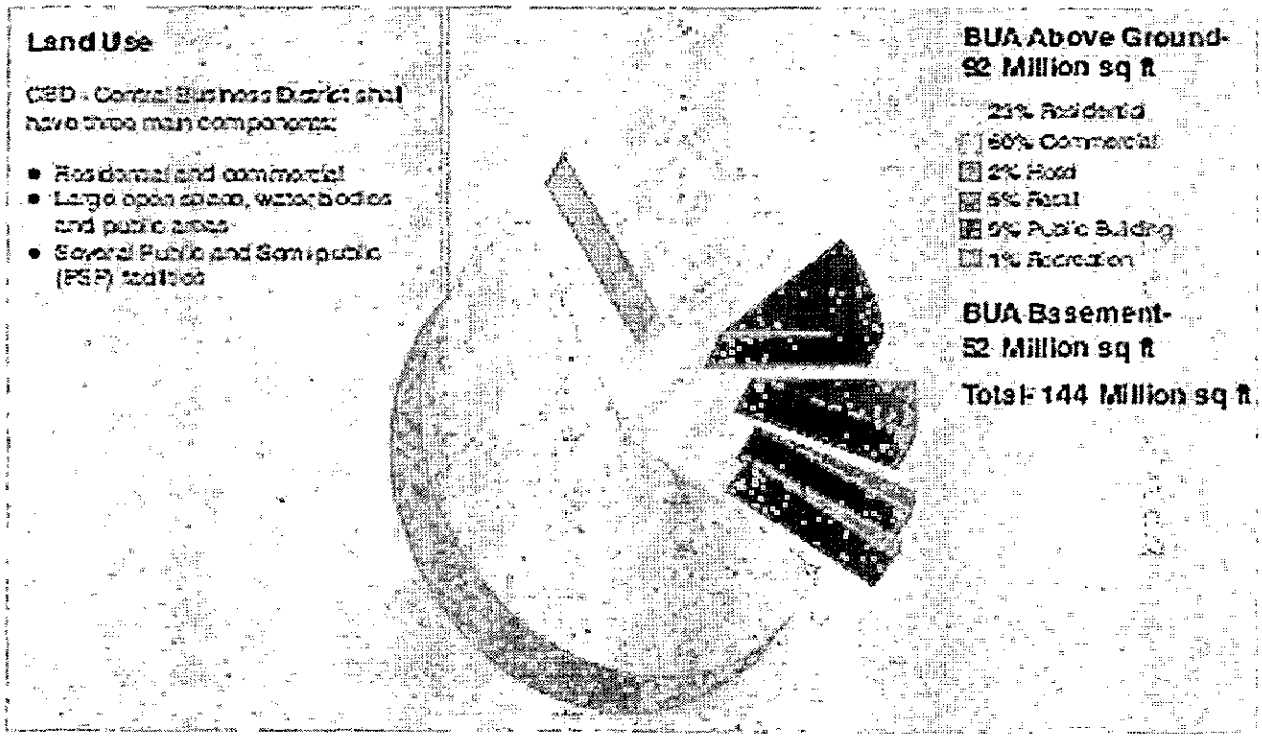


Source: www.giftgujarat.in

Public and open spaces are scattered as per the needs. No isolation of other land uses is done in the city like the institutional, residential, retail and recreational are located in the same structure or cluster in the same zone. A kind of gridiron pattern is maintained in the city from services and transportation with high technology. Recreational zones are located in the center and near the Sabarmati river which are designed nicely as a

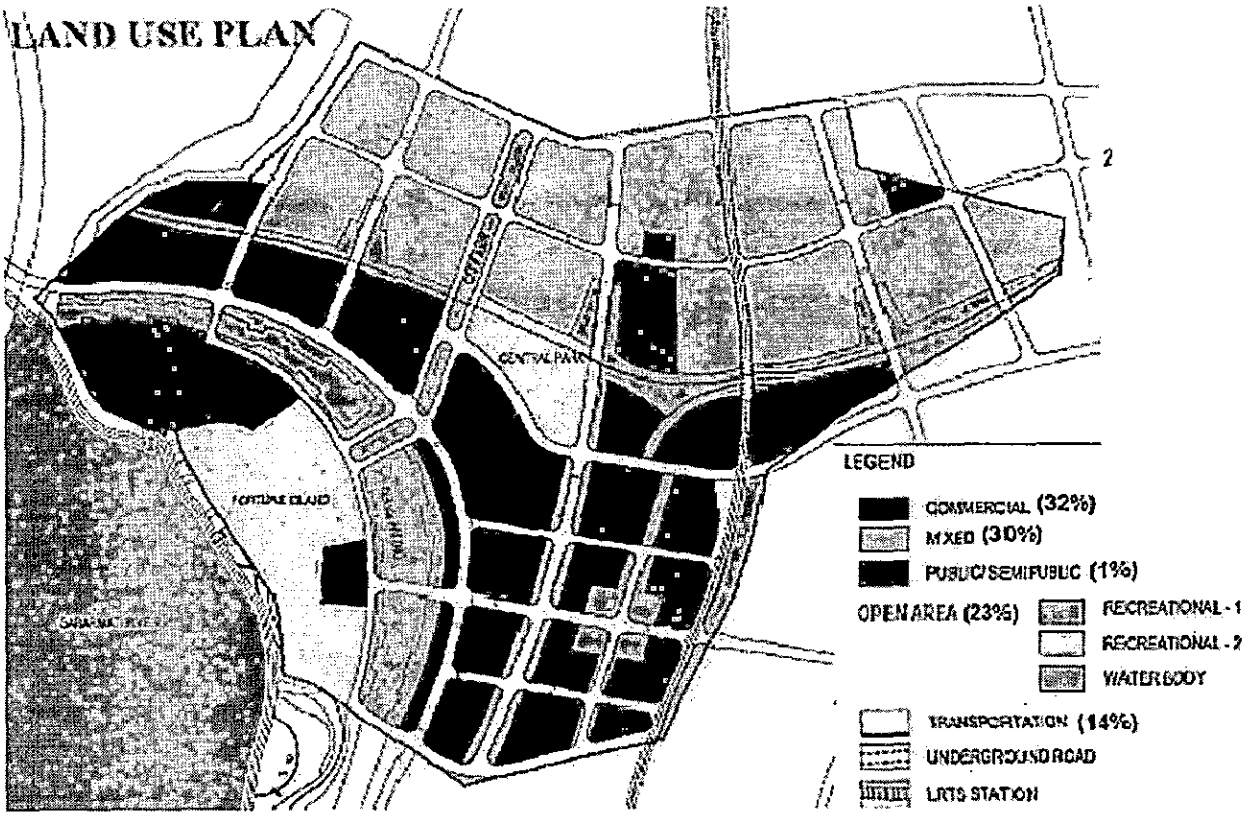
free public space for the residents. Figure 6 shows that GIFT is an autonomous free zone that has its own planning rules and regulations governing size, location, setbacks, height, and bulk and density requirements applicable to each building project. The allowable height in this city is 250m with FAR > 8. Approximately all the structures surrounding the Sabarmati river are high-rise with new design & high technology playing with green spaces. Each mixed space has its own open spaces. The % breakup of ground coverage and open spaces in mixed zone are as per Ahmedabad byelaws for DTA and SEZ. There is no space allocated for heavy industries. Skyline along the prime waterfront is expected to follow the profile depicted with limited fluctuation.

Plate 3.5: Landuse breakup in percentage of GIFT



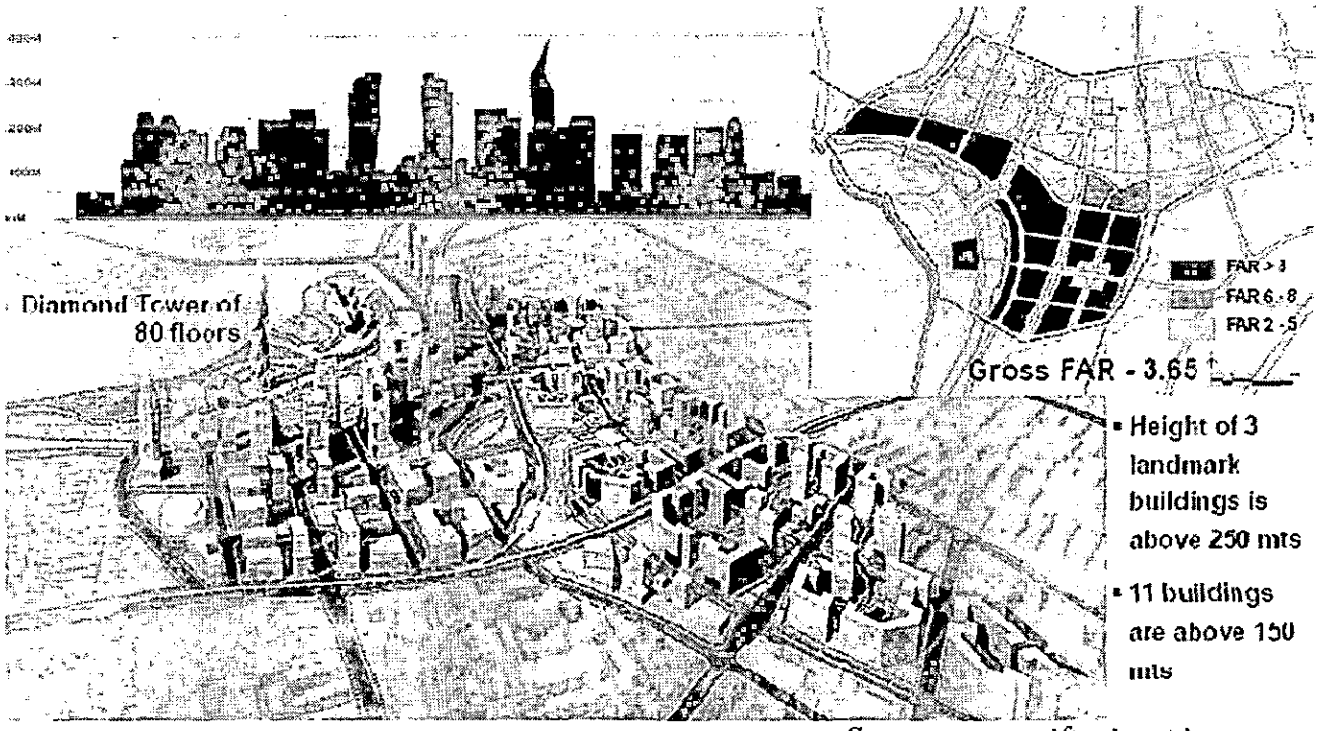
Source: www.giftgujarat.in

Plate 3.6: Landuse plan of GIFT



Source: www.giftgujarat.in

Plate 3.7: FAR and height variation



Source: www.giftgujarat.in

3.1.8 GIFT EXPECTED ADVANTAGES:-

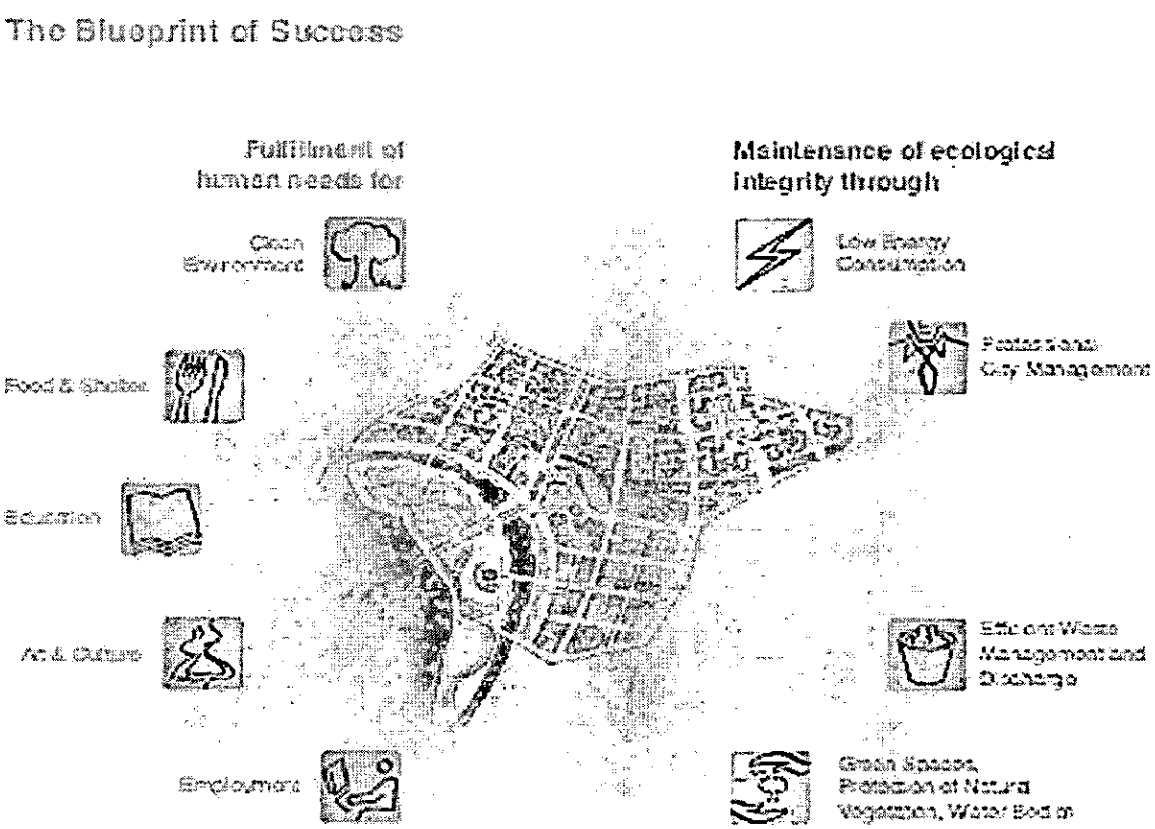
(Referred from the GIFT presentation given on the site www.giftgujarat.in)

1. As per McKinsey Study by the year 2020, :
    a. The sector may provide a potential 10 million to 11 million jobs
    b. GDP contribution may outperform at a rate of 15 to 20 per cent
2. Strong Location Advantage:
   Its Proximity to Mumbai and strong connectivity
    a. by air and road
    b. 12 kms from Ahmedabad International Airport: 8 lanes Expressway
    c. 8 kms from Gandhinagar: Administrative Capital of Gujarat
    d. Abuts National Highway 8:Delhi -Mumbai
    e. Strong Intercity Connectivity: MRTS / BRTS
    f. Integrated Townships: High Quality Residences, Entertainment, Hospitality, Commercial & Social Infrastructure
3. Robust Urban Planning:
4. Attractive façade, skyline and Urban form. It is a self-sustainable city
5. High Quality Infrastructure:
    a. State of the Art Physical, ICT and Social Infrastructure at affordable prices.
    b. Intelligent transportation system- MRTS / LRTS / BRTS
    c. District cooling system- Measures for energy conservation with Reduction of Air Conditioning Power demand
    d. Comprehensive water management plan- 24 hrs power and water supply through a dedicated system for the GIFT city
    e. Integrated township with the best of social and physical infrastructure
        i. Completely developed site with high quality internal roads, landscaping and storm water drainage
        ii. Underground arterial road
        iii. Abundant Parking Space
        iv. Access to Piped Gas Network.
        v. Environmental Protection measures including e-Waste Management

vi. Adequate Social Infrastructure: entertainment, institute, clubs, banks, post offices, etc.

6. Availability of Talent Pool and its development programmed
7. Firm Implementation Plan
8. State Government: Known for development on fast track, always open to ideas, ready for action Pragmatic.
9. River front development
10. Technology backbone for a tech-finance hub
11. Data centers
12. Energy conservation measures, low per capita energy consumption
13. Business Friendly Regulations and Policies: Affordable Pricing Options for Occupants
    a. Outright Purchase: Bare, Furnished, Plug & Play and Press & Play
    b. Lease: Bare, Furnished, Plug & Play and Press & Play
    c. Guaranteed Service Levels
14. For occupants:
    a. Access to high speed network and cutting edge IP based Networks (NGN) allowing seamless Voice, Video and Data integration and use of advanced end user applications
    b. Residential and Intelligent Building services such as high speed Internet access, telephony services (VoIP, PSTN), IPTV, Video on Demand, Home Security (CCTV, alarms), Automation (lighting & heating control, energy management, appliances and remote control, etc.)
    c. Faster setting up of business with Plug and play services the organizations would spend more time on customer business services than on developing infrastructure services
    d. Attractive price-performance ratio because of the economies of scale better than the Best technology available, more cheaply.
    e. A fully self-contained network management and self operations to support the services and performance SLAs for uptime with properly backed up remote Disaster Recovery site as a fall back.

Plate 3.8: Blueprint of success



Source: www.giftgujarat.in

The Project design has benefited greatly from the inputs of a large number of domestic and international experts who have had an opportunity to determine the key needs of Companies in the financial services space. More particularly, connectivity, infrastructure and transportation access have been integrated into the design of the city. An attractive pricing strategy is also being developed to ensure that it is a fraction of the cost that is ordinarily incurred in other Indian and global finance cities.

3.1.9 Current Status:-

(Directly taken from the GIFT presentation given on the site www.giftgujarat.in)

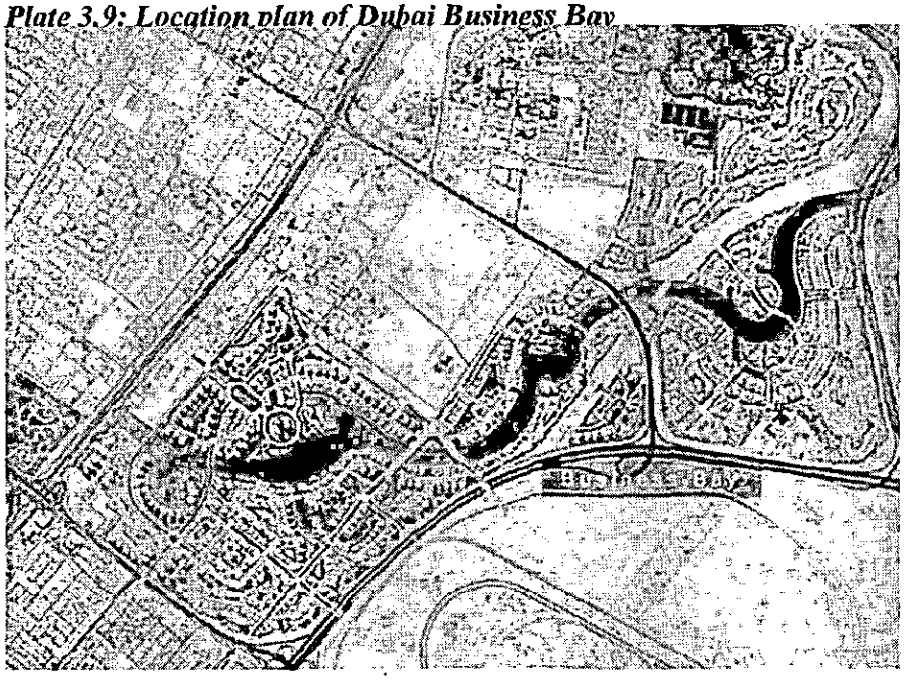
1. Land acquired and transferred to GIFTCL
2. Detailed Master Plan completed
3. Concept Design of Buildings for six packages completed
4. Completion of Concept Design of Buildings for all packages.
5. Work completed on DPR of External Connectivity for Phase 1
6. Built form engineering underway
7. Approval of GoG received
8. Approval of GoI received for SEZ
9. Infrastructure Design Concept completed.
10. Site preparation activities and Surveys commenced
11. ICT Technical Regulatory Compliance submitted

3.2 Dubai's Business Bay:

3.2.1 Introduction

The 'Business Bay', a new initiative that aims to make the UAE a leading international commercial and business centre. 'Business Bay' is a new commercial and business cluster that will be located along a new extension of the Dubai Creek as shown in fig. 3.9. It will extend from Ras Al Khor to Sheikh Zayed Road. This new initiative will provide a conducive environment and infrastructure for businesses from around the world to establish their local, regional and international headquarters. This master plan for a new CBD for Dubai was prepared on behalf of a government entity set up to spearhead development growth in Dubai. It includes a 15km. extension of the existing Dubai Creek, wrapping it through the site and connecting it to the Arabian Gulf. The extended creek will occupy a quarter of Business Bay's total land. At an average width of 130 meters and depth of six meters, the creek will accommodate yachts up to 60 meters. The legendary Dubai Creek - an important aspect of Dubai's trading past that have shaped Dubai from a fishing and pearl diving center to international port; has been extended considering its significance as a trade centre.

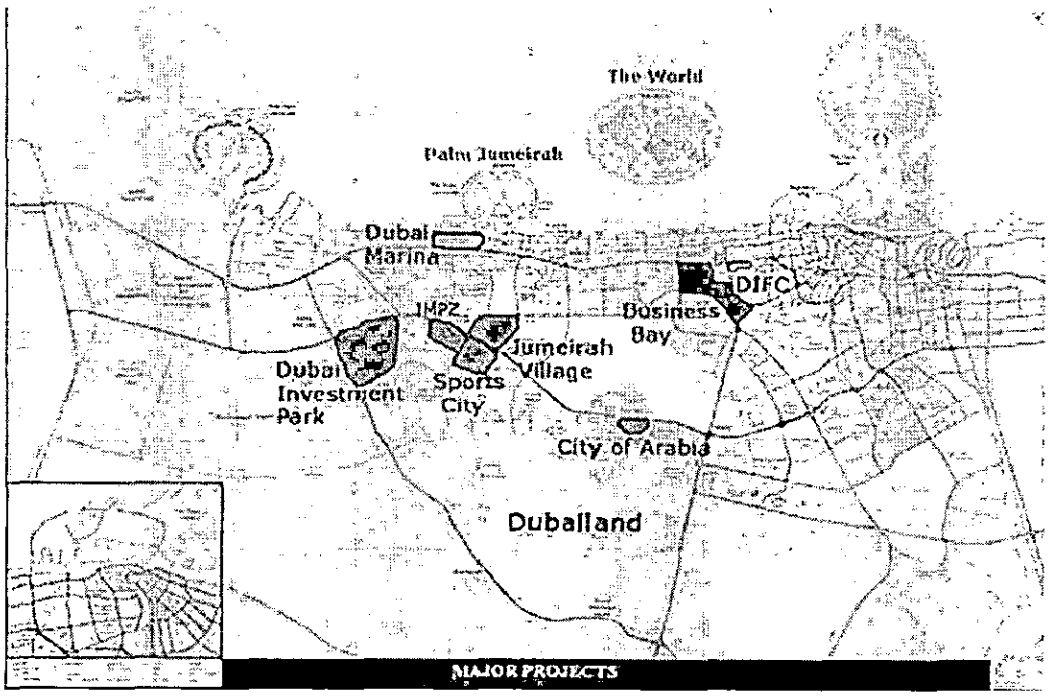
Plate 3.9: Location plan of Dubai Business Bay



Source: www.gowealthy.com/.../businessbay_map.jpg

Business Bay will be a free-zone business, commercial and residential district. It will be conveniently located next to Downtown Dubai and is expected to be fully completed by 2010. The ambitious Business Bay project is being developed to provide Dubai with the role of a leading international commercial and business center. Multi-nationals and regional corporations can establish their headquarters on a freehold basis in Dubai's sprawling central business district. Business Bay will feature facilities such as towers for offices and accommodation, landscaped layout, and a network for roads for easy access and exit. It will also feature fascinating canals to add to the magnificence of the project. Versatile and highly-advanced technology such as Voice over Internet Protocol, wireless internet technology and fully integrated intelligent business and energy management systems are put to use towards one simple end to create working spaces that are as advanced as the people in them. Due to the sheer size of the development, residents and people working in the district will benefit from a great selection of amenities, which will include hotels, restaurants, cafes, shopping malls and supermarkets. Dubai Business Bay will have medical facilities, sports complexes, health clubs, swimming pools, supermarkets, landscape gardens and children play areas; with a two-level shopping strip facing the creek and offering fine dining restaurants, cafes and shopping outlets for some retail therapy in its residential zone.

Plate 3.10: Layout of Dubai Business Bay



Sources: www.difc.ae

The lifestyle in Business Bay is urban, self-sustaining and business-oriented, catering to corporate entities setting up base here. The key feature of the Business Bay is to offer a mix of work and play all in one place, right in the heart of the city. It includes:

1. Traffic Impact Assessment
2. Environmental Impact Assessment
3. Water Modeling Studies

Key facts:

1. 64 million sq. ft total area and 78.5 million total GFA
2. About 240 buildings attracting commercial and residential developments.
3. Project Value: AED 110 billion / USD 30 billion
4. Projected population- 191000
5. Estimated employers/ shoppers- 110000
6. Dates of completion: Creek in 2007, Infrastructure in 2008, & Entire city in 2012-15
7. Population growth- 3.8%

3.2.2 Why Dubai for Business Bay?

The remarkable progress this city and the emirates in all-purpose has made an astonishing impact worldwide over the years. It is an ideal location for Ultra Modern Business Hub. Dubai is the gateway to 2 bn people in fast growing emerging markets and second largest emirate of the (UAE). Dubai is the City of Merchants and proud of its adventurous construction projects.

Key Points about Dubai (2008)

1. FDI- $21bn
2. GDP- $53.8bn
3. Non oil growth 18%
4. Oil production 0.24 mbd
5. Tourism 6.99m
6. Open, transparent market and easy access to regional markets

7. Pro-business attitude and government policies
8. Consistently strong economic outlook
9. Fast growing industry fuelling economic growth and rapid development
10. Best regulatory environment
11. Cosmopolitan work environment
12. Well connected location
13. Safe and stable base for business: Free zones
    a. 100 per cent foreign ownership
    b. Exemption on all import and re-export duties
    c. 100 per cent repatriation of capital and profits
    d. Freedom from corporate taxation for 50 years with an option to renew.
    e. No personal income taxes
    f. An abundant and inexpensive energy supply
    g. Simple, efficient recruiting procedures
    h. High level of administrative support from authorities
    i. Sell directly to dealers and distributors
14. Full range of banking and business services
15. First class infrastructure
16. Dubai Strategic Plan 11 % real growth actual 7.7% in 2008.

3.2.3 3 major zones of Business Bay in its first phase

(Referred from the www.dubai-properties.ae)

1. Bay Square

Bay Square is a new business, retail and residential project. It will cover over 2.4 million square feet and will be located 1km away from Sheikh Zayed Road within Business Bay. Residents, professionals, and visitors at Bay Square will enjoy a community similar to creative business hot-spots in major cities around the world. A place where passers-by find inspiration while strolling along the canals and sidewalks, intricately decorated with a wide variety of restaurants, cafes and retail stores. With over 1.6 million sq-ft of office space within the development, Bay Square will host numerous small and medium-sized

enterprises. Professionals from small to medium-sized businesses will form Bay Square's commercial populace. There will be approximately 575 offices with an average size of 2,000 sq-ft each to be handed over in core and shell. The total BUA is 5330393 sq ft. Retail and food outlets will be available to service the residents of the community. Current status – 43% completed. The project comprises of the following: 13 Low Rise Buildings in total in Bay Square which comprises of

1. 10 office/residential buildings
2. 1 dedicated residential building
3. 1 dedicated commercial building
4. 1 Boutique Hotel

2. The Executive Towers

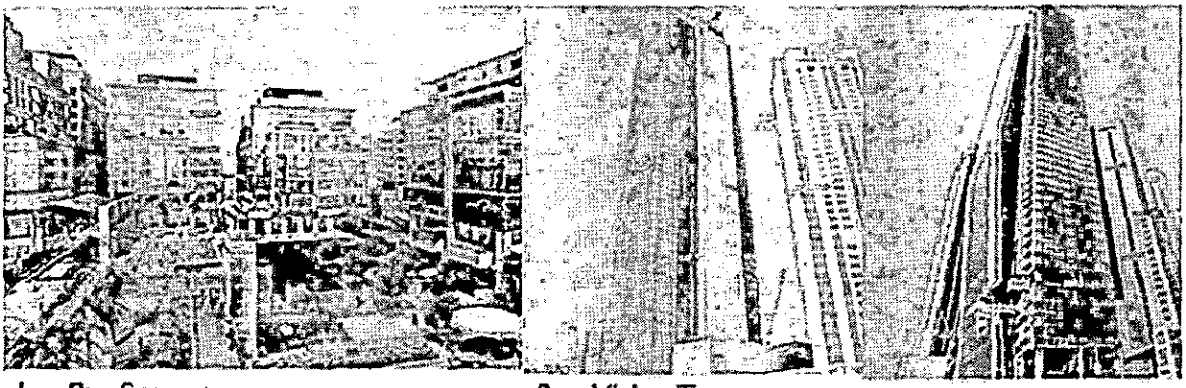
The Executive Towers at Business Bay comprise of 12 towers: Ten residential towers, one commercial tower known as Aspect Tower; and hotel the Business Bay Hotel. The apartments come equipped with modern amenities, high-tech facilities and internationally designed interior spaces with views of the winding Creek. The Executive Towers offer the highest standards of luxury and style, with ten residential towers, the lavish Business Bay Hotel, and Bay Avenue, a two-level shopping mall that houses fine dining restaurants and high-end shopping outlets. It also features clinics, health clubs, sports complexes, swimming pools, supermarkets, and medical facilities, fine dining restaurants, shopping outlets, landscape gardens and children's play areas.

3. Vision Towers

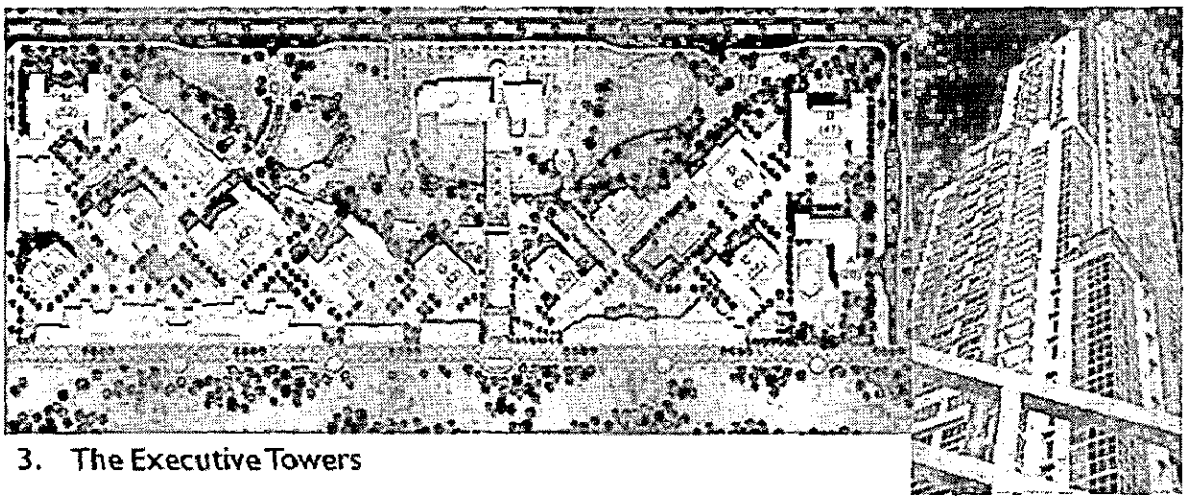
The Vision Tower is being built at the entrance of Business Bay, the freehold commercial and residential district in Dubai located on Sheikh Zayed Road between interchanges 1 and 2. The 51-storey skyscraper will be a freehold office tower with office spaces from 5,000 to 12,000 square feet, built on an area of 592,000 square feet (55,000 square meters). Vision Tower will rise 260 meters (853 feet) high, covered with transparent glass, allowing clear views from both outside and in. Current status- 91% completed including infrastructure. BUA- 1150575 ft².

Plate 3.11: Views of 3 major zones of Business Bay

Business Bay consists of three major zones in its first phase:



1. Bay Square
2. Vision Tower



3. The Executive Towers

Source: www.dubai-properties.ae

3.2.4 Landuse plan

Dubai business bay is basically developing the unused area near the creek, so major land portion goes in its extension process i.e. 48.6% as shown in table 3.2. Mixed use development is more so that they can get benefit of flexibility in bylaws applied for various land use i.e. 63% then come residential i.e. 21.7% and finally commercial with 15.3%. Land acquired for Support facilities which includes open spaces, services, public buildings, etc. are more than the developed land. From fig. 3.12 we can see major portion of each land use is aligned as a strip on the edge of the creek. Open spaces or public facilities are provided where creek width is more. Fig. 3.13 shows that the height of various buildings in Business Bay on the shore of creek is much higher as compare to one away from it. Average height near the creek is 260 mts.

Table 3.2: Landuse breakup of Dubai Business Bay

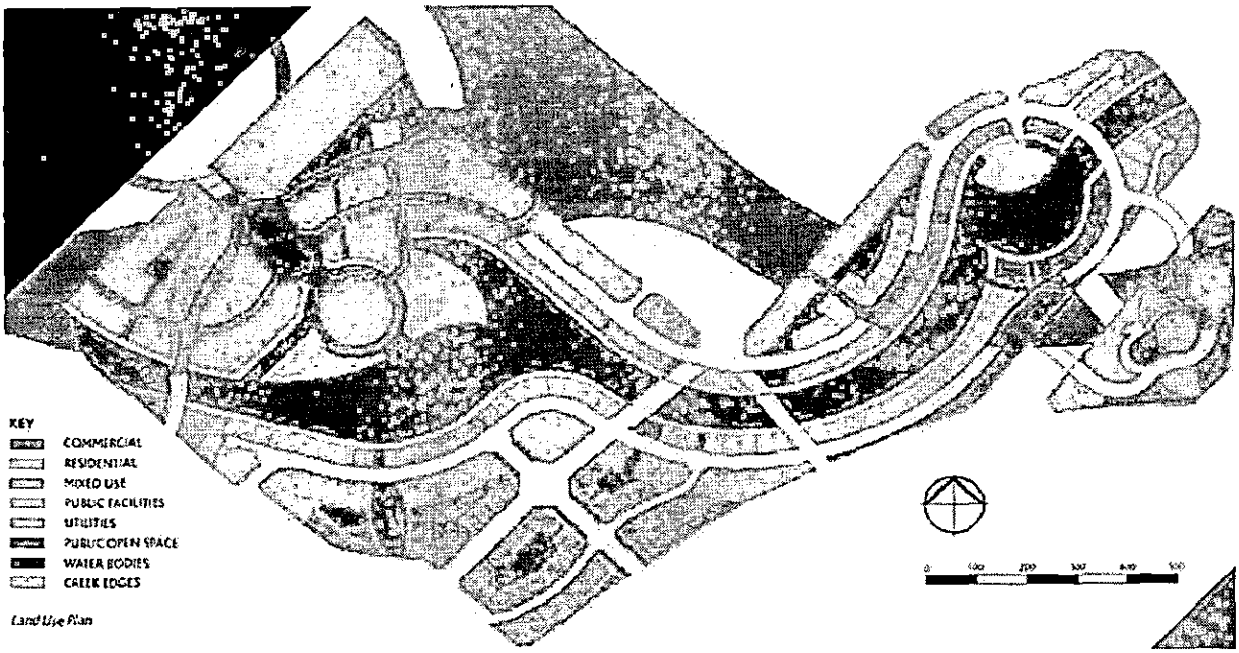
Land use budget summary			**Support facilities**		
Landuse	**Area (sq.ft.)**	**%**	**Landuse**	**Area (sq.ft.)**	**%**
Development land	14337240	48.3	Public open space	5780345	37.9
Support facilities	15324498	51.7	Public facilities	1240625	7.6
Total	**29661738**		Utilities	900137	5.9
			Creek extension	7403390	48.6
			Total	**15324497**	

Development profile (GFA)

Land use	**Area (sq.ft.)**	**Percentage**
Commercial development	12008247	15.3
Mixed-use development	49472770	63
Residential development	17002246	21.7
Total	**78503263**	

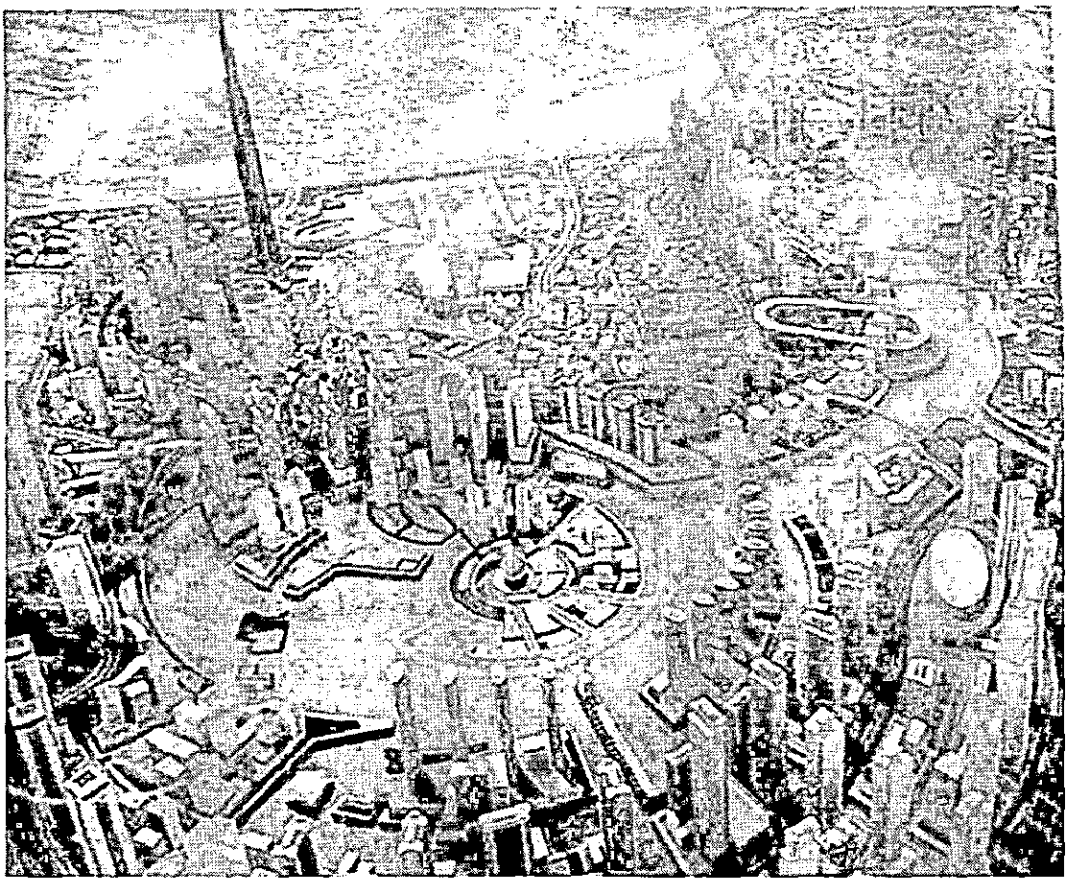
Source: www.dubai-properties.ae

Plate 3.12: Landuse plan of Dubai Business Bay



Source: www.dubai-properties.ae

Plate 3.13: Sky view of Dubai Business Bay



Source: katodrytis.com/main/images/549.jpg

3.2.5 Project concept:

(Referred from the www.difc.ae)

Prior to the establishment of the DIFC, this region between Europe and South East Asia was not directly served by a world class financial centre with local onshore capital markets akin to London, New York or Hong Kong. The purpose of the DIFC is to provide such a financial centre and to retain the vast reserves of capital within the region in suitable local or international investment vehicles. Business bay is an additional to it which was developed on an unused land surrounding the creek. The objectives of the Business bay are stated as follows:

1. Attract liquidity back into investment opportunities within the region and contribute to its economic growth.
2. Facilitate planned privatizations in the region and enable initial public offerings by privately owned companies, giving impetus to the programme of deregulation and market liberalization throughout the region.
3. Create added insurance and reinsurance capacity- 65 percent of annual premiums are reinsured outside the region.
4. Develop a global centre for Islamic Finance- This is now an over $260 billion international market serving large Islamic communities stretching from Malaysia and Indonesia to the United States.
5. The Business bay will act as a catalyst to the region's economic developments- just as Wall Street, the City of London and Hong Kong have contributed to the growth of the US, European and Asian economies."
6. Developing the creek and area nearby.

Dubai's ruler has shrewdly created the perfect environment for setting up business in, or relocating to, the Emirate. Income tax, capital gains tax and corporate tax are all rated at 0% and facilities from Dubai World Central International Airport, to efficient ports.

3.2.6 Project summary

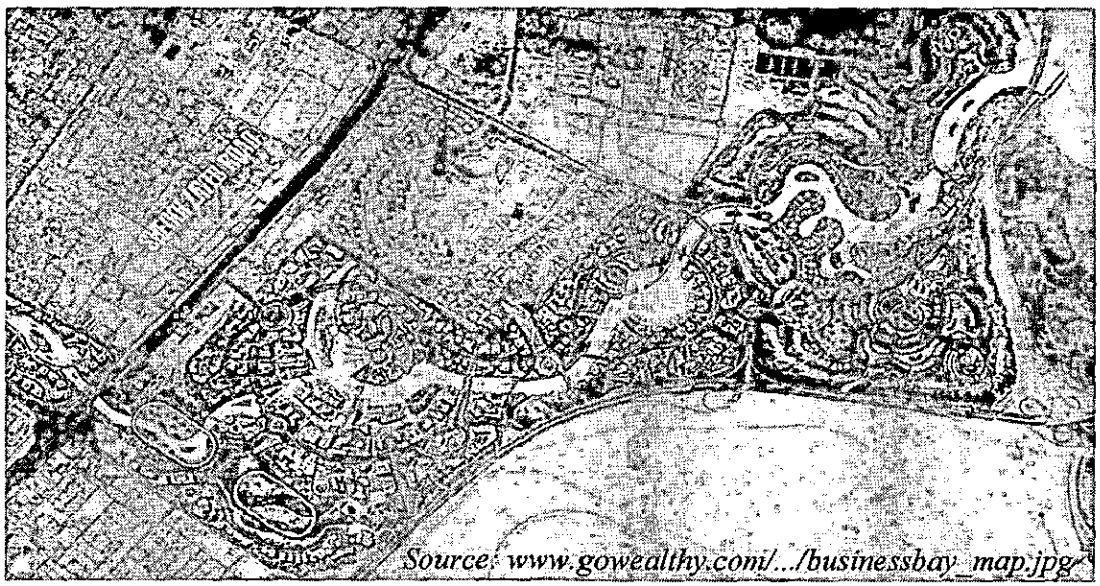
(Referred from the www.dubai-properties.ae)

1. **Free Zone:** The Dubai Business Bay is a federal financial free zone with its civil laws and courts designed to create a regulated regional financial marketplace.
2. **Financial hub:** It is similar in nature of business centers like Manhattan or Ginza.
3. **World class regulation:** A regulatory regime supervised by the Dubai Financial Services Authority [DFSA] from the leading jurisdictions and primarily from the London & UK has been enacted to ensure that licensed brokers and other financial intermediaries know that upon relocating to the business bay they will be operating within a world class financial regulatory system.
4. **Buildings:** The project consists of 240 buildings, with heights varying from 12-50 stories, in a 64 million sq ft.
5. **Sectors:** It focused on six distinct financial sectors namely:
    a. Banking services [investment, corporate, and private banking].
    b. Capital markets [equity, debt instruments, derivatives, & commodity trading].
    c. Asset management and fund registration.
    d. Insurance and re–insurance
    e. Islamic finance.
    f. Professional Service providers
6. **Licenses:** Financial institutions may apply to the Authority for licenses in the above sectors. All licenses operating in the Business bay are entitled to the following taxation advantages which are as similar to licenses operated in DIFC:
    a. Zero tax rates on profits.
    b. 100% foreign ownership
    c. No restrictions on foreign exchange or capital repatriation
    d. US dollar denominate environment
    e. Substantial onshore capital market- well regulated operating environment
    f. State of the art office accommodation, technology, security and data protection.

A business bay Authority regulated stock exchange

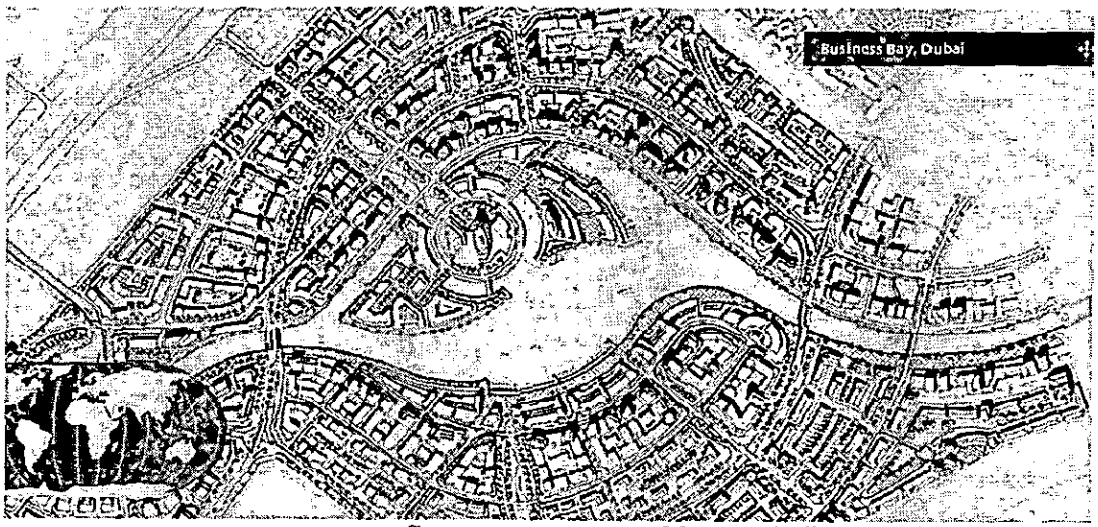
All these points indicate that major role to develop a city like a business bay is to increase GDP. The policies are planned accordingly. Landuse are planned in such a way that each sector can gain capital or benefit. FAR selection and % break up for various land use depend on market analysis and demand of population. This city is generally planned to pool the talented people by providing high standard living. Fig 3.14. shows the site plan for Business bay when all phases are completed.

Plate 3.14: Site plan of Dubai Business Bay



Source: www.gowealthy.com/.../businessbay_map.jpg

Plate 3.15: Plan of Dubai Business Bay phase 1



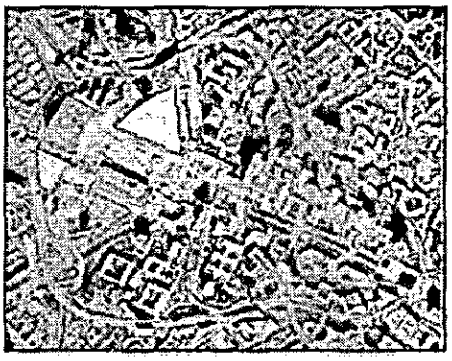
Source: www.gowealthy.com/.../businessbay_map.jpg

3.3 Various other examples:

Some other examples of IFC in the world can be listed as:

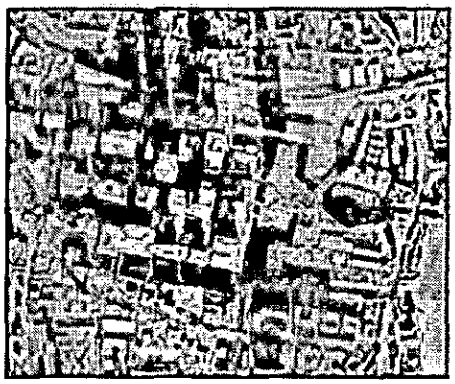
1. Dubai IFC	10. Yale IFC
2. Busan IFC	11. DIFC
3. IFC Phnom Penh	12. DIC
4. La Defense Paris IFTC	13. SONGDO
5. Shinjuku Tokyo	14. New WTC – New York
6. Lujiazui / Pudong, Shanghai	15. Canary Wharf - London
7. Dockland London IFTC	16. London Stock Exchange
8. Seoul IFC	17. New York Stock Exchange
9. Shanghai World Financial Center	18. Tokyo IFC

Plate 3.16: Sky views of the best CBD's of the world

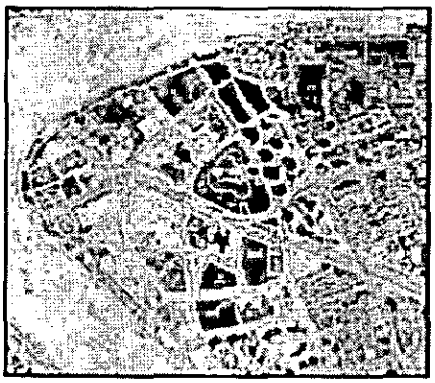


Paris La Defense

Tokyo



London



Pudong

Source: www.giftgujarat.in

Table 3.3: Comparative study between the best CBD's of the world

	Paris (La Defense)	Tokyo (Shinjuku)	London (Dockyards)	Pudong (Lujiazui)	GIFT
Land use Scale (sq km)	1.6	1.6	1.05	1.7	2.02
Construction Scale (in mn sq m)	2.5	1.6	1.1	4.5	8.4
Greenbelt (in thousand sq m)	40	120	50	363	615
Height (m)	200	250	250	490	410

Source: ECADI/Fainvood Consultants

In terms of scale and sheer physical scope, GIFT has been planned to be designed at par with the presently acknowledged Globally Benchmarked International Financial Centers (IFCs).

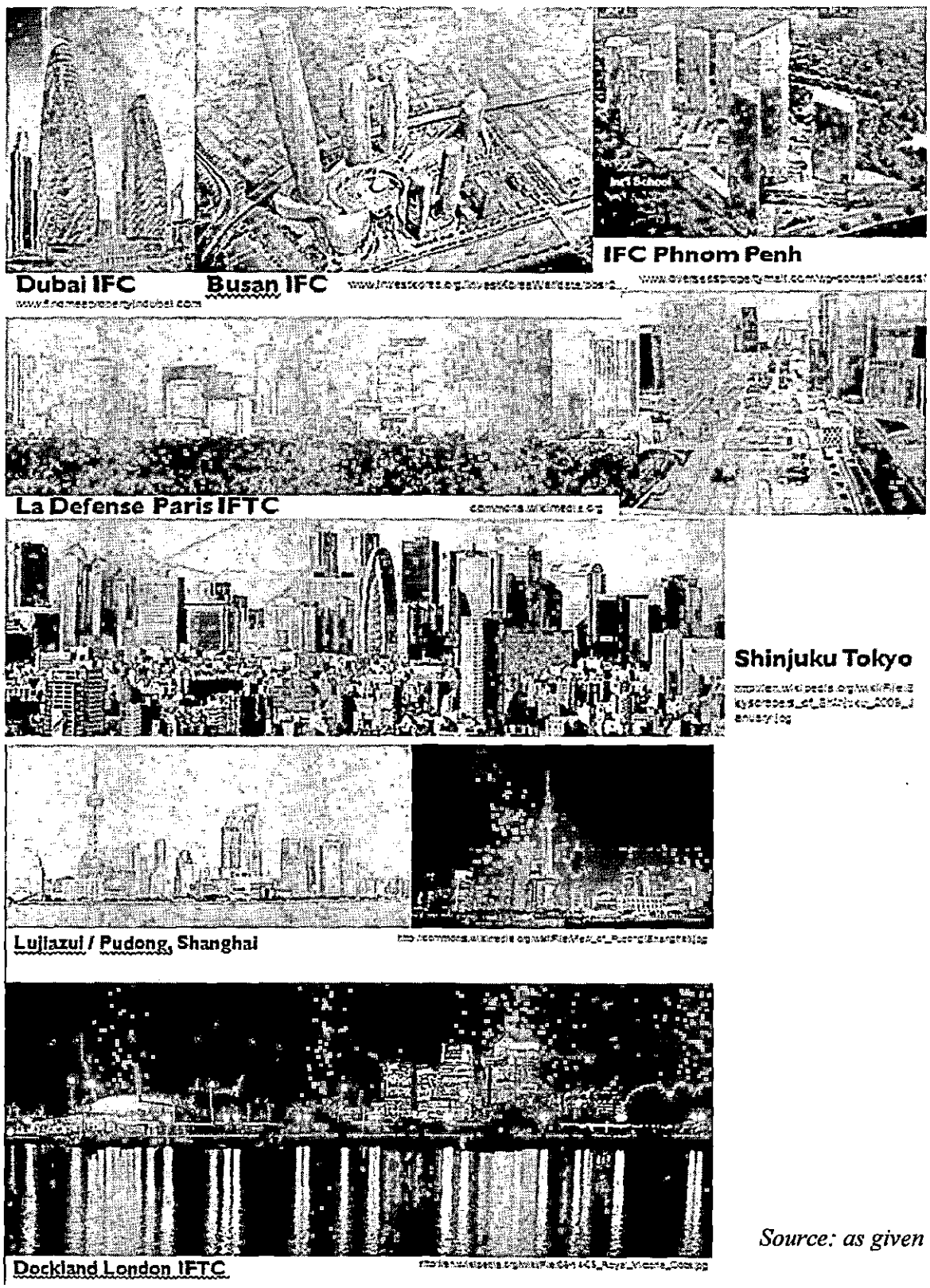
Table 3.4: Comparative study of International Financial Center in the world

name	Phase	Time of Development	Total Area	BUA	Hight of tower	Floor Area
La Defense, Paris	Phase I	1958	184 acres	1,52,000 sq m	14 high rise tower of 150 m	
	Phase II	1981		3,00,000 sq m		
	Phase III	2001		1,02,000 sq m		
BRICKWELL FINANCE CENTRE	Phase I		13.61 acre	55090 sq m	40 stories	
	Phase II		35 acres	89,264sq m	68 stories	
DUBAI INTERNATIONAL FINANCE CNETRE		2004	110acre	40,00,000 sq m	40 towers	20,00,000 sq m (Gross)
SHANGHAI WORLD FINANCE CNETRE		construction started in 1997	7.5 acre	46,500sq m	101 floors(492m)	Footprint 14,400 sq m

FSI	No of firms	No of Employee	Investment or project cost	Features
		1,50,000		Important modernisation plan has to give a new dimension to the district and focuses on 4 main axes: regenerate outmoded skyscrapers, allow new buildings, improve the balance between offices and housings and make the transport of local employees from their house to La Défense easier.
		4000 people	5245 million USD or Rs 2620 million	provides office, retail and restaurant spaces in a single building.
		6000 people (expected)		Green Building certified by LEED.
4.5		130000		live, work and enjoy their leisure time in one strong location.
				Presence of world-class stock exchange, the Dubai International Financial Exchange (DIFX).
12		20000		It is marked as skyscraper which will consist of office spaces, hotel rooms, conference rooms, observation decks and shops on the ground floors

Source: Combined from various sources

Plate 3.17: Pictures of various IFTC



Source: as given

3.4 INFERENCES

Places such as Anguilla, Antigua, Bahamas, Bahrain, Cayman Islands, Hong Kong, Isle of Man, Jersey, Lebanon, Luxembourg, Netherlands Antilles, Panama, Singapore, and United Arab Emirates (UAE) have International Financial centre (IFC) which offer little or nongovernment interference in legitimate business and financial activities. In many cases, it also offers very low or zero tax rates, and provides excellent communications facilities. For developing an international financial tech city in a state, status check must be done in the following parameters.

1. Availability of skilled personnel and the flexibility of the labour market i.e. Availability of institutions, colleges or good education background which gives large no. of talented workforce.
2. Regulatory environment
3. Access to international financial markets i.e. geographical proximity and business clusters
4. Availability of business infrastructure for eg. telecommunications, IT (information technology) infrastructure, transport links and international financial services
5. Easy access to customers
6. A fair and just business environment in terms of legal system and personal trustworthiness.
7. Government responsiveness i.e. the level of support for financial services and to the concern of the industries.
8. Corporate and personal tax regime or SEZ
9. Operational costs like cost of employment, travel time, travel expenses, etc and maintenance.
10. Access to suppliers of professional services for eg. accountants and lawyers
11. Quality of life indentify from good work and life balance between work and life, leisure facilities and culture, healthcare facilities, school and colleges, transport system and residential property
12. Cultural and language - culture, cosmopolitan and accepting immigrants
13. Demand for an international financial hub

14. Demand for the industries like BPOs, Foreign exchange, loans, credit and debit banks, IT firms, International Financial Services, ITES, etc.
15. Growth rate, migration and urbanization with its reason.
16. Strategic geographical location with good International and domestic connectivity
17. Tourism
18. Attractive sustainable local economy

Thus the plan proposal would need to:

1. Provide a development that is a genuine leisure and business destination.
2. Create a humane environment that has an authentic work-life balance
3. Create a vibrant mixed-use development. It has the financial free zone has a mix of public office, hotel, retail and residential buildings and spaces.
4. Maximize connectivity and convenience for occupiers and visitors. This has been achieved by a stunning new interlinked climate controlled pedestrian podium running throughout the zone - one level above the car traffic podium – and using people mover systems interlinked with pedestrian, road, and train systems.
5. Create a master plan that embraces strategic transport initiatives and plans for the future.
6. Ensure that the IFC differs significantly from any local or regional competition.
7. Provide a development that is responsive to local environmental conditions
8. Create a piece of 'living architecture' where people, not vehicles, take precedence. The segregation of pedestrian and car traffic also meant that cars and buses could access the office from a safe subterranean level – whilst leaving the upper level free for pedestrian movement, landscaped spaces, and emergency vehicle access.
9. Ensure that the master plan allows for buildings and spaces that are responsive to the local culture and climate.
10. Improve quality of life
11. Adequate and proper availability of IFS.
12. Infrastructure development- social, physical, economical and institutional
13. Integrated planning

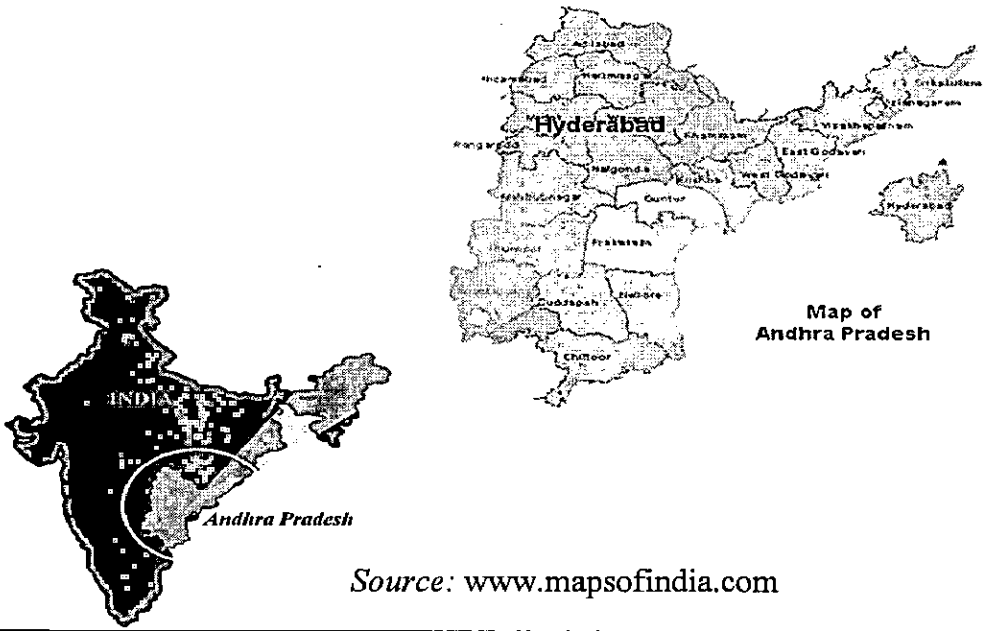
Chapter 4. WHY ANDHRA PRADESH FOR IFTC

4.1 General profile

AP is situated on the south east zone of India as shown in fig. 4.1. Its Area is 0.27 Mn sq. km. It lies between 12°41' & 22°N latitude and 77° & 84°40'E longitude, and is bordered by Maharashtra, Chhattisgarh and Orissa states in the north, the Bay of Bengal in the East, Tamil Nadu states to the south and Karnataka state to the west. Andhra Pradesh is the fifth largest state in India with a second largest store house of mineral resources. AP stands as 5th most populous state and a home for 7% of Indian population. It has Second longest coastline of 970 kms. Languages- Telugu &Urdu. AP is historically called "Rice Bowl of India". Its capital and largest city is Hyderabad. Total districts are 23 with urban agglomerations of 37 and 39 as class I towns. There are three major regions in AP

1. Northern Circars or coastal Andhra including Srikakulam, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Ongole and Nellore districts
2. Rayalaseema or Ceded districts including Kurnool, Cuddapah, Chittoor and Anantapur districts
3. Telangana including Khammam, Nalgonda, Warangal, Karimnagar, Medak, Nizamabad, Aadilabad, Mahbubnagar and Hyderabad districts.

Plate 4.1: Location and political map of AP

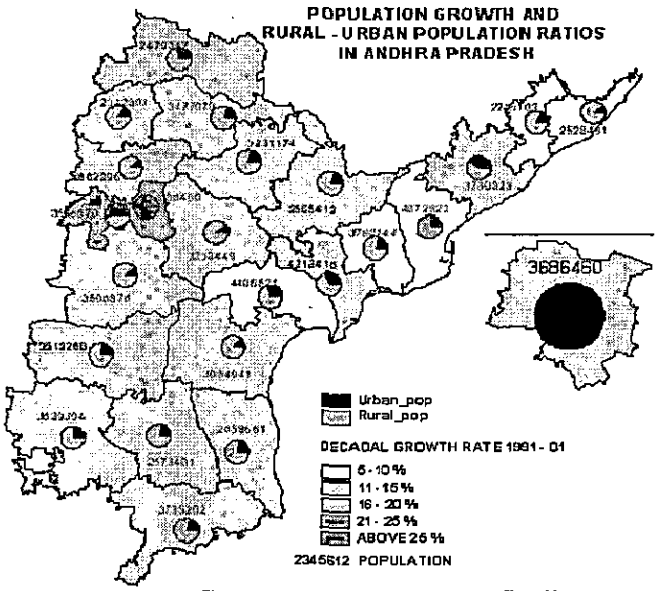


Source: www.mapsofindia.com

4.1.1 Climate

Physiologically, the state is divided into 3 zones of Coastal plains, Eastern Ghats, and the plains. The climate of AP is tropical, mostly hot and humid (particularly in the coastal belt) which varies considerably, depending on the geographical region.

Plate 4.2: Population growth & Rural Urban Population ratios in AP Census 1991-2001



Source: www.censusofindia.com

The average temperature is 31.58°C. The major role in determining the climate of the state is played by monsoons. Summer temperatures are generally higher than the rest of the states, with temperature ranging between 20°C and 41°C. About one third of the total rainfall in Andhra Pradesh is brought by the North-East Monsoons. Winters in Andhra Pradesh are pleasant.

4.1.2 Demography

Andhra Pradesh has a population of 75,727,541 with 275 persons per sq km as per 2001 census. AP ranks tenth compared to all Indian States in the Human Development Index scores with a score of 0.416. The urban population in the State is 20,503,597, which is 27.08% of the State's total population in 2001.

4.1.3 Economics status

Agriculture has been the primary source of income for this state's economy. AP's GSDP for 2005 was estimated at $62 billion in current prices. In 2008-09, the export was 32509 crores Rs with growth rate 24.5%. Exports from A.P economics are growing @ 10%

every year which is consistently higher than National Exports. In 2007-08 it was 16% high and in 2008-09 it was 3.855 high. AP contributes 15% in export from IT/ITES units.

Table 4.1: State GDP in a year

Year	State GDP (Rs. MM)
1980	81,910
1985	152,660
1990	333,360
1995	798,540
2000	1,401,190
2007	2,294,610

Source: www.censusofindia.com

It was globally recognized as fastest growing base for IT enabled services, exports upto $1 billion. The per capita income in 2005 was US 292$. The exports rate by STPI & SEZ is 24.5% with an employment generation of 11.44%. Share of AP in GDP is 15% with nation in 2008-09. The sectoral GSDP contributions in 2005-06 are: Primary - 27%, Secondary sector– 23% &Tertiary - 50%.

AP is the leading state in several Agro-based industries like Rice, Sugar, Edible Oil, Sea foods, etc. A.P is the cement and granite powerhouse of India and a leading Producer of Paper. AP is Bulk Drug Capital & Biotech Hub of the Country with 1/3rd of India's Production. AP has Huge Natural Gas resources over 30 TCF– KG Basin in AP. The economic Activity in various sectors are Manufacturing - 17%, Services - 43% & Agriculture -40% with an Investor Profile as Govt. 48.7%; Foreign 21.2%; & Indian 30.1%.

Table 4.2: Comparative study of exports shares of various states

Sr. No	Centre	2001-02	2002-2003	2003-2004	2004-2005	2005-2006
1	**Karnataka**	9903	12350(24%)	18100(46%)	27600(52%)	37000(34%)
2	**Maharashtra**	4500	5420(20%)	7845(44%)	11500(46%)	15500(35%)
3	**Tamilnadu**	4646	6315(35%)	7400(17%)	10730(41%)	13960(29%)
4	**AP**	2907	3668(26%)	5025(37%)	8270(64%)	12521(51%)
5	**Noida(UP)**	6100	7450(22%)	9900(32%)	12900(30%)	8358(40%)
6	**Kolkata**	604	1200(98%)	1620(35%)	2000(23%)	2500(25%)
All India				58240	74019(34%)	100809(36%)
AP SHARE IN COUNRY EXPORTS				8.62%	11.17%	12.39%

Source: www.apit.gov.in

Note: Shows AP rank second in investment with 105 projects.

Table 4.3: Top 10 investment destinations in India

Top 10 Investment Destinations in India*

State	No. of projects	Amount (Rs. crore)	Amount (US$ bn)	% of Investments garnered
Gujarat	86	73,170	17.8	25.8
Andhra Pradesh	105	25,173	6.1	8.9
Maharashtra	142	24,330	5.9	8.6
Tamil Nadu	157	24,299	5.9	8.6
Karnataka	91	19,930	4.9	7.0
Orissa	23	14,806	3.6	5.2
Uttar Pradesh	60	9,836	2.4	3.5
Rajasthan	38	9,806	2.4	3.5
Jharkhand	13	7,174	1.7	2.5
Delhi	19	6,359	1.6	2.2
Total	**1,054**	**283,605**	**69.2**	**100**

Source: RBI *2006-2007

Source: Institutional Investor Sponsored Report • September 2007

4.1.4 Education and Employment status

Andhra Pradesh is served by more than 20 institutes of higher education that offered arts, humanities, science, engineering, law, medicine, business and veterinary, leading to first degrees as well as postgraduate awards. A large pool of talented people from 1330 arts, science and commerce colleges; 1000 MBA and MCA colleges; 500 engineering colleges; 510 Industrial Training Institutes and 53 medical colleges passed out every year as shown in table 4.4. The student to teacher ratio is 19:1 in higher education. According to the 2001 census, Andhra Pradesh has an overall literacy rate of 60.5%. Every 4th IT professional in Silicon Valley is an Indian from AP.

The unemployment rate in the State as per NSSO data is 6.67%. The unemployment rate among educated is higher (7.3%) than the unemployment rate of the illiterate. There are about 3.10 million job seekers registered in employment exchanges in Andhra Pradesh. A large chunk of them (57%) i.e., 1.80 million people are without any skills. About 50,000

professional postgraduates, and 5,62,167 educated & skilled are also awaiting jobs in organized sector. Population increases, growth of labor force, under-employment, illiteracy, unskilled persons, and globalization of economy are some of the concerns putting pressure on the environment.

Table 4.4: Educational scenario of AP

Category	Total No.	Total Enroll
Secondary School	8994	1095190
Pre Degree /Jr. College	2231	-
Board of Intermediate / Secondary Education	2	754874
Degree College	923 Arts/Sc/Com	461896 BA/BSc/BCom
Engg. College	38	44234
Medical College- MBBS	31	10384
All University- MA/MSc/ MCom/PhD/DLit/DSc	20	37911
Teacher Training College	99	13337
Polytechnic Institutes	101	36487
Technical/Industrial/ Arts & Craft School	459	36364

Source: www.apsche.org

The State's priority areas are Food processing, Software, Financial services, Electronics, Power, Textiles, and Tourism. Its investment Strengths are Reform-oriented state, improved governance and administration, fourth largest market in the nation and relatively high purchasing power. It has 71 /500 top global corporate chosen by World Bank (IFC) for promoting first venture capital organization. It ranks fifth in cumulative disbursement of assistance by Central Finance Institutions. It has diversified industrial base which includes ship building, fertilizers, hi-precision machine tools, drugs and pharma, cement, power and power generation equipments, electronic hardware, long range missiles, castings and forgings, Defense Electronics, ceramics, Automobiles & Engineering, Textile & Apparel and Food Processing.

4.2 International and domestic Connectivity:

4.2.1 Airports

Andhra Pradesh is well linked internally by air. Regular air services to Hyderabad, Visakhapatnam, Vijayawada and Tirupati and Rajahmundry are offered by regional airlines. Smaller airfields are also available for private aircraft. Andhra Pradesh also has a number of small airstrips with basic facilities and landing grounds in 17 locations spread all over the state. Over 50 international flights per week operated by Indian; Air India; Lufthansa; KLM; Singapore Airlines; Malaysian Airlines; Emirates; Qatar Airlines; Oman Airlines; Saudi Airlines; Srilanka Airlines Connecting to USA, UK, Amsterdam, Singapore, Colombo, Dubai, Sharjah, Bangkok, Kuala Lumpur etc. Hyderabad has hub for SAHARA airlines. A new upcoming International Airport is to be operational by 2008. In 2006 the total passenger traffic in the state is 4.65 lakh posting an impressive growth of 35.61%. AP consists of 6 Domestic airports which constitute 62.24% passenger and 1 International airport which constitute 24.88% passenger. The accelerated growth in the air passengers was largely generated by the introduction of low cost airlines, higher frequency of flights, adoption of aggressive and innovative pricing strategies and promotional offers.

Plate 4.3: Global connectivity of AP

Source: www.apit.gov.in

4.2.2 Ports

AP has one major port at Vizag and two intermediate ports at Kakinada and Machilipatnam. The State also has minor ports at Krishnapatnam, Gangavaram, Mutyalampalem, Bhavanapadu, Kalingapatnam, Bhimunipatnam, Narsapur, Nizamapatnam, and Vodarevu. Kakinada is the largest port in AP; handling capacity of 10 million tonnes (MT) per annum with draft of 12 MT and Rawa Port handled 2.53 MT. Gangavaram Port is the only all-weather Greenfield Sea port in India with capacity of 200 MT. Visakhapatnam Port - Largest cargo handling port with 56 MT in 2005-06 and the only port in India accredited with international systems of ISO 9001, ISO 14001, OSHAS 18001. In 2006-07 AP gives 12.20 % share in major ports of India both in traffic and commodity-wise traffic.

4.2.3 Rail and Road

Andhra Pradesh has an enormous length of about 5085 km of railway track. The broad gauge railway route extends upto 4362 km approximately and the narrow gauge line is about 37 km long. It has 4 zones among 16 zones of Indian Railways which are South Central Railway, East Coast Railway South Western Railways, and Southern Railways. It has headquartered of South Central Railways.

Electric Loco Sheds: Lallaguda, Kazipet, Vijayawada,Visakhapatnam

Diesel Loco Sheds: Gooty, Guntakal, Kazipet, Moulali, Visakhapatnam

A total of 1,46,944 km of road are maintained by the State, of which State Highways comprise 42,511 km, National Highways 2,949 km and District Roads 1,01,484 km. The major national highways passing through the city are NH-5, NH-7, NH-9, NH-16 and NH-18. The growth rate of Vehicles in AP is highest in the country with 16%. A regular luxury bus services connecting major Indian cities. Road length per 1000 km: 653 and Surfaced roads 100 sq km: 40.1 Andhra Pradesh State Road Transport Corporation (APSRTC) is the major public transport corporation owned by the government of Andhra Pradesh connecting all the cities and villages. APSRTC is also in the Guinness Book of World Records for having the largest fleet of vehicles (approximately 21000), and the longest area covered/commuted daily. The occupancy ratio of APSRTC in 2006-07 is 68. It has

excellent service of buses with a network of smooth, wide and clean roads. Two line, 74 km intercity commuter rail and Multi-Modal Transport System (MMTS). Inorder to ease the ever growing traffic various road projects and flyovers were proposed.

4.3 Infrastructure: water, power plant, gas plant, ITeS, etc.

4.3.1 Water Supply

AP is called a 'river's state', with major rivers such as Godavari, Krishna and Pennar providing ample water supply across the state. There are many multi-state irrigation projects in development, including Godavari River Basin Irrigation Projects and Nagarjuna Sagar Dam, the world's highest masonry dam of 124 m and creates a reservoir holding up to 11.472 billion cu m. The major projects of the government are Krishna and Rural water supply projects.

4.3.2 Power plant:

Andhra Pradesh's power sector has consecutively ranked first in 2004–2005 and 2005–2006 as per the CRISIL ratings. Andhra Pradesh is the third-largest power utility in the country with installed capacity of 11,134 MW. The state has the highest hydel installed capacity in India, reduces the cost of power. The state's power supply network, which consists of 25,719 circuit km (ckm) of EHT lines, 207,432 ckm of HT lines, 437,610 ckm of transmission lines and 2,645 sub-stations, is one of the largest networks in the country that supplies power to nearly 16,925,194 consumers. Gross Power Generation in year 2006-07 was 44206.06 million KwH. The power availability in year 2006-07 is 33,478 million KwH with a demand of 34,307 million KwH. The power deficit found was 2.42 and peak deficit was 8.82. It is programmed to add 4 x 400 KV, 5 x 220 KV and 20 x 132 KV sub-stations and 809 ckm of 220 KV lines and 395 ckm of 132 KV lines. Another 279 33/11 KV sub-stations are being added.

4.3.3 Tele-communications

AP has a good communication network, with 3,341 telephone exchanges and 326.4 million of telephone connections. Optical fiber cable networks by corporate leaders like BSNL (44,500 km), Reliance (6,000 kms), Bharat (3,450 kms) and Tata (1,700 km) are being planned and will bring a wide range of communication network to the state.

The state is in the top quartile of Internet subscribers with 219,000 in 2003. The state has a bandwidth of 365 Mbps out of Hyderabad. Postal infrastructure includes 16,213 offices. Andhra Pradesh has Broadband Connectivity.

Bandwidth Availability in AP: District headquarters: 10 Gbps, Mandal level: 1 Gbps and at Village level: 50-100 Mbps.

Table 4.5: Growth Parameters rating of Cities

Parameter	Delhi	Mumbai	Bangalore	Kolkata	Hyderabad
Telecom Connectivity	*4*	*4*	*4*	*4*	5
Power Supply	2	4	3	5	4
Airports & Hotels	4	5	3.5	3	3
Public Transport	1.5	3	1	2.5	3
Roads	4	1.5	1	1	3.5
Housing	4	3.5	3	3.5	3
Cost of Living	2	1	2.5	4	4
Talent Pool	4	4	4	4	4
Total Score	25.5	26.0	22.0	27.0	29.5

Source: The Times of India, Dt.3/08/04, Pg.10.)

Growth Parameters rating of Cities which indicates Hyderabad in top that located in AP.

1. Ranking from 5 to 1 indicate very good to very poor
2. Cost of living indicates low to high from 5 to 1
3. Ratings in the form of 4/3 indicate preference for the first figure, in this case.

4.3.4 Social Infrastructure

The Social Infrastructure in India includes the education system in India, health care, the management of the education and health services in India. Andhra Pradesh has adequate quantity and quality of social infrastructure which includes hospital, institute and recreational spaces.

a. Hospitals

The state is well equipped with super specialty and specialty hospitals in the cities of Hyderabad, Visakhapatnam, Vijayawada, etc. The rural health care of the state is good compared to that of other states but it still needs considerable improvement.

b. Institute

The state has 20 leading institutes such as Indian School of Business (ISB), Indian Institute of Chemical Technology (IICT), International Institute of Information Technology (IIIT), and Centre for Cellular and Molecular Biology (CCMB) etc. The state has 1,330 arts, science and commerce colleges, 238 engineering colleges and 53 medical colleges.

c. Recreational Area

The state currently has quality recreational areas in cities like Hyderabad and Visakhapatnam. Hyderabad and Visakhapatnam have multiplexes, malls and pubs. The smaller cities in the state have cinema theatre and local restaurants for recreation.

4.4 Tourism

Andhra Pradesh is promoted by tourism department as "Koh-i-Noor of India." Major tourism destinations are Tirupati, Hyderabad and Visakhapatnam. Andhra Pradesh is the home of many religious pilgrim centres. Tirupati, the abode of Hindu god Venkateswara, is most visited religious center (of any faith) in the world. Srisailam, nestled in the Nallamala Hills, Amaravati's Shiva temple, The Ramappa temple and Thousand Pillars temple in Warangal are famous for their temple carvings. The state has numerous Buddhist centres at Amaravati, Nagarjuna Konda, Bhattiprolu, Ghantasala, Nelakondapalli, Dhulikatta, Bavikonda, Thotlakonda, Shalihundam, Pavuralakonda, Sankaram, Phanigiri and Kolanpaka.

The golden beaches at Visakhapatnam, the one-million-year old limestone caves at Borra, picturesque Araku Valley, hill resorts of Horsley Hills, river Godavari racing through a narrow gorge at Papi Kondalu, waterfalls at Ettipotala, Kuntala and rich bio-diversity at Talakona, are some of the natural attractions of the state. Visakhapatnam is home to many tourist attractions like Kailashagiri, INS Karasura Submarine museum (The only one of its kind in India), the longest Beach Road in India, Yarada Beach, Araku Valley, VUDA Park, and Indira Gandhi Zoological Gardens. The Borra Caves and the Belum caves were formed due to action of carbonic acid or weakly acidic groundwater formed due to reaction between limestone and water.

Horsley Hills with elevation 1,265 m, is a famous summer hill resort in Andhra Pradesh, The town of Madanapalle lies nearby. Major tourist attractions include the Mallamma temple, Koundinya Wildlife Sanctuary and the Rishi valley school. Charminar, Golconda Fort, Chandragiri Fort, Chowmahalla Palace and Falaknuma Palace are some of the monuments in the state. The latest attraction is Ramoji Film City.

Kanaka Durga Temple in Vijayawada in Krishna district, Venkateswara Temple in Dwarakatirumala, West Godavari District (it is also called Chinna Tirupathi), Surya temple in Arasavelli in Srikakulam District and Annavaram Satayannarayana Swami temple is in East Godavari are also places to see in Andhra Pradesh. Visakhapatnam is embedded amidst the sea coast and the hills, making it a good destination for scenic beauty. Andhra Pradesh's tourism facilitates tourism facilities with hotels, lodges and the information needed to plan vacations.

4.5 SEZs

After coming into force of SEZ rules, Board of Approval granted approvals for the establishment of 68 SEZs in Andhra Pradesh in an area of 14,357 hectares. In conference organized by Confederation of Indian Industry and Andhra Pradesh Industrial Infrastructure Corporation, Acharya (2007) highlighted that of the 71 SEZs in Andhra Pradesh, 49 have been notified, formal approval has been given for 17 and the rest 05 have received approval in principle which would be able to generate a total employment (direct & indirect) for over 25 lakh persons, with an investment of over 33,000 crores. Andhra Pradesh is also leading in the number of SEZs being developed for IT & ITES with 33 of the 49 notified SEZs in Andhra Pradesh, which account for around 67 percent. AP has 40 SEZs approved by the central government for the IT sector as on 31st December 2007, which is highest in the country. It is expected to create direct employment of about 800,000 people in next five years. The total land of 2356 acres is allotted for these SEZ developments and it is expected to provide a total built up space of 97.25 million sq ft. The SEZs are expected to provide international standard IT environment. The State is expected to get a total of 71 SEZs among which 49 SEZs have already been notified and expected to create overall jobs for 2.5 million people.

4.6 New projects

1. Animation & Gaming City – known as Digital Entertainment City. Rs
2. The development of Hitec City (Hyderabad Information Technology and Engineering Consultancy City) in Hyderabad. A capital investment of over Rs.15 billion on 158 acres.
3. Operation Black Top Rs. 354.00 Crores
4. Road Widening Rs. 171.00 Crores
5. Housing for Poor 20,000 units Rs. 630.00 Crores
6. Improvements to Nalas Rs.180.00 Crores
7. Bus Rapid Trainst System Rs.150.00 Crores
8. MMTS Rs.200.00 Crores
9. Council Hall Rs.40.00 Crores
10. Improvements to Monda Market Rs.50.00 Lakhs
11. Beautification of River Musi Rs.15.00 Crores

4.7 Government policies

Due to proactive governance, the State is the first to have a comprehensive Single Window Clearance Act in place. It has Diversified industrial base.

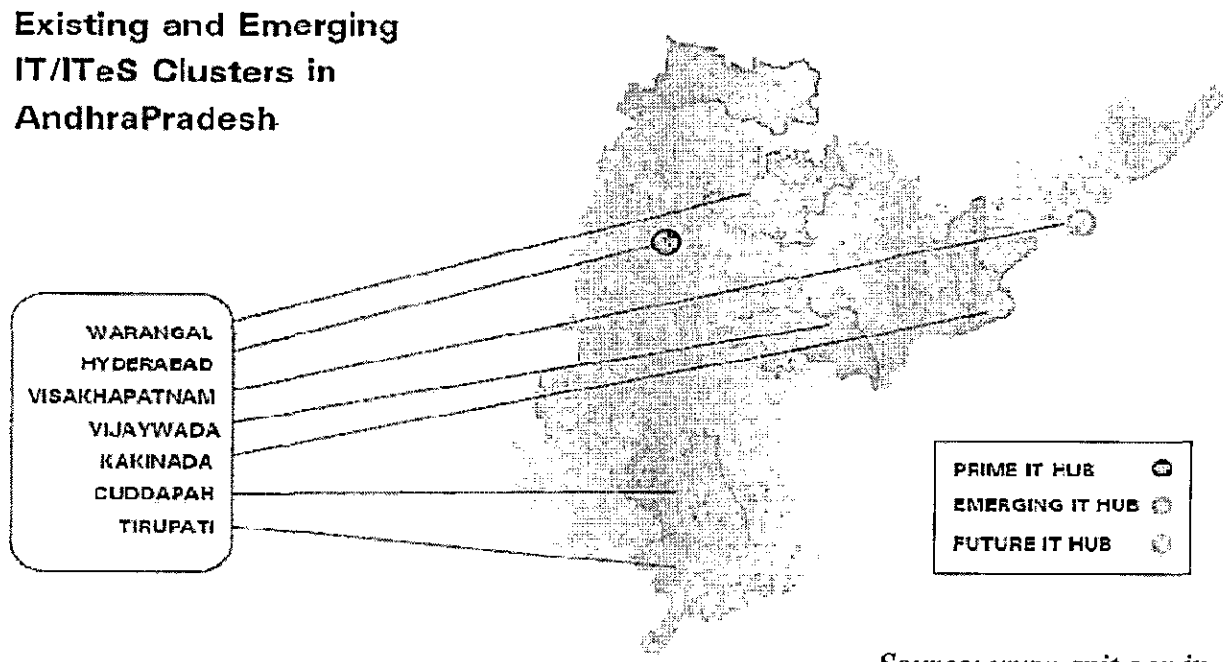
1. Allocation of Government Land at reasonable rate (far less than market price) to Mega IT Projects
2. 100% reimbursement of stamp duty, registration fee and transfer duty
3. Exemption from inspections, Self certification on various labour laws.
4. Non-hazardous electronic hardware manufacturing industry declared as essential service.
5. 24 x 7 x 365 days IT/ITES operations permitted
6. Employment of Women in night shift permitted.
7. 25% power subsidy for SMEs.
8. Provision of Power, Water & Drainage to the door step of the ICT industry/Hardware Manufacturing Clusters
9. Exemption from Statutory Power cuts and provision of Uninterrupted and quality power supply
10. Linkages between engineering colleges, leading academic institutions and the industry
11. Promotion of strategically relevant R&D for developing high value added products and services
12. Reimbursement of expenditure on Quality Certification, Patent filing, Exhibitions participation

4.8 Summary

While Gujarat was studying the feasibility of IFTC, the results show that if again such city has to be developed the best location after Mumbai and Delhi would be AP. As AP has a conducive business environment, easy access to domestic and global market, availability of raw materials, world class infrastructure, investor friendly contemporary governance, international connectivity through ports and airways, Diversified industrial base and availability of large pool manpower / talented people. From AP, fully trained manpower is available as it has many training institute, headquarters of many industries and

high quality education. Globally recognized and fastest growing base for IT enabled service. AP is known for its industrial peace as it has conducive and flexible labor laws. The concept of 'e-seva' was first introduced in the state.

Plate 4.4: Existing and emerging IT/ITeS hub



Source: www.apit.gov.in

The social infrastructure in the state's cities and towns is also good. AP has better infrastructure and amenities like hospitals, banks, and other services. As per study it was found that for IFTC the working environment required are fully satisfied by the AP standards. Andhra Pradesh has huge development potential with Hyderabad as an important IT hub followed by Visakhapatnam and emerging cities like Vijayawada and Tirupati. The State's initiatives and strategies for infrastructural development, human resource development and policy framework to support and attract investments are expected to place it firmly on the global business map in the coming years. The government started focusing on policies and infrastructure developments in other cities of the state to attract IT investment, aiming at projecting AP as a prime IT destination in India. The fast-emerging cities that must be on the radar of developers, occupiers and investors after Hyderabad are Visakhapatnam and Vijayawada. The major employment generated from IFTC is from service sector. So the cities which are feasible for developing IT/ ITeS /BPO are most preferable.

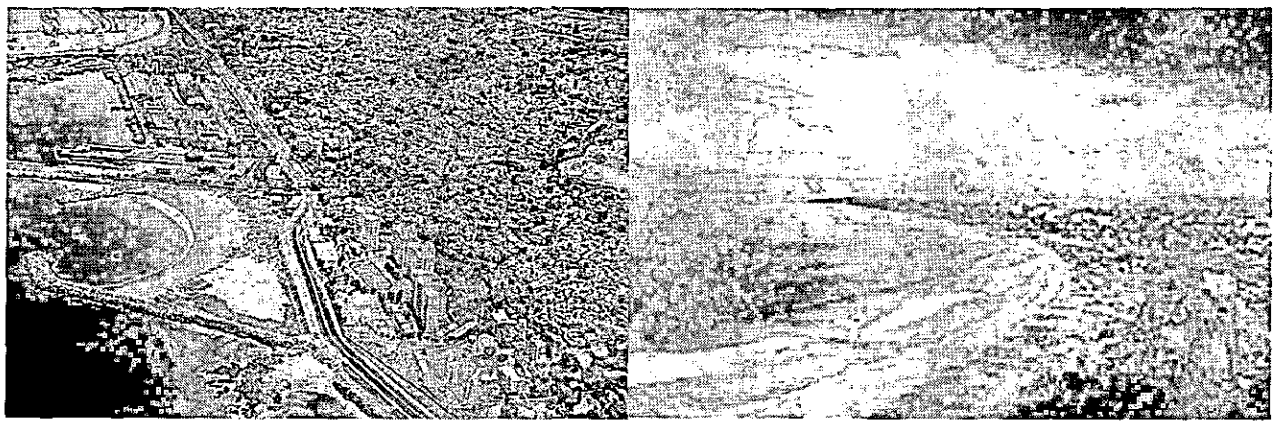
Chapter 5. SITE SELECTION IN VISAKHAPATNAM

5.1 General profile of Vizag

Visakhapatnam, Visakha/Vizag or Vizagapatam/Vizag City is a coastal, port city, often called "The Jewel of the East Coast" or "City of Destiny", and is being considered as the next destination for investment after Hyderabad. Visakhapatnam is the second largest city of Andhra Pradesh with an area of 550 km²; it is primarily an industrial city, apart from being a tourist destination. It is known for its unspoilt beaches, nearby scenic Araku Valley and Borra caves, the 11th-century Simhachalam temple and ancient Buddhist sites like Thotlakonda spread across the area. Visakhapatnam, Andhra Pradesh's main seaport, and is home to the Indian Navy's Eastern Naval Command. The city was originally a small fishing village but due to its natural harbour it developed into a major port. It has experienced rapid industrialization with the growth of major industries, including steel, petroleum refining and fertilizer. Visakhapatnam with its abundant natural resources in the hinterland, an impressive array of major industries in the core sectors of steel, fertilizer and oil and an excellent access by rail, road and air make it an ideal city for investment. It has the distinct advantage of location, being equidistant from the major industrial sectors of India. It also has easy access to South East Asia, Japan and Korea.

The vibrant modern port of Visakhapatnam is visited by all the major international shipping lines. Its low cost of social infrastructure with reputed educational institutions, modern hospitals, housing facilities, recreational centres is comparable to the best in the country.

Plate 5.1: VIZAG beach view



Source: http://vossindia.com/about-vizag/

The city's growth has mostly been due to its heavy industries (both state owned and private such as:

1. HPCL Oil refinery
2. Visakhapatnam Steel Plant – Rashtriya Ispat Nigam Ltc(RINL)
3. Hindustan Shipyard Ltd,
4. BHPV, HSL, NTPC, Cormandal Fertizer
5. Rain Calcining Limited, Essar Pelletization Plant

With the formation of "Greater Visakhapatnam" in 2005 the city's development is set for a quantum leap.

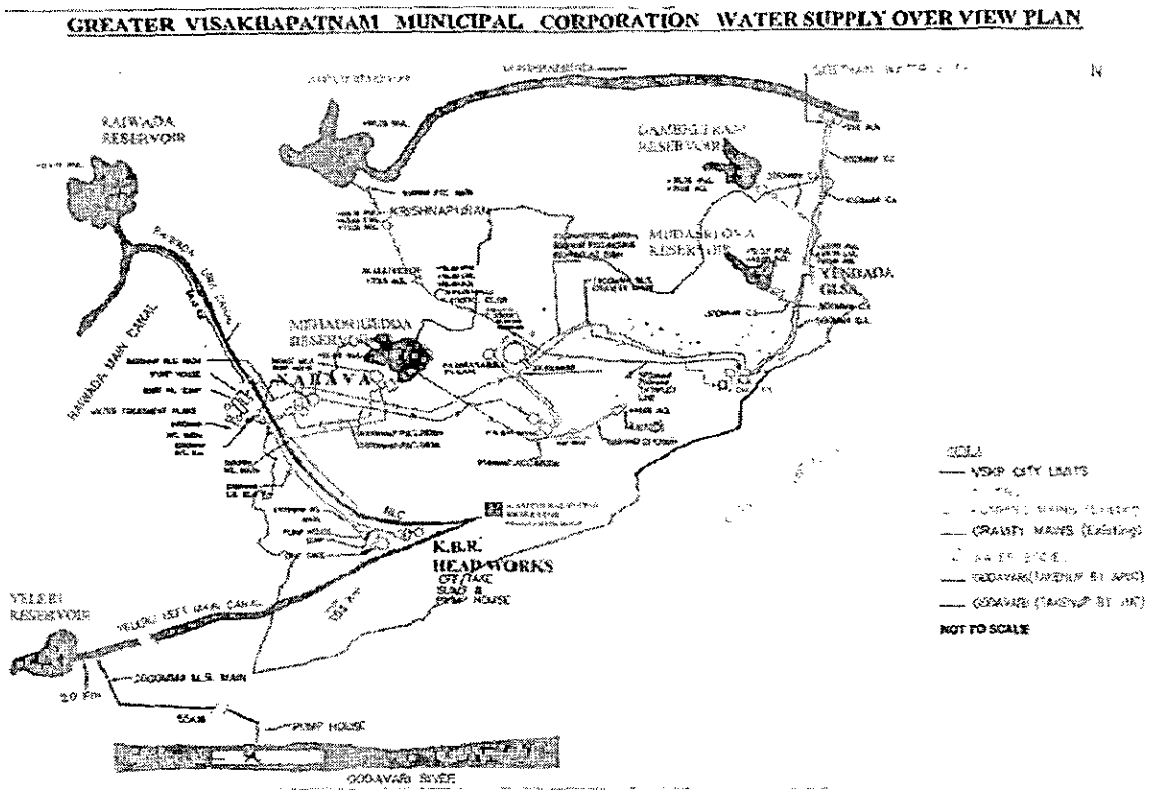
5.1.1 Key features

1. Area: 533 sq.km.
2. Population: 17.20 lakhs
3. Density: 3227 Persons/Sq.km
4. Zones: 6
5. Literacy rate is 60%
6. Election Wards: 72
7. Location and topography: Vizag is located on the east coast of India, in 17°42' North latitude and 82°02' East range of hills. Based on topographical conditions, the city and its environs can be divided into four categories viz., Hilly region, Upland tracks, Rolling plains and Plains. The Kailasa and Yarada are the major hill ranges in the city.
8. Strategically located: excellent domestic market connectivity: Hyderabad - 650 km, Mumbai – 1361 km, Kolkata – 866 km, Chennai – 810 km & Pune – 1198 km
9. Geographical Advantages
    1. Safe Seismic Zone – Visakhapatnam falls under Seismic Zone II
    2. Low Tidal Amplitude - Approx. 1.0 mt
10. Infrastructure facilities
    1. Power: Power consumption by industries is 408.88KWH while it is 357.44KWH for agriculture purposes. Global leading player to manage the power infrastructure. Advantageous mix of thermal, hydro and gas

power. NTPC Power Plant at Visakhapatnam (1000MW); expansion of additional 1000MW is under construction. Dedicated substations at every Industrial Parks and SEZ's

2. Water Supply: 365 days assured industrial water supply through Visakhapatnam Industrial Water Supply Company Limited (VIWSCO). India's first dedicated industrial water supply project.

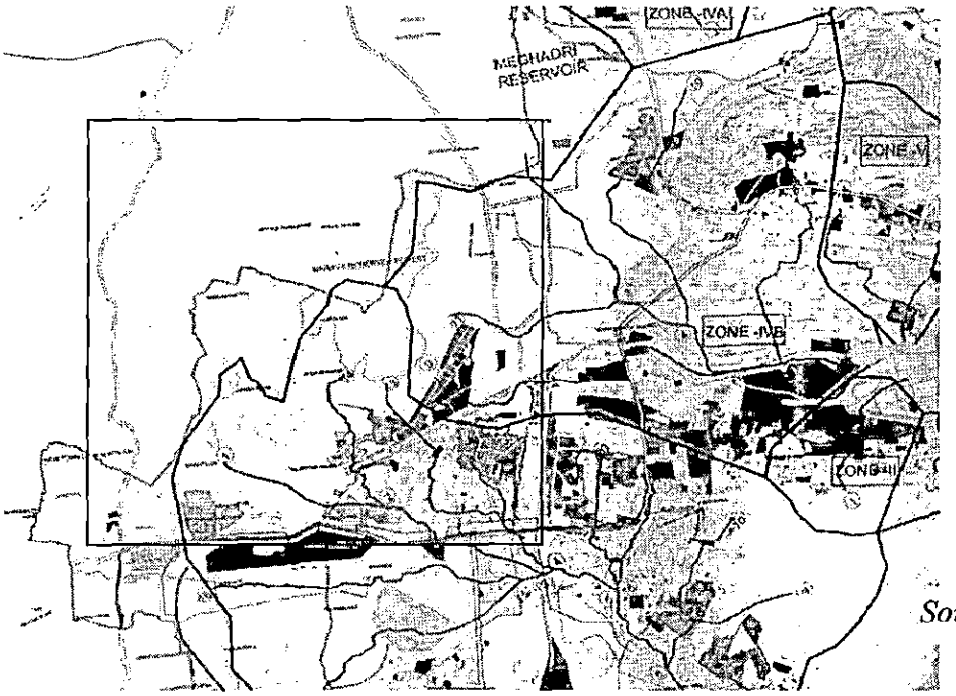
Fig 5.1: Water supply overview plan



Source: Master plan of VMR2021

3. Connected (International & National) Postal and Telecommunication network Facility (BSNL, AIRTEL, RELIANCE, IDEA, TATA INDICOM, HUTCH)
4. Drainage

Plate 5.2: Storm water drainage and catchment area



Source: Master plan of VMR2021

5. Solid Waste Management:
   a. Waste Generation : 880 Tons Per Day
      i. Domestic Waste Generation : 330 Tons Per Day (Approximately)
      ii. Commercial, Drain Silt and Others : 550 Tons Per Day (Approximately)
   b. Daily waste Collection : 880 Tons Per Day

   Source Segregation and Door to Door Waste Collection

      1. At Source Segregation of Garbage and waste has been introduced in 6 wards (6 to 11 Wards)
      2. 45000 families were given two dustbins (Red & Green) for non biodegradable and biodegradable waste collection.
      3. Door to Door Waste collection 20 Auto Tippers engaged to transfer KRM Colony from 6 Wards
      4. 1000 tricycles are being used for door to door waste collection in other wards
         - Door to Door Waste Collection – 70%
         - Future strategy is to cover 100%

Transportation and Storage of Waste

1. Tricycles collect the waste from the households and tip the waste in metal dumper bins.
2. Dumper placer vehicles lift the metal dumper bins; transport the waste to the transfer station.
3. At the transfer station the 14 ton capacity Taurus Tipper Vehicles collects the waste from dumper vehicles and transports the waste to the dumping yard.
    - Dumper Bins – 800 Nos.
    - Dumper Vehicles – 47 Nos.
    - Tippers – 33 Nos.

c. Waste Disposal

The Garbage generated in the city is being disposed to dumping yard located at Kappul Uppada located 22 Kms from the city area scattered about 100 acres.

Bio Medical Waste: Bio Medical Waste from Hospitals and laborites is being collected by private agency and treating as per the norms of A. P. Pollution Control Board.

d. Sanitation – Road Sweeping and Drain Cleaning
    1. Regular Sweeping and Drain Cleaning – 5329 Sanitary Workers (Permanent & Contract)
    2. Night sweeping of main roads – 802 Contract Workers through 26 packages.

11. Connectivity through Airport, Road, Rail, & Port

Airport:

a. Daily connectivity by air to all Indian Metros
b. All major Airlines fly to Visakhapatnam
c. Proposed International Airport
d. Hyderabad - less than an hour away
e. Fourth Largest International Airport in the Country Hub for Sahara Airlines
f. Aircraft Movements (April 2004)
    i. Domestic: 46450 Growth: 23.6%

ii. International: 11940 Growth: 17.4%

Easy Access to Three Major Ports

a. Visakhapatnam – 45 km
b. Exclusive Gangavaram Port – 15 Km by proposed Costal Corridor & 32 Kms through dedicated logistics corridor
c. Kakinada – 100 km

Located on National Highway 5: Part of the 4-lane Golden Quadrilateral Highway

Special Costal Corridor: reducing the distance by 15 Km

Rail Connectivity –Key rail link between Southern and Eastern India

12. 16 e-Seva centres: 23 services
13. 15 lakh transactions and 150 cr/yr
14. LAN connecting main office, Zonal offices and e-Seva Centres
15. Connectivity to banks
16. 11 Private and Govt. hospitals are connected
17. Recreation: The city has beaches, pubs and restaurants for recreation.
18. Hospitality: The city has 3 five star hotels with total capacity of 225 rooms.
19. Medical facilities: 10 private hospitals and 3 government hospitals which include Apollo Hospital, Care, Seven Hills,Queen's NRI Hospitals
20. Agriculture is the main stray of nearly 70% of the households. Some important food crops of the district are Rice, Paddy, Raggi, Bajra and Jowar and Cash Crops such as Sugarcane. Groundnut, Sesamum Niger and Chillies are important.
21. Minerals & Rocks: The district has mineral deposits of Bauxite Apatite (Rock Phosphate) Calcite; Crystalline Limestone confined to tribal tracts at Aruku and Ananthagiri mandals. Manganese of high quality occurs at many places. Quartz, vermiculite, granite, charnakites, khondalites and other useful building stone and road metal are also available in plenty. Graphite and mica are produced in small quantities in this area.
22. Tourist attractions:
    i. Beaches, Hillocks, Resorts
    ii. Buddhist important places like Thottlakonda, Bavikonda, Bojjannakonda

iii. Hill Station 100 Km Away - ARUKU

iv. Amusement Park

v. Naturally formed Deep Caves (BORRA CAVES)

23. Educational Facilities

There are 4218 schools, 196 junior, Degree and Professional Institutions during 2004-05. Prestigious education universities and institution like Andhra University, Gitam University, A.V.N. College, Andhra Medical College, Gayatri Vidya Parishad College of Engineering, and St. Aloysius Anglo Indian High School located in Vizag.

24. Ample Technical Manpower available with

1. Engineering Colleges - 10 (Graduate Level)
2. Poly-technique - 5 (Diploma Level)
3. I T I's - 30 (Certificate)
   (Electrical / Fitter / Plumber / Turner / Machinist / Civil / Mechanical, Draftsman etc)
4. Managerial / Professional Man Power:
5. MBAs / MCAs / Foreign Trade - 15
6. Medical Colleges - 2

Visakhapatnam has one of the oldest universities of India: Andhra University reputed for high standards in teaching and research. Easy availability of managerial, technical, skilled and semi-skilled manpower and peaceful industrial relations add to its advantage. This availability of a highly educated workforce allowed the entry of many B.P.O. companies such as HSBC, thus providing the roots for the beginning IT/ITES industry in the city. Madhurawada, which is located north-east of the city along NH-5, is witnessing major developments driven by the IT sector. The city has a biotech SEZ and industrial developments like the steel and power plants in the south. The major growth corridor is northwards, along NH-5 towards Vijayanagarm. The city has around 50 small and medium software and call centre units, of which about 10 units started their operations during the year 2005-07. The Vizag Special Economic Zone plays a vital role in the industrial Growth of the city.

25. Some Future projects:

i. New commercial development at Siripuram area with HSBC building as only A grade building. 6 malls are coming up.

ii. Good quality residential development is seen along beach road mostly by local developer. Jurong (Singapore based developer) is developing villas at Rishikonda.

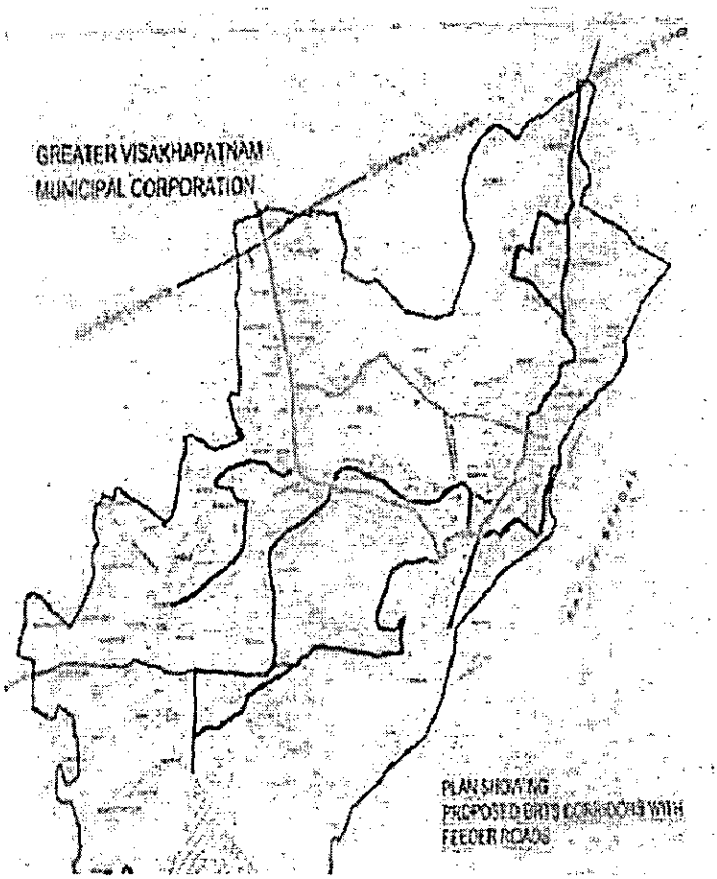
iii. International Airport coming up at Rayavaram 60 kms from the city.

iv. New Seaport at Gangavaram is under construction can draw ships up to a depth of 21 mts.

v. 3 notified IT SEZ – Two by APIIC and one by Satyam Technologies.

vi. Unitech has taken up 1,700 acres to develop a knowledge city adjacent NH-5

Plate 5.3: Proposed 8 BRTS corridor in VMR

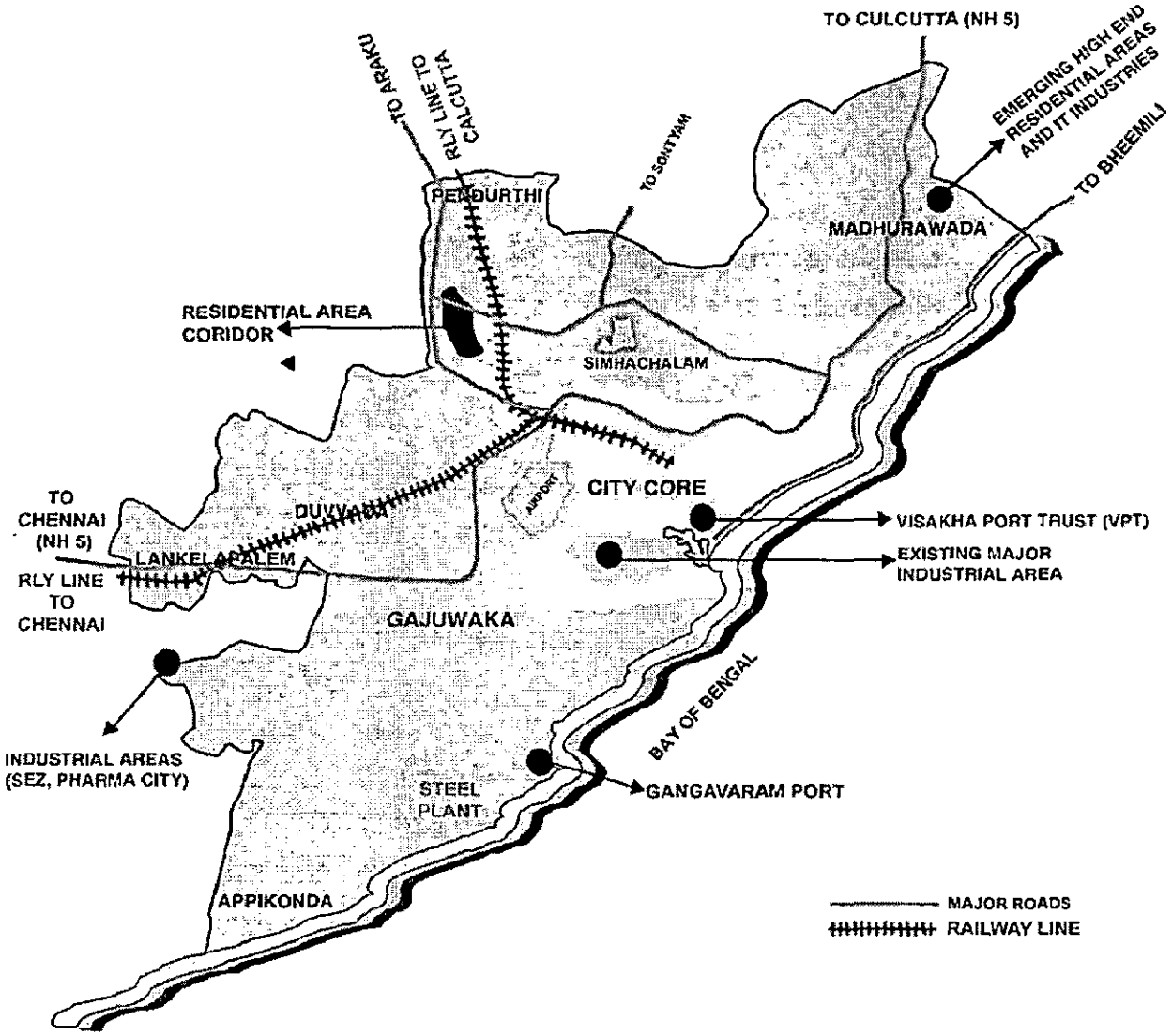


Source: CDP of VMR

5.1.2 Economics

Visakhapatnam is the district of plentiful opportunities. The city having an investment of Rs. 20,000 Crores is the industrial capital of the State. The city is recognized as the fifth-fastest growing "Industrial Metropolis" in the Asian subcontinent and the fastest growing industrial city on the East coast of India strategically located midway between Calcutta and Chennai.

Plate 5.4: Areas of economic growth of VMR



Source: CDP of VMR

The geographical advantage with a natural harbor and bountiful infrastructural facilities helped the city acquire industrial importance and well known place in the international market. The ideal industrial climate has led to the development of core industries. Rich deposits of iron and aluminum ores in close proximity and good rail and road connectivity and Export oriented Zones and EXIM parks present interesting possibilities for setting up major industries.

The basic requirements which are necessary for establishing an industry are the power supply, raw materials, transportation facilities etc are available in Visakhapatnam and very large plants have come to be established in Visakhapatnam like Hindustan Ship Yard, Bharat Heavy Plates and Vessels factory and others. The employment potential is 2, 00,000 workers.

With its long coast line, fishing and travel and tourism is a major economic activity. There is also handful opportunity for development of brackish water, prawn culture, pisciculture since this is an export oriented and a lot of investment can be poured into it.

The State as well the city government have made concerted efforts to make Visakhapatnam the second economic development hub in the areas of Information Technology Enabled Services, Pharma and Biotechnology, development of Consumer goods and Ancillary industries/Tourism after Hyderabad. Significant efforts in this direction include some of the recent projects as shown in the fig 4 are supported by the Corporation which include Upgradation of the local Airport, setting up of VSEZ, Simhadri Power Plant, Special Economic Zone, Pharma City at Parawada, Gangavaram Port, Gems and Jewellery Park and Apparel Export Park amongst other Projects. There is a possibility of a few more manufacturing unit being located in the close proximity to the City.

The city's landscape, virgin beaches, tourist locales at Araku valley, almost crime-free status and availability of cheap land and labour will be tempting for the investors.

Socio-economic:

1. 50% population below 25 years of age.
2. Occupation - Students @ 31% and housewives @ 30.34%
3. Average household monthly income. Rs.4200/-
4. Economically weaker group (upto 2500) - 28.5%
5. Low income group (2500 - 5500) - 32.5%
6. Middle income group (5500 . 10000) - 27.25%

7. Higher income group (Above 10000) - 11.5%
8. Expenditure on transport - 11.4%

5.1.3 Comparison with Indian and international cities

Table 5.1: Visakhapatnam at the National Level – A comparison

Sector	Indicator	Vizag	Hyd	Mumbai	Delhi	Chennai	Kolkata
Economy	Gross District Product Per Capita (in Rs.)	20,910	23000	43000	39000	34,000	33,000
	Population below poverty line (2001)	30%	23%	27%	8%	20%	6%
	Economic Disparity (% of low and lower middle Income households, 2002)	43%	37%	27%	18%	42%	32%
Education	Literacy Rate (2001)	70.46%	79%	87%	83%	80%	81%
	Drop out rate (2001)	33.4	66%	42%	52%	46%	42%
Housing	% of population living in slums (2001)	28%	37%	55%	35%	40%	31%
Health	Child Mortality Rate (2001)	6%	6.90%	NA	2.60%	3.70%	1.60%
Water	Piped water supply per day (Hours)	0.75	2	NA	2	1	NA
	Per capita Availability in lpcd of potable water	62	110	168	180	106	173
	Household water connections (2001)	23%	36%	58%	51.30%	NA	23%
Sanitation	Sewerage Connections (UA)	6%	41%	NA	55%	55%	NA
Transport	Average commute time (minutes)	30	60	30	45	NA	NA
	Public Transport Utilization rate	49%	44%	NA	62%	36%	NA
	% Area covered by roads	1.5%	6%	10%	18%	10%	12%
	Vehicles Density (passenger car units per KM of road length)	372	723	242	NA	293	NA

Source: CDP of VMR

Table 5.2: Visakhapatnam at the International Level – A comparison

Sector	Indicator	Vizag	Hyd	Hanoi	Bangkok	Jakarta	Jo'burg
Economic Outcomes	Per capita income (USD)	495	511	3,510	15,053	7,2,69	2,900
	Population below poverty line (2001)	30%	23%	1.80%	NA	NA	25%
	Unemployment Rate (%) (1998)	24%	22%	10.30%	2.20%	16.80%	26.40%
Education	Literacy Rate(2001)	70.46%	79%	92%	97%	98%	93%
	Drop out rate (2001)	33.4%	66%	7.40%	NA	NA	NA
Housing	% of population living in slums (2001)	28.3					
Health	Child Mortality Rate	6%	6.90%	4.20%	3.30%	2.40%	5.50%
Water	Household access to water	43%	81%	100%	NA	91%	84.50%
	Per capita Availability in lpcd of potable water (Water utility coverage area, 2003)	62%	106	NA	NA	77	261
	Household water connections (2001)	23%	64%	70%	99%	50.30%	50%
Sanitation	Sewerage Connections (UA)	6%	41%	50%	100%	64.80%	84%
Transport	Average commute time (minutes)	30	60	15	60	NA	50
	Public Transport Utilization rate	49%	44%	2%	28%	NA	33.40%
Source – Monitor group report			Strong	Weak			

Source: CDP of VMR

5.4 Site selection

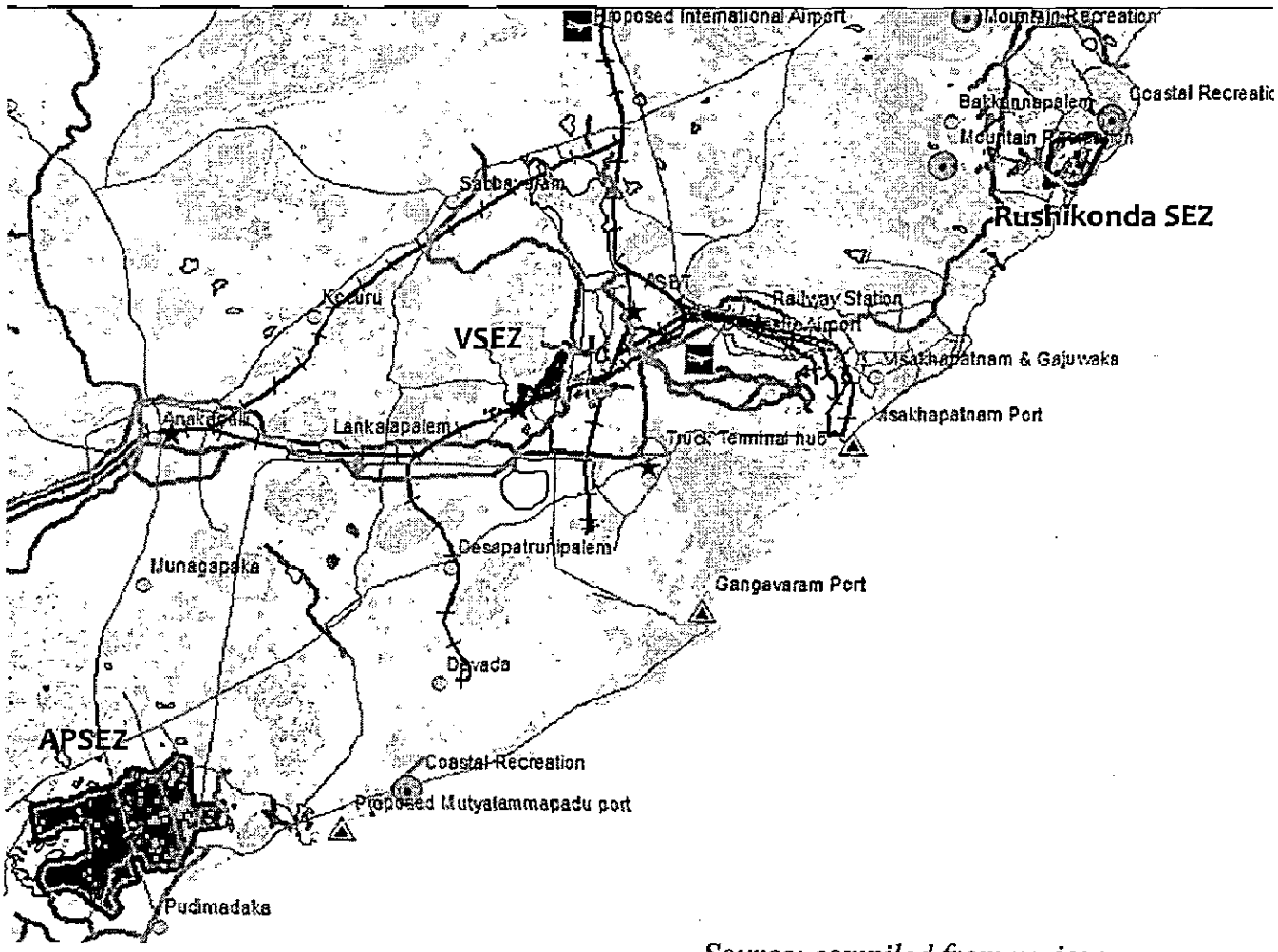
5.4.1 Site option

The broad vision of this dissertation was: "to identify economic activities that have the potential to become the driving forces of the Andhra Pradesh economy, and then develop a city around these activities". The site area should fulfill the following criteria for basic selection:

1. Should have Special Economic Zone
2. Area within jurisdiction of Visakhapatnam Metropolitan Region
3. Additional area available for future growth of the city.

3 sites from SEZ are selected for rapid reconnaissance survey as shown in fig.

Map 5.1: Location of 3 alternative sites

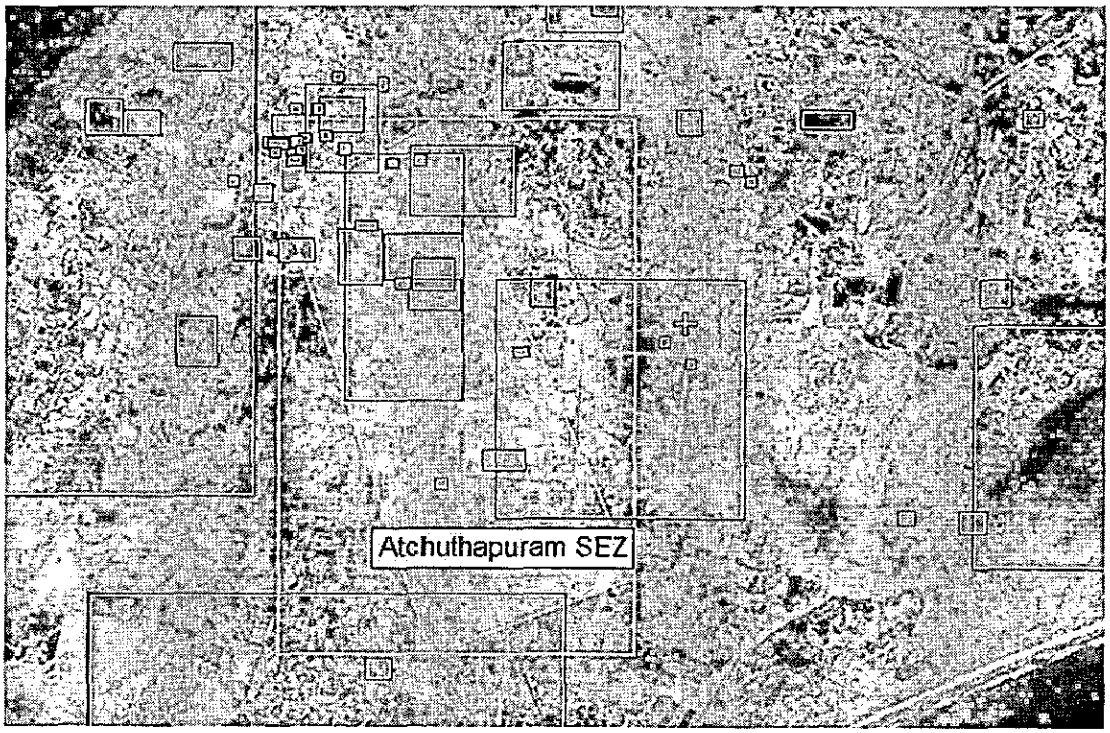


Source: compiled from various sources

1. APSEZ: Industrial Location: Multipurpose

APSEZ is located 50 kms south of the Visakhapatnam port with an area of 5449 acres which was obtained from the Atchutapuram and Rambilli Mandals of Visakhapatnam district. Major road is NH5 which is 18 km away. Airport is 40km and it is 18Km from Yellamanchilli and Anakapalle Railway Station. Power: 220/132/33 KV with 100 MW substation is dedicated to APSEZ to provide uninterrupted power supply to the units inside the Zone. 60 MLD (Millions of Litres per Day) of water is supplied to APSEZ. Total Investment Proposed (Specify Units) is 27,804.58 Crores and Expected Employees are 72949.

Plate 5.5: Location of APSEZ



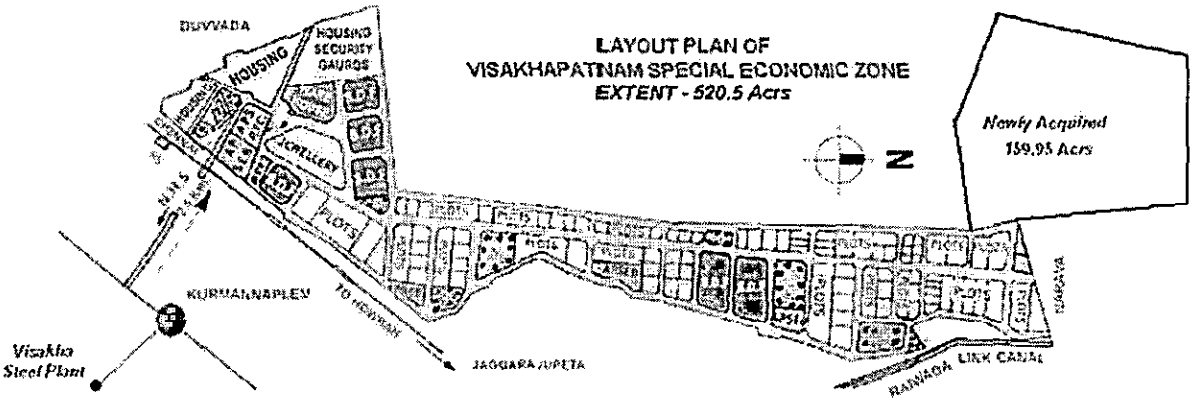
Source: www.*wikimapia.org*

2. VSEZ in Duvvada: Multipurpose

Visakhapatnam Special Economic Zone is located 24 kms away from Vizag city and is set up in a sprawling 360 acres of prime land on the outskirts of fastest growing city of Visakhapatnam. The export-friendly administrative set up ensures disposal of all approvals

and clearances instantly. It is redundancy between Hyderabad and Visakhapatnam. Excellent four lane high-way links VSEZ with Visakhapatnam and the rest of the country. City buses and local train services available are between VSEZ and the city. Andhra University and several technical, managerial educational institutions provide a large pool of professional, managerial manpower. Peaceful industrial scenario coupled with a low cost social infrastructure viz., recreational, medical, healthcare and educational facilities. Dedicated 33/11 KV sub-station provides good quality and uninterrupted power supply. Abundant water is provided from the nearby reservoir. Telecom connections are available on out-of-turn basis. There are in-house customs facilities to ensure speedy clearance of goods.

Map5.2: Layout plan of Visakhapatnam Special economic zone

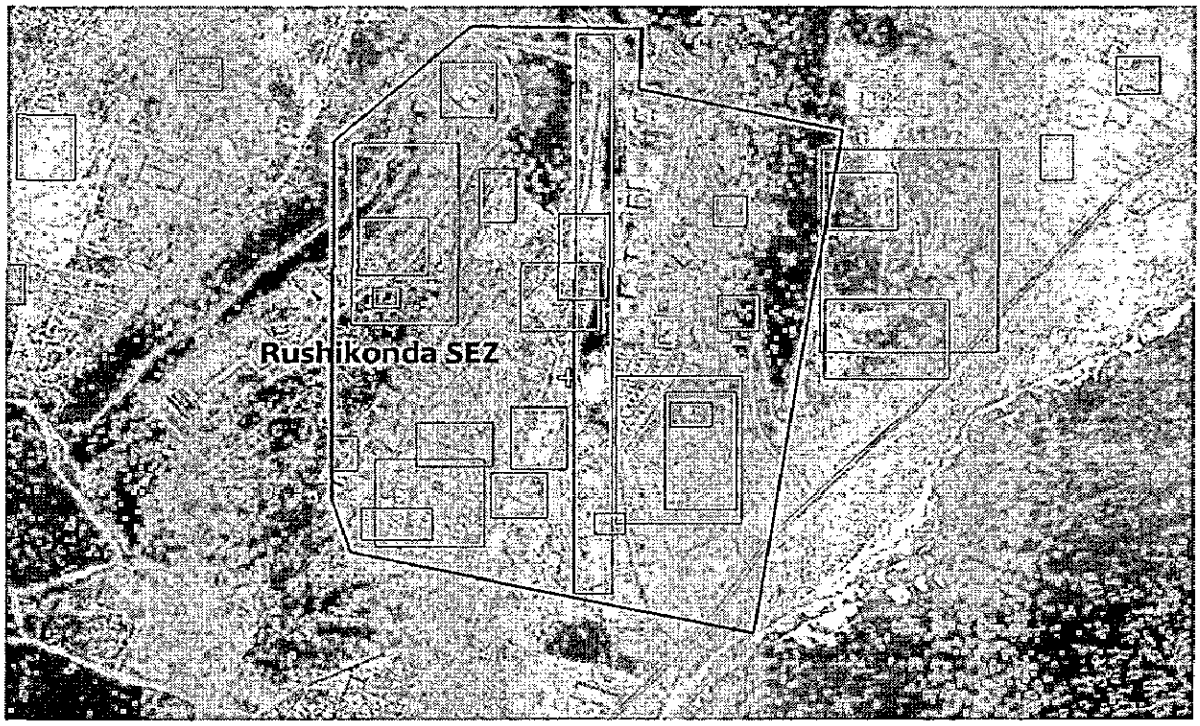


Source: www.vsez.gov.in

3. Rushikonda SEZ: IT park

SEZ at Rushikonda is inching towards turning into a hub for IT units. Hill No. 2 and 3 in the SEZ are fully occupied. In next six months, as per APIIC projections, 5,000 jobs will be created. Employment in the zone is assumed as 10,000 people in 2010 and 20,000 by 2011 making it a major IT hub. Though on infrastructure front, everything is complete, public transport is missing as the APSRTC is running only an ordinary bus. IT entrepreneurs want that a couple of Metro or JNNURM buses should be plied regularly. Voltage fluctuation and load shedding have also caused serious concern among the exporters.

Plate 5.6: Location of Rushikonda SEZ



Source: www.*wikimapia.org*

5.4.2 Methodology for site selection

Fig. 5.2: Methodology for site selection

Input data source	Satellite image- Landsat TM Toposheets Field data	Digital Elevation Model Masterplan of Visakhapatnam Metropolitan Region Detail project report of SEZ areas
↓		
Thematic data layer preparation	DEM – 1. slope 2. relief contour plan Satellite – landuse/ landcover *Master plan – maps of soil, settlement hierarchy, ecological sensitive* areas, water bodies, transport & linkages, tourist spots, economic activities, LRT corridor, hazard prone areas, Physical and zonal plan	
	↓	
	Physical map - Barriers, future expansion, Development, & SEZ area Landuse/ landcover – forest, agricultural & poor agricultural area, & vacant land	

	Transport & linkages- distance from vizag, Sub- regional growth center, growth centers, growth points, NH5, State highway, major roads & ports LRT corridor- distance from railway station DPR of SEZ- rest of the data in table form
Decision rules - subjective weight rating	Weight are assigned to each factors from expert's opinions Score to each class are given as per the requirement of each factor based on expert's opinions.
Output data – weighted overlay tools	Map showing suitable Special Economic Zone for IFTC. Extension of SEZ is the site for IFTC.

Source: By Author

For making base map: toposheet, images from Wikimapia & satellite, landuse map, master plan and Digital elevation model were used. Toposheets were registered as per WGS84 in UTM zone 44 in ERDAS imagine software. All the satellite images and maps were brought in same projection system for digitizing basemap.

- Roads, river, waterbodies, node as city and major spots, etc were digitized in ARCGIS from satellite image, toposheet and Master plan of Visakhapatnam Metropolitan Region.
- A landuse map was created from standard False Colour Composite of Landsat TM image using digital image classification. Training samples for each class were selected and signatures extracted for each landuse classes of interest. The signature file was used in the allocation stage of supervised classification using maximum likelihood classifier to produce a landuse map. Error matrix was generated to assess the accuracy of classification. If accuracy is > 80%, then the classification is considered as good.
- Contours were generated from Digital Elevation model through ARCGIS.

The factors responsible for site selection were identified through case study and literature survey. Categorization of each factor into classes was done as shown in the table 5.3. All these factors were fed in the attribute table of each site. The site was selected finally by considering 26 factors which were given weight as per their influence for planning an IFTC observed from the studies. These factors were further classified into various other classes and scores were assigned as per the preference of it requirements on a scale of 1 to

10. Various thematic data layers pertaining to the factors were prepared in GIS from the given data. The data layers were integrated by applying weighted overlay tool. Certain decision rules are applied on integrated plan generated from the results of above mentioned factors. These decision rules can be based on

1. Subjective weight rating approach

The above mentioned factors are further divided into subclasses which will be given a spatial form in GIS as layers and weights are assigned relatively. The site having the highest weight is preferred for developing an IFTC.

2. Analytical hierarchy approach (AHP)/ MCE

It is a statistical based approach in which the role of each factor determined based on index overlay of maps defined as:

$S = \sum Wi \text{ class } (MAPi) \sum Wi$ ..... (5.1)

where, Wi is the weight of the ith map and class (MAPi) is between 0 and 1(both inclusive) based on its suitability.

The decision rules applied here was subjective weight rating. The main 5 sets of criteria for selection were Economics, physical factors, connectivity, facilities and environmental factors. As the site is going to be used for an IFTC which should be a strong economic driven city, the main focus for giving weight is on connectivity, and market spread or catchment area. The weights for factors like economics, connectivity and infrastructure are more as compare to other factors.

Table 5.3: Weights assigned to factors and their categories

No.	Factors	Source	Classes	Score	Weight	Sites		
						Rishikonda	VSEZ	APSEZ
	physical - 19.5							
1	Slope	DEM	0 to 8 (flat)	9	4.5		40.5	40.5
			9 to 15	7				
			16 to 24	5		22.5		
			25+	3				
2	Soil type	Master plan	red	4	2.5		10	
			sandy	2		5		5
3	Hazards	Master plan	not flood or tsunami	4	3		12	
			flood or tsunami	2		6		6
4	Development	Master plan	least	4	2.5			10
			moderately	2		5	5	
			densely	1				
5	Barriers	Landuse/ landcover	available	2	3	6	6	
			not available	4				12
6	Future expansion	Master plan	good	7	4			28
			moderately	4		16		
			poor	1			4	
	economics - 20.5							
7	SEZ area	Master plan	0 - 10%	1	4	4	4	
			10 - 30%	4				
			30 - 60%	1				4
8	Vacant land	Landuse/ landcover	0 - 30%	1	4			
			30 - 60%	4				16
			60 - 90%	7		28	28	
9	poor agricultural area	Landuse/ landcover	0 - 10%	1	2	5		
			10 - 30%	2			10	10
			<30%	3				
10	Agricultural area	Landuse/ landcover	5 - 15%	4	3	12		
			15 - 30%	2			6	
			<30%	1				3
11	Forest area	Landuse/ landcover	YES	1	3.5	3.5		
			NO	4			14	14

12	Land value	DPR of SEZ areas	least	7	4			28
			moderately	4			16	
			costly	1		4		
	Ecology - 3.5							
13	Climate	Master plan	moderate	2	1.5	3		3
			dry	1			1.5	
14	Pollution	Master plan	low	2	2			4
			high	1		2	2	
	Connectivity - 34							
15	Distance From Vizag	Master plan	0 - 15	9	5	45	45	
			15 -30	7				
			> 30	5				25
16	Marketing catchment region < 20km							
	Sub- regional growth center	Master plan	1	9	5	45	45	
			2	7				35
			3	5				
	Growth points & growth centers	Master plan	1	1	3			
			2	2		6		6
			3	4			12	
17	Proximity to transportation							
	Road							
	Nh5	Master plan & toposheet	5	4	4	16	16	
			10	1				4
	State highway	Master plan & toposheet	1	2	3		6	6
			5	1		3		
	Railhead	Master plan & toposheet	0 to 5	7	4		28	
			5 to 10	4				
			< 10	1		4		4
	Airport							
	Domestic	Master plan & toposheet	0 to 5	6	3.5			
			5 to 10	4			14	
			< 10	2		7		7
	International	master plan & toposheet	0 to 10	4	3			
			10 to 30	2		6	6	
			< 30	1				3

	Ports	Master plan & toposheet	0 to10	6	3.5			21
			10 to 30	4		14	14	
			< 30	2				
	Facility - 22.5							
18	Tourist place	Master plan	available	2	2	4	4	
			not available	1				2
19	Power & telecom.	DPR of SEZ areas	available	4	4		16	16
			not available	1		4		
20	Water	DPR of SEZ areas	0 to 5	4	3		12	12
			5 to 10	2		6		
			> 10	1				
21	Drainage	DPR of SEZ areas	natural slope	2	2	4	4	
			flat	1				2
22	Waste disposal	DPR of SEZ areas	suitable	2	2	4	4	4
			not suitable	1				
23	Security	DPR of SEZ areas	preferred	2	2.5	5		5
			not preferred	4			10	
24	Gas lines	DPR of SEZ areas	available	2	2	4	10	
			not available	1				2
25	Local resources	master plan	available	2	3	6	6	
			not available	1				3
26	SEZ type	DPR of SEZ areas	multipurpose	2	2		4	4
			IT	1		2		
	Total weight					**307**	**415**	**344.5**

Source: compiled from various sources

5.2.3 Results

The site having the highest weight is considered to be most preferable for constructing an IFTC. The study shows that the preferable site as per subjective weight rating approach is Duvvada SEZ i.e. VSEZ near Duvvada Railway station with a score of 415.

Chapter 6. ANALYSIS OF DUVVADA SEZ (VSEZ)

6.1 Data Collection

6.1.1 Primary data:

a. Field survey
b. Household Survey to access and analyze:
    i. Household characteristics;
    ii. Perceptions of the town and its residents;
    iii. Standard of living;
    iv. Priorities for development;
    v. Educational level and literacy rate;
    vi. Willingness to participate;
c. Cadastral and Topography Survey:

For the preparation of the base map required for land suitability analysis, toposheet (plate 6.1) and Landsat TM images have been used and for detail planning development structure plan have been procured from the Municipal Administration which is a kind of secondary data set.

6.1.2 Secondary Data:

This consists of data collected from various agencies useful for the development of the Structure Plan and Local Area Plans. It includes:

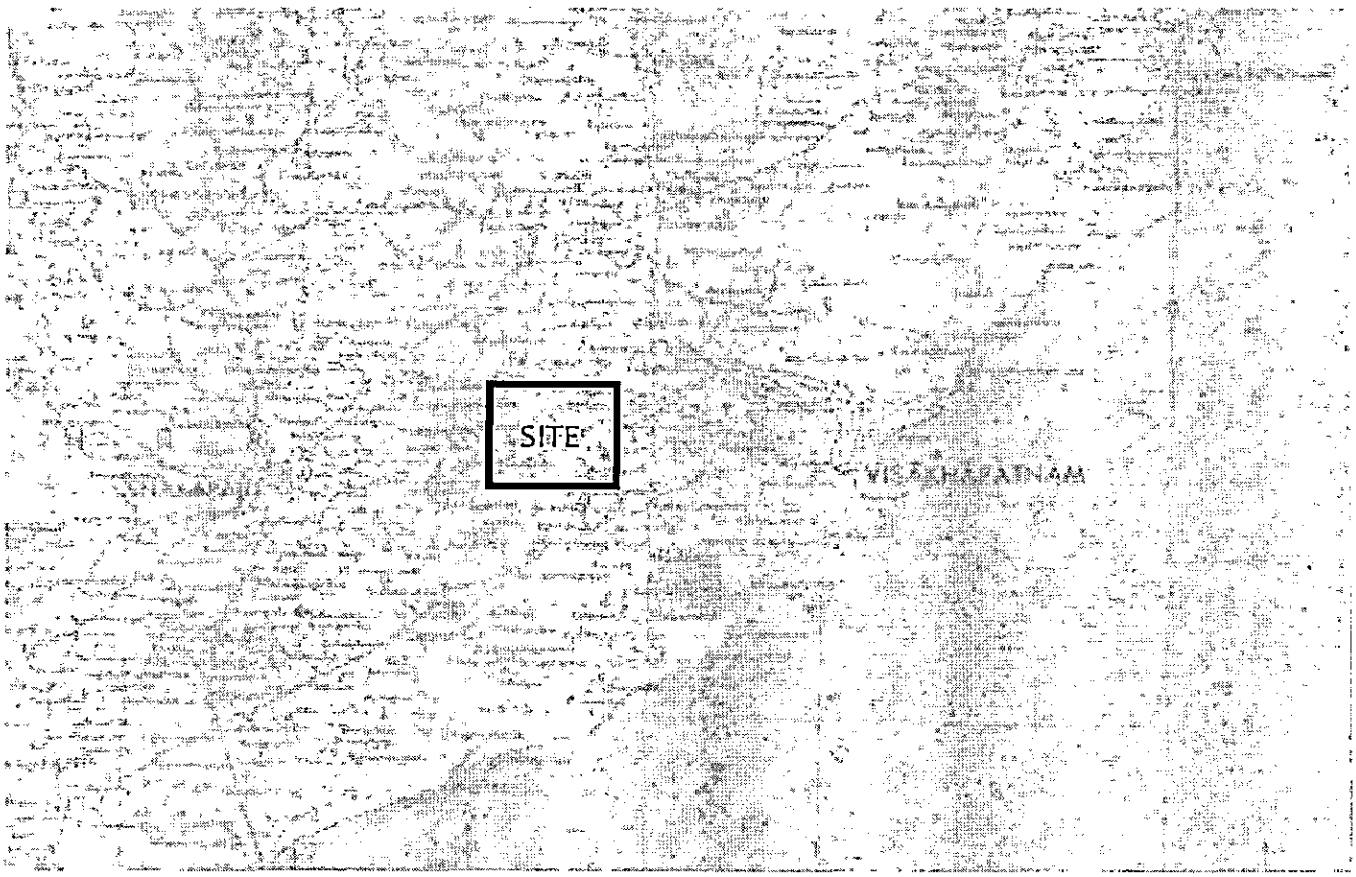
a. Administrative Boundaries: From the Municipal Authorities records
b. Demographic Studies: From Census 2005
c. City Development Plan Vizag
d. Master plan of Visakhapatnam metropolitan region
e. SEZ Structure Plan

6.2 Findings from the Primary and Secondary Surveys:

The site VSEZ lies in Gajuwaka municipality area. House hold size of this area is 4.5. In 2001, the number of households was 57813 to serve the population of 258944. The number of occupied residential houses is 57235 and deficit is 578. The number of slums is 24 with dwelling units of 7296.

Housing need is high in the EWS and LIG categories. The 19 growth engines for a city as per 2020 plan are agriculture sector with 6 units, industries with 6 units and services with 7 units. It has higher level education with 2 colleges, 20 secondary school and 51 nursery and primary school. As per survey, 60% of the population is willing to participate.

Plate 6.1: Toposheet with site in black



Source: NIH, IITR

Administrative Boundaries: From fig 6.1 it is clear that site lies in Gajuwaka Municipal area and is in industrial zone as shown in purple colour. The site includes khasra no. 43 to 62, 65 to 113 and 120 to 140.

6.2.1 Demographic Studies of area related to site

The total population of Gajuwaka is 303244 in an area of 251944. 50% of site lies in regional growth center Vizag and Gajuwaka. The rest lies in urban extension named Aganampudi with a population of 22336 and Lankalapalem with population 75272. The urban centers within 20 km are Anakapalle. The growth centers within 10 km are Vepagunta & Sabbavaram, and growth points Lankalapalem and Koduru. Employments to be needed are 250453. Institutional areas given for the site are 131ha. The total number of household required for 2021 is 10646. Aganampudi is the nearest urban area with a population of 20001 in 2006, literacy rate – 70.12%, and workforce participation rate – 43. Percentage of main workers, marginal workers and non workers in VSEZ in 2006 are 43, 6 and 51 respectively.

6.2.2 City Development Plan Vizag

Greater Visakhapatnam Municipal Corporation (GVMC) has prepared a City Development Strategy (CDS) in 2005 to address the infrastructure and service delivery gaps in with support and assistance from Cities Alliance. It includes the area of Vizag Metropolitan city. Data required for the analysis of the site and for the proposal are available for the comparative study.

6.2.3 Master plan of Visakhapatnam metropolitan region

The Visakhapatnam Urban Development Authority revised its Master Plan in 2004 for the target year 2021 with a view to develop Visakhapatnam Metropolitan region with sound and equitable planning. Considering the growth pattern the Master Plan was prepared for VMR which proposed town ship developments in potential areas. Similarly, in respect of transportation sector provision has been for LRTS in the Master Plan. The Govt. initiatives to develop tier two cities for IT and other purposes have also been taken into consideration while preparing the Master Plan for the VMR region. Sufficient care has been taken in the Master Plan to maintain ecological balance and also to protect fragile coastal stretches in the region.

As the site is covered in the Master plan of VMR, complete details of site features was carried from it for analysis and proposal. The demand of household, employment and infrastructure in 2020 was known. A clear picture of available resources and infrastructure is obtained from the master plan.

6.2.4 VSEZ Structure Plan

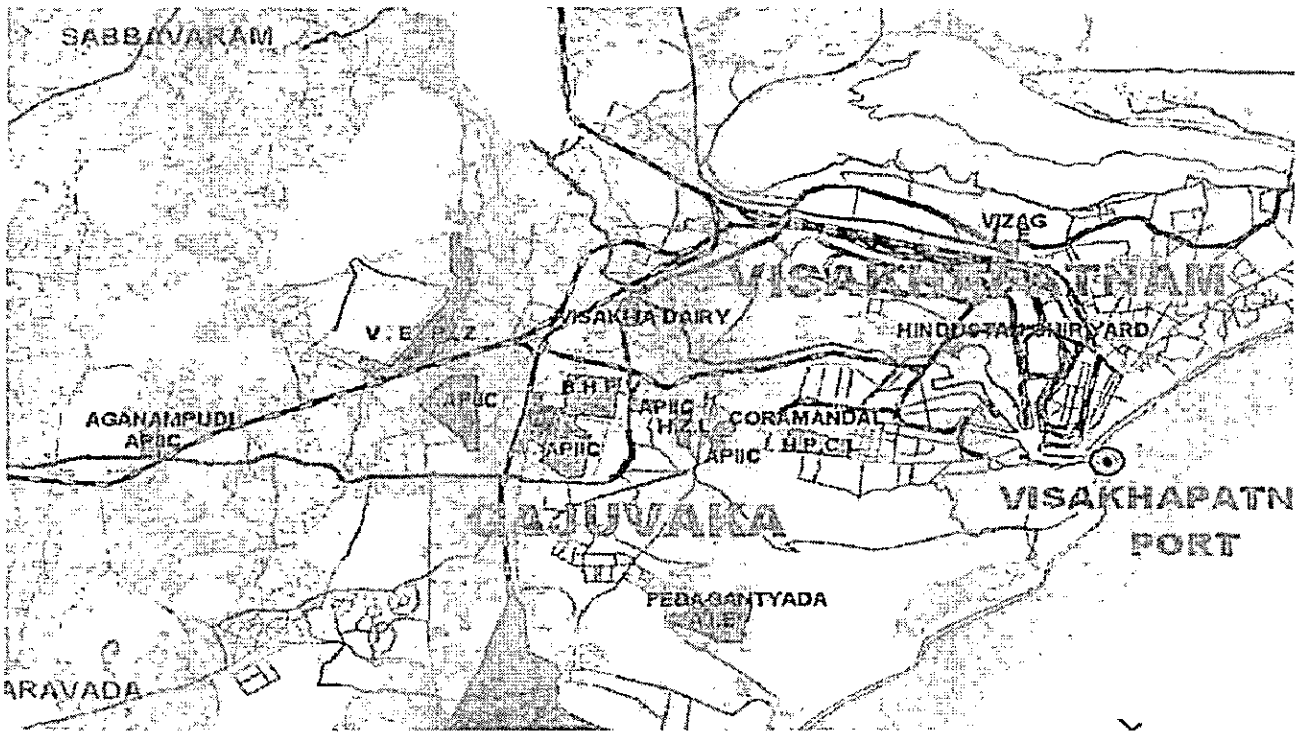
Most of the countries in the world have ridden SEZ/FTZ vehicle in attracting FDI, increasing international trade and attaining overall economic development. Since 1950's, most of the countries in the world have adopted export zone for example US, Puerto Rico, Taiwan, Singapore, Ireland, Mexico, Korea, Dubai, UAE and currently coastal China for faster economic development of the region. SEZ models have been implemented in more than 100 countries around the globe accounting for 1000+ free trade zone projects. Most of them have succeeded while there are also failures. India has also experimented with the concept of EPZs on smaller areas which have accounted for just 4% of the total exports of the country.

Table 6.1: Land value of VSEZ

Radius (km)	Price (Rs./sq.yard)
1	3000
3	1800
5	1200

Source: VSEZ structural plan

Map 6.1: VSEZ Location plan



Source: Revised Master Plan of VMR- 2021

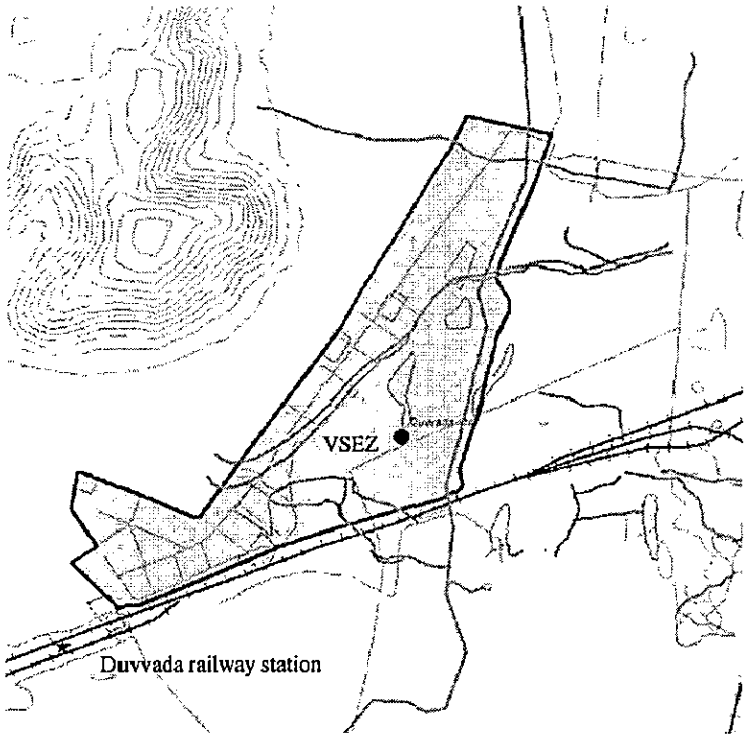
VSEZ was one of them, established as a Greenfield project. The SEZ is bounded by the Yerawada hills to the north. VSEZ is one of closed SEZ to major urban centers of Vizag within 25 km. It was 4 phase development with the land area as 163, 100, 100 and 200 acres in subsequent phases.

Distances of VSEZ from major transportation modes:

a. Airport – 7 km
b. Vizag Railway station - 12 km
c. Port – 16 km

As Export Processing Zone is converted into VSEZ there is no provision of housing for the employees, leading to slum development and other residential inducements. The completion of the 3rd phase leads to development of ancillary industries along the railway line leading to more industrial area. The major industries planned in VSEZ are Gems & Jewellery, Pharmaceuticals, IT and Bio-diesel & Chemicals. The major Ancillary industries planned are packaging, spare parts and other raw material based industries. The total projected employment through this project was 20000 by the end of 2007-08. Taping the huge potential for workers housing, lead to the establishment of residential area across the railway line located at south.

***Map 6.2: VSEZ* Site Plan**



Source: compiled from various sources

Employees of VSEZ reside in Vizag - 25%, Duvvada and Vicinity - 20%, Gajuwaka - 25% and Anakapalli - 30%. FDI investment in VSEZ is very high amongst the existing Converted SEZs i.e. 40%. The VSEZ is likely to see an investment of about Rs 360 crore from 24 manufacturing units.

Infrastructure: Physical infrastructure would have the maximum impact due to SEZ development due to the sheer magnitude of

infrastructure requirements by the SEZ. Most of the employees depend on public transport because of the following reasons:

1. Far location of SEZ from residential area where majority lives
2. Easy accessibility to local transport (rail/road)
3. Less affordability of employees on public transport

It increases after SEZ commencement and construction of Duvvada railway station and new flyover. In addition to the above, Railway siding, C&F Agents, Electronic Weigh Bridge, communication facilities, public transport, local trains and other utility services are also available in the zone premises

POWER: A dedicated 33/11 KV sub-station provides uninterrupted power supply to the units in the zone. Another 132/33 KV sub-station is under construction which will become operational shortly. The tariff for power is as per the rates prescribed by the A.P. Transco from time to time.

WATER: Abundant and good quality water is made available from a nearby reservoir. Besides, adequate alternate arrangements have also been made for supply of ground water. There is deficit of 31 MGD in VMR leading to undue extraction of groundwater resulting in the decline of water table. Now, water supply from Meghadri Gedda reservoir, Kanithi balancing reservoir and Yeleru canal can be given.

SEWERAGE: In VSEZ, sewerage plant is available for less than 1 lakh population and presently VSEZ produces 8 MgD. There is no separate effluent treatment plant and all the untreated sewerage is spilled over to the drain which opens to the sea.

SOLID WASTE: Solid waste produce is 73 kg/worker/day. There is neither proper solid disposal nor any landfill site available to the polluting industries like Pharma & chemical industries leading to environment degradation.

SOCIO- ECONOMIC: VSEZ's impact on surrounding is limited to 3- 5 km. Due to increase in number of IT units in VSEZ, it lead to rapid increase in residential units (>1250 DUs) catering to the IT professionals in the Duvvada area thereby, increasing the land values, improving the quality of life of nearby villagers, providing employment in the

service sector to the tune of 9000 and new malls and commercial spaces have boomed. Income of people has been upswing. Two public sector banks namely Andhra Bank and State Bank of India have full-fledged branches operating from the Administrative Building of VSEZ. Both the banks are authorized to deal in foreign exchange. Increase in the health (3 dispansaries, 2 clinics, 3/ 25 bed hospital and 1/ 100 bed hospital) as well as educational facilities (10 primary schools, 4 senior secondary schools, 2 ITI and 1 engineering school) in the vicinity of SEZ after its establishment. Haphazard industrial and residential growth occurs in this SEZ.

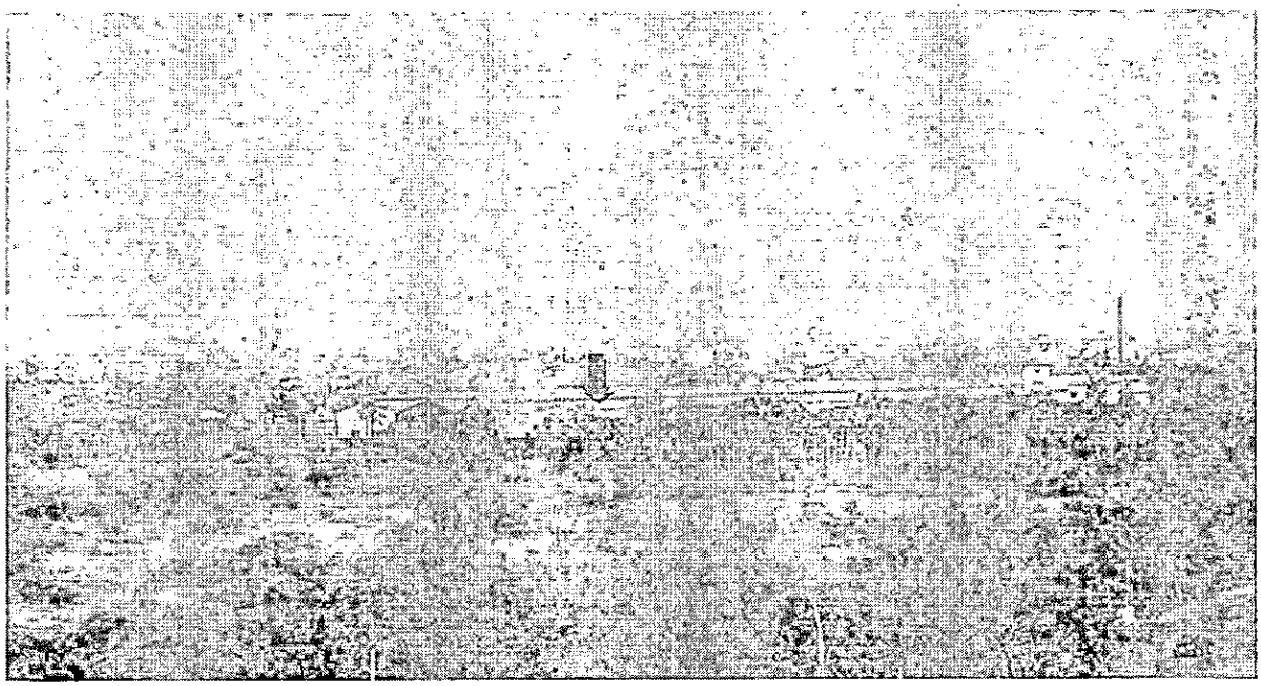
ENVIRONMENT: Air Quality- considering the residential standards apart from Nox, the peak concentration of other pollutants is higher than the standards.

Water Quality- analysis of water sample indicates that pollutants in the water have crossed the critical mark.

Noise Pollution- noise level in this area is within the acceptable range.

6.2.5 Site Pictures

Plate 6.2: Pictures of Duvvada railway station

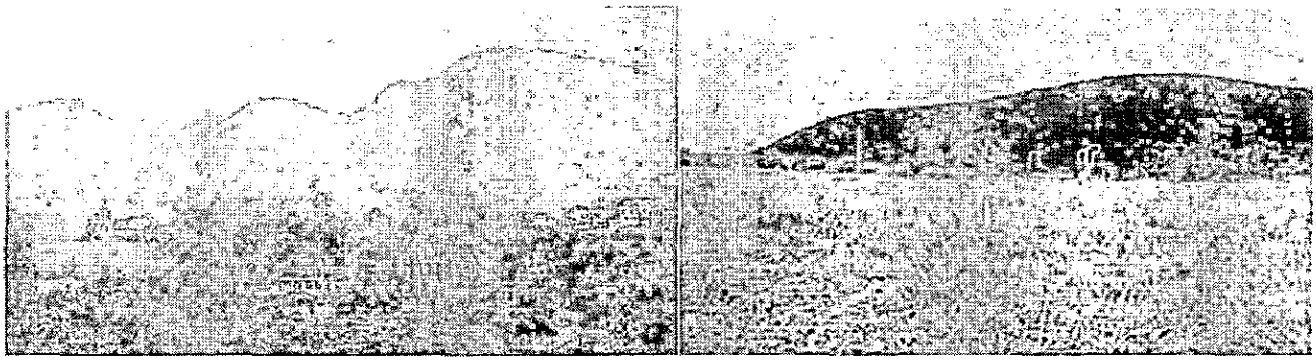


Source: By Author

Plate 6.3, 6.4: Pictures of the flat sites with a few built-up areas in Aganampudi area

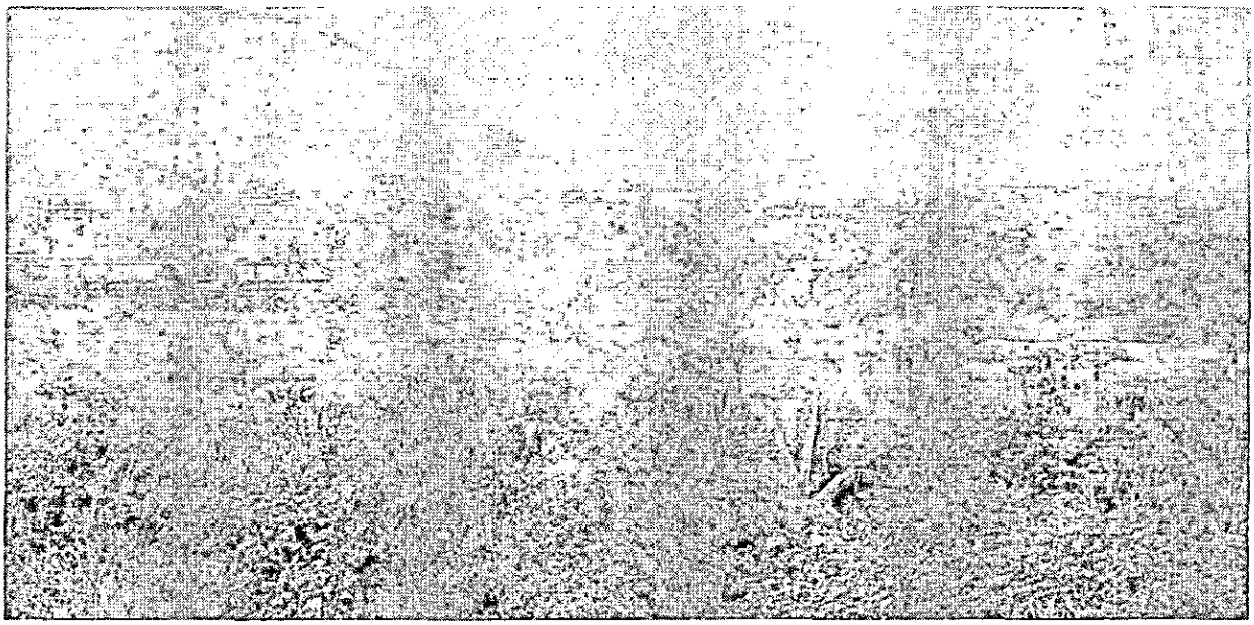
Source: By Author

Plate 6.5, 6.6: Pictures of Vedulanarava area near hill covered with dense vegetation



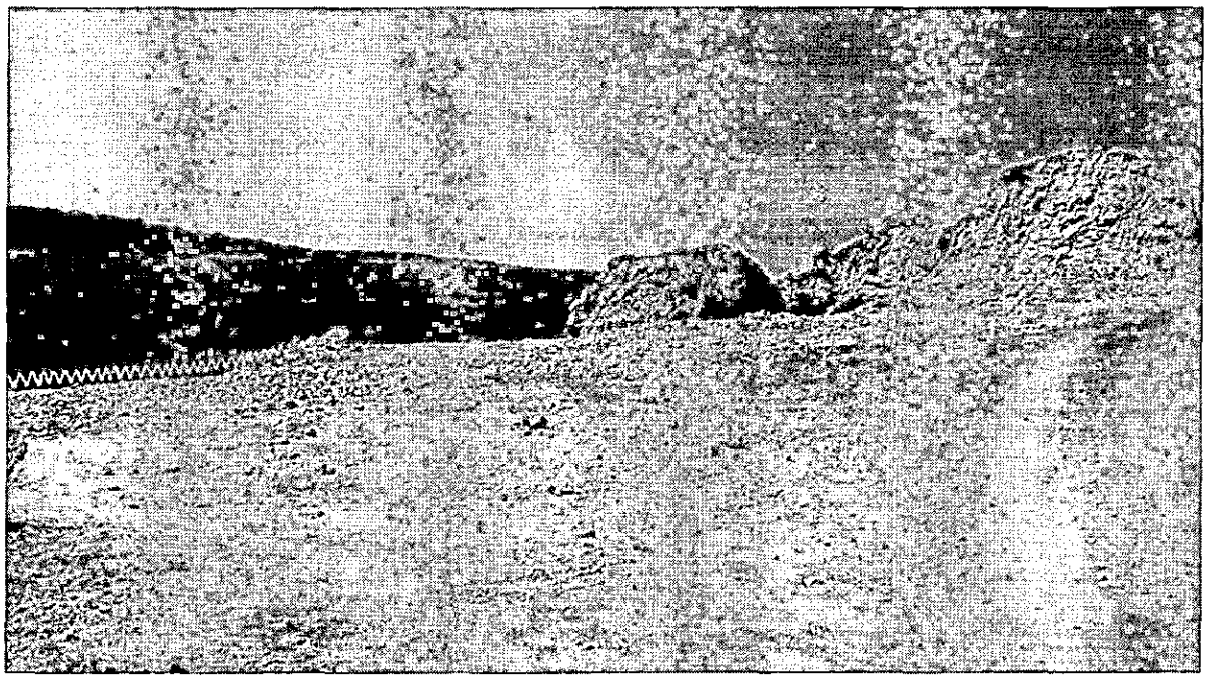
Source: By Author

Plate 6.7: View of Yarawada hill from VSEZ



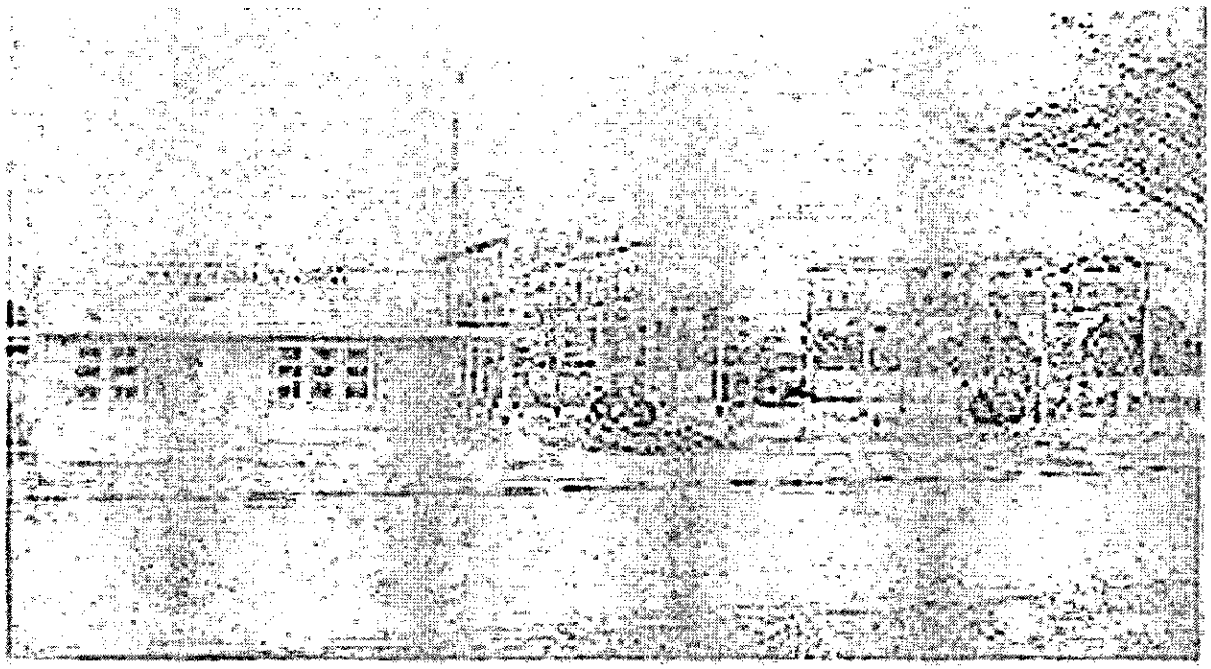
Source: By Author

Plate 6.8: Vacant Land



Source: By Author

Plate 6.9: Substation



Source: By Author

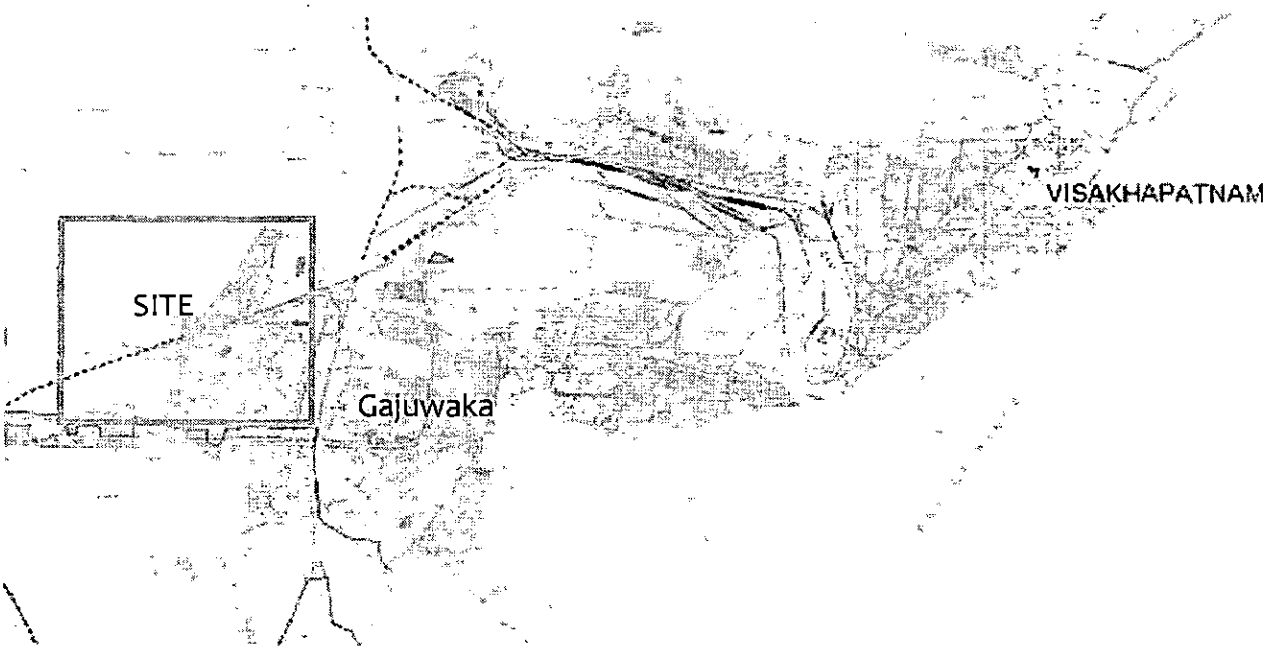
6.3 Extension of VSEZ for the site of IFTC:

For IFTC, the site required both DTA and SEZ areas. For SEZ portion the complete site of VSEZ is include and for Domestic tariff area khasra no. 38, 57, 59 to 62, 73 to 75, 77 to 113 and 120 to 141, 145 to 151, and 155. The extension of SEZ area for the site selection of IFTC is done basis of followings factors:

1. Area required
2. Nearest major roads, railway lines or canal running
3. Ends of administrative boundary or khasra boundary
4. Non- forestry and non- agricultural area
5. Availability of the areas through various Government policies
6. Barren or vacant spaces

From fig 6.1 it is clear that site lies in Gajuwaka Municipal area and it is in industrial zone as shown in purple colour.

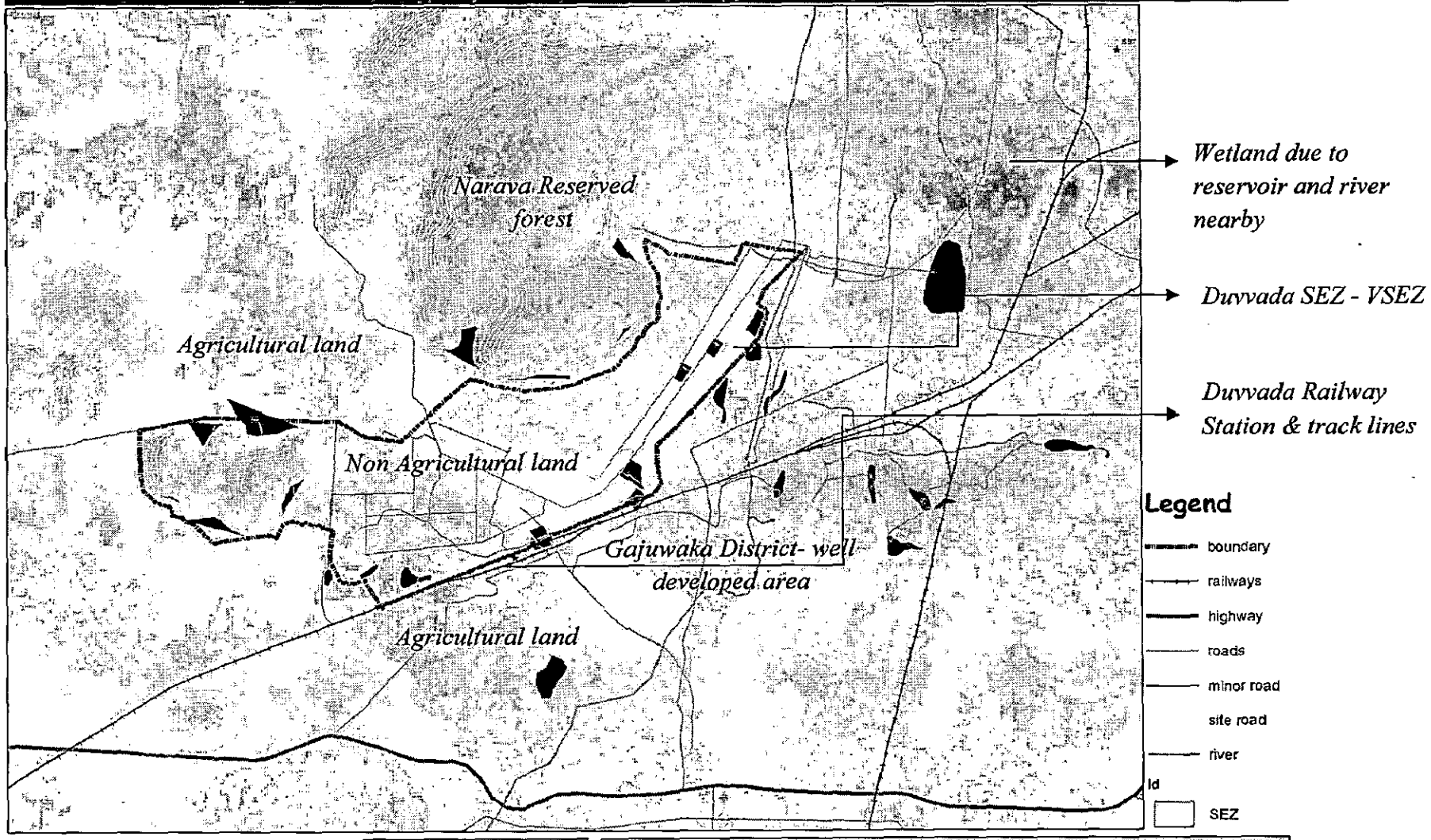
Map 6.3: Administrative boundaries of VIZAG & Gajuwaka



Source: Revised Master Plan of VMR- 2021

SITE SELECTION

Map 6.4 Extension of VSEZ for the Site



Source: Analysis by Author

scale: 1:20000
WGS 84 UTM north 44

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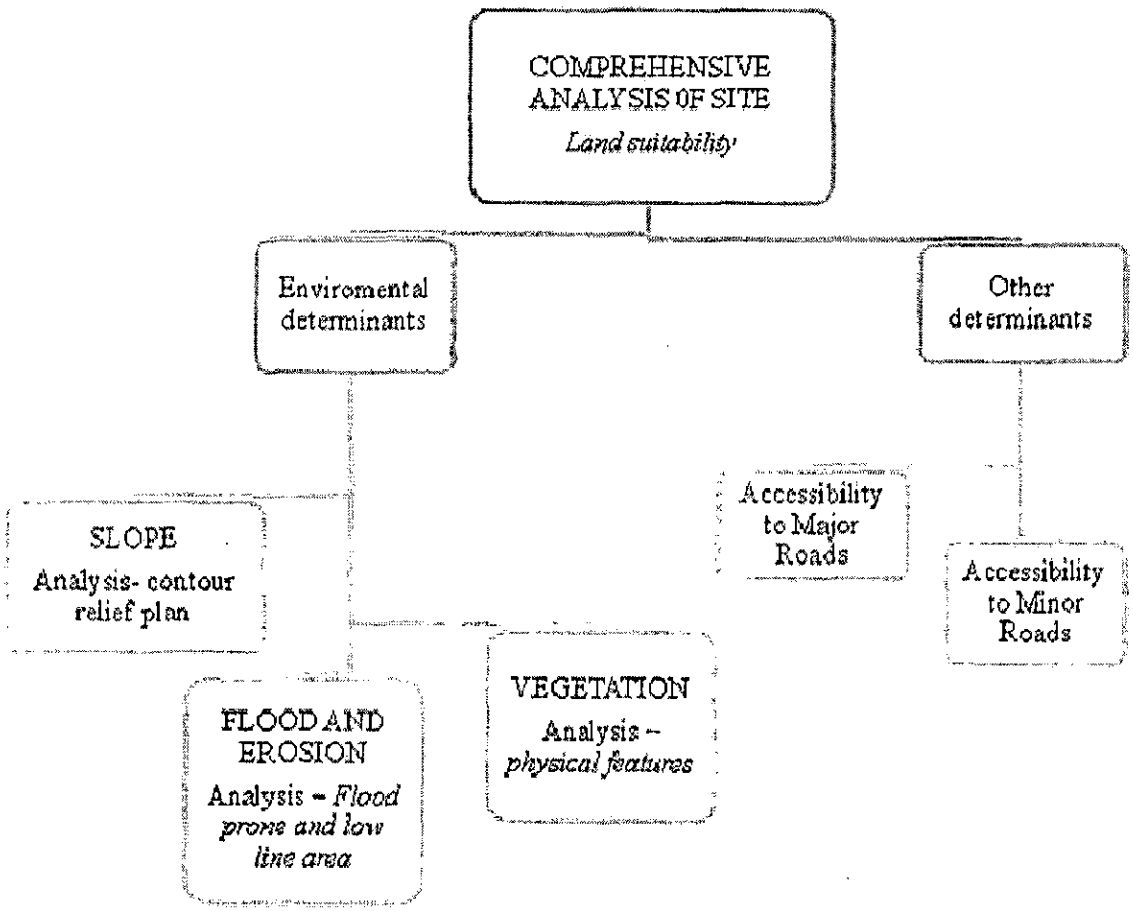
6.4 Land Suitability Analysis of VSEZ

(Analysis process referred from Structure plan and local area development plan for Samdrup Jhongkhar, Bhutan.)

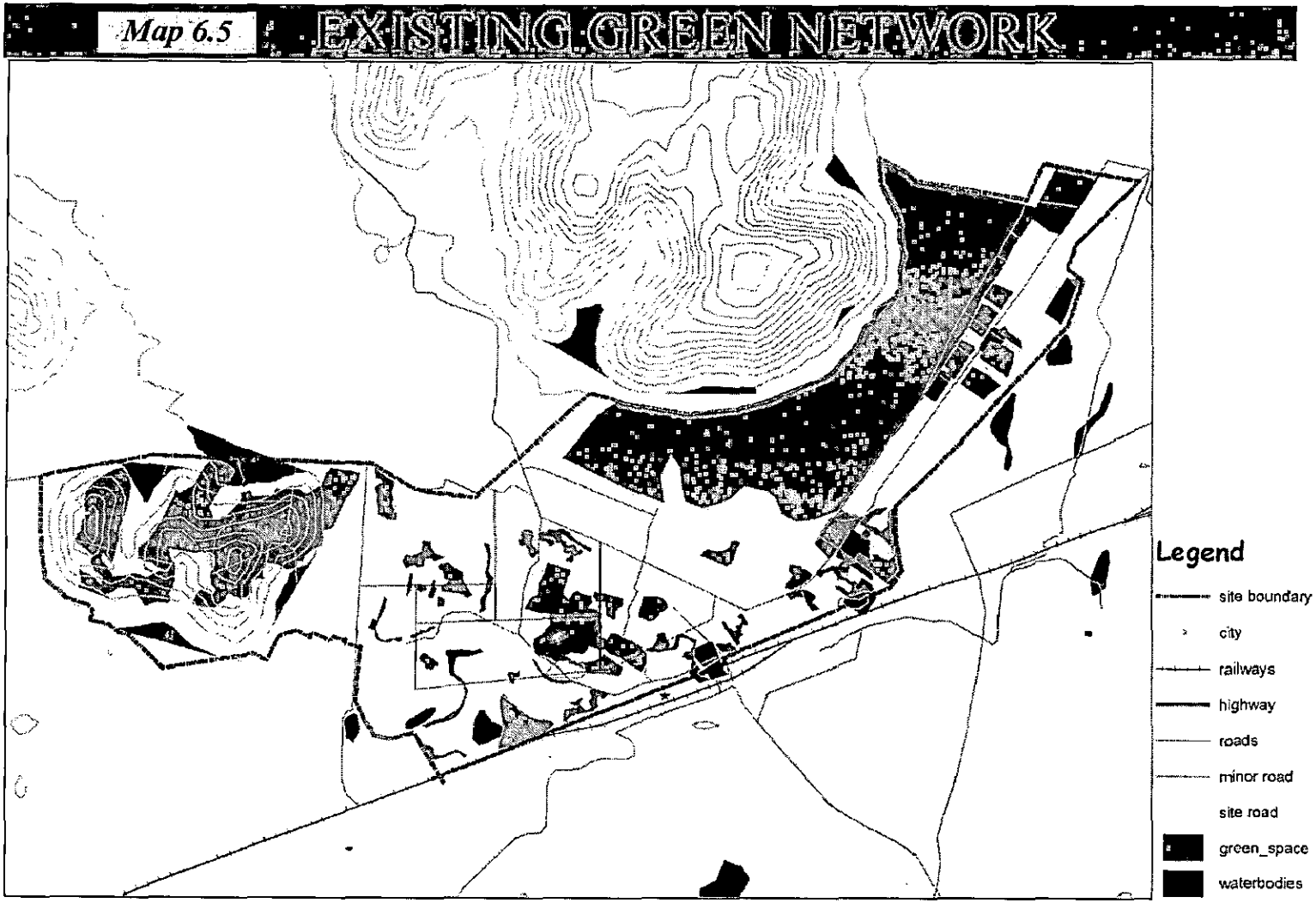
This study helps in identification of land suitable for building, in other words suitable for development of various land uses. There are several factors that determine land suitability, but the most influential and governing are the environmental factors, like slope, soil and geology, flood and erosion prone areas, expanse of vegetation, etc. Maps shown in figures 6.4, 6.6, 6.7, 6.8, 6.9, and 6.10 provide brief idea about the existing features on the site which may be helpful for the site analysis.

Fig 6.1: Generalized process of land suitability analysis



Source: By Author

6.4.1 Existing features of the site



Source: Analysis by Author

Map 6.6 EXISTING BUILT AND OPEN SPACES

Source: Analysis by Author

scale: 1:12000
WGS 84 UTM north 44

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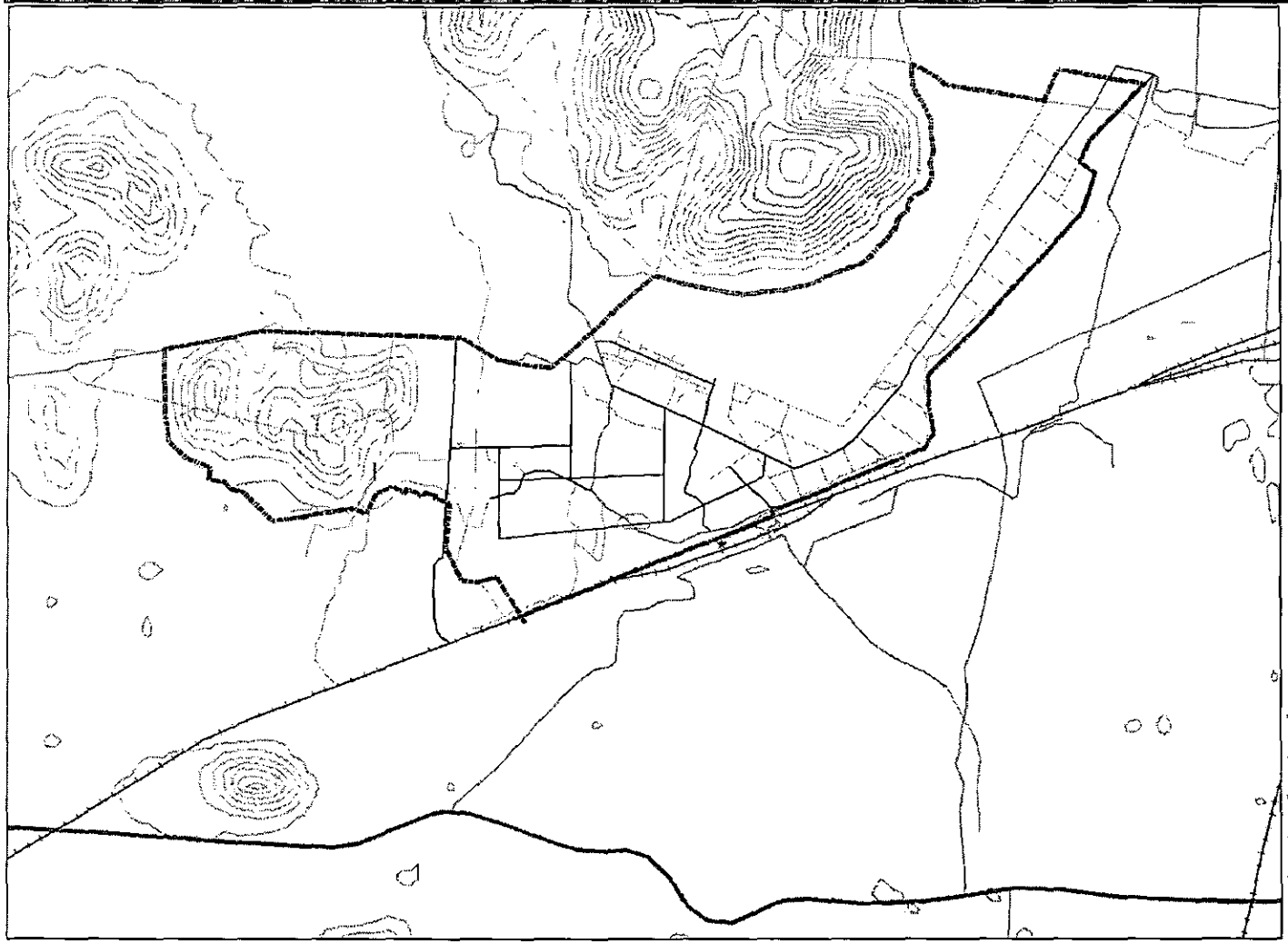
Map 6.7

EXISTING ROAD HIERARCHY



Source: Analysis by Author

scale: 15000
WGS 84 UTM north 44

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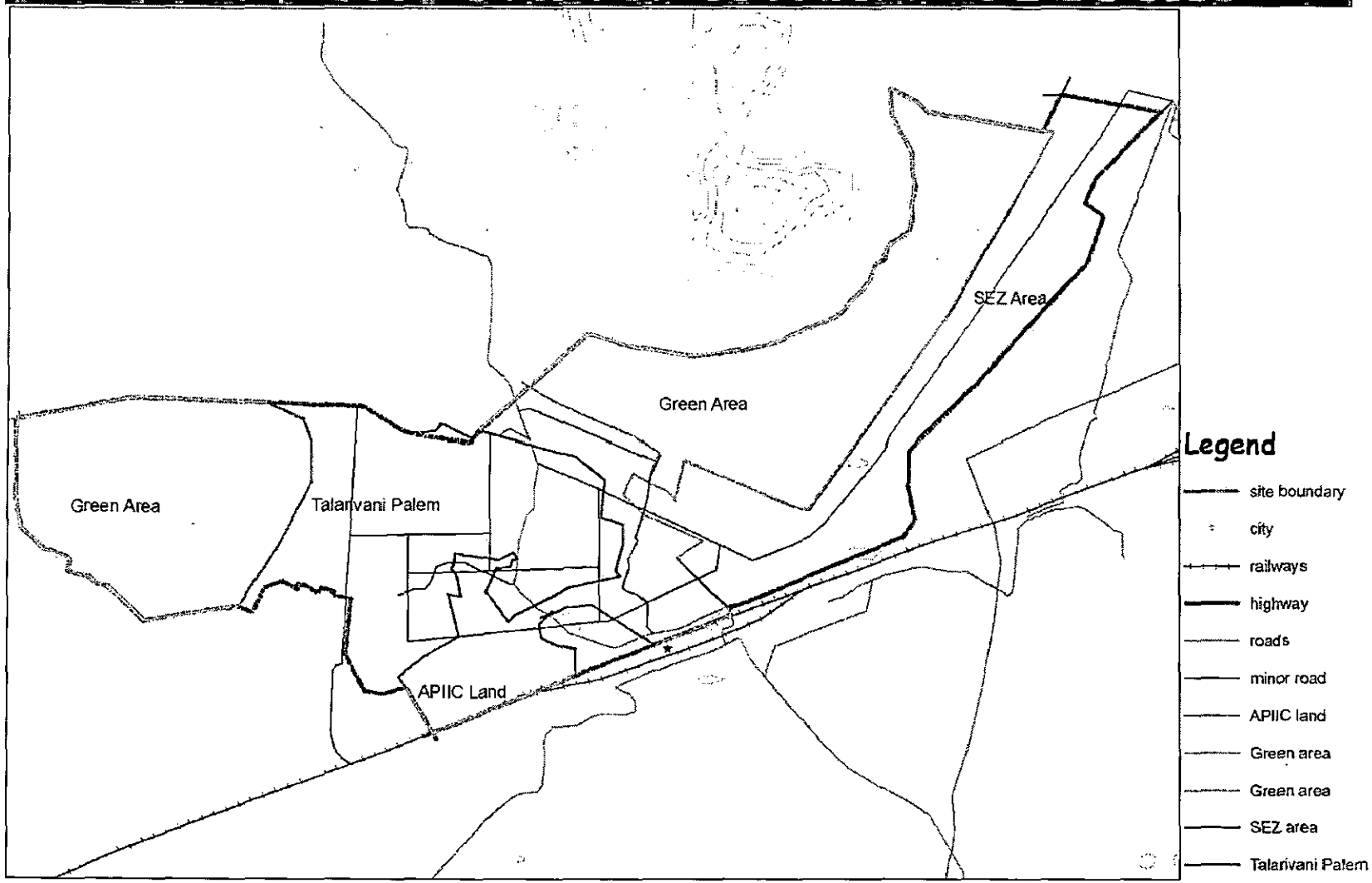
Map 6.8 EXISTING ADMINISTRATIVE BLOCKS



Source: Analysis by Author

scale: 12000
WGS 84 UTM north 44

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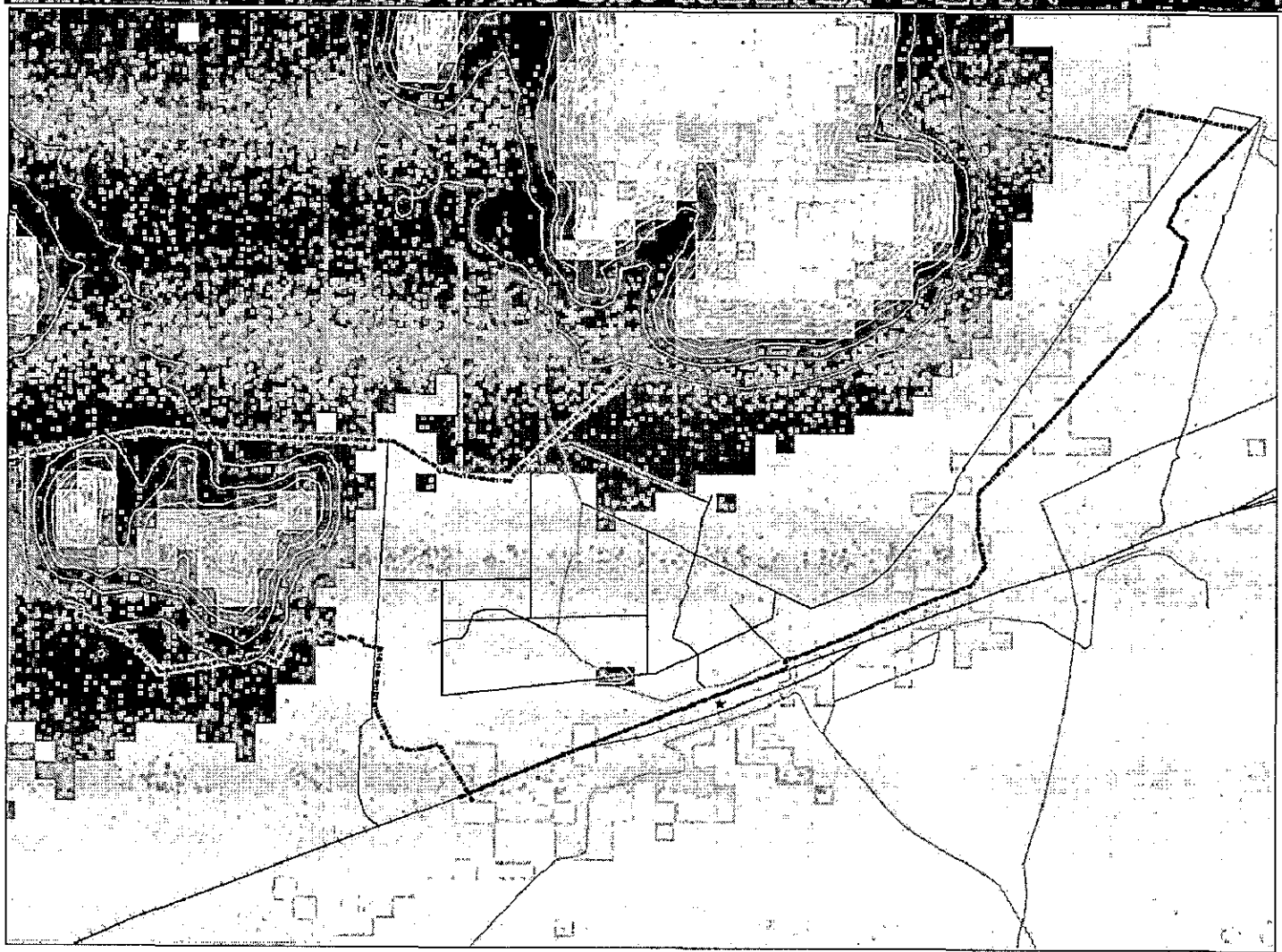
Map 6.9

CONTOUR RELIEF PLAN



Source: Analysis by Author

scale: 12000
WGS 84 UTM north 44

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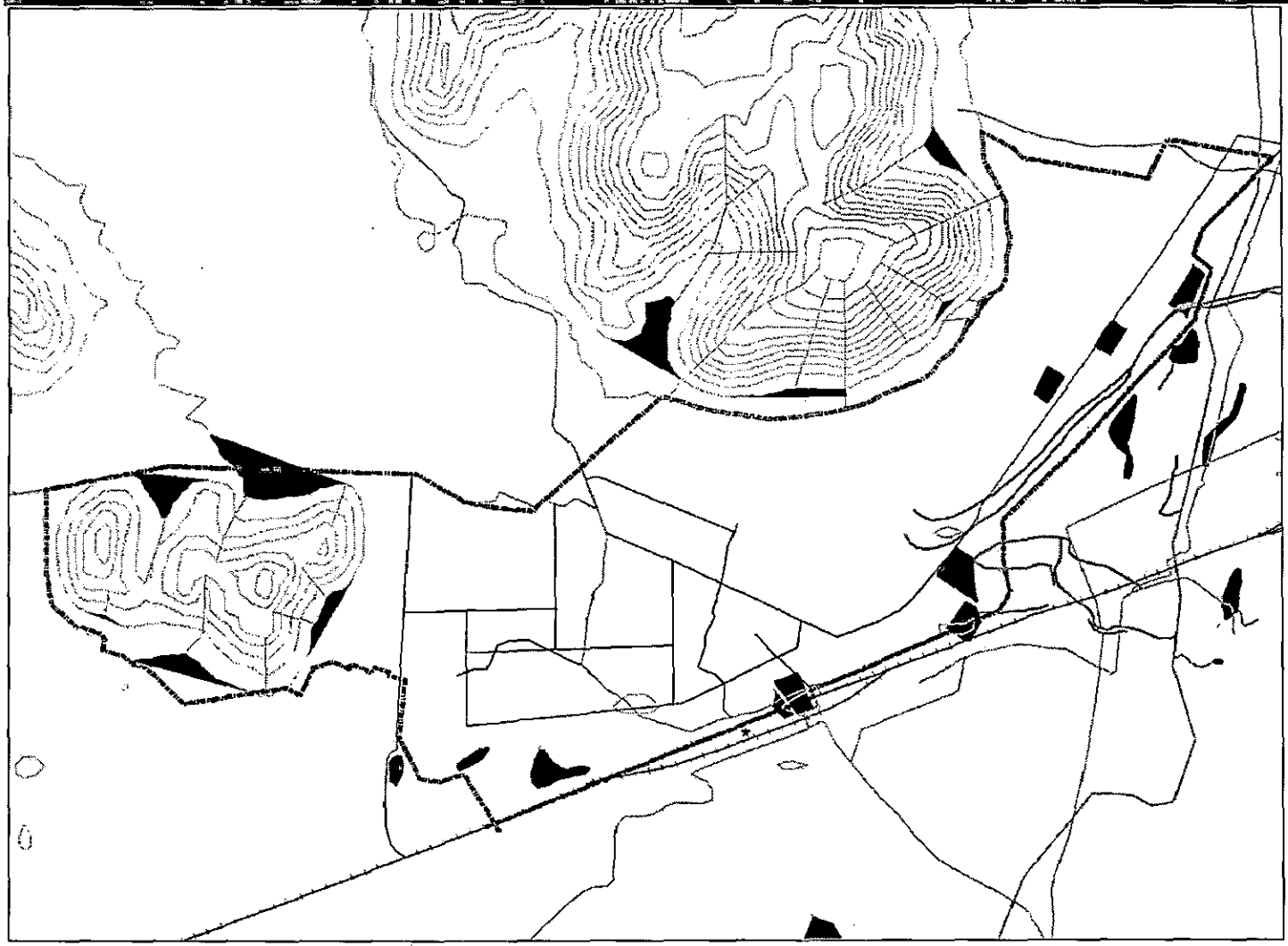
Map 6.10

WATER CATCHMENT AREA



Source: Analysis by Author

scale: 12000
WGS 84 UTM north 44

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Map 6.11 FLOOD AND EROSION ZONES

Source: Analysis by Author

scale: 1:12000
WGS 84 UTM north 44

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The analysis is done using the method of rating regional cells. In this method after the site demarcation certain criteria are identified which may be either static or dynamic. Here only static factors have been considered for suitability analysis which are classified and given absolute and relative ratings. Based on these ratings, suitable maps pertaining to factors considered have been produced in GIS and are shown in figures 6.9, 6.12, 6.13, 6.14 and 6.15. Processing of these comprehensive rated criteria is done through weighted overlay tool which gives Composite Environmental Land Suitability Map and Composite Accessibility Map.

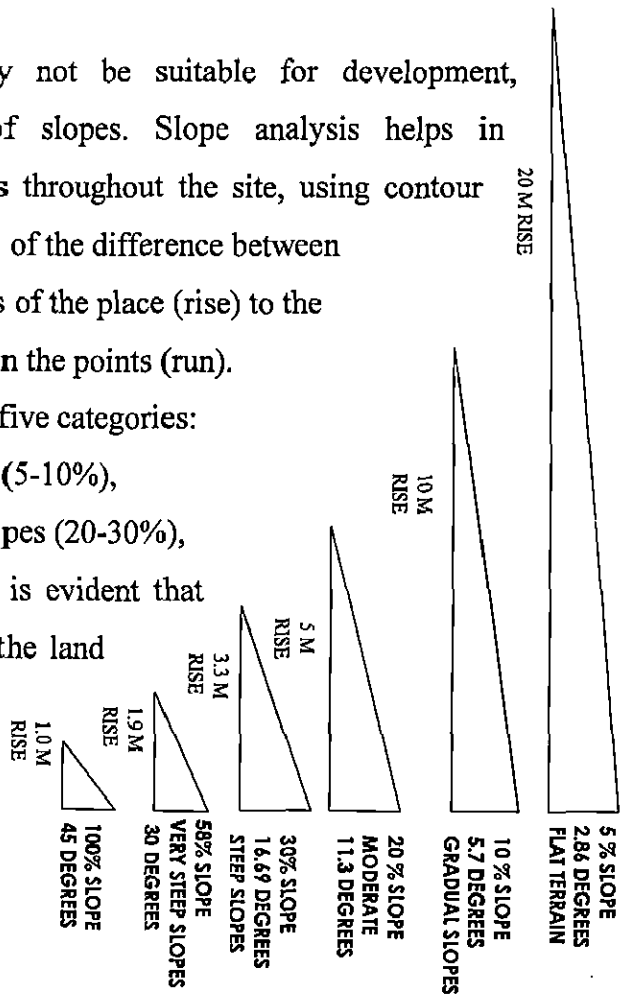
6.4.2 Environmental Determinants

6.4.2a Slopes

Fig. 6.2: slope analysis

Sloping land may or may not be suitable for development, depending upon the steepness of slopes. Slope analysis helps in determining the steepness of slopes throughout the site, using contour data. The slope of an area is the ratio of the difference between the highest and lowest altitude points of the place (rise) to the horizontal distance measured between the points (run).

The slopes have been classified into five categories: Flat terrains (0–5%), Gradual slopes (5-10%), Moderate slopes (10-20%), Steep slopes (20-30%), and Very steep slopes (> 30%). It is evident that steeper the slope, the less suitable the land will be for urban development. Slope map analysis is shown in map 6.11.



Source: Analysis by Author

6.4.2b Flood and Erosion

The Yeleru canal and Mehadri River are running along the site. Generally due to steep slopes in the catchments and heavy rainfall is the reason why an area is prone to flooding. The several bends and turns that the river takes increases chances of flooding as they gather boulders and other debris, forming a bottleneck at those turns. Map 6.10 shows areas along the river that are prone to flooding and low line area. It should be noted that areas close to the river course may not be suitable for typical urban land uses; however they may be suitable for recreational or sports activities.

6.4.2c Vegetation

As mentioned earlier, the SEZ is situated near a Narava Reserved forest. The spread of trees and other flora can be seen all over, ranging from sparse vegetation in the lower areas to dense vegetation up in the hills. As can be seen from Map 6.4, areas with sparse or scattered vegetation may be considered most suitable for development since they require no or little cutting down of trees. This is followed with areas with moderate vegetation, where it is possible to build with certain restrictions that may be implemented at policy level. The forest areas should be preserved; hence they appear as not suitable for building.

6.4.3 Other Determinants

Environmental features are the key determinants to land suitability; however there are also other factors like proximity to roads, availability of public services, etc. These factors have lesser influence on land suitability since they can be easily remedied through appropriate measures, and do not harm the natural environment. Some of these factors that are relevant in for the site have been analyzed, as given below.

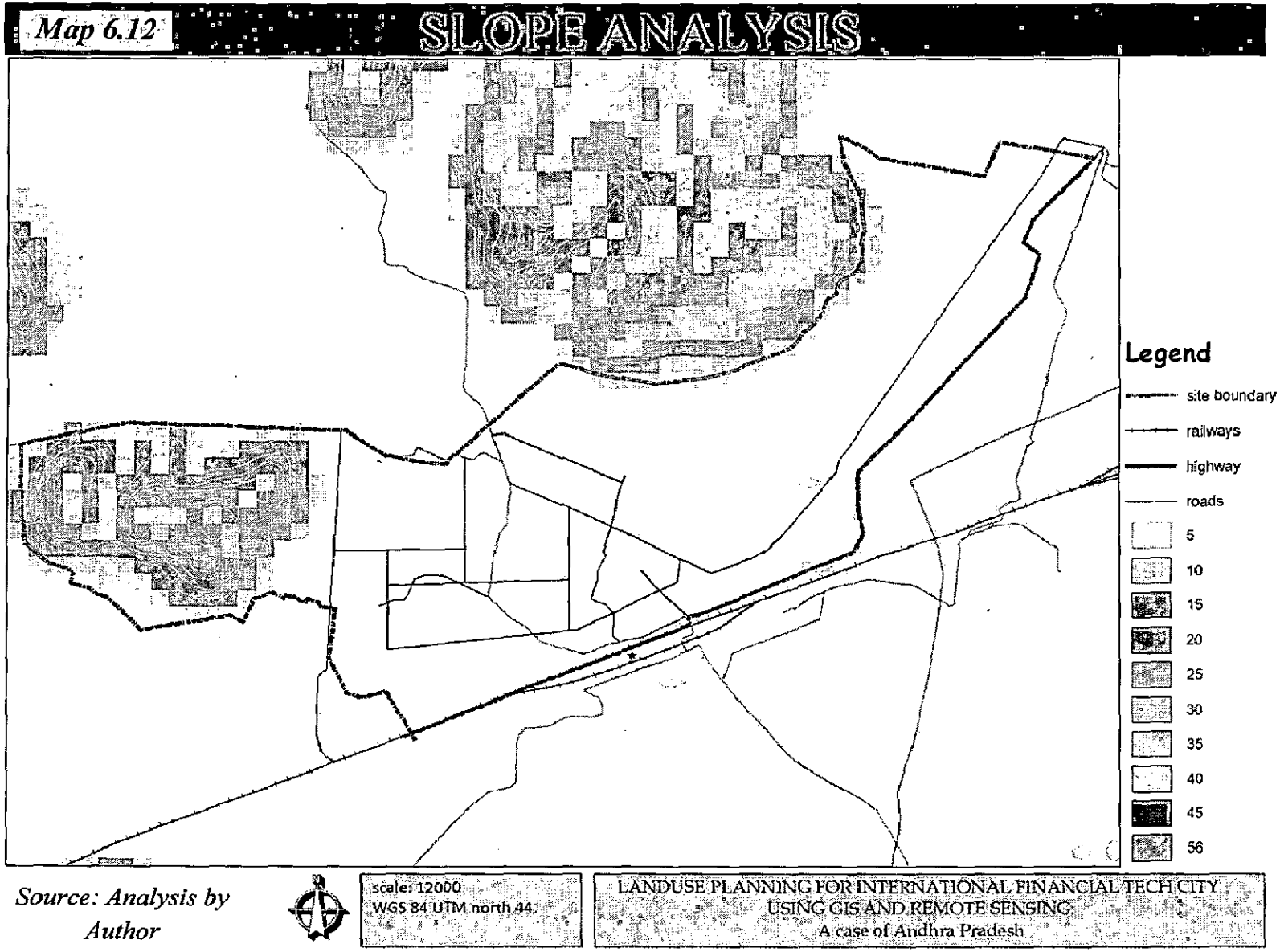
6.4.3a Accessibility to Major Roads

A planned road network in this area was included in VMR Master plan 2021. At present, 30% has planned road and rest are grown organically over the years, resulting in a maze of paths with varying widths and erratic connectivity. However, it has some major roads through the site or attached with the site. Areas along this spine will naturally benefit from their proximity to it and hence may be considered suitable for development. Map 6.13 depicts land that is at varying distances from the central spine; the first category being land located up to 100m from the spine, the second category being land located upto 150m from it, and the third category being all land at a distance exceeding 150m.

6.4.3b Accessibility to Minor Roads

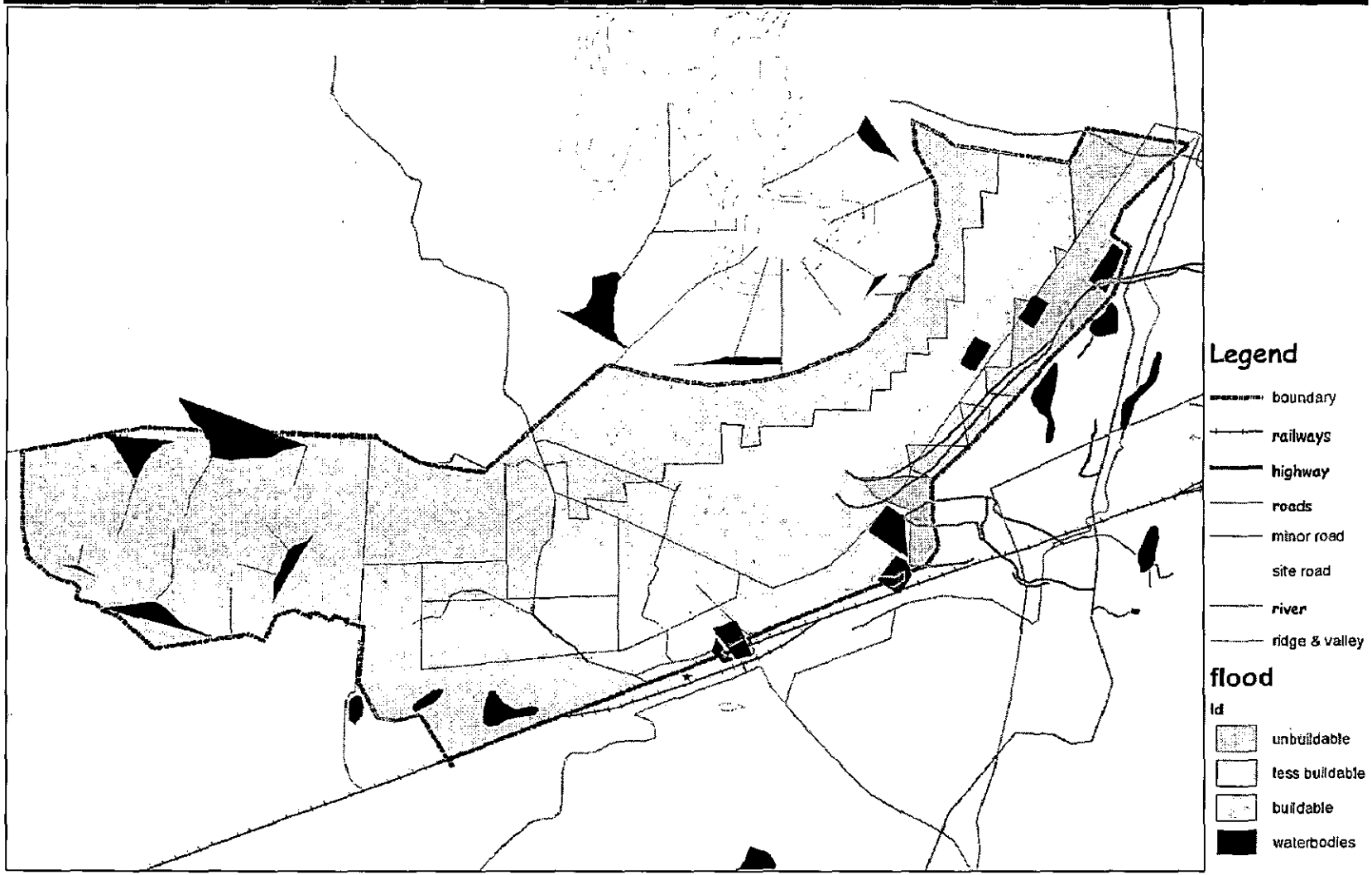
Map 6.14 shows land at varying distances from the minor roads throughout the area. Here, the land that is up to 50m proximity from the roads is considered suitable.

6.4.4 Land Suitability Analysis Map



Source: Analysis by Author

Map 6.13 LAND SUITABILITY - FLOOD



Source: Analysis by Author

scale: 1:12000
WGS 84 UTM north 44

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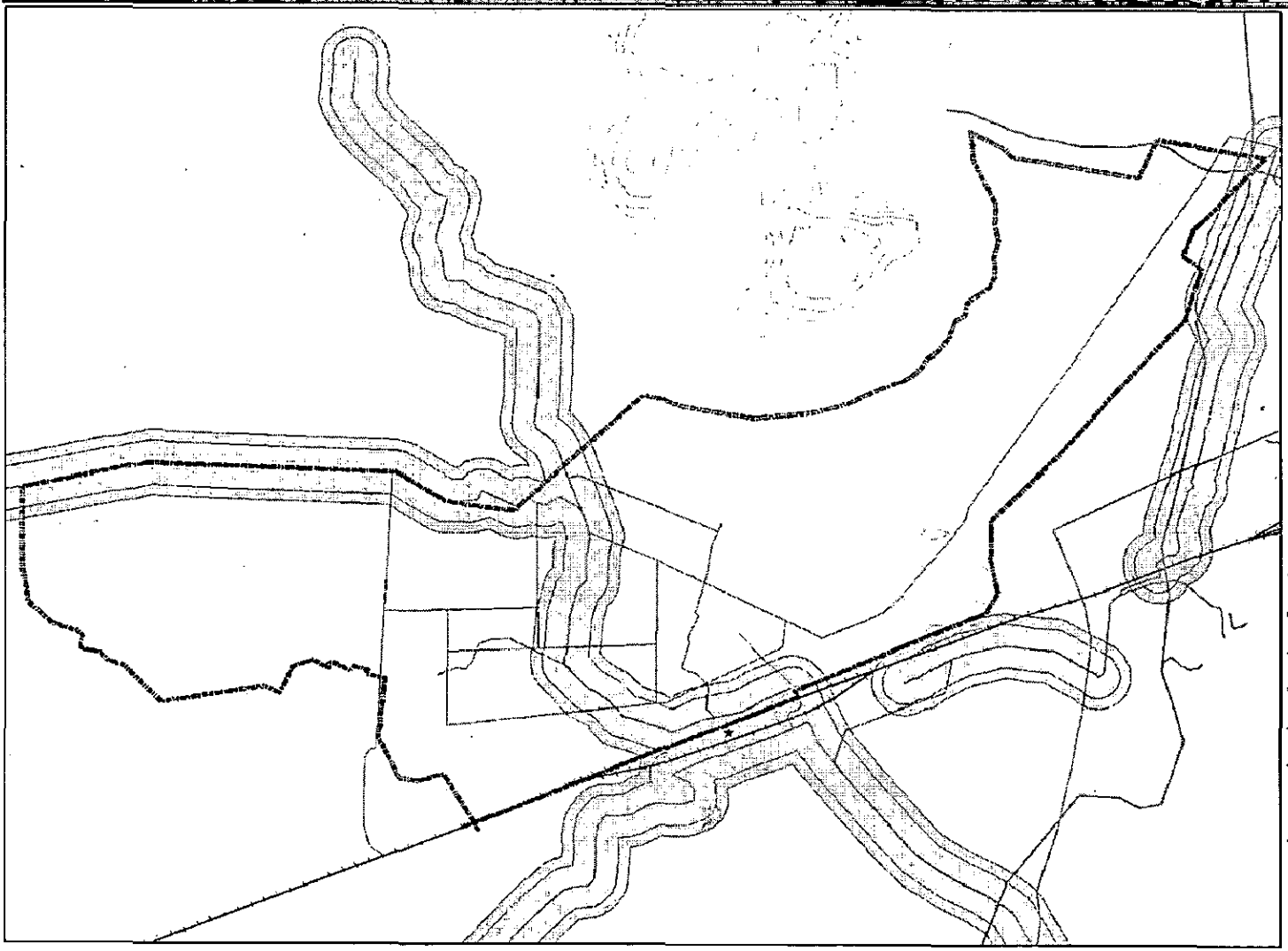
Map 6.14 LAND SUITABILITY - MAJOR ROAD



Source: Analysis by Author

scale: 1:12000
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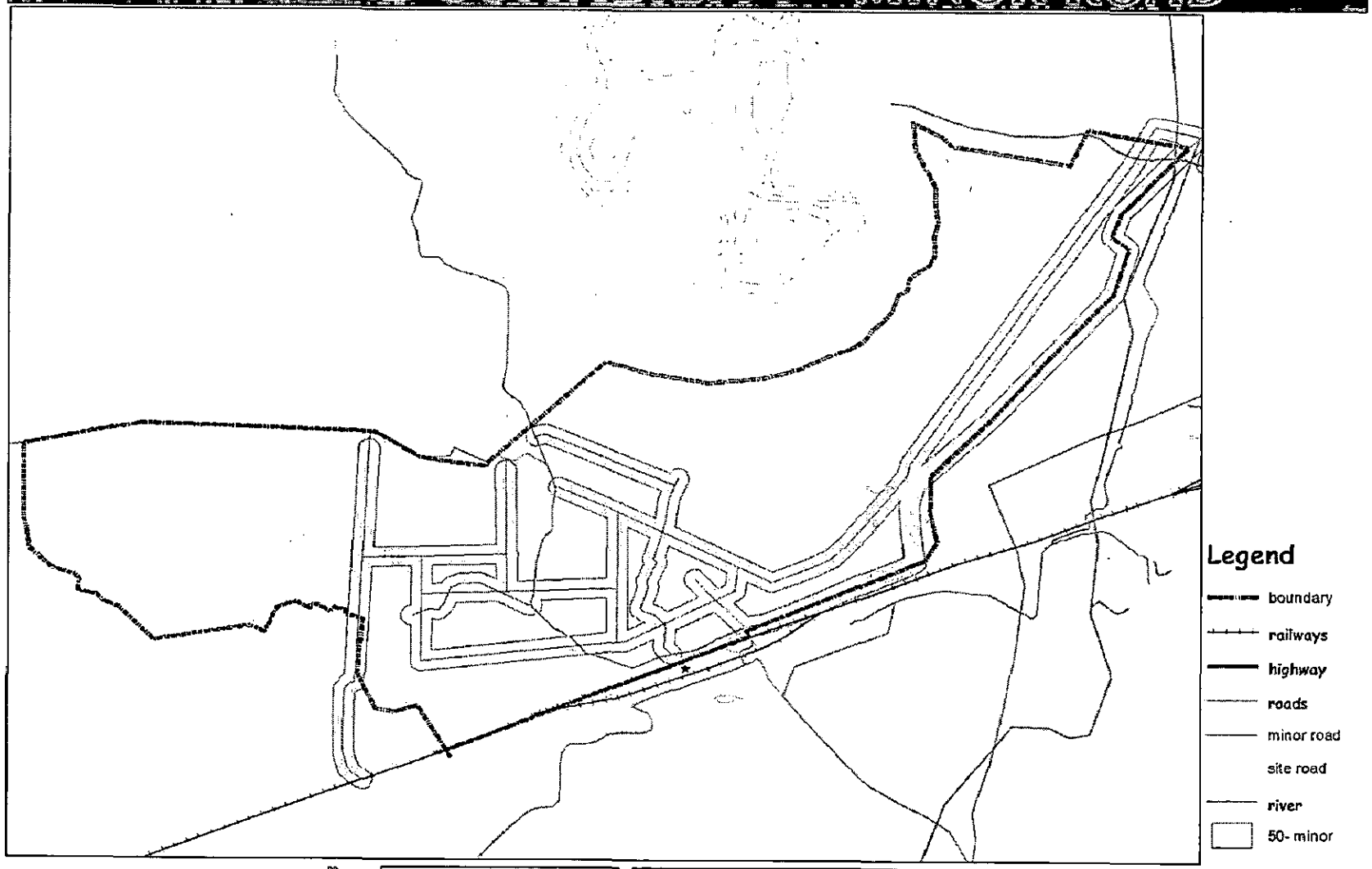
Map 6.15 LAND SUITABILITY - MINOR ROAD



Source: Analysis by Author

scale: 1:12000
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6.4.5 Results

6.4.5a Composite Environmental Land Suitability Map

Based on the different criteria of environmental land suitability, a composite land suitability map was prepared to determine land most suitable for development. This was done by giving weightage to each criteria and then overlapping all the individual suitability maps. The weightage was assigned on a scale of 1 to 10, where 1 is least influential and 10 is most influential; for example since slopes are a very crucial criterion for development, slope was given high weightage. In this manner, the weightage assigned to each criterion was: 9 for slope, 7 for flood areas, and 5 for vegetation.

The composite map created by juxtaposing each of these criteria is shown in Map 6.15. It can be seen that flat and gradually sloping land in the floor of the valley is ideal for development, and the suitability decreases as one moves outwards to steeper slopes and dense vegetation.

6.4.5b Composite Accessibility Map

Map 6.16 shows overall accessibility to the major and minor roads in the town, formed by overlapping the above drawings together. The map clearly indicates areas that have little or no road accessibility, thus bringing out gaps in the existing infrastructure network. These areas, once made accessible through provision of roads, can become highly suitable for development.

Chapter 7. PROJECTION AND PLANNING APPROACH

7.1 Background

An International Financial City is a new concept to India. Several developed countries have successfully established high-tech financial hubs, which over the time have catered as international financial services centers. These centers provide suitable regulatory regimes and create a business environment to promote talent and increase capital flow. As they develop, they create significant economic value for their domestic economies. If India wants to compete with international financial hubs, our cities will have to provide global standards in infrastructure, office space, internet and telephone connectivity and lifestyle opportunities which would attract top talent.

This can be clear from table 7.1 that the condition of existing cities of India and developing them cost more compare to create a new city using high technology.

Table 7.1: How justified is it to invest on a new cities

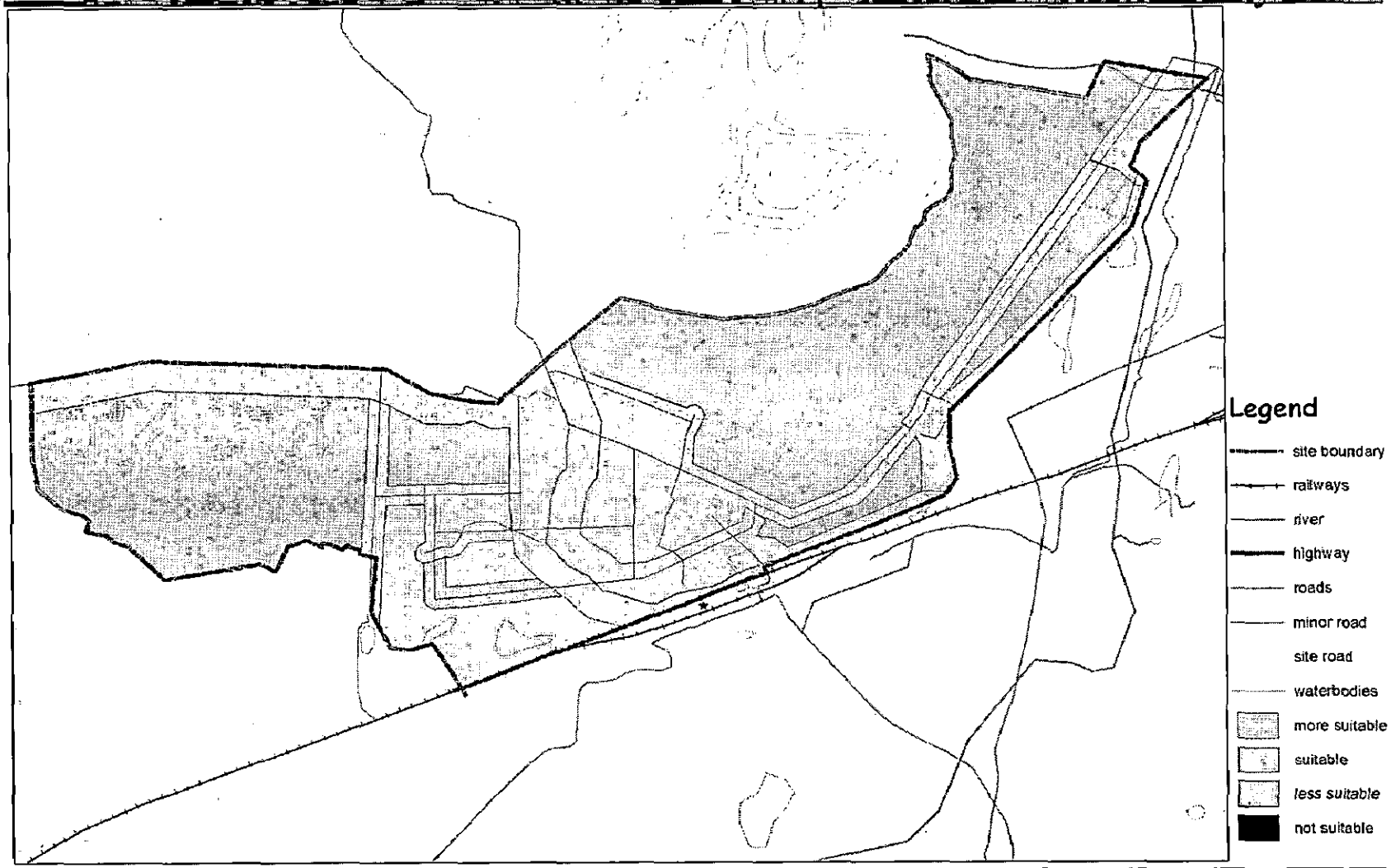
	Parameters for evaluating the two targets	1 If we develop existing Cities	2 If we develop New Cities
1	Infrastructure and linkages	Basic infrastructure already in place, just need to built on it and extrapolate	Developments can be done from scratch keeping in mind long term growth in urbanization
2	Regional economic and income growth drivers	Largely depends on the historic developments in and around City	Can cherry pick growth drivers
3	Availability of quality workforce	Depends on the opportunities that exist in the City & quality of lifestyle that attracts such work force	Planned concept with thrust on specific sectors to create ample opportunities and good quality of life to sustain the workforce
4	Pro-activeness of local government	Subject to mode of functioning of governing bodies	New city to be run as an enterprise with thrust on self-governance
5	Land and sectoral demand & supply scenario	Some constraints if development planned within the city but can always expand in suburbs	Locations can be chosen keeping in mind future growth and land availability
6	Demographic profiles	Studies show that most of the Indian cities have favorable demographic profile, skewed towards working age – 15 years to 52 years	Can be well balanced and controlled
7	Educational and social infrastructure	Dependence on Government but quite a Corporates have started setting up *educational institutes*	Can attract world class Educational Institutes
8	Law and order situation ... in addition to this	Improving in most of the cities in India	Restricted access and high surveillance can keep law and order in check
9	Regulatory framework	As defined by Government Bodies & agencies	Can be tailor made as per the needs of the city

Source: Trammell Crow Meghraj, McKinsey

Cost of developing an existing city is over $ 15 Bn

Source: Trammell Crow Meghraj, Mckinsey

Map 6.16 LAND SUITABILITY - Composite Accessibility



Source: Analysis by Author

scale: 1:12000
WGS 84 UTM north 44

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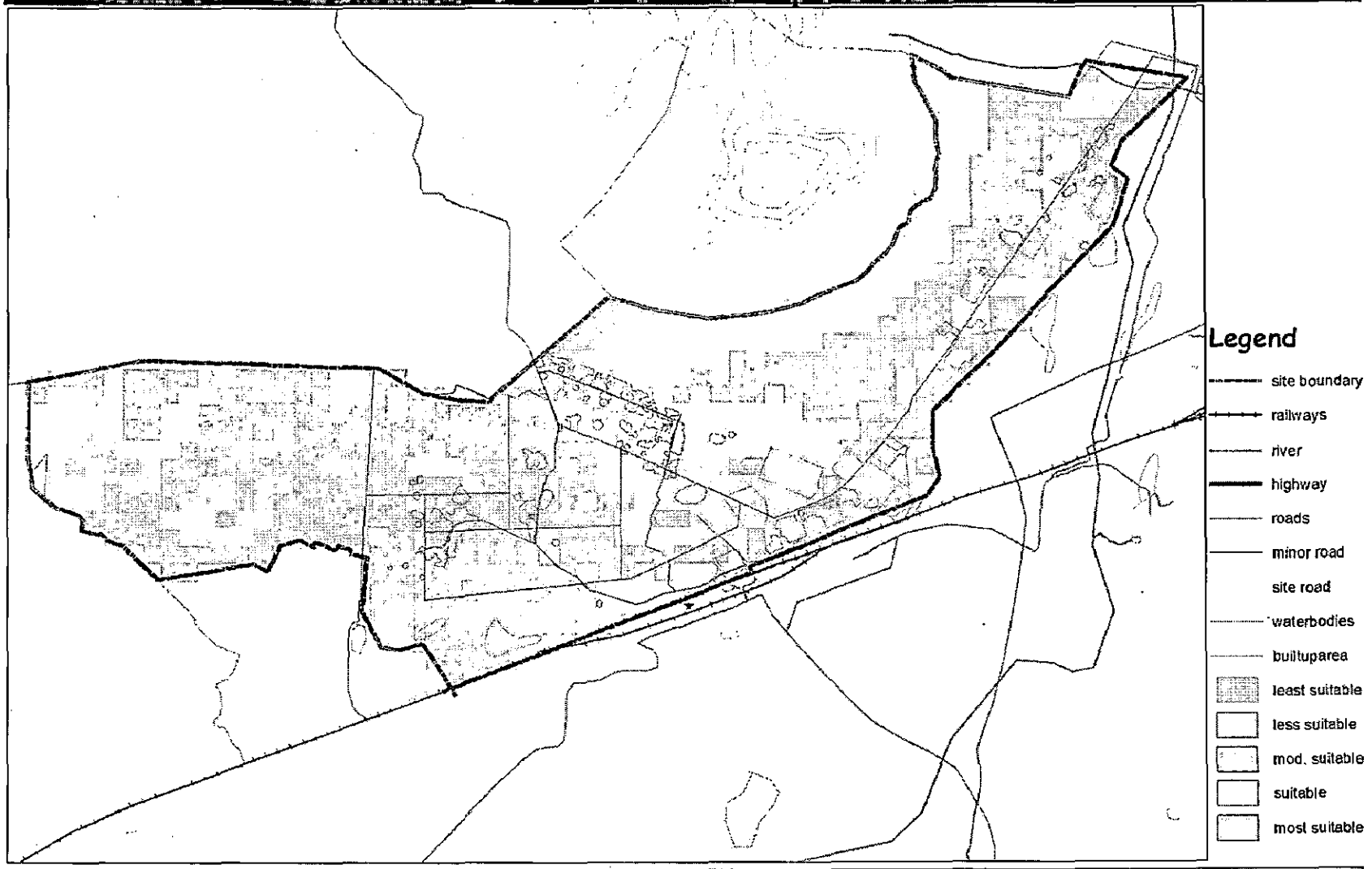
Map 6.17 LAND SUITABILITY - Composite Environmental



Source: Analysis by Author

scale: 1:12000
WGS 84 UTM north 44

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Thus, a landuse plan has been suggested for a new city, which aspires to cater India's large financial services potential by offering global firms having a world-class infrastructure and facilities and aims is to attract the top talent in the country by providing the finest quality of life and standard of living.

7.2 Size of the City

To determine the required size of a city two issues must be considered:

1. The final and optimal population size of the proposed city
2. The gross average density of persons per land unit (acre)

The aim of an International Financial City is to improve the standard of global services, GDP, GSDP, employment and compete with other countries' lifestyle. Therefore, the optimal population size is generated by the workforce requirements and the density also varies as per the land use and site condition.

7.2.1 Workforce requirements

Today's global economy can be described as one in transition towards a "knowledge economy". For the purpose of creating an IFTC, it may be of critical importance to create a strong knowledge economy within the city that centers round International Financial services which create tremendous opportunities for white-collar employment. As mentioned earlier, these activities require skilled professionals, trained in the fields of management, logistics, statistics, operations research, engineering, IT, etc. This kind of employee is commonly referred to as a "knowledge worker", a term popularized by Peter Drucker in his book "The Age of Discontinuity"1.

"The knowledge worker is one who either focuses on the production/creation of knowledge, or uses knowledge/information as an input in the creation of something of value".

It has already been identified that the every city can cater to both physical activity as well as business (explained above). Physical services have the potential for creating employment opportunities for a large pool of unskilled and semi-skilled labour. The kinds of workers required are drivers, crane/fork operators, manual laborers, etc. Moreover, the

construction and maintenance of logistics infrastructure, like roads, ports, warehouses, etc, will also provide a large number of blue-collared jobs.

Table 7.2: Employment calculation for 2020

Employment calculation for 2020	Numbers
Total employment expected from the VMR in 2020	1095233
Employment in VSEZ	7670
Employment required at regional as discussed in master plan within 15 km	
Employment target of Pendurthi	1479
Employment target of Aganampudi	2973
Employment target of Lankalapalem	5106
30% Employment target of Gajuwaka & Vizag	119881
Migrant of AP for job from which 22.5% consider in Vizag. out of which 12.5% are targeted in VSEZ	16680
Total main employment	153789
Service employment 0.4 times the total employment	61515.6
Total employment expected in 2020	215304.6

Reference: Master Plan of VMR 2021

Table 7.3: Population calculation for 2020

Index	Numbers	%
Total Employment generated	215304.6	100
Floating Population	129182.76	60
Residential Population	86121.84	40
Total Residential Population	107652.3	50
Household size	4.5	

Source: Analysis by Author

Table 7.2 shows the employment expected to be generated from the proposed IFTC in Vizag in 2020. At a distance of 15 km from the site, expected employment of all the new developing urban centers as per the master plan 2021 of VMR is taken. The expected employment in Pendurthi, Aganampudi, Lankalapalem, Gajuwaka, and Vizag are 1479, 2973, 5106 and 119881 respectively with the work participation ratio as 46%. Employment in secondary and tertiary industries of AP constitutes 67% of the total working population. Migrants to VIZAG for job is also consider which contribute 12.5%.

Service employment 15% total employment is mention in standards. Table 7.3 indicates the requirement of household due to new city generating an employment of 215304. The total residential working population multiplied by household size (i.e. 4.5 for Gajuwaka) gives total population. The percentage of floating population and residential is calculated from the existing condition of Visakhapatnam Metropolitan Region.

7.2.1 Gross Average Density

The quotient of the total number of dwelling units divided by the base site area of a site, expressed in dwelling units per acre is gross average density. The maximum number of dwelling per unit area is fixed through zoning regulations in order to control the growth of a city in a haphazard manner. There is no universal standard for density calculation for IFTC, but it is usually affected by the following variables:

1. Per capita income and standard of living in a country.
2. Suitability of land for buildings and utilities without exceeding the threshold of its resources.
3. Cost of construction and maintenance.
4. Market value and taxation which may dictate the intensity of land use.

It is clear from the case studies (Ch. 3) that the density within the International financial tech city varies as per the land use or location. Commercial development is the primary focus of development with ~70% built up space dedicated to it and to IT/ ITeS services, banking services, etc. which is an economic driven land uses. So density of this area is more as compare to other city. Moreover, the high technologies are used in such city to cover up the maintenance and availability of resources which enable us to have a high-rise or skyscrapers in the city. This new technology will attract people, decreases the emigrant and provide a world class life style. For IFTC, high FSI and density are provided as compare to other Indian cities, which would be predominantly used vertically thereby maximizing open spaces and green areas (65% space). The design aim is also to incorporate appropriate building height, scale, and form that are complementary to its forest area, CBD and nearby old city location. The height, scale and form are decided from the density of that area. Thus, density can be decided by the availability of area, infrastructure and resources in order to provide sustainable environment and urban fabric.

7.3 AREA ANALYSIS

Table 7.4 indicates the available site for the development and the spaces which are considered non built-up is due to high slope or dense vegetation. Table 7.5 with a graph in figure 7.1 shows various land uses given on site and area allocated to them.

Table 7.4: Area calculation

Spaces	Area (acres)
Non built-up spaces	360
Built-up spaces	1240
Phase 1	860
Phase 2	740
Total area	**1600**
Domestic Tariff Area	1000
Special Economic Zone	600
Total	**1600**

Source: Analysis by Author

Two phase development is considered in this proposal: phase 1 is shown with detail land use planning of each block and phase 2 is just identified with block level divisions. Phase 1 consists of 24 blocks and phase 2 consists of 12 blocks.

4 blocks are farmland in Phase 2 which will be a co-operative farm owned by the government and farmers are given job on it with a place to stay and to keep the livestock. Commercial is primary focus of development for an IFTC so major land is allocated to this land use which covers IT services, Industries, banking services, etc. Industries and IT services constitute 289.82 acres. which make 33.7%.

Table 7.5: Landuse area calculation at broader level

Sr. No.	Landuse (860 acres - phase 1)	Area (acres)	Percentage
1	Industries SEZ	110	12.7
2	IT /services	180	21
3	Residential	172	20
4	Commercial	34.4	4
5	Public semi public	36.8	4.3
6	Utilities	25.8	3
7	Transportation	86	10
8	Green open spaces	215	25
	Total	**860**	**100**

Source: Analysis by Author

Fig. 7.1: Percentage breakup of landuse

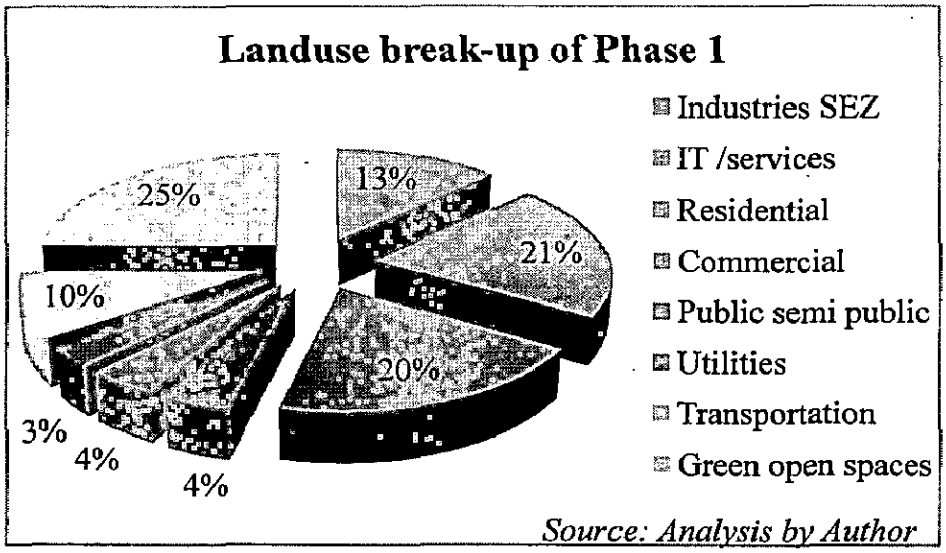


Table 7.6: Landuse area calculation

Sr. No.	Landuse (860 acres)	Business - 515 acres /60%		Residential - 345 acres/ 40%	
		Area (acres)	%	Area (acres)	%
1	Industries	110	21.35	0	0
2	IT services	180	35	0	0
3	Residential	0	0	172	49.85
4	Commercial	14.9	2.9	19.5	5.65
5	Public semi public	17.3	3.35	19.5	5.65
6	Utilities	15.5	3	10.3	3
7	Transportation	51.5	10	34.5	10
8	Green open spaces	125.8	24.4	89.2	25.85
	Total	***515***	***100***	***345***	***100***

Source: Analysis by Author

Fig. 7.2: Percentage break-up of Business Area

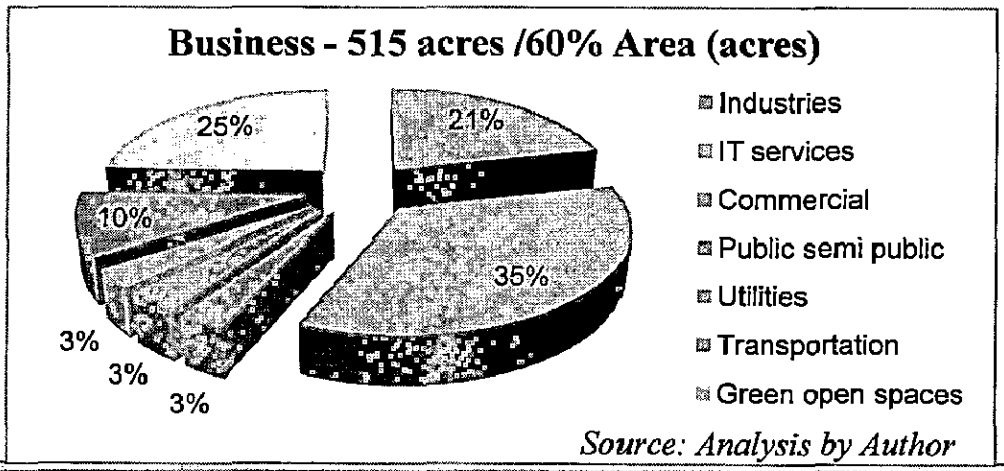
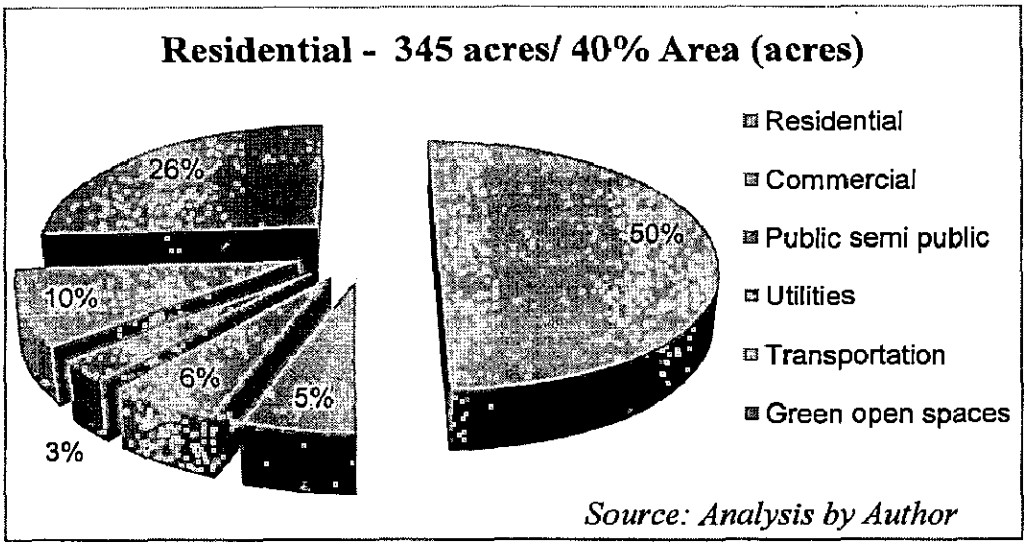


Fig. 7.3: Percentage breakup of Residential Area

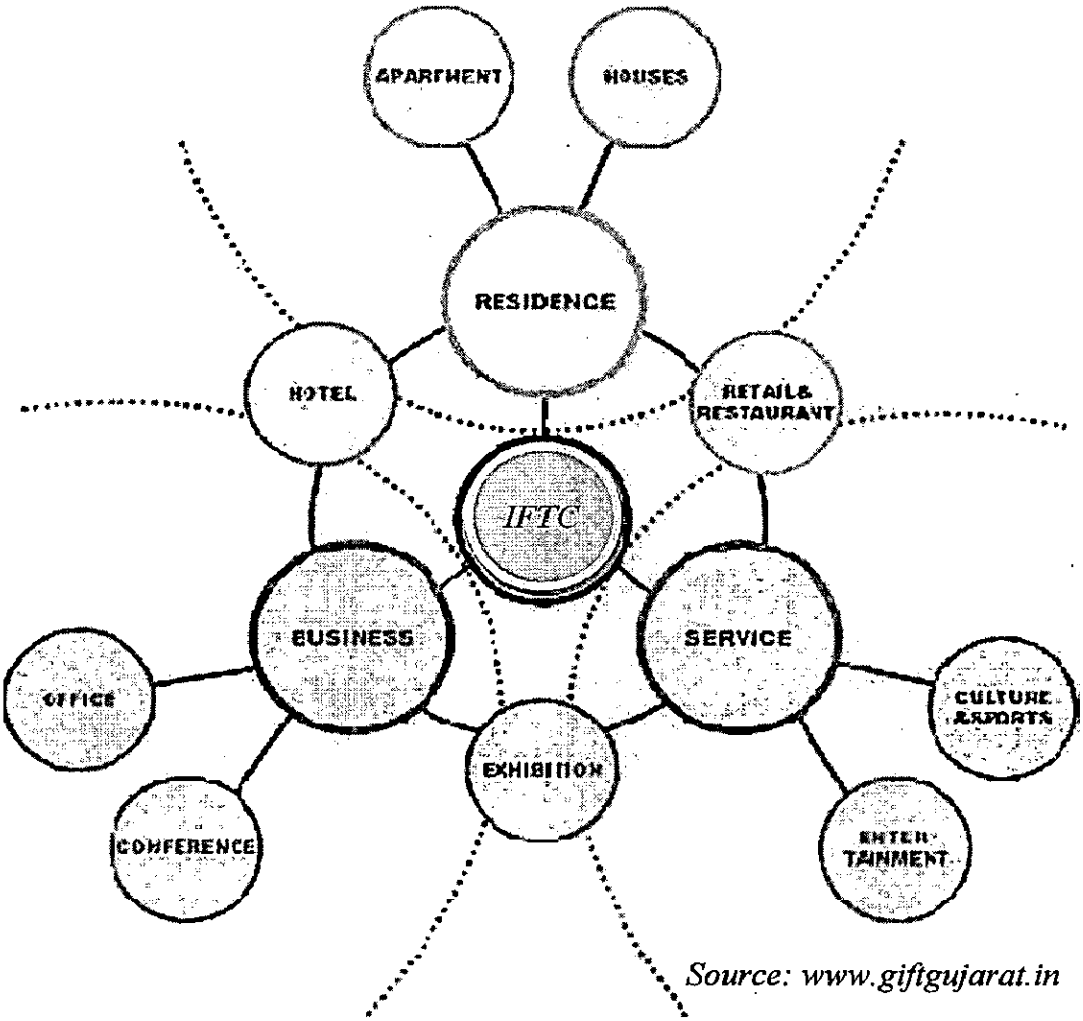


Three major zones are considered for landuse classification (as per the case study) shown in table 7.7.

1. Residential zone (344 acres - 40%) – includes public semipublic spaces, utility, commercial, open spaces and transportation
2. Business zone (516 acres - 60%) – includes industries, IT/ITeS services, commercial, public semipublic spaces, utilities, transportation and open spaces.
3. Services – as per required it is divided into the above two zone.

Business area consists of the economic driven unit of the IFTC, where tertriary industries constitute the major portion and primary and secondary constitute 21.3 % which is 110 acres. The tertiary industries are basically the services or consultancy services which includes IT/ ITeS services, Banking services, BPO, outsourcing firms, financial service and operation, capital market and trading, product market and financial service corporate center.

Plate 7.1: Integration of functions



Source: www.giftgujarat.in

Table 7.7: Business area calculation

Sr. No.	Business - 516 acres /60%		
		Area (acres)	Percentage
1	Industries	110	12.7
	Primary	5.5	5
	Secondary	8.47	7.7
2	Tertiary - IT services	180	21
	Financial services	16.2	9
	Media services	10.8	6
	Business services	27	15
	Educational services	21.6	12
	Health services	14.4	8
	IT/ITeS	90	50
	Total	***290***	***33.7***

Source: Analysis by Author

Fig. 7.4: Landuse Breakup for IT/ITeS

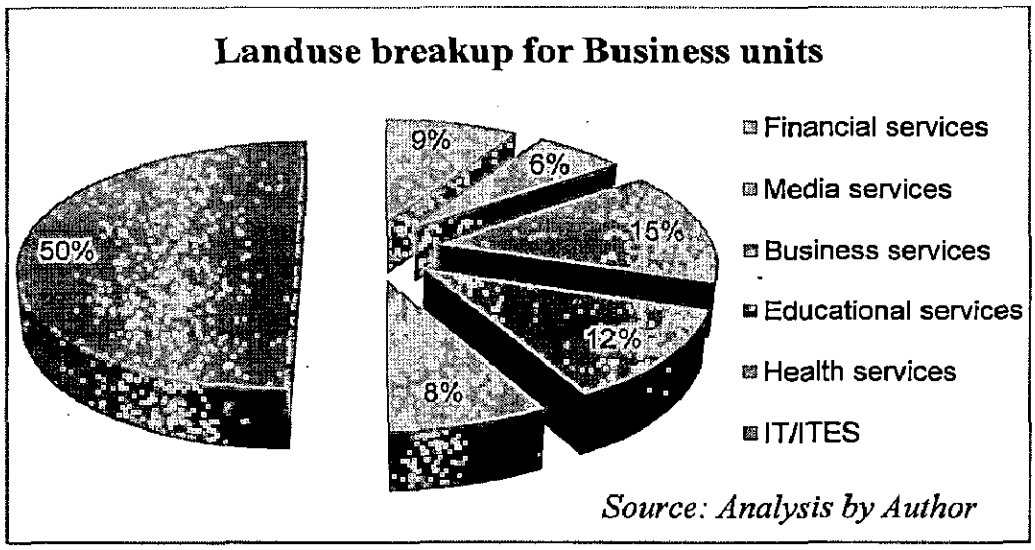
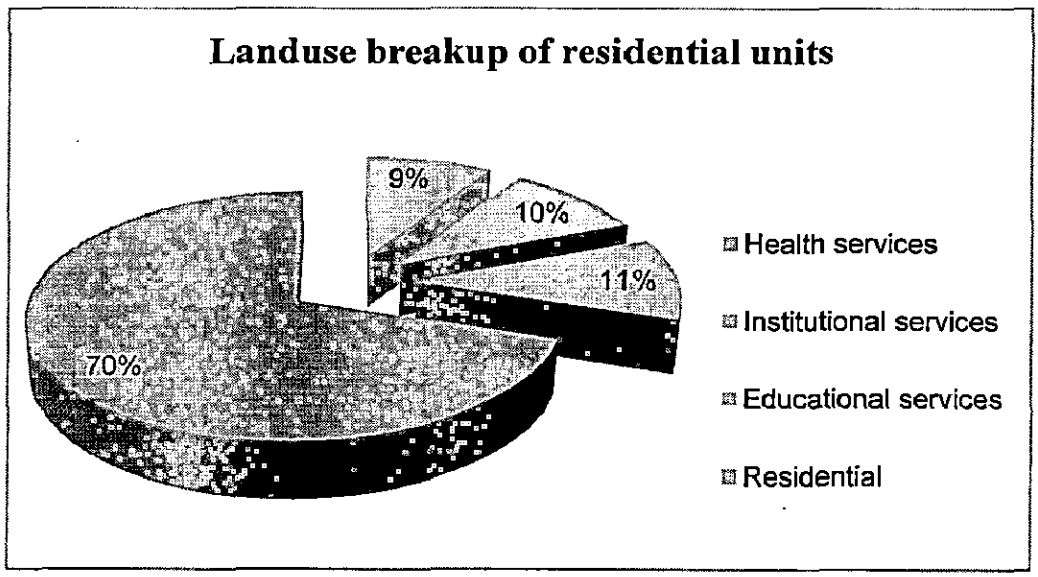


Table 7.8: Residential area calculation

Residential - 344 acres/ 40%		
	Percentage	**Area (acres)**
Health services	9	15.48
Institutional services	10	17.2
Educational services	11	18.92
Residential	70	120.4
Residential	**50**	**172**

Source: Analysis by Author

Fig. 7.5: Landuse Breakup for residential areas



Source: Analysis by Author

Table 7.9: Landuse breakup for Business units

Landuse breakup for business units - 515 acres					
Total area under Business units - 322.2 acre					
Sr. No.	**Landuse**	**Area (acres)**	**Percentage**	**Dividing area under roads green and utilities (acre)**	**Total area for calculation of FSI**
1	**Industries**	110.0	37.9	68.0	178.0
2	**IT/ ites**	90.0	31.0	55.6	145.6
3	**Health services**	14.4	5.0	9.0	23.4
4	**Education services**	21.6	7.5	13.4	35.0
5	**Business Services**	27.0	9.3	16.7	43.7
6	**Financial services**	16.2	5.6	10.0	26.2
7	**Media services**	10.8	3.7	6.6	17.4
		290.0	100.0	179.3	469.3
8	**IT/ services**	290.0	93.0	179.3	469.3
9	**Commercial**	17.3	2.0	3.9	21.2
10	**PSP**	14.9	5.0	9.6	24.5
	Total	322.2	100.0	192.8	515.0

Landuse breakup for business units - 515 acres						
Total area in road, green and open spaces in business area - 192.8 acre						
Landuse	**sq. m.**	**Percentage**	**FSI**	**Total built up area (mn. sq. m.)**	**Total employment**	**Density/ acre**
Industries	720183	34.6	Varies	1800456.68	80079.615	
IT/ ITeS	589174	28.3		1472936.00	65512.35	
Health services	94558.2	4.5		236395.39	10514.25	
Education services	141837	6.8		354593.08	15771.375	
Business Services	176752	8.5		441880.80	19653.705	
Financial services	106197	5.1		265491.29	11808.36	
Media services	70555.8	3.4		176389.51	7845.345	
	1899257	91.1		4748142.75	211185	450
IT/ services	1899273	91.1				
Commercial	85618.3	4.1		214045.83	9520.2	
PSP	99313.4	4.8		248283.45	11043	
Total	2084205	100.0	2.5	5210512.50	231750	450

Source: Analysis by Author

Table 7.10: Landuse breakup for Residential units

Landuse breakup for residential unit - 345 acres					
Total area under Residential units - 211 acres					
Sr. No.	**Landuse**	**Area (acres)**	**Percentage**	**Dividing area under roads green and utilities (acre)**	**Total area for calculation of FSI**
1	**Residential**	112.5	65.4	71.4	183.9
2	**Institutional**	17.0	9.9	10.8	27.8
3	**Health services**	17.0	9.9	10.8	27.8
4	**Education services**	25.5	14.8	16.2	41.7
		172.0	100.0	109.2	281.2
6	**Residential**	172.0	81.5	109.2	
7	**Commercial**	19.5	9.2	12.4	31.9
8	**PSP**	19.5	9.2	12.4	31.9
	Total	211.0	100.0	134.0	345.0

Landuse breakup for residential unit - 345 acres							
Total area under Residential units - 211 acres							
Sr. No.	**Landuse**	**sq. m.**	**%**	**FSI**	**Total built up area (million sq m)**	**Population**	**Density / acre**
1	**Residential**	744427	53.3	3.1	2307725.0	122681	
2	**Institutional**	112491	8.1		247480.8	6949.1	
3	**Health services**	112491	8.1		247480.8	6949.1	
4	**Education services**	168737	12.1		371221.1	10423.6	
		1138147	81.5		3173907.7	56246.4	
6	**Residential**	1138147	81.5		3173907.7	198384.8	250
7	**Commercial**	129034	9.2		283875.0		
8	**PSP**	129034	9.2		283875.0		
	Total	1396215	100	2.2	3741657.7	217310.7	

Source: Analysis by Author

Densities of institutional, health service, education, are as per the building byelaws of Vizag. For reference I have taken here 250/acre. Whereas the average density of residential area comes out to be 700/acre. The family size is considered as 4.5.

Table 7.11: Residential population calculation for IFTC Phase 1

Residential population calculation – 172 acres with 2307725 BUA					
	Percentage	Area (acre)	Area (sq. m.)	FSI	Built-up (sq. M.)
Plotted	15	25.8	104412.6	5.53	576931
Group housing	85	146.2	591671.4	2.93	1730794
	100	172	696084.0		2307725.0
Plotted housing					
	Percentage	Built-up (sq. m.)	Size of units in (sq. m.)	No. of units	Population
MIG	40	230772.4	210	1099	4945.5
HIG	60	346158.6	280	1236	5562
Total	100	576931		2335	10507.5
Group housing					
	Percentage	Built-up (sq. m.)	Size of units in (sq. m.)	No. of units	Population
LIG	45	778857.3		19405	87322.5
MIG	30	519238.2	160	3245.23875	14603.57438
HIG	25	432698.5	190	2277.360526	10248.12237
Total	100	1730794			112174.1967
EWS housing					
	Percentage	Built-up (sq. m.)	Size of units in (sq. m.)	No. of units	Population
EWS	20	346158.8	30	11538	51921
Social res. (studio apts)	25	432698.5	55	7867	35401.5
Total	45	778857.3		19405	87322.5

Total population covered in residential areas	**10507**	**112174**	**122681**

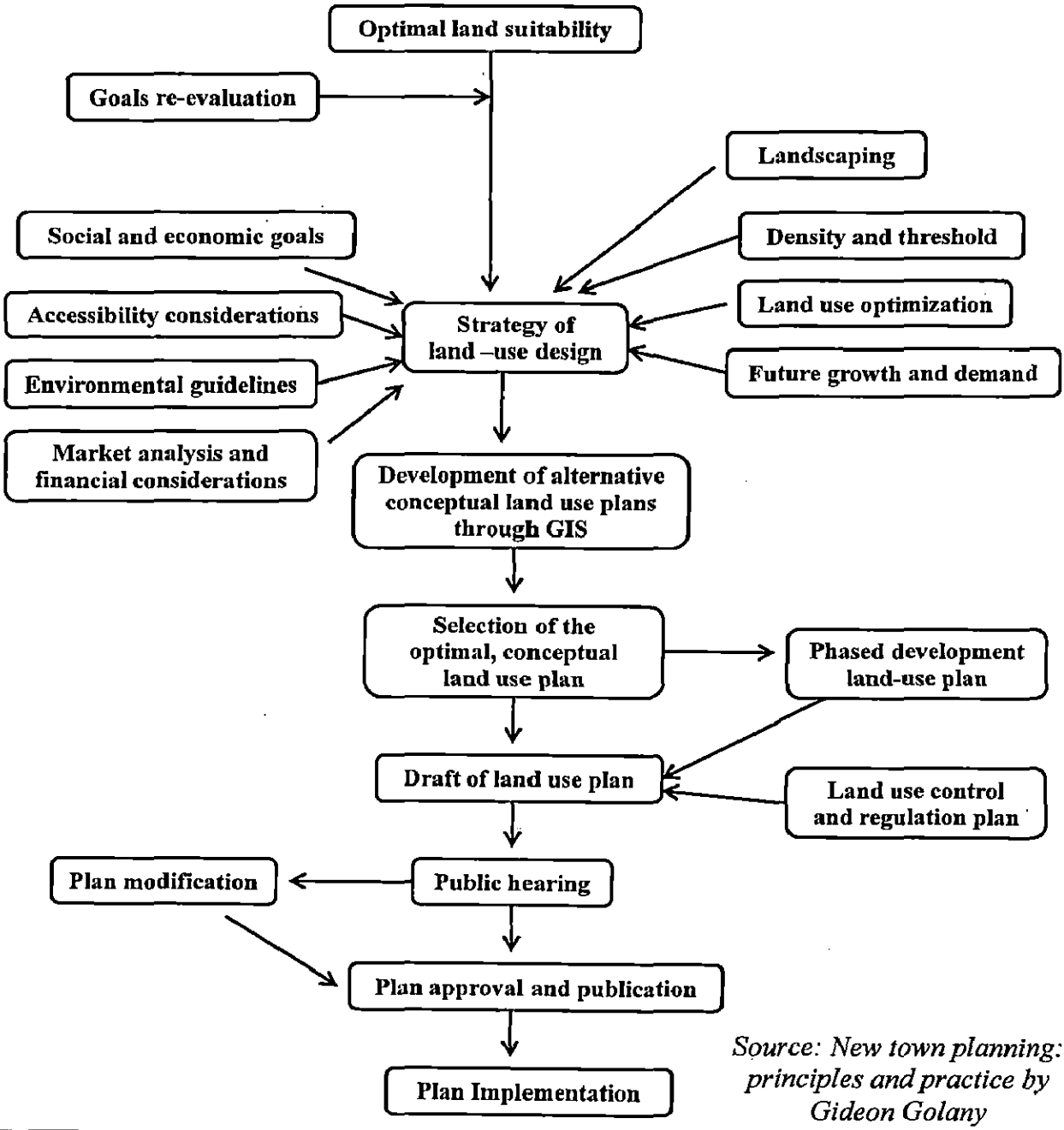
Source: Analysis by Author

7.4 Planning Approach

7.4.1 Land use Planning Methodology

Planning land use plan is a complex process; there are several major steps as shown in the fig 7.6. Land use planning encompasses both physical characteristics and constraints and socio-economic possibilities. In this chapter of planning approach, till strategies for land use plan will be covered.

Fig. 7.6: Generalized process of planning land use in IFTC



Source: New town planning: principles and practice by Gideon Golany

7.5 Strategy for land use Planning

Land use planning provides the prerequisites for achieving a sustainable form of land use which is acceptable as far as the social and environmental contexts are concerned and is desired by the society while making sound economic sense. An IFTC should have an advanced degree of self containment with a sound economic characterized by

1. A sufficient number of jobs provided for its residents
2. Diverse job opportunities and
3. A mixed economy that includes basic industries

It should also have an education system, a commercial network, social, cultural and recreational services for various age groups and local public utilities, services, and other required amenities for the whole community. For an IFTC such a model of patterns for urban land use are involved in which a city act as a unit of economic cells whose major function is transfer and trading of goods and products both within the city and to its region.

Land suitability map gives a brief idea about the potential of land for a particular land use. A land value map outcome of land suitability map as shown in Map 7.1 should index the value of various sections of a site for two categories.

1. Subjective value of topographical characteristics, and
2. Values of proximity

To do this, a city must operate its entire transportation network efficiently and establish an interrelated system of segregated land uses. In the process of land use planning, an optimal suitable site is selected. Goals are formed and re-evaluated which in case of IFTC the main focus concentrate on socioeconomic goals. The major routes for mapping out and dividing the site into blocks are identified which act as a dedicated freight corridors. The routes are identified to design major connector in order to know the area having higher land value or outcome with less investment for placing the business hub.

7.5.1 Environment guidelines & accessibility - Land Suitability Matrix

Land Suitability Matrix is a comprehensive chart, which determines the levels of inter-compatibility between urban land uses and the factors governing land suitability. This chart helps determine the best use of land, given its physical characteristics and limitations.

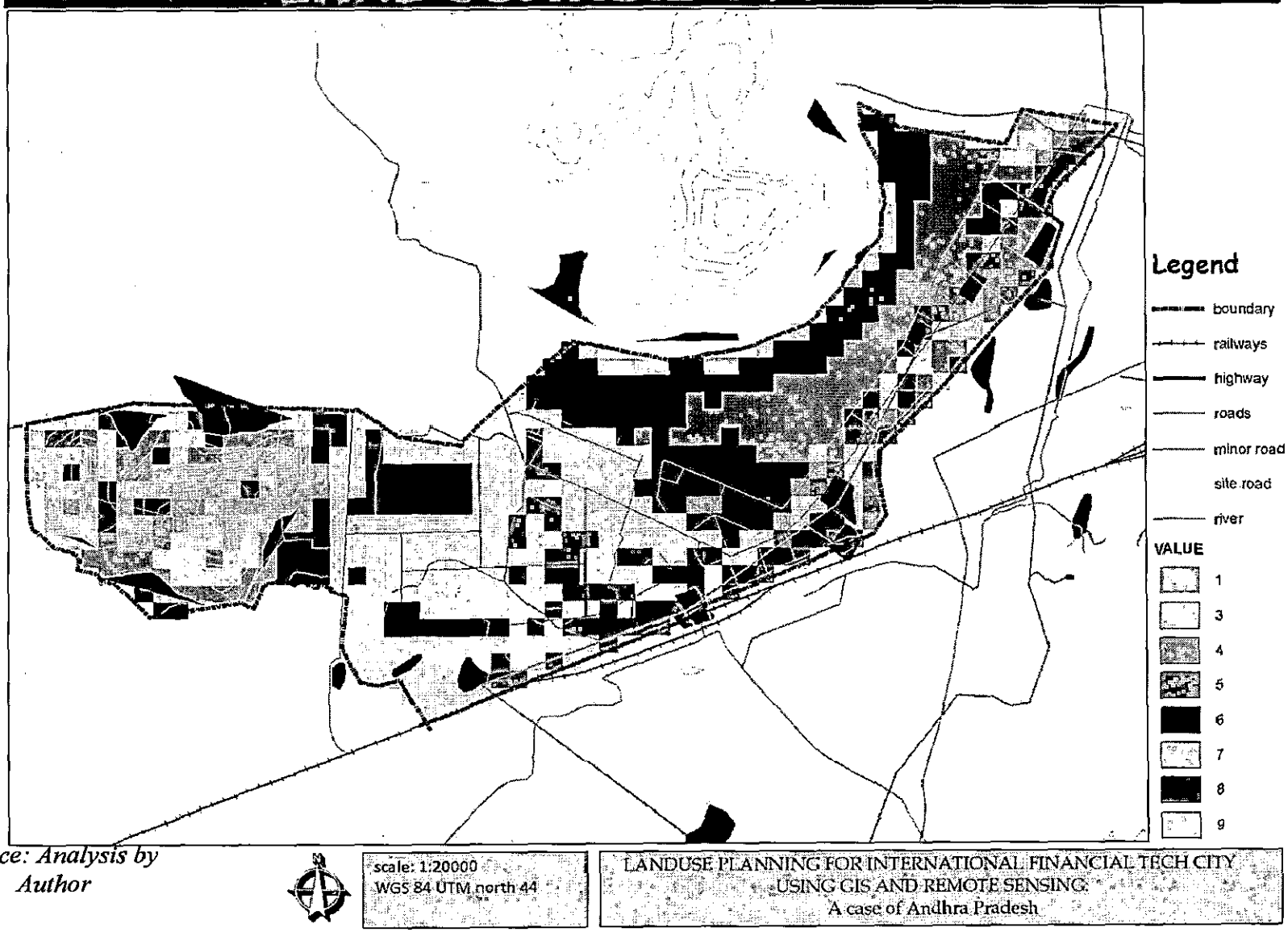
It establishes multiple compatible land uses within a given resource constraint, and conversely also identifies factors most suitable for development of a specific land use. All these factors are given weight on a scale of 1 to 10 whose subclasses are given value on a scale of 1 to 5. Integrating all these factors and calculating it the map obtained Land Suitability Matrix as shown in map 7.1 where highest value indicate area as a most feasible for all kind of development and land uses and lowest value indicate area with least chance of any kind of development.

For example, flat land is suitable for almost all land uses, moderate slopes and scattered vegetation is ideal for institutional uses. Similarly, recreational uses are suitable in areas near the river, while such land is not suitable for residential or industrial uses. Proximity to major roads is ideal for commercial and institutional uses, while it is not a critical issue for residential uses. Hence, it can be concluded that reference to the land use vs. land suitability matrix can be helpful while designing the future land use plan, considering the land suitability. Major work area is in the center and away from water bodies. Residential area is located near village settlement. Green or recreational area is located besides the ravine and near the water bodies. Area with moderate slopes and scattered vegetation is for institutional uses.

Land use optimization is done by the same method as explained above. Land use optimization is "the mechanism by which diverse market and financial elements can be integrated into a comprehensive model which is useful in analyzing and planning the development program". It uses the physical and aesthetic characteristics of land to maximize potential social and economic returns which are estimated by the method of rating regional cells, similar to subjective weight rating as discussed in chapter 5.

Map 7.1

LAND SUITABILITY MATRIX



Source: Analysis by Author

7.5.2 Accessibility considerations - Dedicated freight corridors

An IFTC requires a sufficient and sustainable network of trunk infrastructure in major priority as compare to other factors. However, since a large volume of goods will be flowing to and from the city at construction and working stage, the scale of such infrastructure requirements is much larger. There are different alternatives for handling such a requirement. One option is to develop dedicated freight corridors along the routes of large freight movement. This will include a corridor connecting the major hub nodes to the port nodes. The advantage of a dedicated freight corridor is that it allows the smooth, quick and timely flow of large volumes of freight.

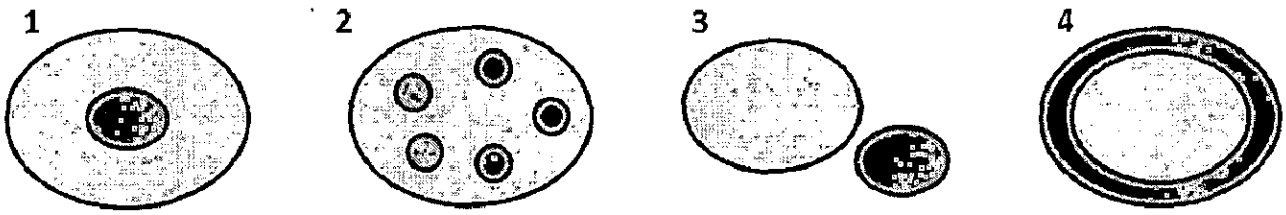
Since these corridors are dedicated only to freight movement, the flow does not get diluted with the slower and more erratic flow of urban traffic. But dedicated corridors are only viable along routes that have a large volume of flow. Often, it is the end points of these corridors that are the main contributing factors to the flow. These end points can be major production hubs, markets or ports. Moreover, the extent of the corridors should not be restricted to the boundaries of the IFTC as the viability of this city concept rests on its regional connectivity. For this strong networks of both road and rail are required. Rail connectivity is more preferred because rail transport emits lower air pollution compared to road transport and is cheaper too.

7.5.3 Social and Economic factors - Business/ IT hub location

In many aspects, the requirements of Business/ IT hub activities are in conflict with the general characteristics of the urban habitat. Its location is main concern to get a good benefit out of it for which the following conditions are required.

a. These activities require large land parcels at low price/rentals.
b. These areas need to be well connected to the main regional road and rail corridors, including connection to the main ports.

Plate 7.2: Business/ IT hub location alternatives



Sources: New town planning: principles and practice by Gideon

The darker shaded region represents the business area or IFS area and the lighter shaded region represents the rest of the city. Plate 7.2 shows four alternatives.

In the first two alternatives, the Business/ It hub services are located within the city, and the rest of the city revolves around these services which minimizes the average distance travelled by goods or workforce from the rest area of the city. But external (regional) freight will have to enter the city, even when they are not destined to this city. This will unnecessarily increases the traffic within the city, and create associated problems like congestion, air pollution etc. Moreover the closer an area is located to the centre of the city, the higher is its price and density. Both these factors are incongruous with the requirements of the hub activities. A third disadvantage is that for the viability of the hubs at a regional level, they need to be well-connected to the trunk infrastructure and ports, preferably through dedicated road/rail freight corridors.

In the third and fourth alternatives, the hub areas are located in the outskirts of the city, clustered together in the first case, and forming a ring around the other areas in the second. Both these alternatives neutralize the disadvantages of previous alternatives. The choice between the third and fourth alternative will be dependent upon the location of the city in the regional context. If the city is to be connected to many nodes scattered in different direction, then the fourth alternative may be preferable. On the other hand, if the city lies along a single main regional corridor, then the third alternative may be preferable, with the corridor passing through the hub service areas. This serves the economic factors and for social neighborhood concept is used.

7.5.4 Future growth, demand, density, threshold and economic activity

Area analysis is done as per 2020 condition. Future growth, demand, density and the threshold can be clear from the area analysis. Density consider in business area is 450/ acre and in residential as 200/acre. Threshold of resources are calculated when SEZ are studied in detail in Chapter 6. The demand of workers and type of economic activity are given below:

Table 7.12: Economic profile of an IFTC

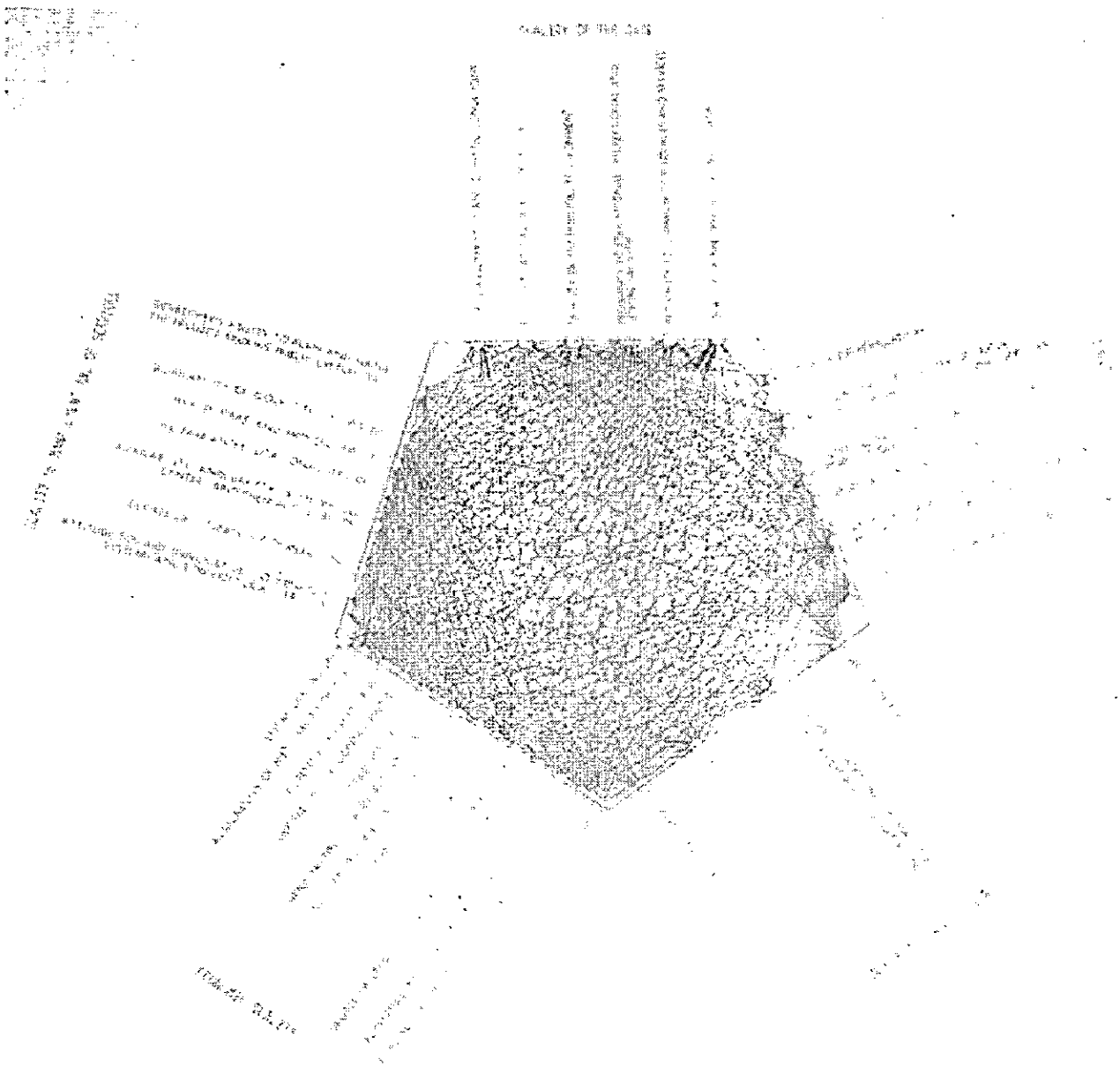
Occupation of workers	Types of economic activity
Professional like engineers , architects, planners, lawyers, teachers, surgeons, physicians, technicians, artists, etc.	Service like transportation, hospitality, ICT, recreational, auto and other repair, IT services, ITeS /BPO services, etc
Manager and administrators Salaried: manufacturing, retail trade and other industries Self employed: retail trade and others	Financial Services Operations and Financial Services Corporate Center like banks, trust companies, insurance, real estate, Admin, accounting, HR, etc
Sales workers	Public and community institutions
Clerical like secretaries, typists, book keepers, etc	Capital Market and Trading Includes DCM, ECM, M&A, Commodity trading, Private Equity, etc
Craftsmen, Foreman and Kindred workers	Retail Business
Operatives	Some Wholesale Business
Laborers	Manufacturing
Service Workers	Select Product Market like Private banking, banking, Product development, microfinance, etc.

Sources: Analysis by author

7.5.5 Interrelated factors supporting an IFTC

Plate 7.3 shows the various factors supporting the economy of a new IFTC. The interrelation of this factors helps to know how to frame land use for an IFTC. The basic five factors on which this relationship is studied are quality of the site, management, services, social, and economic and transportation efficiency.

Plate 7.3: Interrelated factors supporting an IFTC



Sources: New town planning: principles and practice by Gideon Golany

7.5.6 Conclusion

Lawrence Susskind has noted:"*what is important is not that a new community simply provide jobs but rather that it help to balance a region's economy by making it less subject to cyclical fluctuation, that it promise training and employment opportunities for those presently unemployed, and that it utilizes the construction of the community itself to promote job training and economic development.*" From the study, it is clear that an area of 1600 acre can be available for planning an IFTC near VSEZ in Vizag to cater the population of 211138.3 with job opportunities for 215305 people. The density and land use for a city is divided into two zones:

1. Business with 450/acre and consists of money earning land uses with some basic requirements of services, transportation and utility.
2. Densities of institutional, health service, education, are as per the building byelaws of Vizag here I have taken it as 250/acres. Whereas the average density of residential area comes out to be 700/acre. The family size is considered as 4.5.

In planning approach, certain basic criteria are discuss related to transportation network, business unit location, future growth, density, threshold, economic activity and its relationship which are analyzed by the land suitability matrix, land optimization, area analysis and DPR of VSEZ. The followings are the outcome of the study:

1. If LRTS are their no dedicated freight corridors are required.
2. For the location of IT hub / business unit on the periphery was the best option.
3. All the factors responsible for the land use planning are interconnected to each other which where site, social, economy, transportation network and services/ infrastructure.

There are four key requirements without which no center will attract international participation. These keys have to be considered while proposing a landuse plan for IFTC. The keys are:

1. Communications infrastructure, including solid and uninterrupted international links and modern IT capabilities.
2. Legal certainty through clear commitment to the rule of law, protection of property rights and efficient legal processes. Fiscal structures and policies must also be clear and predictable.
3. Fair treatment. Markets must be better regulated so that local insiders are unable to exploit their position. Standards of governance of corporations and institutions must ensure disclosure and the fair treatment of minority shareholders through adequate and consistent disclosure.
4. Availability of skills at all levels either locally or through the free admission of foreign staff.

Chapter 8. PROPOSALS AND RECOMMENDATIONS

8.1 Guidelines

The basic aim for IFTC is to develop a region which is globally competitive and sustains the local economy without compromising on equitable growth and ecological balance. For analysis, a state for developing an IFTC the factors or criteria required are explained in inferences of chapter 3 case studies. After the feasibility check is done for a proposing an IFTC in a state its land use planning can be workout by the following guidelines:

1. It should have strong national and international connectivity nearby.
2. It should have both domestic tariff area and special economic zone at an equal or comparative proportion.
3. It should have economic driven environment so the land use are arranged in that fashion which leads to high property cash gain or output. For eg. Commercial units near the main roads or residential near green area or near the water bodies sells at high capital.
4. It should facilitate a mix of uses and activities.
5. It should have an appropriate building height, scale and form to fulfill the requirement.
6. It should develop in such a way that services are available at each point with same frequency.
7. It should have more and more green areas which cannot be misused. So better to have green spaces in the center and should maintain regularly.
8. It should have sustainable environment and urban fabric.
9. It should have high technologies like intelligent transportation system, use of solar energy, reuse or recycling of waste things without creating any nuisance, etc are used in the entire city to improve its standard of living.
10. Able to make it free from pollution, public transportation, pedestrian and bicycle should be encouraged. Modal Split of 10:90 between private & public transport.
11. Able to have an attractive pricing strategy.

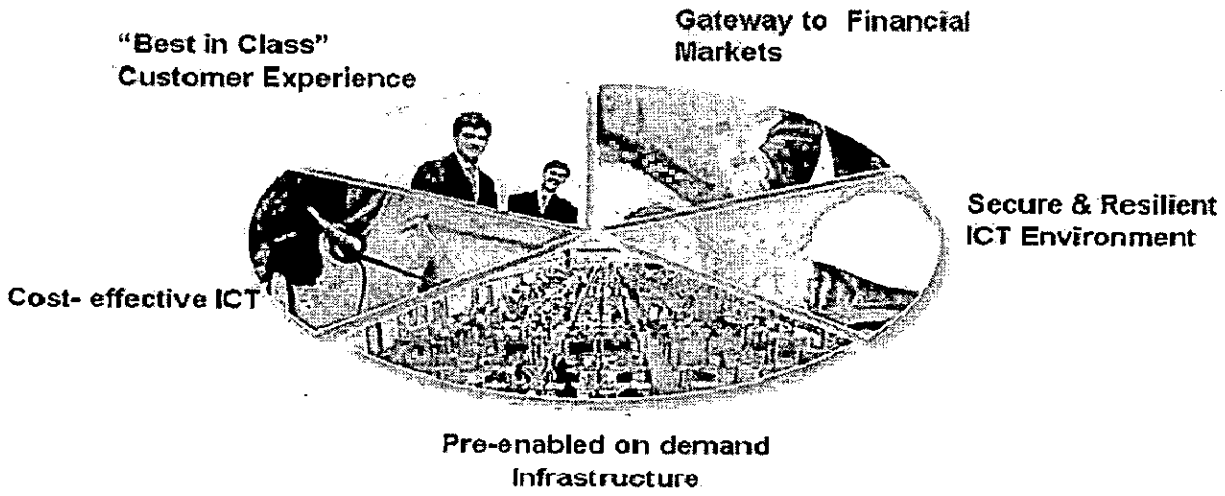
12. Act as centralized hub for mid and back office related activities for domestic financial services company.
13. Its design looks to create new build and open space paradigms for a diverse and highly creative workforce and user group.
14. Should have transit oriented development
15. Segregation of vehicular and pedestrian traffic.
16. Integrated development is required for,
    1. Residential Housing Projects: Well planned residential housing projects with walk-to-work layouts
    2. High Rise business district: Benchmark office high-rise district to be created with landmark buildings
    3. Social Infrastructure: Educational Institutes to be established. Privatized hospitals with infrastructure to be established.
    4. Overall Connectivity/ Transport: External Connectivity includes MRTS/BRTS/Roads and strong internal connectivity with new and high efficient technology.
    5. Retail cum entertainment hubs: High quality entertainment malls to be set up. Over 60% of the space is planned to be green
    6. Basic Infrastructure: Uninterrupted and highly reliable infrastructure.
    7. Technology: Broadband FTTP, WiFi/Wimax, Shared IT Services and Global Connectivity
17. International standards proposed for residential, educational and recreational facilities.

The factors recommended for planning an IFTC but not for land use plan, are:

1. Attractive sustainable local economy
2. Low cost and efficient communication and information system
3. Strong commitment by Federal and state Governments to promoting International Financial Centre
4. A multilingual professional financial services workforce that can flexibly respond to changing business conditions and independently add value to services;
5. Political and economic stability;

6. Competitive cost, including general living expenses, commercial rents and a high quality social infrastructure;
7. A strong, stable and transparent legal and regulatory system; and
8. Strengthen domestic financial markets;
9. Enhance integration with external financial markets;
10. Build International Financial Centre dealing with full set of financial service products including capital markets and trading.
11. Development and system support center for IT players with a significant presence in financial services sector.
12. Preferred off-shoring location for global financial services players.
13. Preferred R&D hub for industry.
14. Concept of zero discharge energy and modular design.
15. Integrated underground services
16. High standard of ICT services.
17. Study of talent development road map.
18. All utilities /services to be controlled and coordinated.
19. Encourage public private partnership
20. Create leading-edge infrastructure, services and platforms and offer financial services enterprises a significant competitive advantage to operate regionally and globally through below 6 factors:

Plate 8.1: ICT Vision and Value Proposition



Source: www.giftgujarat.in

These are followed by the design 'responses' which reinforce them. As the design of the whole project is intended to lend an international character to the city and project it on world map, the design of all the buildings is proposed to have a global expression providing satisfactory sensory experience for both user and passerby that is hallmark of good design. The emphasis has been laid on long term flexibility, by focusing the identity making components of the concept to the external form, while maintaining an interior that is clear, flexible & adaptable to evolving needs.

8.2 Land use planning

8.2.1 Basic concepts

Land use plan is basically a physical planning which can be described in form, structure, aesthetic, skylines, zoning and network. Urban forms are workout by requirement of the urban experience, skylines and aesthetic. Fig 8.1 shows the urban form and skylines on the basis of height and FSI through density level for various activities or urban experiences.

Fig. 8.1: Vision for Urban form

Source: By Author

The structure of city depends on the function for which a city evolved as shown in fig 8.2.

STRUCTURE	⟷	FUNCTION
Fractal		smart growth
Chaos		intelligent urbanism

The four basic factors which affect the planning of IFTC are as follows:

1. **Acting as a magnet:** for which infrastructure, economy, investments, institutions, jobs and quality of life should be improved using high technology.
2. **City for the people:** for which concerns should be given on health, time, right & facilities and recreation & tourism.
3. **Interdependent city:** for which a city should have good quality of infrastructure & sources, services, inter & intra connectivity and should act as a catalyst of development.
4. **Minimal footprint in term of ground coverage:** Covers
    1. Responsive to water body and natural features (green area)
    2. Enrich site with water and vegetation
    3. Rehabilitate the animals dependent on site

RATIONALE:

To provide an alternative to urban sprawl, traffic congestion, disconnected neighborhoods and urban decay in terms of ecology, its principles challenge, old assumptions in urban planning, such as the value of detached houses and automobile use.

Principles:

1. Environment protection: - promoting smart growth by advocating urban growth boundaries, or green belts, respecting natural view and vistas.
2. Opportunity matrix: - variety of opportunities for enhanced employment, living condition, education and recreations.
3. Public health: - hierarchy of green spaces, advocating mass transit systems, discouraging the use of private vehicles which can improve the quality of life and encourage a healthier, pedestrian based lifestyle with less pollution.
4. Social access and pace making:- adequate public spaces and services, adopting various transportation typologies, giving identity to the spaces, developing public domain with people friendly walkways.
5. Compact neighborhoods: - It attracts more people and business. It includes mixed-use development, inclusion of affordable housing, restrictions or

limitations on suburban design forms like detached houses on individual lots, strip malls, and surface parking lots, and inclusion of parks and recreation areas.

6. Pedestrian and bicycle friendly design: - introducing urban bike land system, bike parking and pedestrian crossings.
7. Transit oriented development: - maximize access to public transport throughout the plan, introducing commercial parking taxes and road pricing system.
8. Policy tools: -
   Zoning ordinance - local zoning laws, phase wise zoning, plotted development
   Environmental impact assessments

The three major things considered while giving a proposal for IFTC are,.

1. Major transportation axis towards the site
2. Location of IFC on spine and its importance
3. Various opportunities as means of travel

8.2.2 Alternative conceptual plan through GIS

After fixing the size of the city, the next step for land use planning is designing a layout for the connectivity or road pattern. For which there are many examples given by the scholars in past like radial, grid-iron, circular, branch, etc. Here 3 options for landuse plan for the site of an IFTC are given.

Map 8.1 shows the first option for landuse plan for the site of an IFTC in which the radial with circular pattern are used for transportation network. City roads are running in the center of the site connecting to the state highway and major roads exist or planned at the edge of the proposed site. The central spine and the edge road are then connected with radial roads give a number of spaces or block for allocating the land uses. In this landuse plan, commercial and mixed land uses are segregated. Commercial are located in south and in SEZ areas in the canal whereas mixed land use are located in north towards the forest and agricultural area. These spines can be used for any mode of transportation and services. Public and semi public is assembled in the central of the site. Urban green spaces are distributed equally to mixed area and commercial area either in center or at the end of the

site which will be used for recreational area. At the end of the site the agricultural area and open spaces or unbuildable land are given which define the edge of the city.

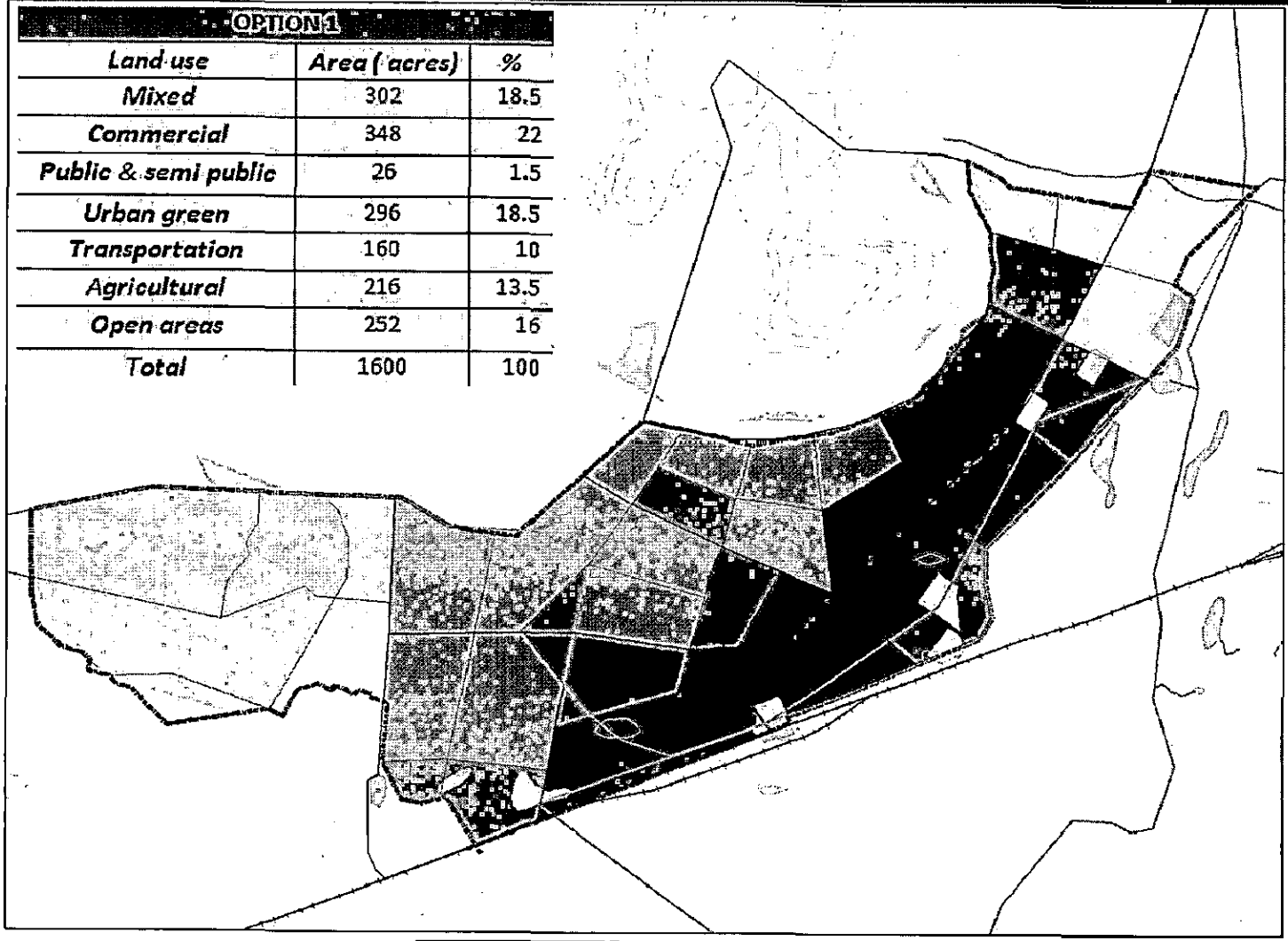
Map 8.2 shows the second option in which the roads proposed are just alteration of the existing roads. City roads are same as the main road of that area connecting to the state highway and major roads are planned as per the existing minor road. The minor roads are copy of street. The spaces comes out of such road network are allocated to some classes of land use. In this proposal commercial are placed along the central spine, more in SEZ area and less towards DTA whereas mixed land use is placed on the central area away from the main spine. Public and semi public is assembled in the central of the site connecting the main spine. Urban green spaces are distributed on the site near the water body and extended Riwada canal. At the end of the site same agricultural area and open spaces are given.

Map 8.4 shows the third option which is the final one having grid-iron pattern for transportation. This option is explain in detail in next section along with a reason to be chosen as final one for the site.

Map 8.1

LAND USE PLAN - OPTION 1

OPTION 1		
Land use	*Area (acres)*	*%*
Mixed	302	18.5
Commercial	348	22
Public & semi public	26	1.5
Urban green	296	18.5
Transportation	160	10
Agricultural	216	13.5
Open areas	252	16
Total	1600	100



Source: Analysis by Author

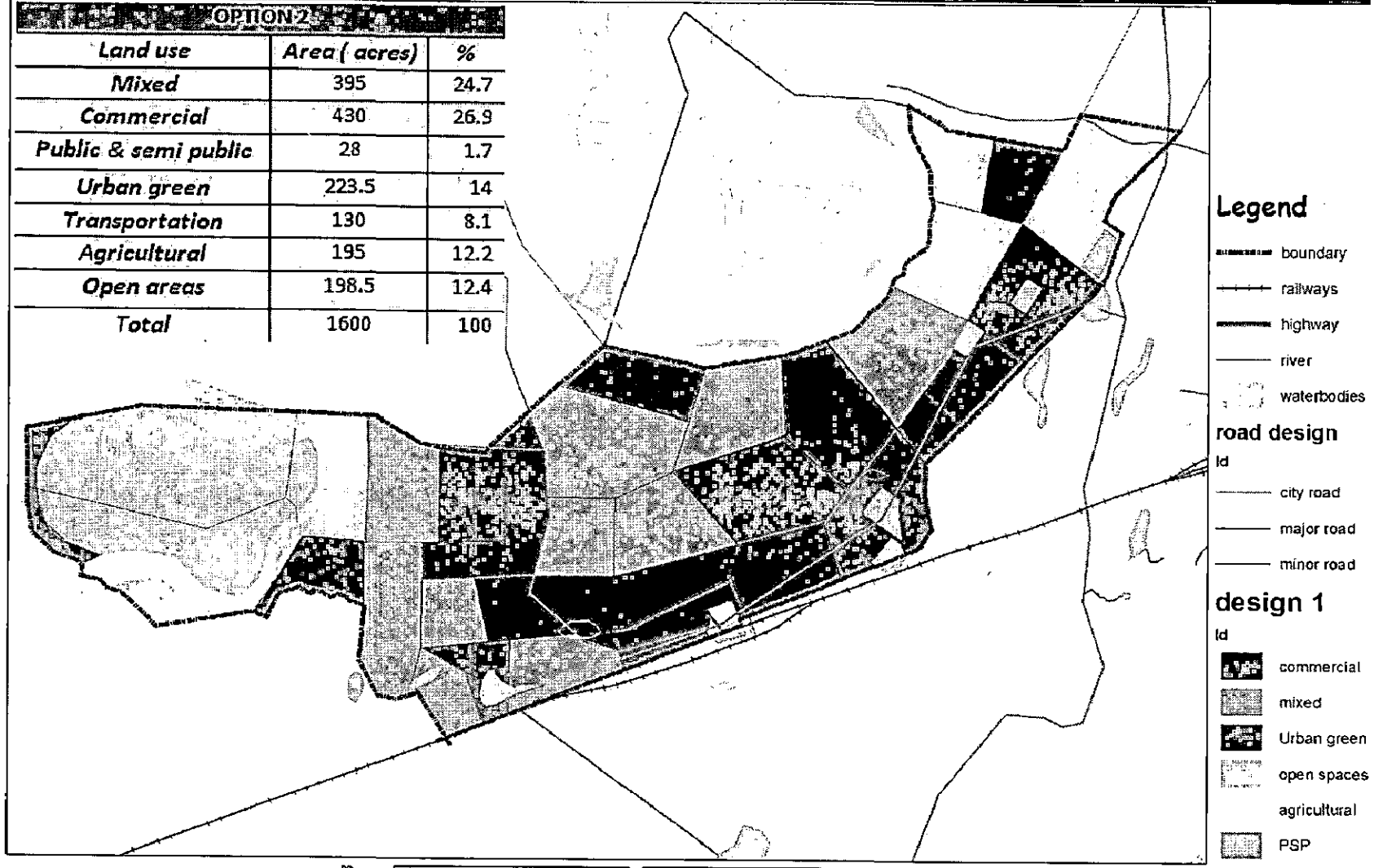
scale: 1:12000
WGS 84 UTM north 44

LANDUSE PLANNING FOR INTERNATIONAL FINANCIAL TECH CITY USING GIS AND REMOTE SENSING:
A case of Andhra Pradesh

Map 8.2 Final Plan LAND USE PLAN - OPTION 2

OPTION 2

Land use	Area (acres)	%
Mixed	395	24.7
Commercial	430	26.9
Public & semi public	28	1.7
Urban green	223.5	14
Transportation	130	8.1
Agricultural	195	12.2
Open areas	198.5	12.4
Total	1600	100



Source: by Author

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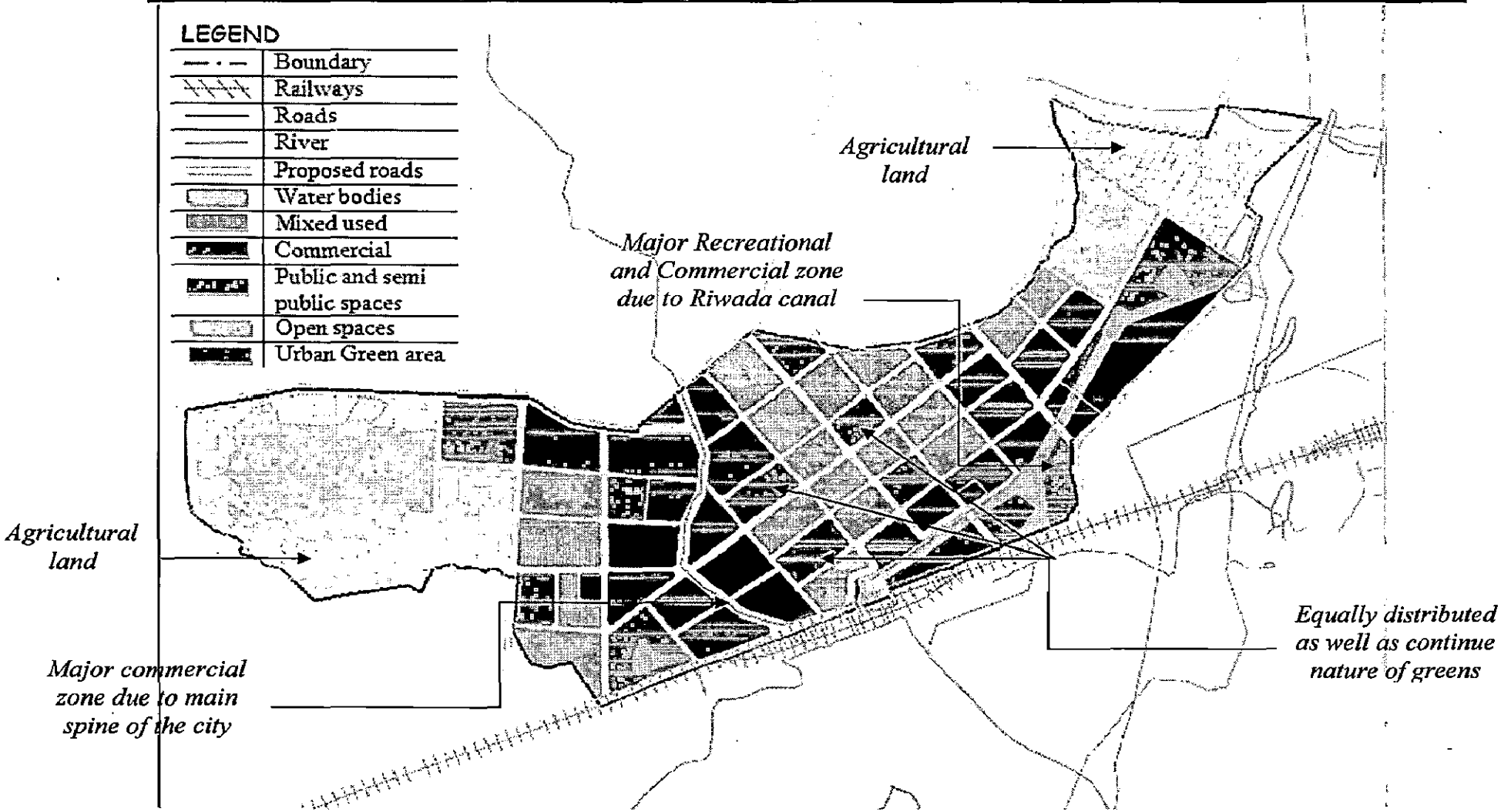
LANDUSE PLANNING FOR INTERNATIONAL FINANCIAL TECH CITY USING GIS AND REMOTE SENSING: A case of Andhra Pradesh

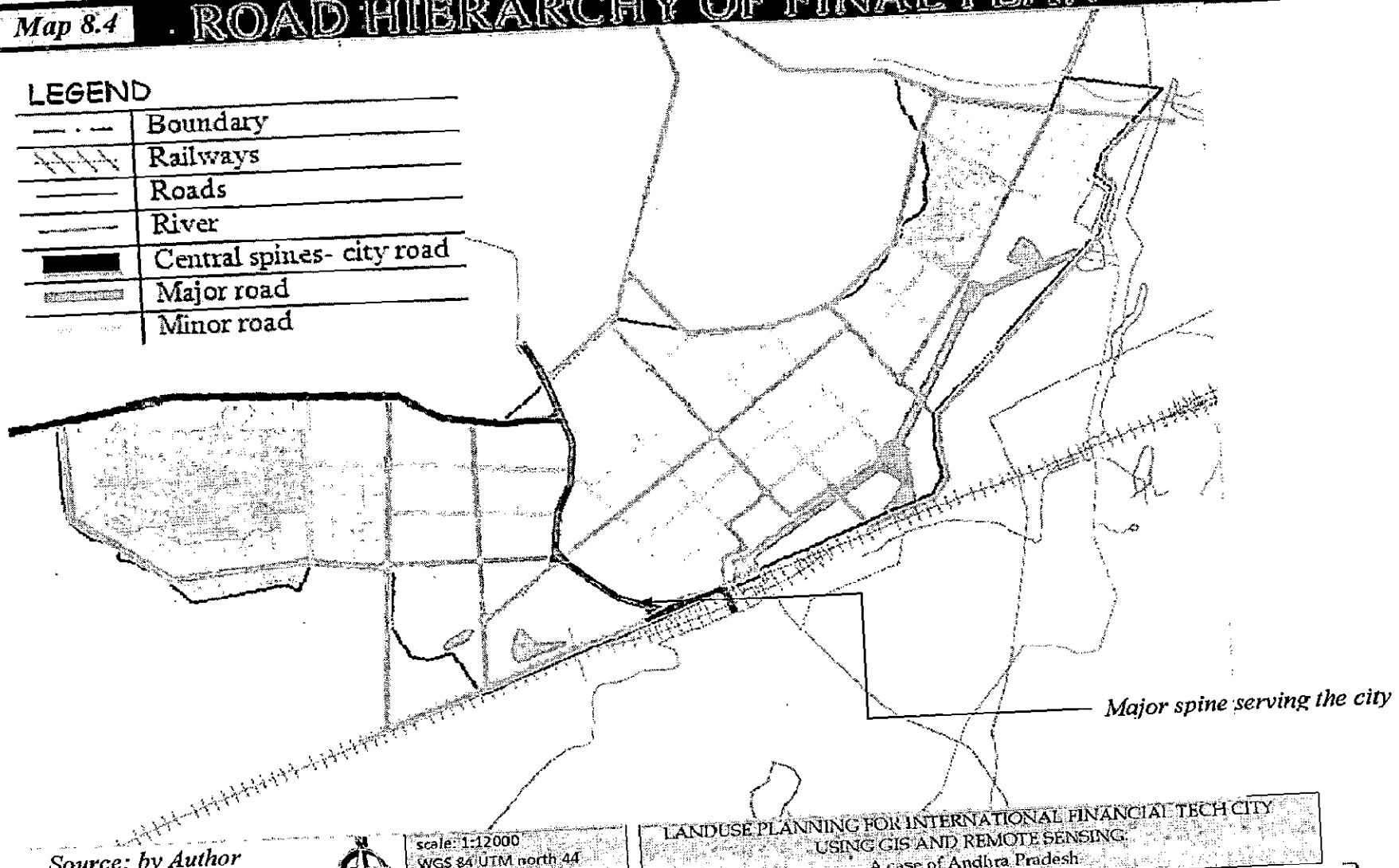
Map 8.3

LAND USE PLAN - OPTION 3



Source: by Author

Map 8.4 . ROAD HIERARCHY OF FINAL PLAN



Source: by Author

scale: 1:12000
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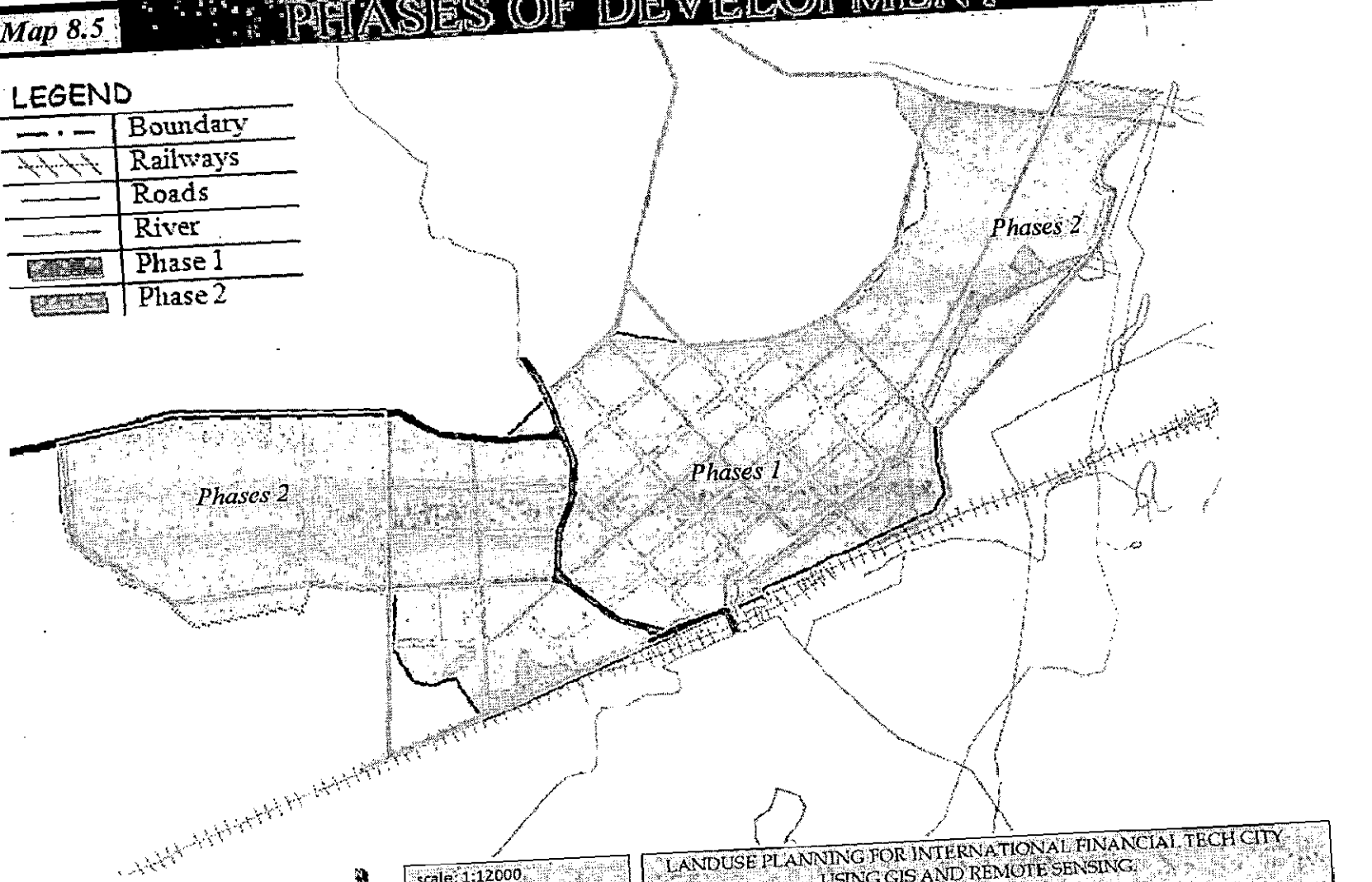
LANDUSE PLANNING FOR INTERNATIONAL FINANCIAL TECH CITY USING GIS AND REMOTE SENSING: A case of Andhra Pradesh

Map 8.5 PHASES OF DEVELOPMENT



Source: by Author

8.2.3 Final plan and discussion

To start with, the site was divided into phases for development as per the land use and earning gain from it for further construction. With reference to existing road, a grid-iron pattern is laid on the whole site with three major parallel spines on one side and two on the other site of the central spine connecting to the state highway. The central one is the major road connecting the site from other cities or major growth centers too. Two connectors are running in whole site through which perpendicular branches are formed giving a grid-iron pattern as shown in map 8.4. Metro are planned on this spine. Duvvada station will be renovated and metro line will be connected to it. Two major transportation hubs are given at the junction of the corridor. Regional connectivity is expected to through metro lines, bus route and railroad. Metro connection will be provided with the domestic airport and port. As per the road layout and other studies phases and land use are planned as shown in map 8.5 and map 8.3 respectively.

Table 8.1: Landuse break up of phase 1

Land use	Area (acres)	Percentage
Mixed	258	30
Commercial	275.2	32
Public & semi public	11.18	1.3
Open areas	208.12	24.2
Transportation	107.5	12.5
Total	860	100

The first phase covers 30% mixed and 32% commercial as shown in table 8.1 which are constructed to earn more capital to use for the next phase development and serve the concept of IFTC. The 2nd phase consists of agricultural land on co-operative basis where farmers are employed and given land to work, stay and feed their cattle. Their cultivation will be only for the residence of IFTC. Rest of land use break-up for phase 2 is shown in the table 8.2.

Table 8.2: Landuse break up of phase 2

Phase 2	Area (acres)	Percentage
Mixed	22.75	3.1
Commercial	60	8.1
Public & semi public	7.86	1.1
Open areas	89.72	12.1
Transportation	125	16.9
Agricultural	215.37	29.1
Non buildable green spaces	219.3	29.6
Total	740	100

Source: By Author

The proposed landuse plan (Refer Map 8.3) exhibits a balanced of mixed, commercial and open spaces. In

this proposal a mixture of 2nd and 4th option for location of IT/ Business units is used.

The 60 % industrial area will be located at the northeast in SEZ connected with the major routes. 40% will be along the major transport cut of the site which will be basically allocated to the IT/ITeS services.

The area statement, as seen in the proposed landuse plan, gives distribution of the individual land uses. A comparison with the existing landuse area statement reveals an increase in mixed use, residential and urban green areas from the vacant and unused land as shown in table 8.2. While the forest areas are completely preserved, the green spaces have been divided into two parts – urban green areas and Recreational area. Urban green areas are identified as areas with recreational and sports activities, pedestrian trails, river walks, etc. Open spaces are defined as those areas that may be maintained, public or quasi-public green areas, like gardens, parks, playgrounds, etc with no permanent build structure. The addition of recreational club, sports complex, library, museum, etc is aimed to enhance the overall quality of life of the residents is included in public and semi public spaces PSP. A canal is introduced into the site to have a good fresh environment and to enhance the beautification of the site as there is no river available on the site.

Table 8.3: Distribution of proposed landuse from existing ones

Phase 1	Area (acre)	Water bodies	Urban area	Uncultivated	Vacant	Forest	Total
Industries SEZ	110		28.6	46	35.4		110
IT /services	180		7	108	64.82		180
Residential	172		18	74	80		172
Commercial	34.4		5	17	12.4		34.4
Public semi public	36.8		1.5	25.5	9.98		36.8
Utilities	25.8		2.5	10.5	12.8		25.8
Transportation	86		7	34	45		86
Green open spaces	215	13		70	52	80	215
Total	**860**	13	69.6	385	312.4	80	860
Phase 2		0	10	95	561	74	740

Source: By Author

Table 8.4: Development stage and area available

Development stage	Buildable	Nonbuildable	Total
Phase 1	790	70	860
Phase 2	530	210	740
Total	1320	280	1600

Source: By Author

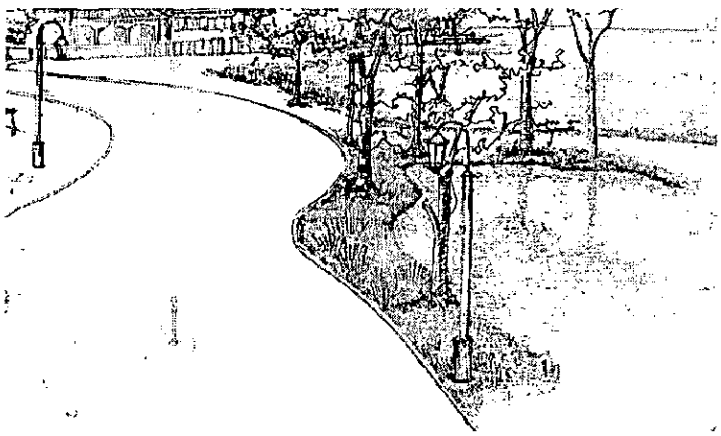
This plan is more feasible as compared to other two plans because of its grid-iron connectivity pattern which always prove to be a better layout. Moreover, in this layout, less alteration of the road has to be done. Each land use gets the benefit of natural factors and connectivity. Urban green areas are equally divided placed in center and near water body to serve each and every area. Public and semi public spaces are located in such a way that it is easily approachable are at equal distance from any corner of the site.

The proposed landuse plan clearly indicates the importance of open, green space network, with sufficient buffering between land uses. It brings out the character of an urban, hilly town, developed along a river valley and protected naturally by the surrounding hills.

City Centre Area: The attempt is to develop the urban core as the City Center, with retail commercial uses such as IT hub; BPO services units, ITeS, other offices, banks, tourist center, hotels, restaurants, and coffee shops along side with recreational, open spaces and sports uses. The vibrant and dynamic city center is surrounded with a belt of mixed use and urban green spaces. This central zone caters for the regional needs.

Fig. 8.2: Vision of street near Riwada canal

A smaller strength of major road to the north east in SEZ which is developed with commercial uses caters to international needs. This road also contains the bus terminal, the tourist center, the district library, art gallery, a dharamshala and a hotel in mixed and public & semi public areas.



Source: By Author

The 9-meter road along the canal edge in urban green area has a large, pedestrian path (see fig. 8.2) that is developed with a jogging

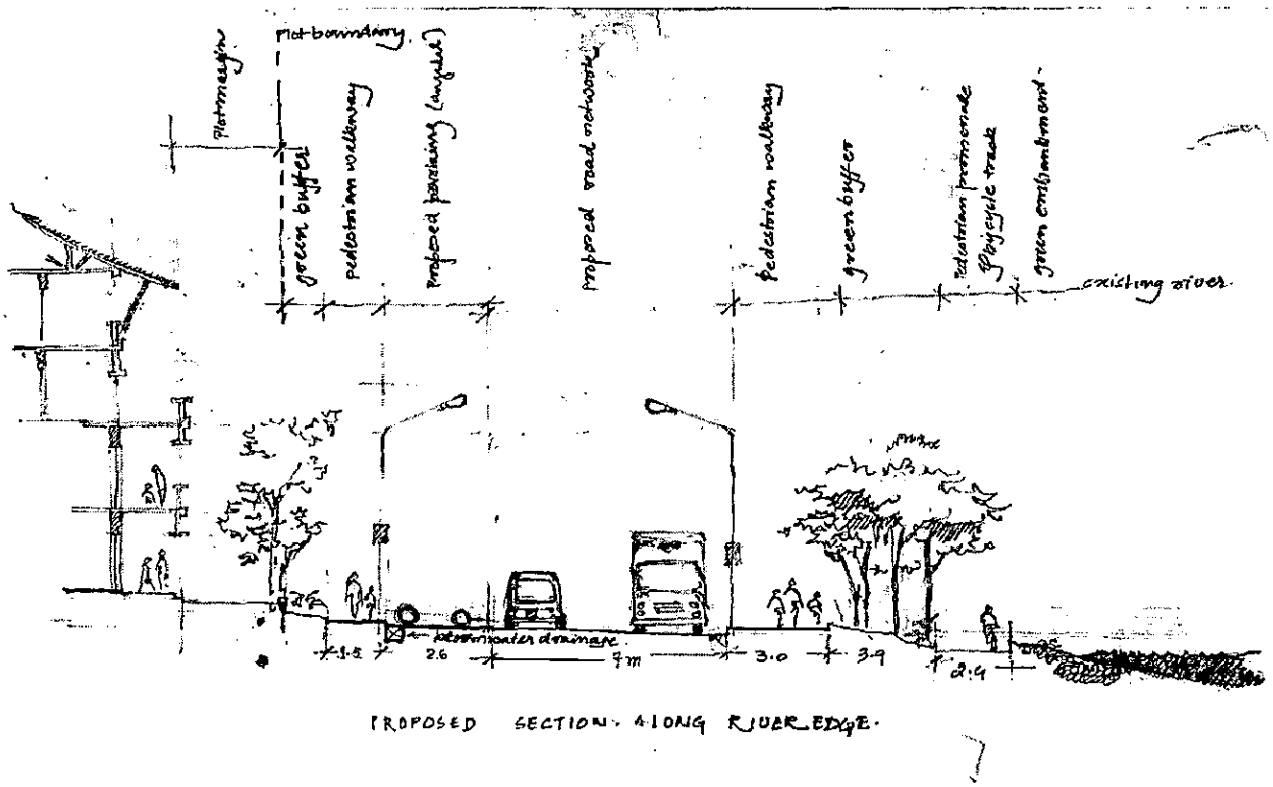
area or as an evening walk to maximize on the views of the canal and provide a unique experience of walking along the canal edge.

This place has the potential to open up into plazas at intervals, where people may gather on occasions. For example, the plazas may be used to form weekend market places, informal festival stalls, special exhibit areas, and similar such lively urban places.

In addition to this, there is also a pedestrian and bicycle trail (see fig. 8.3) along the river, where users may take morning walks and enjoy the river and mountains, without being disturbed by vehicular traffic.

This trail can also be interspersed with seating benches and small gathering areas at intervals, with kiosks and information about the local flora and fauna, ecological systems, and local history.

Fig. 8.3: Vision of road near Riwada canal



Source: By Author

Location of commercial and mixed Use Area: Commercial areas are the major land use integrated into the city center area or urban core of the city running parallel to the main spines, while others are proposed to be incorporated into the SEZ towards northeast

end. The mixed use areas are spread in pockets at various locations in the town such that they ensure availability of basic services and commercial needs throughout the city.

The attempt is to develop IFTC as a regional commercial node, with trade links to Andhra Pradesh as well as India. The new transportation hub, developed in the second phase in urban green spaces in Talarivani Palem to streamline this exchange of goods and develop the city as a regional logistics hub.

The proposed mixed use areas form a ring around the sports complex and open green areas, providing the required services and retail needs. Local and regional festivals are celebrated.

The mixed areas are envisaged to be 15 storey high buildings, with 2 - 3 floors of commercial use and residential uses above. Restaurants, hotels and dharamshalas are also anticipated to develop in these areas. The commercial area are planned to have high rise or skyscrapers with new technology in order to enrich the quality of the life of the residents.

Based on the population projections, it is anticipated that the IFTC will need 86.72 acres of land for social facilities and civic amenities to be able to better serve the residents. These areas are divided and incorporated in mixed and commercial land use. The neighbourhood centers are proposed to house primary and nursery schools, as required, as also convenience shopping, based on the local neighbourhood needs. The residential and neighbourhood centers will also have small religious buildings like prayer wheels. The sports complex with stadium like seating pavilion, and recreation club form a chunk of recreational amenities. The plan also includes social and civic amenities like the central district library, art gallery, sports complex, dharamshala, etc in public and semi public spaces. Other amenities like banks, communication centers, etc will form a part of mixed use areas. Residential and Commercial land use in mixed zone and high end commerce in the commercial area. Land use plan of one of the block of mixed use zone are shown below in detail.

Creating variety within the Block A and reinforcing two key factors;

- Achieving appropriate orientation and solar access;
- Achieving high quality built form and urban design.

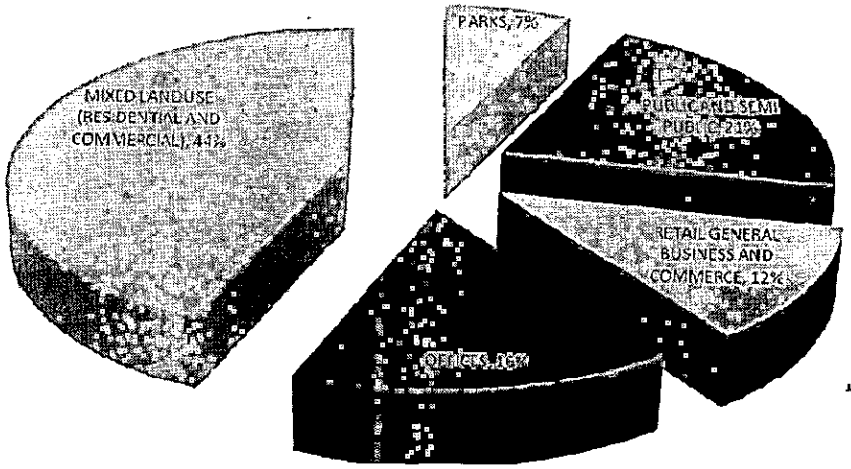
Neighbourhood Centre / Residential Areas: The residential areas are a part of mixed used block. The residential areas are developed more as neighbourhood nodes, with medium density housing, supported with local amenities and shopping facilities. They serve as self-sufficient units, meeting the daily needs of the residents.

Fig. 8.6: Vision of Neighborhood streets

Source: By Author

The neighbourhood center to the south and north is located at a scenic point as Riwada canal and Narava forest are there. The internal roads can be developed with pedestrian footpaths and can be developed as viewing platforms as shown in fig 8.4. Residential areas in phase 2 within the central areas near Narava forest mostly cater to institutional housing needs or studio apartments. It is proposed that the new neighbourhood centers be developed with a component of affordable housing. This can be easily integrated with mid to high-density residential development. Co-op housing and other such alternatives are a fairly popular way of providing such housing facilities, and they have found to work well when located along with apartment type residential buildings. The proposed neighbourhood center on the south side can be designed with large plots and co-operative housing, along with some convenience shopping and local amenities to meet the demands of the residents for affordable housing.

Fig. 8.5: Landuse break up of block A



Source: By Author

Table 8.5: Area statement of block A

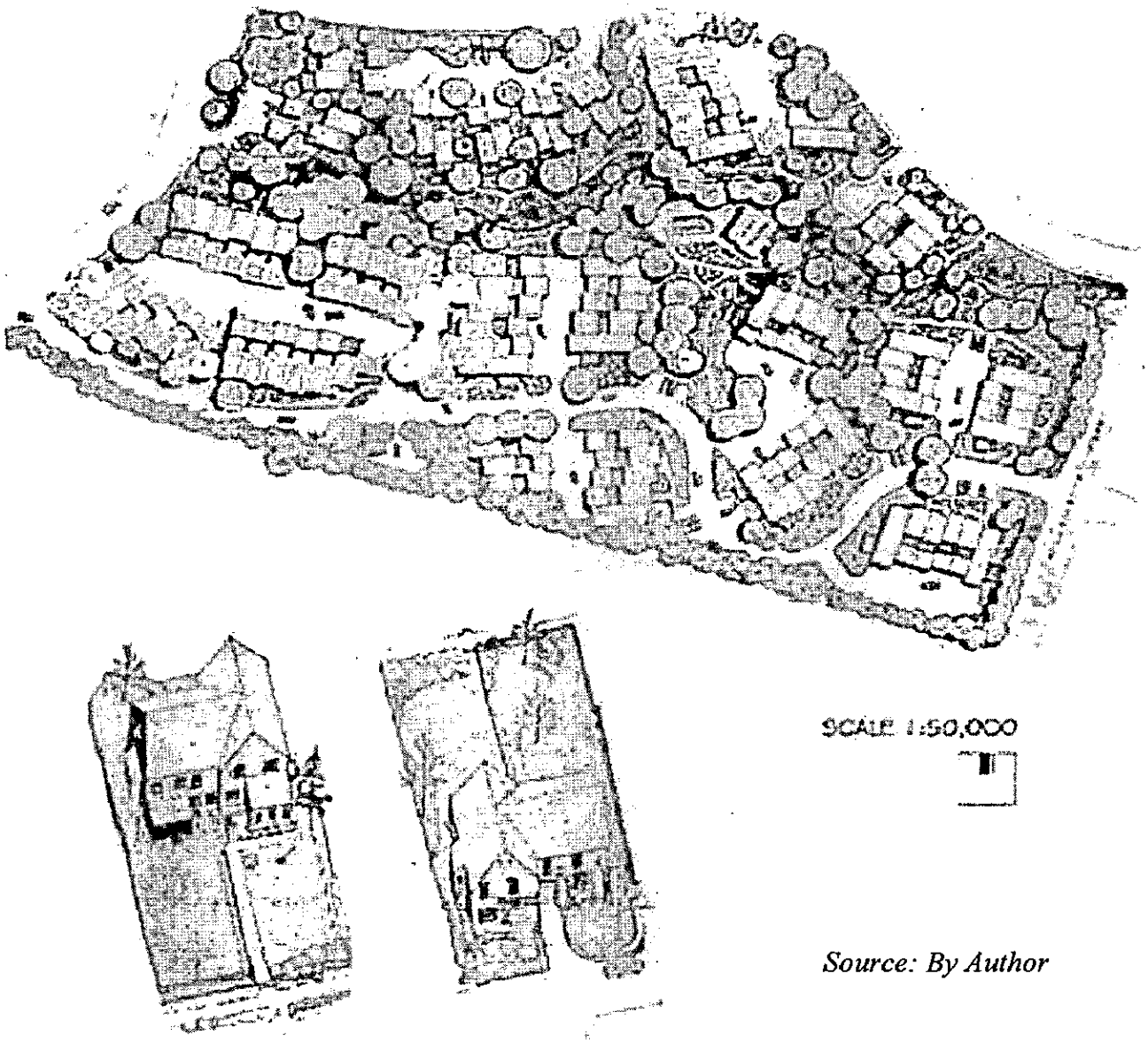
Plot no.	Land	Permissible FAR	Permissible BUA	Ground coverage	Permissible maximum height
	Sq. M.	*Sq. M.*	*Sq. M.*	*%*	*Meters*
1. Mixed use	19730.3	5	98651.25	35	75
2. Retail, Commerce	5129.87	4	20519.46	80	24
3. Offices	6708.29	8	53666.28	45	100
4. Public, semi public	9207.45	1	9207.45	25	24
5. Parks	1753.8				
6. Open spaces	1315.35				
Total	**43845**		**182044.44**		

Source: By Author

Building height, scale, and form have been considered with regard to the following principles:

1. Establishing urban scaled streets and public spaces;
2. Integrating green belt both visually and physically;
3. Reinforcing underground road system as the Park Axis;
4. Integrating with adjacent development;
5. Retail block is interconnected at the plaza level to the adjacent development on the other side of the boulevard street

Fig. 8.7: View of Neighborhood



Source: By Author

Compact neighbourhood – mixed type approach: - dense mixed type development which serves the residents of the place in such a way that they just not have to rely much on other far of sectors.

Circulation, Mobility and Accessibility: Many new roads are proposed and major roads are the widening of existing road. These networks are also used for other mode of transportation and services. Levels are given on this network to fulfill the different mode of transportation and services route required running parallel.

As mentioned above, the existing stretch of road needs to be widened to allow for higher traffic volume, while simultaneously providing better infrastructure to the region. This stretch of road is proposed to become a four-lane highway, with footpaths, parking possibilities, and some landscaping. The total right-of-way will be 45 meters. The major roads are two- lane with a ROW of 30 meters at the minimum and may open out for seating areas, where possible. This stretch of road should also display urban design features.

The main road of the block is also proposed to be 18.0mts wide, as also the roads in the Commercial areas. The third category of roads will be 9.0mts wide; this includes the inner loop road in the city center area, the primary spines of both the neighbourhood centers, and main inner streets of the other residential areas. All other tertiary streets are proposed to be 6.0mts wide.

Proposed Open Space and Pedestrian Network: One of the greatest assets of the site is the natural environment – the canal, water bodies, the hills, and the forests. The site being surrounded by hills, has limited land available for development, which can be an advantage since the area near the hill and forest has the potential to become a pedestrian-oriented. The preserved forest areas on the two sides already form strong green corridors. The land use plan proposes to enhance this by provision of pockets of green spaces within the entire city and all along the canal edge as shown in Map 8.3. These open spaces can have pedestrian and bicycle trails all along their stretches. These green fingers criss-crossing the site can be developed with careful landscaping, kiosks, seating areas, etc. to make for a pleasant walking experience.

Infrastructure Facilities/Services

a. Site Development
b. Landscaping
c. Maintenance Systems
d. Roads and Transportation
e. Water Systems
f. ICT
g. District Cooling System
h. Domestic Gas Distribution
i. Power Generation and Distribution
j. Waste Management Systems

8.2.4 Controlling Parameters

1. Density: The densities in the city are anticipated to change as compare to other city in Andhra Pradesh as there will be substantial addition in residential and mixed use areas due to its international level serving. The projected population for 2025 can be best met by increasing densities in the urban fabric. The strategy of densification not only ensures that the projected population demand is met, but also reduces the amount of land consumed, and helps preserve the natural forest areas or green open spaces on the site. The density of commercial area is calculated to be 450/acres to serve the population related to employment. The density of residential area located in mixed zone is calculated to be 250/acres to serve the number of resident employee to the city.

2. FAR/FSI: The FAR/FSI of the city is assumed to vary from 2 to 3.65 to cover the expected population of 2020. The maximum FAR/FSI on the site is 4 in one of the building used for offices and hotel.

3. Green belt: there are natural green belt provide in the side as 2 ends are having densely vegetated hills and forest. In this rest of areas the green belt assumed is to be 0.59 mn sq m.

4. Building Height: The maximum height assumed in this city is 350m and the minimum is 10 m.

5. Built space: The BUA of business unit is approximately 5.23 mn sq.m. and that of residential unit is 2.8 mn sq.m. The total built space is assumed to be 8 mn sq. m.

6. Ground Coverage: 30 - 35% is the standard which is running in most of cities of India. Here the ground coverage proposed is 30% to have more open spaces or breathing spaces.

7. Land use scale: 2 taken with reference to GIFT.

Rests of controlling parameters are taken either from Vizag byelaws or the master plan of VMR 2021.

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