UTILIZING URBAN WATER BODY TO ENHANCE THE CITY IMAGE

(An examination of utilizing water bodies as a transport system to enhance the image of the Colombo city)

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L. B. Minoka De Silva
Faculty of Architecture
University of Moratuwa
Sri Lanka
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ABSTRACT

"There is a quality about water, which calls to the most deep rooted, and atavistic part of our nature. In the deep canyons of our cities water along with fire, trees and the almost hidden sky above are the elements, which can still tie us to our primitive past. Of all these water and fire evoke the most direct responses. Fire in the city is dangerous, negative and evil, while water is positive and life giving – the element from which we all have come. The wildness and exuberance of water stirs us with qualities of non-conformity and vigor"

Lawrence Halprin, Cities, 1963

Venice the mystical city of water

"There are a great number of wonderful lanes, canals, squares and narrow streets scattered all over with no clear pattern. Tiny archways connect ancient buildings and sidewalks; windows sparkle with flashes of water; and flowers spill down from charming balconies over the tops of passing boats. The atmosphere is magical - inexplicably festive. In Venice you will not hear any noisy traffic, just the soft sound of lapping water against the sides of marble buildings from the passing ***vaporetti. A Venezia*** *the song of romance is everywhere in the air. Welcome to the first paradise made for pedestrians!"*

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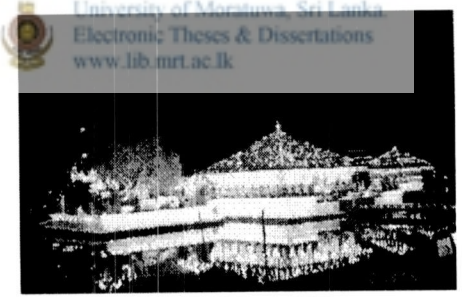


INTRODUCTION

INTRODUCTION

1.1 BACK GROUND OF THE STUDY

Water body in an urban context act as a utilitarian, recreational, reflective, landscape and transport feature in the urban built environment from the history. The Urban water bodies consist of canals, lakes, rivers, reservoirs and sea. However in our urban context, the use of inland water bodies for utilitarian purposes is very limited.

The water bodies function as provision for drainage purposes. This is very significant in the urban areas where the built up area is intensively developed in comparison to rural areas. Therefore storm water drainage is a must in these areas to drain out excess water through a network by using gravity flow, wherever it is possible and where such natural setting is, not available to use pump houses.

The next dimension is, as a mode of transport and transport is a part of communication system. Communication is linking two locations in terms of human activities. Road, railway, air, water and telecommunication networks links one location of settlements with another and socio economic activities of same. This implies, the internal water bodies of an urban area, therefore need planning and management in order to maintain its functional system. However from the inception of the human race water had the close link with their settlements. In identifying their location for their sustenance. Water is an essential commodity for any living creature.

The third aspect is focused on its potential as an element, which covers substantial space of an urban area. This has to be seen, not merely to above two functions of water bodies, but also should consider the aesthetics and its relevance to the design perspective of an urban area. Therefore, water bodies are just not an object, but it has a multiple effect on in terms of physical, social, economic and environmental aspects are concern. The latter has become increasingly important, due to the open spaces demanded, in order to ease the mental stress of the urban folk. Environmental psychology is therefore stressing, the proper conservation,

preservation and maintenance of water bodies in urban area as potential spatial entities in highly congested and complex built up areas in such urban areas.

Easing out the mental pressure of the urban inhabitants, by the water bodies therefore seriously considered in land use planning and related urban design. In the present day physical development in urban areas, therefore, demanding not only the beautification of water fronts just for the sake of maintaining the banks of the water bodies by the technical personnel, but to give a design dimension in a more broader sense to link the functional areas within an urban area. Accordingly water bodies can be considered as functional spaces of land use areas.

On the other hand these water bodies have the potential to function as navigable roots. The environmental quality of water bodies including their banks has a higher environmental quality of than the other modes of transport roots. As it was mentioned earlier settlements are to be connected with the employment, location, providing an opportunity for the passengers, who use these water bodies as transport roots definitely has a higher psychological effect than the other transport roots. This could enhance the labour productivity due to less mental stress.

Ecology of water has some bearing on the banks of the water bodies. Flora and fauna is thriving on the vegetation of these water bodies further enhancing its quality. The design of buildings should consider the image of the water bodies, which vary from time to time of the day, and location to location.

1.2 SCOPE OF THE STUDY

The very fabric of many cities around the world is inextricably linked to the bodies of water that contributed to their founding and to their subsequent development. Some of the planet's most fascinating cities –Hamburg, and Rotterdam, Sydney, and Hong Kong, Rio de Janeiro and Cape Town, New York and Tokyo –are famous for their waterfront character.

Water is a fundamental attraction in all cultures and among all classes of people, from Alaska to Angola or Argentina. It is a favourite location for celebration and ceremonies, for evening picnics on the beaches of Bahrain, religious rites on the Ganges River in Benares, for dragon boat races in Shanghai, and for New Year's ocean front offerings for the goddess Eimanja in Brazil. Whether for ritual or recreation people seek the water edge.

Water was the man's earliest settlements as a necessary source of nourishment, irrigation and transportation. The ancient inhabitants of Egypt who lived along the Nile, those who settled London on the Thames and Rome on the Tiber, the colonists who founded Sydney on the banks of Botany Bay and the pioneers who founded Chicago at the Junction of the river and Lake Michigan are proof that the city by water is a constant throughout history.

A vital part of the record of civilization involves events and developments that have occurred along the world's coasts, rivers, bays and Lakes, corresponds to the time when many communities began to perceive urban waterfront areas as possible assets, rather than abandoned physically deteriorated, problematic tracts on polluted water bodies.

Our global culture today denies more open spaces for recreation and physical activities. With the rise of the middle class and changing labour patterns in many countries, many people enjoy more leisure time. More time and more mobility have caused an expansion of tourism in general, and the emergence of what has come to be called 'cultural tourism' and "eco tourism" each with its own nuances.

These related factors add up to a market for sophisticated installations along water bodies that combine areas of open space and leisure with shops, cafes, and restaurants and provide cultural as well as recreational attractions. These establishments cater not only to local residents and the traditional tourists but also to visitors from near by areas – the regional tourists.

1.3 JUSTIFICATION

The demand for water cleans up in the interest of health and not incidentally, to encourage new water front investment is now widely appreciated. Perhaps the unifying element around the globe, as it relates to recent urban waterfront phenomena is the public's desire to be near a body of water. A rather sharp contrast to the time when, many water front areas were lined with heavy industry, docks and fenced off ware houses or marred by abandonment and dereliction.

Today they are neglected and detached from the urban fabric. This abandonment has caused pollution, encroached of low-income shanty dwellers and squatters to the canal banks and in some places they have become dumping grounds.

Water pollution; take place due to unplanned development taking place on the banks. This implies that no proper planning and design incorporated into these developments coming into banks. It has become no mans land and as a result, encroachments and other forceful occupation has made some of the areas as underserved settlements. However such settlements had depicted as part and partial of this water bodies, due to the material used and temporary in nature.

But the current trend throughout the world has been a positive approach towards the water bodies. In Sri Lanka also, all most all of the current master plans for Colombo city has included water bodies in to their master plans creating maximum possibilities of utilizing them for various functions. But in answering a most prevalent question of the city it is identified as a "water street" to provide another mode of transport. Transport, providing linkage between two destinations added to the perception of these destinations. This respond towards the design or aesthetic aspect of the city, added to the image of the city in the long run.

1.4. RESEARCH OBJECTIVES

The overall study is specifically focused on the use of, urban water body as a transport mode, which act as a communication system, linking two locations in terms of human activities, which leads to design dimension in a broader sense to link the functional areas of administration and commercial capitals of SriLanka.

The main objectives of the study are,

1. To identify, a network of water bodies as a "water street" to implement transportation.
2. To identify environmental and functional viability of accommodating transport activities to urban water body.
3. City image gain through its relationship to water bodies.

1.5 METHOD OF STUDY

- A study of historical background of the urban water body including canal system, lakes and rivers in Colombo. The focus is on the various relationships that the society engaged with water in terms of socio- economic needs including transport.
- A study on comparable countries such as Venice, Paris and London etc. where city image gain through its relationship to water bodies.
- Analysis of settlement patterns through road network of city of Colombo and "Water Streets" which made up of urban water body including canal system, lakes and rivers in Colombo and its vicinity.
- A study of Beira Lake, Wellawatta Canal, Heen Ela – Kotte Ela and Kotte Lake, which identified as main link between administrative and commercial capitals of SriLanka though boat rides and a photographic survey. This provides existing situation and the further development locations.
- Study the current demand for socio-economic and recreational activities in Colombo city and identify the environmental and functional viability of accommodating transport activities to urban waterfronts. This will include an analysis of strategies proposed for the development of Colombo city through development proposals, where water body has integrated as a major element in it.

- An analysis and comparable study of how city of Colombo could become more integrated as a whole through the use of water transport. This will include a travel time analysis of water transport and various other modes of transport in given destinations where water transport can be introduced. This will be compared and the viability of utilizing water transport also will be discussed.
- Identification of nodes of interchange and nodes of entrance to city. This will be further analysed to conclude where integration become a major factor for the image of the city.

1.6 SCOPE AND LIMITATIONS

A development strategy involves many direct and indirect aspects, which could be categorized as physical, social, economical, financial, aesthetics etc. This study emphasizes the physical (built environment) development and also an effort shall be made on its financial aspects too.

Integrating water body as a water street in a development plan requires the whole of water bodies to function as a network to maximise its links to the other modes. Though the water bodies in and around Colombo city can be identified as a network connecting water bodies, from Puttlam up to Kalutara, for this study the resource within the city limits taken in to consideration.

CHAPTER 02

PERCEPTUAL AND ASSOCIATIONAL ASPECTS OF THE CITY

PERCEPTUAL AND ASSOCIATIONAL ASPECTS OF THE CITY

2.1 INTRODUCTION TO THE CHAPTER

This chapter mainly focus on, how the human person, who is animal, fantasist, and computer combined experiences and understands the world. Narrowing down the topic it mainly concerns what ways do people attach, meaning to and organize space and place?

The underline research area can be clearly described by,

> *"The most significant property of place is the direct personal relevance it has to the person been asked to describe it (who is experiencing that place)"* (Canter, 1977: p122-123)

This makes a useful statement for the study.

The human person is a species with inherent emotional needs. He is programmed to seek emotional satisfaction and emotional reward is a fundamental mechanism of survival. When man evolved in to the complex creature he is today, he invented all kinds of artificial ways to satisfy his emotional appetite. War, religious rites, exploration and art are the diverse expressions of this fundamental need. But among all, the city has been the most complex and all embracing projection of emotional desires.
As the city, became an increasingly sophisticated artefact, so symbolic and aesthetic factors combined to make it a place of ultimate emotional significance.

> *"Emotional needs constitute a spectrum, and included in that spectrum are needs which we can specifically define as aesthetic"* (Grove A .B. p: 31)

In what, ways and what basis does people experience the environment, "the city", which fulfil their emotional satisfaction? The answers will be the study area in this chapter.

2.2 CITY- A DEFINITION

Cities are urban settlements of people in which they perform the drama of life. It suggests his capacity to use his intellect and sensitive nature to organize physical objects around for him to lead a better way of life.

> *"The city is a place, a centre of meaning, par excellence. It has many highly visible symbols more important, the city itself is a symbol." (Tuan Yi- Fu, 1977, P: 173)*

2.3 PERCEPTUAL AND ASSOCIATIONAL ASPECTS OF THE CITY

2.3.1 Perceptual aspects and its meaning

Perception can be defined as,

The degree of involvement of a person with the place in perceiving,

People's experiences of places are so varied, and making sense of place has different values for different people, the understanding of the involvement of people in places is of utmost importance in trying to make a connection between people, and places.

> *"The ability of users to communicate particular meanings through personalization, by using objects and other environmental elements in order to transform environments so that they bight communicate different meanings particular to various individuals and groups"*
> *(Rapoport, 1982,P: 22)*

> *"Purposive movement and perception, both visual and haptic, give human beings their familiar world of disparate objects in space."*
> *(Tuan Yi-Fu, 1977,P: 12)*

The natural tendency is, as Tuan Yi-Fu in his book *space and place* notes,

> *"That place is security, space is freedom: we are attached to the one and long for the other."* (Tuan Yi- Fu, 1977, P: 01)

This shows the relationship of human with space and place. Thoughtful people curious to know more about our own nature – Our potential for experiencing –

People tend to experience the place, experience is defined as;

> *"Experience is a cover-all term for the various modes through which a person knows and constructs a reality. These modes range from the more direct and passive senses of smell, taste and touch, to active visual perception and the indirect mode of symbolization."*
> *(Tuan Yi- Fu, 1977, P: 08)*

Experience can be gained in many ways,

> *"The range of experience and knowledge..... Experience can be direct and intimate, or it can be indirect and conceptual, mediated by symbols. We know our home intimately; we can only know about our country if it is very large. A long time resident of Minneapolis knows the city, a cab driver learns to find his way in it, and a geographer studies Minneapolis and knows the city conceptually. These are three kinds of experiencing. One person may know a place intimately as well as conceptually."*
> (Tuan Yi- Fu, 1977, P: 06)

As lynch states, nothing is experienced by it self, but always in relation to its surroundings, the sequences of events leading up to it, the memory of past experiences. Every person has had long associations with some part of his city, and his image is soaked in memories and meanings.

Image and experience is gained mainly visually. The visibility of objects and places make it legible to the person who perceives it. So visibility is the first step towards creating the image.

2.3.2 Visibility, the Creation of Place

Visibility: is defined as state of being visible

> "Visibility attributes describe how the building is from pedestrian and vehicular paths."
> (Apple yard 1976)

Here the image is created by its visibility to the place it can be perceived. Mostly people tend to see built environment while they move. They grab what ever they pass by and these collective memories give them the legibility of a particular place.

Mostly people perceive cities from the streets, as they are places common to every person. The street acquires major significance as the city is born in a fixed place and the street gives it life.

As Norberg Shultz , 1971, states,

> *The street is a form that is more easily imageble. In the past it was a small universe, where the character of the district and of the town as a whole was presented in condensed form to the visitor.*

When considering a city, the fact of movement and spaciousness has a direct link with the street network

> *"Physical environment can influence a people's sense of size and spaciousness." (Tuan Yi- Fu, 1977, P: 54)*

> *"Human lives are a dialectical movement between shelter and venture, attachment and freedom. In open space one can become intensely aware of place" (Tuan Yi- Fu, 1977, P: 54)*

Spaciousness is closely associated with the sense of being free. Freedom implies space. It means having the power and enough room in which to act. An immobile person has difficulty mastering even primitive ideas of abstract space, for such ideas develop out of movement – out of the direct experiencing of space through movement.

Fig. 1 *Sense of being free "Freedom implies space"*

Fig. 2 *'Sense of freedom' Spaciousness is linked with being free*

2.3.3 Legibility, the meaning of place

Legibility can be defined as (Lynch K.1960)
The ease with which its parts can be recognised and can be organized into a coherent pattern.

Fig. 4 *Freedom tends to personalize space*

If the components of a place or a object is legible and can be grasped as a related pattern of recognizable symbols, so a legible city would be one whose districts or landmarks or pathways are easily identifiable and are easily grouped in to an overall pattern.

As Lynch K. 1960 states,

Structuring and identifying the environment is a vital ability among all mobile animals. Many kinds of cues are used: the visual sensations of colour, shape, motion or polarization of light, as well as other senses such as smell, sound, touch .....

> *"In the process of way finding the strategic link is the environmental image, the generalized mental picture of the exterior physical world that is held by an individual. This is the product both of immediate sensation and of the memory of past experience, and it is used to interpret information and guide action" (Lynch K. 1960,P: 04)*

As stated above, the legibility of the city, where one can generate a clear mental picture of it, easily recognise the surrounding and move about easily and quickly. So the need to recognize and create an image of the city has wide practical and emotional importance to the individuals, where they can be inhabitants or visitors. The generalized mental picture of the pattern of our surroundings creates an image of the place.

Lynch K. says,

> *"An ordered environment may serve as a broad frame of reference and organizer of activity or belief or knowledge".*

The recognizable pattern of cities directly indicates a visual order, which can be grasped easily. This pattern consists of *related* patterns of roads, landmarks, pathways, built up areas etc. Successive legible environment in cities create an emotional bond between its possessor and the city. It has a strong expressive meaning and always offers security a sense of intimacy and a sense of belongingness to share. Ultimately, this impression creates a strong bond between man and the city.

> *"Human beings not only discern geometric patterns in nature and create abstract spaces in the mind; they also try to embody their feelings, images, and thoughts in tangible material." (Tuan Yi- Fu, 1977, P: 17)*

This is the attractive force behind living cities. The people are attracted with emotional relationships, created with legible surroundings. The varied experiences, emotional satisfaction, ability to communicate and organize patterns, the pleasurable moments are rewards of a legible surrounding to its user.

Communication draws people's attraction and it reveals an opportunity to communicate back. This becomes a mute dialogue between built environment and its users, both inhabitants and visitors.

Transport provides the facility of communication between every possible location within the city. It is the physical connection method of places. So, the more integrated city provides

more opportunity for legible environment. Integration of its physical features such as its symbolic physical features, road network, natural elements such as water bodies, to act as a net work of communicating system, the sense which the inhabitants of a settlement towards perceiving its image will be enhanced.

2.3.4 Perceived environmental quality in city

Environmental quality of the city plays a major role in Imagebility. A striking landscape is the skeleton upon which many cities erect their physical built environment. And nature in the city makes it more visible, legible and imageble creating many opportunities for the inhabitants as well as the visitors to hang their memories, experiences and so on.

> *"Nature acts as a source of inspiration and beauty; it provides a link with values from which we are becoming increasingly isolated. Through making nature an integral and immediate experience of many more people, by showing them on their door steps the interdependence of all living things, our society may come to understand better the need for man to exist in harmony with this environment and to conserve its limited natural resources. The adoption or rejection of such a conservation ethic may decide the kind of future today's children will enjoy, in both town and country".* (Grove A.B., 1983, P; 48)

In this respect integration of water bodies to enhance the image of the city will be a further step towards legibility as it provides enough clues about its setting. Water streets or water corridors in a city will produce a sharp physical setting for many activities which lead to a harmonious relationship with activities woven around its built environment.

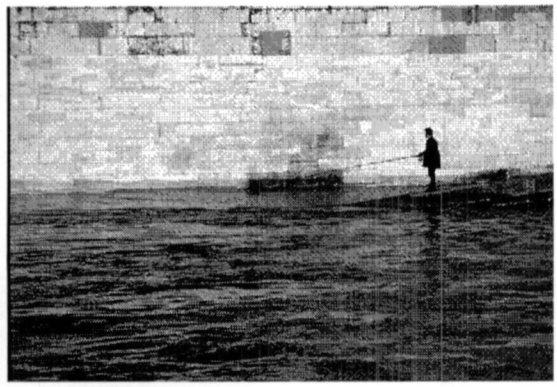


Fig. 3 *Provides space to personalize and feel free*

Fig. 4 *Nature acts as a source of inspiration and beauty – which inspires its users*

The environment is the actual geography that uses experience. It is comprised of elements- The basic discrete parts of the environment that constitute the physical substance of community designs. These elements include masses (landforms, buildings and structures), spaces (parks and other types of open areas) and paths (linear travel ways).

Naturalness and mystery of the building can be achieved in many ways. If it is sited along a water body both can be maximized. If it is accessed through water body attractiveness, navigability and distinctiveness will add in to the perception of the building.

	Natural (Form/ Detail)	Built (Form/ Detail)
Masses	Land Forms	Structures
	Topography	Contouring
	Crowds	Vehicles
	Vegetation	Landscaping
		Public art
		Street furniture
		Public utilities
Spaces	Agricultural Land	Recreational park areas
	Plains	Squares/ Plazas/ Malls
	Valleys	Parking Lots
	Scenic and historic places	Yards
	Water areas	Vacant Land Terminal areas
Paths	Rivers	Expressways/ Parkways
	Streams	Streets/ Roads/ Alleys
	Gullies	Railways/ Subways
	Ridges	Bridges/ Tunnels
	Canyons	Walkways/ Trails/ Bicycle Paths

Fig. 5 *Elements of the environment*

2.3.5 Imagebility, the identity of the place

"Environmental images are the result of a two-way process between the observer and his environment" (Lynch K., 1960, P:06)

An image evoked in an observer's mind is a mental picture. Each individual creates and grasps images and gives meanings to images with what he sees, understands and experiences.

Over the long period of history people have attempted to create their living surrounding with good environmental images. In some instances this was to give an identity and to gain emotional attachments to their living surroundings.

As Lynch K. states, (1960; P 10)

> *"These are characterizations that flow from our definitions. The concept of Imagebility does not necessarily connote something fixed, limited, precise, unified or regularly ordered. .... The total environment to be patterned is highly complex, while the obvious image is soon boring, and point to only a few features of the living world. "*

In perceiving the image the observer also plays an active role. This differs, if he is an inhabitant or a visitor.

In this aspect

> *"Imagebility of a town, city can be defined as a necessary quality of a city environment. Which evokes vividly identified. Powerfully structured, highly meaningful city image to the user"* (Lynch K., 1960, P:09)

Material objects first arouse a feeling that provides a background for more specific images, which are then fitted to the material, and in the case of environments affective images play the major role in decisions.

2.4 CITY IMAGE & ITS ELEMENTS

2.4.1 Building the image & its elements

For the creation of the image the built environment play a major role, the built fabric of an urban streetscape can be identified and experience in relation to the spaces of a building a building consist of an entrance, corridors (streets), flanked by walls (built elements at either side of the street), lobbies connecting with entrances to other rooms, (street intersections), and the end of the building.

a. Urban solids

b. Urban voids

Urban solids are the built elements, which contribute to the urban visibility including public monuments, dominant buildings, and directional or edge defining buildings.

Urban voids are the open spaces in a city including open public areas which become breathing spaces within the built fabric.

Fig. 6 City image through urban streetscape

Fig. 7 The relationship of urban solids & urban voids

In creation of image Apple yard critically discusses the contribution by the urban voids in 1976,

> *"People cognitively organize and conceptualise cities, in part, in terms of paths, landmarks, nodes, edges, and districts"* (Lynch K., 1960)

A critical extension of Lynch's above theory on urban perception perspective is Donald Apple yard's research on physical and socio-cultural aspects of structures that influence memory for buildings and landmarks, which leads towards the image of the city. . (Appleyard1969, 1976)

As Donald Apple yard remarks,

Building characteristics were organized in three dimensions

1. Building form
   - Movement around the building, Clarity of contour, Size, Shape complexity, Surface colour and texture, Maintenance quality
2. Building visibility
   - Numbers of people likely to daily pass the most prominent viewpoint of the building
   - The proximity of the building to a major orientation decision point (e.g., street intersection)
   - Proximity and centrality of the building to the circulation system

3. Building use and symbolic significance
   - How often a building was typically used, Uniqueness of its function, Symbolic significance reflected cultural and historical importance

Thus there is strong evidence that certain characteristics of building structure and **location enhance the urban knowledge.**

As this statement implies, the location, the proximity of the building to a major orientation decision point (e.g., street intersection) increases the memory for buildings. In this aspect a building located in a remarkable setting increases its identity, which leads to legibility, which create a distinctive image in the perceiver. Around the globe this phenomenon has used very cleverly in setting their city centres. A water body in this aspect will increase the urban knowledge where it increases the visibility.

Building form, use and symbolic significance contributing to the liveliness of place

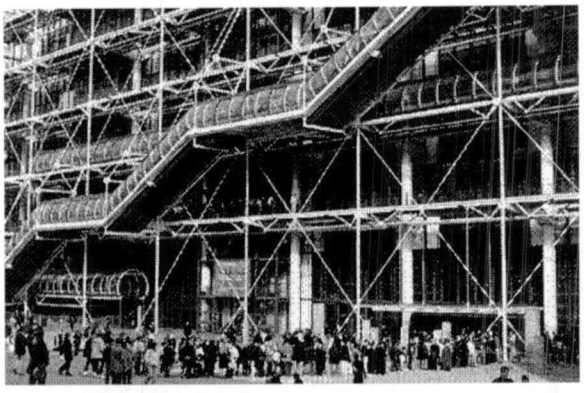


Fig. 8 *Centre Pompidou*

Fig. 9 *Gathering of people near Pompidou*

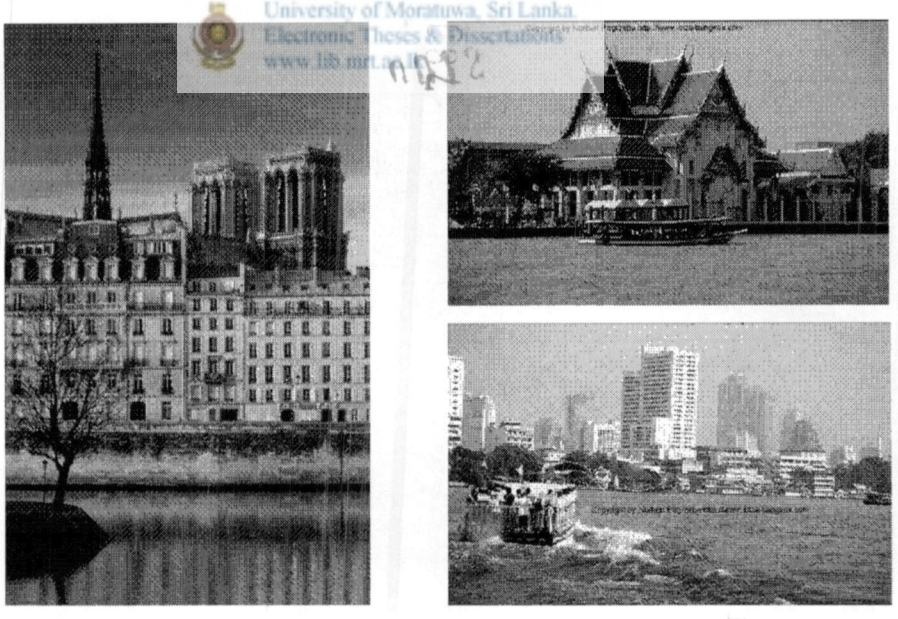


Fig. 10 *Building location enhance the urban knowledge*

2.4.2. Urban streetscape as the key element of city image

Jane Jacobs a critic of the urban form mentions,

> *"Streets and their sidewalks, the main public places of a city, are its most vital organs. Think of a city and what comes to mind? Its streets. If a city's street look interesting, the city looks interesting if they look dull, the city looks dull"*

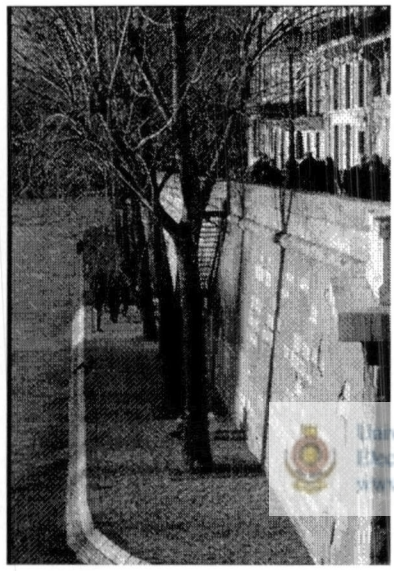


Fig. 11 *Sense of direction*

Fig. 12 *Experience and memories provide a pleasurable image!*

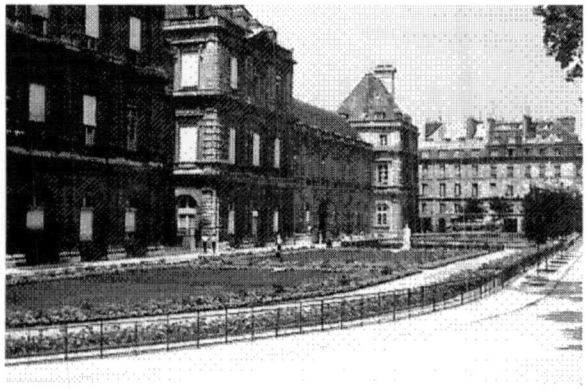


Fig. 13 *Movement, sense of size and spaciousness*

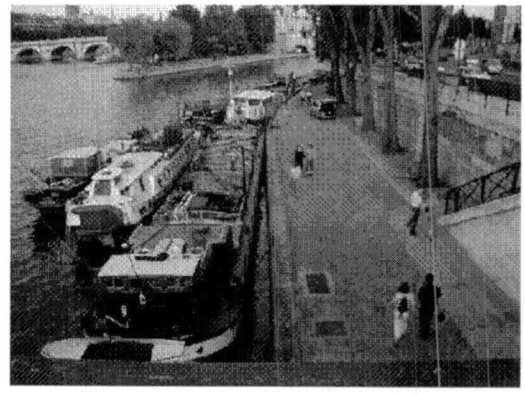


Fig. 14 *Free of mind through walk ways*

The street provides a link between buildings both within the street, and in the city at large. As a link it facilitates the movement of people as pedestrians, vehicles and also the movement of goods to sustain the wider market and some particular uses with the street. Street as a place of social contact and interaction, also contribute to the city image. In this respect, walking becomes an integral part considering the freedom and experience such as looking at shop windows, admiring the scene, or talking to people. This freedom provided by a street contributes to the civilized quality of an urban area.

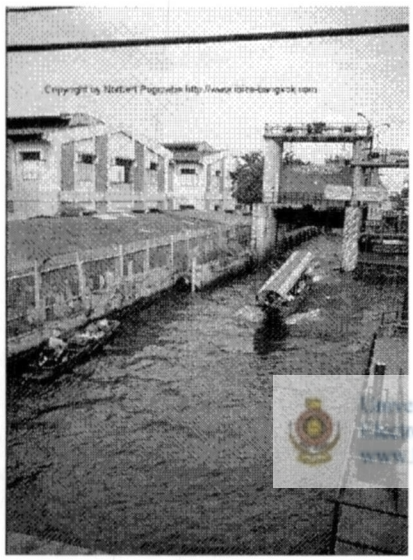


Fig. 15 *Canal in Venice*

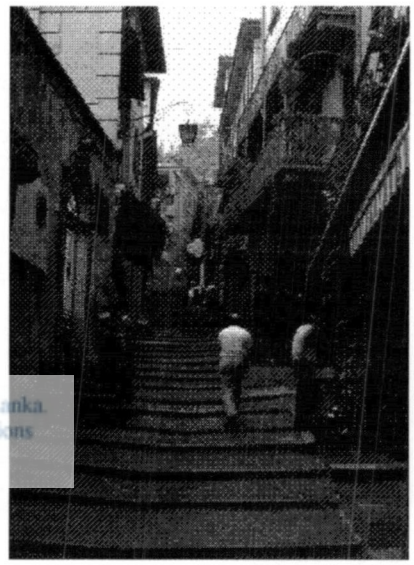


Fig. 16 *Walkways in Venice*

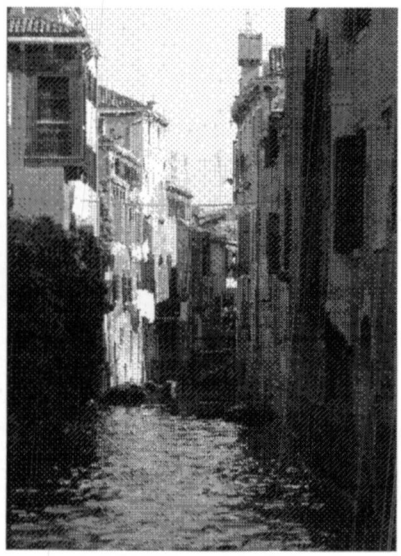


Fig. 17 *Canal in Venice*

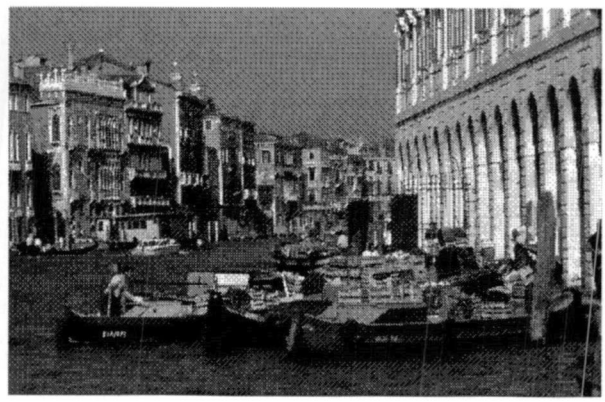


Fig. 18 *Gondolas in canals - Venice*

2.4.3. Accessibility as a key element in city form

The city is a creative endeavour of many people attempting to give forms to their spatial needs, accommodation and movement pattern.

> *"A city is the grip of man against nature, a human organism both for protection and for it. It is a creation."* (Le corbusier, 1929)

When considering the historical back ground of the formation of city, and its location, As Johnson H. J. In Urban Geography (An introductory analysis), 1976 says,

1. Those settlements which are predominantly concerned with serving the needs of surrounding areas, the so- called "central places"; require being accessible to the people who use them.
2. Secondly, those cities, which are concerned with linking an area to the out, side world or with certain types of manufacturing, are often located on through routes.
3. Third locating factor is provided by highly localized physical resources, on which groups of cities are clustered.
4. Finally there is an often measure of chance or human whim in urban location, which is often overlooked, simply because this factor is so difficult to assess.

A second factor governing the location of urban settlements is the distribution of through transport routes and break- of- bulk points along them. Incidental to its primary function, a through transport route often modifies the pattern of local accessibility in an area, since it can hardly fail to have an effect on local transport facilities. As a result a through transport route can distort the central place arrangement of the cities and towns near to it.

Transport routes are most influential in governing the location of cities, which link regions to external areas. Often the dominating metropolis of a region has had its origin as a transport centre, although later urban growth has attracted so many other functions that this original stimulus to its original development has been masked. Many of the great coastal

cities of the world provide an example of a location of this kind, lying as they do at the junction of two kinds of transport.

Urban settlements tend to grow on transport routes only at specific places, particularly at junctions and break-of-bulk points, where one form of transport is changed for another. In fact there are innumerable locations of this kind – at road and railway junctions, at the head of sea and river navigation, or where a route changes direction and passengers and goods are likely to branch off from one form of transport to another. Hence settlements whose locations are guided by transport routes are found not only at the end of these routes, but also along them.

Urban settlements, which owe their location to transport facilities, possess a variety of functions. Often a line of small local service centres is attracted to a transport route. Or again some towns mainly provide services for passengers and vehicles moving along transport routes, although settlements of this kind are easiest to pick out in relatively empty areas, where there are no other stimuli for urban growth. Break –off –bulk points are convenient points for certain types of manufacturing.

2.4.4. City form through water, the 'water city'

Techniques of moving people within cities have put their distinctive mark on their fundamental form. Flexibility of personnel movement will be a feature of the various social and economic activities found in these dispersed cities. For example it will become less and less viable to assess urban structure and population densities in terms of linear distance from the city centre.

It maybe said, therefore, that the physical restriction of urban growth produces both good and bad results. The great expanse of very large demands more expenditure than necessary in travelling and creates wasteful congestion at critical points in the transport network, although many of these costs pass unnoticed because they are borne by the community rather than by the individual.

In this aspect the urban water body can be utilized for the integration of the city. The natural water resources such as rivers, lakes, sea and the man made canals, can be utilized as water streets as they create a network among them selves most of the time. This phenomenon is cleverly integrated in most of the countries around the world. Amazingly this respond has created their identity providing spectacular image not only for its citizens but also for the whole world.

These water resources act as water streets, maximise the interchange of transport modes, this lads to the legibility of the place as discussed earlier, and this legibility heightens the potential depth and intensity of human experience.
Because as Lynch K. (1960, p: 05) states,

> *"Although life is far from impossible in the visual chaos of the modern city, the same daily action could take on new meaning if carried out in a more vivid setting"*

This will be the answer to many problems prevailing in modern city, including not only easing out the traffic problems, making the city commercially more viable, creating commercial centres at places of interchange but also providing the pleasure we lack in day to day activities. This is a main advantage as water streets provides the most scenic variety and the environmental quality of water bodies including their banks has a higher environmental quality of than the other modes of transport roots

As Lynch K. 1960, P:05 say,

> *"The positive values of legible surroundings are missing: the emotional satisfaction is the framework for communication or conceptual organization, the new depths that it may bring to every day experience. These are pleasures we lack"*

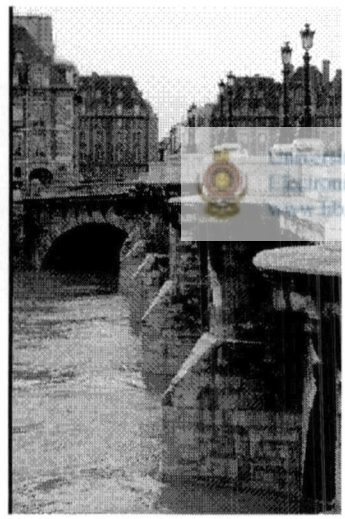


Fig. 19 *Water within the city as an element*

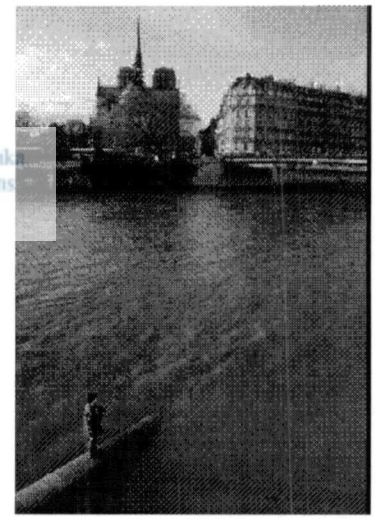


Fig. 20 *Water as an element*

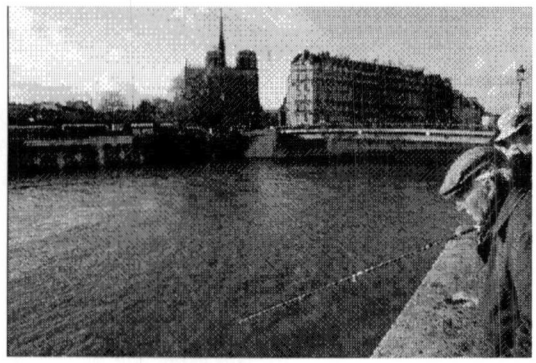


Fig. 21 *Water as a recreational element*

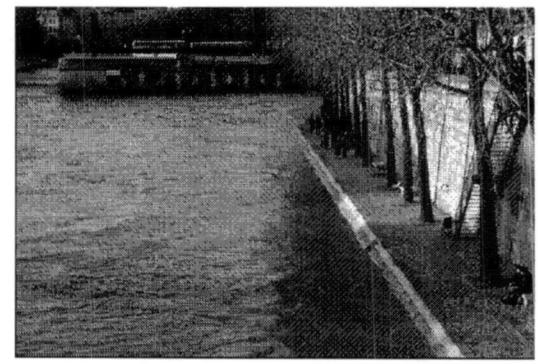


Fig. 22 *Pedestrians walking along the water body*

2.4.5. Accessibility as a key element in city image

On the plane man choose and create paths, which give his existential space a more particular structure. Mans taking possession of the environment always means a departure from the place where he dwells, and a journey along a path which leas him in a direction determined by his purpose and his image of the environment..... The path, therefore represents a basic property of human existence and it is one of the great original symbols.

The road network plays the major role of moving people from one place to another. It is regarded as a place where many of social interactions happen.

A city contains a great number of places, distributed rather evenly across a two dimensional sheet. The trips people want to make are typically between two points at random in this sheet. No one linear system (like a train system) can give direct connection between the vast possible numbers of point pairs in the city.

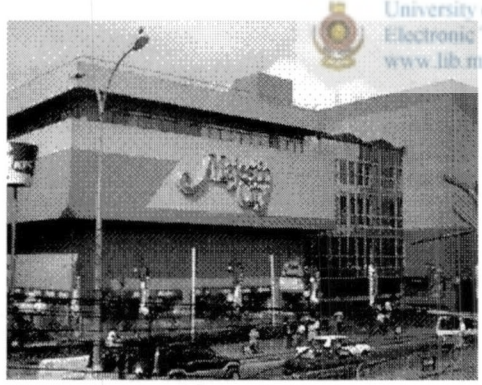


Fig. 23 *Built fabric contributing to the street fabric*

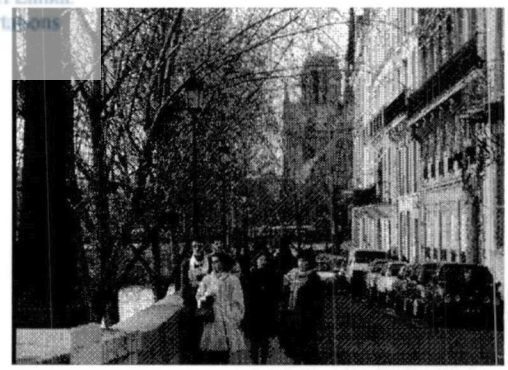


Fig. 24 *The natural elements contributing to the street fabric*

As for the city centre accessibility plays a major role. It is where the transport interchange take place and visitors who arrive from different parts of the country makes entrance to the city. This is the place where people perceive the image of the city.

2.5 CONCLUDING REMARKS

As Noberg Shultz indicates,

> *"Perceptual space has a centre, which is perceiving man, and it therefore has an excellent system of directions which change with the movement of the human body; it is limited and in no sense neutral in other words it is finite, heterogeneous and subjectively defined and perceived; distances and directions are fixed and relative to man" (1971, P: 13)*

Perceived space have personal significance. Therefore these places are organizations of intimate thinking. Perception and meanings, within a wider social or cultural space, any individual has his or her own perceptual spaces and perceptual places.

Places cannot be experienced as independent, clearly defined entities. All places are overlapped with each other and people experience different types of places in day-to-day life with or without having much concern about the places they use. People become attached to certain places while in some occasions places can detach people from their association. This attachment or detachment happens due to the perceptual image each individual carry with them through experience.

Image and experience is gained mainly visually. The visibility of objects and places make it legible to the person who perceives it. So visual perception is the fundamental step towards creating image.

But city being large and dispersed, and the city population which is the inhabitants, concentrated on particular areas and visitors may find it a problem to experience and memorise the city, which gives them the legibility, the identity of the city. In this aspect accessibility plays a vital role. Flexibility of personal movement is a feature of the various social and economic activities find in dispersed cities. This makes the city alive.

The technique of moving people within cities has become a distinctive mark on their fundamental form and image. As in Colombo city the city has formed along the main roads mainly along the Galle road. So people experience the city in a linear perception within two planes of built fabric without even a sense of, all the natural resources, the breathing spaces of the city.

Accessibility, the link of two locations by movement creates live spaces. More the accessibility it becomes more legible. Accessibility and movement make provision for people to create images, experience and memorise the city. The network of movement makes the city legible for inhabitants and the visitors.

For a legible city the built fabric contributes a lot. As discussed in the chapter, Applyard critically discusses the characteristics and related elements of buildings to the city image in criticism with lynch's theories on city image. Lynch says, *People cognitively organize and conceptualise cities, in part, in terms of paths, landmarks, nodes, edges, and districts"* (Lynch K., 1960) A critical extension of Lynch's above theory by Donald Appleyard's research on physical and socio-cultural aspects of structures identified that, influenced memory for buildings and landmarks, leads towards the image of the city. In this research it says, building form, building visibility and building use and symbolic significance become key factors in conceptualising the city.

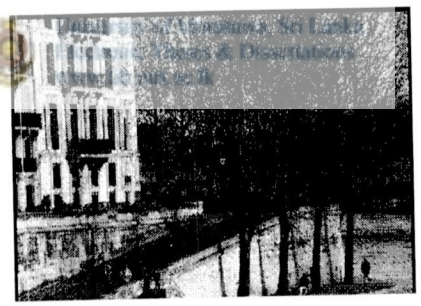
The integration of water bodies in the urban areas provide a significance character in finding solutions for these problems

As a transport mode, travel to a number of centres within the built up area in the city the existing water body can be utilized as a "Water street". With this, local environmental features eventually become integrated in to the city fabric and this integration provides provision for development of sub centres which are linked by the water street in to the main grid of transport.

The development of land for recreation is often a desirable process, to be encouraged rather than prevented; the use of land for transport and other purposes essential for the functioning of the city is inevitable. In this regard utilizing the existing resources will provide the ultimate solution.

The city, which we play our drama of life, is not merely a concept or an abstract. It is a direct experience in live- world with full of memories, and a place which we embody our feelings, images, and thoughts. But the lack of sensitivity towards city is a question that has been raised over and over again. Mega development, lack of concern in integrating environmental resources, but more profoundly, our attitudes on neglecting resource has added to this problem. But identifying the key characters and responding to them and integrating the features that enhance the image of the city will increase the attachment towards it creating a live city.

CHAPTER 03



WATER FRONT DEVELOPMENT TRENDS IN CITIES.

WATER FRONT DEVELOPMENT TRENDS IN CITIES

This chapter mainly discuss how water has been utilized as an element to enhance the perceptual and associational aspects of the city, which discussed in the previous chapter. Here mainly three cities will be discussed with a great Variety in successfully integrating the natural water resources as well as the man made waterways, to enhance the image of the city. The cities are Venice, Paris, London, and a redevelopment project which is docklands in England are discussed to prove the fact that a water feature always provide horizons to expand the existing land use.

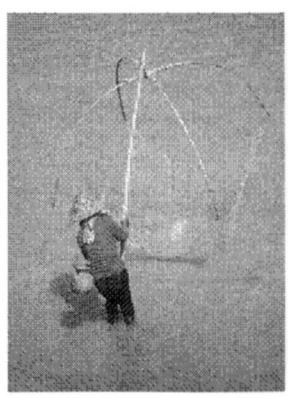
3.1 WATER IN THE GENERAL USE.

This chapter briefly discuss importance of water to mankind and its general uses. As it is a resource, which our lives are depended on, people, tend to neglect it in present day situation. But in the ancient times it had a different perception. The legend describes the important of water in many ways such as a god, creator, defending element, and a necessity for cultivation and agriculture and a basic need for livelihood.

All most all the civilizations originated on banks of rivers. This provided them water for general purposes, for cultivation, defence, transport, recreation element and act as a mode of communication too. It is noteworthy that people cross the oceans on navigable roots searching for treasure established the network of communication around the globe

3.1.1. Cultivation / Agriculture

Fig. 25 *Paddy Cultivation*



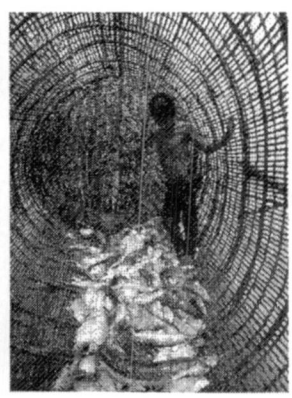


Fig. 26 *As a resource of fish*

3.1.2. Ritual performances

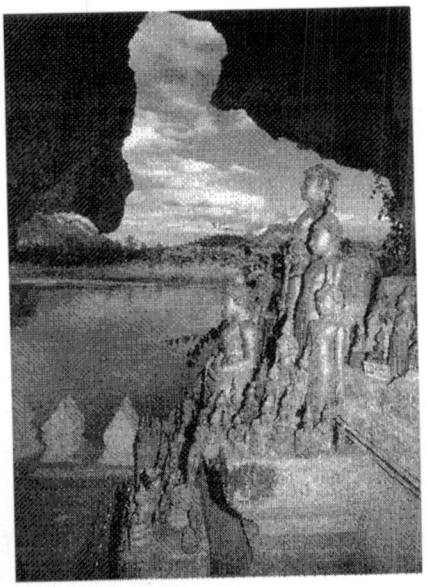


Fig. 27 *Ritual performance linked with water body*

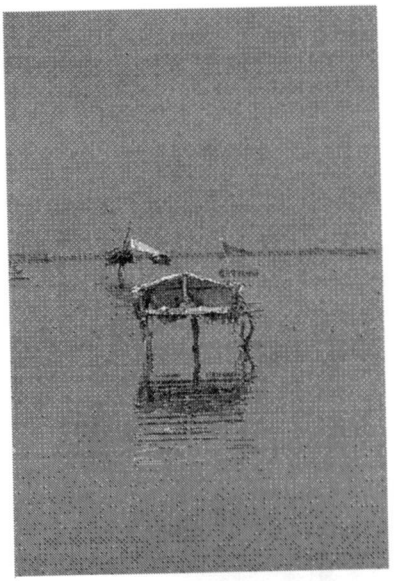


Fig. 28 *Offering made for the water*

3.1.3. Day to day activities

Fig. 29 *Bathing*

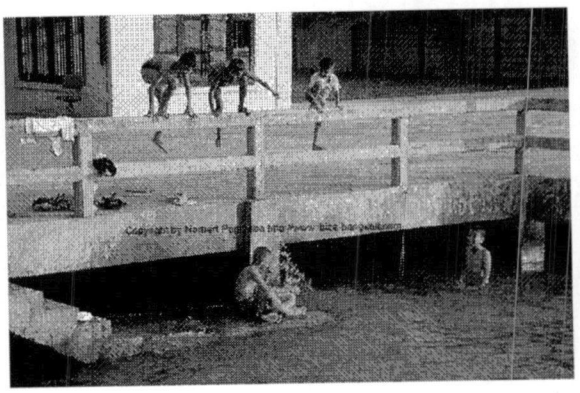


Fig. 30 *As a pleasurable entity*

3.1.4. Aesthetic purposes

Fig. 31 *Reflectivity creating illusion*

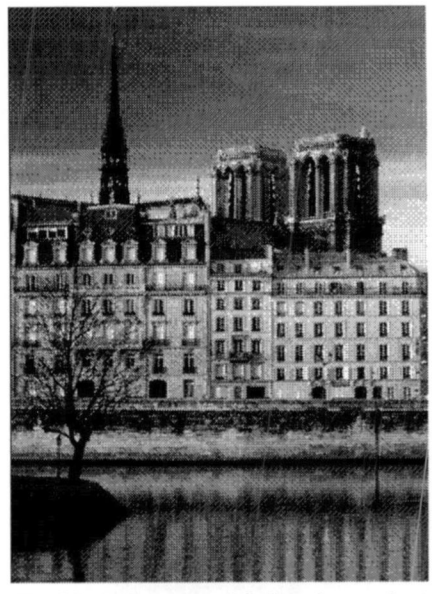


Fig. 32 *Reflection added to the aesthetics*

3.1.5. Navigable Root

In Sri Lanka water transport has been used in ancient times. Today also in Negambo, the Hamilton Canal is utilized as a Navigable root serving the fishing community.

In most of the countries this is a main strategy in attracting tourists both foreigners and locals. Boat trips around places or cities with a historical and cultural value encourage the tourism as well as preserve the heritage of the country.

Fig. 33 *Waiting on pier for the boat*

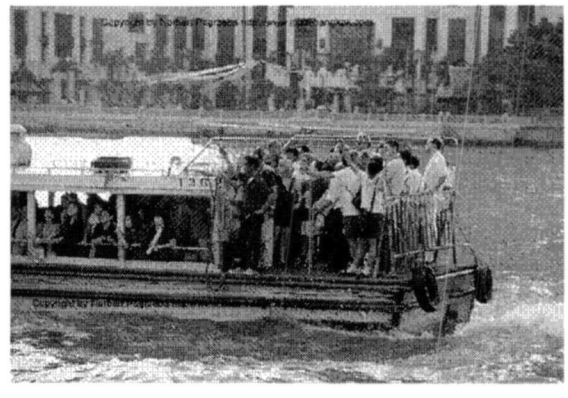


Fig. 34 Water transport mitigate the traffic problem in Bangkok

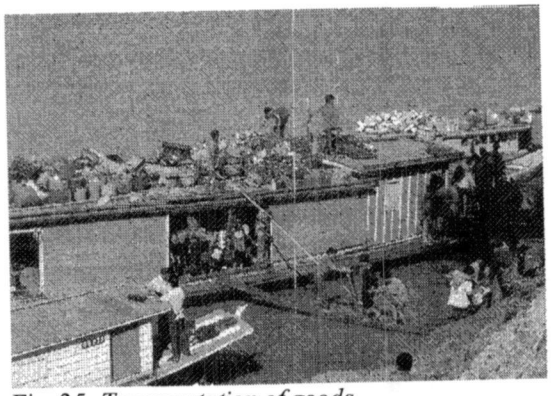


Fig. 35 *Transportation of goods.*

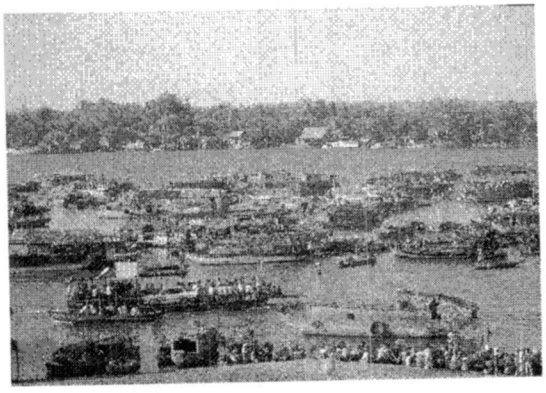


Fig. 36 *Acting as the main mode of transport*

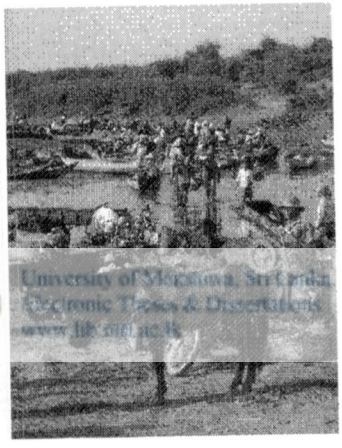


Fig. 37 *Transport interchange*

3.1.6. As a recreational element

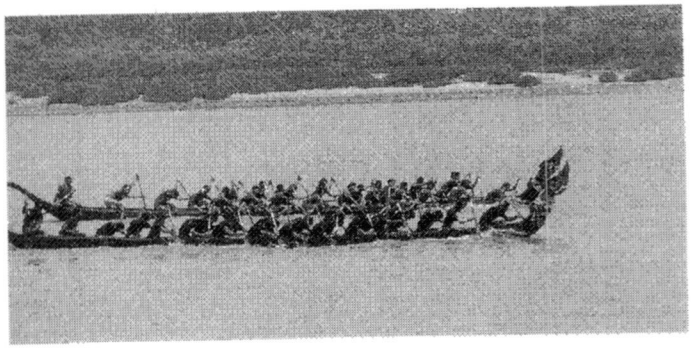
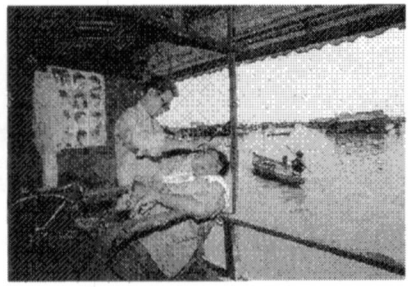


Fig. 38 *Water sports*

3.1.7 Economic & Residential uses



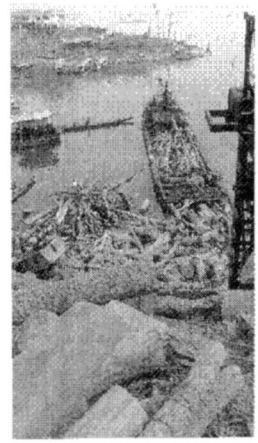


Fig. 39 Water becomes ground for exchange of goods & Services

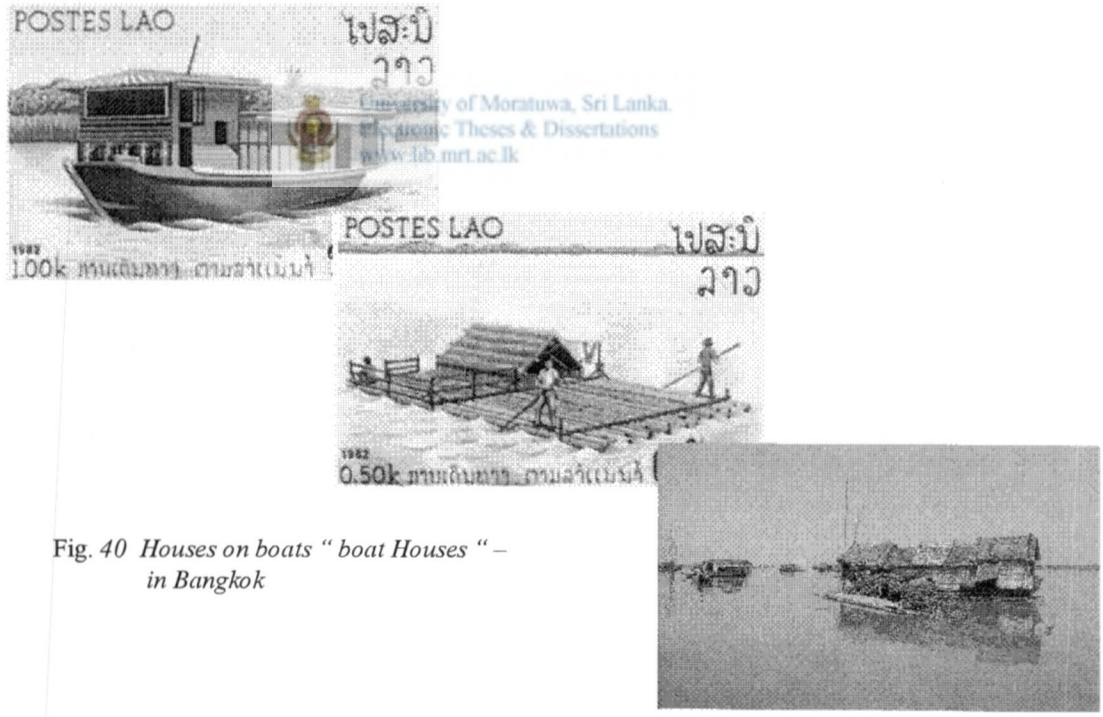


Fig. *40 Houses on boats " boat Houses " – in Bangkok*

3.2 USE OF WATER IN RESTRUCTURING URBAN VOIDS.

Some major water front transformations

Project/ City	Size (Acres)	Cost	Former Use	Date
1. Granville Island -Vancouver	42	$ 70 million	Industry	1979
2. Harbour front -Toronto	90	$340 million	Industry/Rail	1972
3. Battery park city -New York	92	$ 4 billion	Land Fill	1979
4. Inner harbour – Baltimore	95	$ 2.5 billion	port	1963
5. Port Vell – Barcelona	134	$340 million	port	U.C.
6. Sal ford Quays - Manchester	148	$750 million	port	1990
7. Darling harbour – Sydney	148	$ 2.5 billion	abandoned rail	1988
8. Victoria and Alfred Cape town	203	R 2.5 billion	docklands/ Industry	1989
9. Kope Von Zuid – Rotterdam	308	DFI475 million (Public money)	port/industry	U.C.
10. Minato Mirai21- Yokohama	460	$200 billion	landfill	1983
11. OJ Havengebied –Amsterdam	-	2.5 billion	old docks	1989
12. Teleport city - Tokyo	1,107	-	landfill	U.C.
13. Docklands – London	5,000	-	warehouses /docks	1981

U.C. – under construction

3.2.1 Background study - Venice

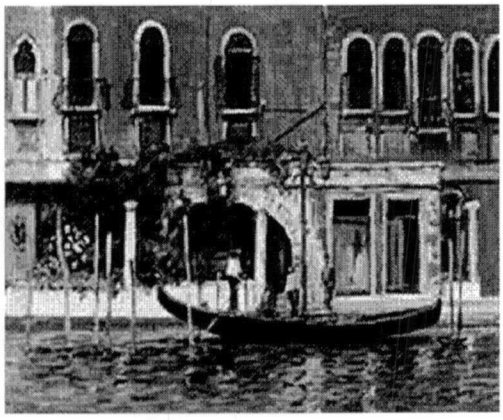


Fig. 41 *Venice the city of water*

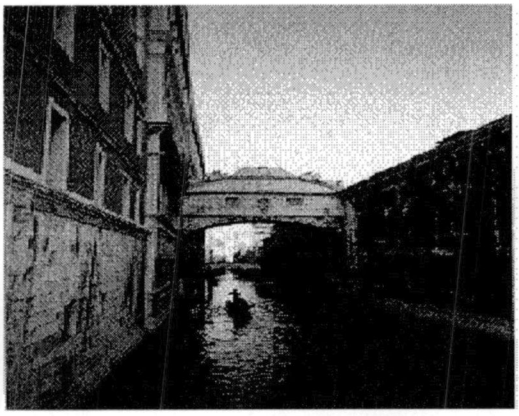


Fig. 42 *Grand canal between two rows of buildings & the connection with a bridge*

Venice will be studied at its spectacular respond to the water body as a front yard. As all most all the houses at the edges of the canals face the water body it has given a specific character to the built fabric.

Actually the image of the city is derived from its water body and its respond towards it. So the built fabric responding to the water body will be the area studied under Venice "the city of water"

The city of Venice is situated in a lagoon at the north end of the Adriatic Sea, surrounded by islands and marshlands. Viewed from the air, it appears to be one very large island, cut down the middle by a river that runs in a double-S curve, with several smaller islands to the south and east.

The individual islands, separated from each other by sea water, appear to the pedestrian as solid land interrupted by frequent running streams that may be crossed with ease, owing to the multiplicity of bridges. To the waterborne, the islands retain their individuality, as it is the water, edged with looming outcrops of masonry that provides the connecting medium.

The perceptual effect of this constant tidal cycle was to make the city seem insubstantial and not entirely anchored, as though the city itself were sinking into and ascending from the sea, rather than the sea falling and rising around the land.

> Water, of course, creates certain visual effects; as it flows and ripples, the reflections move and catch the eye in a way that reflections off solid surfaces cannot. In a city permeated with water, the reflections are all around, painting non-moving surfaces such as buildings with motion. The light shimmers, and is evanescent. These water-imposed characteristics of light move the watery realm into the land-based one; even when water is not physically present, the stamp of its interaction with light permeates the visible landscape.

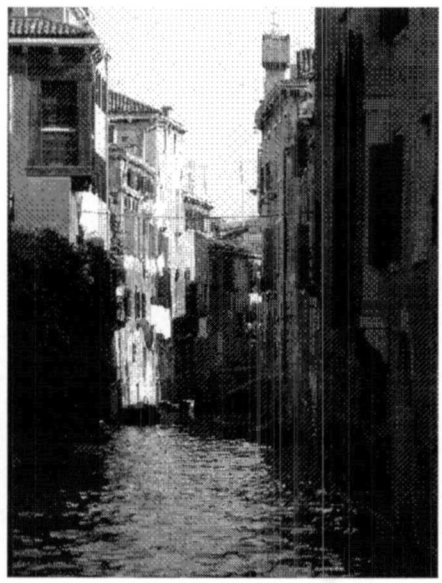


Fig. 43 *Canals providing a landscape for the city*

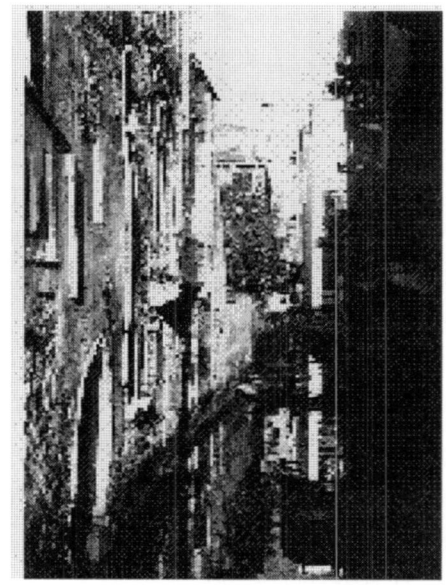


Fig. 44 *A narrow canal*

Fig. 45 *Patterns of lines and edges. The aesthetics of pattern!*

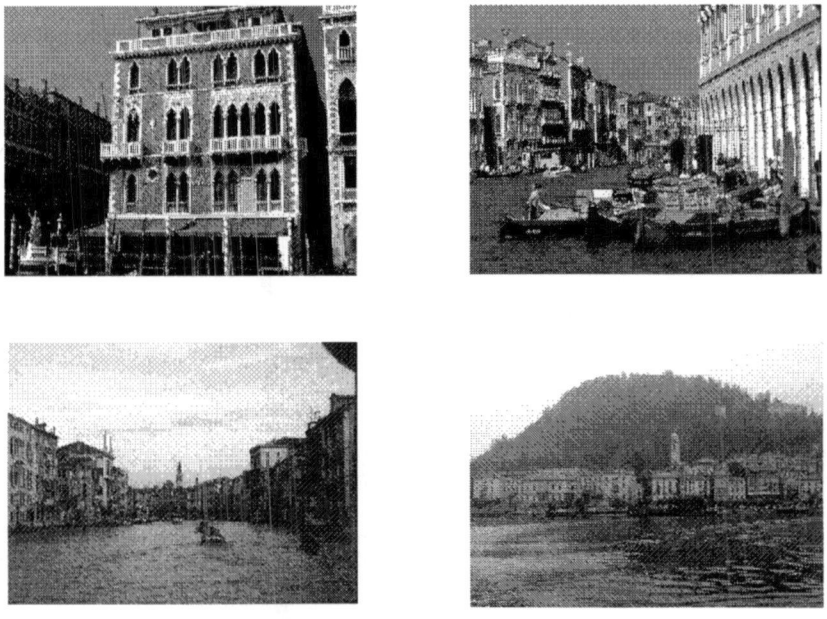
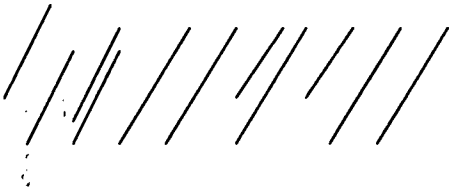


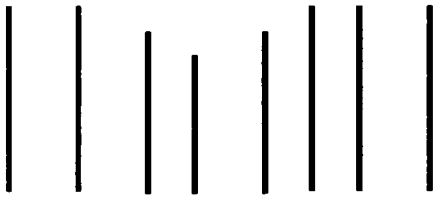
Fig. 46 P*atterns exceeds the complexity*

Patterns of lines and edges

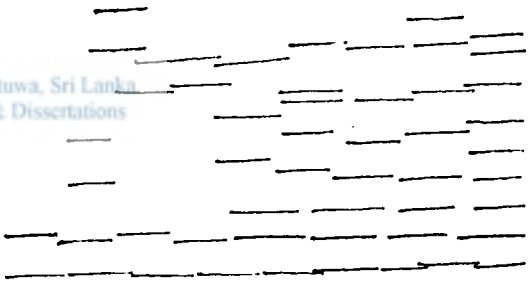
1.0 Roof divisions



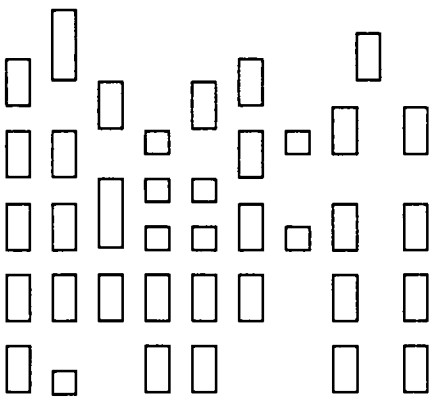
2.0 House divisions



3.0 Floor divisions



4.0 windows



At first sight, Venice appears disorderly. Storey heights fail to correspond, windows vary in size and placement, in other words there is a high rate of complexity on the visual level. But this variation falls within a band, which suggests likeness more than difference. This means that the buildings as a whole observe the same scale. The same goes for windows.

There is a fundamental affinity about the size, proportion, colour, and the rate of placing, which suggest that there is more connecting pattern than dividing them in to isolated units.

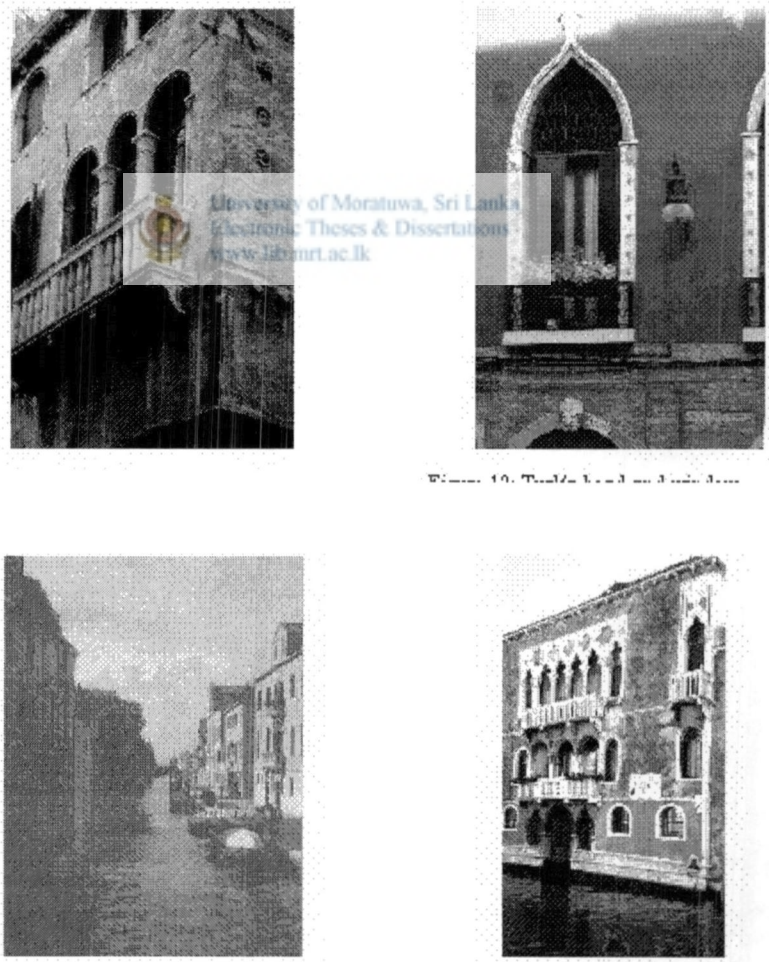


Fig. 47 *Specific elements, which add up to the Imagebility*

Fig. 48 *Venice Size, proportion & colour connecting in to a pattern.*

Fig. 49 *Venice Likeness tempered with difference*

Expression of pattern is reinforced by the unity of materials, especially the brown brick, which add up to a high rate of redundancy. Venice becomes aesthetically pleasing because the rate of repetition and patterning exceeds variability and disorder.

Contest between Complexity and orderliness makes Venice an aesthetically and therefore emotionally rewarding city.

3.2.2 Background study - France, Paris

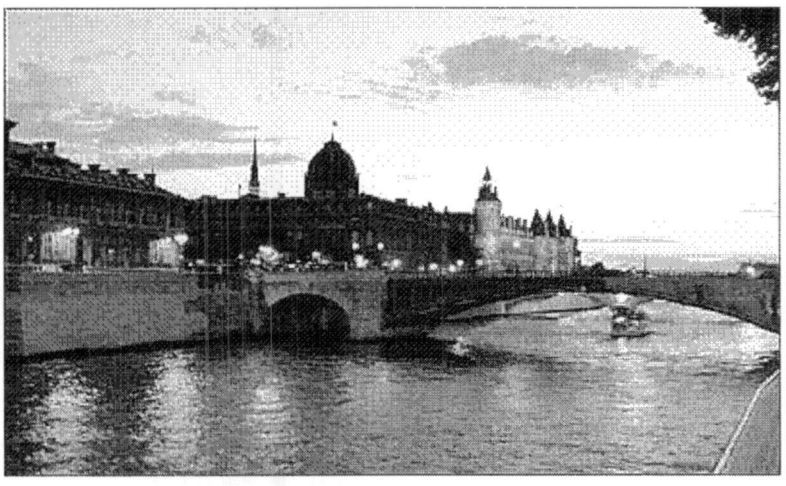


Fig. 50 *Night- time view of Paris through right bank of River Seine*

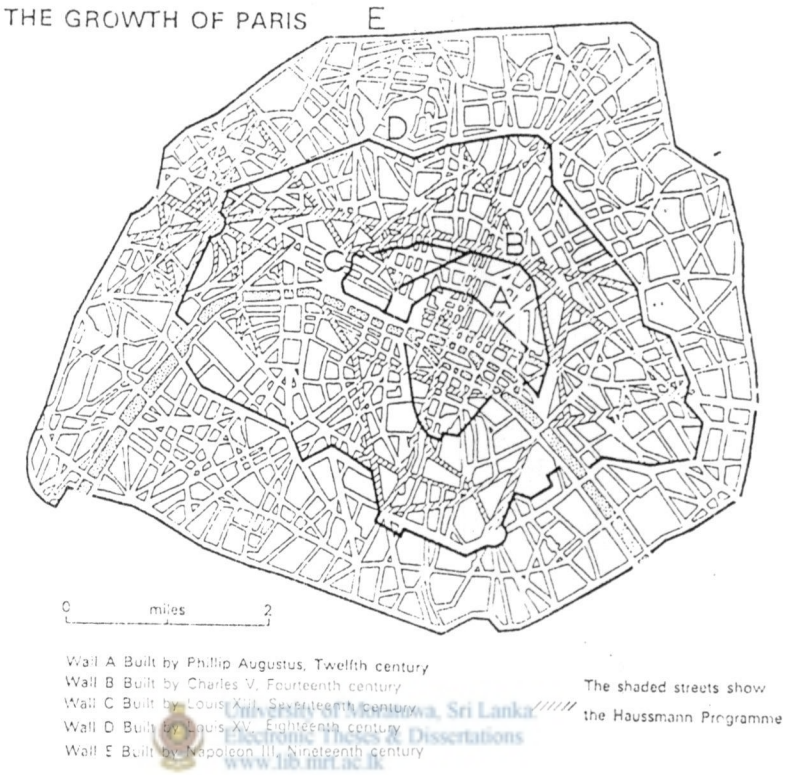
Paris is a city, which gains its identity, & significant character through its relationship to a water body, river Seine. Most of the day-to-day activities of inhabitants as well as the visitors are woven round this magnificent water body. So Paris will be discussed as a city, which gains its cultural value, emotional satisfaction, and informal recreation and aesthetic creation and enjoyment through its relationship to a natural water body.

A sand bank in Seine River has grown and had become Paris. France has been developed taking Paris as a central, spreading grand farms and green forests around there.

Known as the **City of Light**, Paris has been extolled for centuries as one of the great cities of the world. Its location on the Seine River, at a strategic crossroads of land and river routes, has been the key to its expansion since the Parisii tribe first settled here in the 3rd century BC.

The city's location on the Seine River has been the key to its expansion, success, and beauty. Paris is an alluring city boasting many monumental landmarks, such as the Cathedral of Notre Dame, the Louvre, and the Eiffel Tower. Which is a remarkable landmark, which located on the south bank of the Seine.Its beautiful gardens, world-class cuisine, high fashion, sidewalk cafés, and intellectual endeavours are well known.

The cultural life of the city is centred on the Left Bank (north) of the Seine, while business and commerce dominate the Right Bank.



Map No. 1 *The growth of Paris*

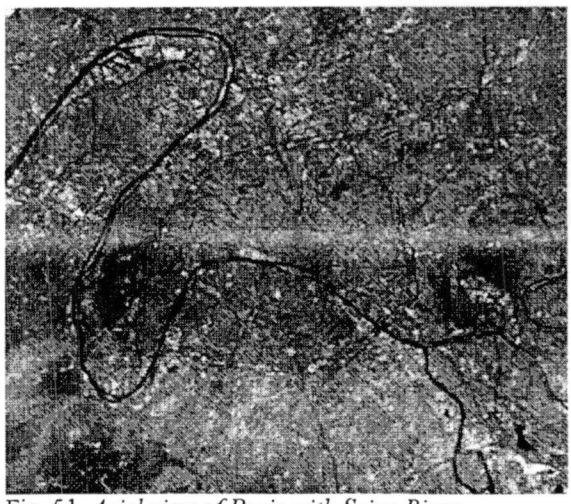


Fig. 51 *Ariel view of Paris with Seine River*

This image of Paris was acquired on July 23, 2000 and covers an area of 23 by 20 km.

Fig. 52 *Live performances on the banks of the river - live portrait*

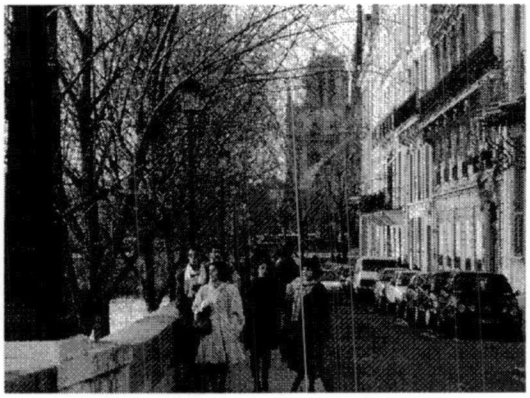


Fig. 53 *Pedestrian movement along the banks of the river*

Fig. 54 *Pedestrian sidewalks become cultural exhibition place in city giving it identity*

Fig. 55 Restaurants along side the banks of river make it lively & busy

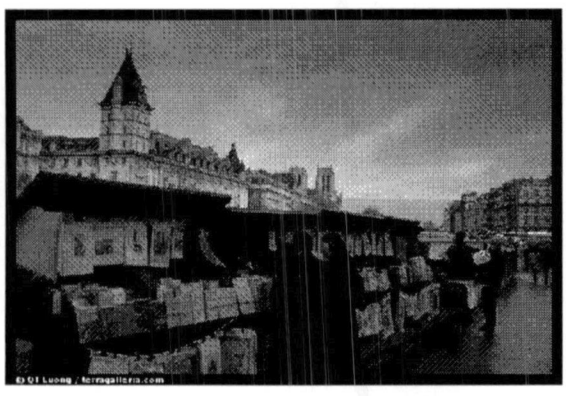


Fig. 56 *Book stalls on the banks of Seine*

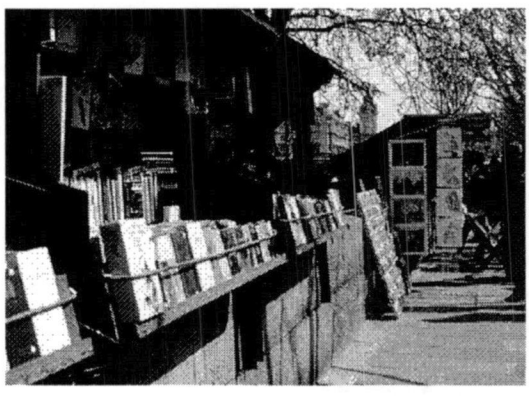


Fig. 57 *Book stalls- providing functions*

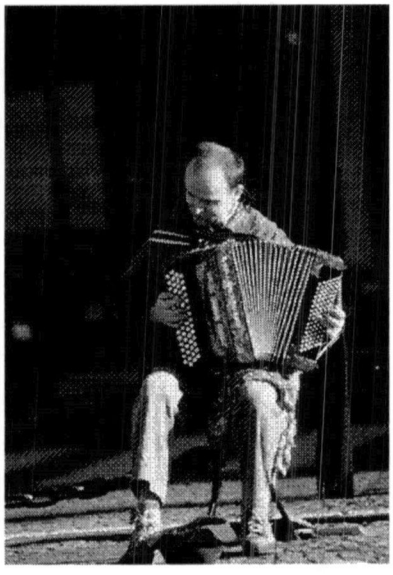


Fig. 58 *Accordion player A live performance*

Fig. 59 *Wayside restaurants added to the activities*

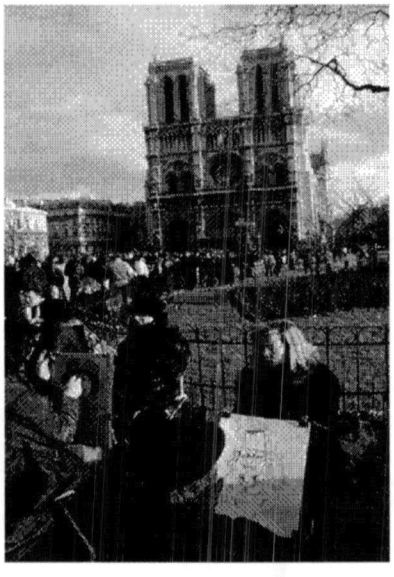


Fig. 60 *The gathering suggests more than cultural value*

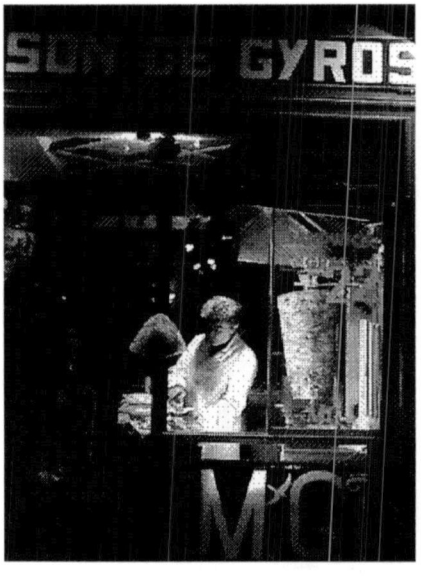


Fig. 61 *Way side Restaurant*

3.2.3 Background study – England (London)

London has gain image through its respond to river themes. City of London has originated along the banks of the Thames and expanded its development around the river.

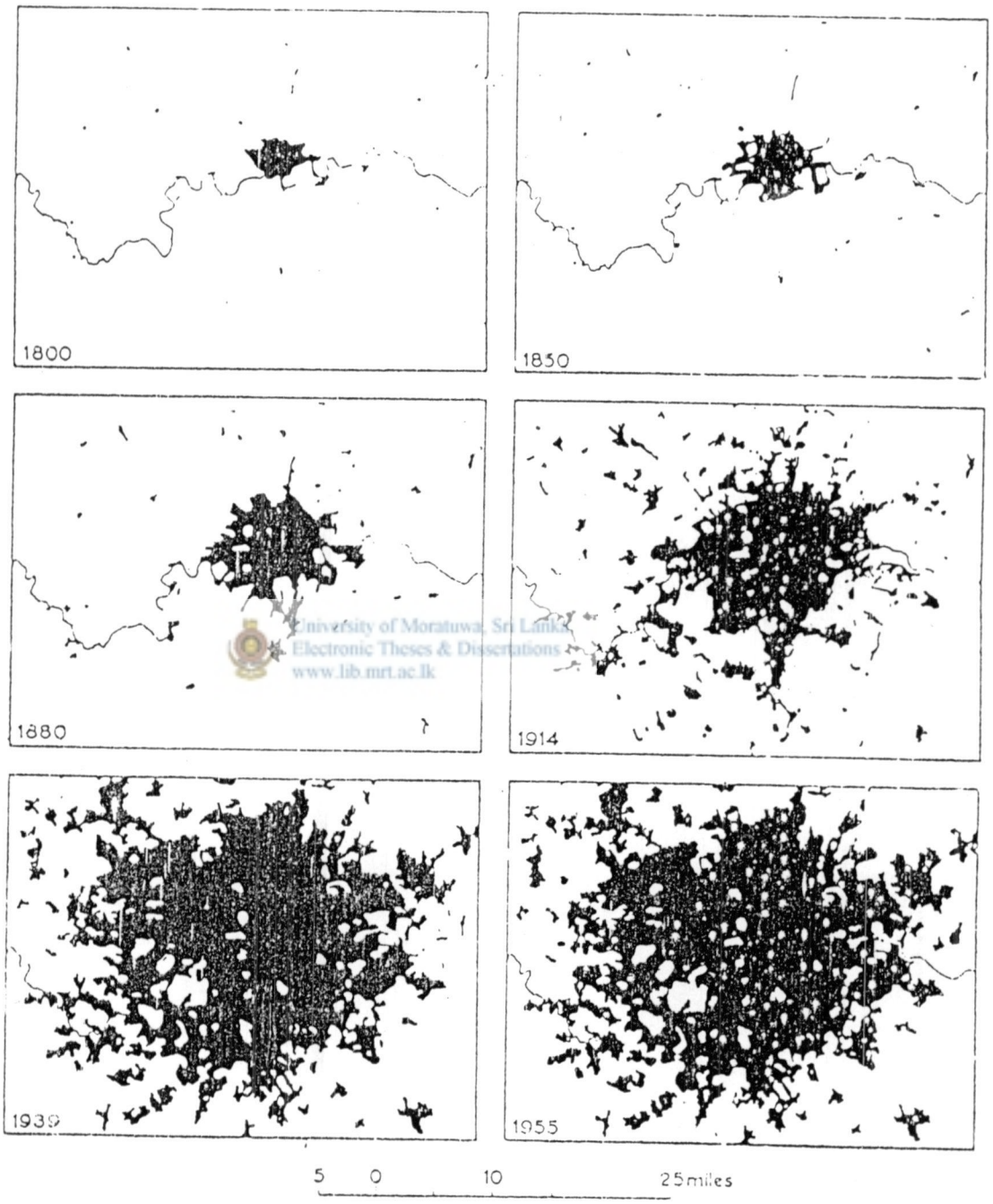
Image of the London through water

The Imagebility of a city is the very factor, which continuous the strong bond between the city and its inhabitants. City gain its identity through this emotional factor where visitors also find speciality on visiting it. Imagebility of a city helps man to gain emotional attachments to the city and contribute a strong sense of belongingness.

In this aspect highly imageble cities appear to be well formed, distinct and remarkable. Easily it draws the curiosity as well as the attention in to participation in various aspects. Such as visual experience and personal experiences which tend to celebrate these places. These cities provide positive background for people to live in. this trend eventually tend to development of the city through its social, cultural, economical and environmental enhancement. People use, share and make attachments and live successfully in these city environments.

City of London in this aspect has provided aesthetic, emotional, social and cultural prosper throughout the history. The image it has established on people makes it a precious piece of art. London, originated, developed and sustain on the banks of the River Thames.

As this chapter discusses the water front development trends in cities around the globe, London will be studied as a city, which successfully integrated qualities of water with the built environment.



Map No. 2 *The growth of London*

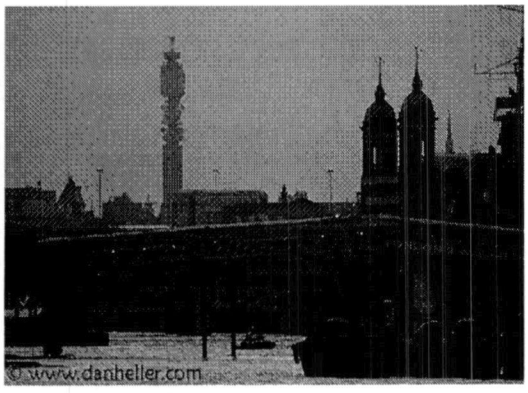


Fig. 62 *London at dusk*

Fig. 63 *London at dawn*

Fig. 64 *London at night*

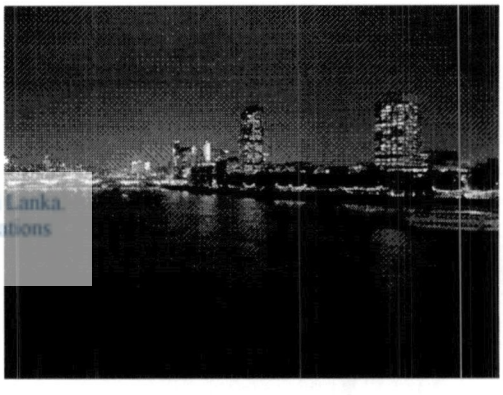


Fig. 65 *Reflection creating a panoramic view*

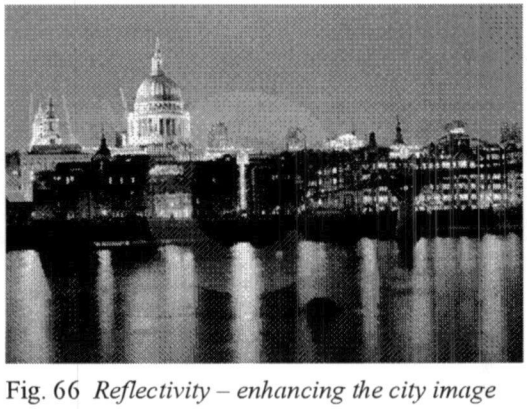


Fig. 66 *Reflectivity – enhancing the city image*

Fig. 67 *Reflectivity*

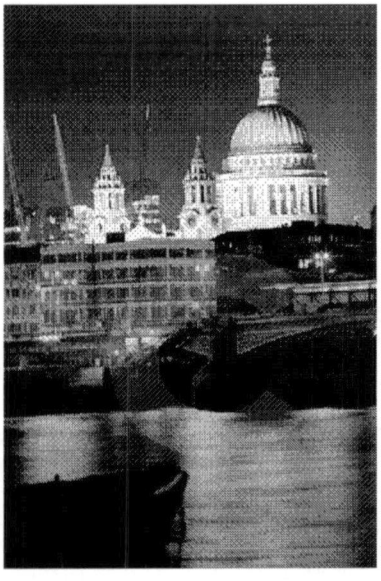


Fig. 68 Prominent buildings stand out with dignity over water body

3.3 INTEGRATION OF CITY THROUGH WATER.

3.3.1 Waterfront as an open space.

Today cities are facing dilemma on vanishing public spaces from their living cities. Ultimately creating great damage to their liveability

Alexender C. explains this phenomenon,

> *"Each sub culture needs a enter for its public life, a place where you can go to see people, and to be seen. "(Alexender C, 1977, P: 169)*

Water body in the city have a great possibility of utilizing it as an effective public space. Often waterfronts are used to provide adequate open space for the health and recreational need of the citizens. The developments of typical waterfronts are compatible with pubic access or public pleasure caused to the city dwellers to move in other directions stirred by new standards of civic beauty or new social ideas.

> *"The canal, or man made river is also an important connector and communicator. Canals can physically connect cities to bodies of water, lace together neighbourhoods or distinct or link several cities in one line"* (Moore, 1995; 23)

The space contributed by an expanse of water is realized as a resource only when the public can enjoy it. It must be open to view and also approachable. Developing the cities with an awareness of the degree to which a waterfront is "affected with a public interest" eventually give it a sociological value. This, in the long run added with an economic value where movement or gatherings of people of inhabitants as well as the population born out side the local community attracts to this natural entity. This promotes eco tourism and further extends its horizons with providing facilities for them.

Openness in a packed crowed city is a treasure, due to the open spaces demanded, in order to ease the mental stress of the urban folk. Environmental psychology can be obtained, by preservation and maintenance of water bodies in urban areas.

Potential spatial entities in highly congested and complex built up areas in such urban areas will be catered as open spaces. But the natural tendency is that only a particular community of people is benefiting from these recreational spaces. And as the development desires land for extension these open spaces become the filling areas in the first instance.

> " *In theory, towns maintain a desired effect of openness, but unless controls over rigidly enforced, they tend to merge in to massive walls*"
> (Heckster & Robinson, 1913,P: 109)

In Colombo city, such open spaces are very less in number but Galle face Green and the Parliament grounds preserve their openness providing distinctive remark in the Colombo city.

3.3.1.1. Parliament grounds

Fig. 69 *Parliament ground*

This is a stretch of land in front of Diyawanna oya, which the parliament of SriLankan government is situated in a man made island created in it. Facing the parliament building, the premises have become an attraction of citizens over the years. The calmness of the vicinity makes the surrounding a healthy atmosphere making a live place especially at night. Children find it a very special place here, as they are provided with a place which they can be them selves having a life time experience.

3.3.1.2. Galle Face Green

Galle face green has become the gathering place for Colombo city over the years. The amount of people gathers every day to this waterfront indicates many factors of socio cultural demand for such places for city of Colombo.

A critic on places Peter Downton (1985) says,

> *"A place is simply somewhere, to do something. It is somewhere to do something that matters to the doer(s) and is seen by the doer as appropriate or fitting for the doing. Thus it is evident that, once a person enters in to some sort of ongoing relations with a place or intends to enter into such relations, the simple place starts to become something more"*

The experience, the image they create about the city is strongly influence by these open areas. Common places influence s identification among people. They create relationships with the surrounding. Ultimately this phenomenon becomes a major need where people cannot afford to live without it. There fore open spaces in a city is a sociological, psychological, recreational entity. Galle face green situated within the heart of the city and its closer proximity to places of transport interchange and easy approach contributes the city with a remarkable entity of a live place.

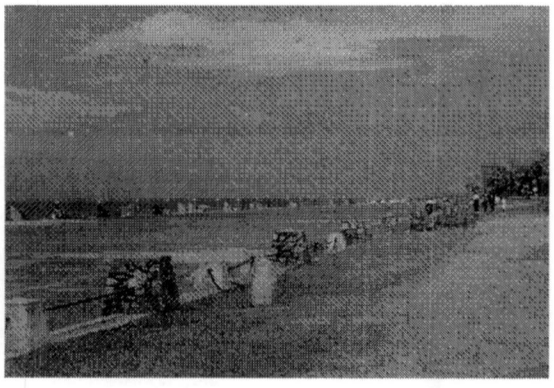


Fig. 70 *Galle face -A breathing space for city*

Fig. 71 *Galle face -Large gathering in evening*

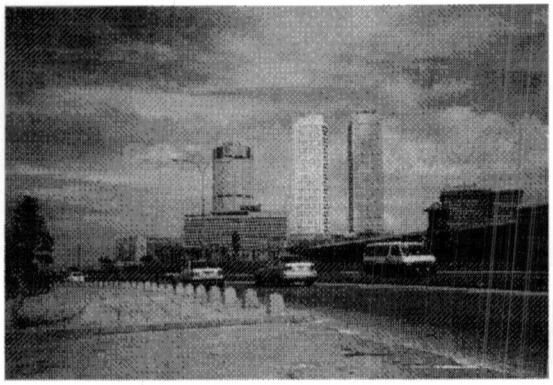


Fig. 72 *Galle face – parking lots*

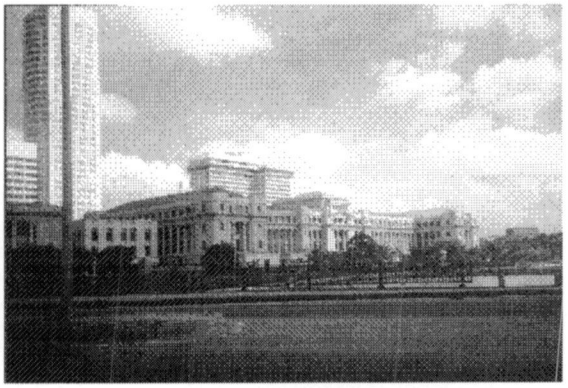


Fig. 73 *Galle face – the built fabric at vicinity*

3.4 THE DEVELOPMENT OF THE URBAN BUILT ENVIRONMENT WITH WATER CORRIDORS.

3.4.1 Canals in the city as urban waterfronts.

As discussed in the previous section cities such as Venice has very effectively utilized and responded to canals as urban waterfronts. It is an existing resource and the environmental integration in to development ultimately becomes a sustainable development. Where user is benefited with out harming the environment. Waterfronts can be utilized for variety of purposes, such as residential, commercial, & industrial uses. The priority should be given to open space component to urban entertainment.

In Bangkok this method has used very effectively.

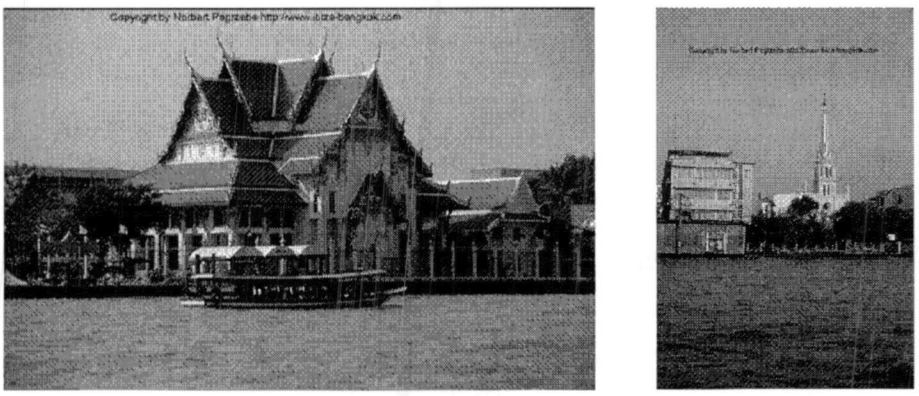
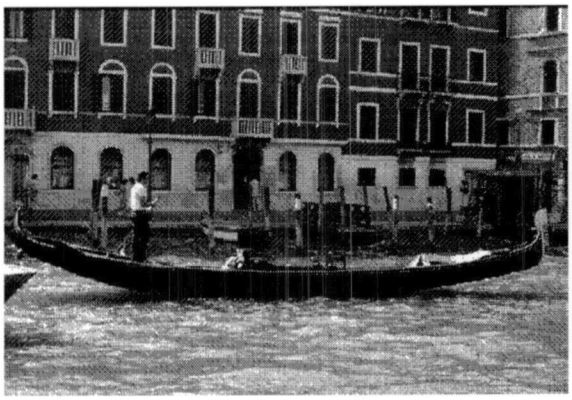


Fig. 74 *Canals as waterfronts - Bangkok*



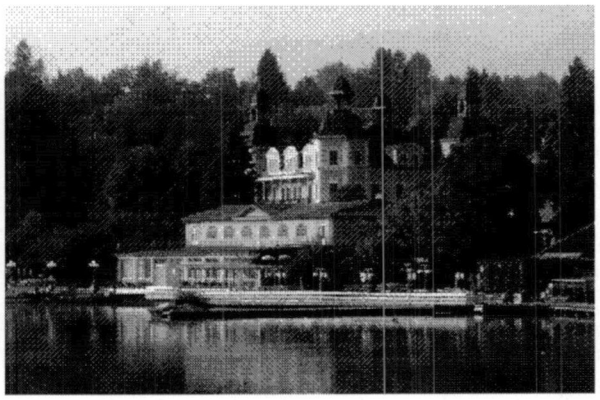


Fig. 75 *Canals as waterfronts - Venice*

3.5 CONCLUDING REMARKS

From history water has been a utilitarian for the survival of mankind a water resource was treated as a gift from god in ancient times. They use I up to its maximum potential. But with today's highly urbanised situation and the trend of neglecting what is around us has caused these resources diminishing from our interest

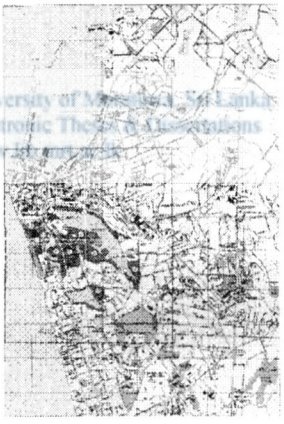
But taking into consideration the psychological, social, economical value of a water body within the limits of the city, many countries around the globe has integrated them into their development processes. Many countries have used a different perception towards utilizing this resource more effectively and created these areas with fully-fledged cultural, social, economical places. As the image of the city is mainly governed by its physical features these cities have gain their identity through this respond towards the waterfronts. Namely Venice, Paris, London etc. respond and expand its horizons with integration of this feature. As for Venice the built fabric has responded the canals as a waterfront creating a unique architectural character. This has increased its potential as a tourist destination where such kind of architecture is unique to the globe.

As for Paris it originated on the banks of River Seine. France has been developed taking Paris as a central. As analysed above it developed around the banks creating the city one of the most imageble cities around the world with its location on the river. Known as the **City of Light**, Paris is known for its land marks most of them visible from the river make it a highly legible city. The city's location on the Seine River has been the key to its expansion, success, and beauty. The function happenings along the banks have been taken as the key factor of studying it in this study. The cultural life of the city is centred on the Left Bank (north) of the Seine, while business and commerce dominate the Right Bank. The amount of activities namely restaurants, live performances, (music, dances, art, etc.) and commercial stalls such as bookstalls give Paris its unique identity.

London the city developed around the banks of river Thames also responds to the city image very effectively. Buildings standing out with dignity along the banks of river make it a highly imageble city.

These cities have contributed to the city image through its respond to water bodies. And in implementing development proposals for cities considering its environmental features add to its prosperity. And in Sri Lanka the use of waterfronts as features in the city image is very limited. The Galle face green and Parliament ground can be catered as successful open waterfronts within the city.

CHAPTER 04



ENVIRONMENTAL RESTORATION & LAND DEVELOPMENT PROPOSALS

ENVIRONMENTAL RESTORATION & LAND DEVELOPMENT PROPOSALS

This chapter more concerns about the future development trends related with water bodies of Colombo city after detail analysis of the present existing situation and condition of network patterns of integration within the city in the previous chapter and water front development trends around the planet in the second chapter. This chapter deals with several recent most proposals, which include water bodies as a major element for renewal of the, image of the city of Colombo.

Beira Lake Business Plan Study, prepared by Urban Development Authority (UDA) with the assistance of Coginter- Urbanex Consortium of Canada and other local agencies, mainly concerns on the fact of recognizing the relationship between the waterfront and the city centre. This acts comprehensive master plan for the core area & provide with guidelines and recommendations for the Beira lake master plan.

The master plan will act as a management tool for the implementation of goals and for the physical development of the surroundings of the lake.

4.1 BEIRA LAKE BUSINESS PLAN STUDY BY URBAN DEVELOPMENT AUTHORITY (UDA)

4.1.1. Master plan - specific objectives

The Lakes have shaped the urban form of Colombo. These Lakes also have shaped the city's economic growth by enabling it to become a centre of commerce, trade and manufacturing. Thus in the future the Lakes should be an important source of employment and recreation for many residents and visitors and should be a dominant physical feature for numerous neighbourhoods.

Several goals have been established to guide the preparation of the master plan

1.0 Ensure the full development of the Beira Lake core area.
2.0 Reinforce the core area's economic vitality.
3.0 Promote the growth of business districts
4.0 Ensure an efficient traffic system
5.0 Improve the quality of residential neighbourhoods.
6.0 Develop core area tourist attraction
7.0 Enhance the historical value of buildings and sites
8.0 Protect the natural elements and control environmental problems.

Master plan will act as a management tool for the implementation of goals and for the physical development of the surroundings of the Lake.

In order to achieve this overall purpose, the master plan will address specific objectives:

1.0 Promote optimum utilization of lands around the Lakes water bodies (parts of Beira Lake referred in this report as the Lakes.)
2.0 Control activities causing environmental degradation and pollution of the lakes.
3.0 Improve the aesthetic quality of the built up environment and the conservation of the natural environment.
4.0 Provide public access to the lakes and recreational facilities in and around the lakes for the local and tourist population. (6 to 12 m reserve of water front without construction)
5.0 Facilitate the view / visibility of the lakes by preserving or creating "windows "or "vistas" in-between or through buildings, walls, bridges and fences.
6.0 Create economic and employment generating activities especially for the local population

The master plan offers Colombo the rebirth of the core area as a place for sophisticated business and life. The goal for the core area is to create a place to live and work, to shop and dine, to be entertained and have fun. This plan recognizes the magnificent amenity afforded by the water, and the development proposed by this plan is designed to take full advantage of this natural asset.

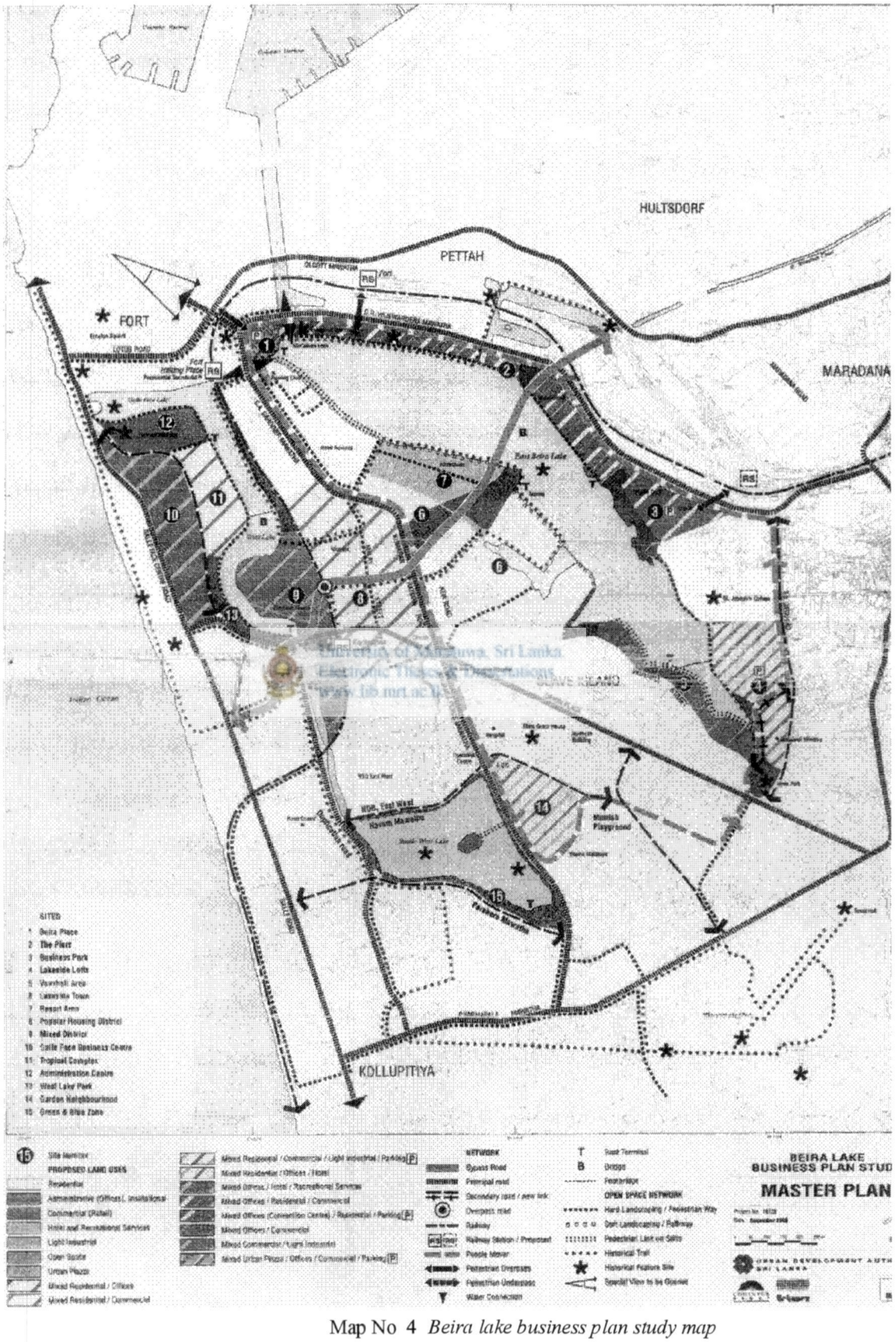
4.1.2. Transportation Analysis

The refocused Beira Lake business plan study and the related transportation analysis were carried out within the framework of two parallel urban planning initiatives of the UDA, namely, the Colombo metropolitan regional structure plan and the city of Colombo zoning and development plan.

This study deals with the existing transportation system and traffic conditions, future transportation impacts, system improvements to accommodate future development, and strategies for implementing improvements. These can be referred in appendix no 01.

4.1.3. Master Plan and Identified areas

Map No. 3 *Beira Lake core area*



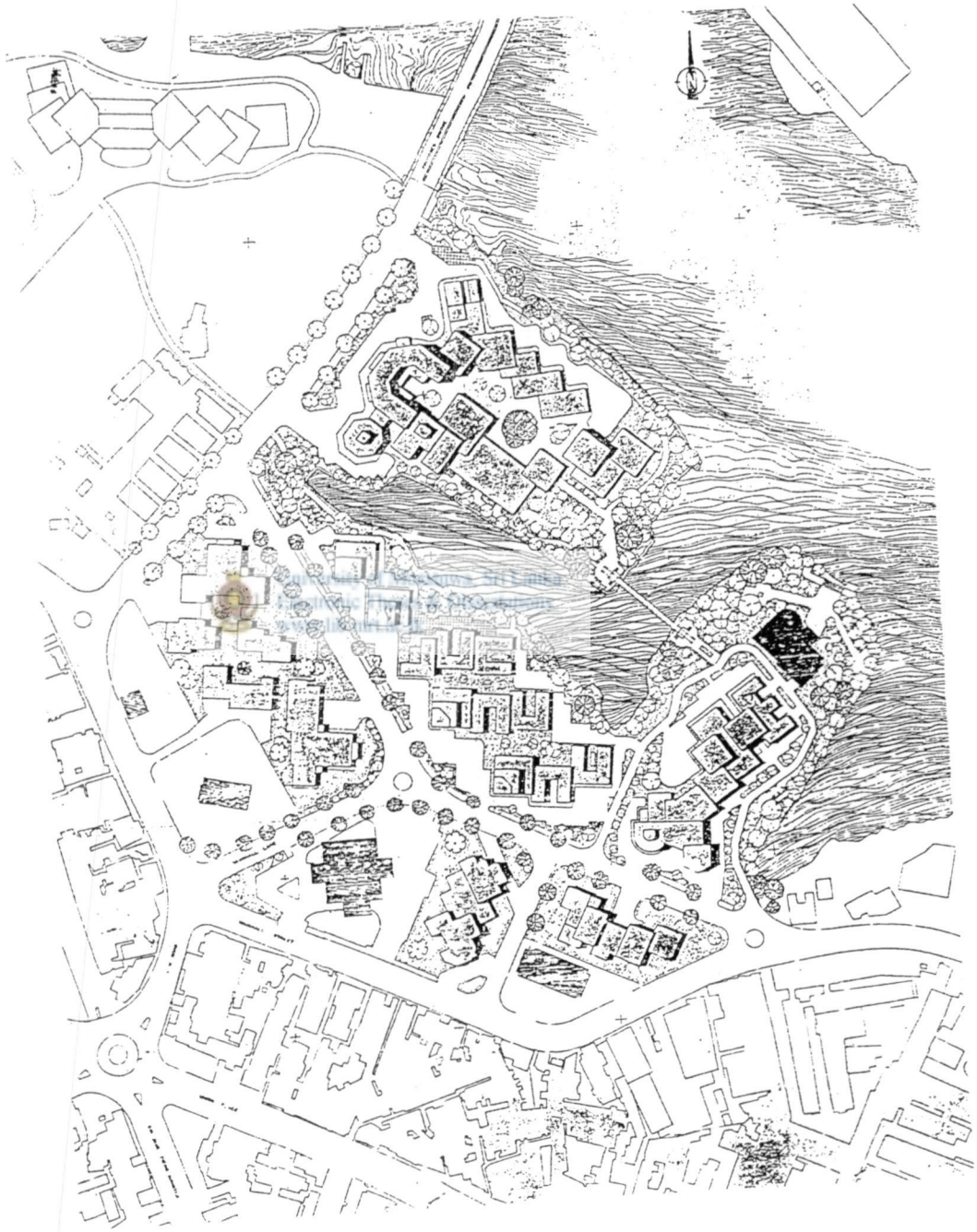
Map No 4 *Beira lake business plan study map*

SITE NO 01/10 **BEIRA PLACE/MULTI STOREY CAR PARK** EAST BEIRA LAKE

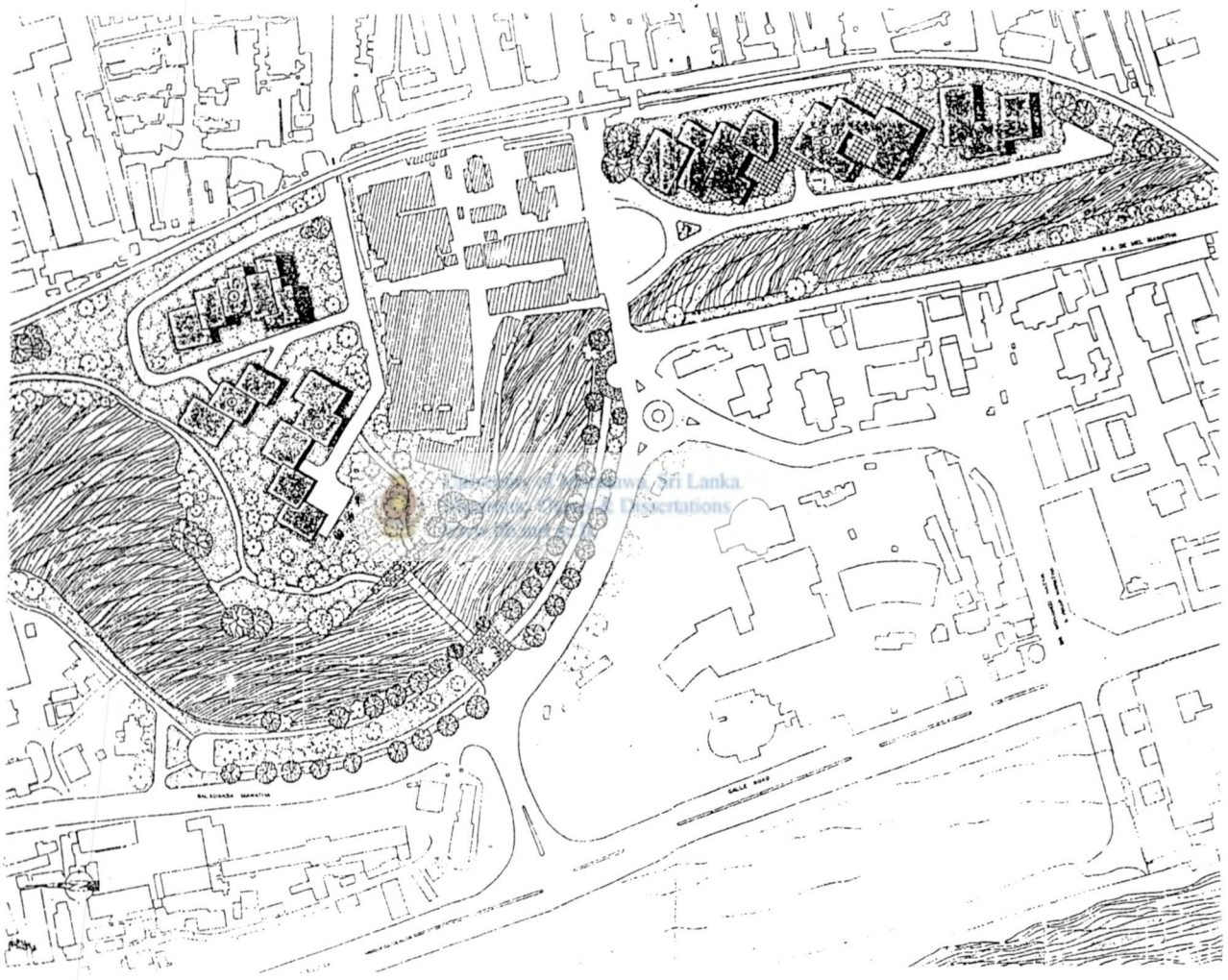
SITE NO 03 **BUSINESS PARK** EAST BEIRA LAKE

SITE NO 04 / 05 **LAKESIDE LOFTS/VAUXHALL AREA** EAST BEIRA LAKE

SITE NO 06 **LAKE SIDE TOWN** EAST BEIRA LAKE



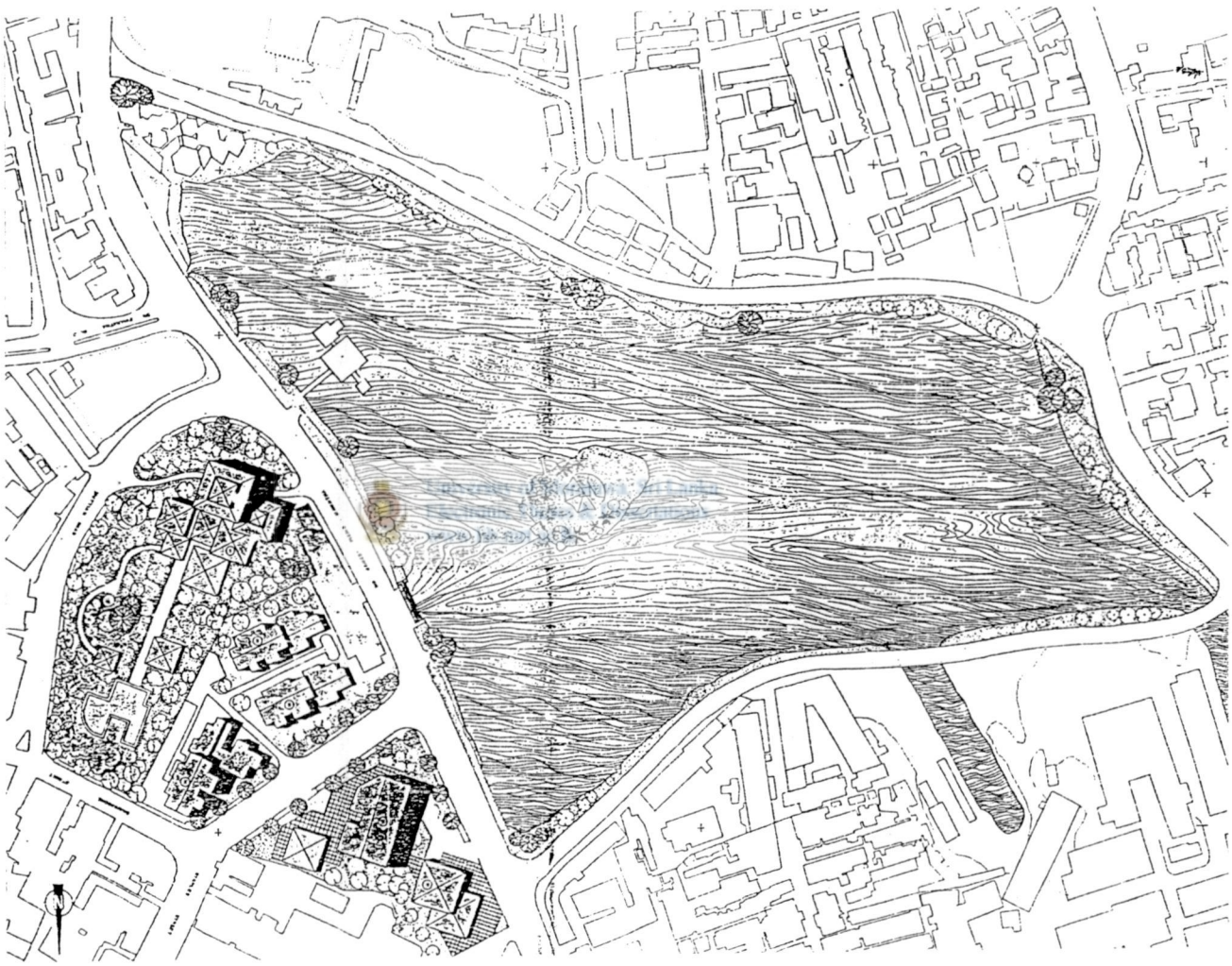
SITE NO 07 **RESORT AREA** EAST BEIRA LAKE



SITE NO 09 & 13 **MIXED DISTRICT & WEST LAKE PARK** WEST BEIRA LAKE

SITE NO 14/15 **GARDEN NEIGHBOURHOOD** SOUTHWEST BEIRA LAKE

BLUE & GREEN ZONE



4.2 AN URBANITY FOR THE NEW MILLENNIUM

(Building the distinctive Sri Lankan city)

Description of the redevelopment proposed, designed by the Architrave Charted Architects, headed by Archt. Madura Premathilake.

Vision- To establish Colombo as the prime financial centre of the region characterized by unique cultural – environmental entity.

To achieve this goal, Colombo must evolve not merely the elementary requisites of office space, communications and transport, but also a unique cultural environmental setting, as the world's leading centres have done. Colombo has clear potential to create a world-class cultural- environmental setting; **the life style possibilities offered by its waterfronts (both sea and lake)**, historic urban fabric, rich mix of functions, traditional and contemporary culture, tropical climate and landscape must be seized to create **a financial centre of distinctive and unrivalled character.**

A further advantage of this policy is the possibility for cultural tourism. Colombo can strengthen the attraction of Sri Lanka as a key tourist destination by providing an experience of post colonial and contemporary culture.

The urban design proposals generated by these goals are based on several key concepts.

Urban focus A festival square at Beira place, linking fort, Pettah, Slave Island, Galle face and the port to a common visual and functional focus.

Water front city A re-orienting of the city to its sea and lakefronts by introducing new maritime activity (for example, a marina and yacht harbour) and port related commercial development

Ceremonial axis A new ceremonial axis along Janadipathi mawatha, commencing from Gordon gardens and culminating in a new state square from the presidential secretariat to the sea.

New business axis A shoreline extension of corporate offices along Beira Lake, on a direct visual axis with echelon square.

Living historic core With the release of pressure for office development the historic urban fabric of the fort to be adaptively re-used for cultural tourism and retail shopping . a heritage trail along the line of the old fort wall and historic streets.

Landscape infrastructure and pedestrian web

Landscaped green connectors and pedestrian paths form a continuous web of public spaces within the city.

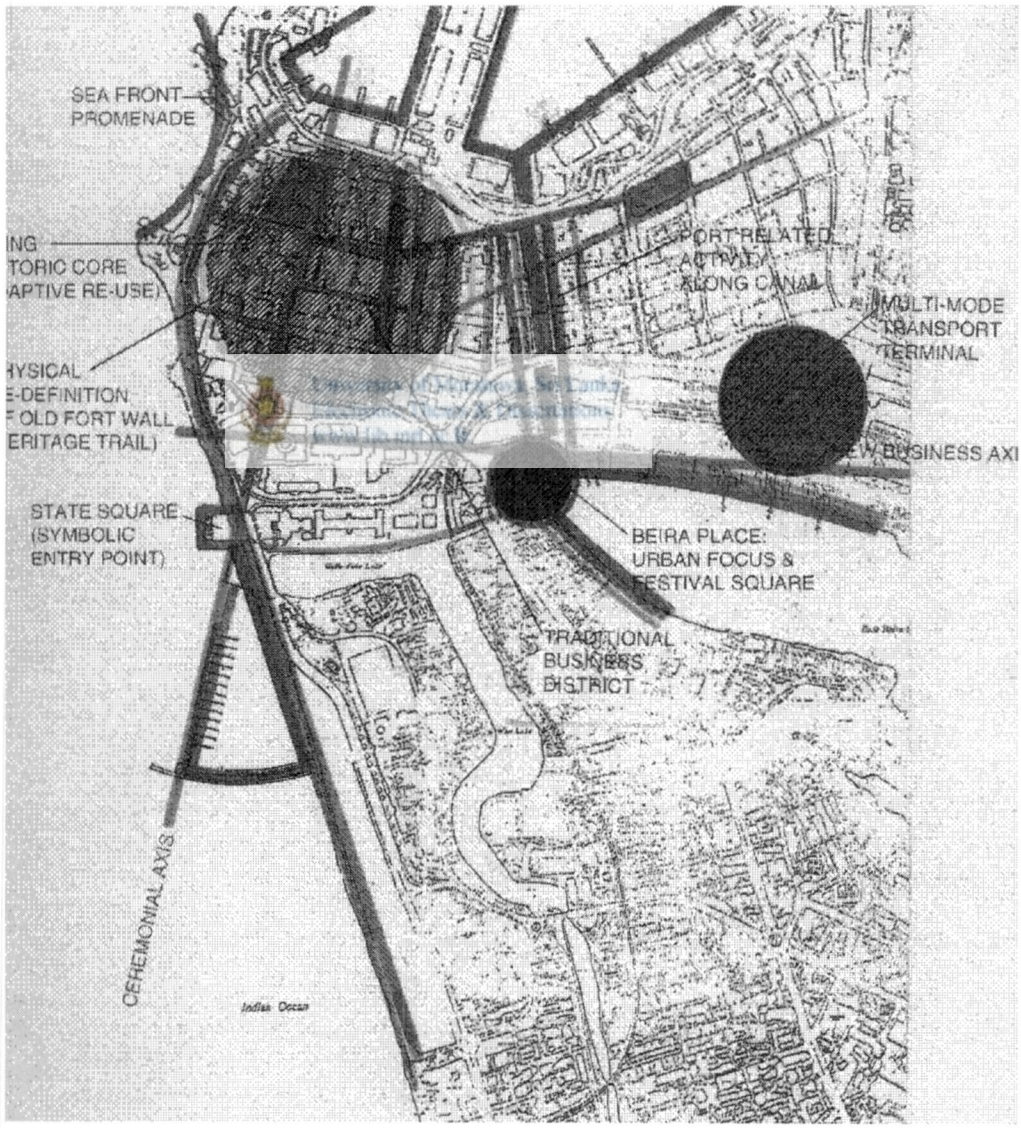
Multi mode transport network

A multi mode transport network incorporating existing modes with a comfortable people system to provide an efficient interface between private vehicular traffic and public transport.

The proposed plan is structured for phased investment and incremental growth. A series of key projects are identified

- A new business axis comprising **new corporate offices** on the Beira lakeshore line.
- **Yacht harbour, marina**, and **state square** at the meeting point of Janadipathi mawatha and Galle Face.
- **Aquatic maritime museum** at the culmination of the western shoreline.
- **Beira lake festival square**, and a **centre for performing arts**.

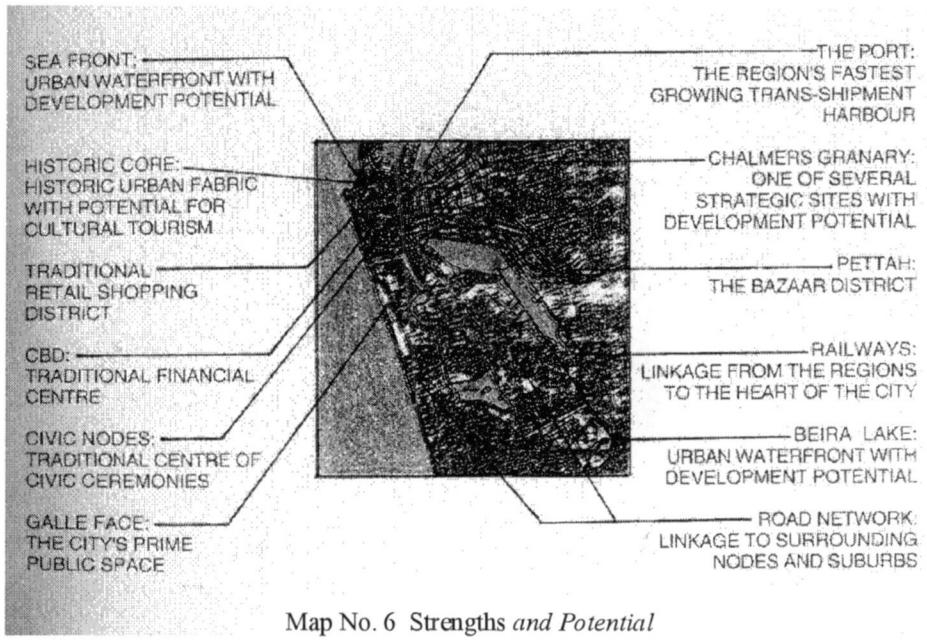
- **City wall museum** and state guesthouse bordering presidents house and Gordon gardens.
- **Housing development**, including exclusive point blocks on the western shoreline, and shop houses in the historic core.
- A multi mode **transport terminal** combining the fort railway station with terminals for bus and water transport.



Map No. 5 *Urban design Proposal*

4.2.1. Analysis

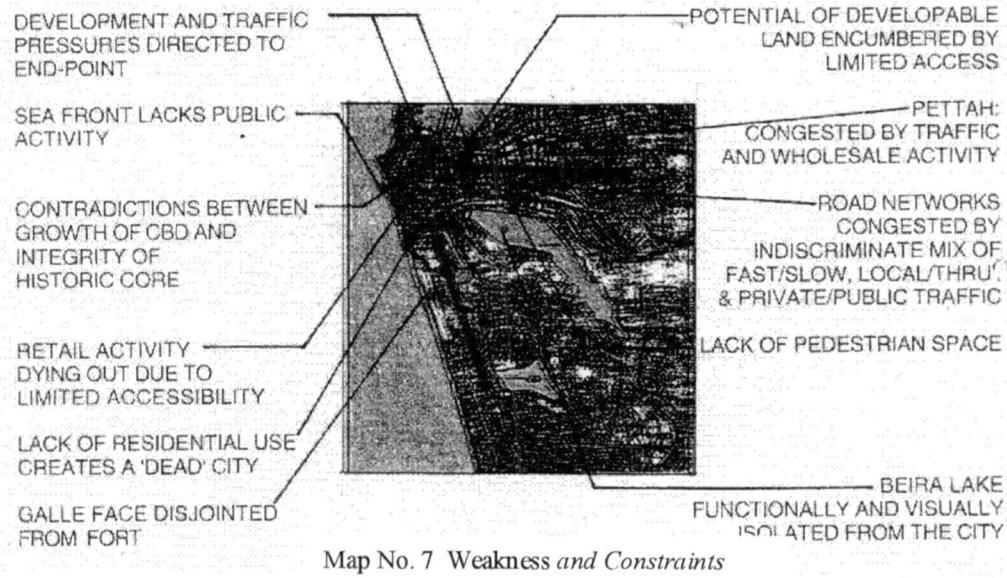
Strengths and potentials



Map No. 6 Strengths *and Potential*

The fort is Colombo's financial centre as well as its civic centre and historic core. It commands a central location adjacent to the port, the bazaar area of Pettah, the waterfronts of Beira Lake and the western seaboard, and the Galle Face esplanade, which has long been the venue of major celebrations and national events.

4.2.2. Weaknesses and Constraints



Map No. 7 Weakness *and Constraints*

Further growth in the fort is restricted due to its locational characteristic and as an end point (culmination point): Large scale growth in the fort will increase the present pattern of traffic attraction from North, East and South.

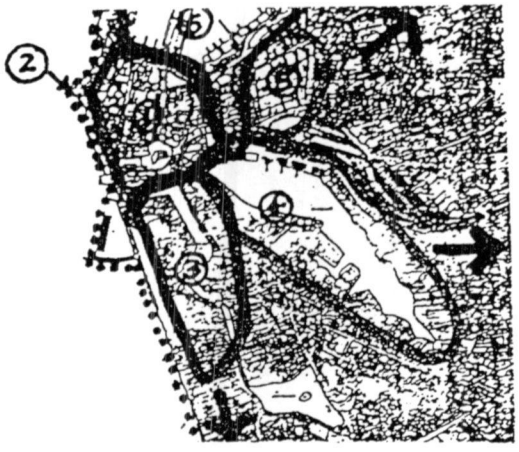
As a major city Colombo actually lacks expression of the public realm: public space is meagre and does not fulfil its function as a connecter between civic, commercial, residential and other uses, or as a link between the fort and its adjacent areas such as Galle Face and Beira Lake. The character of the fort lies hidden due to traffic congestion, unsuitable land use and inactivity after office hours.

The immense potential of the Fort as a financial centre, set among commerce, civic, leisure and cultural activity, remains un–realized.

4.2.3. Macro Concepts

A. Balanced growth

Six distinctive urban quarters are identifiable in central Colombo. The character of each is to be reinforced, and growth is distributed corresponding to the potential of each.



1.0 Down Town Core

- Celebrate ceremonial centre
- Restore traditional financial district
- Develop historic core for culture, leisure
- Retail uses, especially for cultural tourism.
- Enhance residential use
- Redefine traffic systems

2.0 Sea Front

- Restore sea front as accessible public space (Eg; promenades)
- Inject compatible cultural & leisure uses (Eg; marine museum)
- Develop housing & hotels

3.0 Galle Face District

- Celebrate ceremonial centre
- Inject leisure harbour as growth catalyst
- Develop housing, hotels, leisure, commercial use.

4.0 lake district

- Develop as new business district
- Develop leisure, housing and hotels
- Celebrate waterfront as accessible public space

5.0 Bazaar district

- Restore charm of traditional
- Bazaar district
- Remove incomplete uses.
- (Eg; whole sale0
- Promote for cultural tourism

6.0 Port district

- Widen scope of harbour related urban activity
  (Eg; harbour related commerce)

The six urban districts of the central area are Linked to the other nodes of Colombo By 3 growth directions; south, east & north.

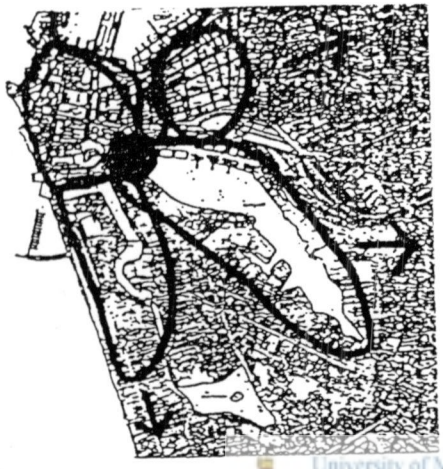
A key feature of this concept is the development of a new financial district along the northern shore of the of the Beira lake. Which is an ideal location due to its ease of vehicular access immediate connections to multi model public transport, and prestigious lake front address with excellent services.

The consequent easing of pressure on the fort will enable continuation of the traditional financial centre, a celebration of its ceremonial centre and exploitation its potential for cultural tourism.

B. FOCUS & LINKAGE

1.0 Create an urban focus

Colombo needs a pivotal center, a hub/ fulcrum that will coherently bring all its components into a common focus.

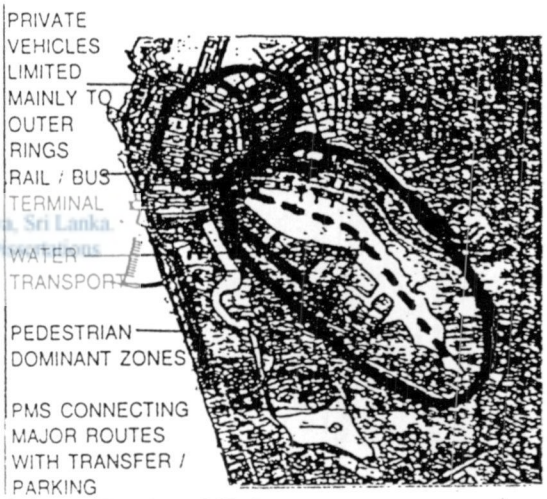


By its perfect location at the head of the Beira, it's unconstrained linkages to each district, its suitability as a public space, and its availability for development, Beira place is the natural focus.

2.0 local linkage

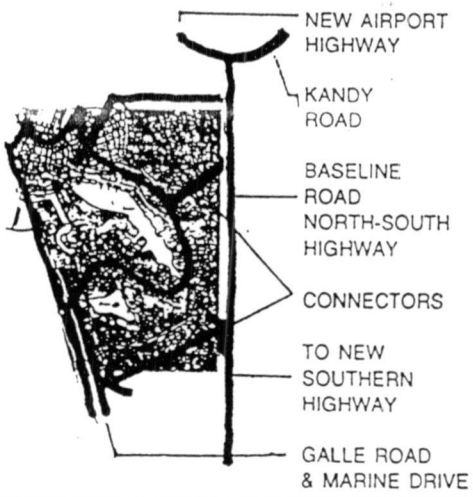
Create pedestrian (and cycle)networks to promote pleasurable and convenient local movement.

Pursue an inter- model public transport net work using rail, bus, people mover and water transport systems, combined with park & ride facilities for private vehicles.



3.0 Regional linkage

Strong road & rail links to the suburb & regions



4.2.4. Future Opportunities - New Development

1.0 Proposed yacht harbour, marina and the state square (8500 sq.m.)

The yacht harbour accommodates berthing facilities for 50 yachts and 75 to 100 small boats. The built up area realized by this development will include a passenger terminal, the royal Colombo yacht club and a number of specialist restaurants, this development will also create new demands for city hotels.

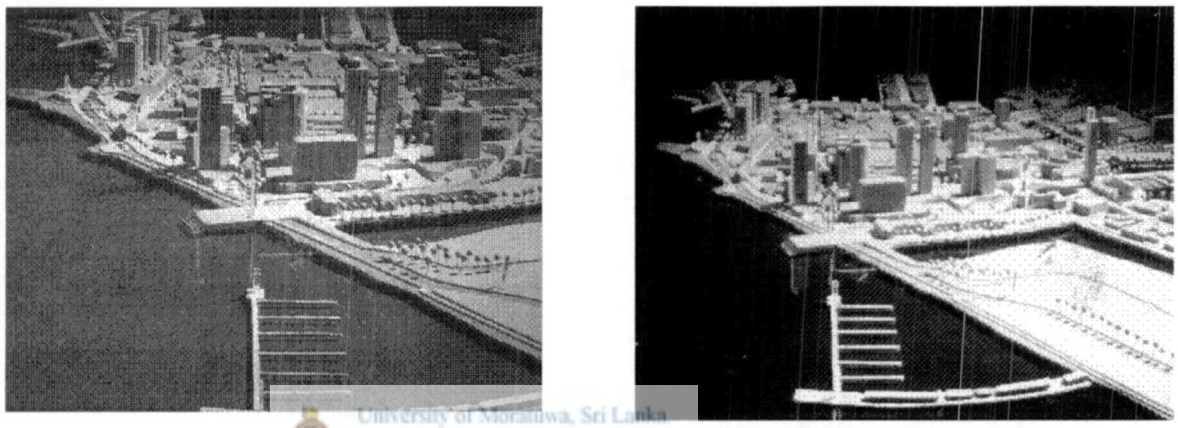


Fig. 76 *Proposed Yacht Harbour*

2.0 Lotus centre development (200,000 sq.m.)

The lotus centre development is unique in its canal front location, which is conducive for restaurants, pubs and other specialized activity. The pedestrianized canal front streets link up with the Beira lake walkways and to the pedestrianized main street from the Pettah. With its close proximity to the port and connection via the canal, the upper levels of these buildings will be ideal for port related businesses.

3.0 New business axis office development (200,000 sq.m)

The new business axis opens up a new well-serviced vacant land area with a prestigious lakeshore setting for development of corporate offices. One of the prime advantages of this location is its close proximity to public transport and ease of access for private vehicles. The site also offers excellent potential for restaurants and water front recreation.

4.0 Marine front housing / commercial development and

5.0 Aquatic marine museum (35,000 sq.m)

Marine front housing and commercial development on the western shore will generate an active edge on the western shore culminating in the Aquatic Marine Museum. A large number of parking could be generated by maintaining the ground level above the ring road. The uninterrupted view of the Indian Ocean from these blocks will generate some of the most prestigious housing in Colombo.

6.0 Beira place development (40,000 sq.m.)

Beira place development takes advantage of the natural level difference between the site and the street level. Three levels of parking are proposed within the level difference. The upper level of Beira place will be n open-air theater with a floating stage, which could be used for festivals and performances. The edge of the amphitheatre is defined by a five storey curved building and a tower block for commercial use. A pedestrian under pass connects the Beira place with the national art centre across Chittampalam Gardener mawatha.

7.0 National art centre for the visual and performing arts (30,000 sq.m.)

The performing arts centre will have a complex of theatres and a concert hall will establish the cultural resurgence of the city. It will be combined with the existing Regal theatre.

8.0 City wall museum and state guest-house (6,000 sq.m.)

The wall museum built on the line of the old historic wall location will be of immense importance in promoting cultural tourism. It forms part of the public activity zone on the western shoreline.

9.0 Intermodal transport terminal (26,000 sq.m.)

The intermodal transport terminal will combine the fort railway station with a new bus terminal on the site released by the manning market. The new people mover system and the water transport terminal adjacent to the lock gates. The different terminals will be continuously connected by pedestrian bridges incorporating prime retail space.

4 .3 ANALYSIS OF DEVELOPMENT PLANS

Beira Lake Master plan

The Beira lake master plan offers Colombo, aims at the rebirth of the core area as a place for sophisticated business and life. The goal is to create a place to live and work, to shop and dine, to be entertained and have fun. This plan recognizes the magnificent amenity afforded by the water, and the development proposed by this plan is designed to take full advantage of this natural asset.

Summery of conceptual goals and objectives;

Develop the core area as the focus of the rebirth of the waterfront

- Develop he core area as a major public attraction and centre of activity
- Encourage residential development at the core area
- Develop the core area as a commercial centre

Create vital, attractive new residential communities along the waterfront

- Encourage new residential development
- Encourage residential rehabilitation of existing buildings and zones
- Develop retail and commercial space to serve new residents

Provide opportunities for the public to enjoy the special amenities of the waterfront

- Reserve 6 to 12m of water front with out construction for public and environmental uses.
- Encourage access and activity at the water's edge through the system of pedestrians links and
- Protect and improve the natural heritage

Improve access to and within the core area

- Improve the core area's transportation network
- Improve access to adjoining neighbourhoods and the city centre
- Serve new development

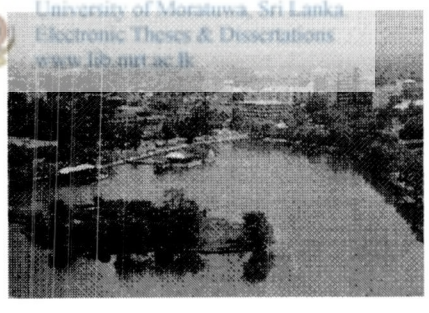
An urbanity for the new millennium

In setting the vision for redevelopment for the Colombo city, the prime consideration has been optimising the use of existing water bodies, mainly the Beira Lake and the canals. The urban design approach towards water front in categories such as Yacht harbour, marina, and state square, and aquatic maritime museum mainly identified as possibilities for cultural & eco tourism.

For future opportunities also, the nine identified major projects clearly respond to the water bodies around the city. Almost all the projects including housing, transport terminal office development etc. integrates the water body for various purposes. Such as easy accessibility, parking on lake shore, for berthing facilities, as a place for recreation and houses with pleasing environment.

In the long run all these will add to demonstrate the identity of the modern Sri Lankan: its heritage, amiability, energy and future and it will also define an environment for a contemporary urban Sri Lankan life style.

CHAPTER 05



STUDY OF EXISTING URBAN WATER BODY IN COLOMBO CITY

STUDY OF EXISTING URBAN WATER BODY IN COLOMBO CITY

5.1 STUDY ON BEIRA LAKE

5.1.1. Historical Background

Colombo is the site where Kelani River, one of Sri Lanka's major rivers meets the sea. Centuries ago a port existed at the mouth of the river but at that time, marshlands that were frequently flooded occupied the site of today's Colombo. A small settlement, believed to have accommodated the Arab traders export activities (cinnamon, arecanuts, pearls, gems and elephants) was established in the early 8th century A. D. Between the 9th and the 16th centuries, Colombo served as a small seaport used by various ethnic groups: Arab, Indian, and Persian As Well As Chinese.

The Portuguese period (1505- 1658)

End of 1505 the Portuguese discovered the island and by 1518 they built a fortress in the area of present day Colombo. Later to protect themselves, they dug a trench to separate the fort from the mainland. In 1521, Beira Lake was created, in an effort to repel the attacks of a local ruler. With the creation of the Lake, the city was protected on all sides, south and east by the Lake, and north and west by the sea. Although, the native population was not able to take over the fort, it succeeded twice to drain the Lake using canals. The San Sebastian Canal, which still exists today, was one of them.

The Dutch Period (1658-1796)

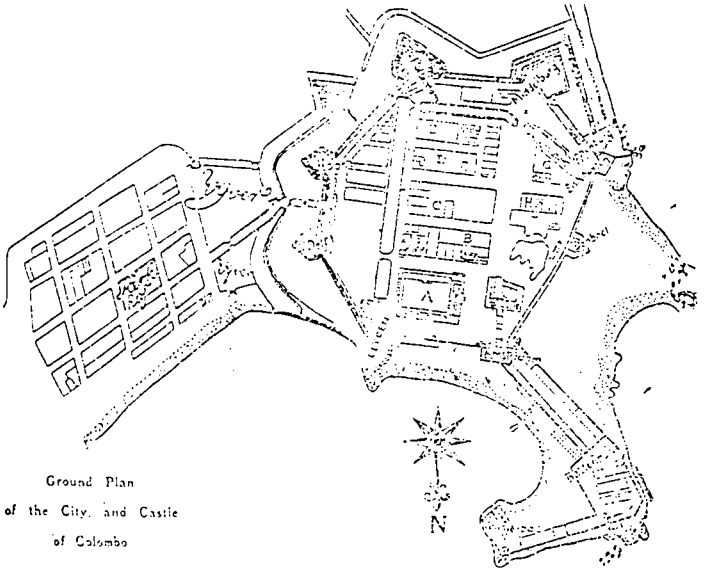
Although, the Dutch were present in the area since 1602, using Colombo as port of trading activities, it was not until 1655 that they besieged Colombo. Both Dutch and Portuguese used the potential of the Lake in their battle strategies. The Portuguese used the Lake to transport their defence material and the Dutch used it to transport their soldiers and break through enemy lines. The Portuguese fortifications were badly battered and they were finally moved to higher grounds. The low-lying ground become vacant following the displacement of the defences and was flooded as far as Kaymans Gate. During that period the Lake was connected by a navigable canal system to the Kelani and Panadura rivers.

The British Period (1797-1948)

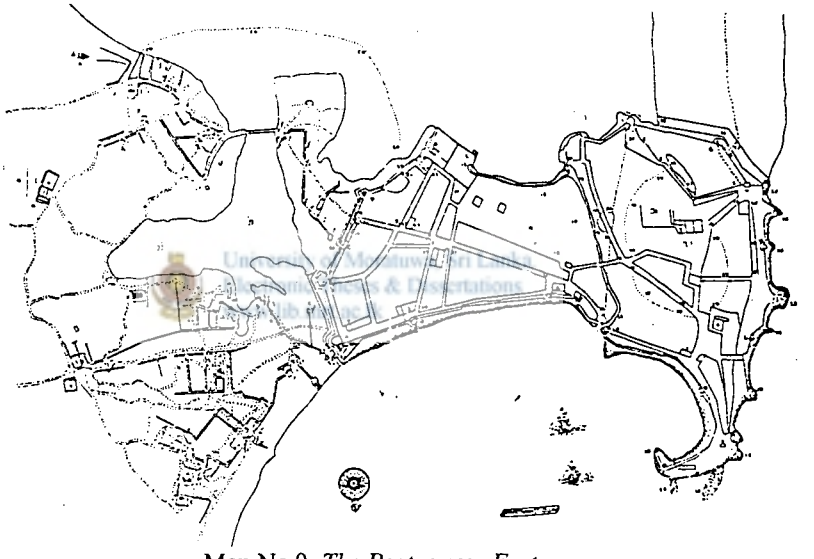
By 1795, most of the maritime provinces of Ceylon had fallen to the British and by 1815; the whole Island came under British rule with Colombo being the country's capital.

In the first half of the 19th century Beira Lake was larger than it is today. It was used for boating related to work activities as for leisure. On the banks of the Lake, villas were located in the most salubrious conditions when compared to the Fort accommodations. The shores of Beira Lake were also the site of various recreational activities such as parties, concerts, theatre, balls, etc. During the early period it was the centre of commercial life as well as a leisure resort.

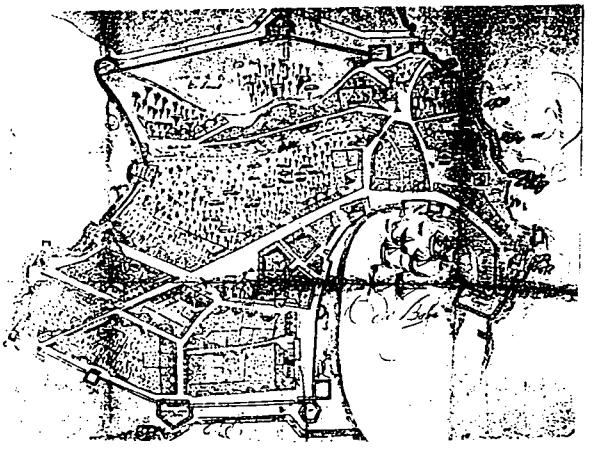
Today, Beira Lake is the centre of various conflicting uses, which include domestic, industrial, commercial, tourist and religious activities. Subsistence fishing, recreational activities, boat repair activities, the washing of vehicles and livestock, the dumping of garbage as well as the disposal of laundry and wastewater into the Lake, are among the many conflicting use that exist around and in Beira Lake. In many instances, these contribute to the deterioration of the Lake's water and surrounding, and ultimately jeopardize its survival as well as that of the wildlife supported by this ecosystem (feeding and breeding grounds for birds). These activities "have resulted in the eutrophication of the Lake and encouraged periodic unrestrictive growth of algae, fish kills, bad odours and discoloration of the water which has caused much public nuisance besides being a health hazard." (Beira Lake Restoration Study, 1993).



Map No 8 *The Dutch Fort*



Map No 9 *The Portuguese Fort*



Map No 10 *The British Fort*

Fig. 77 *Colombo harbour*

Fig. 78 *Main street -Pettah*

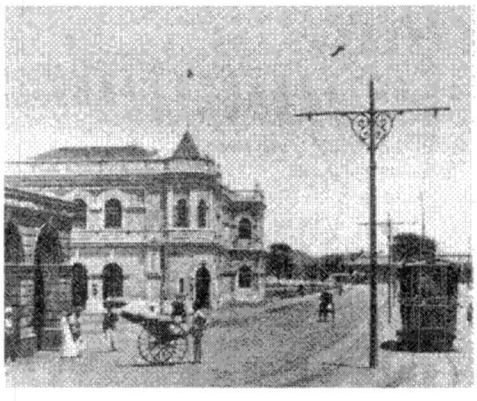


Fig. 79 *Sea Street*

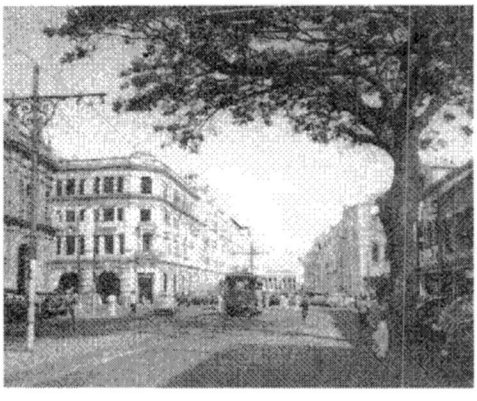
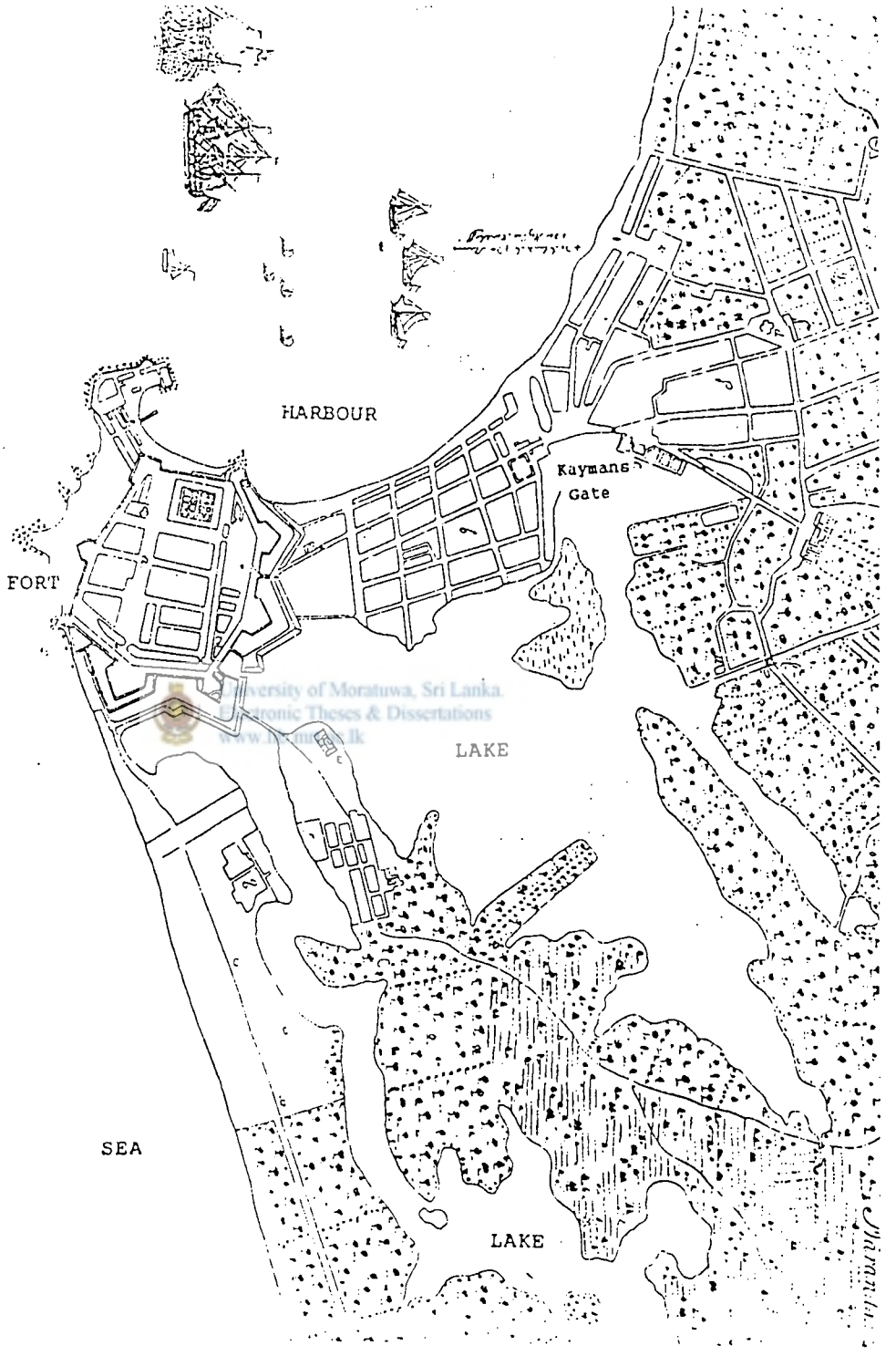
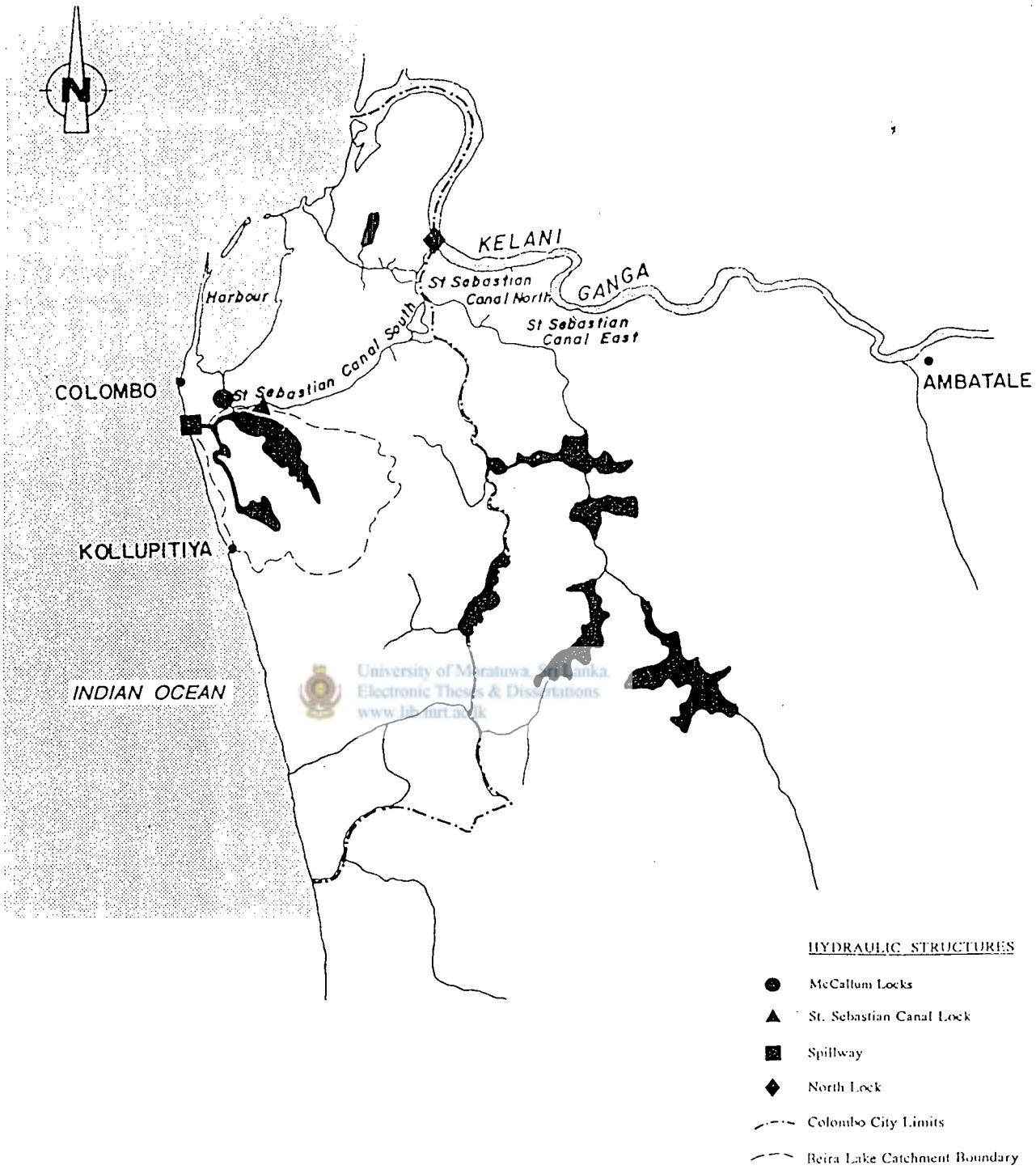


Fig. 80 *York Street*



Map No. 11 *Lake and fort of Colombo in 1750*



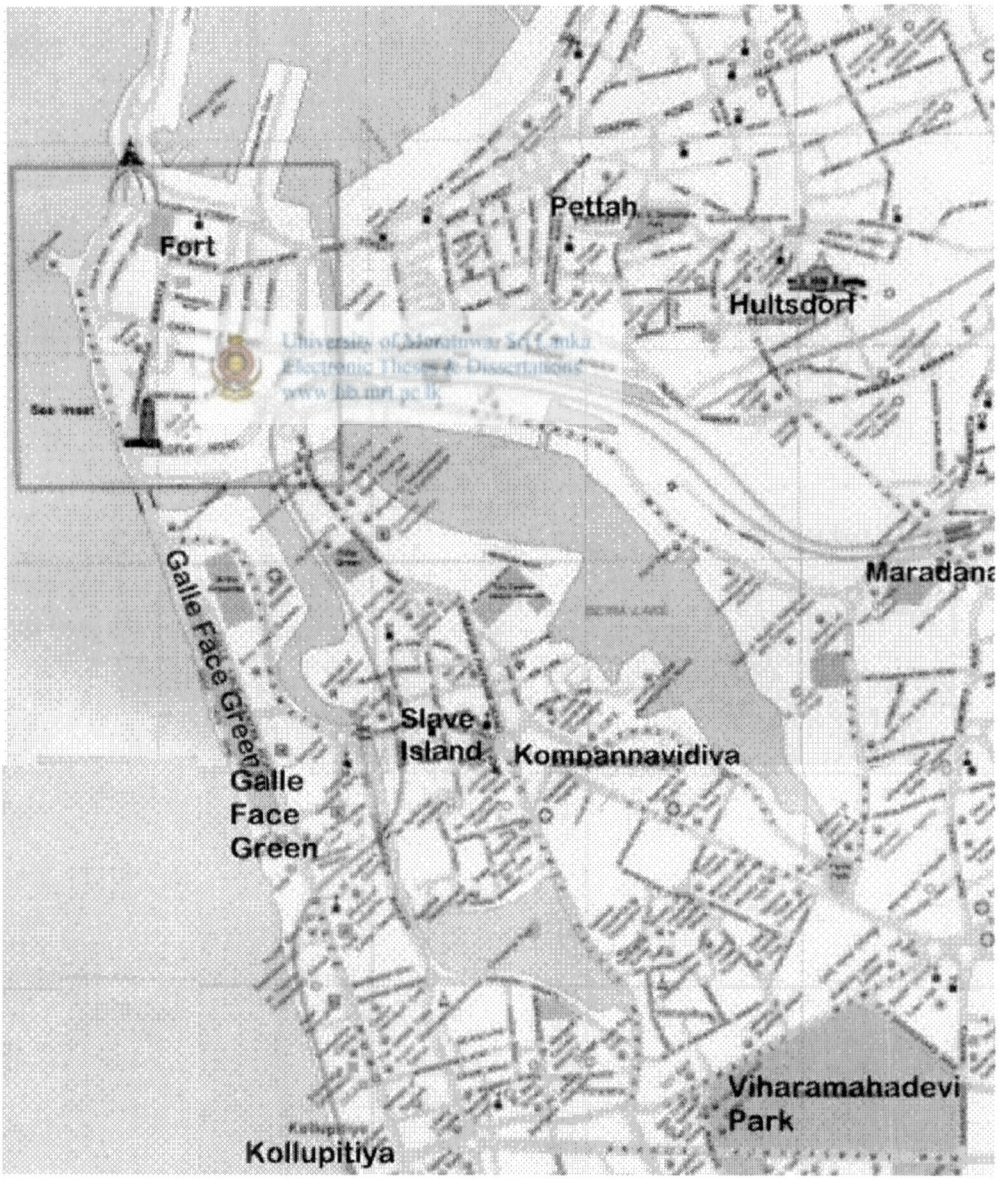
Map No 12 *Location of the main water bodies with a significant importance to the Beira Lake restoration strategy*

Source: Urban Development Authority

5.1.2 Existing Environment, Land Uses & Conditions

5.1.2.1 Physical Environment

Beira Lake has a highly urbanized catchment of 448ha that is mostly flat, with ground levels ranging from less than 1m to 6m above mean sea level. The Lake covers 65.4 ha and has a mean depth of 2.0m. It comprises four main basins the east Lake is the largest and the deepest basin while the other three basins are much smaller and shallower.



Map No. 13 *Beira Lake indicating its four basins*

Map No 14 *Bathymetry of the Beira Lake*
Source: Urban Development Authority

Source: Urban Development Authority

Map No 15 *Beira lake catchments and storm sewer network*

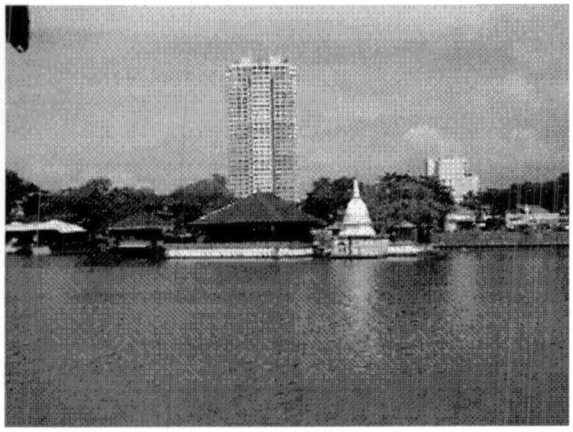


Fig. 81 *South West Lake*
Buddhist Shrine / Seema Malakaya

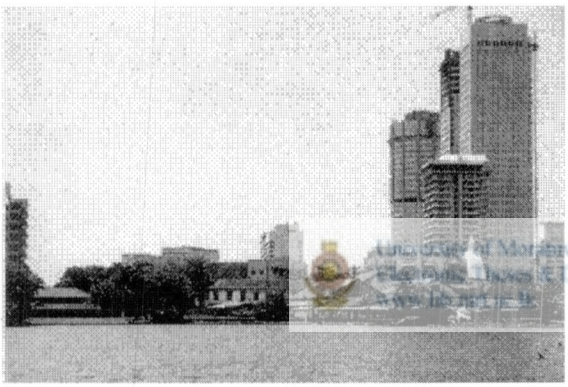


Fig. 82 ***East Beira Lake***
Echelon Square - Fort

Fig. 83 *West Lake*
Shanty area – people to relocate

Fig. 84 *East* ***Beira Lake***
Entrance to inlet – area to redevelop

Fig. 85 *South West Lake*
Natural bank

Fig. 86 *East Lake*
C. W. Mackie & Co. Ltd, warehouses

Fig. 87 *South Lake- East side of canal*
Don Carolis & sons premises

Fig. 88 East Lake
Warehouses and floating restaurant

Fig. 89 *West lake – east side*
John Keels premises

5.1.2.1 Climatology

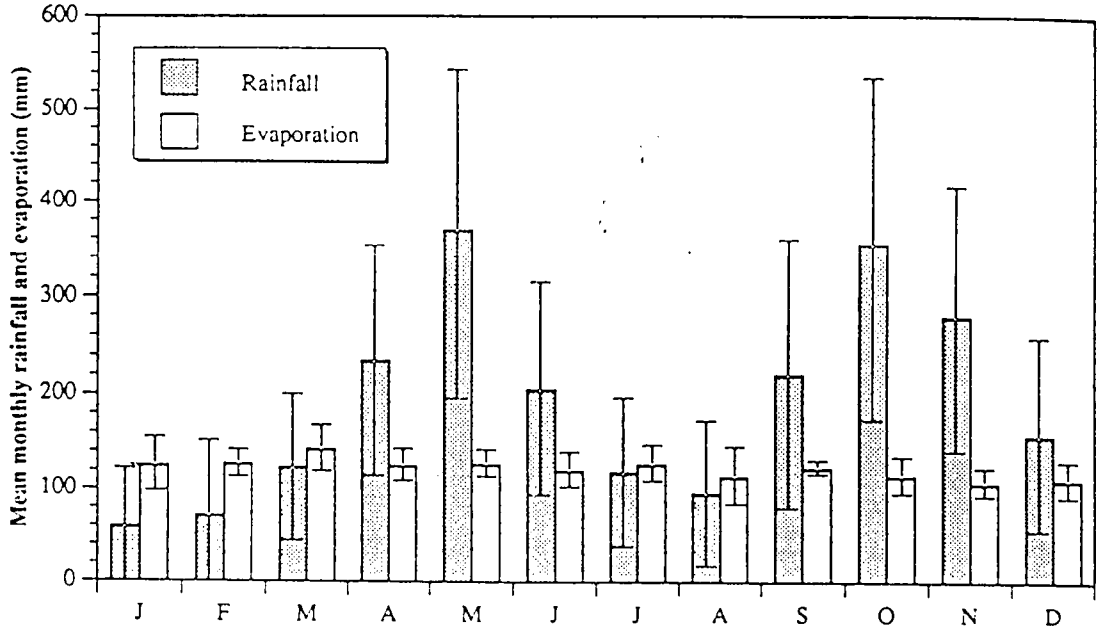
5.1.2.2.1 Rainfall

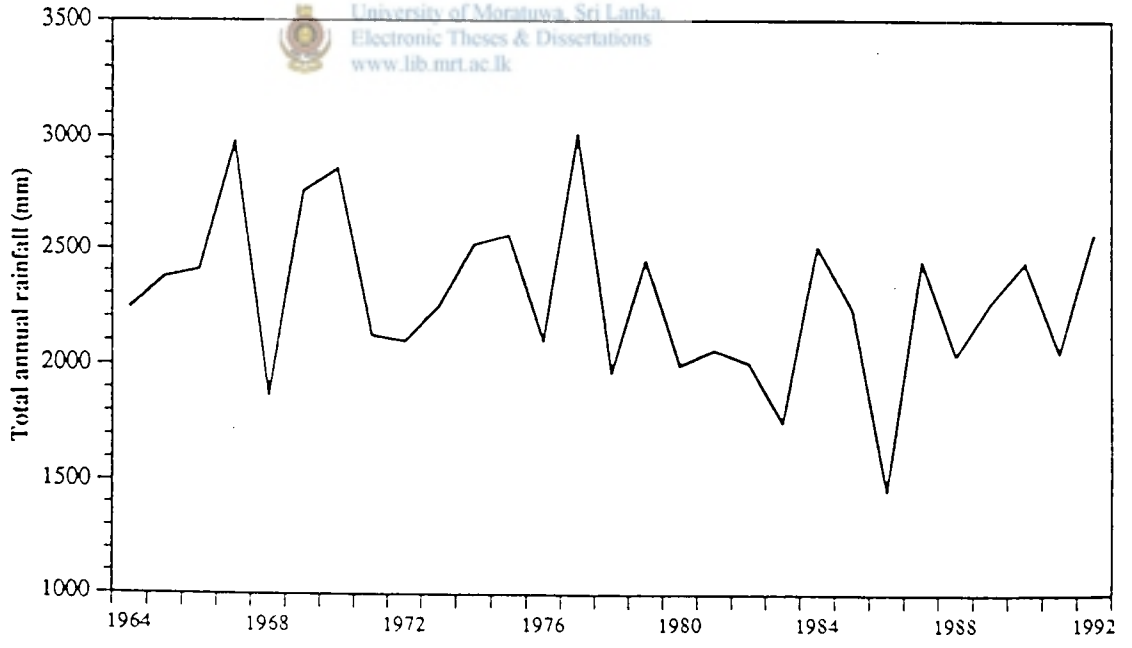
This factor deserves special attention, since rainwater is an important element in the water budget of the Beira Lake.

	Rain duration (hour)					
Return period (year)	3	6	12	24	48	96
1	69.0	83.0	100.0	118.0	145.0	170
2	79.8	100.3	116.8	141.5	174.2	215
5	100.3	131.6	149.1	186.4	229.5	283
10	113.8	152.2	170.4	216.2	266.2	328
25	130.8	178.3	197.4	253.8	312.5	385
50	143.5	197.6	217.4	281.7	346.8	427

Source: Atkins, 1988

Table 01 *Long duration rainfall depth in (mm)*





Source: Colombo Meteorological Department

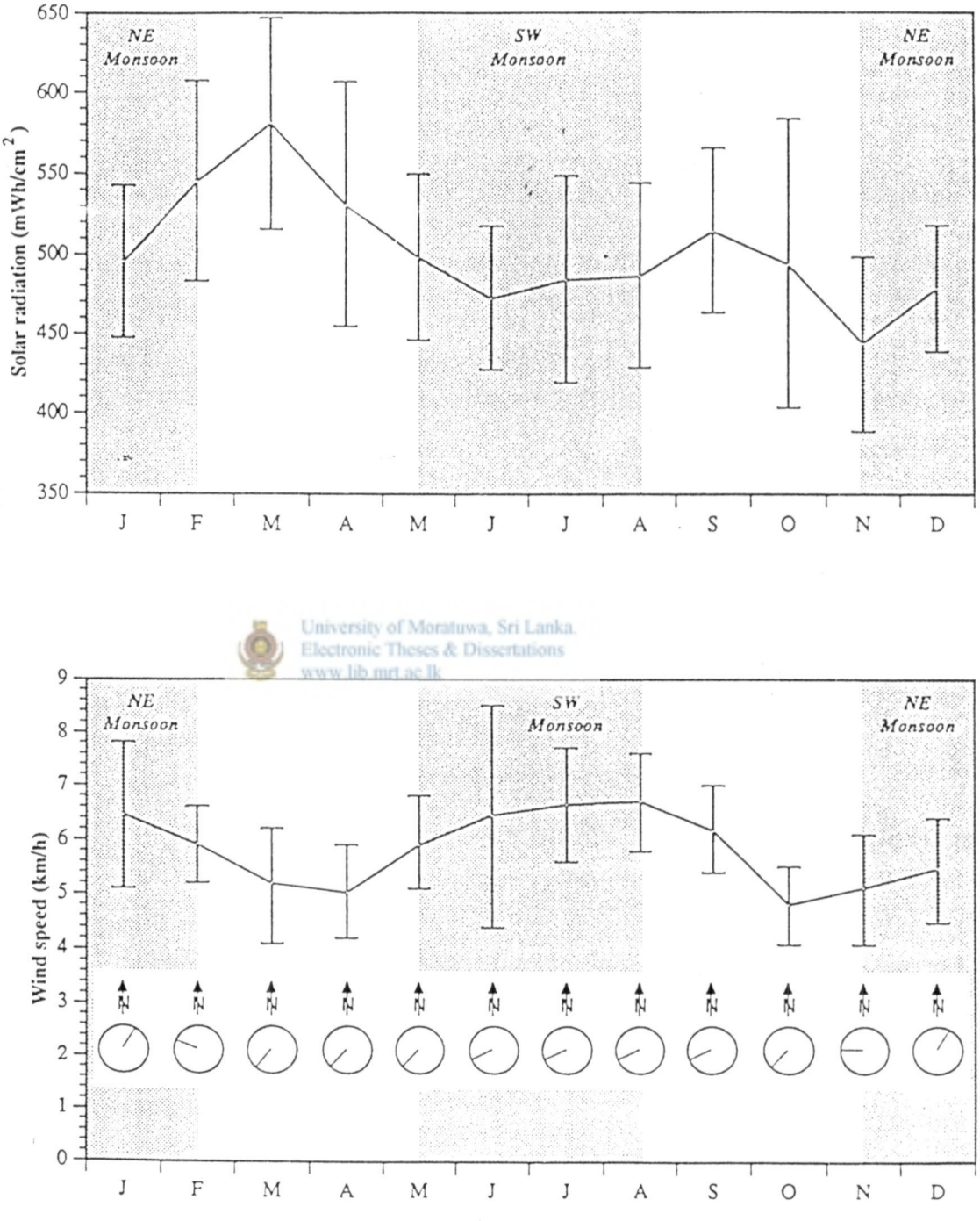
Table 02 *Mean monthly rainfall and evaporation rate in Colombo during the 1964- April 1993 period, and total annual rainfall during the 1964- 1992 period*

5.1.2.2.2. Wind/Solar Radiation

In Sri Lanka, winds are of the utmost climatologically importance. As they are responsible for the major seasonal changes; the onset of both monsoonal periods. At a more local scale, winds are also important, as they can affect the water-mixing pattern and prevent or encourage satisfaction of water in a Lake.

Monthly average wind speeds (km/h) and resultant wind direction measured at 10 m above ground level by the meteorology department from January 1980 to 1993 are given in following figure. In the area of Colombo, winds are predominantly from the South West from March to October, and then shift to the North East during December and January.

In relation to the general spatial orientation of the Beira Lake, it appears that prevailing winds rarely blow lengthwise in any of the Beira Lake basins, apart from the Galle Face Lake during the North East monsoon months. The average monthly wind speeds do not appear high enough to generate water movement or to create waves and currents in the Beira Lake system.



Source: Colombo Meteorological department

Table 03 *Mean monthly solar radiation, wind speed and resulting wind direction (compass card0 in Colombo during the 1980- 1992 period*

5.1.2.3. Biological Environment

Beira lake is known for its aquatic communities namely, phytoplankton algae, aquatic plants, benthic organisms, fish and bird communities. Shoreline plants and aquatic plants can be found in great diversity. Nine aquatic and nearly three hundred terrestrial plant species were recorded in or around Beira Lake in April 1993.

As for the fish community of Beira Lake 12 to 15 species were reported in Beira Lake in 1954 and 1970 respectively. The 1993 survey revealed the presence of only 7 fish species.

Beira lake avifauna (birds) feed directly on Beira lake aquatic resources (amphibians, fish, insects) and in this respect the degradation of the life supporting capacity of the lake system indirectly and adversely affects them.

The organisms depending directly on the lake support a local fishery industry and attract fish eating birds that live on these resources. These birds represent a natural asset in th heart of the city.

Consideration to be made on, as stated in the Beira lake business plan study,

- The activities of local fisherman and the presence of birds along the lake should be taken in to consideration when utilizing the water front.
- Areas with natural shorelines should be improved, preserved and increased.
- Aquatic vegetation should be kept up to a maximum level as they become breeding areas for fish species.
- Bird concentrating areas should be preserved and integrated in the overall redevelopment plan

Source: urban development authority

Map No. 16 *Summary of the1993 biological environment surveys*

Common name	*Scientific name*
House Crow	*Corvus sp.*
Pond Heron	*Ardeola grayii*
Domestic Pigeon	*Columba livia*
Little Cormorant	*Phalacrocorax niger*
White Breasted Kingfisher	*Halcyon smyrnensis fisca*
Whiskered Tern	*Chlidonias hybrida indica*
Brahminy Kite	*Haliastur indus indus*
Spotted Billed Pelican	*Pelicanus roseus*
Night Heron	*Nicticorax nicticorax nicticorax*
Common Kingfisher	*Alcedo atthis taprobana*
Egrets	*Egretta sp.*
Pied Kingfisher	*Ceryle rudis leucomelaneura*
Little Tern	*Sterna albifrons sp.*
Common Babbler	*Turdoides striatus striatus*
Indian Shag	*Phalacrocorax fuscicollis*
Darter	*Anhinga melanogaster*
Little Grebe	*Podiceps ruficollis capensis*
Brown Headed Gull	*Larus brunnicephalus*
Paraiah Kite	*Milbus migrans govinda*

Source: NARA, 1985

Table 4 *List of bird species recorded from the Beira Lake and its shoreline in 1985*

5.1.2.4. Human Environment

5.1.2.4.1. Existing Population

Beira Lake serves ten municipal wards of Colombo. Namely,

1.0 Fort
2.0 Slave island
3.0 Kollupitiya
4.0 Hunupitiya
5.0 Cinnamon gardens
6.0 Suduwella
7.0 Maradana
8.0 Maligakanda
9.0 Kuppiyawatta west

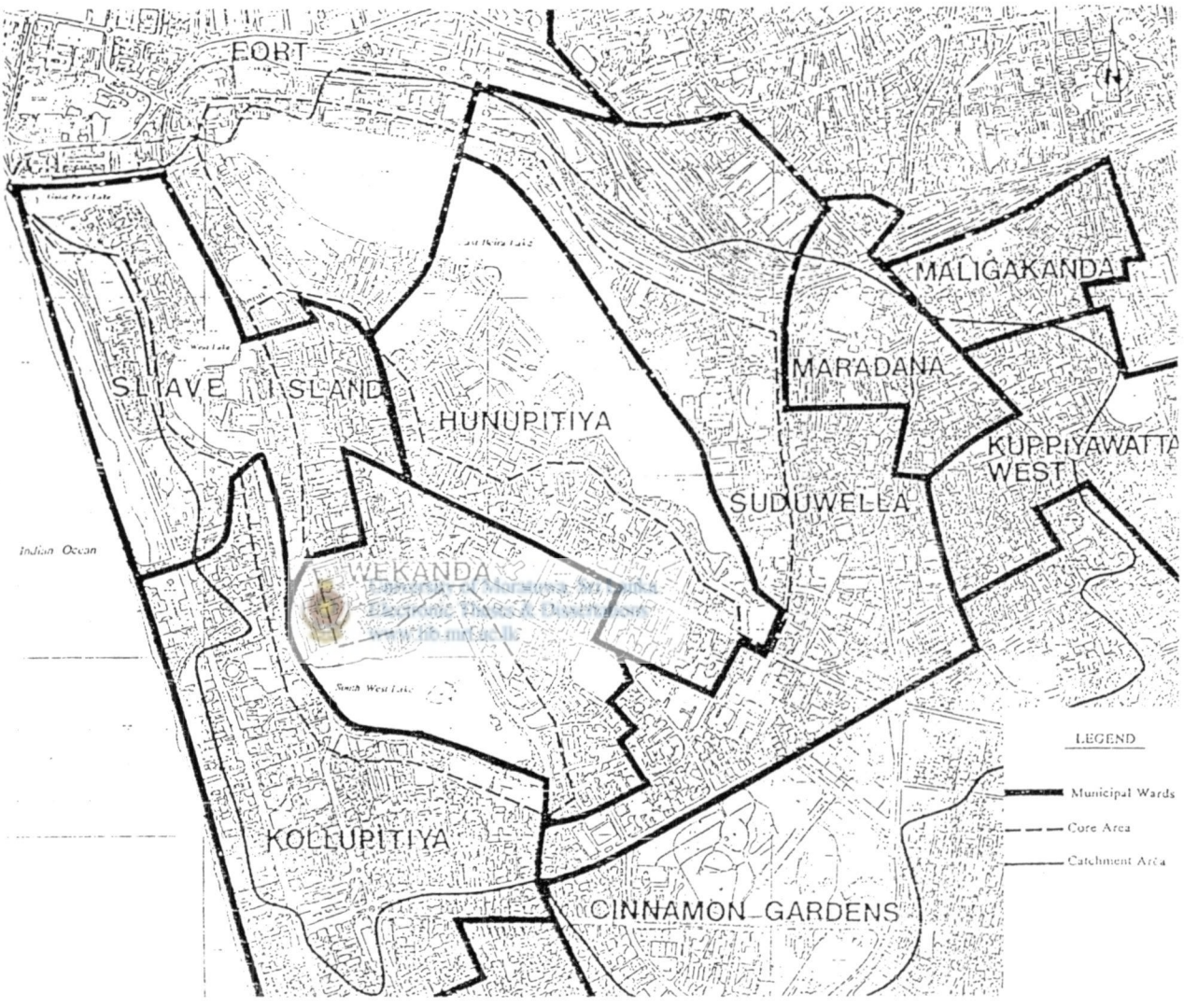
Population in the Beira lake core area

A clearly noticeable fact is that working population and other occupants contribute to the population than residential population. Situating closer proximity to the heart of Colombo and its functional viability as a highly urbanised area is the key factor to this situation.

Other main reason is its road network, which creates boundaries to the core area.

East Beira:	**D.R. Wijewardana Mawatha** to the north
	T.B. Jayah Mawatha to the east
	Kew Road to the south
	Sir Chittampalam A. Gardiner Mawatha to the west
Galle face and west lakes:	Section of the **Lotus Road** & regal cinema block to the north
	Section of **Sir Chittampalam A. Gardiner Mawatha** to the east
	Section of **Duplication Road** and **Baladaksha Mawatha** on the western boundary
Southwest lake	**Nawam Mawatha** to the north
	Section of **Sir James Peiris Mawatha** to the to the east
	Perahara Mawatha to the south
	Duplication road to the west

Source: Urban Development Authority
Map No. 17 *Premises, existing boundaries and road network*



Source: Urban Development Authority

Map No:. 18 *Municipal wards of the Beira lake catchment*

	Residential / permanent		*Working / other occupants*		TOTAL	
	No.	%	No.	%	No.	%
East Lake	2 955	42.9	24 503	55.7	27 458	53.9
Galle Face and West Lakes	2 222	32.3	9 590	21.8	11 812	23.2
South West Lake	1 707	24.8	9 929	22.5	11 636	22.9
TOTAL	6 884	100	44 022	100	50 906	100

Municipal ward	*1971* [a]	*1981* [b]	*Average annual growth rate* (%) [a]	*1993* [b]	*Proportion within catchment* [c]	*Estimated for catchment*
Hunupitiya	8 916	8 502	-0.464	8 029	100%	8 029
Wekanda	9 292	9 571	+0.300	9 916	100%	9 916
Suduwella	9 303	7 874	-1.536	6 423	100%	6 423
Slave Island	14 538	13 775	-0.539	12 884	95%	12 240
Maradana	8 940	8 817	-0.138	8 671	90%	7 803
Kollupitiya	12 424	11 209	-0.978	9 894	75%	7 421
Cinnamon Gardens	16 624	17 618	+0.598	18 882	20%	3 776
West Kuppiyawatta	9 823	10 457	+0.645	11 266	40%	4 506
Maligakanda	9 318	9 355	+0.040	9 400	10%	940
Fort						1 223 [d]
TOTAL						62 278

Source: land use survey by NBRO, and socio economic survey by NHDA, May 1993

Table 5 *Population in the Beira lake core area*

5.1.2.4.2. Existing Land Use

Approximately 26% of the Beira-lake catchment area is used for residential purposes and commercial premises account for 15% and institutional premises (public and semi public, educational, health, religious, etc) occupy 8.5%.

When considering the land use, which is a more essential part, in developing process, Lands mainly bordering the east lake, the Galle face lake and the northern section of the west lake are under government ownership.

	Beira Lake	
Major category	Extent (ha)	%
Residential	115.8	25.8
Manufacturing industries	19.2	4.3
Transport, communication and utilities	34.0	7.6
Commercial (shops)	42.8	9.6
Commercial banking and allied (offices)	24.2	5.4
Cultural, entertainment and recreational	41.2	10.5
Institutional	83.0	18.5
Vacant and non urban uses	5.1	1.1
Other urban uses	15.0	3.4
Roads and reservations for circulation spaces	61.8	13.8
TOTAL	448.2	100.0

Source: land use survey by UDA and NBRO, 1993

Table 6 *Existing land use in the Beira lake catchment area*

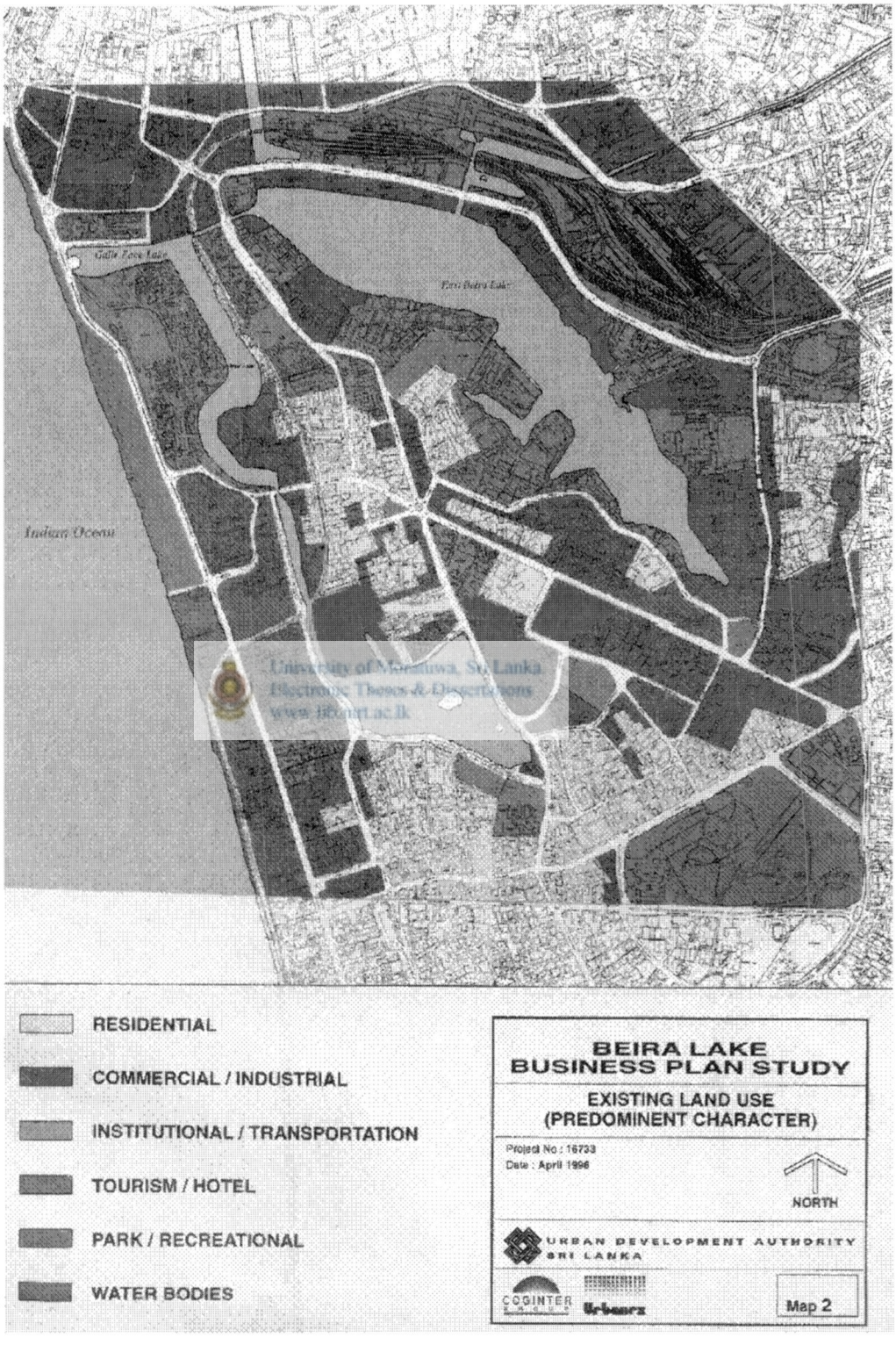
Source: Urban Development Authority

Map no. 19 *Existing land use (detailed)*

Major category	*East Lake*		*Galle Face and West Lakes*		*South West Lake*		TOTAL	
	Extent (ha)	%	Extent (ha)	%	Extent (ha)	%	Extent (ha)	%
Residential [a]	12.47	19.52	1.31	4.17	6.02	28.49	19.80	17.0
Manufacturing industries	3.02	4.73	4.57	14.54	3.59	16.99	11.12	9.6
Transport, communication and utilities	15.11	23.65	0.30	0.95	2.41	11.41	17.82	15.3
Commercial (shops)	7.11	11.13	1.46	4.65	1.75	8.28	10.32	8.8
Commercial banking and allied (offices)	0.99	1.55	0.52	1.65	0.77	3.64	3.28	2.8
Cultural, entertainment and recreational	2.80	4.38	1.54	4.90	1.44	6.81	5.78	4.9
Institutional	16.92	26.48	3.40	10.82	4.24	20.07	23.56	20.2
Vacant and non urban uses	1.60	2.50	1.08	3.44	0.91	4.31	3.59	3.08
Other urban uses (Defence)	3.88	6.07	17.25	54.88	0.00	0.0	21.13	18.1
TOTAL	63.90	100	31.43	100	21.13	100	116.46	100

Source: land use survey by NBRO, 1993

Table 7 *Existing land use in the Beira lake core area*



Source: Urban Development Authority

Map No. 20 *Existing land use (predominant character)*

5.1.2.4.3. Existing Land Ownership

Source: Urban Development Authority
Map No:. 21 *Predominant Land owner ship*

Category	East Lake		Galle Face and West Lakes		South West Lake		TOTAL	
	Extent (ha)	%	Extent (ha)	%	Extent (ha)	%	Extent (ha)	%
Government ownership								
State/Crown	27.0	42.3	19.8	63.1	0.7	3.3	47.5	40.8
Colombo Municipal Council	1.0	1.5	0.4	1.2	2.5	11.7	3.9	3.4
State institution	9.1	14.2	1.1	3.4	6.0	28.4	16.2	13.9
Sub total	37.1	58.0	21.3	67.7	9.2	43.4	67.6	58.1
Private ownership								
Private	9.9	15.5	7.4	23.7	3.1	14.5	20.4	17.5
99 year leased land	5.9	8.1	1.9	6.0	4.7	22.3	11.8	10.1
Sub total	15.8	23.6	9.3	29.7	7.8	36.8	32.2	27.6
Other ownership								
Catholic Church	7.7	12.1	0.5	1.6	2.1	10.1	10.3	8.8
Buddhist Temple	0.1	0.1	0.2	0.6	1.6	7.7	1.9	1.6
Community and other Religious organization	3.9	6.2	0.1	0.4	0.4	2.0	4.4	3.9
Sub total	11.7	18.4	0.8	2.6	4.1	19.8	16.6	14.3
TOTAL	63.9	100	31.4	100	21.1	100	115.4	100

Source: land use survey by NBRO< May1993

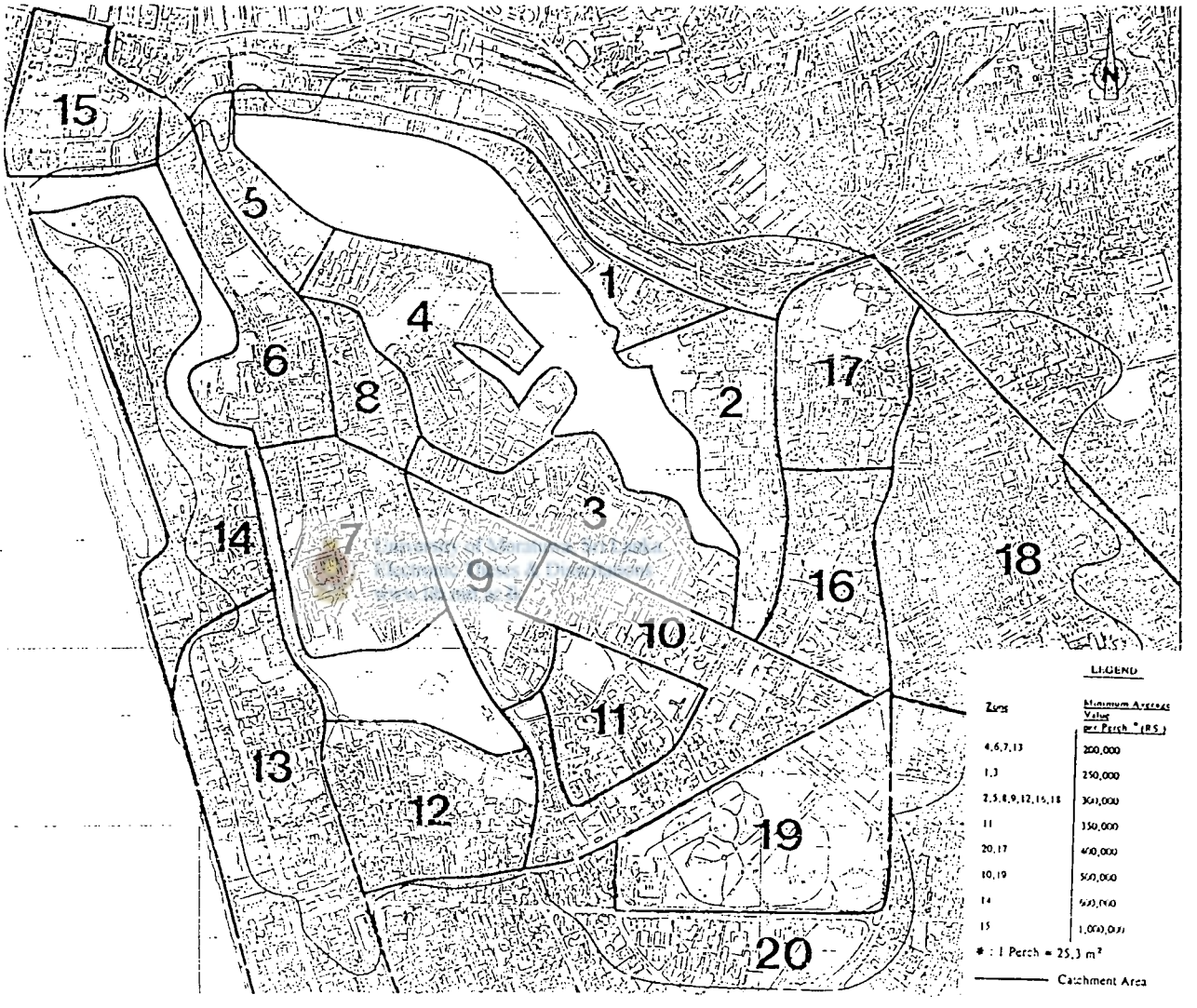
Table 8 *Land / property ownership in the Beira lake core area*

5.1.2.4.4. Existing Land Values

Zone [a]	*Range of values per perch (Rs)*
1	250 000 - 350 000
2	300 000 - 400 000
3	250 000 - 400 000
4	200 000 - 350 000
5	300 000 - 400 000
6	200 000 - 300 000
7	200 000 - 400 000
8	300 000 - 400 000
9	300 000 - 350 000
10	500 000 - 600 000
11	350 000 - 450 000
12	300 000 - 400 000
13	200 000 - 300 000
14	600 000 - 700 000
15	1 000 000 - 1 250 000
16	300 000 - 500 000
17	400 000 - 500 000
18	300 000 - 400 000
19	500 000 - 600 000
20	400 000 - 500 000

Source: consulted charted valuer

Table No. 9 *Prevailing land values in the Beira lake catchment*



Source: urban development authority
Map No. 22 *Prevailing land values in the Beira lake catchment*

5.1.2.4.5. Squatter Settlements

Squatter settlements are located on the banks of Beira Lake. Human activities in lake include fishing, recreational and competitive rowing. The Sri Lanka ports authority & security forces also use the lake occasionally.

Fig. 90 *Squatter settlements along banks of Beira Lake*

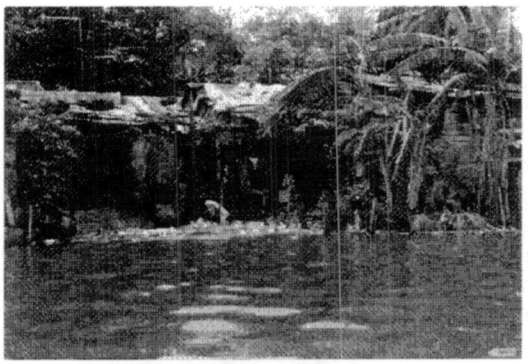


Fig. 91 *Squatter settlements*

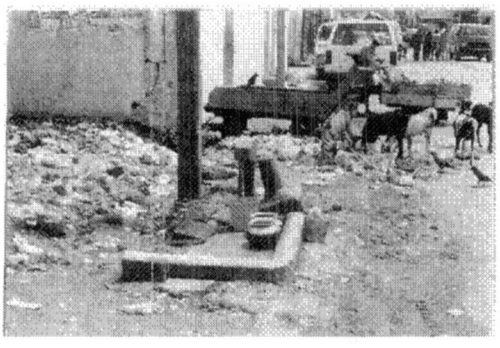


Fig. 92 *Lake banks become dumping grounds*

Fig. 93 *Land filling for construction*

Location	*Number of units*	*Number of families*	*Population*
A - Glennie Passage	182	228	942
B - Garden No 100 Chittampalam Gardiner Mawatha	33	43	175
C - Garden No 340 (Johnson Watta) D.R. Wijewardena Mawatha	63	66	256
D - Garden No 87 Vauxhall Street	141	153	616
E - Garden No 175 Vauxhall Street	68	83	358
TOTAL	487	573	2 347

Location of settlement

	A		B		C		D		E		TOTAL	
Monthly income	No of units	%	No of units	%	No of units	%	No of units	%	No of units	%	No of units	%
Less than Rs 750	7	43.8	5	15.2	3	54.8	9	6.4	6	8.8	30	6.1
Between Rs 751 and 1 500	103	56.6	17	51.5	28	44.4	--	57.5	—	50.0	236	54.0
Between Rs 1 501 and 2 500	46	25.3	10	30.3	32	50.8	—	25.5	—	25.0	141	29.0
More than Rs 2 500	26	14.3	1	3.0	—	—	15	10.6	11	16.2	53	10.9
Employment category	No of persons	%	No of persons	%	No of persons	%	No of persons	%	No of persons	%	No of persons	%
Permanent	29	15.9	6	18.2	9	14.3	26	18.4	16	23.5	86	17.7
Temporary	58	31.9	13	39.4	34	54.8	81	57.4	46	67.5	232	47.6
Self	82	45.1	14	42.4	19	30.2	32	22.7	4	6.0	151	31.0
Abroad	13	7.1	—	—	1	1.5	2	1.5	2	3.0	18	3.7
Distance to work place	No	%	No	%	No	%	No	%	No	%	No	%
Less than 1 km	151	83.0	27	81.8	32	50.8	19	13.5	11	16.2	240	47.2
1 - 2 km	17	9.3	—	—	12	19.0	97	68.8	19	27.9	145	29.8
More than 2 km	14	7.7	6	18.2	19	30.2	25	17.7	38	55.9	102	21.0

Source: socio economic survey by NHDA, May 1993

Table No: 10 *Squatter settlements in the Beira lake core area – income and employment status*

5.1.2.5. Visual environment

Beira Lake represents one of the important scenic assets of the city. As it is located in heart of Colombo it relates to many of the areas including the new city, the magnificence of Echelon Square, which can be seen from East Beira Lake.

The presidential secretariat stands in dignity in Galle Face Lake and some hotels and the Colombo rowing club, are some of the few buildings benefiting from the scenic potential of the lake.

The scenic beauty is enhanced in South West Lake mainly by the seema malakaya and the institutional buildings designed responding to the water body. The reflections of the built fabric on water surface during both day & night enhances the scenic potential of the area.

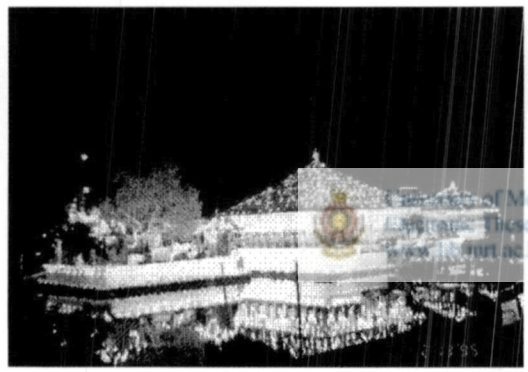


Fig:. 94 *Seema Malaka at night contributing to the scenic beauty*

Fig. 95 *Old parliament building benefiting the scenic beauty of lake*

Fig. 96 *Southwest Lake built fabric responding to water - Nawam mawatha development*

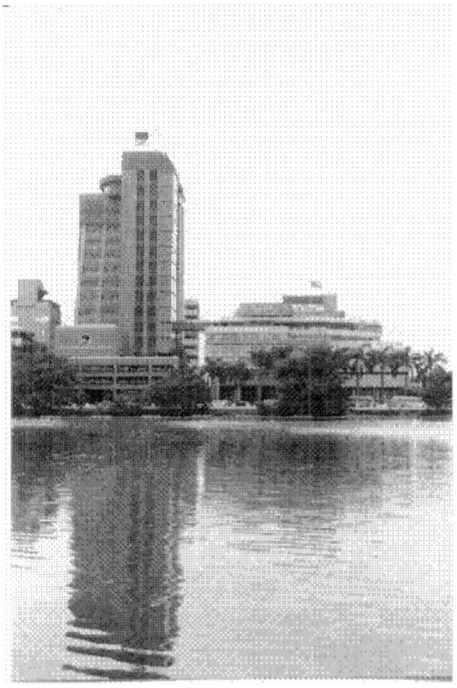


Fig. 97 *Nawam mawatha development*

5.1.3. Current problems and Issues

But in most of the areas this aspect has been neglected by treating the lake as a backyard. Building neglecting the presence of a lake, use the banks for long stretches of warehouses, and boat repair facilities and treating as garbage dumping grounds limit the number of view points from which the lake can be seen and pollutes the water body.

Fig. 98 *Garbage dumping on lake banks*

5.2 STUDY ON CANAL SYSTEM

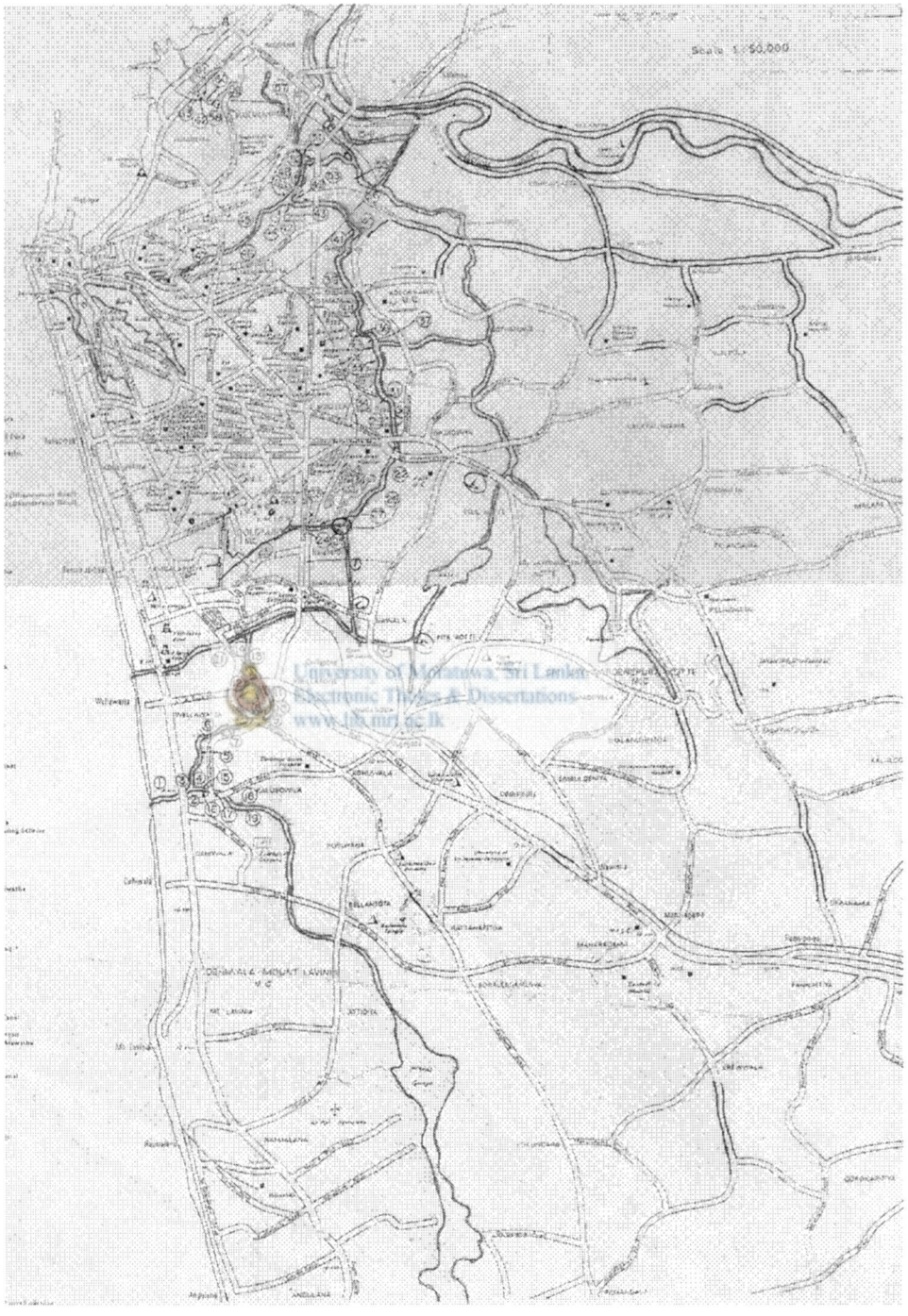
5.2.1 Canal network in Colombo

Canal network in Colombo consist of

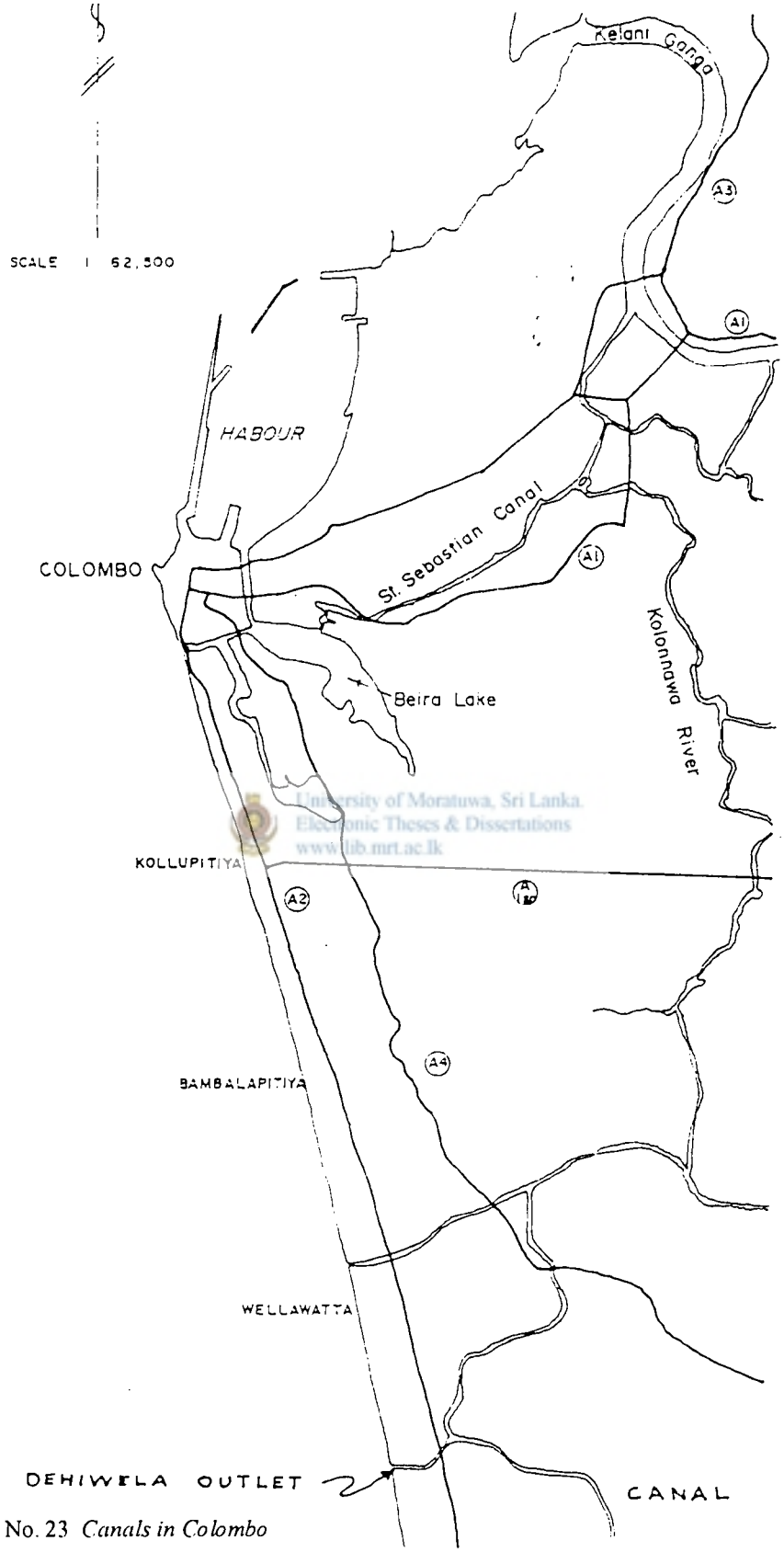
Canals-	St Sebestian canal
	Dematagoda canal
	Serpentine canal
	Wellawatta canal
	Kirulapone canal
	Dehiwala canal
	Torrington south canal
	Heen ela –kotte ela connection canal
	Bolgoda canal
	Colombo –Puttlam canal
	Colombo- Kalutara canal

To identify these canals in a net work other water resources such as rivers, lakes, and *ela* have to integrated

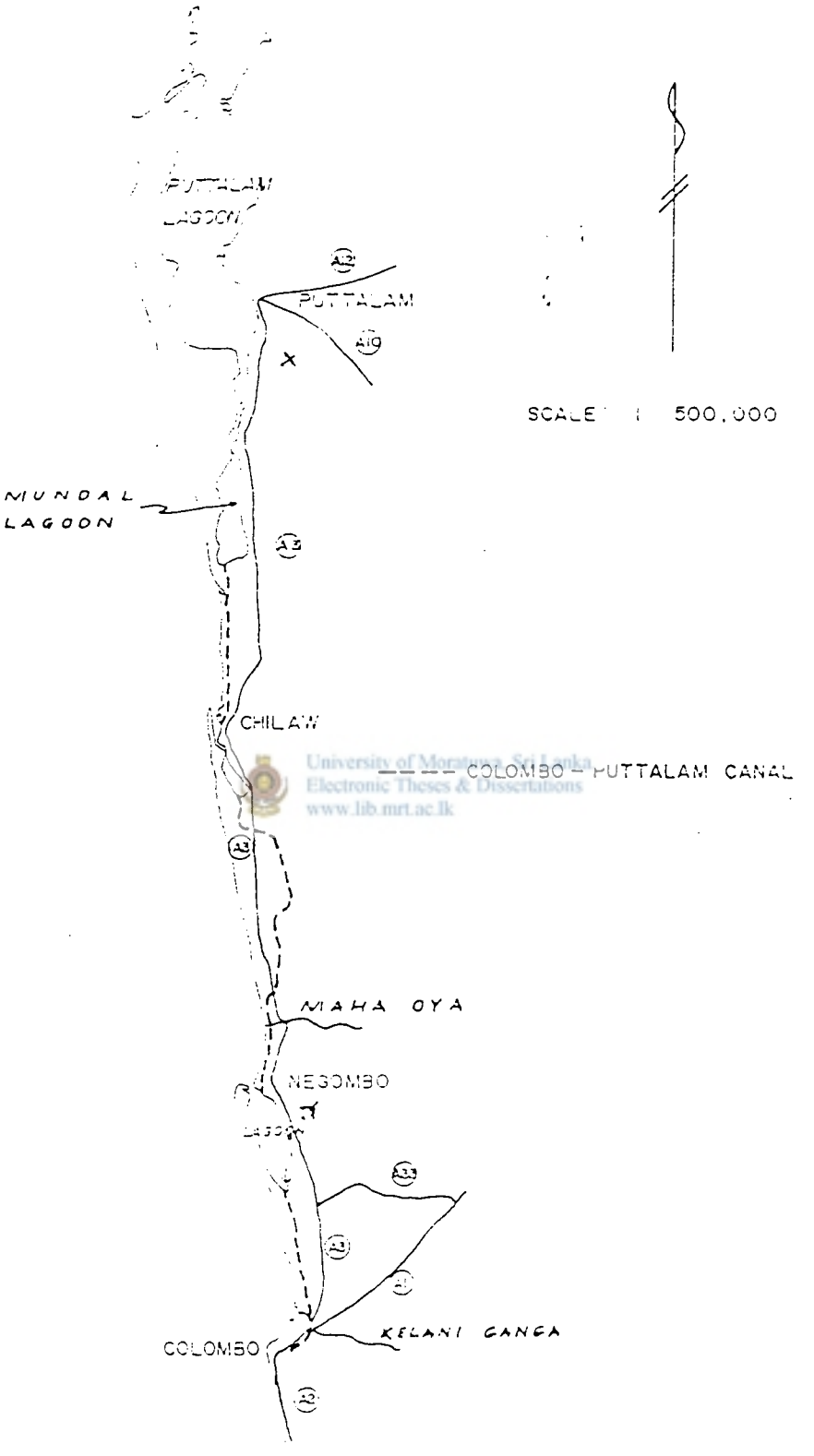
Lakes	Beira lake
	Kotte lake
Ela	Heen ela
	Kolonnawa ela
	Kotte ela
	Mahawatte ela
River-	Kelani river
	Bolgoda river
	Kalu river



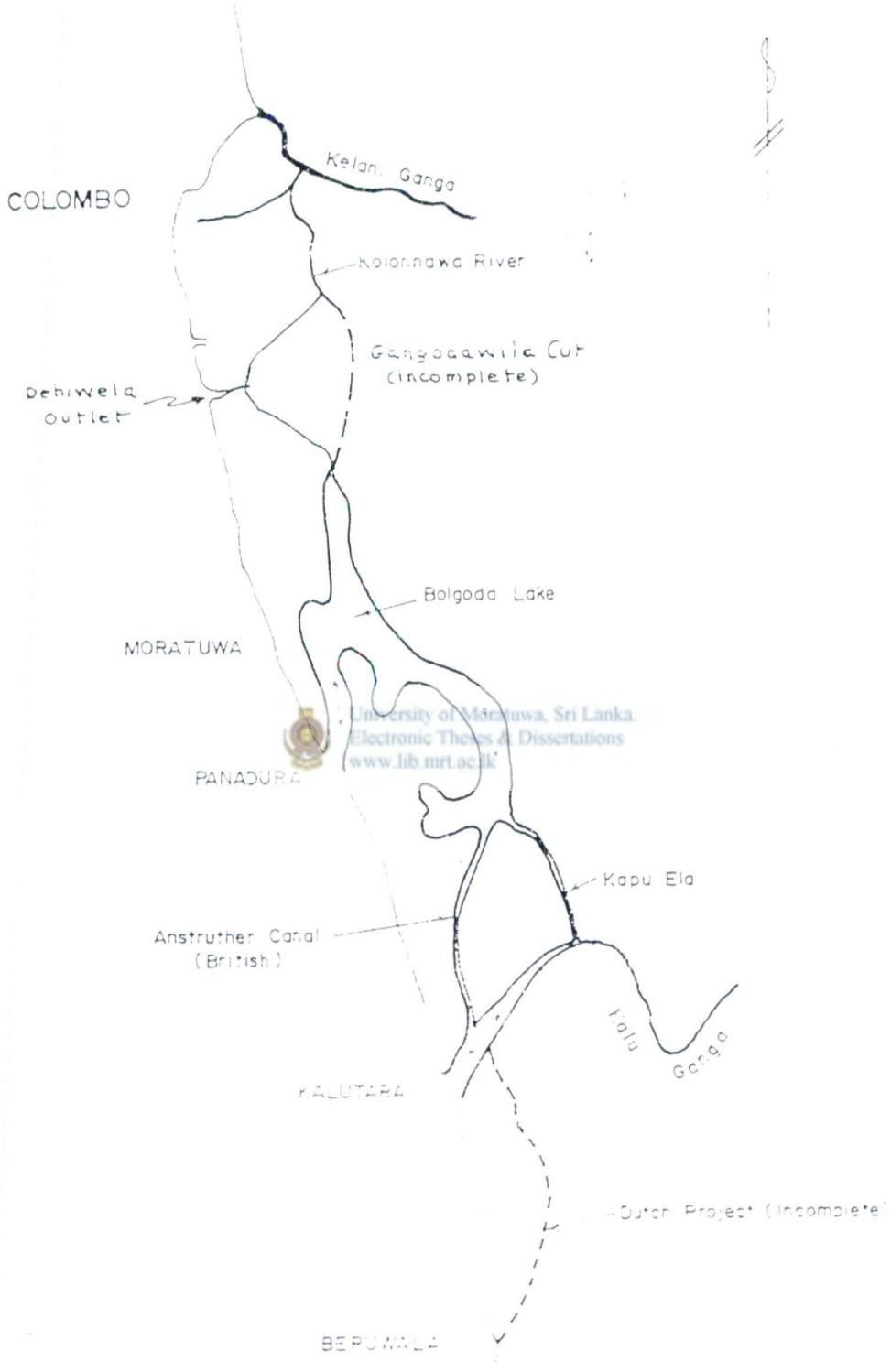
Map No 23 *Canal system in Colombo*



Map No. 23 *Canals in Colombo*



Map No. 24 *Colombo – Puttlam Canal*



Map No. 25 *Colombo –Kalutara canal*

5.2.2 Existing functions of canals in the Colombo city

Canals in the Colombo city mainly function as provision for drainage purposes as a flood controlling method. But originally they were created for defence and as a trans port mode to transport goods from various districts through canals to the Colombo harbour. In this aspect the whole network of water body act as a transport mode starting from Kalutara, Puttlam And Negambo.

But today these canals are abandoned from the cityscape and left without utilizing. A major exception to this action is the utilization of Hamilton Canal, which runs from Colombo to Negambo used by fishing community in areas closer to Negambo lagoon as a navigable root. Other than that these canals are treated as dumping grounds of sewer and garbage. In some canals fishing is carried out as a mini industry and the most significant character of canals is the squatter settlements along the banks of them.

Fig. 99 *Squatter settlements*

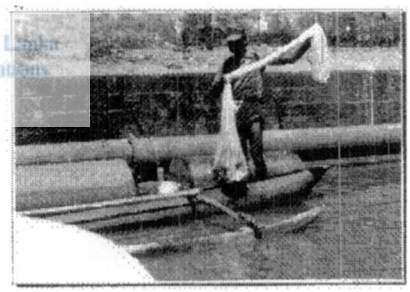


Fig No. 100 *Fishing along the canal*

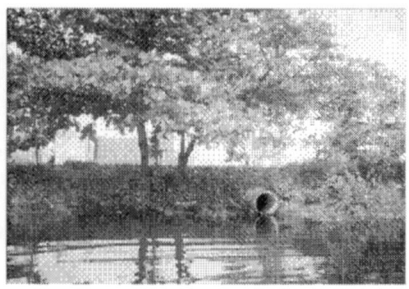


Fig. 101 *Connection of sewer lines*

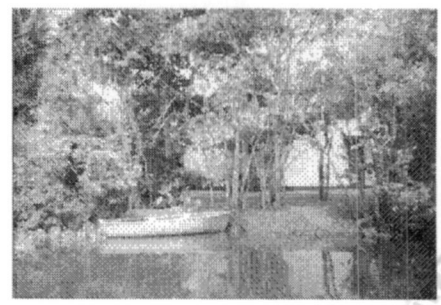
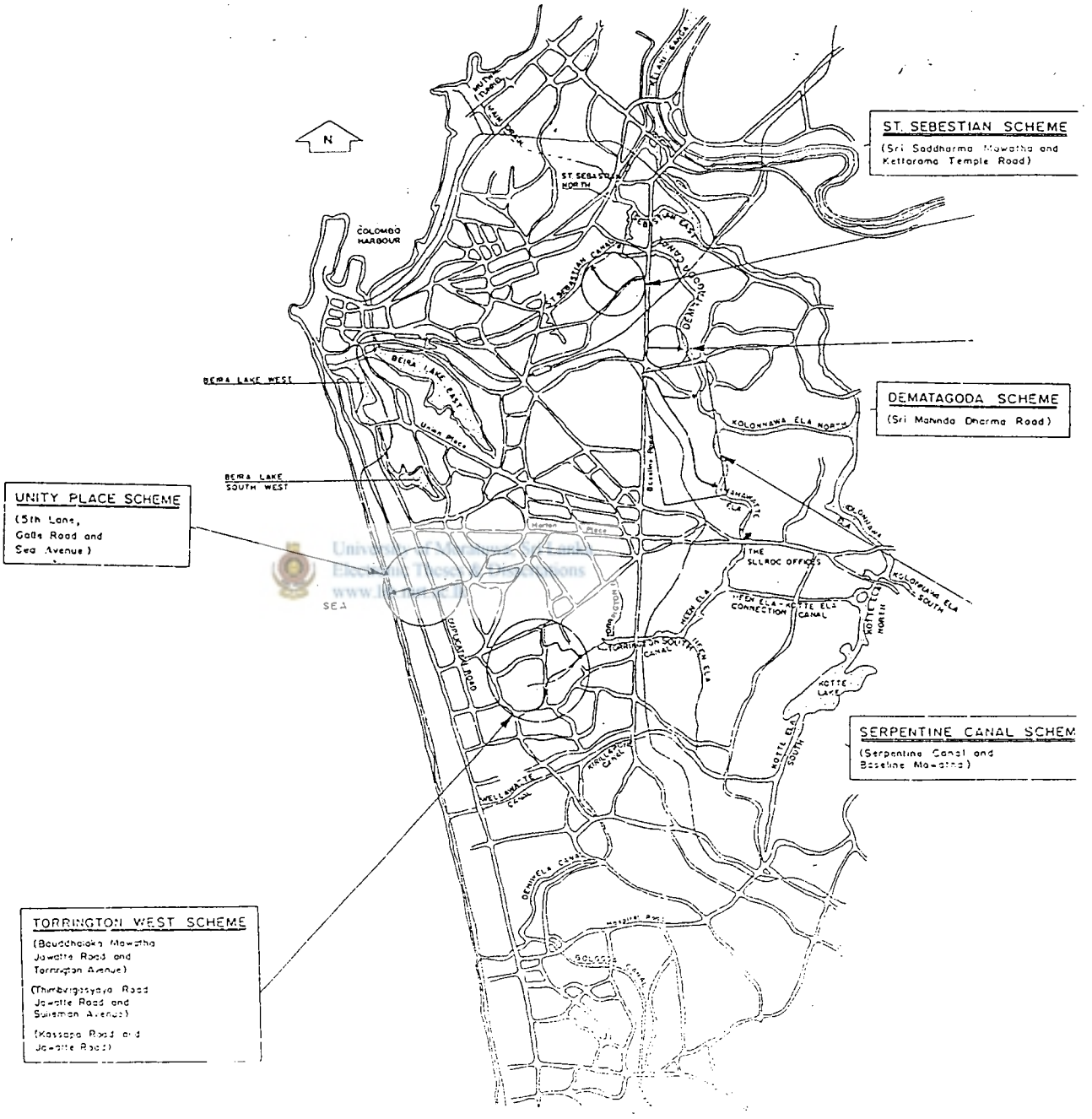


Fig. 102 *Private boatyard*



Map No. 26 *Locations of storm water drainage schemes*

5.3 CASE STUDY IN KOTTE- WELLAWATTA CANAL

As identified in the map all the canals are linked and function as a network. But different sections of this section are named with the closest district or town. As for the Kotte – Wellawatta canal it starts from the Kotte marsh and meets the sea at Wellawatta.

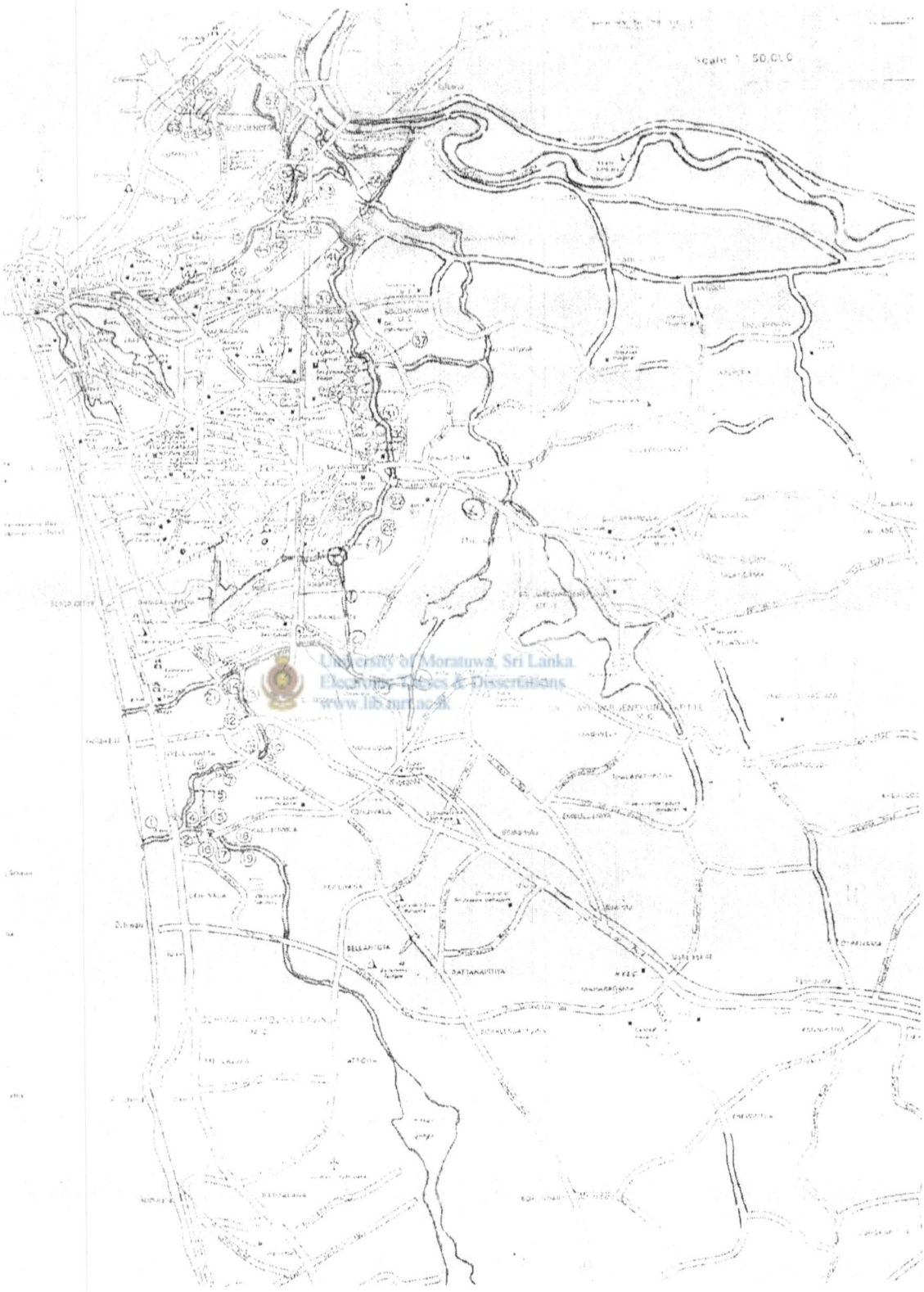
The significance of this canal is its connection locations. As can be seen from the map it connects major towns of Colombo district through a navigable root.

The importance is the two locations where it starts and ends. Kotte is Sri Lanka's administrative capital. Wellawatta is the closest navigable water street to the city of Colombo. As identified in the study on Beira Lake, Sri Lanka's business district also have the connection towards water with its location of, closer proximity to the Beira Lake and the sea.

So if this phenomenon is further analysed, a connection between the administrative capital and the business capital through a body of water will ultimately provide a total different perception towards the image of the city.

The places with a importance to the city, connected by the canal are annotated in the map are as follows,

CITY	INSTITUTIONS
Battaramulla	Parliament
Sri Jayawardana pura Kotte	Sethsiripaya
Ethul Kotte	Open university
Pita Kotte	Wellawatta weaving mills
Nawala	Royal institute
Narahenpita	Lumbini Vidyalaya
	St. Peters collage
	Savoy cinema
	Apollo hospital
	Housing schemes



Map No. 27 *Kotte – Wellawatta canal*

5.3.1 Analysis On Environmental Variation Along Canal Banks

This analysis is carried out by observation and by a photographic study on the canal. As it reveals the present situation, conclusions can be drawn effectively. This can be categorized in to several parts such as physical environment, visual environment, human environment and its potential for future development.

5.3.1.1. Physical environment

Physical environment along the canal banks mainly consist of vegetation. The amount of growth of trees makes the place as situated in a rural area. This feature is highlighted along the stretches of Kotte marsh. When starting the trip from Kotte ela, first the glimpse of the parliament can be seen. The prevailing security conditions of the country do not allow people on up streams of the Diyawanna Oya where the Parliament is situated. On the right opposite is the Sethsiripaya where administrative ministries and departments are situated as a proposal of shifting administrative district to the Sri Jayawardanapura Kotte. Other than these two important institutions, all the other buildings added to the physical environment are residential buildings or commercial buildings along the Kotte canal.

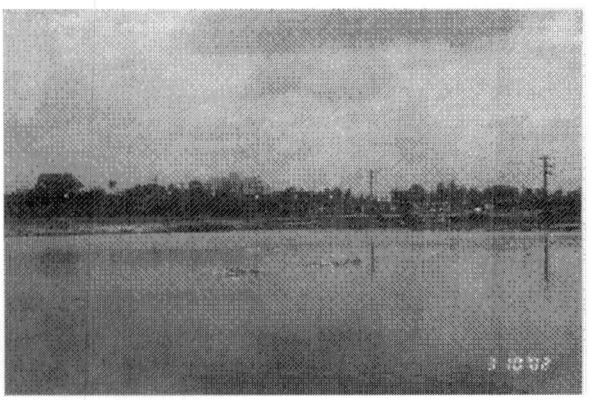


Fig. 103 *Sethsiripaya*

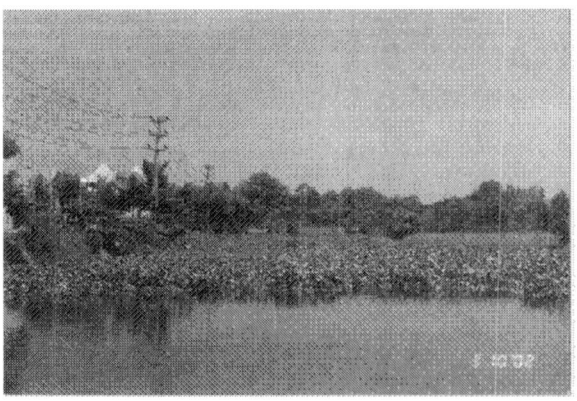


Fig. 104 *Vegetation*

When journey proceed to Kotte marsh, as stated earlier, the growth of vegetation can be noticed. This area acts as a sanctuary for animals and birds. When canal leave the Kotte Marsh it is named as Kirulapone Canal. The Open University is located on the adjacent land which canal comes to a junction with Heen ela.

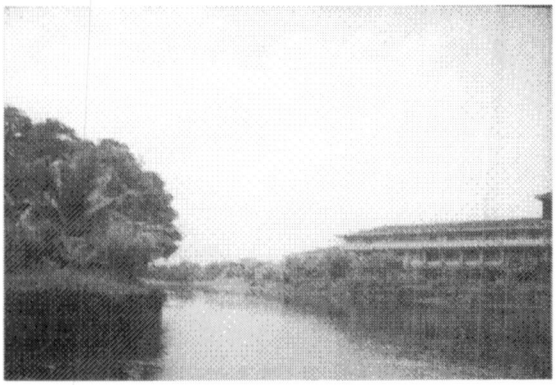


Fig. 105 *Open University*

Fig. 106 Apartments along Kirulapone canal

Along the canal various buildings with various functions contribute to the physical environment of the canal.

Fig. 107 *Apartments along Kirulapone canal*

Fig. 108 *House near Kirulapone canal*

Fig. 109 *Apollo hospital*

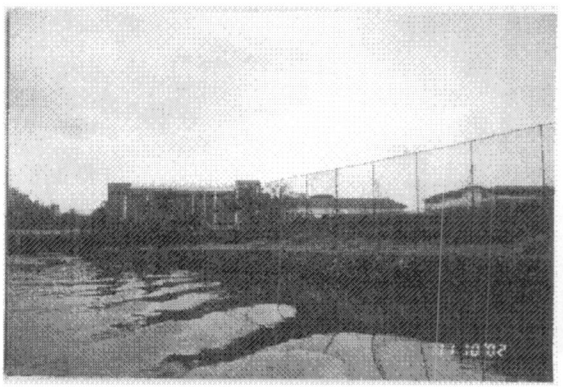


Fig. 110 *St. Peters collage*

5.3.1.2. Visual environment

Most of the canal banks are treated as backwaters. Other than very few occasions such as randomly located residential blocks and housing schemes with a satisfiable respond to the water as a waterfront all the other built elements create a visual disharmony. The scenic potential of the canal is neglected by building large walls and this exploit the long stretch of canal front to others. Although housing schemes have faced the waterfront, the height of the buildings destroys the quality of visual harmony. This tendency limits the awareness of the resource to a visitor. The vegetation and the aviflora and avifauna add up to the visual harmony.

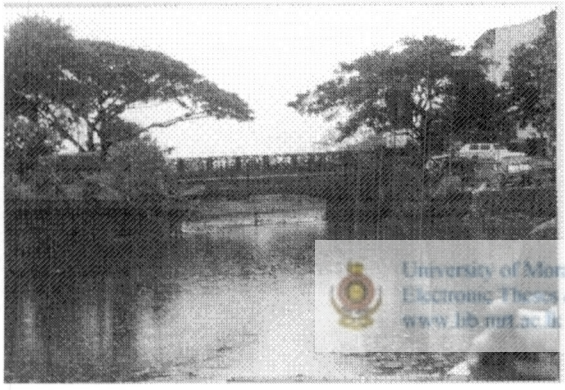


Fig. 111 *Flora & Fauna added to the visual harmony*

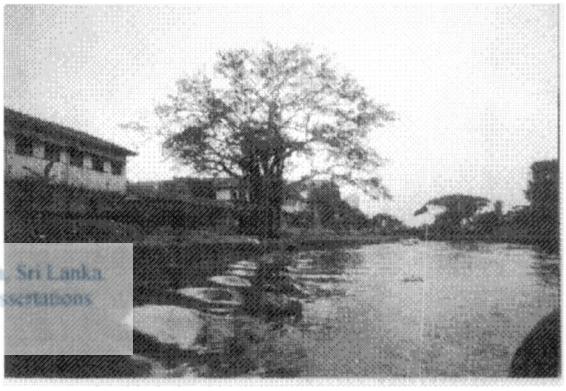
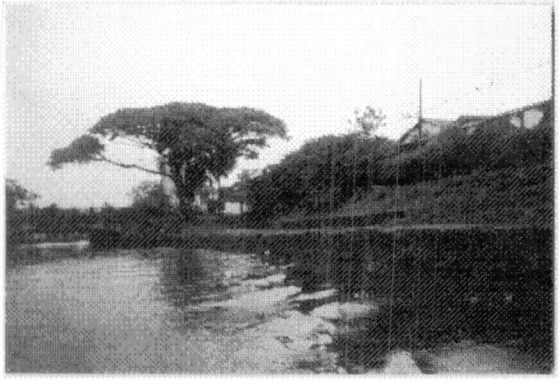


Fig. 112 *Visual harmony near Veluwana College*



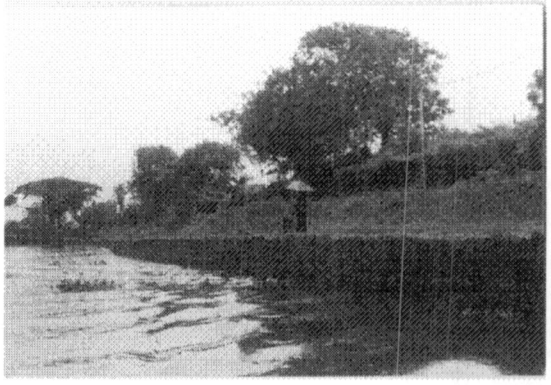


Fig. 113 *Canal Bank Near Weaving Mills*

5.3.1.3. Human environment

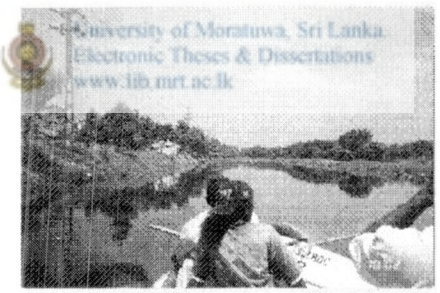
> *"The canal or manmade river is also an important connecter and communicator. Canals can physically connect cities to bodies of water, lace together neighbourhoods or districts or link several cities in one line" (Moore, 1995:23)*

The potential obtained from a canal to human environment is enormous. It can be utilized as a way of income. As in the present situation also it provide ground for commercial establishments. But more than the uses the human behaviour acts as a destroying factor. At numerous spots the untidy banks re used for garbage disposal. This is extensively high in shanty settlements which they discharge raw sewage in to the canal.

5.3.1.4. Potential for future development.

As stated above, this canal links up two main nodes in the city, namely Kotte the administrative city and Wellawatta. And the direct link of these destinations and the amount of cross connections of other nodes also make the canal, as a navigable root of higher potential. The physical and visual environmental concerns are with much importance in implementing development proposals. The scarcity of avifauna and aviflora in the sanctuary of Kotte marsh will be catered as a plus point towards future implementations.

CHAPTER 06



ANALYSIS ON UTILIZING URBAN WATER BODY AS A TRANSPORT MODE TO ENHANCE THE CITY IMAGE

ANALYSIS ON UTILIZING URBAN WATER BODY AS A TRANSPORT MODE TO ENHANCE THE CITY IMAGE

6.1 ANALYSIS –PATTERN OF OPEN SPACES

The underlying principle of the analysis is to recognize the waterfronts as continuous open spaces within a cityscape, which enhance the Imagebility of its inhabitants and in the long run added to the image of the city.

The structure of space between two domains is seen as a means of interfacing two kinds of relations: those among the inhabitants of the system; and those between inhabitants and strangers. The essence of the method of analysis is that it first establishes a way of dealing with the global physical structure of a settlement without loosing sight of its local structure; and then it establishes a method of describing space in such a way as to make its social origins and consequences a part of that description

"It is the form and shape of the open space system as everywhere defined by the buildings that constitute our experience of the settlement" (Hiller B., 1984,P: 89)

"It is an important sense the open space structure of a settlement is one continuous space" (Hiller B., 1984, P: 89)

6.2 ANALYSIS OF COLOMBO CITY THROUGH ROAD NETWORK (GALLE ROAD)

Streets moderate the form and structure of urban communities. They have the effect of focusing attention and activities on one or many centres, at the edges, along a line, or they may not direct one's attention to anything in particular. In a very elemental way, streets allow people to be out side. Streets are what constitute the outside for much urbanity. Place to be when they are not indoors. And streets are places of social and commercial encounter and exchange. They are where you meet people.

If the network of water bodies can be considered as a continuous open space the road network within a city also plays the same role. As the accessibility to a place enhances its legibility and experience of the place, the road network becomes a feature related to the perception of the city. People perceive the city through its streets. It is a linear perception consisting of urban voids and urban solids in the given sheet of two planes. The urban built fabric consist of a wall to wall built fabric with regardless to each other in what so ever create disharmony to the visual environment.

Inhabitants as well as the visitors perceive the image of the Colombo city, mainly through its main road "the Galle road'. It is the place where people memorize and make reference to describe another place. If one asks a visitor or an inhabitant of the city to describe its main locations most of the time it is referred to the main junctions, which come across in the Galle road.

Points at which people memorize the city through road network, (Galle Road)

Fort

Fig. 114 *Colonial City*

Fig. 115 *Echelon Square*

Fig. 116 *Arial View of Fort*

Fig. 117 *Fort By Night*

Kollupitiya

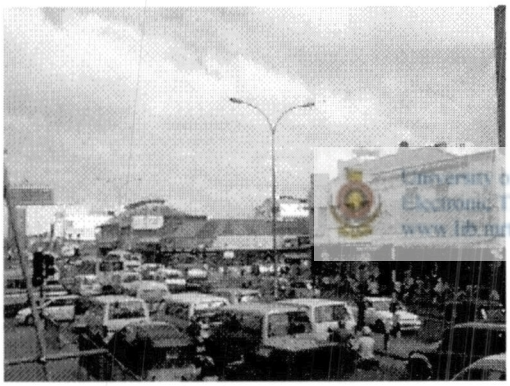


Fig. 118 *Kollupitiya Junction*

Bambalapitiya

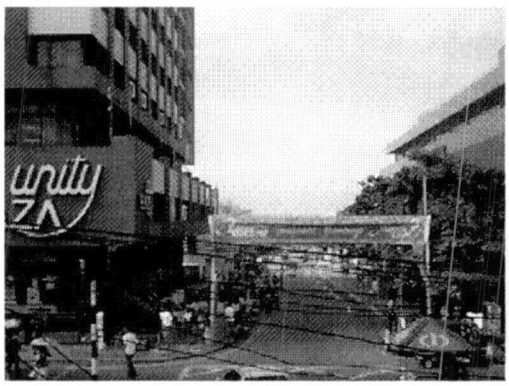


Fig. 119 *Majestic City – Land mark*

Wellawatta

Fig. 120 *Wellawatte Market and Bo- Tree*

Dehiwela

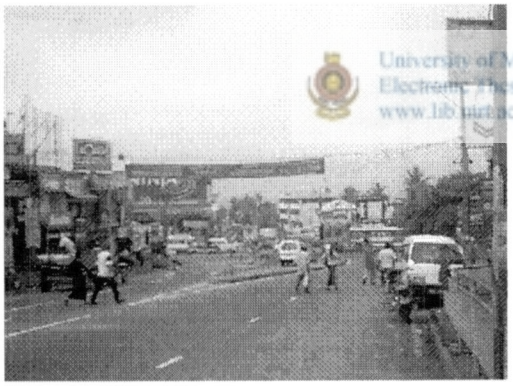
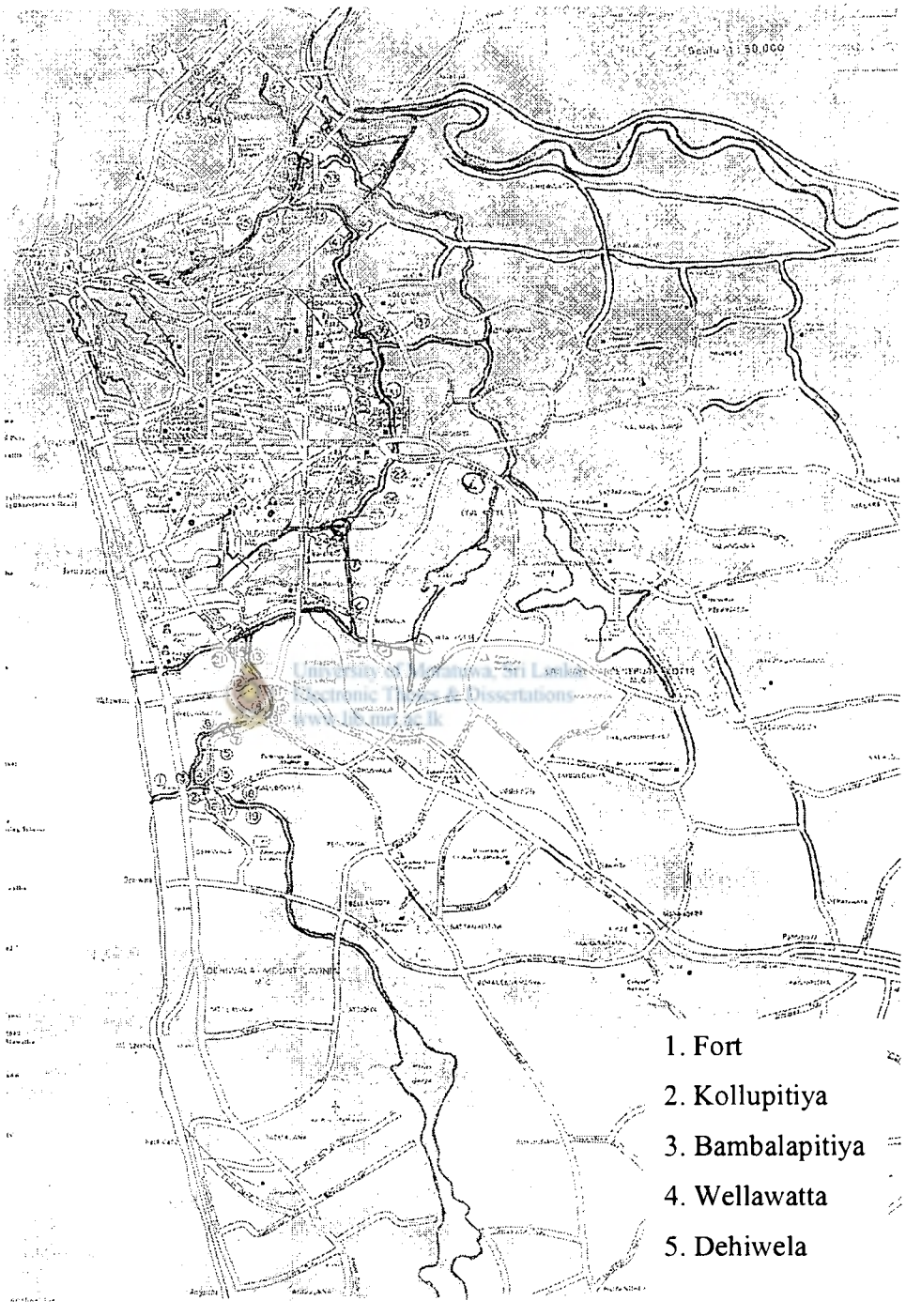


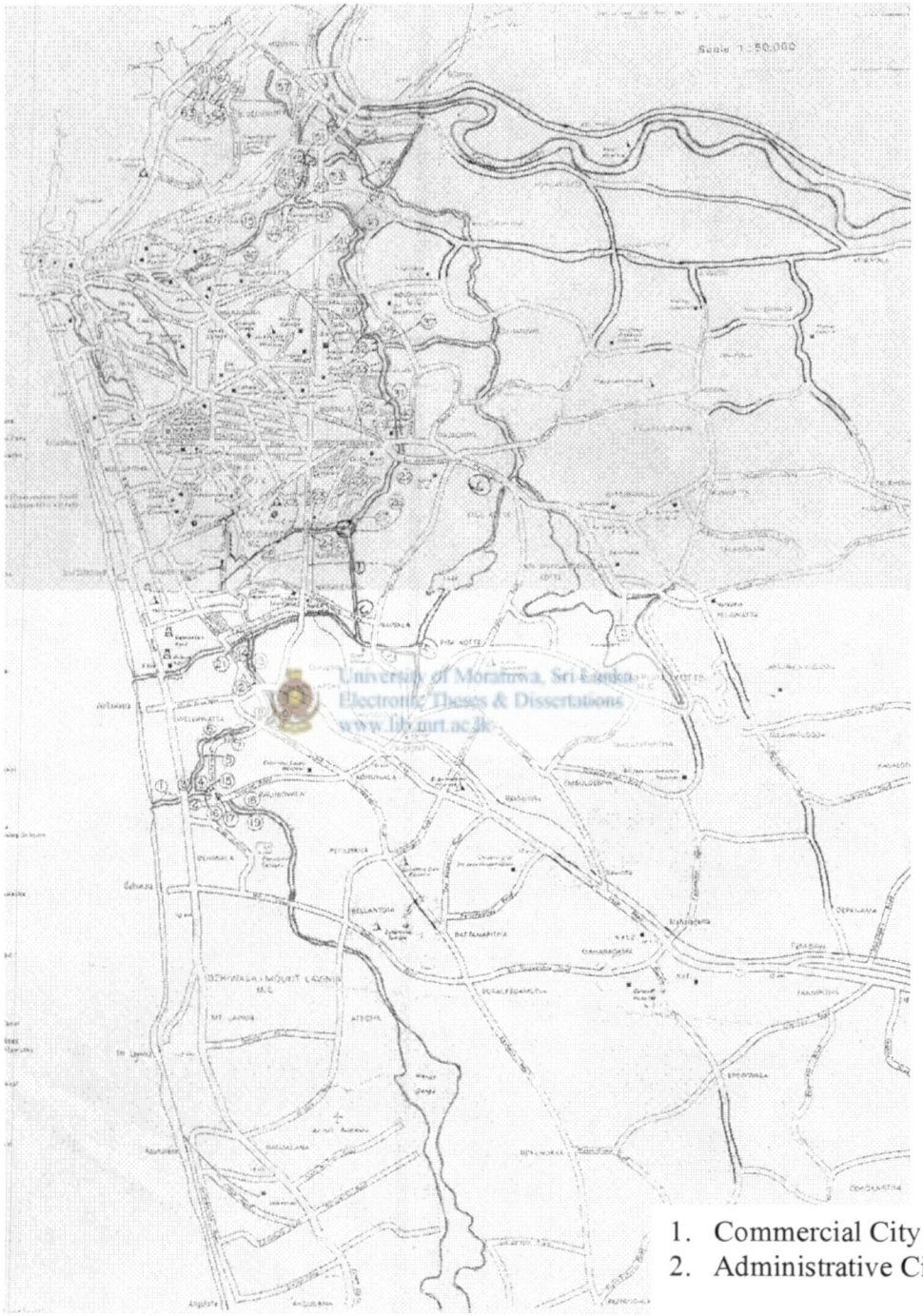
Fig. 121 *Dehiwala Junctoion*

6.2.1 Identification of main network



Map No. 27 *Road network and nodes of interchange*

6.2.2 Link between commercial and administrative capitals of the city



Map No. 28 *Link between administrative and commercial capitals of the city*

6.3 ANALYSIS OF COLOMBO CITY THROUGH NETWORK OF WATERWAYS

Colombo has grown in density over the last 40 years, and an acute lack of open spaces is felt. The map of Colombo shows an obvious solution – the use of the expanses of the Beira Lake to create new lungs and areas for the city population. Technological changes have transformed the shipping patterns from barges to containers, and the Beira has reused to be a shipping route. The warehouses and industries still remain, without their exclusive significance, and pollution of the Lake has increased to an alarming extent.

To turn Colombo into a water front city using the Beira Lake as a central attraction will be the main study. Water front cities have a special attraction and Colombo accustomed to only a Galle face and Galle buck.

6.3.1 Beira lake

As indicated in the land use map of Beira Lake core area, the existing road network creates boundaries for the Beira Lake. This issue can be taken as a primary factor in identifying nodes of interchange.

Existing water body within city limits should not be catered as a barrier for development and further extension. Rather it should be catered as a element which integrate the city

6.3.1.1 Areas connected by Beira Lake

- Fort
- Pettah
- Slave Island
- Kollupitiya
- Maradana

Roads connected by Beira Lake

East Beira Lake

D. R. Wijewardana Mawatha

T.B. Jayah Mawatha

Kew Road

Sir Chittampalam A. Gardiner Mawatha

Galle face and west lakes

Lotus Road

Sir Chittampalam A. Gardiner Mawatha

Duplication Road

Baladaksha Mawatha

Southwest lake

Nawam Mawatha

Sir James Peiris Mawatha

Perahara Mawatha

Duplication road

Map No. 29 *Potentials and constraints*

Map No 30 *Identification of major land uses around Beira Lake*

6.3.1.2 Identification of major land usès around Beira Lake

Galle Face Lake

1.0 Presidential secretariat

2.0 Hilton hotel

3.0 Regal theatre

West Lake

4.0 Defence ministry

5.0 Army play ground

6.0 Elephant house (Ceylon cold stores)

7.0 Military hospital

8.0 Taj samudra hotel

9.0 Slave island railway station

10.0 Office buildings

Southwest lake

11.0 Hotel Lanka Oberoi

12.0 Office buildings

13.0 Bishop collage

14.0 Colombo commercial company

15.0 Crescat

16.0 Stanley janz play ground

East Beira Lake

17.0 Office buildings

18.0 Trans Asia hotel

19.0 Colombo rowing club

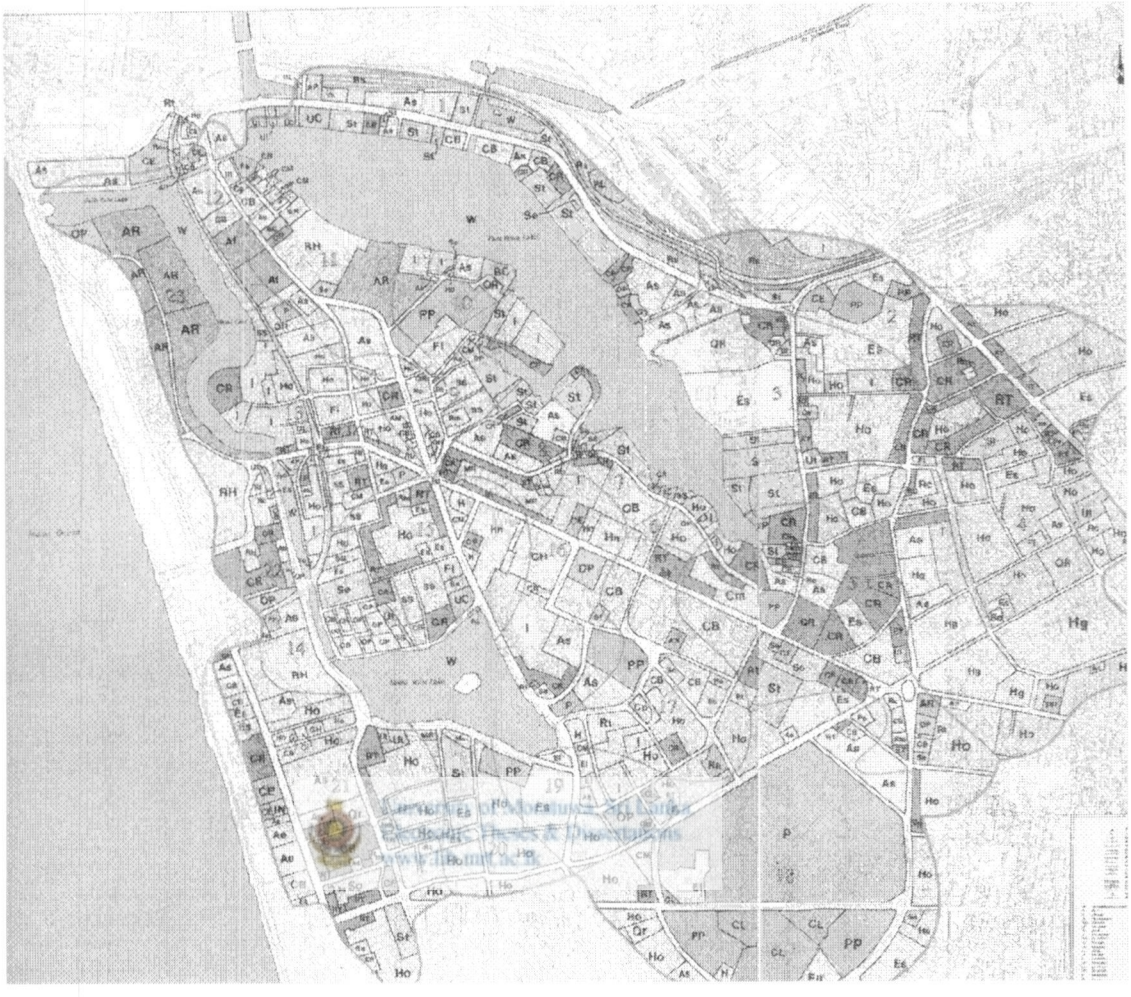
20.0 CWE stores

21.0 Ware houses

22.0 St. Joseph's collage

23.0 Hyde park

24.0 Sri Lanka ports authority boat yard



Map No. 31 *Nodes of interchange*

6.3.1.3 Identified Nodes Of Interchange

Closer proximity to important buildings which identified in the present situation and leaving possibilities for future expansion govern the identification of major nodes from Beira lake to the vicinity.

Galle Face Lake

The main concern is given to the accessibility to Colombo business district. The echelon square, office buildings and the colonial city will benefit from this node.

The residential hotels such as Hilton, intercontinental, Taj Samudra, and Galadari will benefit from this node. As these contribute to the tourism the water transport will be an added consideration. Regal theatre and Galle face will receive access from this node contributing to recreational activities of the Colombo city.

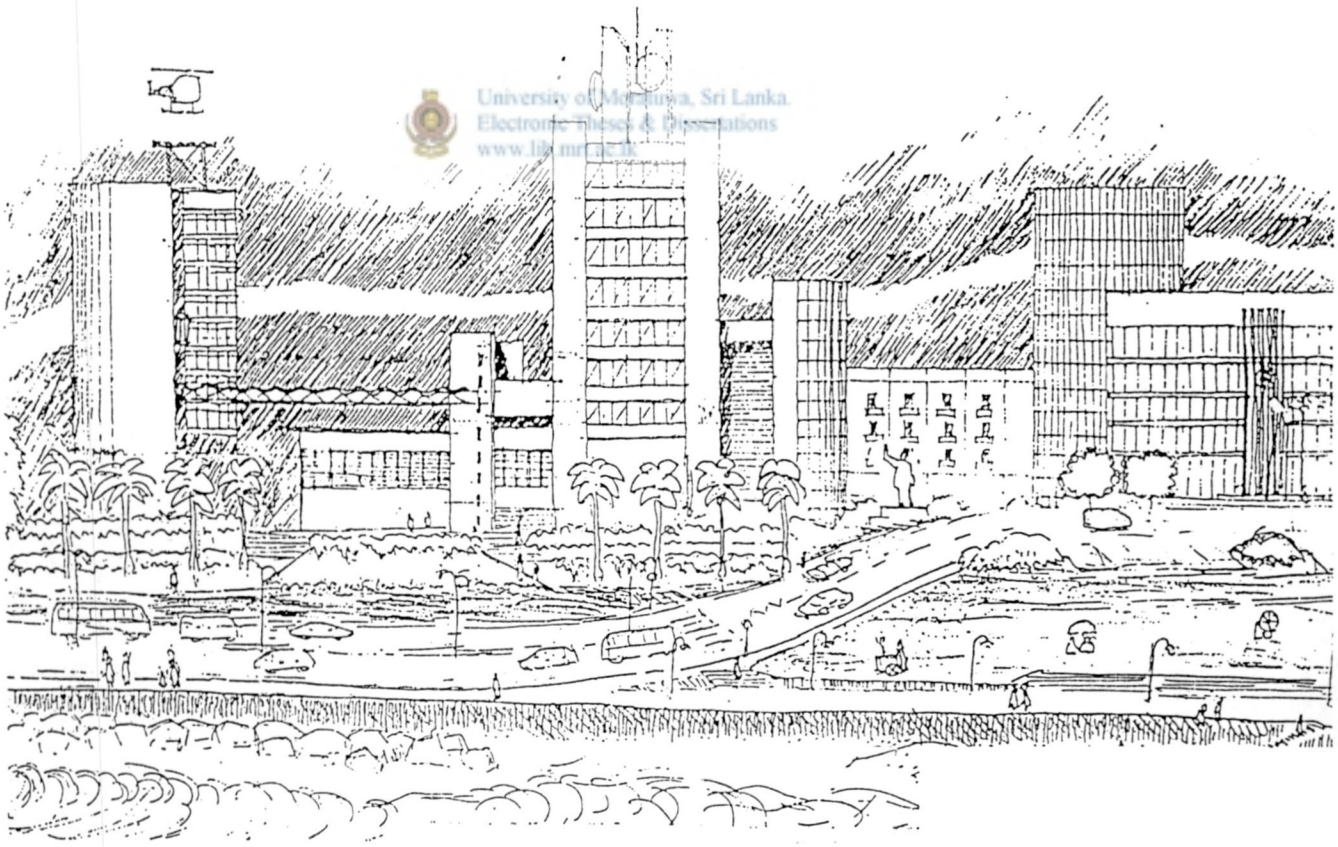


Fig. 122 *View from Galle face*

East Beira Lake

This node becomes the centre to east basin of Beira. Trans Asia Hotel, office buildings, Colombo rowing club will benefit from this location. Colombo receives many commuter passengers daily from many parts of the country. Transporting them towards their destinations in rush hours will be another use of this node. The warehouses of CWE and other commercial establishments will use this node for their storing purposes.

The convention and exhibition hall, Lake House, railway station, the general postal exchange also in demand for this node. St. Joseph's college Hyde Park corner will also benefit from this node.

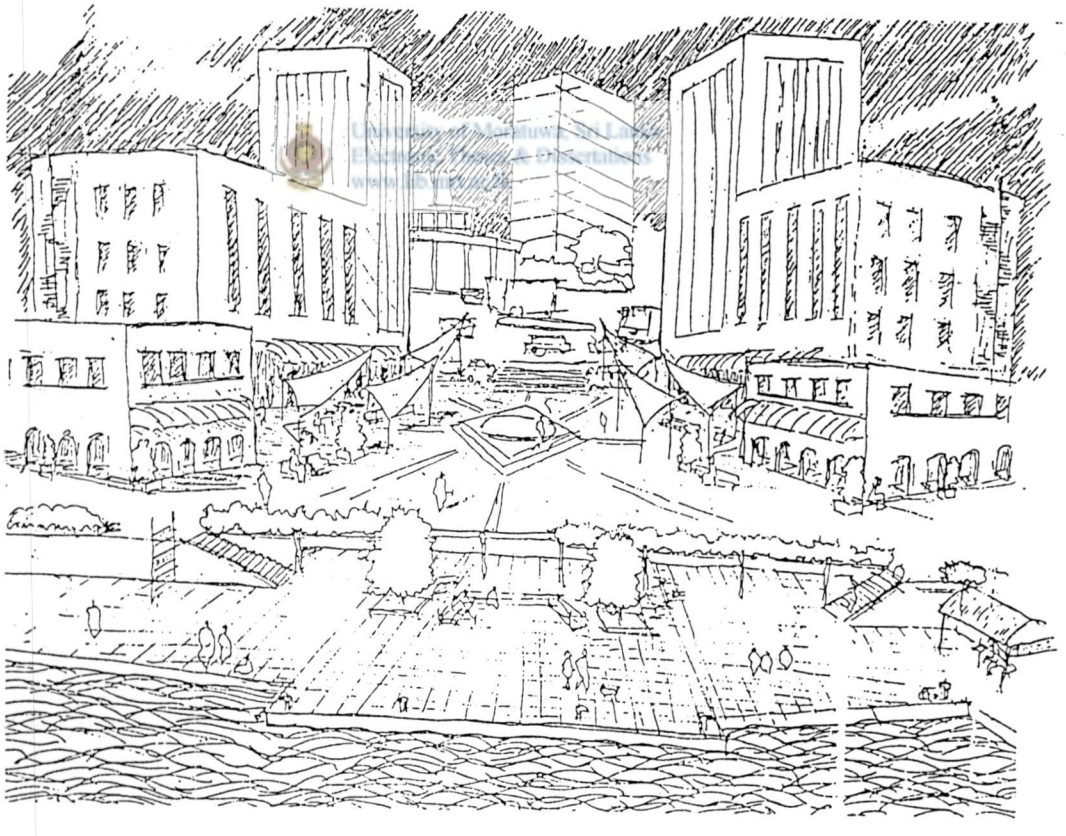


Fig. 123 *Integration of water in to central business district*

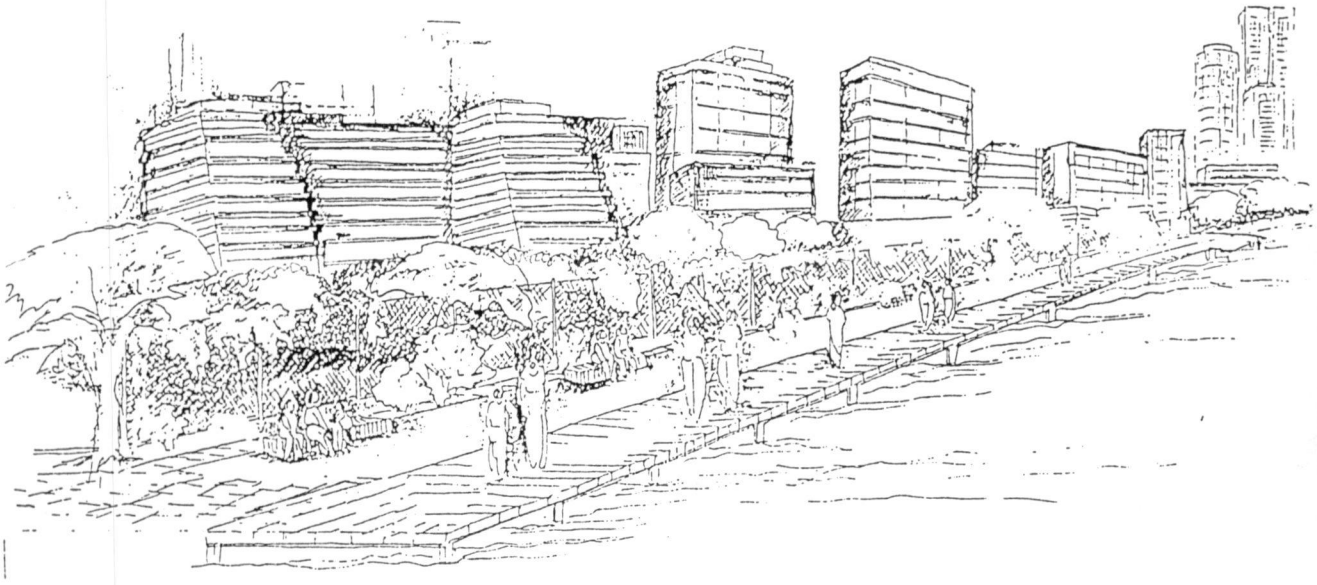


Fig. 124 *Public walk over water – backyard of Trans Asia hotel*

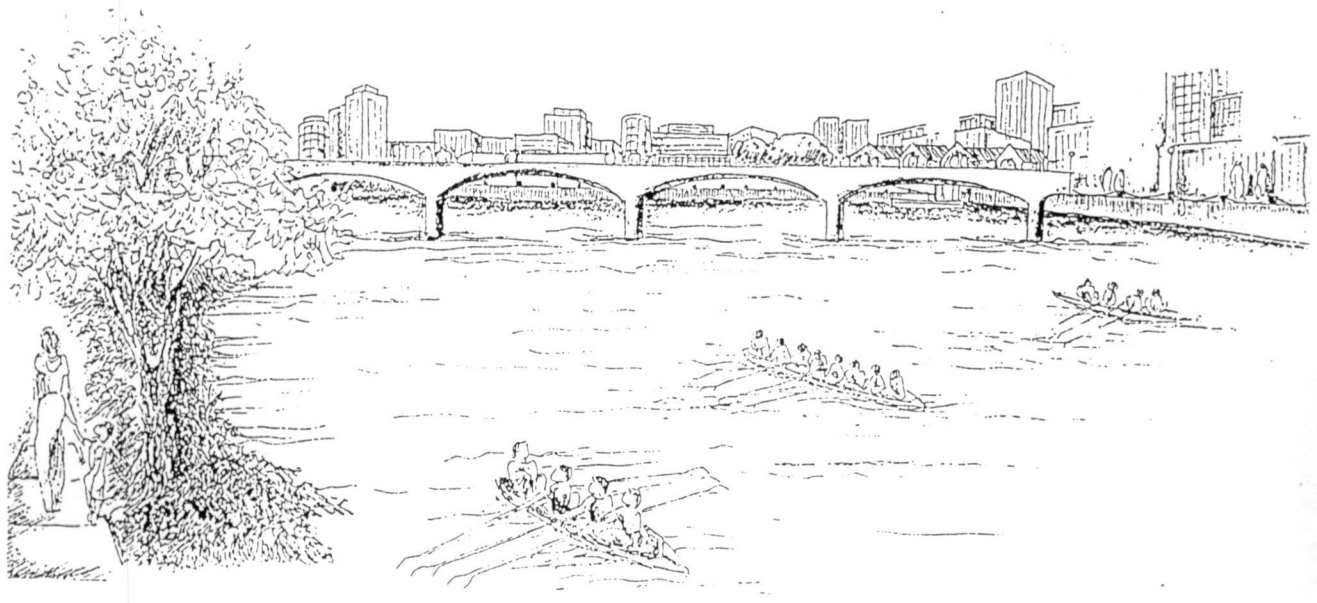


Fig. 125 *Bridge across Eastlake*

Southwest Lake

The southwest basin will be a tourist attraction and also a recreation area. The Nawam Mawatha development with office buildings and recreational opportunities become the breathing space of the area. The closer proximity to the main road of Sir James Peiris Mawatha increases the demand for an interchange node. Colombo commercial company, bishop's collage, hotel Lanka Oberoi will benefit from this node. Seema malakaya add cultural, historical and aesthetic value to the setting.

Fig. 126 *Seema malaka seen from the road*

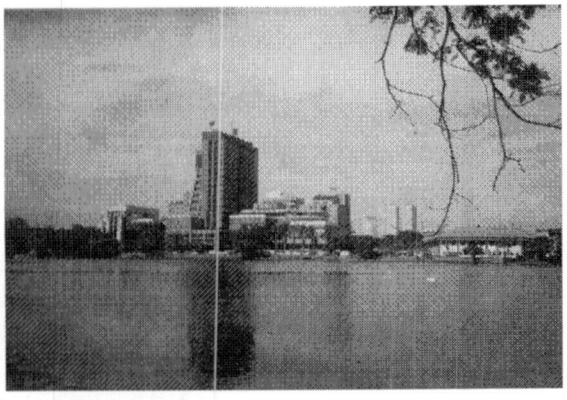


Fig. 127 *Office buildings at northern bank of southwest lake*

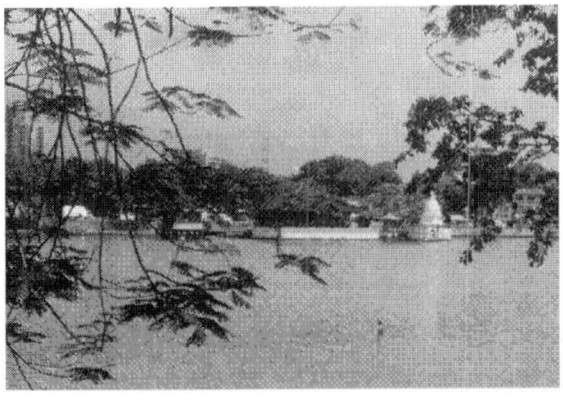
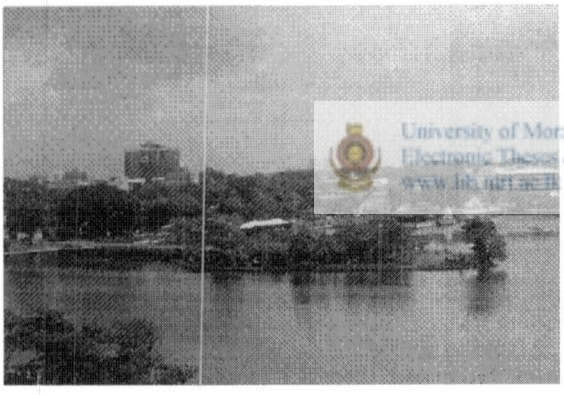


Fig. 128 *Seema malakaya*



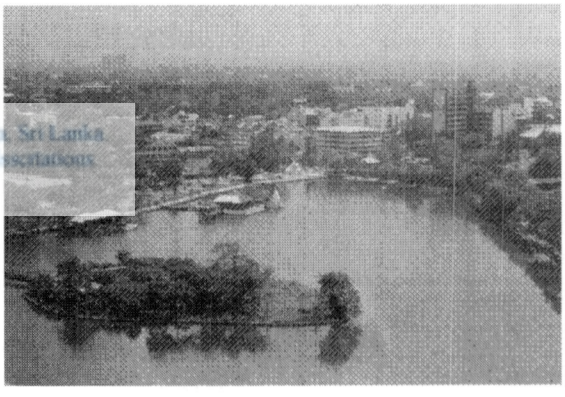


Fig. 129 *South west lake – Arial View*

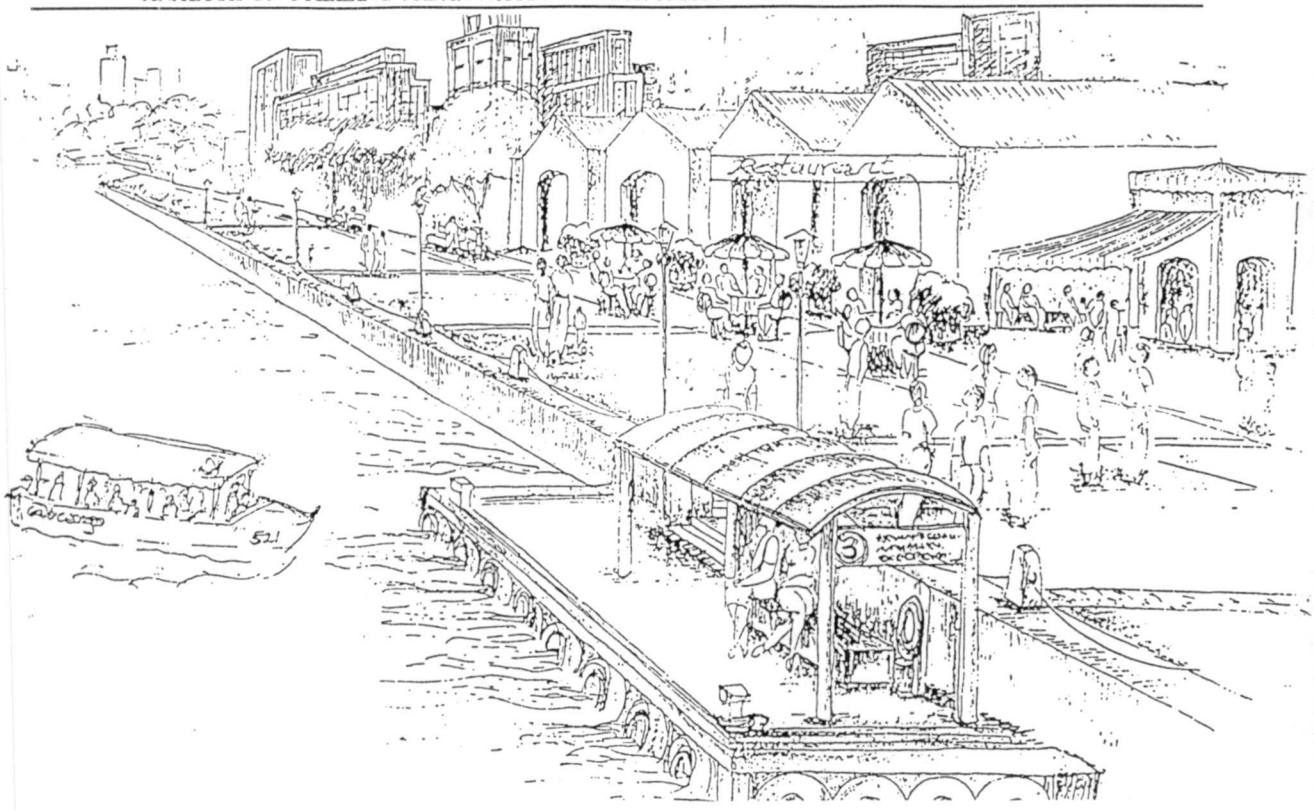


Fig. 130 *The pier*

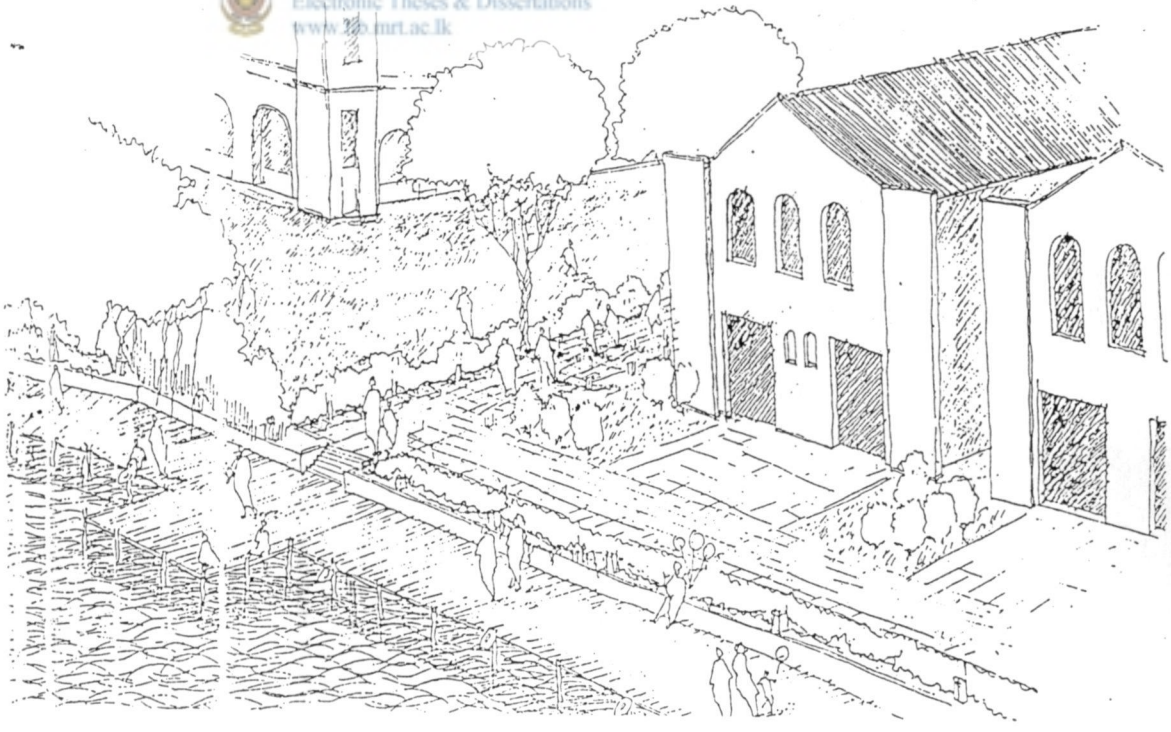


Fig. 131 *Public walk*

6.3.2. Kotte Wellawatta Canal

When considering the canals potential as a navigable root, the amount of roads which crosses the canal itself make it a viable project as it provide links to many important destinations.

Map No. 32 *Road network & Structures in relation to canal*

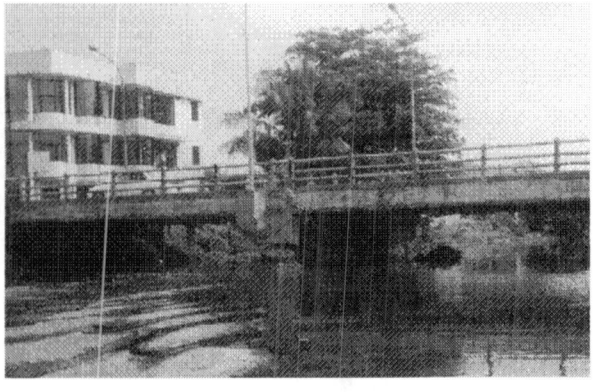
6.3.2.1. Roads connected by the canal

A. Sri Jayawardanapura Mawatha
B. Nawala Road
C. Elvitigla Mawatha
D. Havelock road
E. Duplication road
F. Galle road

6.3.2.2 Structures of transport interchange

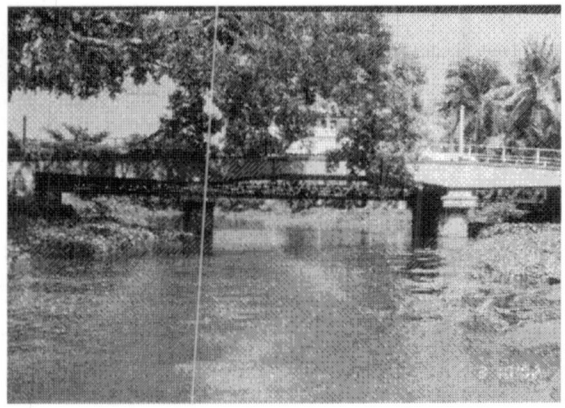
Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
2.07	1.78	--

Fig. 132 *Bridge at Kirimandala Mw*



Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
2.02	1.73	--

Fig. 133 *Bridge at Wall Tiles*

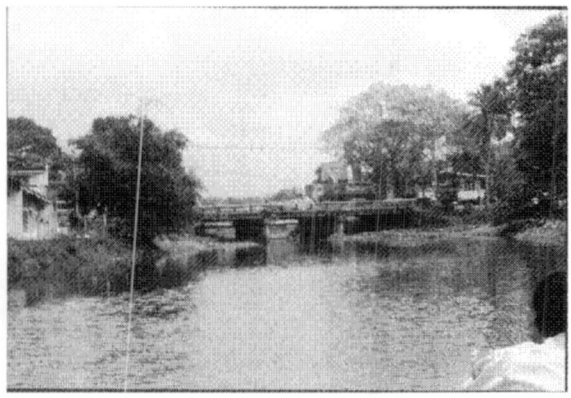


Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
2.05	1.76	0.68

Fig. 134 *Bridge at Open University*

Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
>4	>4	--

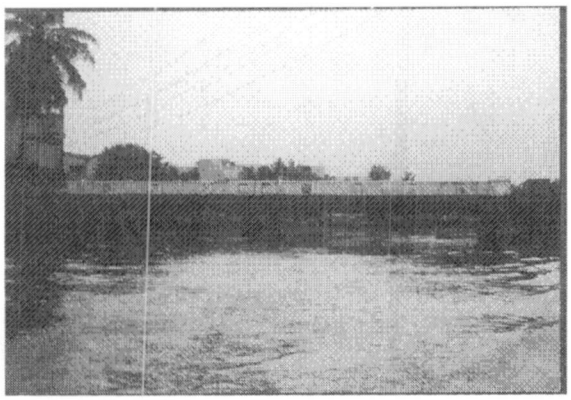
Fig. 135 *Bridge for water line*



Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
2.87	2.58	0.6

Fig. 136 *Bridge at Etul Kotte Near Domimo's Pizza*

* Head clearance to the pipe line along the bridge

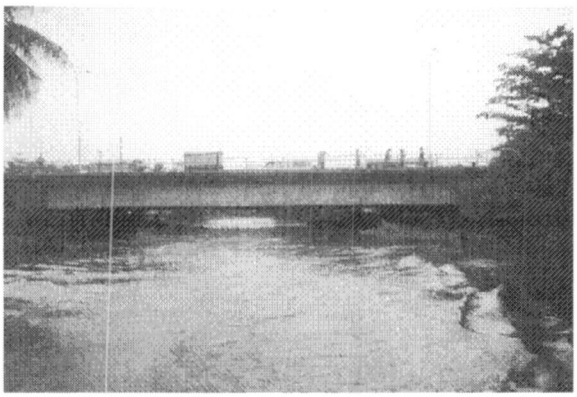


Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
2.09	1.80	0.75

Fig. 137 *Bridge to Open University from narehenpita Rd.*

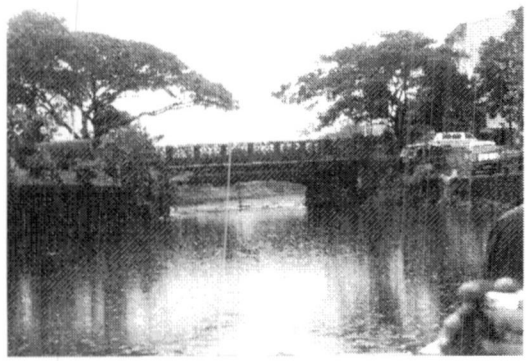
Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
>4.0	>4.0	--

Fig. 138 *Rail Bridge*



Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
2.19	1.90	--

Fig. 139 *Bridge at Base line Rd.*



Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
2.29	2.00	--

Fig. 140 *Bridge at Havelock Rd*

Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
3.29	3.00	0.55

Fig. 141 *Bridge Near St Peters*

Head Clearance		
At Low water Level (m)	At High Water Level (m)	Water Level (MSL) (m)
>4.00	>4.00	--

Fig. 142 *Bridge at Galle Rd.*

6.3.2.3 Identification of nodes of interchange

The canal starting from Kotte to Wellawatta passes many nodes with special identity and specific use. But selecting nodes of interchange is governed by many factors. One main factor is its possibility or provision to change in to another mode of transport with fewer disturbances. In this aspect it should be in closer proximity to a point of transport interchange. It is evident that the bridges that cross the canal should receive priority. The intersections where above-mentioned roads cross the canal will be first set of nodes of transport interchange.

In this aspect Colombo canal commuter transit project (CCCTP), which is a current project govern by Info Consult Inc., global engineering consultants, Canada. , Which studying the viability of utilizing transport to Wellawatta canal, has identified places for pier locations for the canal.

Pier no	location	facilities
01	Sethsiripaya	ticketing office Mini mart Parking
02	Domino's pier Kotte Bridge	ticketing office
03	Open university	ticking office Mini mart
04	Lanka Wall tiles	ticketing office Mini mart Parking
05	Apollo hospital	ticketing office Mini mart
06	Havelock road	Ticketing office Mini mart Parking
07	Duplication Road	Ticketing office Mini mart
08	Galle Road	ticketing office mini mart Parking

6.3.2.4. Travel time demands and system improvements

Transport analysis shows the comparison of canal transportation with other transport modes currently available. It further compares the multi modal transport network taking some nodal points. The travel times along the canal is tabulated in Table 11

WELLAWATTE CANAL TRAVEL TIMES

Starting Node	End Node	Travel Time (Down Stream) (min).	Travel Time (Up Stream) (min).	Average Travel Time (min)
Kirimandala Mw Bridge	Wall tiles Bridge	4.58	5.00	4.79
Sethsiri paya	Domino's Pizza Bridge	4.77	4.78	4.78
Domino's Pizza Bridge	Beginning of Kotte lake	16.67	16.67	16.67
Beginning of Kotte lake	Open uni. Nawala rd Bridge	3.90	3.75	3.83
Open uni. Nawala rd Bridge	Wall tiles Bridge	4.37	4.67	4.52
Wall tiles Bridge	Open Uni. Narehenpita Bridge	0.75	0.75	0.75
Open Uni. Narehenpita Bridge	Rail way Bridge	1.87	1.87	1.87
Rail way Bridge	Base line Rd. bridge	1.47	1.47	1.47
Base line Rd. bridge	Havelock Rd. Bridge	6.42	7.00	6.71
Havelock Rd. Bridge	Dupilation Rd (St peters) Bridge	4.35	5.97	5.16
Dupilation Rd (St peters) Bridge	Galle Road, bridge	1.50	1.87	1.69
Galle Road, bridge	Marine Drive Bridge	1.88	2.00	1.94
		47.95	50.80	49.38

** Travel Times at 14 Km/h

Table 11 *Travel times along Wellawatta Canal*

Travel time down stream is lesser than the up stream travel times since; the boat has to overcome the water flow. The speed of the boat is also governed by the width of the canal, as the wave action originated from the propeller tends to erode the canal banks. Table 12 shows the comparison of travel times between use of canal by boat and use of road by cars. Cars always tend to be the fastest mode on road. The analysis shows that cars are faster than canal. But the average speed achieved by boat was 14 km/h. It is much lower than that can be achieved. The boat travelled at a slow speed due to vegetation on water. Thus if the design speed for the canal is 25 km/h the use of canal is efficient than even cars.

Origin	Destination	Travel Time (Min)			
		By Car at Peak Hour		By Canal	
		Route	Time (Min)	At 14 km/h **	At 25 km/h
Ethulkotte (Domino's Pizza)	Nawala Open University	Sri Jayawardenapura Mw, - Nawala Rd.	14.81	20.50	11.26
	Narehenpita (Apollo Hospital)	Sri J'pura Mw, - Nawala Rd - Narehenpita rd - Baseline rd.	18.46	29.11	15.99
	Havelock Rd (Weaving Mills)	Sri J'pura Mw, - Nawala Rd - Narehenpita rd - Baseline rd - Park rd.	20.60	35.82	19.67
	Wellewatte (St. Peters)	Sri J'pura Mw - Nawala Rd - Narehenpita rd - Baseline rd - Kirullapana Junc.- W.A. Silva Rd - Galle Rd	35.71	42.67	23.43

** Surveyed Speed at 14 km/h due to vegetation on water

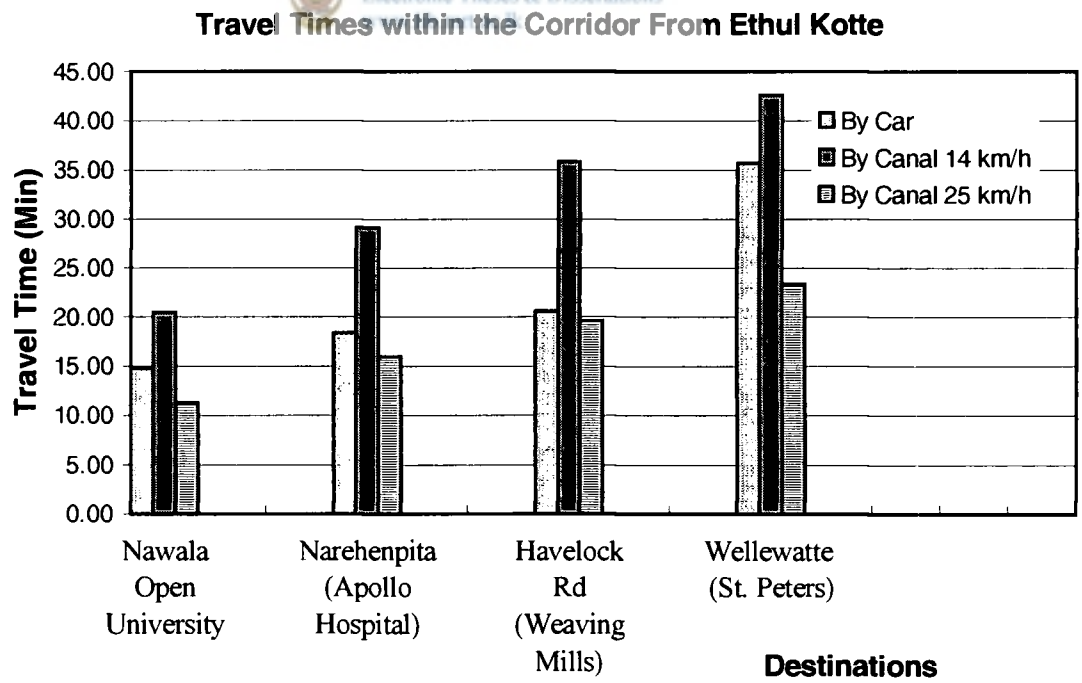


Table 12 *Comparison of Road and Canal*

Further the justification of canal transport can be made with the comparison of bus network. The multi modal transport network can be used for this purpose. The analysis is tabulated in Table 13 There is a loss of time between the inter change of modes. That is the waiting time, transfer time and etc. this has been taken as 5 minutes for each inter changing times for simplicity.

Origin	Destination	Travel Time (Min)					
		By Bus Only			By Bus And Boat		
		Bus Route	No of Change overs	Time (Min)	No of Change overs	At 14 km/h **	At 25 km/h
Batharamulla	Apollo Hospital	Batharamulla (170,177,174) - Borella; Borella (103,135,178) - Narehenpita	1	42.21	1	40.09	24.81
	Wellawatte	Batharamulla (177) - Kollupitya; Kollupitya (100,133,101) - Wellawatte	1	88.27	2	55.39	37.14
		Batharamulla (170,177,174) - Borella; Borella (103,135,178) - Narehenpita; Narehenpita (141)- Wellawatte	2	73.15			
		Batharamulla (163) - Dehiwela; Dehiwella (100,101,133 etc.) - Wellawatte	1	50.32			
	Bambalapitiya	Batharamulla (177) - Kollupitya; Kollupitya (100,133,101) - Bambalapitiya	1	73.02	2	64.21	45.96
		Batharamulla (163) - Dehiwela; Dehiwella (100,101,133 etc.) - Wellawatte	1	62.78			

Table 13 *Multi modal transport Travel Times*

It is evident that use of canal as another mode will increase the efficiency of the transport system even at the current slow speeds. Thus with proper design and management it will be major force for the transport system in Sri Lanka.

6.4 INTEGRATION OF CITY WITH NETWORK OF WATERWAYS.

The connection of a city with a water body gives an entirely different perception. Usually associated with natural features such as river ways, waterfronts and wetlands cut through urban districts to establish edges to create larger scale connection.

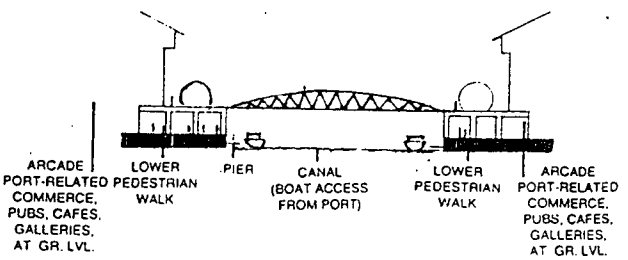
In water front developments the following standards should be observed if the open space possibilities are to be realized.

a) Maintenance of visual connection between the central city and the water.
b) Access by pedestrians to waterside promenades and parks.
c) Limited use drives and landscaped parkways providing views of the water.
d) Abatement of water pollution to allow use of the waters for recreational activities.
e) Preservation of historic area with their long-standing orientation towards the water.

This will concentrate especially on one particular visual quality, the apparent clarity or "legibility "of the cityscape.

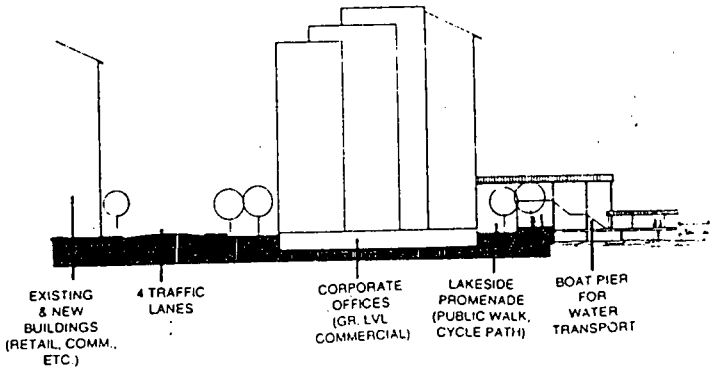
Lotus centre – canal front

The integration of water has increased the public movement with provided public walkways.



D. R. Wijewardana Mawatha

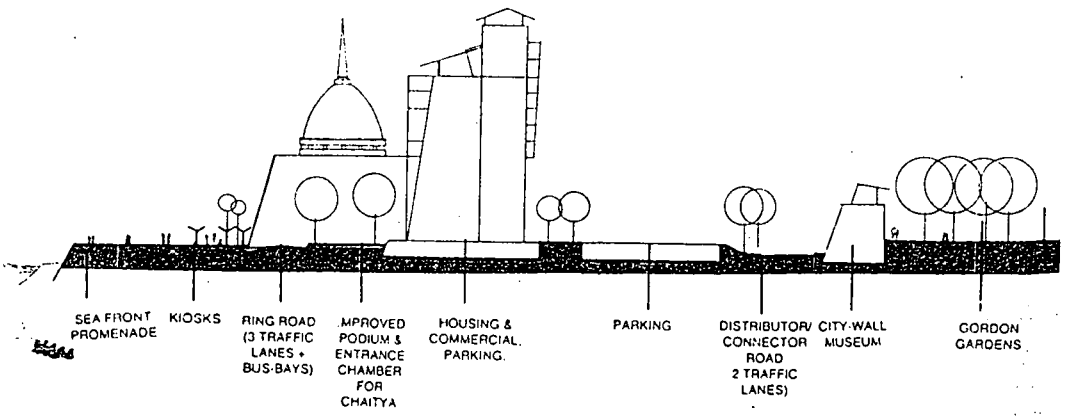
Lakeside promenades increase the provision for leisure activities



Chaitya Road

The sea front promenade provides leisure activities

All these future proposals suggest the enhancement of the city image obtained by utilizing water bodies in to the city scape.



6.5 IMPACT ON THE CITY THROUGH INTEGRATION OF THE CITY

The theories established in the first chapter clearly defines the effect of accessibility and communication enhances the potential for legibility, visibility and ultimately for the perception of the city.

The typology of streets including water streets and the typical implication of road systems has a clear demarcation. Integration becomes a major enhancement in terms of economic, social and cultural developments. With this city boundaries become closer. All the places of the city will be approachable with the integration of the city. All these factors eventually create a live city.

6.6 CURRENT PROBLEMS AND ISSUES

Squatter settlements become the major problem on implementing development plans to Beira Lake. As the squatter population increases every year the encroachment become more significant. As these are provided with opportunities of living closer to a central business district he tendency of attracting more people towards these areas a critical phenomenon. These distract the visual environment of the vicinity and directly involves with polluting the water body. Water has become the dumping area of the sewer and garbage.

The existing improper land use is another fact discouraging the development implementations. A large number of water front areas have become properties of private owners. Some are catering to only some communities of people such as; a larger portion of Galle Face Lake is taken over by the defence ministry for their offices. This is more appropriate for recreational activities with the location of Galle face and all residential hotels.

Another problem is the vegetation, which creates problems for the water body by in balance biological environment. This is caused by lack of maintenance and if the water bodies utilized in a proper way this problem can be minimised.

CONCLUSION

CONCLUSION

City is the basic place, which orders our experience of the world. It is the place where we perform our drama of life. City is a place of concentration of our intentions, experiences, attitudes and purposes and above all, the place where we hang our memories.

The study intended to study and identify the elements, which contribute to enhance the above qualities of the city, which lead it to become the centre of human existence. Study focus on exploring the perceptual and associational aspects of the city in terms of visibility – the creation of place, legibility – the meaning of place, Imagebility – the identity of place.

City and the image of it, has been spoken of, questioned and studied by various theorists. The theories established by them suggest and bring forward many aspects of it. Two main theories by Lynch K. and its further extension by Appleyard D. is reviewed as an attempt to establish different approaches taken in to identify the concept of the image of the city and its elements. This provides a strong stand point where these elements could be interpreted, analyse critically and be compared to the practical possibilities. These theories enable further insights of various ways of creating image of the city.

The study focusing on utilisation of urban water body to enhance the city image is concentrating on one aspect out of all the other possible elements and exploring the significance of it towards the Imagebility of the city. But as the study proceeds it is evident that all the other features, to come up with a successful full cityscape compliment this element, the urban water body.

Further narrowing down the study, the main focus is given to utilization of water bodies as a transport mode and how this approach influences the Imagebility of the people. As transport provides communication by linking up two locations, the question of how, the visitors will perceive the city also become an important aspect for further analysis. Accessibility of the city increases its visibility where all the parts of it are revealed to the inhabitants and to the visitor, enabling them to understand the city and its possibilities. A legible city is a meaning

full place and this increase the understanding of ones surrounding providing security, environmental and social interaction and concern for psychological and socio cultural values create a live city. This liveliness is the ultimate goal of creating physically exotic, socially vibrant and psychologically meaning full places.

The theories established through literature survey are limited to theoretical orientation of the study. Taking examples around the globe discussing application of this key element provides the practical implementation of this aspect. The basis for choosing these examples has been the various successful aspects or responses they have implemented towards the water body. Venice, Paris and London formulate the basis for building a sensible and highly imageble cityscape with its practical approach towards the existing water body, with identification and understanding of its potential to enhance the image of the city. As stated above the image of these cities not merely a credit of its respond to water body but it draws the main attention complementing the other features. For example Paris is known for its remarkable landmarks namely, the Eiffel Tower, and lots of other statues. But the tower been located on the bank of the river Seine increases its visibility complementing its remarkable location.

Through the study of successful implementation of the water body to enhance the image of the city around the globe, the study shift to implementing the existing water body in the city of Colombo in to cityscape as an element to achieve the same goal.

A comprehensive analysis carried out, in environmental restoration and land development proposals related with water bodies of Colombo city. The Beira Lake Business Plan Study by Urban Development Authority (UDA) and recent development plan for Colombo city "An Urbanity For The New Millennium" are discussed in this aspect. The Beira lake master plan offers Colombo, emphasizing the rebirth of the core area as a place for sophisticated business and life. The goal for the core area is to create a place to live and work, to shop and dine, to be entertained and have fun. This plan recognizes the magnificent amenity afforded by the water, and the development proposed by this plan is designed to take full advantage of this natural asset. In the development plan "An Urbanity For The New Millennium"; in setting the vision for redevelopment for the Colombo city, the prime consideration has been optimising the use of existing water bodies, mainly the Beira Lake and the canals. The urban

design approach towards water front in categories such as Yacht harbour, marina, and state square, and aquatic maritime museum mainly identified as possibilities for cultural & eco tourism. These will be catered as positive approaches in the study.

Identifying the water body, within the city of Colombo come up as a network which is totally disregarded as a possible element to enhance the city image. It serves the city for drainage purposes and other than that the water body, which covers a substantial space of the urban area, is hardly seen by the people who live in it. This resource is treaded as a back yard and has become dumping ground of garbage and provision for squatter settlements.

Excessive growth of population and immense development of built fabric in present situation leads psychological pressure to urban inhabitants. To ease out the mental pressure this urban folk are in search for open spaces as recreational areas. The existent water body is a possible answer in fulfilling this need.

Water body consisting of Beira Lake, canals and Kelani River spreads out and links most of the main nodes of the city. In this aspect water should not be catered as a barrier for extending the horizons for development but as an element of linking functional areas within the urban area. This respond increase the accessibility within the city providing another mode of transport to the main network consisting of roads, railway, air, & telecommunication. As stated above, this linking up between two locations in terms of human activities increases the legibility of the city.

So the study is focused on the current situation of selected water bodies, within the city limits of Colombo city, where more nodes can be linked together. Beira Lake situated in the heart of the Colombo and the Kotte – Wellawatta canal, which is the link between commercial are of the city and the administrative city, are taken in to further analysis in search for utilizing and to identify its contribution for the enhancement of the image of the future cityscape.

First the current situation is studied in both, in terms of physical, visual, human and environmental aspects. Then these are analysed as water bodies of navigable roots connecting major nodes of the city and its existing functional aspects. The environmental

quality of water bodies including their banks has a higher environmental quality than other modes of transport roots. This is added with avifauna and aviflora on banks of the water bodies. The settlements connected with employment, location, and the passengers using these navigable roots are definitely provided with a higher psychological effect.

The selected nodes of interchange will become the entrance points to the city. This will create a total different perception towards the city. Where, urban folk used to perceive the city through two building lines running on either side of the street, the usual mode of access. The banks of the water body and the vast open spaces connected with water body give away clear picture of the city elements. This leads to visibility and the built fabric will be clearly identified providing legibility. All these added to the Imagebility of the person and give away a lifetime experience with the changing qualities of water bodies with the time period of the day. A different picture can be perceived at night in total contrast to what it was at noon or morning. This added to recreational possibilities in these navigable roots as leisure boating rowing etc.

The problems and constraints in implementing these proposals mainly consist of human activities. Such as, dumping of garbage on banks and squatter settlements. The growth of vegetation on the water body is another asset. This has caused mainly due to neglect ion of this resource, but if these are utilized and maintained properly the problem will be eased. On the other hand the canals and lake can earn its own money for maintenance by these utilizations.

This dissertation tries to identify the theories behind creating image of the city and its elements and its practical application. In applying these theories to city of Colombo the priority has given to its existing resources. In this respect the water body spreading over a vast amount of area has given the prime attention. The possibility of its function as a navigable root providing accessibility to the city and connecting its major nodes is considered as positive aspects implementing the water body in to land use development. All these ultimately cater to an interconnected, pleasing mode of transport with visual harmony and contribute visibility of built fabric enhancing the image of the city.

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RULES AND REGULATIONS GOVERNING THE MANAGEMENT OF THE DEVELOPMENT AND THE OPERATION OF LANDS SURROUNDING BEIRA LAKE

2.0 LAND AND LAND USE

2.1 Land Acquisition

The ownership of land can broadly be categorized under state and private owned lands. The operation and management of both are governed by legislative enactments. However, state institutions have been established by separate legislative enactments with powers to manage and operate lands to achieve the objectives of those institutions. On the basis of physical development, institutional powers of such matters are both positive and negative. All these institutions derive powers for acquisition, management and operation of land, whether be state or private, from the legislative enactments governing land, which include beds of lakes and streams. Given in Tables 2.1a, 2.1b and 2.1c are legislative enactments governing land directly, institutions or legal frameworks with powers to acquire land for promotion of development and institutions or legal frameworks with powers to limit or restrain acquisition of land for development purposes respectively.

Law/Regulations	Institutions	Remarks
State Land Ordinance No. 8 of 1947 (as amended)	Land Commissioners Dept.	Opportunity
State Land (Recovery of possession) Act No. 7 of 1979.	- do -	- do -
State Lands (Encroachments) Ordinance No. 12 of Mo 1840 (as amended)	- do -	- do -
Land Resumption Ordinance No. 4 of 1887 (as amended)	- do -	Constraint
Land Acquisition Act No. 9 of 1950 (as amended)	- do -	Opportunity

Table 2.1a

Legislative Enactments Governing Land Directly

Law/Regulations	Institution	Remark
Urban Development Authority Law No.41 of 1978 (as amended)	UDA	Opportunity
Urban Development Projects (Special Provisions) Act No. 2 of 1980	Minister in charge of Urban Development	Opportunity
a. Greater Colombo Economic Commission Law No. 4 of 1978 b. - do - (Amendment) Act No. 49 of 1992.	BOI	Opportunity
Municipal Ordinance No. 9 of 1940 (As amended)	CMC	Opportunity
Colombo District (Low-Lying Areas) Reclamation and Development Board Act No. 15 of 1968 (as amended)	SLLR & DC	Opportunity
National Housing Department Act. No 17 of 1979	NHDA	Opportunity

Table 2.1b

Institutions with Powers to Acquire Land for Promotion of Development

All these institutions have to follow the procedures stated in the respective legislative enactments of their establishment for declaration of areas for the purposes of the respective institutions and the procedures stated in the same enactments for the acquisition of land.

Procedures for declaration of land for a purpose and for acquisition are stated in the legislative enactments in Table 2.1a and only State Institutions are empowered to exercise powers of declaration and acquisition.

Law/Regulations	Executive Institutions	Remark
Antiquities Ordinance No. 9 of 1940 (as amended)	Dept. of Archeology.	Constraint
Defence Stations Ordinance No. 38 of 1954 (as amended)	Ministry of Defence	Constraint
Special Areas (Colombo) Development Ordinance No. 40 of 1947 (as amended)	Colombo Special Areas Development Board	Constraint
Flood Protection Ordinance No. 4 of 1924 (as amended)	Dept. of Irrigation	Constraint

Table 2.1 c

Legal Frameworks with Powers to Limit of Restrain Aquisition of Land for Development Purposes.

2.2 Land Use

Presently the land use in the project area is governed by the City of Colombo Development Plan 1985 of the UDA. The CMC has been delegated with powers of UDA to implement the land use plan of the development plan. A review of progress of the implementation, has revealed that in spite of development control and promotion mechanisms, goals and objectives had not been achieved especially in respect of the development of water-front of Beira Lake. Shanties, Warehouses and host of other activities still continue to occupy the water-front preventing access to exploit its true economic potential.

Failure to achieve the goals of water-front development can be attributed to lack of fiscal policy supporting the Development Plan and also lack of sufficient enforcement powers. Insufficient co-ordination between state institution such as Sri Lanka Ports Authority, NARA, BOI, UDA, NHDA, and CMC has had a negative impact on improving the environmental quality in the area.

On the positive side, the City of Colombo Development Plan of 1985 has mechanisms to redefine any area comprised in the Development Plan for special treatment, vis-a-vis changing the land use. There are other institutions having powers of declaring either the whole or parts of the project area for special treatment provided that circumstances for such declaration are within the purview of those agencies, even though the project area has already been declared under the UDA. Tables 2.2a and 2.2b give legal frameworks having opportunities and constraints respectively for land use planning in terms of investment oriented physical development.

Law/Regulation	Institution	Remarks
Municipal Ordinance No.29 of 1947 (as amended)	CMC	Opportunity
UDA Law No. 41 of 1978 (as amended)	UDA	Opportunity
Greater Colombo Economic Commission Law No. 4 of 1978 (as amended)	BOI	Opportunity
City of Colombo Development Plan 1985 of UDA	UDA	Opportunity

Table 2.2 a

Legal frameworks with powers of Land Use Planning in the Project Area.

Since the project area has already been declared as an Urban Development Area, land use planning has to be in accordance with the procedure detailed in the Section 8 of UDA Law No. 41 of 1978 (as amended).

Law/Regulation	Institution	Remarks
Defence Stations Ordinance No. 38 of 1954 (as amended)	Ministry of Defence	Constraint
Coast Conservation Act No. 57 of 1981.	Coast Conservation Dept.	Constraint
Temple Lands (Compensation) Ordinance No. 28 of 1944 (as amended)	Land Commissioner's Dept.	Constraint
Central Environmental Authority Act No. 47 of 1980.	CEA	Constraint
Sri Lanka Ports Authority Act No. 51 of 1979.	SLPA	Constraint
Ceylon Electricity Board Act No. 17 of 1969 (as amended)	CEB	Constraint
Municipal Ordinance Act No. 29 of 1947 (as amended)	CMC	Constraint
Antiquities Ordinance No. 9 of 1940 (as amended)	Dept of Archaeology	Constraint

Table 2.2b

Legal Frameworks Having Limitations on Land Use Planning

Legal frameworks in Item 5,6 and 7 though have control over infrastructure facilities can adversely affect land use planning, owing to their controlling powers over underground or over-head service facilities.

3.0 PLANNING AND BUILDING REQUIREMENTS

Presently the planning and building requirements in force in the project area are described in the City of Colombo Development Plan 1985 of UDA. Also there are by-laws of the CMC which have regulatory powers over planning and building.

In addition to these statutory and regulatory legal frameworks, there are other institutions with statutory and regulatory powers over different activities, which impose or could impose requirements to be complied with in planning and building operations in the project area.

These requirements are not described in the City of Colombo Development Plan 1985, and therefore, can be considered as constraints.

For achieving desired results of the business plan, a set of special guidelines for the physical development of the project area will have to prepared and enforced, incorporating all the statutory and regulatory planning and building requirements, upon preparation of the development plan for special treatment of the area. It will increase the efficiency of issuing planning clearances and development permits, and also it will facilitate the preparation of schematic designs and layout plans.

However, the present statutory and regulatory planning and building requirements do not include codes or standards for fire safety, structural stability, energy efficiency, disabled and mechanical ventilation. In order to remedy the situation to a certain extent, the UDA Planning & Building regulations 1986 require, that certain certificates be submitted by persons qualified in different aspects of planning and building of the built environment. It still leaves, issues of energy efficiency and disabled and compliance with any internationally accepted codes in this regard, is acceptable though not required.

Law/Regulation	Institution	Remarks
City of Colombo Development Plan 1985 of UDA.	UDA/CMC	Opportunity
UDA Planning & Building Regulations 1986.	UDA	Opportunity
Municipal Ordinance No. 29 of 1947.	CMC	Opportunity
Local Authorities (Stated By-Laws) Act No. 6 of 1952.	CMC	Opportunity
UDA Law No. 41 of 1978.	UDA	Opportunity

Table 3.0 a

Legal Frameworks with Powers Complementary to Enforcement of Planning and Building Requirements.

It should be noted here that, there are no zones or areas declared under provisions of the BOI, in the project area. Therefore, all planning and building requirements are within the purview of the UDA.

Law/Regulation	Institution	Remarks
Defence Stations Ordinance No. 38 of 1954 (as amended)	Ministry of Defence	Constraint
Special Areas (Colombo) Development Ordinance No. 40 of 1947 (as amended)	Colombo Special Areas Development Board	Constraint
Air-Navigation Regulations	Dept. of Civil Aviation	Constraint
Sri Lanka Ports Authority Act No. 51 of 1979.	SLPA	Constraint
National Aquatic Research & Development Agency Act No. 54 of 1981 (As amended)	NARA	Constraint

Contd.....

Contd. from ....

Law/Regulation	Institution	Remarks
Colombo District (Low Lying Areas) Reclamation & Development Board Act No. 15 of 1968 (as amended)	SLLR & DC	Constraint
Road Development Authority Act No. 73 of 1981.	RDA	Constraint
Colombo City Traffic Regulations	Traffic Police/ CMC	Constraint
Ceylon Electricity Board Act No. 17 of 1969 (as amended)	CEB	Constraint
Telecommunication Ordinance No. 50 of 1944 (as amended)	Sri Lanka Telecom	Constraint
Gas Ordinance of 1 of 1869 (as amended)	Colombo Gas and Water Company	Constraint

Table 3.0 b

Legal Frameworks Having Limitations on Planning and Building Requirements in the Project Area.

Since the Project Area is within the jurisdiction of the Colombo Municipal Council comprising peoples' representatives, the CMC has powers to enforce by-laws to control certain situations which could be both complementary and constraining in terms of desired objectives of development and operation, of urban systems in the project area.

4.0 ENVIRONMENTAL ASPECTS

Sri Lanka has made a very satisfactory progress in management of natural resources and protection of environment vis-a-vis legislation. Establishment of Central Environmental Authority, National Environment Act No. 47 of 1980, Environmental Impact Assessment Regulations, Forestry Master Plan and Coastal Zone Management Plan etc., are some of the noteworthy achievements. Furthermore, the studies that are being carried out or have been completed could also be considered as strengthening the research base in this sector. Environmental Management Strategy for Colombo Urban Area, Beira Lake Restoration Strategy, Controlling Industrial Pollution in Ratmalana, Restoration of Lunawa Lagoon, Conservation and Development of Lunawa Lagoon and Conservation and Development of Muthurajawela are a few such studies aimed at increasing feasible physical development.

Although, the responsibility of environmental issues has been given high priority by virtue of it being under a Cabinet Minister, all other state institutions responsible for various spheres of physical development have legal frameworks or powers to manage or control environmental issues of matters under their purview. This has been identified in preparation of EIA regulations and these institutions have been brought under a common legal framework for Environmental Impact Assessment, in the capacity of Project Approving Agencies. This has increased the efficiency of addressing environmental issues in development projects and more studies are being done to reduce the time taken for EIA process.

As for constraints in this sector, there are other statutory and regulatory legal frameworks which have provisions to intervene with powers of peoples' mandate, judiciary or protection of other interests.

In table 4 a and 4 b the legal frameworks are listed under legal frameworks supportive of clearing environmental issues of sustainable physical development and legal frameworks with provisions for intervention in environmental issues, relevant to the project area.

Law/Regulation	Institution	Remarks
Municipal Ordinance No.29 of 1947	CMC	Constraint
Local Authorities (Standard By-Laws) No. 6 of 1952.	CMC	Constraint
Provincial Councils Act No.42 of 1987.	Western Provincial Council	Constraint
Fauna & Flora Protection Ordinance No.2 of 1937 (as amended)	Divisional Secretariat	Constraint
Soil Conservation Act No 25 of 1951 (as amended)	Director (Agriculture)	Constraint
Felling of Trees (Control) Act No. 9 of 1951	Divisional Secretariat	Constraint
Antiquities Ordinance No. 9 of 1940	Dept. of Archaeology	Constraint
Colombo District (Low-Lying Areas) Reclamation & Development Board Act No. 15 of 1968 (as amended)	SLLR & DC	Constraint
National Environment Act No. 47 of 1980 (as amended)	Ministry of Environment	Constraint
UDA Law No. 41 of 1978 (as amended)	UDA	Constraint
UDA Planning & building Regulations 1986 (as amended)	UDA	Constraint
Health Services Act No. 12 of 1952 (as amended)	Ministry of Health	Constraint

Table 4.0 b

Legal Frameworks With Powers of Intervention in Environmental Issues.

The recent global emphasis on natural resources management, environmental protection and sustainable development and the programmes initiated and implemented in Sri Lanka in this regard, have greatly increased the environmental consciousness of people. This has led to emergence of a large number of non-governmental organizations (NGO's) for protection of peoples' rights and natural resources. It may be prudent that public hearings and public awareness programmes of the proposed development be organized while addressing the environmental issues in conformity with the Law.

5.0 URBAN DESIGN ISSUES

Urban design which is one of the vital issues of urban planning, has not been adequately addressed in the City of Colombo Development Plan 1985 of UDA. It has therefore, failed to realize the core objective of urban design that is public space. Presently, the urban design issues in the City of Colombo are addressed under provisions of UDA Planning & Building Regulations 1986, which give UDA powers for architectural control, advertisement control, splaying of street corners, landscape and tree preservation and conservation of places of historical, architectural interest or landscape value.

Decision making in this regard is on the basis of nature of the place, architectural character of the area, special guidelines prepared for Fort and Pettah areas. Therefore, it is necessary that, urban design issues be seriously addressed in the development plan for special treatment of the project area.

6.0 INFRASTRUCTURE REQUIREMENTS

Provision, operation and maintenance of the infrastructure of the project area is within the purview of Colombo Municipal Council, Sri Lanka Telecom., Ceylon Electricity Board (CEB), Postal Department, Dept. of Education, Dept. of Health, Central Transport Board (CTB) and Ceylon Government Railway (CGR). Beira Lake, which could be a resource for transportation, is within the purview of Sri Lanka Ports Authority.

However, both the UDA and the BOI have powers to plan and to co-ordinate provision of all these facilities in the areas declared under the respective legislations. The National Water Supply and Drainage Board and the CMC have the organizational capacity to plan, construct, operate and maintain the infrastructure facilities of water supply, drainage and sewerage and both institutions have powers to appoint other parties to undertake any or all these activities on their behalf.

Under circumstances of the need for development of project area, with private sector participation all the agencies except (CGR) can be considered as providing opportunities. The CGR does not permit operation of train services by private sector. This could somewhat be compensated by the provisions of Municipal Ordinance No. 29 of 1947 to operate Tram Car Services. Table 5.0 gives details of legal frameworks governing the infrastructure requirements.

Law/Regulation	Institution	Activity	Remarks
Municipal Ordinance No.29 of 1947 (as amended)	CMC	Roads, Water Supply Drainage, Sewerage, Garbage, Disposal & Tram Cars.	Opportunity
National Water Supply & Drainage Board Law No.2 of 1974	NWS & DB	Water Supply Drainage Sewerage	Opportunity
Electricity Board Act No.19 of 1950 (as amended)	CEB	Electricity	Opportunity

Contd...

Contd.

Law/Regulation	Institution	Activity	Remarks
Telecommunication Ordinance No.50 of 1944 (as amended)	Sri Lanka Telecom.	Telecomm-unication	Opportunity
Post Office Ordinance No. 11 of 1908 (as amended)	Postal Dept.	Postal Services	Opportunity
Road Development Authority Act No.73 of 1981	RDA	Roads	Opportunity
Transport Board Law No.19 of 1978 (as amended)	CTB	Bus Services	Opportunity
National Transport Commission Act No..	Ministry of Transport	Private Bus Services	Opportunity
Railway Ordinance No.9 of 1902 (as amended)	CGR	Train Services	Constraint
Education Ordinance No.31 of 1939 (as amended)	Dept. of Education	Schools	Opportunity
Health Services Act No. 12 of 1952 (as amended)	Dept. of Health	Hospitals	Opportunity
UDA Law No. 41 of 1978 (as amended)	UDA	All	Opportunity
Greater Colombo Economic Commission Law No. 21 of 1983 (as amended)	BOI	All	Opportunity
Boats Ordinance No. 4 of 1900 (as amended)	SLPA	Transportation by Boats.	Opportunity

Table 6.0

Legal Framework Governing Infrastructure Requirements in the Project Area.

It should be noted that, Beira Lake, a major resource in the business plan of the proposed Beira Lake Company is within the purview of Sri Lanka Ports Authority. CMC, NARA and CEA could intervene to protect or regulate interests within their purview under circumstances of any of these infrastructure activities been found causing problems in that regard.