EDWARD ANDRÉ

URBAN TROPICAL LANDSCAPE DESIGN:
KUCHING CITY RIVERFRONT

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ABSTRACT

This study examines the subject of urban tropical landscape design and carries out a landscape assessment of the Kuching City Riverfront.

A research objective is to identify and reinforce the contribution that various interpretations of landscape can help landscape designers define and carry out a landscape assessment of the Kuching City Riverfront. A rigorous and integrated landscape assessment process can then form the basis for contextualising and directing ecological landscape design opportunities for Kuching's riverfront.

The study recognises that the word 'landscape' has slippery connotations which can be interpreted in many ways. To overcome this problem the interpretation and analysis of Kuching's riverfront is assessed in the context of defined interpretations of landscape.

The first approach carries out an assessment of the 'landscape as place'. The second focuses on the assessment of 'landscape as system' and the third provides an assessment of the 'landscape as meaning'.

The first approach examines ideas such as place, context, history, 'sense of place' and the role of participatory design for landscape designers. The second assesses tropical landscape systems within the theoretical meaning framework of the system's functional and perceptual dimensions. Ideas of order, the value of tropical plants as multi-dimensional systems and principles of ecological design are also examined. The third approach carries out an assessment of the riverfront in the context of 'landscape as meaning'. The main themes studied are technology as a symbol of nature, the symbolic dimension of landscape as meaning, symbols of landscape culture and the meaning and usefulness of culture to landscape systems ecology.

These landscape assessments are carried out within a framework of the expert paradigm, but supplemented as appropriate with other paradigms and landscape theory framework. The expert paradigm refers to landscape assessments that are usually carried out by an expert who is typically a trained professional. This framework provides the theoretical background to assess a waterfront plan that was recently implemented in Kuching City.
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However any errors or mistakes remain the responsibility of the Author.
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Source: All photographs taken by Author
1.0 INTRODUCTION

1.1 Study Background

This study represents the findings of research carried out by the author whilst on secondment from the Western Australian Overseas Projects Authority in Sarawak, East Malaysia, covering the periods 1985-1989 and 1996-1998.

The author of this study has been responsible for preparing urban design guidelines to guide development and protect the Kuching Riverfront landscape. Current pressures to develop the riverfront landscape with high-rise buildings and the massive reclamation of the riverfront landscape proposed by developers has motivated the author to carry out this study. Kuching's riverfront was selected because development of the City's riverfront landscape, in my view, has not been interpreted adequately. Consequently, there is an urgent need to educate politicians and developers alike of the city's important riverfront landscape and resource. This concern for Kuching's tropical riverfront landscape has prompted this study, and the focus on landscape narrative theory as Place, System and Meaning. Preliminary investigation revealed that there had been little previous landscape architecture or urban design research on the interpretation of tropical landscapes. Consequently much of the landscape design data required to produce a comprehensive study on urban tropical landscapes would need to be extracted from primary sources with specific reference to a case study of the Kuching City riverfront. Figure 1.1 shows the location of Kuching City and Sarawak in relation to Peninsula Malaysia and Australia.

This study makes an important contribution to the field of urban tropical landscape design because it will demonstrate how urban waterfronts can be assessed and designed to create a unique urban tropical landscape place. Here, landscape place refers to the cumulative, physical and landscape resources of the city which relates to the core values of the landscape identified in terms of the totality of human experience and memory landscapes that emerges from the study of the landscape in terms of place, system and meaning. The topic of 'urban tropical landscape design' is directly related to this general area. Within the study area (see figure 1.2), the concept of
urban tropical planting design, has not been successfully applied or implemented directly to Kuching's Sarawak River foreshore. However, some attempt has been made to implement a landscape design concept. This plan is referred to as the Conybeare-Morrison Plan (CMP). The plan was completed in 1993 and covers the eastern part of the study area. Part of this riverfront plan has been built in accordance with the Conybeare-Morrison designs and part left undeveloped. Figure 1.2 shows the extent of this developed part within the study area. The assessment of the landscape has always been the starting point for beginning the landscape design and management process.

1.2 The Sarawak River and Kuching City Study Area

This study focuses on the Sarawak River and its immediate surroundings. The main study area boundary is restricted to the southern bank of the Sarawak River between the Chinese Chamber of Commerce building and the State Mosque, and to the south by Mosque Road, Gambier Street and Main Bazaar site as shown on Figure 1.2. This study area has been selected because this stretch of the waterfront can be recognised as an urban river system that is geographically specific to Kuching. It is an area of distinct and recognisable identity (Martin, 1993: 23).

Prior to 1985 the Sarawak River waterfront was an unattractive and inhospitable place for local city dwellers and visitors alike. This perceptual conclusion is evident in some early town planning studies carried out for Kuching City, and some local architects that have been strongly influenced by international training (Shankland Cox, 1974: 215). The perception that this waterfront landscape is unattractive, means that it was unattractive to some European eyes, and not necessarily to the educated Sarawakan bureaucrats or the local communities that perceive it as 'landscape as nostalgia', 'landscape as community', and 'landscape as place'. The waterfront was not accessible to pedestrians. Many buildings and godowns (industrial buildings) on the waterfront were in a dilapidated state and obstructed views to the river. Pedestrian linkages between the hotel/tourist zone and waterfront areas within Kuching City were poor. Based on these observations research objectives were formulated for this waterfront.
Figure 1.1

Kuching City Context
(Land Custody and Development Authority, 1989: 8)
Extent of Conybeare Morrison plan for part of the Kuching City Riverfront.

Undeveloped part of Kuching City Riverfront.

Figure 1.2

Study Area Boundary

(Kuching North City Council, 1989: 6)
1.4 **Research Aims and Objectives**

(1) To identify and reinforce the contribution that the cultural landscape has made to Kuching City;

(2) To explore appropriate landscape assessment methodologies for Kuching's waterfront;

(3) To examine the subject of tropical ecological design, its associated benefits and problems and the contribution that ecological design concepts can make to urban landscape design and creating 'landscape place';

(4) To carry out research within an expert landscape paradigm and appropriate landscape narrative theory viz. 'landscape as place', 'landscape as system' and 'landscape as meaning';

(5) To carry out a case-study assessment of the Conybeare-Morrison Plan in terms of the plan's contribution to creating a landscape place for Kuching City;

(6) To formulate design recommendations and principles for Kuching's waterfront focusing on the Mosque landscape zone;

(7) To encourage the protection of the Sarawak River landscape, the landscape place it creates and the River's cultural resources.

1.5 **Research Methods**

To achieve the research aims and objectives of this study it is necessary to clarify what type of Research Methods will be used. In particular the exploration of landscape assessment methods must be considered in terms of the contribution the assessment makes to recognising and creating a tropical landscape place for Kuching's waterfront. This means that measures of landscape quality "should be systematically related to other human social values" so that it provides an effective landscape narrative theoretical framework for guiding the management and ecological design of landscape resources. In this case the Sarawak River and its immediate landscape (Daniel and Vining, 1983: 41).
The subject matter of this study will focus on exploring an appropriate landscape assessment methodology which reinforces the landscape of Kuching's waterfront. This focus will help ensure that the ecological design concept proposed for the selected Mosque landscape zone will make a positive contribution not only to the discipline of urban landscape design but also to the creation of an appropriate landscape for Kuching City. Creating a tropical riverfront landscape is important for Kuching City because this part of the system can be used to represent the whole or the whole to symbolically stand for a part.

Landscape designers need to ensure that their ecological designs do not fall into the trap of muddling rather than unravelling actual nature from its mythological or ideological representations (Shadle, 1996: 1) Schama (1995) acknowledges "that once a certain idea of landscape, a myth, a vision, establishes itself in an actual place, it has a peculiar way of muddling categories, of making metaphors more real than their referents; of becoming in fact, part of the scenery".

This study recognises that in attempting to create an appropriate landscape for Kuching City, the landscape assessment methodology adopted in this research, must recognise that we are dealing with "formidably complex matters" (Meinig, 1974: 36). To overcome this problem in the research method we should not forget the tragedy of muddling categories (Schama, 1995: 61).

The research method recognises this problem and concludes with the suggestion that landscape designers should not concern themselves with the elements, viz. houses, roads, trees and hills, "but with the essence, with the organising ideas we use to make sense of what we see" (Meinig, 1979: 35).

These organising ideas may be reduced to ten versions of landscape. Of these ten and for the purposes of this study, the research methodology focuses primarily on "landscape as system", "landscape as place" and "landscape as meaning" as the main organising ideas of landscape. The reasons for this selection will be explained later. Other categories which read the "landscape as problem" and "landscape as wealth" will also be incorporated in a supporting adjunct in the research methods. More
importantly, the research method attempts to ensure that the Sarawak River landscape can be read like a book, in essence a text or narrative which tells a story as well as a landscape which is full of semiotic meaning.

To achieve the theoretical objective of this thesis, I have selected one landscape theoretical assessment paradigm for carrying out a landscape assessment of the Sarawak River. This paradigm is the expert paradigm (Daniel and Vining, 1983: 47). The paradigm is by no means the only one nor is it necessarily the correct one, but it may be appropriate in this study because a focus of this study is an examination of tropical ecological design concepts and its associated benefits and problems (Van der Ryn, 1996: ix). Additionally, the study uses an analytical framework which recognises the contribution that the phenomenologists have made to creating and recognising a new and emerging "place paradigm" (Dovey, 1985: 93).

In summary, a landscape assessment of the Sarawak River landscape will be carried out against an appropriate theory/paradigm which focuses on three core themes or cultural values. Table 1.0 provides an outline of the Landscape Assessment Research Model.

Ken Taylor (1997) has discussed these constructs under various key words such as 'Meaning', 'Sense of Place' and 'Memory, Nature and Culture', as have other authors, Dovey (1985), Thayer (1996), Whitmore (1995) and Van der Ryn (1996). Each element on the landscape provides a memento for recalling 'a time, an event, or a place ... landscape narrative is a very fundamental way people shape and make sense of experience and landscapes. Stories link the sense of time, event, experience, meaning and other intangibles to the more tangible aspects of place. Because stories sequence and configure experience of place into meaningful relationships, narrative offers ways of knowing and shaping landscape not typically acknowledged in conventional documentation, mapping, surveys or even the formal concerns of design' (Potteiger and Purinton 1998: ix).
EXPERT PARADIGM

CARRY OUT LITERATURE REVIEW

SELECT LANDSCAPE THEORY FOR ASSESSING KUCHING'S LANDSCAPE

USE AN INTEGRATED/HYBRID LANDSCAPE ASSESSMENT MODEL:
- Landscape narratives
- Transaction model of human response to technological/utilitarian landscapes
- Concept of landscape care
- Four landscape preference characteristics

FOCUS ON:
- Expert paradigm/including public consultation
- Psychophysical paradigm - (preference for specific landscape qualities)
- Psychological model (refers to the feelings and perceptions of people who use or view the landscape)
- Phenomenological model (emphasis is upon determining the meaning and significance of various aspects of the cultural landscape to the particular person)

READ THE LANDSCAPE OF KUCHING'S RIVERFRONT LANDSCAPE IN TERMS OF THREE LANDSCAPE CONSTRUCTS OR LANDSCAPE NARRATIVES

SELECT THE LANDSCAPE CONSTRUCTS AND DEFINE THEM:
1. Landscape as place
2. Landscape as system
3. Landscape as meaning

LANDSCAPE INVENTORY AND CLASSIFY THE LANDSCAPE IN TERMS OF LANDSCAPE CONSTRUCTS

ASSESS THE LANDSCAPE IN TERMS OF THE 'SURFACE' AND 'CORE' VALUES OF LANDSCAPE PLACE, SYSTEM AND MEANING AND INTEGRATE WITH THE THEORY OF LANDSCAPE NARRATIVES

| Table 1.0 |

Landscape Assessment Research Model

This study recognises that, in the main, landscape architecture has appropriated theories from other disciplines and recast theory as their own, often using the same language and diagrams, but without recording or acknowledging the philosophical or cultural origins of these theories. In the context of landscape narrative theory, and in particular the works of Potteiger and Purinton (1998: 3), it is important for the landscape profession to realise the contribution of the anthropological discipline in forming the foundation upon which landscape design theory is able to validate an 'intellectual' approach to the professional practice of landscape architecture.

The meaning dimension of landscape design theory often derives its cultural narratives from cultural anthropologists and ethnographers where words such as texts, scrawls and symbols are used collectively or singularly as narratives within 'culture' and 'vocabulary'. Readers of this study therefore should recognise that, whilst landscape architecture theory, as it relates to narrative, place and system within the context of landscape assessment approaches and tropical landscapes, provides a sound basis for landscape design, they need to recognise the source and assumption that underpin landscape narrative's theory (Potteiger and Purinton, 1998: 5) and (Gregory and Altman, 1989: 176).

1.5 Thesis Outline

This thesis has been structured as follows:

1.0 Introduction

- Study background
- The Study Area
- Research Aims and Objectives
- Research Approach
- Thesis Outline
2.0 Literature Review

- Understanding the Landscape
- Concepts of Landscape
- Why Assess Landscapes
- Paradigms of Landscape Assessment Methodologies
- Evaluating Methodologies
- Conclusion and evaluation of landscape Constructs

3.0 Selecting a Preferred Landscape Assessment for Kuching

- Landscape as Place
- Landscape as System
- Landscape as Meaning
- Applying three Constructs of Landscape in an Integrated, Expert, Ecological Paradigm

4.0 Undertaking the Assessment

- Conybeare Morrison Plan Critique
- Ecological Design Principles adapted to Landscape as Place, System, Meaning

5.0 Research Conclusions

6.0 Appendices

7.0 Key Terms Defined

8.0 Bibliography
2.0 THE CONCEPT OF LANDSCAPE VALUES: NEW WAYS TO SEE THE URBAN CULTURAL LANDSCAPE

2.1 Introduction

The tropical landscape, like any other landscape, is itself a language of text which can be interpreted, read and transformed. The modern landscape is a highly situated phenomenon in terms of space, time and culture and exists in our minds as an interpretation of the types of landscape narratives.

The Sarawak River landscape is distinguished from 'natural' tropical landscapes because it is land which has been modified by humans. The landscape we see and experience is more than a physical expression of what we see, it is also a cultural text through which the minds work as a conceptual filter for expressing our relationships.

This filter provides the framework through which our interaction and relationship between 'nature' and 'cultural landscape' can be understood.

This chapter provides some key definitions of the cultural landscape as well as a review of some key landscape values that contribute to our understanding of Kuching's riverfront landscape.

2.2 Understanding the Landscape

Landscape designers must clarify early in their research methods their understanding of key words such as 'landscape', 'place', 'character', and 'sense of place'.

The phrases 'landscape place', 'landscape character', 'sense of place' and landscape theory seem simple concepts to understand, but further reflection demonstrates their potential for vagueness and misunderstanding.
Allen Carlson (1993) has noted that the word ‘theory’ may be almost as ‘slippery’ a word as ‘landscape’ itself. Landscape has been described as a ‘slippery’ word because of "the breadth of objects, conditions and situations to which it is applied" (Zube, 1984: 105).

In this study, the word landscape means a ‘cultural’ landscape as opposed to a ‘natural’ landscape. However, the interpretation of a cultural landscape can be read in many different ways. The Kuching River landscape may be perceived as many cultural interpretations, a product of our ideologies and memory in concrete form (Taylor, 1997: 5).

Landscape thereby reflects the character of Society (Taylor, 1997: 5). The challenge for landscape designers is to realise that meaning and interpretation are closely related, and that landscapes are not only value loaded but have depth of meaning. Designers often can only interpret meaning in a superficial way, and therefore are unable to create the many dimensions of depth that connects people to the landscape (Swaffield, 1997: 1).

The interpretation of place meaning will be "enhanced by a sense of participation by the observer or user, which is well understood in the field of heritage management" (Taylor, 1979: 6), and the field of philosophical inquiry that deals with experiential phenomenological constructs of landscape.

Any cultural landscape that captures the depth of cultural meaning will contribute to creating a sense of ‘place’. The preference for one interpretation of landscape over another in a given culture depends on the mood of that culture at a particular time. The mood can usually be assessed by the antonyms in use. If ‘sense of place’ is valued then its opposite will be ‘placelessness” (Seddon, 1998: 139). People who cannot identify with place are said to be ‘rootless’ (Relph, 1976: 63).

Consider, for example, the Kuching waterfront plan implemented by Conybeare-Morrison south of the Sarawak River. The imported plants planted on the waterfront such as *Delonix regia* and *Pterocarpus indicus* have not historically been
considered to be part of the identity of Kuching's riverfront landscapes. Since the waterfront's completion however, these types of tropical plants are being increasingly planted to reflect the fact that these plants are now part of the 'identity' of the Sarawak River. They are being planted to express the newly found 'sense of place' for Kuching City.

'Sense of place' is a 'plastic' concept, and an idea which may also be considered to be very 'elastic'. Therefore, in order to understand what "sense of place" means, we need to ask again who is identifying with the place (Seddon, 1998: 139). Although 'sense of place' can be uncertain in its applications, the concept "can at least help to stimulate reflection about the nature of both the cultural and physical context, necessary in fully understanding and evaluating art of any kind including landscapes" (Seddon, 1989: 141).

The most meagre meaning of 'sense of place' is the ability to recognise different places and different 'identities of place', furthermore, the concept is more complex and profound than the capacity to differentiate localities (Relph, 1976: 63). The concept 'sense of place' and its opposite 'placelessness', are all attempts at giving meaning and an appropriate interpretation to cultural landscapes. Thus, 'sense of place' may be authentic and genuine, or it can be unauthenticated, contrived or artificial. These notions of authenticity and unauthenticity are taken from phenomenology (Relph, 1976: 63).

This authentic - unauthentic division provides a starting point for understanding 'sense of place', but it does not necessarily offer a complete framework for the description of all experiences or places, nor is it intended that these categories are absolute (Relph, 1976: 63). Rather it is an aid for an interpretation of cultural landscapes and landscape assessment.

The role of landscape designers should be to work within a framework of landscape assessment theory which builds on these experiences of Kuching's cultural river landscape. This means that landscape assessment theory must incorporate in the
design of the urban tropical landscape a perspective of experience which recognises that landscapes cannot be

...understood merely as an assemblage of objects, landforms, houses and plants. These comprise no more than a physical setting that can be grouped only in terms of a particular set of personal and cultural attitudes and intentions that give meaning to that setting (Relph, 1967: 121).

Finally landscape designers need to recognise that landscapes possess a dimension of:

... character that derives from the particular association of that physical and built characteristics with the meanings they have for those who are experiencing them; in other words character and imputed to landscapes by the intentionality of experience (Relph, 1967: 123).

'Landscape' is a phenomenon which requires designers to understand and clarify at the beginning of their design process landscape values which go beyond 'surface' values and to also provide meanings which reveal the 'core' values of the landscapes of place (Thayer, 1996: 14). 'Surface' values are those that one can readily see and sense - the interaction by which one engages the landscape at its most immediate level. 'Core' values are the functional, technological, and ecological values of the landscape, or the way in which the landscape operatively connects with the larger ecological context, including that of humans (Thayer, 1996: 140; Tuan, 1989: 234).

In the literature reviewed on the concept of landscape values the following definitions of landscape have been borrowed to focus on the research aims and objectives of this study, and also because cultural values might help to explain why a tropical riverine landscape should be introduced to Kuching City.
• Identity

all places have identity, and this is relevant to landscape designs as places for people. "The identity of a place is comprised of three interrelated components, each irreducible to the other. Physical features of appearances, observable activities and functions, and meaning or symbols" (Relph, 1967: 61).

• 'Sense of place'

is both about recapturing earlier "site conditions and character and to do with creating something which has associative connections" (Taylor, 1992: 11). The aim is to capture a mood or feeling which is developed through expression or style. The essence is on a place's depth of meaning" (Olin, 1988: 21).

• Memory, nature and culture

. According to Schama (1995: 10) "All landscape is ineluctably the work of mind and memory". All designed landscapes provide opportunities for creating layers in the landscape or a cultural mosaic of landscape which provides personal and collective memory allusions for translating the landscape.

. "It is an holistic approach that encompasses both nature and culture, that embodies function, sensory perception, and symbolic meaning, and that embraces both the making of things and places and the sensing, using and contemplating of them" (Spirn, 1988: 108).

• Cultural landscape model

Embodies a humanistic approach to interpreting everyday "cultural (vernacular) landscapes. Here the central tenet is that landscapes are not what we see, but a way of seeing ... It is an approach to interpreting landscape as a cultural construct which has shifted logically to the understanding that landscapes can not only be read, but also interpreted as texts in which ideologies are transformed into concrete form" Taylor, 1997: 16).
Aesthetics and meaning

"Aesthetics is a discourse of the body ... the term refers ... to the whole region of human perception and sensation, in contrast to the more rarified domain of conceptual thought ... aesthetics is to do with affections and aversions, the whole of our sensate life ... aesthetics therefore concerns cultural context, associations and ways of seeing" (Eagleton, 1990: 13).

Landscapes and meaning

Landscapes "can express certain things, can possess symbols, and refer to ideas, events, and objects extrinsic to their own elements and locus, and in certain circumstances can be didactic and/or highly poetic. How they do this is not well understood" (Olin, 1998: 158).

In conclusion, fundamental issues relating to meaning in landscape design is the province of landscape assessment theory. Appropriate landscape assessment theory can help to assist designers understand the landscape place and meanings they generate.

Thus a modern interpretation of Kuching's river landscape will embrace an assessment paradigm which addresses specific kinds of meanings. The first type seeks to understand the 'natural' or 'evolutionary' meaning given to past or recent landscapes. The second type refers to the 'invented' meanings that include most "works of landscape design and represent our art" (Olin, 1998: 158). For the Sarawak riverfront landscape the strong settings include the State Mosque (an Islamic place of worship), the Islamic cemetery (a place which commemorates the dead) - basically a 'sacred' landscape - which "provides associations with spiritual values and especially those of the origin myths of ancient peoples" (Olin, 1998: 159) and the Brooke Dockyard which provides a rich vocabulary for providing the design of an informed inquiry into 'the history of people connected with place, and the place itself. Structurally, the planting of *Pterocarpus indicus*, *Cocos nucifera*, water-edge treatment of 'softscape', concrete retaining walls, and the shape of the Dockyard evokes the vernacular genius of the Sarawak river landscape (Olin, 1998: 159).
The Sarawak river landscape therefore provides opportunities to enhance and reinforce the landscape by unfolding in the design the layers of a contemporary urban river landscape. These series of layers may reflect the rich mosaic of history which should be apparent in the various forms and transects of designs, or allude to the evolutionary meaning of landscape as text.

The theory which provides a framework for providing an appropriate assessment or interpretation of meanings, will provide the most thoughtful landscape design today (Olin, 1988: 167). It has been suggested that landscape assessment theory should address the following - I quote:

1. Ideas of order;
2. Ideas of nature including a critique of past views as provoked by knowledge of ecology;
3. Ideas about the arrangement of cities and thereby society and its desires (as well as needs);
4. Ideas about the medium as an expressive one (that landscape as medium) revealing something about our methods and its processes;
5. Considerations about the history of art and landscape design, and the history of places - their archaeology (Olin, 1988: 167).

2.3 Concepts of Landscape

2.3.1 The Landscape: A Reinterpretation in Terms of Story, Text, Memory, Metaphors and Narrative Content

The ecology of a landscape offers opportunities for interpreting and reinterpreting the experience of place in terms of story, text and memory. There is a danger in the early landscape design process if the focus of the interpretation of a landscape centres on the notion of "landscape as problem" (Meinig, 1979:39). This notion may lead to the reinforcement of traditional landscape architecture values of object - "making, problem-solving or formalising and manoeuvring. All still popular schools of thought in the profession" (Berger, 1998: 4).
If these schools of thought continue to be embedded in the values of landscape architecture, then the potential to create landscapes that are open to many experiences may remain closed to many users of a place.

There is a need for designers to see or read the landscape as broadly as possible during the early stages of the design process. More importantly, the design process must allow for changing of roles between landscape designer and user of the site.

There are many ways to read the landscape. One way is to read the landscape of a place as metaphor. "Throughout antiquity landscape has provided writers, painters, and artists with a deep reservoir of metaphors that has shaped our cultural attitudes. Metaphors open new avenues for communication" (Berger, 1998: 5).

Perhaps a major criticism of modern landscape design is its failure to recognise that "meaning in landscape comes from a cumulative experience of habitation and use of an environment" (Treib, 1995: 47). There is a suggestion in the literature that there exists a spatial phenomenon which rejects the notion that "landscapes have always been used by cultures to harbour the transformative symbolism of physical place" (Berger, 1998: 5). For example, some designs of landscape sites may not be appropriate, because they fail to "dignify humanity, harmonious proportions and geometric patterning" (Berger, 1998: 37). Others "... are not fully aware of (or some prefer to ignore) the existing ecological and biological systems inherent in their project sites" (Meinig, 1996: 58).

In conclusion there is a need today to create an ecological design metaphor at the landscape scale, which offers new opportunities to understand how the spatial arrangement affects the composition and function of a landscape place (Meinig, 1996: 58).

A designer for example needs to ensure that he draws on the rich narrative of metaphor to create a cultural landscape for the Kuching City river landscape which reads as a narrative text, that tells a story of the landscape. This narrative of landscape can help to contribute to the total experience of the cultural landscape in
two ways. Firstly, the narrative needs to understand and describe how the Kuching river landscape is constructed in the mind as a cultural symbol or image. This type of reading of a landscape is essentially a ‘hermeneutic’ approach to landscape assessment, because the emphasis is on uncovering the meaning assumptions of a landscape and of landscape theory by entering the landscape through the language of text. Thus -

... text is not analysed but recovered through experiencing it imaginatively, rather than remaining outside and seeing it as an object studied. Because iconographic reading assumes one is looking for signs or symbolic imagery already embedded in landscapes, 'text' is viewed as an object separated from the reader (Berger, 1998: 6).

For Kuching City the river landscape can be seen as offering opportunities in the design sense for negotiating between the reader/writer or user/designer. The landscape of the Sarawak River may be assessed in terms of landscape scenes that are overlaid with many mosaics and transects which work to "cumulatively both encourage and arrest spatial experience" (Berger, 1998: 8).

Secondly, in order to understand the landscape of Kuching's tropical riverfront a starting point for design could attempt to put together a narrative text based on responses to questions from residents of the Sarawak River. Some questions the interviewer could ask residents of Kuching City could be structured so that the answers reveal, remember and reconstruct a personal narrative of landscape place. For example the following structured questions could be asked.

Can you describe an important childhood memory of the Sarawak riverfront landscape?

What significant historical or contemporary events have changed the cultural river landscape of Kuching City?

How has your city evolved overtime?

Can you state the most frequently used landscape?

The purpose of asking this type of structured question is "to explore the representational potential of working with the narrative medium in constructing a spatial story" (Berger, 1998: 6).
The advantage of the narrative as text approach which tells a story of the landscape is that it does away with the designer as controller of landscape approach to landscape design of places, and offers opportunities for better reinforcing or -

... incorporating the interests and needs of the users. In the landscape, users can experience space through their own reconstituted history, rather than solely through the designer's intent. Metaphorically speaking this sort of 'give and take' experience of landscape is synonymous with an unfolding narrative text, or story (Berger, 1998: 8).

To summarise, there are many lessons to be learned from a re-interpretation of a tropical landscape in terms of story, text, memory and narrative content.

Firstly, post-modernist theory, provides opportunities to reconstruct landscapes in terms of the story. This theory seeks to resist the authority of a single landscape designer or expert to create a closed interpretation of ordinary landscapes, and to open the design of a landscape so that other users of the place may understand it. Whilst these landscapes are experienced through what the user sees, smells, feels and mentally records, it is pertinent to note that the eye sometimes lies. A theme which has been recanted many times, for example, as in Meinig's (1979: 38) ten ways for interpreting the same landscape reference.

Secondly, any assessment of landscape should recognise that -

... throughout history, the body has been perceived as a receptacle of memory, from the memory of bodily movements, such as walking, to the memory of past events in physical scars, to the memory of one's genetic history in every cell. The landscape resonates with experiential phenomena, sensual essences and spatial imagery which become sediments in the memory by passing through the body (Berger, 1998: 11).

There is a parallel in psychoanalytical research which illustrates how memory functions on a spatial place to reveal the 'informational patterns' of the landscape that allow for new information and maintenance of spatial orientation (Kaplan, 1982: 85). Memory is one of the attributes which can be used to create a sedimentation of experience in the mind. The language of memory recognises the role history plays in the interpretation of ordinary landscapes (Schama, 1985: 70).
A cultural landscape such as the river landscape of Kuching City is a mind-field that is full of landscape history. This interpretation recognises "... that history is not continuous. It is made of stops and starts, of presences and absences ... where history ends memory begins" (Berger, 1998: 11). A tragedy of modern landscape design is that it fails to recognise the role history plays in interpreting the cultural landscape of the Sarawak River landscape. There is a need today to bring back the memory of history into the design of Kuching's river landscape. This approach to cultural/historical interpretation of landscapes may take the form of "a series of overlapping and superimposed grids, or a reorganised layering of the site's narrative histories" (Berger, 1998: 11). The landscape design therefore is a reflection of archaeological artefacts of new landscapes present creation together with its past. Essentially, a landscape where people speak of a "vivid experience of a place", a wonderful memory, a magic moment that catches and brings back the experience and memory of a place (Hiss, 1990: viii).

Thirdly, any assessment or study of a landscape should recognise the importance of the cognitive paradigm, sometimes also referred to as the psychological paradigm, which recognises the importance of human meaning associated with a landscape.

2.3.2 Connectedness, Place and Meaning

Meaning is connected with interpretation and presentation of not just the physical form of a place, but also the association inherent in the ideas and ideologies that underlie the physical form of a landscape, including a designed landscape (Taylor, 1997: 4).

Simply, meaning in landscape has to do with the connectedness between people, places and events through time. The landscape we see is interpreted as a cultural mosaic, it should represent the sum total of our ideologies in a physical landscape design form that creates a place for people. "Landscape thereby reflects the character of society. It is a cultural phenomenon defined by our vision and interpreted by our minds (Meinig, 1979: 3).
Landscapes have many meanings. Landscape designers must learn to dissect these meanings in a variety of ways:

- through reading the landscape;
- through research;
- through interpreting human attachment;
- and through understanding landscapes - including designed landscapes - as system of signs (Taylor, 1992: 5).

Hayden (1995: 53) points out "how urban landscapes are storehouses of social memory, meaning and shared values, and the lessons for this in urban design work". She alludes to the fact that design work does not necessarily require large amounts of monetary expenditure to improve meaning in public places. Rather, the designer's aim should be to create landscape places that "connect with human experiences and public history, where history provides a connecting thread between people, place and meaning" (Taylor, 1998: 5).

There is a danger therefore that designers of landscape can easily eliminate the 'sense of place' and 'stored memories of ordinary places'. This can be found in large urban renewal waterfront projects which destroy historical buildings, remove large streetscape trees and remove historical street patterns.

This crisis of 'place' and 'placelessness' and the meaning attached to places began in the early 1970s and is still a major issue of concern to landscape designers today (Low, 1992: 10). The phenomenological interpretation is recognised as an important factor in the creation of designed landscape places because it "offers a philosophical basis for understanding everyday spaces, and hence the social sense of place" (Taylor, 1997: 5).
Place attachment is -

... a complex and multifaceted concept worthy of systematic analysis and is based on several assumptions: first place attachment is an integrating concept comprising interrelated and inseparable aspects; second, the origins of place attachments are varied and complex and third place attachment contributes to individual, group and cultural self-definition and integrity" (Low, 1992: 4).

The word 'attachment' emphasises effect, whilst the word 'place' has many multidimensional meanings. Place refers to the landscape settings to which people are emotionally and culturally attached. Place may be defined as referring

... to space that has been given meaning through personal, group or cultural processes. Places may vary in several ways, scale or size, and scope, tangible versus symbolic, known and experienced, versus unknown or not experienced (Low, 1992: 58).

To create a landscape, say for Kuching's river landscape, requires an understanding of the local and global scale. For example with regard to scale -

... places can be very large (e.g. the earth, universe or nation), mid-sized (e.g. cities, communities and neighbourhoods), smaller (e.g. homes rooms) or very small sized (e.g. objects of various kinds) (Low, 1992: 8).

The important theme which landscape designers need to understand in regard to the interpretation of landscape place, is that it is an integrating concept which facilitates connectedness of landscape. This concept involves patterns of:

• "Attachments (effect, cognition and practice)
• Places that vary in scale, specificity and tangibility
• Different actors (individuals, groups and cultures
• Temporal aspects (linear, cyclical)" (Low, 1992: 8).

The extensive literature dealing with the aims and objectives of this study demonstrates that the major weakness lies in creating the link between theory and practice. To a large extent this weakness may be understood as a crisis of meanings and interpretations associated with the assessment of a landscape place. In essence,
it is a crisis of how to better apply landscape theory to practice. A way forward is to bring or incorporate the theory of phenomenology and landscape narratives into an appropriate landscape paradigm which is a hybrid of both the psychophysical and psychological models. This is discussed later.

To summarise: in order to be able to identify and reinforce the contribution that landscape character has made to Kuching City, the Sarawak River needs to be understood in terms of the concept of landscape values (Corner, 1991: 121).

2.3.3 Landscape Interpretations

Meinig (1979: 34) attempted to show that any landscape can be interpreted to be meaningful or not to society. In his article entitled "The Beholding Eye - Ten Versions of the Same Scene", he discusses implicitly the polysemic nature of landscape perceptions. He identifies and explains ten different concepts of landscape.

Firstly, 'landscape as nature' (Meinig, 1979: 34) alludes to the power of metaphors which nature has to offer such as the rolling hills, the sky above and the land below. This concept of landscape attempts to remove the dominance of humans on the landscape and aims to "restore nature to her pristine condition" (Meinig, 1979: 34).

Secondly, 'landscape as habitat' (Meinig, 1979: 34) recognises that every landscape including the remote tropical riverine rainforest of Sarawak is a piece of the earth as the home of man' (Meinig, 1979: 35). Because human beings are always tempering, shaping, remoulding the landscape, Meinig (1979: 36) concludes that 'every landscape is therefore basically a blend of man and nature'. The important point that thrusts forward from this concept of landscape is that we all learn from mistakes, because if we continue to harm nature, in the long run we damage ourselves. Consequently because human beings are endowed with survival instincts, we learn to look after and repair nature.
This is perhaps the reason why I have assumed that the tropical riverine landscape of Sarawak should be reintroduced along the foreshore of the Kuching's Sarawak River, because this is only one way to educate everyone about the need to repair or restore Sarawak's river landscapes. In my view, and from the extensive site inspections I have carried out of Sarawak's rivers, I believe that if an urgent conservation and regenerative strategy is not put into place now, then the repair to Sarawak's river system may come too late.

Thirdly, 'landscape as artifact' (Meinig, 1979: 36) recognises the landscape as 'a platform, but all thereon is furnished with Man's effects so extensively that you cannot find a scrap of pristine nature' (Meinig, 1979: 37). This concept of landscape suggests that all landscapes are human creations. Thus the landscape exists only to serve human needs at whatever cost to the landscape, even if it leads to loss of habitats and silted streams.

Fourthly, 'landscape as system' (Meinig, 1979: 37) suggests that all of the landscape that we see before our eyes is "an immense and intricate system of systems .... In such a view landscape is a dynamic equilibrium of interacting process" (Meinig, 1979: 38). In this study, I have adopted this concept of landscape because it is one interpretation of the landscape which provides an opportunity for landscape designers to assess the landscape in terms of 'core' values (Thayer, 1996: 131). As Meinig (1979: 38) has pointed out "for such persons the landscape that others may see is only a facade which their vision penetrates to reveal a transect of intricate pulsating networks, flows, interactions, an immense input-output matrix". If the landscape assessment process can flush out the core values of landscape systems or processes then there is merit in carrying out a landscape assessment process, with a focus on landscape systems. By processes we mean the pattern or events that result from the impact of some landscape agent such as wind and water, that occur sequentially over time toward some desired end such as landscape restoration or landscape healing.

Fifthly, 'landscape as problem' (Meinig, 1979: 39) alludes to the fact that we live on landscapes that are riddled with problems such as "eroded hills, flooding rivers,
scattered woodlands, dying trees, dilapidated farms, industrial pollution, urban sprawl' (Meinig, 1979: 40) and many others. Generally, we live in a society which reinforces the view that we have the scientific knowledge to fix all landscape problems and many more. Surely, this thinking process cannot continue indefinitely. There is a need to promote greater awareness among politicians, and developers and to let them know of the adverse consequences for human survival if we do not promote strategies for fixing the problem.

Related to this problem is the fact that many developers see the landscape not as a resource, but as a gold mine that has monetary value. This concept of landscape has been referred to by Meinig (1979: 41) as the 'landscape as wealth'. It is a view which promotes the ethic that we take what we can from the landscape, and return or recycle nothing. This view works against a concept of landscape which promotes ecological design principles (Van der Ryn, 1996: 53).

'landscape as ideology' is the seventh concept of landscape noted by Meinig (1979: 42). In this interpretation of ordinary landscapes he explores the landscape as the symbolic as the symbolic 'expression of cultural values, social behaviour and individual actions worked upon particular localities over a span of time' (Meinig, 1979: 28) this view of landscape '... clearly insists that if we want to change the landscape in important ways we shall have to change the ideas that have created and sustained what we see' (Meinig, 1979: 29).

Implied in this view of landscape is the fact that landscape assessment cannot be carried out in an institutional vacuum. Therefore, successful landscape assessment emanates not only from placing landscape in its institutional decision-making context, but also in identifying the importance human beings attach to the landscape of a place. This meaning comes from "landscape properties that are derived on past experience, future experience and socio-cultural conditioning of the observer" (Whitmore, 1995: 29).

To see the landscape as ideology suggests that human beings use their minds to find out how the landscape was created? But a focus on this concept of landscape
suggests that there is another way of adding meaning to our experience of landscape. This view "while at its best is reflective and philosophic, is also much more detailed and concrete to see" (Meinig, 1979: 42).

This concept of landscape is the eighth version and is referred to by Meinig (1979: 43) as "landscape as history". Here, everything that is seen by our eyes is recorded in the mind as "a cumulative record of the work of nature and man in this particular place. ... The principle organising system is chronology, which is not itself history but the scaffold upon which one constructs history" (Meinig, 1979: 44). The important point to note here is that the visible landscape is not a full record of history, but it will yield to diligence and inference a great deal more than meets the casual eye" (Meinig, 1979: 44).

The ninth version of landscape is that of "landscape as place" (Meinig, 1979: 45). In this view every landscape is a locality, an individual piece of the infinitely varied mosaic of the earth. ... It is landscape as environment, embracing all that we live amidst, and thus it cultivates a sensitivity to detail, to texture, colour, all the nuances of visual relationships, and more ...". (Meinig, 1979: 45). Implicit in this view of landscape are the dimensions which give depth of meaning to landscape as place. In essence a 'sense of place' (Dovey, 1985: 95).

The final version sees the 'landscape as aesthetic' (Meinig, 1979: 46). In the next section, an examination of landscape as place, meaning and system is studied so that the focus hereafter will be on a more appropriate theoretical framework for Kuching City's riverfront.

2.3.4 Landscape as Place. A Reflection of History.

Today the built form of Kuching displays a history of migration. The Chinese, Malay, European and to a lesser extent the Indian people have all contributed to the planning of Kuching City.
These cultural elements provide constraints and opportunities which should be recognised in the waterfront plan for Kuching City. These constraints and opportunities are identified with the aim of highlighting their importance to the design of the waterfront.

A Town or City that possesses a waterfront is a place blessed with a potential natural asset. Great cities of the world all capitalise on this asset, either through farsighted landscape planning or later redevelopment. In Sibu, Sarawak for example, the Rejang River waterfront has been redeveloped into a well-integrated, environmentally designed area, a far cry from the days when it was dotted with industries and dockyards. The eastern part of the waterfront within the study area was recently implemented by the Sarawak Government. Whilst the waterfront concept is an improvement to the former predominantly industrial buildings, that abutted the Sarawak River, the concept has not been successful in recreating a tropical landscape text for the waterfront (Pollard, 1972: 20).

Human beings whether young or old are attracted to water and riverine landscapes. Most people will be unconsciously drawn to rivers, for either active or passive recreational pursuits. To many, a river scene has a comforting effect on body and mind, especially to the city dwellers of Kuching. The river scene offers opportunities for associations and references which bring out elements of the landscape that connect people's experience with history, event, religious influence or other narrative forms.

The Kuching waterfront is just like an uncut gem. The Sarawak River foreshore has been in existence since the eleventh century. The river's importance as a trading centre since the eleventh century A.D. is confirmed by early excavations carried out in the delta of the Sarawak River. Ceramic shards and other artefacts have been excavated. There is early evidence of iron smelting and gold mining, with the latter being carried out possibly to meet demand. The Chinese arrived initially as traders, but some seized the opportunity to settle in Kuching and other parts of Sarawak. In time, Kuching grew from early settlements along the Sarawak River, and by the nineteenth century the Chinese had established a presence.
Chinese presence was not significant as they had to co-operate with the Malays before they could exert their influence on the growth of Kuching. The Malay presence pre-dates that of the Chinese, and were once numerous and forceful enough to control most of North Borneo.

European presence in the region began with the Dutch, but there was not significant European influence until James Brooke, an Englishman sailed into Kuching in 1839. James Brooke arrived at a time when the Sultan of Brunei, whose nobleman ruled the provincial capital of Kuching were experiencing social and economic difficulties. In consequence they began rebelling against his oppressive regime, and the Sultan's open support of piracy (Pollard, 1972: 20).

In 1841 James Brooke became Rajah of a limited territory. His position as Rajah coincided with the steady rise of the State of Sarawak and of Kuching as a port and administrative centre, and the decline of power by the Sultanate of Brunei. He made an important contribution to the planning of Kuching City.

After his death in 1868, James Brooke was succeeded by his nephew Charles Vyner Brooke (Rajah from 1917 to 1941). It is during this period that some of the waterfront's historic buildings were erected.

Kuching was occupied by the Japanese during World War Two with this period of occupation having a minimal impact on the built form of Kuching. After the Japanese surrendered in 1945, Rajah Brooke ceded Sarawak to the British Government. The British administered the State until 1963 when it joined Malaysia.

From 1963 to 1997 Kuching has experienced many changes, some of which are beginning to change the built form and character of Kuching's landscapes. These changes have gained momentum in the last fifteen years, with the advent of industrialisation and modernisation of Kuching. Thus, Sarawak's Riverfront offers opportunities for creative interpretative landscapes which tells stories of what
happened in a place. The object is to make existing or future landscape narrative intelligible.

Oil-related industries, logging of the rain forests, free trade zones and tourism have opened up the interior of Sarawak and all offer opportunities for story-telling landscapes. Whilst these pressures have helped Kuching to become a modern city, so have the costs of modernisation become noticeable. In particular the Bakun hydro project and other modern projects are having an impact on the culture of indigenous groups and the viability of tropical rain forests. Many indigenous groups have left traditional lands and customs and migrated to towns such as Kuching (Mohd Idris, 1990: 39).

Kuching’s traditional port functions which were once served by the Sarawak River and the godowns were also used for storage. What is more apparent is the proliferation of wharves and riverside landings which are growing in ad hoc fashion along the waterfront, and still provide a major means of communication. This intricate relationship between the city, river, sea and interior rain forests is as important today as it was in the past 200 years, albeit for different reasons.

Kuching, the capital of Sarawak, reflects the mix of races that have come to live in the city. The city has a rich diversity of building. Among these are the Courthouse and Post Office which are still operating. In contrast, while some buildings such as Fort Margherita have lost their initial reason for being they continue to be used for new uses. The Istana (built by Charles Brooke in 1870) continues to be the official residence of Sarawak’s Head of State. The State Mosque (Mesjid Negeri Sarawak), Tua Pek Kong Temple and St. Thomas’s buildings provide important architectural and religious focus for the different cultural groups that live in the city, namely the Malay, Chinese, Christian, and Indian communities. Other less grand buildings such as the shophouses and residences above the Main Bazaar with their typically Chinese colonnades and detailing, as well as the traditional Malay houses to the north of the Sarawak River reinforce the unique historic character of Kuching and the waterfront (Tay, 1995: 18).
So far the decision by the State Government to declare the city as a development area, has been responsibly managed by the Land Custody and Development Authority (LCDA). The management of the city by LCDA has resulted in the city being spared the worse excesses of twentieth century architecture and planning. Where changes to the city have been initiated the planners are going through extensive lengths to protect the history of the city. With few exceptions, a low scale sympathetic building style has been maintained and there is still a chance that new buildings will continue to reflect the traditions of the various ethnic groups, including those of the indigenous people. The LCDA has put in place policies which will reflect the unique socio-cultural mix of Kuching. These policies will minimise the city becoming yet another undistinguished modern city.

The waterfront is the market-place of Kuching. Although the existing market is still used by the locals, its significance as a regional distribution, retailing and trading centre for Kuching is losing its significance for Kuching and its hinterlands. This trend may be attributed to a number of factors (Zulpilip, 1994: 94).

Firstly, the rural service centres in the alluvial coastal regions are now much more accessible as a result of the Government's policy of providing more roads to these centres. Water transport is thus less important, and will become more evident once major hydro projects are completed. The number of river vessels is also steadily declining. Nonetheless, the Sarawak River offers opportunities for placing texts in the landscape. The riverfront landscape can be interpreted by means of design form elements which traces the river as an important transport route, and emerging water highway.

Secondly, the goods which are now sold in the waterfront's vegetable, fish, and other market buildings on Gambier Street are no longer used as frequently by customers. This observation may be attributed to the Government's policy of decentralising markets to other parts of the city. Stall holders in consequence have poor sales turnovers as they have to compete for a limited piece of the diminishing market and in order to survive they get involved in the wholesale business. The
markets open before dawn and remain open for a very short time of the day (Conybeare-Morrison, 1990: 78).

Thirdly, the stalls do not have the variety that consumers would expect from a city of this size. The rapid increase in car ownership in the city coupled with the urban sprawl within the region is resulting in the ad-hoc location of development being cast far and wide. In consequence, the river is becoming more inaccessible and the traffic congestion is also detracting from the beauty of the river, and providing another barrier to pedestrians. Businesses within the centre are also likely to suffer if planning measures are not put in place to limit parking and make the city more accessible to pedestrians and tourists.

Fourthly, the waterfront is used as a bus terminal and terminal for taxis. These land uses give the impression that nearby market stalls are a hive of activity. In reality, stalls locate in close proximity to the bus terminals in order to maximise patronage of the bus services, and give a false impression of vitality in the market-place. The market stalls no doubt contribute to the traffic congestion within the city (Conybeare-Morrison, 1990: 64).

The waterfront needs to be developed to recognise the central importance of Kuching's commercial centre which stretches contiguously along the waterfront. This commercial centre is still convenient for people living across the river and on the north bank of the river. The old commercial centre of Kuching is easily accessible by small boats from the northern bank. Therefore, although the northern bank is separated by the Sarawak River, the southern and northern banks are still complementary, as may be observed by the many commuters that cross the river. The northern bank of the river is an important landscape resource.

The recent increase in the number of fishing trawlers using the wharves and jetties has introduced a new factor for consideration in the redevelopment of the waterfront (Conybeare-Morrison, 1990: 69).
Although the city of Kuching is a riverine settlement, the waterfront until recently has turned its back to the river. When the pedestrian is walking in the heart of the city centre, along Gambier Street it is possible for them not to realise that they are walking in close proximity to the river, simply because views to the river are blocked out by a mass of buildings. Existing market buildings and godowns (industrial buildings) block out river views and force the pedestrian inward toward the street, rather than outward towards the river, Kuching's most valuable asset has not been fully exploited, but opportunities exist to reinforce this seemingly powerful secrecy, somewhat subconscious and sublime in character, to the undeveloped part of the riverfront. (See Figure 2.1)

Figure 2.1
Current Plan for Kuching City
(Shankland Cox, 1998: 189)
With proper landscape planning and design, the Kuching waterfront and other tropical riverine environments can be developed into a great venue for art and cultural exhibition, evolutionary meaning, recreation, social gathering, small local commercial activities and perhaps more importantly, a tourist attraction given the present government emphasis on tourism development. The waterfront is a resource of regional significance, and should be redeveloped so that it may be enjoyed by all users. However, to do this effectively, it is necessary to appreciate the contextual elements that will contribute and reinforce both the urban and landscape of the waterfront (Land Custody and Development Authority, 1992: 2)

The southern bank of the Sarawak River foreshore is the most intensively used and favoured section of the river from the beginning of Kuching's settlement. The history of Kuching devotes a very substantial part of its story to the growth of its foreshore and the uses which have located on the river. Ever recent studies of the city give appropriate recognition of the waterfront in the development of the city as well as the maritime importance of the waterfront in contributing to the growth and cultural landscape of the city (Shankland Cox, 1978: 86).

Two religious buildings delineate or symbolise the importance of two cultures which should be used to bring out the 'sense of place' of the waterfront. The two buildings which were built prior to 1839 and located in close proximity to the river are the State Mosque which marks the western boundary of the study area and the other is the Siew San Ten Temple which is also known as the Hock Teck Tse (Tse is the Chinese word for temple). However, it is commonly known as the Tua Pek Kong among the Teochew and Hokkien communities. This temple marks the eastern boundary of the study area (Pollard, 1972: 84).

The waterfront, has many buildings of historic significance. Among these are the Chinese Chamber of Commerce (1911-1912), High Court (1874-1883), Fort at Pangkalan Batu (1879), Fish Market, Poultry Market, State Mosque (1880) and the Brooke Dockyard (1908-1911) (Pollard, 1972: 102).
In landscape and urban design terms there exists tremendous potential to create appropriate settings for historical buildings and the Brooke Dockyard while respecting existing constraints, activities, and the cultural landscape.

Many proposals have been put forward for redeveloping the waterfront. However, these proposals generally have not had the support of the State Government. In the absence of a waterfront plan many ad hoc structures, land-use activities and planting proposals have been put forward, some of which have been implemented.

In recent times the Government of Sarawak has put in place measures to redevelop part of the Sarawak River foreshore. However, the landscape designs are inappropriate, with too much emphasis being placed on the 'hardscape' aspects. More emphasis should be placed on the 'softscape' components of the tropical landscape and the constraints and opportunities that are imposed on the waterfront because it provides the narrative setting and topos to create a highly conventionalised setting for connecting with particular events, rituals and routines, that are evoked often in Kuching's cultural narratives. The narrative of setting and topos offers a retreat from the complexities, pressures and stresses of Kuching City as well as the nostalgic return to childhood origins where a place exists apart and in sympathy with nature (Potteiger and Purinton, 1998: 11). The term 'hardscape' is used to encompass that aspect of landscape architecture which uses 'hard' landscape forms and/or construction works, as different from 'softscape' which uses plant as design constructed material. In this study of the waterfront the emphasis will be on making use of plant material as a softscape design tool to try and recreate the tropical riverine and landscape place of the Sarawak River (Beaumont, 1995: 21). This theme is in keeping with an emerging trend which seeks to "reanimate urban landscapes through more concern for ecological and biological values and less technological determinism" (Thayer, 1996: 38). Consequently, soft landscape materials such as planting may be used as a narrative that generates forms. This means that the designer can use stories as a technique for expressing ideas of order, selecting, sequencing and revealing or developing images in the design process, to make intelligible narratives (Potteiger and Purinton, 1998: 12).
2.3.5 Landscape as Meaning

Landscape as Meaning is critical to knowing how designers read the landscape and open new avenues of understanding or interpreting the tropical riverfront landscape of Kuching City.

Meaning in landscape means bringing together the metaphor of Kuching's landscape as narrative text, exploring the notion of inter-textual connections, multiple authorship and the role of the public in constructing landscape as meaning. How do we devise meaning in landscape? To answer this question landscape designers must understand that the tropical riverfront landscape is not so much a landscape of trees, sculptural elements, public art, and paving technology, but as a reading of the landscape which leads to an integral understanding of the processes that mould or create the landscape in the first place. Figure 2.2 shows how landscape designers can follow a process which provides a more focussed approach for constructing meaning (Gorham, 1996: 27) of tropical riverfront landscape and sets the stage for demonstrating how landscapes could be interpreted (Meine, 1996: 47).

The process shows how a landscape narrative landscape theory which incorporates landscape concept dimensions of meaning can set in motion a landscape design process which allows us to see more clearly -

... the process of selecting, interpreting, negotiating, and structuring the meanings of contemporary landscape narratives ... Narrative refers to both the story, what is told, and the means of telling, implying both product and process, form and formation, structure and structuration. Narrative is thus a more comprehensive and inclusive term than story. While every story is a narrative, not every narrative necessarily meets the conventional notions of story as a well wrought tale plotted with a sense of clear beginning, middle and end. A narrative may be as simple as a sentence, "I went down to the crossroads", or as extensive and complex as the notion of progress. Beyond conscious awareness or inherent in daily actions it may be as mundane, varied, scripted, or open-ended as our own lives." (Potteiger and Purinton, 1998: 3)
Figure 2.2


The inter-relationships of ecosystems and landscapes with the environmental dimensions and cultural influences on them.

Landscapes can be "located" on a triangular field of attitudes according to the relative degree to which each embodies tophilia, technophilia, or technophobia.

For any landscape L, \( L(Tp) = \% \) tophilia, \( L(Tt) = \% \) technophilia, and \( L(Tb) = \% \) technophobia.

Although some landscapes seem to embody only one attitude, most embody some combination of all three.
Matthew Potteiger (1998: 135) in landscape narratives states that "physical forms and processes, metaphysical ideas, associations, hopes and fears, and political ideologies are all embedded in the landscape and wait to be deciphered". He also explores approaches which focus on the practice of revealing and concealing by exploring three fundamental ideas connected to landscape narratives.

Narratives: Firstly, the idea of **Secrets** or hidden information, secondly the idea of **transparency**, and finally, the idea of **masking** and unmasking information, identity, and meaning. Secrets, transparency, and masking/unmasking each create specific relations between the author and the reader.

Creating mystery offers a landscape narrative which is important and fundamental to engaging the reader of the landscape. Mystery is an important evaluation criteria for assessing the success of design and also in engaging the user of the landscape. Secret places offer opportunities for revealing the meaning of landscape.

Robert Thayer (1996) in *Gray World Green Heart* points out how the concealment of technological features masks a certain dishonesty, guilt and denial. His argument is that some or superficial surface values that encourage scenic management practices and hide problems about the landscape may lead to a misinterpretation of the landscape and disguise the source of the real problem. Landscape as meaning therefore forces us to choose between two competing paradigms of landscape: Simulation or Sustainability: "the movement towards a sustainable world must include the peeling away of intervening images between landscape functions and experience." Thayer, 1996: 218)

Thayer (1996: 311) puts forward a thinking process which encourages the unmasking of values of concealment. In essence, he offers a strategy for revealing "intervening images" and challenges authoritarian and centralised decision-making frameworks which control key life support and landscape systems. Thayer (1996: 311) notes: "Opacity and fakery in the landscape ultimately only serve to perpetuate the unsustainable status quo". His suggestion is that transparency and truth will give communities grass roots power to make more accountable and responsible decisions.
2.3.5 *Landscape as System*

To those who are observant, the messy looking mud-flats of the Sarawak River, inappropriate patches of grass planted on the river's edge of the Mosque landscape zone, together with abandoned patches of tropical plants tell a story of loss and degradation. What is being lost? Perhaps to the ecologist and environmental historian the loss is of a complicated estuarine and tropical riverine planting system.

These places together with the fenced up areas of the Brooke Dockyard and the neglected Muslim Cemetery represent the wasteland of Kuching City. They also tell a story of cultural influences on the riverfront landscape and perhaps the potential of these influences to adversely impact on the riverfront landscape. In essence, the Sarawak riverfront landscape tells a story of lost tropical riverine landscape systems.

At low tide the remnant stumps of tropical riverine plants that intermix with the mud flats and the land-print of the slow meandering stream nearby, brings home the message of what was once there.

The ecological history of the Sarawak River and its cultural landscape influences tells a story, or provides opportunities for the designer to reconstruct or create a story which reflects the idea of landscape as system. The study therefore of landscape as system means a study of the ecological history of the Sarawak River landscape which constructs a story of the interplay between loss and degradation of this riverfront landscape. Thus, the story could begin with making visible the rise and fall of the Sarawak River tide, beginning with the movement of water which advances and recedes as time goes by. This movement of the river tide could then be used to show how tropical riverine planting systems have adapted to this process of evolutionary change, to create albeit a cultural landscape system which creates as far as is practicable an ideal functioning tropical riverine planting system, albeit a small patch or microcosm of what once existed on the Mosque landscape zone site.

From this mosaic of landscape as system, the designer can begin to show how intervention, in the form of Malay migration, and later Chinese and European influences in the form of settlement patterns and development on the landscape
"initiated a crisis and a process of decline ending in a compromised system" (Potteiger and Purinton, 1998: 218).

As recently as 1998 the Sarawak government has constructed a causeway to control the flow and level of the Sarawak River. This decision has added to the centuries of decisions relating to the draining and filling of the riverfront. Consequently, today the hydrologic pattern of the river has been altered, and the poor quality of the river which exists from the outflow of raw sewerage into the river system has contributed to the wasteland of the Sarawak riverfront, and the death of vegetation from pollutants. The construction of the causeway and the proposed massive reclamation of the Brooke Dockyard area, will periodically cut off the regular flushing of semi-saline water that is regularly needed to protect the mangroves, and the different types of tropical vegetation that the natural breeding grounds of wildlife inhabitants such as prawns and fish.

The wasteland of the Sarawak riverfront represents a narrative of loss of tropical landscape as system as well as the loss of energy as it breaks down from a complex system into energy systems that become difficult to understand. Therefore, the interpretation of landscape as system suggests, that the Sarawak riverfront can be interpreted as the demise of landscape history, its sense of evolution and equilibrium over time. More importantly, perhaps the idea of landscape as system can be interpreted as a critique of progress and cultural influences on the Sarawak riverfront.

The interpretation of landscape as system may well focus on making visible the idea of landscape as problem and the many frustrated efforts aimed at improving the few remnants of a degraded tropical riverine plant and wildlife habitat landscape systems. Thus the story of the Sarawak riverfront may be shown as a series of mosaics of wasteland narratives. In my reading of the Sarawak river landscape this narrative may address ecological design issues which relate to the wasteland as narratives of ecological or landscape history, progress and energy systems. These narratives exist in many forms and at difference places on the Sarawak riverfront. They may be interpreted as a cumulative, varied and interconnected mosaic of decision-making
processes and cultural influences which may help to explain the landscape problems of the riverfront, the causes of the problem and who was responsible for the problem. The interpretation of the Sarawak River and its landscape as system may help to provide design solutions which will influence future decision-making and institutional frameworks that shape the riverfront landscape, as well as the landscape assessment framework, which focusses on the rightness and wrongness of the decision-making processes that influence the landscape as system.

Later in this study the concept of landscape as system will address the restoration ecology of the Sarawak Riverfront which tells a cultural story through the metaphor of restoration which addresses new meanings from the remains of past and old landscapes.
Restoration in a holistic sense addresses the tropical riverine landscape of the Sarawak River as a system. Thus landscape as system may be described as "any action that seeks to reverse the plot, conditions, actions and meanings of wastelands... the distinctions that various professionals make between restoration, mitigation, reclamation, rehabilitation, and so on reflect important differences in ideologies and discourse concerning nature, culture and history (Potteiger and Purinton, 1978: 109). However, the important issue to consider is which nature or landscape system to restore? Is it any tropical green or the conventions of a tropical riverine planting design concept. In this study the landscape as system, may be interpreted as a landscape concept that is a "selected, manipulated, and in some cases reinvented nature ... the various types of restoration practices - mitigation, synthetic ecology, regeneration - signify differences in approach, degree of historical authenticity, and models of ecologic order, as well as different ideologies of nature and culture. The negotiation and discourse between these differences makes restoration a vital work in progress" (Potteiger and Purinton, 1998: 109).

Landscape as system may be interpreted today as a cultural story which reflects the wide array of people engaged in depicting this story. The story is being told by artists, governments, grass roots communities and many professional organisations. The interpretation of landscape as system is therefore a landscape narrative which focuses on the metaphors of restoration. In this study, the focus of this metaphor will be almost exclusively on ecological design and restoration within the context of an expert paradigm and design participation.

Design participation therefore is about a process of thinking which constructs many restoration narratives through the connection and integration of the ecological knot (Dovey, 1985: 105) which makes visible the cultural and natural processes that have been responsible for shaping and moulding the Sarawak riverfront landscape. This landscape narrative recognises that the interpretation of landscape as system, recognises no single author or landscape designer, but many narrators, many groups and experts therefore will have a stake in restoration ranging from the institutional framework, naturalists, landscape architects, environmental science specialists and educators among others. In the final analysis the restoration metaphor offers
narratives that are sometimes conflicting, diverse, localised and sometimes a compromise which offers alternative ecological design principles and strategies of restoration. The aim is to offer a representation of a state of nature before human disturbance - an attempt at achieving a utopia or return to an original state.

2.4 Why Assess Landscapes

The assessment of landscape offers opportunities for designers to encode a mosaic of narrating from place (types of experience and local history), meaning (recalling a time, an event or a place) and system (preserving landscapes) for putting text in sidewalks as a design strategy(s) for plotting sequences, revealing forgotten histories, writing their own fiction(s), preserving landscapes associated with stories, retelling tradition in new forms and inviting people to add their own stories to places (Potteiger and Purinton, 1998: x). The study of landscape as place, system and meaning it can be argued provides the ecological knot (Dovey, 1985: 105) or framework for creating landscape narratives. Each of these three interpretations of landscape provides the context or landscape ingredient which tells a story or message about the landscape understudy. These three interpretations attempt to read the landscape in terms of more than literal storytelling. That is, these three dimensions of landscape attempt to search for the 'core' values of landscape which achieve more than relying as Conybeare Morrison (1990) has done, on signs, icons and other explicit references of landscape.

Assessing Kuching's riverfront provides opportunities for exploring other dimensions or mosaics of landscape which provides landscape narratives which "resonated with other dimensions of experience - with the narratives explicit in materials, in processes, and in ordinary practices of drawing boundaries and excavating, preserving, or demolishing landscapes" (Potteiger and Purinton, 1998: x). The types of narratives which designers could refer to when designing landscape are outlined by Potteiger and Purinton (1998: 11) in Table 2.1.

In view of the fact that some landscape assessment methodologies have been criticised for relying too much on rating scale approaches to assessing landscape
value, as well as too much emphasis on the dollar value of landscapes, a more modest assessment methodology is proposed. This assessment model recognises that the way people experience a place, albeit visual or otherwise may be highly personal and individualistic. For example, unlike artistic or literary experiences, landscapes are not static, people are in the landscape and a simple turning of one's head or an inadvertent distraction may radically change the experience of landscape.

In recognition of the need to integrate the subjective and objective approaches to landscape assessment the landscape could be redefined as follows. Landscape is the product of core human and cultural values contained within one's field of view for any place which interacts with living and non-living systems to create or evoke meaning. The interpretation of landscape therefore is about merging the subjective and objective dimensions of landscapes.

To achieve this aim, a psychological model of landscape assessment has been used to assess Kuching's riverfront because it measures two factors. Firstly, the individual's experience of a place may be described relative to other landscape narratives or life events. Secondly, as the landscape before our eyes changes it triggers a change in the mood of the individual as a result of the experience. Therefore whilst these experiences cannot be measured accurately because of their subjective content, an indication in terms of their importance and meaningfulness to people of Kuching can be gauged by developing the assessment within a framework of landscape care and healthy landscapes. There appears to be some merit in assessing the landscape or the value of the landscape in terms of its core values or major content themes, or the three major criteria and sub-criteria that relate to the various realms of landscape narratives. Firstly, the story realm (landscape as system), secondly, the contextual/intertextual realm (landscape as place) and thirdly, the discourse realm (landscape as meaning). In cases where assessment of the landscape may be in appropriate, or the designer does not wish to use a rating scale approach or to put a dollar value on the landscape resource, the criteria listed in Table 2.2 may be useful for assessing the realms of landscape narrative.
Narrative Experiences

Tourists enact narratives, selecting and organizing the experience of place into temporal sequences. The major tourist route through Prague, from the Powder Tower, to Old Tower Square, across the Charles Bridge, and up to the Castle, follows the sequence of public monuments and spaces established centuries earlier by the coronation route of the king.

Narrative Setting and Topos

The pastoral topos is connected with narratives of retreat from the social complexities of the dry and nostalgic return to nature, childhood, and a place apart in harmony with nature. The ideal setting of this story is repeatedly conjured in suburb, park, garden, and campus with just the minimal elements of lawn and trees.

Genres of Landscape Narratives

Places designed to tell specific stories with explicit references to plot, scenes, events, character, etc. The stories may be either existing literary or cultural narratives or produced by the designer.

Processes

Actions or events that are caused by some agency (wind, water, economics) and occur in succession or proceed in stages towards some end (progress entropy). Erosion, growth, succession restoration, demolition, and weathering are visible records of change that inscribe time into landscape form.

Interpretive Landscapes

Elements and programs that tell what happened in a place. The intent is to make existing or ongoing narratives intelligible.

Table 2.1

Types of Landscape Narratives

(Potteiger and Purinton, 1998: 11)
LANDSCAPE AS SYSTEM

CRITERIA 1: THE STORY OF REALM

In this context any landscape can be assessed within a narrative of its content, story, temporal order, place, character, agency, events as a system of signs that makes and suggests a coherent and believable story.

SUB-CRITERIA

- Agency, events and characters
- Time, story and narration (story telling)
- Sequence, plot and spatial form
- Complex forms
- Authority and belief

LANDSCAPE AS PLACE

CRITERIA 2: THE CONTEXTUAL/INTERTEXTUAL REALM

Stories relate to many aspects which are outside their control, consisting of multiple references and traces which live their land print and histories on the landscape. The stories tell of many authors that have had a stake in creating the landscape and can be interpreted in different contexts and from multiple points of view.

SUB-CRITERIA

- Context
- Intertext
  - Layering of texts and references
  - Passing on/communicating information
  - Landscape and memory
- Opening the text
  - Significance

LANDSCAPE AS MEANING

CRITERIA 3: THE DISCOURSE REALM

A discourse is a "Social framework of intelligibility, that influences all practices of signification, including narrative and landscape.

SUB-CRITERIA

- Naturalising discourse
- Denaturalising discourse
- Discourse of ecological design

Table 2.2

Realms of Landscape Narrative: Assessment Criteria

(Potteiger and Purinton, 1998: 60)
Landscape assessment methodology is a broad field of study and consists of many paradigms. It may be accurate to suggest that landscape assessment is not a static field of study, but it evolves to capture the ‘cultural landscape’ value of people at a place in time.

In the early stages of development landscape design evolved a multiplicity of working theories, hypothesis and concepts with a focus on the visual landscape assessment method of landscapes (Lynch, 1981: 62).

By the mid eighties many disciplines developed landscape assessment models that embedded theory in the social and physical sciences, such as the visual landscape/assessment models of Zubel (1982: 20) and the Kaplans (1982: 83).

Today the main paradigms of landscape assessment can be summarised in five conceptual frameworks. These are the ecological, formal aesthetic, psychophysical, psychological and phenomenological models outlined by Daniel and Vining (1983: 40) and the four visual assessment paradigms the Kaplans (Kaplan, 1982: 183).

In this chapter landscape assessment methods are compared and contrasted within three main ideas of landscape, so that emerging landscape assessment models can be applied to the assessment of a specific place. These ideas represent the ‘core’ values of cultural landscape assessment as outlined by Thayer (1996: 140) and Nassauer (1996: 163).

The focus here will be on landscape methodology which integrates how landscape appears with how landscape works. The former are referred to as ‘surface’ values whilst the latter refers to ‘core’ values (Thayer 1996: 127). The ‘core’ values are ways of assessing the landscape within a coherent body of ideas. We perceive the cultural, landscape as a ‘place’ or ‘system’ and in terms of depth of ‘meaning’ and ‘experience’ which contributes to our understanding of ordinary landscapes (Groth, 1997: vii).
The surface values embody landscape assessment paradigms which emphasise sensory impression and symbolic meaning. Thus "landscape means more than a pleasing view of scenery" (Groth, 1997: 1). Landscape also means more than paradigms which focus on aesthetics, mental images or "an aesthetic of cognitive mapping" (Hayden, 1995: 16).

The core and surface values provide a framework for evolving an integrated paradigm which specifically provides a practical tool for assessing the tropical landscape of Kuching. A paradigm maybe defined "as a scheme or model for understanding and explaining aspects of reality" (Rosenburg, 1986: 79).

Today it is possible to suggest that the landscape profession is closer to having an integrated paradigm of landscape assessment in the sense that Kuhn (1962) defined the term in the 1960s (Rosenburg, 1986: 75). This paradigm embraces a theoretical framework which explores the ‘meaning’ dimensions of technological/utilitarian landscapes (Thayer, 1996: 129). This mode of landscape assessment is useful because it allows each landscape to be "considered in terms of perceptual, functional and symbolic dimensions which interact to yield an overall relative evaluation of the landscape" (Thayer, 1996: 133). The point to note is that landscape assessment is first a subjective process, whereby each individual "categorises a landscape according to a framework of subjective meanings based on perceptual, functional and symbolic dimensions, then responds to that specific landscape as if it were an ‘objective’ stimulus, placing it in a relative ‘field’ framed by topophilia, technophilia, and technophobia (Thayer, 1996: 134).

In the next Section I define the key terms which the Kaplans (1982: 181) use to assess the landscape. According to this assessment framework, landscapes are preferred if they can be understood. For the riverfront landscapes that are preferred are legible, complex, coherent and mysterious.
2.4.1 Legibility

Legibility is the clarity of landscape; it all allows the viewer to comprehend the landscape through the recognition of well-structured visual elements (Kaplan, 1989: 182). Legibility is understood by definition and contrast (Whitemore et al, 1995: 32). The attributes of landscape could include components of core values from landscape as system, viz. Vegetation, water and surrounding landform in terms such as low vegetation definition legibility, high vegetation definition legibility, low water surface contrast legibility, high water surface contrast legibility, low landform contrast legibility and high landform contrast legibility.

2.4.2 Complexity

Complexity is the number, intricacy and relative distribution of landscape elements discernible to the viewer (Kaplan, 1982: 182). Complexity attributes may include landscape systems ‘core’ values such as ‘the diversity of vegetation, the skyline and the shoreline’ (Whitmore, 1995: 18) or values which reflect selected types of landscape narratives such as memory landscapes.

2.4.3 Coherence or Spatial Definition

Coherence is determined by an arrangement of three-dimensional space that creates order and unity of aesthetic elements and allows the viewer to make sense of the landscape (Kaplan, 1982: 182). The landscape core values of coherence are spatial enclosure and spatial depth. For example, spatial enclosure could be assessed in terms of whether the space is extremely enclosed, moderately enclosed or of average enclosure and spatial depth could be assessed in terms of whether it is moderately open or extremely open.
2.4.4 *Mystery*

Mystery is the promise of additional information, it encourages an individual to enter a visually inviting place in order to seek additional information not readily apparent (Kapalan, 1982: 182). Some elements are associated with vegetation or shoreline shape and form patterns that obscure the view or alter the intensity and pattern of light (Whitmore, 1995: 32).

The next section identifies how an integrated landscape assessment can be used which best fits the evaluation assessment criteria in terms of the paradigms acceptability in terms of validity, reliability, utility and sensitivity (Daniel and Vining, 1983: 40). See Table 2.3.

2.4.5 *Evaluation Criteria: Reliability*

Reliability means “agreement or consistency in measures obtained from one application of a method to another” (Daniel and Vining, 1983: 62) unlike the expert-based methods of assessment, some paradigms of landscape assessment such as "psychological methods generally rely on averaged judgement from groups of public observers, so group measurers are appropriate" (Daniel and Vining, 1983: 60).

Reliability of landscape in terms of evaluation criteria is important for landscape assessment because it can accommodate consensus views about the landscape being studied and provide the framework for trade-offs. A measuring system which can accurately predict the core values of landscape to society is important to the landscape evaluation process, particularly if it can accommodate “comparisons and inter-relationships with other environmental and social variables" (Daniel and Vining, 1983: 62).
<table>
<thead>
<tr>
<th>LANDSCAPE ASSESSMENT MODELS</th>
<th>EVALUATION CRITERIA</th>
<th>RELIABILITY</th>
<th>SENSITIVITY</th>
<th>VALIDITY</th>
<th>UTILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological model e.g. Leopold</td>
<td>Good. Because expert provides preliminary judgement about the landscape. But experts do not always assess the landscape in same way.</td>
<td>Poor. Difficult to determine. More effective distinguishing between natural and cultural (human influenced landscapes)</td>
<td>Poor. Almost impossible to perform because public perception on aesthetic judgement is difficult to determine.</td>
<td>Poor. Because the emphasis is on decision making process which reinforces the status quo i.e. recommendations</td>
<td>Poor. Because they are widely used by professionals and have the potential advantage of economy.</td>
</tr>
<tr>
<td>Formal Aesthetic Model (Based on expert opinion)</td>
<td>Poor. Even experts cannot agree on how the landscape should be rated.</td>
<td>Poor. Because the rating of landscapes into high, medium, and low medium categories does not distinguish between different landscape modifications.</td>
<td>Validity is poor because sensitivity and reliability are also poor. Additionally, it is uncertain how effective these landscape assessments reflect accurate aesthetic/ scenic values of landscape.</td>
<td>Excellent. Good levels of agreement, with reliability coefficients greater than 0.90. Good for design participatory exercises.</td>
<td>Good. Provides a good basis for measurement of the public’s views.</td>
</tr>
<tr>
<td>Psychophysical Model (Not based on an expert’s opinion)</td>
<td>Excellent. Very high levels of agreement, with reliability coefficients greater than 0.90. Good for design participatory exercises.</td>
<td>Excellent. Assesses small landscape variations with psychophysical functions proving to be robust to landscape changes in observers. Can measure social as well as landscape variables.</td>
<td>Excellent. Good correlation between perceptual dimension based on colour slides and judgements made at the actual sites where those photographs were taken. Seems to measure what it is intended to measure i.e. perceived scenic qualities.</td>
<td>Excellent. Provides a good basis for measurement of the public’s views.</td>
<td>Good. Provides psychological dimensions such as mystery can be accurately defined and are independently measurable.</td>
</tr>
<tr>
<td>Psychological model (Emphasis is on the cognitive and affective reactions evoked by various landscapes)</td>
<td>Excellent. Reliability can be determined and has generally been found to be relatively high.</td>
<td>Excellent. Because they reveal differences among landscapes along many different dimensions of human reaction. Statistical methods can be used to calculate standard error.</td>
<td>Excellent. Provides a good basis for measurement of the public’s views.</td>
<td>Excellent. Provides a good basis for measurement of the public’s views.</td>
<td>Good. Provides psychological dimensions such as mystery can be accurately defined and are independently measurable.</td>
</tr>
<tr>
<td>Phenomenological model (often the assessment is based on a personal interview or verbal questionnaire)</td>
<td>Good. Reliability is generally sacrificed in favour of sensitivity.</td>
<td>Sensitivity is good, but results may be difficult or impossible to determine. Consistencies across different assessments.</td>
<td>Mean error is that it is not focused and may include too much variables in the assessment process. Identifying the assessment variables may be a complicated process.</td>
<td>May be too sensitive to be useful and yield as many different assessments for each alternative because there are many combinations of contexts and observers of each landscape.</td>
<td>Excellent. Good correlation between perceptual dimension based on colour slides and judgements made at the actual sites where those photographs were taken. Seems to measure what it is intended to measure i.e. perceived scenic qualities.</td>
</tr>
</tbody>
</table>

**Assumptions:**
1. Ecological model: Aesthetic value is mainly a function of ecological criteria.
2. Formal aesthetic model: Equally applicable to natural and cultural (human influenced landscapes, including any individual landscape or landscape type such as rivers, oceans, tropical forests and deserts.

Table 2.3
Landscape Assessment Models and Evaluation Criteria
(Daniel & Vining 1983: 44)
2.4.6 *Evaluation Criteria: Sensitivity*

The evaluation of any landscape must use measurement methods that are 'sensitive to changes in the relevant properties of that which is being measured' (Daniel and Vining, 1983: 40). If this method of landscape assessment is to be effective for the Kuching City riverfront, it must be able to demonstrate that it is "very sensitive to subtle landscape variations and psychophysical functions ... and ... have proven very robust to changes in landscapes and in observers" (Daniel and Vining, 1983: 61).

Sensitivity evaluation criteria in addition to being able to measure core values of landscape should be able to "reveal differences among landscapes along many different dimensions of human reaction" (Daniel and Vining, 1983: 69). Recently these dimensions have proven to be of use to landscape designers because it may be "possible to calculate a standard error of estimate for scale values and to determine the scaled differences between landscapes relative to that error" (Daniel and Vining, 1983: 69).

2.4.7 *Evaluation Criteria: Validity*

Any landscape evaluation method must achieve more than balance between reliability and sensitivity. "Given this balance the next consideration is validity. A method must not only provide reliable and sensitive measures, but the measures must reflect changes in the property that the system purports to measure" (Daniel and Vining, 1983: 40).

2.4.8 *Evaluation Criteria: Utility*

In addition to meeting all three evaluation criterion of reliability, sensitivity and validity, landscape "assessments should provide measures that are useful. Utility of a method is usually gauged in terms of efficiency and generality. Efficient methods provide precise, reliable measures with relatively low costs in time, materials and equipment, and personnel" (Daniel and Vining, 1983:40).

The expert paradigm has the advantage of utility, because it is cost effective.
The paradigm will prove to be valid, sensitive and reliable if it can rank important core values, that are the outcome of a design participatory exercise that reduces subjectivity in landscape assessment. More importantly, an integrated model will bring together the three constructs of landscape meaning, system and place which focus on the appropriateness of human intervention in the landscape that embraces relevant landscape narratives within the context of the perceptual, functional and symbolic dimensions of landscape as well as an assessment framework which explains why humans prefer certain landscapes.

Landscape assessment theory has evolved to a point of maturity as we move closer to the year 2000. Today the debate on landscape assessment theory is not about whether an adequate theory of landscape assessment exists but “has reached a level where future growth is limited by narrowly defined approaches and the lack of a unifying theory” (Zube, 1984: 104).

The many authors of landscape assessment reviews, Penning-Rowsell (1981), Porteous (1982), Zube, Sell and Taylor (1982), Daniel and Vining (1983), Corner (1991), Jacobs (1992), Carlson (1993), Whitmore, Cook and Steiner (1995), Nassauer (1996), Bowring (1997), and Potteiger and Purinton (1998), come from many disciplines and generally agree that substantial progress has been made throughout the last thirty five years. However there are some conceptual difficulties which need to be overcome if landscape assessment theory is to reach maturity.

The first issue is how should landscape assessment be fine tuned so that it is useful to the everyday practitioner. Secondly how can the objective approaches to landscape assessment be integrated with the subjective approaches to ensure that landscape designers read the landscape correctly (Meinig, 1979: 198). Thirdly, how can the findings from the many contributors to landscape assessment theory be incorporated into a coherent whole. Among these contributions are those dealing with Semiotics as a tool for landscape assessment (Field, 1997: 29). Fourthly how can ecological design principles be applied to a site specific level so as to create a culture of caring for healthy landscapes. Van der Ryn (1996) and Nassauer (1996). Finally how can designers use other theories of landscape assessment to create an
ecology of place and placemaking as outlined by Dovey (1985), Relph (1976), Seddon (1997), Kaplan (1981). This ecology of place has also been referred to as "Topophilia" and "placing nature" (Thayer, 1996: 17). The former definition has been expanded to mean "the range of positive emotions relating to affection for land, earth, and nature" (Thayer, 1996: 18). The latter means "care of a place that is attentive to change. It means watching over a place and intervening in change to achieve a proper landscape" (Nassauer, 1996: 76).

From the broad overviews it is apparent that many landscape assessment models exist as tools for interpreting ordinary landscapes. The issue is how and to what extent should these landscape assessments be used for Kuching's riverfront (Groth, 1997: 3).

The key to understanding any landscape is not to apply a particular theory of landscape, but to integrate the theories so that they can be applied to the particular landscape under study. In this case the critique of landscape assessment theory should be used so that it can be applied to the cultural landscape of Kuching's waterfront. Landscape assessment theory should recognise that the notion of landscape cannot be approached as a single dimension of study to a particular landscape. To be successful, landscape assessment theory must recognise the multiple dimensions of landscape. That is "the notion of landscape as a multi-layered series of representations" (Thayer, 1996: 141) that incorporates the appropriate paradigm(s) into the design of a landscape. The greater the depth of layers that landscape assessment is able to reveal, the more meaningful the cultural landscape becomes and the closer we come to understanding the core values of landscape.
2.5 Paradigms of Landscape Assessment Methodologies


Whilst many landscape assessment models exist, landscape designers must be careful not to apply the models inappropriately, because to do so would lead to a wrong reading or interpretation of ordinary landscapes (Meinig, 1979: 40). For example, since Kuching’s waterfront is essentially a ‘cultural landscape’, it would be inappropriate to use a landscape assessment model that addresses issues relating to a ‘natural landscape’. Later, when I carry out an assessment of the riverfront landscape, I will be assessing the expert paradigm not only in terms of validity, reliability, utility and sensitivity, but also in terms of legibility, coherence, complexity and mystery and landscape narrative theory.

These models address specific or central issues in landscape quality assessment. For example, “the definition of landscape quality, the determination of aesthetically relevant attributes of the landscape, the involvement of the landscape observer and the importance of observer, the importance of observer perceptions, feelings and interpretations, and the relationship between landscape quality and other human/social needs and values (Daniel and Vining, 1983: 76).

All of these models recognise the role the actual landscape plays in determining landscape quality, but each model assesses the landscape differently. Interpreting the ordinary landscape in terms of different models is a theme that recurs many times in the landscape literature (Meinig, 1979: 47).

The search for an appropriate theoretical framework for assessing cultural landscapes has continued to remain a problem for landscape designers, because the landscape profession in attempting to interpret ordinary landscape has tried to embrace many landscape issues. For example, some approaches have tried to be
holistic in order to address issues of sustainability and ecological designs (Thayer, 1992: 101).

This notion that landscape assessment theory can address all issues is a major factor which is working against the credibility of landscape assessment theory. The way forward is to apply the correct model to the particular issue(s) and concepts of landscape being considered and supplemented by 'Hybrid' models to address the particular problem or objective of the study. For example, if a landscape is being considered in terms of the important contribution that people make to give meaning to a landscape, then possibly ecological and formal aesthetic models may not be appropriate. This is so because both models "place humans in a peripheral position, with landscape quality determined entirely by features of the environment" (Daniel and Vining, 1983: 77).

The formal aesthetic model which assesses the landscape in terms of formal characteristics such as design axis, form, unity, variety, line, colour, textual and legibility among others is essentially an expert model. That is an individual expert such as a landscape architect with knowledge of design, ecology or resource management, assesses the formal properties which are assumed to be of importance in protecting and reinforcing the landscape character of a place. Whilst this model has high utility, it also has been shown to have low reliability.

In contrast the “psychophysical, psychological and phenomenological models all place humans in a central position. Landscape quality is determined by the effects of the landscape on people” (Daniel and Vining, 1985: 72).

The psychophysical model is perhaps an objective model because it attempts to assess or interpret the landscape in terms of its objective physical or biological attributes. The landscape is assessed by putting measures on human preferences of landscape quality. The landscape quality is measured or given a value from landscape features located on photographs or by direct inventory procedures. The emphasis is on the measurement of the populations “preference for specific landscape qualities based primarily on physical characteristics in the landscape"
Major disadvantages of the model are the considerable time and expense required to actively involve locals in a public participation program and the extensive time and site inspections required to intellectually validate the model.

The psychological model assesses the landscape in more subjective terms and uses the language of the Kaplans (1982: 82) to carry out a visual landscape assessment. In essence, this model assesses visual landscape types from the field inventory to determine the landscapes legibility, complexity, spatial definition and mystery. These terms have specific definitions and therefore are a useful tool for carrying out a visual assessment of the landscape edge of the Sarawak River (Whitmore et al, 1995: 31). The advantage of this model is the fact that "landscape - quality assessments may be left in multi-dimensional terms, or the multiple dimensions may be related to a single preference or landscape - Quality dimension" (Daniel and Vining, 1983: 78). Other advantages of this model is that it allows the assessment of a particular landscape to be considered in terms of a single issue such as 'legibility' or to be considered in terms of other multiple analysis of human landscape experience such as 'complexity', 'coherence' or 'spatial definition' and 'mystery'.

However if this model is to be useful to landscape design experts attempting to read or interpret a landscape it may have to be used together with other models of landscape assessment. In particular a blending with other landscape assessment models such as the phenomenological model may be useful.

The phenomenological model "represents the extreme determination of relevant landscape features with each individual serving as an interpreter of landscape encounters" (Daniel and Vining, 1983: 78). This model is valued by some designers because it recognises that each individual's experience of a landscape is a unique result of the person interpreting the landscape and is valued in its own right. A disadvantage of the model is "that there is rarely any effort to order landscapes on a quality (excellence) dimension" (Daniel and Vining, 1983: 78). This model is also recognised as an 'experiential paradigm' and attempts to consider landscape values based on the interaction of people with the landscape" (Whitmore et al, 1995: 29).
The usefulness of this model lies in its potential to bring forward various types of landscape narratives that focus on the three concepts of landscape.

This study recognises that whilst most themes in landscape assessment and landscape theory have their own particular advantages and disadvantages the problem can be partly overcome by applying the appropriate paradigm(s) in three ways. Firstly the paradigm should be relevant to the scale of the site being studied. For example "whether a landscape is viewed as homogenous or heterogeneous has much to do with the scale at which it is observed. However, the effect of changes in scale was long ignored in landscape ecology and concepts of landscape theory (Arlington, 1998: 53)

Secondly, more than one paradigm can be applied to effectively carry out an assessment of any landscape. For example it has been suggested that linking the expert, behavioral and humanistic paradigms provides an information rich approach to landscape assessment. Additionally transactional relationships which consider cultural influences, biological, heritage and normative aesthetic values provides a better framework for assessing the transactions of landscapes and humans (Nassauer, 1996: 166).

Thirdly, for any landscape assessment to be successful it must recognise the multi-layered series of representations which influence the interpretation of ordinary landscapes. For example at one level the landscape could be read as text, and another level read as Semiotics or past experiences. This multi-dimensional reading or interpretation of 'landscape as place', 'landscape as meaning' or 'landscape as system' has the potential to create an image that "ties together many of the threads of these interlocking characteristics of place ecology. It can be conceived of metaphorically as a kind of "ecological knot" (Dovey, 1985: 105)

This knot is at once a conjunction of the paths and projects of everyday life and a 'knot' that ties and anchors our socio-spatial patterns, meanings and identities (both individual and collective). It is a knot that connects us with other people and also with the physical world (the geography, built form, climate and plant communities). It embodies a connection with the past as a mnemonic anchor and with the future as a vehicle for our dreams and the elaboration of our personal
and collective power. It is this social, spatial and temporal connectedness that constitutes the ecology of place (Dovey, 1985: 105).

The interpretations of landscape place therefore can only be successful if designers recognise that landscape assessment paradigms or landscape assessment theory ties the knot that links people and setting of a landscape with both the past and the future. Thus if any landscape design is to capture the ecology of place, it must integrate the mosaic of "landscape as place" and "landscape as system" to create a healthy experience of place (Dovey, 1985: 105). See Figure 2.3. More importantly the experience of place will be more holistic for humans if the ‘meaning’ (Thayer, 1996: 133) dimensions of technological landscapes are included in the mosaic of ‘place’ (see Figure 2.4).

To some extent the Conybeare Morrison plan for Kuching’s Riverfront that has been built in accordance with their designs for part of the waterfront provides a degree of cultural symbolic meaning at the micro level. Their interpretation of cultural narratives, whilst adding to the design dimension of meaning to the riverfront, appear to be based on a ‘narrow’ realm of cultural narrative messages. That is to say the input is ‘only’ based on the contribution of Museum staff. Sarawak has a wide array of races, and their views about cultural narratives would have provided a much richer appreciation of cultural narratives, had they been consulted in the landscape design process.
Figure 2.3
Ecology of Place
(Dovey, 1985: 105)
“Meaning” Dimensions of Technological Landscape

Through repeated experience with many landscapes, participants mentally construct a cognitive framework of subjective meanings based on perceptual, functional, and symbolic dimensions.

Emotions/Attitudes Toward a Specific Landscape

Participant responds to a specific landscape as if it were an “objective” stimulus, placing it in a relative attitude or emotional response “field” of various proportions of topophilia, technophilia, and technophobia.

A transaction model of human response to technological/utilitarian landscapes. Through repeated experience, a participant categorizes a landscape according to a framework of subjective meanings based on perceptual, functional, and symbolic dimensions, then responds to that specific landscape as if it were an “objective” stimulus “placing” it in a relative attitude “field” framed by topophilia, technophilia, and technophobia.

Table 2.4

‘Meaning’ Dimensions of Technological Landscapes

(Thayer, 1996: 133)
In this analysis of landscape assessment theory it is apparent that whilst no particular model meets all of the objectives of landscape quality assessment, on all landscape evaluation criteria some models are more useful than others. More importantly, the landscape assessment model adopted for a landscape place needs to be relevant not only to the specific landscape place but also to the particular objectives or landscape problem being addressed in Kuching City.

The critical analysis of landscape assessment theory suggests that if the expert paradigm is used together with overlays of the psychophysical paradigm, and the Kaplans psychological model or paradigm, then the paradigm will be useful for carrying out a landscape assessment of Kuching City's river landscape, provided the views of the public are sought as to why landscapes are preferred and meaningful to them. Given that this study aims to identify and reinforce the contribution that landscape place has made to Kuching City, it will also be necessary to consider various aspects of the phenomenological model. This model if used together with landscape narrative theory is useful for understanding what it is that makes a landscape contribute to the experience of place, what is memorable about the landscape and thus contribute to the ecology of place (see Figure 2.3).

2.6 Evaluating Methodologies

The expert paradigm of landscape assessment is useful as a tool to carry out assessments of the cultural landscape, provided it incorporates a degree of community or public participation during the landscape design process (Whitmore et al, 1995: 27). A good approach to landscape assessment therefore should first attempt to gauge the importance of landscapes to humans.

The interpretation of meaningful cultural landscapes is a subjective process, which consists of perceptual, functional and symbolic dimensions - see Figure 2.4. Therefore, it is the subjective frameworks of landscape assessment which provide the weakest links in the landscape evaluation process. This subjective approach to the evaluation of landscape assessment can be overcome if an expert evaluation method is integrated with a public evaluation method.
The integrated landscape assessment process may use trained observers of Kuching City's river corridor to select preferred and representative landscapes. Public review processes could then be used to assess the importance of the riverfront as a resource landscape with about 50 percent public involvement (Whitmore, et al, 1995: 28).

To summarise if a landscape designer wishes to assess only visual quality issues, some of Zube's (1975) work would be the most useful. In contrast if the landscape issues have a focus on aesthetic values and historic preservation then Lynch's (1972) work would be the most useful (Rosenberg, 1986: 98).

In view of the above landscape designers should approach landscape assessment of any landscape with caution. The preferred approach to landscape assessment is to use an integrated landscape assessment approach to address the specific landscape issue or problem. The three constructs of landscape identified in this study together with landscape narrative type theory may be a useful starting point the value of the landscape resource in the first place.

In this study a public valuation method could be used to assess the effectiveness of the waterfront plan implemented for part of Kuching City because it is the most appropriate technique for assessing a case-study (Whitmore, et al, 1995: 27). The approach minimises subjective approaches to the assessment of landscapes, because it integrates three methodologies. Firstly, the expert paradigm, secondly the public valuation method and thirdly the psychophysical paradigm developed by the Kaplans (1982) which attempts to describe landscape types in terms of their legibility, complexity, spatial definition and mystery.
A limitation of the public valuation method is that it interprets some landscapes in terms of areas that may need greater protection and others may be sacrificed. Taken independently, this may be a troubling result of the process because the overall value of the resource is not considered (Whitmore, et al, 1995: 43).

However, the limitations of the public valuation method may be overcome by adopting an objective interpretation of a landscape which includes a new landscape paradigm of "place".

According to Dovey (1985: 93), this idea of a "place paradigm" is beginning to emerge in the literature. The paradigm has also been referred to as a model of human/landscape interaction which integrates the "meaning" dimensions of technological/cultural landscapes with the human emotion/attitudes towards a specific landscape (Thayer, 1996: 133). Nassauer (1995) also recognises the emergence of the paradigm, and refers to it as 'placing nature' (orderly frames: cultural symbols neatness and naturalness) which includes sustainable landscape issues (Nassaueur, 1995: 169 and 1996: 77).

2.7 Critical Review of Landscape Assessment and Other Theories in the Context of a Definition of Landscape Place

Landscape as place is a difficult concept to define, as it takes on different meanings depending on the scale being considered, and the type of landscape assessment being carried out and the type of experience. In addition the role landscape designers wish to play as managers and manipulators of the landscape, will influence the social construct they wish to create at a particular site viz. creating a hardscape, conservation plan, regeneration plan, restoration plan, sustainable landscapes or softscape (Thayer, 1996: 37) and (Van der Ryan: 1996:11).

At a broader level, the regional landscape of the riverine tropical places can be determined by peoples perceptions of the extent to which tropical rivers are interpreted as a landscape of important resource, and the extent to which it is considered as being of high scenic quality. In addition to these two factors the Sarawak River or parts of it within Kuching City need to also be perceived by local
people as a coherent landscape which contributes to the sense of (riverine tropical) place, and the management of the river landscape because of its regional identity, and conservation interest.

The important factor that needs to be considered in defining tropical riverine landscape is the extent to which there is consensus by both professional designers and the public as to the landscape type being protected. For example, which areas should consist of opaque vegetation and which areas should promote transparent properties of landscapes (Thayer, 1996: 141).

The problem with defining landscape is that its assessment into the classification of which elements have value to the public do not score consistent grades in regard to which aspects of visual quality have a distinct, consistent and coherent image to create a regional identity. It is difficult to agree on the contribution non-visual factors have in creating a meaningful riverine tropical landscape. For example which of the following visual/non-visual factors are important, physiography, history, wildlife, topography, vegetation, psychological and abstract images of the landscape or cultural association relating to indigenous architecture, writings and paintings among others, about the area under study.

Therefore in order to conceive which particular aspects of riverine tropical places have visual and non-visual qualities of importance to the public, it is necessary for landscape designers to carry out a landscape assessment of these places and document the scenic (visual and non-visual) elements of the Sarawak River.

The problem with these types of landscape assessment is that an expert’s preference of landscape features may not coincide with those of untrained observers. Landscape assessment in terms of topography and characteristics of landscapes, linkage and services, zoning into landscape zones, hardscape/softscape analysis and studies of riverine tropical plant material, scale and texture may all differ between experts (see Appendix 6.1).
For example, landscape preference based on the non-expert assessment of observers carried out by the Kaplans (1989: 88) environmental psychologists from the University of Michigan found in forested and open landscape associated with rivers that there is a desired preference for a degree of openness. They also found a preference for open landscapes associated with some spatial definition.

Therefore in light of people’s preference for open landscape and the works of Carter (1996: 36), Jackson (1994: 63) and Lynch (1981: 93), it would appear that landscape assessments of riverine tropical landscapes require a degree of simplification, and that assessments should be carried out in terms of complexity, coherence, mystery and legibility (Kaplan, 1982: 68).

This simplification is necessary so that designers can zoom in on specific landscape preference features and produce a design based on strong imagery, spatial definition and abstract composition that gives a clear and specific intention to the user of a space of its inherent landscape place qualities, including the potential for varied experiences of the landscape.

A landscape can be defined at a regional scale as the typical and distinctive space within an area or region. It is the visible established landscape remembered as the total impression from numerous individual views both at ground level and from the air. It does not necessarily identify a naturalistic landscape and can be an agricultural setting, an urban environment, a cultural landscape, a naturally forested environment or a combination of the settings. In order to create a landscape for Kuching's waterfront, which evokes a ‘sense of (riverine tropical) place’ the first task is to spatially define the waterfront as a coherent whole (Thayer, 1996: 15). This can be done by retaining the landscape features of the Sarawak river wherever possible, or by manipulating, extending and reconstructing the rivers edge as Conybeare Morrison (1990) has done for the first part of Kuching's waterfront.

Thus, the manner in which landscape designers perceive the river's landscape will play a significant role in determining whether the design concept does or does not evoke in an environmental psychological context a sense of (riverine tropical) place.
Given that the main spatial features of the Sarawak River, as well as other rivers in Sarawak, are its narrow and linear length, it is this feature more than others that provides the legibility cues for reinforcing the positive features of riverine tropical landscapes. Generally, river edges are linear, but some can have very distinct meanderings through the landscape, as well as sharp turning circles with islands created between rivers. This is the simplified pattern that captures the eye of the tropical riverine landscape when viewed from an aircraft or aerial photograph.

River edges are often perceived as representing boundaries which are soft and real to the eye, they are therefore important organising elements. River edges are important for assisting humans to create a meaningful construct of the landscape because the design treatment of the edge may trigger an experience, memory or a 'sense of (riverine tropical) place', if it evokes a message in the brain, abstract or real that alludes to riverine tropical landscapes in Sarawak. Otherwise, unless the river landscape is arid, it will be perceived as terrain vague and void of any experience to the individual. That is we "receive signals, physical impulses that steer in a particular direction the construction of an imaginary place that we establish as that of a specific place or city" (Morales Rubio, 1996: 5). Often this construction of an imaginary place may create or evoke the wrong image or memory. If this is the case then a wrong "sense of (riverine tropical) place will be created. Herein lies the danger of designing river edges recklessly, or manipulating the river's landscape to create a hard straight edge where the water meets the land.

Once tropical riverine plants are located both physically on the land and in an abstract sense, so that the landscape design concept for the river can be visualised in three dimensions we can begin to immediately experience and see the "sense of (riverine tropical) place" that has been created. Thus the environmental psychologists' approach ensures that because "we have already seen or are going to see some of those places, we consume this semiological mechanism of communication, and the memories that we accumulate through direct experience, through narratives or through the simple accumulation of new signals produce our imagination of the city" the existence of a "sense of (riverine tropical) landscape" (Morales Rubio, 1996:5).
A major criticism therefore of landscape theorists and their works Lynch (1981), Kaplan (1989), Schama (1995) and Carter (1996) among others is that their theories may not capture the dual and multi-dimensional nature of experiences that landscape designs capture. Perhaps a more appropriate landscape theory is one that focuses on landscape narratives but having a focus on landscape as meaning.

On top of this mosaic another pattern of spatial definition may be added to the landscape to allow users of the space to experience the many interpretations of the cultural landscape. For example, a landscape type narrative which complements meaning with a restoration strategy might be more appropriate for the riverfront.

Conversely, in dense forested tropical riverine landscapes, or wide open areas lacking in spatial structure, observers or users of a space along Kuching’s waterfront may perceive a lack of structure and a risk of becoming lost because the landscape does not have an intricate mix of openness and enclosure, mystery and legibility (Kaplan, 1989: 10). A point which was made at the beginning of this chapter.

From the discourse so far, it is possible to conclude that the landscape assessment of riverine tropical places requires an integrated approach which blends the knowledge of ecological processes, ‘place’, ‘meaning’ and ‘system’ with the operational site protection and site management factors and an appreciation of the riverfront landscape resource.

Many of the ideas used in this chapter can be used on Kuching's waterfront to show how sustainable riverine tropical functions can be adapted to improve the landscape designers understanding of how nature functions, particularly the transparent types of ecological processes in operation such as erosion, the need for restoration and bringing out the records of change that have made their imprint on the land. Thus, the role of the landscape designer is to act as a conduit that translates nature's dynamic patterns into practical and innovative designs, instead of imposing abstract, idealised and transplanted western ideas, somewhat decorated with local motifs as solutions to Kuching's complicated cultural waterfront landscape.
This principle is particularly important and appropriate to landscape architects as the managers and manipulators of denatured and natured landscapes because landscape designers have a role to play in ensuring that technological solutions are not allowed to dominate natural patterns and processes that may reinforce a meaning of guilt towards the landscape (Thayer, 1996: 46). Inappropriate or explicit use of technology on the landscape can foster an attitude of fear towards technology, resulting in technophobia (Thayer, 1996: 131).

Landscape designers, through their appreciation of landscape assessment methodologies and qualities of landscape place are trained to exploit and preserve both regional and local identity. They do this by the creative use of plant materials, and landscape narratives which reinforce landscape and meaning. The design process is almost complete when physical and abstract compositions of hardscape and softscape, are integrated and located on the land or water body which decodes a memory or mental conception of a ‘sense of (riverine tropical) place’.

The aim always should be to avoid examples of naturalistic tropical planting design, which encode a wrong reading of the landscape because they will not be culturally acceptable (Thayer, 1992: 30). Society does not need landscape designs which are unsustainable, nor designs which ignore cultural landscape values, and those that fail to recognise their ecological consequences.

However, even where the planting of riverine tropical plants, have been implemented the expression of regional identity and landscape place may not be successful because the cultural context of placing nature or mental conception of landscape place and has not been understood or grasped by landscape designers.

New theories of landscape design and landscape assessment that have begun to address this discrepancy are emerging and being documented in recent writings by Morales Rubio (1996: 11), Sehaik (1996: 48), Thorvaldson (1996: 318) and Thayer (1996: 133) among others.
From this landscape assessment the Sarawak River can be identified as a place, located within Kuching city and a specific region which is perceived by the public as being so important that it should be studied and classified as a regional resource of cultural importance and scenic beauty. This beauty of the river comes not from the existing riverine tropical vegetation system but from the cultural landscape of the river setting in an urban city which is punctuated with a variety of landscape interpretations. Some examples include the flat and high topography, the river’s linear edge, the water body itself, the rise and fall of the river and the array of historical and cultural influences which have left their imprint on the Sarawak River landscape. To this concept or definition of landscape we may superimpose other layers of mental conceptions or mosaics. Some of these compositions may be manifested in the landscape as abstract compositions and the incremental elements of landscape characters identified by Thorvaldson (1996: 319), and the elements inferred from Lynch’s (1981) views in “The Image of the City”, that is paths, edges, nodes and landmarks are elements that give form to spaces within cities and to the city itself by evoking an image that is recognised, consciously or subconsciously. It is important however not to create sensitised landscapes (Groth, 1977: 1).

The problem with these approaches to design is that they do not relate to local values of what constitutes landscape place in a vernacular and environmental psychological context. It is in this context that a design should attempt to come to terms with the issue of landscape as place. This can be done by focussing on landscape narrative types which reinforce memory landscapes that bring out core values of landscapes which reinforce and create meaning. A good example is the State Mosque and Cemetery artefacts including various historical elements on the landscape.

From this definition it is apparent that landscape place is a mental conception that reinforces and contributes to landscape memory and which brings together the diversity of natural tropical land surface units, cultural landscapes and the visually perceived units into a focus as the total sum of these psychological cues (Thorvaldson, 1996: 318).
Therefore, if landscape designers are to be in a better position to design riverine tropical landscapes they need to acknowledge and reinforce the contribution of Kuching's riverfront resource into their design. For example, landscape designers may choose a social construct or landscape narrative of a riverine tropical setting, which depicts a distinctly single concept of landscape place or many other cultural interpretations of the landscape. Thus, the designer has many opportunities to create a construct of the riverfront landscape by explicit story telling, by reading landscape narratives through shared knowledge, of Islamic literature and local history, by reinforcing, collecting memory and implicit narratives which are linked to the site by landscape system process and cultural practices. A good example, is the tradition of Muslims which require them to visit grave sites and care for them during the fasting month of Ramadam.

In reality, the most successful landscape designs for Kuching's waterfront may initially begin by trying to express a single construct of landscape as place, meaning or system that reveals rather than conceals the physical entity of the Sarawak river expressed as an ecological system.

Finally, an assessment of the Sarawak River landscape becomes meaningful when designers put together not a single element of landscape, but from revealing complicated mosaic of interpretations the designer is able to include on the riverfront landscape. Good landscape assessment therefore is about making, selecting and sequencing landscape narratives. Issues of concern relate to how designers can create intelligible narratives and what cultural traditions to draw upon among others.

2.7 Conclusion and Evaluation of Landscape Constructs

Many models can be used to create a 'sense of place' for Kuching's urban landscape waterfront. These models and their numerous variations make up the basic human made models which landscape designers can use to create a cultural landscape and 'sense of place' for Kuching's urban waterfront. These features are all common in the urban environment. On some occasions, similar qualities may be observed in the natural tropical riverine landscape along the Sarawak River.
The Sarawak River has places along Kuching's urban waterfront where the view, treeline, landform, or water's edge has in its own way a coherent identifiable place or landscape interpretations. With the introduction of human-made inventions, the one concept which has recently come into focus is the fragile relationship that exists between humans and the natural landscape. Fewer resources and the growing world population are easily lost by a technology that has taken humans into a realm once considered the home of gods. This global perspective has made society more conscious that the balance between earth and humans is as acute as ever.

It is inadequate to deal purely with the issue of urban tropical planting design, from the context of environmental psychology and the non-picturesque aesthetic, because it suggests that designing a place is an intellectual endeavor. A much better and time tested approach for resolving problems relating to the management, manipulation and recreation of de-natured environments is first and foremost a strong theoretical approach based on ecological and historical/cultural approaches to landscape design. Firstly, this means an emphasis on landscape as system which focuses on restoring, caring and healing of the landscape. Secondly, an understanding of local and cultural practices which brings out the 'very proliferation of masks, of stage events, simulations, scripted places, invented histories, and escapes to other realities' (Potteiger and Purinton, 1998: 25). Thirdly, a focus on landscape as place which includes the idea of landscape narratives.

Without this basic grounding in ecological landscape quality assessment, and the Kaplans (1982) approaches to creating legibility and coherence, it is difficult to comprehend how de-natured environments can be repaired or managed, or how an appropriate landscape place can be created. More importantly, perhaps the landscape designer needs to identify the implicit and richer nature of narratives in Chinese or Muslim cultures so that the designer, with the help of local people, can eventually learn to decipher complex narratives and to reproduce this experience and objects on the landscape albeit in miniature form. This will help to reinforce the memory of landscape, which some cultures cast off when they went through the agricultural revolution.
Thus, landscape designers if they are to have any credibility at all, must work, research and harness their knowledge in ways which will expand the profession's knowledge of tropical plants, ecology and also the ecological history of a place.

Approaches to the design of tropical riverine landscapes in tropical regions like Malaysia that are subject to gigantic storms, floods and very little top soil cannot afford to ignore local geology, drought conditions, land form, soil, vegetation, hydrology and cultural conditions. A blatant ignorance of landscape assessment, and theoretical/ ecological approaches to landscape design may be achieved at great ecological and aesthetic cost because the opportunity to protect an important landscape resource, albeit a unique one may be lost forever.

Thus, the landscape of the waterfront can be assessed by recognising that the Sarawak River has a linear landform which provides the basis for describing and analysing the characteristics of the landscape, within a broader spatial context. There is need to study habitats as interlocking functions of the landscape rather than isolated elements, and also by adhering to a hierarchy of spatial geometry. For example the river can be divided into old and new areas, primary, secondary and tertiary (transact) design axes, to which may be superimposed a grid of palm trees, tropical shade trees and groves of tropical riverine trees for shade and fragrance, so as to reinforce the particular asset of a landscape.

The ultimate aim of landscape assessment methodology and landscape theory is to identify a set of core values that relate to place, system and meaning which meets human/social needs. This focus will make it easier for landscape designers to evaluate the landscape in terms of general criteria, and to also rank the importance of core values to the people of Kuching City. Finally, the designer must select the best paradigm(s) and use relevant criteria such as legibility, coherence, mystery, complexity, that are statistically appropriate in terms of utility, validity, sensitivity and reliability to assess the riverfront landscape of Kuching City.
The assessment of ‘sense of place’ can be read at many levels, or mosaics. At one level it can be read fairly literally -

...as concerned with sensation, with the visual form, colour, scale, smell, etc. ... However, it also includes the patterns of everyday life, culture, economic and social activities, institutions and shared meanings (Dovey, 1985: 96).

Therefore, although ‘sense of place’ can be experienced visually as well as through all the five senses, its roots lie deeper in the structures of societies and the ways that society have adapted and interpreted the physical and cultural setting.

‘Sense of place’ is therefore a difficult concept to use in carrying out an assessment of Kuching’s riverfront, because it depends on an accurate assessment of the ‘meaning’ dimensions of technological or cultural landscapes. These dimensions although subjective by nature, can provide a sound framework for identifying landscapes which society assesses as having the highest value (Thayer, 1996: 129).

The key to creating a sense of place is through a process of parliamentary design, which engages people in placemaking processes, and an appreciation of design practices for telling stories and deciphering landscape narratives.
3.0 SELECTING A PREFERRED LANDSCAPE ASSESSMENT FOR KUCHING

3.1 Assessment of Landscape Place

3.1.1 Introduction

A landscape gains its meaning through the accrual and association of ideas and their interpretation for the community (Taylor, 1997: 4). In this section an assessment framework is developed.

The aim of carrying out an assessment of landscape as place is to achieve a deep understanding of a landscape through a process of phenomenological interpretation. The deeper this understanding of landscape the closer we come to an accurate interpretation of how landscape works as opposed to how a landscape appears. These two questions are generally referred to respectively as the 'surface' and 'core' properties of landscape (Thayer, 1996: 140).

The closer the designer is able to interpret the 'core' properties of landscape the better the chances of being able to understand the 'sense of place' of a landscape setting. In this study the assessment of 'sense of place' can be achieved by revealing the many layers which contribute to the depth of meaning of a place.

The 'sense of place' of Kuching's riverfront landscape focuses on the following layers of meaning: place, context, history, identity, participatory design and the experience of place.

The aim and the challenge for designers is to create a landscape which engages users and leads them to understand what is meant.

Meaning in designs may be apparent or it may need interpretation and accumulate with time; it will be based on experiences (including the challenge of new experiences as well as that born of familiarity or connection with history), human values and sense of fit. (Taylor, 1997: 7)
3.1.2 *Place, Memory and Placelessness*

Perhaps the most useful definitions of place is the term 'topophilia ... which refers to "the affective bond between people and place or setting" (Tuan, 1974: 92). This definition has been expanded to mean "the range of positive human emotions relating to affection for land, earth and nature" (Thayer, 1996: 5). When an individual experiences the depth of meaning or layers of interpretation a landscape offers, their understanding of place improves significantly. The outcome of the experience leaves the individual with a cultural interpretation of landscape which reinforces their meaning, depth of understanding and values.

The 'sense of place' of a landscape provides the basis by which humans gain attachment to a place. Sometimes this idea of 'sense of place' is reinforced to coincide with the idea of 'place attachment'.

There is a danger today that large scale urban renewal, streetscape design and new waterfront projects can lead to the destruction of the 'sense of place' of Kuching's waterfront as well as the loss of place attachment. If this happens to the Kuching riverfront landscape, then the shared memories and the human experiences associated with the place's history and enduring memories will also be lost. More importantly, the connecting thread between people and place meaning will also be lost, sometimes for ever (Hayden, 1995: 12). The outcome of this destruction of place is placelessness (Relph, 1976).

3.1.3 *Kuching's Riverfront Landscape*

Any assessment of landscape cannot take place in a cultural vacuum.

Context is the way in which we make comparisons with other places, it is related to our range of cultural experiences through which we situate a place, see it and interpret it, and construct meaning from it.

(Taylor, 1997: 7)
The aim of carrying out a contextual assessment of Kuching's riverfront landscape is to provide the "opportunity to acquire, over time, layers of symbolism, meaning and significance available to the community" (Taylor (1997: 8).

Many cultural influences have shaped the development of Kuching City. These influences are apparent in the architecture and cultural artefacts of the various races that arrived in Sarawak. Today the built form of Kuching displays this rich landscape narrative of associations and references. For example, the surviving examples of *Samanea Saman*, in the vicinity of the High Court serves as a metaphor of continuity and of a past time and culture which treasured these rain trees. The trees provide a symbol and meeting place of a colonial culture. They present the collective memory and identity of a past time (Potteiger and Purinton, 1998: 3).

3.1.4 **Identity**

Central to understanding the concept of 'place' in Kuching City is identity. "Improved knowledge of the nature of 'place' can contribute to the maintenance and manipulation of existing places and the creation of new places" (Relph, 1976: 44). Every place in the city has identity because identity is "formed not out of legal membership but out of a sense of cultural belonging" (Hayden, 1995: 8).

Landscape design for Kuching's waterfront can help to reinforce the idea of what it means to be a Malaysian living and working in Kuching City. Identity is ultimately related to memory, both our individual and collected memories - where we live and have migrated to, where we go in the city to eat and recreate. Identity also helps us to recall as many memories as possible and provides the network which connects the user of place with the histories of our colleagues, familiar neighbours and different ethnic communities.

Kuching's riverfront is therefore more than a point in space, or a physical setting (Dovey, 1985: 94). The search for identity in a city, is a search that goes beyond surface values of the landscape. Surface values analyses how landscape appears, and provides a sensory impression or symbolic meaning of a place. These values
facilitate "the interaction by which one engages the landscape at its most immediate level" (Thayer, 1996: 140).

Another way to conceive of how identity can reinforce landscape is to understand 'place' as -

the interaction between people and a physical setting together with a set of meanings that both merge from and inform this experience and interaction. Thus 'place' implies both people and meaning. Quality or 'sense of place' then depends on the quality of the experience and the depth of meaning (Dovey, 1985: 94).

The search for a 'sense of place' is therefore related to a search of identity which permeates surface values of the landscape to reach the core values.

Core values are the functional, technological, and ecological properties of the landscape, or the way in which the landscape operatively connects with the larger ecological context including that of humans (Thayer, 1998: 104).

Identity is a process of understanding places which encourages the production of landscapes that are both transparent and congruent, as opposed to opaque and incongruent.

The relationship between 'surface' and 'core' is about 'what you see' and 'what you get'. This relationship facilitates the creation of transparent landscapes - meaning that "their core properties are visible or otherwise accessible; one is able to see into them" (Thayer, 1996: 140). It also encourages the creation of congruent landscapes. In this situation if the surface and core values are compatible, then the interpretation of landscape is said to be congruent. Identity therefore fosters the creation of meaningful places, by making the storehouses of an urban landscape(s) social memories visible.

The power of place - the power of ordinary urban landscapes to nurture citizens' public memory, to encompass shared time in the form of shared territory - remains untapped for most working people's neighbourhoods (Hayden, 1995: 9).
3.1.5 Sense of Place

Places make memories coherent in complex ways and places draw out people's experiences of urban landscape to connect with the complex network that creates 'sense of place' with the politics of space.

If people's attachment to places are material, social and imaginative, then these are necessary dimensions of new projects to extend public history in the urban landscape, as well as new histories of ... cultural landscapes and the buildings within them (Hayden, 1988: 43).

'Sense of place' or depth of meaning recognises that there is a strong relationship between ".. place, meaning and identity on the one hand and cultural and historical factors on the other" (Taylor, 1992: 12). The aim of creating spaces with a 'sense of place' is not to mindlessly recreate historical pastiche or to copy design artefacts from the past. To do so would create a focus on the placement of objects in space, when the aim should be to reinforce the continuity of human experience and meaning.

Kuching's riverfront should recognise the cultural and conceptual context of a landscape. Places should be designed so that they emit meanings which can be "... read by users as part of the experience and enjoyment of the designed place. They are those designs where the designer opens opportunity for transaction and dialogue - participation - between the designed place and users" ... These experiences ... "will be based on users' existing experiences, cultural background and on historical connections" (Taylor, 1997: 12).

3.1.6 Placemaking Processes and Participatory Design

The more research we carry out on a site, the more meanings we are confronted with and the more we realise the complexities of landscape places. The more we study the shape and form of cities the more we realise that there is an ecological knot (Dovey, 1985: 105) which needs to be assessed to get us to the 'core' experience of place (see Figure 2.3). The core of this experience of place ties people and setting with both the past and future. This knot may at times evoke similar
meanings and "yield to a variety of meanings" ... "The study of 'place' and of, 'placemaking' processes must go hand in hand" ... The major opportunity for placemaking lies in the emerging practice of participatory design" (Dovey, 1985: 99). Public participation improves a landscape designer's chances of creating landscape places that are -

... of a good fit between built form and the social life it is intended to sustain and enhance. The value of user participation then is in closing the gap between designers and users. The complexities of a place at any scale are such that designers always operate under conditions of uncertainty (Dovey, 1985: 99).

Public participation in the place-making process is a useful design tool for understanding the depth of meaning people associate with a landscape and provides a framework for the expression and growth of identity (Dovey, 1985: 99; Taylor, 1997: 10). The success of participatory design requires a "certain degree of active and creative evolvement by the participants" (Dovey, 1985: 99). Participation allows design ideas to evolve from the bottom up, it provides the process that allows designers to test the images and the interpretation of meanings they give to places. More importantly the process helps to reinforce the identity of a place, through the landscape narrative of memory landscapes.

Identity must be created, not selected. The design participatory process often provides important opportunities not only to understand how cultural landscapes are interpreted but also provides endless opportunities to negotiate and express a collective identity (Dovey, 1985: 100).

3.1.7 The Experience of Place

The experience of place is a "complex system of people, physical setting and meanings .... which requires an understanding of place-making through time" (Dovey, 1985: 103). The experience of place provides for "an enhanced sense of place and identity which can be interpreted as a kind of 'psychological fit' between people and setting" (Dovey, 1985: 101).

The interpretation of place can be experienced in terms of many loose structures of place. One is Lynch's (1960) structure on city images focussing on components of
landmark, district, node and paths (Hayden, 1995: 27). This structure may be useful in the assessment of landscape if it is considered as a process which contributes to the many dimensions of the 'psychological fit' of a landscape. The structure may also be of use if it plays a "role in making the entire city more coherent in the minds of its citizens" (Hayden, 1995: 27). A similar structure can be observed in a pattern that explains places in terms of both hierarchy and network (Alexander et al, 1977: 28).

If a place is defined as comprising of depth of meaning, then it is reasonable to conclude in a superficial sense, that a place's collective or individual meaning can be a landmark or an enclosure. This conclusion however should only be taken to mean that a landscape assessment of Kuching's riverfront that focuses on "an aesthetic of cognitive mapping" can at best be only a 'surface' assessment of landscape values (Hayden, 1995: 27 and Thayer, 1996: 140).

If designers are to achieve a 'core' assessment of Kuching's riverfront as a landscape, then the design process needs to recognise the ecology of place, and the many hierarchical levels or mosaic of meanings that contribute to the experience of place through the accumulation of memory. More importantly, the design process should not attempt to apply any rigid frameworks, but to recognise that these frameworks are a way of thinking about what experiences should be selected, in order to create a meaningful place for Kuching's riverfront. The design process should recognise that landscape design allows for meaning to be continuously negotiated and renegotiated over time. Sometimes as Richard Chenoweth (1990) has noted the nature and ecology of aesthetic experiences in the landscape may be described or assessed in terms of the; nature of experience, object of the experience including physical, psychological, artistic, symbolic and past associations, ecology of experience and finally, the value of the experience.

The experience of place is in the end a thinking process which recognises the cyclical nature of design. Whilst "possibilities for meaning are certainly created or denied by built form, they are by no means determined, nor limited by it" (Dovey, 1985: 95).
There is logic for using a theory which recognises the cyclical nature of the design process and which helps to identify human preference for landscapes. A framework which allows humans to articulate their preferences for landscapes and which allows "a high degree of ability to become involved with and make sense of the landscape in terms of four properties of landscapes", has gained credibility recently (Thayer, 1996: 13). These properties are: coherence, complexity, legibility and mystery. (See Table 3.1)

These four concepts can be analysed in terms of a two by two, two by two matrix, and have also been used at a practical level to carry out a visual assessment and effectiveness of public involvement in a river corridor study (Thayer, 1996: 14; and Whitmore et al, 1995: 31).

Robert Thayer's (1996) meaning dimensions-framework, provides a useful tool for carrying out an assessment of the Sarawak Riverfront landscape. Firstly it achieves in part the objectives of this study, namely to reinforce the contribution that landscape place has made to the Kuching City riverfront. Secondly, the model recognises the complementary role of the expert paradigm in carrying out landscape assessments of the riverfront. Thirdly, it can accommodate other paradigms such as the Kaplan's (1982) psychophysical paradigm in the landscape assessment process of a landscape, with a focus on the four landscape properties of coherence, complexity legibility and mystery (see Table 3.1). Other paradigms can also be included in the model to gain a deeper understanding of a new 'place paradigm' which has its methodological roots in phenomenology and the inclusion of the 'meaning' dimensions of technological landscapes (see Figure 2.4).
Table 3.1

Four Landscape Assessment Preference Characteristics

<table>
<thead>
<tr>
<th>Present, Immediate or Static</th>
<th>EXPLORATION Seeking Involvement with the Environment</th>
<th>UNDERSTANDING Making Sense of The Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>richness, diversity of the environment</td>
<td>Coherence environment “hangs” together ... is familiar, redundant</td>
</tr>
<tr>
<td>Mystery</td>
<td>- ability to acquire new knowledge by moving into the environment</td>
<td>Legibility ability to explore the environment without getting lost</td>
</tr>
</tbody>
</table>

(Thayer, 1996: 15)

3.1.8 Conclusion

Landscape assessment for Kuching's riverfront can be approached objectively, however a weakness of the landscape as place assessment model is that it needs to be assessed within a framework of the 'meaning' dimensions model (Thayer, 1996: 133). This model depends on humans repeated experience, for categorising landscapes according to a framework of subjective meanings based on perceptual, functional and symbolic dimensions, and potentially creates a problem for designers because an assessment of any landscape cannot be measured accurately.

The problem associated with the assessment of landscape can be largely overcome by incorporating the theoretical works of the Kaplans (1982: 83) and Thayer (1996: 129) into the landscape assessment process. In addition the importance of Kuching's riverfront landscape can be assessed in terms of engaging a design participatory process as well as including the criteria discussed in this chapter, such
as place, context and history, identity, 'sense' of place, placemaking, participatory
design, and the experience of place. To these criteria we could also add coherence
or spatial definition, complexity, legibility and mystery. The more layers we add the
closer we get to achieving a good assessment of Kuching's riverfront as a landscape
and the closer we get to understand what it is that contributes to the experience of
a place, in terms of its nature, object, ecology and value of the experience.

To summarise, landscape assessment has strong connections between the experience
of place and memory as well as revealing the ecological history of the landscape
system. Because of deficiencies in the rating scales approach to landscape
assessment, the measurement of landscape qualities or the importance of core
values, landscape assessments of riverfront landscapes should be supplemented by
landscape narrative assessment theory.

3.2 Assessment of Landscape as Systems

3.2.1 Introduction

In this section a framework is developed for assessing Kuching's tropical river
landscapes in terms of three themes. The first is to establish an understanding of
how tropical riverine landscapes function as a complex landscape system. This theme
will help to reinforce the view that landscape design has firm roots that are
embedded in the earth and therefore landscape architects have a role to play in
remedying the landscape problem of the tropics. Secondly, for landscape design to
be useful to society it should also be given visible expression to the underlying
processes that shape the earth. In so doing landscape designers may succeed in
making useful connections between tropical landscape systems and human culture.
Thus, a study of tropical riverine planting systems and their ecology provides
designers with a sense of order, that is visible and transcends complex ecological
landscape systems. Thirdly, landscape designers need to recognise that if their
landscape designs do not communicate an ethic of care, or orderly frames, even if
the designs promote ecological quality, that may not be appreciated or maintained
by the public (Nassauer, 1995:161). Further, because tropical riverine plant systems
violate our "cultural norm for the neat appearance of landscapes" they tend to be neglected. To overcome this problem ecological designs should strive to make landscape systems visible by promoting a cultural language which promotes "cues to care" (Nassauer, 1995: 163) thereby reinforcing cultural values and traditions for the neat appearance of landscapes. These values are largely symbolic.

To summarise, the assessment of the Sarawak River 'landscape as system' could be approached in terms of the extent to which the riverfront landscape contributes to the highest possible landscape value. In this chapter I will focus on the perceptual and functional dimensions of Thayer's (1996) theoretical framework.

3.2.2 Tropical Landscape Systems

Meinig's (1976) twelve interpretations of landscapes demonstrates the complexities inherent in trying to understand landscape as systems. Tropical riverine landscape systems are of infinite complexity. They give an impression of messy ecosystems of dynamic complexity to the uninitiated and uneducated.

To overcome this perception of complexity in our ecosystem, ecologists have put together a view of tropical riverine planting systems that are hierarchically organised. If landscape designers reinforce complexity rather than a sense of order in their tropical designs, then it is likely that society will reject their designs, because it lacks order and visible expressions of care.

Landscape design which reinforces this sense of order has a tendency to inform the landscape we see. Every ecological design problem, connects with larger ones until it escalates to the regional and eventually the global scale. Therefore, a small ecological design solution for any part of the Kuching riverfront, combines with the linear length of the river system to provide a solution to a larger problem. This problem may be perceived as the reckless destruction of tropical riverine vegetation systems, to make way for oil palm plantation projects, transportation of logged rainforest timber, and massive hydro-electric projects. Extensive destruction of tropical rainforests may lead to the destruction of water
catchments and various wildlife habitats. These threats slowly escalate from local problems, to regional problems which affect the sustainability of local human habitats. Indigenous people and city dwellers that require good quality water for drinking may soon realise that their source of water supply is polluted and harmful to their health. Eventually, the landscape problem escalates to one of global sustainability. Sustainable development has been defined as "improving the quality of human life while living with the carrying capacity of supporting ecosystems" (Thayer, 1996: 100).

If we can understand the tropical landscape as a system in which order exists at every scale, then it may be possible to "restore humanity to its rightfully harmonious role in nature's scheme of things" (Lyle, 1990: 39). At a practical level we might be able to provide many shady tropical plant species to protect people from the harsh tropical climate of sun and rain, reduce degraded river landscapes and minimise the flow of silts into the river.

In the context of all these issues it may be logical to redefine landscape as the visible manifestation of a landscape system. This is essentially an "underlying order based on scientific understanding along with a faith that human creativity can use such understanding to give cultural significance to their theory" (Lyle, 1990: 39).

The underlying order of tropical river systems may be analysed in terms of Robert Thayer's (1996) functional dimension consisting of informative, agricultural, transportive, energetic and transformative values an the perceptual dimension comprising consumptive, sustainable, utopian and nostalgic values. (See Figure 2.4)

Firstly, landscape systems that are informative or tell a story about landscape narrative are a useful way of interpreting the value of tropical landscape systems to the individual and to society. The Sarawak River and its landscape may be assessed in terms of its potential value as informative technology. Thayer, (1996: 12) defines informative technology as that "which involves the generation, transmission, dispersal, and digestion of information rather than physical materials or hard goods". In this context it could be argued that Sarawak's tropical plants have the potential
to create a relatively inexpensive approach to the landscape design of Kuching's waterfront. Compared to the functional characteristics of other more intensive landscape or system technologies such as roads, the land, trees and buildings, informative landscape system technologies have more landscape value (Thayer, 1996: 122 and Meinig, 1979: 37). Humans generally find little inherent unpleasantness in the few visible landscape manifestations of the transfer of information, provided they tell a coherent story.

The core values of Kuching's riverfront landscape may be analysed in terms of a landscape system which penetrates the facade of tropical riverine trees to reveal a transect of complicated landscape systems. In particular a landscape system which makes visible the informative technology of the tropical riverine landscape.

Secondly, the underlying order of a landscape as system in the tropics may be assessed in terms of the perceptual dimension of Kuching's riverfront landscape. This dimension assumes that humans biologically prefer natural landscapes, and therefore react negatively to cultural landscapes and technologies which are perceived as intrusions on the landscape. According to Thayer (1996: 112) we perceive these intrusions at the most basic level "as radical deviations to the form, colour, reflectivity, pattern or activity level of the natural background context".

Based on well-supported evidence Thayer (1996: 113) suggests that humans prefer 'natural' landscapes over those that are 'man-made'. He has therefore identified four basic categories ranging in value between these two extremes which reflect our perception of technological intrusion on the landscape: invisible, implicit, explicit and iconic.

For the Kuching riverfront the landscape systems which are likely to contribute to the public's perception of highest possible landscape value will yield technology landscapes that are invisible or implicit because the landscapes create a metonymy construct which reinforces positive meaning by association - by cause and effect.
Invisible technology, in landscape terms results in minimal change or has "no visible effect on landscape structure, form or materials - at least for the untrained eye" (Thayer, 1996: 113).

Implicit technology is the form or pattern left on the land when technological machinery or other essential hardware has 'come and gone'. Implicit technology may dramatically alter or rearrange the 'natural' landscape of soil, rock, vegetation or water, but leave little in the way of obvious manufactured materials such as asphalt, concrete, plastic or steel" (Thayer, 1996: 113).

The key therefore to identifying and reinforcing the contribution that landscape has made to Kuching City is to focus on a landscape as system - interpretation which reflects the invisible technology or implicit technology dimension.

Since the Kuching riverfront is essentially a cultural landscape it is assumed that the implicit dimension of technology would be more appropriate for promoting the landscape in terms of its highest possible value.

Thirdly, the Kuching riverfront landscape may be assessed in terms of Thayer's (1996: 12) symbolic dimension. This dimension is the most abstract, because the values that humans attach to these landscapes tend to be the most fluid in terms of associated values. Therefore, symbolic values are difficult to assess, and because of this difficulty, a separate section is set aside to assess the landscape in terms of symbolic values.

3.2.3 The Functional Dimension of Landscape as System

Kuching's riverfront landscape may be assessed in terms of five major categories of technological function. For the riverfront landscape these categories may be identified as transformative, transportive, energetic, agricultural and informative (Thayer, 1996: 117). These categories are not fixed, and may also exist in other categories.
3.2.3.1 *Transformative technology*

Kuching's riverfront landscape is testimony to many examples of transformative technology. The impact of this category of technology is the most significant because its major purpose is to transform the tropical riverfront landscape of its earthly materials for the benefit of humans. Thayer (1996: 117), cites examples such as mining, manufacturing, and construction which require the conversion of raw materials from the earth's surface and sub-surface into other materials, goods and structures. The Sarawak steamship building, concrete jetties and the Conybeare-Morrison waterfront plan, are examples of transformative technology.

The impact of the new and old technologies on the riverfront landscape, are important because they strongly influence our attitudes and overall assessment of the landscape.

To minimise the impact of these transformative technologies on the landscape, society has created its own methods to assess or minimise the impact of these technologies on the landscape, including land-use zoning, environmental impact assessment procedures, visual impact procedures and other themes in landscape assessment theory (Zube, 1984: 105). For example, any number of these transformative technologies could be assessed in terms of the Kaplans (1982: 80) categories of complexity coherence or spatial definition, legibility and mystery.

At a broader level transformative technologies are generally "ranked low on the ideological value scales of most citizens" (Thayer, 1996: 118). However, they might be ranked as of having highest possible landscape value if the technologies are assessed to have nostalgic values which are implicit or invisible.

Many old buildings and structures on Kuching's riverfront landscape would have a low ranking because the story realm is not clearly articulated in the
landscape. That is the landscape narrative of these places in terms of its context story, temporal order character, agency and events do not elicit a clear system of signs that make and suggest a coherent and believable story. These are: Brooke Dockyard industrial buildings, Hawker buildings and stalls, vegetable, pork and poultry markets, among others.

3.2.3.2 **Energetic Technology**

"These technologies transform energy resources into useful work, and therefore they provide the means by which other utilitarian technologies operate" (Thayer, 1996: 118). These technologies may be renewable or non-renewable. Much of this technology is tangible and can readily be seen on Kuching's riverfront such as the power lines and the electrical energy that is needed to make the fountains operate, and turn the waterfront lights on at night. The electric energy that is needed to operate these various landscape systems on the waterfront is not always reliable. At times the fountains do not operate for weeks and the fountain ponds are devoid of water. This malfunction of the energy supplies exposes fountain technology, pipes and pumps when the fountain has no water, thus promoting a degree of confusion towards energetic technologies.

Technologies which confuse people, probably reinforce the cultural languages that they are not wanted or needed by society because expressions of human care and naturalness are lacking (Nassauer, 1995: 163). Consequently, parts of the waterfront plan prepared by Conybeare Morrison are often misunderstood as being in appropriate by the local population when in fact they should be assessed as part of the intricate landscape system that they are.

The Brooke Dockyard site may also be mistakenly misunderstood as being inappropriate because the entire site is surrounded by unsightly wired fences and may be interpreted as a wasteland or junkyard.
3.2.3.3 **Transportive Technology**

Transportive technology which moves people, material or goods from place to place has had a great impact on Kuching's riverfront and has "largely defined the landscape we inhabit today" (Thayer, 1996: 118).

Samples of transportive technologies on Kuching's riverfront landscape are: floating pontoons, concrete wharfs and steps which facilitate entry and exit on to the river boats. Other examples are the bus station, car parks, loading and unloading areas and the mooring areas for boats, including areas for maintaining boats, of various sizes.

These transportive technologies particularly those associated with river transport have a long history of permanence and evolution and are part of the local culture. These technologies are acceptable because all races have used the river as a primary means of transportation. Therefore, although transportive technologies have adversely impacted on Kuching City and its riverfront landscape, they are, according to Thayer (1996: 118) "generally more highly valued than transformative or energetic technologies. It is reasonable to conclude therefore that transportive technologies which reinforce the locals use of the river will be highly valued.

3.2.3.4 **Agricultural Technology**

Thayer (1996:120) defines agricultural technology as "the manipulation of the surface of the earth and water for the production of food and fiber". There is a deep-seated bias in most cultures for rural landscapes partly because of our need for survival and essential necessity for food and fibre.

The Kuching riverfront landscape has one area located to the west of the State Mosque which has permanent coconut plants. The waterfront also has a vegetable market and the river itself which is accepted as a source of fish and other marine life delicacies.
Therefore the river itself, and the rural coconut landscape adjacent to the State Mosque, despite the high levels of river pollution and land degradation are landscapes that are still ranked highly because of their visual, spatial and human survival values.

This simple assessment of the Sarawak riverfront suggests that there are two major landscape areas which are considered by the local population as having the highest landscape value. Firstly the Sarawak River and secondly the rural agricultural landscape located to the west of the State Mosque. This assessment, like the other assessments of the riverfront landscape are done within the context of the expert paradigm.
3.2.3.5 **Informative Technology**

Thayer (1996:120) observes that "informative technologies have far fewer visible manifestations since their main product - information - is an 'invisible' concept". However depending on how these informative technologies are defined they could be either visible or invisible. In landscape terms they are considered to be largely invisible, apart from Signage and Music from the Fort.

Informative technology landscapes apart from Signage do not exist in the Kuching City riverfront, and although they cannot be assessed, there is potential to make more provision for the planning and design of narrative informative technologies in Kuching’s riverfront landscape.

3.2.4 **The Perception Dimension of Landscape as System**

Kuching’s riverfront landscape may also be assessed in terms of four basic categories of technological intrusion on the landscape. The levels of intrusion are in fact perceptual cues, which provide an initial recognition of technology (that is a human, utilitarian alteration to ‘natural surroundings) through form, colour, reflectivity, texture and pattern" (Thayer, 1996: 12).

The four categories of technological intrusion are invisible, implicit, explicit and iconic landscapes.

3.2.4.1 **Invisible Technology**

In terms of the cultural landscape, technology is said to be invisible or minimal when technological change is perceived as having “no visible effect on landscape structure, form or materials at least for the untrained eye” (Thayer, 1996: 113).

Tropical landscapes particularly plants that have been instantly planted using transplant technologies may be acceptable to the local population.
Similarly, neat tropical landscapes that are dotted with indigenous tropical plants or imported plants may also appear to be invisible, because the technology that created the landscape design is not immediately visible. Consequently, humans have to draw on their cognitive processing abilities or their own creative imaginations to "understand and assign relative value to it. Where landscape assessment of Kuching's riverfront falls into the invisible category, particularly in situations where an assessment of softscape is relevant, the psychophysical paradigm may be useful (Zube et al, 1982: 25; Whitmore et al, 1995: 30; and Kaplan, 1982: 82).

In these situations an assessment of the riverfront landscape may focus on the relative value of landscape types. For example, is the riverfront landscape a natural, cultural or a combination of natural and cultural? Other landscape features may be added to the assessment of landscape type to differentiate areas within the landscape type, viz. landform, vegetation patterns, water forms, rock formations, mud flats, colour, texture, harmony, variety, contrast, adjacent scenery, scarcity and cultural modification (Whitmore et al, 1995: 31). Each of these factors or variables can then be assessed against the Kaplans' (1982: 82) four characteristics which affect humans preference for particular landscapes (Thayer, 1996: 15).

In this context the cultural riverfront landscape softscape in the vicinity of the State Mosque and the Chinese Chamber of Commerce building would probably be rated as the most preferred landscapes. The former is a cultural landscape, whilst the latter may be appropriately categorised as an invisible cultural landscape because it used invisible technology to create the landscape design of Kuching's new waterfront.
3.2.4.2 **Implicit Technology**

Thayer's (1996: 113) definition of implicit technology suggests that this category may be appropriate for assessing Kuching's riverfront landscape because it leaves little evidence of technological prints on the landscape. Implicit technology however may express the interactive wholeness of landscape systems, ecological processes and its relationship with the larger world.

Whilst implicit technology may drastically alter or rearrange the 'natural' properties of the landscape, it is perceived as being of medium to high landscape value because it exhibits qualities of care for the landscape (Nassauer, 1995: 165). Examples on Kuching's riverfront which demonstrate attractive qualities of care are the trees, birds and native vegetation planted in the vicinity of the State Mosque, and good conservation practices which show that no erosion is occurring.

3.2.4.3 **Explicit Technology**

Explicit technology consists of essentially man-made materials and forms or 'landscape'. This type of technology is very visible and so “widespread as to be perceived as integral and essential to the total landscape” (Thayer, 1996: 114).

Examples of the use of explicit technology on Kuching's riverfront landscape are; the Conybeare-Morrison waterfront civic design features, adjacent roads (Gambier Street and Main Bazaar), concrete kerbs, brick paths, concrete retaining walls, jetties and an array of buildings and structures. Most of these features...

...are 'tuned out' and not noticed. In a direct way explicit landscape technology is the contextual fabric of our modern experience - the human altered backdrop against which most of our daily life occurs" (Thayer, 1996: 114).
3.2.4.4 Iconic Technology

Iconic technology is generally very conspicuous on the landscape. Its medium of expression may be described as comprising; large-scale elements "unique form or function of controversial nature" (Thayer, 1996: 114). A good example on the riverfront is the Brooke Dockyard, particularly the Dock and its associated industrial buildings. Generally because these technologies are conspicuous on the landscape and represent the outcome of a visually dominant technology, they are less valued by humans regardless of their functional or symbolic overtones. (Thayer, 1996: 114) This observation has been reinforced in Kuching City, where the government has made a policy decision to relocate the Brooke Dockyard.

In situations where iconic technology exists and is not valued, society sets aside large amounts of money to camouflage or screen these technologies. However, if iconic technology such as the Istana (Pollard, 1972: 10) and the northern riverbank are valued by a cultural community because of their heritage iconic value, then they will be cared for by society. In this context, the landscape system may be perceived as a landscape narrative which communicates to the observer and user of the landscape, a place which says something about the contextual/intertextual realm (landscape as place). Here, the landscape assessment may focus on stories which relate to many aspects that are outside their control. These stories may consist of multiple references and traces which live their land print and histories on the landscape. The stories tell of many authors, the influence of the White Rajahs and today's designers in shaping and moulding the northern bank of the Sarawak River. The important point to note is that each author of the landscape can interpret the landscape in different contexts and from multiple points of view. In so doing, designers offer opportunities for opening up the text, creating layers of texts and references, passing and communicating information and reinforcing attributes of landscape and memory.
3.2.5 Order in Landscape Systems

Order in tropical landscape systems are infinitely complex in their detail, but are conceptually relatively simple to understand in concept. Essentially, tropical riverine systems in Sarawak comprise of three modes of order, all of which we reshape to use in the design of a particular landscape. The first is a structured order of tropical landscape systems which shows the relationship between living and non-living elements. Rocks, soil, plant, and animal species are some examples. Basically, this structural order is a natural process which changes over time, from succession to climax systems. The landscape system is a complex interaction of systems and diversity which are in equilibrium.

The second landscape system is a functional system which focuses on energy flows and the distribution of materials, including nutrients and sunlight which are essential for maintaining the life of the species such as plants and animals. When humans interfere with these landscape systems by logging tropical riverine rainforests and clearing the vegetation adjacent to rivers on a large scale, they materially alter the landscape system. That is landscape system structure, energy flows and essential materials are altered by human activity.

The third landscape system seeks to explain how locational vegetation patterns exist adjacent to Sarawak's tropical rivers. This pattern is often the only one which is used in landscape designs. The shape, height, structure, type and cover of tropical riverine plants used vary from place to place, depending on the micro-climate, geology and soil conditions.

The ability of the Kuching riverfront to support the tropical riverine softscape will depend on the place's specific conditions. These conditions in so far as they apply to the Sarawak River landscape are described in this section.
3.2.5.1 *Landscape System Conditions*

Landscape system conditions fall broadly under soils and microclimate. The soils in the riverfront area are made up of deep alluvium deposits which over the years have been carried from up river slopes that lead into the Sarawak River. These alluvium soils are generally well drained, but have inherent problems related to fertility and salinity.

The Sarawak River is subject to extreme tidal ranges, as well as an annual rainfall in excess of four hundred millimeters. This has the effect of leaching nutrients from the soil, resulting in low fertility. Further, alluvial soils, due to their formation processes lack cohesion and structure, making them more susceptible to erosion.

The organic function is also likely to be low. Over the years the banks of the river have been subject to the addition of composted organic material. This practice of filling the river banks with organic material has improved the nutrient holding capacity of soils, as well as the soils fertility and should be continued until tropical riverine plants have been established.

Much of the low lying area to the north and north-east of Kuching City is mantled by quaternary alluvium which is composed of riverine swamp sediment and marine sands with soil, clay, peat and some gravel. In addition to these deposits there are isolated areas mantled by older alluvium near the City of Kuching. The older alluvium consists of sand, pebbles and local gravels. Current geological maps do not indicate the presence of additional recent alluvial materials further inland, however the banks of the Sarawak River exhibit evidence of recent alluvial deposition such as well sorted sand from the river for use as construction grade sand.

In addition to these materials, the river banks are composed of occasional gravel beds, which could impair the growth of plants. The site is typical of much of the riverine landscape of Kuching with the underlying formation being derived from sedimentary rocks (Baillie, 1976: 10). Borings were
put down in 1913 by engineers responsible for constructing the Brooke Dockyard. These borings were put down at a suitable depth to take foundations for the Dockyard and associated structures, and indicate that the layer of shale is usually overlaid on extensive layers of superficial sediments of alluvium (Carew-Gibson 1913: 24).

The geological formation and lithology consists of essentially shallow water, fluvial and marine deposits. Textures, vary from clay to sand, and soils at various depths comprises of; peat, sand, and mud; soft yellow clay; hard yellow clay, white clay, red shale, blue clay, blue shale, soft clay, and mixed sand.

Based upon the limited sub-surface information available it has been estimated that the depth of the alluvial sediments ranges from three to fifteen metres. The riverine alluvium is dissected by numerous river and tributary courses which have exposed the alluvial materials and bedrock on the river banks. These exposures are best observed at low tide. It has been postulated that much of the alluvial sediment may contain sea water. This theory is supported by the fact that parts of the rivers and tributaries become increasingly saline as the tide rises and sea water moves inland up the rivers.

Alluvial landforms are characteristic of the study area, and essentially fall into the group set aside for coastal swamps, river floodplains, and quaternary terraces. Soils along the riverfront are formed in an environment that combines high temperatures, heavy rainfall, steep slopes, and sedimentary rocks. There are large areas of alluvial soils including peat, podzols, grey white podsolic soils and gley. Many of the alluvial soils have poor or imperfect drainage (United Consultants, 1990: 4). Climatic conditions affecting the study area are influenced by the tropical monsoons and proximity of the equator to Kuching. The riverfront is subject to high temperatures, high humidity, and high rainfall, with significant downpours.
and thunderstorms noticeable from the month of November to February. Kuching's climate therefore is typical of a monsoonal climate.

Climatic data for Kuching has been collected since 1876. Mean temperatures range from an average daily maximum of 31.5°C and minimum of 23.1°C.

The mean annual rainfall is 4042.8mm with rain falling on average two out of every three days. The monsoonal period, often referred to locally as the 'Landas' season, occurs from November to February. There are no prevailing winds within the study area; due to the tropical nature of the climate which is characterised by heavy rainfall that ranges from 3,000 - 4,000mm annually. Although the waterfront is endowed with this heavy annual rainfall, the pattern of its distribution, both spatially and in time greatly affects not only the distribution of water resources but also modifies humidity to create localised cooling along the waterfront. (Mailvaganam, 1995: 78).

With such extremes of microclimate, design consideration needs to be given to the provision of shade and shelter to combat the very hot and wet conditions.

3.2.5.2 **Engineering Assessment**

The tidal range experienced by the Sarawak River will have considerable influence on the planting and hardscape design of the riverfront. The difference between mean higher watermark and lower watermark is 3.5 metres. King tides occur during the rainy season between November and February. These tidal extremes have implications for the design of river bank structures. Wharves and pontoons will need to be studied in detail before recommendations can be put forward for the design of the riverfront.
The City of Kuching is sited on the flood plain of the Sarawak River upstream from its delta, and is fed by numerous streams from the nearby hills (see Figure 3.1). The combination of high rainfall particularly during November and February with the King tides results in periodic flooding occurring, sometimes with devastating effect (Conybeare-Morrison, 1990: 21).

The design and documentation of riverfront structures must therefore have regard to the fact that flooding will occur from time to time in spite of the best design efforts to mitigate against these extremes.

The pressures of pollution and development have taken their toll on the water quality of the Sarawak River. While most of the city is seweried by septic tanks, effluent seepage, from riverfront urinals, septic tanks and direct seepage from nearby Malay villages will continue to create problems unless major infrastructural measures are planned and implemented by the government. However in the interim there are some important management issues which could be addressed. Among these are the need to stop the disposal of garbage and waste from the wet markets direct into the river. The Council itself can introduce an efficient and enforced garbage and waste disposal service (Conybeare-Morrison, 1990: 28).

The increased use of disposable plastic packaging and containers over natural biodegradable wrapping and re-usable containers is having a detrimental effect on the city and its river systems. The success of any riverfront landscape solution will depend largely on the maintenance strategies put in place, as well as the maintenance of an efficient disposal and cleansing system (Conybeare-Morrison, 1990: 30)
Upstream the clearing of vegetation resulting from large-scale development, soil erosion, and land degradation is also affecting the quality of the Sarawak River. Whilst outside the scope of this thesis the provision of riverside structures should have regard to siltation and deposition effects. These effects should be taken into consideration during the ecological design phases.

In order to improve the visual quality of the river, measures should also be put in place to remove on a regular basis the flotsam along the Kuching riverfront by netting or other appropriate collection methods. The existing stormwater system, where it discharges directly into the river within the study area will require re-evaluation particularly in the area of the former water courses of the Sarawak River and Gartak River (see Figure 3.1) (Conybeare-Morrison, 1990: 32).

The design of the stormwater system capable of handling the heavy rainfall will need to be carried out, and maintenance systems put in place to ensure the separation of solid waste and packaging from stormwater run off.

Areas of the riverfront which are relatively wide and/or where mud flats have formed could be suitable for reclamation. A number of prototype have been evaluated in the ‘Master Plan Study for Coastal and Riverine Transport in Sarawak’ and generally recommend using reinforced concrete reliving platform structures (Conybeare-Morrison, 1990: 35).

Environmental and engineering issues will have a big influence on the design of the river-front platform, and the type of structures and hardscape finishes to be used in the landscape design solution for the river-front.
Figure 3.1

Kuching City and its Relationship to Nearby Hills and Old River Systems

(Pollard, 1988: 45)
The type of selected infill used on the riverfront will also be a determining factor in selecting the type of tropical plants to be planted along the riverfront. Therefore if the design objective is to recreate a tropical riverine rainforest, the landscape designer will need to select soils which will support a tropical riverine rainforest. However, other conditions will also need to be planned for, if the tropical riverine plants are to survive in an urban waterfront setting. More important to the landscape design assessment process is the extent to which these engineering technologies will gain acceptance by the local population when assessed against Thayers (1996: 129) theoretical ‘meaning’ dimensions of technological/utilitarian landscapes.

3.2.5.3 Tropical Riverine Vegetation Systems

Sarawak's tropical riverine vegetation Systems fall into three categories, namely the beach or littoral forest, mangrove forest, and peat swamp. The vegetation structure and composition of plants adjacent to rivers have a unique habitat. This habitat is different to the vegetation systems and ecology of tropical rainforest and secondary rainforest. Therefore, if the landscape designer is to be successful at replicating the vegetation of tropical riverine systems a better understanding of these vegetation systems are needed. (Anderson, 1963: 3).

The need to document and understand the ecology of tropical riverine Systems is becoming more and more urgent as Sarawak's Rivers and adjacent vegetation Systems come under pressure for development, and the planning of new towns. More importantly there is a need to document which tropical plants grow successfully along riverbanks so that future generations are left a legacy to put appropriate seeding programs in place, and store the gene pool for the future.
beach or littoral forest occurs along the coast on stretches of recently deposited sands. The most characteristic Species is Casuarina equestifolia but other associated species largely confined to this type of forest are Terminalia catappa, Pongamia pinnata, and Calophyllum inophyllum. In most localities beach forest grades rapidly into the peat swamp forest. Casuarina equestifolia is a protected tree and the felling of it is prohibited to prevent coastal erosion, whilst Dipterocarpus oblongifolius is protected to control river bank erosion. (Bruenig, 1987: 331) and (Yap and Mohamad, 1991: 16).

The mangrove forest occurs along the coastline and within estuaries of rivers where alluvium brought down by the rivers is deposited. All parts of the mangrove forest are liable to flooding by saline water, and the degree and frequency of inundation largely determines the species that will grow in these localities. On the seaward Avicennia spp and Sonneratia spp are found in pure stands. Further inland members of the family Rhizophoraceae, including two species of Rhizophora spp and four species of Bruguiera occur. These are the most valuable timbers of the mangrove forest. In areas that are only inundated at spring tides Exoecaria agallocha may form almost pure stands. The Nipa palm (Nypa fruticans) covers large areas where there is influence of fresh water. (Anderson, 1963: 3).

Over the last five thousand years alluvium deposited in sheltered bays and within deltas of rivers has been colonised by mangrove, but with the seaward progression of the mangrove areas, this type of forest has changed because they have been less frequently flooded and finally not flooded at all. These latter areas form the peat swamps that now cover about twelve per cent of the land surface of Sarawak. The soil is entirely composed of peat, which is the undecomposed or semi decomposed vegetable matter of previous generations of trees. The
forest types tend to change in uniform sequence from the perimeter to the centre of each swamp, though in recent coastal swamps the sequence may not have developed. The peat swamp forest falls into a number of categories. Among these are the; mixed swamp forest, alan forest, alan bunga forest, padang forest, and the padang keruntum forest (Anderson1, 1963: 3).

The mixed swamp forest occurs on the perimeter of the swamps and covers extensive areas of mainly shallow peat near the coast. This is the most valuable forest type containing *Gonystylus bancana* (Ramin), *Dactylocladus stenostachys* (Jongkong), *Copoaifera palustris* (Sepetir paya), and four species of *Shorea* spp (Meranti) (Mailvaganan, 1992: 101 & 108).

The Alan forest is similar to that of mixed swamp forest except that it is dominated by huge, usually very defective, trees of *Shorea albida* (Alan forest). This type of forest is most extensive in the Rejang Delta.

The Alan Bunga forest consists of almost pure stands of *Shorea albida* with an even canopy at a height of between 55 and 64 metres. Extensive areas of this forest type occur in the second and fourth divisions of Sarawak.

Located in the centre of many swamps is the Padang Alan forest. All trees are relatively small (few exceed 180 centimetres girth) and the forest has a pole like aspect. Species are few and the most common dominant is Padang Alan forest, though in some areas such as in the Rejang Delta *Litsea crassiolia* (Medang padang) is the most dominant. This type of forest is known as the Padang medang (Anderson¹, 1963: 3).
The last development in the swamp forest is the Padang Keruntum, which only occurs in the centre of the oldest swamps in the Baram. The forest is very open and all trees are small and stunted. The only species to exceed 600mm girth is *Combretocarpus rotundatus* (Keruntum). *Dactylocladus stenostachys* (Jongkong) is very abundant as a small tree or shrub. Surrounding Padang Alan and Padang Keruntum forest a sixth forest type, intermediate between Padang Alan and Padang keruntum, is recognised. Neither of these two forest types have any timber harvesting value (Anderson¹, 1963: 3).

3.2.5.4 *Riverine Tropical Landscapes*

Riverbanks and low lying areas beyond the banks that are liable to flooding have a distinct vegetation. Much of these areas are now under cultivation. Typical trees along inland rivers are *Dipterocarpus oblongifolius*, and *Shorea macrophylla*. This is also the habitat of other river trees such as *Eusideroxylon zwageri* and *Eusideroxylon melangangai*. The comments that follow need to be considered in the context that the Kuching City riverfront is a very narrow linear landscape.

These trees and also many shrubs and ground covers found in the riverine riparian forest of Sarawak are not suitable for developing an urban tropical planting design for the Sarawak River foreshore for many reasons. Firstly, there is difficulty in obtaining viable seed of the primary forest giants. Secondly, trees that grow naturally in river areas may be slow to grow when transplanted out of their natural habitats, and difficult to establish in urban areas. Thirdly, tropical vegetation may not tolerate pollution and it may be difficult to find the right soil conditions and maintenance regimes. Fourthly, the direct transplantation of tropical rainforest trees to urban riverbanks may result in incompatible scale differences between rainforest trees and the urban context, and fifth, the non-availability of tropical rainforest plants in nurseries makes it difficult
for landscape designers to select trees for the riverfront development (Anderson¹, 1963: 3).

A natural tropical river landscape appears to need hundreds of years to create the forest cycle, and in our haste to proceed with development, countries which have abundant rainforests such as Malaysia are not willing to wait for such ponderous processes. (Steed, 1986: 28).

Many landscape problems relating to urban areas need to consider the long term cycles and the urban scale of the Riverfront that are needed to create an authentic riverine tropical landscape. However, having regard to this constraint, designers of riverfronts in urban areas will have to focus on creating modified tropical rainforests.

In essence while the landscape designer can select tropical riverine plants from a wide palette, the choice of plants will need to be broadened to include a range of plants from both the primary tropical rainforests as well as the secondary rainforest.

Therefore, designers need to recognise that tropical riverine plants, as well as those from the primary and secondary rainforest will take time to develop. In this context the design emphasis for the riverfront should be on creating a landscape which is capable of being managed, and implemented in harsh urban tropical landscapes. The design objective therefore should not be to create an authentic tropical riverine rainforest, but rather a landscape which evokes the image and memory of a tropical rainforest landscape. In a design context, this could be reflected in Kuching's waterfront landscape plan by recognising the importance of interactions between tropical riverine vegetation systems that exists in nature. To achieve or recreate the tropical landscape character of the river, the main goal should be to
restore hydrologic flood plain dynamics and landscape plants which maintain ecological processes in the Sarawak River floodplain. Under these conditions, the Sarawak River tropical alluvial forests may regenerate and provide habitat for many species. In some parts of the waterfront, the lower mud flats within the city could be left intentionally in order to establish a hydrological connection with the river. Other areas however, may be raised above the flood level to provide greater flood protection and diversity in the landscape.

3.2.5.5 Potential Ornamental Plants from Sarawak’s Rainforests
It is from Sarawak's tropical rainforests that many plants are collected and found to have potential as ornamental plants. They are the herbs, shrubs, creepers, epiphytes and small trees. From a landscape planting viewpoint these plants are visually beautiful for their brightly coloured flowers, calyx or bracts or for the shapes or arrangement of their leaves. They are suitable for planting in pots, gardens, and at roadsides. These plants are collected from all different types of habitats throughout Sarawak. Plants collected from limestone, kerangas or montane areas are very particular of their ecological habitat. Therefore only some plants are suitable for planting in urban riverfronts. This list of plants is far from complete, as it is impossible to name all species that are suitable for the riverfront due the large number of tropical plants that grow in the rainforests. Even today botanists are still actively classifying and discovering new plants. These tropical plants whilst having enormous ornamental potential are not classified to species level, but are grouped generally under respective genera (Awa, 1988: 38).

There are few tropical plants which are suitable for the Sarawak River foreshore because Kuching's linear waterfront landscape is very narrow. This finding suggests that riverfront landscapes should be based on creating a managed tropical rainforest landscape which can
be planted along the waterfront's narrow landscape spaces. Few landscape architects would attempt to plant every tropical plant they see, without having regard to a tropical plant's habitat, and its suitability for adaptation to an urban environment.

An alternative strategy for creating an appropriate landscape is to select tropical trees and other plants for Kuching's waterfront that grow well on riverbanks and urban areas. Alternatively designers may emulate the design techniques of other eminent landscape designers.

3.2.6 **Other Influences on Tropical Planting Design**

The esteemed artist and landscape architect Roberto Burle Marx of Rio De Janiero has reduced the variety of species used in his garden designs, to sometimes less than a dozen (Kingsbury, 1994: 15). His approach to landscape design is to select a few characteristic plants, massed in groups or covering extended areas, each in a different shade of color. He considers color to be the basic element of a planting design concept, and he uses whatever material is available, even stones to create a unique place in the design. This approach is often used in urban contexts by landscape architects to give meaning to their designs and to also provide a symbolic reference to the design problem. The technique can be used to create a tropical riverine landscape. For example, indicator species might allude to the health of the whole ecosystem. Alternatively, water forms bringing back wildlife and micro-climate are effective landscape narrative devices which can suggest a whole complex story just by using a part from the story or tropical riverine landscape system. The work of Roberto Burle Marx reflects a way of thinking which could be used as a design model for Kuching's waterfront (Kingsbury, 1994: 15). His work not only has a unique tropical flavour but reflects his ability to recreate tropical landscapes. This landscape narrative technique provides a tool for understanding landscape systems that are too vast and
complex to grasp. He is also credited as being a plantsman and botanical explorer, who would regularly plunge into the tropical jungles of his homeland to bring back plants new to cultivation and science. Often these would find their way into his landscape schemes, into plantings that were inspired by the original natural habitats. The most powerful feature of his work is use of eye and skill as an artist as well as his deep love of and empathy with plants (Kingsbury, 1994: 14).

The function of tropical plants and the environments in which they grow needs to be understood by designers, before they can be used in urban riverfront contexts. Therefore landscape designers should not only appreciate the riverine ecology of tropical rainforest plants, but also their scale, shape, colour and texture. An appreciation of these factors will make it easier for designers to recreate a tropical riverine landscape, as well as make a positive contribution to tropical planting design knowledge. Inevitably compromises will be needed, but a balanced approach to the task of tropical planting design will ensure that plants are selected not only from their riverine habitats but also from primary and secondary rainforests.

In the tropics many plants grow so well that it seems to hinder designers in creating a landscape character and providing a unique expression to their designs. Tropical plant designers have had a tendency not to consider plant groupings in an abstract per se. This results in monotony, and creates landscapes which are confusing as they bear little resemblance to tropical rainforests, and often lack character and variety. Gardeners may not design the best landscapes, but they are right to criticise the limited range of plants used by many landscape designers. Each should learn from the other (Brookes, 1984: 65).
The ecosystem concept derived by Golley (1983) has been used for studying tropical rainforest vegetation. He defines the ecosystem simply, "as a system of living and non-living components, interacting as a whole" (Golley, 1983: v). The concept provides a useful strategy, as well as an integrated tool for relating rain-forest structure to its functional or dynamic properties. A study of rain-forest ecosystems provides a better understanding of the nature and structure of rain forest plants in both the theoretical and practical sense (Golley 1983: v). Tropical rain forest ecosystems, although providing a valuable model for landscaping towns and cities; represent a "very general concept inherent in the thought of many observers of natural history" (Major, 1969: II).

The tropical rainforest may be simulated in urban environments by using a number of tools which are used by nature. Among these are the structure of the rainforest, its profile, and the form of plants.

3.2.6.1 The Structure of the Rain Forest

Sarawak's rain forests may be defined as a closed tropical rain forest meaning that the crown cover is more than forty per cent. (Jacobs 1983: 336). Whilst knowledge and ecological principles relating to the function of rain forests are increasing, theories about the rain forest differ markedly from expert to expert (Golley, 1983: 336).

The tropical rain forests of Sarawak are generally dominated by the Dipterocarpaceae, a family of many species, no one of which is regionally dominant, and nowhere does any one species account for more than ten to fifteen percent of the trees (Ng, 198: 103). This type of forest is almost impossible to define by composition, as it varies continuously from place to place. This dynamic composition of the tropical rain forest resulted in Symington (1944) stating that: "the dominants... are segregated and grouped so that they form an almost unlimited number of different communities. Obscure local climate or
edaphic variations may influence the distribution of species but it is more probable that the main determining factors are chance and opportunity”.

The difficulty of identifying a lowland forest by floristic composition, has resulted in these forests being identified by the dominance of a single indicator, the Dipterocarp *Shorea curtissii* (Jacobs, 1988: 85). The tropical lowland evergreen rain forest has some common characters and/or architectural features (see Table 3.2).

The primary rain forest vegetation, is often referred to as virgin or untouched forest. This type of forest takes about 250 years to develop from succession to primary or climax forest. The recovery of bare logged forest areas may take as long (Kartawinata, 1989: 600). A density of over forty different species, each over one hundred millimetres in diameter per hectare is common. Sometimes there are over one hundred species. Rarely are the species repeated in close proximity to the observer, and often trees are of varied form, dimensions and colours. This observation suggests that recreating a tropical rainforest image is not a simple matter of selecting a dozen or so plants and incorporating them into the landscape design of the riverfront.
Figure 3.2
Schematic Diagram of Tropical Forest
(Jacobs, 1988: 50-51)
Schematic diagram of a tropical rain forest with mature forest giants 11b and d of the present, e of the past ( ): mature trees of middle height ensemble (:A and c of the present): below that, a still smaller ensemble of trees remaining small when mature. In between (shaded) the trees of the future from ensemble I and II
3.2.6.2 *Profile of a tropical rainforest*

Plants in the rain forest compete for survival and grow to different levels in response to conditions such as, lighting, micro and macro climates, rain, soils, topography, geology, and site conditions (Tija 1988: 13). In response to these factors most tropical rain forests develop to form definite layers. The first layer consists of the emergents which grow to heights of between sixty to eighty metres. (Leguminosae and Dipterocarpaceae). The second layer is a continuous main canopy of trees, of which Burseraceae and Saptoaceae may be found. The lower storey of trees forms the third layer. This layer contains most species of the two biggest tree families, Euphorbiaceae and Rubiaceae, and many Annonaceae, Lauraceae, and Myristicaceae, among others. The fourth layer comprises of shrubs and/or woody treelets. It is from this layer that individuals of growing trees start to grow to eventually become taller as well as mature short trees. Lianes or woody climbers might also be observed as well as occasional stragglers. Understorey herbs, including small seedlings, forest floor herbs and small seedlings form the fifth layer. The remaining layers are made of vascular epiphytes, vascular parasites, and vascular saprophytes (Phang, 1983: 7).

Each of these groupings are capable of further subdivision. However, the dominant life of any tropical rain forest are trees. Even the woody treelets layer undergrowth consists mainly of tree forms. Shrubs are rare, although the treelets layer is loosely referred to as the shrub layer (Whitmore, 1988: 21).

Tree species which grow in shade and reach the main canopy at maturity, experience two types of growth environments at different stages of their growth cycle. In consequence they have adapted features which allow them to grow in both shady and full sunshine environments (Whitmore 1988: 21) (see Table 3.2).
3.2.6.3 *The Form of Tropical Plants*

Once the landscape designer understands the complicated ecology of tropical rainforests they can begin to visualise the form and pattern of tropical rainforest architecture. The trunks of trees are straight and slender and do not branch until they reach the canopy. The bark is generally smooth and deep fissures or conspicuous fissures are rare. The majority of mature trees, as well as shrubs and saplings, have large, leathery dark leaves with entire or mostly entire margins. The colouring of leaves is similar or mostly entire margins. The colour of palms, cane or rattan plants and species of Pandanus and Dracaena provide visual relieve and contrast to an otherwise uniform tree layer. The relative accessibility of primary rain forest structure makes walking through the forest interesting. However, on riverbanks or where canopy trees have fallen, there is much dense growth, in response to increased light penetration and access is difficult and general impenetrable. This is really typical of secondary forest. (See Table 3.2)
<table>
<thead>
<tr>
<th>FORMATION</th>
<th>CHARACTERS/ARCHITECTURAL FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
<td>Mixed - defined by prominence of single indicator species 10-15%</td>
</tr>
<tr>
<td>Canopy height</td>
<td>24 - 45 metres</td>
</tr>
<tr>
<td>Emergent trees</td>
<td>Characteristic: to 60 (80)m tall</td>
</tr>
<tr>
<td>Pinnate leaves</td>
<td>Frequent</td>
</tr>
<tr>
<td>Principal leaf size of</td>
<td>Mesophyll161.5</td>
</tr>
<tr>
<td>woody plants</td>
<td>Frequent</td>
</tr>
<tr>
<td>Buttresses</td>
<td>Usually frequent and large</td>
</tr>
<tr>
<td>Cauliflory</td>
<td>Lianas with flexible stems of 300mm or more</td>
</tr>
<tr>
<td>Big woody climbers</td>
<td>in diameter</td>
</tr>
<tr>
<td>Bole Climbers</td>
<td>often abundant</td>
</tr>
<tr>
<td>Vascular epiphytes</td>
<td>Frequent</td>
</tr>
<tr>
<td>Non-vascular epiphytes</td>
<td>Occasional</td>
</tr>
</tbody>
</table>

Table 3.2

Characters used to define the tropical lowland evergreen rain forest
(Whitmore, 1986: 26)

Climbing palms and rattans not only form an interesting feature of rainforests, but most of the big woody climbers are prototypes which grow prolifically in clearing and on forest fringes. They therefore contribute to the popular myth of the impenetrable dense forest jungle (Whitmore, 1986: 33). Woody climbers (lianas) have stems which are lengthy and twine upwards along trees which support them. Most rise to the forest canopy, or hang down in large loops or
festoons. Like the tree species, richness is not uncommon with stems commonly above 150 mm diameter.

Although tropical trees of the lowland evergreen rain forest are numerous, they display a similar general form and physiognomy.

Secondary forest refers to the fast growing, species poor, and at first impenetrable forest that grows on bared or degraded soils. Forest in transition, or those which have been degraded by human impacts such as logging are also referred to as secondary forests or successional forests. Secondary forests which are not recut, or near or within a primary forest will be colonised by nearly primary rain forest species, and will eventually be replaced by primary rain forest. However, other rain forests exist, depending on the particular climate of a region (Chin and Corlett, 1986: 161 & 50).

3.2.6.4 Plants as Multi-dimensional Systems

Planting tropical plants on riverbanks can facilitate the creation of a range of visual images in Kuching City. One way is to use similar colours found in the tropical rain forest growth cycle. Another alternative might be to locate tropical vegetation in a layered hierarchy which resembles the tropical rain forest, or to focus on the four characteristics which affect preference for particular landscapes: complexity, coherence, legibility and mystery (Kaplan, 1982: 82; Thayer, 1996: 15).

In the urban landscape and along the banks of the Sarawak River, the use of colour can create variety and interest. The bare soil or backfilled soil can be used to advantage along the riverfront as a backdrop for tropical plants. For example, young plants may be grey, ochre or pale green initially, then bright green, and later darker green as one stage of the flora and vegetation gives way to another (Jacobs,
1988: 89). Therefore, landscape designers can emulate this colour pattern by selecting plants which give similar effects to the rain forest, and thus create a sense of mystery in the landscape design.

Tropical plants may also be located on riverbanks to show that plants firstly grow as pioneers, then as young secondary plants, followed by late secondary, and finally the primary rain forest. The landscape tool to use here would be to name and plant riverbank plants that would eventually develop to create some emergents while other plants would develop into a continuous canopy of trees, thus completing the four stages of succession. This approach to planting design is particularly useful for Kuching City and the northern bank of the Sarawak River because it provides a continuous canopy for protecting pedestrians at ground level, from the harsh tropical climate, and also helps to rename and thus reclaim in a historical sense lost spaces that help to reveal and give meaning to a name in its spatial context.

A third method which landscape designers could use along riverbanks, is to integrate the layered forms of planting, with the unique habit of tropical riverine plants, as a strategy for reclaiming lost identity and the potential loss of landscape systems, now under threat from various episodes of redevelopment and other major displacements. More importantly this strategy acts as a source of education to users of the riverbank and helps to reinforce landscape narratives association with restoration and conservation of ecosystems.

Therefore inherent in the design of the urban riverfront is the need to set aside areas which improve the learning experience of Kuching's tropical riverfront landscape. In particular, provision should be made for interpretative displays, slide shows and movies which explain the
dynamic growth cycle of tropical riverine rain forest structure, and promote the use of invisible technology, which will improve the relative value of the landscape for humans (Thayer, 1996: 15; Nassauer, 1995: 165).

Whilst these three techniques are not exhaustive, it is evident that each technique may be more responsive to a particular site or landscape problem. Alternatively, a particular riverbank site may lend itself to all three techniques being used in a particular instance. For example, the planting of secondary forest plants can contribute to the return of a tropical rain forest, provided landscape designers put in place well-managed, and skilful plans. To do this effectively however the riverbank or area selected for planting should border primary forest borders or surround secondary forest, because this will provide the seed-bank to sustain tropical plant systems as well as encourage wildlife. If this is not possible then in order to make the landscape design more acceptable to the local population, the design must demonstrate it is not a "messy ecosystem(s)" (Nassauer, 1995: 163).

In the urban situations such as the riverbank of the Sarawak River were insufficient primary forest exists, secondary rain forest will become the climax vegetational stage. Young secondary forest can in time evolve into mature secondary forest if such forest is in close proximity. It is therefore important in any land-use planning, or landscape design strategy to protect plots of mature secondary forest, to ensure that existing species diversity, young seedlings and seeds in the region do not become impoverished.

In the secondary forest plant species density is less, and species diversity are not as abundant as the primary rain forest. Planting of secondary rain forest plants therefore, has the potential to extend and renew rain forest ecosystems, and is a strategy worth pursuing for
restoring, conserving and preserving Sarawak's tropical riverine rain forest (Jacobs, 1988: 210).

Plants from the secondary rain forest are useful for rehabilitation of land after clearing, and also as a genetic pool of fast growing tropical trees, which could be used for riverbank planting schemes.

Tropical plants of the rain forest are dynamic, integrated living systems which are continuously changing until they reach a stage of equilibrium, culminating with the climax phase of a very complex growth cycle. No attempt has been made to study specific tropical species as this would be premature without having regard to the range of natural habitats that support tropical plants, and ecological design issues which need to be addressed in the planning and design of tropical riverine landscape.

3.2.7 Ecological Design Principles, Messy Ecosystems and Orderly Frames

Tropical riverfront landscape designs that look messy will create problems for designers because society is driven by 'consumerist ideology of beauty'. For example, if a tropical landscape concept for Kuching's riverfront functions well from an ecological point of view, but is culturally perceived as messy it will generally be rejected by society. Nassauer (1995: 161) sums this idea by stating that "what is good may not look good, and what looks good may not be good" (Nassauer, 1995: 161). This finding may be distressing for people who study and implement design based on ecological systems principles because it is inherent to the landscape design process. Each landscape is recognised according to Nassauer (1995:161) as one of any number of possible designs for a particular locality. Landscape architects may consult and draw on the phenomenologists' new paradigm of 'place' or 'sense of place' to design a landscape, but they do not expect their understanding of 'sense of place' to design the tropical riverfront landscape (Nassauer, 1995: 161).
Designing Kuching's tropical riverfront landscape is not a simple problem of applying scientific knowledge of ecosystem dynamics or -

... an artistic problem of expressing ecological function, but a public landscape problem of addressing cultural expectations that only tangentially relate to ecological patterns into cultural language. It requires placing unfamiliar and frequently undesirable forms inside familiar, attractive packages. It requires designing orderly frames for messy ecosystems (Nassauer, 1995: 161),

and is an issue which requires an investigation of landscape as meaning. This link between landscape systems and culture is an important one for landscape designers and will be explored more fully in the next chapter.

Nassauer (1996: 4) has summed up this link appropriately by stating that "we must use culture to advance ecological health, or we risk removing ourselves altogether from the ecosystems we know" ... "many landscape ecological solutions to landscape management problems have been offered only to be impeded or disregarded because they did not fit the cultural context" (Nassauer, 1996: 4).

3.2.7.1 Ecological Design

Thinking ecologically about design is a way of strengthening the weave that links nature and culture" (Van der Ryn, 1996: 18). Ecological design may be defined as any form of design that minimises environmentally destructive impacts by integrating itself with living processes. This integration implies that the design respects species diversity, minimises resource depletion, preserves nutrient and water cycles, maintains habitat quality, and attends to all the other pre-conditions of human and ecosystem health (Van der Ryn, 1996: 18). Hopefully this comprehensive definition of ecological design will mean that we do not have to put up with inappropriate comments about the subject, for example, "it's an ecologically correct design" or an 'ecological design', whatever that is) in relation to the use of native vegetation or a 'natural' water feature" (Taylor, 1997: 8).
Ecological design also embraces conservation, regeneration and stewardship issues which help us to reinforce the idea that tropical river landscapes should be conceived of in terms of landscape systems which integrate these three themes (Van der Ryn, 1996: 20).

"Conservation slows the rate at which things are getting worse by allowing scarce resources to be stretched further" (Van der Ryn, 1996: 20). Some examples of conservation measures that are appropriate for Kuching's riverfront are preserving agricultural land and tropical riverfront landscapes, recycling materials and by including them into the landscape design of the riverfront, and designing fuel-efficient marine boats for use as a means of public transport along the Sarawak River.

Regeneration refers to "the repair and renewal of living tissue. Ecological design moves to regenerate a world deeply wounded by environmentally insensitive design" (Van der Ryn: 1996, 22).

Examples of regeneration ideas which could help revive living tissue on Kuching's riverfront are: restoring eroded streams or parts of the Sarawak River edge to biological productivity, managing the type and frequency of boats that use the river so as to minimise river edge erosion and pollution of the river, renewing soil or re-creating habitat through appropriate planting design strategies.

Stewardship means maintaining sustainable tropical landscape systems. "It is a particular quality of care in our relations with other living creatures and with the landscape. It is a process of steady commitment informed by constant feedback" (Van der Ryn: 1996, 22). More importantly it is a process of landscape design which engages in both an active and passive design participatory process (Dovey, 1985: 100). "Stewardship is the wisdom to live on renewable interest rather than eating into natural capital" (Van der Ryn, 1996: 22). Stewardship is about fostering an ethic of care for
Sarawak's tropical river landscapes. It is one component of care, the others are 'neatness' and 'naturalness' (Nassauer, 1996: 165).
Finally, Ecological design addresses specific tropical landscape riverfront issues which relate to the site under study as well as the cultural context of the local population (Van der Ryn, 1996: 25). See Table 3.3. Ecological design also embraces the five principles outlined by Van der Ryn (1996: 55) - firstly, solutions grow from place, secondly, ecological accounting informs design; thirdly, design with nature; fourthly, everyone is a designer; and fifthly, make nature visible.

3.2.7.2 First Principle: Solutions Grow From Place
Landscape designs for Kuching's riverfront landscape should evolve from landscapes specific conditions and constraints as well as enhance the values of users. An example might be to explore tropical design solutions which do away with or minimise the use of standardised landscape details.

3.2.7.3 Second Principle: Ecological Accounting Informs Design
Tropical landscape design should factor into the design process - all economic and ecological factors of a proposed design solution. For example, the residents of Kuching City do not have an adequate, safe and non-polluting means for treating sewerage. Presently, raw sewage from nearby Malay Kampungs or villages dispose of their raw sewage directly into the Sarawak River. There is a need to devise wastewater systems that save water, are cost effective, energy efficient and minimise damage to fresh water and ocean habitats.
## Table 3.3 Characteristics of Conventional and Ecological Design (Van Der Ryn, 1996: 26)

<table>
<thead>
<tr>
<th>Issue</th>
<th>Conventional Design</th>
<th>Ecological Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy source</td>
<td>Usually nonrenewable and destructive, relying on fossil fuels or nuclear power; the design consumes natural capital</td>
<td>Whenever feasible, renewable: solar, wind, small-scale hydro, or biomass; the design lives off solar income</td>
</tr>
<tr>
<td>Materials use</td>
<td>High-quality materials are used clumsily, and resulting toxic and low-quality materials are discarded in soil, air, and water</td>
<td>Restorative materials cycles in which waste for one process becomes food for the next; designed-for reuse, recycling, flexibility, ease of repair, and durability</td>
</tr>
<tr>
<td>Pollution</td>
<td>Capious and endemic</td>
<td>Minimized; scale and composition of waste conform to the ability of ecosystems to absorb them</td>
</tr>
<tr>
<td>Toxic substances</td>
<td>Common and destructive, ranging from particulates to paints</td>
<td>Used extremely sparingly in very special circumstances</td>
</tr>
<tr>
<td>Ecological accounting</td>
<td>Limited to compliance with mandatory requirements like environmental impact reports</td>
<td>Sophisticated and built inovers a wide range of ecological impacts over the project, from extraction of materials to final recycling of components</td>
</tr>
<tr>
<td>Ecology and economics</td>
<td>Perceived as in opposition; short-run view</td>
<td>Perceived as compatible; long-run view</td>
</tr>
<tr>
<td>Design criteria</td>
<td>Economic, custom, and convenience</td>
<td>Human and ecosystem health, ecological economics</td>
</tr>
<tr>
<td>Sensitivity to ecological context</td>
<td>Standard templates are replicated all over the planet with little regard to culture, or place; sky-scrapers look the same from New York to Cairo</td>
<td>Responds to bioregion; the design is integrated with local soils, vegetation, materials, culture, climate, topography; the solutions grow from place</td>
</tr>
</tbody>
</table>

### Characteristics of Conventional and Ecological Design

- **Issue**
  - Sensitivity to cultural context
  - Biological, cultural, and economic diversity
  - Knowledge bases
  - Spatial scales
  - Whole systems
  - Role of nature
  - Underlying metaphors
  - Level of participation
  - Types of learning
  - Response to sustainability crisis

- **Conventional Design**
  - Tends to build a homogenous global culture; destroys local commons
  - Employs standardized designs with high energy and materials throughput, thereby eroding biological, cultural, and economic diversity
  - Narrow disciplinary focus
  - Tends to work at one scale at a time
  - Divide systems along boundaries that do not reflect the underlying natural processes
  - Design must be imposed on nature to provide control and predictability and meet narrowly defined human needs
  - Machine, product, part
  - Reliance on experts and engineers who are unwilling to communicate with public limits community involvement in critical nature and energy technologies
  - Nature and technology are hidden; the design does not teach us over time
  - Views culture and nature as inscrutable; strives to show the rate at which things are getting worse by implementing more conservation efforts without questioning underlying assumptions

- **Ecological Design**
  - Respects and nurtures traditional knowledge of place and local materials and technologies; fosters commons
  - Maintains biodiversity and the locally adapted cultures and economics that support it
  - Integrates multiple design disciplines and wide range of sciences, comprehensive
  - Integrates design across multiple scales, reflecting the influence of larger scales on smaller scales and smaller on larger
  - Works with whole systems; produces designs that provide the greatest possible degree of natural integrity and coherence
  - Includes nature as a partner; whenever possible, subsidizes nature's own design intelligence for a heavy reliance on materials and energy
  - Cell, organism, ecosystem
3.2.7.4 Third Principle: Design With Nature

Tropical landscape design should facilitate the break-down of materials continuously "into their basic components, and rebuilt into new living forms. For example some landscape designers have attempted to draw together information from all experts of the design team and to shape it into an integrated whole" (Lyle, 1992: 44). The design form for a site may evolve or be inspired from the ecological concept of energy and material flow. This flow may explore how human waste should be disposed of on the landscape. The process may examine issues such as how to treat sewage, how to handle biomass and biogas and what type of digester to use. The process may also examine how water, and nutrients could be harnessed for recycling to plants and animals.

3.2.7.5 Fourth Principle: Everyone is a Designer

The best approach to any tropical landscape design is to involve as many people as possible in the design process. Often this requires good listening and leadership skills. Good design experiences often occur when "no-one can claim credit for the solution - when the solution grows and evolves organically out of a particular situation, process, and pattern of communication" (Van der Ryn, 1995: 55). In Sarawak public participation in the design process is not openly embraced. However, it can and does happen if designers have the vision and fortitude to persuade the political masters and the newly formed State Planning Authority which came into operation on 1 August 1998. Such a public participation exercise was carried out by the author in 1998 in order to make the planning process more transparent and to also involve the public in the process. No doubt a similar exercise of participatory design for the Kuching waterfront could be implemented. However, for this process to be effective it requires an appreciation of the local culture and institutional framework in which decisions are made (Andre, 1998: 1).
3.2.7.6 *Fifth Principle: Make Nature Visible*

The landscape design process should also educate the users of Kuching's riverfront place about the role technology can play in identifying and reinforcing the contribution that the riverfront landscape will make to Kuching City to reveal how "people's involvement, and that involvement necessarily connected them with their own biological processes" (Van der Ryn, 1996: 56).
3.2.8 Conclusion

Carrying out an assessment of the Kuching riverfront landscape system is a complicated matter and cannot be carried out in a theoretical vacuum. To overcome this problem two theoretical dimensions of landscapes were used as a broad framework for carrying out an assessment of the Kuching Riverfront landscape. These are the functional and perceptual dimensions. Where this theoretical framework is difficult to apply or vague, the Kaplan's (1982: 83) Model of visual assessment has been used to complement Thayer's (1996: 129) theoretical framework.

An assessment framework for Kuching's riverfront has also been carried out. This assessment has focussed on the idea of order in landscape systems, and the need to appreciate tropical plants as multi-dimensional systems. Finally, an assessment is carried out in terms of five principles of ecological design.

3.3 Assessment of Landscape as Meaning

3.3.1 Introduction

The Sarawak River landscape is a cultural landscape that is packed with remnant technologies and artifacts of the past. The water system of the river provides many opportunities for reinforcing the experiential role for sustainable landscapes. The movement of boats across the river and the diversity of races that use the river as a means of transport all contribute to giving the river landscape meaning.

The Sarawak River landscape is a place that consists of many layers of meaning to the people who live, visit and use the city. The issue that needs to be considered is how and to what extent should designers design or interpret the landscape to reveal the many layers of the cultural landscape? What are the cultural layers that give the river landscape meaning and which layers
should the designer select to facilitate the interpretation of the landscape as text.

This section carries out an assessment of the Sarawak River landscape with the intention of revealing or telling a story about the landscape, which can be read as a book. The aim is to reconcile the struggle between technophobia and topophilia by searching for ways we can overcome the conflicts to create a love for the landscape by understanding what the landscape means to us. This love of the landscape is sometimes referred to as ‘biophilia’ and "reminds us that we are designed to live and adapt within nature" (Van der Ryn 1996: 162).

The landscape assessment for the Sarawak Riverfront recognises the biophilia hypothesis which "powerfully asserts that much of the human search for a coherent and fulfilling existence is intimately dependant on our relationship to nature" (Van der Ryn, 1996: 162).

This fulfilling existence however can only be reinforced if the assessment of landscape meaning is carried out within the context of maintaining sustainable landscape. The Riverfront assessment should therefore result in a tropical landscape design, which provides a "demonstration and diffusion of environmentally and socially sustainable principles into common usage in the everyday world" (Thayer, 1996: 309).

A theme of this study is that landscape designers should recognise a growing school of thought which looks and interprets the tropical landscape of Sarawak mainly from an ecological viewpoint (Thayer, 1996: 38). This emerging trend seeks to re-animate urban landscape through more concern for ecological and biological values and less technological determinism (Thayer, 1996: 38).

The emphasis of this chapter will be on the cultural and symbolic meaning dimensions of landscape.
3.3.2 *Technology as a Symbol of Nature*

The Sarawak Riverfront landscape may be perceived as a cultural landscape which is a "manifestation of technophilia wherein the array of material by-products begins to serve as a symbol for the landscape itself" (Thayer, 1996: 38). In this context the 'sense of place' (topophilia) is reinforced by a culture symbol of technology "to the point that the later attitude replaces the former" (Thayer, 1996: 38).

The Sarawak Riverfront consists of many technological features such as tropical trees, shrubs, fences, retaining walls, waterforms, earthforms, jetties, mud flats and many building facades. These features represent the technologies of different generations and today provide an expanding source for designers to use as a text for the riverfront.

These remnant technological artifacts are an expanding source of complex meanings, and provide a rich framework for both assessing and reinterpreting the landscape of Kuching's riverfront. The important matter which designers need to grasp about the concept of meaning is that whilst it is a slippery concept of landscape that is open to many interpretations, it provides avenues for assessing various elements of the discourse realm. A discourse is a "social framework of intelligibility", that influences all practices of signification, including narrative and landscape.

The theoretical "meaning" dimensions of technological landscapes, provides a three dimensional cube for identifying landscapes which are considered to be of higher public value. The assessment of Kuching's riverfront landscape provides a basis for identifying shades of acceptable landscapes. "Landscapes represented by the darker cell are less acceptable, whereas those represented by higher cells are more acceptable" (Thayer, 1996: 129) The overall conclusion is that "landscape meaning resides in the observer, but the observer acts as though the meaning resides in the environment and through the interpretation of landscape narratives" (Thayer, 1996: 129).
Theoretical 'meaning' dimensions of technological/utilitarian landscapes. Each landscape may be considered in terms of perceptual, functional, and symbolic dimensions which interact to yield an overall relative evaluation of the landscape. In this diagram, arrows point towards higher public value; landscapes represented by the darker cells are less acceptable, whereas those represented by lighter cells are more acceptable.

Fig. 3.1

Theoretical "Meaning" Dimensions of Technological/Utilitarian landscapes
(Thayer, 1996: 129)
"Landscape can be evaluated in itself as beautiful or ugly, productive or infertile. On the other hand it is also a clue to a region's human personality (Tuan, 1979: 93). Any landscape can be evaluated. One approach is to carry out descriptive analysis which appeals largely to the mind (Tuan, 1979: 93; Schama, 1995: iii). Another is to evaluate the meaning of landscape as culture or as symbolism yet another approach might focus on landscape narrative theory.

Narratives construct meaning or signing much like the cultural systems of signification. People construct meaning in landscapes through basic sequences which form the necessary metonymy of relating one thing to another, the known to the unknown. In this way the basic scheme of metaphor is used as a theoretical tool for reading the Sarawak River Landscape as a text to present difficult and complex ideas in terms of an equally complex but more familiar practice of determining meaning through the realm of discourse.

In order to assess the landscape of the Sarawak riverfront, the study will focus on what are considered to be four major schemes of landscape narrative theory which forms the back-drop of landscape narrative assessment. These schemes are; metaphor, metonymy, synecdoche and irony. These four schemes - see the glossary for definitions - provide an important theoretical framework for assessing any landscape and to understand how effective meaning is constructed between both landscape and narrative. At the early stage of the landscape assessment process it is important to clarify what schemes are used, how they frame or evoke meaning in the landscape and explain landscape designs in terms of their boundaries and limitations.

The important point that needs to be understood about landscape narrative theory is that it does not stipulate rigid laws and rules but provides the framework which compels designers to question what they are doing with and on the landscape and to ask why they are providing a particular solution to the problem.
Meaning in landscape can at times be ironic when its interpretation presents an "incongruity or ambiguity between expectations and reality, nature and artifice, revealing and concealing and so on" (Potteiger and Purinton, 1998: 38).

An assessment of the Sarawak Riverfront landscape should offer opportunities for interpreting the hidden layers of change on the landscape. Consequently, in carrying out an assessment of the Mosque landscape zone the designer has to decide what elements of history and culture should be concealed or revealed. In so doing the designer may choose to reinforce or highlight the effect of hidden meanings, and bring to the surface underlying dimensions of core values and to make these more transparent. See Appendix 6.1 for an assessment that was carried out for the Mosque landscape zone.

"Culture is nothing more than a system of commonly held beliefs, symbols and behaviours" (Thayer, 1996: 105) Each individual and social group. Malays, Chinese, Indians and the native indigenous peoples of Sarawak may perceive many different layers of meanings in the same cultural landscape at different times. For example Kuching's riverfront landscape was interpreted in the early part of the nineteenth century as a place for locating industrial buildings and a dockyard. In the mid 1980s it was perceived by urban designers and politicians as an eyesore. In 1998 the same politicians perceive the riverfront landscape as a locality that is ready for developing high rise buildings and massive reclamation of the river in the vicinity of the Brooke Dockyard.

In this study, I argue that, whilst the process of interpreting a riverfront landscape is subjective, it is a design process which initially facilitates analysis of 'surface' properties of landscape. Later the analysis of meaning allows designers to appreciate the 'core' properties of landscape (Thayer, 1996: 141), particularly when supplemented with landscape narrative assessment criteria. The design process of searching for meaning in landscape provides generalisation about the interpretation of landscape which are applicable or
useful to the particular landscape being assessed because "they literally hold culture together" (Thayer, 1996: 103)

3.3.4 *The Symbolic Dimension of Landscape as Meaning*

Kuching's riverfront landscape may be assessed in terms of the four descriptions which reinforce humans attitude towards landscape. Thayer, (1996: 123) offers the following descriptions which contribute to our understanding of the symbolic dimension of landscape as meaning. These are consumptive, sustainable, utopian, and nostalgic.

3.3.4.1 *Consumptive Technology*

Consumptive technologies exist everywhere in today's world, but "are incapable of sustained interaction with land systems in the future" (Thayer, 1996: 122). Examples of this technology include mining, construction and manufacturing. The flow of raw materials is typically one way and has little regard to incorporating natures need into the process. The basic principle is one of "taking from the earth for a short-term gain and symbolises a wounding and consumption of the earth's flesh" (Thayer, 1996: 122). Consequently, when humans experience this "violation of the body of nature"……a negative reaction spills over into all other technologies through guilt by association" (Thayer, 1996: 123).

Consumptive technologies are widespread in Sarawak's tropical riverine rainforest areas. Some examples are - the construction of logging roads leading from the interior to the river's edge, pollution of the river from scattered human settlements along he river and seepage of toxic waste and petroleum into the river, and reckless removal of river edge vegetation to make way for oil palm plantation and Industrial development.
The massive reclamation of the Sarawak River which arose from Kuching's new waterfront construction of the Brooke Dockyard, and the extensive landscape of hardscape on Kuching's riverfront are blatant examples of situations where consumptive technologies have been used.

3.3.4.2 **Utopian Technology**

"Utopian technology represents the technology of the future" and because it has yet to diffuse extensively to every corner of society it has not gathered much negative reaction (Thayer, 1996: 124). Consequently, these technologies are assessed higher by the public in terms of their landscape value because these emergent technologies hold the key to solving some of today's problems. These technologies are generally considered to be 'landscape invisible' and are interpreted by society in terms of symbols. Some examples are satellite and radio telescopes that are located strategically on the landscape. Another example might be art or sculpture which shows utopian or future technologies located in idyllic settings. Some of the sculptures and light weight structures located on Kuching's waterfront are good examples of projects which allude to these types of utopian technology.

3.3.4.3 **Nostalgic Technology**

Nostalgic technology is "that which is associated with the past, is no longer viable, and has become part of history" (Thayer, 1996: 124). Examples of these types of technologies on Kuching's riverfront are; defunct industrial zones such as the Brooke Dockyard, the State Mosque and Muslim Cemetery and old marine equipment. Nostalgic technologies ease our guilt of unpleasant taste towards the landscape and help to create the symbolic and intricate web that connects us with the past.
Some research has shown that of all the symbolic dimension's, nostalgic technology is assessed by humans as consisting of the highest visual landscape status. However, other research on the object of experience has shown in so far as aesthetic experiences are concerned, only a few aesthetic experiences where classified as 'symbolic' or in terms of past associations (Thayer, 1996: 126).

3.3.4.4 **Sustainable Technology**

"Sustainable technology creates useful energy or goods but does so by relying on renewable resources and respecting culture, human scale, existing land integrity and ecosystem integrity" (Thayer, 1996: 126). For the Sarawak River landscape the most appropriate sustainable technologies are solar power and the tidal flow which results in the river pontoons rising and falling in harmony with the Sarawak River tide. This type of technology is far more acceptable to humans because it reduces our guilt towards the landscape. Consequently, sustainable technology scores a positive value provided it has been readily diffused into the local community and fulfills a practical function. For example it facilitates entry and exit onto the riverboat and symbolically connects humans with the water and land systems.

3.3.5 **The Meaning of Culture and Landscape Ecology**

The design of tropical landscapes cannot be addressed adequately until designers have taken time to develop an inquiring attitude towards human values. Every tropical landscape provides opportunities to explore and come to terms with our human values. "Science can inform us it cannot lead us" (Nassauer, 1996: 4). To overcome this problem we need to activate culture into the landscape ecological design process. Landscape designers need to realise that not only landscape systems have ecological value, but that designed elements of the landscape also have value. For example many parts of Kuching's riverfront landscape has value - the vacant landscape open space next to the Mosque, the many carparks that are
dotted on the landscape and even the Muslim cemetery site has ecological value. They all have potential to promote ecological health as well as to provide the support, the movement, and survival of species.

The Muslim cemetery site can be designed to; prevent soil from eroding into the Sarawak river, minimise the use of water, nutrients, pesticides or herbicides, prevent pollutants from moving off the site, encourage diverse habitats that connect to the surrounding landscape pattern.

Ecological knowledge of tropical riverine landscapes, aesthetic experience and landscape are all values which strike at the heart of cultural images of nature.

Other cultural concepts or ways of seeing nature have the potential to shape and frame our perspectives of nature. For example, we can see nature in terms of any of the following cultural concepts, viz. exploiters, naturalists, conservative users and preservers (Nassauer, 1996: 28).

"Perhaps care of the landscape is most readily demonstrated by signs of neatness and order such as fences and mown borders, in otherwise much less orderly landscapes" (Nassauer, 1996, 30). Table 3.4 provides a summary of the content analysis of descriptive terms organised under the concept of landscape care.

3.3.5 Symbols and Metaphors for the Tropical City

Any landscape design approach for Kuching's waterfront should aim to create a balanced 'softscape' and 'hardscape' design solution that is easily managed. This landscape design philosophy is a strong feature of Burle Marx's (Kingsbury, 1994:13) work. His designs are clear, decisive and bold. Because Kuching's waterfront is a narrow linear landscape, there is no need to use tropical plant material in a similar way to his work. For example, his plant forms are always dramatically contrasted. "Palms and other trees rise up from low groundcover, their meeting never blurred by intervening shrubs, and the
divisions between plants in borders are always strict" (Kingsbury, 1994: 14). His use of plant material are not only visually contrasting, but also emphasise the features of the plants within them.

<table>
<thead>
<tr>
<th>Neatness</th>
<th>Attractive</th>
<th>Unattractive</th>
<th>Stewardship</th>
<th>Attractive</th>
<th>Unattractive</th>
<th>Naturalness</th>
<th>Attractive</th>
<th>Unattractive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Yard Care</td>
<td>Dead or rotten</td>
<td>Lack of yard</td>
<td>Good</td>
<td>Poor</td>
<td>Apparent</td>
<td>Naturalness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fences</td>
<td>No flowers</td>
<td>No shade</td>
<td>Conservation</td>
<td>Conservation</td>
<td>nature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flowers or shrubs</td>
<td>Not landscaped</td>
<td>Not mown</td>
<td>Contour plowing</td>
<td>All planted to corn</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>Messy</td>
<td>Chattered</td>
<td>No erosion</td>
<td>Effluent from feedlot - poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscaped</td>
<td>Construction</td>
<td>Junk</td>
<td>Pasture</td>
<td>water quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawn ornaments or architectural details</td>
<td>going on</td>
<td>Messy</td>
<td>Stripcropping</td>
<td>Erodible land plowed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trees in rows</td>
<td>Messy</td>
<td>Poor care</td>
<td>Terraces</td>
<td>No conservation practices being used</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Yard</td>
<td>Neglected</td>
<td>Abandoned</td>
<td>Windbreak</td>
<td>Pastures are overgrazed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean and neat</td>
<td>No house on a farmstead site</td>
<td>No weeds</td>
<td>Wildlife</td>
<td>Plowing up the hills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean</td>
<td>Mown</td>
<td>New</td>
<td>White</td>
<td>Runoff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neat</td>
<td>No Junk</td>
<td>Put away</td>
<td>Good Care</td>
<td>Slimy looking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Junk</td>
<td>Good</td>
<td>Care</td>
<td>Maintained</td>
<td>water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Put away</td>
<td>maintained</td>
<td>Well kept</td>
<td>New</td>
<td>Table 3.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good Care</td>
<td>Mown</td>
<td>No weeds</td>
<td>White</td>
<td>Burle Marx's skill also demonstrates his mastery of the hard landscape (Kingsbury, 1994: 17). Some of his design skills could be used effectively along Kuching's waterfront because his design style provides a suitable technique for intelligbly tinkering with the waterfront, and to package the design to make it acceptable to the consumers and ideology of today's culture. For example, he often used hard materials and tropical plants to show each other off to best advantage (Kingsbury, 1994: 17). He also often used large-leafed plants to soften the hard outlines of modern buildings.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To achieve this design objective the tropical softscape image for the waterfront can be facilitated by selecting plants from the riverine tropical rain forest. This discourse of ecology and restoration should permeate the landscape of Kuching's riverfront landscape so as to reinforce the metaphor of tropical plant life and wildlife communities including the metonymy of waterforms where appropriate. However, the creation of a hardscape which reflects the "place", uniqueness of Kuching City and the image associated with tropical rivers is not as simple. Nonetheless a study of the city's context and the elements which give the city its "sense of place" can be studied, modified, reinterpreted and applied to waterfront designs to give it identity as well as tropical landscape image which reinforces place names. For example, Matthew Potteiger (1998) has pointed out that the technique of using place names can be used as a story which provides the text for reading the cultural landscape of Kuching appropriately. He says that it is "important to see names not just as individual words but as social practices that attempt to fix identity within a system of values. Names are drawn from distinct reference systems - history, politics, science, mythology, art, etc" (Potteiger and Purinton, 1998: 181).

The hardscape and symbolic image developed for the waterfront must suit Kuching's climate as well as reflect the culture of the people. The riverfront landscape should be integrated with the tropical softscape image created for the area abutting the southern bank of the Sarawak River foreshore. The landscape design tools needed to create a practical and symbolic tropical imagery suitable for a managed urban tropical landscape are developed further in Section 4.6 in order to give 'meaning' to the design of the waterfront.
3.4  **Conclusion**

Landscape designers must work across scales so that they can promote an ecology of care towards tropical landscapes. Working across scales means considering global effects like:

- Climatic warming
- Consulting the ecology of the watershed and noticing patterns of species movement before we change a single site.
- It also means consulting the cultural interpretation of the larger landscape before designing a single site, including the origins and history associated with place names.

Cultural interpretation begins with looking at the landscape to see the way we ordinarily look through it, in precisely the way that Meine (1996) demonstrates by looking at the land-ownership grid. (Nassauer 1996: 10)

We must tune our actions to working across scales of natural disturbance of riverfront landscape. That means tuning our actions in the landscapes to time and space scales that operate beyond everyday experience. As a strategy for bringing ecology into our conscious awareness, Eaton (1990) lays out categories for matching ecological scales with aesthetic experience in design (Nassauer 1996: 10).

Understanding the landscape as 'meaning' is about putting together an 'accreting' framework for landscape ecology. Landscape as meaning provides a way of thinking about the landscape that integrates history, design and philosophy with the strong foundations established by science and landscape narrative theory which should frame any landscape assessment methodology and to minimise loopholes in the assessment process.

Wilderness preservation is a matter of ethics, dictating that we do not knowingly cause the extinction of other creatures that inhabit the earth. This tendency may have its roots in an inborn tendency to 'biophilia' or love of the
the plants and animals that share the planet with us, although the presence of such genetic bias is quite controversial at present (Nassauer, 1996: 22).

In the next chapter an assessment of the Conybeare-Morrison plan is carried out in terms of the landscape as place and this construct of landscape has been selected because this mode of assessment is reflected as a specific research objective.
4.0 UNDERTAKING THE ASSESSMENT

4.1 Introduction

In this chapter an assessment of the Conybeare-Morrison plan is carried out and ecological design recommendations for part of Kuching’s riverfront landscape are proposed. To achieve this later objective the riverfront site selected for further study is the Brooke Dockyard and Mosque landscape. An expert paradigm will be used to identify the ‘core’ values that are relevant to this intensive landscape zone within the context of three interpretations of ordinary tropical riverfront landscapes, that is landscape as place, landscape as system and landscape as meaning constructs.

4.2 Landscape as place: An Expert Paradigm Approach to Landscape Assessment.

The Conybeare Morrison plan for Kuching’s waterfront was completed in 1990, and its construction completed in 1993. Their conceptual plans for the waterfront cover five main localities of the waterfront. These are:

4.2.1 The Kuching Riverwalk place. (Less intensive landscape zone), and the Promenade Park and Pontoon Place (Intermediate Landscape Zone)

The less intensive landscape zone included the Chinese Chamber of commerce building, and the former site for hawkers, squatters, petroleum storage, petrol station, mud flats and the mooring area of many small boats as well as fishing boats (see Appendix 6.1, photographs 2 and 5).

The Intermediate Landscape zone consists of the long linear length of Kuching’s waterfront, located north of Main Bazaar street. This riverfront is almost as long as this street, and is the place where many old maritime buildings and port related facilities were located. Therefore it was the site of many jetties and marine related artefacts, including an electrical substation. (see Appendix 6.1).
4.2.2 The Courthouse Square
(Formal Landscape Zone)

This zone includes the Square Tower, the Courthouse and the Sarawak Steamship industrial building. The zone includes Tun Abang Haji Openg Street and Barrack Street. The riverfront is the former place of retaining walls, hardscape surfaces for pedestrian walks and a Chinese Garden (see Appendix 6.1, photograph 5).

4.2.3 Riverfront Plaza and Amphitheatre
(Commercial Landscape Zone).

This zone includes Jawa Street, Gambier Street and part of India Street. This landscape remains intact today and is a mixed commercial retail zone. This part of the riverfront is the site where many stalls, concrete jetties and markets are located including the fish market, vegetable market, retail market and poultry market. A large concrete platform extends into the Sarawak River, and the mud flats are exposed at low tide (see Appendix 6.1, photograph 6).

4.2.4 The Brooke Dockyard and Mosque Landscape Place
(Intensive Landscape Zone).

This zone includes the Brooke Dockyard, its associated industrial and maritime buildings, mixed uses, two and three level traditional shophouses, the State Mosque, Muslim cemetery as well as a semi-rural/agricultural landscape. (see appendix 6.1, photographs 7 and 11).

This part of the waterfront forms part of the western edge of the waterfront study area. It is one of two areas within the study area which could be used to create a tropical ecological design. This area as a whole is a hardscape zone which has a distinct, consistent and recognisable landscape. The zone meets all the criteria identified in the landscape theory part of this study, see Chapters 2 and 3. The Mosque and Padang Pasir areas are recognised from the expert analysis carried out in this study as a tropical riverine landscape which is a resource of at least regional and local importance for reasons of
variety or ecological representativeness. The location of the Mosque on a hill provides focal points as well as a gateway to the western part of Kuching City and the waterfront. This landscape zone has a recognisable ‘sense of place’ because it is a natural meeting area for the local Muslim population, and also a burial place for dead people. The Mosque area is a landmark zone which has a distinctive and common landscape system, including varied topographic features and visual unity as well as a clear and identifiable ‘sense of place’. The visual and expert landscape assessment carried out for this landscape zone demonstrates that it is of high scenic quality, with panoramic views to the Sarawak River and the northern bank. The site has pleasing patterns on the land, cultural combinations of landscape features and important aesthetic and intangible qualities. The zone also has conservation value, scenic qualities as well as other notable conservation interests, which offer opportunities to restore various features of historical, wildlife, architectural and tropical softscape interest.

The landscape has a range of large trees, medium trees and tall palms that reinforces the tropical riverine landscape system. The prominence of the Mosque together with the Tua Pek Khong Temple provides a strong spiritual link. The Mosque area also provides opportunities for enhancing the relationship between the two riverbanks. The visual connection between the two banks could be reinforced by opening up view corridors from the city and by maximising vantage points along the riverfront to take advantage of the views. The activities between the two banks can be linked with boat connections. Furthermore, the differences between the green, passive parkland of the north bank and the active urban edge of the south bank could be strengthened.

A major constraint to the place’s development is the Muslim Cemetery and the presence of the Brooke Dockyard nearby (see Figure 4.1).
Figure 4.1: The Brooke Dockyard today (1998) showing the Dockyard and industrial buildings that are used to repair a range of boats.

Figure 4.2: Market buildings and other ad-hoc structures constructed on the waterfront, such as buildings and concrete jetties which are constructed over the Sarawak River. In the foreground is the completed waterfront plan for Kuching City.

Source: Both photographs taken by the Author.
This brief description of the Sarawak River gives an impression of the landscape places that once existed on Kuching's riverfront. All of these places have been removed from Kuching's riverfront except three historical buildings. They are the Chinese Chamber of Commerce building, the Sarawak Steamship building and the Fort at Pankalan Batu located opposite the Courthouse and other buildings such as the fish market, poultry market and vegetable market still exist on the riverfront (see Figure 4.2).

The consultants that prepared the waterfront plan for Kuching City carried out the landscape assessment using the expert paradigm. There was no public consultation or any attempt to involve the public in the landscape design process. However, the consultants were guided by the State Planning Committee during the waterfront plan preparation process. Presentations of the design concepts to the State Planning Committee were minimal and although inadequate provided the institutionalised framework for decision making. Appendix 6.2 outlines the landscape design concepts prepared for Kuching's waterfront by the consultants.

The State Planning Committee comprises of the following members: The Chief Minister of Sarawak, the State Secretary, the Permanent Secretary (Ministry of Planning and Resource Management) and the Director of Lands and Surveys. The Committee is also advised by a planning adviser and other persons are called to attend the meeting depending on their expertise and the particular issue being considered.

The landscape assessment of the Kuching riverfront will focus on that part of the Sarawak Riverfront that has been implemented. These landscapes are located opposite and to the east of the Courthouse. The places to be assessed are the Riverfront Plaza, the Promenade Park and Pontoon Boardwalk and the Courthouse Civic Square.
The landscape assessment framework outlined in Section 3.1 of this study suggests that the Conybeare Morrison assessment of Kuching's waterfront is very superficial, and does no more than examine the "surface" values of the landscape.

To appreciate the adequacy of the consultants landscape assessment in terms of the "core" properties of landscape, landscape designers need to understand "how the landscape works" (Thayer, 1996: 140).

### 4.2.5 The 'Core' Properties of Landscape as Place

The core values of a landscape aim at a practical level to connect humans with the broader ecological context. In this context as we are attempting to assess the Conybeare waterfront plan in terms of the landscape as place constructs, the assessment process must identify the "core" values of landscape. Table 4.1 identifies six "core" values which contribute to the landscape of Kuching's riverfront. These are, place, memory and placelessness; Context and history, identity, sense of place, participatory design and finally the experience of design. No doubt other categories could be added; These categories however would only become evident if the designers engaged in an extensive design participatory exercise. The six "core" values may also comprise of a range of sub-categories. See table 4.1.

Table 4.1 may be described as the outcome of an expert evaluation method, which has identified the "core" values of landscape, without resorting to public participation and interaction.
1. **Place, memory and placelessness**
   
   Place and Placelessness  
   Human Attachment (Topophilia)  
   Memory  
   Places where people meet and can recall certain activities and events occurring on the riverfront  
   
   Placelessness  
   Extensive removal of the riverfront's features  
   
2. **Context and History**

   Multi-cultural Races - Malays - Indigenous people  
   
   Architectural style  
   
   Migration - English, Chinese, Indians  
   
   Old Industrial Buildings  
   
   Trading Centre  
   
   Iron and Gold Smelting  
   
   Excavation of Historic Artefacts such as Ceramic shard.  
   
   Key Personalities.  
   James Brooke, Chief Minister of Sarawak  
   
   Historic buildings:  
   Courthouse, Post-Office, Fort Margherita,  
   The Istana, State Mosque, the Tua Pek Kong Temple, Chinese Chamber of Commerce,  
   Fort at Pankalan Batu and Brooke Dockyard,  
   
   Market Place: - Fish Market, Poultry Market, Brooke Dockyard.  
   
   Bus Terminal  
   
   Wharves and Jetty  
   
   Sarawak River  
   
   Maritime Activities
3. **Identity**

Accumulation of a Place's Memory
ie: Social Events, interaction with people.
Carving Traditions

4. **Sense of Place**

Coherence of memory

Depth of Meaning

Place and the meaning of place

Identity

Culture

History/Historic Connections

Human Attachment to Place

5. **Participatory Design**

6. **The Experience of Design**

Kaplan's (1982) Model

Chenoweth's (1990) Model of Experience

Thayer's (1996) Meaning dimensions framework

**Table 4.1**

Core Properties of Landscape as Place
4.2.6 The Expert Evaluation

Research ranging from Zube (1982) to the Kaplans (1989), as well as the works of Chenoweth (1990), Thayer (1996) and Whitmore et al (1995) demonstrate that humans agree on what they "behold to be most beautiful and what they consider most unattractive. Between these two extremes, however there is less agreement" (Whitmore, et al, 1995: 28).

The Kuching riverfront has been studied by two groups of 'experts'. They are the Conybeare-Morrison group and also a group of students from the Mara Institute of Technology. Both groups concur that the three historic buildings on the waterfront should be retained because of the nostalgic memory the buildings evoke. These buildings are: The Square Tower, Sarawak Steamship Building and the Chinese Chamber of Commerce building. However whilst the student's assessment of the riverfront are more extensive they also fall within the expert paradigm of landscape assessment of the riverfront place. The results of some of the students' assessment were submitted to the Local Council. See Appendix 6.1 (Kuching City Council, 1989: 87).

Contrary to popular belief the local students assessment of the landscape place did not yield significantly different conclusions (Kuching City Council, 1989: 127). Therefore it is reasonable to conclude that the relatively standard approaches of experts involved in the assessment of landscape place, provides only a surface assessment of the riverfront. To overcome the limitations of this approach the landscape assessment should focus on the "core" values of landscape. Table 4.2 and 4.3. outlines a landscape assessment methodology which focuses on an expert's appreciation of the landscape.

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A significant disadvantage of the psychophysical model is that it requires considerable time and expense to carry out landscape assessments and visual resource management studies. Furthermore, once the assessment of the riverfront landscape is completed, it may be apparent to the public that the resource assessment exercise is nothing more than the way government agencies and experts “hide from the public view what is really happening to the land” (Wood, 1988: 192). Consequently, in spite of the benefits of the psychophysical model, and its methods which incorporate a public participation exercise, the model’s major disadvantage is the length of time taken to embrace a public participation program. Thus, whilst the psychophysical model is a useful landscape assessment tool, it lacks quantitative precision and objectivity, as well as providing a false sense of security that hides the truth about what designers are actually doing to the landscape and our resources. Dennis Wood (1988: 203) said:

“The point is not the resource use, but the lying about it, not the cutting down of the trees, but the attempt to pretend we didn’t do it (it was the wind, it was the rockslides, it was the fire). In this way, nature is reduced to no more than an alibi for culture.”

He suggests that designers should be more careful and honest with the public, particularly when purporting to involve the community in the cultural landscape assessment process. In particular, he says that “telling the truth won’t save the universe, but it will force us to accept responsibility for our desires” (Wood, 1988: 203). On balance, however I would argue that whilst the criticisms offered by Wood (1988: 198) offer a critique of the psychophysical and expert models, his views do not offer much in the form of constructive suggestions for improvement. Consequently whilst designers are generally aware of the limitations inherent in landscape assessment models they use in the design process, they should never stop learning about how the process works because the process of learning itself provides clues for improving the landscape assessment process as a whole.
1. **Place Memory and Placelessness**
   Place - loss of human attachment, after demolition of Chinese Gardens.
   Memory - many local people met friends at this garden. It is an important place.
   Placelessness - Landscape made for tourists, not local people.
   - Loss of place names

2. **Context and History**
   Generally all context and sense of history has been lost resulting in uniformity and standardisation in places.

   The nostalgic memory of past history has been lost. The Sarawak Steamship building and the square tower are exceptions.

   Loss of Dominant Maritime activities and cultural softscape.

3. **Identity**
   The accumulation of a place's memory including Social events, the landing place of Charles Brooke, and the centres concentration as a 'stage' for interacting with people has been lost.

4. **'Sense of Place'**
   The coherence and continuity of past memories and events have been lost for ever.
   The depth and layers of past and future interpretations of 'place' have been lost.

5. **Participatory Design**
   No opportunity for local people to comment on the expert's design intentions. Therefore, there is no 'sense' of place.
   Focuses on 'surface' landscape values.

6. **The Experience of Design**
   No attempt to include relevant landscape models into the place's assessment process such as legibility, complexity, coherence, mystery, nature of the experience, object of the experience, ecology of the experience, value of the experience or landscape narratives theory.

   **Table 4.2**

   The Courthouse Square (Formal Landscape) Zone.
1. **Place, Memory and Placelessness**
   - **Place** - Significant loss of human attachment, viz. Cultural softscape, marine related artefacts and mud flats.
   - **Memory** - The demolition of six industrial buildings means that the potential to evoke many maritime stories have now been lost.
   - **Placelessness** - A good example of museumised places and futurist places contributing to impermanence and instability of places.

2. **Context and History**
   - Generally all context and sense of history has been lost resulting in a waterfront that resembles Australian places rather than ‘Asian’ or ‘Local’ water fronts.
   - Nostalgic Memory of past history has been lost. For example, no industrial buildings are retained. The exception is the Sarawak Steamship building.
   - Loss of a place that was recognised as a popular mooring area in the vicinity of the Chinese Chamber of Commerce building, and the Fort.

3. **Identity**
   - The accumulation of a place’s memory, including social events and the docking place of maritime vessels has been lost.

4. **‘Sense of Place’**
   - The continuity and coherence of past memories has been lost for ever, viz. Getting on and off maritime vessels.
   - The depth and layers of past and future interpretations of ‘place’ have been lost, including the site of the old prison.

5. **Participatory Design**
   - No opportunity for local people to comment on the experts’ design intentions; therefore there is no ‘sense of place’, or ownership.

6. **The Experience of Design**
   - No attempt to include models of landscape place assessment or other hybrid models into the place’s assessment process, such as legibility, complexity, coherence and mystery, and Thayer’s (1996) theoretical ‘meaning’ dimensions of landscapes.

Table 4.3

The Kuching Riverwalk Place (less extensive landscape zone) and the Promenade Park and Pontoon Place (intermediate landscape zone): An Assessment of Landscape Place.
4.2.7 Test the Landscape Assessment Process

A landscape assessment process which focuses on the 'core' values of landscape provides a much better appreciation of the Kuching riverfront than an assessment process which evaluates 'surface' values.

Therefore, the landscape assessment process of a landscape can provide a broad framework for determining whether the new waterfront landscape genuinely identifies and reinforces the contribution that landscape place and memory has made to Kuching City.

In the context of the 'landscape as place' construct it is apparent that the Conybeare-Morrison waterfront for Kuching City has some deficiencies. Firstly, the process has focussed on the expert's assessment of the 'surface' values of landscape rather than the 'core' values and also has not integrated the assessment with landscape paradigms such as the psychological paradigm or landscape narrative theory. The landscape design solution therefore can only be appreciated at the superficial layer, which suggests that the waterfront as a whole has not been successful in creating a relevant 'sense of place'. The many dimensions or mosaics needed to create a depth of meaning are lacking. Among these layers are the ideas relating to the following layers of landscape. Place, memory and placelessness; context and history; identity, 'sense of place', participatory design and the experience of design.
Secondly, the process is devoid of any participatory design input from the local population. Therefore, the various meaning dimensions which contribute to the shape and form of a Robert Thayer’s (1996) three dimensional cube are missing. The only way to overcome this problem is to actively engage as much of the public as possible in the design process, to ensure that designers can put together as many narratives as possible so that the shape and form of the cube becomes recognisable. These dimensions of the cube are metaphorically similar to the core values of landscape identified in Table 4.1. Therefore, using public participation in the landscape design process is extremely important because it provides the ecological knot (Dovey, 1985: 105) which gets designers to the ‘core’ experience of a landscape.

Thirdly, the landscape assessment process has made no attempt to articulate a thinking process which makes the design process valid, reliable, sensitive or of utility value to designers. For example, even if the phenomenological approaches to place making are inadequate, there are other landscape assessment methods which can be used to complement the emergence of a new ‘place paradigm’, including the Kaplan’s (1982) model, Chenoweth’s (1990) landscape assessment model relating to ‘the nature and ecology of aesthetic experiences in the landscape’, or Matthew Potteiger’s (1998) landscape narratives framework for telling stories.

Finally, the expert paradigm will be more valid, reliable, valuable and of utility value if it is combined together with a public valuation program which embraces ‘landscape as place’ narratives that focus on core landscape values. This could be done through a series of workshops that focus on ‘sense of place’ issues (Daniel and Vining, 1983: 49; and Whitmore, et al, 1995: 30).
These standardised outcomes of landscape assessment procedures could then be used on the waterfront 'landscapes' and tested against various general components of the landscape narrative landscape constructs or types, selected for assessment together with some assistance from Thayer's (1996:129) theoretical 'meaning' dimensions of technological landscapes.

The use of an expert paradigm to carry out an assessment of Kuching's riverfront landscape is a useful starting point for undertaking an assessment of the landscape. However, the paradigm would be more fruitful to designers if it is used together with a new and emerging place paradigm. The outcome of this assessment process can then be tested for its validity, reliability and utility value.

The key to any good landscape assessment is to define the landscape construct and the important values which relate to the particular construct under analysis.

The 'core' values can then be assessed statistically and the 'core' values ranked in terms of the most preferred, preferred, no clear preference and not preferred.

In the next section ecological design principles adapted to landscape as place, system and meaning, are applied to the Brooke Dockyard and Mosque landscape which is a small part of the whole riverfront landscape of Kuching City. It is perhaps at this stage that landscape narrative theory could be used to integrate the assessment of the three landscape constructs across the three related realms: firstly, the story, secondly, the context/intertext, and thirdly, the discourse (Potteiger and Purinton, 1998: 48).
4.3 Assessment of the Mosque Zone Using the Landscape Construct of Place

The Mosque and Brooke Dockyard cultural landscape is now assessed in terms of one construct of landscape. In this case place, and also in terms of the site’s core landscape values.

4.3.1 Place, Memory and Placelessness

- **Place** - The Mosque and Muslim Cemetery are both landscapes which represent a degree of deep human attachment. This sense of attachment is both religious and personal. The Brooke Dockyard also has human attachment because it is the place where many historical ships docked for repair.

- **Memory** - The Mosque, Muslim Cemetery and Brooke Dockyard are a storehouse of cultural memory. Muslims go there to pray and also visit the cemetery to pray for the dead, heal, repair and restore the grave sites.

- **Placelessness** - The Mosque does not exhibit any components of a placelessness geography. However, this is evident at the Brooke Dockyard because it has a high perimeter fence (Relph, 1976: 118).

4.3.2 Context and History

Generally the Mosque, Cemetery and Brooke Dockyard evoke a deep sense of collective memory for the people of Kuching. These places exhibit traces of richness, variety in detail and complex meaning. This complexity results in a landscape that is neither uniform nor standardised, and becomes more meaningful to observers of the landscape when Muslims go to the Mosque to pray and particularly during the fasting month of Ramadan when a process for healing the landscape takes place. Healing the landscape is thus one of the metaphors which designers could use to structure the plot or design of the site. This reading of the site could focus on a story which reveals the healing of the site associated with the Mosque and the Cemetery as well as provide a
reading of the landscape which alludes to the restoration of the landscape system. In essence, this reading of the tropical landscape could take the form of an ecological restoration narrative which I will discuss later.

The nostalgic memory of past history and cultural practices remains intact and the Muslims attend the Mosque frequently, particularly for Friday prayer at mid-day. The Mosque is also a popular meeting place for the Muslim Community, and provides a cultured link between people who live at the Northern bank of the river, and cross the river by boat to pray and pursue other activities such as marketing, going to work and to school.

Whilst the Brooke Dockyard continues to be used for the repair of large boats, there is no evidence to exhibit the glory of past maritime activities. Permanent historical artefacts exist on the site but they are in disrepair and decaying rapidly.

4.3.3 Identity

The accumulation of the landscape’s memory in terms of significant regular events, and also where many historical people repaired their maritime vessels remains largely intact.

The place’s potential as a meeting place for religious groups, commercial and retail activity as well as a place of maritime employment remains, and should therefore be reinforced.

4.3.4 ‘Sense of Place’

This landscape has significance because it is coherent or has a strong sense of spatial definition. The site also provides the context for reinforcing the continuity of the intricate ecological knot (Dovey, 1998: 105) that brings back many past memories, such as healing the landscape of the dead, and the construction of many historic and symbolic artefacts.
The potential for bringing back into the design process the many depths and layers of meaning in terms of past interpretations of the landscape are significant, for designers.

4.3.5 *Participatory Designs*

Ample opportunities exist for entering into a design discourse using methods such as questionnaires and design workshops focussing on key ‘sense of place’ issues. This design discourse could in the final analysis take the form of a landscape design narrative which tells us a story about how the place came to exist, how it evolved and what it means to the people of Kuching today. The story could tell of names of places that once existed and are now lost.

The objective of participatory design would require both a process of active and passive participation, to assist designers with a more accurate interpretation of ‘core’ landscape values.

4.3.6 *The Experience of Design*

To facilitate the participatory landscape design the experts assessment of the landscape could be analysed by bringing into play various dimensions of the psychophysical paradigms. For example, this could be formulated to the local population’s preference for specific ‘core’ values of landscape ‘based on past experience, future expectations, and socio-cultural conditioning of the observer’ (Whitmore et al, 1995: 29).

4.4 *Assessment of Landscape as System*

The purpose of carrying out an assessment of landscape as system is simply to add to another layer or mosaic of interpretation which is relevant to addressing past and current landscape design issues. The core values of landscape as system may be assessed in terms of; the landscape’s functional and perceptual dimensions, the sense of order that are evident in tropical
landscape systems, the potential of tropical plants as multi-dimensional systems, and the potential for applying ecological design principles to the site.

4.4.1 The Functional Dimension of Landscape as System

The functional dimensions of landscape as system attempts to assess the Mosque intensive landscape zone in terms of the functional meanings of technological landscapes. These landscapes may be ranked in a value hierarchy that relate to the five major categories of technological function. They are: transformative, transportive, energetic, agricultural and informative. The focus on this assessment will be on those categories which yield the highest possible landscape value, namely informative, agricultural and transportive landscapes.

4.4.1.1 Informative Technology

The Mosque intensive landscape zone does not exhibit many examples of informative technologies. However, because these types of technologies generally yield the highest landscape value they are perceived as containing ‘little inherent unpleasantness’ because they are nothing more than the ‘few visible landscape manifestations of the transfer of information’ (Thayer, 1996: 122).

Informative technology does not to a large exist on this zone, but has potential for incorporation into the ecological design of the Brooke Dockyard yard site if the technology educates the public about the importance of landscape system values. Particularly restoration and healing processes associated with ecological health.

4.4.1.2 Agricultural Technology

Some parts of the Mosque Zone contain remnants of agricultural landscapes. The green landscape open system to the west of the Mosque that are dotted with coconut plants and Nypha Palms evoke a strong hierarchy of visual and spatial values. They suggest a
metaphor of lost tropical riverine plant and wildlife systems. These technologies reinforce the human need for water and as a source of production for food and fibre. Consequently fishing, coconut plantations and rural landscapes are accorded a high rating of landscape value.

4.4.1.3 Transportive Technology

This landscape zone has for a long time been recognised as a landscape system that promotes the movement of 'people, material or goods from one location to another' (Thayer, 1996: 118).

Therefore, there are many psychosocial attractions that local people and visitors to the site associate with the movement of small boats up and down the Sarawak River, and also to and from the northern and southern banks of the river. Small and large boats of all kinds are both "a transcendent cultural symbol and a utilitarian necessity in the current lifestyle of the local population" (Thayer, 1996: 119).

There is need to recognise the cultural symbol of the 'boat' as a design tool which reinforces the important landscapes at both banks, and which also take advantage of views to important historic, water and land features.

Previous sites for mooring areas and boat repair in particular provide ample opportunities for reinforcing a landscape that makes provision for mooring of boats, jetties and floating pontoons that will allow humans to reinforce the physical and cultural linkage of the landscape, as well as creating design opportunities for open landscape narratives by including elements of transportive technologies in the ecological design of the landscape.

Open narratives as opposed to closed narratives can intersect with existing and known transportive sites, to accumulate layers of history,
and organise sequences of landscape narratives that reveal the processes and materials of the landscape. Thus the Mosque and Brooke Dockyard Zone provides the designer with a unique opportunity to keep clear of preparing spaces that adhere to the ideology of consumptive spaces as well as the growing trend to create closed narratives. Pedestrian malls like India Street and Kuching’s new waterfront are examples of controlled and scripted places, which can silence, hide or erase past voices, meanings and layers of complex associations.

To overcome this trend of creating closed narratives the landscape assessment process shown in Appendix 6.1 stresses the role of the reader. Matthew Potteiger (1998: 188) has noted that landscape design, particularly urban landscape design should produce meaning by creating open landscape narratives that denaturalise established ideologies and make provision for “the multiple, contextual and changing nature of meaning” (Potteiger and Purinton, 1998: 118). The qualities which contribute to open narratives are: lived experiences, indeterminate, participatory, public, integrated, non-scripted, and contain a range of possible and decoded interpretations, including the layering of multiple time frames as well as a range of discourses that make references and traces to the stories of many other authors. Consequently, the landscape can be interpreted by readers from many points of view and in different contexts. Potteiger and Purinton, (1998: 38) refers to these qualities as the contextual/intertextual realm. Among the devices which landscape designers could use to bring closure or create meaningful spaces are metaphor, metonymy, synecdoche and irony (Potteiger and Purinton, 1998: 40).

4.4.2 The Perceptual Dimension of Landscape as System

The perceptual dimension of landscape as system allows us to realise a “man-made intrusion when we see one” (Potteiger and Purinton, 1998: 40) and to
also identify the "many fine gradations of the degree to which technological or utilitarian alterations to landscape are visible and distinctively perceivable" (Thayer, 1996: 113). Some of these perceptual dimensions yield higher possible landscape values and are assessed further in the next section.

4.4.2.1 Invisible Technology

Invisible technologies are not readily apparent in the Mosque landscape. In landscape terms technological changes are perceived as minimal and generally to the untrained eye have no "visible effect on landscape structure form or materials" (Thayer, 1996: 113). However, examples of the use of these types of invisible technologies are evident on the landscape. They express themselves in the landscape topography, where topography has been moulded and shaped to accommodate human and softscape needs. Examples include the landscape form of the grave sites, hills and valleys created by humans, the treatment of the 'softscape' edge of the Sarawak River and the use of technology to plant tropical softscape material. These types of invisible technological landscapes are acceptable to people because they reinforce our vision of nature, and the perception that technological intrusion is largely invisible.

Consequently, the existing patterns of trees, shrubs and ground covers reinforce our natural perceptions of 'softscape' and 'naturalness'. Therefore these 'softscape' materials together with the moulding of the landscape form are important ecological design cues which should be included in the landscape design concept.

4.4.2.1 Implicit Technology

Implicit technology leaves a pattern or form on the land after technology has "come and gone" (Thayer, 1996: 113). Examples where these technologies have had an impact on the rearrangement or composition of soil are rock formations, vegetation, water and land forms.
Because of the manipulation of materials commonly perceived as 'natural', implicit technology is often reacted to as part of the 'natural' world, although the altered landscape may hardly resemble the original landscape 'place' before alteration by humans. (Thayer, 1996: 114)

Good examples are the softscape edge adjacent to the Sarawak River, old footpaths and building foundations that are being colonised by tropical groundcovers and shrubs.
4.4.2.2 *Explicit Technology*

Explicit technology refers to the extensive use of man-made materials and forms of 'hardscape'. This type of technology is used so extensively on the landscape, that it is eventually accepted as an "integral and essential part of the landscape" (Thayer, 1996: 114). Because the use of these types of explicit landscape technology are widely used on the landscape, humans eventually accept this technology as "the contextual fabric of our modern experience - the human altered backdrop against which most of our daily life occurs" (Thayer, 1996: 114).

In the Mosque intensive landscape zone there are many examples of explicit technology including foreshore concrete retaining walls, asphalt roads, concrete platforms, buildings and brick pavement systems.

4.5 *Designing the Tropical Landscape*

Nature has defined a unique relationship between tropical plants and their environment. This relationship is the key to successful design of riverbank landscapes and tropical parks.

Tropical rain forest plants for riverbank landscapes should be designed so that they emulate a typical rain forest structure as well as the four dimensions of the landscape preference model listed previously. This structure consists of: a canopy level, sub-canopy, under-storey trees, shrub layer or seedling zone, and a layer of small seedlings and forest floor herbs.

4.5.1 *The Layers of a Malaysian Tropical Rain Forest Landscape*

The canopy top level of the primary rain forest consists of individual or grouped emergent trees. The main forest giants of the primary lowland evergreen rain forest are the *Shoreas, Dyera, Dryobalonops, Koompassia,*
Dipterocarpus, and Hopeas. It may be possible today, with improved horticultural technology, to obtain viable seed, of the main primary rain forest. These seeds can be obtained and nursery grown. Often several genera of Dipterocarps, such as Anisoptera, Dipterocarpus, Dryobalanops, Parashorea, and Shorea together with other species grow side by side (Whitmore, 1986: 157). Emergent trees may vary from area to area, but the most common species were Shorea parvifolia, which is a strongly light demanding species (Whitmore, 1986: 221).

Soil conditions may favour certain emergent trees. For example, the Dryobalanops aromatica association east of Peninsula Malaysia is commonly found on sedimentary rocks, in the lowlands from about fifty to four hundred metres, and Shorea curtisii on quartz-rich parts of granite rocks (Whitmore, 1986: 227). To some extent contemporary landscape architects will be able to manipulate light conditions and soil conditions to create a meaningful landscape.

The sub-canopy of the tropical lowland evergreen rain forest forms a main and continuous stratum below the giant emergent trees. This canopy has trees that grow between twenty four to thirty-six metres, with smaller shade dwelling trees below that. The height and canopy structure image commonly found in the Malaysian rain forest could be adopted in the design of tropical riverfront landscapes.

The under-storey trees of the sub-canopy create a microclimate which supports the growth of small shade dwelling trees up to twenty metres high. The under-storey stratum is characterised by a rich, ground layer palm flora of shade and moisture living genera, mainly Iguanura and Pinanga species. Flora such as Arenga, Nenga, and Rhopaloblaste may also be observed, but to a lesser extent (Whitmore, 1979: 159). Today the Mosque landscape zone exhibits landscapes of open grassland, tangled growth of woody light demanding climbers and many pioneer species of tropical riverine plants. A natural healing and restoration process is beginning to take place and requires
reinforcement in the urban landscape design concept for the zone. See Appendix 6.1.

*Eugeissonia tristii*, the giant stemless undergrowth palm, and the diamond-fronted palm *Johannesteijsmannia altifrons*, occupy distinct distributions through the lowlands. This observation suggests partial extinction, possibly following an era of secular climatic change (Whitmore, 1986: 159). Some under-storey trees and palms are potentially suitable for planting not only in the Mosque Zone but also in urban situations and urban parks.

Shrubs are not common in the lowland evergreen forest. Ground vegetation is sparse and consists mainly of small trees and herbs.

### 4.5.2 Plants of the Secondary Forest

Plants of the secondary rain forest have an important role to play in designing the tropical landscape. Light demanding plants of the secondary forest provide the shade required to regenerate plants of the primary rain forest or encourage growth of primary rain forest plants.

Plants of the secondary rain forest are varied and patchy on the landscape. The canopy is seldom uniform and there are patches of giant herbs (mainly bananas and gingers), sedges (especially *Scleria*), and tangled growth of woody light demanding climbers. Climbers such as *Merremia, Mezoneuron, Uncaria* and rattans are common. Their growth is also stimulated by removal of the primary forest canopy.

Many plants of the secondary rain forest are absent from primary forest. However, two palms *Caryota mitis* and *Pigafetta filaris* out of two hundred and twenty indigenous Malaysian palm species are characteristic of the secondary rain forest and the primary rain forest. *Macaranga* pioneer species, are also common plants of the secondary forest, and encourage tree seedling establishment below.
This young secondary forest, if left intact, will eventually revert to an old secondary forest and ultimately the climax lowland Diptereocarp rain forest. Continuous felling and cultivation of the young secondary forest, causes site deterioration and soil erosion, as well as loss of potential tree species. Shrubs develop including *Melastoma malabathricum*, *Lantana Camara*, and *Dillenia suffruticosa*. Ultimately continued disturbance leads to the development of open grassland (Whitmore, 1986: 227). The pattern of open grassland provides a scar on what was once a tropical riverine landscape in the vicinity of the Mosque Zone.

4.5.3 *Plants of the Riparian and Alluvial Rain forest*

A profusion of plants line the banks of Sarawak's rivers. The upper reaches of rivers which have fast flowing and shallow water display shrubs which are able to attach to and thrive on the banks and rocky stream beds. These plants have adapted to the microclimate and fast flowing water by developing strong stems, branches and roots. They are able to withstand both the flow of water as well as periods of drought. Further down the river the riverbanks develop a different character, as the bigger tropical trees lean over the river. These drooping trees have edible fruits which fish feed on once they fall into the river after ripening. The lower trunks of these trees have features which are different to the primary rain forest trees. Below the flood level the lower trunks of these trees are often thick and rough.

An example of such a large tree is the *Dipterocarpus oblongifolious*. This tree is a protected tree because it helps to stabilise the riverbanks and stop erosion. The heavy crown of this tree allows filtered sunlight to penetrate the riverbank and water below providing plenty of shade, as well as keeping the water cool. Its trunk and higher branches display a range of microclimates as light penetrates a different intensity. The result is that these microclimates create a range of homes for many species of epiphytes and climbers.
The sand, silt, and clay sediment that is not held by the big riverbank trees finds its way, together with other plants, downriver where the fine soils settle in the lower riverbanks as water flows over and through them. Erosion is kept to a minimum, and at a management level for the ecosystem to deal with. This delicate balance which the tropical rain forest has created, creates an ecological habitat which resembles flat alluvial plains that are eventually colonised by alluvial forest. Different trees grow in response to light conditions, soils and other environmental factors, and in time develop a unique pattern of their own.

In the alluvial forest of riverbanks, the lower canopy of tropical riverine rain forest develops a canopy of lower tropical trees. These trees form a canopy of dense, small dense trees, having uniform height of between twenty to twenty-five metres. Many trees provide a source of visual interest and contrast, as they are overladen with climbers of different sizes and species, and epiphytes are common. Palms, herbs and ferns add to the number of plants in the undergrowth, and should provide a source of inspiration for the design of urban riverbanks.

The tallest trees which break through this lower tree canopy form an uneven canopy of emergent trees about forty metres high. Typical tropical riverine rain forest trees which occupy the emergent canopy are the *Pometia pinnata* and *Octomeles sumatrana*. Their trunks grow to great lengths and widths, with the latter having to grow to one metre in Diameter to support these forest giants (Steed, 1995; 195).

Other examples of rain forest plants found along riverbanks are, *Eusideroxylon zwageri*, *Eusideroxylon malaganggai*, *Tristaniopsis clemenisiae*, the palm *Arenga undulatifolia*, the stemless palm consisting of *Salaca* species, colonies of *Osmyxylon borneensis*, ferns such as *Dipterous lobbiana*, species of *Clavaria*, *Pandanus affinis*, the less common *Tacca borneensis*, mushrooms such as *Caprinus* sp. which grow in small colonies, and the *Zingiber porphyrosphaera* (see Appendix 6.3).
Most of the rainforest plants outlined in Table 4.4 have been planted at Sarawak's Semengok Botanical Research Centre. These plants are normally found in riverine environments such as those along the river's edge, and may be used to evoke and restore the tropical landscape image along the waterfront. The plants are particularly useful for riverside tropical planting design because of their potential ornamental value.

Many other plants however, may be found adjacent to rivers throughout Malaysia, and many of these can be used to supplement tropical plants selected for Kuching's waterfront. Landscape designers however should have regard to the fact that "... common and obvious plants of any large river in south-East Asia probably numbers no more than twenty different species as against the forest nearby" (Rubeli, 1986: 14).

These riverine plants are generally site specific due to the different conditions needed for plant establishment and growth. Some of these species will be found within the forest proper, with fewer plants occurring along the river banks. A list of common tropical riverside plants suitable for the waterfront are outlined in Table 4.5.

Various species of palms are also suitable for planting along riverine environments such as *Johannesteymannia altifrons*, resembling the feathers in a shuttlecock. In damp places the large fan palm *Pholidocarpus majadum* is frequent. Small palms of the genera *Pinanga, Areca, Iquanera*, and *licuala* sp. everywhere abound. Where shady conditions prevail the tree fern *Cyathea latebrosa* may be found (Ashton, 1971: 159).

A suitable mix of riverside tropical plants for design purposes could include *Dipterocarpus oblongifolius, Licuala spinosa, Saraca declinta*, and also the large heat-shaped leaves of an *aroid* sp. planted on the bark of *Shorea macrophylla* (see Appendix 6.4). Appendix 6.5 provides a more detailed description of some tropical riverine plants.
Ground Covers
Selanginella polystachya
Dianella ensifolia
Dianella cf. reticulata

Mass Planting of Naturalised Shrubs or Herbs
Dillenia suffruticosa
Homalomena griffithii
Homalomena rubra
Homalomena propinquas
Nicolaia elator

Climbing Plants
Hoya latifolia
Hoya coronaria
Hoya mitrata
Piper nigrum

Palms
Licuala orbicularis
Licuala bidentata
Iquanura palmuncula Becc. var. Masua
Pinanga aff. stricta
Salaca magnificia magea

Small Trees or Large Shrubs
Dillenia suffruticosa
Cinnamomum iners
Memecylon ovatum
Shefflera petiolosa
Melastoma normala

Medium Size Trees (8 - 20m)
Barringtonia asiatica
Callophyllum inopohyllum
Cerbera odollum

Table 4.4

Suitable Tropical Plants for Kuching’s Waterfront
(Steed, 1986: 19)

The plant selection rationale for Kuching’s waterfront are based not only on the development of horticultural technologies that facilitate the cloning of tropical plants, but also on this study’s recognition of the importance of cultural landscapes to landscape design.

More importantly, the growing importance of suitable tropical plants for Kuching’s waterfront are based on local botanical authorities which recognise
the growing importance of tropical plants for Kuching’s waterfront. (Chai and Liew, 1988: 21) and (Jabatan Perancangan Bandar dan Desa Semenjung Malaysia, 1995: 3-9). In addition the selection of plants are based on the information local and foreign botanists have discovered in the field, and the tropical riverine plant list that are located at the Forest Department’s herbarium located in Kuching, Sarawak.

<table>
<thead>
<tr>
<th>Common Tropical Riverine Plants</th>
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<td>Rubeli, 1986: 14</td>
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The landscape setting of the Sarawak River, or the ‘Sense of Place’ of the site should establish the tropical riverine mood of the planting concept. In particular tropical plants should be selected according to the function which they are required to perform. Plants for the waterfront may be categorised into any number of elements, such as aesthetic, manipulative, colour, form, and texture but should be selected based on the designers' objectives for the site, and the selected landscape construct for the site.

The aesthetic element aims to achieve a pleasing prospect and ‘sense of place’ for pedestrians. Examples of tropical plants, which meet this objective are; *Alocasia macrorrhiza, Cinnamomum iners, and Barringtonia asiatica.*
The manipulative element can be used by designers to form a visual or acoustic screen, so as to create areas of shelter and privacy. This design element can be used to discourage vandalism, or used to frame vistas to particular historical or Islamic features such as the Islamic portals on the Cemetery site (see Appendix 6.6, photograph 12). Examples include; *Dillenia suffruticosa*, *Peltophorum pterocarpus*, *Cocos nucifera*, *Cyrostachys lakka*, and *Licuala orbicularis*.

The colour element is the most striking of all the planting design elements, because of the psychological impact it can have on human beings. For example, people have a psychological tendency to lean towards light and vivid colours, whilst subdued light and cool colours are more conducive to moody reflections of thought. Bright light and warm colours tend to excite and may lead the viewer to move through the landscape space, and warm colours such as reds, yellows, and oranges have a tendency to appear nearer to the observer or to advance, while cool colours such as dark greens appear further away or recede. More importantly, colour changes should be graduated so as not to break the continuity (Robinson, 1992: 245).

Tropical plants can be selected on the basis of form to create a tropical riverine landscape image in situations where indigenous plants may not be available (see Appendix 6.5).

The shape of a tropical plant and its surface quality depends upon the visual texture of the leaves, bark and branches. The leaf texture is the main design element that determines the shape, although the bark and branch structure can readily modify the plant's texture and character during varying seasons and also with the passing of time. For example, *Cassia fistula* has a very noticeable leaf colour and yellow flowers when young, but has a tendency to drop branches as it ages and to also become straggly.

Large or closely packed leaves of *Terminalia catappa* form a strong prominent image while the smaller leaves of *Ixora 'sunkist'* are not so
noticeable when planted in isolation (see Appendix 6.6). Therefore, Ixoras may be displayed to their best advantage when planted in groups. Dull textured leaves of tropical plants such as *Barringtonia asiatica* appear much heavier than shiny, reflective ones of equal size. In the tropical rainforest there exists many subtle varieties of colour. As time passes the tropical rainforest displays an unlimited range of greens and to a lesser extent yellow and reds, of leaf, bark, and flowers. These are the colours which not only anchor any tropical planting design theme, but also serve to complement the dominant theme of evergreen trees, by adding colour and giving a coherent structure to the waterfront planting design. More importantly, imported colourful plants that have a tropical look, is what the local people expect to see in the landscape design of urban waterfront sites. This is perhaps one way of placing nature within a framework of culture and ecology.

Within this basic framework specific variegated textured plants such as *Erythrina variegata* and *Erythrina crista galli* can be introduced to the planting design to highlight the bright colours which emanate from their foliage, flowers and fruit. These planting design tools however, are often dependent on season, and the design of floral displays needs to be consciously designed with this in mind (see Appendix 6.6).

As with any design, the colour effects intended for Kuching's waterfront should be designed to achieve the moods and landscape character desired, for example, plants can be warm, or cool, or create the context for a calm environment, or stimulate users of the waterfront into action or to reflect and remind us of what has been lost. Colour, texture, form and tropical plants can be used to create a design framework which evokes the image of tropical riverine rainforests and to rekindle our "belief in immortality, some essence, idea, or memory that lives on despite apparent loss" (Potteiger and Purinton, 1998: 217).

Creating a tropical design framework for the waterfront requires considerable design skill in order to avoid the monotony that is evident in many evergreen
tropical rainforests. This will require more than merely planting for diversity, and filling the waterfront spaces with inappropriate landscape structures and materials. Too much variety becomes meaningless and creates confusion, to waterfront users by detracting from the character of the tropical and urban landscape.

Thus the design objective for the waterfront should aim to create a strong framework within which variety and interest can be maintained. Strength, order and simplicity are the landscape architects' planting design hallmark, as they allow plant groupings to be designed to accommodate gradual changes of form, texture, and colour that are more soothing than a tropical image or jungle of strong contrast. Within groupings key plants could be introduced that will catch the wandering eye of pedestrians, or strategically located along the waterfront to draw pedestrians to desired waterfront vistas or entry into the waterfront park. More importantly, landscape designers can recommend recycling strategies for reinforcing and contributing to the metaphor which “transforms restoration. Rather than recreating nature, it integrates with ongoing activities” (Potteiger and Purinton, 1998: 234) and forms the basis for ecological design.

Tropical plants which could be used to create an overall tropical planting design framework within the study area are:

**Herbs:**

*Alocasia macrorrhiza*

**Climbers:**

*Aroid Spp.*

**Shrubs:**

*Kopsia fruitcosa*

**Small, Trees or Large Shrubs**

*Cyathea latebrosa*

**Medium Size Trees**

*Dillenia excelsa*
Large Trees

*Peltecorcarpum pterocarpum*
*Fagrea fragrans*
*Shorea macroptera*
*Dipterocarpus oblongifolius*

Freshwater Swamp Forest

*Pandanus helicopus*
*Oncosperma tigrillaria*
*Oncosperma horridum*

Palms for Riverine Areas

*Cocus nucifera*
*Cycas revoluta*
*Johannesteijsmania altifrons*, and
*Cyrtostachys lakka*

The primary objectives of landscape architects when approaching the task of waterfront planting design should be to group tropical riverine plants so as to achieve a balanced landscape which will complement the river foreshore environment, as well as allude to the meanings which emanate from the cultural landscape. For example, restoration strategies and the landing area that starts with the edge of the Sarawak River could tell a story that is structured according to the chronological history of the Northern bank of the Sarawak River, particularly the intertext that reveals the intricate (Islamic influences), the Brooke Dockyard (Maritime influences) and the impact of Chinese migration on the cultural riverfront landscape of Kuching City. See Appendix 6.1 (Landscape Narrative Assessment) for a demonstration of how chronological history can be used to represent symbolically: metaphor, synecdoche, metonym and irony (Potteiger and Purinton, 1998: 118).

Tropical plants should therefore be selected so that they are located on the landscape to complement historical buildings, landscape furniture, structures, and materials as well as explore how meaning is constructed between both landscape and narrative. To achieve this task designers will need to use the particular characteristics of individual plant specimens to their best advantage,
and exploit the restorative features of tropical riverine plants, particularly erosion stabilisation and the establishment of pioneer plants as strategies for creating a unique waterfront design for Kuching, and the Mosque Zone in particular.
Designers need to realise that urban tropical planting design is not a static process, but requires a design approach which recognises the dynamic nature of tropical plants, that is plants grow and change over time to create their own niches along the waterfront including wildlife habitat. It is therefore necessary to cut down and thin off the plants periodically in urban areas to ensure their survival, and also maintain a balanced relationship between the 'softscape' and 'hardscape' elements of the waterfront landscape. The degree of maintenance necessary varies according to the species selected and the manner of their grouping.

Urban tropical planting design recommendations for Kuching’s waterfront should recognise that maintenance of the design solution is a factor which will have a determining influence on the types of tropical plants ultimately selected for the waterfront, and the extent to which ecological design strategies such as recycling can be integrated with the urban landscape.

5.5.4 *Tropical Planting Strategy*

A planting strategy for Kuching’s riverbanks need not necessarily include the mass planting of emergent trees or sub-canopy trees. The size and scale of tropical forest trees would be inappropriate for planting in a small urban park or along narrow riverbanks such as those found within Kuching City. However, some of the sub-canopy trees may be useful along the riverbanks of the Sarawak River because they can provide a symbolic reference to the tropical river landscape by the use of scale, texture, and colour. For example, the mass planting of the riverbank with the tree *Tristania clemensia*, can add visual interest to the riverbank because it has distinctively brightly coloured red/orange bark, that are tall and slender as well as extremely attractive bright coloured green leaves. The palm *Arenga undulatifolia* can be used as a specimen plant as it is medium sized and has long undulating leaves which overhang the river. *Pandanus affinis* can be used to start the colonising process as it colonises brackish and fresh water zones upriver from the
mangrove forest, often with its lower parts located entirely in the water. This plant is very attractive and has distinctive red flowered spikes that take the shape of a round ball. Another plant which can be used is the less commonly seen herb *Tacca borneensis*, which has distinctive and conspicuous purple flowers.

Among the edges of the primary rainforest and open spaces abutting the primary rainforest small shrubs, under-storey trees and palms should be planted to give visual continuity between the primary rainforest and the riverbanks.

The primary lowland rainforest and vegetation abutting tropical riverbanks are fast disappearing. Landscape designers can make a significant contribution to restoring the tropical riverine landscape by applying some basic principles of tropical planting design and ecology to urban situations.

The choice for landscape designers is clear. They should use local tropical plants where these are available to make a contribution to restoring the vegetation of lost riverine tropical landscapes, or follow the path of impoverished mad-made landscapes and open grasslands that replace the beautiful tropical riverbank vegetation.

Successful application of the urban tropical design concept to Kuching’s waterfront requires the skilful application of artistic skills, as well as an appreciation of tropical plant and symbolic characteristics. The suggested urban tropical design concept proposed for the waterfront should attempt to capture some of the more elusive dimensions of tropical riverine plants, and integrate these elements into the design of the waterfront. More importantly tropical plant material may be used to not only reinforce the landscape character of the waterfront but also used to reinforce distinctive features of the waterfront such as the wide, flat flood plain and nearby Malay settlements which are raised on stilts above the flood plain.
A Transactional Model of Human/Landscape Interaction for the Mosque-landscape Zone

The transactional view of human/landscape interaction is considered an appropriate model to use for the design of the Mosque Landscape Zone. This model attempts to accommodate the human, the landscape and the transactions between them and also provides a broad framework or a landscape methodology for conceptualising the tropical landscape of Kuching City as multi-model and multi-experiential. This transactional approach of human/landscape interaction accommodates three approaches to landscape assessment: ‘landscape as place’, ‘landscape as system’, and ‘landscape as meaning’ (Thayer, 1996: 133). Central to Ittelson’s (1973: 3) transactional view is the fact that “one cannot be a subject of an environment, one can only be a participant”.

So far this chapter has assessed the landscape of the Mosque Landscape Zone in terms of Thayer’s (1996: 3) perceptual and functional ‘meaning’ dimensions of technological landscape as well as various ‘core’ values of the new and emerging ‘place paradigm’ (Hiss, 1990: 195; Relph, 1976: 30) and the landscape as system.

In this part an assessment of the Mosque Landscape zone will be carried out using the Kaplans’ (1982: 84) information model of landscape preference which proposes a psychophysical paradigm of landscape that contains the ‘core’ dimensions of mystery, complexity, coherence and legibility. The mystery dimensions of humans’ preference for landscape is supported by research and statistical analysis which provides “support for the validity of the mystery component of the Kaplans’ (1982:174) information processing model as a perceivable attribute of rural scenery” (Gimlett, Itami and Fitzgibbon, 1985: 94). The mystery component of landscape preference was tested against five attributes of screening, distance of view, physical accessibility, spatial definition, and radiant forest and were found to be “consistently explained within the framework of their information processing model:
screening, distance of new spatial definition, physical accessibility and radiant forest" (Gimlett, et al, 1985: 94). This research confirms that all the ‘core’ values of landscape assessment proposed by the Kaplans (1982, 84) can be defined by landscape form and cover. However these definitions of landscape are found to be a function of vegetation and topography that varies from landscape to landscape. Additionally, these sub-elements of mystery, were found to be of utility value in any landscape perception or landscape assessment process. These findings support the conclusion that “scenic quality assessment procedures which are theoretically sound, have validity in terms of public perceptions and are adaptable to different landscape concepts” (Gimlett et al., 1985: 94). Tables 4.6 and 4.7 provide an indication of the extent the opportunity of involvement in landscape design and “the distance factor affects the perception of those attributes that stimulate mystery” (Gimlett et. al, 1985: 94).

<table>
<thead>
<tr>
<th>Physical accessibility</th>
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<tbody>
<tr>
<td>Opportunity of involvement</td>
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<tr>
<td>Distance of view</td>
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<td>Spatial Definition</td>
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Table 4.6

Mystery and the Opportunity of Involvement
As the landscape opens up, spatial definition, screening paths, and mystery decline.

(Gimlett, et al, 1985: 94)
Promise of Information

Distance = +

Opportunity of Involvement

Table 4.7

Mystery and Distance

While distance does not define mystery, this factor affects the perception of those attributes that stimulate mystery.

(Gimlett et al, 1985: 94)

Recent research has supported the other dimensions of landscape preference particularly complexity, coherence, and legibility (Whitmore et al, 1995: 34). More importantly previous research has shown “that a major factor in preference for landscapes appears to be naturalness of the scene with naturalness being associated with vegetation type and amount of human-induced change present in a scene” (Purcell and Lamb, 1998: 58). This finding together with the Kaplans’ (1982: 82) research and Nassauer’s (1995: 161) work broadly closes the ecological knot and relates our experience of place with other people, and also with the real perceivable world, viz. The geography of landscape, built form, micro and macro climate, plant communities and landscape systems (Dovey, 1985: 105).

Whilst Purcell and Lamb’s (1998: 64) research found that “mean preferences for a diverse set of examples of a wide variety of types of outdoor scenes varied between 1.9 and 9.8 (on a 10 point scale). This result confirms in general the belief that vegetation plays a significant role in creating preference for natural scenes”. From the research carried out in this study we can assume that this preference extends to cultural riverfront landscapes, such as the Mosque landscape zone of Kuching City’s riverfront. In so far as tropical landscape riverine plants are concerned the following principles could be applied to the design of the riverfront. First there is a preference for tropical
plants or vegetation types that are typical of the region. Trees are preferred to other vegetation types (ground covers and shrubs) if they are significant in the landscape. Secondly “the difference between forest and scrub is higher for the structurally intact examples than it is for the altered examples” (Purcell and Lamb, 1998: 64). This suggests that landscape designers should retain significant examples of tropical riverine forests or cultural forested landscapes where they exist on the landscape. Thirdly, there is preference for forests that are more “sensitive to the types of indirect human induced change that produce structural alteration” (Purcell and Lamb, 1998, 64). Fourthly, there is a higher preference for forest that is closed rather than wide views. Fifthly, low forest which closes the view was found to be more coherent and legible because of the spacing between the trees and the absence of dense understorey” (Purcell and Lamb, 1998: 64). “By contrast close scrub is very complex and low in legibility and mystery because of the density of this vegetation type and its height. Effectively, the viewer is presented with a wall of vegetation” ... (Purcell and Lamb, 1998: 65) (which are common to Sarawak's tropical riverine landscape vegetation) ... “that would be hard to penetrate and cannot be seen through and over” (Purcell and Lamb, 1998: 65).

Sixthly, in the landscape/human interaction between vegetation forestation and density, there was a higher preference for low forest over scrub than sparse examples of vegetation systems. “Here legibility, mystery and coherence would be greater because of the larger spaces between the trees and the absence of understorey” (Purcell and Lamb, 1998: 65). Seventhly, Purcell and Lamb’s (1998: 64) research shows that the process of human/landscape interaction is consistent with the Kaplans’ (1982: 82) model of landscape preference.

To summarise: Firstly there is human preference for the design of tropical riverine landscapes if the planting strategy includes sparse, close views as well as dense wide views because “these particular combinations of density, and extent result in legibility and coherence together with mystery and some complexity” (Purcell and Lamb, 1998: 65). Secondly, the mystery aspect of tropical landscapes should focus on the following elements of cultural
landscapes: screening, distance of view, spatial definition, physical accessibility and radiant forest. Thirdly, there is a need to create a landscape aesthetic experience which does not present the viewer with a wall of vegetation. The implication of this last point is that the Mosque Zone tropical riverine landscape should be permeable. A design method which facilitates permeability of landscapes should include the use of a hierarchy of transects that fit into an integrated mosaic, which facilitates the experience of space. Including transects and mosaics on a tropical “landscape is the thread that provides opportunities for connections to others through social interaction and people watching, as it is an important form of social life in the public” (Smith, Nelischer and Perkins, 1997: 133). It is also the complicated conduit that connects humans, with the past and future setting of the landscape which in totality contributes to the experience of place, or what Dovey (1985: 105) calls the “ecology of place”.

The Mosque landscape zone is therefore a landscape system that can be studied and assessed in terms of complexity, coherence, mystery, legibility and an ecology or aesthetic of experience (Chenoweth and Gobster, 1990: 7). Research on the aesthetic experience suggests that “opportunities should be provided for people to experience nature in their home environments as part of their everyday activities. The importance of providing ‘nature at the doorstep’ should not be overestimated” (Chenoweth and Gobster, 1990: 8).

The landscape assessment that follows picks up on this theme of naturalness as being an important object of the experience, because “many more experiences were related to natural objects (65%) rather than to man-made ones (20%)” (Chenoweth, 1990). Whilst this aspect of the object of experience is the focus of the landscape assessment, the assessment process should recognise that other aspects of experience also have merit. These are an ecology of experience -
... which are not evenly distributed in time or by social circumstances ... and that many experiences occurred unrepeatedly ... as well as in connection with ephemeral events e.g. changing of seasons, clouds, sunsets, weather precipitation and included sense other than vision (Chenoweth and Gobster, 1990: 83)

4.6.1 Complexity

For the Mosque landscape zone complexity refers to a “measure of perceived diversity or richness from a single viewpoint” (Thayer, 1996: 13). Thus the Mosque zone landscape assessment should facilitate the creation of tropical landscapes that have sufficient information to keep one interested or occupied. Consequently, complexity could be created by making provision for many transects through the site, some of which are dynamic whilst others are static. Examples of potential complexity attributes are:

- vegetation diversity particularly vegetative-water interspersion patterns that relate directly to the number of dominant vegetation groups visible;
- skyline complexity - an assessment of whether the complexity is high or low;
- river edge or shoreline complexity, viz., straight versus meandering shorelines and extent of visual contrast between the water and shoreline.

4.6.2 Coherence

Coherence is the property that allows a landscape to ‘hang together’ as a perceptual whole, or to be identifiable, familiar, and redundant, allowing us to make sense of it in a static, present sense through perceptual means (Thayer, 1996: 13).

In the Mosque landscape zone coherence could mean the extent to which various elements of the landscape come together through repetition of elements, textures, and structural factors which facilitate comprehension.
These elements help us to make sense of the landscape through strong definition of three dimensional spaces which provide spatial enclosure and depth. Examples of spaces which reinforce coherence are:

- parts of the riverfront landscape that can be described as being extremely enclosed because the tree planting and landform consist of space defining elements that produce a dominant enclosure that simulates a continuous canopy;

- other parts of the river foreshore are moderately enclosed, as the landscape whilst having no canopy present does have some space defining elements of vegetation and landform which produce enclosure. The Sarawak River shoreline is recessed and obscured, due to the curvature of the river and the foreground dominates;

- some parts of the river are of average enclosure because there are some space defining elements present. The river structure has an acceptable scale, with some parts of the river having a linear edge whilst others are punctuated with a small stream or undulating topography. There are no strong recessed or projecting areas and people approaching the site from the river are aware of the middle ground and foreground;

- other spaces around the Mosque, cemetery site and a large open space/rural area to the west of the Mosque consist of space defining elements which may be variously described as moderately open and extremely open.

4.6.3 Legibility

Legibility “is a more dynamic relative of coherence - a property of environments that affords humans the ability to move through and explore without getting lost” (Thayer, 1996: 13). Landscapes such as the Mosque landscape zone are extremely legible because the site has many features which make it easy for people to make sense of the landscape as they move deeper
and deeper into the site. Some examples of the site’s legibility elements are the Mosque, roads, footpaths, Islamic sculpture and structures, and riverfront cultural landscape which comprise retaining walls, and various nostalgic artefacts in the vicinity of the Brooke Dockyard. Legibility is determined by definition and contrast and includes various landscape attributes such as the enclosure of hills within the site. It is worth noting here that water as an object of experience including lakes, rivers, ponds and ocean contributed to the highest category of aesthetic experience (32%) (Chenoweth, 1990: 7).

4.6.4 Mystery

Thayer (1996: 13) defines “mystery as the ability of humans to acquire new knowledge as if travelling deeper into the scene”. The Mosque landscape zone demonstrates various degrees of mystery that are associated primarily by the topographical patterns and to a lesser extent by the vegetation patterns and alignment of the Sarawak River’s alignment. The mystery element at the site is strongly evident at some locations but is dependent of screening, distance of view, spatial definition, physical accessibility and radiant forest.

The landscape assessment for the Mosque landscape zone including the Brooke Dockyard will be approached in terms of the five ecological principles put forward by Van der Ryn (1996: 55).

4.6.5 First Principle: Solutions Grow from Place

The Mosque landscape zone could be designed based on ecological design principles which grow from an intimate knowledge and assessment of the site. This design approach embodies knowledge of ancient springs, appreciation of soil conditions and an appreciation of the six tropical vegetation landscapes which exist at a regional scale in Sarawak. These are mangrove coastal and riverine vegetation litoral forest, mixed Dipterocarp forest, Kerangas (interior forest), Riverine Forest (forest along rivers beyond limit of saline forest, but subject to flooding) and peat swamp forest.
The landscape provides design opportunities to plan along principles of sustainability by planting of coconut trees and putting in place tropical landscape systems that are responsive to place and culture.

Landscape systems that are responsive to the sites’ particular needs will demonstrate a rich understanding of soils, wildlife habitat, hydrology and tropical plant systems.

4.6.6 Second Principle: Accounting Informs Design

The landscape assessment process should attempt “to trace the environmental impacts of existing or proposed designs, and use this information to determine the most ecologically sound design possibility” (Van der Ryn, 1996: 83). Some of the impacts of the site are; signs of eroded soil along the Sarawak River, flow of pollutants from the Brooke Dockyard into the Sarawak River, and limited opportunities for resource recovery of construction systems at the end of the building life.

Future ecological design for the site may address issues of life-cycle accounting which reinforces concepts of landscape character, and landscape narrative theory, and incorporate and increase design practices for telling stories.

4.6.7 Third Principle: Design with Nature

Designing with nature provides opportunities for working with living processes and landscape systems. “We respect the needs of all species while meeting our own. Engaging in processes that regenerate rather than deplete, we become more active” (Van der Ryn, 1996: 104).

Ecological designs attempt to design with nature and simulate landscape designs that are compatible with nature. Essentially this means that the
landscape design proposed for the Mosque landscape zone should respect the tropical riverine ecology and imagery of the Sarawak River. Landscape designers therefore should carry out a landscape assessment of the site, by creating a photographic record of the site's ecology and landscape systems. This thinking process not only assists designers to create 'sense of place' but also places nature into its culture and landscape ecology context (Nassauer, 1996: 4).

Ecological design promotes ecological health through the appropriate planting processes which provide opportunities for hydrophyte planting and also the planting of tropical riverine plants. Designing with nature is a strategy for reducing harmful impacts by attending to the preconditions of health for each level. This philosophy of design represents more than a shift in language and epistemology; it is a shift in the way things are made and landscapes are used (Van der Ryn, 1996: 104).

Nature is an intricate network... within which designs find an identity and a coherence that contribute to the health of the whole. Ecological designs are articulated within an ecosystem or bioregion in the way veins are articulated within the leaf. They fill out an existing structure in a way that enhances life, the flows, the processes within it (Van der Ryn, 1996: 105).

A tested and proven way to design with nature is that ecological designs for the Mosque landscape zone "should mimic the vegetation structure of natural plant communities" (Van der Ryn, 1996, 120). This means creating a system of tropical riverine planting design that respects and understands the structural order of tropical riverine plants. The ecological design objective is to create an ecotone at the edge of the Sarawak River edge where two or more different types of landscape and cultural systems can co-exist, together with tropical riverine plants, wildlife and river habitats that encourage the interaction with humans and the cultural landscape of the Mosque landscape zone.)
Ample landscape design opportunities exist for turning around the Muslim cemetery from a constraint to a design opportunity for placing nature into a correct relationship with the Sarawak River. This could be achieved by exploiting opportunities for creating an internal stream and the planting of both culturally acceptable tropical plants as well as plants from Sarawak’s tropical riverine landscapes. By designing this way we encourage designs which have ecotones (softscape).

... rather than hard edges, and therefore promote and intensify the interactions with all living and non-living landscape systems. Consequently, landscape designers have a major role to fix denatured landscapes, problem landscapes as well as tropical landscapes that are destroyed by the politics and landscape of wealth (Meinig, 1979: 41).

In addition, landscape designers can each help to encourage the interplay between ecological design, landscape system, and biodiversity (Van der Ryn, 1996: 134).

4.6.8 Fourth Principle: Everyone is a Designer

Ecological design suggests a deeply participatory

... design process in which technical disciplinary languages and barriers are exchanged for a shared understanding of the design problem. Every little decision matters, and hopefully the landscape design participatory process will perhaps lead to an unexpected lesson in democracy and value of the compromise (Edgar, 1998: 31).

For example, multi-dimensional drawings or design recommendations prepared for the Mosque landscape zone could be made available and to create the story which provides for feedback and discussion with the landscape designer. Design participation provides the context where everyone can contribute to creating a tropical river landscape.

4.6.9 Fifth Principle: Make Nature Visible

Landscape designers can help to minimise development impacts on the tropical landscape by ensuring that we do not ignore de-natured landscapes and their
potential for regeneration, conservation and sustainable landscapes. The
landscape design for the Mosque landscape zone should not “ignore our need
and our potential for learning. Making natural cycles and processes visible
brings the designed environment back to life. Effective design helps to inform
us of our place in nature” (Van der Ryn, 1996: 161).

There is a need for landscape design to encourage a new kind of landscape
aesthetic which embraces the nature and ecology of aesthetic experiences in
the landscape. This ecological aesthetic aims to “explicitly teach people about
the potentially symbiotic relationship between culture, nature and design. It is
a powerful approach, since new ideas are learned most rapidly when they can
be expressed visually and experienced directly” to give meaning to the
landscape (Van der Ryn, 1996: 164; Chenoweth and Gobster, 1990: 7; Koh,

Ecological design gives meaning to the landscape design process because it
requires everyone to use education to foster abstract links with the landscape
and create an ethic or social construct of a tropical riverine tropical landscape.

Thayer (1996: 311) called this approach visual ecology. This approach
favours designed environments that can:

- “create transparent landscapes by helping us to see and become
  more aware of the abstractions we superimpose on the land;
- make complex natural processes visible and understandable;
- unmask systems and processes that remain hidden from view; and
- emphasise our recognised connections with nature” (Van der
4.7 **Assessment of the Landscape as Meaning**

In the earlier sections of this study an assessment of the main ideas which contribute to the creation of meaningful landscapes was carried out in terms of Nassauer's (1995: 165) content analysis of descriptive terms organised under the concept of landscape care. The symbolic dimensions of landscape as meaning was also considered in more detail. The concept of landscape care provides a sound basis for understanding how the 'core' values of landscape reinforce and contribute to our understanding of cultural meaning and landscape ecology. Tropical landscape care for the Mosque landscape zone and Brooke Dockyard are now assessed under three headings; of neatness, stewardship and naturalness.

4.7.1 **Neatness**

Our human need for neatness and order in the design of tropical riverine landscapes must reflect our cultural perception of order in the landscape. Essentially this means that designers need to translate ecological patterns into cultural language, by integrating the concept of care, and orderly landscapes in ways that enhance the ecological function of the Mosque zone landscape.

To achieve this vision landscape designers must ensure that their designs improve ecological quality, by providing designs which "frame ecological function within a recognisable system of form" (Nassauer, 1995: 162).

The successful designs of landscape systems will only be meaningful to people if they demonstrate that people care for the landscape of the Mosque zone and take measures to maintain the landscape and its visual attractiveness. Successful landscapes therefore will only be meaningful to people if they show evidence of design cues of human intention, because there is an urban landscape culture which promotes this idea of care for the landscape.
4.7.2 Naturalness

Whilst the local residents of Kuching City may accept a landscape such as Kuching’s waterfront as being neat, because it shows evidence of human intention of care towards the landscape, a natural looking tropical riverine landscape may be misinterpreted.

“Nature is a cultural concept that is frequently mistaken as an indication of ecological quality. It has no specific appearance in form and may be as readily applied to a canopied urban plaza (Kaplan, 1983) or cultivated field as to a wilderness” (Nassauer, 1995: 162)

Therefore if landscape systems, based on ideas of naturalness in the landscape are to be accepted by the people of Kuching, the ecological functions of the system must be made visible. Tropical riverine ecological functions that are visible make it easier for people to understand and read the landscape as a metaphor of care towards the landscape and therefore encourage the maintenance of ecological function. For landscape designers this means that “people prefer to see landscapes that they perceive as natural” (Nassauer, 1995: 162).

However, our perceptions of what even amounts to ‘core’ values of naturalness in the landscape such as natural appearance, water and tropical riverine vegetation are highly dependent on cultural interpretations. Not all types of vegetation or planting structure are equally preferred by the local population: a fact which was discussed extensively in Section 4.6.4 under the subject of ‘mystery’. “Even within the context of appreciating nature, too much nature or nature that falls outside cultural expectations is unappealing. In an effort to make nature fit our cultural expectations, people care for the landscape to the detriment of indigenous ecosystems” (Nassauer, 1995: 163). This is why resort developments facing Sarawak’s South China Sea, and waterfront landscapes among others are planted with exotic tropical plants,
turfed and planted with tropical trees and shrubs that are akin to Burle Marx’s landscapes (Kingsbury, 1994: 13). It is also the reason why many tropical landscapes look similar: they are in fact a mirror of our cultural need for such landscapes.

A successful tropical design concept for the Mosque landscape will attempt to make ecological function visible by framing it in terms of the three landscape constructs outlined in this study, and ensure that the design is not camouflaged or covered up or compromised in the design process. This finding suggests that any design for tropical riverine landscape will use the language of symbols and metaphors to make the design palatable to the public and include where appropriate landscape narratives such as metonymy, synecdoche and irony. These symbols and metaphors often demonstrate cues to human care. They ensure that “expressions of neatness and tended care, are inclusive symbols by which ecologically rich landscapes can be presented to people and can enter vernacular culture” (Nassauer, 1995: 163). The design concept for the Mosque landscape zone must demonstrate cultural symbols of neatness, naturalness and orderly frames. Some of these symbols are:

4.7.2.1 *Human Intervention*

The look of care; agricultural landscapes, open spaces, grassed areas and mainenance of the landscape generally, particularly the grave sites.

People who live in an urban landscape see beauty in the straightness of lines that emulate streets or transects, but will only appreciate any tropical riverine landscape concept that looks attractive and neat and gives the impression of being well cared for. Nassauer (1995: 167) ... supports the conclusion that ‘neatness’ labels a landscape as well cared for, and that ‘naturalness’ expectations - trees, shrubs, flowers and grasses - look attractive unless there is ‘too much’. Then the immediate cues to care, the presence of human intention, are lost (Nassauer, 1995: 167).
4.7.2.2 Cues to Care

Landscape designs for the Mosque tropical landscape zone can use the language of cultural symbols which demonstrate cues to care as a means of:

... adapting cultural expectations to recognise new landscape forms that include greater biodiversity .... the cues may vary from region to region and among ethnic groups, but an underlying principle across cultures and regions is that these cues express care for the landscape. Examples include: mowing a strip along human paths (streets, walkways) frames patches of greater biodiversity with clear signs of human intention; and bold patterns on the landscape show 'human intention' of care because of their crisp edges and landscape scale.

Similar patterns that are strongly visible of strong hillside terracing to facilitate oil palm plantations and rice growing practices as well as grassed waterways which provide evidence of cues to care can be adapted for use to urban land-uses and landscapes (Nassauer, 1995: 168). This research finding suggests that the landscape design concept for the Mosque landscape zone should include a mosaic of design which reflects this conclusion. Consequently, one landscape design theme may demonstrate a strong sense of geometry, spatial definition, unity and diversity (Nassauer, 1995: 168; Van der Ryn, 1996: 37).

Other examples which demonstrate cues to care of the landscape are; trimmed shrubs, plants in rows, linear planting designs; fences, architectural details, lawn ornaments and painting; and foundation planting (Nassauer, 1995: 168).

4.7.3 Stewardship

Tropical landscape design solutions or assessments which promote stewardship of the landscape will only achieve this objective if they are first and foremost promoted as attractive landscapes. The Mosque zone landscape should therefore encourage good conservation practices, minimise erosion,
provide windbreaks, terraced contoured landforms and protection from the tropical sun and high humidity (Nassauer, 1995: 165).

Good stewardship and design builds on the metaphor of healthy and restorative landscapes and builds on the three constructs of landscape by integrating the design with descriptions of varied diversity of landscape narrative forms and practices as reflected in the discourse of three schemes: the story realm, the contextual/intertextual realm and discourse realm (Potteiger and Purinton, 1998: 48).

The story of stewardship could be told in some form of narration. “Narration time and story time are integral but different. The time represented in a narrative may be one week, a moment or a millennium, but the actual time to tell, hear or read the stories may be just five minutes. Likewise in landscape the sense of time can be accelerated (installing mature vegetation) frozen (preserving) and modulated in many ways. Nature is often perceived as a ‘slow event’ that can be retold, organised into epochs and summarised” (Potteiger and Purinton, 1998: 48).

For this context the design recommendations for the Mosque landscape zone precinct, could focus on landscape narrative theory that reflects an assessment of the landscape in terms of the three landscape constructs discussed previously. The design for the Mosque zone could aim to tell a story of four hundred years of ecological succession or reflect the short 150 year history of Kuching which can be experienced within a two hour walk. For example, the creation of an internal stream may set the stage for creating a mosaic of tropical riverine ecotones. Each zone could be managed to reflect different stages of ecological succession. Other landscape transects could focus on condensing the short history of Kuching or show how the cultural landscape of the Mosque and Brooke dockyard sites were created over time.
4.8 Design Recommendations

4.8.1 The Commercial Landscape Zone

The design recommendations for the Sarawak riverfront should embody the following principles which are generally numbered 1 to 7 on Figure 4.3.

Firstly: An informal tropical garden park could be created to the east of the Sarawak Steamship Building. The park would be a soft-tropical landscape in a grassed setting. The emphasis of this landscape would be on 'neatness' and an attractive landscape which provides a symbolic entry point to the Sarawak Steamship Building. Tropical plants found normally in tropical riverine habitats would be used to supplement the planting scheme of the Conybeare Morrison waterfront plan, for example, *Saraca thaipingensis, Dipterocarpus oblongifolius, Parkia Javanica* and *Lagerstroemia speciosa*.

The use of these types of plants would create a landscape, which alludes to the memory of tropical riverine landscapes, as well as a landscape system which makes explicit use of technology.
Figure 4.3 Kuching City 2000. Conceptual Waterfront Plan
(West of Courthouse Central Open Space System)
Secondly: this area is significant because it is a compact space framed by three buildings of heritage value, the Sarawak Steamship Building, the High Court and the Fort. The old prison was located on this site. This place could draw inspiration from the context and history of the former prison site. The emphasis would be on a cultural landscape form and structure which reinforces the history of these three buildings, in a condensed time.

The plants used would have textured variety, and based on a selection of plants that are drawn from the other tropical regions of Sarawak. The plants should reinforce the coherence of these buildings. Therefore, these spaces would be spatially defined by plants such as; *Lagostemia flos-reginae*, *Congea tomentosa*, *Browea ariza*, *Cinnamomum iners* and *Livistonia rotundifolia*.

The site would draw its meaning through reinforcement of attractive landscape architectural details which suggest structural cues of care for the adjacent landscape and historical buildings and reflect on the nostalgia of the space and make the site meaningful to people who use the space.

This gathering of information for example is important to narrative because it gathers stories which tell of history and place names: India Street, Sarawak Steamship and Mosque Road to configure time, event and place. Likewise, places serve as means of gathering collective experience and memory ‘... they configure landscapes which reflect the interconnection of natural and cultural processes. Any valley, watershed, island, or coastal plain gathers. As stories create boundaries and ‘compress time into beginnings, endings, returns and cycles, so too gardens, parks and neighbourhoods create a focussed ‘story space’. We use narrative as a means of tying together events to make sense of both experience and place. Memory is critical in this process. By definition memory, as recollection or remembering is also a gathering (Potteiger and Purinton, 1998: 169).
Thirdly: This landscape is significant because it lies between the High Court building and Sarawak River. In 1890 this landscape was not bisected by a road as it exists today, it was a place for pedestrians, and the government of the day constructed a concrete footpath. Historically therefore, the site was an important pedestrian link between Gambier Street and Main Bazaar Street. In order to re-establish this old historical pedestrian link it is recommended that this alignment be retained and reinforced to create a ‘sense of place’ based on history, context and memory.

Because of the importance of this landscape, it is suggested that a bold pattern should be created to show human intention to care for the landscape. The design metaphor aims to create a landscape of care and naturalness that frames the site for a proposed tropical arboretum. The aim is to create an informal landscape garden that provides a setting for the display of a range of tropical riverine plants, as well as the locals preference for plants. These plants would represent the local people’s cultural preference for certain plants, such as *Pterocarpus indicus, Dillenia indica, Terminalia catappa, Crytostachys lakka, Pandanus helicopus* and *Pisonia alba* among others.

The space could use three manifestations of gathering - the Miniature, where larger ideas and places are compressed into smaller contained and identifiable spaces, the Souvenir, where a piece of or a part acts, much like a synecdoche, “as a reminder or representing of a larger event or place, and the collection where many pieces are assembled in an ordered way, revealing narratives of the collected and collector” (Potteiger and Purinton, 1998:165). These spaces often exist in nature together, consequently, the Arboreum reflects a primary discourse of ecology.

Fourthly and Fifthly: This landscape, together with the spaces in the vicinity of the fish market and poultry market provides in a general sense the scope to reinforce nostalgic technology. In addition, the site could be used to provide a demonstration of agricultural technology because the site has
traditionally been used as a vegetable market and also the locality where fishermen bring in the catch of the day from the South China Sea.

This place provides opportunities for using technology to manipulate the river edge and water body, because the site is symbolically and functionally associated with the production of food and fibre. In order to enforce ideas of sustainability and agricultural technology a triangular pontoon is proposed at this locality that would tie into the geometry of the street pattern.

The pontoon would reinforce the ecological design principle which recognises that good solutions grow from place, and which contributes to a culture of sustainability. For example, the floating pontoon would use the rise and fall of the Sarawak River to encourage access to and from boats. Additionally, there is scope to use this form of renewable energy to educate the public about the potential for using renewable energy (solar power and tidal power) as a viable and alternative source of energy.

The triangular pontoon could also be extended southwards to provide a vital link or transect that connects the Sarawak River with the existing shophouses. This transect would create an experience of walking through a tropical riverine rainforest. The triangular space of the pontoon would provide an experience of Rheophytes or Hydrophyte planting, that rise and fall with the level of the river.

The alignment of the pontoon would make provision for a range of shade canopy trees, plants that allude to food and fibre as well as tropical riverine plants. Some examples are Cocos nucifera, Erythrina crista-galli, Eugenia Malaccensis, Cinnamomum iners, Licuala spinosa, Pronephrium hosei (fern), Dipteris Lobbia (fern) and Bucephalandra Motbleyana (fern), among others.
Opportunities abound for creating landscape narratives that are...
... shaped by variety of practices: framing, naming, sequencing, revealing/concealing, erasing, gathering, opening and so on. These are fundamental practices of narrative as well as cultural practices that reach beyond those of professional design to include the vernacular, the rituals of daily life, journeys or memory (Potteiger and Purinton, 1998: 28).

**Sixthly:** This landscape provides many opportunities for reinforcing the meaning dimensions of this riverfront site, because of its proximity to the Indian Mosque. The potential exists to create a landscape that is symbolic of Islam (the religion of Muslims), as well as other symbols based on the crescent and a serpentine wall. Further, there is scope to locate plants on the landscape that tie into a colonial grid street pattern, as well as to use tropical plants that represent the six landscape vegetation types of Sarawak. Some tropical plants which reinforce the landscape system approach to landscape interpretation are: *Saraca thapiingensis, Peltophorum pterocarpum, Dillenia suffruticosa, Cocos nucifera* and *Pandanus helicopus*.

In a symbolic context, there is scope to explain on the waterfront, why the ‘Kiblat’ (prayer orientation to Mecca) is important to Muslims, as well as the significance and meaning of the Kiblat to Muslims.

There are also opportunities to use the language of metaphor as a thread or text to tell a story about how the cross-section of a typical Sarawak River or stream looks. The shape of the riverfront could symbolically mimic the cross section of the river as well as explain the role and importance of Sarawak’s rivers to people who use the riverfront.

This space offers opportunities for creating a non-scripted place by opening up the site for multiple or alternative readings of the riverfront landscape not just readings of the landscape based on the author of the design. Opening is a landscape design strategy for denaturalising consumerist type dialogues like the new waterfront which are closed to interpretations. This space together with the Brooke Dockyard and Mosque landscape zone provide opportunities
for engaging the design practices which tell stories of how people make places to reflect “their own experience, interpretation and memory” (Potteiger and Purinton, 1998: 26).

4.8.2 The Brooke Dockyard and Mosque Landscape (Intensive Landscape Zone)

Seventh: This landscape would be interpreted as a cultural landscape based on six levels of cultural interpretation and five ecological design principles outlined earlier. Appendix 6.6 provides the multi-dimensional context for illustrating how a landscape can be interpreted as ‘mosaics’ or layers of meaning. The first, mosaic, would be based on a loose colonial grid of six squares running in a north-east/south-west direction. This grid would provide the basis for showing the six tropical landscapes of Sarawak at a Regional Scale. If the community considers it desirable this informal grid could be extended to nine squares. The nine squares symbolically refers to the nine streets that existed in Kuching town in 1890 and also refers to the nine divisions of the State of Sarawak. Thus landscape as place (history and context), landscape as system (six tropical landscape types) and landscape as meaning (symbols, secrets and transparency) are created to reinforce the study’s three cultural interpretations of the landscape.

The second mosaic of landscape would provide a tangible way for making nature visible, but focussing on various dimensions of landscape narrative theory and landscape restoration of the Dockyards wastelands. Landscape restoration means a focus on the nature of the land, and also on healthy ecosystems. The idea is to convey a total picture of the landscape without making value judgements about what an expert thinks or how the expert reads the landscape. The aim is to let the landscape speak and to also let the user of the space create his own story in the context of a scripted/non-scripted cultural landscape.
The emphasis of this mosaic would be on the integration of landscape narrative theory and a rich pattern which draws on any of the ‘core’ values identified with the ‘landscape as place’, ‘landscape as system’ and ‘landscape as meaning’ approaches to landscape interpretation, viz., retention of the Muslim Cemetery site (creates a place and evokes strong memories of friends and historic personalities), retention of open space and agricultural landscapes (creates a place that reinforces the contribution of the functional dimension of landscape a system), and finally, the place could be made more legible by using the locals preference for orderly frames: cultural symbols of neatness and naturalness (Nassauer, 1995: 169) such as the planting of *Erythrina Variegata* and *Pterocarpus indicus*.

The third mosaic would identify the contribution that landscape as system makes to the Mosque landscape zone. The emphasis would be on understanding tropical riverine ecology, as well as reinforcing the images that people are familiar with from literature and photography to create a ‘sense of place’. Good examples are a design focus on the State Mosque and the Brooke Dockyard. Other nostalgic and sustainable images could also be created on the site to focus on the ‘meaning’ dimensions of technological/utilitarian landscapes, particularly the symbolic dimensions of landscape, viz., Brooke Dockyard artefacts and creating an internal stream which uses indigenous materials such as rock and timber in lieu of concrete and hardscape. Every attempt would be made to use construction systems, landscape material and energy forms that reflect our current concerns for creating sustainable landscapes.

This mosaic would focus on tropical riverine ecology and their potential to reinforce and contribute to the establishment of tropical riverine plants on Sarawak’s riverfront landscape. The intention is to bring back or reveal the river landscape. A listing of tropical riverine plants which the landscape architect could reflect in the design to give shape, scale, order and form to the landscape area included in Table 4.8. These plants have potential to bring back wildlife habitats as well as re-establish denatured landscapes that are
subject to erosion. They also have potential for promoting conservation and regeneration practices (Chai, 136).

The Fourth Mosaic would reinforce the landscape character of the riverfront by placing nature into its cultural and landscape ecological context. The various transects would be aligned to make the landscape’s ecological system visible, by design which shows human intention of care. The transects are located to reflect the fact that “human inhabited landscapes operate as ecological systems, but they also operate as communication systems” (Nassauer, 1995: 162). The fifth and sixth transects focus on the meaning dimensions of landscape narratives and on geometry, coherence and complexity, including mystery and legibility.

The landscape design concept for the Sarawak River therefore provides five transects through the Mosque landscape zone. The transects are the landscape designer’s communication tool, they help us to understand and read tropical sites of the Sarawak River landscape. As Dovey (1985: 93) says: “phenomenology does not seek to reveal ‘facts’ as science does, rather it seeks to reveal and understand our experiences as they appear to us, with meanings and values intact” (Dovey, 1985: 93).

The five transects are physical lines on the landscape which help us to put together a coherent and legible image of abstract links, as well as social constructs of a riverine tropical landscape in an urban context. The experience of the Mosque zone cultural landscape may be achieved by deconstructing each interpretation of this cultural interpretation in terms of both the ‘surface’ and ‘core’ values of the landscape.

The ‘landscape as place’ interpretation of landscape would focus on making the cemetery site, the Mosque, the Brooke Dockyard, the Dock itself, and the various artefacts on the site visible and more accessible and visible to the people who live and work in Sarawak, particularly Kuching City.
<table>
<thead>
<tr>
<th>Large Trees</th>
<th>Large Shrubs</th>
<th>Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dipterocarpus oblongfolius</td>
<td>Licuala spinosa</td>
<td>Phanera Vine</td>
</tr>
<tr>
<td>Shorea macrophylla</td>
<td>Bauhinia kockiana</td>
<td>Bauhinia kockiana</td>
</tr>
<tr>
<td>Terminalia catappa</td>
<td>Cyathea Laterbrosa</td>
<td>Kothalsia SP calamus SP</td>
</tr>
</tbody>
</table>

**Emergent Trees**

Eusideroxylon zwageri  
Eusideroxylon melangangai  
Tristania clemensiae  
Pometia pinnata  
Octameles sumatrana

**Specimen/Colourful Plants**

Erythrina variegata  
Erythrina Crista galli  
Cyrtostachys lakka  
Cyrtostachys renda  
(Sealing Wax palms)

**Freshwater Plants/ Rheophyte Plants - Palms**

Licula spinosa  
Pandanus helicopus  
Onosperma tigillaria  
Pronephrium hosei (Fern)  
Tectaria angulata (Fern)  
Dipteris lobbiana (Fern)  
Pronephrium saucifolium  
Mesophlebinolisodictyon  
Tectaria SP (Fern)  
Bolbitis SP (Fern)  
Bucephalandra motleyana  
(Aroid)

**Overhanging Trees and Riverbank Plants**

Dipterocarpus oblongfolius - used to control riverbank erosion  
- used to recreate a tropical river character, because of the overhanging features along rivers and general suitability for planting on clay riverbank soils.

Pinanga rivularis - used to recreate a tropical riverbank character. These rheophytes are found in the rivers of Sarawak.  
Pinanga tenella Var tenella  
(These small plants are one of a small number of palm rheophytes.)

**Structure Planting Used to Reinforce the Waterfronts Landscape Character**

Pterocarpus indicus  
Samaea saman  
Cinnamomum iners  
Dillenia suffruticosa  
Arenga undulatifolia  
Cerbera odollum

**Table 4.8**

Tropical Riverine Plants for the Mosque Landscape Intensive Landscape Zone
A design participatory process would help the designer to flush out the public's perceptions of landscape, as a means of ensuring that those that are living on the landscape must be involved in the evolution and the place making process. This process would provide a framework of sequencing which accommodates a range of time altering devices found in the landscape. Mathew Potteiger (1998:113) lists these landscape devices as follows: jump-out, flash back, flash forward, flash between, fade, blackout, freeze frame, slow motion, fast motion - an in medias res. (See Chapter 7.0 for definition of terms.)

Ideas about sustainability, the use of appropriate energy and the recycling of materials, all depend on putting in place a transparent and congruent framework for identifying all of society's values. The landscape architect's professional credibility as an 'expert' designer rests firmly upon community involvement. This means that the designer's drawings or design intentions must be easily understood if local participation is to be effective. This public participation process would also identify the 'core' values of 'landscape as system' and 'landscape as meaning' dimensions of landscape that are important to people.

The 'landscape as system' approach to landscape design will focus on ecological design approaches that help people at all stratas of society to fix the denatured, and denuded tropical riverine landscape of the Sarawak River. This approach will focus on conservation, regeneration and stewardship issues among others which seek to identify and minimise environmental impacts on the site.

This 'landscape as system' approach to landscape interpretation will focus on issues of importance to the particular place such as tropical riverine plants, acceptable cultural landscapes, soils, climate, wildlife habitat, water flows and tidal variations, and topography. At all times the design process would aim to create places that show qualities of: legibility, complexity, coherence and
mystery. The landscape as meaning approach to landscape interpretation will attempt to create a 'sense of place' and protect tropical riverine landscape systems, by putting in place the cultural reflections of the local people. Essentially, the proposed transects, the internal river system and the Sarawak River edge would reflect orderly frames and cultural symbols of neatness and naturalness. More importantly, the transects help to make the landscape systems visible, and does away with images of messy tropical riverine landscapes, such as the 'wall' of riverine landscapes we see in Sarawak on boats moving along the river (Nassauer, 1995: 163).

Finally, the sixth mosaic would provide a geometry, which encourages spatial definition, as well as promoting unity and diversity within the Mosque landscape and Brooke Dockyard landscape zone. This geometry includes design ideas which reflect the structure of a place that has 'characteristics of both hierarchy and network' (Dovey, 1985: 94). Examples include, informal tropical planting, East-West (horizontal planting), North-South planting (vertically), Diagonal overlays (symbolic) and the creation of an informal East-West river stream on the landscape. See Appendix 6.6.

The ecological knot ties a landscape together, to create an ecology of place for the river landscape and provides the psychological fit that links landscape assessment theory with various interpretations of landscape.

The knot explains the importance of the expert paradigm in contributing to the assessment of a landscape. The expert paradigm however, will only be effective if it is integrated with other paradigms such as the 'place' paradigm and the 'psychophysical' paradigm of the Kaplans (1987: 48).

A major benefit of this integrated approach to the landscape assessment is that it brings together into a coherent whole both the 'objective' and 'subjective' approaches to landscape assessment. Another advantage of this approach is that it aims to overcome the subjective limitations of the place
paradigm by presenting a strong case for including design participation in the
design of all tropical landscapes.

This integrated valuation method of landscape assessment ensures that the
landscape assessment process will be a valid research method in terms of its
validity, sensitivity, reliability and utility.
5.0 RESEARCH CONCLUSIONS

5.1 Research Findings

The research aims and objectives of this study are outlined in Section 1.3 and the findings of the research are summarised in terms of these objectives. The limitations of the study are outlined as well as the future directions for research in regards to urban tropical design for riverfront cities.

5.1.1 First Objective: Identify and reinforce the contributions that the cultural landscape place has made to Kuching City.

The Sarawak River Landscape has many places which can contribute to the ‘Sense of Place’ of the riverfront. ‘Sense of Place’ is a difficult phrase to describe because it has many dimensions and each layer of meaning has to be unravelled, researched and understood before any landscape designer can confidently begin the landscape design process for a site.

‘Sense of Place’ may be assessed in terms of its ‘surface’ value or ‘core’ value, or both surface and core values. An assessment of the riverfront which focuses on its surface values will only succeed in addressing superficial issues at the expense of the 'core' values of landscape.

An understanding of the core properties of landscape as place will reflect an appreciation or understanding of the following key cues: place, memory and placelessness, context and history, identity, ‘sense of place’, participatory design and the experience of design.

Each of these cues provides a perspective or slice of meaning. The more each cue is researched the more designers understand about the context of place, memory, identity, context and history of Kuching's Riverfront. This process of unravelling the meaning of Landscape place(s) contributes to our
understanding of 'Sense of Place', because it provides the designer with a deep understanding of a site.

For the Kuching City Riverfront 'Sense of Place' means putting together in the design process as many of these cues as possible. Some of these are:

- The many rivers and streams that bisected the riverfront in the past. A map of Kuching shows the following rivers - Kuching River and Gartak River. A small stream also existed in the vicinity of the State Mosque.

- The origin of the name 'Kuching' is uncertain, but James Brook called the town 'Kuchin' in 1889, which suggests the old word 'Kochin' or port, as in India or Indo-China, but a more probable interpretation of the word is that it is the Malay word for Cat. Another possible interpretation is that the name 'Kuching' came from the tremendous number of Mata Kuching trees which used to grow on the hill behind the Tua Pek Kong Temple, which aligned with an old river in the vicinity of the temple that went by that name Kuching River. The landscape narrative of placing names on the landscape would be a useful design practice in this context.

- The Brooke Dockyard, the State Mosque and the Muslim Centenary are all significant cultural landscapes and historic places. These places together with many others suggest that the local population have developed a degree of place attachment to these places. The Fish Market, the Poultry Market, the Fort, the High Court, the Sarawak Steamship Building, the Chamber of Commerce Building and the Tua Pek Kong Temple, are all fine examples of cultural landscapes and offer opportunities for sequencing.

- Some places have a strong sense of place attachment or human belonging. This suggests that people have developed a strong identity with some landscapes. These landscapes represent the collective and individual places which are the storehouses of past memories where, for example, the intersection of the Sarawak
River and Kuching River was once a popular mooring spot for boats in a jungle setting.

- Core values can be understood by actively engaging local people in a design participatory process. This process will assist designers to unravel the depth of meaning people associate with a particular landscape.

- Finally any place must be experienced as a kind of 'psychological fit' between people and setting. In essence a cognitive map which improves a place's legibility in terms of landmarks, visually interesting places, a jungle landscape imagery and also a place which reinforces coherence. Thus, Kuching's riverfront landscape can be understood in terms of a complicated mosaic which exists as both hierarchy and network.

5.1.2 **Second Objective:** Encourage the Protection of the Sarawak River landscape, the landscape Place it creates and the river's cultural resources.

The Sarawak River Landscape has many other resources and sites that are worthy of reinforcement, some of them are not always tangible, some may be intangible. A landscape inventory of these places, by way of a photographic record are identified in Appendix 6.1 as well as a landscape classification and assessment of the riverfront.

The landscape analysis identifies the following important riverfront landscapes:

- Physical linkages (connecting between important nodes, landmarks and places).

- Five landscape zones: less intensive landscape zone, intermediate landscape zone, formal landscape zone, commercial landscape zone, and intensive landscape zone.
• Softscape and hardscape zones which reinforce landscape character, ‘sense of place’ and identity of place.
• Location of existing trees and green areas.
• Important landscape places.
• Plant material, scale and texture.
• Analysis that improves legibility by applying landscape narrative theory.
• Hardscape features analysis.

The process of landscape inventory, landscape classification and landscape assessment provides a well-known framework to help the decision-making process as well as a rational framework for identifying the need and/or opportunities for conservation, enhancement, regeneration or stewardship. This process identifies the urban edge and the landscape edge as well as parts of the riverfront that are suitable for tropical riverine planting, or cultural landscape planting and reinforcement.

This landscape assessment suggests the following:
• The northern edge of the Sarawak River should reinforce a tropical riverine planting concept, as well as the cultural landscape.
• The riverfront in the vicinity of the Tua Pek Kong Temple, the Chinese Chamber of Commerce building and area identified as the Mosque landscape zone including the Brooke Dockyard should reinforce both the cultural landscape features (Kuching River, the Dock, and the State Mosque) as well as a tropical riverine softscape.
• The balance of the riverfront including the Conybeare Morrison waterfront plan should reinforce more of the tropical jungle imagery of Sarawak.
5.1.3 **Third Objective:** Explore appropriate landscape assessment methodologies for Kuching’s waterfront.

The five paradigms of landscape assessment were researched and studied with the intention of linking theory with the practice of urban landscape design or landscape architecture.

The key to understanding landscape assessment lies in our understanding and definition of the word ‘landscape’. Landscape has been defined as a ‘slippery’ word because it can be interpreted in many ways, even by landscape experts. One way to overcome this problem of interpretation is to clarify or define our interpretation of landscape in terms of three landscape constructs.

In this study the focus of landscape interpretation is on a threefold appreciation of landscape. Firstly, ‘landscape as place’; secondly, ‘landscape as system’; and thirdly, ‘landscape as meaning’. These three interpretations of landscape were selected because they more appropriately explain the human response or interaction to technological landscapes.

This study and case-study assessment carried out for Kuching’s waterfront supports the use of the three landscape constructs used for assessing the tropical landscape. To be successful all three constructs need to be used together to create a hybrid landscape assessment method that assesses both the subjective and objective dimensions of landscape within three paradigms of landscape assessment methodology.

The first is the expert paradigm, which involves an assessment of the visual and cultural quality of the tropical riverfront landscape by a trained expert. This expert will often have special knowledge in design, ecology or resource management among others.
The second is the psychophysical paradigm that focuses on a population’s preference for certain riverfront landscape types, classification or landscape qualities that reflect the particular physical characteristics of the landscape.

The third approach uses the psychological paradigm together with the experiential paradigm, to consider and evaluate the Kuching riverfront’s values based on the interaction of people with the landscape. This approach has recently been recognised as a new and emerging place paradigm.

Whilst each paradigm has its own strengths and weaknesses, this study recommends the use of all three paradigms for the purpose of carrying out an assessment of cultural landscape.

The expert paradigm is useful for identifying the core values of landscape. However because this type of assessment may not be valid or reliable in identifying the ‘core’ values of the three landscape constructs it will need to be supported by a design participatory exercise.

Similarly, the psychophysical paradigm which identifies the core values of landscape systems by using an expert paradigm will also lack validity and reliability. Again, to overcome this problem a design participatory program will need to be incorporated into the design process, but supported as appropriate with landscape narrative theory.

To summarise: both the place paradigm and the psychophysical paradigm, must be integrated with a design participatory exercise to be successful. The latter will need to incorporate or make a connection with the informational model of landscape preference to
improve validity, reliability, sensitivity and utility of the landscape assessment process. This model proposes a psychological theory of landscape that contains four key dimensions of legibility, coherence, mystery and complexity.

The landscape as place paradigm together with a public evaluation program aims to list the core values of place and to rank their importance, by using appropriate statistical assessment methods. The assessment of the riverfront’s landscape system aims to use the psychophysical paradigm together with a public evaluation program to identify the core values of landscape systems, and similarly uses statistical methods to improve validity.

Therefore, contrary to popular belief both the place paradigm and the psychophysical paradigm can be used to carry out an objective assessment of landscapes that are interpreted as ‘place’ or as ‘systems’.

The major area of concern for landscape designers today is how to overcome the subjective assessments of landscape which focus on the meaning dimensions of landscape interpretation. To a large extent this concern for subjective assessment of landscape can be solved by incorporating in the design assessment or evaluation process the theoretical ‘meaning’ dimensions of technological/utilitarian landscapes.

To add validity, reliability, sensitivity and utility to the landscape evaluation process any classification of landscape can be assessed in terms of the core functional and perceptual values. The functional dimension for instance will require a focus on the informative, agricultural and transportive aspects because they yield the highest possible landscape value. Similarly, the perceptual dimension will require an assessment of the implicit, and invisible dimensions.
because they also contribute to the highest possible landscape value. To complete the framework the 'landscape as meaning' interpretation of a cultural landscape will require an assessment of the symbolic theoretical 'meaning' dimensions of technological landscapes, because this aspect is the most abstract and therefore the hardest to pin down. Landscape assessments which require an appreciation of the symbolic meaning dimensions of landscape will require a focus on the nostalgic, utopian and sustainable aspects because they yield the highest possible landscape value.

The usefulness of the theoretical 'meaning' dimensions framework is that it can be used to focus on any paradigm or landscape assessment theory which requires more reliability, sensitivity, utility and validity in terms of landscape assessment methodology.

More importantly, the symbolic dimensions will result in a more appropriate landscape assessment if it also includes a cultural landscape assessment methodology into the assessment process. In essence, this means that landscape designers need to also include various elements of the content analysis of descriptive terms organised under the concept of care, into the landscape design assessment process. Neatness, stewardship and naturalness are all sub-categories which need to be considered under a Culture of Care.

5.1.4 Fourth Objective: Examine the subject of ecological design.

The study has found that there is merit in applying the five ecological design principles to address landscape problems across a kind of geometry which links and connects various scales of landscape interpretation.

For example, ecological design principles can be used to solve problems in terms of how a designer sees the cultural landscape.
How will the landscape be read? Will it be in terms of place, system or meaning constructs of landscape? Additionally, the design principles can be used to address ecological problems or concerns at three main levels; global, regional and local.

The five landscape design principles are: solutions grow from place; ecological accounting informs design, design with nature, everyone is a designer and, make nature visible. These principles can be used to:

- address the world's concerns for sustainable development and design;
- conserve and regenerate de-natured and denuded tropical riverine landscape systems, and massive degradation of the tropical rainforest in Malaysia; and
- finally, at a local level, to apply the principles to solve landscape problems on Kuching's riverfront.

5.1.5 **Fifth Objective:** Carry out research within an expert landscape paradigm and appropriate landscape theory, or landscape constructs namely; 'landscape as place', 'landscape as system', and 'landscape as meaning'.

The research on landscape theory and landscape assessment methodology has demonstrated that the greatest weakness of landscape assessment lies in the subjective approaches to landscape assessment. This research has put together a framework of landscape assessment paradigms and landscape theory to provide a more useful link between theory and the practice of urban tropical landscape design. More importantly this framework which is a 'hybrid' of landscape narrative theory and landscape paradigms can be used to assess the adequacy of implemented landscape projects such as the Conybeare Morrison waterfront or applied to a practical site(s).

This framework is outlined in Table 1.0.
This landscape theoretical framework for carrying out assessments of cultural landscapes provides the context for establishing:

- A strategic vision for protecting tropical riverine landscapes and for addressing management and land-use change;
- Establishing public awareness of cultural landscape interpretation and classification;
- Policies to protect landscape and cultural resources;
- Formulate site specific policies, ecological design principles and urban tropical landscape design guidelines or concepts.
- Landscape design and management recommendations; and
- A focus on particular landscape constructs as a valid framework for landscape assessment.

5.1.6 Sixth Objective: Carry out a case-study assessment of the Conybeare-Morrison plan in terms of the plan's contribution to creating a landscape place for Kuching City.

An assessment of Conybeare' Morrison's waterfront plan was carried in terms of the new waterfront landscape it created for Kuching City. This assessment used the expert paradigm, the place paradigm and the Kaplans' (1982) psychological paradigm as the framework for landscape assessment.

The landscape assessment process concludes that the waterfront plan at best, reflects a superficial assessment of landscape place and landscape systems constructs. The plan is deficient in some respects, because many core values of landscape have not been included in the waterfront plan. For example, the alignment of the old Kuching river is not celebrated in the plan, nor are the places that have strong memories and desire for human attachment been included in the plan. Additionally, no attempt has been made to incorporate in the softscape planting strategy tropical riverine landscape plants. Consequently, the desire for naturalness and the mystery we associate with tropical riverine rainforest vegetation are non-existent.
5.1.7 **Seventh Objective**: Formulate design recommendations and principles for Kuching's waterfront, particularly the Mosque landscape zone.

An assessment of this zone has been carried out using an integrated landscape assessment methodology. The assessment model uses landscape narrative theory as the overall framework and as a backdrop to the analysis (see Table 2.1). The actual assessment of the zone uses an appropriate range of landscape assessment models based on the experts' paradigm. These models are: the landscape narrative assessment criteria (see Table 2.2), four landscape assessment preference characteristics (see Table 3.1), theoretical 'meaning' dimensions of technological/utilitarian landscapes (see Figure 3.3), content analysis of descriptive terms organised under the concept of landscape care (see Table 3.4), and the core values of landscape place (see Table 4.1).

The end results of this process are generally reflected as a mosaic or layers of multi-dimensional ideologies or design ideas which could form the basis of detailed urban landscape design recommendations for the mosque landscape zone specifically and Kuching's riverfront generally (see Appendix 6.6).

This zone has been read in terms of the three landscape constructs of 'place', 'system' and 'meaning' to reflect six levels of cultural landscape interpretation or mosaics which add meaning to the landscape and within the content of five ecological design principles.

This analysis of the landscape recommends that this cultural landscape should be read firstly, as a place which has regard to the core values of memory, placelessness, context, history, identity, sense of place', participatory design and experience of design. Secondly, in terms of landscape as meaning which uses the technique of landscape narrative particularly the metaphor of symbols, nostalgia and narrative text which explore the intertextual connections, multiple ownership and the role of the public in constructing landscape as meaning. The design practice of revealing, concealing,
sequencing and gathering are used to make connections between landscape narratives and to bring together on Kuching’s riverfront landscape a range of physical processes and forms including metaphysical ideas and past associations. The study recommends that future urban landscape design for Kuching’s riverfront should include or bring out hidden information (secrets), to make design ideas transparent (make core values visible), and finally to create an ideological framework for masking and unmasking information about the Mosque landscape zone.

Thirdly, urban landscape design ideas should focus on the landscape as system. This means that the focus of design should be on the ecological history of the site, which tells a landscape narrative story of the relationship between loss and degradation of the riverfront landscape. This strategy will promote ecological design ideas that encourage and reinforce an ideal functional tropical riverine planting system which focusses on the metaphor of ecological restoration and healing of the landscape, but framed under the concept of landscape care. This approach would make the design more acceptable to local politicians, whilst offering long-term opportunities to protect an important cultural landscape albeit in miniature form and provide a souvenir which reinforces conservation, regeneration, restoration and stewardship principles or landscape ideologies.

5.2 Research Limitations

5.2.1 Tropical Riverine Rainforest Imagery
A major limitation of the study is that it has not been possible to recreate a tropical riverine landscape to all parts of the study area. This is because the linear landscape feature of the waterfront cannot be used to effectively plant tropical riverine landscape plants in ways which reinforce the landscape character of tropical river landscapes. Therefore, the landscape edge of the flood plain cannot be used to effectively achieve other landscape roles, such as amenity, environmental and wildlife roles. However, the Mosque zone
offers these opportunities and is the only site within the urban landscape of Kuching City which can be used to demonstrate this study's objectives.

5.2.2 Case-Study Assessment of Kuching's Riverfront Carried out by Conybeare-Morrison

Conybeare Morrison's concept plan, when viewed as a whole is weak in the area of riverine tropical design, and in this context has not been successful in preserving or reinforcing the tropical riverine landscape of Sarawak. Additionally, the Conybeare-Morrison waterfront plan has created a significant loss to both the integrity and tropical riverine character of the landscape. Therefore, the scenic quality of the river's informal edge and the potential for creating a riverine tropical landscape in the urban area of Kuching City has been lost for ever together with the amenity/wildlife/environmental and plant-life systems associated with the Sarawak River.

Given that the Sarawak River is an example of a de-natured environment, there is little to commend in the Conybeare-Morrison waterfront plan, because their implemented plan has no ecological basis. The overall adverse impact of the plan on the tropical riverine landscape suggests that landscape designers have no role to play in managing, manipulating and representing de-natured riverine tropical environments and landscapes. This sad state of affairs has occurred, at a time when sensitive environmental issues relating to the management of riverine tropical landscapes, sustainability and tropical riverine design issues are gaining in prominence.

Conybeare Morrison's landscape assessment of Kuching's waterfront appears to be modelled on Lynch's (1981) language of landmarks and nodes in a vernacular context, to create both 'a sense of (riverine tropical) place', and an urban tropical landscape character using the power and language of symbols to reinterpret the historical and vernacular past in a modern urban landscape. This assessment however focuses on 'surface' landscape values only.
This is the context in which Conybeare Morrison's work has been used in their waterfront plan of Kuching City. Surely this approach is too superficial because the focus has been on the hardscape and inappropriate symbols. Whilst their approach serves as a powerful reminder of how the historical and vernacular past can be interpreted in a modern context (albeit an abstract one), this approach has not been used to accurately depict the powerful metaphor and symbol of tropical riverine landscapes. The approach is therefore a failure because the design pattern of the hardscape and public artworks has failed to remind the users of Kuching's waterfront, that natural landscapes can be evoked through non-naturalistic representation.

Additionally, the landscape assessment process has not clarified the analytical framework they have used to assess the riverfront, nor clarified how they have interpreted this cultural landscape in terms of 'place', 'meaning' or landscape 'system' constructs of landscapes.

Issues that explore ecological design principles as well as sustainable urban landscape design issues are sadly lacking.

5.2.3 Institutional Framework

This study has not considered the institutional, social, political, or cultural framework in which decisions relating to urban tropical design are made. An understanding of the 'local' decision-making framework, particularly the role of education in convincing decision-makers to understand tropical landscape design issues are vitally important.

5.2.4 Landscape Research Method

Having identified a framework for an integrated approach for the design of a tropical landscape, and the listing of core values, no attempt has been made to apply statistical methods to test the validity, reliability, sensitivity or utility of
the relevance of the core values in terms of ranked order of importance in the community.

5.2.5 The Expert Paradigm and Public Valuation Landscape Assessment Method

The study has found that whilst the expert paradigm of landscape has some limitations, these can be overcome by incorporating a public valuation method which focuses on an assessment of core values which yield the highest possible landscape value. Additionally, whilst an integrated landscape assessment methodology has proven to be a useful landscape assessment method, the process of identifying and evaluating core landscape values can be time-consuming in the real world of landscape practice.

5.2.6 Landscape Theory and Cross-Cultural Influences

This study has considered the scholarly work of only some people and their interpretations of place, and has not recognised the full diversity of disciplines that have a deep understanding of 'landscape place' and concepts such as 'place attachment', 'landscape character' and 'sense of place'. There are many disciplines with differing perspectives that have their own definitions, analyses, theories, research and field work of concepts dealing with place.

5.2.7 Landscape Assessment Methodology

Whilst this study recognises the importance of rating scales and statistical analysis as a strategy for carrying out assessments of landscape, these techniques have not been used for the Kuching City riverfront. Instead the analysis has been on the descriptive content of key landscape constructs, understanding the experience of place and landscape narrative assessment theory.
5.3 Future Research Directions

5.3.1 The Landscape Place Paradigm: More Scope for Objectivity

Future research directions should attempt to progress the study of landscape place to a more scientific level, because even in 1999 it is evident that many gaps exist in the study of place attachment. Future research directions should focus on:

• Firstly, the development of a rational theoretical position which seeks to apply the knowledge of research to the solutions of practical problems which landscape designers can apply to real landscape places;

• Secondly, ‘place’ needs to be defined more precisely so that we can progress towards the last stage of theoretical development;

• Thirdly, landscape place research needs to recognise that there exists -

... an emerging ‘place paradigm’, it is identified by a focus on environmental experience and meaning and a recognition of the inadequacy of empirical measurement in understanding this experience (Dovey, 1985: 94).

5.3.2 Conservation and Landscape Place

There is need for future research to focus on conserving the ‘sense of place’ and diversity of the Malaysian tropical riverine landscape. Perhaps it is because that the idea of landscape place is poorly understood, that the government has been slow to identify and describe its tropical riverine landscapes. This lack of understanding is leading to the destruction of river landscapes and ecosystems as well as hindering the sustainability of fragile tropical river systems. Landscape designers need to be careful about tropical species selection, appropriate management, and sustainable principles if self-regulating and dynamic tropical riverine landscape systems can be recreated.
There is need for future research to identify and describe the tropical landscape riverine landscape systems of each area through text and illustrations with a view to identifying changes to the landscape particularly since logging operations have gained momentum. In addition, there is a need to identify the key forces (and trends) for future landscape change, and identify management opportunities to conserve and enhance the tropical character of Malaysia's riverine landscape.

5.3.3 **Typologies of Experience**

Whilst this study has identified a contents list of core values which contribute to an understanding of the landscape construct of place' including the core value of design experience, there is need for future research to be directed at establishing the core values of place which contribute to the range of experience and explain the variations of human experience on the basis of three landscape constructs of place, meaning and system.

5.2.4 **Scientific/Common/English Names of Tropical Plants**

A comprehensive check-list of the Botanical names of plants cited in this study are included in Chapter 9.0. However, a list of Common/English names are not provided because my discussions with a number of Botanists and Foresters have revealed that they are of little use in the tropics. Consequently, the vernacular equivalents are provided because they make more sense in terms of the cultural context in which landscape design occurs.
APPENDIX 6.1: PHOTOGRAPHIC RECORD OF KUCHING’S RIVERFRONT LANDSCAPE PRE 1986 AND TODAY LANDSCAPE INVENTORY, LANDSCAPE CLASSIFICATION AND LANDSCAPE ASSESSMENT
All photographs taken by the Author.

(Pre 1990)
LANDSCAPE INVENTORY

Less Intensive Zone (1)

Intermediate Landscape Zone (2)

Formal Landscape Zone (3)

All photographs taken by the Author.
LANDSCAPE INVENTORY

Commercial Landscape Zone (4)

Intensive Landscape Zone (5)

All photographs taken by the Author.
Commercial Landscape Zone (4)

All photographs taken by the Author.
All photographs taken by the Author.

State Mosque and Muslim cemetery
LANDSCAPE CLASSIFICATION

(Directorate of National Mapping Malaysia 1972)
Landscape zoning can be divided into five ZONES:

1) Less intensive landscape zone
Chinese Chamber of Commerce building and Pengkalan Ah Poon consist of hawkers and squatters area. Mud flats area and basic landscape elements.

2) Intermediate landscape zone
Along Main Bazaar Street includes the Godown and port facilities areas. Shortage of suitable spaces for landscape facilities. This area can be identified as a mixture of landscape features.

3) Formal landscape zone
Area of Courthouse, in between Jalan Tun Abang Haji Openg and Barrack Street until Central padang. Not fully developed and to a certain extent some buildings are in the state of deterioration.

4) Commercial landscape zone
Lebuh Jawa, Jalan Gambier and India Street do not have sufficiently good urban landscape facilities.

5) Intensive landscape zone
Mosque area surrounded with greenary but needs to be improved to generate sympathetic landscape development adjacent to the commercial area.

LANDSCAPE ANALYSIS-CONCEPTUAL DIAGRAM
(Kuching North City Council, 1989: 85)
MOSQUE

HISTORIC BUILDINGS

OLD SHOPHOUSES

PARKS

ROADS

SARAWAK RIVER

LOCATION OF EXISTING TREES AND GREEN AREAS

(Kuching North City Council, 1989: 87)
VISUAL ANALYSIS
(Kuching North City Council 1989: 95)
<table>
<thead>
<tr>
<th>Area</th>
<th>The Mosque and Padang Pasir Area</th>
<th>Brooke Dockyard, Ban Hock Centre, Lorna Doone Jetty and Tower market</th>
<th>Jalan Gambier and Market Place</th>
<th>Civic Centre and Central Padang</th>
<th>Main Bazaar Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard landscape features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paved footpath/Paved area</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Seating</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Rubbish bin</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Signage system</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Planting bed</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Bill/advertisement board</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Public amenity (kiosk, toilet, booth, etc.)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Barrier/fencing</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Linking elements (steps/ramp/jetty, pedestrian crossing etc.)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Vehicular control (bollard, hump, temporary fencing, etc.)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

- Landscape elements/features exist but may require improvement/upgrading.

**HARD LANDSCAPE ELEMENTS/FEATURES**

(Kuching North City Council, 1989: 92)

(Directorate of National Mapping Malaysia 1972)
<table>
<thead>
<tr>
<th>Tree Type</th>
<th>Crown Diameter (C.D)</th>
<th>Height (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Trees</td>
<td>30-60 ft.</td>
<td>40-60 ft.</td>
</tr>
<tr>
<td>Medium Trees</td>
<td>15-30 ft.</td>
<td>20-40 ft.</td>
</tr>
</tbody>
</table>

**LANDSCAPE ANALYSIS-PLANT MATERIAL, SCALE AND TEXTURE**

(Kuching North City Council, 1989:89)
PHYSICAL LINKAGE
- Link the activities and amenities of the two banks with boating facilities connecting between the various nodes.

VISUAL LINKAGE
- Reinforce the visual connection between the two banks by optimising vantage points along the riverfront to take advantage of the views.
- Enhance the visual links to recognise the importance of historic objects as well as water/land link.

SERVICES
- No proper drainage system, and the existing stormwater system, effluent discharged directly into the river.
- The physical limitation imposed by existing structures and proximity to monsoonal drains will need to be considered to ensure stability to the trees.

MODERN BUILDINGS

KUCHING CITY

OLD BUILDING

LANDSCAPE ANALYSIS LINKAGE AND SERVICES

(Kuching North City Council, 1989: 84)
Based on the analysis, it was found that the Courthouse area to the Central Padang can be considered as the green belt which acts as the green core to generate, the tropical landscape plants along the riverfront as well as the inland streets.

Besides, the landscape elements also act as a linkage to the whole city as well as providing continuity of space to the riverfront. Pockets of green landscapes are created wherever feasible. Parking lots, empty urban spaces, would emphasise the metaphor of ‘restoration’ and ‘healing’.

LANDSCAPE POTENTIAL AND OPPORTUNITIES

The conceptual zoning for landscape development has been proposed based on the existing landscape character and identity of the riverfront.

ZONE 1 - SOFT LANDSCAPE

(Existing mature trees to be preserved with proposed garden for leisure and recreational purposes)

ZONE 2 - SOFT LANDSCAPE FOR COMMERCIAL ACTIVITIES

(Intermediate landscape)

ZONE 3 - FORMAL LANDSCAPE

(Existing mature trees to be preserved and incorporated with hard landscape)

ZONE 4 - URBAN HARD LANDSCAPE

ZONE 5 - HARD AND SOFT LANDSCAPE FOR COMMERCIAL AND RECREATIONAL PURPOSES. (Intensive landscape)

(Kuching North City Council, 1989: 85)
APPENDIX 6.2: CONYBEARE-MORRISON'S WATERFRONT PLANS
LESS INTENSIVE LANDSCAPE ZONE

(Conybeare-Morrison, 1990: 85)

LESS INTENSIVE LANDSCAPE ZONE
INTERMEDIATE LANDSCAPE ZONE

(Conybeare-Morrison, 1990: 86)
FORMAL LANDSCAPE ZONE

(Conybeare-Morrison, 1990: 87)
COMMERCIAL LANDSCAPE ZONE

(Conybeare-Morison, 1990: 88)
SARAWAK RIVER

(Conybeare-Morrison, 1990: 89)

INTENSIVE LANDSCAPE ZONE

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Appendix 6.3

Tropical Riverine Plants found in Sarawak (Herbarium Forest Department)

- Areca
- Arenga brevipes
- Arenga hastata
- Arenga undulatifolia
- Avicennia alba
- Baccaurea bracteata
- Bauhinia kockiana var. Velutina
- Bauhinia kockiana var. Screeinervia
- Crvostachys renda
- Cyathea latebrosa
- Cyathea glabra
- Daemonorops angustifolia
- Derris trifoliata
- Eugeissona utilis
- Ficus racemorsa
- Ficus racemorsa var. Elongata
- Hova coronaria
- Iguanura curvata
- Iguanura melinauensis
- Iguanura palmuncula bec. Var magna
- Lagerstroemia speciosa
- Licuala grandis
- Licuala orbicularis
- Licuala mattenensis
- Licuala mattenensis var. Panisecta
- Licuala bidentata
- Licuala spinosa
- Licuala petiolulata
- Melastoma borneensis
- Melastoma polyanthum var. Linearifolium
- Millettia vasta
- Cinnamomum iners
- Oncosperma horridum
- Oncosperma tigillaria
- Pandanus dorystigma
- Pandanus fuginus martelli
- Pandanus odorntissimus
- Pinanga angustisecta
- Ptychosperma macarthuri
- Saraca declinta
- Saraca magnifica
APPENDIX 6.4 SOME TROPICAL RIVERINE PLANTS FOUND IN THEIR NATURAL SETTING
Dipterocarpus oblongifolius, Semongkok River.
Photograph taken by the Author.
Licula spinosa, Semongkok River
Photograph taken by the Author
Saraca declinta, Semongkok River.

Photograph taken by the Author
Aroid climber growing on the bark of *Shorea macrophylla*. Semongkok River. Photograph taken by the Author
Appendix 6.5  Examples of non indigenous tropical plants

1. Rounded or globular

| Andira surinamensis | Lagerstroemia speciosa |
| Bauhinia purpurea    | Mimusops elengi |
| Cassia fistula       | Peltophorum pterocarpum |
| Cerbera odollum      | Ixora coccinea |
| Erythrina glauca     | Ixora javanica |
| Filicium decipiens   | |

2. Oval

| Cinnamomum iners      | Codium variegatum |
| Eugenia grandis       | Hibiscus sinensis |
| Fagraea fragrans      | Ixora ‘Sunkist’ |

3. Conical or pyramidal

| Casuarina equisetifolia | |
| Casuarina sumatrana     | |
| Araucaria excelsa       | |
| Polyalthia longifolia   | |

4. Weeping

| Salix spp. | |

5. Upright

| Plumeria alba          | Mussaenda philippica |
| Pterocarpus indicus    | Nerium oleander |
| Ravenala madagascariensis | Caesalpinia pulcherrima |
| Calliandra surinamensis | |

6. Spreading

| Delonix regia         | Bougainvillea spectabilis |
| Enterolobium saman    | Terminalia catappa |

7. Irregular

| Pithecellobium dulce | |

8. Palm Shape

| Archontophoenix alexandrea | Licuala grandis |
| Cocos nucifera             | Rovstonia regia |
| Elaeis guineensis          | |

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APPENDIX 6.6: MULTI DIMENSIONAL DRAWINGS FOR THE MOSQUE LANDSCAPE ZONE INCLUDING THE BROOKE DOCKYARD
LANDSCAPE NARRATIVE ASSESSMENT

STRATEGY 1 (PLACE)

A single point in time (photography. A frozen moment). A path establishes a sequence and opening up chance encounters and opportunities for revealing/concealing mystery in the landscape.

STRATEGY 2 (MEANING)

Linear narrative. Linking a series of individual episodes into linear sequences. Every landscape leaves its mark: floods, urban renewal, building episodes, restoration and healing metaphors.

STRATEGY 3 (SYSTEM)

Continuous narrative. Represents the passage of time with a series of events, all of which take place within a unified context. For example one scene of the cultural landscape with many different episodes may show three episodes: spatial depth, temporal position, and forward/backward scenes of the landscape.

(Potteiger and Purinton, 1998:96)

WASTELAND (OIL/PETROL DRUMS) - SIGNIFICANT MARITIME ARTEFACT

EVIDENCE OF PIONEER PLANT SPECIES (COLONISATION)

GROVES OF PLANTED TREES ON THE CULTURAL LANDSCAPE

EDGES OF RETAINING WALL

BOAT MOORING REPAIR SITE

RIVER EDGE WALK

SECONDARY TROPICAL PLANTS

CONTINUOUS SOFT EDGE

REEDS

TRACES IN THE LANDSCAPE AND INVITE INTERPRETATION

(Directorate of National Mapping Malaysia 1972)
LANDSCAPE NARRATIVE ASSESSMENT

STRATEGY 1 (PLACE)

A single point in time (photography, a frozen moment). A path establishes a sequence and opening up chance encounters and opportunities for revealing/concealing mystery in the landscape.

STRATEGY 2 (MEANING)

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Continuous narrative. Represents the passage of time with a series of events, all of which take place within a unified context. For example, one scene of the cultural landscape with many different episodes may show three episodes: spatial depth, temporal position, and forward/backward scenes of the landscape.

(Potteiger and Purinton, 1998:96)

(Directorate of National Mapping Malaysia, 1972)
All photographs taken by the Author.
THE KUCHING WATERFRONT

MOSAIC 1 SIX TROPICAL LANDSCAPES AT A REGIONAL SCALE

MOSAIC 2 TANGIBLE CONCEPTS OF LANDSCAPE PLACE AND LANDSCAPE ASSESSMENT THEORY INCLUDING TYPES OF LANDSCAPE NARRATIVES AND A PATTERN OF MOSAICS

MOSAIC 3 TROPICAL RIVERINE ECOLOGY, RESTORATION, SYSTEMS IMAGERY, PHOTOGRAPHY AND CREATING SENSE OF PLACE

MOSAIC 4 CREATING A TROPICAL RIVER LANDSCAPE CHARACTER, viz. LANDFORM, EDGES, TRANSIENT, DENSITY GRADIENT OF VEGETATION AND THE VARIATION IN TEXTURE

MOSAIC 5 ABSTRACT LINKS AND CREATING A SOCIAL CONSTRUCT OF A RIVERINE TROPICAL LANDSCAPE. FOCUS ON THE MEANING DIMENSIONS OF LANDSCAPE NARRATIVES AND TECHNOLOGICAL LANDSCAPES.

MOSAIC 6 GEOMETRY, SPATIAL DEFINITION, UNITY AND DIVERSITY

LEGEND:

- Informal planting of tropical shrubs, small trees, shrubs.
- East West Planing (Direction) success overall river and bridge.
- North South Planing (Direction) filled with medium planting and tropical shrubs plant combination  and other evergreen shrub plant combination (e.g. Derris indica) and the Cynometra coriacea or live a variety of plants from similar landscape types on the basis of visual quality and color (e.g. Chorisia speciosa) and large shrubs such as Lysiloma latisili and Canthium indica.
- Diagonal planting (emphasis) represent the way the tropical river landscape in area along a transect in demonstrating the various tropical plants which classify the developed tropical landscape, as well as rivers and artificial cultural environments such as Kota Kinabalu river.
- The grid of squares represent:
  1) The basic grid of area where this area started in the mid area of Kuching.
  2) The main river of Sarawak.
  3) The river within regional landscape vegetation type of Sarawak.

- An south west current river stream is incorporated into the design concept to represent an artificial tropical river stream in Sarawak. This stream is shown with diagonal, rectangular and vertical transects as well as north southerly, and lateral. The minimal grid provides the geometry which will be used to help the whole riverine landscape design.

LANDSCAPE DESIGN CONCEPT FOR THE SARAWAK RIVER

Scale 1:2000
LAND FORMATION EDGE CHARACTER PLAN FOR LINEAR STREAM AT WESTERN END OF THE WATERFRONT AND SHORE PROTECTION TYPES

Foreground/background planting plan to simulate rolling hills and slopes of the surrounding topography.

- Stone pitching (Type A)
- Stone wall (Type B)
- Concrete wall (Type C)
- Concrete wall (Type D)
- Turfing (Type E)
- Rock and stone (Type F)
- Overhang (Type G)
- Steps (Type H)
- Streamside/hydrophyte planting (Type I)
- Timber piling (Type J)
- Steps (Type K)
- Wooden deck (Type L)

SHORE PROTECTION LEGEND:
- Natural image
- Artificial image

LANDSCAPE DESIGN CONCEPT FOR THE SARAWAK RIVER

Scale 1:2000

Palm and Large Canopy Planting Along Transects
LANDSCAPE DESIGN CONCEPT FOR THE SARAWAK RIVER
Scale 1:2000
All Mosaics Integrated into a Plan
Foreground/Background Planting Plan to simulate rolling hills and slopes of the surrounding topography.

Stone Pitching (Type A)

Stone Wall (Type B)

Concrete Wall (Type C)

Turfing (Type G)

Rock and Stone (Type H)

Concrete Wall (Type D)

Overhang (Type E)

Steps (Type F) (Takano Landscape Planning, 1982:86)

Wooden Deck (Type L)

Streamside Hydrophyte Planting (Type I)

Timber Piling (Type J)

Steps (Steps - Type K)

Legend:
- Turfing
- Rock and stone
- Concrete wall
- Overhang
- Steps
- Wooden deck

Land Formation Edge Character Plan for Linear Stream at Western End of the Waterfront and Shore Protection Types

Shore Protection Legends:
- Turfing
- Rock and stone
- Concrete wall
- Overhang
- Steps
- Wooden deck

(Takano Landscape Planning, 1982:86)
Informal planting of Tropical Riverine small trees and shrubs.

Diagonal Planting Transect:

East-West Planting (Horizontal) Outlines overall Canopy cover and height transect.

North-South Planting (Vertically) Planted Transect

Brooke Dockyard (Model Boat Area)

Steps Leading down to The Sarawak River

Overhead Bridge (Tree Canopy Transect)

Viewing Structure

CROSS SECTION ALONG OVERHEAD BRIDGE AND WALKWAY

Scale: 1:2000
Cyrtostachys lakka

ECOLOGICAL DESIGN PRINCIPLE 1: SOLUTIONS GROW FROM PLACE (MOSAIC 4): CONNECTORS

ECOLOGICAL DESIGN PRINCIPLE 3: DESIGN WITH NATURE (MOSAIC 3): INFORMAL TROPICAL RIVERINE PARK

A STAGED TROPICAL RIVERINE PLAN FOR THE MOSQUE ZONE

KUCHING CITY 2000
URBAN TROPICAL CONCEPTS FOR THE SARAWAK RIVER FORESHORE

(Takano Landscape Planning, 1982:86)
An east-west overhead bridge transect has been created to link the Sarawak river from the eastern end past the Mosque area to the west. This transect has been strategically aligned so as to maximise important views and to also heighten the experience of a tropical riverine landscape at the tree canopy level. The bridge helps to unify the western end of the waterfront as well as create a visual riverine tropical planting experience. Below the bridge an area has been set-aside for model boating. This area retains the shape of the Brooke Dockyard site. The area is formed as the end to an historically engineered Dockyard. The Dockyard or part of the proposed river-stream to the east of the Dockyard could be formed by lining an arm to the lake with shallow concrete, with other parts of the stream being lined with rocks to form a shallow 450mm pool, an ideal place for sailing boats. The stream width varies in width but is long and linear with tree shaded pathways around the stream and stepping stones to define the end of shallow stream and model boat area.

Stormwater and circulated water from the town square fountains will be introduced at the northern end of stream and close to the edge of the Sarawak River in the vicinity of the boating lake to ensure constant circulation of water through this section of the stream which meets both with the Sarawak River and Brooke Dockyard area.

Tree planting on either side of the overhead bridge will be along formal lines, but merging with informal planting (following contours for areas leading towards the Mosque). Trees will be selected to provide shade and colour and particular attention given to selection of the colour of tree trunks and its alignment.
### 7.0 KEY TERMS DEFINED

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>GODOWN</td>
<td>Means industrial buildings</td>
</tr>
<tr>
<td>HARDSCAPE</td>
<td>Refers to man-made artefact and/or construction works</td>
</tr>
<tr>
<td>HERMENEUTICS</td>
<td>The general theory and practice of interpretation</td>
</tr>
<tr>
<td>IMAGE</td>
<td>A mental conception held in common by members of a group and is symbolic of a basic feeling or orientation in regard to the way visual clues are translated to form a construct of a place. It can also be expressed as an idea, concept or visual interpretation of a place.</td>
</tr>
<tr>
<td>JALAN</td>
<td>Street</td>
</tr>
<tr>
<td>LANDSCAPE TYPE</td>
<td>A generic term referring to a type of landscape which can theoretically occur anywhere in the country.</td>
</tr>
<tr>
<td>LANDSCAPE CHARACTER ASSESSMENT</td>
<td>The process of assessing strong regional and local variations in character, so that we can understand landscape character, and define design solutions or methods for determining how landscapes should evolve in the future. In so doing the process focuses on isolating the distinctive character or sense of place of regions, local areas (natural and denatured areas including cities) with the intent of providing guidance as to how we can reinforce and build on that character.</td>
</tr>
<tr>
<td>LEBUH</td>
<td>Street</td>
</tr>
<tr>
<td>LANDSCAPE CHARACTER</td>
<td>This term is geographically specific and may also suggest that the area has distinct and specific identity. Identity is defined as the oneness or individualism of a person, place or landscape. It refers to distinguishing characteristics of a place.</td>
</tr>
<tr>
<td>MNEMONIC</td>
<td>Helping or intending to help memory.</td>
</tr>
<tr>
<td>PADANG</td>
<td>Means open space</td>
</tr>
<tr>
<td>PADANG PASIR</td>
<td>Means the market area opposite the State Mosque</td>
</tr>
<tr>
<td>SOFTSCAPE</td>
<td>Plants are used as a design material</td>
</tr>
<tr>
<td>SUNGAI</td>
<td>River</td>
</tr>
<tr>
<td>SEMIOTICS</td>
<td>The study of signs</td>
</tr>
</tbody>
</table>
Metaphor

"Metaphor derives from the greek word metaphor, to "carry over", to convey. To use a metaphor, the aspects of one object are carried over, or transferred, to another object so that it is spoken of as if it were the first".

Metonymy

"A metonymy constructs meaning by association .... By cause and effect. Through repeated use or memory, one thing can become associated with another so that it can be used as a sign of the other. In this way place names become metonymies of events (Watergate, Vietnam) or institutions (wall street, the white house).

Contiguity - being next to, on top of, before, or after - is the most basic yet strongest, form of metonymic relationship. It forms the axis of combination and placement in narrative".

Synecdoche

"Synecdoche is the use of a part of something to represent the whole or of the whole to stand for a part". Indicator species, for instance, point to the health of a whole ecosystem .... Synecdoche is a particularly effective device in landscape narrative because it can conjure a whole complex story just by using a piece or fragment from the story.... Also synecdoche is a way of representing landscape systems, often too vast and complex to grasp. Erratic rocks speak of the power and extent of glaciers, plantings of native species recall whole ecosystems, while arboretums and zoos collect single species as representative of other places".

Irony

"Something is ironic when it presents an incongruity or ambiguity between expectations and reality, nature and artifice, revealing and concealing and so on".

(Potteiger and Purinton, 1998:36)
jump cut
Outside the city a farm may jump-cut to suburban development or the streets of Manhattan north of Sixtieth Street may jump-cut to Central Park.

flashback
In the book On This Site by Joel Steinfeld, photographs of the scenes of past crimes are placed next to the description of the crime. The viewer imaginatively flashes back to the crime that is described in the accompanying text. This is a common experience in historical landscapes, where the visitor imagines what happened here.

flash-forward
As the visitor circulates around a picturesque garden, glimpses of the future and final destination are given. Or along a road way, signs flash-forward the places that are ahead.

flash-between
The insertion of billboard advertising for sneakers, gum or blue jeans along a scenic drive is a flash-between, or something that happens between two events that does not belong there. Agricultural field-sneakers-hedgerow.

fade
Many gardens fade, or create gradual transitions, from the urban environment to pastoral or from formal to informal.

blackout
The tunnel acts as a blackout between one side of the river or mountain and the other.

freeze-frame
Historic landscapes such as Colonial Williamsburg are frequently interpreted according to one historic period. These places seem frozen in time.

slow motion
The careful selection of ever-blooming plants and the development of new hybrids that bloom later or earlier than usual may create the sense of a spring in slow motion.

fast motion
Most interpretations of ecological successions are presented in fast motion, making the otherwise slow and unperceivable processes of nature visible. At the Crosby Arboretum the juxtaposition of ecological stages of succession enables the visitor to walk by in a few minutes what would take nature hundreds of years to transform.

in medias res
Landing by plane into a foreign country or a distant city is a way of entering in medias res, or in the middle of the activities of a distinct space.

(Potteiger and Purinton, 1998:113)
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BIBLIOGRAPHY


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9.0 SARAWAK CHECKLIST OF BOTANICAL PLANTS AND THEIR VERNACULAR (CULTURAL/COMMON NAMES
<table>
<thead>
<tr>
<th>Scientific names</th>
<th>Vernacular/ Common names</th>
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<tbody>
<tr>
<td>Alocasia macrorrhiza</td>
<td>Keladi</td>
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<td>Andira surinamensis</td>
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<td>Araucaria excelsa</td>
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<td>Archontophoenix alexandrea</td>
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<tr>
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<td>Arenga hastata</td>
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<td>Avicennia alba</td>
<td>Api-api hitam</td>
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<td>Avicennia spp.</td>
<td>Api-api</td>
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<td>Baccaurea bracteata</td>
<td>Tampoi paya/puak burong</td>
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<tr>
<td>Barringtonia asiatica</td>
<td>Putat Laut</td>
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<tr>
<td>Bougainvillea spectabilis</td>
<td>Bunga keras/Bougainvillea sp.</td>
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<tr>
<td>Bauhinia kockiana var velutina</td>
<td>Akar tekop bedaup</td>
</tr>
<tr>
<td>Bauhinia kockiana var scirpentinervia</td>
<td>Akar tekop bedaup</td>
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<td>Bauhinia kockinia</td>
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<td>Bruguiera spp.</td>
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<td>Bucephalandra motleyana</td>
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<td>Bintangor laut</td>
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<td>Calamus sp.</td>
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<tr>
<td>Caprinus sp.</td>
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<td>Caryota mitis</td>
<td>Fish tail palm</td>
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<td>Casuarina equisetifolia</td>
<td>Rhu laut</td>
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<td>Casuarina sumatrana</td>
<td>Rhu bukit</td>
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<tr>
<td>Cassia fistula</td>
<td>Golden shower</td>
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<td>Cerbera odollum</td>
<td>Pong pong</td>
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<td>Cinnamomum iners</td>
<td>Medang tija</td>
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<td>Cocos nucifera</td>
<td>Coconut/Kelapa</td>
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<td>Sepetir paya</td>
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<td>Congea tomentosa</td>
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<td>Dillenia suffruticosa</td>
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<td>Elaeis guinensis</td>
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<table>
<thead>
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<th>Scientific Name</th>
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<tr>
<td>Pinangia tenella var. tenella</td>
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<tr>
<td>Tristaniopsis whiteana</td>
<td>Selunsur/melaban</td>
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<td>Zingiber porphyrophaera</td>
<td>Ginger</td>
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