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**DESIGN CRITERIA FOR DEVELOPMENT OF SETTLEMENTS IN ARID  
COASTAL REGION OF IRAN WITH SPECIAL REFERENCE TO  
ENVIRONMENTAL CONSTRAINTS AND CONSERVATION :  
CASE STUDY OF BANDAR LENGEH AND BANDAR KONG**

A THESIS

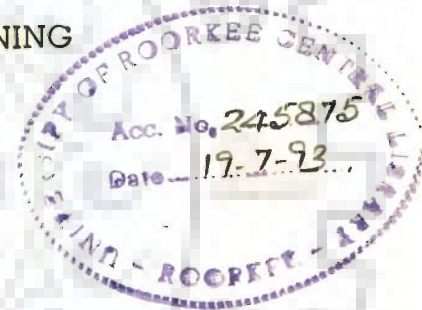
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requirements for the award of the degree

of

DOCTOR OF PHILOSOPHY

in

ARCHITECTURE AND PLANNING



By

**MOHAMMADREZA POURJAFAR**

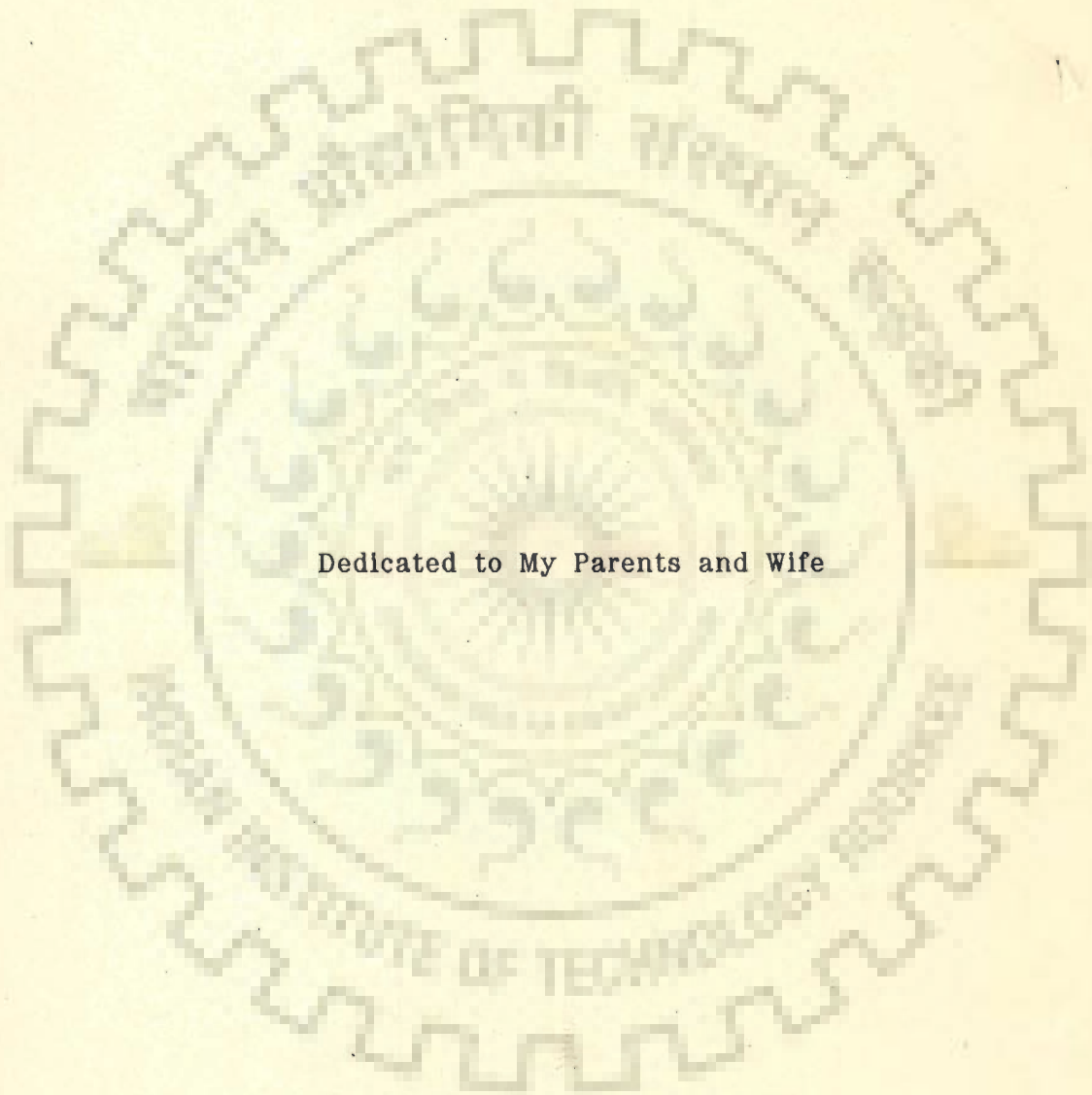


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**JUNE, 1992**







Dedicated to My Parents and Wife

# CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled, DESIGN CRITERIA FOR DEVELOPMENT OF SETTLEMENTS IN ARID COASTAL REGION OF IRAN WITH SPECIAL REFERENCE TO ENVIRONMENTAL CONSTRAINTS AND CONSERVATION: CASE STUDY OF BANDAR LENGEH AND BANDAR KONG, in fulfilment of the requirement for the award of the Degree of Doctor of Philosophy and submitted in the Department of Architecture and Planning of the University is an authentic record of my own work carried out during a period from November 1987 to June 1992 under the supervision of Prof. Rattan Kumar and Prof. Vishwamitter.

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

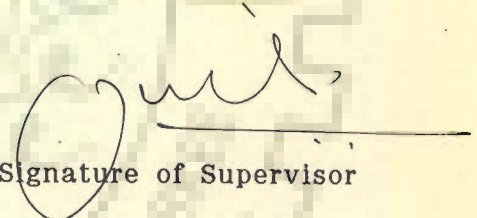


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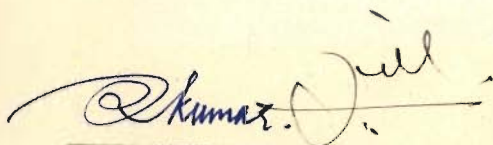


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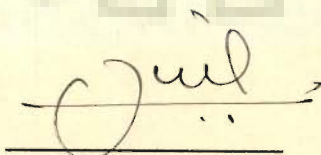


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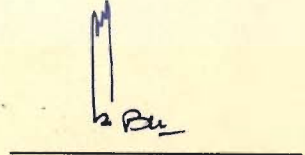
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Mohd. Reza Pourjafar



## GLOSSARY OF PERSIAN TERMS

(Persian Terms asterisk Colloquial In Arid Coastal Zones of Iran)

Badgir*	Wind-Catcher, Wind-Shaft
Bagh*	Park, Garden
Bakhsh*	district
Berkeh*	Underground water storage tank
Fatwa*	Is the idea of knowledgeable and well
Gereh*	Node
Ghebleh*	Direction to which Mohammadan turn in praying
Hosseinieh*	A place like Mosque
Houzeh*	District
Kucheh*	Alley, Narrow Street
Labeh*	Edge
Madrasseh*	School
Mahalleh*	Neighbourhood
Manzar*	View
Masji*	Mosque
Mossalla*	Place for public prayer at town level.
Nahieh*	Ward, Sector.
Nakhlestan*	Date Palm Grove
Neshaneh*	Landmark
Ostan*	Province
Sabat*	Shady Place
Shahrestan*	Subdivision of Province
Shariah*	Are the Islamic Rules
Sunnat*	Is the way Prophet Mohammad lived.
Takkieh*	Large gathering urban space.
Urf*	Is the action or belief in which Persons, priests with the concurrence.

## PREFACE

The availability of land for physical development in the favorable ecological zones will be gradually depleted due to increasing pressure of population. Such a supply can maintain a certain level of density, beyond which man's life will have social, as well as, physical problems. Therefore, it will be necessary to explore other options where human settlements can be sustained with only limited additional efforts. The man may have the potential to create underwater cities and colonize space, but their costs would be exorbitant. Thus, a more plausible solution is to investigate the feasibility of humanizing the vast stretches of waste Arid Desert lands which are more readily available on earth (1/3rd of world's land area being arid or semi arid desert). Once again, amongst the arid lands, the semi-arid coastal regions, compared to frozen arid deserts could be dealt with on a higher priority for the obvious advantages of being closer to the sea and its inherent resources. These locations facilitate shipping and movement of bulk merchandise to other sea ports and boost fishing and thus allow sustenance of adjacent/off shore settlements.

For a country like Iran, and many others in the Middle East with vast stretches of arid wilderness, they will have no choice but to consider humanizing selected locales in these adverse desert areas and rejuvenate the already existing settlements in these locations in order to satisfy their growing demands for shelter.

It is in this context that the current study assumes importance where in comprehensive strategies and criteria for development of Arid Coastal Region of Iran along the Persian Gulf is envisaged. Coastal settlements of Bandar



Lengeh and Bandar Kong have been chosen because of their historical and architectural importance and their proximity to each other. And also because of the fact that at macro level they will constitute a typical situation. The methodology adopted for their study and proposals could be profitably adopted for other settlements along other coastal regions having similar climatic configuration.

In the absence of adequate precedence, the development of Arid Coastal settlements and their surrounding region required a thorough and comprehensive understanding as to how over a very long period of time the settlements and their sub-components in a constant interaction with the requirements of their inhabitants, and the constraints imposed by the adverse climatic factors, evolved a settlement morphology which was conducive to good living. From this point efforts have been made to identify causes of degeneration and decline preparatory to analysis of socio-economic life patterns for projecting new proposals. Lessons learnt from such a cause and effect relationship, can then be profitably applied to chalking out proposals which would mitigate and eliminate incongruities and pave the path for harmonious growth and development of the settlements and their surrounding region.



# ABSTRACT



## ABSTRACT

The study concerns with planning and design criteria for development of settlements in the Arid Coastal Zones of Iran along the Persian Gulf, with special reference to Bandar Lengeh and Bandar Kong. The study consists of nine chapters, each chapter is further subdivided into different sections.

The first chapter deals with Arid Coastal Zones in general, the Persian Islamic settlements in these zones and the impact of major factor influencing the built forms. The second chapter gives an idea about background of Iran, the regional context and the factual information available on climatical, geology, geographical and socio-economic aspects of the region. The third chapter is the study of physical and non-physical aspects of the two settlements. The physical studies are the outcome of six months field work at the site. It covers the planning and urban design studies of the two settlements. Chapter 4 deals with the evaluation of plans and programmes already proposed, to review their feasibility from implementation point of view. Chapter 5, deals with peculiar ecological consideration of Arid Coastal Zones, i.e., positive and negative impacts of floodways and runoff on the settlements. The surveys done by the author and the results are presented in Chapter 3, 4 and 5. The literature study of the already proposed Master plans lead to the identification of many problems evident in these zones which have been grouped together and are presented in Chapter 6. Chapter 7 is devoted to the synthesis of planning criteria in relation to landuse and town structure. This information serves as a feed-in for the Chapter 8; that addresses itself to the urban Design Criteria, Development and revitalization of these settlements. Chapter 9 brings out important conclusions and



recommendation to highlight the achievement of the study. The study is amply illustrated with relevant drawings and graphics.

#### THE OBJECTIVES, LIMITATIONS AND METHODOLOGY OF THE STUDY

The study endeavours to gather and analyze empirical evidence on the planning and design of settlements in arid coastal zone of Iran along Persian Gulf with the following aims and objectives in focus.

1. Because of the loose connotation given to arid coastal zones and treating these as synonymous with the arid areas at large; the first objective of the thesis is to define the arid coastal zones, in specific terms -- to clearly understand the underlying nuances of such a climate.
2. To prepare an inventory of the characteristics of two typical coastal settlements of Bandar Kong and Bander Lengeh with the consideration that the methodology developed in their study could be usefully deployed in the study of other similar settlements in future.
3. To understand the hydrolytic process that governs the run off in the area and their impact on the ecosystem of the region and morphology of the selected settlements.
4. To study the characteristics of the urban form of the selected settlements with special emphasis on the design qualities of its architecture inherited from Persian and Islamic influences.

5. To study and understand the current disposition of these selected communities in all their ramifications. Highlighting the causes of their growth and development over time. Critically reviewing their current social, economic and physical disposition.

6. To study and critically review the contents of the Master Plans proposed in the last two years for the growth and development of these settlements. Isolate causes which impeded their implementation.

7. To evolve an appropriate philosophy of planning and design criteria suited to the growth and development of small settlements in arid coastal regions.

8. To demonstrate through new plan proposals, (based on derived planning standards and design criteria) for Bandar Kong and Bandar Lengeh that it is quite feasible, and in fact most essential that expanding demands of urbanization can be successfully met both by inward development and outward expansion without obliterating the cultural heritage and without damaging the ecological character of the area.

#### **FIELD WORK**

Due to lack of adequate information, a strong need was felt to study real situation of the settlements on site, update the site information so as to generate a reliable primary information base to create an authenticity of the research goals.



To clear the bases for recommendations and policies a proper study of factual aspects and the analysis of their interaction have been done through field survey. This establishes a system for covering the entire area with equal attention to provide multiple opinions in subjective analysis to reduce personal bias.

The field survey was carried out in winter of 1987 and spring of 1988, which covered many aspects of urban planning and design. Most of the items presented in Chapter 3, 4 and 6 are the outcome of the aforesaid field survey. Updating of the maps, the condition of structure, circulation net work, architecture and urban design studies and feed back to the already proposed Master plan, housing studies and land ownership, the eco-system study and problem identification are based on the surveys conducted by the author. The author's own photographic equipment was used for the field survey, and urban design studies were done through sketches made on the site. The study of floodways, green spaces, and water storage tanks are the important parts of the field survey which helped to determine the factors which have led and continue to affect existing eco-system of the environment and providing suggestion to maintain the system and its future improvement regarding vegetation cover and water supply.

Besides diagnosis of the problems, the field survey helped to investigate the state of historical core of the settlements, tracing the morphological development, analyzing their problems and constituent urban and architectural elements.

## SCOPE AND LIMITATION OF STUDY

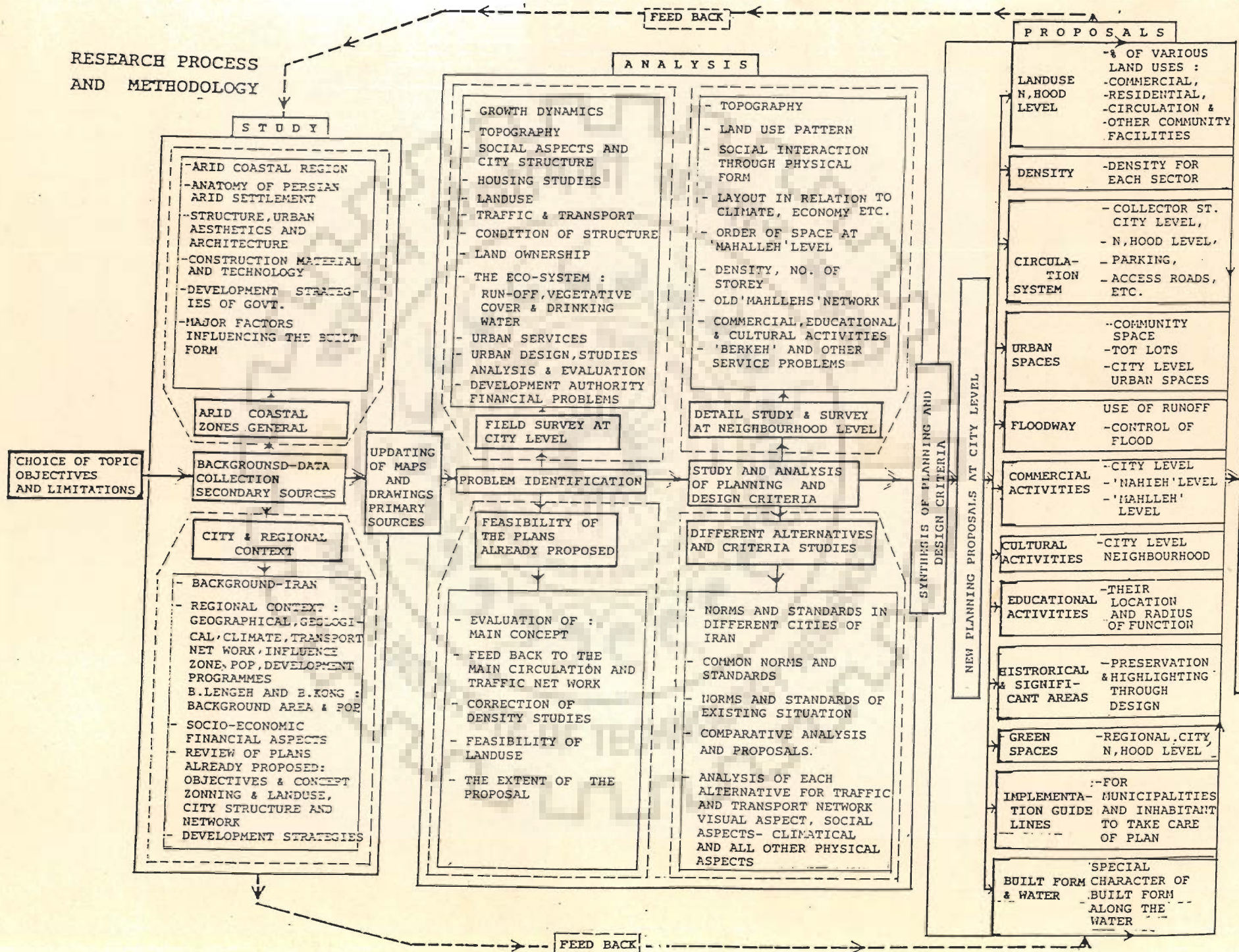
The research has been limited to defining the arid coastal zone of Iran, its urban design and architectural qualities. An introduction to Persian architecture, a brief on the regional aspects of the settlements of Bandar Kong and Bander Lengeh. A broad level review of the plans already proposed with focus on finalizing the major circulation plan, the study of special quality of environment and ecosystem, problem identification, synthesis and criteria for developing major concept to develop the neighborhood and other city sectors. Considering, circulation system, climatical aspects, layout of various open and urban spaces and locating the facilities proposed in the master plan. The scope will be limited to the design demonstration and application of criteria in the old core, transit zone and future expansion areas. The regional interferences are out of the scope of this thesis.

## METHODOLOGY

In general, the manner adopted to do the thesis included three major phases, i.e. research, investigation, analysis and synthesis ( study, analysis and proposals). The first step which is survey or research is assembling of the facts and data which have consequences for the design outcome. The second which is analysis or the making of value judgments. This is about the effects of one fact upon another. The last step can be called synthesis or the weaving of the results of the study and analysis into a comprehensive form and organization of solution to the problem. The strict chronological order discussed above may not be followed for there have been much feed back and interplay among them. The detail break up of the methodology followed has been shown in the following figure.



RESEARCH PROCESS AND METHODOLOGY





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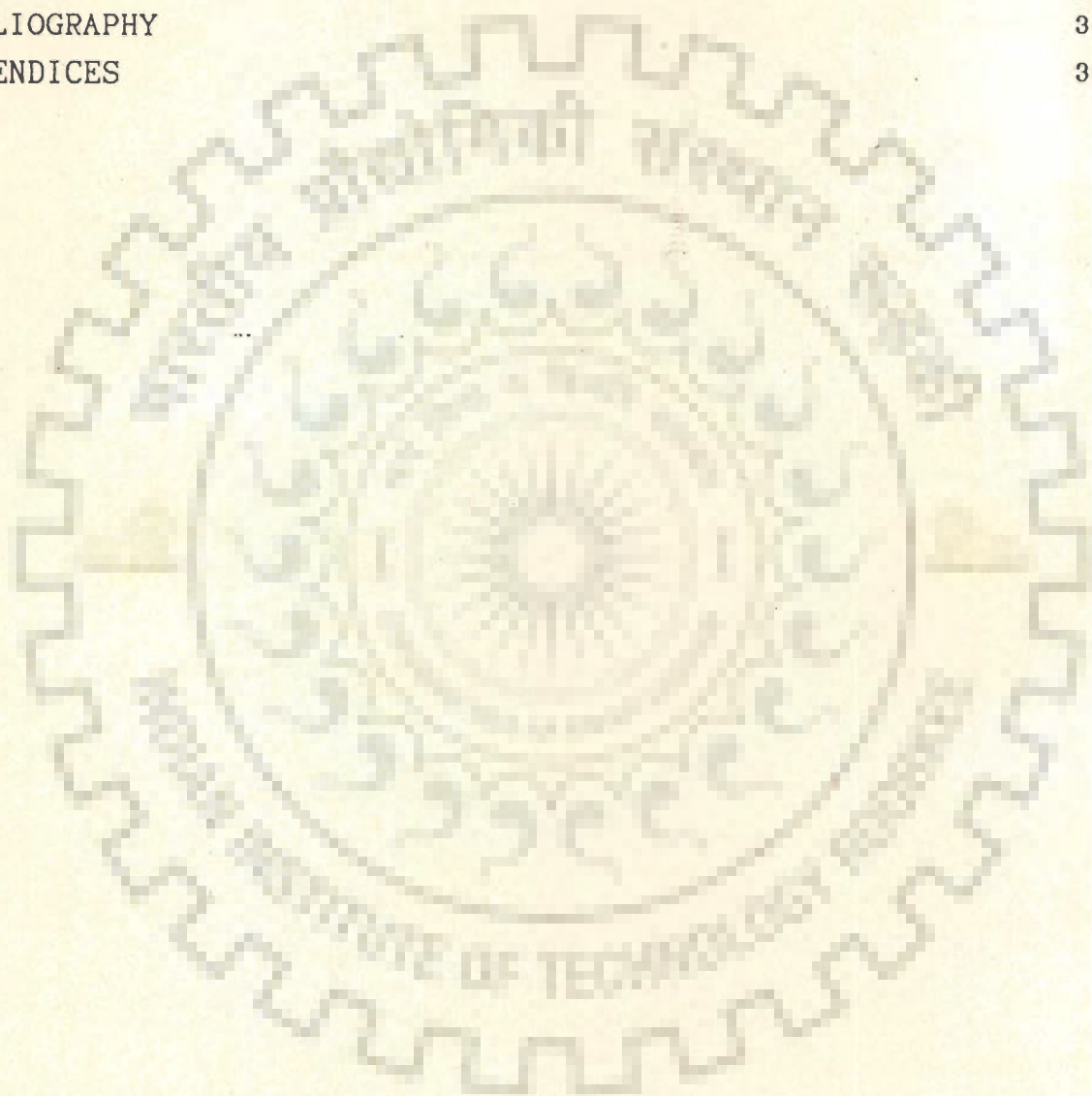
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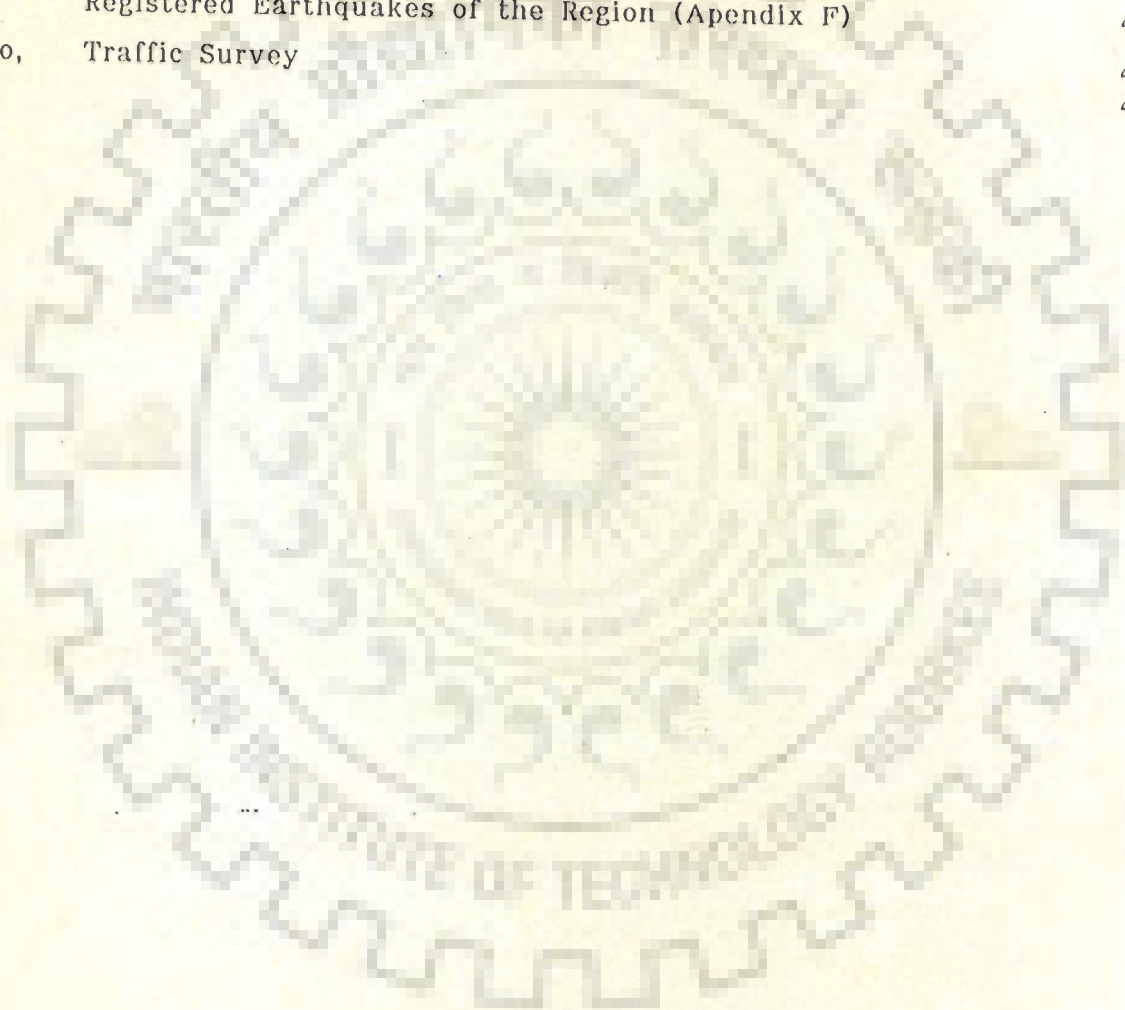


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# CHAPTER 1



## CHAPTER - 1

### INTRODUCTION : SETTLEMENTS IN ARID COASTAL REGION STRUCTURE, ARCHITECTURE AND IDENTITY

#### 1.1 ABSTRACT

A wide range of definitions on Hot and Arid regions often preclude Arid Coastal regions. Such definitions do not consider the amount of high humidity obtained in Arid Coastal zones. Also, these definitions do not bring out clearly the fact that the temperature range variation is not much between day and night, and the solar radiation is not as high as compared to the climate of the Arid desert.

Although these coastal settlements are situated along water, but lack of potable water is observed almost in the entire area, and that is why, it is named as Arid coastal zone. The built forms that evolved originally from the dictates of the major factors, such as, harsh climate, sea water, tradition and western technology, served the functions which were required of a town situated along waterfronts. The social, religious and the traditional needs and values endeared by the inhabitants of these settlements had their own impact in moulding the urban form over a period of time.

The entire settlements could be imagined as an agglomeration of various built forms, dominated by the religious minarets, the domical structures of "Berkeh" (water storage tanks) and the "Badgir" (wind catcher) etc. The traditional part of these settlements has a clear-cut urban form with a distinct personality in relation to the landscape of Arid coastal zones. Commercial activities have been tied to the major movement patterns with

crests and troughs depending on where the nodes come in between. Main bazaars, often covered, were mostly located in the hub of town activities.

Unfortunately, most of the subsequent interventions and planning efforts to make amends and rejuvenate these settlements were unimaginative, and, thus doomed to failure.

## 1.2 ARID COASTAL ZONES

Arid coastal zones form part of arid zones (Fig. 1.1) which comprise one third of the area of the world land, and, can be classified as i) Cold polar zones, as in Siberia ii) Cold dry continental zones, as in Central Asia and Central Australia and upland zones blocked by high mountains, and iii) Hot dry zones, as in North Africa, Middle East and South Western United States<sup>2</sup>

The Arid coastal regions are part of arid zones which are close to the sea. Arid coastal zones are those which have sufficient rain to support dry farming, have no natural source of drinking water, have a very hot temperature and have a large daily solar radiation with a high degree of humidity, especially, during the summer period. The term Arid is used for the zone because of shortage of rain, water supply and lack of vegetation in the region.

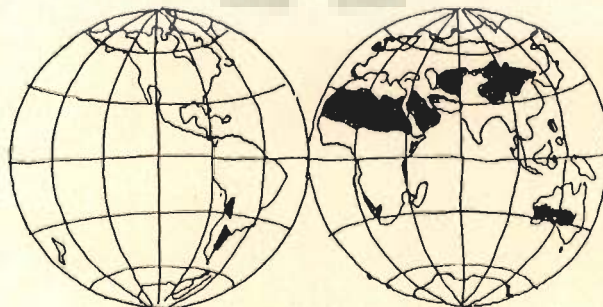


Fig.1.1 :Arid land of world and desert surplus of Middle East  
(source,Eckholm and Brown,1977)



Some of these places of Arid Coastal zones receive varied amounts of precipitation and the aridity is caused by the evaporation rate which is higher than the precipitation rate. Besides, the rain that does fall in Arid Coastal Zones is sometime torrential, turbulent, brief and scattered and often causes floods as the rain water does not have time to seep into the ground. In the case of Arid Zones, the phenomenon of soil erosion decreases vegetation growth and cover which in turn decreases the absorption capacity of the ground resulting in a speedier runoff causing extensive soil erosion and soil transportation.<sup>4</sup>

Coastal Zones are Plains having usually mountains on one side and the sea on the other side. The strata, climate, water system and physical form in these zones have been affected by the sea and the mountains. Coastal Zones have diverse land forms, and due to their location, different soils, such as, sand and clay, gravel and coral rocks can be found there.

"Coastal plains are sedimentary strata composed of sea shelf that has emerged as a margin of the continent. After emerging from the sea but before eroding, coastal plain's surface is smooth and nearly featureless sloping gently toward the sea"<sup>5</sup>

Most of the Arid Coastal Zones, regardless of their age, decline gently toward the sea therefore they have a parallel drainage from the mountains towards the sea. Due to their location, there is a high percentage of humidity. The dew, fog and some breezes, have had an interesting impact on the overall built form, mountains, plains, beaches, coral and sand dune shorelines and the blue water all make very attractive landscape and a good local resource for attracting tourists to the settlements along the Persian Gulf.

"By definition, it is rainfall, or lack of it, which produces stress in an Arid Zones. Heat is usually of secondary importance. But when one wants to consider rainfall quantitatively, it is not enough to know the amount of fall, the distribution of precipitation in space and time is also equally important to understand the characteristics of the Arid zones".<sup>6</sup>

The length of the Iranian Coastal line (Fig.1.2) which can be considered as part of Arid Coastal Zones is from the sea of Oman (Arabian Sea) to Bandar Abbas which is 784 kilometers, and that in the Persian Gulf from Bandar Abbas to the mouth of Shat-ol-Arab, it stretches 1259 kilometers, thus, making a total of 2043 Kilometers<sup>7</sup>. Besides the above, the largest islands of Iran are in the Persian Gulf and the strait of Hormuz which can be considered as other parts of Arid Coastal Zones in Iran.<sup>8</sup>



Fig.1.2 : Arid Coastal Zones of Iran

### 1.3 PERSIAN SETTLEMENT PLANNING - A PERSPECTIVE

The outer limits of the persian Settlements consisted of fortifications and the other traits of these settlements are and outcome of climate as expressed in traditional residential areas. The "Mahallehs" are compact and individual houses visits virtually integrate in to a large continues mass. The



low-rise high density concept has evolved over the centuries as a result of climatic determinants and social needs. The characteristic plan of houses is shaped by courtyards with the focus of attention being on the interior rather than the exterior.

It is observed that each of the settlement is a combination of three distinct parts, eg., a traditional core, and transit area, and the periphery, existing in an interconnected spatial continuity. Although there are no clear-cut boundaries of segregation, yet the change is felt as one moves from the inner core to the outermost area. The transit core provides ample space for accommodating present infrastructural requirements than the inner core which is densely built. However, the outer core is available for accommodating future demands of urban infrastructure; centre was marked either by a fortress or an open square with the major buildings situated around it. While the gathering of communities within a fortification goes back to prehistoric times in Iran, (Fig. 1.3) the town with an open square as its focal point, appears at least as far back as the partian period i.e. 171 B.C. to 224 A.D. The cities, which had square as a focal point, usually contained the Jamia Mosque, the king's palace (if a capital) or the governor's residence (if a provincial town) and the Bazaar. Among other features were caravanserai, bath house, hostel, prison, pavilion, and high view towers whenever the city had a particularly impressive surrounding country side.

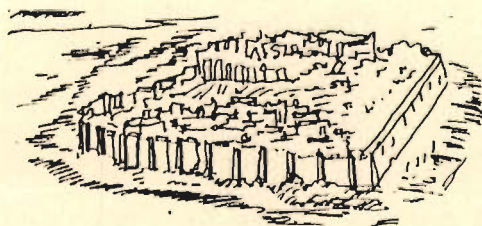


Fig.1.3 : Tappeh-e-silk in Kashan From 3000 to 1000 B.C.  
(source: M.Y. Kiani, 1986)

"The defensive walls were very often surrounded with a large deep moat, and the entrance to the city was approached across viaducts with single, double, or triple rows of arches typical architectural feature already established in the partian period".<sup>9</sup>

The citadel was surrounded by its own walls, then and finally by the city's surrounding walls. With increase in population, many clusters appeared around the outer walls for protection, forming a sort of suburb. The houses were usually very closely built for defense purposes. The garden wall was and still is a major features of Iranian towns (Fig.1.4). These walls were built, not only for defensive purposes, but also for privacy, which plays an important role in those major portion of Iran where outdoor activities last for about half a year.

"Beyond the city walls there were often extensive plantations, not only supplying the cities with fresh fruit, vegetables and staple food, but also acting as a green belt. In the dry rainless climate of Iran, these green belts required artificial irrigation and thus the sitting of the towns was an important factor. Many of them were situated at the foothills of the mountains in order to take advantage of the running streams which were often brought into cities by means of "Ghanats " or under-ground canals in order to prevent evaporation and water contamination"<sup>10</sup>, (Fig.1.5 and 1.6).

Gardens have always played an important role in city planning, and have influenced the city plans which were often laid out in the garden form of "Chahar Bagh" or the four quadrants (Fig.1.7). The culmination of these garden cities were Samarkand and Isfahan of the Shah Abbas period in Iran and other cities of Europe and Asia, eg., Mogul gardens in India.



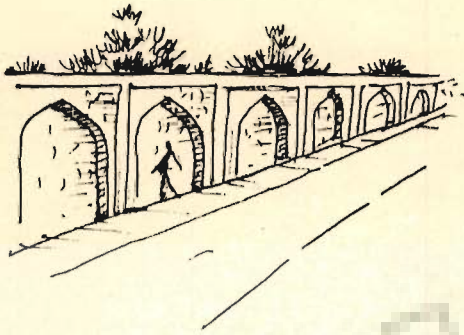


Fig.1.4 : Typical Garden Wall

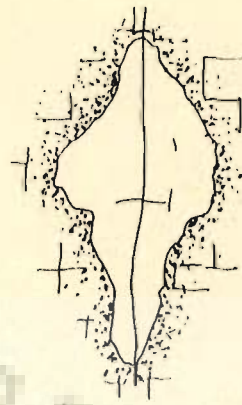


Fig.1.5 : Fruit Garden around the Settlements (Abadeh)

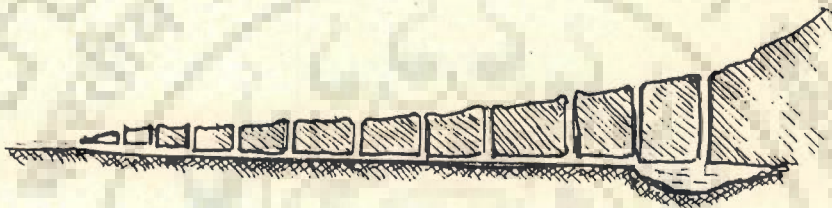


Fig. 1.6.: Section Through "Ghanat"

Four major plan types dominated the city plans of Iran throughout history, (Fig 1.8 & 1.9). The circular, the rectangular, the elongated, and, much later the open plan form. Round cities with single or double fortifications are known from Partian period, the most interesting being the city of Drabjird, where the battlements and the moat form an exact circle.

The elongated - cross plan was often formed by a large avenue which connected the palace to the main congregational Mosque. This avenue with its line of shops and long vistas become the focal point of the city and is well exemplified by Qazvin city of the twelfth century.

Persepolis is an interesting examples of a typical Persian city planning which was neither a capital nor a simple palace. It was an outstanding Achaemenid dynasty (550 B.C.) civic centre. The spatial relationship of the various building at right angles to one another, their varying levels and differing heights, remain an outstanding example of civic layout and design to this day (Fig.1.9).

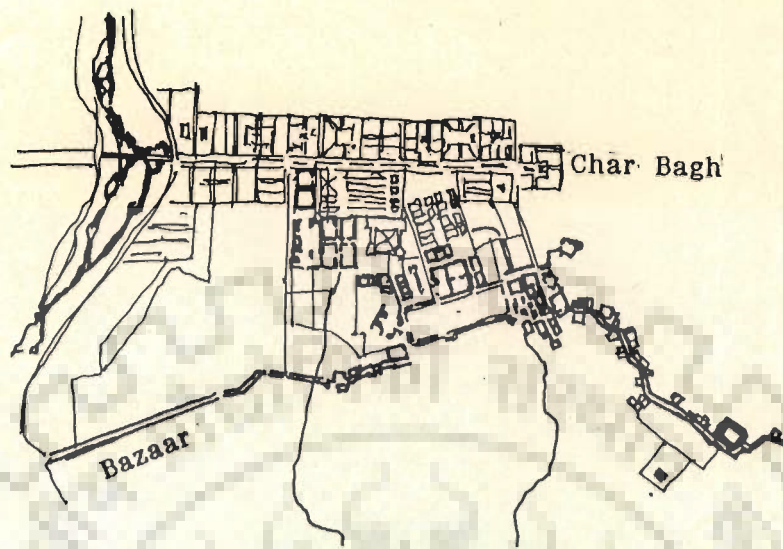


Fig.1.7: Plan of Char Bagh Bazaar in Esfahan

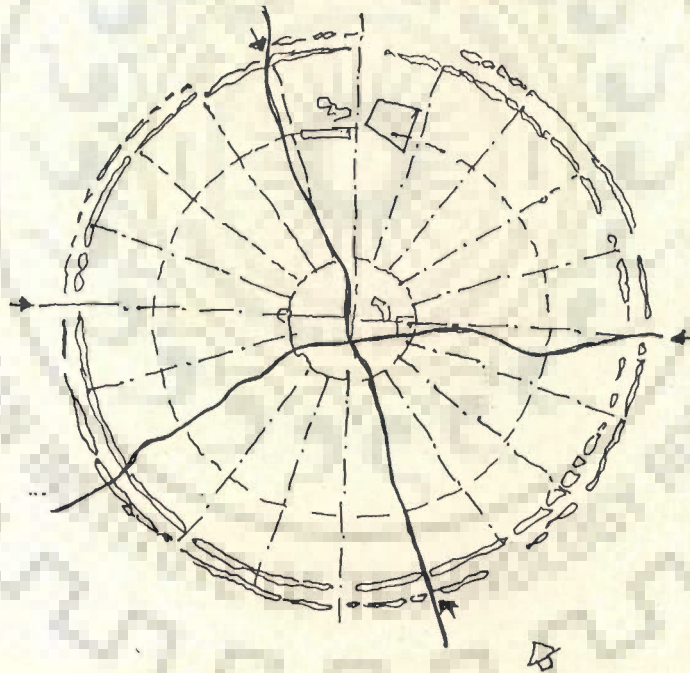


Fig 1.8 : The Circular City of Ardeshr-Khurreh (300 A.D.)

(source : M.Y.Kiani, 1986)

#### 1.4 ANATOMY AND STRUCTURE OF SETTLEMENTS IN ARID COASTAL ZONES OF IRAN

The basic anatomy of the typical settlements along the Persian Gulf presents a simple geometric form before it exploded and mushroomed into its present distended form under the contemporary impact of man, machine and oil boom (Fig.1.10). The Mosque is its dominant central architectural feature.



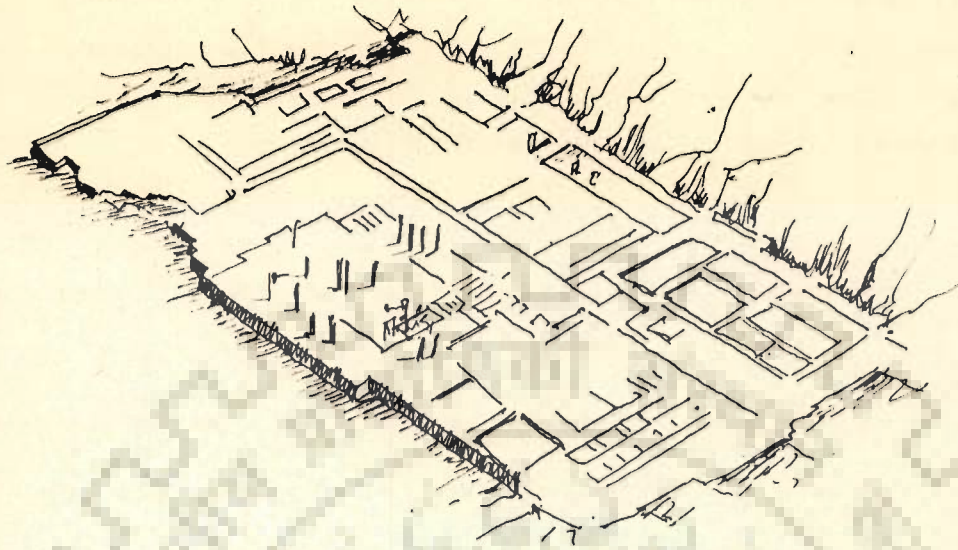


Fig. 1.9 : Persepolis, Shiraz (550 B.C.)

By virtue of its size, location and distinctive architectural form, the Mosque dominated the silhouette of the settlement (Fig.1.11). Around the Mosque grew residential, commercial and other quarters. The intra city road system, designed primarily for pedestrian and animal purposes, did not conform to any set geometric pattern but grew, in stages, creeping out and often ramifying into specialized commercial and artisan Bazaars.

A high wall encircled each town pierced only by gates which gave access from the cardinal directions. Thorough-fares then linked these gates, and converged at a focal point, thereby dividing the town into a number of quarters. These walls are however, with a few exceptions, not in evidence today, having been pulled down to give way to the exploding cities. Originally, beyond the walls were areas for cultivation and pastures for animals.

A dominating form in every settlement is the strategically located Mosque after the emergence of Islam.

"This focus did not originate from any specific teaching in the Quarn. The Quarn does not emphasize on the physical structure or location but merely specifies that the prayers of Muslims should be offered towards the Mecca, which by and large, influences the growth of these settlements".<sup>11</sup>

Another distinctive expansion was in the form of minarets, a component of the Mosque. Their primary function was to facilitate the Azan or the call to the faithful to attend the prayer. They, however, served another vital purpose, that of orienting a distant traveller to the town, and once in the town, to the Mosque or Bazaar.

Houses have been constructed close to each other to protect themselves from solar radiation (Fig 1.12.). There are narrow spaces between the houses for breeze circulation around the houses. The social life of the inmates revolves in the courtyards which they have generally built around it.

There are a variety of spatial experiences of light and shadow, changing views and interesting harmonious relationship and proportions while moving through narrow and winding "Kuches" (Fig. 1.13). The entire settlement could be imagined as an agglomeration of various landuses dominated by the religious built form and lack of green spaces. Blanca has described in his book traditional muslim cities and western planning ideology :

"Mixed landuse is the order of the day in the traditional settlements. The public space at the focus sought to promote interaction between religious, educational, commercial, industrial and recreational spaces in an attempt to express the full range of human activities. The primary spines of the central market, the main stream of the public life, integrated the laterally attached bays of sanctuaries, "Madresas" and specialized markets."<sup>12</sup>



Commercial activities have been tied to the major movement pattern with peaks and deeps depending on where the nodes come in between. Central Bazaar are mostly located at the hub of the settlement activities. The traditional part of the settlement has a clear cut urban form (Fig.1.14 & 1.15). It has a distinct, overall urban structure and has a distinct personality in relation to the regional landscapes in the country side.



Fig. 1.10: Bandar Abbas-A typical settlement along the Gulf.



Fig. 1.11 : A Mosque in the Settlement



Fig.1.12: Compactly Built Around the Courtyard



Fig.1.13: Narrow Streets

#### 1.4.1 Urban Aesthetics and Architecture

Persian settlements have a tone of poetry and asceticism to their beauty (Fig.1.16). The settlements along the Persian Gulf can be recognized by a kind of distinct physical form that conforms to the socio-cultural context.



Fig.1.14



Fig.1.15

#### Traditional Built Forms

The traditional core of the settlement is almost similar to those of medieval times. The traditional urban form is a tight cellular matrix, set in an arid regional context with its responses to the social mores, climatic conditions, available technology, and building materials.<sup>13</sup> The layout of the city focuses on the Mosque buildings (Fig.1.17) and "Berkeh" (underground water



storage tank) that connect with the rest of the units of settlements through narrow and wide pathways. These pedestrian routes branch out to several narrow cul-de-sacs (Fig.1.18) and walkways ("kucheh") leading to individual houses, thus forming "Mahallehs" which are clusters of residential areas and neighbourhoods with very strong social ties.

The Islamic architecture is well known as introvert, that reflects the true philosophical meaning of Persian Islamic architecture.

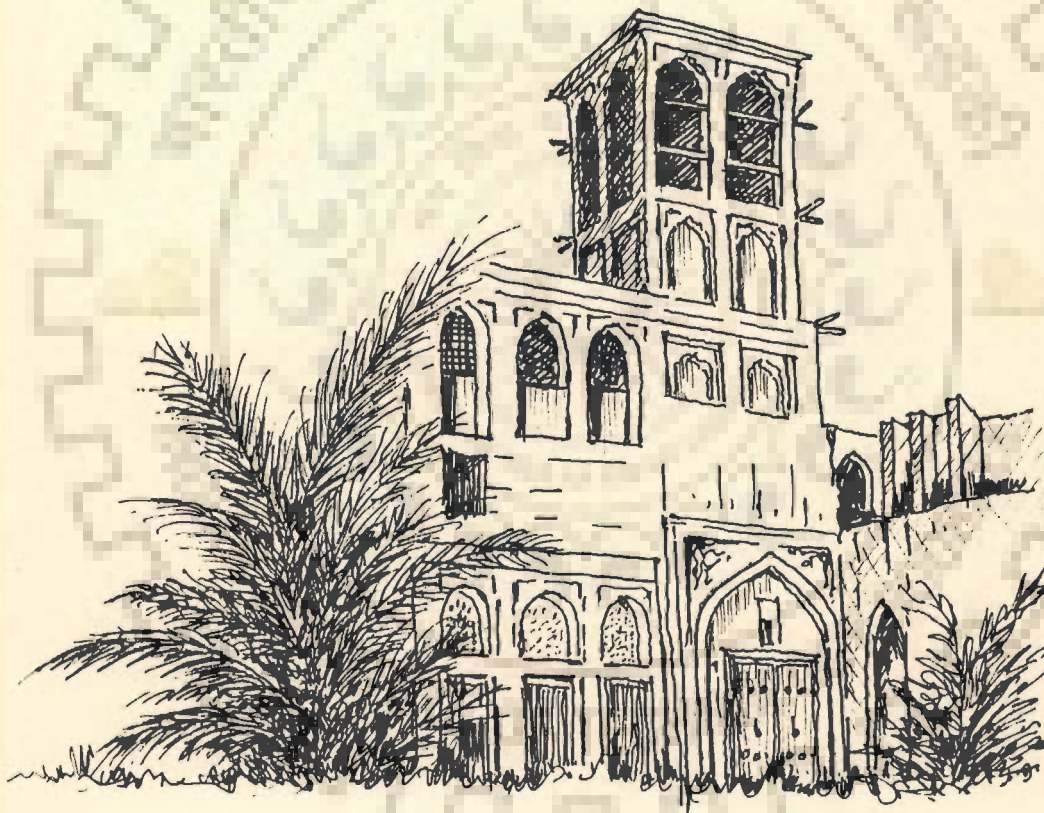


Fig.1.16 : Poetry in Architecture

With regard to style, the arches and the fine "jaalies" (Fig.1.19) are two characteristics of architecture along the Persian Gulf, that are practically found in every traditional building. Decoration consists of ornamental geometric design mixed with inscriptions. The methodology of their creation follows a set of simple rules based upon geometric forms (Fig.1.20).

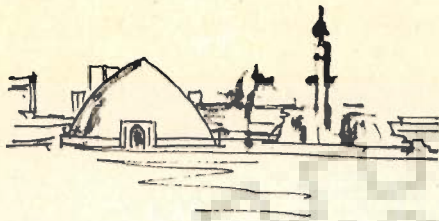


Fig.1.17 : Mosque and "Berkeh" as Settlement forms

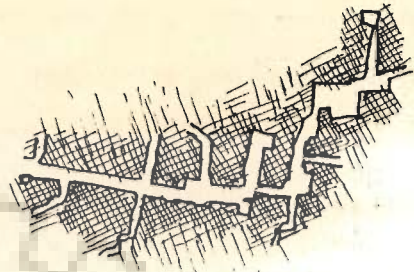


Fig.1.18 : Movement & Cul-de-sacs



Fig.1.19 : A typical Jaali and Arch.

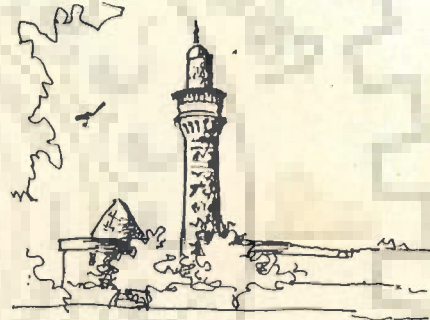


Fig.1.20 : A Minaret with geometric patterns

A number of characteristic architectural traits can be identified as being specifically Islamic, prominent among these are the domes and the minarets. Dome as a roof form of the water storage tanks ("Berkehs"), appears as a major trait in architecture of the settlements.

#### 1.4.2 Persian Settlement in Arid Coastal Zones - A Present Profile.

The settlement in Arid Coastal region of Iran along the Persian Gulf can be defined on the basis of its recognition by its distinct physical form. The impact of various aspects such as climate, culture, material, water etc., have given rise to its distinct physical form which can be distinguished from the



other settlements in cold and moderate zones. Single and double height mud structures with fat and heavy wind catchers on top and fine jaalies, fenestration of row arches on the facade at first floor, the domical roof structure of "Berkehs" (water storage tank) starting right from ground level and fine tall and thin minarets made out of masonry, mud and coral stone dominating the sky line, are interesting features in these settlements.

Most of the settlements are located near and on a series of natural floodways which create problems in the rainy seasons,<sup>14</sup> although, the flood water helps in growing the green vegetation. These floodways provide water supply for these settlements throughout the rainy period. These settlements are located along the Persian Gulf and the altitude is usually low. The land is basically dry because of little rain in these areas. weather is humid during the long summer.

These settlements lack any kind of organized sewer system as a result of which the settlement are poor and unsatisfactory from the public health point of view. In some places the sewage of the town is either deposited into the alley or into the wells (cesspool). It may creates serious dangers for the public's health in the settlements. The climatological phenomenon or evaporation in the region adds to the existing problems of health hazards.

### **1.4.3 Major Factors Influencing the Built Form**

#### **1.4.3.1 Climate**

"These settlement have hot and humid weather during the long summers. The weather is relatively warm in the winter. Little rain occurs in these settlements".<sup>15</sup> The local climate constitutes an important input to the quality of built form as has been discussed earlier.

Winding or zig-zagging narrow alleys form a traditional pattern of planning for living spaces (Fig.1.21) so that they receive minimum sunshine, reduce the effect of stormy winds, establish shadowed space throughout the day to provides a cool and comfortable microclimate.<sup>16</sup>

Traditionally compact neighbourhood units (Fig. 1.22) are conceived of as single component of the city as a whole.

A compact form, as a result of climatic factor, reduces the length of utility networks. Thus ensuring economy through energy conservation. Also, a compact form decreases the traditional need for transportation system and vehicles, further reducing construction and living costs.

"Badgirs" ( Wind-catchers - Fig. 1.23) are other elements due to the hot climate which were used to ventilate the buildings. Wind-catchers are structures built onto the roofs of buildings with open units at their head facing in the direction of the cooler prevailing winds. Air caught in the vents is channeled down through a shaft in the building into the rooms below which are cooled and ventilated.

Environmentally, the courtyard (Fig.1.24) has gone a long way to mitigate the hot climate of the area which has a high percentage of sunshine. The heat lost during the night to clear sky by radiation allows the courtyard to remain cool most of the day. Upper floors covered by galleries immediately above the ground plan, help to reduce the quantity of heat gain during the day by obstructing the direct solar radiation.

Appropriate orientation and the fenestration of rooms opened into the court facing the direction of cool breeze, help in creating summer comfort conditions.



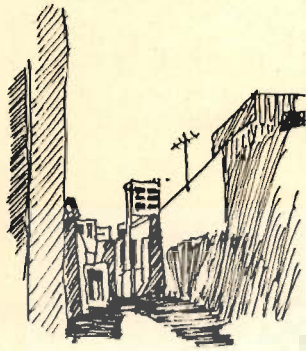


Fig.1.21 : Narrow Zigzagging Shady "Kucheh"

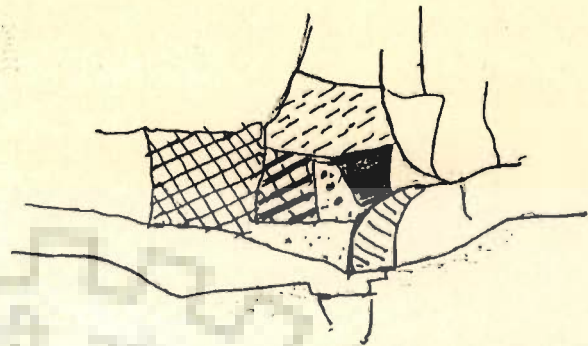


Fig.1.22 : "Mahallehs" of Bandar Kong

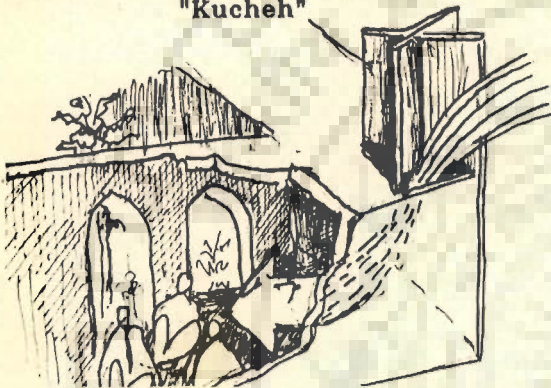


Fig.1.23 : "Badgir"-sectional view

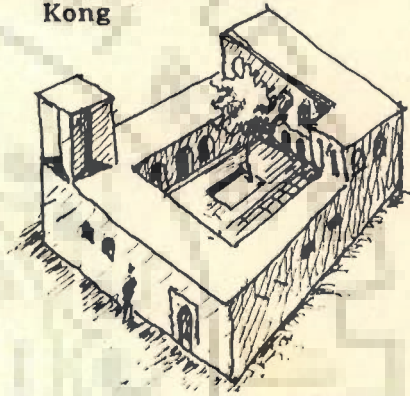


Fig.1.24 : Central courtyard in a House-Bandar Lengeh

#### 1.4.3.2 Water

Because of the location of the Persian Gulf the water in the form of ocean plays an important role in the emergence of settlements in the area. The impact of water over these settlements can be brought out as under.

1. Water forms a major element of landscape in this area and emerges out as an outstanding characteristic.
2. Water forms an independent mode of transportations and activities and thereby the city circulations best concentrated towards the water from inner cities, thus the shape of the settlement gets decided by the basic presence of water as a focal point. Hence the growth is generally parallel to the water line.

3. Large number of jaalies, balconies, and jetties stand as unique features along water edge which give a distinct character to the city appearance.
4. Water offers good facilities for shipping where by a communication links gets established with other nations.
5. In order to get a better view and the cooler breeze of the water, most of the buildings units of the settlements are generally two storeyed in height.
6. Coral stone which is the product of the sea has been used extensively in the construction of the buildings and structures giving a unique character to the settlements.
7. Because of the presence of salt in the water vapors, the generally very high humidity results in the erosion of the buildings materials such as steel, concrete etc. thereby reducing the life of the structure.

#### **1.4.3.3 Tradition and Western Impact**

Religion which forms a part of tradition has had its profound impact on the built form of settlement, particularly in developing units (Fig. 1.25). The Islamic laws required the organization of a house such as to provide maximum privacy. Some of the traditional houses have developed even double circulation system. One of the main characteristics of the traditional house in these settlements is the central courtyard which for many centuries remained the dominant element in the plan of Iranian houses.

Due to the courtyard position within the house, the courtyard is much quieter than the alley ways. The social convention of providing privacy to each family was another major design consideration which gave muslim houses an inward orientation. The openings were constructed in such a way as to prevent any one introducing unseen in to the intimacy of his neighbour's life.



Since the roof was used for sleeping for about six months in a year and for reasons of ensuring privacy of a family, no house could look down upon its neighbour nor could one house look into the court of another (Fig. 1.26 & 1.27).

This prescription effectively limited most houses to two storeyed above ground. Such self-imposed social restraint was much more than mere good neighbourliness. There are very few openings in the alleys (Kuchehs) for safety and privacy purpose.

Buildings, particularly dwelling units, were therefore, a culmination of influences from the religion, the climate and the social conventions. The vernacular solutions emerged through an evolutionary phase over several centuries before they came to stay. It, therefore becomes all the more important that deserved attention to the traditional form of the built environment be paid, at all times, for projects aimed at revitalizing or modernizing the historical cities and particularly their historic core.



Fig.1.25 : High Walls for privacy



Fig.1.26 : One or Two Storeyed Houses  
in Bandar Imam



Fig.1.27 : Windows for Privacy

### 1.5 URBAN GROWTH AND DEVELOPMENT

There has been a dramatic transformation toward urbanization in recent decades. Population growth is high (8.46% per year <sup>17</sup>) and there are changes in the social system, particularly in larger towns and cities. There are changes in the mode of travel, the life-style has undergone a tremendous change and the individual is now less dependent on the large and extended family both socially and economically.

On the other hand, some indigenous factors make it difficult to predict, and control the settlement growth in a rational way. Some cities have virtually established their growth while others continue to boom effectuated by forces that accelerate the growth of some cities in a rather unusual and orthodox manner.<sup>18</sup> Several settlements attained some kind of importance and entered a period of rapid development due to one of the above factors. Most settlements with new found oil wealth experienced accelerating standards of living, as well as, new transportation and communication networks. The agriculture-based economy gave way to other economic sectors affecting dramatic shift in population distribution with increasing concentration in urban areas.



The phenomenon of urbanization underway in the Zone is attributed to motorway that has imposed its order upon the structure, morphology and organization of existing urban spaces. The character of the settlement development has not only affected but also destroyed some parts of the traditional urban spaces. Bulldozing of traditional buildings and clearance of for redevelopment, and sudden removal of their context by reconstruction in the vicinity have all contributed to alteration of the traditional urban character of the traditional cores.

Some Persian settlements, faced with unprecedented urban pressure looked up to the west for answers believing that western engineering and design solutions, planning and administrative concepts, could all be successfully applied to modernizing Iranian societies. The low density western style urban development occurred outside the walled city largely out of rythm from the traditional Persian islamic city, and the implementation of the typical grid plan for laying out of utilities and transport networks ignored the local social needs and customs. The entire urban fabric has undergone drastic charges. Consequently, architectural and urban character which the historic core once possessed, has been seriously damaged (Fig.1.28) by applying unsympathetic modern development.



Fig.1.28: Historic Core Bandar Lengeh Which is Seriously Damaged

Unfortunately, the traditional areas were the worst affected. The construction of new roads is the single largest factor in destroying the traditional urban fabric (Fig.1.29). New developments, which overshadowed the traditional structure, curtailed the latter's privacy, flow of cool breeze and changed the micro-climate.

The general problems faced by the settlements along the Arid Coastal Zone are:

- (a) Lack of proper criteria for planning and physical design demonstration, community facilities and services in the new developing areas of the settlements, as well as, in the old core areas, unable to keep pace with the growing population.
- (b) Increased land and building costs, coupled with decreasing land availability, have particularly affected the dwellings of the lower income groups changing the situation from a compact organic living to over crowding in old core area (Fig.1.30).
- (c) Lack of criteria for matching the old traffic system and situation with the proposed one.

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In this context, Bokhari has suggested, that the modernisation process must always be guided rather than permitted to become the guide. Borrowing from the international culture together with technological cooperation may be necessitated by circumstance but it should essentially be selective and adoptable.



### 1.5.1 Future of the Settlements

The transformation from the traditional to the modern settlements along the Persian Gulf is instant which is due to discovery of oil as mentioned before. The modern city development in the Arab countries on the other side of Gulf and coupled with the modern trends of planning and design have totally changed the character of big cities like Bandar Abbas. In the case of other settlements, such as Bandar Lengeh and Bandar Kong, the proposed plan by the authorities has not been implemented for not being feasible and practical. For future development, the traditional areas and the old core have either to be demolished or have to remain without any improvement and no changes are to be proposed.

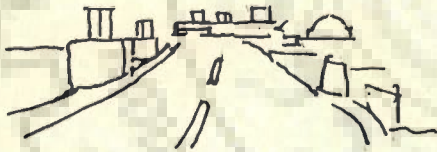


Fig.1.29 : A New Road Constructed in the Traditional Urban Fabric.



Fig.1.30 : High Density Core Area of Bandar Lengeh



Fig.1.31 Seaside Profile - Bandar Lengeh

A city life and spirit lies in the city centre and therefore, demolishing the traditional structures, for more intensive developments may prove uneconomical in the long run. The preservation of historic core should not be seen as a cultural fancy but viewed as a major step towards urban renewal. Unfortunately but for the historic cores very little has remained which genuinely be called indigenous in big settlement like Bandar Abbas.

The traditional core urgently require conservation, otherwise in future there will be nothing to sustain a continuity with the indigenous architecture and built form of the old traditions. The present needs to be viewed with a full understanding of the city history morphology, continuity and the process of transformation and the future should be planned with this understanding so as to provide appropriate solutions for city problems two cases in point refer to the port settlement of Bandar Lengeh and Bandar kong. The history and architectural heritage of these settlements provide enough opportunity and practical relevance to modern planning.

The evolution, expansion and changes in these settlements have always been associated with many signs of spatial continuity.

These settlements have some splendid examples of harmonious juxtaposition of narrow streets and open spaces which evoke a variety of emotive feelings and experiences when traversed upon (Fig.1.31).

The urban morphology of these settlements together with their qualitative space values, the criteria of creating such kind of physical environment for attribution to future planning, need to be well understood before modifications are made, else, it should be allowed to remain untouched.



### 1.5.2 Contemporary Problems

"Oil boom" was the major reason for the post 1950 developments. A total change took place in the socio-economic image due to the exponential rise of oil revenues received by the Gulf countries. In migration of the rural folks to the urban areas, added to the latter's population abundance. A forceful implementation of alien and imported planning techniques, have caused an almost full breach and rupture of the traditional urban built forms. Which have affected, patterns and values of traditional, Islamic settlements, particularly by the superimposition of wide boulevards that have unsympathetically divided the otherwise indigenous organically coherent and logical urban form.

### 1.6 CONSTRUCTION MATERIALS AND TECHNOLOGY

Construction materials and practices in the settlements along the Persian Gulf, as elsewhere, have gradually changed from the traditional (Fig.1.32) to the modern. All regions of Iran have however not undergone the same degree of change. The availability and utility of local building materials and the economic development of the region have been the influencing considerations.

An examination of the materials and techniques for each major element helps to clarify the picture. Most of urban Iran uses baked clay bricks for load-bearing wall and roof construction. A major exception is in the case of traditional buildings, along the Gulf where coral stone is plentiful. Recent years have witnessed a small scale introduction of hollow concrete blocks in periphery area of the settlements. Dwellings in the villages are generally made of sun dried bricks.

Roofs and floors have been traditionally constructed of timber, most of which had to be imported from India and Africa. In these settlements, the traditional system of flat, domical and vaulted roof are very common. A major change came about after the first world war when imported steel joists were employed for floors and roof construction, particularly jack arches made of bricks resting on steel (I-Section) beams, which have now become synonymous with the traditional systems. Of late, in construction for middle and upper classes, reinforced concrete has been recently accepted for roof slabs.

Brick had been traditionally used for paving rooms and courtyards before the introduction of cement tiles. More appealing alternative, presently in use, is the terrazzo or marble tile slabs.

For the construction of doors and windows, timber was formerly the only material used in the better off urban buildings (Fig.1.33). Timber flush doors and steel doors are extensively used today. Rolled aluminum sections for doors are used for the more expensive buildings.



Fig.1.32 : "Berkeh" built with Coral Stone and Lime Concrete

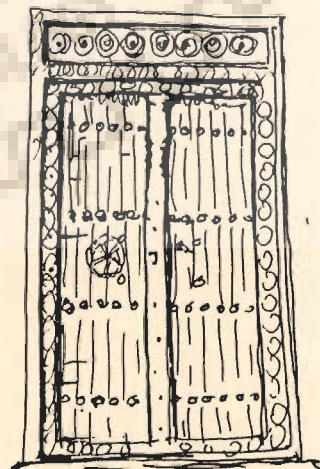


Fig.1.33 : Timber has been used for Doors and Windows





## CHAPTER 2

## CHAPTER 2

### BACKGROUND OF IRAN - THE REGIONAL CONTEXT

#### 2.1 ABSTRACT

The chapter presents a general historical background of Iran. A review of urbanization and urban planning about Iran has been incorporated to provide a framework of the settlement patterns and their location in the context of their historical background, socio-economic structure, religious mores, climatic and physiological factors which have influenced life style of people and their physical habitat at different community levels.

At the macrolevel, the "Shahrestan" (a provincial district) is discussed in the context of its regional location, population distribution, transport network, geological influences and the location of settlements, which in this specific case relate to district towns of "Shahrestan-E-Lengeh" and Bandar Lengeh. The influence zone of Bandar Lengeh, has been determined according to economic, social, cultural, political and administrative impacts on the surveyed region.

At the micro-level, the discussion focuses on climatic as an outcome of the moderation influenced by the Gulf waters, particularly, with a specific realization that the area has a very low rainfall but generally a high humidity. The temperature touches  $50^{\circ}\text{C}$  with not much of variation occurring between day and night temperatures, unlike Hot Desert Zones.



## 2.2 GENERAL BACKGROUND OF IRAN

Man has lived in this region as early as the Paleolithic period.

"Strong typological information suggest from the early stage down to the first traces of settled village farming communities have been gathered from various parts of Iran. The material collected from this time-period represents the stone Age industries from nearly 1,00,000 to 12,000 years ago".<sup>1</sup>

The transitional Period from food-gathering to Food-Producing ways of life, have lasted for some 2,000 years. After that village farming communities have appeared all over Iran, with the remains of rather developed settlements appearing about 8,000 to 7,000 years ago

Vast settlement displaying urban planning soon appeared on the Iranian plateau, and, on the south western and south eastern alluvial plains.

"Certainly by 7,000-6,500 B.C. archaeological evidence suggests that the ancestors consumed grains which were cultivated for food in western Iran".<sup>2</sup>

Improvement and development in the field of agricultural technologies and better harvests eventually caused increases in population, which affected the growth of settlements. The economic interactions between these types of early villages with surplus agricultural goods played a very important role in the development of other technologies in ancient times. As a result of the physical growth of the settlements, various socially organized institutions of a religions, economic or political nature appeared, accompanied by

institutional centres in the form of some sort of public structure, of which the "Painted Building" unearthed at Zagheh may be considered as one such early type of monumental architecture (Fig 2.1).



Fig. 2.1: Zagheh Ruins in Iran

From 6th to 7th millennia B.C. various sites of settlements can be observed in Iran Tappeh Hassar in Damghan, Tall Iblis in Kerman, and Chogha Zarbil and Haft tappeh in Khuzestan.

Although several important structures survive from Achaemenid period. But our knowledge of urban planning in general is very little, since the surveys and excavations into this period have chiefly concentrated on monuments such as Pasargadae, Persepolis (Fig 2.2) and Susa. and the palatial centres of the dynasty.

At the beginning, the Parthians were built on a circular plan. Nisa, Meru and Asak are the other examples. Due to its feudal structure, military considerations were paramount. Later, square, rectangular, polygonal and



circular shape of plan were used by the Parthian rulers. Citadel and double fortification walls were also dominating feature of this period. Urban Planning reached to its peak during rule of Mehrdad I and II (138 B.C.).

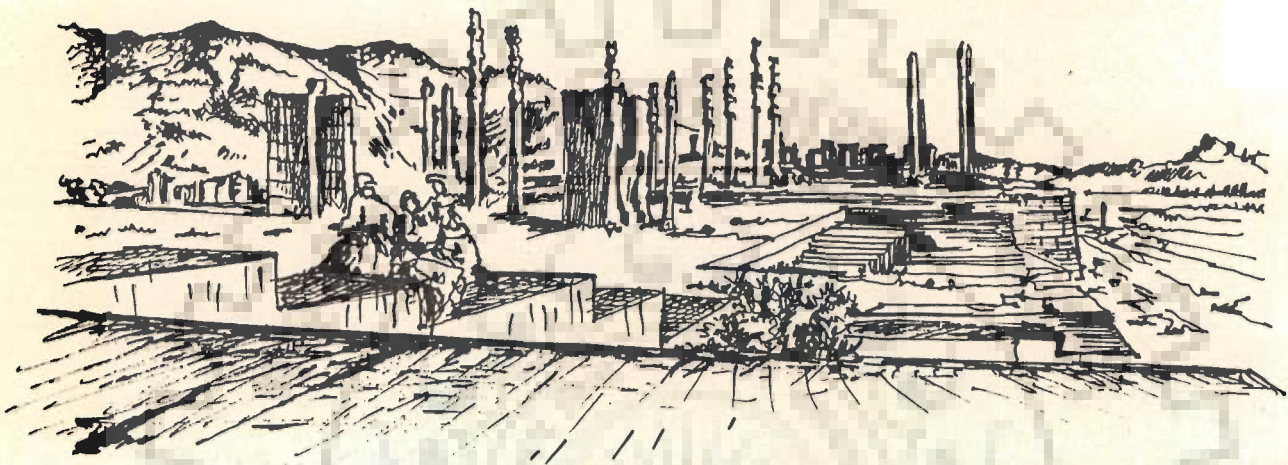


Fig. 2.2: View of Persepolis

A newly-founded Sasanian city had a rectangular grid of street, an orthogonal cross of the main axis, and a more or less rectangular outline fortified with moat walls and rounded bastions. According to differences of function or social rank, the city was generally divided into two or three different zones.

Royal residences and major religious centres were not always connected with the city. Great places and fire-sanctuaries were found to be away from the city at the end of Sasanian dynasty (632 A.D.).

With the emergence of Islam, the tradition of the Sasanian Period continued into the Islamic period, and adopted to cater for the function and appearance of the Mosque, "Madrassah," "Hosseinieh," "Takkieh," "Mussallah".

"In general, urban planning in the Islamic period can be divided into early, middle and late periods, but in all periods one consideration was common; that the city was a place of military power and an official centre".<sup>3</sup>

Various sections like administrative government, industrial section, the complicated system of water supply, commercial (Bazaar) residential and industrial architecture, with their insights into social stratification were forming principle for the Islamic cities.

During the last 40 to 50 years, Iran has been going under many socio-economic and cultural changes due to western impact on urban planning. At present Iran, covers an area of 1,648,195 square kilometers. About 90% of the Iranian land is situated within the bounds of the Iranian plateau and the country can therefore be considered as belonging to the mountainous type. More than half of Iranian soil is covered by the mountains, quarter by the deserts and less than quarter remains for agriculture purposes.

About 10.93% of Iran covered by the forests, 55.5% of which are the Western Oak forests of the North bordering the southern fringes of the Caspian Sea. The pistachio forests, scattered in the South and East, claim another 13.31%, the mountainous, forests of areas cover 6.6% and those of warm country and Kavir forests constitute 5.6% of all (Fig.2.3).





Fig.2.3: Land Resources of Iran

(Source: Statistical Centre of Iran, 1984)

The country is divided into 24 "Ostans" (Provinces) 195 "Shahrestans" (Districts) and 498 "Bakhsh" (townships). The district which is a sub-division of a Province, consists of a certain number of townships and also a central town or a city. This main town or city of each district usually bears the name of the district itself. Further sub-divisions of a Township are "Dehestans" (rural areas).<sup>4</sup>

### 2.2.1 Tradition - Customs and Religious Beliefs

Life style of people in Iran has been influenced by their religious beliefs. From almost 1300 years ago Islam has been adopted as their religion by majority of people (98.81% are Muslims). Therefore in Iran Social life is still traditional and owes most of its customs to the traditions of Islam. Customs and religious beliefs are some of the chief factors responsible for the transition in ways of life and urban process from the traditional Persian settlements to the modern city. Before the advent of Islam most of Iranians were Zoroastrians. But, in 640 A.D. (Hijrat 21), when "The well equipped Iranian army in two main battles were defeated from then on Islam gradually spread throughout the land and extended beyond".<sup>5</sup> A dominating feature of every settlements has become the strategically located Mosque after the emergence of Islam.

### 2.2.2 Socio-Economic Scenario

The Iranian monetary unit is Rial and Rials 10 is one Tooman. A US dollar equalled Rials 83. In the year 1981 The Gross National Product was over Rials 6305 billion and National Revenue was Rials 5,872 billion. The per capita income was about Rials 1,50,500. The component of Gross National



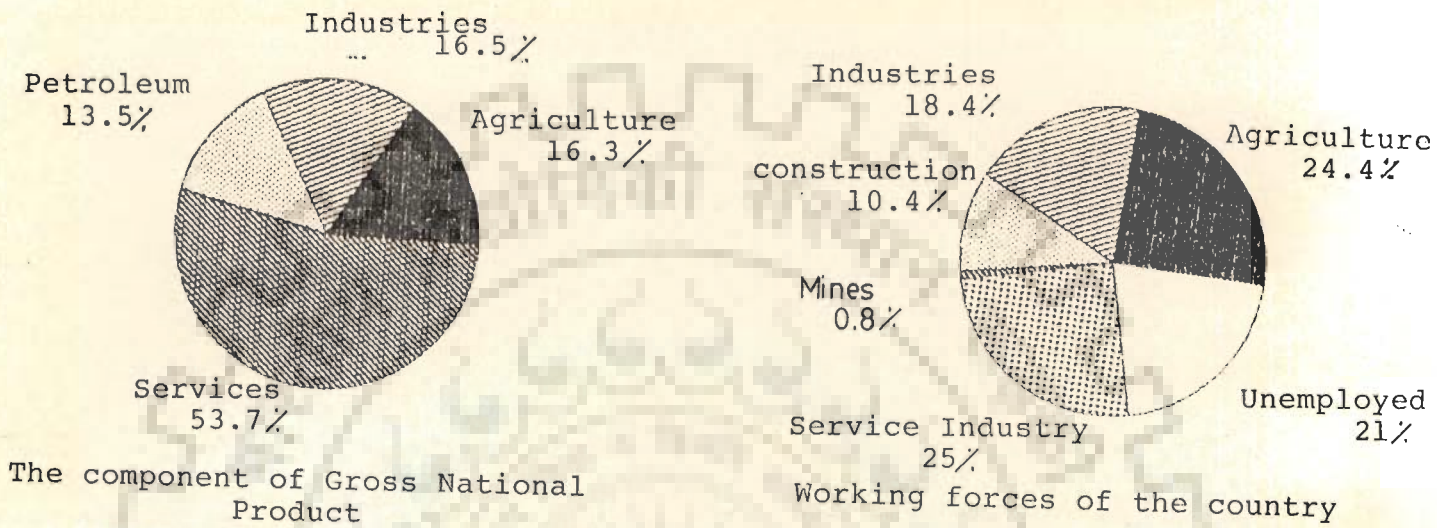


Fig. 2.4 Economic Indices 1980-81  
 (Source : Embassy of I.R. Iran, *Iran*, 1987.)

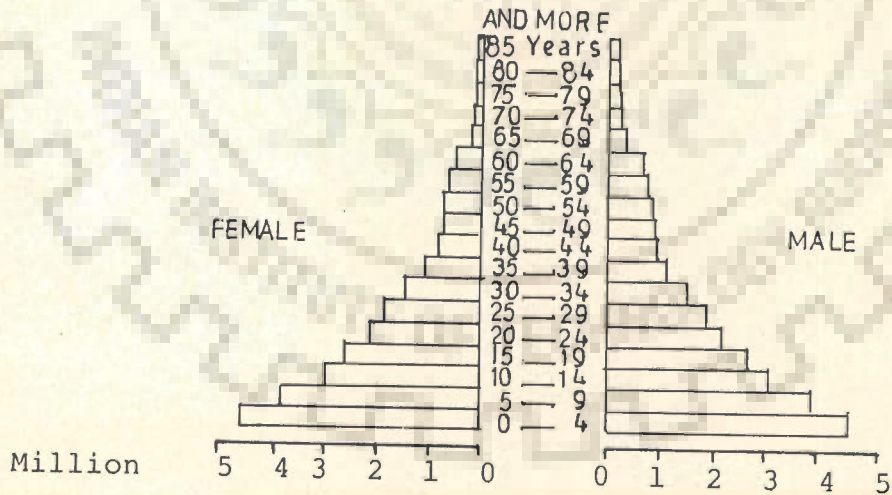


Fig.2.5 : POPULATION PYRAMID OF IRAN-1986

Table No.2.1 : FAMILY SIZE

Rural	Urban	Overall
5.4	4.8	5.1

(Source : Statistical Centre of Iran, 1986)

Product were : 16.3% agriculture, 16.5% industries and mines, 13.5% petroleum and 53.7% services Out of 11'489'000 working force, 24.4% were in agriculture, 18.4% in industries, 10.4% in construction, 0.8% in mines and 25% in (fig.2.4)the service industry. The unemployment constituted 21%.

Just like any other developing country, Iran has a high child mortality rate and low productivity (population growth 3.2%) and These drawbacks are unequally distributed all over the country. The urban areas have a slightly better situation (see Fig.2.5 & table 2.1).

In the big cities, people have better access to public and social services, than that of smaller towns and villages. Recently, Government has undertaken different rural planning projects which may help to improve the rural living environment.

## 2.3 REGIONAL SETTING OF BANDAR LENGEH AND BANDAR KONG

### 2.3.1 Geographical Location

The settlement of Bandar Lengeh and Bandar Kong are located in the Province of Hormozgan which is in the southern part of Iran along Persian Gulf (Fig.2.6). This Province is only  $2^{\circ}$  above the Tropic of Cancer. The capital of this province is Bandar Abbas, the Length of this Province is 700 km, and its total area is 68472 Km<sup>2</sup>. Many of the islands in the Persian Gulf are parts of this province. The natural boundaries are, the Zagros mountains in the North and the Persian Gulf and Oman Sea in the South (Fig.2.7) of the two settlements.



The temperature is usually high that it reaches a maximum of  $54^{\circ}\text{C}$  in Khuzistan. There are hot summer and mild winters with no great temperature variation between day and night in different seasons.

Due to the altituded and height of the Alborz Mountains in the North and the Zagros Mountains in the west the hinterland of the Iranian plateau has a dry desert climate. As one proceeds from the west to the east, and north to south, the winds become less and less moisiturous while the temperature goes on increasing. The climate in the low lands of central, Eastern and South Eastern is dry which is extremely cold in winter and hot in summer.

Bandar Lengeh and Bandar Kong are only Six km. away from each other, located at longitude of  $54^{\circ} 54'$ , and latitude of  $26^{\circ} 33'$ .

### 2.3.2 Climate Of The Zones

Iran has a diverse climate. The climate in the north (southern shores of the Caspian Sea) is mild and temperate with an average annual temperature of about  $18^{\circ}\text{C}$ . The climate in the Western part of country, is of Mediterranean type whereas in the southern sector, it is influenced by semi-desert conditions, despite the humidity present all over.

Although the Arid Coastal Zone of Iran is situated in the Northern moderate latitude, but being close to the equatorial zone, there are no four clear seasons. The only dominating seasons are winter and summer .

The Persian Gulf and its Coastal Zone are the hottest among the other areas of the latitude (Appendix B-1). Winter winds blow parallel to the sea



Fig. 2.6: Climatic Divisions of Iran  
(Source: Statistical Centre of Iran, 1984)

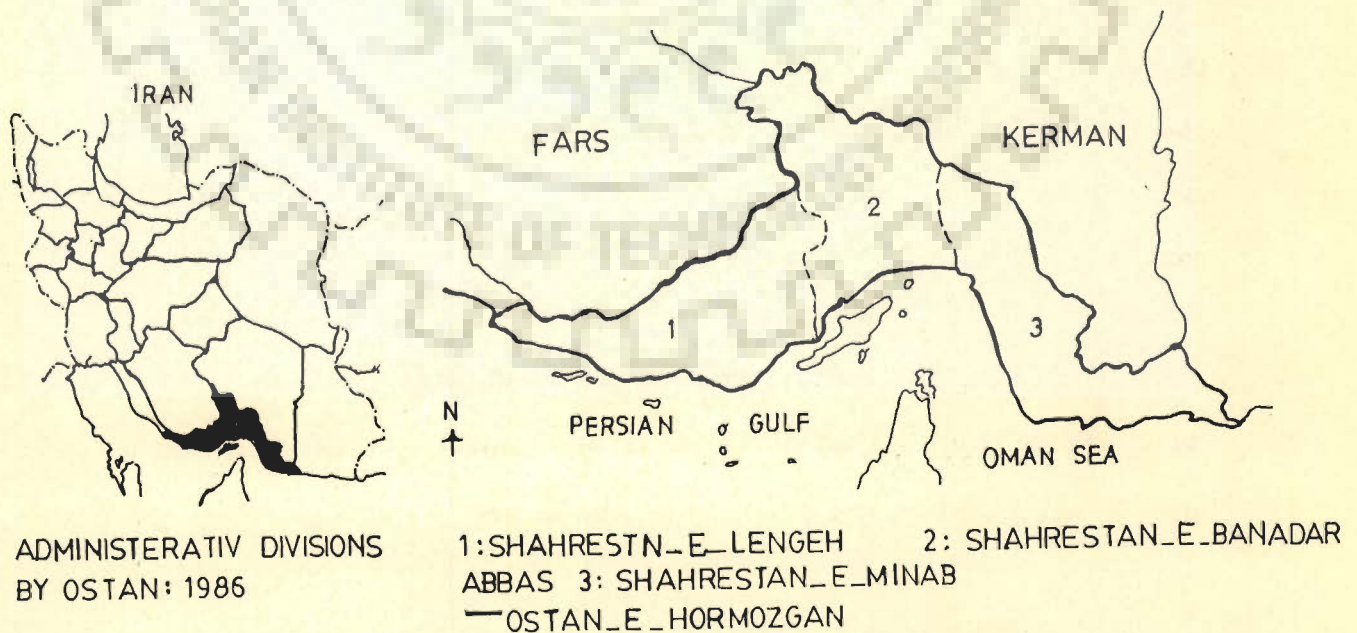


Fig. 2.7: Ostan\_e\_Hormozgan



shore form North West to South East and the dust carrying summer winds blow from North-West and South side (Appendix B-2 & E ).

Humid wind is known as "Ghous" wind in Bandar Bushehr, Bandar Abbas and Bandar Lengeh. It is a disturbing wind of the Northern Coastal area. It increases the humidity which creates uncomfortable living conditions. In winter, there are formidable storms along with dangerous whirlwinds.<sup>6</sup>

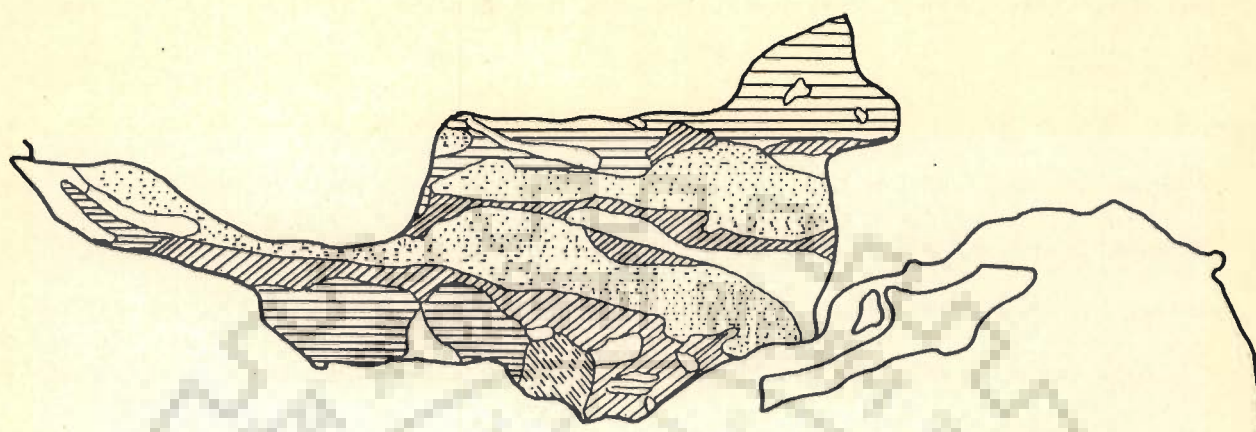
The climatological characteristics make the cities of Lengeh and Kong hot and humid weather, with a very hot long summer, and a short and moderate winter, (not below 6<sup>0</sup>C to 7<sup>0</sup>C). The style of the Architecture and the sitting of different envelopes in urban fabric and the use of air conditioners have helped the inhabitants to live in this zone.







There is low rainfall and it may rain in winter (Appendix B-3). The rain that falls in these zones is torrential, turbulent, brief and sparse and often causes floods because the intense, brief rainfall does not have time to seep into the ground.

### 2.3.3 Geological Aspects

The geology of arid coastal zone (Fig. 2.8 & 2.9) is related to the geology of the Persian Gulf, therefore it is necessary to have an idea of the Gulf morphology. The coastal area of the Gulf belongs to the Pliocene period. The kind of stones found there, are: lime, salt, coral and sulphur due to the existence of volcanos.

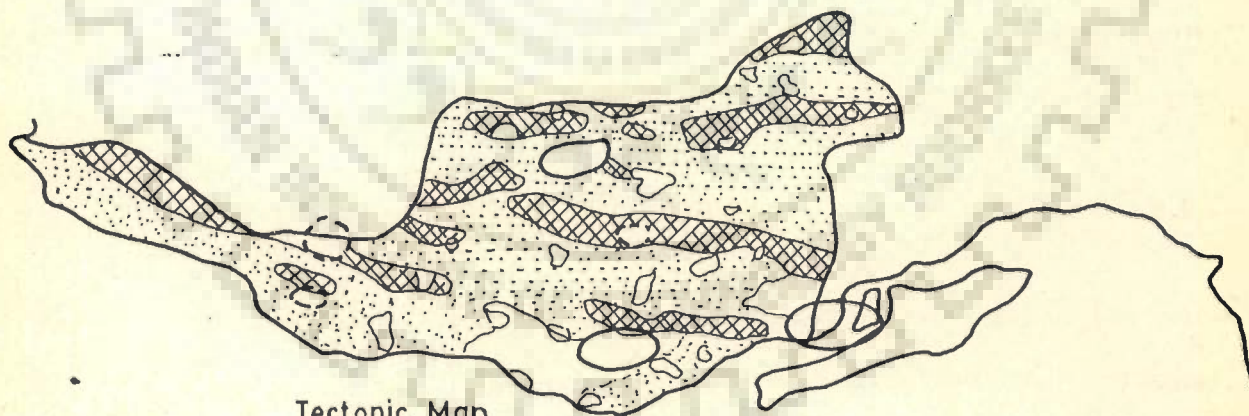
The Alpine pressure has effected the old layers of the pliocene and has brought up the cambrine salt from lower layers which appears like domical salt



- |   |   |   |  |
|---|---|---|--|
|  | Calcerous Lithosols Desert and Sierozem Soils             |  | Saline Alluvial Soils                          |
|  | Solonchek and Solonetz Soils                              |  | Salt Plug                                      |
|  | Coarse Textured Alluvial and Colluvial Soils and Regosols |  | Calcareous Lithosols Desert and Sierozem Soils |

Most of the land is not good for agriculture  
 Total agriculture land is 55 hectares in Shahrestan-e-Lengeh

Fig.2.8: Soil Map of Shahrestan\_e\_Lengeh



Tectonic Map







- |   |                                |   |                  |
|---|--------------------------------|---|------------------|
|  | Unbreached Salt domes          |  | Inter Bomal High |
|  | Fors Groap                     |  | Hormoz Saltplugs |
|  | Asmri Jurassic Last Anticlines |  |                  |

Fig. 2.9 Tectonic Map of Shahrestan-e-Lengeh

(Source : Ministry of Housing and City Planning, Iran, 1983-84)



formation.<sup>7</sup> In the Lengeh and Kong region, 20 cm stone layer exists at 40 cm depth from the surface. However, the existing Quality of stone has a very poor bearing capacity.

One of the difficulties in the Northern side of city is digging the well due to this hard layer of stone. Although there is no need for foundation for building in many places but at the same time the hard land creates problem in providing the infrastructure for the settlements (passing of cables for electricity, water supply, and sewage etc.).

#### **2.3.4 Transportation**

##### **2.3.4.1 Water Network**

Water is one of the important media of transportation in the Islamic republic of Iran which is connected to the outside world from various harbours in the Oman sea and Persian Gulf. Bandar Abbas is the biggest port, the other ports are like Bandar Lengeh, kong, Jask, Serik, Khamir, Mogham, Moaalem and Charak. Shahrestan-E-lengeh, is an administrative Subdivision of Hormozgan Province and has many small and big ports such as Bandar Lengeh and Bandar Kong which have better jetty facilities and break-waters (both man made and natural) for loading and unloading.<sup>8</sup>

##### **2.3.4.2 ROAD NETWORK**

According to the Census of 1982,<sup>9</sup> out of 2123 km of road network 100 km. were asphalt paved. Province of Hormoagan is one of the poorest regarding road network (Fig. 2.10 & 2.11).

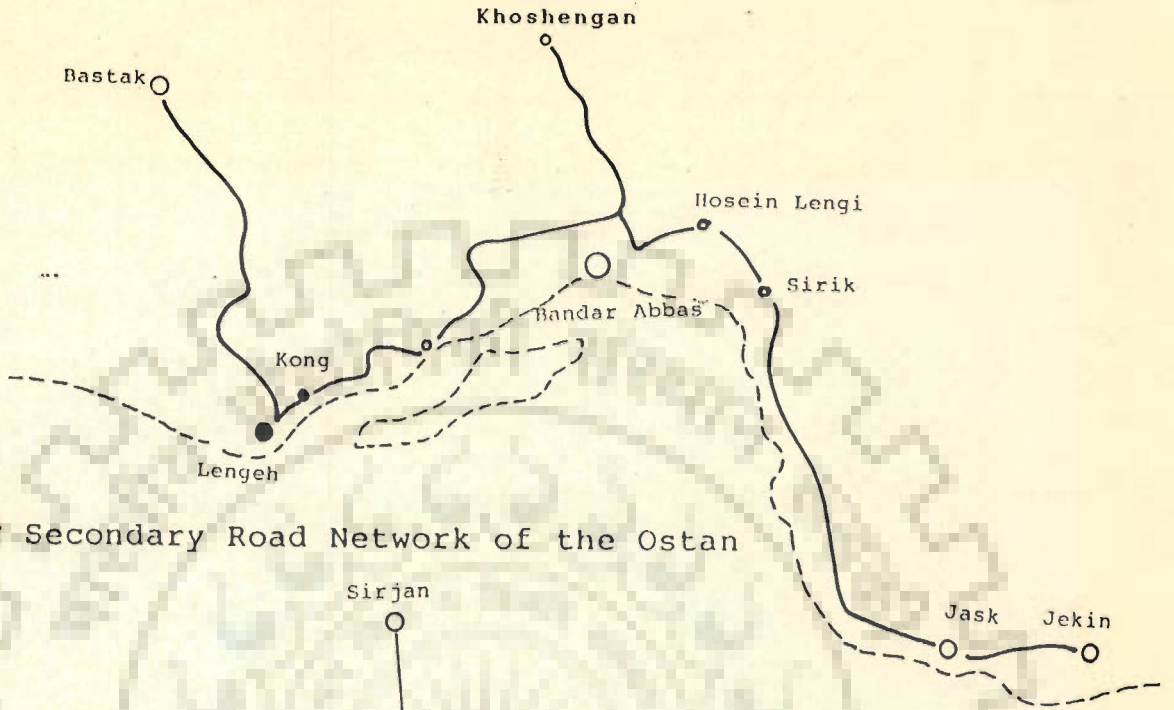


Fig.2.10: Secondary Road Network of the Ostan

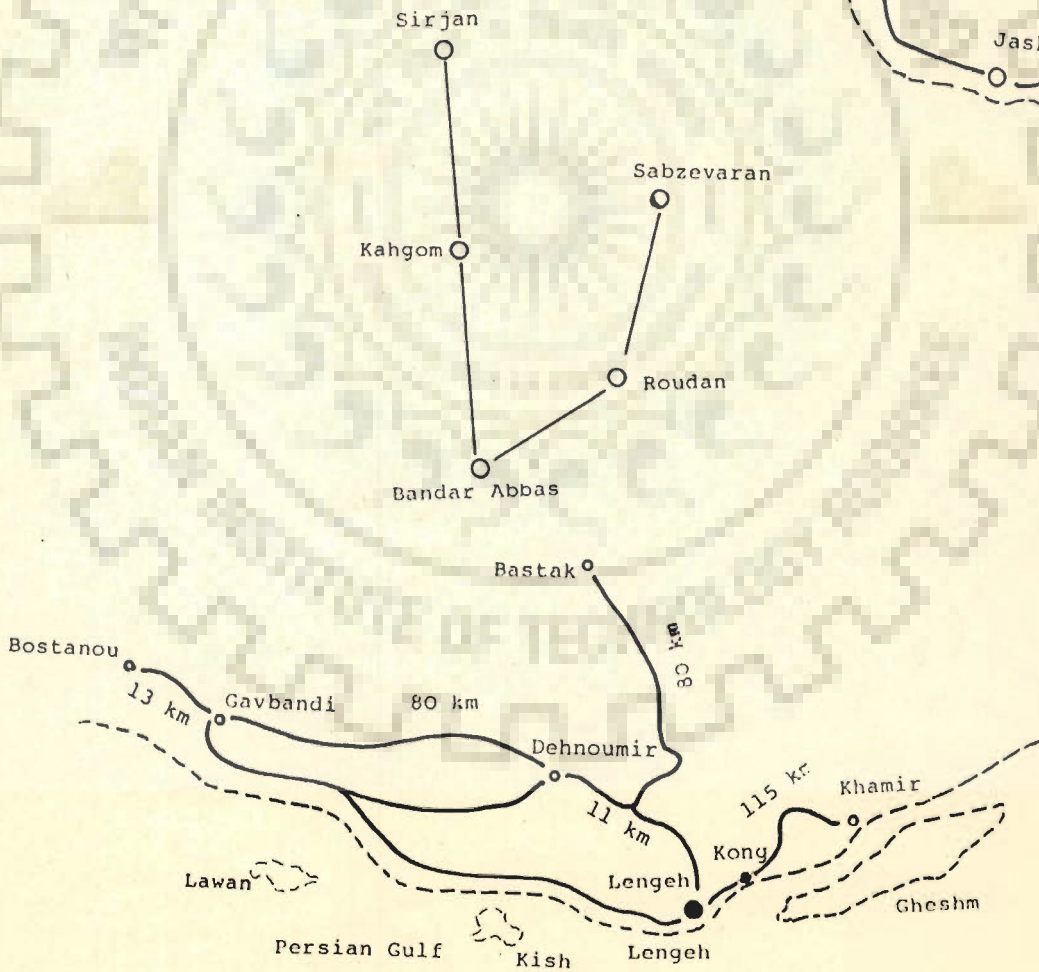


Fig.2.11: Road Network in Shahrestan-E-Lengeh

(Source: Ministry of Housing and City Planning, Iran, 1983-84)



Bandar Lengeh has 2 main gates from which traffic movement takes place. From East, it is connected to Bandar Kong, from which all regional traffic of Bandar Abbas, Bandar Khamir, Bastak, Lar and all other rural areas enter and leave. The next gate is on the West from where all traffic of Boshehr province and the towns situated in East of Bandar Lengeh enter and exit (Fig. 2.10, 2.11, 3.12 & 2.13).

#### 2.3.4.3 Air Network

Hormoagan province has 31 Airports, out of which 2 Airports of Bandar Abbas & Kish are international Airports, Bandar Lengeh airport has also served as an international airport in 1984.<sup>10</sup>

The city of Bandar Lengeh is connected to Shiraz and Bandar Abbas by means of air ways. It's airport is one of the active airports of the country which had the 4th position in air traffic activity of the country in 1984.

In connection with transportation network the connection of Bandar Lengeh - Bastak to Lar is under construction. Improvement of Lengeh Gavbandi highway and Gavbandi to Boshehr highways are given high priority - Provision of development of present port of Bandar Lengeh and construction of new ports in other settlements are the other share of development of the Shahrestan-E-Lengeh from the Regional Plan.

#### 2.3.5 Influence Zone

A city or an urban area can be the centre of economic, social, cultural and political activities. The extent of communication and relations to fulfill the requirements of various activities form the influence zone of a city.

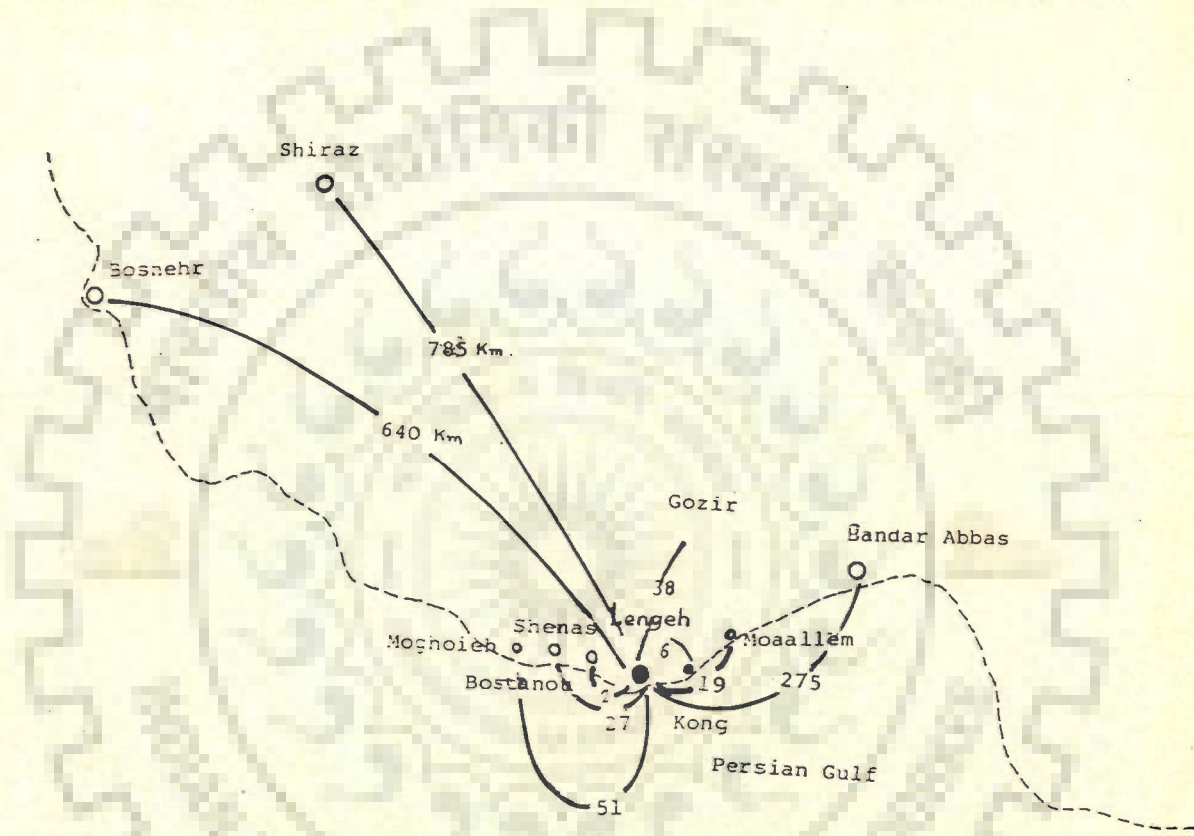
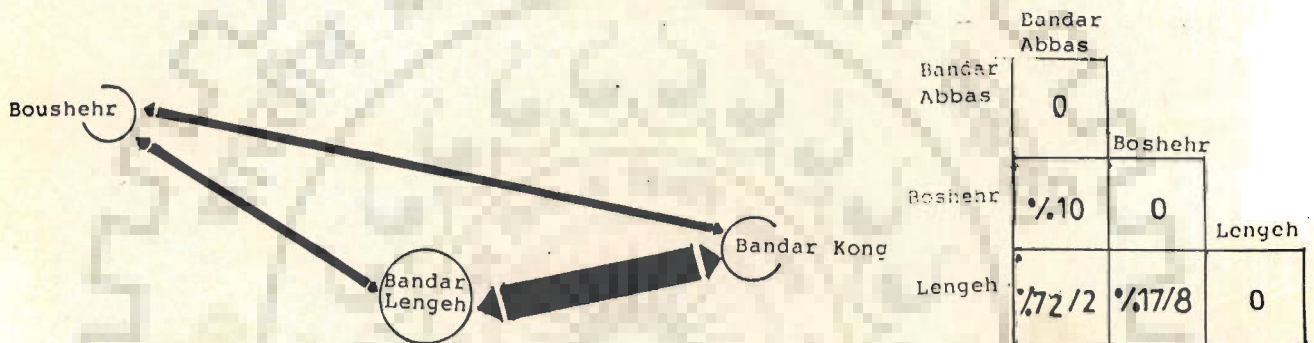
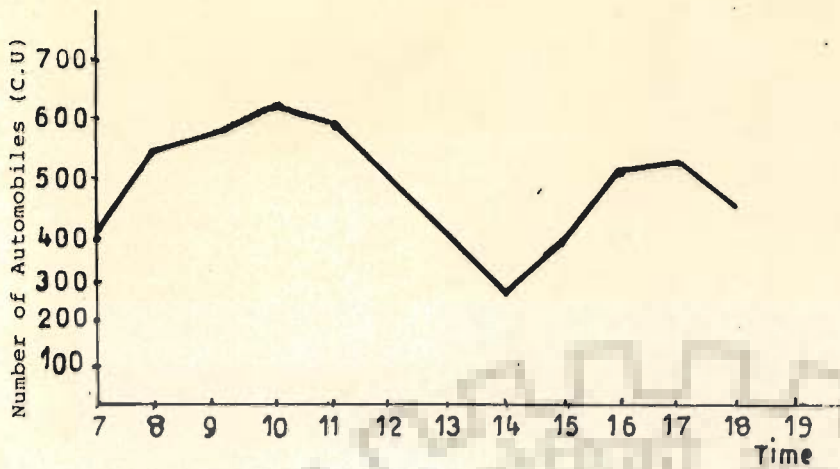


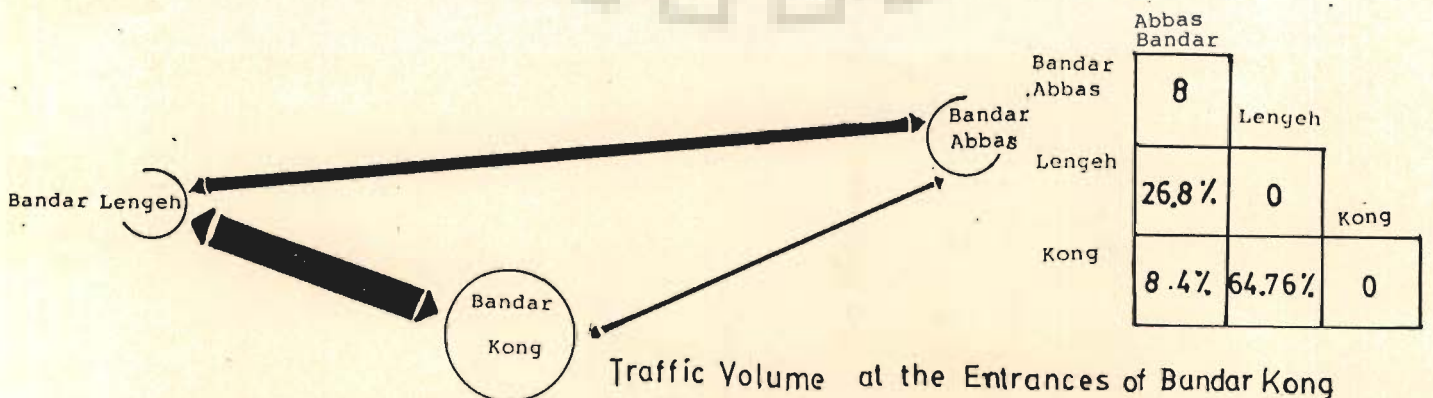
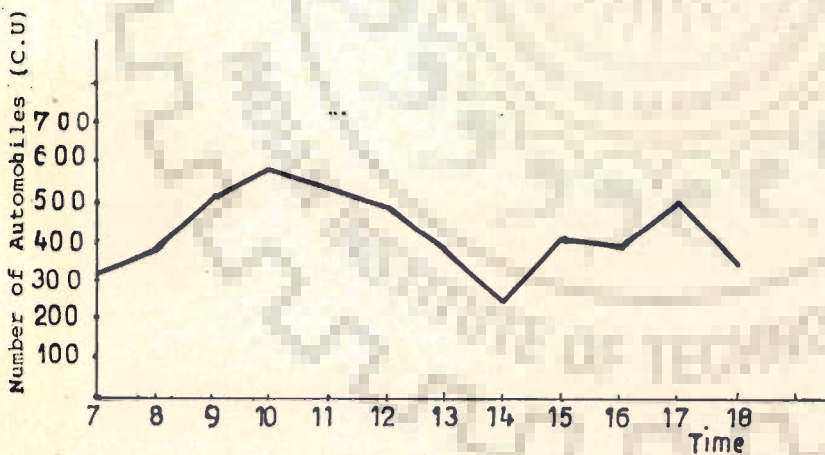
Fig.2.12 : Distance from other Places

(Source : Ministry of Housing and City Planning, Iran, 1983-84)





Traffic Volume At the Entrances of Bandar Lengeh



Traffic Volume at the Entrances of Bandar Kong

Fig.2.13: Traffic Flow to Bandar Lengeh and Kong  
 (Source : Ministry of Housing and City Planning, Iran, 1999, 64)

The influence zone of Bandar Lengeh and Bandar Kong has been determined according to the economical, social, cultural, political and administrative influences on surrounding urban and rural areas (Fig.2.14).

The influence zone of Lengeh and Kong is limited between the natural boundaries of Persian Gulf in the South, salt marsh of Mehregan and foot hills in the North, Sour river and Moghoueh mountains in West and mountains of Ashour and Hiran in the East.

#### 2.3.5.1 Socio-Political Structure

The influence zone had a population of 23295 in 1976 and 37247 in 1984 out of which 26078 are urban and 11179 rural. According to the growth rate of 2.8%, the future population of rural areas will be 14790 in 1994.

The oldest civilizations have taken place along the Persian Gulf and the Oman Sea (Arabian Sea). The most famous road of drugs had been passing through these areas. Portuguese, English, French, and Germans had fought for colonization of this area. For centuries Russians have had the fond of hope dominating over the Persian Gulf.

From Achaemenic dynasty to Safavid Dynasty (i.e., from 500 BC to 1501 AD) Iranians, and after that Portuguese came to the picture. Pearl fishing was very famous before the discovery of oil. After Portuguese, English people indirectly (through agreements) entered the Gulf and from Qajar dynasty onwards the famous places of pearl fishing had been converted in to a transportation corridor of oil shipping.



Name of some "Mahallehs" shows that, people had come from other parts of the country. These "Mahallehs" are like Minabi "Mahallehs," Roudbary "Mahallehs" and so on. (Minab and Roudbar are two cities of Iran). Even there are the "Mahallehs" of Bahraini (Bahrain is an independent country which was already part of Iran). The above shows the extent of the socio-cultural influence zone.

The city of Bandar Lengeh is the administrative centre of Shahrestan of Lengeh. Therefore people from all the surrounding rural areas come to do their administrative work in Lengeh. The Shahrestan of Bandar Lengeh which has four "Bakhshs" and 333 villages (Bakhsh is subdivision of Shahrestan). This makes the administrative and political influence zone of Bandar Lengeh.

Economic activities of influence zone of Bandar Lengeh are mainly fishing and agriculture. At present, the cities of Lengeh and Kong are neither agricultural nor industrial towns. Their economy-base is related to sea activities, primarily shipping, fishing and business of foreign goods.

Due to the shortage of health facilities in rural areas of the Lengeh Shahrestan and even in the south of Province of Fars, many people come to Bandar Lengeh for health care and hospital facilities. Therefore the influence zone boundaries which is already mentioned may not be correct in this context.

The ratio of economically active to the total population of the shahrestan is 48.8% and out of which 90.2% is employed and 9.8% is unemployed (Fig. 2.15).

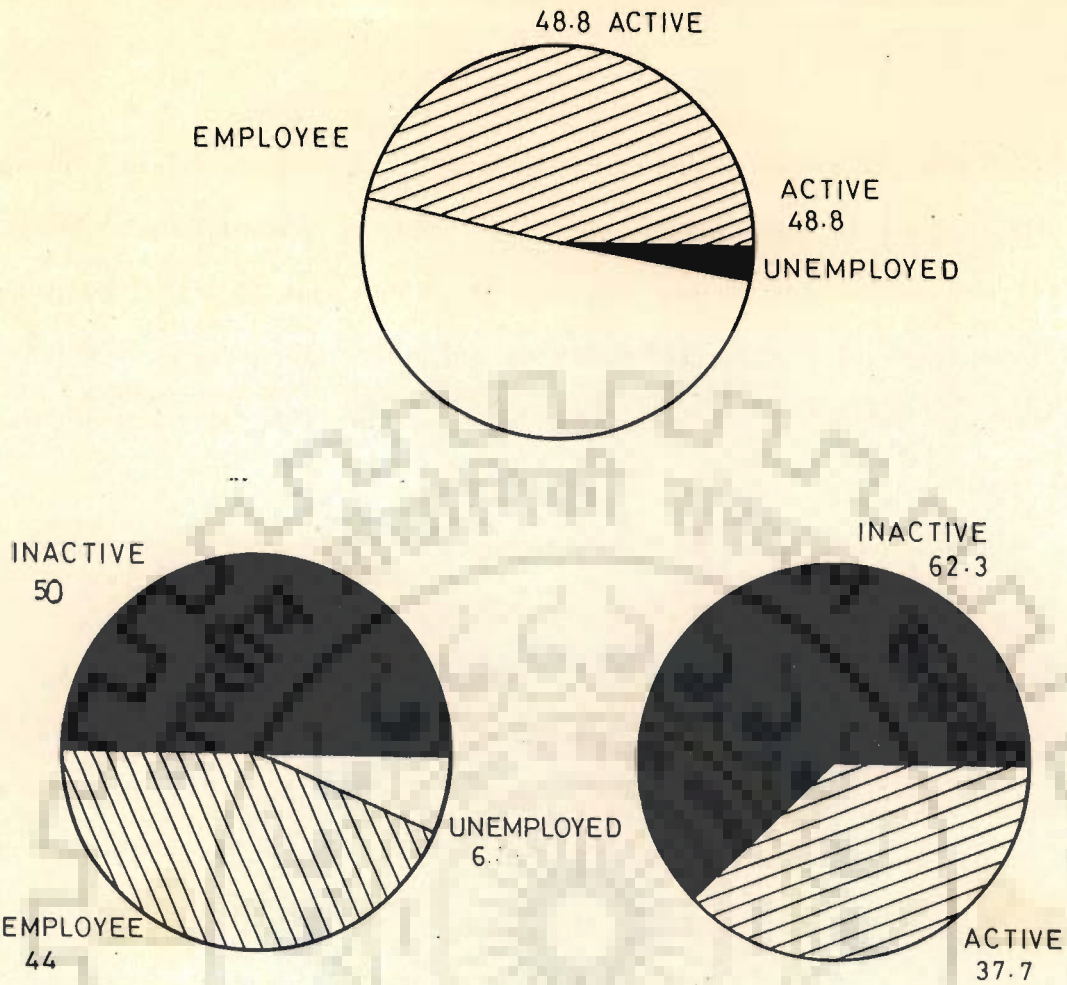


Fig.2.15 : Economically active and inactive 1983

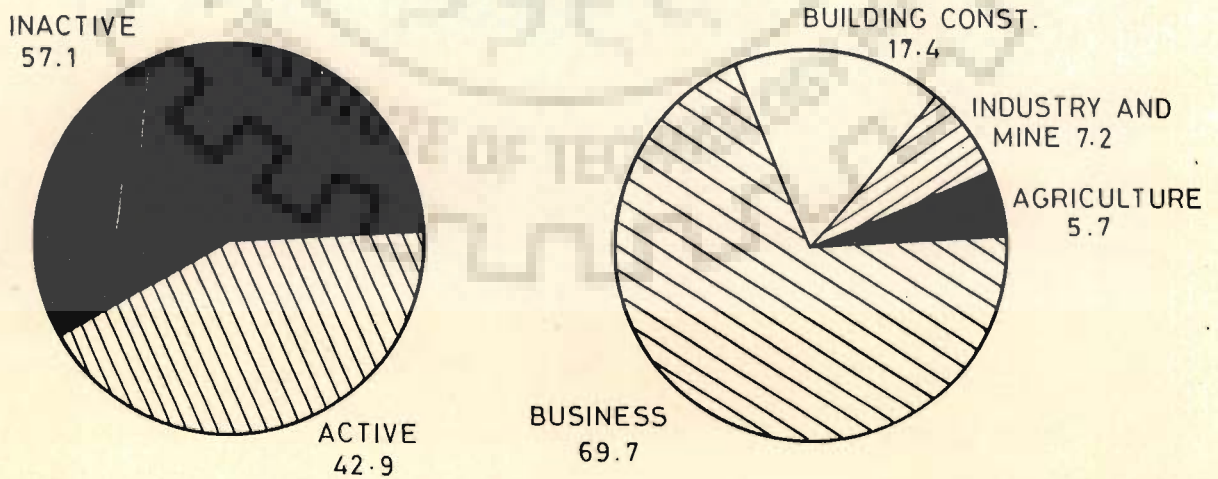


Fig.2.16 : Employee in shahrestan of lengeh 1976



In 1976 out of total agricultural land of 5510 Ha, 1260 Ha. was under agriculture use employing 5.7% in agriculture. For the same year 3576 employed in urban areas in "Shahrestan" of Lengeh 7.2% in industry and mining, 17.4% in building construction, 69.7% in business (Fig.2.16).

Out of three break-waters of the province two are in Lengeh and Kong and out of six jetties available in the province two are in Bandar lengeh and Kong.

Most of the surrounding villages have no Primary Schools. Therefore for higher educational facilities they come to Lengeh and Kong. For example from Bostaneh which is situated 36 km in the west of Bandar Lengeh 40 students were studying in Lengeh. The education influence zone can have a maximum scope of shahrestan limitation. Similarly Lengeh provides job opportunity for surrounding villages which results in daily traffic between rural and urban areas.

### 2.3.6 Water Supply (drinking)

There are hundreds of water storage tanks known as "Berkeh" in the rural areas around Lengeh. In case of drought Bandar Lengeh has to provide drinking water for people. Therefore the villages of the surrounding hinterland are primarily depending on Bandar Lengeh for the supply of drinking water in case of a drought.

All villages in the region are located near the floodways to get rain water for their supply. They have no water supply pipe line (there is not much of water to be supplied through the pipe line).

### 2.3.7 Development plans and Programmes

According to the requirements and available resources in the rural areas of influence zone, the following proposals are given in a development plan already proposed in 1983.<sup>11</sup>

- a) Development of Fishery Installations (Shilat)
- b) Provision of providing dam at the estuary to get water for agriculture and drinking purposes.
- c) Provisions of health centres, hospitals, electricity and communication development to control the migration, are the other proposals for the zone (Fig 2.17).

### 2.3.8 Share of Shahrestan-E-Lengeh from the Proposed Regional Plan.

One of the major reasons of migrations from rural areas which are away from the seashore is the shortage of water for agriculture (1.4% rural growth rate and 8.46% is the urban growth rate). Therefore, it has been proposed to put up industries of fishery and ship building. But the above proposal will not help the existing population distribution in the "Shahrestan". Therefore in the Master plan (1983), it is proposed that according to the policies framework of Islamic Republic of Iran regarding improvement of agriculture, and to control migration, agriculture shall be given more importance.

Therefore provision of water by controlling of floodways, agricultural facilities, and electricity etc. for villages far from seashore becomes important. Co-operative ship-building, fishery industry, rural fishing and handicraft are the economic activities which can play an important role in upgrading of the economy.







# CHAPTER 3

## CHAPTER - 3

# CASE STUDY BANDAR LENGEH AND BANDAR KONG – URBAN PLANNING AND URBAN DESIGN STUDIES

### 3.1 ABSTRACT

The historical past of Bandar Lengeh and Bandar Kong; their circumstances of growth, decay and development, Geography of the place and urban growth dynamics are incorporated here.

The emergence of these port settlements bear strong impacts of spatial resources such as natural break-waters on the coastal lines, accessibility to fishing spots, source of drinking water provided by the floodways and the existence of highway intersections supporting a variety of economical activities. The chapter includes a study of the social aspects of the "Mahallehs", a physical residential territory defined as a social unit of the settlements, comprising population ranging from 500 to 1500 persons. These "Mahallehs" have evolved over a long period of time based on strong socio-cultural ethos. The "Mahallehs", comprise of several social sub-units termed as "Kucheh", a residential street organized as a clustering of 10 to 20 households, making it an exclusive built space to promote social interactions and a sense of security.

At the micro levels courtyards of the traditional houses within the "kuchehs" provide a space for family privacy in response to socio-religious practices and the specific requirements of the climatic challenges to induce summer comfort for living.



Specific studies have been included on an analysis and evaluation of the traditional urban characteristics from the visual impact point of view. Urban Design aspects, related to traffic and transportation of major road systems and street patterns are also included in this chapter. The chapter ends with a proposal of a systematic matrix for the study of spaces related to their classification and hierarchy in the settlements.

### 3.2 CASE STUDIES - BANDAR LENGEH AND BANDAR KONG

#### 3.2.1 Background - Growth and Development

The inhabitants of Bandar Kong believe that their town is almost 1800 years old (200 A.D.).<sup>1</sup> The name of Bandar Kong has however appeared in many recognized documents during Safavid dynasty.<sup>2</sup> Shah Abbas permitted defeated Portuguese, Dutch and English to stay and have their commercial connections in this port for about one century<sup>3</sup> during which. Bandar Kong was one of the most important Portuguese commercial centers in the Gulf.

"During the time when Kong was one of the accredited ports of the Persian Gulf, Bandar Lengeh was not in existence, the development of this town began during the first year of Ghajar reign in the 17th century and its population once reached 60,000".<sup>4</sup>

Bandar Lengeh and Kong were competing with Bandar Abbas in terms of commerce in the 17th century. In the starting of 18 century, Bandar Lengeh became one of the most important ports in the Persian Gulf (Fig.3.1 & 3.2).

Mohammed Ebrahim Naderi has mentioned that:

"It is the most developed harbour along the Persian Gulf and Oman Sea, with five thousand households of nobles and merchants involved in commercial activities with Oman and India. There are beautiful buildings constructed with stone, and plaster. Most of buildings have "Badgir". There are 360 "Berkeh" full of rain water, and one of them is consumed in one day due to the dense population".<sup>5</sup>

- OLD CORE
- ▨ END OF SAFAVID DYNASTY - 1629 TO 1965
- ▧ FROM 1965 TO 1979
- FROM 1979 TO 1988

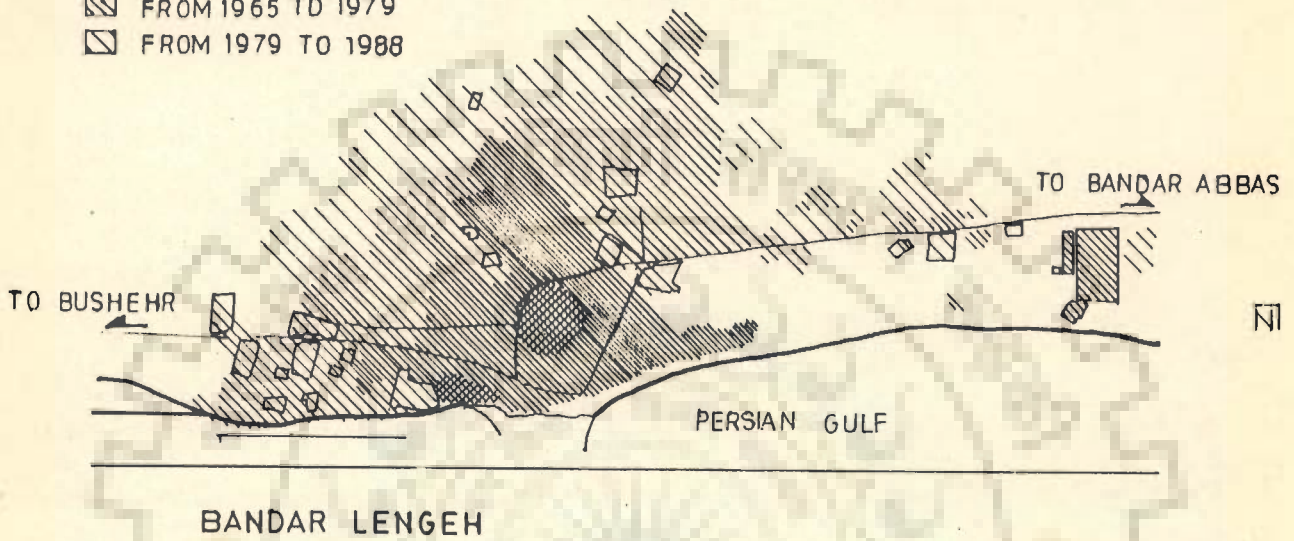


Fig.3.1 : Settlement Growth Pattern Through History - Bandar Lengeh

- OLD CORE
- ▨ QAJAR DYNASTY - 1796 TO 1921
- ▧ TILL 1964
- 1964 TO 1989



BANDAR KONG

Fig.3.2 : Settlement Growth Pattern Through History - Bandar Kong.



During Pahlavi Dynasty (1926) Bandar Lengeh and Kong declined, and most of the merchants, started migrating to their ancestral places in other Arabic countries, and Lengeh became a dead town. The main causes of the migration were the following push and pull factors :

- a) Changes in the transport network of commerce and trade with the South to the province of Fars, development of Bandar Khoramshahr, Mahshahr and Shahpour (Emam Khomani) and connection of main railway to these ports in Khozestan province.
- b) The law of monopoly and restriction of internal commerce (from abroad). The open market operations became limited and there was also interference from the government. Due to these reasons, the major economic base became weak.
- c) Considering the social aspect of community, westernization was another cause of migration. Although the inhabitants of Lengeh and Kong were very much religious and traditional, but government used to force them to wear dresses like Europeans.

Recent development - from 1961 onwards due to migration from rural to urban areas (because of decline in agriculture) Lengeh and Kong population started increasing. The traditional city of Lengeh was formed out of 8 "Mahallehs" known as Massah, Samach, Bahraini, Bolouki, Hedayati, Kaghazabad, Amirabad, Khouri, Roudbary, and Pakarti, the rest are newly developed. The oldest "Mahalleh" is Samach or Mahigiran (Fishermen), but the element of traditional heritage can be observed in "Mahalleh" of Massah which indicates the central situation of the old town. The comparison of the aerial

photographs taken in 1964 & 1984, clearly show that due to migration (between 1951 to 1961) from rural to urban areas, new "Mahallehs" around the old "Mahallehs" have appeared. Minabi "Mahalleh" is only 20 years old, which has covered a part of city in the west of Bandar Lengeh.

### 3.2.2 Geographical Aspects - Topography

The two settlements of Lengeh and Kong have a common geographical situation. The causes of formation and appearance of different elements like floodways, hills etc., are the same. Therefore, the topography of both settlements will be studied and analyzed together. The maximum height of land for both the settlements is almost 20 m above sea level. Bandar Lengeh is on the foot of the southern hills. The unevenness of the Northern side has surrounded the city in a semicircular pattern. The coast line forms the diameter of the semi circle with Lengeh coming within a diameter of 2300 m. The city is on a mound as the East and West of the city have a lower altitude in comparison to the central area. Many floodways and flood plains direct the flood water toward the sea. The perspective view of the settlements is not uniform, from west to east there are some small and big floodways which change the uniform form of the land primarily due to stone quarrying in "Eshkaft Mahalleh". Consequently a difference of level up to 10m observed. (there is no proper topographical map and this figure is based on actual site situation.

### 3.2.3 Growth Dynamics

The sea front is economically attractive for shipping and fishing and physically accessible locations for human settlements. There are some places along the sea which offer natural breakwater for anchorage. Bandar Kong and Lengeh, besides having natural site for anchorage of ships, they have



good approaches to big fishing and hunting sites. The sites are almost a node or an intersection among the highways of Fars, Hormozgan and Sahell Province. The good strategic location of the sites cause the existence of these settlements (Fig.3.3)

The settlements have taken their form and shape due to various site constraints;The plain land between the sea and mountains, as it connects the sea for good pleasing views, recreation in nature and along floodways become supplementary assets of topography (Fig 3.3 & 3.4).

The sea from one side and mountains from the other, and the even land in between have generated dynamics of settlement growth in the form of a linear pattern.



Fig 3.3 : Spatial pattern of the settlements in response to site and location conditions.

### 3.3 APPRAISAL OF EXISTING SITUATION

Surveys of various elements of planning and urban design were made under the two major heading of spatial (Nonphysical) aspects and physical disposition.

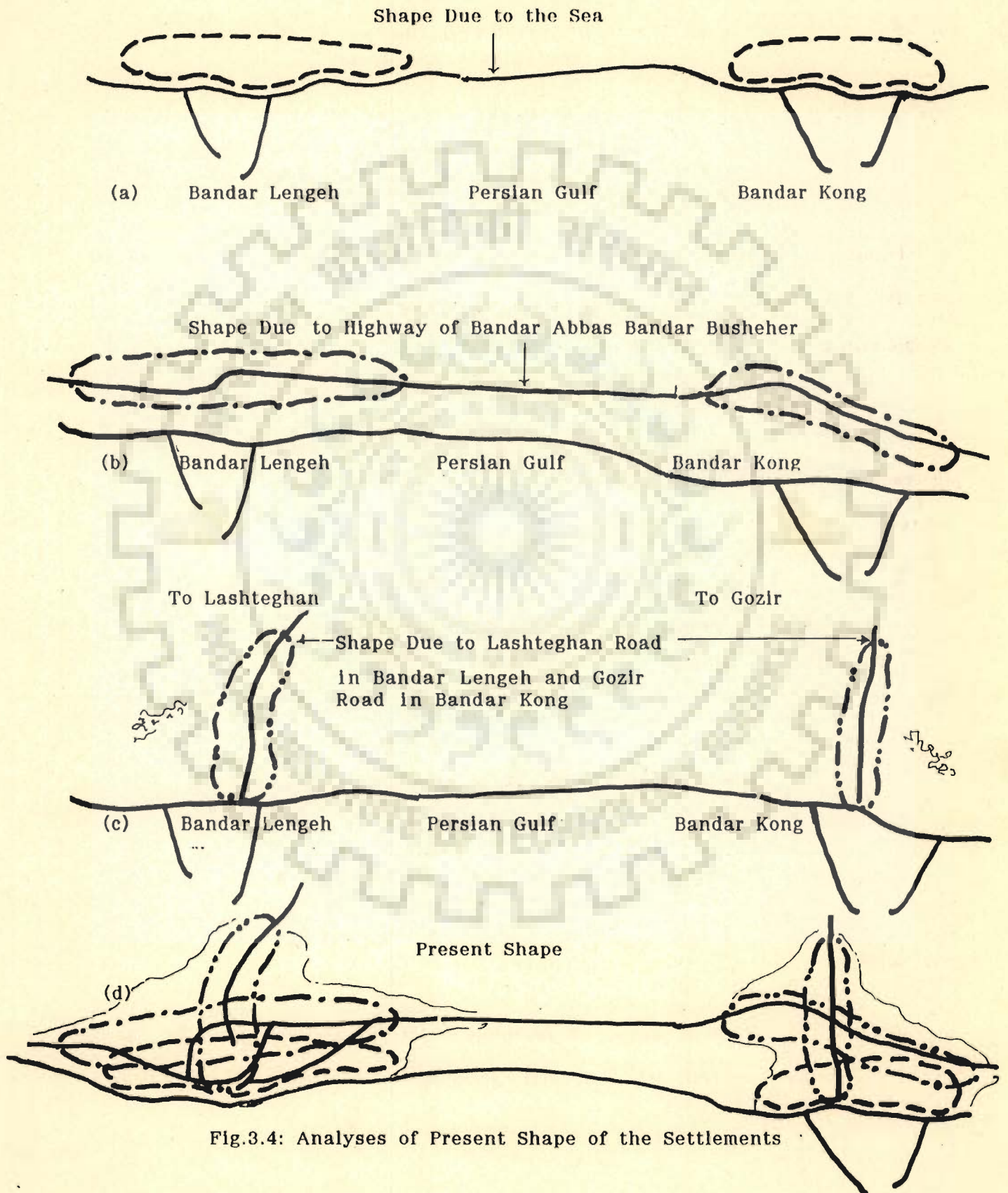


Fig.3.4: Analyses of Present Shape of the Settlements



### 3.3.1 Nonphysical Aspects

#### 3.3.1.1 Population - Density

The total area of Bandar Lengeh is almost 1700 hectares out of which 400 hectare was built up area of the town in 1984. Bandar kong also has an area of 1000 hectares and has a built up area of 230 hectares. They have an gross density of 16 persons per hectare<sup>6</sup>.

The growth rate of lengheh and kong for the period 1966 to 1986 are shown in table 3.1 and 3.2. The population projection from 1984 onward is shown in tables No. 3.1 & 3.2<sup>7</sup>.

Table No.3.1  
Population & Household in Lengeh From 1966 to 1994

Year	Households	Population	Growth rate in %
1966	1348	7218	-
1976	1743	8797	1.98
1982	2896	14614	8.46
1984	3430	17309	8.46
1994	7964	42606	8.8

(Source : Master Plan of Bandar Lengeh) \* Projected

Table 3.2  
Population & Household in Kong

Year	Households	Population	Growth rate in %
1966	935	4285	-
1976	1133	5564	2.61
1982	1596	7820	5.67
1984	1788	8759	5.67
1994	3835	20518	6.70

(Source: Master Plan of Bahdar kong 1983-84) \* Projected

### 3.3.1.2 Socio Economic Scenario

Out of the total population in Bandar Lengeh and Bandar kong about 37% were engaged in Active Economic pursuits and 63% in inactive pursuits in 1976 respectively. The employed women in Lengeh is only 5.3% and in Kong, 1.1%. Female economical activities here, are more than the average for the province.

The main economic activities in these two settlements are fishery and shipping. There are 30 to 35 boats and small ships which belong to both the settlements. Out of 1000, fishermen of Shilat cooperation (fishery cooperation society) 300 belong to the Lengeh and Kong, and the rest (i.e); 100 additional fishermen working unofficially, are migrants.

Comparison of the No. of people involved in fishery in 1976 to that of 1983, indicates that no improvement has occurred in the growth of this activity.

People of these settlements are good specialists in ship building such as boat and good "Lanj" (wooden ships of up to 700 tons capacity).

Shilat Cooperation (fishery cooperation) has, a cold store of 200 tons and a freezing tunnel of 5 tons and another prefreezing of 5 tons. There are also ice making machine of 5 tones, a generator, (Elec.) and a 18 m<sup>3</sup> capacity distillation plant. There are only 20 persons working in this place. This needs more development, because only 10% of resources available with them are used (Regional report of Hormozgan Province).

The Fish will be taken to Shilat after fishing, then some of the fish will be given to the inhabitants and the excess fish will be sent to Bandar



Abbas tinning factory. Dally 500 kg fish was given to the local fishmongers from Shilat, cooperation in 1982, which was less than the required amount by the inhabitants and the rest of the required fish, was provided by unauthorized fishing.

Shilat has a proposal for putting up a factory for fish powder and a 250 tones cold storage which is under construction. According to the available data of Shilat (Fishery cooperation) a fisherman earns only an income of Riials 2,52,000 in a year by selling fish to the cooperation which is lower than the income of others engaged in other occupations. Therefore, there is less interest in the fishing occupation, nowadays.

Regarding industry there is not much of development, the percentage of people engaged in industrial activities was 7.2% in 1976 and it has reduced to 3.9% at present. In general, the industrial activities in the cities of Lengeh and Kong are limited in numbers, as indicated in Table NO.3.3

Table.3.3  
Employment in Industrial Activities

Kind of Activities	Lengeh	Kong	Total
Cloth Industry	11	6	17
Wood Industry	30	20	50
Food Industry	22	8	30
Steel door and window factory	37	23	60
Carpet	2	-	2
Total	102	57	159

(source: Ministry of Housing and City Planning, Tehran)

Earlier carpentry and caulking were the famous economic activities of Bandar Lengeh and Bandar Kong (for ships and buildings). Extensive use of steel, which although, is not durable in that climate, has caused a decline in the carpentry trade. Handicrafts and embroidery constitutes is very famous activity in the entire province of Hormozgan. There is a workshop which works under Handicraft Centre of the country. Mat weaving is another activity fulfilling local requirements.

#### Services & Commercial activities

In fact, the commercial activities form the back bone of the economy of these two settlements. More than 68% of economic activities fall in the category of services and commerce. These can be further classified into services such as social, administrative, traffic and transportation, warehousing, salesmanship, hotel and restaurants, financial and insurance, etc. Further details of these activities are shown for the year 1983 in Table 3.4.

Table.3.4 (a)  
Active Economic Engagements for Lengeh and  
Kong (1983)

Economic Activities	personnel		
	Lengeh	Kong	Total
Whole Sale	22	22	44
Sale of Luxury Items	51	32	83
Peddling	49	24	73
Fishmongering & others	236	192	428
Hotel, Restaurant	20	8	28
Total	378	278	656



Table.3.4 (b)

Active Economic Engagements for Lengeh and Kong (1983)

Economic Activities	Lengeh	Kong	Total
Transportation	222	578	880
Portage	67	-	67
Electricity & water supply	33	8	40
Total	322	586	987

Table.3.4 (c) Active Economic Engagements for Lengeh and Kong (1983)

Economic Activities	Lengeh	Kong	Total
Police personnel	273	3	276
General Offices & Other Govt. Officer	503	65	568
Educational Services	93	7	100
Health Care	81	3	84
Repair & Maintenance	138	29	167
Bank & insurance etc.	21	13	34
Total	1109	120	1229

Source: Municipallty of B' Lengeh

3.3.1.3 Social Aspects in "Mahallehs"

To develop or to propose criteria regarding design and planning of any settlement, it is required to understand the intangible social aspects of that society. It is of great importance that planners aim at discovering and organizing a plan with respect to the social aspects of the inhabitants.

"As a basic condition it is necessary to achieve harmony between intangible social, economic and cultural aspects and the tangible forms of physical planning and architecture"

The "Mahallehs" are the social units of these settlements which have been formed during a long course of time, based on strong social relationship. In terms of social interactions, "Mahalleh" is a meaningful residential unit of a traditional area.

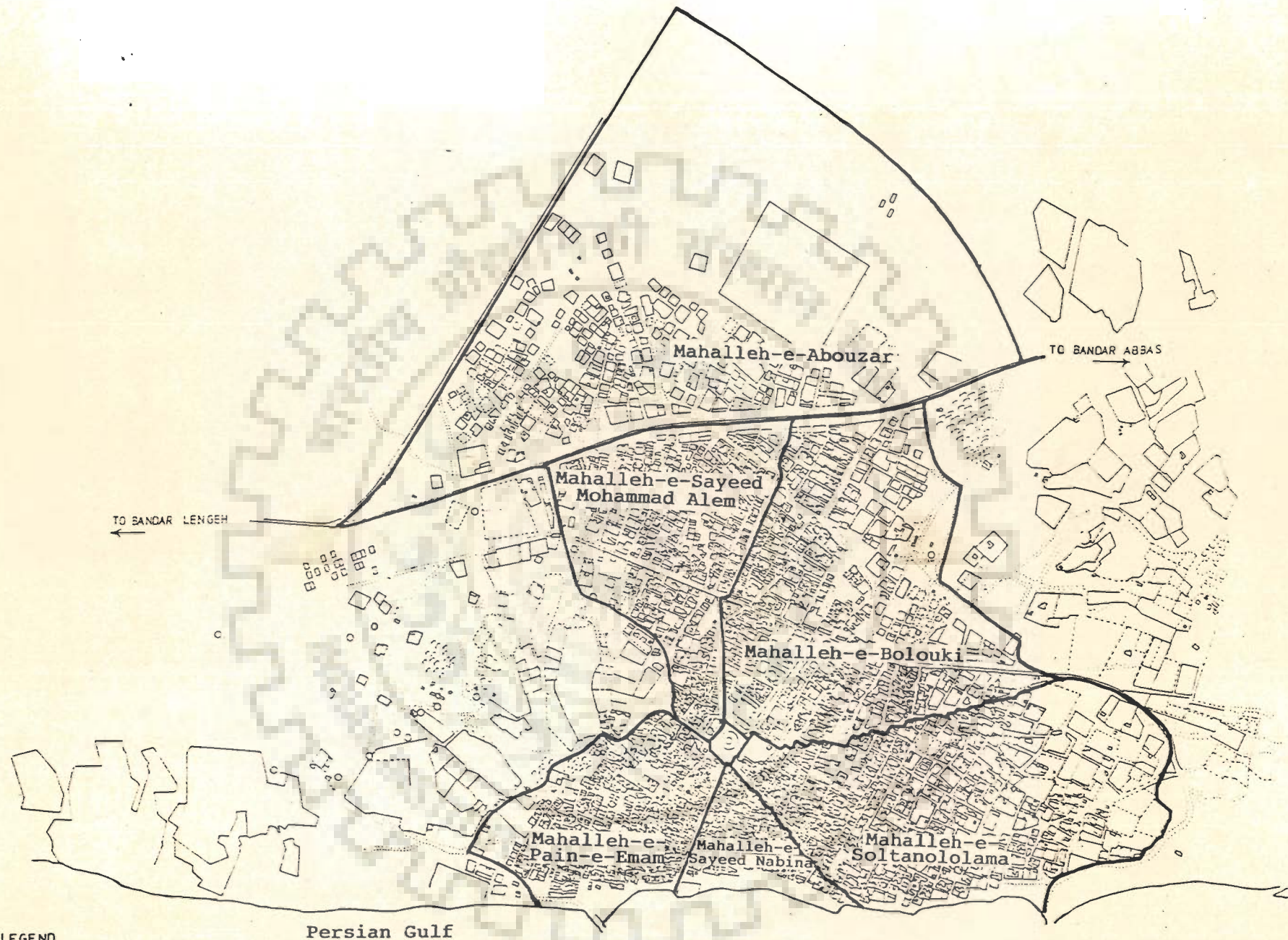
The inhabitants of Bandar Lengeh and Kong have been living in various "Mahallehs" (Fig 3.5 & 3.6). The old communities in Bandar Lengeh are the people living in "Mahallehs" of Massah, Samach, Bahraini, Bolouki, Khouri, Lari, Kloul and Afghan. Most of the people in the settlements believe that "Mahallehs" of Samach and Massah form the oldest part of the settlement of Lengeh. "Mahalleh" of Massah has all the urban elements within itself, which are "Hesar" (Boundary wall), Bazaar and Mosque (Fig 3.7).

The other 8 "Mahallehs" are Minabi, Hedayati, Kaghaz Abad, Amir Abad, Roudbari, Pakerti, Gorg and Gendarmerie which are later communities of the settlements. ... The name of "Mahallehs" indicate that their inhabitants have migrated from some other cities and they have strong social ties. Such as Minab, Lar, Roudbar etc. But in case of Bandar Kong, the name of "Mahallehs" are names of important persons, like Sayeed Nabina, Soltanololama and Sayeed Mohammad Alam.

The oldest community of Bandar Kong lives in "Mahallehs" of Sayeed Nabina and Soltanololama, and after that, the new "Mahallehs" of Bolouki, Sayeed Mohammad Alam were developed around the small communities which were already in existence (Fig.3.8)

People interest who are living in these Mahallehs", are interrelated, and they act as part of family. In fact, the family pattern is obvious in all aspects of the social structure that gave the communities an integration, which is existing today.

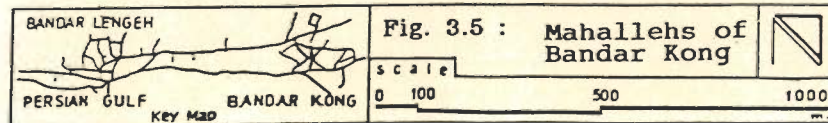




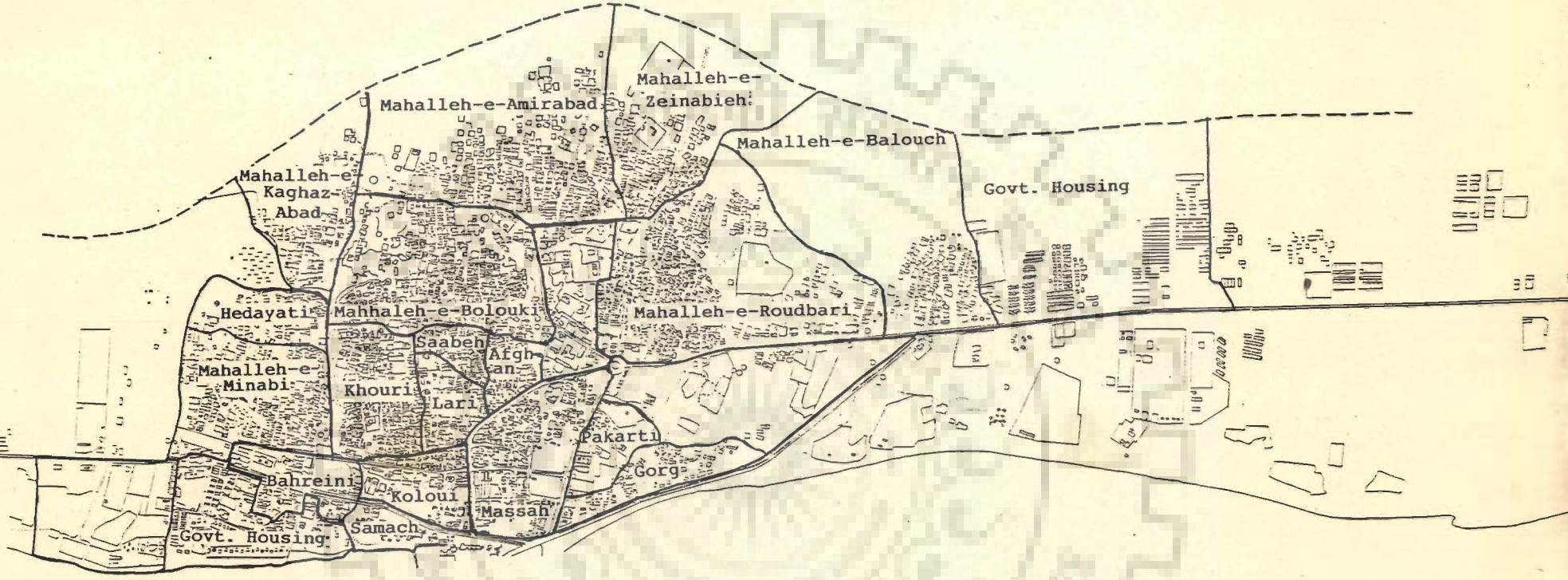
LEGEND

Persian Gulf

Boundary of 'Mahallehs'







— Boundary of 'Mahallehs'

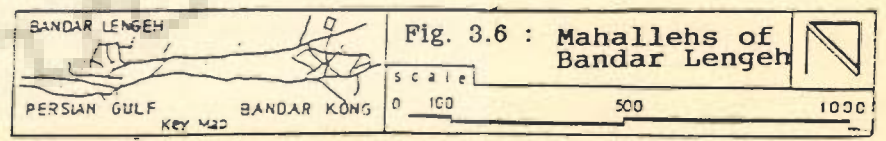






Fig.3.7 : Plan of Massah "Mahalleh" - Bandar Lengeh

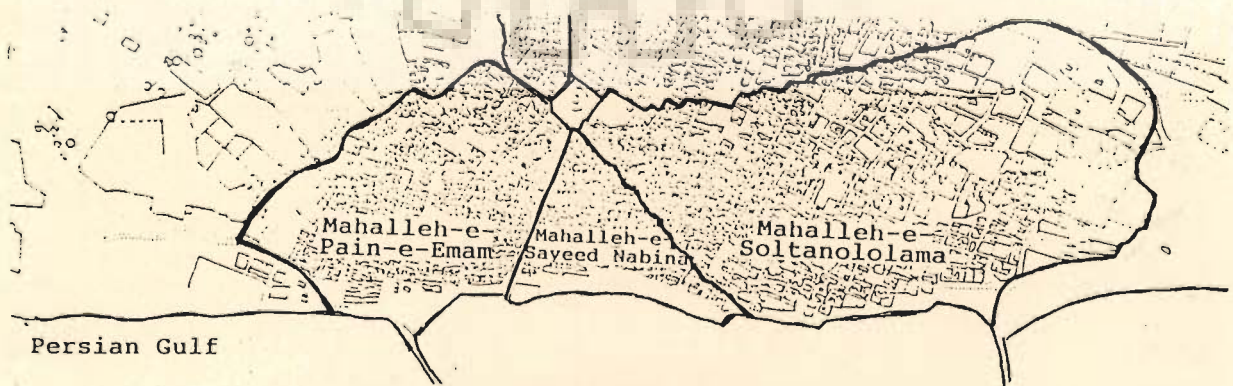


Fig. 3.8 : Old "Mahallehs" of Bandar Kong

Although some of the inhabitants are from other places, but living together for many years, they have developed fairly good relationships. In old communities some people still live in joint families. But younger generations prefer to stay separately, consequently, some of the old houses have been subdivided in old "Mahallehs". In the core areas, the "Mahallehs" belong to the residents and serve as a kind of second home. This and the "Kucheh", with dead ends, provided enough emotional and physical security in the open space.

Therefore, considering social interaction and emotional security, two levels become meaningful; first, is the "Mahalleh" with a population ranging from 500 to 1500, and the second is a "Kucheh", which ranges from 10 to 20 households. The Mosques have been built in these settlement within accessible distance to people who are predominantly Muslim by faith. Religion has become one of the most important factors influencing, motivating and supporting, their architecture and urban design<sup>9</sup>. Religious ideas, not only, dominated motifs for small artisans and famous artists, but also had strong influences on features of towns.

"In the beginning the Islamic Philosophy of sacrificing the material life for the coming life after death drew all attention to the creation of Mosques and other public buildings initiated the design of Mosques"<sup>10</sup>.

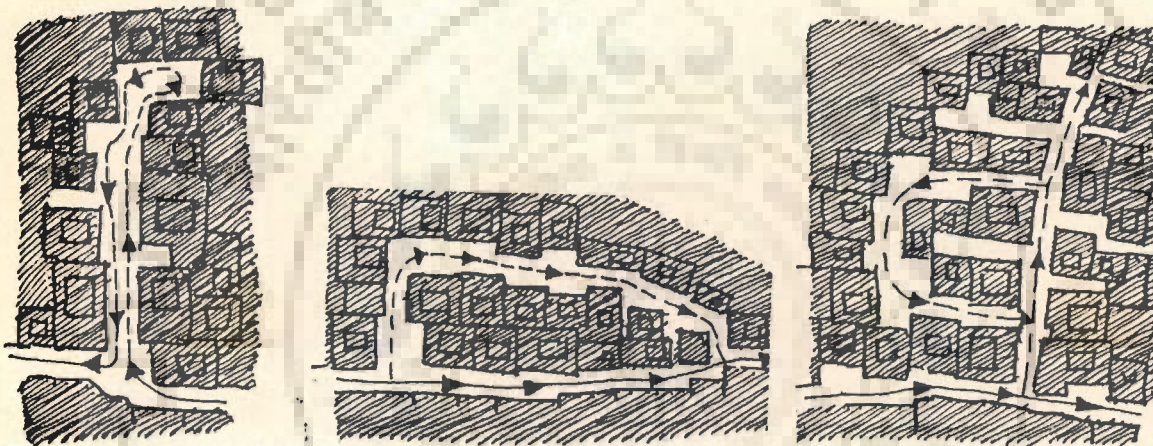
Islam is not merely an abstract religious faith but it implies an entire social order and a set of rules of conduct which virtually encompass all aspects of daily life. The sources from which the Islamic laws pertaining to building structure are originally derived from "Shariah", "Sunnath", "Urf" and "Fatwa"<sup>11</sup>. Collective living in the settlements preordained the requirements of



privacy and security as is illustrated by the disposition of physical structures in the existing towns. Some of the significant features are discussed here.

### Street Layout

The closed alley provides greater security and privacy for the inhabitants as it excludes nearly all strangers and passers by from using the street as a through fare. (Fig.3.9)



1. Closed Alley

2. Loop

3. Combination of 1&2.

Fig.3.9 : Closed alley and Loop as private community space.

### House Plan

From the main entrance to the courtyard and the rooms, a number of doors are provided, to ensure maximum security and privacy.

The courtyard has traditionally provided a private family space for all the activities of the women, as demanded by religious and social criteria. It is also a good place for children to play safely. All the rooms open to the courtyard which is a secluded and safe place for family activities.

#### 3.3.1.4 Social Interaction through Physical Design

There are various urban design elements which help in good social interaction in these settlements these are as follows :

- Narrow width of streets as a built form helps, in social interaction and draw people together and balconies bring people in close contact with each other (Fig.3.10)

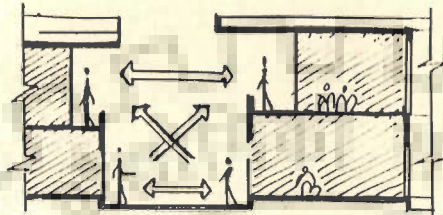


Fig.3.10 Street Section :Built form and proximity

- Space like widening of the "kucheh" create community spaces where people can sit together for community discourses. (Fig 3.11)

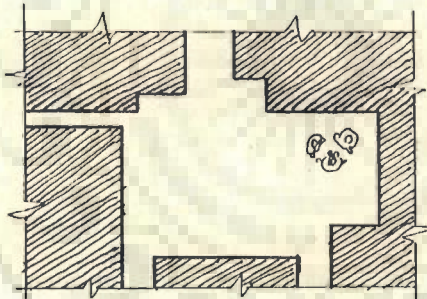


Fig 3.11 street plan :community space

- Street shops (Bakery, vegetable and small grocery) in the "Kucheh" act as Nodes attracting people and promote spontaneous socialization among residents.

- Minarets of the Mosques as the spatial land marks guide people toward the Mosque for religious congregation and prayer. - "Berkeh"- a water storage tank and community node - also acts as an informal meeting place for those who come to take water dally thus resulting in spontaneous social interactions social interactions (Fig 3.12).



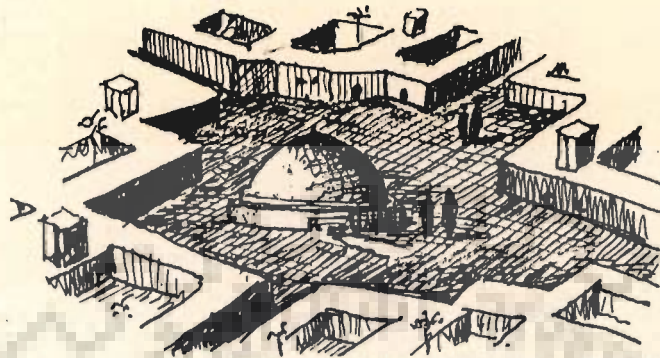


Fig 3.12 : Community node (Berkeh) and the social space.

There had been an inherent harmony in the social, cultural and traditional activities, through good social interactions as promoted by the urban elements. These elements - their planning and design have specifically responded to the community needs of a traditional privacy, at various levels e.g., (a) Interiors of courtyards supports first level privacy, (b) Street patterns in secondary level and (c) "Mahalleh" at 3th level of privacy.

#### 3.3.1.5 Housing Stock and Residential Density

According to the census 1976, there were 1511 living units in Lengeh, and, 1089 units in Bandar Kong. Because 1986 census has not been published, therefore, a survey was conducted in 1987 (by the author) which shows the number of houses have increased to 3300 units in Bandar lengeh. Although the Number of plans passed by municipalities are available but they can not give the correct data, because some people have built without approved plans. Out of the existing residential units about 38.86% are in good condition, 47.75% are fair and 18.48% require repairing and 2.89% are in dilapidated condition. Most of the recent residential buildings are built with cement blocks, Rcc frames, wood, and "I" section steel, structural members. At present, there are 40 housing unit which range in height from 2-4 storeyed.

Out of 1700 residential unit studied, In Bandar kong 10.9% were in good condition and newly built. 39.8 % were having fair condition, 23.7% required minor repairing and only 5.3% of the buildings were dilapidated and fit for demolition.

"Residential covered area - The plot size of residential buildings is reducing year by year, due to high land value."The average size of plots in 1979 were 416 m<sup>2</sup> and in 1980 it has come down to 306".<sup>12</sup>

According to the field survey done in 1987, out of 182 plots (Residential units) 63 units had an area of between 100 to 300 sqm, 72 units of 300 to 500 sqm and 47 units of 500 to 700 sqm. Therefore the average plot size in Amirabad "Mahalleh" was 399 sqm.

In the "Mahallehs" of Kaghazabad, 109 plots were studied and the average plot size was 396 sqm, similarly 250 units in the "Mahallehs" of Khouri, Lari, Saabeh, Bolouki and Afghan were studied and the average plot size was 396 sqm. Average plot size in "Mahallehs" of Hedaiati and Minabi were 385 sqm in Massah 399 sqm, in Roudbari 204 sqm and in the areas which are subdivided by urban land organization, the average plot size is 250 sqm. (near Kong) and their plot sizes were varying from 200 to 300 sqm.

The covered area in 1979 was 31%, in 1981 it was 46.5% and according to the recent field survey it has reached to about 50% which is due to increase in land value and municipality regulations.

The statistics available in municipality of Bandar Kong indicate that, the average plot size of residential buildings in 1981 was 151 sqm and from



1984 and 1986 onwards it has reduced to about 140 sqm., (land given by urban land organization) and the others is around 170 sqm per plot.

It has been observed that although the land value has gone up, but the new plot size of residential areas has increased to about 500 sqm in the peripheral area. For the purpose of finding out the proper residential plot size a survey of traditional houses, newly built and plot division by urban land organization are shown in Table C.1, appendix C.

### Architectural Characteristics of Housing

Most Iranian cities, have a mix of house designs that depict the traditional and modern approaches. The traditional design has grown out of the specific need of the society. Open courtyard, "Badgir" (wind catcher), insulation of building with high and thick walls, "Sabat" (semi enclosed space) and unique jaalies are the architectural elements of traditional houses (Fig. 3.13).

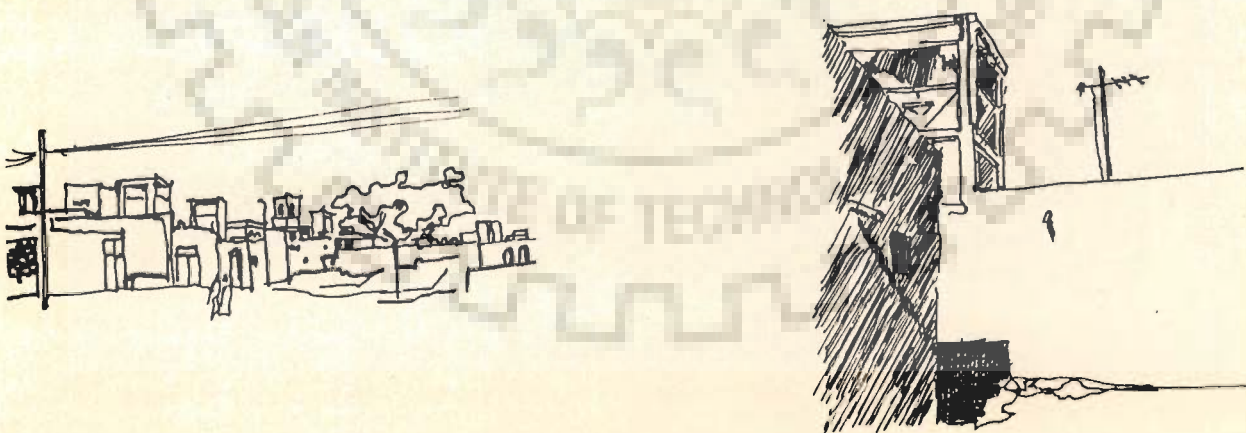


Fig. 3.13 : Traditional Houses : Architectural Character

There is a hierarchy of rooms, according to their importance for living, around the courtyard. In most of the cases studied, living, dining and bed rooms are around an enclosed space (Sabat) attached to the

shaded: courtyards. Stores, Bathrooms and kitchens are the other places around courtyard. Ninety five percent of houses are single storied. "Sabat" is multi-function space for active and passive activities, e.g. living & sleeping etc. (Fig 3.14,3.15,3.16,3.17 & 3.18) The spaces separating the houses are sometimes very narrow and form service lanes for draining the rain water.They also form a passage for pedestrians,and also help in the circulation of wind across the buildings for cooling as required by the hot-wet conditions of the area.

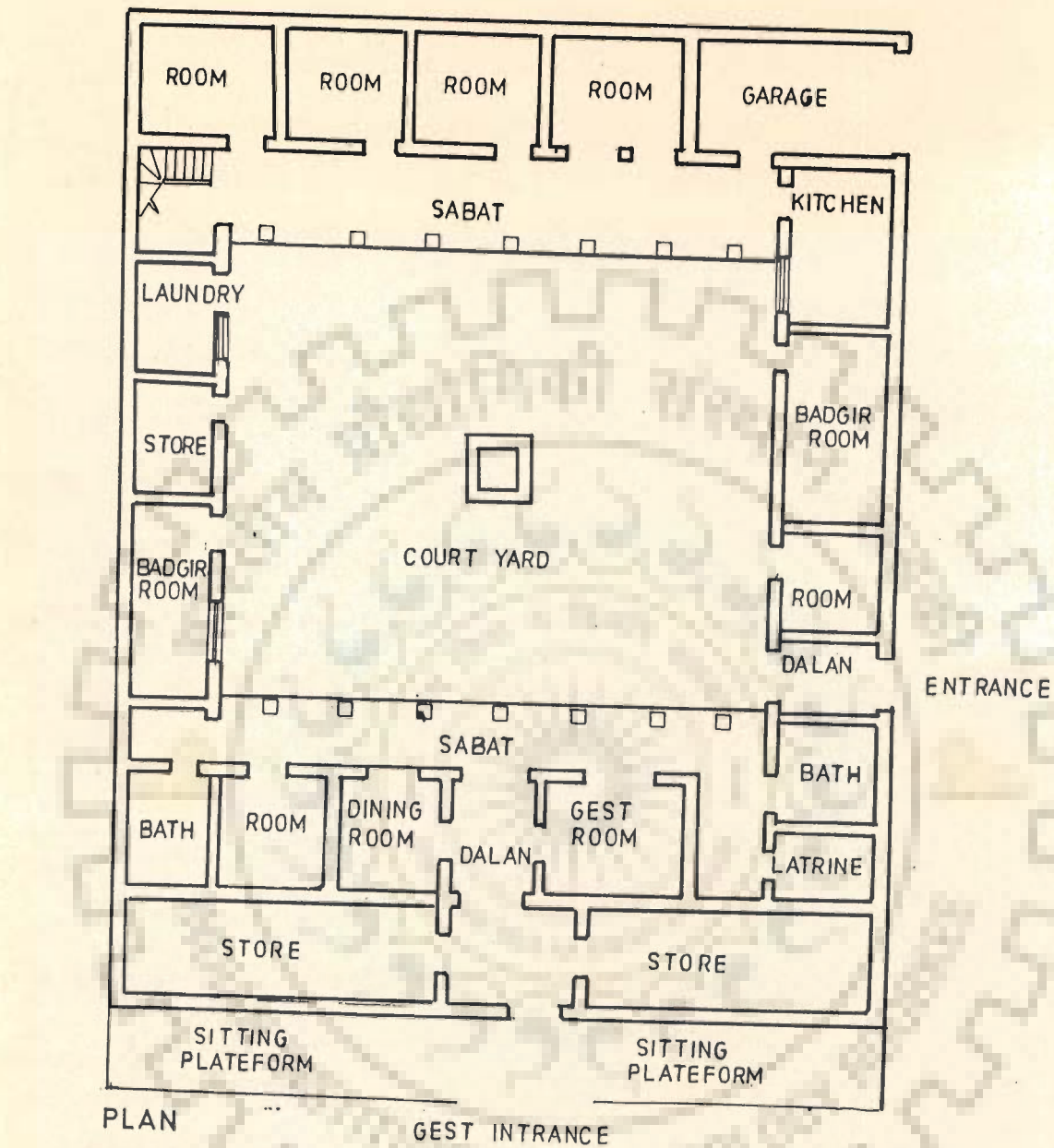
### Residential Density

Although, there is some kind of relation between building density (in a residential area) and population density, but it was not so, in the case of Bandar Lengeh and Kong in some places. Because out of 103 residential units studied in Amirabad "Mahalleh", 41 units were only plots with boundary wall, 11 blocks without any residents and 2 blocks for educational facilities. Out of 125 units studied in "Mahalleh" of Kaghazabad, 28 blocks without any residents, 12 plots with only boundary wall. Out of 311 units studied in Khouri, Lari and Bolouki "Mahalleh" 32 units were with only boundary wall, 20 blocks without residents and 8 blocks for other infrastructure. Similarly out of 403 units studied in Hedayati and Minabi "Mahalleh" 44 units were with only boundary wall, 6 blocks were not residential and 102 blocks were without any residents. The wide areas occupied by floodways within the residential areas and the vacant plots are not taken to account for density calculations. The existing residential density of each "Mahalleh" is shown in Fig.3.19 & 3.20.

### 3.3.2. Land use - Quantitative & Qualitative Studies

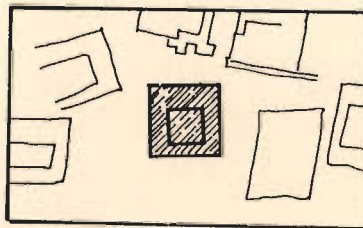
The total area of Bandar Lengeh is 1700 hectares out of which 400



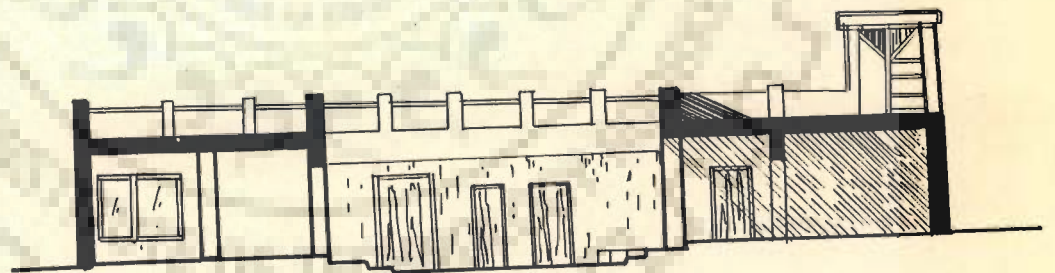
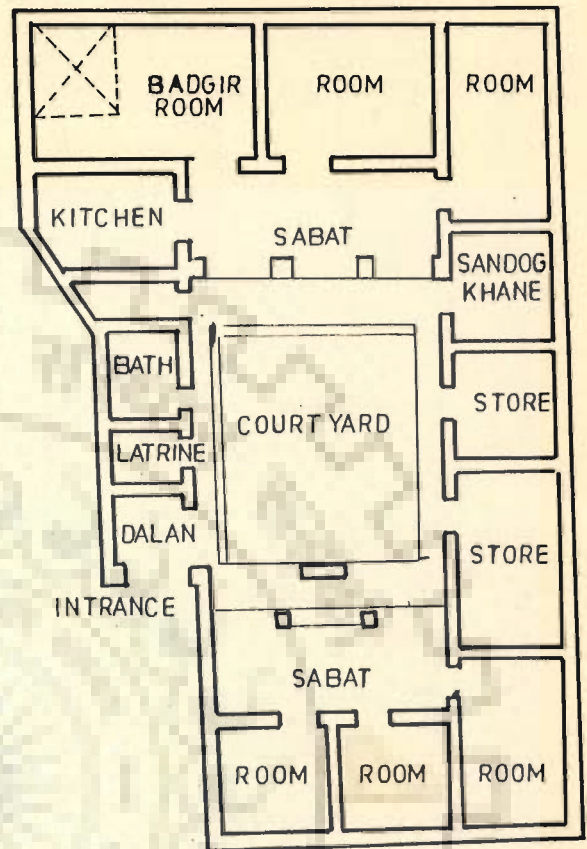


SECTIONAL ELEVATION

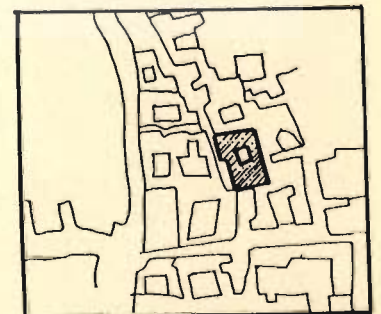
Fig.3.14 : A Traditional House in Mahalleh Bolouki of Bandar Kong



A TYPICAL INDIGENOUS DESIGN  
OF TRADITIONAL HOUSE



SECTIONAL ELEVATION



KEY MAP

Fig.3.15 : A Traditional House  
in Lari Mahalleh of  
Bandar Lengeh



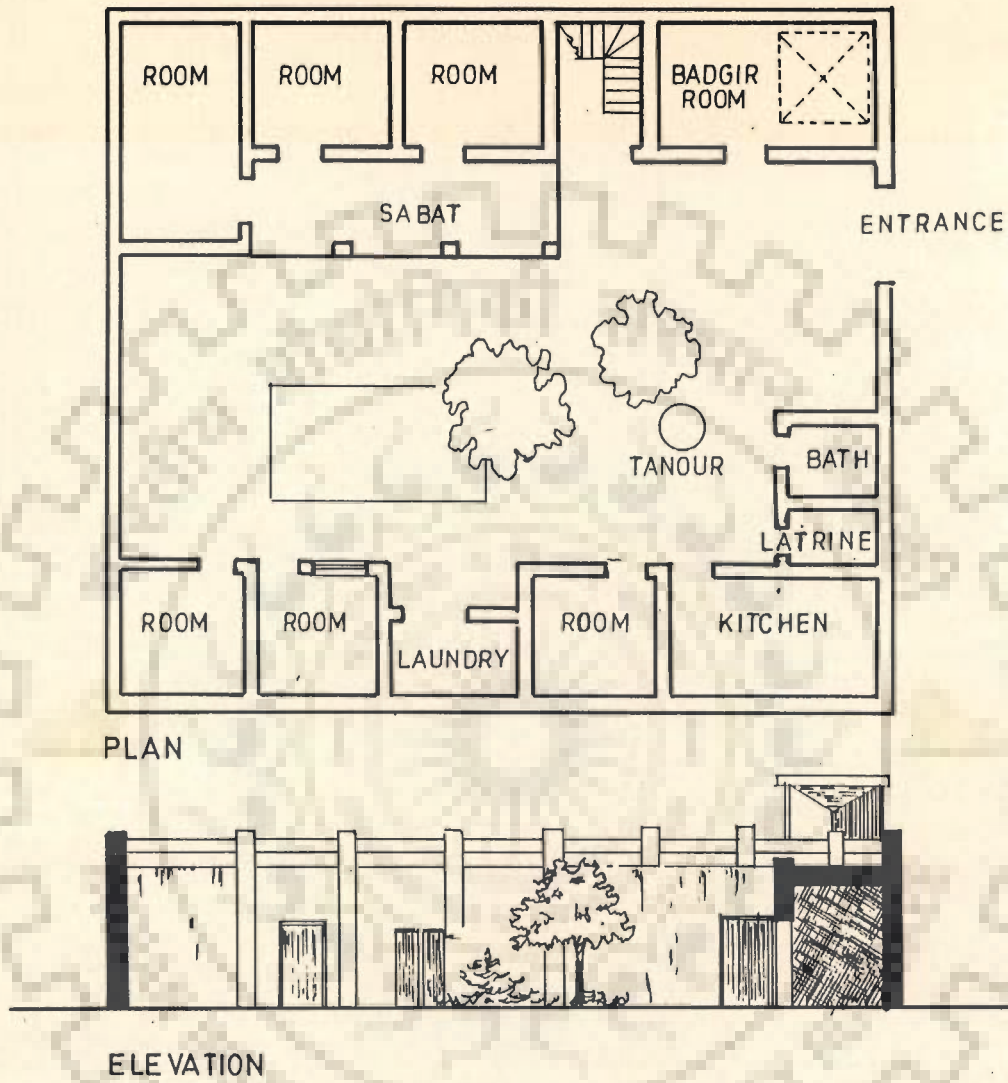
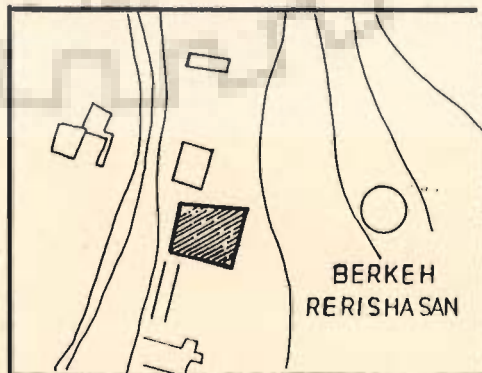


Fig.3.16 : A Traditional House in Kaghazabad of Bandar Lengeh



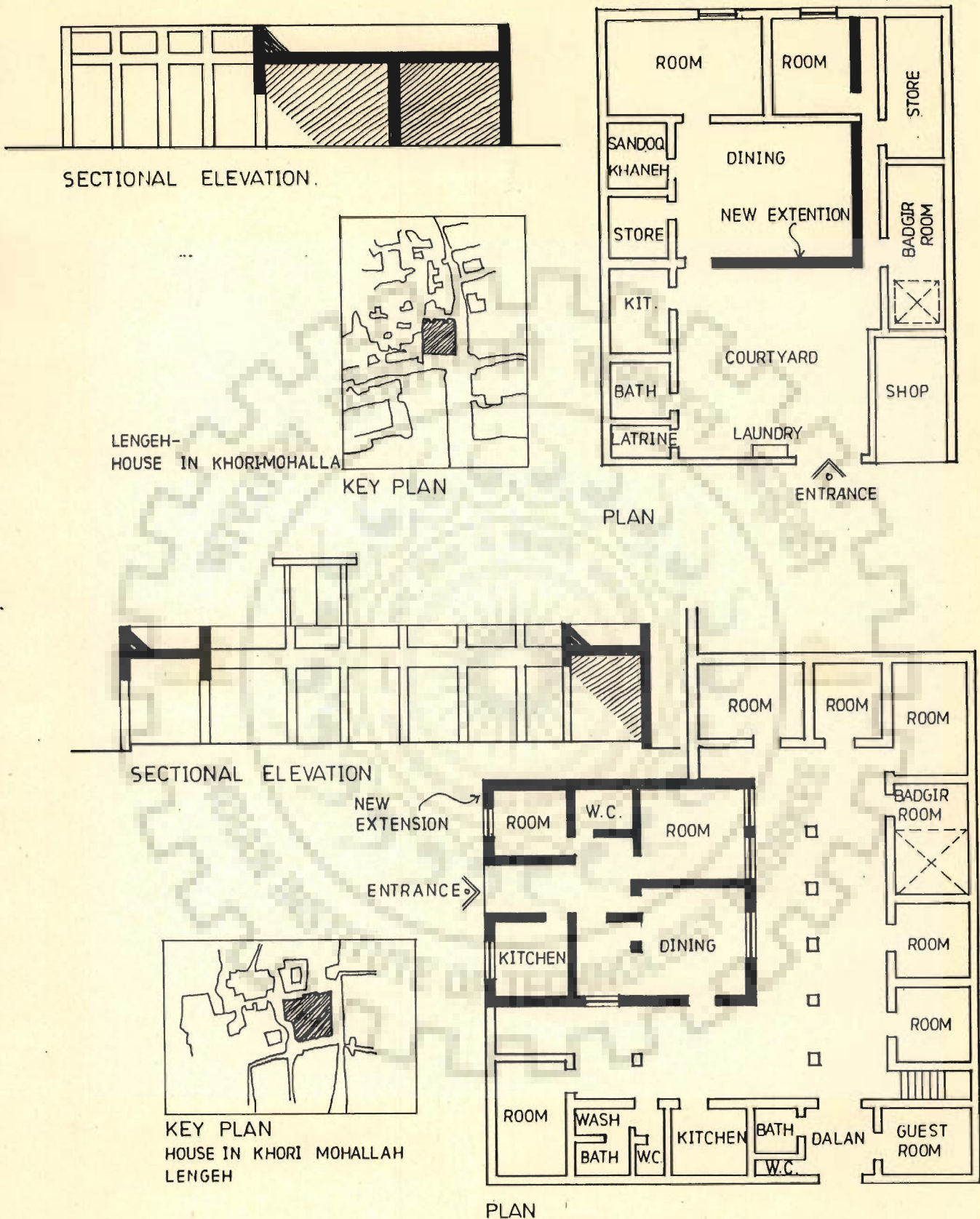
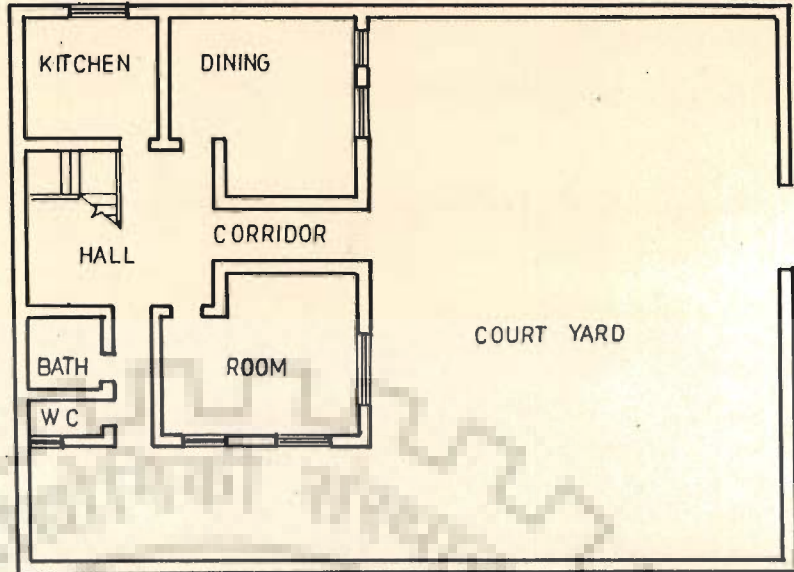
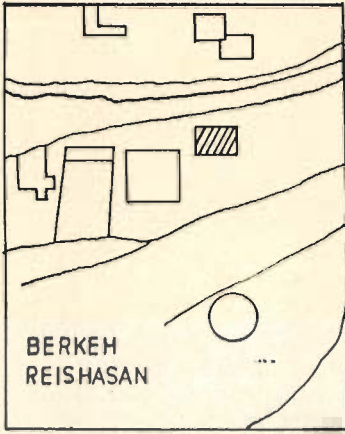
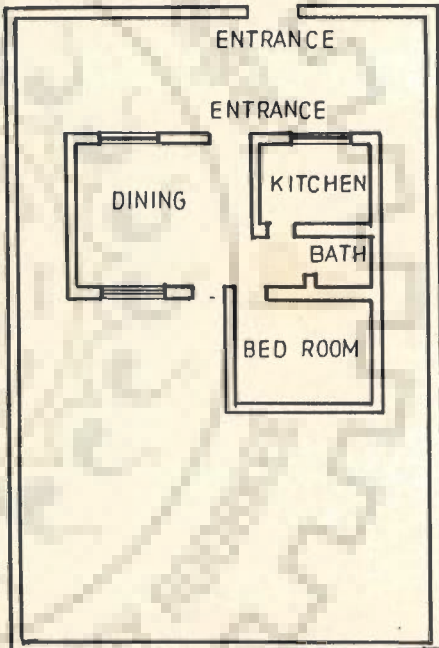
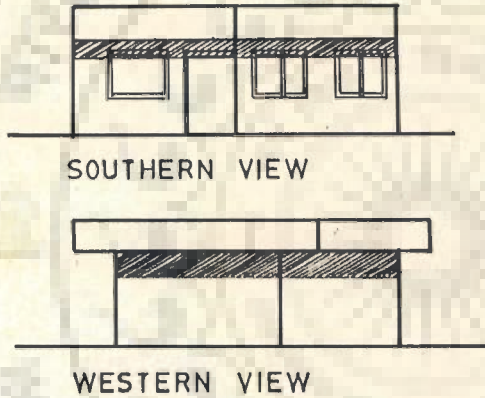


Fig.3.17 : Transition from Traditional to a Modern House Plan Bandar Lengeh





HOUSE BUILT IN LAST DECADE WITHOUT CLIMATICAL CONSIDERATION



TYPICAL HOUSES DONE BY HOUSING ORGANIZATION- MINISTRY OF HOUSING AND URBAN PLANNING-LENCEEN

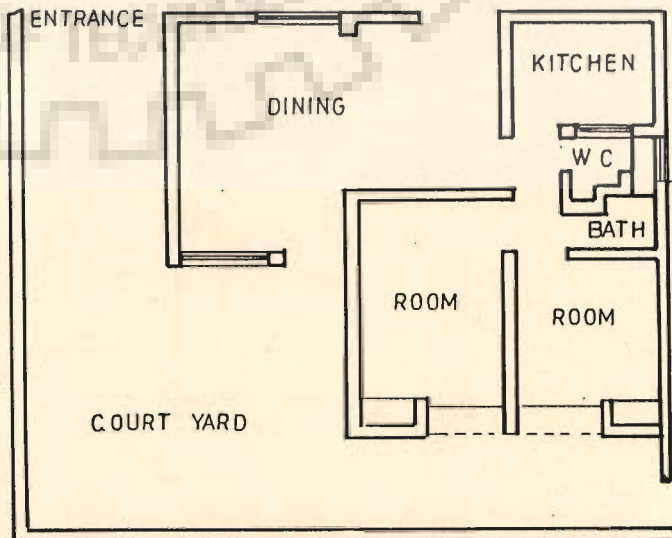
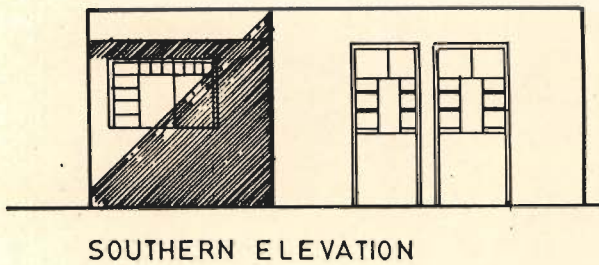
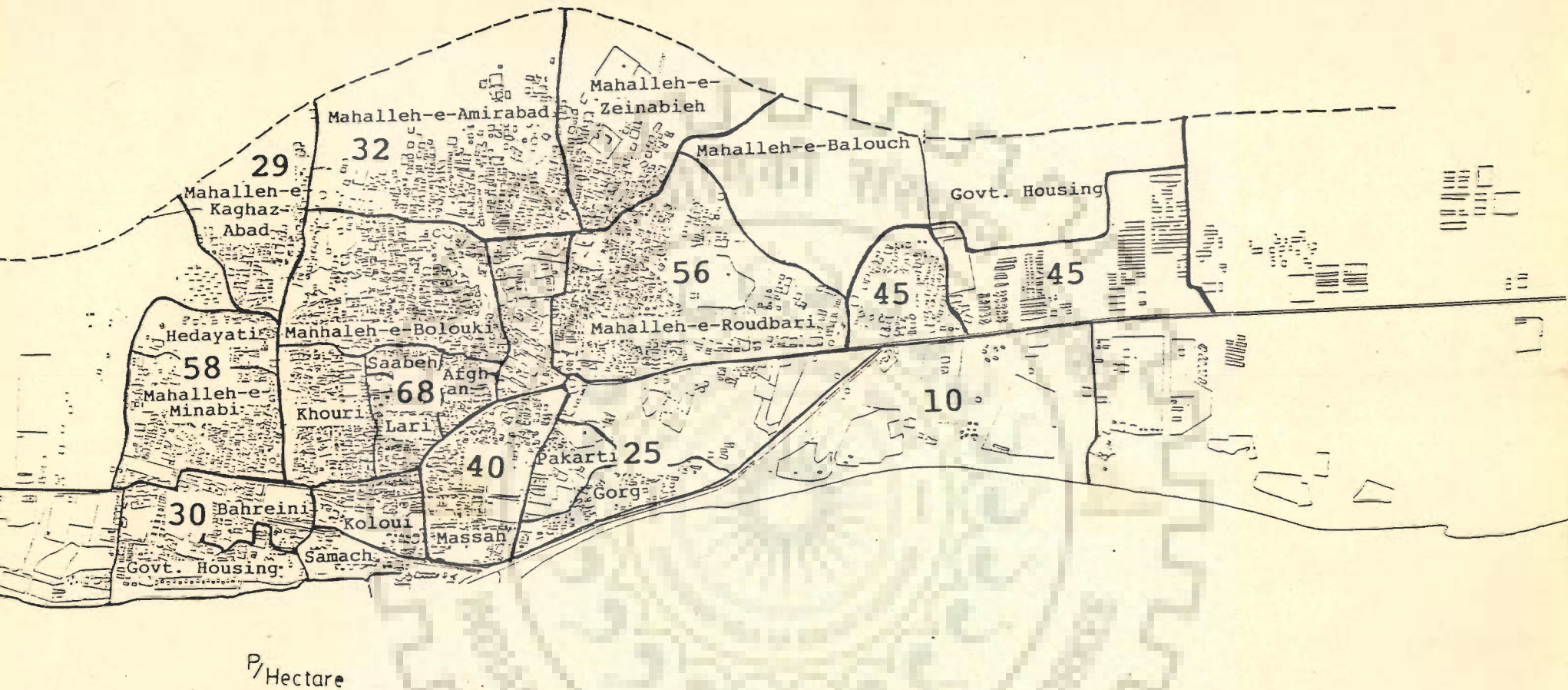
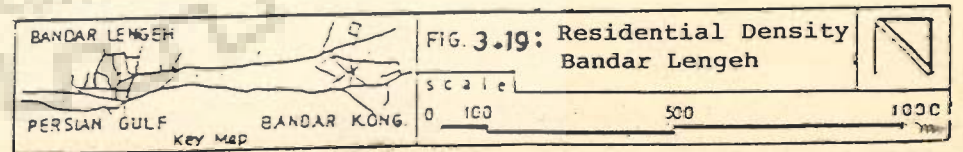


Fig.3.18 : Modern Houses in Bandar Lengheh



(calculated by the author)







LEGEND

Persian Gulf

P/Hectare  
(calculated by the author)

		<b>FIG. 3-20: RESidential Density Bandar Kong</b>	
BANDAR LENGH PERSIAN GULF KEY MAP	BANDAR KONG		



hectares is under city built form (buildings and all the infrastructure). Out of 1000 hectares of the total area of Bandar Kong 230 hectares is under city built form and other infrastructure. Residential land use is almost covering 1/5 of Lengeh and 1/4 of Bandar Kong, (Table C.2 & C.3, Appendix C) commercial and institutional activities are concentrated in a few centres like port, Bazaar and the institutional area between and along Shahid Beheshti street and Enghelab street in Bandar Lengeh (geometrical centre), and the main Bazaar along the main street and port in Bandar Kong. The administrative centre which is situated in Bandar Lengeh is the administrative centre of "shahrestan-E-engeh" too, because Lengeh is the centre of township (district). The administrative centre is along the Enghelab street and the main round about (Up dated Land use Maps by the author, Fig.3.21 & 3.22).

### 3.3.2.1 Education, Commercial, Health and Recreational Facilities

All of the educational centres are located in traditional core areas and a few in between recent government housing areas. Eastern, Northern and North-Southern parts which were developed recently do not have any educational facility nearby.

The number of educational centres (schools and high schools) were 25 in the year 1986-87 out of which 19 units were in Lengeh and 6 units were in Bandar Kong. Therefore Kong requires more number of educational facilities. Although Bandar Kong population is about 10,000 less than Lengeh's population and Bandar Lengeh is also the centre of the Shahrestan, but still Kong requires more of educational facilities. There is no high school in Bandar Kong and students are required to go to Lengeh for studying beyond intermediate.



The Master Plan studies shows that, there have been 778 students, studying in Kong and 1644 students in Lengeh (1984). But recent studies (1987) indicated that, there were 1565 students studying in Bandar Kong and 2582 students in Bandar Lengeh. Which means the number of student have increased by 938 in Kong and 287 in Lengeh while, the number of schools added for each settlements are only 2. This shows the short comings in educational facilities in the settlements (Appendix C, Table C.4).

#### **Health Care Facilities**

Except shahid Beheshti Hospital & Health -care centres there are no other health care faculties in these settlements. There is an acute shortage of health care facilities.

#### **Commercial Facilities**

There are very few commercial Facilities in recently developed "Mahallehs". It has been observed that some of the inhabitants have to traverse a long distance to purchase their daily requirements.

#### **Recreation and Sport Facilities**

At present, Bandar Lengeh has 3 parks with an area of 12500 sqm., without any attractive elements for inhabitants. Absence of greenery is due to shortage of water although there exist opportunities for other landscape elements and areas which can be developed for greening and beautification of the parks. These will be highlighted in the coming chapters. Sport facilities with respect to the interest of inhabitants is quite inadequate. They need more of play ground for football.

### 3.3.2.2 Traffic and Transportation

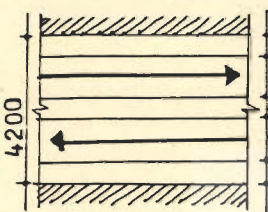
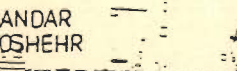
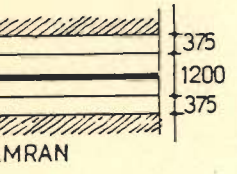
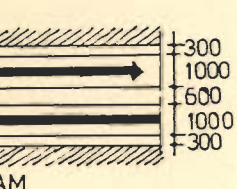
There are a few streets in Bandar Lengeh which form the structure of the settlement. One of these is Boulevard-E-Emam which joins the eastern entry to the western one, that is, the, Boshehr highway to the Bandar Kong Road. This is the Longest and widest road of the city which is the main collector and distributor of traffic of some of the main functions, such as, port activity, custom office, hospital and important administrative land uses. Enghelab, Shahrdari and many other secondary streets join this boulevard street.

Enghelab street, which joins the port and custom office to the main city centre, is the most congested one. The round about of the town is a junction of the main roads, such as, Enghelab, Kong road, Taleghani and Motahhari. The intersection of Enghelab, where Enghelab and 22 Bahman streets meet is the main generator of the traffic (Vehicular and pedestrian, Fig.3.23).

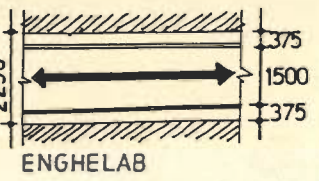
The main streets of Bandar Kong are Bandar Abbas Road, which, beside being a highway, also act as an inner city road. The other is Emam street, which starts from Bandar Abbas road and connects the eastern and southern parts of the town. This road continues till the port and becomes the main access to the east and the west side of the town. Boulevard of Shahid Beheshti connects the main town square with the sea side. There are two main traffic intersections, one is the triangular, and the other is the Shahrdari square. The triangular intersection is located between the old part and the new part of the town (Fig 3.24)

Transport and traffic networks of the inner core areas of both the settlements do not allow the vehicles to reach each and every house and shop.

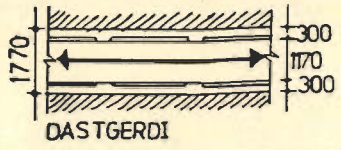




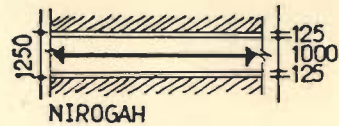
BOULEVARD  
TALEGHANI



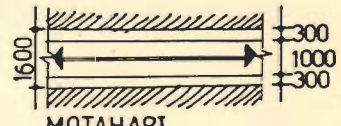
ENGHELAB



DASTGERDI



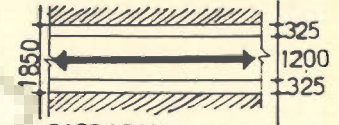
NIROGAH



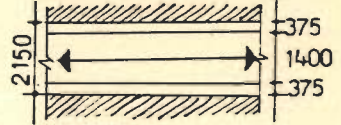
MOTAHARI



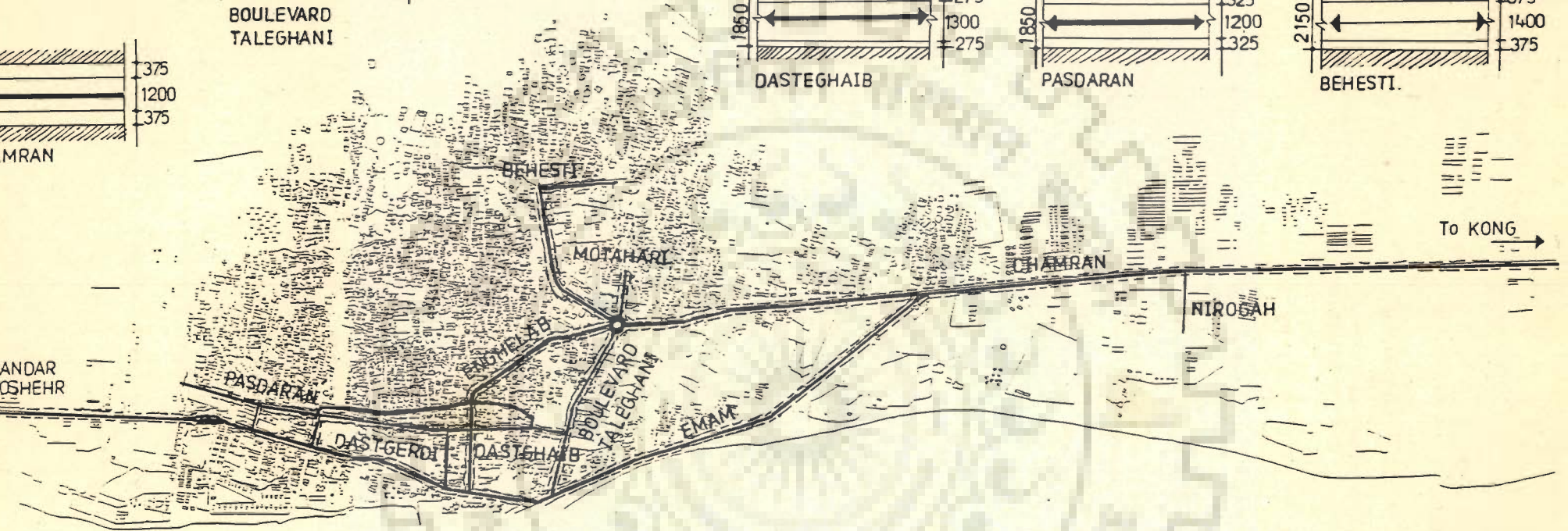
DASTEGHAIB



PASDARAN



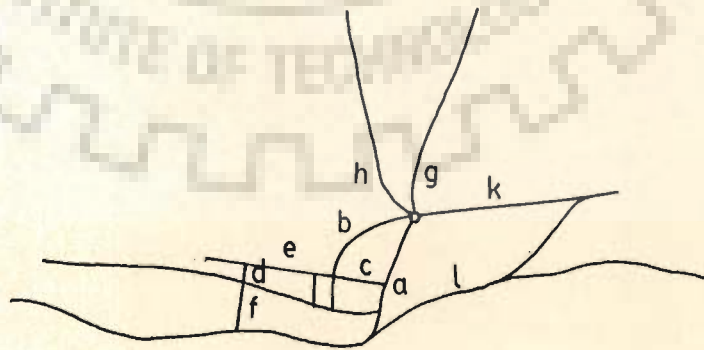
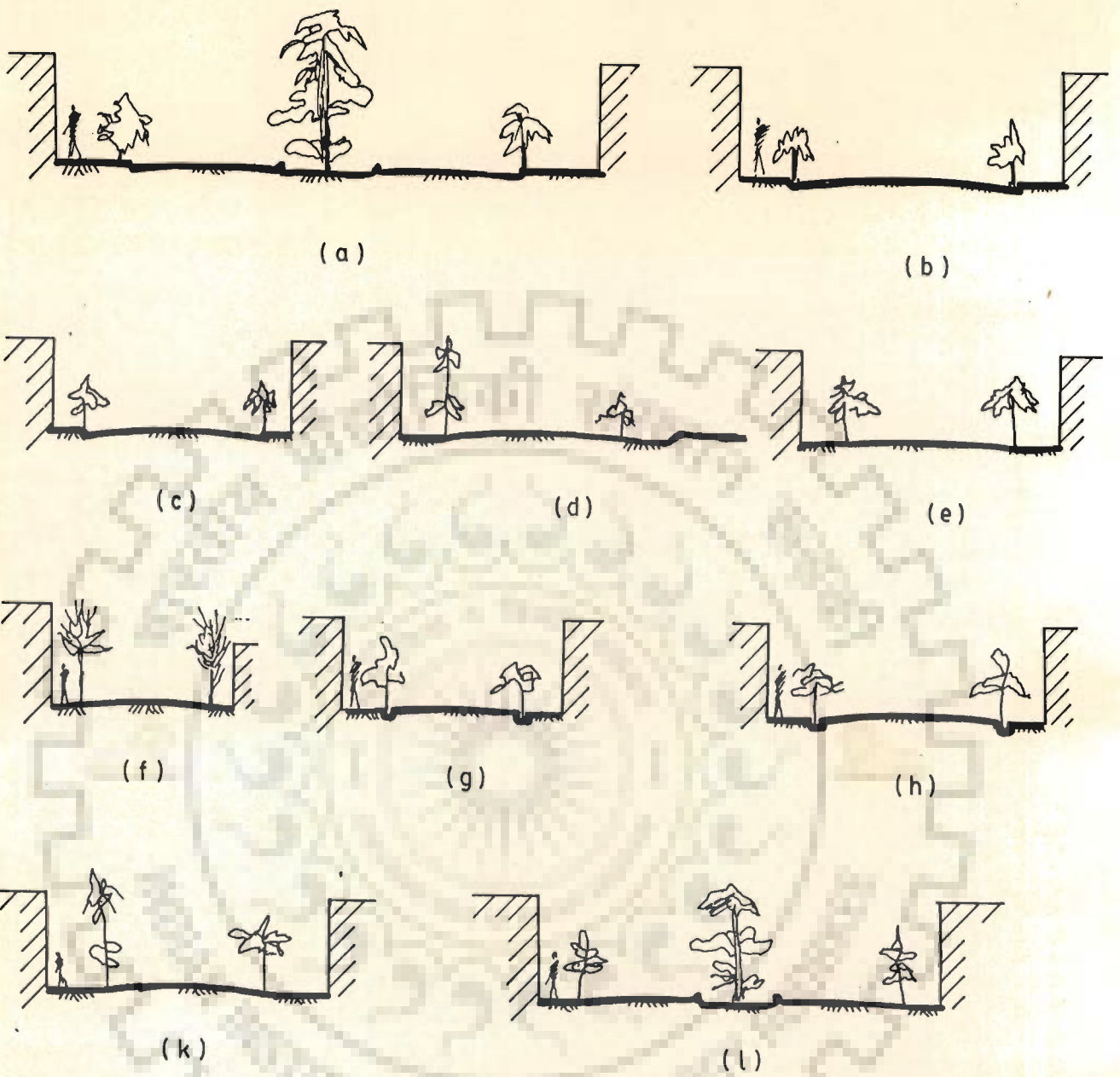
BEHESTI



BANDAR LENGHEH

- LEGEND
- Total Width
  - Vehicular Portion
  - ▶ Traffic Volume

<p>BANDAR LENGHEH</p> <p>PERSIAN GULF</p> <p>BANDAR KONG</p> <p>Key Map</p>	<p>FIG.3-23(A): STREETS' DETAIL (TRAFFIC STUDIES)</p>		
	<p>scale</p> <p>0 100 500 1000</p>		

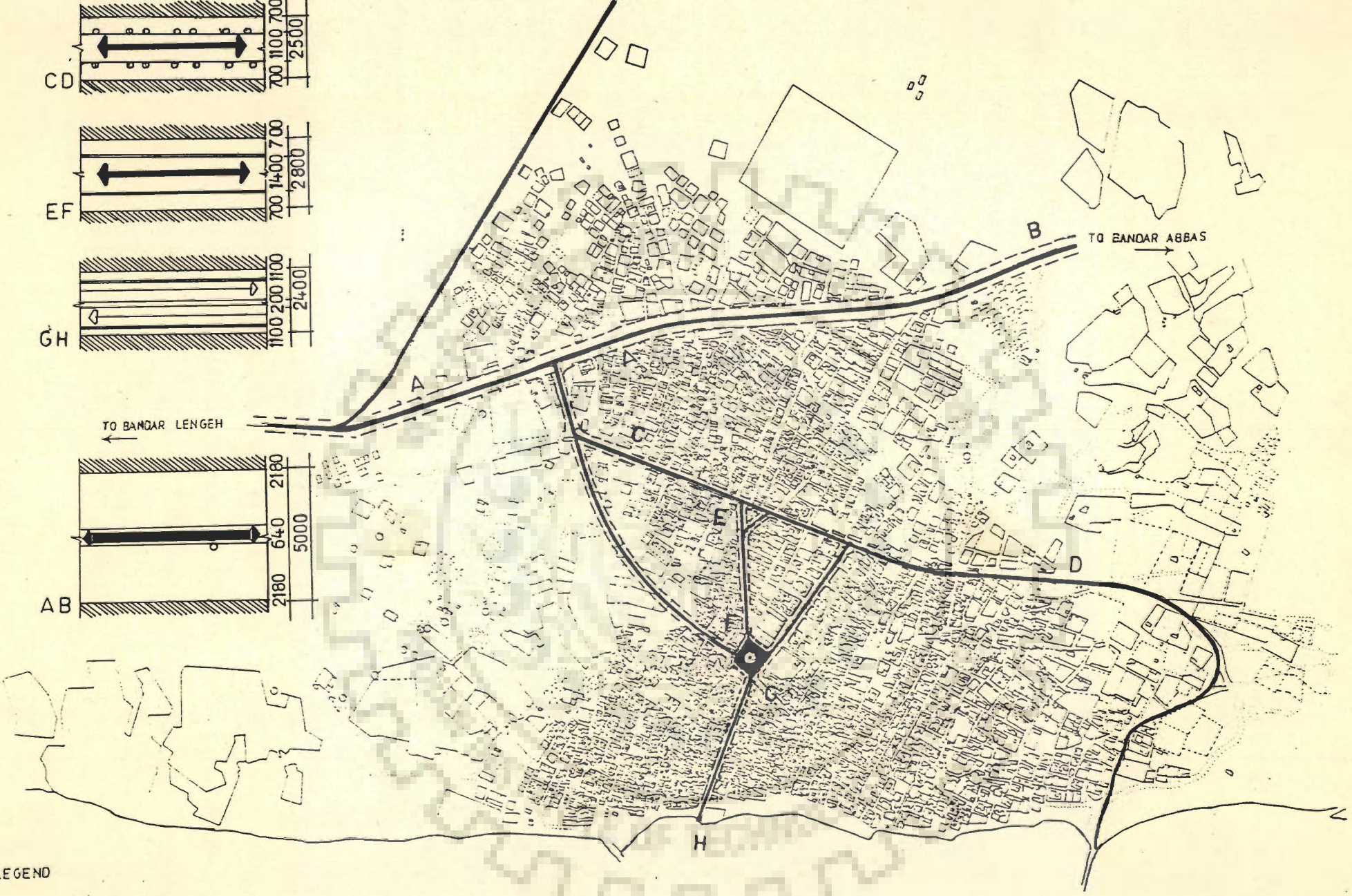
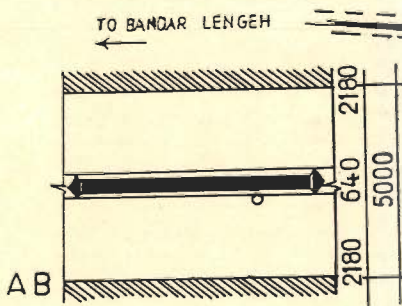
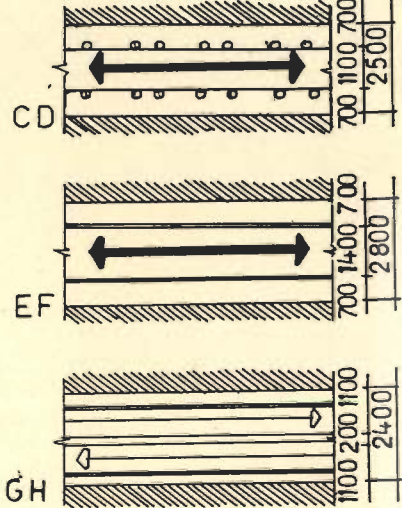


Key Plan

SCALE :- 1 : 500

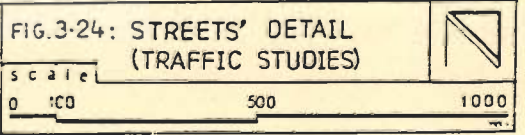
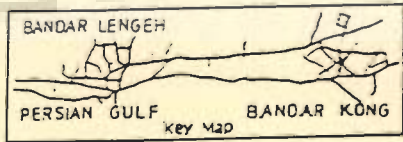
Fig.323(B):Street Sections.





BANDAR KONG

- LEGEND
- Right of Way
  - Traffic Flow
  - ||||| Traffic Volume





The irregular pattern of the alleys (Kucheh) and their narrow width is not suitable for vehicular traffic. At present some of the dry beds of the flood ways serve as a transport network during dry period, which then become ineffective during wet season. In a detail survey all these problems are mapped for proper proposals (Fig.3.25 & 3.26 and Table C.5, C.6, C.7 Appendix C). The origin and destination surveys are being shown in Fig.3.27 & 3.28 based on the results of the actual surveys conducted as shown in Fig.T.1 to Fig. T.12 (Appendix T). The counted vehicles are converted into a car unit (pcu).

Parking of cars, buses and trucks, along the roads, often create traffic problems and reduce the capacity of the road resulting in reducing the efficiency of the roads to cope with the traffic demands.

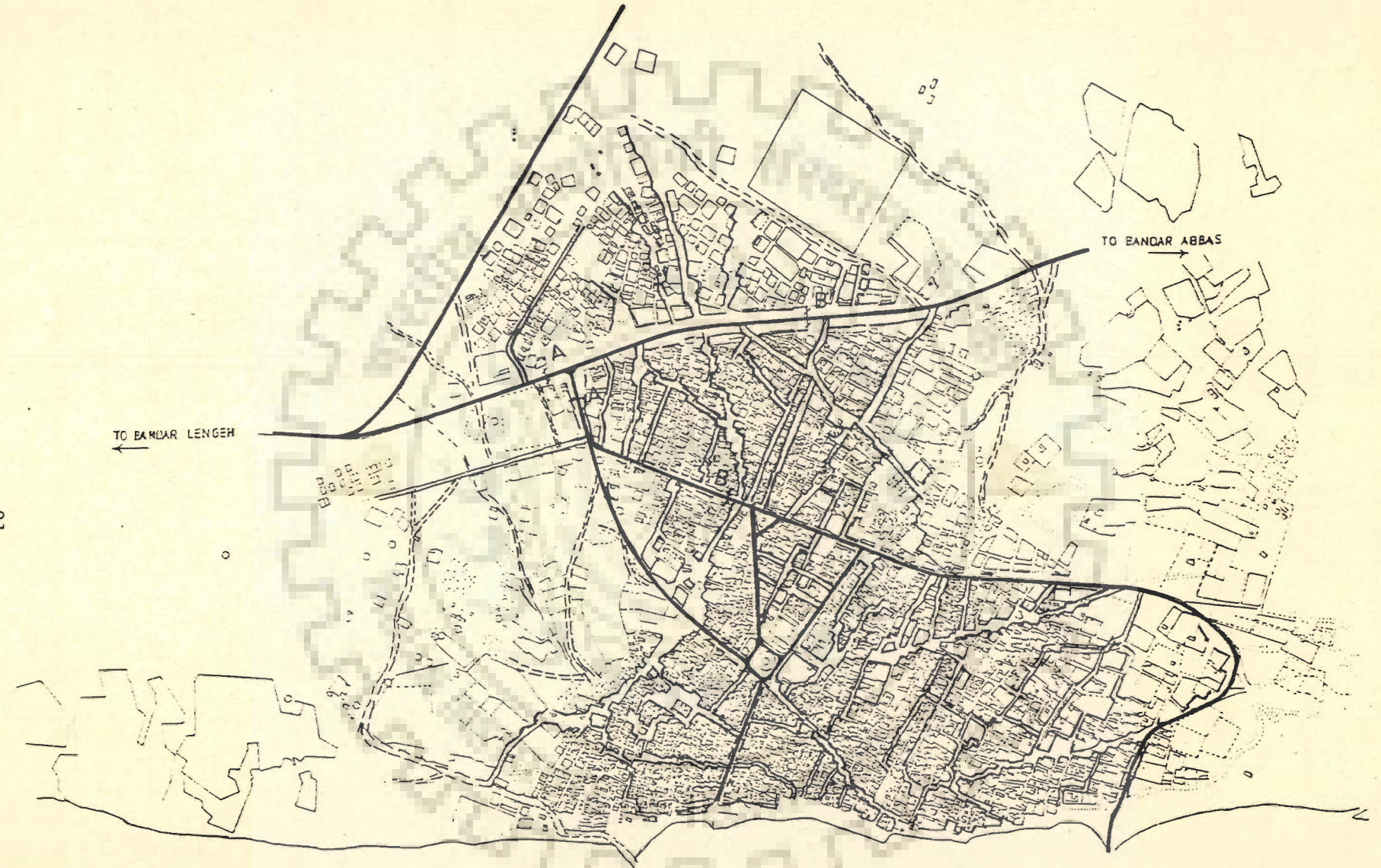
### 3.3.3 Condition of Structures (Historical Building)

Although the condition of structures in the old city cores is usually structurally not safe, but it is not so in the case of Bandar Lengeh. Most of the buildings in Lari Khouri, Afghan and Bolouki "Mahallehs" are structurally quite safe and only in some areas they need structural repairs and finishing. The buildings of Kaghazabad and north of Minabi and west of Amirabad "Mahallehs" are mostly new although structurally and architecturally they are in bad conditions. The buildings constructed between Lengeh and Kong are all new, built with cement blocks, steel, and brick or RCC roofs. Their structural safety is good, but without much of consideration toward local and vernacular architecture. Of course, due to mass and uniform housing done by the government in a short span of time usually architectural quality becomes weak and poor. According to the survey made, out of 1700 building units studied, 10.9% were in good structural condition and new, 39.8% were having a






TO BANDAR LENGEH ←

TO BANDAR ABBAS →



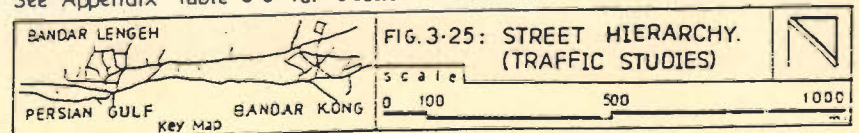
LEGEND

Traffic & Transportation Network

-  First Order
-  Second Order
-  Third Order (Road Within Floodway)

BANDAR KONG

See Appendix Table C-5 for Sections A & B









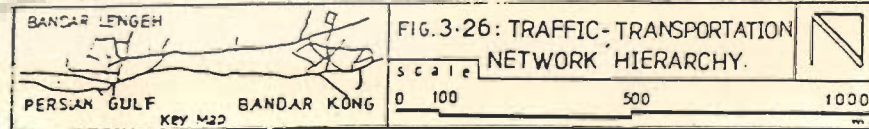


BANDAR LENGEH

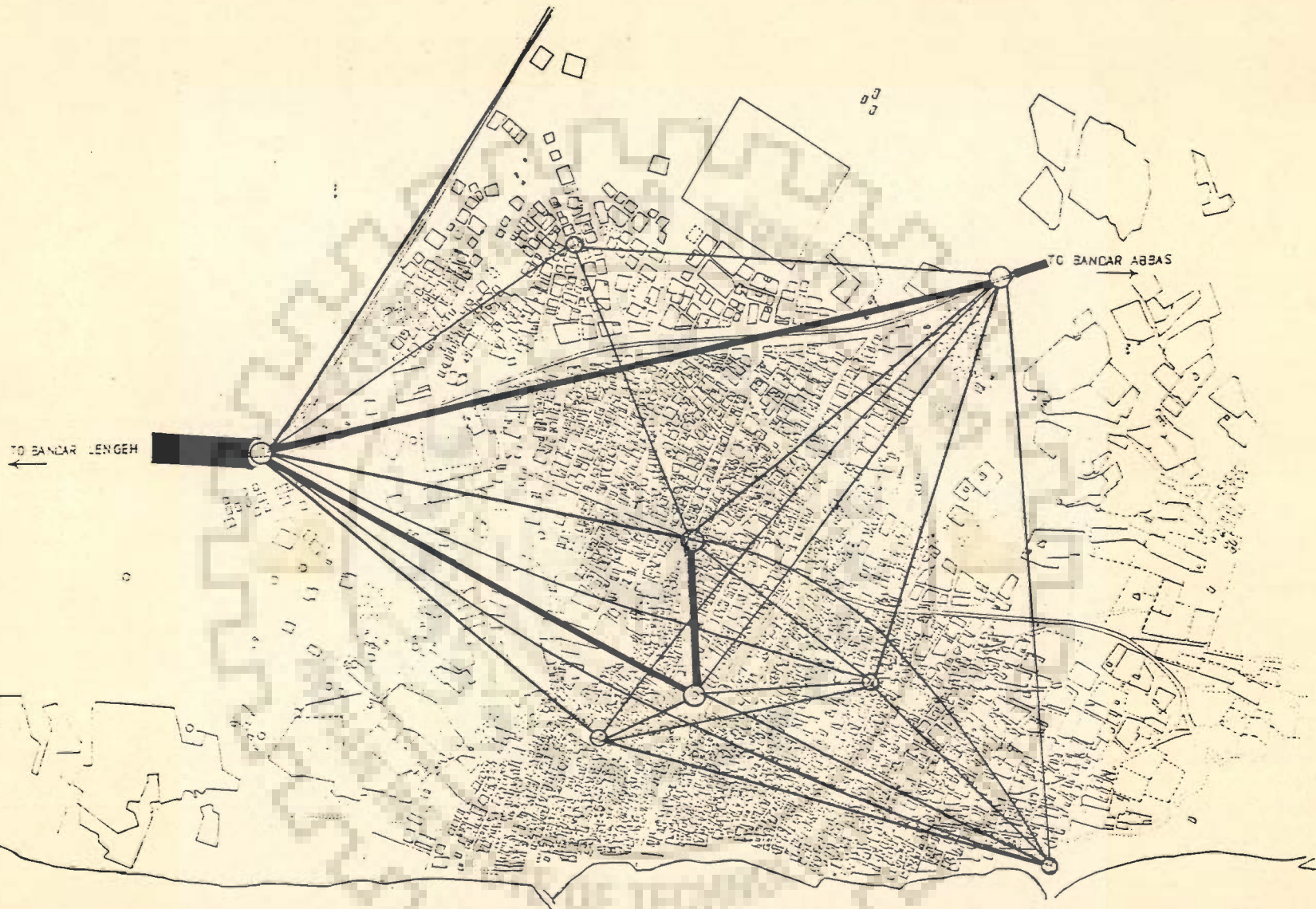
LEGEND

-  First Order
-  Second Order
-  Third Order
-  Road within a Floodway.

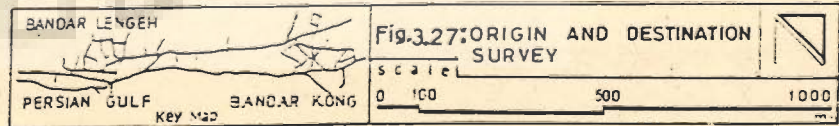
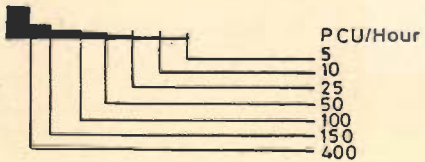
See Appendix Table C-6 for Sections A, B & C.



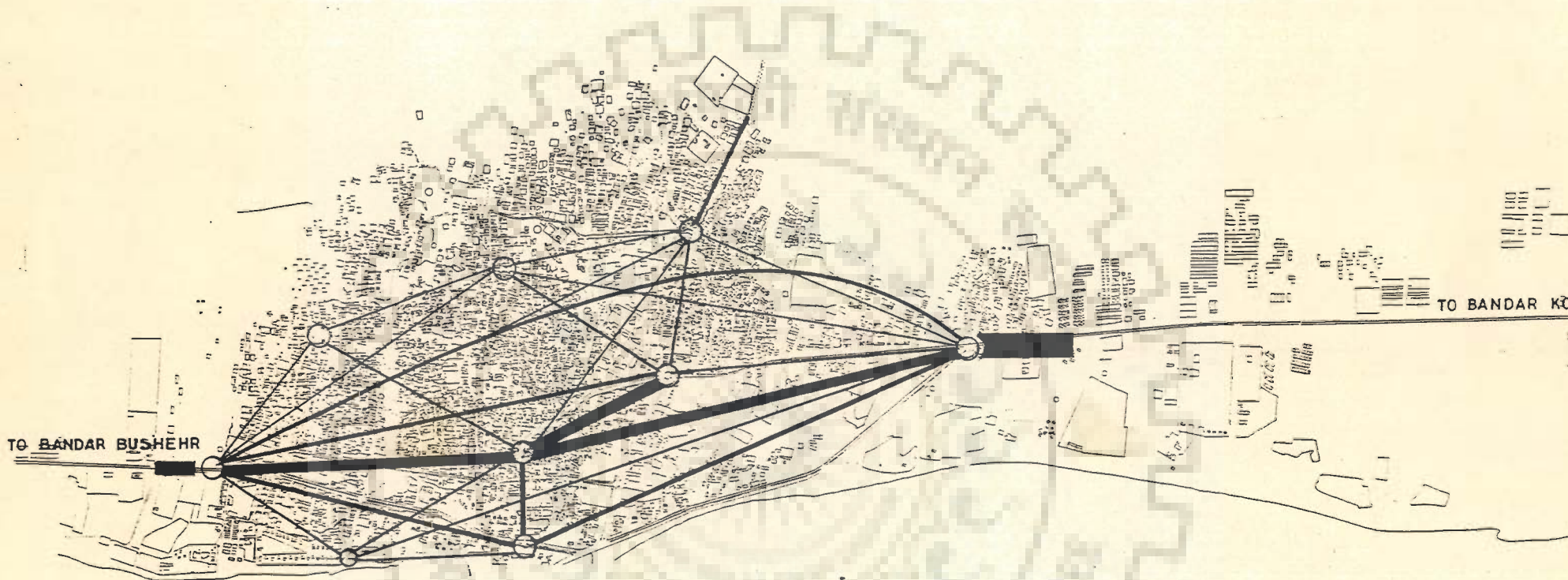




LEGEND  
Traffic Volume

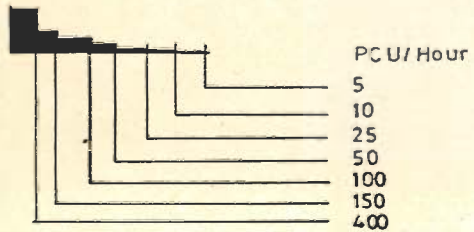






**LEGEND**

Traffic Volume



BANDAR LENGEH			<b>Fig 328: ORIGIN AND DESTINATION SURVEY</b> Scale 0 100 500 1000	
PERSIAN GULF BANDAR KONG				



fair and livable condition in comparison to the other buildings, and 23.7% requires major structural repairing. Most of the buildings of "Mahallehs" of Paen and Sayeed Nabina and Soltanololama are presenting the traditional, vernacular architecture of the Arid coastal Region. The buildings of "Mahallehs" of Abouzar north of Bolouki and Sayeed Mohammed Alem, although, they are newly constructed, but unfortunately, they lack in vernacular content and spirit of the Arid Coastal Architecture.

The recent housing and other building activities on the site of urban land organization indicate, that if the growth of buildings continued at this present rate, there will be no sign of traditional architecture and design in these settlements. The condition of structures studied become important for the design of the cores and transit areas of the settlements, specially in terms of proposing new transportation network or widening some of the narrow access roads to the neighbourhoods to give them some of the required facilities (Fire fighting, ambulance, water pipes to the "Mahallehs") and for providing open spaces. This study will help where surgery can be done to propose other necessary inputs. Therefore the buildings are divided into few categories according to age, materials, architectural value and structural safety. This information has been graphically shown in Fig.3.29, 3.30, 3.31, 3.32, 3.33, 3.34 and 3.35, 3.36, 3.37.

Historically, important buildings and areas of these settlements can be divided in two types, (Fig.3.38 to Fig.3.59) those which are registered by the archaeological department and those which are not yet registered. The registered monuments of Bandar Lengeh are as follows:

- \* Afghan mosque - safavid dynasty (1501 - 1722)
- \* Malekebne Abbas Mosque starting of Safavid dynasty

- Agha sayeed Abdolghader Mosque Zandleh dynasty (1779)
- Haj Khodadad Mosque Safavid dynasty
- Ghias Mosque Safavid dynasty
- Lashteghan fort before Safavid dynasty
- In Bandar Kong:
- "Hoseinleh" Ghazanfari with Safavid Architectural style - Safevid dynasty
- Portuguese fort - Before Safavid dynasty



Fig. 3.31 : Traditional building in dilapidated condition



Fig.3.32 : Dilapidated building old - core B.Lengeh



Fig.3.33 : Building requiring Repair - Lengeh



Fig.3.34 : Building requiring Repair - Kong



Fig.3.35 : Building in between B. lengeh & B. Kong in fair condition



Fig.3.36 : Newly built hospital building



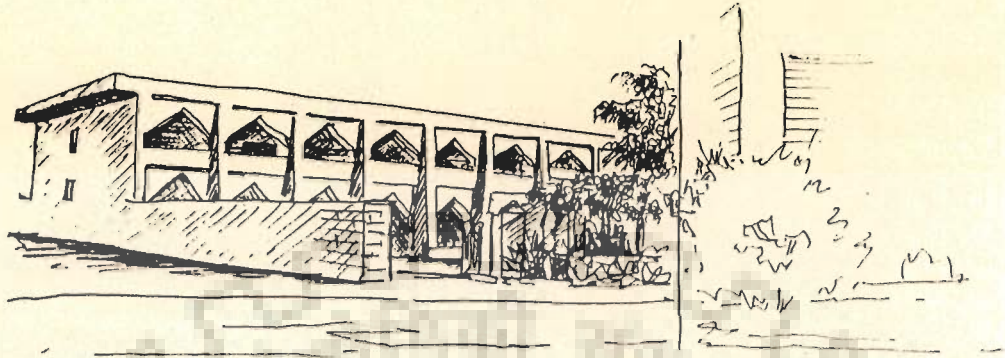


Fig.3.37 : Newly built office building B. Lengeh

Historical Places & Cultural Heritage

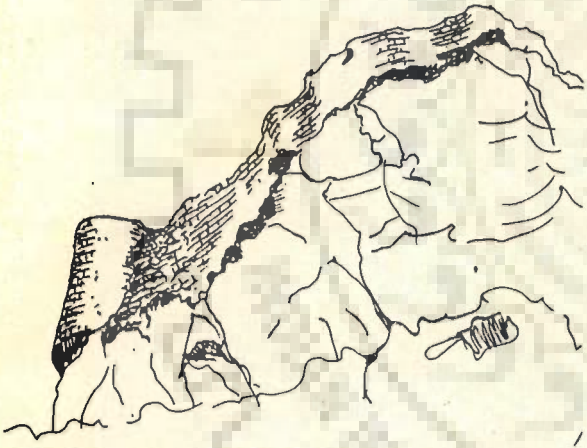


Fig.3.38 : Lashteghan Fort View



Fig.3.39 : Tower in the Lashteghan Fort



Fig.3.40 : "Berkeh" in Lashteghan Fort



Fig.3.41 : Portuguese Fort Remaining Ruins



Fig.3.42 : Portuguese Fort in the Persian Gulf



Fig.3.43 : Fort Remnants



Fig.3.44 : Seaside tower of the Portuguese Fort

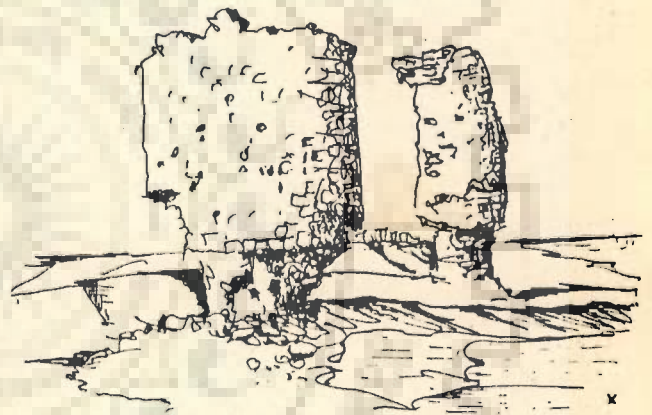


Fig.3.45 : The bastion of the Fort

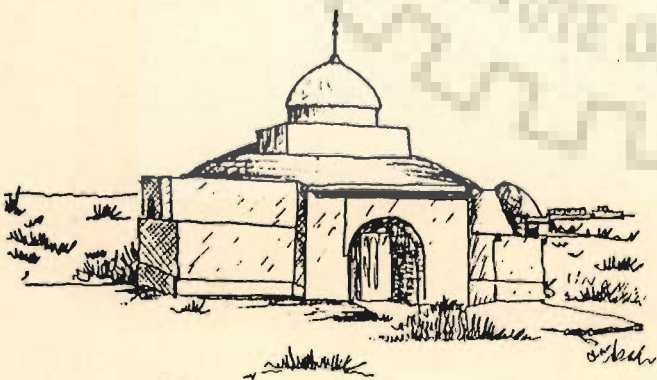


Fig.3.46.: Tomb of Sayeed Alam

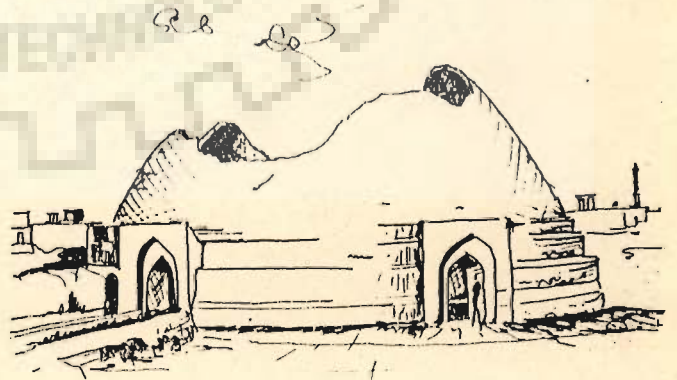


Fig.3.47 : Dilapidated "Berkeh" in Bandar Lengeh





Fig.3.48 : Dome and Vault  
"Berkeh Bandar  
Panjtai Bandar Kong



Fig.3.49 :Jamia Mosque-Bandar Kong



Fig.3.50 : Minaret of Jamia Mosque -  
Bandar Kong

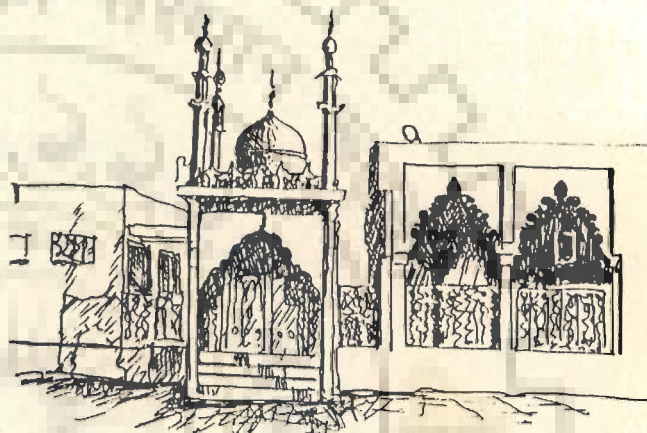


Fig.3.51 : The typical Entrance  
of Mosque in B. Kong



Fig.3.52 : Minaret of Ebne Abbas  
& Malekebne Abbas Mosque



Fig.3.53 : Mosque in core area of  
Bandar Kong

Mosque views and Skyline - Minaret as a Dominant Element



Fig.3.54 : Farough House

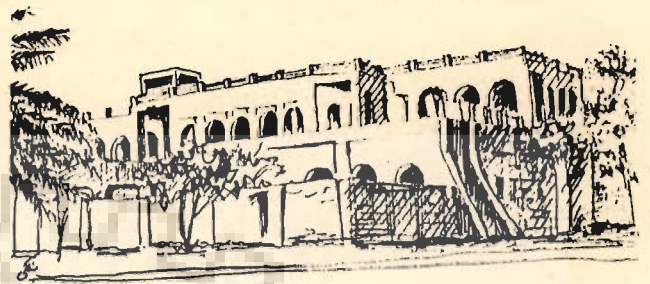


Fig.3.55 :Saadi House

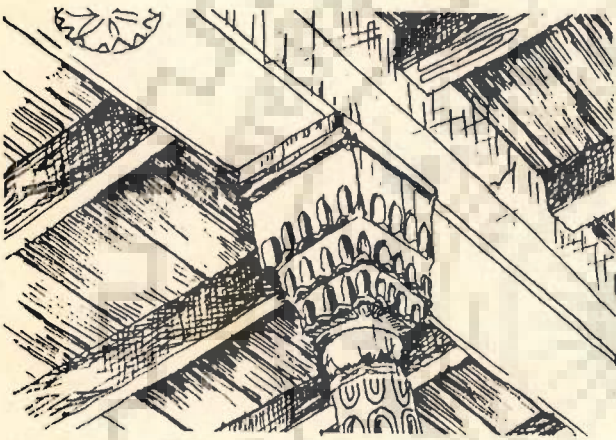


Fig.3.56 : The Roof Detail of the Residential Building



Fig.3.57 : The Interior of a Traditional House



Fig.3.58 : Bastaki House - The Indigenous Form



Fig.3.59 : Section of Fekri House in Bandar Lengeh

Those which are not yet registered, they are also valuable assets of the Iranian Heritage. Some of these are with domical roofs, and form the symbol and image of these settlements. The Most important among them are Beshari "Berkehs" (they are 5 and situated close to each other) near Beheshti



hospital. Khalifeh "Berkehs" (near pasdaran street), Pakarti and Abbas, are the other important structures. There are other buildings, like the houses of Bastaki, Fekri and Farough, which have good traditional architectural character. Usually, "Berkehs" have a diameter of 14 m, and are constructed out of stone, "saroug" and plaster of paris. They are sometime roofed by using vault system (Fig.3.47 and 3.48).

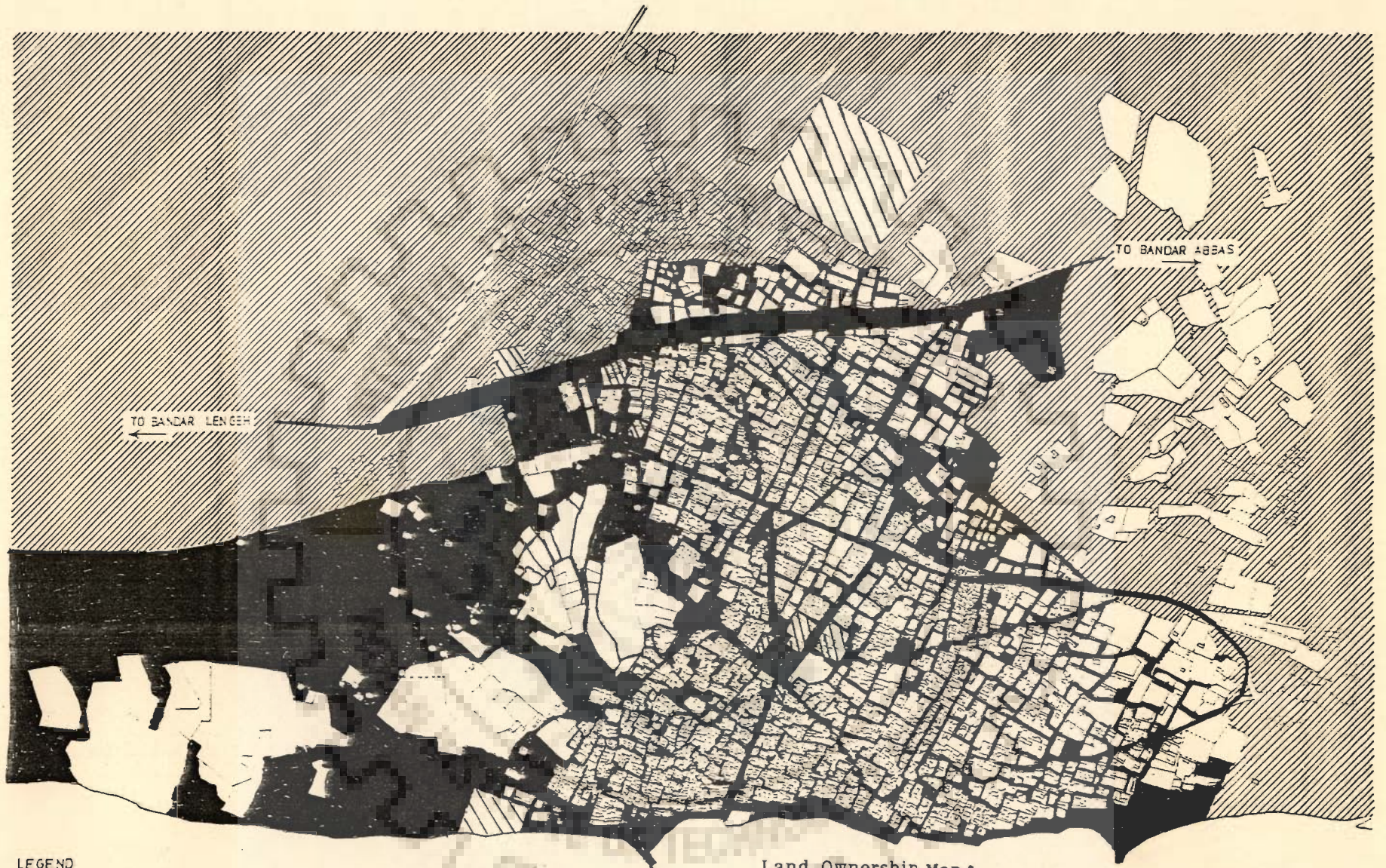
According to the studies made, no proper research of the important architectural heritage of these settlements has been carried out. The regulations for development incorporating the spirit or intent of the historically and architecturally important buildings are not well defined, although there are some general regulations. Each important building, however, requires its own regulation with respect to its architectural and urban design character.

### 3.4 URBAN PLANNING

#### 3.4.1 Land Ownership

Bandar Lengeh with an urban area of 1710 Hectares and 390 hectares covered area, has all sorts of land ownerships. Most of the urban land having residential building is controlled by private ownership. The municipality has 680,000 sqm land out of which 220,000 sqm is on the periphery of the city. About 1000 Hectares of land belong to urban land organization that is the land on the periphery of city. All of the educational areas belong to the ministry of education, and the areas under government offices belong to the government, which are about 720,000 sqm. There are areas which belong to pious foundation ("Oghaf") for public use, eg., Mosques, "Houseinieh" and "Berkeh" and a few shops. The type and pattern of land ownership is shown in Fig.3.60 and 3.61.



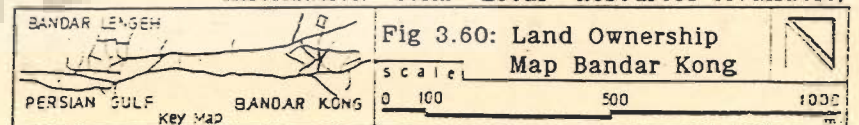


LEGEND

- Municipality
- Government
- Urban Land Organization
- Private Land
- Oghaf

Land Ownership Map :

(Prepared by the Author based on the Information from Local Resources Available)



Original Drawing Prepared by the Author is at 1:2500 Scale

Fig 3.60: Land Ownership Map Bandar Kong



In Bandar Kong also, most of urban land belong to private owners. Municipality has only 10,000 sqm of land within the city. Land along western seaside and all the government offices which are about 22180 sqm belong to government, 10.5 Hectares of stadium land is not included.

Bandar Kong has 20 Mosques and 16 "Berkehs" which belong to "Oghaf" organization. The studies indicate that municipality can occupy the urban land on the east and west which do not have a clear ownership.

This study help us to reduce the total cost of the proposed plan by using more of municipality land, urban land organization's land, government land and less of private land. In this way there will be less problem for implementation of the urban plans.

#### 3.4.2 Urban Services - Needs & Requirements

Various studies such as Master plan report and author survey of the site indicate that shortage of water supply is the most important problem of these settlements. This is due to the salt-marshs and salty Land and consequently due to the absence of potable under ground water. Water supply of these settlements is of two types: semi salty water which is used for washing purposes, and drinkable water. Water for washing purposes is provided through pipe lines, the main source of it, is in the town of Gozir which is 30 km away from Bandar..Lengeh and the source of potable water is the "Berkeh" and the distillery.

A 30 cms. diameters pipe brings water from Gozir to Bandar Lengeh and kong for washing purposes only. The length of the pipe line for Lengeh is

15,000 mts. and kong is 10,000 mts. However, due to the saline quality of water, sedimentation reduces the diameter of pipes. Each household uses about 168 liters in summer and 120 liters in winter and 154 liters as the average (Master Plan 1984).

#### Potable water - (drinking)

The settlements in the region suffer from absence of potable water in sufficient quantities. Three sources of drinking water are available at the moment; "Berkeh", distillery and packed mineral water bottles. In case there is no rain, water will be supplied from other parts of the country by ship. "Berkeh" (covered rain water storage tank) serve drinking water to 70% of the inhabitants. There are 490 "Berkehs" in the central zone of Bandar Lengeh alone. Until a few years ago, "Berkeh" was the only source of water for drinking. Of course, they were unhygienic, but now a days, the public health centre takes care of the required hygienic conditions. Though distillery systems are not something new in Iran, but they are not used for preparation of drinking water on a large scale. In 1980, the distillation plant of drinking water has been started. At the time being 30% of drinking water of Lengeh and Kong is provided with the help of this plant. Drinking water used by Lengeh inhabitants is  $180 \text{ m}^3$  and Kong inhabitant  $67 \text{ m}^3$  respectively.

There should be proper proposals for future water supply to these settlements with respect to their population growth. This can be based on the norms of ministry of power of Iran (Table 3.5) But according to the author survey, at present every person takes 154 Liters out of which 9 Litre from distillery and 22 liters from "Berkeh".is available for drinking.



**Table 3.5**  
**Proposed Norms for Water Consumption Pattern**

75-150 Liters	Per Person (Proposed)
10-20	Offices
7-10	Green Spaces
20	Fire fighting & Sports
45	Commercial & Industry
10% of Total above	Waste & Evaporation

Source : Ministry of Housing

The norm of water consumed by the inhabitants of Lengeh and Kong (185 liters) is almost matching with the proposed norm by the ministry (min. 100 and max. 215 liters). According to the above norms, Master Plan proposes the requirement of 10514 liters of water supply per day for the year 1994.

#### Electricity

There are 90 transformers in the electricity network of Bandar Lengeh out of which 75 are in Lengeh and Kong and the rest are in the villages. Due to the hard and rocky surface of the land under ground cable system is economically not viable and it is very costly. Out of 18 Mega Watts electricity produced by the Power plant of Lengeh, 7.2 Mega watts is supplied to Kong and 8-10 to Lengeh. Around 97% of the residential buildings are using electricity.

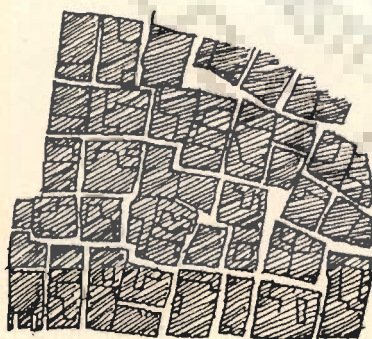
Some of the establishment like hospitals, airports, shilat and communication offices have their own generators of electricity. According to the 1982 Census electricity produced per head in the country was 710 kw.,

while the electricity produced per head in these settlements is 116 kw. There is a proposal to produce 40 Mega Watts and also join the grid to Bandar Abbas and Fars provinces.

But with population growth of the settlements and according to Master Plan proposals electricity production should reach 147 Mega Watts per hour by the year 1994.

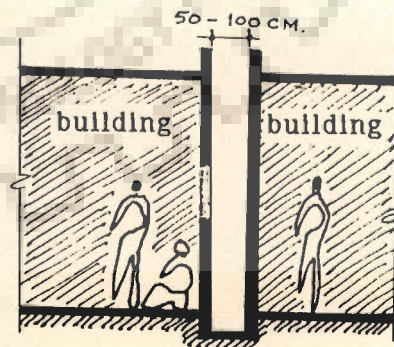
### Sewage and Garbage Collection System

The settlements of Bandar Lengeh and Kong do not have a sewage disposal system and some of the houses use the well for disposing their drainage water and some of the poor people dispose that to the open drain outside their houses in the "kucheh" and streets which goes to the flood-ways. Garbage collection is done by municipality workers. Due to the narrow space in some of the areas (about 50 cm between the building blocks) the garbage collection of these places becomes difficult (Fig.3.62).



(a)

Residential area, Lengeh narrow spaces



(b)

Cross-section Through Narrow Space

Fig. 3.62 : problems of Garbage Collection



### 3.5 URBAN DESIGN STUDIES - Analysis and Evaluation

The essence of Urban Design is known as the arrangement of city elements in an aesthetic and functional way. The city elements are the various buildings, streets, communications, utilities, transportation, leisure spaces and utilities.

The old core of Bandar Lengeh and Kong has certain urban form characteristics. The Jama Mosque and other mosques are dominant structures and can be well recognized. The "Berkeh" is functional and beautifully designed and located strategically both in form and scale. They also have their own visual character. The street patterns and various building blocks have been designed in relation to the waterfront. However, the recent growth or development has become an amorphous accumulation of solids and voids. The philosophy and vocabulary of urban design in these settlements will be studied and analyzed to prepare a background for better proposals in designing of the future extension of these settlements.

#### 3.5.1 Landmark (Neshaneh)

There are beautiful landmarks in these settlements which basically can be divided into traditional and contemporary landmarks. Traditional landmarks are those which are usually situated in the core area or the historically important areas. These are like minarets "Berkeh" and tower or wall of the fort or a unique "Badgir". The contemporary landmarks can be a tall antenna or a T.V. or microwave tower figures (3.76 to 3.78). There is a hierarchy of landmarks, in the settlements which are, at the levels of town, "Mahalleh" and "Kucheh" level. The town level landmarks usually have a monumental scale, with unique feature and character. The neighbourhood and

"kucheh" landmarks are also dominant at their own level in terms of scale or character (Fig.3.63 to 3.67). These help in an identification of the places as, the key physical characteristics of this class is singularity of some aspects which are unique or memorable in the context.<sup>13</sup>

Most of these landmarks were bottomless. This means that they may dominate the general sky line but the location and identify of their base is by no means as significant as that of their top. None of these may have been designed to act as landmarks, but they serve this function. A sequential series of landmarks--in which one detail calls up anticipation of the next and key details trigger specific moves of the observer, appeared to be a standard way in which these people travelled through the city.<sup>14</sup>

The sequential series somehow do not exist in these settlements. Although, as we enter Bandar Lengeh, in the first square, "Berkeh" and a minaret are visible but after that the street pattern does not bring any other dominating and striking structure to our notice. This could have been worked out while preparing the plan in 1964 (first plan) before the city had grown to the present size.

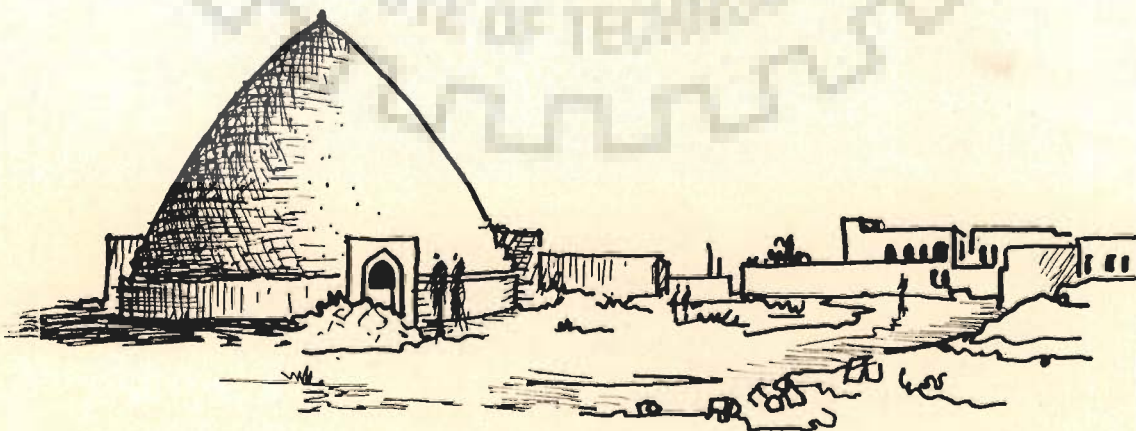


Fig.3.63 : "Berkeh" as a "Neshaneh" ("Berkeh" Bangelow - "Bandar" Lengeh )



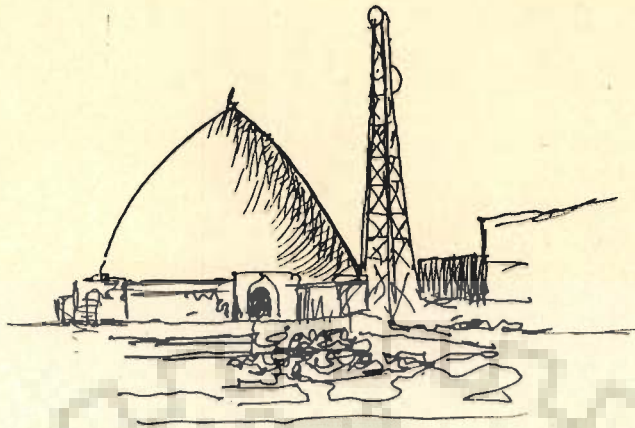


Fig.3.64 : Traditional and Contemporary "Neshaneh"

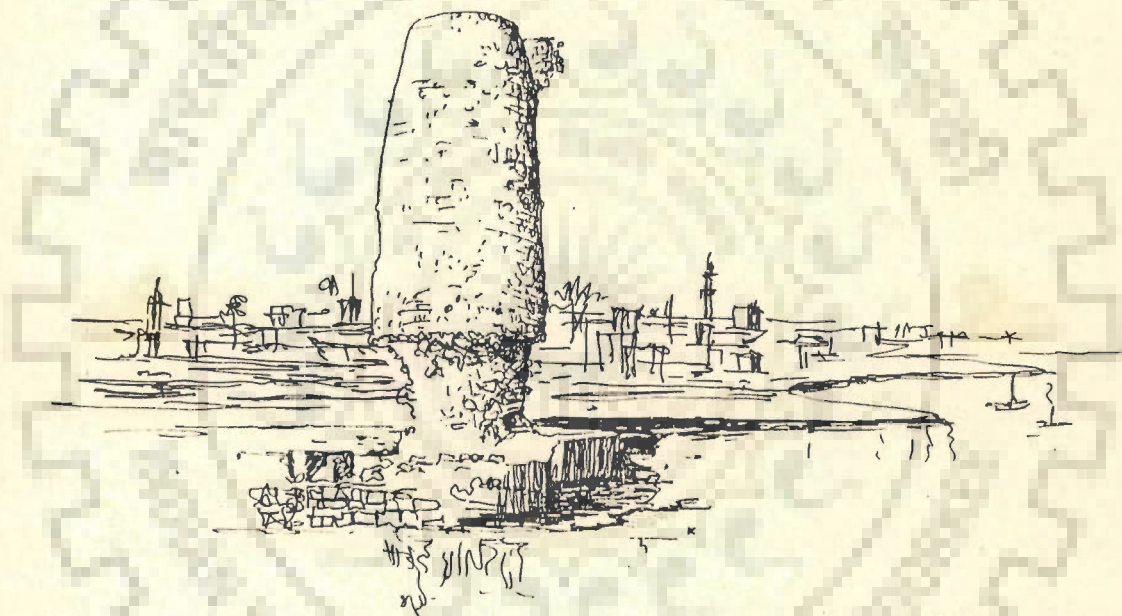


Fig.3.65 : Portuguese Tower is a Dominating Historical Structure and as a City Scale "Neshaneh"

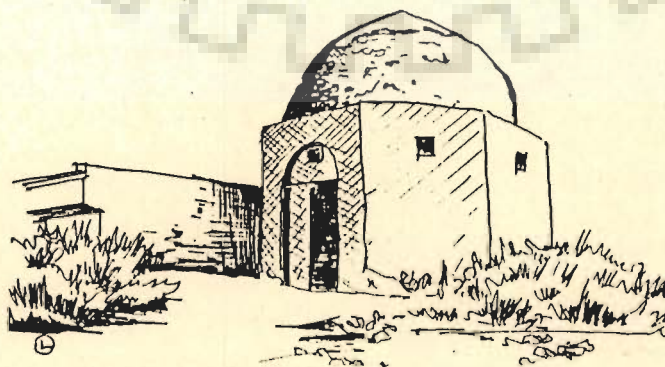


FIG.3.66 : This Tomb Acts as a "Neshaneh" at a Cluster Level of the Settlement



Fig.3.67 : A Unique "Badgir" Acts as "Neshaneh" at "Kucheh" Level

### 3.5.2 Edges (LabeH)

One of the good points of these settlements is that there are defined edges in the old core area. One such edge is the water front built form of Bandar Lengeh or Bandar Kong (Fig.3.68 to 3.69) These edges also help in the identification of an envelope or an urban district in a city. Although, the major edges of the town are well defined, but the edges of each "Mahalleh" are physically not defined, due to various circumstances, (primarily due to Architecture and Planning similarity of the style). In another term, one can say, that the edges can act as a kind of landmark in a settlement if designed properly.

It has almost coarse grained and uniform texture, the course grains are due to the "Badgir" of buildings. These edges give definition to the open spaces too. "The essential function of the edges is to give definition, to establish boundary and form, and to join uses",<sup>15</sup> The edges are the most sensitive part of open spaces as well (Fig. 3.70 to 3.72).



### 3.5.3 "Manzar" (Views and Vistas)

The beautiful bluish shore of the Persian Gulf in the south, and an undulated land form of the north, dusty bushes of zylphus, prospis specigera and data palm grove and the coral surface of floodways, all represent the natural views of these settlements.



Fig.3.68 : Where the Water and Land Meet is the Very well Defined "LabeH" of Bandar lengeh and Bandar Kong

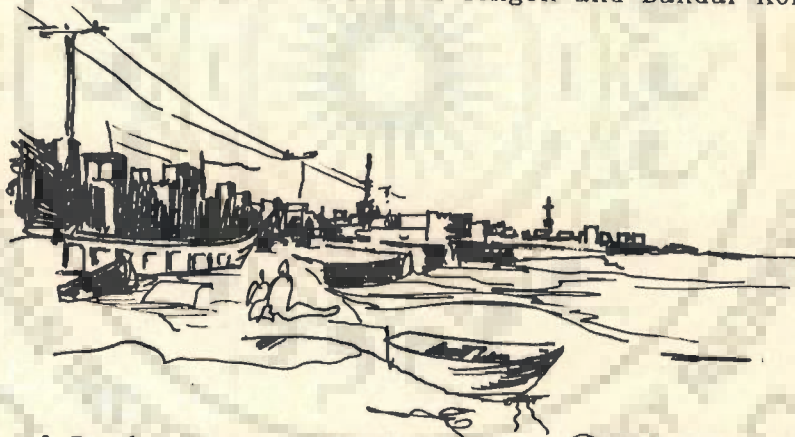


Fig. 3.69 : Edge of Bander Kong along Persian Gulf which is in harmony with that of Bander Lengeh. But this edge has a few tall and thin minarets in itself and it is more traditional.

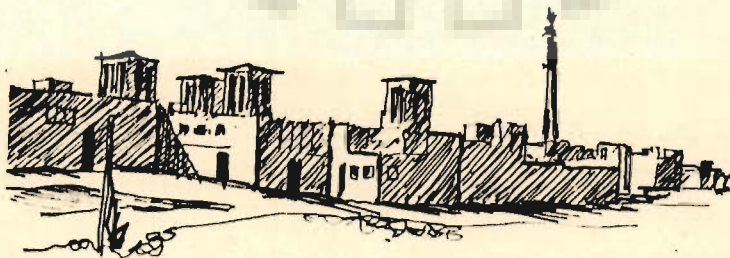


Fig. 3.70 : The Edge of Traditional "Mahalleh" with many wind catchers (old core areas).



Fig. 3.71 : The edge of peripheral areas of settlements which is having Fine grain and uniform texture without any traditional character.

The natural views have been combined with the views of man made built forms, such as, bare "kuchehs" and street, adobe buildings with "Badgirs", domical "Berkeh" and slim minarets which form a kind of unique agglomeration of built forms and skylines.

Vegetation cover of the east of Bandar Kong makes it much more fresh and pleasant than that of Bandar Lengeh. These towns get a cheerful look during the rain period and in the winter. But they look dim and dull in summer. Different views and vistas are illustrated in the following sketches (Figs. 3.73 to 3.91).

#### 3.5.4 Nodes

These are the junction of paths which form, the centre of activities. They are concentrations with some characteristics.

"But although conceptually they are (nodes) small points in the city image, they may in reality be large squares, or some what extended linear shapes or even entire central districts when a city is considered at a large enough level".<sup>16</sup>



"Actually it (node) is a type of landmark but is distinguished from a landmark by virtue of its active function. Where a landmark is a distinct visual object, a node is a distinct hub of activity".<sup>17</sup>

Places like the jetty, intersection of Pasdaran, Dastghelb and Enghelab streets, Bazaar area (open space at the entrance of Bazaar ) are strong junction nodes in Bandar Lengeh (Fig. 3.92 to 3.99).



Fig. 3.72 : The Difference of Level due to the Floodway, Provides an Edge to the Eshkaft "Mahalleh".



Fig. 3.73 : View of Coral Stone Beaches Near Bandar Lengeh.



Fig. 3.74 : View from Jetty to the Gulf.



Fig. 3.75 : View from the Minaret of the Mosque to the Town - Bandar Kong.

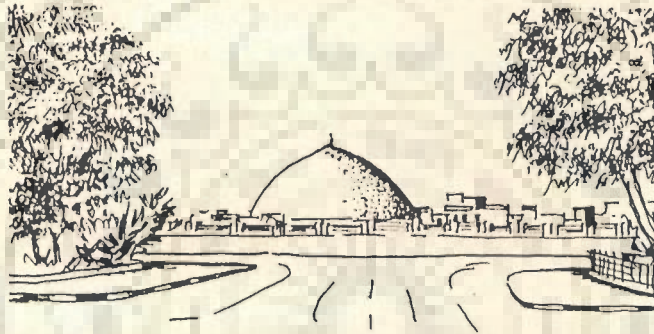


Fig. 3.76 : Nice Vista is formed at the turning of the Emam Boulevard.

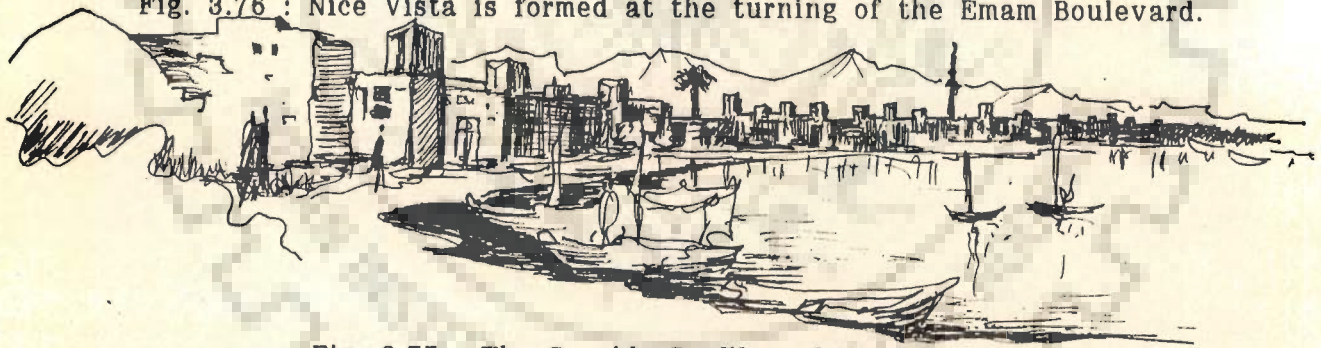


Fig. 3.77 : The Seaside Profiles of Bandar Kong.



Fig. 3.78 : Unique form of "Badgir", not only adds to the beauty of the view of a "Kucheh" but also acts as a Landmark.





Fig. 3.79 : View from the Jetty to the settlement

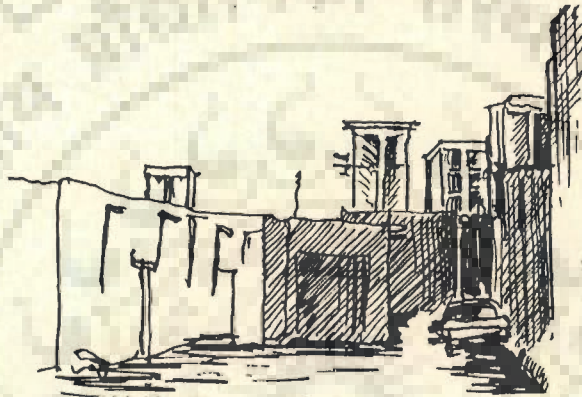


Fig. 3.80 : View of "Kucheh" in Transit Zone zone of Built Form - Bandar Lengeh.



Fig. 3.81 : View of "Kucheh" in Old Core of Bandar Kong.

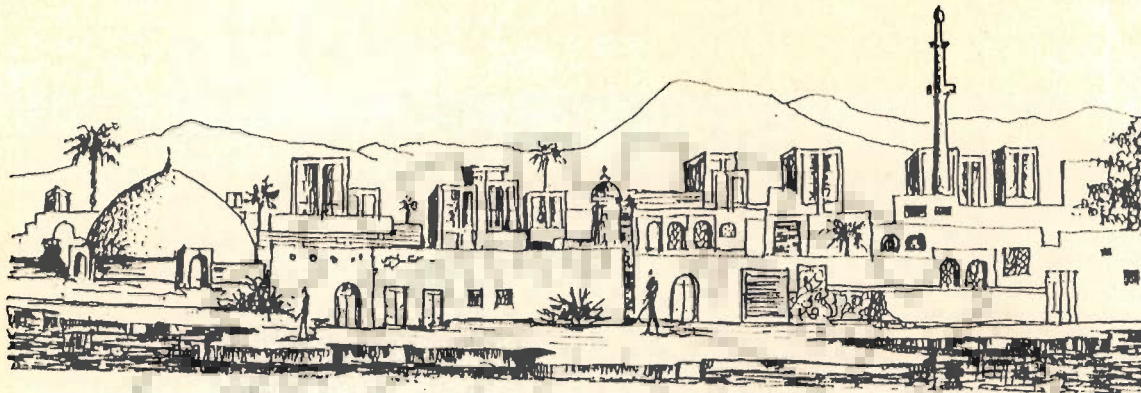


Fig. 3.82 : View of Bandar Kong from the Gulf.



Fig. 3.83

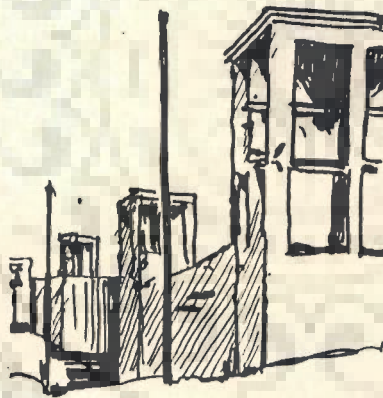


Fig.3.84

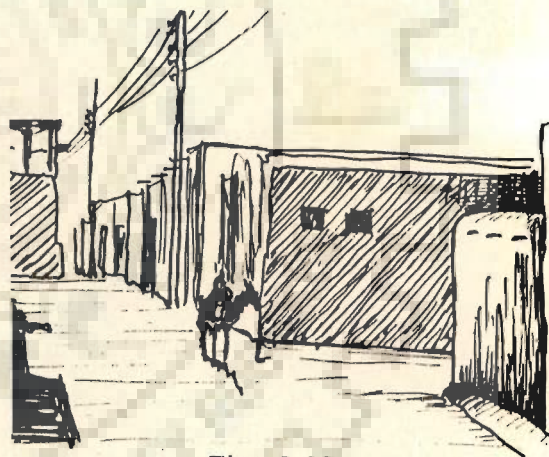


Fig. 3.85

Different Views of "Kucheh" in various Parts of the Towns.



Fig. 3.86



Fig.3.87



Fig.3.88

View of "Berkeh" "Nakhlestan" and Minaret of Mosque from the Main Boulevard of Bandar Lengeh.



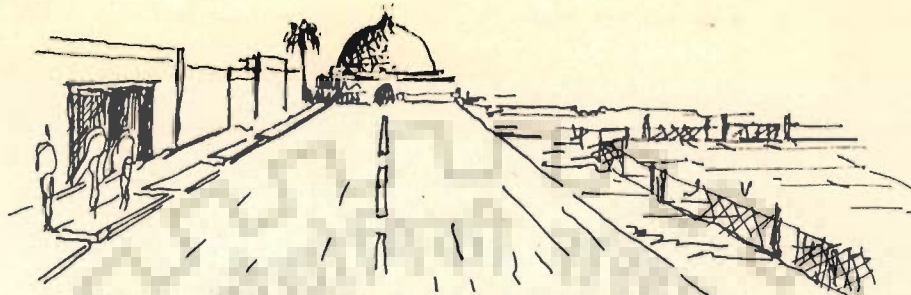


Fig.3.89 : View of Sepah Street focusing on a "Berkeh".

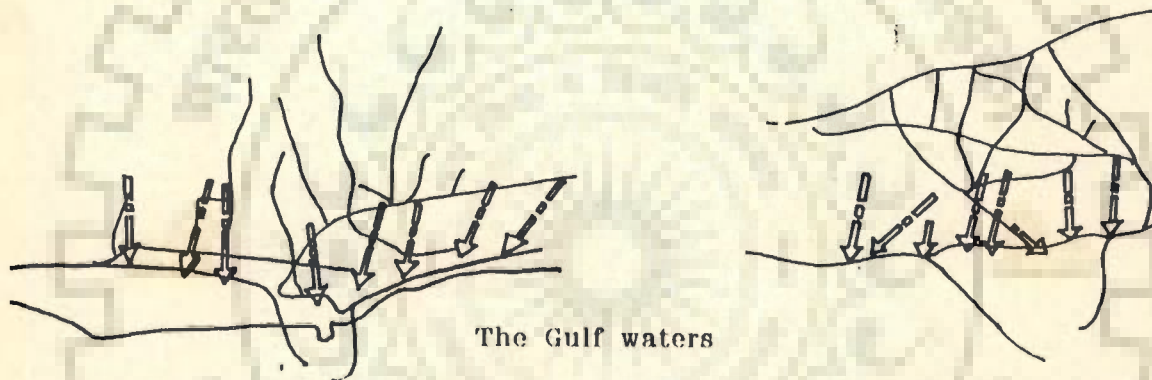


Fig. 3.90 : Bandar Lengeh

3.91 : Bandar Kong

Most of the "Kuchehs" open to the sea framing a beautiful water view of the Gulf Landscape. This quality needs to be conserved and enhanced.

As Kevin Lynch describes:

"In theory even ordinary street intersections are nodes, but generally they are not of sufficient prominence to be imaged as more than the incidental crossing of paths. The image can not carry to many nodal centre".<sup>18</sup>

Although, a strong physical form is not absolutely essential to the recognition of a node, but the form of break-waters and the jetties give a much stronger impact and make them memorable experience of nodal activities.

The nodes of Bazaar area are due to the shopping activities and its covered cool areas. Node of Dastghalb street is due to transportation and traffic activities from where buses and cars go to the other settlements.

### 3.5.5 District ("Houzeh").

These are various sections of settlements, conceived of as having a defined two dimensional extent. They have some common identifying character. Districts sometime becomes the basic elements of the city image.

"The physical characteristics that determine districts are thematic continuities which may consists of an endless variety of components: texture, space, form, details, symbol, building type, use, activity, inhabitants, degree of maintenance and topography"<sup>19</sup>.



Fig.3.92 : Street as a Hub of Activities - Bandar lengh



Fig. 3.93 : Bazaar as the Centre of Activities





Fig. 3.94 : The Old Bazaar as the Centre of Activities (Now in a dilapidated condition).



Fig. 3.95 : 22nd Bahman Street as the Node and Urban Space of Bander Lengeh



Fig. 3.96 : Bazaar of Bander Kong



Fig. 3.97 : Bazaar of Bandar Lengeh

There are four different districts in these settlements as are being shown in the Figures 100 to 113. District 1 has a traditional character of architecture with fine grained and uniform texture. Materials which have given shape to the texture of the grains (Building blocks) are coral stone, lime and mud plaster, making a whitish appearance to the entire district. Traditional arches, jaalies, doors and courtyard houses have all imported a unique harmonious continuity to this district. The narrow "Kuchehs" form the space corridor linking themselves into a circulation system.

District 2 has coarse grained and uniform texture, primarily due to the gaps between the blocks. Materials are almost same as in the case of district 1.

There are more of green spaces ( date palms ) in this part, District 3 consisting of peripheral areas which is characterized by a separation of grains from each other. The cement blocks used as a building material input a uniform textural quality. District 4, is characterized by coarse grained and uniform texture with plantation in between the grains.



In district 1, a combination of few building blocks make one grain, while a single building makes one grain in the case of other districts. Grain density in district 1 is higher than any other district in these settlements.

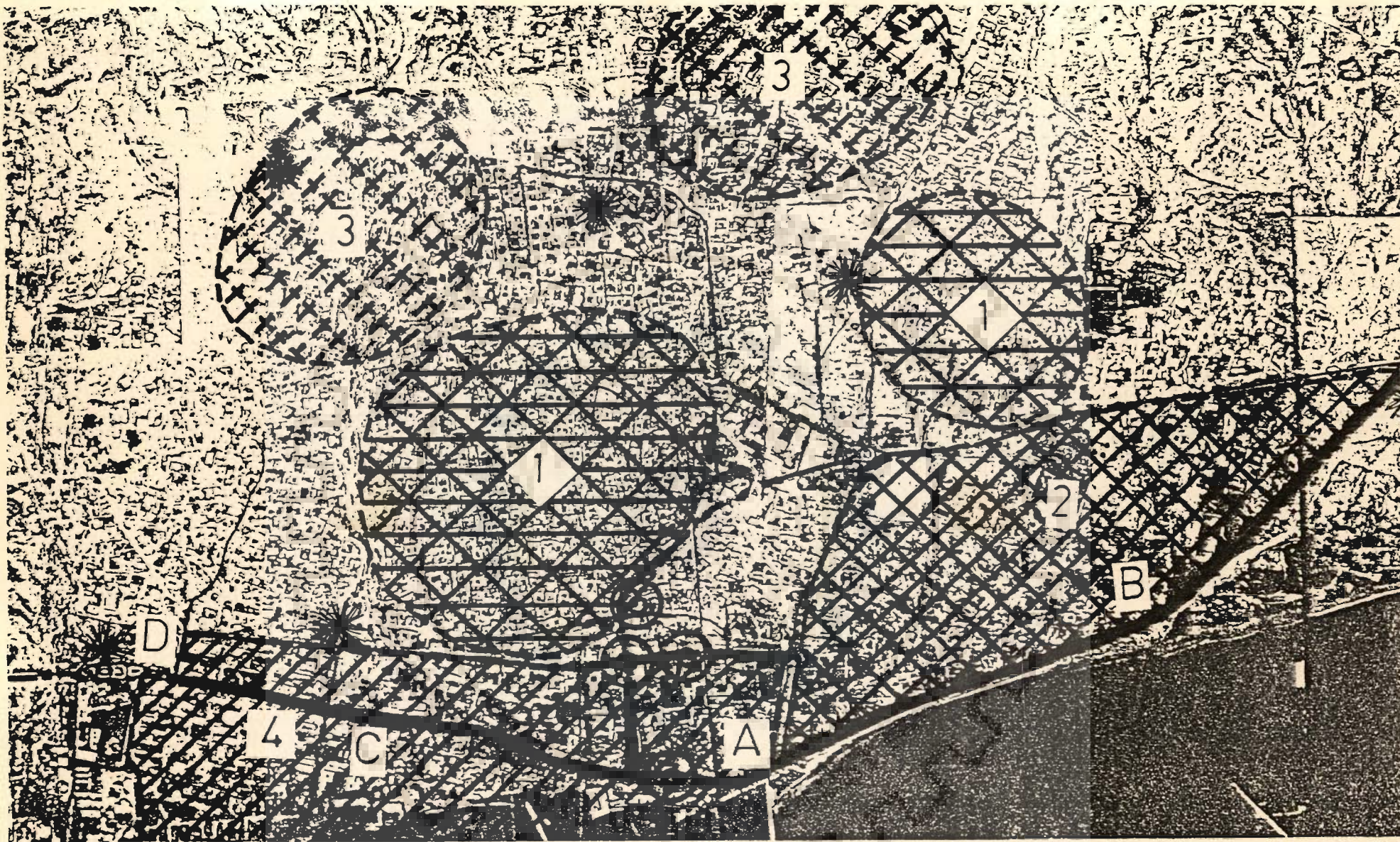


Fig. 3.98 : Dastgheib Node and Urban Space



Fig. 3.99 : Node of Jetty Bandar Kong

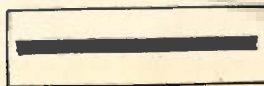




Legend



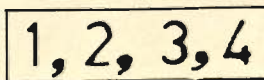
Node



Path



Land Mark



District

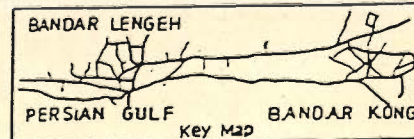
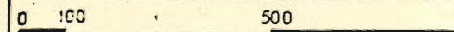


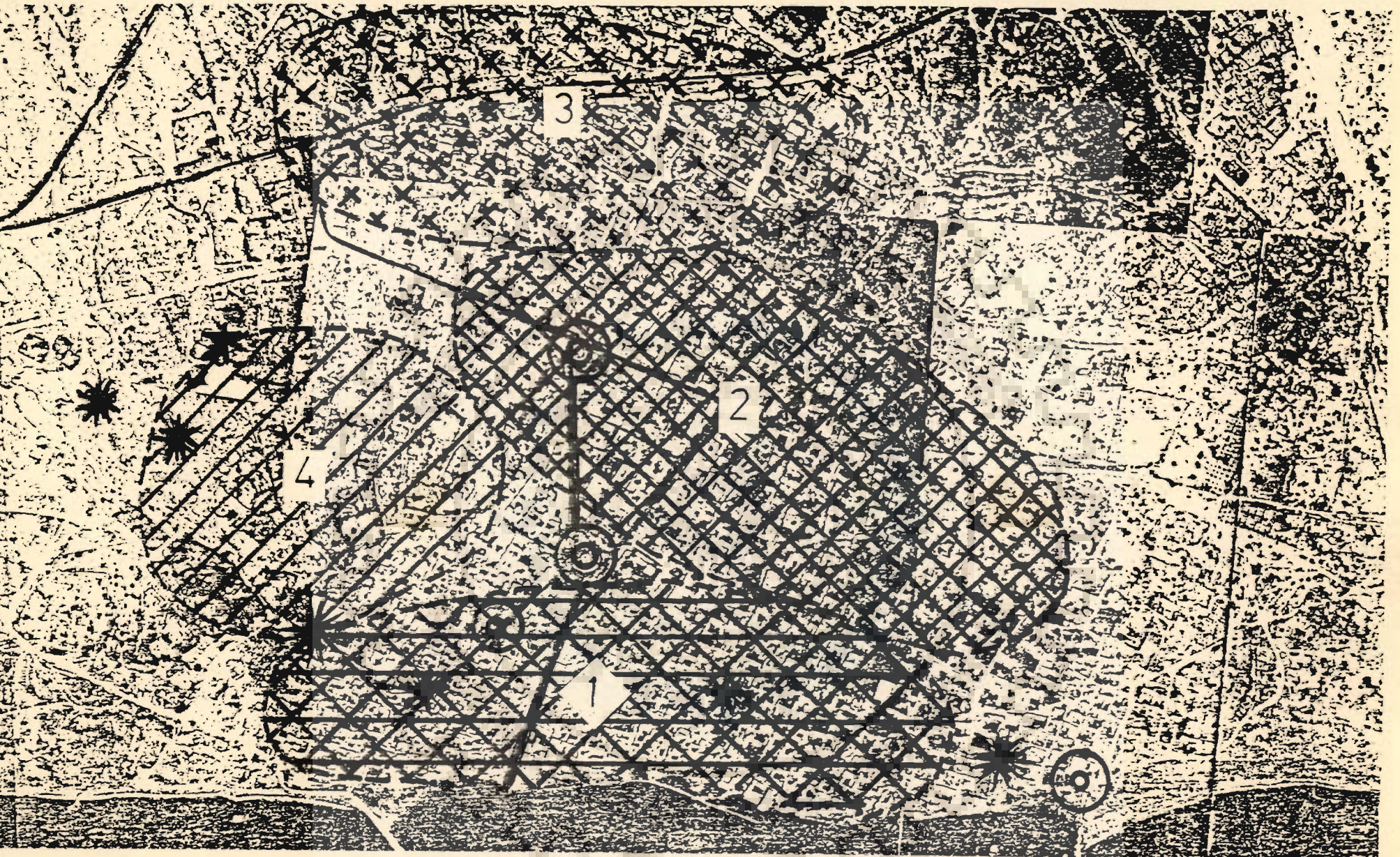
Fig. 3.100 : Study of Major Urban Design Elements

scale



Bandar L





Legend



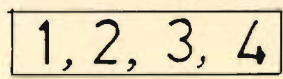
Node



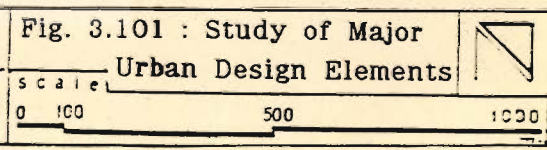
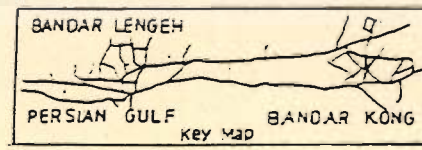
Path



Land Mark



District



Bandar Kong





Fig. 3.102 : Massah "Mahalleh", District 1 - Bandar Lengeh



Fig. 3.103 : Khori "Mohalleh", District 1 - Bandar Lengeh

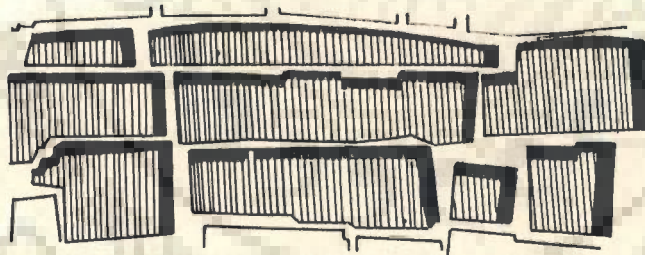


Fig. 3.104 : Sultan Ul Ollama "Mahalleh", District 2 - Bandar Kong

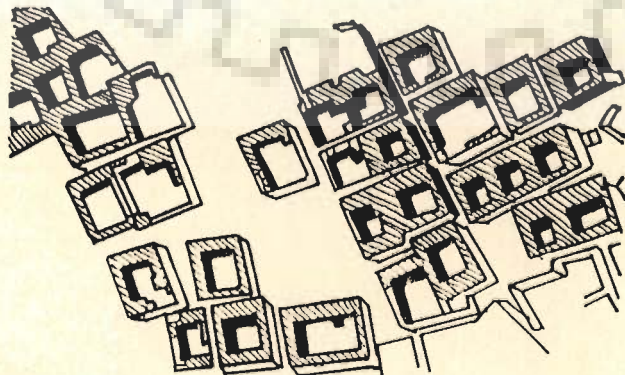


Fig. 3.105 : Sayeed Nabina "Mahalleh", District 2 - Bandar Kong





Fig. 3.106 : Bolouki "Mahalleh", District 2 - Bandar Lengeh

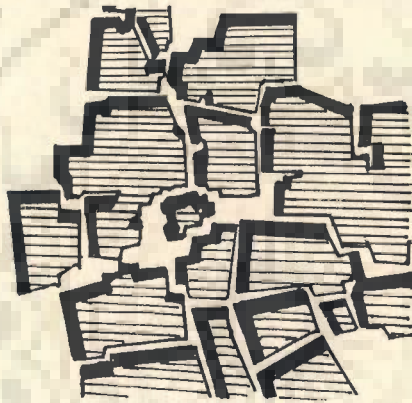


Fig. 3.107 : Emam "Mohalleh", District 2 - Bandar Kong

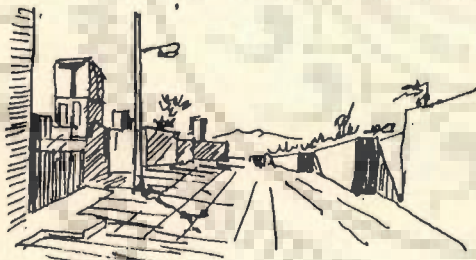


Fig. 3.108 : Traditional and Modern Built Forms Juxtaposed (District 1 & 4) B'Lengeh.



Fig. 3.109 : Coral Stone Used for Building Construction, District 1 - B'Lengeh

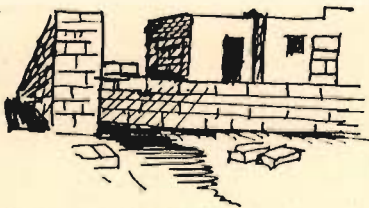


Fig.3.110 : Cement Block largely Used Recently, District 3 - Bandar Kong

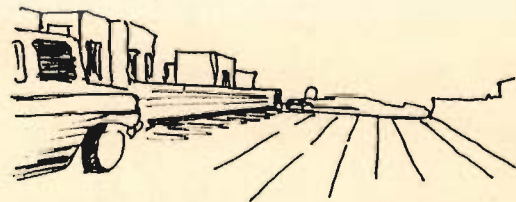


Fig. 3.111 : Govt.Housing Between Lengeh and Kong



Fig. 3.112 : Kucheh - a corridor space at "Mahalleh" Level District - 1.



Fig. 3.113 : The Intersection of Streets as a Major Nod, Bandar Lengeh District-1.

District 4, is planned with the geometry of a grid pattern, much in line with the modern trends of a fast mobility. Stone, bricks and concrete are the primarily building materials used for construction in this district.

District 3, is haphazardly planned and needs some kind of order. It is confusing for an individual to orient himself within this district.

There is, however, a good order in districts 1 and 4. A certain reinforcement of elements is required in these districts to produce a strong image. Although there are a few distinctive images in Districts 2 and 3 but not enough for a perceptual impact. The role of edges become important in providing boundaries for each district. The seaside districts of the settlements have well defined edges, making them more distinguishable from the rest.



### 3.5.6 Pathways

Paths as defined by the lines of movements exist in these settlements as streets, "Kuchehs" (walkway) and transit lanes. People can observe and experience the city and form an image while passing through them. (Fig.100 and 101).

Boulevard Emam, 22nd Bahman and Dastgheib street in Bandar Lengeh and the street joining, the triangular crossing to the main "Maidan" (round about) and the boulevard to the Gulf, all are customary lines of movements through which the image of the city is experienced. The walkway along the Gulf, and, at the side of main edges of the settlements, form the important paths, accentuated by the meeting of water line and built forms that give a unique spatial experience and imageability.

When an observer (either on foot or in a car) moves along the Boulevard of Emam from the point A to B, (Fig. 3.100) a sudden view of the Gulf waters appear, thus creating an experience of surprise. This axis derives much importance from its location along the waterfront in terms of its ability to create experiential variety.

Beside this the turning of the Boulevard at A and B points widen the visual perception of curvature. The Boulevard has a clear and well identified origin and destination; it is the entrance and exist path of the settlement. This path has also directional quality by having the tall and ceramic cladded minaret of Eban Abbas and the "Berkeh" at point C and D (Fig.3.76, 3.100 & 3.114). These elements give scale to these paths and make them recognizable. One can compute distances by the help of these visual elements on the path. Boulevard Emam has a wide "Maidan" with lots of plantation, bushes and reddish

flowers which dominates in the settlements. Although municipality has made another boulevard (Fig.3.115) between Roudbari and Kaghazabad "Mahalleh", but it has neither any function nor any character.

Although in Bandar Lengeh, there is some relation between paths, which are dominant in many individual images, and the other elements such as junction nodes, landmarks and the edges they move along, but this relation among these elements is weak in Bandar Kong. Except the path along the seaside, the other paths are not given identity and tempo by the regions they pass through, the edges they move along and the landmark existing in the settlement.

### 3.5.7 Space Study Matrix

To study the settlement spaces, a model for space function relationship has been developed. This model takes into account the entire space existing in these settlements for evaluation and comprehension (Fig.3.116). A brief definition of each term has been given to clarify their meanings, based on hierarchy.

An entire city exists in space, and further, the space occupied by a city is sub-divided to other different space uses, because of man-made and natural built forms. In general, a city or town has two kinds of spaces : built urban spaces and open spaces. "Urban spaces" are volumetric spaces, defined by building facades and the floor of city in a formal way; and the "open spaces" as the natural environments in and around the settlements. Each of the above space categories can be subdivides into major and minor ones. The major spaces have a distinguished character, the quality of enclosure being



predominant. There may be a few major urban or open spaces in a settlement while the minor spaces are many.

The Dāstgheib street with shops all around, the Bazaar, and the inter-section of Dastgheib street and 22nd Bahman street (B.Lengeh) with a group of buildings around it is an urban space which has a sense of permanence or place identity in the city. This is an urban space, that distinguishes itself as a landmark, a traffic node, as well as an office node. Similarly the triangular crossing and the square in front of municipality in Bandar Kong are the islands in the settlements that can be classified as good examples of urban spaces.

The spaces for linear movement can be called as corridor spaces. The corridor spaces are the major paths which have been enclosed on both sides. Sometimes the corridor spaces and the "stay spaces" may be inter connected. The minor "stay urban spaces" are like community spaces in a "Mahalleh" where people get together sit and talk. These are spaces usually enclosed by a Mosque, a few shops or a "Berkeh" etc. They can be also tot-lots where children can play without vehicular traffic problem. These usually have a sense of enclosure. Parking plots are also other "urban stay spaces". In these settlements sometime all these spaces are available in a mixed activity form. "Kucheh" and the 3rd order streets are the corridor spaces in a minor form. Usually when a "Kucheh" is wide, a tot-lot community space is created in traditional "Mahallehs".

The open spaces which are basically the natural spaces in and around the settlements, have been divided into two : green organized spaces and bare

land, Their scale is given by shrubs, rocks and ground surface, rather than their gross width and length.<sup>20</sup> The open space appearance is determined and characterized by the sight of natural elements, rather than man-made built form. But the bare spaces are usually unorganized, which are either incidental as left out spaces, reserved spaces, the site of floodways or seasonal rivers. Green spaces of Bandar lengh and Kong are the date palm grove in and around the settlements.

The city parks at some places are lying in a state of neglect, for the reasons that their site selection, did not give enough thought to the consideration of water collection for the parks. There are orchard of date palms in "Mahallehs" of Pakarti and Roubary. Though these gardens are private but they play an important role in bringing nature to man-made environment.

The spaces around Bandar kong and Bandar lengh is dotted with date palms providing enough green foliage to the area to serve as a Regional park for these settlements. A cluster of trees can be observed in some of the "Mahallehs", these act as a complement to the urban form. All these green spaces have been mapped and the areas having potential to grow as green space have been defined in the later chapters. There is no any green continuity from a "Mahalleh" to a city park which is very much required in such climate. It may, however, not be possible to have such pathways every where, but there are places which can be developed as green pathways for pedestrians free from urban traffic. The floodways generally present a picture of bare land separated by wide gaps and the urban form that emerges reflects the physical patterns that respond to these characteristics. Typical character of settlement spaces are shown in Fig.3.117 to 3.134.



There is limitation regarding the variety of plants which can grow in this Arid Coastal Region. The plants which can grow in this zone are list in Appendix P.

There are other types of spaces which are architecturally or historically important. These spaces are like the spaces around portuguese fort, between the "Berkehs", and tomb in Bandar Kong between "Berkeh" Bangalou and Bastaki house, and spaces between other "Berkehs" in Bandar Lengeh. These spaces give a view of important historical features of the town (Fig.3.117 to 3.134 show the various types of spaces in these settlements).



Fig.3.114 : Boulevard, Emam, Bandar Lengeh

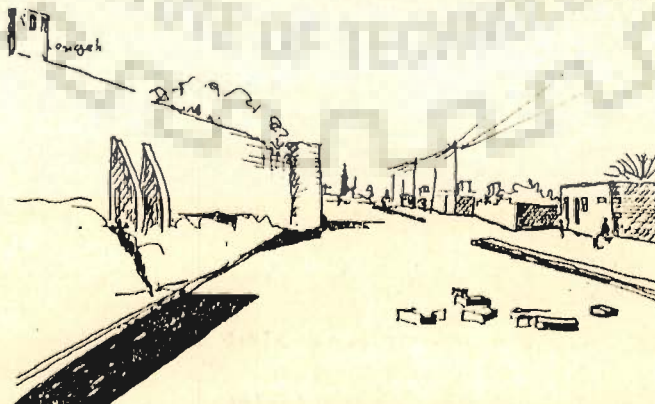


Fig. 3.115 : Boulevard in bandar Lengeh

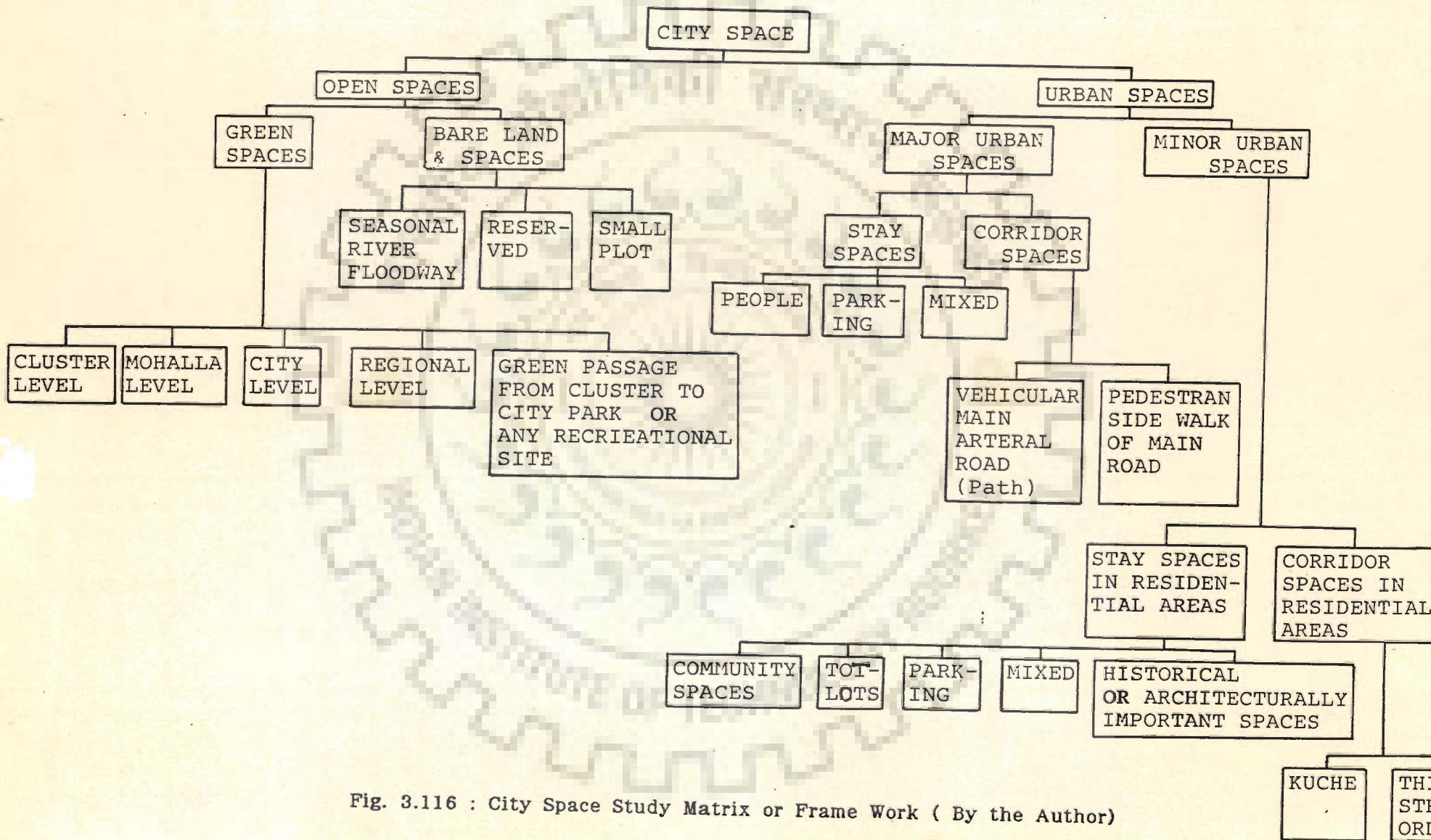


Fig. 3.116 : City Space Study Matrix or Frame Work ( By the Author)



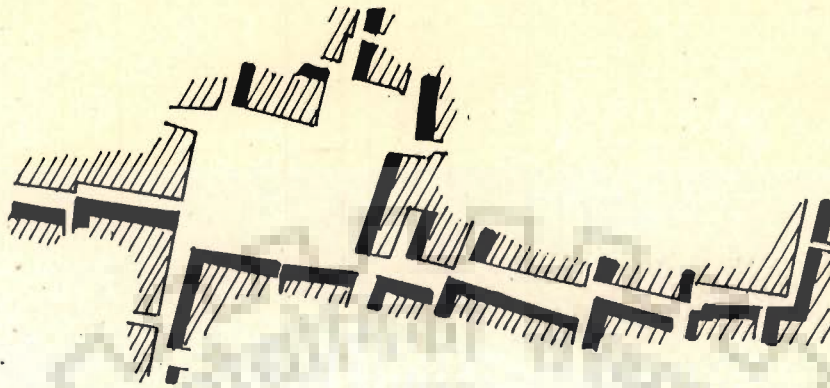


Fig. 3.117 : Community Tot lot (space for Children to play)

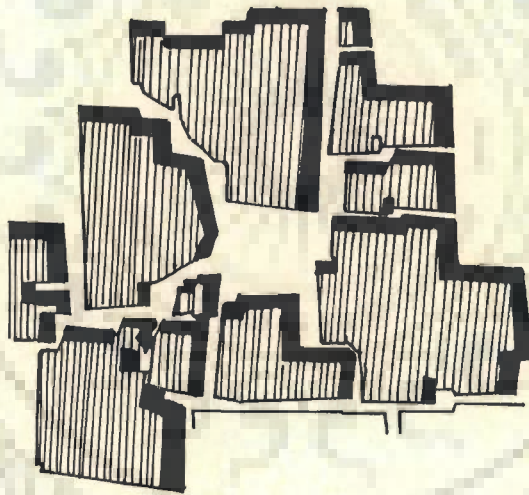


Fig. 3.118 : Tot lot in "Mahalleh" of Sayeed Nabina, Bandar Kong



Fig. 3.119 : View of a Tot lot

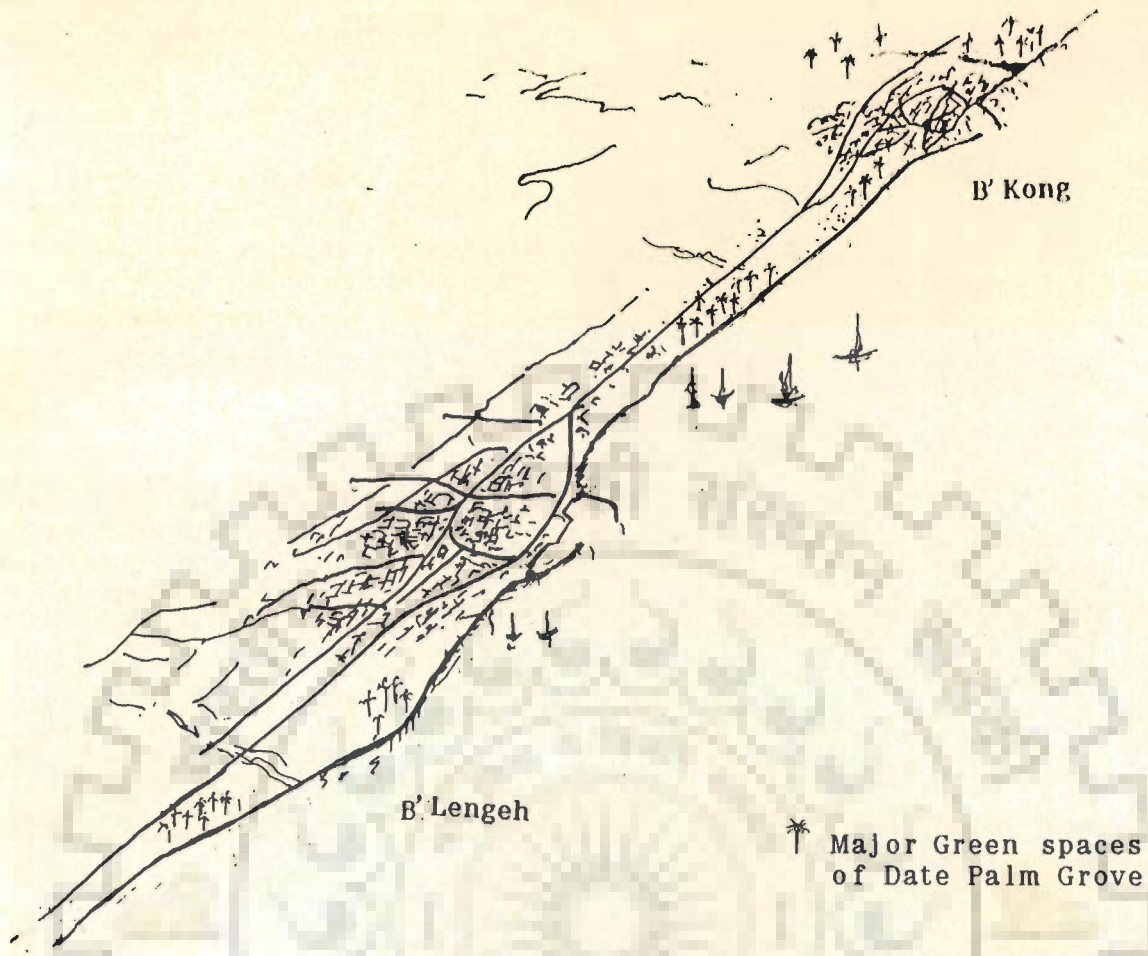


Fig. 3.120 : Spatial view of Major "Green Spaces at Settlement levels"

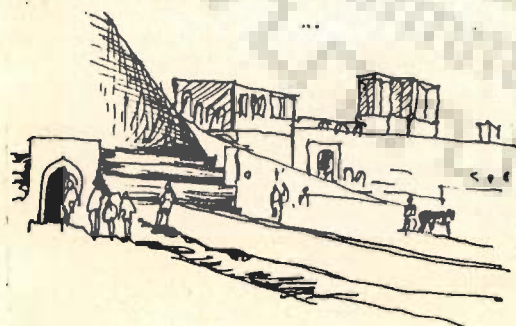


Fig. 3.121 : Community space in the "Mahalleh" of Bandar Lengeh.



Fig.3.122 : The Mosque and the "Berkeh" in the centre and Surrounding Shops are important Elements of the community Space.



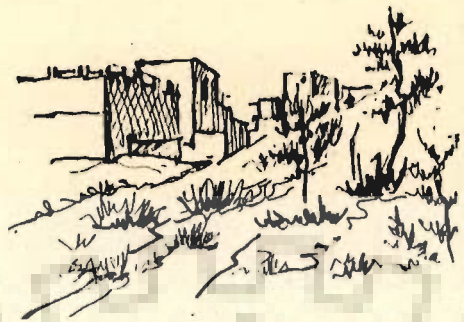


Fig.3.123 : Natural space in a "Mahalleh" has a potential to become green

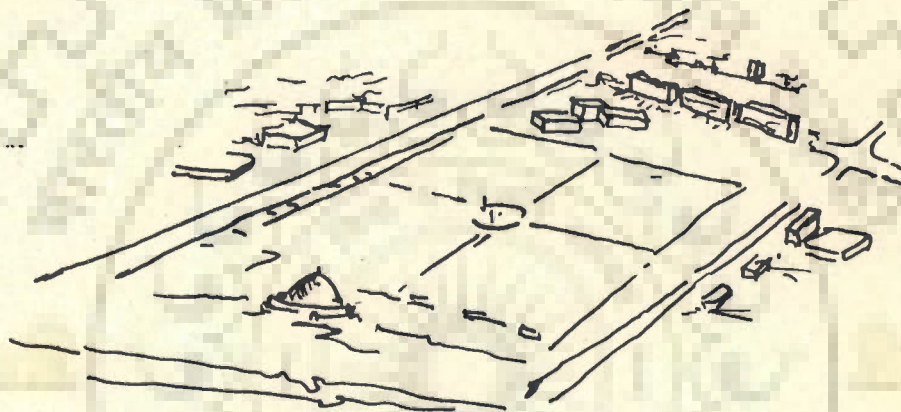


Fig.3.124 : Already proposed city park - absence of greenery due to lack of irrigation - Bandar Kong



Fig.3.125 : Green space in Central Core of Bandar lengeh can be developed as City Park



Fig.3.126 : The major Urban space in Bandar lengeh at the entrance of covered Bazaar



Fig.3.127 : Valuable Architectural Space Roudbari Mohalleh Bandar lengeh



Fig. 3.128 : 22nd Bahaman Square Rich in Landscape - Bandar Lengeh



Fig. 3.129 : Boulevard Crossing with Date Palm - Bandar Lengeh





Fig. 3.130 : A Small Garden, "Mahalleh" of Kaghaz Abad Bandar Lengeh

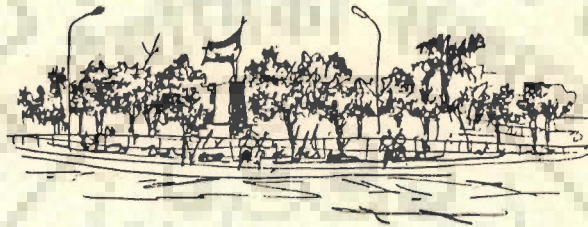


Fig. 3.131 : A Municipal Square with healthy landscape, Bandar Lengeh



Fig. 3.132 : The natural green space of the flood plain behind Jama Mosque in Bandar Kong.



Fig. 3.133 : Vegetation Due to Flood Water - Bandar Lengeh



Fig.3.134 : Vegetation in the Flood way bed - Bandar Lengeh

### 3.6 CHAPTER HIGH LIGHTS

This Chapter is a body of important information which is an out come of the studies and analysis done by the author on the site. The information helps to understand the viability of the proposals, given in the master plan already prepared (Chapter 4).

The chapter also helps to understand the existing landuse, circulation system, urban growth dynamics, and qualitative and quantitative aspects of "Mahalleh" their socio economic significance density patterns, condition of structures, land ownership, urban services and urban design concept.

This understanding is essential for giving new proposals. Many of the problems highlighted in Chapter 6 of the thesis is the gist of Chapter 3.

This chapter and chapter 5, besides providing a base to recommend a comprehensive way for planning and design of the settlements, also brings out various characters of the settlements in the Arid Coastal regions, which has been considered as one of the objective of the thesis mentioned in the introduction part of the thesis. From sociological studies related to urban planning, we conclude that the "Kucheh" is a physical organization of built spaces to accommodate social fabric of the inhabitants. The "Mahalleh" is a socio economic organization of built forms of "Kucheh" into a web of living networks for more intense neighbouring interaction. The intensity or propensity of social interaction are a direct outcome of the physical form of the "Kucheh", such as, cul-de-sac, loop or Fork types.



Physical form of the "Mahalleh" and Kucheh are adaptable to the social norms of the inhabitants, such as, the social aspects of privacy, security and contacts or interaction among the inhabitants.

At the settlement level, "Berkeh" and "Mosque" are important Community nodes that serve the needs of social interaction among people.

The traditional house has grown out of the specific needs of the society. There is an accepted hierarchy of rooms around the courtyard according to their importance, "Sabat" as a semi covered space linked to the courtyard is a multi -function space supporting both active and passive activities of the families.

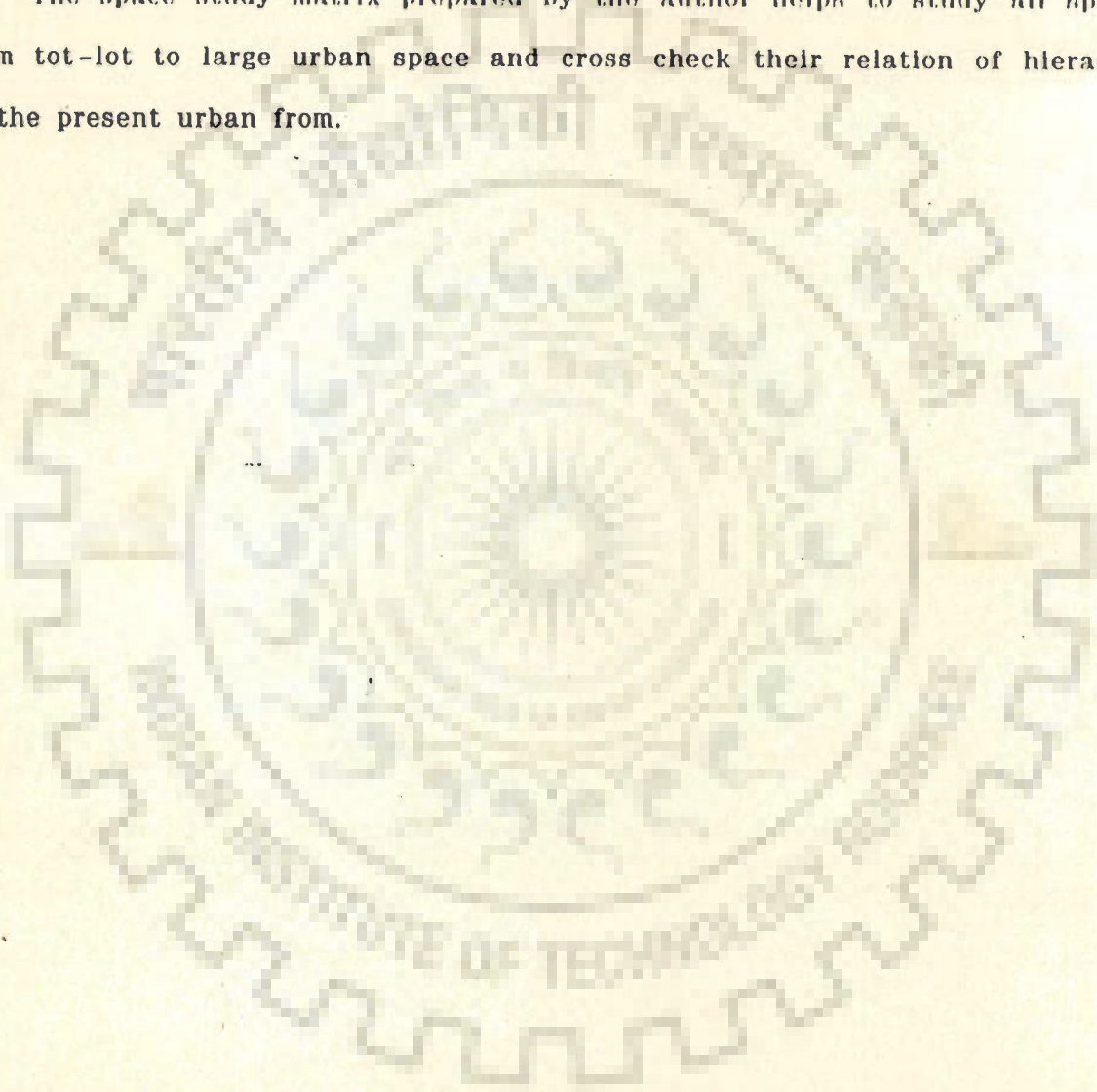
The narrow spaces between the houses help in circulating air around the houses but it is difficult to remove the garbage collected over there.

The residential densities of each "Mahalleh" has been calculated by the Author to have a base for proposing densities and the net result of that is 45 persons/hectare for Lengeh and 38 persons/hectare for Bandar Kong. The highest density is 68 persons/hectare in the core area and the lowest is 10 persons/hectare in peripheral areas.

Urban design studies of the Iranian settlements have been undertaken to understand settlements and emphasize the most important dramatic elements like interesting views of the Gulf, where water and land meet. Minarets of the mosques, and the "Berkehs" characterize the sky line and constitute significant, Architectural images of these settlements. Analytical studies

help in bringing out the spirit and intent of these elements for improving the design quality particularly related to the views and vistas which require strengthening in terms of visual corridors linking urban elements.

The space study matrix prepared by the author helps to study all spaces from tot-lot to large urban space and cross check their relation of hierarchy in the present urban form.







# CHAPTER 4

## CHAPTER-4

### REVIEW AND EVALUATION OF ALREADY PROPOSED NEW DEVELOPMENT PROGRAMMES OF BANDAR LENGEH AND BANDAR KONG (PREPARED BY DIFFERENT AGENCIES AND PROJECTED UP TO 1994)

#### 4.1 ABSTRACT

The master plans have been studied in light of their outlined goals, objectives concepts, city functions, methods of expansion, and future city structure. Analysis of plans have been done in three parts; namely, brief history of the plans, enunciation and practical realization of the concept. This has brought to light the successful and unsuccessful aspects and adaptation in the settlements. The pattern of development, as proposed, lays an emphasis on concentric inward expansion of each city linearly inter-connected with each other. The studies and investigation of other alternative systems indicate that the proposed development plan is the most efficient concept. However, the objective to conserve and revitalize the old core areas, with an additional anticipated commercial load emerging in the future, may not be achieved because of the contradictions inherent in this type of planning. The studies done by the author himself have shown that the development plan proposals without proper detailing, of open and built- spaces and feed back can not be implementable in these traditional settlements. A specific point of concern is, related to the density studies, which are not properly done in the proposed plans. The terms like "high", "average" and "low" density have been used without defining their applicative relevance. Also various facilities and infrastructures have been proposed without determining their locations.



The main roads, as proposed in the master plans, are not implementable without sacrificing the existing man made and natural resources of the area because of a serious deficiency of updated maps and information required for this purpose. Therefore, detailed studies were undertaken by this author to generate a larger information base for future planning considerations. These problems, as also the technical issues of road layout, have been identified by this author from the factual information base for a comprehensive proposal for modifications in a later chapter.

#### 4.2 PLAN EVALUATION: OBJECTIVES, CONCEPT AND EXPANSION

A Master Plan was prepared for Bandar Lengeh in 1967 which could not be implemented because of various problems.<sup>1</sup> Due to importance of Bandar Lengeh and Bandar Kong, another Master Plan was prepared for these settlements in 1983-84. Although, the period of implementing of the Master Plan was 10 years, yet they have not been implemented.

The Master plan had projected a population figure of about 20000 for Kong and 42000 for Lengeh for 1994. However, the census figures which have been published recently show that these estimates were rather liberal and were on the high side. The author has made his own calculations and in doing so has come to the conclusion that the projections made in the Master Plan for 1994 would be good for the year 2001.

One of the goals of these plans was the provision of a suitable environment for the inhabitants with respect to the existing valuable spaces and artifacts.<sup>2</sup> The objectives to achieve the above goal has been stated as followings :

1. Emphasis on and improvement of the marine economy.
2. Conservation of historical and architectural heritage.
3. Balanced development in different parts of the settlements.
4. Defining land requirements and land uses for different activities of the settlements.
5. Providing proper circulation system among various part of the settlements.
6. Development of settlements in the influence zone in the context of their requirements.
7. Revitalization of traditional core areas, and buildings/monuments within their spatial settings.
8. Maximize use of inner city land, due to proximity and accessibility to work and service places.
9. Upgrading of "Mahallehs" to function as a self-sufficient urban unit.
10. Hygienic living condition free from noise pollution, flood and storm from the sea.

#### 4.2.1 Method of Expansion and Pattern of Development

There is an emphasis on concentric inward expansion of each settlement, and the linear inter connection of both the settlements, in the proposed plan. However, the studies done by the author indicate that, in general, there can be two kinds of city expansions; e.g., the concentric growth, and the linear growth (Fig.4.1 and 4.2).



#### 4.2.2 Evaluation of Concentric Pattern

- Easy access to present service and commercial centres.
- Use of educational, health and sport facilities existing in the present city centres.
- Accessibility to the "Berkehs", port and fishery industry (Shilate).
- Use of breeze from, sea by building on higher level land.
- Natural safety factor from flood due to the higher level land.
- Strengthening of neighbourhood and social aspects of "Mahallehs".
- View of the sea.
- Land Limitation, due to sea on one side, hills on the other, floodways and flood plains in between, promote physical compactness, social proximity, urban sense and urban extents, which had been the hall mark of traditional Persian settlements.

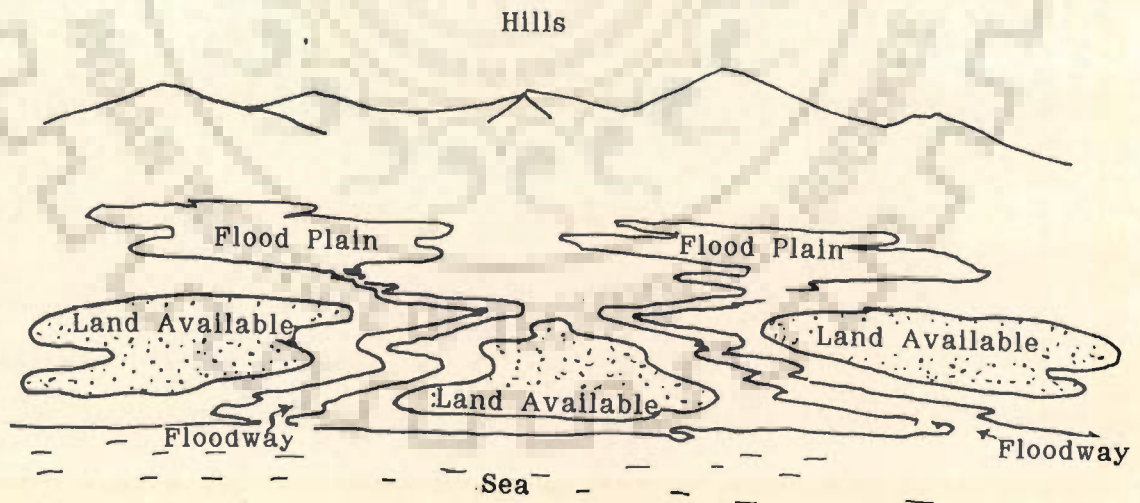


Fig.4.1 : Land limitation

- Short-distance inner city movement network, accessibility scale, contact and urban perception induce a sense of belongingness to the area.

- Fast speed movements run into difficulties due to high density in the area, as well as, narrow and irregular street patterns.

#### 4.2.3 Evaluation of Linear Development

- Availability of land for future development at low land value provided by urban land organization.
- Possibility of easier planning and land- subdivision in a grid pattern already proposed for government housing.
- An axial link between the settlements with properly designed road networks afford a faster vehicular movement.
- Density standards can be suitably controlled and applied to the area.
- The linear growth tends to enlarge distances between urban activities and their cost of accessibility in terms of time and money goes high and after becomes inconvenient.
- Linear pattern also demands a higher cost of infrastructural layout and development.
- Linear patterns generally tend to grow incompatible functions along their axial stretch bringing in an urban heterogeneity which is an anti-thesis of Persian urban patterns.

At present, however, the linear growth is taking place along the Bandar Kong and Bandar Lengeh road. It is important, therefore that the growth occurring along this axis becomes an integrate part of the future development. However, the assessment of the linear and concentrated growth patterns indicates that a combination of both concept is more feasible. This

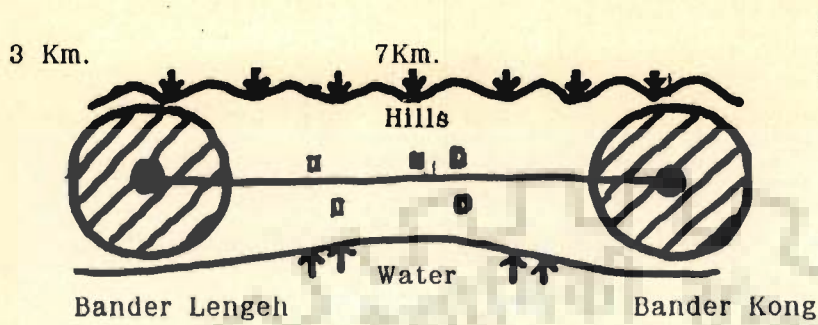


means that both settlements can grow around the existing core, and at the same time, have linear development towards each other. Although, it is well understood that the cost of infrastructure is much higher in a linear shape, than, in a concentric shape but infrastructure facilities like main water supply line, electricity, telephone wire etc., are already laid along this road. The only important aspect is that the view of the Gulf, which is an asset of the area at the moment, should not be blocked by this development.

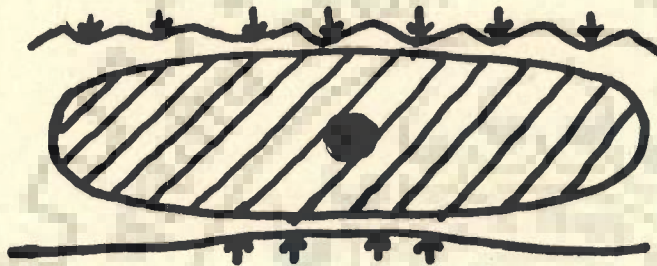
The proposed shape is a synthesis of maximum concentrated development of each settlements and linear development of Bandar Lengeh toward Bandar Kong. The main reason for the concentrated system has been for the purpose of reconstruction and conservation of old cores and to reduce the high tendency toward an intra city linear growth.

According to the Master Plan concept, the old core shall dominate the new development and conserve its indigenous character of space quality in relation to the arid coastal region. It has been expected, that the new parts of settlements will form part of the area and gain an indigenous urban identity. To strengthen this it is suggested that: (a) Maximum use of inner city and periphery land, (b) expansion of commercial centre in the same area, (c) easy access to port facilities, (d) development of the port to meet the commercial, industrial and shopping needs, and (e) proper spatial organization through deliberate land uses to evolve an urban fabric for a healthy living.

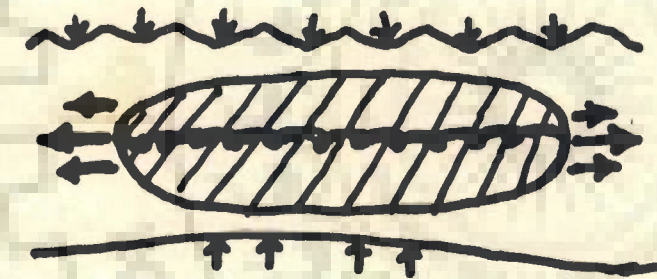
Unsuitable for development.



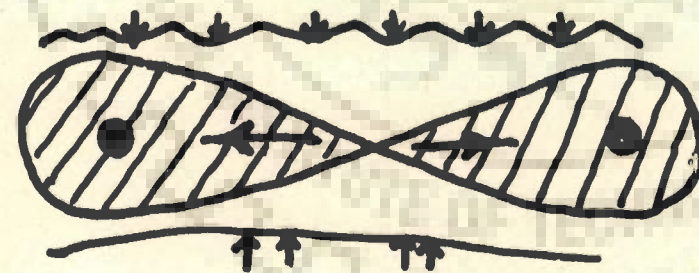
Each settlement grows in a concentric shape around its own centre



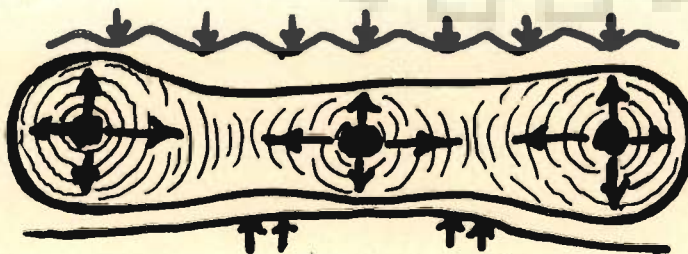
Both settlements have one Dominant centre.



Linear development with no Definite central Node



More concentric and less linear with 2 Centres Master Plan Proposals



Growth of concentric and linear, toward each other with the third Centre along the main road. (proposed by this Author)

Fig. 4.2 Alternative for Future growth and Development



#### 4.2.3.1 Problem :

Studies and evaluation of these Master Plans has shown that the master plans without proper detailing can not become implementable. The base maps used for the new plan preparation were neither perfect, nor updated to become more reliable. Therefore, in many areas the drawings are not matching with the site or its conditions.

In some areas the proposed roads in the master plan are indicated to be laid along the dry land, whereas, the road will actually come on the sea surface. A careful detailing of these problems will remove such gross discrepancies and make the plan more practical and accurate.

#### 4.3 ZONING AND LANDUSE PROPOSAL

The settlements of Bandar Lengeh and Bandar Kong, according to their coastal nature, have some compatible and incompatible land uses and activities. The land use allocation, spatial organization of the various nature of activities, as well as, historical and other factors, such as, social related to traditional way of life are shown in Fig.4 .3 and 4.4 (Appendix D, Tables D.1 and D.2).

There are four major types of land uses, indicated in the plan proposals i.e.:

- (1) Residential,
- (2) General activities zone & old city centres
- (3).Harbour and fishery, and
- (4) industrial Zone.<sup>5</sup>

#### 4.3.1 Zone of Harbour and fishery industry

Harbour activities and fishery industry are the major important activities of these settlements. International shipping, fishery, export and import activities make up the main base of economy. Therefore, the land available in Bandar Lengeh and Kong near the jetty have been proposed for future development of harbour activities.

In Bandar Lengeh there however, much of land available for expansion of these activities. A parcel of land, which is existing at present, has been occupied by Municipality for development of a children park which is under construction. Only a small part of land is left for future harbour activities, and that is not sufficient for harbour activities and their expansion in the future.

#### 4.3.2 Industrial Zone:

These settlements are under developed as they lack in the provision of proper industrial areas and industrial economy, Kong has a good background of traditional wooden ship building and fish netting and according to the national programme, these should be emphasized for industrial growth and job creation. Therefore, in between the two settlements, a site has been prepared for industrial zone. Distance from residential areas, place for further expansion toward North side, access to the main proposed regional bypass, are some of the aspects considered for the site selection for this area.

Other industrial areas in two parts, have been earmarked beside the jetty and the proposed bypass in Bandar Kong. Shipbuilding activities are going on



near the jetty at present, because of easy access to water. Major parking, stores and transportation facilities are proposed to be located in this zone between the settlements.

#### 4.3.3 General Activities Zone:

As the settlement of Lengeh is the centre of "Shahrestan" of Lengeh, therefore, general services such as health, education, institutional, and other cultural activities, electricity and water supply exist as common to both the settlements, due to their proximity to each other. Therefore, future requirements of these facilities are proposed along the road connecting Bandar Lengeh and Bandar Kong.

#### 4.3.4 The Old City Centres

The general activity zone includes activities of bazaars, custom office and round about in the inner city areas. It has been proposed that the future commercial area will grow in these areas. Jamia Mosque and other tourist facilities also can be developed in the same place, to create a verity and acceptance in the old core areas. Fish markets are also proposed to be located in the sea-side of the core areas.

##### 4.3.4.1 Problem

In the Master Plan, the conservation of historic core and traditional built form have been given prime consideration. It is, however, quite obvious that if the future anticipated commercial load is added to the present congested condition of Bazaar, this will result in high rise buildings and possibly demolition of the traditional structures. The concept of urban conservation will then become meaningless. Although some of the dilapidated

buildings can be reconstructed and some of the activities can be housed there but that is not sufficient to meet the high demand for urban land.

#### 4.3.5 The New Center

In view of these problems the author has proposed an alternative development concept which is expected to take care of these problems. The high mark of this alternative is the concept of a new nodal centre midway between kong and Lengeh.

The area between lengheh and Kong as it is growing now, along the major road in between the two settlements, will have housing, infrasturcutral, facilities and utilities to fill the gap between the two them. It has been proposed in the Master Plan that commercial and service activities, land uses, shall not be allowed to appear in this area and these shall remain in the old centres.<sup>6</sup>

##### 4.3.5.1 Problem

But it is against the idea of conservation of old core (Master plan proposal), because the commercial need of future of these towns also will be added to the old core areas which will result in a vertical growth pattern as it has already started in Bandar Lengeh bazaar area (Fig.4.5).

A greens space is proposed to be the Centre of this Zone which should become the most important urban space. However, large green space of this nature will give a feeling of openness, although maintenance of a large green space in an Arid Zone without proper potential of land and other activities to subsidize its cost is not practically feasible.





Fig.4.5 : Vertical Growth Pattern in Bazaar Areas Bandar Lengeh

#### 4.3.6 Residential areas:

As it has been described in Chapter 3, these settlements are formed out of small residential units called "Mahallehs". The number of house units vary from 50 to 100 houses in the older areas. The recently developed "Mahallehs" have 100 to 200 houses and those which had land available around them have 200 to 300 houses. Therefore, there are almost three different categories of residential densities that characterize the size of a "Mahalleh" (Fig.4.6). Besides this social distribution and subdivision of each of the settlements, i.e., traditional "Mahallehs", housing different ethnics migrants, there are other physical elements, such as, roads and flood ways which influence the subdivision and their physical distribution in these settlements. Each of these parts may be formed out of one or a few "Mahallehs" having a population of 5,000 persons.

##### 4.3.6.1 Problem

The city structure and subdivision of residential areas of future has not been well defined. In the Master Plan, "Mahalleh" has been considered to be

the smallest city unit and the "Nahieh" as a self-sufficient unit of city which will have availability of daily requirement. But Neither the size of the "Mahallehs" nor the size of "Nahieh" (sector) have been physically defined.

The location of daily requirement of the inhabitant also, has not been defined. The Author has taken these issues into consideration in chapter 7 and 8.

There is no provision for reorganizing incompatible landuses such as Elec. power plant, prefabricating cement factories in future residential and recreational areas in the Master plan.

#### 4.4 PROPOSED TRAFFIC AND TRANSPORTATION NETWORK IN THE MASTER PLAN :

The traffic problem in Bandar Lengeh is severe due to the lack of proper streets and connecting roads.<sup>7</sup> A major road as regional bypass for fast traffic and heavy vehicle linking Bandar Abbas and Bandar Bushehr, has therefore been proposed in the Master plan. Go-downs and industrial areas are projected along this road, so that, transportation of the goods can take place in an easier manner. The bypass helps in creating a better and safer atmosphere for the inhabitants of these towns by keeping heavy vehicular traffic away from the populated city areas.

The next order of road is the boulevard street in the towns. The main roads, according to the proposed Master Plan, are between 24 to 35 mts. and 18 to 24 mtrs. wide (Fig. 4.7, 4.8). Each "Nahieh" is having a road of minimum 18 to 24m width around itself which acts as a "Nahieh" distributory for traffic



- 1 Mahalleh-e-Saabeh
- 2 Mahalleh-e-Khourri
- 3 Mahhaleh-e-Bolouki  
(Bandar Lengeh)



Fig. 4.6 : Densities and the Size of "Mahallehs"



Fig. 4.7 : Street Order and network - Bandar Lengeh (Proposed in 1983-84)



- Regional Bypass
- ... First Order
- .- Second Order
- Third Order

Fig. 4.8 : Street Order and network - Bandar Kong (Proposed in 1983-84)

link to the town. These settlements will thus have a structure of road system as shown in Fig.4.3 and 4.4.

#### 4.4.1 Problem

Bandar Lengeh and Bandar Kong did not have up dated map. Their maps for preparation of Master Plan in 1983 were prepared by Tracing the available aerial photographs, which are over 40 years old. Therefore, there are differences between the distances of the drawings and the actual sizes in the town. To resolve this incongruous situation, this author undertook an actual measurement survey on ground and rectified the shortcomings and errors. The aerial photographs of 1:2000 which have been prepared in 1981 and converted to map in 1985 show many fallacious differences. Besides the above, the site survey indicates the implementation of city circulation network also faces problem emerging from inaccurate situations. In some places, destruction of many good and valuable building stock has been caused, somewhere the roads fall on the floodway and water course. There are also technical problems, such as, improper road curvature with respect to the speed of traffic. From preparation of Master Plan to now many new structures that have come up in the way of already proposed roads, many of these structures are Government housing and offices which are not feasible to be destroyed now. Several of these issues have created problems for city circulation network and, therefore, require modification before implementation. Fig.6.1 in Chapter 6 shows the problem of each part in more detail.

#### 4.5 PROJECTION OF SOCIAL AND ECONOMIC GROWTH:

To project the social and economic growth, the number of employed in different activities have been used in base calculations.<sup>9</sup>



#### 4.5.1 First Alternative

According to the first 5 year plan of I.R. Iran, growth of various economic sections have been shown in Table D.3 and D.4 (Appendix D).

The future condition of employment in different sections between 1983 to 1986 has been determined in tables D.5 (Appendix D) and the average growth rate from 76 to 83 in table D 6 (Appendix D). In the above two tables, new occupations are basically in services and building activities i.e. 70% in service and 24% in building activities and only 6% in fishery and industry.

#### 4.5.2 Second Alternative

Here the employed are calculated on base of the post revolution time, i.e., 1977 to 1983. Although the period is short but no other data are available. According to the tables D.7 and D.8 (Appendix D) possibility of growth of activities is only in present services and other activities would not have considerable growth. In agriculture, industry, mining, electricity, water supply and gas works estimated to be -14, -37, -3 persons. In building activities there would not be any change as such.

#### 4.5.3 Third Alternative

According to the population rate of growth for Bandar Lengeh which is 8.8% and for Bander Kong is 6.8%. Here the proposed employment growth is based on the above growth rate. Due to non availability of employment data of census in 1983, employment data of 1978 has been used to propose future occupation pattern projection. Though there have not been major changes in this period.

According to the socio-economic policies of the government, this zone has been considered as an important, both for its strategic location, as well as, for its attractive economic values of the scenic coastal landscape, and has therefore been given a high priority for economic development of the region. This priority eliminates the applicability of alternative one and two. Alternative one ignores the considerations of special Regional aspects of the deprived areas. The second alternative is in direct contrast with the govt. Policies.

The third alternative, is more people oriented and mentioned economic policies are expected to be more efficient. But with combination of alternative Ist and IIIrd which determine the various economic activities of society, one can incorporate and propose the important activities in the development plan. The Table D.9 (Appendix D) shows the basis for the proposal.

#### 4.6 SOME SIGNIFICANT DETAILS OF THE PROPOSED MASTER PLANS

10

The master plan has recommended some space standards for various activities, on the basis of which, suitable assumption for the calculation of city areas can be made. Some of the selected examples are summarized in table 4.1 a quick glance.



TABLE 4.1

Space Standards Recommended in the Master Plan (1983 - 84)

Bldg. Category	Size of plot Sqm.	Covered space permit.	open space Min.	storeys	Remarks
Residential	150 - 350	45%	40%	1 - 3	It depends on density . Recommended
Office	250	60%	40%	3	Total floor area 180%
Health care	0.81/head	50%	50%	3	Every 60 Sqm. shall have one parking space
Education	40 for each class ,min., coverage 100 Sqm.	50%	50%	2	3.5Sqm./stud. for primary and 4.0 Sqm/Stud. for High school
Industry	60/Head		50%		For industries more than 10 workers
Transportation	Bypass=100m Boulevard=35m Street=25-12m				Road width according to their assigned orders
Parking	20 Sqm. / H'Hold				



# CHAPTER 5



## CHAPTER 5

### STUDY OF ECOLOGICAL ORDERS AND NATURAL RESOURCES

#### 5.1 ABSTRACT

The emergence of environmental problems due to unpleasant growth and development have been reviewed in the context of depleting water supply from the natural floodways, the vegetation cover and the degradation of the eco-system in general.

A detailed study of the floodways of the two settlements have been undertaken to establish a healthy relationship between the forces of urbanization and the needs of ecological balance of the area.

In this context, an interplay among natural elements and the man made forces have been studied so as to preserve the natural vegetation cover and the conservation of the natural landscape resources and elements. A detailed investigative study on the hydrological cycles of the zones has been incorporated for quantitative and qualitative evaluation of floodways. In the Arid Coastal Zones, man had tried and learned to store the flood water and created their own anthropospheres on the edge of the sea water to derive manifold advantages of trade, commerce, fishing and shipping. The author has taken pains to collect first hand information on the hydrological cycle and prepare an information base by updating the existing maps through field surveys and area photography. All the floodways from the Northern Hills to the sea have been studied within their overall morphology to highlight their existing problems.

This updated information is intended to be focussed in later chapters for the purpose of future planning and conservation strategy of the area.

This chapter deals with the unique environmental problems which have surfaced due to sudden spurt in the growth and development in the last two three decades. The traditional floodways which were the source of potable water supply and an aid to sustain the vegetative cover for centuries are in the process of being destroyed; thereby setting in motion the degradation of the age old ecosystem.

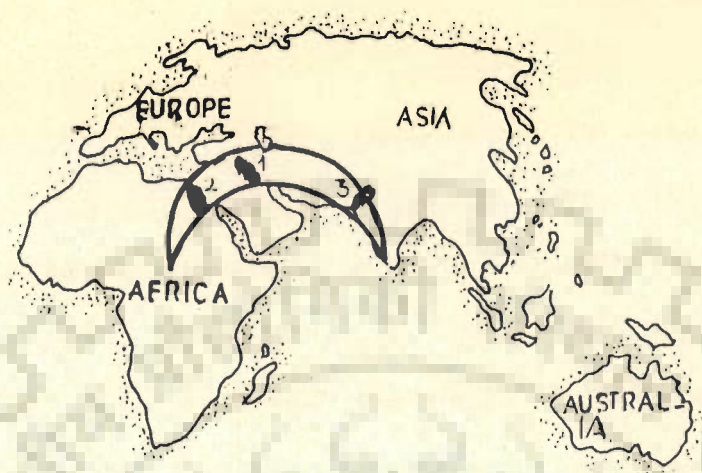
To illustrate as to how the onslaught of pressure unleashed by the demands of new urbanism can be absorbed without damaging and unduly altering the existing ecological balance of the area, studies of floodways in two settlements of Bandar Kong and Bandar Lengeh are reported in this chapter. The study reveals the manner in which the depleting and abused floodways and neglected "Berkehs" (water storage tanks) and the vegetative cover can be restored to their original glory and health; thereby refurbishing the only source of natural potable water supply of these urban communities.

## 5.2 INTRODUCTION :

Thousand of years ago as the ice-caps retreated, the climate gradually became drier, and the grass lands became desert. But the two rivers (Tigris and Euphrates) flooding annually brought down mud which they deposited along their banks, building a fertile green strip across the desert

Paleoclimatologists claim that the fertile crescent (Fig.5.1)





- (1) Tigris and Euphrates River Valley
- (2) Nile River valley
- (3) Indus River valley

Fig. 5.1 : The Fertile Crescent

which today has a hot dry climate; at the dawn of civilization had cyclonic weather pattern similar to those of central Europe.

Man moved with their animals towards the two rivers which, with a few desert oasis, were the only remaining sources of water. Here is the place where Mesopotamian civilization flourished which is well known to us, here is the place where the famous ports such as Magan on the Persian Gulf as far back as 3000 B.C. was existing and today many of such ports like Bandar Lengeh and Bandar Kong are growing due to mass transportation of goods and oil on land as well as on water.

### 5.3 ECO-DETERMINANTS OF SETTLEMENTS : Land, Water, Vegetation and Settlement Profile.

It is a very rational approach to study the Eco-determinants in the planning and design of human settlements. These ecological factors to be considered are : 1. Physiographic (nature's forms forces and processes) i.e. geology, hydrology, climate, 2. Topographic (land-surface configuration and features) i.e. Land information, natural features and man made features.(Fig 5.2) 3.Cultural (social, political and economic factors) i.e. social influences, political and legal constraints and economic factors. In the foregoing most of the above aspects have been studied. Here, the inter-relationships and interplaying of some of the natural elements with each other and with the man made feature which form the settlements profile will be studied, so that the best of the natural vegetation cover can be preserved and the best of the landscape features, conserved and thus seek a harmonious and balanced development of both.

It is necessary to focus our attention on dynamic interplay of the forces in a living community. Every organism depends upon its environment to supply it with vital material and energy. Every plant is subject to both living and the non-living influences of its surrounding.

Although the settlement of Bandar Lengch and Bandar Kong are near a vast sheet of water connected to the Oceans which cover three quarters of the globe's surface; but there is not a drop of fresh water in natural form.

History reveals the metamorphosis of man, by tracing the story of man's search for fresh water to maintain a continuous supply. From dawn of



civilization man was interested to live and camp beside the rivers and lakes; people fought for their water holes.

Usually, civilization rise and flourish where fresh water is abundant, and vanish when the supply is depleted or fails. But in the arid coastal zones man tried and learned to store the flood water and sustain the vegetation cover and stay beside the sea due to its other economical values such as fishing and shipping. He developed an ability to exercise a measure of control over the movement of rain water on the surface.

There is salty water in watertables of the arid coastal zones which is either due to the soil quality or intrusion of salt water from the sea (Fig.5.3).

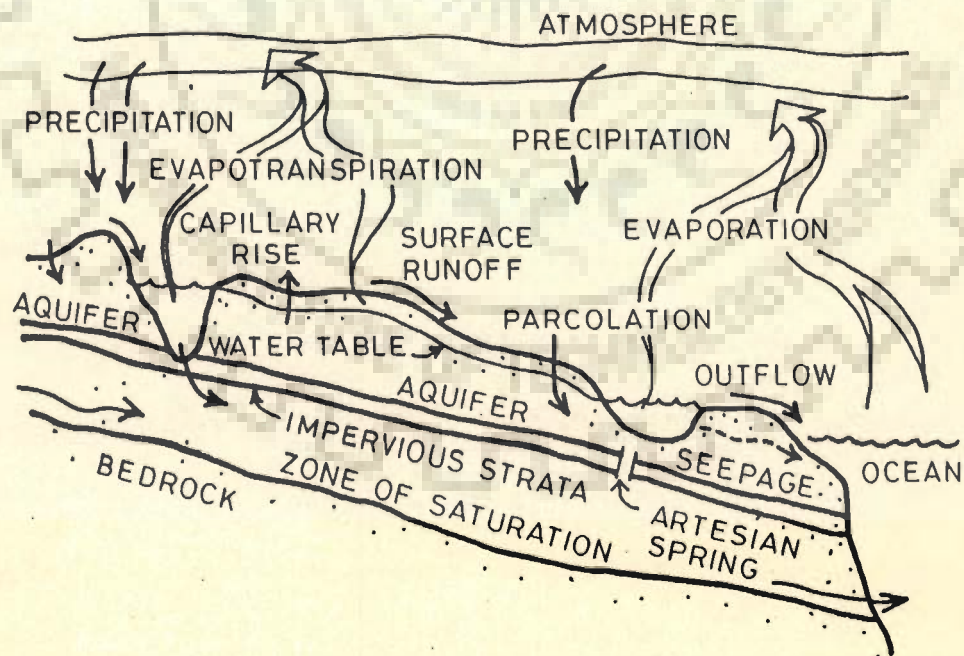


Fig. 5.3 : The Natural Hydrologic cycle -The watertable makes the upper level of the aquifer Below this Variable line the crevices, sands, gravels, and other porous materials of the earth are filled with water.

(Source : John O. Simonds, Earthscape,1978)

As a result of the long periods of drought in arid coastal regions, the seasonal rivers or floodways carry water sporadically. Since the potential evaporation is many times larger than the annual rainfall, the depressions are often devoid of any outflow. Often, the water remaining in such depressions evaporates, and the salts which are left behind concentrate over a period of time, thereby giving rise to saturated brine, from which salt then crystallizes. The vast area of "Shorezar" of Mehregan (brakish ground or salt marsh) near Bandar Lengeh is one such example. Of course the other areas are also saline but the concentration of salt is much more in "shorezar" of Mehregan (Fig.5.2) than the other places.

In these areas salt is washed down from higher elevation to lower levels, thus making the soils in depressions more saline (Fig.5.4). Otherwise the entire area is saline, because the sedimentary rocks contain much salt and rainfall is very scanty, therefore salt transportation is not too much in a rainless area. The other important point is that, the bed of floodways were washed very well and they may have carried salty water previously, but the water stored in the water storage tanks which is fresh and potable indicates that the salt transportation does not take place in the floodways bed with a normal rainfall which usually comes from uplands.

But "Land is not merely soil, it is a fountain of energy flowing through a circuit of soils, plant, and animals"<sup>1</sup>

As far as plants are concerned, it is the salt concentration of the solution surrounding the roots, that is important and not the salt content of the soil calculated on a dry weight basis. In slightly salty but dry soils the concentration is often higher than in very saline but wet ground.



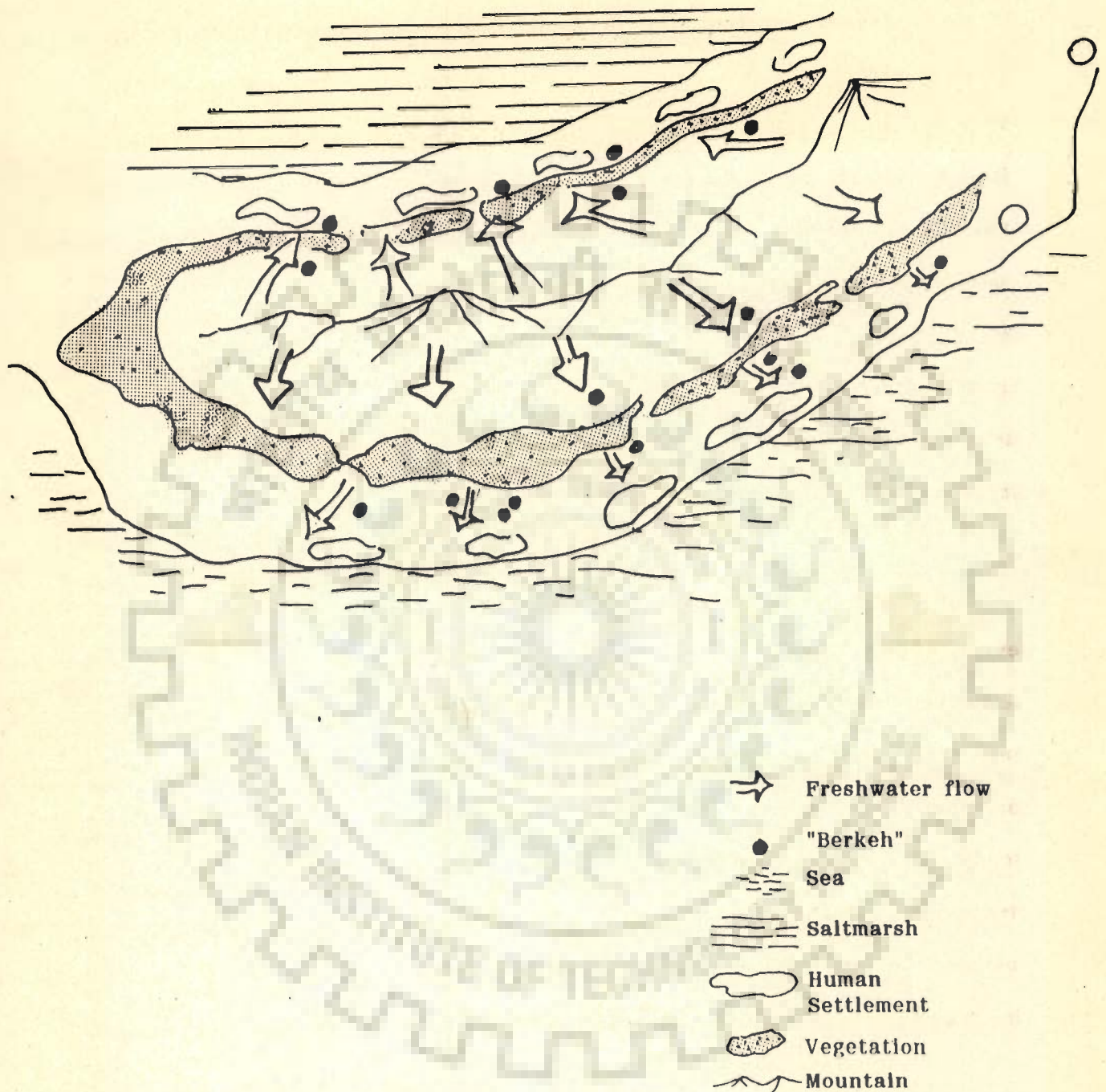


Fig.5.4 :Traditional System of Collecting Rain Water

The flow of freshwater from the upper areas to lower areas.- The traditional people added new "Berkehs" at proper sites as their population increased. However, the new generations have neglected the time tested old system & allowed it to degenerate. It requires to be refurbished.

"Evaporation from the soil surface in places where the ground water is less than one meter below the soil surface can also lead to salt accumulation."<sup>2</sup>

Usually, when irrigation in arid regions is not accompanied by at least a certain degree of drainage the cultivated areas necessarily turn brackish in time, even if the water used for irrigation purposes contains only a small quantity of salt.

"Extensive cultivated areas in Mesopotamia, in Indus region, in California and other parts of the Western U.S. have been transformed into salt desert in this manner"<sup>3</sup>.

The amount of water remaining in the soil and thus available to them, is of far greater importance. Part of the rain water runs-off and a further portion evaporates. How much of the water remains in the soil, and is thus available to the plants, is determined by the texture of the soil in humid regions. The sandy soils are dry because they retain only small amount of rain water; whereas the clay soils are wet. The reverse of this is true for arid regions. On the flat ground in this zone water does not sink down to great depths and thus does not reach the ground water. Only the upper soil layer are damp, and the depth to which the water penetrates depends upon the field capacity of the soil. Water can penetrate more in sand before run off than in clay (Fig.5.5).

The sandy soil are favourable habitat for plant in arid region. This can be seen from the fact that the same type of vegetation occurs on sand with lower rainfall than on clay. The soils in this zone are composed largely of sand and other porous materials in some areas. Top soil is practically non-existent in the higher level areas,-- in the bed of floodways, and where



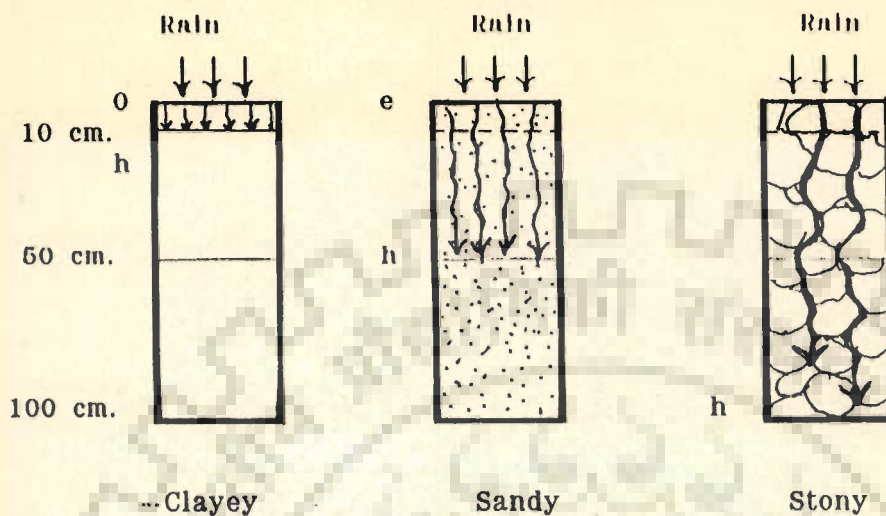


Fig.5.5 : water Retention in Various kinds of Soil

"Diagrammatic representation of Water retention in various kind of soil following a rainfall of 50 mm in Arid regions. h - h : lower level of moistened soil; e - e : lower level to which the soil dries out again. The clay soil retains 50% . The sandy 90%. and stony 100%"<sup>4</sup>

the run off is diverted from its old pattern of flow--due to man's interferences, i.e. highways and other built up areas.

The typical profiles of settlement showing the land form and its kind and the vegetation cover etc. are shown in Fig. 5.6, 5.7 5.8, 5.9 and 5.10 and the form of some of the popular plants in Fig. No. 5.11 to 5.18.

In this zone, there are various plants and small trees of Manguibern type(fig 5.11 to 5.18), in a width of 15 to 25 kilometers which continue from these settlements till the end of the boundary of Hormozgan Province . Along the Persian Gulf and Oman sea (Arabian Sea) in most of the places, there are

trees and plants which stabilize the sand dunes<sup>5</sup>. The total area is about five thousand hectares. The plants, though thinly scattered, help in soil stabilization, upgrade micro climate and provide a grazing ground. These plants also produce a kind of beans which is nutritive food material for the consumption of domestic animals.

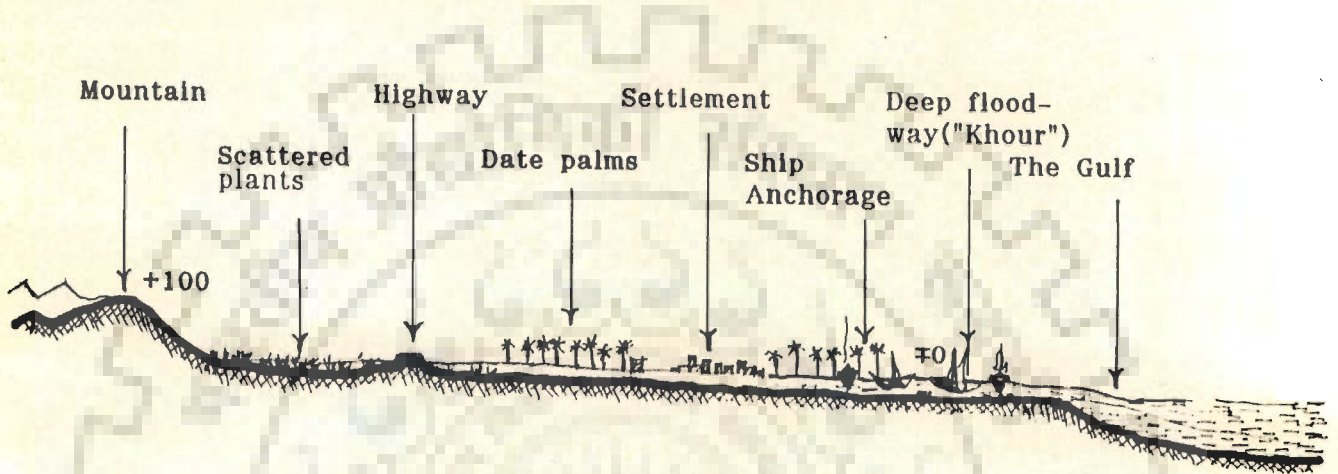


Fig.5.6 : Section through the deepest floodway

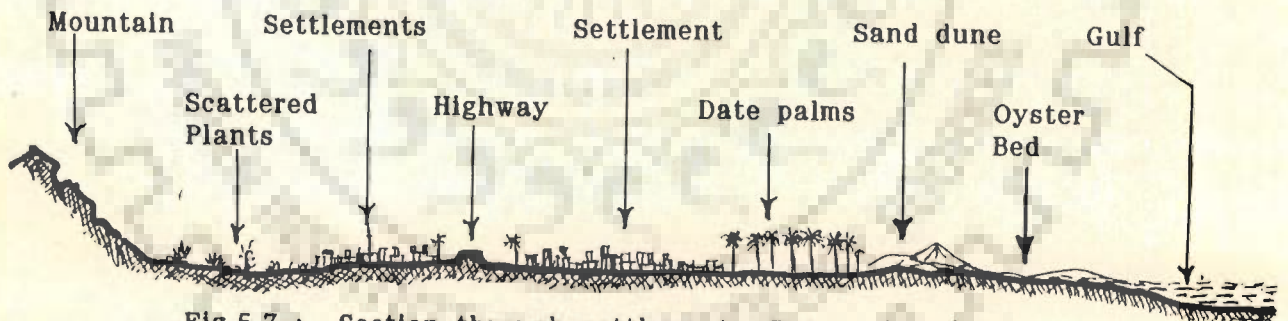


Fig.5.7 : Section through settlements, Date palm groves sand dunes.

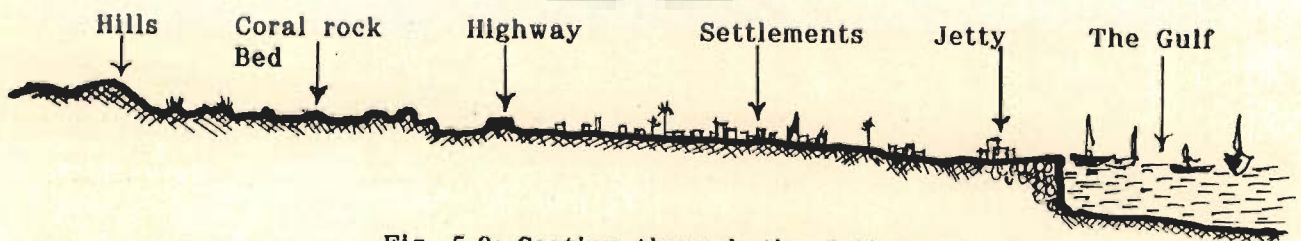


Fig. 5.8: Section through the Jetty area.



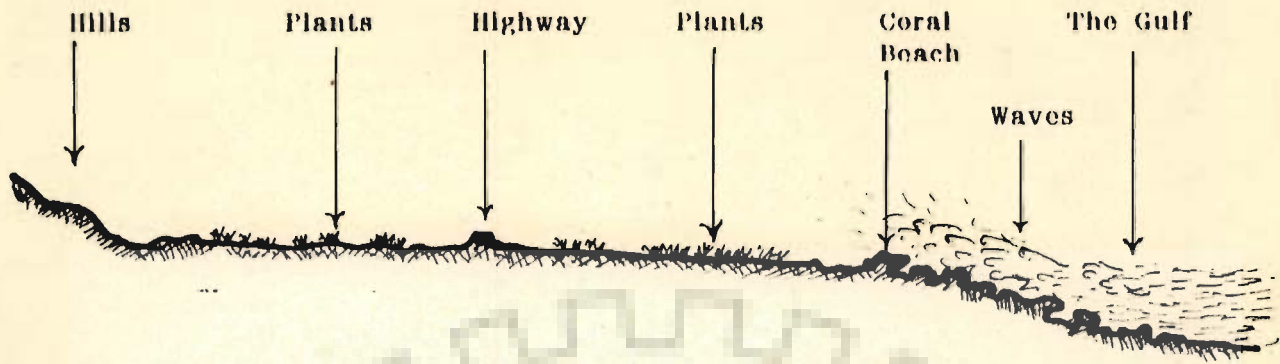


Fig. 5.9 : Section through the coral Beach which is near Bandar Lengeh.

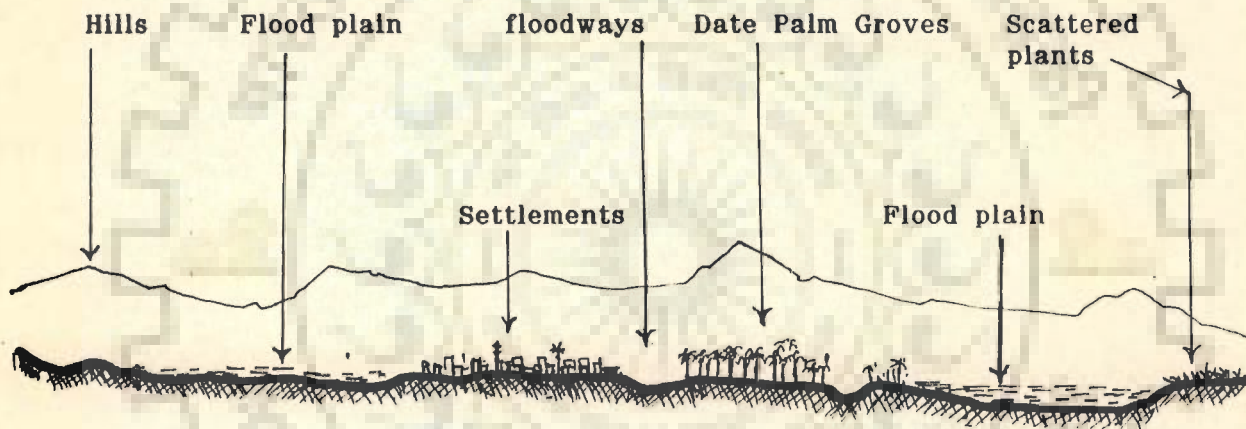


Fig. 5.10 : Longitudinal Section with Hills at the background showing the flood plains floodways and settlement

#### 5.4 Wild ANIMALS AND MARINE LIFE

There were interchange of animal and wild life between southern Iran and North Africa a long time ago. There are various types of animals in the zone. The yellow Deer which is one of the rare quadrupeds lives in this zone. Jerboa, Rabbit, Porcupine, Wild Cat and Fenret are other wild animals in this zone. Wild Sheep, "Kal" "Jeyplr" (local name) are also the other quadrupeds which live in this area. Birds, like Pigeon, Crow and most kind of other



Fig.5.11 : Loor (Local Name)



Fig.5.12 : Somr (Local Name)



Fig.5.13 :Gole Kaghazi  
(Local name)



Fig.5.14 :Nilufar-e-vahshi  
(Local name)

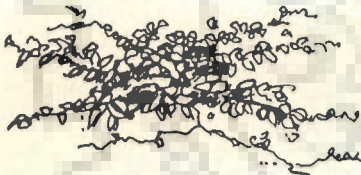


Fig.15 : Kharzahreh  
(Local name)

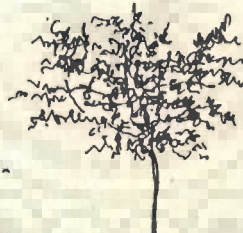


Fig.5.16 : kert  
(Local name)



Fig. 5.17: Abrisham  
(local name)



Fig. 5.18 : Date Palm Groves



marine birds are available. "Tarlan" and "Charkh" (local name) are the two famous game birds hunted by the inhabitants provided sports as well staple food for consumption.

Marine animals, are the most interesting and varied in type, and the environment they require. The Persian Gulf has warm water which is one of the most suitable environments for the variety of living organisms. Many of invertebrates, tortoises and sharks are available in the Persian Gulf. Most of the places in the Gulf are quite suitable for subsistence of corals and are coralliferous, and the skeletons of the corals are good place for worms, crabs, Mollusks and Echinoder-matouses. Big and small tortoises, various type of fish, prawns, snakes and sponges are also available in the Gulf. There are so many of two-shelled type of living organisms, that their fossils cover many parts of the coast. The Gulf is a very good site for pearl fishing, although it has been stopped, at present, ;but it can be resumed once again.

## 5.5 FLOODWAYS

Most of the settlements in this zone are located near a series of floodways or they are intertwined with these floodways. During the rainy season, water usually flows through most of the streets from north to south and brings sufficient amount of fresh water to these settlements. The term floodway means where the run-off is flowing and the term run-off is the excess water flowing off on the earth surface.

Iran with a length of approx. 2043 Km. of Arid Coastal line along Persian Gulf needs to realize the special coastal environmental constraints such as depending on run-off for irrigation and drinking. Previous urban developments have not given due consideration to this vital aspect. The traditional built

forms which developed over long span of time in conformity with the constraints imposed by the floodways have not been respected while planning and design preparations. Understanding of various thresholds and various forces which have been generated by the floodways are important elements of the site, and their cognizance while planning and designing in this zone is a must.

Because the run-off from rains is the only primary source of potable water in these settlements; it is necessary to have proper knowledge of traditional way of functioning of their ecosystem (Fig. 5.19) and the significant role these flood ways played in their sustenance.

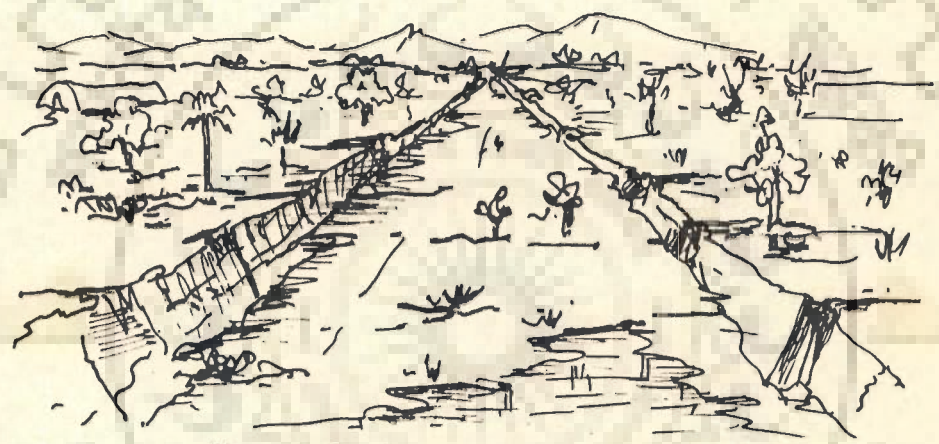
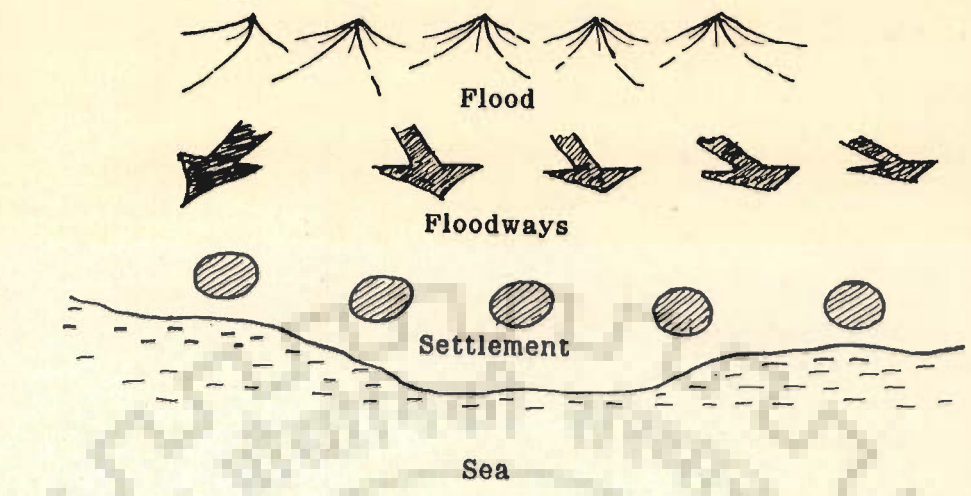
Relation of run-off, "Berkeh" and vegetative cover

## 5.6 THE ECOSYSTEM

Ecology is the study of major amalgamative disciplines that links together the physical, biological and social sciences. Ecosystem is the vital unit which includes both the living organisms and non-living environment. It is the system in which the man made and natural elements influencing the properties of one another and both necessary for conservation of life, as we have on our planet.

Usually ecosystems are capable of self-developments that may include internally programmed or externally induced, growth, repair, replacement of parts, and other processes that counter the natural tendency of any and all systems to deteriorate with time. It is especially important to know whether an ecosystem is in a state of change or is stable; otherwise how are we to anticipate future condition and be able to judge whether a future condition is going to be the result of a natural process or man-made perturbations.





Biggest floodway in Bandar Kong ("U")

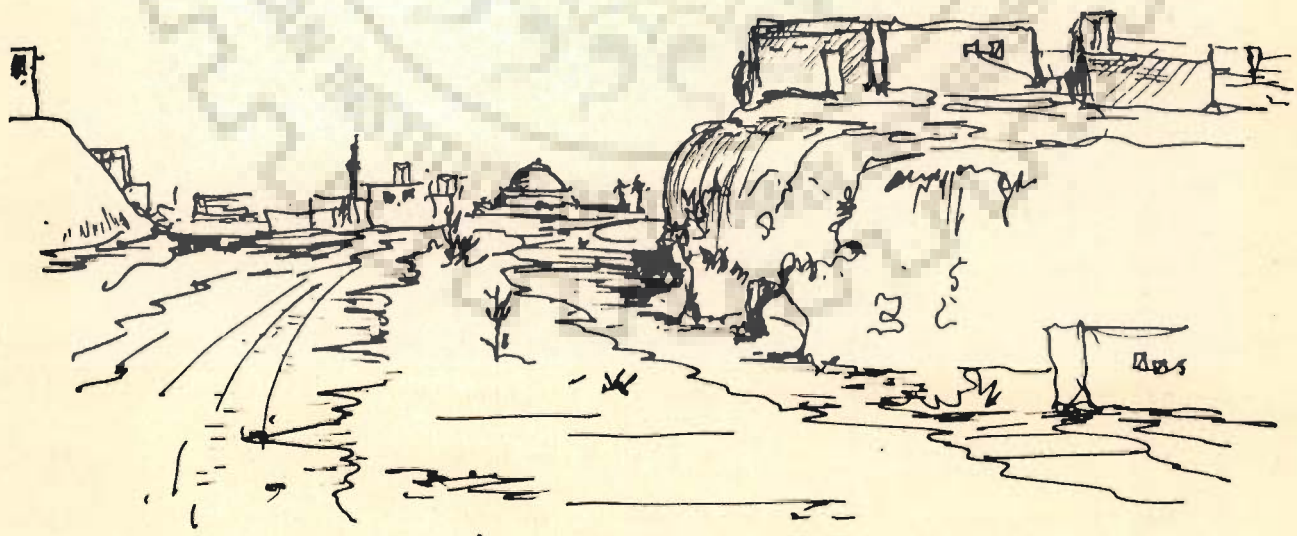


Fig.5.19 : Floodway of Eshkaft (B) In Bandar Lenghe

Organisms that populate such systems have evolved notable adjustments and adaptations for subsistence and efficiently utilizing scarce energy and other resources. Man, of course, learned early how to modify and subsidize nature for his direct benefit, (Fig.5.20) and today he has become increasingly skillful in not only raising productivity but also in poisoning the natural wealths. In today's technologically advanced world man's constant intervention with nature and manipulations of natural environment has given rise to innumerable hazards and problems. Environment means

"Everything which is seen or experienced, it encompasses the natural surroundings, in terms of geology of the areas climate and micro-climate, physiography, soils, water resources, plants, animals, as well as the man-made components like individual structure, transportation corridors, sewer systems, surface drainage, social and economic constraints etc"<sup>6</sup>

It is only after studying and receiving a clear image of overall structure and function of various components such as population, the cycle behaviour of nitrogen, or plant productivity that, the unique environment of the arid coastal zone can be placed in proper perspective.

Considering energy as a common denominator of classification of all ecosystems, either natural or man-made, the arid coastal zone has a

"unsubsidized natural solar-powered ecosystems which has an annual energy flow (power level) of 1000-10,000 (2000)kilo calories per square meter"<sup>7</sup>.

This ecosystem slowly converted to the subsidized solar-power ecosystems where man, learned early how to modify and subsidize nature for his direct benefit, and became increasingly skillful in not only raising productivity but





View From Floodway to the Gulf - Bandar Kong (Floodway "U")



View of a Floodway entering the Settlement from Bandar Lengeh (Floodway "D")



View of a Floodway and a "Berkeh" Bandar Lengeh (Floodway "C")



Digging Wells in the bed of Floodway To Take Water to the Under Ground Water Water table - Bandar Lengeh

Fig. 5.20: Collection of Rain Water

also more especially in channeling that productivity, into food and fibre materials which are easily harvested, processed and used. Agriculture and water culture are the prime examples of this category of ecosystem.

But this system is in the process of being destroyed and fuel-powered ecosystem is going to be replaced within a short period, the safe existing ecosystem which is not wise, when, other's are trying to replace fuel energy by supplementing solar energy system at present. Although the "power density" of natural ecosystems is not very impressive nor could such ecosystems by themselves support a high density of people, they are never the less extremely important because of their huge extent.

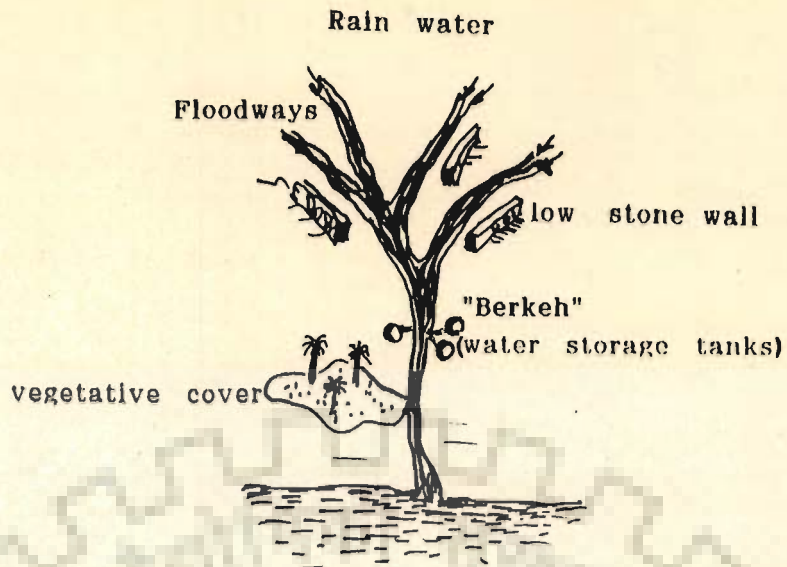
"The only permanent water for drinking in these settlements are the water of "Berkeh". Most of the population in these regions are still dependent upon the rainfall run-off to produce drinking water and support agricultural activity"<sup>8</sup>

"The concept was simple, in this hard dry and forbidding environment, a system of low stone walls and graded terraces help the rain water to get collected in different man-made water storage tanks duly covered with a domical structure"<sup>9</sup>

Many of these traditional water storage tanks are neglected, thus wasting the natural resource and free use of potable water resource and vegetation cover (Fig. 5.21).

Natural recycling of water is free and constitutes a vast, but almost unrecognized use of solar energy. A hydrological cycle shown as a pictorial model and as a flow chart which is by itself a perfect system.





a) Relation of run-off, "Berkeh" and vegetative Cover.



b) Different form of "Berkeh"



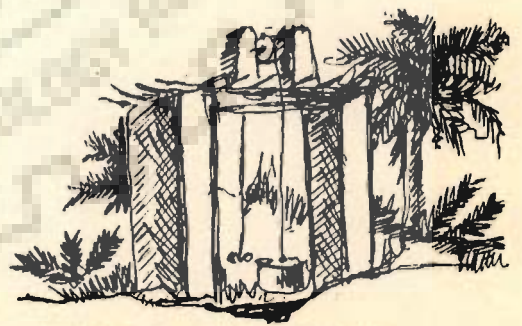
c) Drinking water being carried from "Berkeh"



d) Interior of a "Berkeh"



e) Directing Flood to the "Berkeh" by Building Low Stone Walls



f) The system of taking collected Rain Water from Lower Areas to the Fields

Fig.5. 21: Ecosystem of Natural Support of Human Life and Vegetative Cover - System is Under Degredation

The Fig.5.22 to 5.24 shows the role of solar energy as the driving force that pumps water uphill, (the energy factor shown as K cal/m<sup>2</sup>) and the Fig. 5.25 shows the flow charts regarding the traditional system and the damaged system at present time.

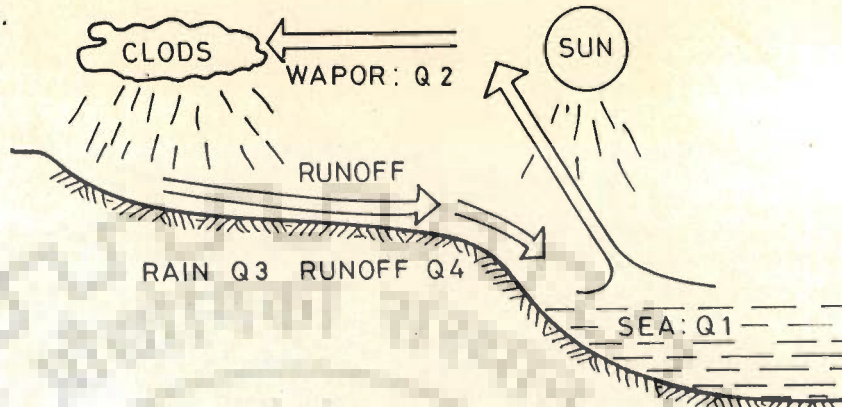


Fig.5.22 : Natural Water Cycle

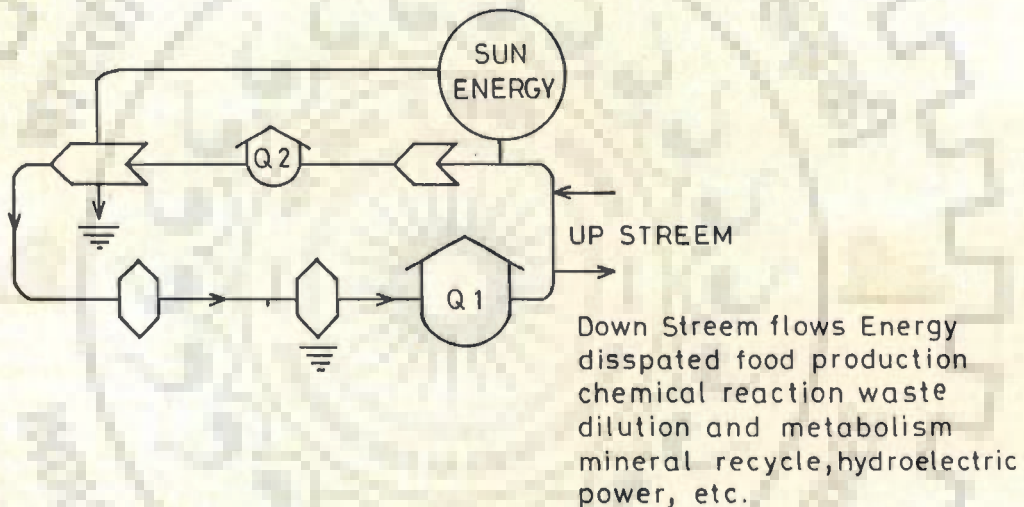


Fig.5.23 : System Model

(Source : Adopted from Engene P. Odum, Ecology, Second Edition, Rinehart and Winston. Inc., New york, 1975, pp. 102-103.

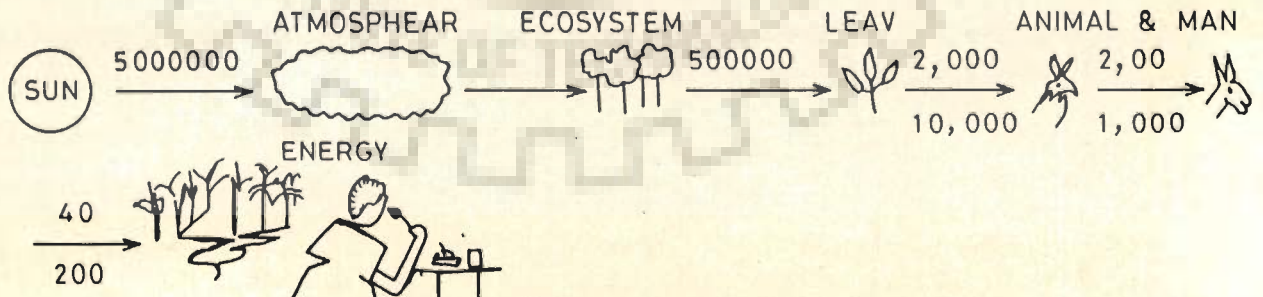
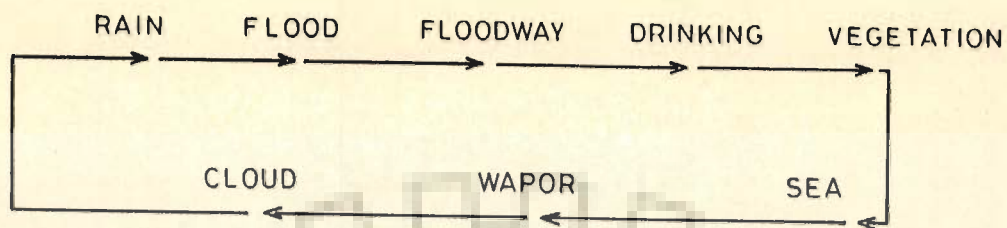


Fig 5.24 : Energy Flow in K.Cal./Sq.m.





Traditional system

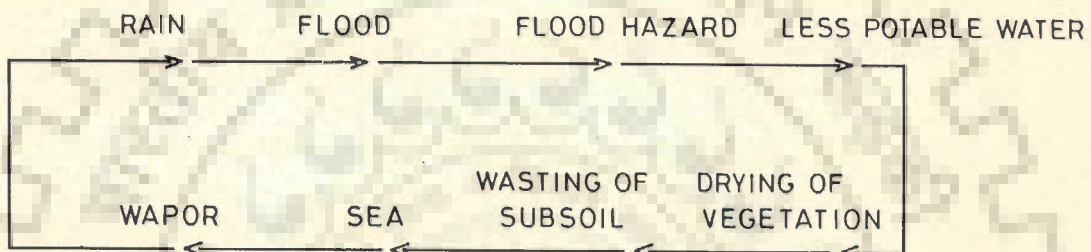


Fig 5.26 : Present Situation Due to Modern Man's Intervention

The dangerous consequences of human activities on environmental quality demand policies to control the situation and to prevent its deterioration. But far reaching decisions on the environmental policy are impaired or even made impossible as long as the relevant ecological relations are not sufficiently understood and large-scale quantitative information on the most important parameters is not available in sufficient quality and quantity.

The important fact is that Arid coastal regions of Iran have a highly sensitive ecosystem. The scarcity of water and the extremes in temperature and humidity have brought all flora and fauna to the threshold of destruction. Thus any planning and design for the arid regions must converge on restoring the lost equilibrium of its ecosystem if any lasting results have to be achieved.

### 5.6.1 Qualitative studies.

The movement & flow of water through the floodways as it is obtaining today in these settlements has been studied at site; the study revealed that the inhabitants of Bandar Lengeh and Bandar Kong by experience have learned how to collect every drop of rain water flowing through the floodways and store it in tanks for deploying it throughout the year for drinking & irrigation purposes. (Fig.5. 26)

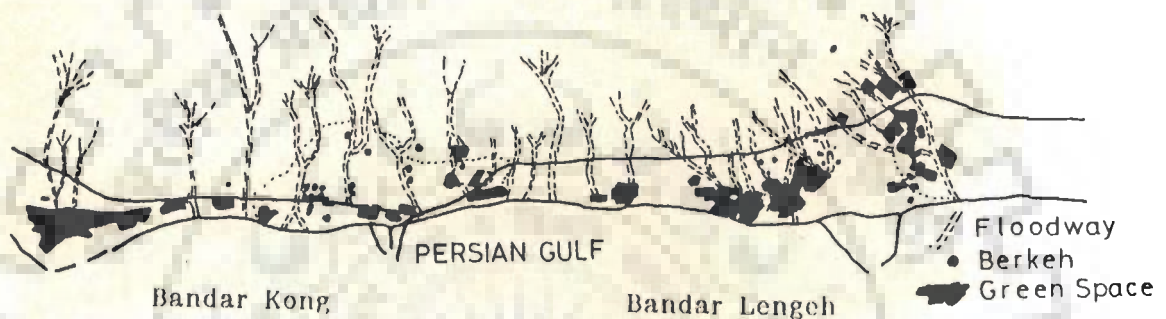


Fig.5.26 : Floodways Pattern and Flow of Flood To "Berkeh" and Green Areas.

The inhabitants of these settlement have been able to live through ages. Although these settlements are located beside the virtually inexhaustible source of sea water but the shortage of drinking water was always imperative.

To make an in-depth study of the functioning of these floodways, the author undertook to update the available maps with the help of aerial photographs and by on the spot inspection at the site. For proposes of their appraisal these were categorised as follows; (based on their morphology, their existing situation and unique problems).

Generally floodways are divided into three types (Fig.5.27 and 5.28) :

1. Those which originate from a definite flood plain or flood storage and then they get divided, and subdivided into branches, and later downstream.



these may again join each other. Examples of such floodways is shown in Fig. 5.27 and are marked as A, E., and U. Subdivision of a floodway may be in a natural way that is such as contacting with a hard strata of ground (This indicates the areas which are soft for digging, if required). Other reason of branching a floodway is mans interference that is by making low stone walls on the bed of floodway and channel improvement to take water toward their storage tanks ("Berkeh"), orchard, agricultural field and discharge to the sea.<sup>10</sup>



Fig.5.27: Floodways Classification - Bandar Lengeh.

2. These are flood ways which are made out of smaller branches and stream of water coming from hear and there and finally make a main stream which after irrigating the various places discharge into the sea (Fig.5.27 & 5.28). Floodways of "C" type are made of smaller floodways ( $C_1, C_2, C_3$  - Fig.5.27).provides an illustration. The branches of " $C_1$ ", " $C_2$ " and " $C_3$ " after feeding the Bangelo "Berkeh" and Abbas Berkeh have become one and feed the two "Berkeh" near the Shahid Beheshti street and after crossing the Enghlab

street they are again branched and irrigate the agricultural land, orchard and "Nakhlestan" areas, branched, and finally discharge into the sea.

3. These are small floodways which collect the surface water of a small zone within the built up area of town and after irrigating a few "Berkehs" and agricultural land and gardens discharge into the sea. G, F and K are of such type <sup>11</sup>

### 5.6.2 Floodways of Bandar Kong.

Most of the floodways, from movement point of view, are different from those in Bandar Lengeh. In Kong most of floodways, (Fig.5.28)

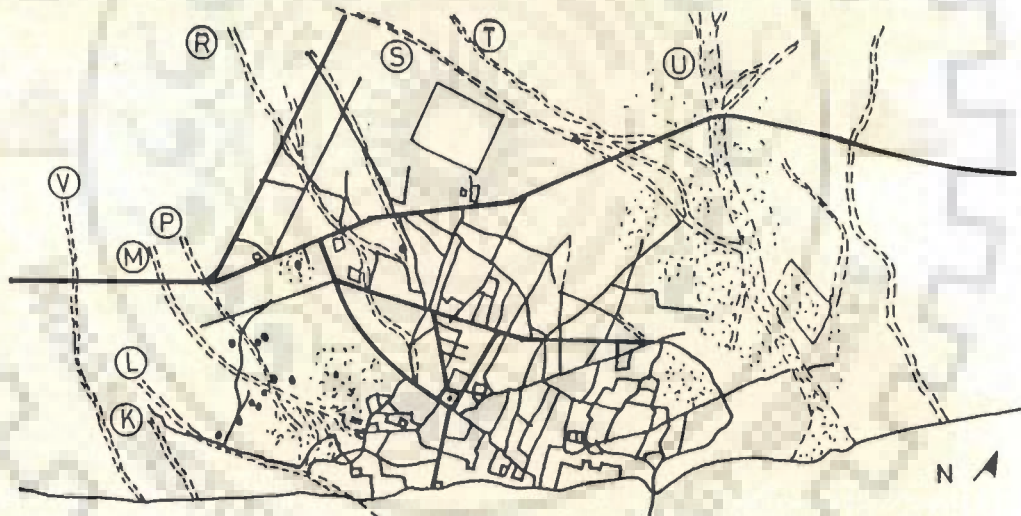


Fig.5.28 : Floodways classification - Bandar Kong

are from North and before reaching the city built up areas they get branched into two groups and go around the settlement. Some of these while going toward eastern seasonal river (floodway "U") feed gardens and water tanks and from there on discharge into floodway "U" and then into the sea. And the others water the western gardens of date palms, many water tanks and discharge into



water the western gardens of date palms, many water tanks and discharge into the sea. Except a few secondary branches of floodways the rest do not create any problem for settlements.

Anchorage and harbour activity was taking place previously in the floodway "U", but due to carelessness the level of this floodway has come higher than sea level and sea waters do not come to the floodway. Thus ships can't anchor in this place.

### 5.6.3 Quantitative aspect.

To make a comprehensive plan, rational decisions and to utilize the most important element of the site (water) and at the same time to avoid flood hazard; it was required to have some quantitative study which can help us in channelization of these floodways wherever required. Encroachment of floodway areas by inhabitants and developers (which has created flood hazard), need of expensive urban land at central core for inward future urban expansion, and to respect the ecological aspects in conservation of water resources and vegetation, are the causes of preparing the following quantitative study and analysis. Therefore, minimum width, maximum depth at minimum width and slope at this point for each floodway is found and registered (Table 5.1). Similarly the maximum width, maximum depth at max. width are studied and these data are available in Table 5.2. These tables can answer to the max. required space for each floodway. The Table 5.3 gives the average space required that can be used for preparation of physical design and channelization of a floodway and to plan various landuse allocations around it.<sup>12</sup> Generally the slope in Bandar Lengeh and Bandar Kong is approx. north south. The last part of site is the seaside. In any case the highest Northern point is below 20 ms.

and the general slope is about 1.5% (Fig.5.29) and the flow is gently from N to S.<sup>13</sup>

### 5.7 REALIGNMENT OF FLOODWAYS

The author has also studied and proposed the best possible pattern with natural slope in which channels for water circulation to "Berkeh" and green spaces and sea shall not be disturbed when any future development is envisaged.(Fig 5.30).

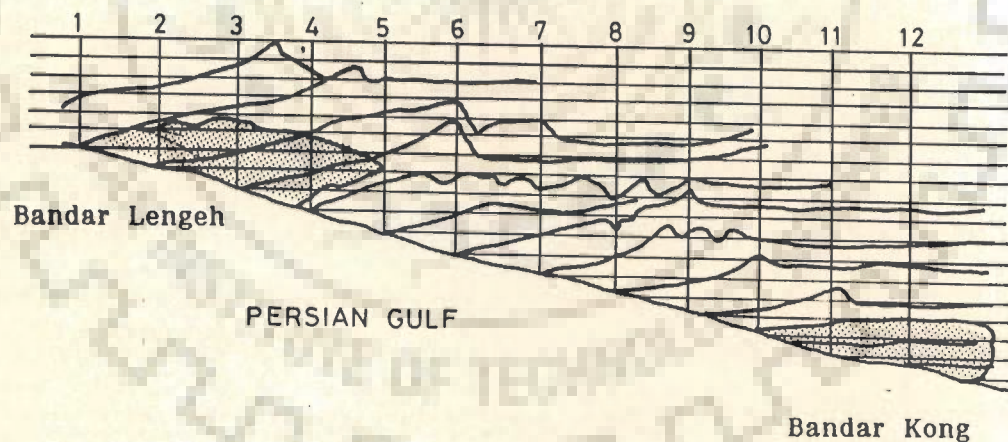
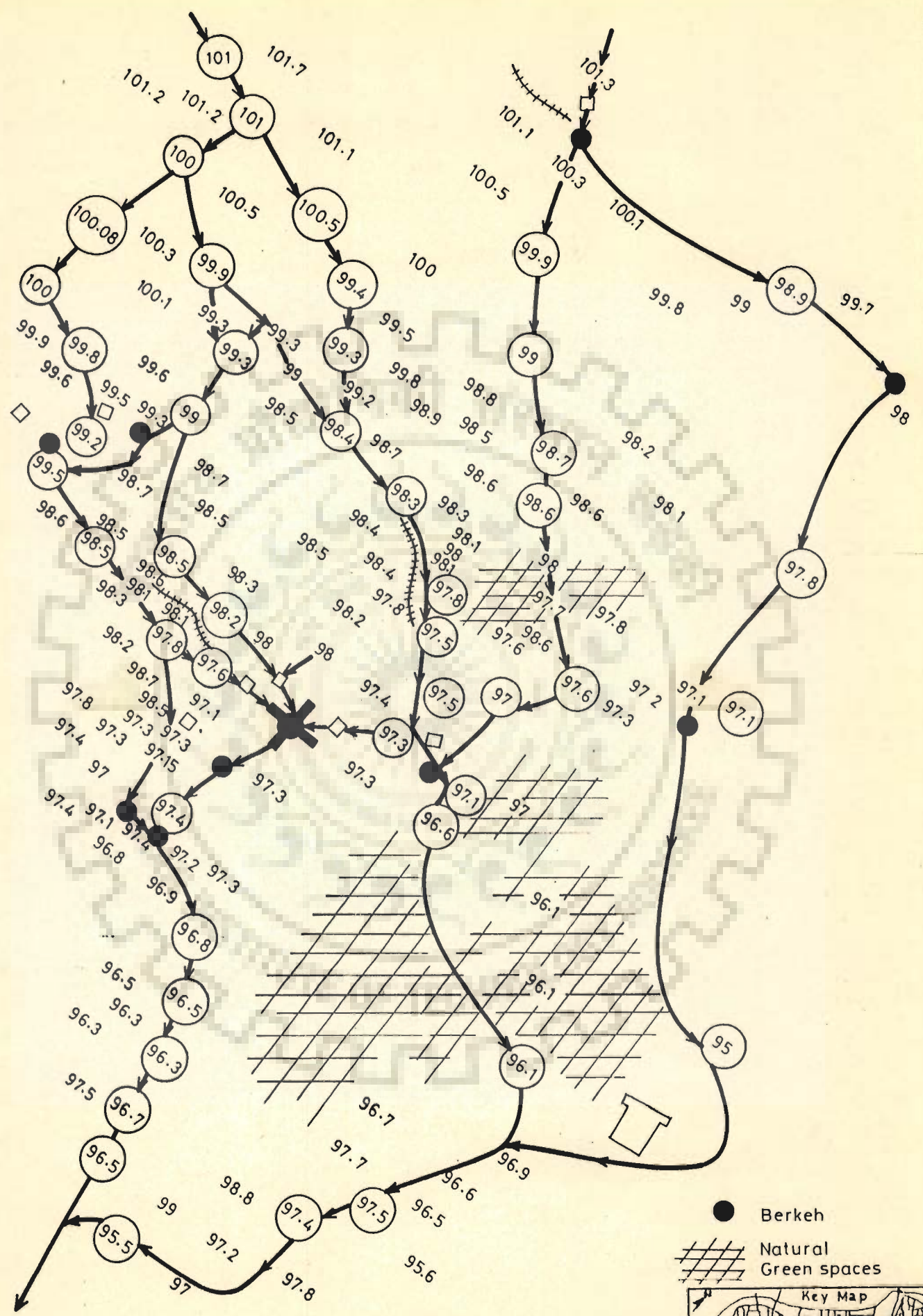


Fig.5.29 : Topography

(Source: Ministry of Housing and City Planning, Master Plan, 1983-84)





● Berkeh

▨ Natural Green spaces

Key Map

Persian Gulf

Bandar Lengeh Bandar Kong

TABLE 5.1

PHYSICAL PROPERTY OF FLOODWAYS (MIN. WIDTH, MAX. DEPTH AND SLOPE)

Name	Min. Width in cm.	Max Depth in Cm.	Average slope (%)
A	1000	90	0.5%
B	1200	140	0.7%
C	700	120	1.3%
D	1000	220	1.1%
E	900	140	1.2%
F	1400	90	1.4%
G	300	100	1.9%
H	1000	150	2.0%
I	1200	150	2.0%
J	600	60	0.3%
K	500	150	1.0%
L	400	180	1.0%
M	300	70	2.0%
P	3000	60	0.9%
R	800	20	1.2%
S	500	90	1.01%
T	600	80	1.0%
U	2000	260	0.6%
V	700	80	1.0%



TABLE 5.2

MAXIMUM WIDTH, MAXIMUM DEPTH AND SLOPE OF FLOODWAYS

Name	Max. Width in cm.	Max Depth in Cm.	Average slope (%)
A	3000	40	0.5%
B	2800	30	0.4%
C	1700	70	0.8%
D	4500	80	0.7%
E	3500	40	0.7%
F	1200	50	0.6%
G	1600	40	0.7%
H	4000	40	0.5%
I	3000	40	0.3%
J	2200	70	0.8%
K	600	110	0.3%
L	700	30	0.8%
M	1000	40	0.9%
P	800	15	0.7%
S	1600	20	0.5%
T	1400	15	0.3%
U	5000	160	0.4%
V	2000	40	0.7%

TABLE 5.3

APPROX. SLOPE, DEPTH AND WIDTH REQUIRED FOR EACH FLOODWAY

Name	Width	Depth	Slope
A	1800	65	0.5%
B	2000	80	0.55%
C	1600	90	0.55%
D	2800	150	1.1%
E	2200	90	0.95%
F	1800	70	1.0%
G	950	70	1.3%
H	2500	95	1.25%
I	2100	95	1.5%
J	1400	65	0.55%
K	550	130	0.65%
L	550	105	0.9%
M	650	55	1.45%
P	550	35	0.8%
R	800	20	1.2%
S	1050	55	0.8%
T	1300	50	0.65%
U	3500	210	0.5%
V	1350	60	0.85%





# CHAPTER 6

## CHAPTER-6

### PROBLEM IDENTIFICATION

#### 6.1 ABSTRACT

In general, the problems of planning in Bandar Kong and Bander Lengeh relate to the conflicts between the functional proposals and pragmatic feasibility of the site in the context of comprehensive planning and urban design proposals. In the foregoing studies, surveys and analysis of the present situation of Bandar Lengeh and Bandar Kong, specific problems were identified in planning and design areas of these settlements.

The nature of the planning problems; in addition to the ones highlighted in an earlier Chapter, relate to the difficulties of the proposed plans which can be classified at two levels, e.g. those problems which have been physically revealed on the site during the field surveys done by the author, and those which relate to proposed plans, the formulation of which did not take into account the ground situation prevailing on the site.

More specifically, the problems that need attention while preparing the master plans relate to : evolving a neighborhood concept; natural system of water supply; poor residential layout without regard to the natural systems of the area; contamination of potable water due to sewage and garbage disposal; haphazard development of the settlements; and the time period that spans the process of plan preparation and implementation. The problems of efficient traffic networks; circulation system and accessibility without destroying the architectural heritage, as well as, management problems, arising out of



shortage of experts, financial aspects; and public participation, have been identified as crucial inputs into plan/design proposals. Problems related to the review of the land uses that cause encroachment to the floodways and promote unhealthy use of land e.g. land for shipping companies vs the need for development of good recreational areas have been highlighted.

## 6.2 PROBLEMS INHERENT IN THE PLANS ALREADY PROPOSED

The studies of the plans already proposed have shown that the master plans without proper detailing can not be implementable. The base maps used for the plan presentation is not updated and not perfect. Therefore in many areas it does not match with the prevailing site conditions. In some areas the proposed road in the map is on dry vacant land, but on the site the road will run over the sea. Therefore, through detailing, many such problems would get resolved and thus the plan would be amenable to easy execution.

In the Master Plan, already proposed the historic core and traditional built form were supposed to be conserved, but it is quite obvious that if the future commercial load will be added to the present congested condition of bazaar in the core areas, this will result in construction of high rise buildings and demolition of the traditional structures, and thus the conservation will become meaningless. Even if some of the dilapidated buildings are reconstructed and some of these commercial activities housed in them there would not be sufficient space to insatiate the hunger for unbridled commercial space in the central areas. Therefore, the solution lies somewhere else; and not in indiscriminate demolition of valuable traditional structures and their replacement with monstrous multistoried commercial buildings.

In Bandar Lengeh, there is not much of land for expansion of port facilities and the piece of land which is existing at present has been occupied by municipality for development of a children's park which is under construction and only a small part of it is left for future harbour activities which is not sufficient in case all harbour activities and their expansion has to be catered for.

#### 6.2.1 Problems of Circulation System Already Proposed

Bandar Lengeh and Bandar Kong did not have updated map. The maps used for the preparation of their Master Plans were evolved from the tracings of the available aerial photographs of 1981. Therefore, there are differences between the dimensions on the drawings and the actual measurements on the ground. For example, the site survey indicates that the implementation of city circulation network faces problems. In some places, it is causing destruction of many good and valuable residential buildings, in other places the roads inadvertently are shown to run over the floodways and the sea waters.

There are also technical problems such as proper curvature with respect to the proposed speed of vehicle for particular kind of roads. From the inception of the Master Plan to date, many new structures have come up in the alignment of proposed roads; many of these structures are government houses and offices, the pulling down of which is just not possible. All these hindrances create problems for the proposed city circulation network and it requires modification for its implementations. Fig.6.1 shows the problem of each part of the network in detail as assimilated by the author through on the spot surveys.

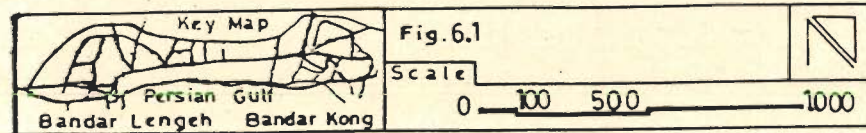




1. Inadequate residential area
2. Road going over new housing
3. Master Plan road wrongly aligned
4. Road passing through Date palm grove
5. Road passing over newly built structures
6. Inadequate curvature for speeds of 90 to 120 K/h
7. Inadequate curvature for speeds of 90 to 120 k/h.
8. Road wrongly aligned over "Berkeh" and floodway.
9. Difference of Level

- Proposed Bypass
- Proposed First Order Road
- Existing Road

Fig. 6.1 : Problems Due to Infirm Prospects of Earlier Master Plan





### 6.3 LACK OF FEASIBLE PLANNING AND DESIGN CRITERIA

Population : Bandar Lengeh's growth rate was 1.98% from 1966 to 1976 and Bandar Kong had a growth rate of 2.6% in the same period, while the normal growth rate of the country was 3%. 1982 census of Ministry of Work and Social Welfare shows a population of 18,559 persons for Bandar Lengeh and 7820 persons for Bandar Kong. This means growth rate of 12.49% for Bandar Lengeh and 5.67% for Bandar Kong. At the same time the growth rate of province was 9.66%. Thus there has been decrease of population during 1966-1976 and a sudden increases in population from 1976 to 1982. But, unfortunately the city infrastructure has not developed accordingly.

However, the old Master Plan had taken 3% growth rate which gives a population of 15000 for Bandar Lengeh in 1991. Comparison of aerial photograph of that time with present situation indicates the miscalculation in this regard. This shows that there has not been adequate criteria for population forecast.

#### 6.3.1 Housing

Assessment of the housing situation in Kong and Lengeh is based upon the information contained in the Master Plan of 1983; and the census data of 1986 plans, a random sample survey conducted by the author in 1987. An appraisal of both the quantitative aspects of absolute housing shortage and qualitative deficiencies has been included here under.

In 1987, it was estimated that in Kong and Lengeh there was an apparent housing shortage of 408 residential units including 174 dilapidated houses. For nearly 4930 households there were 14526 housing units, that were



available. In other words, 109 households were living in 100 residential units. Therefore, there is an amount of over crowding. It is both, due to large in migration of people from war ravaged areas and due to enormous inflation and the spiralling costs of construction. Given an opportunity and with the strengthening of their financial base these households will seek residential units of their own. Therefore, they would exert added pressure on demands. If units are added at the current average rate of 236 per year by 2001, there will be an absolute shortage of 3894 units (see Table 7.5 in chapter 7)

The survey of 1987 by the author revealed that 7.5% of the units were housing only one room. At the average rate of 5.35% per household for Kong and Lengeh this certainly constitutes over crowding. Cooking in 30% of the units is being done right within the room. Further, the houses on the periphery are discharging the sewerage into street or the floodways instead of the dug well. However, the discharge from the lavatory is invariably conducted to the dug wells within or outside their compounds.

8.8% units in Lengeh and 4% units in Kong did not have water connections ( water from deep wells - unfit for drinking but used for mostly washing ) for drinking water the residents have to bank upon municipal tankers which supply the water from "Berkeh" 2/3rd and 1/3rd from distilleries.

Study of the structural condition of residential units by the author in 1987 has revealed that 174 dilapidated units in Kong and Lengeh would require replacement on priority. Nearly 949 units require repairs to save these from deteriorating further.

Further, it has been observed that residential buildings have not been built to take care of any impending earthquakes and are thus exposed to earthquake hazards. The region being in Seismic zone having possibility of earthquakes of magnitude up to 6 RM (See Appendix F).

Further, it has been observed that the neighbourhood environment has steadily degenerated due to haphazard growth. "Mahallehs" which were constituting an elementary traditional neighbourhood has steadily got eroded due to haphazard growth of these settlements. The cause and effect relationship of which have been described earlier in the thesis.

**Educational facilities :** Studies of educational facilities indicate that there are shortages of all type of educational facilities. Bandar Lengeh being the centre of influence zone can not fulfill this requirement and the present available facilities are overloaded. "Mahallehs" of Roudbry, Amirabad, Kaghazabad and old parts of Bandar Kong and peripheral areas have no educational facilities and students from these areas have to walk long distances in the inclement hot weather to reach to their schools. Some of the students have to come from Bandar Kong to Bandar Lengeh for using these facilities.

There are lack of criteria regarding location of nursery school, primary, Intermediate and high - schools In old core, transit zone, periphery and future expansion areas. The municipalities do not know the requirements regarding size and number of these facilities; the radius within which they should function. Although it is well known fact that a nursery school or primary school should be located within a walking distance but usually, there is a problem of having sufficient land for the purpose.



**Hygiene and Health Care Facilities :** There are only 3 doctors, 6 nurses and 3 beds for every 10,000 persons. However, these have to serve the entire influence zone too, which while considering the influence zone the ratio becomes one doctor, 2 nurses and 5 beds per 30,000 persons. In case, we consider the facilities of one hospital and one health care Centre for the entire influence zone of Lengeh, there is no health facilities to serve at town level and "Mahallehs". Very hot and humid climate, open drain and unhygienic conditions of water supply, mixed living of human beings and cattle; unplanned and dusty "Kuchehs" and streets and absence of proper sewerage system, all degrade the environmental conditions, and thus raise the demand for health and hygiene facilities.

There is absence of criteria for location of health centre in the "Mahallehs" of both Bandar Lengeh and Bandar Kong.

**Retail Shopping :** There has been no criteria for the number of shops which can come up at "Nahieh" and "Mahallehs" level in these settlements. There is no research to find out the proper means and the way of analysis to determine the location of such activities. The number of users and the radius within which they can serve have not yet been determined.

**Religious and Social Activities :** There is lack of religious places such as Mosques and Hoseinieh with regard to the inhabitants who are religious and offer prayers 5 times a day. In some places, although, these facilities may be available but they are not within reasonable walking distance, therefore old people face difficulties to walk a long distance in the inclement hot weather.

### 6.3.2 Urban Services

Sewerage System - Bandar Lengeh and Bandar Kong do not have any sewerage system. They discharge, their night-soil and sewage in to the wells of 8 to 10 meters depth. Due to the quality of land, there is no seepage from these wells, and thus, they have to be emptied periodically. This is done by the municipalities at regular intervals. Their tankers collect the fermented discharge and let it out in the open outside the town.

Hot weather, open drain of Wash Basin and Kitchen and the full well of night-soil and sewage in the "Kuchehs" all spoil the living environment of the settlements.

Electricity : Bandar Lengeh has one power plant, which serves Bandar Lengeh, Bandar Kong and all surrounding villages. Shortage of power, manpower, old machinery and plants are the problems which await resolution. But fortunately, the Lengeh Kong Power supply is expected to be hooked to the regional network and the problem hopefully will be solved within the national frame work.

Telephones : Lengeh and Kong have no automatic telephone exchange system, the system is magnetic type which is not commensurate with the modern needs of port and harbour activities. But there is a plan for converting the system to an electronic one in near future.

Pipe and Distillery Water : Piped water supply is catering only for the needs of washing and bathing. Apart from the fact that this water is full of salts and minerals and is not most appropriate for the purpose; even this



water is also not available for 24 hours of the day. Also in areas of slightly higher elevation there is inadequate pressure.

The only distillery plant which is distilling the sea water supplies potable water to the settlements of Kong and Lengeh. The supply is through tankers which individually can not reach every road corner. Quantity of water is only sufficient to cater for 1/3rd of the inhabitants and is also unhygienic in terms of its operation.

Other source of drinking water is from the traditional "Berkeh", which currently is also unhygienic because of the neglect and inadequate care of the "Berkeh".

**Fire-Fighting :** The fire fighting equipment are quite old and can not be of much help with regard to harbour activities in these settlements. There are large quantities of volatile and vulnerable materials stored in the warehouses of the harbour which require good fire fighting equipment to take care of any eventualities.

**Slaughter House and Fish Market :** These have problem of their solid discharge which create pollution and bad odour. Most of the buildings are very old and unhygienic. Discharge channels get choked and create bad smell and unhygienic condition.

**Cemeteries and Mortuaries :** These are very close to residential areas without any isolation, or buffer zone. The mortuaries are not made hygienic and their maintenance is difficult.

### 6.3.3 Other Issues

The changes which might take place according to the government plans, have not been quantified adequately. The scale of industry, mining, agriculture, animal husbandry, fishery (Shilat) activities have not yet been determined at regional level with any confidence; and the five year plans in these respects have been held in abeyance due to heavy criticism by members of parliament. Therefore, the exact space requirement could not have been defined for major economic activities.

There is inadequate provision and direction in the plans in regard to the following aspects.

- According to the goals of development of the country job opportunities need to be created in each settlement with a view to control migration and raise the living standards of their inhabitants. However, in case of Bander Kong and Bander Lengeh inadequate infrastructural facilities at their harbour have acted as a deterrent in their growth and development and thus the creation of job opportunities.

- Although rich fishing spots are located near the coast which are active for 8 to 11 months in a year, and ship building and skilled labourers are available but fishing facilities have not been provided in conformity with its potential.

- Pearl fishing has been stopped, while it was one of the good economic bases of these settlements. There are fishermen who have become handicapped due to water pressure i.e. blind and deaf, because of lack of modern equipment required for divers.



Absence of industries to revitalize the economy due to shortage of potable water, although there are potential for shipbuilding, fish oil, ice making, pearl industry, fish conserve and tin industry and industries related to mining, salt, other chemical and petrochemicals.

Although there is potential for developing marine based industries in these ports, such as ship building, fish, and fish oil processing and other allied industries to boost enhance their economic base, however, not much attention seems to have been paid to this by the authorities.

Tourism industry has not been developed while the zone has enough potential to attract national and international tourists for at least nine to ten months in a year.

#### 6.4 URGENT STEPS FOR PREPARING PLANNING AND DESIGN CRITERIA FOR DEVELOPMENT OF "MAHALLEHS" AND NEIGHBOURHOODS

Previous Master plans have not imbibed any design and planning or design strategies for development of the "Mahallehs" in residential areas for the old core, transit zone, peripheral and future expansion areas. There is no guideline regarding use of space for residential circulation, community spaces, tot-lot, green space and retail shops as well as other community facilities. The housing construction is going on and the commercial buildings are coming up, but yet the structure plan and main road system proposed are not implemented. Thus the problems of implementation will increases day by day. Destruction of some of the buildings possessing high degree of cultural heritage has alienated many enlightened from the process of planned development.

## 6.5 DESTRUCTION OF STRUCTURES POSSESSING ARCHITECTURAL HERITAGE

The unique historical properties possessing high degree of architectural and cultural heritage located within urban area have been and are still being rapidly destroyed due to the pressure of modern developments motivated by commercial interests. Many of the architecturally valuable buildings have been replaced by monotonous and uniform built environment.

The interesting Bazaar Pattern in the core of these settlements which is in harmony with climate and natural surrounding, is in the process of being replaced by straight and unimaginative large avenues without any concern or calculation of the irretrievable destruction that such development inevitably cause. Damage of the historic fabric can not simply be calculated and assessed on the basis of number of buildings demolished. The introduction of new and largely incompatible uses, the damage to the historic skyline, the generation and attraction of vehicular traffic and the disruption of the social fabric of "Mahallehs" are other losses which should be taken into account by planning authorities before embarking on any development or renewal programme in these areas.<sup>1</sup> It must be recognized, however, that apart from the above mentioned problems most municipalities and local authorities are simply ignorant of the value of their historic environment.

## 6.6 PATTERN OF GROWTH

It has been observed that because of the increased activity in the harbours and added traffic movement on the road along the shore, there is a natural tendency of development to take the form of a ribbon, not only at the town level but also at a regional level along the Persian Gulf in Iran (Fig.6.2). In the absence of any regulatory measures and planning controls



this kind of ribbon development along the coast line is inevitable and is loaded with the following disadvantages.

- As the built form extends in the form of a long strip there is increase in cost of various basic utility services, such as water supply, electricity, postal deliveries, telephones, etc.
- Ribbon development tends to scatter the community along a long strip thereby, unwittingly, putting a wedge in its social cohesiveness.
- The future improvement becomes costly and difficult if not impossible.
- The buildings face heavy traffic associated with noise, dust and undesirable smells.
- The interior portion is left undeveloped which results in the wastage of valuable land. There are chances of traffic accidents and traffic delays because of the presence of Pedestrians and low speed vehicles on the main roads.
- The development spoils the countryside and also hampers visibility of The Gulf waters which is the most important element of these site.
- The traffic capacity and efficiency of main roads get reduced.
- \* Through traffic on main highways get hampered due to the mixed slow moving local traffic.

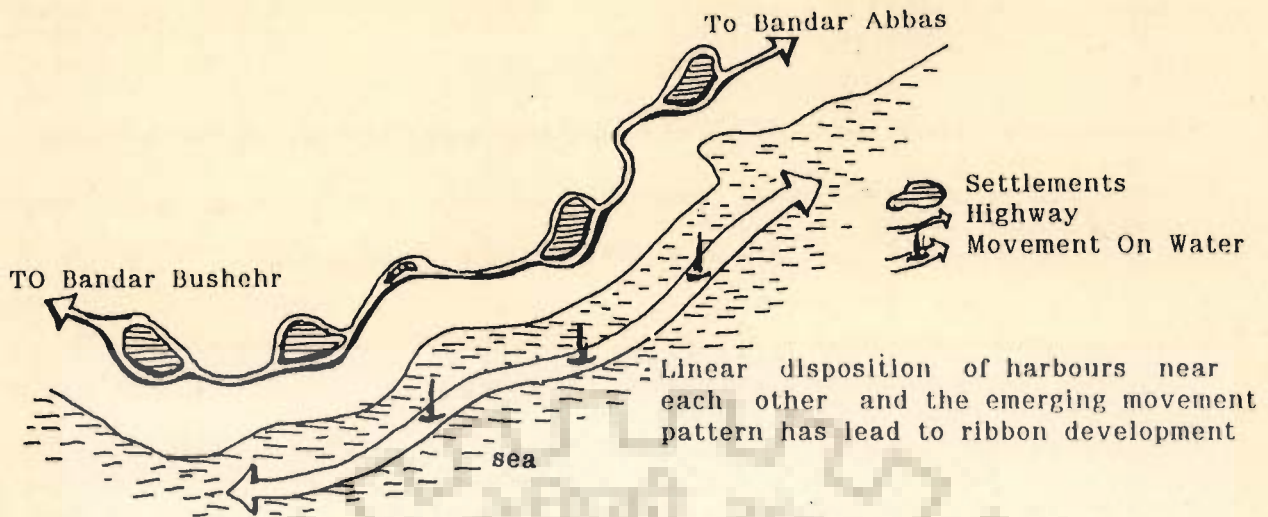
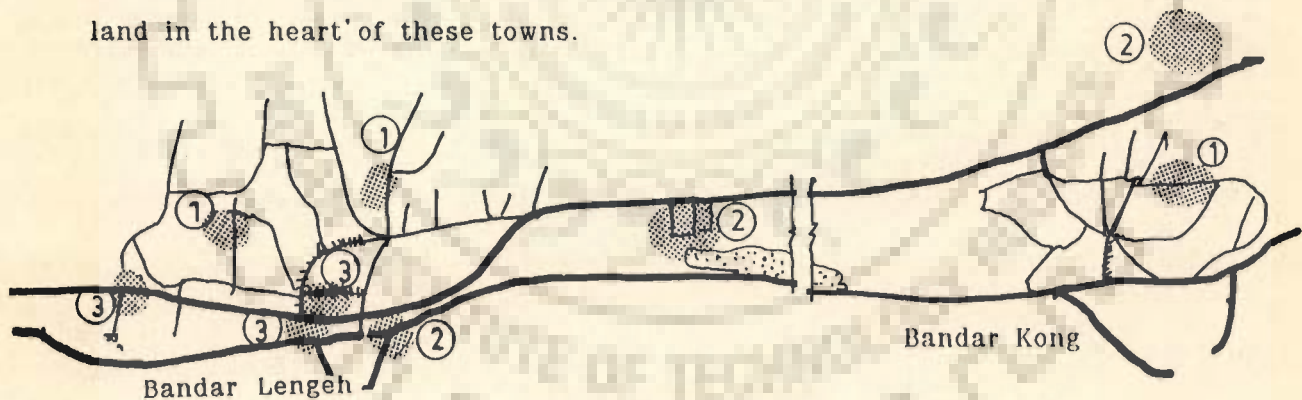


Fig.6.2 : Causes of Ribbon Development.

### 6.7 LANDUSE

Besides the foregoing aspects regarding landuse, the land use problem can be considered as one of the major issues in the recent growth of unbridled development. The best part of the sea side which can be developed into recreational areas have been occupied by Shipping Companies for storage of goods and other industries. The whole sale market, the truck and bus terminal are other incompatible land uses which are cluttering (Fig. 6.3) the precious land in the heart' of these towns.



Conflicting landuses :

- |  |  |
|--|--|
| 1. Wholesale in residential areas                        | 3. Wrong location of Bus terminal and Truck terminals along the street |
| 2. Recreational sites encroached upon by industrial uses |  |

Fig. 6.3 : Major Landuse Problems

The land which should properly be preserved to keep the floodways in a state of good physiological health is continuously being encroached upon by



Incongruous development such as the power plant, factories etc. or by dumping rubbish. Alongside the flood ways there are rich natural green spaces which are getting destroyed naturally by the afore-said encroachment.

There is inadequate appreciation of direction of future development and the kind of use to which the land will finally be put to. Similarly the space and right of ways which would be required for highways, the transport network for different phases in future is going to be problematic because the areas adjacent to the existing net work are getting occupied by both authorized and unauthorized developments.

In the proposed Master Plan a general activity zone has been proposed without defining or explaining its contents. However, in the proposals by the author in the new Centre between the two settlements it is proposed to have all activities which go into what is termed as a down town in the western concept. Only its formation in our case would be a mutation of a traditional bazaar functionated with modern buildings such as hotels etc. wherever necessary. The centre will house and cater for activities and buildings such as :Museum, stadium for game, swimming Pool, Cinema, Theatre, Library, City hall, Conference building and Commercial building ( Shops for all kinds, Insurance and cooperative etc.).

## 6.8 DENSITY PATTERN

Although there has been a sample survey of the number of households and type of households in the town, but as yet residential density of each "Mahalleh" or neighbourhood unit is not well defined in the master plan's studies (Fig.6.4 & 6.5). However, area of residential unit (house), covered

area of the plots and number of household in some "Mahallehs" are the items which have been described in Master Plan's studies. The covered area of a house gives idea about a house while the residential density gives an overall picture of a sector in a settlement. Residential studies help us to know whether a sector of settlement allow more population, with its existing infrastructure or its population should be enhanced or decreased.

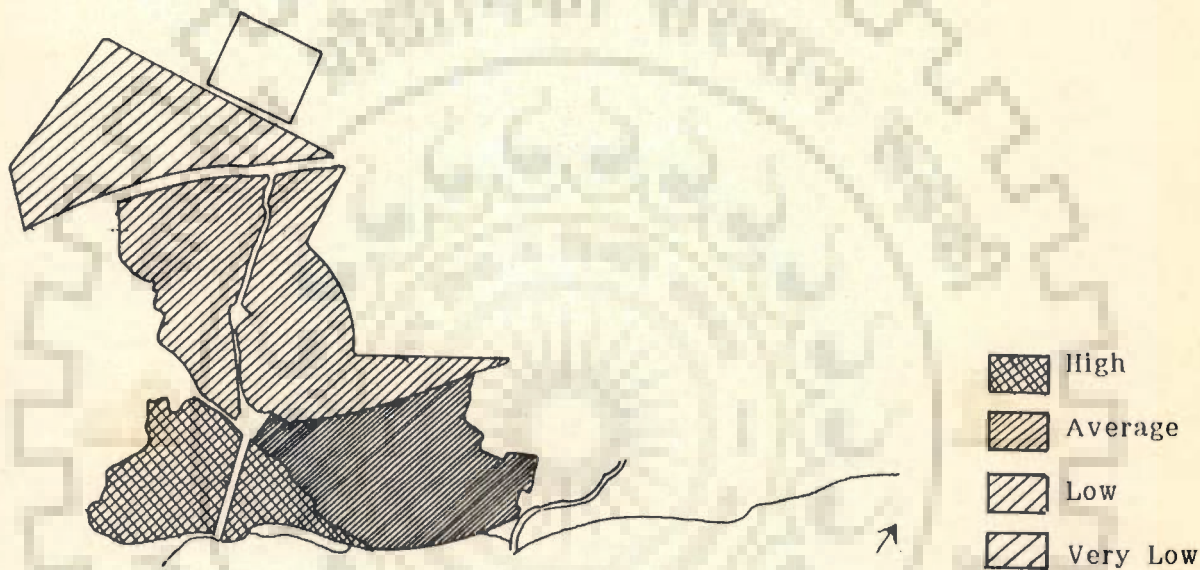


Fig. 6.4 : Existing Density Pattern as Given in the Master Plan of 1983 -84  
Bandar Kong (Lacks Quantification)

Densities in an area are supposed to closely correlate with the community services, amenities and infrastructure facilities. Although, it is problematic to provide desired infrastructure to cater for even the prevailing densities, the Master Plan has envisaged even higher densities in the congested core than those obtaining now. This would inevitably imply additional educational, health and other community facilities and services and augmenting of all infrastructural facilities related to water supply, electricity, sewage disposal etc. This is going to be well nigh impossible ; specially if requirements of conservation have to be kept in the vanguard.



Another problem inherent in the plans already proposed is the manner of defining density as high, average, low and special, (Fig 6.6) these terms have not been defined in terms of persons per hectare. Therefore it does not give proper guideline and picture for planning of the sectors of the towns. Sufficient reasons have not been advanced for assigning high densities in some areas and low densities in other areas. Many of the "Mahallehs" along water front have higher density than the "Mahallehs" behind them; this not only blocks the view of the most important element of the site, i.e., the Gulf waters but also blocks circulation of the sea breeze which is very essential in the arid coastal zones to aid micro-climatic effects which help in creating comfort conditions in these settlements.

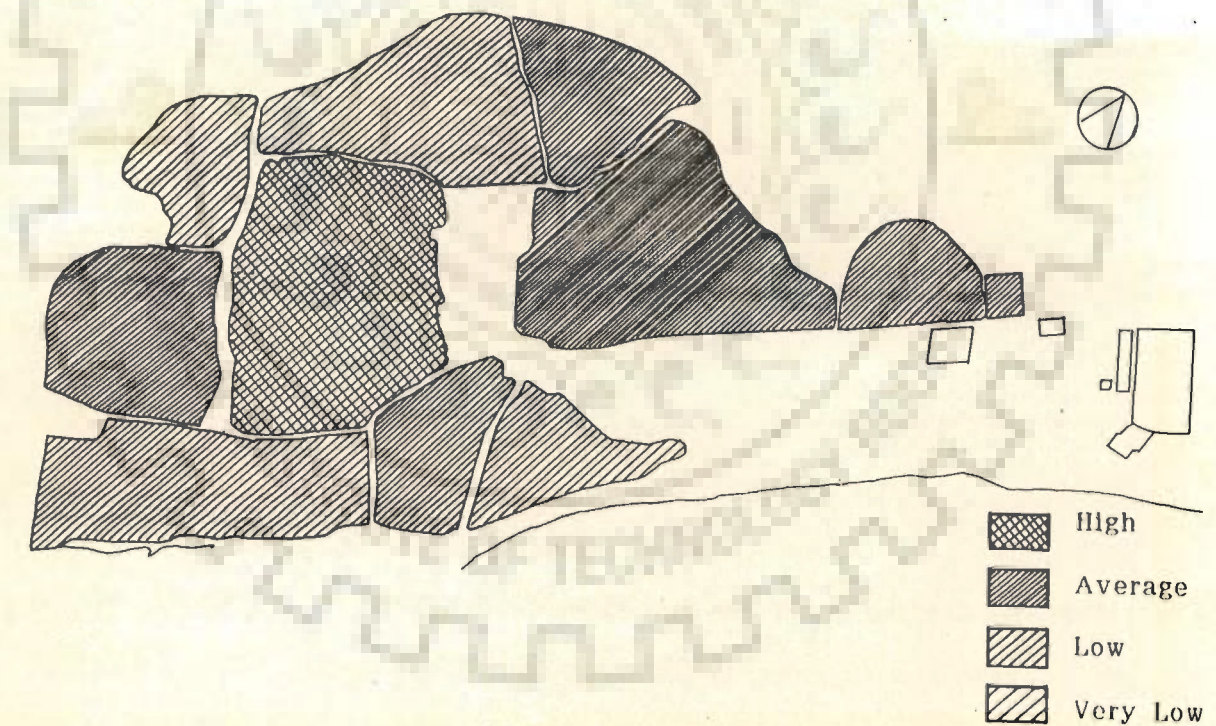


Fig. 6.5 : Existing Density Pattern as Given in the Master Plan of 1983 -84  
Bandar Lengeh (Lacks Quantification)



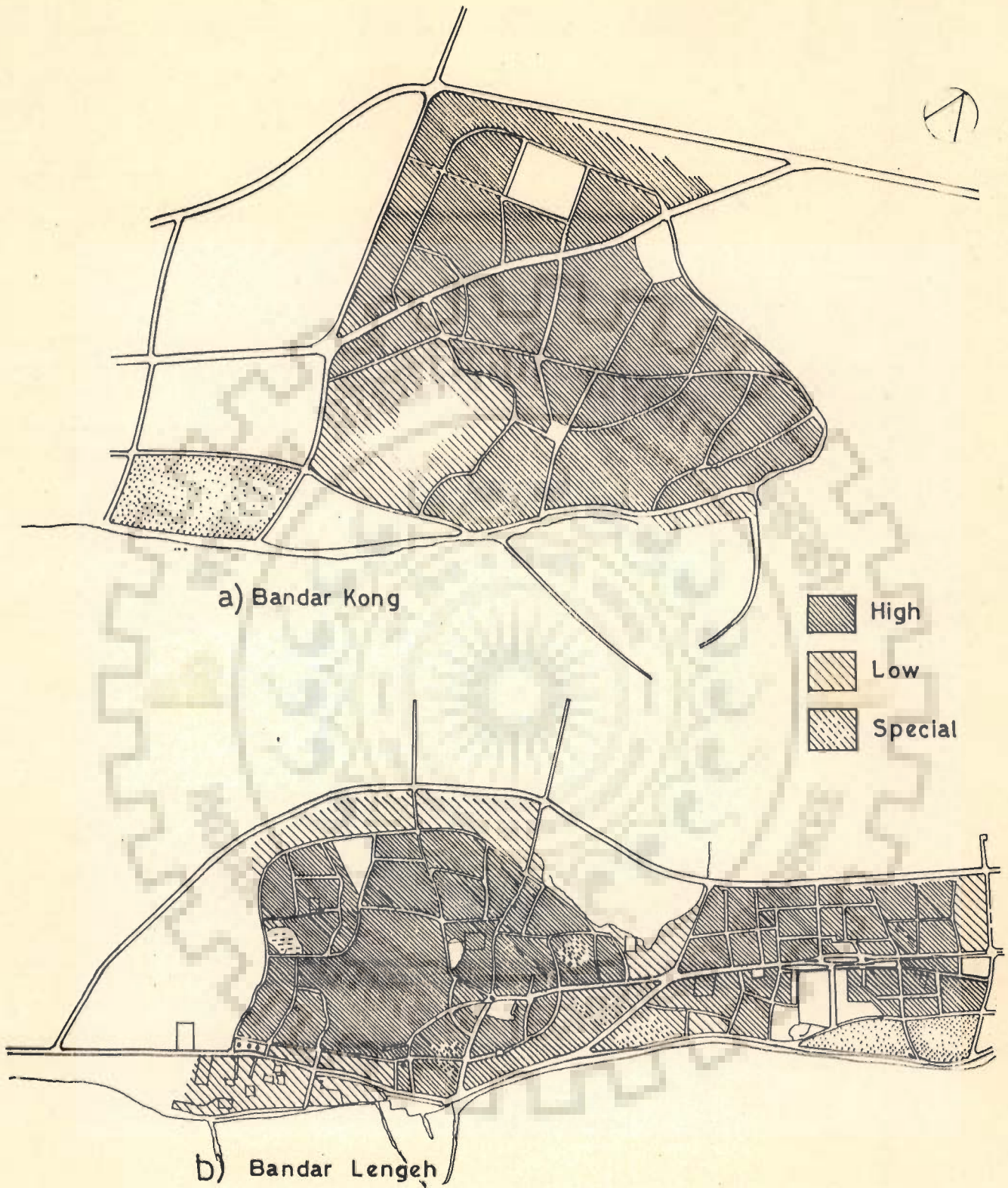


Fig. 6.6 : Proposed Density Pattern as Given in the Master Plan of 1983 -84  
(Lacks Quantification)



## 6.9 FLOODWAYS, SURFACE WATER, WATER SUPPLY AND OTHER ENVIRONMENTAL PROBLEMS

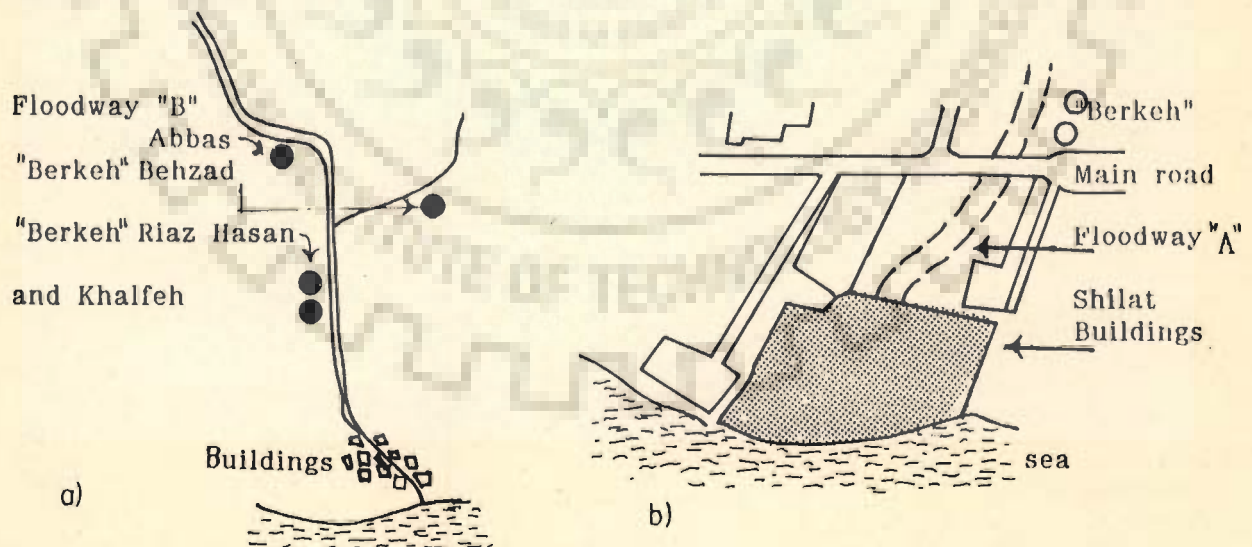
The development of settlements along the Persian Gulf is highly characterized by the interspersed floodways. Earlier, when seen from sea side, clear wide gaps could be observed in an otherwise a continuously built urban scene. Current encroachment by urban development of these floodways is a serious matter of concern.<sup>2</sup> Restoring their ecological well-being can avoid lots of socio-economic problems, which otherwise would set in motion a chain of degenerating reactions. As has been described earlier in Chapter 5, Floodways constitute the base of the permanent source of water supply which in turn bring water to underground storage tanks (Berkehs).

The other sources of potable water supply is the distilled sea water, and packed mineral water. But these are quite insufficient for the population of these settlements and surrounding villages. The quantity of distilled water and packed mineral water is unlikely to increase to match the growing demand of the increasing population simply because the costs would be exorbitant. Since, "Berkehs" provide 70% of the drinking water requirements of these settlements it is most essential that the deteriorating conditions of the Floodways is restored to their original health and the "Berkeh" maintained in a good state of repair. It has been observed that not only some of the inhabitants but also municipality workers are dumping the city garbage inside the floodways. Rain water passing over this rubbish gets contaminated and thus, polluted water gets collected in the water storage tanks of these towns which is later used for drinking. Sometimes the dumping continues until the Floodways is completely blocked. Evidently, after complete filling of Floodway the site is used for construction of buildings. This causes two problems, first, in diverting the floodwater a flood hazard is created; second

It lent amounts to wastage of valuable rain water, and also results in drying of vegetation which was otherwise getting irrigated from this water. Therefore, inadvertently many of these traditional water storage tanks are getting denuded due to this unthoughtful assault on the Floodways.<sup>3</sup>

### 6.9.1 Problems Resulting from Piecemeal Development

Absence of comprehensive plan of urban development and respecting the morphology and Ecosystem of functioning of a human settlement finally will result in missing of the treasured natural resources. Damaging planning and construction activities have resulted in division of the course of flood from their original-- almost traditionally planned and controlled destination i.e. water tanks, vegetation and finally sea. In previous transportation plans, in many cases, the proposed roads have changed the pattern of floodways. This has happened because of lack of proper study of the site before planning. Shilat Corporation buildings, which have come up in the floodway is one such example (Fig. 6.7).



Floodway "B" & "A" encroached upon by haphazard unauthorized construction

Fig. 6.7 : Wrongly Located Buildings : Blocked Floodway "A" & "B".



### 6.9.2 Break in Continuity of Urban Form

One of the main problems is the large width of most of the floodways, thus increasing cost of urban services and infrastructures such as pipelines, electricity and telephone wires, circulation areas etc. Visually this results in a break in the continuity of urban built form too. Channelization of the floodways which fall within the urban built form constitute a problem which requires resolution. But due to unique property of Coral Stone which forms the bed of the floodways in many areas, digging of floodways for increasing their depth to augment their carrying capacity is going to be uneconomical.

### 6.9.3 Anchorage and Filtering of Rain Water Entering to "Berkehs"

Anchorage and harbour activity was taking place previously in the floodway "U", but due to carelessness the level of this floodway has come higher than sea level and sea water does not come to the floodway. Thus ships can not anchor in this place and the natural anchorage place is lost. Now, the flood waters enter the "Berkehs" without getting adequately filtered; the flowing water thus carries with it silt and sand in to the tanks; thereby continuously reducing their capacity and rendering the water unhygienic (Fig. 6.8).

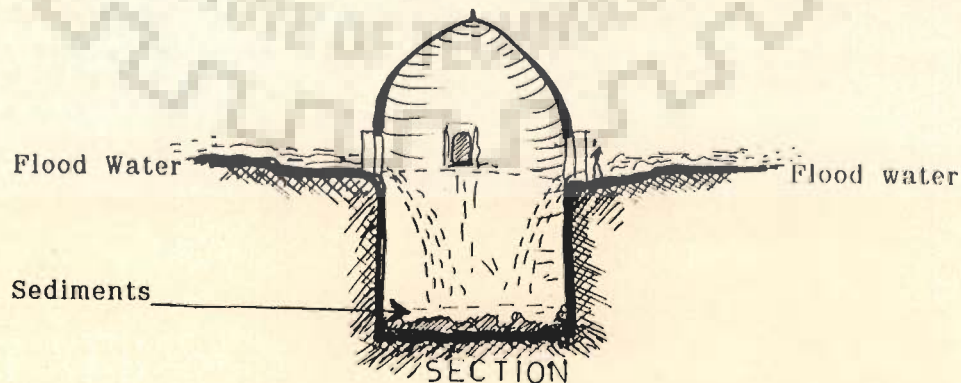


Fig. 6.8 : Water Storage Tank (Berkeh)

## 6.10 PROBLEMS REGARDING LAND OWNERSHIP

Whenever the proposed roads have to pass through any land other than municipal land, or property, problem of the property ownership are bound to arise.

Municipality has to pay for the private property for changing of their landuse according to the proposed plan and this results in increase in cost of implementation. Usually municipalities do not have enough funds; thus plans do not get implemented. Sometimes there are some unauthorized buildings where a new road has been proposed. Although, municipality has the legal sanction to demolish these structures but taking an over view of the efforts and investment that has gone into creating a residence - an addition to the existing housing stock-- the authorities get refrained from pulling it down. However, unauthorized construction (Fig.6.8) on public land is a menace which needs to be curbed.

## 6.11 TRAFFIC AND TRANSPORTATION FACILITIES

These two settlements being ports they possess some transportation activities which are regional, national and international in character. These activities will increase day by day with growth and development of the harbours.

But, there are shortage of terminals, parking, stores for imported and export goods and technical services. There will be requirements of facilities like hotels, inns and restaurants too.

The two settlements are located on the way of Bandar Abbas, Bandar Bushehr. Province of Fars highway, the coastal highway and the regional



highway passes through these settlements. With the recent growth and road improvements between Bastak and these settlements, the volume of traffic has increased and is likely to increase further in future. The safety of their inhabitants from heavy vehicular traffic and fast moving regional traffic have become a problem. The recent development of long straight avenues encourages through traffic and has in its wake destroyed much of the intimate built forms of the old and traditional areas. Due to narrowness of the streets, in most of the places, there is problem of accessibility for vehicles, which may be necessary for services like fire fighting, ambulances, water supply (water that is brought by tankers) and similar urgent services. The settlements are lacking in proper circulation system and connections of inner city network with the regional highways. There are various problems of implementing the proposed main road system in the already proposed master plans, which have been shown in Fig. 6.1 and 6.9.

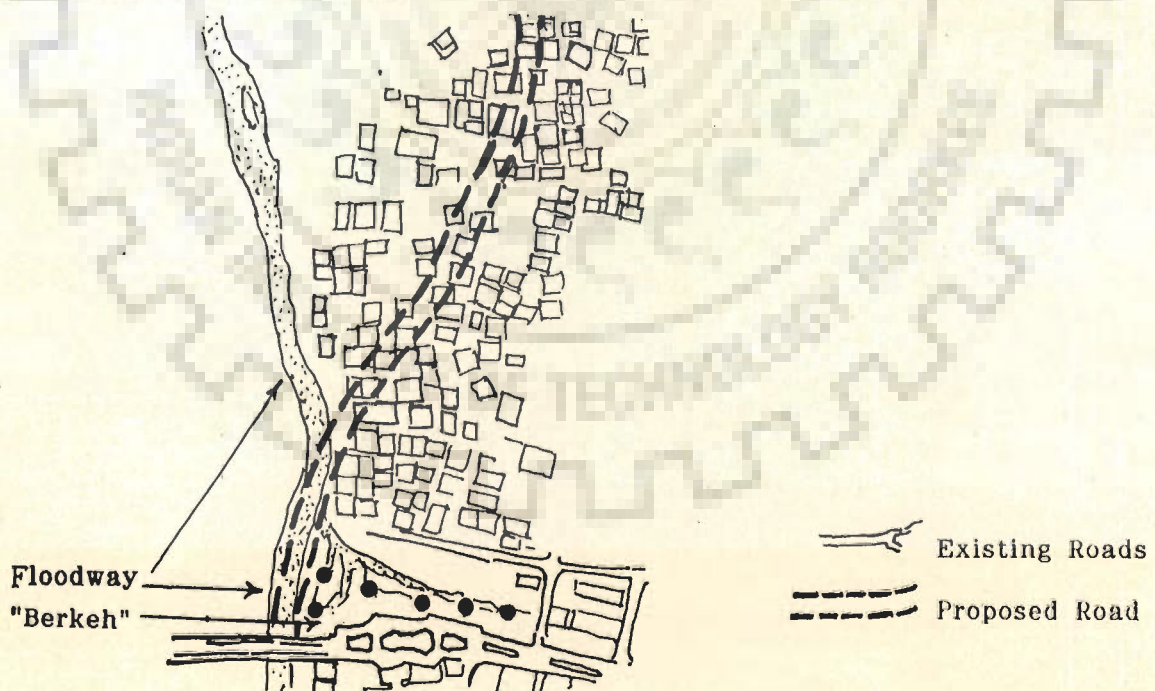


Fig. 6.9 : Proposed Roads in the Master Plan of 1983-84 shown passing through Private properties and Newly built Structures (Thus not feasible)

### 6.11.1 Water Transportation Facilities

Although Port of Kong has a bigger capacity for anchorage with bigger break waters, and better situation, but there is problem of having proper jetty. Old retaining wall along the coast which is partly destroyed and thus loading and unloading of ships faces problem with respect to local activities of fishing and shipping etc. Kong can serve more volume of traffic, Bandar Lengeh has problem of quick loading and unloading of ships. Ships have to wait for days and weeks together. This is uneconomical. There is wastage of time and perishable goods get effected adversely. Jetty of B. Lengeh Port can not answer future export and import of goods. Although the two ports are having most important fishing spots, but there is shortage of facilities regarding these activities i.e. jetty for receiving fish from fishermen and their transport infrastructure are inadequate.

Bandar Lengeh is one of the seventh important harbours of the persian Gulf (Iran) and the second important port of the province of Hormozgan. It is the closest to Shargh Ras-ol-Khimeh, Daubi, Abudabi. Transportation of goods and passengers takes place by sea from and to this port, but there has been no provision for commercial and future growth of the jetty facilities.

### 6.12 NEGLECTED AREAS

Periphery of the settlements are growing in a haphazard manner without any definite plan of street system. The street pattern of these places naturally does not efficiently serve the need of the modern traffic. While the area under circulation system has considerably increased and is tending to become uneconomical, its utility is not commensurate with its added expanse and area. Paving the road surfaces will be too costly - providing services



such as water supply, drainage and rain water control are perennial problems of these fringe development (Fig. 6.10 , 6.11 and 6.12)



Fig. 6.10 : Haphazard growth in the North West of Bandar Kong



Fig. 6.11 : Haphazard growth at the periphery of the settlements

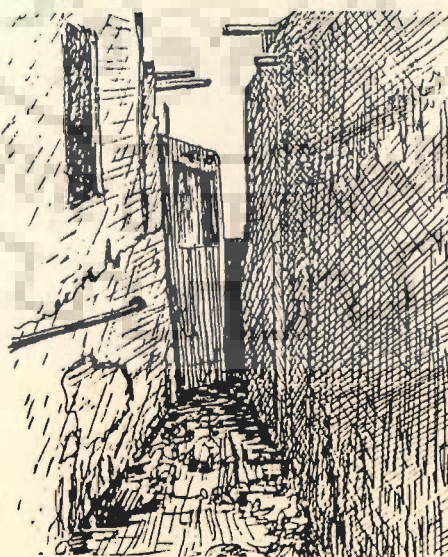


Fig. 6.12 : Garbage collected in the small gap inbetween building blocks in many parts of these settlements

## 6.13 DEVELOPMENT AUTHORITY

### 6.13.1 Financial Aspects

Enormous efforts and resources are spent in many developing countries to prepare urban planning projects. However, when it comes to their implementation, these plans get stuck and rarely, if ever, get translated in their entirety. Lack of financial viability of most urban planning projects is the over-whelming cause of their failure. When the plans are over ambitious and removed away from the realities of financial constraints and obligations, they tend to be capital intensive; and even if executed would be difficult to operate and maintain in the long run. As it is, the local bodies including municipalities of Bandar Lengeh and Bandar Kong which are the development authorities responsible for implementation of urban planning projects, are unable to cope with their routine obligations from their meagre financial resources. They have to often solicit financial support from the Central Govt. in the form of grants and long term soft loans, which are rarely, if ever, repaid.

The financial status of these municipalities is given in Table 6.1 and Fig. 6.13. Therefore, it is necessary to take the financial aspects into consideration for an effective urban planning project. Proposals should incorporate within the plan, measures to boost and expand the pecuniary strength of the local bodies, possibly by rationalizing tax structure and tax collection and more so through commercial ventures and cashing on tourist industry. In other words, special planning proposal should be supported by financial planning showing clearly as to how the two dovetail into each other at various stages of the plan implementation; and at later date in terms of operation and maintenance of the effectuated planning proposals.<sup>4</sup>



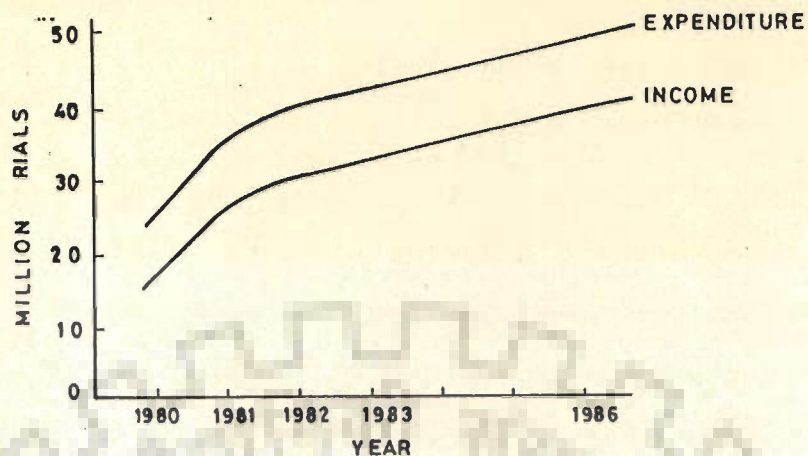


Fig. 6.13 : Comparison of Expenditure and Income of Municipality of Bandar Lengeh

Table 6.1 Financial Status of Municipalities<sup>5</sup>

Year	Bandar Kong		Bandar Lengeh		
	Tax	Govt. Others	Tax	Govt.	Others
1980	33.1%	65% 1.9%	20%	77%	2.6%
1981	48.0	47% 5.0%	36%	44%	19.8%
1982	3.0%	67% 3.0%	24%	61%	12.8%

The Master Plan proposed for Bandar Lengeh in 1964 and bandar Kong in 1983 did not include such financing layout plan as envisaged in the foregoing paragraph. Thus, whatever small part of the plan was actually implemented in each case it was only through the irrational process of hit and miss

(Fig.6.14). The overall cost of Bandar Lengeh plan (1983) was Rials 51838248, while the budget of municipality was only 809,066,56 Rials and this was for all sorts of expenditure which the municipality is required to incur and fulfill its innumerable routine responsibilities.



Fig. 6.14 : Part of core area in Bandar Lengeh - About 40% of the area proposed to be green in the Master Plan Proposed in 1964, which is very difficult to obtain and maintain, specially because of the Arid nature of the area. Thus the plan could not be implemented.

### 6.13.2 Inadequate Legislative Support for Implementation

The Town Planning Legislation of Iran consists mainly of the urban Renewal act 1968. The municipal act presents in detail the general setup with regard to the duties and election of mayors and the organization of municipal councils and municipalities. It also provides regulation for new developments, slum clearance, developmental control, and a number of town



planning recommendations. The municipal bureau are required to frame building bye -laws and implement them. They must issue building permits, serve notices where required and appropriate or demolish property in accordance with the law and subject to the approval of the municipal council. After final sanction of the high planning council the approved plans are submitted to the ministry of interior which after getting send these to the appropriate municipal councils for local approval after which they are ready to be implemented by the technical bureaus of the municipalities. The technical bureaus are responsible for planning control, building permits and day-to-day technical problems of the town.<sup>6</sup>

The municipalities are legally bound to prepare implementation programme and supervise the execution of renewal and other urban plans (Master Plan). But municipalities of Bandar Lengeh and Bandar Kong are not able to do the needful, due to lack of experienced and qualified personnel in the field of urban planning. Although private firms that prepare the plans, are responsible to train a Team of 5 persons unfortunately, there are not enough employees who can be spared and sent for training. The number of technicians who could be trained was only one in the municipality of Bandar Lengeh and no one in municipality of Bandar Kong. Insufficient resources and lack of attention to the development of management capacity have made it difficult for the municipalities to perform even routine tasks, such as implementing of the by-laws. Management capacity often is totally inadequate for implementing the projects to achieve better living environment. Most of the plans proposed for different cities in the last three to four decades have just remained as paper plans.

The remedial measures have been dealt in chapter 7 and 8.

### 6.13.3 Problems Regarding Rules and Regulations

Problem regarding rule and regulation have not been considered while passing the plans of buildings by municipalities of Bandar Lengeh and Bandar Kong. The following regulations were proposed in 1965 at the time of first master plan. These were about the height of the inside of the room i.e. 3 meters, the ratio of window area to the covered area i.e. 1/6, length of "Sayehban" i.e. 80 cm., length of veranda i.e. 2.5 meters, height of "Badgir" i.e. 3 mts., the plinth level i.e. 70 cm., thickness of external wall to be minimum 35 cm., use of insulation material on roof top, minimum courtyard with minimum of 25 m of green area. High wall to stop dust and use of rubble stones available there, were not allowed. But building made during last 15 years have not considered such by-laws in their structures and municipality also has been careless in ensuring that the buildings get executed in accordance with the rules and regulations. Beside this, some of these bye-laws are not feasible and economical. Stoppage of rubble-stone, use of false ceiling and so on, can not be included in urban rules and regulations without proper building research.

### 6.14 URBAN DESIGN PROBLEMS (Lack of Proper Criteria)

The absence of any urban design structure, frame or rationale in these settlements can be felt by having a perceptible walk through their urban envelopes.

Except in traditional core areas, which exhibit some three dimensional conception, there is no sense of orientation or space organization in the area which have taken shape in the recent past. The street pattern is complicated, inherent and disorderly. As the period for the implementation of



the Master Plan is getting over and the urban design criteria remains undefined the built form in the Northern parts of these settlements are continuously aggravating. The major and minor floodways have mixed with the disturbed, distressed and dishevelled patterns and have created a great higgledy piggledy and complete disorder without any origin and destination. There is no point of reference, nor any space organization, as it exist the in the old core areas.

Only some short stretches of the streets appear orderly; more due to coincidence than by deliberate act of design. The vacant land between the building blocks constitutes nearly 30% of the meaningless and neglected spaces which invariably gather fresh and muck of the town and become eye sores.

The new development betrays an impression that the building blocks have been strewn here and there on a large piece of land without any order or organization. The buildings which have come up along the Bandar Kong and Bandar Lengeh road belong to different government departments, however, here too there is no unity or cohesiveness, in their composition, colour, texture or form. The emerging form and the streetscape is a disjointed and incoherent aggregation of several building blocks. Among these buildings there are unfinished building with botching of all types of materials, just with the aim of putting a piece of land under construction to fulfill the regulation of allotment of land by Urban Land Organization.

This chaos has occurred primarily because no clear cut norms and urban design criteria have been specified in the building bye laws to regulate

these developments to ensure that a proper urban envelop would finally emerge.

These problems pertaining to transit, periphery and future expansion areas have been tackled in Chapter 8 through "Mahalleh" or neighbourhood design.

#### 6.14.1 Green Spaces and Entertainment Areas

Vegetation in these settlements is sparse and far between, essentially due to the poor soil condition and scarcity of water. The tragedy, however, is that whatever vegetation is available it is constantly mauled due to grazing by the stray cattle. There are no specific organized parks and playground either at the town or the neighbourhood level where children and adolescents can spend their leisure time in gainful play or passive recreation. Nor there are any social or cultural organizations or amenities where community members can develop their hidden talents in this direction.

#### 6.14.2 Buildings of Historic and Architectural Significance

No methods, rules or regulations, have yet been devised to save the buildings possessing historic or architectural importance from the onslaught of commercial development. At times, even the Master Plan provisions have ignored their existence and the roads have been aligned to run over them, thereby contemplating their demolition. There is dire need to save these important buildings, and at times their complete attendant environment for this is the heritage which must pass on to posterity.

#### 6.15 PROBLEMS OF OIL PATCHES AND OIL BURNING

Presence of oil in the region has created the problem of oil patches in the sea and smoke soot emitted from burning oil which in turn have multiple ill effects on environment and the flora and fauna of the region. Oil



patches created due to the leakage from the oil tankers seriously hamper the life of the sea birds and the micro organisms and other marine life because of the sun light getting blocked at the very surface of the water.

"The grounding of a German ship at the estuary of the ELBE in 1955 caused a release of 6 thousand tones of oil that killed thousands of sea birds. It has been calculate that until recent times tanker fleets have annually discharged while clearing the tanks, between one to two million tones of oil into the sea".<sup>7</sup>

The recent oil leakage in the Persian Gulf due to war, is creating similar hazards to the marine life and has also damaged the distillery plants. Burning of the oil from the wells creates a thick smoke, which gets combined with clouds and cause a hazardous black type of rain which not only harms the vegetative cover, but also creates problems for drinking water, rivers and lakes.



# CHAPTER 7



## CHAPTER - 7

### SYNTHESIS OF MAJOR PLANNING CRITERIA

#### 7.1 ABSTRACT :

In this chapter, synthesis of issues and challenges arising on account of the analysis of the already proposed land use plan have been discussed; and proposals for the major problems of land use and circulation network have been described.

A new commercial centre has been proposed, with a view, to reduce the load on the existing commercial centres, and load on the demands of the infrastructure of the city core. Investigative studies of the major circulation plan and transportation network, as already proposed for the settlements, have been undertaken with a purpose to revise the structural plan, and accomplish the most feasible alternative plan. The criteria for the proposed feasible alternative takes into account the requirements of the growth in accordance with the site conditions, accommodating the technical aspects of the layout, the natural landscape and green spaces and conserving natural floodways, and avoiding the demolition of important historical artifacts. A concern for the conservation of the old core has been given significant importance while deciding density patterns and controls for the settlement subdivisions in order to preserve the traditional character of the architectural heritage. The redensification concept is worked on the basis of reducing higher densities where it is possible to juxtapose a revised circulation pattern in the existing "Mahallehs"; and maintaining densities at

the same level where enough open space is not available to permit a superimposition of a new network.

The Chapter also highlights the identification of the need for comprehensive planning, and issues related to policies in a hierarchical manner, which primarily focus on the growth pattern of important landuses, considering the development potential of the two ports,--the harbour and the marine activities. For this purpose, a significant emphasis is laid on evolving the planning norms and standards from the existing situations prevailing in Iran in general.

## 7.2 COMPREHENSIVE LANDUSE PLAN (CITY LEVEL - Fig7.1)

The already proposed Landuse plan has been discussed in Chapter 4 and its problem highlighted in Chapter 6 to achieve a comprehensive Landuse Plan, in this chapter the discussion will centre on the criteria adopted for formulation of the comprehensive landuse plan and solution to the problems will be described and demonstrated. To eradicate incompatible land uses all the wholesale commercial areas shall be shifted from residential areas to the wholesale market and the big workshops also shall be shifted to the industrial areas. The Truck terminal near Jetty site and the Bus terminal in the Dastgheib street is also proposed to be housed adjacent to the industrial zone. The seashores which are not yet occupied are proposed to be used for city greens and public Leisure sites. Specially the site near the city centre and near the old jetty of Bandar Lengeh. A new centre which will fulfill the growing commercial demand for space in the two settlements is proposed to be located in between them at an almost equal distance. This Centre will form a new hub of commercial, social, cultural and recreational



activity. It will be much larger in scale and magnitude. In hierarchy of commercial complexes, this will be at the Apex. This proposition will resolve two crucial problems at one and the same time. Firstly, it will take the pressure off the existing cores of the two settlements. Thereby, automatically checking the Wanton destruction of properties in the core which constitute cultural and architectural heritage. Secondly it will permit the erection of a modern commercial centre commensurate with the aspirations and devices of these two communities without undue constraints of space and required infrastructure. The centre will be easily accessible to the inhabitants of the two communities as shown in Fig. 7.2.

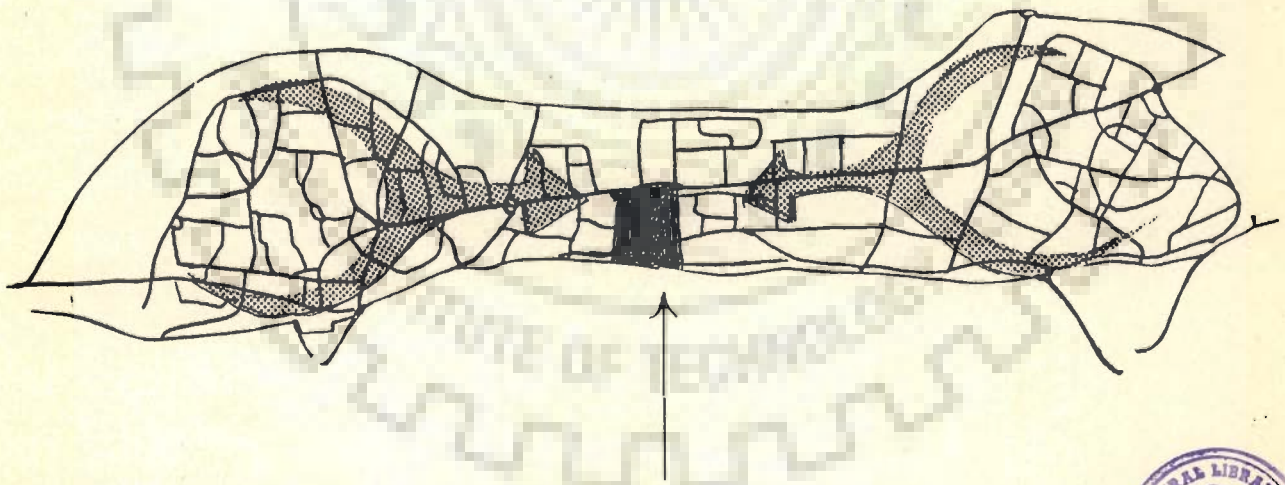


Fig.7.2 : The New Town Center

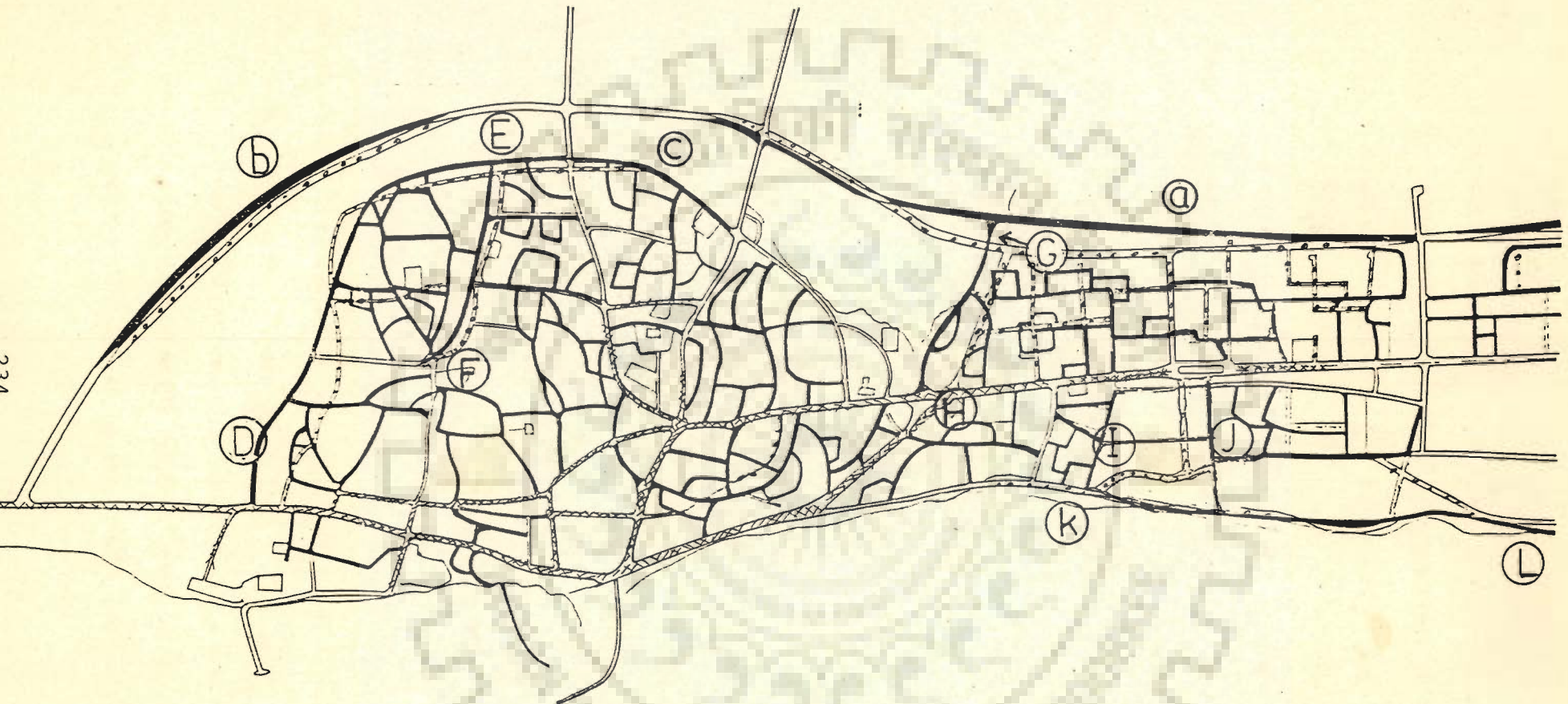


### 7.3 FEASIBLE CITY CIRCULATION AND NETWORK IN TOWN STRUCTURE

The circulation plans and transportation networks at city level for both the settlements and the problems which they are facing, were discussed in the

previous Chapter 6. Therefore the changes which were required to make the proposed Master Plan feasible regarding their implementation have been discussed below, and the altered plans are shown in Fig.7. 3 and 7.4 . There are two important changes in the already proposed bypass of Lengeh. One is due to the growth of the town on the proposed site and the second pertain to the curvature of the road with respect to the speed of the vehicles. Both these modifications as incorporated are shown at points "a" and "b" in Fig. 7.3. . The main collector and distributor of traffic at city level was shown passing through many valuable structures and floodways. In the proposition by the author necessary corrections have been effected. For example the position of floodway "A" has been changed to make it feasible (Fig.7.3 point C to D). Street from "E" to "F" and "G" to "H" and "I" to "J" as shown in Fig. 7.3 & 7.4 have the same problem, i.e. either they were passing through valuable structures or good green or orchard areas. The stretch of "K" to "L" was cutting the easy movement of pedestrian from green space to the sea-side therefore, the road was shifted up (towards North) and a walkway was proposed over there (Fig.7.3). In Bandar Kong "MN" stretch also was cutting the relation of the Shilat installation with water this part also has been shifted upward (Fig.7.3 & 7.4). The part PQ of bypass was shifted up because the place where industrial area was already proposed is very green and it is not advisable to destroy such valuable place. "ST" road can not be practically implemented because there is not enough space to make this road specially at the water's edge. Therefore, it can be an access road only. The edge of the built form along the water required to be conserved and also it is not a good idea to cut the relation of pedestrian with water by a marine drive. "MN" Part of the same road is also passing through valuable historical site of Portuguese fort and also the other part of it is coming exactly on water and





Feasible Proposed Circulation-Bandar Lengeh

LEGEND





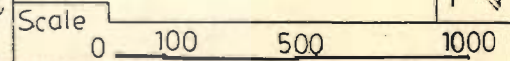
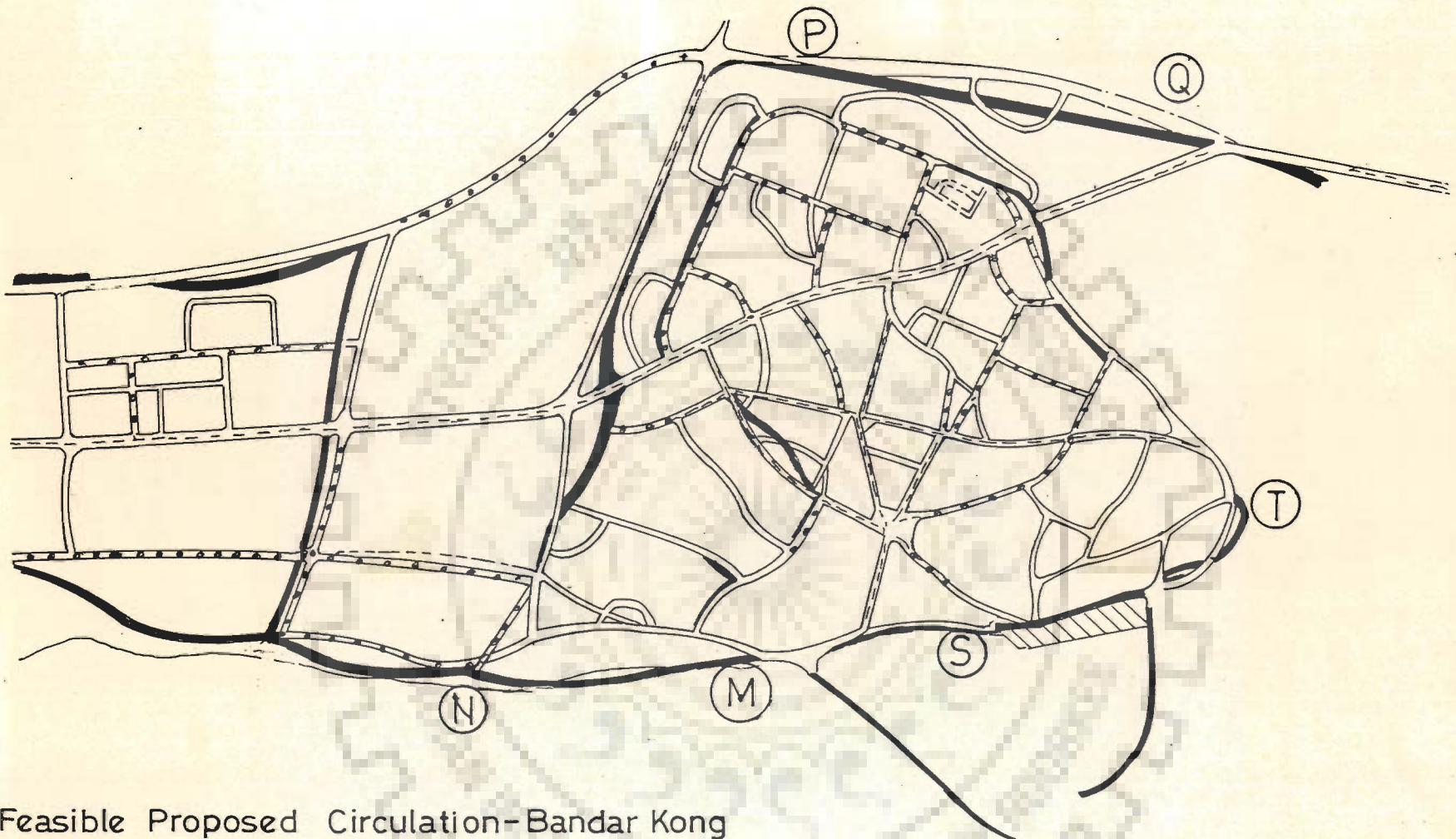
-  Already Proposed Circulation Network Facing Various Problems
-  Proposed Feasible City Circulation Network (By the Author)
-  Already Proposed Circulation Network (Feasible)
-  Existing



Fig.7.3 :Circulation Plan





Feasible Proposed Circulation-Bandar Kong

LEGEND





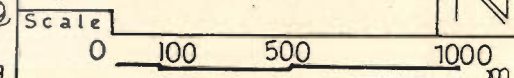
-  Already Proposed Circulation Network Facing Various Problems
-  Proposed Feasible City Circulation Network (By the Author)
-  Existing
-  Already Proposed Circulation Network (Feasible)



Fig. 7.4: Circulation Plan





thus, is not viable economically. The other parts of the road modified are due to almost same reasons<sup>1</sup>(Fig.7.3 & 7.4).

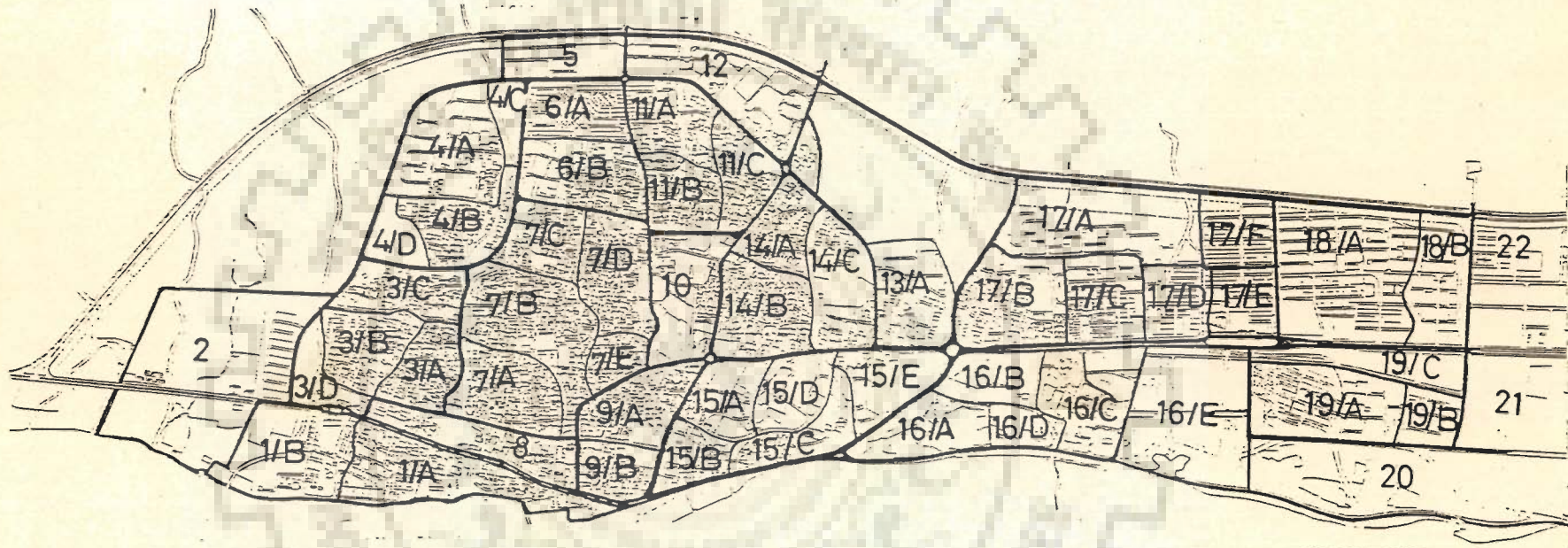
#### 7.4 DENSITY CONTROL AND SETTLEMENT SUBDIVISION (FOR BETTER ACCESSIBILITY)

With regard to the studies made in Chapter 3 and the problems identified in Chapter 6 and keeping in view the densities recommended in the earlier Master Plans, a new pattern of densities is proposed for different "Mahallehs". The guiding principle in deciding these has been the kind of built form that is finally desired and the infrastructure that is feasible to be created to support that form.



The conservation of the old core has been given due importance, while proposing those densities; so that not to over load them and indirectly destroy their traditional character. Visual link with the sea waters is another important factor which has affected the choice of these densities.

The edges which are formed due to proposed circulation network, define the boundaries of the new areas<sup>2</sup> (Fig.7.5 & 7.6) for allocating new densities (Table 7.1). The clear demarcation of physical boundaries besides providing an order and identity in the built form, would also enable the municipalities to control the proposed densities (Fig.7.7 & 7.8) within a well defined area.

However, the old "Mahallehs" of Lair, Saber, Khori, in Bandar Length and "Mahallehs" Pain and Spayed Nadine in Kong can not accommodate higher densities than those prevailing at present, specially, if the architecture and design qualities of these areas are to be conserved. But in other "Mahallehs" where there is enough vacant land higher densities than those



Proposed Town Structure Subdivision - B' Lengh (By the Author)

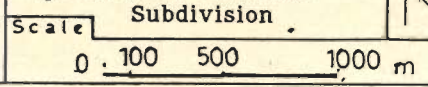
 "Nahieh" (Sector)  
 "Mahalleh" (Neighbourhood)

**Note:**

Numbered areas "Nahieh" (Sector - 3500 to 5000 persons)  
 Alphabetic Identified areas "Mahalleh" (1000 to 1500 persons)

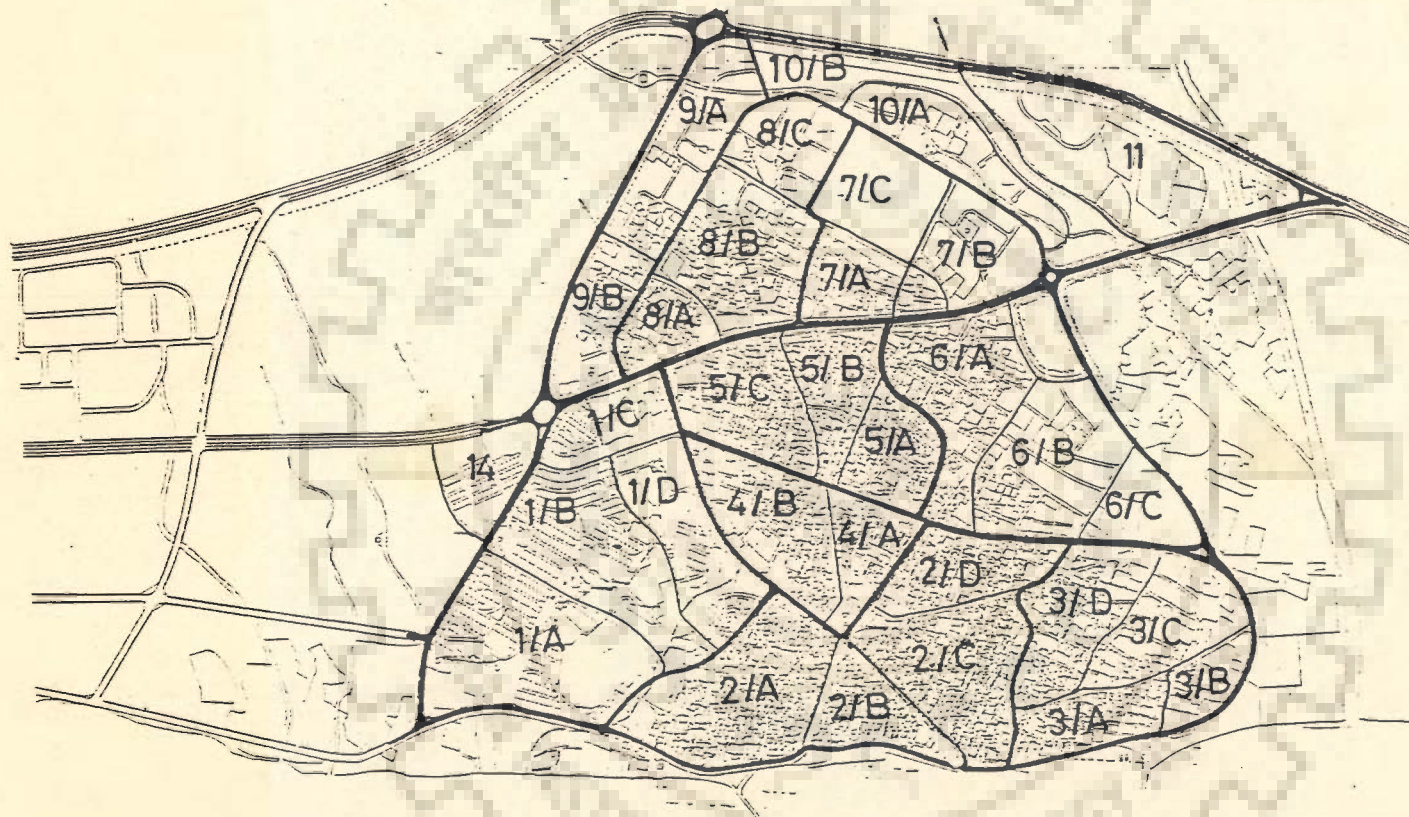


Fig.7.5: Town Structure Subdivision

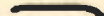



Bandar Lengh



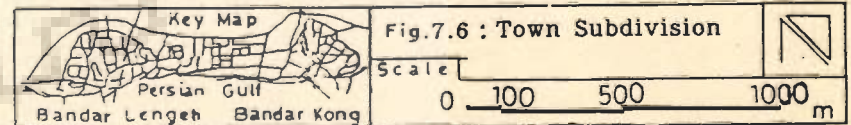


Town Subdivision of B' Kong - Proposed (By the Author)

 "Nahieh" (Sector)  
 "Mahalleh" (Neighbourhood)

**Note:** Numbered areas "Nahieh" (Sector - 3500 to 5000 persons)  
 Alphabetic Identified areas "Mahalleh" (1000 to 1500 persons)

Bandar Kong



obtaining now have been proposed. The main reason for maintaining the existing densities in some of the existing areas are listed here under :

1. Shortage of Vacant Land - Due to shortage of vacant land in some places like core areas it is difficult to provide additional community facilities and thus any additional population, (i.e. higher densities). These community facilities imply facilities for education, health, recreation and retail shopping etc.
2. Traffic and Circulation Network - Higher densities in the core areas will naturally invite larger numbers, which in turn will generate problems of increased traffic that the existing streets are incapable to cope with. Demolition to accommodate added traffic is neither wise nor desirable; both from the point of view of conservation and economic inability.
3. Built Form Character - The character of traditional built form in old core is the outcome of many factors such as unique climate of the Arid Coastal Region and the socio-psychological needs of the inhabitants. Increase in density of the area would tantamount to changing the basic character of such a valid built form. Any additional space in the already existing residential buildings in terms of added stories or covering courtyards to accommodate new numbers would inevitably shake, or at times, completely destroy the physical configuration of the area, and thus, the social fabric which has been inherited from centuries old traditions.
4. Urban Services - Increased numbers in the old core would naturally put additional burden on the already strained services. Replacing water



supply lines, telephone and overhead electricity lines, if not impossible, would certainly be cost intensive, which the municipalities are ill-equipped to support.

Table 7.1 (a)

Proposed Densities - Bandar Lengeh  
P/Hectare

"Nahieh" (Sector)	"Mahalleh" (Neighbour- hood)	Density	
		Existing	Proposed
1	A	30	65
	B	-	-
2	-	-	-
3	A	100	100
	B	60	80
	C	50	75
4	A	10	90
	B	35	50
	C	-	-
	D	-	-
5	-	-	90
6	A	-	100
	B	35	65
7	A	90	110
	B	70	85
	C	35	65
	D	35	60
	E	35	60

Cont...

Proposed Densities - Bandar Lengeh

"Nahieh" (Sector)	"Mahalleh" (Neighbour- hood)	Density	
		Existing	Proposed
8	-	25	75
9	A	50	70
	B	30	35
10	-	-	-
11	A	20	80
	B	40	50
	C	35	50
12	-	-	-
13	A	25	55
	B	-	-
14	A	80	90
	B	120	130
	C	25	60
15	A	15	45
	B	30	65
	C	30	60
	D	-	30
	E	-	-
16	A	10	40
	B	5	35
	C	10	90
	D	-	-
17	A	-	145
	B	45	70

Cont....



"Nahieh" (Sector)	"Mahalleh" (Neighbour- hood)	Density	
		Existing	Proposed
17	C	45	140
	D	60	120
	E	30	120
	F	20	95
18	A	15	70
	B	-	45
19	A	15	120
	B	-	85
	C	-	-

Table 7.1 (b)

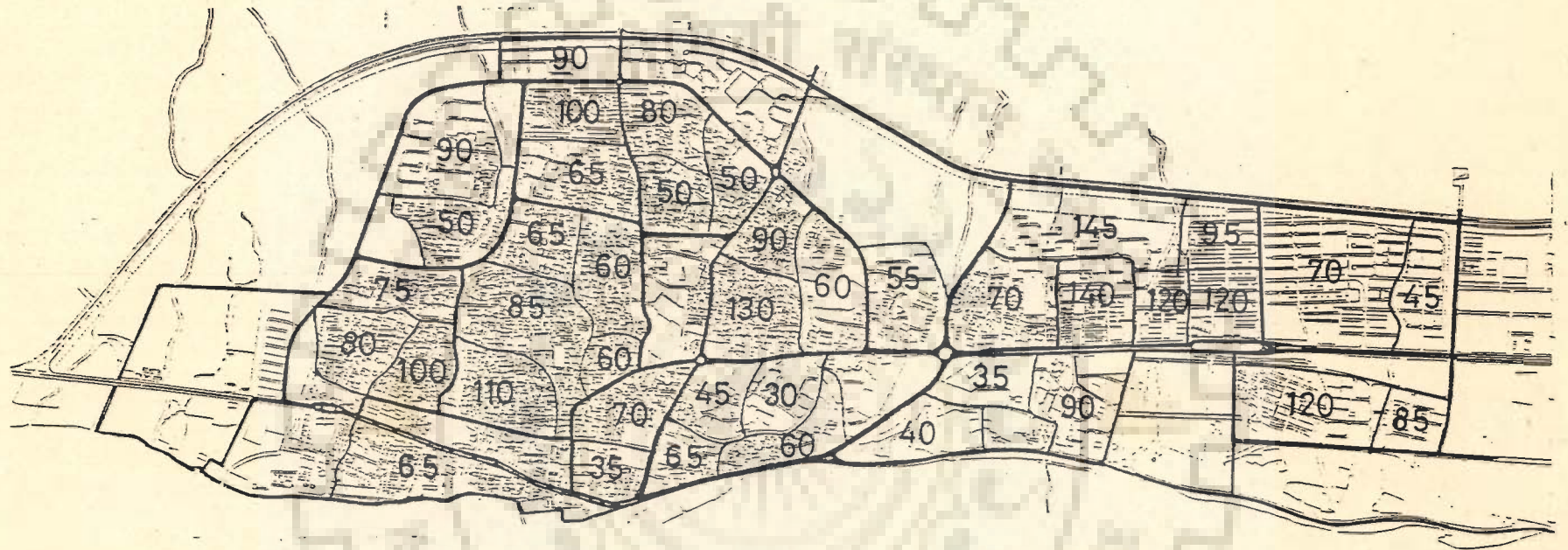
Proposed Densities - Bander Kong

"Nahieh" (Sector)	"Mahalleh" (N,Hood)	Density	
		Existing	Proposed
1	A	-	60
	B	-	50
	C	-	50
	D	10	40
2	A	120	130
	B	100	100
	C	70	70
	D	60	60
3	A	60	60
	B	-	20

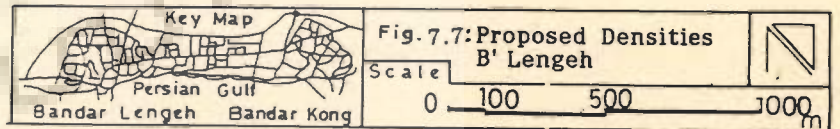
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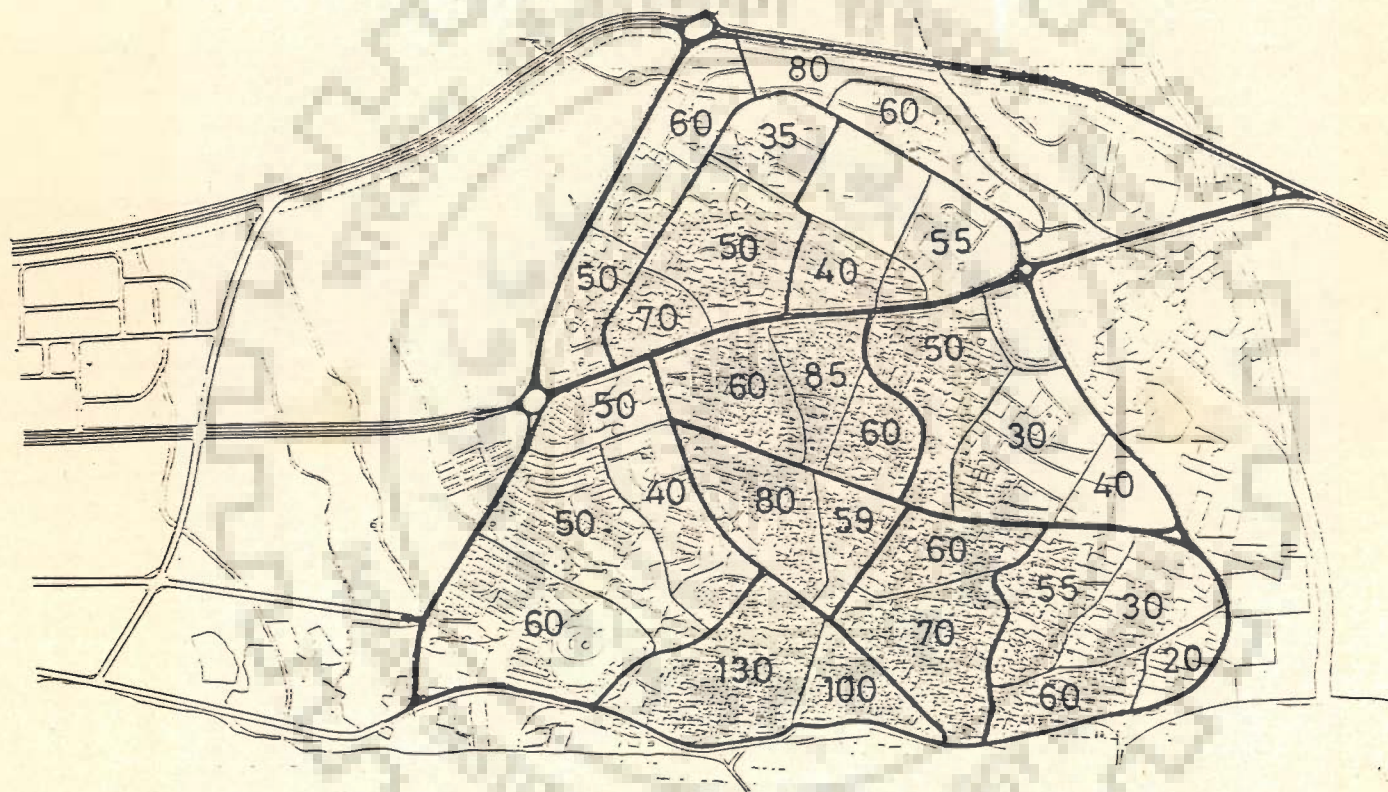
"Nahieh" (Sector)	"Mahalleh" (Neighbour- hood)	Density	
		Existing	Proposed
3	C	15	30
	D	50	55
4	A	55	59
	B	60	80
5	A	60	60
	B	85	85
	C	60	60
6	A	40	50
	B	10	30
	C	-	40
	D	-	-
7	A	30	40
	B	-	55
8	A	60	70
	B	35	50
	C	-	35
9	A	-	60
	B	20	50
10	A	-	60
	B	-	80
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	40





(By the Author)  
Persons/ Hectare

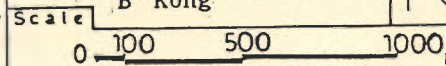




(By the Author).  
Persons/Hectare



Fig.7.8: Proposed Densities  
B' Kong





## 7.5 PLANNING CRITERIA

### 7.5.1 Norms and Standards

The norms and standards prepared for these settlements are the outcome of the studies and analysis made on the norms and criteria which are used in various cities of Arid Regions in Iran and the existing condition of the settlements in this Arid Coastal Zone. Table 7.2 shows the proposed norms based on the criteria of minimum number of users, maximum radius in which a unit can function, ability of children and old people and other inhabitants of the settlements to reach the facility.

In general, the norms for land use are also based on the understanding of the shortcoming, in their present use pattern, the future requirements of these settlements and the standards followed by various organizations such as Ministry of Education, Ministry of Health and Hygiene etc. and of course the recommendations contained in the Master Plan have also been given due consideration in finalizing these norms.

### 7.5.2 Educational Facilities

As the studies indicate there is shortage of educational facilities in the two settlements. Therefore, according to the norms of Ministry of Education, the usual practice in Iran and the proposals of Master Plan of having one school for 2000 students, there should be about 21 unit of primary school - single stream with an area of about 2000 sqm each, to work within a maximum radius of 350 m. But in case of the old core area the radius may be changed in case there is no place to provide such accommodations.

TABLE .7.2  
PROPOSED NORMS

Facilities		Min. No. of Users (Person)	Max. Radius of Function- ing m	Area per User m <sup>2</sup>	Area per Head of Total Population m <sup>2</sup>	Note
Nursery School	A	1000	300	10	0.6-1.00	There was a nursery School in 1986.
	B	20376	-	-	-	* For a population of 42000 nursery school and school areas were considered together which can be separated later. (proposed)
	C	2361	350	-	-	
Primary School	A	2000	800	6.75	0.9-1.80	* There were 7 schools, out of which 2 were working 2 times(morning and afternoon shift)
	B	2910	500	10	1.3	
	C	1920	350	6.13	0.85	* 21 schools have been proposed i.e. 21/42000 persons.
Inter- mediate School	A	3500	1000	6.75	0.9-1.80	* There are 4 units of such schools (grade 6,7 & 8)
	B	5094	-	24.5	0.96	Another 5 units have been proposed i.e.
	C	3102	400	9	1.08	3 units/42000 persons
High School	A	5000	1000	12.0	0.7-1.00	
	B	5094	2000	35.4	1.18	
	C	3102	800	9	1.07	

A : Usual Norms Used  
B : Existing Condition  
C : Proposed

Cont....



TABLE .7. 2  
PROPOSED NORMS (Continued)

Facilities	Min. No. of Users (Person)	Max. Radius of Functioning m	Area per User m <sup>2</sup>	Area per Head of Total Population m <sup>2</sup>	Note
Technical School	A 1000	-	-	1.0-1.8	* There was one unit in 1986 * 3 more unit were proposed for 2001 which become 4 units area per user (B) is because of the Tech. school built which has not been occupied yet.
	B 2037	-	44	0.24	
	C 10084	-	60	0.93	
Health Care	-	-	-	2.40	All the health care units have been shown in the detail land use plan.
	10188	-	-	1.44	
	8067	-	-	1.7	
Retail shop	-	-	-	1.3	One unit/22.5 household were taken as the practical norm according to the calculation and analysis made (30 sq.m. each)
	-	-	-	-	
	-	500	-	0.26	

A : usual Norms Used  
B : Existing Condition  
C : Proposed

Cont....

**Table 7.2**  
**Proposed Norms (Continued)**

Facilities		Min. No. of Users (Person)	Max. Radius of Function- ing m	Area per User m <sup>2</sup>	Area per Head of Total Population m <sup>2</sup>	Note
Social & cultural centre	A	1000	-	-	0.85	There is no cinema hall at present and there is only one library at city level. These facilities have been proposed along with other cultural facilities in the town.
	B	-	-	-	-	
	C	-	-	-	-	
Sport	A	5000	-	-	4	With respect to the interest of people towards sport, various centres have been proposed based on international standards
	B	-	-	-	3.78	
	C	-	-	-	4	
Park	A	2000 to 2500	-	-	8.00	
	B	-	-	-	0.68	
	C	-	-	-	7	
Cemetery	A	-	-	-	1.00	
	B	-	-	-	-	
	C	-	-	-	4	

A : Usual Norms Used

B : Existing Condition

C : Proposed Norms

Source of usual norms used (A) : Report prepared by Dr. Saidnia, Planning Deptt., University of Tehran.

(B) and (C) by the author.



About 33,607 sqm area is considered for primary school in the master plan, which means 1680 sqm/primary school and the extra space proposed can be used as nursery school if required in Bandar Lengeh. Similarly, 9 primary schools have been proposed in various "Mahallehs" of Bandar Kong i.e. including the existing ones.

The number of students of intermediate school (age of 12 years) will be 4838 in 2001 according to the author studies. This means there will be need of 151 classes with a capacity of 32 person each; all of these are provided in various parts of the towns within a radius of 500 m in different "Mahallehs". The high school students would number about 4800 by 2001, for which 9 units within a radius of 800 m have been proposed. The area for intermediate schools can be 2 to 3 thousand sqm and for high school an area of 4000 sqm would suffice. Similarly for 1628 students of Bandar Kong, 46 class rooms will be required by 2001 which have been proposed to be accommodated in 5 units with 14652 sqm of area. The total areas of high schools of Bandar Lengeh is 43200 sqm.

### 7.5.3 Health Care Facilities

With respect to the need of health care centres 5 units in suitable places (See the proposed Landuse Plan) of the towns have been proposed which cover an area of 17500 sqm and help to fulfill the requirement of Bandar Lengeh, Bandar Kong and the influence zone, according to the norms provided by Ministry of Health and Hygiene. Beside this a big site for a hospital between the two settlements has been proposed to fulfill the present and projected requirements up to year 2001.

#### 7.5.4 Sport Facilities

With respect to the interest of the inhabitant of these settlements various sport stadium have been proposed in these settlements. The area of each one can accommodate a Football and other sport grounds plus place for administrative and other required functions the international norms have been adopted for planning of the playgrounds.

#### 7.5.5 Retail Shops

There was no norm as such for shopping facilities of the neighbourhood in the settlements and municipalities were interested to build retail shops in various "Mahallehs" and they required a proper norm for this purpose.

The important aspects for provision of the norm were first, that, whether the commercial area proposed can economically be supported by the inhabitants. This means that will a proposed commercial unit have enough customer or not? And whether these customers would expend enough money to make it economically viable. Therefore two elements will play an important role here, one is the people's income and the other is the amount of purchases they actually effect.

A centre at "Mahalleh" level is supposed to cater for the day to day needs of the inhabitants. Thus there is need to have shops selling vegetables, meat, confectionary etc.; of course these should be within a walking distance too. According to the Census (1982) a household spent the following amount for their daily shopping.

Iranian Rials	7828 for Grocery
	4230 for Bakery
	10197 for Butcher's Shop
<hr/>	
Rials 22,255	Total



If we accept the Rials 100,000 as the income of a shopkeeper which should be earned from 20% profit out of the daily sale, we can conclude that a shopkeeper should sell about Rials 500,000 so that he gets Rials 100,000 per month. Therefore, every 22.5 households can practically support one unit of grocery. This will form a valid norm for the minimum required no. of shops in a "Mahalleh", of course, repairing shops such as Elec. Water Supply and other repairing shops can come in the centre of a "Mahalleh". Various percentages of retail shops and other landuses are shown in Fig.7.9.

#### 7.5.6 Future Traffic

According to the survey done in 1987 regarding vehicles ownership, it has been found that motor cycle is the main mode of travel and then comes private cars (usually van type). Table 7.3 shows a typical sample survey done in the "Mahallehs".

Table 7.3

#### Mode of transport to work and vehicles Ownership

	Mode of travel to work place			Vehicle ownership			
	"Mahalleh" House holds	Public vehicles	Motor Cycle	Car	Pedestrian	Motor Cycle	Car
1	59	2	41	6	10	44	6
2	191	4	182	17	10	185	12
3	55	-	46	6	15	59	9
4	309	12	252	20	25	272	25
5	93	1	57	8	42	74	15
6	39	-	32	2	14	42	3
Total	746	19	610	59	126	676	70

Source : Municipality of Bandar Lengeh, 1987

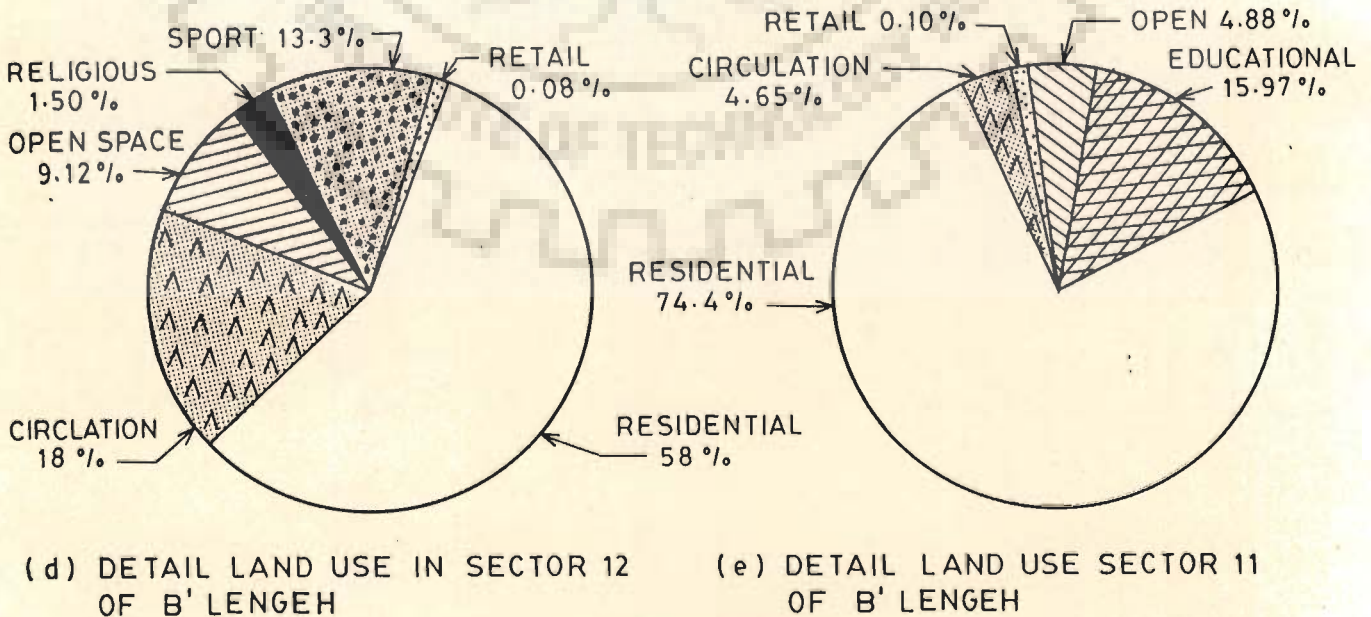
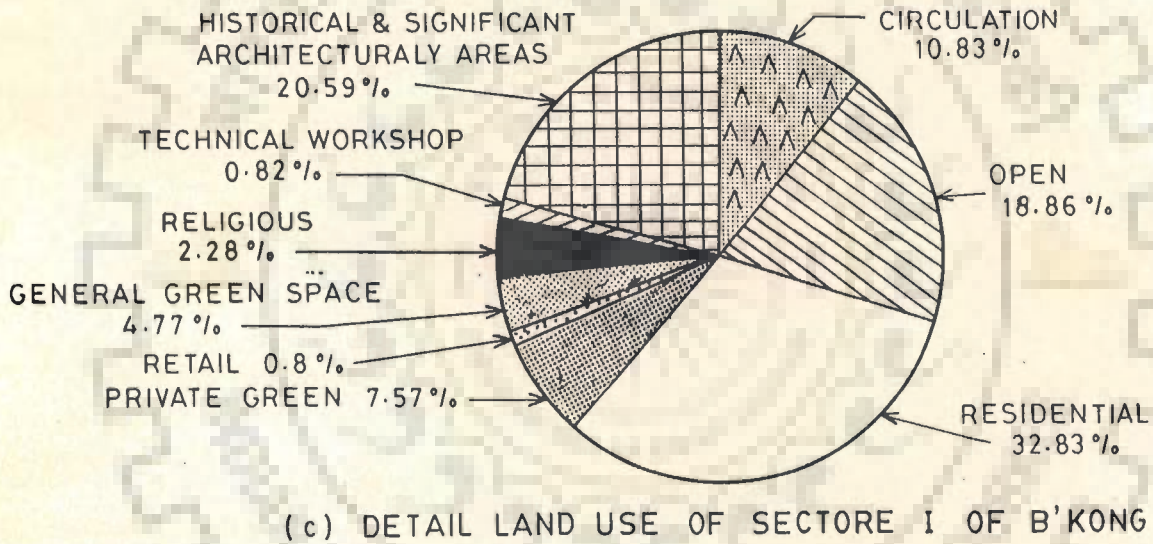
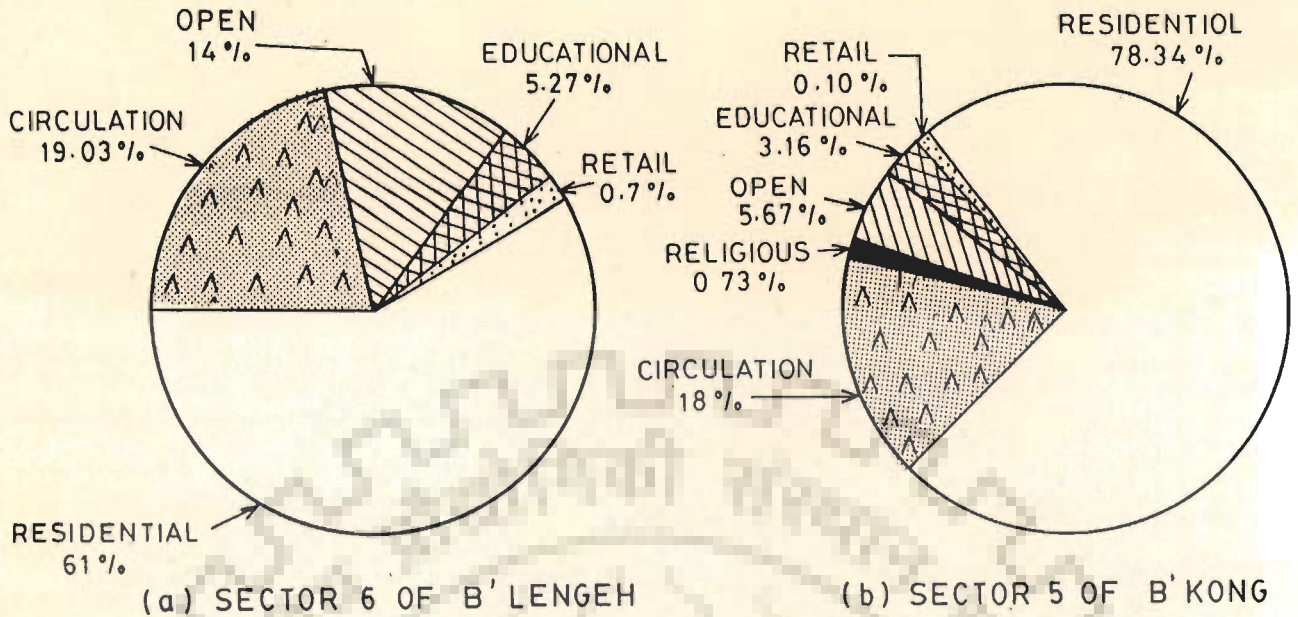


Fig. 7.9 : Detail Land use Quantity



In other words, every 10 households have one car and every three households have two motorcycles. Vehicle ownership of the country was one vehicle per 26.82 person. The above analysis indicates that pedestrian and motorcycle movement is playing more important role than the other vehicles. However, this is due to the short distances in the towns.

The growth rate of vehicles of these settlements are not available. Therefore, the growth rate of the country can be used, which shows an increase of 540 cars for the year 2001. There will be public vehicle services between Bandar Lengeh and Kong to serve the traffic and transportation between the two settlements. The number of motorcycles also can be found out according to growth rate between the years 1979 and 1982 for the year 2001. This reaches to 7300 units.

Beside the number of automobile which indicates the density of vehicular traffic in the towns, the number of journeys shows that with the proposed network they will not have problems of traffic.

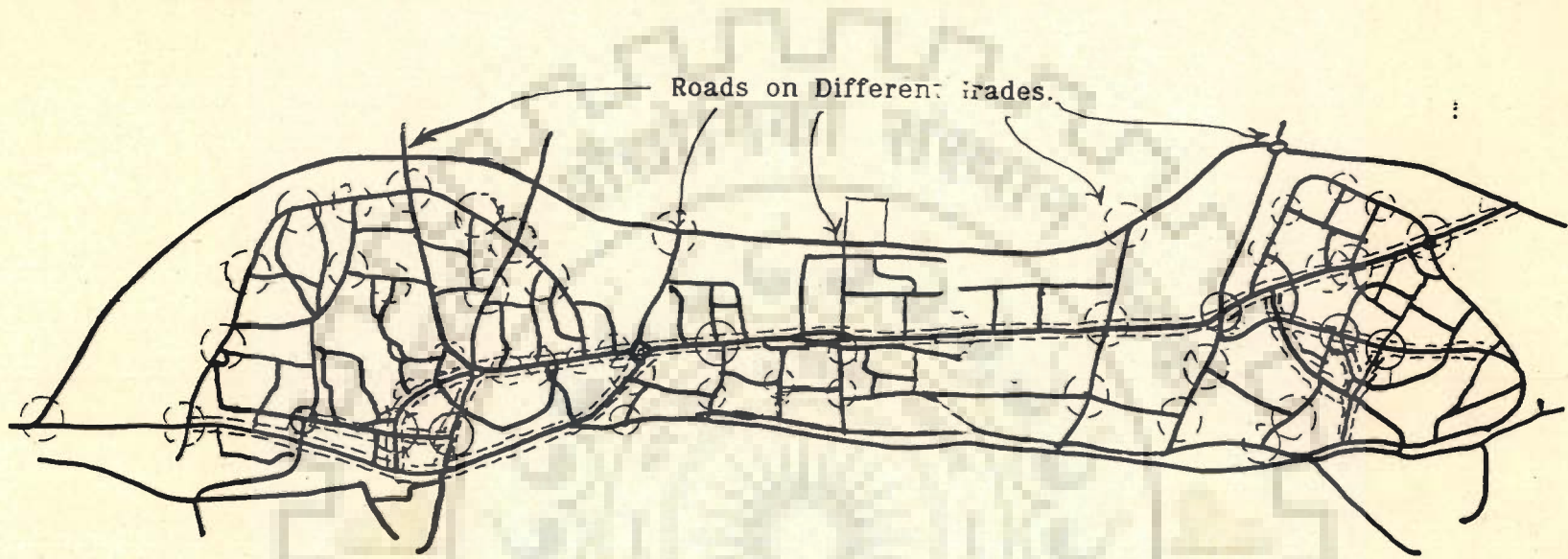
According to the survey done in 1987 (Table 7.3), by the Municipality of Bandar Lengeh, No. of journey/person is 0.625 and number of journeys/households is 3.4125 and number of daily journey according to the Census 1986 is 11152.5 and number of journey according to the Master Plan for 1994 is 13802.5. This shows the low intensity of traffic volume of the town. The traffic calculation indicates that the proposed network is more than adequate.

The outside journeys observed by the settlement are 1950 P.C.U./day at present. Forecasting this without proper criteria is not logical. But in case the volume increases by 10% per year. The observed journeys to the town will be 3799 vehicles in a day which enter to and exist from the settlements. Therefore, if four entrances are proposed for the town, this load will be distributed among them. Of course, the internal load will be added to them too. For instance, Motahhari street which passes through Roudbari and Amirabad "Mahallehs" and reaches to northern bye pass carries 25% load of outside journeys and 100% of the internal "Mahallehs" load of traffic. According to the proposed density, i.e., about 6269 person, will live in this "Mahalleh". They will therefore daily travel a total distance of 3918.12 Km. per day @ 0.625 Km per person. With the absorbed outside journeys of  $3799 \times \frac{1}{4} + 3918.12 = 4867.8$ , the amount of the load added to this road during daytime can be calculated. With respect to the peak hour volume of traffic, to the average traffic of one hour, the peak time traffic of this route will be 616. It indicates that, this route in Amirabad "Mahalleh" can work with 6 lanes out of which four can be active. The study of various important functions indicates that there is no traffic problem as such, and because the neighbouring streets can yet serve without any problem (because only 50% of capacity being utilized), therefore, these crossing will not create problems. But there shall be lighting signs for traffic control on main crossing such as; Emam and Enghelab crossing, Pasdaran and Fadaian, Shahr bani and Sabte ahual crossings. There shall be road marking and lighting specially at important crossings and roads of these settlements (Fig. 7.10)

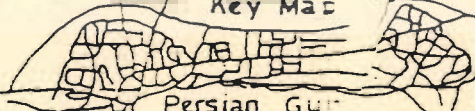

## 7.6 PLANNING ISSUES AND POLICIES

Because of the disposition of the adjacent harbours of Lengeh Kong, there is no doubt, that these settlements will develop considerably along the





- Crossings Requiring Immediate Traffic Lights.
- ≡ Roads Requiring Immediate traffic Signs and Marking.
- Crossings Requiring Phased Traffic Lights.
- Roads Requiring Phased Traffic Signs and Marking.

<p>Key Map</p>  <p>Persian Gulf</p> <p>Bandar Lengeh    Bandar Kong</p>	<p>Fig.7.10: Road Marking and lighting</p>	
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Persian Gulf. The important aspects which shall require proper attention and consideration for this appropriate growth and development are deliberated upon here under :

**Harbour Activities :** This is the most important activity in these settlements and as well as in the Arid Coastal Zone. The ports of Bandar Lengeh and Bandar Kong are two of the nine important ports of Iran along Persian Gulf. These command important strategic location which is along the base of the triangle of Bandar Abbas, Boushehr and Lar in the Fars province which are playing an important role in international export and import of materials and goods. As it has been mentioned before, these were the most functional ports during Zandieh and Gajarieh dynasties as it is now. The two ports were mostly involved in international import activities; and the development and improvement of these would mean incorporating them in international export activities too. Taking the economic growth policy of the country into consideration, that is trying to become a developed economy in the future, the growth and development of these ports assumes an added significance.

With the development of mining, agriculture and industry of the country the surplus of requirements of the country can be exported through these ports. These ports should keep in readiness to receive and absorb the impact of such expanded economic activities. Their physical form and configuration should have an inevitable condition to welcome such activities which in turn would also improve the economic status of these settlements. Various planning measures and policies required to give effect to these measures are detailed here under :



### 7.6.1 Growth Pattern of Port Activities

Proper growth pattern of port activities in harmony with residential as well as other commercial growth shall be given prime consideration in Arid Coastal Zone as the main economic backbone of these settlements.<sup>3</sup>

At present the most important activity of loading and unloading of ships in Kong is taking place improvisely on the Eastern break-water. Even this make shift arrangement is experiencing serious congestion. There is immediate need to have proper jetties. Bandar Lengeh in comparison has reasonably proper jetty for loading and unloading of ships but other facilities related to warehousing and transitory storage of goods needs to be augmented. In addition there is a need to have a separate jetty for fishermen in Bandar Lengeh as "Shilat" cooperation is active over there.

There are two alternatives for the growth of these activities with respect to the space available and accessibility to water ; one is the growth towards each other, the other alternative is to have the growth outwards. If these grow towards each other then not only, their growth would be limited but the situation is likely to create more congestion in the town as the residential growth is also occurring in the same direction. Therefore, it is advisable to have the growth of these activities outwards (i.e., Eastwards for Kong and westwards for Lengeh ) which would not, only, provide enough space for future but also release the future congestion and give chance to these settlements to have some more recreational and open spaces (Fig.7.11).

### 7.6.2 Fishery

The unique location of these settlements along the shore line next to the Persian Gulf provide them with a potential to tap marine wealth. With the

Governments keenness to develop fishing and fishery industry<sup>4</sup>, Kong and Lengeh are well poised to undertake the development of this important export oriented economic activity in a big way. Therefore, it can reasonably, be expected that the current fishing spots near the villages of Shenah, Gasheh and Bostanah will be further developed, specially with the added marketing support from Kong and Lengeh thereby, giving fillip to the regional economy as well.

However, to absorb and cater for this expanded activity necessary facilities both physical and organizational, will have to be created well in advance. In this direction a beginning has been made by the formation of cooperative societies but provision of Jetties and allocation of defined space for fabricating fish for trawlers, setting up fish processing plants was improperly allocated in the Master Plan away from the waters edge.

The author in his proposals placed at Fig.7.1. has after detailed discussions with the Fish Corporation Authorities, demarcated the required sites for the purpose in the landuse plan. The proposed road near the site, has been joined to the bypass to help for taking the products easily to the other cities of Iran. All the settlements in this region shall have proper jetties for fishing activities as a vital economic activity of the zone.

### 7.6.3 Pearl Fishing

Pearl fishing which a few decades ago was an important economic activity of these towns<sup>5</sup> had slowly died out because of lack of adequate support by the Government, and even now, one comes across pearl divers who had become blind and deaf due to deep sea diving because they did not have proper gear and equipment for the purpose. Therefore, by providing required facilities this vital export oriented economic activity can be started again.



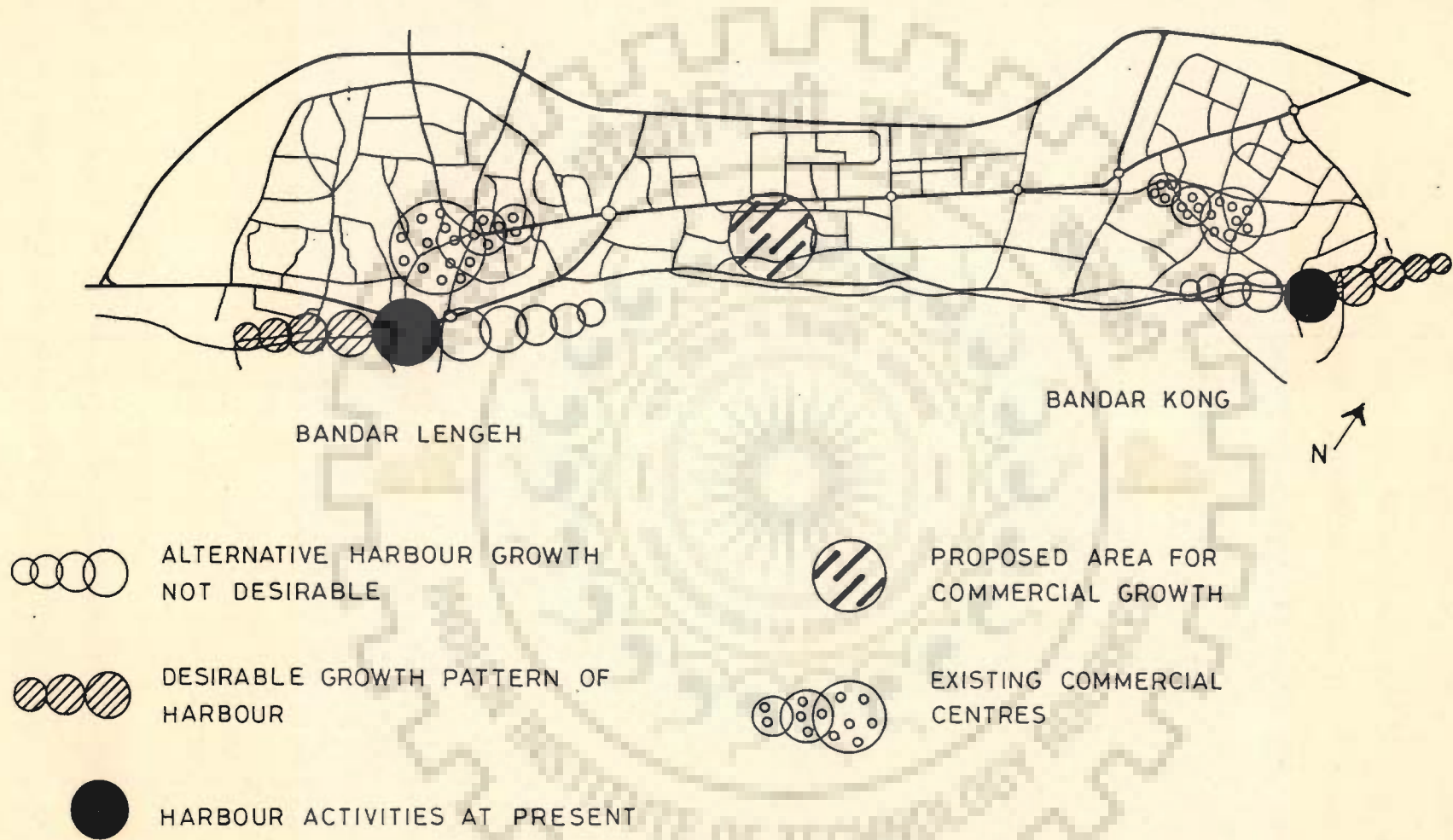


Fig. 7.11 : Possible Growth pattern of Harbour and Commercial Activities of both the settlements. ( By the author )

#### 7.6.4 Industries

Lack of potable water, continuous supply of skilled labour and financial resources are some of the constraints, which are acting as deterrents to the industrial development of these settlements. Lots of foreign exchange is getting drained to buy foreign goods which can, other wise, be produced locally.

However, vantage position of these settlements and National Policy of the Government, focusing on industrial development, provides a climate for instituting a variety of marine based and related industries in and around these communities to augment their economic well being.

For example, apart from major shipbuilding and fishery industries related ancillary and allied industries such as manufacturing packing cases, tin products, ice making; net making, coral and pearl industry and wood craft factories and manufacturing of building components, both for domestic consumption and exports outside can be located here.

Factories for building materials, fabrication and preparation of plaster of paris, lime, brick and salt factories and salt processing i.e. preparation and packing for export can be installed with advantage. Local industries for food, clothes and electrical instruments and water supply fittings can also be put up to supply the up coming industries in these areas with these essential requirements.

#### 7.6.5 Tourism Industry

The beautiful beaches of these regions have variety of visual quality and interest. There are nice sand dunes and coral beaches. There can be



interesting marine life, material collection, museum, sound and light programmes in the fort of Lashteghan and Portuguese at the seaside for Tourists attraction. There are big ships the parts of which are Sunken in the water and they have been there for many decades now. These can be deployed as floating restaurants for the tourist after giving some finishing touches to them. Good hotels, marines second homes, scuba diving, swimming, sport fishing and boating all can attract tourists in this area. The weekly flight to Bandar Lengeh from Tehran and Shiraz and the road network which is the nearest from the centre of the country can provide good transport facilities for the tourists. Calm and good weather during winter and life style of people will naturally attract tourists from all over the country, besides those coming from overseas.

#### 7.6.6 Communication Network

The settlements have been located in a very strategic place. It is the nearest to Sharjah, Rasol Khalmeh, Dubai and Abouzabi in the south. Goods and Passenger transportation to abroad and to southern cities of Fars province by land and the air transport facilities, all can obviously enhance the commercial as well as tourism industry developments.

#### 7.6.7 Population Projection :

According to the census of 1986<sup>6</sup>, the projected population for 1994 in the Master Plan for Bandar Lengeh and Bander Kong were rather liberal and on the higher side. The author has extrapolated the population of 1986 on the basis of the growth rate given in the census of 1986 ,for predicting the population figures for the year 2001.

It is estimated to be about 43,000 for Lengeh and 20,000 for Kong. This means the proposed plan (1983-84) till 1994 would be valid up to 2001 (Table 7.4).

The population growth was 29% for Lengeh and 19.8% for Kong between 1966 and 1976, but there was enormous spurt during the decade of 1976-86, 88% for Lengeh and 68% for Kong. This was essentially due to the migrant from the war ranged south western areas. Therefore, the extrapolated figures for 2001 are still on the higher side because the pattern of 76 - 86 is not likely to repeat. However, this higher rate has been accepted to remain on the safer side for making planning provisions.

Table 7.4  
Population Projection

City	1976		1986		1996	2001*
	pop.	Growth Rate	pop.	Growth Rate	Estimated POP.	Estimated POP.
Lengeh	8797	88%	16570	88%	31151	42606
Kong	5564	68%	9328	67%	15671	20518
<b>Total</b>	<b>14361</b>		<b>25898</b>		<b>46822</b>	<b>63124</b>

\* This datum is taken because the Master Plan (1983-84) advocated by the Govt. up to the year 1994 had a projected population which will actually mature by the year 2001 as reveals by the census of 1986 and extrapolated by the author till 2001.



#### 7.6.8 PROPOSALS FOR HOUSING :

By the year 2001, absolute requirement of additional units would be 8171 that is every year for the next 14 years (having the datum of 1987) Kong and Lengh would be required to add new units to its housing stock of 1987 at the rate of nearly 583 units per annum to take care of the increase in number of households per year and the depletion of stock due to wear and tear of 1% per year (For details of increment required per year refer Table 7.5).

To meet the enormous challenges of almost doubling the efforts in housing construction as detailed earlier it is necessary do bother private housing by creation of Housing Corporation. They should be provided with the developed land at no profit no loss basis as is being done in many other developing countries successfully. Financial institutions should simultaneously be created to help these housing cooperation with soft loan.

To ensure future safety against damage due to earthquake, most strengthen regulations need to be adopted and a halt need be put to unauthorized construction.

Further, efforts need to be geared to save the residential buildings from further deterioration particularly through alienated whose owners have left the country and structures are unused.

Table 7.5

Proposed Housing Units that Need to be Built by 2001

Year	POP.of Both Settlement	POP. Household <u>col 2</u> household	Units avail- able- on inc. based at avg. of 236 unit per yr.	Dilapi- dation	Absolute shortage in case units built at current rate of 36 units/year (Col. 3-4+5 = 6)	No. of units that need to be added to have no Shortage
1	2	3	4	5	6	7
1987	26400	4934	4700	174	408	
1988	29155	5449	4936	49	562	923
1989	30935	5782	5172	51	661	386
1990	32825	6135	5408	54	781	400
1991	34831	6510	5644	56	992	440
1992	36963	6908	5880	58	1086	467
1993	39222	7331	6116	61	1276	496
1994	41622	7779	6352	63	1490	525
1995	44170	8256	6588	65	1733	559
1996	46876	8761	6824	68	2005	592
1997	49748	9298	7060	70	2308	629
1998	52797	9868	7296	72	2644	668
1999	56035	10473	7532	75	3016	709
2000	59473	11116	7768	77	3425	754
2001	63124	11798	8004	80	3874	799

1073



#### 7.6.9 Urban Services :

Because of the sizable gap between the demand for urban services and the resources of the municipal authorities to provide the same, desired services never got provided. Their provision is also handicapped due to inadequate technical and rational support for viable systems.

Because of the lack of resources these settlements may have to continue with the old systems of dug wells for disposal of sullage and sewage till such time that a sewerage system can be installed. To save the water in "Berkeh" from any inadvertent contamination it would be advisable to have a combination of septic tanks and dug wells instead of directly discharging the sullage and the sewage into the wells.

Regarding electric supply; it is expected that the supply to these settlements will now be looked to the regional net work for which the plans of execution are already afloat.

**Fire Fighting :** New fire fighting equipment is expected to augment the only fire tindal now available in Bandar Lengeh, which will serve the unified settlement of Lengeh and Kong which will be located at the edge of new commercial centre.

**Slaughter House and Fish Market** are other areas which require refurbishing and reorganization. It is proposed to bring the fish market next to the sea shore so that the remains of fish can be easily put into the sea which would be consumed by the other fish and sea organism in turn. The fresh fish can be sold right on the spot.

Cemeteries in the proposed plan will be isolated with a strip of green buffers from the residential areas, which currently mingle with other uses. These areas can be planned with proper street order and parking layout with in set hygienic mortuaries where dead can be washed before burial as per prevalling custom.

#### 7.6.10 Sport Facilities

As it has been shown in the proposed landuse plan various sports centres have been proposed in different parts of the settlements. Each of these having football, basketball, volleyball and other required spaces according to the international norms and standards. The inhabitant them self are so much interested in sport that they have them self already paid for construction of such centres. It will be augmented by a modern central facility of a stadia in new centre.

#### 7.6.11 CULTURAL ACTIVITIES

It is required to have theater hall, cinema hall and museum and other such activities in the new centre. The existing facilities in the two towns will be updated and reorganized on modern lines and with modern equipment.

#### 7.7 IMPLEMENTATION

For efficient implementation of Urban Plans, it is better that the assistant of the mayor takes up the job of programming and implementation of the renewal plan. The proposed hierarchy for this is shown in Fig. 7.12.

If the implementation strategies are classified under different heads such as conservation, land allocation, demolishing, new development etc.; it would help in expedition the plan implementation. Delay in execution push up



the price of the project , and is also exposed to the danger of losing its relevance.

There should be a proper organization in future to take up the urban development of these settlements. The organization should follow the proposed urban and regional plan etc. and bear the responsibility of implementation and management. This plan implementation unit can be a governmental, private or semi governmental body. This unit should have all resources that it needs to carry out the implementation of the city plans independently. It can be an autonomous authority or a Corporation.

Finding new and more effective ways of preparing physical plans which can be practically useful at a time when financial resources are limited, is a great challenge. It was required that proposed transport corridors and disposition of land uses against three dimensional design requirement be constantly tested to arrive at a compromise and economically practical solution with minimum demolition of buildings. To economize and make the plan affordable, the road net work proposed in the renewal plan of 1983 has been studied, which shows about 1600 sq.m. of area under existing buildings ear-marked for demolition that can be brought down considerably merely by realigning the roads. In this way the traditional built form can also be conserved and in other word municipality of Lengeh has to pay much less for the operation of the proposal.

Another problem which the municipalities are facing is reading of the drawings. It has been observed that they measure the size of roads from map of 1:10000 scale, which is not a correct way. Therefore, the sizes of roads and other things shall be given in a larger scale maps or drawings.

Regarding financial acceptance and appreciating of plan implementation, development theorists argue that improving education is a primary means of building human resources, which Harbison<sup>7</sup> calls "the ultimate basis for the wealth of nation". Peoples participation makes project more relevant and useful to people. It is time consuming by minimizing changes of wastages, corruption, in efficiency and eventual failure of the project"<sup>8</sup>.

For example, providing an access road to the centre of a "Mahalleh" or for providing other infrastructure, municipality can take into confidence the council of the concerned neighbourhood. When people come to know that they would be the beneficiary of the project after its implementation it is highly likely that they would extend their support for the project.

Further for upgrading the finances of the Municipalities and to fill the gap between expenditure and income, following policies are recommended to be followed by the Municipalities :

- Taxes from inhabitants through Consul of "Mahalleh" for upgrading of "Mahalleh" condition on no profit no loss basis.
- Taxes from Harbour organization and other Shipping Companies.
- Taxes from Parking of Trucks and Buses.
- Construction of Parkings (Long term), storage and renting to harbour organization and shipping companies.
- Development of interesting parks and selling entry tickets to the visitors.
- Construction of small Neighbourhood and Nahieh Shopping areas and selling them.



It can be summarized that urban plans of Bandar Lengeh and Kong did not get implemented properly in 1964 onwards, because these were often unrelated to the resources required for their realization. Other important reasons which impeded their execution pertained to the woeful shortage of trained personnel to manage and supervise actual effectuation of the plan proposals.

Therefore, its evident that the urban plan formulation ought to be realistic in terms of its financial implications, and sensitive to the community aspirations of its inhabitants. Simultaneously there should be efforts to augment the fiscal resource of local bodies and municipalities.

Last but not the least, It is necessary, that all the agencies and institutions involved in the complete process of plan formulation, its appraisal, sanction, and execution should work in close cooperation with each other and the public at large for whom the plan is being prepared, especially if its implementation is to be assured.

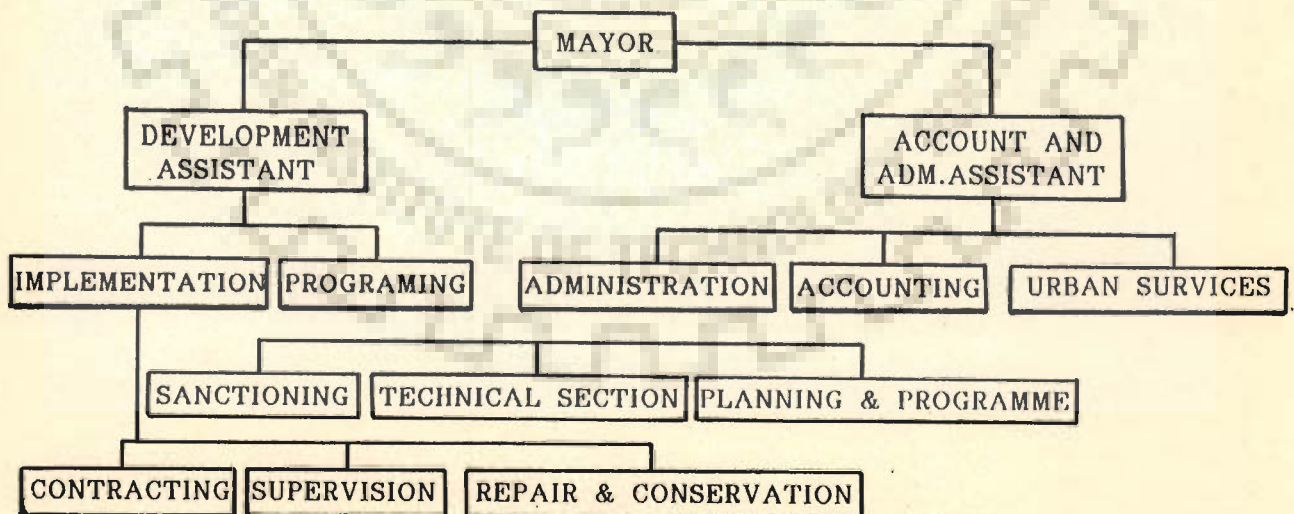


Fig. 7.12 : Proposed Administration Set up for the Municipalities



# CHAPTER 8



## CHAPTER - 8

# URBAN DESIGN CRITERIA, DEVELOPMENT AND REVITALIZATION OF THE SETTLEMENTS

### 8.1 ABSTRACT

The major concept, design criteria, and demonstration in the form of the full layout, and detail specimen for the action areas viz. Old Core, Transit, Periphery, and future expansion of Bandar Lengeh and Bandar Kong settlements; derived from; the research, site analysis and experience of existing built form, are outlined. Following are the major applied design strategies to emphasize the basis for approach to the design of the city components, identified within the action areas:

#### old core :

- Conservation and revitalization of traditional "Bazaars" and "Mahallehs".
- Provision of efficient, economical accessibility.
- Avoiding unnecessary demolition.
- Enhancing the qualitative and visual values of Historical architectural and religious buildings, through deliberate urban design approach.
- Assessing appropriate density standards.

**Transit zone :** Integrating this zone with the old core through the circulation system and green spaces, for achieving a designed integration and continuity with the character of the old core.

**Periphery Areas:** Reorganization of disorderly existing built form and spaces into a deliberate organization, compatible with new development proposals.

**Future Expansion areas :** Development proposals as a part of new planning scheme and concept to reflect architectural spirit of the past heritage, and the modern needs for neighbourhood design, and circulation pattern.

All the above design strategies for the identified action areas will be treated as an inseparable part of a comprehensive urban design scheme e.g., at macro level, that ensures the conservation of the natural floodways, avoid the contamination of natural water resources through design of green spaces and recreational areas; and at the microlevel, ensure conservation of built form and spaces incorporating modern infrastructural facilities and promoting spontaneous visual movement and experiences.

## 8.2 INTRODUCTION

Chapter eight would present the major concept and design criteria and design demonstration in the form of the full layout and detail specimen for, old core, transit, periphery and future extension areas of Bandar kong and Bandar lengh which can form the model, not only for all parts of these settlements, but also for the other settlements existing in the arid coastal zones of Iran. The followings are design strategies which have been elaborated to emphasize the basis for approach to various city components or units, in this Chapter :

1. Traditional way of designing Bazaar, i.e., Commercial areas.
2. Social significance and relationship of "Mahallehs", i.e. residential areas.



3. Historical, Architectural and religious values of buildings and conservation of old core of the settlements.
4. Organic community spaces.
5. Formless plans - application of space and design norms to new plans.
6. Socio-Religious practices for "Mahalleh" Design.
7. Minimum destruction and Maximum use of natural resources.

### 8.3 MAJOR CONCEPT AND DESIGN CRITERIA

The experience gained from the study of the indigenous areas which were in harmony with the life style of its inhabitants and the contemporary knowledge in relation to the aspect such as traffic and transportation requirements and the factors relating to ecological aspects, are the valuable consideration in forming the major concept and design criteria.

No idea has been adopted without proper study and analysis. In preparing design, all alternatives have been considered and the efficient one has been selected. This was achieved essentially by detailed designing of a situation at micro level taking various factor into consideration such as economy, functional proficiency, environmental and aesthetic values for different alternatives. This was possible because of the modest size of these communities and intimate knowledge of the same which the author had. Keeping the volume of these in mind it was not possible to include all the alternatives in the text. An example of this rational is however, provided in Fig. No. 8.44.

History reveals that the utopian ideas and plans, rarely, if ever get translated in their entirety. Those which get translated on ground to some

extent are often at a great variance from what was stipulated in the original proposals. When it comes to their implementation they get stuck due to economical problems and lack of experienced and qualified personnel in the field of urban planning, specially in developing countries.<sup>1</sup> In fact, many of the plans based on personal bias or utopian concepts, get shelved and never see the light of the day and accumulate dust in the cabinets of the secretariat. Such a state of affair entails uncalled for waste of valuable resources of both time and money.

Of course, this does not mean having bias towards copying of whatever has happened in the old core areas. In preparation of new criteria there shall be deep thinking over the achievement gained in traditional areas. The present built form is the out come of their need and requirement such as climatical, topographical, land use pattern, social concern, economic consideration, traffic flow pattern, and the aesthetic values.

The criteria achieved to guide the future development of the settlements, have been prepared through a sieve map system. It has been tried to achieve logical criteria which can be implemented easily; and not the ideal one which is not implementable. One of the major aim was to scrutinies the proposed master plan of 1983, and then update it by incorporating required changes on the basis discussed in the foregoing. The structure plan thus evolved, then forms a basis for further detailing of various components in the two settlements.

The following are the important aspects which shall be taken into consideration while preparing design schemes in these areas :



### **I. Ecology :**

- Respecting the discussed eco-system of the zone.
- Use of run-off and safety from flood hazard.
- Conservation of natural green spaces.

### **II. Built form :**

- Revitalization of historically and architecturally important and defined areas.
- The visual aspects
- Minimal destruction of buildings and selection of most economical alternative roads keeping in view the study of traffic and transportation and condition of structures.
- Social and religious values
- One of the most important aspects is water, i.e., the Gulf. Both planning and design should be oriented toward this vital element from aesthetic as well as from the economic point of view.<sup>2</sup>

### **III. Landuse :**

- Maximum use of vacant land within the urban areas.
- Easy access to the "Berkehs" and other urban areas.
- Access to the jetty and fishery activity spots, and strengthening of their relation with water.
- Circulation system to solve traffic problems and safety of the pedestrian.
- Compatible land uses.
- Provision of facilities and their exact location.

### **IV. Orientation :**

- Orientation of streets which will effect the orientation of the plots for housing etc.
- Use of breeze for cooling.

### 8.4 THE FINAL STRUCTURE PLAN




These settlements will be structured out of the currently scattered residential, commercial, and industrial areas each having its own hierarchy (Fig. 8.1 and 8.2). Space for the growth and expansion of each of these activities has been proposed accordingly. Each group has been segregated by the circulation net work which would simultaneously serve their utilitarian functions.

T : Town (20000 to 40000 Person)

N : "Nahieh" (3500 to 5000)

M : "Mahalleh" (1000 to 1500)

K : "Kucheh"

-  Nucleus for Town
-  Nucleus for "Nahieh"
-  Nucleus for "Mahalleh"

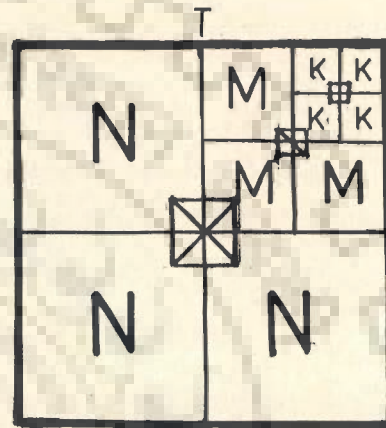


Fig.8.1(a) : Conceptual Diagram of Town Structure

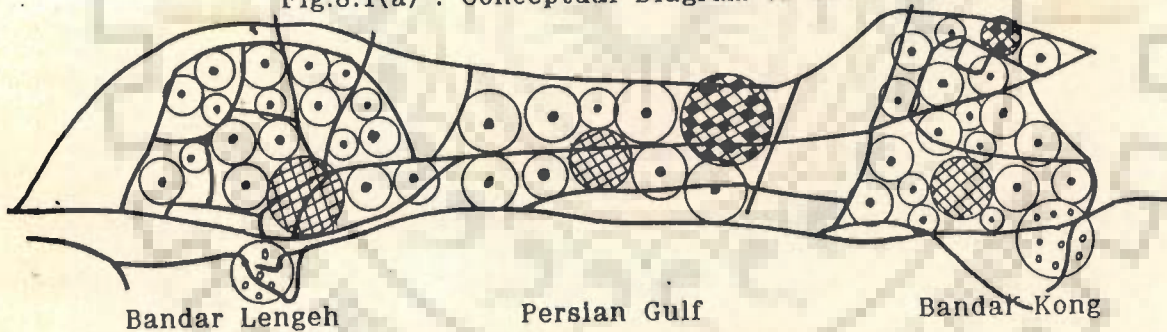






Fig.8.1(b) III Collector and Distributor Streets of Neighbourhood

-  Main Commercial and Town Centre
-  Harbour
-  Industrial
-  Neighbourhoods (Mahallehs)

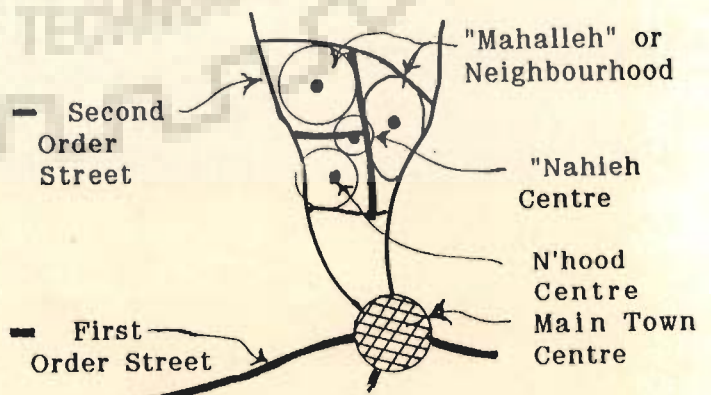


Fig 8.2 : Details of "Nahieh"

Fig.8.1 : Final Structure Plan (By the author)



Therefore, the settlements would have three main commercial centres (Fig.8.1 ) and a number of neighbourhoods or "Mahallehs" which are almost self supporting regarding their daily requirement with a safe and calm atmosphere for children and old people. There are industrial areas planned near the by-pass for easy transportation. Each zone has been described in detail in the following:

#### 8.5 CONCEPT AND DESIGN CRITERIA FOR CENTRAL COMMERCIAL AREAS

The traditional way of designing of the bazaar and the contemporary requirement can form the concept and criteria for the future development of commercial areas.

The oldest centres of commercial area in these settlements are Bazaars, however, the later development of commerce and shopping along edges of the main street as shown in the land use plan has also emerged. These came up because of the traffic activities and easy accessibility. So, it has become a usual practice that wherever a road has been proposed or constructed, immediately both the sides of that road become commercial, and problems of vehicular traffic, pedestrian mixing, parking problems arise.

The parking problems of the old bazaar areas has been solved by identifying the vacant land behind the bazaar area and deploying these for parking (Fig. 8.3). The interior of these areas will remain fully pedestrian. The extension of the covered bazaar for future is shown in the proposed design for this area (Fig. 8.4).

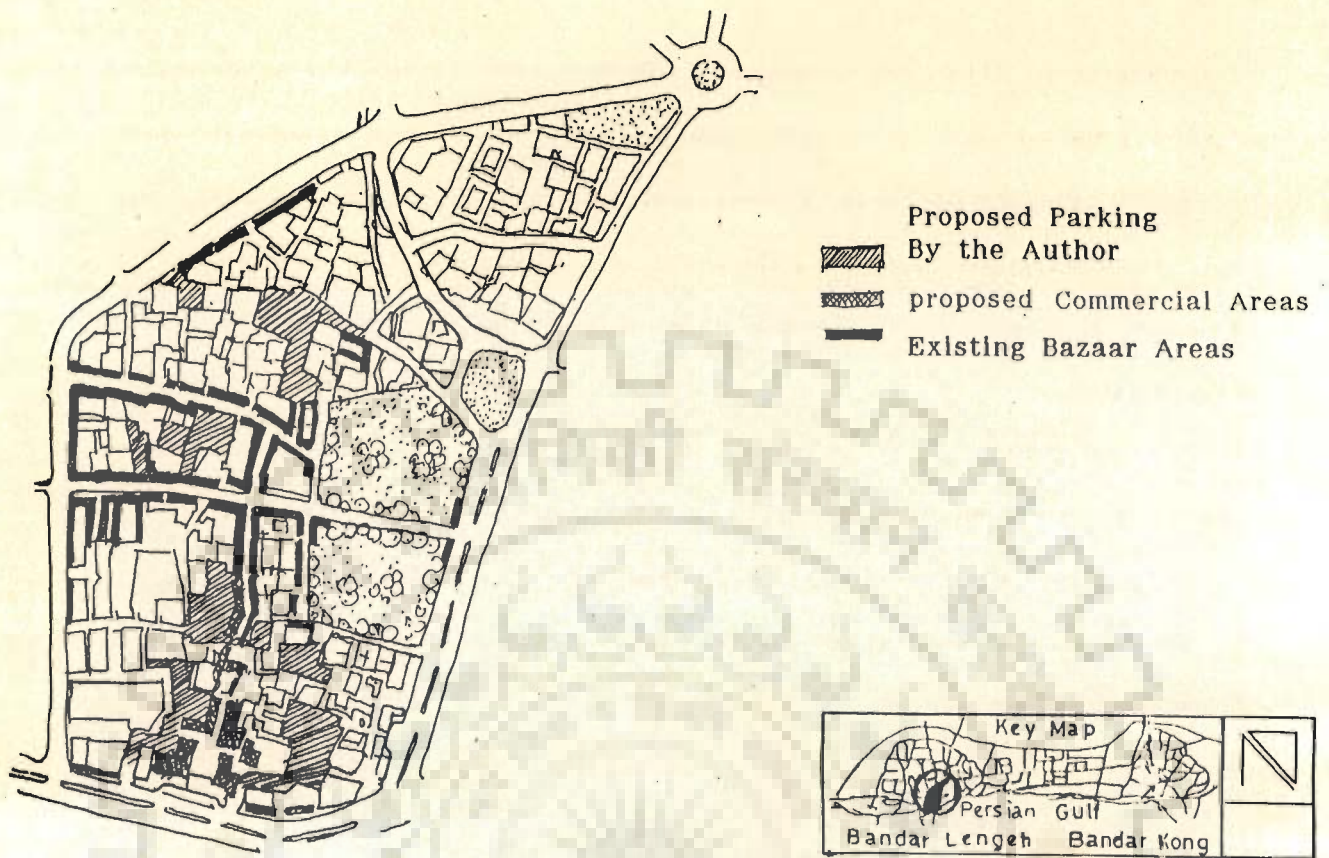


Fig. 8.3 : Proposed Parking  
Bandar Lenghe

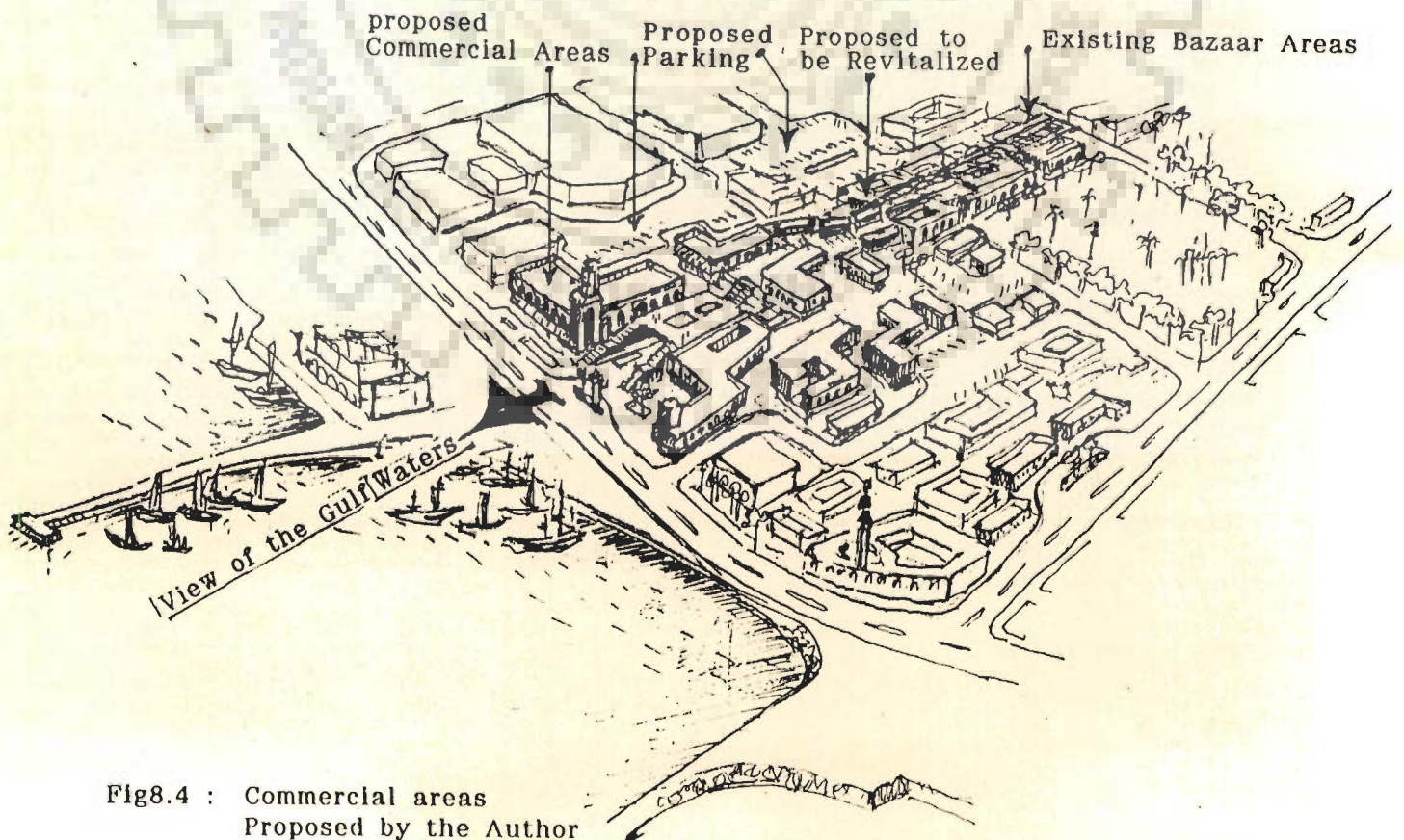
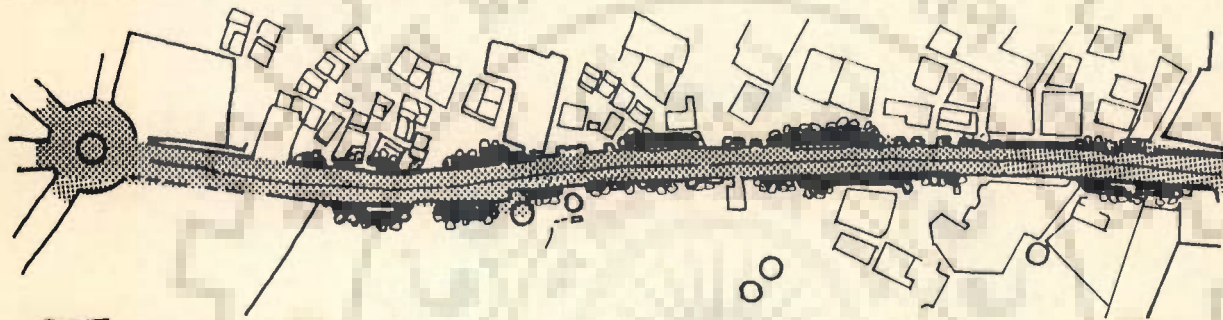


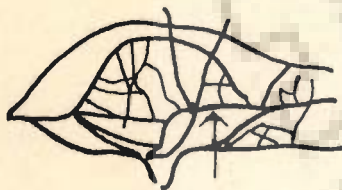
Fig8.4 : Commercial areas  
Proposed by the Author



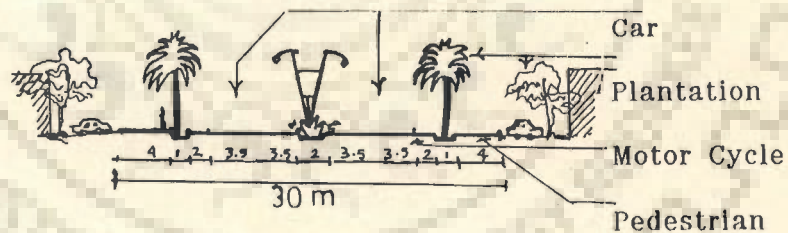
The servicing of these areas will be from the back side. The pedestrians can get good view of water from the proposed site. Problems of parking and servicing of the commercial places which are at the road sides, have been solved by proposing the vacant land available near by for such type of activities, among which the proposed parking areas along Enghelab street, near Bank of Melll crossing and those in between the 22nd Bahman round about and Farmandari building can be seen in Fig. 8.3 and 8.5. These areas shall be shaded with local trees plantation.



(a) Irregular vacant lands are proposed to be used for parking; plantation, and street furniture



Key Map



(b) Road Sections

Fig. 8.5 : Roadside Parking

The Dostghaib street shall be free from heavy vehicular traffic such as buses, trucks etc. This street shall be pedestrian in the evening time, so that the inhabitants and other tourist can enjoy their shopping etc.

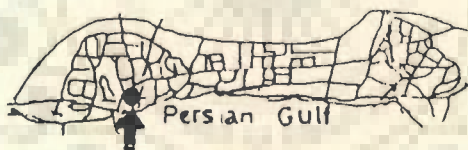
Any commercial building can come up within the proposed zone only and must have parking and servicing area. The parkings on the road side shall be used as short term parking only.

The neglected part of the bazaar in Bandar Lengeh shall be revitalized and reconstruction of some of the shops can be done so that some of the future commercial needs can be fulfilled (Fig. 8.6).



Existing old Bazaar - Lengeh

Bazaar after revitalization



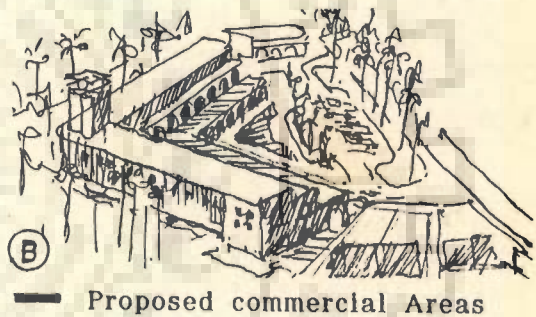
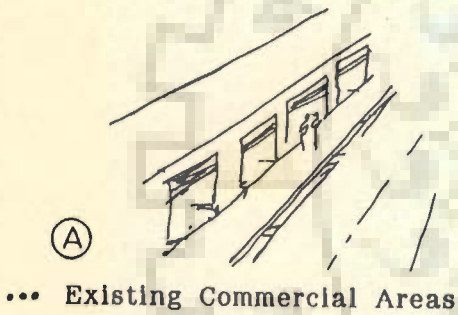
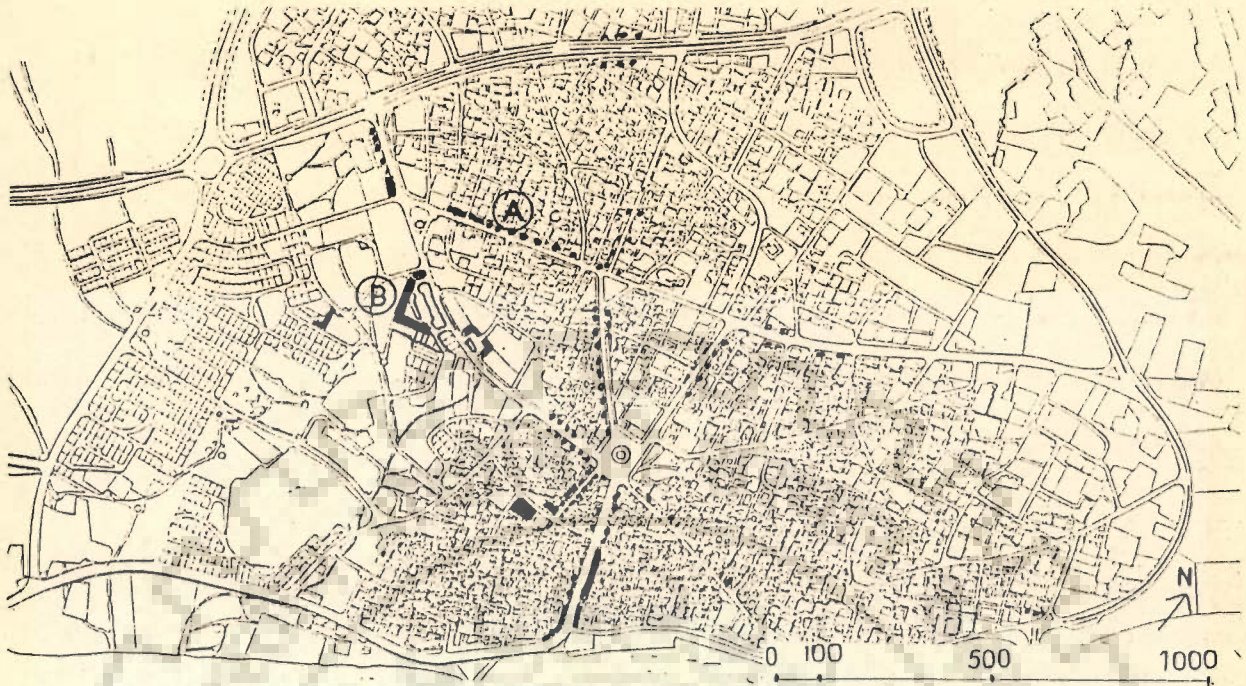
Key Map

Fig. 8.6 : Revitalization of Bazaar Areas - Bandar Lengeh

For the commercial growth of Bandar Kong beside the existing road side other centres have been proposed considering their servicing and parking requirements. Among these the one in Shahid Rajai and Fish Market are the typical ones (Fig. 8.7).

However, the commercial requirements at neighbourhood level have been estimated and provided for at appropriate locations. At present, some of the commercial areas have not been occupied fully and there is enough vacant land in between the occupied areas.





Bandar Kong

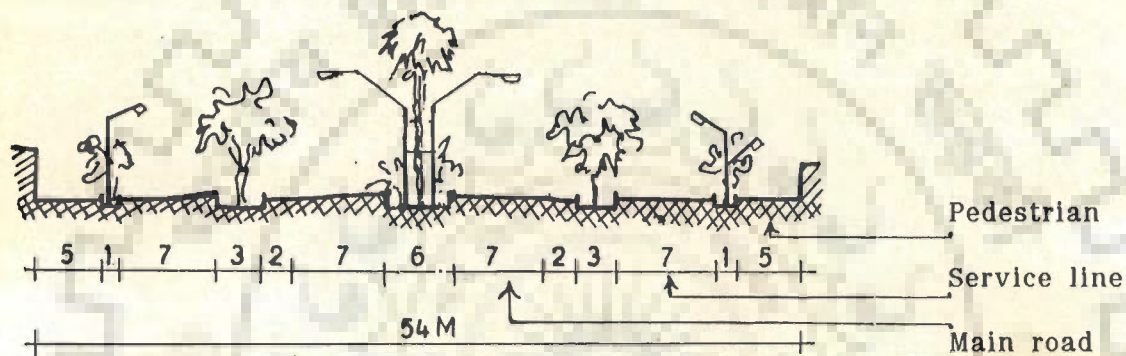
Fig. 8.7 : Existing and Proposed Commercial Areas - Bandar Kong

Availability of these areas can answer the future requirements of each settlement by allowing 2 to 4 storeyed commercial development. Such development will not only bring life to the town but also revitalize the economy of these areas. The main streets which have been allowed to, have commercial land uses around, with enough width and capacity to accommodate the traffic volume for the proposed period of master plan and the expected population growth.



### 8.5.1 The New Town Centre

During the course of time the two settlements of Bandar length and kong are likely to merge into each other, therefore, along the connecting road a (designed by the author Fig.8.8) new centre will be created (Fig.8.9). It shall accommodate cultural, commercial, administrative and tourism activities, with all required infrastructure such as servicing, parking and green spaces. Pedestrian safety shall be given prime consideration.



(a) Section (Panjbagh Street)



(b) View (Panjbagh Street)

Fig. 8.8 :Proposed road Connecting B' Lengh and B' Kong (By the Author)



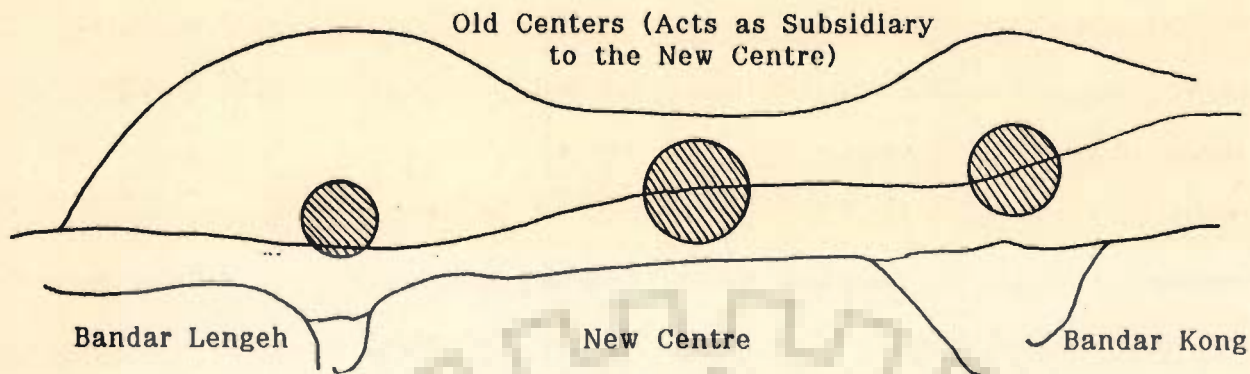


Fig. 8.9 : Main Commercial Areas (by the author)

The centre shall have special design scheme with interesting spaces and landmark. The linear corridor space of the connecting road shall change to the "stay" urban spaces. This will form an important node of these settlements.

The Bandar lengeh Bandar Kong road shall be depressed near the new town centre to allow the pedestrians from the nearby residential areas to cross the road for going to the new town centre without any interruption. (Fig. 8.10).

This centre would also create a break in the linear access of Lengeh Kong road and become the hub and a meeting place for the inhabitants of both the settlements with a suave scenario of the sea as a back drop. The site selection and analysis, design concept and approach have been discussed in the following :

#### 8.5.1.1 The Site

After relocating the incompatible landuses, i.e., the factory, the power plant and the storage, buildings from their present site to some other places, about 27 hectares of land will be available along Bandar Lengeh, Kong road. According to the area analysis made by the author (Table 8.1) there is enough land available, to not only accommodate the required facilities of the town centre up to 2001, but also, to take care of its future extension.

The natural and suave environment of the site, the climate and the materials obtaining in its vicinity will govern the design approach and the final form.

These parameters would form a context and any thing which is added in the form of buildings and flora must necessarily harmonize with these existing features in and around the site. In fact the effort would be to enhance and complement these.

"It is incorrect to think of landscaping a setting after the building structures are placed. The landscape existed in the beginning. The man made elements must be carefully added so as to harmonize, complement, and be completely integrated with qualities of the existing natural environment"<sup>3</sup>

Thus, the existing elements of the site, both natural as well man made, which bear importance in the landscape, shall guide the overall form and composition of the complex. The significant elements which are currently dominating the site include the Gulf waters which also form a lagoon during high tide, the floodway and "Berkeh" on the western side and the date palm grove on the Eastern side.

Maintaining a visual link of these elements from the major urban spaces of the town centre would be essential. Therefore, a kind of zoning will be suggested as shown in Fig. 8.10.

#### 8.5.1.2 Provision of Lagoon

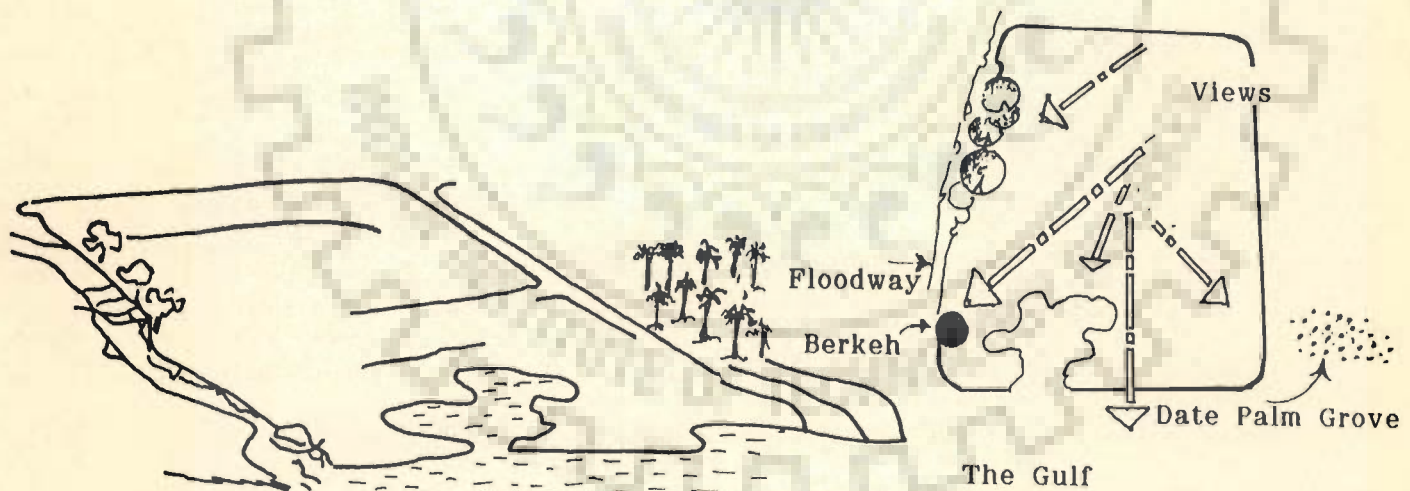
The ground area is generally devoid of any vegetation thus it enhances



the desire to find solace in being near the edge of the water.

The tendency and character of the land is such that a natural lagoon is existing, which during high tide gets filled with water. Therefore, by additional efforts, the Lagoon can be formalized, and the town centre then can be accommodated around it. The water of the lagoon is so clear that the fish, tortoises and other marine life can be seen even at a depth of two metres below the surface. Thus a feeling of freshness and different visual experiences would be created by the most important element of landscape which is water (Fig.8.11, 8.16, 8.17 & 8.18).

Further, the proposed expanded lagoon shape will help to widen the scope of vision by getting more view of water and at the same time occupying less of the sea front.



a) The Site View (Existing)

b) Site Important Features

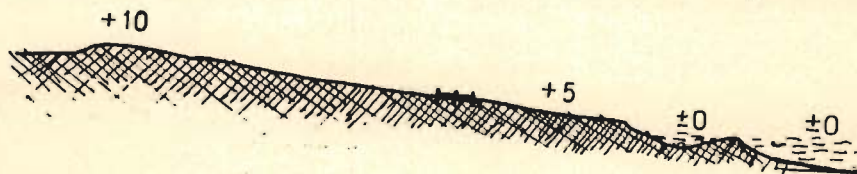
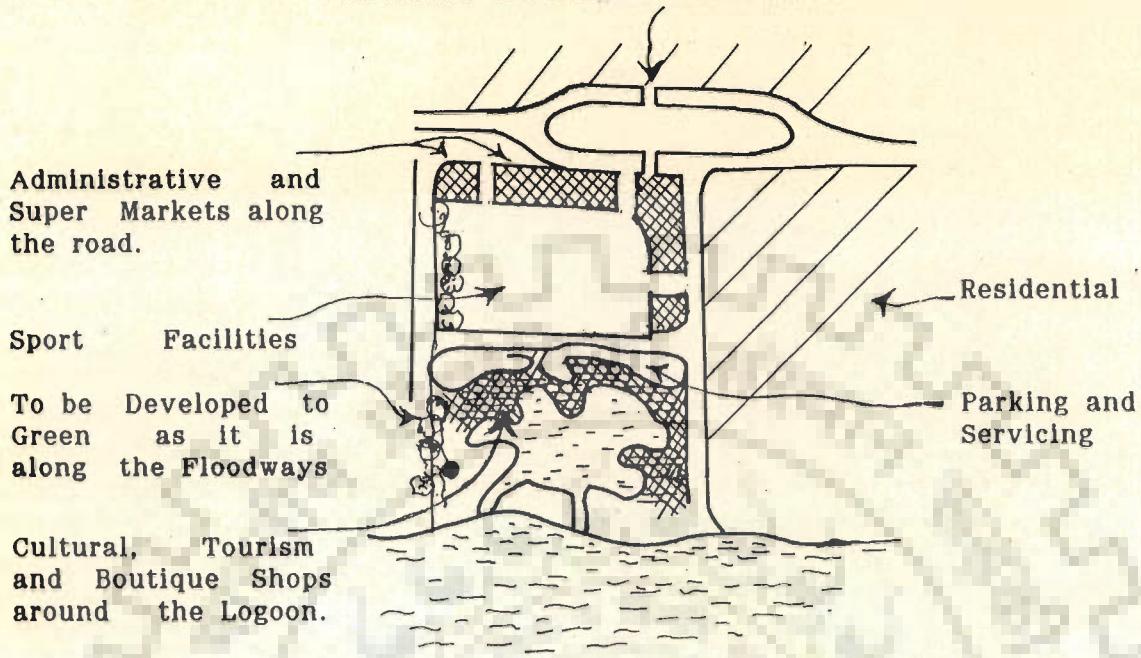


Fig.8.10 (c)

Site Section (Existing)

### Pedestrian Crossing at Lower Level



d) Zoning of Activities

Fig. 8.10 :The Site and Zoning of Activities

The other important function of lagoon is that, it acts as a break -water and does not let the waves to destroy the development along it. It would create a calm water for the small boats to anchor around it. Angling will also be allowed in the lagoon for those seeking recreation.

There can be three types of strategies for development along the lagoon, i.e, to build along the lagoon; at the lagoon and in the lagoon. Activities for tourist attraction would be in the island created inside the lagoon. These islands also would help in easier crossing of the lagoon and having a continuous movement in the town centre (Fig. 8.11) along the building and water. Structures like Hotel etc. would be allowed to be built at the side of lagoon or projecting over the water. Of course, for occupying such type of places municipality shall sell the property at premium . This will also help to subsidize the development cost of other areas. The area around the lagoon



is about 9.75 hectare which can be used for booth type shops, boutique and other cultural and tourists activities at ground floor.

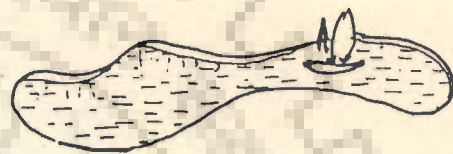
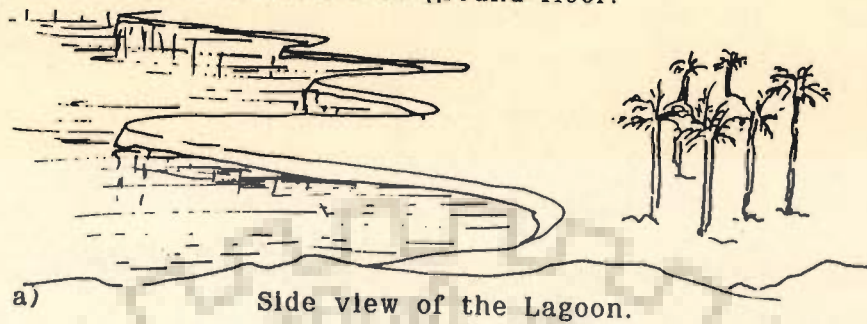


Fig.8.11 : Crossing of the Lagoon

The administrative building would come along road side to give a better streetscape view (Fig.8.12).



### 8.5.1.3 Orientation

The climate condition is one of the governing factor of the building form as in the case of traditional buildings under the circumstances, its better to orient the buildings with their long axis facing south with a tilt of only 5 degree away from west. This would take care of the solar load and face the Gulf waters for view (Fig.8.13). Small horizontal and vertical

projection on the south side will cut off the sun during summer months and hot periods during the day. This orientation will also ensure cool breeze from the sea.

To further ensure that there is no heat transfer from the louvers these could form an independent egg crate set apart from the main structure.

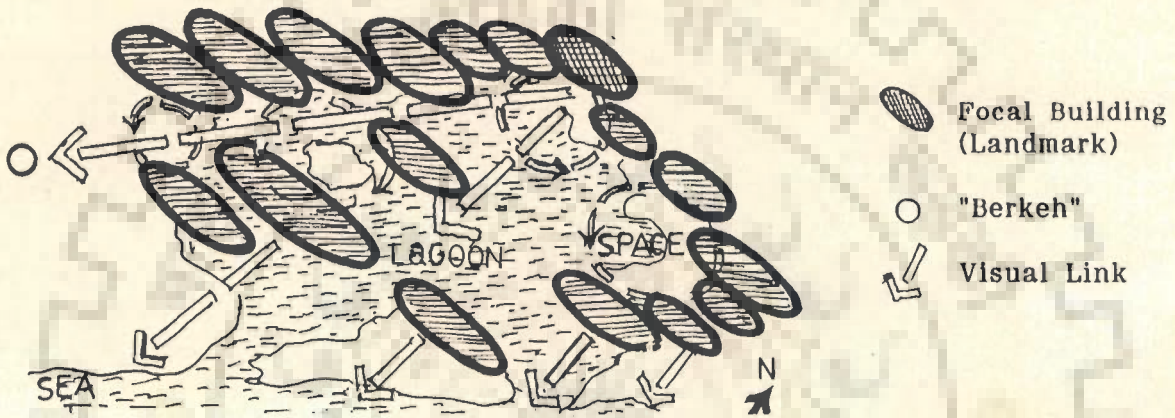


Fig. 8.13.: Part of the Town Centre Around The Lagoon (conceptual diagram) Proposed by the author

#### 8.5.1.4 The Space Quality

In the conceptual design proposal an attempt has been made to create urban patterns by adopting adjusting feasible traditional values in contemporary town centre with respect to future needs and understanding of shopping behaviour of the inhabitants. This has been illustrated from Fig. 8.14(a) to 8.14(n).

The tradition of building close to water and facing the spaces toward the waters in Arid Coastal zones has been adapted.

The concept of Linear weaving and widening spaces of bazaar which may be conveniently pictured as corridors and rooms of spaces has been followed.

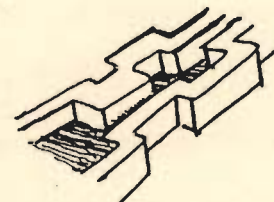
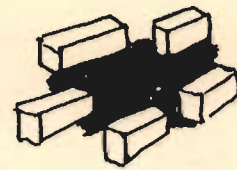


Fig.8.14.(a) Cont..

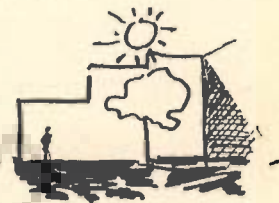


- To give life and avoid monotony in town centre as it is in the case of lively traditional areas. Spaces which give feeling of enclosure would be provided.



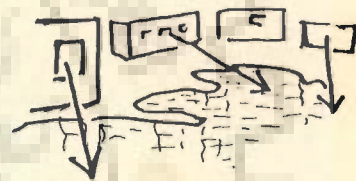
(b)

- A type of space which shaded most of the day (corridors) and is not exposed to harsh sun would be provided with the help of built form and plantation (local plant where it is feasible See Appendix P for possible plant material).



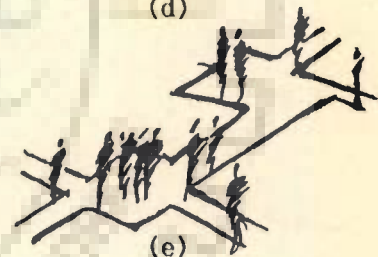
(c)

- Pedestrian spaces are designed to command good view of the waters.



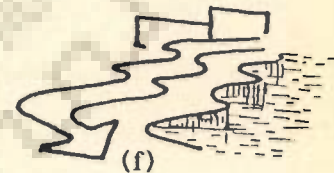
(d)

- Pedestrian and parking spaces shall be provided in consonance with their requirements --neither too small nor larger than required.



(e)

- The shopping pattern would follow the desired movement line as it is in the case of traditional areas.



(f)

- The view of important elements from vantage shall be maintained.



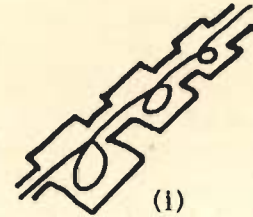
(g)

- Concept also provides for a traffic free space allowing free and continuous movement of pedestrians.

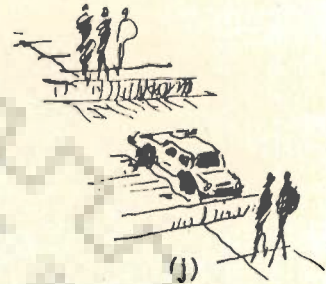


(h) Cont...

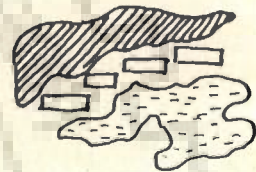
- The sequence of movement to the larger central space to the smaller enclosures shall be clearly defined.



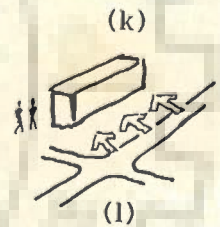
- The main pedestrian circulation would be either lower than the ground level or higher, so that vehicular traffic does not enter in these areas.



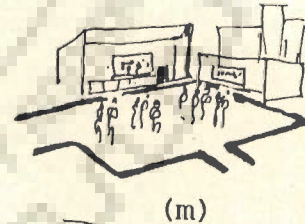
- Parking and service spaces would be well distributed at the rear side of the buildings.



- All shopping and commercial establishment will have direct access from service roads.



- Places of public gatherings like cinema halls, Civil Structures would be so located, as to conveniently handle large crowds and make for easy and quick dispersal of people.



- Provision of activities which are much in demand but usually fail to find space would be made in the proposed town centre.<sup>4</sup>

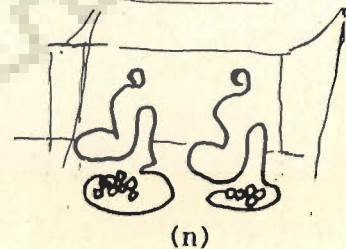


Fig.8.14 :  
The Space Quality  
(Conceptual Sketches)



### 8.5.1.5 The Form

Beauty by definition "is the evident harmonious relationship of all parts of a thing observed".<sup>5</sup>

"Thus rather than a superficial aspect beauty is the essence of a thing. The best illustration of this is the effect of nature upon the emotions of man. In observing the natural landscape character there is a very real pleasure in sensing the unity and harmony of the total scene. A visit to the mountains, the sea or the forest provides a feeling of exhilaration, awe or tranquility and a genuine renewal of spirit and complete relaxation. The evident harmony and unity of the various elements in a landscape is the quality which we call beauty".<sup>6</sup>

Therefore, the lagoon by itself would become, the element of beauty and buildings around it would be in harmony and in relation to the water to enhance this beauty. The whole composition will focus around a dominant structure from where the surrounding building elements will be steadily stepped down to harmonize with the profile of the mountains in the background (Fig.8.15).

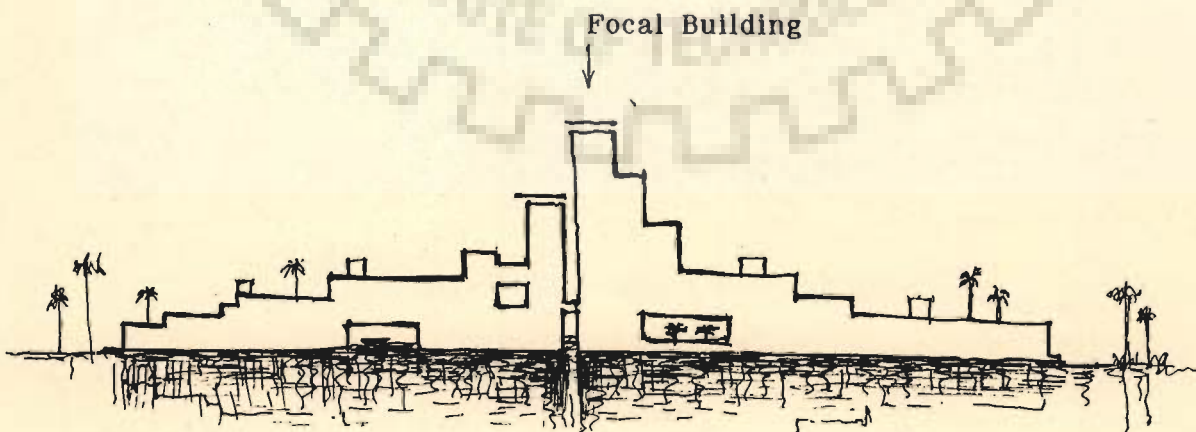


Fig. 8.15 : Conceptual Outline of Overall Composition of the Complex.

Fig. 8.16 to Fig. 8.18 show the various treatments to enhance the visual quality and beauty of the area.

The entire complex will be unified by help of connecting the upper floor or through covered passages and by a continuous arcade at the lower floors. This would help in linking the entire shopping areas with a rhythm which is not monotonous.

Discrete use of coral stone (which is available in plenty) in the facade of buildings and the attendant landscape area would create a sense of unity in diversity in the whole composition.



a) Building at the Lagoon



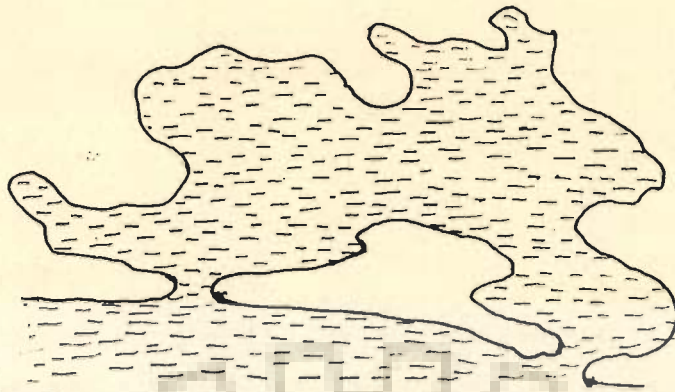
b) Building in the Lagoon



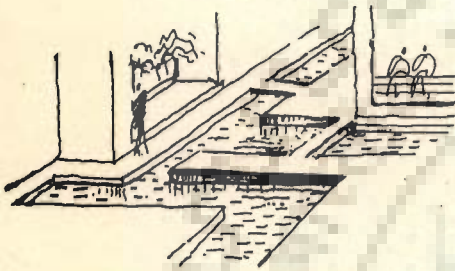
c) Building Away from the Lagoon

Fig.8.16 : Built Form Along the Lagoon.





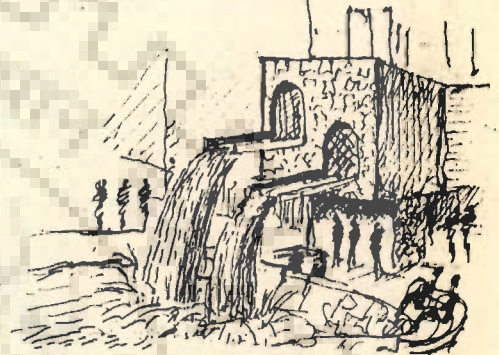
(a) Irregular Expanded Form of Lagoon to Make It Appear Natural



b) Formal Treatment, Close to the Buildings



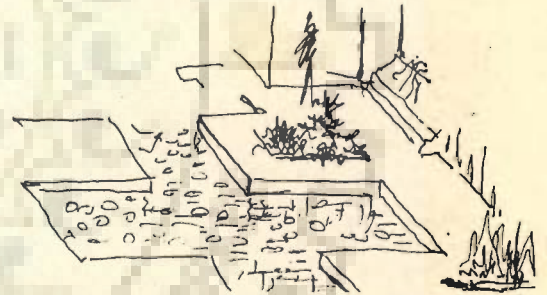
c) Water in Sheet Form in the Lagoons



d) Cascading from Buildings to the Lagoon



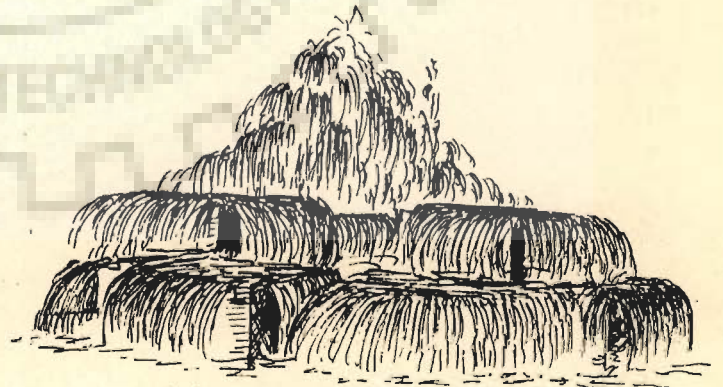
(e) Water in Fall Form Around the Lagoon



(f) Sparkling Movement Around the Lagoon



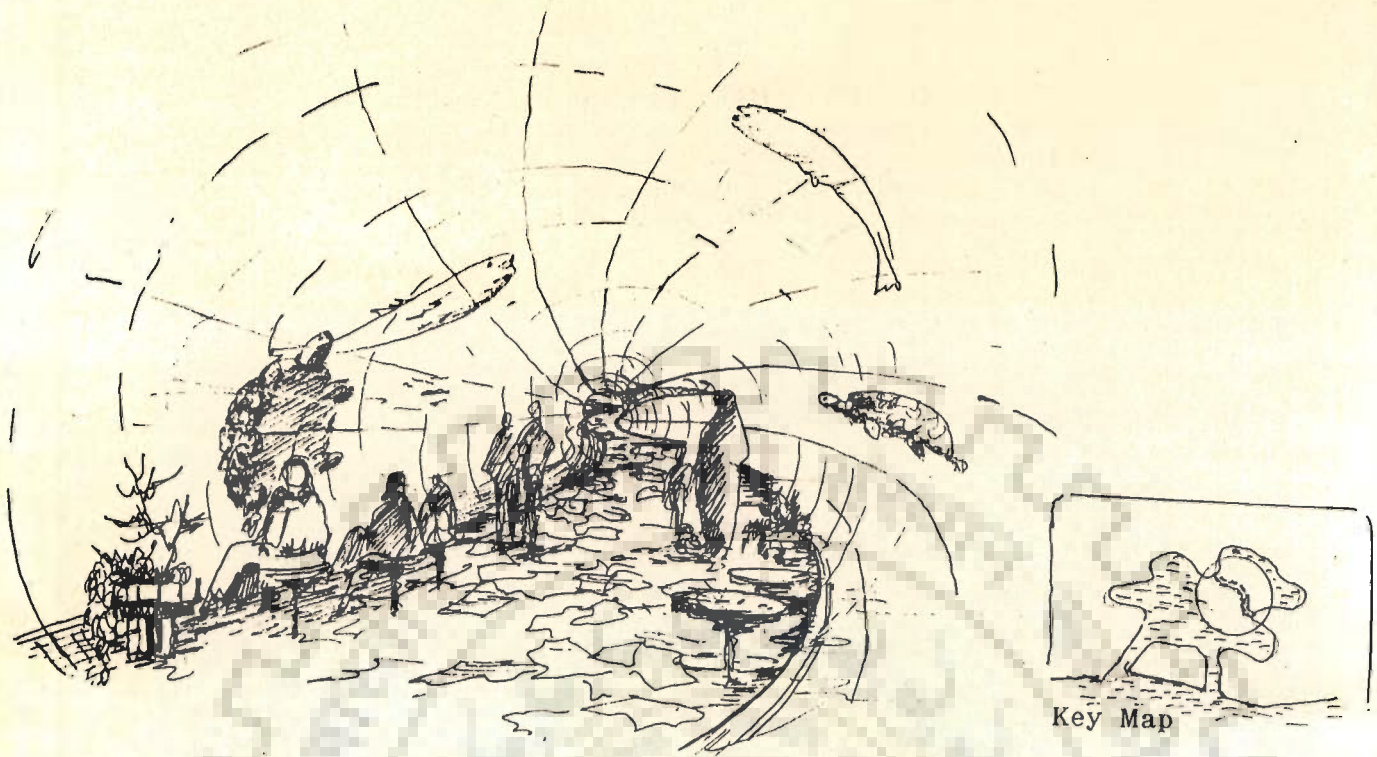
(g) Fountains in the Lagoon



(h) Fountain and Fall

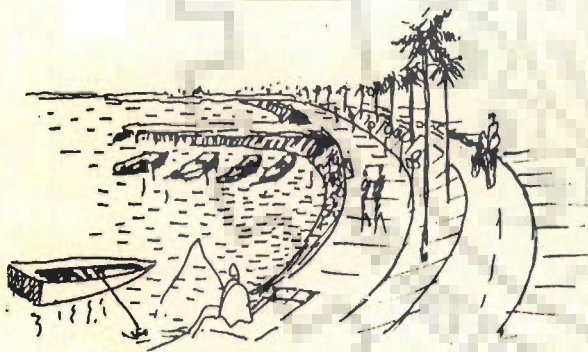
Fig. 8.17 : Various Treatment of Water Along the Lagoon





a) Transparent Footpath Through the Water of the Lagoon to Marine Life (Fish, Tortoises, etc.).

Experience



b) Footpath along the water



c) Footpath crossing the water.



d) Sidewalk Behind the Fall

Fig. 8.18 : Pedestrian Paths In and Along the Lagoon



Table 8.1  
NEW TOWN CENTRE AREA ANALYSIS (In hectares)

1 Bandar Kong :			
	2	3	3-2=4
Landuse	Existing Area Hectare	Proposed upto 2001	Required
Commercial	1.6359	4.5300	2.8941
Administration	0.4038	2.5363	2.1325
Tourism	0.4296	0.8592	0.4296
Cultural	-	2.9367	2.9367
1 Bandar Lengeh :			
	2	3	3-2=4
Commercial...	2.2710	14.0000	11.729
Administration	6.9800	17.3444	10.3644
Tourism	1.4468	7.4468	6.0000
Cultural	0.4284	2.7636	2.3352
Total	13.5955	52.417	38.8215

Area provided in the existing town centres : 19.9500

Area required to be provided in the proposed site

$$= 38.8215 - 19.9500 = 19.95 \text{ Hectare}$$

Area provided around the lagoon : 9.75 Hectare

Area to be provided along road side in the proposed site : 10.20

Green Space and sport : 7.3

Area of the site without lagoon : 27.25

## 8.6 CONCEPT AND DESIGN CRITERIA FOR RESIDENTIAL AREAS

As it has been already discussed, the settlements of Bandar Lengeh and Bandar Kong have been structured out of different units called "Mahallehs". The most important aspect in their formation was the social relationships. Besides the above the other physical elements have been responsible for their evolution into the present shape and form. These are floodways, roads, "Berkehs" date palm grove, agricultural fields and other previously existing "Mahallehs".

Although conservation of the structure of the existing residential areas with narrow "kuchehs" have been given prime consideration, but the need of the inhabitants to use vehicles in emergency cases can not be ignored. Therefore, such aspects will have impact on the town structure and the future proposals.

The smallest unit in residential areas can be considered as a house and then "Kucheh" or a cluster of houses around an open space. A "Mahalleh" will be formed out of a few "kuchehs" or clusters and "Nahieh" can be the term for a few "Mahalleh". The "Nahiehs" are segregated with city traffic collectors and distributors ( First or Second order of streets ) and "Mahallehs" are segregated with "Nahiehs" collectors and distributors roads (3rd order streets - Fig. 8.2, 8.19 ).

In general, there are different strategies for old core; transit zone; Periphery and future expansion of built form (Fig. 8.20).

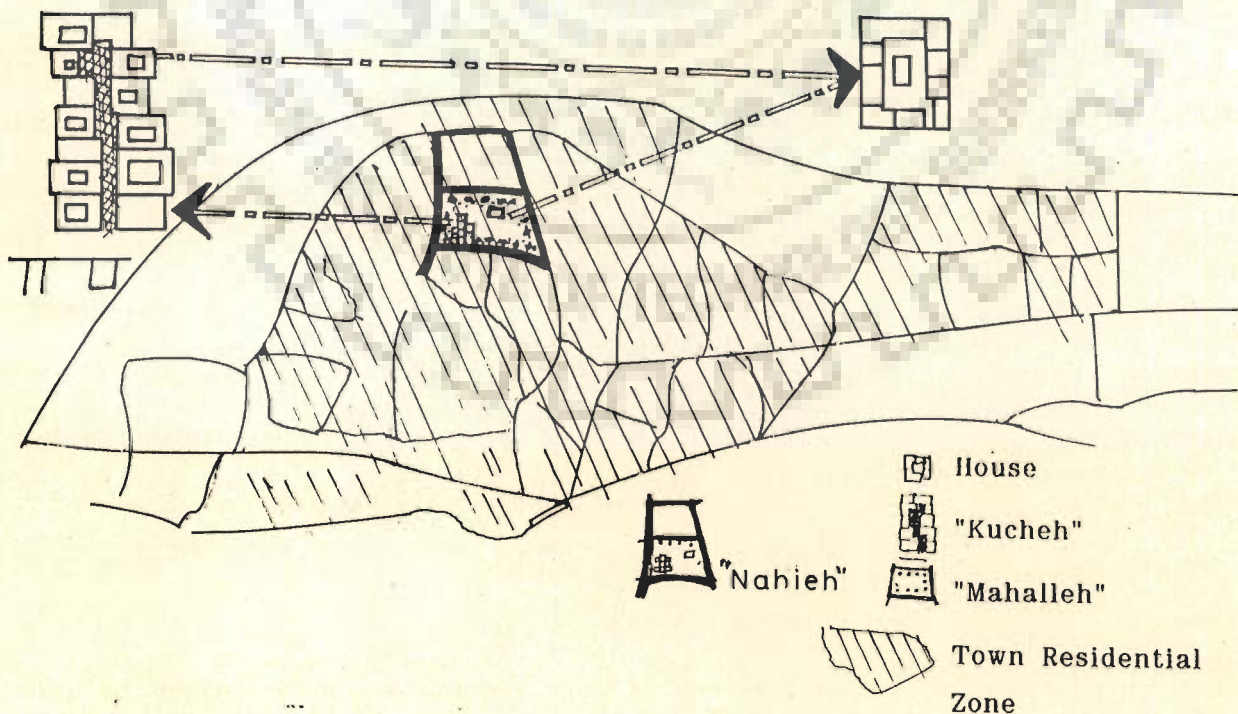


Fig.8.19 : Hierarchy of Residential Areas



## Texture and Grain of Different parts of the Settlements

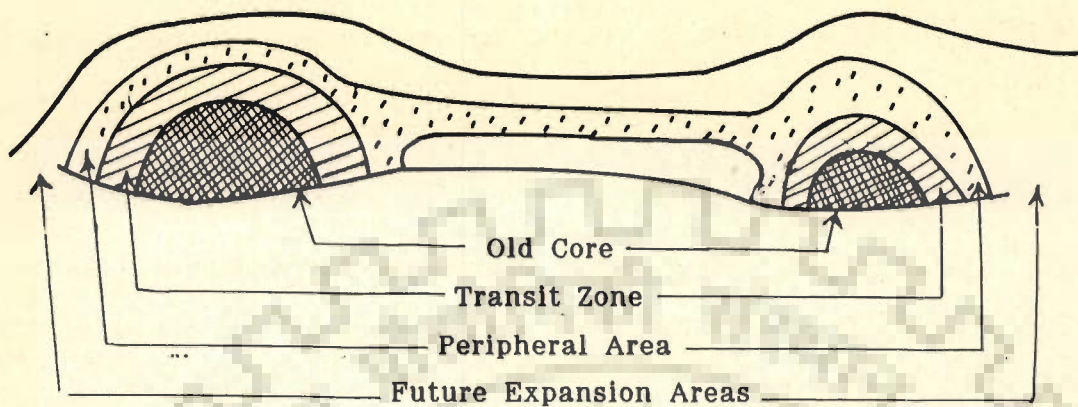


Fig. 8.20 : Classification of Different Built forms

In general the classification is done on the basis of grain and texture of built form, vacant land for planning and design for new development, kind of architecture and the circulation system.

If we look more in detail, we can realize that this is the type of grain and texture together and their placement in the space in a course of time which have resulted in the above classification (Fig. 8.20). The placement of the grains which are nothing except man made built forms (building blocks etc. ) will govern the type of coarseness and fineness in a settlement envelop. If it has some functional advantages of economic, climatic or from aesthetic view point these qualities shall be enhanced and future development shall be governed by these. Most of the old core areas are climatically, historically, economically, and aesthetically pleasing and important, therefore, the use of materials, number of storeys, (max. 2 ) and plot size shall not be very much different if any reconstruction is going to take place. In this context and on the basis of field surveys average plot

size for sector of 7 part of 9A, 8, 15A, and B, 14 and Part of 10 (Fig. 8.21), is about 240 sq.m. In sector 9B and within a depth of 30 m from Enghelab and pasdaran streets a minimum of 150 sq.m. is proposed due to the existing built form and landuses. Minimum plot size for the sector of 6, 10, 11, 13, 17, 18, 19, 8, 1, 9a, 3, 4 and 6b is recommended to be of 300 Sqm. keeping in line with the land value and space available within a depth of 30 m around Amirabad Boulevard and depth of 30 m in sectors of 6 and 7, will have plot of 240 sq.m. each can be adopted. The rest of "Mahallehs" and sectors will have plots of ...350 sq.m.

In sector 2 of Bandar kong minimum plot size of 240 sq.m. can be adopted, in case of reconstruction of the areas. With respect to the interesting view of the coast, urban design of the buildings or grains are important and the height of new buildings shall not go beyond 7 m and they shall be as high as the buildings which have already been there. The sectors 3, 4 and 5 are recommended to have plots of 300 sq.m. each. The sectors of 1, 8, 10, 9 and 6 shall have plots of 350 sq.m.each.

Coverage for plots of 350, 250 and 150 has been recommended to be 50%, 60% and 70% respectively. Recommended height of new buildings have been shown in Fig. 8.21 and 8.22 which is according to the existing built form and to ensure view of the Gulf.

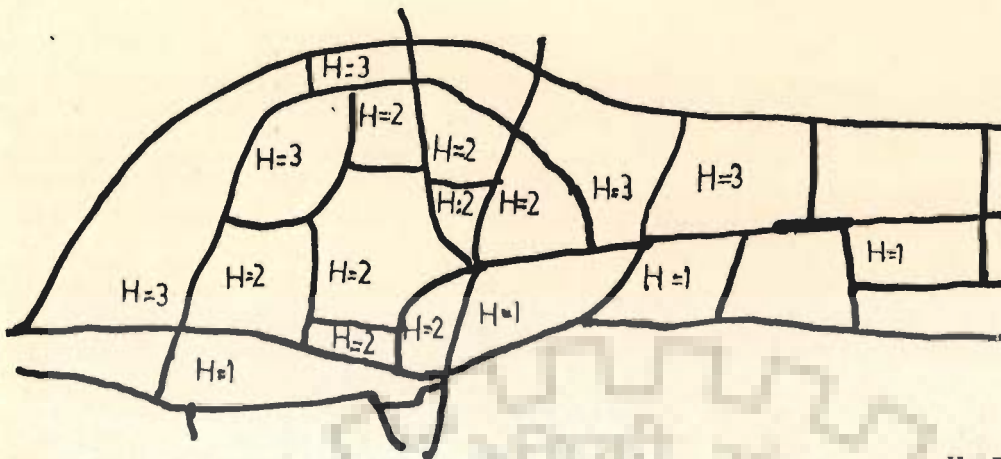
**8.6.1 Designing in the Old Core :** As it has been discussed in the foregoing, there is a kind of compactness in the both forms of old core which is the outcome of socio-cultural ethos which developed over centuries. These areas had been constructed before the introduction of the automobile in the city. Therefore, the network is related to the human scale and is in contrast with



contemporary traffic conditions. Vacant land is very rare and only dilapidated buildings can be found in a scattered form which provide some space for locating some of the infrastructure or these can be used for widening some of the "kuchehs". The buildings which have historical, architectural and religious value shall not be disturbed; perhaps these can be highlighted through a good design approach as it is shown in the design demonstration (Fig. 8.23 and 8.24). The healthy green spaces and the areas which have tendency to become green should be preserved and they shall not be used for locating other required infrastructure and facilities. The condition of structure shown in Fig.3.29 and 3.30 Chapter 3 is very helpful guide for control of such criteria. Due to scarcity of area for needed infrastructure and facilities, there is no way except locating some of these activities in the neighbouring "Mahallehs" of transit zone where land is available, or any where else where an old building can be used for a new purpose ( i.e., residential to school ) at the nearest distance to centre of the "Mahalleh". In old core area the exact criteria regarding the radius of functioning of a facility can not be followed. It is also important to preserve the traditional architectural character of the buildings in this areas in case of reconstruction of any building.

#### 8.6.2 Transit Zones

Areas which are younger than the old core areas and have more of vacant land to accommodate various requirements have been termed as transit zones. The architectural character and design criteria will remain same as those for old core. There are lesser buildings with traditional character than the old core, but still there are interesting elements like "Berkeh" or an organic community space which would become part of overall design theme, while any future development (Fig. 8.25) is being envisaged.

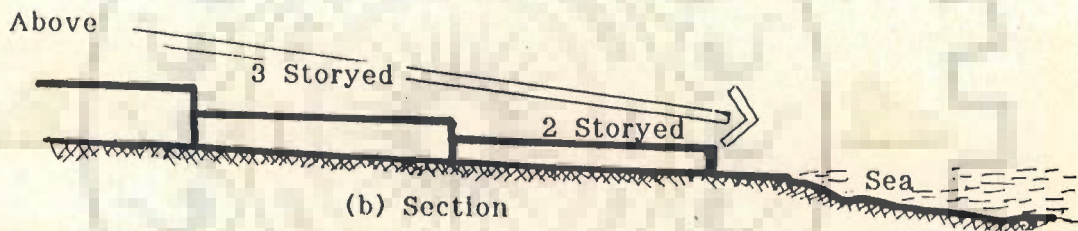


SEE FIG.7.5

H : Proposed Height

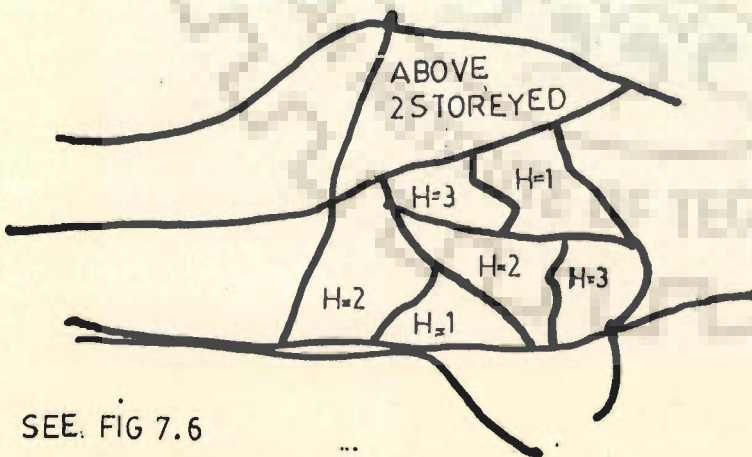
(a) Bandar Lengeh

Sectors of 7, 8, 9A, 15A, B and 10 : 240 sq.m. plot size and 2 Storeyed High  
 Sectors of 1, 8, 9A and B, 3, 4B, 6B, 10, 11, 13, 17, 18, 19, and with in a  
 Depth of 200 m from Khalifeh Floodway: Plot size of 300 sq.m. and height of 2 m  
 storeyed except within a Depth of 30 M from Emam Street. Within an area of 30  
 from road side 150 sq.m. plot size would be allowed.



Height Control For getting better view by most of the Inhabitants.

Fig. 8.21 : Proposed plot size and No. of storey



SEE. FIG 7.6

H : Proposed Height

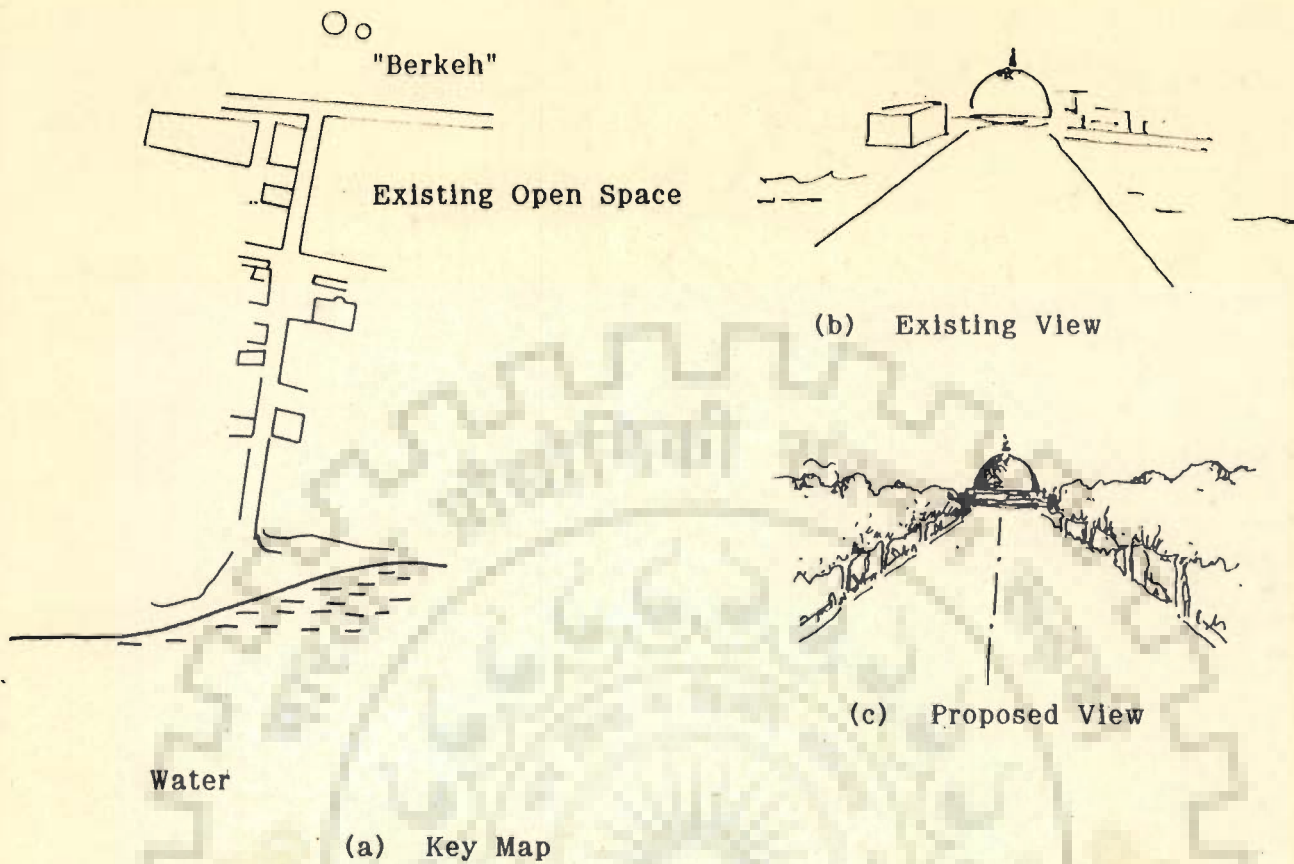
Sectors of 3, 4, 5 would have plot sizes of 300 sq.m. and height of 2 storeyed.  
 Sectors of 1, 4, 6, 8, 9 and 10 : 350 Sq.m. Plots size and height of 2 storeyed -  
 and above.

NOTE : The criteria for height is to build in Harmony with existing  
 traditional Built form and to have better view of the waters.

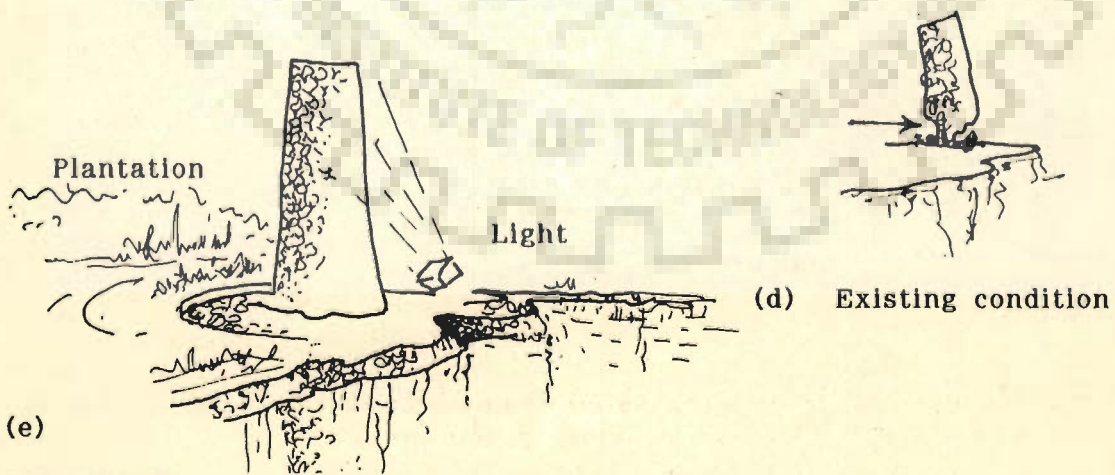
Coast line height 7 M except for Minarets, "Badgirs" and approved landmarks

Fig. 8.22 : Proposed Plot sizes and Building Height - Bandar Kong





By strengthening of the axis of "Berkeh" its visual quality will be heightened



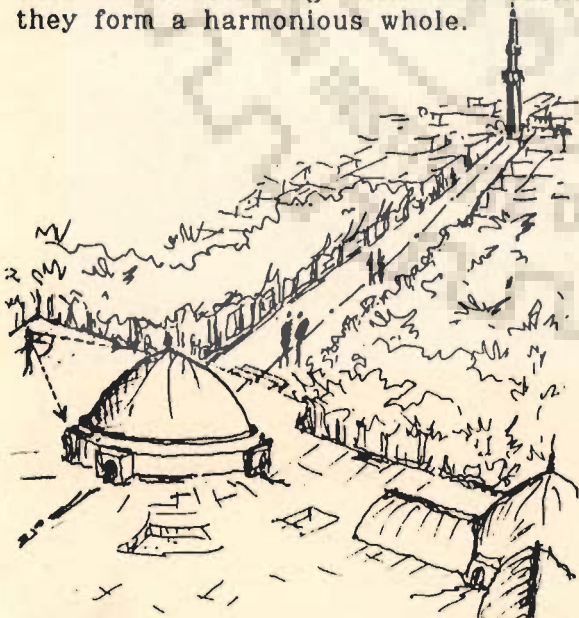
The foundation of tower in the fort in Bandar Kong is washed away by water which shall be reconstructed.

Fig. 8.23 : Revitalization of Historically and Architecturally important areas



The "Mahalleh" has been designed in such a way that all the elements of the site are incorporated in the design so that while retaining their own identity they form a harmonious whole.

Mosque the Parjty "Berkeh" the waters and other interesting elements of the site have been incorporated in the proposed design by the author.



Traffic is not allowed near the "Berkeh" therefore Cul-de-sac has been used.

Enough space has been provided around most "Berkeh" to act as a fore court so that their aesthetic beauty can be enjoyed and the traffic can be kept at bay.

Fig. 8.24 : Design Criteria with Respect to the important Elements of the site



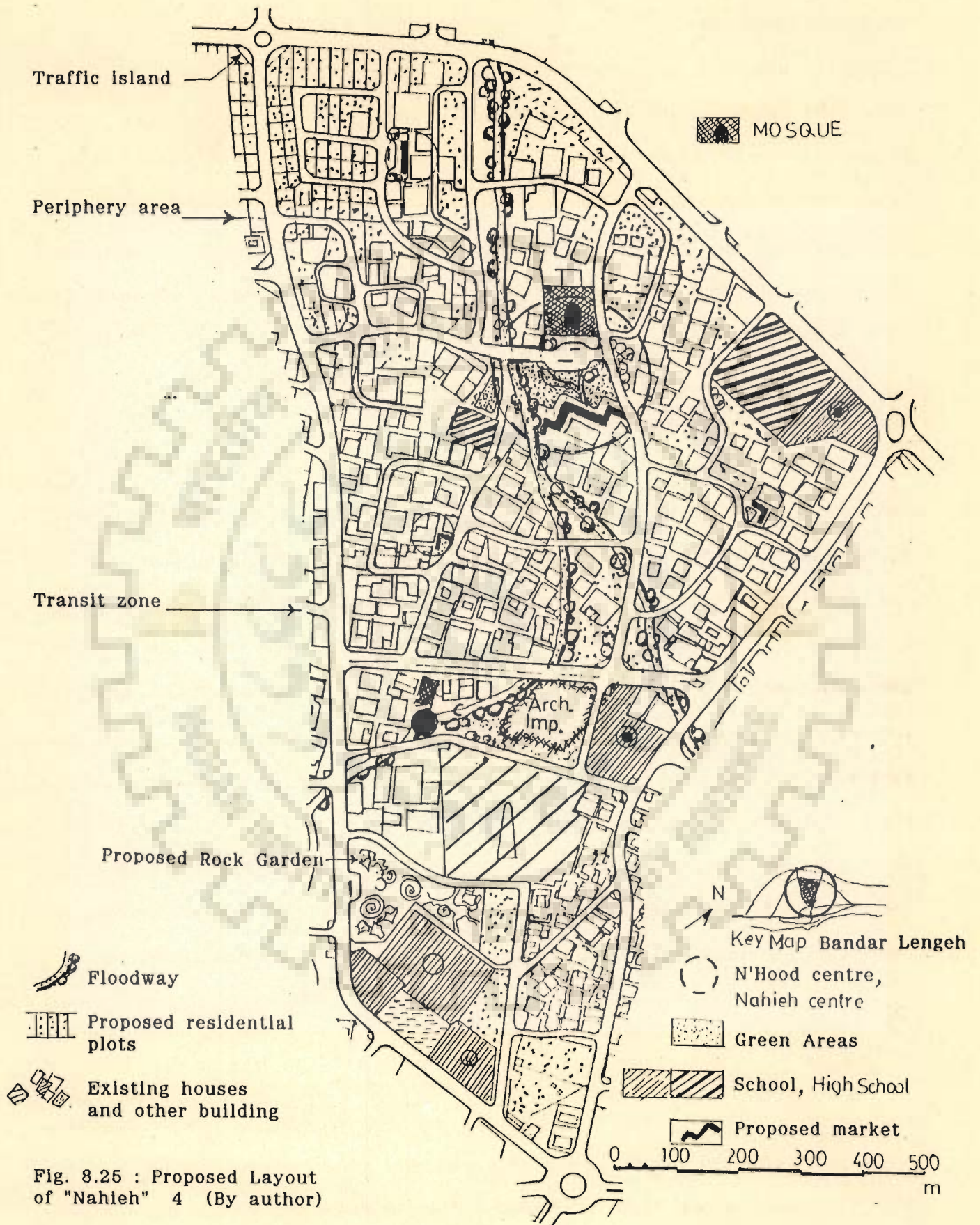


Fig. 8.25 : Proposed Layout of "Nahieh" 4 (By author)

### 8.6.3 Periphery areas

As it has been described in the urban design studies this zone does not have good space quality and proper architectural character. There are many unauthorized buildings and many of the plots have only boundary walls. These places can be planned and designed on the basis of proposed densities, space standards and the facilities can be located in required places and the required circulation system can be implemented as it is shown in various areas ( Fig. 8.25).

### 8.6.4 The Future Expansion Areas

Planning and designing can be done according to the norms which have been proposed already. There is no problem regarding vacant land requirements as such, and the limitation in this regard is minimum. Of course there are a few "Berkehs" here and there which will provide opportunity to orient our design towards them. There are other natural elements which may create limitation for implementing any required circulation system. These may be floodways or a garden etc. Implementing the regulation and norms of contemporary traffic and transportation is much easier in these areas than other parts of the town; facilities like nursery schools, schools and retail shops etc. can be provided within the required ratios. But this does not mean that the good criteria gained from the study of the old core areas should be ignored while designing these future expansion areas (Fig. 8.26 and 8.27).

## 8.7 "MAHALLEH" AND NEIGHBOURHOOD DESIGN

### 8.7.1 The Concept (Fig 8.28)

In 1911 the first model neighbourhood was developed by Clarence Perry and built in Long Island. His concept was that the neighbourhood should contain that population which could be served by one elementary school and that in



addition to housing, the neighbourhood should provide parks and recreation areas, local shops and civic institutions and an internal street system designed for specific local use.<sup>7</sup> However, as it has been discussed in the foregoing these settlement have strong social, traditional and religious beliefs.

In Perry's neighbourhood concept the Elementary School was the nodal factor around which other components of the neighbourhood were knitted, however, in the formation of "Mahallehs" in the present context the Mosque constitutes the generic centre around which the other socio cultural activities parallel to the Perry's neighbourhood get woven automatically and organically.

Therefore, in a newly planned neighbourhood both the mosque and the elementary school should form the important elements beside other elements such as dally required shops, community spaces, small park and tot lots etc. The physical aspects shall become important beside the social aspects in these newly coming up "Mahallehs". Generally, enough importance should be given to the pedestrians, specially, the children and the old people. The children need to have a school within a walking distance and the old people require a short distance to walk to the mosque five times in a day, as they are very particular about it. They shall have a safe and secure pathway for walking. Another important aspect is to determine the Gebleh i.e. Kaaba's direction as it is important for praying and other activities (Fig. 8.28). Through traffic has been discouraged by deliberate peripheral design of roads. The other factors which have been considered while planning the neighbourhoods are given here under :



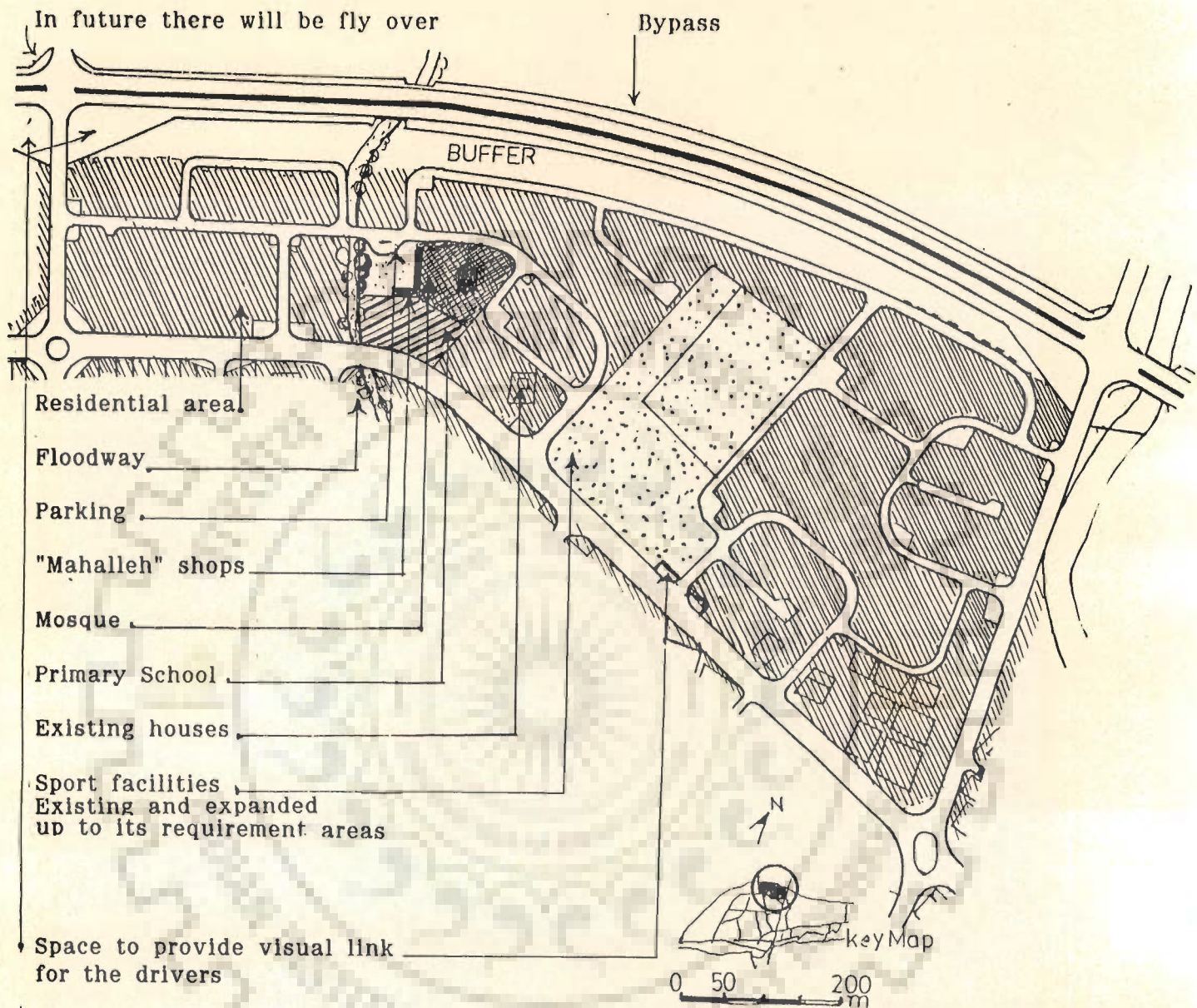


Fig. 8.26 : Proposed future expansion area (By the author) Bandar Lengeh Sector 12 -Scale 1:5000

### 8.7.2 Population

An average population of 2,000, i.e., 1000 to 3,000 persons with the suitable density as already proposed and with respect to the criteria for safety, security and privacy is recommended.

The houses as well as the circulation system shall ensure the safety and security of its inhabitants. The studies done on social aspects of old



core area show such type of criteria. Houses shall have high wall and inward opening, or they would have ventilators above eye level.

Building lines to control streetscape





These spaces have been designed based on speed and break distance for the driver.

Future extension area - proposed layout plan Plots for residence.

Transit zone  
Existing House  
Floodway



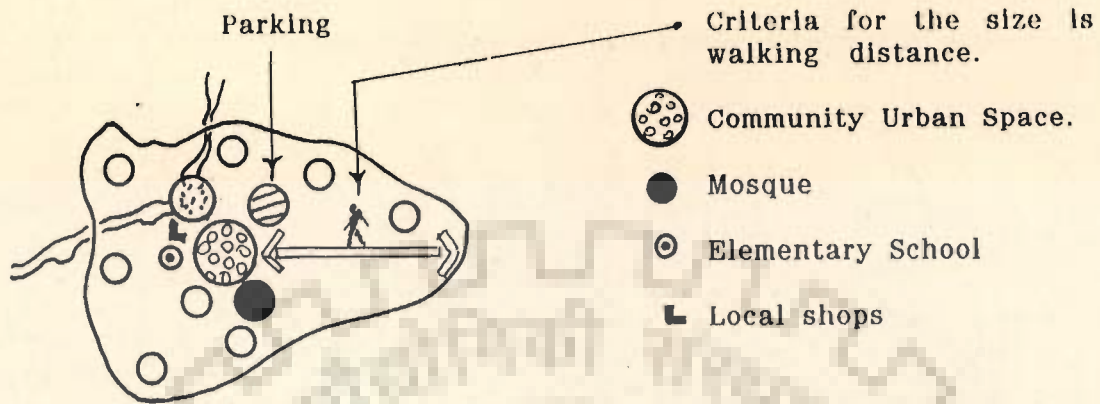
Key Map

	MOSQUE
	SHOPS
	SCHOOL, HIGH SCHOOL
	TECH. SCHOOL

0 50 200 m

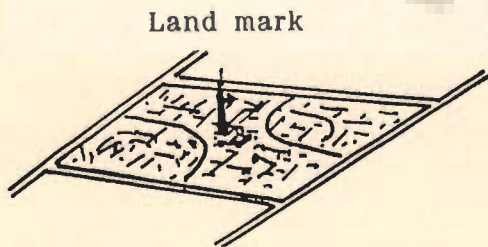
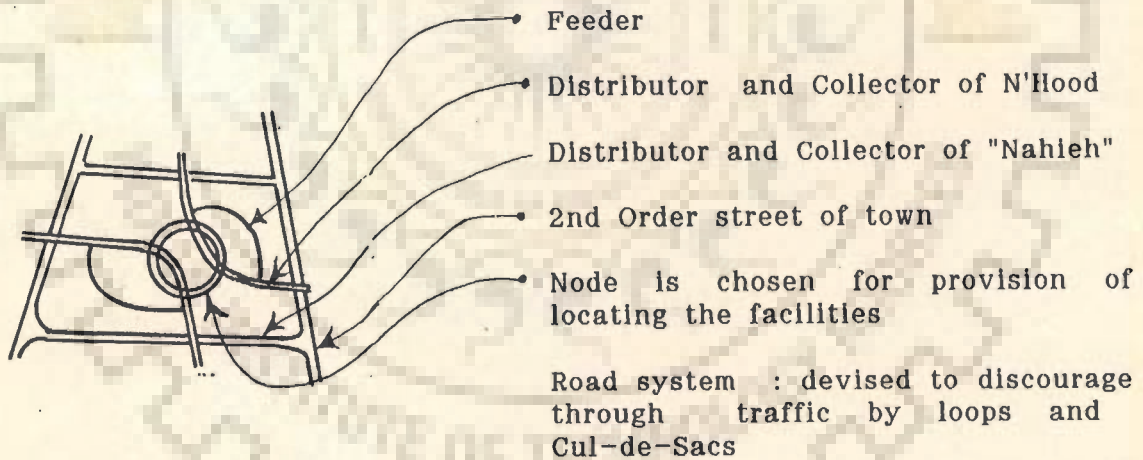
NOTE : The street network design would facilitate movement within the Unit but discourage through traffic

Fig. 8.27 : Proposed Layout Plan - "Nahleh" 6 (By the author - Bandar Lengeh



- ⊙ Areas to be converted into parks which have a potential to sustain greenery.
- Playground within the cluster of houses.
- ⎓ Floodway.

Population to support the provided facilities such as School, Shops, open and urban spaces



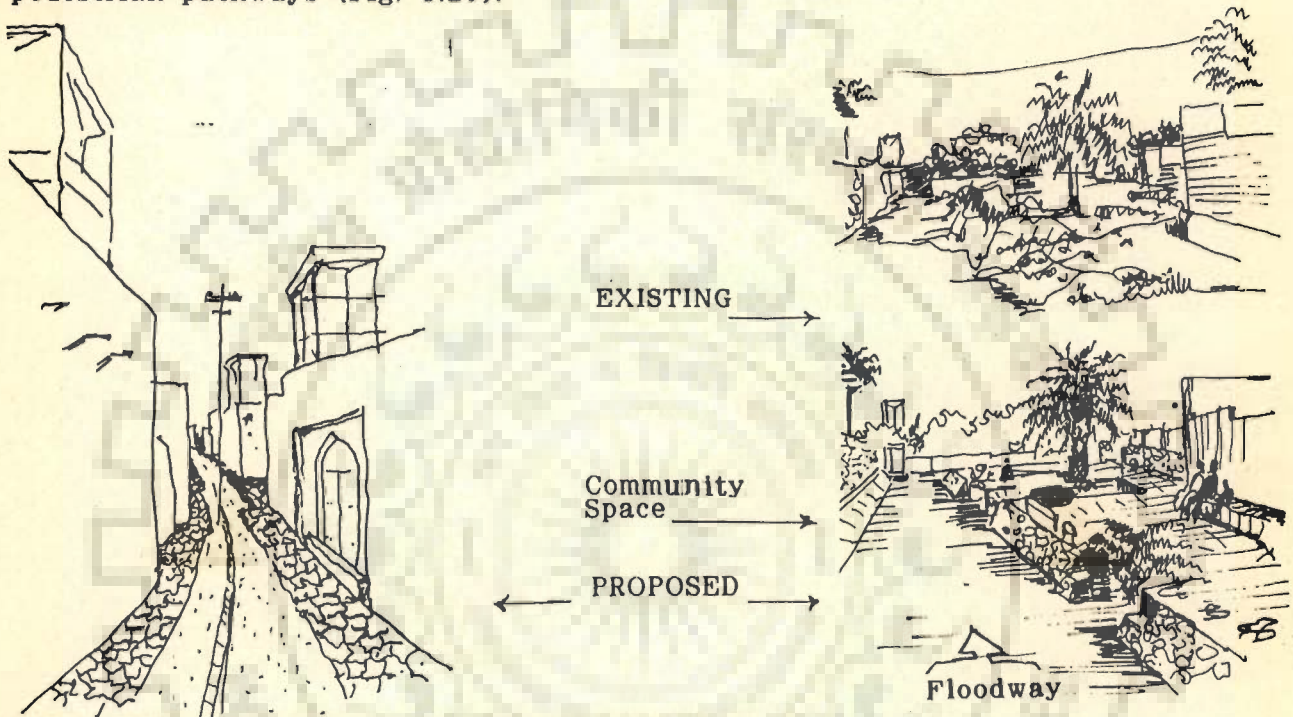
Land mark, for Unit identification : showing "Ghebleh" in "Mahalleh"

Fig. 8.28 : Conceptual sketches for Designing A "Mahalleh"



### 8.7.3 Revitalization

Creation of good atmosphere by providing minimum facilities for vehicular access with minimum destruction and maximum use of natural resources such as sea water landscaping and use of green spaces along the floodways for pedestrian pathways (Fig. 8.29).



Stone paving at side, Asphalt paving with an small channel for rain water drainage in the Centre.

Fig. 8.29 : Revitalization of "Kucheh" By the Author

Provision of harmonious land uses with residential areas and provision of green buffers where an incompatible landuse is at the neighbouring site (Fig. 8.30).

### 8.7.4 Orientation

Use of correct geographical orientation for the built forms for the type of temperatures which reaches to about 49 deg.C and a high degree of humidity; it is necessary to cut sun as much as possible through proper orientation of the built forms as shown in Fig. 8.31.

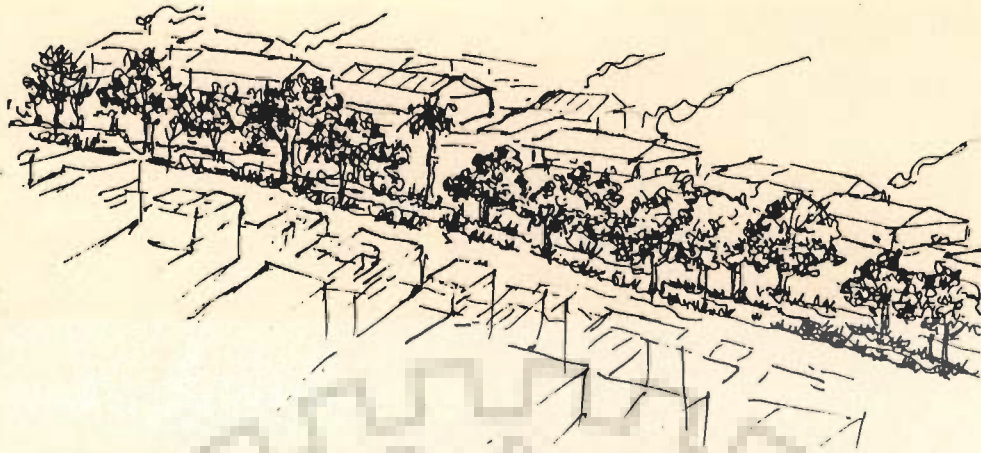


Fig. 8.30 : Green Buffer : The natural green space at the side of floodway selected to act as a green buffer between industrial area and the residential areas.

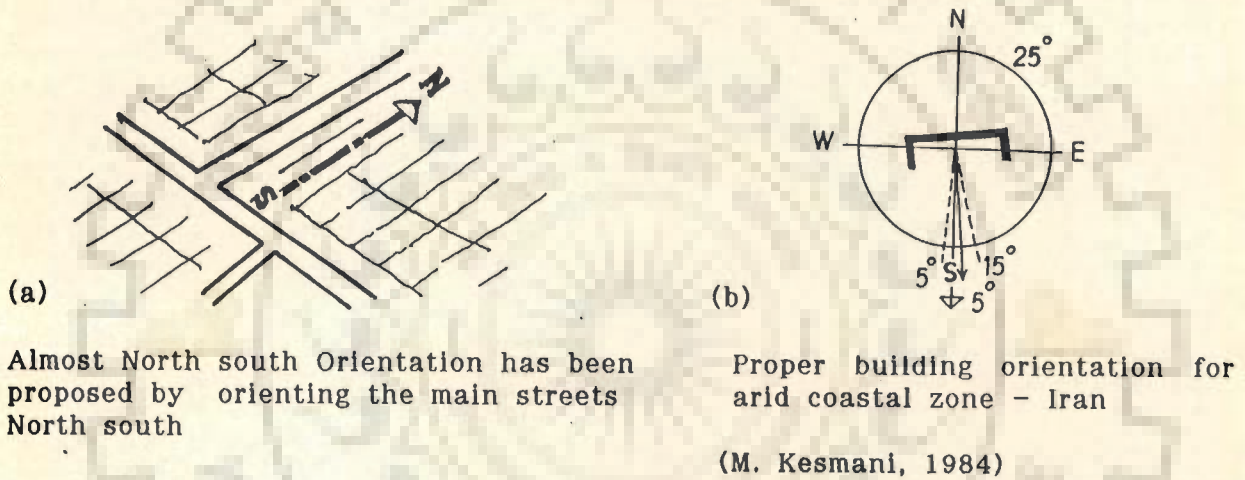


Fig.8.31 : Orientation

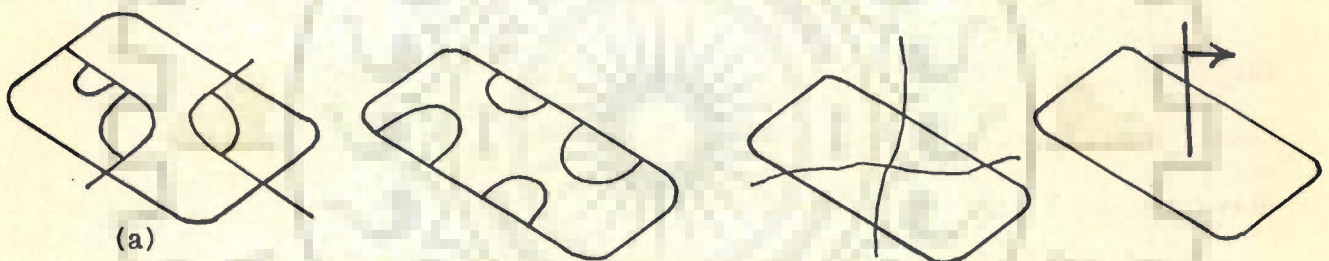
### 8.7.5 Unit of Identification and Sense of Orientation

This is now widely accepted that physical design should provide the inhabitants of a community, both with a sense of belonging and a sense of orientation-- whether you are stationary or moving in the town.

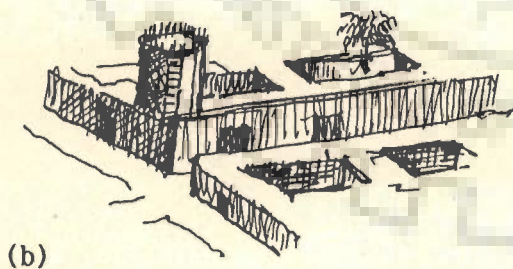
Variety and relief in the design of different "Mahallehs" would provide urban identity for easy recognition of a group of buildings. To differentiate various urban districts from each other and to ensure clear distinction amongst various building blocks in a neighbourhood, a hierarchy of spaces and



built from will be created. This will eradicate confusion for accessibility and curtail weariness while walking in the city. Of course, the fundamental laid out shall remain the same while creating any variety. This can be achieved by erecting an element of monumental scale for identification of an area ("Ghebleh Minar" ) at a large scale. The other approach which can be helpful at an eye level is to have different circulation systems, different design of houses, tree plantation etc. This will facilitate the children to find their way to the school, and a new comers to locate a point or a building. Above all, such a treatment of "Mahalleh" would provide each "Mahalleh" (Fig. 8.32) a flavour of its own and provide its inhabitants a sense of belonging and cohesiveness unique to each of these enclaves.



Sense of orientation in a "Mahalleh" has been achieved through different layout based on same principles and through other 3 dimensional design scheme and minaret of the Mosque showing the "Ghebleh" too.



Unique design of "Badgir" (wind catcher) Acting as a "kucheh" landmark

Fig. 8.32 : Sense of orientation and landmark

### 8.7.6 Circulation System

One of the main concept for circulation system is to develop a system of net work which first of all does not allow extraneous traffic into the

"Mahallehs" or neighbourhood. Therefore, with respect to the kind of built form and the above aspects, various systems to fulfill the same concept can be used.

In the old and transit zone of these settlements cul-de-sac which provide accessibility within a radius of 100 m can work, for providing drinking water, fire fighting and other emergency services such as ambulances etc.. In the other areas (transit and periphery) Loop type of system has been suggested. In this way a kind of pedestrian path-way can be achieved so that children and old people can be more safe (Fig. 8.32a).

The street systems will discourage through traffic as the vehicles have to go through a longer distance. The vehicular traffic shall be minimal and would essentially be the neighbourhood traffic only. The width of cul-de-sac would be about 8 to 10 m in old core and for future extension areas 10 to 12 m. By pass road will have a width of 16 to 18 m.(Carriage Way) and the Right of Way for the First order is around 30 m.and second order about 20 to 24 m. The third order would be 16 to 18 m and neighbourhood collector street would be 12 to 15 m. (These suggested road widths are based on actual feasibility studies done by the author).

#### 8.7.7 Market Area

According to the daily requirements of each "Mahallehs" a small market has been proposed in the centre of neighbourhood units or "Mahallehs". This shall be within a walking distance and free from vehicular traffic interference. The norm for the number of shops has been worked out in the foregoing. This area will be the node of a "Mahallehs" where people meet each other and social



interaction takes place. Therefore, it has to have an interesting atmosphere by achieving or creating attractive spaces and well landscaped area. Landscape furniture is required to give better meaning to these spaces. The shops serving in these areas can be bakery, vegetable and grocery etc.

#### 8.7.8 Residential Area Layout

Various aspects derived from the study of the traditional areas mentioned in previous chapter and the future and contemporary requirements such as social, economic, climatical, topographical, ecological, Landscape, geological and the visual and aesthetical aspects are the basic factors that shall be considered in the layout of a new "Mahallehs" or in revitalizing of an old area. The typical design demonstration of the layout of different "Mahallehs" can be seen in Fig. 8.25, 8.26, and 8.27. It has been tried to achieve most of the things through a logical way and not with personal bias.

The quantity of various landuses have been shown in Fig. 7.9 in Chapter 7.

### 8.8 SETTLEMENTS SPACES

A matrix was proposed (Fig. 3.116-Chapter 3) to study the various spaces in the settlements as it was not advisable to study various spaces in a haphazard manner. The hierarchical order also shall be considered for the proposal of different spaces in the urban set up, from the cluster of "Kucheh", to the regional level. These green, open, parking, urban and community spaces are as follows :

...

#### 8.8.1 Tot Lots

These are spaces which are secure and wider than a corridor space of "Kucheh" in which children can play. The "kucheh" space usually gets wider and forms a place for children to play in the old core and traditional areas.

Usually there are some dilapidated buildings ( Fig. 8.33) in core areas which can not be reconstructed as such. These are proposed to be removed and the spaces that created are used as Tot lots. Tot lots are also planned in other parts i.e. of transit area and areas of future extension, keeping in view the safety and security of children. Each cluster or a few clusters shall have such spaces. Although, there are many spaces available in periphery areas, but these are not well defined and these required to be delineated with the help of either new building blocks or plantation (Fig. 8.33 & 8.34).

#### 8.8.2 Parking Spaces

These have been provided in the required places like market area and in front of buildings which offer common activities. These are approachable to the traffic through collector and distributor streets of "Mahallehs".

#### 8.8.3 Urban Spaces

These are more complex than community spaces, these are provided in front of buildings with some general activity or a sitting arrangement under a tree. Similarly urban spaces are provided at a larger scale and work as a meeting place amongst a few "Mahalleh" and at the "Nahieh" and city levels (Fig. 8.35 & 8.36).

#### 8.8.4 Community Space

There are spaces with larger scale at "Mahalleh" level and they incorporated in the market areas, in front of the mosque where common activities will be going on. These are located at the main stream of movement and at the nodes of the "Mahallehs". These will serve as meeting places as in the old core areas.



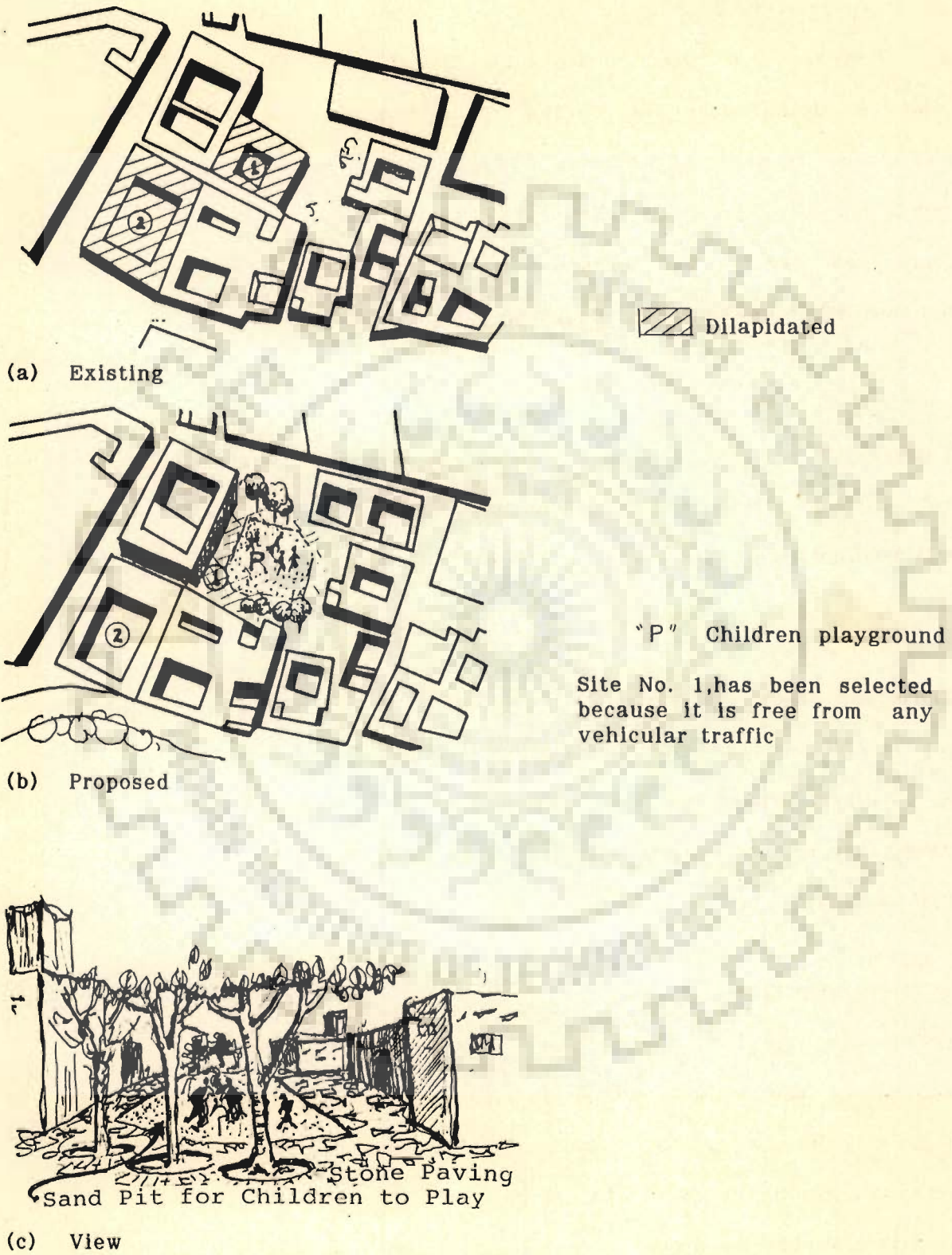


Fig. 8. 33 : Dilapidated building converted to children playground - Sector 2A, Bandar Lengh

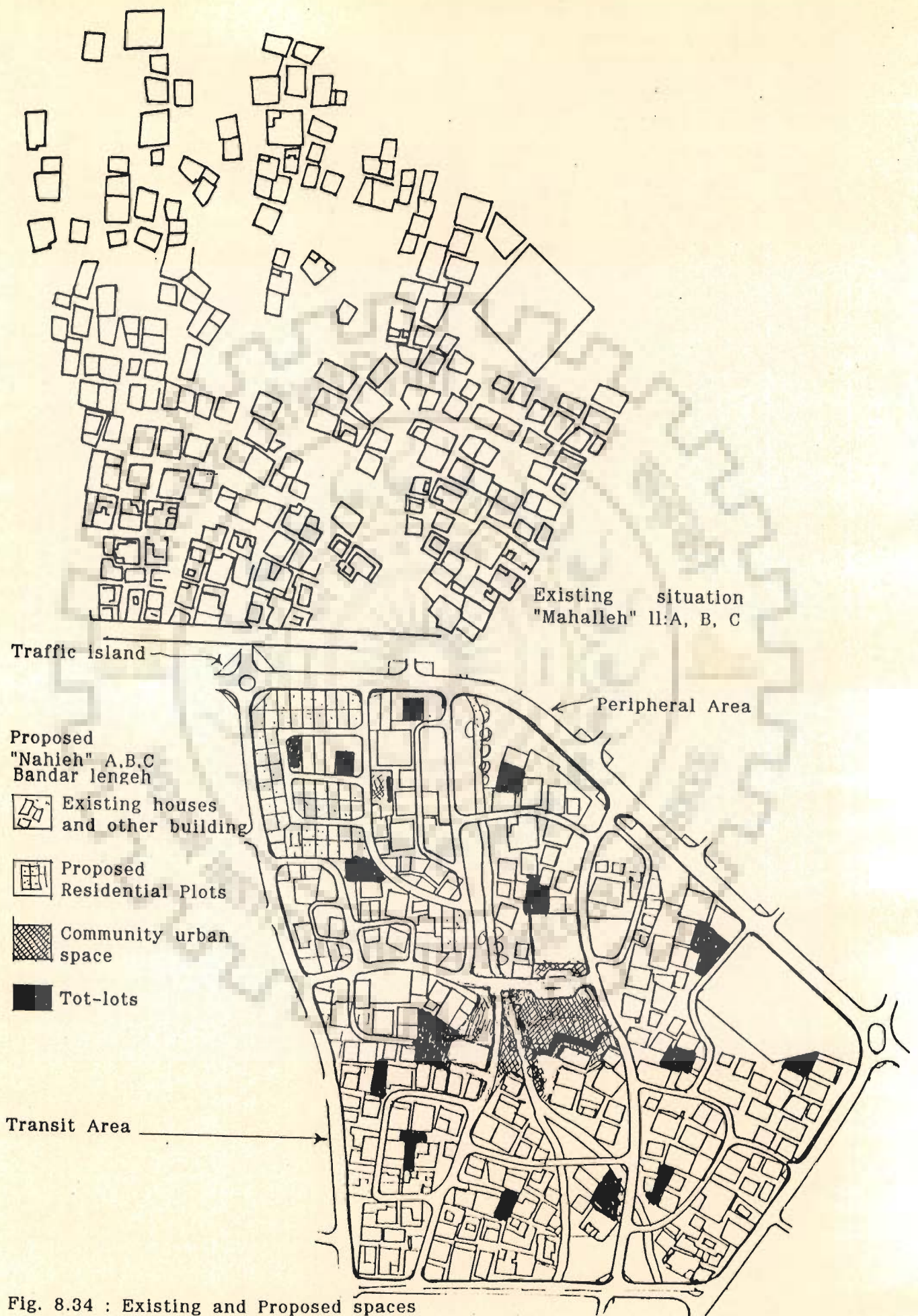




Fig. 8.34 : Existing and Proposed spaces



Existing situation  
"Nahieh" or Sector 6B

Transit zone

 Proposed "Nahieh" 6B  
Urban space at "Nahieh"  
level.

 Tot lots

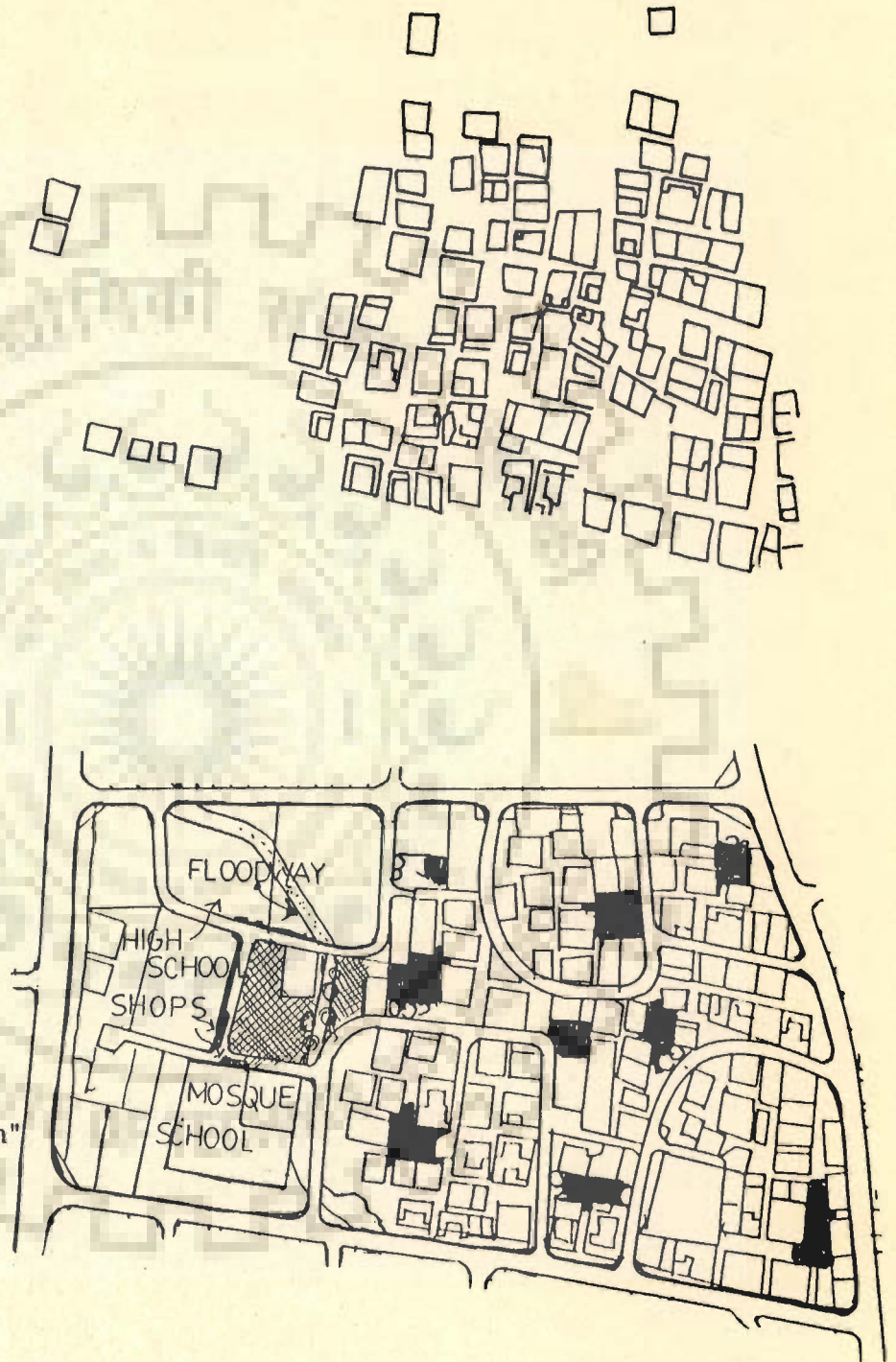


Fig. 8.35(a) : Existing and proposed spaces - Bandar Lengeh





Urban spaces indicates the order of gathering which are :

- 1. Town Level
- 2. "Nahieh" level
- 3. "Mahalleh" Level
- 4. "Kucheh" Level

(b) Bandar Lengeh



(c) Bandar Kong

Fig. 8.35 : Major urban Spaces



space



Fig 8.36 : Spaces at Sector Level - Bandar Kong - Core Area

## 8.9 GREEN SPACES AND LANDSCAPING

Various green spaces are proposed in low lying areas in these towns, which have potential of developing into neighbourhood and city parks (Fig. 8.37 to 8.41). As has been discussed in the Chapter 6 and 7 concerning planning issues, the streets are designed with streams at both sides and the entire runoff and surface water at the town level shall be brought to water some areas and then take these to the floodways which further can be used for irrigation and upgrading of large green areas before draining into the sea (Fig. 8.37 & 8.41).

Street furniture like lighting, sitting arrangements and plantation can help to bring life in the "Mahallehs". Floodways which pass through residential areas are given prime consideration in maintaining their required

space and defining their channels, an alternative proposal has been shown in (Fig. 8.39) which has different levels, so that if the amount of flood is not much it does not look ugly.<sup>B</sup> Plantation of local trees and the pathways beside it adds to its visual quality and moderate the micro climate.

### 8.9.1 City and Regional Green Spaces and Recreational Areas

These will be the green spaces which work at the city scale and the entire population of the town can enjoy their natural atmosphere. The spaces which are green to an extent or they have potential to develop to a green space and may have the view of water (Persian Gulf) would become city green spaces and those with the same property but located in between the two settlements and are approachable by both the inhabitants of Bandar Lengeh and Bandar Kong would work as regional green spaces.



▲ Proposed surface water circulation      ● Proposed park (by the author)  
 Proposed surface water circulation along the roads to feed water to green spaces and "Berkehs".

Fig. 8.37 : Proposed circulation of rain water - Bandar Lengeh

The Sea side areas of such nature are proposed to be conserved for recreational purposes. Water shall be used as a strong element of landscaping



as well.<sup>9</sup> Through land reclamation and the construction of new break-waters at the heart of Bandar Lengeh a new piece of land has emerged; it is proposed to carve out water garden here by treating the water in different ways, such as a plane sheet or cascading over steps or waterfalls and various type of fountains etc.

Sculptural form of coral stone and plant species which can grow at the site shall be used to revitalize these places. Interesting pattern will be created by deploying materials like sea shells (mother of pearl) which are available at the site (Fig. 8.42).

#### 8.9.2 Green Buffers

These act as edges of an incompatible landuse to insulate them from each other and reduce the unwanted impact of one upon the other.

The space proposed along the by-pass with a width of 30 m. and the green spaces at the edge of industrial areas are such type of spaces .

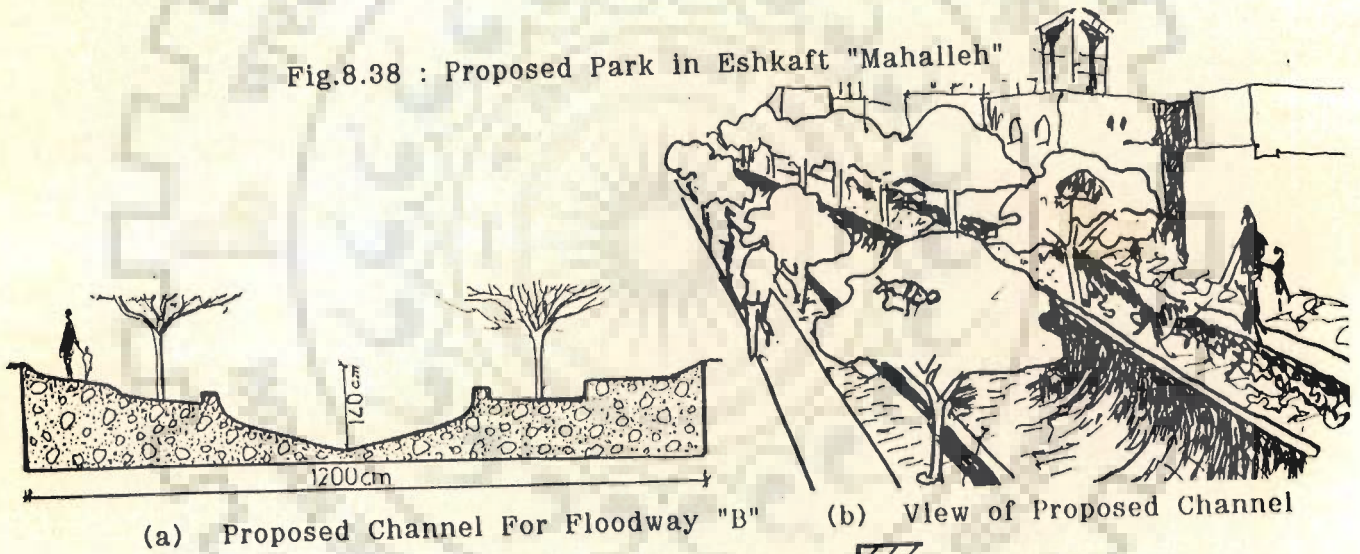
#### 8.10 Visual Corridors

There are other spaces which provide visual link at the junction or crossings of roads and work as traffic islands (Fig. 8.27), these have been designed according to the speed of vehicle moving on the roads and the distance required to stop the vehicle.

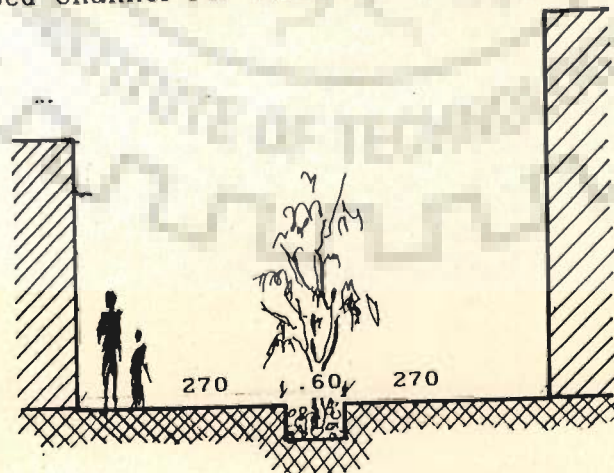
The other green spaces which required to be conserved, are private orchard areas, the boundaries of which have been determined in the case of Bandar Lengeh and Bandar Kong through actual survey by the author and these are shown in the drawing (Fig. 8.43)<sup>10</sup>



Fig.8.38 : Proposed Park in Eshkaft "Mahalleh"



(a) Proposed Channel For Floodway "B" (b) View of Proposed Channel



(c) Kucheh with Stream in Centre, Proposed to be Revitalized

Fig. 8.39 : Proposed Channel



It is very essential to avoid cutting of any tree or date palms in this zone and the same has been ensured in the proposal prepared for the two settlements.

Many core areas are cluttered with closely packed traditional development and are not amenable to easy solutions for providing vehicular access. Vehicular access which is required for emergent situations like fire tidal, ambulances, drinking water tank car etc. Such areas have been closely studied specially from the point of view of conservation and solution have been recommended as illustrated in Fig. 8.44 and 8.45.

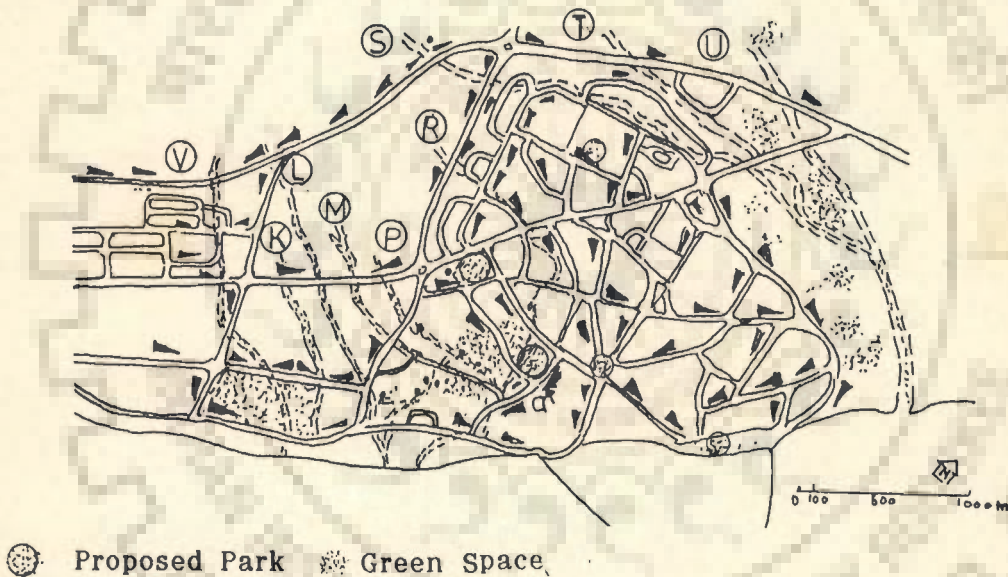


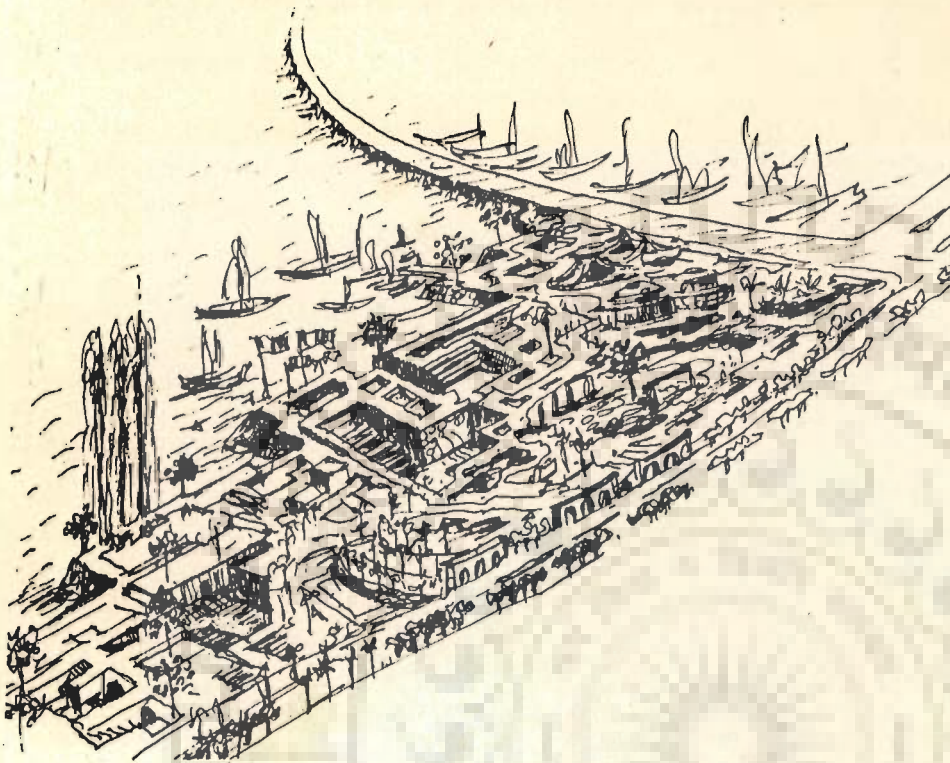
Fig. 8.40 : Surface Water Circulation - Bandar Kong (by the author)



(Existing Green Due to Flood Water)

Fig. 8.41 : Green Space View Behind Jama Mosque Proposed to be a City Park





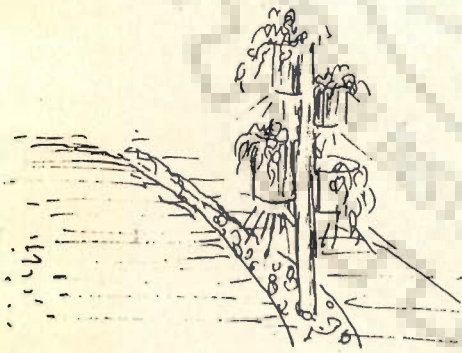
(a) Water Garden  
Near Jetty - Bandar Lengeh



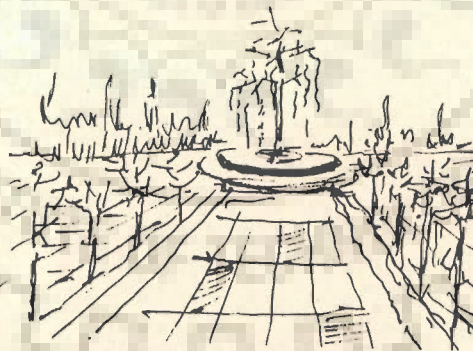
(b) Pathway with  
Fountain on both  
sides



(c) Path with Sheet of  
Water on one Side  
and Stone Wall on  
the Other



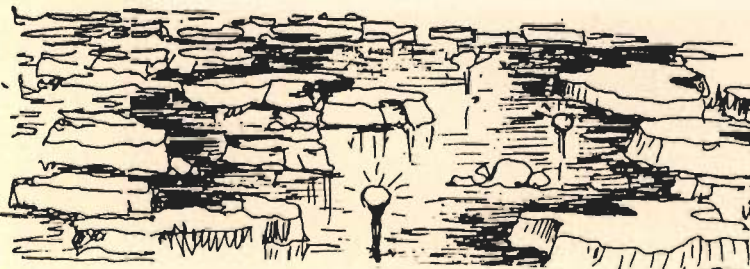
(c) Planter and lighting



(d) Vista of fountains



(e) Water Flowing  
over coral rock  
group



(f) Stone and Sheet of Water  
Fig. 8.42 : Water Garden Features



(g) Water getting  
out of a Stone Wall



## 8.11 CONSERVATION OF LANDMARK AND EDGES

Conservation of the interesting traditional edges and landmarks, is a must. It has been endeavoured to maintain, the edges of old "Mahallehs" in Bandar Kong and Bander Lengeh. Although it is very difficult to conserve all the edges during a long course of time, but important edges like the existing buildings or grains along the water - front in Bandar Kong, which with their traditional texture and the dominating "Badgirs" and minarets (Fig. 8.46) constitute important landmarks must be conserved. The effect has been to design and plan in such a way that the interesting traditional and even contemporary structures form, the important landmarks of these settlements. In the proposed design of Bandar Kong the application of this criteria is revealed in (Fig. 8. 24). For example, the "Berkeh" and minaret of Jama Mosque is kept on the same axis by which a kind of identity has been achieved, thereby, simultaneously integrating the old and new development.

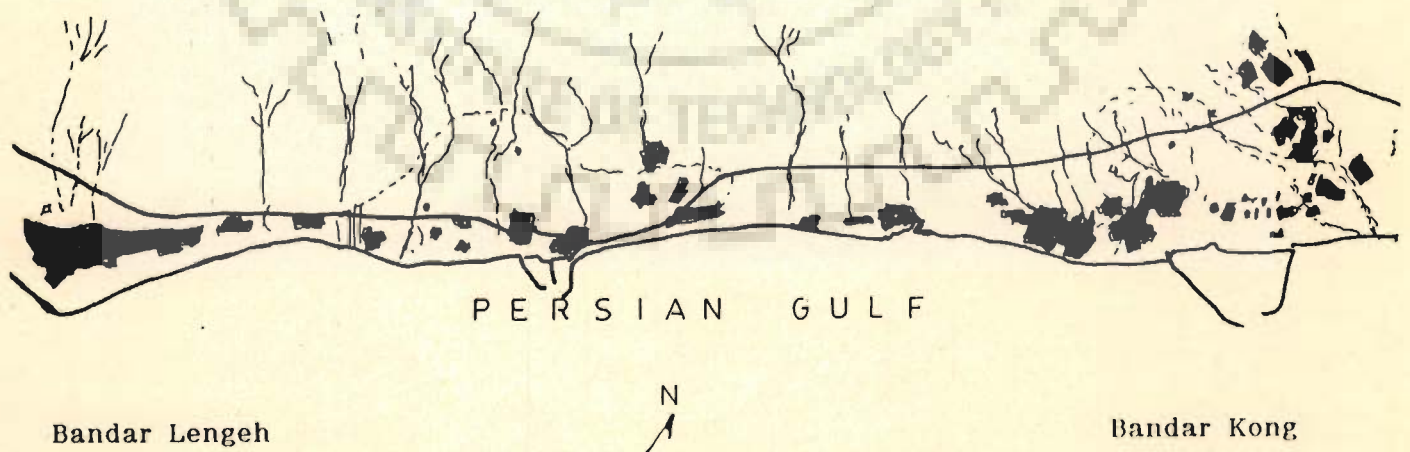
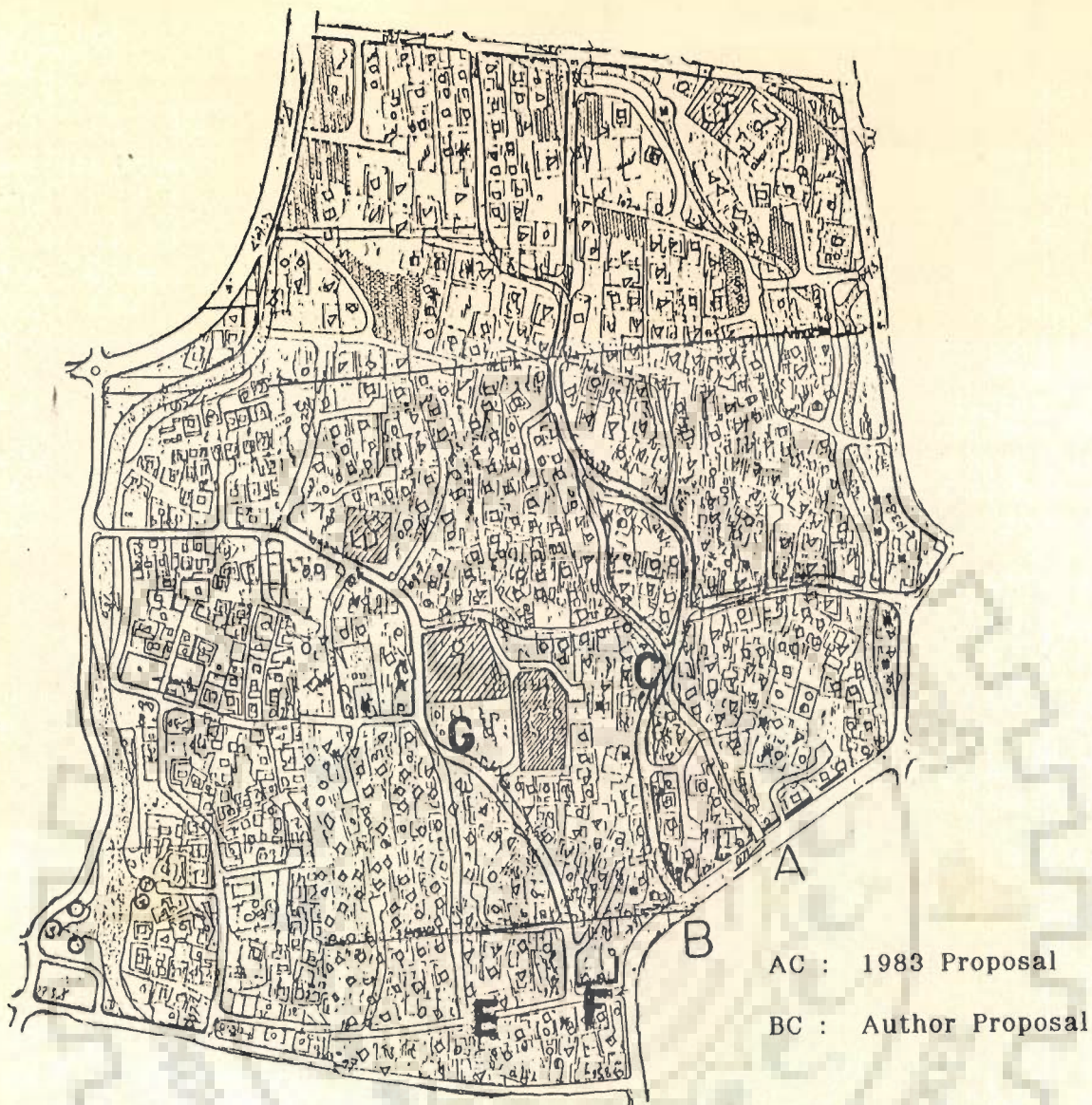


Fig. 8.43 : Green Spaces to be Conserved (by the author)





Part of the core areas Bandar Lengeh showing the road net work Proposed in 1983. The other alternative network shown in dark has better feasibility.

Alternative AC : 16 houses will have to be pulled down which have fair structural condition  
Alternative BC : Only parts of 7 houses will require to be demolished Therefore alternative BC has been proposed.

- Newly Built
- Fair Condition
- △ Require Minor Structural Repairs
- ∩ Badly Dilapidated

Fig. 8.44 : Access Road Alternatives Analysis





The traditional "Mahallehs" in Bander Kong with proposed cul-de-sac to discourage through traffic and maintain social cohesiveness

Fig. 8.45 : Proposed Access Roads in the Core areas of Bandar Kong  
(By the author)

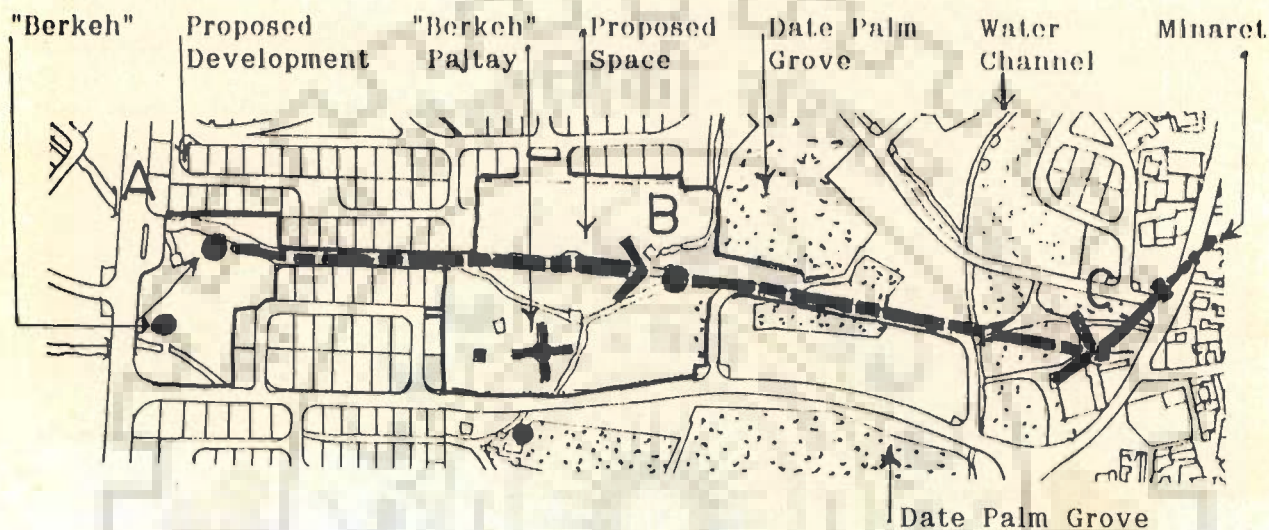


Bandar Kong

Fig. 8.46 : Revitalization of Waterfront by the Author.

As, it has been observed at the site, the "Menar" of Jama Masjid which is the most important Mosque of the town and is the gathering place of Friday prayers and talks, was visible from points A & B (Fig. 8.47). This axis has

been further strengthened to, not only, up grade the visual references, but also highlight the important physical and social overtone. From point A which is the pedestrian entrance to the site, a "Berkeh" at point B is visible and from point B the "Menar" of the "Jama Masjid" is seen in its alignment.



A, B, C Axis has been further strengthened in the new proposal To Highlight The Landmark

Fig. 8.47 : Design Criteria for Architecturally Important Places

While, it may not be possible to always have a monumental scale of buildings to create an important land mark at a desired location but fairly successful results have been achieved by creating excitement, by giving bends and turns to the streets and by bringing a sudden change in the perspective view of an observer.

### 8.11.1 Important spaces and Buildings of Architectural and Historical values :

These spaces and buildings have been defined in the previous chapters and they shall be conserved and to an extent revitalized by the help of



landscaping or by the type of layout which will be proposed for the areas around them. These are areas which are grown out of the need of society and their conservation is important.

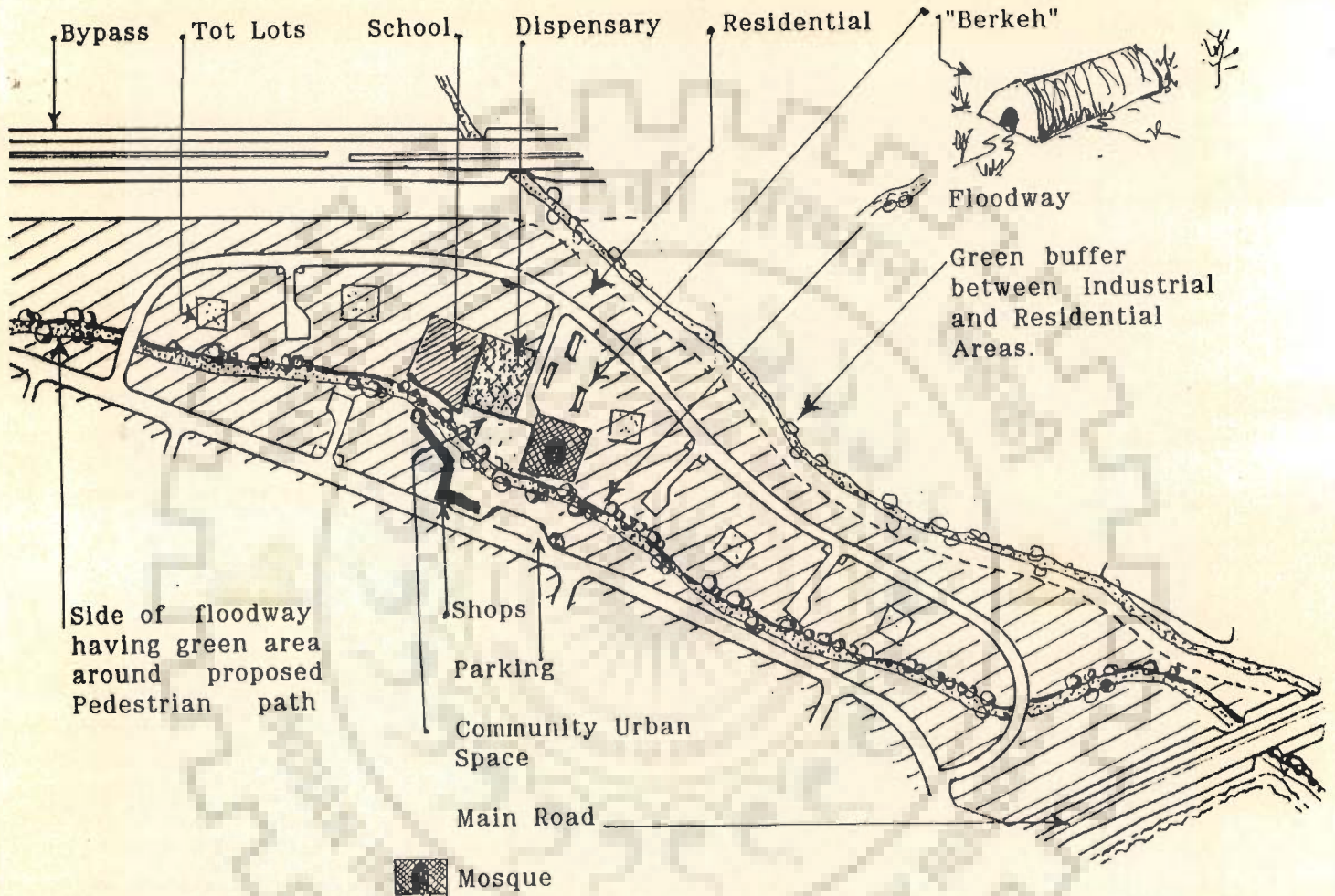
The required distance to have a good and full view of the important buildings has been maintained. The areas around "Berkeh" Panjtay in B.Kong, have been designed carefully by taking into account the importance of such buildings (Fig. 8.24c).

Some of the places and buildings form the image of these settlements strengthening of these places, shall be kept as an objective. There has to be proper rule and regulation to keep the traffic away which may result in damaging vibrations and prove injurious to the structure. Creating a relation between these buildings and the spaces around are very important and will further strengthen their visual values as in the case of planning of the areas around the "Berkehs" in west of Bandar Kong (Fig. 8.24).

#### 8.12 PEDESTRIAN PATHWAYS

The sides of some of the flood ways have been proposed to be used for pedestrian walkways and open spaces in the "Mahallehs". This is helpful in creating better living environment for the inhabitants. Side of the some of the floodways have potential of developing in to green areas as it was observed during the field survey (Fig.8.30, 8.36 & 8.37). Therefore, side of the floodways shall be planted by the specified plants (appendix P). It can be done either now or after canalization. Any green spaces existing at present have been incorporated in the design as pedestrian path ways or parks in the "Mahallehs" and neighbourhoods, so that the residents of the "Mahallehs" can

go to the market on foot in a better environment. In this way, there will be some impact on micro climate and a cooler place can be created for walkways (Fig. 8.48).



New "Mahalleh" design in Bandar Kong in which floodway side has been used as a pedestrian path to walk to the neighbourhood centre

Fig. 8.48 : Design criteria for a Mahalleh along the floodway Bandar Kong



## 8.13 CONCEPT AND CRITERIA FOR SOME OTHER AREAS

### 8.13.1 Seaside Edges

These edges are the most interesting parts of these settlements. Proper landuse have been proposed with respect to function, topography, eco-system, visual quality and all other aspect studied in the field survey. These areas are either built or they will be planned and designed for future. Those which are already built have gained a kind of identification. Studies indicates that by and large many important aspects have governed their development of design. The alluring skyline along the water shall be preserved, it should not go under derogatory changes. The visual form of the edges which resulted, was a direct out come of the immediate needs and the materials available at hand. Therefore, where new road development had to take place in Bandar lengh and Bandar Kong waterfront areas, it was done with consideration to the architectural significance of the existing structure.

The curves and bends in the layout have been tolerated essentially to conserve important existing buidlings and natural environmental features. However, it has been ensured that these are adequate sight lines and appropriate curvatures at bends commensurate with the desired speed of vehicular traffic.

"The assessment of the waterfront built environment is greatly influenced by facade of the buidlings and their skyline as mentioned before. These features, in fact, provide the first impression to any new comer. Major deviations from the traditional form in the prescribed pockets are to be resisted".<sup>11</sup>

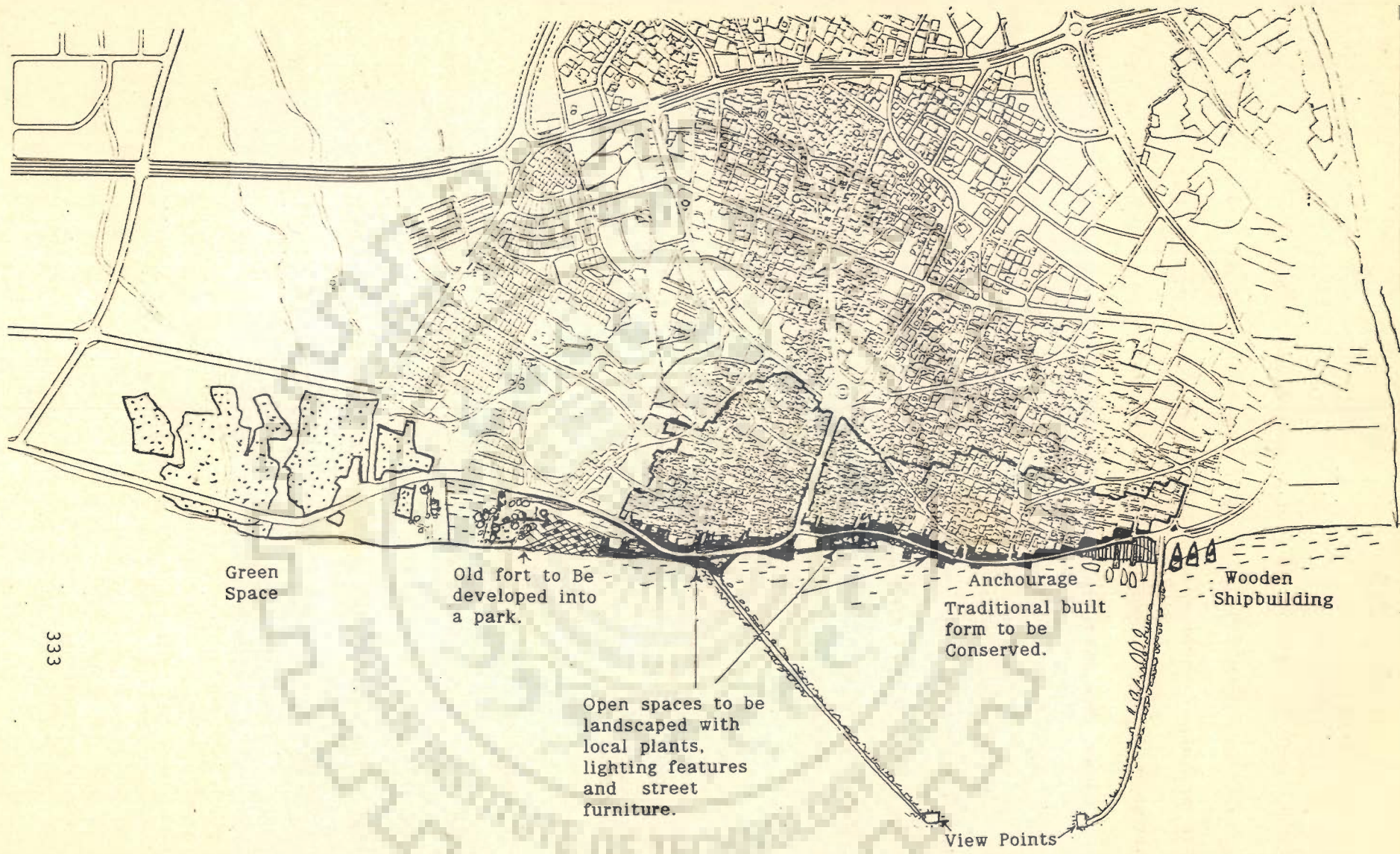
Guide lines for new development and renovation should be established -- based on the lessons learnt from the study of these areas and matched with the new requirements.

In specific pockets, identified for conservation, the policy could be more rigidly applied to conserve the existing man made and natural environment and take care of future development. The development of the seaside edges shall not form as a wall which may block the view of water to the heart of the settlements. Various view corridors have been provided which beside providing access to the sea side give good view of water too. Some parts of portuguese port is still in existence which requires immediate repairs; otherwise the bastion of the fort is likely to crumble, as its foundation has been almost washed away by the waves of the sea. The treatment for various part of the seaside have been shown in the drawing (Fig.8.49, 8.50, 8.51 & 8.53).

"Badgirs" and Minarets are interesting elements of the skyline which shall be preserved and reconstructed in case of decay.

In general, the seaside edges of the two settlements can be subdivided into various pockets according to the existing and proposed landuses. These are the built edges, i.e., man made structures and the green edges which are natural ones. There are places which are a combination of both, and there are vacant lands which have been used for future development. These all are shown in the drawing (Fig.No.8.49, & 8.50). The conservation and upgrading or revitalization of every pocket has been given importance. For example, new plantation and saving of the old trees and date palms from the animals or any other disturbances has been stipulated. The ship buildings workshops in Bandar Kong which is nonpolluting activity, not only adds to the beauty of the edges (Fig. 8.52) but also strengthens its seaside character. It is also an interesting site for the visitors and tourist to see the skill and art of the inhabitants of these settlements.





Green Space

Old fort to Be developed into a park.

Open spaces to be landscaped with local plants, lighting features and street furniture.

Anchorage  
Traditional built form to be Conserved.

Wooden Shipbuilding

View Points

333

Fig. 8.49 : Proposed water front treatments and activities

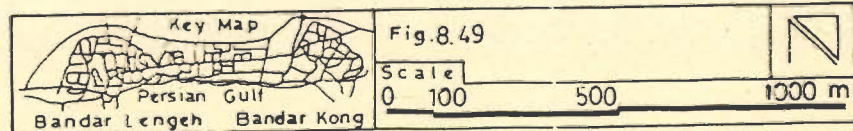


Fig.8.49

Scale

0 100 500 1000 m

Bandar Lengeh Bandar Kong





Fig. 8.50 : The Waterfront

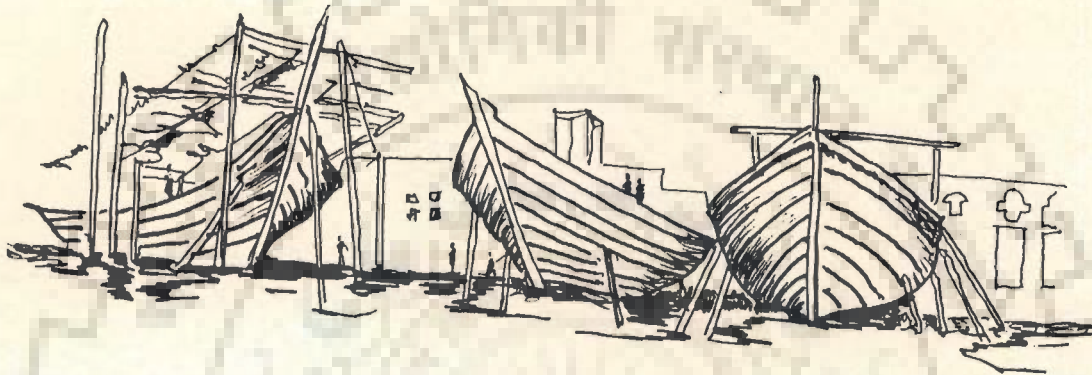


Fig.8.51 : Wooden shipbuilding Industry

The monochrome earthen colour of sea side built forms against the blue sky and based with magnificent sheet of water has been maintained. The sunset view behind the ships is the interesting view of the coastal zone for which good view point has been established so that not only the inhabitant but also outsiders can enjoy this beauty.

#### 8.13.2 Hierarchy and Relation of Spaces, From Tot Lots to Regional Green Spaces

A matrix was proposed in Chapter 3 for the urban design studies and analysis of spaces as a yardstick and in residential area layouts also some of these spaces have been discussed and certain proposals have been given. Here all these spaces have been presented in a drawing form in which it is clearly shown as to the kind of space and the function that space has to perform along with its location which has been illustrated in (Fig.8.33 to Fig.8.35).





Fig. 8.52 : Proposed Waterfront Treatment - Bandar Kong

### 8.13.3 Hierarchy of Landmark

(From two dimensional to three dimensional)

Studies and analysis of the existing landmarks and their classification have been done in the foregoing. Therefore, here we deal with the proposal of new treatment of the existing landmarks. In revitalization of traditional areas, the revitalization of the existing landmarks become important too. That is by improving their function. This has been achieved through orienting the access road towards them or by providing visitors view on their axis. The axis further has been be strengthened by defining it through building blocks or plantation or may be color and paving (Fig.8.53).

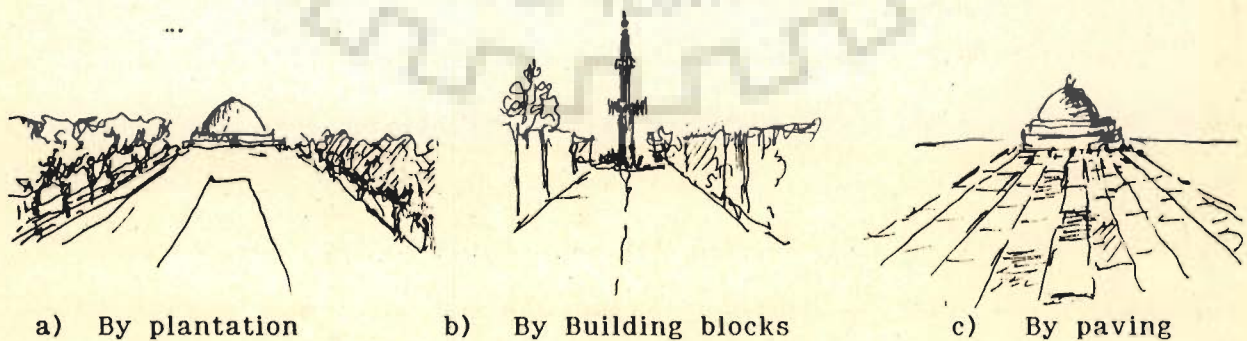


Fig. 8.53 : Upgrading visual Quality of Various Landmarks



Corridor view from certain nodes to these land mark has not been blocked at all in case of any reconstruction. The important buildings are expected to be given monumental scale in future, to act as city level land marks, in future urban extension areas.

A landmark for a "Mahalleh" would be a "Berkeh" or a Mosque dominating the "Mahalleh". It is not required to have a very much different scale, that much which it can be addressed will be sufficient and it will function as such. "Badgirs" with different design are expected to form landmarks for "Kuchehs".

It can be even a group of trees or an interesting neighbourhood shopping complex. The landmark at city level should be dominating if not from the city gates but at least from the important city streets and boulevards. These shall be well identifiable in the skyline of the town from edges like seaside; it is very difficult to have one landmark for entire settlement. Therefore, every "Nahieh" have its own land mark these not only address the important areas of the town, but constitute a strong image for an observer or a visitor.

#### 8.13.4 Visual Link

From urban design point of view it is desirable to provide visual links from one important element to the other or from an important space to an important element of a monumental scale and vice-versa. These can be provided according to the opportunities offered by the site or on the basis of some logical concept or through a judicious combination of both. For instance, the area around "Berkeh" Panjtay in Kong has been designed (Fig. 8.25 and 8.47) by following the last stated principle. As one enters the area near "Berkeh" Panjtay the minaret of Jama Mosque becomes visible. This create a pull factor towards the natural park too; and one can walk through the park and reach the



most important Mosque in the settlement. There are visual link from one "Berkeh" to another and from entire area to the waterfront.

The site in front of the proposed town market which is the core area of Bandar lengh has been proposed for a children park. While on one side it provides its users a magnificent view of the Gulf waters but at the same time it permits an uninterrupted view of the sea from the old centre.

The other elements of the towns have also been woven in a similar chain of visual links through deliberate design efforts.

#### 8.14 POTABLE WATER, FLOODWAYS

Beside the conservation of the traditional water supply system, more of distillery of sea water plants shall be introduced according to the requirements.

Comprehensive proposals in harmony with the economical condition and with respect to present requirement as well as conservation of traditional system in use of natural resources can be worked out. The prospects are as follows :

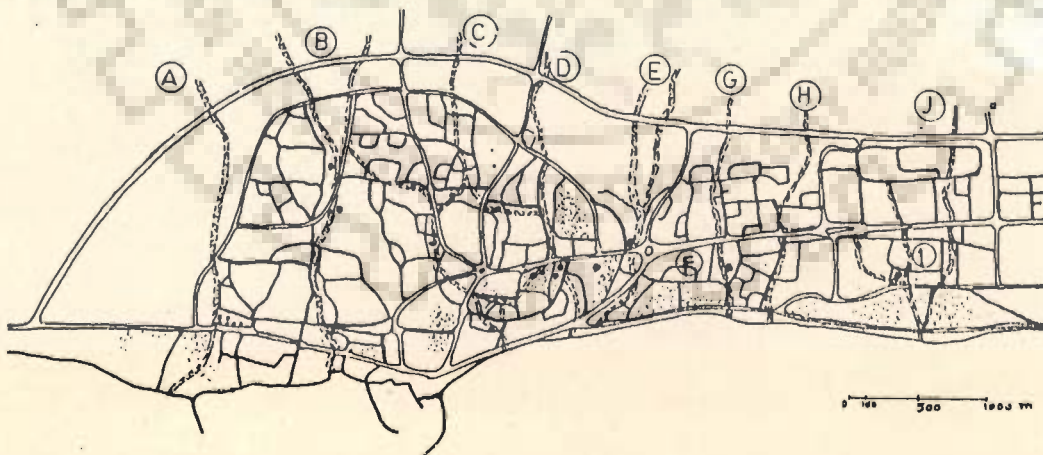
In the proposed plan (Fig.8.54 & 8.55) it has been contemplated to carry the water of obstructed floodways through a neighbouring floodway or the streams planned along the streets to feed the dried water storage tanks (Berkeh) and orchards. A branch of floodway "D" (Fig. 8.56) is one such example. It was feeding a "Berkeh" in Roudbari "Mahalleh" and today it is no more there<sup>12</sup> but the streams along the neighbouring street has been planned to feed that water tank. The revised circulation network of the already proposed master plan and the newly proposed network for "Mahallehs" and neighbourhoods which will be superimposed on existing situation can solve various problems created by interfering the eco-system of the developed pattern of floodways, by piece meal developments.

Wherever the floodways are obstructed by any construction, it is necessary to provide appropriate channels or out lets to allow uninterrupted flow of water in the floodway. An example of such a channel is illustrated in Fig. 8.57 where Shilat construction had put up a factory on the floodway. In future municipality authorities will have to exercise vigilance to ensure that such situations do not arise.

Building constructed  
in the floodways

(a)

Existing situation of  
floodways pattern  
Bandar Lengh



(b) Proposed Pattern of Floodways Conservation System

Fig. 8.54 : Existing and Proposed Pattern of Floodways





Fig. 8.55 : Proposed plan of floodway conservation system  
Bandar Kong

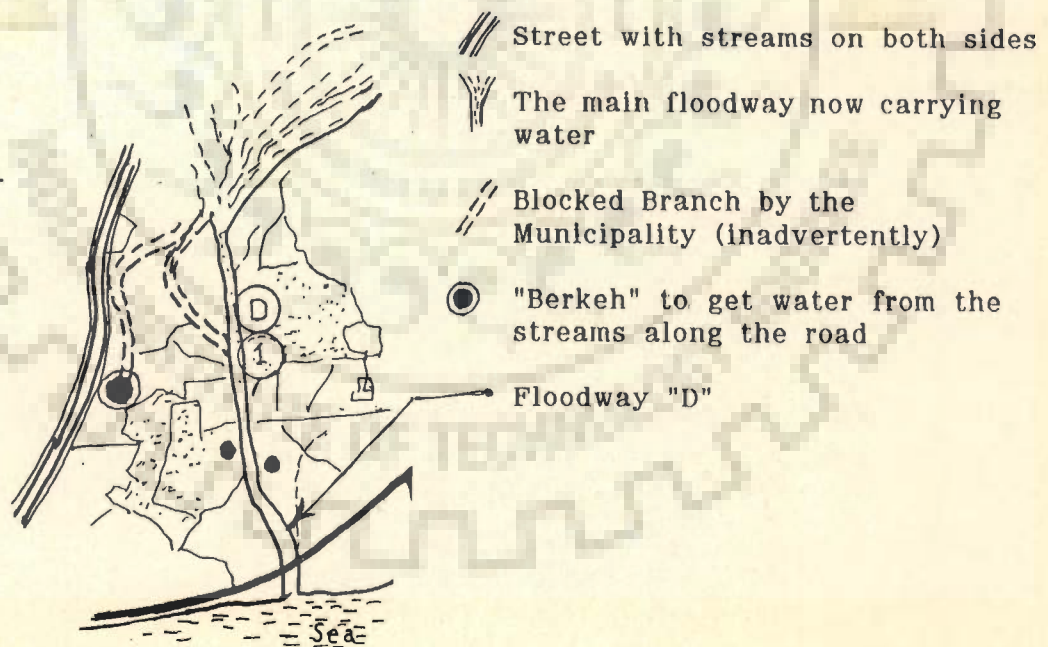


Fig. 8. 56: Floodway Conservation

Break in continuity of urban form has resulted due to the wide width of most of the floodways. This has further lead to increase in cost of urban

services and infrastructures such as pipelines, electricity and telephone wires and circulation areas etc. Some of the floodways can be filled as it is proposed and shown in the drawings. These are usually 3rd category of floodways (Fig. 8.58 ). The rest would be canalized as shown in Fig. 8.54, 8.55, 8.39a, and by use of the table 5.3 in chapter 5. When the municipality funds increase and the available land can be reclaimed for inward urban development.

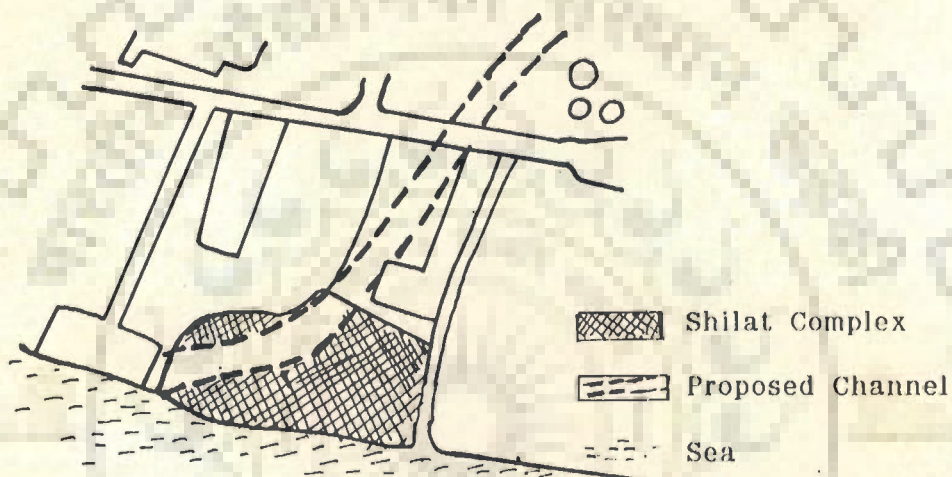


Fig. 8.57 : Proposed Channel to Solve Floodway Blocking.

#### 8.14.1 Water Distribution from Distillery and "Berkeh"

distribution is done either by animal or by mobile vans. Some of the houses situated in a narrow "kucheh" can not receive water because automobile can not enter the "kucheh". Therefore, various points of water distribution have been provided in every "Mahalleh"; water would be stored in tanks at each station and supply of cold water for drinking would operate automatically on dropping of a coin. These tanks can be filled by water which municipality brings from distillery or "Berkeh". This will solve problem of taking water to each house and reduce the volume of traffic in the neighbourhoods.



- This "Berkeh" would be fed by the streams along the neighbouring road.

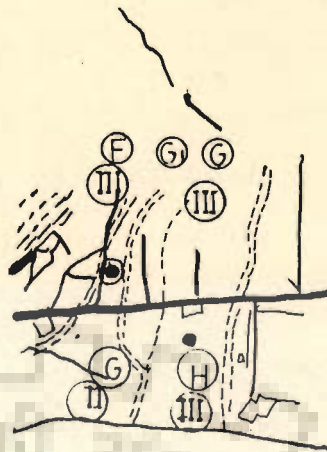


Fig. 8.58 : The floodways which would be filled are like "F" and "G".

#### 8.14.2 Criteria for Encroached Floodways

The floodways which have been encroached upon by the inhabitant due to unauthorized construction and dumping of debris are required to be dug deeper at places to allow the required discharge and flow of the incoming water. Table 5.1 in chapter 5 shows details of various floodways which have been refurbished in this manner to ensure that there is no undue over spilling of the flood waters.

The proposed shape of these floodways will accommodate plantation at its sides and as water increases more area can be occupied. When there is no flood water then it would not look bad in the urban scene, because of the proposed new configuration and the greenery.

#### 8.14.3 Maintenance and Conservation of Floodways and Green Spaces

To avoid the rubbish and muck finding its way into the "Berkeh" it is very important that municipality ensure through tough regulatory measures that no rubbish by the inhabitants is thrown or dumped in the floodways.

Further, before the floods are expected in the floodways the floodways should be cleaned and this should constitute a compulsory obligation of the municipality. It has also been proposed to have the intake of water to the "Berkeh" through sand filters to further purify the flood waters (Fig.8.59). Besides, regular chlorination is also recommended.

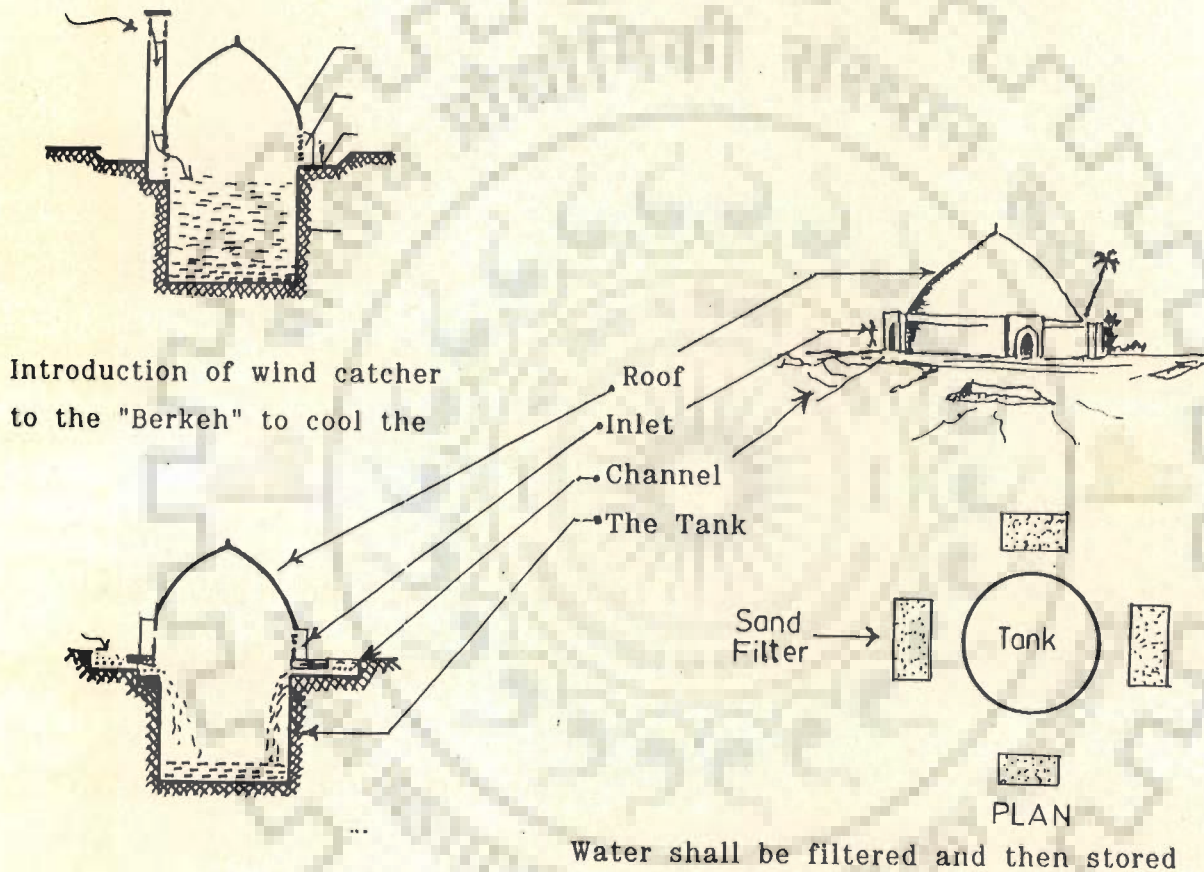


Fig. 8.59 : Proposed treatment of the "Berkeh" to improve their water quality proposed by the Author

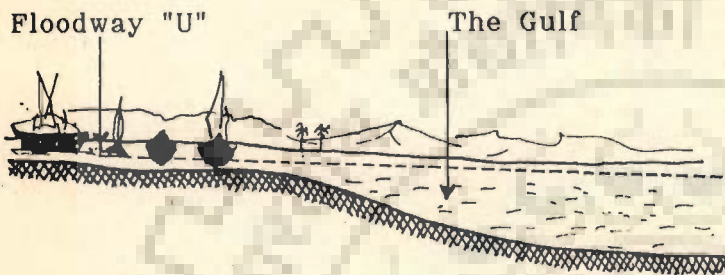
#### 8.14.4 Anchorage

Anchorage and harbour activities in the flood way U, can be revitalized by its clearing and brining down its level at the sea side. It shall be so desired that during both the high tide and the low tide water remains there (Fig.8.60). In this way ships and boats can have their long term anchorage over there, when there is no flood.



#### 8.14.5 Conservation of Natural Sources of Water

To conserve the rain water, defined flood plain shall be controlled by providing dams (Fig. 8.61) and releasing the required water to fill the "Berkehs" and watering the orchards and agricultural fields as and when required. This will save the valuable rain water flowing away into the sea.



(a) Section

Fig 8.60 : Revitalization of Traditional Anchorage Areas

All the neglected "Berkehs" shall be reconstructed and cleaned and shall join new organized system. More "Berkehs" shall be constructed. Water of "Berkehs" shall be well treated and after ensuring its hygienic condition, it will be allowed to be used by consumers. Wind catcher (Badgir) would be introduced in "Berkehs" for cooling their water by wind.

The studies in Chapter 5 revealed that the flood water of type first floodway can be controlled from the flood-plain, just by providing small dams around the flood-plains. This will stop the flood water from discharging into the sea in a short period of time and rain water can serve the community for a longer period. To avoid evaporation of water, it can be kept in various wells dug in the bed of the flood-plains.

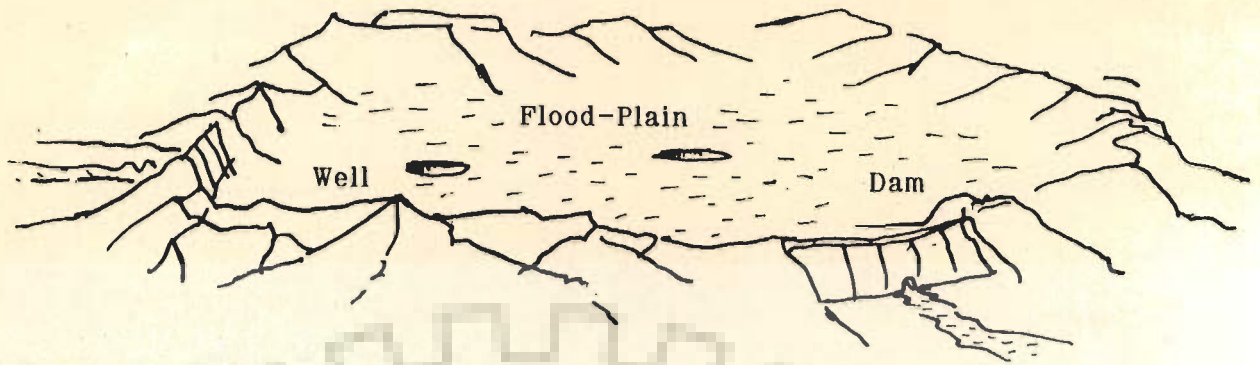


Fig. 8.61 : Conservation of Flood Water  
in Flood-plain is recommended.

We can conclude that the traditional water supply system shall be conserved and revitalized, even if these settlements get enough distilled water. Dumping of garbage; encroachment of floodway shall henceforth be strictly prohibited. Conserving natural sources of potable water in the Arid Coastal Zones, along the Persian Gulf should be given top priority in any settlement planning, if ecologically sound development is required.





# CHAPTER 9

## CHAPTER 9

### SALIENT CONCLUSIONS AND RECOMMENDATIONS

#### 9.1 ABSTRACT

In this chapter final conclusions and recommendations have been incorporated, which it is considered would be applicable in general to all settlements in Arid Coastal Regions in the Gulf and to Bandar Kong and Bandar Lengeh in particular. Conclusions and recommendations are further sub-divided into those that are relevant at macro level and the others that have significance at micro level.

#### 9.2 CONCLUSIONS, MACRO LEVEL

- Planning of the settlements need adaptation to local dominant climatic elements for ensuring a living comfort.
- In view of extreme scarcity of potable water, there is an inescapable need to conserve and store rain water.
- Recent development plans prepared by the consultants and Govt. agencies overlook the existence of natural floodways for lack of proper identification of the natural courses on the maps, and as such, indiscriminate building activities on these floodways has been the



cause of several flood havocs. These floodways, therefore, need to be retrieved to ensure uninterrupted flow of flood waters.

- Contamination of drinking water results from frequent dumping of garbage that finally enters floodways and in turn the "Berkeh". This position needs to be corrected on priority.
- Integrated and comprehensive management of coastal lands to increase vegetative cover and landscape values of the areas is imminent.
- An understanding of functional geography in the form of accurate mapping of coastal line, high way alignments, floodways and land topography are essential for any policy about the future settlements.
- Lack of updated maps of floodways results in excessive, cost-intensive infrastructural layouts and thus, inadvertently break the visual link of built forms and thereby create a problem of accessibility to the important nodal urban activities and facilities. Realignment of floodways is therefore, urgently needed.
- A scientific ecological study of the coastal regions in relation to building activities need to be undertaken for proper development of coastal settlements and their hinterland.

### 9.3 CONCLUSION, MICRO LEVEL

- A deeper research on the population bases of the proposed Master plan for 1983-84 indicates that the projected plan proposed by the author would be valid up to 2001.
- Conservation of buildings and areas possessing high architectural heritage and environmental merit should invariably be incorporated in the plans for future development.
- Adhoc decisions for demolishing buildings of architectural importance to create boulevards need to be regulated.
- Conservation of the old core and its traditional spaces, such as "Mahallehs" and "Kuchehs", which promote social interaction -- need to be recognized and revitalized.
- The sociological concept of "Kucheh" and "Mahalleh" in the Iranian context and way of life are very essential to be recognized for future planning and design of residential areas.
- "Berkeh" and Mousque emerge as important nodal activities of the community of settlements in promoting strong social relationships among people.
- There is a strong need to study the density patterns and propose modifications without affecting the traditional character.



- Transport network system need to be reorganized to provide for efficient and safe movement of both men and vehicles.
- A periodic review and continuous monitoring of proposed plans is essential to ensure their efficient and effective implementation.
- Formulation of development strategies for different segments of each settlements are required to be contrived in response to their character and development needs.
- Western planning concepts, techniques and methodologies and the traditional approach to plan preparation need to be carefully screened before their application to culturally sensitive areas of the settlements.

#### **9.4 RECOMMENDATIONS, MACRO LEVEL**

- The layout plans of buildings and streets should be based on climatic knowledge of the area and oriented to get best advantage of sea breeze. The scientific aspects of "Badgirs" should be studied in depth, and knowledge be applied to the modern buildings.
- The physical layout of residential units should be concisely designed to promote climatic concepts, specially the air circulation in the hot and humid Zone.

- Conservation and management of fresh water should be promoted by the traditional systems of "Berkeh" or their modern version. Feasibility of storing large quantities of flood water through series of weirs or small dams on the floodways combined with the digging of water storage well within the flood plains is recommended to save the water that may otherwise be lost due to flowing out into the sea or just getting evaporated.
- Specific regulation should be promulgated to ensure that buildings and other obstructions are not allowed to be built on the floodways and the garbage and sewage systems are rationalized as a part of urban service systems, to avoid contamination of water.
- Future policies of the growth and development of the settlement should be related to the physical constraint of natural topography, landscape and ecological system of the floodways imposed on the settlement forms and pattern.
- In the background of coastal arid conditions, landscape studies to promote conservation and provision of green spaces, vegetative covers and recreational areas by utilizing the sea water should be encouraged to create a feeling of coolness and freshness. Movement systems for pedestrian and vehicles should integrate the potential of visual aspects of waterfront.
- Plan preparation, implementation in the periphery areas should have enough flexibility to meet the future need for expansion. In order that



plan proposal are implemented effectively the financial capacity of the municipalities should be enhanced through its internal resources, as well as by soliciting support from the federal government through its ongoing schemes.

#### 9.5 RECOMMENDATIONS, MICRO LEVEL

- The development strategies should have legal sanctions to ensure the conservation of buildings of historical, architectural and religious significance while proposing revitalization/renewal plans of the core areas.
- There should be controls to regulate density standards to retain traditional character of building heights to create a sense of human scale for free movements of people on the landscaped paths leading to the waterfront.
- The physical planning and design of the "kucheh" should be based on an organization of built spaces to accommodate the social fabric of the inhabitants.
- The physical planning and design of a "Mahallehs" should be based on socio-economic organization of the grouping of "Kucheh" for creating a pattern of living network that promote an intensity and propensity for a social interaction.

- Physical growth for the future settlements should evaluate the significance of community nodes such as "Berkeh" and Mousque for the special design concept that are generic to the communities.
- The "Mahallehs" concept, which has served to create a cohesive harmonious community should be retained and where necessary modern facilities be added at convenient locations to uplift the living condition.
- Wherever traditional Bazaars are over-loaded, alternative commercial centres retaining a general character of the area should be provided.
- A transportation network based on a rational hierarchy of movement systems should be introduced along with the sensitive and aesthetics aspects of urban landscape design to promote movements with the sense of orientation and belongingness to the area.
- To ensure public participation and to reduce the gap between plan preparation and its implementation it is imperative to have a periodic review of the plan. The plan should be updated at regular interval of say 5 years and rolled over for the next five years to make it a continuous process through regular and systematic flow of information and feedback from the inhabitants to be monitored by a standing expert team of professionals.
- In view of varying planning needs of different segments within each settlements, the plan proposals should be worked out on specific development strategies that are relevant to the specific areas.



- These recommendations are intended to be universal and can be deployed for most of the traditional settlements along the Persian Gulf in Iran to resolve a variety of planning and urban design problems.

## 9.6 SCOPE FOR FUTURE STUDIES AND RESEARCH

This study was undertaken to have a comprehensive understanding of the Arid Coastal Zones environment, environmental constraints, planning, urban design and architecture qualities. The vastness of this topic did not permit the author to address himself to matters which would have regional implication on one extreme and would have greatly influenced the internal arrangement and restructuring of these settlements from within related to realities at the level listed here in terms of the local priorities.

The study of Arid Coastal Region is still in its infancy. There is considerable scope to study climatology specially wind behaviour, which has an overbearing influence on the complete design and structure of these settlements. Scientific methodologies and behavioural studies of wind against various types of built forms and circulation systems would have significant influences on design solution, both of individual units and their aggregated configuration.

There is enormous scope to do research on the patterns of floodways in relation to the regional ecology of the area, landscape character, their relationship to coastal environment and soil fertility for the location of communities.

There is scope for research on housing in the context of Arid Coastal Zones particularly with reference to local and cultural influences.







**NOTES**

## NOTES

### Chapter 1

1. See Prévail Meigs, "World Distribution of Arid and Semi-Arid Homoclimates," UNESCO publication, Quoted in Gideon, Golany, *Urban Planning for Arid Zones*, John Wiley and Sons, New York, 1978, p. 5.5.
2. Gideon Golany, ed., *Urban Planning for Arid Zones*, John Wiley and Sons, New York, 1978, p.3.
3. E. Eckholm, and L. Brown, *World Watch Paper 13: Spreading Desert the Land of Man*, (World watch Institute, Washington DC), Quoted in : Mahmoud A. Abdel-Latif and Wolfgang G.Roeseler, "Setting the Desert with Advanced Industrial Technology," *Ekistics*, Vol.52, No 311, March/April, 1985, pp. 162-175.
4. Gideon Golany, op. cit., p.3.
5. Arthur N. Strahler, and H.Strahler, *Introduction to Environmental Science*, John Wiley and Sons, New York, 1974, p. 381, Quoted in :Gideon, Golany, ed., *Urban Planning for Arid Zones*, John Wiley and Sons, New York, 1978, p.12.
6. Kraus, Eric Bradshaw, "Catastrophic Droughts," in :Gideon S., Golany, ed., *Design for Arid Regions*, Van Nostrand Reinhold Company Inc, New York, 1983, p.26.
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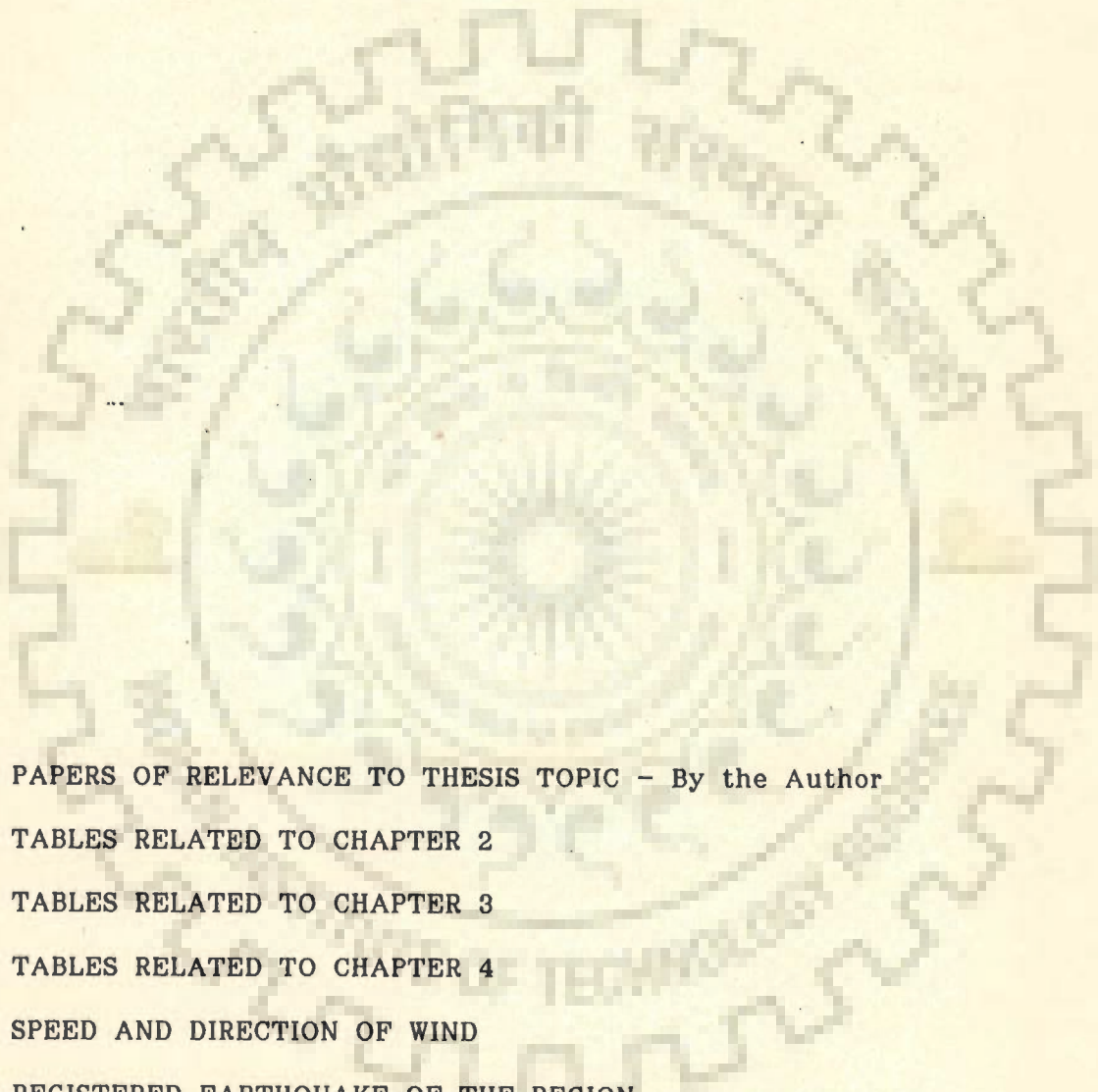
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# APPENDICES

## APPENDICES



- A : PAPERS OF RELEVANCE TO THESIS TOPIC - By the Author
- B : TABLES RELATED TO CHAPTER 2
- C : TABLES RELATED TO CHAPTER 3
- D : TABLES RELATED TO CHAPTER 4
- E : SPEED AND DIRECTION OF WIND
- F : REGISTERED EARTHQUAKE OF THE REGION
- P : PLANTS, For Arid Coastal Zones
- Q : BUILDING SURVEYED CARDS (Sample)
- T : TRAFFIC STUDIES



## APPENDIX A

### INTERNATIONAL CONFERENCES ATTENDED AND PAPERS OF RELEVANCE TO THESIS TOPIC PRESENTED BY THE AUTHOR

"Environmental problems unique to development of settlement along Persian Gulf" Proceedings of International Conference, Environmental Planning and Management, 4-7 April 1990, Civil Engineering Department, University of Roorkee, Roorkee, India.

"Feed Back Mechanism : Urban planning, conservation and implementation Correlations", Proceedings, Building Maintenance and Modernization, World wide, Volume one : International Council for Building Research Studies and Documentation --Working Commission 70, CIB, 7-9 March 1990, Singapore.

"Environmental Constraints in Reconstruction of Coastal Settlements - Case study Bandar Lengeh and Bandar Kong, 3<sup>rd</sup>. International Iranian Congress of Civil Engineering School of Engineering University of Shiraz, 14-16 May, 1990 Shiraz Iran.

"Water Font Revitalization of Settlement along Persian Gulf in Iran, Congress Report, International Congress, Vol 1-B, Chiba, IFHP 13 - 17 November 1989, Chiba, Japan.

## APPENDIX B

Table B.1  
Average temperature of Bandar Lengeh & Bandar Kong between  
1965 to 1975.

Month	Average Max Tem- perature	Average Min Tem- perature	Max Tempe- rature	Min Tempe- rature	Average daily tempera- ture
January	24.7	13.9	32	6	19.3
February	22.4	12.4	28	6	17.4
March	23.0	13.3	30	7	18.1
April	27.2	16.8	36	10	22.0
May	31.1	20.0	40	11	25.5
June	35.7	24.3	49	16	30.0
July	36.7	26.9	49	20	31.8
August	37.3	29.3	46	22	33.3
September	37.2	29.6	42	24	33.4
October	36.0	26.8	42	22	31.4
November	33.4	22.5	42	17	28.0
December	29.1	17.6	35	9	23.4

Source: Aerology Office Tehran (Iran)



## APPENDIX B

Table B.2

The Prevailing wind and their Max speed in Bandar Lengeh.

Speed Kms/Hours	Direction	Month
9.6	East	January
9.1	East	February
10.3	East	March
11.4	South & West	April
12.2	South & West	May
10.0	South & West	June
10.3	East	July
11.5	East	August
10.4	East	September
9.3	East	October
9.0	East	November
6.5	North & West	December

## APPENDIX C

Table C.1  
Area of Residential Plots

"Mahalleh" of Massah - Lengeh			
AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	12	2252	187
200 to 300	12	3010	250
300 to 400	8	2681	335
400 to 500	5	2166	433
500 to 600	4	2155	538
600 to 700	3	1958	652
... "Mahalleh" of Amirabad - Lengeh			
100 to 200	17	2595	152
200 to 300	46	11510	250
300 to 400	33	11098	336
400 to 500	39	16696	428
500 to 600	31	16966	547
600 to 700	16	10959	684

cont..



"Mahalleh" of Kaghazabad - Lengeh

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	7	1014	144
200 to 300	27	6921	256
300 to 400	29	9859	339
400 to 500	21	9396	447
500 to 600	14	7600	542
600 to 700	11	7183	653

"Mahallehs" of Minabi, and Hedayati - Lengeh

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	47	7834	166
200 to 300	106	27088	255
300 to 400	73	24828	340
400 to 500	57	24849	435
500 to 600	46	24765	538
600 to 700	20	11587	579

"Mahalleh" of Roudbari - Lengeh

100 to 200	6	993	165
200 to 300	29	6204	213
300 to 400	16	5990	374
400 to 500	17	7562	444
500 to 600	8	4505	563
600 to 700	6	4018	669

Cont..

"Mahallehs" of Boluki, Lari, Khouri, Saabeh and Afghan - Lengeh

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	34	5321	156
200 to 300	61	15356	251
300 to 400	52	18299	351
400 to 500	49	21717	443
500 to 600	35	19611	560
600 to 700	19	11694	615

"Mahalleh" of Zeinabieh - Lengeh

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	6	991	153
200 to 300	8	2011	251
300 to 400	16	5791	361
400 to 500	18	7760	431
500 to 600	17	8681	510
600 to 700	10	6352	635

"Mahalleh" of Sayeed Nabina - Kong

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	1	100	100
200 to 300	1	200	200
300 to 400	2	670	335
400 to 500	3	336	446
500 to 600	-	-	-
600 and more	19	18535	1029

Cont...



"Mahalleh" of Soltanololama - Kong

100 to 200	-	-	-
200 to 300	1	216	216
300 to 400	1	320	320
400 to 500	9	3898	433
500 to 600	3	1548	516
600 and more	20	20940	1047

"Mahalleh" of Abouzar - Kong

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	3	390	130
200 to 300	1	258	258
300 to 400	3	1020	340
400 to 500	4	1640	410
500 to 600	8	4300	537
600 and more	15	12940	862

"Mahalleh" of Bolouki - Kong

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	9	1470	163
200 to 300	6	1570	261
300 to 400	8	2761	345
400 to 500	9	4188	465
500 to 600	9	4839	537
600 and more	21	20508	976

"Mahalleh" of Sayeed Mohammad Alam - Kong

100 to 200	-	-	-
200 to 300	3	740	246
300 to 400	1	396	396
400 to 500	6	2581	430
500 to 600	4	2130	503
600 and more	10	16190	1619

"Mahalleh" of Emam - Kong

AREA OF PLOT IN Sqm	NO. OF PLOTS	TOTAL AREA IN Sqm	AVERAGE AREA IN Sqm
100 to 200	3	437	145
200 to 300	3	698	299
300 to 400	6	1960	326
400 to 500	3	1282	427
500 to 600	6	3236	503
600 and more	6	3987	797



Table C.2 (Appendix C)  
Existing Landuse Bandar Kong

Landuse	%	Per person in Sqm
Residential	93.09	64.36
Commercial	1.87	2.55
Industrial	0.40	1.09
Administrative	0.17	0.46
Gendarmerie	0.16	0.43
Tourism	0.18	0.49
Port Facilities	0.23	0.62
Transport facilities	0.22	0.60
Store	0.47	1.25
Transport Network	20.34	54.61
Institutional	0.43	1.16
Health care	0.06	0.17
Religious	0.7	1.89
Historical - Architectural	0.63	1.67
Sport	0.45	1.21
Park & Garden	0.4	1.08
Town infrastructure Elec., water supply	0.17	0.47
Cemetery	4.70	12.49
Dilapidated buildings	2.30	6.15
Flood ways	27.69	74.27
Unutilized land	2.92	7.84
Private garden	1.99	5.33
Total built up Area	100.00	268.24

Table C.3 (Appendix C)  
Existing Landuse of Bandar Lengeh

Landuse	%	Per person Sqm
Residential	18.90	42.6
Commercial	0.58	1.31
Industrial	0.68	1.54
Administrative	1.8	4.03
Gendarmerie-Police	1.35	3.06
Tourism	0.37	0.84
Port facilities	0.51	1.16
Shilat	0.74	1.67
Transport facilities	0.72	1.64
Store	0.99	2.24
Transport Network	15.42	34.76
Institutional	1.27	2.84
Health care	0.93	2.09
Cultural	0.11	0.25
Religious	0.37	0.83
Historical - Architectural	0.23	0.52
Sport	1.58	3.17
Parks & Gardens	0.3	0.67
Private Gardens	3.73	8.40
City infrastructure Elec., water supply Cemetery	3.33 1.25	7.5 2.83
Dilapidated building	2.88	6.47
Flood ways	39.35	88.71
Unutilized area	2.61	5.88
Total town built up area	100.00	225.41



Table C.4 (Appendix C)  
 Number of Schools and High Schools in Lengeh and Kong  
 1986-89

Kind of Educational facilities	Kong			Lengeh			Note	
	total	co-edu. girls	boys	total	co-edu. girls	boys		
Handicap School	-	-	-	-	-	-	Closed due to shortage of proper facilities	
No. of students	-	-	-	-	-	-		
Nursery School	-	-	-	1	-	-	1	
No. of Students	-	-	-	200	-	-	200	
Primary School	3	-	1	2	9	4	5	
No. of Student	1565	-	515	1050	2582	-	1185	139
Intermediate	3	-	1	2	4	-	1	3
No. of Student	340	-	60	280	790	-	230	560
High School	-	-	-	-	4	-	-	4
No. of Student	-	-	-	-	680	-	-	680
Technical School	-	-	-	-	1	-	-	1
No. of Student	-	-	-	-	115	-	-	115

Source: The Author

Table C.5 (Appendix C)  
Condition of Road in Bandar Kong.

Name of street section	Condition of Pavement		Roadway			Pavement		Total Width mts
	Paved	Plant- ation	Left Lane	Median	Right Lane	Plant- ation	Paved	
	mts		Width mts		Width mts		mts	
Bandar Abbas Lengeh (A)	-	-	6.5	-	-	-	-	45
Bandar Abbas Lengeh (B)	-	-	6.5	-	-	-	-	60
Emam S.A.	8.70	-	14.30	-	-	-	5	28
Amini S.B.	5.70	-	14	-	-	-	5.30	26
Taleghani	6	-	12	-	-	-	6	24
Rajael	-	-	14	-	-	1.5	-	24
Beheshti	3	-	8	2	8	-	3	24
Montazari	7	-	14	-	-	-	6	24
Eskeleh - S.A.	4.10	-	15.20	-	-	-	6.70	26
Eskeleh - S.B.	-	-	5.5	-	-	-	-	-

S = Section See Fig. 3.24 and 3.26



Table C.6 (Appendix C)  
Condition of Roads in Lengeh

Name of street section	Condition of Pavement			Roadway			Pavement			
	Pav- ed mts	Not Paved mts	Plant- ation	Left Lane Width mts	Med- lan Width mts	Right Lane Width mts	Plant- ation	Pav- ed mts	Not Paved mts	Total Width mts
S.A. Chamran		6		6.40				6		18
S.B. Chamran		23		6.40				22		51.5
S.A. Enghlab	4			18				3.5		25.5
S.B. Enghlab	5.5			17				3		25.5
S.A. Taleghani	4.5			12	6	12			10.5	45
S.B. Taleghani	3			13				4		20
S.A. Emam	2.5			9.30	6	9.30		3		30
S.B. Emam		5.60		9.30	6	9.30		3		33.20
S.C. Emam		5.80		11.50	5	11.5		4	4	28.89
S.A. Dastghaib	3.5			11				2.5		16
S.B. Dastghaib	4			12						4
S.A. Pasdaran		5		10.5				4.5		20
S.B. Pasdaran	3			12				3		18.5
Dastgerdi	4			12				2.80		18.80
Fadaeian	4.20			11.80				4		20
Kalantari		2.5		9					2.5	14
Navab	2.5			7.5						10
Mostafa Komani				10						10

Cont...

S.A. Motahari	3		10			2	15
S.B. Motahari			6				10
S.A. Beheshti	3		12			3	20
S.B. Beheshti		3	12				3 20
Dabaghian		2.5	7	1	7		2.5 20
Falahl		3	12				3 18
Fakouri	4		9			3	16

See Fig 3.24 & 3.26

Source: Author

Table C.7 Appendix C)  
Volume and Capacity of Roads

Name of Streets	Average Width mts	Road-way width mts	No.of lanes	Park-ing lanes	Use-ful lanes	Volume of traffic	Capa-city of Road	% of capacity Occupied PCU
Emam Khomani	30-35	18.60	6	2	4	476	1800	26.4
Chamran	30	6.40	2	-	2	480	500	96
Enghelab	25.5	18	6	2	4	589	1800	32.7
Taleghani	45	24	8	2	6	466	2400	19.4
Dastgheib	16	11	4	2	2	426	1200	35.5
Pasdaran	18.5	12	4	2	2	487	1200	40.5
Dastgerdi	18.80	12	4	2	2	112	1200	9.3
Fadaeian	20	11.80	4	2	2	267	1200	22.2
Motahari	15	10	3	1	2	99	900	11
Beheshti	20	12	4	2	2	128	1200	10.6
Dabbaghian	20	14	4	2	2	64	1350	4.7
Hafez	20	13	4	2	2	440	1200	26.6
Kalamantri	14	9	3	1	2	144	900	16

Source:The Author



## APPENDIX D

Table D-1

Proposed Landuse Pattern : Bandar Lengeh 2001

Landuse	%	Per head
Residential	30.62	58.69
Commercial	1.81	3.47
Industrial	2.77	5.31
Adminitrative	2.24	4.04
Police Gendarmerie	0.92	1.76
Tourisom	0.96	1.84
Post facilities	1.73	3.31
Shilat	0.38	0.74
Transportation	1.78	3.04
Store	2.71	5.18
Transport Network	20.69	39.66
Institutional	1.97	3.76
Healt care	0.77	1.48
Cultural	0.36	0.68
Historical	0.11	0.22
Religious	0.52	1.00
Sport	1.58	3.03
Public garden	2.04	3.89
Private garden	7.26	13.09
City Infrastructure	3.18	6.09
Cemetry	1.25	2.38
Floodways vacant	6.31	12.08
Reserved Area	8.04	15.41
Total built up Area	100.00	191.70

The area of Date Palm Groves around the town is 20.61 Hact. and the vacent land is 961.2 Hact. Total area of the Town is 1710.00 Hact..

Table D.2 (Appendix D)

Proposed Landuse Pattern : Bandar Kong 2001

Länduse	%	per head
Residential	30.33	64.36
Commercial	1.21	2.55
Industrial	1.44	3.07
Adminutrative	0.67	1.42
Police gendarmerie	0.10	0.20
Tourisom	0.23	0.48
Post facillties	2.05	4.36
Shilat	4.10	8.70
Transportation	1.03	2.16
Store	3.47	7.37
Transport Network	18.62	39.52
Institutional	1.57	3.33
Healt care	0.38	0.81
Cultural,Religious	0.77	1.65
Historical	0.38	0.82
Sport	0.61	1.47
Parks	2.15	4.57
city infrastructure Facillties	0.16	0.35
Cemetery	2.88	6.12
Floodways	9.64	20.47
Private garden	18.37	39.02
Town covered Area	100.00	212.33

The area of date palm groves around the town is 96.3476 Hact. and the reserved land is 96.4 Hact. and the total area of the town is 1,00,00,000 Hact.



Table D.3 :Economic Activities (Appendix D)

Economic Activities	Average Growth	Average of
	% value added	activities
	% value added	
Agriculture	7	4.4
Industry & Mine	14.1	9.8
Water Supply,Elect.	9.7	5.6
Building activities	9.8	2.3
Services	1.8	- 2

Source : Planning and finance Ministry- Iran

Table D.4 (Appendix D)

Proposed No. of Employees in Different Economic Activities of the Settlements First 5-Year Plan Concepts.

Year	1987			1986			1985		
	Town	Kong	Lengeh	Total	Kong	Lengeh	Total	Kong	Lengeh
Agriculture	127	65	192	124	63	187	121	62	183
Industry & Mine.	72	120	192	70	116	186	67	111	178
Water,Elect.	8	38	46	8	37	45	8	36	44
Building-Activities.	196	559	755	183	521	704	170	485	655
Services	1498	2364	38862	1442	2275	2717	1388	2190	3578
<b>Total</b>	<b>1901</b>	<b>3146</b>	<b>5047</b>	<b>1827</b>	<b>3012</b>	<b>4839</b>	<b>1754</b>	<b>2884</b>	<b>4638</b>

Table Contd..

Year	1984			1983		
	Town	Kong	Lengeh	Total	Kong	Lengeh
Agriculture	118	60	178	115	59	174
Industry & Mine.	64	107	171	62	103	165
Water,Elect.	7	34	41	7	33	40
Building Activities	159	452	611	148	421	569
Services	1336	2109	3445	1286	2030	3316
<b>Total</b>	<b>1684</b>	<b>2762</b>	<b>4446</b>	<b>1618</b>	<b>2646</b>	<b>4263</b>

Source: Ministry of Programming and Finance

Table D.5 (Appendix C)  
Proposed Employee pattern in Both Settlements  
In Programming Years

Activities	1983-84			1984-85			1985-86		
	Lengeh	Kong	Total	Lengeh	Kong	Total	Lengeh	Kong	Total
Agriculture	1	3	4	2	3	5	1	3	4
Industry & Mines	4	2	6	4	3	7	5	3	8
Water.Elect.Gass	1	0	1	2	1	3	1	0	1
Building Const.	31	11	42	33	11	44	36	13	49
Services	79	50	129	81	52	133	85	54	139
Total	116	66	182	122	70	192	128	73	210

Table Cont....

Activities	1986-87			Total		
	Lengeh	Kong	Total	Lengeh	Kong	Total
Agriculture	2	3	5	6	12	18
Industry & Mine	4	2	6	17	10	27
Water,Elect.Gas	1	0	1	5	1	6
Building Const.	38	13	51	138	48	186
Services	89	56	145	334	212	546
Total	134	74	208	501	283	783

Source: Ministry of Programming and Finance



Table D.6 : No. of Employees in 1976 to 1983 and their Average Growth rate  
(Appendix D)

Activity	1976		1983		Growth Rate	
	Kong	Lengeh	Kong	Lengeh	Kong	Lengeh
Agriculture	139	63	115	59	2.4	1
Industry & Mine	95	163	62	103	6	6.2
Elect.water,Gass	7	40	7	33	7.2	2.5
Services	885	1559	1286	2030	5.5	3.9

Table D.7 : Proposed Employees for 1983 to 1987 in Lengeh and Kong -  
Second Alternative (Appendix D)

Activity	1987			1986			1985		
	Lengeh	Kong	Total	Lengeh	Kong	Total	Lengeh	Kong	Total
Agriculture	56	104	160	57	107	164	58	109	167
Industry & Mine	80	48	128	85	51	136	91	55	146
Water,Elect.Gass	30	7	37	31	7	38	31	7	38
Bldg. Const.	456	110	566	446	118	564	438	127	565
Services	2366	1593	3959	2277	1510	3787	2191	1431	3622
Total	2988	1862	4850	2896	1793	4689	2809	1729	4538

Table Contd.

Activity/Year	1984			1983		
	Lengeh	Kong	Total	Lengeh	Kong	Total
Agriculture	58	112	170	115	59	174
Industry & Mine	97	58	155	62	103	165
Water,Elect.Gass	32	7	39	7	33	40
Bldg.Const.	429	137	566	148	421	569
Services	2109	1357	3466	1286	2030	3316
Total	2725	1671	4396	1618	2646	4264

Source: Master Plan (1983-84)

Table D.8 (Appendix D)  
New Employees of Lengeh and Kong According to  
Second Alternative

Activities	83-84			84-85			85-86			86-87			Total 83-87		
	L	K	T	L	K	T	L	K	T	L	K	T	L	K	T
Agriculture	-1	-3	-4	0	-3	-3	-1	-2	-3	-1	-3	-4	-3	-11	-14
Industry & Mines	-6	-4	-10	-6	-3	-9	-6	-4	-10	-5	-3	-8	-23	-14	-37
Water,Elect.Gass	-1	0	-1	-1	0	-1	0	0	0	-1	0	-1	-3	0	-3
Building Activities	8	-11	-3	9	-10	-1	8	-9	-1	10	-8	2	35	-38	-3
Services	79	71	150	82	74	156	86	79	165	89	83	172	336	307	643
<b>Total</b>	<b>79</b>	<b>53</b>	<b>132</b>	<b>84</b>	<b>58</b>	<b>142</b>	<b>87</b>	<b>64</b>	<b>151</b>	<b>92</b>	<b>69</b>	<b>161</b>	<b>342</b>	<b>244</b>	<b>586</b>

L:B' Lengeh ... K:B' Kong T:Total Source:Master Plan 1983-84

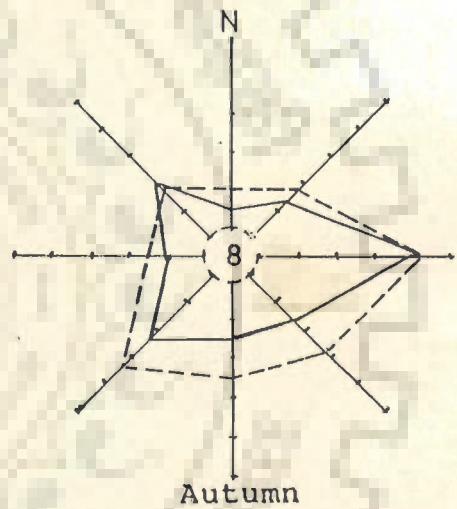
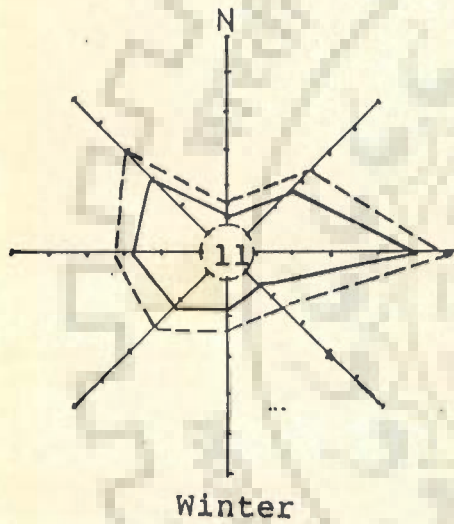
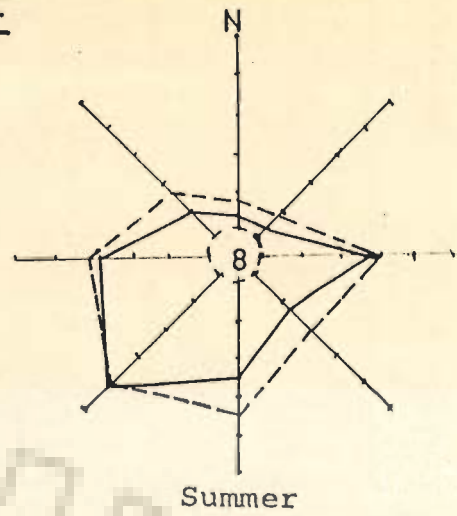
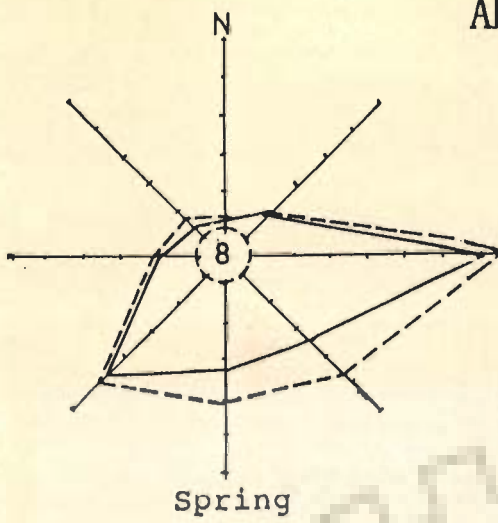
Table D.9 (Appendix D)  
Proposed Number of Employees in Economic  
Activities for 1987

Activities Group	Lengeh		Kong	
	No.	%	No.	%
Agriculture	117	2.1	172	6.7
Industry & Mine	211	3.8	98	3.8
Water,Elect.Gass	67	1.2	10	0.4
Building	990	17.8	265	10.3
Services	4179	75.1	2024	78.8
<b>Total</b>	<b>5564</b>	<b>100</b>	<b>2569</b>	<b>100</b>

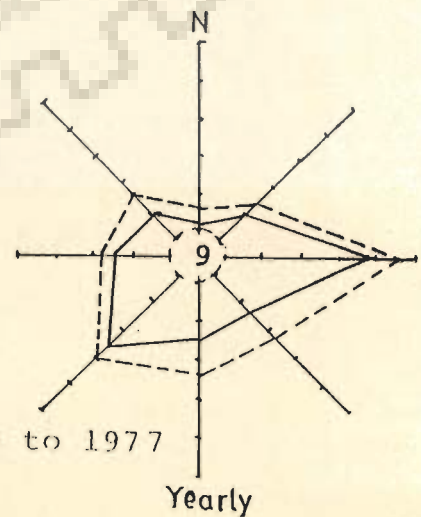
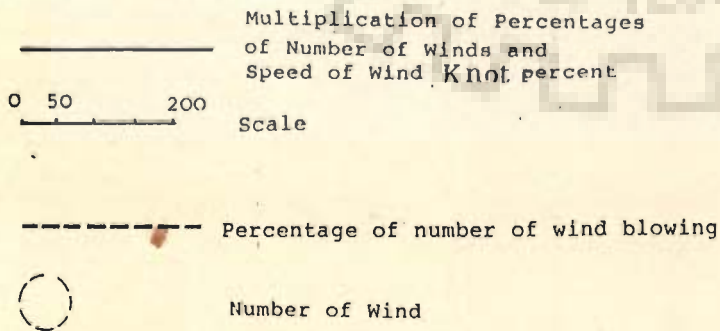
Source: Master Plan (1983-84)



# APPENDIX E



Average of 5 years/Census i.e. from 1975 to 1977



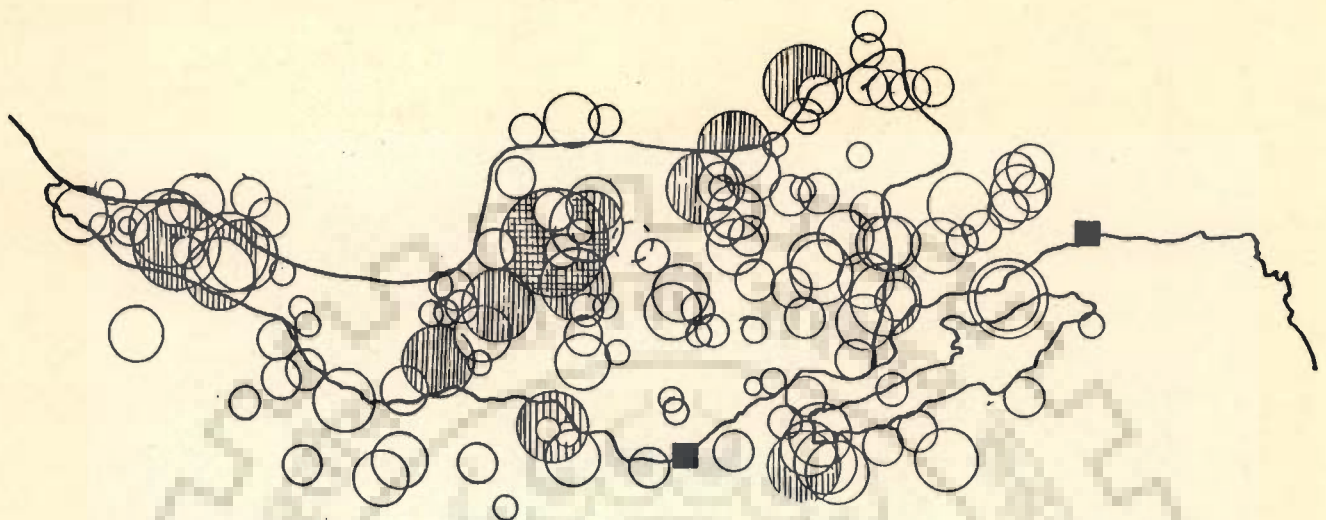
Average of 5 years/Census i.e. from 1975 to 1977

(Source : M. Gangi, 1962)

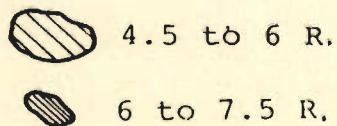
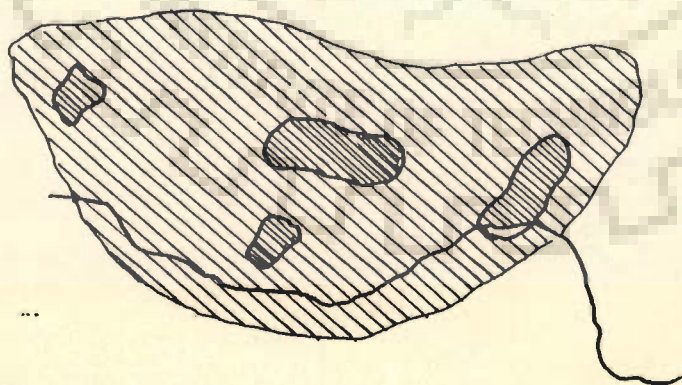
Speed and Direction of Wind in Bandar Lengeh

# APPENDIX F

## Earthquake in the Region of Lengeh



Registered Earthquake in the Region, 1900-1981



Registered Earthquake of the Region  
 (Source : Geophysics Centre, Tehran University, 1982.)



## APPENDIX : P

Amarix, stictabolss (GAZ) . ( The names in the bracket are the local names of the plants.) ziyiphus (Konar) Ceeratoniasiliqua (Kharnoub), Prospis spicigera (Kahour), Acaciasp (Acasia), Gacla Lubiea (Kebr), Acacia Aravblica Varnilotisa (Selm), Cakotropis Procera (Estabragh), Acacia Arabica wind (kenet) Euphor Biatriacalli (Bidar), Nerutm cdorumsoland (Kharzareh), Periploca Aphylls Dc (Gishdar) Dodkea Viscosa (Naderak), Salvodora Pesslea Garcin Edgew (Choukh), Cydonia oblonca Mill (Touch), Capparis Decidua or Forsk (Gallr), Euphorbialorica (Parkh), Nannor Hopsritchibana Wendl (Daz), Ficus Bebnгалensis (Louz).

*The terms mentioned within (brackets) refer to local names of vegetation occurring in Arid Coastal Regions of Iran.*

## APPENDIX Q

### BUILDING SURVEY CARD (Sample)

Settlements ..... Lengeh.....

Date 11-12-1976.

Mahalleh ... BaLouch.....

Kucheh Latch.....

Plot No. 110.....

1 Household Information						
No. of Persons	People Going To				No. of Households	Major Economic Activities
	Nursery Primary	Intermediate	High School	Technical School		1 person in Fishing 1 person in Shipping
5	1	1	1	1	1	

2 Buildings Information															
Plot No.	Age	Plot size m <sup>2</sup>	Covered area m <sup>2</sup>	No. of Storeys	Building Condition							Historically Important	Architecturally Important		
					Materials									Structure	
					Brick	Stone	Cement	Lime	Steel	Wood	Safe			Reqd. Repair	Dilapidated
110	35	250 m <sup>2</sup>	100	2	1	✓	-	✓	-	✓	-	-	-	✓	

3 Buildings Category							
Building Use							Notes
Residential	Commercial		Industrial		Administrative	Educational	Miscellaneous
Luxury	Retail	Polluting	Non -				
-	-	-	-	-	-	-	-



APPENDIX T

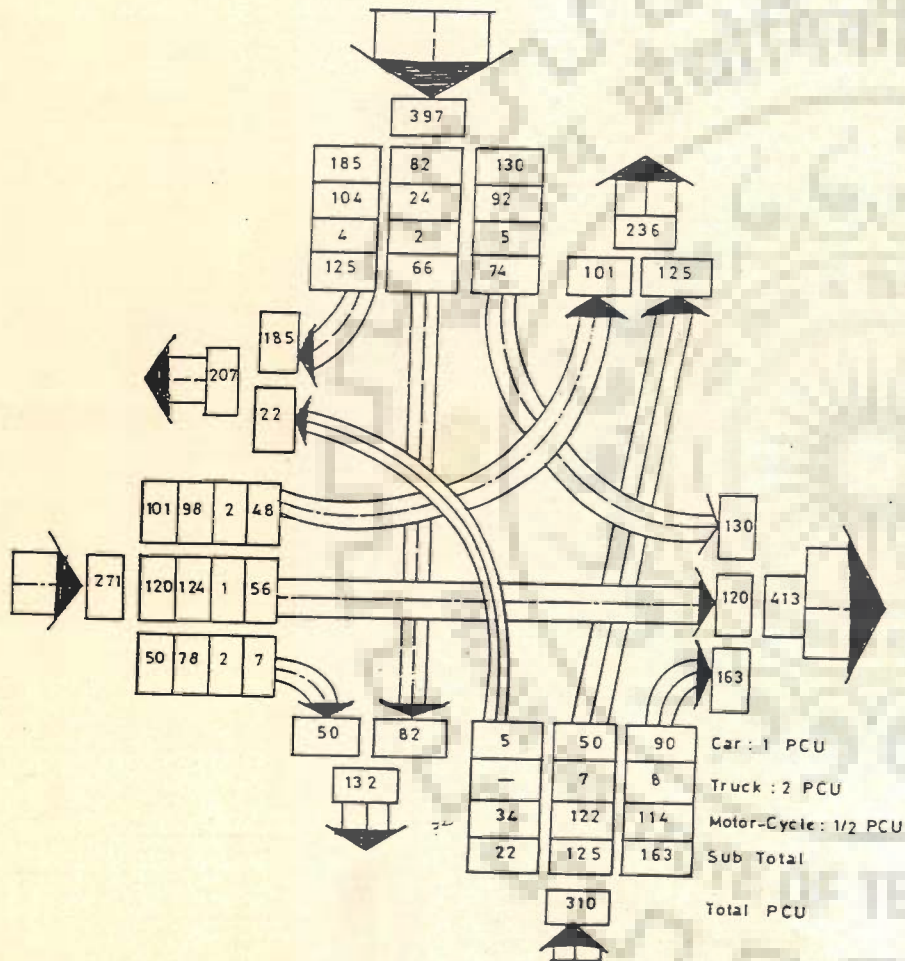


FIG.T.1 : Intersection of Enghelab and Pasdaran Streets  
 Bandar Lengeh

Time: Morning

T. 2

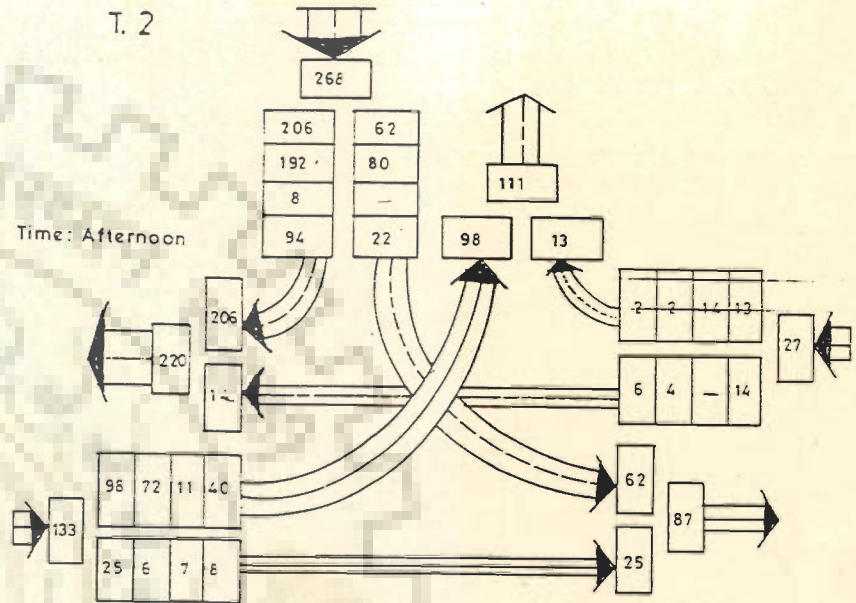


FIG.T.2 : Intersection of Boulevard Emam and Taleghani Streets  
 Bandar Lengeh

T.3

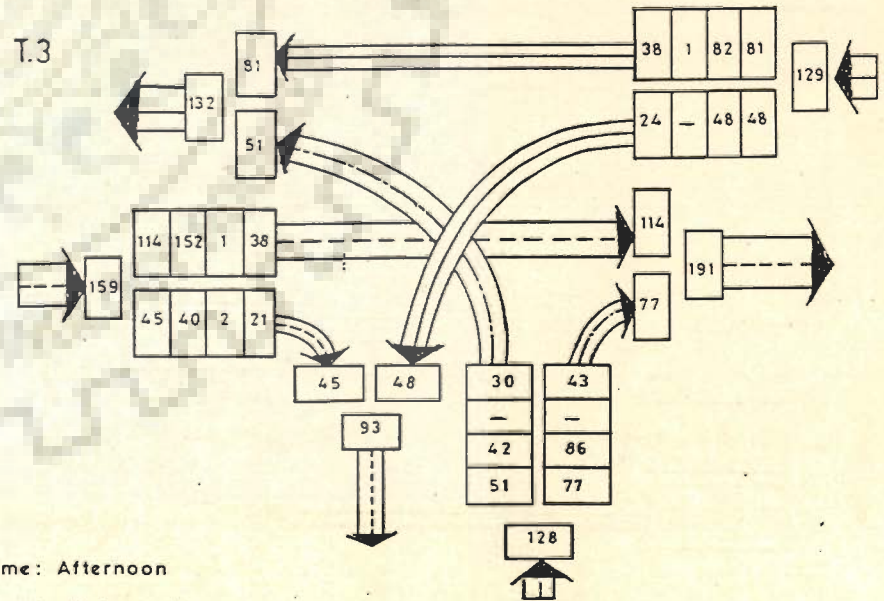


Fig.T.3 : Intersection of Fadaeian Islam Street and Pasdaran Street  
 Bandar Lengeh

Time: Afternoon

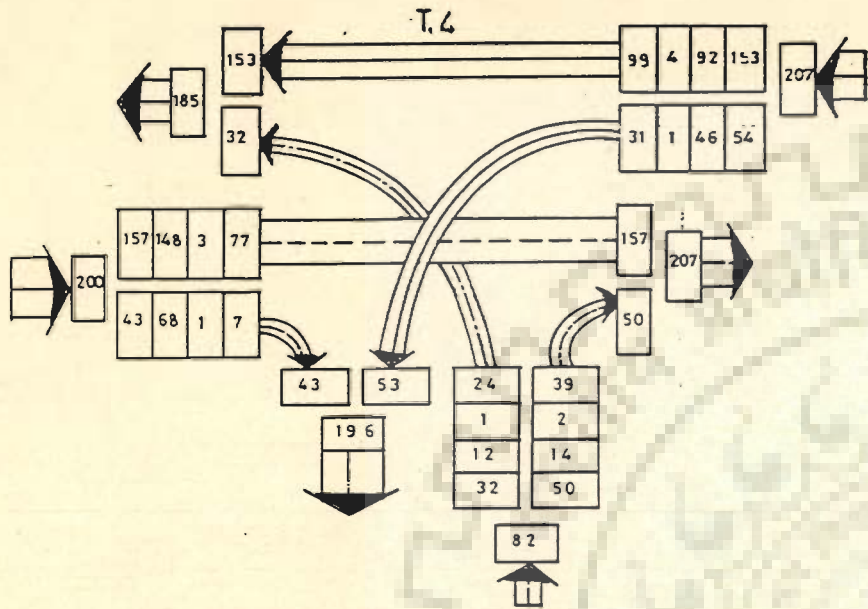


FIG.T.4 : Intersection of Fadaian and pastaran Streets - Bandar Lengh  
Time: Morning

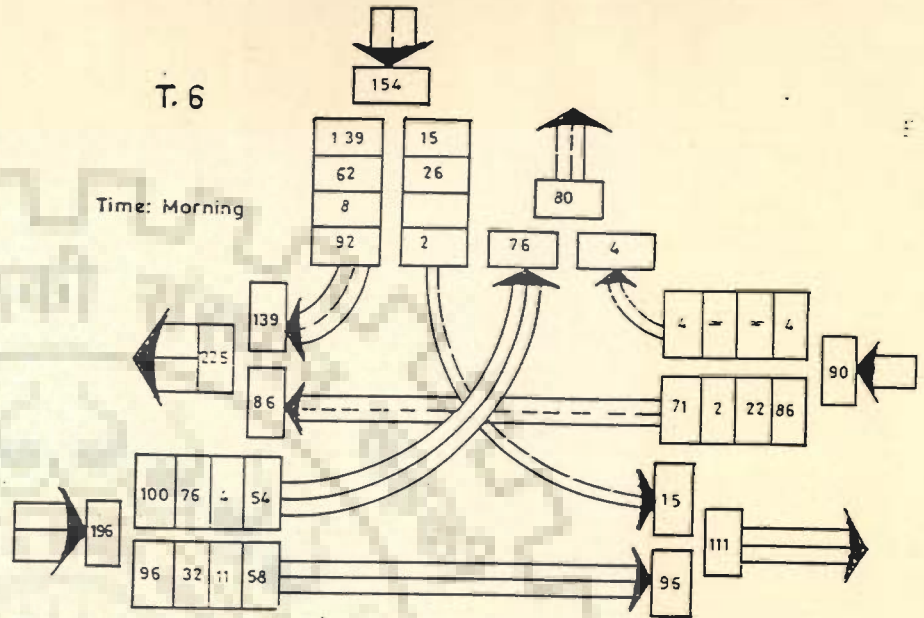


Fig.T.6 : Intersection of Boulevard Emam and Taleghani Streets Bandar Lengh

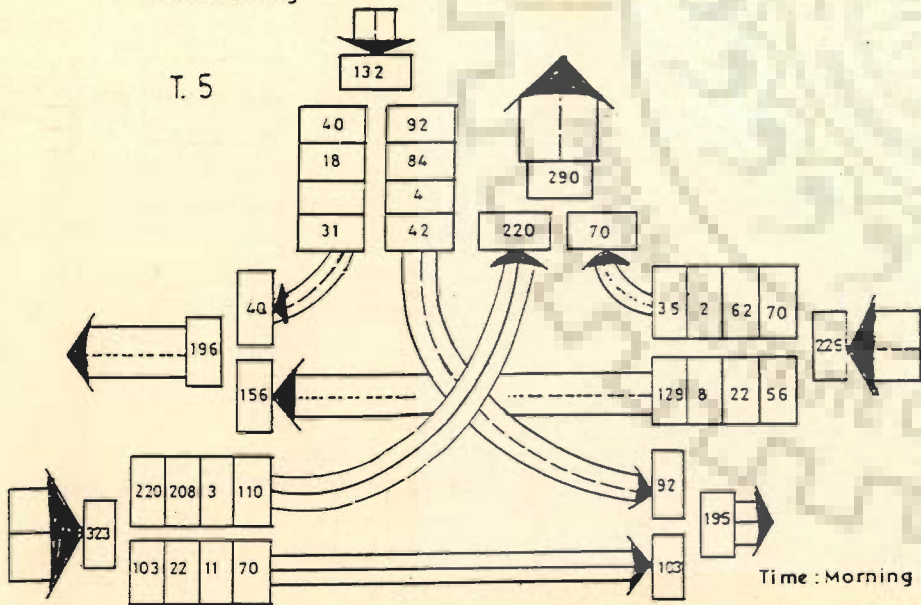


FIG.T.5 : Intersection of Boulevard Emam and Enghelab Streets - B Lengh

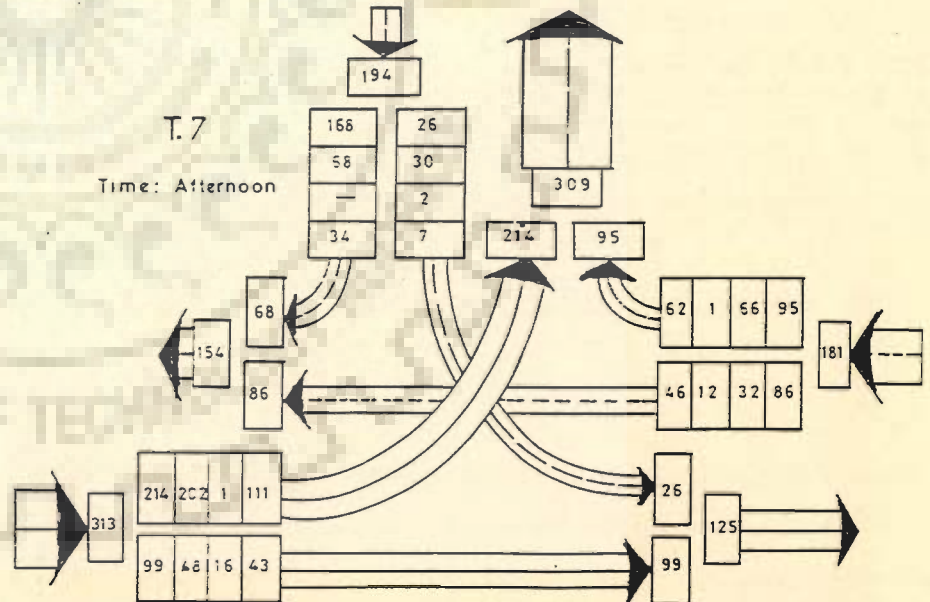


FIG.T.7 : Intersection of Boulevard Emam and Enghelab Streets Bandar Lengh



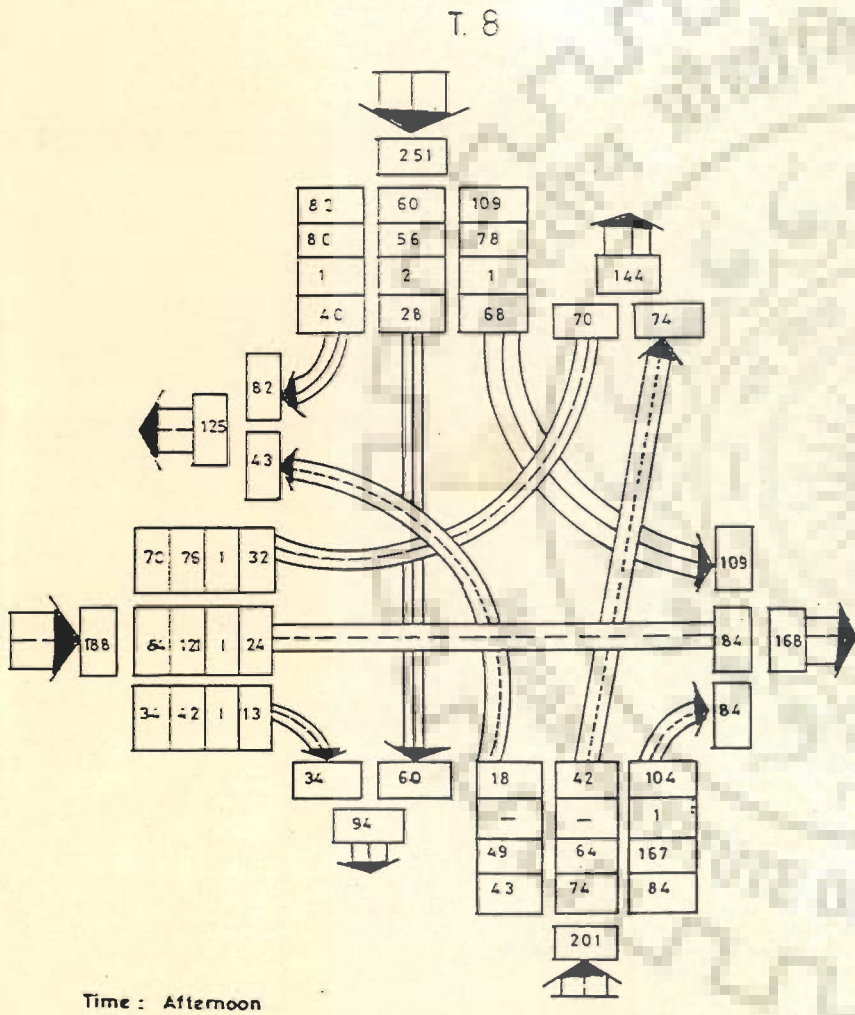


FIG.1.8 : Intersection of Enghelab Street and Pasdaran Street  
Bandar Lengeh

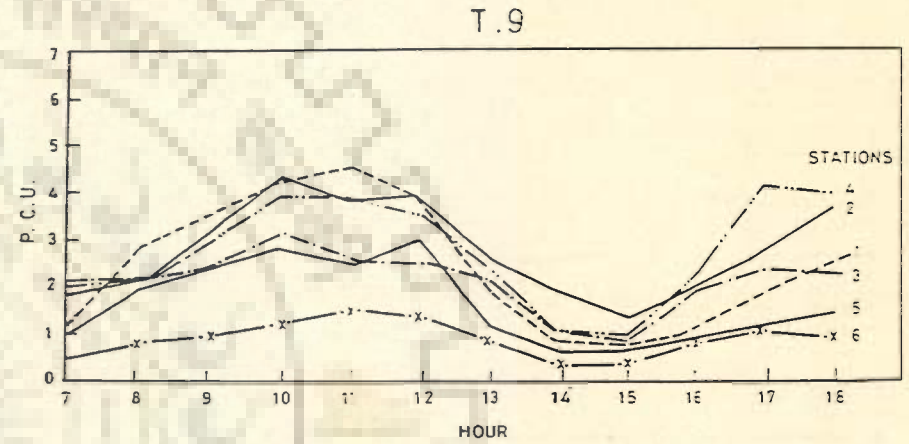


Fig.1.9 Different volume of Different Road at Different time intervals - Bardar Lengeh.

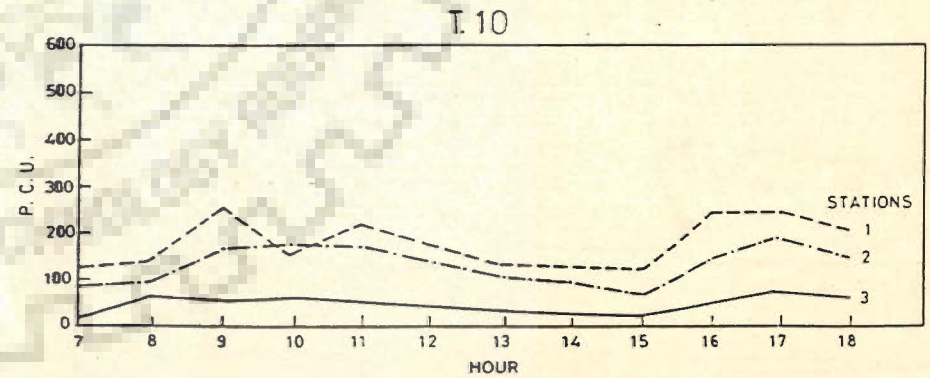
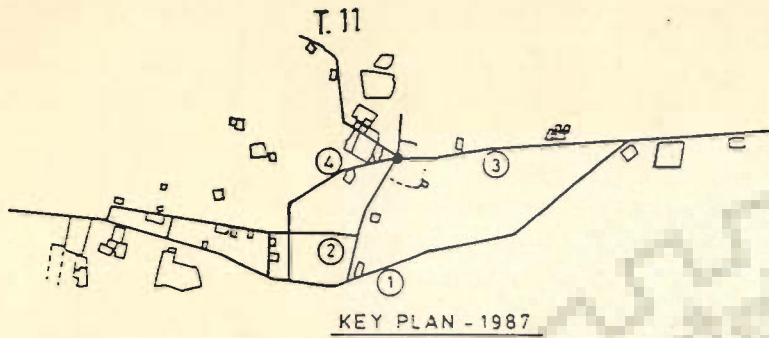


Fig.1.10 Traffic volume of the Road at Different time intervals  
Bardar Kong.



VEHICLE NAME	NO. OF VEHICLE	KEY MAP	ONE WAY	TOTAL
① CAR	277	111	224	224
② BUS & TRUCK	22	15	14	14
③ MOTOR-CYCLE	310	160	338	338
TOTAL P.C.U./ HOUR	476	191	426	426

① MORNING

VEHICLE NAME	NO. OF VEHICLE	KEY MAP	ONE WAY	TOTAL
① CAR	211	364	282	282
② BUS & TRUCK	17	19	32	32
③ MOTOR-CYCLE	350	414	268	268
TOTAL P.C.U./ HOUR	420	589	480	480

② AFTERNOON

VEHICLE NAME	NO. OF VEHICLE	KEY MAP	ONE WAY	TOTAL
① CAR	45	171	259	259
② BUS & TRUCK	11	5	15	15
③ MOTOR-CYCLE	72	161	260	260
TOTAL P.C.U./ HOUR	103	261	419	419

③ TOTAL

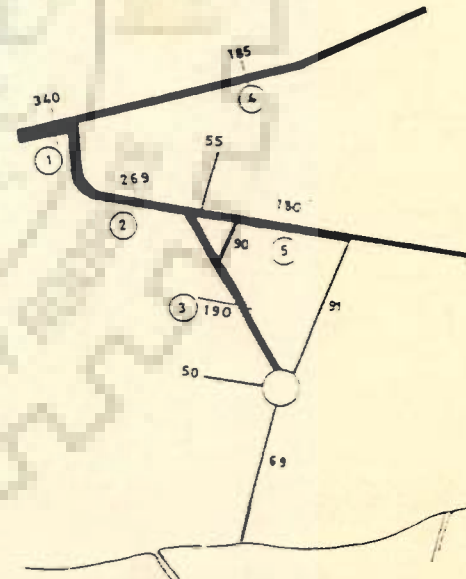
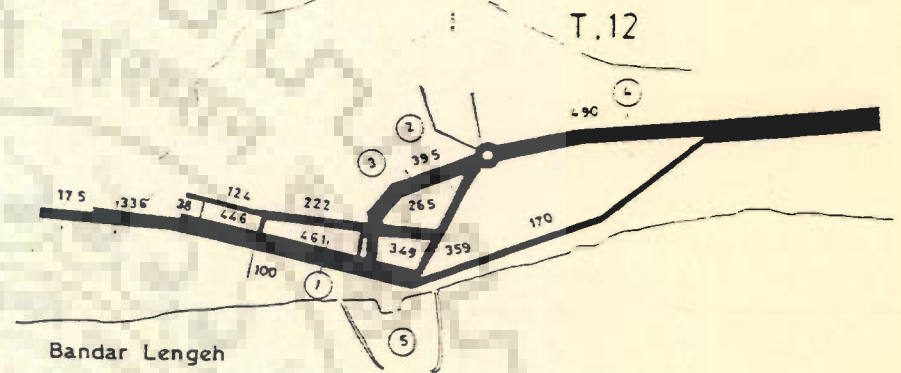


Fig. 1.11 : Traffic volume of Roads-Lengh.

Fig.1.12 : Existing Traffic Volume